



# PaperCutNG<sup>®</sup> Manual

Release: 16.0.2

# Notice

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# 1 Introduction

## 1.1. About This Guide



The PaperCut MF Manual covers the setup, management and configuration of PaperCut MF.

For information regarding how to configure and install PaperCut MF, see the Quick Start Guide in [Tour](#), and the accompanying sections, such as, [Configuring Secondary Print Servers and Locally Attached Printers](#). Prior to installing the application, take a few moments to read key sections of this manual. In addition, people new to print control might also find the accompanying implementation guide available from the PaperCut Software website useful in managing the deployment process.

The latest version of this manual in HTML and a printable PDF format are available from the PaperCut Software International Pty. Ltd. website at <https://www.papercut.com>.

### 1.1.1. Expectations & Prerequisites

PaperCut MF is a network based server application. Experience with basic network concepts, such as, server administration and network connectivity is expected. Prior to installing or evaluating PaperCut MF you should be familiar with:

- The concept of sharing printers and print servers
- Understanding of client-server relationships
- Understanding of basic security concepts such as permissions, groups and users.

### 1.1.2. Terminology used in this document

To make reading this manual easier, the names of all of the screens, tabs and actions from PaperCut MF are marked up in a different font. The **User Details screen** for instance.

A sub-screen or tab is indicated with an arrow. **User Details > Adjustments** means: select *Adjustments & Charges* tab from the *User Details* screen.

User Interface Buttons are indicated by: Click **OK** to continue.

System output and keyboard input is indicated with a `different` font as well.

Field labels are indicated by **Username**.



**Note:** Note are marked like this.

 **Tip:** Tips provide useful advice to make your life easier.

 **Example:** Examples of how the function could be used.

 **Important:** Important notes are marked like this.

 **Caution:** Indicate situations where you have to be careful what you are doing.

 **Warning:** Where extreme care has to be taken.

## 1.2. What is PaperCut MF?



PaperCut MF is a comprehensive print management system designed to seamlessly monitor and control your resources with easy to use administrative and user tools that can be securely accessed from anywhere on the network through a web browser.

Print management requirements vary from organization to organization, and often change dramatically within an organization over time. PaperCut MF is designed for flexibility and scalability and can be configured to meet your print management needs now and in the future. It is used in a wide variety of environments ranging from universities with large printer fleets supporting over 100,000 users to smaller organizations that track printing for a fewer than 50 users on 3 or 4 printers. You can implement a basic system within a few minutes, or if you need more than simple monitoring and reporting, you can configure powerful features that include differential pricing, blocking filters and programmatic control via APIs and scripting. No matter where you start, you can easily adjust parameters to implement changes as gradually or quickly as you want.

Possible implementations can include:

- Silent activity monitoring
- Visible activity monitoring and expense tracking by work area, projects and departments
- Quota/allowance enforcement
- Charge per-print system
- Combinations of all of the above to accommodate various user / group profiles

In addition PaperCut MF provides System Administrators with a kit of tools to manage printers including:

- Detailed logging and reporting
- Notifications for printer errors and low toner
- Job blocking filters and re-direction

### 1.2.1. Benefits

✓ Some of the key benefits of PaperCut MF are:

- Transfers accountability to users or departments by individually tracking activity.
- Creates environmental awareness by drawing users' attention to the impact of their specific usage.
- Reduces overall printing cost through job filtering, enforcing flexible quotas, or direct cost recovery.
- Discourages overuse of IT resources by establishing a managed print environment.
- Improves efficiency by allowing administrators to create rules that can steer printing to designated printers for load balancing, to implement Find-Me printing, or to redirect print jobs based on criteria defined using advanced scripting tools.
- Improves network reliability by implementing rules to prevent printer queue jams, queue hogging, and inappropriate printing types.
- Protect intellectual property and conform to audit objectives by enabling features such as print auditing and digital signatures.

### 1.2.2. Key Features

✓ Some of the key features of PaperCut MF are:

- Track all printing activity by user, client account, printer and document metadata.
- Enforce per user quotas, or group account budgets
- Differential print cost/charging allowing costs to be assigned on a per printer basis with advanced options to charge different amounts based on document type (e.g. color, grayscale or duplex), page size, user or group.
- Hardware neutral solution supports all major printer types and operating systems. No hardware vendor lock-in!
- Both cross-platform and multi-platform support. Run a mix of Windows and/or Linux print servers and support clients ranging from Windows, Mac, Linux, Unix and Novell OES.
- User Web Tools allow end-users to track usage, transfer funds, request refunds and upload documents from unauthenticated (wireless) laptops.
- Provides end-users with advanced options to allocate print jobs to shared accounts, cost

centers, faculties or departments.

- Single sign-on user authentication with native Active Directory integration or synchronization with LDAP user accounts. (no separate passwords to manage!)
- Flexible hold/release queue support with Release Station software allowing administrators to implement management approved or secure user release printing environments.
- Service Oriented Architecture utilizing the latest software design methods including, test driven development, XML Web Services and layered architecture. This ensures scalability and stability by design.
- Advanced reporting and charts available in standard formats including PDF, Excel, and HTML. All reports accessible from anywhere on the network via a standard web browser.
- Ability to run on top of leading 3rd party Relational Database Management Systems (RDBMS) including Microsoft SQL Server, Oracle, MySQL and PostgreSQL Database.
- Enterprise level security and encryption based on SSL.
- Open architecture with a powerful scripting language, source code access and API documentation.

### 1.2.3. System Requirements

PaperCut MF supports the following *server* platforms:

- Microsoft Windows 10 (Pro/Enterprise)
- Microsoft Windows Server 2012 (any edition)
- Microsoft Windows Server 2008 (any edition)
- Microsoft Windows 8 (Pro/Enterprise editions)
- Microsoft Windows 7 (any edition except Home editions)
- Microsoft Windows Server 2003 (any edition)
- Microsoft Windows Vista (any edition except Home editions)
- Mac OS X 10.8 - 10.10 (i.e. Mountain Lion, Mavericks, Yosemite)
- Novell Open Enterprise Server 11 (OES11)
- Most modern Linux operating systems including:
  - Red Hat Enterprise Linux (6.0+)
  - Novell SuSE Linux (11.0+)
  - Ubuntu (10.04+)

- Debian (6.0+)
- Others supporting GNU glibc 2.11 or higher.

Print queues can be hosted on:

- Any Windows version listed above
- CUPS based print queues on Mac OS X 10.8 and above and Linux
- Novell OES

Servers and clients must use user ID/username based authentication (e.g. Active Directory, Windows NT, LDAP, or local system accounts).

PaperCut supports a minimum of 768MB of memory, with 1GB or higher recommended. Sites with more than 500 users should consider a server class system with more than 2GB of RAM and 500MB of free disk space. When using Print Archiving at least 100GB of additional free disk space is recommended.

Site Servers have similar operating system and memory requirements to the Application Server. However, Site Servers do not need to run the same operating system or database as the Application Server. For more information, see [Resiliency with Site Servers](#).

PaperCut MF supports approximately 90% of printers on the market. Where possible use printers that support one of the two major printer language standards - Postscript or PCL.

On workstation clients:

- All supported Microsoft Windows platforms: Windows 10, 8, 7, Vista, XP
- Mac OS X 10.8 or higher recommended
- Most modern Linux and Unix Operating Systems (Java 8.0+ required for optional client tool)

## 1.3. How does PaperCut MF work?

Before explaining how PaperCut MF works at a technical and end-user level, read through the following key concepts.

### 1.3.1. Key Concepts

#### Print Server

A print server is a system responsible for hosting print queues and sharing printer resources to desktop clients/workstations. Users on the workstations submit print jobs to a print server rather than directly to the printer itself. A print server can be a dedicated server but on many networks this server can also perform other tasks such as file serving.

## Print Queue

A print queue is first-in-first-out queue listing all jobs pending on a given printer.

## User ID/Username

In a multi-user environment, users log on to a network or computer using a username and password. These are often managed by services such as Active Directory or LDAP. The username is known as the user's identity. PaperCut MF uses this identity to track printing.

## Shared account

A shared account is a PaperCut MF term used to represent an account (pool of funds or allocation group) accessible to multiple users. Accounts usually represent "work areas" such as Departments, Faculties, Projects, Clients, Client/Matter, or Cost Centers.

## Client/Server Model

Client software is a small program that runs on each workstation and communicates with a server. The printing process on most networks works on a client/server model with clients (workstations) submitting jobs to a server. PaperCut MF also uses the client/server model in the optional client software to communicate with end-users.

## Application Server

An Application Server is a server program responsible for centrally processing business logic and providing services to end-users. PaperCut MF uses the Application Server model to provide a business logic unit for calculating user costs and providing a web browser interface to end-users.

## Information Provider

A provider is a software component or program responsible for providing information to an Application Server. PaperCut MF uses providers to submit print queue/job information to its Application Server. This information provider is called the *Print Provider*. Other important providers included with PaperCut MF include user directory and authentication providers.

## Web Application Interface

A web application is a software program that interacts with end-users via a web browser. Examples range from Google, Microsoft SharePoint, Hotmail, Internet banking and router management consoles. PaperCut MF provides a web-based interface for system administration and management. Web applications offer administration flexibility by allowing access from any location on the network and avoid the need for installation of separate software.

## Scripting Language

A scripting language is a programming language that allows control of one or more software applications. In PaperCut MF, you can use scripting to perform various administrative functions such as modifying parameters for users, shared accounts or printers. It can also be used for programmatic control during the print process to provide functionality such as print job re-direction, user notifications / warnings and confirmation for large or expensive print jobs.

## Web Print Server

Web print server is the PaperCut terminology for a server that allows laptop (wireless) users to upload Microsoft Office and PDF files to be printed on network printers from personal computers that are not authenticated to the network and do not have network printer drivers.

### 1.3.2. Understanding the print process flow

To help explain what PaperCut MF is and how it works we'll introduce the system by example. We'll start with a simple high school example:

*The student's perspective (transparent quota control):*

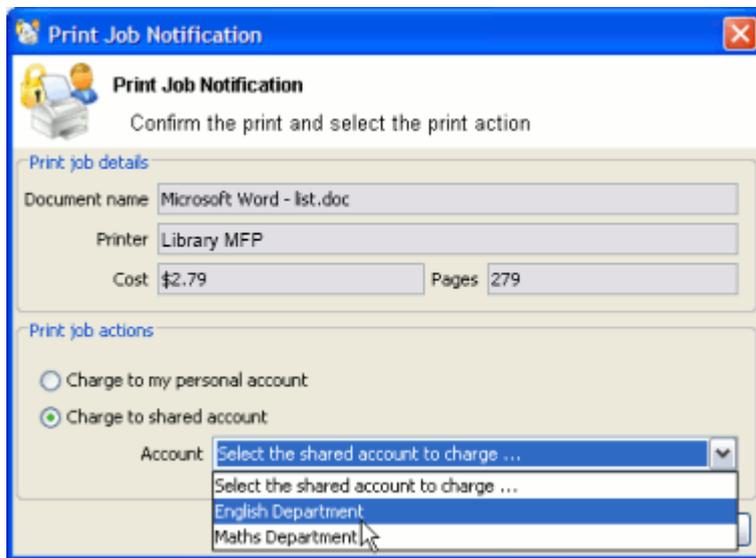
1. Chris is a student at a local high school. He has logged onto the network using his username, `chris.j.smith`, and is surfing the Internet. He selects Print from his web browser to print out a web page for his school assignment.
2. The network administrator has allocated Chris a printing credit budget of \$20.00 a month. He can see his current account balance of \$10.00 in the PaperCut Client Tool window.



3. A confirmation screen listing the number of pages and the cost of the print job is displayed on the Workstation.
4. Chris confirms the print job.
5. 5 pages come out of the printer.
6. The network administrator has set a cost-per-page inside PaperCut on the printer at \$0.10. Chris' 5 page document costs \$0.50.
7. Chris' account balance is now at \$9.50. He can continue to print until he submits a print job that has a cost that is higher than the balance in his account.

*The teacher's perspective (allocation to accounts):*

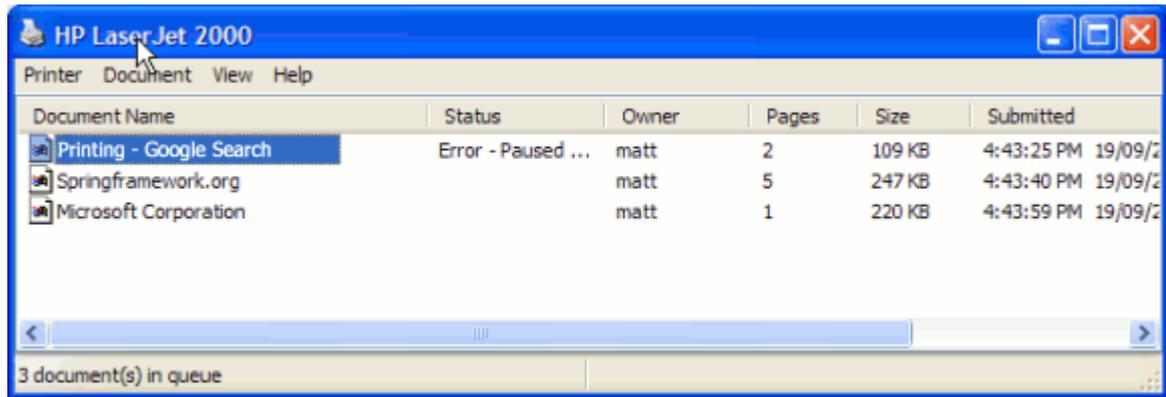
1. Matt is an English and Mathematics teacher at the same local high school.
2. Matt needs to print out a 279 page document for his next class.
3. The network administrator has configured PaperCut to charge users in the faculty group \$.01 per page, and has granted Matt access to charge to his personal account or to the English or math department's shared accounts.
4. Matt clicks **Print** in the application.
5. The PaperCut client tool displays a popup and presents Matt with information about the print jobs and requests an account selection. In this case accounts represent Departments but could also represent projects or other work areas.
6. Matt selects the English department's shared account from the list.



7. The print job is printed and the English department account is charged \$2.79 for the print job.

*The technical perspective (behind the scenes):*

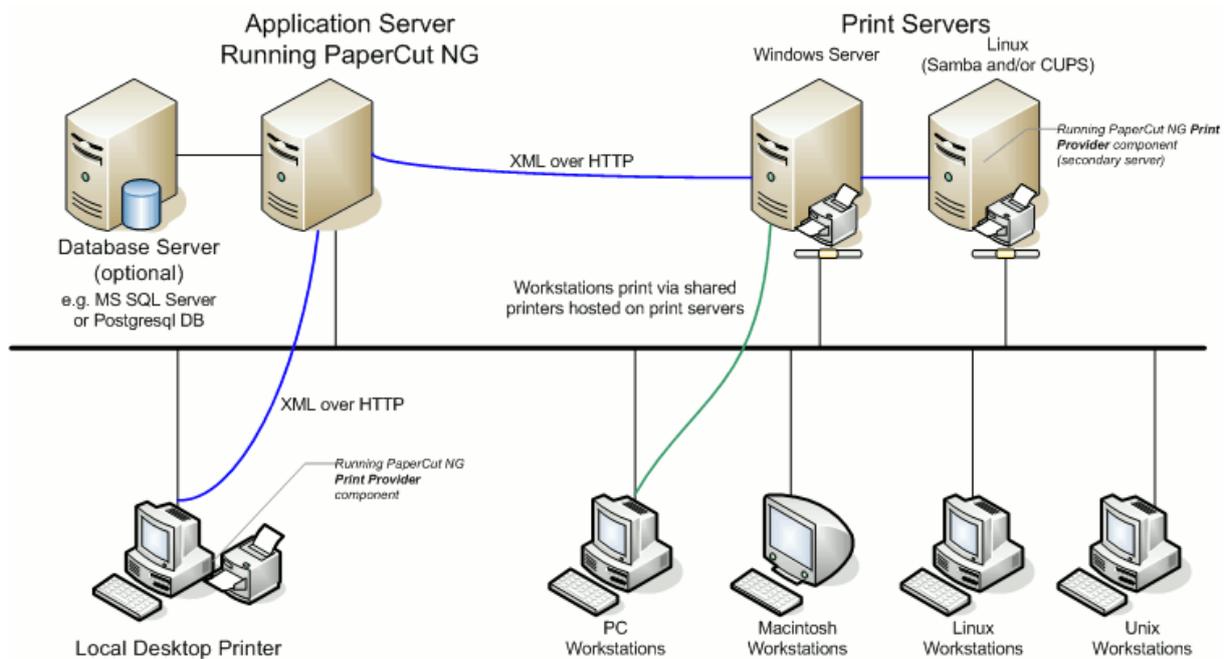
1. When the teacher, Matt, prints from his application, his workstation transfers the print job to the server and places it in the print queue.



2. The PaperCut Print Provider intercepts the print job in the queue prior to printing, pauses it, and analyzes the information determining:
  - a. Who printed the document
  - b. The number of pages in the document
  - c. Other information such as duplex, grayscale mode, paper size, etc.
3. The *Print Provider* submits the job's information to the *Application Server* to process the business logic.
4. The *Application Server* determines that Matt needs to select the account to charge. It notifies the *Client Software* on Matt's desktop.
5. The *Client Software* displays the Popup requesting for the user to select an account.
6. After Matt selects the account, the *Application Server* is notified of Matt selection. The business logic validates that Matt is authorized to charge to the selected account.
7. The *Application Server* charges the appropriate account, logs the job and instructs the *Print Provider* to resume or unpause the print job in the print queue allowing it to proceed to the printer.

### 1.3.3. Architecture Overview

PaperCut MF was developed using the latest software development strategies, a strong influence being Service Oriented Architecture (SOA). The *Print Provider*, *Application Server* and *Client Software* all communicate with one another using XML-based web services over HTTP.



**Figure 1: Architecture - an advanced configuration**

A more detailed explanation of the architecture and support for multiple servers, Web Print servers, server clustering, and payment gateways is provided in subsequent sections of this User Guide.

## 1.4. The Top-Ten Hidden Features!

# PaperCut<sup>NG</sup>

Much of PaperCut MF flexibility and usefulness comes not from the features you can see, but from the advanced hidden features. PaperCut MF is packed full of handy tools, utilities and options and you will read about these throughout this guide. To provide a quick overview now, the most popular hidden features are:

### 1.4.1. One: Zero-install Client Deployment

PaperCut MF is implemented using 100% server-side logic and no client software is required. A simple lightweight client tool is, however, provided so end-users have access to advanced features such as shared accounts and the option of viewing their account balance in a popup window.

Deploying client software can be a time consuming and fiddly process. To streamline the process PaperCut MF allows its client to be run directly off a network share - you do not need to install locally, or mess around with deployment tools! Just set the executable as a startup program and it runs and auto-updates itself thereafter.

See [User Client](#) for more information.

## 1.4.2. Two: Remote Administration

PaperCut MF is a 100% web based application. Full system administration can be performed from anywhere on the network via a standard web browser - no special admin software is required! To access the administration section, point a browser at the server on port 9191:

```
http://[server_name]:9191/admin
```

Encrypted SSL/HTTPS access is also available on port 9192:

```
https://[server_name]:9192/admin
```

Access is granted to the built-in `admin`, or to any user with administrator level access.

## 1.4.3. Three: Mobile Printing & BYOD

Mobile Printing & BYOD enables printing from user-owned devices without the overhead of installing printer drivers and managing workstation authentication to the server.

For example, in Web Print Microsoft Office or Adobe PDF files are uploaded using the same User Web Tools available on network computers. Mobile Printing & BYOD is fully integrated into PaperCut's standard print charging/accounting/quota process. It does not matter if you're a staff user allocating to a faculty or department account, or a student charging to your free print quota, the user account allocation experience the same as that seen when printing from a networked desktop system.

PaperCut's Mobile Printing & BYOD has been widely deployed across education campuses and is an ideal solution for offering print services via student owned laptops, netbooks or hand held devices.

See for more information.

## 1.4.4. Four: Shared accounts

Many organizations want to track their printing on more than a per-user level. With shared accounts, users can allocate jobs to cost areas such as Faculties, Departments, Projects, Clients, Cost Centers, or Pools. Shared accounts are selected via a customizable popup window. Two popup window types are available:

- *Standard* - A simple account selection window design ideal for most users.
- *Advanced* - An advanced account selection window designed for the power user including features such as search, preference list, recent selections, comment entry and invoicing options. This is ideal for businesses including Engineering, Law, Accounting and Architecture Firms.

Access to accounts is controlled via integrated network group membership or optionally PIN's.

See [Shared accounts](#) for more information.

## 1.4.5. Five: Secondary servers and Site Servers

PaperCut MF is an enterprise level application designed to be managed and controlled from a central location. Multi-server environments are common in large organizations and PaperCut MF handles them with ease. All servers are configured to report back to the central *Application Server*. This ensures that all management, logging and control is centralized. Secondary servers and workstations with local printers run a light weight monitoring component that communicates to the central server via XML Web Services calls.

You can compliment secondary servers with a Site Server, which ensures continuity of print services even if the Application Server is unavailable due to a network outage. For more information, see [Resiliency with Site Servers](#).

Servers and workstations can run the Site Server and secondary server software on any supported operating system no matter what operating system is used on the Application Server because PaperCut MF supports mixed or heterogeneous networks as well!

See [Multi-Server and Multi-Site Deployments](#) for more information.

## 1.4.6. Six: Scripting

Scripting can be applied on a per printer basis to provide programatic control during the print process. Possible applications include:

- Route the job to the cheapest compatible printer and notify the user of the change (least-cost routing)
- Prompt users to print large color jobs on a compatible low cost grayscale printer
- Charge printing during class time to the department
- Inform user when printer is in error and suggest a compatible alternative

See [Advanced Scripting \(Print Scripting\)](#) for more information.

## 1.4.7. Seven: Customizable Web Interface

The end-user interface can be quickly customized to make it look like an official part of your organization's infrastructure. With some simple HTML, you can make the PaperCut MF end-user interface look just like your existing web site or intranet site.

See [Customizing the User web pages](#) for more information.

## 1.4.8. Eight: XML Web Services and Command-line Control

Many things these days are Web Services enabled. Not to be outdone, PaperCut MF exposes dozens of API's via secured XML Web Services. This provides advanced administrators and developers with the ability to programmatically remotely control, integrate and manage the application. The possibilities are endless... some of our users now have their library fines hooked into the PaperCut MF system!

In addition to the Web Services API's, System Administrators can hook into the inner workings of PaperCut MF using server commands and scripting.

With server commands you can use batch files or scripts to automate system functions such as:

- Schedule "online" backups to coordinate with your existing backup processes. You do not need to take the system down to take a data snapshot.
- Create users in PaperCut MF automatically and as part of your existing user creation scripts.
- Automatically import/sync list of accounts from a file, 3rd party system or existing directory structure. (Great for Engineering and Architecture firms)

See [The XML Web Services API](#) and [Server Commands \(server-command\)](#) for more information.

## 1.4.9. Nine: 3rd Party Database Support

PaperCut MF ships with its own preconfigured and self-maintaining database. The system, however, is database independent and can be run on top of a number of leading database systems. Maybe you have an existing Microsoft SQL Cluster and want to take advantages of this infrastructure. No problem! PaperCut MF can be quickly configured to hook into your preferred database.

See [Deployment on an External Database \(RDBMS\)](#) for more information.

## 1.4.10. Ten: The Development Team

Software is only as good as the development process. PaperCut MF is developed in an open and transparent fashion by a small development team. Suggestions and feedback are encouraged and source code access is provided to our customers. The team works closely with key system users to architect new features. A member of the development team is online for 8 hours a day and is always happy to chat. Come visit us on our Live Web Chat page!

See the PaperCut Software website <https://www.papercut.com> for more information.

## 1.5. Example User Information Sheets

Usually administrators are responsible for educating users about policy or system changes when PaperCut MF is deployed on their network. Providing the right information and guidelines for users is important for the success of any new system.

This section contains examples of information sheets that you can distribute to users. The purpose of these information sheets is to assist the administrator in providing important information about the new system and how to use it. These examples can act as templates or starting points for your own information sheets.

You can enhance the information sheets to include information such as:

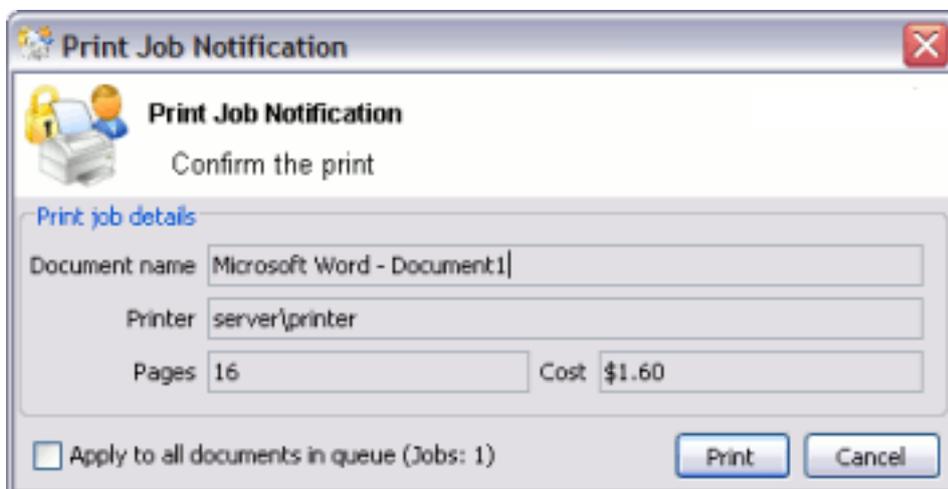
- Details of your organization's printing policy, such as, the standard cost per page and whether or not more printing balance can be added after the user has run out.
- Location of the printers.
- How to report problems or receive assistance, such as refunding a failed print job.
- How to contact the help desk.
- How to provide feedback about the new system.

### 1.5.1. Example 1: Printing with the popup confirmation window

New software to manage printing costs has been installed on the network. To allow effective printing, make sure you understand the following points:

#### 1.5.1.1. Popup Confirmation Dialog

After sending a print job, a popup dialog is displayed asking you to confirm the details. Click **Print** to confirm the job and agree to the cost. Otherwise, click **Cancel** if you no longer want to print the job.



*Note:* Large documents might take a while to display the number of pages and cost.

### 1.5.1.2. The Printing Balance Window

After logging on to a workstation a window showing your printing balance is displayed.



If the balance window is not visible (or if you have closed or minimized it) click the icon in your system tray to show it again.



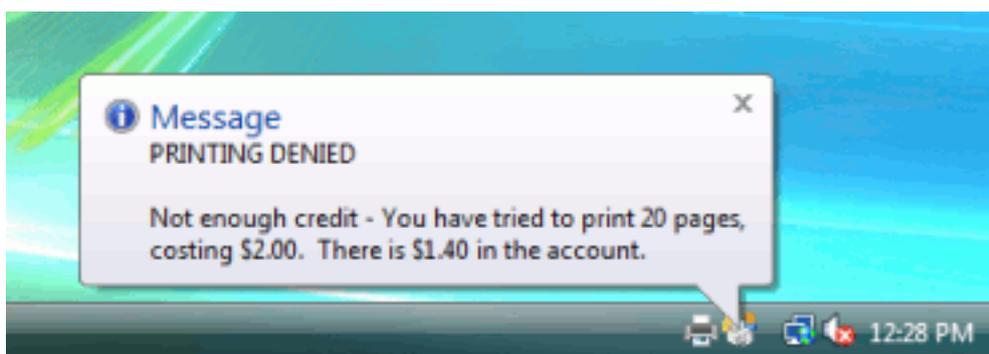
When you confirm a print job by clicking **Print** in the popup dialog the cost is deducted from your printing balance.

### 1.5.1.3. Resolving Problems

If the popup window is not displayed or the icon is missing from your system tray, the print control system is not active and printing is denied. Try restarting your system, or ask for assistance if problems continue.

### 1.5.1.4. Printing Denied Message

If you do not have enough printing balance for a job, a **Printing Denied** message is displayed, and your document will not be printed.



## 1.5.2. Example 2: Printing with shared accounts (for staff)

New software to manage printing costs has been installed on the network. The system allows the college to track printing expenses according to the individual, faculty or department. To allow effective printing, make sure you understand the following points:

### 1.5.2.1. Shared Account Selection Popup window

After sending a print job, a popup dialog is displayed asking you to confirm the details. The print job can be charged to your personal account (using your personal printing balance), or to a shared account (a faculty, using the faculty budget). After choosing an account to charge, click **Print** to confirm the job and agree to the cost. Otherwise, click **Cancel** if you no longer want to print the job.

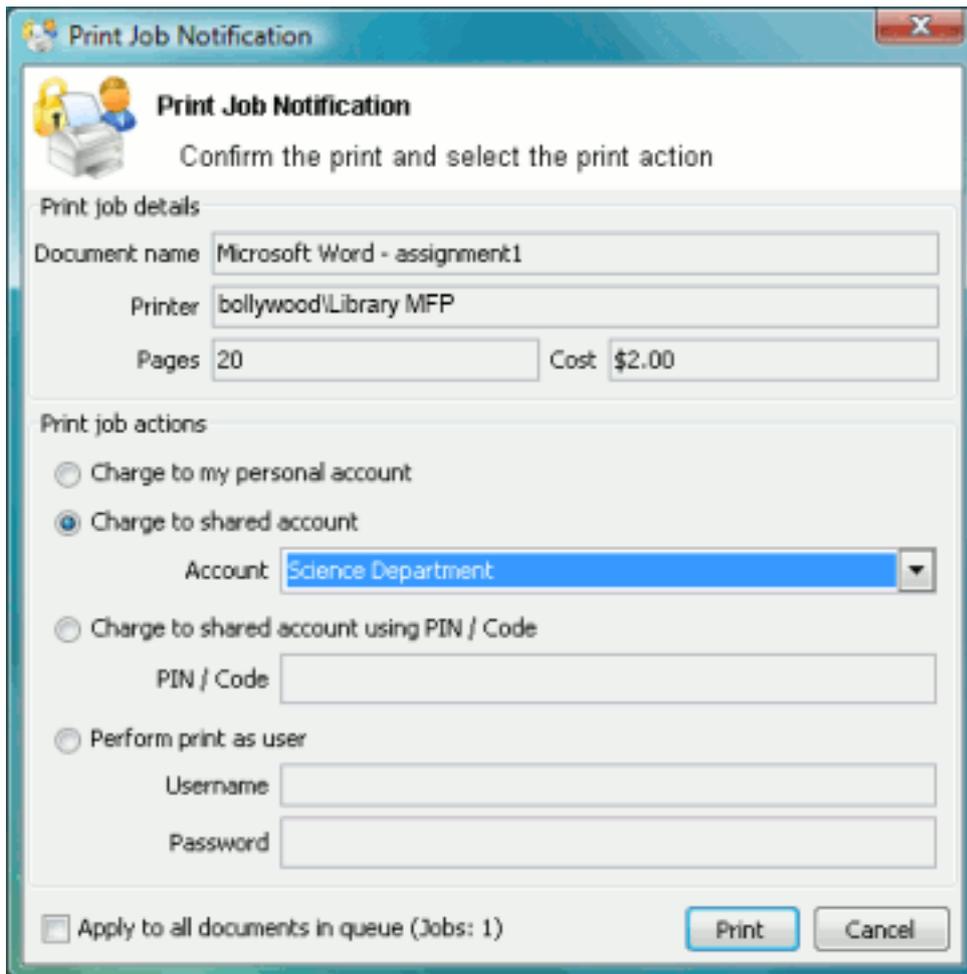
Select your personal account when printing non-faculty related documents. For example:

- Printing your personal bank or phone statement.
- Occasional personal use of a photo printer.

Select a shared account for faculty printing. For example:

- Student handouts.
- Student reports.
- Course syllabus.
- Class lists.

Selecting the right faculty account from the drop-down list is important. Different staff members need access to different faculty accounts. If an account that you require is missing from the list, please contact the System Administrator. Note that the use of faculty accounts is monitored and faculty heads are provided with printing reports.



*Note:* Large documents might take a while to display the number of pages and cost.

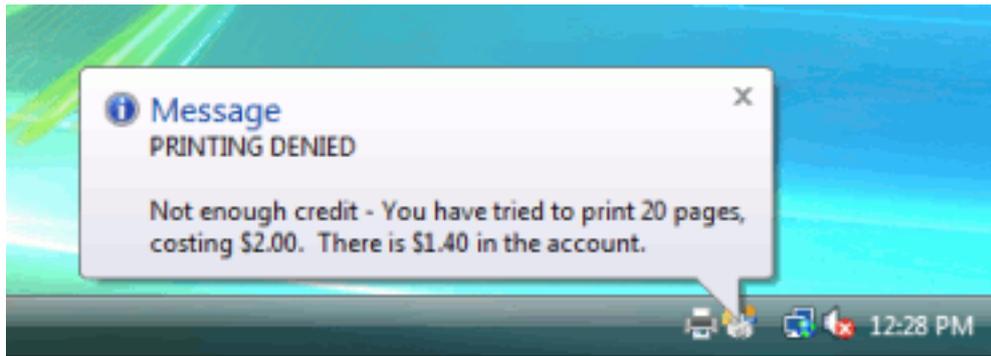
### 1.5.2.2. Resolving Problems

If the popup window is not displayed or the icon is missing from your system tray, the print control system is not active and printing is denied. Try restarting your system, or contact the network administrator if problems continue.



### 1.5.2.3. Printing Denied Message

If you do not have enough printing balance for a job, a **Printing Denied** message is displayed, and your document will not be printed.



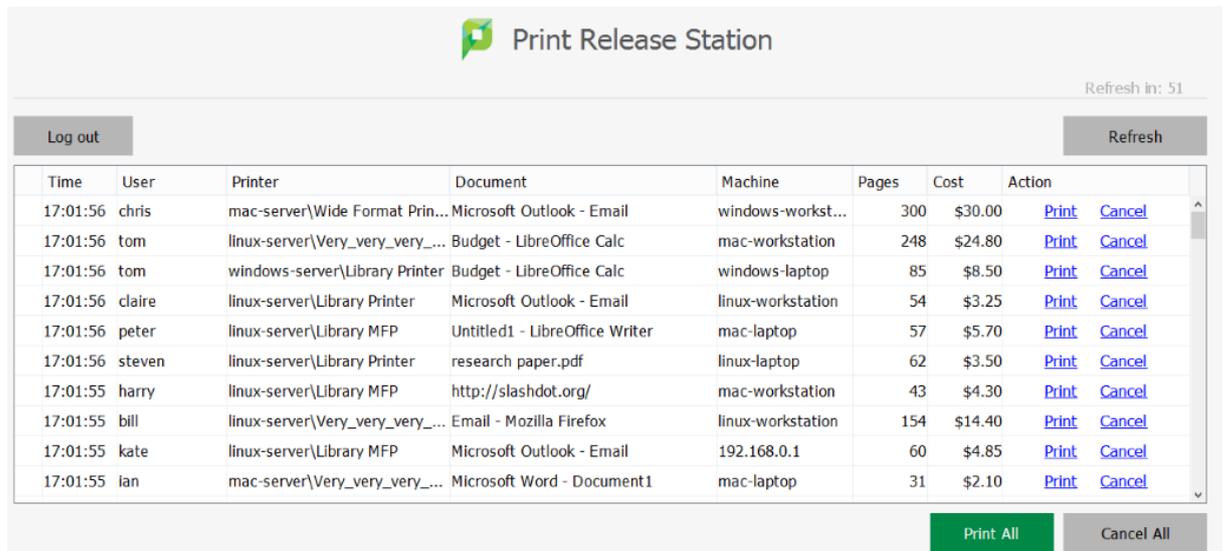
### 1.5.3. Example 3: Printing using a Release Station

The printing procedure has been changed on the network. Now when you print a job, it is not printed immediately, but instead is held in a queue. You need to attend a Release Station and release the job to print. This new system ensures that you are present and ready to collect your job.

1. Select Print from your application (e.g. **File > Print**)
2. Walk up to the Release Station located next to the printer.
3. Log in to the Release Station using your network username and password.

A screenshot of a login interface for a Release Station. The background is a solid green color. On the left side, the text "To begin, enter your details ..." is displayed in white. On the right side, there are two white input fields. The first field is labeled "Username" and contains the text "john". The second field is labeled "Password" and contains six asterisks "\*\*\*\*\*". Below the password field is a white button with the text "OK" in black.

4. After login the system displays a list of print jobs. Search for your document by looking for your user name or document name.



Time	User	Printer	Document	Machine	Pages	Cost	Action
17:01:56	chris	mac-server\Wide Format Prin...	Microsoft Outlook - Email	windows-workst...	300	\$30.00	<a href="#">Print</a> <a href="#">Cancel</a>
17:01:56	tom	linux-server\Very_very_very_...	Budget - LibreOffice Calc	mac-workstation	248	\$24.80	<a href="#">Print</a> <a href="#">Cancel</a>
17:01:56	tom	windows-server\Library Printer	Budget - LibreOffice Calc	windows-laptop	85	\$8.50	<a href="#">Print</a> <a href="#">Cancel</a>
17:01:56	claire	linux-server\Library Printer	Microsoft Outlook - Email	linux-workstation	54	\$3.25	<a href="#">Print</a> <a href="#">Cancel</a>
17:01:56	peter	linux-server\Library MFP	Untitled1 - LibreOffice Writer	mac-laptop	57	\$5.70	<a href="#">Print</a> <a href="#">Cancel</a>
17:01:56	steven	linux-server\Library Printer	research paper.pdf	linux-laptop	62	\$3.50	<a href="#">Print</a> <a href="#">Cancel</a>
17:01:55	harry	linux-server\Library MFP	http://slashdot.org/	mac-workstation	43	\$4.30	<a href="#">Print</a> <a href="#">Cancel</a>
17:01:55	bill	linux-server\Very_very_very_...	Email - Mozilla Firefox	linux-workstation	154	\$14.40	<a href="#">Print</a> <a href="#">Cancel</a>
17:01:55	kate	linux-server\Library MFP	Microsoft Outlook - Email	192.168.0.1	60	\$4.85	<a href="#">Print</a> <a href="#">Cancel</a>
17:01:55	ian	mac-server\Very_very_very_...	Microsoft Word - Document1	mac-laptop	31	\$2.10	<a href="#">Print</a> <a href="#">Cancel</a>

*Note:* If you can't find your print job, it might have 'timed out'. Print jobs are held by the Release Station for 30 minutes. If they have not been released after this time they are deleted.

5. Check the cost and details of the job.
6. Click **Print** to release the job. It can take up to 30 seconds for the printer to warm up after clicking **Print**.

### 1.5.4. Example 4: Refunding a print job (for staff)

Selected staff members have been granted access to refund print jobs in the new print control system.

Reasons for refunding a print job include:

- There was a paper jam or the document failed to print correctly.
- The document failed to print at an acceptable quality.

As a staff member, you will make an assessment about whether or not to issue a refund. A print job can be fully or partially refunded. A full refund is the more common scenario.

#### 1.5.4.1. Refund

To issue a refund:

1. Log in to the PaperCut MF administration interface at `http://server-name:9191/admin` using your network username and password.
2. Find the user to refund from the **Users** tab by entering their username in the **Quick find** box or clicking their username.
3. Click the **Job Log** tab. The recent print jobs printed by the user is displayed, with the most

recent at the top.

4. Find the print job that needs refunding; then click the **refund** link next to it.

**User Details: kelly**

Details Adjustments & Charges Transaction History **Print History**

Show Filter [ filter active: remove ]

Usage Date ▼	Charged To	Printer	Pages	Cost	Document Name	Attribs.	Status
Sep 8, 2009 11:46:47 AM	kelly	linux-server/Library MFP	38	\$3.80	Presentation - OpenOffice.org Impress	11X17 Duplex: No Grayscale: Yes 75.183 kb windows-laptop GDI	Printed <b>refund</b> [edit]

Export/Print

Report based on above data

5. Enter a comment; then click **OK**.

**Refund Print Job**

**Print Job Details**  
Job details of the job to be refunded.

**Date:** Sep 8, 2009 11:46:47 AM  
**Charged to:** kelly  
**Pages:** 38  
**Document:** Presentation - OpenOffice.org Impress  
**Cost:** \$3.80  
**Printer:** linux-server/Library MFP

**Refund Action**  
Take an appropriate action.

**Refund Amount**  
\$3.80

**Comment**  
Printer out of toner.

OK Cancel

### 1.5.4.2. Action Refund Requests

Users can send refund requests via user web interface. More information about this is given in [Refunding Print Jobs](#).

To action a refund request:

1. Log in to the PaperCut MF administration interface at `http://server-name:9191/admin` using your network username and password.
2. Navigate to **Printers > Refunds** .

3. Locate the user's refund request.
4. To approve/reject click the **approve/ reject** link.

**User Refund Requests**

Printer List | Jobs Pending Release | Notification Options | Print Log | Charts | Refunds

There are 6 refund requests pending.

Show Filter [ filter active: (smous) ]

Request Date ▲	Username	Amount Requested	Reason	Job Detail	Refund Actions
Sep 3, 2009 3:24:41 PM	patvanka Accepted: 10 Rejected: 5	\$0.10 (Job cost: \$0.10)	The printer was out of toner.	Usage: Sep 3, 2009 3:07:23 PM Pages: 1 Cost: \$0.10 Printer: mac-server\Office MFP Document: PaperCut NG : Users : User ...	[approve] [reject] [other]
Sep 3, 2009 3:41:06 PM	chris Accepted: 1 Rejected: 5	\$4.50 (Job cost: \$4.50)	No reason given	Usage: Sep 3, 2009 3:31:33 PM Pages: 45 Cost: \$4.50 Printer: mac-server\Library MFP Document: research paper.pdf	[approve] [reject] [other]
Sep 4, 2009 12:12:07 PM	john Accepted: 10 Rejected: 5	\$5.50 (Job cost: \$5.50)	No reason given	Usage: Sep 4, 2009 12:01:28 PM Pages: 55 Cost: \$5.50 Printer: mac-server\Office MFP Document: Microsoft PowerPoint - Presentation	[approve] [reject] [other]
Sep 4, 2009 12:16:43 PM	john Accepted: 10 Rejected: 5	\$5.00 (Job cost: \$10.00)	printer out of toner. Only 50% of the job was completed.	Usage: Sep 4, 2009 11:56:20 AM Pages: 100 Cost: \$10.00 Printer: mac-server\Library MFP Document: Untitled1 - OpenOffice.org Writer	[approve] [reject] [other]

5. To get an overview of user's refund requests click the **other** link. Use this to edit the refund amount and write a comment.

**Refund Print Job**

---

**Print Job Details**  
Job details of the job to be refunded.

**Date:** Sep 4, 2009 11:56:20 AM  
**Charged to:** john  
**Pages:** 100  
**Document:** Untitled1 - OpenOffice.org Writer  
**Cost:** \$10.00  
**Printer:** mac-server\Library MFP

---

**Refund Request Detail**  
Information about the refund requested.

**Date:** Sep 4, 2009 12:16:43 PM  
**Username:** john (History: 1 Accepted, 1 Rejected)  
**Amount Requested:** \$5.00  
**Reason:** printer out of toner. Only 50% of the job was completed.

---

**Refund Action**  
Take an appropriate action.

Deny  Refund Amount   
**Comment:**

OK Cancel

## 1.5.5. Example 5: Adding credit using a TopUp/Pre-Paid Card

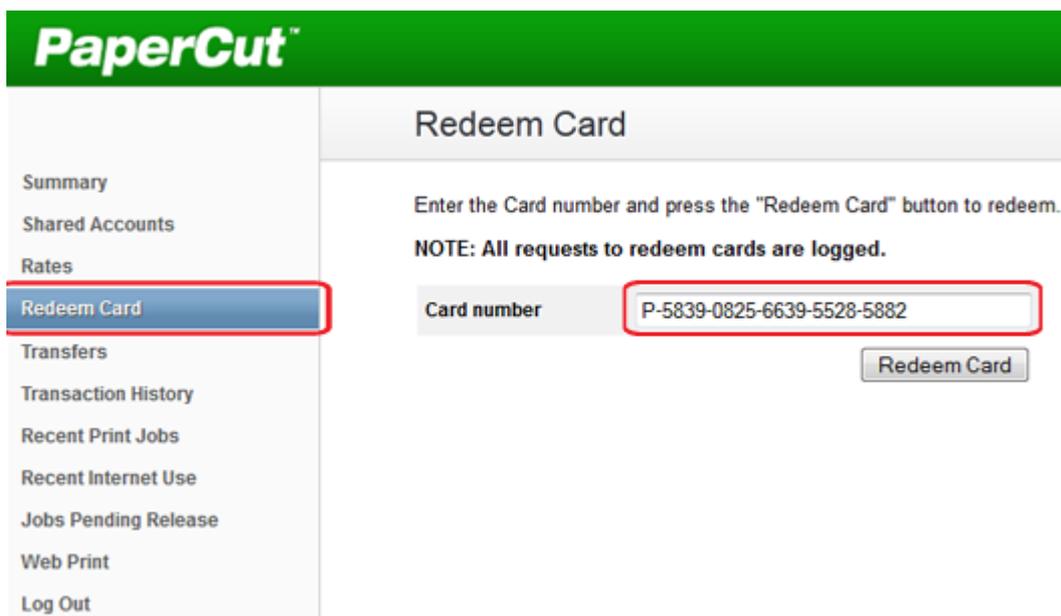
New software to manage printing costs has been installed on the network. Without sufficient printing credit in your account, printing is denied. To add more credit you can buy TopUp/Pre-Paid Cards from the nominated venues around the college. Each card is a voucher or coupon with a unique number. Make sure your card number is kept secret until use.

To add credit to your account using a card:

1. Log in to a computer. Soon after login, your printing balance window is displayed.
2. Click the **Details** link on the balance window.



3. A web page is displayed requesting your network username and password.
4. After logging in click the **Redeem Card** link from the left menu.
5. Enter the number from the card. Enter it exactly as shown on the card including any dashes (-).



6. Click **Redeem Card**. The value of the card is immediately be added to your printing

balance.

7. Click **Summary** from the left menu and check your balance to confirm the card's value has been added to your account.

**Note:** The card is valid for a single usage only. Recycle or dispose of the card after use.

## 1.5.6. Example 6: Printing from a wireless network or laptop (Web Print)

The Web Print system allows students to print to college printers from their own laptops without installing drivers. It works by offering a facility to upload documents in formats such as PDF, DOC etc using a standard web browser. You access Web print from the print system's User Web Tools.

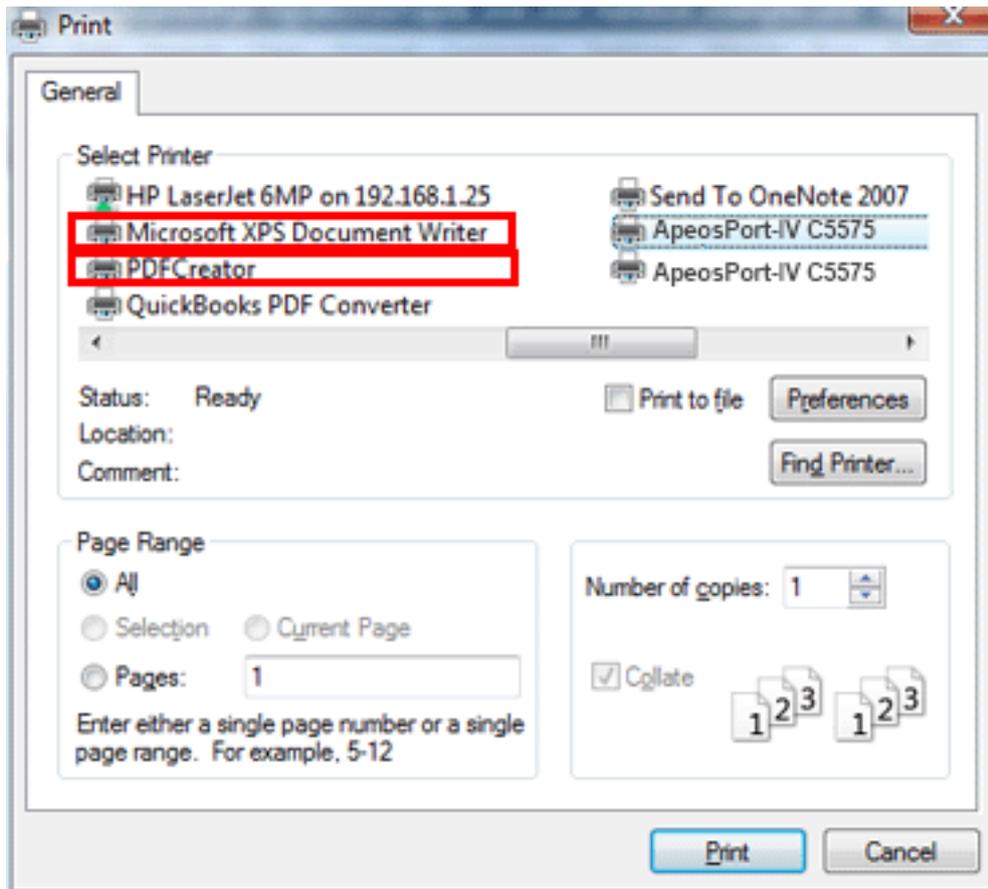
The system can print documents that have the following file formats:

**Table 2: Web Print Supported Applications and File Formats**

Application	File Format(s)
Adobe Reader 9	PDF
Microsoft Office Excel 2007	XLS, XLSX, etc.
Microsoft Office PowerPoint 2007	PPT, PPTX, etc.
Microsoft Office Word 2007	DOC, DOCX, etc.
Microsoft XPS Document Writer	XPS

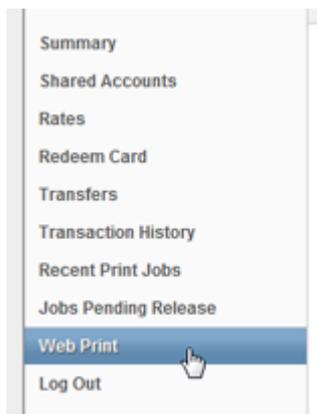
Free PDF printers are available for download from several websites such as [PDF Creator](#). Printing from any application using the normal print function produces a PDF document that you can upload using this system.

All Vista and higher versions of Microsoft Operating Systems have a virtual XPS printer that works similarly to the PDF printers.



To print a document:

1. Open your browser to `https://[server-name]:9192/user` and log in using your network username and password. Select the **Web Print** link in the navigation menu.



2. The front page contains a list of your active and recently submitted Web Print jobs. At first the list is blank. Later the list shows the status of submitted jobs.

	Submit Time	Printer	Document Name	Pages	Cost	Status
	Jan 16, 2012 1:52:07 PM	desktop-tom2\TestPrinter	Poster.pdf			Rendering successful. Preparing job for processing.
	Jan 16, 2012 1:51:49 PM	desktop-tom2\TestPrinter	Biology Homework.docx	1	\$0.10	<a href="#">Held in a queue</a>

You might see a message at the top of the Active Jobs page with other information that you need to know to use Web Print.

Web Print is a service to enable printing for laptop, wireless and unauthenticated users without the need to install print drivers. To upload a document for printing, click [Submit a Job](#) below.

[Submit a Job »](#)

- Click **Submit a Job** to start the Web Print wizard.
- The first step of the Web Print wizard is selecting a printer where your job will be printed.

rd

History

t Jobs

g Release

1. Printer
2. Options
3. Upload

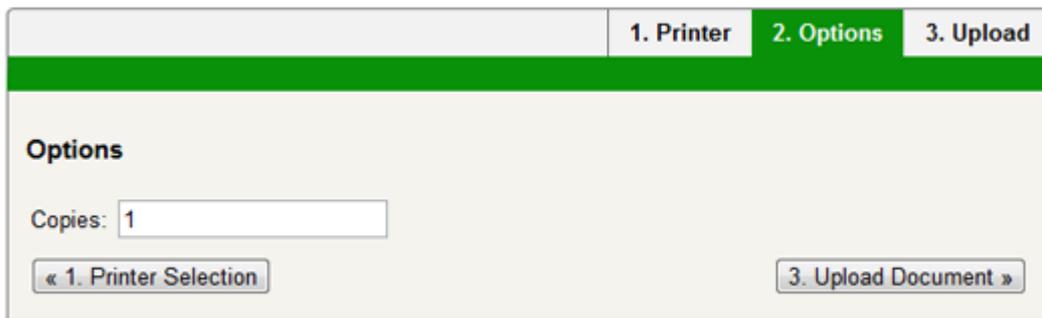
Select a printer:

Quick Find:

Printer Name ▲	Location/Department
<input type="radio"/> linux-server/Office MFP	Maths Department Staff Room
<input type="radio"/> mac-server/Wide Format Printer	Graphic Design
<input type="radio"/> windows-server/Library MFP	Library Foyer
<input checked="" type="radio"/> windows-server/Library Printer	Library Internet Area

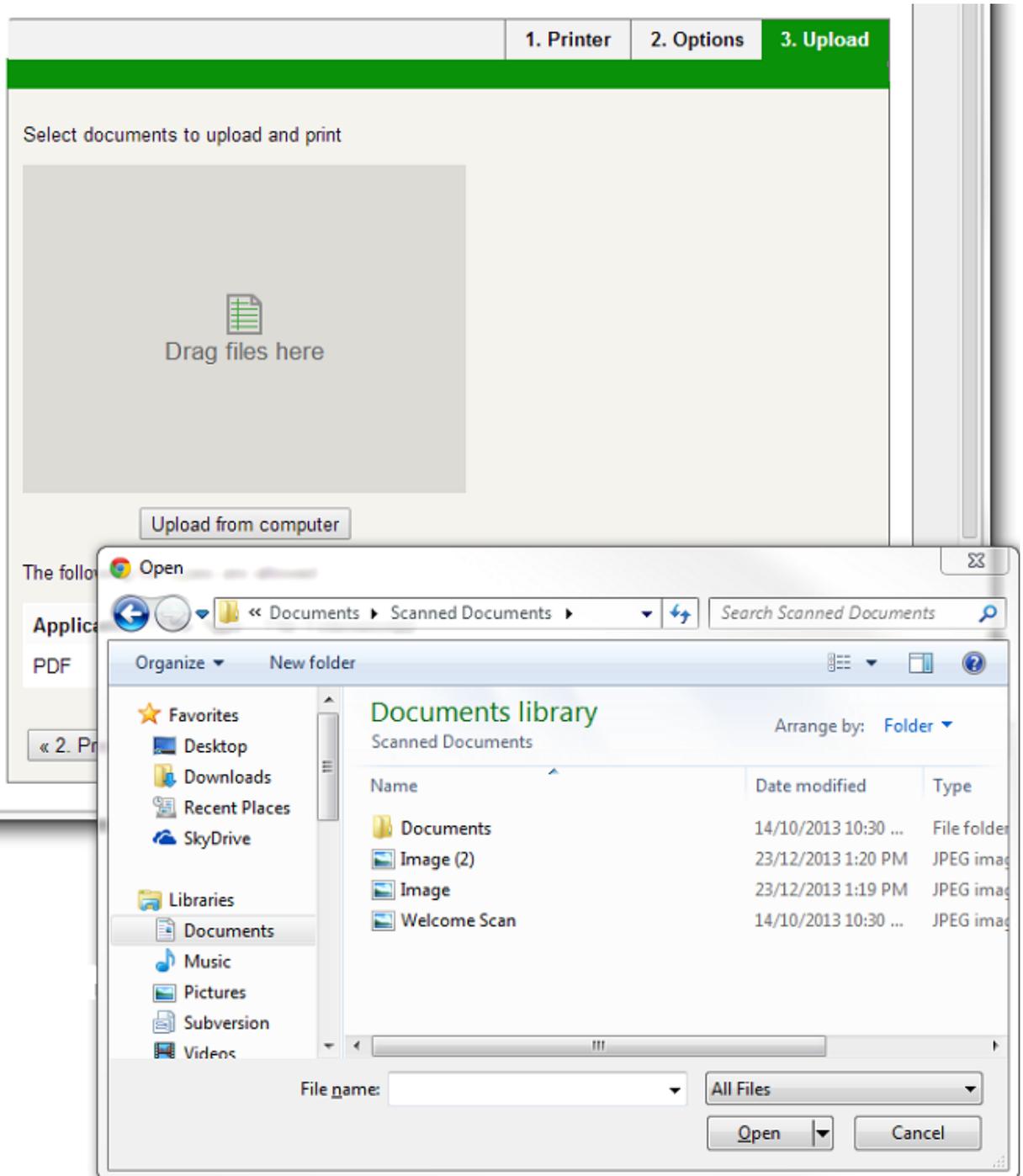
Instead of the Printer List you might see a clickable map or other graphical representation of the printers that are available.

- Select the number of copies to print. (Users who have permission to print to shared accounts will see additional options on this page.)



The screenshot shows a web interface for a print wizard. At the top, there are three tabs: '1. Printer', '2. Options', and '3. Upload'. The '2. Options' tab is currently selected and highlighted in green. Below the tabs, the word 'Options' is displayed in bold. Underneath, there is a label 'Copies:' followed by a text input field containing the number '1'. At the bottom of the form, there are two buttons: '« 1. Printer Selection' on the left and '3. Upload Document »' on the right.

6. After selecting the print options and/or account selection settings, the third and final step in the Web Print wizard is to upload a document to print. This page lists the applications and associated file extensions that are supported. Once you have selected a document and clicked **Upload & Complete**, the file uploads to the server.



7. Once the document upload is complete you are returned to the front Web Print page. The table now displays the status of your job. Jobs can be queued during times of high load. The status changes to indicate the progress of the job from rendering to printing, and job details such as cost and number of pages is populated when known. You can stay at this page to track the status of the job or navigate away or close the browser. The job will not be affected.

**Note:**

If the printer selected in step 4 has print release enabled, your job is held until you release it by logging into the Release Station.

## 1.6. Licensing and Support

This section describes how to install the PaperCut MF license you receive after purchase, and also provides information about gaining support and assistance.

### 1.6.1. Installing a License

PaperCut MF licenses are issued as a digitally signed file. Installing the license file into the application enables the software for use within your organization.

To install the license file supplied by your vendor:

1. Save the license file to your hard disk. Your desktop is a handy location. Files are typically named `PaperCut MF-[orgname].license`.



**Tip:** There is no need to unzip the file. You can load the file into the system as supplied.

2. Log in to the PaperCut MF administration interface.
3. Navigate to the **About** page.
4. Scroll down to the **Register** section; then click **Browse**.
5. Locate the license file saved in step 1; then click **Open**.
6. Click **Install license**.
7. Verify license information is correctly listed in the **About** page.



**Note:** The file supplied is a digitally signed and zipped text file containing your license information. It's converted to ZIP format to minimize size. If you're interested in viewing the contents of the file, rename the file to `.zip` and open it in any ZIP extraction utility.

If you have a question about your license or need assistance please email the PaperCut Software International Pty. Ltd. technical support team and they are more than happy to assist you.

## 1.6.2. Technical Support & Further Information

The PaperCut Software development team is always happy to assist customers with further technical questions. Please feel free to contact us via email or phone. The development team can also be contacted via the live web chat feature available on the PaperCut Software International Pty. Ltd. website at <http://www.papercut.com/>.

You can also find lots of other useful information in the Knowledge Base located at: <https://www.papercut.com/kb/> The Knowledge Base is updated regularly and is a good place to start if your question is not addressed in this user manual.

## 1.6.3. End User License Agreement (EULA)

### END USER LICENSE AGREEMENT

#### 1. **AGREEMENT**

This End User License Agreement is between PaperCut Software International Pty Ltd (ACN 124 440 400) of Ground Floor, 1 Oxley Road, Hawthorn, Victoria 3122, Australia (PaperCut), and:

- a. if there has been no charge for the license (an Evaluation License), the company or other entity that installed the Software for the purpose of the evaluation; or
- b. if there has been a charge for the license (a Production License), the company or other entity that applied for the Production License as set out in the Company Details tab on the Website.

#### 2. **DEFINITIONS**

**Affiliate** means an entity owned by, controlling, controlled by, or under common control with, directly or indirectly, an entity. For this purpose, one entity "controls" another entity if it has the power to direct the management and policies of the other entity (for example, through the ownership of voting securities or other equity interest, representation on its board of directors or other governing body, or by contract).

**Agreement** means the terms and conditions in this End User License Agreement and the Support Policies, and, if this is a Production License any details in the Contract Details, as may be amended by a Variation.

**Authorised Platform** means servers, workstations, printers, Multifunction Devices and mobile devices that are owned, leased or controlled by You or Your Affiliates on which the Software is designed to be used.

**Confidential Information** means any non-trivial non-public information, however, recorded, preserved, disclosed or communicated (whether directly, indirectly, orally or by writing), disclosed by either party or its Representatives to the other party or its Representatives in connection with this Agreement that is or, ought to have been, understood by the Parties, using

reasonable business judgment, to be confidential. The Software and related documentation, License Keys and this Agreement, including the terms, pricing and Fees payable, are agreed to be the Confidential Information of PaperCut.

**Contract Details** means the details of any transaction for a Production License that relate to the Software license, including the maximum number of Users (or other license metric that is applicable to the particular Software program), the Premium Upgrade Assurance service and applicable Fees and Taxes, that are advised to You and/or are selected, or entered, by You on the Website prior to You placing Your order for the Production Licence, or to which You have otherwise agreed in writing with PaperCut.

**Discloser** means the party that makes a disclosure of Confidential Information.

Effective Date means:

- a. for an Evaluation License, the first date of installation of the Software on any of Your Authorised Platforms; or
- b. for a Production License, the date that the person clicked "I Agree" during the sign on process.

**Evaluation License** means the right to use the Software in accordance with clause 4.1.

**Fees** means the amount payable for the relevant Software license, the Premium Upgrade Assurance service or other items acquired under the Agreement, as applicable, exclusive of Taxes.

**Intellectual Property Rights** means copyright, moral rights, trade mark, design rights, service marks, patent, semiconductor or circuit layout right, trade secrets, know-how, database rights or other rights in the nature of intellectual property rights (whether registered or unregistered), or any right to registration of such rights, existing anywhere in the world, or protected by statute from time to time, whether created before, on or after the Effective Date.

**License Key** means any form of license file, lock, password or other mechanism that may be used to control access to, or manage use of, the Software.

**PaperCut Marks** means all trademarks, service marks, logos or other words or symbols identifying the Software, Premium Upgrade Assurance service, PaperCut Customer Care service or PaperCut's business (whether owned by PaperCut or any PaperCut Affiliate), and all trademarks, service marks, logos or other words or symbols identifying any third party software that is licensed by the third party to Papercut and integrated in the Software.

**Premium Upgrade Assurance** means the services described in clause 5.

**Production License** means the right to use the Software in accordance with clause 4.2.

**Recipient** means the party that receives a disclosure of Confidential Information.

**Representatives** means the employees, agents, contractors of a party, or those of any Affiliate, and the professional representatives of a party providing advice in relation to this Agreement, including the lawyers, bankers, auditors, accountants and insurers of a party.

**Software** means the object code version of PaperCut's software program made available to You, and any Updates and Upgrades that may be made available to You by PaperCut in its discretion, under this Agreement. The term Software does not include any beta, prerelease or other special release programs.

**Support Policies** means PaperCut's document that describes the policies, processes and scope of support services for the Software, as are posted on the Website under the heading Support. The Support Policies may be updated by PaperCut in its discretion from time to time.

**Taxes** includes goods and services taxes or other sales taxes, duties, withholding taxes, levies, imposts or other charges or duties levied by any federal, state or local government that arise out of or in connection with the Software, Premium Upgrade Assurance service or this Agreement, and any interest, penalties or liabilities incurred on such amounts, but excludes taxes based on the net income of PaperCut.

**Update** means any bug fixes, patches or workarounds for the Software that have been produced primarily to overcome defects in the Software without significantly altering the functionality of the Software.

**Upgrade** means a version of the Software that has been produced primarily to extend, alter or improve the Software by providing additional functionality or performance enhancements (whether or not defects are also corrected). Upgrades do not include any software that is marketed by PaperCut as a different product. PaperCut shall determine in its discretion whether any software is an Upgrade or a different product.

**User** means an identifier (individual's name or generic term such as "purchasing officer") that is listed as a user in the Software's database. Any User that is defined by a generic term may only be used by a single individual. All Users from You and/or Your Affiliates who have identifiers listed as users in the Software's database are included in aggregate in the total number of Users.

**Variation** means any addition, deletion or substitution to any part of this Agreement that is made in accordance with this Agreement.

**You** (and Your) refer to the other party to this Agreement, being the entity that is the licensee of the Software.

**Website** means PaperCut's website from which You can acquire the Software, Premium Upgrade Assurance service, additional Software programs, add more Users or other license usage or extended Your Premium Upgrade Assurance service.

### 3. ***AGREEMENT AND LICENSE***

3.1 In the case of an Evaluation License, the person that installs the Software and clicks "I Agree" during the installation process warrants to PaperCut that he/she has authority to enter into this Agreement on behalf the entity that is his/her employer.

3.2 In the case of a Production License, the person that clicked "I Agree" during the sign-on process warrants to PaperCut that he/she has authority to enter into this Agreement on behalf the entity that was entered into the Company Details tab on the Website during the sign-on process.

3.3 By using the Software You accept this Agreement as from the Effective Date, and acknowledge that You are bound by the terms and conditions of the Agreement.

3.4 PaperCut may send a "proof of purchase" confirmation email or other document (Order Confirmation) after You acquire a Production License, summarising the Contract Details. If You do not notify PaperCut in writing of any discrepancy in the Contract Details as set out in the Order Confirmation within 48 hours of receiving it, then you accept the Contract Details as set out in the Order Confirmation.

#### ***Evaluation***

3.5 If You requested a free of charge Evaluation License for the Software (via the Website or other means) then PaperCut will make the Software available for You to download from the Website, subject to Your acceptance of this Agreement. If You accept this Agreement then You acquire an Evaluation License, from the Effective Date until the license is terminated in accordance with clause 3.7. There is no Fee payable for an Evaluation License.

3.6 PaperCut does not provide Premium Upgrade Assurance services for Evaluation Licenses, but may, in its discretion, provide assistance, advice and error correction services to support Your evaluation of the Software.

3.7 A Evaluation License:

- a. terminates automatically after 40 days from the Effective Date, unless extended by agreement with PaperCut;
- b. will be terminated if the Agreement terminates in accordance with clause 12.

#### ***Upgrading to a Production License***

3.8 You may upgrade an Evaluation License to a Production License by completing and agreeing the Contract Details via the sign-on process on the Website and agreeing to pay the relevant Fees and Taxes. You may also order Premium Upgrade Assurance services at the same time. The Production License and any Premium Upgrade Assurance service will be provided on the terms and conditions of this Agreement. In the case of a Production License, PaperCut will provide You with a License Key to enable You to use the Software.

### ***Production License***

3.9 Where you acquire a Production License by agreeing the Contract Details with PaperCut, including by completing the Contract Details on the sign on process, then You acquire a license for the Software in accordance with clause 4.2 and the right to receive and install any Updates for that Software that may be issued by PaperCut from time to time. You must install Updates promptly, especially Updates that have been made available for security issues. There are no additional Fees for this right to receive Updates.

### ***Premium Upgrade Assurance***

3.10 Where You ordered Premium Upgrade Assurance services in the Contract Details, upon acceptance of your order PaperCut will provide the Premium Upgrade Assurance services for 12 months from the Effective Date in accordance with clause 5.

### ***Additional Licenses, Usage or Premium Upgrade Assurance.***

3.11 If you wish to add more Software programs, add more Users or other license usage or extended Your Premium Upgrade Assurance service and such items are available from PaperCut at the time, You may order those items by completing and agreeing the relevant Contract Details with PaperCut via the Website and agreeing to pay PaperCut's then current Fees and Taxes for such items. Any such items will be provided on the terms and conditions of this Agreement.

3.12 If You do not extend Your Premium Upgrade Assurance service so that Premium Upgrade Assurance service is provide continuously, and subsequently wish to re-instate Premium Upgrade Assurance service, then You must pay PaperCut's then current support re-instatement fee in addition to the then current Fees for the Premium Upgrade Assurance service prior to the Premium Upgrade Assurance service being re-instated.

### ***Variations***

3.13 Subject to clauses 3.8 and 3.11, this Agreement, or any part of it, may be varied by the parties agreeing to the Variation in writing (and the Variation will be binding when both parties have signed the Variation).

## **4. LICENSES**

### ***Evaluation License***

4.1 From the Effective Date until the license is terminated in accordance with this Agreement, PaperCut grants You a non-exclusive, non-transferable, limited use license solely to install and run the Software on one or more computers that are Authorised Platforms for You and your Affiliates to evaluate the Software to determine whether to acquire a Production License. Under this Evaluation License You and Your Affiliates may use the

Software for testing and evaluation in a production environment prior to the termination of the Evaluation License.

### ***Production License***

4.2 Subject to PaperCut's receipt of the applicable Fees and related Taxes in accordance with the Contract Details, PaperCut grants You a non-exclusive, non-transferable, indivisible, limited use license solely to install and run the Software on one or more computers that are the Authorised Platforms, for use by You or Your Affiliates from the Effective Date until the license is terminated in accordance with this Agreement, for:

- a. up to the maximum number of Users or other license metric set out in the Contract Details, for Your internal business data processing/printing requirements in accordance with, and subject to any other limitation of use set out in, the Contract Details; and
- b. for testing, disaster recovery and back up (hot or cold), without additional Fees.

### ***Delivery and installation***

4.3 PaperCut will make the Software available for download from the Website. If You specifically request, PaperCut will ship to You a physical copy of media with the software loaded on it, at additional cost. You are responsible for copying and installing the Software on the Authorised Platforms. You must follow any instructions provided by PaperCut when installing the Software. All Software is deemed to be accepted by You upon successful installation on the first Authorised Platform.

### ***Prohibited Actions***

4.4 Nothing in this Agreement permits You to:

- a. use the Software to provide any facility management or service bureau service, or for the benefit of any third party (other than an Affiliate);
- b. disclose the Software or any online or hard copy documentation related to the Software to any third party (other than an Affiliate);
- c. adapt, translate, publish, communicate to the public, or create any derivative work or translation of the Software, unless expressly permitted by law;
- d. sub-license, lease, rent, loan, assign, novate or otherwise transfer the Software to any third party;
- e. reverse engineer, reverse compile, de-compile or disassemble the object code of the Software or any part of the Software (or other underlying data), or otherwise attempt to derive the source code of the Software, except to the extent the permitted by law;
- f. use any part of the Software other than as an integrated part of the overall Software

- program;
- g. remove, alter or obscure any PaperCut Marks, or any proprietary or restricted use notice on the Software;
  - h. allow the Software to become the subject of any charge, lien, encumbrance or security interest; or
  - i. deal in any other manner with any or all of Your rights and obligations under this Agreement.

## ***Compliance***

4.5 You acknowledge and agree that the License Key may prevent, hinder or reduce availability of features where You are using the Software in excess of the usage rights that You have agreed to pay for.

4.6 During the period of this Agreement and for 2 years thereafter, You must permit PaperCut, or its nominee, to inspect and have access to the Software, the usage logs in the Software and to any records kept in connection with this Agreement, for the purposes of ensuring that You (and Your Affiliates) are complying with the terms of this Agreement. If PaperCut requires access to Your offices (or those of Your Affiliates) in order to access the Software or the relevant records then:

- a. PaperCut must provide reasonable advance notice to You;
- b. any access must be during business hours or other times agreed by You;
- c. PaperCut must use reasonable endeavors to minimize any disruption to Your business; and
- d. if PaperCut uses a nominee to conduct the inspection, such nominee must not be a competitor to You and must sign a non-disclosure agreement with PaperCut that protects any information found during the inspection on terms that are no less protective than those terms that are included in clause 9 of this Agreement.

## **5. *PREMIUM UPGRADE ASSURANCE***

5.1 This clause 5 applies during the period when You have acquired Premium Upgrade Assurance services for a Production License.

5.2 If and when PaperCut makes an Update or Upgrade generally available to customers with Premium Upgrade Assurance services for the Software, the Update or Upgrade will be made available to You at no additional charge. You must, at your own cost, download and install the Update or Upgrade within a reasonable period.

5.3 If You (or any of Your employees or employees of any of Your Affiliates) believe that there is a defect in the Software those employees should report it to Your internal support desk personnel, and Your internal support desk personnel should report it to PaperCut's

support email address 24/7 or call PaperCut's support helpline during business hours. You must ensure that Your internal support desk personnel are technical competent and trained in the use of Software. They must use reasonable efforts to resolve the issue prior to contacting PaperCut for assistance.

5.4 PaperCut will use its best efforts to provide a remedy or a workaround for any defect in the Software that is reported to its support helpline in a timeframe that is reasonable given the nature of the issue and the impact on Your business operations.

5.5 PaperCut shall have no obligation to provide Premium Upgrade Assurance services:

- a. in respect of any Software which has not had any Update or Upgrade installed prior to the date that PaperCut has notified its customers generally that is the "end of life" date for that version. PaperCut shall provide its customers with at least 90 days notice, including by posting notice on the Website, of an "end of life" date for that particular version;
- b. to any adaptations, translations or derivative works made to the Software; or
- c. for any Evaluation License.

5.6 PaperCut shall have no obligation to provide Premium Upgrade Assurance services where faults arise from:

- a. misuse, incorrect use of or damage to the Software from whatever cause (other than any act or omission by PaperCut), including failure or fluctuation of electrical power;
- b. failure to maintain the necessary environmental conditions for use of the Software;
- c. use of the Software in combination with any equipment or software other than Authorised Platforms;
- d. any breach of Your obligations under this Agreement;
- e. having the Software maintained by a third party; or
- f. user error.

5.7 If it is necessary for PaperCut to attend Your (or Your Affiliates') premises to provide Premium Upgrade Assurance services, or PaperCut determines that the work it performed in relation to a logged issue was caused by any of the items in clause 5.6, then You must pay for such work at PaperCut's then current Fees and charges as well as any expenses (and travel time) incurred by PaperCut in performing such work.

## 6. ***FEES AND TAXES***

6.1 PaperCut will provide You with the ability to download the Software from our Website as an Evaluation License for use in accordance with this Agreement without charge.

6.2 Where You agree on the Contract Details to pay the Fees, charges and Taxes for any Production License, Premium Upgrade Assurance, additional Software, additional Users or extended usage rights, further period of Premium Upgrade Assurance or other thing acquired under this Agreement by credit card (or other online payment mechanism supported by PaperCut) then you must complete the relevant details and authorizations stated on the Website. PaperCut will provide you with a tax invoice/receipt promptly following receipt of Your payment.

6.3 Where You agree on the Contract Details to pay the Fees, charges and Taxes for any Production License, Premium Upgrade Assurance, additional Software, additional Users or extended usage rights, further period of Premium Upgrade Assurance or other thing acquired under this Agreement following receipt of a tax invoice, PaperCut will provide You with a tax invoice for the Fees and Taxes at the start of the license or the supply of the service and You must pay this tax invoice within 14 days of receipt.

6.4 You are solely responsible for ensuring that PaperCut receives the net amount of the Fees for any transaction under this Agreement, including:

- a. You must pay any fee for receiving the Software on physical media;
- b. You must pay any fee associated with the use of a credit card (or other payment mechanism accepted by PaperCut);
- c. You must pay any fee associated with a bank charge or transfer fee;
- d. You must pay any fee incurred by PaperCut for any charge back or other payment failure, plus PaperCut's administration fee for dealing with a failed payment (other than where a refund of the Fees is required to be provided by law);
- e. You are responsible to pay all Taxes. All payments under the Agreement must be made free and clear and without deduction for any and all present and future Taxes. Payments due to PaperCut under the Agreement must be increased so that the amounts received by PaperCut, after provision for Taxes and all Taxes on such increase, will be equal to the amounts required under the Agreement as if no Taxes were due on such payments.

6.5 You irrevocably authorize PaperCut to deduct from your credit card (or any debit card accepted by PaperCut) any amount due and payable under this Agreement without further reference to You.

6.6 You must pay a late charge for any failure to make any payment by the date required under the Agreement, calculated daily using a rate that is 4% over the Reserve Bank of Australia's Cash Rate, from the date that the payment first becomes overdue, to the date that the payment is received by PaperCut, both dates inclusive.

6.7 If any Fee, charge or Tax is not received by the required date, PaperCut may suspend Your access to the Software or suspend or cease providing services to You until the outstanding amounts (including applicable late charges, damages, costs and expenses) are

paid. You do not have any claim for breach of contract or otherwise for any action taken by PaperCut under this clause.

## 7. **TRADEMARKS**

7.1 You acknowledge and agree that PaperCut is the owner and/or licensee of the PaperCut Marks. You do not acquire any right to use, or interest in, any of the PaperCut Marks. You must not at any time or in any way assert any ownership of, or any right in, the PaperCut Marks and You must not contest the right of PaperCut or any PaperCut Affiliate or any of their licensors to the use of any of the PaperCut Marks.

7.2 PaperCut will not use Your (or those of Your Affiliates) trademarks, logos or branding without your prior written consent. You give us consent to incorporate any trademark, logo or branding that You provide us into the Software in order to take advantage of the Software features that allow the use of customers' branding. PaperCut may disclose the fact that You (and Your Affiliates) are customers and the nature of Your (and Your Affiliates') use of the Software to third parties in private conversations and documentation, but PaperCut will not use Your name (or the names of Your Affiliates) in PaperCut's general marketing materials or websites etc without Your prior written consent.

## 8. **PROPRIETARY RIGHTS**

8.1 All Intellectual Property Rights that are created by any person that are adaptations, translations and derivative works in the Software or related documentation, are and shall remain the exclusive property of PaperCut (and its licensors, if any) or shall vest in or be transferred to PaperCut immediately upon creation, as the case may be.

8.2 Except for the rights expressly granted by PaperCut to You under this Agreement:

- a. PaperCut and its licensors, if any, reserve all right, title and interest in and to the Software or related documentation and all Intellectual Property Rights in them;
- b. no right, title or ownership interest in or to the Software or related documentation whether by implication, estoppel or otherwise, is granted, assigned or transferred to You under or in connection with this Agreement.

8.3 You must not make any unauthorized copies of the whole or part of the Software or related documentation. You acknowledge and agree that the unauthorized disclosure, use or copying of the Software or related documentation may cause PaperCut serious financial loss that may not be adequately compensated by monetary damages. Accordingly, in the event of any unauthorized disclosure, use or copying of the Software or related documentation, You agree that PaperCut shall have the right to seek injunctive relief to stop such unauthorized disclosure, use or copying.

## 9. ***CONFIDENTIAL INFORMATION***

9.1 The Recipient must not use any of the Discloser's Confidential Information except in connection with the performance of its obligations specified in this Agreement.

9.2 The Recipient must not disclose the Discloser's Confidential Information to any third party without obtaining the Discloser's prior written consent, provided that the Recipient may disclose the Discloser's Confidential Information to:

- a. its employees, agents and contractors, and those of any of its Affiliates, who have entered into a written agreement with the Recipient that is no less protective of the Discloser's Confidential Information than this Agreement provided those persons have a need to know such information for the purposes of this Agreement;
- b. to its lawyers, bankers, auditors, accountants and insurers, who have a need to know the information in order to provide professional advice to the Discloser relating to this Agreement.

9.3 You must ensure that each person who is issued with a License Key does not disclose their License Key to any other person.

9.4 The Recipient must use, and must ensure that any person to whom it is permitted by this Agreement to disclose the Discloser's Confidential Information to uses, the same measures to protect the Discloser's Confidential Information as it uses to protect its own confidential information, but in no event less than reasonable measures.

9.5 The restrictions in this clause 9 shall not apply to information that:

- a. is independently developed by the Recipient without any access to the Confidential Information of the Discloser;
- b. becomes known to the Recipient without restriction, from a third party who, to the Recipient's knowledge, was not bound by a confidentiality agreement with the Discloser, or otherwise prohibited from disclosing the information to the Recipient, or had the right to disclose it;
- c. was available to the Recipient on a non-confidential basis prior to disclosure by the Discloser;
- d. was lawfully in the possession of the Recipient before the information was disclosed to it by the Discloser, and that was not subject to a confidentiality obligation;
- e. is or becomes in the public domain through no act or omission of the Recipient;
- f. the parties agree in writing is not confidential or may be disclosed; or
- g. is required to be disclosed under an order or requirement of a court, administrative agency, or other governmental body (but only to the minimum extent required to comply), provided however, that Recipient shall provide prompt notice to Discloser of any

potential disclosure and shall use its reasonable efforts to prevent disclosure of such information.

## ***Privacy***

9.6 The parties must:

- a. comply with the requirements of the any privacy law in the country in which the party is located and in any country to which the personal information is to be sent; and
- b. only use, manipulate, store and handle personal information for the purposes of meeting its obligations under this Agreement.

9.7 You warrant that:

- a. You have obtained the informed consent from each individual about whom PaperCut will obtain personal information from You as a result of this Agreement; and (b) PaperCut, its Representatives and their permitted successors, assignees and sub-licensees may use that individual's personal information in any manner that may be reasonably contemplated by this Agreement, including a transfer overseas for the purpose of providing support and error correction services.

## ***Consent to use of data***

9.8 You agree that PaperCut may collect and use technical information - including but not limited to technical information about your system setup, license, and feature usage - that is gathered periodically to facilitate the provision of software updates, product improvement, product support and other services to you. PaperCut may use this information to improve, provide, and develop our products, services and technologies. PaperCut will not disclose this information in a form that personally identifies you.

9.9 By clicking the "check for updates" button you authorize PaperCut to gather system, version and licensing information to facilitate the provision of software updates, product support, and other services to you (if any) related to the PaperCut software.

## **10. *LIMITATION OF LIABILITY***

10.1 Except as set out in this Agreement, to the extent permitted by law, and subject to clause 10.2, PaperCut's total, cumulative liability to You (and Your Affiliates) for any claim whether it be for breach of contract (including under an indemnity), in tort (including negligence), breach of statutory duty or otherwise, arising out of or in connection with the Software, the Premium Upgrade Assurance service, this Agreement or the relationship between the parties, shall be limited to:

- a. where the claim arises in connection with the Software, the total of all Fees paid by You for the Production License; or
- b. where the claim arises in connection with the Premium Upgrade Assurance, the total

of all Fees paid by You for the Premium Upgrade Assurance during the Premium Upgrade Assurance year in which the claim first arose; or

- c. or any other claim, USD\$10,00

10.2 To the extent permitted by law, PaperCut will not be liable for any loss, damage or expense which is indirect, consequential, special or exemplary damages, nor for any lost profits, lost revenue, lost data or business interruption, even if PaperCut has been advised of, knows of, or should have known of the possibility of such loss, damage or expense.

10.3 You acknowledge and agree that owing to the nature of the Software, PaperCut does not represent or warrant that:

- a. access to the Software will be continuously available; or
- b. the Software will be error free.

10.4 You act as agent for Your Affiliates in respect of this Agreement and are responsible to PaperCut for their acts and omissions.

## 11. **INDEMNIFICATION**

11.1 In addition to any rights You may have at law, PaperCut undertakes at its own expense to indemnify and defend You or, at PaperCut's option, settle any claim or action brought against You alleging that the use or possession of the Software in accordance with this Agreement infringes any Intellectual Property Right enforceable in the United States, Canada, any country in the EU, Switzerland, Australia, New Zealand, Hong Kong, Singapore and Japan (an "**Infringement Claim**") and shall be responsible for any losses, damages, expenses or costs (including reasonable legal fees) incurred by, or awarded against You as the result of, or in connection with, any such Infringement Claim, provided that:

- a. You promptly notify PaperCut of the Infringement Claim in writing, specifying the nature of the claim in reasonable detail and providing access to, and copies of, documents, software any other material, that are relevant to the Infringement Claim, as well as providing prompt access to any Representative who may be relevant to PaperCut's defense of Infringement Claim;
- b. You do not make any admission of liability, agreement or compromise in relation to the Infringement Claim without the prior written consent of PaperCut;
- c. You grant PaperCut the sole right to defend, negotiate and settle the Infringement Claim, at PaperCut's expense, or at PaperCut's option, PaperCut may permit You to defend the Infringement Claim in which case:
  - (i) PaperCut will pay any costs associated with Your defense, and will provide security for such costs; and

- (ii) You must follow any reasonable request from PaperCut to avoid, dispute, defend and/or compromise the Infringement Claim;
- d. You provide PaperCut with reasonable assistance, at PaperCut's expense, to defend, negotiate and settle the Infringement Claim.

11.2 PaperCut will have no obligation under this clause 11 or otherwise with respect to any Infringement Claim based upon:

- a. any use of the Software not in accordance with this Agreement, or documentation provided by PaperCut;
- b. the combination, operation or use of the Software with any other product, equipment, business method, software or data;
- c. any modification of the Software by any person other than PaperCut or its authorized agents or subcontractors; or
- d. any use of the Software after PaperCut has provided You a new software version, patch or correction that would have overcome the infringement.

11.3 If any Infringement Claim is made, or in PaperCut's opinion is likely to be made, then PaperCut may (at its sole option and expense) either:

- a. procure for You the right to continue using the affected Software, or substantially similar software that does not substantially affect the functionality of the Software, in accordance with this Agreement;
- b. replace or modify the affected Software so that it becomes non-infringing but performs substantially the same functions; or
- c. if neither (a) or (b) is commercially reasonable, as determined in PaperCut's sole discretion, then PaperCut may terminate Your rights to use the affected Software and pay damages of up to an amount of the Fees paid for the license for the Software.

11.4 Subject to any rights that You may have under statute, this clause 11 states PaperCut's entire liability and Your sole and exclusive remedy for any claims related to any infringement of the Intellectual Property Rights in respect of the Software.

## 12. **TERMINATION**

12.1 PaperCut may immediately terminate this Agreement for cause by giving You written notice if You:

- a. breach any of the provisions of clauses 4, 6, 7.2, 8.3, 9 or 13.5;
- b. breach any other provision of the Agreement and You do not remedy it within 14 days of PaperCut providing You written notice of the breach;
- c. cease to carry on business, are unable to pay Your debts as they fall due, You enter

into liquidation or have a controller, managing controller, liquidator or administrator appointed or suffer any similar event in any jurisdiction; or

- d. merge with, sell substantially all of Your assets, or You are subject to a change of control. A "change of control" shall be deemed to occur when an entity acquires fifty percent (50%) or more of Your voting shares or equity interest or fifty percent (50%) or more of Your assets, in the event of a change of a majority of Your Board of Directors (or majority of the partners if a partnership) or if there is any other effective change of control.

12.2 You may immediately terminate this Agreement for cause by giving PaperCut written notice if PaperCut:

- a. breaches any of the provisions of this Agreement and PaperCut does not remedy it within 30 days of You providing PaperCut written notice of the breach; or
- b. ceases to carry on business, is unable to pay its debts as they fall due, enters into liquidation or has a controller, managing controller, liquidator or administrator appointed or suffer any similar event in any jurisdiction.

12.3 If this Agreement terminates:

- a. any license for Software and its related Premium Upgrade Assurance terminates immediately;
- b. each party shall immediately return to the other (or at the other party's request destroy) any of the other's Confidential Information;
- c. You must ensure that all copies of the Software installed pursuant to this Agreement are uninstalled and deleted from all hardware in your possession or control within 14 days of the date this Agreement is terminated.

12.4 Any termination of this Agreement shall not prejudice, limit or restrict any other rights or remedies either party may have arising prior to such termination. To the extent permitted by law, PaperCut shall be under no obligation to refund any amounts paid by You for any of the Software or Premium Upgrade Assurance services that have been provided prior to any termination of this Agreement.

## 13. **GENERAL**

### **Notices**

13.1 Any notice that is given under this Agreement:

- a. by PaperCut may be:
  - (i) posted to You;
  - (ii) emailed to You at any email address provided by You;

- (iii) included on any invoice (which may be emailed or posted to You); or
  - (iv) posted on the Website. You must review the Website regularly for notices.
- b. by You must be posted to PaperCut at the address stated on the latest invoice.

13.2 A notice is deemed to be received:

- a. when posted from Australia to an address in Australia; within 3 business days of the date when it was posted;
- b. when posted from an address outside of Australia, within 7 days of the date when it was posted; or
- c. when emailed; within 1 business day of the date that the email was sent, provided no notice of failure has been received by the sender;
- d. when posted on the Website, within 3 business days of the date it was posted.

### ***Relationship of Parties***

13.3 The parties to this Agreement are independent contractors. Nothing in this Agreement shall be deemed to create an agency, employment, partnership, fiduciary or joint venture relationship between the parties, constitute any party the agent of another party, nor authorize any party to make or enter into any commitments for or on behalf of any other party.

Compliance with Laws

13.4 You must comply with all laws which are relevant to You performing Your obligations under this Agreement.

### ***Assignment***

13.5 You must not assign or transfer this Agreement or any rights or obligations under this Agreement, in whole or part, without the prior written consent of PaperCut.

13.6 PaperCut may assign or transfer this Agreement, in whole or part, without Your consent to any PaperCut Affiliate or in connection with a merger, acquisition, or purchase of fifty percent (50%) or more of its assets. This Agreement will bind and inure to the benefit of each party's permitted successors and assigns. PaperCut may assign or transfer all or part of any of its rights to receive any Fees and Taxes or other monies due under this Agreement, to any person without Your consent. Notwithstanding clause 9, PaperCut may disclose any of Your Confidential Information which is reasonably necessary to affect any assignment or transfer.

### ***Waiver***

13.7 No failure or delay by a party to exercise any right or remedy provided under this Agreement or by law shall constitute a waiver of that or any other right or remedy, nor shall it preclude or restrict the further exercise of that or any other right or remedy. No single or

partial exercise of such right or remedy shall preclude or restrict the further exercise of that or any other right or remedy.

### ***Remedies***

13.8 Except as specifically provided otherwise in this Agreement, the rights and remedies provided under this Agreement are cumulative and in addition to, and not exclusive of, any rights or remedies provided by law.

### ***Severability***

13.9 If any part of this Agreement is determined to be invalid, illegal or unenforceable by any court or competent authority, such part will be severed from the remainder of the Agreement and the remaining provisions will continue in force.

### ***Force Majeure***

13.10 Except for Your obligations to pay PaperCut under this Agreement, neither party shall be in breach of this Agreement nor liable to the other party for any failure or delay in performance caused by events beyond the party's reasonable control.

### ***Agreement***

13.11 All clauses which naturally survive termination of the Agreement, including clauses 4.6, 7.1, 8, 9, 10, 12.3(b), 12.4 and 13, will survive termination of this Agreement.

13.12 The parties are entitled to rely on any notice or communication in electronic format, including any facsimile or email, that on its face appears authentic, and that has the purported author's name on it to the same extent as if it were a document written by the author. The parties consent to this Agreement being signed or varied through electronic communication.

13.13 To the extent permitted by law:

- a. PaperCut excludes any warranty or guarantee not expressly stated in this Agreement, whether express, implied or statutory, including any guarantees or warranties of acceptability and fitness for a particular purpose;
- b. this Agreement constitutes the entire agreement between the parties regarding the subject matter and supersedes all prior or contemporaneous agreements, arrangements, understandings and communications, whether written or oral.

### ***Export***

13.14 You acknowledge and agree that the Software may be subject to applicable export and import laws. You agree not to export the Software or any direct product thereof, directly or indirectly in violation of these laws, nor will they be used for any purpose prohibited by these laws, including nuclear, chemical or biological weapons proliferation.

## ***Governing Law***

13.15 If You are resident, domiciled or incorporated in the USA, this Agreement will be governed by the laws of the State of Oregon, USA, without regard to its conflict of law principles. The parties submit to the exclusive jurisdiction of the courts in the State of Oregon. You hereby agree any claims will be brought exclusively in the federal or state courts located in Oregon and the parties hereby irrevocably consent to the personal jurisdiction and venue of the courts located in Oregon for the purpose of litigating any and all such claims.

13.16 In all other cases, this Agreement will be governed by the laws of the State of Victoria, Australia, without regard to its conflict of law principles. The parties submit to the exclusive jurisdiction of the courts in the State of Victoria, Australia.

## **14. *COUNTRY-SPECIFIC PROVISIONS***

The following provisions apply to the extent required under local laws.

### ***Australia:***

#### ***Australian Consumer Law***

14.1 Our goods come with guarantees that cannot be excluded under the Australian Consumer Law (ACL). You are entitled to a replacement or refund for a major failure and for compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

14.2 The Premium Upgrade Assurance services that are provided to remedy any defect in the Software may be a "Warranty Against Defects" as defined in the ACL.

The Premium Upgrade Assurance services are provided by PaperCut Software International Pty Limited (ACN 124 440 400) of Ground Floor, 1 Oxley Rd, Hawthorn, 3122, tel +61 3 9809 5194, email address [customer.service@papercut.com](mailto:customer.service@papercut.com).

In order to make use of the Premium Upgrade Assurance services, You must contact PaperCut's support helpline during the period of your agreement for Premium Upgrade Assurance service using process in clause 5.3. When you make use of the Premium Upgrade Assurance services, PaperCut will use its best efforts to provide a remedy or a workaround for any defect in the Software in a timeframe that is reasonable given the nature of the issue and the impact on your business operations. This service is not available for Evaluation Licenses. The costs for the service in respect of the Production Licenses are included within the Fees that are set out in the Contract Details. No additional fees are payable by you for the Premium Upgrade Assurance for Production Licenses. You are responsible for any expenses you incur in using the Premium Upgrade Assurance. The benefits that we provide to consumers under our Warranty Against Defects are in addition to any other rights or remedies a consumer may have in respect of these goods or services under

the ACL. The provision of Premium Upgrade Assurance services may result in the loss of user generated data.

14.3 To the extent permitted by law, PaperCut's liability for a failure to comply with any statutory guarantee is limited to one or more of the following, at PaperCut's option:

- a. the replacement of the goods or the supply of equivalent goods;
- b. the repair of the goods;
- c. the payment of the cost of replacing the goods or of acquiring equivalent goods;
- d. the payment of the cost of having the goods repaired,
- e. unless it is not fair or reasonable for PaperCut to rely on this term of the Agreement.

14.4 If You are entitled to the benefit of a guarantee under the ACL then in respect of goods and/or services which are not of a kind that are ordinarily acquired for personal, domestic or household use or consumption, PaperCut's liability for a failure to comply with such guarantee is limited to one of the following, at PaperCut's option:

- a. supplying the goods and/or services again; or
- b. payment of the cost of having the goods and/or services supplied again,
- c. unless it is not fair or reasonable for PaperCut to rely on this term of the Agreement.

## ***USA:***

### ***USA Government Rights***

14.5 If You are a US civilian agency, the US government acquires certain parts of this commercial computer software and/or commercial software documentation or other technical data subject to the terms of this Agreement as specified in the 48 C.F.R. 12.212 (Computer Software) and 12.211 (Technical Data) of the Federal Acquisition Regulation (FAR) and its successors. If acquired by or on behalf of any agency within the Department of Defence (DOD), the US Government acquires certain parts of this commercial computer software and/or commercial software documentation subject to the terms of this Agreement as specified in 48 C.F.R. 227.7202-3 of DOD FAR Supplement (DFARS) and its successors. The US Government Rights clause is in lieu of, and supersedes any other FAR, DFARS or other clause or provision that addresses US Government rights in computer software or technical data.

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## 2 Installation

This section covers the initial installation and configuration of PaperCut MF in your network environment. Initial installation takes only a few minutes on a currently configured server. This guide walks you through installation and configuration step-by-step. The process is summarized below:

1. System requirements check
2. Downloading and installing PaperCut MF
3. Completing the configuration wizard
4. Testing client software
5. Testing printing and remote access

PaperCut MF is a cross-platform solution and the installation procedure varies depending on the target operating system(s).

- Windows: [Quick install: Windows](#)
- Mac: [Quick install: Apple Mac](#)
- Novell: [Quick install: Novell OES Linux \(iPrint\)](#)
- Linux: [Quick install: Linux \(CUPS and/or Samba\)](#)

### 2.1. Implementation by Example

PaperCut MF is a feature-packed application designed to meet the print management requirements of all types of organizations. It's unlikely that any single organization would use or need all the features in PaperCut MF. The key to a successful implementation is with identifying the features that are most needed, and utilizing them in the correct manner.

This section covers common implementation scenarios in a case study form. It discusses the requirements common to the scenario, and how these requirements are satisfied using key features. The aim of this section is to guide implementers towards identifying and utilizing the most appropriate features.

Locate the scenario that's the closest fit to your organization. It might also be beneficial to read other scenarios that might apply to your situation. For example, a large business can benefit from some of the ideas presented in the small business case and so on.

## 2.1.1. Scenario: The Small School

Fast River School has a student population of 200 and caters to students in Kindergarten through 6th grade. A teacher is responsible for each class. The school has a two computers in each class room and a small computer lab for older students. All computers are networked. A single server acts as a domain controller and a file and print server. The students in each year level log on to the computers using the username and password allocated to their class.

## Requirements

1. Each grade level has a monthly printing budget of \$50.
2. If the budget is exceeded, teachers can discuss additional funding with the school principal.
3. Student use of color printers should be approved by teachers.
4. The teacher for each grade level should have access to activity reports in order to track the class's printing volume.
5. The school principal needs a summary report of class printing activity at the end of each semester.

## Implementation

### Initial Installation

Install PaperCut MF on the school's file and print server. The initial installation process is covered in [Installation](#).

### Requirement 1

You can automate the monthly budget by applying a \$50.00 monthly quota to the [All Users] group. The domain login accounts used for each year level are automatically placed in the [All Users] group. For more information, see :

- [Groups in PaperCut MF](#)
- [Setting up quota allocations](#)

### Requirement 2

Teachers can be warned when their class's balance has reached a low balance limit. The notification can be via email. The notification option is located under: **Options > Notifications > Low Balance Notifications** . Enable the email option for email notifications.

## Requirement 3

The System Administrator can set up the printers so only selected users (i.e. teachers) can approve jobs issued to color printers. By selecting the **Only managers can release** option on a given printer, jobs are held in a queue. Teachers can then approve the student print jobs by accessing the web based release software accessed via the URL:

```
http://server_name:9191/release
```

Where `server_name` is the name of the organization's print server.

## Requirement 4

Teachers can view print activity and account balance by connecting a web browser to:

```
http://server_name:9191/user
```

Where `server_name` is the name of the organization's print server. Access to the end-user pages is covered in [Interface Levels](#).

## Requirement 5

Summary reports can quickly be generated by any user with PaperCut MF's System Administrator access. For more information about granting administrator access and running reports, see [Assigning Administrator Level Access](#).

### 2.1.2. Scenario: The Large School

North Shore High has a student population of 2000 students. Their network consists of:

- Three student Windows PC labs and one Mac lab with other computers scattered around the school for student use.
- A mixture of Mac and Windows laptops used by staff.
- A Windows Active Directory environment hosted on a number of servers.
- Printers are hosted on two separate Windows servers.
- Some teaching staff have desktop printers attached locally to their workstations.
- Each lab has a black and white laser printer.
- Two high-end color copier/printers and large format printers are located in a print room situated away from the computer labs.

Students have their own login account and small home directories for storage.

## Requirements

1. The system must support the mixed Mac and Windows environment.
2. The system should support multiple print servers and locally attached desktop printers.
3. The school wants to experiment with hosting printers on a Linux system with the aim of using Linux for print serving tasks to help save on future Windows licensing costs.
4. Students are to be granted a small \$5 a month printing budget. Final year students have a \$10 a month allowance.
5. If students need additional printing, they must purchase it. The payment process should be simple and easy to manage.
6. Jobs issued to printers situated in the print room should be held in a queue and only printed on the physical printers after the user has arrived at the room to collect the job.
7. Staff members should have the option of charging printing to department accounts or to a small personal account, depending on the type of print job.
8. Student printing should be archived for a period of 4 weeks. This allows IT staff to determine the individual students responsible for printing inappropriate material when incidents are reported.

## Implementation

### Initial Installation

The mixture of operating systems and multiple-servers makes this a complex installation. Prior to deployment, it is advisable for the network manager and/or network administrator to plan the deployment and familiarize themselves with the PaperCut MF software.

### Requirement 1

PaperCut MF is a cross platform solution designed for all major operating systems. Given the existence of an existing domain environment, the installation of Windows systems is typically straightforward. The Macs, however, can be set up in a number of different ways. Network administrators should consult [Mac Printing in Detail](#).

### Requirement 2

Multi-server installations are commonplace on larger networks. One system needs to be nominated as the primary PaperCut MF server. This system is responsible for running the "brains" of the system and storing all data. The other servers, *secondary servers*, report back to the central

primary server via XML Web Services. The system architecture, deployment considerations, and recommendations are outlined in [Multiple Print Servers](#).

## Requirement 3

Linux is becoming ever popular in the server space. First web hosting, and now common file and print services are being serviced with the Linux operating system. PaperCut MF is available for Windows, Mac and Linux systems. Not only that, its architecture allows all three systems to run side-by-side sharing a common central server. This school can experiment with hosting printers on Linux by running a Linux based secondary server alongside their main Windows servers. See [Configuring a Linux or Novell iPrint secondary print server](#) for additional information.

## Requirement 4

Quotas or allowances are allocated to users on a per-group basis. By adding network domain groups to PaperCut MF that represent the respective student groups, System Administrators can automate the allocation process. See [Setting up quota allocations](#) for further information.

## Requirement 5

The purchase of additional quota/credit is best managed by the TopUp/Pre-Paid Card system. The system reduces the data entry and management requirements associated with manual transactions. More information on TopUp/Pre-Paid Cards is covered in [TopUp/Pre-Paid Cards](#).

## Requirement 6

Print release in the print room is best achieved with the Release Station. By running a special full-screen application on a dedicated terminal in this room, students can release their jobs once they arrive at the room. The Release Station and secure printing in general is covered in detail at [Hold/release queues & Print Release Stations](#).

## Requirement 7

Tracking and allocating staff printing to departments is best achieved by using [Shared accounts](#). When set up, teaching staff are presented with a popup window asking them to select an account to charge. You can control account access via domain group membership or via PINs. More information on shared accounts is available at [Shared accounts](#).

## Requirement 8

The requirement to archive, audit and view all print activity can be accomplished by enabling [Print Archiving \(viewing and content capture\)](#). This allows approved staff to visually inspect the contents of all print jobs.

### 2.1.3. Scenario: The University

West Face University has a student population of 10,000 full-time students and off-campus and part-time students. IT services centrally control the network, however, individual faculties and departments also offer and manage some of the specialist IT infrastructure. All major operating systems are in used on both the workstations and servers.

## Requirements

1. Centrally managed printers are hosted in a clustered print server environment. The solution needs to support clustering.
2. IT services wants to provide the option for department labs to also have their printers controlled via the central system.
3. Client software needs to be optional. It would be preferable for students to have access to their account details via a web browser.
4. The design of the web interface should be customizable.
5. The system must be secure and support SSL-based encryption.
6. The system should run on top of a database system and allow data access to facilitate custom reports using packages such as Crystal Reports.
7. An open source system would be preferable.

## Implementation

### Initial Installation

University-wide deployments can be quite involved. Most large universities that have deployed PaperCut MF have worked closely with the PaperCut MF development team during implementation. A lot can be gained by arranging a teleconference or similar with the development team. We're always happy to help our customers deploy the ideal solution.

### Requirement 1

PaperCut MF supports clustering at all application layers including the print server, the database server, and the Application Server on both Microsoft Windows and Linux. Setting up PaperCut MF in Microsoft Clustering Services is covered in [Clustering and High Availability](#). The PaperCut MF development team has experience using Linux-HA (High-Availability Linux) and other tools to support customers who use Linux.

## Requirement 2

Printers and labs hosted by individual faculties and departments outside the central IT services area can optionally be joined into the campus-wide system via PaperCut MF's secondary server support. Central IT staff can approve these secondary servers via IP address and grant selected staff administrator level access to the system's admin web interface on a case-by-case basis. See [Configuring Secondary Print Servers and Locally Attached Printers](#) for more information on secondary servers.

## Requirement 3

PaperCut MF's client software is optional in a basic charging/quota environment. Users can access their accounts and view their account balance, transaction and printing history, and use advanced tools such as TopUp/Pre-Paid Cards and transfers. More information on the web-based users tools is available at [Interface Levels](#).

## Requirement 4

The design and layout of the end-user web interface can quickly be changed using HTML and Cascading Style Sheets. Customizing the end-user web design is covered in [Customizing the User web pages](#).

## Requirement 5

PaperCut MF provides secure connections for report access and administration via SSL-based encryption. Larger universities often have their own certificate signing procedure for SSL based servers. PaperCut MF can even accept these signed certificates. SSL-based encryption is set up by default and is accessed via a URL such as:

```
https://[server_name]:9192/admin
```

Information on using a custom SSL certificate is covered in [SSL/HTTPS Key Generation](#).

## Requirement 6

Hosting the PaperCut MF system on top of an external database system such as Microsoft's SQL Server offers a number of advantages including easy data access, better performance and scalability, and the ability to take advantage of existing backup processes. More information on external RDMS support is available at [Deployment on an External Database \(RDBMS\)](#).

The data structure is simple and administrators with report writing skills will quickly be able to access the data for custom reporting via tools such as MS Access or Crystal Reports.

## Requirement 7

PaperCut MF is a commercial system with commercial level support. However, unlike many other commercial applications, PaperCut Software International Pty. Ltd. does offer source code access. A number of universities have used the source code access for:

- *auditing* - verifying that the software is secure.
- *customization* - knowing how the application works and how to implement add-ons.

Large universities should also look at the large school scenario. Features such as shared accounts and secure printing are also applicable to many university environments.

### 2.1.4. Scenario: The Small Business

Northwoods Inc. is a small twelve-person Engineering and Architect Drafting office serving the local area. Their network consists of a mix of Windows XP and Windows Vista workstations connected on a Workgroup based network. Wireless network access is also provided to employees with laptops. Most staff work on a project basis and you need to track use by project code and sub-project. Some staff work on a freelance basis and management want to track and charge for color printer use on a monthly basis.

## Requirements

1. The system must be easy to set up and maintain as there is no full-time IT staff.
2. The system must work in a Windows workgroup environment.
3. Staff are to have unlimited access (i.e. no budgets).
4. Staff need to allocate their printing to projects and cost centers so printing and drafting costs can be passed back onto the clients (chargeback).
5. Managers need access to view real-time reports.
6. Data should be able to be exported to Excel on a monthly basis for billing.

## Implementation

### Initial Installation

One system on the network needs to be allocated the task of hosting the printer and the PaperCut MF application. Users will print via this system so it needs to be left on most for most of the time. An existing file server is ideal, however, someone's desktop system will also suffice (must be left on at all times).

## Requirement 1

PaperCut MF is well known for its ease-of-use. It is a self-maintaining system with a simple to use web-based interface. Apart from the initial set up, and the recommendation to incorporate the application's data into a backup procedure, no further technical administration and support is required.

## Requirement 2

Workgroup environments are common on small networks. They differ from a domain environment in that they are not centrally authenticated via a server. Users can use a system that automatically logs in as "a user" or maybe they just log in locally on their workstations. For more information on the ways in which PaperCut MF can be installed in a workgroup environment, see [Running in a Workgroup Environment](#).

## Requirement 3

You can set up all users as "unrestricted". In this mode, users can start of with a zero balance and count down as they print. Their balance indicates their printing value to date.

## Requirement 4

You can create shared accounts to represent the current projects with sub-accounts used to represent areas under these projects (sub-projects). You can enable the client popup software on user accounts forcing users to allocate printing to the project/client. In addition, the advanced client popup allows premiums to be charged for special printing such as reproduction of expensive mylar film.

Selected staff can run monthly or quarterly invoice reports at any time to quickly determine printing associated with a given client/project. For more information on shared accounts and reporting, see [Shared accounts](#).

## Requirement 5

PaperCut MF records data in real-time. Full print logs and reports are available at any time and can be accessed using a standard web browser. The manager can log in to the administration interface and access the reports at any time.

## Requirement 6

You can export all reports and activity lists to Microsoft Excel. To access the Excel data, click the small Excel icon located next to the report name, or the icon at the bottom of the print log.

## 2.1.5. Scenario: The Medium to Large Business

SandComp is a large manufacturing company consisting of 3000 employees spread over 4 sites. All sites are connected via a fast Wide Area Network (WAN). Printers are hosted on local servers with the largest site hosting printers in a Microsoft Cluster environment.

### Requirements

1. Must support a Microsoft Cluster environment.
2. Must centrally store print data on a server located at the main office.
3. Must not cause disruption if the WAN link goes down between offices.
4. The consulting division needs to be able to track printing by project (client/matter format) so costs can be passed back to their clients.
5. The finance department needs secure print release on their shared printers stored in the utility room.

### Implementation

#### Initial Installation

The implementation of PaperCut MF in this environment would best be managed using staggered or step-by-step approach. First, install and test the software on the central offices' clustered environment, then rolled out to the other offices, and finally implement the secure printing and client popups. A staggered approach is likely to minimize disruption allowing network administrators to focus on the tasks at hand.

#### Requirement 1

PaperCut MF supports Microsoft Clustering Services. The installation process is documented in [Clustering and High Availability](#).

#### Requirement 2

You can install the print servers at the remote locations as *secondary servers* reporting back to the primary server. All data is stored in one location. The services communicate using XML Web Services and consume only a few bytes per print job. This means the system works well over the WAN.

## Requirement 3

PaperCut MF has a *fail-open* design. This means that if a failure occurs, such as the network fails between servers, printing continues as normal. Businesses with WAN deployments should consider implementing a Site Server at each site to ensure continuity of Find-me Print and copy services during a WAN outage. For more information, see [Resiliency with Site Servers](#).

## Requirement 4

The consulting division can make use of the share accounts feature to track their printing by client. More information on shared accounts is available in [Shared accounts](#). These advanced users would benefit from using the advanced popup. The advanced popup offers advanced searching features allowing end-users to quickly locate the appropriate account and enter job comments as required.

## Requirement 5

You can facilitate secured print release by setting up a terminal (a low-end PC will do) in the finance department's utility room. When a member of the finance department prints to a shared printer, their document will hold in the queue until that member goes to the utility room and releases the print job with his or her username and password. This process ensures that documents stay secure and can't be "accidentally" collected by other people.

### 2.1.6. Scenario: The Public Library or Internet Cafe/Kiosk

The Sandy Beach Cafe is a typical Internet cafe offering Internet access, faxing, printing and other services. This business has 50 computers and two printers. A black & white laser printer called "Black and White Printer" and a high-end color inkjet system named as "Color Printer". They want to implement a pay-per-print system that meets the following process and requirements:

## Requirements

1. The customer prints the job to the appropriate printer.
2. At the front desk, the customer pays a staff member for the print job.
3. The staff member releases the job for printing.
4. The customer collects the print job.

# Implementation

PaperCut MF's hold/release queues are ideally suited to the Internet cafe scenario. More information on the hold/release queues is available at [Hold/release queues & Print Release Stations](#). PaperCut MF provides both an application interface for *Release Station managers* (i.e. desk staff) as well as a convenient web browser-based interface. To summarize a typical implementation:

1. The PaperCut MF server software is installed on the system hosting the printers. An existing server or desktop system will suffice.
2. Workstations are configured to print to the printers shared on the system set up in step 1.
3. Inside the PaperCut MF admin interface, the printers should have the **manager only release** option selected.
4. Desk staff can view and control pending print jobs, their cost, and other details via the web based release interface accessible at the URL:

```
http://server_name:9191/release
```

## 2.2. Capacity Planning

This section discusses capacity planning considerations to allow administrators to plan future infrastructure requirements and make decisions about how to deploy the application.

PaperCut MF is designed to be self-maintaining, however, it is important that the administrator understands the disk-space requirements and how this changes overtime.

### 2.2.1. Database Sizing and Growth

The most important part of capacity planning for PaperCut MF is the size and growth of the underlying database. All other aspects of the system manages itself, but care must be taken to ensure there is enough disk space to hold the growing database.

The size and growth of the database depends on the database being used. Each database uses a different format to store their data, therefore the growth characteristics of databases differ. This section outlines the database growth characteristics of:

- The internal database (Apache Derby)
- Microsoft SQL Server

For more information on running PaperCut MF on external databases, see [Deployment on an External Database \(RDBMS\)](#).

Database growth is very dependent on the usage patterns and therefore differs significantly from site to site. The best way to predict database growth is based on the rate of print jobs performed. Although, there is some overhead for other data (like users, groups, printers, etc.), this data is

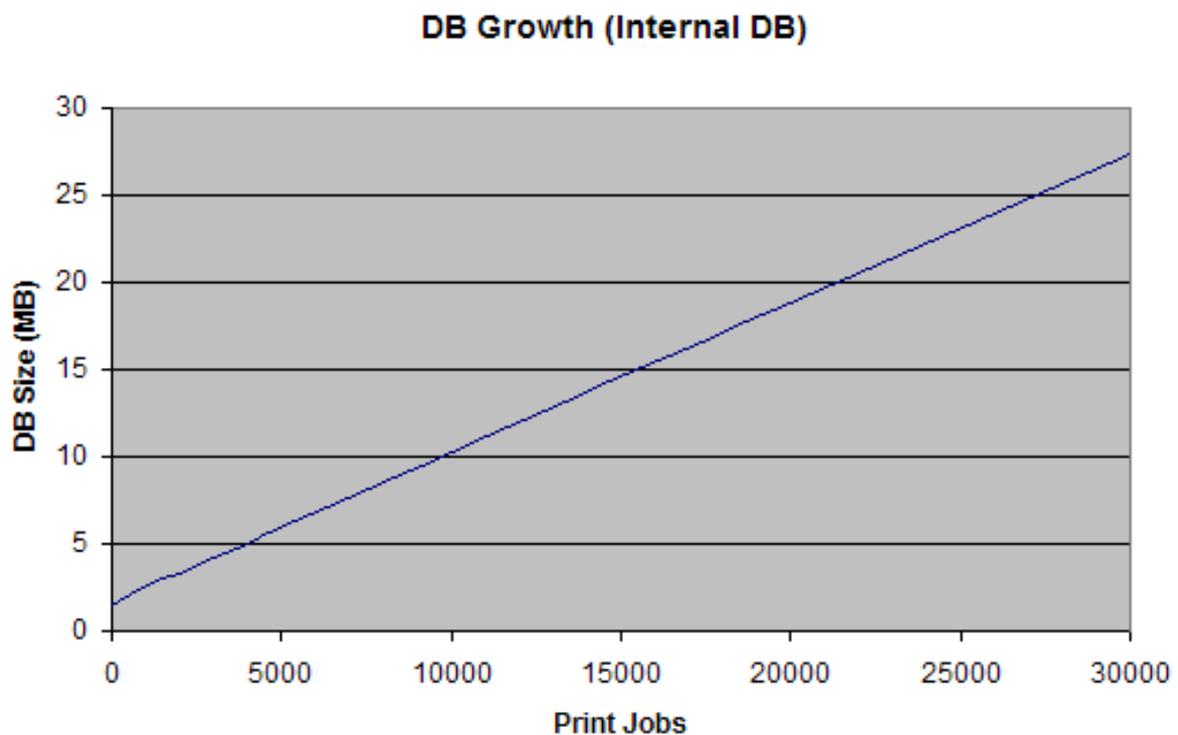
static and does not grow over-time. The majority of database growth is caused by print and transaction logs.

The growth calculations performed below provide an indication of growth per 1000 or 10000 print jobs. Then using these numbers and your estimate of the rate of printing in your organization, you make a growth estimate. See [Sample database growth calculation](#) for an example of this calculation.

### 2.2.1.1. Internal database growth

Most PaperCut MF installations use the internal database. This database is suitable for most organizations, however, some prefer to run using an external database (see [Deployment on an External Database \(RDBMS\)](#)).

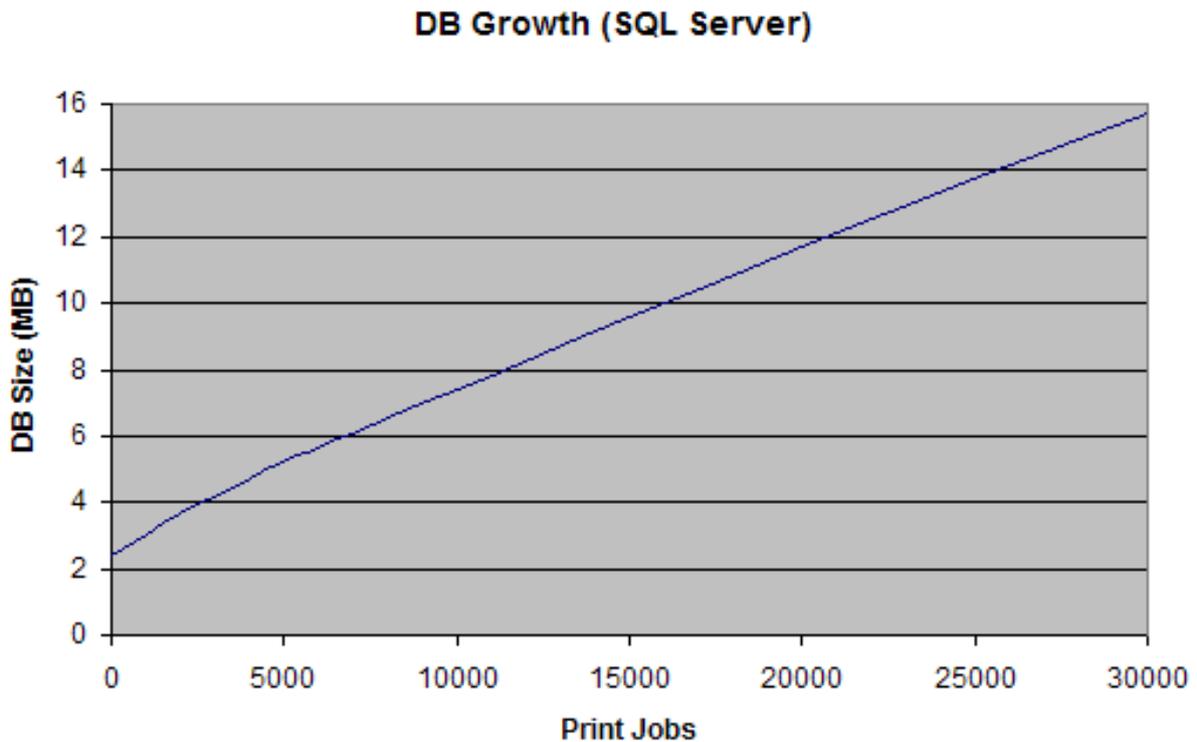
The following graph shows the database size increase with the number of print jobs.



**Figure 3: Database growth using the internal database**

These results show that the internal database grows by approximately 8.5MB per 10,000 print jobs.

### 2.2.1.2. SQL Server database growth



**Figure 4: Database growth using a Microsoft SQL Server database**

These results show that a Microsoft SQL Server database grows by approximately 4.5MB per 10,000 print jobs.

### 2.2.1.3. Sample database growth calculation

This section provides a sample of how to estimate the database growth for your environment. To perform this calculation you need to make a number of assumptions. Adjust these assumptions to suit your organization. The assumptions are:

- 1 print job per user per day
- 20 working days in a month
- Therefore, 20 print jobs per user per month

Here is a sample database growth calculation based on a 500 user site using the internal database:

1. Calculate the total number of print jobs expected for the month. (i.e. the total number of users multiplied by the number of print jobs).  $500 * 20 = 10,000$ . So in this example, PaperCut MF is handling 10,000 print jobs a month.
2. Calculate the monthly growth rate by dividing the jobs per month by 10,000 and then

multiplying by the database growth rate (i.e. for the internal DB this is 8.5MB for 10,000 jobs). So,  $10,000 / 10,000 * 8.5 = 8.5\text{MB}/\text{Month}$ . Therefore in this situation the internal database will grow by approximately 8.5MB per month.

3. To estimate the growth per year, multiply the above by 12. Therefore in this situation, the database will grow by  $10.2 * 12 = 122.4\text{MB}$  per year.

## 2.2.2. Print Archives Sizing and Growth

If PaperCut MF is configured to use Print Archiving then additional disk space is required to store the archive files. The amount of space required depends on a number factors unique to your site:

- Number of print jobs
- Average size of print jobs spool files
- Archive retention policy
- Backup plan

Proactively monitor your archive directory size over time to understand your specific requirements. For further information, see [Print Archiving \(viewing and content capture\)](#).

## 2.2.3. Network Bandwidth Planning

With modern switched Ethernet networks, bandwidth is rarely a factor when planning PaperCut MF deployments. The bandwidth consumed by PaperCut MF is usually dwarfed by the print document data - e.g. the Postscript spool data sent across the network. Bandwidth does, however, become a consideration when planning deployments crossing physical site boundaries such as networks linked via a WAN.

PaperCut MF uses an XML based web services protocol for communication between client-to-server and server-to-server. This protocol is very bandwidth efficient and designed to work well on low bandwidth and high latency networks.

### 2.2.3.1. Bandwidth Estimates

Bandwidth consumption can be summarized as follows:

#### Server-to-Server

Other than normal print server traffic (standard job spooling), PaperCut MF generates XML-RPC based Web Services based traffic on port 9191. Connections are made from the print server to the main PaperCut MF Application Server (primary server). Normal activity is around 1-2kb of traffic for for each print job. Connections are instigated from the secondary server. Network packets are only sent during printing activity.

## Client-to-Server

Connections are instigated by the client inbound to the server on port 9191 and 9192 (Encrypted SSL). While at idle, the client consumes a few bytes once every minute (a keep-alive heartbeat). During print activity, up to 1-2kb per print job can be consumed depending on client popup settings.

If using account selection popups, the client must download the latest account list from the server whenever it is updated. The accounts are downloaded in a very efficient compressed format (approximately 20 bytes per account). If you have 10's of thousands of accounts, and many clients running on remote sites with limited bandwidth, see [Managing large client billing databases](#).

### 2.2.4. Managing large client billing databases

When using the [The Account Selection Popup](#), the User Client displays a list of client accounts for the user to choose from. This account list is downloaded from the server whenever the account list is updated (i.e. new accounts added). The accounts are downloaded in a very efficient compressed format (taking approximately 10-20 bytes per account). This works very well on the vast majority of sites that have less than 10,000 accounts and are running on fast network connection.

On sites that have 10's of thousands of accounts and many workstations on remotes with bandwidth-limited WAN connections the accumulated bandwidth usage could be significant. To reduce this bandwidth usage, you can configure the clients to load the accounts from a file stored locally at each site. When the accounts are updated on the server, you can recopy the file to each site. This distributes the client account list to all users at a site by sending the account list over the network only once, instead of one copy per workstation/client.

The process works as follows:

1. On the server the administrator sets up a scheduled task to run the server command to generate the client accounts file as follows:

```
server-command create-user-client-accounts-file
```

This creates the client account file in `[app-path]/server/data/client/client-accounts.dat`.

For more information running `server-command` see [Server Commands \(server-command\)](#). See below for a sample batch file.

2. Copy the `client-accounts.dat` to each of the sites running the client software. Copy the file to a shared location accessible by all users running the client (e.g. a file share).



**Tip:** If you are using Microsoft distributed file system (DFS), you can copy the client account file to the distributed share. DFS then efficiently distributes the file to all your remote sites.

3. Configure the User Client to run with the

```
--accounts-file "\\filesrv\path\to\client-accounts.dat"
```

option. Clients at each site should use the accounts file stored locally at that site. The account file location can also be specified in the client's `config.properties` file. For more information on client configuration settings see [User Client Options](#).

4. Clients then load the accounts from the file and not directly from the server. The client only loads the accounts from the server if it fails to load the accounts file (i.e. the file does not exist).

Below is an example batch script that you can schedule to run regularly on your PaperCut MF server. Schedule this to run whenever your shared accounts are updated (e.g. once a day). Modify the script to reflect where PaperCut MF is installed and where the client file is distributed.

```
REM Batch file to create and distribute the client accounts
file
REM Create the client account file
[app-path]\server\bin\win\server-command create-user-client-
accounts-file
REM === COPY TO SERVER 1 ===
REM Copy to destination server
REM Create temp file, so clients do not load an incomplete
file.
copy /y [app-path]\server\data\client-accounts.dat \\s-
vr1\share\accounts.tmp

REM Rename the temp file the final account file name used by
the User Clients
move /y \\svr1\share\accounts.tmp \\svr1\share\client-account-
s.dat

REM === COPY TO SERVER 2 ===
copy /y [app-path]\server\data\client-accounts.dat \\s-
vr2\share\accounts.tmp
move /y \\svr2\share\accounts.tmp \\svr2\share\client-account-
s.dat
```

### 2.2.4.1. Known limitations

There is one minor limitation of using the client account file approach. When the account selection popup is displayed, it lists all the defined accounts (even if the user does not have permission to charge to these accounts). The server still enforces security to ensure that users can only charge to the accounts they have permission to access.

## 2.3. Installation on Windows

## 2.3.1. Quick install: Windows

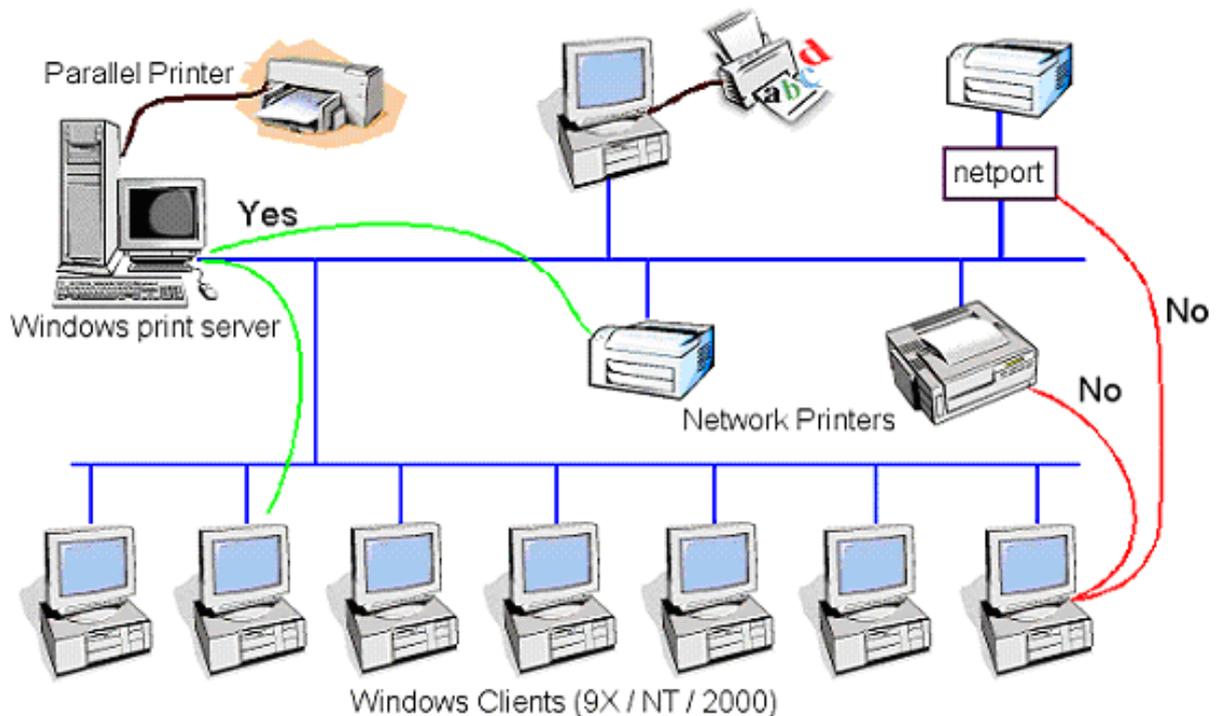


**Important:** This guide assumes that you are using Windows Server 2008. The process is similar for other Windows operating systems such as XP, Server 2003 or Windows 7. If you're upgrading from a previous PaperCut MF version, refer to the directions outlined in [Upgrading From a Previous Version](#).

### 2.3.1.1. Step 1 - System Requirements & Network Setup

Before installing PaperCut MF for either evaluation or production use, the System Administrator should take a few minutes to verify system requirements.

- Is the operating system version supported and patches up-to-date? Take a few minutes to verify the system is current and supported (see [System Requirements](#)).
- In workgroup environments (i.e. where no domain is present), some additional configuration is required. For more details see [Running in a Workgroup Environment](#).
- Are printer(s) installed and hosted on this system? PaperCut MF needs to be installed on the system directly hosting the printer(s). Install the printer as a "Local Printer" with a connection method such as TCP/IP Port, LPR, or JetDirect or directly connected to the system via USB or LPT Port.
- In a multi-user environment, printers are often shared with other network users. Other workstations should connect to these printers as "Network Printers". Ensure workstations are configured to print to the shared print queues. For example, a Windows workstation might connect to a printer via a path like: `\\[samba_server]\[printer]`.
- Ensure that printers are configured correctly and work *before* installing PaperCut MF.



**Figure 5: Network printer configuration**

**Important:** If you are running the PaperCut MF server on Windows XP (Professional) you must disable "Simple file sharing". For more information, see [Troubleshooting & Technical FAQ's](#). If you are running a Windows workgroup network or using Windows XP/Vista Home workstations, see [Running in a Workgroup Environment](#).

### 2.3.1.2. Step 2 - Print Queue Configuration

When using Release Stations or account selection popups, PaperCut pauses jobs on the Windows print queue to hold jobs prior to printing. It is important, especially in charging environments, that the queue is secured to prevent users from resuming jobs themselves and bypassing PaperCut. There are two ways a Windows print queue can be secured:

1. Configure the queue using the PaperCut TCP/IP Port.
2. Restrict the print queue security permissions to prevent users from performing management functions.

## Using the PaperCut TCP/IP Port

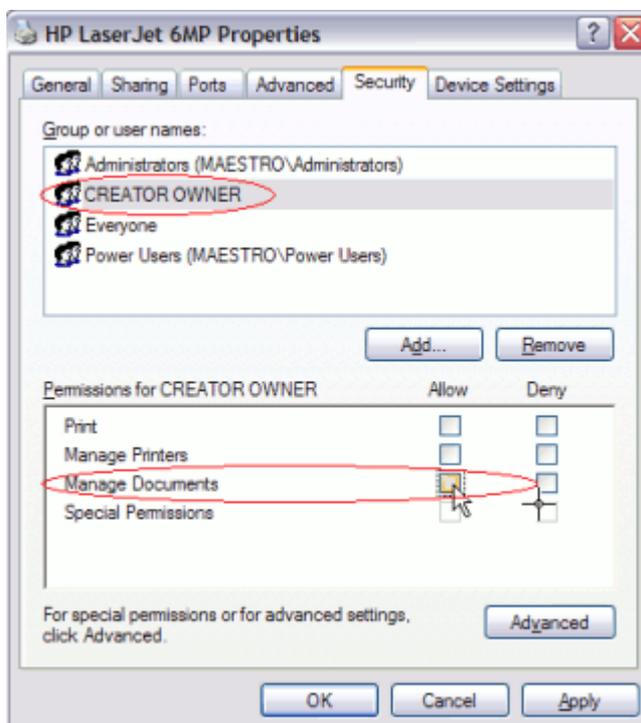
Queues configured to use the PaperCut TCP/IP Port automatically ensure that manually resumed jobs will not be printed. You will already be using a PaperCut TCP/IP Port if you are using hardware page count validation. You can see which port is being used in the **Ports** tab under **Printer Properties**. If you are not currently using PaperCut TCP/IP ports, see [Windows printer queue configuration](#).

## Restricting Windows Print Queue Security Permissions

This method works for most versions of Windows. However, it might interfere with printing on Windows 8.1 and Windows 2012R2. On these systems you should secure printing using PaperCut TCP/IP ports.

To restrict security permissions for a queue:

1. Log onto the server hosting the printers as an Administrator.
2. Open the printer configuration screen: **Start > Printers**
3. Right-click a printer and select **Printer Properties**.
4. Select the **Security** tab.
5. Select the **CREATOR OWNER** user and uncheck the **Manage Documents** permission.



6. Click **OK**.
7. Perform these steps for each of the monitored printers.



**Tip:** When using Windows 2008 Server, use the Server Manager, navigate to the Print Management Console and globally set the security permissions by right-clicking the **Print Server(s) > Properties > Security** and editing the permissions there. This applies only to printers added *after* the global permissions are changed, not for pre-existing printers.

## Windows Server 2008 R2 only

Windows Server 2008 R2 installations can experience an issue where print jobs are not removed from the print queue when completed. These jobs stay in the queue with a status of 'Sent to Printer'. To work around this, configure the Printer Driver Isolation so that jobs are removed from the queue when completed.

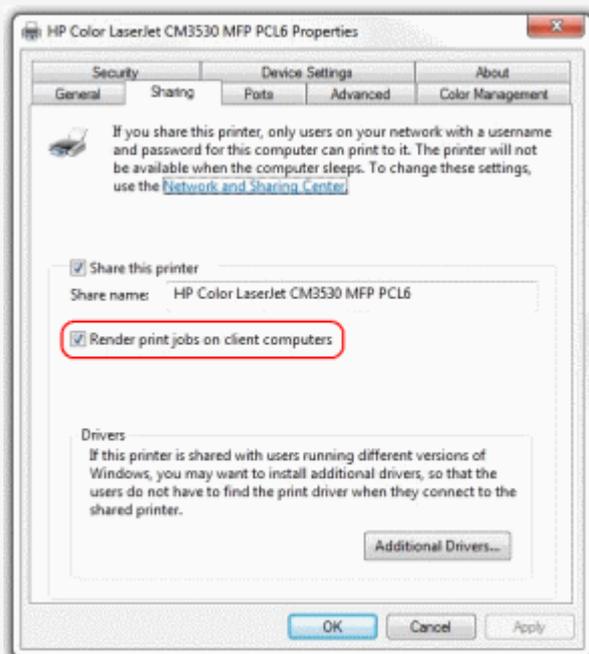
1. Log onto the server hosting the printers as an Administrator.
2. Using the Server Manager, navigate to the Print Management Console: **Server Manager > Roles > Print and Document Services > Print Management > Print Servers > PrintServerName > Drivers**
3. Right-click a printer driver and select **Set Driver Isolation > None**.
4. Perform these steps for each of the monitored printers drivers.

Windows 2008 R2 installations might require hotfix KB2906850 to be installed. Consult with your Microsoft experts regarding the suitability of this hotfix.



### Tip:

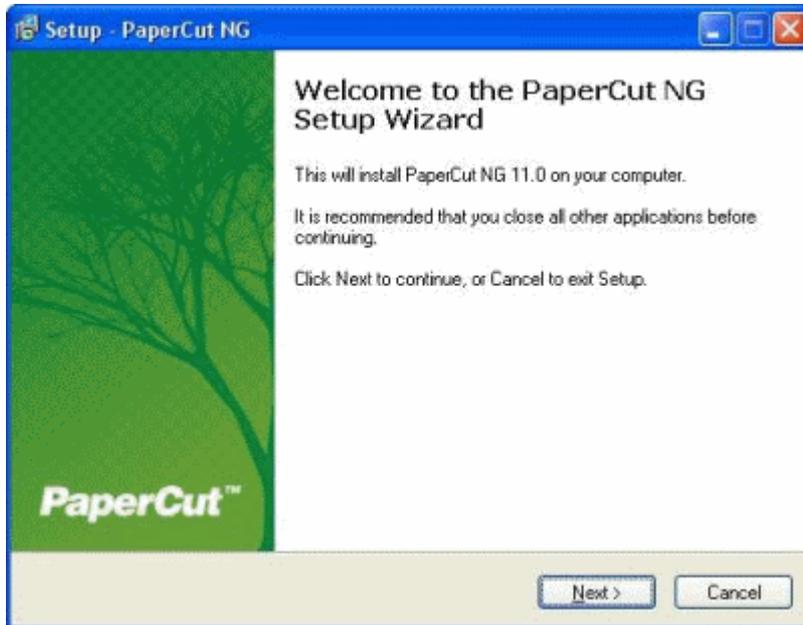
If you receive an "Access denied" error when changing both the **CREATOR OWNER** permissions and the **Print Driver Isolation** settings, turn off the **Render print jobs on client computers** found under the Sharing Tab for that printer.



### 2.3.1.3. Step 3 - Download and Install

PaperCut MF is supplied as a standard Windows `setup.exe` install program. You can download the latest version from <https://www.papercut.com>. This installer automatically detects whether

your operating system is 32 or 64-bit and installs a version of the software optimized for your system. After the download is complete, run the setup wizard as an administrator level user. A system restart is usually not required but administrators are advised to perform installation on live production systems during periods of low activity - for example, not during backup operations or other administration activities.



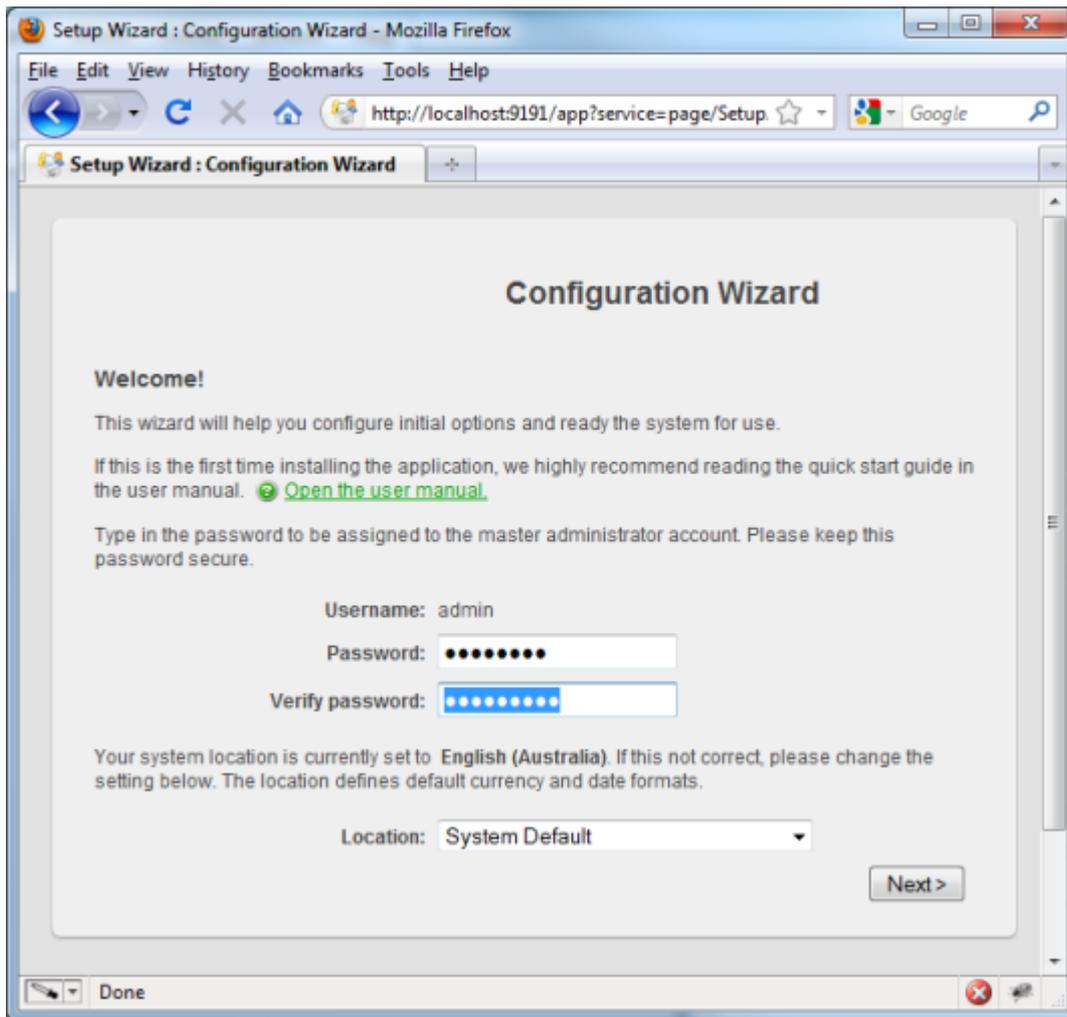
Select the "Standard installation (primary server)" option and install PaperCut MF onto a hard drive with adequate free disk space. The default options will suffice for most systems.

#### 2.3.1.4. Step 4 - Configuration Wizard

After installation, a web browser window is displayed. The configuration stages are explained below:

### Administrator Password

This is the master password for the main in-built admin account, and is independent of the operating system or domain passwords. The password must meet minimum strength requirements, and must be at least six characters. Ensure that knowledge of this password is kept secure. This screen also sets the system's physical location and language; ensure that these are correct before proceeding.



**Tip:** Treat this password the same as your router/modem management passwords. It is independent of your domain accounts and needs to be kept secure.

## Organization Type

This is the organization type that matches the organizational environment where PaperCut MF is used. Choosing the appropriate organization type determines which system defaults are used on setup. For example, in a Professional (Client Billing) organization, where it is useful to charge-back printing to customers, an advanced client popup is provided with additional features useful for dealing with large numbers of client (shared) accounts. You can change these default settings chosen for an organization type after installation.

## Default Print Cost

This is the default cost-per-page assigned to the printers. You can change this setting on a per-printer basis after installation. Choosing a sensible cost now helps minimize future setup. For

example, in the USA, a value of \$0.05 would be appropriate for many standard black & white printers.

## Initial User Credit (for Education installations)

When the organization type is set to Education, you can assign users an initial starting credit. This ensures they have funds in their account as soon as the system is enabled. An option also exists to control what happens when users run out of credit/quota. If you are evaluating PaperCut MF it might be appropriate not to disable printing when a users funds run out. This way you can be assured that user printing is not disrupted during the evaluation. You can change these settings after setup.

## User/Group Synchronization

PaperCut MF extracts user information out of the System or Domain. The options presented here vary depending on the Operating System and its environment. During evaluation, most sites import all users from the system/domain into PaperCut MF. An option also exists to import a subset of users from a given group. This option is useful when only a subset of users will use the printers.

**User/group synchronization**

The system will synchronize user and group information from a network, domain or computer. Please select the user information source.

User source: **Windows Standard**

Import all users

Import a subset of the users  
e.g. a group or org unit. (This will be selected on the next page)

< Previous    Next >

Options on Microsoft Windows include **Windows Standard**, **Active Directory**, or **LDAP**. In a domain environment, **Active Directory** is the default option as this offers access to Organization Units, Nested Groups and other AD features.

Use the **Test Settings** to test and confirm your settings before continuing.

## Client Settings in Professional (Client Billing) installations

In a Professional (Client Billing) environment, the main focus is on allowing users to allocate print jobs to client (shared) accounts. The process works by:

- Pausing all jobs that enter the print queues.
- Displaying a popup on the user's workstation asking them to allocate the print job to an account. This is done by selecting the account from a list.
- After the user has responded to the popup, the job is released to the printer.

You can read more about the account selection process and shared accounts at [Shared accounts](#).

The account selection popup option is enabled at the user level. Once the option is enabled, the user *must* run the client software. If the client software is not running, the popup cannot display, and the job remains paused in the print queue. This option is considered high impact. You are presented with two strategies that allow you to choose the implementation approach that best suits your needs:

## Minimal impact (Initial single user testing)

In this strategy the account popup is only initially enabled on a single user for testing. You need to nominate the testing account; this can be an existing system/domain account used for testing purposes or even your own user account. The username should be in the format used to log in to the domain/system (usually the short form).

The minimal impact strategy allows you to test the popup with the nominated test system/domain user account, after which you can enable the **Advanced Account Selection Popup** option for other users as appropriate.

## Immediate implementation (Enable for all users)

This strategy enables the account selection popup on all users, and is often preferred for smaller networks as it minimizes the required post-install configuration. Once the client has been deployed, the system is operational. If this option is selected, install the client software on user desktops (see Step 7) immediately to prevent disruption of user printing services.

If in doubt, select the minimal impact strategy. This ensures the impact is isolated to only the nominated test account.

## Verify Setup Options

Prior to enabling the configuration options that you have selected, you can verify the setup options. At this stage you are still able to return to any of the prior configuration screens to alter options before clicking **Finish**.

## Wizard Completion

After completing the configuration wizard you are presented with a user synchronization status screen, showing the progress and results of the system completing its initial setup. Once you have closed that, click **Login** to access the interface and begin familiarising yourself with the options

and features available. Take some time to explore, and refer back to the relevant sections of this manual as required.

### 2.3.1.5. Step 5 - Printer Configuration

The printers are automatically detected, and listed under the **Printers** section. If the printers do not display, try printing a document. The first job triggers registration.

### 2.3.1.6. Step 6 - Sharing Client Software

The PaperCut MF client software is located in the directory `[app-path]/client`. This software needs to be shared over the network so workstations can access/install the client application. The directory is automatically shared in read-only form as `PCClient` as part of the install process. Confirm that you can access the client software via the network by browsing to `\\server\PCClient`.

### 2.3.1.7. Step 7 - Client Software Deployment (Optional)

The PaperCut client software can now be deployed if required. The client software is not required for basic print tracking and reporting. Some features the client software provides include:

- Displays notification messages, such as why a print job was denied.
- Displays print policy popups, such as to encourage duplex printing.
- Displays popups for shared account allocation/charging (department accounts, client billing).
- Allow the user to confirm the details and/or cost of their print job before printing.
- Shows the user their current balance (useful in schools where print quotas are used).
- Can be used for authentication when printing from public terminals or other unauthenticated systems.

For a professional (client billing) installation the client software is required so that users can allocate print jobs to client (shared) accounts via a popup. It is recommended to follow the steps in [User Client Deployment](#) for best practice client deployment methods. After the client software is deployed, you can enable the account selection popup for all users. For more information, see [Enabling the Advanced Account Selection Popup For All Users](#).

For other installation types the client software is optional. If you choose not to deploy the client software you can still deploy it in the future.

For more details about the client software see [User Client](#). For details about deploying the client software see [User Client Deployment](#).

### 2.3.1.8. Step 8 - Testing

Following a fresh installation, it is highly recommended to test core features of the system. For further details, see [Testing the Installation](#).

### 2.3.1.9. What Next?

This concludes the Install Guide. Take some time to explore the features of PaperCut MF before continuing reading at [Implementation by Example](#) or [Tour](#). Business users might be interested in trying the popup client software as covered in [Client Software](#). If desired, the client software should also be deployed to other workstations. This procedure is detailed in [User Client](#).

## 2.3.2. Running in a Workgroup Environment

A workgroup environment differs from a network domain model. In the domain model, users authenticate using a common username/password as defined in a central server. Users can typically access and use any PC on the network by using their username and password. In a workgroup, the computers are loosely coupled and user identity is validated locally rather than centrally. The computers are either set up to automatically log in as a general "user", or user accounts are set up on the computers as required.

For systems running Windows XP Home, 'simple file sharing' cannot be disabled, forcing client machines to try to authenticate as the Guest user. For this reason, we do not recommend the use of Windows XP Home in multi-user environments.

Users can still authenticate with PaperCut MF on Windows XP Home by entering their details into the User Client utility. This is similar to how user authentication is performed with Mac clients. For more information see [Option 2: Authenticating via popup](#).

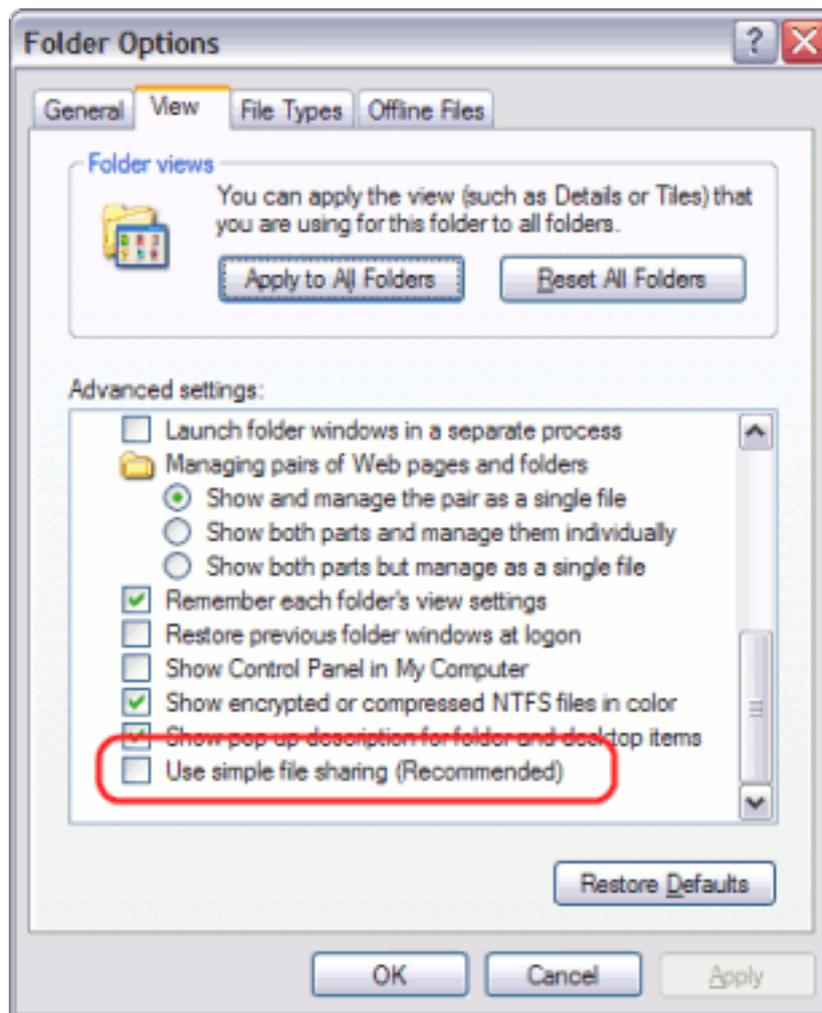
PaperCut MF offers a number of options for running and authenticating users in a workgroup. The two common options are:

### 2.3.2.1. Option 1: Common username and passwords on all systems

This option is suitable for networks running Windows 2000 or Windows XP Pro.

1. Nominate a system to host the printers and the PaperCut MF server software.
2. Set up the printers and share with appropriate names.
3. Windows XP only: Turn off simple file sharing by
  - a. Open Windows Explorer.
  - b. Select **Tools > Folder Options**

- c. On the **View** tab, clear the appropriate check box.



On the nominated host system, ensure that the `Guest` account is disabled. To do this on a system running Windows XP:

- a. Open the `Local Users` screen: **Start > Control Panel > Administrative Tools > Computer Management > Local Users and Groups > Users**
  - b. Right-click the `Guest` user; then select **Properties**.
  - c. On the **General** tab, select **Account is disabled**.
  - d. Click **OK**.
4. This should also be performed for any system running a Release Station.
  5. On the nominated host system, set up user accounts for all users via **User Accounts** in the **Windows Control Panel**.
  6. Set permission on the printer so only these users can access the printer shares (i.e. don't

allow guest).

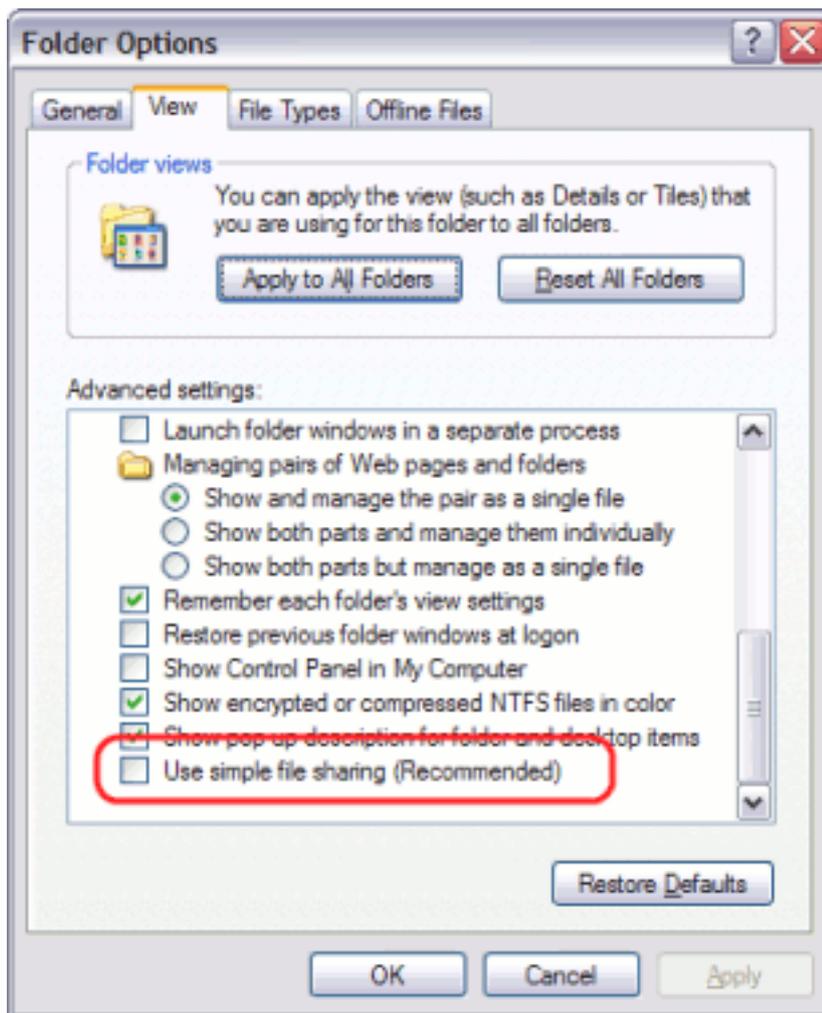
7. Install the PaperCut MF server software and complete the configuration wizard.
8. Instruct each user to log onto their workstation using an account with the same username and password as set up for them on the nominated host system. This ensures that their jobs list in the queue under their username.

### 2.3.2.2. Option 2: Authenticating via popup

[Option 1: Common username and passwords on all systems](#) might not be appropriate for some environments. For example, Windows XP Home edition has a limitation that ensures that all users list as "guest" when printing to a remote printer. You can work around this limitation with popup authentication.

1. Nominate a system to host the printers and the PaperCut MF server software.
2. Windows XP only: Turn off simple file sharing by
  - a. Open Windows Explorer.
  - b. Select **Tools > Folder Options**

- c. On the **View** tab, clear the appropriate check box.



On the nominated host system, ensure that the `Guest` account is disabled. To do this on a system running Windows XP:

- a. Select **Start > Control Panel > Administrative Tools > Computer Management > Local Users and Groups > Users**.  
The **Local Users** screen is displayed.
  - b. Right-click the `Guest` user; then select **Properties**.
  - c. On the **General** tab, select **Account is disabled**.
  - d. Click **OK**.
3. This should also be performed for any system running a Release Station.
  4. On the nominated system, set up user accounts for all users.
  5. Install the PaperCut MF server software and complete the configuration wizard.

6. Print from another workstation. The job should list in PaperCut MF under the user "guest".
7. In the PaperCut MF admin interface, enable the **account selection popup** and turn off the **Allow user to charge to their personal account** option and enable the **Allow user to perform printing as another user**.

**Print account selection**

Show the account selection popup

**Warning:** This setting requires this user to run the client software at all times.

**Information to show in popup**

- Allow user to charge to their personal account
- Allow user to select shared accounts (from list)
- Allow user to select shared accounts (using a PIN)
- Allow user to perform printing as another user

**When shared account is selected**

- Charge shared account
- Charge personal account (and allocate to shared account for reporting)

8. Install the client software on each workstation. See [User Client](#).
9. When the user prints to the shared printer, a popup now asks the user to enter a username and password.

## 2.4. Installation on Mac

### 2.4.1. Quick install: Apple Mac

#### Important:

This guide assumes that you are installing on Mac OS X (either server or workstation) hosting and sharing printers. This guide refers to this system as the 'server'. This represents the role of the system rather than the 'edition' of the operating system. PaperCut MF equally supports both the server and workstation versions of Mac OS. If you're upgrading from a previous PaperCut MF version, refer to the directions outlined in [Upgrading From a Previous Version](#).

The following section assumes the reader has knowledge of general Mac OS X server management. Although the installation process is graphical, it would be an advantage to have knowledge of the command-line, creating users, editing configuration files and an understanding file permissions.

### 2.4.1.1. Step 1 - System Requirements

Before proceeding with the installation the System Administrator should take a few moments to verify system requirements. Is the operating system version supported and are patches up-to-date? Take a few minutes to verify the system is current and supported (see [System Requirements](#)).

### 2.4.1.2. Step 2 - Print Queue Setup

Most small to medium Mac networks configure their workstations to print directly to the physical printers. This method of printing is *not* supported by PaperCut MF and instead administrators must set up global server hosted print queues. Some administrators are familiar with server queues, while others might need to invest some time into understanding Mac printing in more detail. The topic of Mac printing is complex and is deserves its own chapter! Read the first section of [Mac Printing in Detail](#) and ensure your organization's printers are set up as required.

Administrators should ensure that the server based print queues are set up and working as expected *before* attempting to install PaperCut MF.

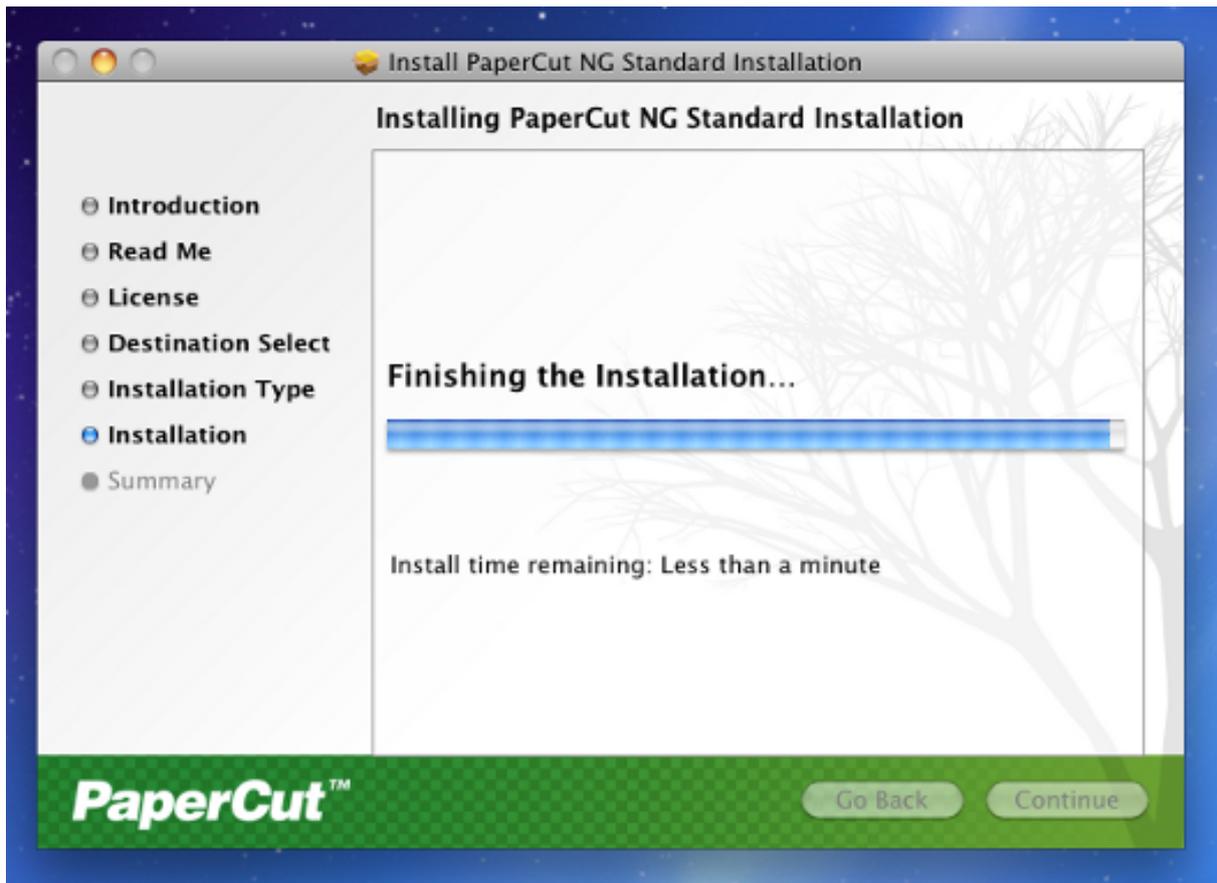
### 2.4.1.3. Step 3 - Download and install

PaperCut MF is supplied as a standard disk image containing the installer. Log on as an `admin` level account. Download and double-click Mac installer. Double-click the installer package named `PaperCut MF Standard Installation.pkg`. Follow the directions on the screen. The installation process takes between two and five minutes depending on the speed of the system. A system restart is not required but administrators are advised to perform installation on live production systems during periods of low activity - for example, not during backup operations or other administration activities.

The default install location is `/Applications/PaperCut MF`



**Important:** Make sure you're installing the correct package. The similarly named `PaperCut MF secondary server Installation.pkg` only installs part of the application and is designed for more advanced networks.

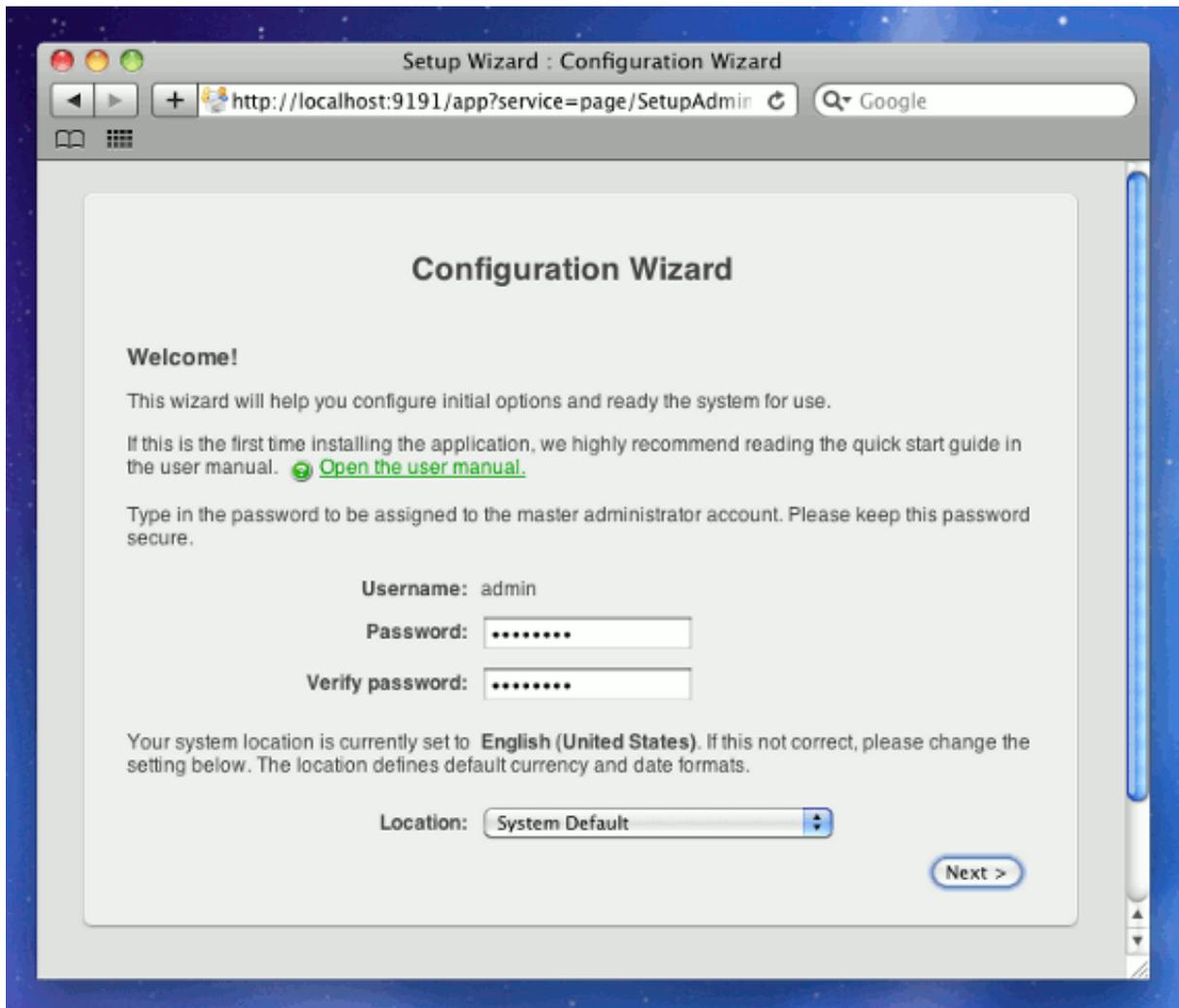


#### 2.4.1.4. Step 4 - Configuration Wizard

After installation, a web browser window is displayed. The configuration stages are explained below:

### Administrator Password

This is the master password for the main in-built admin account, and is independent of the operating system or domain passwords. The password must meet minimum strength requirements, and must be at least six characters. Ensure that knowledge of this password is kept secure. This screen also sets the system's physical location and language; ensure that these are correct before proceeding.



**Tip:** Treat this password the same as your router/modem management passwords. It is independent of your domain accounts and needs to be kept secure.

## Organization Type

This is the organization type that matches the organizational environment where PaperCut MF is used. Choosing the appropriate organization type determines which system defaults are used on setup. For example, in a Professional (Client Billing) organization, where it is useful to charge-back printing to customers, an advanced client popup is provided with additional features useful for dealing with large numbers of client (shared) accounts. You can change these default settings chosen for an organization type after installation.

## Default Print Cost

This is the default cost-per-page assigned to the printers. You can change this setting on a per printer basis after installation. Choosing a sensible cost now helps minimize future setup. For

example, in the USA, a value of \$0.05 would be appropriate for many standard black & white printers.

## Initial User Credit (for Education sites)

When the organization type is set to Education, you can assign users an initial starting credit. This ensures they have funds in their account as soon as the system is enabled. An option also exists to control what happens when users run out of credit/quota. If you are evaluating PaperCut MF it might be appropriate not to disable printing when a users funds run out. This way you can be assured that user printing is not disrupted during the evaluation. You can change these settings after setup.

## User/Group Synchronization

PaperCut MF extracts user information out of the System or Domain. The options presented here vary depending on the Operating System and its environment. During evaluation, most sites import all users from the system/domain into PaperCut MF. An option also exists to import a subset of users from a given group. This option is useful when only a subset of users will use the printers.

**User/group synchronization**

The system will synchronize user and group information from a network, domain or computer.  
Please select the user information source.

User source: **Windows Standard**

Import all users

Import a subset of the users  
e.g. a group or org unit. (This will be selected on the next page)

< Previous    Next >

Options include **Mac Standard** (PAM, Local NetInfo, etc.), **LDAP** (Open Directory), or **Samba**. Select **Mac Standard** if the user accounts are set up and defined on the local system. This option works with most Mac networks.

The LDAP option is appropriate for large networks with existing Open Directory domains. This includes networks running Mac OS X Server with Open Directory, and Windows domains running Active Directory. PaperCut MF does it's best to auto discover LDAP settings, but some knowledge of LDAP and/or Open Directory is required. More information on LDAP is available in [Using LDAP for user synchronization](#).

Use the **Test Settings** to test and confirm your settings before continuing.

## Client Settings in Professional (Client Billing) installations

In a Professional (Client Billing) environment, the main focus is on allowing users to allocate print jobs to client (shared) accounts. The process works by:

- Pausing all jobs that enter the print queues.
- Displaying a popup on the user's workstation asking them to allocate the print job to an account. This is done by selecting the account from a list.
- After the user has responded to the popup, the job is released to the printer.

You can read more about the account selection process and shared accounts at [Shared accounts](#).

The account selection popup option is enabled at the user level. Once the option is enabled, the user *must* run the client software. If the client software is not running, the popup cannot display, and the job remains paused in the print queue. This option is, therefore, considered high impact. You are presented with two strategies that allow you to choose the implementation approach that best suits your needs:

### Minimal impact (Initial single user testing)

In this strategy the account popup is initially enabled only on a single user for testing. You need to nominate the testing account; this can be an existing system/domain account used for testing purposes or even your own user account. The username should be in the format used to log in to the domain/system (usually the short form).

The minimal impact strategy allows you to test the popup with the nominated test system/domain user account, after which you can enable the **Advanced Account Selection Popup** option for other users as appropriate.

### Immediate implementation (Enable for all users)

This strategy enables the account selection popup on all users, and is often preferred for smaller networks as it minimizes the required post-install configuration. Once the client is deployed, the system is operational. If this option is selected, install the client software to user desktops (see Step 7) immediately to prevent disruption of user printing services.

If in doubt, select the minimal impact strategy. This ensures the impact is isolated to only the nominated test account.

## Verify Setup Options

Prior to enabling the configuration options that you have selected, you can verify setup options. At this stage you are still able to return to any of the prior configuration screens to alter options before

clicking **Finish**.

## Wizard Completion

After completing the configuration wizard you are presented with a user synchronization status screen, showing the progress and results of the system completing its initial setup. Once you have closed that, click **Login** to access the interface and begin familiarising yourself with the options and features available. Take some time to explore, and refer back to the relevant sections of this manual as required.

### 2.4.1.5. Step 5 - Printer Configuration

To configure which printers are monitored by PaperCut you should run the `Control Printer Monitoring` command script as described in [Monitoring Printers on the Mac](#), and return to this section when complete.

The monitored printers are listed under the **Printers** section. If the printers are not displayed, try printing a document. The first job triggers registration.

### 2.4.1.6. Step 6 - Sharing Client Software

The PaperCut MF client software is located in the directory `/Applications/PaperCut MF/client`. You can share this directory over the network so workstations can access/install the client application. If you're running Mac OS X Server, use **Server Admin** to add a read-only file share called `PCCClient`. Sharing with Protocols AFP for Mac clients, and SMB for Windows clients is recommended.

Users can have the client software start automatically using the OS X "Open at Login" feature. Manually start the PaperCut MF client software, command click the dock icon, select **options** and the "Open at Login" from the small pop up menu.

### 2.4.1.7. Step 7 - Testing

Following a fresh installation, it is highly recommended to test core features of the system. For further details, see [Testing the Installation](#).

### 2.4.1.8. Step 8 - Deployment for a Professional (Client Billing) Installation

NOTE: This step is a requirement for a Professional (Client Billing) installation.

Now that the system is tested and working, it is time to deploy the client software and enable the account popup for their use. It is important to deploy the client software before enabling the popup, otherwise users' printing are stopped/paused.

## Deploy the client software

As discussed earlier in the section, you can run the client directly from a network share (which is automatically configured on Windows). There is also the option to install the software locally on each workstation, however, this is not usually recommended because it makes the process of updating the client software more complicated.

For more information about client deployment options, see [User Client Deployment](#). Follow those instructions to deploy the client software, and then enable the popup as described below.

## Enable the advanced client popup

Once the client software is deployed on user workstations, you can set the **Account Selection**. In a Professional (Client Billing) configuration, users who print jobs for clients are often given the Advanced account selection popup, however, other **Account Selection** options might be better suited for some users based on their job function. You can enable the popup on one user at a time or for all users in bulk. The popup for a single user is enabled on the **User Details** page. To enable the popup for all users in bulk:

1. Log in to the admin interface.
2. Under the **Users** section, select the **Bulk user actions** action from the menu at the top left of the **Users** tab.
3. Select the target group. To enable for all users select the `[All Users]` group.
4. In the **Change account selection setting** section, enable the **Change account selection** option.
5. Select the **Show the advanced account selection popup** option from the list.
6. If you do not want to allow users to charge printing to their personal account, then disable the **Allow user to charge to their personal account** option.
7. Click **OK**, and confirm the operation. Once completed, the account popup is enabled for the selected users.

Once the popup is enabled for all users, perform some testing from users' desktops. To test, log in to the user workstation, perform a print, and check that the account popup is displayed and the job is logged as expected.

### 2.4.1.9. What next?

This concludes the Install Guide. Take some time to explore the features of PaperCut MF before continuing reading at [Implementation by Example](#) or [Tour](#). Business users might be interested in trying the popup client software as covered in [Client Software](#). If desired, the client software should also be deployed to other workstations. This procedure is detailed in [User Client](#).

## 2.4.2. Mac Printing in Detail

This section of the manual is split into different sections for ease of use, one section covering Mac OS 10.8+ installations, and another covering Windows hosted print queue setup. In most cases only one section applies on your network. As Mac systems have become more popular recently, many sites are opting for Mac print servers to support their Mac workstations. You can install PaperCut directly on a Mac print server, offering native, end-to-end Mac printing.

### 2.4.2.1. Terminology

Below is an overview of the common terminology.

**Print Queue:** There are typically two ways of providing shared multi-system access to a printer:

1. Configure each system to print directly to the device. The device needs to be networkable (e.g. have an Ethernet connection) and support multiple connections.
2. Configure a shared print queue. In this setup, only one system connects directly to the device (e.g. a server) and in turn the device is shared on the network via a print queue.

Other systems on the network print to the shared queue rather than directly to the device. Option 2 is regarded as a better solution on multi-user networks as it provides a higher level of scalability, allows for centralized administration, and allows administrators to move or remap devices without needing to propagate changes to workstations. PaperCut MF requires a shared print queue as it works by intercepting the jobs as they pass through the server's queue.

**CUPS:** CUPS is the print queue system used by Mac. This is the same queue system used by many other UNIX based platforms including popular Linux distributions. Apple is a major supporter of CUPS.

**IP Printing:** This is a generic term used to describe a number of print protocols that are used to exchange print documents between a computer, a server queue, or a physical printer. (Note: This term is also occasionally used incorrectly to describe the "JetDirect" print protocol discussed below)

**IPP:** This is an acronym for Internet Printing Protocol. This is the "native" print protocol used by CUPS and the Mac. It's a modern protocol designed to work well on modern networks including local networks, or even over the internet or a WAN.

**LPR:** LPR/LPD is the traditional UNIX based print protocol.

**JetDirect/Socket:** This is a very simple print protocol used to transmit print jobs to a physical printer on a TCP network. The printer accepts connections on port 9100. In Windows, this print protocol is often referred to as a `Standard TCP/IP Port`, and in some cases generally as IP Printing. Almost all network printers support this method.

**Bonjour Printing:** This is not a print protocol, but instead is Apple's method of publishing printers on a network so workstations can locate the device/queue.

Where possible PaperCut MF works with all print protocols, however, we do recommend some over others. The following set up procedure highlights methods that have shown to work in most environments.

PaperCut's recommended setup procedure is:

- Install the printers on the server using a compatible driver.
- Test printing from the server.
- Share your printers.
- Set up the workstations to connect to the server's shared print queues.

### 2.4.2.2. Optional Hardware Configuration

Some printer models support several of the connection methods listed above. If the printer offers the option to disable these protocols through their web administration page, you should turn off all except the connection method that you will use. This minimizes the chance of incorrect configuration, and the chance of a workstation user discovering the printer directly. Some printers also support access control via IP address. If this is available, consider setting access control so only the server IP can submit print jobs directly to the printer.

### 2.4.2.3. Handling unauthenticated systems (e.g. Laptops)

Print queues in Mac OS X by default are unauthenticated. Authentication in an Open Directory environment is instead performed at the time of system login. Unauthenticated systems such as laptops fall outside this. The introduction of unauthenticated systems on your network mandates the need for an extra layer of authentication. To address this need, PaperCut offers two options:

1. Popup authentication via the PaperCut client software.
2. Authentication via a Release Station or the web-based release interface (end-user login -> **Jobs pending release**).

It is your decision whether or not the authentication policy/procedure is to be applied to all systems on the network, or just "untrusted" laptops.

## Network-wide policy

This is the simplest solution and provides a consistent procedure and policy across all your users irrespective of their access method (such as via workstation or their own laptop). Select your authentication method and enable this option on ALL print queues. The set up procedure for both methods is summarized as follows:

*Using popup authentication*

1. Select the **Unauthenticated printer** option on all printers. (apply this to multiple printers via **Copy settings from Printer to Printer**.)
2. Ensure that all workstations have the PaperCut client software installed. This includes both authenticated lab systems and laptops. The PaperCut client must be running to be able to print successfully.
3. Instruct users that they need to enter their username and password in the PaperCut client, which you can set to save their credentials for an X amount of time if required.

### *Using hold/release queue authentication*

1. Check the **Enable the hold/release queue** option on all print queues. Jobs do not print until a user has authenticated and released the job.
2. Set up Release Stations, or ensure the **Allow users to view held jobs** option is enabled on the Options tab in the PaperCut administration console.
3. Instruct users on how to release their jobs. This procedure must be followed by all users.

## Laptop Only Policy (Advanced)

One problem with the network-wide policy discussed above is that the authentication method (e.g. client popup or hold/release queue) also applies to authenticated systems. In some ways this is a positive (i.e. provides a consistent policy), while in other ways it can be viewed as an unnecessary on trusted authenticated systems. This section discusses a solution appropriate for larger sites.

The solution is to set up two servers. One server hosts a set of queues for authenticated systems, while the other server provides queues for unauthenticated systems. Network router or firewall rules are used to ensure that only authenticated systems have access to the authenticated queues. Laptops systems must use the other queues. This is best done with partitioned IP address ranges and/or subnets. An experienced network administrator can assist with restricted server access by IP address.

### 2.4.2.4. Eliminating popup authentication via Mac Login Hook

You can use popup authentication to provide a secure environment. For example, there might be a mix of lab systems and unauthenticated laptops. The lab systems are managed and secured via authentication against a central user directory source, while the unmanaged systems (e.g. laptops) are limited to local user authentication only so user identity is indeterminate. Use popup authentication at the print queue level to provide an added level of user verification.

This is an advanced topic and is targeted at experienced Mac administrators with command-line knowledge. The double-authentication is eliminated by having the system login also perform the PaperCut log in via the system login hook. After the administrator has confirmed that the workstation is securely authenticating via a central directory service, they endorse the system by copying a shared secret file onto the workstation. To perform this endorsement, follow these steps:

1. Setup the PaperCut client on the workstation and configure it to start via the login hook as explained in detail here [Multi-User Install](#).
2. Use a secure method (e.g. USB key or `scp`) to copy the file located on the PaperCut primary server at:  
`[app-path]/server/data/pc-shared-secret.dat`  
to the workstation in either of the following locations:  
`/etc/pc-shared-secret.dat` or `/Library/PCClient/pc-shared-secret.dat`
3. Set ownership and permissions on the file via the command line as follows:  
`sudo chown root /etc/pc-shared-secret.dat sudo chmod 600 /etc/pc-shared-secret.dat`
4. Test login and verify that PaperCut popup authentication step has been eliminated by printing to an unauthenticated printer. Confirm that the job prints and logs as expected.
5. Repeat steps above for each trusted directory authenticated system (e.g. lab system) on the network, or use system imaging processes.

### 2.4.3. Mac hosted print queues for OS 10.8+

This section discusses printer setup on systems where print queues are hosted on Mac OS 10.8+. There are some very minor differences between the two setup instructions, but they follow the same structure. See [Windows hosted print queues](#) if you have Windows hosted print queues.

#### 2.4.3.1. Installing the printers

Install the printer on the system running PaperCut using a compatible driver. For example, a driver supplied by Apple or the manufacturer. If there is a choice of driver, we recommend a Postscript or PPD based driver. Follow the manufacturer's suggested setup procedure for this part of the implementation. If the manufacturer supports various connection methods, we recommend using JetDirect/Socket if possible. Here is an example of a procedure that sets up a standard printer using a plain JetDirect/Socket connection:

1. Select **System Preferences**.
2. Select **Print & Scan** (in 10.9, this is named **Printers and Scanners**).
3. Click **+** to add a new printer.
4. Click the **IP** tab.
5. In the Protocol list, select **HP Jetdirect - Socket**.
6. Enter the printer's IP address.

7. Give the printer a simple name *without* spaces.
8. Select the driver or printer model from the list; then click **Add**.

Print some test pages to the newly configured printer, such as printing a web page from Safari. Confirm that printing works as expected before continuing. Be sure to test multiple options such as Duplex and Grayscale. If printing is not working as expected, see the troubleshooting section below.

**Note:**

If you are adding new printers, configure PaperCut to monitor the new print queues. For more information, see [Adding and Removing/Deleting/Ignoring Printers](#).

The screenshot shows the 'Add' printer dialog box. At the top, there are four icons: Default, Fax, IP, and Windows. A search field is located to the right of these icons. Below the icons, there are two main sections of form fields. The first section contains: 'Address: 10.100.64.32' with a note 'Valid and complete address.', 'Protocol: HP Jetdirect - Socket' in a dropdown menu, and 'Queue:' with a note 'Leave blank for default queue.'. The second section contains: 'Name: LibraryColor', 'Location: Library Room', and 'Use: Apple LaserWriter Pro 810' in a dropdown menu. An 'Add' button is located at the bottom right of the dialog.

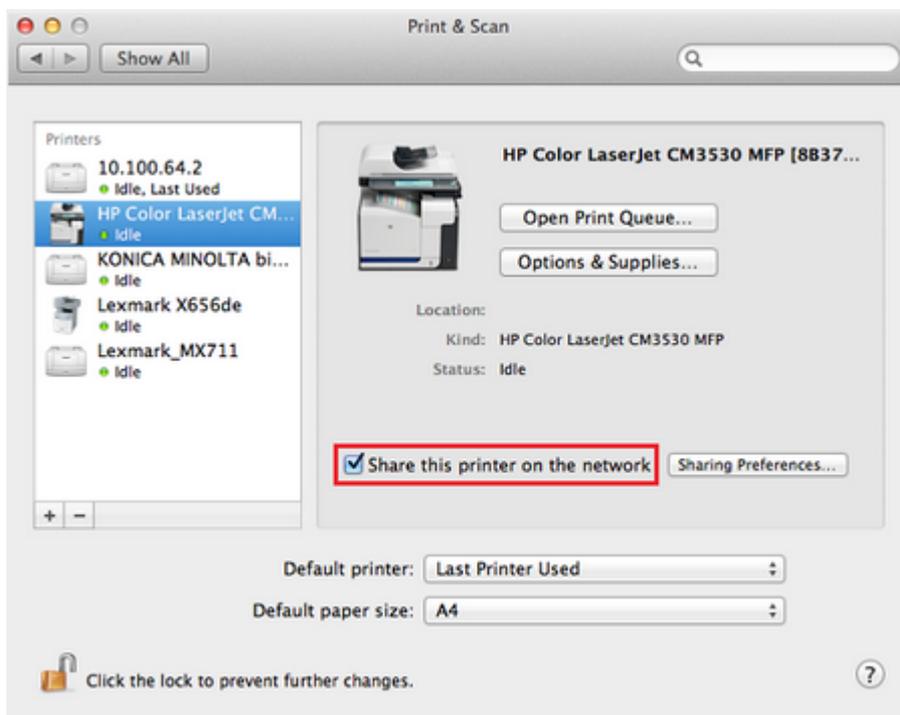
## Tips and Troubleshooting

- Always try HP Jetdirect/Socket first, and use proprietary connection methods as a last resort
- If your printer does not support HP JetDirect/Socket, consider using IPP as an alternative
- If you are not able to install or find a driver for your printer, try the **Generic Postscript Driver/Printer**

### 2.4.3.2. Sharing the Printers

On Mac OS 10.8, Apple removed the ability to share printers using the Server Admin app. Sharing printers is now easier, however, LPD has since been removed as an sharing option, and the default sharing method is now IPP. To share your printers, follow the below steps:

1. Open **System Preferences** → **Print & Scan** on the print server (in 10.9, this is named **Printers and Scanners**)
2. Click the printer you want to share
3. Tick **Share this printer on the network**.



### 2.4.3.3. Setting up the printers on Mac workstations

Once the printers are set up on the server and shared, the next step is to install the printers on the workstations. This section includes the manual setup of print queues to workstations, as well as discussing a method of automating deployment via the Workgroup Manager. The goal is to add the printer on the workstation so it communicates with the server's print queues rather than directly to the printer. Protocols include IPP, LPD, or LPD added via Bonjour. The recommended setup is to use IPP, as this is the native protocol.

## Manual Setup

1. Open **System Preferences** → **Print & Scan** on the workstation (in 10.9, this is named **Printers & Scanners**)

2. Click **+**.
3. Select IP as the type and select **Internet Printing Protocol - IPP** as the **Protocol**. If IPP is not compatible with this device, select **Line Printer Daemon - LPD** as the **Protocol**
4. In the **Address**, enter your server name (or IP Address).
5. In **Queue**, enter the the printer's **Queue Name** prefixed with **printers/**. For example: **printers/my\_office\_printer**.
6. Select the appropriate driver under **Print Using**.
7. Select **Printer Software**. If your model is not listed here, install the manufacturer's driver and repeat these steps again
8. Take some time to test printing from the workstation, and confirm that all functions of the printer are working.

**Note:**

If you have trouble connecting, ensure the queue name you are entering is correct. The queue name of the printer is set when the print queue is first created on the Mac server, and might be different to the visible printer name. The queue name is displayed on the print server under **System Preferences > Print & Scan > [select printer] > Options & Supplies > General > Device Name**.

If you have problems obtaining a driver for your printer, try the **Generic Postscript Driver**. This option works with most printers. If after a test print the printer stops with a connection error, check the printer sharing permissions on the server or try the alternate method discussed below.

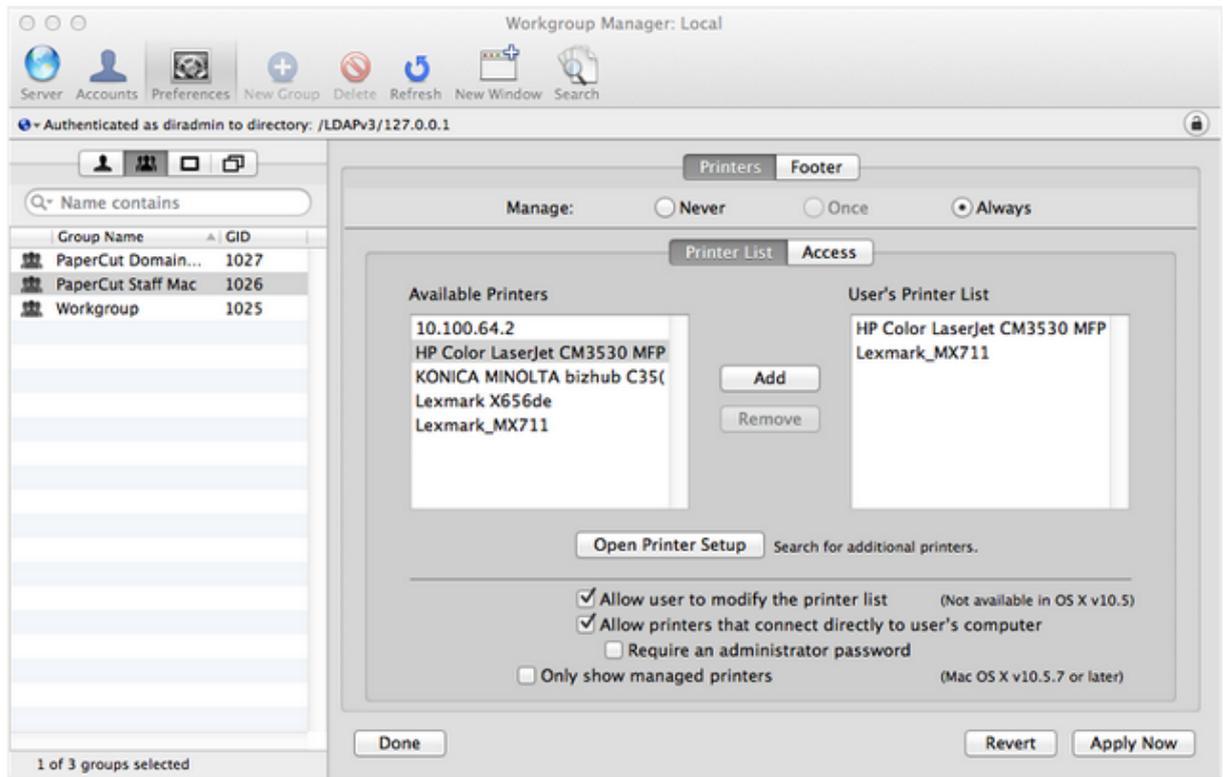
The screenshot shows the 'Add' printer dialog box in macOS. The dialog is titled 'Add' and has a search bar at the top. Below the search bar are four icons: Default, Fax, IP, and Windows. The 'IP' icon is selected. The form contains two sections. The first section has 'Address: 10.100.66.25' with a note 'Valid and complete address.', 'Protocol: Internet Printing Protocol - IPP' in a dropdown menu, and 'Queue: printers/LibraryPrinter' with a note 'Leave blank for default queue.'. The second section has 'Name: Library Printer', 'Location: Library Room', and 'Use: HP LaserJet 4350' in a dropdown menu. An 'Add' button is at the bottom right.

## Publishing the printer via Workgroup Manager

Manually installing the printer on each desktop on a large network can be tedious. Large networks using Open Directory can automate the process with Workgroup Manager. The key to successfully deploying/publishing printers via the Workgroup Manager is to publish the configuration from a working workstation rather than the server itself. The reason behind this is that it would publish the server's printer configuration. Since the server is configured to print direct to the device and not to the queue, this would be the incorrect configuration for user workstations. Instead, install the Workgroup Manager software on a configured workstation/client and publish its known configuration. We recommend having a workstation setup that is for Workgroup Manager administration and deployment only.

1. Select one workstation on your network. Follow the manual set up procedure as discussed above.
2. Test and confirm this workstation is configured and printing correctly. Also select other settings as appropriate such as tray, duplex and other defaults. It is important to test this step before continuing. If printing is not working, this needs to be fixed before Workgroup Manager is used to publish your print queues.
3. Install the **Workgroup Manager** on this client workstation found on the Mac OS X Server install disk).
4. Open the Workgroup Manager, connect to your directory and select an appropriate user group or computer group used to manage client settings.
5. Enter the **Settings/Preferences** area and select **Printing**.

6. Select **Manage Always** and add printer(s) set up in step 1.
7. Save settings and exit (e.g. click **Done**).
8. Log onto another workstation and confirm that printer settings are being published as expected.



## 2.4.4. Windows hosted print queues

This section discusses printer configuration on Mac OS X workstation in environments systems where the print queues are hosted on a Windows operating system. See [Mac hosted print queues for OS 10.8+](#) if your print queues are hosted on Mac OS 10.8+.

When a printer from a Windows environment is shared and added to a Mac system, **Print and Scan** requests printer access credentials in the form of username and password. Any user that prints to this printer uses these supplied credentials. This means that the administrator that added the printer to the workstation is the owner of all documents printed from the workstation irrespective of the current logged in user.

The ideal solutions varies from network to network and depends on factors including:

1. Your existing network configuration
2. The mix and makeup of operating systems used on the network

3. The underlying directory technologies (Active Directory, LDAP, etc.) if used
4. Whether Macs are used by a single owner or multiple users

The following sections outline common set up scenarios and their pros and cons. Your solution might fit one of these scenarios or might be composed of a combination.

### 2.4.4.1. Scenario One: My Own Mac (Single User)

Many networks, particularly those in a business environment, have a dedicated desktop system for each user. This allows the desktop system's global settings to be customized for the user. Common examples include:

- Dedicated computers used in a business
- Staff laptops or desktops used in education

## Requirements

- Printers hosted and shared from a Windows or Linux server.
- Mac systems used by a single user (or small group of known users).
- Each user has a domain account and password.
- The username associated with the account on the Mac matches the domain username (either the account used to log in, or the account set up as the automatic log in account).
- Running Mac OS X 10.8 or higher.

## Installation

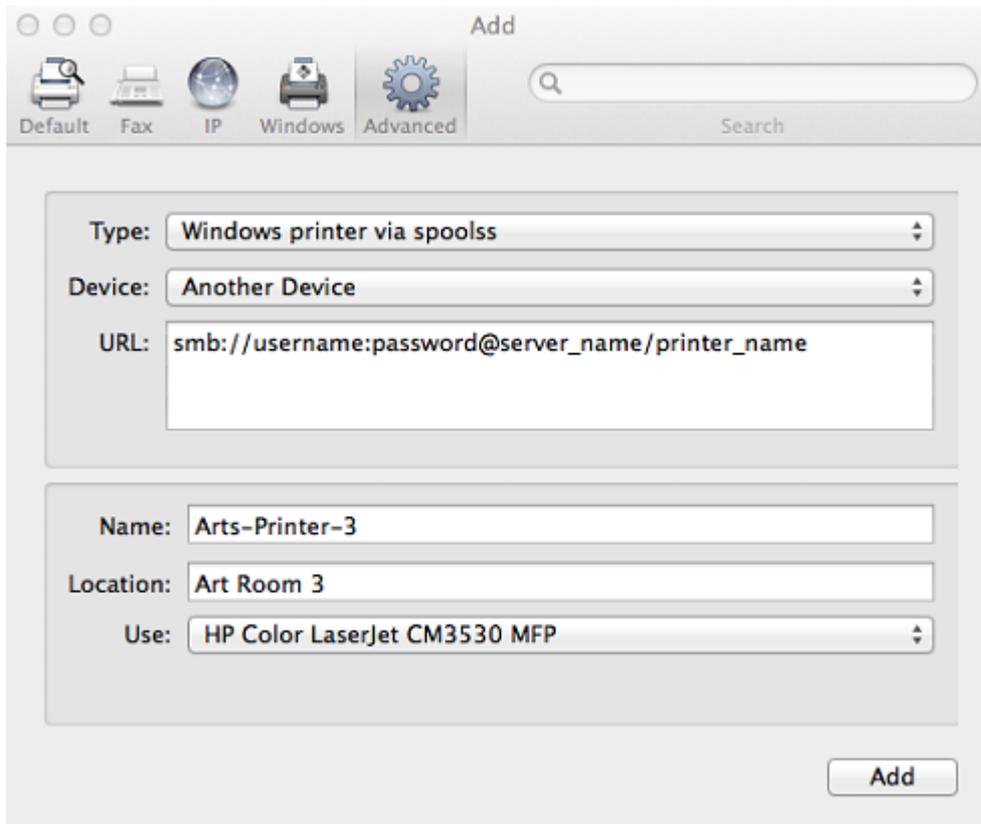
Check the user account information:

1. Start up the Mac, log in as the local administrator, and ensure the system is connected to the network.
2. Select **System Preferences**
3. Depending on your Mac OS version, select **Accounts** or **Users and Groups**.
4. Click **MyAccount**. (*Skip this step in Mac OS 10.8 and 10.9*)
5. Ensure that the **Short name** associated with the account matches the user's domain account username. If not, create a new working account as appropriate.

## Setting up the printers:

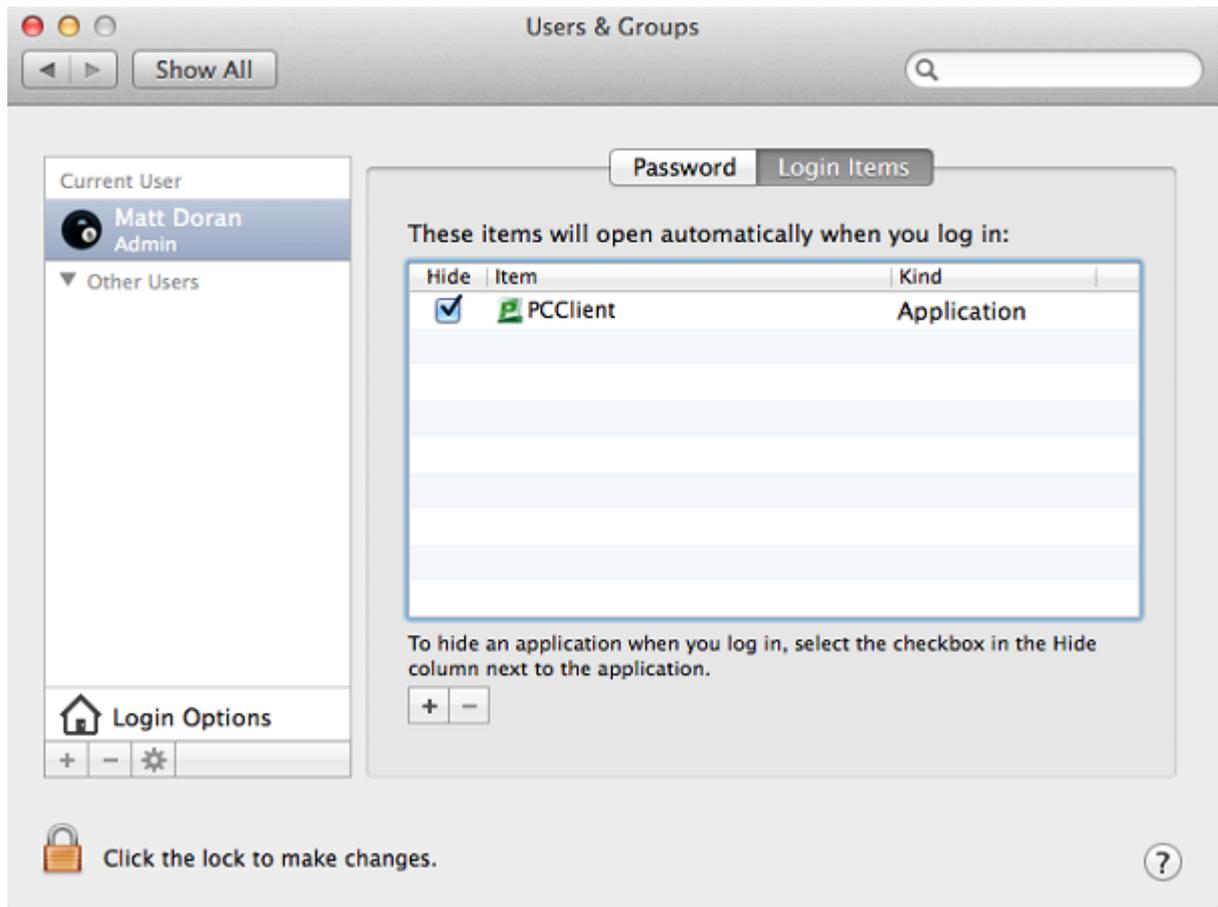
1. Navigate to **System Preferences** -> **Print and Scan**.
2. Click **+** to add a new printer.
3. Control-click the Toolbar; then select **Customize Toolbar**.  
Drag the **Advanced** icon onto the bar; then click **Advanced**.
4. Select the **Windows printer via spoolss** device type.
5. Enter a **Device URL**, such as: `smb://username:password@server_name/-printer_name`
  - Tip: `server_name` is the name of the server hosting the printer, and `printer_name` is the printer's share name
  - You might need to include the port in the DeviceURL: `smb://server_name:139/-printer_name`
  - OS X can struggle with printer share names containing spaces. We recommend a share name without spaces
6. In **Name**, enter a friendly and informative printer name.
7. Choose a driver for this printer by pulling down the drop-down box and selecting **Select Software**
8. Click **Add**.

9. Test print and ensure jobs are logged in PaperCut MF as the correct user.



## Installing the PaperCut MF Client software

1. Open **Finder** and select **Go -> Connect to Server**.
2. Enter `smb://servername/pcclient` where `servername` is the name of the server hosting PaperCut MF. If you are prompted for a username and password, this is a username that has access to connect to the SMB share on your Windows server.
3. Drag the `PCClient` application across to the local **Applications** directory.
4. Open **System Preferences**
5. Select **Users & Groups**.
6. Select the **Login items** tab.
7. Click **+**; then select the newly installed `PCClient` application. Tick the **PC Client** option once it is displayed.
8. Restart the system and ensure the client starts upon login.



## Tips and Troubleshooting

- Get the user to log in to the Mac. Verify that the `PCClient` program starts automatically and shows the user's balance.
- Print to the newly set up printer. On the server's print queue, ensure that the job is displayed under the correct username.
- Ensure that the print job successfully reaches the printer and that the user gets charged in PaperCut.
- Check that the balance has changed to reflect the new balance in the `PCClient` program.

### 2.4.4.2. Scenario Two: The multi-user Mac with popup authentication

Schools and universities often have Macs available for student use in dedicated computer labs. In these environments the Macs are shared by many users and Scenario One is not appropriate. Larger Mac networks already using LDAP or Active Directory authentication, or planning on doing so, might want to consider Scenario Three explained in the next section.

Scenario Two uses a popup authentication model. For more information, see [Popup authentication](#).

The end-user's perspective:

1. The user sees the `PCClient` program running.
2. When the user prints a job, the client pops up a window requesting the user to enter a username and password. See [Popup authentication](#).
3. The user enters a domain username and password.
4. If the credentials are valid, the job is charged to the user account.

The explanation:

1. The print event is performed as a generic user - For example, "macuser", "student", etc.
2. In PaperCut MF, the "macuser" account is set up to use popup authentication by enabling the option **Unauthenticated user**. See [Popup authentication](#) for further details.
3. The popup requests the user to enter a username and password.
4. The password is authenticated and printing is charged against the supplied account.

## Requirements

- Printers are hosted and shared off a Windows, Mac or Linux server.
- The Mac systems are set up to log in under a generic account name. (e.g. macuser, student, etc.)
- The domain contains a user account matching the generic account.

## Installation

Domain account set up:

1. Log onto the print server or the domain controller as a domain administrator.
2. Open **Active Directory Users and Computers** (or equivalent user management tool) from **Start -> Administrative Tools**.
3. Add a new domain user called `macuser`.
4. Define a password for `macuser` and set the password to never expire.

Mac account set up

1. Start up the Mac, log in as the local administrator, and ensure the system is connected to the network.
2. Select **System Preferences**

3. Depending on your Mac OS version, select **Accounts** or **Users and Groups**.
4. Create an account called `macuser`. Ensure the account's short name is `macuser`.
5. Set this account as the automatic login account, or alternatively make the password known to all users.

Set up the printers that the user requires access to:

1. Navigate to **System Preferences -> Print and Scan**.
2. Click **+** to add a new printer.
3. Control-click the Toolbar and select **Customize Toolbar**.  
Drag the **Advanced** icon onto the bar, then click **Advanced**.
4. Select the **Windows printer via spoolss** device type.
5. Enter a **Device URL**, such as: `smb://username:password@server_name/-printer_name`
  - Tip: `server_name` is the name of the server hosting the printer, and `printer_name` is the printer's share name
  - You might need to include the port in the DeviceURL: `smb://server_name:139/-printer_name`
  - OS X can struggle with printer share names containing spaces. We recommend a share name without spaces
6. In **Name**, enter a friendly and informative printer name.
7. Choose a driver for this printer by pulling down the drop-down box and selecting **Select Software**
8. Click **Add**.
9. Test print and ensure jobs are logged in PaperCut MF as the correct user.

## Installing the PaperCut MF Client software

1. Open **Finder** and select **Go -> Connect to Server**.
2. Enter `smb://servername/pcclient` where `servername` is the name of the server hosting PaperCut MF. If you are prompted for a username and password, this is a user-name that has access to connect to the SMB share on your Windows server.
3. Enter account details for an account able to connect to the SMB share if requested
4. Drag the `PCClient` application across to the local **Applications** directory.
5. Command-click the newly copied `PCClient` application in the **Applications** directory.

Select **Open Package Contents**.

6. Navigate to `Contents/Resources/`.
7. Double-click the `install-login-hook.command` script.
8. Restart the system and ensure the client starts upon login.

## Configure the popup settings:

1. Log on to the PaperCut MF administration interface as built-in admin user.
2. Select the `macuser` account from **Users**.
3. On the `macuser`'s details screen, set the account balance to zero.
4. Ensure the user is set to **Restricted**.
5. Select the **Unauthenticated** option and save the changes.
6. Click **Apply** to save the changes.

If users log in to the Mac using their AD/LDAP username, you can eliminate the authentication popup by configuring the client as described in [Popup authentication](#).

## Tips and Troubleshooting

- Get the user to log in to the Mac. Verify that the `PCClient` program starts automatically.
- Print to the newly set up printer. On the server's print queue, ensure that the job is displayed under the correct username.
- An authentication popup should display on the Mac. Enter a valid domain username and password.
- Charge the corresponding user for the job. Also check that the balance has changed to reflect the new balance in the `PCClient` program.

### 2.4.4.3. Scenario Three: Multi-user Macs using LDAP or Active Directory authentication

Larger networks often run the Macs in a domain environment either authenticating with an Active Directory or an LDAP network. In an authenticated domain environment, the identity of the user (the user's username) is known and verified at the time of log in. With the help of the TCP/IP Printing Services for Microsoft Windows, and the LPR/LPD support on the Mac, print jobs can be identified on the server and associated with the user's login name. This avoids the need for the popup authentication used in Scenario Two.

## Using the LPR and IPP printing protocols on Windows print servers

LPR is a legacy protocol developed for UNIX that clients use to send print jobs to print servers. Microsoft has supported this protocol for a number of years via an add-on module called Print Services for UNIX (PSfU). Under certain conditions Windows LPD printers can cause issues when using PaperCut hold/release print queues. The information included here is to help customers understand the issue and document suggested workarounds.

The mechanism used by the Windows PSfU subsystem to accept LPR and IPP print jobs is different from other implementations in Windows such as native SMB based printers. In SMB the event notification to applications such as PaperCut is well behaved and reliable. Event notification for LPR and IPP based printing does not use the same set of underlying APIs and under some conditions the PaperCut print monitoring layer receives notification *after* the print job has started. This means that some print jobs can start to print before the hold instruction is issued. This job is then suspended in a **Paused Printing** state (i.e. both paused and printing) and this results in all other jobs on that queue being held up by the paused job.

The symptoms are generally not consistent, suggesting an underlying race condition bug in Windows. Things that can affect the problem include:

- Running the print server on a virtual machine
- The number of processors/cores
- The current load on the print server
- The version and patch level of Windows

Because the issue is in the underlying Windows print subsystem, it is not possible for PaperCut to quickly implement a reliable solution and Microsoft is unlikely to implement a fix to this legacy subsystem. If a site does experience this issue there are some steps that can help alleviate or fix the issue.

1. Use the SMB protocol for Windows based print server queues. Note that using SMB can place some constraints on how users authenticate and how anonymous users are able to print at your site. This is the recommended approach.
2. Use two print queues. Queue *A* is virtual and queue *B* is the real queue attached to the physical printer. Users print to *A* using LPR and PaperCut can always place a hold on the print job. PaperCut then redirects the job to *B* on release. Managing virtual print queues is documented in section [Find-Me Printing and Printer Load Balancing](#). Configure queue *A* to use a port with no printer (e.g. LPT1 : ), it should be permanently *paused* ( **Printer > Pause Printing** ), and the virtual queue configuration for *A* in PaperCut should forward jobs to *B* (setting **Jobs may be forwarded to these queues**).

If queue *A* is un-paused then the job will error, however, it can still be re-directed as needed.

## Requirements

- Macs set up in multi-user mode authenticating off a domain. Either Active Directory or LDAP.
- Printers hosted on a Windows print server.
- The server needs the TCP Printing Services installed (also known as Print Services for Unix).

## Installation

On the server hosting the printers, set up TCP/IP Printing:

1. Log in to the server as a system administrator.
2. Select **Control Panel -> Add Remove Programs**.
3. Click **Add/Remove Windows Components**.
4. Select **Other Network File and Print Services**.
5. Click **Details** and ensure **Print Services for Unix** is selected.
6. Click **Next** to complete the installation.

Some systems running firewall software can block LPD printing. On systems running firewall software, ensure that incoming connections from the local network are allowed on port 515.

On each Mac, add the required printers:

1. Open the **Printer Setup Utility** from **Applications -> Utilities**.
2. Click **+** to add a new printer.
3. Click the **IP** tab at the top toolbar.
4. From the **Protocol** dropdown, select **Line Printer Daemon - LPD**.
5. In **Address**, enter the IP address of the server hosting the printers .
6. In **Queue**, enter the printer's share name .
7. In **Name**, define a user friendly name; then select the printer type.
8. Click **Add**.
9. Repeat for other printers as necessary.

## Installing the PaperCut MF Client software

1. Open **Finder** and select **Go -> Connect to Server**.
2. Enter `smb://servername/pcclient` where `servername` is the name of the server hosting PaperCut MF. If you are prompted for a username and password, this is a username that has access to connect to the SMB share on your Windows server.
3. Enter account details for an account able to connect to the SMB share if requested
4. Drag the `PCClient` application across to the local **Applications** directory.
5. Command-click the newly copied `PCClient` application in the **Applications** directory. Select **Open Package Contents**.
6. Navigate to `Contents/Resources/`.
7. Double-click the `install-login-hook.command` script.
8. Restart the system and ensure the client starts upon login.

## Tips and Troubleshooting

- Restart the system and ensure the `PCClient` application starts on login and lists the user's account balance.
- Ensure print jobs correctly show in the PaperCut job logs under the user's PaperCut account.
- Charge the corresponding user for the job. Also check that the balance has changed to reflect the new balance in the `PCClient` program.

## Additional information and tips

The client install process is also covered in [User Client](#). After the first Mac is set up and the printing process is tested, provide the simplified client install notes covered in [Deployment on Mac OS X](#) to end-users or other System Administrators.

The `PCClient` client can accept command line options as explained in [User Client Options](#). If the client is started via the login hook, you can define the command-line options in the file:

```
/Applications/PCClient.app/Contents/Resources/login-hook-start
```

Look for the line starting with `client_args` and the associated comments above.

## 2.5. Installation on Linux (CUPS and Samba)

## 2.5.1. Quick install: Linux (CUPS and/or Samba)



**Important:** The following section assumes the reader has knowledge of general Unix/Linux system management including using the command-line, creating users, editing configuration files and understanding file permissions.

### 2.5.1.1. Step 1 - System Requirements

Before proceeding with the installation the System Administrator should take a few moments to verify system requirements. Is the operating system version supported and are patches up-to-date? Take a few minutes to verify the system is current and supported (see [System Requirements](#)).

Are printer(s) installed and hosted on this system and are they exposed to the network either via CUPS or Samba? Administrators should ensure that the print queues are set up and working as expected before attempting to install PaperCut MF.

In a multi-user environment, printers are often shared with other network users. Other workstations should connect to these printers as "Network Printers". Ensure workstations are configured to print to the shared print queues. For example, a Windows workstation can connect to a samba exposed printer via `\\[samba_server]\[printer]`. Other Linux or Mac workstations use IPP via CUPS.

If the printers are currently not installed and configured, perform and verify this task before proceeding further.

### 2.5.1.2. Step 2 - Create the host user account and firewall settings

PaperCut MF runs and installs under a non-privileged user account called "papercut". The installation location for the application is the `papercut` user's home directory. Create a user account on this system called `papercut`. This is usually done by logging in as `root` and using a user management GUI tool or at the command prompt entering:

```
shell> useradd -m -d /home/papercut papercut
```

The syntax for `useradd` and `groupadd` can differ slightly on different versions of Linux. They can also be called `adduser` and `addgroup`.

The user's home directory (the `-d` option) denotes the install location. `/home/papercut` is the recommended location. Administrators can, however, also consider alternate install locations depending on personal preference. Alternatives include:

- `/usr/local/papercut`
- `/opt/papercut`



**Important:** This quick start guide assumes the install location is `/home/papercut`. If an alternate home location is defined, some of the paths listed in subsequent sections will require modification.

Some Linux distributions impose strict resource usage limits on user accounts (`ulimit`). The `papercut` account is a special account used for hosting an application and needs to be granted satisfactory resource limits, such as, the ability to open many files. The methods of setting user-level `ulimit` levels vary from distribution to distribution, however, the common solution is to add the following line to `/etc/security/limits.conf`:

```
papercut - nofile 65535
```

Many Linux distributions have strict default firewall policies. PaperCut MF uses TCP ports 9191 (for HTTP) and ports 9192 (for HTTPS/SSL) and these ports must be open. Take some time now to ensure these ports are open. Consult your distribution documentation for details on how to open firewall TCP ports.

### 2.5.1.3. Step 3 - Download and installing



**Important:**

Make sure you download the correct architecture for your distribution. `i686` is for 32-bit operating systems. `x64` is for 64-bit systems (also known as `x86_64` or `amd64`).

PaperCut MF is supplied as a self-extracting and self-installing archive. The installation is performed as the newly created `papercut` user and installs to that user's home directory. Temporary `root` access is required for part of the install. Make sure the root password or `sudo` password is handy. For more detail about the install process including installing to a different location, see [PaperCut NG on Linux](#).

Log on as the newly created `papercut` user and download and execute the installer. You can execute the file from any directory.

```
shell> su - papercut
shell> wget [download url from PaperCut Software website]
shell> sh ./pcmf-setup-*-linux-*.sh
```

Follow the installation instructions and enter the root password when requested.



**Important:** Ensure you login as the user `papercut` so that the user's environment is sourced so the home directory (install location) is correctly defined.

```
Installing into /home/papercut...
358920 blocks
4731 blocks
Applying default permissions...
Setting permissions on Application Server files...
Setting permissions on Print Provider files...

The install needs to perform some tasks as root. Tasks include:
  * Setting setuid-root on the authentication provider
  * Installing a CUPS backend
  * Configure the server's boot scripts

Would you like to perform these tasks now? [yes or no]
yes
Enter root password when requested:
Password:
Setting authpan as setuid root...
Installing SysV style boot scripts...
Attempting to locate CUPS installation...
Found CUPS backed_directory at /usr/lib/cups/backend
Linking Print Provider into CUPS backend directory
Creating client configuration file...
Config file successfully written.
Starting the application server...
Starting Application Server.....started (pid: 4361).
Configuring.....
```

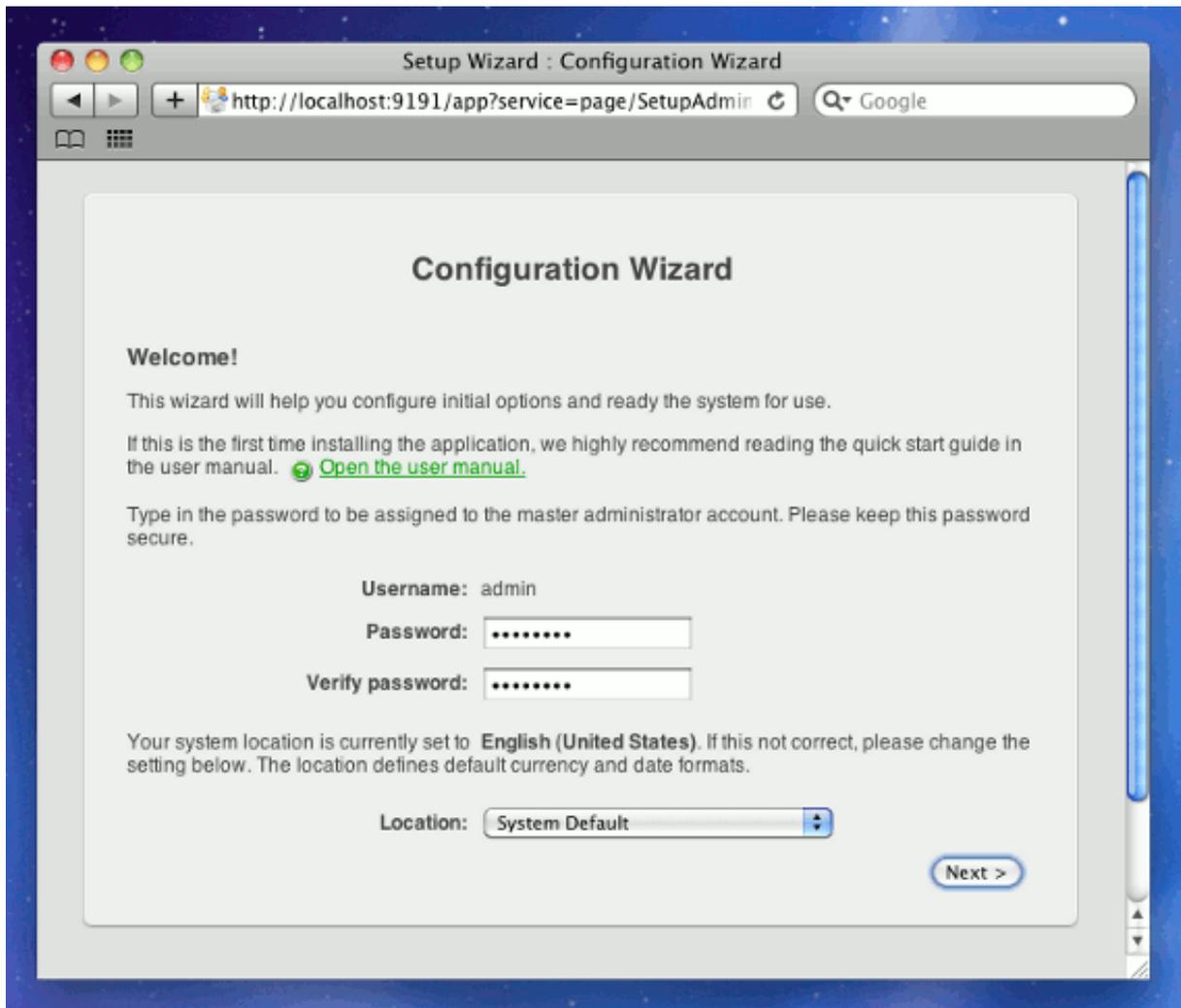
The installation process takes between two and five minutes depending on the speed of the system. A system restart is not required but administrators are advised to perform installation on live production systems during periods of low activity - for example, not during backup operations or other administration activities.

### 2.5.1.4. Step 4 - Configuration Wizard

After installation, you are prompted to open a web browser at `http://[server-name]:9191/admin` to complete configuration. The configuration stages are explained below:

## Administrator Password

This is the master password for the main in-built admin account, and is independent of the operating system or domain passwords. The password must meet minimum strength requirements, and must be at least six characters. Ensure that knowledge of this password is kept secure. This screen also sets the system's physical location and language; ensure that these are correct before proceeding.



**Tip:** Treat this password the same as your router/modem management passwords. It is independent of your domain accounts and needs to be kept secure.

## Organization Type

This is the organization type that matches the organizational environment where PaperCut MF is used. Choosing the appropriate organization type determines which system defaults are used on setup. For example, in a Professional (Client Billing) organization, where it is useful to charge-back printing to customers, an advanced client popup is provided with additional features useful for dealing with large numbers of client (shared) accounts. You can change these default settings chosen for an organization type can be changed after installation.

## Default Print Cost

This is the default cost-per-page assigned to the printers. You can change this setting on a per printer basis after installation. Choosing a sensible cost now helps minimize future setup. For

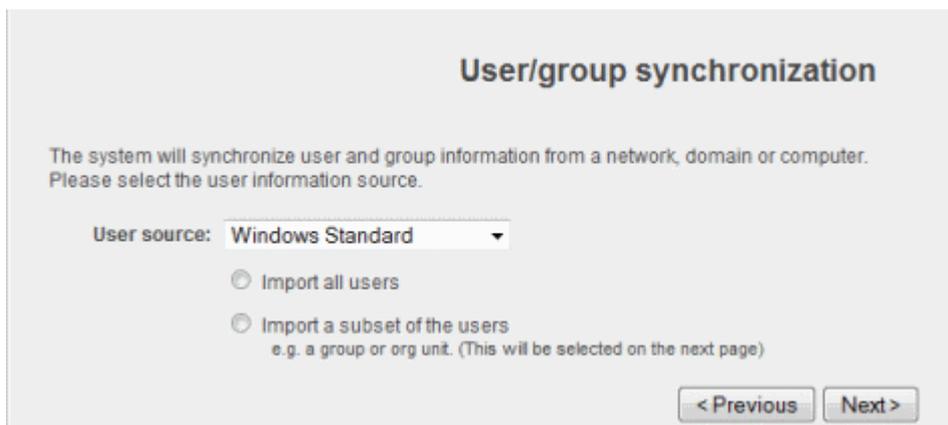
example, in the USA, a value of \$0.05 would be appropriate for many standard black & white printers.

## Initial User Credit (for Education sites)

When the organization type is set to Education, you can assign users an initial starting credit. This ensures they have funds in their account as soon as the system is enabled. An option also exists to control what happens when users run out of credit/quota. If you are evaluating PaperCut MF it might be appropriate not to disable printing when a users funds run out. This way you can be assured that user printing is not disrupted during the evaluation. You can change these settings after setup.

## User/Group Synchronization

PaperCut MF extracts user information out of the System or Domain. The options presented here vary depending on the Operating System and its environment. During evaluation, most sites import all users from the system/domain into PaperCut MF. An option also exists to import a subset of users from a given group. This option is useful when only a subset of users will use the printers.



Options on Linux include **Unix Standard** (PAM, NIS, etc.), **LDAP**, or **Samba**.

Select **Unix Standard** if the user accounts are set up and defined on the local system as standard Unix accounts or mapped into the system from a central directory service such as LDAP via nsswitch.conf and PAM. Most large established networks use this option.

The LDAP option is appropriate for large networks with existing Open Directory domains. This includes networks running Open LDAP and Windows domains running Active Directory. PaperCut MF does it's best to auto-discover LDAP settings, but some knowledge of LDAP and/or Open Directory is required. More information on LDAP is available in [Using LDAP for user synchronization](#).

Select **Samba** if the central user directory is a Windows Domain. The Samba option is only available if Samba is installed on the system. The Samba option is appropriate on medium to small networks currently operating in a Windows Domain environment.

The Samba option requires additional information such as the name of a domain server, and login credentials for an Administrator level account. This information is requested on the subsequent wizard screen. Take care to ensure this information is complete and correct.

More information on user/group synchronization on Linux is available in [PaperCut NG on Linux](#).

## Client Settings in Professional (Client Billing) installations

In a Professional (Client Billing) environment, the main focus is on allowing users to allocate print jobs to client (shared) accounts. The process works by:

- Pausing all jobs that enter the print queues.
- Displaying a popup on the user's workstation asking them to allocate the print job to an account. This is done by selecting the account from a list.
- After the user has responded to the popup, the job is released to the printer.

You can read more about the account selection process and shared accounts at [Shared accounts](#).

The account selection popup option is enabled at the user level. Once the option is enabled, the user *must* run the client software. If the client software is not running, the popup cannot display, and the job remains paused in the print queue. This option is, therefore, considered high impact. You are presented with two strategies that allow you to choose the implementation approach that best suits your needs:

### Minimal impact (Initial single user testing)

In this strategy the account popup is initially enabled only on a single user for testing. You need to nominate the testing account. You might already have an appropriate test user account on your system/domain or alternatively selecting your own personal account is a good choice. The name should be in the format used to log in to the domain/system (usually the short form).

The minimal impact strategy gives you time to test the popup with the nominated test user. Then you can enable the **Advanced account selection popup** option for other users when appropriate.

### Immediate implementation (Enable for all users)

This strategy enables the account selection popup on all users. This option is good for smaller networks as it minimizes the amount of post-install configuration - just deploy the client and your up! If this option is selected you can install the client software on user desktops as soon as possible.

If in doubt, select the minimal impact strategy. This ensures the impact is isolated to only the nominated test user.

## Verify Setup Options

Prior to enabling the configuration options that you have selected, you can verify setup options. At this stage you are still able to return to any of the prior configuration screens to alter options before clicking **Finish**.

## Wizard Completion

After completing the configuration wizard you are presented with a user synchronization status screen, showing the progress and results of the system completing its initial setup. Once you have closed that, click **Login** to access the interface and begin familiarising yourself with the options and features available. Take some time to explore, and refer back to the relevant sections of this manual as required.

### 2.5.1.5. Step 5 - Printer Configuration

Unlike Windows and Mac with single print system environments, Linux is a more complex environment with a choice of print system implementations. At this stage some manual printer configuration is required. See [Linux Print Queue Integration](#) and follow the steps for integrating with the print queues in your environment before returning to this section and following on with the next step.

Printers hosted on a machine other than the PaperCut MF server, require additional installation steps to be configured as 'secondary' servers. See [Configuring Secondary Print Servers and Locally Attached Printers](#) for details.

### 2.5.1.6. Step 6 - Sharing Client Software

The PaperCut MF client software is located in the directory `[app-path]/client`. It is useful to share this directory over the network so workstations can access/install the client application. Common sharing methods include:

- Samba - used to share files to Windows based workstations. Mac OS X Server tools such as the Workgroup Manager or other 3rd party tools such as SharePoint can help with sharing the client directory via Samba. Similar GUI tools exist on Linux.

Advanced System Administrators can share this directory by hand-editing the `/etc/smb.conf` file. The following configuration shares the directory in read-only form:

```
[pcclient]
path = /home/papercut/client
comment = PaperCut Client
public = yes
only guest = yes
read only = yes
```

- NFS - a popular sharing method used for Linux/Unix based workstations.

### 2.5.1.7. Step 7 - Testing

Following a fresh installation, it is highly recommended to test core features of the system. For further details, see [Testing the Installation](#).

### 2.5.1.8. Step 8 - Deployment for a Professional (Client Billing) Installation

NOTE: This step is a requirement for a Professional (Client Billing) installation.

Now that the system is tested and working, it is time to deploy the client software and enable the account popup for their use. It is important to deploy the client software before enabling the popup, otherwise users' printing is stopped/paused.

## Deploy the client software

As discussed earlier in the section the client can be run directly from a network share (which is automatically configured on Windows). There is also the option to install the software locally on each workstation, however, this is not usually recommended because it makes the process of updating the client software more complicated.

For more information about client deployment options, see [User Client Deployment](#). Follow those instructions to deploy the client software, and then enable the popup as described below.

## Enable the advanced client popup

Once the client software is deployed on user workstations, you can set the **Account Selection**. In a Professional (Client Billing) configuration, users who print jobs for clients are often given the Advanced account selection popup, however, other **Account Selection** options might be better suited for some users based on their job function. You can enable the popup on one user at a time or update for all users in bulk. Use the **User Details** page to enable the popup for a single user. To enable the popup for all users in bulk:

1. Log in to the admin interface.
2. Under the **Users** section, select the **Bulk user actions** action from the menu at the top left of the **Users** tab.
3. Select the target group. To enable for all users select the [All Users] group.
4. In the **Change account selection setting** section, enable the **Change account selection** option.
5. Select the **Show the advanced account selection popup** option from the list.
6. If you do not want to allow users to charge printing to their personal account, then disable the **Allow user to charge to their personal account** option.

7. Click **OK**, and confirm the operation. Once completed, the account popup is enabled for the selected users.

When the popup is enabled for all users, perform some testing from users' desktops. To test, log in to the user workstation, perform a print, and check that the account popup is displayed and the job is logged as expected.

### 2.5.1.9. What next?

This concludes the Install Guide. Take some time to explore the features of PaperCut MF before continuing reading at [Implementation by Example](#) or [Tour](#). Business users might be interested in trying the popup client software as covered in [Client Software](#). If desired, the client software should also be deployed to other workstations. This procedure is detailed in [User Client](#).

## 2.5.2. PaperCut NG on Linux

This section is designed to supplement the Install Guide (see [Quick install: Linux \(CUPS and/or Samba\)](#)). It provides an in-depth explanation of the Linux installation process, the directory layout and tools.

Information in this section is technical in nature. It is expected that readers have prior experience with:

- The Unix command line environment
- Unix file permissions
- Configuring CUPS and/or Linux print queues
- Or basic Samba configuration

## 2.5.3. The Installation Process

The Linux version of PaperCut MF is supplied as a pre-compiled self-installing application. The installation process is designed to work with all major Linux distributions. Due to the varied nature of some installations and administrator preferences, often some manual configuration is required. This section describes the installation process in detail as well as some additional options available to System Administrators.

### 2.5.3.1. Manual extraction

The Linux version of PaperCut MF is supplied in a self-extracting, self-installing archive. The archive is a `tar` archive compressed with `gzip`, and headed with a shell script to facilitate self-extracting. After extraction is complete, the installation script named `install` is executed to begin the install process. Some System Administrators might want to inspect the contents of the archive, and possibly the installation process itself prior to the actual install. The self-extracting installer takes a number of command line arguments. The `-e` argument extracts the archive into

the current working directory ready for inspection. Further options and documentation is available via the `--help` option.

```
Usage: pcmf-setup.sh [-e|-i|-l] [-v] [-n] [list ...]
  -e      Extract the files and then exit without installing.
  -i      Install after extracting the files (default).
  -l      List the contents of the archive and exit without
          extracting.
  -v      Verbose. Print the names of the files as they are
          extracted.
  list    The list of files to extract."
```

### 2.5.3.2. The install process

Even though the majority of the installation process is completed under the identity of the non-privileged user account called `papercut`, most administrators want to know what the install process does. The main steps are outlined below:

## Extraction

The first stage in the install process extracts the archive to `/tmp` or a location as defined by an environment variable `TMPDIR`. The command-line programs `tar` and `gunzip` are used during this phase.

## Installation

After extraction is complete, the installation script is called. The install script, called `install`, presents the EULA and request acceptance. The script then determines the install location. This is the `papercut` user's home directory. The home directory is determined by the `HOME` environment variable, or if not set, the result of a call to `getpwnam()`.

Files are then copied into the `papercut` user's home directory. Care is taken not to overwrite any existing data or configuration files if this is an install-over-the-top upgrade.

## Permissions

To ensure the default installation is secure by default, permissions are applied to key files. The following area of the application are restricted to the `papercut` user only:

**Table 6: Secured Application Areas**

Area	Comments
<code>~/server/server.properties</code>	Contains server configuration including the default admin password.

Area	Comments
<code>~/server/data</code>	This directory contains application data including database files. Some of this data might contain sensitive information.
<code>~/server/bin/linux-[x64 i686]</code>	This directory contains a setuid-root binary. Even though the binary is no use to an end-user or hacker, good security practice stipulates that you should allow only the <code>papercut</code> user access to this directory.

You can check and reapply permissions at any time post-install by running the scripts:

```
~/server/bin/linux-*/setperms
~/providers/print/linux-*/setperms
```

## Firewall

The PaperCut MF *Application Server* (`pc-app` process) listens on port 9191. This port is used for browser based administration access, for client access, and other services. Ensure that any firewall or local IP filtering software such as `iptables` is set to allow local network traffic access to this port.

## Root Level Tasks

A small part of the install process needs to run as the `root` account. The tasks conducted as root include:

- Setting the `authpam` binary as setuid-root. This binary is used for password verification.
- Installing a CUPS backend. This is done by placing a symlink in the CUPS `lib/backend` directory.
- Setting up SYSV style start scripts if the system uses this boot process. This is done by placing symlinks in the:

```
/etc/init.d/
/etc/rc3.d/
/etc/rc5.d/
and so on...
```

- Setting up SYSD services if the system uses this boot process. This is done by placing the following service definition files in `/etc/systemd/system` directory:

```
pc-app-server.service
pc-event-monitor.service
pc-connection-monitor.service
pc-web-print.service
```

If the administrator decides not to run the root-level tasks during the install process, the tasks can be run again post-install by executing the shell scripts:

```
~/server/bin/linux-*/roottasks
~/providers/print/linux-*/roottasks
```

Alternatively the administrator can view the scripts and make the required changes by hand.

### 2.5.3.3. Linux Print Queue Integration

PaperCut MF is able to integrate with and monitor CUPS, Samba and Novell iPrint based print queues. The configuration and an explanation of the integration methods follows:

## CUPS Configuration Overview

If the print queues are managed and controlled via CUPS, modify the Device URI on each printer so the `papercut` backend is incorporated into the print process. To automate this, run the `configure-cups` script as `root` (the simplest option):

```
~/providers/print/linux-*/configure-cups
```

and follow the interactive instructions. Alternatively, you can do it manually via the CUPS web admin interface or by editing the CUPS `printers.conf` file:

1. Open `printers.conf` (e.g. `/etc/cups/printers.conf`)
2. Prefix the DeviceURL for each printers with "`papercut :`". For example:  

```
DeviceURI socket://192.168.1.200:9100
```

Would become:  

```
DeviceURI papercut:socket://192.168.1.200:9100
```
3. Restart `cupsd` so the new configuration is detected (e.g. `/etc/init.d/cupsd reload`)

## CUPS Integration Explained

CUPS, the Common UNIX Printing System, is a popular system for managing printers on Linux servers. CUPS uses a chain-of-commands concept where `filters` and `backends` combine together to form a process steam - a workflow. PaperCut MF hooks into this workflow at the backend level, intercepting the job before it's passed on to physical printer hardware.

The interception is done by wrapping or proxying the real CUPS `backend`. CUPS calls the PaperCut MF backend, which processes the job. If the job is approved, it passes the document onto the real backend. If the job is denied, it is deleted and proceeds no further. The PaperCut MF backend is usually set up and installed by default during the standard installation.

Setting up the PaperCut MF CUPS backend proxy is a relatively simple task. All the administrator needs to do is prefix the existing `DeviceURI` with `papercut :.` For example, the entry:

```
DeviceURI socket://192.168.1.200:9100
```

would become:

```
DeviceURI papercut:socket://192.168.1.200:9100
```

The printer registers itself with PaperCut MF on the first print event.

## PaperCut MF CUPS Architecture

The PaperCut MF CUPS backend is a native compiled binary. In PaperCut MF documentation it is referred to it as a *Print Provider* - a component that provides print event information to the *Application Server*. It's responsible for analyzing the print job and then communicating this information to the *Application Server* component. Communication is via an XML-RPC based Web Services call. This means that the backend does not need to be on the same server as the system hosting the Application Server component.

## Samba Configuration Overview

If the print queues are exposed to network workstations using Samba ([Samba Website](#)), and a print system other than CUPS is used (e.g. BSD, LPRNG, SYSV, etc.) the `smb.conf` needs some additional configuration. The "print command" needs to be replaced with a PaperCut MF command.

1. Open the `smb.conf` (e.g. `/etc/samba/smb.conf`)
2. Under the `[global]` section insert the line:

```
print command=/home/papercut/providers/print/linux-
i686/samba-print-provider
-u "%u" -J "%J" -h "%h" -m "%m" -p "%p" -s "%s"
-a "[standard print command]" &
```

(IMPORTANT: The above information is displayed on a single line. Note the use of the & (ampersand) on the end of the line.)

where `[standard print command]` is the command that would normally called for printing. Typical examples of commands usually used for printer are listed below:

**Table 7: Standard print commands**

Type	Command
BSD, AIX, QNX, LPRNG or PLP	<code>lpr -r -P%p %s</code>
SYSV or HPUX	<code>lp -c -d%p %s; rm %s</code>

More information on standard print commands is available under the Samba documentation installed on your system (see `man smb.conf`).

## Samba Integration Explained

Samba is used to provide file and print sharing to Windows systems and is a popular solution. One of the main reasons for its popularity is that it avoids the need for expensive Microsoft Windows server licenses!

Samba exposes the locally set up Linux/Unix printers as network shared Windows printers. It does this by wrapping the underlying print system - usually CUPS or LPR/LPD. In the case of LPR, Samba calls the standard `lp` command line programs to perform printing. PaperCut MF works by wrapping or proxying the "print command". More information on how Samba interacts with the underlying print system is available in the Samba documentation.

A typical entry in the Samba configuration file `smb.conf` defining the PaperCut MF print command wrapper would be:

```
print command=/home/papercut/providers/print/linux-i686/samba-  
print-provider  
-u "%u" -J "%J" -h "%h" -m "%m" -p "%p" -s "%s"  
-a "[standard print command]" &
```

(IMPORTANT: The above information is displayed on the one line. Note the use of the `&` (ampersand) on the end of the line.)

where `[standard print command]` is the command that would normally be called for printing.

The `%u`, `%p`, etc., are Samba substitution variables. These are replaced with content such as the username, printer name, etc. and are used by PaperCut MF in the reporting and logging.

The printer registers itself with the PaperCut MF web interface after the first print is received.

## PaperCut MF Samba Architecture

The PaperCut MF Samba print command wrapper is a native compiled executable. The PaperCut MF documentation refers to it as a *Print Provider*. It's responsible for analyzing the print job and then communicating this information to the *Application Server* component. Communication is via an XML-RPC based Web Services call. This means that the command does not need to be on the same server as the system hosting the Application Server component.

## Novell iPrint Configuration

PaperCut MF works by directly integrating with the Novell iPrint Print Manager.

The configuration process is detailed in [Step 5 - Printer/iPrint Configuration](#).

The development team at PaperCut Software has worked with the Novell iPrint engineers during 2008 to ensure an iPrint API was available that allow iPrint users to have access to the same feature set as seen on Windows, Mac and Linux CUPS. PaperCut MF uses this API set to intercept and account for jobs as they pass into the iPrint queue.

### 2.5.4. Advanced Configuration & Logs

The majority of PaperCut MF configuration is conducted in the *Application Server's* web interface. Some additional configuration options are available in the following configuration files:

**Table 8: Advanced Configuration**

Config File	Comments
<code>~/server/server.properties</code>	Contains server configuration including the default admin password, the server's TCP port and external database connection parameters.
<code>~/providers/print/linux-[x64 i686]/print-provider.conf</code>	The <i>Print Provider's</i> configuration file used by both the Samba and CUPS Print Providers. This file defines items such as the <i>Application Server's</i> IP address and port, process timeouts and other.

### 2.5.4.1. Advanced Logging

Most important application logging is available via the **Application Log** section of the *Application Server's* web interface. Some additional advanced level logging is maintained in standard text files located at:

```
~/server/logs/*
~/providers/print/linux-[x64|i686]/print-provider.log
```

Administrators can consult these logs when attempting to diagnose or troubleshoot problems.

### 2.5.4.2. Maintain correct user name when print jobs are redirected on CUPS

When print jobs on CUPS are redirected to a second print queue the job seems to come from a user account called `lp`. Note that the job is still correctly tracked against the user and the appropriate accounts are charged as needed. However, some users can be confused when their jobs appear to be printed by another user at the device.

Administrators can edit the file `~/providers/print/linux-[x64|i686]/print-provider.conf` and uncomment the `RedirectCommand` entry. This forces PaperCut MF to pass the user's name to the CUPS subsystem on redirection. This is not the default behaviour as it can cause authentication problems, depending on how your network printer queues are configured, and you should verify that users can still print after making this change.

## 2.5.5. Backups & System Management

Suggested backup procedures are detailed in [System Backups](#). Common system management functions are covered in [System Management](#).

Administrators managing Linux servers should also consider adopting the following management policies:

- Regularly check for PaperCut MF updates. You can apply updates with a simple, *install-over-the-top* procedure.
- Remember to add the PaperCut MF backend or command when configuring new printers.
- Always check PaperCut MF's functionality after a system updates (i.e. new versions of CUPS or Samba, or configuration changes).

## 2.5.6. User Directory and Authentication

PaperCut MF synchronizes its user directory with the underlying operating system or network. The Linux version of PaperCut MF ships with two user directory implementations. Due to the nature of Linux, some organizations might have customized user directory implementations. PaperCut MF can support customization in this area. This section details the user-/group/authentication options available as standard, as well as how one would go about developing customized implementation.

### 2.5.6.1. Standard Unix

The **Standard Unix** user directory provider uses standard Unix API's to enumerate user and group information. This allows group information to be defined on either the local system or via another source as configured via `nsswitch.conf`. For example, you can configure the system using `nsswitch.conf` to obtain user directory information from a centralized LDAP server or Novell's eDirectory.

User password authentication is performed via PAM. (Note: For administrators wanting to customize the PAM authentication method at the application level, PaperCut MF reports itself as "papercut".)

### 2.5.6.2. Samba/Windows Domain

If the user and group information is provided by a Windows Domain such as an NT Style Domain or Active Directory, the **Samba** option is most appropriate. This option would normally be used on networks where the printers are hosted on a Linux server and exposed to Windows users via Samba. The server needs Samba installed and configured, but does not need to be a member of the domain.

At the technical level, the Samba support is implemented as a set of Perl script wrappers around standard Samba commands such as `net` and `smbclient`. Administrators should ensure these Samba commands are on the `papercut` user's path.

The wrapper script is located in `[app-path]/server/bin/[arch]/sambauserdir`.

### 2.5.6.3. Custom

Some large networks, particularly those found at established universities, have custom user directory and authentication services not directly supported by PaperCut MF. To support these networks, administrators can use scripting and other technologies to build a new custom *User Directory Information Provider*.

PaperCut MF works by handing off user, group and user authentication tasks to a separate program/process. The external process must accept a set of commands as command-line arguments and return the answer in a tab delimited prescribed format on standard out. For more information on the format, see [Custom User Directory Information Providers](#). The source code for the standard PaperCut MF supplied *User Directory Information Provider* is also supplied as part of the installation, and is a good example. The source code is provided in:

```
~/server/examples/providers/
```

Organizations wanting to build a custom *User Directory Information Provider* are encouraged to contact the PaperCut MF development team. They are more than happy to assist.

### 2.5.7. Unix command-line Release Station client

In a modern Linux environment, the most commonly used print system is usually CUPS. You can configure PaperCut MF to integrate with CUPS to conveniently track printing. On Legacy Unix systems CUPS is often not an option and printing is performed via the Line Printer tools such as `lp` or `lpr`. LPR/LPD is a non-authenticated printing protocol so the identity of the user associated with a print job can't be trusted. Instead, the authentication must be performed at the PaperCut MF application layer. The PaperCut MF client tool with popup authentication as discussed at [Scenario Two: The multi-user Mac with popup authentication](#) is a good option but not appropriate for a terminal-only environment. Terminal-only environments can be supported via a Release Station queue (see [Hold/release queues & Print Release Stations](#) for more detail). Jobs held in a Release Station queue are normally accessed and released via a dedicated terminal or a web browser based interface, however, for the benefit of terminal-only users, a command-line job release client is also provided.

This process is best explained using an example:

1. John uses the `lp` command to print a Postscript document from his Unix terminal session. The job arrives in the queue under the username identity "john". (Although the name can't be trusted.)
2. The administrator has enabled the PaperCut MF Release Station on this print queue. The job is placed into a holding state.
3. John must now authenticate and then release the job. He wants to do this via the command-line Release Station client.
4. John enters the command `release-print-job`. This command was set up by the

System Administrator.

5. John enters his username and password, confirms the job's name, cost and page count and releases the job for print. The following is an example of the output seen:

```
Please enter your username: john
Please enter your password:
Current balance: $8.00
18:04:13 - Name: "Configuring Linux", Pages: 2, Cost: $0.40
Print this job? [yes]
Released 1 job(s).
```

6. The job prints and John's account is charged.

Enabling the Release Station on a printer is a global option - it affects all jobs from all users. In some environments it might not be appropriate to have all jobs controlled via a Release Station - for example, jobs originating from Windows systems are already authenticated and should print directly. An alternate strategy is to have two queues for the same printer. The first queue does not use the Release Station option and only allows printing from authenticated workstations/users, while the other queue has the Release Station option enabled.

You can expose PaperCut MF managed print queues for access via LPR/LPD using various methods. Use the PaperCut LPD Service when the queues are hosted on a Windows system. An LPD interface is available for CUPS if the queues are hosted on Linux.



**Tip:** Windows System Administrators can control which queues are exposed via LPR/LPD by setting printer permissions. Queues set up to explicitly *deny* permission to access from the SYSTEM account are *not* accessible via LPR.

### 2.5.7.1. Installing the Command-Line Release Station Client

The following installation instructions assume the reader has prior Unix system administration experience.

1. Ensure that Java 1.8 or newer is installed on your system. To check, type `java -version` at the terminal. If you do not have Java 8 (1.8) or higher, install it before continuing. Java is available for all major Unix operating systems.
2. Copy the Release Station files from your primary server to the system for which you want to set up the command line Release Station client. These files are located in `[app-path]/release`. If your primary server is running Windows, this folder is shared by default (accessible via `smb://[server]/release`). You can use tools such as Samba (`smb-client`) to help copy these files. Ensure all files in the folder are copied taking care to preserve the existing hierarchy.

The recommended location to install the Release Station command line client is `/usr/local/papercut/release/`.

3. Ensure that the command line Release Station client has execute permissions for all users.

Use the following command:

```
chmod 755 ./pc-release-cmd-line.sh
```

4. For convenience, you can create an alias for the command line Release Station client. This is typically done by entering the following line in a global profiles file, or each user's `.profile` file:

```
alias "release-print-job" = \
"/usr/local/papercut/release/pc-release-cmd-line.sh
```

5. Users can now release their print jobs by typing `release-print-job`.

You can also create a 'wrapper' for `lp` to run the command line Release Station client after a user has sent a print job. The following script `print-doc` provides an example:

```
#!/bin/sh
echo "Printing document using lpr..."
/usr/bin/lpr "$@"
echo "Printing done, calling program to release job..."
sleep 1
cd /usr/local/papercut/release
./pc-release-cmd-line.sh
echo "Done."
```

For the convenience of users, install the command line Release Station client on all systems where printing from the terminal can be performed.

## 2.5.8. Removing PaperCut NG from a Linux server

You can completely remove PaperCut MF from a system:

1. Remove all files from the `papercut` user's home directory.
2. Remove the `papercut` user account and home directory.
3. Remove any server start scripts matching:

```
/etc/init.d/papercut
/etc/rc*.d/*papercut
```

## 2.5.9. Linux FAQ

### 2.5.9.1. Troubleshooting & Installation Questions

**How can I run the root installation tasks manually?**

If you do not run the root level tasks during installation, or if they fail, you can manually run them later by running the following shell scripts as root:

```
~/server/bin/linux-*/roottasks
~/providers/print/linux-*/roottasks
```

---

**I am unable to open a browser to `http://[server_name]:9191/admin`. What is**

---

## wrong?

The first step is to check to see if the PaperCut MF is listening on the port. The command:

```
netstat -anp | grep 9191
```

should list the `pc-app` as the owner of the process on port 9191. If nothing is listed, check that the Application Server has started (e.g. `ps -ef | grep pc-app`).

If the server is already running, the next step is to ensure no IP filtering is applied to the port. Some Linux distributions have strict `iptables` filters enabled by default. Ensure that port 9191 is accessible from all local network systems.

---

### I want to use a custom script to start the server. Is this possible?

The SYSV style start script included should work with all systems using an `/etc/rc*.d` style boot process. Some administrators might want to replace the `app-server` with a custom script that better fits in with their Linux distributions style guide. Administrators should consider storing this script outside the PaperCut MF install structure so it's not overwritten in any further upgrade.

However, if the system is using SYSD, use the service definition files (see [Root Level Tasks](#)) for configuration changes. Do not modify the `app-server` script.

---

### Can I run/install PaperCut MF under an account other than "papercut"?

No. At the moment the installation, and other scripts, assume the existence of a user called `papercut`. This might, however, change in the future. E-mail your thoughts to the development team!

---

### Is an RPM or .deb package available?

No. At the moment we're supplying it as a self-extracting and self-installing archive. This allows the flexibility to support install-over-the-top for upgrades and maintain full control over the installation process. The process also allows PaperCut MF to run and install on systems not using RPM or apt. We also plan on supporting other Unix based operating systems in the future such as FreeBSD and Solaris. The current installation method should work with all standard Linux distributions.

---

## 2.5.9.2. General Questions

### Is PaperCut MF open source?

PaperCut MF is not "open source" in reference to it being available under the GPL or another popular open source license. Source code is, however, provided to customers upon request as needed for security reviews. As a company, PaperCut Software is transparent in our development approach, works closely with our users, and support a number of open source projects both financially and with code submission. PaperCut MF, however, remains a commercial application with commercial support at the current time.

---

## 2.6. Installation on Novell OES Linux (iPrint)

---

## 2.6.1. Quick install: Novell OES Linux (iPrint)



**Important:** The following section assumes the reader has knowledge of general Novell OES Linux system management including using the command-line, creating users, editing configuration files and understanding file permissions.

### 2.6.1.1. Step 1 - System Requirements & Printer Setup

Before proceeding with the installation the System Administrator should take a few moments to verify system requirements. Is the operating system version supported and are patches up-to-date? Take a few minutes to verify the system is current and supported (see [System Requirements](#)). PaperCut MF is designed to integrate with iPrint on Novell OES Linux. If your printers are currently hosted on iPrint on a Netware server or even under legacy NDPS, migrate your queues over to a OES Linux based server. Ensure your printing is correctly working under iPrint on OES Linux before continuing to the next step.

*Important:* iPrint and the print queues must be configured and confirmed to work *before* progressing to step 2.

### 2.6.1.2. Step 2 - Create the host user account and firewall settings

PaperCut MF runs and installs under a non-privileged user account called "papercut". The `papercut` user's home directory location is the application install location. `/home/papercut` is recommended, however, Administrators might choose an alternate install location depending on personal preference. Alternatives include:

- `/usr/local/papercut`
- `/opt/papercut`

The host user account is *not* an eDirectory account but a local system account. One way to create the "papercut" account on OES Linux is:

1. Open **YaST Control Panel** and select **User Management** under **Security and Users**.
2. Click **Add** to create a new user.
3. On the **User Data** tab, enter a username of `papercut` and assign a secret password.



The screenshot shows a web interface titled "New Local User" with a user icon. Below the title are three tabs: "User Data", "Details", and "Password Settings". The "User Data" tab is selected. The form contains the following fields and options:

- User's Full Name:** A text input field containing "PaperCut System Account".
- Username:** A text input field containing "papercut" and a "Suggestion" button.
- Password:** A text input field containing "\*\*\*\*\*".
- Confirm Password:** A text input field containing "\*\*\*\*\*".
- Disable User Login:** A checkbox that is currently unchecked.

4. On the **Details** tab, select `Empty Home` with permissions `755` and change the `Home Directory` path to define an alternate install location.

5. Click **Accept** to create the account.

 **Important:** This quick start guide assumes the install location is `/home/papercut`. If an alternate home location is defined, some of the paths listed in subsequent sections will require modification.

A default OES Linux installation imposes strict resource usage limits on user accounts (`ulimit`). The `papercut` account is a special account used for hosting an application so needs to be granted satisfactory resource limits such as the ability to open many files. Larger sites should consider adding the following line to `/etc/security/limits.conf`:

```
papercut - nofile 65535
```

Novell OES Linux has a strict default firewall policy. PaperCut MF uses ports 9191 (for HTTP) and ports 9192 (for HTTPS/SSL) and these ports must be open. To open these ports:

1. Open **YaST Control Panel** and select **Firewall** under **Security and Users**.
2. Select **Allowed Services**, then click **Advanced**.
3. Add ports 9191 and 9192 to the **TCP Ports** list (separated by spaces).
4. Click **OK**, **Next**, then **Accept** to apply the changes.

### 2.6.1.3. Step 3 - Download and installing

PaperCut MF is supplied as a self-extracting and self-installing archive. The installation is performed under the rights of the newly created `papercut` account and temporary `root` access is required. Make sure the root password is handy. (Administrators who are after a detailed explanation of the install process should also consult the background information in [PaperCut NG on Linux](#)).

Log on as the newly created `papercut` user and download and execute the installer from the command prompt. Here is an example using `wget` to fetch the installer:

```
shell> su - papercut
shell> wget [download url from PaperCut Software website]
shell> sh ./pcmf-setup-novell-oes-linux.sh
```

Follow the installation instructions and enter the root password when requested.



**Important:** Ensure you login as the user `papercut` so that the user's environment is sourced and the home directory (install location) is correctly defined.

```
Installing into /home/papercut...
358920 blocks
4731 blocks
Applying default permissions...
Setting permissions on Application Server files...
Setting permissions on Print Provider files...

The install needs to perform some tasks as root. Tasks include:
  * Setting setuid-root on the authentication provider
  * Installing a CUPS backend
  * Configure the server's boot scripts

Would you like to perform these tasks now? [yes or no]
yes
Enter root password when requested:
Password:
Setting authpan as setuid root...
Installing SysV style boot scripts...
Attempting to locate CUPS installation...
Found CUPS backed_directory at /usr/lib/cups/backend
Linking Print Provider into CUPS backend directory
Creating client configuration file...
Config file successfully written.
Starting the application server...
Starting Application Server.....started (pid: 4361).
Configuring.....
```

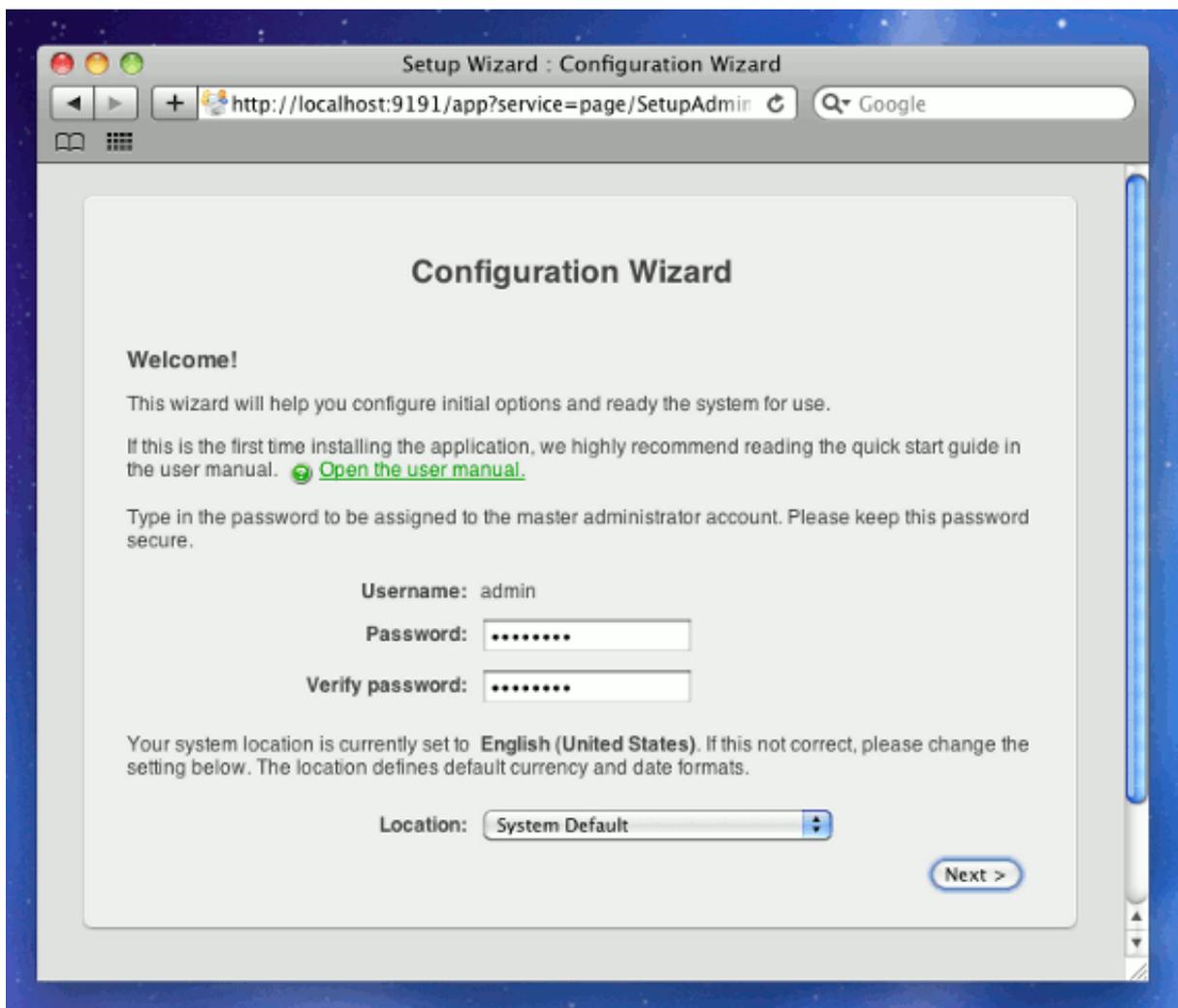
The installation process takes between two and five minutes depending on the speed of the system. A system restart is not required but administrators are advised to perform installation on live production systems during periods of low activity - for example, not during backup operations or other administration activities.

### 2.6.1.4. Step 4 - Configuration Wizard

After installation, you are prompted to open a web browser at `http://[server-name]:9191/admin` to complete configuration. The configuration stages are explained below:

## Administrator Password

This is the master password for the main in-built admin account, and is independent of the operating system or domain passwords. The password must meet minimum strength requirements, and must be at least six characters. Ensure that knowledge of this password is kept secure. This screen also sets the system's physical location and language; ensure that these are correct before proceeding.





**Tip:** Treat this password the same as your router/modem management passwords. It is independent of your domain accounts and needs to be kept secure.

## Organization Type

This is the organization type that matches the organizational environment where PaperCut MF is used. Choosing the appropriate organization type determines which system defaults are used on setup. For example, in a Professional (Client Billing) organization, where it is useful to charge-back printing to customers, an advanced client popup is provided with additional features useful for dealing with large numbers of client (shared) accounts. You can change these default settings chosen for an organization type after installation.

## Default Print Cost

This is the default cost-per-page assigned to the printers. You can change this setting on a per printer basis after installation. Choosing a sensible cost now will help minimize future setup. For example, in the USA, a value of \$0.05 would be appropriate for many standard black & white printers.

## Initial User Credit (for Education installations)

When the organization type is set to Education, you can assign users an initial starting credit. This ensures they have funds in their account as soon as the system is enabled. An option also exists to control what happens when users run out of credit/quota. If you are evaluating PaperCut MF it might be appropriate not to disable printing when a users funds run out. This way you can be assured that user printing is not disrupted during the evaluation. You can change these settings after setup.

## User/Group Synchronization

PaperCut MF extracts user information out of the System or Domain. The options presented here vary depending on the Operating System and its environment. During evaluation, most sites import all users from the system/domain into PaperCut MF. An option also exists to import a subset of users from a given group. This option is useful when only a subset of users will use the printers.



**LDAP Server Details**

The LDAP source requires connection and authentication information about your LDAP server.

Enter the following details for your LDAP server. Completing these settings require a good understanding of LDAP and your LDAP configuration. For more information see the manual below.

The system has attempted to automatically discover your LDAP configuration. Carefully review these settings.

[See the LDAP documentation for more information.](#)

LDAP server type: Novell eDirectory

LDAP server address: OES-VM

Use SSL (Must be enabled on LDAP server)

Base DN: O=myorg

Admin user DN: cn=admin,O=myorg

Admin user password: \*\*\*\*\*

**Test LDAP Settings** < Previous Next >

PaperCut MF has native support for eDirectory LDAP schemas. This is the default user import option for most sites. PaperCut MF does its best to auto-discover LDAP settings, but some knowledge of eDirectory and/or LDAP is required. More information on LDAP is available in [Using LDAP for user synchronization](#).

## Client Settings in Professional (Client Billing) installations

In a Professional (Client Billing) environment, the main focus is on allowing users to allocate print jobs to client (shared) accounts. The process works by:

- Pausing all jobs that enter the print queues.
- Displaying a popup on the user's workstation asking them to allocate the print job to an account. This is done by selecting the account from a list.
- After the user has responded to the popup, the job is released to the printer.

You can read more about the account selection process and shared accounts at [Shared accounts](#).

The account selection popup option is enabled at the user level. Once the option is enabled, the user *must* run the client software. If the client software is not running, the popup cannot display, and the job remains paused in the print queue. This option is considered high impact. You are

presented with two strategies that allow you to choose the implementation approach that best suits your needs:

## Minimal impact (Initial single user testing)

In this strategy the account popup is only initially enabled on a single user for testing. You need to nominate the testing account. You might already have an appropriate test user account on your system/domain or alternatively selecting your own personal account is a good choice. The name should be in the format used to log in to the domain/system (usually the short form).

The minimal impact strategy gives you time to test the popup with the nominated test user. Then you can enable the **Advanced account selection popup** option for other users when appropriate.

## Immediate implementation (Enable for all users)

This strategy enables the account selection popup on all users. This option is good for smaller networks as it minimizes the amount of post-install configuration - just deploy the client and your up! If this option is selected, you can install the client software on user desktops as soon as possible.

If in doubt, select the minimal impact strategy. This ensures the impact is isolated to only the nominated test user.

## Verify Setup Options

Prior to enabling the configuration options that you have selected, you can verify the setup options. At this stage you are still able to return to any of the prior configuration screens to alter options before clicking **Finish**.

## Wizard Completion

After completing the configuration wizard you are presented with a user synchronization status screen, showing the progress and results of the system completing its initial setup. Once you have closed that, click **Login** to access the interface and begin familiarising yourself with the options and features available. Take some time to explore, and refer back to the relevant sections of this manual as required.

### 2.6.1.5. Step 5 - Printer/iPrint Configuration

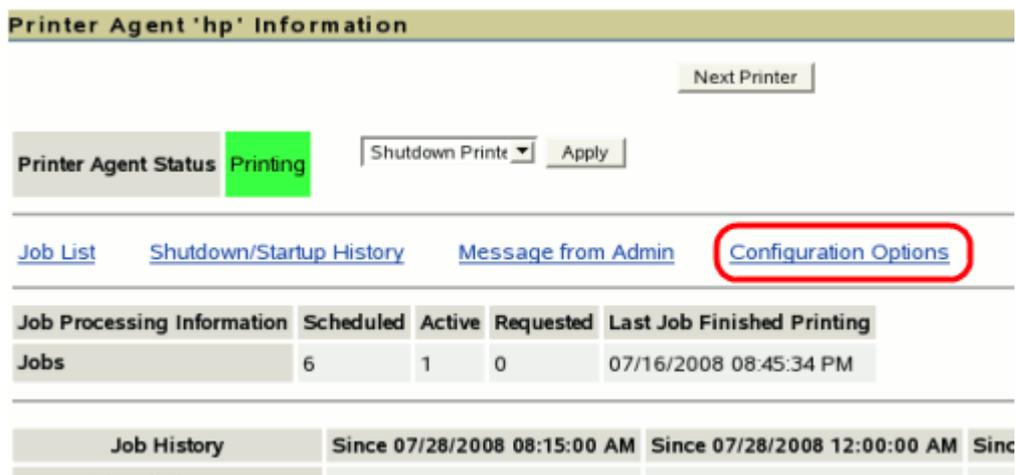
PaperCut MF works by directly integrating with the Novell iPrint Print Manager. iPrint must, however, be configured to use PaperCut MF as an accounting control source. In the current release, this configuration is done manually at the individual print queue level:

1. Log in to iManager, expand **iPrint**, and select **Manage Printer Manager**
2. Select the Printer Manager associated with one of your print queues.

- Click the **Manage health monitor** link. A list of all your printers is displayed.



- Select a *Printer Agent* from the list.
- Click **Configuration Options**.



- Enter `papercut` under the **Accounting Autoload Command**. Take care to write this all in lower case with no spaces.

**Configuration Options for Printer Agent 'hp'**

Enable Auditing  
 LPR Enabled  
 Require SSL

Printer Location

Gateway Autoload Command

Accounting Autoload Command  
 

7. Click **Apply**.
8. Click **Back**, then **Back** and repeat steps 4 through 7 for all printers you want monitored/controlled by PaperCut MF
9. In line with best practice, backup the new printer configuration (`padbtxt.xml`) as follows:
  - a. In iManager open up the active *Print Manager*.
  - b. Select **Manager health monitor > Advanced iPrint Manager Information > iPrint Manager Internal**
  - c. Click **Backup Database**.
10. Finally restart the *Printer Manager* in iManager by clicking **Shutdown** then **Startup**. After this, all jobs on the queues are tracked.

### 2.6.1.6. Step 6 - Sharing Client Software

The PaperCut MF client software is located in the local directory:

```
/home/papercut/client
```

This software needs to be shared over the network so workstations can access/install the client application. Novell iManager provides a number of file sharing options. One simple solution is to add a read-only NCP or Samba share called `PCClient` pointing to `/home/papercut/client`. Established networks will benefit from ensuring the client files are available in their Distributed Files Services. The deployment of the client software (e.g. zero-install deployment) is covered in [User Client](#).

### 2.6.1.7. Step 7 - Testing

Following a fresh installation, it is highly recommended to test core features of the system. For further details, see [Testing the Installation](#).

## 2.6.1.8. Step 8 - Deployment for a Professional (Client Billing) Installation

NOTE: This step is a requirement for a Professional (Client Billing) installation.

Now that the system is tested and working, it is time to deploy the client software and enable the account popup for their use. It is important to deploy the client software before enabling the popup, otherwise users' printing is stopped/paused.

### Deploy the client software

As discussed earlier in the section the client can be run directly from a network share (which is automatically configured on Windows). There is also the option to install the software locally on each workstation, however, this is not usually recommended because it makes the process of updating the client software more complicated.

For more information about client deployment options, see [User Client Deployment](#). Follow those instructions to deploy the client software, and then enable the popup as described below.

### Enable the advanced client popup

Once the client software is deployed on user workstations, you can set the **Account Selection**. In a Professional (Client Billing) configuration, users who print jobs for clients are often given the Advanced account selection popup, however, other **Account Selection** options might be better suited for some users based on their job function. You can enable the popup on one user at a time or update for all users in bulk. Use the **User Details** page to enable the popup for a single user. To enable the popup for all users in bulk:

1. Log in to the admin interface.
2. Under the **Users** section, select the **Bulk user actions** action from the menu at the top left of the **Users** tab.
3. Select the target group. To enable for all users select the `[All Users]` group.
4. In the **Change account selection setting** section, enable the **Change account selection** option.
5. Select the **Show the advanced account selection popup** option from the list.
6. If you do not want to allow users to charge printing to their personal account, then disable the **Allow user to charge to their personal account** option.
7. Click **OK**, and confirm the operation. Once completed, the account popup is enabled for selected users.

Once the popup is enabled for all users, perform some testing from users' desktops. To test, log in to the user workstation, perform a print, and check that the account popup is displayed and the job is logged as expected.

### 2.6.1.9. What next?

This concludes the Install Guide. Take some time to explore the features of PaperCut MF before continuing reading at [Implementation by Example](#) or [Tour](#). Business users might be interested in trying the popup client software as covered in [Client Software](#). If desired, the client software should also be deployed to other workstations. This procedure is detailed in [User Client](#).

## 2.7. Testing the Installation

Once the installation is complete, it is now time to test the system.

### 2.7.1. Testing for an Education or Small/Medium Enterprise Installation:

1. Print a test document such as a web page or basic document.
2. Navigate to the printer section and select the Print Log tab.
3. Navigate to the **Printers > Print Log** tab.
4. Your print job should now be listed in the log.
5. Your user account should also be charged an appropriate amount.

### 2.7.2. Testing for a Professional (Client Billing) Installation:

1. Log in to the admin interface after completing the configuration wizard.
2. Under the **Users** section, locate and click your test user account. The **quick find** feature can assist here.
3. Ensure that the user has the **Account Selection** option set to **Show the advanced**

## account selection popup.

**Account Selection**

Account selection can be used to allow the user to select what account is charged, or even to confirm print jobs before they are sent to the printer. These options require running the user client tool on workstations.

**Print account selection**

Show the advanced account selection popup

**Warning:** This setting requires this user to run the client software at all times.

**Information to show in popup**

Allow user to charge to their personal account

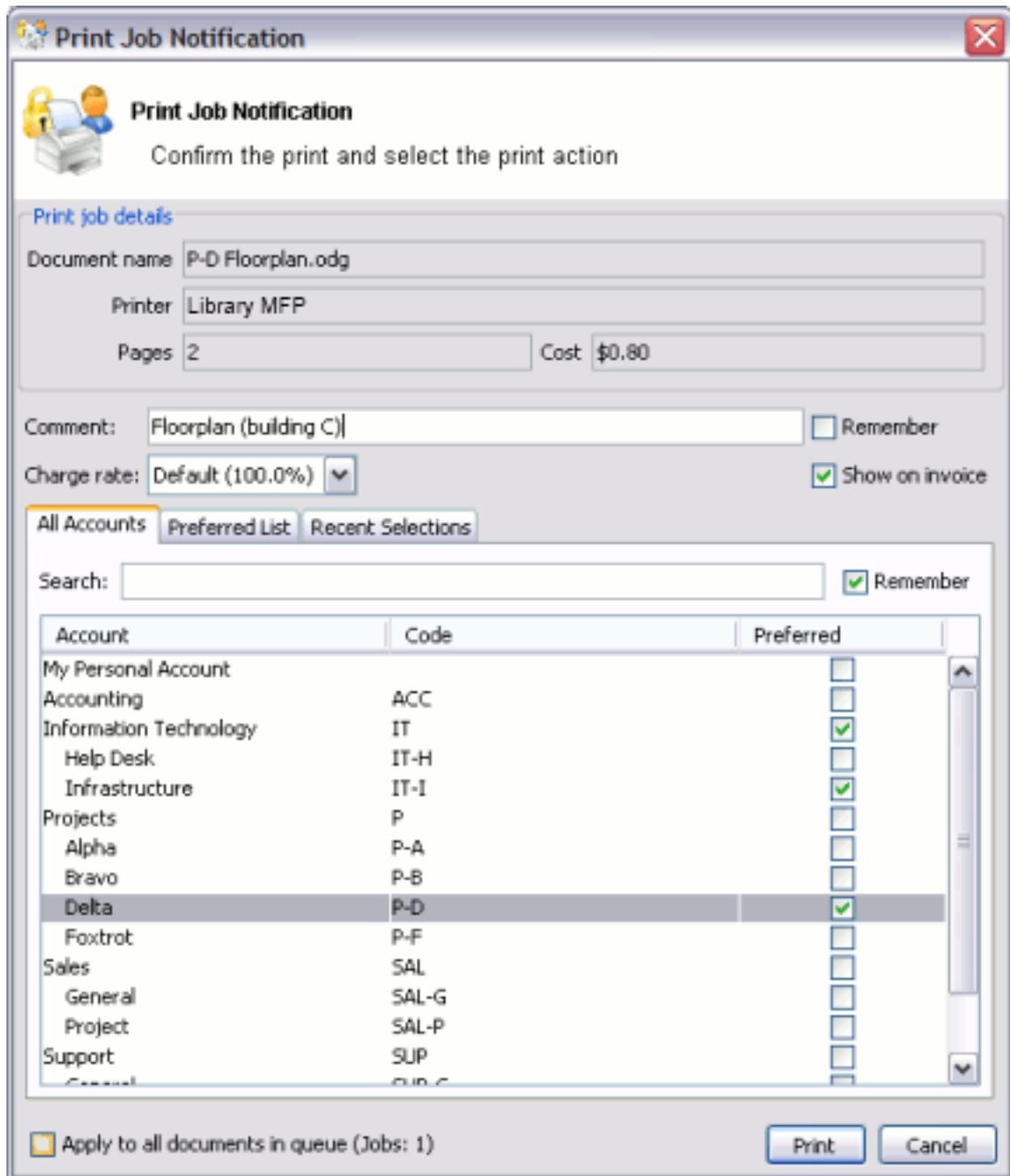
**When shared account is selected**

Charge shared account

Charge personal account (and allocate to shared account for reporting)

Now you need to log onto a workstation, start the client and test printing. The following instructions assume testing is performed from a Windows desktop system. For other platforms, consult the client deployment process as explained in [User Client](#).

1. Log onto a workstation and open Windows Explorer (the file explorer). In the address bar enter:  
`\\[server-name]\PCClient`  
Where `[server-name]` is the hostname of the system you installed PaperCut on. Explorer should connect to the share containing the client software.
2. Browse into the `win` directory and double-click `pc-client.exe`. The client launches and an icon is displayed in the task tray.
3. Print a test document such as a web page or basic document.
4. The client popup window should display. Select **My Personal Account**.



**Print Job Notification**

Confirm the print and select the print action

**Print job details**

Document name: P-D Floorplan.odg

Printer: Library MFP

Pages: 2 Cost: \$0.80

Comment: Floorplan (building C)  Remember

Charge rate: Default (100.0%)  Show on invoice

All Accounts Preferred List Recent Selections

Search:   Remember

Account	Code	Preferred
My Personal Account		<input type="checkbox"/>
Accounting	ACC	<input type="checkbox"/>
Information Technology	IT	<input checked="" type="checkbox"/>
Help Desk	IT-H	<input type="checkbox"/>
Infrastructure	IT-I	<input checked="" type="checkbox"/>
Projects	P	<input type="checkbox"/>
Alpha	P-A	<input type="checkbox"/>
Bravo	P-B	<input type="checkbox"/>
Delta	P-D	<input checked="" type="checkbox"/>
Foxtrot	P-F	<input type="checkbox"/>
Sales	SAL	<input type="checkbox"/>
General	SAL-G	<input type="checkbox"/>
Project	SAL-P	<input type="checkbox"/>
Support	SUP	<input type="checkbox"/>
General	SUP-G	<input type="checkbox"/>

Apply to all documents in queue (Jobs: 1)

5. Back in the PaperCut MF server admin interface, navigate to the **Printers > Print Log** tab.
6. Your print job should now be listed in the log.
7. Your personal user account should also be charged an appropriate amount.

## 2.8. Advanced implementation

PaperCut MF offers a number of installation options for more complex implementations.

## 2.8.1. Multi-Server and Multi-Site Deployments

The PaperCut solution is designed with distribution in mind. The solution is built using Service Oriented Architecture, which allows its components to be installed on different machines of varying OS'. This allows PaperCut to be installed in a variety of configurations, adapting to your network design as no two sites are the same.

The simplest and most common installation is to install PaperCut onto a site's Print Server (where the site has only one). For a school or a small organization the implementation doesn't need to be any more complex than this. This is a Single Application Server, Single Print Server deployment and suits the majority of deployments.

Some more complex implementation examples exist below, as a way of showing what's possible. You can extend or merge some of these concepts to suit your network and create your ideal PaperCut deployment.

PaperCut operates at a layer above your network print services. For this reason, design your solution to provide your printing services first, then integrate the PaperCut application into your network second. i.e. if you want a Print Server per site to stop large jobs traversing network links, do so. You can also use clustering to provide high up time to printing services.

### 2.8.1.1. PaperCut Site Server

All of the solution designs in the next section can be complemented with the PaperCut [Site Server](#).

The PaperCut Site Server gives the risk averse customer peace of mind that access to printing resources won't be interrupted by unexpected network dropouts. Deploying the PaperCut Site Server ensures the critical services of the PaperCut primary server are supported locally during a disaster. Site Servers are simple to install and hide the complexity of database replication from Administrators.

Whilst initially designed for usage in multi site solutions, this isn't the only usage of the Site Server. Think of the Site Server as a proxy to the Application Server that can also perform a set of the Application Server tasks with the last known set of data during an outage.

### 2.8.1.2. Deployment Examples

#### Scenario A - Single Site, Multi Print Server

It is quite common for sites to have multiple print servers, even if they are a customer at a single physical location.

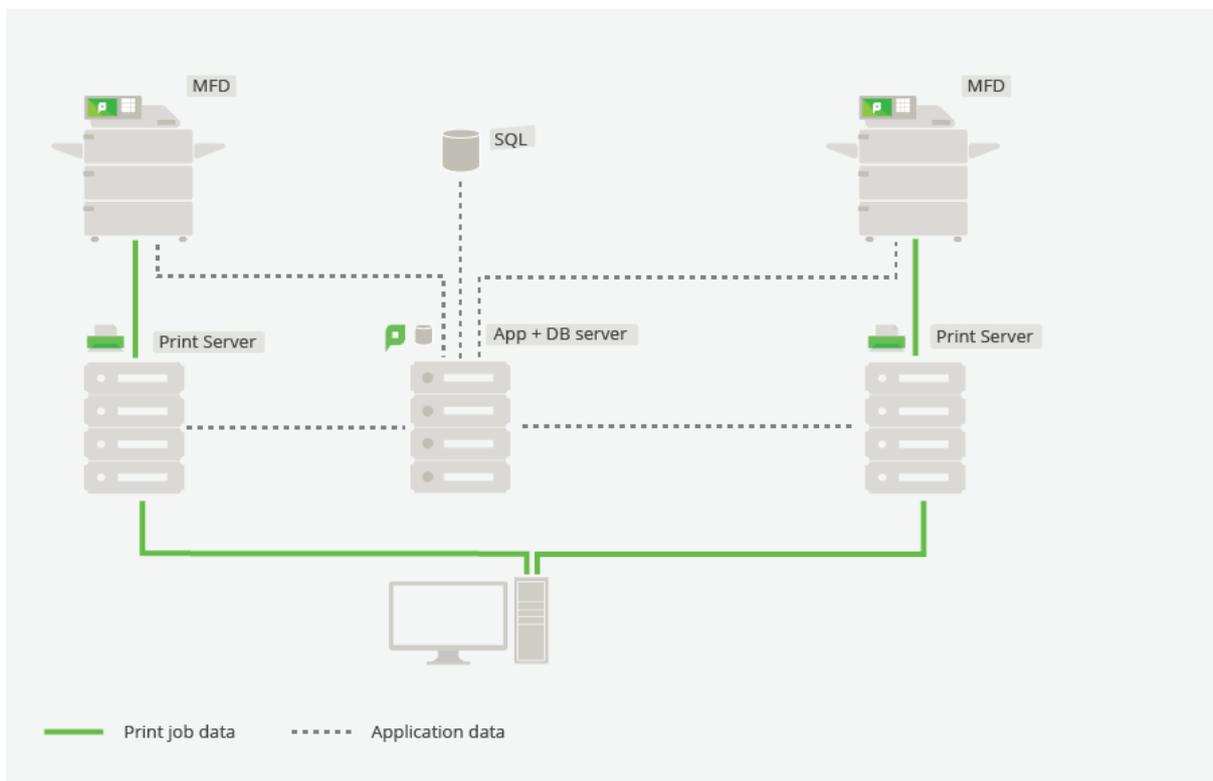
- **iOS printing** - Deploy supporting printing from iOS devices using a Mac Server to compliment a Windows Print server.
- **Admin / Curriculum** - A number of schools separate printing in the Administration section

of the school from general staff/student printing.

- **Clustering** - Each node of a clustered resource is installed as a Print Server.

Each of the print servers in this scenario must be installed and configured to communicate with the Application Server. For more information, see [Configuring Secondary Print Servers and Locally Attached Printers](#).

The PaperCut Site Server could add benefit in this deployment scenario if your Application Server were deployed within the Private Cloud. The Site Server would offer a local level of redundancy in the event the connection to the cloud resources were to drop. One of the Print Servers could play this role in addition to being a PaperCut Print Provider host.



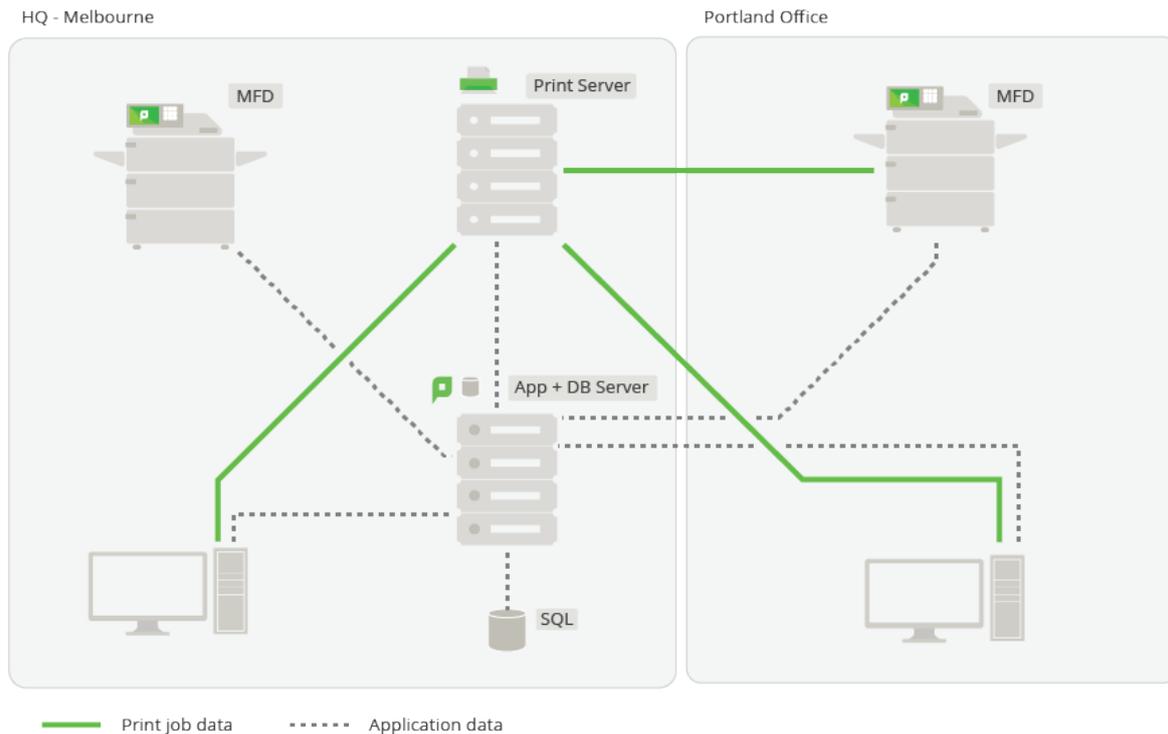
**Figure 9: Multi Site/Multi Print Server deployment**

## Scenario B - Multi Site, Single Server

Not all multi site installations rely on a print server on each site. This might be because the sites are small and don't warrant the resources, or because they are quite large and have resources centralised in a data centre or on the private cloud.

In either case, if all printing is centralised through a Single Application Server, Single Print Server installation, the installation is the same as if it were a single site with a single server.

The PaperCut Site Server could add benefit in this deployment if each of the sites wanted to ensure key business services of MFD usage and Print Release were supported during a network outage between a site and Application Server.



**Figure 10: Single Server deployment**

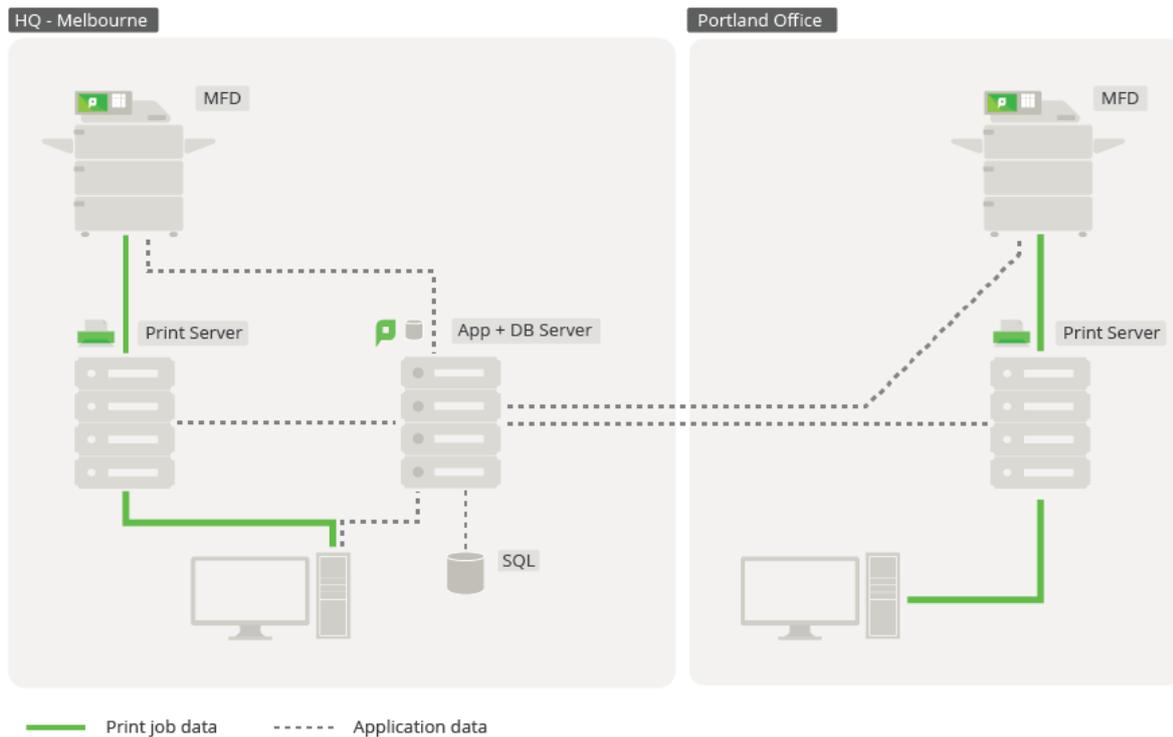
## Scenario C - Multi Site, Multi Print Server

The deployment of print servers into remote sites allows for print jobs to be spooled within the local site, alleviating the need for these jobs to be sent to a centralised print server to only be sent back again to the remote site where the destination printer is located. This might be the choice of design for customers with

- **Low bandwidth** between sites
- **Large print jobs** generated on sites (architects, design firms, etc)
- **Historical infrastructure** that supports this

The PaperCut solution supports this design through the deployment of [Configuring Secondary Print Servers and Locally Attached Printers](#) on each of the Print Servers. This allows the print jobs to remain locally spooled, with only light-weight transactional data and control information being transmitted between sites.

The PaperCut Site Server would add significant benefit in this design, possibly being installed onto one of the existing Print Servers. This would provide local support for Application Server functions should the link between Primary and Secondary sites be unavailable.

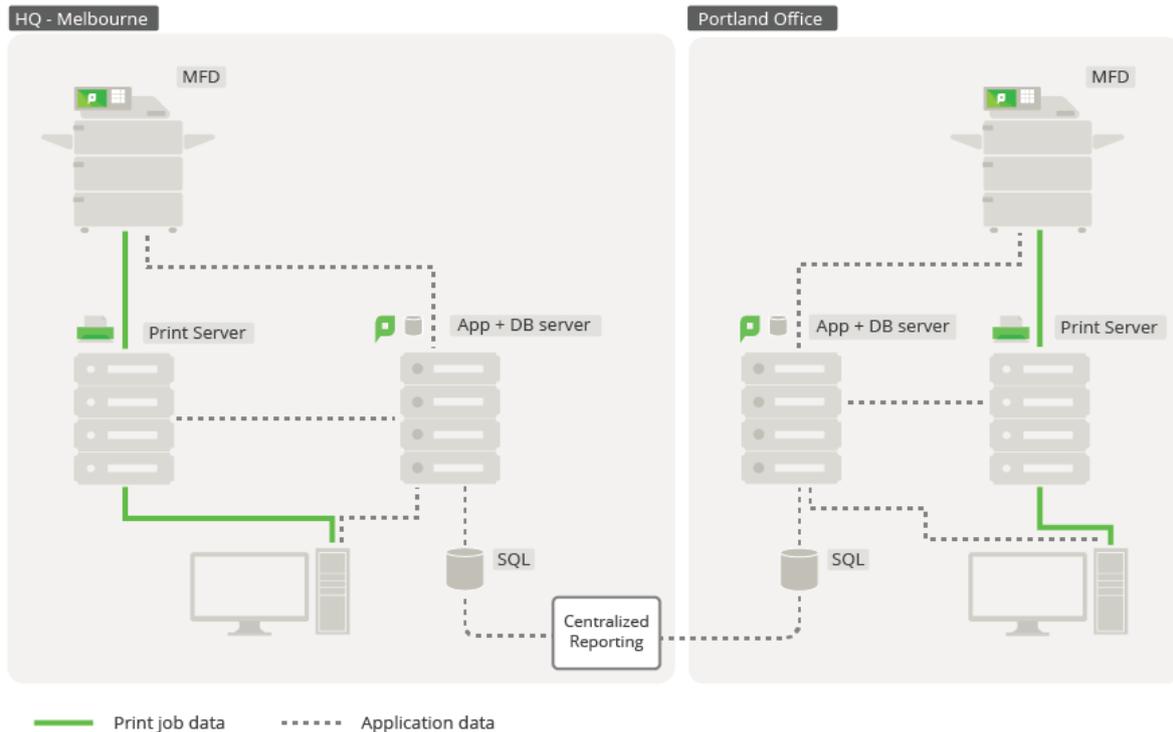


**Figure 11: Multi Site/Multi Print Server deployment**

## Scenario D - Multi Site, Multi Print Server, Multi Application Server

It is also possible to install PaperCut into each site of a multiple site organization as if each site itself were a separate installation of PaperCut. PaperCut has the ability to link separate Application Servers together for reporting purposes. Each individual site then has the ability to function and be administered autonomously, relying only on the links between the sites when there is a need to run a report from the [Central Reports](#)

Each of the individual autonomous sites would use one of the previous installation options. The PaperCut Site Server could then be considered for deployment to offer the same benefits listed above within these installations.



**Figure 12: Multi Site/Multi Server deployment**

## Scenario Variations

All of these scenarios can be complemented with other approaches to address high availability, resilience and scalability, including:

- [Clustered print server.](#)
- [Clustered Application Server.](#)
- [Deployment on an External Database \(RDBMS\).](#)
- [Clustered Database Server.](#)
- [Off-premises \(Private cloud hosted server backed by infrastructure provider\).](#)

### 2.8.1.3. Comparison Table

The following table should assist with comparing deployment architectures. Different models offer different benefits and challenges. The key is to select the model that addresses your primary requirements, and to understand any constraints that need to be managed in your environment.

**Table 13: Deployment model comparisons**

Deployment type	Benefits	Considerations
1 site, multi server	<ul style="list-style-type: none"> <li>● Printing load distribution</li> </ul>	<ul style="list-style-type: none"> <li>● Multiple print servers to</li> </ul>

Deployment type	Benefits	Considerations
	<ul style="list-style-type: none"> <li>Central Application Server administration</li> <li>Removes single-point sensitivity at print server layer</li> </ul>	manage
Multi site, single server	<ul style="list-style-type: none"> <li>Central administration</li> <li>Simple deployment</li> <li>Simple user management</li> <li>Simple queue and device management</li> <li>Job roaming across sites (Find-Me)</li> </ul>	<ul style="list-style-type: none"> <li>Requires robust WAN</li> <li>Least complex setup</li> </ul>
Multi site, multi print servers	<ul style="list-style-type: none"> <li>Central administration</li> <li>Simple user management</li> <li>Reduced WAN traffic</li> <li>Reflects commonly used architectures</li> <li>Job roaming across sites (Find-Me)</li> </ul>	<ul style="list-style-type: none"> <li>Requires robust WAN</li> <li>Requires more servers</li> <li>Decentralised queue management</li> <li>Multiple find-me queues</li> <li>More complex setup</li> </ul>
Multi site, multi Application Servers	<ul style="list-style-type: none"> <li>Doesn't require robust WAN</li> <li>Enables decentralised and parallel deployment and setup</li> <li>Decentralised administration</li> <li>Enables rolling updates</li> <li>Consolidated reporting is available</li> </ul>	<ul style="list-style-type: none"> <li>Each site requires an independent implementation</li> <li>Overall setup for all sites requires more time</li> <li>No job roaming across sites (Find-Me)</li> </ul>

### 2.8.1.4. Further Resources

For further details of setup for each scenario, refer to the following resources. and .

## Scenario A - Single Site, Multi Print Server

- [Configuring Secondary Print Servers and Locally Attached Printers.](#)
- [Resiliency with Site Servers.](#)

## Scenario B - Multi Site, Single Server

- [Capacity Planning](#).
- [Resiliency with Site Servers](#).

## Scenario C - Multi Site, Multi Print Server

- [Configuring Secondary Print Servers and Locally Attached Printers](#)
- [Capacity Planning](#).
- [Resiliency with Site Servers](#).

## Scenario D - Multi Site, Multi Print Server, Multi Application Server

- See [Central Reports](#).
- [Deployment on an External Database \(RDBMS\)](#)
- [Resiliency with Site Servers](#).

### 2.8.2. Resiliency with Site Servers

For customers with distributed deployments, considerations such as redundancy and resilience to network outages are often a high priority.

A robust solution should defend critical points of failure, to ensure an organization can still continue to operate whilst a network is under duress. For PaperCut this means a robust deployment should ensure the availability of printing over failing and unreliable network links.

The installation of PaperCut Site Servers give customers peace of mind that access to printing resources won't be interrupted by unexpected network dropouts.

The Site Server duplicates the key features of a PaperCut primary server to a local site during an outage. MFDs are configured to connect to a Site Server as if it were the primary server to remove their reliance on WAN links. PaperCut secondary servers (Print Providers) are also aware of their local Site Server, providing a failover server if the primary server cannot be contacted.

This simple but effective design delivers high availability to MFDs and support for Secure Print Release including Find-Me Printing.

The Site Server installs in minutes with minimal configuration steps and no ongoing administration. Installers and Administrators need no specialist skills in database management or replication to provide business continuity. The Site Server ensures it is kept up to date with the current state of the primary server, transparently performing the role of the primary server when

needed. Once a connection to the primary server can be re-established, the merge of local Site Server logs and transactions back to the primary server is also seamlessly managed by the Site Server.

The close relationship between the Site and primary servers allows the support of the same set of Operating Systems and Databases for installations. It's perfectly valid to promote an existing PaperCut secondary server (Print Provider) to a PaperCut Site Server to improve a site's resiliency.

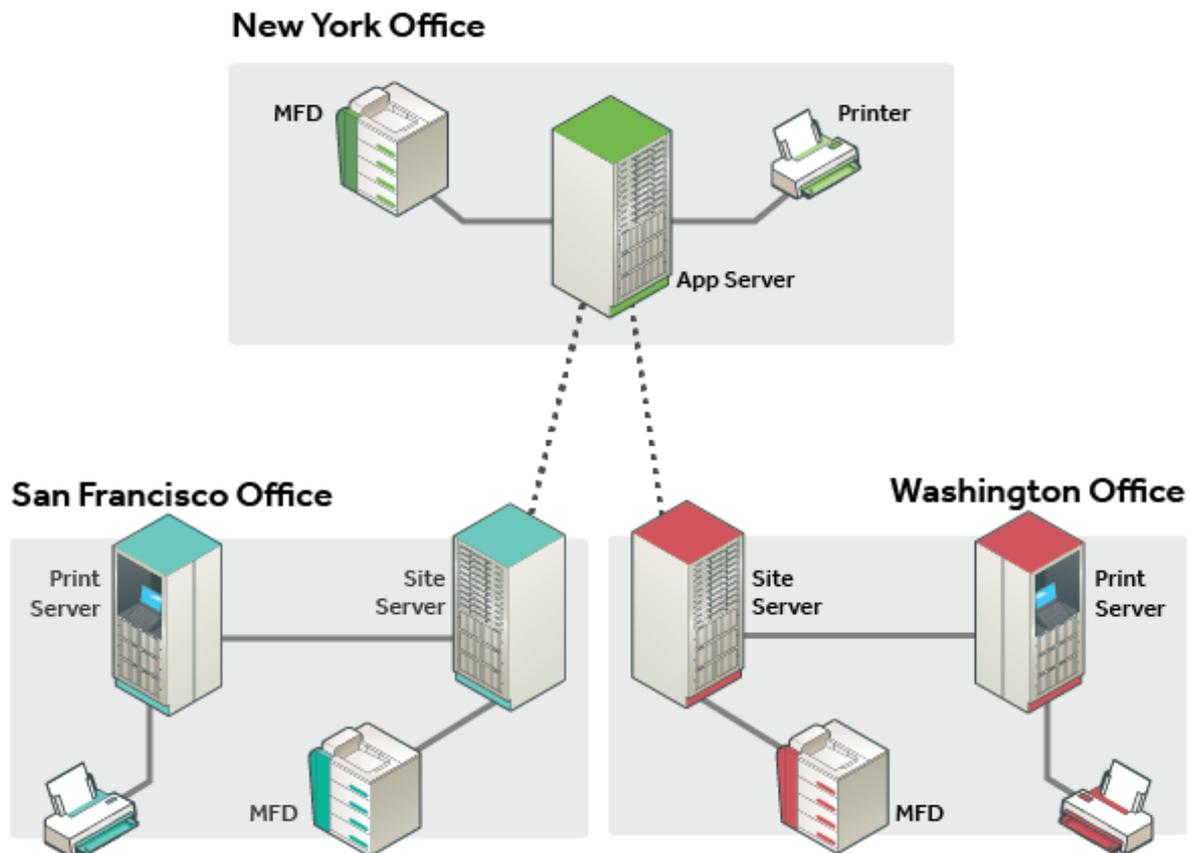
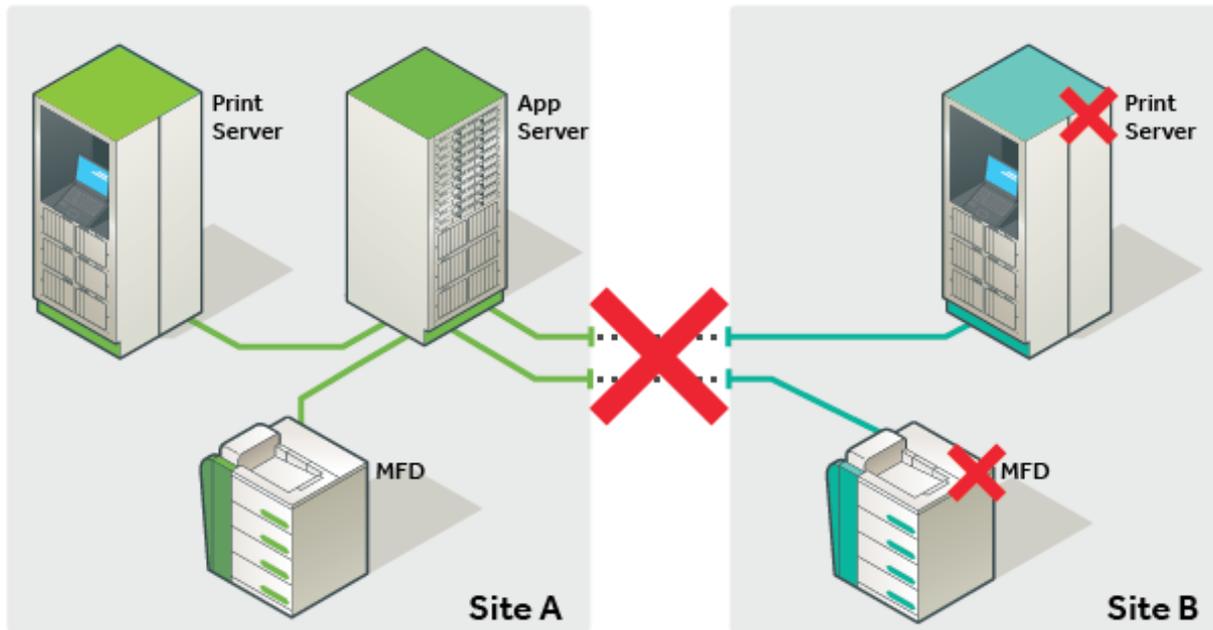


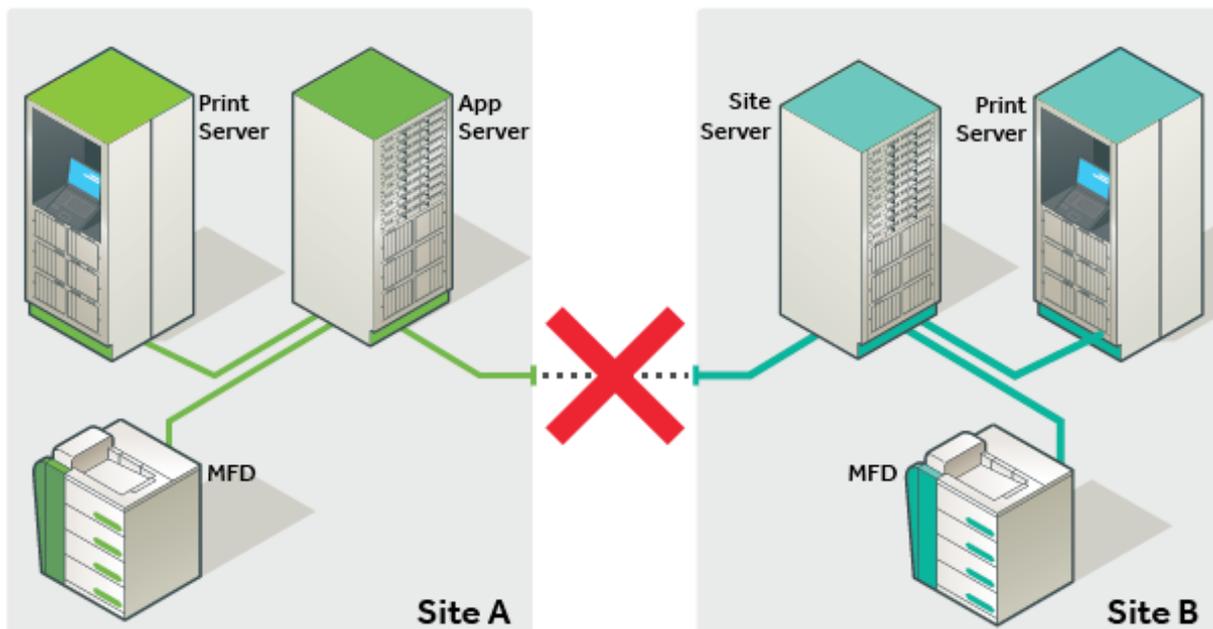
Figure 14: Site Server example

### 2.8.2.1. Technical Overview

The goal of the Site Server is to support access to printing and copying, and is designed to be implemented with equal ease for existing PaperCut customers and new PaperCut Customers. The diagrams below highlights the change in design for existing customers implementing a Site Server, or for new customers that want to incrementally build a solution and phase a Site Server in after a basic *single server* solution is functioning.



**Figure 15: WITHOUT Site Server**



**Figure 16: WITH Site Server**

These images show the changes in how elements of a PaperCut solution communicate when a Site Server is deployed.

- MFDs now communicate with the Site Server. This ensure an outage between Site Server and Application Server is defended by the Site Server.
- Print Servers also communicate with the Site Server when the Application Server is unavailable.

During normal operation where the Site Server and the Application Server are connected, the two servers together deliver the full set of PaperCut functionality. In anticipation of an outage, the Site Server also caches an up to date set of Application Server data.

In the unlikely event of an outage, the Site Server immediately takes over to deliver business continuity. When the link is re-established, normal operation resumes and offline job logs and transactions are submitted to the Application Server.

## What you will need

The Site Server implements the core functions of the Application Server, and as such the majority of requirements are the same.

**Table 17: What you will need**

<b>Operating System</b>	All eligible choices for an <a href="#">Application Server</a> . Can be chosen independently from the Application Server.
<b>Database</b>	All eligible choices for an <a href="#">Application Server</a> . Can be chosen independently from the Application Server.
<b>Database licensing</b>	PaperCut database replication is provided by PaperCut. No database enterprise licensing is required.
<b>Server specs</b>	Follow the suggested <a href="#">sizing</a> requirements of the Application Server.
<b>SSL</b>	Server to server communication is encrypted by default. We recommend using a certificate for your Application Server signed by a CA. Your CA of choice should provide instructions for your installation.
<b>Versioning</b>	Your Application Server must be v15.0 or greater, and your Site Servers must be of the same version.
<b>Licensing</b>	The Site Server component is a license feature of the PaperCut Application. Licenses must be arranged <b>prior</b> to installation.
<b>Ports</b>	<b>Site Server:</b> The Site Server listens on port 9191 for Print Provider connections and the inbound ports for your chosen <a href="#">Device Connections</a> . <b>Application Server:</b> The Application Server listens on port 9192 for connections from the Site Server and 9191 for Print Provider connections.

## Where to deploy

An effective way to consider where a PaperCut Site Server should be deployed is to install a Site Server in **any network segment** where you have **concerns about the link reliability** between this segment and the Application Server and an outage to this segment would impact your business.

- Remote sites
- City offices
- Separate campuses
- Individual buildings with poor links
- Local sites where servers are on the [Private Cloud](#)

### 2.8.2.2. Offline Operations

Site Servers ensure the access to print and copy services is supported during a network outage. However, some services will remain unavailable during an outage, as detailed below.

## Supported functions

**Table 18: Supported Functions**

dd	Normal Operations	Offline with NO Site Server	Offline WITH Site Server
<b>Basic printing (Failure mode)</b>	Yes	Yes	Yes
<b>MFD login (ALL devices)</b>	Yes	No	Yes
<b>Hardware terminals (CPad, Alpha, VCC...)</b>	Yes	No	Yes
<b>Secure Print</b>	Yes	No	Yes
<b>Find-Me Print</b>	Yes	No	Yes
<b>User Balances</b>	Yes	No	Yes
<b>Filters and conversions</b>	Yes	No	Yes
<b>Release Stations</b>	Yes	No	Yes
<b>Shared Accounts at the MFD</b>	Yes	No	Yes

dd	Normal Operations	Offline with NO Site Server	Offline WITH Site Server
Payment Gateways, Kiosks	Yes	No	No
Mobile Print (Web, GCP, iOS, Email...)	Yes	No	No
Desktop Client / Account Selection	Yes	No	No
Scripting	Yes	No	No

To ensure continuity, Offline Policies allow an Administrator to define the application behaviour ahead of any outage that disrupts PaperCut normal operations.

## Offline Policies

The User Client, scripting services, and payment options are not available during an outage. Offline Policies fill the gaps allowing users to continue to work. Offline policies are available after installing your first Site Server. They are accessible via **Sites > Offline Policies**.

## Account Selection

**Account Selection**

Policy to automatically select an account when account selection pop-up is not possible.

[? More Information...](#)

Automatically charge to a single shared account

Automatically charge to personal account  
 Cancel the print job

The PaperCut **User Client** is one service that remains connected to the Application Server. Users who normally have the desktop client popup ask for a shared account before prints are accepted need a policy to determine the account to charge when the desktop client is unavailable during an outage. The policy options are;

1. **[default] Automatically charge to a single shared account.** The print job is charged to a specified shared account (the default is "Offline Account").
2. **Automatically charge to personal account.** The print job is charged to the user's personal account.
3. **Cancel the print job.** If a shared account must be selected by the end user and this is not possible, the job is cancelled.

## Restricted Credit

<p><b>Restricted Credit</b></p> <p>Policy to set credit behavior for restricted accounts and users when offline.</p> <p><a href="#">? More Information...</a></p>	<p><input checked="" type="radio"/> Use last known balance</p> <p><input type="radio"/> Use last known balance and allow overdraw by: <input type="text" value="\$0.00"/></p> <p><input type="radio"/> Allow job to proceed, regardless of balance</p> <p><input type="radio"/> Assume no credit. Deny any job charging to restricted accounts</p>
---	--

The *Offline Credit Policy* determines how PaperCut should determine whether to assume credit is available or to deny the job when the Application Server is unavailable. As an example, organizations can choose to allow an overdraft should the ability for users to top up their accounts be impacted whilst the central Application Server cannot be contacted.

The following policies are defined for *restricted* users and accounts whilst a site is in offline mode:

1. **[default] Use last known balance.** Only deny jobs when the user's balance (as known by the Site Server) is used up.
2. **Use the last known balance and allow overdraw by.** Only deny jobs when the User's balance known by the Site Server, plus a specified offline overdraft amount is used up.
3. **Allow job to proceed, regardless of balance.** Treat the account as unrestricted and allow all jobs to proceed. The account might go into negative when the Application Server is available again.
4. **Assume no credit. Deny any job charging to restricted accounts.** Only unrestricted accounts can be used when offline with this policy. For example, when offline, Staff are able to use resources, whereas Students are not.

**Important:** The first three policies might result in accounts being deficit when the Application Server is online again.

## Unauthenticated Users

<p><b>Unauthenticated Users</b></p> <p>Policy to handle offline print jobs when users are not authenticated.</p> <p><a href="#">? More Information...</a></p>	<p><input checked="" type="radio"/> Assign print job to this user <input type="text" value="unknown"/></p> <p><input type="radio"/> Do not track, but allow job to print</p> <p><input type="radio"/> Cancel the print job</p>
---	--

The *User Authentication Policy* prescribes the behavior in offline mode where PaperCut cannot validate the owner of the job. This is anticipated for sites that rely on the [Handling Unauthenticated \(non-domain\) Laptops](#) feature of PaperCut. For unauthenticated users, the following policies are available:

1. **[default] Assign print job to this user.** (The default user is "unknown"). Configure the preconfigured user as unrestricted, so that jobs allocated to this user are not denied based on the *Offline Credit Policy*. You can also configure this user to charge to a specified shared account (which should also be unrestricted).
2. **Do not track, but allow job to print.** Jobs pass through *physical* queues unimpeded to the destination printers. However, jobs sent to *virtual* queues do not print.
3. **Cancel the print job.** Any print jobs sent from the unauthenticated users are cancelled immediately.

**Important:** This policy also applies for users who have not been encountered by PaperCut previously. i.e. new domain users who have not been previously synced into PaperCut.

## User Password Authentication

<p><b>User Password Authentication</b> Policy for password authentication when offline.</p> <p><a href="#">More Information...</a></p>	<p><input checked="" type="radio"/> Attempt password authentication from site server (e.g. via local Active Directory)</p> <p><input type="radio"/> Password login is denied (Card/ID authentication only)</p>
--	--

PaperCut normally performs user authentication via an external directory source, such as Active Directory. In normal operations, this validation is performed by the Application Server. When offline, you can choose between these options:

1. **External authentication on:** The Site Server attempts to authenticate the user via the external source as configured. This option requires the authentication source to be able to be contacted by the Site Server during the interruption that is preventing access to the Application Server.
2. **External authentication off:** Authentication from an external source is not available. This means that offline username/password login to a device or Release Station is not available, other than for Internal users.

### 2.8.2.3. Installation

Site Servers are an architectural component of the PaperCut solution. Setup is a straightforward process. Like most architecture projects, the time is best spent planning.

#### 1. Planning

Planning is the most critical step of a successful Site Server deployment. Take a few moments prior to installation to run through a checklist of items:

- Arrange a license to include the required number of Site Servers.
- Consider a signed certificate by a trusted CA for your Application Server
- Plan to install/update the Application Server to v15.0.

- Discuss and choose the appropriate Offline Policies for your site.
- Choose a Site Server location that ensures a reliable connection to the devices and print servers it needs to support.
- Plan for minor disruption for any existing embedded or hardware devices you reconfigure to use the Site Server.
- Review the critical functions the Site Server supports to understand offline behaviour.

## 2. Apply your license

Your Application Server must be licensed for Site Servers before installing the Site Server software.

## 3. [optional] Import a trusted signed certificate

Where practical, consider implementing a signed certificate for SSL communications. For more information, see [SSL/HTTPS Key Generation](#).

## 4. Installation

Before installing a Site Server, verify that the primary server (central Application Server) is set up and running correctly.

## Windows

On a Windows server, install the Site Server software by selecting the **Site Server installation (advanced)** option in the installation wizard. If the PaperCut primary server software was previously installed on the server, uninstall it prior to installing the Site Server software.

## Linux

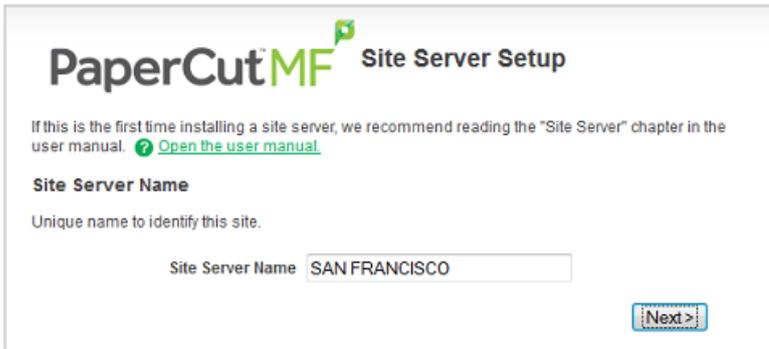
Follow the existing [Quick install: Linux \(CUPS and/or Samba\)](#) section of the PaperCut manual, with the additional parameter of `--site-server` when executing the installer.

## Mac

On a Mac server, install the Site Server by downloading the latest Mac DMG disk image and execute the contained installer called **PaperCut MF Site Server Install (advanced).pkg**

## 5. Post installation setup

1. Set a unique name of the Site Server you are configuring.



**PaperCut<sup>MF</sup> Site Server Setup**

If this is the first time installing a site server, we recommend reading the "Site Server" chapter in the user manual. [Open the user manual.](#)

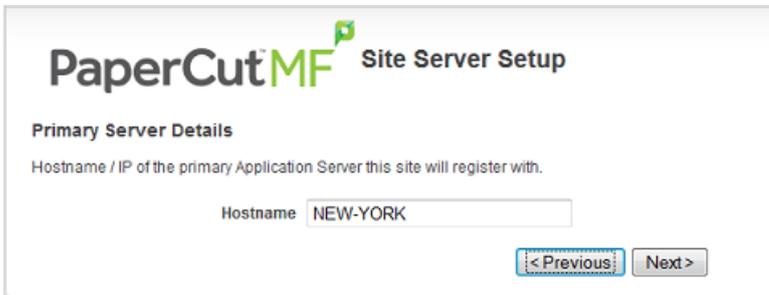
**Site Server Name**

Unique name to identify this site.

Site Server Name

[Next >](#)

2. Enter the name or IP of the Application Server this Site Server connects to.



**PaperCut<sup>MF</sup> Site Server Setup**

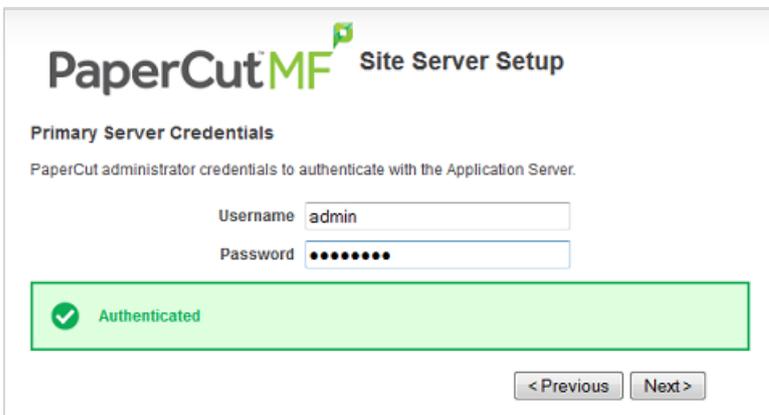
**Primary Server Details**

Hostname / IP of the primary Application Server this site will register with.

Hostname

[< Previous](#) [Next >](#)

3. Enter the credentials of a user with administrator access to PaperCut on the primary server.



**PaperCut<sup>MF</sup> Site Server Setup**

**Primary Server Credentials**

PaperCut administrator credentials to authenticate with the Application Server.

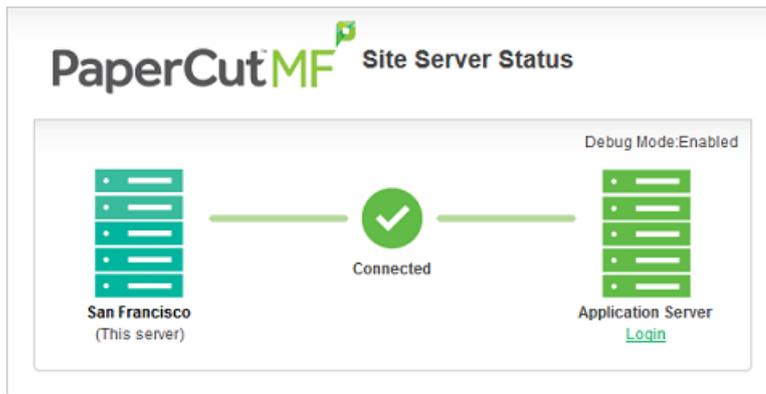
Username

Password

**Authenticated**

[< Previous](#) [Next >](#)

The Site Server is now connected to Application Server and will begin the data synchronization process.



- The Site Server requires no additional configuration at the local machine. You can use the **Login** link under the Application Server image to access the PaperCut admin interface on the primary server. The **Sites** tab is now available.

Site Server List		Offline Policies		
Quick find: <input type="text"/> <span>Go</span> <span>Clear</span>				
	Site Name	Host Name	Last Contacted	Hosted Devices
Online	<a href="#">SAN FRANCISCO</a>	Laptop-Damien	Feb 4, 2015 4:17:52 PM	0

- Click the **Sites > Offline Policies** tab to set the *Offline Policies* for your installation.



**Tip:** If you have installed the Site Server onto an existing PaperCut [Configuring Secondary Print Servers and Locally Attached Printers](#), the Print Provider is automatically configured to work with the new Site Server. Upgrade any additional Print Providers to the same version of the Application Server and configure in the `print-provider.conf` file to connect to the Site Server address.

## Release Station configuration

The Standard Release Stations and [Mobile Print Release - Releasing print jobs on your mobile](#) apps are both supported by the Site Server to allow held jobs to be released in both online and off-line operation.

- The Standard Release Station is connected to the Site Server by editing the Release Station's `connection.properties` file and changing the server-ip setting to the Site Server address.



### Note:

The port used in the `connection.properties` file is an HTTP port only. Do not change it to an SSL port. The SSL port set up in the `server.properties` file is used for communication by the Release Station.

- The Site Server version of the mobile release app is accessed by using the Site Server address in the URL, e.g. `http://[site-server]:9191/mr`

## Testing your installation

The **Sites** tab of the admin interface shows at a glance the status of all Site Servers. Whilst the Site Server is connected, your PaperCut installation operates as per normal.

To verify that your Site Server is providing resilience, you can take the site offline. You can achieve this by simulating network failure (pulling the plug), or by disabling the site in the **Sites** tab.

1. Select the site in the **Sites** tab
2. Choose **Disable connection (force offline)** in the **Site Connection** section.
3. Click **Apply**

You can validate the site as being in offline mode via the Site Server URL (`http://[Site Server]:9191/admin`). Printing and copying should continue according to the offline policies defined in the installation section. Validating the application of the policies via copy and print transactions ensures your settings have been applied correctly.

To complete the test, return the Site to online by selecting **Enable connection** in the Site record. Validate your transactions have been uploaded to the Application Server by searching either the User, Device, Printer or Job log.



**Tip:** Jobs performed offline are marked as such in the print log. You can see which jobs are offline by inspecting the job details in the job log. In addition, when creating job log reports, you can now filter by offline jobs, to report only the jobs performed offline in a specified period.

## Important note about future upgrades

Version upgrades to the Application Server result in the Site Servers supporting their local site in offline mode until they are also upgraded. Therefore you should also plan to upgrade the Site Servers as part of your [upgrade procedure](#).

### 2.8.2.4. Common questions about Site Servers

#### Do I need to backup my PaperCut Site Server?

No. The Site Server does not maintain its own data and does not need backing up. If a Site Server fails, you can quickly establish a new one by re-installing. By contrast, the Application Server does maintain important configuration and history data and should be backed up.

#### Does the Site Server replicate the entire PaperCut database?

No. The Site Server does replicate key tables from the PaperCut database related to

configuration. This includes User, Group, Printer, Device and Attribute tables. Importantly, the Site Server does not replicate the Printer Log table from the Application Server, as this data is not needed. For many customers, the Printer Log table is by far the largest table in the database.

---

**Is communication between the Site Server and Application Server secure?**

Yes. The Site Server performs all communication with the Application Server over a secure HTTPS connection. A Site Server cannot be connected to the Application Server without the approval of a PaperCut administrator with sufficient admin rights.

---

**Do I need to run a Site Server on an external database?**

No. The PaperCut Site Server also ships with an internal database in the same way the Application Server does. However, if you prefer an external database, we support these too.

---

**What database replication technology do you use?**

PaperCut developed its own database replication strategy to remove the requirement for costly enterprise database licenses.

---

**Is failover automatic, and how quickly does it happen?**

The failover from online to offline mode for the Site Server is an automatic process and happens without the need for intervention from an administrator. The failover time is also instantaneous for the MFDs and configurable for the Print Provider, so users can continue to function without interruption.

---

**How do I check the status of a Site Server?**

You can validate the status of a Site Server through the PaperCut admin interface via the **Sitestab** as well as via the `http://[site-server]:9191/admin` URL.

---

**Will features, such as, conversion to greyscale or force duplex work in offline mode?**

Yes. Filters and restrictions set at the queue level are supported when the Site Server is offline from the Application Server. However, print scripts and any conversions controlled by script do not run when offline.

---

**Will username and password login methods be supported if the Application Server isn't available?**

Yes. Site Servers are able to be configured in a way that they can validate username and passwords when the Application Server is unavailable, however, this is not enabled by default. If a link between a remote site and the main site is unavailable, there is a high likelihood that the directory server is also not available to validate credentials.

---

**Will cross server releasing of print jobs work during an outage?**

Cross server releasing of print jobs (where the physical queue and virtual queue are on different print servers) is supported during an outage when both source and target queues reside on print servers connected to the same Site Server.

---

**Will Site Servers replace the need for clustering?**

Customers implementing clustering of the Application Server to maintain high service levels should continue to do so. The Site Server offers additional protection, but many features of the Application Server, such as Web Print, BYOD printing and external payment gateways are not currently available through a Site Server.

---

#### **Will Site Servers improve scalability of my system?**

In the initial release, we are not claiming scalability benefits for the Site Server. However, the Site Server is distributing workload - and as we gather more data and continue to build the solution, we will likely see some scalability benefits.

---

#### **How do I specify the Site Server network address for my Web Services device?**

Where a Site Server has multiple IP addresses, devices that look for PaperCut might need to know which IP address is the correct address to connect to. On the Application Server, this is easily set under **Options > Advanced > Server Address**. On the Site Server, you can specify the address to use on the **Sites > Site Server Details** page in **Override Network Address**.

---

#### **What happens to my existing held print jobs when the Application Server becomes unavailable?**

Jobs that were printed to a local print server prior to an outage are redisplayed in your held jobs list a few minutes after the Application Server becomes unavailable.

---

## **2.8.3. Configuring Secondary Print Servers and Locally Attached Printers**

This section covers the setup of a secondary print server in "Quick Start" format. For a detailed explanation of the underlying technology and what's happening behind the scenes see the subsequent sections.

A secondary print server is a system that directly hosts a printer. In many situations it can be a dedicated server, however, a secondary server can also be a desktop system hosting a directly attached USB printer. If this printer is to be controlled and tracked by PaperCut MF, a small *monitoring* component needs to be installed. The monitoring component intercepts the local printing and reports this use back to the primary *Application Server*. A secondary server can be either :

1. A server style system hosting many printers.
2. A desktop style system hosting printer(s) also shared to other network users.
3. A desktop style system with the printer used only for local users (not shared).

The monitoring service is also referred to as a *Print Provider* as its task is to provide information back to the main *Application Server*.

The process of setting up a secondary print server, depends on the operating system. Read the section appropriate to the required operating system.



**Tip:** For resilience against network outages, consider installing [Site Servers](#) at each of your secondary print server locations. Refer to [Multi-Server and Multi-Site Deployments](#) for a broader discussion of multi-site and WAN scenarios.

If you have a networked environment but do not have a print server, you can configure your computers to print directly to a printer. For more information, see [Configuring Direct Printing](#).

### 2.8.3.1. Configuring a Windows secondary print server

This section describes the process of setting up a secondary Windows print server.

#### Step 1 - Ensure primary server is set up correctly

Before installing a secondary server you should take some time to ensure the primary server (central Application Server) is set up and running correctly. If it is not running fine now adding an extra server only adds an extra variable to the equation and complicates troubleshooting. Take some time now to verify that the primary server is functioning correctly. For example, verify that:

- Printers on this server are being tracked.
- Users are allowed to login to user pages from their workstations.
- Administrators can access the system.

#### Step 2 - Ensure firewall software is set to allow access to port 9191

Secondary server needs to communicate (initiate a TCP connection) on port 9191. Administrators should ensure that any firewall software on the primary *Application Server* is not set to block any incoming local network traffic on this port.

#### Step 3 - Install the Print Provider

Install the Print Provider software onto the secondary server. On a Windows server, this is done by selecting the **Secondary Print Server** option in the installation wizard. If the PaperCut primary server software was previously installed on the server it must be uninstalled prior to installing the secondary server software.

#### Step 4 - Configuration

The Print Provider on the secondary server needs to know where the primary server is installed.

1. Open a text editor such as Notepad.
2. Open the file:

```
[app-path]\providers\print\win\print-provider.conf
```

3. Locate the line starting with `ApplicationServer=` and change `localhost` to the

name or IP address of the primary server.

4. Restart the server so the new configuration is detected. To avoid a restart, manually restart the **PaperCut Print Provider** service.

## Step 5 - Test

The secondary server should now be configured. Log in to the system as "admin" and verify that the printers are now listed under the Printers section. Perform a multi-page test print on each printer and verify that print jobs are tracked correctly.

## Automated Install

You can automate the installation of the secondary server component on Windows systems. This is handy when the *Print Provider* component needs to be installed on a number of desktop systems running locally attached printers. For more information see, [Automating secondary server deployment on Windows](#).

### 2.8.3.2. Configuring a Macintosh secondary print server

This section describes the process of setting up a secondary Mac print server. The primary *Application Server* can either be a Windows, Mac or a Linux basis system. PaperCut MF has full support for "mixed" or heterogeneous printing environments.

## Step 1 - Ensure primary server is set up correctly

Before installing a secondary server you should take some time to ensure the primary server (central Application Server) is set up and running correctly. If it is not running fine now adding an extra server only adds an extra variable to the equation and complicates troubleshooting. Take some time now to verify that the primary server is functioning correctly. For example, verify that:

- Printers on this server are being tracked.
- Users are allowed top login to user pages from their workstations.
- Administrators can access the system.

## Step 2 - Ensure firewall software is set to allow access to port 9191

Secondary server needs to communicate (initiate a TCP connection) on port 9191. Administrators should ensure that any firewall software on the primary *Application Server* is not set to block any incoming local network traffic on this port.

## Step 3 - Check that the host user account exists

PaperCut MF runs under a non-privileged user account called "papercut". This invisible system account is created automatically upon first install. Advanced System Administrators can, however, have a preference to create this account manually. If you fall into this category, create the `papercut` account now prior to installation.

## Step 4 - Install the Print Provider

Install the Print Provider software onto the secondary server. Download the latest Mac DMG disk image and execute the contained installer called `PaperCut MF secondary server Installation.pkg`.

## Step 5 - Configuration

The Print Provider on the secondary server needs to know where the primary server is installed. The installer attempts to open the appropriate configuration file automatically after the install completes. However, your IT environment configuration might prevent this from happening. If it does not automatically open, open the following file in a text editor:

```
[app-path]/providers/print/mac/print-provider.conf
```

To configure a secondary server:

1. Locate the line starting with `ApplicationServer=` and change `localhost` to the name or IP address of the primary server.
2. Save the file and exit the text editor.
3. Double-click the command script `/Applications/PaperCut MF/Control Printer Monitoring.command`, and enable monitoring on the appropriate printers.

## Step 6 - Test

The secondary server should now be configured. Log in to the system as "admin" and verify that the printers are now listed under the Printers section. Perform a multi-page test print on each printer and verify that print jobs are tracked correctly.

### 2.8.3.3. Configuring a Linux or Novell iPrint secondary print server

This section describes the process of setting up a secondary print server on a Linux system. The primary *Application Server* can either be a Windows, Mac, Novell or a Linux based system. PaperCut MF has full support for "mixed" or heterogeneous printing environments.

#### Step 1 - Ensure primary server is set up correctly

Before installing a secondary server you should take some time to ensure the primary server (central Application Server) is set up and running correctly. If it is not running fine now, adding an extra server only adds an extra variable to the equation and complicates troubleshooting. Take some time now to verify that the primary server is functioning correctly. For example, verify that:

- Printers on this server are being tracked.
- Users are allowed user login to user pages from their workstations.
- Administrators can access the system.

#### Step 2 - Ensure firewall software is set to allow access to port 9191

Secondary server needs to communicate (initiate a TCP connection) on port 9191. Administrators should ensure that any firewall software on the primary *Application Server* is not set to block any incoming local network traffic on this port. A good way to test, is to open a browser on the planned secondary server and confirm you can access the administration web interface on port 9191.

#### Step 3 - Check that the host account exists

On the secondary server, create a user account called `papercut`. Set the `papercut` user's home directory to the desired install location. This is normally `/home/papercut`. The method of creating this account is the same as that used for the primary server setup. See [Installation](#) for more details if required.

#### Step 4 - Install the Print Provider



**Important:** The instructions below assume `i686` architecture. If your system OS is 64-bit, replace `i686` with `x64` in all file paths.

Install the *Print Provider* software onto the secondary server by copying all files and directories from the primary *Application Server's* directory:

```
[app_path]/providers/print/linux-i686/* (32bit)
[app_path]/providers/print/linux-x64/* (64bit)
```

To the equivalent location on the secondary server:

```
/home/papercut/providers/print/linux-i686/ (32bit)
/home/papercut/providers/print/linux-x64/ (64bit)
```

on the secondary server. Perform the copy operation as the `papercut` user so that files are owned by the `papercut` user. You can use any method to copy the files, including over the network or via a USB key. If the primary server is also Linux, the simplest way would be use Secure Copy (`scp`) as follows:

```
shell> su - papercut
shell> mkdir -p providers/print
shell> cd providers/print
shell> scp -r primary.server.name:/home/papercut/providers/print/* .
```

After the copy operation is performed, execute the `setperms` and `roottasks` scripts as `root`:

### 32bit

```
>shell> su - root
shell> sh ~/papercut/providers/print/linux-i686/setperms
shell> sh ~/papercut/providers/print/linux-i686/roottasks
```

### 64bit

```
shell> su - root
shell> sh ~/papercut/providers/print/linux-x64/setperms
shell> sh ~/papercut/providers/print/linux-x64/roottasks
```

## Step 5 - Configuration

The *Print Provider* on the secondary server needs to know where the primary server is installed (e.g. its IP address).

1. Open the following file in a text editor:

```
/home/papercut/providers/print/linux-i686/print-provider.conf (32bit)
/home/papercut/providers/print/linux-x64/print-provider.conf (64bit)
```

2. Locate the line starting with `ApplicationServer=` and change `localhost` to the name or IP address of the primary server.

You now need to integrate the binaries copied in step 4 into the CUPS, Samba or Novell iPrint print queues.

This process is detailed in [Linux Print Queue Integration](#) and [Step 5 - Printer/iPrint Configuration](#).

## Step 6 - Test

The secondary server should now be configured. Perform some test printing on all of this secondary server's printers. Log in to the system as "admin" and verify that the printers are now listed

under the Printers section. Perform a multi-page test print on each printer and verify that print jobs are tracked correctly.

### 2.8.3.4. Print Monitoring Architecture

This section covers PaperCut MF print monitoring architecture from a technical perspective. Knowledge of advanced networking is expected.

PaperCut MF is designed using the latest software design principles. An important design principle used is Service Oriented Architecture (SOA). PaperCut MF divides key operational areas into components. These components communicate using an XML Web Services standard. Two of the main services are:

**Table 19: PaperCut MF services/components**

Service/Component	Description
The Application Server	The central logic service responsible calculating user costs and providing the web and admin interface.
Print Provider Service	A service responsible for monitoring and analyzing print jobs and reporting this information using XML Web Services to the Application Server.

In a single server setup, you do not need to be concerned with the two components as they automatically act as one (it's only noticeable in that two processes are running on the server). On a multi-server/system environment a deeper understanding of the architecture is required.

### 2.8.3.5. Multiple Print Servers

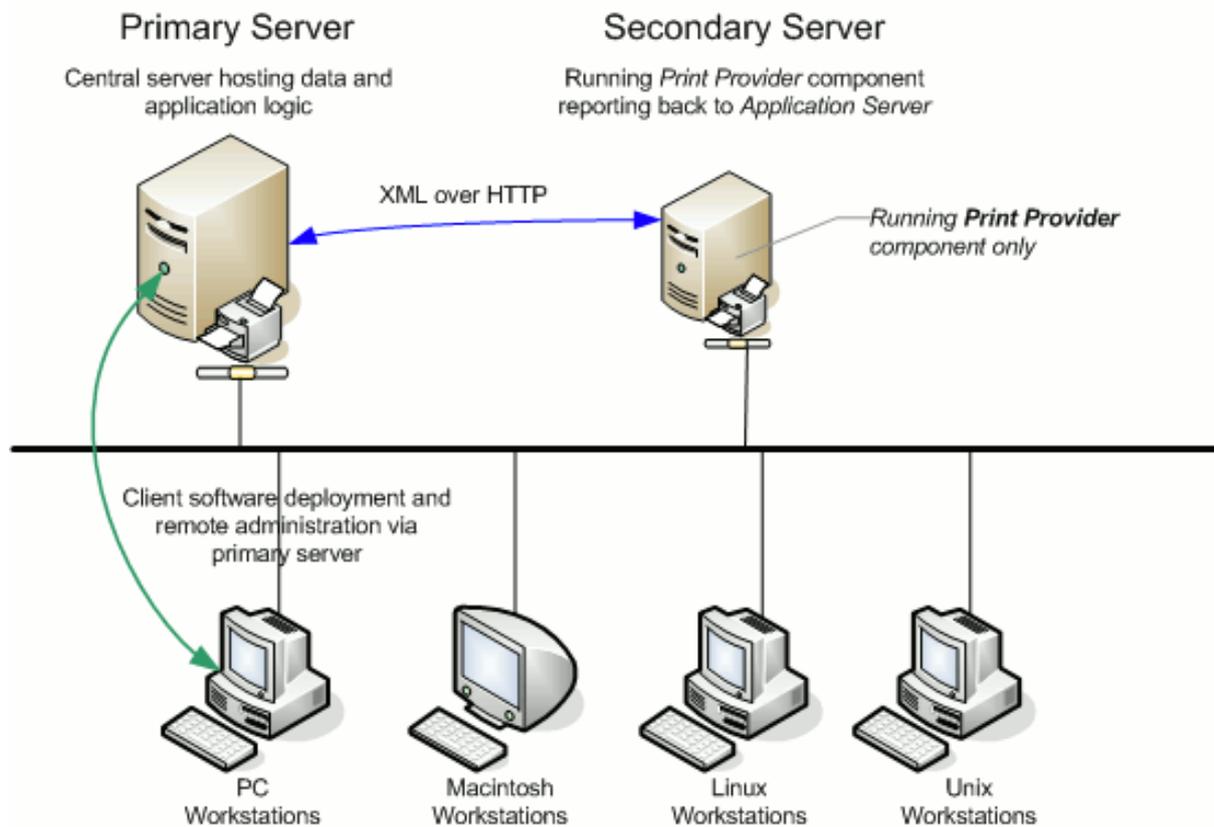
Many large networks, or even smaller networks with a legacy design, can have more than one print server. Reasons for separating printers across servers/systems include:

- Legacy design - That's the way the previous admin set it up.
- Networks with 100 printers or more might need multiple servers to spread the printing load.
- Networks spanning multiple physical sites or subnets can have separate servers minimize cross-site network traffic.
- Servers can exist to support different operating systems
- A local desktop printer attached to a system is also a remote *print server*.

One of the servers on the network needs to be nominated as the primary server. This system runs the *Application Server* software responsible for providing the user interface, storing the data, and managing the application logic. The system nominated for this task is usually a print server (but could be any server). It needs to be a system with spare capacity to run the PaperCut MF Applic-

ation Server software. This system should have good performance, have at least 500 Mb of free hard-disk space, and be included in an off-disk backup routine.

Other print servers are known as secondary servers. These servers run the Print Provider component and communicate back to the central server. The following diagram illustrates this setup.



**Figure 20: Secondary server reporting back to primary server (application server)**

When a client prints to a secondary server, the Print Provider intercepts the print job and forwards the information to the central server for processing. Communication is via XML Web Services over HTTP on the PaperCut Application Server's nominated port (normally port 9191). The web services protocol is specifically designed to facilitate easy firewalling, scalability, and works over a wide range of network speeds.

PaperCut MF Service Oriented Architecture offers many advantages for network administrators including:

- Secondary servers run the minimum amount of software
- Communication between servers uses minimal bandwidth. Physically separated servers connected via WAN links, VPNs or other slow links are supported with minimal or no impact on printing performance.
- All data, logging and configuration information is stored on one single central server facil-

itating central backup from one location.

- Management is conducted centrally from one location.

PaperCut MF's SOA design allows advanced setups including:

- Decentralized deployment
- Separation of concern (servers dedicated to separate tasks such as database server-, Application Server and print server)
- Options to remove points of failure via clustering or fail-over

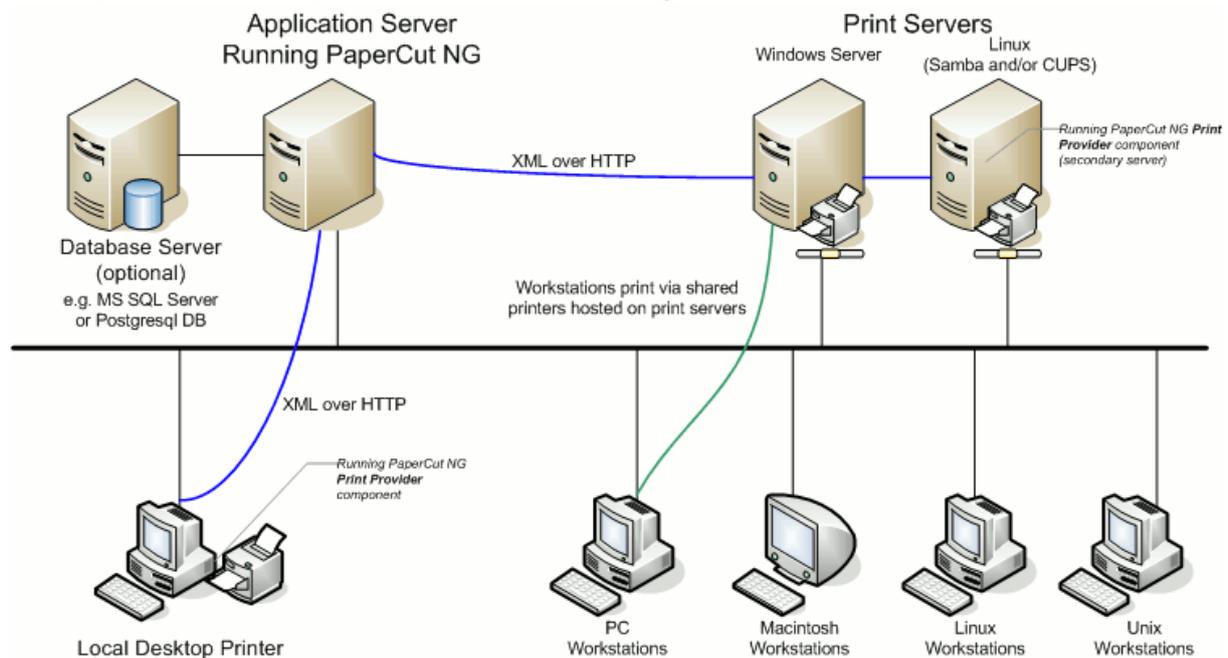


Figure 21: Architecture - an advanced configuration

### 2.8.3.6. Automating secondary server deployment on Windows

The secondary server installation process can also be automated via command line switches issued to the installer program. This is useful when you need to install the *Print Provider* on a number of desktop systems hosting local attached printers.

To automate the installation:

1. Copy the windows installer program, `pcmf-setup.exe`, into a directory accessible to the target systems (i.e. A network share or mapped drive).
2. Copy the `print-provider.conf` file from main server. This file is located at `[app-path]/providers/print/win`. Place the file in the *same* directory as the install program (as performed in step 1.)
3. Edit the `print-provider.conf` file and define the correct server name or IP address of the main Application Server in the line starting with `ApplicationServer=`.
4. Use a batch file or equivalent to start the install program as follows:

```
pcmf-setup.exe /TYPE=secondary_print /SILENT
```

*Note:* The installer requires administrator level - needed to install a system service.

**Note:**

- The executable name of the installer program can vary depending on the version.
- Replacing the `/SILENT` option with `/VERYSILENT` suppresses all visual output during the installation process.
- The copy of the `print-provider.conf` file is used during the install process to ensure the installation is aware of the location of the main Application Server.
- For a full list of command-line arguments, see [Automating / Streamlining Installation on Windows](#).

## 2.8.4. Configuring Direct Printing

This section describes how you can track and report on printing that is sent directly from a computer to a printer, without the need for a print server.

This solution is ideal for businesses that have distributed branches with a modest number of computers, such as, post offices, bank branches, gas stations, retail outlets. It also suits small businesses with a collection of computers in an environment without dedicated IT support. The combination of a Direct Printing configuration and a private cloud implementation of PaperCut can eliminate the need for any local infrastructure.

**Important:**

Direct Printing is not recommended for environments using quotas or charging, such as, education. This is because users can turn off PaperCut MF's tracking from their computer. It might be possible, depending on permissions, for a user to disable the Direct Print Monitor, which would turn off print tracking on their computer.

## Scenario 1: Small business

Matt's Accounting is a small business with five employees working in a Windows environment. They want to track their printing costs per client, but do not want the overhead of having to set up and maintain a print server and dedicated Application Server. They have two choices for the Application Server:

- purchase a low cost PC that can be used as an Application Server
- use a cloud-based Application Server

They have chosen to use a cloud-based Application Server.

Since they do not have a dedicated print server and also do not have the experience to manage a print server, they want to print directly from their computers to the printer. This PaperCut MF solution is easy to set up and requires no IT infrastructure changes.

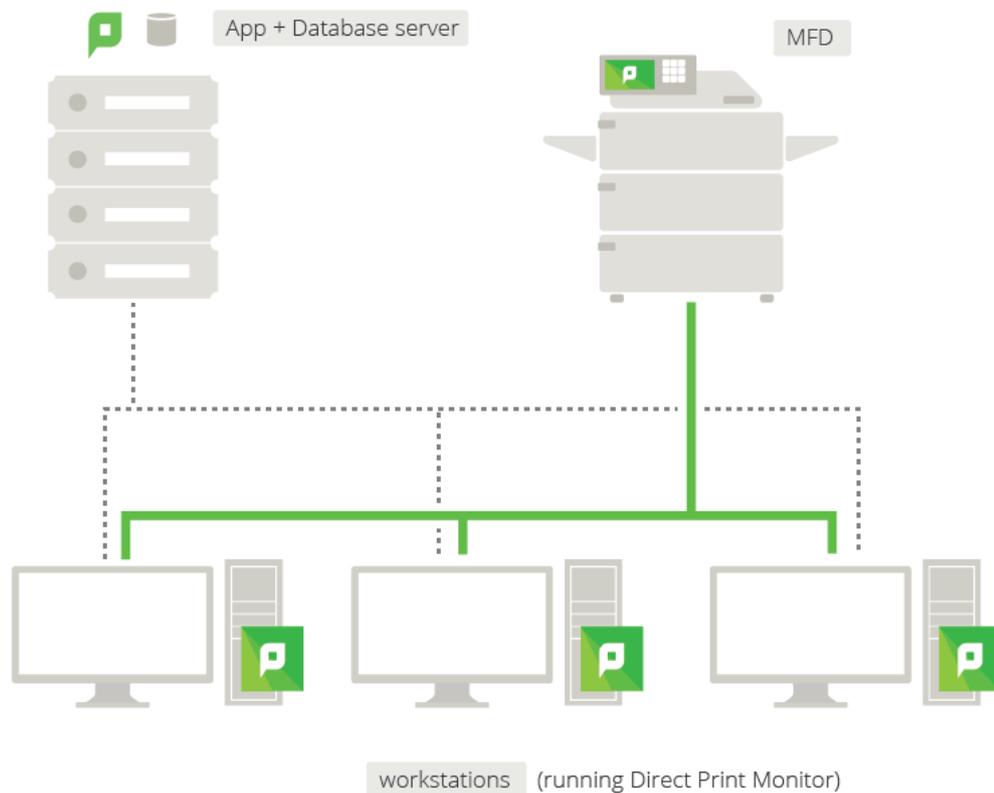
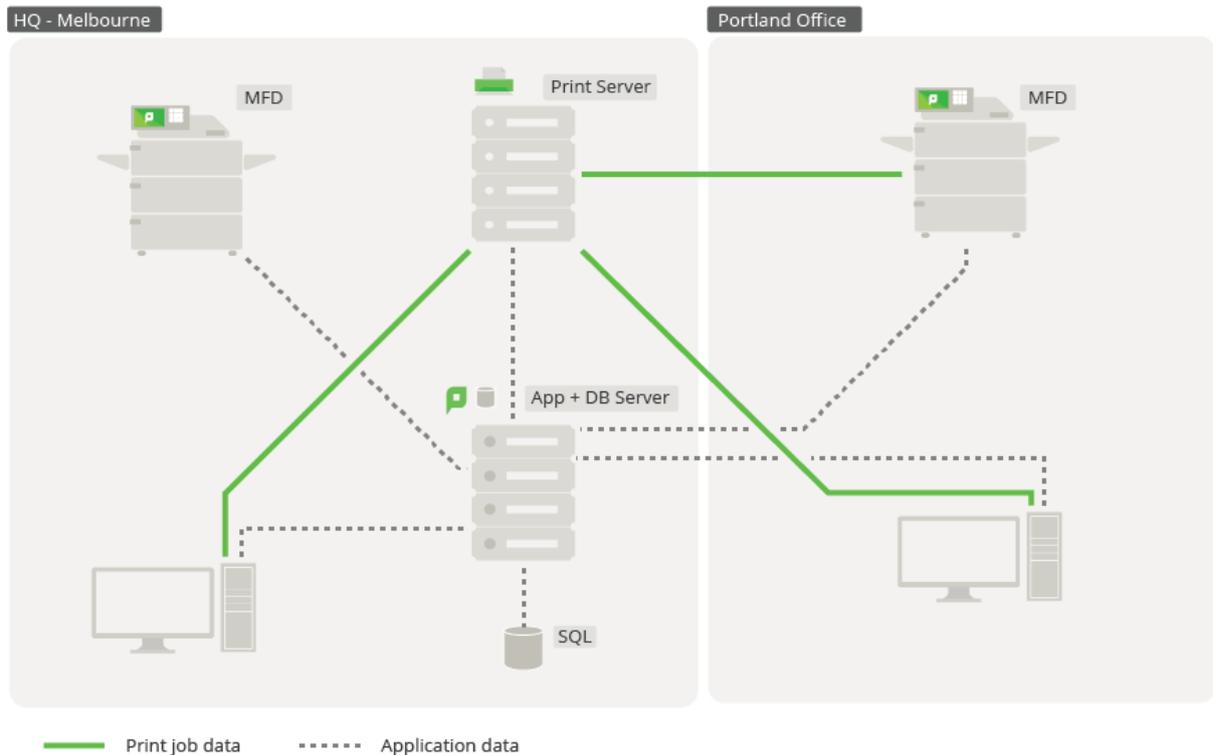


Figure 22: Direct Printing setup - small office

## Scenario 2: Business with distributed small branches

Dash About Inc. is a medium sized taxi company that comprises a head office plus 20 home-based offices used by the drivers. They currently have PaperCut set up in their head office and now want to roll out PaperCut to each home office. They do not want the network overhead of print jobs being sent to head office and then back to the home offices via their VPN, but also do not want to set up a print server in each home office. Direct Printing is ideal in this situation as a print server is not required.

Dash About have already set up an automated PaperCut install process for new computers and want to incorporate the Direct Printing installation into this process.



**Figure 23: Direct Printing setup - distributed branch**

## How does it work?

Direct Printing allows print jobs to be sent directly from a user's computer to a printer, without an intervening print server. This requires print queues (sometimes referred to as “printers” or “drivers”) to be set up on each computer for each printer. For example, on Windows, this is done through the **Devices and Printers** control panel.

With this setup, there are multiple computers each with a print queue directed at the same physical printer. However, you do not want each print queue to be displayed as a separate printer in PaperCut MF. Direct Printing consolidates the print jobs from multiple print queues into a single printer.

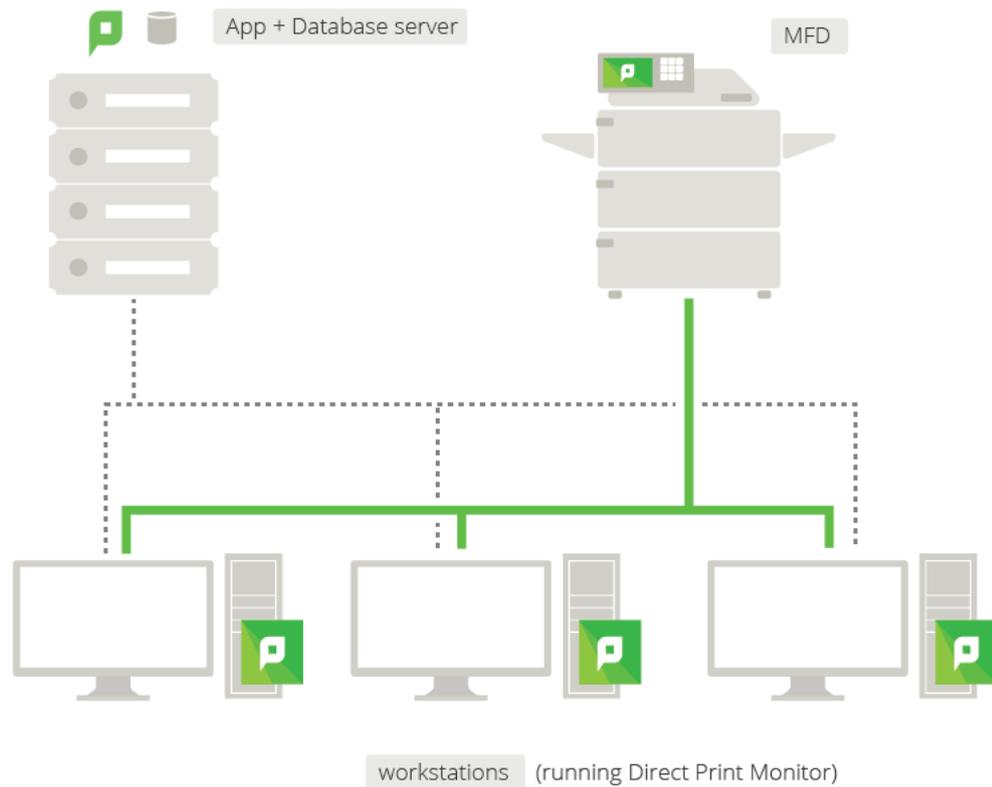
Each computer that prints directly to a printer needs the following components:

- a print queue that sends jobs directly to a printer rather than to a print server queue. The print queue can use either the IP address or hostname of the printer.
- a small monitoring component, known as a *Direct Print Monitor*. This monitoring component reports back to the Application Server.

Direct Printing simplifies the configuration, management, and reporting of print jobs. The Application Server automatically merges the information from multiple computers into one printer in the **Printer List**. This process is called *linking*.

Each linked print queue automatically uses the printer's configuration, which means you do not need to configure each print queue individually. PaperCut MF reports the summarized data at the printer level rather than for each individual print queue.

The process of setting up Direct Printing, depends on the operating system.



**Figure 24: Direct Printing architecture**

### 2.8.4.1. Install the Direct Print Monitor

The way in which you install Direct Printing depends on your operating system. For more information see:

- [Installing the Direct Print Monitor on a Windows computer](#)
- [Installing the Direct Print Monitor on a Mac computer](#)
- [Installing the Direct Print Monitor on a Linux computer](#)

## Installing the Direct Print Monitor on a Windows computer

This section describes the process of setting up Direct Printing on Windows computers. The primary *Application Server* can be either a Windows, Mac, or a Linux based system. PaperCut MF has full support for "mixed" or heterogeneous printing environments.

### Step 1 - Ensure primary server is set up correctly

Before installing the Direct Print Monitor, you should ensure that the primary server (Application Server) is set up and running correctly.

Verify that:

- PaperCut NG/MF release 16.0 or above is installed.
- Users are allowed to log in to user pages from their computers.
- Administrators can access the system.
- The Application Server is accessible from each computer requiring Direct Printing, that is, you can Ping the Application Server.

### Step 2 - Ensure firewall software is set to allow access to the port used by the Application Server

A computer with the Direct Print Monitor installed needs to communicate (initiate a TCP connection) on the port used by the Application Server (by default this is port 9191). Ensure that any firewall software on the primary Application Server is not set to block any incoming local network traffic on this port.

### Step 3 - Change the default configuration (optional)

The Direct Print Monitor installation configuration file is installed in the following location on the Application Server:

```
[app-path]/providers/direct-print-monitor/win/direct-print-monitor.conf
```

**Note:**

If you need to change the configuration after deploying Direct Printing, you must change the configuration on every computer using Direct Printing.

The Direct Print Monitor configuration file is automatically generated with the hostname of the Application Server when the Application Server is installed. If required, you can change the default configuration, however, the default configuration suits most implementations. For example, you can change the IP address of the Application Server to a Fully Qualified Domain Name (FQDN).

## Step 4 - Install the Direct Print Monitor on each computer

Install the Direct Print Monitor on each Windows computer. You can install the Direct Print Monitor either:

**manually—if you do not have many computers on which you want to install the software, manual installation might be easier**

### Manually install the Direct Print Monitor

**Note:**

If the computer has a PaperCut MF Print Provider installed, uninstall it.

1. Ensure the following files are in a shared folder that is accessible to the target computers (i.e. a network share or mapped drive):

```
[app-path]\providers\direct-print-monitor\win\
```

This folder contains the following files:

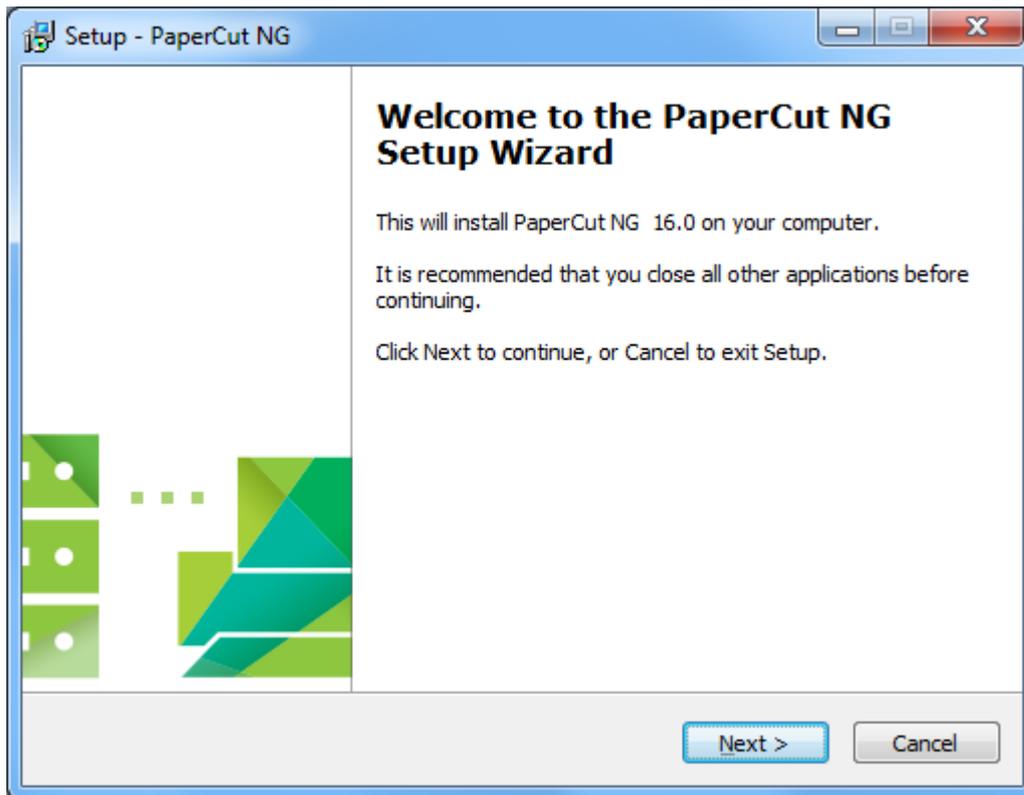
- `pc-direct-print-monitor.exe`
- `direct-print-monitor.conf`

**Note:**

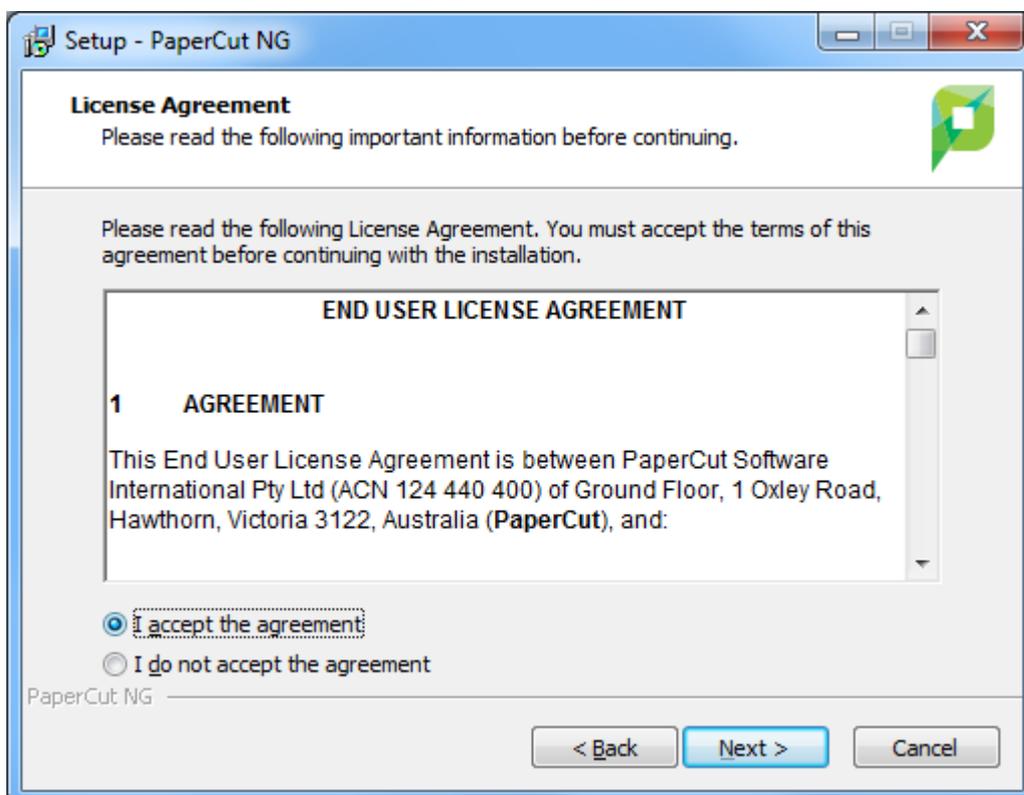
These two files must be in the same folder for the Direct Print Monitor installation to work.

2. On each computer, navigate to the shared folder on the Application Server.
3. Double-click `pc-direct-print-monitor.exe`.

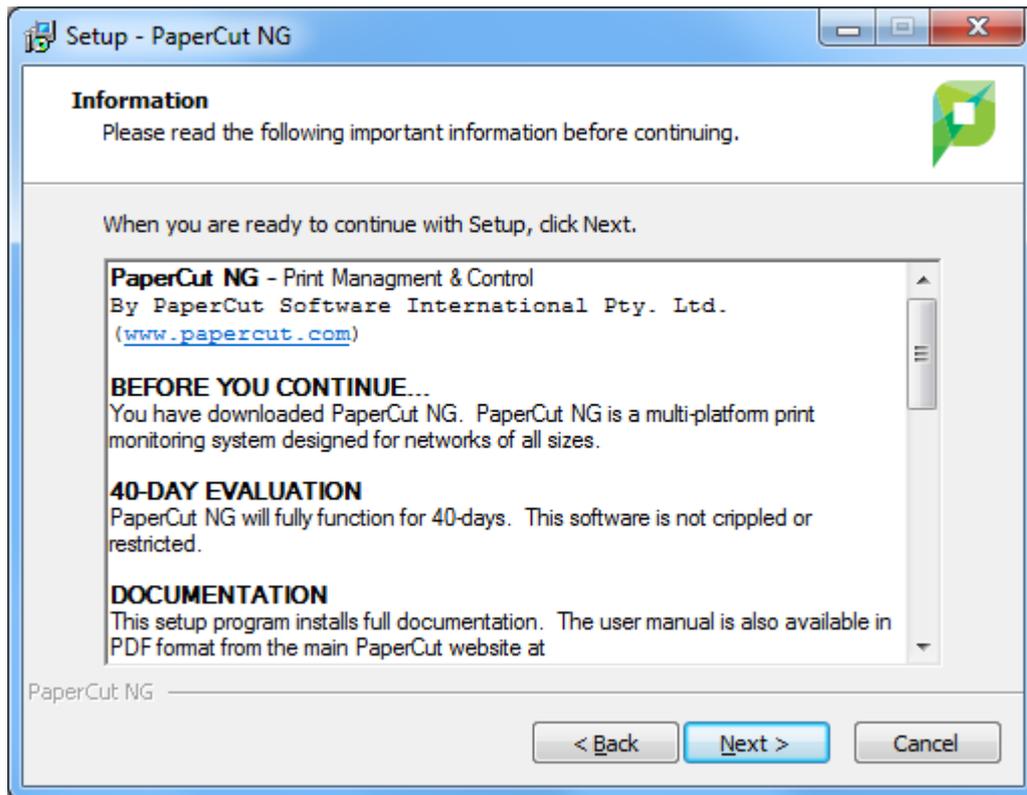
The **PaperCut NG Setup Wizard** is displayed.



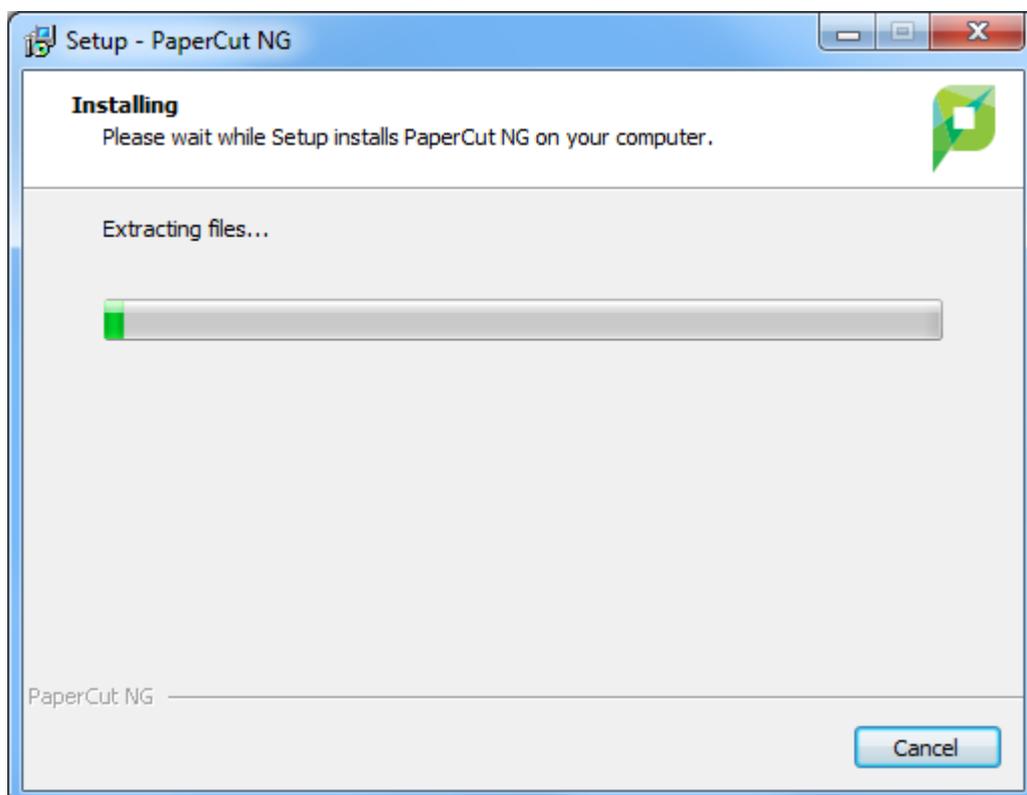
4. Click **Next**.



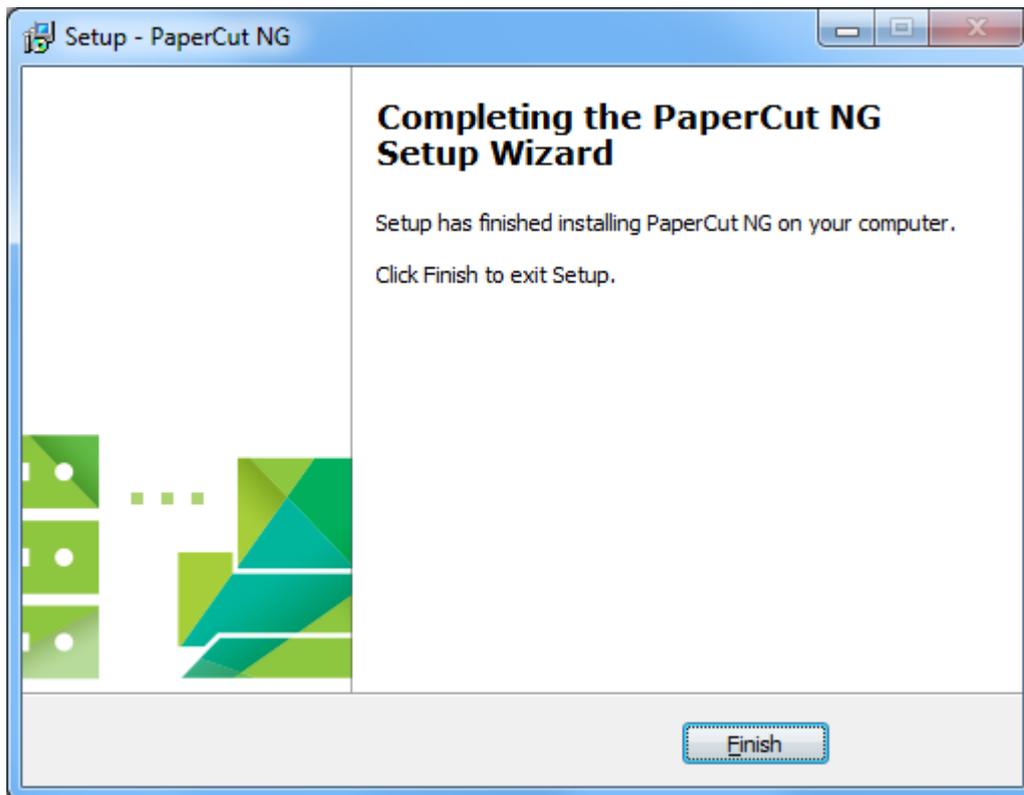
5. Read the End User License Agreement; then click **Next**.



6. Click **Next**.



When the installation is complete, the **Completing the PaperCut Setup Wizard** screen is displayed.



7. Click **Finish**.

The Direct Print Monitor is installed.

**automatically—if you have a large number of computers, or existing automated install processes in place, then we recommend you automate the install process**

## Automate Direct Print Monitor installation

The Direct Print Monitor installation process can also be automated via command line switches issued to the installer program. This is useful if you need to install the Direct Print Monitor on a number of computers.

To automate the installation:

1. Ensure the following files are in a shared folder that is accessible to the target computer (i.e. a network share or mapped drive):

- `pc-direct-print-monitor.exe`—Windows installer program
- `direct-print-monitor.conf`



**Note:**

On Windows Application Servers, these files are located by default in the



following shared folder:

```
[app-path]\providers\direct-print-monitor\win\
```

2. Use a batch file or equivalent to start the install program. For example, for Windows use the following:

```
pc-direct-print-monitor.exe /TYPE=secondary_print /SILENT
```



**Note:**

- Replacing the `/SILENT` option with `/VERYSILENT` suppresses all visual output during the installation process.
- The copy of the `direct-print-monitor.conf` file is used during the install process to ensure the installation is aware of the location of the main Application Server.
- For a full list of command-line arguments, see [Automating / Streamlining Installation on Windows](#).



**Important:**

You cannot install the Direct Print Monitor on a computer that has a Print Provider installed. This includes computers that are acting as Application Servers, Site Servers, and secondary servers.

## Step 5 - Test

The Direct Print Monitor should now be configured.

1. Log in to the Application Server as "admin" and verify that the printer queues are linked to the printer:
  - a. Navigate to the **Printers** page.
  - b. Select the printer.
  - c. Click the **Queues** tab.
  - d. Verify that the printer queues are linked to the printer.
2. Perform a multi-page test print on each printer and verify that print jobs are tracked correctly.

### Installing the Direct Print Monitor on a Mac computer

The process to install the Direct Print Monitor on a Mac computer is the same no matter which operating system your Application Server is on.

## Step 1 - Ensure primary server is set up correctly

Before installing the Direct Print Monitor, you should ensure that the primary server (Application Server) is set up and running correctly.

Verify that:

- PaperCut NG/MF release 16.0 or above is installed.
- Users are allowed to log in to user pages from their computers.
- Administrators can access the system.
- The Application Server is accessible from each computer requiring Direct Printing, that is, you can Ping the Application Server.

## Step 2 - Ensure firewall software is set to allow access to the port used by the Application Server

A computer with the Direct Print Monitor installed needs to communicate (initiate a TCP connection) on the port used by the Application Server (by default this is port 9191). Ensure that any firewall software on the primary Application Server is not set to block any incoming local network traffic on this port.

## Step 3 - Install Direct printing

Install the Print Provider software onto each computer.

1. Download the latest Mac DMG disk image from:

```
http://www.papercut.com/products/ng/download/direct-print/?platform=mac
```

2. Distribute the installer to the target computers using your preferred method, for example, via a share drive or a portable memory device.
3. On each computer, open the downloaded .dmg file.
4. Double-click `PaperCut MF secondary server Installation.pkg` and follow the prompts to install the Print Provider.

## Step 4 - Configure the Direct Print Installer on each computer

The Print Provider on the computer needs to know where the Application Server is installed and that it should be running in Direct Printing mode. The installer attempts to open the appropriate configuration file automatically after the install completes. However, your IT environment configuration might prevent this from happening. If it does not automatically open, open the following file in a text editor:

```
[app-path]\providers\print\mac\print-provider.conf
```

1. Locate the line starting with `ApplicationServer=` and change `localhost` to the name or IP address of the Application Server.
2. Locate the line with `#DirectPrintingMode=false` and change it to:

```
DirectPrintingMode=true
```

**Note:**

Make sure you remove # at the beginning of the line.

3. Save the file and exit the text editor.
4. Double-click the command script `/Applications/PaperCut MF/Control Printer Monitoring.command`, and enable monitoring on the appropriate printers.

**Note:**

- If required, you can also modify the other default configuration details. For more information see [Adding and Removing/Deleting/Ignoring Printers](#)
- If you need to change the configuration after deploying Direct Printing, you need to manually update the `print-provider.conf` file on each computer.

## Step 5 - Test

The Direct Print Monitor should now be configured.

1. Log in to the Application Server as "admin" and verify that the printer queues are linked to the printer:

- a. Navigate to the **Printers** page.
  - b. Select the printer.
  - c. Click the **Queues** tab.
  - d. Verify that the printer queues are linked to the printer.
2. Perform a multi-page test print on each printer and verify that print jobs are tracked correctly.

### **Installing the Direct Print Monitor on a Linux computer**

The process to install the Direct Print Monitor on a Linux computer is the same no matter which operating system your Application Server is on.

## **Step 1 - Ensure primary server is set up correctly**

Before installing the Direct Print Monitor, you should ensure that the primary server (Application Server) is set up and running correctly.

Verify that:

- PaperCut NG/MF release 16.0 or above is installed.
- Users are allowed to log in to user pages from their computers.
- Administrators can access the system.
- The Application Server is accessible from each computer requiring Direct Printing, that is, you can Ping the Application Server.

## **Step 2 - Ensure firewall software is set to allow access to the port used by the Application Server**

A computer with the Direct Print Monitor installed needs to communicate (initiate a TCP connection) on the port used by the Application Server (by default this is port 9191). Ensure that any firewall software on the primary Application Server is not set to block any incoming local network traffic on this port.

## Step 3 - Check that the host user account exists

On the computer, create a user account called `papercut`. Set the `papercut` user's home directory to the desired install location. This is normally `/home/papercut`. The method of creating this account is the same as that used for the primary server setup. See [Installation](#) for more details if required.

## Step 4 - Install the Direct Print Monitor



**Important:** The instructions below assume `i686` architecture. If your system OS is 64-bit, replace `i686` with `x64` in all file paths.

Install the Print Provider software onto the computer by copying all files and directories from the primary Application Server's directory:

For Linux Application Servers:

```
[app_path]/providers/print/linux-i686/* (32bit)
[app_path]/providers/print/linux-x64/* (64bit)
```

For Windows Application Servers:

```
[app_path]/providers/print/win/* (32bit)
[app_path]/providers/print/win/* (64bit)
```

To the equivalent location on the computer:

```
/home/papercut/providers/print/linux-i686/ (32bit)
/home/papercut/providers/print/linux-x64/ (64bit)
```

Perform the copy operation as the `papercut` user so that files are owned by the `papercut` user. You can use any method to copy the files, including over the network or via a USB key. If the primary server is also Linux, the simplest way would be use Secure Copy (`scp`) as follows:

```
shell> su - papercut
shell> mkdir -p providers/print
shell> cd providers/print
shell> scp -r primary.server.name:/home/papercut/providers/print/* .
```

After the copy operation is performed, execute the `setperms` and `roottasks` scripts as `root`:

32bit

```
>shell> su - root
shell> sh ~/papercut/providers/print/linux-i686/setperms
shell> sh ~/papercut/providers/print/linux-i686/roottasks
```

## 64bit

```
shell> su - root
shell> sh ~papercut/providers/print/linux-x64/setperms
shell> sh ~papercut/providers/print/linux-x64/roottasks
```

## Step 5 - Configure the Direct Print Monitor on each computer

The Print Provider on the computer needs to know where the primary server is installed (e.g. Its IP address) and that it should be running in Direct Printing mode.

1. Open the following file in a text editor:

```
/home/papercut/providers/print/linux-i686/print-provider.conf (32bit)
/home/papercut/providers/print/linux-x64/print-provider.conf (64bit)
```

2. Locate the line starting with `ApplicationServer=` and change `localhost` to the name or IP address of the primary server.
3. Locate the line with `#DirectPrintingMode=false` and change it to:

```
DirectPrintingMode=true
```

**Note:**

Make sure you remove # at the beginning of the line.

4. Save the file and exit the text editor.
5. Integrate the binaries copied in step 4 into the CUPS, Samba, or Novell iPrint print queues.

This process is detailed in [Linux Print Queue Integration](#) and [Step 5 - Printer/iPrint Configuration](#).

**Note:**

- If required, you can also modify the other default configuration details. For more information see [Adding and Removing/Deleting/Ignoring Printers](#)
- If you need to change the configuration after deploying Direct Printing, you need to do it manually by updating the `print-provider.conf` file on each computer.

## Step 6 - Test

Direct Printing should now be configured.

1. Log in to the Application Server as "admin" and verify that the printer queues are linked to the printer:
  - a. Navigate to the **Printers** page.
  - b. Select the printer.
  - c. Click the **Queues** tab.
  - d. Verify that the printer queues are linked to the printer.
2. Perform a multi-page test print on each printer and verify that print jobs are tracked correctly.

### 2.8.4.2. How are direct print queues linked to a printer?

The Direct Print Monitor intelligently creates printers in the Application Server Printer List. It creates one printer with multiple print queues (that is, one from each computer). Every print queue with an IP address or hostname that matches the printer, is linked to the printer.

Linking the print queues to a printer allows PaperCut MF to consolidate the information from all linked queues and report on the printer as a whole. It also allows the print queues to dynamically use the configuration of the printer. If any print queues do not automatically link, you must manually link the print queue to the printer.

The linking process works as follows:

1. The first print queue added on a computer with the Direct Print Monitor installed creates a printer in the Printer List.
2. If a print queue on any other computer (with a Direct Print Monitor installed) has the same IP address or hostname as the printer, then a new printer is *not* created and the print queue is linked to the printer created in step 1.

**Tip:**

You should always use a consistent IP address or hostname for print queues to ensure they are automatically linked.

This process is automatic and works in most of cases. There might, however, be some rare situations where a print queue does not automatically link to the printer, or a print queue is incorrectly linked to the printer. In these cases, you need to manual link or unlink the relevant print queues.

When you add a computer to your environment and install the Direct Print Monitor, the Application Server detects the network address of the print queue and automatically links the print queue to the printer if it matches.

When you remove a computer from your environment, the print queue remains in PaperCut MF. You need to unlink the print queue on the decommissioned computer, then manually delete the printer from the **Printer Details** page.

For more information, see:

- [Link a print queue to a printer](#)
- [Unlink a print queue from a printer](#)

## View linked print queues

You can check that all print queues have been linked to the appropriate printer.

1. In the Application Server, click **Printers**.

The **Printer List** page is displayed. This list includes all printers and unlinked print queues.

The screenshot shows the PaperCut MF interface. At the top, there's a navigation bar with 'Printers' selected. Below it, the 'Printer List' page is displayed. On the left, there's an 'Actions' menu with options like 'Copy settings from printer to printer', 'Reset counts on all', 'Charts and statistics', 'Notification options', and 'List all jobs'. The main area contains a search bar and a table of printers. The table has columns for 'Printer', 'Page Cost', 'Attribs.', 'Total Pages', and 'Total Jobs'. The 'Ricoh Aficio MP C3000 PCL6' printer is highlighted in green and has a small green box with the number '2' next to its name. Other printers listed include 'KONICA MINOLTA C224E' (3), 'Kyocera Copystar 500ci' (1), and 'VirtualQueue-C224E (virtual)' (3). At the bottom of the table, there are icons for 'Export/Print' and other actions.

Printer	Page Cost	Attribs.	Total Pages	Total Jobs
[Template printer]	\$3.00 (standard)	No filters	0	0
Ricoh Aficio MP C3000 PCL6 <b>2</b>	\$3.00 (standard)	No filters	0	0
KONICA MINOLTA C224E <b>3</b>	\$3.00 (standard)	No filters	1	1
Kyocera Copystar 500ci <b>1</b>	\$3.00 (standard)	No filters	1	1
tw7x64samsunqc8650	\$3.00 (standard)	No filters	0	0
tw7x64TOSHIBA e-STUDIO2555C-11277256	\$3.00 (standard)	No filters	0	0
VirtualQueue-C224E (virtual) <b>3</b>	\$3.00 (standard)	No filters	0	0

Printers that are configured for Direct Printing can be either:

- **printer with linked print queues**—printers with linked print queues are indicated by an icon containing a number greater than one after the printer name ( [Ricoh Aficio MP C3000 PCL6](#) **2** )

- **print queues that are not linked to a printer**—print queues that are not linked to a printer are indicated by an icon containing **1** after the printer name ( [Kyocera Copystar 500ci](#) **1** )
2. Click the printer for which you want to view the linked print queues.

The **Printer Details: Summary** page is displayed.

The screenshot shows the PaperCut MF web interface. At the top, there is a navigation menu with items: Dashboard, Users, Groups, Accounts, Printers, Devices, Reports, Cards, Options, Logs, and About. The user is logged in as 'admin' with 'Help' and 'Log out' options. The breadcrumb trail is 'Location > Printers > Printer List > Printer Details'. The main heading is 'Printer Details: Ricoh Aficio MP C3000 PCL6'. Below the heading are tabs: Summary, Queues, Charging, Filters & Restrictions, Scripting, Job Log, and Statistics. The 'Summary' tab is active. On the left, there is an 'Actions' panel with the following options: Reset Counts, Copy settings to other printers, Rename this printer, Delete this printer, View charging rules, View filter rules, View job log, and View statistics. The main content area is titled 'Configuration' and contains the following information: 'Hosted on' (10.100.64.32), 'Serial number' (W492M310043), 'Physical identifier' (net://10.100.64.32), 'Toner status' (No toner information received. [update]), 'Location/Department' (empty text box), 'Page cost' (\$5.00 standard), 'Enable/Disable' (Enabled dropdown), and 'Queue type' (This queue points to a physical device (default) dropdown).

3. Click the **Queues** tab.

The screenshot shows the PaperCut MF web interface. At the top, there is a navigation menu with items: Dashboard, Users, Groups, Accounts, Printers, Reports, Cards, Options, Logs, and About. The user is logged in as 'admin'. The main content area is titled 'Printer Details: Ricoh Aficio MP C3000 PCL6'. Below the title, there are tabs for Summary, Queues, Charging, Filters & Restrictions, Scripting, Job Log, and Statistics. The 'Queues' tab is active, displaying a table with the following data:

Name	Hosted on	Unlink
Ricoh Aficio MP C3000 PCL6	mac-matt	
Ricoh Aficio MP C3000 PCL6	pc-debbie	
Ricoh Aficio MP C3000 PCL6	pc-travis	

On the left side, there is an 'Actions' menu with the following options:

- Link another print queue
- Reset Counts
- Copy settings to other printers
- Rename this printer
- Delete this printer
- View charging rules
- View filter rules
- View job log
- View statistics

A green button labeled 'Link another print queue' is located at the bottom right of the table area.

This page displays the following information for each linked print queue:

- **Name**—the name of the printer
- **Hosted on**—the name of the computer

You can do the following on this page:

- [Link a print queue to a printer](#)
- [How are direct print queues linked to a printer?](#)

## Link a print queue to a printer

1. In the Application Server, click **Printers**.

The **Printer List** page is displayed. This list includes all printers and unlinked print queues.

Location › Printers › Printer List

## Printer List

Printer List | Jobs Pending Release | Notification Options | Charts | Refunds

Quick find:

Filter off [\[edit\]](#)

Printer	Page Cost	Attribs.	Total Pages	Total Jobs
<a href="#">[Template printer]</a>	\$3.00 (standard)	<a href="#">No filters</a>	0	0
<a href="#">Ricoh Aficio MP C3000 PCL6</a> <b>2</b>	\$3.00 (standard)	<a href="#">No filters</a>	0	0
<a href="#">KONICA MINOLTA C224E</a> <b>3</b>	\$3.00 (standard)	<a href="#">No filters</a>	1	1
<a href="#">Kyocera Copystar 500ci</a> <b>1</b>	\$3.00 (standard)	<a href="#">No filters</a>	1	1
<a href="#">tw7x64samsunoc8650</a>	\$3.00 (standard)	<a href="#">No filters</a>	0	0
<a href="#">tw7x64TOSHIBA e-STUDIO2555C-11277256</a>	\$3.00 (standard)	<a href="#">No filters</a>	0	0
<a href="#">VirtualQueue-C224E (virtual)</a> <b>3</b>	\$3.00 (standard)	<a href="#">No filters</a>	0	0

[Export/Print](#)

Printers that are configured for Direct Printing can be either:

- **printer with linked print queues**—printers with linked print queues are indicated by an icon containing a number greater than one after the printer name ( [Ricoh Aficio MP C3000 PCL6](#) **2** )
- **print queues that are not linked to a printer**—print queues that are not linked to a printer are indicated by an icon containing **1** after the printer name ( [Kyocera Copystar 500ci](#) **1** )



### Note:

To view the queues linked to a printer, see [View linked print queues](#).

2. Check the **Printer List** for any unlinked print queues.
3. If there is an unlinked print queue in this list, click the printer to which you want to link the print queue.

The **Printer Details: Summary** page is displayed.

The screenshot shows the PaperCut MF web interface. At the top, there's a navigation menu with 'Dashboard', 'Users', 'Groups', 'Accounts', 'Printers', 'Devices', 'Reports', 'Cards', 'Options', 'Logs', and 'About'. The user is logged in as 'admin'. The main header shows 'Printer Details: Ricoh Aficio MP C3000 PCL6'. Below this, there are tabs for 'Summary', 'Queues', 'Charging', 'Filters & Restrictions', 'Scripting', 'Job Log', and 'Statistics'. The 'Configuration' section is expanded, showing a list of actions on the left and configuration options on the right. The configuration options include: Hosted on (10.100.64.32), Serial number (W492M310043), Physical identifier (net://10.100.64.32), Toner status (No toner information received), Location/Department (empty field), Page cost (\$5.00 standard), Enable/Disable (Enabled), and Queue type (This queue points to a physical device (default)).

4. Click the **Queues** tab.

This page displays a list of all print queues and the name of the computer on which the print queue is hosted.

The screenshot shows the PaperCut MF web interface with the 'Queues' tab selected. The 'Actions' menu is open, showing options like 'Link another print queue', 'Reset Counts', 'Copy settings to other printers', 'Rename this printer', 'Delete this printer', 'View charging rules', 'View filter rules', 'View job log', and 'View statistics'. The main content area displays a table of print queues:

Name	Hosted on	Unlink
Ricoh Aficio MP C3000 PCL6	mac-matt	
Ricoh Aficio MP C3000 PCL6	pc-debbie	
Ricoh Aficio MP C3000 PCL6	pc-travis	

Below the table, there is a green button labeled 'Link another print queue'.

5. In the **Actions** menu, click **Link another print queue**.

The Link another print queue popup is displayed.



Link another print queue

Select another print queue to link to the same physical printer as Ricoh Aficio MP C3000 PCL6 :

KONICA MINOLTA C224e

Note: Settings of the selected print queue will be overwritten by settings of Ricoh Aficio MP C3000 PCL6 .

Cancel Link

6. In the drop-down list, select one or more print queues that you want to link to the printer.
7. Click **Link**.

**Important:**

Any configuration for the linked print queue is overridden by the printer configuration.

The following message is displayed on the **Application Log** page:

*Linked print queue "tw7x64\Kyocery Copystar 500ci" with printer "Ricoh Aficio MP C3000 PCL6"*

## Unlink a print queue from a printer

1. In the Application Server, click **Printers**.

The **Printer List** page is displayed. This list includes all printers and unlinked print queues.

Location: Printers > Printer List

## Printer List

Printer List | Jobs Pending Release | Notification Options | Charts | Refunds

Quick find:

Filter off [\[edit\]](#)

Printer	Page Cost	Attribs.	Total Pages	Total Jobs
[Template printer]	\$3.00 (standard)	No filters	0	0
Ricoh Aficio MP C3000 PCL6 <b>2</b>	\$3.00 (standard)	No filters	0	0
KONICA MINOLTA C224E <b>3</b>	\$3.00 (standard)	No filters	1	1
Kyocera Copystar 500ci <b>1</b>	\$3.00 (standard)	No filters	1	1
tw7x64[samsungc8650]	\$3.00 (standard)	No filters	0	0
tw7x64[TOSHIBA e-STUDIO2555C-11277256]	\$3.00 (standard)	No filters	0	0
VirtualQueue-C224E (virtual) <b>3</b>	\$3.00 (standard)	No filters	0	0

Export/Print

Printers that are configured for Direct Printing can be either a:

- printer with linked print queues**—printers with linked print queues are indicated by an icon containing a number greater than one after the printer name ( [Ricoh Aficio MP C3000 PCL6](#) **2** )
- print queues that are not linked to a printer**—print queues that are not linked to a printer are indicated by an icon containing **1** after the printer name ( [Kyocera Copystar 500ci](#) **1** )

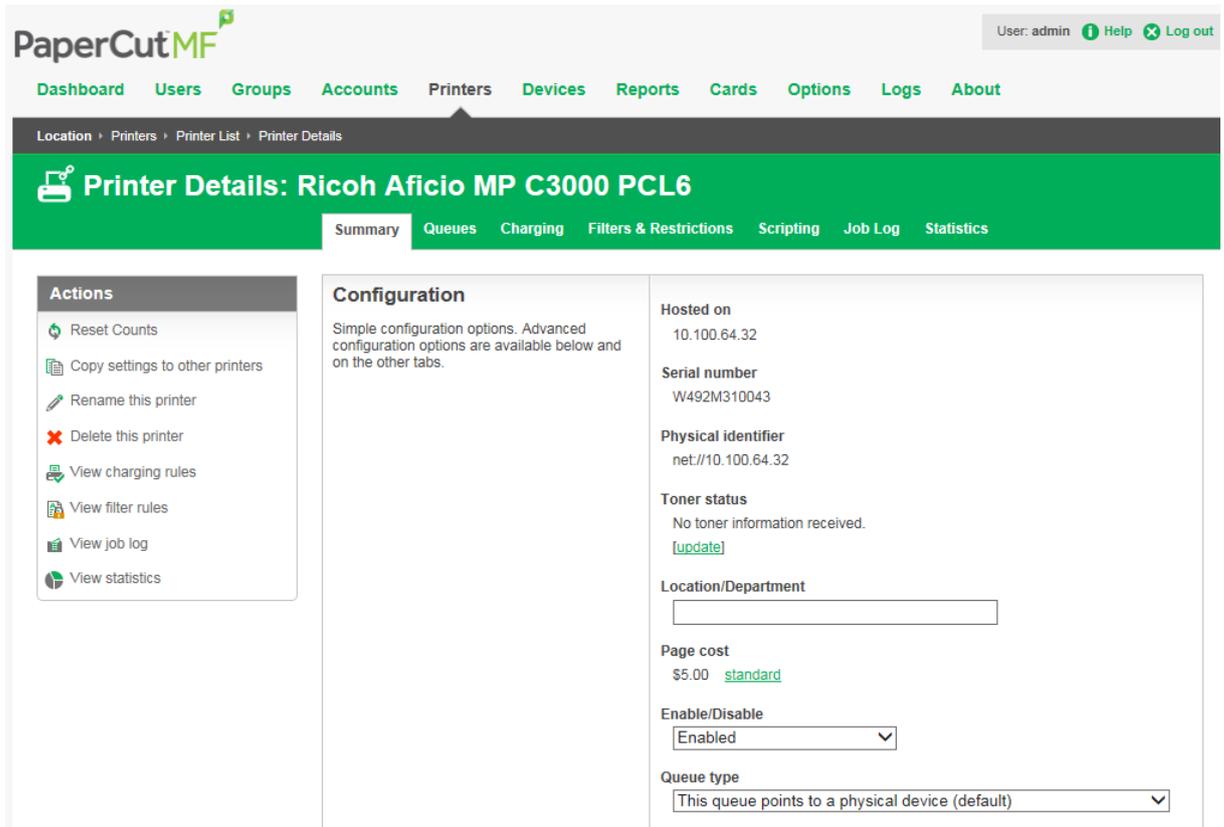


### Note:

Linked print queues are not displayed on this page. For more information about viewing the print queues that are linked to a printer, see [View linked print queues](#).

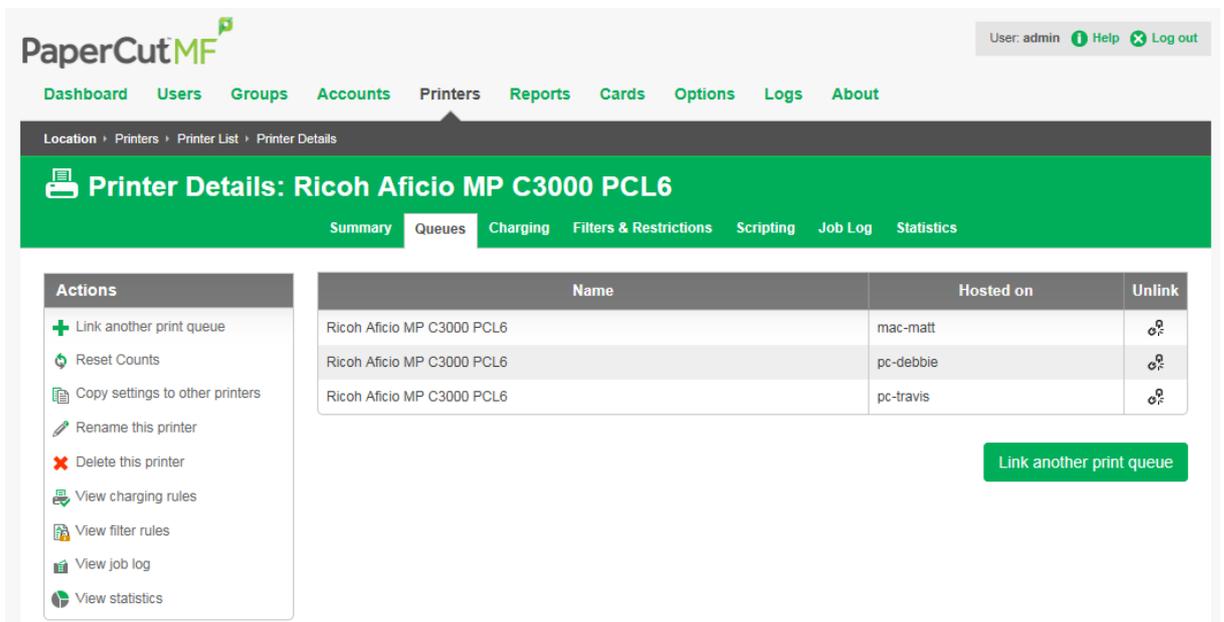
- Click the printer from which you want to unlink a print queue.

The **Printer Details: Summary** page is displayed.



3. Click the **Queues** tab.

This page displays a list of all print queues and the name of the computer on which the print queue is hosted.



4. Find the print queue you want to unlink; then click in that row.

The print queue is unlinked from the printer and is displayed as a unique printer on the **Printer List** page. The print queue retains the configuration of the printer from which you just unlinked.

The following message is displayed on the **Application Log** page:

*Unlinked print queue "tw7x64\Kyocera Copystar 500ci" from printer "Ricoh Aficio MP C3000 PCL6"*



#### Note:

Each printer using Direct Printing must have a minimum of one print queue. You cannot unlink a print queue if there is only one.

### 2.8.4.3. Configure a directly connected printer

With Direct Printing, you need to configure only the physical printer (in the Printer List) and then all linked printer queues automatically use the physical printer configuration.

1. On the Application Server, click **Printers**.

The **Printer List** page is displayed. Printers that are configured for Direct Printing indicated by an icon containing a number after the printer name ([Ricoh Aficio MP C3000 PCL6](#) **2**)

The screenshot shows the PaperCut MF interface. At the top, there's a navigation bar with 'Printers' selected. Below it, the 'Printer List' page is displayed. On the left, there's an 'Actions' sidebar with options like 'Copy settings from printer to printer', 'Reset counts on all', 'Charts and statistics', 'Notification options', and 'List all jobs'. The main content area has a 'Quick find' search bar and a 'Filter off' button. Below that is a table of printers:

	Printer	Page Cost	Attribs.	Total Pages	Total Jobs
	[Template printer]	\$3.00 (standard)	No filters	0	0
	Ricoh Aficio MP C3000 PCL6 <b>2</b>	\$3.00 (standard)	No filters	0	0
	KONICA MINOLTA C224E <b>3</b>	\$3.00 (standard)	No filters	1	1
	Kyocera Copystar 500ci <b>1</b>	\$3.00 (standard)	No filters	1	1
	tw7x64\samsungc8650	\$3.00 (standard)	No filters	0	0
	tw7x64\TOSHIBA e-STUDIO2555C-11277256	\$3.00 (standard)	No filters	0	0
	VirtualQueue-C224E(virtual) <b>3</b>	\$3.00 (standard)	No filters	0	0

At the bottom of the table, there are 'Export/Print' and 'X' icons.

2. Select the printer you want to configure.

The **Printer Details: Summary** page is displayed.

The screenshot shows the PaperCut MF web interface. At the top, there is a navigation menu with options: Dashboard, Users, Groups, Accounts, Printers, Devices, Reports, Cards, Options, Logs, and About. The user is logged in as 'admin'. The main heading is 'Printer Details: Ricoh Aficio MP C3000 PCL6'. Below this, there are tabs for Summary, Queues, Charging, Filters & Restrictions, Scripting, Job Log, and Statistics. The 'Summary' tab is active, showing an 'Actions' panel on the left with options like 'Reset Counts', 'Copy settings to other printers', 'Rename this printer', 'Delete this printer', 'View charging rules', 'View filter rules', 'View job log', and 'View statistics'. The main content area is divided into 'Configuration' and 'Hosted on' sections. The 'Configuration' section includes a note about configuration options and a list of settings: 'Hosted on' (10.100.64.32), 'Serial number' (W492M310043), 'Physical identifier' (net://10.100.64.32), 'Toner status' (No toner information received, with an 'Update' link), 'Location/Department' (empty text field), 'Page cost' (\$5.00, with a 'standard' link), 'Enable/Disable' (dropdown menu set to 'Enabled'), and 'Queue type' (dropdown menu set to 'This queue points to a physical device (default)').

3. Configure the printer. For more information, see [Advanced Printer Management](#).



#### Note:

The following options are not available on a direct print queue:

- Google Cloud Print
- Email to Print
- Web Print (users may upload documents to print)
- Print Archiving

To offer these services to your users, set up a server queue for this device/printer.

### 2.8.4.4. Configure Find-Me Printing for directly connected printers

Find-Me Printing is available for direct print queues. To implement Find-Me Printing for direct print queues, you need to do the following for each printer to be serviced:

- On each computer, create a virtual print queue. The virtual print queue must have the same name on each computer.

**Note:**

If you use the word virtual in the virtual print queue name, PaperCut MF will treat the queue as a virtual queue.

- On the Application Server, create a virtual printer queue with the same name as the computer virtual print queues. PaperCut MF automatically links all virtual print queues with the same name as the virtual printer on the Application Server.
- Configure Find-Me Printing and Release Station on the virtual printer. For more information, see [Find-Me Printing](#).

**Important:**

You cannot set up Find-Me printing between a direct printing queue and a print server queue.

## 2.8.5. Clustering and High Availability

PaperCut MF is designed to scale to networks over 50,000 users (largest deployments are running over 300,000 users). To ensure reliability on networks of this size, network architects can adopt strategies including:

- Load balancing - spreading tasks across multiple servers.
- Clustering - building in redundancy by implementing a failover strategy.

PaperCut MF is a cluster compatible application. It supports clustering at all levels of the application, including

- Clustering at the print spooler service layer by integrating with clustering services.
- Failover based clustering at the Application Server layer using clustering services. (PaperCut's Application Server is web and web services based, which means it can support other failover methods such as heartbeat driven DNS).
- At the database layer by utilizing cluster aware databases such as Microsoft SQL Server or Oracle.

Setting up PaperCut in a cluster environment is an advanced operation. This section assumes the reader has a high level of expertise in system and cluster configuration. Make sure the cluster environment is operational *before* undertaking the PaperCut installation. Readers should also have a good understanding of PaperCut's Service Oriented Architecture - specifically its two main components, the *Application Server* and the *Print Provider* and how they work together (see [Print Monitoring Architecture](#)).

In a cluster environment, you can set up PaperCut in one of two possible configurations.

*Mode 1* is the simplest configuration and is suitable for most organizations. It implements clustering in the front line, that is, the printers and print monitoring layer. The cluster print server is

configured as a secondary print server reporting back to a primary PaperCut server hosted on another system outside the cluster.

*Mode 2* implements clustering on all levels of the application for maximum fault tolerance - In addition to the print queues, the PaperCut Application Server is also hosted in the cluster. *Mode 2* is somewhat more demanding to configure and should only be attempted by organizations with staff experienced with advanced cluster and database management.

Refer to the subsequent sections for an explanation on how to set up *Mode 1* or *Mode 2* in your environment.

This section assumes that you have an already installed and working clustered printing environment.

### 2.8.5.1. Microsoft Failover Cluster Manager (MSFCM) on Windows 2008 R2 or later

Microsoft Windows 2008 R2 and later offers clustering capabilities through its *Microsoft Failover Cluster Manager (MSFCM)*.

This section documents the setup for Microsoft Failover Cluster Manager. Sites using [Veritas Cluster Server \(VCS\) on Windows](#) or [Novell Cluster Services \(NCS\) on Novell OES Linux](#) should jump to their respective sections.

This section assumes that you have an already installed and working clustered server environment.

*Mode 1* is the simplest configuration and is suitable for most organizations. It implements clustering in the front line, that is, the printer and print monitoring layer. The cluster print server is configured as a secondary print server reporting back to a primary PaperCut server hosted on another system outside the cluster.

*Mode 2* implements clustering on all levels of the application for maximum fault tolerance - In addition to the print queues, the PaperCut Application Server is also hosted in the cluster. *Mode 2* is somewhat more demanding to configure and should only be attempted by organizations with staff experienced with advanced cluster and database management.

Refer to the subsequent sections for an explanation on how to set up *Mode 1* or *Mode 2* in your environment.



**Important:** Windows Server 2008 R2 installations might experience a Windows bug where print jobs are not removed from the print queue when completed. For more information, see [Windows Server 2008 R2 only](#). Perform this work around on the clustered print server, not the nodes.

## Mode 1 - Clustering at the print layer



**Note:** Windows 2012 no longer support high-availability of printing servers using Fail-over Cluster Manager. Microsoft now only supports printing high availability through the use of highly available VM clusters. This is described in detail in the Microsoft document [High Availability Printing Overview](#). You should also review [Virtual Machine Clustering](#) for more information on VM clustering. To set up Mode 1 clustering on Windows 2012 the printer server must be installed on a highly available VM cluster. The remainder of this section described setting up Mode 1 on Windows 2008.

### Step 1 - Application Server (primary server) Setup

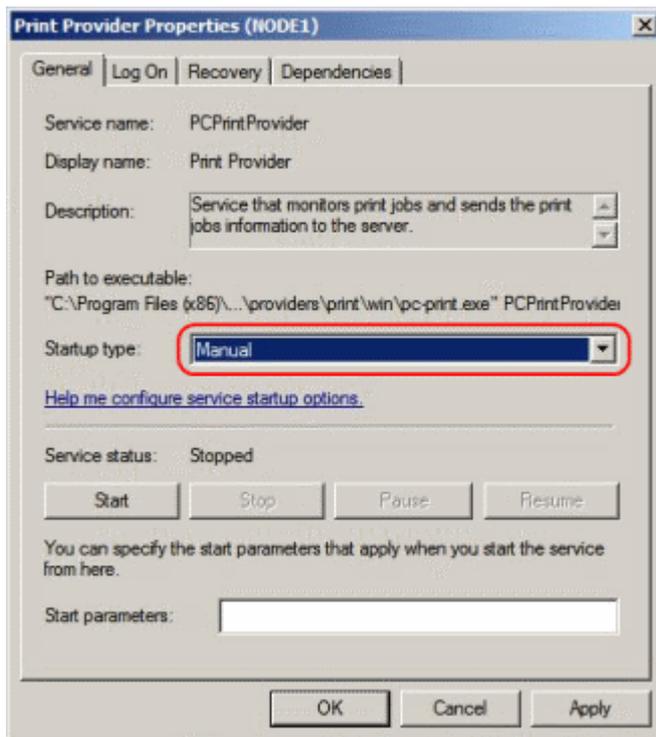
Install the *Application Server* component (**Standard Install** option) on your nominated system. This system is responsible for providing PaperCut MF's web based interface and storing data. In most cases this system will not host any printers and is dedicated to the roll of hosting the PaperCut Application Server. It might be one of the nodes in the cluster; however, a separate system outside the cluster is generally recommended. An existing domain controller, member server or file server will suffice.

### Step 2 - Installing the Print Provider components on each node

The *Print Provider* component needs to be separately installed on each node involved in the print spooler cluster. This is done by selecting the **Secondary Print Server** option in the installer. Follow the secondary server set up notes as detailed in [Configuring Secondary Print Servers and Locally Attached Printers](#). Take care to define the correct name or IP address of the nominated Application Server set up in step 1.

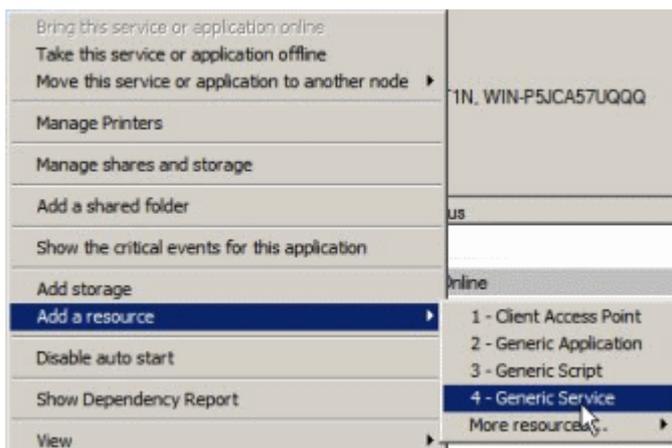
### Step 3 - Decouple service management from nodes

By default the *Print Provider* component is installed under the management of the node. To hand over management to the cluster, the service start-up type needs to be set to manual. On each node navigate to **> Administrative Tools > Services**, locate the `PaperCut Print Provider` service. *Stop* the service and set the start-up type to **Manual**. Repeat for each node in the cluster.



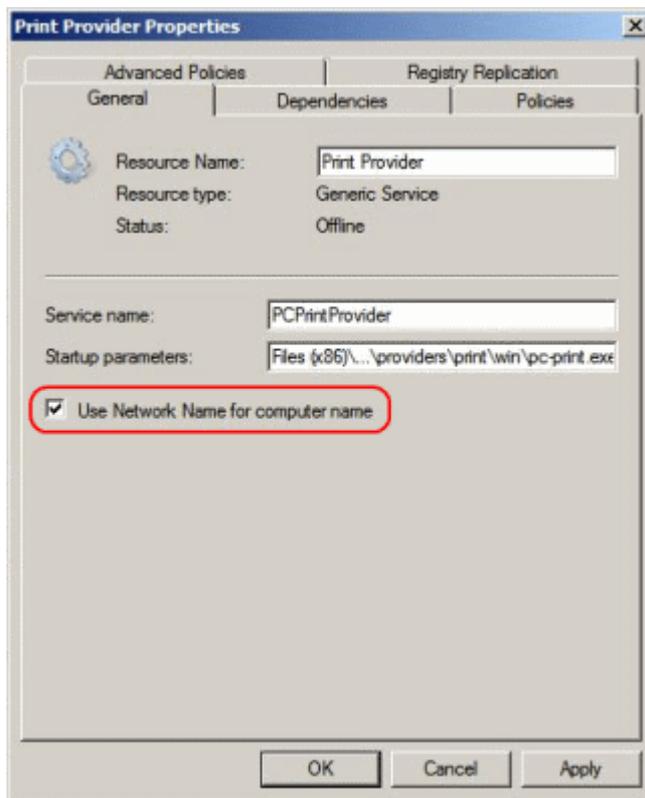
## Step 4 - Adding the Print Provider service as a resource under the print spooler's cluster group

1. Open the **Failover Cluster Manager**.
2. Right-click the cluster group hosting the spooler service and select **Add a resource > 4 - Generic Service**.



3. In the new resource wizard, select the name `PaperCut Print Provider` and click **Next**.
4. Click **Next** at **Confirmation**.
5. Click **Finish** at **Summary**.

- Right-click the PaperCut Print Provider; then click **Properties**. On the **PaperCut Print Provider Properties** page ensure the **Use Network Name for computer name** option is *checked*.



- Next, click the **Dependencies** tab and ensure the **Print Spooler** is added as a resource. Click **OK**.
- Right-click the PaperCut Print Provider; then click **Bring this resource online**.

## Step 5 - Shared active job spool

To ensure the state of jobs currently active (e.g. held in a hold/release queue) are not lost during a failover event, PaperCut MF is able to save job state in a shared drive/directory. If a shared disk resource is available and can be added to the cluster resource, PaperCut can use this to host a shared spool directory to ensure no active job state is lost.

- Add a shared drive to the cluster resource. e.g. (Q: drive). It is advisable to use the same drive as used for the shared print spool directory.
- Create a directory in this drive called PaperCut\Spool
- On *each* node, edit the file: [app-path]/providers/print/win/print-provider.conf and add a line pointing to the shared active job spool directory:

```
SpoolDir=Q:\\PaperCut\\Spool
```

Change the drive letter as appropriate.



**Important:** If running an "Active-Active" print cluster you must use a separate active job spool directory for each node. To configure this use the `%service-name%` value in the `SpoolDir` setting. The `%service-name%` value is replaced by the service name of the running **PaperCut Print Provider** instance. e.g.

```
SpoolDir=Q:\\PaperCut\\Spool\\%service-name%
```

See below for details on "Active-Active".

4. Restart the cluster resource to ensure the change is picked up.

## Step 6 - Test

Perform operations to verify that:

1. Print jobs are logged as expected.
2. There is no error message in the Print Providers text log located at: `C:\Program Files\PaperCut MF\providers\print\win\print-provider.log` on each node.

## Active/Active Clustering - Special notes regarding multiple virtual servers

On large networks it is common to distribute load by hosting print spooler services under two or more virtual servers. For example, two virtual servers might each host half of the organization's printers and share the load. This is sometimes referred to as Active/Active clustering - albeit not an entirely correct term, as the print spooler is still running in Active/Passive.

Virtual servers cannot share the same service on any given node. For this reason if the virtual servers share nodes, you need to manually install the PaperCut Print Provider service a second time under a different name. You can do this with the following command line:

```
cd \Program Files\PaperCut MF\providers\print\win pc-print.exe  
PCPrintProvider2 /install
```

The argument preceding `/install` is the unique name to assign to the service. The recommended procedure is to suffix the standard service name with a sequential number. Repeat this on each physical node. Use a unique service name for each "active" virtual server hosted in the cluster group.

Make sure that you have unique `SpoolDir` settings for each node of your cluster. Ensure that the `SpoolDir` setting in the `print-provider.conf` file has a `%service-name%` expansion variable as explained above. This ensures that each service has its own spool directory.

## Mode 2 - Clustering at all application layers

Mode 2 implements failover clustering at all of PaperCut MF's Service Oriented Architecture software layers, including:

- Clustering at the Print monitoring layer
- Clustering at the Application Server layer
- Optional clustering at the database layer

*Mode 2* builds upon *Mode 1* by introducing failover (Active/Passive) clustering in the *Application Server* layer. This involves having an instance of the Application Server on each of the cluster nodes. When one node fails, the other automatically takes over the operation. Both instances use a share data source in the form of an external database (see [Deployment on an External Database \(RDBMS\)](#)). Large sites should consider using a clustered database such as Microsoft SQL Server.

This section assumes that you have an already installed and working Service and Application group hosting a clustered printing environment.

### Step 1 - Application Server Installation

On one of the cluster's nodes, install the PaperCut Application Server component by selecting the **Standard Install** option in the installer. Follow the setup wizard and complete the process of importing all users into the system.

### Step 2 - Convert the system over to an external database

The system needs to be configured to use an external database as this database is shared between both instances of the Application Server. Convert the system over to the required external database by following the procedure detailed in [Deployment on an External Database \(RDBMS\)](#). The database can be hosted on another system, or inside a cluster. As per the external database set up notes, reference the database server by IP address by entering the appropriate connection string in the `server.properties` file.

### Step 3 - Setup of 2nd Node

Repeat steps 1 and 2 on the second and any subsequent cluster nodes.

### Step 4 - Distributing Application Licence

Install your licence on your 2nd node and any subsequent cluster nodes. To do this:

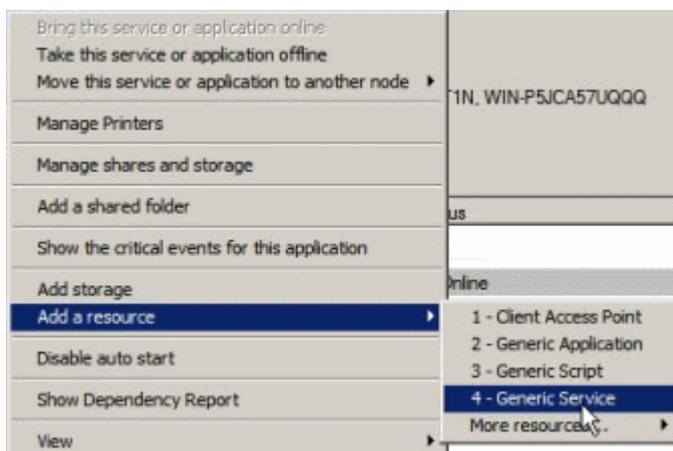
1. Log in to the administration console by browsing to `http://[IP-Address-Of-Your-Node]:9191/admin`.
2. Navigate to the **About** section.
3. Scroll down to the **Register** section; then click **Browse**.
4. Locate the license file.
5. Click **Install license**.
6. Verify license information is correctly listed on the **About** page.

## Step 5 - Decouple service management from the nodes

By default the PaperCut Application Server component is installed under the management of the node. It needs to be managed inside the cluster, so set the service's start-up type to manual. On each node navigate to **> Administrative Tools > Services** locate the **PaperCut Application Server**. Stop the service and set its start-up type to **Manual**. Repeat this on all nodes.

## Step 6 - Create a new Services and Applications group

Create a new Services and Applications group containing the two nodes. Make note of the **IP Address** that you assign as you will use it later. Add the Generic Service **PaperCut Application Server**. Give the Client Access Point an appropriate title such as `PaperCutAppCluster`.

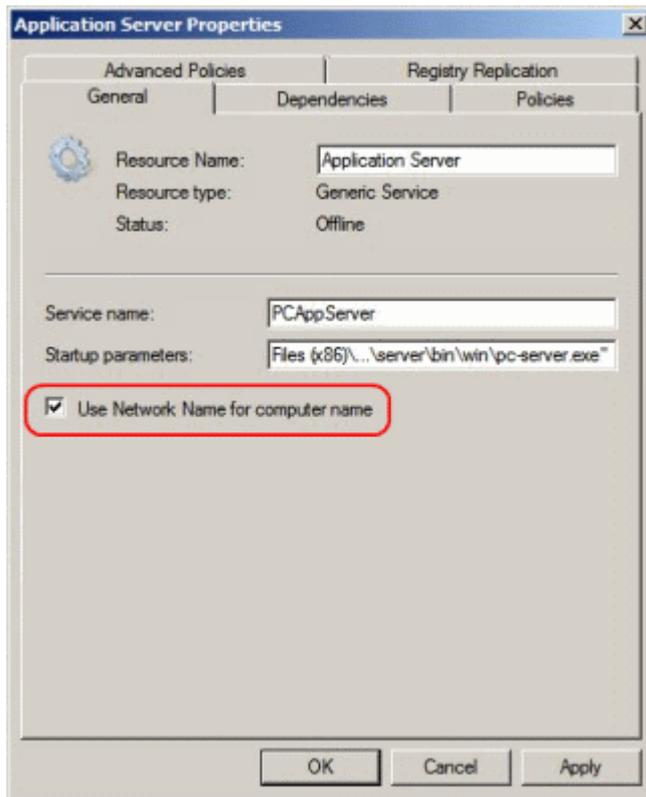


This Services and Applications group is separate to the existing clustered printing environment. It is recommended to set up two Services and Application groups where you can later set the node affinity to better distribute the application load across nodes.

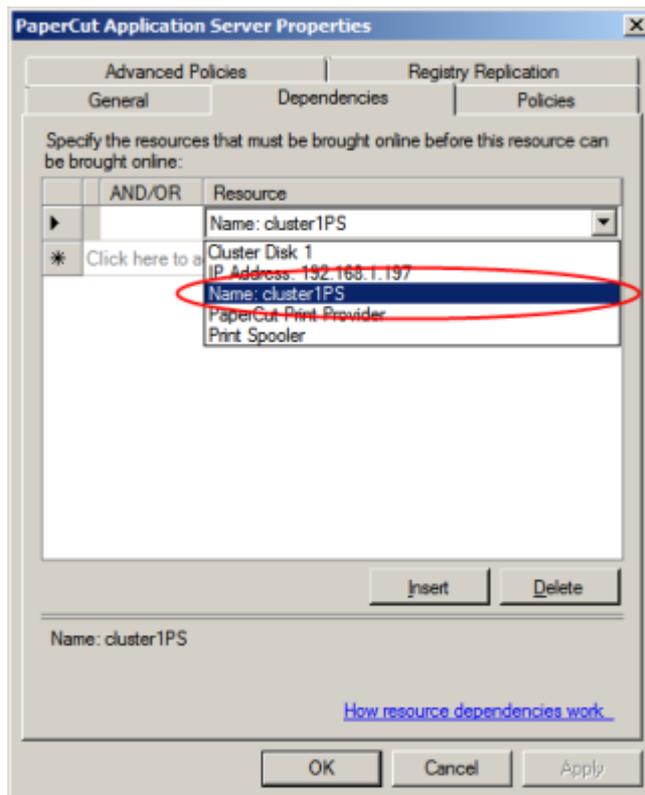
## Step 7 - Configure PaperCut Application Server

1. Right-click the PaperCut Application Server; then click **Properties**.
2. On the **PaperCut Application Server Properties** page, select the **Use Network Name**

for computer name.



3. On the **Dependencies** tab make sure the Service and Application group is added as a *Resource*. Click **Ok**.



## Step 8 - Confirm PaperCut Application Server active

Right-click the Service and Applications group and select Bring online. Wait until the Application Server has started, then verify that you can access the system by pointing a web browser to:

```
http://[Virtual Server Name]:9191/admin
```

Log in, and perform some tasks such as basic user management and User/Group Synchronization to verify the system works as expected.

## Step 9 - Set up the Print Provider layer

Set up the Print Provider as described in [Mode 1 - Clustering at the print layer](#). The exception being that the IP address of the Application Server is the IP address assigned to the Virtual Server.

## Step 10 - Client Configuration

The client and Release Station programs are located in the directories:

- [app-path]/client/
- [app-path]/release/

These directories contain configuration files that instruct the client to the whereabouts of the server. Update the IP address and the server name in the following set of files to the Virtual Server's details (Name and IP address):

- `[app-path]/client/win/config.properties`
- `[app-path]/client/linux/config.properties`
- `[app-path]/client/mac/PCClient.app/Contents/Resources/config.properties`
- `[app-path]/release/connection.properties`

Edit the files using Notepad or equivalent and repeat this for each node. Also see [Client/Workstation Configuration](#).

## Step 11 - Test

Mode 2 setup is about as complex as it gets! Take some time to verify all is working and that PaperCut MF is tracking printing on all printers and all virtual servers.

## Advanced: Load distribution and independent groups

Separating these resources into to groups, running on different IP addresses allows you to set up different node affinities so the two groups usually run on separate physical nodes during normal operation. This ensures the load is spread across multiple nodes.

To make this change after setting up the single group Mode 2 configuration:

1. Set the **Preferred owners** of each Services and Applications group to different physical nodes.
2. Restart or bring on line each group, and independently test operation and operation after fail-over.

### Clustering Tips

1. Take some time to simulate node failure. Monitoring can stop for a few seconds while the passive server takes over the role. Simulating node failure is the best way to ensure both sides of the Active/Passive setup is configured correctly.
2. It is important that the version of PaperCut running on each node is identical. Ensure that any version updates are applied to all nodes so versions are kept in sync.
3. The PaperCut installation sets up a read-only share exposing client software to network users. If your organization is using the zero-install deployment method, the files in this share are accessed each time a user logs onto the network. Your network might benefit from exposing the contents of this share via a clustered file share resource.
4. PaperCut regularly saves transient state information (such as print job account selections) to disk so that this state can be recovered on server restart. If failing over to a new cluster server, you should ensure this state information is saved to a location available to the new server.

By default the state information is located in `[app-path]/server-/data/internal/state/systemstate`. You can change this location if required by setting the property `server.internal-state-path` in your `server.properties` file.

## Additional configuration to support Web Print

By default the Application Server looks in `[app-path]\server\data\web-print-hot-folder` for Web Print files. This location is generally available only on one node in the cluster. To support Web Print in a cluster, add a **Shared Folder** on the **Shared Storage** in your cluster. This can be done on the same disk that the spool files reside and the Print Provider point to.

To change this location, use the **Config Editor** and modify the `web-print.hot-folder` key.

1. Add a **Shared Folder** on the **Shared Storage**, an example would be `E:\web-print-hot-folder` and share it as `\\clustername\web-print-hot-folder\`.
2. Log in to the PaperCut MF administration console, navigate to **Options > Config Editor**
3. Modify `web-print.hot-folder` to `E:\web-print-hot-folder`
4. Map your selected network drive on the Web Print Sandbox machine to `\\clustername\web-print-hot-folder\`
5. Add all relevant printer queues from `\\clustername\web-print-hot-folder\` to the Web Print Sandbox server.

## Additional configuration to support Print Archiving

If you have enabled [Print Archiving \(viewing and content capture\)](#), the Applications Server stores archived print jobs in `[app-path]\server\data\archive`. This location is generally only available on one node in the cluster. To support Print Archiving in a cluster, add a **Shared Folder** on the **Shared Storage** in your cluster. This location must be accessible to all cluster nodes and also any print servers that are collecting print archives.

For instructions for moving the archive location see [Phase 1: Moving the central archive:](#). This describes how to configure both the Application Server and your print servers to use the same shared storage location.

### 2.8.5.2. Microsoft Cluster Server (MSCS) on Windows

Microsoft Windows 2003/2008 offers clustering capabilities through its *Microsoft Cluster Server (MSCS)*

This section discusses both [Clustering and High Availability](#) and [Clustering and High Availability](#) configuration in Microsoft Cluster Server. Sites using [Microsoft Failover Cluster Manager \(MSFCM\) on Windows 2008 R2 or later](#), [Veritas Cluster Server \(VCS\) on Windows](#) or [Novell Cluster Services \(NCS\) on Novell OES Linux](#) should jump to the following sections.

This section assumes that you have an already installed and working clustered printing environment.

## Mode 1 - Clustering at the Print Provider layer

The *PaperCut Print Provider* is the component that integrates with the print spooler service and provides information about the print events to the *PaperCut Application Server*. At a minimum, in a cluster environment, the *Print Provider* component needs to be included and managed within the cluster group. The *Application Server* component (The **Standard Install** option in the installer) is set up on an external server outside the cluster. Each node in the cluster is configured to report back to the single Application Server using XML web services over TCP/IP.

## Step 1 - Application Server (primary server) Setup

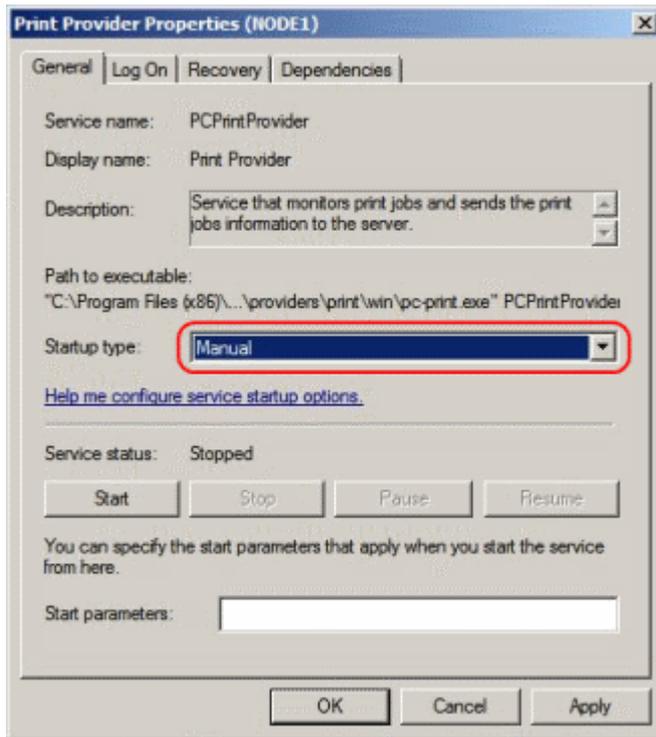
Install the *Application Server* component (**Standard Install** option) on your nominated system. This system is responsible for providing PaperCut MF's web based interface and storing data. In most cases, this system will not host any printers and is dedicated to the roll of hosting the PaperCut Application Server. It can be one of the nodes in the cluster; however, a separate system outside the cluster is generally recommended. An existing domain controller, member server or file server will suffice.

## Step 2 - Installing the Print Provider components on each node

The *Print Provider* component needs to be separately installed on each node involved in the print spooler cluster. This is done by selecting the **Secondary Print Server** option in the installer. Follow the secondary server set up notes as detailed in [Configuring Secondary Print Servers and Locally Attached Printers](#). Take care to define the correct name or IP address of the nominated Application Server set up in step 1.

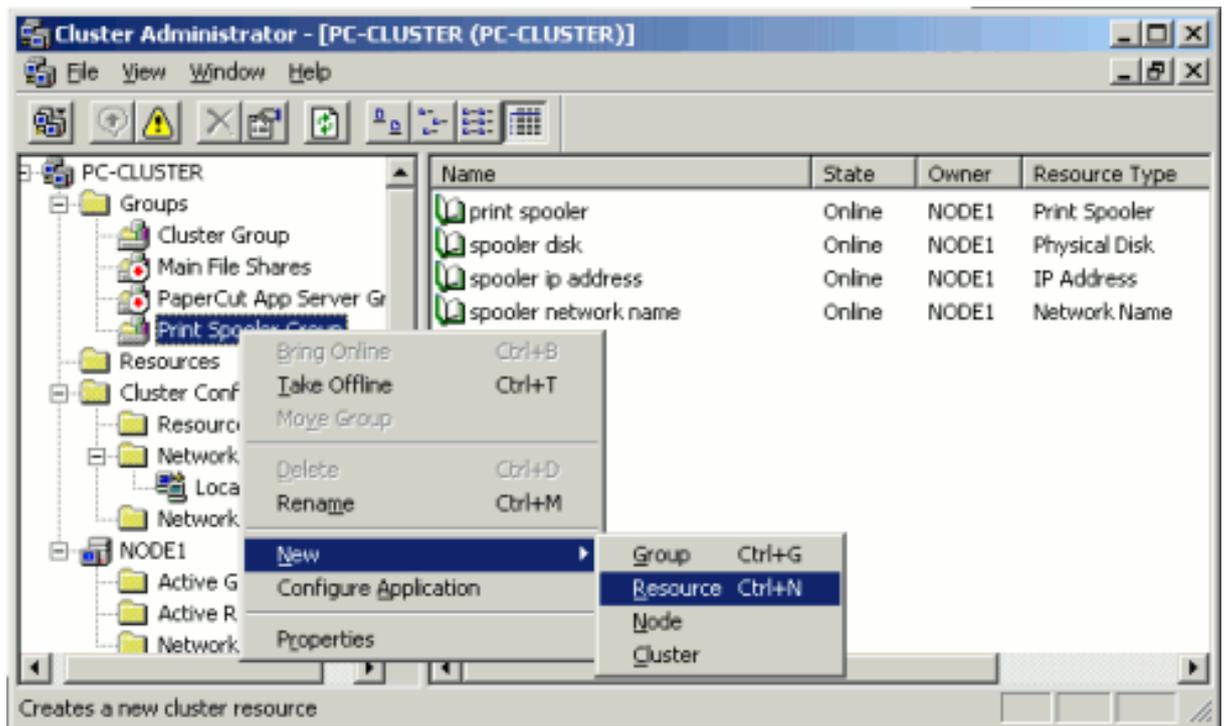
## Step 3 - Decouple service management from nodes

By default the *Print Provider* component is installed under the management of the node. To hand over management to the cluster, the service start-up type needs to be set to manual. On each node navigate to **Control Panel > Administrative Tools > Services**, locate the `PaperCut Print Provider` service. *Stop* the service and set the start-up type to **Manual**. Repeat for each node in the cluster.

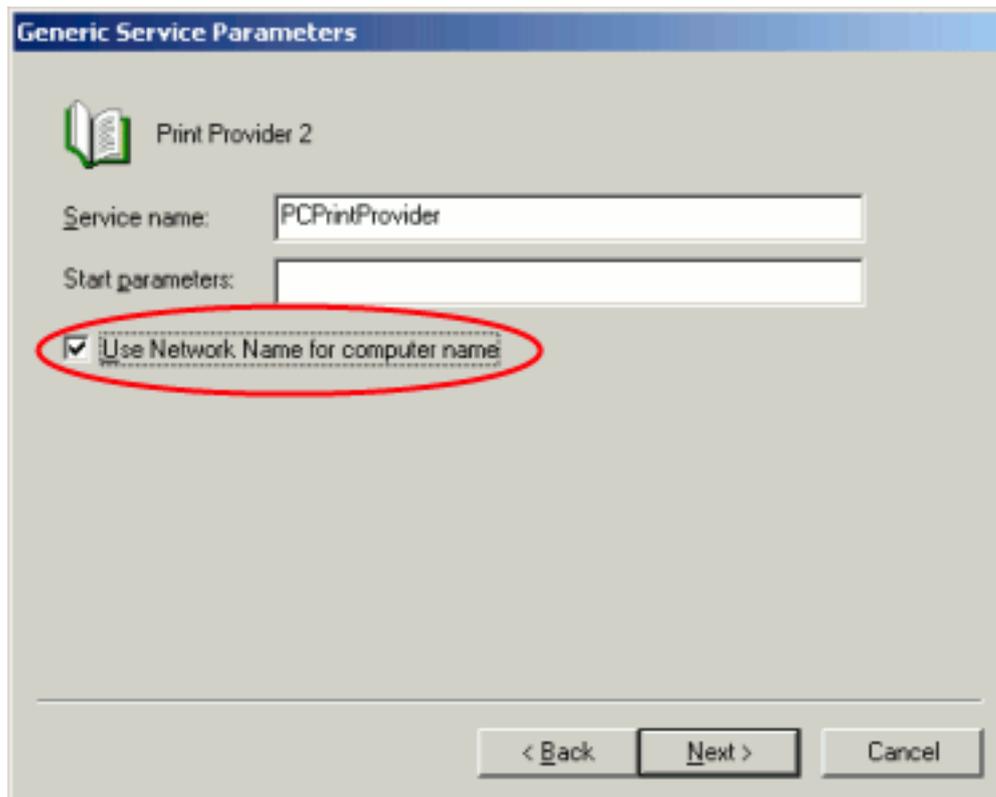


## Step 4 - Adding the Print Provider service as a resource under the print spooler's cluster group

1. Open the **Cluster Administrator**.
2. Right-click the cluster group hosting the spooler service; then select **New > Resource**.



3. In the new resource wizard, enter a name of PaperCut Print Provider and select a resource type of **Generic Service**. Click **Next**.
4. Click **Next** at **Possible Owners**.
5. Ensure that the Print Spooler Service resource is set as a required dependency, then click **Next**.
6. On the **Generic Service Parameters** page, enter a service name of PCPrintProvider and ensure the **Use Network Name for computer name** option is *checked*. Click **Next**.



7. Click **Finish** at the **Registry Replication** page.

## Step 5 - Shared active job spool

To ensure the state of jobs currently active (e.g. held in a hold/release queue) are not lost during a failover event, PaperCut MF is able to save job state in a shared drive/directory. If a shared disk resource is available and can be added to the cluster resource, PaperCut can use this to host a shared spool directory to ensure no active job state is lost.

1. Add a shared drive to the cluster resource. e.g. (Q: drive). It is advisable to use the same drive as used for the shared print spool directory.
2. Create a directory in this drive called `PaperCut\\Spool`.
3. On *each* node, edit the file: `[app-path]/providers/print/win/print-provider.conf` and add a line pointing to the shared active job spool directory:  
`SpoolDir=Q:\\PaperCut\\Spool`  
Change the drive letter as appropriate.



**Important:** If running an "Active-Active" print cluster you must use a separate active job spool directory for each node. To configure this use the `%service-name%` value in the `SpoolDir` setting. The `%service-name%` value is replaced by the service name of the running **PaperCut Print Provider** instance. e.g.

```
SpoolDir=Q:\\PaperCut\\Spool\\%service-name%
```

See below for details on "Active-Active"

## Step 6 - Bring up all cluster resources and test

Perform operations to verify that:

1. Print jobs log as expected.
2. There is no error message in the Print Providers text log located at: `C:\Program Files\PaperCut MF\providers\print\win\print-provider.log` on each node.

## Active/Active Clustering - Special notes regarding multiple virtual servers

On large networks it is common to distribute load by hosting print spooler services under two or more virtual servers. For example, two virtual servers can each host half of the organization's printers and share the load. This is sometimes referred to as Active/Active clustering - albeit not an entirely correct term, as the print spooler is still running in Active/Passive.

Virtual servers cannot share the same service on any given node. For this reason if the virtual servers share nodes, manually install the `PaperCut Print Provider` service a second time under a different name. This can be done with the following command line:

```
cd \Program Files\PaperCut MF\providers\print\win
pc-print.exe PCPrintProvider2 /install
```

The argument preceding `/install` is the unique name to assign to the service. The recommended procedure is to suffix the standard service name with a sequential number. Repeat this on each physical node. Use a unique service name for each "active" virtual server hosted in the cluster group.

Make sure that you have unique `SpoolDir` settings for each node of your cluster. Ensure that the `SpoolDir` setting in the `print-provider.conf` file has a `%service-name%` expansion variable as explained above. This ensures that each service has its own spool directory.

### Mode 2 - Clustering at all application layers

Mode 2 implements failover clustering at all of PaperCut MF's Service Oriented Architecture software layers, including:

- Clustering at the Print monitoring layer
- Clustering at the Application Server layer
- Optional clustering at the database layer

*Mode 2* builds upon *Mode 1* by introducing failover (Active/Passive) clustering in the *Application Server* layer. This involves having an instance of the Application Server on each of the cluster nodes. When one node fails, the other automatically takes over the operation. Both instances use a shared data source in the form of an external database (see [Deployment on an External Database \(RDBMS\)](#)). Large sites should consider using a clustered database such as Microsoft SQL Server.

This section assumes that you have an already installed and working clustered printing environment.

## Step 1 - Application Server Installation

On one of the cluster's nodes, install the PaperCut Application Server component by selecting the **Standard Install** option in the installer. Follow the set up wizard and complete the process of importing all users into the system.

## Step 2 - Convert the system over to an external database

The system needs to be configured to use an external database as this database is shared between both instances of the Application Server. Convert the system over to the required external database by following the procedure detailed in [Deployment on an External Database \(RDBMS\)](#). The database can be hosted on another system, or inside a cluster. As per the external database setup notes, reference the database server by IP address by entering the appropriate connection string in the `server.properties` file.

## Step 3 - Setup of 2nd Node

Repeat steps 1 and 2 on the second cluster node.

## Step 4 - Distributing Application Licence

Install your licence on each node in your cluster.

1. Log in to the administration console by browsing to `http://[IP-Address-Of-Your-Node]:9191/admin`.
2. Navigate to the **About** section.
3. Scroll down to the **Register** section; then click **Browse**.
4. Locate the license file.
5. Click **Install License**.
6. Verify license information is correctly listed in the **About** page.

## Step 5 - Decouple service management from the nodes

By default the `PaperCut Application Server` component is installed under the management of the node. It needs to be managed inside the cluster, so set the service's start-up type to manual. On each node navigate to **Control Panel > Administrative Tools > Services** locate the **PaperCut Application Server**. *Stop* the service and set its start-up type to **Manual**. Repeat this on each node.

## Step 6 - Create a new cluster group

Designate the `PaperCut Application Server` to run inside its own cluster group. Create a new cluster group containing the each of the nodes. Add an **IP Resource** and a **Network Name** resource. Give the network name resource an appropriate title such as `PCAppSrv`.

The need for a new cluster group is not required. It is, however, recommended as it gives the most flexibility in terms of load balancing and minimizes the potential for conflicts.

## Step 7 - Adding the PaperCut Application Service as a resource managed under the new cluster group.

1. Open the **Cluster Administrator**.
2. Right-click the cluster group hosting the spooler service and select **New > Resource** .
3. In the new resource wizard, enter a name of `PaperCut Application Server` and select a resource type of **Generic Service**. Click **Next**.
4. Click **Next** at **Possible Owners** page.
5. Click **Next** at **Dependency** page.
6. On the **Generic Service Parameters** page, enter a service name of `PCAppServer` and ensure the **Use Network Name for computer name** option is *checked*. Click **Next**.
7. Click **Finish** at the **Registry Replication** page.

## Step 8 - Bring the cluster group online

Right-click the cluster group; then select **Bring online**. Wait until the Application Server has started, then verify that you can access the system by pointing a web browser to :

```
http://[Virtual Server Name]:9191/admin
```

Log in, and perform some tasks such as basic user management and User/Group Synchronization to verify the system works as expected.

## Step 9 - Set up the Print Provider layer

Interface the *PaperCut Print Provider* layer with the clustered spooler service by following the same setup notes as described for *Mode 1*. The exception being that the IP address of the Application Server is the IP address assigned to the Virtual Server assigned in step 6.

## Step 10 - Client Configuration

The client and Release Station programs are located in the directories:

- [app-path]/client/
- [app-path]/release/

These directories contain configuration files that instruct the client to the whereabouts of the server. Update the IP address and the server name in the following set of files to the Virtual Server's details (Name and IP address):

- [app-path]/client/win/config.properties
- [app-path]/client/linux/config.properties
- [app-path]/client/mac/PCClient.app/Contents/Resources/config.properties
- [app-path]/release/connection.properties

Edit the files using Notepad or equivalent and repeat this for each node. Also see [Client/Workstation Configuration](#).

## Step 11 - Test

Mode 2 setup is about as complex as it gets! Take some time to verify all is working and that PaperCut MF is tracking printing on all printers and all virtual servers.

## Advanced: Load distribution and independent groups

You can split the two application layers (Resources) into two separate Cluster Groups:

- Group 1: Containing only the `PaperCut Application Server` service.
- Group 2: Containing the `PaperCut Print Provider` and `Print Spooler` services. These services are dependent and must be hosted in the same group.

Separating these resources into to groups allows you to set up different node affinities so the two groups usually run on separate physical nodes during normal operation. The advantage is that the load is spread further across the systems and a failure in one group will not necessarily fail-over the other.

To make this change after setting up the single group Mode 2 configuration:

1. Change the `ApplicationServer=` option in `[app-path]/providers/print/win/print-provider.conf` on each physical node to the IP or DNS name of the virtual server.
2. Create a new group called `PaperCut Application Server Group`.
3. Set the **Preferred owners** of each group to different physical nodes.
4. Restart or bring on line each group, and independently test operation and operation after fail-over.

## Clustering Tips

1. Take some time to simulate node failure. Monitoring can stop for a few seconds while the passive server takes over the role. Simulating node failure is the best way to ensure both sides of the Active/Passive setup is configured correctly.
2. It is important that the version of PaperCut running on each node is identical. Ensure that any version updates are applied to all nodes so versions are kept in sync.
3. The PaperCut installation sets up a read-only share exposing client software to network users. If your organization is using the zero-install deployment method, the files in this share are accessed each time a user logs onto the network. Your network might benefit from exposing the contents of this share via a clustered file share resource.
4. PaperCut regularly saves transient state information (such as, print job account selections) to disk so that this state can be recovered on server restart. If failing over to a new cluster server, you should ensure this state information is saved to a location available to the new server.

By default the state information is located in `[app-path]/server-data/internal/state/systemstate`. You can change this location if required by setting the property `server.internal-state-path` in your `server.properties` file.

## Additional configuration to support Web Print

By default the Application Server looks in `[app-path]\server\data\web-print-hot-folder` for Web Print files. This location is generally only available on one node in the cluster. To support Web Print in a cluster, add a **Shared Folder** on the **Shared Storage** in your cluster. This can be done on the same disk that the spool files reside and the Print Provider points to.

To change this location, use the **Config Editor** and modify the `web-print.hot-folder` key.

1. Add a **Shared Folder** on the **Shared Storage**, an example would be `E:\web-print-hot-folder` and share it as `\\clustername\web-print-hot-folder\`.
2. Log in to the PaperCut MF administration console, navigate to **Options > Config Editor**

3. Modify `web-print-hot-folder` to `E:\web-print-hot-folder`
4. Map your selected network drive on the Web Print Sandbox machine to `\\cluster-name\web-print-hot-folder\`
5. Add all relevant printer queues from `\\clustername` to the Web Print Sandbox server.

## Additional configuration to support Print Archiving

If you have enabled [Print Archiving \(viewing and content capture\)](#), the Applications Server stores archived print jobs in `[app-path]\server\data\archive`. This location is generally available only on one node in the cluster. To support Print Archiving in a cluster, add a **Shared Folder** on the **Shared Storage** in your cluster. This location must be accessible to all cluster nodes and also any print servers that are collecting print archives.

For instructions for moving the archive location see [Phase 1: Moving the central archive:](#). This describes how to configure both the Application Server and your print servers to use the same shared storage location.

### 2.8.5.3. Virtual Machine Clustering

Virtual Machine (VM) technologies, such as VMWare, Microsoft Hyper-V are becoming increasingly popular. They provide great flexibility in deploying servers within an organization. VM implementations can also provide high-availability through the use of VM clusters. When a VM is running in a highly available VM cluster, any failure of the physical hardware does not affect the running VM as it is seamlessly transferred to another node in the cluster.

Implementing high-availability using VM infrastructure is much simpler to install and manage than using the built-in operating system and application clustering support. You set up your VM instances and the VM infrastructure ensures they continue to run uninterrupted.

This allows you to set up PaperCut in the same way as on a physical server, but allow the VM infrastructure to provide the high availability.

This section discusses a generic clustered Virtual Machine setup.

PaperCut offers great flexibility and allows you to easily structure your installation into physical multi-tiered clustered components.

Clustering at Virtual Machine level offers these advantages over other traditional clustering setups:

- Your software, drivers, settings, etc. are installed and configured once, in a single VM
- Depending on your VM infrastructure, when a physical node fails the VM can be shifted to another node with marginal or no downtime
- Dramatically simplified backup processes
- Disaster recovery capabilities are inherently available

Virtual Machine hosts can automatically detect when a VM crashes or becomes unresponsive. You should consider whether you will augment this with application level monitoring. Although the VM might be running normally, the underlying application can have problems and application level monitoring can detect this. Ways to perform application level monitoring include (but not limited to):

- Loading an Application Server URL to test server is running
- IP pings
- Checking that PaperCut services are running

## Define your VM Clustering Environment

Define your Virtual Machine Vendor/Product and how you want configure the VM cluster for high availability.

There are many VM deployment strategies you can leverage depending on the VM platform you are utilizing, including VMs that might be hosted in different physical boxes, or even in different sites, which might configure a typical Disaster Recover (DR) scenario.

When selecting a VM product, it's particularly important to consider the following product features:

- **Fault Tolerance (FT):** FT provides continuous availability for virtual machines by automatically creating and maintaining a secondary virtual machine that is identical to the primary virtual machine.
- **High Availability (HA):** Should a VM fail, you can make a new VM available minimizing down time. Generally, FT is a functionality added on top of HA that provides seamless switch over if no loss of state.
- **Application High Availability (App HA):** It's important that your VM vendor product offers Application Level monitoring. If the application fails, you can make a new VM available minimizing down time.
- **Data Replication and Backup:** Consider features on how the application data can be backup and restored. Generally tape based backups are slow and can very often get corrupted. Replication of in memory data in case of FT or Disaster Recovery (DR) features might also play an important role. Specific proprietary algorithms for memory segments replication usually reduce the bandwidth needs and are very efficient.

## VM Clustering Setup

There are many ways in which you can deploy PaperCut on VM infrastructure. Consider the following for implementing a VM-based clustered PaperCut installation.

## Mode 1 - Clustering at the Print Layer

Set up and configure print servers as required in your VM environment, and configure them for VM high availability. You then just need to install the PaperCut secondary server components to monitor printing on the print servers. See [Configuring Secondary Print Servers and Locally Attached Printers](#).



**Tip:** Microsoft have a guide to high availability printing that discusses the set up of printing in highly available VM environments (in particular Hyper-V). See [the Microsoft High Availability Printing Overview](#).

## Mode 2 - Clustering at the Application Server layer

Setup and configure a new server in your VM infrastructure to host the Application Server component. Configure this VM with high-availability. Then install the PaperCut Application Server as per the normal setup process.

You can then choose to set up your print servers for high availability as described in [Mode 1 - Clustering at the Print Layer](#).

### 2.8.5.4. Veritas Cluster Server (VCS) on Windows

This section discusses configuring PaperCut MF on a Veritas Cluster Server (VCS). The section provides a brief overview and is designed to supplement guidance from the PaperCut MF development team. If you are about to commence a production deployment on VCS, please feel free to get in touch with the development team for further assistance if required.

Note that [Clustering and High Availability](#) only is supported for deploying on VCS.

This section assumes that you have an already installed and working clustered printing environment.

#### Mode 1 - Clustering at the print layer

The `PaperCut Print Provider` is the component that integrates with the `Print Spooler` service and provides information about the print events to the `PaperCut Application Server`. At a minimum, in a cluster environment, the `PaperCut Print Provider` component needs to be included and managed within the cluster group. The `PaperCut Application Server` component (The **Standard installation (primary server)** option in the installer) is set up on an external server outside the cluster. Each node in the cluster is configured to report back to the single Application Server using XML web services over TCP/IP.

## Single Virtual Server (Active/Passive)

PaperCut MF supports both Active/Passive and virtual Active/Active in VCS. This section discusses configuring PaperCut MF on a single virtual server running Active/Passive. If your organization hosts multiple virtual servers, jump to the following section covering Active/Active.

### Step 1 - Set up the cluster, print spooler and printers

First, set up and verify that the cluster and print server is working as expected. Fully configure and test the system s before proceeding to the next step and installing PaperCut MF.

### Step 2 - Set up the PaperCutApplication Server (primary server) on a system outside the cluster

Install the `PaperCut Application Server` component (**Standard installation** option) on your nominated system. This system is responsible for providing PaperCut MF's web based interface and storing data. In most cases, this system does not host any printers and is dedicated to the role of hosting the *PaperCut Application Server*. It can be one of the nodes in the cluster; however, a separate system outside the cluster is generally recommended. An existing domain controller, member server or file server will suffice.

### Step 3 - Install PaperCut Print Provider on both nodes

The *Print Provider* component needs to be installed separately on each node involved in the print spooler cluster. This is done by selecting the **Secondary Print Server** option in the installer. Follow the secondary server set up notes as detailed in [Configuring Secondary Print Servers and Locally Attached Printers](#). Take care to define the correct name or IP address of the nominated Application Server set up in step 1.

### Step 4 - Configure the PaperCut Print Provider Service to bind to the virtual server

By default the PaperCut Print Provider component associates itself with the physical node. A configuration change is required to force it to bind to the virtual server. Add the following lines (or uncomment the example lines) to the file: `C:\Program Files\PaperCut MF\providers\print\win\print-provider.conf`

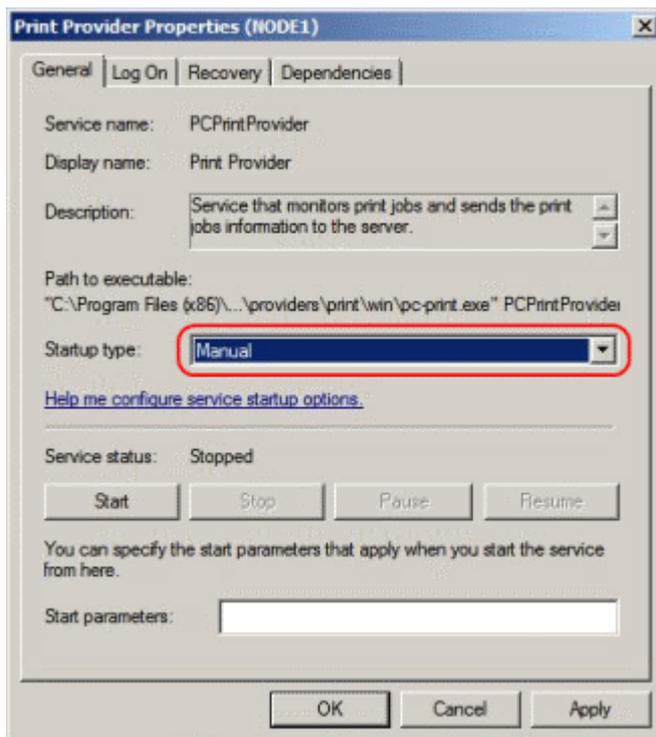
```
ServerName=[VIRTUAL SERVER NAME]
PrintServerName=\\[VIRTUAL SERVER NAME]
```

Where `[VIRTUAL SERVER NAME]` is the network name associated with your virtual server. Note that the `PrintServerName` must be prefixed with two back-slashes (`\\`). The first setting is used to override the name reported to the *PaperCut MF Application Server*. The

`PrintServerName` setting instructs the Print Provider to search for printers on the virtual server rather than on the physical server.

## Step 5 - Decouple service management from nodes

By default the *Print Provider* component is installed under the management of the node. To hand over management to the cluster, the service start-up type needs to be set to manual. On each node navigate to **Control Panel > Administrative Tools > Services** and locate the `Paper-Cut Print Provider` service. *Stop* the service and set the start-up type to **Manual**. Repeat for each node in the cluster.



## Step 6 - Add the PaperCut Print Provider Service as a Generic Service

The *PaperCut Print Provider* service needs to be added to the Veritas Cluster group associated with the virtual server. This is to ensure that the service is managed within the same group as the print server and will fail-over as part of the group. Create a new **GenericServer** resource called `PaperCutPrintProvider01`. Set the service name to `PCPrintProvider`. You can leave the account, password and domain as defaults.

## Step 7 - Set up dependencies

The `PCPrintProvider` service must start after the print spool resource. Create a dependency link between `PaperCutPrintProvider01` and the `PrintSpooler` using the tools on the Veritas Cluster Resources tab associated with this virtual server.

## Step 8 - Test

Take some time to test and ensure printing is monitored as expected. Use the Veritas Cluster administration console to simulate node failure and ensure monitoring continues after failure.

## Multiple Virtual Servers (Active/Active)

On large networks it is common to distribute load by hosting print spooler services under two or more virtual servers. For example, two virtual servers can each host half of the organization's printers and share the load. This is sometimes referred to as Active/Active clustering - albeit not an entirely correct term, as the print spooler is still running in Active/Passive.

Virtual servers cannot share the same service on any given node. For this reason if the virtual servers share nodes, manually install the `PaperCut Print Provider` service a second time under a different name. Use the following procedure.

### Step 1 - Set up one Virtual Server

Set up one virtual server using all steps in the preceding section. After this virtual server is tested, perform the steps below to set up the 2nd virtual server.

### Step 2 - Create a 2nd instance of the PaperCut Print Provider on each physical node

A 2nd copy of the *PaperCut Print Provider* needs to be created on each physical node. This is required so that a separate service can be installed and configured to bind to the 2nd virtual server. Copy the following directory, and all its contents: `C:\Program Files\PaperCut MF\providers\print` to `C:\Program Files\PaperCut MF\providers\print2`. Repeat this step on both physical nodes.

### Step 3 - Configure the copied instance to bind to the 2nd virtual server

Add the following lines (or uncomment the example lines) to the file at `C:\Program Files\PaperCut MF\providers\print\win\print-provider.conf`:

```
ServerName=[VIRTUAL SERVER NAME 2]
PrintServerName=\\[VIRTUAL SERVER NAME 2]
```

Where `[VIRTUAL SERVER NAME 2]` is the network name associated with your 2nd virtual server. Note that the `PrintServerName` must be prefixed with two back-slashes (`\\`).

Repeat this step on both physical nodes.

## Step 4 - Manually install the a 2nd instance of the PCPrintProvider service

Services need a unique name. We'll install a 2nd instance of the service under the name `PCPrintProvider2`. This is done by typing the following commands at the command prompt.

```
cd C:\Program Files\PaperCut MF\providers\print2\win
pc-print.exe PCPrintProvider2 /install
```

The argument preceding `/install` is the unique name to assign to the service. The recommended procedure is to suffix the standard service name with a sequential number. Repeat this on each physical node. Use a unique service name for each "active" virtual server hosted in the cluster group.

## Step 5 - Add this service to the resource group associated with the 2nd virtual server

Repeat steps 5 through 8 in the preceding section, this time using the service name `PCPrintProvider2` rather than `PCPrintProvider`. The recommend unique name for the cluster resource in step 6 is `PaperCutPrintProvider01`.

### 2.8.5.5. Novell Cluster Services (NCS) on Novell OES Linux

This section assumes that you have an already installed and working clustered printing environment.

#### Mode 1 - Clustering at the print layer

## Step 1 - Application Server (primary server) Setup

Before installing a secondary server/clustered Print Provider you should take some time to ensure the primary PaperCut server (central Application Server) is set up and running correctly. The primary server is responsible for providing PaperCut MF's web based interface and storing data. In most cases where a cluster is involved, the primary server does not host any printers and is dedicated to the role of hosting the PaperCut Application Server. If it is not running fine now, adding an extra server only "adds an extra variable to the equation" and complicate troubleshooting. Take some time now to verify that the primary server is functioning correctly. For example, verify that:

- Install and configuration is completed
- Administrators can access the system via a web browser for administration.
- Users can log in to the user web interface from their workstations.

## Step 2 - Ensure firewall allows access to port 9191

Cluster nodes need to communicate (initiate a TCP connection) with the primary PaperCut server on port 9191. Administrators should ensure that any firewall software on the primary Application Server is set to block any incoming local network traffic on this port. A good way to test is to open a browser on the planned cluster nodes and confirm you can access the administration web interface on port 9191.

## Step 3 - Create eDirectory user account

The `papercut` user's home directory denotes the application install location. For the fact that it is the default for LUM enabled users, `/home/papercut` is recommended, and assumed through the rest of this guide.

1. In iManager open **Users > Create User**.
2. For **username**, enter `papercut`.
3. For **Last name** enter `PaperCut LUM user`.
4. For **context** select the same eDirectory context as your the iPrint user and `iprintgrp` group created during your clustered iPrint installation.
5. Assign the user a secret password during creation, and ensure the user's password is set to not expire. If you are using eDirectory password policies, associate the user with an appropriate password policy after creation .
6. Select the **Create home directory** check box.
7. In **Volume** select the volume that is holding your clustered iPrint resource.
8. In **Path** ensure that it reads `papercut`.
9. Click **OK** to create the user.

You now need to LUM enable this PaperCut eDirectory user and add it to the already LUM enabled `iprintgrp` used by the clustered iPrint resource.

1. In iManager, open **Linux User Management > Enable Users for Linux**.
2. Select your `papercut` eDirectory user and continue.
3. Select **An Existing Linux-Enabled Group**; then select the `iprintgrp` created during your clustered iPrint installation; then click **Next**.
4. Confirm that **Workstation list** includes all of the servers in your cluster; then click next.

5. On your clustered iPrint volume, navigate to the `papercut` user's NSS home folder (`/media/nss/[volume]/papercut`) using, for example, Windows Explorer or ConsoleOne and add `RWECMF` file rights for the eDirectory group `iprintgrp` created during your clustered iPrint installation. This ensures the iPrint services have access to the installed files.
6. As `root`, on *each* node that will run the iPrint resource, run the following command, replacing `[volume]` with the volume name of your iPrint resource.

```
shell> ln -s /media/nss/[volume]/papercut /home/papercut
```

**Note:**

The symlink target exists only on the active node and *dangles* on the other nodes ready for when it becomes the active node.

7. To confirm all the above stages are working, using any method you want (such as, the traditional Novell client for Windows, logged in as an admin user), create a folder or test files inside the `papercut` folder on your iPrint cluster volume, then on the server holding that resource run:

```
shell> su - papercut
shell> ls
```

You can see the files created on the NSS volume. You can also view them via `/home/papercut` on the *active* node.

## Step 4 - Install the Print Provider



**Important:** The instructions below assume x64 architecture. If your system OS is 32-bit, replace x64 with i686 in all file paths.

Install the Print Provider software onto the secondary server by copying all files and directories from the primary Application Server's directory:

```
[app-path]/providers/print/linux-x64/*
```

to the equivalent location on the node currently holding the iPrint resource:

```
/home/papercut/providers/print/linux-x64/
```

Perform the copy operation as the `papercut` user so that files are owned by the `papercut` user. You can use any method to copy the files, including over the network or via a USB key. If the primary server is also Linux, the simplest way would be to use secure copy (`scp`) as follows:

```
shell> su - papercut
shell> mkdir -p providers/print
shell> cd providers/print
shell> scp -r primary.server.name:/home/papercut/providers/print/* .
```

After the copy operation is performed, execute the `setperms` and `roottasks` scripts as `root`:

#### 64bit

```
shell> su - root
shell> sh ~papercut/providers/print/linux-x64/setperms
shell> sh ~papercut/providers/print/linux-x64/roottasks
```

#### 32bit

```
shell> su - root
shell> sh ~papercut/providers/print/linux-i686/setperms
shell> sh ~papercut/providers/print/linux-i686/roottasks
```

## Step 5 - Configuration

The Print Provider on the cluster needs to know where the primary server is installed (i.e. its IP address). It also needs to correctly report the cluster name to the primary server.

1. Open the file `/home/papercut/providers/print/linux-x64/print-provider.conf` in a text editor.
2. Locate the line starting with `ApplicationServer=` and change `127.0.0.1` to the hostname or IP address of the primary server.
3. Locate the line starting with `ServerName=`, uncomment it and add the hostname of the cluster. This tells PaperCut MF to report printers as being hosted on the cluster rather than on the node running the resource.

## Step 6 - Cluster Configuration

### 1. Configuring services

As the services are going to be managed by Novell clustering, the services on the physical nodes must be disabled so that they don't start. On the node used to install PaperCut in [Step 4 - Install the Print Provider](#), in **YaST > System > System Services (Runlevel)**, disable `papercut-event-monitor`.

### 2. Installing services and disabling them on all other nodes

On each other node in the cluster perform the following steps:

- a. As `root` run the following command (`[resource-name]` is the name for your iPrint resource, and `[node-name]` is the server name of the node you are now working on):

```
shell> cluster migrate [resource-name] [node-name]
```

- b. Once the resource has successfully migrated run the following command (still as `root`):

```
shell> /home/papercut/providers/print/linux-[arch]
/roottasks
shell> chown root:iprintgrp /op-
t/novell/iprint/bin/papercut
```

- c. In **YaST > System > System Services (Runlevel)**, disable `papercut-event-monitor`.
- d. Repeat steps 1-3 on the other nodes in the cluster.

Now you need to integrate the binaries copied in [Step 4 - Install the Print Provider](#) into Novell iPrint by adding `papercut` as the **Accounting Autoload Command** as discussed in [Step 5 - Printer/iPrint Configuration](#) under [Quick install: Novell OES Linux \(iPrint\)](#). Follow that step only and return here once completed.

## Step 7 - Test

Mode 1 clustering should now be configured. Perform some test printing on all of this secondary server's printers. Log in to the PaperCut admin interface as `admin` and verify that the printers are now listed under the **Printers** tab. Simulate a node failover and test again (wait a minute or two between failures for the new node to engage).

## Mode 2 - Clustering at all application layers

This section assumes that you have an already installed and working clustered printing environment.

## Step 1 - Prerequisites

This guide assumes you have iPrint up and working within an existing cluster. It is assumed the cluster is set up following Novell's documentation at [http://www.novell.com/documentation/oes2/iprint\\_lx/?page=/documentation/oes2/iprint\\_lx/data/akujhhq.html](http://www.novell.com/documentation/oes2/iprint_lx/?page=/documentation/oes2/iprint_lx/data/akujhhq.html).

Ensure the size of the shared disk partition and NSS Pools are sufficient for your print manager, driver store, and PaperCut installation. This can mean making it larger than Novell's recommended 20GB if you are intending to use the internal database and store large amounts of data over time.

## Step 2 - Create eDirectory user account

The `papercut` user's home directory denotes the application install location. For the fact that it is the default for LUM enabled users, `/home/papercut` is recommended, and assumed through the rest of this guide.

1. In iManager open **Users > Create User**.
2. In **username**, enter `papercut`.
3. In **Last name** enter `PaperCut LUM user`.
4. In **context** select the same eDirectory context as your the iPrint user and `iprintgrp` group created during your clustered iPrint installation.
5. Assign the user a secret password during creation, and ensure the user's password is set to not expire. If you are using eDirectory password policies, associate the user with an appropriate password policy after creation.
6. Select the **Create home directory** check box.
7. In **Volume**, select the volume that is holding your clustered iPrint resource.
8. In **Path**, ensure that it reads `papercut`.
9. Click **OK** to create the user.

You now need to LUM enable this PaperCut eDirectory user and add it to the already LUM enabled `iprintgrp` used by the clustered iPrint resource.

1. In iManager open **Linux User Management > Enable Users for Linux**.
2. Select your `papercut` eDirectory user and continue.
3. Select **An Existing Linux-Enabled Group**; then select the `iprintgrp` created during your clustered iPrint installation; then click **Next**.
4. Confirm that **Workstation list** includes all of the servers in your cluster; then click next.
5. On your clustered iPrint volume, navigate to the `papercut` user's NSS home folder (`/media/nss/[volume]/papercut`) using, for example, Windows Explorer or ConsoleOne and add `RWECMF` file rights for the eDirectory group `iprintgrp` created during your clustered iPrint installation. This ensures the iPrint services have access to the installed files.
6. As `root`, on *each* node that will run the iPrint resource, run the following command, replacing `[volume]` with the volume name of your iPrint resource.

```
shell> ln -s /media/nss/[volume]/papercut /home/papercut
```

**Note:**

The symlink target only exists on the active node and *dangles* on the other nodes



ready for when it becomes the active node.

- To confirm all the above stages are working, using any method you want (such as, the traditional Novell client for Windows, logged in as an admin user), create a folder or test files inside the papercut folder on your iPrint cluster volume, then on the server holding that resource run:

```
shell> su - papercut s
hell> ls
```

You can see the files created on the NSS volume.

## Downloading and installing

On the node that is currently hosting the iPrint resource, perform a primary server PaperCut installation as per steps 3 and 4 in [Quick install: Novell OES Linux \(iPrint\)](#).



**Important:** Ensure this only done on the node that is currently holding the iPrint/PaperCut resource.

## Step 4 - Installing services

- As the services are going to be managed by Novell clustering, the services on the physical nodes must be disabled so that they don't start. On the node used to install PaperCut in [Step 4 - Install the Print Provider](#), in **YaST > System > System Services (Runlevel)**, disable both `papercut` and `papercut-event-monitor`.

### 2. Installing services and disabling them on all other nodes

On each other node in the cluster perform the following steps:

- As `root` run the following command ([resource-name] is the name for your iPrint resource, and [node-name] is the server name of the node you are now working on):

```
shell> cluster migrate [resource-name] [node-name]
```

- Once the resource has successfully migrated run the following two commands (still as root):

```
shell> /home/papercut/server/bin/linux-[arch]/root-
tasks
shell> /home/papercut/providers/print/linux-[arch]
/roottasks
shell> chown root:iprintgrp /op-
t/novell/iprint/bin/papercut
```

- In **YaST > System > System Services (Runlevel)**, disable both `papercut` and

```
papercut-event-monitor.
```

- d. Repeat steps 1-3 on the other nodes in the cluster.

## Step 5 - File permissions

On each node in the cluster, *including* the one used to install PaperCut in [Downloading and installing](#), run the following command as `root`:

```
shell> chown root:iprintgrp /opt/novell/iprint/bin/papercut
```

## Step 6 - Configure the nodes to report the virtual server hostname



**Note:** This step only has to be completed on which ever node is currently holding the iPrint resource, as the Print Provider config file is on the portable volume and is automatically picked up when the resource moves.

1. Open the file `/home/papercut/providers/print/linux-x64/print-provider.conf` in a text editor.
2. Locate the line starting with `ServerName=`, uncomment it and add the hostname of the cluster. This tells PaperCut MF to report printers as being hosted on the cluster rather than on the node running the resource.

## Step 7 - Update iPrint cluster resource scripts to load/unload the PaperCutApplication Server

1. In **iManager > Clusters > Cluster Options** open the cluster hosting your iPrint resource.
2. Click the iPrint resource; then click **Scripts**.

This screen displays the load script, which is similar to the following:

```
#!/bin/bash
. /opt/novell/ncs/lib/ncsfuncs
exit_on_error nss /poolact=IPRINT
exit_on_error ncpcon mount IPRINT=250
exit_on_error add_secondary_ipaddress 10.10.55.7
exit_on_error ncpcon bind --ncpservername=FPCL_IPRINT_SERVER --ipaddress=10.10.55.7
ignore_error mv /media/nss/IPRINT/var/opt/novell/iprint/iprintgw.lpr /media/nss/IPRINT/var/opt/novell/iprint/iprintgw.lpr.bak
```

```
exit_on_error rcnovell-idsd start
exit_on_error rcnovell-ipsmd start
exit 0
```

3. Add the following line **between** `exit_on_error rcnovell-ipsmd start` **and** `exit 0`:

```
exit_on_error /etc/init.d/papercut start
exit_on_error /etc/init.d/papercut-event-monitor start
```

4. Click **Apply**; then click **Unload Script**. The unload script looks similar to the following:

```
#!/bin/bash
. /opt/novell/ncs/lib/ncsfuncs
ignore_error rcnovell-ipsmd stop
ignore_error rcnovell-idsd stop
ignore_error ncpcon unbind --ncpservername=FPCL_IPRINT_
SERVER --ipaddress=10.10.55.
ignore_error del_secondary_ipaddress 10.10.55.7
ignore_error nss /pooldeact=IPRINT
exit 0
```

5. Insert the following two lines **between** `. /opt/novell/ncs/lib/ncsfuncs` **and** `ignore_error rcnovell-ipsmd stop`:

```
ignore_error /etc/init.d/papercut-event-monitor stop
ignore_error /etc/init.d/papercut stop
```

6. Click **Apply**, then offline and online the iPrint resource to load it with these new scripts.

## Step 8 - Config files

When installing PaperCut in step [Downloading and installing](#) the IP address of the physical node is automatically detected and stored in config files to simplify the deployment of remote components. These config files require modification so that the components connect to the cluster / virtual server resource instead.

Update the server IP address and hostname to the cluster / virtual server resource in the following configuration files:

- `/home/papercut/client/win/client.properties`
- `/home/papercut/client/mac/PCClient.app/Contents/Resources/config`
- `/home/papercut/release/connection.properties`
- `client-config.js` in each Gadget in `/home/papercut/client/win/`
- `/home/papercut/client/mac/Widget/PCWidget/config`

- `/providers/net/connection.properties`
- `/providers/hardware/ricoh/*/connection.properties`

As these config files are all on the shared resource, you need to change them only once on the node currently hosting the resource.

## Step 9 - Printer / iPrint configuration

Each printer in the cluster that is managed/tracked by PaperCut needs further configuration via iManager.

Follow [Step 5 - Printer/iPrint Configuration](#) under [Quick install: Novell OES Linux \(iPrint\)](#) and return here once completed.

## Step 10 - Test

Mode 2 clustering should now be configured. Perform some test printing on all of this secondary server's printers. Log in to the PaperCut admin interface as `admin` and verify that the printers are now listed under the **Printers** tab. Simulate a node failover and test again (wait a minute or two between failures for the new node to engage).

## Step 11 - Sharing Client Software

As the clustered solution uses NSS, the client folder is already available as an NCP share at `\\[cluster-virtual-server]\[volume-name]\papercut\client`. Users should be able to access this folder once they are given file rights. Alternatively, consider making these files available via an alternate share/path/location.

### 2.8.5.6. Client/Workstation Configuration

In a clustered environment the behavior of PaperCut MF on the workstations is identical to that of a non-clustered environment. The one exception, however, is in terms of configuration - configure the clients to connect to the *Virtual Server* rather than directly connecting to a node (i.e. make the network connections via virtual server's designated IP address). The changes necessary are:

1. Update User Client's configuration file `config.properties` with the Virtual Server's details as per [Step 10 - Client Configuration](#).
2. Ensure that any URL's pointing to PaperCut MF's web administration and user interfaces; `http://[server]:9192/admin` and `http://[server]:9192/user` use the virtual server's name. For example, any links on the organization's intranet site or links supplied to other System Administrators.

## 2.8.6. Deployment on an External Database (RDBMS)

This section describes the process of running PaperCut MF on an external relational database, and describes why you would choose to do this. By default, PaperCut MF uses an internal database product known as Apache Derby. This database engine was donated to Apache by IBM and was previously known as IBM Cloudscape.

### 2.8.6.1. Why use an external RDBMS?

The internal PaperCut MF database is stable, scalable, self-maintaining, and provides very good performance. For this reason, most organizations do not need an external database system. However, you might consider running PaperCut MF on an external RDBMS if:

- Your organization has existing database infrastructure and wants to consolidate all applications on the same database platform.
- Your organization has an existing database maintenance and backup procedure and wants PaperCut MF to take advantage of this.
- People want to use 3rd party reporting and analysis tools (like Crystal Reports or Microsoft Access) to view and analyze the PaperCut MF database.
- Your organization is very large and requires the performance benefits of a dedicated RDBMS. This also allows the database to reside on a separate server to PaperCut MF, which improves the system scalability.

### 2.8.6.2. Supported Databases

PaperCut MF supports the following external databases out-of-the-box:

- Microsoft SQL Server 2000/2005/2008/2012/2014 (either 32 or 64-bit)
- Microsoft SQL Express 2005/2008/2012/2014 (free from Microsoft)
- PostgreSQL 7.1+ (a free open source database)
- MySQL 5.5+ (a free open source database)
- Oracle 9.2+ (including the free Oracle Express Edition).

These databases were chosen to cater for the majority of customers.

### 2.8.6.3. Upsize to an External RDBMS

Upsizing to an external RDBMS is a simple process that should take approximately 15-30 minutes. The high-level steps to upsize are:

1. Backup the existing data.
2. Create and initialize the new database.

3. Load the backed up data into the new database.
4. Restart the application.

These steps are discussed in detail below.

This section also includes some database specific configuration information. For more information, see [Database specific configuration](#).



**Important:** Each Application Server requires exclusive access to an external database. i.e. A single database cannot be shared between more than one Application Server. If you are running multiple Application Servers (e.g. a test and production instance), then each must have a separate database.

## Step 1 - Stop PaperCut MF

Stop the Application Server. This allows the data to be backed up, guaranteeing that all data is saved and ready to load into the new database.

For more information, see [Stopping and Starting the Application Server](#).

## Step 2 - Perform a backup of the existing data

Perform a backup of the database. This data is loaded into the application in a later step. For more information, see [System Backups](#).

To back up the database:

1. On the server, open a command prompt. (If you see 'Access Denied' errors, run the command prompt as an Administrator).
2. On Linux or Mac, use `su` or equivalent to become the identity of `papercut`. e.g.

```
Mac: sudo su - papercut
```

```
Linux: su - papercut
```

3. Change (`cd`) to the server binaries directory. e.g.

```
Windows: cd "C:\Program Files\PaperCut MF\server\bin\win"
```

```
Mac: cd "/Applications/PaperCut MF/server/bin/mac"
```

```
Linux: cd ~papercut/server/bin/linux-*
```

4. Run the following command:

```
db-tools export-db
```

The output of the above command shows the name of the backup file.

5. Take note of the backup file name because it is required in a later step.

### Step 3 - Create a new database in the external RDBMS

This step differs depending on the external database you are using. It is assumed that the administrator knows how to create a new database. No matter what database is used the following steps must be performed:

1. Create a new empty database for dedicated use by PaperCut MF. When creating the database make sure to select the correct character encoding for your language.

**Important:**

Create the database with a character encoding suitable for your language. For SQL Server, the character encoding is set in **Collation** on the new database screen. For other databases, such as, PostgreSQL or MySQL, select a unicode character set (UNICODE or UTF8) that allows all possible characters to be stored.

2. Create a new database user (and password) for PaperCut MF to use to connect to the database.
3. Assign the appropriate permissions to the new user to give them full access to the new database (e.g. permission to create/drop tables, and select/insert/update/delete in all tables).



**Important:** To use SQL Server, ensure that SQL Server has the TCP protocol, and the server authentication option is set to "SQL Server and Windows Authentication".

The database user created for PaperCut MF should have only the minimum set of permissions required for the PaperCut application. The user should have full permissions to create/drop tables and have full access to any created tables. However, the user should not have permission to access other databases installed on the database server.

### Step 4 - Change the PaperCut MF connection details

The next step is to configure PaperCut MF to connect to the new external database. To do this:

1. On the server, open the server config file in a text editor (e.g. Notepad):

```
[app-path]/server/server.properties
```

2. Comment out the line:

```
database.type=Internal
```

by adding a # (hash) character to the beginning of the line.

3. Find the database connection details for the database type you require (e.g. SQL Server or PostgreSQL), and uncomment the lines by removing the # (hash) characters.
4. Set the username and password to connect to the database

```
database.username=[your-db-user]
database.password=[your-db-password]
```

5. Set the database URL, which describes the location and connection details of the external database. See below for details of the format of the database URLs for different database types.

## SQL Server database connection URL format

The SQL Server URL format is:

```
jdbc:jtds:sqlserver://[server]/[database]
```

The `[server]` parameter is the name of the server running the SQL Server database, and must be resolvable from the PaperCut MF server. If the SQL Server instance is running on the same machine, then you can use `localhost`.

The `[database]` parameter is the name of the SQL Server database you created in Step 3 above.

The default port is 1433. You can specify a different port in the URL if required.

```
jdbc:jtds:sqlserver://[server][:port]/[database]
```

When using SQL Server instances, the instance name is specified in the connection URL as follows:

```
jdbc:jtds:sqlserver://[server]/[database];instance=[instance-
name]
```

## SQL Server Express Database Connection URL Format

The SQL Server Express format is:

```
jdbc:jtds:sqlserver://[server]:[port]/[database]
```

The `[server]` parameter is the name of the server running the SQL Server database, and must be resolvable from the PaperCut MF server. If the SQL Server instance is running on the same machine, then you can use `localhost`.

The `[port]` parameter is the port the SQL Server Express edition is configured to listen on. For more information on configuring SQL Express, see [Configuring Microsoft SQL Express](#).

The `[database]` parameter is the name of the SQL Server database you created in Step 3 above.

## PostgreSQL Database Connection URL Format

The Postgres URL format is:

```
jdbc:postgresql://[server]/[database]
```

The `[server]` parameter is the name of the server running the PostgreSQL database, and must be resolvable from the PaperCut MF server. If the PostgreSQL instance is running on the same machine, then you can use `localhost`.

The `[database]` parameter is the name of the PostgreSQL database you created in Step 3 above.

## MySQL Database Connection URL Format

The MySQL URL format is:

```
jdbc:mysql://[server]/[database]
```

The `[server]` parameter is the name of the server running the MySQL database, and must be resolvable from the PaperCut MF server. If the MySQL instance is running on the same machine, then you can use `localhost`.

The `[database]` parameter is the name of the MySQL database you created in Step 3 above.



**Important:** See [Configuring MySQL](#) for specific instructions to configure MySQL.

## Oracle Database Connection URL Format

The Oracle URL format is:

```
jdbc:oracle:thin:@[server]:[port]/[ServiceName]
```

The `[server]` parameter is the name of the server running the Oracle database, and must be resolvable from the PaperCut server. If the Oracle instance is running on the same machine, then you can use `localhost`.

The `[port]` specifies the port number that the Oracle services are listening on. By default this is 1521.

The `[ServiceName]` specifies the Oracle service name or identifier used to identify the database. For Oracle Express edition this is `XE`.

E.g. for an Oracle Express Edition installation on the same server as PaperCut, running on the default port and SID, use:

```
jdbc:oracle:thin:@localhost:1521/SE
```



**Important:** See [Configuring Oracle \(and Oracle Express Edition\)](#) for specific instructions to configure Oracle.

## Step 5 - Initialize the new database

The next step is to initialize the new database, creating the required database tables and initial data. To initialize the database:

1. On the server, open a command prompt. (If you see 'Access Denied' errors, run the command prompt as an Administrator).
2. On Linux or Mac, use `su` or equivalent to become the identity of `papercut`. e.g.

```
Mac: sudo su - papercut
Linux: su - papercut
```

3. Change (`cd`) to the server binaries directory. e.g.

```
Windows: cd "C:\Program Files\PaperCut MF\server\bin\win"
Mac: cd "/Applications/PaperCut MF/server/bin/mac"
Linux (32bit): cd ~papercut/server/bin/linux-i686
Linux (64bit): cd ~papercut/server/bin/linux-x64
```

4. Run the following command: `db-tools init-db`

A message is displayed to indicate that the connection details are correct and the database was initialized correctly.

## Step 6 - Load the data into the new database

This step loads the data (that was exported in Step 2) into the database. To import the data:

1. On the server, open a command prompt. (If you see 'Access Denied' errors, run the command prompt as an Administrator).
2. On Linux or Mac, use `su` or equivalent to become the identity of `papercut`. e.g.

```
Mac: sudo su - papercut
Linux: su - papercut
```

3. Change (`cd`) to the server binaries directory. e.g.

```
Windows: cd "C:\Program Files\PaperCut MF\server\bin\win"
Mac: cd "/Applications/PaperCut MF/server/bin/mac"
Linux (32bit): cd ~papercut/server/bin/linux-i686
Linux (64bit): cd ~papercut/server/bin/linux-x64
```

4. Run the following command: `db-tools import-db "backup file name"`.

This command shows the data import progress.

If no errors occur, the application is ready to restart.

## Step 7 - Restart PaperCut MF

The data is now in the new database and you can restart the server.

For more information, see [Stopping and Starting the Application Server](#).

Wait 30 seconds for the server to start, then log in to the admin console. If you can log in successfully, then the upsizing process worked successfully.

### 2.8.6.4. Database specific configuration

This section includes database specific configuration for use with PaperCut MF.

#### Configuring Microsoft SQL Express

Microsoft SQL Express provides enterprise class database performance for free. However, it does have some limitations when compared to the full version of SQL Server. But these limitations are not likely to adversely affect most PaperCut MF users. These limitations include:

- 4GB limit on database sizes (10GB for SQL Server Express 2008 and 2012)
- Limited to use only 1 CPU
- Limited to use only 1GB of RAM

This section described how to configure Microsoft SQL Express edition for use with PaperCut MF. It is assumed that SQL Server Express is already installed with the default configuration.

Once this configuration is complete, you can use the database with PaperCut MF by following the instructions in [Upsize to an External RDBMS](#).

### Enable TCP/IP connections

PaperCut MF uses TCP/IP to connect to the SQL Server database, but SQL Server Express does not enable TCP support by default. To enable TCP/IP:

1. On the machine with SQL Express installed, open the **SQL Server Configuration Manager**.
2. On the left, expand the **SQL Server Network Configuration** node.
3. On the left, select the **Protocols for SQLEXPRESS** node.
4. Right-click the TCP/IP item on the right; then select **Properties**.
5. On the **General** tab, change **Enabled** to **Yes**.
6. On the **IP Addresses** tab, under the **IPAll** node, clear the **TCP Dynamic Ports** check box.
7. In **TCP Port**, enter the port to listen on . For example, 1450. Remember this port, because it needs to be used in the PaperCut MF connection string.
8. Click **OK** to save the changes.
9. Restart the Microsoft SQL Server Express service using either the standard service control panel or the SQL Express tools.

## Enable SQL Server authentication

PaperCut MF requires SQL Server authentication to be enabled on the instance of SQL Express. To do this:

1. On the machine with SQL Express installed, open the **SQL Server Management Studio Express** tool.
2. Right-click the instance of SQL Express to configure; then select **Properties**.
3. Select the **Security** section on the left.
4. Change the **Server Authentication** to **SQL Server and Windows Authentication mode**.
5. Restart the Microsoft SQL Server Express service using either the standard service control panel or the SQL Express tools.

## Create Database User

PaperCut MF requires a user to connect to the database. To create this user:

1. On the machine with SQL Express installed, open the **SQL Server Management Studio Express** tool.
2. Right-click the **Security > Logins** node; then select **New Login**.
3. Enter the username (e.g. papercut).
4. Change the **Server Authentication** to **SQL Server and Windows Authentication mode**.
5. Enter the user's password.
6. Disable password expiration.
7. Click **OK** to create the user.
8. After creating the PaperCut MF database, assign this user `db_owner` permissions on the database, so that it can create the required database tables.
9. To initialize the database, follow the instruction in [Upsize to an External RDBMS](#).

## Configuring MySQL

MySQL is a free/open-source database solution that provides robust, proven, and scalable storage at a great price. PaperCut MF supports MySQL 5.5 and higher.



### Important:

PaperCut MF requires the use of the MySQL InnoDB table type, which provides full



support for transactions. Ensure your MySQL database server is configured to support InnoDB (usually this is enabled by default).

## Database Driver

PaperCut MF does not ship with a database driver for MySQL because the MySQL licensing does not allow redistribution of the driver. Download these drivers for free from the MySQL website as described below.

To download the required version of the driver:

1. Visit the MySQL web site download page for the *MySQL Connector/J* product here: <http://dev.mysql.com/downloads/connector/j/>.
2. Select the appropriate driver version (the latest version is best).
3. Download the driver package and unzip the contents to a temporary directory.
4. Find the driver JAR file, which is typically named `mysql-connector-java-X.Y.Z-bin.jar`.
5. Copy the JAR file into the `[app-path]\server\lib-ext` directory. This allows PaperCut MF to find and load the driver.

Once the driver is installed into PaperCut MF, you can follow the standard upsizing procedure. For more information, see [Upsize to an External RDBMS](#).

## Configuring Oracle (and Oracle Express Edition)

Oracle is a high-end database solution that provides a very robust and scalable data storage solution. And with the release of Oracle Express Edition, it is available at no cost, but it does have some limitations that should not impact PaperCut MF installations.

PaperCut MF supports Oracle versions 9.2 and higher. Oracle 8 (and earlier) are not supported because they did not support the `TIMESTAMP` datatype required by PaperCut MF.

## Database Driver

PaperCut MF does not ship with a driver for Oracle because Oracle does not allow us to redistribute the driver. Also, the recommended driver depends on the version of Oracle used. You can obtain these drivers from the Oracle website as described below.

To download the required version of the driver:

1. Visit the Oracle web site here: <http://www.oracle.com/technetwork/database/features/jdbc/index-091264.html>
2. Select the appropriate Oracle version.

The required file to download differs depending on the Oracle version.

3. Download the `ojdbc7.jar` for your Oracle Database version.
4. Copy the downloaded file into the `[app-path]\server\lib-ext` directory.
5. Restart the service **PaperCut Application Server**. This allows PaperCut to find and load the driver.

Once the driver is installed into PaperCut MF, you can follow the standard upsizing procedure. For more information, see [Upsize to an External RDBMS](#).

## Best Practices on Microsoft SQL Server

Microsoft SQL Server provides enterprise class database performance. With this type of database, it is recommended that the administrator puts in place a database re-index every month. This database optimization helps with general performance, and more specifically, large queries performed on the SQL database. These queries include Reporting, as well as Bulk Actions performed on multiple data points. It's highly recommended that this optimization be set up as a scheduled task after hours to ensure you see no performance issues due to database indexing problems.

The optimization we recommend you run is:

- `exec sp_msForEachTable @COMMAND1= 'DBCC DBREINDEX ( "?" )';`
- `exec sp_updatestats;`

PaperCut support has seen databases with large databases with millions of print jobs complete this command in less than three minutes. The result was seen where reporting took 10-15 minutes before optimization, and now takes a matter of seconds.

### 2.8.7. Web Browser Single Sign-On (SSO)

Single Sign-On (SSO) lets users access PaperCut's web interface without re-entering credentials. For example, you can give a user logged into Windows direct access to PaperCut's web interface without needing to re-enter their username and password at the PaperCut login screen. Sites with an intranet portal often find SSO particularly attractive, as it allows diverse IT systems to be seamlessly integrated into the portal without the need for separate logins.

Single Sign-On also goes hand in hand with technologies such as two-factor authentication used in high security environments. With two-factor authentication, sign-on can involve presentation of an ID card or reading a fingerprint. In some cases, user passwords are managed by the security system and not known to the user, making it impossible to login using a traditional login screen. PaperCut's SSO support allows PaperCut to leverage the two-factor security already in place.

Web single sign-on is an advanced topic. The standard web login that comes built-in with PaperCut is most appropriate for many sites.

PaperCut supports two different web SSO methods:

1. *Integrated Windows Authentication* For Windows domain environments where both the PaperCut Application Server and the user computers share the same Windows domain and intranet zone. With Integrated Windows Authentication, PaperCut uses existing Windows technologies to securely identify Windows domain users as PaperCut users.
2. *WebAuth* A web authentication system developed and freely licensed by Stanford University. It is implemented as an Apache module and works by intercepting requests to the PaperCut Application Server. WebAuth is operating system neutral, but requires specialist expertise to set up.

PaperCut's WebAuth integration is actually quite generic and is also used for Shibboleth SSO integration at several customer sites.

### 2.8.7.1. Planning for Web SSO Implementation

There are a number of considerations and preparation steps you must take prior to implementing SSO in PaperCut.

#### Preparing for SSO

1. An effective security system offers multiple layers of defence against unwanted intrusion. For example, an organization's firewall can provide the first layer of defence, but if an intruder penetrates that, the Windows login presents a second barrier. Once logged into Windows, PaperCut's login screen represents a third layer of defence.  
  
SSO trades off the convenience of direct access with removing one layer of security. For example, with SSO a user can click a hyperlink in an email or instant message and be taken directly into PaperCut. Before implementing SSO, you must weigh up the risks and benefits for your organization.
2. PaperCut offers granularity of control over which parts of PaperCut will use SSO. For example, you might decide to use SSO for just the user web pages and mobile client, not the admin interface. Decide your policy up front before configuring SSO.
3. Decide whether you want PaperCut MF SSO to directly log in users, or to first present a confirmation page. The confirmation page displays the user name and can also offer a **Switch User** link to allow users to use an alternate login. With direct login, one less click is required, but there is no opportunity to confirm the correct login or switch to an alternate user.
4. Decide if you want to redirect the user to your intranet portal after logout. A logout URL is required when direct access is configured.
5. Your PaperCut users must be sourced from a central directory server, such as, Windows directory. *Internal users (users managed by PaperCut NG)*, and the built-in `admin` are internal to PaperCut so do not work with SSO. If you have internal users, show the confirmation page with the **Switch User** link to make the PaperCut login page accessible.
6. If using SSO to access the PaperCut administration interface, set up the necessary

[Assigning Administrator Level Access](#) for all administrative users before enabling SSO. The same applies to other PaperCut interfaces, such as, Release Station, Web Cashier, and Central Reports.

7. Select which SSO technology is right for you. While many PaperCut MF sites choose Integrated Windows Authentication, it does have strict prerequisites. For example, if you have a significant number of non-Windows users, Windows based SSO might not be the best choice for you. More information about each SSO technology is provided below.

## Planning for Integrated Windows Authentication

Integrated Windows Authentication (IWA) is designed for Microsoft Windows environments where both the PaperCut Application Server and client PCs reside on the same Windows domain and intranet zone. In summary the requirements are:

1. The PaperCut Application Server must run on the Windows operating system.
2. PaperCut web users are using PCs running Windows
3. All computers are on the same domain
4. Your site uses Active Directory for managing users, including PaperCut users. Windows Authentication works only with users who are managed by Windows.
5. The Application Server URL is on the same intranet zone as users' PCs. By default this means that the URL does not contain periods. You can configure user internet options to explicitly add the PaperCut Application Server to the intranet zone.
6. Your organization's recommended web browser supports IWA. Browsers that support IWA include Internet Explorer, Chrome, and Firefox. (Note that Firefox requires [additional configuration](#) to enable IWA support.)

Integrated Windows Authentication is part of Windows, so if your site meets the above criteria, no additional setup is needed prior to configuring SSO.

## Planning for WebAuth

WebAuth uses a reverse proxy server to manage HTTP traffic between users and PaperCut. If you are considering WebAuth, you need the resources and skills to implement and configure an Apache web server and perform the [installation instructions](#) provided by WebAuth.

WebAuth takes care of authorizing the user and inserts a special HTTP header in all authorized requests sent to PaperCut. Specify the name of this header and also a list of whitelisted source IP addresses when integrating WebAuth with PaperCut

Although WebAuth SSO is considerably more complex to implement than IWA, it does have the advantage of supporting a non-Windows environment.

## 2.8.7.2. Configuring Web SSO

Configuring SSO in PaperCut is easy, but you must work through the preparation steps above, or you might not be able to log in to PaperCut!



### Tip:

After enabling SSO on the admin interface, it is not easy to use the built in `admin` user as the login page is no longer shown. Before configuring SSO, you must ensure your domain or corporate login has admin rights and you need to use this login. As a protection, the built-in `admin` user does not have the rights to enable SSO. If you lock yourself out after enabling SSO, you can bypass SSO by adding `/nosso` to the Application Server URL. For example: `http://[myserver]/admin/nosso`.

1. Navigate to **Options > Advanced**.
2. In the **Web Single Sign-on (SSO)** area, select the **Enable Single sign-on** check box to enable SSO. Additional configuration items are displayed.

### Web Single Sign-On (SSO)

Enabling SSO authentication allows login without the need to re-enter username and password.

[? More Information...](#)

Enable Web Single Sign-On

WebAuth

WebAuth HTTP header key

Allowed WebAuth IP addresses

(a comma separated list of IP addresses/subnets)

Admin login (/admin)

Standard (username and password)

User login (/user)

Standard (username and password)

Other logins (/webcashier, /release, /central-reports)

Standard (username and password)

Show "Switch User" link on confirmation page

On logout, direct user to URL

(e.g. `http://myportal.org`)

3. Select the SSO method:
  - **Integrated Windows Authentication**
  - **WebAuth**
4. If you select **WebAuth**, complete the following fields:

- **WebAuth HTTP header key**—the WebAuth HTTP header name.
  - **Allowed WebAuth IP addresses**—a comma separated list of whitelisted IP addresses.
5. Specify the SSO behavior you want for the user web interface and mobile client, admin interface, and other interfaces:
    - a. **Standard (username and password)**—don't use SSO and show the PaperCut MF login screen.
    - b. **SSO with confirmation page**—use SSO and present a confirmation page at login.
    - c. **SSO with direct access**—use SSO and directly log in the user with no confirmation page.
  6. If you want to show a **Switch User** link on the confirmation page, select the **Show "Switch User" link on confirmation page** check box.
  7. In **On logout, direct user to URL**, enter a URL to go to on logout. A typical example would be the URL for your intranet portal.

## Advanced Configuration

You can set advanced config keys to fine tune SSO behavior. For more information, see [Using the Config Editor](#).

1. Some installations want to enable SSO for web users, but not for users of the mobile client and mobile release apps. To disable SSO for mobile users, set the advanced config key: `auth.web-login.sso-enable.mobile-user` to N.
2. By default, Windows SSO does not authenticate users belonging to the "Guest" group. You can change this behavior by setting the advanced config key `auth.web-login.sso-allow-guest` to Y.

## Post Installation Testing

After enabling SSO, perform the following tests to ensure that users can successfully access the PaperCut interface.

1. Verify that you can still log in to the admin interface.
2. Verify that a user without admin rights can still access their user web pages.
3. If in use, verify that a user with the appropriate admin rights can still access other interfaces, such as, Release Station or Web Cashier.
4. Try logging in from other computers in the domain.
5. Try logging in from different browsers supported in your organization.

6. If using IWA, try logging in from a non-windows client or a PC outside the domain. Verify you can still log in after providing your Windows credentials.

## 2.8.8. Advanced LDAP Configuration

PaperCut MF supports the following LDAP server types out-of-the-box:

- Novell eDirectory
- Microsoft Active Directory
- Unix/NIS/Posix

For more information about basic configuration options for these platforms, see [Using LDAP for user synchronization](#).

However, PaperCut MF can support other server/schema types by defining the fields to query and the LDAP searches to perform. Configure these options in the **Advanced Config Editor** on the **Options** tab. The following config keys are available for the primary sync source:

**Table 25: LDAP Primary Sync Source Config entries**

Config name	Description
ldap.schema.user-name-field	The LDAP field that contains the user's username.
ldap.schema.user-full-name-field	The LDAP field that contains the user's full name.
ldap.schema.user-email-field	The LDAP field that contains the user's email address.
ldap.schema.other-emails-field	The LDAP field that contains the user's other email addresses. If the user has only one other email, then use a single value or a multi-value LDAP field. If the user has multiple other email addresses then use a multi-value LDAP field.
ldap.schema.user-second-card-id-field	The LDAP field that contains the user's second card id.
ldap.schema.user-department-field	The LDAP field that contains the user's department.
ldap.schema.user-office-field	The LDAP field that contains the user's office location.

Config name	Description
ldap.schema.user-card-id-field	The LDAP field containing the user's primary card ID value.
ldap.schema.user-second-card-id-field	The LDAP field containing the user's secondary card ID value.
ldap.schema.user-name-search	The LDAP search to retrieve the user. The {0} in the search is replaced with * when listing all users, and [username] when searching for a specific user. If no search is defined, the default is ([userNameField]={0}). <b>IMPORTANT:</b> The search must include the {0} value.
ldap.schema.group-name-field	The LDAP field that contains the group's name.
ldap.schema.group-member-field	The LDAP field that contains the group members.
ldap.schema.group-search	The LDAP search to retrieve the group. The {0} in the search is replaced with * for all group searches. If no search is defined, the default is ([groupMemberField]={0}), which means get all entries with at least one member. <b>IMPORTANT:</b> The search must include the {0} value.
ldap.schema.posix-groups	If Y, then the group member field contains the user's username. If N, then the group member field contains the user's DN.
ldap.schema.home-directory-field	The LDAP field that contains the user's home folder path.

If you are using a secondary sync source, the following config keys are available:

**Table 26: LDAP Secondary Sync Source Config entries**

Config name	Description
ldap2.schema.user-name-field	The LDAP field that contains the user's username.
ldap2.schema.user-	The LDAP field that contains the user's full name.

Config name	Description
full-name-field	
ldap2.schema.user-email-field	The LDAP field that contains the user's email address.
ldap.2.schema.other-emails-field	The LDAP field that contains the user's other email addresses. If the user has only one other email, then use a single value or a multi-value LDAP field. If the user has multiple other email addresses then use a multi-value LDAP field.
ldap.2.schema.user-second-card-id-field	The LDAP field that contains the user's second card id.
ldap2.schema.user-department-field	The LDAP field that contains the user's department.
ldap2.schema.user-office-field	The LDAP field that contains the user's office location.
ldap2.schema.user-card-id-field	The LDAP field containing the user's primary card ID value.
ldap2.schema.user-second-card-id-field	The LDAP field containing the user's secondary card ID value.
ldap2.schema.user-name-search	The LDAP search to retrieve the user. The {0} in the search is replaced with * when listing all users, and [username] when searching for a specific user. If no search is defined, the default is ([userNameField]={0}). <b>IMPORTANT:</b> The search must include the {0} value.
ldap2.schema.group-name-field	The LDAP field that contains the group's name.
ldap2.schema.group-member-field	The LDAP field that contains the group members.
ldap2.schema.group-	The LDAP search to retrieve the group. The {0} in the

Config name	Description
search	search is replaced with * for all group searches. If no search is defined, the default is ([groupMemberField]={0}), which means get all entries with at least one member. <b>IMPORTANT:</b> The search must include the {0} value.
ldap2.schema.posix-groups	If <b>Y</b> , then the group member field contains the user's user-name. If <b>N</b> , then the group member field contains the user's DN.
ldap2.schema.home-directory-field	The LDAP field that contains the user's home folder path.

### 2.8.8.1. LDAP Server Default Configuration

When a particular LDAP server type is selected (e.g. Novell eDirectory), PaperCut MF uses the following defaults to query the LDAP server. Use these defaults as a starting point for customizing the LDAP searches or for supporting other server types.

#### Standard (Unix / Open Directory)

The following defaults are used if the LDAP server is configured to support Unix based authentication.

**Table 27: Unix / Open Directory LDAP default settings**

Config name	Default value
ldap.schema.user-name-field	uid
ldap.schema.user-full-name-field	cn
ldap.schema.user-email-field	mail
ldap.schema.user-department-field	departmentNumber
ldap.schema.user-office-field	<i>[not set]</i>
ldap.schema.user-name-search	(uid={0})
ldap.schema.group-name-field	cn

Config name	Default value
ldap.schema.group-member-field	memberUid
ldap.schema.group-search	(memberUid={0})
ldap.schema.posix-groups	Y
ldap.schema.home-directory-field	<i>[not set]</i>

## Novell eDirectory Defaults

The following defaults are used if the LDAP server is a Novell eDirectory.

**Table 28: Novell eDirectory LDAP default settings**

Config name	Default value
ldap.schema.user-name-field	cn
ldap.schema.user-full-name-field	fullName
ldap.schema.user-email-field	mail
ldap.schema.user-department-field	OU
ldap.schema.user-office-field	1
ldap.schema.user-name-search	(&(cn={0})(objectClass=person))
ldap.schema.group-name-field	cn
ldap.schema.group-member-field	member
ldap.schema.group-search	(&(member={0})(objectClass=s=groupOfNames))
ldap.schema.posix-groups	N
ldap.schema.home-directory-field	<i>[not set]</i>

## Microsoft Active Directory Defaults

The following defaults are used if the LDAP server is a Microsoft Active Directory.

**Table 29: Active Directory LDAP default settings**

Config name	Default value
ldap.schema.user-name-field	sAMAccountName
ldap.schema.user-full-name-field	displayName
ldap.schema.user-email-field	mail
ldap.schema.user-department-field	department
ldap.schema.user-office-field	physicalDeliveryOfficeName
ldap.schema.user-name-search	(&(sAMAccountName={0})(objectCategory=person)(objectClass=user)(sAMAccountType=805306368))
ldap.schema.group-name-field	sAMAccountName
ldap.schema.group-member-field	member
ldap.schema.group-search	(&(member={0})(objectCategory=group))
ldap.schema.posix-groups	N
ldap.schema.home-directory-field	homeDirectory

## 2.8.9. Print Authentication

Modern large multi-user networks, like those typically seen in Higher Education, are made up of mix of operating systems, authentication methods, personal student laptops, print protocols and disparate networks. This heterogeneous mix poses problems for System Administrators working towards a unified and centralized print management system. PaperCut MF supports an array of tools to help administrators meet their unification goals. PaperCut MF's flexibility is, however, a double-edged sword and the multitude of options also bring complexity. This section discusses cross-platform support in detail, and hopes to arm the reader with the knowledge needed to make the correct architecture decisions. Solutions are presented as "recipes" with the aim of directing the reader to appropriate procedures and other sections.

The objective of a centralized and unified PaperCut MF system is to offer all users, irrespective of their operating system or access method, access to the full array of features in a secured and authenticated way. PaperCut MF offers cross-platform client software providing end-user features on all major operating systems, however, the need for secured and authenticated access adds an extra, somewhat complex dimension.

### 2.8.9.1. About Authentication and Printing

#### What is authentication?

Authentication in a printing environment is the act of confirming the digital identity of the person who issued a print job. Knowledge of the user's identity allows PaperCut MF to offer the user access to functions such as allocating the cost of a job to their account, or offering them access to shared accounts. In a Windows domain environment, authentication is handled at the point of login using a username and password. A web-of-trust is then established between servers and services.

#### Why does authentication pose a problem?

By default PaperCut MF assumes the printer queues are authenticated and trusts the username that is associated with the print job. It is this user is charged for for the printing. On fully authenticated networks (like 100% Windows Active Directory networks), PaperCut MF can trust the username associated with the job. There are a few common scenarios where authentication is not as simple:

1. Generic, common, or shared user accounts. (e.g. generic "student" login).
2. Systems that auto-login as a set user.
3. Unauthenticated print queues or print protocols (e.g. LPR).
4. Users' personal laptops that are not authenticated on the network.

Generic or shared login accounts are seen in some computer lab and network environments. In these environments administrators ask users to log in to selected systems using standard user names such as "student" or "user". This practice is particularly common on the Apple Mac

operating system as a single login helps streamline system and application management. The use of the Windows auto-login feature also poses a similar problem - authentication is not enforced at the time of system startup. An extra layer of authentication is required on these systems to correctly identify the person that performs printing.

Unauthenticated print queues also pose problems in cross platform environments. In an ideal world, all computers would talk the same protocols and happily work together in a single centrally authenticated environment. You can come close to this goal in a 100% Microsoft Windows environment, however, if you mix in Unix, Linux and Mac, it's a different story. Although initiatives such as CUPS (Common Unix Printing System) and the Internet Printing Protocol (IPP) offer some hope, unification in the area of authenticated printing is still some way off. Unfortunately technical reasons often prevent networks from using CUPS authentication or exclusively using the authenticated Microsoft printing protocol.

The use of personal laptops or other unauthenticated workstations in an otherwise authenticated network is another cause of problems. These machines might not be able to authenticate to your network for a number of reasons:

- The operating system does not support authentication (like Windows Home editions).
- It is too complex to configure authentication on personal laptops.
- Users log in to their laptop with their personally chosen username and password.
- You cannot force users to change the configuration of their personal laptops.

## How does PaperCut MF address authentication?

If technical reasons prevent authentication at the print queue level, PaperCut MF provides a number of alternate authentication options. These options change PaperCut MF's default behavior of trusting the username associated with a print jobs, and instead the user is required to re-authenticate before the job is printed. The two alternate authentication options are described below.

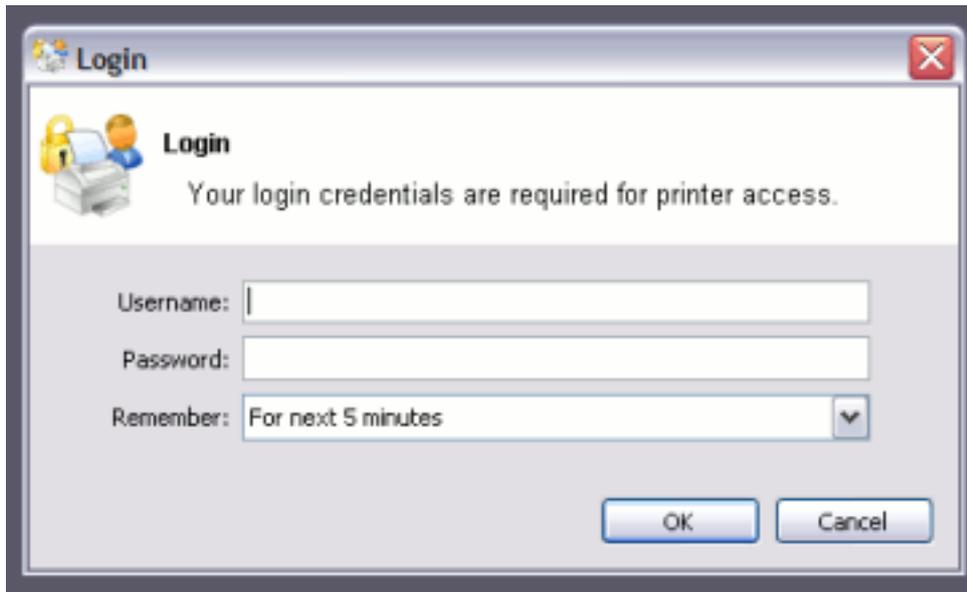
## Popup authentication (IP session based authentication)

This method involves associating the workstation's IP address with a user for a specified period of time - a session. Any print jobs arriving from this IP address are deemed to be associated with this user. Authentication is provided by the PaperCut MF client software in the form of a popup dialog requesting a username and password. Data is transmitted to the server via an SSL encrypted connection. To print with popup authentication the client software must be running on the workstations or laptops.

Use popup authentication to:

- Authenticate users who print from a generic login or auto-login account. This is done by flagging the generic account as unauthenticated in PaperCut MF.

- Authenticate users not authenticated to the network (e.g. personal laptop users). This is done by marking the print queues as unauthenticated in PaperCut MF.



For more information, see [Popup authentication](#).

## Web Print

Web Print is a service for printing documents that are uploaded via a web browser. This provides a simple way to enable printing for laptop, wireless, and anonymous users without installing print drivers.

With Web Print users are authenticated when they log in to the PaperCut MF user web interface. Any documents they upload can then be tracked against their user name.

For more information, see [Web Print \(Driver-less printing via a web browser\)](#).

## Release Station authentication

Release Stations work by placing print jobs in a holding queue. Users must authenticate at a Release Station before being given access to release their job. A Release Station normally takes the form of a dedicated terminal located next to the printer(s), however, the holding queue can also be accessed via a web browser. The act of a user releasing a job causes it to be charged to their account. You can use Release Stations without installing the client software on user's workstations.

The hold/release queues are enabled on a printer queue level within PaperCut MF

For more information on setting up and using Release Stations, see [Hold/release queues & Print Release Stations](#). To achieve authentication, the Release Station is run in "release any" mode.

## Choosing the right authentication option for your network

The choice of the authentication approach depends on the constraints of your network and your requirements. Below are some points to consider when making this decision:

- **Popup authentication:** Usually the most user-friendly option, but it requires the client software to be installed and running on all workstations that print. In some environments it is not possible to mandate that software be installed on personal laptops.
- **Release Station Authentication:** Users do not need any additional software installed but the process of releasing a print job is more involved. You must install [standard Release Stations](#) nearby all your printers, or make use of the [end-user web Release Station](#). If you are already using hold/release queues, then it makes sense to also use them for authentication.

## Handling partially authenticated networks

Many sites have a heterogenous network with a mix of both authenticated and unauthenticated printing. A common example, is a college where all lab computers are connected to the domain and users must log in to the workstations to print. The college also allows students to print using their personal laptops that are not authenticated on the network.

An administrator can enable PaperCut MF authentication for all users. This is the simplest to set up but is inconvenient for users who are already fully authenticated. Why should an authenticated user have to re-authenticate with PaperCut MF to print?

To overcome this it is recommended to set up two sets of print queues, one for the authenticated users and another for the unauthenticated users. These queues can point to the same physical printers, but are configured differently in both PaperCut MF and the operating system. The authenticated print queues:

- Must only be accessible to authenticated users (i.e. through network security or operating system permissions).
- Should not have the authentication enabled within PaperCut MF (i.e. do not enable the hold-/release queue or unauthenticated printer options on the print queue).
- Should not be published to unauthenticated users.

The unauthenticated print queues:

- Must be configured to allow printing by unauthenticated users.
- Must have the authentication enabled within PaperCut MF. i.e. Enable the hold/release queue or flag the printer as unauthenticated.
- Must be published to anonymous users so they know how to connect/user the printers.

If the decision has been made to split up printers into two separate queues (authenticated and unauthenticated), administrators can use tools such as IP address filtering, firewalls, or

user/group access permissions to control who has access to which set of queues (i.e. deny "guest" account access on authenticated queues in Windows).

For a detailed explanation of setting up PaperCut MF for unauthenticated laptop printing see [Handling Unauthenticated \(non-domain\) Laptops](#)

For discussion of many other authentication scenarios see [The Authentication Cookbook - Recipes by example](#)

### 2.8.9.2. Handling Unauthenticated (non-domain) Laptops

Schools and colleges commonly allow students to use their personal laptops for printing to campus printers. They also want to allocate/charge printing from these unauthenticated users to the correct person. However, if the systems haven't authenticated with the network, then user credentials are not provided with the print job (or worse, their personal laptop username is associated with the job). For example, on Windows networks, the jobs might list as `guest`. PaperCut MF addresses this problem by providing alternate print authentication options. This section provides a step-by-step guide to configuring these authentication options.

Before continuing it is highly recommended to read the introduction to print authentication (see [Print Authentication](#)). It introduces the important concepts required to understanding print authentication.

#### Option 1: Popup authentication for unauthenticated laptops

Having chosen popup authentication to authenticate your laptop users, you should review [Popup authentication](#) for a detailed explanation of the feature.

### Step 1: Decide whether to enable popup authentication on all printer queues

First decide whether to enable authentication for all queues, or only the queues accessed by unauthenticated laptop systems. For more information, read [Handling partially authenticated networks](#).

If you enable authentication only for your unauthenticated laptops, you must configure a second set of unauthenticated print queues. These queues can point to the same physical printers as your authenticated queues.

Often the simplest way to set up these unauthenticated queues is to configure a separate print server that allows anonymous printing. You can make use of a firewall or operating system permissions to ensure that the anonymous users cannot access the "authenticated queues". On Windows networks, you might need to enable the `guest` account on the domain/system so users running the "Home" editions of Windows can print to these queues.

## Step 2: Install/run the User Client software on laptops

To use popup authentication, the client software must be installed and running on the unauthenticated laptops. You should make the client available for your users along with instructions of how to install the software on their laptops. You can easily install the software on all common operating systems (Windows, Mac and Linux).

For more information on installing and deploying the client software see [User Client Deployment](#).

## Step 3: Mark the printer queue as "Unauthenticated"

By default PaperCut MF trusts the usernames that are associated with the print job. When printing from unauthenticated laptops this username cannot be trusted. By flagging the printer queue as "unauthenticated", PaperCut MF no longer trusts the username and prompts the user to authenticate.

*Advanced:* An alternate approach on Windows networks is to enable the **unauthenticated** option at the user-level on `guest` only rather than at the queue level.

To flag the printer as Unauthenticated:

1. Log in as the built-in `admin` user.
2. Click in the **Printers** section.
3. Select the printer you want to mark as *Unauthenticated*.
4. In the **Configuration** section, select the **Unauthenticated printer** check box.
5. Click **OK** to save the changes.
6. Repeat this process for each printer that requires popup authentication enabled.



**Important:** Once the printer is flagged as *Unauthenticated*, no print jobs are printed until the user has authenticated using the client software. It is important that all workstations using these print queues are running the client software.

## Step 4: Test the popup authentication

It is important to test the popup authentication once enabled. To do this:

1. Start-up an unauthenticated laptop/workstation.
2. Ensure that the User Client software is installed and running.
3. Perform a test print job to the queue on the print server you flagged as Unauthenticated.
4. The client software should popup the authentication dialog box. The print job should not print until you successfully authenticate.

5. Once authenticated, verify that the print job completes and the job is logged against the correct username in **Printers->Print Jobs**.

## Option 2: Release Station Authentication for Unauthenticated Laptops

Having chosen Release Stations to authenticate your laptop users, you should review [Hold/release queues & Print Release Stations](#) for a detailed explanation of the feature.

## Step 1: Decide whether to enable Release Station authentication on all print queues

First decide whether to enable the hold/release queue for all print queues, or only the queues accessed by unauthenticated laptop systems. For more information, read [Handling partially authenticated networks](#).

If you enable the hold/release queue only for your unauthenticated laptops, you must configure a second set of unauthenticated print queues. These queues can point to the same physical printers as your authenticated queues.

Often the simplest way to set up these unauthenticated queues is to configure a separate print server that allows anonymous printing. You can make use of a firewall or operating system permissions to ensure that the anonymous users cannot access the "authenticated queues".

## Step 2: Choose which Release Station interface to use

You can choose between the [Standard Release Station interface](#) and the [end-user web interface](#). The standard Release Station:

- Requires a dedicated workstation nearby the printers that is configured to run the Release Station.
- Requires less user education because when they walk up to fetch their print jobs it is obvious they need to use the Release Station to user the job.

The end-user web Release Station:

- Requires no workstations configured near the printers. Users use a web browser to log in to the end-user web interface and release their jobs.
- Users must be provided with instructions on how to print and then log in to the web Release Station to release their print jobs.

After choosing the Release Station interface, proceed to the appropriate step below.

## Step 3a: Run and configure the Standard Release Station

If using the standard Release Station:

1. Deploy the standard Release Station to workstations located nearby your printers. See [Release Station Configuration](#) for information on deploying the Release Station.
2. Run the Release Station in "Release Any" mode, which allows users to log in and see all print jobs awaiting release. When they release a job it is charged to their user account. For more information see [Release Station Modes](#).

## Step 3b: Enable and configure the End-user Web Release Station

If using the end-user web Release Station:

1. Log in as the built-in `admin` user.
2. Click in the **Options** section.
3. In the **User Features** section, enable the **Allow users to view held jobs (hold/release queues)** option.
4. Change the **Users have permission to** setting to **Release any jobs (charge to their account)**.
5. Click **Apply** to save the changes.

## Step 4: Enable the hold/release queue for the print queues

By default, PaperCut MF allows the jobs to be printed without any interaction from the user. The hold/release queue feature holds the print job until the user logs into a Release Station and releases the job. To enable the hold/release queue for a printer:

1. Log in as the built-in `admin` user.
2. Click in the **Printers** section.
3. Select the printer you want to enable the hold/release queue on.
4. In the **Configuration** section, enable the **Enable hold/release queue** check box.
5. Click **OK** to save the changes.
6. Repeat this process for each printer that requires the hold/release queue enabled.



**Important:** Once the hold/release queue is enabled, no jobs print until released using a Release Station. It is important to instruct your users how to use the Release Station, otherwise they will not be able to print.

## Step 5: Test the Release Station

It is important to test the Release Station once enabled. To do this:

1. Start-up an unauthenticated laptop/workstation.
2. Perform a test print to a print queue with the hold/release queue enabled.
3. For the standard Release Station, go to the print Release Station and log in as a user. Select the job you printed; then click the **Print** link to release the job.
4. For the end-user web Release Station, log in to the end-user web pages at `http://yourserver:9191/user`. Select the **Jobs pending release** link. Select the job you printed; then click the **[print]** link to release the job.
5. Log in to the PaperCut MF admin pages and verify the print job was allocated to the correct user in the **Printers->Print Jobs** section.

### 2.8.9.3. The Authentication Cookbook - Recipes by example

This section discusses various solutions to the "authentication problem" in recipe style. The aim is not to provide detailed step by step instructions, but rather guide the user to the relevant procedures and sections in other parts of the manual.

#### Windows systems with generic logins

This scenario arises either when users log in to systems using a common username such as `user` or `student`, or if the workstations auto-login as a generic user. See introduction for details.

#### Preferred Method:

- Ensure all users have an account (username and password) on the server (or domain) hosting the PaperCut MF software.
- Install client software on all systems. See [User Client](#) for more detail.
- Enable popup authentication by selecting the **Unauthenticated** option on the corresponding generic user account.
- See [Popup authentication](#) for more detail.

## Other Methods:

1. Use [standard Release Station](#) in "Release Any" mode, or the [end-user web Release Station](#) configured to allow users to release any jobs. See [Hold/release queues & Print Release Stations](#).
2. Consider implementing domain level logins.

### Windows laptops that do not authenticate against a domain

Portable systems can spend most of their time outside the organization's network so setting up domain authentication might not be required. The laptops/notebooks are often owned by a single individual and are not under the control of a central administrator.

## Preferred Method:

Use popup authentication or hold/release queues. For more information, see [User and Group Synchronization](#).

## Alternate Method 1:

If using a version of Windows that can authenticate with a domain (i.e. not the Windows Home editions), then you can configure the laptop to authenticate with the network as follows.

1. Teach the user how add their domain username and password to their **Stored user-names and passwords**:
  - a. **Start > Control Panel > User Accounts**
  - b. Select the user's laptop login account
  - c. Click Manage my network passwords
  - d. Click **Add**
  - e. Enter the name of the server and the user's network domain username and password
2. Teach the user how to add a network printer in the form `\\server\printer`.
3. *Optional:* Locally install client software using the `client-local-install.exe` install program. This is located on the `\\Server\PCClient\win` share. At the end of the install process, the client opens asking the user to confirm their network identity. See [User Client](#) for more detail.

## Alternate Method 2:

1. Add a generic "LaptopUser", or "guest" user account to the domain. Make the password known to all users (e.g. `password`).
2. Set the unauthenticated option on this user (enable popup authentication).
3. Locally install client software using the `client-local-install.exe` install program. This is located on the `\\Server\PCClient\win` share. At the end of the install process the client opens asking the user to confirm their network identity. See [User Client Options](#) for details.
4. Teach the user how to add a network printer pointing to `\\server\printer`.
5. See the preceding scenario for more detail.

## Windows print server using LDAP or eDirectory authentication

The Microsoft Windows operating system does not play well in non Active Directory domain environments such as LDAP or eDirectory. Although it is possible to configure a Windows print server on any network, Windows does not normally provide the ability to use LDAP as an authentication source. Jobs are listed under either a local Windows user identity or a guest account. Use PaperCut MF's popup authentication, bound to LDAP, to work around this limitation.

## Preferred Method:

- Set up the Windows server and install and share printers.
- Set printer permission to allow printing from a general "guest" type account. This usually takes the form of the built-in guest account, or a local account with a known username and password (e.g. `printuser`).
- Configure printers on each workstation. Ensure all workstation users can print and jobs list in the print queue under the guest account configured in the previous step.
- Install the PaperCut MF software. Select the LDAP server as your user/group source. PaperCut MF then uses this source for the user list and authentication. See [Using LDAP for user synchronization](#) for more information about LDAP.
- Set the **Unauthenticated** option on each printer (print queue). This enables popup authentication. See [Popup authentication](#) for more information.
- Install client software. See [User Client](#) for more detail.

## Other Methods:

1. Use Release Station. See [Hold/release queues & Print Release Stations](#).

## Mac OS X systems with generic user accounts

Mac OS X workstations in a lab environment are often set up so users log in using a common, generic, or standard account. For example, "macuser" or "student".

### Preferred Method:

1. Install client software. See [User Client](#) for more detail.
2. Add a domain/network user account that matches the generic login account (i.e. "macuser"). This ensures the account is available in PaperCut MF.
3. Set the **Unauthenticated** option on the "macuser" account.
4. Add the printer(s) so jobs list under the "macuser" account. If the print queues are hosted on Windows, add the printer using Samba. (e.g. A DeviceURI such as `smb://macuser:password@servername/printer`). See [Mac Printing in Detail](#) for an explanation on how to add a printer using this method.



**Tip:** If you are running Mac OS 10.7, you might need to include the port in the DeviceURL:

```
smb://username:password@server_name:139/printer_name
```

### Other Methods:

1. Use [standard Release Station](#) in "Release Any" mode, or the [end-user web Release Station](#) configured to allow users to release any jobs. See [Hold/release queues & Print Release Stations](#).
2. Consider setting up domain-level authentication.

## Mac OS X systems using domain authentication via Open Directory

You can configure Mac systems to authenticate users via a central Mac OS X server running Open Directory. Each user has their own login account.

### Preferred Method:

- Set up print queues on the Mac OS X Server.
- Set up PaperCut MF on the server either as a primary server, or as a secondary server reporting to another primary server (either Mac, Linux or a Windows system) (see [Installation](#)).

- Add printers to each Mac workstation. Ensure the local printers point to the shared print queue set up on the server.
- *Optional:* Install client software ([User Client](#)).

## Other Methods:

1. Use [standard Release Station](#) in "Release Any" mode, or the [end-user web Release Station](#) configured to allow users to release any jobs. See [Hold/release queues & Print Release Stations](#).
2. Set up print queues on a Windows system and use popup authentication - see next recipe.

## Mac OS X systems using domain authentication via Windows Active Directory

You can configure Mac systems so users log in using their Windows Active Directory domain username and password. The Mac Windows printer support using Samba/SMB, however, requires printers to be added using a single username and password and this is shared by all users. For this reason an extra layer of authentication is required.

## Preferred Method:

- Host printers and the PaperCut MF system on the Windows server.
- Ensure the print server is running in **Mixed mode** or **Pre-Windows 2000 Compatibility Mode**. Macs currently have problems with `Native Mode` networks.
- Add a domain/network user account that matches the generic login account (i.e. "macuser"). This ensures that the `macuser` account is added to PaperCut MF's user list.
- In PaperCut MF, turn on the **Unauthenticated** option on the "macuser" account to enable popup authentication. Also ensure that the account has zero balance and is restricted.
- Add the printer(s) so jobs list under the "macuser" account. If the print queues are hosted on Windows, add the printer using Samba. (e.g. A `DeviceURI` such as `smb://macuser:password@servername/printer`). For more information about how to add a printer using this method, see [Mac Printing in Detail](#).



**Tip:** If you are running Mac OS 10.7, you might need to include the port in the DeviceURL:

```
smb://username:password@server_name:139/printer_name
```

- Install client software (see [User Client](#)).

## Other Methods:

1. Use LPR as a connection method. See [Scenario Three: Multi-user Macs using LDAP or Active Directory authentication](#) in detail.
2. Use [standard Release Station](#) in "Release Any" mode, or the [end-user web Release Station](#) configured to allow users to release any jobs. See [Hold/release queues & Print Release Stations](#).
3. Host printers on a Mac Server (see the previous recipe).

## Mac OS X laptops (or single user systems) printing to Windows print queues

Mac systems that are owned/used by a single user can benefit from having the printers added in such a way in that they automatically authenticate under their identity.

## Preferred Method:

- Teach users how to add printers using the method described in [Scenario One: My Own Mac \(Single User\)](#).
- Use popup authentication or hold/release queues. For more information, see [Handling Unauthenticated \(non-domain\) Laptops](#).

## Other Methods:

1. Locally install client software using the `client-local-install` program located in the directory `[app-path]/client/mac`. The client displays a popup asking them to confirm their network identity (via username/password).

## Linux Workstations in a lab environment with printers hosted on a Windows server

Linux workstations typically use the CUPS print system. CUPS, through the use of Samba, can print directly to Windows print queues.

## Preferred Method:

- Ensure the system is configured to deny remote shell access to standard users - that is, only allow direct screen/console access. This ensures the system's IP address can be associated with a single user providing a suitable environment for popup authentication.
- Ensure the print server is running in **Mixed mode** or **Pre-Windows 2000 Compatibility**

**Mode.** Some Linux distributions currently have problems with `Native Mode` networks.

- Add a domain/network user account that matches the generic login account (i.e. "linuxuser"). This ensures the "linuxuser" account is added to PaperCut MF's user list.
- In PaperCut MF, turn on the **Unauthenticated** option on the "linuxuser" account to enable popup authentication. Also ensure that the account has zero balance and is restricted.
- Add the printer(s) so jobs list under the "linuxuser" account. If the print queues are hosted on Windows, add the printer using Samba. (e.g. A `DeviceURI` such as `smb://linux-user:password@servername/printer`). Refer to the CUPS or distribution documentation to read more how to add a CUPS printer using an `smb` backend.
- Install client software. For more information, see [Deployment on Linux and Unix](#). If users log in to the workstations using a username that matches their Active Directory password, no additional client configuration is required. If users log in using a generic or non-matching account, use command-line options or the `config.properties` file to force the client to display under the user's domain identity. See [User Client Options](#) for more information.

## Other Methods:

1. Use [standard Release Station](#) in "Release Any" mode, or the [end-user web Release Station](#) configured to allow users to release any jobs. See [Hold/release queues & Print Release Stations](#).
2. Host printers on a CUPS server running on Linux.
3. Install PaperCut LPD Service and use a LPR rather than CUPS (or CUPS with an LPR backend).

## Linux Workstations in a lab environment with printers hosted on Linux

### CUPS server

Network administrators running Linux labs might choose to host the printers on a Linux server running CUPS. For convenience, CUPS is set up without authentication.

## Preferred Method:

- Set up CUPS print queues on a Linux server.
- Ensure each user has an account on this system (or the domain depending on PaperCut MF's selected user list source)
- Set up PaperCut MF on the server either as a primary server, or as a secondary server reporting to another primary server (either Mac, Linux or a Windows system) (see [Installation](#)).

- Set the **Unauthenticated** option on each printer (print queue). This enables popup authentication (see [Popup authentication](#)).
- Ensure the system is configured to deny remote shell access to standard users, that is, only allow direct screen/console access. This ensures the system's IP address can be associated with a single user providing a suitable environment for popup authentication.
- Install client software (see [User Client](#)).

## Other Methods:

1. Use [standard Release Station](#) in "Release Any" mode, or the [end-user web Release Station](#) configured to allow users to release any jobs. See [Hold/release queues & Print Release Stations](#).
2. Use CUPS Authentication.

### Linux laptops (or single user systems)

Modern Linux laptops make use of the CUPS print system. This environment is equivalent to the Mac laptop recipes described above.

### Multiuser Unix terminal servers

Unix or Linux systems allowing remote SSH, Telnet, VNC, or X connections differ from the other scenarios discussed above. These systems cannot use the popup authentication as it is not possible to uniquely identify a user from the system's IP address. The only secure option is to use the Release Station.

## Preferred Method:

- Set up PaperCut MF on your preferred server - this does not need to be the multi-user terminal system itself. It could be another Windows or Linux server.
- Ensure PaperCut MF sources its user list from the same source as that used by the multi-user terminal server - most likely an LDAP server.
- Enable the Release Station option on all printers that are accessed via users of the multiuser terminal system.

**Important:**

Enabling the Release Station option might be incompatible with objectives of other operating systems so it might be appropriate to set up a separate set of print queues. See Further Recommendations below for more detail.

- Set up a Release Station. This commonly takes the form of a dedicated terminal located

near the printers, however, other options worth considering using the PaperCut MF end-user web interface to release jobs, or the Release Station command-line client. See [Hold/release queues & Print Release Stations](#) for details.

- Instruct users on how to use the Release Station.

## Other Methods:

1. No alternate methods.

## Further Recommendations

1. Decide on an authentication method and use it consistently throughout the organization and network. For example, using popup authentication on some systems and Release Stations on others might be confusing for users. Try to offer a consistent user experience.
2. Where possible, configure workstations to communicate with the server using the server's native print protocol. For example, use SMB or standard Windows printing when printing to a Windows server, and Internet Printing Protocol (IPP) when printing to a CUPS server. Servers are most reliable when talking their own language!
3. Consider the scope of any configuration change. For example, enabling popup authentication or Release Station on a print queue affects ALL users of that printer. For example, you might want to ask Linux users to use the Release Station, however, this might be considered an inconvenience for Windows users. In these cases, you might set up two print queues for each physical printer - the first queue without Release Station enabled for Windows users and the other with the Release Station option enabled for Linux users.

### 2.8.10. PaperCut LPD Service

PaperCut MF ships with its own LPD Service that supports support cross platform printing. This service provides end-to-end support for customers who use PaperCut MF and LPD.

The PaperCut LPD Service allows print administrators to connect disparate systems to a Windows Print Server, allowing the server to accept jobs from

- Mac Clients/Servers
- Linux Clients/Servers
- AS400 Servers
- Mainframes
- ...any other client or server that supports LPR printing.

The PaperCut LPD Service also allows administrators to continue to support methods that bypass any authentication requirements to print to a Windows Server.

## 2.8.10.1. Using the PaperCut LPD Service

### Installing the PaperCut LPD Service

After installing the Microsoft Windows version of PaperCut's Primary, Secondary or Site Server software, the PaperCut LPD Service wizard style installer is available under `[appath]\providers\lpd\win\pc-lpd-installer.exe`



LPD Servers listen on port 515 by default, so Administrators must ensure that this port is open to requests from clients (check that the port is not blocked by your firewall). The installation wizard also checks for previous versions of the Windows LPD Server, and disables these to ensure there is no port conflict.

It's important at this point to consider how the print jobs are being tracked. The print jobs are sent with the username from the client system; e.g. the Unix, Linux or Mac, etc username associated with the print job. If the username is not consistent with the Windows username you want to associate with the job, consider additional PaperCut features like:

- [Username aliasing](#)
- Unauthenticated printing. See [Handling Unauthenticated \(non-domain\) Laptops](#)
- If this queue services a single account, enable the **Override user-level settings** at a given queue and charge all jobs to a given shared account.



#### Note:

- You must share the printer before being able to connect to it using LPR. This is different to Microsoft's implementation, but provides an extra level of control over which queues can be printed to using LPR.
- The PaperCut LPD Service accepts inbound print data over TCP/IPv4. The



PaperCut LPD service does not support data over TCP/IPv6.

- The PaperCut LPD service records routed print jobs in the Windows Application Event log.
- PaperCut LPD responds to LPQ commands with "OK". No pending print job information is revealed.
- For customers currently using the Windows LPD Service, installations of the PaperCut LPD Service should not require any changes to the client.

## Connecting to an LPD Service

Most operating systems, including Windows, support connecting to an LPD Service via the LPR printing protocol. You need the following information:

- The address of the server running the PaperCut LPD Service.
- The name of the queue: either share name or queue name.



### Note:

Some print systems (e.g. CUPS) do not allow spaces in queue names, so a share or queue name that does not include spaces improves the likelihood of connection.

## An example using Mac OS X System Preferences

1. Select **System Preferences**.
2. Select **Printers & Scanners**.
3. Click **+** to add a new printer.
4. Click the **IP** tab at the top toolbar.
5. From the **Protocol** dropdown, select **Line Printer Daemon - LPD**.
6. In **Address**, enter the IP address of the server hosting the printers.
7. In **Queue**, enter the printer's share name.
8. In **Name**, define a user friendly name; then select the printer type.
9. Select the driver or printer model from the list; then click **Add**.

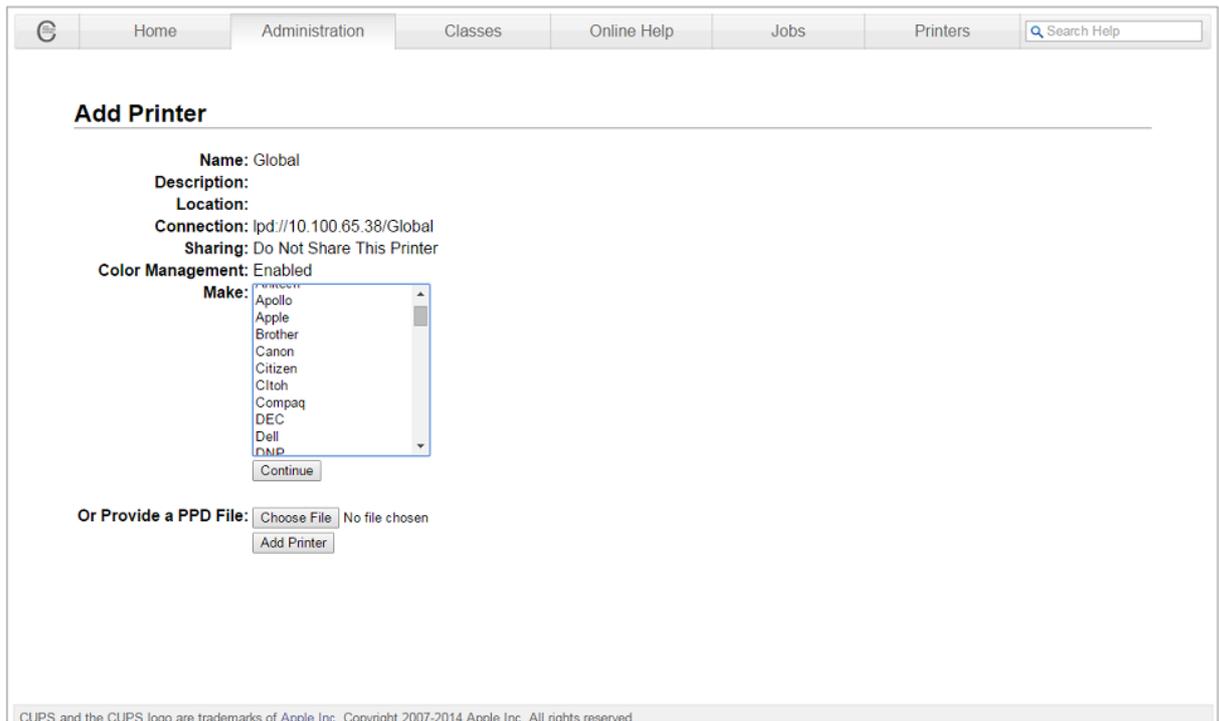
## An example using the CUPS admin interface

This example assumes you are using the CUPS web based admin interface. Other methods are also available (e.g. GNOME printer manager in GNU/Linux)

1. Log in to the CUPS Administration UI.
2. Click **Administration > Add Printer**.
3. Scroll to **Other Network Printers**; then select **LPD/LPR Host or Printer**.



4. Enter in the **Connection** string using the example format on the page. i.e.
  - **lpd://hostname/queue**
  - **lpd://10.100.65.38/Global**
5. Queue **Name** — either the share name or print queue name on the print server. For CUPS the queue name cannot contain spaces.
6. Create the CUPS queue by entering in the rest of the required information, such as **Name**, **Description**, **Location** etc.
7. Choose the driver; then click **Add Printer**.



Print jobs are accepted by LPD into the Windows printing system.



# 3 Tour

This section will guide you through the main areas of the application and cover some common management tasks.

## 3.1. Navigation

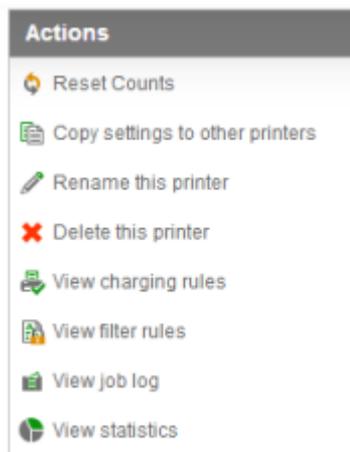
Before you jump in and start the tour of PaperCut MF, it is important to take some time to understand the application's navigation tools. The subsequent sections detail the major user interface elements.

### 3.1.1. Tabs



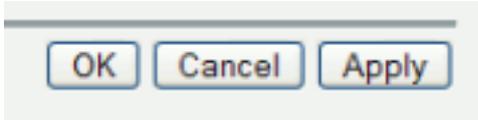
Application areas are grouped into tabs that logically separate parts of the system. Selecting a tab displays the controls and information related to that area. Users are familiar with the concept of tabs from many other applications.

### 3.1.2. Actions



Throughout the application, the *Actions* area lists a number of tasks or actions that can be performed. The Actions list is always located in the top left-hand corner of the application window. Actions are adaptive and the list of actions changes depending on the area of the application being viewed.

### 3.1.3. Buttons



Changes made to options, user settings or configurations are only validated and applied after submitting the change. Screens that you can save in the application have the following buttons located at the bottom:

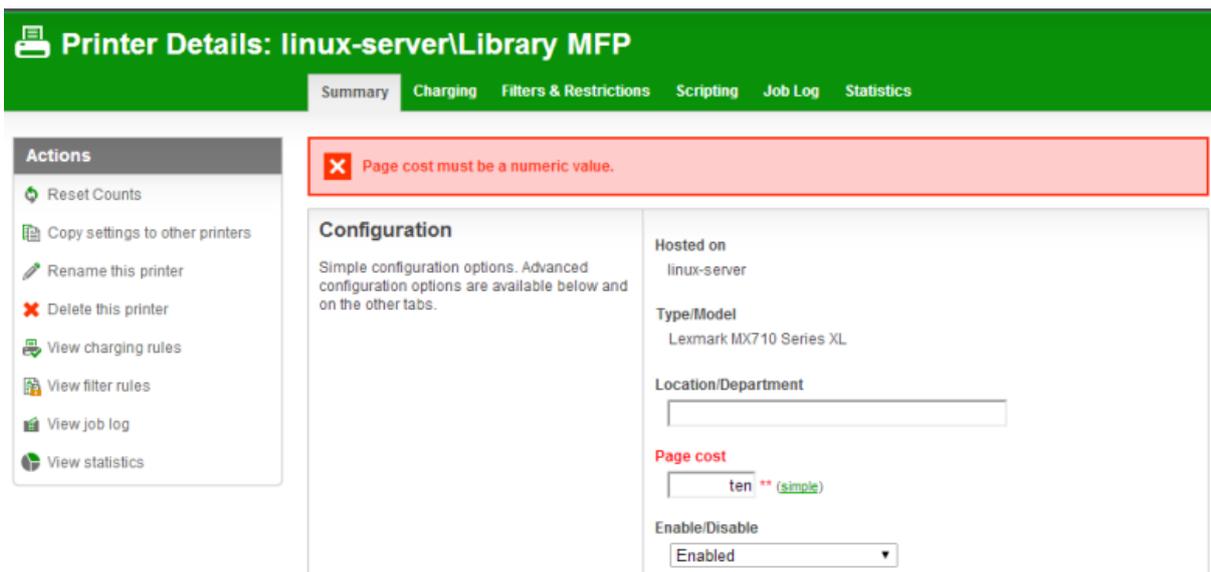
- **Apply** - Validate and save the changes and return to this location/object
- **OK** - Validate and save the changes and return to the data list ready to select and edit another object.
- **Cancel** - Don't save and changes.

### 3.1.4. Crumb Trail



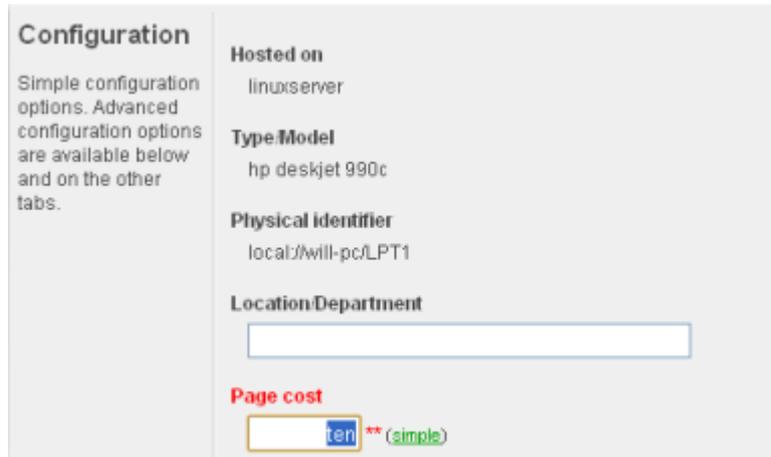
The crumb trail serves two purposes. It maps out the navigation path followed by the user and provides a way to navigate up (back) the navigation path. For example, while editing a user's account, the crumb trail provides a hyperlink up one level back to the **User List**.

### 3.1.5. Status Messages

A screenshot of the 'Printer Details' page for a printer named 'linux-server\Library MFP'. The page has a green header with the printer name and a navigation bar with tabs: 'Summary', 'Charging', 'Filters & Restrictions', 'Scripting', 'Job Log', and 'Statistics'. On the left is an 'Actions' sidebar with options like 'Reset Counts', 'Copy settings to other printers', 'Rename this printer', 'Delete this printer', 'View charging rules', 'View filter rules', 'View job log', and 'View statistics'. The main content area shows a configuration form. At the top of the form is a red error message: 'Page cost must be a numeric value.' Below this, the 'Configuration' section includes a description: 'Simple configuration options. Advanced configuration options are available below and on the other tabs.' The form fields include: 'Hosted on' (linux-server), 'Type/Model' (Lexmark MX710 Series XL), 'Location/Department' (empty text box), 'Page cost' (input field containing 'ten' with a red error message and a '(simple)' link), and 'Enable/Disable' (dropdown menu set to 'Enabled').

Important status messages are displayed in the top section of the application window. Messages relating to an error or requiring user intervention are displayed in red. Standard messages are displayed in green and cautions in yellow.

### 3.1.6. Fields



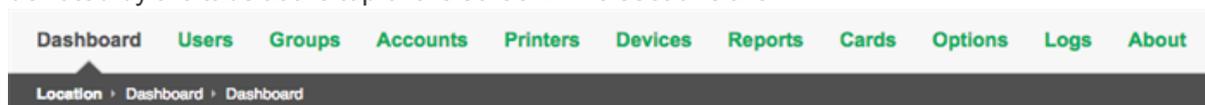
The screenshot shows a configuration window with a sidebar on the left and a main content area on the right. The sidebar contains the heading "Configuration" and a note: "Simple configuration options. Advanced configuration options are available below and on the other tabs." The main content area has several sections:

- Hosted on:** linuxserver
- Type Model:** hp deskjet 990c
- Physical identifier:** local:/will-pc/LPT1
- Location/Department:** An empty text input field.
- Page cost:** A text input field containing "ten" with a red asterisk to its right, and a "(simple)" link in green text.

Configuring printers, users or settings are often done via text fields. Changes made to fields are validated after clicking **OK** or **Apply**. If the field fails validation, the offending data is marked with a red asterisk. Typical validation errors include invalid number or currency formats.

## 3.2. Sections

The PaperCut MF administration interface is grouped into task oriented sections. These are denoted by the tabs at the top of the screen. The sections are:



### 3.2.1. Dashboard

- The What's next? gadget provides tips for new users.
- The System Status gadget provides a list of system statistics.
- The Pages Printed graph shows a running history of the daily pages printed over the past 30 days.
- The Environmental Impact gadget provides environmental impact statistics.
- The Printer Status gadget displays daily pages printed and device status per printer.
- The News gadget has links to the latest information about release and development activity at PaperCut.

- The Real-time Activity gadget is a scrolling summary of PaperCut events with expandable details.
- Related sections:
  - [The Dashboard](#)

### 3.2.2. Users

- View a list of all users
- View and change a user's credit balance
- View a user's statistics and charts
- List a user's printing activity
- Change user privileges and settings
- Related sections:
  - [Basic User Operations](#)
  - [Advanced User Management](#)

### 3.2.3. Groups

- Add/Remove domain or network groups required for user management
- Define rules controlling how new users are created
- Perform bulk user operations
- Control user quota allocations
- Related sections:
  - [Groups in PaperCut MF](#)
  - [Advanced User Management](#)

### 3.2.4. Accounts

- View, edit and create shared accounts
- View and change the shared accounts credit balance
- List all charges against shared accounts
- Set account access security
- Related sections:

- [Shared accounts](#)
- [User Client](#)

### 3.2.5. Printers

- View and edit printer costs and settings
- Define printer filter rules and restrictions
- View printer statistics and charts
- Visually inspect the contents of print jobs (via Print Archiving)
- Related sections:
  - [Basic Printer Operations](#)
  - [Advanced Printer Management](#)
  - [Web Print \(Driver-less printing via a web browser\)](#)
  - [Print Archiving \(viewing and content capture\)](#)

### 3.2.6. Reports

- Access to standard reports for viewing, export and printing
- Run one click reports for quick overviews
- Run reports over Ad-hoc date ranges
- Related sections:
  - [Charting, Statistics, Reports and Logs](#)
  - [Reports](#)

### 3.2.7. Cards

- Managed TopUp/Pre-Paid Cards
- View card use and activity
- Download and install the card creation wizard
- Import new cards
- Related sections:
  - [TopUp/Pre-Paid Cards](#)

### 3.2.8. Options

- Access general system settings
- Control administrator access and security
- Perform network user and group synchronization tasks
- Perform backup snapshots
- Related sections:
  - [System Management](#)
  - [Tools - database, server-command scripting, and APIs \(Advanced\)](#)

### 3.2.9. Logs

- View all recent print jobs
- View system audit, security and application events in the application log
- View administrative changes made to users in the audit log
- Related sections:
  - [System Management](#)

### 3.2.10. About

- List version and build information
- Access update news
- Install and view license information
- Related sections:
  - [Licensing and Support](#)

## 3.3. Basic User Operations

The user section is dedicated to user management. Common user oriented tasks include assigning additional credit to users, viewing a user's activity, and controlling user privileges.

Users in PaperCut MF can be assigned either:

- Restricted access where access to resources is denied once their credit drops to zero (or to the overdraft limit).
- Unrestricted access meaning the user is never denied access.

To change a user's restriction privileges:

1. Log in as the built-in `admin` user.
2. Click the **Users** section.
3. Select the user from the list (or enter the user name in the quick find).
4. Scroll down to the **Account Details** section.
5. Click the **Restricted** check box.
6. Click **Apply** to save the change. A save success message is displayed.

To increase a user's account balance by \$10.00:

1. Select the user from the list (or enter the user name in the quick find).
2. Select the **Adjustments and Charges** tab.
3. In **Adjustment**, enter `$10.00`.
4. Enter a comment to associate with the transaction.
5. Click **Apply**.

**User Details: Chris Dance (chris)**

Details Adjustments & Charges Transaction History Job Log

**Actions**

- Modify user's credit
- View user's transactions
- View user's job log
- View user's audit log
- Re-apply initial settings
- Reset user's statistics
- Delete user

Find user...

**Transaction Details**

Enter the adjustment amount to apply to this account. A negative value subtracts from the account (a deduction). Comments will appear in the transaction list and are used to track the reason for the adjustment.

Account: Default

Current balance: \$10.00

Adjustment to apply: \$10.00

Comment: Added \$10.00 after cash payment

Apply

To view a user's transaction and print history:

1. Select the user from the list (or enter the user name in the quick find).
2. Select the **Transaction History** tab to view the user's transaction.
3. Select the **Job Log** tab to view the user's recent print activity.

## 3.4. Basic Printer Operations

All printers managed by PaperCut MF are configured under the Printers section. Printer configuration includes:

- Setting a cost-per-pages or defining more complex charging rules.
- Defining advanced filter and restriction rules. For example, configuring a printer to deny jobs of a selected size or automatically removing duplicate documents.
- Controlling the enabled/disabled status via time-latches.

To define a basic cost-per-page of \$0.10:

1. Log in as the build-in `admin` user.
2. Select the **Printers** section.
3. Click the printer who's page cost is to be defined.
4. In the **Configuration** section, enter a page cost of `$0.10`.
5. Click **Apply** to save the change.

To define an advanced cost model offering a 40% discount for duplex (double sided) printing:

1. Under the **Printers** section, select the printer whose cost model is to be modified.
2. Click the **Advanced Charging** tab.
3. Select a charge type of **by category**.
4. In **Duplex Discount**, enter **40%**; then select **Percent less** from the drop-down list.

5. Click **Apply** to save the change.

Charging type:

**Charging by Paper Size Category**

This charging model provides the ability to control cost based on categories. All jobs are charged at the base cost-per-page. Documents printed on large paper can be charged at a higher rate (a surplus) while grayscale and duplex documents offered a discount.

**Base cost**

**Large paper surplus** (larger than Legal or ISO A4)

**Very large paper surplus** (larger than 11x17 or ISO A2)

**Grayscale discount**

**Duplex discount**

Filters provide administrators with access to a set of rules to control what type of documents are allowed access to the printer. You can use filter rules for a variety of tasks such as:

- Enforcing good printing practices
- Preventing queue jamming and hogging
- Ensure printers are used for the purpose they are designed for

Filter options include:

- Control by the jobs cost
- Control by a document's page count
- Denying jobs based on their color mode
- Filtering by document name
- Automatically denying and deleting duplicate documents

Example - To apply a filter preventing jobs over 100 pages:

1. Under the **Printers** section, select the printer to which the filter will apply.
2. Click the **Filters** tab.
3. Scroll to the **Page Count** section.
4. Click and select the **deny jobs based on number of pages**.

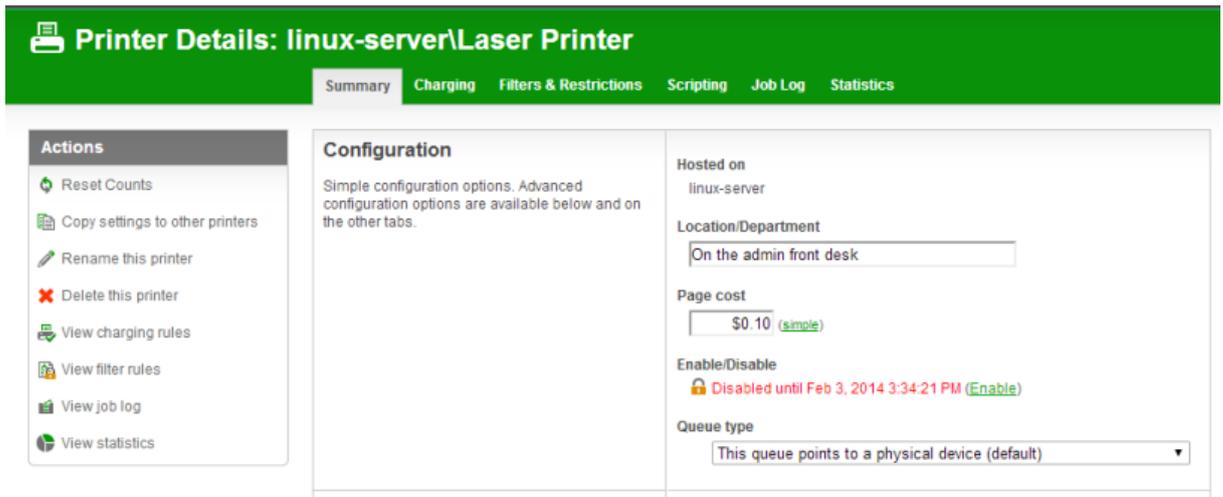
5. Enter in 100 in the maximum filed.

Summary	Charging	Filters & Restrictions	Scripting	Job Log	Statistics
<b>Conversions</b>					
<b>Convert to Grayscale</b> Automatically convert color jobs to grayscale for the specified users.		<input type="checkbox"/> Convert color jobs to grayscale for: <input type="text" value="All users"/>			
<b>Convert to Duplex</b> Automatically convert simplex (single sided) jobs to duplex (double sided) for the specified users.		<input type="checkbox"/> Convert simplex jobs to duplex for: <input type="text" value="All users"/>			
		<input type="button" value="Apply"/> <input type="button" value="Cancel"/>			
<b>Restrictions</b>					
<b>Restriction Scope</b> Specify how filters should be applied to users.		<input checked="" type="checkbox"/> Only apply filters to restricted users			
<b>Group Restriction</b> Specify which groups should have access to this printer.		<input type="checkbox"/> Only allow the following groups to print			

To disable a printer for the next hour using a time latch:

1. Under the **Printers** section select the printer to lock or disable.
2. On the **Summary** tab, scroll to the **Configuration** section.
3. Select **Disable for next hour** from the drop-down list.

4. Click **Apply** to save the change.



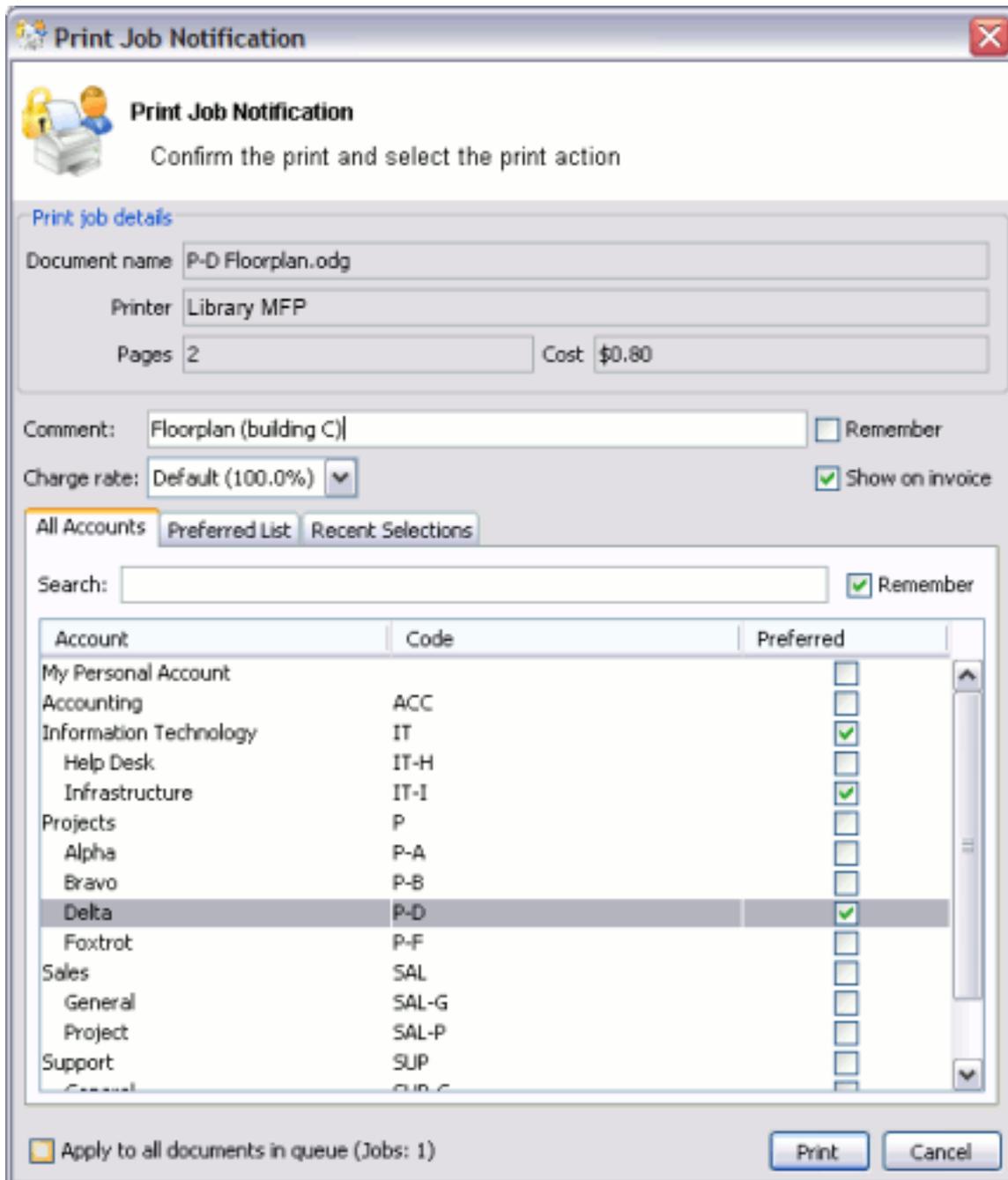
The screenshot displays the 'Printer Details' page for a printer named 'linux-server\Laser Printer'. The page has a green header with the printer name and a navigation bar with tabs for 'Summary', 'Charging', 'Filters & Restrictions', 'Scripting', 'Job Log', and 'Statistics'. The 'Summary' tab is active. On the left, there is an 'Actions' sidebar with options: 'Reset Counts', 'Copy settings to other printers', 'Rename this printer', 'Delete this printer', 'View charging rules', 'View filter rules', 'View job log', and 'View statistics'. The main content area is titled 'Configuration' and contains the following information:

- Hosted on:** linux-server
- Location/Department:** On the admin front desk
- Page cost:** \$0.10 (simple)
- Enable/Disable:** Disabled until Feb 3, 2014 3:34:21 PM (Enable)
- Queue type:** This queue points to a physical device (default)

## 3.5. Client Software

The client software is optional and not required for basic logging, however, it does provide users with access to advanced features. These features include:

- Real-time feedback to the user including their account balances and event messages such as "print job denied" reasons.
- Access to the account selection popup so users can allocate print jobs to shared accounts - for example, accounts representing departments, projects, clients, etc. This is particularly important in a business environment.



### 3.5.1. Demonstrating the client software and account selection process

Create a shared account:

1. Log in to PaperCut MF as an administrator (e.g. admin account).
2. Select the **Accounts** tab.
3. Click the **Create a new account** action.

4. Enter an appropriate name for the account. For example, "test account".
5. Click **Apply** to save the account.
6. Select the security tab and ensure the [All Users] group has access to the account. If not, add the group by selecting it from the drop-down; then clicking **Add**.
7. For more information about creating and managing shared accounts, see [Shared accounts](#).

Grant account selection access to your account:

1. Select the **Users** tab.
2. Locate and click your personal user account.
3. Under the **Account Selection** section, select the option **Show the advanced account selection popup**.
4. Click **OK** to save and apply changes.

Launch the client software (Windows Platform):

1. Log in to a workstation using your user account as modified above (note: The server itself can also be used for this testing if desired)
2. Open **Windows Explorer** (File Explorer).
3. In the address bar, enter `\\server_name\pcclient` where "server\_name" is the name of the server hosting the PaperCut MF software. This brings up files located on the `PCClient` share.
4. Launch the `pc-client.exe` program by double-clicking the file. An icon is displayed in the task tray.
5. Print a test page (for example, a web page). The advanced client popup is displayed allowing you to select the "test account" set up in the preceding section.

For more information about shared accounts, see [Shared accounts](#). For more information about client software deployment, see [User Client](#).

## 3.6. Interface Levels

PaperCut MF provides two layers of system access, Admin and User.

### 3.6.1. Admin Access

Admin access provides access to the system for administration and management. This level is usually only granted to selected individuals in the organization, such as network administrators or management staff. To assign admin rights to an individual or group of users see [Assigning Administrator Level Access](#).

## 3.6.2. User Access

End users are granted access to a set of basic web pages providing them with access to:

- View their account balance
- List recent account activity
- Use tools such as TopUp/Pre-Paid Cards and funds transfers to other users

The User Client Tool (PaperCut MF User Client Software) complements the web pages by providing users with a quick view of their current account balance.



**Important:** Access to the user area, such as, the admin area, requires authentication - that is the user must enter their network username and password. Authentication is required because user information such as print history is confidential. Access to the user's funds transfer feature also needs to be protected. This is particularly important in schools. Students can rest assured that should they leave their workstation for a few minutes another student can't transfer their account balance to themselves!

To access the user pages via the User Client Tool:

1. Start the client software if it is not already running. On the server, start the client software via the **Client** Start menu item. See the client software section for details on how to start this on a remote workstation or desktop.



2. Click the **Details** link. The web browser is opened.
3. Enter your username and password and click **Login**.
4. The user page pages are displayed.

To access the user pages directly via a web browser:

1. Open a standard web browser.
2. Enter the URL `http://[servername]:9191/user` where `[server_name]` is the network name assigned to the system running PaperCut MF. The login screen is displayed.
3. Enter your username and password.
4. Click **Login**.

## 3.7. Assigning Administrator Level Access

PaperCut MF sets up one administrator account called admin. This is the master administrator account, with access to all features, whose password is assigned during the configuration wizard. In large organizations it is likely that administrator level access is granted to more than one person. One solution is to give all persons the master password; however, the recommended approach is to assign administrator rights to these individual's network user accounts. The advantages of this approach are:

- They can access the administration pages using their own username and password (they don't have to remember another password!).
- You can assign different levels of administrator access to different users. PaperCut MF includes an advanced Access Control List (ACL) allowing different administrators access to different functions and areas of the application.
- Most activity is audited so changes can be sourced to an individual.

For more information see [Assigning Administrator Level Access](#).

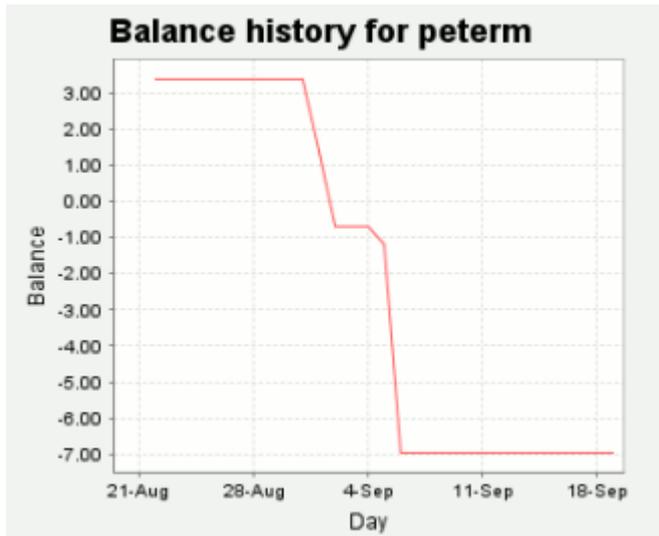
## 3.8. Charting, Statistics, Reports and Logs

One of the key features of PaperCut MF is the advanced charting, statistics, reporting and logging. Use this information to:

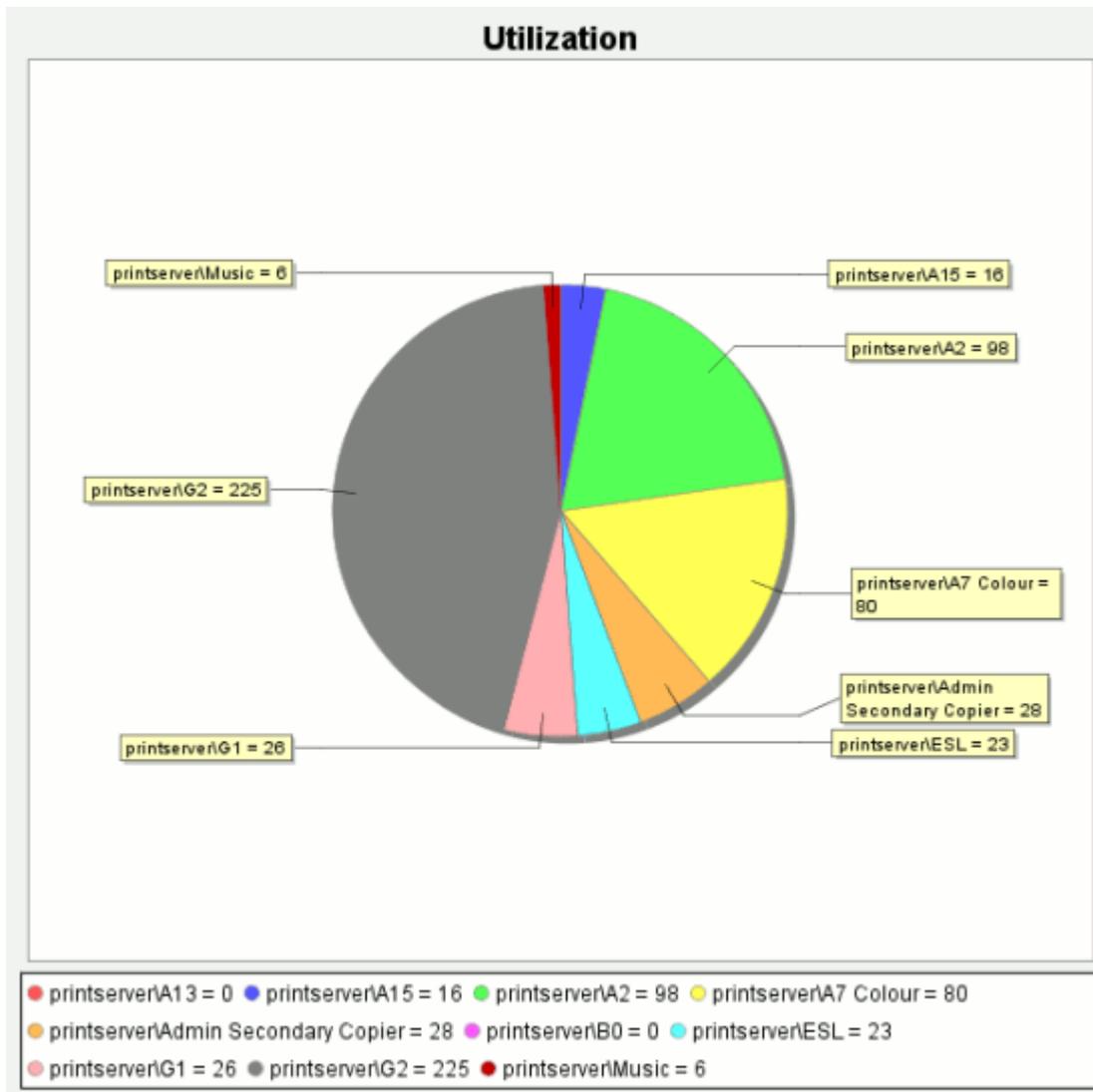
- Determine which printers are most used
- Spot areas where printers are inappropriate for the task.
- View user and printer trends over time.

### 3.8.1. Charts

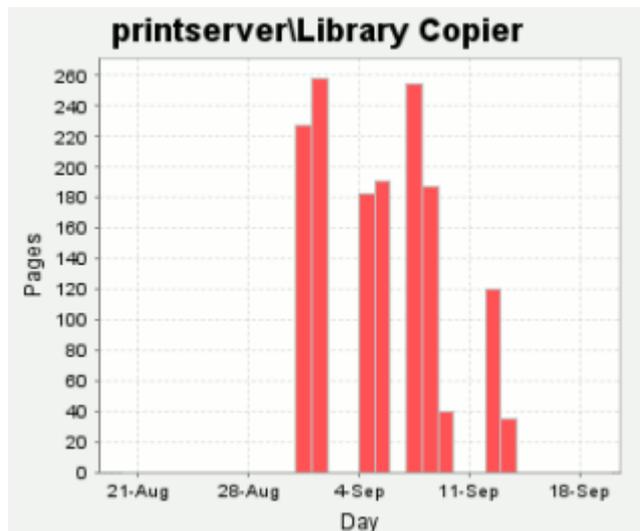
Charts are ideal for obtaining a quick visual overview. All users and printers have a line chart displaying activity over the last 30-days.



The Charts Tab under the Printers section hosts a set comparison charts allowing administrators to compare printers side by side.



Under each individual printer the Statistics section provides information on all jobs printed on a given printer.



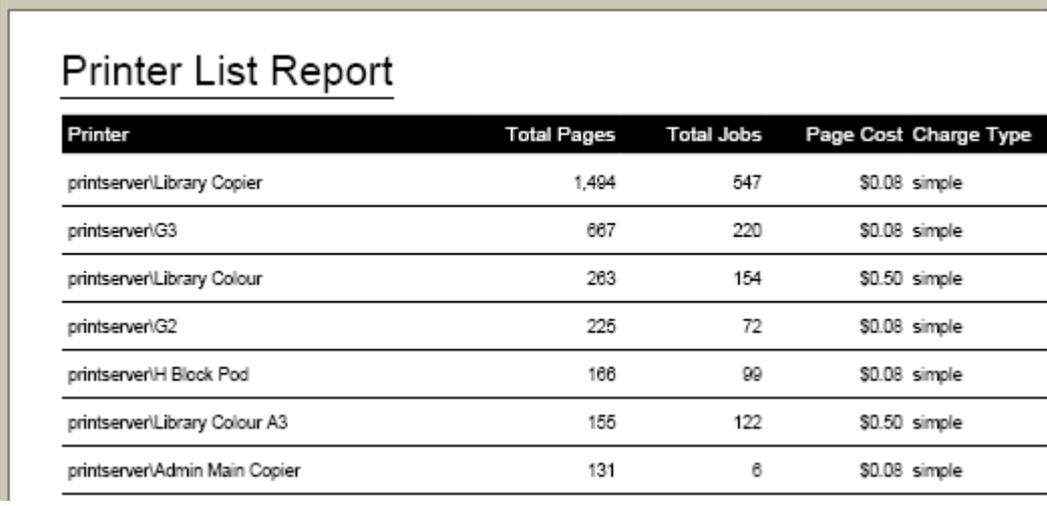
### 3.8.2. Reports

Reports provide a tabular data display, often in a printable format, of system information ranging from activity histories, summaries, transaction details, etc. Reports are typically run to print a summary of user activity, printer activity, or group or account activity. To streamline access to common reports, PaperCut MF provides a series of predefined one-click report links under the **Reports** section. You can generate most reports over a variety of common date ranges or user-defined date ranges.

Standard reports include:

- User Reports
  - Print summary statistics grouped by user
  - Quick list of the most active print users
- Printer Reports
  - Summary of print activity grouped by printer
  - Quick lists of the most active/busiest printers
- Group Reports
  - Summary of print activity grouped by network group (Note: The group needs to be defined under the Groups section.)
- Shared Account Reports
  - Summary of print activity grouped by shared account charged
- Print Log Reports

- Detailed lists of all print jobs over a given period
- Quick list of the largest print jobs



Printer	Total Pages	Total Jobs	Page Cost	Charge Type
printserver/Library Copier	1,494	547	\$0.08	simple
printserver/G3	667	220	\$0.08	simple
printserver/Library Colour	263	154	\$0.50	simple
printserver/G2	225	72	\$0.08	simple
printserver/H Block Pod	166	99	\$0.08	simple
printserver/Library Colour A3	155	122	\$0.50	simple
printserver/Admin Main Copier	131	6	\$0.08	simple

Standard reports are provided in a variety of output formats including, HTML, PDF and MS Excel. PDF reports are ideal for printing. HTML versions of the reports are provided for systems without a PDF viewer.



**Tip:** In addition to the standard reports, administrators can run other reports on ad-hoc data by using the **Export/Print** option available under most of the data lists. This is covered further in the subsequent report section (See [Reports](#)).

### 3.8.3. Logging

The following types of activity logging is performed by PaperCut MF:

#### Usage Logging

Usage logging records information about usage events such as printing. Information includes:

- The date of the use
- Who performed the use
- Details of the type of user including, cost and other attributes

Usage Date ▼	User	Charged To	Printer	Pages	Cost	Document Name	Attribs.	Status
Jan 11, 2011 2:45:26 PM	<a href="#">sally</a>	<a href="#">sally</a>	<a href="#">linux-server/Library MFP</a>	43	\$9.89	Budget - OpenOffice.org Calc	A3 (ISO_A3) Duplex: Yes Grayscale: No 750 kb mac-workstation PCL6	Printed <a href="#">[refund]</a> <a href="#">[edit]</a>
Jan 11, 2011 2:45:23 PM	<a href="#">john</a>	<a href="#">john</a>	<a href="#">mac-server/Laser Printer</a>	20	\$4.60	Microsoft PowerPoint - Presentation	11X17 Duplex: No Grayscale: Yes 62,439 kb linux-workstation Postscript	Printed <a href="#">[refund]</a> <a href="#">[edit]</a>
Jan 11, 2011 2:45:22 PM	<a href="#">luke</a>	<a href="#">luke</a>	<a href="#">mac-server/Office MFP</a>	16	\$3.68	Budget - OpenOffice.org Calc	11X17 Duplex: Yes Grayscale: No 63,024 kb windows-workstation GDI	Printed <a href="#">[refund]</a> <a href="#">[edit]</a>

## Transaction Logging

All modifications or deductions to an account (user or shared) are recorded in the transaction log. Information recorded includes:

- The date of the transaction
- Who performed the transaction
- Any comment or note associated with the transaction (if performed by a user)

Transaction date ▼	Transacted by	Amount	Balance after	Transaction type	Comment
Jan 11, 2011 2:48:49 PM	admin	\$10.00	\$16.80	Manual adjustment	user paid \$10 at the front office
Jan 11, 2011 2:48:19 PM	[system] (print)	-\$0.50	\$6.80	<a href="#">Printer Usage</a>	
Jan 11, 2011 2:48:14 PM	[system] (print)	-\$0.50	\$7.30	<a href="#">Printer Usage</a>	
Jan 11, 2011 2:47:58 PM	[system] (print)	-\$1.00	\$7.80	<a href="#">Printer Usage</a>	
Jan 11, 2011 2:47:13 PM	[system] (print)	-\$1.00	\$8.80	<a href="#">Printer Usage</a>	
Jan 11, 2011 2:07:47 PM	[system] (print)	-\$0.20	\$9.80	<a href="#">Printer Usage</a>	
Jan 11, 2011 1:13:24 PM	[setup wizard]	\$10.00	\$10.00	Initial allocation	

## Application Activity Logging

The Application Log records system events messages such as:

- User logins
- Security errors such as incorrect password attempts
- Backup times and scheduled tasks
- Any system errors or warning

It is similar to the operating system's event log. It is recommended that System Administrators view this log on a daily basis for the first week and weekly thereafter.

## User Audit Logging

All administrative modifications to a user are recorded in the audit log. Information recorded includes:

- User properties such as emails and popup settings
- Account selection and popup settings
- Balance and overdraft
- Card Ids and pins

The audit log is enabled by default and the data is stored for 30 days.





# 4 Configuration

## 4.1. Services for Users

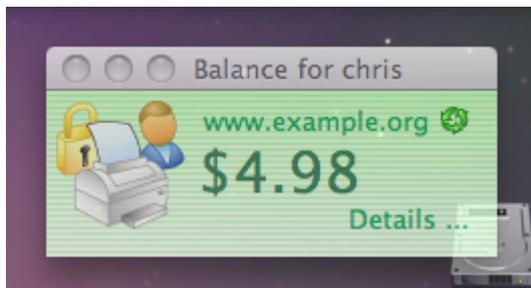
How a user experiences and interacts with PaperCut MF varies depending on how it is implemented. When configured as a silent monitoring solution, users might not even know PaperCut MF is in use. In other environments, users make extensive use of the various services that are available.

Services are provided to users through one of two interfaces:

### 4.1.1. The User Client

The User Client is an optional piece of software that provides additional functionality. The client software serves a number of purposes including to:

- Display the user's account balance (for print charging or quota environments)
- Display account selection or print conformation popups.
- Show system messages such as "low balance" notifications.
- Display popup warnings as configured by the administrator (e.g. Print policy discourage printing of emails).
- Provide popup authentication services in anonymous desktop environments.



You can customize the appearance of the User Client tool to fit in with your organization. For more information, see [Customizing the User Client Tool window](#). The features visible to the user (e.g. popup dialogs) are a function of server-side settings and are configured by the administrator.

### 4.1.2. The User Web Pages

The User Web Pages provide additional features for users. Functionality includes summaries and logs of usage, using TopUp/Pre-Paid Cards, transferring funds and displaying usage costs. The User Web Pages are accessed either via the **Details** link on the *User Client* window, or via the browser URL `http://[server_name]:9191/user`.

The screenshot shows a web browser window displaying the PaperCut NG Summary page for user 'tom beresford'. The page has a green header with the PaperCut logo. A left sidebar contains navigation links: Summary, Shared Accounts, Rates, Redeem Card, Transfers, Transaction History, Recent Print Jobs, Jobs Pending Release, Web Print, and Log Out. The main content area is titled 'Summary' and contains a table of account details, an 'Activity' section with a line graph titled 'Balance history for tom beresford', and an 'Environmental Impact' section with three rows: Trees, Carbon, and Energy.

Username	tom beresford
Balance	\$48.70
Total print jobs	3
Total pages	3

**Activity**

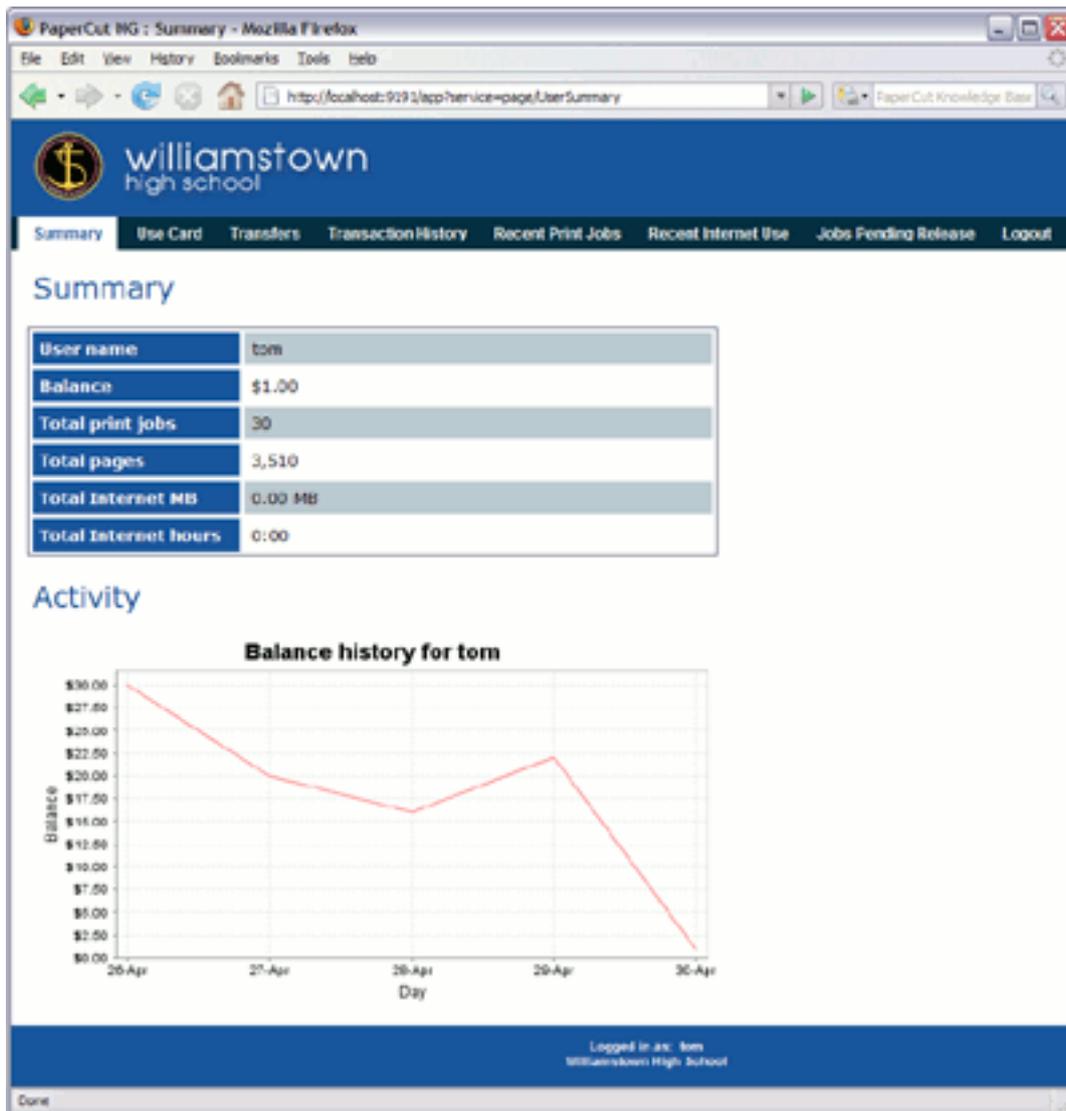
**Balance history for tom beresford**

Day	Balance
21 Dec	\$50.00
28 Dec	\$48.70
4 Jan	\$40.00
11 Jan	\$40.00

**Environmental Impact**

<b>Trees</b>	🌳 0.004% of a tree since Dec 21, 2011
<b>Carbon</b>	🌫️ 13 grams of carbon dioxide since Dec 21, 2011
<b>Energy</b>	💡 Equivalent to running a 60W bulb for 0.8 hours

You can customize the appearance of the user web pages to fit in with your organization's existing intranet, web pages or color scheme. For more information, see [Customizing the User web pages](#).



### 4.1.3. The iPad / iOS App (for iPad Printing)

The PaperCut iPad / iOS App for iPad/iOS Printing enables printing from your iPads enables printing to all your PaperCut managed printers across your enterprise. For more details see [iOS Printing \(iPad & iPhone\)](#).

More information about each of these areas is available in the following sections.

### 4.1.4. User Client

The PaperCut MF activity tracking and charging is implemented using 100% server-side technology. User Client software is not required as part of the activity monitoring process.

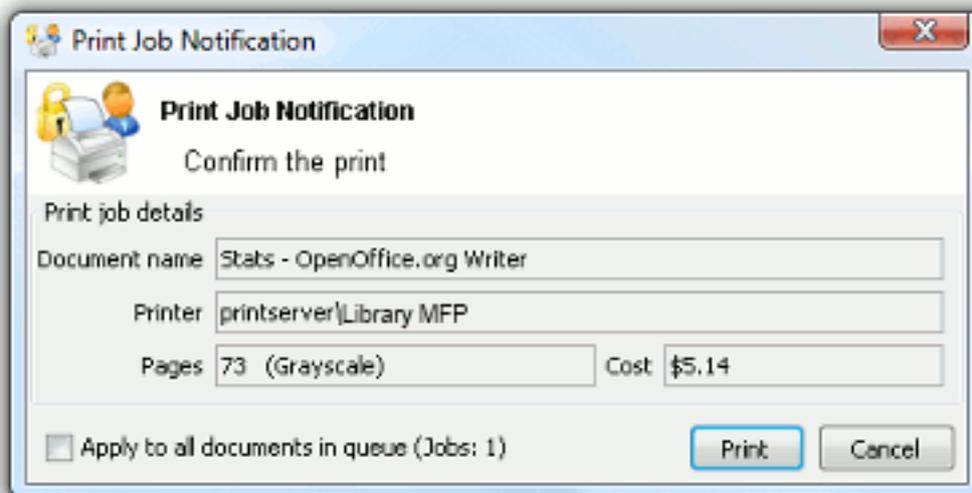


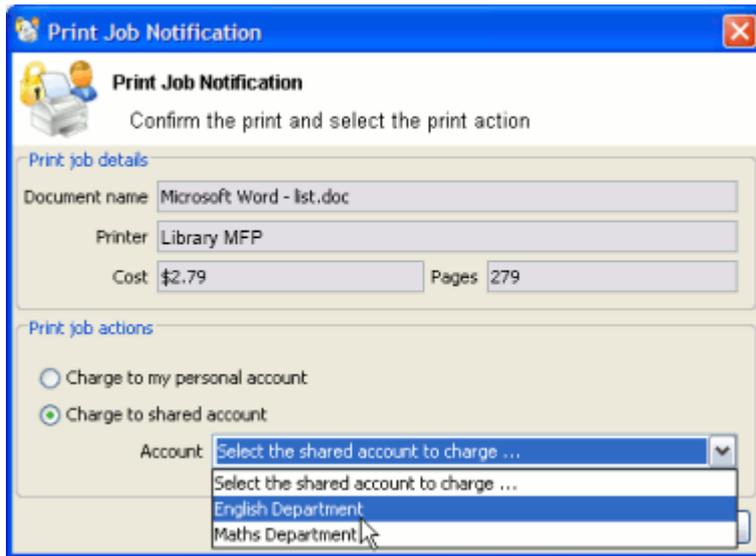
**Note:** The use of client software for activity monitoring could open up security problems as client software is readily accessible to end-users. By design PaperCut Software developers endeavor to implement all monitoring at the server level eliminating client-

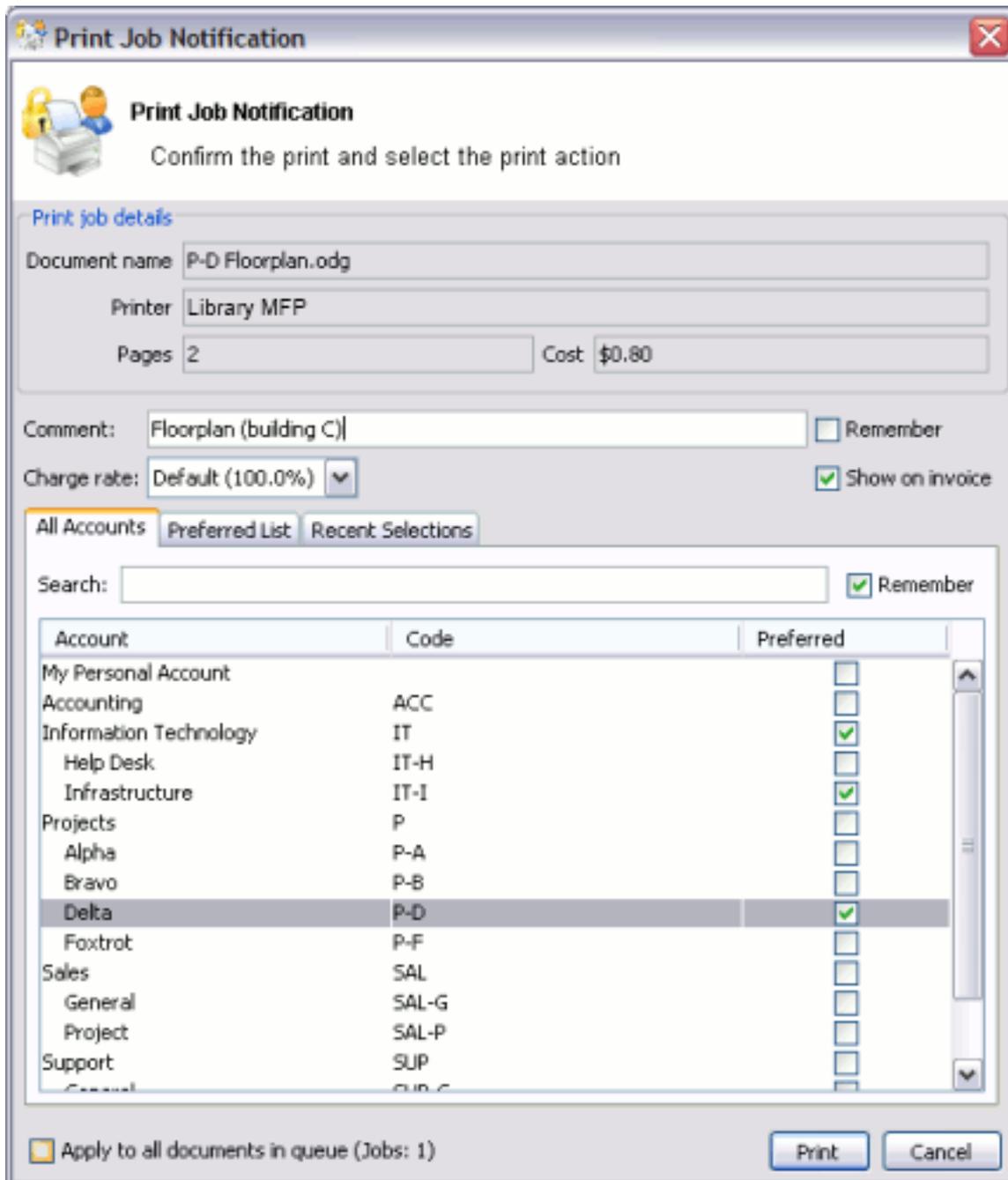
side loopholes. The client software supplied with PaperCut MF is a presentation layer around server-side implementation.

Client software is provided to facilitate four tasks:

- Allow users to view their current account balance via a popup window.
- Provide users with a "last chance" before printing, confirming what they are about to print.
- Allow users to select shared accounts via a popup, if administrators have granted access to this feature.
- Display system messages such as the "low credit" warning message or print policy popups.







**Print Job Notification**

Confirm the print and select the print action

**Print job details**

Document name: P-D Floorplan.odg

Printer: Library MFP

Pages: 2 Cost: \$0.80

Comment: Floorplan (building C)  Remember

Charge rate: Default (100.0%)  Show on invoice

All Accounts Preferred List Recent Selections

Search:   Remember

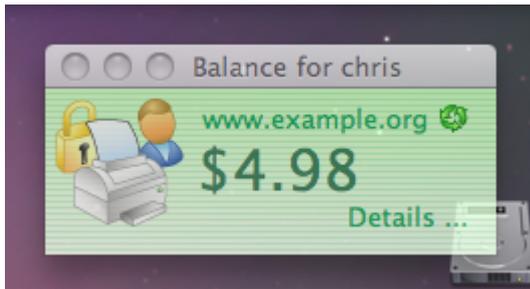
Account	Code	Preferred
My Personal Account		<input type="checkbox"/>
Accounting	ACC	<input type="checkbox"/>
Information Technology	IT	<input checked="" type="checkbox"/>
Help Desk	IT-H	<input type="checkbox"/>
Infrastructure	IT-I	<input checked="" type="checkbox"/>
Projects	P	<input type="checkbox"/>
Alpha	P-A	<input type="checkbox"/>
Bravo	P-B	<input type="checkbox"/>
Delta	P-D	<input checked="" type="checkbox"/>
Foxtrot	P-F	<input type="checkbox"/>
Sales	SAL	<input type="checkbox"/>
General	SAL-G	<input type="checkbox"/>
Project	SAL-P	<input type="checkbox"/>
Support	SUP	<input type="checkbox"/>
Casual	SUP-C	<input type="checkbox"/>

Apply to all documents in queue (Jobs: 1)

**Print** **Cancel**

The client software is available for most major platforms including:

- Microsoft Windows
- Mac OS X
- Linux and Unix



The client software and deployment tools are installed automatically on the server under the `[app-path]\client` directory. On a Windows based server this directory is automatically shared in read-only form providing network users with access to the client executables.

The following sections contain further information about the User Client:

- [User Client Options](#)—command line and config options.
- [Customizing the User Client Tool window](#)—customization of the User Client .



#### Tip:

You can customize the behavior of the User Client, such as, where on the screen it pops up or which option is selected by default. For more information, see [User Client Options](#). To educate the users about the User Client, administrators might find the [Example User Information Sheets](#) helpful.

### 4.1.4.1. User Client Deployment

## Deployment on Windows

You can deploy the PaperCut MF client software to workstations using a variety of deployment methods. The deployment options are covered in detail in the `[app-path]\client\README.txt` file.

Options include:

1. If you're after a manual "setup wizard" style installer, run the program `client-local-install.exe` located in the network share `PCClient`. You can access this share by typing the following address into Windows Explorer. `\\<MyServer>\PCClient\win`, where `MyServer` is the name of the server where PaperCut MF is installed.
2. Administrators looking for an automated install/deployment option should consider the "zero install" strategy. This is the recommended strategy for most Windows network environments as it's 100% self-maintaining.
3. Administrators can also deploy via MSI package, allowing the Client software to be remotely installed via Group Policy. This option is available for advanced sites that already

leverage MSI packages for staged software deployment and want to continue with this procedure.

The recommended approach with Windows networks is the "zero install" strategy. This involves configuring the workstations via group policy or otherwise, to run the client executable directly off the `PCClient` share - a share set up during installation. This avoids the need to for a separate installation process on each workstation and ensures the client software is automatically updated in conjunction with server updates.

You can run the client directly from the `PCClient` share setup on the server. Two executables provide this launch functionality:

```
pc-client.exe pc-client-local-cache.exe
```

`pc-client.exe` launches the client directly off the network share. The "local-cache" version (`pc-client-local-cache.exe`), is a smarter version that first copies itself and associated files to the local drive and launches itself from there. The local-cache version has the advantage that any future startups use the local copy, which minimizes network traffic. The cache is self-managing and kept up-to-date ensuring that any new versions of the client are automatically and transparently copied down to the client.

Using `pc-client-local-cache.exe` is recommended on large networks. It does, however, require a globally writable cache directory. By default the cache is created in a directory on the system drive (normally `C:\Cache`). You can specify an alternate cache with the `--cache` command-line switch. Administrators should ensure than standard users have write access to the system drive, or manually create the cache directory if required.

The zero-install deployment option is not appropriate for all situations. A local install is recommend on Windows Laptop systems that are not permanently connected to the network or centrally managed by network administrators. The `client-local-install.exe` program can assist end users with a standard "setup wizard" install process. You can also streamline/automate this installer by using command-line options. Fore more information, see [Automating / Streamlining Installation on Windows](#).

The recommended way to launch the `pc-client-local-cache.exe` on startup is to add a line to your Domain login script:

```
cmd /c "start \\servername\PCClient\win\pc-client-local-cache.exe --silent"
```

See below for other automatic start options.

For more information on alternate deployment options see the `[app-path]\client\README.txt` file.

## Deployment on Windows via Silent Installer MSI

The User Client software is available as a silent-install MSI (no clicks or wizards). This option is available for advanced sites that already leverage MSI packages for automated software deployment and upgrades using Active Directory Group Policy options. We recommend using the `pc-`

`client-local-cache.exe` version of the User Client for most deployments, as all updates are automatically pushed to client machines. The MSI option discussed here must be manually updated.

The MSI package is a great option for organizations managing staged rollouts via Group Policy Filters. It is common in large organizations to progressively roll out new software as a series of small steps, for example, the IT department might get the software first, followed by a roll out across the organization.



**Important:** Ensure these steps are conducted by an administrator experienced with Active Directory MSI software deployment.

## Step 1 - Copy User Client files to deployment location

Copy the all client files and subdirectories from

```
\\servername\PCClient\win\
```

into a versioned folder on your domain, alongside your other MSI-deployed software, e.g.

```
\\DeployedSoftware\papercut-client-16.0.2\
```

Do not deploy the MSI directly from the PaperCut install directory because the contents of this directory change when PaperCut is upgraded. This results in problems in your MSI deployments.



### Note:

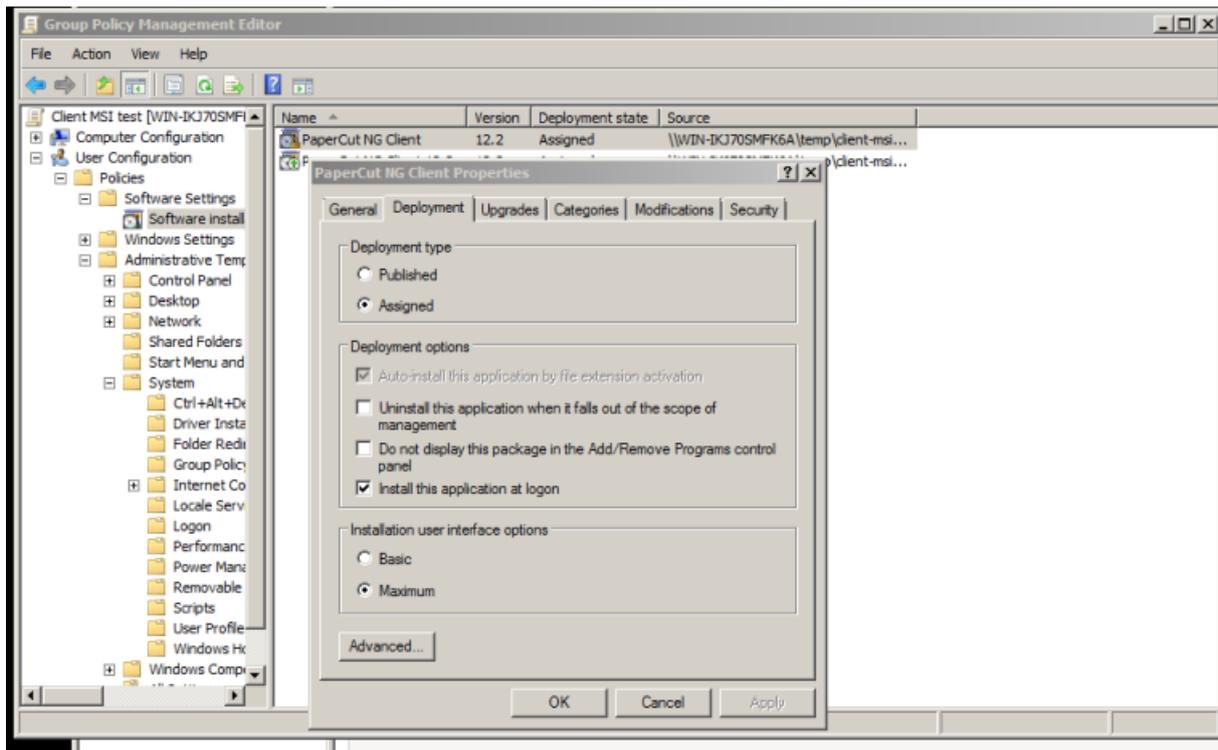
Unlike some other MSI packages, this file is not a self-contained archive - it must be copied along with the rest of the PaperCut client files when preparing your deployment.

## Step 2 - Configure the User Client

If you need to make adjustments to the client (such as modifying `config.properties` or adding a custom logo), now's the time to do so. Changes made are distributed to your domain as the MSI deploys.

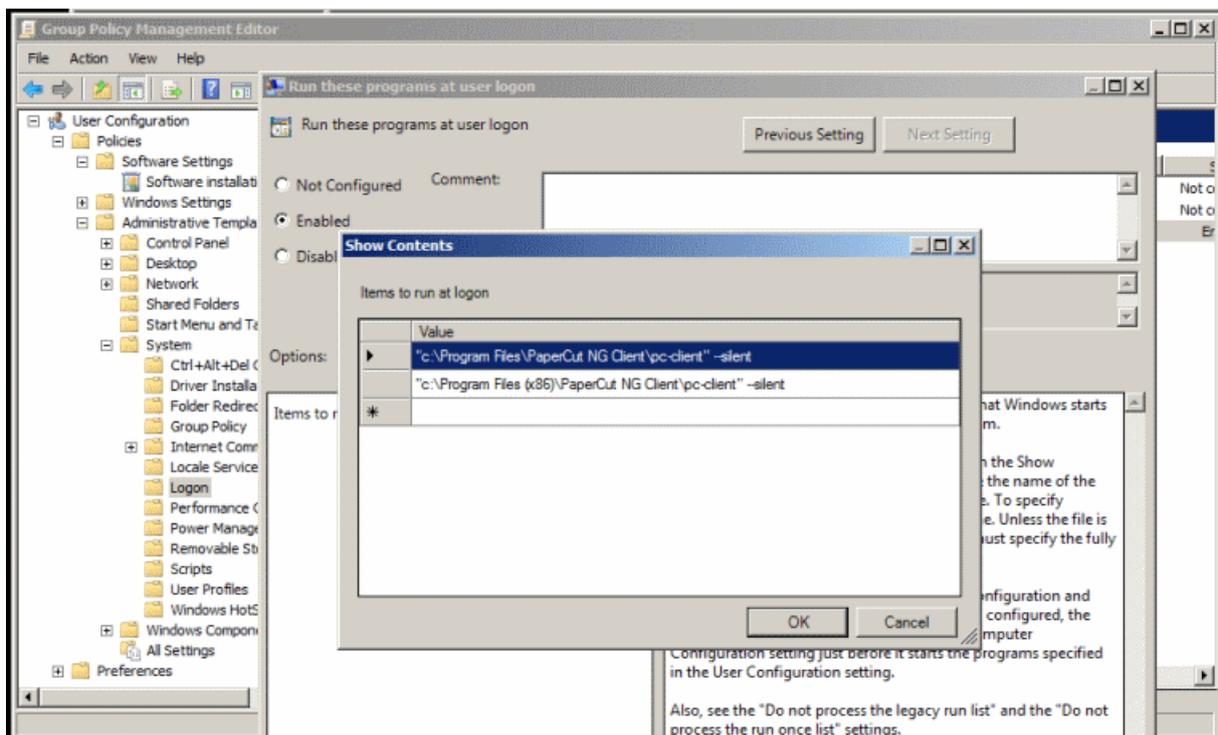
## Step 3 - Deploy the MSI

Deploy the `pc-client-admin-deploy.msi` to your domain, as a Software Installation component to a Group Policy Object. The procedure for MSI deployment via Group Policy is explained in Microsoft's Knowledge Base: <http://support.microsoft.com/kb/816102>.



## Step 4 - Configure for auto launch

Configure pc-client.exe to launch automatically at startup, as you would for any other program. One option is to add the User Client application to your GPO's "Run these programs at user logon" setting, found under **Computer/User Configuration > Policies > Administrative Templates > System > Logon**





**Tip:** To deploy to a heterogeneous environment of 32 and 64-bit systems, the default install paths are different for each architecture. A simple solution to this path problem is to launch the client from both `C:\Program Files` and `C:\Program Files (x86)` paths, as in the screenshot above. The non-matching path silently fails.

An alternate option is to start the client from an existing user logon script. An example of the line to add to the logon script is:

```
cmd /c "start "C:\Program Files\PaperCut MF Client\pc-client.exe --silent"
```

## Prerequisites/Troubleshooting

Older machines might require an upgrade to the Windows Installer Service. If so, the following error message is displayed:

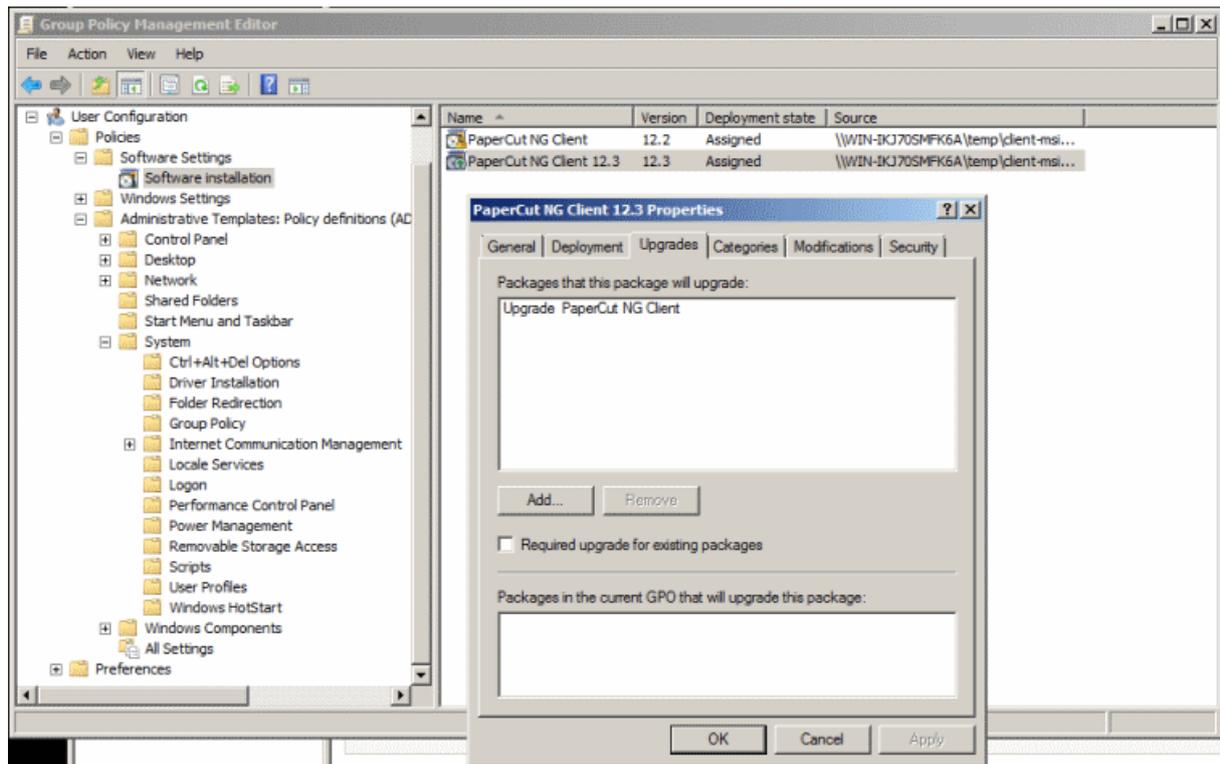
```
"This installation package cannot be installed by the Windows Installer Service. You must install a Windows service pack that contains a newer version of the Windows Installer Package"
```

To resolve this, download and install the Windows Installer 4.5 Redistributable, from: <http://www.microsoft.com/en-us/download/details.aspx?id=8483>

## Upgrade an MSI Installation

The procedure for upgrading an already-deployed installation of the client (e.g. from 12.3 to 12.4) is slightly different to that of the initial deployment - add the updated MSI packages to your original GPO as an upgrade item. For step-by-step instructions on the procedure, see Microsoft's Upgrade Guide at: <http://technet.microsoft.com/en-us/library/cc783421%28v=ws.10%29.aspx>

Do not replace an old MSI with a newer version. If after following the instructions in the Microsoft article above you're still unsure how to proceed, please seek assistance, or contact technical support.



## Windows 8 Metro Requirements

Windows 8 introduced a new user interface called Metro. It has a tile based start screen or runs one application at a time. This user interface is also known as the "Windows 8-style UI".

When the Windows 8 user interface is in Metro mode, Windows Desktop applications are not visible. This includes notifications such as the PaperCut Client popup. Therefore the Client popup could be missed.

PaperCut uses a Toast notification to notify user in Metro mode that a notification requires their attention in Metro mode.



With the Toast notification, users working in metro mode are notified of all PaperCut activities that require their attention in Desktop mode.

## Deployment on Mac OS X

This section covers the installation of the PaperCut client on Apple Mac systems. Before installing the client software, review [Mac Printing in Detail](#) and first ensure printing is working as expected.

The PaperCut Mac client is supplied as a native Mac `.app` package. The client is delivered in two flavors:

1. The *current* client, which supports Mac OS X 10.7 (Mountain Lion) and above.
2. The *legacy* client, which supports Mac OS X versions from 10.4 to 10.6. It is a universal application that runs on both PowerPC and Intel hardware. The legacy client will not receive future feature enhancements.

Apple has switched to a yearly release cycle for Mac OS X, which means it is difficult to keep this documentation up to date. For the most recent and up-to-date information on current best practices, see the [Knowledge Base](#).

### For Mac OS X 10.7 and later

*Utilizing LaunchAgent:*

For Macs running 10.7, 10.8, 10.9, 10.10, 10.11, and later, the best way to establish set launch behavior patterns for the PCClient.app is to use LaunchAgents managed by LaunchD. For more information, see <http://www.papercut.com/kb/Main/MacClientStartupWithLaunchd>.

### For legacy Mac OS X (10.6 and earlier) solutions:

For Macintosh computers running versions of Mac OS older than 10.7, the following three common installation methods cover most situations. The instructions for the "single user install" follow the standard Mac application installation process and can be conducted by any Mac end-user. The other installation methods are more technically focused and aimed at Mac network administrators.

*Special Notes for Mac OS X 10.6 and earlier*



**Note:** The current version of the PaperCut client does not work on Mac OS X 10.6 and earlier. For these systems the legacy client must be used. If the client fails to start, ensure you are using the correct client for your system.

The legacy client is found in `[app-path]/client/legacy`. Use this path to locate the client when referenced in the following sections.

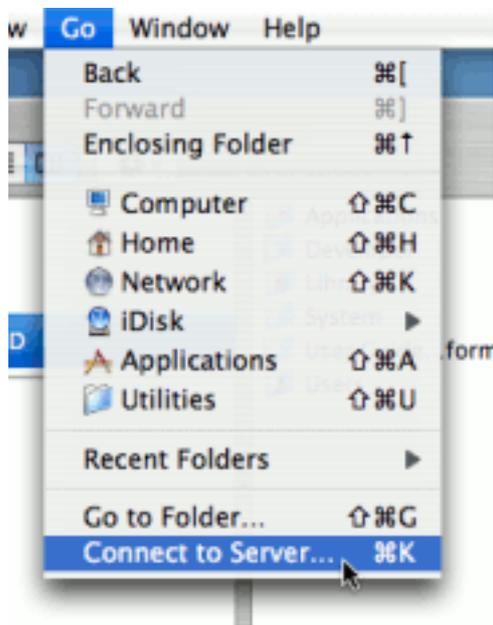
The legacy client software works best if Java 5 (or higher) is installed. Java 5 is available for OS X 10.4 or above. If Java is not already installed, the installer is available from the Apple website. This simplest way to install Java is to run **/Applications/Utilities/Java Preferences** from OS X Finder, and you are prompted to complete the installation.

## Single User Install

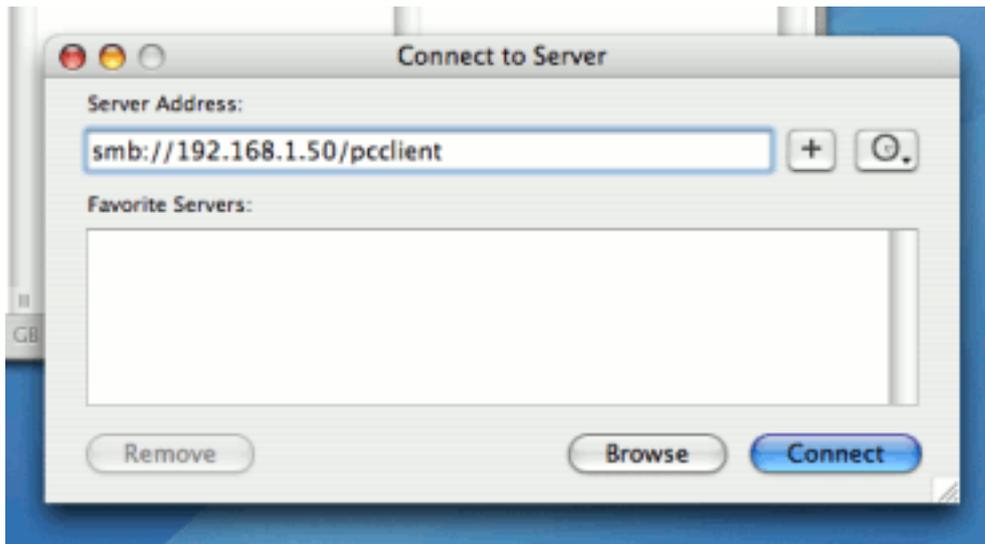
This method is suitable for a Mac computer used by a single user. For example, a personal Mac desktop or laptop. The installation process involves clicking the `client-local-install` program. This copies the `PCClient` application into the over to the system's `Applications` folder and starts the client in the "confirm network identity" mode. The simplest way to run the install process is to connect to a Windows server's `pcclient` share over the network, however, alternate methods such as copying the folder contents via a USB key or drive are also possible.

To install the Mac client from a server's share:

1. Start and Log in to the Mac computer. Ensure it's connected to the network.
2. Open the **Finder**.
3. From the **Go** menu, select **Connect to Server**.



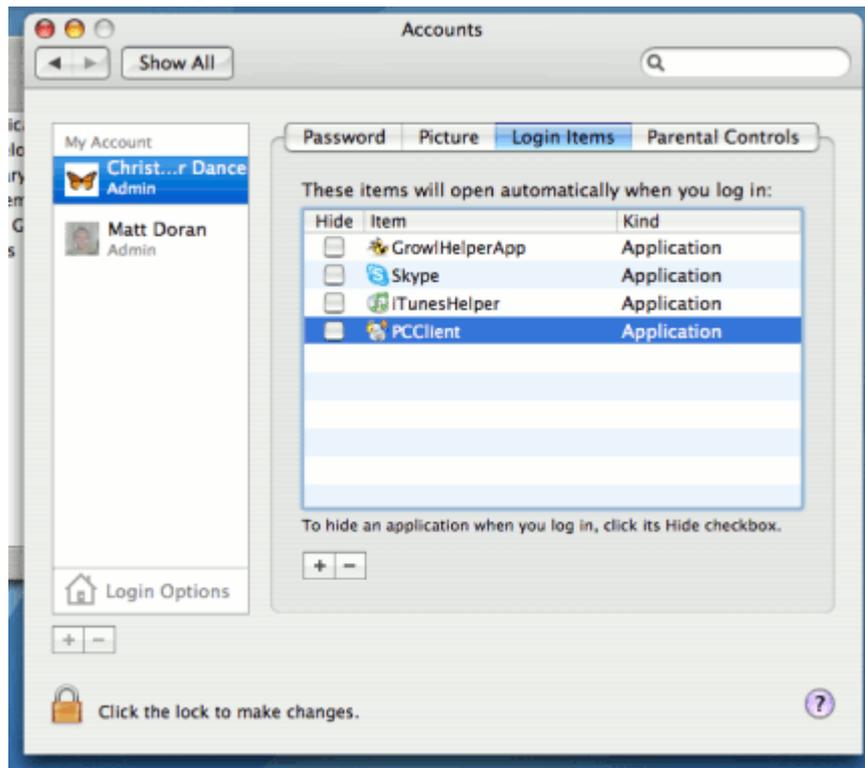
4. Enter the `pcclient` share's connection details, such as: `smb://server_name/pcclient`.



5. Enter password information if requested.
6. Double-click the `client-local-install` file. This executes a small AppleScript program that starts the install/copy process. (If installing on a legacy system (OS X 10.6 or lower) you must install the legacy client located in the `legacy` folder.)
7. Test the application by double-clicking the `PCClient` application icon in the system's local `Applications` folder.

If the user needs the client for printing - for example, to use the shared account popup - it's advisable to configure the application to automatically open upon start-up:

1. Open **System Preference** from the **Apple** menu.
2. Select **Accounts**.
3. Select your login account.
4. Click the **Login Items** tab.
5. Click + and browse and locate the `PCClient` application.



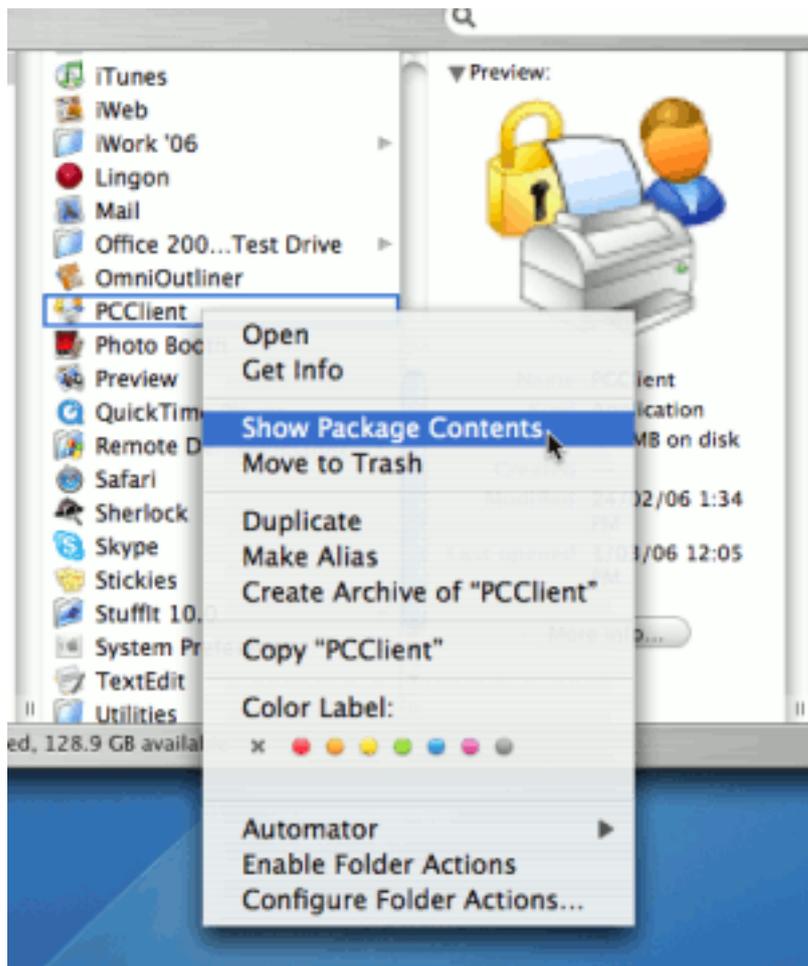
6. Test by restarting the computer. The client should start automatically after the reboot and login procedure is complete.

## Multi-User Install

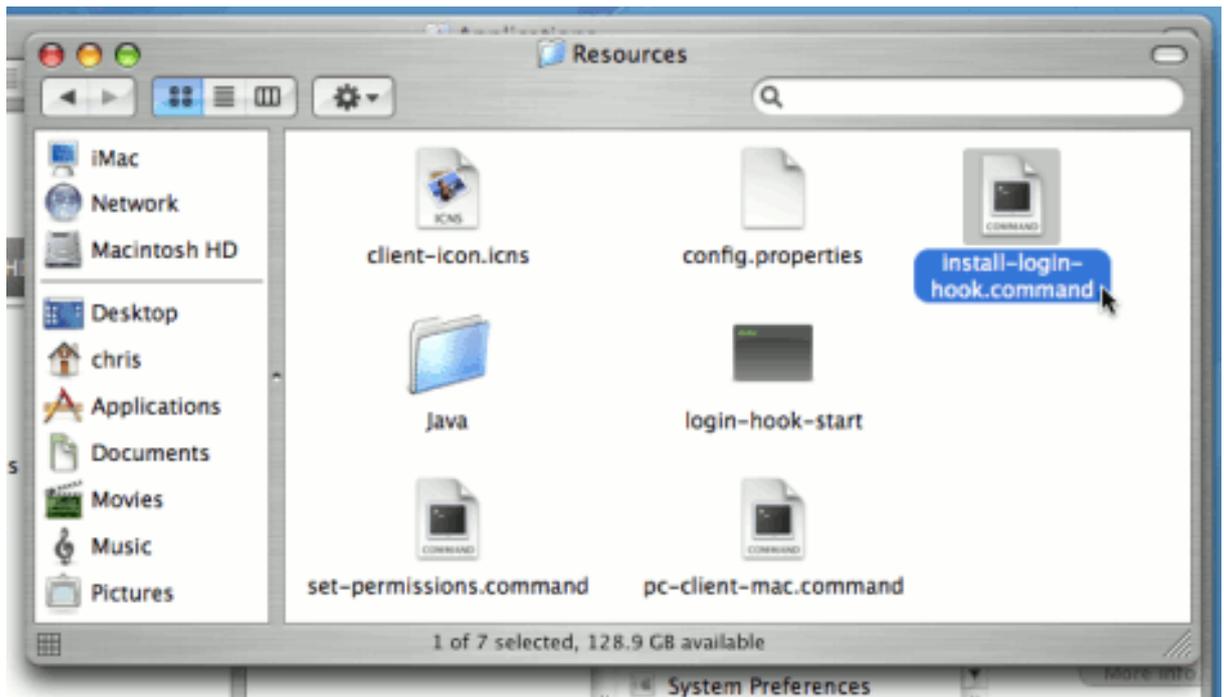
On a multi-user Mac system, setting up a **Login Item** for each user would be a tedious task. To streamline this process, you can configure the **PCClient** application to start on login via the login hook. A login hook is an advanced Mac feature that works by running a script when a user logs in. The **PCClient** package includes a command script resource that installs the login hook.

To install the client on a multi-user system:

1. Start and Log in to the Mac computer. Ensure it's connected to the network.
2. Open the **Finder**.
3. From the **Go** menu, select **Connect to Server**
4. Enter the pcclient share's connection details like: `smb://server_name/pcclient`
5. Enter password information if requested.
6. Drag the **PCClient** (or `legacy/PCClient` on OS X 10.6 or lower) package over to the local hard disk's **Applications** folder. The copy process begins.
7. **Control+click** the newly copied **PCClient** application in the **Applications** directory.

**Select Open Package Contents.**

8. Navigate to `Contents/Resources/`.
9. Double-click the `install-login-hook.command` script.



- Restart the system and verify the client starts on login.

**Important:** If you're already using a login hook for other script tasks, the setup process is different. Instead in step 9, double-click the `set-permissions.command` file. Then insert the following line at the end of your current login script (all on one line):

```
/Applications/PCClient.app/Contents/Resources/login-hook-start "$1"
```

The `set-permissions.command` script ensures the software is set up with the correct permissions, ensuring it's accessible to all users.

You can remove the login hook, once installed, with the terminal command:

```
sudo defaults delete com.apple.loginwindow LoginHook
```

## Zero-Install Deployment

This deployment method is for advanced Mac network administrators and is suitable for medium to large Mac networks. Knowledge of the Mac's Unix underpinning and scripting is required.

A more flexible option over locally installing the `PCClient` package on each Mac system, is to directly launch the client from the `pcclient` share. The advantage of this deployment method is that any updates applied on the server (and updates to the client directory) are automatically propagated to all workstations.

The process of setting up zero-install deployment varies from network to network depending on the directory environment in use and administrator preferences. The process can, however, be summarized as:

1. Configure the Macs to mount the `pcclient` share as a volume on login or start-up.
2. Configure a login hook to start the client off the share. The `install-login-hook.-command` resource script explained in the multi-user install above might help.

The typical way to mount the share is to use `mount_smbfs` in a boot script. See the Apple documentation on `mount_smbfs` at: [http://developer.apple.com/documentation/Darwin/Reference/ManPages/man8/mount\\_smbfs.8.html](http://developer.apple.com/documentation/Darwin/Reference/ManPages/man8/mount_smbfs.8.html)

Further information on Mac printing is available at [Mac Printing in Detail](#).

## Deployment on Linux and Unix

You can deploy the PaperCut MF User Client software on Linux and other Unix based operating systems using the following installation procedure.

### Step 1 - Install Java 8.0+

Linux and Unix workstations are supported via Java. Java version 8.0 or higher is required. Your Linux distribution might have Java pre-installed or have the option to install. If no Java option exists, Oracle provides a self-install Java distribution for Linux and other major Unix platforms.

Ensure Java 8.0 is installed and the `JAVAHOME` environment variable is defined on the `PATH`.

### Step 2 - Copy (or Mount) the PaperCut MF User Client files

Similar to the Windows version of the client software, the Linux/Unix Java version is installed in the `~/client` directory on the server. Copy or make available to the Linux/Unix workstation, all files in this directory. Common methods include:

- Copying the files from the server using file transfer programs such as FTP or scp.
- If the server is Windows based, connecting using `smbclient` or the Gnome or KDE `smb://` file browsing tools. The client files are shared via a read-only share called `\\[server_name]\PCClient`.
- If the server is Linux based, consider exporting the `~/papercut/client` directory via NFS and mounting on the workstations. The client can then be ran directly from the mount.

If the workstation is used by multiple users, copy the client directory to a common location such as `/usr/local/papercut/client`.

### Step 3 - File permissions

Open a command prompt and set execute permissions on the `pc-client-linux.sh` file as follows:

```
cd /usr/local/papercut/client
chmod 755 ./pc-client-linux.sh
```

## Step 4 - Testing

Log on as a user (a user listed in the PaperCut MF system) in your preferred Linux desktop GUI environment. Locate and execute the file `/usr/local/papercut/client/pc-client-linux.sh`. The PaperCut MF client should open displaying the user's account balance.

It is usual to configure the client as a "Startup Program" or "AutoStart Program" launched during login. See your desktop documentation to see how to define a startup program.

A number of command-line options are available to change the client's behavior. For more information, see [User Client Options](#).

### 4.1.5. User Web Pages

The User Web Pages are accessed either via the **Details** link on the *User Client* window, or via the browser URL `http://[server_name]:9191/user`.

The User Web Pages provide a range of services for users, including:

- *Summary*: A summary of usage and balance history.
- *Shared Accounts*: Lists the shared accounts that the user can use for printing.
- *Rates*: The current costs for printing usage.
- *Use Card*: Add balance by using a TopUp/Pre-Paid Card.
- *Add Credit*: Add balance from an external payment system (when using the payment gateway module).
- *Transfers*: Transfer funds to other users.
- *Transaction History*: A history of balance transactions.
- *Recent Print Jobs*: A list of the user's recent printing.
- *Jobs Pending Release*: Print jobs pending release (when using a Release Station).

The services available provide a range of functionality that empowers users to make the most of PaperCut MF without requiring intervention from administrators. The user web pages allows users to do what they need for themselves, and quickly get back to what they were doing.

You can switch many of the services on or off as required. This is useful for situations where a particular service is not suitable for exposing to the users. For example, you can disable the ability for users to transfer funds.

Each service is discussed in the following sections.

#### 4.1.5.1. Summary

This page provides a summary of the information most important for a user, including their current balance, a summary of their printing usage, and a graph of their balance history.

## Summary

Username	tom beresford
Balance	\$48.70
Total print jobs	3
Total pages	3

## Activity



### 4.1.5.2. Environmental Impact

One of the primary aims of PaperCut MF is to reduce printing levels by changing a user's printing behavior. Implementing monitoring, quotas and charging are a good way of drawing a user's attention to their habits. The topic of the environment, global warming, and waste management is currently an area of debate and interest to many. Highlighting the environmental aspects of their activities is another good way of modifying a user's behavior.

The *Environmental Impact* section is displayed on the *Summary* page and provides the user with feedback on the environmental impact or footprint associated with their activities. Information presented includes an indication on how their printing equates to trees, CO<sub>2</sub> emissions and energy.

For more information about how these values are calculated, see [Environmental Impact](#). If desired, you can disable this option using the **Options** section.

 0.0% of a tree

 50 g of CO<sub>2</sub>

 3.2 hours running a 60W light bulb

Since Apr 13, 2015

 [Environmental Dashboard](#) <sup>↗</sup>

### 4.1.5.3. Shared accounts

Shared accounts page lists the balances of the shared accounts that a user can access.

Account Name	Balance	Restricted
Art Department	\$80.50	No
Commerce Department	\$109.20	No
Economics Department	\$9.80	No
English Department	\$10.00	No
Finance Department	\$10.00	No
History Department	\$160.90	No
IT Department	\$10.00	No
Marketing Department	\$50.80	No
Maths Department	\$30.50	No
Office	\$99.60	No
Science Department	\$110.00	No

For more information, see [Shared accounts](#).

### 4.1.5.4. Rates

The rates page lets users know the printing costs associated with each printer. Displaying costs to users is a good way for them to see and understand the costs involved without having to spend time distributing the information to them.

Armed with this information, users can seek the most cost effective way to manage their printing. With discounts for grayscale and duplex printing clearly visible, ink and paper usage is reduced by the users own accord.

## Printing Rates

Printer ▲	Page Cost	Grayscale Discount	Duplex Discount	Details
windows-server\Office Printer	\$1.00/sq. meter	\$0.10 less per page	\$0.20 less per page	
desktop-tom\Library MFP	\$0.12			
<a href="#">desktop-tom2\TestPrinter</a>	\$0.10			
<a href="#">linux-server\Office MFP</a>	\$0.10			
<a href="#">mac-server\Wide Format Printer</a>	\$0.10			
<a href="#">windows-server\Library MFP</a>				<a href="#">[ details ]</a>
<a href="#">windows-server\Library Printer</a>	\$0.10			

\*Large paper = larger than Legal or ISO A4

Size	Grayscale Cost	Color Cost
A3 (ISO_A3)	\$0.60	\$1.20

### 4.1.5.5. Use Card

From here users can use a TopUp/Pre-Paid Card. When a valid card number is entered, the value of the card is transferred to the user's balance. More information about cards is available in [TopUp/Pre-Paid Cards](#).

#### Redeem Card

Enter the Card number and press the "Redeem Card" button to redeem.

NOTE: All requests to redeem cards are logged.

Card number

### 4.1.5.6. Add Credit

The Add Credit page is used to transfer funds into a user's account from an external source. This option is available when using the payment gateway module for integration with an external system.

### 4.1.5.7. Transfers

This page allows users to transfer credit to other users. Transferring balance is useful in situations such as:

- A student transferring credit to a fellow student for printing something for them
- A teacher transferring credit to a student for extra printing
- Teachers trading printing credit between each other

#### Transfers

<b>Transfer from</b>	Tom Beresford
<b>Available credit</b>	\$48.00
<b>Amount</b>	<input style="width: 80%; border: none;" type="text" value="\$0.00"/>
<b>Transfer to user</b>	<input style="width: 90%; border: none;" type="text" value="paul"/>
<b>Comment</b>	<input style="width: 95%; border: none;" type="text" value="For printing my communications assignment - thanks!"/>

### 4.1.5.8. Transaction History

The transaction history page displays a user's balance history in detail. Here a user can see how, when any why their balance was affected. If there is ever doubt about why a user's balance is at

the current amount, or what they have been spending their credit on, the transaction history page has the answer.

Show Filter (filter active: [remove](#))

Transaction Date ▼	Transacted By	Amount	Balance After	Transaction Type	Comment
Jan 17, 2012 10:02:54 AM	[system] (print)	-\$0.10	\$48.00	<a href="#">Printer Usage</a>	
Jan 17, 2012 10:02:18 AM	[system] (print)	-\$0.10	\$48.10	<a href="#">Printer Usage</a>	
Jan 17, 2012 10:01:35 AM	[system] (print)	-\$0.20	\$48.20	<a href="#">Printer Usage</a>	
Jan 17, 2012 10:00:40 AM	[system] (print)	-\$0.10		<a href="#">Printer Usage</a>	
Jan 16, 2012 11:19:02 AM	[system] (print)	-\$0.10			
Jan 16, 2012 11:18:02 AM	[system] (print)	-\$0.10			
Jan 6, 2012 11:49:19 AM	[system] (print)	-\$0.10			
Jan 6, 2012 11:49:00 AM	[system] (print)	-\$0.10	\$48.80	<a href="#">Printer Usage</a>	

**Printer Usage**

- Printer: desktop-tom2/Library MFP
- Document: PaperCut NG : Recent Print Jobs
- Total pages: 2
- Cost: \$0.20

[Export/Print](#)   

### 4.1.5.9. Recent Print Jobs

This page displays the user's printing history. It allows a user to see the cost of their print jobs, or to find a particular print job. The filter criteria allows for many different views of printing, and can be used to easily drill-down to find the information required.

Show Filter (filter active: [remove](#))

12

Date ▼	Charged To	Printer	Pages	Cost	Document Name	Attribs.	Status
Jan 17, 2012 1:47:57 PM	tom beresford	linux-server/Library Printer	1	\$0.10	Final Poster.pdf	LETTER (ANSI_A) Duplex: Yes Grayscale: No 1,486 kb DESKTOP-TOM2 Postscript	 <a href="#">Cancelled</a>  <a href="#">Not Charged</a>
Jan 17, 2012 11:10:15 AM	tom beresford	desktop-tom2/Office Printer	1	\$0.06	Faculty Spending.xlsx	LETTER (ANSI_A) Duplex: Yes Grayscale: No 25 kb DESKTOP-TOM2 Postscript	 <a href="#">Printed</a> <a href="#">request refund</a>
Jan 17, 2012 10:59:58 AM	tom beresford	windows-server1/Library Printer	19	\$0.00 <small>(Original cost: \$1.90)</small>	Microsoft Word - assignment-science.docx	A4 (ISO_A4) Duplex: No Grayscale: No 24 kb DESKTOP-TOM2 EMF	 <a href="#">Cancelled</a>  <a href="#">Refunded</a>
Jan 17, 2012 10:48:15 AM	tom beresford	desktop-tom2/TestPrinter	48	\$4.80	Microsoft Word - Biology Homework.docx	A4 (ISO_A4) Duplex: No Grayscale: No 55 kb DESKTOP-TOM2 EMF	 <a href="#">Printed</a> <a href="#">request refund</a>
Jan 17, 2012 10:46:13 AM	tom beresford	desktop-tom2/TestPrinter	1	\$0.10	Microsoft Word - assignment-science.docx	A4 (ISO_A4) Duplex: No Grayscale: No 2 kb DESKTOP-TOM2 EMF	 <a href="#">Cancelled</a>  <a href="#">Not Charged</a>
Jan 17, 2012 10:02:54 AM	tom beresford	windows-server1/Library Printer	1	\$0.00 <small>(Original cost: \$0.10)</small>	Microsoft Word - assignment-science.docx	A4 (ISO_A4) Duplex: No Grayscale: No 4 kb DESKTOP-TOM2 EMF	 <a href="#">Cancelled</a>  <a href="#">Refunded</a>
Jan 17, 2012 10:02:18	tom	windows-server1/Library Printer	1	\$0.00 <small>(Original cost: \$0.10)</small>	Microsoft Word - Biology	A4 (ISO_A4) Duplex: No Grayscale: No	 <a href="#">Cancelled</a>

### 4.1.5.10. Jobs Pending Release

This page allows users to view and interact with jobs held in a hold/release queue. From here, users can release (print) the jobs that have been held in a managed queue. This allows for them to confirm the cost and details of the job before printing, and/or confirm their identity before the job is released.

Jobs awaiting approval prior to printing are listed below:

Auto refresh (Refresh in: 14) Your balance: \$48.00

	Submit Time ▼	Printer	Document	Client	Pages	Cost	Action
⌵	Jan 17, 2012 10:48:15 AM	desktop-tom2\TestPrinter	Microsoft Word - Biology Homework.docx	DESKTOP-TOM2	48	\$4.80	<a href="#">[print]</a> <a href="#">[cancel]</a>
⌵	Jan 17, 2012 10:46:13 AM	desktop-tom2\TestPrinter	Microsoft Word - assignment-science.docx	DESKTOP-TOM2	1	\$0.10	<a href="#">[print]</a> <a href="#">[cancel]</a>

More information about hold/release queues is covered in [Hold/release queues & Print Release Stations](#).

### 4.1.5.11. Web Print

Web Print is a printing solution ideal for laptops and other non-domain connected systems. This page allows users to upload documents for printing, rather than requiring the print queues to be installed on their system.

The user is guided through a wizard where they can select a printer, select options, such, as number of copies, and select a document to upload. The document is then queued for printing and the user can track its status from this page.

	Submit Time	Printer	Document Name	Pages	Cost	Status
	Jan 16, 2012 1:52:07 PM	desktop-tom2\TestPrinter	Poster.pdf			Rendering successful. Preparing job for processing.
	Jan 16, 2012 1:51:49 PM	desktop-tom2\TestPrinter	Biology Homework.docx	1	\$0.10	<a href="#">Held in a queue</a>

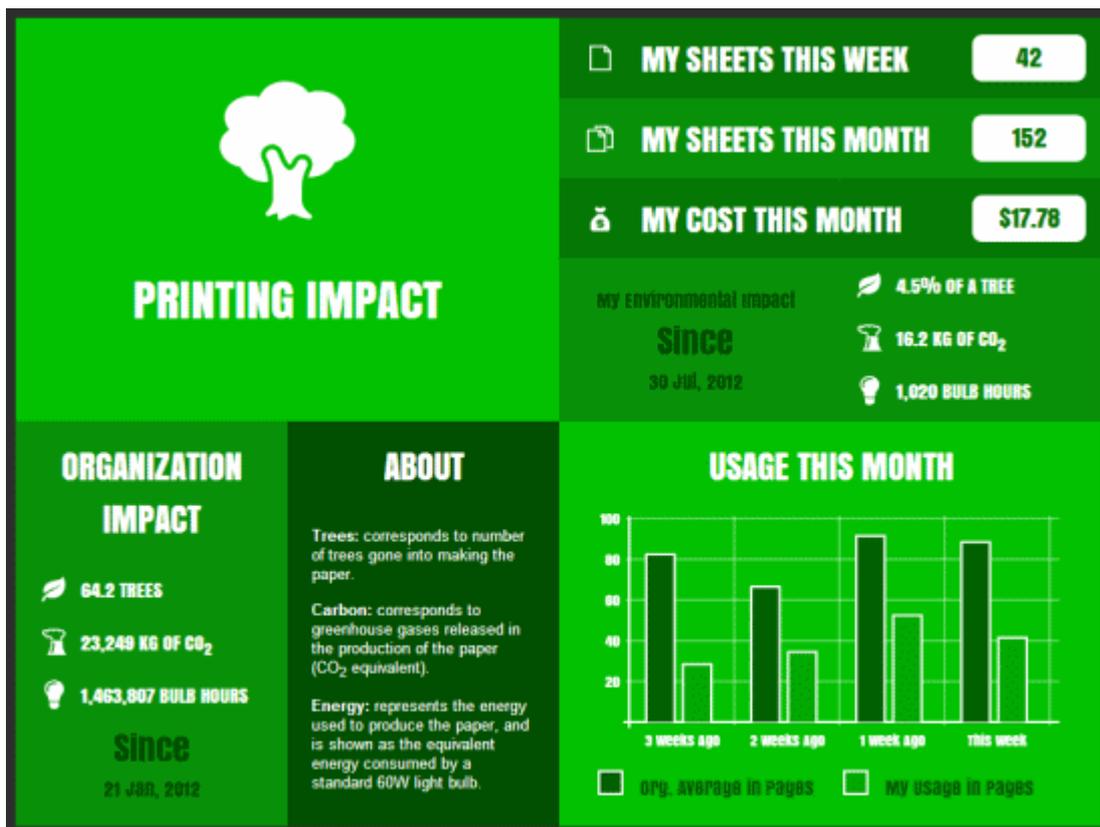
For more information, see [Web Print \(Driver-less printing via a web browser\)](#).

## 4.1.6. Environmental Dashboard / Windows Live Tiles

One of the most powerful features in PaperCut is not actually a feature at all - it's the culture change that it brings about in an organization. Most of this change is encouraged by increasing the visibility of the impact printing has on the company and the environment. The *Environmental Dashboard* and the *Windows Live Tile* is an innovative way to raise awareness. It promotes paper saving in a positive and creative way. For example:

- See your environmental impact front and center
- Benchmark your usage against others in the organization

- Reward and promote good user behaviour:
  - Award users for printing less
  - Encourage the user of duplex and grayscale
- It makes printing impact tangible and understandable:
  - Converting sheets into an "energy equivalent"
  - Emphasising forest conservation
  - Highlighting CO<sub>2</sub> emissions



### 4.1.6.1. Windows Live Tile

The increasing use of devices running Windows with a tile based interface (featured in Windows 8 and above) has opened up a new avenue to communicate to users. You can pin the Environmental Dashboard page to the Windows Start Screen to create a dynamic Live Tile. This Live

Tile communicates over 20 user-specific facts, awards and challenges all generated from real-time PaperCut data.

## Sending a positive message with the Live Tile

All too often, the IT department is implementing back-end systems or invisible projects. The PaperCut Windows Live tile is a highly visible and positive story, and is a great complement to other changes planned in your print management program.

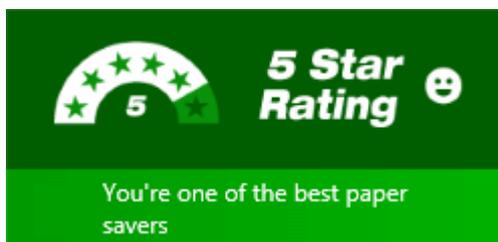
 **Tip:** Recently PaperCut was working with a large national retail organization and they were in the middle of a project to implement PaperCut's secure print release. There was push-back from various department heads worried that any barriers to printing were going to reduce productivity. The environmental impact statistics helped turn this reluctance around. In the end, the savings were so compelling the project's success was promoted not only internally but externally as a strong corporate and social responsibility story. Oh, and for once the IT guy was the hero!

Some suggestions:

- Encourage your users to bookmark their dashboard
- Draw Windows users attention to the Live Tile and encourage them to Pin it to their start menu. See [Windows Live Tile Installation](#).
- Link to the Environmental Dashboard on your intranet or monthly newsletter
- Share environmental impact information visually with management
- Challenge users to compare their live tile awards with their colleagues

## Windows Live Tile Examples

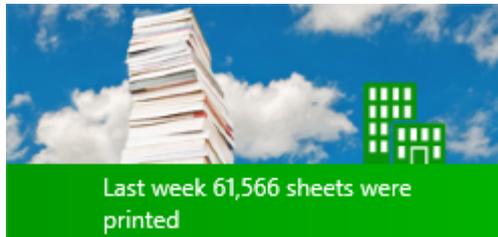
Below is a small sample of the 20+ tiles available:



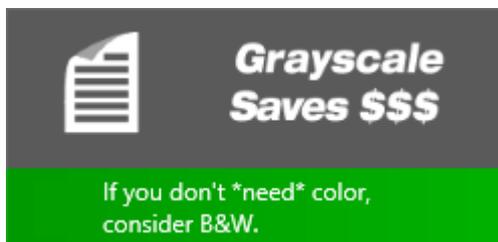


**Organization  
Print Impact**

Total annual printing uses  
59.9 trees per year



Last week 61,566 sheets were  
printed



**Grayscale  
Saves \$\$\$**

If you don't \*need\* color,  
consider B&W.



**Your Energy  
Equivalent**

Your yearly printing = 60W  
bulb for 294 hours

### 4.1.6.2. Windows Live Tile Installation

To pin the environmental live tile on the Windows Start Menu:

1. Go to the Start Menu (press the Windows key).
2. Open Internet Explorer or Edge in the Start Menu. (NOTE: The browser must be configured as the default browser to complete the pinning process).
3. Enter the URL below (where [server-name] is the hostname of your Application Server).

`http://[server-name]:9191/environmentaldashboard/`

4. Enter your network username/password. After successful login, the **Environmental Dashboard** showing your usage statistics is displayed.
5. Click the favorites button. 

6. For Internet Explorer, click the pin button. 

For Edge, click the menu button. 

7. Click **Pin to Start**. 
8. Press the Windows key to go back to the **Start** screen. The **Environmental Dashboard** is now pinned to the **Start** screen. Clicking the live tile opens the **Environmental Dashboard**.

After a short period the live tiles start displaying. Five distinct live tiles rotate displaying your environmental usage statistics, ratings, tips, etc. A new set of five tiles are retrieved every 30 minutes.



**Tip:** Although Windows usually starts displaying the live tiles after a short delay, sometimes it takes a few minutes for them to activate. If the live tiles are not displaying, changing the tile size can kick it into action. To do this, right-click the tile, select **Resize** from the bottom and select a different size. Then change the size again back to the "Wide" tile format.



**Important:** The Environmental Dashboard shows user level environmental information by default. If you do not want user level information to be available, you can turn it off by unchecking the `Show environmental impact information` check box found in the administration interface under **Options > General > User Features**. When this option is off, only organization wide environmental stats are shown in the live tiles and dashboard.

## Windows Tile Deployment

Windows has very limited options to automatically deploy the live tile through the organization.

You should provide instructions to your users on how to access the **Environmental Dashboard** and install the live tiles on Windows 8.1 and above. These instructions could be provided in an email or on the organization's intranet. The instructions should include information from [Windows Live Tile Installation](#) and [Using Environmental Dashboard on other browsers/platforms](#).

### 4.1.6.3. Using Environmental Dashboard on other browser-s/platforms

The Environmental Dashboard displays interesting environmental impact and printing statistics for the user and organization. The Dashboard is useful to all users and can be accessed using any web browser running on any platform.

The simplest way for to access the Environmental Dashboard is to open their web browser to:

1. Open a web browser to the following URL:

```
http://[server-name]:9191/environmentaldashboard/
```

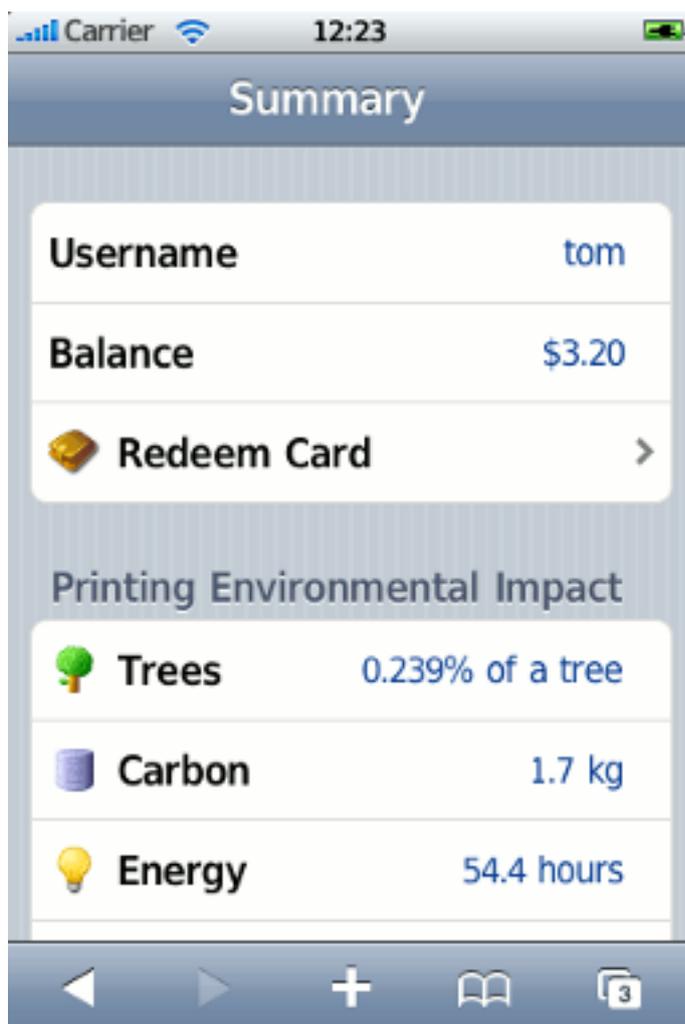
2. Enter their network username/password. After successful login you are taken to the **Environmental Dashboard** showing your usage statistics.



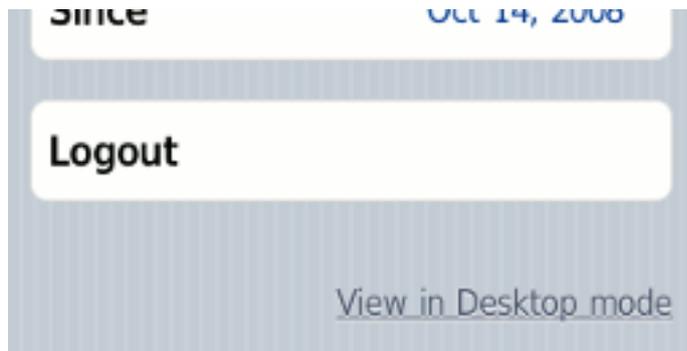
**Tip:** An alternate way to access the dashboard is to open a browser to the following URL (replacing [username] with their username): `http://[server-name]:9191/environment/dashboard/[username]/` This URL could be linked from the organization's intranet site if the user's username is known.

### 4.1.7. Mobile User Web Pages

When the user web pages are accessed from a mobile browser (e.g. Mobile Safari from an iPhone), the user is presented with a lightweight interface that is optimized for smaller screen sizes.



The user can view the user web pages in desktop mode instead by clicking **View in Desktop mode**



Features available in the mobile user web pages include:

- Checking user balance

<b>Username</b>	tom
<b>Balance</b>	\$3.20

- Viewing environmental impact statistics

Printing Environmental Impact	
 <b>Trees</b>	0.239% of a tree
 <b>Carbon</b>	1.7 kg
 <b>Energy</b>	54.4 hours
<b>Since</b>	Oct 14, 2008

- Redeeming a TopUp/Pre-Paid Card

The image displays two screenshots of a mobile application interface for redeeming a card.

The top screenshot shows the "Redeem Card" screen. It features a home icon in the top left corner. The main text reads: "Enter the Card number and press the 'Redeem Card' button to redeem." Below this is a note: "NOTE: All requests to redeem cards are logged." A large white input field is labeled "Enter card number".

The bottom screenshot shows the same screen after the card number "P-0810-1192-73" has been entered. Below the input field, there are three buttons: "Previous", "Next", and "Done". A numeric keypad is visible at the bottom of the screen, with digits 1-0 and symbols: -, /, :, ;, (, ), \$, &, @, and ".

For more information about the full (desktop) user web pages see [User Web Pages](#).

### 4.1.8. Gadgets/Widgets and more

Gadgets/Widgets are a lightweight application that sits on a user's desktop. Some versions of Windows (for example, Windows Vista and Windows 7) have in-built support for sidebar gadgets. The equivalent on the Mac is the Widget. PaperCut MF offers three useful Gadgets as well as a series of AJAX/JSON style embeddable components that can be leveraged by intranet developers.

### 4.1.8.1. Paper-Less Alliance Widget

PaperCut has teamed up with *Do Something*, the non-profit organization behind many environmental initiatives including *Save Paper* (<http://savepaper.com.au/category/save-paper/what-software-to-get>). The Desktop Widget, developed in Adobe Air works off the data in PaperCut. It is designed to help organizations reduce paper in a fun positive way. Highlights include:

- Draw user's attention to their environmental impact upon login
- Allow users to compare/benchmark their usage with the company/organization average
- Highlight facts fun about the environment and paper use
- Support a non-profit organization leading the paper reduction initiative

To download the widget, visit: <https://www.papercut.com/products/save-paper-widget/>



**Note:** Organizations deploying the widget are asked to make a small donation of less than \$1.00 a user to the Paper-Less Alliance. All proceeds go to the non-profit supporting paper saving initiatives and awareness.

### 4.1.8.2. Windows Gadgets

Two small footprint Windows Gadgets are available:

- *The Print Balance Gadget:* Used to display user's personal balance on the desktop or sidebar. This is called `PCBalance.gadget`.
- *The Environmental Impact Gadget:* Used to provide the users with feedback on the environmental impact associated with their printing activities. Highlighting the environmental aspects is useful in modifying a user's behavior towards printing. For more information about how these values are calculated, see the section called [Environmental Impact](#). This gadget is called `PCEnvironmentalImpact.gadget`.



To install a Gadget:

1. Log in as administrator
2. Browse to the share on the PaperCut MF server at `\\server-PCClient\win\Gadgets`
3. Copy all `*.gadget` folders to the local directory `C:\Program Files\Windows Sidebar\Gadgets`
4. Users should now see the PaperCut MF Gadgets as available Gadgets on the system.

### 4.1.8.3. Web Widgets

PaperCut MF also provides web widgets that you can easily embed within pages on your intranet site. These widgets work in a similarly to Google Web Gadgets or the Google Maps APIs. All that is required is to paste a few lines of HTML/JavaScript on your pages. There are two built-in web widgets that offer balance and environmental impact (and look identical to the Vista widgets

above). However, if the built-in widgets do not suit your needs you can create your own that better suit your site.

There are only two requirements to running web widgets on your intranet site:

1. You require edit access to the intranet pages to add the required HTML/JavaScript.
2. The username of the logged in user is required so the web widget knows whose details to load. This usually requires that users log in to the intranet. When using a Microsoft Active Directory domain and Microsoft IIS web server the user can be automatically detected if using NTLM or Kerberos authentication, which provides a transparent login process via the Web Browser.

The simplest way to get started with web widgets is to look at some examples. There are detailed and well commented examples available on the PaperCut MF server in the directory `[app-path]/server/examples/webwidgets/examples.html`. Use these examples as a starting point to implement web widgets on your site.

The basic steps to adding a web widget to a page are:

1. Add a `<div>` element to your page. The widget is drawn within this tag. The div element must be given a unique ID.
2. Include scripts into your page to load the widget and user data from the PaperCut MF.
3. Edit the included script to set `pcUsername` to the logged in user.
4. Edit the included script to set `pcServerURL` to base URL of the PaperCut MF server.
5. Add some script to draw the built-in widgets to the page. You can use one of the built-in widgets, or create your own.

## 4.2. Advanced User Management

This section covers some of the more advanced user management tasks. On large networks managing users on an individual basis is not practical. Management needs to be handled either via a level of automation, or manually at group level. Some common user management tasks that typically consume time on a large network include:

- Creating new user accounts
- Allocating user credit or quotas.
- Performing administration tasks such as allocating additional allowances or applying different privileges.
- Generating or allocating card/ID numbers for users

PaperCut MF offers a number of features to help automate these tasks.

## 4.2.1. Groups in PaperCut MF

Groups are collections of users. PaperCut MF uses the network domain or computer's groups, meaning administrators can take advantage of the existing network structure. Groups in PaperCut are used in the following ways:

1. To control how quota/credit is allocated to users on a regular basis.
2. To automate the addition of new (future) user accounts.
3. To assist with making modifications to user accounts by group.
4. For group based reporting.

PaperCut MF mirrors (caches) domain network group memberships for performance reasons. Therefore, changes in group membership made at the domain level might not be immediately reflected in PaperCut. You can refresh the group membership at any time using the **User/Group Sync** option under the **Options** section. Groups are mirror/cached for two reasons:

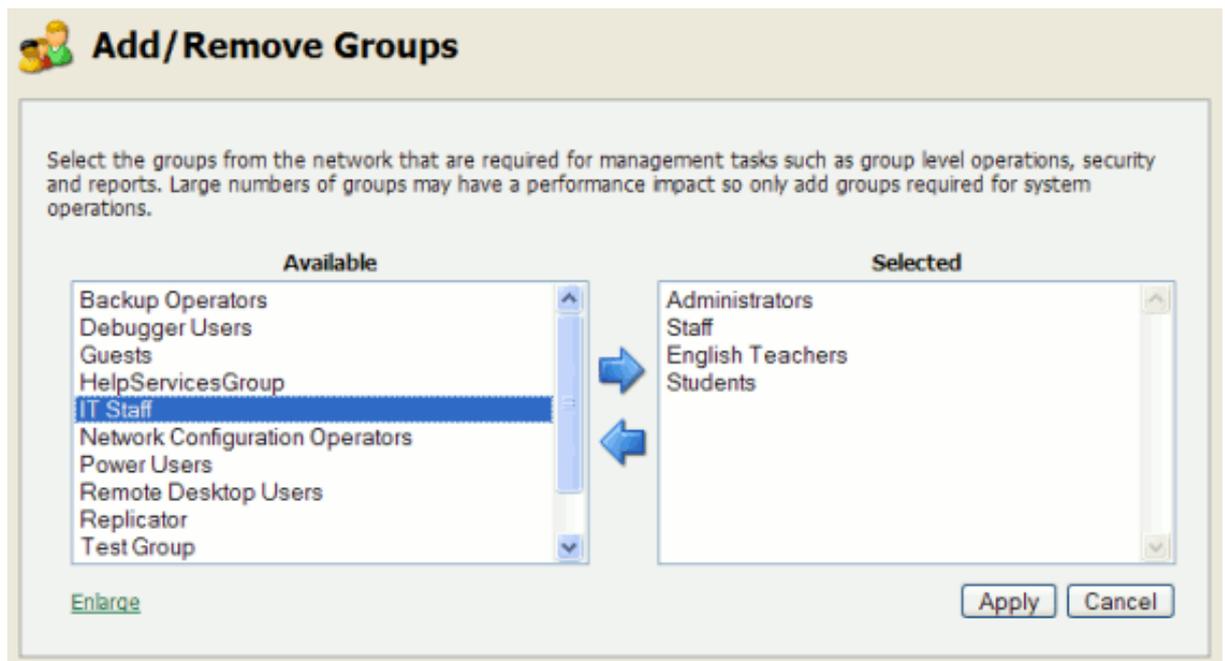
- For fast reporting and search performance.
- To ensure PaperCut MF is a good network application and does not overload domain controllers with group membership requests.

Many large networks can contain hundreds of groups and/or organizational units. In many cases only a small percentage of these groups are pertinent to PaperCut MF management. To ensure administrators are not overwhelmed with all groups, PaperCut MF only lists the groups selected as relevant by the administrator.

To add a group to PaperCut MF:

1. Navigate to the **Group** section.
2. Select the **Add/Remove Group** link at the bottom of the groups list.
3. Select the group(s) required on the left-hand-side and click the **Add** arrow.

4. Click **OK** to add the group(s).



PaperCut MF includes one built-in group called the `[all users]` group. This group is not related to any existing network group and is a "catch all" group that represents the *all users* list in the PaperCut system. It is similar to the "Everyone" special group in Windows.



**Note:** PaperCut MF sources groups and group members from your selected directory/domain source. There are, however, some situations where maintaining groups within the network directory source is not possible. For example, you might only have read-access to the domain. If for technical reasons it's not possible to define the required groups in your network directory, groups can also be defined via a text file (e.g. a tab-delimited file). Simply place your group definition file at the location `[app-path]/server/data/conf/additional-groups.txt`. See the template file `additional-groups.txt.tmpl` in the same directory for an example and further information. The `additional-groups.txt` can also be used to manage an internal user's group memberships.

## 4.2.2. Setting up quota allocations

In many organizations PaperCut MF is used to control and restrict users to sensible use by allocating a quota or allowance (a budget). For example, a user might be allocated \$10.00 a week. This type of control is particularly popular in schools and universities. You can automate the process of quota allocation using the **Groups** section.

To allocate a \$10.00 a week to members of the Students group:

1. Navigate to the **Groups** section
2. Add the `Student` group via **Add/Remove Groups** if not already listed.

3. Select the Student group
4. Under the **Quota Scheduling** section, select a period of Weekly and enter 10.00 in the **Schedule amount**.
5. Click **Apply** to save the change.

**Group Details: staff**

**Details**  
The group or organization unit's name.

**Group Name**  
staff

**Quota Scheduling**  
Quota can be added to users' accounts on a scheduled basis either daily, weekly or monthly.

If 'Only allow accumulation up to' is not selected, the user's balance will accumulate indefinitely.

If 'Only allow accumulation up to' is selected, the user's balance will only accumulate to the amount specified.

**Period**  
Weekly

**Schedule Amount**  
\$5.00

**Only allow accumulation up to:**  
\$10.00

To configure quotas correctly it is important to understand how quota allocations work. Users receive quotas for all groups they belong to. For example, consider the situations where `Students` and `Student Newspaper` groups are defined in PaperCut MF, with \$20/month and \$10/month quotas respectively. If a student belongs to both groups, they will receive a \$30/month of quota. If they belong to only the `Students` group, they will receive only \$20/month.

If you configure a quota on the special `[All Users]` group then all users in the system receive this quota in addition to quotas defined on other groups.

Credit will be assigned to group members at just past 12:00am (midnight) on the day of the schedule. Administrators can verify that this has taken place by inspecting log entries in the Application event log and/or users' transaction logs.

**Table 30: Quota schedule times**

Task	Time
Daily Allocations	Applied at 12 : 10am every day (7 days a week).
Weekly Allocations	Applied at 12 : 20am on Sunday.
Monthly Allocations	Applied at 12 : 30am on the first day of the month.
Custom Allocations	Applied at 12 : 10am on the given day (after the daily alloc-

Task	Time
ations	ations).

One potential issue associated with quota allocation in some organizations (for example, Schools or Universities) is that users can "bank up" their quota allowance over time leading to excessive use at periods of the year such as the end of semester. Use the **Only allow accumulation up to** option to implement a "use it or lose it" policy!

### 4.2.2.1. Custom Quota Scheduling Periods

In some cases, you might want to schedule quotas for unusual times. A good example of this is unusual term or semester start dates. The `Custom` quota scheduling period allows specifying any date for which to run quotas. To set a custom quota scheduling period:

1. Select the group for which to allocate quotas
2. Under the **Quota Scheduling** section, select a **Period of Custom**.
3. Enter a date in the ISO international date format `YYYY-MM-DD` (e.g. `2007-03-15`). You can enter multiple date, separated by a comma (e.g. `2007-03-15, 2007-08-20`). \* wildcards are supported.
4. Click **Apply** to save the change.



**Tip:** You can omit the year or replace it with a \* wildcard to specify that quota allocations should take place on the same date every year. The same is true for months. For example, entering `*-03-15` or `03-15` results in quotas being allocated on March 15th every year. Entering `*-*-15` results in quotas being allocated the 15th of every month of every year.

### 4.2.2.2. Advanced User Quota Management

Some organizations might require scheduling quota allocations for periods other than those available above. For example, an education organization might want to schedule quota allocation per term, semester (period) or academic year, which do not have set dates. You can achieve this with a manual update when necessary through **Bulk user actions** in the **Users** or **Groups** tab. For more information, see [Bulk User Operations](#).

You can also automate the allocation of user quota through the use of Server Commands (see [Server Commands \(server-command\)](#)) or XML Web Services (see [The XML Web Services API](#)).

### 4.2.2.3. Automated Quota Allocation Example

One way to automate quota allocation is through the use of Server Commands. Following is an example of how to use Server Commands to automate quota allocation in a Microsoft Windows environment:

North Shore High wants to automate their quota allocation on a per-term basis. There are four terms in a year, and terms do not necessarily start on the same date every year. Junior students are to receive \$5 per term printing budget, and senior students are to receive \$10 per term. The domain has the groups `junior-students` and `senior-students` to reflect the students' grade.

Using the information from [Server Commands \(server-command\)](#), you can see that the Server Command `adjust-user-account-balance-by-group` meets the needs of this situation. Create a batch file with a name, such as, `assign-term-quotas.bat` with content similar to the following (depending on your environment):

```
cd "C:\Program Files\PaperCut MF\server\bin\win"
server-command adjust-user-account-balance-by-group "junior-stu-
dents" \
+5.00 "$5 term budget for junior students"
server-command adjust-user-account-balance-by-group "senior-stu-
dents" \
+10.00 "$10 term budget for senior students"
```

**Note:**

Backslash indicates text should be displayed on the same line.

Running this script allocates \$5 to all members of the group `junior-students`, and \$10 to all members of the group `senior-students`. The script can then be scheduled to run at the specified dates by the use of a tool such as Windows Task Scheduler ( **Control Panel > Scheduled Tasks > Add Scheduled Task** ).

This example can be found with your PaperCut MF installation under `[app-path]\server-  
\examples\scripting\batch\assign-term-quotas.bat`.

### 4.2.3. New User Creation Rules

It is inevitable that new users will be added to your network in the future. To streamline account setup, PaperCut MF offers the option of having new users automatically assigned initial settings such as starting credit, privilege level, and other settings based on their group membership. Users are automatically added to PaperCut MF when either:

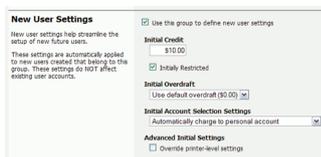
- The user sends his or her first print job
- Overnight during user/group synchronization
- When a manual user/group synchronization is performed

- When a user logs in (i.e. authenticates) to the User Client, Release Station or user web pages

Taking the time to configure initial settings rules means one less job for administrators to perform! The group based control offers maximum flexibility and ensures that it's possible to have a different set of initial settings rules for different types of users. This flexibility is particularly important in an academic environment where students of different year levels need different settings.

For example, an administrator might want to allocate new users belonging to the `Senior Students` group, a \$10 starting credit and allow them `restricted` access, while all other students receive \$5.00 starting credit.

New user creation rules are controlled under the **Groups > Group Details > New User Settings** section. When a new group is added it does not provide any new user settings. To enable user creation rules for a group the **Use this group to define new user settings** option must be enabled.



**Important:** Changes made to `new user` settings are in the **Groups** section only affect users *NOT* yet listed in the system. (i.e. future users). Any users *already* listed in the system are not affected. Initial user settings also do not apply when users change groups. To modify settings or credit on existing users, see **Bulk user actions** in the following section.



**Tip:** Initial settings can become confusing when a user belongs to more than one group. PaperCut MF uses the following logic to allocate initial settings:

- The user obtains a starting credit that is the sum of all the matching groups (the special `[all-users]` group is ignored).
- If any of the matching groups has `unrestricted` access, the user inherits unrestricted status.
- If any of the matching groups has account selection popup settings, the user inherits the ON settings.
- If the user does NOT belong to any group with new user settings defined, they inherit the settings applied to the special `[all-users]` group.
- The initial settings are applied from each group in alphabetical order. So for settings that cannot be merged (e.g. charge to single shared account), the last group alphabetically takes precedence.



**Tip:** To control when users are automatically created, see [On Demand User Creation](#).

## 4.2.4. Bulk User Operations

A bulk user operation refers to an operation that is applied to more than one user. This operation was referred to in previous PaperCut releases as "Group level functions". You can perform bulk operations on a user group or a comma separated list of users. Bulk user operations are best described by example.

### 4.2.4.1. Example 1: Bulk operation on a user group

John is a network administrator at a local high school. A number of students from each year level have been placed on the school newspaper committee. The head teacher has requested that John allocated an extra \$10.00 of printing credit to these students. The students are all in a network group called "NewspaperCommittee". John performs this operation as follows:

1. Click the **Bulk user actions** link under the **Users** section.
2. Select NewspaperCommittee as the group to perform the action on.
3. Select the **Adjust credit by** option; then enter \$10.00 in **Amount**.
4. Enter a transaction comment of "extra allowance for newspaper committee role".
5. Click **OK** to apply the change.

### 4.2.4.2. Example 2: Bulk operation on an ad-hoc list of users

Now, John wants to add \$10.00 credit to a list of users he has saved in an Excel spread sheet. John needs to perform this operation as follows:

1. Click the **Bulk user actions** link under the **Users** section.
2. Change the **Perform operation on users to in the list**.
3. Cut and paste the list of names from the spread sheet. This would generate a comma separated list of usernames.
4. Select the **Adjust credit by** option; then enter \$10.00 in **Amount**.
5. Click **OK** to apply the change.

### 4.2.4.3. Additional information

Bulk user operations apply changes to all users matching the selected group and other criteria. Settings under the **Groups** section or shared accounts are not affected.



**Warning:** Group level operations are one-way and cannot be undone. Always carefully consider the operation before proceeding. If you are unsure of the function or behavior, performing a backup prior to undertaking the operation is advised.

Other bulk user operations available under **Bulk user actions** include:

- Adjust or set the users' credit (perform a transaction).
- Change the users' restriction status
- Modify account selection popup options
- Reset the users' count statistics
- Apply user level overrides, such as, print cost adjustments, and disabling printer filters for a user
- Disable printing for a specified period of time
- Generate new card/ID numbers for users who don't have one

### 4.2.5. Using overdrafts

The overdraft setting applies to restricted users (and restricted shared accounts). An overdraft allows a user to continue to use services even though their account has dropped below zero. In essence, the overdraft value moves the "zero-point" allowing users to overdraw the account to the agreed limit. An overdraft can also be referred to as a credit limit.

Reasons for using an overdraft include:

- Provide users with flexibility between budget, quote or allocation periods. For example, an overdraft allows a user to "draw on" a portion the next month's quota allocation.
- To Implement a credit system with credit limits rather than an up-front pay system.
- Grant trusted users a "loan" on a case-by-case basis.

You can define an overdraft at two levels:

1. Globally as a default affecting all users and shared accounts.
2. On an individual user or account basis.

The default overdraft is zero. You can change this **Options > General > Account Options > Default overdraft limit**

Optionally, you can apply a separate overdraft to an individual user (or shared account) using the following procedure:

1. Click the **Users** section.
2. Select the user.
3. Ensure the account is set as **Restricted**.
4. In **Overdraft**, select the option **Individual overdraft**.

5. Enter a positive value in the adjacent overdraft balance field.
6. Click **Apply** to save the changes.



**Balance**

Restricted

**Overdraft**

## 4.2.6. Batch User Data Import and Update

The user data batch import and update feature allows the administrator to import users, user information and optionally update existing users details by reading data from a simple text file. It enables administrators to update the following user data:

- Credit balance
- Restriction status
- Full name
- Email address
- Department
- Office
- Primary Card/ID Number
- Card/ID PIN
- Notes
- Secondary Card/ID Number
- Other email addresses
- Username alias
- Home folder

Examples of where the batch user details import feature is useful include:

- To set the user email addresses that are stored in another system (like a student management system).
- When importing user and balance data from another external or legacy system.
- When moving user balances from previous PaperCut editions to PaperCut MF.

For more information on using the batch import to import data from previous PaperCut editions, see [Upgrading from PaperCut Quota](#).



**Tip:** PaperCut MF is designed to import user information from the underlying system or network domain. The batch user data import feature is not designed to replace this but rather complement it by allowing importing of user data from other systems or sources. For more information about managing a set of users in addition to those in a user directory, see [Internal users \(users managed by PaperCut NG\)](#).

To perform a batch import:

1. Manually inspect your file in a text editor and ensure it's in the prescribed tab-delimited format as detailed at [Batch User Import File Format](#).
2. Navigate to the **Users** section.
3. Click the **Batch import** action (on the left).
4. Click **Browse** to select the file to import. (The format of the file is described in [Batch User Import File Format](#)).
5. Choose whether you want the import to create new users if they do not already exist. If you clear this check box, lines that contain users who do not exist are ignored and only existing users are updated.
6. Click **Import**.
7. Upon completion you are told how many users were updated and how many users were created.



**Caution:**

Batch imports are a major operation modifying data en masse. Best practise suggests:

- Always run a backup *before* proceeding with the import.
- First experiment/test the import process with a small batch of users before moving onto the full batch.

#### 4.2.6.1. Batch User Import File Format

The import file is in tab delimited format and contains the following fields in the given order.

**Table 31: User Import File Format**

No.	Field	Description	Optional?	Limitations
1.	Username	The user's	Mandatory	Max. 50 characters

No.	Field	Description	Optional?	Limitations
		username		
2.	Credit Balance	The user's credit balance	Optional - balance not set if blank	A number with no currency symbol or separators, using a full stop for the decimal separator. Correct: 1.23 Incorrect: \$1.23 or 1,23 or 1,023.00
3.	Restricted Status	The user's restricted status. (Y/N)	Optional - restricted status not set if blank	
4.	Full Name	The user's full name	Optional - full name not set if blank	Max. 255 characters
5.	Email	The user's email address	Optional - email not set if blank	Max. 255 characters
6.	Department	The user's department or faculty	Optional - department not set if blank	Max. 200 characters
7.	Office	The user's office or location	Optional - office not set if blank	Max. 200 characters
8.	Card/ID Number	The user's primary identity/card number	Optional - card/id number not set if blank	Max. 100 characters, case insensitive
9.	Card/ID PIN	The user's card PIN number	Optional - card/id PIN not set if blank. If the field is '-' then	Max. 20 digits

No.	Field	Description	Optional?	Limitations
			the PIN is set to zero.	
10.	Notes	Notes about the user.	Optional - notes not set if blank	Max. 2000 characters
11.	Secondary Card/ID Number	The user's secondary identity/card number	Optional - secondary card/id number not set if blank	Max. 100 characters, case insensitive
12.	Other email addresses	The user's other email addresses	Optional - other email addresses not set if blank	Email addresses must be separated by commas
13.	Username alias	The user's alias. Only useful if username aliasing is enabled	Optional - alias not set if blank	Max. 100 characters, case insensitive
14.	Home folder	The user's home folder	Optional - required for scanning to a user's home folder.	Max. 256 characters

*Other limitations:* Although any actual limit to the size of an import file should be large enough for any purpose, we recommend keeping the file size below 10MB.



**Tip:** A simple way to create a tab delimited file is to create a spreadsheet in Microsoft Excel, and then save it in the `Text (Tab delimited)` format.

## Import File Format Examples

The following lines shows importing all the above fields. (The fields are separated by tabs).

```

matt 20.00 Y Matt mat- Science Dept Head \
      John- tj@email.com offic-
      son e
10325-91225-Note-
1 4 A
john 25.00 N John jj@domain.com Admin- Other \
      Jack- istration offic-
      son e
96325-12325-Note-
4 4 B

```

**Note:** backslash indicates text should be displayed on the same line.

The following lines shows importing user email addresses only. NOTE: That the tabs still exist for balance, restriction, full name fields, but each entry is blank.

```
matt mattj@email.com john jj@domain.com
```

The following lines shows importing the credit balance and full name for the first user and the credit balance and email address for the second user. NOTE: That the tabs characters still exist for blank fields.

```
matt 10.00 Matt Johnson john 15.00 jj@domain.com
```

For more examples, refer to the following files in the install directory:

```

[server install]/server/examples/import/user/external/batch-
user-example.tsv
[server install]/server/examples/import/user/batch-internal-
user-example.tsv

```

## 4.2.7. User card and ID numbers

PaperCut MF supports two closely related features: card and ID numbers:

1. A *card number* is the number read from a swipe or proximity card assigned to a user. Swipe and proximity cards are often used for user authentication at hardware terminals, copiers and print Release Stations.
2. An *ID number* is a unique number allocated to a user. It can represent a student or employee number or can be a random number. It can be keyed in at a copier, hardware terminal or Release Station as an alternative to username/password authentication. As ID numbers can be guessed or learnt by others we recommend a secret PIN be used in conjunction with an ID number when used for user authentication.

As both card numbers and ID numbers function as a unique number identifying a user, they both share the same field in the User record of the database - the card/ID number. This means that all administrative functions related to card numbers and ID numbers are the same - because they operate on the same database field.



**Tip:** Although we use the term "number", PaperCut permits any string containing both letters and numbers in the card/ID field. If used as an ID number to be typed at a numeric keypad, a purely numeric number is best. ID numbers generated by PaperCut are always purely numeric.

One more thing to know is that PaperCut MF actually supports two different card/ID numbers for each user. These are called the primary and the secondary card/ID number. There are many reasons why having two numbers is useful. For example:

1. One number can be for a card, and the other for an ID number in case the user misplaces his or her card.
2. Different card readers can sometimes read different numbers from the same card - so having two numbers allows both types of readers to be supported.
3. You can issue new cards to users and phase out the old card with an overlap period in which they both work.

Use of either the primary or secondary card/ID number field is optional - the decision is up to your organization.

PaperCut offers a range of tools for managing card/ID numbers allowing for either centrally managed or user managed card/ID numbers:

1. Automatic generation of numbers within PaperCut (See [Automatic Card/ID Generation](#))
2. Batch update from an external file (See [Batch User Card/Identity Update](#))
3. Import from AD or LDAP (See [Card/Identity Numbers Sync](#))
4. Lookup via an external database (See [Database lookup configuration](#))

### 4.2.7.1. Automatic Card/ID Generation

PaperCut can generate random card/ID numbers for your users. This might be the ideal solution if you don't already have ID numbers assigned for other purposes. PaperCut provides a number of options allowing you to choose whether to centrally administer the card/ID numbers or to allow users to generate and manage their own numbers. You can:

1. Enable users to manage their own card/ID number and/or PIN. (See [Allowing users to manage their own card/ID number and/or PIN.](#))

2. Generate card numbers during your nightly user/group sync operation (See [Card/Identity Numbers Sync.](#))
3. Generate numbers as a Bulk User Operation. (See [Bulk User Operations.](#))

When generating numbers on behalf of users, inform users what their number is. PaperCut can help with this task as well. You can:

1. Send an email to each user with their new number. This is set up in **Options > Notifications > Card/ID Number Notification** . See [Card/ID Number Notification](#) for more information.
2. Allow users to view their number in the user web portal. To enable this feature, select the **Allow users to view their card/ID numbers** check box in **Options > General > User Features** . Specify whether you want users to view their primary or secondary card/ID number.



**Tip:** When generating card/ID numbers, you are asked to specify the length or number of digits you require in the generated numbers. Short numbers are easier to remember and faster to key in, but it is also easier to guess someone else's number. If your number is too short, PaperCut cannot generate sufficient numbers to cover all your users. A good rule of thumb is to make the number 3 digits longer than the number of users in your organization. If you have 10-20 users, a 4 digit number is probably sufficient. However, if you have 1000 users, you probably need a 7 or 8 digit number.

## Allowing users to manage their own card/ID number and/or PIN

You can allow users to manage their own card/ID number or PIN or both. These options are controlled in **Options > General** and result in different functionality in the **Change Details** menu item of the end-user web interface.

### Editing card/ID PIN

When using card number and PIN authentication, you might want to allow users to change their PIN in a similar way to changing passwords.

To enable this feature:

1. Navigate to **Options > General**.
2. Enable the option **Allow users to change their card/ID PIN**.

When users log in to the end user web interface, the option **Change Card/ID PIN** is available under the **Change Details** menu item.

## User Generating the card/ID number

You can allow users to generate their own card/ID number from the **Change Details** page:

1. Navigate to **Options > General** .
2. Enable the option **Allow users to change their card/ID number** and then select which card number they can change. Users can edit the primary number, or the secondary but not both.
3. Select the **Auto-generate random number (users cannot manually enter a number)** check box. This option gives users the ability to generate a new random number, but not to create a number of their own choosing.

If this check box is cleared, users can select any number they want. **Please note that this may be a potential security risk as it may allow users to confirm the existence of a valid card number used by someone else.** We recommend that sites enable two-factor authentication by also requiring users to have a secret PIN number.

Note: To change the number of digits used when users auto-generate their own card/ID number, change the **user.auto-generate-card-id.length** value by using the **Config Editor**. In version 14.3 or later, you can also set this in the Admin interface under the **Auto-generate random number** option, by setting the 'Length' value.

Users can then log in into the end user web interface and under the **Change Details** menu, the **Change Card/ID** option is available.

### 4.2.7.2. Batch User Card/Identity Update

The batch user card/ID update feature allows the administrator to update user card/ID numbers and optionally import or update PINs by reading data from a simple text file. User card/ID numbers can also be imported using the batch user import/update feature (see [Batch User Data Import and Update](#)).

Example: To update/import the card/ID numbers or PINs of all the users in the import.txt file on a windows system.

```
C:\> cd C:\Program Files\PaperCut MF\server\bin\win
server-command batch-import-user-card-id-numbers "C:\card num-
bers\import.txt"
```

Note: Quote the import path if it contains spaces.



#### Important:

The card/ID number must uniquely identify a user, so take care to ensure that no two users have the same card/ID number. Make sure the card/ID numbers defined in the import file are unique. If PaperCut MF encounters a non-unique card/ID number, that user is not updated.

Perform a batch user card/ID update by calling the `batch-import-user-card-id-numbers` server-command. Use of server-command is detailed in [Server Commands \(server-command\)](#). The import file format is detailed in [Batch User Card/Identity Update File Format](#).



### Caution:

Batch updates are a major operation modifying data en masse. Best practise suggests:

- Always run a backup *before* proceeding with the import.
- First experiment/test the update process with a small batch of users before moving onto the full batch.

## Batch User Card/Identity Update File Format

The import file is in tab delimited format and contains the following fields in the given order.

**Table 32: User Card/Identity Update File Format**

No.	Field	Description	Optional?	Limitations
1.	Username	The user's user-name.	Mandatory	Max. 50 characters
2.	Primary User Card/ID Number	A unique primary card/ID number for this user.	Optional (card/ID number not set if blank)	Max. 100 characters. To specify that the number is blank, enter a hyphen (-).
3.	User Card/ID PIN	The user's card/ID PIN.	Optional (card/ID PIN not set if blank)	To specify that the PIN is blank, enter a hyphen (-).
4.	Secondary User Card/ID Number	A unique secondary card/ID number for this user.	Optional (card/ID number not set if blank)	Max. 100 characters. To specify that the number is blank, enter a hyphen (-).

*Other limitations:* Although any actual limit to the size of an update file should be large enough for any purpose, we recommend keeping the file size below 10MB.

If your card/ID numbers are stored in an external database, see [Looking up card numbers in an external database](#).

**Tip:**

A simple way to create a tab delimited file is to create a spreadsheet in Microsoft Excel, then save it in the `Text (Tab delimited)` format.

### 4.2.7.3. Looking up card numbers in an external database

PaperCut MF can import user card/ID numbers from Active Directory and LDAP. This is the recommended approach because it allows the card/ID numbers to be associated with users in a centralized location. For more information see [Card/Identity Numbers Sync](#).

Card numbers can also be imported using the import file described in [Batch User Card/Identity Update](#).

In some circumstances the mapping between card numbers and users is stored in another external database (e.g. a database used for secure door access). In this case, it might be more convenient to look up the card numbers in this database in real-time.



**Tip:** This also allows users to be associated with more than two card/ID numbers. This is useful where users are allocated different types of authentication cards, or there are alternate card systems used throughout the organization. To allocate multiple card numbers to a user, populate the mapping table with multiple entries per user where different card numbers map to the same username.

Once external user lookups are enabled, PaperCut MF does the following when looking up a user by card number:

1. Find a user with the matching card number in the PaperCut MF database.
2. If not found, the card number is looked up in the external database.
3. If a match is found the information returned is used to find the matching user in the PaperCut MF database. If a user is found the lookup is successful.

## Database lookup configuration

To enable external card number lookups:

1. Navigate to **Options > Advanced > External User Lookup**.
2. Enable the option **Use external database for card number lookup**.
3. Select the database type. If using Oracle or MySQL you must install the database driver as described in the [Database specific configuration](#), and the Application Server must be restarted.
4. Enter the database connection URL. For examples see [Step 4 - Change the PaperCut MF connection details](#) of [Upsize to an External RDBMS](#).

5. Enter the database connection username and password.
6. The option **SQL to map card number in external database to:** allows you to choose what the card number in your external database maps to. The options include:
  - **username**, used if your external database contains a mapping between card numbers and usernames, and
  - **user's identity number**, used if your external database contains a mapping between card numbers and user ids (and the user ids have been imported and stored on users in PaperCut).

Select the option that matches the mapping in your external database.

7. Enter an SQL select query that looks up the card number in your external database and returns either a username or user id as selected above. The query must return a single row with the first field being the username or user id (as found in PaperCut MF). The SQL statement must contain `{cardnumber}`, which is replaced with the card number to find.

An example select query that looks up a card number and returns a username is:

```
select user_name from users_table where card_number =  
{cardnumber}
```

An example select query that looks up a card number and returns an identity number is:

```
select user_id from users_table where card_number = {card-  
number}
```



**Note:** The `{cardnumber}` replacement does not require quotations (it is sent as a parameter). This also serves to prevent SQL injection attacks sent via card numbers.

## Testing

To test the lookup is working as expected:

1. Navigate to the **Users** tab.
2. Pick a card number from your external database that maps to a user in PaperCut MF.
3. In **Quick Find**, enter this card number; then click **Go**.
4. Verify that the matching user is displayed. If the expected user is not displayed check the **App. Log** tab for errors.

### 4.2.8. Disabling user printing with time latches

PaperCut MF allows printing to be disabled for particular users using time-based locks. These time latches allow a user's printing to be disabled for a predetermined amount of time. After this time has passed, the user's printing is re-enabled without the need for manual intervention. Some examples of where time latches are useful include:

- Student discipline - Under some circumstances it might be useful to disallow printing for a student who has misbehaved in class, abusing computer resources or for other disciplinary reasons. You can disable the user's printing for the duration of a class, or indefinitely. Once the time period has passed, printing is automatically enabled for this user.
- Classroom Management - Using the bulk user actions screen, you can disable printing for a group of users. This is useful to stop a classroom from printing for a period of time.
- User Management - If an employee or student is away for an extended period of time and will return, you can disable printing so that their details and balance is unchanged but no-one can use their account for printing.

The disable printing option is located on each user on the user details screen.

**User Details: Amy Jones (amy)**

Details Adjustments & Charges Transaction History Print History

**Details**  
General information about this user. To send email notifications to users their email address must be entered.

**Username**  
amy

**Full name**  
Amy Jones

**Email**

**Enable/Disable printing**  
🔒 Printing disabled until Jun 28, 2006 6:24:01 PM (Enable)

## 4.2.9. Office/Department History

PaperCut maintains a historical record of changes to users' office and department fields. PaperCut cross-references job logs against these histories so that it can report print usage by the office and department a user belonged to at the time they printed a job. Normally this happens in the background so you do not need to know that it is happening.

There are some cases where a user's office or department has been updated incorrectly in the user directory, e.g. updated too late, or changed to the wrong name. These changes reflect how user activity is reported by PaperCut. To ensure that information is reported correctly, you can retrospectively alter changes that were made incorrectly. The most common cases where alteration might be required are described below.



**Note:** A user's office and department history are synchronized from the user directory into PaperCut, and not the other way around. Therefore it is important that the details in the user directory are updated before making historical changes in PaperCut. PaperCut automatically synchronizes these details overnight, however, you can make a change in the same day by running a manual synchronization from **Options > User/Group Sync > Synchronize Now**.

### 4.2.9.1. Scenario 1: Correcting a late change to a user's office or department

User `peter` moves from the Science department to the Medicine department on 14 May but the user directory is not updated with the change until 28 May. The PaperCut administrator Jane notices that Peter's activity between 14 and 28 May has been incorrectly allocated to his old department, Science. Luckily Jane can alter history, and she does so as follows:

1. Navigates to **Users > peter**.
2. Clicks **View/edit history** below **Department**.

Department  
Medicine  
[View/edit history](#)

3. The **Department history** screen is displayed, including the department change on the incorrect date of May 28.

Period	Department	
On 07 Apr 2011 the department was:	[No department]	
On 08 Apr 2011 the department was changed to:	Science	<a href="#">[delete]</a>
On 28 May 2011 the department was changed to:	Medicine	

OK Cancel Apply

4. Jane finds the row where the department was changed to `Medicine` on the incorrect date (On 28 May 2011 in the screenshot below), corrects the date and clicks **Apply**.
5. Peter's department change has now been retrospectively updated to 14 May. Reports now show Peter's activity being allocated to the `Medicine` department after this date.

### 4.2.9.2. Scenario - Correcting an unintended office or department change

On April 9 Peter joins the Medicine department. At the time, his department's administrator entered the department name into the user directory as `Medical Department`, where the correct name should have been `Medicine`. The PaperCut administrator Jane realizes this mistake on April 28 and updates the user directory.

PaperCut now displays Peter's activity between April 9 and April 28 as being allocated to the incorrect department `Medical Department`. To correct this, Jane performs the following actions:

1. Navigates to **Users > peter**.
2. Clicks **View/edit history** below **Department**.

**Department**

Medicine

[View/edit history](#)

- The department history screen is displayed, and shows the incorrect department change on April 9.
- Jane clicks the **delete** link in the row of the incorrect department change `Medical Department`.

Period	Department	
On 07 Apr 2011 the department was:	[No department]	
On 09 Apr 2011  the department was changed to:	Medical Department	<a href="#">[delete]</a>
On 28 Apr 2011  the department was changed to:	Medicine	

OK Cancel Apply

- The incorrect department change has now been deleted, leaving the new department `Medicine` as active since April 28.

Period	Department	
On 07 Apr 2011 the department was:	[No department]	
On 28 Apr 2011  the department was changed to:	Medicine	

OK Cancel Apply

- Jane updates the change date of the `Medicine` department to April 9 and clicks **OK**.
- Reports now consider `Medicine` as Peter's department since April 9, and the incorrect entry `Medical Department` has been deleted.

## 4.2.10. Username Aliasing

In some scenarios, a particular user wants to print a job but his/her username has been changed for various reasons and it is reflected in PaperCut now as a different username. Examples of why the username has changed include:

- Two networks/domains/servers have different naming conventions, e.g. for user John Smith, one network uses the convention "j.smith" while the other uses "jsmith".
- For some policy reasons, the format of usernames has changed and you want to allow forgetful users to log in with their previous username.
- Print jobs are coming from an ERP or mainframe system where usernames are different.
- In some organizations, users log in with employee numbers.
- Print jobs coming from some software packages might use the "application username" and

not the user's network username used by PaperCut. This can occur in some SAP configurations.

- Unix has strict requirements for usernames, (IEEE Std 1003.1–2001), where the only valid characters are letters, digits, underscores, full stops, at-signs, dashes (but not start with a dash) and having \$ at the end. So when printing on a Unix server, it can sanitize the username, such as converting an apostrophe into an underscore, and then recording in PaperCut as a different user when one really wants it to be the same user.

To work around this problem PaperCut allows users to have an alias for their username. The username alias is applied at the following levels:

- User login to the web interface, client popup authentication, or Release Station login.
- Print jobs arriving in the print queues under the alias.

Username aliasing is enabled via **Options > Advanced**

<b>Username Aliasing</b> Add an alternate username to identify each user. <a href="#">More Information...</a>	<input checked="" type="checkbox"/> Enable username aliasing
---	--

Once username aliasing is enabled, **Username alias** is displayed on the **User Details** page.

<b>Details</b> General information about this user. To send email notifications to users their email address must be entered. The home directory must be set to send scan jobs to the user.	<b>Username</b> debbie <b>Username alias</b> <input type="text" value="deb"/> <b>Full name</b> <input type="text" value="Debbie Jones"/> <b>Primary email (Used for system notifications)</b> <input type="text" value="debbiej@papercut.com"/> <b>Other emails</b> <a href="#">+ Add email address</a> <b>Home directory</b> <input type="text" value="/users/debbiej"/> <a href="#">Test</a> <b>Enable/Disable printing</b> <input type="text" value="Enabled"/>
--	--

You can import this information from Active Directory or LDAP during an overnight sync. Once username aliasing is enabled, an option to enter an **AD/LDAP field name** is displayed under **Options > User/Group sync**. You can choose any valid Active Directory user field to import this information. For example: employeeNumber, employeeID, otherLoginWorkstations.

### Sync Source

The sync source defines where users and groups are imported from.

Users are automatically imported. Groups are managed via the top-level Groups tab.

#### Primary sync source

Import disabled users

Enable multi-domain support (Advanced)

Import all users

Import users from selected groups  
(Selected groups: SOA Print Group - PaperCut)

#### Username alias

AD/LDAP field name  
  
(An AD/LDAP attribute name. [More Information...](#))

#### Card/ID number

Primary number

Secondary number

Once this is set, information from this Active Directory field is imported every night as username aliases. For more information on user group synchronization see [User and Group Synchronization](#).

## 4.2.11. User Management Quick Reference

### How do I add credit to a user?

Select the user from the groups list; then click the **adjust** link next to the credit or select the **Adjustment & Charges** tab.

### How do I add a new user to the system?

PaperCut MF automatically adds users to the system the first time they print. If your new user initial settings rules are defined correctly under groups section, the user is automatically created with the designated starting credit and settings.

If you have added a large batch of new users, you can force the addition of these users immediately via the **User/group synchronization** option under the **Options** section. For more information see [User and Group Synchronization](#).

### How should I make a change to more than one user?

If you need to make a change to more than one user, consider using the **Bulk user actions** link located under either the **User** or **Groups** section. This allows bulk modification of user settings based on their network group membership. See [Bulk User Operations](#).

### How do I grant administrator access to a trusted person to manage a group of users?

You can grant administrator level access to trusted individuals. See [Assigning Administrator Level Access](#). By using advanced access control rights, you can limit administrators to a subset of users (a group) via the option **Limit access to users only in group**.

### How can I prevent new users from being added automatically?

See [On Demand User Creation](#).

### Due to technical reasons I'm unable to create new groups in my domain. Can I create groups in PaperCut MF?

Yes. You can also define groups via a text file (e.g. a tab-delimited file). Simply place your group definition file at the location

```
[app-path]/server/data/conf/additional-groups.txt
```

See the template file `additional-groups.txt.tpl` in the same directory for an example and further information.

### I have two different networks with different username naming conventions (e.g. j.smith and jsmith). Is this supported?

Yes. You can enable **Username aliasing** under **Options > Advanced**

Another option to set up username aliasing is described in the file below:

```
[app-path]/server/data/conf/username-aliases.txt.tpl
```

See the comments in this file for more information.

### Can I manage my own set of users inside PaperCut MF (as well as / instead of importing users from a user directory)?

Yes. PaperCut MF is designed to keep user management simple and automated, but you can manage users inside PaperCut MF as well as or instead of using users from a user directory. Users managed by PaperCut MF are termed *internal users*. For more information, see [Internal users \(users managed by PaperCut NG\)](#).

## 4.3. Printing solutions for guests and anonymous users

PaperCut tracks print activity against individual users. In most cases, these users belong to your organization, and user information is synchronized against an external user directory source such as Active Directory, Open Directory, eDirectory or LDAP. If you are able to synchronize your users against an external directory source - this should be your first choice.

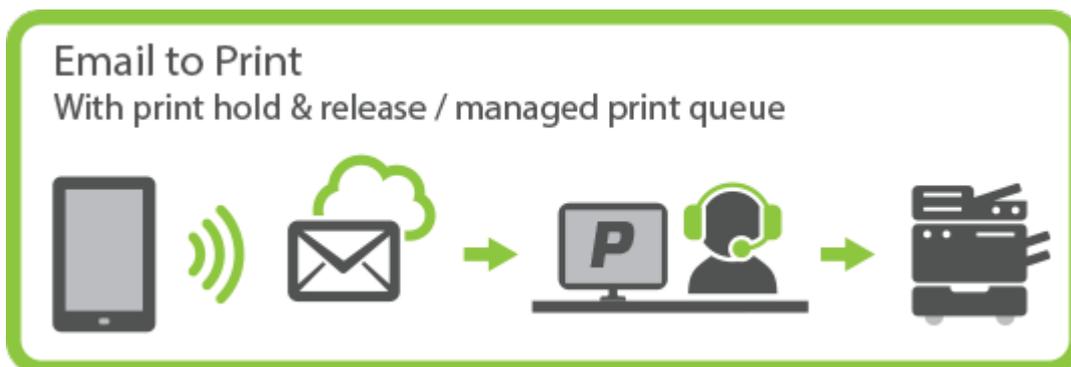
There are a number of scenarios where it is not practical to synchronize all users from an external directory. They typically involve visitors and guest users printing from BYOD mobile devices who might not even have access to the corporate wired or wireless networks.

## Guest Printing for Business



- *Requirement:* Need a printing solution for visitors and casual guests - often using BYOD devices with no network access.
- *Considerations:* Tracking of individual guest users is not important.
- *Recommend:* [Anonymous guest printing](#) (direct print or managed release)

## Guest Printing for K-12 Schools



- *Requirement:* Need a printing solution for visitors and casual guests.
- *Considerations:* Tracking of individual guest users is not important, but need controls in place to prevent student use.
- *Recommend:* [Anonymous guest printing](#) with hold/release queue managed by front desk.

## Guest Printing for Higher Education / Library Pay-for-Print



- *Requirement:* Need a pay-for-print solution for students and guest users.
- *Considerations:* Each user has their own account and account balance.
- *Recommend:* [Internal users \(users managed by PaperCut NG\)](#) with self-registration.

To address these varied requirements, PaperCut offers multiple solutions for guest and anonymous printing:

- [Internal users \(users managed by PaperCut NG\)](#): Internal users are added directly to PaperCut and are not synced with an external user directory. Internal users can be added by a PaperCut administrator or self-registered.
- **Shared or generic users:** A shared username and password is provided to guests to allow them to log in and print using company equipment. All guest jobs are logged in against this generic user.
- [Anonymous guest printing](#): Guests not registered in PaperCut are permitted to send jobs to a special email address for printing. Jobs are logged against a single internal guest user.

### 4.3.1. Internal users (users managed by PaperCut NG)

Internal users are best thought of as user accounts that only exist inside PaperCut and are independent of the domain, network or operating system. Internal users are managed inside PaperCut, which means you do not need to create or manage them in an external user directory.

There are several ways you can use this feature:

- You can give selected staff to create internal user accounts. This gives staff control over who can receive a new account, preventing the creation of unwanted accounts (e.g. with offensive usernames).
- You can give users the ability to create their own internal accounts via a web based registration form. This is useful for providing guests the ability to register their own accounts and begin printing immediately, removing the need for staff intervention.
- Administrators can create a new batch of internal users via a text based file import. You can use this file to import or update a set of users who are managed separately to the regular domain users. For more information about the internal users batch import and update feature, see [Batch internal user import and update](#).

The following sections present several different environments and how you can use the internal users feature to accommodate them. For information about specific configuration, [Internal users options](#) provides full details about each available option.

#### 4.3.1.1. Implementation by Example

Several examples are provided below demonstrating how the internal user feature can be applied.



**Important:** In PaperCut MF all internal usernames must only contain characters that can be printed (e.g. *not* `newline`) and must not contain `/`, `\` or `@`.

## Scenario One: Manually Managed Guest Accounts

North Shore University has a campus that occasionally hosts students from other universities. These guest students do not have a login in the universities domain, and it is considered too much effort to go through "official channels" to create one for them.

The administrator wants to provide selected staff the ability to create PaperCut MF accounts for these guest students as needed. To go about this, the administrator performs the following:

1. The guest students are first provided with access to computers or network resources using the generic login `guest`, password `guest`.
2. The generic `guest` login is marked as **Unauthenticated** using the PaperCut MF administration interface. This option is available on the user's details page.
3. Navigates to **Options > User/Group Sync > Internal User Options**.
4. Checks the **Enable internal users** option, and under **Access control** selects **Only admins can create users**.

The **Confirmation message** is tailored to provide relevant information such as how to log in.

5. Click **Apply**.
6. PaperCut MF administrator access is assigned to the staff who are responsible for creating the new student guest accounts. The administrator right **Create internal users** is required for this purpose. For more information about assigning administrator rights see [Assigning Administrator Level Access](#).
7. Ensures that the PaperCut MF client software is running on workstations where guest printing is allowed.

The system is now configured to allow selected staff the ability to create internal accounts for the guest students. When a guest student prints from the generic `guest` login, the PaperCut MF client tool displays the *authentication popup*. This allows them to enter their personal username and password, assigned by the administrator when registering their internal user account.

Staff can create an internal user account for a guest student as follows:

1. Log in to the PaperCut MF administration interface, and select the **Create internal user** action from the **Actions** menu of the **Users** tab.
2. Complete the form; then click **Register**.

## Scenario Two: Automated Guest Management (self-registration)

West Face College is a large community college that regularly has members of the public visiting to use the library resources.

It is not feasible to create a domain login for every visitor, and manually creating an internal user account for each guest would require too much time of the administrators or staff, so the decision is made to automate the process and allow guests to register their own internal user accounts.

To set up the internal users feature and allow guest self-registration, the administrator performs the following:

1. The guests are first provided with access to computers or network resources using the generic login `guest`, password `guest`.
2. The generic `guest` login is marked as **Unauthenticated** using the PaperCut MF administration interface. This option is available on the user's details page.
3. Navigates to **Options > User/Group Sync > Internal User Options** .
4. Checks the **Enable internal users** option, and under **Access control** selects **Users can register their own account**.
5. Checks **Display registration links on login screens** so that users have easy access to the registration interface.
6. Changes the **Link text** to `Guests click here to register`, to provide a better clue for guests.
7. Adds more information about the organization's printing policy, how to access printing resources, etc. under **Additional registration instructions**. A note is also added to specify that only guests need to register to access printing resources - students or users with existing accounts do not need to register.
8. Click **Apply**.
9. Ensure that the PaperCut MF client software is running on workstations where guest printing is allowed.
10. Creates an information sheet for guests, providing instructions about how to register, how to print, and where to find additional help. Most people do not need this type of information to work out how to use the system for themselves, but some people appreciate step-by-step instructions.

The system is now configured to allow guests to register their own internal user accounts. When a guest user prints from the generic `guest` login, the PaperCut MF client tool displays the *authentication popup*. This allows them to enter their personal username and password, chosen when registering their internal user account.

For a guest to create an internal user account, they must:

1. Click the **Register as a New User** link on a login screen (the web interface login screen, or on the authentication popup), or access the registration web interface directly at `http://[server-name]:9191/register`.
2. Complete the form; then click **Register**.

## Scenario Three: Managing Users in a Non-Domain Environment

Southmark Inc. is a medium sized ten person real estate office service the local area. Their network consists of a mix of Windows XP and Windows Vista workstations connected to a workgroup based network. No user directory / domain exists, and setting one up is not a current priority. They want to take control of their printing costs and volumes, and use PaperCut MF to identify the amount of printing performed by each staff member.

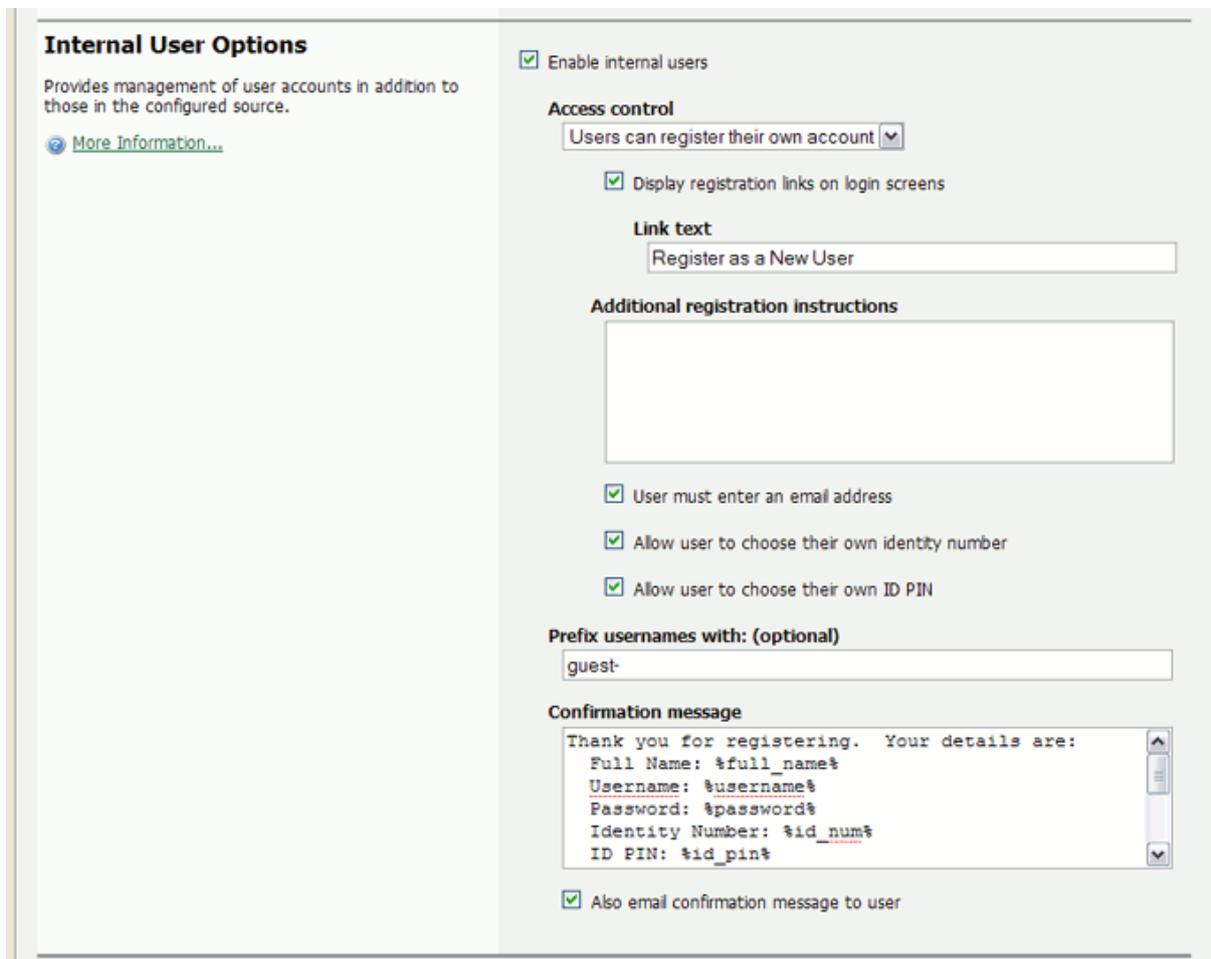
Because no user directory exists, PaperCut MF is used to maintain user accounts, details and passwords for all staff. To set this up, the administrator performs the following:

1. Navigates to **Options > User/Group Sync > Internal User Options** in the PaperCut MF administration interface.
2. Ensures that the **Enable internal users** option is enabled.
3. Removes (sets to blank) the value for **Prefix usernames with:**. There is no need for an internal username prefix, because all users are internal!
4. Collects a chosen username and password from each staff member. This is used to construct a batch import file, using the format specified in [Batch internal user import file format](#).
5. Imports the batch file into PaperCut MF using server-command to create a new internal user account for each staff member, following the directions in [Batch internal user import and update](#).
6. Follows the directions in [User Client Deployment](#) to deploy the client software to each workstation in the office.
7. When staff send print jobs from their workstations, they arrive at the print server under the generic `guest` username. The administrator marks this generic account as **Unauthenticated** using the PaperCut MF administration interface. This option is available on the user's details page.

The batch of internal user accounts has now been imported, ready for the staff to use them. When a staff member next sends a print job, the PaperCut MF client tool displays the *authentication popup*. This allows them to enter their personal username and password, provided to them on arrival, having been assigned by the administrator in the batch import file.

### 4.3.1.2. Internal user options

The options for configuring internal users are located at **Options > User/Group Sync > Internal User Options** in the administration interface.



**Internal User Options**

Provides management of user accounts in addition to those in the configured source.

[More Information...](#)

Enable internal users

**Access control**

Users can register their own account

Display registration links on login screens

**Link text**

**Additional registration instructions**

User must enter an email address

Allow user to choose their own identity number

Allow user to choose their own ID PIN

**Prefix usernames with: (optional)**

**Confirmation message**

Thank you for registering. Your details are:  
 Full Name: %full\_name%  
 Username: %username%  
 Password: %password%  
 Identity Number: %id\_num%  
 ID PIN: %id\_pin%

Also email confirmation message to user

The available options are:

- **Enable internal users** - enables or disables the feature in general. If the feature is disabled, internal users cannot be created.
- **Access control** - determines who can create internal users. The available options are:
  - **Users can register their own account** - A web based interface is available for users to register their own account. This allows users to register their own accounts without intervention from staff or administrators.

### Register New User Account

Full Name:	<input type="text" value="John Smith"/>
Email Address:	<input type="text" value="john.smith@domain.org"/>
Username:	<input type="text" value="john"/>
Password:	<input type="password" value="....."/>
Verify Password:	<input type="password" value="....."/>

- **Only admins can create users** - Only administrators can create users via the PaperCut MF administration interface. For information about delegating this access to additional users see [Assigning Administrator Level Access](#).

### Create Internal User

#### New User Settings

Internal users are managed internally by PaperCut NG, and may be used in addition to those in the configured user directory source.

[More Information...](#)

Username	<input type="text" value="guest-john"/>
Full Name	<input type="text" value="John Smith"/>
Email Address	<input type="text" value="john.smith@domain.org"/>
Password	<input type="password" value="....."/>
Verify Password	<input type="password" value="....."/>
Identity Number	<input type="text"/>

Email confirmation message to user

- **Display registration links on login screens** - When enabled, PaperCut MF login screens display a **Register as a New User** link. Clicking this link takes the user to the web based

registration interface, allowing the user to create their own internal user account. If disabled, registration links are not displayed, and users can access the web based registration interface only by navigating to the URL at `http://[server-name]/register`.

The image shows a web-based login and registration form for PaperCut. At the top left, there is a logo featuring a yellow padlock, a printer, and several colorful spheres. To the right of the logo, the word "PaperCut" is written in a large, bold, black font with a trademark symbol. Below the logo, there are three input fields: "Username" with a text box, "Password" with a text box, and "Language" with a dropdown menu currently set to "English". To the right of the "Language" dropdown is a blue "Login" button. Below the "Login" button is a green link that says "Register as a New User".

- **Link text** - The text used for registration links on login screens. The default link text is `Register as a New User`. An example of alternate link text might be `Guests click here to register`.
- **Additional registration instructions** - This option allows providing additional instructions to users when registering, and are displayed above the web based registration form. Specific instructions will vary from site to site, but could include information such as how to log in and print, how to add credit to their account, or where to find additional help.
- **User must enter an email address** - Enable this option to require that the user enters an email address. If disabled, entering an email address is optional.
- **Allow user to choose their own identity number** - If enabled, the user can enter/choose their own identity number. The chosen identity number must be at least 6 digits, and must be unique. If disabled, a unique identity number is automatically generated for the user. Use identity numbers for logging into some devices where only a numeric keypad is available.
- **Allow user to choose their own ID PIN** - If enabled, the user can enter/choose their own ID PIN. The chosen PIN must be at least 4 digits. If disabled, a random PIN is automatically generated for the user.
- **Prefix usernames with: (optional)** - This prefix is applied to the username of all users registering via the web based interface. E.g. if a user chooses the name `john`, and the username prefix is `guest-`, their allocated username is `guest-john`. This prevents name clashes with existing or future users from the configured user/group sync source, and immediately identifies the user as being internal.
- **Confirmation message** - This message is displayed to the user after they have completed registration. It can also be emailed to the user (see next option).
- **Also email confirmation message to user** - If this option is enabled the confirmation

message is emailed to the user after registration (if an email address was provided).

**Note:**

- An alternative to the PaperCut MF client tool's authentication popup is to use a print Release Station in `Release Any` mode. After ensuring that guest users have their own internal account, this allows users to submit a print job under a guest/generic login, then authenticate at the Release Station and choose which job (s) they want to release. For more information about setting up a Release Station see [Hold/release queues & Print Release Stations](#).
- To delete an internal user, navigate to their **User Details** page in the administration interface by clicking the user in the **User List**, then select the **Delete user** item from the **Actions** list. The domain/network-level [User and Group Synchronization](#) settings and operations do not affect and do not delete internal users.
- The special `[Internal Users]` group contains all internal users. You can use it to produce reports showing information about internal users, or to apply a *bulk user operation* on all internal users.

### 4.3.1.3. Changing internal user passwords

Both internal users and administrators can change their own password.

- Administrators can reset the password on the **User Details** page in the PaperCut MF Application Server Administration Console. In the **Internal User Settings** area, click the **Change Password** link.



- The internal user can reset their password on the **User Web** pages by clicking **Change Details**.

## Change Password

New password

Verify new password

Change Password



**Tip:** Administrators can turn on or off the ability for internal users to change their password by using the Config Editor and modifying the key: `internal-users.user-can-change-password`

### 4.3.1.4. Batch internal user import and update

This section covers the batch importing and updating of *internal users*. Internal users are managed internally by PaperCut MF. For more information about internal users, see [Internal users \(users managed by PaperCut NG\)](#). For information about importing and updating regular users, see [Batch User Data Import and Update](#).

The batch internal user import and update feature allows the administrator to import users, user information and optionally update existing internal user details by reading data from a simple text file. In addition to being able to create internal users, it enables administrators to update the following user data:

- Password
- Credit balance
- Restriction status
- Full name
- Email address
- Department
- Office
- Card/ID Number
- Card/ID PIN
- Notes

- Secondary Card/ID Number
- Home folder



**Important:** You can delete an internal user by selecting the **Delete user** action while viewing the user. You can delete multiple users selecting **Bulk user actions**; then selecting all internal users.

Examples of where the batch user import feature is useful include:

- Several guests to the organization are arriving at the same time and require their own accounts in PaperCut MF.
- A set of users needs to be managed separately / externally to the existing user directory source. For example, the users of a certain computer lab require their own accounts in PaperCut MF, but it is not possible to create accounts for them in the existing user directory.
- Details for existing internal users needs to be updated.

To perform a batch internal user import:

1. Manually inspect your file in a text editor and ensure it's in the prescribed tab-delimited format as detailed at [Batch internal user import file format](#).
2. Follow the directions in [Server Commands \(server-command\)](#) to run the server-command `batch-import-internal-users`.

For example, to import/update internal users from a file `import.tsv` on a Windows system:

```
C:\> cd "C:\Program Files\PaperCut MF\server\bin\win"
server-command batch-import-internal-users "C:\extra users\import.tsv"
```

Note: Quote the import path if it contains spaces.

On a Mac OS X system:

```
mac-server:~ jason$ cd "/Applications/PaperCut MF/server-
/bin/mac/"
mac-server:mac jason$ ./server-command batch-import-
internal-users /path/to/the/file/import.tsv
```

If your import path has spaces, remember to escape them if you don't use quotes:

```
/path/to\ the\ file/import.tsv
```

3. The import process will start running in the background. See the **App. Log** tab in the administration interface to check the status of the import or if any errors were encountered.



**Caution:** Batch imports are a major operation, modifying data en masse. Best practice suggests:

- Always run a backup *before* proceeding with the import.
- First experiment/test the import process with a small batch of users before moving onto the full batch.

## Batch internal user import file format

The import file is in tab delimited format and contains the following fields in the given order:

**Table 33: Internal User Import File Format**

No.	Field	Description	Optional?	Limitations
1.	Username	The internal user's username. If the policy is to use a username prefix for internal users, include the prefix here (e.g. <code>guest-user123</code> ).	Mandatory	Max. 50 characters
2.	Password	The user's password	Optional - although internal users cannot log in without a password	
3.	Credit Balance	The user's credit balance	Optional - balance not set if blank	A number with no currency symbol or separators, using a full stop for the decimal separator. Correct: <code>1.23</code> Incorrect: <code>\$1.23</code> or <code>1,23</code> or <code>1,023.00</code>

No.	Field	Description	Optional?	Limitations
4.	Restricted Status	The user's restricted status. (Y/N)	Optional - restricted status not set if blank	
5.	Full Name	The user's full name	Optional - full name not set if blank	Max. 255 characters
6.	Email	The user's email address	Optional - email not set if blank	Max. 255 characters
7.	Department	The user's department or faculty	Optional - department not set if blank	Max. 200 characters
8.	Office	The user's office or location	Optional - office not set if blank	Max. 200 characters
9.	Primary Card/ID Number	The user's primary identity/card number	Optional - card/id number not set if blank	Max. 200 characters, case insensitive
10.	Card/ID PIN	The user's card PIN number	Optional - card/id PIN not set if blank. If the field is '-' then the PIN is set to zero.	Max. 20 digits

No.	Field	Description	Optional?	Limitations
11.	Notes	Notes about the user.	Optional - notes not set if blank	Max. 2000 characters
12.	Secondary Card/ID Number	The user's secondary identity/card number	Optional - card/id number not set if blank	Max. 100 characters, case insensitive
13.	Home folder	The user's home folder	Optional - required for scanning to a user's home folder.	Max. 256 characters

*Other limitations:* Although any actual limit to the size of an import file should be large enough for any purpose, we recommend keeping the file size below 10MB.



#### Tip:

- If an optional field is not specified in the import file then it is not updated. To remove or "blank out" an existing value, use a single "-" (hyphen / dash).
- A simple way to create a tab delimited file is to create a spreadsheet in Microsoft Excel, then save it in the `Text (Tab delimited)` format.

For some examples of using tab-delimited files, see [Import File Format Examples](#).

### 4.3.2. Anonymous guest printing

In the normal case, PaperCut must identify the user responsible for each print job so that jobs are correctly tracked and charged. However, for ad-hoc guest printing by visitors, it is often more important to provide a convenient printing solution than to provide individual print tracking per visitor.

In addition, visitors and guests often want to print from their BYO mobile devices so a generic, widely available printing solution is required.

For these scenario's, PaperCut provides the ability for guest users to print anonymously using [Email to Print](#). This solution provides a simple and convenient printing experience from any device, imposing minimal or no administrative inconvenience on the guest user as there is no need to set up accounts or network access for the guest.

You can implement anonymous email printing in three ways:

- **Direct Print**

Guests can send their job directly to the anonymous email defined for a physical printer. This is the most convenient way to provide printing access for guests or visitors.

- **Managed Release**

Guest users send their job to the printer's anonymous email address where they are held in a hold/release queue. Jobs are released by the receptionist or a trusted person in the organization. Jobs sent by different guests are identified by the guest's email address, which is appended to the document name.

- **Guest Self-Release**

Guest users send their job to the printer's anonymous email address where they are held in a hold/release queue. Guests are provided with a common username and password by which they can log in to the MFD to release their job. Jobs are identified by their email address appended to the document name.

Each of these options has advantages:

**Table 34: Guest Email to Print Modes**

	Suitable For	Benefits	Trade-Off	Document Privacy
Direct Print	Business	Very convenient - no staff involvement	Low security. Printing is uncontrolled with potential for paper wastage. Separate email aliases are required for each printer (no virtual queue).	Low
Managed	Business and	Convenient for guest.	Staff must	Good

	Suitable For	Benefits	Trade-Off	Document Privacy
Release	Education	Printing is supervised and managed by staff.	be available and interrupted to release jobs for guests.	
Guest Self-Release	Business	Convenient for site staff.	Moderate. Printing is uncontrolled with potential for paper wastage. Guests can see and release each others jobs.	Low-Moderate

### 4.3.2.1. Anonymous setup

The starting point for all three anonymous printing modes is the **Options > Mobile & BYOD** page. Email to Print must be enabled and configured. If you have not yet set up Email to Print, do that first (see [Email to Print](#)), then return to this section.

- **Step 1:**

- On the **Options > Mobile & BYOD** page, under **Email to Print**, check the box `Enable anonymous printer email addresses`.
- Optionally change the user to which anonymous jobs will be logged. The default user is `guest-user`.
- If you want guests to receive a reply email in response to sending a print job, check the

box Send a response email. You can customize the email body as required.

The screenshot shows the 'Anonymous/Guest Submission' configuration page. It includes the following elements:

- A checked checkbox labeled 'Enable anonymous printer email addresses' with a help icon.
- A summary box showing 'Printers with anonymous addresses: 0 (Configure at [Printers > Printer List](#))' and a link for 'More Information...'. The text is highlighted in yellow.
- A text input field for 'Assign anonymous jobs to user' containing the value 'guest-user'.
- A checked checkbox labeled 'Send a response email'.
- A text area for 'Email body' containing the text: 'Thank you. Your print job has been received. To collect, please visit the front desk.'



### Important:

If the guest user (default `guest-user`) does not already exist, it is created for you, as an internal user. If you want to be able to log in as this guest user, either:

- Create the user beforehand in AD/LDAP as a regular user and sync it with PaperCut. This allows you to manage the guest user in the same way as any other user. Ensure the user is configured as `unrestricted`.
- or Enable internal users in **Options > User/Group Sync**. If internal users are not enabled, you can still use the internal guest user to log jobs, but you cannot log in to this user.

### ● Step 2:

Enable a printer for anonymous printing by configuring an anonymous printing email alias.

- Go to **Printers** and select a printer
- In the **Email to Print** section, add a valid email address or alias in the `Anonymous email address` text box.
- Click **Apply**

The remaining steps are specific to your selected anonymous printing mode:

## Direct Print Setup

- **Step 3:** Ensure your printer does not have `Enable hold/release queue` checked in the Printer Details page.

You are now ready to test. Email to Print jobs sent to the printer's guest email alias print without intervention.



**Tip:** When using direct print, consider implementing a print script to force printing policy. For example, converting jobs to duplex, or redirecting large jobs to a high volume printer.

## Managed Release Setup

### • Step 3:

Configure your printer to use a hold/release queue.

- Check `Enable hold/release queue` in the Printer Details page.
- `User Release` is the correct option for most scenarios.

### • Step 4:

Make the receptionist or person responsible for releasing guest jobs a delegated release manager for the guest user.

- Go to **Users**, and select your receptionist user.
- In the **Advanced Options** section, check the box: `Allow this user to release jobs printed by others (Delegated print release)`.
- Add your configured guest user (default `guest-user`) to the list of Users and click **Apply**.

#### Advanced Options

Advanced options include the ability to override printer-level settings, change authentication options, or delegate the release of another user's jobs from a hold/release queue. For example granting rights for a personal assistant to collect a manager's jobs.

Override printer/device settings

Allow this user to release jobs printed by others (Delegated print release)

#### Users

(comma separated list of usernames)

#### Groups

(comma separated list of groups)

The receptionist can now log in to a Release Station or MFD and see the guest print jobs. Anonymous Email to Print jobs are identified by the source email address appended to the document name.



**Tip:** If using swipe cards, reception can swipe their card to log in and release jobs.

## Guest Self-Release Setup

### • Step 3:

Configure your printer to use a hold/release queue.

- Check `Enable hold/release queue` in the Printer Details page.
- `User Release` is the correct option for most scenarios.
- **Step 4:** Set a password for the configured guest user (default `guest-user`). Change this password regularly - e.g. daily or weekly.

**Tip:**

- You can edit the response email to include the guest username and password - or you can direct the user to ask reception for this information.
- Keep the guest password secure to avoid abuse of the guest printing facility.
- Run regular reports of printing by your guest user to audit usage of guest printing.
- Change the guest user password regularly. You can automate this using `server-command`.

## Known users and anonymous printing

The anonymous printing feature is designed for ad-hoc use by guests and visitors. It should not be used by people within your organization, as printing is not tracked by user and many important features such as account selection, script popups etc are not supported.

If an Email to Print job is sent to an anonymous printer email address by a known user (i.e. the source email matches a user in the PaperCut database), the job is *not* logged to the guest-user account. Instead, the normal print workflow for the known user is performed and the job logged against that user.

## 4.4. Multiple Personal Accounts

Users in PaperCut have a personal balance used to fund their personal printing. This balance can be treated as a bank account used for printing. When the account is out of credit the user can no longer print until more funds are added to the account. By default, users have a *single account* to store their balance, but this can be too restrictive in some situations. For example, it's often useful to have separate accounts for "free" print quotas and cash payments.

The *multiple personal accounts* feature discussed in this section is an advanced feature that has been carefully architected with the assistance and feedback from leading Universities and Colleges from around the globe.

When *multiple personal accounts* are enabled, a user has multiple accounts with credit available for printing. Each account is a separate pool of credit that adheres to the following rules:

- Credit is deducted from the available funds in the order configured by the administrator.
- If the designated account does not have enough credit, the next account in sequence is used

until all of the credit is used.

- If a print job costs more than the total credit in all accounts, the job is disallowed.

From the perspective of the end-user little changes when multiple accounts are enabled:

- The total balance of all accounts is displayed in the User Client, Release Station, and end-user web interface.
- Printing, quotas, [TopUp/Pre-Paid Cards](#) and all other PaperCut features work the same with multiple accounts as they do with a single account.
- The fact that there are multiple balances can optionally be effectively hidden from the user.



**Important:** Although the concept of multiple personal accounts is quite simple, the management can be complex depending on implementation. Readers are advised to read this section in full and conduct some planning before full deployment. Good print management in large organizations is hard enough, and multiple accounts if not implemented right could make it just that little bit harder!

## 4.4.1. Why use multiple personal accounts?

There are a number of reasons why a site might use multiple personal accounts, but the most common is the need to separate "free" print quotas from cash payments. Common reasons for considering multiple accounts are:

### 4.4.1.1. Separating Quota and Cash

Many sites such as colleges, schools, and universities allow users to pay for printing using [TopUp/Pre-Paid Cards](#) or credit card using a payment gateway, such as, PayPal or Authorize.Net. When cash payments and "free" quota are combined into a single account balance it is not possible to give cash refunds without potentially refunding quota amounts.

Using multiple accounts to separate "quotas" and "cash" has a number of benefits:

1. Simplified auditing and tracking of cash payments and refunds.
2. Allows for refunding of unused cash payments at the end of year or enrollment.
3. Making cash payments does not interfere with "not to exceed" quota thresholds.

For more information about this configuration, see [Example 1: Separate Cash/Quota Accounts](#).

### 4.4.1.2. Independently Managed Work Areas

In some more large and complex environments each department or faculty independently manage and control their own printer fleet. In these situations the departments might want to assign a "free" quota to their members/students that should only be used on their own printers. Any "free"

quotas allocated from other departments must not be used on this department's printers. If the user adds cash to their account, it can be used in any department.

In most environments this configuration is not required because the print policy is managed centrally. This is useful when implementing a centralised PaperCut installation in an environment where the departments historically had independent control of print policy. Using this configuration is the first phase in a transition to a fully centralised system.

This is an advanced configuration. For more information, see [Example 2: Department/Faculty Quotas \(Advanced\)](#).

## 4.4.2. Configuration

Enabling and configuring multiple personal accounts is quite simple. However, before enabling this feature it is recommended that you read this section and understand the concepts involved.

### 4.4.2.1. Enabling Multiple Personal Accounts

To enable multiple personal accounts:

1. Navigate to **Options > Advanced > Go to multiple personal account setup**.
2. Enable the **Enable multiple personal accounts option**.
3. The built-in default account is where initial credit is assigned and quota allocated.

Account Name	Priority	Overdraft	Enabled
Default (built-in account)	1	-	<input checked="" type="checkbox"/>

4. Click **Add Account** to add a new account. A new account is added to the list with a blank description, and default options for priority and overdraft.
5. Enter a descriptive name for the account. You can change this at any time.
6. Edit the account priority to change the order in which the account balances are used. Accounts at the top of the list (i.e. the lowest priority number) are used first. You can change the priority at any time. For more information on priorities see [How Account Priorities Work](#).
7. (Optional) Edit the overdraft value. This allows this account to go into negative. e.g. If the overdraft is set to \$5.00, then the account is allowed to go to \$5.00 into negative.
8. Repeat these steps adding accounts as necessary. Take care to add only the accounts you

require (See [Why can't I delete accounts?](#)).

9. When the accounts are configured as required, click the **Set Up Accounts**. This starts the process of creating the new accounts for all of your users.

### 4.4.2.2. How Account Priorities Work

When a user has multiple accounts it's important to have a well-defined order for how the balances are used. If one account is used for cash and the other for quotas, the quota credit should be used first before cash. The account priority defines this order. This is best explained with some examples.

The account priorities are configured with the "Default" account first and the "Cash" account second (as shown in the screenshot below).

Enable multiple personal accounts

Account Name	Priority	Overdraft	Enabled
Default (built-in account)	1	-	<input checked="" type="checkbox"/>
Cash	2	\$0.00	<input checked="" type="checkbox"/>

Example 1: If a user has \$1.00 in each of the "Default" and "Cash" accounts, and a \$0.25 job is printed the cost of the job is deducted from the "Default" account, leaving a balance of \$0.75.

Example 2: If a user has \$1.00 in each of the "Default" and "Cash" accounts, and a \$1.30 job is printed the cost of the job split between both accounts. First, the \$1.00 available in the "Default" account is used, then the remaining \$0.30 is deducted from the "Cash" account. The user is then left with \$0.00 in the "Default" account and \$0.70 in the "Cash" account.

Whenever a print job is refunded, the credit is refunded to the accounts in the reverse order.

### 4.4.2.3. Configuring the Payment Accounts

When a user has multiple personal accounts, you can configure user payments to credit different accounts for different payment sources:

- [TopUp/Pre-Paid Cards](#),
- Payment gateways (such as, PayPal or Authorize.Net),
- User transfers

- Other payments, including web cashier, value loaders, etc.

To configure the "Cash/Payment" account:

1. Navigate to **Options > Advanced > Go to multiple personal account setup** .
2. Towards the bottom of the screen, select the accounts you want to use for each of the payment types using the **User payment accounts** option.
3. Click **Apply**.

#### 4.4.2.4. Why can't I delete accounts?

Once an account is configured and created it cannot be deleted. Once an account is created it can be used immediately by users for their printing activity. If you could delete an account, you would also need to delete any transaction associated with that account, resulting in a confusing transaction history for the user.

Although you cannot delete an account, you can disabled an account. Disabling the account means that it is no longer available to the user, nor displayed in their account details. From the perspective of the user the account no longer exists, and any associated balance is also no longer available. If the account is later re-enabled any previous balances are made available to the user again.



**Caution:** Because accounts can't be deleted it's prudent to carefully plan accounts and their use before deployment.

#### 4.4.2.5. Other Options

By default the end-user web interface displays just the total of all of the user accounts. To display an itemized list of each of the account balances enable the option on **Options > User Features > Itemize multiple personal accounts** , then click **Apply**.

To change the available personal accounts or the order that they are used, use the Advanced Printer Scripting feature. For more information, see [Example 2: Department/Faculty Quotas \(Advanced\)](#).

### 4.4.3. Configuration Examples

This section describes in detail how to set up PaperCut for the most common uses for multiple personal accounts.

#### 4.4.3.1. Example 1: Separate Cash/Quota Accounts

In environments where users have both freely allocated quotas and the option for users to pay for printing it's useful to separate quotas from cash. For a description of this scenario see [Separating Quota and Cash](#).

To configure multiple accounts for this situation:

1. Navigate to **Options > Advanced > Go to multiple personal account setup** .
2. Enable the **Enable multiple personal accounts option**.
3. The "Default" (built-in) account is used for quotas. Rename it to something appropriate (e.g. "Quotas").
4. Click **Add Account** to add a new account. This account are used for user payments. Name it appropriately, and set the priority to a value higher than the default/built-in account.

Enable multiple personal accounts

Account Name	Priority	Overdraft	Enabled
Default (built-in account)	1	-	<input checked="" type="checkbox"/>
Cash	2	\$0.00	<input checked="" type="checkbox"/>

It is important that the accounts are given this priority order. This way any freely allocated quotas are used before using the cash payments. This allows a user to add credit to their account and know that it will be used only when they run out of allocated quota.

5. Click **Set Up Accounts** to start applying the change.
6. When the account setup is complete, select the "Cash" account as the account for user payments. To do this select this account under the **User payment accounts** option.
7. Click **Apply**.

At this point the system is ready to use. Any cash payments from TopUp/Pre-Paid Cards or Payment Gateways are added to the selected cash account. The quotas are added to the default/built-in account. (*Note:* Sites running a Payment Gateway module released prior to version 10.5 might need to upgrade the gateway to leverage this setting.)

### 4.4.3.2. Example 2: Department/Faculty Quotas (Advanced)

A much more advanced configuration is required when different departments/faculties/areas want to each have their own quotas that are only available for use by their users on their printers. Department quotas are also often combined with user cash payments, which can be used anywhere on site. For a description of this scenario see [Independently Managed Work Areas](#).

This configuration requires the use of many advanced PaperCut features. This section gives a brief outline of how this is configured.

- Enable multiple personal accounts and create the accounts for each of the work-areas or departments required. If users can also pay for printing, also create a cash account. The priority/order of the quota accounts is not important, as long as the "Cash" account is displayed last. The screenshot below shows a possible configuration.

Account Name	Priority	Overdraft	Enabled
General Quotas (built-in account)	1	-	<input checked="" type="checkbox"/>
Science Quota	2	\$0.00	<input checked="" type="checkbox"/>
Arts Quotas	3	\$0.00	<input checked="" type="checkbox"/>
Engineering Quotas	4	\$0.00	<input checked="" type="checkbox"/>
Cash	5	\$0.00	<input checked="" type="checkbox"/>

Click **Set Up Accounts** to apply the change.

- When the account setup is complete, select the "Cash" account as the account for user payments. To do this select this account under the **User payment accounts** option; then click **Apply**.
- At this point all the accounts are enabled and can be used on any printers. The Advanced Printer Scripting feature is used to restrict the accounts that can be used on different printers. For more information, see [Advanced Scripting \(Print Scripting\)](#). The advanced scripting provides a method (`actions.job.changePersonalAccountChargePriority`) that allows for changing both the accounts available and their order/priority. The method is documented in detail in [Script Actions](#).

For example, the following script snippet, shows how to limit the available accounts to only "Science Quotas" and "Cash" (in that order).

```
actions.job.changePersonalAccountChargePriority(["Science Quotas", "Cash"]);
```

- Departments can allocate initial quotas at enrollment or periodically throughout the year using the web-service APIs or `server-command` to adjust user balances. All the balances affecting APIs/commands have a parameter to specify which of the accounts to adjust/set. For example, to use `server-command` to set the balance of the "Science Quotas" account to \$10.00 for all members of the "Science Students" group:

```
server-command set-user-account-balance-by-group "Science Students" 10.0 \ "Enrollment quota" "Science Quotas"
```

You can integrate this technique with existing student management systems to automate the allocation of free print quota at the time of enrollment.

For more information on web-service APIs or `server-command` see [The XML Web Services API](#) and [Server Commands \(server-command\)](#).

You can achieve a lot with the power of Advanced Print Scripting and Multiple Personal Accounts. Large universities and colleges needing this level of flexibility also tend to have very competent IT staff. Take some time to bounce around some ideas. Here are a few:

- Use advanced print scripting to tune on/off access to accounts based on conditions such as group membership, time of day, device, etc.
- Automate account management tasks such as free quota assignment on course enrollment using scripts.
- Clearly explain to users any complex rules on which accounts are used and under which conditions. Take some time to document this and communicate policy with staff/students/members.

## 4.5. Shared accounts

PaperCut MF has two types of accounts - personal accounts and shared accounts. Each user has a personal account. This is the default account charged under normal operation. In some organizations and businesses you might want to provide users, or selected users, with the option to charge printing to a shared account. Some uses of shared accounts include:

In business:

- Allocate and budget printing by business areas (e.g. cost center)
- Track printing by project, phase, client or account
- Track printing by client/matter - popular in legal and accounting firms

In a school or university:

- Budget staff use via shared faculty or department accounts
- Provide share accounts for classes or subjects
- Track printing costs by subject areas

**Tip:**

**Do you have many client matter accounts?** Organizations such as legal firms, engineering firms, or accounting offices often have long lists of accounts, projects, clients, or matters. It is not uncommon to see more than 10,000 accounts, and some organizations run in excess of 300,000 accounts. Here are some tips to help improve performance when you have a large number of shared accounts:

- If you have 2,000 or more accounts, make sure you use an [Deployment on an External Database \(RDBMS\)](#)
- If you have 50,000 or more accounts, consider using the methods outlined in the Knowledge Base article "[Managing Large Client Matter Databases](#) and [Managing large client billing databases](#)."

These recommendations improve:

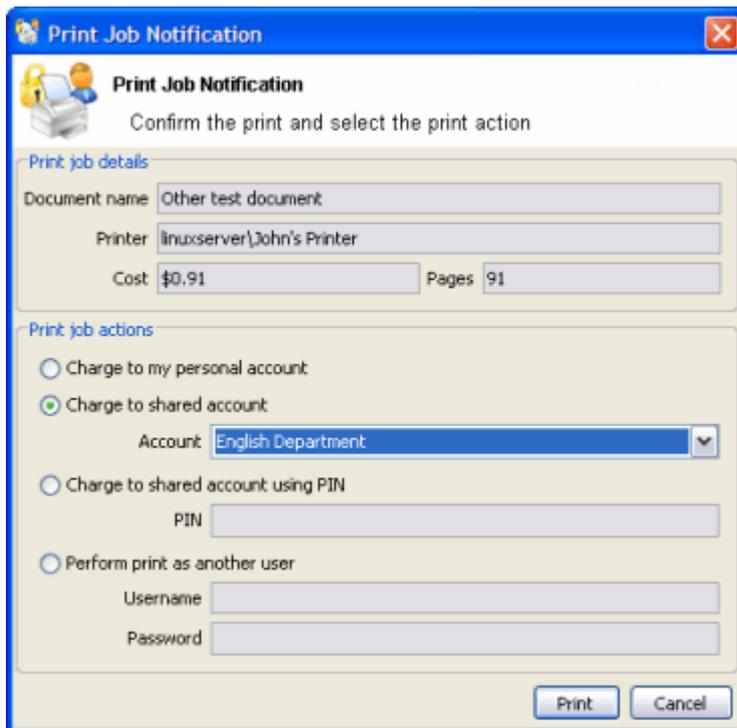
- account selection lookup and search speed on the popup client software
- client popup speed after print
- account selection speed on the copier/MFD embedded software
- server load (using a scalable database)

### Shared account scenario

East Beach High School has implemented PaperCut MF to control their printing. Students are allocated a \$5.00 a month budget. Pre-paid cards are sold at the library for students who need extra credit above this allowance.

Teachers and staff are given a small personal budget to cover casual printing with curriculum material to be allocated to share accounts. Shared accounts exist for each faculty. The network administrator has granted staff members access to the share account popup. Access to faculty accounts is controlled via Active Directory group membership.

Sarah is a Science and English teacher at the school. When she prints she is able to allocate the print job to either her personal account or either the Science or English shared account via a drop-down list. She can also view the shared accounts balances from the [User web pages](#).



**Tip:** To educate the users about shared accounts, administrators might find the [Example 2: Printing with shared accounts \(for staff\)](#) helpful.

### 4.5.1. Creating a shared account

Personal user accounts are automatically created when users are first imported into the system. Shared accounts are created manually on an as-need basis. Normally shared accounts are created manually via the administration interface, however, organizations with many accounts and good IT skills can automate the account creation process by importing accounts. Import options include via a file (for example, Excel, or an export from a 3rd party system) or by scanning an existing directory structure. For more information on automatic importing, see [Batch shared account import and update](#).

To create a shared account:

1. Log in to PaperCut MF as an administrator (e.g. admin account).
2. Select the **Accounts** tab.
3. Click the **Create a new account** action.
4. Enter an appropriate name for the account. Make the account names as descriptive as possible.
5. Complete other details such as starting balance, restrictions status and notes as appropriate.

- Click **OK** to save the changes and return to the accounts list.

By default shared accounts default to an unrestricted status. This means that the account's balance is allowed to drop below zero. Many organizations use shared account to track printing expense. A common strategy is to start the account off at a zero balance and let it count down into the negative. By setting the account to restricted and allocating an initial starting balance, you can use shared accounts as a budget control system as printing to the account is denied once credit is exhausted.



**Tip:** PaperCut MF has support for advanced parent/child account structures. The subsequent account naming conventions section covers many of the common practices. See [Account Naming Guidelines](#) for more details.

Each account can also be assigned a PIN/Code that helps uniquely identify an account. Many users use the codes to represent cost-centers, clients, projects, etc. These codes are often also used in other systems (like the accounting system) to identify these accounts consistently across the organization. Once defined, you can use these codes in the client software to quickly search for accounts, and can also displayed in account-based reports.

The account PIN/code can be entered on both parent and sub-accounts. For example, it is common to use parent accounts to represent clients and sub-accounts to represent projects for those clients. In this scenario, the parent account code would represent a client code, and the sub-account code would represent the project code.

#### 4.5.1.1. The Template Account

The [Template Account] is designed to save time by applying the most common settings to all newly created accounts. The [Template Account] is on the **Shared Account List** page of the **Accounts** tab.

Any settings applied to the template account are applied to new accounts when they are created.

Some examples of where the template account might prove useful include:

- Applying common security settings. For example, if the `Staff` group should have access to all accounts, adding the group to the template account ensures group members can also charge to future accounts.
- Applying a starting balance. The starting balance might represent the standard department print quota or the amount of 'free printing' a customer has before they are billed for the excess.

## 4.5.2. Account Naming Guidelines

Administrators are encouraged to create accounts as logically related groups. Doing so makes for easier searching and charging, and better integration with existing accounting systems.

Different account models can be adopted by organizations depending on their requirements. Common models are:

- *Faculty or Department* - a simple flat list familiar to schools, colleges and Universities.
- *Client / Matter model* - familiar to legal and accounting firms
- *Project / Phase model* - familiar to engineering and technology firms

- *Customer / Job model* - familiar to other customer based firms and common in accounting software

The following sections describe how to configure PaperCut MF to best match the three advanced models.

### 4.5.2.1. Client / Matter Naming Model

The client / matter model is one with which legal and accounting firms are familiar. In this model:

- Top level accounts are created for each client
- Sub-accounts are created for each matter under the relevant client

Usually, charging directly to a client (without a matter) is not allowed in this model. Instead users should charge to the relevant matter. System Administrators should set each top level account to be inactive (disabled), and all sub-accounts to active, as shown in the following image. This enforces use of sub-accounts only.

Location > Accounts > Shared Account List

## Shared Account List

Shared Account List    Batch Import / Update    Shared Account Sync

Quick find:

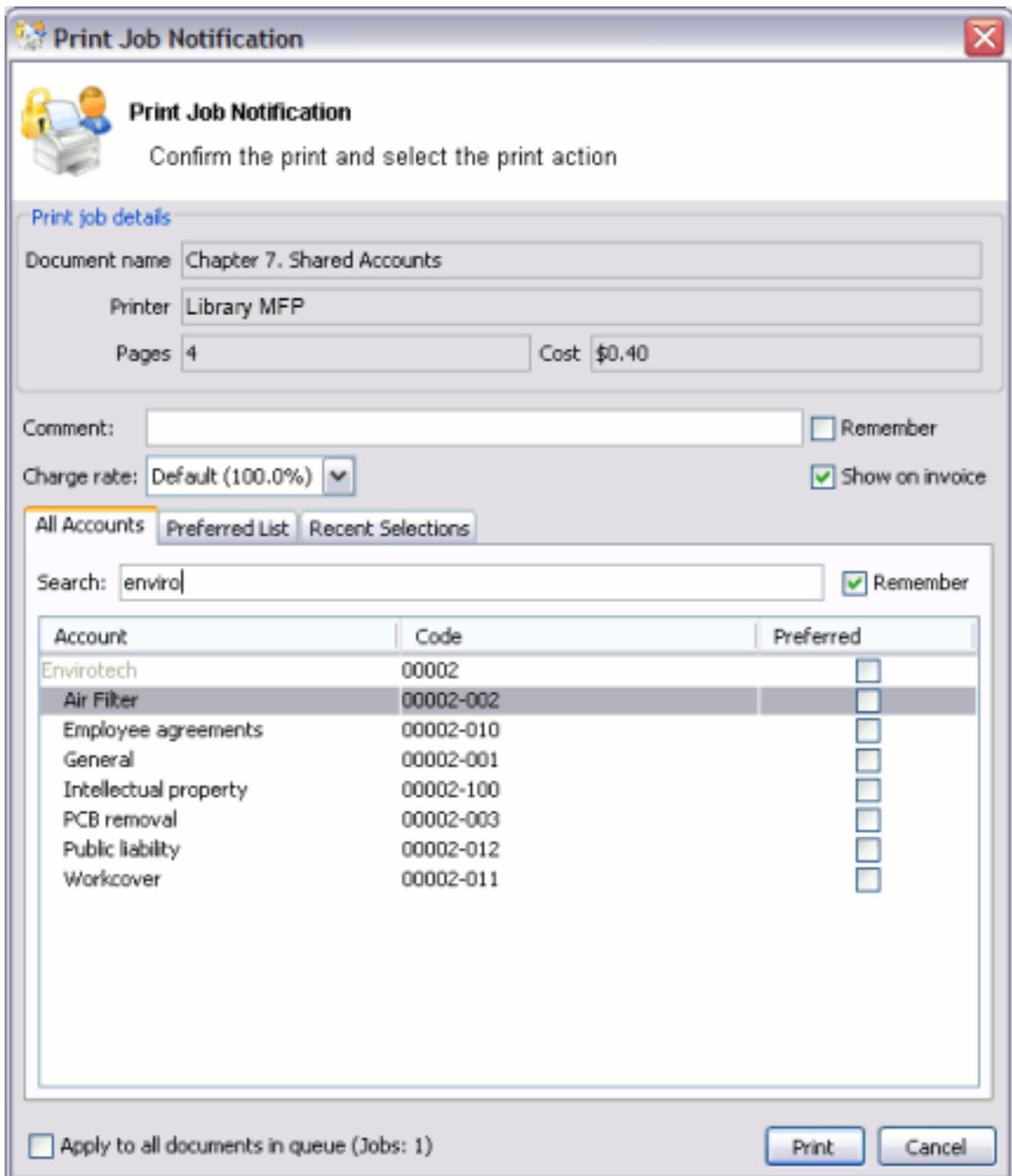
Filter off [edit]

	Name ▲
	<a href="#">[Template Account]</a>
	<a href="#">Envirotech</a>
	<a href="#">Air Filter</a>
	<a href="#">Employee Agreements</a>
	<a href="#">General</a>
	<a href="#">Intellectual Property</a>
	<a href="#">PCB Removal</a>
	<a href="#">Public Liability</a>
	<a href="#">Workcover</a>
	<a href="#">Finance</a>
	<a href="#">Friends of the Earth</a>
	<a href="#">General</a>
	<a href="#">Habitat Preservation</a>

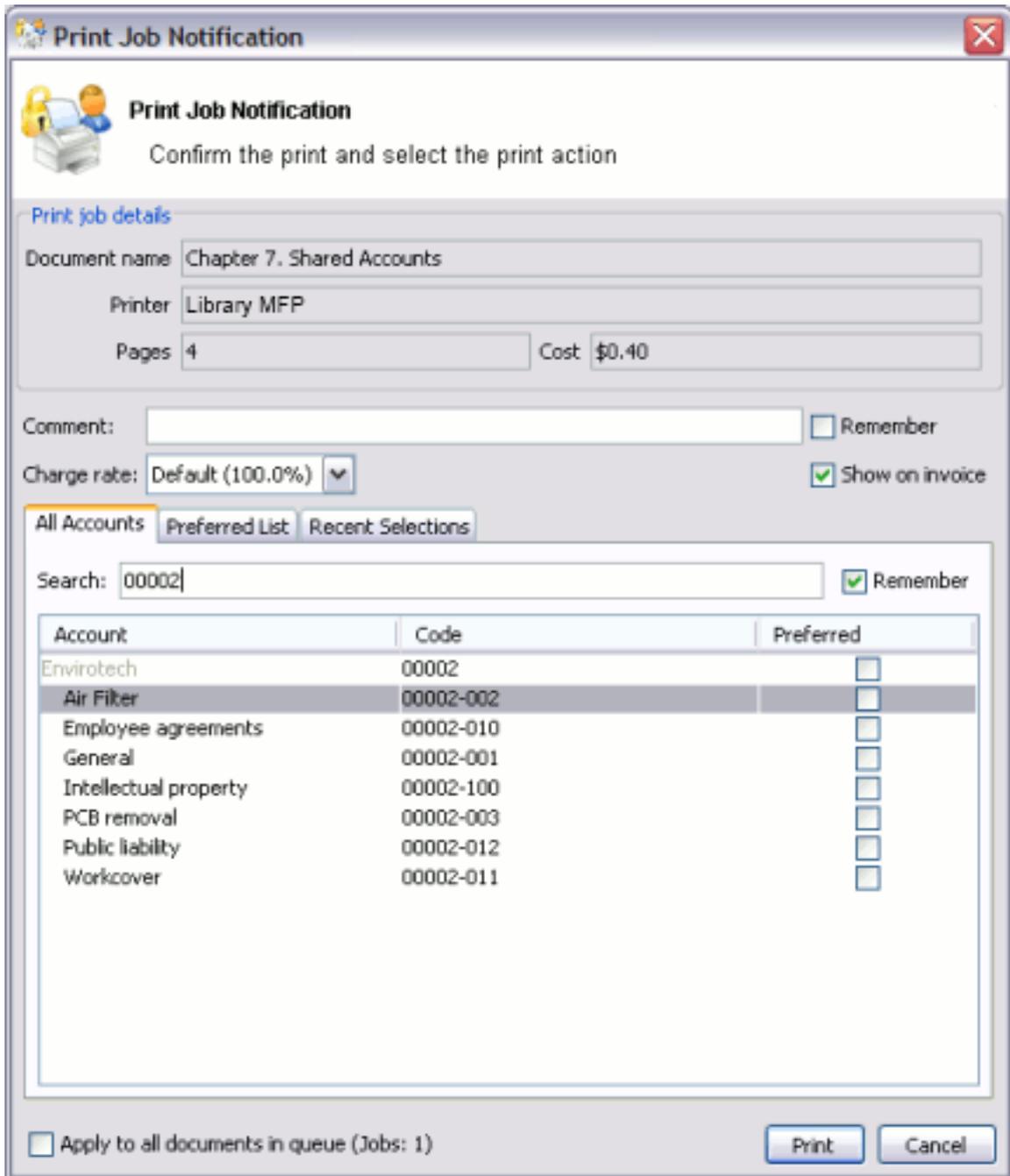
As shown in the example, the shared account *code* is used as the client code for the top level client accounts, and the matter code for the matter sub-accounts. In the account list, the sub-account codes are displayed as `[parentCode] - [subCode]`. For the shared account code to be visible, the option **Make shared account PIN / code visible** must be enabled. For more information see [Advanced shared account options](#).

By including both the client/matter code and name, users are able to search for a particular account by either client code, matter code, client name or matter name. The following examples demonstrate this:

1. Searching by client name displays the client plus all matter codes for the client.



2. Searching by client code displays the client plus all matter codes for the client.



3. Searching by matter name displays the matching matters plus the client for each matching matter.

**Print Job Notification**

**Print Job Notification**  
Confirm the print and select the print action

**Print job details**

Document name: Chapter 7. Shared Accounts

Printer: Library MFP

Pages: 4 Cost: \$0.40

Comment:   Remember

Charge rate: Default (100.0%)  Show on invoice

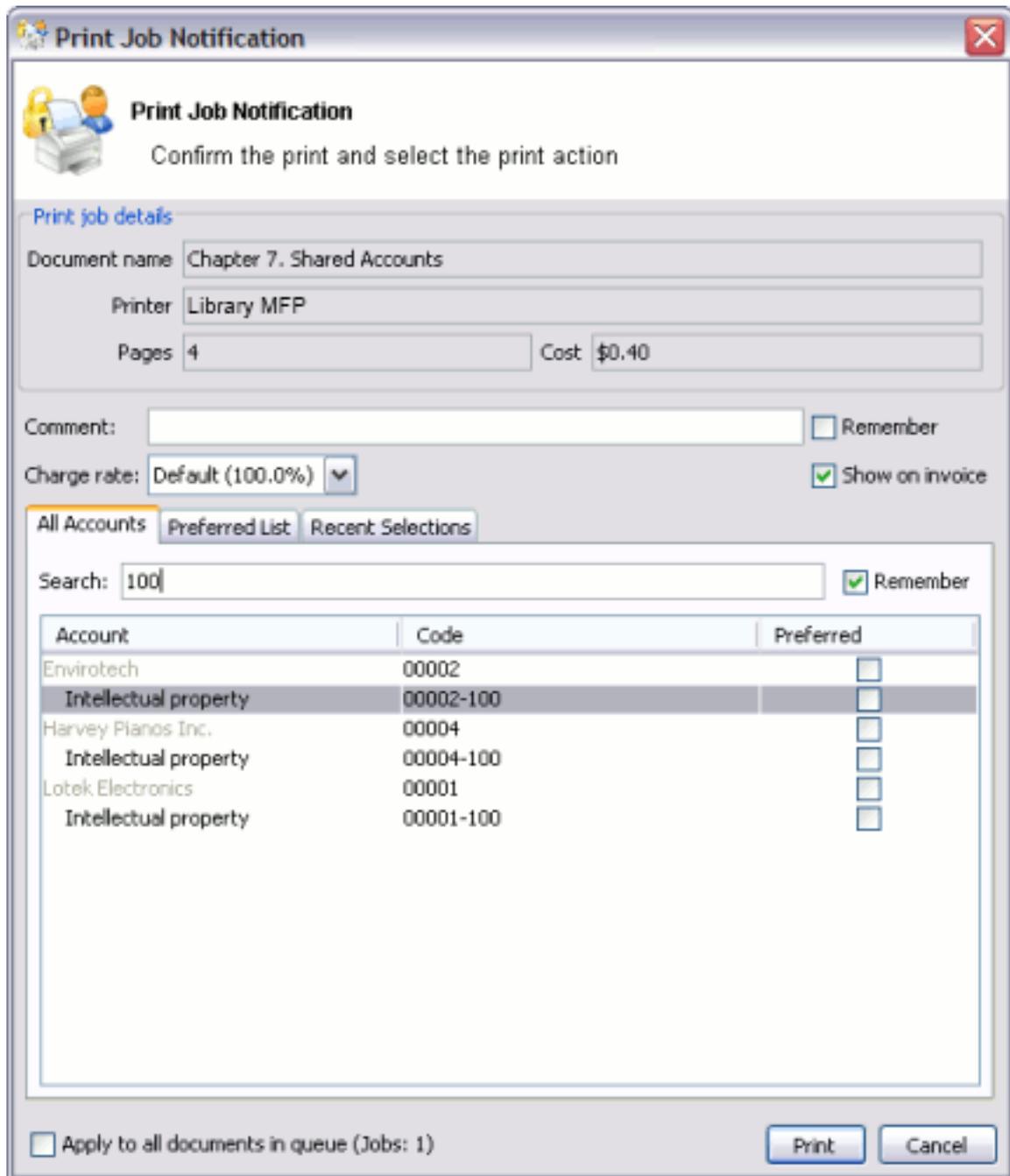
All Accounts Preferred List Recent Selections

Search: intellect  Remember

Account	Code	Preferred
Envirotech	00002	<input type="checkbox"/>
Intellectual property	00002-100	<input type="checkbox"/>
Harvey Pianos Inc.	00004	<input type="checkbox"/>
Intellectual property	00004-100	<input type="checkbox"/>
Lotek Electronics	00001	<input type="checkbox"/>
Intellectual property	00001-100	<input type="checkbox"/>

Apply to all documents in queue (Jobs: 1)

4. Searching by matter code displays the matching matters plus the client for each matching matter.



**Print Job Notification**

Confirm the print and select the print action

**Print job details**

Document name: Chapter 7. Shared Accounts

Printer: Library MFP

Pages: 4 Cost: \$0.40

Comment:   Remember

Charge rate: Default (100.0%)  Show on invoice

All Accounts Preferred List Recent Selections

Search: 100  Remember

Account	Code	Preferred
Envirotech	00002	<input type="checkbox"/>
Intellectual property	00002-100	<input type="checkbox"/>
Harvey Pianos Inc.	00004	<input type="checkbox"/>
Intellectual property	00004-100	<input type="checkbox"/>
Lotek Electronics	00001	<input type="checkbox"/>
Intellectual property	00001-100	<input type="checkbox"/>

Apply to all documents in queue (Jobs: 1)

Print Cancel

### 4.5.2.2. Project / Phase Naming Model

Engineering and IT firms are familiar with the project / phase model:

- Parent accounts are created for each project
- Sub-accounts are created for each project phase or stage

Usually, charging directly to a project is not allowed in this model - instead users should charge to the relevant project phase. System Administrators should set each parent account to be inactive (disabled), and all the sub-accounts to be active, as shown in the following image.

**Shared Account List**

Shared Account List | Batch Import / Update | Account Sync

Quick find:  Go Clear

<< < 1 2 >>

	Name ▲	Code	Balance	Restricted
🔒	[Template Account]		\$0.00	No
🔒	Customer Contact History	034225	\$0.00	No
🔒	Analysis - Dynamic modelling		\$0.00	No
🔒	Analysis - Functional modelling		\$0.00	No
🔒	Analysis - Object modelling		\$0.00	No
🔒	Design - Object design		\$0.00	No
🔒	Design - System design		\$0.00	No
🔒	Design - User interface design		\$0.00	No
🔒	Implementation - Phase 1 implementation		\$0.00	No

When projects have a job or project number, it is recommended that it be included as the shared account *code*. For the shared account code to be visible, the option **Make shared account PIN / code visible** must be enabled. For more information see [Advanced shared account options](#).

By including the project name, project number and phase name, users can search for a particular account using any of these fields. The following examples demonstrate this:

1. Searching by project name or number displays the project plus all phases for that project.

**Print Job Notification**

Confirm the print and select the print action

**Print job details**

Document name: Chapter 7. Shared Accounts

Printer: Library MFP

Pages: 4 Cost: \$0.40

Comment:   Remember

Charge rate: Default (100.0%)  Show on invoice

All Accounts Preferred List Recent Selections

Search: customer prod  Remember

Account	Code	Preferred
Customer Product Inventory	034227	<input type="checkbox"/>
Analysis - Dynamic modelling		<input type="checkbox"/>
Analysis - Functional modelling		<input type="checkbox"/>
Analysis - Object modelling		<input type="checkbox"/>
Design - Object design		<input type="checkbox"/>
Design - System design		<input type="checkbox"/>
Design - User interface design		<input type="checkbox"/>
Implementation - Phase 1 implem...		<input type="checkbox"/>
Implementation - Phase 2 implem...		<input type="checkbox"/>
Testing - Phase 1 UAT		<input type="checkbox"/>
Testing - Phase 1 stress and volu...		<input type="checkbox"/>
Testing - Phase 2 UAT		<input type="checkbox"/>
Testing - Phase 2 stress and volu...		<input type="checkbox"/>
Testing - Phase 3 UAT		<input type="checkbox"/>
Testing - Phase 3 stress and volu...		<input type="checkbox"/>

Apply to all documents in queue (Jobs: 1)

Print Cancel

2. Searching by phase displays all matching project phases, plus the project name for each phase.

**Print Job Notification**

Confirm the print and select the print action

**Print job details**

Document name: Chapter 7. Shared Accounts

Printer: Library MFP

Pages: 4 Cost: \$0.40

Comment:   Remember

Charge rate: Default (100.0%)  Show on invoice

All Accounts Preferred List Recent Selections

Search: testing  Remember

Account	Code	Preferred
Customer Contact History	034225	<input type="checkbox"/>
Testing - Phase 1 UAT		<input type="checkbox"/>
Testing - Phase 1 stress and volume		<input type="checkbox"/>
Testing - Phase 2 UAT		<input type="checkbox"/>
Testing - Phase 2 stress and volume		<input type="checkbox"/>
Customer Product Inventory	034227	<input type="checkbox"/>
Testing - Phase 1 UAT		<input type="checkbox"/>
Testing - Phase 1 stress and volume		<input type="checkbox"/>
Testing - Phase 2 UAT		<input type="checkbox"/>
Testing - Phase 2 stress and volume		<input type="checkbox"/>
Testing - Phase 3 UAT		<input type="checkbox"/>
Testing - Phase 3 stress and volume		<input type="checkbox"/>

Apply to all documents in queue (Jobs: 1)

### 4.5.2.3. Customer / Job Naming Model

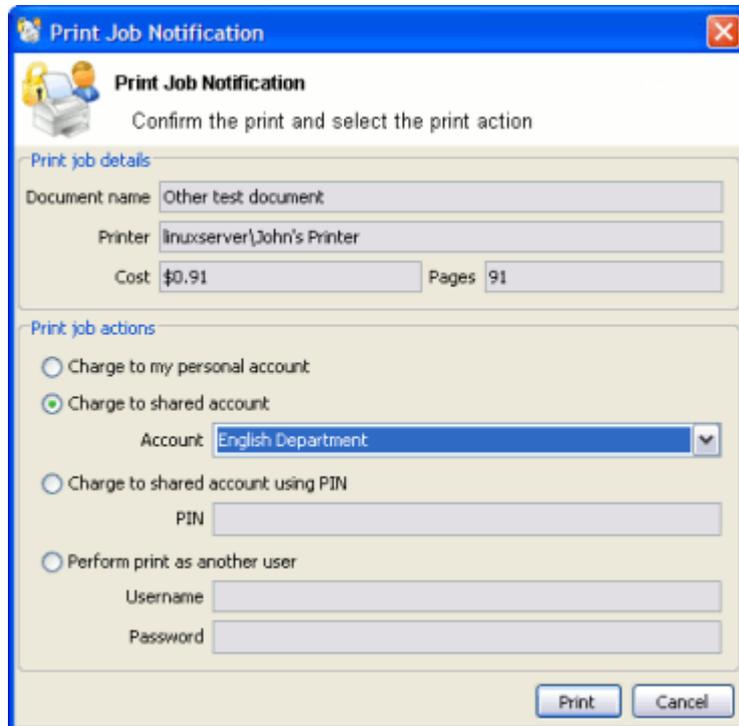
Organizations that deal with customers on a per-job basis are familiar with the customer / job model, as are those who use common accounting software packages. In this model:

- Parent accounts are created for each customer
- Sub-accounts are created for each job

The basic principals of the customer / job naming model are the same as the project / phase naming model. See [Project / Phase Naming Model](#), substituting *project* for *customer* and *phase* for *job*.

## 4.5.3. Client Security

By default all printing is automatically charged to the user's personal account. For a user to be able to select a shared account the user needs to be granted access to the account selection popup.



Access to the account selection popup, as shown in the above figure, is controlled at the user level on the user's details page. The **Show the account selection popup** option needs to be selected for each user that requires access to shared accounts. System Administrators might find the **Bulk user actions** section under the **User List** screen convenient for applying this change to many users.

<p><b>Account Selection</b></p> <p>Account selection can be used to allow the user to select what account is charged, or even to confirm print jobs before they are sent to the printer. These options require running the user client tool on workstations.</p>	<p><b>Print account selection</b></p> <p>Show the account selection popup <input type="button" value="v"/></p> <div style="border: 1px solid yellow; padding: 5px; background-color: #ffffcc;"> <p> This setting requires this user to run the client software at all times.</p> </div> <p><b>Information to show in popup</b></p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Allow user to charge to their personal account</li> <li><input checked="" type="checkbox"/> Allow user to select shared accounts (from list)</li> <li><input checked="" type="checkbox"/> Allow user to select shared accounts (using a PIN)</li> <li><input checked="" type="checkbox"/> Allow user to perform printing as another user</li> </ul> <p><b>When shared account is selected</b></p> <ul style="list-style-type: none"> <li><input checked="" type="radio"/> Charge shared account</li> <li><input type="radio"/> Charge personal account (and allocate to shared account for reporting)</li> </ul>
--	---



**Note:** You can also automatically charge printing to a single shared account without the need for the popup. This is useful in environments where a user only ever needs to charge to a single shared account so the popup is not needed.



**Important:** Users must restart their workstation (or manually restart the PaperCut client software) for this change to take effect. Users with the **Show the account selection popup** option enabled must run the client software at all times. Print jobs do not print until the user has selected the account.

In addition to granting users access to the popup, they also need access to a shared account. You can control shared accounts access using two methods:

- Network group membership
- PINs (also known as security codes or passwords)

If an account is allocated a PIN (an alpha-numeric access code) users with knowledge of the PIN can select the account. A PIN based system would be a sensible selection in an organization when PINs are already in use for other systems such as photocopiers or door access codes.



**Tip:** PINs/codes can also be used when using parent and sub-accounts. To select a specific sub-account from the client software, both the parent and sub-account pins are required. Enter them in the format of: [parentPIN] - [subPIN] (i.e. they are separated by a hyphen).

An alternate method is to delegate access to the shared account via network group membership. One advantage of group based control is that users do not have to remember PINs. Most medium to large organizations already have their network structured into suitable groups representing their position, title, department or work area. Use these existing groups to control access. Access to shared accounts can also be granted on an individual user basis, however, best practice suggests group-based management for medium to large networks.



**Tip:** In a Windows Active Directory environment, Organization Units are treated as special groups. This means you can also use them to control access to a shared account. Controlling access to shared accounts via group membership rather than individual user accounts is recommended. By using group based control, new users created on the network inherit the correct account access by virtue of their network group membership. This alleviates the need for additional user modification inside PaperCut MF.

To grant access to a shared account for all members in a given network group:

1. Log in to the system as an administrator (i.e. admin account).
2. Select the **Accounts** tab.
3. Select the appropriate shared account from the list.

4. Click the **Security** tab.
5. Select the appropriate group from the drop-down list.
6. Click **Add**.



**Account Details: English Department**

Details Adjustments & Charges **Security** Transactions Print History

 **Control access to this account:**

Allow the following groups to select this account without a PIN:

**Groups:**

English Teachers

▼ **Add** **Remove Selected**

Allow the following users to select this account without a PIN:

**Users:**

No users selected



**Tip:** To simultaneously change security settings of multiple shared accounts, click the **Bulk account actions** link on the **Accounts** tab. For more information, see [Bulk User Operations](#).

#### 4.5.3.1. Using account security with PIN/codes

PIN/codes provide a convenient way to select shared accounts. However, this convenience can compromise security when short or guessable PINs are used. For this reason PaperCut MF allows the user/group security to be also applied to PIN/code access. This allows sites to use convenient and short codes with confidence that only authorized users are granted access.

To enforce user/group security for PIN/code access:

1. Log in to the system as an administrator (i.e. admin account).
2. Go to the **Options** tab, to the **Account Options** section.

3. Change the **Access rules defined on shared account security tab apply to:** setting to **both PIN/code and selection from list**.
4. Click **Apply**.

With this setting changed, users can only select an account using PIN/code when they:

1. know the PIN/code; and
2. are in the shared account's user/group security

## 4.5.4. The Account Selection Popup

The account selection popup is a feature of the User Client that allows allocating printing to shared accounts. There are two types of account selection popup:

- *Standard account selection popup*

The standard account selection popup provides the basic features required to charge to shared accounts. It's ideal for sites with simple account structures.

- *Advanced account selection popup*

The advanced account selection popup includes additional features that are suitable when shared accounts are used frequently, and especially when many shared accounts exist.

- *Manager mode popup*

The manager mode popup is designed for "print managers" that allows charging printing to any user or shared account, and apply adjustments to the job costs (e.g. for charge for special paper, binding, etc). The manager mode popup is often used in print rooms where staff perform printing on behalf of other users.

- *Automatically charge to a single shared account*

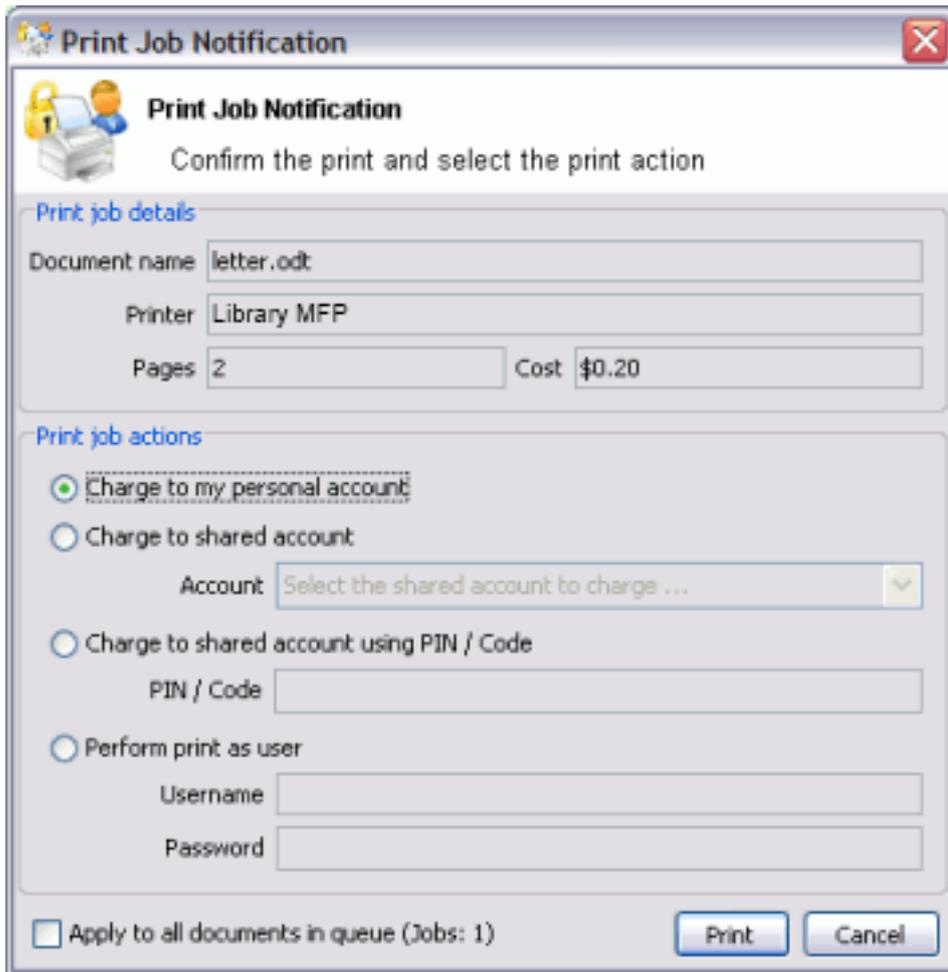
This is a special mode that allows automatically charging all printing to a selected shared account, without any user interaction or popup.

### 4.5.4.1. Standard Account Selection Popup

The standard account selection popup offers four account selection types:

1. Charge to personal account.
2. Charge/allocate to a shared account selected by a PIN.
3. Charge/allocate to a shared account from list (taking into account security settings).

4. Perform print as another user (username and password required).



The image shows a 'Print Job Notification' dialog box. It has a title bar with a close button (X). Below the title bar is a header area with a printer icon and the text 'Print Job Notification' and 'Confirm the print and select the print action'. The dialog is divided into two sections: 'Print job details' and 'Print job actions'. In the 'Print job details' section, there are three text boxes: 'Document name' containing 'letter.odt', 'Printer' containing 'Library MFP', and 'Pages' containing '2'. To the right of 'Pages' is a 'Cost' field containing '\$0.20'. The 'Print job actions' section contains four radio button options: 'Charge to my personal account' (selected), 'Charge to shared account', 'Charge to shared account using PIN / Code', and 'Perform print as user'. Below the 'Charge to shared account' option is a dropdown menu labeled 'Account' with the text 'Select the shared account to charge ...'. Below the 'Charge to shared account using PIN / Code' option is a text box labeled 'PIN / Code'. Below the 'Perform print as user' option are two text boxes labeled 'Username' and 'Password'. At the bottom left of the dialog is a checkbox labeled 'Apply to all documents in queue (Jobs: 1)'. At the bottom right are two buttons: 'Print' and 'Cancel'.

When a user selects a shared account, there is the option to:

1. Charge the print to a shared account.
2. Charge the print to personal account (and allocate to shared account for reporting).

The option to charge a to personal account allows printing to be tracked against shared accounts while allowing the use of user-based quotas. When this option is selected, the cost of the print job is deducted from the user's personal account, but the job is allocated against the shared account, which allows for account based print reporting.

You can set up the **Default shared account** to speed up the process of selecting a commonly chosen account. When entered, the selected account is pre-selected in account selection popups.

System Administrators can control on a per-user basis what options are available in the user's popup.



**Note:** Changes to the options available in the account selection popup come into effect immediately. You do not need to restart the client software for these settings to take effect.

### Account Selection

Account selection can be used to allow the user to select what account is charged, or even to confirm print jobs before they are sent to the printer. These options require running the user client tool on workstations.

#### Print account selection

**This setting requires this user to run the client software at all times.**

#### Information to show in popup

- Allow user to charge to their personal account
- Allow user to select shared accounts (from list)
- Allow user to select shared accounts (using a PIN)
- Allow user to perform printing as another user

#### When shared account is selected

- Charge shared account
- Charge personal account (and allocate to shared account for report)

The **Charge to personal account with popup notification** option displays a popup with no account selection features. This option is useful in environments where the System Administrator desires to provide users with cost confirmation prior to printing.

**Print Job Notification**
✕

**Print Job Notification**  
Confirm the print

*Print job details*

Document name

Printer

Pages  Cost

Apply to all documents in queue (Jobs: 1)



**Tip:** To educate the users about the popup confirmation window, administrators might find the [Example 1: Printing with the popup confirmation window](#) helpful.

### 4.5.4.2. Advanced Account Selection Popup

The advanced account selection popup allows charging to personal or shared accounts, and has the following additional features:

1. *A searchable account list*

You can search the account list by the account name or code, making it much easier to find an account when there are many in the list. The search can also be remembered for next time.

## 2. *Structured account list*

The account list is hierarchical; that is, sub-accounts are shown indented from their parent accounts for clarity.

## 3. *A preferred list of accounts*

You can save the most commonly used accounts to a list. This is a useful feature when many accounts exist, but each user mostly just uses a few of them.

## 4. *A list of recently selected accounts*

The accounts that have been recently selected are saved to a list for quick selection.

## 5. *Comments on print jobs*

The advanced account selection popup allows assigning a comment to a print job for future reference.

## 6. *Cost Adjustments*

Cost adjustments offer the ability to apply various adjustments to the cost of a print job. You can apply a percentage rate adjustment, a per job adjustment, or a per page adjustment. For example, a 200% adjustment could be defined for manually loading photo paper (charge twice the standard cost). Other common examples of adjustments include; Mylar Film, draft paper, draft printing mode, discounts for "special" customers/jobs, and extra for binding and manual handling. Cost adjustments are defined at either a global or printer level and are documented in detail in [Cost Adjustments](#).

## 7. *Option to not show a print job on invoices*

Sometimes there are print jobs that you want to allocate to an account but not include on any invoice reports. The advanced account selection popup has an option to allocate a 'non invoiceable' print job to an account.

**Print Job Notification**

Confirm the print and select the print action

**Print job details**

Document name: P-D Floorplan.odg  
 Printer: Library MFP  
 Pages: 2 Cost: \$0.80

Comment: Floorplan (building C)  Remember  
 Charge rate: Default (100.0%)  Show on invoice

All Accounts Preferred List Recent Selections

Search:   Remember

Account	Code	Preferred
My Personal Account		<input type="checkbox"/>
Accounting	ACC	<input type="checkbox"/>
Information Technology	IT	<input checked="" type="checkbox"/>
Help Desk	IT-H	<input type="checkbox"/>
Infrastructure	IT-I	<input checked="" type="checkbox"/>
Projects	P	<input type="checkbox"/>
Alpha	P-A	<input type="checkbox"/>
Bravo	P-B	<input type="checkbox"/>
Delta	P-D	<input checked="" type="checkbox"/>
Foxtrot	P-F	<input type="checkbox"/>
Sales	SAL	<input type="checkbox"/>
General	SAL-G	<input type="checkbox"/>
Project	SAL-P	<input type="checkbox"/>
Support	SUP	<input type="checkbox"/>
General	SUP-G	<input type="checkbox"/>

Apply to all documents in queue (Jobs: 1)

As in the standard account selection popup, there are two charging options for shared accounts:

- Charge shared account
- Charge personal account (and allocate to shared account for reporting)

You can set the **Default shared account** to speed up the process of selecting a commonly chosen account. When entered, the selected account is pre-selected in account selection popups.

## Enabling the Advanced Account Selection Popup For All Users

In a professional (client billing) installation, the advanced account selection popup is often enabled for all users, so that every user is prompted for a shared account (client) to charge when printing.

Once the client software is deployed on user computers (covered in [User Client Deployment](#)), you can enable the account selection popup. You can enable the popup on one user at a time or for all users in bulk. To enable the popup for all users in bulk:

1. Log in to the admin interface.
2. Navigate to **Users > Actions > Bulk user actions**.
3. By default the action is applied to all users (the special `[All Users]` group). To apply the action to a subset of users (a user group), select that group from the dropdown list.
4. In the section **Change settings**, enable the option **Change account selection setting** and select the option **Show the advanced account selection popup** from the dropdown list.
5. If you do not want to allow users to charge printing to their personal account (i.e. they must select a shared account) then disable the option **Allow user to charge to their personal account**.
6. Click **OK** and confirm the operation. Once completed, the account popup is enabled for selected users.

Once the popup is enabled for all users, perform some testing from users' computers. To test, log in to a user computer, perform a print and confirm that the account popup is displayed and the job is logged as expected.

### 4.5.4.3. Manager Mode Popup

The manager mode popup is designed to be used by authorized users to perform printing on behalf of other users (e.g. in a school's print room when jobs are emailed in with often complex instructions such as binding, color paper covers, etc.). The approved user can charge printing to users' personal accounts or any shared account. This popup provides the following features:

1. *Charge printing to any user*

The manager enters the user's username or ID number. The printing is logged under this user's account.

2. *Charging to any account*

The print job can be charged to the user's personal printing account or any of the shared accounts in the system. Users can select the shared account from a list, or by using the account code/PIN.

### 3. *Standard cost adjustments*

Standard cost adjustments provide a list of adjustments that can be applied to the cost of a print job. The print manager can select one or more standard adjustments to apply to a given print job. You can apply a percentage rate adjustment, a per job adjustment, or a per page adjustment. For example, a 200% adjustment could be defined for manually loading photo paper (charge twice the standard cost). Other common examples of adjustments include; Mylar Film, draft paper, draft printing mode, discounts for "special" customers/jobs, and extra for binding and manual handling. You can define these adjustments on the server at a global or printer level and are documented in detail in [Cost Adjustments](#).

### 4. *Custom cost adjustments*

If none of the standard adjustments are applicable, the print manager can easily apply a custom per page or per job adjustment. Examples could include special binding, delivery, etc.

### 5. *Comments on print jobs*

Allows assigning a comment to a print job for future reference. e.g. to explain the reason for the cost adjustments.

**Print Job Notification**  
Manager mode popup (for approved users only)

Print job details

Document name: Budget - OpenOffice.org Calc

Printer: server\printer

Pages: 160 Cost: \$1.60

1. Select a user

Username or ID: matt

Verified - Matt Johnson (matt)

2. Select an account

Account: Science Faculty

Or enter PIN/code:

3. Adjustments

Standard

- Binding (+\$2.00 per job)
- Color Paper (+\$0.20 per page)
- Staff Discount (-30.0%)

Custom: 0.00 per page 3.50 per job

4. Comments

Extra for color cover sheet

Apply to all documents in queue (Jobs: 1)

#### 4.5.4.4. Automatically charge to a shared account

This special account selection mode allows all printing to be automatically charged to a single shared account, without user interaction or the User Client software running on the workstation. This mode is useful when a user only ever charges printing to a single shared account and does not want the inconvenience of responding to the account selection popup when they print.

An example of where this would be useful is in a school or business environment where shared accounts represent a department within the organization. In this situation, automatically allocate user printing to a single shared account without any user interaction. Although this can mostly be achieved with the standard account selection popup, it requires the user to respond to each popup when they print.

You can select this option for an individual user, set on multiple users using the **Bulk User Actions** or set in the initial user settings in the **Group** section. Once the **Automatically charge to a shared account** option is selected, then enter the account name to charge. To select a sub-account the account name must be entered in the parent\sub-account format.

<h3>Account Selection</h3> <p>Account selection can be used to allow the user to select what account is charged, or even to confirm print jobs before they are sent to the printer. These options require running the user client tool on workstations.</p>	<h3>Print account selection</h3> <p>Automatically charge to a shared account</p> <h3>Charge to account</h3> <p>Science Department e.g. "Science Department" or "Acme Corp\Reports"</p> <h3>When shared account is selected</h3> <p><input checked="" type="radio"/> Charge shared account <input type="radio"/> Charge personal account (and allocate to shared account for reporting)</p>
---	--

## 4.5.5. Account Selection in Non-Domain Environments (Workgroups)

Many small networks are not controlled via a central domain server. These networks are sometimes referred to as workgroups or peer-to-peer networks. On these networks users cannot log on to their desktop, or computers might be shared by multiple users. The **Allow user to perform printing as another user** option is useful in non-domain/logon environments. User accounts can be set up in the system hosting the printers and users can select their account using usernames and passwords for each print job, irrespective of which user account is currently logged onto the workstation.

### Information to show in popup

- Allow user to charge to their personal account
- Allow user to select shared accounts (from list)
- Allow user to select shared accounts (using a PIN)
- Allow user to perform printing as another user



**Tip:** PaperCut MF can also be configured to manage its own set of user accounts. See [Internal users \(users managed by PaperCut NG\)](#) for more details.

## 4.5.6. Batch shared account import and update

The batch import and update feature allows the administrator to import accounts, and optionally update existing account details by reading data from a simple text file or directory structure. In addition to being able to create accounts, it enables administrators to update the following account data:

- Enabled / disabled status
- Account PIN / Code
- Credit balance
- Restriction status
- Users allowed to use the account
- Groups allowed to use the account
- Invoicing options
- Comment options
- Notes

Examples of where the batch import feature is useful include:

- When importing account and balance data from another external system (e.g. a project management or accounting system).
- To reset the account balances at the end of a billing period (year/term/semester).
- To bulk update the users and groups who are allowed to use/access the accounts (security).



**Tip:** To update shared accounts from a tab delimited file on a regular basis, see [Shared account synchronization](#) instead. You can also synchronize shared accounts against the directory structure of a file system, for example, when there is a separate folder for each department or customer.

To perform a batch import:

1. Manually inspect your file in a text editor and ensure it's in the prescribed tab-delimited format as detailed at [Batch account import file format](#).
2. Navigate to the **Accounts** section.
3. Click the **Batch Import / Update** tab.
4. Click **Browse** to select the file to import. (The format of the file is described in [Batch Account Import File Format](#)).
5. Choose whether you want to delete accounts that exist in PaperCut MF but not in the import

file.

6. Click **Test Settings**.
7. The window displayed indicates how many lines were processed, and how many shared accounts will be imported, updated or deleted when you click **Import**.
8. If you are happy with the results of the test, click **Import**.



**Tip:** Consider testing your import file format with a small sample first (e.g. maybe a copy of the file containing only the first five lines). This way any formatting mistake only propagates to a few accounts rather than all!

Some example shared account import files are located at `[app-path]/server-  
/examples/import/shared-accounts/` in both Excel and TSV (tab separated values) formats. Use the Excel format to produce the TSV format by saving as Text (Tab delimited). Examples include a flat list of accounts using the example of departments in a school (`school-departments.tsv`) and another with subaccounts using the example of a client-matter layout for a business' clients (`client-matter.tsv`).

#### 4.5.6.1. Batch Account Import File Format

The import file is in tab delimited format and contains the following fields in the given order.

**Table 35: Shared Account Import File Format**

No.	Field	Description	Optional?	Limitations
1.	Parent Account Name	The name of this account's parent. When creating a top level account, leave the sub-account name blank (this is the account's name).	Mandatory	Max. 255 characters
2.	Sub-account Name	When creating a sub-account (1 level deep only), enter its name here.	Optional - account is top level if blank	Max. 255 characters
3.	Enabled	Whether or not this account is enabled. (Y/N where Y = YES, and N = No).	Optional - account is enabled if blank	

No.	Field	Description	Optional?	Limitations
4.	Account PIN/Code	The account PIN/Code. For parent accounts, the code must be unique for all parent accounts. For sub-accounts, the code must unique amongst accounts with the same parent account.	Optional - PIN not set if blank	Max. 50 characters
5.	Credit Balance	The account balance. <ul style="list-style-type: none"> <li>When updating an existing user, a blank balance indicates that the existing balance is maintained without modification.</li> </ul>	Optional - Balance not updated if blank	A number with no currency symbol or separators, using a full stop for the decimal separator. Correct: 1.23 Incorrect: \$1.23 or 1,23 or 1,023.00
6.	Restricted Status	The account's restricted status. (Y/N where Y = YES, and N = No).	Optional - if blank, set to a configurable default	
7.	Users	Modifies the users who are allowed to select this account from the list (no CODE/PIN required). You can modify the access list as follows: <ul style="list-style-type: none"> <li>To replace the previously defined</li> </ul>	Optional - users are not updated if blank	No real limit, but if there are many users consider

No.	Field	Description	Optional?	Limitations
		<p>access list, use a pipe ( ) delimited list of usernames. e.g. <code>user-1 user2 user3</code> sets the list to these three users (removing any previously defined).</p> <ul style="list-style-type: none"> <li>To add users to the existing access list, prefix the pipe delimited user list with a plus sign (+). e.g. <code>+user-1 user2 user3</code> adds these three users to the access list.</li> <li>To remove users from the existing user list, prefix the pipe delimited user list with a hyphen (-). e.g. <code>-user-1 user2 user3</code> removes these three users from the access list.</li> <li>To remove all users from the access list, enter a hyphen (-).</li> </ul>		using an access group instead
8.	Groups	<p>Modifies the groups that are allowed to select this account from the list (no CODE/PIN required). To reference the special 'All Users' group, use the syntax <code>[All Users]</code>. You can modify the access list as follows:</p> <ul style="list-style-type: none"> <li>To replace the previously defined access list, use a pipe ( ) delimited list of groups. e.g. <code>group1 -group2 group3</code> sets the list to these three groups (removing any previously defined).</li> <li>To add groups to the existing access list, prefix the pipe delimited group list with a plus sign (+). e.g. <code>+group1 -group2 group3</code> adds these three groups to the access list.</li> <li>To remove groups from the existing group list, prefix the pipe delimited group list with a hyphen (-). e.g. <code>-group1 group2 group3</code></li> </ul>	Optional - groups are not updated if blank	

No.	Field	Description	Optional?	Limitations
		<p>removes these three groups from the access list.</p> <ul style="list-style-type: none"> <li>To remove all groups from the access list, enter a hyphen (-).</li> </ul>		
9.	Invoice Option	<p>The invoicing option defines how prints allocated to this account are invoiced. Available values are:</p> <p><code>ALWAYS_INVOICE</code> - prints allocated to this account are always invoiced</p> <p><code>NEVER_INVOICE</code> - prints allocated to this account are never invoiced</p> <p><code>USER_CHOICE_ON</code> - it is up to the user whether or not to invoice prints allocated to this account. The default is yes.</p> <p><code>USER_CHOICE_OFF</code> - it is up to the user whether or not to invoice prints allocated to this account. The default is no.</p>	Optional - set to <code>USER_CHOICE_ON</code> if blank	
10.	Comment Option	<p>The comments option defines whether or not comments are added to prints allocated to this account. Available values are:</p> <p><code>NO_COMMENT</code> - comments cannot be added</p> <p><code>COMMENT_REQUIRED</code> - comments must be added</p> <p><code>COMMENT_OPTIONAL</code> - it is up to the user whether or not to add a comment</p>	Optional - set to <code>COMMENT_OPTIONAL</code> if blank	
11.	Notes	Notes about the shared account (placed in the Notes field).	Optional - notes not set if blank	Max. 2000 characters

*Other limitations:* Although any actual limit to the size of an import file should be large enough for any purpose, we recommend keeping the file size below 10MB.



**Tip:** A simple way to create a tab delimited file is to create a spreadsheet in Microsoft Excel, and then save it in the `Text (Tab delimited)` format.

## Import File Format Examples

The following lines shows importing all the above fields. (The fields are separated by tabs).

```
Maths Y 12 5 N user1|user2 group1|group2 ALWAYS_INVOICE
COMMENT_REQUIRED Science Physics Y 1620 100 Y user3 NO_COMMENT
A Note Science Biology N 16 12.50 N group3 USER_CHOICE_OFF
```

The following lines show updating only the groups that can access the account. NOTE: The tabs still exist for the enabled status, pin, balance, restriction and users fields, but each entry is blank.

```
Maths group1|group2|group3 Science Physics group1 Science
Biology group3
```



**Tip:** The shared account import process is triggered by the command-line scripting tool `server-command`. See [Server Commands \(server-command\)](#).

### 4.5.7. Shared account synchronization

The shared account synchronization feature allows the administrator to define an external source for shared accounts. This is useful for situations where shared accounts are managed by an external system, and allows PaperCut MF to mirror the accounts without any additional administration.

To enable shared account synchronization:

1. Navigate to the **Accounts** section.
2. Click the **Account Sync** tab.
3. Choose appropriate settings. For more information, see [Synchronization Options](#).
4. Click **Test Settings**
5. The window displayed indicates how shared accounts were processed, and how many shared accounts will be imported, updated, or deleted when you click **Synchronize Now**.
6. If you are happy with the results of the test, click **Synchronize Now**. This triggers a shared account synchronization, and synchronization continues at the chosen interval.

### 4.5.7.1. Synchronization Options

You can synchronize shared accounts against two possible sources: a text file or a directory structure. This is configured in the first option on the **Account Sync** tab: **Sync source**.

- *Text file* - Synchronize shared accounts against a text file. For more information about the format of this text file, see [Batch Account Import File Format](#).
- *File System Directory Scan* - Synchronize shared accounts against a directory structure. Many organizations have a 'Customers' folder or similar in their file system that contains one folder per customer. For example, given `Customers/Client 1` and `Customers/Client 2`, synchronizing against the `Customers` directory imports `Client 1` and `Client 2` as shared accounts.



#### Tip:

The location of the text file or directory (the sync source) is relative to the system where PaperCut MF is installed, not the system being used to access the admin interface. The sync source should either be physically on that system, or accessible via a mapped / mounted drive. Additionally, the source should have permissions to be readable by the `Local System` account on Windows, or the `papercut` account on Mac or Linux.

The other options include:

- *File location / directory location* - The location of the file or directory to sync against. The location is relative to the server.
- *Perform sync* - How often the account sync should take place. The available options are **Hourly** and **Overnight**. If new accounts are being added regularly throughout the day, **Hourly** is probably the best choice. The **Overnight** sync occurs nightly at approximately 12:55am.
- *Treat subdirectories as sub-accounts* - This option is only available with directory synchronizing against a directory. When checked, subdirectories are treated as sub-accounts. For example, a directory structure of `Customers/Client 1/Project 1` produces a top level account called `Client 1` and a sub-account of `Client 1` called `Project 1`.
- *Delete accounts that do not exist in the selected source* - This option deletes accounts that exist in PaperCut MF but not in the sync source. Use this option to clean out 'old' accounts. This option is not 'remembered' for the automatic synchronization, so accounts can only be deleted by checking this box and clicking **Synchronize Now**. Deleting is a destructive operation. Don't forget to perform a test first and a backup is also advised!

### 4.5.8. Bulk shared account operations

A bulk shared account operation refers to an operation that is applied to more than one shared account. There are occasions where the same task needs to be performed on multiple accounts. With a large number of shared accounts, it can take too long to perform the task manually on each one; this is where bulk account operations are useful.

**Bulk account actions** are in the **Actions** list on the **Accounts** tab.

Some examples of where bulk account operations might come in useful include:

- Resetting shared account balances at the start of a new billing period.
- Introducing a new printing policy or account model that needs to be rolled out across all shared accounts.
- Temporarily disabling shared accounts. For example, over the holiday period when there should be no shared account based printing.
- Giving to a particular group access to all shared accounts.



**Warning:** The bulk account operations are one-way and cannot be undone. Always carefully consider the operation before proceeding. If you are unsure of the function or behavior, performing a backup prior to undertaking the operation is advised.

You can perform the following tasks through bulk account operations:

- Adjust of set the accounts' credit (perform a transaction)
- Change the accounts' restriction status
- Disable the accounts for a specified period of time
- Change the invoicing option
- Change the comments option
- Change the cost multiplier
- Change the security settings
- Change quota scheduling settings

### 4.5.9. Shared account quota allocation

Sometimes organizations want to control printing to shared accounts. You can do this by allocating quotas on a periodic basis.

To allocate a \$100.00 weekly quota to *Science* account:

1. Navigate to the **Accounts** tab.
2. Select the account.
3. Under the Quota Scheduling section, select a period of **Weekly** and enter 100.00 in the **Schedule amount**.
4. Click **Apply**.

Quota for shared accounts gets allocated very similar to group quota. See [Setting up quota allocations](#) for more details about quota scheduling.

For details about scheduling times, refer to [Setting up quota allocations](#).

### 4.5.10. Shared account cost multiplier

Sometimes organizations want to charge different amounts to different shared accounts. You can set a cost adjustment multiplier on a shared account. For example, by setting the **Multiply cost by** to 50%, then printing to the shared account costs 50% less. Setting the **Multiply cost by** to 125% costs 25% more.

To provide a discount to the example "Administration" shared account, follow the steps listed below:

1. Navigate to the **Accounts** tab.
2. Select the "Administration" account.
3. Under the Advanced Options section, select the option **Multiple cost by** and enter 50.
4. If you want to apply same cost adjustment to all it's sub accounts of "Administration", then select the option **Apply to all sub accounts**.
5. Click **Apply**.

If you want to apply same settings to multiple accounts you can use **Bulk account actions**. For more information, see [Bulk shared account operations](#).

### 4.5.11. Advanced shared account options

You can customize the functionality of shared accounts to suit a wide range of uses. There are several advanced options available throughout PaperCut MF to control this customization:

- *Make shared account PIN/code visible*

When this option is active, the purpose of the shared account PIN is changed. Usually the PIN is equivalent to a password, and can be required before a user is able to charge to a shared account. When this setting is active, the PIN is treated as a 'code' instead; that is, a unique identifier for a given shared account. For example, an organization dealing with projects might allocate a shared account the project code 123.

When this option is active it has several effects throughout PaperCut MF, including:

- The shared account list (on the **Accounts** tab) includes the shared account code.
- Reports dealing with shared accounts display the code.
- On the account selection popup dialogue of the User Client tool, the code is visible

when entering (i.e. it is no longer hidden by stars). This allows charging to a shared account by code, rather than scrolling through the dropdown list to find the correct account by name.

To activate this option:

- Go to the **Options** tab
- Check the option **Make shared account PIN/code visible**
- Click **Apply**
- *Apply to all documents in queue*

This option is displayed at the bottom of both the standard and advanced account selection popups. When checked, the settings being applied to the current print job are applied to all waiting jobs automatically. The text lets you know how many jobs this affects (e.g. "Jobs: 5").

This setting is useful when printing a batch of documents for the same purpose. For example, when printing a letter, diagram and spreadsheet for a client, the client account can be selected on the account selection popup along with any other appropriate settings, and the settings are applied to all three jobs. This saves the time taken to apply the settings for each job.

- *Changing the time after which jobs are deleted when awaiting popup response*

If a user does not respond to the account selection popup after a defined time, their print job is automatically deleted. This is to prevent a buildup of old jobs in the print queue. For more information see [User Client Options](#).

## 4.6. Advanced Printer Management

This section covers some of the more advanced printer management tasks. Advanced printer management has the following high-level concepts:

- Activity monitoring
- Encouraging appropriate use
- Managing the addition of new printers

This section addresses these management areas and covers tools available in PaperCut MF to assist administrators.

### 4.6.1. Adding and Removing/Deleting/Ignoring Printers

### 4.6.1.1. On Windows

PaperCut MF tracks all print queues *local* to the system by default. Local print queues are those that have been set up on the server running PaperCut MF with a local port, such as: a TCP/IP connection to a network printer, an LPR connection, or a printer attached locally via USB or LPT. Standard Windows print queues that are hosted on a different system, or re-shared, are not tracked (you can track these queues by setting up a *secondary print server*, see [Configuring Secondary Print Servers and Locally Attached Printers](#)).

New print queues added to the system should show up automatically in PaperCut MF, however, in some rare situations the printer shows up only after the first print job is sent.

Under some situations you might not want to track all printers. Some examples of why an administrator might not want to monitor a printer include:

- The printer is a virtual printer such as a PDF generator, FAX, or document management program.
- The administrator might want to offer free printing on a selected printer and is not concerned with monitoring (silent monitoring with a zero page cost also achieves this).
- The printer might not be supported by PaperCut MF and needs to be ignored.

The *Print Provider* component is responsible for locating and tracking the printers. To instruct it to ignore a printer:

1. On the computer system hosting the queue to be added/removed/ignored, open the file `[app_dir]\providers\print\win\print-provider.conf` in a text editor such as Notepad.

2. Locate the line `IgnorePrinters=` and enter the full name of the printer on the right-hand-side of the equals line. For example:

```
IgnorePrinters=Office Printer
```

*Note:* This is the printer's locally assigned name and not the name of its network share.

If you have multiple printers to ignore, then separate the each printer name with a comma. For example:

```
IgnorePrinters=Office Printer,Copy Room Printer
```

Wildcard expressions can also be used. Use `*` to ignore any span of characters, and `?` to ignore a single character. For example, to ignore any printers that start with the phrase *Copy Room*:

```
IgnorePrinters=Copy Room*
```

3. Restart (stop then start) the `PaperCut Print Provider` component under **Start > Control Panel > Administrative Tools > Services**
4. If the printer data is no longer required for reporting purposes, log in to PaperCut MF's admin interface and select the **Printers** section, then click the printer to be removed and select **Delete printer** from the **Actions** list.

5. Test the changes by printing to the deleted printer and ensuring the printer does not re-register itself in the system. If it does, verify the name assigned under the `IgnorePrinters=` setting is correct.

### 4.6.1.2. On Mac

The list of monitored printers is configured when installing PaperCut MF. To change the list of monitored printers, run the script at `/Applications/PaperCut MF/Control Printer Monitoring.command`. Read the script's instructions carefully and ensure that the **Print Setup Utility** is closed/quit when running this script.

After running the script, print a test document (i.e. using a text editor or printing a web page from Safari). The act of printing for the first time registers the printer with the primary server. Log in to PaperCut MF as `admin` and verify that the printers are now listed under the **Printers** section. Perform a test print on each printer and verify that the jobs are tracked correctly.



**Note:** At the technical level, Mac systems use the Common UNIX Printing System (CUPS). PaperCut MF tracks printing by integrating with CUPS. (For System Administrators familiar with CUPS, PaperCut MF integrates by wrapping or proxying the CUPS backend). The `Control Printer Monitoring.command` script edits the file `/etc/cups/printers.conf` and prefixes the `DeviceURI` with `papercut:`, enabling monitoring on the selected printer. System Administrators experienced with the terminal might prefer to edit the `printers.conf` file directly with a text editor. See [On Linux](#) for more details.

To delete a printer:

1. Double-click the `Control Printer Monitoring.command` script.
2. Choose to disable monitoring on the printer(s) to delete.
3. If the printer data is no longer required for reporting purposes, log in to PaperCut MF's admin interface and select the **Printers** section, then click the printer to be removed and select **Delete printer** from the **Actions** list.
4. Test the changes by printing to the deleted printer and ensuring the printer does not re-register itself in the system. If it does, verify that it is not being monitored using `Control Printer Monitoring.command`.

### 4.6.1.3. On Linux

PaperCut MF tracks printing by integrating with the Common UNIX Printing System (CUPS), the printing system on Linux. For a printer to be tracked, CUPS needs to be told to route print jobs through PaperCut MF before printing.

To do this, the `printers.conf` file must be edited. This can either be done manually, or assisted via the `configure-cups` script.

To use the script, run the script file at `[app-path]/providers/print/linux-*/configure-cups`. Read the script's instructions carefully to enable monitoring on the desired printers.

To edit the file manually:

1. Open your `printers.conf` in a text editor such as `vim`. On most Linux distributions `printers.conf` is located at `/etc/cups/printers.conf`.
2. Prepend `papercut :` to the `DeviceURI` of the printers you want to track. After the modification a `DeviceURI` line might look like:  

```
DeviceURI papercut:ipp://1.2.3.4/printers/My_Printer
```
3. Restart CUPS in the way appropriate to your distribution. E.g.:  

```
/etc/init.d/cupsys restart
```
4. Perform a test print on each printer. This causes the printers to be registered. This step is not required with the `configure-cups` script, because the script registers the printers automatically.
5. The printers should now be registered. Log in to PaperCut MF as `admin` and verify that the printers are now listed under the **Printers** section. Verify that the test prints sent previously were tracked correctly.

To delete a printer:

1. Double-click the `configure-cups` script (or manually edit `printers.conf`); then select to disable monitoring on the printer(s) to delete.
2. If the printer data is no longer required for reporting purposes, log in to PaperCut MF's admin interface and select the **Printers** section, then click the printer to be removed and select **Delete printer** from the **Actions** list.
3. Test the changes by printing to the deleted printer and ensuring the printer does not re-register itself in the system. If it does, verify that it is not being monitored using `configure-cups`.

## 4.6.2. The Template Printer

The Information Technology field is a rapidly moving environment. Change is driven by two main forces:

- Business and end-user requirements
- Technology advances

It is change that often consumes a network administrator's time. PaperCut MF endeavors to alleviate some of the more mundane tasks via automation. The **New User Initial Settings** section under **Groups** assists with the creation of new user accounts. The addition of new printers, although less common, is also inevitable. PaperCut MF helps administrators streamline new print setup using a concept of a template. A template is a pattern or initial condition used as a starting

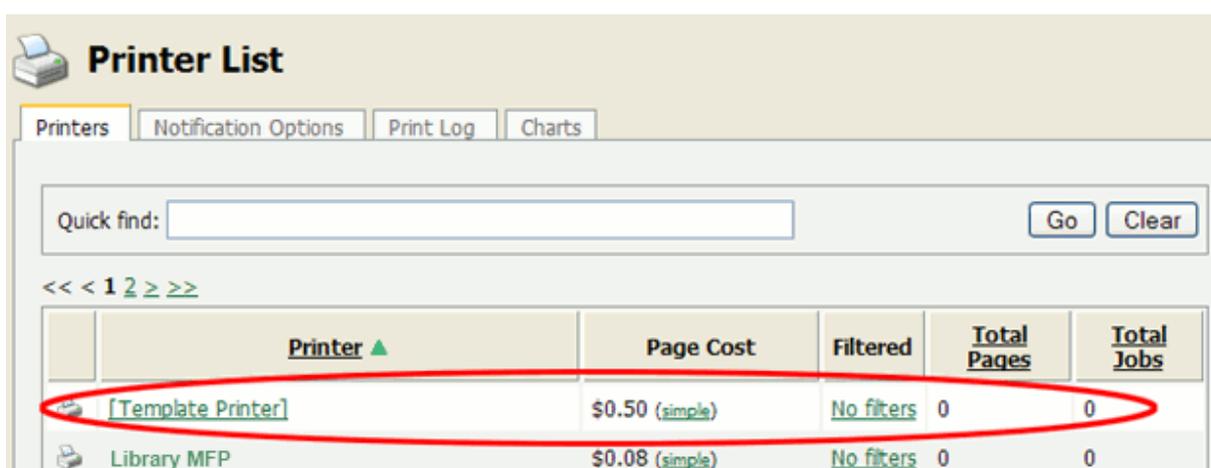
point. PaperCut MF has a special virtual printer called the `[template printer]`. This is not a real printer, but a special printer used as a template for printers added in the future.

The `[template printer]` is best described by an example:

1. Jane is a network administrator at a local business. She has implemented a print policy across all printers as follows:
  - a. The page cost for a standard page is \$0.10.
  - b. Double sided printing is encouraged with a 40% discount.
  - c. A filter exists on all printers to prevent jobs of over 100 pages. This prevents users from holding up the queues with large single jobs.
2. Jane has set up her policy on all existing printers and then adjusted settings on a printer-by-printer basis depending on the type and functions.
3. She has also set up this policy on the `[template printer]`.
4. Two months later Jane adds 4 new printers. No change in PaperCut MF needs to take place as the printers automatically set themselves up based on the settings in the `[template printer]`.
5. When Jane has spare time later in the month she fine tunes printer configuration as required.

As the example shows, the template printer not only helps alleviate future configuration work, but also ensures a consistent policy is applied on printers by default. It brings PaperCut MF one step closer to the "zero-administration" goal.

It is recommended the administrators take a few minutes to configure the template printer on any network of more than 100 users.



Printer ▲	Page Cost	Filtered	Total Pages	Total Jobs
 [Template Printer]	\$0.50 (simple)	No filters	0	0
 Library MFP	\$0.08 (simple)	No filters	0	0

### 4.6.3. Copying Printer Settings

Another way to quickly configure printers and have a consistent charging policy is to copy printer settings (costs, filters, etc.) from one printer to another.



**Warning:** Copying settings to printers is a one-way operation and cannot be undone. Always carefully consider the operation before proceeding. If you are unsure of the function or behavior, performing a backup prior to undertaking the operation is advised.

To copy printer settings from one printer to another:

1. Navigate to the **Printers** tab.
2. Select the printer you want to copy the printer settings from. The **Printer Details** screen is displayed.
3. Click the **Copy settings to other printers** action link.
4. Choose which settings to copy. There is a choice of the cost and the filter settings.
5. Select the printers / printer groups to copy the settings to.
6. Click **Copy** to perform the copy.

<p><b>Source</b></p> <p>Select the printer and type of information to copy.</p>	<p>Copy settings from:</p> <p>[Template printer]</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Copy cost settings</li> <li><input type="checkbox"/> Copy filters and restrictions</li> <li><input type="checkbox"/> Copy release station settings</li> <li><input type="checkbox"/> Copy user-level override settings</li> <li><input type="checkbox"/> Copy authentication settings</li> <li><input type="checkbox"/> Copy color detection settings</li> <li><input type="checkbox"/> Copy print job hardware check settings</li> <li><input type="checkbox"/> Copy failure mode settings</li> <li><input type="checkbox"/> Copy watermark settings</li> <li><input type="checkbox"/> Copy cost adjustment settings</li> <li><input type="checkbox"/> Copy Web Print settings</li> <li><input type="checkbox"/> Copy printer group settings</li> <li><input type="checkbox"/> Copy scripts</li> </ul>
<p><b>Target</b></p> <p>Select the printers that the above information should be copied to. Please be careful as the operation is not reversible.</p>	<p><b>Printers:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> mac-serverWide Format Printer</li> <li><input type="checkbox"/> windows-serverLinkjet</li> <li><input type="checkbox"/> windows-serverLaser Printer</li> <li><input checked="" type="checkbox"/> windows-serverLibrary MFP</li> <li><input checked="" type="checkbox"/> windows-serverLibrary Printer</li> <li><input type="checkbox"/> windows-serverOffice Printer</li> <li><input type="checkbox"/> Select all printers</li> </ul> <p><b>Printer groups:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Department: Science</li> <li><input checked="" type="checkbox"/> Office:NewYork</li> <li><input type="checkbox"/> Type: b&amp;W</li> <li><input type="checkbox"/> Type: color</li> <li><input type="checkbox"/> Type:Laser</li> <li><input type="checkbox"/> Select all printer groups</li> </ul>

Copy Cancel

## 4.6.4. Renaming a printer

To uniquely identify a print queue PaperCut MF uses a combination of the hostname the print queue is hosted on and the printer's queue name. If either of these change, for example, because if the print queue is renamed, or because the print queue was migrated to a new print server, then a new entry is created for the **Printer List**. Future print logs are tracked against the new printer name, and the old printer name is still available along with all its logs.

In some cases this is the desired behavior. In other cases, you might prefer to rename the "old" printer to its new name so that logs and settings are maintained.

To rename a printer, log in to the administration interface and:

1. Select the printer to rename via **Printers > Printer List**
2. Click **Rename this printer** from the Actions menu.
3. Enter the new server and print queue name.



**Important:** The print queue name might not be the same as the print queue's share name. On Windows the print queue name is displayed in **Control Panel > Printers** . On Mac the print queue name is displayed on the printer's **Printer Info** sheet under **Name & Location > Queue Name** . Take care to enter the name exactly as it is displayed in the OS, as case is important.

4. If there is already a printer with the chosen name, for example, because the print queue has already been renamed in the OS and was automatically added to PaperCut MF, select the **If a printer with the new name already exists, delete and replace it** check box.
5. Click **Apply**.
6. Perform a test print to ensure that printing is logged under the new name.

## 4.6.5. Disabling printers with time latches

Time latches allow a printer to be disabled for a predetermined amount of time. After the disable time has expired, the printer is re-enabled without the need for manual intervention. Some examples of where time latches are useful include:

- Printer maintenance - A printer might be consistently jamming and require maintenance. The administrator can lock the printer for 24 hours until the maintenance is performed. Users receive a notification message if they try to use the locked printer.
- Classroom management in schools - A teacher might want to disable printer use to force students to focus on their work for the duration of the class. The printer can be locked for the duration of the class. After the class has finished the printer is re-enabled automatically ready for the next class.

The disable option is located on each printer under the printer configuration area.

**Printer Details: linux-server\Laser Printer**

Summary | Charging | Filters & Restrictions | Scripting | Job Log | Statistics

**Actions**

- Reset Counts
- Copy settings to other printers
- Rename this printer
- Delete this printer
- View charging rules
- View filter rules
- View job log
- View statistics

**Configuration**

Simple configuration options. Advanced configuration options are available below and on the other tabs.

**Hosted on**  
linux-server

**Location/Department**  
On the admin front desk

**Page cost**  
\$0.10 (simple)

**Enable/Disable**  
Disabled until Feb 3, 2014 3:34:21 PM (Enable)

**Queue type**  
This queue points to a physical device (default)

## 4.6.6. Managing printing using differential charging

In a quota-based or charged environment, one of the most important tools at the administrator's disposal is the ability to charge different amounts for different types of documents or on different types of printers. Printers are designed for a particular task and a particular work rate. For example, an inkjet color printer is ideal for photos or the occasional color page but should not be used print 1000-page black and white documents when the heavy duty laser printer is located just down the corridor.

PaperCut MF allows administrators to:

- Charge different cost-per-page amounts for each printer
- Charge different amounts based on the type of document including:
  - Charge more for color printing vs. black and white or grayscale
  - Charge more for single-sided printing vs. double-sided or duplex
  - Charge more for larger or non-standard paper sizes

Administrators can use differential charging to encourage users to use the correct printer and printer settings for the task at hand. This ensures maximum utilization of the resources available.

*Example:* David is a network administrator at a local university. The printer comparison charts in PaperCut MF suggest that one of the printers on the 4th floor in the computer science wing is only used half as much as other printers. Upon investigation he finds that students prefer to use the closer printer located in the corridor outside the lab. David decides to relocate the printer at the end of semester. In the meantime he encourages its use by reducing the price thereby taking load off the other printers.

### 4.6.6.1. Charging types available

PaperCut MF offers a range of charging types to cover the needs of most organizations. Most people find that either Simple or Standard Charging meets their needs best.

## Simple Charging

Simple charging is appropriate to all types of printers. It allows administrators to define a simple cost-per-page setting only. For example, if the cost per page was defined at \$0.10, 50 pages would cost \$5.00.

## Standard Charging

Standard charging is the default and is ideal for printers that support advanced print attributes including:

- Duplex or double-sided printing
- Color or Black & White (grayscale) printing modes
- Multiple paper trays offering standard and large sizes

Standard charging allows administrators to define the exact charges per page for each printing category and paper size in a spreadsheet-like table. Each row in the table specifies the charges for a specified paper size. Rows for common paper sizes are added by default and you can add or delete rows as required.

- To add a row, select the desired paper size; then click **Add**.
- To delete a row, click the trash can icon

The columns in the table represent the different printing modes for each paper size.

- Color: specify the cost per sheet for printing color single sided. This is normally the most expensive option.
- Grayscale: specify the cost per sheet for printing grayscale (black and white) single sided. This is normally less than Color.
- Color duplex: specify the cost per side for printing color double sided.
- Grayscale duplex: specify the cost per side for printing grayscale double sided. This is normally the lowest cost option.

Charging type:

**Standard Charging**

Standard charging allows setting costs for each combination of paper size, color / grayscale and single / double sided (duplex).

Size	Color	Grayscale	Color duplex (each side)	Grayscale duplex (each side)
LETTER (ANSI_A) 	\$0.055	\$0.010	\$0.053	\$0.008
LEGAL 	\$0.057	\$0.012	\$0.055	\$0.010
11X17 	\$0.105	\$0.015	\$0.103	\$0.013
Default (other sizes)	\$0.055	\$0.010	\$0.053	\$0.008

Add size:

Click **Apply** after making any changes to save your changes to the database.

## Charging by Category

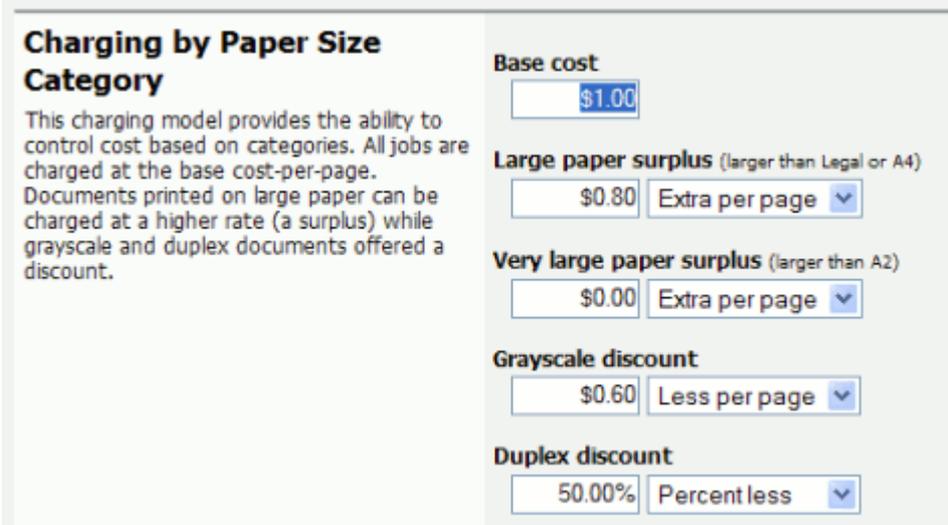
Category based charging is an alternative to Standard charging for printers that support advanced print attributes.

The difference with Category charging over Standard charging is that a base charge and discounts are specified, rather than an exact charge per category. For example, you can grant Black and White (grayscale) documents a discount over full color. An option also exists to discount and encourage double-sided printing. You can apply discounts as either fixed amounts or as a percentage of document cost.

A practical example, Mary has a color printer that supports letter and legal paper and duplex. She wants to define rules to:

- Charge \$1.00 per page for letter (standard size) color printing.
- Charge \$0.40 per page if the users select grayscale (black & white) - a \$0.60 discount for grayscale
- Charge an extra \$0.80 if they use large legal size paper
- Offer a 50% discount for duplex to encourage double sided printing.

To accomplish this complex set of charging rules, Mary should set up the Advanced charging options for the particular printer as defined in the screenshot below.



**Charging by Paper Size Category**

This charging model provides the ability to control cost based on categories. All jobs are charged at the base cost-per-page. Documents printed on large paper can be charged at a higher rate (a surplus) while grayscale and duplex documents offered a discount.

**Base cost**  
\$1.00

**Large paper surplus** (larger than Legal or A4)  
\$0.80 Extra per page

**Very large paper surplus** (larger than A2)  
\$0.00 Extra per page

**Grayscale discount**  
\$0.60 Less per page

**Duplex discount**  
50.00% Percent less

## Charging by Paper Sizes

The charging by paper size mode is designed for printers with multiple trays and a variety of available paper sizes. Administrators have full flexibility to define cost for each of the paper sizes supported by the printer. For example, printing a letter size page would cost less than printing a legal size page. This mode includes options to enable discounts for grayscale and/or duplex jobs. You can apply discounts as either fixed amounts or as a percentage of document cost.

## Charging by Paper Area

This mode is designed for plan printers, plotters or printers that support a variety of paper sizes. For example, many engineering firms use these types of printers for plotting CAD design diagrams. Charging by area allows the cost of the print job to be a function of the paper area.

## Charging by Paper Length

This mode is designed for plotters or printers that use a paper roll or fixed width media. Charging by length allows the cost of the job to be a function of the paper/plot length.

### 4.6.6.2. How duplex discounts are calculated

Several of the supported cost modes allow a discount to be applied to printing duplex documents. The discount is entered as either a percentage or a constant amount per page. It is important to understand that PaperCut MF counts a single *side* of printing as a one page. For example, if you have a 50 page Word document, PaperCut MF counts this as a 50 page document, whether it is printed single-sided or duplex.

When calculating the cost of a job, the duplex discount is only applied to pages when there is printing on both sides of a sheet paper. If a document contains an odd number of pages, the duplex discount is not applied to the last page. For example, if a 11 page document is printed as duplex, the duplex discount is applied to the first 10 pages, but not the last page.

Some printers allow multiple copies of a document to be printed as a single job. PaperCut MF calculates the cost using the above rules. i.e. If a copy contains an odd number of pages, it does not apply the discount to the last page of each copy.

### 4.6.7. Print filters: conversions and restrictions

PaperCut MF offers two categories of print filters: **conversions** and **restrictions**. Conversions change something about the print job, e.g. from color to grayscale. Restrictions are used to ensure jobs meet certain criteria (denying those that don't). Each printer has its own set of filters.

Conversion filters include:

- Convert to grayscale (for all users, or for users in specified groups)
- Convert to duplex (for all users, or for users in specified groups)

The screenshot shows the 'Filters & Restrictions' tab in the PaperCut MF configuration interface. The 'Conversions' section is active, displaying two settings:

- Convert to Grayscale:** Automatically convert color jobs to grayscale for the specified users. The checkbox is checked. The dropdown menu is set to 'Users in the following groups:'. The list of groups includes: [Internal Users], Senior Managers, Staff, and students (checked).
- Convert to Duplex:** Automatically convert simplex (single sided) jobs to duplex (double sided) for the specified users. The checkbox is checked. The dropdown menu is set to 'All users'.

More details about conversion filters are available in [Print Conversion Filters in Detail](#).

Restriction filters include:

- Restrict printer access to one or more user groups
- Restrict color printing access to one or more user groups
- Define the maximum cost of a single print job
- Define the maximum number of pages allowed in a single print job
- Define the maximum number of copies allowed in a single print job
- Allow only simplex or duplex jobs
- Allow only color or grayscale jobs
- Filter documents based on the file extension or name
- Allow only selected paper sizes
- Define the maximum spool size of a print job (to prevent large jobs blocking the printer)
- Detect and delete duplicate print jobs

By default restrictions only apply to **restricted** users. Optionally, you can apply restrictions to all users by changing the **Restriction Scope** option.

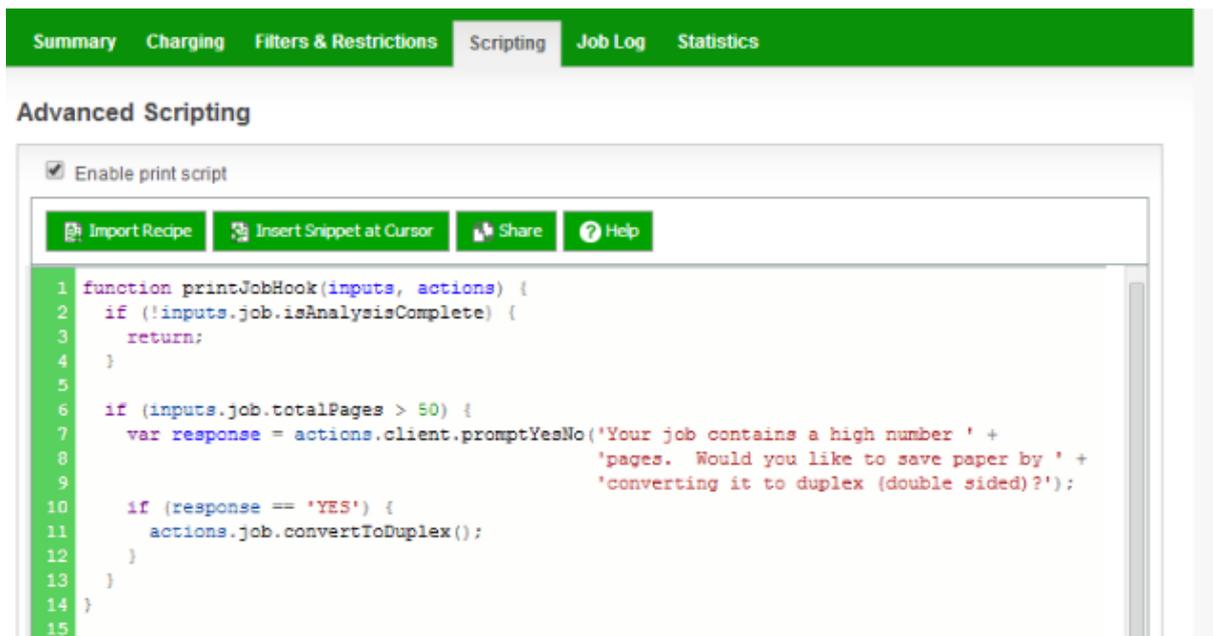
## Restrictions

<b>Restriction Scope</b> Specify how filters should be applied to users.	<input checked="" type="checkbox"/> Only apply filters to restricted users
<b>Group Restriction</b> Specify which groups should have access to this printer.	<input type="checkbox"/> Only allow the following groups to print:
<b>Groups With Color Access</b> Specify which groups should have access to color printing.	<input type="checkbox"/> Only allow the following groups to print in color:
<b>Maximum Cost</b> Filter by document cost. This filter is used to prevent users from accidentally using an excessive amount of their allowance in a single document.	<input checked="" type="checkbox"/> Deny print jobs based on document's cost: Maximum: <input type="text" value="\$50.00"/>
<b>Page Count</b> Filter by the number of pages within a document. This filter may help accomplish tasks such as preventing large documents on slow printers or small documents on specialist high volume printers.	<input checked="" type="checkbox"/> Deny print jobs based on number of pages: Minimum: <input type="text" value="0"/> Maximum: <input type="text" value="200"/>
<b>Maximum Copies</b> Filter by document copy count. This filter is used to limit the maximum copy count for a single print job.  (This option may not be available on all hardware)	<input type="checkbox"/> Deny print jobs based on copy count: Maximum: <input type="text" value="0"/>
<b>Duplex Mode</b>	<input type="checkbox"/> Deny print jobs based on duplex mode: <input type="checkbox"/> Allow duplex documents only

More details about restriction filters are available in [Print Restriction Filters in Detail](#).

For more advanced functionality there is print scripting. While the options available on the **Filters & Restrictions** tab are useful for rules that apply to all users or to some user groups, scripting can take into account multiple factors. Examples include:

- automatically convert all printed emails to grayscale (i.e. do a conversion based on the application type)
- automatically convert large documents to duplex
- suggest or require that users print in grayscale if their job contains a large number of color pages



### 4.6.7.1. Examples

Filters and scripts are applied at the printer level (i.e. on a per-printer basis). The following examples cover how to apply a filter/script to a single printer. Once a filter or script is applied to one printer, you can copy it to other printers (see [Copying Printer Settings](#)).

## Converting student print jobs to grayscale

You can convert all jobs that were sent by a student to grayscale from the **Filters & Restrictions** tab as follows:

1. Ensure you have a `Students` group in your domain (or equivalent) that contains all students.
2. Ensure the `Students` group has been added to PaperCut so that it is displayed on the **Groups** tab. For more information about adding and removing groups see [Groups in PaperCut MF](#).
3. Navigate to **Printers > [select printer] > Filters & Restrictions**
4. Enable the option **Convert color jobs to grayscale for:** and select **Users in the following groups:** from the dropdown menu.
5. Enable the **Students** group in the list of groups for selection.
6. Click **Apply**.
7. Test by printing a color job as a user in the `Students` group.

**Conversions**

**Convert to Grayscale**  
Automatically convert color jobs to grayscale for the specified users.

Convert color jobs to grayscale for:

Users in the following groups: ▾

- Staff
- Students

**Convert to Duplex**  
Automatically convert simplex (single sided) jobs to duplex (double sided) for the specified users.

Convert simplex jobs to duplex for:

All users ▾

Apply Cancel

## Converting printed emails to grayscale

Printing of emails is a prime candidate for reduction of paper and printing costs. Printing of emails in color (when the colour is being used for blue links and email footers) is doubly so. Having PaperCut automatically convert emails to grayscale requires a printer script as multiple factors are taken into account. The logic would read: when a user prints and the print is an email, convert the print to grayscale.

There is a built-in recipe script to achieve this:

1. Navigate to **Printers > [select printer] > Scripting**
2. Click **Import Recipe**.
3. Find the recipe called **Convert all email printing to grayscale** and click **import** next to it. Note the message at the top of the script about the method it uses to detect when an email is printed.
4. Click **Apply**.
5. Test by printing an email in color.

## More Examples

More examples are available in the application by clicking **Import Recipe** on the **Scripting** tab.

### 4.6.7.2. Print Conversion Filters in Detail

Conversion filters work by modifying print jobs on the fly. For example, rather than denying color printing access and asking the user to print again (as is done using a restriction filter), a conversion filter can convert the job to grayscale automatically.

Possible uses include:

- converting color jobs to grayscale to prevent accidental color printing
- converting jobs on high volume printers to duplex to save paper
- having student jobs automatically converted to duplex

Use print scripts for more advanced conversion functionality. For more information, see [Advanced Scripting \(Print Scripting\)](#).



**Important:** After enabling a conversion filter on a new printer model it is always a good idea to perform a test to ensure it is working as expected.

## Using the PaperCut printer port for conversion filters on Windows (Advanced)

Conversion filters work by modifying print jobs on the fly. On Windows (when using standard printer ports) this is performed by modifying a print job and submitting it as a new job. An alternative is to configure the printers to use a PaperCut printer port. When using a PaperCut port, print jobs are modified in-place rather than copied. This has several advantages:

- Processing is faster as there is no need to take a copy of the job.
- When jobs are re-submitted the new job might look unusual (the owner is `SYSTEM`, the document name has a special code in it). Using the PaperCut port avoids this and any potential confusion from administrators about what those jobs are.
- There is no need to disable the **advanced printing features** option on the print queues. Without the PaperCut port this option can cause problems with watermarking and other advanced features. When the PaperCut port is used it can cater for this option being enabled.
- Processing is more robust. Without the re-submission there are less steps, so less things to go wrong!
- Re-submitting can alter job ordering and priority (a feature of Windows print queues). Using the PaperCut port avoids this.

For information about setting up a new or existing printer to use the PaperCut port, see [Windows printer queue configuration](#).

Changing the printer port is not required on other platforms such as Mac, Linux or Novell as the same limitations do not apply.

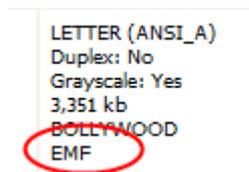
## Troubleshooting

### Disabling EMF printing (Windows print servers only)



**Important:** This section is not applicable if your print queue is using a PaperCut port (see [Using the PaperCut printer port for conversion filters on Windows \(Advanced\)](#) for details).

Print conversion filters work best with open standard languages such as PostScript and PCL. Other manufacturer specific and GDI based languages might be supported, but most of all it's important that print jobs spool in the printer's native language, and not the "EMF" format. If your print server is running Windows and documents are printing using the EMF language (the default) then conversions will not take place.



To disable EMF printing on a Windows print server:

1. On the **print server**, navigate to: **Start > Control Panel > Printers > [right-click printer] > Properties > Advanced**
2. Turn **off** (disable) the option **Enable advanced printing features**.
3. Test printing and check the printer language to ensure that it is now something other than EMF.

You can read more about this setting on the Microsoft website at: <http://support.microsoft.com/?kbid=268093>.

## Updating Printer Drivers

When experiencing problems with print conversion filters and there are new driver versions available for your printer, updating might resolve issues with the driver that caused conversions to not work.

When updating printer drivers, it is important to update the printer drivers on **both the client and the server**.

## Contacting Support

If the other troubleshooting steps do not assist with a print conversion filter related problem, feel free to contact the PaperCut support team. Please include information about the make, model and driver for the printer you are using.

### 4.6.7.3. Print Restriction Filters in Detail

Print restrictions provide network administrators with advanced control over printer usage. Some common examples include:

#### Reduce printer jams

Many printers expect print jobs to be on a single size of paper, or maybe two sizes if the printer has multiple paper trays. A non-standard size causes the printer to enter a *manual load* state causing the queue to halt. PaperCut MF **Filters & Restrictions** section allows Administrators to select the allowed sizes. Non-standard sizes are automatically deleted before they're sent to the printer. It's an effective way of reducing one of the most common causes of queue jams.

#### Controlling documents on slow inkjets

Many inkjet printers have very low throughput rates. A large color document can hold up a queue preventing other users from getting their "fair share" of print time. By setting an upper page count via the printer's **Filters & Restrictions** section, network administrators can prevent large print jobs. The page count forces users to split up large documents and allows other users access to the printer.

#### Automatically deleting duplicate jobs

PaperCut MF can also monitor the print queues and automatically delete duplicate print jobs. This option is useful on networks with novice users. New users often "double click" an application's printer icon causing two identical print jobs to be sent to the queue. This wastes paper and users' print quota. Network administrators can enable duplicate job detection via the **Filters & Restrictions** section. A popup message warns the user and the duplicate job is removed from the queue.



**Important:** This option can affect multiple prints from Microsoft Excel and some other applications. Users wanting to print multiple prints from Excel might need to reprint the document 30 seconds apart. When printing to a hold/release queue, the filter does not apply until the jobs are released, not at the time of submitting the print job. Consider whether this Filter and hold/release queues are the workflow you require for your organization.

## Force sensible use

You can set restrictions to define a maximum cost per job. This prevents users from accidentally spending all their credit/quota in one print job.

## Automatically deny documents based on file extension or name

There are many reasons why users should not print certain files. For example, maybe a report from the accounting application consists of 400 pages. Users might not be aware of this and "accidentally" print the report expecting only a few pages. You can configure PaperCut MF to match this document via its name and automatically delete it from the queue. Use the **Filters & Restrictions** keyword filter to implement this functionality.

Additionally it's also possible to filter documents based on file extension by entering a keyword, such as, `.htm` or `.pdf`.

To filter a document name based on a regex (regular expression), enclose the keyword in forward slashes. Note that the regex matches the entire document name. For example:

- To disallow printing of any documents ending in `.htm`:  
`/.*\ .htm/`
- To disallow printing documents of the form `account-12345.pdf`:  
`/account-\d*\ .pdf/`



**Important:** This is *not* a security option. It is easy to circumvent the filter by renaming the document. Some systems might not even report type information!

## Control who can print in color (Advanced)

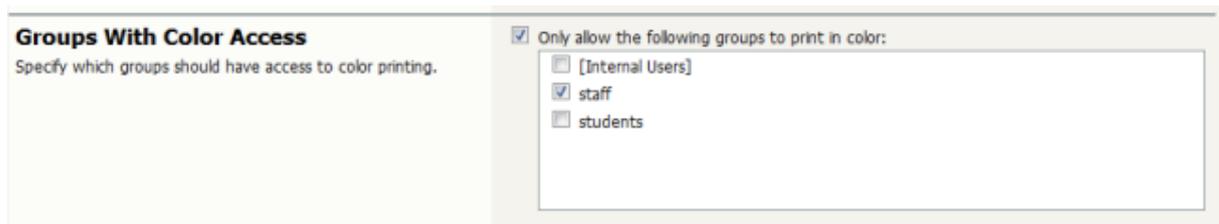
To control which group of users have access to color printing to a particular printer use one of the following methods:

### Method 1

1. On the print server, create a print queue.
2. Share the print queue as normal.
3. Add the printers to PaperCut MF and define appropriate costs.
4. From the printer's **Filters & Restrictions** tab in PaperCut MF select the groups that should have access to color printing via **Groups With Color Access** restriction.

For example:

- To only allow group "staff" to print in color to this printer.



## Method 2

This method uses two print queues, each with different driver defaults. One queue is set to grayscale only and the other have full color access. Group access is used to control who has access to the color queue.

To implement:

1. On the print server, set up two print queues that point to the same physical printer. Call one queue *Grayscale Only* and the other *Color*. You now have two printer icons (logical printers) each connected to the same physical printer.
2. Share the printers as normal.
3. Set Windows access permissions on each queue as required. Ensure Users who require color access can print to the color printer and other users can access to the "black and white" only printer.
4. Add the printers to PaperCut MF and define appropriate costs.
5. From the printer's **Filters & Restrictions** tab in PaperCut MF ensure that the **Color Mode** restriction is configured to **Allow grayscale documents only** on the grayscale printer.

This method although being more complex to manage, sometimes offer better user experience as users do not need to select driver color and black and white options for each print.

## Advanced Setups

PaperCut MF provides printer management features that you can easily extend to more advanced network setups including:

- Environments with multiple print servers
- Monitoring of locally attached network printers.
- Central monitoring over Wide Area Networks (WAN) or VPN.

These topics are an advanced subject and covered in subsequent sections.



**Tip:** For more flexibility in filtering print jobs, one should consider the Advanced Scripting capability. Advanced scripting allows filtering on more more attributes of a print job or combinations of attributes. See [Advanced Scripting \(Print Scripting\)](#) for more details.

## 4.6.8. Managing printer groups

Administrators use groups to manage large number of users. Groups are used for all manner of purposes such as reporting, access control and management. PaperCut MF also offers the ability to group printers offering administrators the same level of management advantages they get from user groups. Printer groups are most useful for organizations with a medium to large number of devices.

Printer groups allow administrators to tag or group printers by attributes. Group names are user definable and can represent any attribute appropriate for printer management. Examples include printer type, location, make, function, owner, age, etc. PaperCut MF's grouping is implemented using text based "tags" offering similar flexibility to that seen in many modern online systems such as Flickr - the popular photo management website.

Some examples of where printer groups are useful include:

- Grouping by printer type allowing an organization to compare volume on inkjets vs. laser printers.
- Grouping by floor, departments, or work areas providing comparison reports to identify areas that might need additional printers.
- Quickly locate printers by attributes or tags defined by administrators.
- Implement fine grained access control by ensuring administrators can only apply adjustments to devices under their ownership/responsibility.
- Facilitate group-level management of devices settings, such as, copying new rules, costs and policies between similar devices.

To group printers that support color output:

1. Locate and click a color printer via the **Printers** tab.
2. On the printer details screen scroll down to the **Printer/Device Groups** section.
3. Enter an appropriate group name such as `Type:Color`; then click **Enter** to add. Read best practises in [Suggested best practises for naming printer groups](#)

<p><b>Printer/Device Groups</b></p> <p>Printer groups can be used to group or tag printers. The groups can then be used for reporting, filtering or access control. Common groupings include location, type/make/model and the department or office responsible for the printer.</p> <p>E.g.: "Type:Laser, Department:Science"</p>	<p>Type:Color </p> <p>Type:Color (create new)</p>
--	---

4. Click **OK** to save the change.
5. Repeat step 1 and 2 selecting another color device.
6. This time, click in the list.

A list of all available printer/device groups is displayed.

7. Click `Type:Color`.

<p><b>Printer/Device Groups</b></p> <p>Printer groups can be used to group or tag printers. The groups can then be used for reporting, filtering or access control. Common groupings include location, type/make/model and the department or office responsible for the printer.</p> <p>E.g.: "Type:Laser, Department:Science"</p>	<p>Department:Science ×</p> <p>Location: IT Building</p> <p>Location: Math Building</p> <p>Location: Physics Building</p> <p>Type:Color</p> <p>Type:Laser</p>
--	---

8. Repeat step 6 for all color devices.



**Tip:** An alternate method to apply a set of printer groups to multiple printers is to use **Copy settings from printer to printer** action.

### 4.6.8.1. Suggested best practises for naming printer groups

An important requirement of group management is to have clear and consistent naming conventions for your groups. This convention needs to be followed by all involved in group management. Being able to see a list of printer/device groups is a good way to ensure consistency. A group name can contain any character except for " , ". Administrators are encouraged to use a key-colon-value format such as:

- Type:Laser
- Location:Floor1
- Department:Science
- Subnet:192.168.4.\*
- Office:NewYork

Prefixing the value with a type makes it easier to compare and locate groups of interest.

Similar to user groups, it's important to keep printer groups up-to-date. Ensure someone is tasked with assigning printer groups when new devices are added to your network.

## 4.6.9. Cost Adjustments

Cost Adjustments are used in conjunction with the User Client's Advanced Popup (see [Advanced Account Selection Popup](#)) or Manager Popup (see [Manager Mode Popup](#)). They allow an administrator to define a user selectable list of adjustments to apply to the current print job. These adjustments can be in the form a percentage adjustment, a per job fixed adjustment or a per page adjustment. Charge Rates are commonly used in the Engineering and Architectural Drafting fields. Examples include:

- Charging different rates for premium print material. For example, 150% for use of Mylar drafting film.
- Offering a discount of selected situations. A second copy of an architectural plan printed on draft quality paper can be charged at 50% normal rate.
- Charging a fixed cost for services such as document binding. For example, binding might cost an additional \$5.00.
- Increasing the per-page cost of a job for color paper (e.g. an additional \$0.20 per page).

Cost adjustments are defined at both a global and printer level - allowing common adjustments to be applied globally to all printers, with the flexibility to also define printer specific adjustments. The adjustments are defined in the format:

```
adjust1:100%, adjust2:150%, adjust3:3.0pj, adjust4:0.10pp,
adjust5:1.0pc
```

(A comma separated list of rates in the format of "Name" and "Amount" separated by a colon). The first rate listed is the default rate and is automatically selected in the Advanced Client Popup. The format of the "Amount" depends on the type of adjustment. Each of the formats is defined below:

**Table 36: Cost Adjustment Types**

Type	Description	Format	Examples
Percentage	Applies a percentage adjustment to the job cost. Rates above 100% increase the cost, while those below 100% discount the job. (NOTE: When multiple adjustments are applied with the manager popup, the percentage adjustments are applied last)	0.00%	120% - increases cost by 20% 75% - discounts the cost by 25% 0% - sets the cost to zero

Type	Description	Format	Examples
Per Page	Adds/subtracts a fixed amount to each page in the job.	0.00pp	0.10pp - increases cost by \$0.10 per page - 0.05pp - reduces cost by \$0.05 per page
Per Job	Adds/subtracts a fixed amount to the total job cost.	0.00pj	3.00pj - increases total cost by \$3.00 - 1.00pj - reduces total cost by \$1.00
Per Copy	Adds/subtracts a fixed amount to each copy in the job.	0.00pc	3.00pc - increases total cost by \$3.00 per copy - 1.00pc - reduces total cost by \$1.00 per copy

If **Always require manual selection** is enabled, then the default selected rate is Select, requiring that users manually select a charge rate every time they print.

Global cost adjustments are defined in **Options > Client Software**. These are available for all printers. Any adjustments defined at the printer level are in addition to the global adjustments. The printer level adjustments are defined in **Printers > Summary > Advanced Configuration > Define cost adjustments**. If an adjustment with the same name is defined at both the global and printer level, the printer adjustment takes preference.

Define cost adjustments

**Global cost adjustments**  
Not configured

**Additional cost adjustments**  
Default:100%,Discounted:50%,Premium:150%

(The user must run the popup in advanced mode to access cost adjustments. Format: rate:100%, Binding:2.00pj, ColorPaper:0.20pp)

Always require manual selection

**Print Job Notification**

Confirm the print and select the print action

**Print job details**

Document name: Chapter 7. Shared Accounts  
Printer: Library MFP  
Pages: 4 Cost: \$0.40

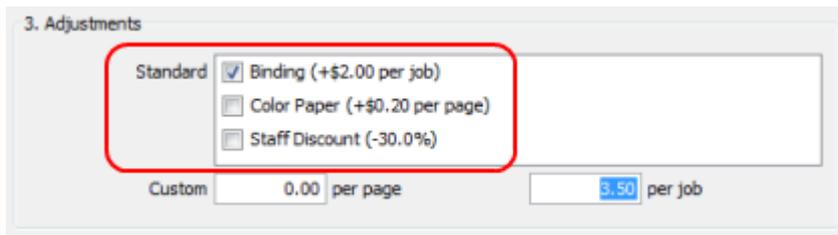
Comment:   Remember  Show on invoice

Charge rate: Photo Paper (200.0%)  Remember

All Accounts:  Search:   Remember

Account	Code	Preferred
General	00003-001	<input type="checkbox"/>
Marine park lobby	00003-004	<input type="checkbox"/>
Tortoise training wheels	00003-003	<input checked="" type="checkbox"/>
Wombat colocation	00003-002	<input type="checkbox"/>
Harvey Pianos Inc.	00004	<input type="checkbox"/>
Design	00004-003	<input type="checkbox"/>
Distributor contacts	00004-002	<input type="checkbox"/>
General	00004-001	<input checked="" type="checkbox"/>
Intellectual property	00004-010	<input type="checkbox"/>
Lotek Electronics	00001	<input type="checkbox"/>
Audit	00001-002	<input type="checkbox"/>
EPA compliance	00001-003	<input checked="" type="checkbox"/>
General	00001-001	<input type="checkbox"/>
Intellectual property	00001-100	<input type="checkbox"/>

Apply to all documents in queue (Jobs: 1)



## 4.6.10. Popup authentication

PaperCut MF normally relies on the underlying operating system and the associated print queues to perform authentication. For example, in normal operation, a user logs into a workstation using a domain/network level authentication method such as a username and password. The print queues also use this authentication and PaperCut MF can trust the supplied identity. However, in some network environments, relying on network level authentication is either not possible, or not reliable. Common examples include:

- All users log in with a common generic username and password meaning that it's not possible to distinguish between users.
- A print queue that does not enforce authentication.

For a detailed explanation of print authentication, see [Print Authentication](#).

### 4.6.10.1. How does popup authentication work?

Popup authentication matches the source IP address of the print job with the user confirmed to be operating from the popup client IP address. The workflow is as follows:

- The user initiates a print job to a server-hosted, PaperCut MF-managed, queue (printer) via unauthenticated print protocol.
- The print job arrives in the print queue and because of the unauthenticated protocol, the user-name cannot be trusted.
- PaperCut MF uses the job's source IP address to determine the PaperCut MF popup client it should contact for authentication.
- The user is prompted to enter their username and password, which are then verified against PaperCut MF's configured directory source. If the credentials are correct, the user is considered authenticated at that client.
- The print job is attributed to the authenticated user.
- Depending on configuration, the server might remember the association between the IP address and the authenticated user for a period of time.

## 4.6.10.2. Where and when should popup authentication be used?

Some real life examples include:

### The Student Lab

Some student labs are set up so everyone logs in using a generic username and password. For example, username: student, password: student. This is common in Apple Mac labs, where enabling multi-user authentication is complex and can often prevent selected applications from running correctly.

### LPR/LPD or CUPS

The Line Printer Daemon print protocol, often used in UNIX environments, is a non-authenticated system. The username associated with the print jobs is passed through to the print queue, however, the name is not verified and can easily be forged. An extra level of authentication is required.

CUPS, the modern print system often used on Linux, Apple Mac and some Unix systems, is often implemented in a non-authenticated fashion. Although CUPS can support authentication, technical considerations such as the inability to interface with Active Directory domain authentication often prevent its use.

### Mac Print Queues

Mac OS X server use the CUPS print system. Current Apple implementations prevent administrators from enabling CUPS authentication. This is not usually a problem in an environment where you can control logins at individual workstation level. It does, however, pose a problem if users have local admin access - for example, individual owned laptops. PaperCut MF popup authentication provides a way to work around the non-authentication issue.

For more information, including a discussion of platform specific issues, see [Print Authentication](#).

### Macs and popup authentication

Popup authentication is often required on Mac networks supporting a mix of lab systems authenticated via a directory service and unauthenticated laptop systems. Advanced administrators might review [Eliminating popup authentication via Mac Login Hook](#) to streamline login on the secured lab systems.

### iPad / iOS Printing and popup authentication

PaperCut comes with an iPad / iOS app that provides popup authentication and other functionality. For more information see [iOS Printing \(iPad & iPhone\)](#).

### 4.6.10.3. What technical considerations do I need to review before implementing popup authentication?

As a general rule, popup authentication should only be used in low-volume, low-complexity scenarios when Protocol-Level Authentication is ruled out. By its design, Protocol-Level Authentication is always the most secure which is why it is used in Windows and authenticated protocols such as HTTP, SSH or Novell's iPrint protocol.

A good example of a situation where Protocol-Level Authentication is not ideal would be a public-access PC in a library set to auto-logon as the insecure, generic account "public". In this case the Protocol-Level Authentication is passing through the insecure user of "public". PaperCut MF's client software and IP address authentication can overlay these insecure user credentials and request authentication from the user at the time of print via a popup.

The following is a general guide to factors your System, Network and Security teams should consider when implementing popup authentication:

- Minimize IP address changes. If you are using DHCP, consider the lease time as well as the re-use rate of IP address and DNS scavenging timeouts.
- Do not use any form of NAT between the clients and print server. NAT obscures the IP address seen by the server.
- Consider the authentication session time (TTL - Time To Live) options offered to your users. This is detailed further in the popup authentication configuration page of the manual. TTL settings are a trade-off; the shorter the time, the smaller the window of mismatch, but the greater the inconvenience to the user. There is no one-size-fits-all answer, this must be taken on a site-by-site basis.
- Ensure that hostnames are resolved to IP addresses, both from the client and server. In some situations, hostnames might be reported instead of IP addresses, and resolution results are key to correct behaviour.
- Any machine relying on popup authentication must have the PaperCut MF client running at all times for printing from that workstation to function.
- Awareness of IP address spoofing. Large sites often actively monitor this and/or endeavour to prevent it, as IP address spoofing is something that affects network application security in general.
- Always reconsider your choice of popup authentication. Protocol-Level Authentication can become viable with changes in technology, infrastructure or internal procedure.
- Popup authentication is not a viable solution for simultaneous multi-user systems, such as Terminal Server or Citrix, as multiple users are reported from a single IP address.

## A real-life an example of the practical difficulties associated with popup authentication

In 2012 one major university user of PaperCut MF in the USA were using popup authentication to support authentication on print jobs issued via the LPR protocol (for Unix desktop systems). This setup had been in place successfully for 5 years with no reported problems. The site's networking team (independent of the server team responsible for PaperCut MF's management) decided to make a few network infrastructure changes and enabled NAT for some subnets. This caused a subtle set of authentication issues that took a number of days to detect and diagnose. During this time some jobs were incorrectly attributed.

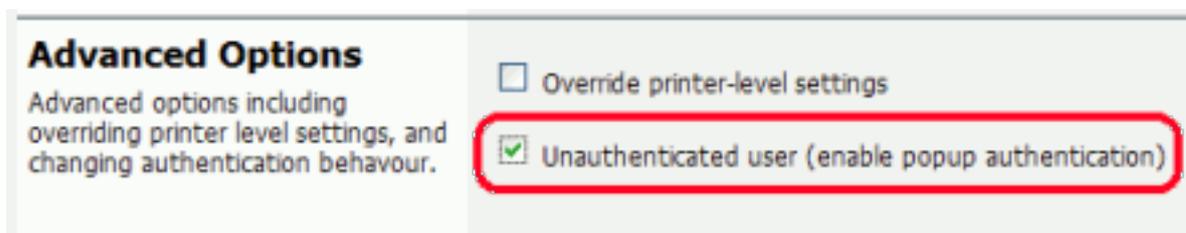
### 4.6.10.4. Configuration

The following sections cover how to enable popup authentication on either the user account level or the print queue level.

## Popup authentication and generic user accounts

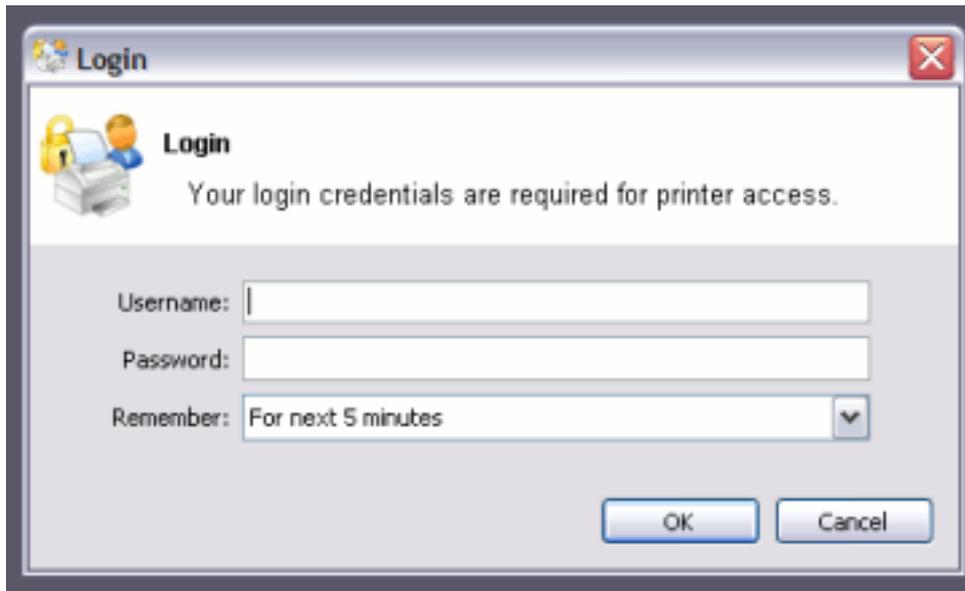
The following notes explain how to enable popup authentication when a user logs in under a generic user account - for example, `student`.

- Add the account to the domain called `student`. You might already have this account set up.
- Perform a **User/Group Sync** or print a job from this account so the username is listed in PaperCut MF
- Select the generic user and set the account to a *zero balance* and a *restricted* status. This ensures that users can't charge against this account.
- Select the **Unauthenticated** check box; then click **Apply** to save the changes.



- Install client software on workstations. See [User Client](#) for details.
- When a user logs in as the generic `student`, they are prompted for their domain level user-

name and password.



## Popup authentication on a print queue

The following notes explain how to enable popup authentication when a user attempts to print to a non-authenticated printer such as one hosted via an LPR/LPD queue or a CUPS print queue:

1. Add the printer to the system as normal. Perform a few test prints to ensure the printer is functioning and tracking as expected.
2. Log in to PaperCut MF and check the **Unauthenticated** option under the relevant print to enable the popup authentication.
3. Install the client software on any workstation that will print to this printer. See [User Client](#) for details.
4. When a user attempts to *print* to this printer, they are prompted for their username and password.

## User Interaction

When running in popup authentication mode, the client offers the following options:

- Log out
- Log in as another user

The **Logout** option is available on Windows via either the right-click option on the task tray icon, or when running on Mac or Linux, via a right-click popup menu (Option Click) access via the icon on the balance window.

The **Login as** option is made available if the client starts as an unauthenticated user. This option allows users to authenticate or quickly switch user identity.

## Advanced Popup Configuration

The login box displayed to the user offers the choice of how long their authentication details should remain active. An administrator can control the options presented to the user by modifying the following system configuration keys. These configuration keys are edited under **Options > Actions > Config editor (Advanced)**

**Table 37: User Client Popup Config Keys**

Config name	Description
client.config.auth.ttl-values	A comma separated list of values to display in the popup authentication login box. Positive numbers represent the number of minutes to remember the authentication for. The value of 0 indicates that the authentication is remembered for "this print job only". The value of -1 indicates that the authentication is remembered until the user logs out or exits the client. The value of -2 indicates that the authentication is remembered indefinitely, even after restarting the client. For security reasons, you need to make this change in the Config Editor, not the client's <code>config.properties</code> and the client does not save the password. Instead a server generated <i>cookie</i> is placed in a file in the user's home directory. The default is: <code>1, 5, 15, 30, 60, -1</code>
client.config.auth.ttl-default-minutes	The default time-to-live value automatically selected when the login authentication window is displayed.
client.config.auth.popup-on-startup-if-unauthenticated	Determine if the client should request authentication when the client starts if the operating system user is unauthenticated. Set to <b>Y</b> (yes = enabled) or <b>N</b> (no = off).



**Important:** User client tools that are already running will pick up changes made via the Config Editor the next time they are restarted.

See [Using the Config Editor](#) to find out how to change config keys.

## 4.6.11. Color Detection

The color detection setting determines the method used by PaperCut MF to analyze documents for the presence of color. Changing the detection method might require some additional printer configuration.

The standard way used by PaperCut MF to handle color in documents is to see if the printer's driver has set the `grayscale` flag. When this flag is set on a document sent to a color printer, the grayscale discount is applied. Otherwise, the document is charged at the printer's standard rate. This might be an inconvenience for users when a large document is printed with just a few color pages.

For example, a user prints a 21 page document to a color printer. The document is all grayscale except for a color header on the first page. When using *standard color detection*, the user is charged for 21 pages at the color printer's standard rate. As a workaround, the user could send the document as two print jobs (one with just the first page containing color, and another with the rest of the document), but this is an inconvenience. An enhanced alternative is to use *page-level color detection*. When this option is selected, the user would be charged for one page at the color printer's standard rate, and receive the grayscale discount for the other 20 pages.

PaperCut MF has three options for document color detection:

- Grayscale only (for grayscale printers)
- Standard color detection (also referred to as document-level detection)
- Page-level color detection

The color detection setting is available for each printer controlled by PaperCut MF. To access the setting, click a printer from the **Printers** tab to bring up the **Printer Details** page.

### Color detection mode

- This is a grayscale printer
- This is a color printer (use standard detection)
- This is a color printer (use page-level detection)

#### 'This is a grayscale printer'

This option indicates that the printer is not capable of printing color documents, so color detection is bypassed. This ensures that the color page count for this printer is always zero.

#### 'This is a color printer (use standard detection)'

When this option is active, documents are treated as being either grayscale (where a printer's driver has set the grayscale flag) or color. This mode is available in almost all color printers. Where users print documents containing both grayscale and color pages, this option encourages users to use color printers only for their color printing.

#### 'This is a color printer (use page-level detection)'

Page-level color detection scans each page of a document for traces of color. The grayscale discount is applied to any grayscale pages and other pages are charged at the printer's standard rate.

PaperCut MF can perform page-level color detection with most modern color printers.

*Important:* To use page-level color detection:

1. Apply the **page-level detection** option for the printer in PaperCut MF.

Linux and Mac systems pick up the change immediately.

On Windows based servers the change takes up to 2 minutes to propagate to the `Print Provider`. You can speed up this process by manually restarting (stop and starting) the `PaperCut Print Provider` service via **Control Panel > Administrative Tools > Services**.

2. On Windows print servers set the **Enable advanced printing features** on the **Advanced** tab of the printer's Windows Properties page according to the type of printer:

*Disable* the setting for *PostScript, PCL, HPGL or XPS* printers. (With these printers, Page level detection works regardless of the advanced printing features setting, but you must disable the setting if you want to use advanced PaperCut features such as Grayscale/Duplex Conversion Filters and Watermarking.)

*Enable* the setting for other printer types. On most printers, this setting causes print files to be spooled using Window's EMF format. PaperCut supports for page level color detection for EMF. See below for limitations.

3. On non-Windows print servers page-level color detection is only available for *PostScript, PCL, HPGL* and *XPS* printers.
4. Print a few test documents with both grayscale and color pages and ensure PaperCut MF is correctly charging the document. The **Print Log** under the **Printers** tab is a good place to monitor the detection in real-time.

#### 4.6.11.1. Printer Color Mode Auto-Detection

From version 14.1 onwards, when a printer is first added, PaperCut MF detects if it is grayscale or color and set its color detection mode accordingly. Color mode auto-detection is performed only once and can be overridden manually.

Color mode auto-detection works well but you might have a reason for not using it. You can turn it off by setting the configuration key `printer.detect.grayscale.printers` to `N`. See [Using the Config Editor](#) to find out how to change config keys.

#### 4.6.11.2. Limitations of Page-Level Color Detection

Page level detection works by inspecting the contents of the document looking for color use. The aim is to track down simple black and white only pages so it can offer the user the grayscale

discount on these pages. There are a few situations that can cause a seemingly grayscale page to list as color - referred to as a 'false positive'. These situations are rare and are discussed below:

- The use of some image formats, even if they look grayscale, can detect as color. For example, JPEG is a lossy format and artifacts as a result of compression can cause speckles of color. PaperCut MF handles most of these situations but grayscale JPEG images in PDF files can cause false positives.
- The use of 'color' white-space in Microsoft Word can cause a false positive with some print drivers. For example, the user selects a color font, enters a single space or new-line, and then changes back to black. PaperCut MF in most cases, correctly filters out the 'color space' but might experience problems with some drivers leading to a false positive.
- The Windows **Enable advanced printing features** setting allows page level color detection to work for many color printers by spooling print files in EMF format. The accuracy of color detection is dependent on the particular printer driver in use. Our testing has demonstrated excellent accuracy with newer printers and drivers, but poorer results with some older drivers. If using an older printer, run a representative set of print jobs to verify that the color page counts meet your requirement. Where possible, select a PCL or PostScript driver if available for your printer.

## 4.6.12. Validating page counts using hardware checks

PaperCut provides accurate tracking of printer usage by analyzing the printer spool file on the server. Before the job is sent to the printer, PaperCut determines the job attributes including the page count, color/grayscale, duplex, paper-size, etc. This up-front analysis allows PaperCut:

- To calculate the job cost and determine up-front whether the user has enough credit to print.
- To display the job details (e.g. the cost and page count) to the user in the print confirmation screens and Release Stations.
- To apply filters and policy rules to print jobs (e.g. to disallow non-duplex jobs, or to enforce print policy using the advanced printer scripting).

After the job is queued for printing, PaperCut logs this print job information and charges the usage to the user.

If the job is sent to the printer but it does not print completely (e.g. if the user cancels the job at the printer), then print job hardware checks allow PaperCut to determine the actual number of pages printed. These checks are performed at the hardware-level by communicating with the printer via SNMP (Simple Network Management Protocol).

The combination of up-front spool file analysis and post-job hardware verification of the jobs provides the best of both worlds:

- Accurate up-front page count and cost calculations; and
- Verification of the printed pages after the job is completed.

### 4.6.12.1. Causes for differences in page counts

The printer can report a difference to the PaperCut server's spool file analysis for a variety of reasons:

- The user cancels the job at the printer's panel - e.g. LCD screen or cancel button.
- The printer goes into an error state (e.g. out of toner) after the job has partially printed. The administrator can then cancel the job at the printer.
- The print job might have become corrupted, causing the printer to print 100's of pages of junk (e.g. PostScript code) instead of the user's document!
- Configuration "strangeness", such as, the devices double-counting large pages or counting the blank page at the end of a duplex job. Most of these corner-cases have been worked around, however, like all things in Computing, some are bound to show up again!

### 4.6.12.2. Requirements

PaperCut's hardware checks use the SNMP protocol to query the page counters of the printer. This is a network protocol supported by most network printers. To support hardware checks the following is required:

- A network printer that supports the SNMP protocol.
- SNMP enabled in the printer (also ensure the "public" SNMP community is enabled).
- The network/firewall allows SNMP UDP packets from the print server to the printers. SNMP uses UDP port 161.
- Some additional configuration of the printer queues might be required. See installation instructions in [Configuring hardware checks](#).
- Only PaperCut should send jobs to the printer. If a job from another print server is sent, the resulting statistics might be unreliable

### 4.6.12.3. How hardware checks work

The Printer SNMP standard allows querying of printer status and page count information over SNMP. PaperCut makes use of this information to verify the number of pages printed for each print job. This works as follows:

1. Before the print job is sent to the printer PaperCut confirms the printer is idle (i.e. not printing).
2. A snapshot of the page counters is retrieved using SNMP.
3. PaperCut waits for the job to complete by querying the printer status and page counts. If the printer is in error (e.g. out of paper), then PaperCut continues to wait until the printer error is resolved and the job completes printing.

4. Once the job is completed and the printer is idle, another snapshot of the page counts is taken.
5. The total pages printed is calculated using the differences between the initial and the post-job snapshot.

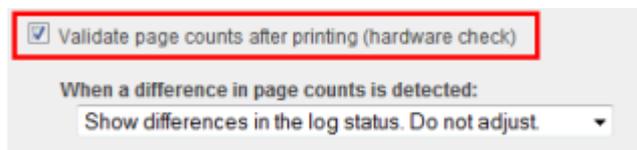
#### 4.6.12.4. Configuring hardware checks

Printer hardware checks are not enabled by default in installations of PaperCut. Enabling the checks requires some configuration within PaperCut and also some additional configuration of the operating system's printer queues. You can enable/disable hardware checks at the individual printer queue level, or alternatively you can apply the settings to multiple printers using the [Copying Printer Settings](#).

### Enabling hardware checks

To enable the print job hardware checks:

1. Navigate to the Printers tab.
2. Select the printer to configure.
3. Under the **Advanced Configuration** setting, enable the **Enable print job hardware check** option.



4. Click **OK** or **Apply** to save the changes.

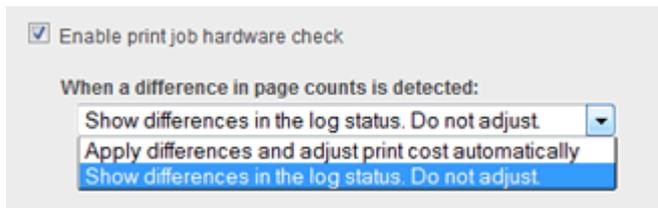


**Important:** On Windows print servers, you must also configure the printer to use a **PaperCut TCP/IP Port**. For instructions see [Windows printer queue configuration](#).



**Tip:** On Windows print servers, this setting can take up to 2 minutes to take effect. You can speed this up by restarting the **PaperCut Print Provider service**.

When a difference in page counts is reported by the printer, the administrator can choose how this is applied to the print jobs. This option is configured using the **When a difference in page counts is detected:** settings as follows:



### 'Show differences in the log status. Do not adjust'

The page count differences are recorded against the print job, but no adjustments are made to the page counts or job costs. This is the default option when hardware checks are enabled.

This mode is useful when you want to use the hardware check information to validate refund request by users. In this case the administrator can verify that a user's job did not complete printing and then refund the job.

The hardware check information is displayed in the print log status and also in the refund screens.

### 'Apply differences and adjust the print cost automatically'

In this mode, the hardware check information is also recorded on the print jobs as described above. However, any differences in page count and costs are automatically applied to the job.

For example, if a user printed a 5 page document costing \$0.50, and they cancelled the job after only 3 pages were printed, the job cost would be reduced to \$0.30 and the user would be refunded \$0.20.

In rare situations, the hardware check can report an increased number of pages. For example, this might happen when a print job is corrupted and prints out 100's of pages of "junk" instead of what the user printed. In this case, the hardware check reports an increased number of pages resulting in an increased cost. By default, PaperCut does not apply the adjustments to the job if the cost would increase.

If you would prefer to apply the differences even if the cost is increased, then select the **Always apply cost adjustments** option.



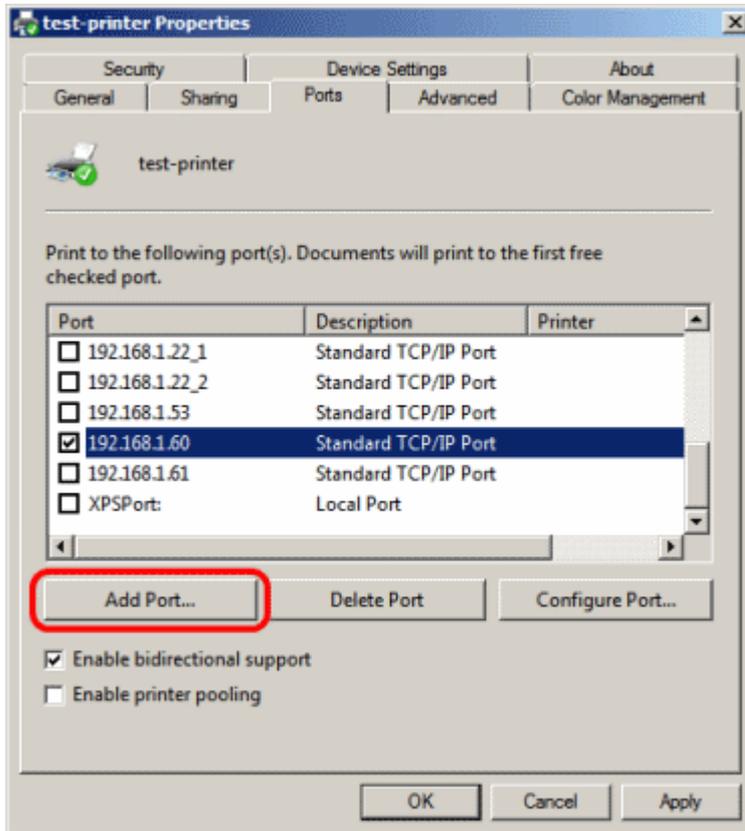
**Tip:** To enable the hardware page counts quickly on multiple printers, use the **Copy settings to other printers** action available on the left of screen.

## Windows printer queue configuration

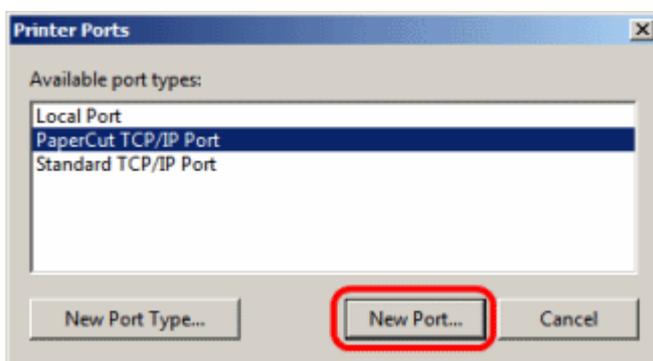
To perform printer hardware checks, configure the Windows printer queues to use the **PaperCut TCP/IP Port** type. This port works the same as the **Standard TCP/IP Port** that ships with Windows. The **PaperCut TCP/IP Port** allows PaperCut MF to perform the page count checks before and after printing the job.

To configure an existing printer queue to use a **PaperCut TCP/IP Port**

1. Open the **Printers** list
2. Right-click the printer and select **Printer Properties** or **Properties**
3. Select the **Ports** tab.
4. Click **Add Port**.

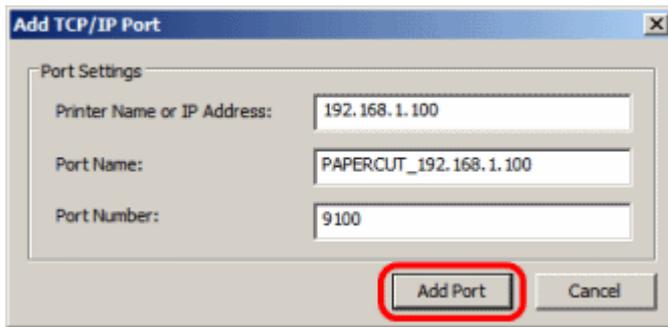


5. Select the **PaperCut TCP/IP Port** option. (Note: if this port is not displayed in the list of available port types, then see [Why is the PaperCut TCP/IP Port not available to be chosen in port selection on Windows?.](#))
6. Click **New Port**.



7. Enter the printer IP address and port name.

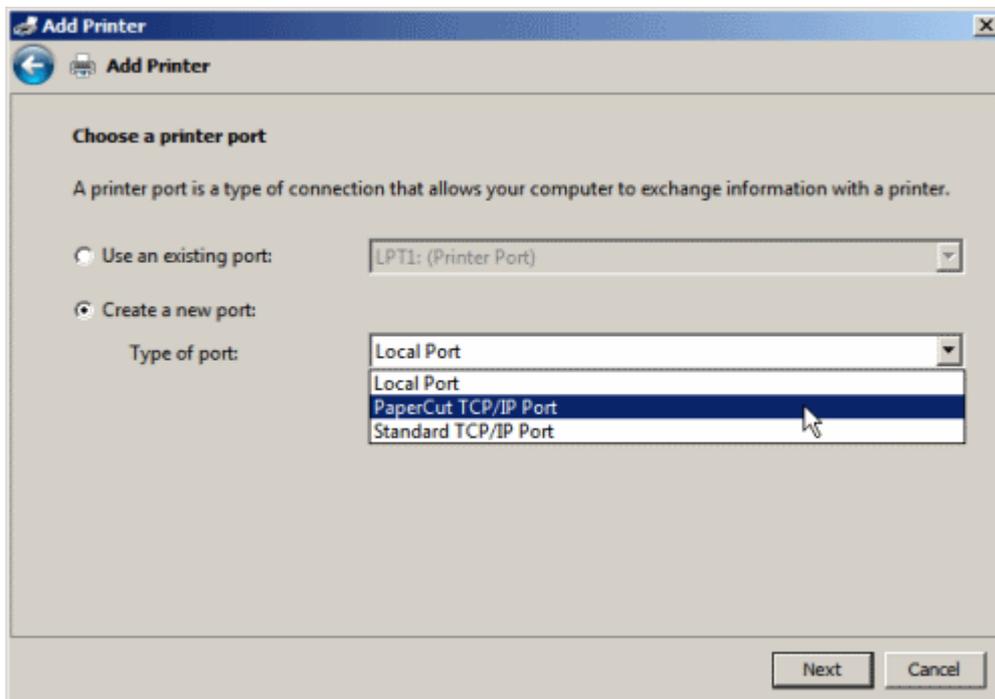
8. Click **Add Port** to save the new port.



9. Click **Close** on each dialog window.
10. This printer is now configured to use the new port. Delete the previous port if it is no longer in use by other printers.

To create a new printer queue to use a **PaperCut TCP/IP Port**:

1. Open the **Printers** list
2. Click **Add a Printer**.
3. Choose to add a **Local printer**.
4. When prompted for the printer port, select **Create a new port**.
5. Select the **PaperCut TCP/IP Port** option, and click **Next**.



6. Enter the printer IP address and port name.

7. Click **Add Port** to save the new port.
8. Complete the **Add Printer** wizard as normal choosing the drivers, etc.

## Novell, Linux and Mac printer queue configuration

When using Novell, Linux or Mac there is no additional configuration of the operating system required for hardware checks to be enabled. This function is controlled via the PaperCut administration console and comes into affect automatically shortly after the hardware checks are enabled. On Linux or Mac, the hardware checking is supported for the CUPS backends of *socket*, *ipp* and *lpd*.

## Changing the SNMP community string

By default, the hardware checks use the SNMP community string of "public". For a basic level of security, one can change the SNMP community string that is used. This must also be set in the configuration of the printer.

1. Open the file `[app_dir]/providers/print/[platform]/print-provider.conf` in a text editor such as Notepad.
2. Locate the line `SNMPCommunity=` and enter the new community string on the right-hand-side of the equals line. For example:

```
SNMPCommunity=secretcommunity
```

### 4.6.12.5. Reviewing hardware check results

Hardware check results are recorded in PaperCut on the print log records. When a hardware check is recorded the **Checked** status is displayed in the **Status** column of the print logs as shown below.

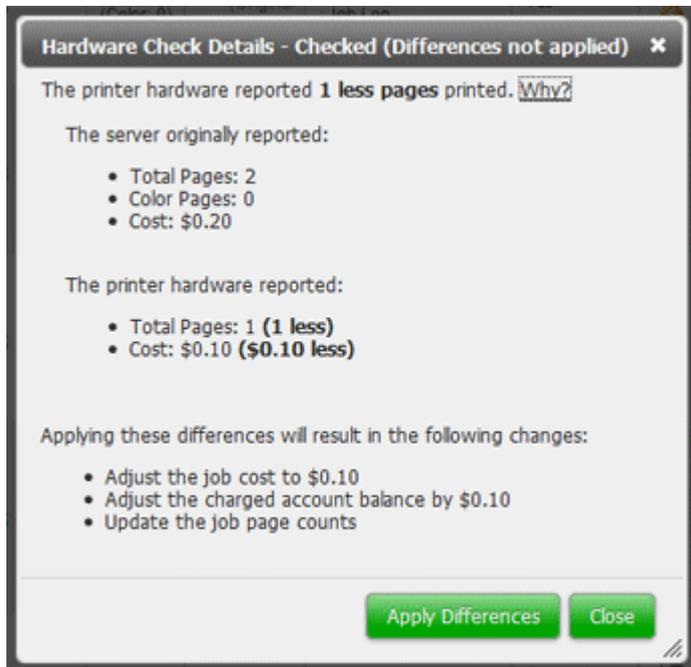
To see the basic details of the hardware check, hover your mouse over the **Checked** status.

Document Name	Attribs.	Status
Financial Report 3rd Quarter.xls	11X17 Duplex: No Grayscale: No 4,204 kb	 Printed  <b>Checked</b>
<div style="border: 1px solid black; padding: 2px;"> <p>Checked (Confirmed)</p> <p>4 pages sent, 4 pages printed.</p> </div>		

When the hardware check detects a difference, click the **Checked** status link to see more detailed information.

To manually apply hardware checks to a print job (if this is not configured to apply automatically):

1. Click the **Checked** status.
2. Review the hardware check information.
3. Click **Apply Differences**. This applies the page counts and any cost differences to the print log.



#### 4.6.12.6. Known Limitations

Hardware-level page count checks are not enabled by default. Sites should carefully consider these limitations and known issues before implementing:

- Hardware-level checks slow down printing a little (a few seconds between each job). The system needs to take a count snapshot before and after a job. The start/end of a job is detected by the printer entering an idle state and stabilization on some devices can take a few seconds (printing => idle). This process adds a small delay between each job.
- Copier functions that delay printing such as printing to a "Mailbox" will prevent PaperCut from detecting the print job as it is expected that the print job is printed immediately.
- Not all devices support SNMP and even some devices that do, do not support the ability to check page counts at the hardware level. Most major MPF/MFD devices support SNMP, however, smaller printer brands might not. Make sure you test this option across your device type(s) once enabled.
- On Windows, install/configure a different Printer Port to support this level of device integration. Care has been taken to emulate the behavior of the **Standard TCP/IP Port**, however, some drivers might complain if a non-default port is selected. Although this is rare, it can cause issues with some drivers. Always test the printer after changing the printer port.

The development team is looking at ways to remove the dependency on a custom port, however, at the current time this method has proven to be the most reliable.

- The use of non-PaperCut hold/release functionality on printers and copiers can cause inaccurate hardware validation as it appears that the job never prints, or at least in a timely fashion. It is recommended to use PaperCut based Release Stations where required: (see [Hold/release queues & Print Release Stations](#))
- If you have many printers it's very time consuming to use the Windows GUI to change the ports! We have not found a reliable way to script this process. We recommend you first test on a representative sample of your devices for a few days, then roll the port change out across your fleet.

### 4.6.12.7. Troubleshooting

## The "Checked" status is not displayed on any print logs

- Verify that the printer supports SNMP and that SNMP v1 or v2 is enabled in the printer's admin interface.
- Ensure that your networks and firewalls allow SNMP traffic (i.e. UDP port 161) between your print server and printers.
- If using a Windows print server, check that the printer is configured to use the **PaperCut TCP/IP Port**. See [Windows printer queue configuration](#)
- Verify that hardware checks are enabled in PaperCut. See [Configuring hardware checks](#).
- You can test that PaperCut can query SNMP data from the printer by running the following in a command prompt or terminal/shell:

Windows:

```
[app-path]\providers\print\[platform]\pc-print-monitor.exe -p -h [printer-ip]
```

Mac/Linux/Novell:

```
[app-path]/providers/print/[platform]/pc-print-monitor -p -h [printer-ip]
```

If SNMP data can be retrieved, some basic status information is printed. If not, an error is displayed.

- If you are still unable to diagnose the problem, then send the following log files in a support request:

Windows:

```
[app-path]\providers\print\[platform]\print-monitor.log*
[app-path]\providers\print\[platform]\print-provider.log*
```

Mac/Linux/Novell:

```
[app-path]/providers/print/[platform]/print-provider.log*
```

## Why is the "Checked" status missing on some print logs?

- An intermittent networking problem between the print server and printer might have stopped the SNMP page counts from being retrieved. E.g. the network was briefly interrupted while PaperCut was waiting for the print job to finish printing.
- If the job is deleted from the print queue while in progress PaperCut cancels any hardware checks and the **Checked** status is not displayed in the print log. To avoid this, it is recommended to fix any problems (e.g. out of paper, etc) at the printer and then allow the document to finish printing. This allows PaperCut to retrieve the page counts from the printer after the job completes. Delete the job from the queue only if it stays stuck even after the printer error is resolved.

## Why is the PaperCut TCP/IP Port not available to be chosen in port selection on Windows?

- A possible reason why the PaperCut TCP/IP Port is not available is because the port was unable to be installed due to a Security Policy disabling the installation of unsigned drivers. A solution for this is to change the Security Policy for the unsigned driver installation behavior to either allow unsigned driver installations or to warn but allow their installation.

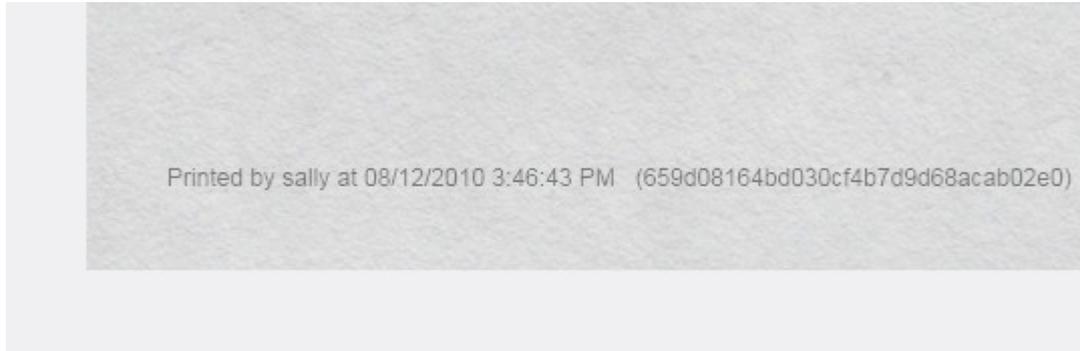
### 4.6.13. Watermarking/Job Annotation

Watermarking is a feature that allows a small portion of text to be written to the bottom (or top) of every page. Watermarking is a powerful and flexible feature. Typical uses of watermarking include:

- adding a username to the bottom of every page to help identify the owner
- writing job metadata in the footer such as print time, printer or document name
- applying a digital signature to help track and verify documents

You can apply watermark text to printers individually. Print scripting makes it possible to change watermarks dynamically (see [Advanced Scripting \(Print Scripting\)](#)). Watermarks can contain substitution variables allowing the insertion of document metadata such as date/time, username, document name, etc.

A typical watermark is shown the picture immediately below. This watermark uses the `%user%`, `%date%` and `%signature%` substitution variables described in the Substitution Variables section.



**Note:** PaperCut MF watermarks print jobs by modifying the print stream as jobs spool via the print server. The watermark is injected into the job using advanced PDL methods such as macros and overlays. This is the reason why PaperCut only supports standards based print languages such as PCL and PostScript - PaperCut must understand the job and its data to perform this on-the-fly modification.



**Important:** Watermarking is a new feature that uses advanced printer techniques that are implemented differently by each device manufacturer. Please report any problems that you experience to our support team for investigation.

### 4.6.13.1. Typical Uses

1. **Owner Identification.** Add the username to each page so it is easy to find the owner (e.g. uncollected print jobs).

Suggested Watermark: `Printed by %user%`

2. **Student Assignments.** Add the username and time of printing to each page. This helps teachers match up student work and help students prove that assignments were delivered on time.

Suggested Watermark: `Printed by %user% at %date% on printer %printer%`

3. **Tracking an Organization's Physical Documents.** Add a sequentially allocated number to every document printed. This number is a document-level Bates number ([http://en.wikipedia.org/wiki/Bates\\_numbering](http://en.wikipedia.org/wiki/Bates_numbering)). It is recorded in the PaperCut MF database and is useful for organizing document trails.

Suggested Watermark: `Document No.: %bates% composed of %pages% pages`

4. **Identification and Source Tracking.** Add a unique and secure digital signature to each

document. use this to verify the origin and generation details of a document. (Note: see Digital Signatures in Detail section below if security is required).

Suggested Watermark: %signature%

- 5. Protecting Value of Documents.** Use the copy protection aspects of watermark signatures described above to protect valuable documents where royalties apply.

Suggested Watermark: Copyright ABC Corporation. All rights reserved. Document Signature: %signature%

- 6. Behavioral Change.** The cost of each print job is added to the bottom of each page. This gives the user immediate feedback on the cost of their printing.

Suggested Watermark: The cost of this print job is: %cost%



**Tip:** To configure watermarking based on the user (e.g. a user's group membership) or job attributes, consider the Advanced Scripting feature. Advanced Scripting allows the watermarking to be enabled/disabled and the watermarking text to be adjusted to meet any need. See [Advanced Scripting \(Print Scripting\)](#) for more details.

## 4.6.13.2. Requirements

Watermarking is currently available for printers using PostScript and PCL drivers. You should ensure that the printer driver uses the PostScript or PCL language rather than GDI or other languages. You can verify this by observing the word `PostScript`, `PCL5` or `PCL6` in the Job Log as shown in the screenshot below.

Location > Logs > Job Log

### Job Log

Job Log Application Log Audit Log

Filter on [edit](#) [remove](#)

Date	User	Charged To	Printer	Pages	Cost	Document Name	Attribs.	Status
Jun 15, 2015 2:21:16 PM	<a href="#">bindu</a>	<a href="#">bindu</a>	<a href="#">desktop-bindu\KONICA MINOLTA 360PS(P)</a>	1	\$0.10	Microsoft Word - Document1	A4 (ISO_A4) Duplex: No Grayscale: Yes 109 kB DESKTOP-BINDU <b>PostScript</b>	Printed <a href="#">refund</a> <a href="#">edit</a>

[Export/Print](#)

▼ Report based on above data

On Windows systems, if the language lists as EMF, then turn off **Advanced Printing Features** as described in [Troubleshooting](#).

### 4.6.13.3. Enabling Watermarking

Watermarking is enabled in a printer's **Printer Details > Advanced Configuration** settings via the options **Apply watermarks to all pages**.

**Advanced Configuration**  
Advanced and less often used configuration items are listed here.

- Override user-level settings
- Unauthenticated printer (enable popup authentication)
- Define cost adjustments
- Enable Web Print (users may upload documents to print)
- Apply watermark to all pages (Watermarking is a new experimental feature)

**Text**  
Printed by %user% at %date%

**Gray level**  
Medium

**Font size (points)**  
8

**Position**  
Bottom of page

## Options

**Text** is the text to be printed on the watermark. You can use macro substitution variables, such as %user% and %date%. Substitution variables are described in the Substitution Variables/Macros section below.

**Gray level** determines how dark or light the text will be. Medium is the default. Light is just viewable.

**Font size** determines the watermark text size.

**Position** can be bottom left of page, top left of page, or custom. Custom is intended for advanced situations where some tweaking is required due to differences in page printable area. Custom positions are specified as the distance from the left of the page and distance from the bottom of the page in millimeters.

## Substitution Variables/Macros

**Table 38: Substitution Variables/Macros**

Field	Description
%user%	The name (username) of the user that printed the document.
%user_ primary_	The user's primary ID code.

Field	Description
card_id%	
%user_secondary_card_id%	The user's secondary ID code.
%user_full_name%	The full name of the user that printed the document.
%user_email%	The email address of the user that printed the document.
%date%	The date/time that the document was printed. The date is formatted in according the locale of the server. An example of a %date% is 12/12/2010 3:12:37 PM.
%document%	The name of the document that printed.
%server%	The server name that is hosting the printer that printed the print job.
%printer%	The name of the printer where the print job was printed.
%client_ip%	The IP address of the workstation the job was sent from.
%client_machine%	The name of the workstation that sent the print job.
%job_id%	The PaperCut MF job id of the job.
%copies%	The number of copies of the document that was printed.
%cost%	The cost of the print job.
%pages%	The total number of pages in the print job.
%bates%	A sequentially incrementing number based on a Bates Numbering ( <a href="http://en.wikipedia.org/wiki/Bates_numbering">http://en.wikipedia.org/wiki/Bates_numbering</a> ) scheme. All pages in the document are stamped with the same number. The number is recorded as a signature in the print log.
%signature%	A unique secure digital signature (in text form) generated via an MD5 HMAC. The signature is recorded in the print log. See Digital

Field	Description
	Signatures in Detail (Advanced) below for technical details.
<code>%digest%</code>	A unique digital signature (in text form) generated using an MD5 of various document attributes.
<code>%sig_md5%</code>	Same as <code>%signature%</code> .
<code>%digest_md5%</code>	Same as <code>%digest%</code> .
<code>%sig_sha1%</code>	Same as <code>%signature%</code> but based on the SHA1 message digest algorithm.
<code>%digest_sha1%</code>	Same as <code>%digest%</code> but based on the SHA1 message digest algorithm.

## Restrictions and Limitations

To ensure a document that has a unique single signature, use only one digital signature macro in a watermark. The digital signature macros are:

- `%bates%`
- `%signature%`
- `%sig_md5%`
- `%sig_sha1%`

### 4.6.13.4. Digital Signatures in Detail (Advanced)

## Signature Algorithm

PaperCut MF document digital signatures are generated using a cryptographic technique called an HMAC (<http://en.wikipedia.org/wiki/HMAC>). This works by taking various print job attributes such as print time, username, printer name and document name and combining them with a secret key. The result is then passed through a digest algorithm such as MD5. The resulting signature is unique to the document. The secret key portioning ensures that it is not possible to predict a signature. Two message digest algorithms are available: MD5 And SHA1. MD5 is secure enough for print job signature applications, however, for cryptographic completeness SHA1 is provided as an option. Using MD5 makes it easier to enter keys to find matching print jobs because the signatures are shorter.

**Note:**

The algorithm used is:

- `Digest = Hash(date time || username || server name || printer name || document name || job id)`
- `Signature = Hash(Digest || Key)`

where

- `key` is a random string generated on first use and stored in the config key "print.signature.hmac-key" and hash is either MD5 or SHA1.
- `date time` is formatted in ISO 8601 basic format from year to second ("yyyyMMddTHHmss"). The time is local time (not UTC). E.g. "20100130T141059"

## Verifying a Signature

If a document is located, for example, due to an information leak, you can use the signature to track down the print event details such as the originating user, time of print, and other details. This is done as follows:

1. Logs -> Job Log
2. Expand the filter section
3. Enter the signature in the **signature** signature field.
4. Click **Apply**. The matching job should list.

For example, the following screenshot shows how to search for the print job with signature `b608c7a39f08643768051217f2f5315a` in the job log.

### 4.6.13.5. Troubleshooting

Watermarking requires print jobs to be printed in PostScript or PCL format. If your document is printed in EMF you might be able to print in PostScript or PCL by following the procedure listed in the EMF section below. For all other drivers, see [Other Printer Languages](#).

## EMF

On Windows systems, if the printer language for a job lists as EMF, then turn off **Advanced Printing Features**. Disabling this option causes print jobs to be rendered into their printer language on the client side. Enabling it can result in rendering on the server side, which is usually unwanted.

```
LETTER (ANSI_A)
Duplex: No
Grayscale: Yes
3,351 kb
BOLLYWOOD
EMF
```

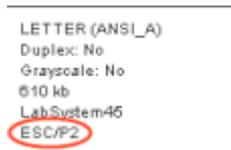
You can do this by following these steps:

1. On the **print server**, navigate to: **Start > Control Panel > Printers > [right-click printer] > Properties > Advanced**
2. Turn **off** (disable) the option **Enable advanced printing features**.
3. Test printing and check the printer language to ensure that it is now PostScript or PCL.

You can read more about this setting on the Microsoft website at: <http://support.microsoft.com/?kbid=268093>.

## Other Printer Languages

If the printer language for a job is listed as a non-supported language, such as, ESC/P2(Epson), then watermarking does not work. The manufacturer might also support other languages, such as, PostScript as an option. Check the printer manufacturer's website download page for details.



## Updating Printer Drivers

When updating printer drivers, it is important to update the printer drivers on **both the client and the server**.

### 4.6.14. Behavior on Server Connection Failures

There are various scenarios where the users want to print their print jobs but the PaperCut Application Server is unable to receive the information about the printing, including when:

- The Application Server's machine is being rebooted,
- The network link is down between a secondary print server on a remote machine and the Application Server,
- The administrator has decided to shutdown the Application Server for maintenance.

When this occurs PaperCut must decide on how to handle the print job without communicating with the Application Server. The administrator can configure PaperCut to handle new jobs in 3 ways:

1. Allow new print jobs to print but do not log (default),
2. Allow new print jobs to print and log after reconnection,
3. Do not allow new print jobs to print but hold and wait for reconnection.

Each of these options offer different compromises, and the best option depends on the needs and priorities of a particular installation. For example, if it's important to never interrupt printing then select options 1 or 2. If it's important to strictly enforce quotas (i.e. allow the job to be cancelled if they do not have enough quota) and it is acceptable to delay printing until the connection is reestablished then choose option 3. These options are discussed in detail below.

These configuration options are controlled under the **Printers [select printer] > Failure Mode**.

**Failure Mode**  
Control behavior under error conditions such as connection problems between primary and secondary servers.

**Action on failure**  
Allow new print jobs to print and log after reconnection

**After reconnection, record job as**  
 The user reported by the print queue  
 This user:  
\_\_\_\_\_

**Charge cost to**  
 User's personal account (or auto-charged to single shared account)  
 Shared account:  
\_\_\_\_\_  
e.g. "Delayed Logging Jobs"

### 4.6.14.1. Failure Mode Settings

## Mode 1: Allow new jobs to print but do not log

This is the default mode and allows jobs to print when the connection to the server is down (a "fail open" mode). The jobs printed during this period are not logged in the Application Server. Use this mode when:

- It is important to not interrupt printing when outages occur,
- The setup needs to be simple and easy to understand,
- It is not important to log jobs printed during failures,
- Strict quota enforcement is not required, Users will not be charged for printing that occurred during the outage.

## Mode 2: Allow new jobs to print and log after reconnection

This mode allows jobs to print when the connection to the primary server is down, but when the connection is re-established these jobs are re-sent to the Application Server and logged (a "fail open" mode with re-send/offline mode). Use this mode when:

- It is important to not interrupt printing when outages occur,
- It is important to log/charge every job printed during failures,
- Strict quota enforcement is less important. Users can use more credit than they have available.

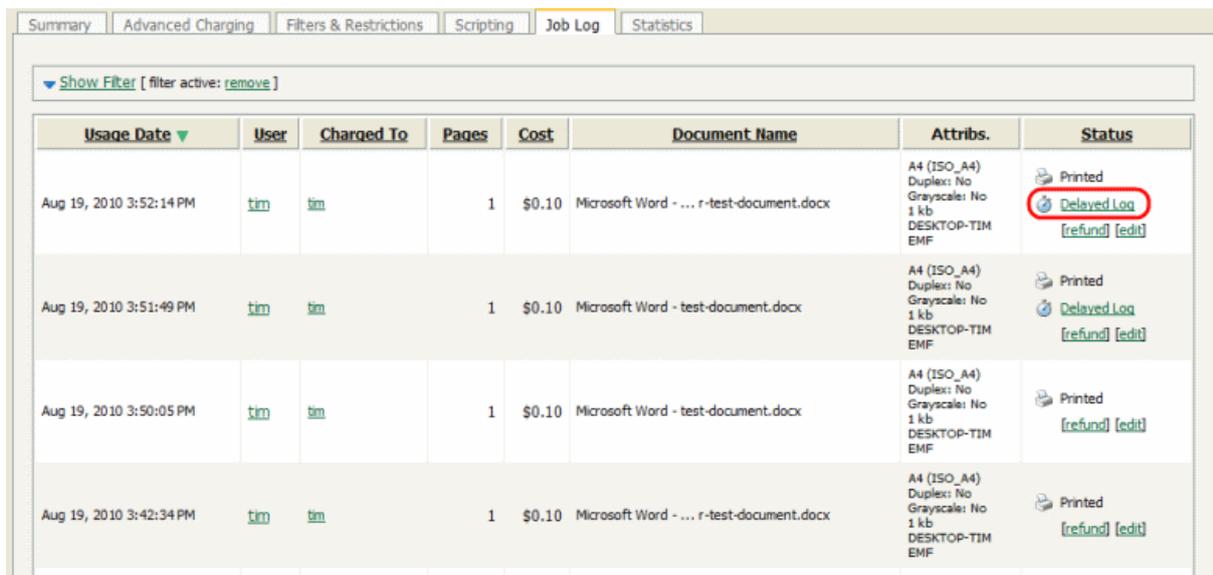
In this failure mode the administrator can configure how these resent jobs are recorded in the job log:

1. Leave the job information unchanged (i.e. log the job against the user that printed it),
2. Change the recorded user to another nominated user,
3. Change the charging of the print job to a nominated shared account.

The default reconnection option is 1, where logging and charging is done in the same way as if the recording was done live. The administrator might consider this unfair to charge the user during this failure time (as there were no warning popups or ways of telling that the user's quota was reaching its limit). It might be more reasonable to use the reconnection options of 2 or 3. With option 2, the administrator can choose a new user, such as, "AppServerDown" to record the job as and in this way completely divorce the user from jobs printed during the failure.

If the administrator wants to track who did the printing but thinks it is unfair to charge their personal account, then choose reconnection option 3, and a new shared account such as "AppServerDown", or an account corresponding to the department owning the printer can be charged. Jobs are still recorded under the user's name.

When the connection to the Application Server opens up again, the print jobs show up in the Application Server's job log within a few minutes. They show up with a special status and icon in the job log (see figure below).



Usage Date ▼	User	Charged To	Pages	Cost	Document Name	Attribs.	Status
Aug 19, 2010 3:52:14 PM	tim	tim	1	\$0.10	Microsoft Word - ... r-test-document.docx	A4 (ISO_A4) Duplex: No Grayscale: No 1 kb DESKTOP-TIM EMF	Printed <b>Delayed Log</b> [refund] [edit]
Aug 19, 2010 3:51:49 PM	tim	tim	1	\$0.10	Microsoft Word - test-document.docx	A4 (ISO_A4) Duplex: No Grayscale: No 1 kb DESKTOP-TIM EMF	Printed Delayed Log [refund] [edit]
Aug 19, 2010 3:50:05 PM	tim	tim	1	\$0.10	Microsoft Word - test-document.docx	A4 (ISO_A4) Duplex: No Grayscale: No 1 kb DESKTOP-TIM EMF	Printed [refund] [edit]
Aug 19, 2010 3:42:34 PM	tim	tim	1	\$0.10	Microsoft Word - ... r-test-document.docx	A4 (ISO_A4) Duplex: No Grayscale: No 1 kb DESKTOP-TIM EMF	Printed [refund] [edit]

## Mode 3: Do not allow new print jobs to print but hold and wait for reconnection

In this mode all jobs are held in the queue while the connection to the server is down (a "fail closed" mode). Once the connection to the server is reestablished the jobs are sent to the server and printing is processed as normal. Use this mode when:

- Strict quota enforcement is required,
- Secure Print Release or Find-me printing is used and jobs must not be printed until released by a user.

#### 4.6.14.2. Failure Mode Settings on Virtual Queues

When using virtual queues and Find-me printing (see [Find-Me Printing and Printer Load Balancing](#)), it is recommended to hold the all jobs and wait for reconnection when the server connection is down. By default, this setting is enforced by PaperCut to ensure the correct operation of the virtual queue.

If jobs are released from the virtual queue when the server connection is down, the jobs would be released to the configured printer (i.e. the configured printer port). If the queue is configured with a NULL port, the jobs are deleted. If configured for a non-existent printer (e.g. LPT1) then the jobs go into an error state. If configured for a real printer, the jobs are sent to the printer (contrary to the secure release / Find-me printing that the user expects). It is for these reasons that the failure mode on virtual queues is set to hold all jobs.

Some organizations prefer to have the virtual queue pointing to a real/physical printer so that if a failure occurs the jobs are printed. This is usually only acceptable if the organization is happy that users jobs be printed on a single queue (bypassing any secure print release function). To configure this, enable the **Override virtual queue failure mode** option and select one of the alternative modes. This option is only visible on virtual queues.

#### 4.6.15. Toner Levels (for supported printers)

Managing printer toner on a large fleet of printers can be a time-consuming task. The administrator must track toner usage and ensure that replacement toner cartridges are available when printer toner runs out. Often the administrator is only made aware that a printer is out of toner after receiving complaints from users. PaperCut MF can track the toner levels for supported printers and provide toner level information in reports or email notifications when the toner is low.

Armed with this information the administrator can purchase toner supplies in advance and replace toner cartridges before the printer runs out of toner. This saves the administrator time and ensures that printer downtime is minimized.

For more information on low toner notifications see [Low printer toner notifications](#).

**Type/Model**

Color MFP

**Serial number**

XXXXYYZZZ

**Physical Identifier**

net://color-MFP

**Toner status**

88% black	93% cyan	92% magenta	93% yellow
--------------	-------------	----------------	---------------

Last updated on Apr 20, 2015 3:58:18 PM [\[update\]](#)

### 4.6.15.1. How toner level information is retrieved?

PaperCut MF retrieves toner information from supported printers using the SNMP network protocol. Most modern network printers allow the toner information be queried via SNMP. PaperCut MF can retrieve toner information for printers that meet the following requirements:

- The printer is networked (i.e. it is connected to your network and not directly to a computer with a USB or parallel port).
- The printer supports SNMP and it is enabled.
- The printer supports the SNMP standard for printers (RFC 1759) that allows toner information to be retrieved in a standardized way. Most network printers support this standard.
- The PaperCut MF server can establish SNMP connections to the printer. Ensure that your network (e.g. routers, firewalls, etc) allow SNMP connections between the PaperCut MF server and your printers.

PaperCut MF regularly updates the toner information to ensure the data is kept up-to-date.

You can generate a report with 'Toner Status', 'Lowest Toner Value' and 'Toner Last Updated on' fields from the Admin Console. Select the Printers tab to open the Printer List. At the bottom of the list select Export / Print in Excel format.



**Tip:** The thresholds for low and very low toner level warnings visible on Dashboard are configurable. Configure the threshold values using the following config keys - `toner.low-threshold` and `toner.very-low-threshold`. See [Using the Config Editor](#) to find out how to change config keys.

**Type/Model**

Color MFP

**Serial number**

XXXXYYZZZ

**Physical Identifier**

net://color-MFP

**Toner status**

88% black	93% cyan	92% magenta	93% yellow
--------------	-------------	----------------	---------------

Last updated on Apr 20, 2015 3:58:18 PM [\[update\]](#)

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### 4.6.16. Printer Quick Reference

How do I view printing history?

You can quickly access printing history via a number of areas. The most appropriate area depends on the information required.

- To view a user's printing history select the **Job Log** under the user's details page.
- To view recent print jobs printed on a printer, select **Job Log** under the appropriate printer's details page.
- To view all print jobs printed on the network with advanced search and filtering options, use the global Print Log under the Logs section.

### How do I add a new printer?

On Windows systems, new printers are added to the system automatically once the printer is added to a monitored server. On a Mac or Linux system, after PaperCut MF is enabled on the printer, it is displayed in the administration interface after the first print. New printers are assigned initial settings based on the configuration assigned to the [Template Printer].

### How do I delete a printer?

Once the printer is removed from the operating system's print list, you can delete the printer from PaperCut MF via the delete printer action under the printer's detail page. This action removes the printer from the monitored list. Print history logs are still maintained allowing access to historical data. Always confirm your action before proceeding with the delete!

### How do I disable a printer?

You can disable printers indefinitely or for a specified time via the **Disable** option under the printer's details section.

### How do I tell PaperCut MF to ignore (not monitor) a printer?

By default on Windows systems all printers are tracked by PaperCut MF. You can instruct the *Print Provider* to ignore a printer by setting the `IgnorePrinters=` attribute in the `print-provider.conf` file. A restart might be required for this to take effect.



#### Note:

This setting only stops monitoring. The printer is still listed under the printer list section until it is manually deleted via the **Delete printer** action.

For more information see [Adding and Removing/Deleting/Ignoring Printers](#).

### What can I use the printer notes field for?

The **Notes** field under each printer is useful for tracking all manner of information. Typical uses include:

- Tracking configuration changes
- Recording maintenance and/or toner replacements

- Documenting problems
- Leaving notes/comments to assist other administrators.

## 4.6.17. Refunding Print Jobs

Paper jams, toner problems, and print quality issues always occur. Larger organizations require a policy to address these situations and under what conditions a print job can be refunded. The assessment to give a refund or not is subjective and needs to be managed by responsible administrators. To streamline and partially automate the process PaperCut MF provides a browser based refund management process.

Highlights include:

- Users can request refunds via a simple form and track their status.
- Administrators can quickly approve/deny requests with one click.
- Administrators can be alerted via email when requests are pending.
- Issue partial and manual refunds.

### 4.6.17.1. Enabling End-User Refunds

Users request refunds via the end user web pages. This feature is enabled as follows:

1. Log in to PaperCut MF admin interface.
2. Navigate to **Options > General** .
3. Under **User Features**, enable the option **Allow users to request refunds**.



4. Click **Apply**.

End-users can enter a reason why they are requesting a refund. You can disable this feature, for example, to prevent users writing inappropriate comments. To disable end-user comments/reasons, clear the **Allow users to enter a reason for their request** check box.

It is recommended that organizations follow a formal refund policy. This policy is outlined via the **Refund policy/instructions** option. This text can also include basic HTML markup, such as, a link to an external policy page.

## 4.6.17.2. Managing Refunds

The refund process is best described in the form of an example.

### How users request refunds

John's print job failed to fully print due to a printer jam, forcing him to reprint the remainder of the job on another printer. He has requested a refund of approx. 50% of his job cost for the first failed job. John would place the request as follows:

1. Log in to the user web interface at `http://[server_name]:9191/user` using his network username and password.
2. Locate the first, failed print job on the **Recent Print Jobs** page.
3. Click the **[Request Refund]** link.

Recent Print Jobs							
<input type="text" value="Show Filter"/> (filter active: <a href="#">remove</a> )							
Date ▼	Charged To	Printer	Pages	Cost	Document Name	Attribs.	Status
Jan 17, 2012 11:10:15 AM	tom beresford	linux-server1Test Printer	1	\$0.06	Faculty Spending.xlsx	LETTER (ANSI_A) Duplex: Yes Grayscale: No 25 kb DESKTOP-TOM2 Postscript	Printed <a href="#">request refund</a>
Jan 17, 2012 10:59:58 AM	tom beresford	windows-server1Library Printer	19	\$0.00 (Original cost: \$1.90)	Microsoft Word - assignment-science.docx	A4 (ISO_A4) Duplex: No Grayscale: No 24 kb DESKTOP-TOM2 EMF	Cancelled Refunded
Jan 17, 2012 10:48:15 AM	tom beresford	desktop-tom2TestPrinter	48	\$4.80	Microsoft Word - Biology Homework.docx	A4 (ISO_A4) Duplex: No Grayscale: No 55 kb DESKTOP-TOM2 EMF	Printed <a href="#">request refund</a>

4. Enter a reason.

## Refund Request

All refund requests will be reviewed by the administrator.

Job Details	
Time	Jan 6, 2012 11:49:00 AM
Pages	1
Cost	\$0.10
Document Name	User Details : tom beresford
Printer	windowsserver/TDS320

Refund Details	
Refund Amount	<input type="radio"/> Full amount <input checked="" type="radio"/> Partial amount: <input type="text" value="\$5.00"/>
Reason for Request	<input type="text" value="printer out of toner. Only 50% of the job was completed."/>
<input type="button" value="Send"/> <input type="button" value="Cancel"/>	

5. Click **Send**.

## The administrator approval process

Jenny is an IT administrator at John's school. She has just received an email indicating that refund requests are pending review. To approve John's request Jenny would:

1. Log in to PaperCut MF admin interface.
2. Navigate to **Printers > Refunds** .
3. Locate John's request and review.

4. Click the **Approve** link.

Request Date	Username	Amount Requested	Reason	Job Detail	Refund Actions
Sep 3, 2009 3:24:41 PM	privanika Accepted: 10 Rejected: 5	\$0.10 (Job cost: \$0.10)	The printer was out of toner.	Usage: Sep 3, 2009 3:07:23 PM Pages: 1 Cost: \$0.10 Printer: mac-server\Office MFP Document: PaperCut NG : Users : User ...	<a href="#">[approve]</a> <a href="#">[reject]</a> <a href="#">[other]</a>
Sep 3, 2009 3:41:06 PM	shrus Accepted: 1 Rejected: 5	\$4.50 (Job cost: \$4.50)	No reason given	Usage: Sep 3, 2009 3:31:33 PM Pages: 45 Cost: \$4.50 Printer: mac-server\Library MFP Document: research paper.pdf	<a href="#">[approve]</a> <a href="#">[reject]</a> <a href="#">[other]</a>
Sep 4, 2009 12:12:07 PM	john Accepted: 10 Rejected: 5	\$5.50 (Job cost: \$5.50)	No reason given	Usage: Sep 4, 2009 12:01:28 PM Pages: 55 Cost: \$5.50 Printer: mac-server\Office MFP Document: Microsoft PowerPoint - Presentation	<a href="#">[approve]</a> <a href="#">[reject]</a> <a href="#">[other]</a>
Sep 4, 2009 12:16:43 PM	john Accepted: 10 Rejected: 5	\$5.00 (Job cost: \$10.00)	printer out of toner. Only 50% of the job was completed.	Usage: Sep 4, 2009 11:56:20 AM Pages: 100 Cost: \$10.00 Printer: mac-server\Library MFP Document: Untitled1 - OpenOffice.org Writer	<a href="#">[approve]</a> <a href="#">[reject]</a> <a href="#">[other]</a>

Jenny could have denied the refund request by clicking **[reject]** link. Clicking the **[other]** option would have allowed Jenny to review John's previous requests for refunds, edit the requested amount and write a comment.

### Refund Print Job

#### Print Job Details

Job details of the job to be refunded.

**Date:** Sep 4, 2009 11:56:20 AM  
**Charged to:** john  
**Pages:** 100  
**Document:** Untitled1 - OpenOffice.org Writer  
**Cost:** \$10.00  
**Printer:** mac-server\Library MFP

---

#### Refund Request Detail

Information about the refund requested.

**Date:** Sep 4, 2009 12:16:43 PM  
**Username:** john (History: 1 Accepted, 1 Rejected)  
**Amount Requested:** \$5.00  
**Reason:** printer out of toner. Only 50% of the job was completed.

---

#### Refund Action

Take an appropriate action.

Deny  Refund Amount   
**Comment:**

### 4.6.17.3. Admin Notifications

Administrators can receive regular emails about pending refund requests. Enable email notifications via **Options > Notifications > System Notifications > Pending refund requests** . For more information, see [Pending refund request notifications](#).

Emails can be delivered hourly or daily. By default daily messages are delivered at 7 a.m. Configure the hour of the day via the config key `notify.pending-refund-requests.daily-hour-of-day`. For more information about changing config keys, see [Using the Config Editor](#).

### 4.6.17.4. User Notifications

Users can receive an email notification when their refund request is actioned by an administrator. To enable this feature:

- Enable the option at **Options > General > User Features > Allow users to request refunds > Email user when their request is processed** .
- Define an SMTP server so that emails can be sent (see [Configuring Email Notifications](#)).
- Either the user must have an email address defined, or the *email suffix* must be enabled.

Email user when their request is processed

Email subject

Email body

Approved message

Denied message

The **Email subject** and **Email body** options make up the subject and body of the email that is sent to the user. The **Approved message** and **Denied message** options are used for the replacement marker `%approved-or-denied-message%` in the email body.

Other than the `%approved-or-denied-message%` marker, you can use the following markers in any of the above four fields:

**Table 39: Fields available printer refund request user notifications**

Field	Description
<code>%job.copies%</code>	The number of copies in the print job.

Field	Description
%job.cost%	The original cost of the print job.
%job.date%	The date the original print job was sent.
%job.document%	The document name of the print job.
%job.pages%	The number of pages in the print job.
%job.paper-size%	The paper size of the print job.
%job.printer%	The printer the print job was sent to.
%refund.refund-amount%	The amount that was refunded.
%refund.request-amount%	The refund amount requested by the user.
%refund.request-date%	The date the user made the refund request.
%refund.request-reason%	The reason the user gave for the refund request.
%refund.request-user-name%	The username of the user making the refund request.
%refund.response-date%	The date the refund was actioned.
%refund.response-reason%	The reason the admin user gave for approving/denying the refund request.
%refund.response-user-name%	The username of the administrator who actioned the refund request.
%refund.status%	The status of the refund request as it is displayed in the <b>Job Log</b> .

### 4.6.18. Custom Printer Fields

To assist with device management, enable custom fields on printers. You can assign custom fields user-defined names and can represent any data you would find useful for printer management in

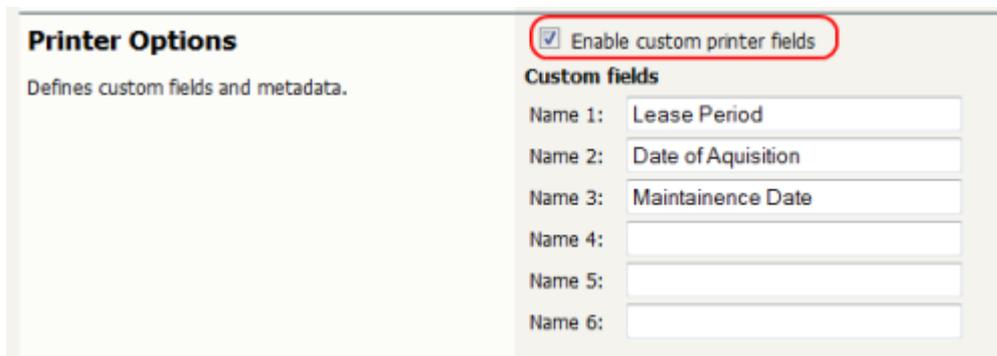
your organization. Common examples include recording metadata such as, asset number, lease period, device status, date of acquisition, last maintenance date, department ownership, etc.

You can define up to six custom fields. The names are set by the administrator as per the site requirement. In turn, you can use these custom fields for many purposes, such as, recording data, filtering lists, and creating/exporting reports.

### 4.6.18.1. Defining Custom Printer Fields

To define a custom printer field(s):

1. Log in to the PaperCut MF admin interface.
2. Navigate to **Options > General**.
3. Under **Printer Options**, select **Enable custom printer fields**.



**Printer Options**  
Defines custom fields and metadata.

Enable custom printer fields

**Custom fields**

Name 1:

Name 2:

Name 3:

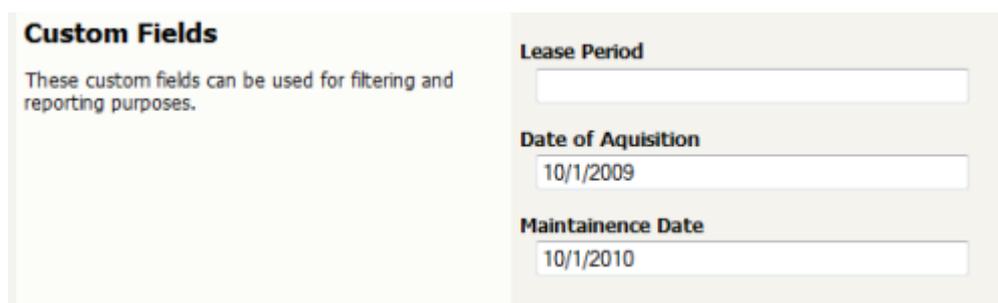
Name 4:

Name 5:

Name 6:

4. Enter an appropriate name for Name 1 and repeat for any other fields that you plan to use.
5. Click **Apply**.

Once enabled, the custom fields are visible in the **Printer Details** page.



**Custom Fields**  
These custom fields can be used for filtering and reporting purposes.

**Lease Period**

**Date of Aquisition**

**Maintainence Date**

You can also use the custom field in other areas of the application, such as, filtering the printer list, and applying ad-hoc reporting conditions.

## 4.6.19. Extracting Usernames in Enterprise Print Environments (e.g. SAP, Unix)

It is common in an enterprise print environment using packages such as SAP, JD Edwards, Oracle Financials or Unix systems for print jobs (e.g. batch reports) to be displayed in print queues under a system account name rather than the instigating user's account name. The result is that all jobs printed from these programs are recorded in the PaperCut MF job log as owned by the program/system account.

In most environments, you can configure these programs or systems to write the username into the print spool file (PDL). For example, you can add the username as a PjL header. If this is done, then PaperCut can extract the username and use it in place of the username supplied to the print queue.



**Tip:** This feature is often combined with Username Aliases (enable **Username aliasing** under **Options > Advanced**) when dealing with differences between the usernames used in the PaperCut MF environment and the external system or program that submits these jobs. For example, `john.wayne` in PaperCut MF might have `jwayne` as a SAP user ID. For more information see [Username Aliasing](#)

The extraction process, when configured, applies the following rules:

1. You can define multiple patterns to extract the username. The matching process returns the first valid result found.
2. Username extraction at the current time is not supported on Novell.
3. The username is included in the first megabyte of the spool file.

### 4.6.19.1. Configuring PaperCut to Extract Usernames from Spool Files

Username extraction from spool files is performed by the PaperCut Print Provider and as such any configuration text described in the following steps needs to be inserted into `[app_path]\providers\print\win\print-provider.conf`. After a change to the config is made, restart the Print Provider service before testing.

## Extracting Usernames using the Simple Method

The Simple Method uses prefix and suffix text as static bookends for the username that is extracted. In the below example (which you can copy and paste into your `print-provider.conf`), the user `john.wayne` is extracted from the string `@PjL COMMENT SAP_USER="john.wayne"`. Simple Matching is sufficient in the majority of customer environments.

```
#
# Extract username from spool files coming from our enterprise
system.
# Look for a header that matches @PJL COMMENT SAP_USER-
R="john.wayne"
#
UsernameOverridePrefix=@PJL COMMENT SAP_USER="
UsernameOverrideSuffix="
```

## Extracting Usernames using the Advanced Method (Regular Expressions)

The Advanced method adds powerful regular expression pattern plus the ability to define up to five of these patterns, labelled `UsernameOverrideRegex1` to `UsernameOverrideRegex5`. Administrators using this method need to be familiar with regular expressions. The username is extracted from the first bracketed match group (e.g. \$1).

In the example below two patterns are matched:

```
#
# Extract username from spool files coming from our enterprise
system.
# Username may be defined in one of two formats:
# (john.wayne) XJXsetUserName
# /Author (john.wayne) def
#
UsernameOverrideRegex1=\((\S+?)\)\s*XJXsetUserName
UsernameOverrideRegex2=Author\s*\((\S+?)\)\s*def
```

The table below shows some further examples of username declarations seen in spool files and corresponding regular expressions that can extract the correct username.

**Table 40: Examples of usernames seen in spool files and regular expressions to extract them**

Username in Spool File	Regular Expression to Extract Username
@PJL SET USERNAME- E="john.wayne"	@PJL\s+SET\s+USERNAME\s*=\s*"(\S+?)"
@PJL SET USERNAMEW- W="john.wayne"	@PJL\s+SET\s+USERNAMEW\s*=\s*"(\S+?)"
@PJL XJAUSERNAME	@PJL\s+XJAUSERNAME\s*=\s*"(\S+?)"

Username in Spool File	Regular Expression to Extract Username
= "john.wayne"	
@PJL COMMENT "User-name: john.wayne"	@PJL\s+COMMENT\s+"Username\s*:\s*(\S+?)"
@PJL COMMENT CANPJL SET USERNAME- E="john.wayne"	@PJL\s+COMMENT\s+CANPJL\s+SET\s+USERNAME-\s*=\s*"(\S+?)"
@PJL COMMENT "User-name: john.wayne;App FileName: True Grit.doc"	@PJL\s+COMMENT\s*"Username\s*:\s*(\S+?)\s*;"
@PJL OKIAUXJOBINFO DATA- ="Use- erName=john.wayne"	@PJL\s+OKIAUXJOBINFO\s+DATA\s*- *\s*"UserName\s*=\s*(\S+?)\s*"
%%For: john.wayne	%%For:\s*\(?([w\.-=]+?)\)?\b
/USERNAME (john.wayne) def	/USERNAME\s*\((\S+?)\)\s*def
/UserName (john.wayne) def	/UserName\s*\((\S+?)\)\s*def
/Author (john.wayne) def	/Author\s*\((\S+?)\)\s*def
(john.wayne) /RRCus- tomProcs /ProcSet find- resource begin logusername end	\((\S+?)\)\s*/RRCus- tomProc- s\s*/ProcSet\s+findresource\s+begin\s+logusername
(john.wayne) XJX- setUserName	\((\S+?)\)\s*XJXsetUserName

## 4.7. Find-Me Printing and Printer Load Balancing

This section covers two powerful features: printer load balancing and "find me" printing.

- *Find-Me Printing* - solves the problem of finding the closest printer from a long list of available printers. It is a roaming print service that allows print jobs to find users based on their physical location. It's sometimes referred to as "Pull Printing", "Push Printing" or "Follow Me" printing.
- *Printer Load Balancing* - covers the act of automatically distributing print load between multiple physical printers.

These topics are addressed together in this section as they both involve the concept of *print job redirection*, where a job is taken from one queue and transferred to another.

The topics covered in this section are relatively advanced in nature and targeted towards the administrator who is already comfortable with PaperCut MF and print queue configuration. If implementing PaperCut MF for the first time it is recommended to plan a simple configuration in the first phase, then return to implement find me printing or load balancing in a later phase once users and administrators are comfortable with the basic features.

### 4.7.1. Find-Me Printing

*Find-Me Printing* is best described not by what it does but by the problem it solves. Consider a large organization with hundreds of printers. The task of selecting the "best" printer from the list at the time of print can be daunting. Organizations tend to mitigate this concern using a number of methods:

- *Naming Conventions* - use a printer naming convention that helps users locate the best printer. A common convention is to use the room name or floor number. This is usually complemented by a sign on the printer itself.
- *Location Adaptive Login Scripts* - in many respects a location adaptive login script is a most elegant solution. The login script automatically adds the printers to the workstation based on the workstation's physical location (denoted by the computer name). For example, any workstation containing "lv2" in the name has the two printers on Level-2 by default. Users need to consult the full list of printers only on the rare occasion that they want to print to a printer outside their physical level/room.
- *Global Profile* - administrators map the "best" printer based on location globally on the workstation (e.g. using `rundll32 printui.dll,PrintUIEntry /ga /n\\server-\printer` on Windows). Any user that logs on to the workstation has the most appropriate printer selected by default.

All these methods have their drawbacks and require careful planning on the part of administrators, and the need for end-users to understand conventions/processes. *Find-Me Printing*

solves the problem by "asking the job to find the user, rather than having the user find the printer". It works as follows:

1. The user prints to a single site-wide global queue.
2. The user then walks up to a [Hold/release queues & Print Release Stations](#) logs in, locates their job and releases it.
3. The job then automatically prints to the closest physical printer.

Find-Me Printing is referred to by users as other terms such as *Follow-me printing* (because print jobs follow you to a printer), *Pull Printing* (because the job is pulled from the global queue) or *Push Printing* (because the Release Station pushes the job to the nearest printer).

Before implementing a Find-Me Printing scenario, make sure you are familiar with Release Stations (see [Hold/release queues & Print Release Stations](#)). Administrators also need to consider and plan hardware and driver compatibility. Find-Me Printing works by re-directing a job targeted at one queue to another so printer compatibility is important. For example, a job designed to print on an inkjet photo printer is not usually suitable for printing on a laser printer. The topic of printer/driver compatibility is discussed in detail in the section preceding the examples below.

### 4.7.1.1. Implementation by Example

Implementing *Find-Me Printing* is best described by way of example. The following sections cover some common scenarios for implementing Find-Me Printing.

## Example 1: Single Virtual Queue (High School)

### Scenario

East Beach High School has seven high volume laser printers of the same model at various locations throughout the campus. When sending a print job students must currently select the printer nearest to them before retrieving the document. Students often send jobs to the wrong queue and rather than going to pick it up they re-send the document to a closer queue and leave the original document uncollected.

The current print queues are named `laser-1` through `laser-7` with the number corresponding to a label on the printer. All printers are hosted on the print server called `print-server`. All printers are the same make and model (using the same driver).

In the library there are two printers, `laser-6` and `laser-7`, side by side.

The goal is to implement one central queue to receive all print jobs. A Release Station is set up next to each printer. Each Release Station allows users to have their job printed at the nearby printer.

## Implementation

The first step is to create a new print queue on the print server. This queue is a *virtual queue* with *hold/release* enabled. When students print to the virtual queue, their job is held, and the Release Station the user releases the job at determines the printer to which the job is sent (the job is pulled from the virtual queue to a printer near the user).

A new queue is called `find-me-queue` is created by the administrator on `print-server` using the normal methods for the operating system in use. The queue is created using the same driver that `laser-1` through `laser-7` use. The queue points to the IP address of one of the printers - this is not strictly necessary as the "virtual queue" is just a *collecting queue* that forwards jobs to real queues, however, some printer drivers "complain" if they do not point to a real printer.

The administrator ensures that the print queue has registered itself with PaperCut MF by checking the **Printers** tab of the administration interface. For more information about adding printers, see [Adding and Removing/Deleting/Ignoring Printers](#).

After creating of the new virtual queue the administrator performs the following:

1. Navigates to **Printers > find-me-queue > Summary** in the PaperCut MF administration interface.
2. Changes the **Queue type** option to **This is a virtual queue (jobs will be forwarded to a different queue)**. This reveals the **Job Redirection Settings** section.
3. The option **Jobs may be forwarded to these queues:** determines which queues `find-me-queue` is capable of redirecting to. The queues `print-server\laser-1` through `print-server\laser-7` are selected.
4. Enables the option **Enable hold/release queue** and sets **Release mode** to **User release** (the default). This ensures that jobs are held in the virtual queue and not automatically forwarded to one of the targets.
5. Clicks **OK**.

The next step is to configure the Release Stations:

1. The administrator first configures each Release Station as per [Release Station Configuration](#). The administrator decides that students should only be able to see and release the jobs they have personally printed, so sets up the Release Station in *Secure* mode.
2. Configure each Release Station to release jobs on the printer it is associated with by setting the `releases-on` option in the Release Station config file. E.g. for the Release Station set up near the printer `laser-4`, set the option to:

```
releases-on=print-server\\laser-4
```

In the library (where there are two printers side by side) the administrator configures a single Release Station to release to either printer by setting the option to:

```
releases-on=print-server\\laser-6,print-server\\laser-7
```

In this case, when a user releases a job at the library Release Station, PaperCut MF selects either `laser-6` or `laser-7` based on a load balancing algorithm (see [Example 1: Simple Load Balancing](#)).

Now when students print from a lab computer to the virtual `find-me-queue` queue, their job is held. The student can visit any Release Station and see their job. When the student releases their job at a Release Station, the job is pulled from the virtual queue into the queue or queues associated with the Release Station for printing. This setup is illustrated in the image below. Administrators should also ensure that the `find-me-queue` queue is set as the default queue on all workstations.

The administrator can now optionally un-share all but the virtual queue. This would enforce that users use the "find me" process rather than printing directly to one of the target printers.

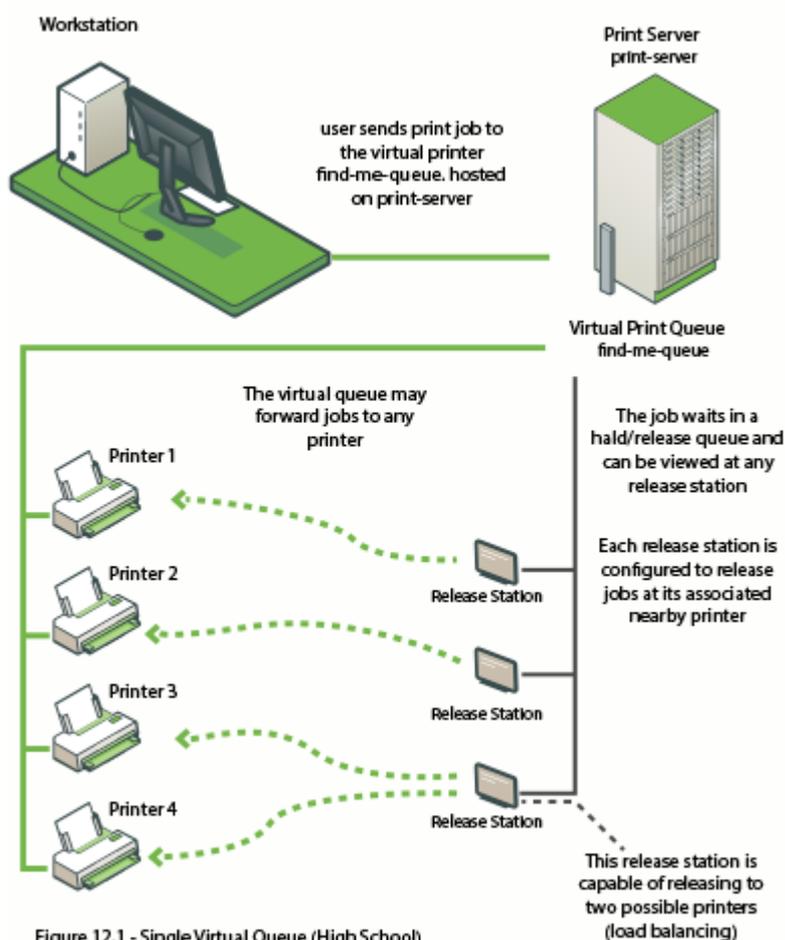


Figure 41: Single Virtual Queue (High School)

## Example 2: Multiple Virtual Queues (Different Printer Types)

## Scenario

West Face University has a Graphic Design department who use two wide format plotters and seven color laser printers. The two plotters and two of the laser printers are located in the department print room, while the other laser printers are scattered around various locations. The plan is to add more printers next year.

The two wide format plotter queues are named `wf-plotter-1` and `wf-plotter-2`, and the color laser printers are named `color-laser-1` through `color-laser-7`. Laser 1 and 2 are located in the print room with the plotters.

The goals of the project are:

- Implement Find-Me Printing so users don't need to remember the names associated with the ever growing list of printers.
- Implement Release Stations. This ensures the student/staff member is there to collect their work minimizing the chance of one person accidentally collecting another's work.
- Ensure the procedure is similar for all types of printers, meaning users only have to learn one process.
- Automatic load balancing in the print room to ensure all printers receive an equal load and throughput is maximized.

## Implementation

This implementation differs from the previous implementation in that you have two distinct printer types. It is not technically possible to have one "find-me-queue" as jobs rendered by the application for the wide-format printer can't be printed on a laser printer and vice versa. See [Requirements For Job Redirection \(Load Balancing or Find-Me Printing\)](#) for more discussion on compatibility.

The first step is to create a new print queue for each printer type on the print server. These queues are *virtual queues* with *hold/release* enabled. When a student prints to a virtual queue, their job is held at displayed at the Release Station. When a student releases their job, PaperCut MF knows which target queues are compatible (based on configuration) and selects one of the available target queues using an intelligent load balancing algorithm.

Two new queues called `wf-plotter` and `color-laser` respectively are created by the administrator on the print server `graphics-print`. `wf-plotter` is created using the same driver as the existing queues `wf-plotter-1` and `wf-plotter-2`, and likewise `color-laser` uses the same driver as its counterparts. Both new queues point to any physical device of the same type, e.g. `wf-plotter` to `wf-plotter-1`. This last point is not strictly necessary but some printer drivers complain if they do not point to a real printer.

The administrator ensures that both print queues have registered themselves with PaperCut MF by checking the **Printers** tab of the administration interface. For more information about adding printers, see [Adding and Removing/Deleting/Ignoring Printers](#).

Following creation of the new queues the administrator performs the following:

1. Navigates to **Printers > wf-plotter > Summary** in the PaperCut MF administration interface.
2. Changes the **Queue type** option to **This is a virtual queue (jobs will be forwarded to a different queue)**. This reveals the **Job Redirection Settings** section.
3. The option **Jobs may be forwarded to these queues:** determines which queues `wf-plotter` is capable of redirecting to. The queues `graphics-print\wf-plotter-1` and `graphics-print\wf-plotter-2` are selected.
4. Enables the option **Enable hold/release queue** and sets **Release mode** to **User release** (the default). This ensures that jobs are held in the virtual queue and not automatically forwarded to one of the targets.
5. Clicks **OK**.
6. Repeats steps 2 through 5 for the `color-laser` queue, except the option **Jobs may be forwarded to these queues:** in step 4 is instead set to `graphics-print\color-laser-1` through `graphics-print\color-laser-7`.

The next step is to configure the Release Station:

1. The administrator first configures a Release Station as per [Release Station Configuration](#). The administrator decides that students should only be able to see and release the jobs they have personally printed, so sets up the Release Station in *Secure* mode.
2. Configure a single Release Station to release jobs to the printers it is associated with by setting the `releases-on` option in the Release Station config file. In the print room the administrator sets the option to the four printers:

```
releases-on=graphics-print\\wf-plotter-1,graphics-print\\wf-plotter-2,\\graphics-print\\color-laser-1,graphics-print\\color-laser-2
```
3. A separate Release Station is also set up next to each of the five remaining laser printers in the department. The `releases-on` is set to the single adjacent printer in each case.

Now when a student prints from a lab computer to either virtual queue (`wf-plotter` or `color-laser`), their job is held. The student can visit the Release Station and see their job. When the student releases their job in the print room, the system automatically implements load balancing and select an available compatible printer. This setup is illustrated in the image below.



**Important:** Load balancing is not appropriate on plotters if manual loading of paper media is required, as it is not possible to know beforehand which target printer will be selected. In this case a separate Release Station is required for each plotter.

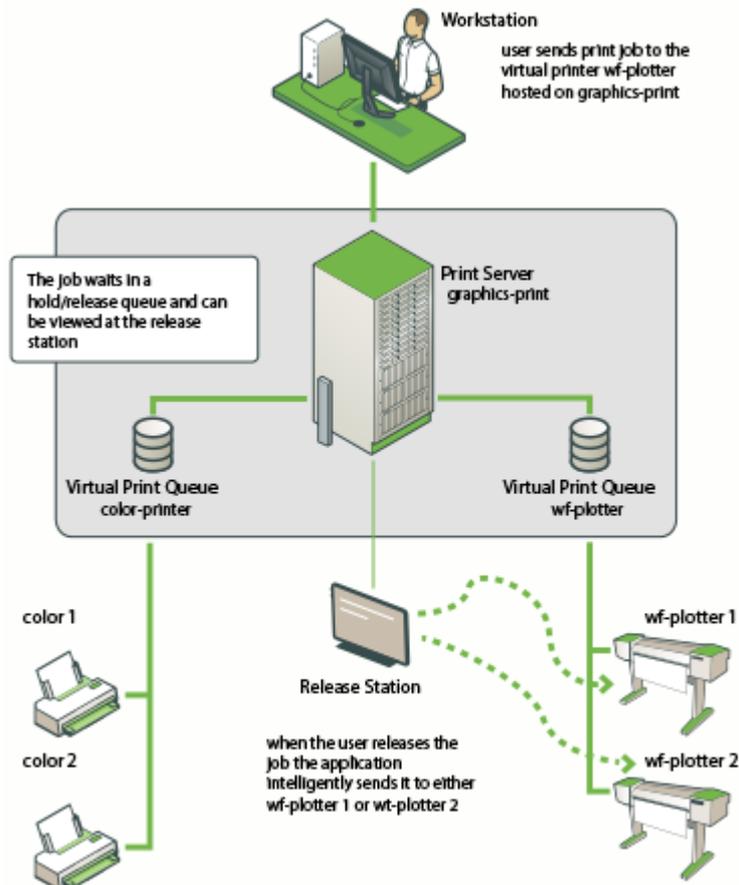


Figure 12.2 - Multiple Virtual Queues (Large Company)

## Figure 42: Multiple Virtual Queues (Graphics Department)

### Example 3: Multiple Location Specific Virtual Queues (Large Company)

#### Scenario

Acme Inc. is a large organization with hundreds of printers located throughout. They maintain a common printer fleet of grayscale devices and a smaller but matching fleet of color devices.

The existing grayscale devices use a naming scheme such as `site1-server\B02_F12_G04`, where B02 represents "building 2", F12 represents "floor 12", G04 meaning it is the fourth grayscale printer on that floor. Color devices use the same naming scheme except the G is replaced with a C.

Each floor of each building has a print room with several grayscale devices and two color devices. The organization also has multiple offices located and separate physical sites. Each sites hosts their local print queues on their own local print server, however, all sites exist in a single WAN and shared domain.

Through trial testing, the IT administrators have confirmed that the Postscript drivers supplied with the color devices also work with the lower cost grayscale-only version of the printers. This means that one common driver will work across the full fleet.

The main goals of the project are:

- Simplify the printing process for users, so that they do not need to decipher the naming scheme to work out their closest available printer.
- Implement a system/procedure common across all sites.
- Reduce wasted printing by ensuring the user is physically present in the print room to pick up their job when it prints.
- Ensuring high uptime by minimizing single points of failure.

## Implementation

This implementation differs from the previous implementation in that there is a large number of printers and users spread across multiple physical sites. Although it would be possible to implement one global virtual "Find-Me Queue", there are some benefits in implementing multiple virtual queues - one per site:

- Minimize network traffic - jobs should only spool on queues on the local server where possible.
- No single-point-of-failure - if an issue occurs on the single "find me queue", it would affect printing on all sites.

Implementing multiple virtual queues offers considerable benefits. Consider one queue per site, or maybe even one queue per floor/department on larger sites as the benefits outweigh the small additional overhead in administration/setup.

The first step is to create the new print queues that will become the virtual queues. The administrator installs a separate queue for each site called "find-me-queue" on each of the site's servers. This queue is set up using the common Postscript driver that was confirmed to work with all models in the printer fleet.

The administrator ensures that all print queues have registered themselves with PaperCut MF by checking the **Printers** tab of the administration interface. For more information about adding printers, see [Adding and Removing/Deleting/Ignoring Printers](#).

After creation of the new queues the administrator performs the following on each new virtual queue. (`site1` example).

1. Navigates to **Printers > site1-server/find-me-queue > Summary** in the PaperCut MF administration interface.
2. Changes the **Queue type** option to **This is a virtual queue (jobs will be forwarded to a different queue)**. This reveals the **Job Redirection Settings** section.
3. The option **Jobs may be forwarded to these queues:** determines which queues are

compatible. Because this virtual queue is capable of forwarding to all printers in the organization the **Select all printers** is clicked.

4. Enables the option **Enable hold/release queue** and sets **Release mode** to **User release** (the default). This ensures that jobs are held in the virtual queue and not automatically forwarded to one of the targets.
5. Clicks **OK**.
6. Repeats steps 2 through 5 for all other `find-me-queue`'s on each Site Server.

The next step is to configure a Release Station for each floor's print room:

1. The administrator first configures a Release Station as per [Release Station Configuration](#). The Release Station is configured in *Secure* mode so that staff can only see and release the jobs they have personally printed.
2. Configure the Release Station to release jobs to the printers it is associated with by setting the `releases-on` option in the Release Station config file. The administrator sets the option to the full name of the printer(s) in each print room:

```
releases-on=site1-server\\B02_F1_G01,\  
site1-server\\B02_F1_G02,site1-server\\B02_F1_C01
```

Configure all workstations to use the local `find-me-queue` on each site by default.

Now when a staff member prints to either virtual queue, their job is held. The staff member can visit the Release Station and see their job. When the staff member releases their job, it is sent to any of the available and compatible devices in the floor's print room. This setup is illustrated in the image below (Multiple Location Specific Virtual Queues (Large Company)).

*Advanced:* PaperCut MF can also support redirection between print queues in different servers. In this example, it might occur when a laptop user that roams between sites prints. Their laptop might be configured to print to the virtual queue on `site1`, but they have release their job on a printer hosted on the server in `site2`. Directing between different servers is supported, however, some additional configuration might be required. For more information, see [Cross-Server Job Redirection](#).

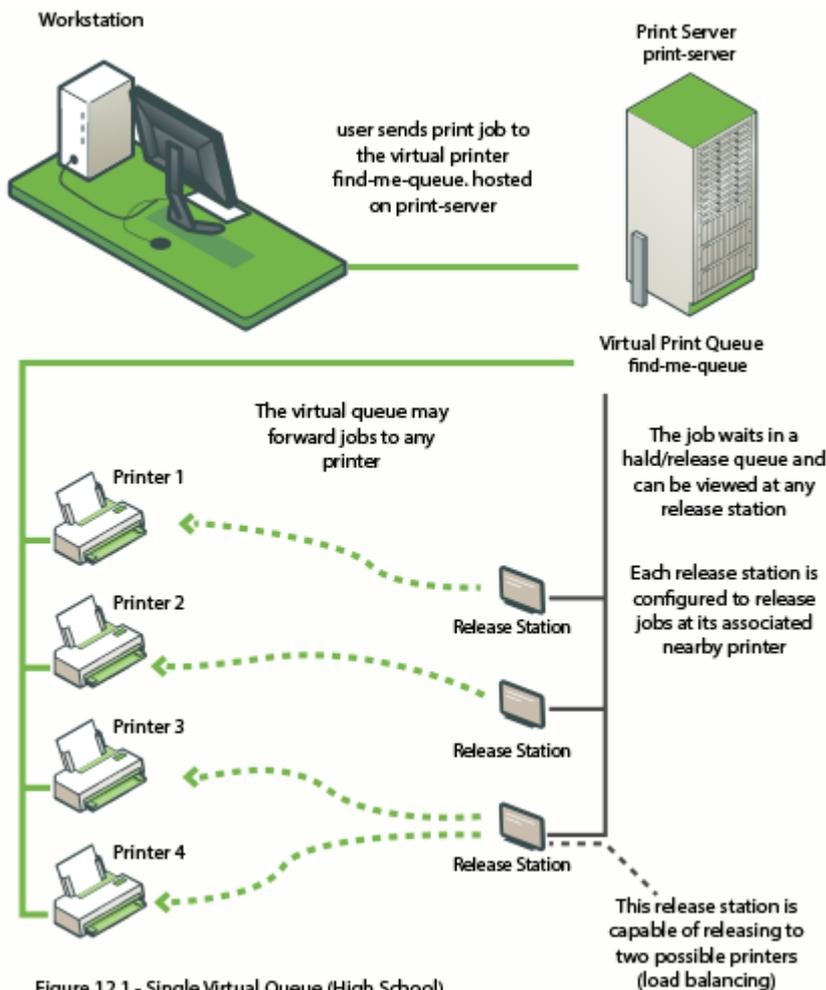


Figure 12.1 - Single Virtual Queue (High School)

Figure 43: Multiple Location Specific Virtual Queues (Large Company)

### 4.7.1.2. Find-Me Printing and Web-Based Release

The *Find-Me* printing examples covered above involve setting up a Release Station so that users can release jobs to the printers at their current location. The web based release interfaces are also supported (via the user web tools, admin interface or full screen web based release interface), although due to the lack of location information the user is asked to select the destination printer.

When a user releases a job held in a virtual queue using one of the web based release interfaces they are presented with a list of target printers and their locations, as shown in the image below.

## Jobs Pending Release

This job may be printed at one of several possible printers. Please select a printer from the list below.

Printer	Location	Status
<a href="#">windowserver/Library_MFP</a>	Building A	 OK
<a href="#">linuxserver/Office_Printer</a>	Main Office	 OK

When using web based release interfaces in conjunction with Find-Me Printing you should populate the **Location** field on printers for the convenience of users.

### 4.7.1.3. Automatic detection of a virtual queue

You can configure PaperCut MF to automatically create a virtual queue for any printer that has a specified keyword in its name (default is **virtual**). You can change the default keyword to anything you want, or alternatively, you can turn off this feature.

Specifying a keyword has the same effect as setting **Queue Type** in the **Configuration** area on the **Printers > Printer Details > Summary** page to **This is a virtual queue (jobs will be forwarded to a different queue)**. You do however, still need to select the printers to which print jobs can be redirected in the **Job Redirection Settings** area.

#### Change the keyword used to automatically detect a virtual queue

1. In Application Server, click **Options**.
2. In the **Actions** menu, click **Config editor (advanced)**.

The screenshot shows the PaperCut MF web interface. The top navigation bar includes 'Dashboard', 'Users', 'Groups', 'Accounts', 'Printers', 'Devices', 'Reports', 'Cards', 'Options', 'Logs', and 'About'. The 'Options' menu is expanded, showing 'Location > Options > General'. The 'General' configuration page is active, with sub-tabs for 'General', 'Mobile & BYOD', 'Notifications', 'User/Group Sync', 'Admin Rights', 'Backups', and 'Advanced'. On the left, the 'Actions' menu has 'Config editor (advanced)' highlighted with a red box. The main content area is divided into 'User Features' and 'Initial page displayed after successful login'. The 'Initial page displayed after successful login' section has a dropdown menu set to 'User Summary (default)' and several checked options: 'Show environmental impact information', 'Allow users to see rates / costs', 'Allow users to view balance information (i.e. balance graph, transaction history)', 'Allow users to transfer funds to other users', 'Enable use of TopUp/PrePaid Cards', 'Allow users to view held jobs (hold/release queues) via end-user interface', 'Enable the 'Release All' and 'Cancel All' buttons', 'Allow users to view/release held jobs via Mobile Print Release', and 'Allow users to view shared accounts balances'. There are also unchecked options for 'Only allow users in this group to transfer funds:', 'Only allow users in this group to view held jobs:', and 'Allow users to change their card/ID number'. A dropdown menu for 'Users have permission to:' is set to 'release their own jobs'.

3. In **Quick find**, enter keyword; then click **Go**.

The **virtual-queue.naming.keyword** configuration key is displayed.

The screenshot shows the PaperCut MF web interface with the 'Config Editor' page active. The top navigation bar is the same as in the previous screenshot. The 'Options' menu is expanded to 'Config Editor'. A yellow warning box at the top states: 'If you use the Config Editor incorrectly, you may cause serious problems which can only be fixed by reinstallation of the application. Use the Config Editor at your own risk.' Below the warning, the 'Quick find' search bar contains the text 'keyword' and is highlighted with a red box. To the right of the search bar are 'Go' and 'Clear' buttons. Below the search bar is a table with two columns: 'Name' and 'Value'. The table contains one entry: 'virtual-queue.naming.keyword' with the value 'virtual'. The 'virtual' value is highlighted with a red box. To the right of the value are 'Update' and 'Remove' buttons. Below the table, there is an 'Add new:' section with 'Name:' and 'Value:' input fields and an 'Add' button.

4. In **Value**, type the keyword you want to use.
5. Click **Update**.

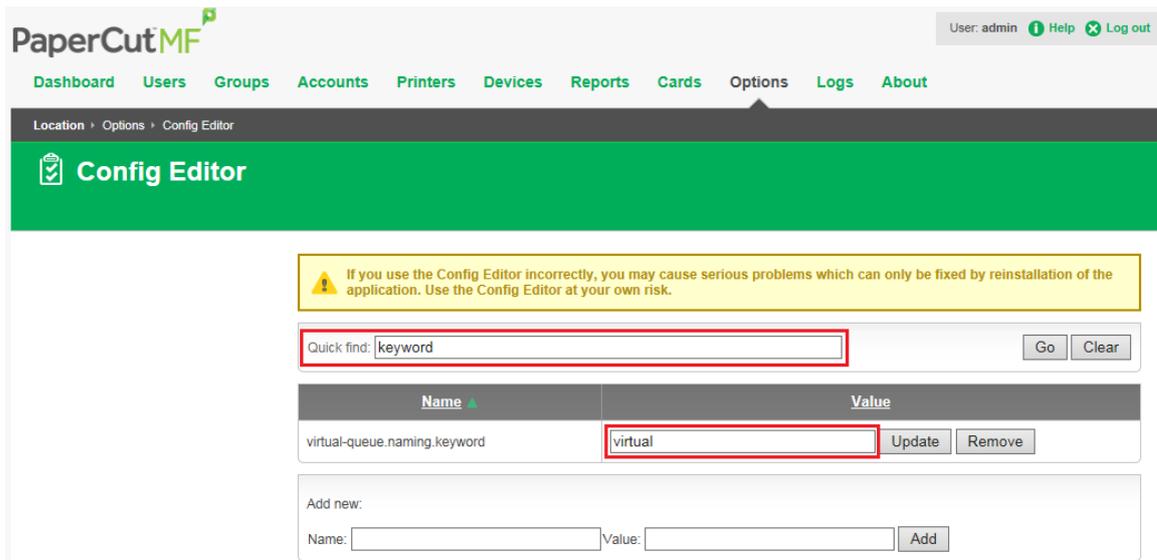
## Turn off virtual queue auto-detection

1. In Application Server, click **Options**.
2. In the **Actions** menu, click **Config editor (advanced)**.

The screenshot shows the PaperCut MF web interface. At the top, there is a navigation bar with the following items: Dashboard, Users, Groups, Accounts, Printers, Devices, Reports, Cards, Options, Logs, and About. The 'Options' menu is currently selected. Below the navigation bar, there is a breadcrumb trail: Location > Options > General. The main content area is titled 'General' and has several sub-tabs: General, Mobile & BYOD, Notifications, User/Group Sync, Admin Rights, Backups, and Advanced. The 'Actions' menu is open, showing the following options: Mobile & BYOD, Printing notifications, Synchronize users, Assign admin access, Backup database, and Config editor (advanced). The 'Config editor (advanced)' option is highlighted with a red box. The 'User Features' section is visible, with the following options: Show environmental impact information, Allow users to see rates / costs, Allow users to view balance information (i.e. balance graph, transaction history), Allow users to transfer funds to other users, Only allow users in this group to transfer funds, Allow users to add comments to manual transfers, Enable use of TopUp/PrePaid Cards, Allow users to view held jobs (hold/release queues) via end-user interface, Only allow users in this group to view held jobs, Users have permission to: release their own jobs, Enable the 'Release All' and 'Cancel All' buttons, Allow users to view/release held jobs via Mobile Print Release, Allow users to view shared accounts balances, and Allow users to change their card/ID number.

3. In **Quick find**, enter keyword; then click **Go**.

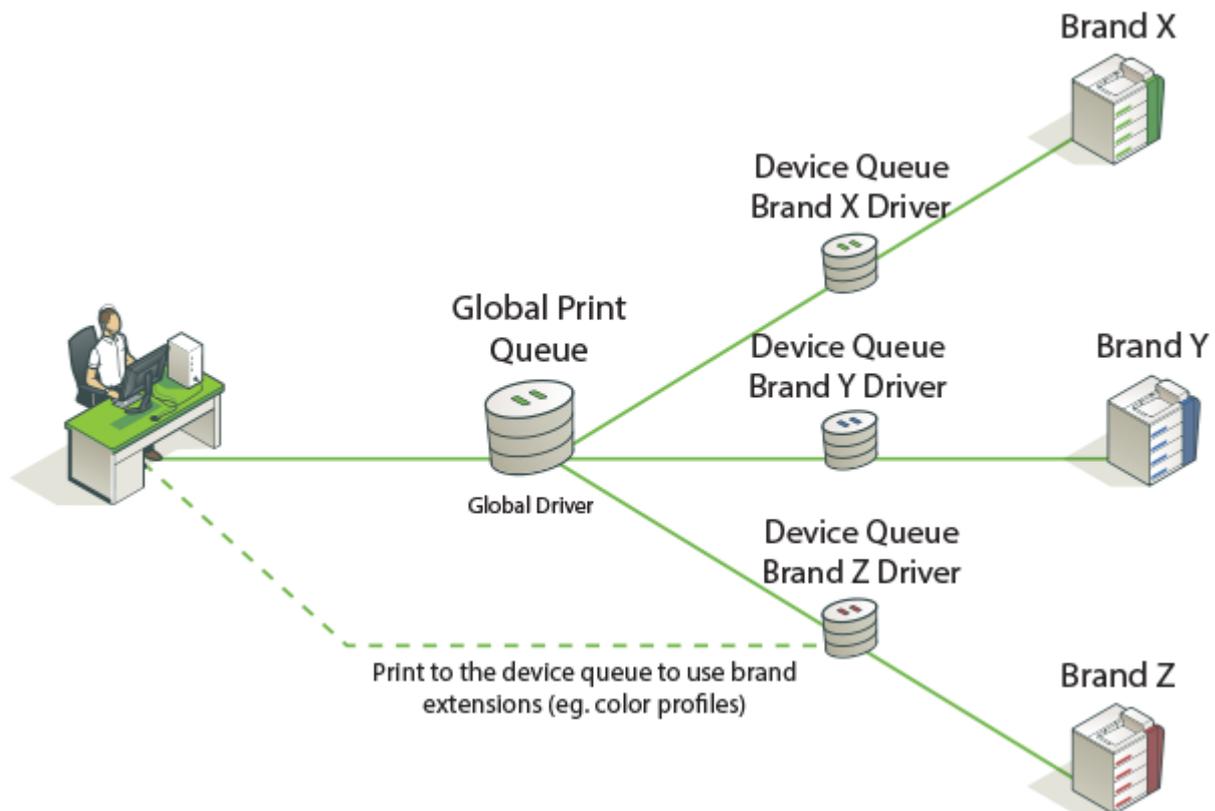
The **virtual-queue.naming.keyword** configuration key is displayed.



4. Click **Remove**.

### 4.7.2. Global Print Driver

A global find-me print queue, combined with secure print release, provides convenience to end-users. On the flip side it poses a number of technical challenges for the System Administrator. One challenge is print driver selection in a mixed brand environment.



A single global queue means one print driver, whose output must be compatible with N possible target printers. Finding a suitable driver is often a difficult trial and error exercise. The available solutions are:

## The PaperCut Global Print Driver

If your organization has a mix of printer brands, the PaperCut Global Print Driver is the most straightforward solution.

- A brand independent maximum compatibility signed print driver.
- Designed to work on the widest possible range of printers out of the box.
- Supports all main print features (duplex, color, paper size and tray selection).

## Predominant Brand/Vendor Driver

If your organization has one predominant printer brand, it might be appropriate to use this brand's driver for the global queue, and use PaperCut's [adaptive transforms](#) to enable compatibility on other brands.

### 4.7.2.1. About the PaperCut Global Print Driver

The PaperCut Global Print Driver should not be confused with "universal drivers" offered by leading printer manufacturers. Manufacturer universal drivers are designed to work with multiple models across a single brand. PaperCut's Global Print Driver works across **both** multiple models and multiple brands.

## Windows:

The PaperCut Global Print Driver is a brand neutral, maximum compatibility PostScript driver developed by PaperCut for Microsoft Windows. As a signed driver, it can be deployed and installed like any standard Windows print driver. You can find the driver at:

```
[install-path]/providers/print/drivers/global/win/
```

## Mac and Linux:

At this time PaperCut is not supplying a Global Print Driver for Mac and Linux, and instead recommends the use of the "Generic PostScript Driver" included within these platforms. PaperCut's server software is designed to use the output of the generic driver and complement it with adaptive transforms, to give maximum compatibility with a wide range of popular printer brands.

## How it works

The PaperCut Global Print Driver is a standards compliant PostScript driver developed to produce PostScript output that is as widely compatible as possible. If vendor specific extensions are required to achieve functionality, the PaperCut server software works transparently in conjunction with the driver to apply these extensions to each job. This is done in the background using in-built Print Description Language (PDL) transforms.

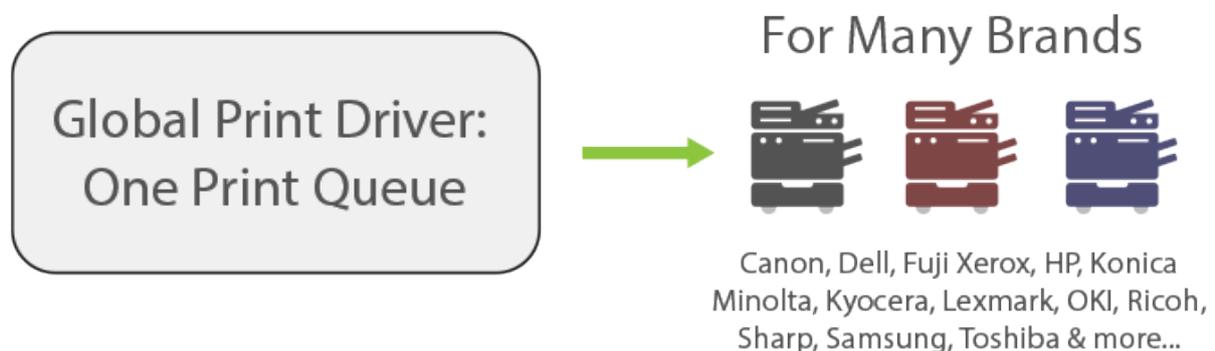
## Benefits

- Easy to deploy
- Consistent user experience across brands
- Familiar Windows print dialog design

## Tradeoffs

- Devices connected to the global queue must support PostScript (other languages are in development)
- Advanced vendor specific extensions (e.g. color profiles) are not available via the Global Queue
- The broad set of capabilities available to the Global Print Driver might not be available on the destination printer.

For example, an A3 or Tabloid job can be sent to a device that prints only A4 or Letter. Depending on the target printer, the job can be scaled to A4 or Letter, cropped to size, or rejected by the device entirely.



### 4.7.2.2. Installation & Setup

Setting up Find-Me printing with the PaperCut Global Print Driver on Windows is done as follows:

- Step 1: Set up each device queue using the manufacturer's standard driver (important).
- Step 2: Set up the [Find-Me Printing](#) using the PaperCut Global Print Driver.
- Step 3: Configure [Secure Print Release](#) and [Find-Me Printing](#)
- Step 4: Test the Global Print Driver with your printers, following the guidelines in [Compatibility Testing](#).

**Important:**

- Make sure the **Enable Advanced Printing Features** option is **disabled** in the virtual queue's properties dialog.
- The PaperCut Global Print Driver should **not** be used on the individual device queues. It should only be used on the global virtual queue(s). It is important that the manufacturer's own driver is installed on the device's direct print queue. The reason for this is that PaperCut uses the manufacturer's driver to identify the device and determine the type of output required.

## User Education

The Global Print Driver should satisfy the vast majority of end users' standard printing requirements. Should a user require device-specific functionality, such as, color profile settings, they can achieve this by printing to the direct device queue, which is set up with the vendor's driver (see Step 1 above).

Best practise is to set up the Global Virtual Queue as the desktop default printer.

### 4.7.2.3. Using Vendor Driver and Adaptive PDL Transforms

An alternative to using the PaperCut Global Printer Driver is to use a Vendor/Manufacturer driver and adapt its output if required. This setup might be preferred if there is a single dominant vendor on the site and there are reasons to use the vendor's own driver. In some cases, vendor specific output does not work on another brand, such as differing tray names. You can use PaperCut adaptive PDL Transforms to solve this problem.

This is an advanced subject. Unlike the PaperCut Global Print Driver, you need to configure vendor specific transforms on a site-by-site basis. Transforms are defined using a transform script. For more information, see [PDL Transform Language](#). Professional services are available via Authorized Solution Centers and certified resellers.

## Supported transform environments

PDL transforms on remote target printers are only supported on Windows. In addition, transforms are only applied when the virtual queue and the target printer are set up on the same operating system type e.g. Windows to Windows, Mac to Mac.

**Table 44: Supported transform environments**

Source Print Server	Destination Print Server	Global Virtual Queue Location
Windows	Windows	Local and Remote
Linux	Linux	Local only
Mac	Mac	Local only

### 4.7.3. Requirements For Job Redirection (Load Balancing or Find-Me Printing)

When redirecting a job from one queue to another, the job is rendered by the source queue's driver, and printed by the destination queue's printer. It is therefore vital that the destination printer is compatible with the source driver.

To be compatible, the source (or *virtual*) print queue and the destination print queue must at least use drivers that produce the same print language (e.g. PostScript to PostScript or PCL5 to PCL5). However, due to the differences in the way each manufacturer uses a print language, and even differences between models from the same manufacturer, compatibility can be limited to printers of the same or similar models.

The ideal setup for job redirection is when all target printers are of the same model. If this is not the case, yselect a driver for the virtual queue that gives the best result across your fleet of destination printers.

A great way to achieve compatibility with a wide range of PostScript printers on Windows is to use PaperCut's [Global Print Driver](#) on the virtual (source) print queue.

If instead you want to use a manufacturer driver for the virtual (source) print queue, pick a simple *lowest common denominator* driver and test it for compatibility with each one of your printers. On the Mac the "Generic Postscript Driver" is a good choice. On Windows select a Color Postscript driver for a mid range popular model. Always carefully test driver compatibility before implementing Find-Me Printing. Take care to address corner cases such as advanced graphics options, grayscale mode, paper sizes, duplexing, tray selection, etc. If a common driver cannot be found, you might need to implement multiple virtual queues as discussed in Example 2 above. The following sections provide a simple procedure that you can follow to test printer compatibility.



**Tip:** You might be able to solve compatibility problems with manufacturer drivers using adaptive PDL transforms. See [Using Vendor Driver and Adaptive PDL Transforms](#).

### 4.7.3.1. Compatibility Testing

1. Select your candidate driver to use for your global virtual queue. Use it to set up a print queue on the server, and share the queue.
2. Select the new printer in PaperCut MF and change it a virtual queue.
3. In the list of compatible queues, select the printers for which you want to test compatibility.
4. In the **Hold/Release Queue Settings** area, select the **Enable hold/release queue** check box.
5. Print a test document (e.g. print an email) to the virtual queue from a computer. The job should hold in the virtual queue.
6. On the **Jobs Pending Release** tab under the **Printers** section, release the held job. Select a target queue to test when prompted.
7. Verify that the job printed correctly. Also check the App. Log sections for any error reports.
8. Repeat the previous 3 steps for all printer types and using different document settings and applications.

Make sure you test a variety of print options targeted at all device types. Problems can manifest in various and subtle ways:

- Error events logged in PaperCut MF's **App Log**.
- Error status on the printer (e.g. a red light and failed print status message).

Or more subtle issues such as:

- Truncated documents because of different device margin sizes (printable area).
- Errors only when non-default options are selected (e.g. finishing options).
- Issues only on very large documents (due to printer memory limitations).
- Errors/problems when certain paper sizes are selected.

If issues/problems/errors occur:

1. Try disabling the **Enable Advanced Printing Features** option in Windows on the virtual queue on the server. This is accessed by right-clicking the printer, selecting **Properties**, then the **Advanced** tab. This change can improve redirection results with some drivers and is required if using the PaperCut Global Print Driver.
2. If you continue to experience compatibility issues, consider setting up multiple virtual queues (for each printer type/class) as discussed in [Example 2: Multiple Virtual Queues \(Different Printer Types\)](#).

### 4.7.3.2. Find-Me Printing Implementation Checklist

Setting up *Find-Me Printing* involves several configuration steps that you must complete before the setup will work. Following is a checklist that you can use to ensure that the main requirements have been carried out. It can also serve as a troubleshooting guide in case of unexpected results.

1. Create a new print queue to function as the virtual queue. Create this print queue using the standard methods or tools provided by the host operating system.
2. Conform that the driver in use by the virtual queue is compatible with the target printers. The output produced by this driver is what is sent to the printer, so it must be compatible.
3. Configure the following settings in the PaperCut MF administration interface for the virtual print queue:
  - a. **Queue type**—set to **This is a virtual queue (jobs will be forwarded to a different queue)**.
  - b. **Jobs may be forwarded to these queues**—configure to reflect the possible or compatible targets for redirection.
  - c. Enable the **Enable hold/release queue** check box.
4. When using Find-Me Printing, Release Stations are recommended because they can automatically select the best nearby printer (based on a match between the virtual queue's configured compatible queues, the Release Station's configured "releases on" queues and current printer load). If the web based release interface is used instead, the user must select the desired printer from the list of all compatible queues.
5. Configure the `releases-on` option in the Release Station configuration file to reflect where jobs released at this station can be sent. PaperCut MF compares this list with the **Jobs may be forwarded to these queues** setting of the virtual queue to find possible target queues. Take care to ensure the name is spelt exactly the same as listed in the printer list.
6. The `show-jobs-from-queues` option in the Release Station configuration file can optionally be configured to limit the jobs shown in the Release Station to one or more queues. This is useful for situations with multiple virtual queues and Release Stations running in *Release Any* mode.
7. If there are multiple print servers and the ability to redirect jobs across print servers is required, ensure that the requirements in [Cross-Server Job Redirection](#) are met.

## 4.7.4. Advanced Configuration

### 4.7.4.1. Overriding cost and filter settings

The default (and recommended) setup is to have the filter and cost settings applied to the virtual queue, For example, the global "find-me-queue" as explained in the examples. This ensures that

you have a common cost and access policy across all printers associated with that queue - a model that your end-users can easily understand. There might, however, be some special cases where you want to apply cost and filter settings based on the target queue/printer selected instead :

- A printer might have less memory than others and jam/error on large jobs. Implementing a page or job size filter at the target queue level can help prevent problems.
- A printer might not support the full range of paper sizes and can jam if an incorrect paper size is selected.

The settings are overridden by the option **Cost and filter settings are overridden by the target queue**. Use this option with care and careful consideration.



**Important:** If used incorrectly, the **Cost and filter settings are overridden by the target queue** option can be very confusing to end-users. For example, the cost that is displayed in the Release Station and/or client popup is as calculated by the virtual queue settings. If, after the job is redirected, the cost changes, the user might become confused. As a general rule, don't override the cost, or if it must be overridden, communicate this situation to your users beforehand.

#### 4.7.4.2. Mixed Color and Grayscale Printers

When the organization has a mix of grayscale and color printers it is important to configure Find-Me Printing carefully. Often the simplest approach is to configure 2 virtual queues: one configured as a color queue and the other as a grayscale queue. This makes it simpler for users to understand where to print and what they'll be charged if they need color or grayscale printing. Configure the queues as follows:

- Grayscale virtual queue - configured to default to grayscale printing, the color mode detection set to **This is a grayscale printer**, and can release on all printers (including color printers).
- Color virtual queue - configured to default to color printing, and can only release to color printers.

Using a single virtual queue is also a valid option. There are no technical problems with this approach, however, it is a little more complicated for users to understand.



**Important:** If a physical printer is a grayscale printer then it is recommended that you set the color detection mode to **This is a grayscale printer** in PaperCut MF. This ensures the job is logged as grayscale, and the user is charged correctly (i.e. not charged for color). This also applies if there is a single virtual queue. If the job is released to a grayscale printer it is logged and charged as a grayscale job.

### 4.7.4.3. Cross-Server Job Redirection

PaperCut MF supports redirecting print jobs across print servers, but due to technical limitations the print servers must be running the same operating system (e.g. Windows to Windows, Mac to Mac, etc.).

## Cross-Server Job Redirection On Windows

To enable redirection of print jobs from one Windows print server to another some additional configuration is required. This section covers the steps necessary to set it up.

The `PaperCut Print Provider` service is the Windows service responsible for interaction with print queues. For security reasons this service, as for most other Windows services, runs as the `SYSTEM` account. This account does not have the privileges required to access another system and place a print job in one of its queues. Therefore to enable this functionality the privileges of the `PaperCut Print Provider` service must be escalated.

The recommended way to escalate the privileges of the `PaperCut Print Provider` service to the required level is as follows. First a service account is created with permission to create new print jobs:

1. Create a new domain user called `papercut_service` (or something suitably descriptive). This account has permission to print on both/all print servers.

If there are multiple domains involved it might be easier to create local users on each print server that all have the *same username and password*.

2. Ensure that the **Password never expires** option is enabled.
3. Grant this user *local* administrator rights on the print server where it is installed. This gives the `papercut_service` the same privileges as the Windows `SYSTEM` account.
4. Ensure this user has the rights to print on all remote printers.

Next the `PaperCut Print Provider` service on each print server is configured to run as the new service account (changed from default `SYSTEM` to `papercut_service`):

1. Open the Windows **Services** list.
2. Stop the service **PaperCut Print Provider**.
3. Right-click the **PaperCut Print Provider** service and select > Properties.
4. Select the **Log On** tab.
5. Select the option **This account**.
6. Enter the username and password of the newly created service account.

7. Click **OK**.
8. Start the **PaperCut Print Provider** service.

Now PaperCut MF has the ability to redirect jobs to the remote print queues to which it has access. Test by setting up a simple job redirection scenario, such as that described in [Example 1: Simple Load Balancing](#).

## 4.7.5. Printer Load Balancing

Printer load balancing means distributing the printing load between two or more printers. While this can be implemented quite effectively by relying on users to pick a printer that is free, thereby distributing the load, the term generally refers to automatically managed load balancing.

You can implement load balancing in PaperCut MF as part of *Find-Me Printing* as discussed in the preceding section, or separately without the need for Release Stations in a direct printing environment. This section discusses load balancing in general including how it works, as well as how to set it up in a direct printing environment (without Release Stations).

You can implement load balancing at several different layers (none of which are usually mutually exclusive), including:

- **the hardware/network layer**, otherwise known as clustering (see [Clustering and High Availability](#)).
- **the operating system layer**, known as printer pooling in Windows and Novell environments, and CUPS classes in Mac and Linux.
- **within PaperCut MF itself**, which is the topic of this section.

PaperCut MF adds value to the load balancing available in clusters and operating systems by ensuring equal load between printers. For comparison the primary objective of Windows printer pools is to provide fault tolerance while load balancing is secondary and to a large extent non-existent. Printer pooling on Windows often picks the first available printer in a predefined order. The result is that wear and tear of printers is not even; the first printer in the group has the heaviest usage and the others might be mostly idle. System Administrators often mitigate this by rotating printers periodically. With load balancing in PaperCut MF none of this is necessary: jobs are distributed evenly between queues based on intelligent algorithms taking into account several factors:

- An estimate of the current print load (i.e. pages remaining to print) by inspecting past print history. The estimate is done by using a Pages Per Minute (PPM) for an average printer, however, PaperCut MF improves on the PPM value by "watching" the printer and learning over time.
- The printer that is likely to get the job done quickest is selected.
- If all printers are currently equal (e.g. all idle), then a random printer is selected. This ensures

that over time, load is distributed evenly.

- Printers currently in an error condition are avoided if possible.
- (Optionally) Printers a user has recently printed to.

*Find-Me Printing* also makes use of printer load balancing while giving users the option of where to send their print job. For more information about Find-Me Printing see [Find-Me Printing](#).

Implementing load balancing in PaperCut MF is best described by way of example. The following section covers a common scenario for implementing printer load balancing.

### 4.7.5.1. Example 1: Simple Load Balancing

#### Scenario

The science department at East Beach High School has a computer lab with a high volume of printing. Students send their print jobs to the nearby print lab, which hosts two high volume laser printers of the same model.

The current print queues are named `sci_laser_1` and `sci_laser_2`, and are hosted on the print server called `science-lab`. Both queues use the same printer driver and settings.

In this scenario there is some natural form of load balancing, as students can select a queue at random or perhaps know which queue is available. Ideally this load balancing would be automatic, and students do not need to worry about which queue to select.

#### Implementation

The first step is to create a new print queue on the print server. This queue will be a *virtual queue*. Students will print to this virtual queue, and PaperCut MF handles the load balancing to the target ("real") queues.

A new queue called `sci_laser` is created by the administrator on the `science_lab` print server using the normal methods for the operating system in use. The queue is created using the same driver that `sci_laser_1` and `sci_laser_2` use. The queue points to the same physical printer that `sci_laser_1` points to. This last point is not strictly necessary but some printer drivers complain if they do not point to a real printer.

The administrator ensures that the print queue has registered itself with PaperCut MF by checking the **Printers** tab of the administration interface. For more information about adding printers, see [Adding and Removing/Deleting/Ignoring Printers](#).

Following creation of the new queue the administrator performs the following:

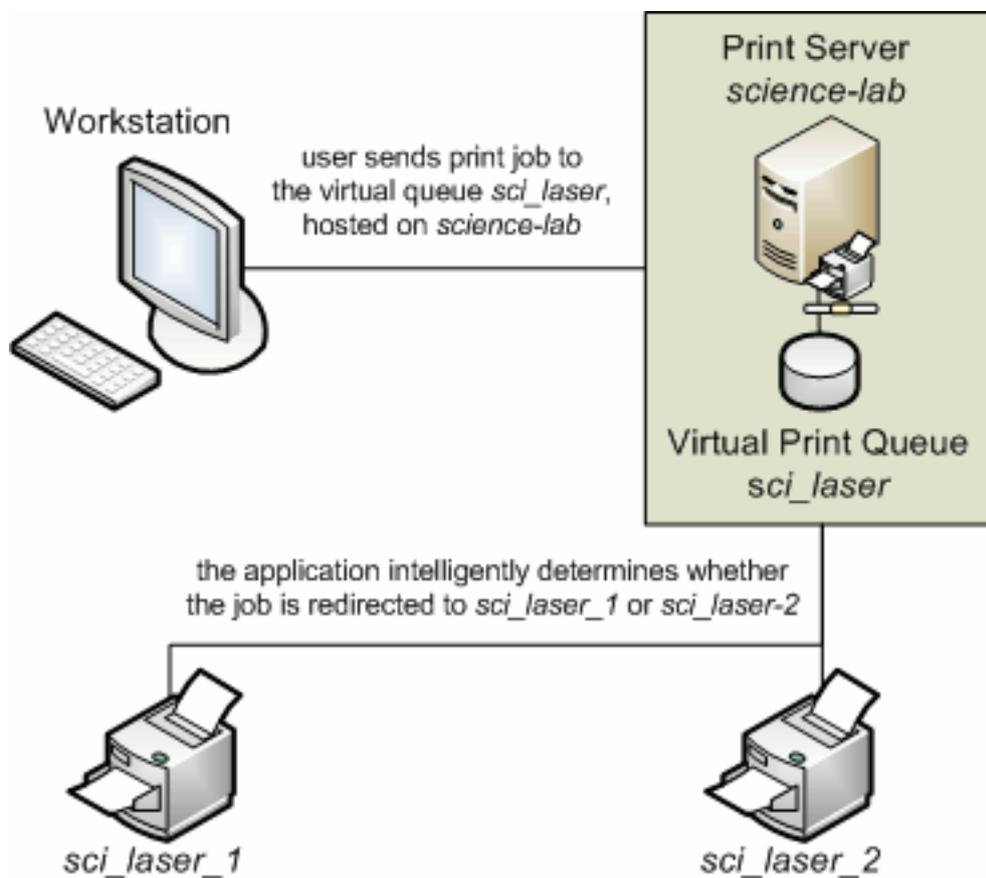
1. Navigates to **Printers > sci\_laser > Summary** in the PaperCut MF administration interface.
2. Changes the **Queue type** option to **This is a virtual queue (jobs will be forwarded to a**

**different queue**). This reveals the **Job Redirection Settings** section.

3. The option **Jobs may be forwarded to these queues**: determines which queues `sci_laser` is capable of redirecting to. The queues `science-lab/sci_laser_1` and `science-lab/sci_laser_2` are selected.
4. Clicks **OK**.

Now when students print from a lab computer to the virtual `sci_laser` queue PaperCut MF intelligently redirects the job to either `sci_laser_1` or `sci_laser_2`, as illustrated by the image below (Simple Load Balancing).

The administrator can now optionally un-share the `sci_laser_1` and `sci_laser_2` queues. Doing so ensures that all printing is via `sci_laser` and therefore, load balanced.



**Figure 45: Simple Load Balancing**

### 4.7.5.2. Bypassing Load Balancing For Recent Print Jobs

Students printing multiple documents might not want their print jobs distributed between multiple printers - especially when they're at opposite ends of the lab! PaperCut provides the capability to bypass Load Balancing for multiple recent print jobs.

By default, this feature is enabled and is set to a window of 20 seconds, that is, a print job is not considered for Load Balancing if a user has printed up to 20 seconds ago, and is sent to the previous job's destination instead.

To configure this setting, navigate to **Options > Config Editor (Advanced)** and modify the config setting `print.load-balancer.default.reuse-printer-window-seconds`.

Set this value to 0 to disable this feature.

## 4.7.6. Find-Me Printing and Printer Load Balancing FAQ

### Why do redirected jobs have document names starting with R:123456:?

This is a security feature. PaperCut MF marks redirected jobs with a special token in the document name to both distinguish between regular jobs and prevent circumvention by users.

---

### When jobs are redirected are they logged in PaperCut MF against the virtual queue or the target queues?

Jobs are logged against target queues. Virtual queues do not represent real printers so do not have printing associated with them. This is why the Job Log and Statistics pages are disabled when viewing a virtual queue.

---

## 4.8. Hold/release queues & Print Release Stations

In a standard network printing environment, when a user prints from an application, the job is sent directly to the printer and starts printing immediately. In some environments it might be advantageous to place the job in a holding state prior to printing. Some common examples include:

- *Secure Printing* - In a secure printing environment jobs are only printed when the user arrives at the print area and confirms his or her identity. This ensures the user is there to collect the job and other users can't "accidentally" collect the document.
- *Approved Printing* - In some organizations it might be appropriate to hold jobs until they are approved by selected individuals. A good example would be a teacher approving printing on an expensive color printer.
- *Authentication* - use hold/release queues as a form of authentication in an unauthenticated environment. Users must authenticate prior to releasing their jobs allowing PaperCut MF to confirm their identity.

PaperCut MF provides the framework and software interface to implement hold and release queues.

Users can interact with the *hold/release queues* (e.g. release their jobs) in a number of ways. This normally takes the form of a *Release Station* - a dedicated computer terminal located next to the printers, however, other interaction methods include access via a browser-based interface. Hold/release queues are used for a wide variety of purposes depending on the requirements of the organization. This section outlines a number of these scenarios, and also how to install and configure the release interface.

The simplest way to get started with hold/release queues is to read through the scenarios below (see [Hold/release usage scenarios](#)), and decide which best suits your needs. These scenarios outline the steps required to configure and manage a queue.



**Tip:** You can use the hold/release queues to implement a *Find-Me printing* environment. See [Find-Me Printing and Printer Load Balancing](#) for details.

## 4.8.1. Release Station Interfaces

PaperCut MF includes four different interfaces to manage hold/release queues. Three of these are variations of a web-based interface and one is a software version that is typically used for dedicated Release Stations. These interfaces are described below.

### 4.8.1.1. Standard Release Station

The standard Release Station is typically used on dedicated workstations located near-by the printers. It usually runs in a full-screen mode that cannot be exited. You can run the Release Station in a number of modes that changes its behavior depending on your needs. These modes are described in [Release Station Modes](#).

For more information regarding deployment of the Standard Release Station see the `[app-path]\release\README.txt` file. For information regarding configuration of the Standard Release Station see [Standard Release Station Configuration](#).

The Release Station scenarios below describe which mode to use for different situations.

Print Release Station							
Log out							Refresh
Time	User	Printer	Document	Machine	Pages	Cost	Action
17:01:56	chris	mac-server\Wide Format Prin...	Microsoft Outlook - Email	windows-workst...	300	\$30.00	<a href="#">Print</a> <a href="#">Cancel</a>
17:01:56	tom	linux-server\Very_very_very_...	Budget - LibreOffice Calc	mac-workstation	248	\$24.80	<a href="#">Print</a> <a href="#">Cancel</a>
17:01:56	tom	windows-server\Library Printer	Budget - LibreOffice Calc	windows-laptop	85	\$8.50	<a href="#">Print</a> <a href="#">Cancel</a>
17:01:56	claire	linux-server\Library Printer	Microsoft Outlook - Email	linux-workstation	54	\$3.25	<a href="#">Print</a> <a href="#">Cancel</a>
17:01:56	peter	linux-server\Library MFP	Untitled1 - LibreOffice Writer	mac-laptop	57	\$5.70	<a href="#">Print</a> <a href="#">Cancel</a>
17:01:56	steven	linux-server\Library Printer	research paper.pdf	linux-laptop	62	\$3.50	<a href="#">Print</a> <a href="#">Cancel</a>
17:01:55	harry	linux-server\Library MFP	http://slashdot.org/	mac-workstation	43	\$4.30	<a href="#">Print</a> <a href="#">Cancel</a>
17:01:55	bill	linux-server\Very_very_very_...	Email - Mozilla Firefox	linux-workstation	154	\$14.40	<a href="#">Print</a> <a href="#">Cancel</a>
17:01:55	kate	linux-server\Library MFP	Microsoft Outlook - Email	192.168.0.1	60	\$4.85	<a href="#">Print</a> <a href="#">Cancel</a>
17:01:55	ian	mac-server\Very_very_very_...	Microsoft Word - Document1	mac-laptop	31	\$2.10	<a href="#">Print</a> <a href="#">Cancel</a>

Print All

Cancel All



**Tip:** To educate users about printing using a Release Station, administrators might find the [Example 3: Printing using a Release Station](#) helpful.

### 4.8.1.2. Manager-mode web-based Release Station

The manager-mode web-based Release Station provides functionality equivalent to the standard Release Station running in "Manager mode". However, the web-based Release Station can be more convenient because you can run it from anywhere using a web browser. It allows release managers and PaperCut administrators to manage held jobs and release or cancel jobs printed by any user.

You can apply a filter to the jobs table. The default filter is the one that was last used by the user (except for the default admin user).

Access the web-based Release Station by visiting the following URL, and logging in as a user with `admin` or Release Station manager permissions.

```
http://[servername]:9191/release
```

where `[servername]` is the name of the PaperCut MF server. To make a user a hold/release queue manager see [Hold/release queue managers](#).

	Submit Time	Printer	User	Document	Client	Pages	Cost	Action
⊕	May 30, 2014 10:42:22 AM	linux-server/Laser Printer	kelly	Budget - LibreOffice Calc	mac-workstation	60	\$3.45	[print] [cancel] [override]
⊕	May 30, 2014 10:42:22 AM	linux-server/Laser Printer	sam	Microsoft Word - Document1	linux-laptop	38	\$1.00	[print] [cancel] [override]
⊕	May 30, 2014 10:42:22 AM	mac-server/Office Printer	jim	Microsoft Outlook - Email	mac-laptop	84	\$4.00	[print] [cancel] [override]
⊕	May 30, 2014 10:42:22 AM	windows-server/Library MFP	lucy	Microsoft Word - Document1	linux-laptop	78	\$7.00	[print] [cancel] [override]



**Tip:** Want to know more about the Override action? See [Override/Change Account Selection during Admin Web Release](#).

### 4.8.1.3. Web-based Release Station within the admin pages

When logged into the admin pages, an administrator can view all jobs held by Release Stations by:

- Navigating to the **Printers** section.
- Selecting the **Jobs pending release** tab.

This interface is identical to the full-screen web-based Release Station, but can be more convenient for users already logged into the administration pages.

**Jobs Pending Release**

Printer List | **Jobs Pending Release** | Notification Options | Print Log | Charts

Release All | Cancel All | Refresh Now |  Auto refresh (Refresh in: 48)

▼ Show Filter

<< < 1 2 3 > >>

	Submit Time ▼	Printer	User	Document	Client	Pages	Cost	Action
⊕	Mar 28, 2006 4:04:16 PM	linuxserver/Office MFP	chris	Microsoft PowerPoint - Presentation	192.168.0.200	55	\$2.75	[print] [cancel]
⊕	Mar 28, 2006 4:04:16 PM	tom/Library Printer	james	http://www.slashdot.org/	laptop	225	\$11.25	[print] [cancel]
⊕	Mar 28, 2006 4:04:16 PM	linuxserver/Library MFP	chris	my file.PDF	WinXP	200	\$10.00	[print] [cancel]

#### 4.8.1.4. End-user web-based Release Station

When end-users are logged into the user web interface, they can view their print jobs that are currently held pending release. The administrator can decide whether this interface is visible to end users, and which type of jobs a user can release. For more information, see [End-User Web Based Release Interface Configuration](#).

**Jobs Pending Release**

3 jobs pending release with cost \$0.35  Auto refresh (42) [Refresh Now](#)

Your balance: \$10.45

Release All | Cancel All

	Submit Time ▼	Printer	Document	Client	Pages	Cost	Action
⊕	Apr 21, 2015 2:29:00 PM	testing-win7-x3(Print Kiosk MFP)	Monthly Budget	TESTING-WIN7-X3	1	\$0.05	[print] [cancel]
⊕	Apr 21, 2015 2:28:41 PM	testing-win7-x3/Library MFP	Microsoft Word - History Assign	TESTING-WIN7-X3	3	\$0.00	[print] [cancel]
⊕	Apr 21, 2015 2:28:17 PM	testing-win7-x3/Library Printer	Microsoft Word - assignment-sci	TESTING-WIN7-X3	3	\$0.30	[print] [cancel]

#### 4.8.1.5. Mobile Print Release

This print release interface allows end-users to release their own jobs via their mobile device. This allows administrators to provide secure print release without the need for dedicated hardware. For more information, see [Mobile Print Release - Releasing print jobs on your mobile](#) chapter.

## 4.8.2. Hold/release usage scenarios

This section describes various usage scenarios discussing why and how to use a hold/release queue. They provide a good starting point for your own implementations.

### 4.8.2.1. Saving paper and toner

A large source of wasted paper in organizations are documents that were never collected from the printer. Some of these uncollected documents are caused by accidental printing, and others were just forgotten. But the majority of these documents end up in the bin.

If the document is not printed until a user walks to the printer to collect it, then this source of waste can be mostly eliminated.

To implement a Release Station to save paper:

- Set up a low-end workstation near the printer(s).
- Run the Standard Release Station in the default mode (Release Any mode). For more information, see [Release Station Modes](#).
- In PaperCut MF, enable the printer(s) for Release Station use. For more information, see [Enabling hold/release support on a printer](#).
- To allow users to release jobs via the end-user web based Release Station, also enable Release Any mode for the web tools interface. For more information, see [End-User Web Based Release Interface Configuration](#).

### 4.8.2.2. Secure Printing

When users print documents that contain sensitive information, it is important that no one else picks up the document from the printer. Even when the printers are close-by, people can accidentally leave sensitive documents on the printer. Use print Release Stations to implement Secure Printing, which ensures that a document can only be released by the person who printed it and only when that person is standing near the printers.

Secure printing is implemented as follows:

- Setup a low-end workstation near the printer(s).
- Run the Standard Release Station in "Secure" mode. For more information, see [Release Station Modes](#).
- In PaperCut MF, enable the printer(s) for Release Station use. For more information, see [Enabling hold/release support on a printer](#).
- [Mobile Print Release - Releasing print jobs on your mobile](#) for secure printing without dedicated hardware.

Secure printing requires users to be authenticated on the network when printing (i.e. an Active Directory domain). This allows the Release Station to enforce the secure printing so that users can only release documents they print.

### 4.8.2.3. Pay per print (e.g. Library or Internet Cafe)

Libraries and Internet cafes usually only allow printing once a user has paid for the cost of the printed document. Previously, implementing pay-per-print often involved deploying expensive card-based payment solutions, however, PaperCut MF Release Stations allow this to be implemented in a more cost effective way.

An example of how print Release Stations would be used in this scenario is:

1. Users print documents from a workstation without any assistance from staff.
2. The printed documents are held in the queue until released by a staff member.
3. The user goes to the staff desk and asks for the document to be released.
4. The staff member opens a Release Station (the program or a web page), finds the user's job, notes the cost and collects the payment from the user.
5. The staff member clicks **Print**, allowing the job to be printed.
6. The user then collects the printed document from the printer.

If the user does not pay for a print, then the print job is automatically deleted without any staff interaction.

To implement a pay-per-print hold/release queue:

- In PaperCut MF, enable the hold/release option on the printer(s). See [Enabling hold/release support on a printer](#).
- In PaperCut MF, setup the staff to be a "hold/release queue manager". This allows them to log in to the "manager mode" Release Stations. See [Hold/release queue managers](#).
- On the staff desk workstations, run the Release Station in "Manager mode". See [Release Station modes](#).
- There are two release interfaces:
  - [Standard Release Station](#) in "Manager mode" - requires minimal setup.
  - [Web-based release interface](#) - requires only a web browser.

### 4.8.2.4. Expensive Printers (Approved Printing)

At times it is necessary to restrict access to an expensive printer (like a color laser printer), or other printer that should only be used with an administrator's permission. Instead of locking the printer away where no one has access to it; you can configure the printer so that only administrators or hold/release managers can release print jobs. In this situation:

1. The user prints the document to the restricted printer.
2. The document is held in the queue awaiting approval by an authorized person.
3. The user talks to the administrator (or approved user) who would decide whether the user is allowed to perform the print.
4. The administrator logs into the web-based release interface from any machine on the network, and "Release" or "Cancel" the job as appropriate.

To implement admin/manager only release interface:

- In PaperCut MF, enable the hold/release mode on the printer(s), and select the "Admin/Manager only release" mode. See [Enabling hold/release support on a printer](#) for more info.
- You do not need to set up a dedicated Release Station near the printer, because the web-based release interface can be used from any machine on the network.
- It is also a good idea to put a notice on the printer that tells users how to have their documents released.

#### 4.8.2.5. Delegated Print Release

It is sometimes useful to allow a user to release jobs printed by other users. This is called *Delegated Print Release*. An example scenario is when a teacher needs to view and release both their own jobs and also jobs printed by their students. You can achieve this by making each teacher a hold/release queue manager, but this allows them to view and release any job. By using Delegated Print Release, teachers can view and release only the print jobs they need to manage.

In this situation:

1. A student prints a document.
2. The document is held in the queue awaiting approval by a teacher.
3. The student talks to their teacher who will decide whether the document should be allowed to print.
4. The teacher logs into their end-user web-based release interface from any machine on the network and releases or cancels the job as appropriate.

To implement Delegated print release:

1. In PaperCut MF, enable the hold/release option on the printer(s). See [Enabling hold/release support on a printer](#).
2. Select the teacher's account via **Users** section
3. Select the option **Allow this user to release jobs printed by others (Delegated print**

**release)** under **Advanced Options**.

4. Enter a list of student usernames delegating print release to the teacher. Alternatively enter an existing group name under **Groups**. For example, if all students belong to "students" group, you can enter "students".
5. Click **Apply** . Now this teacher can release delegated jobs via the end-user web-based release interface.
6. To apply this setting to multiple teachers, use **Bulk User Actions** link under **Users** tab. See [Bulk User Operations](#)

To prevent students from viewing/releasing their own jobs, only allow group "teachers" to view held jobs. To do that:

1. Select the option **Allow users to view held jobs (hold/release queues) via end-user interface** under **Options > General > User Features**
2. Select the option **Only allow users in this group to view held jobs:**
3. Set the group name to "teachers".

#### 4.8.2.6. Override/change account selection during Admin Web Release

Many educational organizations want to charge for printing, which means that some users might not be able to print because of a low balance. This means that the print job waits in the Secure hold/release queue until it is either canceled, times out or the user obtains sufficient credit to release the job.

A hold/release queue manager (see [Hold/release queue managers](#)) can use the Admin Web Release interfaces to override the selected account (shared account or personal balance) and charge the print job to a specific shared account, moving the cost of the print job from the user's selected shared account or personal balance to a shared account that the hold/release queue manager has access to.

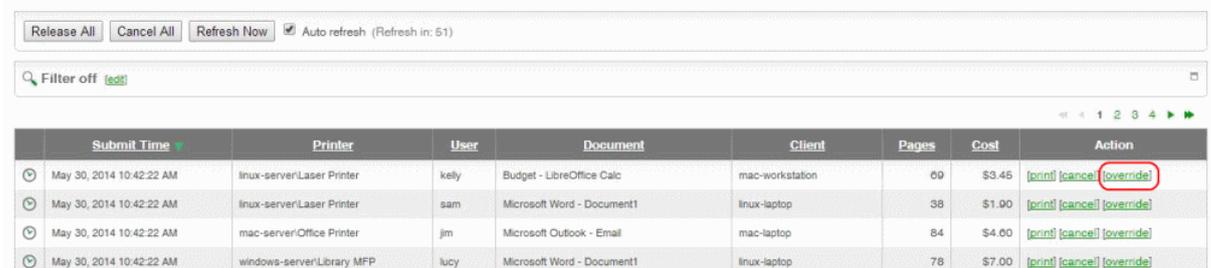


**Important:** The hold/release queue manager's must have access to the desired shared account for feature to work. They do not require the standard account selection popup to be used.

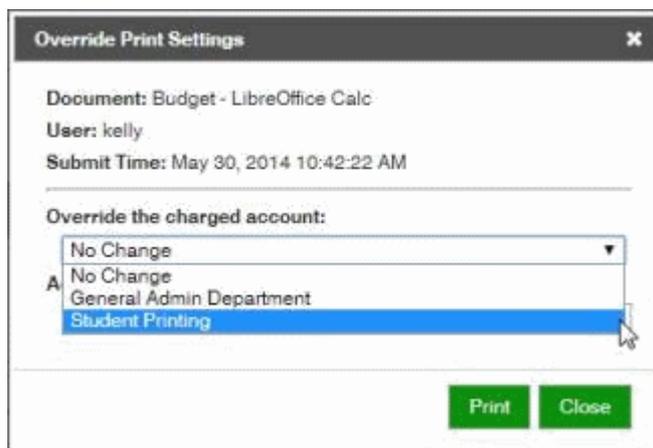
In this situation:

1. A student prints a document.
2. The document is held in the queue awaiting additional funds.
3. The student talks to their teacher who will decide whether the document is allowed to print.

- The teacher logs into their end-user web-based release interface from any machine on the network and selects the **[override]** action for the job.
- The teacher then selects a shared account to charge the job to, optionally enters a job comment and clicks **Print**.



	Submit Time	Printer	User	Document	Client	Pages	Cost	Action
⊞	May 30, 2014 10:42:22 AM	linux-server/Laser Printer	kelly	Budget - LibreOffice Calc	mac-workstation	69	\$3.45	[print] [cancel] [override]
⊞	May 30, 2014 10:42:22 AM	linux-server/Laser Printer	sam	Microsoft Word - Document1	linux-laptop	38	\$1.00	[print] [cancel] [override]
⊞	May 30, 2014 10:42:22 AM	mac-server/Office Printer	jim	Microsoft Outlook - Email	mac-laptop	84	\$4.00	[print] [cancel] [override]
⊞	May 30, 2014 10:42:22 AM	windows-server/Library MFP	lucy	Microsoft Word - Document1	linux-laptop	78	\$7.00	[print] [cancel] [override]



To implement Override Print Settings to charge to a shared account:

- In PaperCut MF, enable the hold/release option on the printer(s). See [Enabling hold-/release support on a printer](#).
- Select the teacher's account via **Users** section
- Select the **Account** section and click **Create a new account**.
- Give the shared account a name. Determine if this is to be a restricted shared account (e.g. cannot have a negative balance, limiting the amount of use) or if it is unrestricted and allowed to accrue a negative balance.
- Click **Apply** then select the **Security** tab.
- Find the teacher's user account in the Users: option and click **Add**.
- Now this teacher can Override jobs via the web-based release interface.

### 4.8.2.7. Unauthenticated printing

In some environments it is not possible (or very difficult) to have users authenticated when printing. This could be due to a technology constraint (like using Macs in mainly Windows environment) or could be for convenience (like having kiosk computers in the library that people can use without logging in).

In these scenarios, print jobs are printed under one name, but charging is allocated to another. For example, a job is printed by a generic "library user", but you need to charge to the user's real account. In order to charge the correct user for printing, PaperCut MF needs to identify the user to charge. You can achieved this using a Release Station in "Release Any" mode.

This works as follows:

1. The user prints from a workstation but is not authenticated, so jobs are allocated to a generic user.
2. The print job is held in the queue awaiting release.
3. The user walks to the Release Station and enters a username and password. Alternatively the user can log in to the PaperCut MF web interface and select **Jobs Pending Release**.
4. All jobs held are listed. Jobs can be identified by document name or workstation machine name.
5. The user selects his or her jobs. Any jobs released are charged to that user's account.


Print Release Station

Refresh in: 51

Log out
Refresh

Time	User	Printer	Document	Machine	Pages	Cost	Action
17:01:56	chris	mac-server\Wide Format Prin...	Microsoft Outlook - Email	windows-workst...	300	\$30.00	<a href="#">Print</a> <a href="#">Cancel</a>
17:01:56	tom	linux-server\Very_very_very_...	Budget - LibreOffice Calc	mac-workstation	248	\$24.80	<a href="#">Print</a> <a href="#">Cancel</a>
17:01:56	tom	windows-server\Library Printer	Budget - LibreOffice Calc	windows-laptop	85	\$8.50	<a href="#">Print</a> <a href="#">Cancel</a>
17:01:56	claire	linux-server\Library Printer	Microsoft Outlook - Email	linux-workstation	54	\$3.25	<a href="#">Print</a> <a href="#">Cancel</a>
17:01:56	peter	linux-server\Library MFP	Untitled1 - LibreOffice Writer	mac-laptop	57	\$5.70	<a href="#">Print</a> <a href="#">Cancel</a>
17:01:56	steven	linux-server\Library Printer	research paper.pdf	linux-laptop	62	\$3.50	<a href="#">Print</a> <a href="#">Cancel</a>
17:01:55	harry	linux-server\Library MFP	http://slashdot.org/	mac-workstation	43	\$4.30	<a href="#">Print</a> <a href="#">Cancel</a>
17:01:55	bill	linux-server\Very_very_very_...	Email - Mozilla Firefox	linux-workstation	154	\$14.40	<a href="#">Print</a> <a href="#">Cancel</a>
17:01:55	kate	linux-server\Library MFP	Microsoft Outlook - Email	192.168.0.1	60	\$4.85	<a href="#">Print</a> <a href="#">Cancel</a>
17:01:55	ian	mac-server\Very_very_very_...	Microsoft Word - Document 1	mac-laptop	31	\$2.10	<a href="#">Print</a> <a href="#">Cancel</a>

Print All
Cancel All

To implement unauthenticated printing using a Release Station:

- Set up a low-end workstation near the printer(s).
- Run the Standard Release Station in "Release Any" mode. See [Release Station Modes](#).
- In PaperCut MF, enable the printer(s) for Release Station use, and select the "User release"

mode. See [Enabling hold/release support on a printer](#).

- To allow users to release jobs via the end-user web based release interface, also enable Release Any mode for the web tools interface. For more information, see [End-User Web Based Release Interface Configuration](#).

To implement unauthenticated printing using the browser interface:

- In PaperCut MF, enable the **Hold/Release** mode on the appropriate printer(s). See [Enabling hold/release support on a printer](#).
- Ensure end-users have the ability to view held jobs and can **release any job (charging to their account)**. For more information, see [End-User Web Based Release Interface Configuration](#).

### 4.8.3. Release Station Configuration

This section describes various aspects to configuring Release Stations.

Some additional installation notes can also be found in the Release Station README file located here:

```
[app-path]\release\README.txt
```

#### 4.8.3.1. Enabling hold/release support on a printer

By default, print jobs are sent directly to the printer and are not held. To turn on hold/release support on a given printer:

1. Log on to the administration section.
2. Navigate to the **Printers** section.
3. Select the printer.
4. Select the option to **Enable hold/release queue**.
5. Choose the appropriate release mode for your needs.

The two release modes available are:

- User Release - this is the standard mode that allows users to release and view only the jobs printed under their name/user account.
- Admin/Manager only release - in this mode, jobs can only be released by administrators or hold/release queue managers.



**Tip:** To configure multiple printers with hold/release queue support, use the **Copy settings to other printers** function. To use this, configure one printer as required, click **Copy settings to other printers**; then select the printers to copy the settings to.

### 4.8.3.2. Hold/release queue managers

A hold/release queue manager is a user that has additional privileges to manage Release Stations and jobs held in hold release queues. Managers can:

- Log on to the "manager mode" Release Stations (both the software and web-based Release Station).
- Log on to the "secure mode" Release Stations, which switches them into manager mode so that users' print jobs can be released.
- Release jobs that can only be released by managers or administrators.
- Can close the Standard Release Station when running in full-screen mode.
- Use the Override Print Account selection in the web-based Release Station.

To assign a hold/release queue manager role to a user or group:

1. Log on to the administration pages.
2. Navigate to the **Options > Admin Rights** .
3. Assign administrator access to a user or group.
4. Restrict the held jobs that a hold/release queue manager can view based on user and printer groups.
  - To restrict them to a group of users:
    - a. Change **Allow job releases for** to `Users` from the following groups.
    - b. Select at least one user group from the list.
  - To restrict them to a group of printers:
    - a. Change **Allow job releases for** to `Printers` from the following groups
    - b. Select at least one printer group from the list.
  - If both user groups and printer groups are selected, then the hold/release queue manager is restricted to only jobs that meet the user and printer group criteria.
5. To restrict their access to only the Release Station interface, deselect all the other admin rights.
6. Click **Apply** to save the changes.

To get more information about assigning admin rights see [Assigning Administrator Level Access](#).

It is also possible to make a user a hold/release queue manager by following the steps below:

1. Log on to the administration pages.
2. Navigate to the **Options** section.
3. Find the **Release Station security** section.
4. In **Hold/Release Queue Managers**, enter the user's username. To enter multiple users, separate usernames with a comma ( , ).

**Note:**

This is a way of assigning hold/release queue manager permission gives unrestricted access to held print jobs.

### 4.8.3.3. Standard Release Station Configuration

The Standard Release Station is configured using a configuration file located in the directory where the Release Station executables are located. The default configuration file is:

```
[app-path]\release\config.properties
```

This configuration file allows you to configure the behavior and look of the Release Station in a number of ways. Each of the configuration items are described in the table below:

**Note:**

There are more advanced options listed in the config.properties file. If you don't see what you're looking for in the table below, take a look through the config file to check if the option is listed there.

**Table 46: Standard Release Station config settings (for other advanced config settings, see the config.properties file)**

Config name	Description
mode	The mode changes the behavior of the Release Station depending on the need. The available modes are described in <a href="#">Release Station Modes</a> .
use-username-authentication	(Y/N) - Enable username authentication. Users are required to enter their domain username to log in to the Release Station. They might also

Config name	Description
	be required to enter their password, depending on the 'mode' setting. Default: Y (Yes).
use-card-authentication	(Y/N/USERNAME) - Enable card-based authentication. This is designed for use with dedicated hardware card readers. If Y: The card number is validated against the user's card-number field. If USERNAME: The card value is interpreted as a username. The user is prompted for a password if required. Default: N (No).
show-jobs-from-queues	Filters the list of jobs to only those print queues listed. This is a comma separated list of full printer names (i.e. server\printer). This is useful when there are multiple Release Stations, each managing the queues of a different set of printers.
releases-on	This option applies to installations using <i>Find-Me Printing</i> and sets the behavior of jobs released from a virtual queue. For more information see <a href="#">Find-Me Printing and Printer Load Balancing</a> . This setting defines the printer (or list of printers) that the jobs are printed to when released. This is usually the printer(s) in close proximity to this Release Station.
confirm-printing	When enabled (Y) and users release a job that is charged to their personal account, a confirmation dialog is displayed to confirm that the user wants to print and be charged for the job. When disabled (N) the confirmation dialog is never displayed.
display-columns	Used to customize the columns displayed and

Config name	Description
	the order they are displayed in the list of print jobs. The default value is: date,user-,printer,document,machine,pages,cost
display-column-widths	Used to customize the width of columns displayed. The setting can only be used if the <code>display-columns</code> is defined. The number of values must match the number of values in the <code>display-columns</code> setting. The default value is: 8,12,25,30,15,8,8
hide-printer-server-names	(Y/N) - Used to hide the printer server names from the list of print jobs. Default: N (No)
show-print-all	(Y/N) - Indicates whether <b>Print All</b> is displayed. Default: Y (Yes)
show-cancel-all	(Y/N) - Indicates whether <b>Cancel All</b> is displayed. Default: Y (Yes)
max-idle-secs	The number of seconds without user input, before the user is logged out of the Release Station. The default is 30 seconds.
show-user-balance	(Y/N) - Indicates whether to hide the user balance information when a user logs into the Release Station. Default: Y (Yes)
background-color	Allows for customizing the background color of the Release Station to match the organization's colors. The color format is the hexadecimal color code used in HTML - #RRGGBB (where RR is the red component, GG is the green component and BB is the blue component).
font-color	Allows for customizing the font/foreground color used in the Release Station. The color format is

Config name	Description
	the hexadecimal color code used in HTML.
locale	Allows to override the default language used for the Release Station. The value is a valid ISO language code. E.g. en, zh_HK.
title	The title that is displayed at the top of the Release Station screen.
instructions	The instructions to display at the login page. Include a <code>&lt;br&gt;</code> to start a new line.
card-and-username-instructions	The instruction text that is displayed when using both card authentication and username authentication, displayed in-between the card entry and username entry fields. Include a <code>&lt;br&gt;</code> to start a new line.
username-label	Override the label text for the Username field.
password-label	Override the label text for the Password field.
logo-image	Allows a custom logo image to be displayed. For best results the image should be between 50 and 80 pixels in height. PNG, JPG or GIF images are allowed.
scale-factor	Allows to adjust the size of text displayed in the Release Station. Higher value increases the text size. Larger text might be preferable on high resolution screens or touch screens. The default is 1.5.
release-cancel-gui-style	Allows to set the GUI style of the Release Station actions. The valid styles are <code>link</code> and <code>button</code> . Setting it to <code>button</code> is useful when running Release Station on touch screens. The default is <code>link</code> .

Config name	Description
enable-card-self-association	(Y/N) - Enable or disable card self-association. This allows users to associate their card with their account without needing any administrator assistance. Default: N (No)
enable-on-screen-keyboard	(Y/N) - Enable or disable the on-screen (software) keyboard. Use of the on-screen keyboard is recommended for touch-screen devices. Supported on Microsoft Windows only, via the on-screen keyboard utility (osk.exe) or an alternate application. Default: N (No)
on-screen-keyboard-path	Specify an alternate on-screen keyboard application to the Microsoft Windows default. Supported on Microsoft Windows only. Default: (none)



**Tip:** When running Release Stations from the `\\server\PCRelease` share, each workstation can have its own configuration file. The "config.properties" is used for default settings for all Release Stations, but you can override settings by defining another configuration file for each Release Station. Put these files in the same directory and use the following naming convention: `config.[machine-name].properties` where `[machine-name]` is the name of the machine running the Release Station. Since the machine specific configuration file overrides the default settings, if you want to clear a setting then it must be unset or commented out in both configuration files. Apple OSX servers might require the fully qualified domain name of the machine running the Release Station rather than the short name. A custom configuration file can also be specified as a startup command-line option using the following syntax: `pc-release.exe --config "[config file path]"`

## Release Station Modes

The Release Station modes available are described below. The Release Station mode is changed in the configuration file as described in [Standard Release Station Configuration](#).

**Table 47: Standard Release Station modes**

Mode	Description
ReleaseAny	This is the default mode. It allows a user who logs onto the Release Station to release any held jobs. Any jobs released are charged to the logged in user.
Manager	Manager mode allows only administrators or hold/release queue managers to log in to the Release Station. In Release Station mode, all jobs are listed and users are not automatically logged out due to inactivity.
Secure	Secure mode allows users to only see and release print jobs that they have printed. Release Station managers can see and release all users' print jobs.
NoPassword	This works similar to the secure mode, however, users don't need to enter the password to view jobs.

In all modes except Manager mode, users are logged out automatically after a period of inactivity defined in the configuration file, the default being 30 seconds.

## Card-based User Authentication

In some environments, users are issued with identity cards that are used for authentication. The cards might be used to gain entry to buildings, or borrow from a library. The cards can also be used to authenticate users at the standard Release Station. Using a card is often much more convenient and less error-prone than entering a username and password.

To use card-based authentication an appropriate hardware card-reader is required. The card reader must be connected to the machine running the Release Station and act as a keyboard. i.e. when the user swipes/scans their card, the card reader outputs the digits just as if someone entered them using the keyboard. There are card readers that can do this for all commonly used card types (e.g. magnetic stripe, barcode, etc). An easy way to test a card reader is to open a text editor and place the cursor in a new text document. Then when a card is swiped the card number is displayed in the text file.

The card numbers entered at the Release Station are validated against the **Card/Id number** field for the user. This is located at the bottom of the **User Details** screen in the admin interface. Before card authentication can be used, the users' card numbers must be associated with the user record in PaperCut MF. You can manually enter the numbers, automatically synchronized from Active Directory or LDAP (see [Card/Identity Numbers Sync](#)) or imported in bulk using the Batch User Import file (see [Batch User Data Import and Update](#)).

Once card numbers are associated with users, you can enable the card-based authentication in the Release Station by setting the `use-card-authentication` to `Y` in the Release Station's `config.properties` file. Once the Release Station is restarted it is in card-authentication mode, and can be tested by swiping a card through the card-reader.

Alternatively, users can self-associate card numbers at the Release Station. Enable this functionality by setting `enable-card-self-association` to `Y`. Note that this also requires `use-card-authentication` to be enabled as well.

The `config.properties` file has some other settings to change how the card-number is read from the reader. For example, you can change the header and trailer characters used by some card readers to indicate the start and end of the card number. See the config file for details.

## Friendly client machine aliases

In some environments (for example, public libraries), it is important for users to identify print jobs by the client machine from which they were printed. By default, the Release Station lists either the IP address or the machine's unique network name. Neither of these are helpful to Release Station users. To avoid this problem the administrator can define a list of aliases, that map the unfriendly names to a more user-friendly name.

For example, print jobs might be displayed in the Release Station as `192.168.1.100` or `winpc0076`, but would be more meaningful for the user to be displayed as `Public PC 1`.

These aliases are defined in the `[app-path]/release/client-machine-aliases.properties` file. The entries are in the format:

```
[machine]=[alias]
```

It is also valid to have multiple entries that map to the same alias. So to add aliases for the example above the following lines would be added to the `client-machine-aliases.properties` file:

```
192.168.1.100=Public PC 1 winpc0076=Public PC 1
```

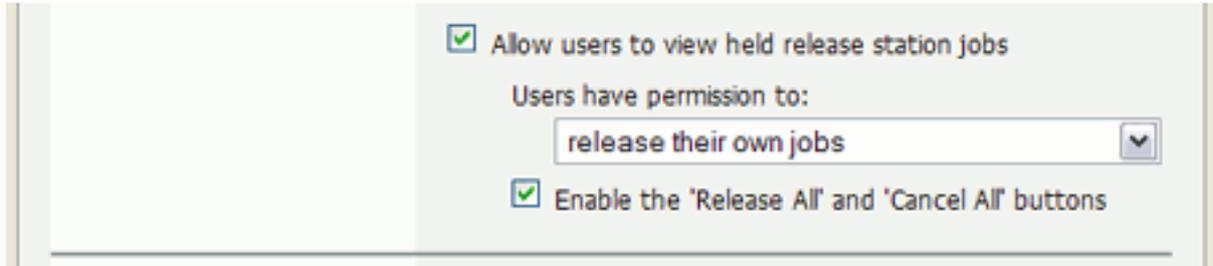
## Job timeout

If a user does not release their held job after a defined time, their job is automatically deleted. This prevents a buildup of old/abandoned jobs in the hold/release queue. The default timeout is 30 minutes. To change the timeout:

1. Navigate to **Options > General > Hold/Release Queues** and find the option **Delete held jobs if not released after**.
2. Enter the number of minutes to wait for users to release their job before it is deleted.
3. Click **Apply**

### 4.8.3.4. End-User Web Based Release Interface Configuration

Configuration options for the end-user web based release interface are in the administrative interface at **Options > General > User Features**. These options control the availability of the **Jobs Pending Release** option available to end users. The available options are:



- *Allow users to view held jobs* - this option enables the **Jobs Pending Release** screen in the user web tools. When this option is disabled, no related functionality is available from the user web tools interface.
- *Users have permission to:* - this option changes the type of jobs users can see and/or release. The available options are:
  - **view their own jobs only** - users see their own jobs that are held in the hold/release queue. Jobs printed by other users are not displayed. They can cancel their own jobs, but cannot release them. This is useful if users are required to be physically at the printer to release a job, where a standard Release Station is running.
  - **release their own jobs** - users can release or cancel their own jobs. Jobs printed by other users are not displayed.
  - **release any jobs (charged to their account)** - users can release or cancel any job that is being held, including jobs from other users. If a user releases a job that was sent by a different user, the releasing user is charged for the job. This option is equivalent to the `Release Any` mode used in Release Station and is ideal for authenticating printing in a unauthenticated environment.
- *Enable the 'Release All' and 'Cancel All' buttons* - enabling this option allows users to release or cancel all held jobs by clicking one button. When this option is disabled, users must release or cancel jobs individually.

This option is purely for the convenience of the users. It can save a user a few clicks when they want to release all their jobs at once. However, if the user is able to release jobs other than their own, a user might accidentally release (and be charged for) many other users' jobs.

### 4.8.4. Mobile Print Release Configuration

Mobile Print Release configuration is detailed in the [Mobile Print Release - Releasing print jobs on your mobile](#).

## 4.9. Mobile & BYOD Printing

BYOD (Bring Your Own) Mobile devices are now accepted as playing an essential role in many organizations and are here to stay. However, providing printing support across the varied devices available is challenging as there are many competing technologies with no standardization. Current mobile printing solutions are problematic because:

- There are lots of choices
- They might not be compatible with your printing infrastructure or are difficult to integrate
- They keep changing

There is no current "standout" mobile printing solution that is the best for all platforms. Rather, each platform has its own native or preferred option. PaperCut harnesses each of the native printing solutions to create a unified solution for your organization. PaperCut's approach is to:

- Integrate with the native printing solutions on each platform,
- Ensure that all of PaperCut's core print management features are available,
- Provide a natural print experience across all devices,
- Allow organizations to re-use their existing print infrastructure (no need for special printers),
- Ensure that all users can be accommodated by providing simple options, such as, Email to Print and Web Print.

This section describes the various tools that PaperCut provides for mobile users and how they can map to your organization's needs, no matter how many users you are supporting. In addition it provides some guidance on how to approach deployment and troubleshooting.

The Process:

- STEP 1 - Understand the tools
- STEP 2 - Understand your users
- STEP 3 - Develop your strategy and deployment plan

### 4.9.1. STEP 1 - Understanding the tools

Before planning your deployment, you need to have a good understanding of the tools and technologies. A number of these technologies might already be in place in your organization, while others are made possible with PaperCut. The key technologies are:

- Native mobile print technologies
  - [iOS Printing \(iPad & iPhone\)](#)
  - [Google Cloud Print](#)

- [Windows 8 Tablets & Windows RT Printing](#)
- PaperCut-provided technologies
  - [Email to Print](#)
  - [Web Print \(Driver-less printing via a web browser\)](#)

PaperCut integrates with existing systems to complement native print technologies with print management functionality. Additionally, PaperCut technologies such as Email to Print provide alternatives on platforms where a native approach is not available or practical.

**Table 48: Technology Benefits**

Technology	Benefit
<a href="#">iOS Printing (iPad &amp; iPhone)</a>	iOS provides users with a native and mature print experience on iPhones and iPads. Users can select various printing options, such as, copies and grayscale, and can print from many applications without the need for additional software. Users can use PaperCut via the Mobile Client app.
<a href="#">Google Cloud Print (GCP)</a>	GCP is Google's preferred mobile and Chromebook (Chrome OS) printing experience. It is the native printing experience for Android, Chromebooks, and Google applications on iOS. GCP is also an option for laptop users (when using the Chrome browser or a custom driver/service). All of PaperCut's print management features integrate with GCP.
<a href="#">Email to Print</a>	A lowest common denominator, and simplest solution that works on any device that's able to send email attachments. PDF, picture files or Microsoft Office document attachments are converted to print jobs.
	A simple web based experience suitable for any BYOD laptop or Net-book users. End-users upload their document via a standard browser form. No special or client print driver setup required.

The remaining parts of this section cover each of these technologies in detail. Ultimately hands-on experience is the best way to understand the approaches and technologies. Your deployment plan, discussed below, will likely have a testing period to help you understand and assess the technologies before committing to them. This is discussed more in the following steps.

## 4.9.2. STEP 2 - Understand your users

Every organization has a different mobile & BYOD strategy. Small organizations might implement one technology, while larger organizations with dedicated IT departments might have a multi-faceted approach. Your strategy is driven by your particular environment and user needs. The range of end-user drivers is diverse - some examples:

- Many education organizations are now allowing students to bring their own laptops, or are considering supplying Chromebooks or iPads.
- In business it's no longer 'one person - one device'. It's now desktop, laptop, tablet and mobile. Some have standard operating environments, while others support a broader spectrum or even a BYOD policy.
- And then there are the unexpected needs, such as Joe Exec turning up with his new Christmas present (a tablet) expecting to print.

After reviewing the user needs for your organization you'll know your device profile. Each device platform has preferred and supported approaches to printing. Use your device profile and the priorities of your user base to help determine the best technologies:

**Table 49: Technology Options**

	iOS Printing	Web Print	Google Cloud Print	Email to Print
<b>Android</b>	N/A	N/A	Preferred	Supported
<b>iPhone/iPad</b>	Preferred	N/A	Preferred in Google iOS Apps	Supported
<b>Chromebooks</b> (Chrome OS)	N/A	Supported	Preferred	Supported
<b>Netbooks</b>	N/A	Preferred	Supported	Supported
<b>BYOD Laptops</b>	N/A	Preferred	Supported	Supported
<b>Windows RT &amp; Windows 8 tablets</b>	Use standard Windows Printing with Mobile Client	Supported	Supported	Supported
<b>Google Mobile Apps (many devices)</b>	N/A	N/A	Preferred	Supported

	iOS Printing	Web Print	Google Cloud Print	Email to Print
<b>Other (e.g. Smart Phone)</b>	N/A	N/A	N/A	Supported

### 4.9.3. STEP 3 - Develop your strategy and deployment plan

As with most IT projects keeping the solution simple as possible but satisfying the majority of users is the preferred approach.

Smaller teams need to balance the needs of their users against the complexity of implementing multiple technologies.

Larger organizations with dedicated IT teams have the benefit of scale. Offering choice to support the widest range of devices might be the project goal.

Each organization differs in terms of rollout strategy. Here's a few checkpoints to work through to make sure everything is in place:

- **Setup** - Can this be done without impacting current users? Are there network or hardware requirements such as purchasing a Mac, or managing user accounts in Google to use GCP?
- **Test** - Before advertising any new feature, can you test it with a small group of users? Maybe you have a small group that's been requesting the feature. They will be eager to test it, and will hopefully come back with fresh feedback.
- **Communicate** - Before you roll out functionality, think about how you can most effectively communicate this to your users. Maybe a step-by-step guide via email is a good place to start.
- **Rollout** - Execute your plan. Larger organizations implementing a multi-platform/technology plan will conduct the rollout in phases.
- **Manage** - Don't forget to keep management in the loop with the different stages of the project. PaperCut has in-built reports on mobile print usage. These are useful tools.
- **Evaluate** - Continue to monitor usage and user requirements. If you introduce new device types in the future, it might be time to consider introducing different methods to print.

At a technical level, it's also important to understand IT infrastructure requirements and the impact your choices have on your data and security policies. The table below highlights some of these considerations.

**Table 50: Technology Options**

Technology	Data Flow	Print Options	Basic Requirements	Other Limitations
iOS Printing	Internal	Basic options, provided by iOS. Usually: <ul style="list-style-type: none"> <li>Page Size</li> <li>Color</li> </ul>	iOS devices. Mac print server with PaperCut, or 3rd party Windows app.	Multiple subnet configuration can be challenging without 3rd party utilities.
Google Cloud Print	Internal / external	All options, provided by Google Cloud Print. Usually at least: <ul style="list-style-type: none"> <li>Page Size</li> <li>Duplex</li> <li>Color</li> </ul>	Users must have a Google Account.	Depending on configuration, users might not be able to print from all applications. Exporting to PDF and printing from a browser is a common work-around.
Email to Print	Internal (maybe external depending on mail server configuration)	OS print queue defaults only (currently there are no options selected by the user). You can create multiple OS print queues with different defaults e.g. a 'duplex queue'.	POP3 or IMAP email server. Optional sandbox machine / VM running Microsoft Office apps.	PDF and picture files only or PDF, picture files and Microsoft Office documents if a sandbox is configured.
Web Print	Internal Poss-	Number of copies	Optional sand-	PDF and picture

Technology	Data Flow	Print Options	Basic Requirements	Other Limitations
	ible to make external by exposing the PaperCut user web interface to the internet.	only, other settings use OS print queue defaults. You can create multiple OS print queues with different defaults e.g. a 'duplex queue'.	box machine / VM running Microsoft Office apps.	files only or PDF, picture files, Microsoft Office and XPS documents if a sandbox is configured.

Detailed information on each technology is provided in subsequent sections.

## 4.9.4. Common questions that come up during planning

### Do I have to turn on all of these mobile solutions at once?

No. It's best to pick the ones that are suitable for your environment, and perform a controlled rollout of the new feature.

### Email to Print works with all platforms. Why would I not just implement this?

This is a viable option and one that many organizations adopt. Our recommendation is to look at native print options first where possible. The benefit for native print options is that they offer a richer and more familiar end-user experience.

### What does it cost to add BYOD features to my PaperCut installation?

All BYOD features are included in the standard PaperCut license. There are no additional licensing costs.

### I want to allow printing, but I don't allow mobile devices to connect to our network. Is there an option?

Google Cloud Print and Email to Print work without requiring users to connect to your network.

### I want to use Google Cloud Print, but don't want users sending documents via Google's servers. Is there a version that I can run on my own server?

Although Google Cloud Print uses open protocols (and upcoming standards), Google is the only server provider we're aware of at the time of writing. By contrast, Email to Print involves

documents routing via your email server, and iOS Printing (if you are supporting mainly Apple devices) is network-internal.

## 4.9.5. Google Cloud Print

### 4.9.5.1. Overview

[Google Cloud Print](#) (GCP) is a cloud based printing service from Google that lets people print anywhere from any device. Users are increasingly bringing their own mobile devices (BYOD) to the workplace and need a printing solution. Google Cloud Print provides a way to print from any mobile phone or tablet, running Android or iOS. Whilst almost any device, including mobile and desktop computers can print to Google Cloud Print, for some devices, such as the Google Chromebook, Google Cloud Print is the only printing solution available.

On its own, Google Cloud Print provides untracked printing only to Google Cloud Print enabled printers. Coupled with PaperCut, Google Cloud Print becomes a powerful mobile and BYOD printing solution for organizations of any size:

1. PaperCut tracks and controls Google Cloud Print jobs the same as any other PaperCut print job.
2. Google Cloud Print deployment is managed centrally, using the PaperCut admin console to publish and deploy Google Cloud Print on selected printers.
3. Rich enterprise PaperCut features such as [Find-Me Printing](#) and [Printer Load Balancing](#) work alongside Google Cloud Print.
4. Use Google Cloud Print with your existing printers. With PaperCut you do not need to have Google Cloud Print Aware printers.

### Supported Environments

**Note:**

Google Cloud Print is not available on direct print queues. To offer this service to your users, set up a server queue for this device/printer.

Users can print to Google Cloud Print in many ways:

1. From a Chrome browser (mobile or desktop) or Chromebook device
2. From an iOS or Android device with a Google Cloud Print enabling app installed
3. From Google applications, such as Drive, Gmail on all platforms
4. From a Windows or Mac desktop using the Cloud Printer app

A current list of compatible printing applications is available at <https://www.google.com/cloudprint/learn/apps.html>.

## How it works

### *Google Cloud Print and PaperCut*



The diagram shows PaperCut as the bridge between an organization's printers and the Google Cloud Print service.

1. PaperCut publishes selected printers to Google Cloud Print, making them available to Google Cloud Print user applications.
2. A mobile or desktop user prints a document or email using Google Cloud Print and selects

- a published printer.
3. PaperCut is notified and downloads the print job from the cloud.
  4. PaperCut authenticates the user sending the job, then renders and spools the job to the specified printer.
  5. PaperCut tracks and manages the print job in the same way as any normal print job.
  6. PaperCut informs Google that the job is complete.

PaperCut takes care of publishing printers with Google, downloading jobs from the Google cloud, and managing the print work-flow. This makes it very easy to integrate Google Cloud Print into your existing print service.

Printers must be published to Google Cloud Print to make them available for users to print. Once Google Cloud Print is enabled, a single click is all that is needed to publish a printer. PaperCut manages any Google Cloud Print print jobs on behalf of the printer, and jobs are processed by the normal PaperCut work-flow.



**Tip:** Some internet printers are marketed as Cloud Print Ready and can be connected directly to Google Cloud Print. However, if you directly connect a printer to Google Cloud Print, you cannot track and control print jobs from Google. We recommend you use PaperCut to connect your printers with Google Cloud Print. Cloud Print Ready printers are not required.

## Requirements

The following requirements must be met for a successful Google Cloud Print integration:

1. Google Cloud Print is supported by PaperCut Print Providers running on Windows, Linux or Mac OS. Printers managed by a Novell print server cannot be published to Google Cloud Print.
2. The Print Provider software must be running a version of PaperCut that supports Google Cloud Print. Printers managed by an older version of the Print Provider cannot be published to Google Cloud Print.
3. Some printers and printer drivers do not respect all printer settings, such as, color or gray-scale, single sided or duplex as specified by the user in the Google Cloud Print User Client. If you observe issues in this area, try upgrading to the latest drivers, as Google is working with the printer manufacturers to resolve any such issues.
4. The Mobile Client must be used to perform Account Selection for Google Cloud Print jobs (see [Mobile Client](#)).
5. The PaperCut Application Server must be able to connect to the internet to communicate with Google Cloud Print servers. You might need to make ports or exceptions in firewalls or

proxy servers. The full details are: TCP (HTTPS) port 443 connections to `https://www.googleapis.com/*`, `https://accounts.google.com/*` and `https://www.google.com/cloudprint/*`, as well as a TCP port 5222 (XMPP with STARTTLS) persistent connection to `talk.google.com`.

### 4.9.5.2. User Authentication and Printer Sharing with Google Cloud Print

Google Cloud Print uses Google's OAuth based system for identifying users and printers. These must be reconciled with the users and printers managed by PaperCut so that you can track Google Cloud Print jobs as normal PaperCut jobs and allocate them to the correct PaperCut user.

This integration between Google Cloud Print and PaperCut domains is managed as follows:

1. A Google account is set up for Google Cloud Print administration. PaperCut uses this account to publish printers and communicate with Google Cloud Print over the internet.
2. User's Google accounts are added to the PaperCut user database as secondary email addresses. This can be done either manually or via an automated email verification process.
3. Printers are published using PaperCut then shared with users using Google's sharing tools.

Each of these topics are covered in detail in the sections below:

## Administrator Authentication

*You need a Google administrator account*

When Google Cloud Print is enabled in the PaperCut administrator interface, you are asked to authenticate with Google credentials. All printers are published by PaperCut using these credentials. The use of one set of credentials to register all printers is in line with Google's best practice recommendations.

You can use any Google account for this purpose, but we recommend that you set up a dedicated account for Google Cloud Print administration. A personal account is not recommended as it might be deleted if an employee changes role or leaves your organization.

When you first enable Google Cloud Print, you are asked to log in to your Google administrator account and authorize PaperCut to have access to the Google services needed to manage Cloud Print. After accepting this request, PaperCut permanently stores an access token, which means you do not need to authenticate each time.

## User Authentication

*Each Google Cloud Print user must have a Google account associated with their PaperCut account.*

Each Google Cloud Print user requires a Google account. This account might be self-registered, or provided to the user under a Google Apps managed environment.

PaperCut must map each user's Google account used for cloud printing to a PaperCut user. For example, Google might know a user as joeadams@gmail.com, whereas the same user in PaperCut might be adamsj with an email joe.adams@myorg.com.

As with this scenario, PaperCut allows multiple email addresses to be associated with a user. Each user can have one primary email address and multiple secondary email addresses. All addresses must be unique across the system.

PaperCut provides two ways to populate the secondary emails on behalf of each user. You should select which method is best for your organization:

1. Manual configuration. An administrator can add and remove secondary email addresses on behalf of a user in the **Users** tab of the PaperCut Admin interface.
2. Self registration through automatic email verification.

When a print job arrives from Google, PaperCut finds the user with a primary or secondary email address matching the address of the sender. The matching user is then associated with the incoming print job.

If no matching user is found, you can choose to have PaperCut cancel the job, or hold the job and perform automatic email verification. Cancelling the job is the appropriate response if you are choosing to manually configure the secondary email addresses.

Automatic email verification works as follows:

1. When a job arrives from an unknown user, the job is held and an email is sent to the originating Google email address asking for the user to click a link to validate their account.
2. The link takes the user to the login screen for the PaperCut web interface.
3. The user logs into their PaperCut account and the Google address is automatically associated with this account.
4. The job proceeds to print as the verified PaperCut user.

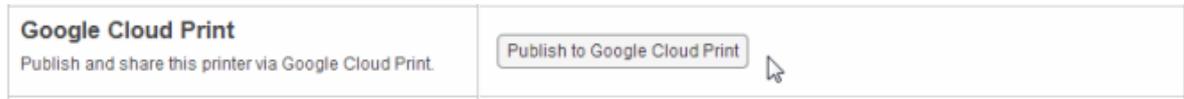
## Publishing and Sharing Printers

*Each printer must be published and Shared with end users.*

Printers are *published* to Google Cloud Print in order to make them available for Cloud printing. By default, printers managed by PaperCut are not published to Google Cloud Print. To publish a printer after enabling Google Cloud Print:

1. On the **Printer Details** page, click **Publish to Google Cloud Print**.

### ***Publishing Printer***



PaperCut publishes printers by using your chosen Google administrator account. By default only that account has access to the printers for printing. To make printers available to your Google Cloud Print users, you must *share* your printers.

Printer sharing is a Google feature and is administered in Google's Cloud Print web interface (<https://www.google.com/cloudprint#printers>), not in PaperCut.

You can share printers with individual users by specifying a list of Google email addresses. You can also share printers with a [Google Group](#). For example, you could set up a Google Group for Students and another group for Teachers and share printers to those groups. Users can self-register with the appropriate Google Groups, but you might need to moderate these registrations. Google provides mechanisms for people to request membership to a Google Group and for a moderator to accept or reject those requests.



**Tip:** When a printer is shared with a user, the user must accept the sharing invitation before they are able to use the printer for printing. This is done within Google's web interface and at the time of writing is not available on some mobile devices. We recommend you test the sharing of printers at your site and provide users with any guidance needed to ensure they are able to successfully accept printers shared with them. People might need to use a computer browser to accept the sharing invitation.

### **4.9.5.3. Setting up Google Cloud Print**

Setting up Google Cloud Print in PaperCut is straightforward. First you must create an administrator Google account (see [Administrator Authentication](#)). Then:

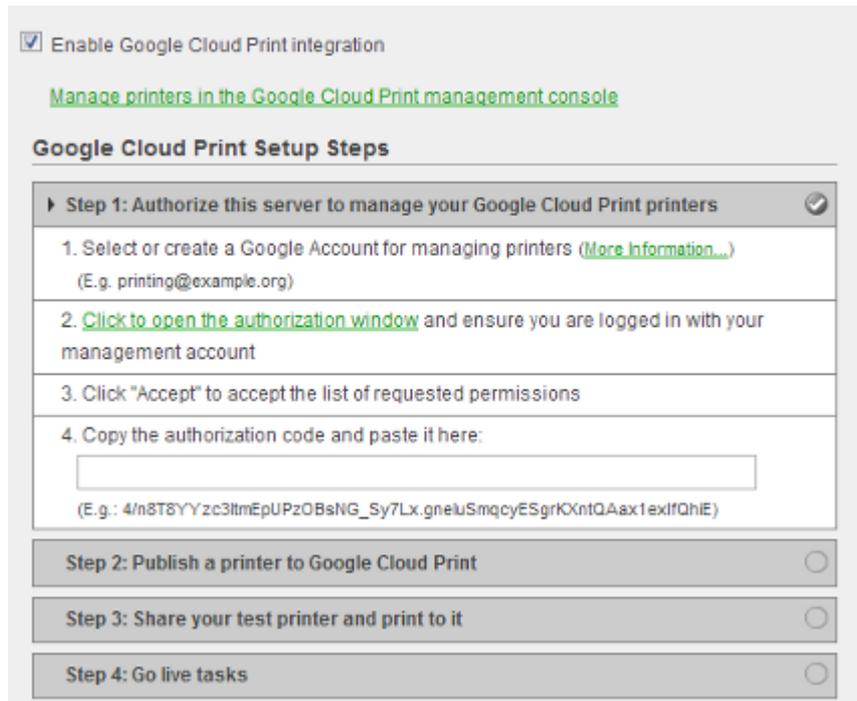
1. Enable Google Cloud Print in **Options > Mobile & BYOD > Google Cloud Print**.
2. Publish printers to Google Cloud Print and share with your users.
3. Test your major user printer scenarios on a range of devices and printers.

These steps are covered in detail below:

## Enabling and Configuring Google Cloud Print

Google Cloud Print is enabled in **Options > Mobile & BYOD > Google Cloud Print**. On checking "Enable" a wizard dialog is displayed to lead you through the process.

### *Google Cloud Print Setup Wizard*

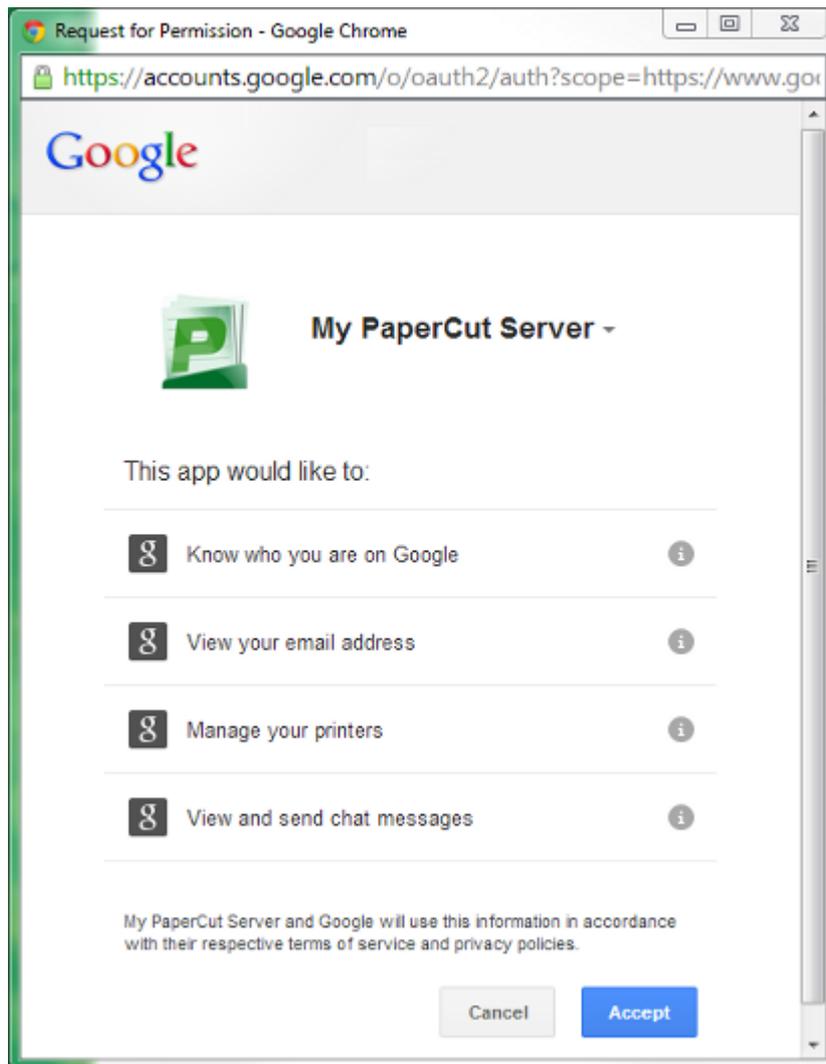


The screenshot shows the Google Cloud Print Setup Wizard interface. At the top, there is a checkbox labeled "Enable Google Cloud Print integration" which is checked. Below this is a link: "Manage printers in the Google Cloud Print management console". The main section is titled "Google Cloud Print Setup Steps" and contains a list of steps:

- Step 1: Authorize this server to manage your Google Cloud Print printers** (indicated by a checkmark icon). This step includes:
  1. Select or create a Google Account for managing printers ([More Information...](#)) (E.g. printing@example.org)
  2. [Click to open the authorization window](#) and ensure you are logged in with your management account
  3. Click "Accept" to accept the list of requested permissions
  4. Copy the authorization code and paste it here:  
  
(E.g.: 4/n8T8YYzc3ltmEpUPzOBsNG\_Sy7Lx.gneluSmqcyESgrkXntQAax1exIfQhE)
- Step 2: Publish a printer to Google Cloud Print** (radio button)
- Step 3: Share your test printer and print to it** (radio button)
- Step 4: Go live tasks** (radio button)

The first step in the process is to authorize PaperCut to use your administrator Google account. (See [Administrator Authentication](#).) Give PaperCut permission to use your Google account to obtain an authorization code. The authorization code is needed for PaperCut to use your administrator account to manage your printers with Google Cloud Print on your behalf.

## Google Request for Permissions Window



**Note:** You must grant permission for *your* PaperCut Application Server to use your administrator Google account to work with Google Cloud Print on your behalf. You are *not* granting permission for any third party, including PaperCut Software, to access your account. Your authorization only applies to your PaperCut Application Server instance.

Once your Google Cloud Print administrator account is authorized, you can publish a printer to Google Cloud Print and test. Printers are published using a button on the **Printer Details** page. See [Publishing Printers to Google Cloud Print via PaperCut](#) for more information.

There are several choices to make on how PaperCut process Google Cloud Print jobs with respect to user authentication and client popup reminders.

1. *Configure what PaperCut should do when a job arrives from an unknown email address.*

PaperCut searches the user database for the originating email address of each job. If the email address is not found, you can choose to have PaperCut cancel the job or hold the job

and email the user with instructions for verifying their Google email address. (See [User Authentication](#).)

You might want to cancel the job if you have decided to manually configure the user Google email addresses on the Users page.

2. Choose whether to send a reminder email for jobs requiring a popup response. (See [Mobile Client](#).)

## Publishing Printers to Google Cloud Print via PaperCut

Before a printer can be used with Google Cloud Print it must be published to Google and shared with users. Publishing a printer to Google Cloud Print makes the printer known to Google and enable access from Google's Google Cloud Print user interfaces.

1. Printers are published to Google Cloud Print on the printer details page for a selected printer in the Printers tab. Click **Publish to Google Cloud Print** to publish a printer. The printer remains published indefinitely.

If you do not see a Google Cloud Print section on the printer details page, check that Google Cloud Print is enabled under **Options > Mobile & BYOD > Google Cloud Print**.

2. Once published, you must *share* your printer with users, using your Google administrator account to log in to the Google Cloud Print printer management page: <https://www.google.com/cloudprint#printers>

### Printer published to Google Cloud Print

	 <p>14 May 21 May 28 May 4 Jun 11 Jun Day</p> <p>Total pages: 4 (Last reset by [system] on Jun 12, 2014 12:32:42 PM) Total jobs: 1 (Last reset by [system] on Jun 12, 2014 12:32:42 PM)</p> <p><a href="#">Environmental Impact</a></p>
<p><b>Printer/Device Groups/Tags</b></p> <p>Printer groups can be used to group or tag printers. The groups can then be used for reporting, filtering or access control. Common groupings include location, type/make/model and the department or office responsible for the printer.</p> <p>E.g.: "Type:Laser, Department:Science"</p>	<p><b>Printer/Device Groups</b></p> <input type="text"/> <p>(a comma separated list of groups)</p>
<p><b>Google Cloud Print</b></p> <p>Publish and share this printer via Google Cloud Print.</p>	<p>This printer has been published to Google Cloud Print.</p> <p><a href="#">Manage sharing in Google Cloud Print</a></p> <p><input type="button" value="Delete from Google Cloud Print"/></p>

You can unpublish a printer by clicking **Delete from Google Cloud Print**.

Sharing a printer sends a *sharing invitation* to each invited user. Each user must respond by accepting the invitation by logging in with their own Google account to the Google Cloud Print printer management page: <https://www.google.com/cloudprint#printers>

The printer sharing process is provided by Google as their solution for printer security and access control. This is not included in this manual as Google's interfaces for sharing printers are likely to change. For example, at the time of writing, the sharing interfaces require a computer or Chromebook browser.

You should test sending and accepting printer sharing invitations at your site, using your targeted mobile devices, and document any required steps for your users.

**Tip:**

You can list only those printers published or not published to Google Cloud Print using a filter:

1. Go to the Printers tab to see a list of printers.
2. Click **[edit]** to edit the filter.
3. From Published to Google Cloud Print select Yes or No and click **Apply Filter**.

## Testing Google Cloud Print

You should test the operation of Google Cloud Print before rolling out the system to your users. Your test plan should factor in the following items:

1. Sharing and accepting printer sharing invitations. Share your printers and test using your targeted mobile devices and applications.
2. Printing to a range of printers, page sizes, duplex and color settings.
3. Automatic email verification (if used). Send a print job from an unknown Google account and check that a verification email is sent. Follow the steps in the email to associate the account with a PaperCut user and print the job.
4. Tracking and control of Google Cloud Print jobs. Verify that print jobs from Google Cloud Print are associated with the correct user and are being tracked in the print log.

You should take into account the requirements listed in [Requirements](#) when creating your test plan.

### 4.9.5.4. Troubleshooting Google Cloud Print Problems

## Troubleshooting Printer Publishing Problems

Some printers might not be able to successfully publish to Google Cloud Print. There are several possible causes:

1. *The PaperCut secondary print server is running on Novell*

For various technical reasons, PaperCut does not currently support Google Cloud Print on Novell print servers.

2. *The secondary print server is a Windows desktop machine*

When running the Print Provider on a Windows desktop, PaperCut disables by default the server events needed for Google Cloud Print operation. This is done for performance reasons for sites running many desktop Print Providers.

You can enable server events on a desktop Print Provider machine by adding the following line to the `print-provider.conf` file and restarting the Print Provider service:

```
ServerEventsEnableOnDesktops=on
```

There might be performance implications if this change is made on a large number of desktops.

3. *The secondary print server is running an older version of PaperCut*

The Print Provider must be running a version of PaperCut that supports Google Cloud Print.

Google Cloud Print support was first introduced in PaperCut release 13.5.

4. *A connection from the Application Server to the Internet is unavailable*

The Application Server must be connected to the Internet to publish printers and process Google Cloud Print jobs.

5. *Google access has been revoked*

This might occur if the Google administrator account used to publish printers has been deleted or PaperCut's access to this account has been revoked. To recover from this scenario, disable and re-enable Google Cloud Print in **Options > Mobile & BYOD > Google Cloud Print** and re-publish and share your printers.

## Troubleshooting Printing Problems

Print jobs printed to Google Cloud Print might not print correctly. If this occurs, check the **App Log** for error or warning messages. The user should also check Google's print job page <https://www.google.com/cloudprint#jobs> for job status information. If the job was submitted, but has not printed, some causes are listed below:

1. *The job is from an unknown user*

PaperCut must map the Google email originating the job with a PaperCut user. If no user is matched, the job is cancelled. See [Enabling and Configuring Google Cloud Print](#). To resolve, manually add the Google email as a user's secondary email address in the **User Details** page. Or you can enable automatic email verification.

2. *The job requires a popup response and no response received*

If a job requires popup response, for example, to select an account to charge, and no response is received, PaperCut waits up to 10 minutes before cancelling the job. Users must respond using the Mobile Client - see [Mobile Client](#). PaperCut sends a reminder email to use the Mobile Client. If a user has not received this email, check that the reminder setting is on, and that the email is not being diverted to the user's spam/junk folder.

3. *The print driver is not capable of rendering the job*

When printing using CUPS (Linux and Mac Print Providers), the print driver is responsible for rendering the PDF document from Google Cloud Print. Some drivers, such as a generic Postscript driver, might not be able to render a PDF document. If you are using a generic Postscript driver as pass-through, you might need to set up a separate queue for Google Cloud Print using the proper printer driver for your printer.

4. *The print driver does not perform as expected*

Some print drivers might not fully comply with the print ticket from Google Cloud Print. This can result in the printed output not respecting the requested paper size, color or duplex setting. Google is working with printer manufacturers to resolve such problems. The first course of action is to update the printer driver to the latest version to see if the problem has been resolved. Otherwise, you can report the issue to our support team.

If the PaperCut page counts or color page counts are incorrect, contact our support team.

5. *The PaperCut Application Server has lost connection with the Internet*

The Application Server must be connected to the Internet to publish printers and process Google Cloud Print jobs.

6. *The printer or secondary print server is down*

A printer can still appear available in Google Cloud Print even if the printer is currently down or the Print Provider managing the printer is unavailable. The job will print when the Print Provider is brought back up.

## 4.9.6. iOS Printing (iPad & iPhone)

PaperCut's iPad / iPhone Printing support enables printing to all your PaperCut managed printers across your enterprise (and iOS devices - iPad, iPhone, iPod Touch). As well as enabling printing, the PaperCut iPad / iPhone App also provides the rich functionality desktop users are used to, such as authentication, balance display and selecting / charging to [Shared accounts](#) when printing.

The PaperCut iPad / iPhone App is able to be deployed / installed in a pre-configured form for your network via a simple URL.

PaperCut's iPad / iPhone Printing support works by providing two key parts:

1. The PaperCut Printer Advertiser - advertises the Apple CUPS printers managed by PaperCut using Bonjour/mDNS (so the iPads / iPhones users can find the PaperCut controlled queues).
2. The PaperCut iOS App, providing support for print authentication, balance display, account selection and other features.

At the time of writing there is no built-in option provided by Apple to print from an iOS device to server shared print queues. PaperCut uses existing technologies built into Mac OS (Bonjour/mDNS) to advertise PaperCut managed server shared print queues so you can track and control iPad / iPhone printing. Some printers include built-in support for AirPrint®



**Note:** "AirPrint" is a registered trademark of Apple Inc.

(for printing direct from iOS devices to the printer), however, the nature of print control/accounting requires that print jobs are intercepted by a central server. Additionally, most larger organizations want to leverage their existing print infrastructure, policies and print rules rather than change them. PaperCut's solution for iPad / iPhone Printing now allows you to leverage your existing network and PaperCut setup.

### 4.9.6.1. Requirements

1. Mac OS X 10.8 or greater system to share the print queues (computer version is fine, server tools not required)
2. Apple iOS 5 or greater devices to print from
3. Wireless network

The PaperCut Printer Advertiser is a part of the PaperCut primary and secondary server installation and advertises the PaperCut print queues to iOS devices.

For Windows, Linux or Novell sites (or sites with a Mac OS 10.6 or older print server they would prefer not to upgrade), you can configure a separate (secondary) Mac OS 10.8 print server to share print queues. This can be as simple as purchasing a *Mac Mini* system and making it accessible from the wireless network.

Alternatively, you can use third party applications, such as, [Presto](#), which can share printers on a Windows server to mobile devices across your network. PaperCut Software has worked with these vendors to ensure compatibility and an improving solution over time. The Presto application also provides a solution for advertising printers over multiple subnets.

### 4.9.6.2. Sharing Printers to iOS Devices

1. Set up a Mac OS 10.8+ system to act as your iPad / iPhone print server. This can be your existing Mac print server (if it meets the system requirements), or a separate (secondary) print server (see [Configuring a Macintosh secondary print server](#) for details).
2. Install the print queues and drivers for the printers you want to share to your iOS devices. These print queues should point directly to the printer, not another print server.
3. Test printing from a local application (e.g. Safari) to ensure that the drivers and printers are functioning correctly.
4. Install PaperCut. If you are setting up a secondary Mac print server (i.e. the primary PaperCut server is on another system), follow the steps at [Configuring a Macintosh secondary print server](#).

Ensure that your Mac server is connected to the same subnet as the wireless network that the iOS devices will connect to. Without further configuration, the publishing protocol Bonjour broadcasts to the local subnet only and devices on other subnets will not see your printers.

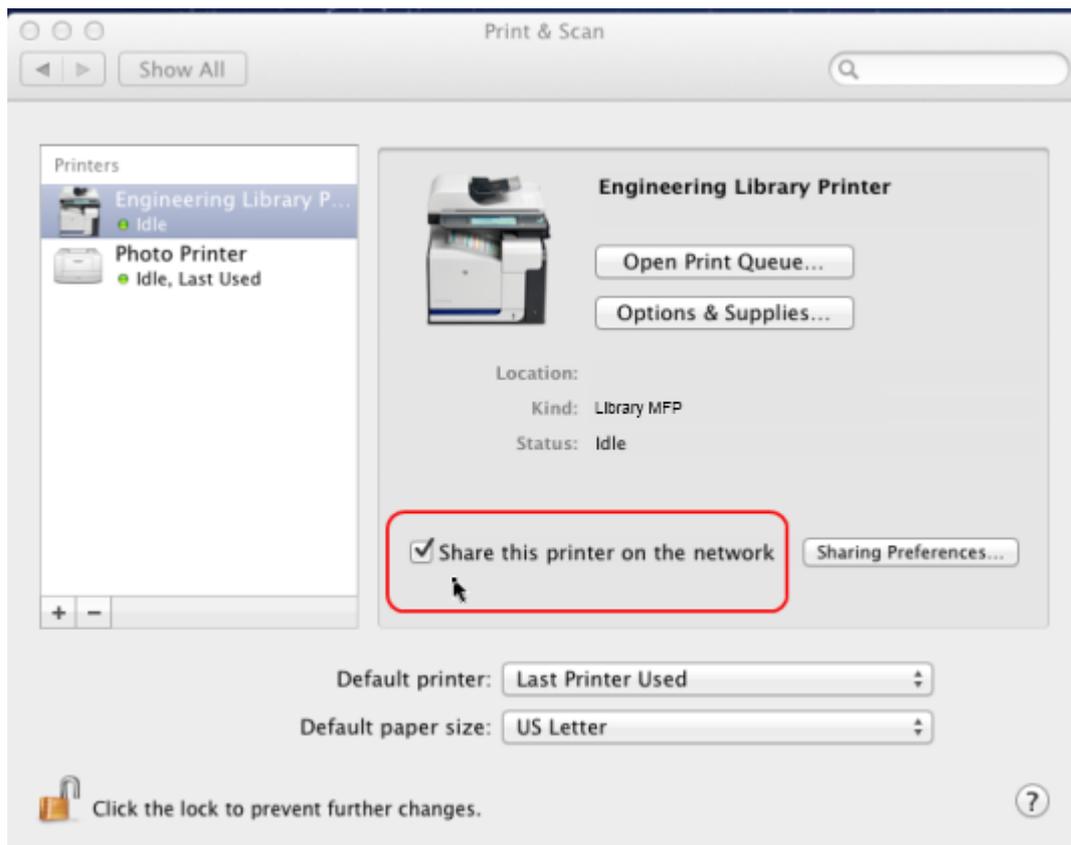
You can overcome the single subnet limitation by connecting your Mac server to multiple subnets. If you are using a cabled network, your Mac needs a separate Ethernet interface for each network connection. However, if you are using a wireless network, you can add multiple IP addresses, one for each subnet, to the same network interface. To add multiple addresses to a wireless interface:

- a. Open Network Preferences ( **System Preferences > Network** ) and select your wireless interface.
- b. Click the gear icon underneath the interface list; then select **Duplicate Service**.
- c. Enter a name for your new network; then click **Duplicate**.
- d. Select the duplicated network connection and click **Advanced**.
- e. Click the **TCP/IP** tab; then select **Configure IPv4 Manually**.
- f. Enter an IPv4 address for the subnet you want to connect to.

Your chosen IP address must be unique. Make sure you choose an IP address outside the DHCP address allocation range so there are no address conflicts. Alternatively, you can configure DHCP to permanently reserve the chosen address for your Mac Server. (DHCP configuration is normally performed on your network router.)

5. *Share* all the printers that you want to publish to iOS devices: **System Preferences > Print & Scan > [select printer] > Share this printer on the network** (to do this,

**Printer Sharing** must first be enabled in the **Sharing** pane).



6. Run `/Applications/PaperCut MF/Control Printer Monitoring.command`; then choose to *disable* print tracking on the print queues that will be shared (see [On Mac](#) for details). This allows you to test iOS Printing functionality without PaperCut's monitoring involved (to limit what is being tested).
7. Print a document from your iOS device e.g. open Safari, load a web page, touch the "arrow" menu and select **Print**. When selecting a printer, the queues shared from your Mac print server are displayed (if not, see [Troubleshooting](#)). The job should print correctly.
8. Test printing across a number of printers and apps such as Mail, Safari, Photos and iBooks / PDFs. Not all printers are capable of supporting all formats. Take the time to test and ensure the printers that you are making available produce acceptable results.
9. Re-enable PaperCut tracking using `/Applications/PaperCut MF/Control Printer Monitoring.command` (see [On Mac](#) for details).

You now need to install the iPad / iPhone app (Mobile Client) to print. See the [next section](#) for details.

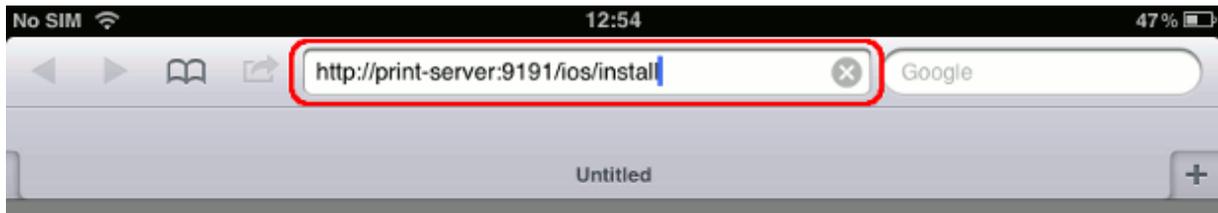
### 4.9.6.3. The PaperCut iPad / iPhone App (Mobile Client)

The PaperCut App for iPad / iPhone (also known as the [Mobile Client](#)) is required for printing to PaperCut managed printers. The App authenticates each print job - effectively linking up users

with their print jobs. It can also provide balance display, print job confirmation, [Shared accounts](#) selection and message notification.

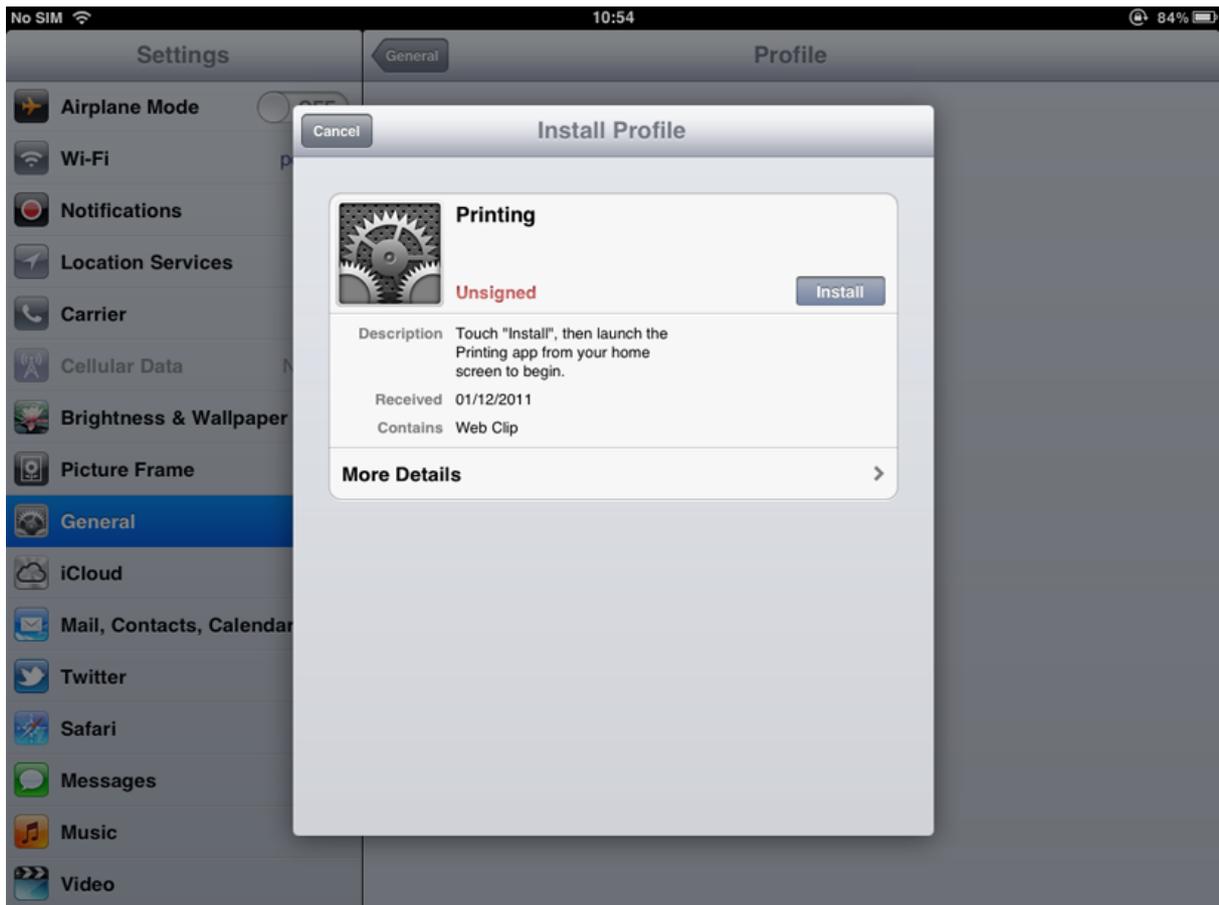
## Deployment

Deploying the App to iOS devices involves the user accessing a URL of the form `http://[primary-server]:9191/ios/install`, where `[primary-server]` is the preferred hostname or IP address of your primary PaperCut server.



**Tip:** For easier distribution of the installation URL, try adding a link on an intranet page, sending it in an email or printing the URL on posters. It might help to add a short DNS name for your print server or even set up a simple redirect URL (e.g. `http://my-org/ios/install -> http://print-server.myorg.edu:9191/ios/install`).

After accessing the installation URL on an iPad / iPhone (iOS device) an **Install Profile** dialog is displayed. Follow the prompts to install the App. Afterwards, a **Printing** App (a Web Clip) is available on the home screen.

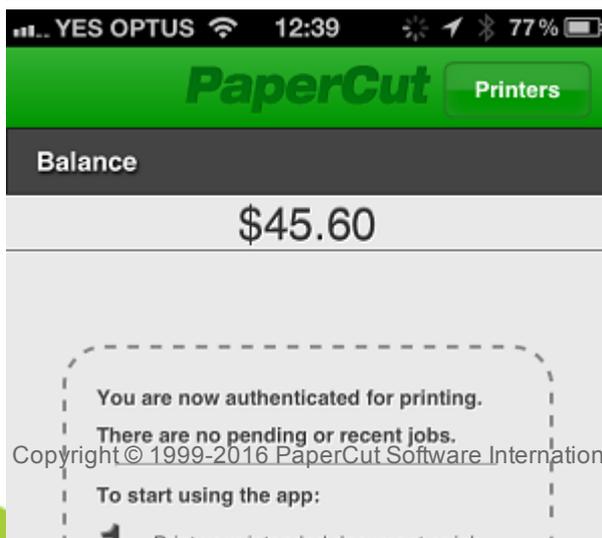
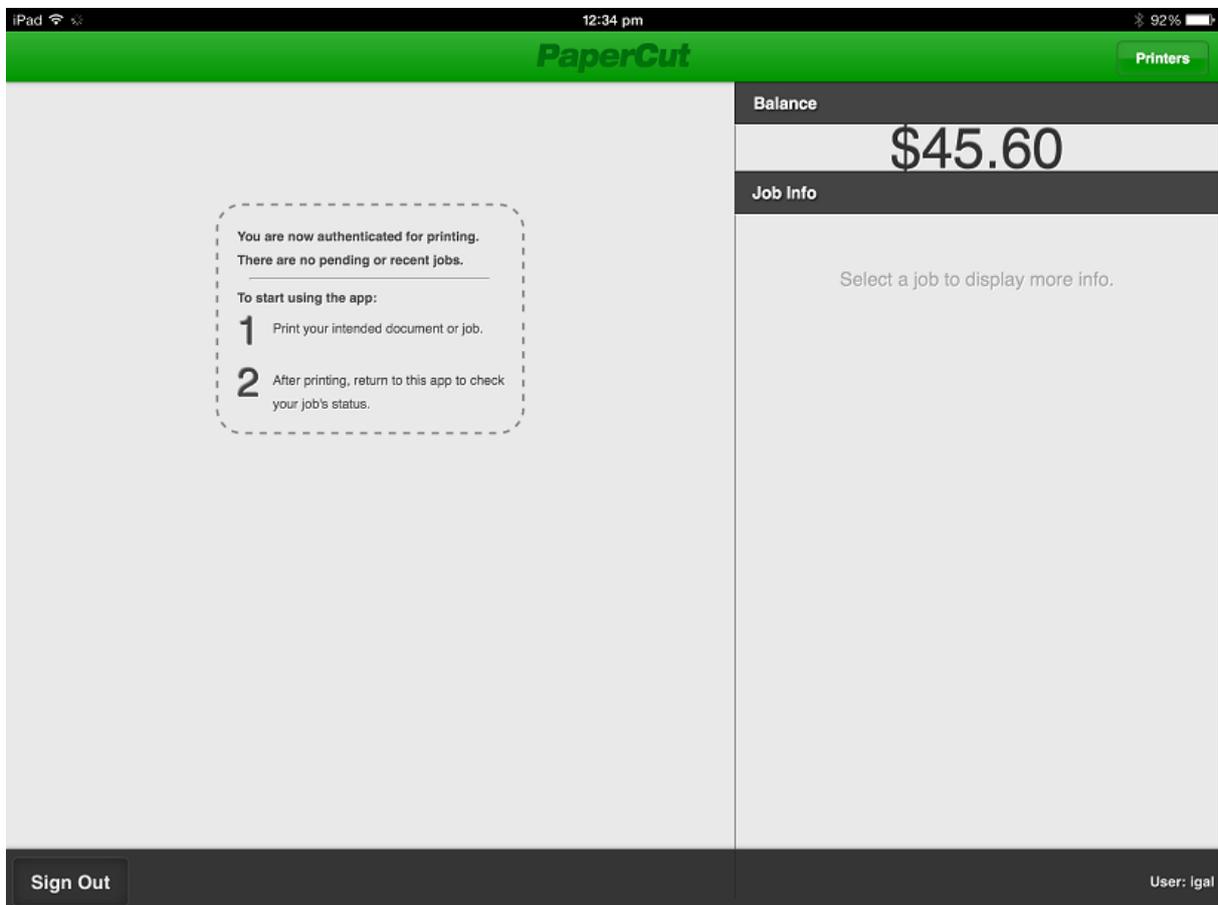


For alternative and advanced deployment options, see [Advanced App Deployment](#).

## Usage

The PaperCut App for iPad / iPhone ([Mobile Client](#)) is used to:

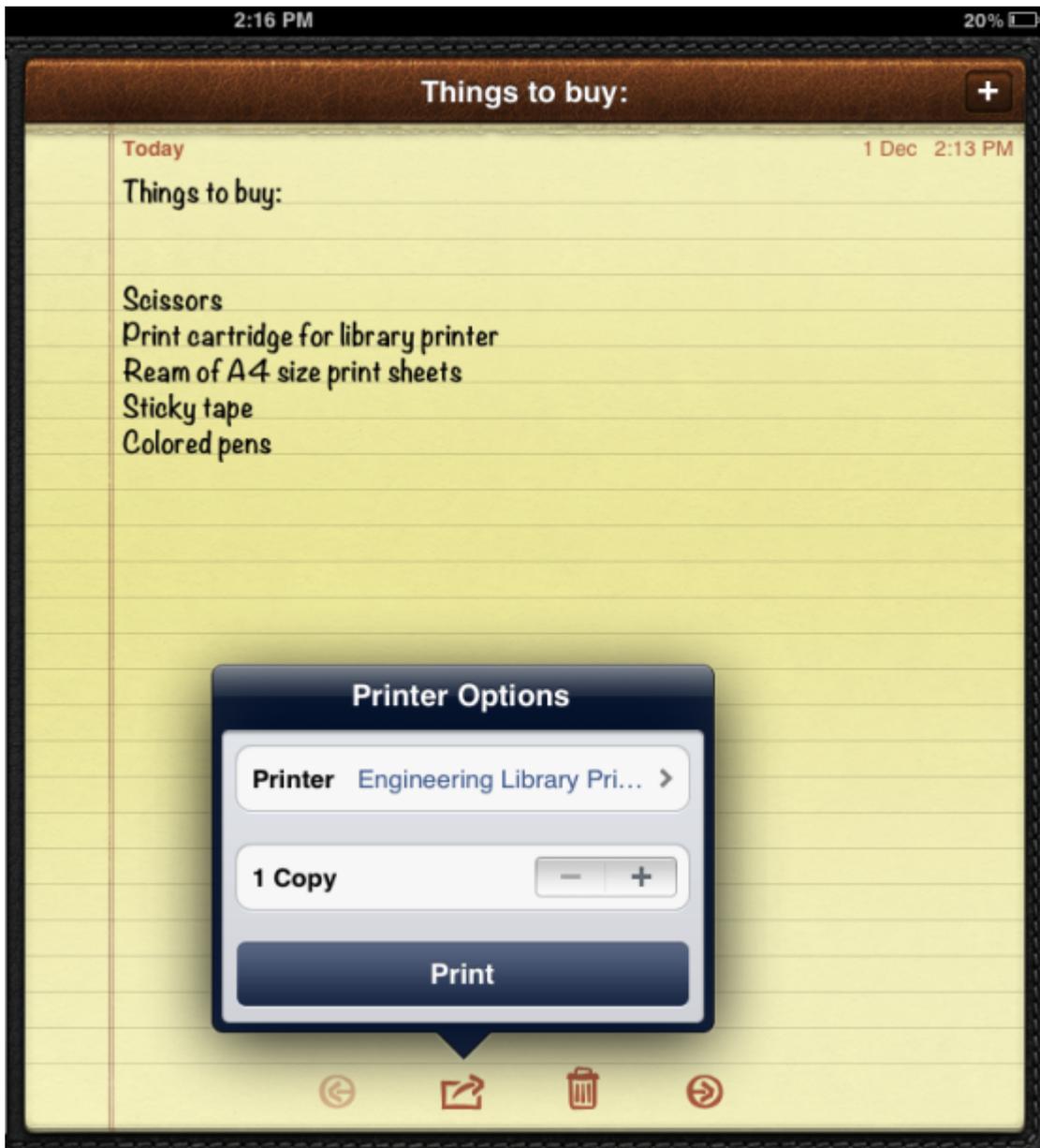
- Authenticate the user and their print jobs.
- Display the user's balance.
- Perform print job confirmation.
- Perform [Shared accounts](#) selection.
- Display [Advanced Scripting \(Print Scripting\)](#) messages.
- Perform other functionality such as message notification.



The following examples illustrate typical usage of the App for a student (immediate print) and a staff member (account selection).

## Scenario: Student Printing

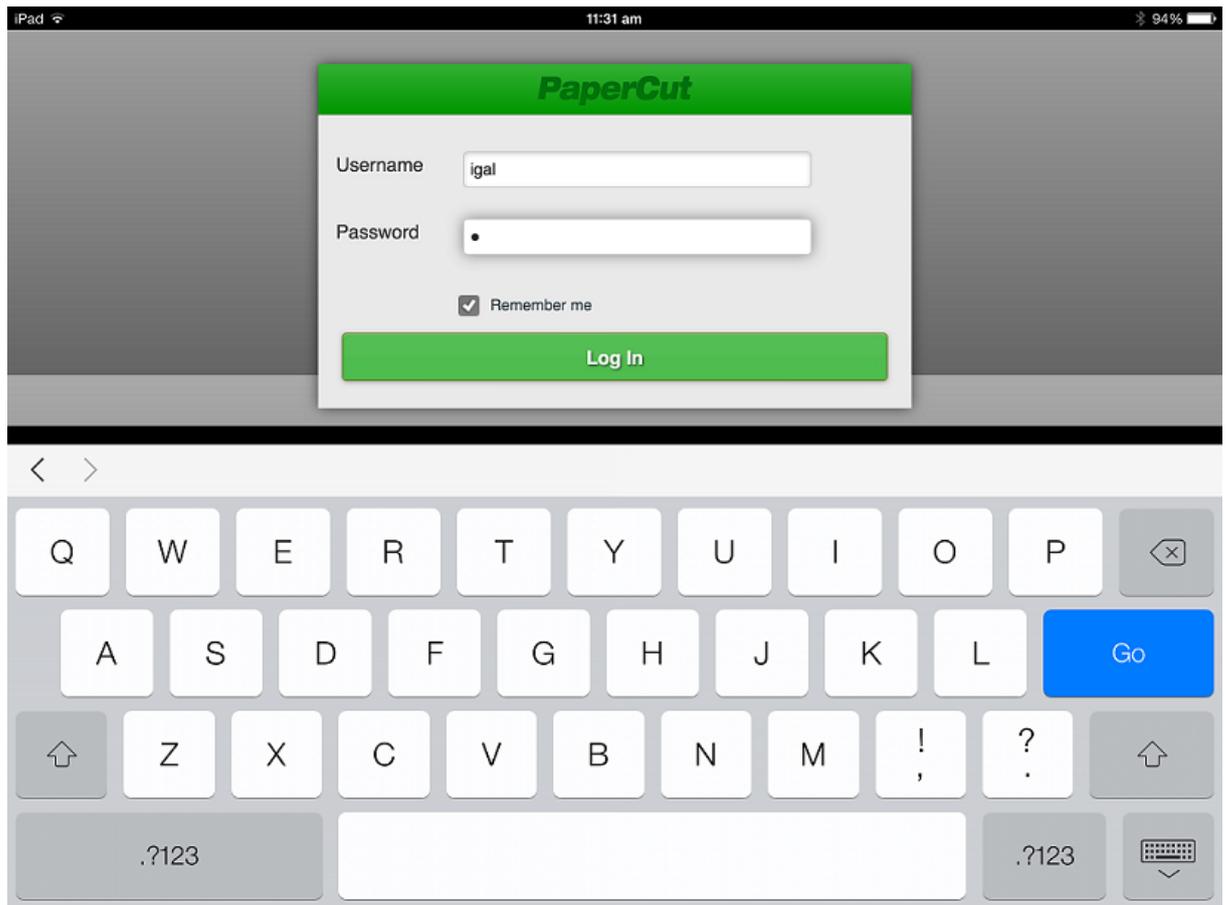
1. The student prints from their selected app.



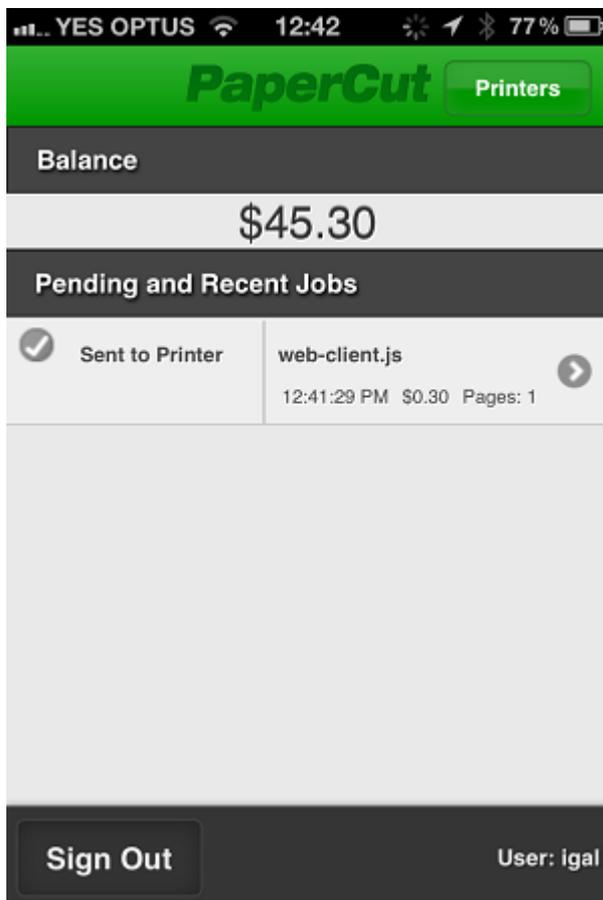
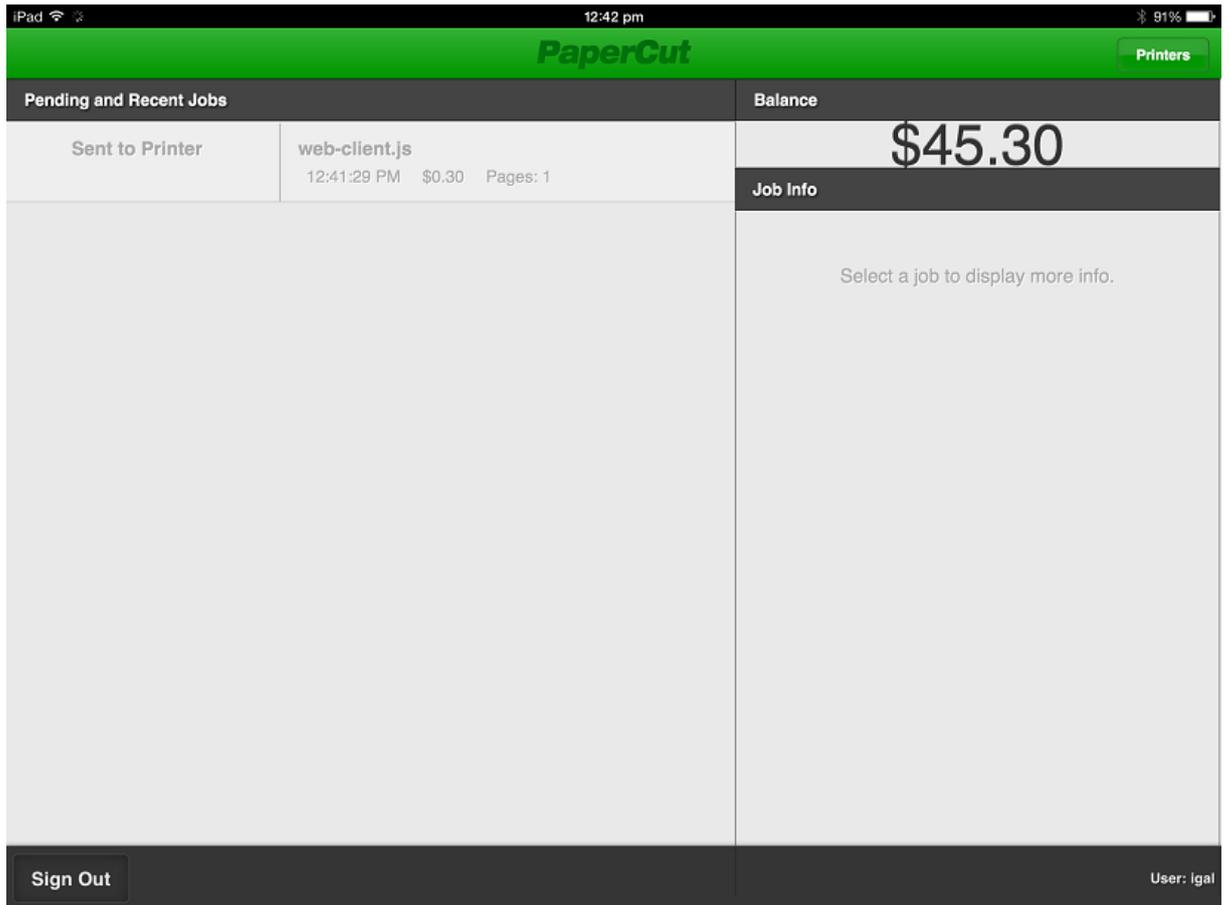
2. The student closes the app and opens the Printing (PaperCut) app.



3. The student enters their username and password. On a personal device this step only needs to be performed once. Future logins are performed automatically through the use of an authentication cookie.

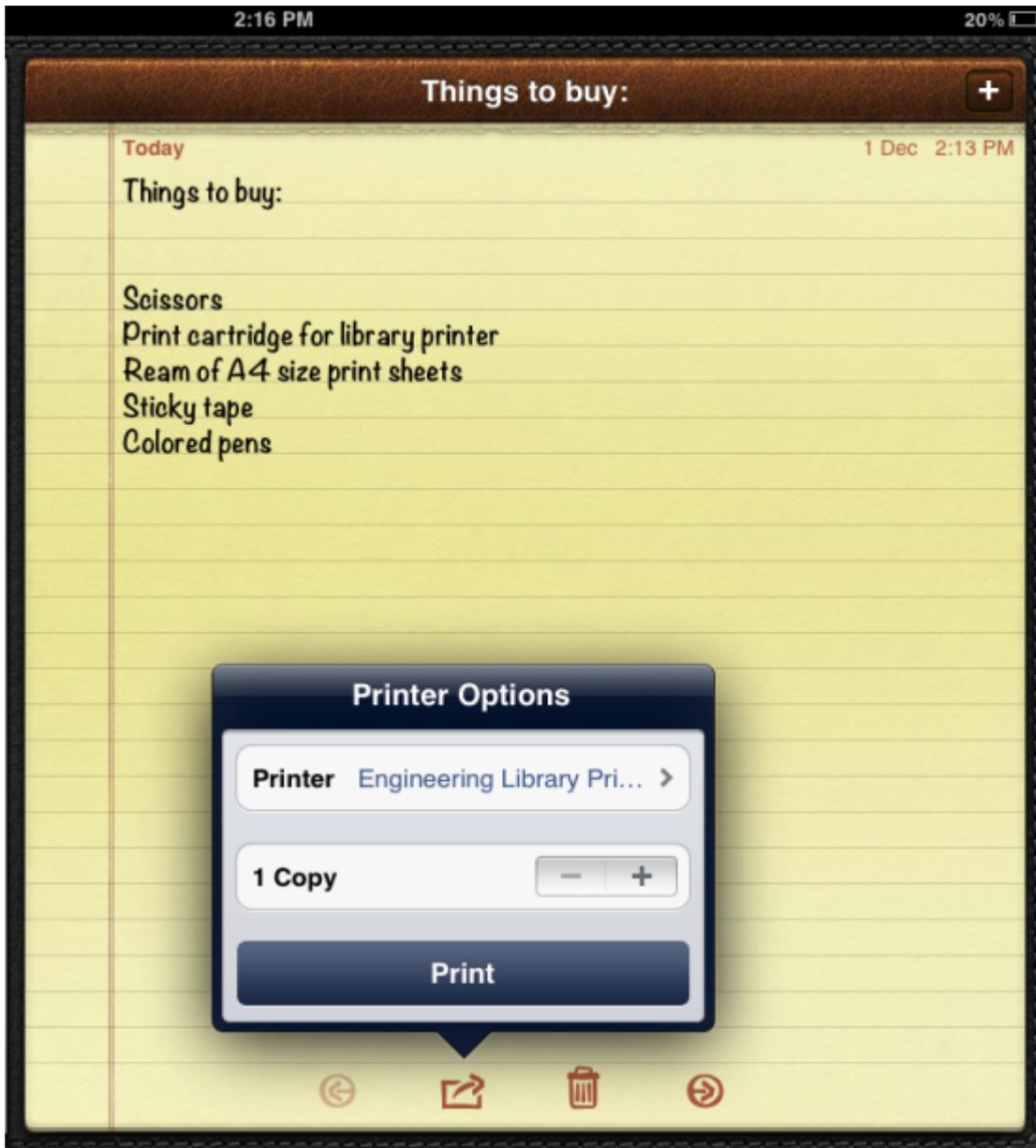


4. The student's print job is authentication and proceeds to print. The student can see their job's progress in the app.



## Scenario: Staff Printing (Account Selection)

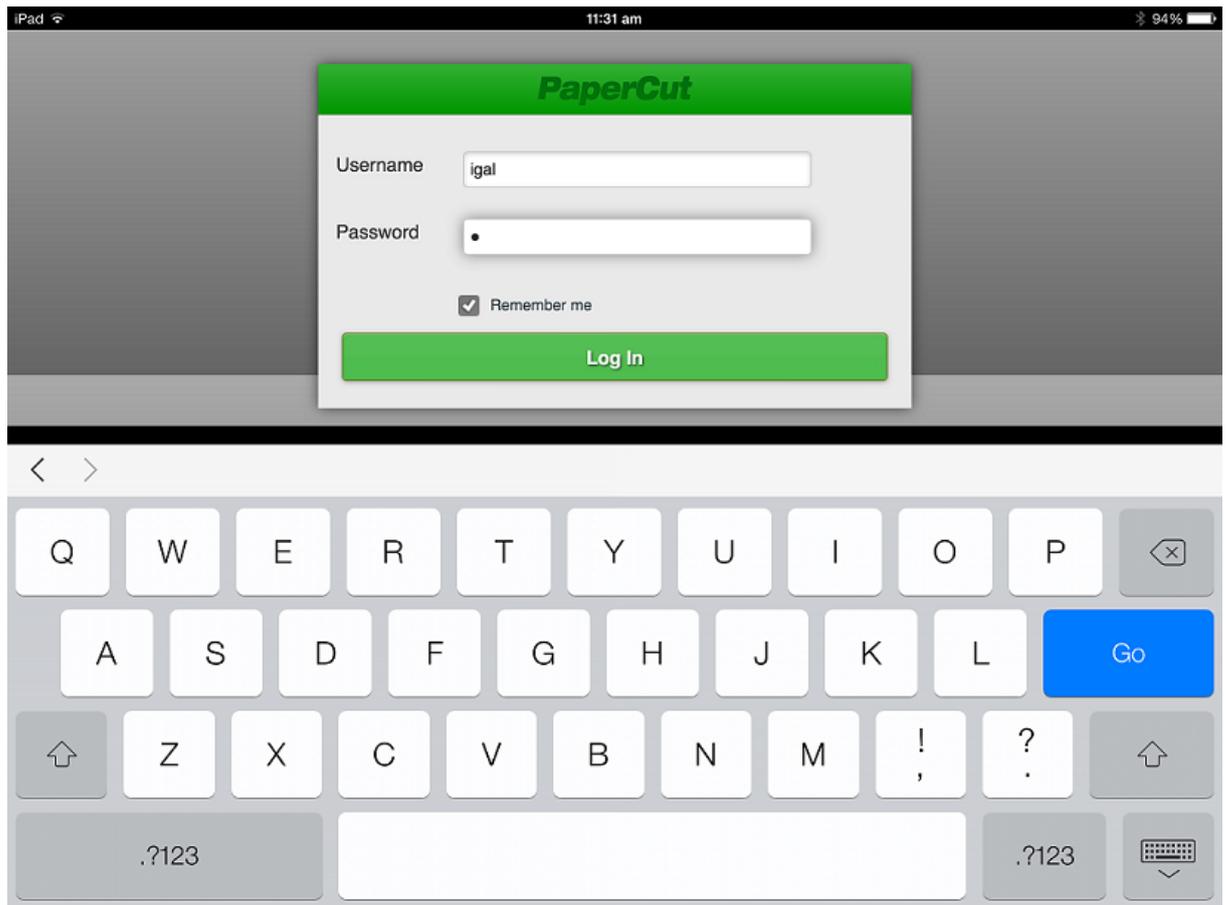
1. The staff member prints from their selected app.



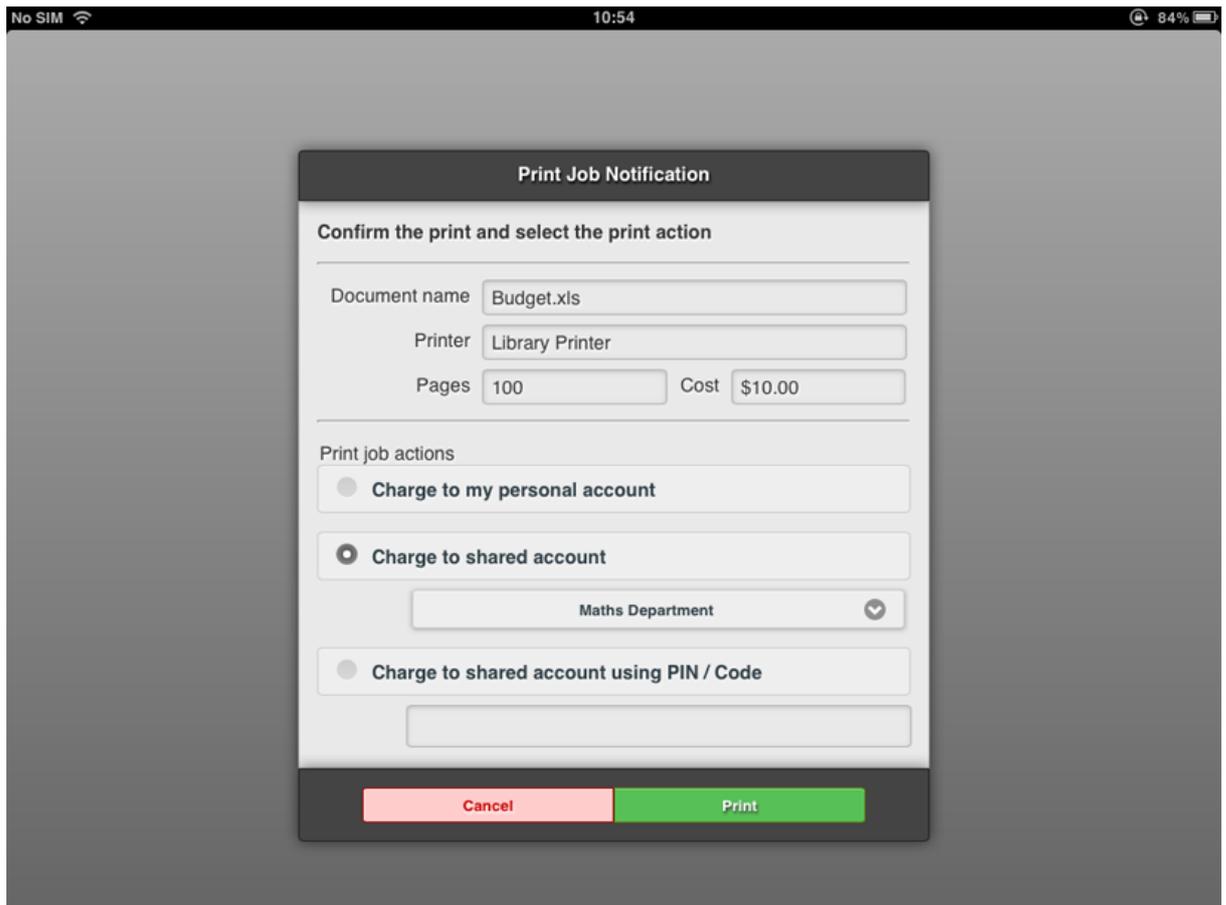
2. The staff member closes the app and opens the Printing (PaperCut) app.



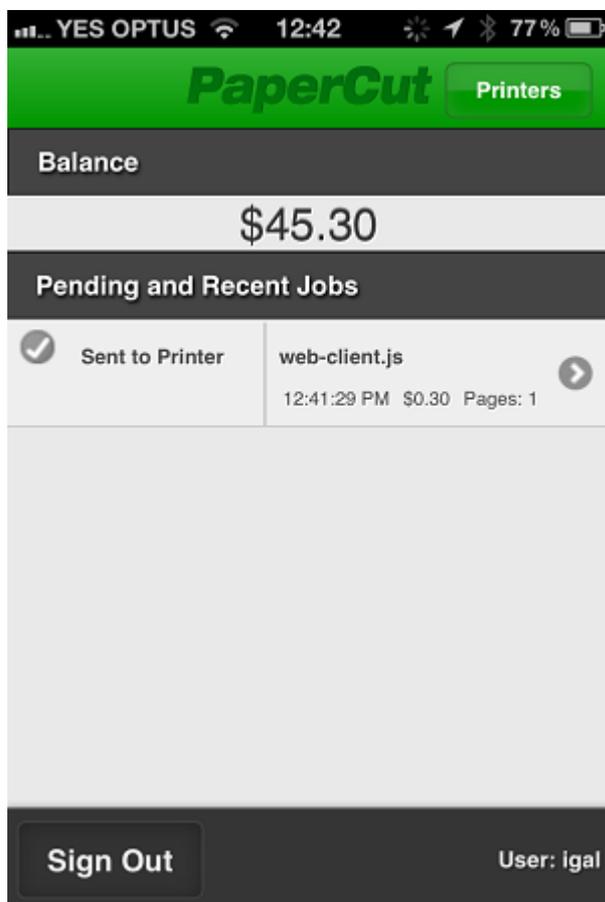
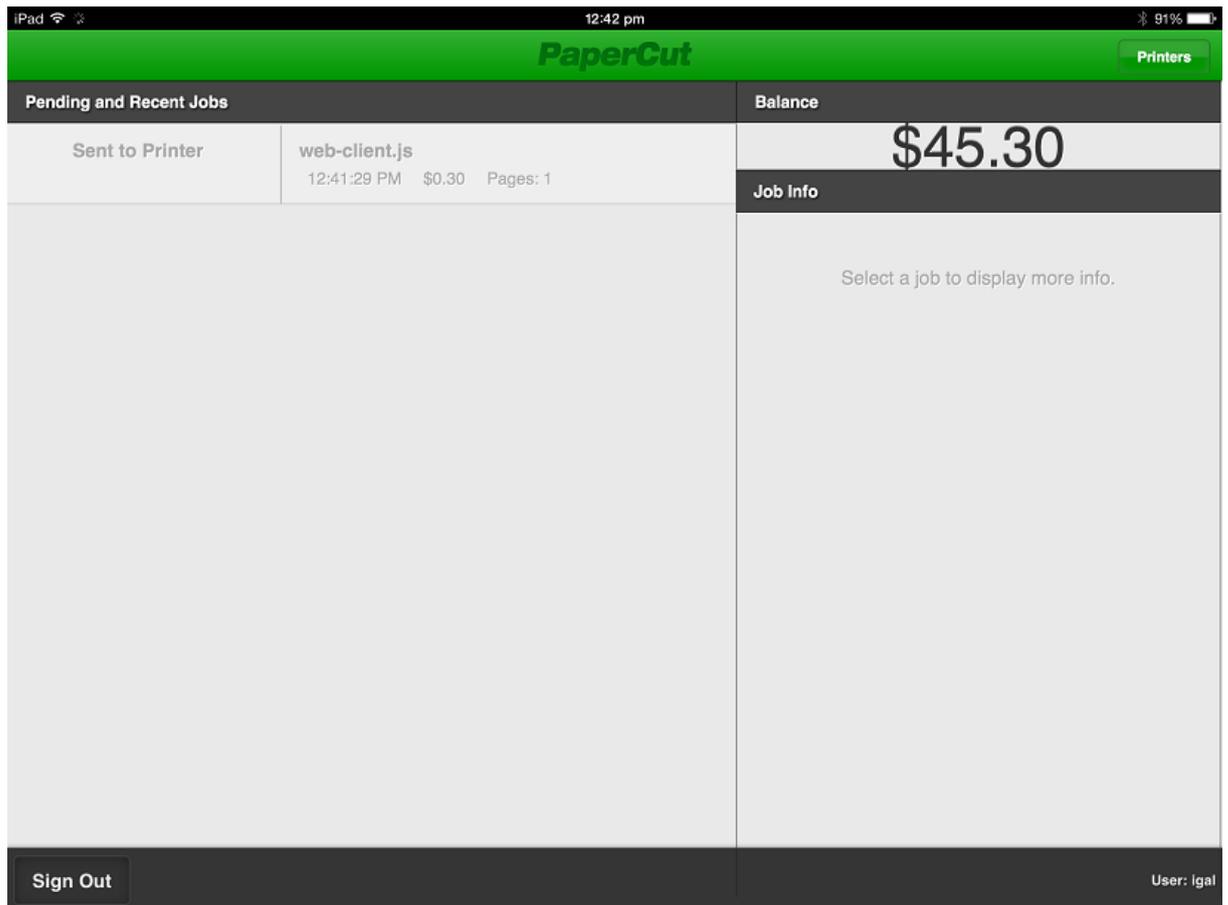
3. The staff member enters their username and password. On a personal device this step only needs to be performed once. Future logins are performed automatically through the use of an authentication cookie.



4. The print job is authenticated and is ready for account selection. The account selection dialog is displayed.



5. The staff member selects their chosen shared account and touches **Print**. The job prints, and the staff member can see their job's progress in the app.



## 4.9.6.4. Troubleshooting & FAQ

### Jobs won't print.

1. Are you printing double sided? Try turning double sided off. There seems to be issues with double sided printing on some iOS devices, as of iOS 5.0.1.
  2. Try printing with PaperCut tracking disabled (using `/Applications/PaperCut MF/Control Printer Monitoring.command`) to help diagnose the problem (see [On Mac](#) for details).
- 

### Can I have multiple Mac print servers running PaperCut's iPad / iPhone App (e.g. to provide different printers to different subnets)?

Yes! Alternatively, to provide the same printers to multiple subnets, consider using Bonjour/mDNS "reflectors" (left as an exercise for the reader ;-)

---

### My printers don't show up on the iOS devices when selecting a printer.

1. Ensure that the printers are *shared* on the Mac server.
2. Ensure that PaperCut is installed on the Mac server (primary or secondary server install).
3. It can take a few minutes before the printers show up on the iOS devices. Has it been that long since sharing the printers?
4. Ensure that the Mac server is on the same subnet as the iOS devices. Bonjour/mDNS, the protocol used to publish/advertise the print queues, is broadcasted only to the local subnet without further configuration (a "reflector", the configuration of which is beyond the scope of the documentation).

You can overcome this limitation by connecting a wireless interface on your Mac server to multiple subnets. For more information, see [Sharing Printers to iOS Devices](#).

5. Try rebooting the Mac server. This refreshes the list of available printers and restarts the Bonjour services that publish them.
- 

### My jobs do not show in the iPad / iPhone App.

PaperCut uses the IP address of your iOS device to determine which jobs to display. If you access PaperCut via a proxy server, the remote IP address might not be immediately accessible and jobs will not be displayed.

Some proxy servers retain the remote IP address in an X-Forwarded-For header. PaperCut can use this header to obtain the remote IP address, but for security reasons you must first add your proxy servers to PaperCut's list of trusted proxy servers.

---

In PaperCut's admin interface:

1. Go to **Settings > Advanced > Security**
  2. Add the IP addresses of your proxy servers to the Trusted Proxy Servers list and click **Apply**.
- 

### Other users' jobs are showing up in the PaperCut iPad / iPhone App.

1. The IP addresses of the iOS devices must be unique. Ensure that the devices are not behind a NAT relative to the Mac Print Server sharing the print queues.
  2. If just one other user's jobs are showing up, ensure that the DHCP lease times aren't too short.
- 

### Why isn't PaperCut iPad / iPhone Printing App supporting Windows print servers?

PaperCut supports Windows print servers by integrating with best-of-breed solutions, such as, [Presto](#). For sites that would prefer a 100% Apple solution, you can add a secondary Mac print server (e.g. a Mac Mini) to provide iOS printing support.

---

### I changed a printer's Location field and it's not reflected on the devices.

Changes to the printer's location and name are not reflected immediately. You might need to restart the system or services to promptly broadcast these changes.

---

### Under what username do jobs from iOS devices arrive in the print queue?

`guest`. The CUPS web interface displays this username as **Withheld**.

---

### Jobs are printing as `[generic account]`, e.g. "guest".

Ensure that `[generic account]` is marked as **Unauthenticated** in PaperCut.

---

### How do I uninstall / reinstall the PaperCut App on my iPad / iPhone?

1. Delete the **Printing** app (Web Clip) (hold your finger down over the app until the icons "go wobbly", then touch the cross icon next to the app).
  2. Delete the **Printing** profile via **Settings > General > Profile > Printing > Remove** It is important that the app / Web Clip is deleted before deleting the profile (if not, problems have been reported such as multiple blank icons returning once the profile is reinstalled, as of iOS 5.0.1).
  3. To reinstall, follow the installation procedure again.
- 

### How do I prevent a printer being shared?

See [Limiting Printer Deployment](#).

---

### How do I disable or re-enable iOS printing support on a Mac Print server?

There are two commands that you can run from the OS X terminal or the OS X Finder:

---

- `[app-path]/providers/iosprint/mac/disable-iosprint.command`. Stops (and disables) the iOS print service and creates a marker file that is used during subsequent upgrades to respect the iOS print status.
- `[app-path]/providers/iosprint/mac/start-iosprint.command`. Enables (and starts) the iOS print service and removes the marker file.

---

### Can the PaperCut App for iPad / iPhone Printing display print scripting popups?

Yes. Scripting popups for the PaperCut App is possible.

---

## 4.9.6.5. Advanced iPad / iPhone Printing Setup

### iPad / iPhone Printing Technical Description

PaperCut for iPad / iPhone Printing works by providing four distinct parts:

1. PaperCut enables Mac OS's built-in Bonjour/mDNS publishing to advertise/publish PaperCut managed/tracked shared print queues, so that they are displayed in the **Print** menu on iOS devices (on the same network).
2. CUPS on Mac OS accepts print jobs (as PDF) and renders them into the queue's target printer language (generally PostScript).
3. PaperCut identifies the print jobs, generally arriving as user `guest`, as being unauthenticated. The device IP address is used to identify the device sending the print job.
4. The PaperCut App on the iOS device is used to authenticate the user from their device IP address, linking their print jobs with their username.
5. The App receives directions from the PaperCut server, such as to display print job details or account selection.

## Limiting Printer Deployment

When PaperCut is installed on a Mac OS 10.8+ print server, all PaperCut MF *managed and shared* printers are published (made available) to iOS devices by default (see [Sharing Printers to iOS Devices](#) for details). If you want to share printers to OS X (desktop) systems but not to iOS devices, you can turn off broadcasting/advertising by adding "No iOS" anywhere in the printer's location field, then restarting the system e.g.:

1. Navigate to **System Preferences > Print & Scan > [select printer] > Options & Supplies > Location**
2. In **Location**, enter the text "No iOS" te.g. "Lab G4.01 (No iOS)".
3. Restart the system for this change to take effect.

## Advanced App Deployment

Large deployments such as universities, school districts or corporations with organization-wide iPad / iPhone deployments might want to consider more advanced app deployment techniques. Other than the standard URL based (Configuration Profile) deployment covered in [Deployment](#), there are several other deployment options, all of which are compatible with PaperCut:

- If you are using the [iPhone Configuration Utility](#) to distribute Configuration Profiles to your iOS devices, you can add a Web Clip to them. Use a URL of the form `http://[primary-server]:9191/ios`. If you are using an SSL certificate with PaperCut that is trusted by your iOS devices, you can use an HTTPS URL of the form `https://[primary-server]:9192/ios`. You can find an icon at `http://[primary-server]:9191/images/icons2/72x72/web-client.png`.
- If you are using a [Mobile Device Management](#) (MDM) server to send configuration to your iOS devices, you can add distribution of the PaperCut App as a Web Clip. Use a URL of the form `http://[primary-server]:9191/ios`. If you are using an SSL certificate with PaperCut that is trusted by your iOS devices, you can use an HTTPS URL of the form `https://[primary-server]:9192/ios`. You can find an icon at `http://[primary-server]:9191/images/icons2/72x72/web-client.png`.
- You can access the PaperCut App for iOS devices from Safari using a URL of the form `http://[primary-server]:9191/ios`. From here, you can either continue to use the app in Safari, or select **Add to Home Screen** from the "arrow" menu. Launching the App from the home screen is recommended for the best experience.

### 4.9.7. Email to Print

Email to Print allows users to print by emailing their documents to a special address. No client software or drivers are required, providing a simple way for your organization to print from any device that can send an email.

Email to Print is part of a collection of solutions to manage mobile and BYOD printing. For more information see [Mobile & BYOD Printing](#).

**Note:**

Email to Print is not available on direct print queues. To offer this service to your users, set up a server queue for this device/printer.

#### 4.9.7.1. How Does it Work?

- Each printer has a unique email address e.g. `printing@example.org`
- Users compose an email, attach printable document(s), and email to the printer's address.
- PaperCut receives the email and prints the documents on behalf of the user.

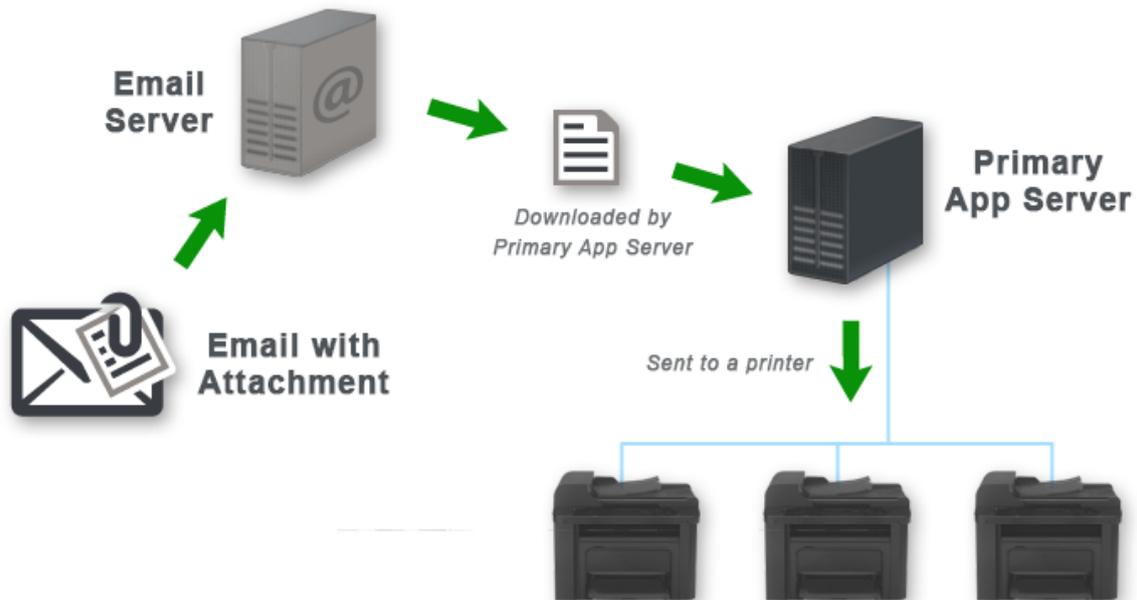


Figure 51: workflow

#### 4.9.7.2. Solution Summary

- Easy to use, easy to set up.
- Works with nearly any device (anything that can send an email with an attachment).
- Supports PDF and picture file attachments. Additionally supports Microsoft Office attachments when a Web Print Sandbox is configured.
- All print options are locked to the OS print queue defaults.

★ **Tip:** You can set up multiple OS print queues for the one printer with different default settings e.g. one for single-sided, one for double-sided.

★ **Tip:** You can use Email to Print in conjunction with [Find-Me Printing and Printer Load Balancing](#). Rather than one email address per printer, you can use a single address for multiple printers. Users could then release their jobs at the printer of their choice.

★ **Tip:** You can use Email to Print in conjunction with PaperCut internal users. This allows users without a domain account to register their own account with an email address. For more information, see [Internal users \(users managed by PaperCut NG\)](#) for details. You can also use Email to Print to create a guest printing solution for visitors and guests with BYOD devices. See [Anonymous guest printing](#) for details.

### 4.9.7.3. Before You Start: Aliases

When processing Email to Print jobs, PaperCut connects to a single mailbox on a mail server. The mailbox receives the emails of all printers, where each printer has its own email alias. This is achieved in one of three possible ways:

1. **Email forwarding** - If options 1 and 2 are not possible with your email server, another option is to configure one mailbox per printer. Each mailbox could then forward all mail to the "main" mailbox e.g. `library@example.org` is a mailbox that forwards to `printing@example.org`.
2. **Dynamic aliases** - Many email servers support the dynamic alias "+" syntax" e.g. `printing+library@example.com` gets delivered to the `printing` mailbox. This is the simplest option to set up and maintain. However, removing or renaming a dynamic alias doesn't stop emails for the now defunct printer name. Also, the email addresses are arguably not as nice to look at!
3. **Server-side aliases** - The email address for each printer is an email alias of the mailbox e.g. `library@example.org` is an alias of `printing@example.org`. This is the recommended approach when using Google Apps (gmail) and Outlook.com.

Pick a strategy that suits your environment and you are ready to start.

### 4.9.7.4. Prepare the PaperCut Server

1. Configure your SMTP server details in PaperCut at **Options > Notifications** .

This is required so PaperCut can respond to user emails e.g. to let them know their job has been received.



**Tip:** When configuring your SMTP settings, use a real, attended **From address**. Users can reply to this address to ask questions. They will have a better experience if they receive a reply.

2. Configure a user facing server address at **Options > Advanced > Server Address > Server address presented to users** .

Email to Print sends emails to users that include links to the PaperCut server, so it needs to know the server's network address. If you want to support Email to Print from the internet, this address needs to resolve both internally and externally to your network i.e. a fully qualified public DNS name.

For more details see [Server address presented to users](#).

### 4.9.7.5. Setting up a Mailbox

1. Set up a new mailbox on your email server. Email to Print supports mailboxes with either POP3 or IMAP protocols.

This mailbox receives all emails for Email to Print. Each email is deleted from the email server after it is processed, so the storage requirements should not be large.

**Tip:**

If you are using Gmail to host your mailbox, there are default actions for emails deleted. These actions are based on the protocol being used. POP3 keeps a copy of the email in the Inbox, while IMAP archives it. If you prefer a different behavior, you can log in to the Gmail account and change the following settings:  
**Settings > Forwarding and POP/IMAP > POP Download > When messages are accessed with POP** - Delete, Mark or Archive [your org's] copy  
**Settings > Forwarding and POP/IMAP > IMAP Access > When a message is marked as deleted and expunged from the last visible IMAP folder** - Archive, Move to the Bin or Delete forever

**Important:**

Do not use your personal email address for testing, unless you want to print every PDF ever sent to you! One of our developers did this. It wasn't pretty.

2. Navigate to **Options > Mobile & BYOD > Email to Print** and check **Enable Email to Print**.
3. Configure the section **Receiving Email Account / Mailbox** according to your mail server and newly created mailbox. Note that with some email servers, the **Username** might not be in the email address format.

The remaining settings are discussed later in this section. The default values will suffice for testing.

**Email to Print**

Print by email with document attachments. Each printer has its own email address.

[More Information...](#)

Enable Email to Print

Status: OK

Enabled printers: 1 (Configure at [Printers > Printer List](#))

Supported formats: PDF

[\[Refresh\]](#)

Receiving Email Account / Mailbox

Protocol:  using security:

Host:  (e.g. pop.example.org)

Port:

Username:  (e.g. printing.internal@example.org)

Password:

**Job Response**

Email forgery (sender spoofing) protection

Email body

Your Email to Print job has been received. Please follow this link to print it: %verify-link% .

This link will expire after %expire-hours% hours.

The following documents were received:

%print-attachment-list%

**Error Responses**

Nothing to print (no valid attachments)

Your Email to Print job was received, but no PDF attachments were found. Please ensure you have attached a PDF and try again.

Other

Your Email to Print job was received, but a problem occurred printing your document. Please check that the attachments are valid, or contact an administrator for assistance.

[See Common Mobile Printing Options](#)

### 4.9.7.6. Testing Email to Print

1. Navigate to **Printers > Printer List** ; then select a printer for Email to Print testing.
2. In the **Email to Print** section, give the printer a unique and simple email alias.
3. Depending on your chosen alias type, configure the email server to point the new email alias to the Email to Print mailbox (see [Before You Start: Aliases](#)).
4. Pick a test user account from the **Users** tab and ensure it has an associated email address you can send an email from (**Primary email** or **Other emails**). If you don't have a test email account, you can temporarily assign your own email address to the test user.
5. From the test user's email address, compose a new email, attach a PDF, and send it to the printer's email address (the alias, not the mailbox).
6. In a short time you should receive a verification email (see [Customization](#)). Click the link in this email. Your job should now print!



**Note:**

Jobs can be held pending further action when features, such as, [The Account Selection Popup](#) or [Hold/release queues & Print Release Stations](#) are in effect.



You need to address this as per a normal print job. See [Interaction with other features](#) for details.

7. Check your job printed successfully, and inspect the print log at **Printers > Job Log** .

If you want to support Microsoft Office document attachments in addition to PDF and picture files, see [Adding support for Microsoft Office Documents](#).

Continue with [Customization](#) below to tweak settings to your site's needs.

### 4.9.7.7. Customization

The following customization settings are in **Options > Mobile & BYOD > Email to Print**.

- **Sender Verification**

This option controls how PaperCut responds when it receives an Email to Print job from a user.

The default setting, **Verify sender. Users must click a verification link.**, sends an email with a link the user must click before their job is printed (or proceeds to the next stage, such as a [Hold/release queues & Print Release Stations](#)). The purpose of this setting is to verify the sender of the email actually owns the email address, as it is often trivial to fake/-forge/spoof the sender address. In the **Email body** for this setting, the special replacement marker `%verify-link%` is required.

If verification of the sender address is not important, you can use the setting **Do not verify sender. Respond to job with confirmation.** When this setting is used, jobs are processed immediately, and the user receives an email to let them know their job was received. In the **Email body** for this setting, use the special replacement marker `%client-url%` as a link to the Mobile Client, which shows the job's status.

- **Anonymous/Guest Submission**

This item enables the sending of Email to Print jobs from anonymous guest users. These jobs are sent to a special guest printer alias. Jobs are logged to the specified user (default is `guest-user`.)

See [Anonymous setup](#) for more information.

- **Error Responses**

These options allow the customizing of response emails sent to users when things go wrong.

**Nothing to print (no valid attachments)** - Used when an email is received but no valid attachments were found. The user might have forgotten to attach their document, or perhaps attached an unsupported document type.

**Other** - Used when any other problem occurs e.g. if the document was corrupt and couldn't be printed, or something went wrong with the print driver attempting to print.

See [Self association for emails and email verification/validation](#) for additional customization settings that apply to both Email to Print and Google Cloud Print.

### 4.9.7.8. Interaction with other features

## Popups (account selection, confirmation, print scripts)

When users have popups configured, jobs hold until the popup is addressed e.g. for shared account selection, the user must select an account to allocate the job to, before it is printed. When using Email to Print, you can address popups using the Mobile Client. To make this easy, the default [job response templates](#) include links to the Mobile Client. If most or all of your users have popups configured, you can tweak the templates to indicate they must follow the included link to progress their job.

For more information about the Mobile Client see [Mobile Client](#).

## Hold/release queues

Hold/release queues allow jobs to be held in a queue and later released by a user. This can be used, for example, to require that users are physically at the device to collect their job ("secure print release").

You can use hold/release queues with Email to Print in the same way as other job types. For more information on hold/release queues, see [Hold/release queues & Print Release Stations](#).

## Find-Me Printing

Find-Me Printing removes the need for a user to select a printer when printing their job. Instead they print to a "virtual", sometimes called "global", queue. They then release their job at the device of their choosing. PaperCut handles routing of the job to the right printer.

You can use Find-Me Printing with Email to Print in the same way as other job types. For more information see [Find-Me Printing and Printer Load Balancing](#).

## Internal users

Internal users are users who exist only in the PaperCut database, not in the organization's domain. They allow you to quickly set up users for printing (or have users set up their own account) without having to go through the normal process of creating full domain accounts.

You can combine internal Users with Email to Print, allowing users to register their own account (and email address) to set themselves up for printing. The recommended approach is as follows:

1. Enable internal user self-registration (see [Internal users \(users managed by PaperCut NG\)](#)). This adds a link to the login screen for users to create a new username, password and email.
2. Enable email self-association (see [Unknown emails and email self-association](#)). This allows jobs from unknown email addresses to be held until the email "becomes known". When the user sends their first job via Email to Print, they will receive a response email asking to verify their email address by logging in. Change this default template to be "If you do not have a username, create one using the Register link on the login screen" or something similar.

After the user has verified their email address, their job continues to print. Future jobs print as per normal.

## Adding support for Microsoft Office Documents

Email to Print prints PDF and picture file attachments by default (See Supported Applications and File Formats for full details). You can add support for Microsoft Office document attachments by configuring a Web Print Sandbox running Microsoft Office. The Web Print Sandbox functions as a document conversion service. Incoming email attachments are sent to the sandbox, and the associated Microsoft Office program automatically converts the source document to a PDF file, which is then sent to the printer.

See Sandbox Mode Setup for information on how to set up a Web Print Sandbox running Microsoft Office.

### 4.9.7.9. Rollout

The following is a list of considerations when moving from a test Email to Print environment that is working as desired, to a wider or organization-wide rollout.

- Create and publish printer aliases for all printers available via Email to Print. This could involve:
  - Adding the printer's email to a sign on the printer
  - Publishing a web page with email addresses for all printers
  - Adding printer email addresses to a shared address book
- Modify the procedure for creating new printers in PaperCut to optionally include an Email to Print alias.

### 4.9.7.10. Advanced Configuration

The following Email to Print settings are for advanced users or special cases, and does not normally need to change. They are found in the PaperCut Config Editor. See [Using the Config Editor](#) for more information on advanced configurations.

**Table 52: Email to Print Advanced Configuration**

Config Name	Description
email-print-ing.attachment-min-image-bytes	Often emails have small images attached as part of the email signature, which users are not likely to want printed. To avoid printing these images, Email to Print ignores image attachments smaller than this value. The default value is 20000 bytes.
email-print-ing.debug	Set this to <code>Y</code> to enable detailed logging of Email to Print emails received, emails sent, and how PaperCut is connecting to the email server.
email-print-ing.service-freq-secs	By default, PaperCut checks (poll) for new emails every 20 seconds. This config item can change the polling frequency. Less than 20 seconds is not recommended so not to burden the email server. If this value is too large, users will find that sometimes jobs will take a long time to print. How long "too long" will vary between sites.
email-print-ing.imap-read-folder	By default, PaperCut looks at the 'Inbox' folder of the mailbox. This is usually the right setting for most mailboxes. When using IMAP as the protocol, emails can be from any folder on the mail server; so if you want to read emails from a specific folder (e.g. setting a rule to forward emails with attachments to a pre-defined 'PrintQueue' folder) you can set the folder name here.

#### 4.9.7.11. Print Options

As the user communicates with Email to Print through emails, there is little opportunity for setting print options. Instead, PaperCut attempts to use default settings for the printer.

### Setting Printer Defaults

Email to Print printing is performed by the PaperCut Print Provider running on the print server for the target printer.

On CUPS print servers, Email to Print uses the default printer settings.

On Windows print servers, default printer settings are configured under: **Start > Devices and Printers > your printer > Printing Preferences**

However, these printer settings are not available when the Print Provider service is running under the SYSTEM account, which is the default. If you want Email to Print to use the Windows printer defaults (Printing Preferences), run the Print Provider service under a user account that has access to the Windows printer settings.

You can do this in: **Start > Control Panel > Administrative Tools > Services** . Find the `PaperCut Print Provider` service and select **Properties > Log On** . Set a user account that has access to the Windows printer settings.

## Image Print Scaling

When printing large image file attachments, Email to Print might need to rotate and/or scale the image to make it fit on the page.

To do this, Email to Print assumes a page size of either A4 or Letter. If an image is too large to fit on an A4 or Letter sized page, Email to Print rotates and/or scales down the image as needed to fit.

### 4.9.7.12. FAQ

**Can multiple documents be printed at once?**

Yes, all attachments are printed (when the attachment type is supported).

---

**Can a job be printed on more than one printer at a time?**

Yes, the job is printed to each printer in the To or CC field of the email.

---

**Will you add support for HTML formatting in the reply emails?**

Probably. Email support to let us know you're interested!

---

**I encrypt/sign my emails, do you support PGP and similar features?**

At this time PaperCut MF supports plain emails. If you need support of other features, email support to let us know you're interested!

---

**I want to support Email to Print without assigning email addresses to users (and without requiring users to associate their own address with their account) i.e. to allow printing without user-level control. Will you add support for this?**

Probably. One possible solution would be to allocate all jobs from unknown emails to a special user account (e.g. `guest`). Please email support to let us know you're interested!

---

**My email server supports SPF (Sender Policy Framework) header checking. Can you add functionality to send a confirmation response when it checks out, and a**

---

## verification response when it doesn't?

Maybe. Please email support to let us know you're interested!

---

### 4.9.7.13. Troubleshooting

**My users are having my Email to Print response emails flagged as spam. How can I prevent this?**

1. Ensure you have configured a public DNS name for your PaperCut server and have configured it at **Options > Advanced > Server Address > Server address presented to users** , so your response emails do not contain (internal) IP addresses.
  2. Ensure you are using a valid SMTP 'From' address ( **Options > Notifications > Email Options > From address** ). For the best user experience, use an attended email address.
- 

**The links in my PaperCut response emails contain IPs. How can I use a DNS name?**

Configure the public DNS name for your PaperCut server at **Options > Advanced > Server Address > Server address presented to users** .

---

**The Email to Print status in the admin interface says there is an error. What should I do?**

1. Check the **App. Log** tab for any obvious errors.
  2. Check your Email to Print mail server configuration. Ensure the server name, username, password etc. are all correct.
  3. If there is no obvious cause, contact support for assistance.
- 

**Email to Print jobs are not coming out of the printer, but the status in the admin interface says OK. What should I do?**

1. Check the **App. Log** tab for any obvious errors.
  2. Check the **Realtime Activity** section on the **Dashboard** tab. This contains a lot of information about the state of print jobs. Try sending a new Email to Print job while watching this status area. Look for messages about the job being held in a hold/release queue, etc.
  3. Is the job:
    - canceled, because the email address was unknown?
    - canceled due to filters or not enough credit?
    - awaiting the user to verify their email?
-

- awaiting the user to click a job verification link? (is the email in the user's spam folder?)
- awaiting account selection, job confirmation, or a print script popup? (try opening the Mobile Client)
- held in a hold/release queue?

4. If it's still a mystery, contact support for assistance.

---

## 4.9.8. Web Print (Driver-less printing via a web browser)

Web Print is a driver-less printing service that allows users to print by uploading documents from a web browser. No client software or driver installation is required. Web Print provides a simple way to enable printing for laptop, wireless and anonymous users without the overhead of installing printer drivers and managing server authentication.

**Note:**

Web Print is not available on direct print queues. To offer this service to your users, set up a server queue for this device/printer.

The recent growth in popularity of laptops and other small devices such as Netbooks and smart phones is changing the landscape of network printing. Where it was previously normal to allow printing only from in-house systems, there is now a growing need to support casual printing from user-owned devices. Providing users with information about how to configure these devices can be inconvenient and complicated, due to issues such as drivers and authentication, and in some situations might not be possible at all.

Due to this complexity, many organizations disallow printing from user-owned systems. A common workaround in these environments is for users to send themselves a document (e.g. via email, on a USB drive) and print from an in-house system. Web Print works in a similar way: it allows a user to upload their file to an in-house system (known as a Web Print server) and have this system perform the printing on their behalf.

With Web Print, users are authenticated when they log in to the PaperCut MF end-user web interface. Any documents they upload can then be tracked against their user name. Users have access to the standard selection of features normally available for in-house printing, including access to shared accounts.

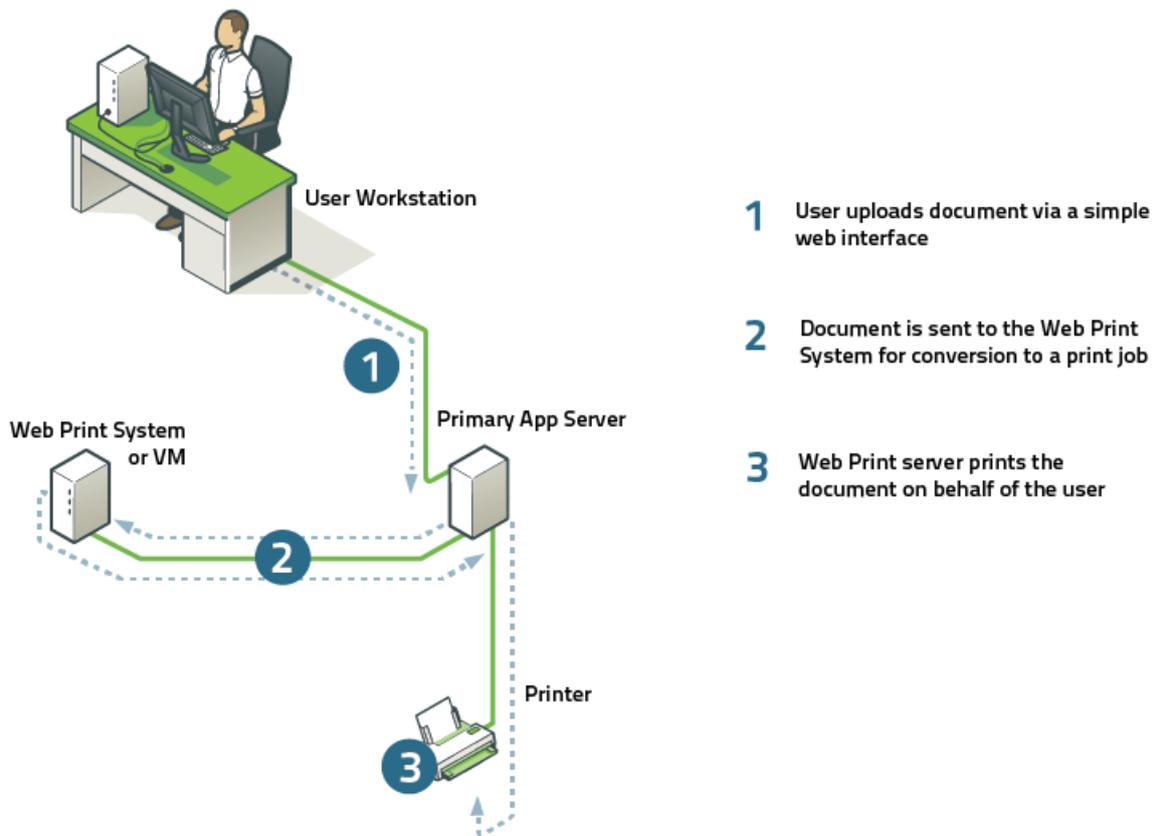


Figure 53: Web Print architecture overview

### 4.9.8.1. Key Features

Some of the key features of PaperCut's Web Print solution include:

- Simple wizard style interface, accessed from any web browser.
- Users authenticate with their regular (network / domain) logins.
- 100% web based. No drivers, client software, or browser plugins required.
- File uploads with progress indicator (in the style of GMail attachment uploads).
- Supports popular document formats including PDF, DOC/DOCX (and other Microsoft Office Word formats), XLS/XLSX (and other Microsoft Office Excel Formats), PPT/PPTX (and other Microsoft Office PowerPoint formats) and Microsoft XPS (XML Paper Specification). Web Print also supports common image formats including JPG, GIF, PNG, TIFF and BMP.
- Users select printers from an auto-generated list or a clickable printer map, which you can design or import using open standards and free software.

### 4.9.8.2. Introduction to Web Print

Web Print works in two ways.

- It can print PDF and picture files directly.
- It can accept popular file formats and convert them to print jobs using common external applications. This is done by orchestrating applications such as Adobe Reader™, Microsoft Office™ and the Microsoft XPS Viewer as background server-side tasks. Using this approach ensures that maximum print compatibility and quality is maintained.



**Important:** Adobe Reader, Microsoft Office and XPS Viewer are not supplied with PaperCut. It is your responsibility to purchase and conform to the licensing requirements of any third party software.

## Supported Applications and File Formats

The following table lists the supported document types and associated applications that Web Print can use to render and print jobs. Before some file formats can be accepted as an upload, you must install its supporting application.

**Table 54: Web Print File Formats and Applications**

Document Type	File Format (s)	Direct Printing	Supported External Applications
Portable Document Format	PDF	Support built-in (all platforms)	Adobe Reader 9, Adobe Reader X (10), Adobe Reader XI (11)
Picture File	JPEG, TIF, BMP, PNG, GIF	Support built-in (Windows only)	
Spreadsheet	XLS, XLSX, etc.	External application required	Microsoft Office Excel 2007, 2010, 2013
Presentation	PPT, PPTX, etc.	External application required	Microsoft Office PowerPoint 2007, 2010, 2013
Word Document	DOC, DOCX,	External application	Microsoft Office Word 2007, 2010, 2013

Document Type	File Format (s)	Direct Printing	Supported External Applications
	etc.	required	
Microsoft XPS	XPS	External application required	Microsoft XPS Standalone Viewer (Essentials Pack) - For more information see <a href="#">XPS Viewer Installation Instructions</a>

## Security Considerations

Before setting up Web Print it is worth considering any security implications. Because Web Print allows any user with access to the PaperCut MF user web interface the ability to upload a document for printing, it naturally increases surface area for attack.

More specifically, security vulnerabilities that might usually be considered local, because they are triggered by opening a document in a Microsoft Office application or Adobe Reader can become a remote vulnerability. This is because these same applications are used to render print jobs on the server after the user has uploaded their document.

You can mitigate much of the security risk through security best practice, such as regularly applying security updates to the orchestrated applications. Organizations that are very security conscious might consider the sandbox approach. Sandboxing the Web Print server provides an extra layer of protection/isolation.

### 4.9.8.3. Setting Up Web Print

You can configure Web Print in one of two possible modes: *Default Mode* or *Sandbox Mode*.

*Default Mode* involves running the Web Print software on the same system as the PaperCut MF primary server. On Windows, it runs as a Service. This is the fastest and easiest way to get Web Print working. However, only printing of PDF documents (and picture files on Windows) is supported in this mode. When Web Print is running in Default Mode, Microsoft Office applications are not available due to limitations in the applications. (See [Default Mode Setup](#).)

*Sandbox Mode* uses a sandboxed or virtualized system, isolated and dedicated to the task of processing Web Print jobs or converting documents for Email to Print. *Sandbox Mode* takes a little more time to configure but offers several advantages, including improved security and more supported document formats. (See [Sandbox Mode Setup](#).)

**Table 55: Web Print Setup Options (by platform)**

primary server Type	Default Mode	Sandbox Mode
Microsoft Windows	Yes (PDF and picture files only)	Yes. All formats supported

primary server Type	Default Mode	Sandbox Mode
Apple Mac	Yes (PDF only)	Yes. All formats supported
Linux running CUPS	Yes (PDF only)	Yes. All formats supported
Novell OES Linux	No. Default Mode not supported	Yes. All formats supported

## Default Mode Setup

*Default Mode* involves running the Web Print software on the same system as the PaperCut MF primary server. It is the fastest and easiest way to get Web Print working. It is suitable for testing Web Print functionality or where only PDF support is required.

In *Default Mode* the Web Print software runs as a service (background process or daemon) that is responsible for watching a directory for documents submitted by users e.g. PDFs. When a new document is detected, the background process opens the document and prints it.

## Web Print Default Mode Setup for Windows Servers (PDF and picture files Only)

This section describes how to configure Web Print on the same Windows system as the PaperCut primary server. This is the fastest and easiest way to get Web Print up and running on a Windows system. Due to the inability of Microsoft Office or XPS Viewer applications to run as a system service, these file formats are only available on Windows when Web Print is configured in sandbox mode. See [Sandbox Mode Setup](#) for more information.

Web Print *Default Mode* supports the printing of PDF documents and picture files by default on Windows systems. No additional configuration is required.



**Important:** Check in Windows Services, that the Web Print service is configured to start automatically. Also, start the service now, if needed.

To confirm that everything is configured correctly, check the **Web Print Status** section under **Options > Mobile & BYOD > Web Print**. The status is listed as **OK**. Enable the Web Print option on at least one printer. If there are any status issues, or if basic Web Print testing produces some errors, consider these limitations/requirements:

- The printers targeted for use via Web Print must be queues that are managed by the Primary PaperCut Server. This includes print servers with the PaperCut secondary server installed.
- If you want to print to remote printers, then the PaperCut MF Web Print server needs to run under a user account that has permission to access these printers.

Create a new user account called `webprint` (or equivalent). If it is not possible to create a domain user or the system is not a member of a domain, then create a local user account instead. *Set the password for this account to never expire.* At a minimum, this account needs access to all the printers you want to print to.

- The printers (as configured on the server) must have working compatible drivers.
- Administrators might find the following log file useful in diagnosing issues: `[app-path]/providers/web-print/[platform]/logs/web-print.log`
- As a final step, enable Web Print for each printer via the **Printers > [PrinterName] > Advanced Config > Enable Web Print** check box.

## Web Print Default Mode Setup for Mac and Linux Servers (PDF Only)

The Web Print *Default Mode* supports PDF documents by default on Mac and Linux systems (running CUPS). No additional configuration is required. To confirm that everything is configured correctly, check the **Web Print Status** section under **Options > Mobile & BYOD > Web Print**. The status is listed as `OK`. Enable the Web Print option on at least one printer. If there are any status issues, or if basic Web Print testing produces some errors, consider these limitations/requirements:

- The printers targeted for use via Web Print must be queues that are managed by the Primary PaperCut Server. This includes print servers with the PaperCut secondary server installed.
- The printers (as configured on the server) must have working compatible drivers.
- Linux: The primary server must be running CUPS version 1.2 or higher.
- Administrators might find the following log file useful in diagnosing issues: `[app-path]/providers/web-print/[platform]/logs/web-print.log`

*Default Mode* for Novell OES Linux and iPrint is not available. Novell OES users should implement the Sandbox Mode (in the following section).

## Sandbox Mode Setup

A Web Print Sandbox (in *Sandbox Mode*) runs the Web Print software in a dedicated Windows system, often a virtual machine. Documents are opened and rendered by standard GUI applications such as Adobe Reader and Microsoft Office applications.

Use *Sandbox Mode* when you need to:

1. Support printing of Microsoft Office documents from Web Print
2. Support printing of Microsoft Office documents from Email to Print
3. Render documents in a secure, sandbox environment away from your main server.

*Sandbox Mode* takes a little more time to configure but offers several advantages, such as support for Microsoft Office formats and improved security. Security is gained by opening and printing documents on an isolated system, separate from the PaperCut primary server; with the only connection between the two being a simple file share / mapped drive.



**Tip:** PaperCut is shipped with a high quality rendering engine for PDF documents. However, if you require documents to be rendered by Adobe Reader, this is also supported. Simply install Adobe Reader in your Web Print Sandbox.

### Prerequisites:

- A dedicated, standalone, cleanly installed system or virtual machine.
- Windows operating system (suggested: Windows Vista or later).
- Adobe Reader 9 or later (optional)
- Microsoft Office 2007, 2010 or 2013 (to support Office formats)
- Microsoft Standalone XPS Viewer / XPS Essentials Pack (to support Microsoft XPS) - [download here](#)

### To set up Web Print in Sandbox Mode:

1. Make sure *Default Mode* is disabled. See *Important* box below:



#### Important:

First, before setting up Web Print in *Sandbox Mode*, ensure Web Print in *Default Mode* is disabled as follows:

- On Windows, stop and disable the PaperCut Web Print Server System Service (set its **Startup type** to **Disabled**).
- On Mac and Linux, use a text editor to edit the file `[app-path]/providers/web-print/[platform]/web-print.conf` and change setting `enabled` to `enabled=off`.

Remove the Web Print status files (named `web-print-server.activity` and `web-print-server.status`) located in the hot-folder `/Applications/PaperCut MF/server/data/web-print-hot-folder`.

Restart the server (or services) to ensure the change is applied.

2. Set up a new virtual machine using [VMware Server](#), [Microsoft Virtual Server](#) or [VirtualBox](#), or set up a standalone system e.g. a dedicated desktop PC. This system houses the Web Print server software and any required printing applications, and is called the *Web Print server*.

This system does not need access to all network resources, but needs access to the hot folder share. This is created later. It also needs access to printer shares if used for Web Print (not Email to Print).

**Important:**

Ensure that the system clocks on the primary server and the Web Print sandbox are synchronized to a common clock. Time differences between these systems can cause problems with the Web Print system.

3. Create a new user account called `webprint` (or equivalent). *Set the password for this account to never expire.* At a minimum, this account needs access to the printers, the ability to run local programs, and the ability to access the hot folder share (created in step 7).
4. *Skip this step if using the Sandbox for Email to Print only.* Log in as the `webprint` user. Add print queues for the printers that you want to make available to users via Web Print. Add the print queues in the same way they would to a computer. They should point to the print queues hosted on the print server, i.e. a Network Printer mapped to `\\server-\printer-share`. *It is important that the jobs pass via the queue on the server - do not add a Local Printer.* You should also add the printers using the print server's machine name and not an IP address.
5. Install one or more of the applications listed in step 7. The applications installed determine which file formats are available to users for printing.

As the `webprint` user, open a file in each of the installed applications and print to several different printers, ensuring that all works as expected. **IMPORTANT:** Make sure you *permanently* acknowledge any license agreement screen, initial-run wizard, or customer experience program dialog during this process.

**Tip:**

- When installing Microsoft Office applications, select all optional components for installation. This prevents printing issues occurring due to missing components.
- Adobe Reader X introduced a Protected Mode setting, which prevents printing from the command interface used by Web Print. Using Adobe Reader therefore requires the Protected Mode feature to be disabled. Web Print *automatically* disables Protected Mode for your `webprint` user. (You can also disable Protected Mode manually by disabling the Enable Protected Mode at startup setting in Adobe Reader under **Edit > Preferences > Security (Enhanced)** )

6. Configure the Web Print server to automatically log in as the `webprint` user on startup. The service then runs when Windows is started, and be logged in as this user.

- o [Automatic logon for Windows Vista/7](#)



**Tip:** Windows Vista/7 machines on a domain might require direct editing of the registry as described here: [Microsoft Technet - Configuring Accounts to Autologon](#). You might want to consider a Group Policy Object (GPO) to make the registry changes.

- o [Automatic logon for Windows XP](#)

7. The primary server and the software on the sandboxed Web Print server communicate via a standard network file share. On the PaperCut primary server, share the folder `web-print-hot-folder` located at `[app-path]\server\data\web-print-hot-folder\`. The hot folder facilitates communication between the primary server and the Web Print server.



**Tip:** By default, Web Print uses this folder, not a sub-folder. You do not need to create a sub-folder in this folder.

### Samba sharing on Linux

On the Linux PaperCut primary server, name the share `PCWebPrint`, and adjust both the **Sharing and Security** (NTFS/file) permissions of the `PCWebPrint` share to allow the `webprint` user read *and* write access.

The following Samba configuration settings might be useful.

```
[PCWebPrint]
comment = PaperCut Web Print Hot Folder
path = /home/papercut/server/data/web-print-hot-folder/
public = no
writeable = yes
read only = no
valid users = webprint
```

You also need to add the `webprint` username to Samba via `smbpasswd -a [username]` and you should consider disabling the `[home]` shares in your `smb.conf`.



**Important:** Ensure that your `umask` and Samba settings allow for the `paper-cut linux` user to be able to read and write to all files in the `web-print-hot-folder`. When using Novell and Linux, the Web Print Sandbox might create files owned by a different user than the PaperCut Application Server runs as, preventing the files from being accessed.

### Samba sharing on Mac

On the Mac PaperCut primary server, adjust both the **Sharing** and **Security** (NTFS/file) permissions of the `PCWebPrint` share to allow the `webprint` user read *and write* access.

- a. Create a user in **Users & Groups**. This user will be used to read and write to the shared folder. Name the user `webprint` and assign it to the `admin` group.
- b. In **Sharing -> File Sharing**, share the folder `[app-path]\server\data\webprint-hot-folder\`; then add Read & Write permissions for the `webprint` user.
- c. Click **Options** on the same menu; then check the `webprint` user under **Windows File Sharing**.
- d. Set read access to everyone on the Web Print hot folder and any files under it by creating a new ACL. Open the Terminal app and type under `[app-path]\server-data` folder:

```
sudo chmod +ai "everyone allow read,file_inherit" webprint-hot-folder
```

8. Log in to the Web Print server as the `webprint` user. Map the `W:` drive to the hot folder share you have defined. Ensure that the option **Reconnect at logon** is selected when mapping the drive. If your `webprint` user's credentials on the PaperCut primary server are different from the Web Print Sandbox's user, click **Connect using different credentials** and enter them.
9. Test that the file share can be accessed and written to from the Web Print server (e.g. by creating a new text file on `w:`). It is also recommended to test in the other direction as well, and confirm that files created on the primary server in the folder `webprint-hot-folder` can be opened/seen by the Web Print server.
10. Run the main PaperCut MF installer on the Web Print server, and select the **Web Print server installation (sandbox mode)** install option.
11. Configure the `webprint` user to run `[app-path]\providers\webprint\win\pc-web-print.exe` at login i.e by adding a shortcut to the user's **Startup** folder.
12. Reboot the system. Ensure the system automatically logs in as the `webprint` user when it starts up, and that the **PaperCut Web Print** dialog is displayed shortly afterwards.

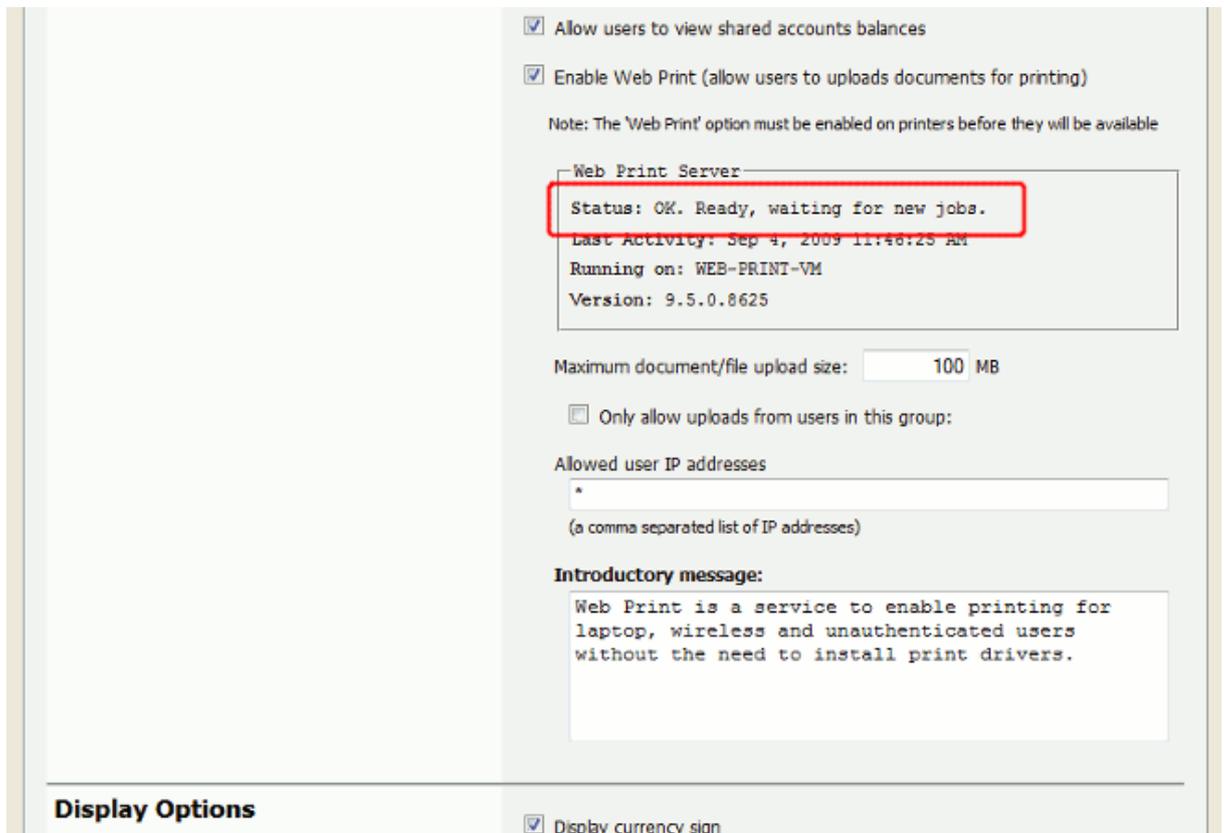


See [Troubleshooting Web Print Problems](#) for assistance if the dialog indicates an error.

13. Log in to the PaperCut MF admin interface and navigate to **Options > Mobile & BYOD > Web Print** .

In the section titled **Web Print Server**, ensure that the **Status** is **OK**. If the status indicates an error, see [Troubleshooting Web Print Problems](#) for assistance.

If your sandbox is for Email to Print only, you should see the full set of supported document types in the Email to Print set up section. If there is a problem, you should temporarily enable Web Print so you can take advantage of the additional status information provided in the Web Print setup.



14. The Web Print setup is now complete and ready for testing. Continue at [Web Print Testing](#)

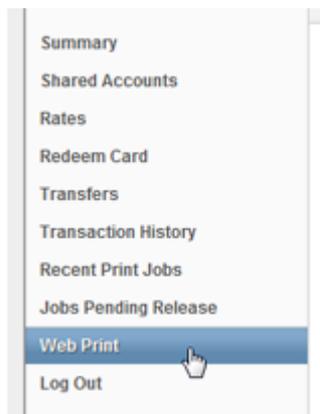
and [Feature Tour](#) to submit a test print job and test functionality.

15. As a final step, enable Web Print for each printer via the **Printers > [PrinterName] > Advanced Config > Enable Web Print** check box.

#### 4.9.8.4. Web Print Testing and Feature Tour

This section covers the usage and main features of Web Print. For detailed configuration, see [Web Print Configuration](#).

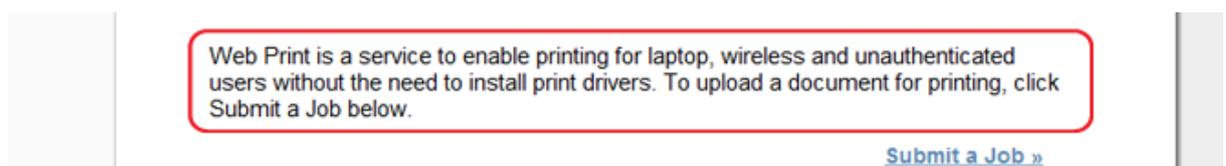
1. Log in to the PaperCut MF user interface and click the **Web Print** link in the navigation menu.



2. The front page contains a list of active and recently submitted Web Print jobs for the logged in user. At first, the list is empty. Later, the list shows the status of submitted jobs.



You can customize the message at the top of this page e.g. to include site specific information or other details users need to know. See the **Introductory message** option in .



The administrator can restrict access to the Web Print feature by group, by IP address/range, or disable the feature entirely. See [Advanced Web Print Configuration](#) for details.

3. Click **Submit a Job** to start the Web Print wizard.
4. The first step of the Web Print wizard is selecting a printer. This is the printer to which the uploaded document will print.

Printer Name ▲	Location/Department
<input type="radio"/> linux-server/Office MFP	Maths Department Staff Room
<input type="radio"/> mac-server/Wide Format Printer	Graphic Design
<input type="radio"/> windows-server/Library MFP	Library Foyer
<input checked="" type="radio"/> windows-server/Library Printer	Library Internet Area

The printers available for Web Print are chosen by the administrator. See [Printer Selection](#) for details.

You can replace the printer list with a clickable map or other custom content. See [Designing Printer Maps / Custom Printer Selection Lists](#) for details.



**Tip:** Web Print works great in conjunction with [Hold/release queues & Print Release Stations](#) and [Find-Me Printing and Printer Load Balancing](#).

5. After selecting a printer, the second step is to select the print and/or account selection options. Most users will see an option to select the number of copies to print:

The maximum number of copies a user can submit is configurable via the `user.web-print.max-copies` Config Editor key. See [Advanced Web Print Configuration](#) for details.

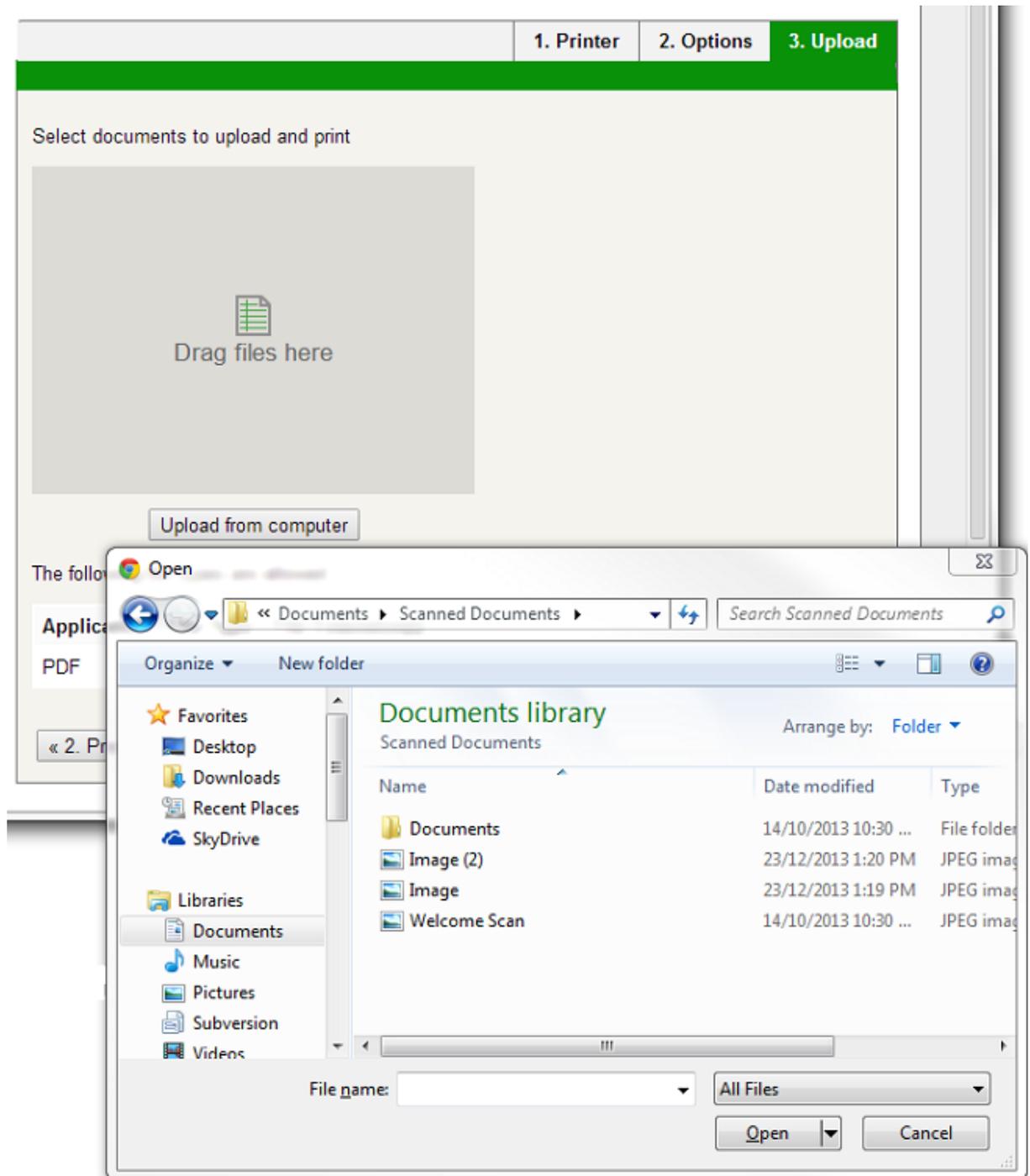
Users with print account selection options will see additional options on this page, equivalent to what they would see on their popup:

The screenshot shows the 'Web Print' interface with three tabs: '1. Printer', '2. Options', and '3. Upload'. The '2. Options' tab is active. Under 'Options', there is a 'Copies' input field with the value '1'. Below that, the 'Account to Charge' section has three radio button options: 'Charge to my personal account', 'Charge to shared account' (which is selected), and 'Charge to shared PIN / Code'. A dropdown menu is open for the 'Account' field, listing several departments: Finance Department, Art Department, Commerce Department, Economics Department, English Department, Finance Department (highlighted in blue), History Department, and IT Department. Navigation buttons are visible at the bottom: '« 1. Printer Selection' on the left and 'Document »' on the right.

**Note:**

The developers hope to be able to support *grayscale* and *duplex* print options in the near future.

6. After selecting the print options and/or account selection settings, the third and final step in the Web Print wizard is to upload a document to print. This page lists the applications and associated file extensions that are supported.



If a supported application/file extension listed in [Supported Applications and File Formats](#) is not shown on this page but you expect it should be, see [Troubleshooting Web Print Problems](#) for assistance.

Once you select a document and click **Upload & Complete »**, the file upload to the server.

The maximum file size a user can upload is configurable, with a default of 100MB. See the option **Maximum document/file upload size** in [Advanced Web Print Configuration](#) for details.

- Once the document upload is complete, the user is returned to the front **Web Print** page. The table displays the status of the user's job. The status changes to indicate the progress of the job from rendering to printing, and job details such as cost and number of pages are populated when known. The user can stay at this page to track the status of the job, or navigate away / close their browser - the job is not affected.

	Submit Time	Printer	Document Name	Pages	Cost	Status
	Jan 16, 2012 1:52:07 PM	desktop-tom2\TestPrinter	Poster.pdf			Rendering successful. Preparing job for processing.
	Jan 16, 2012 1:51:49 PM	desktop-tom2\TestPrinter	Biology Homework.docx	1	\$0.10	<a href="#">Held in a queue</a>

At this stage the PaperCutApplication Server accepts the uploaded document and sends it to the Web Print server. The Web Print server renders the document into a print queue by automating the process of opening the application (e.g. Adobe Reader) and printing to the target printer.

#### 4.9.8.5. Web Print Configuration

### Administrator Settings

Administrators must nominate which printers are available with Web Print. Smaller organizations might want to make all printers available, while larger organizations might want to restrict to a subset e.g. limiting access to printers located in public areas. You can enable Web Print on a printer via **Printers > [select printer] > Advanced Configuration > Enable Web Print (users may upload documents to print)**.



#### Tip:

To easily enable all printers for use with Web Print:



1. Select **Enable Web Print (users may upload documents to print)** on the [The Template Printer](#).
2. Copy the setting to all other printers using [Copying Printer Settings](#).

General Web Print configuration settings are in the admin interface at **Options > Mobile & BYOD > Web Print** .

Allow users to view shared accounts balances

Enable Web Print (allow users to uploads documents for printing)

Note: The 'Web Print' option must be enabled on printers before they will be available

Web Print Server

Status: OK. Ready, waiting for new jobs.  
 Last Activity: Sep 4, 2009 11:46:25 AM  
 Running on: WEB-PRINT-VM  
 Version: 9.5.0.8625

Maximum document/file upload size:  MB

Only allow uploads from users in this group:

Allowed user IP addresses

(a comma separated list of IP addresses)

**Introductory message:**

Web Print is a service to enable printing for laptop, wireless and unauthenticated users without the need to install print drivers.

**Display Options**

Display currency sign

**Table 56: Web Print Settings**

Setting	Description
Enable Web Print (allow users to uploads documents for printing)	When enabled, a <b>Web Print</b> item is displayed in the navigation menu of the user web interface, and users are able to use Web Print functionality. When disabled, this item is not visible, and the Web Print functionality is not available to users.
Maximum document/file upload size	If a user uploads a document greater than the specified size (in MB), their upload is rejected.

Setting	Description
Only allow uploads from users in this group	Use this option to restrict Web Print access to a particular group of users. When this option is enabled users not in the specified group do not see the <b>Web Print</b> item in the navigation menu.
Allowed user IP addresses	Use this option to restrict Web Print access to a selected IP address range. For example, access might be limited to systems on a wireless network (i.e. force users on the wired network to use standard print queues). Address ranges are entered in the format: 1.2.3.0/255.255.255.0.
Introductory message	This message is displayed on the first page after a user clicks the <b>Web Print</b> item. Use this message to explain the service, offer site-specific advice or other information to assist the user. HTML is supported, e.g. use <p> tags to start a new paragraph, or an <a> tag to provide a link.

## Print Options for Web Print Jobs

The print options selected during the Web Print wizard are currently limited to the number of copies to print. Other print options such as grayscale, duplex, paper size etc. are selected based on the default options of the print queue.

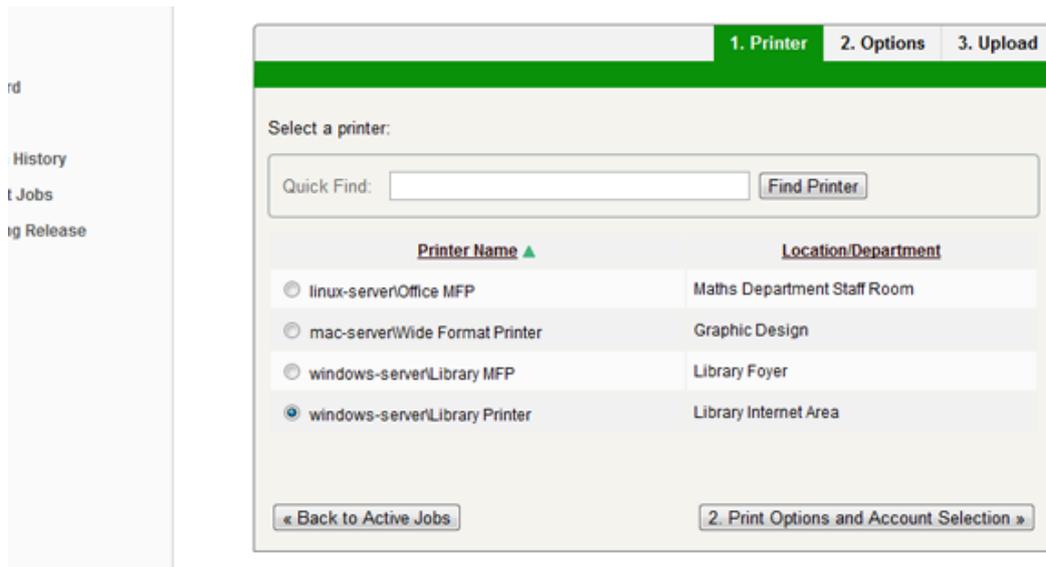
When printing an image file, Web Print rotates and/or scales down the image if needed so that it fits on the page.

If it is important to provide the user with a print option choice (e.g. when the same printer has trays for Letter and Legal paper). You would create two print queues each with different default settings e.g. one print queue called `Library Printer (Letter)` defaulting to the Letter size and tray, and a second print queue (pointing to the same physical printer) called `Library Printer (Legal)` defaulting to the Legal size and tray.

## Designing Printer Maps / Custom Printer Selection

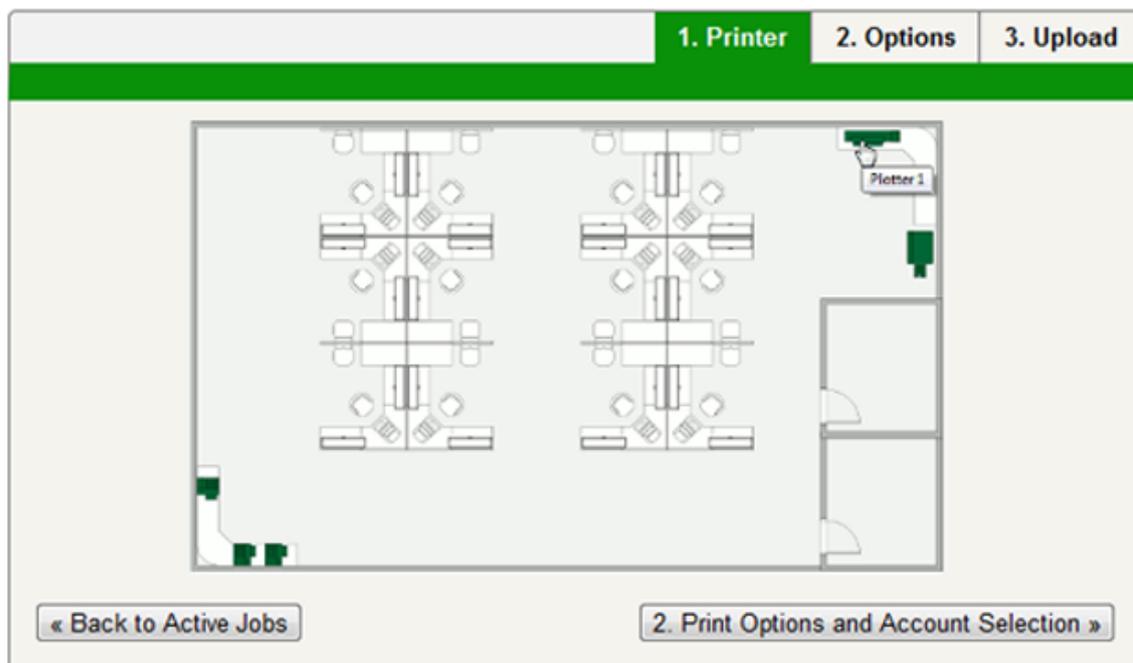
### Lists

Part of the Web Print wizard involves selecting the target printer from a list. This is great for most environments, but organizations with many printers or large sites might prefer something that provides users with more context about the printer they are selecting.



Using a graphical map can assist users to find the most convenient printer. A map allows a user to select a printer by location, rather than guessing the printer's location based on its name. Using printer maps or other types of custom printer lists in PaperCut MF does not require any special or proprietary software - they can easily be implemented using open standards and free software.

## Web Print



Custom content is loaded in place of the printer list, by placing the appropriate file at `[app-path]/server/custom/web/` as described in the following table:

**Table 57: Files used for custom printer selection in the Web Print wizard**

File Name	Description
printer-map.html	If this file exists, it is loaded as an HTML page and displayed in an inline frame (iframe), in place of the printer selection list. The HTML can contain any content or images, including links to other pages (which are also loaded in the iframe by default).
printer-map.svg	If this file exists, it is loaded as an SVG page, and displayed in an iframe in place of the printer selection list. The SVG can contain links to other pages or other SVGs. You can create an SVG using software such as Microsoft Visio or the free/open source <a href="#">Inkscape</a> , and is a convenient way of displaying a map or floor plan with clickable links.



**Tip:**

- You can access any custom content placed in `[app-path]/server/custom/web/`, such as additional images, a URL beginning with `/custom/`. For example, if a file named `floor-plan.png` is placed in `[app-path]/server/custom/web/` it is accessed via the URL `/custom/floor-plan.png`.
- The custom printer map is displayed in an iframe with dimensions 776px x 400px. If the content is larger than this, then scrollbars are visible (the area will not expand to fit the content).

### Example 1: Creating a Printer Map Using an HTML Image Map

- Create a file named `printer-map.html` at `[app-path]/server/custom/web/`. This file is loaded as an HTML page in an iframe in place of the default printer selection list, and can contain any content you choose; including links to further pages. Open this file in a text editor.
- Add the site plan image:

```

```

The `usemap="#buildings"` attribute tells the image to look for an image map with the name `buildings`. Image maps allow you to make parts of an image "clickable". For more information about the HTML `<map>` element see [xhtml.com's map element reference](http://xhtml.com/s/map/element/reference).

### 3. Define the image map.

```
<map name="buildings">
  <area shape="poly" coords="" href="building-a.html"
  alt="Building A" title="Building A" />
  <area shape="poly" coords="" href="building-b.html"
  alt="Building B" title="Building B" />
</map>
```

This defines a new image map called `buildings`, with two clickable areas. These areas are polygon shapes (`shape="poly"`), which means you can specify a list of points that form the outline of the clickable area (i.e. the area inside the points is clickable).

Clicking the first area loads the page `building-a.html`. The `alt` and `title` tags provide information about the link, and display a tooltip when the user hovers over the area.

4. You have defined two areas and the pages they link to, but you have not yet defined the coordinates for these areas. This is done using the `coords` attribute of the two `area` tags. Using an image editor, you can find coordinates for the outline of the two areas. Most image editors, including MS Paint, display pixel coordinates when hovering the mouse over the image.

Using the image editor, find the following points for *Building A* (the lefthand building), starting from the top left corner, in `(x,y)` format: `(0,48)`, `(84,0)`, `(143,34)`, `(143,142)`, `(60,190)`, `(0,155)`. Pixels are counted from the top-left corner of an image, so the coordinate `(60,190)` means "60 pixels from the top, 190 pixels from the left".

5. Repeat the previous step for the second building to get coordinates similar to: `(242,50)`, `(320,4)`, `(422,63)`, `(422,135)`, `(332,190)`, `(226,131)`.
6. Now that you have the clickable area coordinates, you can define them in the image map.

The definition for the `area` tag when using a `poly` type shape, tells you that the coordinates are specified in a list of `x,y` coordinates (i.e. "x1,y1,x2,y2...xn,yn"), so you enter the coordinates in the `coords` attributes as follows:

```
<map name="buildings">
  <area shape="poly"
  coords="0,48,84,0,143,34,143,142,60,190,0,155"
  href="building-a.html" alt="Building A"
  title="Building A" />
  <area shape="poly"
  coords="242,50,320,4,422,63,422,135,332,190,226,131"
  href="building-b.html" alt="Building B"
  title="Building B" />
```

```
</map>
```

7. Open `printer-map.html` in a web browser to display the site plan image. Hovering the mouse over each building displays the link cursor, and indicates a link to the respective pages.
8. Create the `building-a.html` page. Using a similar process to the existing page, add `floor-plan.png` and create an image map for it:

```
<div>Building A (<a href="printer-map.html">back</a>)</div>
```

This map is mostly similar to the previous one, except that you have defined five rectangle shapes (`shape="rect"`) and provided a link back to the main site plan (`printer-map.html`).

Rectangle shapes in an `<area>` element are defined with the coordinates of top-left and bottom-right corners ("`x1, y1, x2, y2`").

9. Now you have the images and shapes in place for the site plan and one building's floor plan. To finish off this building, define what happens when each printer is clicked. This is done using a JavaScript function `selectPrinter`. Calling `selectPrinter('my-server', 'Library Printer')` submits the form on this step of the Web Print wizard, selecting the printer called `Library Printer`, hosted on the print server called `my-server`.

Call this JavaScript function when one of the defined areas is clicked by setting the `href` attribute as follows:

```
<area shape="rect" coords="4,289,22,307"
href="javascript:parent.selectPrinter('building-a',
'Printer 1');"
alt="building-a\Printer 1"
title="building-a\Printer 1" />
```

10. Repeat the previous step for the remaining printers, taking care that the server and printer names are entered correctly. Note that the printer name is the printer's unique name on the print server, and can be different to the printer's "share name".
11. Repeat the steps for creating `building-a.html` to create `building-b.html` (or copy the file and modify to suit).
12. Test the Web Print wizard to ensure that clicking a building takes you to that building's floor plan, and clicking a printer submits the form to select that printer. Note that if the names you've used for the printers don't actually exist in your PaperCut MF server, then you'll see an error message about the printer not being available. You might want to modify the details for one of the printers to match a real printer so that you can test the wizard end-to-end.

The source for this example contains some additional tweaks to improve browser consistency, such as removing the border and white background of the `iframe` in Internet Explorer.

## Example 2: Creating a Printer Map Using SVG

This example explains how to use an SVG image for a clickable printer map. This method is most suitable if you have plans or drawings in a vector format that can be saved as SVG. Otherwise [Example 1: Creating a Printer Map Using an HTML Image Map](#) might be more suitable.

An example SVG floor plan with clickable printers is located in `[app-path]/server-  
/examples/printer-maps/html-image-map/`.

Modern web browsers are capable of displaying an SVG file in a similar way to displaying a web page. Mozilla Firefox and Opera can display SVGs "out of the box", and Microsoft Internet Explorer can display SVGs using the [Adobe SVG Viewer](#) add-on. In addition to drawing the image, you can make parts of the image "clickable" to provide links to other pages or, as in this case, to call a JavaScript function that selects a printer.

This example describes how to take an existing SVG image, and make parts of it clickable so you can select printer.



### Tip:

You can save a Microsoft Office Visio drawing as SVG and used in this example.

1. Download and install [Inkscape](#), the free/open source vector graphics editor, and use it to open your SVG.
2. Select the object that you want to be "clickable". A dotted background is displayed around the object.
3. Right-click the object and select **Create Link**.
4. Right-click the object and select **Link Properties**. The **Link Properties** dialog box is displayed.
5. In **Href**, enter a value such as: `javascript:parent.selectPrinter('server', 'printer');`, where `server` is the name of the print server, and `printer` is the name of the print queue.
6. Repeat to create links for each printer in the image.
7. Select **File > Save As**; then select a file type of `Plain SVG (*.svg)`. Save the image to `[app-path]/server/custom/web/printer-map.svg` on the PaperCut MF server.
8. Try testing with the Web Print wizard. The SVG is visible on the first step of the Web Print wizard, in place of the printer list. Clicking a printer should move on to the next step.

## Advanced Web Print Configuration

The following advanced configuration options are available via the Config Editor. See [Using the Config Editor](#) for information about using the Config Editor.

**Table 58: Web Print Config Editor Keys**

Config Name	Description
web-print-job-idle-timeout-mins	If a Web Print job remains unchanged for longer than this period of time, it is considered finished and is "cleaned up". The document and associated files are removed, and the job is no longer displayed in the user's list of current Web Print jobs. The default idle job timeout is 20 minutes.
web-print-job-rendering-timeout-mins	The Web Print server is given this length of time to render a Web Print document. If a print job has not been generated from the document after this time, the job is marked as errored and associated files are removed. The default job rendering timeout is 5 minutes.
web-print.max-copies	This is the maximum number of copies a user can print via Web Print. This option exists to prevent users accidentally (or thoughtlessly!) printing too much.
web-print.hot-folder	When a user uploads a file via the Web Print interface, it is written into the "hot folder", along with a <code>.metadata</code> file containing information about how to print the job (the data selected by the user in the Web Print wizard). The Web Print server looks for new files in this folder, and prints them as required. The default hot folder location is <code>[app-path]/server/data/web-print-hot-folder/</code> . You can specify an alternate location using this config key. The location must be local to the PaperCut MF primary server (it cannot be a network share or mapped drive due to Windows denying share access to the <code>SYSTEM</code> account).

The following configuration options are available in the Web Print server configuration file, located at `[app-path]/providers/web-print/[platform]/web-print.conf`.

**Table 59: Web Print Server Config File**

Config Name	Description
hotfolder	The location of the Web Print hot folder. This is generally a mapped drive letter (Windows) or a mount point that maps to a file share (Mac, Linux). It might also be a local path, if the Web Print server software is running on the same system as the PaperCut MF primary server.
debug	Set to <code>on</code> to enable debug logging.
options.pdf	Set to <code>xpdf</code> to force PDF printing to use the built-in PDF printing routines. Set to <code>acrobat</code> to force PDF printing to use Adobe Reader.

#### 4.9.8.6. Troubleshooting Web Print Problems

**Why are some file formats not available? (Supported file formats listed in [Supported Applications and File Formats](#) are not listed under **Options > Mobile & Print > Web Print > Status** page, or not accepted when uploading a file.)**

First, check [Supported Applications and File Formats](#) to see that the file format is supported in the mode that the Web Print server is running in. Some file formats are only supported in sandbox mode.

Next, ensure that the associated application is installed and working. If running in sandbox mode, log in as the `webprint` user, then open and print a document with the application to ensure the user has the correct permissions.

The next step is to check the Web Print log files. The Web Print server has a *handler* for each supported application. Each handler has a log file, which can provide more information about why the file format is not available. The handler log files are named `web-print-handler-*.log`, where `*` is the name of the application. See below for the location of the Web Print logs folder.

Open the log file that matches the application of interest in a text editor (e.g. `web-print-handler-mso-word.log` for Microsoft Office Word documents). Check the log file for any obvious errors, such as not being able to find the application or problems launching it.

For further assistance, contact support.

---

**The status in the admin interface or on the Web Print dialog is indicating an error.**

**What can I do?**

**The Web Print server is not running or could not be contacted**

When running in *Default Mode*:

---

- The service `PaperCut Web Print Server` should be running.

When running in *sandbox mode*:

- The Web Print dialog should be visible on the Web Print server, and the **Status** should not indicate any error.
- While logged onto the Web Print server as the `webprint` user, ensure that the mapped `W:` drive is accessible and maps to `[app-path]/server/data/web-print-hot-folder/` on the PaperCut MF primary server.
- Open `[app-path]/providers/web-print/[platform]/web-print.conf` on the Web Print server in a text editor, and ensure the `hotfolder=` option is set to `W:.`

For further assistance, contact support.

---

**The Web Print service is running as the SYSTEM account, and does not have access to render print jobs.**

### Default Mode

If running Web Print in *Default Mode*, check if the printer being printed to is running on the local computer. The SYSTEM account does not have privileges for printing to remote printers.

If the printer is remote, then check the steps listed in [Default Mode Setup](#) to ensure that the service is correctly configured to run as the `webprint` user account.

If the printer is local, then check the printer's privileges allow the SYSTEM account to print to it.

If the above steps do not fix the problem, then the failure is logged in `[app-path]/providers/web-print/[platform]/logs/web-print-handler-pdf.log`. Tech support will analyze this file, and help you find out the cause of the failure.

### Sandbox mode

If running Web Print in *Sandbox Mode*, this error can indicate that the service `PaperCut Web Print Server` is running. This service is not required in sandbox mode, and should be *disabled*.

### No valid handler programs installed/defined

See *Why are some file formats not available?* (Supported file formats listed in the section called "Supported Applications and File Formats" are not listed under Options → Mobile & Print → Web Print → Status page, or not accepted when uploading a file.)

### The configured hot folder location is not writable.

- Check that the location indicated by **Hot folder** on the Web Print dialog is correct.
  - As the `webprint` user, navigate to the drive/directory that is mapped to the `PCWebPrint` share (`W:` on Windows). Try creating an empty text file. If this action fails, there is a problem with permissions. Check the **Sharing** and **Security** (NTFS/file) permissions for the
-

PCWebPrint share on the PaperCut primary server. Allow the `webprint` user read and write access.

- For further assistance contact support.

### Other error messages

Check the Web Print server log file `web-print.log`. See *Where is the Web Print logs folder?* for the location of the logs directory. For further assistance, contact support.

---

#### Where is the Web Print logs folder?

The logs folder is located on the system running the Web Print server software.

On Windows the location of the logs folder depends on configuration and the Windows edition. Logs can be written to `[app-path]\providers\web-print\win\logs\`, or to `%USERPROFILE%\web-print-logs\` (e.g. `C:\Users\[username]\web-print-logs\` on Windows Vista/2008). For a definitive answer, open the file `[app-path]\server\data\web-print-hot-folder\web-print-server.status` on the primary PaperCut MF server in a text editor, and check the line beginning with `server.log-file=`.

---

#### Why is my print queue "currently not available"?

When using the Web Print interface, some print queues might display the following error message:

**Errored: Printer '\\servername\queuename' is currently not available.**

This can be caused by trying to use Web Print on a print queue that has been deleted, or by trying to print to a print queue that is not installed on the Web Print Sandbox. Confirm this by logging into the Web Print Sandbox as the Web Print user, and attempting to print to the above print queue.



#### Note:

It is important that the jobs pass via the queue on the server - do not add a Local Printer. You should also add the printers using the print server's machine name and not an IP address.

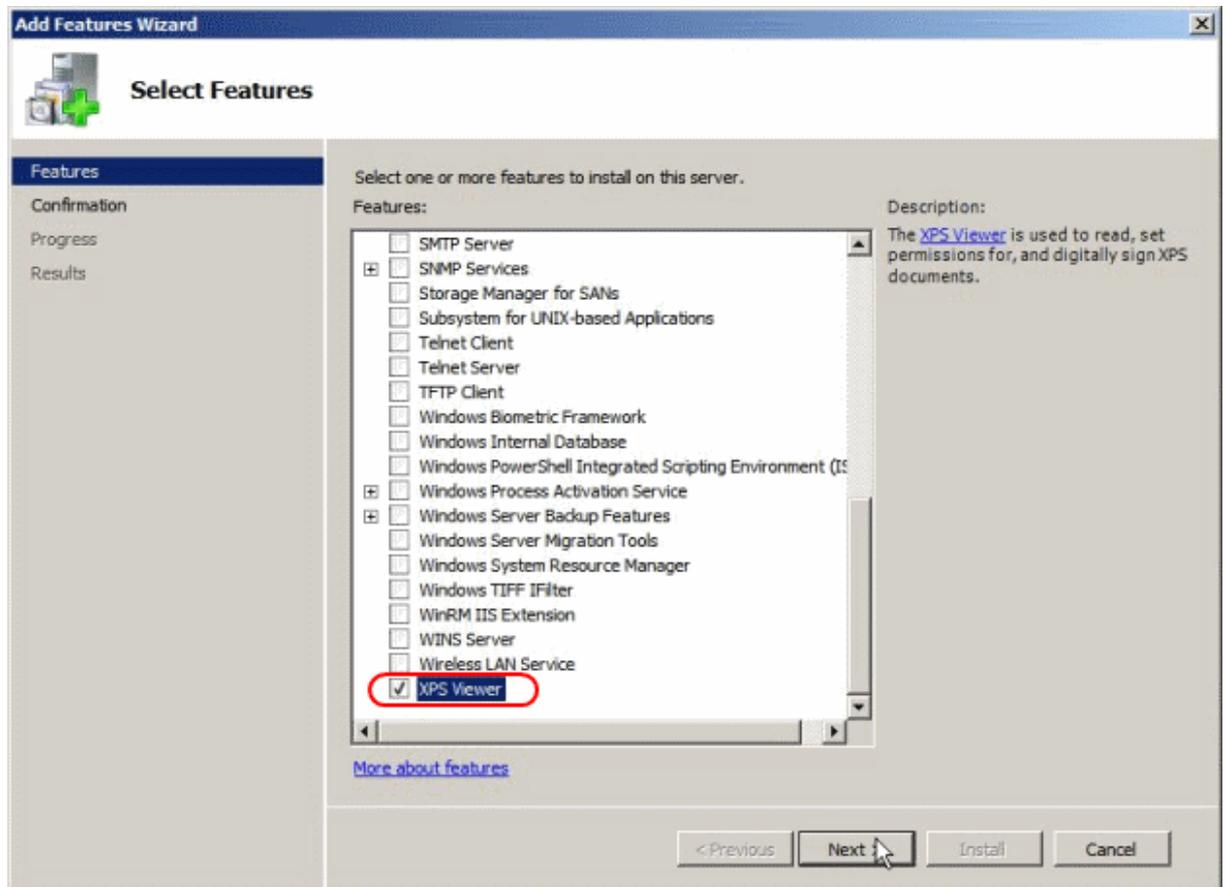
### 4.9.8.7. XPS Viewer Installation Instructions

Microsoft Windows XP and Server 2003 administrators can easily install the Microsoft XML Paper Specification Essentials Pack (XPSEP), which contains the XPS viewer from the Microsoft website. Versions for both 32bit and 64bit are available. By default, Windows Vista and Windows 7 includes a compatible XPS Viewer [if .NET Framework 3.0 is already installed](#).

- [Microsoft XML Paper Specification Essentials Pack](#)

Customers running Microsoft Windows Server 2008, must install the XPS Viewer from the Features module of the Server Manager MMC snap-in.

1. Load the Server Manager MMC snap in via **Start menu > Administrative Tools > Server Manager** .
2. Right-click **Features**; then select **Add Feature**.
3. Select the **XPS Viewer** check box; then click **Next**.



4. On the **Confirm Installation Selections** dialog box, click **Install** .
5. When the installation is complete, click **Close** .

### 4.9.9. Windows 8 Tablets & Windows RT Printing

With the Windows platform being adopted on more and more device types, organizations are seeking knowledge and information on how to support printing and integration with PaperCut. This section discusses Windows mobile device printing and shares some hints and tips.



#### Note:

This is not a step-by-step guide on everything Windows Mobile. Rather, it covers the main concepts that help administrators integrate Windows RT and Windows 8 tablet devices into existing print infrastructure. The following information comes from our own experiences and customer feedback.

In most cases Windows devices are able to print and use existing Windows server-based print queues. The best approach for supporting users and devices vary depending on the device type and purpose:

- Windows 8 Intel-based devices predominantly used in *Desktop Mode*
- Windows 8 Intel-based devices predominantly used in *Tile Mode*
- Windows RT devices

### 4.9.9.1. Client Software

Windows 8 Intel-based devices predominantly used in desktop mode are best treated in the same way as Windows laptops. If the user requires the client software (e.g. for shared account selection), install the PaperCut User Client software locally.

If the device is Windows RT based, or is predominantly used in Tile Mode, bookmark or pin the Mobile Client to the Start Screen. The Mobile Client is located at the URL:

```
http://[server-name]:9191/client
```

The Mobile Client provides most of the functionality of the desktop client software, but does not require local installation, as it runs in a web browser. If your users need to interact with the client (e.g. for shared account selection), instruct them to open the client after printing their job.

### 4.9.9.2. How do I print via a server with Windows RT?

You need:

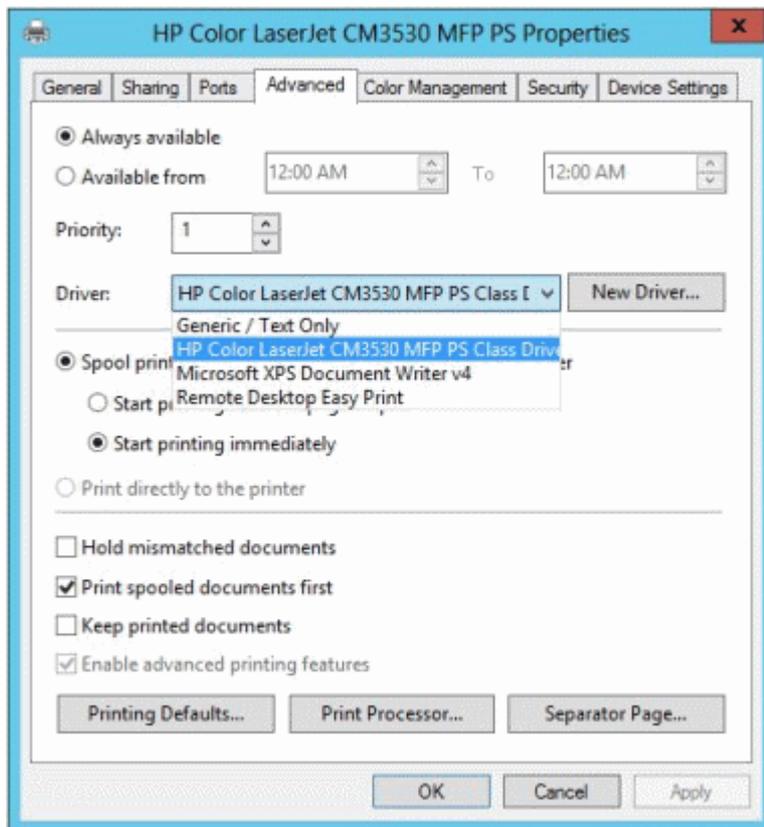
- A print server running Windows Server 2012 or higher, or Windows 8 or higher
- A printer that is supported by one of the "class drivers" built into Windows Server 2012, Windows 8 and above.

Windows RT comes with many *in-built* or *in-OS* drivers. These are called *class* or *mode 4* drivers. Printers that require specialized drivers do not work.



**Tip:** If your primary print server runs an older version of Windows and you are not able to upgrade it, consider setting up a new secondary print server to support Windows RT. PaperCut is able to track printing on multiple servers and multiple operating systems.

When selecting a print driver to use for the printer, find a compatible "Class" driver as shown below.



This manual does not address how to best deploy these printers to your Windows RT users. A manual approach is, however, adopted by many organizations.

If you want to read the latest information on Windows RT, or want to share your preferred deployment method, check out [PaperCut's Knowledge Base article on the topic](#).

## I want to continue to use my standard driver on other systems. Is this possible?

At the time of writing, the suitability of mode 4 drivers with regards to Windows XP, Vista and Windows 7 is unknown. In this situation, you could consider setting up duplicate printer queues on the Windows Server 2012 machine, perhaps with "RT" on the end of them, such as:

```
\\printserver\library \\printserver\libraryrt
```

You can then select the different "class" driver on the RT specific queue. To help with reporting, consider using PaperCut's inbuilt "Printer Groups" or physical printer reports to consolidate usage information from both queues.

### 4.9.9.3. Other Options for Windows RT and Windows 8 tablet devices

and [Email to Print](#) have both been successfully deployed and are in active use in Windows RT and Windows 8 tablet environments. Although the print experience is not native, the simpler setup and

management might be attractive to many organizations.

## 4.9.10. Mobile Print Release - Releasing print jobs on your mobile

Document security is an important requirement in the modern print environment. In a standard environment a user's job prints immediately and can accidentally be collected by another user. This problem is usually addressed with [Hold/release queues & Print Release Stations](#) by implementing dedicated Release Stations, embedded MFD applications, or specialist hardware. PaperCut MF's Mobile Print Release provides an alternate cost effective solution that leverages the powerful devices that exist in almost everyone's pocket - the mobile phone.

Features:

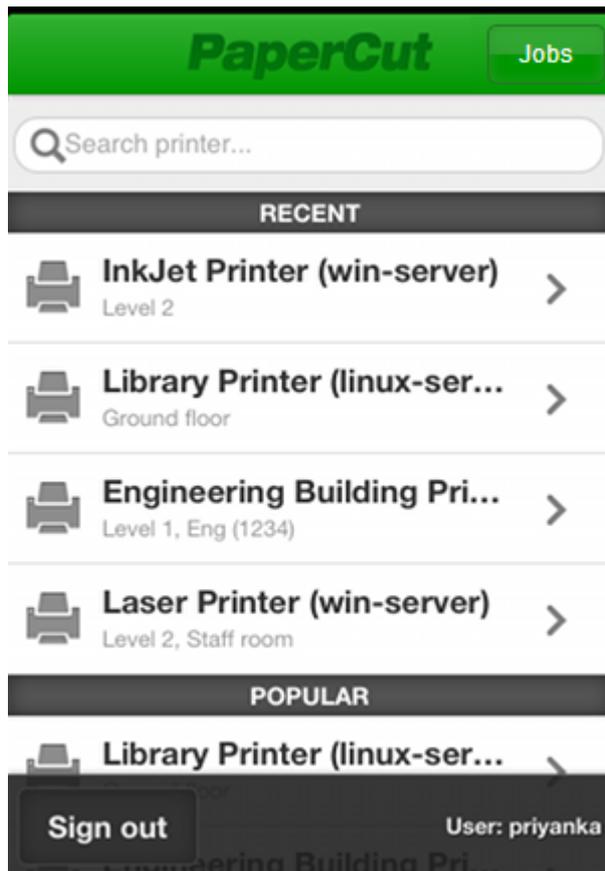
- Release held jobs from any print queue with hold/release enabled
- Simple intuitive interface, optimized for touch screens
- Designed to work with most modern cell and tablet devices
- Quickly locate printers with keyword searching (location, name or code)
- Can be used in environments with Find-Me Printing configured, giving the user ultimate control over where and when their jobs are released
- Support for QR code printer location/lookup

Requirements:

- iPhone iOS 5 and newer (both iPhone and iPad)
- Android ICS and newer (Chrome recommended)
- Other modern mobile web browsers

### 4.9.10.1. Usage and features

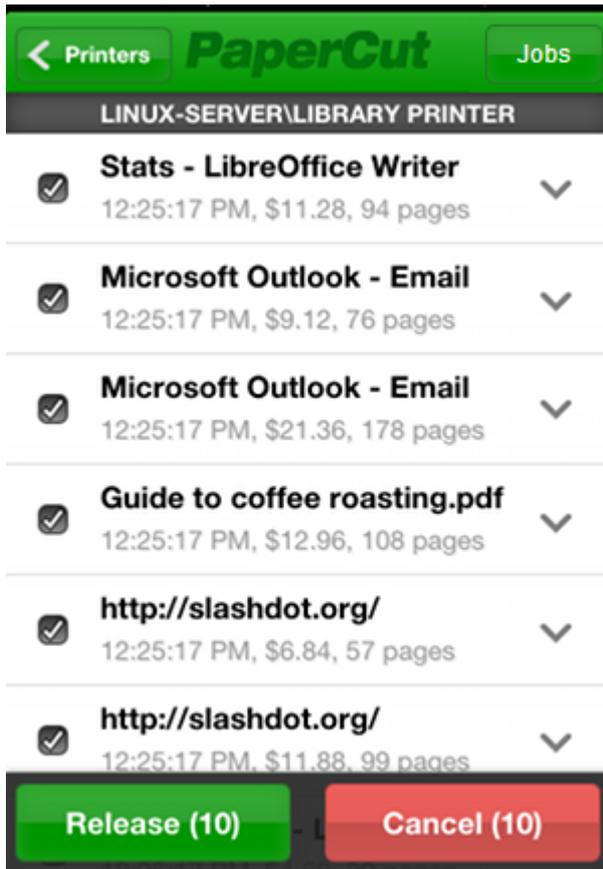
Once logged in, the user is able to see a list of printers that are available to them. The printer's name, location, and alternate ID (if set) are displayed. Mobile Print Release also displays recently used printers, as well as popular printers.



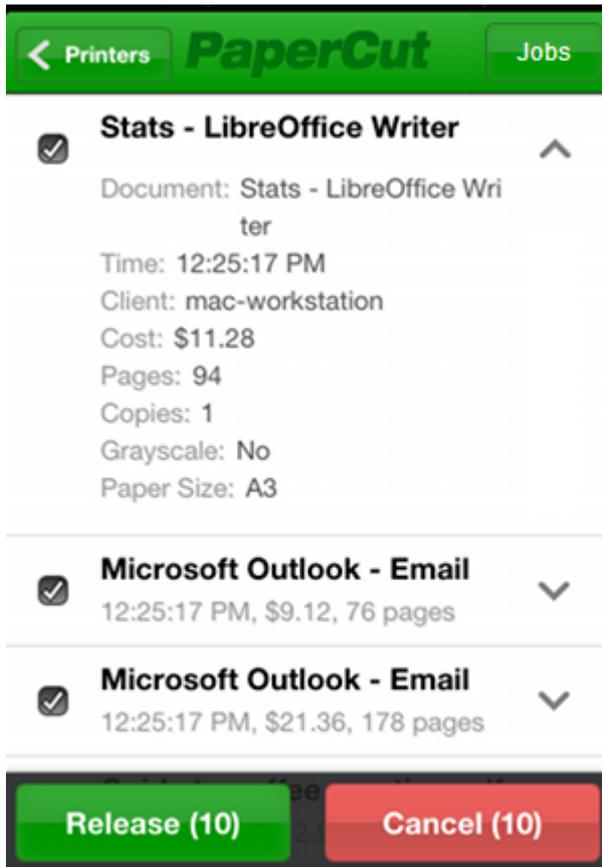
Selecting a printer shows the held jobs that the user can release on the printer. The list includes jobs held in virtual queues that redirect to the selected printer. In the screenshot below there are no jobs available for release.



In the screenshot below you can see there are many jobs available to release. Simple details such as the job name, cost, number of pages, and time that it was queued are displayed.

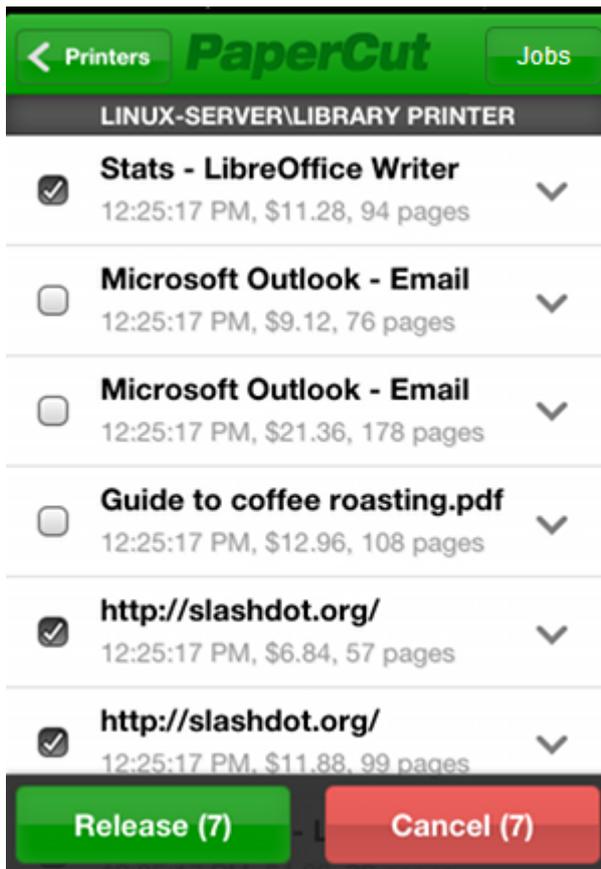


Clicking the arrow next to a job displays more detailed information about the job. In the case where there are multiple jobs with similar names, users can use this information to differentiate jobs.



The screenshot shows the PaperCut Jobs interface. At the top, there is a green header with a back arrow, the text "Printers", the "PaperCut" logo, and a "Jobs" button. Below the header, there is a list of jobs. The first job is "Stats - LibreOffice Writer", which is selected (indicated by a checked checkbox). To its right is an upward-pointing arrow. Below the job title, the following details are listed: "Document: Stats - LibreOffice Writer", "Time: 12:25:17 PM", "Client: mac-workstation", "Cost: \$11.28", "Pages: 94", "Copies: 1", "Grayscale: No", and "Paper Size: A3". Below this job, there are two more jobs, both titled "Microsoft Outlook - Email", each with a checked checkbox and a downward-pointing arrow. The first "Microsoft Outlook - Email" job has details: "12:25:17 PM, \$9.12, 76 pages". The second "Microsoft Outlook - Email" job has details: "12:25:17 PM, \$21.36, 178 pages". At the bottom of the screen, there are two large buttons: a green "Release (10)" button and a red "Cancel (10)" button.

If the user only wants to perform an action on a subset of jobs, they can use the checkboxes to the left of the job titles to either select or deselect them. By default, all jobs in the list are selected. Users can release or cancel the selected jobs by clicking either the green or red buttons at the bottom of the screen.



Other highlights for Mobile Print Release include:

- Avoid logging in every time with the "Remember Me" option
- Search for printers using name, location or alternate ID
- Jump straight to your favorite printer by bookmarking the page (or adding to home screen)

### 4.9.10.2. Mobile Print Release Deployment/Install

One of the benefits of Mobile Printer Release is that it allows you to offer secure release on any type of printer. There is no need for any dedicated hardware. A common configuration is to have two queues for a physical printer; one direct queue (normal printing) and one secure queue (a hold/release queue). When document security is important users can select the secure queue and release the job from their mobile phone. Alternatively, many sites want for a 100% secure environment, mandating release on every job. Mobile Print Release leverages the existing hold/release functionality in PaperCut MF. You need to set up [Hold/release queues & Print Release Stations](#) to use Mobile Print Release.

Mobile Print Release is a core feature included in PaperCut MF. It's a mobile web application, which means there's no need for users to install 3rd party applications or access an off-site App store (such as Apple's iTunes store). The advantage of this model is that all network traffic and application deployment is managed securely in your own network.

You can access the application by opening the phone's Internet browser (while connected to your network's local WiFi) and going to any of the follow URLs:

#### HTTPS

- `https://[servername]:9192/mr`
- `https://[servername]:9192/mobile/release`

#### HTTP

- `http://[servername]:9191/mr`
- `http://[servername]:9191/mobile/release`

"/mr" is a shortened version provided for convenience. HTTPS is highly recommended, as users will authenticate themselves via this connection. By default PaperCut MF installs with a self-signed certificate and raises warnings in secure browsers. Consider installing a [SSL/HTTPS Key Generation](#), or use the HTTP URL. We would recommend HTTP only as a secondary option, and only on secured WiFi.

Users can bookmark or "Add to Home Screen" the Mobile Print Release app on their device to quickly access the application. Held job pages can also be bookmarked, which is convenient for users who often release from the same device.



**Tip:** You can also deploy Mobile Print Release to iOS devices as an App. The user needs to access `https://[servername]:9192/mr/install`. This installs a web profile that automatically creates the home screen icon, which might be preferred to manual bookmarking on some sites.

iOS users can also print directly from their device using [iOS Printing \(iPad & iPhone\)](#). Use these two applications together to provide a comprehensive mobile printing solution.

### 4.9.10.3. Management tips for large networks

Here are some tips to help educate your users to get the most out of Mobile Print Release:

#### User education

When implementing Mobile Print Release across a large network, it can be hard to educate the users of how and when to use the application. Many administrators have used stickers with URLs printed on them to direct users to access the application. Informational posters give administrators a more noticeable and detailed space to explain the enhanced printing architecture.

#### Power features

Regular users of Mobile Print Release can improve their experience by bookmarking the printers that they use the most. When used in conjunction with the "Remember Me" option, users can

release their jobs extremely quickly. This allows users to click a single icon on their mobile device and go straight to the held job list from which their print job can be released.

## Quick printer location

Sites with hundreds of printers should educate their users to use the search function in Mobile Print Release. The Mobile Print Release printer search field provides a quick way for users to find their desired printer. The search terms are matched against the printer's name, location and alternate ID. The alternate ID is a short admin-defined code that you can assign to a print queue. Printer names are usually designed to be read on a computer, assigning an alternate ID gives users identifiers that are easy to remember and type on a mobile device. A suggested approach is to use a 4 digit code (eg 1234) as the alternate ID. You can label printers with stickers with the alternate ID to indicate what term users should search for.

You can use the location or alternate ID to access the printer's Mobile Print Release page directly:

- `https://[servername]:9192/mr/[location]`
- `https://[servername]:9192/mr/[alternate_id]`

## Using QR Codes

While your users can use printer search to locate a device, QR codes provide a mechanism to launch Mobile Print Release directly with the printer automatically selected. The process would work as follows:

1. The user scans the QR code using their mobile.
2. The mobile's browser opens with a list of their print jobs (if they have not previously authenticated, they are prompted to do so).
3. The user selects their jobs; then clicks **Release**. The jobs print immediately.

Below is an example of a sticker that could be adhered to a printer. The QR code results in the URL `https://printerserver:9192/mr/1234`. Note that this URL uses the alternate

Scan this to  
release jobs on  
this device.



1234

printer ID of 1234 (See above).

#### 4.9.10.4. Advanced Options

The following Mobile Print Release configuration keys are available. You can edit Configuration keys at **Options > Actions > Config editor (advanced)** .

**Table 60: Advanced Mobile Print Release Config Keys**

Config name	Description
mobile-release.max-recent-printers	The maximum number of recently used printers displayed in Mobile Print Release interface. These printers are the ones that have been recently used to release jobs via Mobile Print Release. It helps users in selecting their preferred printer quickly. The default value is 4.
mobile-release.max-popular-printers	The maximum number of popular printers displayed in Mobile Print Release interface. These printers are organization's popular printers. The default value is 3.
mobile-	Inactivity timeout for Mobile Print Release interface. The value of

Config name	Description
release.session-timeout-mins	0 indicates that the session will never time out. The special value DEFAULT indicates that the PaperCut's default value will be used. The default value is 1440 minutes (24 hours).

See [Using the Config Editor](#) to find out how to change config keys.

## Mobile Release Customization

It is also possible to customize the logos and the look of Mobile Print Release. See [Customizing Mobile Print Release](#) for details.

### 4.9.11. Mobile Client

When printing from a desktop or organization-owned laptop, the [User Client](#) provides a range of functionality such as

- showing the user their balance / quota,
- delivering notification messages,
- confirming the cost of jobs and
- allocating jobs to shared accounts.

For user-owned and mobile devices it might not be possible or practical to deploy (or have the user install) the desktop client. Instead, the Mobile Client offers most of the same functionality and can run in a web browser on nearly any device.

In most cases use of the Mobile Client is optional and serves only to provide information to users about their print jobs. Its use is required when

- user interaction is required, such as popups for confirmation, account selection or from a print script,
- printing from an iOS device, where the Mobile Client is required to authenticate the user.

The Mobile Client can be accessed from a web browser at `http://[server-name]:9191/client`. Rather than have users type the URL into their browser, we recommend providing a prominent link, for example, on an intranet page, or deploying a link to devices where possible. Specific instructions for deploying to iOS devices are available in [The PaperCut iPad / iPhone App \(Mobile Client\)](#).

In cases where user interaction is required, users might require some prompting to remind them to use the Mobile Client. For [Google Cloud Print](#) and [Email to Print](#) jobs, a reminder email message can be sent if no action is taken for some time (90 seconds after submitting the job by default). Configure this functionality at **Options > Mobile & BYOD > Common Mobile Printing Options > Send a reminder email when a job requires user action (e.g. account selection)** .

## 4.9.12. Self association for emails and email verification/validation

### 4.9.12.1. Unknown emails and email self-association

When mobile printing technologies identify job owners by email address, PaperCut needs a way to identify and authenticate the email's owner. E.g. with [Google Cloud Print](#), jobs are "owned" by a Google Account, which is an email address. With [Email to Print](#), the job's owner is identified by the sending email address.

PaperCut provides three main ways to populate email addresses. Select the method that best suits your organization.

1. Email addresses are automatically imported from the user directory. If you have configured organization / "official" addresses in your user directory then these are imported to PaperCut and further configuration might not be required.
2. Manual configuration. An administrator can add and remove email addresses on behalf of a user in the **Users** tab of the PaperCut Admin interface. We recommend using the **Other emails** section for this purpose if you are adding "official" organization addresses in case you later decide to add them to your user directory.
3. Email self-association, allowing users to add an email address to their user account by themselves.

If a job arrives from an email address that is not known to the system, you can choose to have PaperCut cancel the job, or hold the job and offer the user to verify (self-associate) their address. Canceling the job is the appropriate response if you are choosing to manually configure the email addresses.

This option is available at **Options > Mobile & BYOD > Common Mobile Printing Options > When a job arrives from an unknown email address** . Email self-association is enabled by setting this option to **Hold the job and email the user with instructions for verifying the address**.

Email self-association works as follows:

1. When a job arrives from an unknown user, the job is held and an email response is sent to the user that includes a link.
2. Clicking the link prompts the user to log in.
3. The user logs into their PaperCut account and the email address is added to their account. When viewing the user in the admin interface, it is displayed under **Other emails**.
4. The job is assigned to the verified user and proceeds to print.
5. Future jobs are automatically assigned to the verified user.

## 4.10. TopUp/Pre-Paid Cards

Many organizations run PaperCut MF in either a silent logging mode or as a way of enforcing sensible quotas. On the other hand, other organizations choose to run PaperCut MF in charging mode requiring users to make payments in advance. Recording and entering payments can be a time consuming process for staff or system managers. PaperCut MF offers a web interface for user account management to assist with the process, however, there is still the need for someone to manually assign credit. The TopUp/Pre-Paid Card system included with PaperCut streamlines the payment process and moves much of the manual handling over to the end-user.

Cards are also known as:

- Vouchers
- Re-Charge Cards
- Pre-Paid Cards

### 4.10.1. Cards by Example

The card system is best described by walking through the payment process:

#### 4.10.1.1. The User's Perspective

Amy is a student at a local high school. The school uses PaperCut MF for their charging. Amy is allocated \$5.00 a week for printing. This week she has used all her allocation but still has one assignment to print on Friday. She purchases a \$5.00 Card from the school canteen. The card contains a 16-digit identification number. She logs onto the schools intranet site, enters the PaperCut section, and enters the card's ID number. Her account is automatically credited \$5.00.

#### 4.10.1.2. The Administrator's Perspective

Andrew is a System Administrator at the same high school. At the start of the term he used the PaperCut MF card wizard to generate 500 TopUp/Pre-Paid Card of \$5.00 value. These were generated in 2 batches. The first batch was prefixed with C1 and the second batch L1. The C1 batch was sold at the school canteen and the L1 batch sold at the school library. The cards are kept secured at these locations.

The card wizard generated a *number definition file* for each batch. Andrew imported these numbers into PaperCut. Andrew took the time to customize the look of the cards to include the school logo and simple instructions on how to redeem the card.

During the year Andrew is able to track the cards sold and uses the batch prefixes to track where students purchase cards. Andrew also keeps an eye on the event log and has disciplined students attempting to guess card numbers.

## 4.10.2. The Card System

PaperCut Software International Pty. Ltd. has worked with a number of organizations to design the TopUp/Pre-Paid Card system. A number of payment technologies were evaluated over the period of two years. These technologies included vending machines, smart cards, micro-payment systems, and manual processing. The card system proved to be the most successful and cost effective solution. The card concept is now the de facto standard in other industries such as pre-paid mobile phones.

The PaperCut MF card system is 100% software based. There is no need for special hardware such as smart card readers or special vending machines.

The card system is included as standard with PaperCut MF. The system includes:

- A card wizard application for assisting with the process of creating new cards.
- A web page for end-users to enter card numbers.
- A security framework for tracking card redemption and implementing fraud prevention.

## 4.10.3. Creating New Cards

### 4.10.3.1. Overview and Definitions

Cards are generated using the *Card Wizard*. The card wizard is a Microsoft Windows application that integrates with Microsoft Word. You can download the card wizard install from inside the PaperCut MF administration login under the Card section. The download link is located in the **Actions** area.



**Important:** The *Card Wizard* integrates with Microsoft Word. Ensure that Microsoft Word is installed before using the *Card Wizard*.

**Table 61: Card Terminology**

Term	Definition
<i>Card Wizard</i>	A tool to help administrators produce a set of cards. The wizard generates cards ready for printing and a <i>number definition file</i> suitable for importing into the PaperCut MF system.
<i>Card Number</i>	All cards are designated a random unique number. PaperCut uses this number to identify the card and its value. Users enter this number to allocate the credit to their account. An example number: P0409-1945-4833-5750-4452
<i>Batch ID</i>	A batch ID is a user-defined ID or number assigned to all cards in a

Term	Definition
	batch. The batch ID prefixes all card numbers and are used to identify the source of a card. Assign a unique number to each batch.
<i>Valid Till Date (Expiration Date)</i>	Define the date on which a card can no longer be used. It's analogous to a use by date on a gift certificate. Expiration dates ensures cards only remain in circulation for a limited period of time. A six to 12 month period is recommended. In a school environment it is useful to define an expiration date as the last day of the semester.
<i>Mail Merge</i>	Mail merge is an advanced feature of Microsoft Word. The mail merge feature takes a design template and a data source, and merges the two together to construct a composite document. In the card wizard's case, the number list is the data source and the design template is the template Microsoft Word document.
<i>Number Definition File</i>	The number definition file contains information on all cards in a batch including a list of card numbers, their expiration date, and value. The card wizard creates this file during the generation process and the System Administrator can import this file into the Card administration section.
<i>Card Number Entry Page</i>	The card web entry page is a designated page inside the user login section.

### 4.10.3.2. Using the Card Wizard

This section describes how to create a batch of TopUp/Pre-Paid Cards. The example covers creating a batch of 100 cards of value \$10.00 each.

The Cards feature is accessed via the **Cards** tab. By default there is no **Cards** tab in the Professional (Client Billing) installation. To enable the **Cards** tab:

1. Navigate to the **Options** tab.
2. In the User Features section, select **Enable use of TopUp/PrePaid Cards**.
3. Click **Apply**.

## Step 1 - Install the card wizard

1. Log onto a desktop system with Microsoft Word installed.
2. Open a web browser at:  

```
http://[server_name]:9191/admin
```
3. Log in to PaperCut MF as `admin`.
4. Navigate to the **Cards** tab.
5. In the Actions menu, select **Download card wizard**.
6. Run the install program and complete the installation process.

## Step 2 - Welcome

1. Open the *Card Wizard* from the Start menu.
2. Click **Next**.

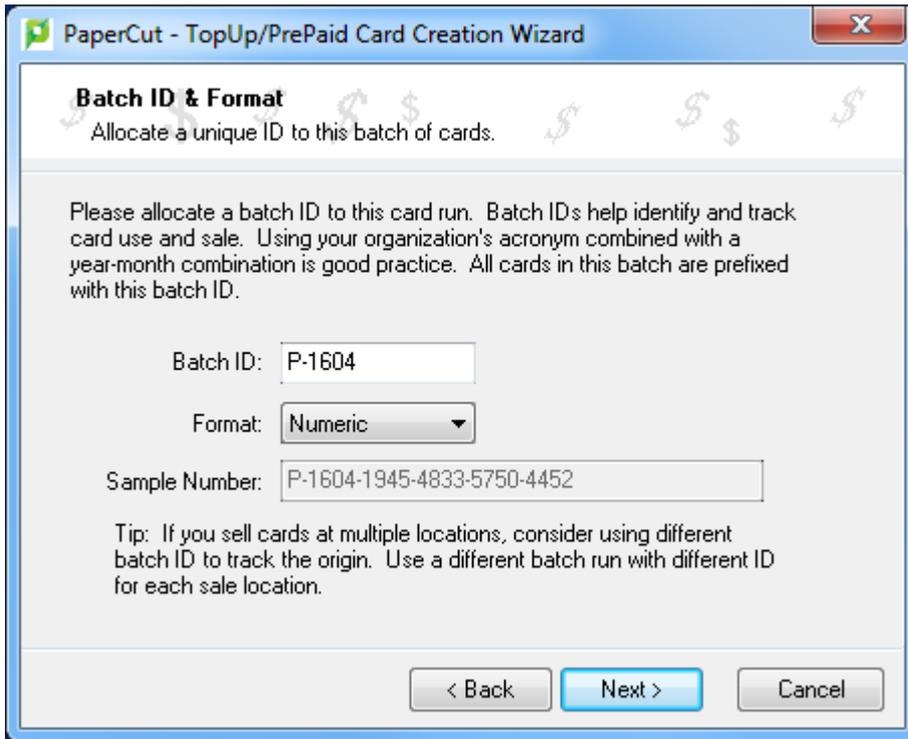
## Step 3 - Batch ID & Format

1. In **Batch ID**, enter a unique identifier for the batch.

**Tip:**

We recommend adapting a consistent convention. For example, choose numbers representing the date, or a sequential numbering scheme.

2. Click **Next**.
3. In **Format**, select the card number format:
  - **Numeric**—this is the most secure and generates long numbers.
  - **Alphanumeric**—produces a shorter format consisting of letters and numbers. The Alphanumeric format is a little less secure due to the reduced number of possible permutations, however, it does offer a shorter, more convenient entry format.



**PaperCut - TopUp/PrePaid Card Creation Wizard**

### Batch ID & Format

Allocate a unique ID to this batch of cards.

Please allocate a batch ID to this card run. Batch IDs help identify and track card use and sale. Using your organization's acronym combined with a year-month combination is good practice. All cards in this batch are prefixed with this batch ID.

Batch ID:

Format:

Sample Number:

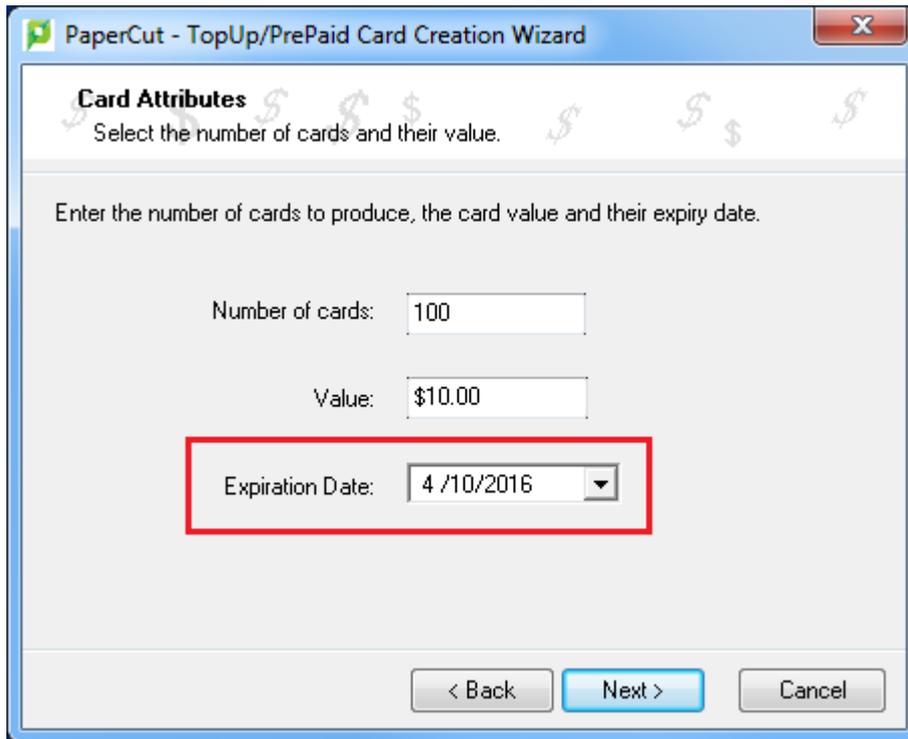
Tip: If you sell cards at multiple locations, consider using different batch ID to track the origin. Use a different batch run with different ID for each sale location.

< Back   Next >   Cancel

## Step 4 - Card Attributes

1. In **Number of cards**, enter **100**.
2. In **Value**, enter **\$10.00**.
3. In **Expiration Date**, set an appropriate date that corresponds to a fixed event, such as, the end of the year, budget year, term or semester. By default the valid till date is set 6 months

in the future.



**PaperCut - TopUp/PrePaid Card Creation Wizard**

**Card Attributes**  
Select the number of cards and their value.

Enter the number of cards to produce, the card value and their expiry date.

Number of cards: 100

Value: \$10.00

Expiration Date: 4 /10/2016

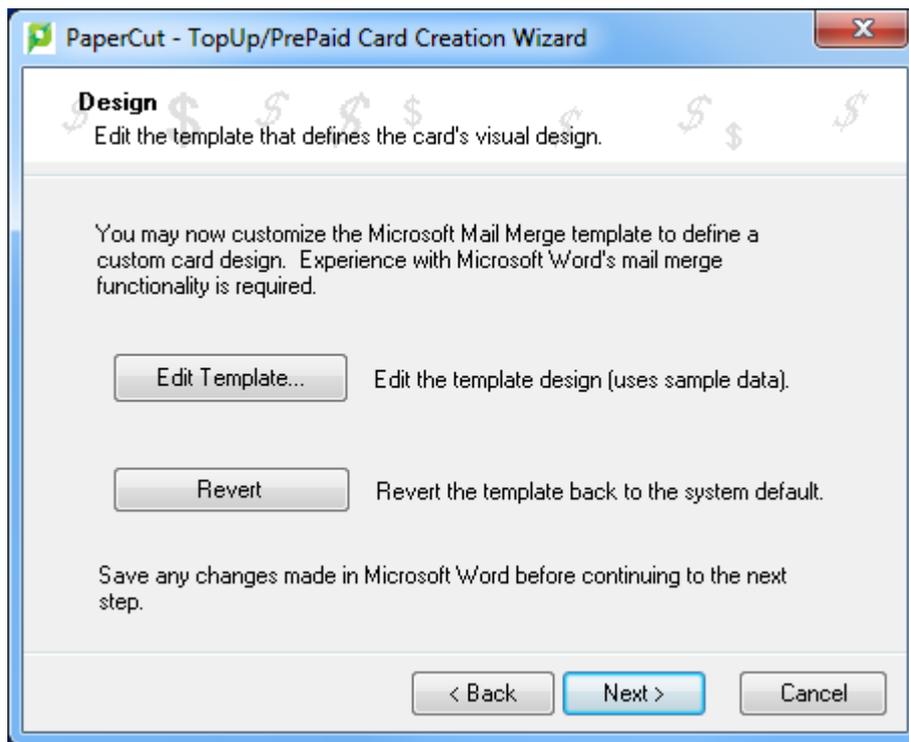
< Back   Next >   Cancel

## Step 5 - Design

To produce a set of standard cards, you do not need a custom design.

1. Click **Next** to move to the next step. Modifying the custom design requires knowledge of Microsoft Word's mail merge functionality. See the [TopUp/Pre-Paid Card Tips](#) for further

details.



## Step 6 - Generate Numbers

1. Click **Next** to generate the card numbers. The **Save Number Definition File** is displayed.
2. Navigate to where you want to save the number definition list; then click **Save**. You can save the file on the local hard driver or a secure network drive.

A screen is displayed informing you that a merged Microsoft Word document will be created.



3. Click **Next**.

## Step 7 - Create Cards

A prompt is displayed asking you if you have macros enabled in Microsoft Word.

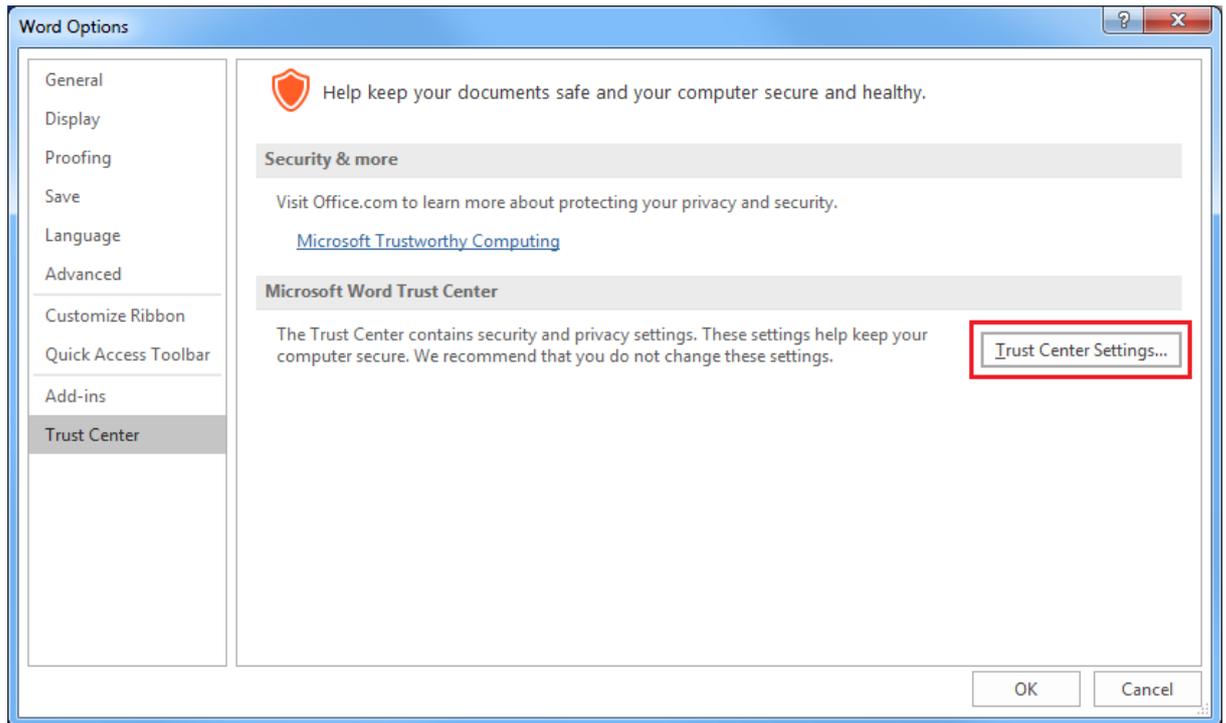


The card wizard uses Word Macros to automate much of the card generation process.

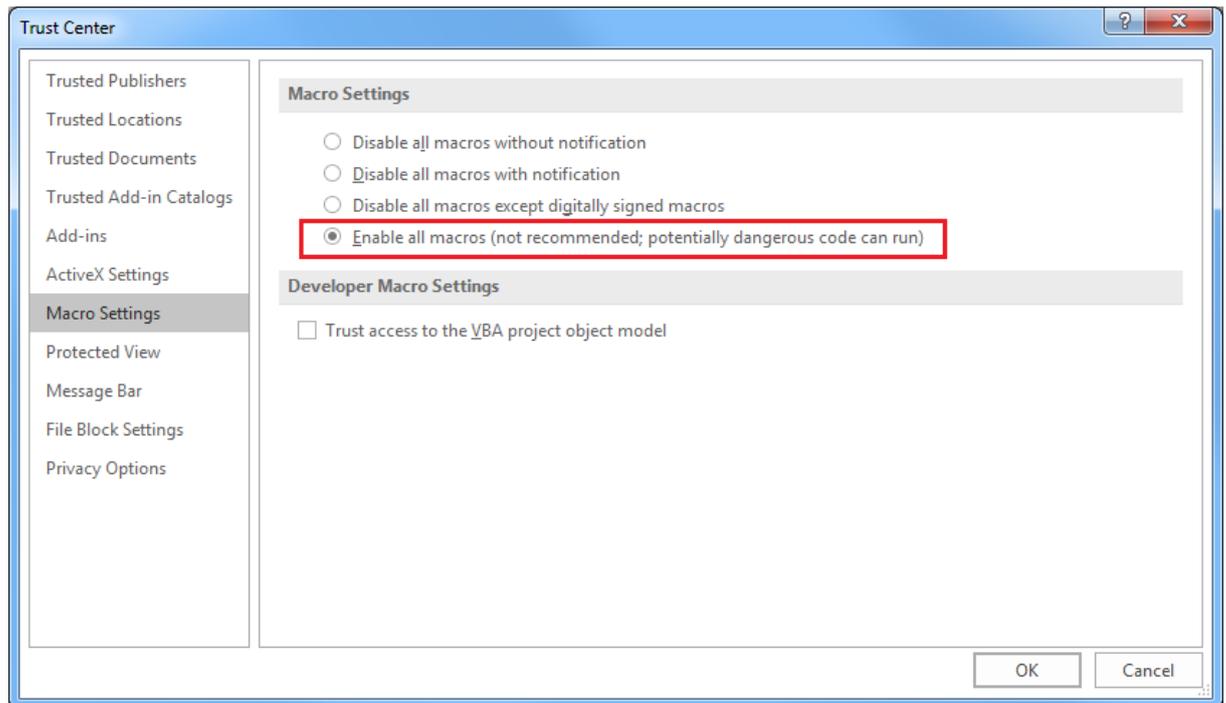
1. Ensure macros are enabled:
  - If you have macros enabled, click **Yes**.
  - If you do not have macros enabled, or are unsure, click **No**. The card wizard guides you through the process of enabling macros.

## Enable macros in Microsoft Word

1. Open Microsoft Word.
2. Open a blank document.
3. Click **File**.
4. Select **Options**.
5. Select **Trust Center**.



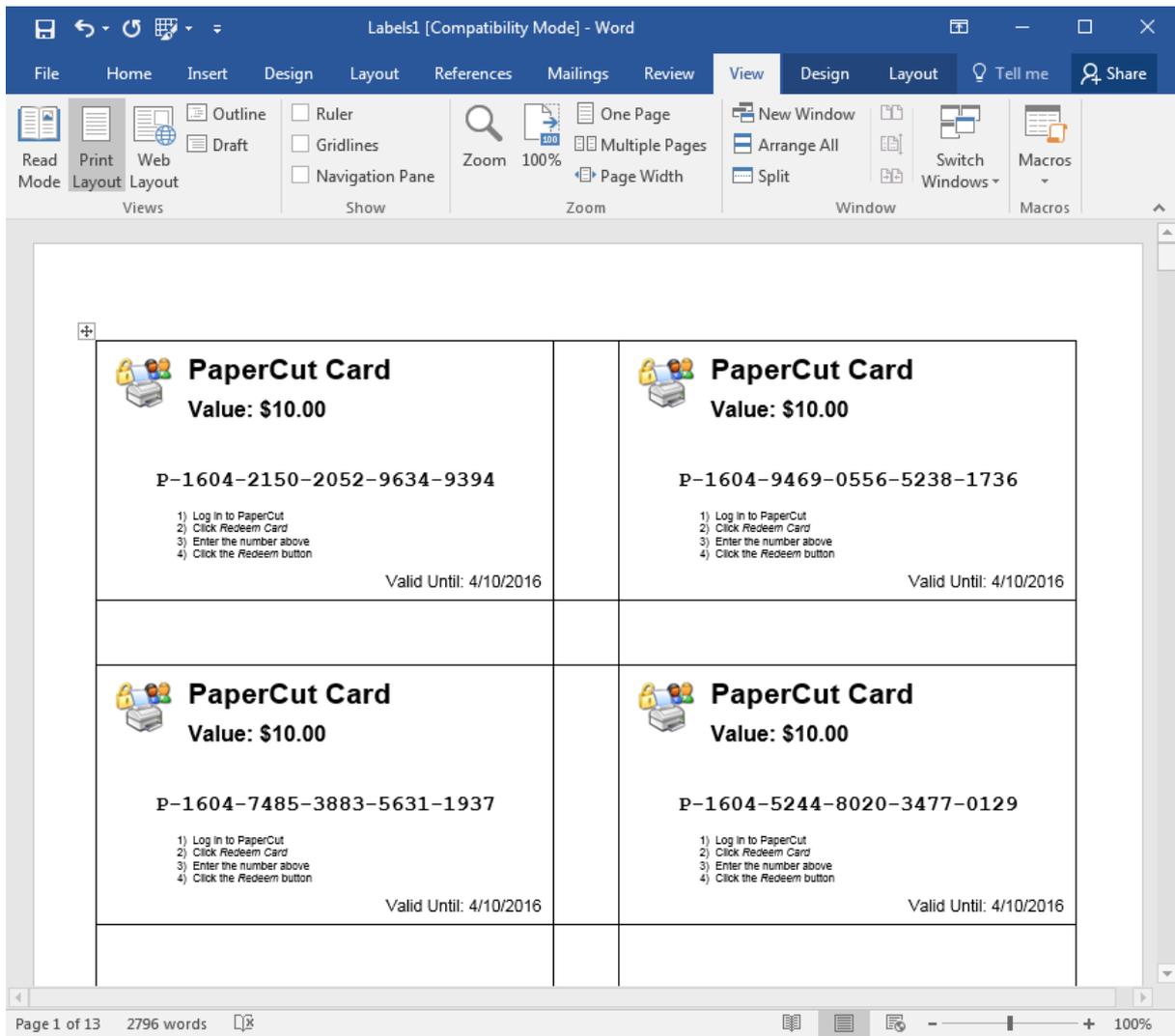
6. Click **Trust Center Settings**.



7. Select **Enable all macros (not recommended; potentially dangerous code can run)**.
8. Click **OK**.
9. On the **Word Options** screen, click **OK**.

## Step 8 - Printing Cards

A new Microsoft Word document opens, listing all 100 cards. The cards are standard business card size suitable for printing on heavy paper and cutting with a paper cutter. For a professional look, consider forwarding a PDF version to your local printing shop. See [TopUp/Pre-Paid Card Tips](#) for more ideas.



## Step 9 - Importing

The final step is to activate the cards by importing the *number definition file* in the PaperCut MF admin section.

1. Navigate to the **Cards** tab.
2. In the **Actions** menu, select the **Import new cards**.

The screenshot shows the 'TopUp/PrePaid Card Management' interface. The navigation menu includes Dashboard, Users, Groups, Accounts, Printers, Reports, Cards, Options, Logs, and About. The breadcrumb trail is Location > Cards > TopUp/PrePaid Card Management. The main header is green with a white icon and the text 'TopUp/PrePaid Card Management'. Below the header is a search bar with 'Filter off' and an 'edit' link. To the left is an 'Actions' menu with options: Import new cards, Download card wizard, Expire selected, Expire batch, Delete batch, Delete used cards, and Delete expired cards. The main content area contains a table with the following data:

	Card Number	Value	Used by User	Date Used	Expiration Date	Date Loaded
<input type="checkbox"/>	010305-1252-JDF4	\$5.00	[Not Used]	[Not Used]	[EXPIRED Sep 1, 2010]	Mar 1, 2010
<input type="checkbox"/>	010305-3W57-Y8MZ	\$5.00	[Not Used]	[Not Used]	[EXPIRED Sep 1, 2010]	Mar 1, 2010
<input type="checkbox"/>	010305-GJM5-1JFT	\$5.00	[Not Used]	[Not Used]	[EXPIRED Sep 1, 2010]	Mar 1, 2010
<input type="checkbox"/>	010305-JB3H-RTHN	\$5.00	[Not Used]	[Not Used]	[EXPIRED Sep 1, 2010]	Mar 1, 2010
<input type="checkbox"/>	010305-S60L-YBHF	\$5.00	[Not Used]	[Not Used]	[EXPIRED Sep 1, 2010]	Mar 1, 2010

3. Click **Browse**; then locate the number definition file as saved in step 5 above.
4. Click **Upload**.

The screenshot shows the 'TopUp/PrePaid Card Management' interface. The navigation menu includes Dashboard, Users, Groups, Accounts, Printers, Reports, Cards, Options, Logs, and About. The breadcrumb trail is Location > Cards > TopUp/PrePaid Card Management. The main header is green with a white icon and the text 'TopUp/PrePaid Card Management'. Below the header is a search bar with 'Filter off' and an 'edit' link. To the left is an 'Actions' menu with options: Import new cards, Download card wizard, Expire selected, Expire batch, Delete batch, Delete used cards, and Delete expired cards. The main content area contains a table with the following data:

	Card Number	Value	Used by User	Date Used	Expiration Date	Date Loaded
<input type="checkbox"/>	P-1605-7667-7959-2037-9312	\$10.00	[Not Used]	[Not Used]	Oct 4, 2016	Apr 4, 2016
<input type="checkbox"/>	P-1605-7782-4699-5563-2500	\$10.00	[Not Used]	[Not Used]	Oct 4, 2016	Apr 4, 2016
<input type="checkbox"/>	P-1605-7890-9884-5976-5851	\$10.00	[Not Used]	[Not Used]	Oct 4, 2016	Apr 4, 2016
<input type="checkbox"/>	P-1605-7902-3688-3053-9163	\$10.00	[Not Used]	[Not Used]	Oct 4, 2016	Apr 4, 2016
<input type="checkbox"/>	P-1605-8091-2968-0670-4949	\$10.00	[Not Used]	[Not Used]	Oct 4, 2016	Apr 4, 2016

## Step 10 - Testing

It is good practice to test the card process by using one of the cards on a test account (standard user level). Remember to destroy the spent card used for the test!

### 4.10.3.3. TopUp/Pre-Paid Card Tips

## Security

The PaperCut MF card system is designed with security in mind. All fraudulent card redemption attempts are detected, trapped and logged. The number allocation system is highly secure and guessing a number is statistically impossible. With 1,000 cards in circulation, the chance of guessing a number is 1-in-10,000,000,000,000, or in non-mathematical terms, it would take over 300,000 years to guess a number if a person enters one number every second!

Like many IT security systems, the weakest link in the system is the human interface. Cards are a form of virtual currency. Take care to protect the cards from unauthorized access and disclosure.

- Ensure the generated Microsoft Word document is deleted or saved in a secure place after the cards are printed.
- Always delete the number definition file after importing the batch into PaperCut.
- Never leave the cards in an unsecured or visible location. Consider sealing cards in envelopes.
- Check the PaperCut MF application event log on a weekly basis for security messages. PaperCut logs and traps unauthorized card use.
- Use the card log to track card redemption and allocation.
- Cancel/Expire lost or stolen cards by batch number as soon as the problem is reported.



### Important:

The cards are similar to cash and should be treated with the same care. Make sure the cards are carefully secured.

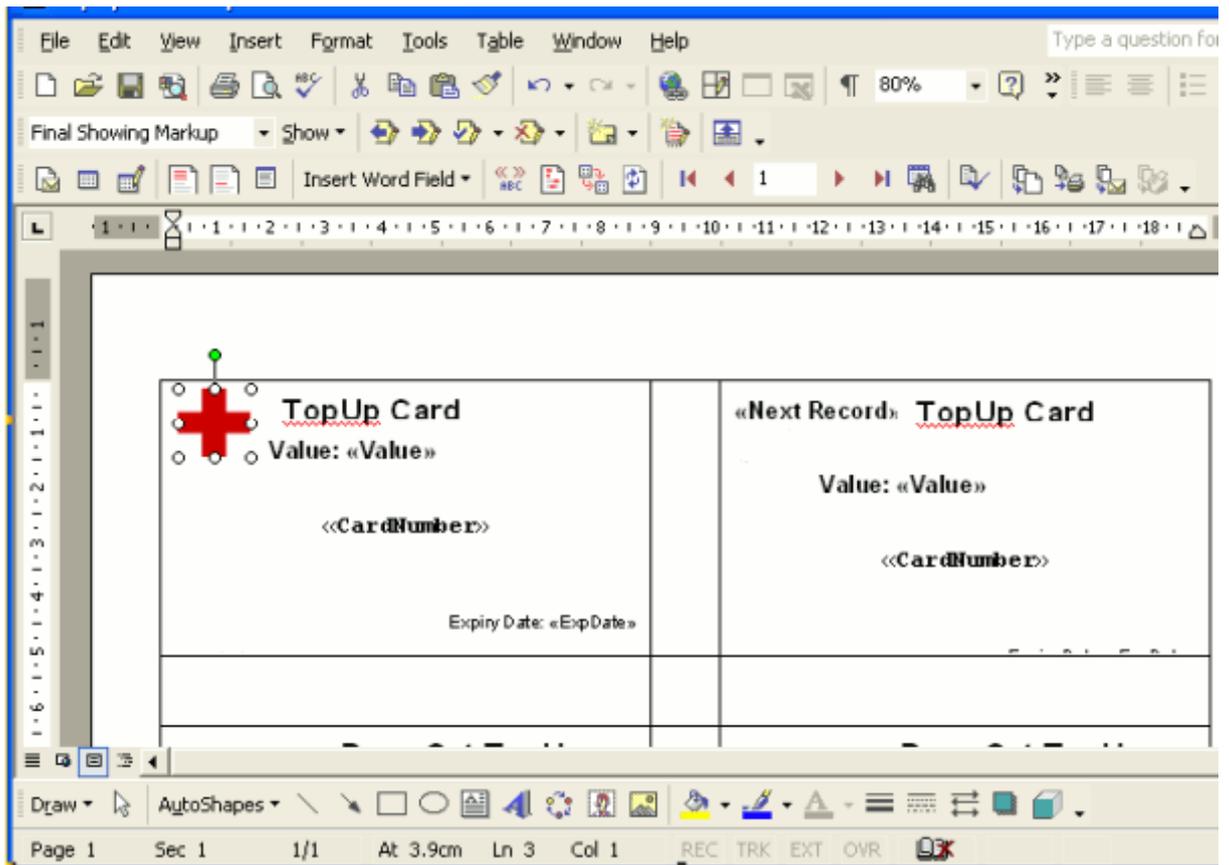
## Cards Design

The **Edit Template** button in Step 4 of the card wizard opens the standard card template for editing. The card wizard is able to use any standard mail merge design. It's even possible to convert the template layout to letters rather than cards. Microsoft's mail merge support is designed for Word power users. Consider taking the step-by-step mail merge tutorial provided with Microsoft Word help if you do not have experience with Word's mail merge functionality.

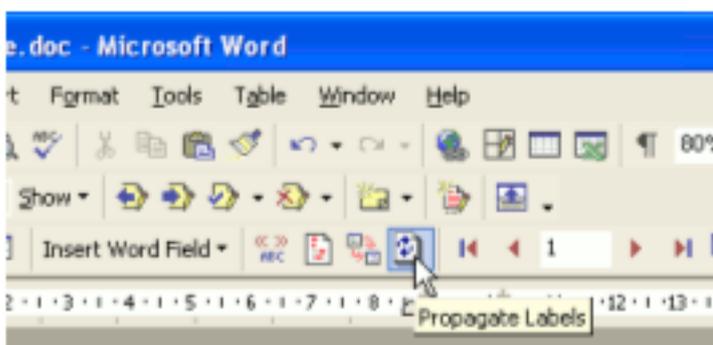
Consider keeping your customizations initially simple and work up towards more complex configuration.

To change the logo graphic:

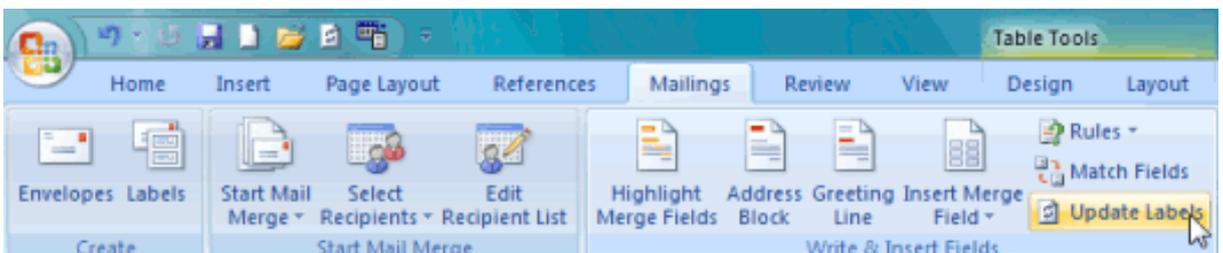
1. Click **Edit Template** in step 5.
2. Say **Yes** to **Enable Macros**.
3. Select the standard *PaperCut logo* on the *first* card; then click the *Delete* button on the keyboard.
4. Select **Insert > Picture > From File**.
5. Locate the desired logo and click **Insert**.



6. If using pre-2007 MS Word click **Propagate Labels** on the mail merge tool bar. The new logo should propagate across all cards on the page.



In MS Word 2007, click **Update Labels** on the Mailings tool bar.



7. Repeat the steps above to change other working and layout as required. Always change

the first card then click **Propagate Lables** or **Update lables** to apply the changes to all cards. *IMPORTANT:* Do not accidentally delete the special <<Next Record>> field as this cause the merge to move to the next card number before printing the next card. Removing this results in all cards displaying the same card number.

8. Click **File > Save** and close Microsoft Word.
9. Test the template by running a batch in the card wizard.

**Tip:***Design Recommendations:*

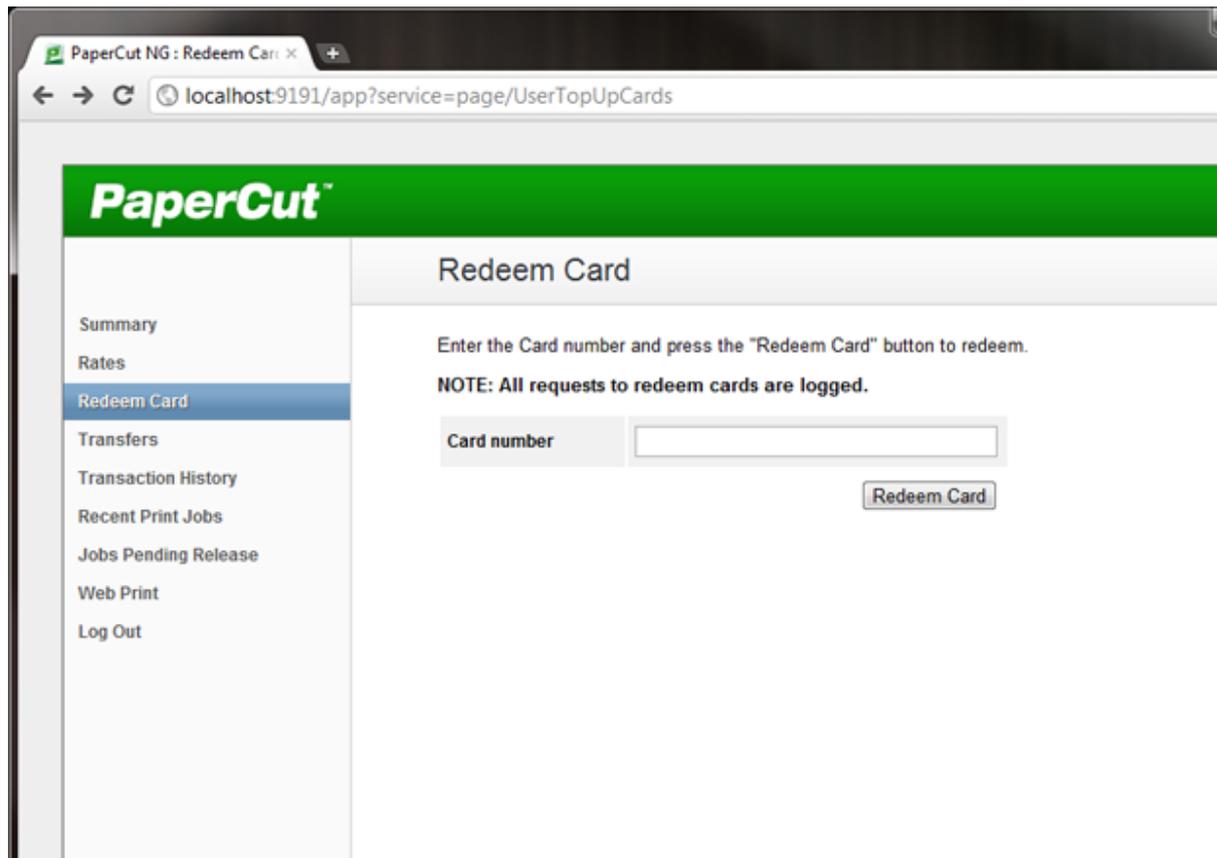
- Consider changing the logo and adding your organization name
- Change the URL reference to point to your intranet site or event your network/card policy page.
- Provide basic instructions on how to redeem the card or the location of an information page.

## 4.10.4. Using a Card

Distribute the following information to end-users - for example, via the "Print Policy" page on your organization's intranet site.

To redeem a TopUp/Pre-Paid Card:

1. Purchase a card from the appropriate person or place. The network administrator creates cards specific for your organization. In schools, cards are often sold at the library, general office or school cafeteria.
2. Open a web browser and navigate to the PaperCut MF user login page. After logging in, your account status should display.
3. Click the **Redeem Card** link on the left-hand navigation bar.
4. Enter the *Card Number* in the **Card Number** box; then click **Redeem Card**. Take care to enter the number exactly as listed including any dashes (-).
5. If the card's number is valid, the credit as listed on the card is transferred to your account and this is displayed in your transaction history.



**Tip:** To educate the users about redeeming their TopUp/Pre-Paid Card, administrators might find the [Example 5: Adding credit using a TopUp/Pre-Paid Card](#) helpful.

## 4.11. Reports

A report is a representation of data, often in a printable tabular format. PaperCut MF provides a set of built-in reports. These include simple pre-built reports accessed via one-click, up to more advanced reports constructed using custom filters.



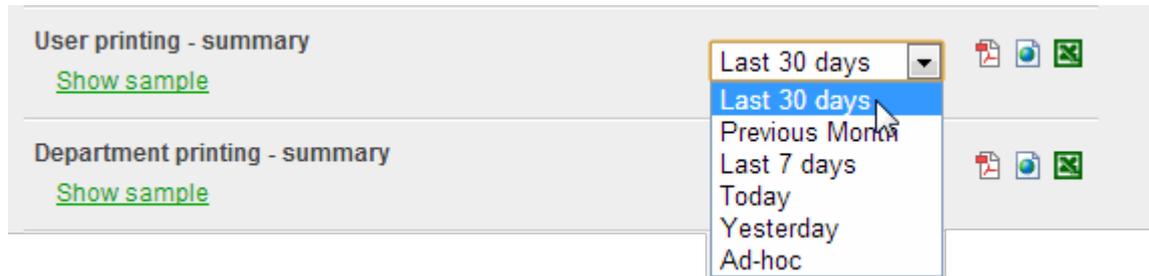
**Tip:**

PaperCut MF is an open system. System Administrators with database management experience might run the system on an external database system. 3rd party reporting tools can then be used to construct custom reports. The PaperCut Software Development team can also consult on custom report development.

PaperCut MF reports are generated for a single Application Server. If your site has multiple Application Servers and you want consolidated reports, see [Central Reports](#).

You can produce reports by selecting the date range and then clicking one of the report format icons. You can select common date ranges, such as **Last 30 days**, **Yesterday** and **Previous Month** via the drop down box. Use the **Ad-hoc** option to generate the reports with custom date ranges and filters (e.g. generate a **User printing - summary** report limited to a particular

department). You can see a sample of each report by clicking the **Show sample** link. A sample report gives an indication of what the final report will look like.



### Ad-hoc Report: Largest print users

<p><b>Report Title</b> Enter the title of the report, or use the default title.</p>	<p><b>Report Title</b> Largest print users</p>
<p><b>Parameters</b> Enter the report parameters to filter the report data as required.</p>	<p><b>From date:</b> 24 Feb 2009 <b>Time:</b> 00:00 Include report data starting from this date.</p> <p><b>To date:</b> <input type="text"/> <b>Time:</b> <input type="text"/> Include report data up to this date.</p> <p><b>Department:</b> <input type="text"/> Limit to users from one department. Leave blank to include users from all departments.</p> <p><b>Office:</b> <input type="text"/> Limit to users from one office. Leave blank to include users from all offices.</p> <p><b>Only show printing allocated to:</b> <input type="text"/> Choose whether to only show printing allocated to user accounts, shared accounts.</p> <p><b>Job Type:</b> <input type="text"/> Choose to show print or copy jobs only.</p>
<p><b>Report Format</b> Choose the output format to create for the report.</p>	<p><b>Report Format</b> PDF</p>

## 4.11.1. Report types

The following types of *one-click* reports are available under the **Reports** section:

### 4.11.1.1. User Reports

These are reports producing information about users. They range from a list of users, their names and current account balance, to detailed reports listing all print jobs printed by a user over a particular time-frame.

### 4.11.1.2. Printer Reports

Printer reports produce information on printers including configuration, usage summaries and statistics.

**Note:**

If you are using Direct Printing, the information for each print queue linked to a printer is consolidated and presented as a summary for the printer.

### 4.11.1.3. Print Log Reports

The print log is a detailed list of all printing performed on the network. The print log reports allow administrators to produce reports list all jobs over a given date range with simple one-click version for today's print jobs and largest print jobs.

#### Largest print jobs (Last 30 days)

For the period of Dec 31, 2006 to Jan 30, 2007.

Date	Printer	Username	Document	Pages	Cost	Allowed	Attributes
Dec 31, 2006 8:36:46 AM	printserver/Library MFP	matt	Awesome Presentation - OpenOffice.org Impress	280	\$28.00	Yes	FOOLSCAP, Duplex: Yes, Grayscale: Yes, 67579kb, Library2
Dec 31, 2006 3:44:36 AM	linuxserver/Office Printer	mark	Awesome Presentation - OpenOffice.org Impress	189	\$18.90	Yes	A3, Duplex: Yes, Grayscale: Yes, 68879kb, Library1
Jan 1, 2007 1:23:36 AM	linuxserver/Library Printer	bob	research paper.pdf	141	\$14.10	Yes	A4, Duplex: No, Grayscale: No, 44155kb, Library1
Jan 1, 2007 5:53:00 AM	windowserver/Office MFP	cathy	Stats - OpenOffice.org Writer	88	\$8.80	Yes	FOOLSCAP, Duplex: Yes, Grayscale: No, 7230kb, Office2

### 4.11.1.4. Group Reports

These reports group printer usage by network group allowing System Administrators to determine which group of users performs the most prints. These reports are ideal for gaining a quick overview of printing costs performed by work area, department, floor, management level, etc.

### 4.11.1.5. Shared accounts reports

Administrators can use the shared account reports to track printing allocated to shared accounts via the popup.

### 4.11.1.6. Transaction Reports

These provide a summary of the transactions / balance adjustments.

### 4.11.1.7. Environmental Impact Reports

These reports summarize the environment impact of printing.

### 4.11.1.8. Ratio Reports

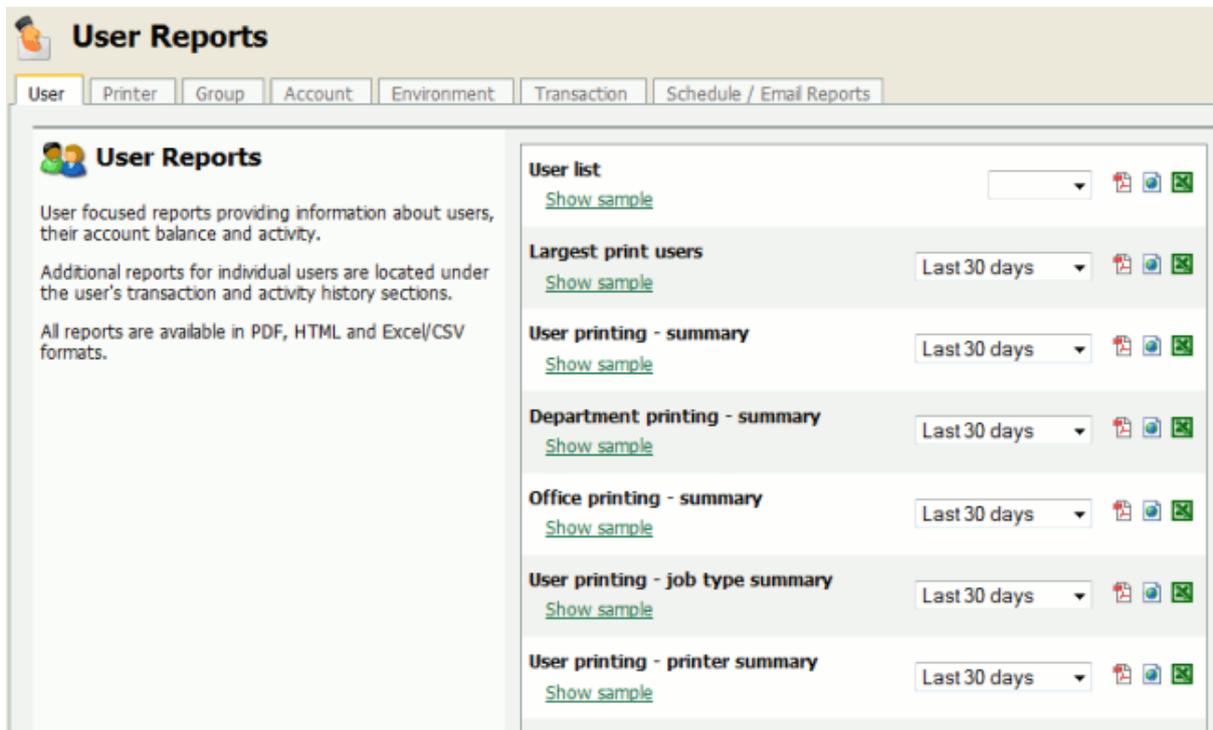
These reports compare relative printing usage.

### 4.11.1.9. Period Comparison Reports

These reports compare printing activity between two periods.

## 4.11.2. Report Formats

All reports are available in three different formats. Access to all formats depends on the software installed on your system. Alternate formats are accessed via the three icons located next to the report period drop down box.



There are three report formats available.

**Table 62: Report Formats**

Format	Description
PDF Reports	PDF is the most appropriate format for printing. To view these reports your computer must have a PDF viewer installed. Adobe Acrobat Reader is a free PDF viewer available from adobe.com.
HTML Reports	HTML Reports work on all systems and don't require an external PDF viewer. These reports might not print or format as well as the PDF versions and are designed for either a quick review of data or for systems that don't have a PDF viewer.
CSV/Excel Reports	Use the CSV/Excel reports to access the data in plain text format. The format is suitable for importing data into programs such as Microsoft Excel.

### 4.11.3. Combining Filters and Reports

All data list views in PaperCut MF have export/print option linked at the bottom of the list. The **export/print** links run a report over the data currently displayed in the list. The lists column order and filter options are taken into consideration when generating the report data. Use this functionality to produce ad-hoc or custom reports. This functionality is best described by example.

To run a report to see who and how much people have printed against a shared account over the month of September:

1. Navigate to the **Accounts**.
2. Click the appropriate shared account.
3. Select the **Job Log** tab.
4. Click the **Show Filters** link.
5. Select the 1st of September in the **from date** and enter the 30th of September in the **to date**.
6. Click **Apply Filter**. All print jobs printed against this shared account for the month of September is displayed in this list.
7. Click the **Summary by user** link to produce the PDF report.

The screenshot shows the 'Account Details: IT Support' page. The 'Transactions' tab is selected. A filter is applied for the date range '01 Sep 2005' to '30 Sep 2005'. Below the filter is a table of transactions.

Transaction Date ▼	Transacted By	Amount	Balance	Usage Log	Comment
13/09/2005 09:52:45	[system]	-\$0.15	\$45.34	<a href="#">Printer Usage</a>	
13/09/2005 09:48:02	[system]	-\$0.08	\$45.49	<a href="#">Printer Usage</a>	
13/09/2005 08:29:01	[system]	-\$0.15	\$45.57	<a href="#">Printer Usage</a>	

To run a report listing all transactions issued against a user's account over the month of September ordered by transaction amount:

1. Navigate to the **Users** tab.
2. Click the appropriate user account. The user details page is displayed.
3. Select the **Transactions** tab.

4. Click the **Show Filters** link.
5. Select the 1st of September in the **from date** and enter the 30th of September in the **to date**.
6. Click **Apply Filter**.
7. Click the **Amount** column to order the data by amount value.
8. Click **Export/Print** at the bottom of the list to produce the report.

#### 4.11.4. Scheduling and Emailing Reports

The one-click reports in the PaperCut MF web interface are good for finding important data fast, however, sometimes it is more convenient to have important data 'pushed' to interested parties. You can achieve this with *scheduled reports*.

PaperCut MF can schedule reports to run periodically and have them automatically sent out via email or saved to a folder. You can schedule reports for a variety of purposes, for example:

- Sending a department manager a summary of the department staff's printing.
- Sending a teacher a summary of printing for each student in their class.
- Producing and using a CSV report saved to disk to import into an external system, such as an accounting package.
- Producing a regular report for billing or invoicing purposes.

##### 4.11.4.1. Usage

To view the scheduled reports page, select **Reports > Scheduled Reports**.



**Important:** Before scheduled reports can be sent via email, PaperCut MF needs to know where to find a SMTP server (outgoing email server). For information about how to configure email notifications, see [Configuring Email Notifications](#).

### Schedule a Report

Reports can be scheduled for automatic delivery via email or can be saved to disk.

To schedule a report, fill in the details to the right and press 'Add'.

[More Information...](#)

**Type** Group printing - user summary

**Title**  
Group printing - user summary  
An optional title to appear at the top of the report

**Optional parameters**

**User group name:**    
Limit to one group. Leave blank to include all groups.

**Only show printing allocated to:**    
Choose whether to only show printing allocated to user or shared accounts.

**Job Type:**    
Choose to show print or copy jobs only.

**Single server name:**    
Limit to one print server.

**Single printer name:**    
Limit to one printer.

**Printers/Devices:** All printers/devices  
Limit to selected printers/devices.

**Printer/Device group:**    
Limit to one printer/device group. Leave blank to include all printers and devices.

**Show report parameters:**   
Enable this option to print report parameters on the report header.

**Format**  
PDF

**Report**  
Daily

**Delivery**  
By Email

**Recipients**  
   
A comma separated list of email addresses, e.g.: joe@domain.org,bill@domain.org

Add

To create a scheduled report, select the desired report options; then click **Add**. The process is best described by way of example:

## Example 1: Faculty based reporting in education

*Joe is head of the science faculty at a university. Faculty staff have the ability to charge printing back to the faculty. Joe wants to see, on a regular basis, how much printing each user charges to the faculty.*

To do this:

1. Navigate to the **Scheduled Reports** page.
2. Click **Schedule a new report** if the panel is not already displayed.
3. Choose the report **Type** of **Shared account printing - user summary**.
4. Under **Optional parameters > Account name**, enter Joe's faculty shared account

- name, *Science*.
5. Change the report title to "Science Faculty Account Printing".
  6. Leave the report **Format** as **PDF**.
  7. Make the report deliverable every week by setting **Report** to **Weekly**.
  8. Set the **Delivery** to **By email**.
  9. Enter Joe's email address under **Recipients**.
  10. Click **Add**.

The report is now scheduled to run every week, and should now be shown in the table on the bottom of the page. Joe will receive an email every Sunday showing the previous week's printing in his faculty. To find out exactly when the report will be sent, see [Details](#). To see an example of what the report will look like, click [**show example**] next to the report. To manually run the report (generate it and email to Joe now), click [**run now**]. The

The [**run now**] operation also provides a convenient way to resend the previous period's report if the original delivery failed or if the email was accidentally deleted.

## Example 2: Division based reporting in business

*Mary is head of the marketing division at a company. She wants to see which printers her staff use most, to make decisions about printer redistribution and purchasing. Also of interest are the sizes of paper being used, and how much color printing is being performed.*

To do this:

1. Navigate to the **Scheduled Reports** page.
2. Click **Schedule a new report** if the panel is not already displayed.
3. Choose the report **Type** of **Group printing - printer summary**.
4. Under **Optional parameters > Group name**, enter Mary's division group name, *Marketing*.
5. Leave the report **Format** as **PDF**.
6. Make the report deliverable every fortnight by setting **Report** to **Fortnightly**.
7. Set the **Delivery** to **By email**.

8. Enter Mary's email under **Recipients**.
9. Click **Add**.

The report is now scheduled to run every fortnight, and should now be shown in the table below. Mary will receive an email every second Sunday showing the previous fortnight's printer usage by her division.

## Example 3: Create reports to import into external system

*John is the head of the accounting department in the organization and wants to charge his clients for invoiced printing allocated to their account. He wants that data in the external accounting system. He can schedule **shared account printing - summary** report to be saved to disk so that he can access the same file periodically and import the data into his external system.*

1. Navigate to the **Scheduled Reports** page.
2. Click **Schedule a new report** if the panel is not already displayed.
3. Choose the report **Type** of **Shared account printing - summary** .
4. Under **Optional parameters > Invoiced** , select, *yes*.
5. Change the report **Format** to **CSV**.
6. Make the report deliverable every week by setting **Report** to **Weekly**.
7. Set the **Delivery** to **To file**.
8. Enter a file name *client-summary*. This is the name under which the file is saved on the disk.
9. Click **Add**.



**Tip:** Selecting the option **Append timestamp to file name** is optional. If the option is selected, then the report is saved with a unique name, including the date every time, otherwise the report is overwritten periodically.

The report is now scheduled to be written to disk every week, and should be shown in the table below. A new report is generated under the name of *client-summary.csv*, every week under `[app-path]/server/data/scheduled-reports`.

### 4.11.4.2. Details

Each report *Period* determines when the report will run. When the report includes date based usage information (such as printing usage), the period also determines the date range of the data to include.

**Table 63: Scheduled reports delivery times**

Period	Report Run Time	Report Date Range
Daily	Early every morning, about 12:55am.	The previous day.
Weekly	Every Sunday in the early morning, about 12:55am.	The previous week, from Sunday to Saturday
Fortnightly	Every second Sunday in the early morning, about 12:55am. Fortnightly reports are run on <i>even</i> weeks, i.e. the second week of the year, the fourth week of the year, etc.	The previous fortnight, from two Sundays ago to Saturday.
Monthly	Early morning on the first day of every month, about 12:55am.	The previous month.
Quarterly	Early morning on the first day of every quarter, about 12:55am. Each quarter of an year is 3 months long. For example: First quarter of the year is from 1st of January to 30th of March.	The previous quarter.
Yearly	Early morning on the first day of every year , about 12:55am	The previous year.



**Tip:** Reports scheduled to write to a file are always written to a folder on the server located at `[app-path]/server/data/scheduled-reports`. This is a local folder on the server where PaperCut MF is installed. It is not possible to change this target location to point to say a network share on another system. The reason for this is that

★ PaperCut runs as a system service/daemon with limited rights so it does not have access to other locations/servers. If the file needs to be accessible/consumed from another system, consider sharing the target folder, or using a scheduled task running as a privileged user (e.g. Windows Task or Cron job) to copy the file.

★ **Tip:** If a user has their email address set in PaperCut MF, you can enter their username in **Recipients** instead. For example, instead of entering `joe123@domain.org`, enter just `joe`.

## 4.11.5. Advanced Reporting Options

The following Advanced Reporting configuration keys are available. You can edit configuration keys at **Options > Actions > Config editor (advanced)** .

**Table 64: Advanced Reporting Config Keys**

Config name	Description
reports.max-rows	The maximum number of rows that a report produces. Once the number of rows in a report reaches this value, the data in the report is cut short (and the report will contain a message to indicate this has happened). This is a 'sanity limit', intended to avoid producing overly large reports by accident. The default value is 10000.
reports.top-x-rows	The number of rows to display in 'top X' reports, such as the <i>Largest print users</i> report. The default value is 100.
scheduled-reports.day-of-month	The day of the month when the monthly scheduled reports are run. By default, the monthly scheduled reports are set to run on the first day of the month. So, the default value is 1. The other valid values are between 2 to 28.
reports.csv-display-comment-headers	Determines whether to display the comment headers in CSV reports (e.g. The report name and report parameters in the first few rows of the file). You might want to remove the headers if the CSV files are to be post processed or imported into a 3rd party system, such as, an accounts database. To display comment headers set the value to <code>Y</code> , to hide set the value to <code>N</code> .

See [Using the Config Editor](#) to find out how to change config keys.

## 4.12. Advanced Scripting (Print Scripting)

PaperCut's advanced scripting interface is a powerful and flexible feature that you can use to define and fine tune your printing policy. While there are many features that you can enable by selecting check boxes and changing options in the admin interface, scripting your own behavior introduces a whole new level of customization.

The functionality made possible by scripting is varied and is constantly being extended based on customer demand. Some common uses include:

- Displaying a popup message if a user forgets to select duplex on large jobs.
- Showing a dialog that displays environmental impact statistics about a user's print job such as the amount of carbon dioxide equivalent greenhouse gases produced.
- Prompting the user to confirm large jobs before printing.
- Automatically routing large jobs to more efficient high volume printers.

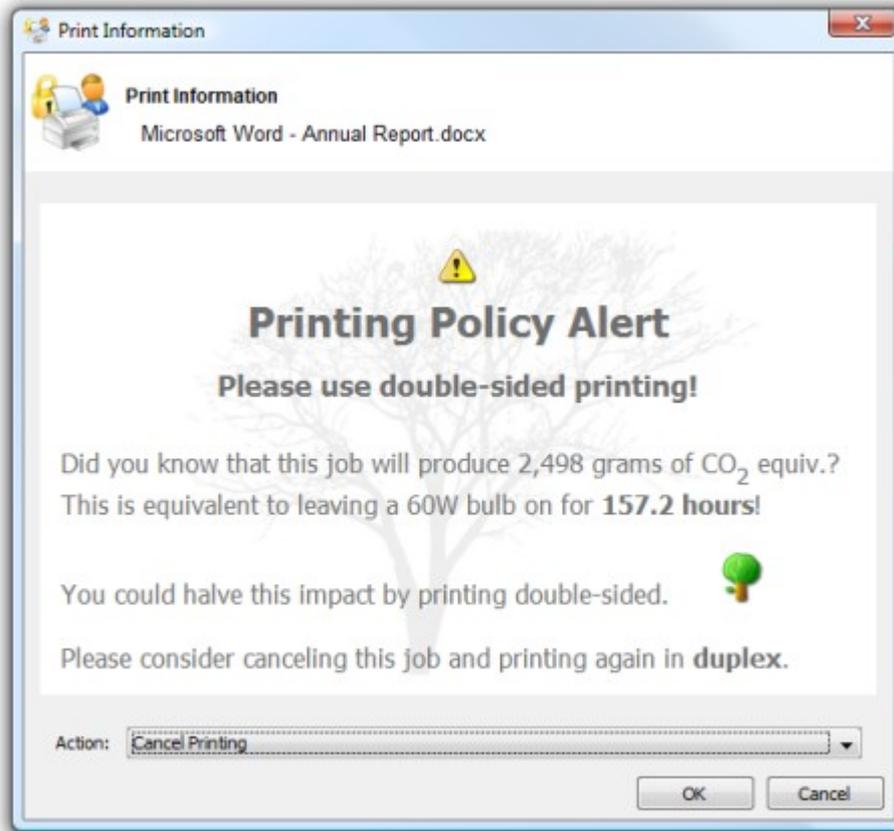
All of the above is possible by writing a small script directly into a code editor in the admin interface. In fact, the above functionality is a pre-built recipe ready to use.

Other usage examples include:

- Requesting job data/security classification.
- Giving discounts during off-peak times.
- Charging printing to departments during class-time.
- Displaying warning messages under selected conditions.
- and many, many more.

At a high level, advanced scripting provides the ability to:

- *Adapt* logic based on print job attributes such as cost, pages, document name, time, etc.
- *Modify* job attributes and behavior such as routing the job to another printer, influencing job cost and account charged, and appending metadata such as comments.
- *Interact* with end users via client messages and popups/dialog boxes.



### 4.12.1. Prerequisites

Writing print scripts brings many possibilities but also introduces the possibility that writing a buggy print script results in unexpected behavior. Previous experience with scripting or programming is strongly recommended. PaperCut MF does provide a number of tools to assist with script development, however, including:

- A mini JavaScript editor with basic error checking and syntax highlighting.
- Quick access to a code cookbook containing dozens of best-practice recipes.
- Pre-canned "code snippets" demonstrating the use of key functions.
- Simple debugging tools such as logging and runtime error reporting.

## Advanced Scripting

Enable print script

Import Recipe Insert Snippet at Cursor Share Help

```

46
47   if (cheapestPrinter == "") {
48     // No cheaper printer, this one is the cheapest.
49     actions.log.debug("Current printer is cheapest.");
50
51   } else {
52     // We've found a cheaper printer.
53     actions.log.debug("Cheapest printer is: " + cheapestPrinter);
54
55     var saving = inputs.job.cost - cheapestCost;
56
57     // Ask the user whether to print on the cheapest printer.
58     var response = actions.client.promptYesNoCancel(
59       "<html>Printing this job on printer <b>" + cheapestPrinter
60       + "</b> will cost <b>" + inputs.utils.formatCost(cheapestCost) + "</b> "
61       + "saving a total of <b>" + inputs.utils.formatCost(saving) + "</b>.<br><br>"
62       + "Would you like this job to be printed on <b>" + cheapestPrinter + "'</b>?</html>");
63
64     if (response == "CANCEL" || response == "TIMEOUT") {
65       // Cancel the job and exit the script.
66       actions.job.cancel();

```

All of PaperCut MF's advanced scripts are written using the world's most popular scripting language, JavaScript (also known as ECMA-262 ECMAScript... apparently ;).



**Note:** *Why JavaScript?* JavaScript was selected as PaperCut MF's scripting language after careful consultation with the existing user base. JavaScript was the language common to System Administrators across all platforms (Windows, Mac and Linux). Its popularity in HTML programming also meant most administrators already had extensive exposure to the language. Internally PaperCut uses the Rhino scripting engine maintained by Mozilla.org, makers of the popular Firefox browser. It is highly performant and allows PaperCut MF to leverage advanced scripting without compromising system scalability. This is done using advanced techniques such as just-in-time compilation.

### 4.12.2. How to Use Print Scripts

Print scripts are segments of code that are run whenever a new print job arrives in the queue. The script is defined using the concept of a "hook". A hook is a JavaScript function (e.g. `function printJobHook(inputs, actions) { }`) that is called for each new job. Your print script defines this method, its behavior and its actions.

Print scripts are defined via **Printers > [select printer] > Scripting**.

All scripts are defined on a per printer basis allowing each printer to have its own logic (although you can share/copy a common script between printers, see [Copying Printer Settings](#)). Enter script code into the editor and once completed, click **Apply** to save. Errors raised by the script are displayed on this page.



**Tip:** One good way of experimenting with print scripting is to apply your script initially on a test printer (or fake print queue such as a print queue pointing to an unused LPT port).



This allows you to test and experiment, and when the logic is right, copy/deploy across to other live printers.

Error messages are classed into two groups:

- *Syntax errors* - these are detected and displayed when a script is applied. The script does not save until all syntax errors are addressed.

The screenshot shows the 'Printer Details: linux-server\Office Printer' page with the 'Scripting' tab selected. A red error message box at the top states: 'The script failed to validate, check the script syntax: unterminated string literal (printer-script#2)'. Below this, the 'Advanced Scripting' section has 'Enable print script' checked. The script editor shows a function definition for 'printJobHook' with a syntax error on line 2: 'syntaxerror'.

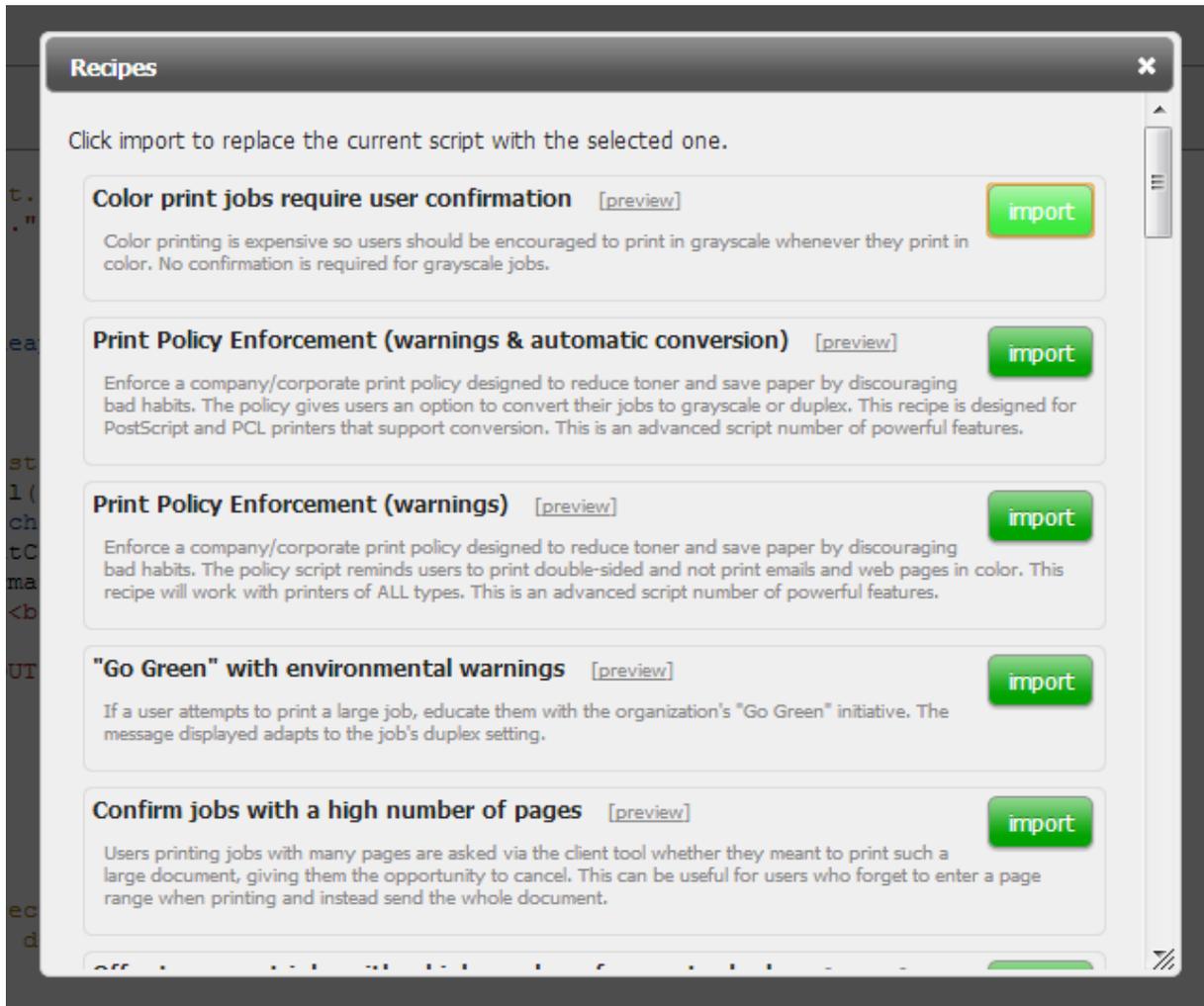
- *Runtime errors* - these are errors that only occur when a script is executed for a print job. Runtime errors are also listed on the **Scripting** tab in red. Refresh the page to see runtime errors. Runtime errors are also logged and are displayed on the **App Log** tab.

The screenshot shows the same 'Printer Details' page with the 'Scripting' tab selected. A red error message box states: 'This script did not run due to an error. This script has raised an error 2 time(s). Last Error: Jan 20, 2014 4:03:04 PM Error in "printJobHook" - ReferenceError: "nosuchfunction" is not defined. (printer-script#2)'. The script editor shows the function definition for 'printJobHook' with a runtime error on line 2: 'nosuchfunction()'.

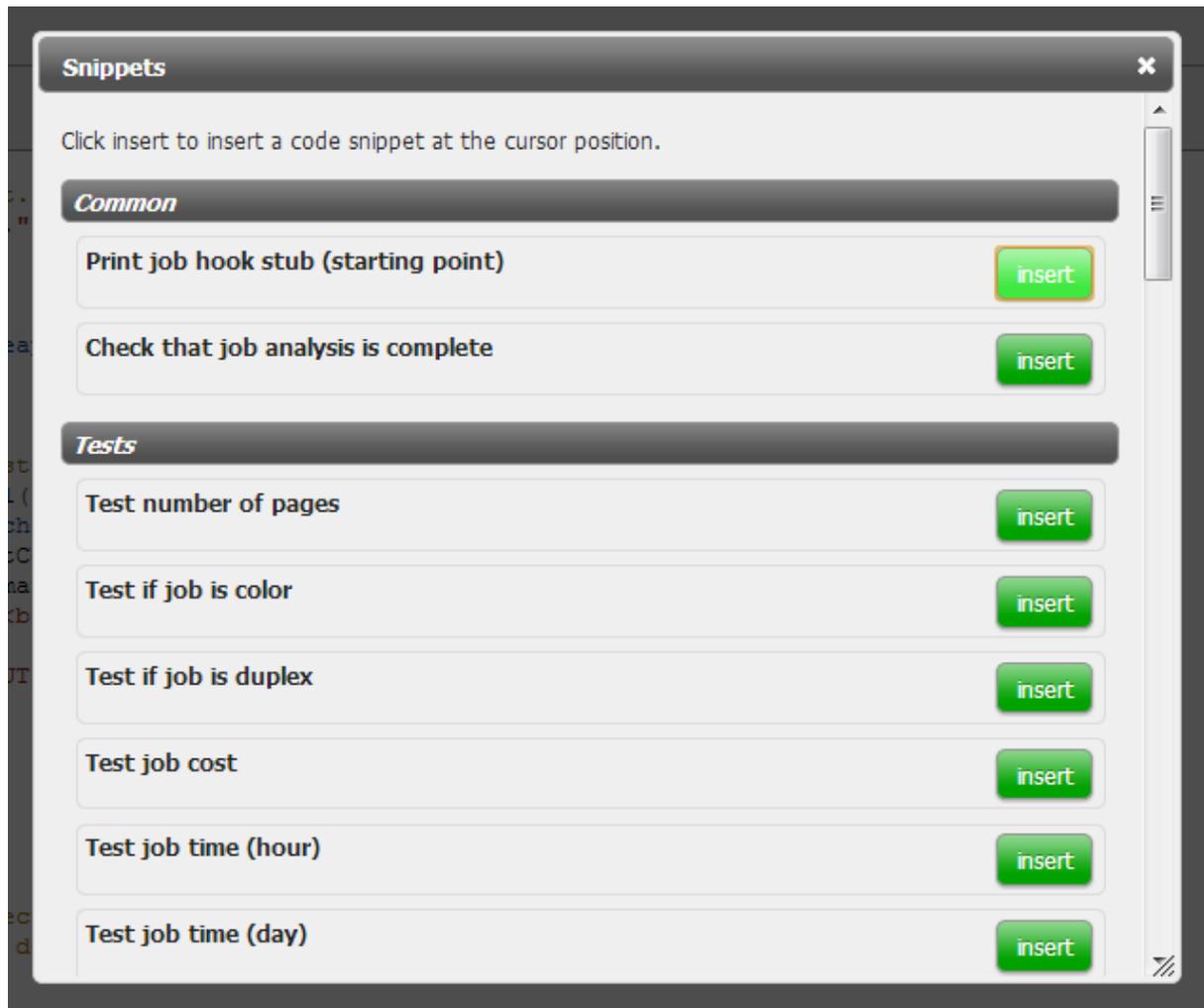
Where possible the error message indicates the line number on which the error was found and the relevant line is highlighted.

The best way to start out writing print scripts is to first experiment with some of the *recipes*. Try importing a recipe on a test/non-production printer by clicking **Import Recipe**. Recipes

demonstrate best practice and should be considered as a starting point for development of your own scripts.



Code *snippets* are small code fragments that demonstrate how to use make best use of the scripting API (inputs, functions and methods). Consider using snippets as a base for adding functionality to your script. Snippets are inserted at the current cursor location and accessed via the **Insert Snippet at Cursor** button.



### 4.12.3. Advanced Print Scripting - Global Include Script

Large organizations with advanced print scripting requirements might need to share common code between different print scripts. Use advanced scripting techniques to build these common libraries.

Writing a common script allows reuse of JavaScript code and functions without needing to copy script code to all printers. Write the common script code in a file named `print-script-common.js` and save it in the `[install-path]/server/custom` directory. This script is included and executed automatically and functions created in this file are accessible from all print scripts.

Errors in the common print script are detected and displayed in the **Scripting** tab. The error message contains the name of the common script file, the error, and the line number where the error occurred. Refresh the page to see these errors. These errors are also visible in the **App. Log** tab.

## 4.12.4. Tips for Print Scripts

1. Use snippets and/or recipes where possible. They are tested and demonstrate best practice.
2. Start out small and aim high. Don't try building your script all in one go. Write a bit, test, then move on. Large scripts written in one go are hard to debug.
3. Always test your scripts! Just because a script compiles does not mean it is bug free. Take time to test your script and exercise all logic paths. For example, if your script applies an action to jobs with more than 100 pages, test it by printing jobs that are both more and less than 100 pages.
4. Check all your scripts from time to time for runtime errors and/or enable error level event notifications to receive an email when errors occur (see [Error level event notifications](#)).
5. Take some time to explore the list of methods in the reference API documentation (see [Print Script API Reference](#)). Knowing what is possible can open up ideas.
6. Use `actions.log.debug()` or `actions.client.sendMessage()` to assist with "print line" style debugging.
7. If your scripts interact with end-users, perform some usability testing to ensure they understand your messages and intentions.
8. Consider using HTML markup to pretty up your dialog messages (see the snippet titled **Show a dialog with HTML formatting**).

## 4.12.5. Print Script API Reference

Print scripts are segments of code that are run whenever a new print job arrives. The script is defined using the concept of a "hook". A hook is a JavaScript function that is defined by you, the script writer. It is also commonly referred to as an *entry point* or *method*. A number of print hooks (entry points) are available and each differ by the point in the print workflow when they are called. For example, a hook early in the workflow has the ability to influence behavior later in the flow, while scripts late will correspondingly have access to additional information that would not be available earlier. In most cases the generic main hook satisfies most requirements.



**Note:** This API reference describing the all the properties and functions available to print scripts. Many of these inputs and functions reference JavaScript objects (e.g. String, Boolean, Date etc.). A good JavaScript reference will assist with making use of and formatting these objects. For more information, see the Mozilla Developer Center here: <https://developer.mozilla.org/en/JavaScript/Reference>.

### 4.12.5.1. Script Hooks (Entry Points)

The available print hooks are:

**Table 65: Print Workflow Hooks**

Hook	Description
<code>printJobHook(inputs, actions)</code>	<p>This is the main multi-purpose hook and is suitable for most situations. <i>Point of Call:</i> Immediately before account selection popup displays. <i>Suitability:</i> Most situations as all print job inputs and most actions are available. <i>Limitations:</i></p> <ul style="list-style-type: none"> <li>● Can't influence popup authentication behavior</li> <li>● End-user account selection information is not available</li> </ul>
<code>printJobAfterAccountSelectionHook(inputs, actions)</code>	<p>This hook should only be used to perform actions that use the result of the account selection popup (i.e. accesses <code>inputs.job.selectedSharedAccountName</code>). <i>Point of Call:</i> Immediately after account selection popup displays (or would display if enabled). <i>Suitability:</i> Only use when the result of the account selection is required. <i>Limitations:</i></p> <ul style="list-style-type: none"> <li>● Can't influence account selection popup behavior or selected results (because it's already been completed)</li> <li>● Can't influence popup authentication behavior</li> </ul>
Other Hooks	<p>If you have the need for another hook (e.g. pre-authentication), explain your requirements to the support team. Your input can influence the development of future scripting features.</p>

All print job hooks have access to job, printer and user information and can perform a variety of actions that affect the job processing. The scripts have access to these through the two function arguments:

- `inputs` - *Read-only* access to the print job, user and printer information.
- `actions` - Access to perform actions that can influence the job processing, e.g. to cancel a job or send a message to the client software.

`inputs` are read-only and any modification to variables do not affect the print job. All actions (also known as side-effects) must be performed via the available `actions`. All available `inputs` and `actions` are listed below.

## 4.12.5.2. Script Inputs

### Job Info (`inputs.job`)

**Table 66: Job Info Script Reference (`inputs.job`)**

Property/Method	Description
<code>inputs.job.date</code>	(date) The date/time the job was printed.
<code>inputs.job.username</code>	(string) The username of the user that printed the job.
<code>inputs.job.printerServerName</code>	(string) The name of the server the print queue is hosted on.
<code>inputs.job.printerName</code>	(string) The printer name.
<code>inputs.job.fullPrinterName</code>	(string) The full name of the printer including the server name, in the format <code>server\printer</code> .
<code>inputs.job.documentName</code>	(string) The document name.
<code>inputs.job.isAnalysisComplete</code>	(boolean) Indicates that the print job has been completely analyzed. Before the job analysis is completed, only basic job information is available (e.g. date, username, printer, document name, client machine, etc). The detailed job information, such as, page counts, paper size, costs, etc are only available after analysis is completed. If scripts require access to the detailed information, they should only access

Property/Method	Description
	<p>these once the job analysis is completed. This is achieved by placing the following snippet at the start of the print hook function:</p> <pre> if (!input- put- s.job.isAnalysisComplete) { return; } </pre> <p>This snippet exits the script if analysis is not complete. Once analysis is completed the script is called again and continue past this point.</p>
<code>inputs.job.isWebPrintJob</code>	(boolean) Determines if the job has been submitted by Web Print.
<code>inputs.job.jobSourceName</code>	(string) The machine name of the client workstation where the job was printed, or the type of job if originating from Google Cloud Print (GOOGLE_CLOUD_PRINT), Web Print (WEB_PRINT) or Email to Print (EMAIL_PRINTING). Can be blank if the client machine name is not known.
<code>inputs.job.clientIP</code>	(string) The IP address of the client workstation where the job was printed. This might not be populated if the client IP address is not known.
<code>inputs.job.clientMachineOrIP</code>	(string) The machine name or IP address of the client workstation where the job was printed. If both the machine name and the IP address are known, the machine name are returned.

Property/Method	Description
<code>input-s.job.selectedSharedAccountName</code>	(string) The full name of the selected shared account. If no shared account is selected the an empty string is returned ("") (available only after the account selection is completed. i.e. from within the <code>printJobAfterAccountSelectionHook</code> hook).
<code>inputs.job.totalPages</code>	(number) The total number of pages in the print job. (available only when job analysis is complete. i.e. <code>isAnalysisComplete</code> is true.)
<code>inputs.job.totalSheets</code>	(number) The total number of sheets of paper produced by the job. (available only when job analysis is complete. i.e. <code>isAnalysisComplete</code> is true.)
<code>inputs.job.totalColorPages</code>	(number) The total number of color pages in the print job. (Only available when job analysis is complete. i.e. <code>isAnalysisComplete</code> is true.)
<code>inputs.job.totalGrayscalePages</code>	(number) The total number of grayscale pages in the print job. (Only available when job analysis is complete. i.e. <code>isAnalysisComplete</code> is true.)
<code>inputs.job.isGrayscale</code>	(boolean) Determines if the job is grayscale (i.e. contains no color). (Only available when job analysis is complete. i.e. <code>isAnalysisComplete</code> is true.)
<code>inputs.job.isColor</code>	(boolean) Determines if the job is color

Property/Method	Description
	(i.e. contains at least one color page). (Only available when job analysis is complete. i.e. <code>isAnalysisComplete</code> is true.)
<code>inputs.job.isDuplex</code>	(boolean) Determines job is duplex. (Only available when job analysis is complete. i.e. <code>isAnalysisComplete</code> is true.)
<code>inputs.job.cost</code>	(number) The cost of the job. (Only available when job analysis is complete. i.e. <code>isAnalysisComplete</code> is true.)
<code>inputs.job.copies</code>	(number) The number of copies. The <code>totalPages</code> attribute already takes the copies into account. (Only available when job analysis is complete. i.e. <code>isAnalysisComplete</code> is true.)
<code>inputs.job.spoolSizeKB</code>	(number) The size of the spool size in kilobytes (KB). (Only available when job analysis is complete. i.e. <code>isAnalysisComplete</code> is true.)
<code>inputs.job.paperSizeName</code>	(string) The paper size name (e.g. Letter, Tabloid, A4, A3). (Only available when job analysis is complete. i.e. <code>isAnalysisComplete</code> is true.)
<code>inputs.job.printerLanguage</code>	(string) The printer language of the print job (e.g. PostScript, PCL5, etc). (Only available when job analysis is complete. i.e. <code>isAnalysisComplete</code> is true.)

Property/Method	Description
<code>inputs.job.paperSizeHeightMM</code>	(number) The height of the paper size in millimetres (mm). (Only available when job analysis is complete. i.e. <code>isAnalysisComplete</code> is true.)
<code>inputs.job.paperSizeWidthMM</code>	(number) The width of the paper size in millimetres (mm). (Only available when job analysis is complete. i.e. <code>isAnalysisComplete</code> is true.)
<code>inputs.job.environmentBulbHours</code>	(number) The amount of energy used by this job in terms of the number of hours of use of a 60W light bulb. (Only available when job analysis is complete. i.e. <code>isAnalysisComplete</code> is true.)
<code>inputs.job.environmentTrees</code>	(number) The amount of paper used by this print job in terms of number of trees. (Only available when job analysis is complete. i.e. <code>isAnalysisComplete</code> is true.)
<code>inputs.job.environmentGramsCO2</code>	(number) The amount of carbon dioxide (CO2) produced by this print job. (Only available when job analysis is complete. i.e. <code>isAnalysisComplete</code> is true.)
<code>inputs.job.calculateCostForPrinter (printerName)</code>	Calculates the cost of printing this job on another printer. Use this to determine the "Least cost route" for this job. This returns the cost of the job. Parameters: <ul style="list-style-type: none"> <li>● <code>printerName</code> (string) - The name of</li> </ul>

Property/Method	Description
	<p>the printer to calculate the cost of the job for. Enter this as <code>server-\\printer</code> or without the server name. If the server name is omitted it is assumed the printer is on the same print server as the current job.</p> <p>NOTE: The <code>inputs.job.calculateCostForPrinter</code> input requires the double <code>\</code> character.</p>

## User Info (inputs.user)

**Table 67: User Info Script Reference (inputs.user)**

Property/Method	Description
<code>inputs.user.username</code>	(string) The username of the user that printed the job.
<code>inputs.user.fullName</code>	(string) The full name of the user that printed the job (if known).
<code>inputs.user.email</code>	(string) The email address of the user that printed the job (if known).
<code>inputs.user.office</code>	(string) The office of the user that printed the job (if known).
<code>inputs.user.department</code>	(string) The department of the user that printed the job (if known).
<code>inputs.user.restricted</code>	(boolean) Determines if the user is restricted. i.e. printing is denied when they have no credit.
<code>inputs.user.balance</code>	(number) The user's current account balance.
<code>inputs.user.getBalance(accountName)</code>	(number) The user's current account balance. Parameters:

Property/Method	Description
	<ul style="list-style-type: none"> <li>● <code>accountName</code> (string) - <i>This is only valid when <a href="#">Multiple Personal Accounts</a> is enabled.</i> This is an optional parameter to specify the personal account name. If not specified, it retrieves the user's total account balance.</li> </ul>
<pre>inputs.user.isInGroup (groupName)</pre>	<p>Determines if the user belongs to the given group name (as defined on the <b>Groups</b> tab). Returns <code>true</code> if the user belongs to this group. Parameters:</p> <ul style="list-style-type: none"> <li>● <code>groupName</code> (string) - The name of the group to check. NOTE: The group name is case-sensitive.</li> </ul>
<pre>inputs.user.getProperty (propName)</pre>	<p>Return a value as a <code>string</code> associated with a persistent custom-defined property saved on the user, or <code>null</code> if there is no such value. Parameters:</p> <ul style="list-style-type: none"> <li>● <code>propName</code> (string) - The name/key of a user property to look-up.</li> </ul> <p>For more information using storage properties see <a href="#">User Defined Persistent Properties (Storage)</a>.</p>
<pre>inputs.user.getNumberProperty (propName)</pre>	<p>A convenience method to return a value as a <code>number</code> associated with a persistent custom-defined property saved on the user, or <code>null</code> if there is no such value. Parameters:</p> <ul style="list-style-type: none"> <li>● <code>propName</code> (string) - The name/key of a user property to look-up.</li> </ul> <p>For more information using storage properties see <a href="#">User Defined Persistent Properties (Storage)</a>.</p>

## Client Info (inputs.client)

**Table 68: Client Info Script Reference (inputs.client)**

Property/Method	Description
<code>inputs.client.isRunning</code>	(boolean) Determines if the user who printed the job is running the User Client software. Use this to adapt the script to handle when a client isn't running. e.g. Only display a popup question when the client is running. The client is considered "running" if there was activity from that client within the last 5 minutes.

## Printer Info (inputs.printer)

**Table 69: Printer Info Script Reference (inputs.printer)**

Property/Method	Description
<code>inputs.printer.serverName</code>	(string) The name of the server where the printer is hosted.
<code>inputs.printer.printerName</code>	(string) The name of the printer.
<code>inputs.printer.fullPrinterName</code>	(string) The full name of the printer in format <code>server- /printer</code> .
<code>inputs.printer.isVirtualQueue</code>	(boolean) Determines if this printer is a virtual queue.
<code>inputs.printer.isDisabled</code>	(boolean) Determines if this printer is currently disabled.
<code>inputs.printer.isStatusError</code>	(boolean) Determines if this printer is currently in an error state (e.g. paper jam, offline, etc.)
<code>inputs.printer.statusInErrorSince</code>	(date) The time when the printer

Property/Method	Description
	went into this error state.
<code>inputs.printer.statusInErrorSeconds</code>	(number) The number of seconds the printer has been in error.
<code>inputs.printer.groups</code>	(Array) An array of all the printer groups that this printer is a member of.
<code>inputs.printer.isInGroup (groupName)</code>	(boolean) Determines if the printer belongs to a particular printer group. Returns <code>true</code> if the printer belongs to this group.  Parameters: <ul style="list-style-type: none"> <li><code>groupName</code> (string) - The name of the printer group to check.</li> </ul>
<code>inputs.printer.getProperty (propName)</code>	Return a value as a <code>string</code> associated with a persistent custom-defined property saved on the printer, or <code>null</code> if there is no such value.  Parameters: <ul style="list-style-type: none"> <li><code>propName</code> (string) - The name/key of a printer property to look-up.</li> </ul> For more information using storage properties see <a href="#">User Defined Persistent Properties (Storage)</a> .
<code>inputs.printer.getNumberProperty (propName)</code>	A convenience method to return a value as a <code>number</code> associated with a persistent custom-defined property saved on the printer, or <code>null</code> if there is no such value.  Parameters: <ul style="list-style-type: none"> <li><code>propName</code> (string) - The name/key of a printer property</li> </ul>

Property/Method	Description
	<p>to look-up.</p> <p>For more information using storage properties see <a href="#">User Defined Persistent Properties (Storage)</a>.</p>

## Utilities (inputs.utils)

**Table 70: Utilities Script Reference (inputs.utils)**

Method	Description
<code>inputs.utils.formatBalance</code> (amount)	<p>Formats the balance amount based on the server currency settings. Returns a string.</p> <p>Parameters:</p> <ul style="list-style-type: none"> <li>● <code>amount</code> (number) - the amount to format.</li> </ul>
<code>inputs.utils.formatCost</code> (amount)	<p>Formats the cost amount (e.g. a job cost) based on the server currency settings.</p> <p>Returns a string.</p> <p>Parameters:</p> <ul style="list-style-type: none"> <li>● <code>amount</code> (number) - the amount to format.</li> </ul>
<code>inputs.utils.formatNumber</code> (amount, decimals)	<p>Formats a number with the given number of decimal places.</p> <p>Returns a string.</p> <p>Parameters:</p> <ul style="list-style-type: none"> <li>● <code>amount</code> (number) - the amount to format.</li> <li>● <code>decimals</code> (number) - The number of decimal places to format.</li> </ul>
<code>inputs.utils.getProperty</code> (propName)	<p>Return a value as a <code>string</code> associated with a persistent custom-defined global property, or <code>null</code> if there is no such value.</p> <p>Parameters:</p> <ul style="list-style-type: none"> <li>● <code>propName</code> (string) - The name/key of a global property to look-up.</li> </ul>

Method	Description
	For more information using storage properties see <a href="#">User Defined Persistent Properties (Storage)</a> .
<code>inputs.utils.getNumberProperty(propName)</code>	<p>A convenience method to return a value as a <code>number</code> associated with a persistent custom-defined global property, or <code>null</code> if there is no such value.</p> <p>Parameters:</p> <ul style="list-style-type: none"> <li><code>propName</code> (string) - The name/key of a global property to look-up.</li> </ul> <p>For more information using storage properties see <a href="#">User Defined Persistent Properties (Storage)</a>.</p>

### 4.12.5.3. Script Actions

## Job Actions (`actions.job`)

Table 71: Job Actions Script Reference (`actions.job`)

Method	Description
<code>actions.job.addComment(comment)</code>	<p>Appends a comment to the job. This is logged to the database and is available in the job logs and reports. If the job already has a comment (e.g. set by the user with the advanced client) then this appends to the existing comment. Parameters:</p> <ul style="list-style-type: none"> <li><code>comment</code> (string) - The comment to add to the print job.</li> </ul>
<code>actions.job.setCost(cost)</code>	<p>Sets the cost of the print job. NOTE: If there are other cost adjustments configured (e.g. user cost overrides), these can further modify the job cost later in the job processing. Parameters:</p>

Method	Description
	<ul style="list-style-type: none"> <li><code>cost</code> (number) - The cost of the job. Must be greater than or equal to 0.</li> </ul>
<code>actions.job.cancel()</code>	<p>Cancels the current print job so that it is not printed. It does not log the cancelled job. To log the job use <code>actions.job.cancelAndLog</code>. The script should typically exit using <code>return</code> after cancelling the job.</p>
<code>actions.job.cancelAndLog([comment])</code>	<p>Cancels the current print job and logs it under job logs. It can also add a comment to the job, which is then available in the job logs and reports. The script should typically exit using <code>return</code> after cancelling the job. Parameters:</p> <ul style="list-style-type: none"> <li><code>comment</code> (string) - An optional parameter to add a comment to the print job.</li> </ul>
<code>actions.job.chargeToPersonalAccount()</code>	<p>Disables any client popups and account selection, and charges the job to the user's personal account. <i>NOTE: If you're using this in conjunction with e.g. <code>inputs.job.jobSourceName</code> to suppress popups when processing e.g. Google Cloud Print jobs, you'll need to remove the initial loop in the script that checks for <code>inputs.job.isAnalysisComplete</code> being true. If this action happens after the analysis completes, that might be too late to suppress the client popup.</i></p>
<code>actions.job.chargeToSharedAccount(accountName)</code>	<p>Disables any client popups and account selection, and charges the job to the specified shared account. Parameters:</p>

Method	Description
	<ul style="list-style-type: none"> <li>● <code>accountName</code> (string) - The name of the shared account. If the shared account is a sub-account then the account name must be provided in the format <code>parentName\subName</code>.</li> </ul> <p><i>NOTE 1: The action- s.job.chargeToSharedAccount action requires the double \ character. NOTE 2: If you're using this in conjunction with e.g. inputs.job.jobSourceName to suppress popups when processing e.g. Google Cloud Print jobs, you'll need to remove the initial loop in the script that checks for input- s.job.isAnalysisComplete being true. If this action happens after the analysis completes, that might be too late to suppress the client popup.</i></p>
<pre>actions.job.redirect(printerName[, options])</pre>	<p>Schedules the job to be redirected to the given printer queue. The job is redirected after it has completed processing (e.g. after print popups are acknowledged, filters are run, and the job is released from the hold/release queue).</p> <p><i>NOTE 1: Jobs should only be redirected between compatible printers (e.g. those that support the same printer language and features). For more information see <a href="#">Requirements For Job Redirection (Load Balancing or Find-Me Printing)</a>. NOTE 2: By default, once a job is redirected it is printed on the destination queue. You</i></p>

Method	Description
	<p><i>cannot run another script or use print popups at the destination queue. If you want the job to be held at the destination queue, you must specify the option: <code>allowHoldAtTarget:true</code>. Parameters:</i></p> <ul style="list-style-type: none"> <li>● <code>printerName</code> (string) - The name of the printer to redirect to. Enter this as <code>server\printer</code> or without the server name. If the server name is omitted it is assumed the printer is on the same print server as the current job.</li> <li>● <code>options</code> (object/dictionary) - An optional parameter defining the additional options to the redirect command. Options include: <ul style="list-style-type: none"> <li>○ <code>allowHoldAtTarget</code> (boolean) - Determines whether the job holds in the destination printer's hold/release queue if present. Although the job is displayed in the destination's hold/release queue, it is not physically redirected until printed. Default: <code>false</code>.</li> <li>○ <code>recalculateCost</code> (boolean) - Determines whether to recalculate the cost based on the settings of the destination printer. Default: <code>false</code>.</li> </ul> </li> </ul> <p><b>Example 1: Redirect to a printer named "server\Fast Printer".</b></p> <pre>actions.job.redirect("server- \Fast Printer");</pre> <p><b>Example 2: Redirect to a virtual queue named "server\Utility Room". The job holds at the Release Station.</b></p> <pre>actions.job.redirect("server- \Utility Room", {allowHoldAtTarget: true});</pre>

Method	Description
	<p>Example 3: Redirect to a virtual queue named "server\Utility Room", recalculating the cost based on the cost settings of the destination printer.</p> <pre>actions.job.redirect("server- \\Utility Room", {allowHoldAtTarget: true, recalculateCost: true});</pre> <p><b>NOTE 3:</b> The <code>actions.job.redirect()</code> action requires the double <code>\</code> character.</p>
<code>action-s.job.bypassReleaseQueue()</code>	Allows this job to pass through the queue without being held in a hold/release queue.
<code>action-s.job.holdInReleaseQueue([mode])</code>	<p>Holds this job in a hold/release queue that it was printed to. If the <code>mode</code> argument is omitted the job is held in "User-release" mode. Parameters:</p> <ul style="list-style-type: none"> <li>● <code>mode</code> (string) - An optional parameter defining the Release Station mode. If set to <code>user-release</code>, the user can release the job. If set to <code>manager-release</code>, only an admin or print release manager can release the job. Default: <code>user-release</code></li> </ul>
<code>actions.job.bypassFilters()</code>	Allows this job to pass through the queue without being denied by the configured print filters/restrictions.
<code>action-s.job.convertToGrayscale()</code>	Convert this job to grayscale (if it is not already grayscale). The job's cost is recalculated after conversion to grayscale. For more information and troubleshooting with job conversions, see <a href="#">Print Conversion Filters in Detail</a> .

Method	Description
<code>actions.job.convertToDuplex()</code>	Convert this job to duplex (if it is not already duplex). The job's cost is recalculated after conversion to duplex. For more information and troubleshooting, see <a href="#">Print Conversion Filters in Detail</a> .
<code>actions.job.changeNumberOfCopies(newCopies)</code>	Change the number of copies in this job. E.g. change to print 4 copies instead of 1 copy. This should only be used to increase the copy count from 1, not to reduce the count or change in other ways. The job's cost is recalculated after the number of copies is changed. This feature might not be available for all print drivers. For more information and troubleshooting, see <a href="#">Print Conversion Filters in Detail</a> . Parameters: <ul style="list-style-type: none"> <li><code>newCopies</code> (number) - The new number of copies to print.</li> </ul> <p>Note: Changing the number of copies might not work on all devices. If you experience problems and the steps in <a href="#">Troubleshooting</a> do not assist, please contact support for assistance.</p>
<code>actions.job.changeDocumentName(documentName)</code>	Changes the name of the document that is logged in the database. Parameters: <ul style="list-style-type: none"> <li><code>documentName</code> (string) - The new name of the document.</li> </ul>
<code>actions.job.changeUser(username)</code>	Changes the user associated with the job (i.e. the user is logged as the user that printed the job). Parameters: <ul style="list-style-type: none"> <li><code>username</code> (string) - The username of</li> </ul>

Method	Description
<pre>action- s.job.changePer- sonalAccountChargePriority (accountNames)</pre>	<p>the user.</p> <p>Allows overriding which of a users' personal accounts to charge and in which order/priority. This is useful when a printer can only be used when credit is available in a particular subset of user personal accounts (e.g. department allocated quotas). Only those accounts listed are charged for the job. If credit isn't available in the listed accounts the jobs is denied. <i>NOTE: This is only valid when <a href="#">Multiple Personal Accounts</a> is enabled. See <a href="#">Multiple Personal Accounts</a>.</i> Parameters:</p> <ul style="list-style-type: none"> <li> <span style="color: green;">●</span> <code>accountNames</code> (array of strings) - the list of personal account names (as configured in <b>Options &gt; Advanced</b>.) in the order they are charged. e.g. <code>["Default", "Cash"]</code>. When searching for the account names the case differences are ignored. If any of the accounts supplied to do not exist then an entry is written to the server log. If no valid accounts are found then the personal account charge priority is unchanged. </li> </ul> <p>Example: To allow the jobs to be only charge to the accounts "Science Department" and "Cash" (in that order)</p> <pre>action- s.job.changePer- sonalAccountChargePriority( ["Science Department", "Cash"]);</pre>
<pre>actions.job.disableArchiving ()</pre>	<p>Disable print job archiving if it's been enabled for this job.</p>

Method	Description
<pre>actions.job.setWatermark (text)</pre>	<p>Sets the watermark text for this job.</p> <p>Watermarking allows text to be added on each printed page, e.g. the date and name of the user who printed the job.</p> <p><i>NOTE: Using an empty string disables the watermark, overriding a queue-level setting. Example: <code>actions.job.setWatermark("");</code></i> Parameters:</p> <ul style="list-style-type: none"> <li> <code>text</code> (string) - the watermark text to add to each page of the job. The text can include replacement variables such as <code>%user%</code> (replaced with the username of the user who printed the job). An empty string disables watermarking for this job. </li> </ul> <p>For more information about watermarking and the replacement variables that you can use in <code>text</code> see <a href="#">Watermarking/Job Annotation</a>.</p>
<pre>actions.job.setHoldReleaseTimeout (timeoutMins)</pre>	<p>Sets the timeout in minutes for a hold-/release job, which overrides the system setting. Parameters:</p> <ul style="list-style-type: none"> <li> <code>timeout</code> (number) - the time, in minutes, that a hold/release job is held in the queue before it is cancelled. The minimum timeout is 5 minutes. </li> </ul>

## Client Actions (actions.client)

The client actions allow a script to send messages to the User Client and prompt the user for a variety of questions. These require that the user is running the client software.

**Table 72: Client Actions Script Reference (actions.client)**

Method	Description
<code>actions.client.sendMessage(message)</code>	<p>Sends a message to the user. This message is typically displayed as a task tray popup on Windows. Unlike the prompt actions, the user does not need to acknowledge the message to allow the job to print.</p> <p>Parameters:</p> <ul style="list-style-type: none"> <li>● <code>message</code> (string) - the message to display to the user.</li> </ul>
<code>actions.client.promptOK(message[, options])</code>	<p>Prompts the user with the message dialog that displays an <b>OK</b> button.</p> <p>Returns a string:</p> <ul style="list-style-type: none"> <li>● "OK" - if the user clicks <b>OK</b>.</li> <li>● "TIMEOUT" - If the user does not respond within the timeout period.</li> </ul> <p>Parameters:</p> <ul style="list-style-type: none"> <li>● <code>message</code> (string) - the message to display to the user. For information on formatting messages see <a href="#">Client Prompt Message Formatting</a>.</li> <li>● <code>options</code> (object/dictionary) - Options to change the behavior of the prompt.</li> </ul> <p>For the standard prompt options see <a href="#">Client Prompt Standard Options</a>.</p>
<code>actions.client.promptOKCancel(message[, options])</code>	<p>Prompts the user with a message dialog that displays <b>OK</b> and <b>Cancel</b>.</p> <p>Returns a string:</p> <ul style="list-style-type: none"> <li>● "OK" - if the user clicks <b>OK</b>.</li> <li>● "CANCEL" - if the user clicks <b>OK</b>.</li> <li>● "TIMEOUT" - If the user does not respond within the timeout period.</li> </ul> <p>Parameters:</p> <ul style="list-style-type: none"> <li>● <code>message</code> (string) - the message to</li> </ul>

Method	Description
	<p>display to the user. For information on formatting messages see <a href="#">Client Prompt Message Formatting</a>.</p> <ul style="list-style-type: none"> <li>options (object/dictionary) - Options to change the behavior of the prompt.</li> </ul> <p>For the standard prompt options see <a href="#">Client Prompt Standard Options</a>.</p>
<pre>actions.client.promptPrintCancel (message[, options])</pre>	<p>Prompts the user with a message dialog that displays <b>Print</b> and <b>Cancel</b>.</p> <p>Returns a string:</p> <ul style="list-style-type: none"> <li>"OK" - if the user clicks <b>OK</b>.</li> <li>"CANCEL" - if the user clicks <b>OK</b>.</li> <li>"TIMEOUT" - If the user does not respond within the timeout period.</li> </ul> <p>Parameters:</p> <ul style="list-style-type: none"> <li>message (string) - the message to display to the user. For information on formatting messages see <a href="#">Client Prompt Message Formatting</a>.</li> <li>options (object/dictionary) - Options to change the behavior of the prompt.</li> </ul> <p>For the standard prompt options see <a href="#">Client Prompt Standard Options</a>.</p>
<pre>actions.client.promptYesNo (mes- sage[, options])</pre>	<p>Prompts the user with a message dialog that displays <b>Yes</b> and <b>No</b>.</p> <p>Returns a string:</p> <ul style="list-style-type: none"> <li>"YES" - if the user clicks <b>Yes</b>.</li> <li>"NO" - if the user clicks <b>No</b>.</li> <li>"TIMEOUT" - If the user does not respond within the timeout period.</li> </ul> <p>Parameters:</p> <ul style="list-style-type: none"> <li>message (string) - the message to</li> </ul>

Method	Description
	<p>display to the user. For information on formatting messages see <a href="#">Client Prompt Message Formatting</a>.</p> <ul style="list-style-type: none"> <li>options (object/dictionary) - Options to change the behavior of the prompt.</li> </ul> <p>For the standard prompt options see <a href="#">Client Prompt Standard Options</a>.</p>
<pre>actions.client.promptYesNoCancel (message[, options])</pre>	<p>Prompts the user with a message dialog that displays <b>Yes</b>, <b>No</b> and <b>Cancel</b>.</p> <p>Returns a string:</p> <ul style="list-style-type: none"> <li>"YES" - if the user clicks <b>Yes</b>.</li> <li>"NO" - if the user clicks <b>No</b>.</li> <li>"CANCEL" - If the user clicks <b>Cancel</b>.</li> <li>"TIMEOUT" - If the user does not respond within the timeout period.</li> </ul> <p>Parameters:</p> <ul style="list-style-type: none"> <li>message (string) - the message to display to the user. For information on formatting messages see <a href="#">Client Prompt Message Formatting</a>.</li> <li>options (object/dictionary) - Options to change the behavior of the prompt.</li> </ul> <p>For the standard prompt options see <a href="#">Client Prompt Standard Options</a>.</p>
<pre>actions.client.promptForText (mes- sage[, options])</pre>	<p>Prompts the user with a message dialog that prompts the user to enter text, and shows <b>OK</b> and <b>Cancel</b>.</p> <p>Returns a string:</p> <ul style="list-style-type: none"> <li>[user entered text] - if the users enters text and clicks <b>OK</b>.</li> <li>"CANCEL" - If the user clicks <b>Cancel</b>.</li> </ul>

Method	Description
	<ul style="list-style-type: none"> <li>● "TIMEOUT" - If the user does not respond within the timeout period.</li> </ul> <p>Parameters:</p> <ul style="list-style-type: none"> <li>● <code>message</code> (string) - the message to display to the user. For information on formatting messages see <a href="#">Client Prompt Message Formatting</a>.</li> <li>● <code>options</code> (object/dictionary) - Options to change the behavior of the prompt.</li> </ul> <p>For the standard prompt options see <a href="#">Client Prompt Standard Options</a>.</p> <p>Additional options include:</p> <ul style="list-style-type: none"> <li>○ <code>defaultText</code> (string) - The text that pre-populates the text entry field.</li> <li>○ <code>fieldLabel</code> (string) - The label displayed on the left side of the text field. By default no field label is displayed, and the text-box fills the full width of the dialog.</li> </ul>
<pre>actions.client.promptForPassword (message[, options])</pre>	<p>Prompts the user with a message dialog that prompts the user to enter a password, and shows <b>OK</b> and <b>Cancel</b>. User input is masked. Note that this function masks user input - it does not perform any actual password authentication.</p> <p>Returns a string:</p> <ul style="list-style-type: none"> <li>● <code>[user entered text]</code> - if the users enters text and clicks <b>OK</b>.</li> <li>● "CANCEL" - If the user clicks <b>Cancel</b>.</li> <li>● "TIMEOUT" - If the user does not respond within the timeout period.</li> </ul> <p>Parameters:</p>

Method	Description
	<ul style="list-style-type: none"> <li>● <code>message</code> (string) - the message to display to the user. For information on formatting messages see <a href="#">Client Prompt Message Formatting</a>.</li> <li>● <code>options</code> (object/dictionary) - Options to change the behavior of the prompt.</li> </ul> <p>For the standard prompt options see <a href="#">Client Prompt Standard Options</a>.</p> <p>Additional options include:</p> <ul style="list-style-type: none"> <li>○ <code>defaultText</code> (string) - The text that pre-populates the text entry field.</li> <li>○ <code>fieldLabel</code> (string) - The label displayed on the left side of the text field. By default no field label is displayed, and the text-box fills the full width of the dialog.</li> </ul>
<pre>actions.client.promptForChoice (message, choices[, options])</pre>	<p>Prompts the user with a message dialog that prompts the user to select from one or more choices from a drop-down list, and shows <b>OK</b> and <b>Cancel</b>.</p> <p>Returns a string:</p> <ul style="list-style-type: none"> <li>● <code>[user selected choice]</code> - The selected choice item.</li> <li>● <code>"CANCEL"</code> - If the user clicks <b>Cancel</b>.</li> <li>● <code>"TIMEOUT"</code> - If the user does not respond within the timeout period.</li> </ul> <p>Parameters:</p> <ul style="list-style-type: none"> <li>● <code>message</code> (string) - the message to display to the user. For information on formatting messages see <a href="#">Client Prompt Message Formatting</a>.</li> <li>● <code>choices</code> (array of strings) - the list of choices to display in the drop-</li> </ul>

Method	Description
	<p>down list. e.g. ["Unclassified", "Restricted", "Top secret"]</p> <ul style="list-style-type: none"> <li>options (object/dictionary) - Options to change the behavior of the prompt. For the standard prompt options see <a href="#">Client Prompt Standard Options</a>.</li> </ul> <p>Additional options include:</p> <ul style="list-style-type: none"> <li>defaultChoice (string) - The default choice, which is pre-selected for the user. This must match one of the provided choices.</li> <li>fieldLabel (string) - The label displayed on the left side of the drop-down box. By default no field label is displayed, and the drop-down fills the full width of the dialog.</li> </ul>
<pre>actions.client.promptForForm(htmlForm[, options])</pre>	<p>Prompts the user with a dialog containing a multiple input field form. The dialog also shows <b>OK</b> and <b>Cancel</b>. The input fields and layout are defined using HTML with form elements. The <code>htmlForm</code> parameter must contain valid HTML including at least one or more form elements such as <code>&lt;input&gt;</code>. When the user clicks <b>OK</b>, the form data is returned in a JavaScript object where the values can be retrieved using the field name. e.g. <code>response['fieldName']</code>:</p> <ul style="list-style-type: none"> <li>[JavaScript object containing form data] - when the users enters text; then clickes OK. To retrieve the value of the <code>fieldName</code> field, use <code>response['fieldName']</code>.</li> <li>"CANCEL" - If the user clicks <b>Cancel</b>.</li> </ul>

Method	Description
	<ul style="list-style-type: none"> <li>● "TIMEOUT" - If the user does not respond within the timeout period.</li> </ul> <p>Parameters:</p> <ul style="list-style-type: none"> <li>● <code>htmlForm</code> (string) - the HTML form/message to display to the user. The HTML needs to include one or more HTML input elements - including text fields (normal, password or multi-line), radio boxes, check boxes and choice lists. Each form element must have a unique name that is used to identify the field when the user's input is returned to the server. For information on formatting messages see <a href="#">Client Prompt Message Formatting</a>.</li> <li>● <code>options</code> (object/dictionary) - Options to change the behavior of the prompt.</li> </ul> <p>For the standard prompt options see <a href="#">Client Prompt Standard Options</a>.</p> <p>Use of <code>promptForForm</code> is demonstrated in a code snippet and in a recipe.</p>

## Client Prompt Standard Options

All the client prompt options have an `options` parameter to customize the prompt behavior. Some prompt types have additional options, but all prompt types have the following options:

- `dialogTitle` (string) - The title of the dialog.
- `dialogDesc` (string) - The brief one-line description to complement the dialog title.
- `hideJobDetails` (boolean) - Used to hide the job details from the user. e.g. document name, printer name, pages, cost, etc. Default: `false` - the job details are displayed.
- `timeoutSecs` (number) - The number of seconds to wait for a response from the user. Once this time elapses, the prompt method returns "TIMEOUT". The default timeout is 5 minutes (300 seconds).
- `questionID` (string) - Uniquely identifies a question for a given print job and script. Once a

user has responded to a prompt with a given `questionID`, the result is remembered and the user is not prompted again for this job. This is important as the print script can be called repeatedly if jobs are held awaiting prompts, popups or are held in a release queue. If the `questionID` is not provided, the question ID is automatically generated based on the prompt parameters (e.g. message, buttons, choices, etc).

The `questionID` is rarely required, only in the following cases:

- If the same prompt/question is required multiple times for a single script, and the user must answer each time. Assigning a different `questionID` to each prompt ensures that the user is re-prompted.
- If the message of a prompt changes with each call. e.g. if the message included the current time it would change each time the prompt was called. Another example is if the message includes the user's balance, this might change if they are printing multiple print jobs. Both of these would cause the multiple prompts to be displayed. Assigning a `questionID` avoids this re-prompting.
- When performing validation of user-entered text from a text prompt in a `while` loop. Assign a unique `questionID` with each loop iteration, otherwise the user will not be re-prompted and an infinite loop will occur (PaperCut MF detects this and cancel the script execution).
- `fastResponse` (boolean) - When set to `true` PaperCut enables fast response mode to retrieve the response to the client prompt more quickly. This is useful only when displaying a sequence of prompts, and causes the next prompt to display more quickly.



#### Important:

This setting is useful only when displaying a sequence of prompts. Take care when enabling this option as it can cause increased load on the server.

You might also want to consider displaying a multi-input form instead of separate prompts. See `actions.client.promptForForm()` for details.

## Client Prompt Message Formatting

The client prompts allow the administrator to display a message to the user and ask for user input. The dialog messages provide a subset of the most useful HTML formatting options. You can use them to make your message stand out and grab the user's attention.

### *Plain text formatting:*

To use plain text formatting, provide a standard JavaScript string as the `message` parameter. To start a new line, use the new line character `\n`. e.g.

```
actions.client.promptOK("First line\n\nSecond line");
```

### *HTML formatting:*

The dialogs messages HTML formatting that provides a large subset of the most useful HTML formatting options. So you can get creative and make your message stand out and grab the user's attention.

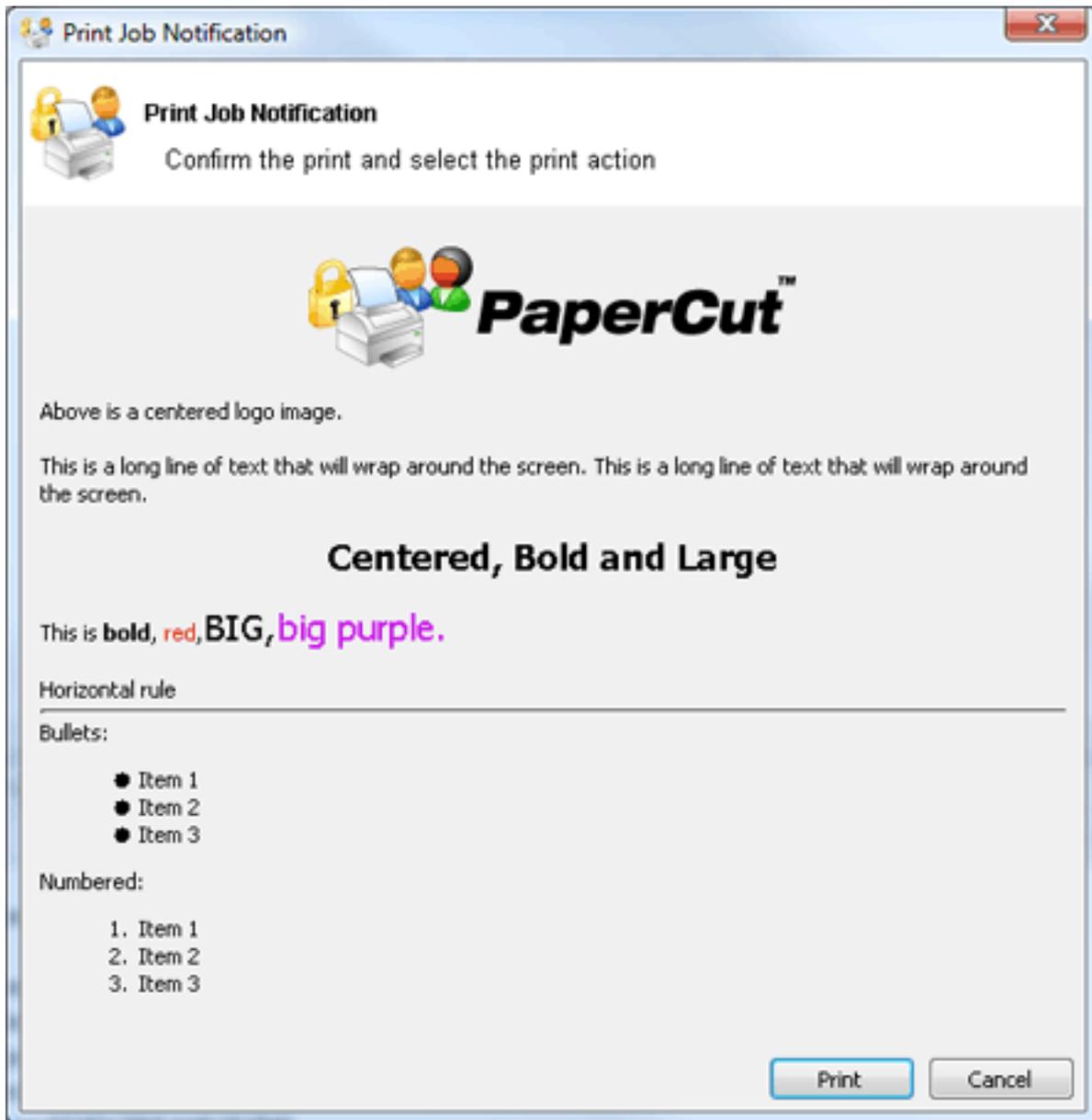
To enable HTML formatting, surround the message text in `<html>` and `</html>` tags. Below is a very simple example that shows the word bold in bold.

```
actions.client.promptOK("<html>This is <b>bold</b></html>");
```

The client dialogs support many of the commonly used HTML features/elements including:

- Bold text - `<b>`
- Colored text - `<span style='color: red'>`
- Images - `<img src='http://host.com/image.jpg'>`
- Line breaks - `<br>`
- Font sizes - `<span style='font: 14px'>`
- Bullet lists - `<ul>` / `<li>`
- Numbered lists - `<ol>` / `<li>`
- Horizontal rule - `<hr>`
- Text Field Input - `<input name="comment">` (only valid in `actions.client.promptForForm`)

The dialog below shows most of the formatting options outlined above. The code for this dialog is available in the "Show a dialog with HTML formatting" snippet.

**Tip:**

To reference an image stored in the directory `[app-path]/server-/custom/web/my-image.jpg` use the HTML:

```
<img src='http://%PC_SERVER%/custom/my-image.jpg'>
```

The special substitution variable `%PC_SERVER%` is expanded to the name and port of your active PaperCut server.

## Log Actions (actions.log)

**Table 73: Log Actions Script Reference (actions.log)**

Method	Description
<code>actions.log.info</code> (message)	Logs an informational message to the <b>App. Log</b> . Parameters: <ul style="list-style-type: none"> <li>message (string) - the message to log.</li> </ul>
<code>actions.log.warning</code> (message)	Logs an warning message to the <b>App. Log</b> . Parameters: <ul style="list-style-type: none"> <li>message (string) - the message to log.</li> </ul>
<code>actions.log.error</code> (message)	Logs an error message to the <b>App. Log</b> . Parameters: <ul style="list-style-type: none"> <li>message (string) - the message to log.</li> </ul>
<code>actions.log.debug</code> (message)	Logs a message to the server's text-based log file ( <code>[app-path]/server/logs/server.log</code> ). This is helpful to diagnose problems with print scripts. Parameters: <ul style="list-style-type: none"> <li>message (string) - the message to log.</li> </ul>

## Utility Actions (actions.utils)

**Table 74: Utility Actions Script Reference (actions.utils)**

Method	Description
<code>actions.utils.sendEmail(recipient, subject, body)</code>	Sends an email to an email address or username. Parameters: <ul style="list-style-type: none"> <li>recipient (string) - either the email address or username of the email recipient.</li> <li>subject (string) - subject text of the email.</li> <li>body (string) - body text of</li> </ul>

Method	Description
<pre>actions.utils.sendEmail(recipients, subject, body)</pre>	<p>the email.</p> <p>Sends an email to one or many email addresses or usernames. Parameters:</p> <ul style="list-style-type: none"> <li>recipients (array of strings) - either the email addresses or usernames of the email recipients.</li> <li>subject (string) - subject text of the email.</li> <li>body (string) - body text of the email.</li> </ul> <p>Example: to send an email to many email addresses or usernames</p> <pre>action- s.utils.sendEmail( ["Administrator", "support-staff@my- university.edu"], "Oh no!", "we're out of print credit!");</pre>
<pre>actions.utils.onCompletionSaveProperty (propName, value[, options])</pre>	<p>Saves a global value as a string associated with a persistent custom-defined property. This operation is performed once the print script completes and the print-job is printed. Parameters:</p> <ul style="list-style-type: none"> <li>propName (string) - the name/key of the property to set.</li> <li>value (string) - the prop-</li> </ul>

Method	Description
	<p>erty value. Note: Numbers are converted to a string.</p> <ul style="list-style-type: none"> <li>● <code>options</code> (object/dictionary) - options to modify behavior of the command. <ul style="list-style-type: none"> <li>○ <code>saveWhenCancelled</code> (boolean) - If set to <code>true</code>, the operation is performed even if the print job is cancelled (eg. insufficient credit). By default, this is set to <code>false</code>.</li> </ul> </li> </ul> <p>For more information using storage properties see <a href="#">User Defined Persistent Properties (Storage)</a>.</p>
<pre>action- s.utils.onCompletionIncrementNumberProperty (propName, value[, options])</pre>	<p>A convenience method to increment a global number value associated with a persistent custom-defined property. This operation is performed once the print script completes and the print-job is printed. Parameters:</p> <ul style="list-style-type: none"> <li>● <code>propName</code> (string) - the name/key of the property to set.</li> <li>● <code>value</code> (number) - the amount to increment by. A negative number will decrement.</li> <li>● <code>options</code> (object/-</li> </ul>

Method	Description
	<p>dictionary) - options to modify behavior of the command.</p> <ul style="list-style-type: none"> <li>saveWhenCancelled (boolean) - If set to <code>true</code>, the operation is performed even if the print job is cancelled (eg. insufficient credit). By default, this is set to <code>false</code>.</li> </ul> <p>For more information using storage properties see <a href="#">User Defined Persistent Properties (Storage)</a>.</p>

## User Actions (actions.user)

**Table 75: User Actions Script Reference (actions.user)**

Method	Description
<pre>actions.user.onCompletionSaveProperty (propName, value[, options])</pre>	<p>Saves a value on the user as a string associated with a persistent custom-defined property. This operation is performed once the print script completes and the print-job is printed.</p> <p>Parameters:</p> <ul style="list-style-type: none"> <li>propName (string) - the name/key of the property to set.</li> <li>value (string) - the</li> </ul>

Method	Description
	<p>property value. Note: Numbers are converted to a string.</p> <ul style="list-style-type: none"> <li>● options (object/dictionary) - options to modify behavior of the command. <ul style="list-style-type: none"> <li>○ saveWhenCancelled (boolean) - If set to <code>true</code>, the operation is performed even if the print job is cancelled (eg. insufficient credit). By default, this is set to <code>false</code>.</li> </ul> </li> </ul> <p>For more information using storage properties see <a href="#">User Defined Persistent Properties (Storage)</a>.</p>
<pre>action- s.user.onCompletionIncrementNumberProperty (propName, value[, options])</pre>	<p>A convenience method to increment a number value on the user associated with a persistent custom-defined property. This operation is performed once the print script completes and the print-job is printed.</p>

Method	Description
	<p>Parameters:</p> <ul style="list-style-type: none"> <li>● <code>propName</code> (string) - the name/key of the property to set.</li> <li>● <code>value</code> (number) - the amount to increment by. A negative number will decrement.</li> <li>● <code>options</code> (object/dictionary) - options to modify behavior of the command. <ul style="list-style-type: none"> <li>○ <code>saveWhenCancelled</code> (boolean) - If set to <code>true</code>, the operation is performed even if the print job is cancelled (eg. insufficient credit). By default, this is set to <code>false</code>.</li> </ul> </li> </ul> <p>For more information using storage properties see <a href="#">User Defined Persistent Properties (Storage)</a>.</p>

## Printer Actions (`actions.printer`)

**Table 76: Printer Actions Script Reference (`actions.printer`)**

Method	Description
<code>actions.printer.onCompletionSaveProperty</code>	Saves a value on the printer as a <code>string</code>

Method	Description
<pre>(propName, value[, options])</pre>	<p>associated with a persistent custom-defined property. This operation is performed once the print script completes and the print-job is printed.</p> <p>Parameters:</p> <ul style="list-style-type: none"><li>● <code>propName</code> (string) - the name/key of the property to set.</li><li>● <code>value</code> (string) - the property value. Note: Numbers are converted to a string.</li><li>● <code>options</code> (object/dictionary) - options to modify behavior of the command.<ul style="list-style-type: none"><li>○ <code>saveWhenCancelled</code> (boolean) - If set to <code>true</code>, the operation is performed even if the print job is cancelled (eg. insufficient credit). By default, this is set to <code>false</code>.</li></ul></li></ul> <p>For more information using storage properties see <a href="#">User Defined Persistent Properties (Storage)</a>.</p>

Method	Description
<pre>action- s.print- er.onCompletionIncrementNumberProperty (propName, value[, options])</pre>	<p>A convenience method to increment a number value on the printer associated with a persistent custom-defined property. This operation is performed once the print script completes and the print-job is printed.</p> <p>Parameters:</p> <ul style="list-style-type: none"><li>● <code>propName</code> (string) - the name/key of the property to set.</li><li>● <code>value</code> (number) - the amount by which to increment. A negative number will decrement.</li><li>● <code>options</code> (object/dictionary) - options to modify behavior of the command.<ul style="list-style-type: none"><li>○ <code>saveWhenCancelled</code> (boolean) - If set to <code>true</code>, the operation is performed even if the print job is cancelled (eg. insufficient credit). By default, this is set to <code>false</code>.</li></ul></li></ul>

Method	Description
	For more information using storage properties see <a href="#">User Defined Persistent Properties (Storage)</a> .

#### 4.12.5.4. User Defined Persistent Properties (Storage)

Print scripts have the ability to store or save information between executions. They allow script authors to implement advanced logic that takes advantage of not just the current print event information, but any information that has been stored by previous script events. Properties can also be used to share data between different scripts. Some ideas that can be implemented with print script properties could include:

- Rate limits – knowledge of previous jobs in the given period need to be stored/known.
- Detecting duplicate events/situations over time.
- Detecting repeatable user behavior. e.g. how many times a user uses duplex in a row.
- Shared settings between scripts . e.g. Global defined configuration variables/settings.

Properties are key-value pair storage that are associated with a user or printer, or optionally can be global. Keys are Strings that uniquely define the property. Values are stored as strings and are any data that can be converted to and from a string. The maximum length of a key is 70 characters, and the value is 1,000 characters.

### Working with properties

Properties are fetched via the `getProperty` call on the associated source. For example, to fetch a property stored on the user associated with the print job, use `inputs.user.getProperty("my-key")`. Printer properties are fetched via `inputs.printer.getProperty()`, and global via `inputs.utils.getProperty()`. There exists a set of convenience methods called `getNumberProperty()` if dealing exclusively with a number.

By default, properties are only saved (to the database) after the print script completes and the job is printed (i.e. not cancelled or denied). If saving/incrementing properties on job cancellation is required (e.g. the user has insufficient credit, or `actions.job.cancel` is called, use the `saveWhenCancelled` optional argument. For example, to set a property on the user, use:

```
actions.user.onCompletionSaveProperty("my-key", "my-value")
```

The same command with "save on cancellation" behavior enabled is:

```
actions.user.onCompletionSaveProperty("my-key", "my-value",
{'saveWhenCancelled' : true})
```



**Tip:** Global properties are stored as PaperCut config settings so any privileged System Administrator can edit them. You can find your properties via **Options > Actions > Config editor (Advanced)**. All script properties are prefixed with `script.user-defined.` and are searchable by name. Global properties are a great way to define editable configuration values that are shared between scripts.

## Implementing Counters (Advanced)

There are two ways to implement a counter (e.g. a page number count). One approach is to get the current value, increment, then save. On high volume networks there exists the possibility of another event overwriting the value. Print scripts provide a convenient method that avoids this called `onCompletionIncrementNumberProperty()`. See the recipe "Prevent overuse of lab printers (rate limiting)" for an example.

### 4.12.5.5. Print Script Requirements (Advanced)

These notes are intended for advanced developers "pushing the limits" of print script functionality. All print scripts must conform to the following technical requirements:

1. *Timeouts:* All scripts execution logic should complete within 5 seconds of CPU time. Failure to comply (for example, due to an infinite loop), results in the script terminating and raising a runtime error. Five seconds is adequate as even the most advanced example recipes complete within a few milliseconds.
2. *Reentrant and Idempotent:* All scripts should be reentrant - designed to be called multiple times for the same job, each time producing the same result/behavior. For example, your script is called multiple times at various stages of analysis and it's expected to provide the same output given the same input. Side-effects based off logic other than the `inputs` are not recommended. For example, logic based off the result of `Math.random()` would violate this principle.

### 4.12.5.6. Print Script Frequently Asked Questions

1. *I'm getting multiple popups for questions I've already answered.*

It's possible that the script has been written with multiple questions or has an issue with the syntax of the script itself. Consider creating a simpler script and working in additional complexity as you go.

If the data used in the popup changes, such as a users balance when releasing multiple jobs or printing multiple jobs, then the script triggers the popup again as the conditions have changed. You can avoid this by using the `questionID` option explained above in [Client Prompt Standard Options](#).

## 4.13. Advanced Customization

PaperCut MF is an important part of network infrastructure at many thousands of organizations. Having the ability to seamlessly integrate PaperCut into an existing network is important. There are a number of ways to ensure end-users see the system as part of the network rather than an add-on. These include:

- Implementing Single Sign On (SSO) to integrate PaperCut into your organization's Intranet portal.
- Changing the URL or link on the User Client window
- Customizing the look and feel of the user web pages
- Using the PaperCut MF back-end data in other procedures such as custom reports

This section covers some of the customization options available within PaperCut MF. For Single Sign On, see [Web Browser Single Sign-On \(SSO\)](#). For general information about the User Client, see [User Client](#).

### 4.13.1. Customizing the User Client Tool window

The `pc-client.exe` program displays a small window highlighting the current logged in user's current account balance. This window contains two links. One called **Details** that takes the user to the **User Pages** login. The other defaults to the PaperCut Software website. You can replace the link to the PaperCut Software website. Some suggestions include linking to your organization's website or intranet site, or linking to a page containing your organization's network usage policy. The logo used on the window can also be customized.

To change the link on the User Client window:

1. Log in to the system as an administrator (e.g. the built-in `admin` account).
2. Navigate to the **Options** section.
3. Scroll down to the **Client software** section.
4. Select the option **Change link on client software**.
5. Enter a **Destination URL** pointing to your new destination. The link should be a complete URL including the `http://` component. e.g. `http://www.my-organization.com/printpolicy.htm`.
6. Under **Link text** enter the text to be displayed. e.g. `Print Policy`.
7. Click **Apply** to the right to apply the changes.

The next time the client tool is started on one of the workstations, the new link is displayed.

Change link on client software

**Destination URL**

**Link text**



There are other configuration keys that allow an administrator to customize the User Client for their organization. The table below outlines all of the client customization config keys available. You can update the value of these config keys using the Config Editor. See [Using the Config Editor](#) to find out how to change config keys.

**Table 77: User Client Customization Config Keys**

Config name	Description
client.config.show-link	Indicates whether the link at the top of the User Client is displayed. To display, set the value to Y. To hide, set the value to N.
client.config.show-details-link	Indicates whether the "Details" link that points to the user web interface is displayed. To display the link set the value to Y, to hide set the value to N.
client.config.show-document-cost	Determines whether to show the document cost to the user in print popup notifications. To show the cost set the value to Y, to hide set the value to N.
client.config.default-advanced-tab	The default tab to display when a user is configured with advanced account selection. Values: DEFAULT (All Accounts), ALL (All Accounts), PREFERRED (Preferred List), RECENT (Recent Selections)

The logo used on the User Client balance window and the account selection dialog can also be customized by placing a file called `client-logo.png` in the directory `[app-path]/client/[platform]` - the same directory as the executable. The image must satisfy the following requirements:

- Comply to the PNG (Portable network graphic) format.
- A size of 64px by 64px.
- Display correctly on different background colors (make use of transparencies or alpha channels).

On the Apple Mac platform the process is a little more involved. The image needs to be placed inside the App package at: `PCClient.app/Content/Resources`. To access this directory, Option-click the PCClient icon and select **Show package contents**.

The User Client can also be configured by passing command-line parameters to the program. This is described in [User Client Options](#).

## 4.13.2. Limiting the list of interface languages/translations

PaperCut MF has been translated into a number of languages. Some of these translations are complete and done at an official level while others are partial and done by PaperCut MF users working in cooperation. Many of these languages might not be appropriate for your environment so it makes sense to limit the list - the user selects the language in the drop-down list on the web login screen. Set the list of available languages by changing config key `language.available` to a comma-separated list of ISO language codes. The list must be a subset of:

```
ca,cs,da,de,es,es_ES,fi,-  
fr,hr,hu,it,iw,ja,ko,lt,lv,nl,no,pl,pt,pt_PT,ru,sl,sr,sv,tr,zh_  
CN,zh_HK,zh_TW
```

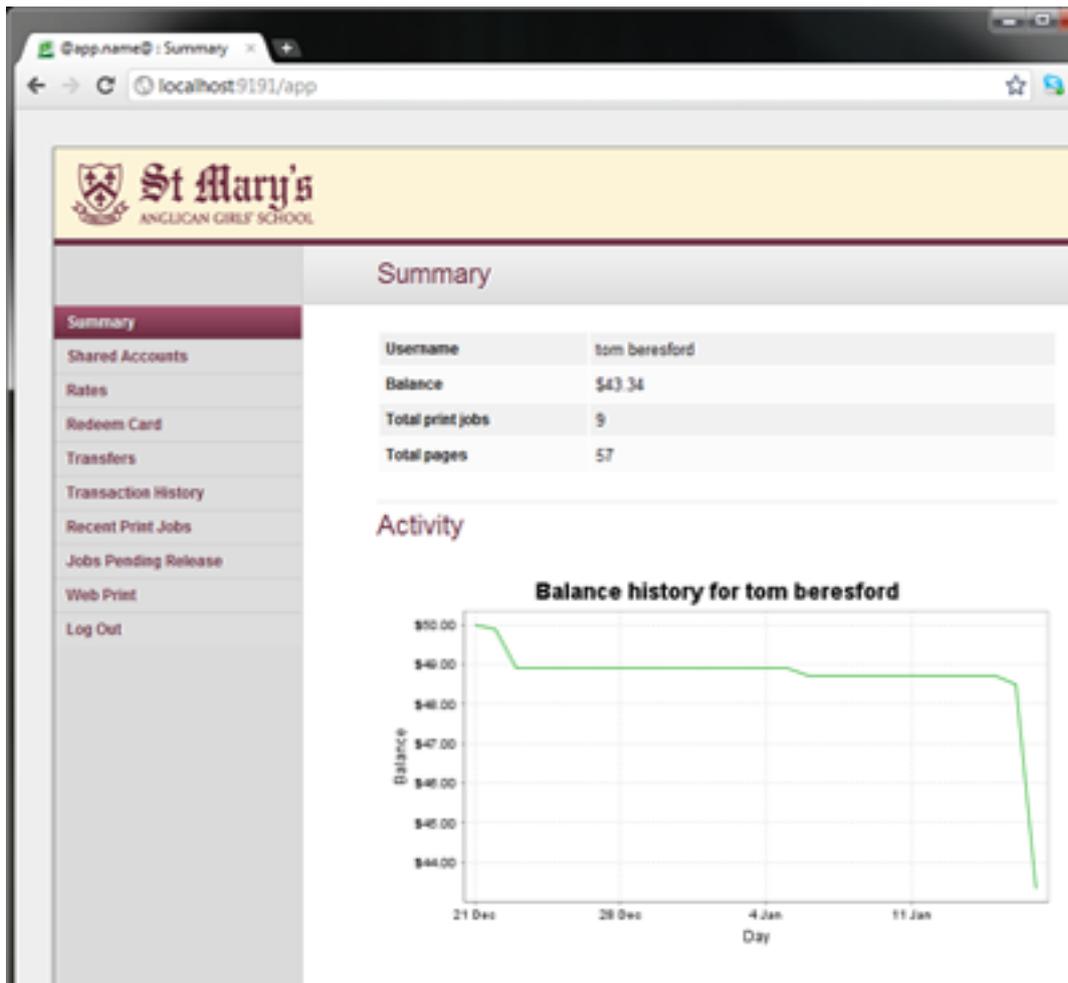
For example, setting `language.available` to `en,de` would limit the list to English and German only.

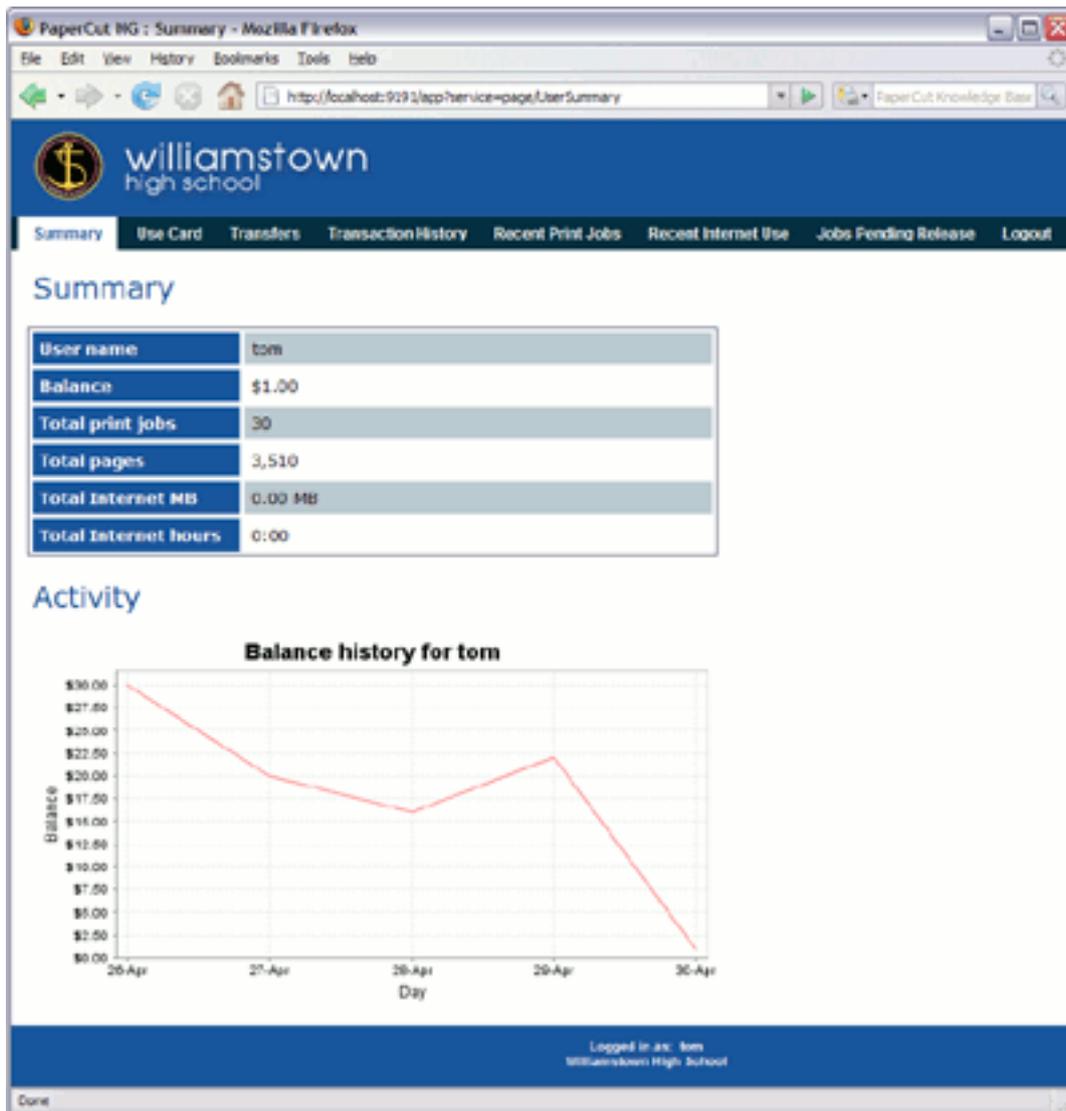
See [Using the Config Editor](#) to find out how to change config keys.

## 4.13.3. Customizing the User web pages

### 4.13.3.1. Look & Feel

The user pages display information about the user's account and provide access to features such as TopUp/Pre-Paid Cards. You can tailor the visual design of these pages to make them fit into the *look and feel* of an existing internet or intranet site. This gives the pages an official look ensuring your users see the system as an important part of your organization's network.





PaperCut Software International Pty. Ltd. offers a service where they design an interface based on an existing website. If you want assistance with the customization, please email the PaperCut Software International Pty. Ltd. support team.

If your organizations has good to advanced HTML experience, you can customize the pages in-house.

The design of the user pages is controlled via HTML "include" files for the header and footer areas of the page, with page styling controlled via Cascading Style Sheets (CSS). Placing the following files in the PaperCut MF directory structure at `[app-path]/server/custom/web` overrides page layout and style.

**Table 78: Files used to customize the user web pages**

Filename	Description
<code>user2.css</code>	If this file exists, the contents of <code>user2.css</code> is included as an overriding stylesheet. Use the styles in this file to define fonts, colors

Filename	Description
	and sizes.
<code>header2.inc</code>	If the header include file exists, the HTML in the header area of the pages is replaced with the contents of the file. Save this file in UTF-8 encoding for international characters to be displayed correctly.
<code>footer2.inc</code>	If the footer include file exists, the HTML in the footer area of the page is replaced with the contents of the file. Save this file in UTF-8 encoding for international characters to be displayed correctly.
<code>login- logo.png</code>	If this file exists, the logo on the web-based login page is replaced with the supplied image. The file should be an image of size 250px by 64px in PNG format.



**Tip:** Any custom content placed in `[app-path]/server/custom/web/`, such as additional images, can be accessed via a URL beginning with `/custom/`. For example, if a file named `header.jpeg` is placed in `[app-path]/server/custom/web/`, you can access it via the URL `/custom/header.jpeg`.



**Tip:** To save a file in UTF-8 encoding on Windows using Notepad, change the **Encoding** option to **UTF-8** on the **> Save As** dialog.



**Note:** Why the "2" in `user2.css` etc.? In previous versions of PaperCut these files did not contain a number. The numbers are there to maintain backwards compatibility for existing user web interface customizations, so that as the default look of the interface is updated in new versions, your customized look is maintained. Remove the "2" for older installations.

### 4.13.3.2. Login Instructions

You can provide additional log in instructions to users. This is useful for explaining which user-name or password to use (in the case there are multiple logins or passwords at the site).

The following config keys allow you to customize the login page:

**Table 79: Config Keys for Customizing the Login Page**

Config name	Description
display.login-instructions	A HTML friendly message to be displayed on the login screen, above the username and password fields.
auth.web-login.autocomplete	Specify Y to enable browser auto-completion of the login fields as a convenience to users. By default, the browser is requested to not use auto-completion.

See [Using the Config Editor](#) for more information about changing the value of config keys.

### 4.13.3.3. Additional Links in the Navigation Menu

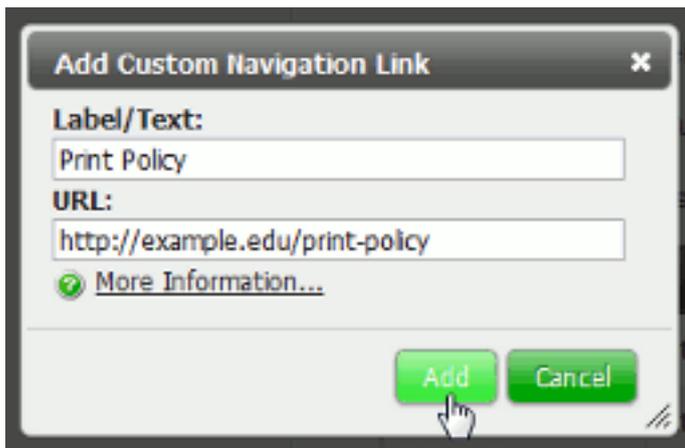
The navigation menu in the user web interface contains links for the PaperCut services that are enabled and available to the user. In some cases, you might want to add additional external links to this menu. Examples include:

- Linking to a print policy page on the organization's intranet.
- Linking to a page with key contact details.
- A link to return to the "main" intranet page/portal.

Custom links are displayed above the **Log Out** item.

To add a custom link:

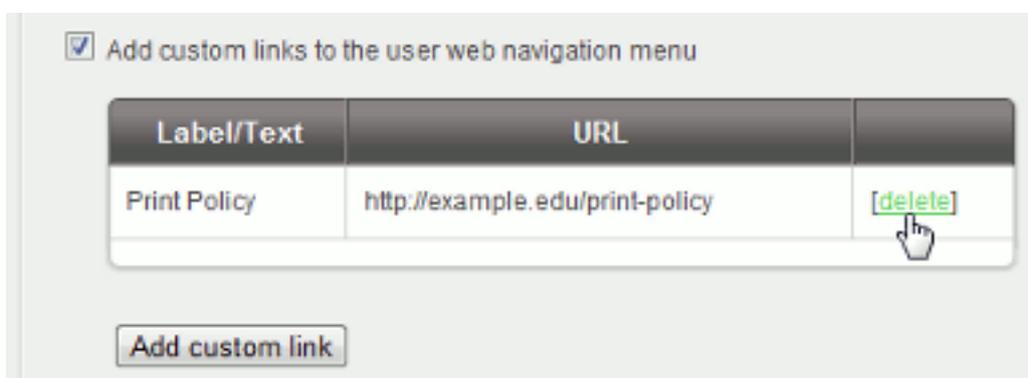
1. Log in to the admin interface and navigate to **Options > General > User Features** .
2. Enable the option **Add custom links to the user web navigation menu**.
3. Click **Add custom link**.
4. Complete the following fields:
  - **Label/Text**—the text that is displayed in the navigation menu.
  - **URL**—the destination of the URL when clicked.



The link is now displayed in the user web interface.



Existing custom links are displayed in the admin interface under the **Add custom links to the user web navigation menu** option. To delete a link, click the **[delete]** link next to the relevant link.



Label/Text	URL	
Print Policy	http://example.edu/print-policy	[delete]

The URL in custom navigation links can also contain special replacement fields. E.g. the `%user%` in `http://example.edu/print-policy?u=%user%` is replaced with the logged in username to create a URL such as `http://example.edu/print-policy?u=tom`.

The available special replacement fields are as follows:

**Table 80: Fields available for replacement in custom navigation links in the user web interface**

Field	Description
<code>%user%</code>	The username of the logged in user.
<code>%user_full_name%</code>	The full name of the logged in user.
<code>%user_id%</code>	The id/card number of the logged in user.
<code>%user_email%</code>	The email address of the logged in user.
<code>%user_office%</code>	The office of the logged in user.
<code>%user_department%</code>	The department of the logged in user.
<code>%return_url%</code>	A URL that sends the user back to the user web interface. The user is sent back to the <b>Summary</b> page as if they had just logged in, assuming their session has not timed out.

#### 4.13.3.4. Custom Printer Maps for Web Print

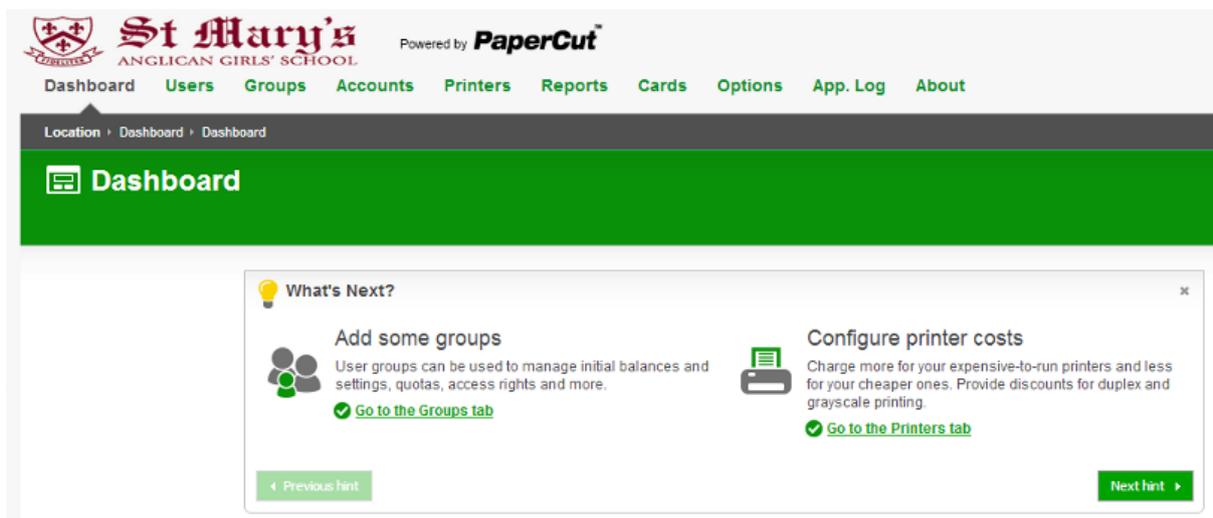
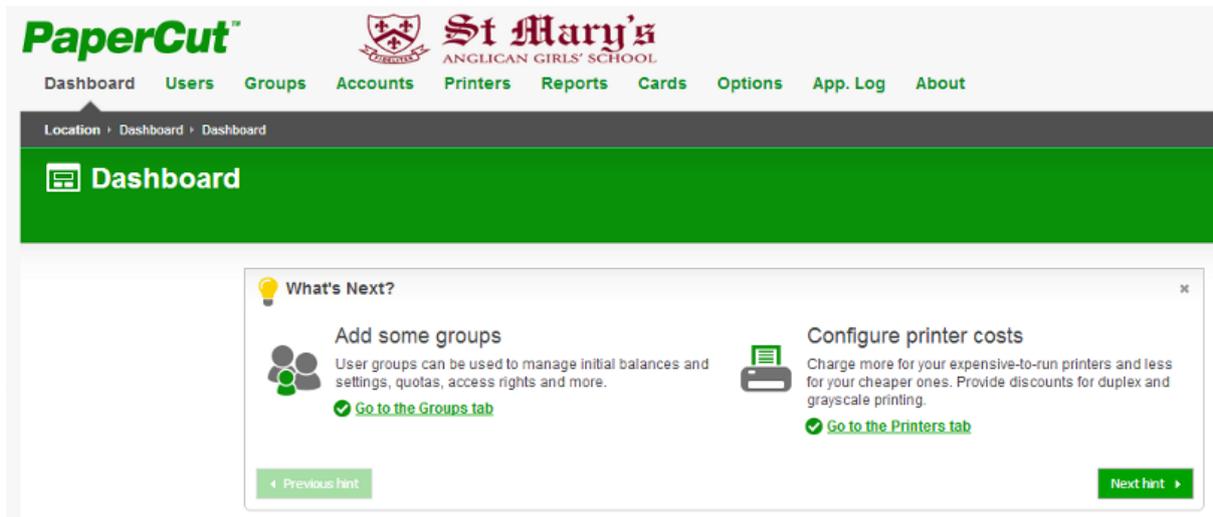
You can use a graphical map or other custom content instead of the default printer selection list in the Web Print wizard. For more information see [Designing Printer Maps / Custom Printer Selection Lists](#).

### 4.13.4. Customizing the Administration Web Interface

As the PaperCut MF administration interface is designed for use by administrators, you generally don't need to customize it to the extent of the user web interface (for information about customizing the user web interface see [Customizing the User web pages](#)). However, you can display an organization logo or other image in the header of the administration interface. The available customizations are:

- Replace the existing administration logo
- Add an image of your choice to the right of the main administration logo
- Add a custom message to the dashboard

Add logos to customize the look of the admin interface. You can customize these by placing the following files in the PaperCut MF directory structure at `[app-path]/server/custom/web/`.



You can add your own content to the dashboard by placing an HTML file in `[app-path]/server/custom/web/` called `dashboard-notice.inc`. This could be used to display a short message for the attention of other administrators. Other examples might include:

- Guidelines for administering printers
- Policies for handing refunds
- Contact details for key people
- Or even your own widget that loads content from elsewhere



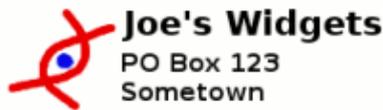
**Tip:** Change the title of the custom dashboard widget by setting the config key `dashboard.gadget.custom.title`. For information about setting config keys, see [Using the Config Editor](#).

**Table 81: Files used to customize the administration web pages**

Filename	Description
<code>admin-logo.png</code>	If this image exists it is displayed to the right of the existing application logo. The image must be in PNG format and for best results should be sized 250px by 42px.
<code>admin-main-logo.png</code>	If this image exists it replaces the standard application logo in the top left corner. Changing the standard logo displays a "Powered by PaperCut" image beside it. The image must be in PNG format and for best results should be sized 280px by 42px.
<code>dashboard-notice.inc</code>	HTML contained within this file is displayed on the administration dashboard page.

### 4.13.5. Customizing Report Headers

You can replace the standard PaperCut MF report header logo with an alternate image. Use this to include an organization logo and address for example, which is useful when attaching reports to customer invoices, or just to make reports look more professional.



## Group list

Group	Initial Balance	Initially Restricted	Schedule Amount	Schedule Period
[All Users]	\$40.00	Yes	\$0.00	None
Building 201	\$10.00	Yes	\$0.00	None
Office Staff	\$100.00	No	\$0.00	None

To use a custom report header logo, place an image at `[app-path]/server-/custom/web/report-header.png`. The image should be 250px by 80px in PNG format.

### 4.13.6. Data Access and Custom Reports

The default PaperCut MF installation stores data in an internal database. For the interested person, the database is Apache Derby - an open source database written by IBM and based on their DB2 Cloudscape Database. The internal database is optimized for embedded use, is very robust, ACID compliant and scales well. The internal database, however, is not designed for multi-application access. To access the data from an external source, such as, a reporting program, consider running PaperCut MF on an external database (RDMS) designed for multi-user and multi-application user access. Common database solutions include Microsoft SQL Server, Oracle, PostgreSQL and MySQL. For more information see [Deployment on an External Database \(RDBMS\)](#).

The PaperCut MF data structure is relatively simple and people with Crystal Reports, MS Access or SQL experience should have no problems extracting data or written custom reports. Report developers should keep in mind:

- Access the data only in read-only mode. Modifying data directly underneath the application can cause unpredictable behavior.
- Always test any custom reports after an upgrade as the underlying data format might have changed. PaperCut Software developers try to minimize data structure changes but they are expected to occur in major upgrades.

You can find a database schema diagram in the PaperCut MF knowledge base located at [Database Schema Diagrams](#).

#### 4.13.6.1. Plain Text Print Log

In addition to storing print log information in the database, a real-time, plain text log is also written into the directory:

```
[app-path]/server/logs/print-logs
```

The log file is in a tab delimited format and a new log is created for each day. Files are named with the format `printlog_yyyy_mm_dd.log` and files are archived for 30-days. The tab delimited file can easily be imported into programs such as Microsoft Excel, Microsoft Access or other database.

**Table 82: Text print log file format**

Field	Description
Field 1	Date in format <code>yyyy-MM-dd\th:mm:ss a/p</code>
Field 2	Server Name
Field 3	Printer Name
Field 4	User who printed the document
Field 5	Account charged (usually the user's personal account but could be a shared account)
Field 6	Client/Workstation Name
Field 7	Document name
Field 8	Total number of pages
Field 9	Total number of color pages
Field 10	Number of copies (this has already been used to calculate the total pages).
Field 11	Cost
Field 12	Duplex status
Field 13	Grayscale status (Color mode)
Field 14	Paper Size (e.g. Letter, A4)
Field 15	Paper Height in Millimetres (divide by 24.5 for inches)
Field 16	Paper Width in Millimetres (divide by 24.5 for inches)
Field 17	Print job size in KB

Field	Description
Field 18	Printer Language
Field 19	Cost Adjustments (comma separated)
Field 21	Job Type (PRINT)

### 4.13.7. Automation and Scripting

PaperCut MF provides a detailed set of server commands and Web Services API's. Use these services to automate common operations and management tasks. Some examples of where an administrator would use scripting/automation include:

- Automate tasks such as backups and domain user/group synchronization.
- Integrate account creation and management into existing scripts or processes.
- Manage account balances and transactions outside the application.

The automation and scripting tools are written for software and script developers. It is expected that readers intending on using these tools are comfortable with developing system management and server monitoring programs.

The `server-command` and Web Services API's are included as standard with PaperCut MF. More information on using these tools is detailed in [Tools - database, server-command scripting, and APIs \(Advanced\)](#) in [Server Commands \(server-command\)](#) and [The XML Web Services API](#).

### 4.13.8. Custom User Directory Information Providers

PaperCut MF is a modern application designed with a modern architecture. It supports plug-ins and extensions at a number of different levels. One such layer is the User Directory source. Organizations with very complex domains, such as those seen in large universities, can use either with the standard options, or if the standard options are not sufficient, via a custom plug-in.

For example, a University might have multiple domains, one running Active Directory and the other LDAP/NIS. A custom plug-in could support this by first querying Domain A, and if the user is not found, the query Domain B via LDAP. The PaperCut MF development team is happy to provide API documentation and sample source code to assist organizations with custom requirements.

For some working examples available in your current installation, look in: `[app-path]/server-bin/linux-[x64|i686]/sambauserdir`, `[app-path]/server/bin/linux-[x64|i686]/authsamba` and `[app-path]/server/bin/linux-[x64|i686]/src/`.

## 4.13.9. Enabling ports 80 (HTTP) and 443 (HTTPS)

By default, PaperCut listens to ports 9191 and 9192 for HTTP and HTTPS communication respectively. These ports have been selected as they're generally unused by other applications. Because PaperCut is a web application, you might want to have the interface available on the standard HTTP and HTTPS ports (80 and 443 respectively). One reason for doing so is to simplify URLs communicated verbally (as the user does not need to supply a port number).

The configuration procedure is different for each operating system. See below for instructions. *Important:* Before you begin, first ensure no other applications (such as IIS, or Apache) are currently installed and using ports 80 or 443 on the server hosting PaperCut.



### Important:

The following directions detail how to enable port 80 in addition to port 9191. Enabling an additional port is recommended over changing the existing port. Port 9191 is also used for server-to-server and client-to-server communication so it's important that this port continue to be made available.

Also make sure you you enable the 80 and 443 firewall ports if users access PaperCut across firewall devices.

### 4.13.9.1. Windows

1. Stop the PaperCut MF Application Sever, under **Control Panel > Administrative Tools > Services**.
2. Open the file: `[app-path]\server\server.properties`
3. Enable port 80 (and 443) by changing the appropriate settings from a `N` to a `Y`. They should look like:

```
server.enable-http-on-port-80=Y
server.enable-https-on-port-443=Y
```

4. Restart the PaperCut MF Application Server stopped in Step 1.
5. Test and ensure the web interface is working. e.g. `http://[myserver]/admin`

### 4.13.9.2. Linux

On Linux systems, only privileged programs that run as `root` can use ports under 1024. In line with security best practice PaperCut runs as a non-privileged user. To enable port 80 and 443, use `iptables` (or `ipchains` on old systems) to port-forward 80 to 9191. The following commands provide an example. Consult your distribution's documentation to see how to persist the `iptables` rules between system restarts:

```
/sbin/iptables -t nat -I PREROUTING --src 0/0 --dst <server_ip> \
```

```
-p tcp --dport 80 -j REDIRECT --to-ports 9191
/sbin/iptables -t nat -I PREROUTING --src 0/0 --dst <server_ip>
\
-p tcp --dport 443 -j REDIRECT --to-ports 9192
```

(These commands would typically be placed in an `rc init` script or the iptables startup config script as provided by your distribution.)

### 4.13.9.3. Mac

The approach on Mac systems is similar to Linux. With the release of Mac OS X 10.11 (El Capitan) and the inclusion of System Integrity Protection (SIP) modifications to `/System/` are disabled by default and disabling this feature is not recommended. The following information works for Mac OS X 10.10. For Mac OS X 10.10 and later, the support for the IPFW firewall has been removed in favor of PF.

## Mac OS X 10.10

From Mac OS X 10.10, you must use the `pfctl` command to modify the Mac firewall.

1. Create the anchor file:

```
sudo vi /etc/pf.anchors/com.papercut
```

2. Modify the `/etc/pf.anchors/com.papercut` file by adding the following lines:

```
rdr pass on lo0 inet proto tcp from any to self port 80 ->
127.0.0.1 port 9191
rdr pass on en0 inet proto tcp from any to any port 80 ->
127.0.0.1 port 9191
rdr pass on en1 inet proto tcp from any to any port 80 ->
127.0.0.1 port 9191
```

3. Test the anchor file:

```
sudo pfctl -vnf /etc/pf.anchors/com.papercut
```

4. Add the anchor file to the `pf.conf` file:

```
sudo vi /etc/pf.conf
```

Then add in the following lines under each corresponding section - e.g. the `rdr-anchor` line under the current `rdr-anchor` line, and the `load anchor` under the current `load-anchor` statement:

```
rdr-anchor "port80"
load anchor "port80" from "/etc/pf.anchors/com.papercut"
```

5. Load the `pf.conf` file automatically at startup by editing the current daemon for `pf`:

```
sudo vi /System/Library/LaunchDaemons/com.apple.pfctl.plist
```

Then within the section detailing the program arguments `<key>ProgramArguments</key>`, add in an extra string with `-e`, which enables the config, as per:

```
<string>pfctl</string>
<string>-e</string>
<string>-f</string>
<string>/etc/pf.conf</string>
```

Then save the file, exit and restart the server to test.

- To test this method manually (no restart required) you can use the `pfctl` command:

```
sudo pfctl -ef /etc/pf.conf
```

This loads and enables the `pf.conf` file, which then calls the `com.papercut` anchor file.

## Mac OS X 10.9 and earlier

In Mac OS X 10.9 and earlier, one needs to use the `ipfw` command to modify the Mac firewall:

```
sudo /sbin/ipfw add 102 fwd 127.0.0.1,9191 tcp from any to any
80 in
```

See the `ipfw` man page for all the scary details!

### 4.13.10. Customizing Mobile Print Release

You can tailor the visual design of the [Mobile Print Release - Releasing print jobs on your mobile](#) by writing a custom Cascading Style Sheet (CSS) or creating custom images. Use this to change the colors of the header, footer and the header image. It is also possible to change the icon shown on the iOS home page. Placing the following files in the PaperCut MF directory structure at `[app-path]/server/custom/web` to override the page layout and style.

**Table 83: Files used to customize Mobile Print Release**

File name	Description
mobile-release.css	If this file exists, the content of this file is included as an overriding stylesheet. Use the styles in this file to define the colors of the header and footer. You can customize the header image by placing your header image file under the custom directory and by defining the following rule in the CSS file. <code>#top-bar-logo { background-image: url('/custom/mobile-release-logo.png'); }</code> The header logo should be an image 130px wide and 25px high.
mobile-release-icon-	If this file exists, you can replace the home page icon on iPad. The file should be a PNG that is 114px wide and 114px high.

File name	Description
114x114.png	
mobile-release-icon-72x72.png	If this file exists, you can replace the home page icon on iPhone. The file should be a PNG that is 72px wide and 72px high.



## 4.14. Web Cashier

The Web Cashier is a simple web interface that provides a till/cashier to facilitate simple transactions using PaperCut MF accounts. It's specially designed for non-technical staff in educational organizations. For example, the cashier user may:

- Charge end-user accounts, or shared accounts, for ad-hoc services such as laminating, binding or library fines.
- Deposit funds to a user's personal printing account, usually after receiving a cash or electronic payment.

Although an administrator can perform account adjustments at any time, the Web Cashier interface is a simpler interface designed specifically for non-technical users such as office administration staff, library staff and service counter staff.

You can use Web Cashier in a variety of ways. Some examples:

- The library teacher can use Web Cashier to charge students for various services such as document binding, laminating, or library fees without handling cash. Services are charged to the user's balance and they receive an itemized transaction acknowledgment slip, which can be printed or automatically emailed if needed.
- Office staff can accept payments from users and then credit the user's balance using the simple Web Cashier **Deposit** screen (e.g. add extra quota or top-up an account over the counter). Web Cashier screens are simple and only present information tailored specifically to the cashier user's role. (Purchase, Deposit or Both). This approach is ideal for smaller organizations who do not have the transaction volume to justify Pre-Paid TopUp cards or an online payment gateway (see [TopUp/Pre-Paid Cards](#)).
- When people leave an organization they can be provided with the balance of their account and the transaction can be recorded as a "refund" item, created by the PaperCut MF administrator. The items are configurable and depend on the services the organization wants to provide.

### 4.14.1. Setting Up Web Cashier

Web Cashier is not enabled by default and must first be set up by the PaperCut MF administrator. To set up Web Cashier:

1. Select **Options > General > Web Cashier**.
2. Click **Enable and set up Web Cashier**.
3. To set up Web Cashier to sell ad-hoc services or products (items) the administrator should first define them. To add an item:
  - a. Click **Add New Item**.
  - b. Give the item a name or short description.
  - c. Enter a default cost.
  - d. Click **Add Item**.

- e. To delete an item click **delete**. You can change the default cost of the item later.

### Web Cashier Items

Items listed here represent items that users may purchase. They will be available for selection by a cashier in the Web Cashier interface.

Example items include binding, lamination and library fees.

Users designated Web Cashier access via Admin Rights may access the Web Cashier interface at <http://localhost:9191/webcashier>

[More Information...](#)

Items currently available for purchase via Web Cashier:

Item Name	Default Cost (per item) ▼	
Library fine	<input type="text" value="\$5.00"/>	<a href="#">[delete]</a>
Binding	<input type="text" value="\$3.00"/>	<a href="#">[delete]</a>
Lamination	<input type="text" value="\$2.00"/>	<a href="#">[delete]</a>
Postage	<input type="text" value="\$1.00"/>	<a href="#">[delete]</a>
Other	<input type="text" value="\$0.00"/>	<a href="#">[delete]</a>

4. Optionally customize the text displayed on the **Purchase** and **Deposits** screens or header of acknowledgment slips. Examples are provided. For more configuration details see [Advanced Web Cashier Configuration](#).
5. Access Web Cashier using the URL `http://[server-name]:9191/webcashier`. This is the URL you provide to your Web Cashier users later (e.g. Office/Admin/Service-desk staff).
6. Perform some test transactions and ensure Web Cashier is set up to your requirements.
7. Grant Web Cashier user privileges to the users who require access (i.e. teacher, office staff, librarian, etc.). To read more about assigning Web Cashier access to users or groups see [Assigning Web Cashier User](#)

## 4.14.2. Purchasing Items

To charge Tom's personal account for "Binding" and "Postage" the Web Cashier user will:

1. Log in to the PaperCut Web Cashier using the URL `http://[server-name]:9191/webcashier`.
2. Enter your network credentials.
3. Search for the user by entering their username or full name. It displays user's full name and current balance on the left.

Enter a username and select item(s) to charge.

Username  tom smith \$10.20

Personal account  
 Shared account

Item	Quantity	Cost (per item)	Subtotal
Binding ▼	<input type="text" value="2"/>	<input type="text" value="\$3.00"/>	\$6.00
Postage ▼	<input type="text" value="8"/>	<input type="text" value="\$0.50"/>	\$4.00
▼	<input type="text" value="1"/>	<input type="text" value="\$0.00"/>	
<b>Total</b>			<b>\$10.00</b>

Comment

4. Select the "Personal account".
5. Now select "Binding" from the item list.
6. The default item price is visible when you select the item. You can modify this if needed. (e.g. give discount for teaching staff)
7. Enter the quantity. PaperCut calculates the total item price.
8. Now add a second item - "Postage"
9. Give a discount by changing the cost (per item).
10. Enter an optional comment. For example, the reason for an exception/discount/charge.
11. Click **Purchase**. Tom's balance is debited with the transaction value and an entry is made in the account's transaction history.
12. An *Acknowledgement slip* is displayed on the screen. To print the Acknowledgement slip, click **Print**.

The text displayed on the top of the acknowledgement slip is configurable. See [Advanced Web Cashier Configuration](#) for more information.

Order successful. Summary below.

Your account has been charged for the following items:

Reference number: P000005

Date: Oct 7, 2011 4:14:02 PM

Username: tom (Tom Smith)

Charge to: tom

Item	Quantity	Cost (per item)	Subtotal
Binding	2	\$3.00	\$6.00
Postage	8	\$0.50	\$4.00
Total:			\$10.00

Balance after: \$0.20

Cashier: admin

Comment: Giving a bulk discount for postage.

OK Print

If previously configured by the PaperCut MF administrator, Tom is automatically emailed a copy of the acknowledgement slip. To set up a SMTP server see [Configuring Email Notifications](#).

### 4.14.3. Depositing Funds

Deposit \$10.00 to a user's personal account.

1. Log in to PaperCut Web Cashier using the URL `http://[server-name]:9191/web-cashier`.
2. Enter your network credentials.
3. Navigate to **Deposit** tab.
4. Search for the user by entering their username or full name. It displays user's full name and current balance on the left.

**PaperCut™** Web Cashier  User: priyanka  Help  Logout [Log in as admin](#)

Purchase Deposit Order History

Location > Deposit

## Deposit Funds

Enter a username and select an amount to add to their account.

Username   tom smith \$0.20

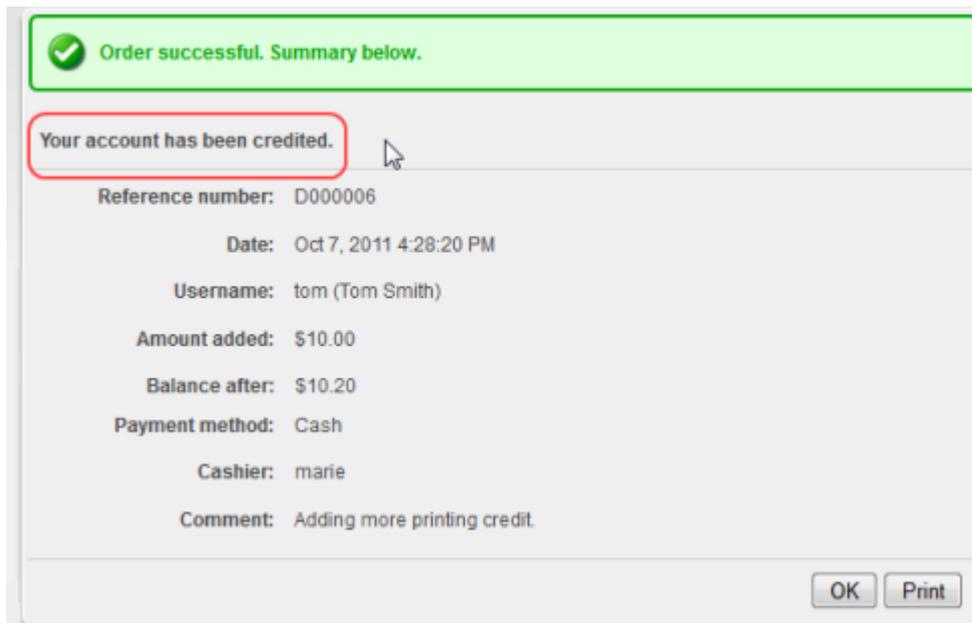
Amount

Payment method

Comment

5. Collect \$10.00 cash from the user and enter \$10.00.
6. Select one of the predefined payment methods. (i.e. Cash in this example)
7. Enter an optional comment.
8. Click **Deposit**. User's personal balance is credited with \$10.00.
9. An Acknowledgement slip is displayed on the screen. To print an Acknowledgement slip, click **Print**.

The text displayed on the top of the acknowledgement slip is configurable. See [Advanced Web Cashier Configuration](#) for more information.



User Tom is automatically emailed a copy of the acknowledgement slip if configured, or it can be printed. \$10.00 is immediately added to Tom's account and available for use.

#### 4.14.4. Web Cashier Order History

A history of Web Cashier orders is displayed on the **Order History** tab. This useful screen allows the Web Cashier to:

- Validate the existence of a transaction/order by searching (e.g. on a reference number).
- Bring up an order/transaction history for a given user or for a given account.
- Quickly review recent transaction.
- Access basic reports or export data.

You can view previous acknowledgement slips by clicking the reference number. You can also set up a filter. e.g. to view the transactions for a specific user. Export the list of orders using the **Export / Print** link.

You can access all Web Cashier reports via the PaperCut admin interface by navigating to **Reports > Transaction** . (See [Web Cashier Reports](#) for more information.)

#### 4.14.5. Advanced Web Cashier Configuration

**Table 84: Web Cashier Settings**

Setting	Description
Purchase page instructions	This text is displayed on the Web Cashier <b>Purchase</b> tab. It might include information on how to charge users. It supports basic HTML markup.

Setting	Description
Purchase acknowledgement slip header	This text is displayed on top of the Web Cashier <b>Purchase</b> acknowledgement slips. It supports basic HTML markup.
Deposit page instructions	This text is displayed on the Web Cashier <b>Deposit</b> tab. It might include information on how to charge users. It supports basic HTML markup.
Deposit acknowledgement slip header	This text is displayed on top of the Web Cashier <b>Deposit</b> acknowledgement slips. It supports basic HTML markup.
Payment methods	This is a comma separated list of user-defined payment methods used for crediting users' accounts. (i.e. Cash). It can be left blank.
Copy acknowledgement slip to user via email	Select this option to send acknowledgement slips to users via email. To set up a SMTP server see <a href="#">Configuring Email Notifications</a> .



**Tip:** Most text configuration options supports HTML markup. For example, this allows custom font colors, size and reference images (e.g. logos). To bold text, surround the text with `<strong>` tags. If you are not familiar with HTML, your webmaster or website administrator can offer some advice.

### Web Cashier Configuration

Enter the text to display on Web Cashier "Purchase" and "Deposit" tabs.

Examples might include information on how to charge users or other information useful to the cashier.

Text displayed on the acknowledgement slips can also be modified.

Note: All fields support basic HTML markup.

[More Information...](#)

---

#### Purchase page instructions

(Displayed to the cashier on the Purchase tab)

```
<strong>Enter a username and select item(s) to charge.</strong>
```

---

#### Purchase acknowledgement slip header

(Displayed at the top of purchase acknowledgement slips)

```
<strong>Your account has been charged for the following items:</strong>
```

---

#### Deposit page instructions

(Displayed to the cashier on the Deposit tab)

```
<strong>Enter a username and select an amount to add to their account.</strong>
```

---

#### Deposit acknowledgement slip header

(Displayed at the top of deposit acknowledgement slips)

```
<strong>Your account has been credited.</strong>
```

---

#### Payment methods

(A comma separated list of payment methods, e.g. "Cash,Other". This field may be left blank if no payment method is required.)

Copy acknowledgement slip to user via email

## 4.14.6. Assigning Web Cashier User

**Web Cashier users** are administrator type users who usually have limited rights. For example, a Web Cashier user might be a service desk staff member and you grant them access to the Web Cashier option only and not other administrator rights. Web Cashier users are assigned via **Options > Admin Rights**

To assign a user or group as a **Web Cashier user**:

- Add a user/group as an administrator. (See [Assigning Administrator Level Access](#) for more information.)
- If you only want to provide them access to the Web Cashier then clear all the other options and only select **Web Cashier user**.

### Rights

By default administrators have access to all functions. Use the show/hide details link on the left to set individual access rights.

[\[ show/hide details \]](#) | [\[ remove \]](#)

marry (Marry James)

- Access users section
  - Allow access only to this group: [All Users] [\[ enlarge \]](#)
  - Perform adjustments & charges
  - Create internal users
  - Change internal user passwords
  - Change user settings
  - Perform bulk user actions
- Access groups section
- Access shared accounts section
  - Change shared account settings
  - Perform bulk account actions
- Access printers section
  - Access global job logs
  - Allow access to: All printers
  - Change printer settings
- Edit job log details
- Refund print jobs
- Hold/Release queue manager
- Web Cashier user
  - Allow user to perform Both purchase and deposit
- Access reports section
- Access cards section
  - Manage cards
- Access options section
  - Access admin rights settings
- Access application log section

- You can allow users to perform **Purchase** or **Deposit** only. For example, library or print room staff might have rights to apply purchases (e.g. binding or bulk printing), while not being given access to deposit money onto accounts for security reasons.



**Important:** Many Web Cashier users are non-technical staff. After setting up a new user as a Web Cashier user make sure you provide them with the browser access URL (i.e. `http://[server-name]:9191/webcashier`) and take a few moments to demonstrate common functionality such as performing a purchase/deposit.

### 4.14.7. Web Cashier Reports

All the Web Cashier reports are accessible via **Reports > Transaction > Web Cashier Transaction Reports** . To see a sample click **Show sample** .

**Table 85: Web Cashier Reports**

Report name	Description
Web Cashier orders	It is a list of all the <b>Purchase</b> and <b>Deposit</b> orders sorted by date.
Web Cashier purchases - details	It gives detailed information for all purchases done via Web Cashier.
Web Cashier items - summary	It is a summary of all the items purchased within a certain period.

To know more about reports see [Reports](#).



**Tip:** You can schedule these reports to be automatically emailed via **Reports > Schedule** on a daily, weekly or monthly basis to designated staff as appropriate.

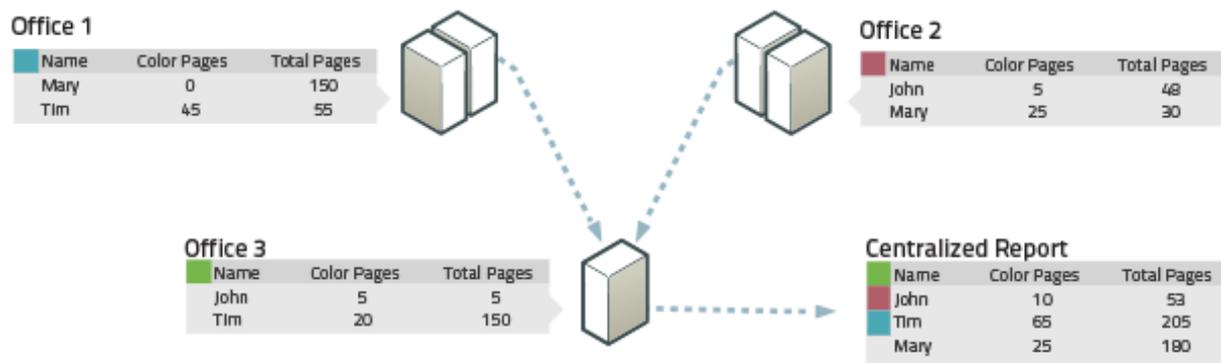
## 4.15. Central Reports

Organizations with multiple sites typically follow one of two deployment strategies: centralized or decentralized. This includes businesses with offices in multiple cities and education institutes with international campuses. Each model comes with its own pros and cons.

One advantage of the decentralized model is that a System Administrator at one site can't inadvertently make changes that affect the other sites. Poor inter-site link reliability and simplified site administration are other motivators for adopting the decentralized model. The main *disadvantage* of decentralization is the difficulty of gaining a unified view of print data and reporting. Central Reports solves this problem.

This section covers how Central Reports provides you with a consolidated data and reporting view across multiple primary/application servers (decentralized model). *If you are using a single Application Server (centralized model) this is not required as the regular reports provide the data you need - see [Reports](#).*

A typical scenario is an organization with multiple sites and one Application Server per site. With Central Reports, organizations such as this can access consolidated reports for the entire organization.



**Figure 86: Central Reports across multiple Application Servers**

Central Reports works by running the same SQL query on all remote PaperCut databases and consolidating the result. This is done by first concatenating the result data from all databases, then grouping, sorting and aggregating as appropriate. For this purpose, entities such as users, groups, printers and accounts are matched by name. For example, if print usage records matching username "Mary" are received from multiple sites, they are all considered as coming from the same user and are aggregated. In other words, users (and some other entities) are considered to be unique across all sites.

Most reports that are suitable for aggregation across systems are available in Central Reports. This includes the Executive Summary report and most usage reports. Not included are configuration reports, transaction reports and print log reports.

You can schedule Central Reports for automatic generation and email distribution just like standard reports.



**Tip:** Central Reports is not a centralized management system. Your multiple PaperCut Application Servers must continue to be operated and managed independently. All configuration and balances remain local to each Application Server, including user and shared account configuration, admin rights and user balances.

### 4.15.1. Prerequisites for Central Reports

Your organization needs at least two production Application Servers to use Central Reports. You can configure Central Reports on one or both of these Application Servers. You can also configure Central Reports on a separate PaperCut installation used solely for the Central Reports feature.

In addition:

1. Each PaperCut Application Server (including the reporting server) must be configured with an external database (see [Deployment on an External Database \(RDBMS\)](#) in the external database section). This database must be accessible for read access from the central server by a nominated URL, user and password.

Central Reports works by running SQL queries on the remote PaperCut databases directly. It is therefore possible as an alternative approach to use other mechanisms to replicate the remote databases to your reporting server and run reports from the local read-only replicas. This manual, however, documents only the usual approach of accessing remote databases directly.

2. All databases must be of the same type. For example, if you use Microsoft SQL Server at one site, this database type must be used at all sites, including the site doing the reporting.
3. You should ensure the same PaperCut version is installed at each location, including the central reporting location. More specifically, the databases at all sites must use the same database schema (which can change between PaperCut versions).
4. By default, Central Reports do not generate reports if any remote databases are unavailable or return errors. It is often better to log these events as errors rather than generate potentially incomplete and misleading reports. Central Reports has a **Status** page that gives you a quick snapshot of the readiness of the system and flags any errors.

You can instruct central reports to generate reports even if some remote databases are unavailable. To configure, see [Server Configuration](#).

## 4.15.2. Setting up Central Reports

Before setting up Central Reports, review the prerequisites in the previous section. If you have not yet set up your external databases at each site, including the reporting site, you must do this first by following the instructions in [Upsize to an External RDBMS](#).

1. Select a server as your reporting server. This is the server on which you will configure and run Central Reports. You can choose which ever server is most convenient for you. In fact, you can configure several or all servers to be able to run Central Reports.
2. On the server, open the server config file `[app-path]/server-/server.properties` in a text editor (e.g. Notepad).
3. At the bottom of the file, add `central-reports` configuration statements as documented in [Server Configuration](#) below and save the file
4. Log in to the PaperCut admin interface to configure admin rights and email notifications:

To grant Central Reports admin rights to users who need access:

- a. Navigate to the **Options > Admin Rights** page.
- b. Select the group you want to add Central Reports rights for and click **Add Group**. Or if adding a single user, enter the user and click **Add User**.
- c. By default the group or user you added will have access to all features. To change this, click the **edit** link to the right of the group or user entry. You can then select the

specific rights you want to apply. In particular, ensure that **Access Central Reports** is checked and click **Apply** to save your changes.

Enabling an email (SMTP) server allows scheduled Central Reports to be sent. Additionally, enabling email error notifications is recommended so that administrators are notified of any issues that would prevent Central Reports from running successfully). E.g. if a scheduled central report fails, this allows administrators to be notified by email rather than needing to log in to the admin interface and check the **App. Log** tab. To enable email notifications, navigate to **Options > Notifications** and:

- a. Under **SMTP Server Options**, enter an SMTP server and other details so that PaperCut can send emails.
  - b. Recommended: under **System Notifications**, enable **Error level events**.
5. Log in to the Central Reports interface using the URL `https://[server-name]:9192/central-reports` and check the **Status** page for any errors. If this page is not available, check that you have added Central Reports admin rights to your login.
  6. Select the **Central Reports** tab and run several reports to test. Verify that the reports run and that the results are as expected.

### 4.15.2.1. Server Configuration

Central Reports is enabled by configuration statements in `[app-path]/server-/server.properties`. Changes to the Central Reports related settings in this file do not require a restart of the PaperCutApplication Server (although most other settings in this file do).

This file should include template examples for configuring Central Reports. If it does not then you can see the `[app-path]/server/server.properties.template` (which is kept up to date with every upgrade) and copy the Central Reports related settings into your `server.properties` file.

As an example, if using Microsoft SQL Server as the external database, the following statements configure a Melbourne Application Server to run consolidated reports across the Melbourne, Perth and Sydney sites:

```
central-reports.enabled=Y
central-reports.database.local.include=Y
central-reports.database.local.label=Melbourne HQ

central-reports.require-all-databases-online=Y
central-reports.database.1.label=Perth Branch
central-reports.data-
base.1.url=jdbc:jtds:sqlserver://per1.example.com/papercut
central-reports.database.1.username=admin central-reports.data-
base.1.password=xJf56gy
central-reports.database.2.label=Sydney Branch
central-reports.data-
base.2.url=jdbc:jtds:sqlserver://syd1.example.com/papercut
```

```
central-reports.database.2.username=admin central-reports.data-
base.2.password=df95FCd
```

Note that in this example the `server.properties` file is for the "Melbourne HQ" site, and it would contain configuration for its own SQL Server database above (as documented in [Upsize to an External RDBMS](#)).

The database statements detailed below must be specified for each remote server. Where specified, *n* is a numeric ID (e.g: 1, 2, 3) used to associate statements for the same site, as per the example above.

**Table 87: Central Reports statements in server.properties**

Key	Description
<code>central-reports.enabled</code>	Central Reports is enabled (but not configured) by default. The purpose of this setting is to allow you to disable Central Reports if required. This results in users not being able to log in to the Central Reports interface, and scheduled Central Reports will not run. Values: Y or N. Default: Y.
<code>central-reports.database.local.include</code>	Specify whether to include the local server in the aggregated Central Reports. Values: Y or N. Default: Y. You would specify N if your local server was set up for running reports only and is not to be used as a PaperCutApplication Server.
<code>central-reports.database.local.label</code>	Provide a meaningful name for the local site. Default: "Local Site".
<code>central-reports.require-all-databases-online</code>	This option configures whether or not all databases must be online to create reports. If set to N, reports are created even if some remote databases are not available, but the aggregated reports

Key	Description
	will not include data from those databases. Values: Y or N. Default: Y.
<code>central-reports.database.n.label</code>	A text label to identify the remote server <i>n</i> , in the Central Reports status page and reports.
<code>central-reports.database.n.url</code>	Specify the JDBC URL providing remote access to your database. This URL is specified in the same way as for the external database you have already configured on this system.
<code>central-reports.database.n.username</code>	A database username providing read access to the remote database.
<code>central-reports.database.n.password</code>	A database password for the supplied username.

### 4.15.3. Running Central Reports

Access Central Reports at the URL `https://[server-name]:9192/central-reports`. The following tabs are displayed:

1. **Status** - check the remote server status and whether you are ready to run reports
2. **Reports** - generate on-demand and scheduled reports

#### 4.15.3.1. Status Tab

The **Status Tab** shows the status of each configured remote server and displays any errors that prevent Central Reports from running.



The screenshot shows the PaperCut Central Reports interface. At the top, there's a navigation bar with 'Status' and 'Central Reports' tabs. Below that, a breadcrumb trail indicates the current location: 'Location > Status > Central Reports Server Status'. A prominent green header bar displays 'Central Reports Server Status' with a server icon. To the left, an 'Actions' panel offers 'Refresh' and 'Configure' options. The main content area reports 'All servers OK. Central reports ready to run.' and lists three offices: Melbourne Office, Sydney Office, and Canberra Office, each accompanied by a server icon and a green 'OK' status indicator.

Reports cannot be generated if any server has an error. Typical errors include:

1. Failing to connect to the database (incorrect authentication, firewall blocking access, configuration error).
2. Servers have mis-matched application versions or database types.

### 4.15.3.2. Central Reports Tab

The **Central Reports** tab shows the reports available under Central Reports and allows reports to be generated on demand or to be scheduled for email delivery. Central Reports provides a subset of the reports available in the admin Reports interface, but the usage is the same. Refer to [Reports](#) for instructions on how to run reports and configure filters.

Select the **Schedule / Email Reports** tab to schedule Central Reports for periodic generation and automatically have them emailed to the appropriate people in your organization.

## 4.16. Print Archiving (viewing and content capture)

Print data is typically short-lived, the user prints the job and then the print job content is lost. PaperCut MF's Print Archiving feature changes that. With Print Archiving, in addition to PaperCut's standard print job information logging, it is now possible to:

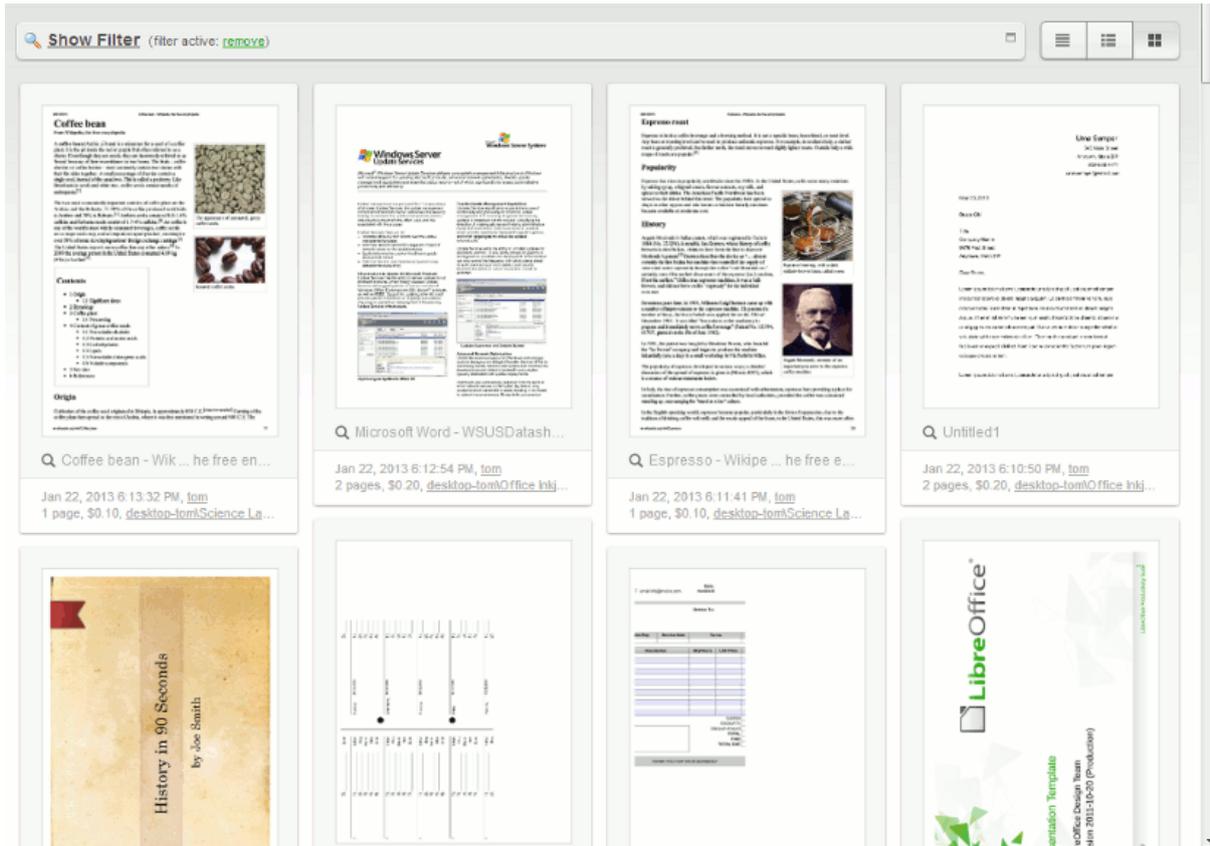
- Save and archive print jobs for a defined period of time
- Interactively view what has been printed

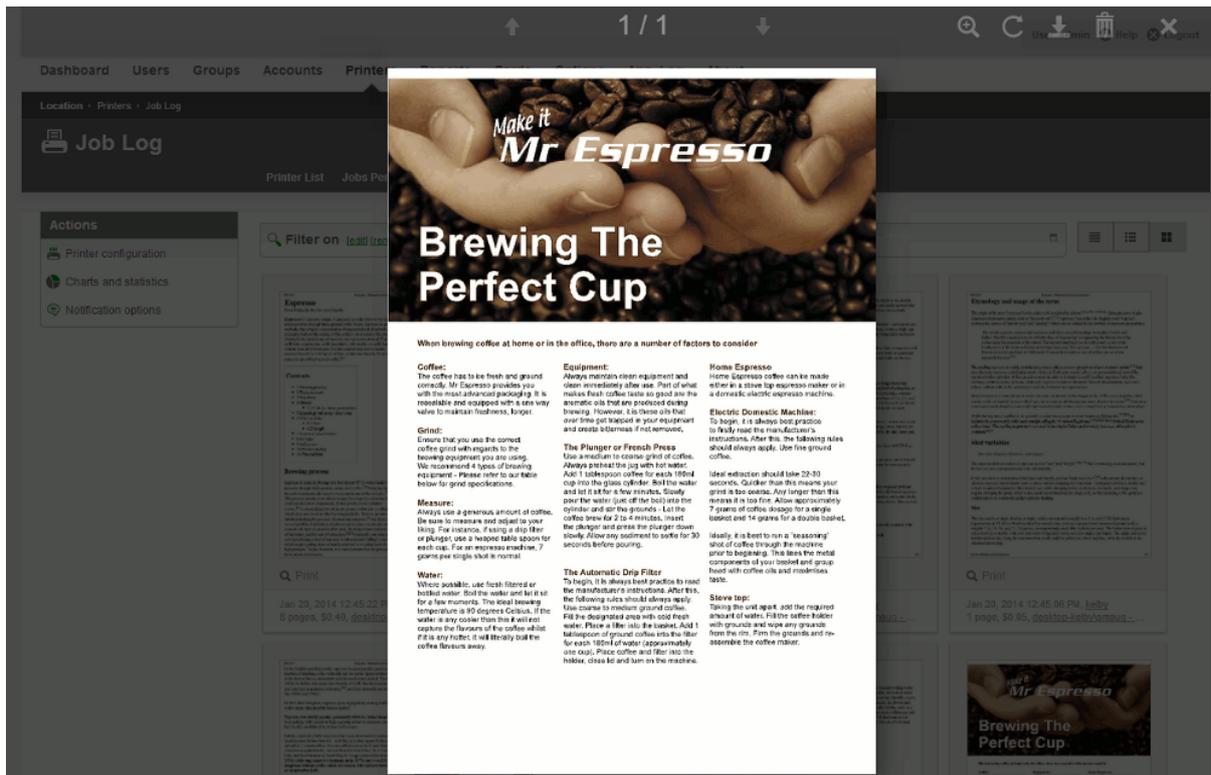


**Note:**

Print archiving is not available on direct print queues. To offer this service to your users, set up a server queue for this device/printer.

Print Archiving is a very visual feature and is best explained with a few screen shots.





Print Archiving, including the ability to view previous print jobs, gives administrators a new set of tools to improve print management. Common uses include:

### Information Security, data retention and audit policies

Many corporations now have defined data management objectives and specific policies around the tracking of data in emails, using thumb drives, cloud storage services, etc. This allows organizations to:

- Comply with externally mandated and legal requirements such as Sarbanes-Oxley and best practice audit procedures.
- Support an organization's needs to protect its customers' and own intellectual property.
- Monitor inappropriate material and potential illegal activity.
- Ensure business resources are being used appropriately and not being wasted.

Print Archiving now allows organizations to extend these security policies to the printer fleet and closes a potentially big loophole in governance processes.

### Fleet Optimization

Inspecting a sample of print jobs held by Print Archiving can help with key resource decision making questions. Is the inkjet photo printer being used for photos? Or should it be replaced with a more appropriate device for color text document output, such as, a laser printer?

### Validating user refund requests

In education environments, it is common for refund requests to be submitted via PaperCut. The ability for administration staff to review the job via Print Archiving can greatly assist in this scenario. See [Managing Refunds](#) for more on this feature.

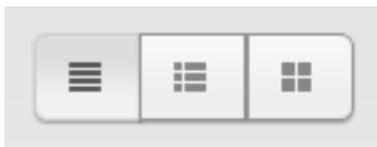
**Caution:** In the same way that email and server administrators have privileged access to a user's email and documents, a PaperCut administrator can access the user's print job content. Treat a System Administrator's privilege to view archived print jobs with the same professional caution as similar access privileges to a user's private data. PaperCut has granular control on administrative rights so this can be managed. For more information, see [Assigning Administrator Access to a User](#).

### Feature Highlights:

- Store an historic record of all printed content, limited only by available storage space.
- View past print jobs interactively in the browser.
- Control which administrators have access to view or remove archived content.
- Download the original spool file for 100% fidelity when reprinting.
- Remove archived data from the system and disk.
- Move older archives to external storage, such as offline backup or offsite cloud repository, for long term data retention.
- Enable or disable archiving on selected printers and users.

When Print Archiving is enabled new options are available for viewing print logs (e.g. the global job log at **Logs > Job Log**, or the per-printer or per-user job logs).

- **Details view:**

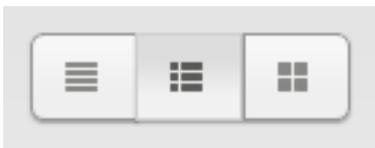


This is the traditional text-only job log view and is best for finding and browsing by non-visual job log information.

 **Show Filter** (filter active: [remove](#))

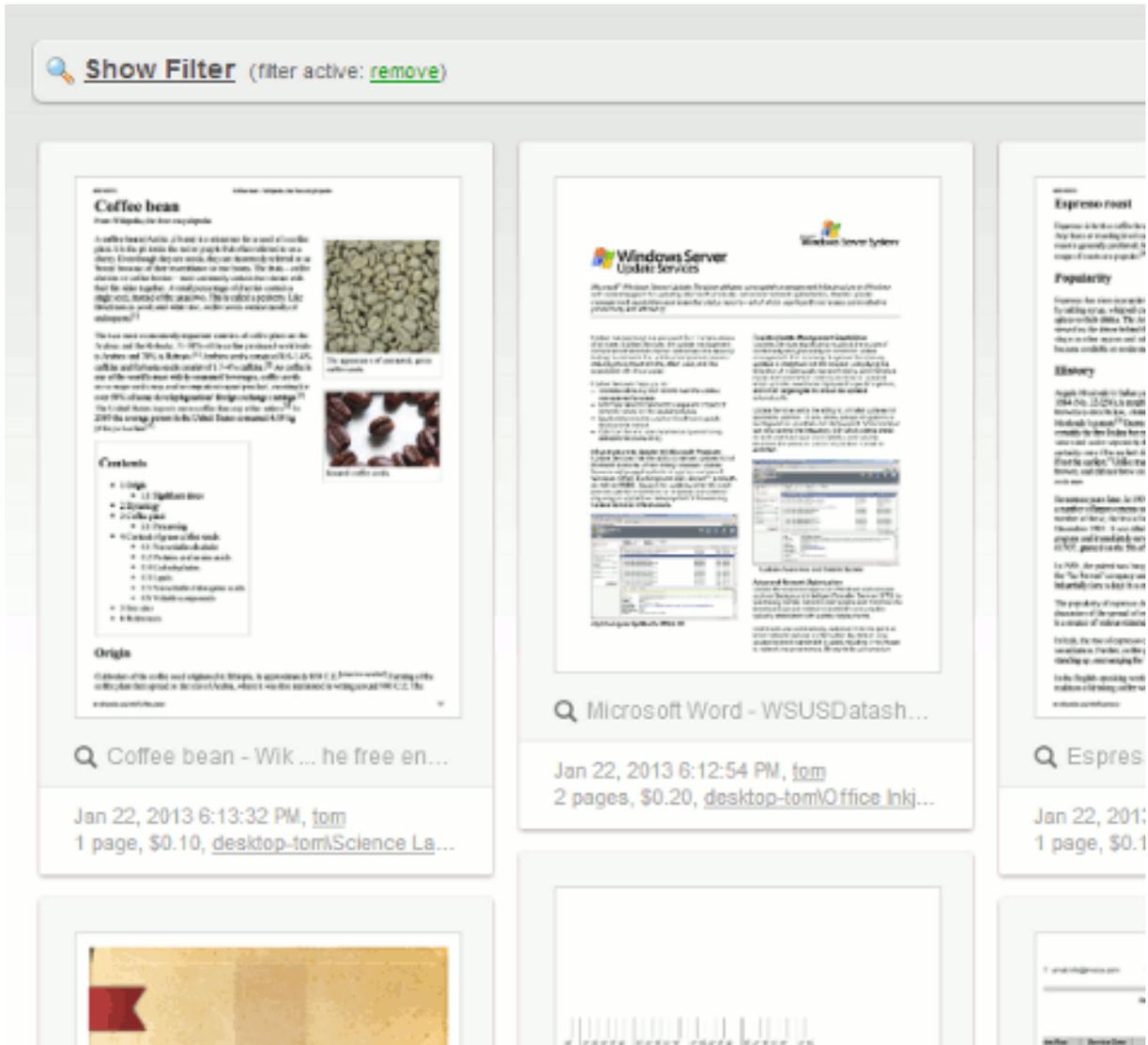
Date ▼	User	Charged To	Printer	Pages	Cost	Document Name
Jan 22, 2013 6:13:32 PM	<a href="#">tom</a>	<a href="#">tom</a>	<a href="#">desktop-tom/Science Lab</a>	1	\$0.10	Coffee bean - Wik ... he free
Jan 22, 2013 6:12:54 PM	<a href="#">tom</a>	<a href="#">tom</a>	<a href="#">desktop-tom/Office Inkjet</a>	2	\$0.20	Microsoft Word - WSUSData
Jan 22, 2013 6:11:41 PM	<a href="#">tom</a>	<a href="#">tom</a>	<a href="#">desktop-tom/Science Lab</a>	1	\$0.10	Espresso - Wkipe ... he free

- **Hybrid view (thumbnails + details):**



The hybrid view is the most flexible view option. It adds a thumbnail column to the details view. This allows for easy filtering and sorting of the print logs table while also being able to view print logs visually.





## 4.16.1. Technical Overview: How does archiving work?

The Print Archiving system has three processes:

### Process 1: The job archiving process

1. A user prints a job from a network device (desktop workstation, mobile, etc.).
2. The job is sent to the print server.
3. On the server, the job is intercepted and the job's spool file is copied into the archive. This is usually a file containing the print data in a Page Description Language (PDL) such as PostScript, PCL, EMF or XPS. The copy process is carried out while spooling takes place, with minimal impact on printing performance.

4. If the spool file is in a PDL format known to the system, images of the printed pages are created.

### Process 2: Archive access and preview process

1. The administrator logs into the PaperCut admin interface.
2. In the print log, the archived jobs are displayed as thumbnails or icons.
3. If the job is in a supported PDL format, clicking the thumbnail brings up a viewer. From there you can page through and view the document.
4. As the administrator pages through a document, further images are generated as required.

### Process 3: The overnight management process

At the set system maintenance time overnight, the archive is inspected for any content older than the **Keep jobs for up to: X days** option set by the administrator. Any content that matches is permanently removed from the archive.

## 4.16.2. Setting Up Print Archiving

Print Archiving is an optional feature disabled by default. Before enabling the System Administrator should consider:

- Disk space implications.
- Privacy and data access.
- CPU load - particularly on low resourced Virtual Machines.
- The additional load on backup storage.

### 4.16.2.1. Step 1: Install print spool file viewer technology

To get the full benefit of Print Archiving, install additional software that assists with the conversion of selected printer language files, such as PostScript, into images. Install this software on the primary PaperCut server. PaperCut detects the software and automatically starts using it.

The recommended software:

## Windows servers

Install *Ghost Trap* - a security-hardened PostScript and PDF-to-image converter.

**Download:**

**DOWNLOAD**  
Ghost Trap

*Ghost Trap* is a security hardened version of Ghostscript.

It's open source software supported by PaperCut Software.

It brings best-of-breed security to the popular PostScript and PDF conversion software by utilizing the same sandbox security technology used by the Google Chrome Browser. You can read more about this project here: [The Ghost Trap Project Page](#).



**Note:** *Ghost Trap* is strongly recommended. An alternate option is to install the following components: [Ghostscript](#), [GhostPCL](#), and [GhostXPS](#) (v9.07).

## Mac servers

Install the PostScript viewing software Ghostscript version 9.06. Richard Koch from the University of Oregon maintains a Mac version of Ghostscript. Download this [here](#).



**Note:** If you're using the [Homebrew](#) package manager, there is a `ghostscript` package available for install.

## Linux and Novell OES servers

All major Linux distributions either come with Ghostscript automatically installed, or an option to install via the standard package manager. See your distribution's documentation for further details. You should ensure that the `gs` command is on the `PATH` (for the `papercut` user).

Ghostscript version 9.07 is recommended. We also recommend installing, [GhostPCL](#) and [GhostXPS](#).

### 4.16.2.2. Step 2: Enable Print Archiving

1. Log in as `admin`.
2. Navigate to the **Options** tab.
3. Enable the **Print Archiving** option.
4. Click **Apply** at the bottom of the page.

Once enabled you should perform some testing across your printer fleet.

### 4.16.2.3. Step 3: Review Configuration Options

System Administrators should first familiarize themselves with the archive disk management options. These are found under **Options > General > Print Archiving**

<p><b>Print Archiving</b></p> <p>Print Archiving allows administrators to preview and later retrieve print job content. Jobs are archived for a period of time. Archiving can be useful for auditing, security, validating refund requests and print fleet decision support.</p> <p>Note: Once enabled, archiving may be disabled at the printer or user level.</p> <p><a href="#">More Information...</a></p>	<p><input checked="" type="checkbox"/> Enable Print Archiving</p> <p><b>Status</b></p> <div style="border: 1px solid #ccc; padding: 5px;"> <p>Enabled on: 158 printers</p> <p>Viewing supported for: EMF, PCL5, PCL6, PDF, PostScript, XPS</p> <p>Free space: 2642.5 GB</p> <p>Archive path: \\archive-storage\archive</p> </div> <p style="text-align: right;"><a href="#">Refresh</a></p> <p><b>Size management</b></p> <p>Keep jobs for up to:</p> <p><input type="text" value="30"/> days</p> <p>Stop if free space falls below:</p> <p><input type="text" value="2000"/> MB</p>
--	--

The important options are:

### Keep jobs for up to: X days

This option determines the number of days a job is kept in the archive. The default value is 30 days, with a minimum value of 1. If you are planning on setting a high value make sure you consider consumption of drive storage. It is advisable to monitor disk space growth during the first full week of usage and use this as a basis to extrapolate your storage requirements. For reference the default archive path is `[app-path]/server/data/archive` on the primary PaperCut server.



**Note:** Any change to the *Keep up to: X days* option is applied when archive maintenance is performed overnight.

### Stop if free space falls below:

This is an emergency stop option. If free disk space falls below the set value all archiving is immediately suspended. This ensures a growing archive will not take down a production server. The default value is 2GB. If the server runs other production software, you might want to increase this value. If email notifications are configured (see [Configuring Email Notifications](#)), administrators also automatically receive an error email alert when disk space drops to this limit.



**Tip:** It is recommended that you proactively monitor disk space usage as a matter of course during your regular service maintenance and assessment procedures.

### Turning off archiving on selected printers, users or groups:

Once enabled, Print Archiving occurs on all queues for all users. You can, however, selectively disable archiving. Examples include:

- Tuning off archiving on selected users, such as human resources managers who routinely print sensitive information.
- Turning off archiving on printers that don't support interactive viewing - for example, a printer

that only supports GDI drivers. Without imaging support, archiving is of reduced benefit as the only option to review the document is to reprint it.

To disable archiving on a specific printer:

1. As an administrator, log in and select the **Printers** tab.
2. Select the printer you want to disable.
3. Deselect **Enable Print Archiving**.
4. Click **OK**.

To disable archiving for a specific user:

1. As an administrator, log in and select the **Userstab**.
2. Select the user you want to disable archiving for.
3. Enable **Override printer-level settings**.
4. Enable **Don't archive this user's jobs**.
5. Click **OK**.

To disable archiving on a group of users:

1. As an administrator, log in and select the **Groups** tab.
2. Select **Bulk user actions** from the Actions menu.
3. Select the group to perform the change on
4. Enable **Change advanced user settings**.
5. Enable **Override printer-level settings**.
6. Enable **Don't archive this user's jobs**.
7. Click **OK**.

## 4.16.3. Advanced Archiving Options and Features

### 4.16.3.1. Changing the archive storage directory

The default archive storage location is `[app-path]/server/data/archive`. Reasons for changing this location include:

- Allowing Site Servers and secondary print servers to archive to a common location.
- Storage restrictions on the drive where PaperCut is installed.
- You want to exclude the archive from your backups.



**Note:** For performance and security reasons using a local disk on the primary server as the storage location is recommended. If a remote network location such as a SAN device is intended to be used, we'd recommend a low-level drive mount such as iSCSI or better if possible. The server must have a reliable connection to the storage. On a Windows server, if the desired location is accessible only via a UNC path, some additional security configuration is required. By default the `PaperCut Application Server` and the `PaperCut Print Provider` services run under the `SYSTEM` account. This account is restricted and does not have remote network drive access. Change the `Log On` account assigned *both* services to one that has full read/write access to the remote location. The change should only be considered and performed by an experienced Windows server administrator.

## Phase 1: Moving the central archive:



**Important:** If you have existing archived spool files you want to move to the new location, it is recommended to perform this process at a period of low printing activity.

To change the location:

1. Create the new directory in the desired location, e.g. `D:\print-archive`. (If the PaperCut Application Server is running in a cluster this directory must be accessible by all cluster nodes. See [Clustering and High Availability](#).)
2. Ensure the `PaperCut Application Server` service has read and write access.
3. Log in to the PaperCut admin interface.
4. Navigate to **Options > Actions > Config Editor (Advanced)** .
5. Search for the key `archiving.path`.
6. Enter the new path (e.g. `D:\print-archive`).
7. Click **Update** to the right of the value.
8. Navigate to the **Options** page and verify the Archive status.
9. A `README.txt` file is now in the top level of the location.
10. Consider copying any existing archived content from the previous archive location. If

existing content is not copied, job previews are no longer be displayed for historical print jobs.

## Phase 2: Changing Print Provider Configuration:

The Print Provider component needs to know the new location. To set this location:

1. Open Notepad (or your preferred text editor) with Administrator rights.
2. Open the file located at `[app-path]/providers/print/win/print-provider.conf`.
3. Locate the line:

```
ArchiveDir=
```

and change the value to point to the new location set up in Phase 1. For example:

```
ArchiveDir=D:\print-archive
```

Note: if you have upgraded from an older version you might need to add the `ArchiveDir=` option to the `print-provider.conf`.

4. Save the file.
5. Restart the Print Provider service.
6. Note: If you have multiple print servers, repeat this on any other secondary print server or Site Server, as outlined in [Setting up secondary print servers or Site Servers](#).

### 4.16.3.2. Backup Considerations

The print archive can potentially grow to a large size and this can have implications for your backup planning. You have various options around archive backup:

- You can fully backup the directory using your backup solution of choice, provided you have sufficient capacity.
- You can choose to not backup the directory at all. PaperCut is resilient to a restoration with an empty archive directory.
- You can back up part of the directory. For example, the current month only. PaperCut is resilient to a restoration with a partially constructed archive directory. There is a `README.txt` in the archive directory that explains more about partial backups and the directory structure layout.

### 4.16.3.3. Setting up secondary print servers or Site Servers

## Introduction

The setup described previously was for the common case where the PaperCut application is installed on a single server. The secondary print server (or a Site Server's print server), as explained in [Configuring Secondary Print Servers and Locally Attached Printers](#), is responsible for managing the contents of the print jobs printed via a server other than the primary server. If Print Archiving is enabled, the secondary server must also participate and facilitate archiving.

In larger print environments it is common to have multiple PaperCut secondary servers located on various machines across the network. In this case Print Archiving can still be used, however, this is an advanced setup procedure and requires additional planning and implementation time.

To support the central tracking and viewing of print archives, transfer all spool files across to the primary Application Server's central archive directory. Each secondary server needs to be correctly configured with write access to this central archive directory. This requires running the `PaperCut Print Provider` service under an account with write access to this directory.

One consequence of this approach, designed to simplify the management of archives, is that it increases bandwidth requirements because all print archives are transferred across the network to the Application Server. The impact of this depends on your specific environment, e.g. number of print jobs, network setup, PDL used, etc. As such you might need to monitor and experiment before a large scale deployment of this feature.

## The Setup process

The process to set up a secondary server under Print Archiving involves four key phases. Before undertaking this process you should ensure that the secondary print server or Site Server is operating correctly for standard print tracking. The following section documents configuring secondary servers on the Windows operating system.

### Phase 1: Creating domain service account

By default the `PaperCut Print Provider` service running on the secondary server(s) operates under a limited rights account called SYSTEM. This account does not have access to network resources and, therefore, can't access the file system on the primary PaperCut server. Create a new service account and set the service to Log On as this account:

1. Create a new domain account with access to the share on the primary server and full management rights of print spooler on the local machine. An appropriate name might be `svc-papercut`.
2. Set the new account's password to never expire.

## Phase 2: Sharing the central archive directory

The secondary server needs the ability to copy print jobs into the central archive. You must first share the central archive folder. On Windows, assuming the archive directory is the default, the procedure would be:

1. Open Explorer and navigate to `[app-path]/server/data/`.
2. Right-click the `archive` directory and select **Properties > Sharing**.
3. Share the directory with a name `print-archive`.
4. Ensure the service account created in Phase 1 has full read/write access.
5. Ensure all other non-Administrator users do not have any access.
6. Click **OK**.

## Phase 3: Change the configured archive path on the secondary server

The secondary server needs to know the location of the recently shared central archive directory. To set this location:

1. Log on to the secondary print server or Site Server as an administrator.
2. Open Notepad (or your preferred text editor) with Administrator rights.
3. Open the file located at `[app-path]/providers/print/win/print-provider.conf`.
4. Locate the line:

```
ArchiveDir=
```

and change the value to point to the UNC share name set up in Phase 2. For example:

```
ArchiveDir=\\my-primary-server\print-archive
```

**Note:**

If you have upgraded from a previous version, add the `ArchiveDir=` option to the `print-provider.conf`.

5. Save the file.

## Phase 4: Assigning rights to the service account

The `PaperCut Print Provider` service (service responsible for monitoring the print queues and transferring print job spool files to the central archive) needs to be able to access the directory shared in Phase 3. Assign the service account set up in Phase 1 to the `PaperCut Print Provider` service as follows:

1. Open **Control Panel > Administrative Tools > Services**
2. Double-click the `PaperCut Print Provider` service.
3. Select the **Log On** tab.
4. Click **This account**.
5. Enter the username and password for the service account set up in Phase 1.
6. Click **OK**.
7. Restart the service and manually check the file `[app-path]/providers/print/print-provider.log` for any error messages at end.

## Phase 5: Test

Take some time now to perform some testing and ensure any jobs printed on a print queue on this secondary server are correctly archived.



**Important:** Archived files are partitioned based on the date and time of the print job. In order for the print archives to be displayed in a consistent manner it is important that all secondary print servers and Site Servers share a common time synchronization. An inconsistent time between servers of more than one hour can cause an error.

## Troubleshooting secondary server setup

Here is a list of common issues leading to problems with Print Archiving and secondary server setups:

- **Incorrect paths:** It's important that all secondary servers are configured to point to the shared central archive directory. Double-check the value entered in `ArchiveDir`. See [Phase 2: Changing Print Provider Configuration](#).
- **System Services can't access user mapped drives.** On Windows it's important that you use a UNC path rather than a mapped drive letter.
- **Ensure that all secondary servers have full write access to the central archive.** Take time to double-check permissions.

### 4.16.3.4. Advanced Configuration Keys

The following configuration keys are accessed via **Options > Actions > Config editor (advanced)** and influence the behavior of Print Archiving.

**Table 88: Print Archiving Advanced Config Keys**

Key	Description
<code>archiving.images.creator.non-interactive.max-concurrent</code>	This value determines the maximum number of image creator processes used to process new print jobs in the background. The system can use this maximum number when it is under high load. The default value is 1. Sites running on fast multiprocessor servers might choose to increase this number. As a guide, this value should not exceed the number of available processor cores. NOTE: The Application Server must be restarted after changing this setting.
<code>archiving.images.creator.interactive.max-concurrent</code>	This value determines the maximum number of image creator processes that can be used to support interactive viewing of print jobs in the admin interface. The default value is 2. Sites running on fast multiprocessor servers might increase this number. NOTE: The Application Server must be restarted after changing this setting.
<code>archiving.images.creator.pages-to-initially-image</code>	This value determines the number of pages that are imaged (pre-rendered) when a print job first arrives. Pre-generation of images speeds up viewing. The default value is 4.
<code>archiving.images.viewer.max-pages</code>	The maximum pages into a document that can be explored.

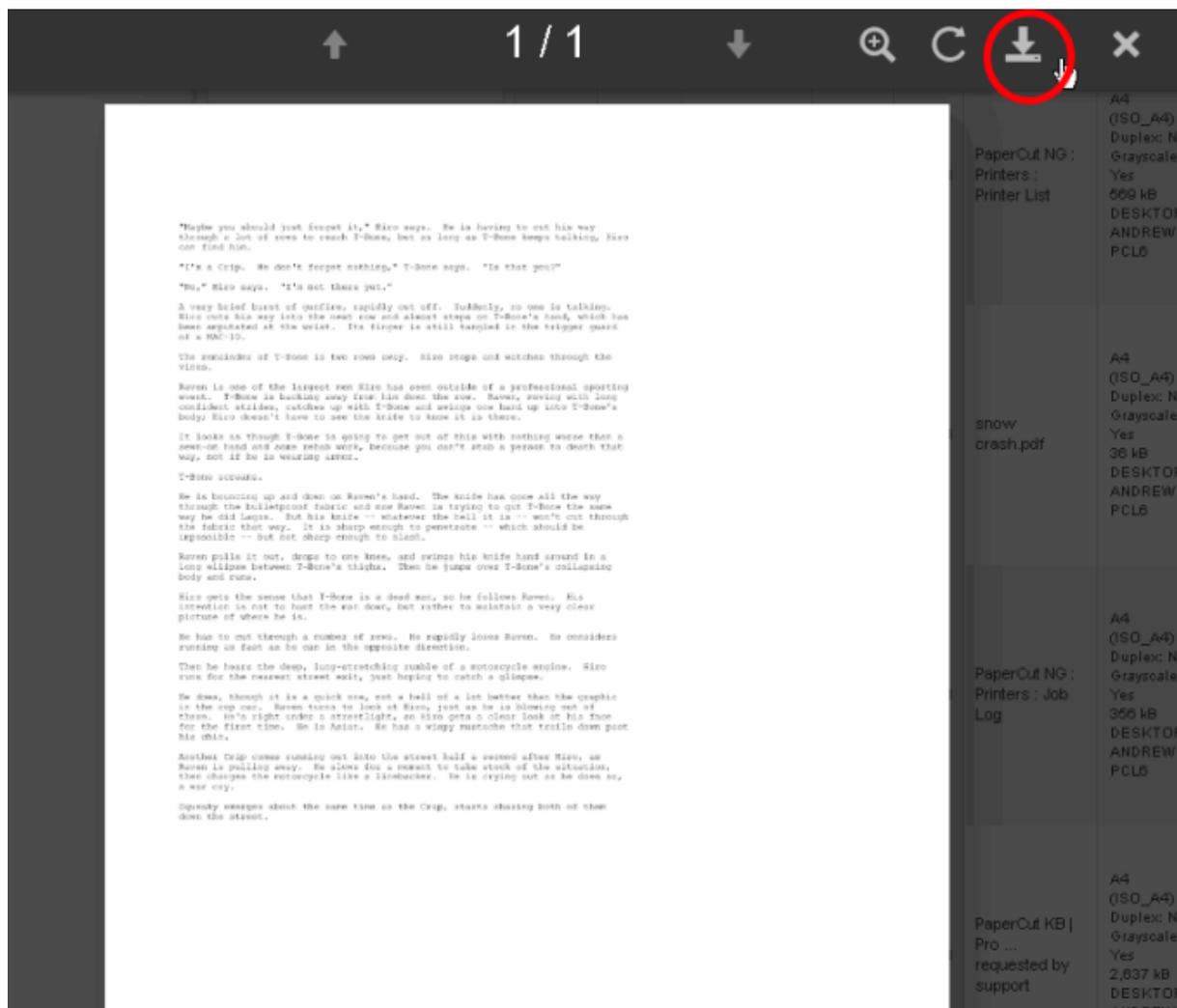
### 4.16.3.5. Downloading PDL / spool files for reprinting

Along with image previews, Print Archiving stores a copy of the print job's PDL / spool file. This can be downloaded and reprinted later. Common reasons for reprinting a job include:

- To produce another hard copy of the print job (e.g. if the original was lost).
- To view, when image previews are not available (such as when the printer is using a proprietary / GDI print language).
- To help diagnose or reproduce printing problems.

To download a job's PDL / spool file:

1. Find the job of interest in the job log
2. Click the job's thumbnail to open the job viewer (full page view)
3. Click the download icon in the toolbar at the top left (see below)
4. Save the PDL file to your computer



For information about how to print a PDL file once it is downloaded, see [Troubleshooting & Technical FAQ's](#).

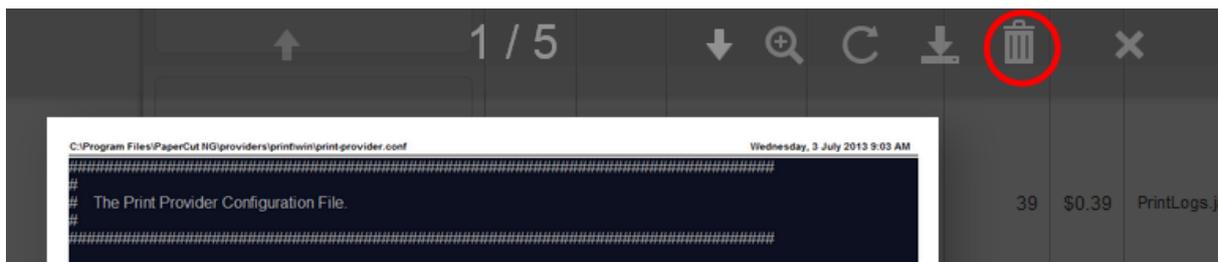
### 4.16.3.6. Remove archived data

You can permanently remove archived data by clicking the remove icon or pressing the **delete** key in the archive viewer.

Removal is available when the user has the administrator right "remove archived jobs" assigned.

To remove archived data:

1. Find the job of interest in the job log
2. Click the job's thumbnail to open the job viewer (full page view).
3. Click the delete icon in the toolbar at the top left (see below) or press the **delete** key.
4. Confirm deletion.



## 4.16.4. Troubleshooting and Known Limitations

### 4.16.4.1. No preview image available

In some cases print jobs do not have a preview image available. This can be for two possible reasons:

1. **Archiving was disabled**



Disable/override archiving in the following ways:

- Printer-level override (disable archiving for a printer)
- User-level override (disable archiving for a user)
- Print scripting (archiving disabled per-job from within a script)

## 2. A preview could not be produced for the archived job



There are several reasons why image previews could not be produced:

- The print driver is using a proprietary or GDI / unsupported print language (see [GDI Printers \(GDI Print Description Language\)](#))
- The print driver might be using vendor-specific language extensions (see [There can be issues viewing some print jobs](#)).
- A component to convert the PDL / spool file into images is missing (see [Step 1: Install print spool file viewer technology](#)).
- The archived PDL / spool file is corrupt or partially copied.
- The conversion software (e.g. Ghostscript) does not produce a preview (e.g. for a complicated document).

In this case, the PDL / spool file for the job can still be downloaded for reprinting (see [Downloading PDL / spool files for reprinting](#)).

### 4.16.4.2. GDI Printers (GDI Print Description Language)

GDI printers produce spool files that are proprietary binary format files and currently there is no standard technology or tools to allow the visual display of printed content, however, you can reprint GDI print jobs by downloading the spool file (see [Downloading PDL / spool files for reprinting](#)). PaperCut Software hopes to approach printer vendors in the future to address this limitation.

### 4.16.4.3. There can be issues viewing some print jobs

Because of its flexibility some PostScript drivers can create spool files that cannot be rendered with the standard viewer. If you find a consistent issue with a particular printer, first see if there is an alternate driver format available (i.e.. another PDL language). If the issue persists after trying

other drivers, please contact PaperCut support. We might be able to address the issue in a future release.

#### **4.16.4.4. Preview images can differ slightly from the printed document**

Depending on the print driver used, certain attributes of preview images generated might differ slightly from those of the actual document (e.g. in some cases a color print-job can have a black-and-white preview image). This is also the case when using [Print filters: conversions and restrictions](#).

#### **4.16.4.5. No watermarking in preview images**

Document watermarks applied by PaperCut's watermarking feature do not display in preview images.

#### **4.16.4.6. Latest Information**

New printers and print drivers are being released every week. For the most up to date information as well as a detailed explanation of known issues, see this article in the PaperCut Software knowledge base: [Known Issues with Print Archiving](#)





# 5 Administration

## 5.1. System Management

This section discusses various options and features to assist the administrator manage and configure the application. PaperCut MF is designed to work with minimal initial configuration and is self-maintaining once set up. This section outlines some of the options available to the administrator, including:

- Monitoring the system activity and status of devices and users.
- Configuring the synchronization of users and groups
- Managing backups
- Configuring user notifications
- Exporting/import the data
- Defining security options
- Disabling features in the user web interface
- Display options (like whether to display the currency sign).

### 5.1.1. The Dashboard

The Dashboard tab is the first page displayed in the PaperCut MF administration interface. It provides an overview of system activity from the past and in real-time for devices and users. It does this by using a collection of gadgets that are described below.

The screenshot displays the PaperCut MF Dashboard with the following sections:

- Navigation:** Dashboard, Users, Groups, Accounts, Printers, Reports, Cards, Options, App. Log, About.
- Location:** Location > Dashboard > Dashboard
- Dashboard Header:** Dashboard
- What's Next?**
  - Add some groups:** User groups can be used to manage initial balances and settings, quotas, access rights and more. [Go to the Groups tab](#)
  - Configure printer costs:** Charge more for your expensive-to-run printers and less for your cheaper ones. Provide discounts for duplex and grayscale printing. [Go to the Printers tab](#)
- System Status:**
  - System uptime: 26m 47s
  - Users: 14
  - Printers: 41
  - Recent errors: 118
  - Recent warnings: 0
  - Total pages: 1,730
  - Pending refunds: 0
  - Pages today: 1,655
  - Hold/release jobs: 0
  - Active user clients: 1
  - Total Google Cloud Print jobs: 3
  - Total email printing enabled printers: 2
- Pages Printed (per day, last 30 days):** A line graph showing daily page counts from 2013-12-22 to 2014-01-20. The y-axis ranges from 0 to 5328.
- Printer Status:**

Printer Name	Status
server1Archaeology Library 1	Low toner (0%)
server1Archaeology Print Room 3	Low toner (18%)
server1Architecture Lab 1	Low toner (0%)
server1Architecture Lab 2	Low toner (24%)
server1Architecture Office 1	Low toner (14%)
server1Architecture Office 5	Low toner (0%)
server1Architecture Staff Room 1	Low toner (27%)
server1Architecture Lab 2	In Error
- Environmental Impact:**
  - 1.8% of a tree
  - 6.5 kg of CO<sub>2</sub>
  - 410.0 hours running a 60W bulb
  - Since Jan 15, 2014
- News:**
  - [PaperCut 13.5 Released](#)
  - November 27 New integration with Google Cloud Print plus many more features.
  - [Using sysadmin skills for good](#)
  - July 11 Josh uses his sys admin skills to successfully track a felon.
  - [Making Technology Simple](#)
  - March 27 I've heard it said that great technology is a simple solution to a complex problem.
- Real-time Activity:**

Timestamp	Activity
Jan 3, 2014 10:55:27 AM	Queueing a job printed by "andrea" on "linux-server1njet" (8)
Jan 3, 2014 10:55:27 AM	Cancelled a job printed by user "claire" on "mac-
Jan 3, 2014 10:55:27 AM	Queueing a job printed by "bill" on "mac-serverLibrary Printer"
Jan 3, 2014 10:55:27 AM	A printer script cancelled a job by "kelly" on printer "mac-
Jan 3, 2014 10:55:27 AM	A printer script cancelled a job by "kelly" on printer "linux-
Jan 3, 2014 10:55:27 AM	Queueing a job printed by "luke" on "windows-serverLibrary
Jan 3, 2014 10:55:27 AM	A printer script cancelled a job by "sam" on printer "linux-

- **What's Next gadget**

At the top of the page is the What's Next gadget. It gives a list of hints that are particularly useful for first-time administrators of PaperCut MF. They give descriptions of useful tasks to do in PaperCut MF with links to other administrator interface or help pages. This gadget can be closed for more experienced administrators who no longer need it.

- **System Status gadget**

The System Status gadget provides a list of system level statistics. They provide an overview of system information including any warnings or errors that need attention.

- *Pages Printed gadget*

The Pages Printed gadget provides a graph showing the trends in printing volume over the last 30 days. The graph displays after three days of data has been accumulated. When upgrading from a version of PaperCut MF prior to a version supporting the Dashboard feature, the data from the previous version is not displayed.

- *Environmental Impact gadget*

The Environmental Impact gadget provides overall environmental impact statistics in terms of trees, carbon and energy. For more information on Environmental Impact, see [Environmental Impact](#).

- *Printer Status gadget*

The Printer Status gadget provides a status overview of the printers managed by PaperCut. The information displayed includes the daily number of pages printed and device alerts such as low toner levels or printer jams. Alerts for printer errors and low toner levels are also available via System Notifications. Refer to [System Notifications and Emailing](#) for additional information.

- *News gadget*

The News gadget ensures you're kept up to date with relevant release and development activity regarding PaperCut.

- *Real-time Activity gadget*

The Real-time Activity gadget shows a list of current events in real-time. It shows activities such as print jobs arriving, users logging in, exceeding print quotas, print job status, a variety of errors and much more. This tool is designed to help administrators monitor activity and diagnose problems. The events are updated as they occur and errors are highlighted in red. The events are described in a one line summary, but can be expanded by clicking the link to the right of the message. Expand the gadget by clicking the **Expand** item at the bottom of the gadget to display more events. Refreshing the browser page reverses the expansion. Use the Pause item at the bottom of the gadget if the number of events being reported makes viewing difficult.



**Tip:** The Real-time Activity gadget alerts you if the PaperCut Account Selection has been configured to use the client software, and the client software is not running on the workstation. For example, if a user has popup confirmation enabled, (see [The Account Selection Popup](#)) and the client software is not running, the job stays paused and eventually time out. In this situation, as soon as the user prints a document the administrator is warned in the Real-time Activity gadget that the client software is not running for that user.

## 5.1.2. User and Group Synchronization

One of the most important parts of managing PaperCut is to configure the User and Group synchronization options. PaperCut synchronizes user and group information from a source such as Windows Active Directory (Windows domains). This simplifies the administration of the system because you do not need to manage a separate database of users and groups. If a user is added to the domain or is removed from a group then PaperCut automatically synchronizes this information without any intervention from the administrator. For example:

- Jason configures PaperCut to assign an initial credit of \$10 to users who are members of the "Students" windows security group.
- At the start of the new school year Jason has just added 100 new students to the Windows Active Directory.
- Jason also adds all the users to the "Students" Windows security group.
- When PaperCut next synchronizes with Active Directory, the 100 new users are added to PaperCut and automatically assigned the \$10 initial credit. This is done automatically without any additional work by Jason.

Synchronization settings are configured via the **Options > User/Group Sync** tab.

### 5.1.2.1. Sync Source

The settings in the **Sync Source** section defines where PaperCut imports users and groups from.

The screenshot shows the 'User/Group Sync' configuration page in PaperCut MF. The 'Sync Source' section is active, showing the following settings:

- Primary sync source:** Windows Active Directory (selected in a dropdown menu)
- Import disabled users
- Enable multi-domain support (Advanced)
- Import all users
- Import users from selected groups (Selected groups: Staff, Students)
- 
- Update the users' unique card/identity number from the AD/LDAP field
- Field: pager
- (An Active Directory LDAP attribute name. The default is 'pager', importing from the pager number field. [More information...](#))

The drop-down list under **Primary sync source** selects the type of directory server to be used. Options include **Windows Active Directory**, **LDAP** (Apple OpenDirectory, Novell eDirectory, OpenLDAP, etc.), **Windows Standard** (local users and groups for workgroup environments), **Samba** and **Unix Standard** (local users and groups / NIS / POSIX).

The **Import a subset of users** option allows users to be imported from a list of selected groups in the domain, rather than importing all the users in the domain. This is useful if the domain contains old users or users who do not print.



**Tip:** If you are using Active Directory and have a long list of groups, you can set the config key `user-source.ad.group-ou-filter` to only display groups under a certain organizational unit. For example, if you set it to "myorganization.local/Import OU/Sub Import OU" then it displays only groups under "Sub Import OU".

If the PaperCut server is a member of an Active Directory domain, you should use this option. The advantages over the "Windows Standard" include:

- Allows using Active Directory organizational units.
- Supports nested groups for simplified user management.
- Allows importing of users from other trusted Active Directory domains.



**Tip:** By default, PaperCut MF automatically syncs user and group information with your directory each night. However, you can perform additional full user/group syncs by scheduling a script to run the appropriate `server-command` command. For more information on using the `server-command`, see [Tools - database, server-command scripting, and APIs \(Advanced\)](#).

### 5.1.2.2. Sync Options

The options listed in the **Sync Options** section control how the synchronization will take place.

- **Update users' full-name, email, department and office when synchronizing** - if a user's details in PaperCut do not match those in the synchronization source, they are updated.
- **Import new users and update details overnight** - when selected, synchronization is automated to occur each night at approximately 12:55am. This option never deletes users from PaperCut.
- **Delete users that do not exist in the selected source** - deletes users from PaperCut if they no longer exist in the selected synchronization source.

This option applies only to manual synchronization (clicking **Synchronize Now**) and does not delete users when automatically synchronizing overnight. Enabling this option also applies only once (i.e. the option must be clicked before a manual sync each time when users are to be deleted).

This option affects only users added via the synchronization source (e.g. the domain) and does *not* delete [Printing solutions for guests and anonymous users](#).

### 5.1.2.3. Secondary Sync Source (Advanced)

Enabling a secondary sync source allows PaperCut to merge the results from two independent sources. Examples for where this is useful include:

- A school with an Active Directory domain for the majority of users and a separate LDAP server that is used and managed by one department.
- An organization with a "new" LDAP server and an old "legacy" LDAP server with separate but unique users who have not been migrated to the new server.
- A university with an Active Directory for the Windows student workstations and an Open Directory for the staff Mac workstations.

When enabled, PaperCut queries both sources to find users and groups. Usernames are treated as globally unique, so the same username existing in both sources is treated as the same user (in this case, the details for the user are merged, with the primary sync source taking priority). If there is an error connecting to or synchronizing against either source then no actions takes place.

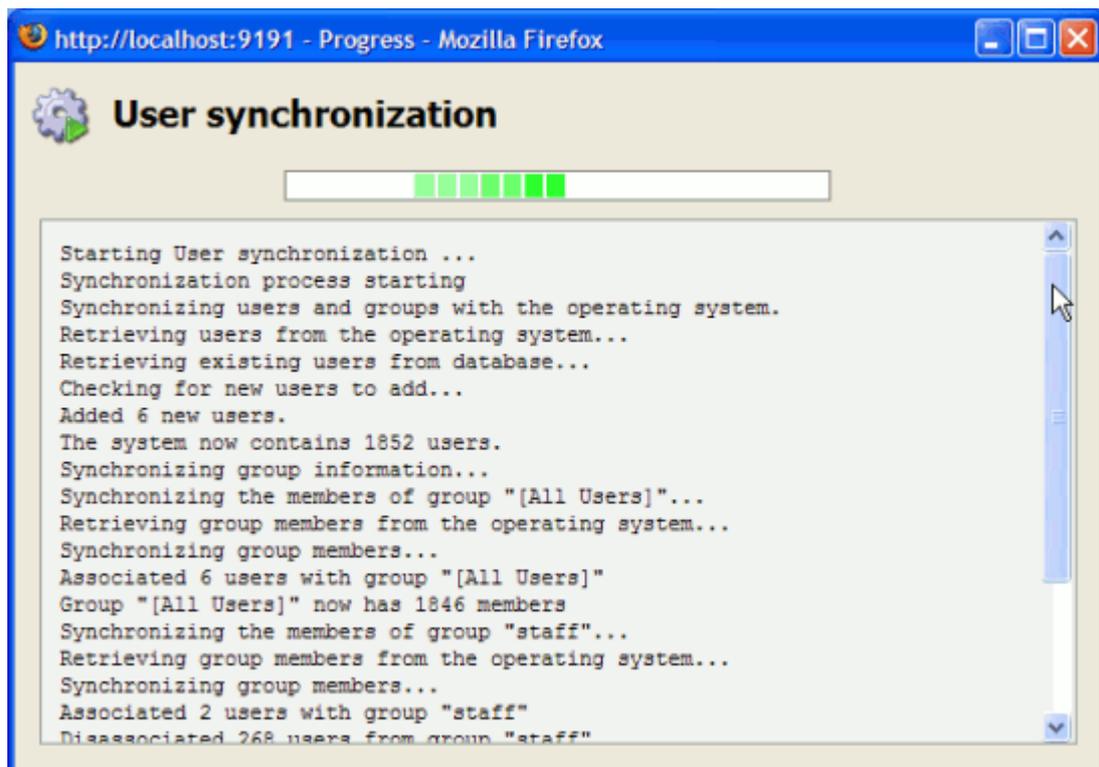
### 5.1.2.4. Manual Synchronization

By default, PaperCut MF automatically re-syncs the user and group information each night, however, the sync process can also be initiated manually. To initiate a manual sync:

1. Navigate to the **Options > User/Group sync** tab.
2. Click **Synchronize Now**.

The sync process starts and a status window is displayed showing the status of the sync

process.



### 5.1.2.5. Card/Identity Numbers Sync

Card and ID numbers are used as an alternative to usernames/passwords for authentication at software Release Stations, or at hardware terminals attached to photocopiers. The card/ID number can also be searched in the user quick-find in the **User List** page. See [User card and ID numbers](#) for more information.

In PaperCut MF, you can associate one or two unique card/ID numbers with each user. These are known as the Primary and Secondary card/ID number. You can automatically import or generate these card/ID numbers for each user.

Very commonly, card/ID numbers are already assigned by other systems, in which case it is required to import these numbers into PaperCut from Active Directory or LDAP. Unlike other fields such as full-name and email address there is no standard field used exclusively for card numbers. For this reason PaperCut allows specifying the field to import the card/ID number from.

To enable importing the primary card/ID number, first enable the **Update users' full-name, email, department and office when synchronizing** and then under **Primary number** select **Sync from AD/LDAP field**. Then enter the field name to import the card/ID number from; then click **Apply**. For more information on the field names to use, see the sections on Active Directory and LDAP below.

For your convenience, PaperCut also allows you to generate a random card/ID number for either the primary or secondary card/ID number. To auto-generate, select the option **Auto-generate random ID (if blank)** and specify the length or number of digits. Short numbers are easier to

remember and faster to key in, but it is also easier to guess someone else's number. If your number is too short, PaperCut cannot generate sufficient numbers to cover all your users.

**Important:** The card/ID number must uniquely identify a user, so you should ensure that no two users have the same card/ID number. Make sure the card/ID numbers you have defined in your user source are unique. If PaperCut MF finds a non-unique card/ID number it does not update the user's details, and displays a warning in the synchronization results. When generating card/ID numbers, you are asked to specify the length or number of digits you require in the generated numbers.

General Mobile & BYOD Notifications User/Group Sync Admin Rights Backups Advanced

---

### Sync Source

The sync source defines where users and groups are imported from.

Users are automatically imported. Groups are managed via the top-level Groups tab.

#### Primary sync source

Windows Active Directory ▼

Import disabled users

Enable multi-domain support (Advanced)

Import all users

Import users from selected groups

Select Groups

#### Card/ID number

##### Primary number

Sync from AD/LDAP field ▼

AD/LDAP field name

pager

(An Active Directory LDAP attribute name. The default is 'pager', importing from the pager number field. [More Information...](#))

##### Secondary number

Auto-generate random ID (if blank) ▼

Length

8 digits

([Email notifications](#) enabled)

(Advanced) Apply regular expression to extract primary/secondary card number from AD/LDAP

## Importing the Card/ID number from Active Directory

Active Directory has a number of user fields that can store the user's card/ID number. Some of these fields are editable in the user's properties in the **Active Directory Users and Computer** tool, but others can only be updated with other tools. By default, PaperCut MF imports the primary card/ID number from the user's pager number field (i.e. the `pager` field). This field was chosen

because it is rarely used and is also editable in the Windows user interface. If this field is not suitable, you can choose any valid Active Directory user field.

The list of standard Active Directory user fields is on the Microsoft web site here: <http://msdn2.microsoft.com/en-us/library/ms683980.aspx>. The field name entered in PaperCut MF must be in the LDAP display name format. For example, if you want to use the `Employee-Number` field, then the field name entered into PaperCut MF should be `employeeNumber` as shown on the `Employee-Number` attribute page here: <http://msdn2.microsoft.com/en-us/library/ms675662.aspx>

You can specify a secondary card number field by selecting **Sync from AD/LDAP field** under **Secondary number**.



**Important:** If you enter the field name incorrectly, the synchronization will fail. It is therefore important to test your configuration changes. To test the changes, click **Test Settings**. If the card number is retrieved correctly, then it is the 4th user field in the test output.

## Importing the Card/Identity number from LDAP

LDAP provides a very flexible way to store a variety of user related information. The fields available depend on LDAP server being used and how that is configured. Many LDAP servers also allow administrators to create custom fields to store additional custom user information. It is recommended you consult your LDAP server's documentation or talk to your LDAP administrator to understand which LDAP field your stores the user card/ID number.

By default, PaperCut MF uses the `employeeNumber` field to retrieve the primary card number. This is a standard LDAP field, but if this is not suitable, you can choose any valid LDAP user field.

You can specify a secondary card number field by selecting **Sync from AD/LDAP field** under **Secondary number**.

If using a secondary sync source, then select **Sync from AD/LDAP field** under **Secondary number** to specify the field. If defined, then the same regular expression that is applied to the first card number is applied to the second card as well.



**Important:** It is important to test the card numbers are being retrieved correctly. To test the changes, click **Test Settings**. If the card number is retrieved correctly, they are listed as the 4th user field in the test output.

## Using a regular expression to extract the card/id number from an LDAP/AD field

The vast majority of sites store the full card number in a single field in AD/LDAP. In this situation, you do not need to use a regular expression (regex) to extract the card number. A regular

expression is only required under some unusual specific circumstances, including:

1. The field contains more than just the card number. For example, if the field contained a card number and student number separated by a comma (e.g. 12345678,0003456).
2. The multi-valued LDAP/AD field contains multiple values and only one representing the card number. e.g. Some third party authentication management systems store external IDs (like card numbers) in a single multi-valued LDAP field. :



**Note:**

For multi-value fields, PaperCut imports all the field values separated by TABs by default. Use the regex to extract the required portion of the field.

To use a regular expression to extract the card/id number, enable the **Apply regular expression to extract card number** option on the **User/Group Sync** page. Then enter the regular expression used to extract the card number. The regular expression must contain a capture group (represented by parentheses), that represents the part of the field that the card number is extracted from.

The simplest way to create a regular expression is to start from one of the examples that follow.

**Table 89: Example regular expressions to extract card numbers**

Regular Expression	Description
<code>([\d]+)</code>	Extracts the first sequence of digits. e.g. if the field contains 12345678,005678 then 12345678 is extracted.
<code>([\d]{5})</code>	Extracts the first sequence of 5 digits. e.g. if the field contains 12345678 then 12345 is extracted.
<code>=([\d]+)</code>	Extracts the sequence of digits after the = character. e.g. if the field contains 12345678=56789" then 56789 is extracted.
<code>([\d]+)::abc</code>	Extracts the sequence of digits preceding the text ::abc. This is a common notation when storing identities in a multi-valued field in LDAP. The ::abc notation is used to indicate the different identity types. In this example, if the field contains 1234::xyz 5678:qrs 9876::abc then 9876 is extracted.

Regular expressions are an advanced topic. For more information on regular expressions and a test tool, see <http://www.fileformat.info/tool/regex.htm>. If you need assistance, please contact support.

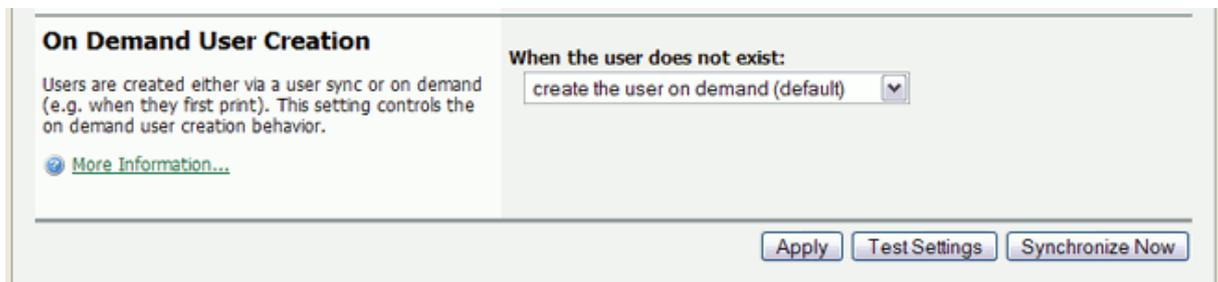
### 5.1.2.6. On Demand User Creation

The **On Demand User Creation** setting defines if and when PaperCut MF creates new users. The settings applied to newly created users are defined by their group membership (for more information see [New User Creation Rules](#)). By default, new users are created automatically when they print for the first time, authenticate via the User Client tool, or log in to the user web tools. This makes administration much easier, as there is no need for additional administration when new users come along; they can use PaperCut straight away.

In some situations it might be preferable to change the way new users are treated. For example, when just one department is being tracked, but there are other departments using the same printers, you might want to allow the other departments' users to print, but not to track them using PaperCut MF.

There are three options available for the setting **When the user does not exist**:

1. *create the user on demand (default)* - users are created when they interact with PaperCut MF for the first time. E.g. when they print for the first time.
2. *do not create the user and allow usage* - users interacting with PaperCut MF who do not already exist are not created, but their usage is allowed. The usage is not logged.
3. *do not create the user and deny usage* - users interacting with PaperCut MF who do not already exist are not created, and their usage is denied. The usage is not logged.



To change the behavior, select the desired option; then click **Apply**.

### 5.1.2.7. Using Active Directory for user synchronization

PaperCut MF's Active Directory integration is performed at a native level and supports advanced features such as nested groups and OU's. Some additional options provided with the Active Directory interface include:

- *Import disabled users* - If set, all users, including disabled accounts are imported from the domain. In an education environment it is recommended to leave this option on as often student accounts are disabled for disciplinary actions, and removing the account from PaperCut MF is not appropriate.
- *Enable multi-domain support* - This is an advanced option and is appropriate for larger sites

running multiple trusted domains. For example, in an education environment it is common to have separate domains for students and staff/teachers with a one-way trust relationship. This option can bring in groups, OU's and users from both domains.

The list of domains is semicolon separated ( ; ). This list should contain the name of the domains in DNS dot notation, and should include the name of the current domain if importing from this domain is desired.

Trust domain relationships are a complex area. Click **Test** to verify that the settings result in the desired behavior. The total number of user accounts is a good measure.

- *Import other email addresses* - import a user's other (secondary) email addresses from a custom field. The field is configured using `user-source.ad.other-emails-field`.
- *Specify a custom attribute for the primary email address* - use a custom attribute for the primary email address instead of the `mail` attribute. The field is configured using `user-source.ad.email-address-field`.

### 5.1.2.8. Using LDAP for user synchronization

LDAP (Lightweight Directory Access Protocol) directories usually store information about user and groups in an organization. One of the most common uses of LDAP is to provide single sign-on on a network that comprises multiple platforms and applications. When a network consists of only Windows computers, then you can use an Active Directory domain. But when there is a mix of Windows, Apple and Linux machines then LDAP can provided the single source of user, group and authentication information. (It is worth noting that both Active Directory and Novell eDirectory implement the LDAP protocol).

PaperCut MF can use an LDAP directory for user authentication and as a source of user and group information. LDAP can either be enabled at installation time, or by changing the user source option in **Options > User/Group sync**. When enabling LDAP, a number of configuration settings must be specified to allow the application to connect to the LDAP server. Ask your LDAP administrator what values to use for the various options:

- *LDAP Server Type* - Determines which LDAP fields are used to get user and group information.
- *LDAP Host address* - The hostname or IP address of the LDAP server.
- *Use SSL* - Indicates if an encrypted SSL connection is used to connect to the LDAP server. The LDAP server requires SSL support to be enabled and should accept connections on the standard LDAPS port 636.
- *Base DN* - This is the Base DN of the LDAP server. This is the equivalent of the "suffix" config setting of the OpenLDAP server. For example, if the domain hosted by the LDAP server is "domain.com" then the Base DN might be `DC=domain,DC=com`. The format of the Base DN can differ significantly depending on configuration. Some older Novell eDirectory installations require a blank Base DN to operate. Some examples:

```
DC=myschool,DC=edu,DC=au DC=myorganization,DC=com OU=O-
OrgUnit,DC=domain,DC=com DC=local
```

- **Admin DN** - The DN of the user who has permission to connect to and query the LDAP server. This is typically an administrative user, although it can be a user that has only read-only access to the LDAP server. An example of the DN of the Administrator user on a Windows AD domain "domain.com", would be `CN=A-Administrator,CN=Users,DC=domain,DC=com`. The exact format of the DN depends on the LDAP server. Some examples:
  - Windows Active Directory: `CN=A-Administrator,CN=Users,DC=domain,DC=com`
  - Windows Active Directory (in organizational unit): `CN=a-administrator,OU=OrgUnit,DC=domain,DC=com`
  - Mac Open Directory: `uid=diradmin,CN=users,DC=domain,DC=com`
  - Unix Open LDAP: `uid=root,DC=domain,DC=com`, or `uid=d=ldapadmin,DC=domain,DC=com`
  - Novell eDirectory: `CN=root,DC=domain,DC=com`, or `CN=ldapa-admin,OU=users,DC=domain,DC=com`.

The Admin DN and password is optional if your LDAP server allows anonymous binds for querying.

- **Admin password** - The password for the above user.



**Tip:** Some LDAP servers are configured to allow 'anonymous' LDAP query access. In these situations, you can leave the **Admin DN** and **Admin password** blank.

PaperCut MF supports the following server types:

- Novell eDirectory
- Microsoft Active Directory
- Unix / Open Directory

However, it is easy to support other server types by adjusting the LDAP fields PaperCut MF searches. For more information, see [Advanced LDAP Configuration](#).



**Tip:** Advanced features such as Nested Groups and OU are supported by the Windows Active Directory sync option. See [Using Active Directory for user synchronization](#)

### 5.1.3. Assigning Administrator Level Access

PaperCut MF sets up one administrator account called admin. This is the master administrator account, with access to all features, whose password is assigned during the configuration wizard.

In large organizations it is likely that administrator level access is granted to more than one person. One solution is to give all persons the master password; however, the recommended approach is to assign administrator rights to these individual's network user accounts. The advantages of this approach are:

- They can access the administration pages using their own username and password (they don't have to remember another password!).
- You can assign different levels of administrator access to the user. PaperCut MF includes an advanced Access Control List (ACL) allowing different administrators access to different functions and areas of the application.
- Most activity is audited so changes can be sourced to an individual.

You can assign administrator access at the group or user level. Assigning admin access to a group is convenient for giving the same permissions to multiple users. Assigning admin access to a user is useful when specific permissions are required. See the following sections for more detail.



**Tip:** Administrative users should login via `http://servername:9191/admin` rather than `http://servername:9191/`, `http://servername:9191/app` or `http://servername:9191/user` so that they are directed to the correct interface.



**Important:** PaperCut MF allows different levels of administrator access to be defined via access control list. The access list is presented as a series of check boxes enabling or disabling access to selected features or application areas. For security reasons it is advisable to:

- Grant the user's own accounts administrator level rights rather than have them use the general built-in `admin` account.
- Grant the administrator the minimum level rights need for them to perform their job.
- ACL configuration can be complex. Always test that the ACL rights assigned work as expected by asking the administrator to log in and verify that they can access the required program functions.

### 5.1.3.1. Assigning Administrator Access to a Group

Assigning administrator access to a group is useful when many users all require access to the same functionality. For example, the `Management` group might be assigned access to reporting functionality only.

Groups in PaperCut MF are mirrored from the domain / directory server. Before you can use a group, you must add it to PaperCut MF (see [Groups in PaperCut MF](#) for more information). By default PaperCut MF synchronizes users' group membership with the domain / directory server overnight. If a user has been added to a group in the domain / directory and requires group level

admin access on the same day, run a manual synchronization. See [User and Group Synchronization](#) for more information.

*Example: assigning the `Management` group access to reporting features:*

1. Log in to the system as the built in `admin` user.
2. Ensure that the `Management` group has been imported into PaperCut MF (see [Groups in PaperCut MF](#) for more information).
3. Navigate to the **Options > Admin Rights** page.
4. In **Assign administrator access to this group:**, select the `Management` group from the list; then click **Add Group**.

**Assign administrator access**

Use the fields to the right to assign administrator rights to a given user or group.

By default, administrators have access to all functions. Use the edit link on the left to set individual access rights.

Assign administrator access to this group:

Management [enlarge]

Add Group

Assign administrator access to this user:

Add User

5. By default `Management` has access to all features. To change this, click the **edit** link to the right of `Management`'s entry or the name of the group itself.
6. Deselect all access rights for `Management` except **Access reports section**. When finished, click **Apply** to save the changes.
7. Test by logging into the administrator interface as a user in the `Management` group, and checking that access is allowed just to the **Reports** section.



**Tip:** The *scheduled reports* feature can automatically deliver selected reports via email to interested parties. See [Scheduling and Emailing Reports](#) for more information.

### List of Admin Rights

Change administrator rights for this user/group.

#### [Internal Users] (Group)

- Access dashboard
- Access users section
  - Allow access to:
  - Perform adjustments & charges
  - Create internal users
  - Change internal user passwords
  - Change user settings
  - Perform bulk user actions
- Access groups section
- Access shared accounts section
  - Change shared account settings
  - Perform bulk account actions
- Access printers section
  - Allow access to:
  - Change printer settings
- Access device and site sections
  - Allow access to:
  - Change device and site settings
- Edit job log details
- Access archived jobs
  - Remove archived jobs
- Refund print jobs
- Hold/Release queue manager
  - Allow job releases for:
  - Allow job releases for:
- Web Cashier user
  - Allow user to perform:
- Access reports section
- Access Central Reports
- Access cards section
  - Manage cards
- Access options section
  - Access admin rights settings
- Logs section
  - Access global job logs
  - Access application logs
  - Access audit logs

### 5.1.3.2. Assigning Administrator Access to a User

Assigning access to an individual user is suitable when the access rights are specific to that user. For example, the junior System Administrator `mary` might be assigned access to all functionality except the ability to grant administrator rights to other users.

*Assigning the user with login name `mary` all admin rights except the ability to grant admin rights to other users:*

1. Log in to the system as the built in `admin` user.
2. Navigate to the **Options > Admin Rights** page.
3. In **Assign administrator access to this user:**, enter `mary`; then click **Add User**.
4. By default `mary` has access to all features. To change this, click the **edit** link to the right of `mary`'s entry or the name of the user itself.
5. Deselect the access right **Access admin rights settings** for `mary`.
6. Click **Apply** to save the change.
7. Verify that Mary can now log in to the administrator interface, but is unable to access the **Admin Rights** section.

**Assign administrator access**

By default, administrators have access to all functions. Use the edit link on the right to set individual access rights.

Assign administrator access to this group:

[Internal Users]

[\[enlarge\]](#)

Assign administrator access to this user:

User/Group	Access type	Actions
<a href="#">Management</a> (Group)	Limited Access	<a href="#">[edit]</a> <a href="#">[remove]</a>
<a href="#">mary</a> (Mary Jane)	Limited Access	<a href="#">[edit]</a> <a href="#">[remove]</a>

### 5.1.4. System Backups

As with any application, it is important to ensure that backups are performed regularly. PaperCut MF includes a built-in database export that saves the state of the database to a file. This functionality is designed to complement (not replace) a good system-wide backup process. The export is stored in the industry standard XML format and compressed using the standard ZIP format to reduce disk-space on the server and your backup medium. The use of these open standards ensures that your data is always available and accessible.

As PaperCut is centrally managed, the only database that requires backup is on the Application Server. [Secondary print servers](#) and [Site Servers](#) do not require a database backup.

PaperCut MF makes the process of managing export backups simple by automatically performing a weekly export. Export backup files are placed in the following directory:

```
[app-path]\server\data\backups
```

The weekly exports are performed at 20 minutes past midnight on Sunday morning (or as otherwise defined by the `schedule.weekly` config key. See [Using the Config Editor](#) to find out how to change config keys.)



**Tip:** In accordance with backup best practice, back up the above directory regularly to offline media (e.g. tape, CD or remote server). This allows the data to be restored in the case the server hard-drive is corrupted. An example backup script called `copy-backups-to-remote-server.bat` found at `[app-path]/server-  
/examples/scripting/batch/` can help administrators automate the process of maintaining an off-disk copy. On larger networks, you might want to perform export backups more frequently than the in-built once a week period. Use the `server-command` tool to execute the export task at other times. Simply write a script (e.g. batch file) to execute `server-command perform-online-backup`. Schedule the script to run at the desired intervals. More information on `server-command` is available in [Server Commands \(server-command\)](#).

### 5.1.4.1. Performing an Online Backup

In addition to the automated weekly exports, it is also possible to manually initiate a database export. This might be useful to back up the system database before performing an upgrade. To perform a manual export:

1. Navigate to the **Options > Backups** page.
2. Click **Export Now**.

A window is displayed showing the export progress and the location where the export file is saved.

### 5.1.4.2. Restoring an Export Backup

There are a number of situations when it might be necessary to restore a database, including:

- Hardware or system failure requires you to rebuild the server and reinstall PaperCut MF.
- A new print server was purchased and PaperCut MF is being moved to a new server.
- To import data into an external RDBMS (See [Deployment on an External Database \(RDBMS\)](#)).

To restore from an export file:

1. Locate a previous export file.
2. Shutdown the Application Server (See [Stopping and Starting the Application Server](#)). The database cannot be in-use when performing the restore, so the Application Server needs

to be stopped first.

3. Open a command prompt. On Windows 7 and Server 2008 systems, this might need to be specifically elevated to run with administrator privileges, even if you are already logged in with an administrator account. Change to the server binaries directory. On a Windows system the directory location is `[app-path]\server\bin\win\`.

**Tip:**

You must run the command prompt as an Administrator. In the Windows **Start** menu, right-click **Command Prompt**; then select **Run as administrator**.

4. Re-initialize the database back to an empty state by typing the following:

```
db-tools init-db -f
```

5. Run the import process by executing the following:

```
db-tools import-db -f "C:\path\to\backup\backup-file-name.zip"
```

(Or, `./db-tools` on some systems. See [Database Tool \(db-tools\)](#) for more information on using `db-tools`) NOTE: On Mac/Linux ensure proper permissions for access to the file, e.g.

```
chown papercut:admin \path\to\backup\backup-file-name.zip
```

6. The import asks if the existing database data should be deleted before proceeding.
7. Once the import has completed, restart the Application Server (See [Stopping and Starting the Application Server](#)).

### 5.1.4.3. Performing Offline Backups

Performing an online backup (as discussed above) is a simple and convenient process, but it is sometimes necessary to perform a backup when the Application Server is not running. For example:

- To integrate into your existing backup procedures, it might be necessary to write a script or batch file to perform a backup at a known point in time.
- When it is necessary to guarantee that the backup captures all the data. Performing an online export while the system is in use can modify data after the export is complete.

To perform an offline backup:

1. Stop the Application Server (See [Stopping and Starting the Application Server](#)). To ensure all data is captured, the Application Server must be stopped to perform an offline backup.
2. Open a command prompt. On a Windows system change to the following directory: `[app-path]\server\bin\win\`
3. Run the database export process by executing:

```
db-tools export-db
```

(This create an export file in the system backups directory and the filename named with a timestamp).

The export command has additional options that allows you to specify a different directory or filename. See [export-db Command](#) for more details.

#### 5.1.4.4. Export File Retention

Export files in

```
[app-path]\server\data\backups
```

are retained for 30 days and then deleted. You can change the number of days on the **Options > Backups** page under "Keep exports for ... days". This period is automatically extended should exports not be performed on a regular basis, i.e. when automatic exports have been temporarily disabled for a time or when skipping scheduled exports due to a system outage. Older export files are not deleted unless a number of new exports have been performed. At the very least the latest export file is always retained regardless of its age.

#### 5.1.4.5. Backup Print Archive files

By default the Print Archive is stored in

```
[app-path]\server\data\archive
```

and is not included in the database exports detailed above. It is recommended that you consider backing up part or all of the Print Archive with your existing backup processes. As PaperCut is resilient to partial restoration of the Print Archive you might want to backup only a month or two worth of archives. There is a `README.txt` in the archive directory that explains more about partial backups and the directory structure layout.

### 5.1.5. System Notifications and Emailing

This section describes system notifications and how they you can configure them to assist your users and administrators. PaperCut MF includes built-in notifications to alert users and administrators of a important pieces of information. Examples of these notifications include:

- Alerting a user when their account balance drops below a given balance.
- Displaying a message explaining why a print job was denied (e.g. not enough credit; the printer is disabled; the print job contains too many pages).
- Alerting administrators or key IT support staff to problems such as printer jams, or application errors.

You can customize the message that is delivered to the user to suit your organization. For example, if the user is denied printing for some reason, you might want to direct the user to the intranet page that discusses printing policies and guidelines.



**Important:** Notifications are important to your users because they let them know why their print jobs were denied. If notifications are not enabled, users print jobs might be deleted without them knowing and they will not understand what happened. They might then contact the Administrator or Help Desk for assistance. If they received a notification, then this situation is avoided.

System notifications can be delivered to the user in a number of ways, and the administrator can decide the preferred option. The delivery options available include:

- Winpopup (or "net send") - this is useful in a Windows network but workstations running other operating systems might not receive these messages.
- User Client - messages are sent to users running the PaperCut MF User Client tool. This option is guaranteed to work in all environments where the user runs the user client.
- Email - messages are delivered by email, to the email address defined in the system. This is a good alternative for "low balance warning" messages but is not recommended for real-time messages, such as, when printing is denied.

### 5.1.5.1. Configuring Notifications

PaperCut MF provides flexible options for configuring the various notifications. The administrator can:

- Enable/disable each of the notification types.
- Change the notification message to suit your organization.
- Choose the delivery method for each notification type.

You can modify notification text to suit your organization's requirements. The notification text is a template that can include some special fields that are replaced by the system when the message is sent. Use these fields to provide more detailed information to the user. These fields are surrounded by percent characters (%).

The default notification text in the application shows a variety of examples using these fields. For a list of the fields available in each type of notification, see the following sections covering each notification type in more detail.

## Printing Notifications

To change printing notification options, navigate to **Printers > Notification Options**.

**Table 90: Fields available in printing notifications**

Field	Description
%user%	The username of the user receiving the message.

Field	Description
%full_name%	The full name of the user receiving the message.
%date%	The date/time that the message was sent.
%balance%	The user's current balance.
%cost%	The cost of the print job.
%printer%	The full printer name (including the server name) the job was printed to. e.g. server-name\printer-name
%printer-server%	The server name of the printer the job was printed to.
%printer-queue%	The queue name of the printer the job was printed to (i.e. without the server name).
%document%	The name of the document printed.
%pages%	The total number of pages in the print job.
%copies%	The number of copies of the document printed.
%paper-size%	The size of the paper used to print the document.
%id_num%	The primary Card/Identity Number of the user receiving the message.

## Notify the user before their print times out and is deleted from a hold/release queue

Notify the user before their print times out and is deleted from a hold/release queue

**ATTENTION**

Your document "%document%" is held for printing and is due to time out if not collected in %minutes% minutes.

Your job was sent and held at %time%.

Time before deleting to notify:  
 minutes

To user client  
 By Winpopup  
 By Email (if known)

This notification option contains the following additional replacements.

**Table 91: Fields only available in notification sent before deleting the held job**

Field	Description
%minutes%	Minutes from now until the job is timed out and deleted. Minimum of 2 minutes.

For more information about hold/release queue timeout see [Job timeout](#).

## Low Balance Notification

To change low balance notification options, navigate to **Options > Notifications**, and scroll down to the "Low Balance Notification" section.

Using the notification options (shown above), you can enable the notification, change the notification text, and modify the delivery type.

**Table 92: Fields available in low balance notifications**

Field	Description
%balance%	The user's current balance.



**Important:** This low balance notification is only sent to users who are restricted.

## Card/ID Number Notification

To change card/ID number notification options, navigate to **Options > Notifications**, and scroll down to the "Card/ID Number Notification" section.

<p><b>Card/ID Number Notification</b></p> <p>Email users when their card/ID number is auto-generated.</p>	<p><input checked="" type="checkbox"/> Notify users when their card/ID number is auto-generated</p> <p><b>Notification subject</b></p> <p><input type="text" value="New ID number"/></p> <p><b>Notification message</b></p> <p><input type="text" value="Your new ID number for printing/copying is %id_number%. Please keep this number confidential."/></p> <p><small>This message is displayed along with the notification details</small></p>
---	---

Enable the option by selecting **Notify users when their card/ID number is auto-generated**. This notification option emails the user with their updated ID number. You can change the notification subject and message to suit your environment.

**Table 93: Fields available Card/ID Number Notification**

Field	Description
%id_number%	The user's Card/ID number



**Important:** This notification sends an email to user's primary email address.

## Configuring Email Notifications

Before sending notifications via email, the system needs to know about the SMTP server that is sending the emails. The SMTP server can be internal or external to your organization, however, it must allow forwarding of emails to your users. The SMTP server is typically the same server that users set in their email application to send email.



**Tip:** PaperCut comes with a number of popular SMTP services preconfigured to simplify the configuration process. If these are used, you need to provide only the login credentials of the SMTP server.

### SMTP Server Options

To send email notifications to users the SMTP server must be set.

[More Information...](#)

<b>SMTP server</b>	<input type="text" value="Gmail"/>	
<b>Host</b>	<input type="text" value="smtp.gmail.com"/>	<b>Port</b> <input type="text" value="465"/>
<b>Encryption</b>	<input type="text" value="SSL"/>	
<b>Username</b>	<input type="text" value="username@gmail.com"/>	
<b>Password</b>	<input type="password" value="*****"/>	

To set the SMTP server:

1. Navigate to **Options > Notifications**.
2. In the **SMTP Server Options** section select either:

- a. a preconfigured SMTP server.
  - b. **Custom** to configure a custom SMTP server. For custom configuration, see Custom SMTP Server Setup.
3. Enter the username and password for that service.
  4. Click **Apply**.



**Important:** Anti-virus software running on the PaperCut server can block/disallow SMTP connections because it attempts to block spam sent by viruses and trojans. Ensure that any anti-virus software is configured to allow PaperCut to make SMTP connections (e.g. add an exception or disable the SMTP blocking). When anti-virus is blocking email delivery, PaperCut MF logs errors, such as: `Mail server connection failed. Software caused connection abort..` These errors are displayed in the application log or on-screen when performing email notification tests. If there are other SMTP connection problems, you should check that your firewall allows SMTP connections, and that your SMTP server is configured to accept connections from the PaperCut server.

## Custom SMTP Server Setup

SMTP Server Options	SMTP server
To send email notifications to users the SMTP server must be set.	Custom
<a href="#">More Information...</a>	Host: smtp.server.hostname Port: 587
	Encryption: TLS
	Username: username
	Password: .....

If your SMTP server is not listed in the preconfigured SMTP server list, you can configure the SMTP server manually by providing the following details:

**Table 94: Custom SMTP Server Fields**

Field Name	Description
Host	Your SMTP server hostname.
Port	The port to connect to on the SMTP server. Common ports include <b>25</b> or <b>587</b> for TLS, and <b>465</b> for SMTPS(SSL).
Encryption	Choose between <b>None</b> , <b>SSL</b> and <b>TLS</b> .
Username	Username for SMTP authentication. Typically an email address.
Password	Password for SMTP authentication.



**Tip:** If debugging a custom SMTP setup, it might be useful to get the Application Server to produce extra logs related to the SMTP feature. To do this, set the **notify.smtp.debug** to **Y** in the Config Editor (see [Using the Config Editor](#)).

## Configuring Email Addresses

To send notification messages to users via email, an email address needs to be defined for the user. Enter user email addresses in the **User Details** screen. However, if all email addresses match the pattern `[username]@yourdomain.com`, then you can define the email address globally using the global email suffix. An example of how this works is as follows:

1. An email notification needs to be sent to user `brian`.
2. No email address has been defined in Brian's user details, but a global email suffix of `@myschool.com` is defined in the **Email Options** section.
3. To generate Brian's email address, the username (`brian`) and suffix (`@myschool.com`) are combined to form the email address `brian@myschool.com`.

To define the global email suffix:

1. Navigate to **Options > Notifications**.
2. Find the **Email Options** section.
3. Enable the **Use email suffix to build user email addresses** option.
4. Enter the Email Address Suffix.
5. Click **Apply**.

To confirm that the email suffix is working as expected:

1. Navigate to the **Users** section.
2. Select a user from the list.
3. Enable the **Use global email suffix** option. The email field contains the address constructed from the username and suffix.

### 5.1.5.2. System Notifications (for Administrators)

PaperCut MF's system notifications feature helps to minimize disruption by notifying key staff of important events. For example, when there is a paper jam, it might take several hours before an annoyed user reports the problem as most users just use another printer.

The following notification types are available:

- *Printer errors*: Notify when a printer enters an error state for a selected period of time.
- *Low Toner warnings*: Notify when a printer runs low on toner (for supported printers).

- *Application errors*: Notify if a application error is detected. This option allows administrators to proactively act on errors raised in the **App. Log** section.
- *License errors*: Notify on important license events such as exceeding the licensed user limit.
- *Pending refund request*: Notify when there is a pending refund request.



**Tip:** Consider SMS alerts: system notifications are often important and require urgent attention. Many organizations use an email-to-SMS gateway service to ensure technical staff can receive urgent messages from anywhere in the building via the text message service on their cell/mobile phones.

## Printer error notifications

Printer error notifications give advance warning when printers go into an error state.

PaperCut MF detects a printer error if either the print queue or the job at the top of the print queue are in an error state. This is the same as clicking the print queue from the operating system and checking its status.

Errors that might be seen on print queues or jobs include: `paper jam`, `out of paper`, `out of toner`, `out of memory`, `device is offline`, `device door is open`, or a generic error. The actual errors reported depend on the printer driver and which ones it supports.

Printers in error (e.g. paper jam)

▼ **Time a printer has been in error before sending notification:**  minutes

**Notification message**

A printer error was detected at %time%:

Printer: %printer%

Location: %location%

Error Type: %error%

This message is displayed along with the notification details

**Recipients** e.g.: `joe@domain.org`, `bill@domain.org`

`joe@domain.org`

Use the setting **Time a printer has been in error before sending notification** to decide how soon a notification is sent after a printer goes into error. For example, if there is a paper jam the user might be able to fix it themselves, and raising an immediate notification is unnecessary. The suggested default is 10 minutes as problems lasting longer than this are probably more serious and need technical intervention.

The message can include information such as the name and location of the printer, the reason for the error, and how many jobs are pending in the queue (an indication of the impact).

You can use the following special fields in printer error event notifications:

**Table 95: Fields available in printer error notifications**

Field	Description
%time%	The time the printer error was first reported.
%printer%	The name of the errored printer.
%printer-server%	The server name of the errored printer.
%printer-queue%	The queue name of the errored printer (i.e. without the server name).
%make-or-model%	The make or model name of the errored printer. This is also referred to as <b>Type/Model</b> .
%serial-number%	The serial number of the errored printer.
%physical-id%	The name used by the operating system to identify the errored printer (e.g. net://office-printer).
%location%	The location of the errored printer.
%error%	The error message detail (e.g. Paper jam).
%num_jobs%	The number of print jobs currently in the queue. Use this information as a guide to judge the severity of the error. For example, if a printer goes into error while there are 30 jobs in the queue, there are probably quite a few people waiting.

You can specify a set of email recipients to receive notifications for all printers and devices. You can enter multiple email addresses by separating them with a comma, for example, joe@domain.org, bill@domain.org.

Alternatively, you can specify a different recipient list for each printer group. This is particularly useful for organizations where different people are responsible for the maintenance of different groups of printers. To achieve this, you must first include each printer in a printer group that identifies the team responsible for managing it, for example, assigning printers based their physical location. For more information, see [Managing printer groups](#).



**Tip:** It is recommended that you configure at least one recipient for all printer related notifications so notifications are not lost due to misconfiguration, such as, if a printer is not in a printer group. This is because notifications for printers without any printer group are only sent to those on the **All Printers/Devices** recipients list.

**Note:**

If you are using Direct Printing, and there is a printer error that affects all print queues linked to a printer, then only a single notification is sent.

To enable and configure printer error notifications:

1. Set up printer groups based on each service team's responsibility. For more information, see [Managing printer groups](#).
2. Navigate to **Options > Notifications**.
3. Check that the SMTP server settings have been configured correctly.
4. Select the **Printers in error** check box.
5. To customize the notification message:
  - a. Click the arrow icon below the **Printers in error** check box.
  - b. In **Notification Message**, change the message text.
6. In **All Printers/Devices**, enter the recipients that need to receive notifications for all printers. Enter each recipient's email address separated by a comma.
7. To configure notifications to be sent to a list of recipients if it relates to a printer in a specific printer group:
  - a. Click the plus icon in the lower right corner of this section. A new entry is displayed.

Printers in error (e.g. paper jam)

▶ **Time a printer has been in error before sending notification:**  minutes

Group	Recipients e.g.: joe@domain.org, bill@domain.org
All Printers/Devices	<input type="text" value="system.admin@domain.org"/>
<input type="text" value="Select a group"/> ▼	<input type="text"/> <input type="button" value="x"/>
<input type="button" value="+"/>	

- b. Select a printer group.

- c. Enter each recipient's email address separated by a comma.

Printers in error (e.g. paper jam)

▶ Time a printer has been in error before sending notification:  minutes

Group	Recipients	e.g.: joe@domain.org, bill@domain.org
All Printers/Devices	<input type="text" value="system.admin@domain.org"/>	
Melbourne Office ▼	<input type="text" value="fred@domain.org"/>	<input type="button" value="x"/>
London Office ▼	<input type="text" value="bill@domain.org, george@domain.org"/>	<input type="button" value="x"/>
		<input type="button" value="+"/>

8. Repeat step 6 for each relevant printer group.
9. Click **Apply**.

## Low printer toner notifications

Low printer toner notifications are used to give advance warning when printers are running low on toner. This allows administrators to ensure that printers never run out of toner and improves printer uptime.

The low toner notifications are available only for supported network printers. The toner information is retrieved from the printer using SNMP over the network. To use low toner notifications, ensure that SNMP is enabled on your printer and that your network/firewalls/switches allow the PaperCut MF server to send SNMP requests to the printers. For more information see [Toner Levels \(for supported printers\)](#).

By default, a notification is sent out as soon as low toner is detected on a printer. You can, however, change the frequency of these notifications by selecting the **Low printer toner Frequency** in the **System Notifications** area on the **Options > Notifications** page. You can select from:

- Hourly
- Daily
- Custom (available only if `notify.toner-level.schedule` Config key has been set)
- Notification for each low toner alert

Low toner notification emails are sent on the first incident where low toner is detected. The next notification is sent only when the toner level goes above and then below the configured threshold.

By default, toner levels are retrieved from the printer at least every 4 hours and also during the scheduled daily maintenance tasks. In most cases, this frequency should be sufficient, however, you can change this rate using the config key `toner.minimum-check-period-mins`. **Note:** Changing this can significantly affect network traffic.

- Printers in error (e.g. paper jam)
- Low printer toner (for supported printers)

▶ Send notifications when toner level drops below:  %

Frequency

---

**Group**                      **Recipients** e.g.: joe@domain.org, bill@domain.org

All Printers/Devices

- Error level events (e.g. New error messages in App. Log)
- Licensing issues (e.g. when the licensed user limit has been exceeded)
- Pending refund requests

The notification message lists all print queues that are related to the same physical printer and includes toner levels for all the printer's toner cartridges. The location of the printer and the server it's hosted on is also included in the message by default.

The following special fields are available in low printer toner event notifications:

**Table 96: Fields available in low printer toner notifications**

Field	Description
%make-or-model%	The make or model name of the printer with low toner.
%serial-number%	The serial number of the printer with low toner. This is also referred to as <b>Type/Model</b> .

You can specify a set of email recipients to receive notifications for all printers and devices. You can enter multiple email addresses by separating them with a comma, for example, joe@domain.org, bill@domain.org.

Alternatively, you can specify a different recipient list for each printer group. This is particularly useful for organizations where different people are responsible for the maintenance of different groups of printers. To achieve this, you must first include each printer in a printer group that identifies the team responsible for managing it, for example, assigning printers based their physical location. For more information, see [Managing printer groups](#).



**Tip:**

It is recommended that you configure at least one recipient for all printer related notifications so notifications are not lost due to misconfiguration, such as, if a printer is not in



a printer group. This is because notifications for printers without any printer group are sent only to those on the **All Printers/Devices** recipients list.



**Note:**

If you are using Direct Printing, and there is a low printer toner notification that affects all print queues linked to a printer, then only a single notification is sent.

To enable and configure low printer toner notifications:

1. Set up printer groups based on each service team's responsibility. For more information, see [Managing printer groups](#).
2. Navigate to **Options > Notifications**.
3. Check that the SMTP server settings have been configured correctly.
4. Select the **Low printer toner** check box.
5. To customize the notification message:
  - a. Click the arrow icon below the **Low printer toner** check box.
  - b. In **Notification Message**, change the message text.
6. In **All Printers/Devices**, enter the recipients that need to receive notifications for all printers. Enter each recipient's email address separated by a comma.
7. To configure notifications to be sent to a list of recipients if it relates to a printer in a specific printer group:

- a. Click the plus icon in the lower right corner of this section. A new entry is displayed.

Printers in error (e.g. paper jam)

Low printer toner (for supported printers)

▶ Send notifications when toner level drops below:  %

Frequency

Group	Recipients e.g.: joe@domain.org, bill@domain.org
All Printers/Devices	<input type="text" value="joe@domain.org"/>

- Error level events (e.g. New error messages in App. Log)
- Licensing issues (e.g. when the licensed user limit has been exceeded)
- Pending refund requests

- b. Select a printer group.
- c. Enter each recipient's email address separated by a comma.

### System Notifications

Notify administrators or other interested parties via email when important system events occur.

Printers in error (e.g. paper jam)

Low printer toner (for supported printers)

▶ Send notifications when toner level drops below:  %

Frequency

Group	Recipients e.g.: joe@domain.org, bill@domain.org
All Printers/Devices	<input type="text" value="joe@domain.org"/>
<input type="text" value="Building 1"/>	<input type="text" value="bill@domain.org"/> <input type="button" value="x"/>
<input type="text" value="Building 2"/>	<input type="text" value="sue@domain.org"/> <input type="button" value="x"/>

Error level events (e.g. New error messages in App. Log)

Licensing issues (e.g. when the licensed user limit has been exceeded)

Pending refund requests

8. Repeat step 6 for each relevant printer group.
9. Click **Apply**.

## Error level event notifications

Error level event notifications help to draw the attention of the administrator to any errors that might occur. This could involve events such as problems contacting a directory server, software crashes, or processing problems.

Error level events (e.g. New error messages in App. Log)

▼ Send notifications no more often than:  minutes

**Notification message**

An application error was reported. Further action may be required:  
%error%

This message is displayed along with the notification details

**Recipients** e.g.: joe@domain.org, bill@domain.org

Some system states produce a lot of errors in the App Log in quick succession. This could cause numerous emails relating to the same issue, to be sent in a short period of time. If you do not want this to occur, you can limit the rate at which the App Log error emails are sent. By default, the frequency is set to 10 minutes, meaning that no notifications are sent within the 10 minute window after the last notification was sent. You can shorten or lengthen this window, however, the default should be suitable for most installations.

You can use the following special fields in error level event notifications:

**Table 97: Fields available in error level event notifications**

Field	Description
%error%	The error message detail.

You can specify a set of email recipients to receive notifications for all printers and devices. You can enter multiple email addresses by separating them with a comma, for example, joe@domain.org, bill@domain.org.

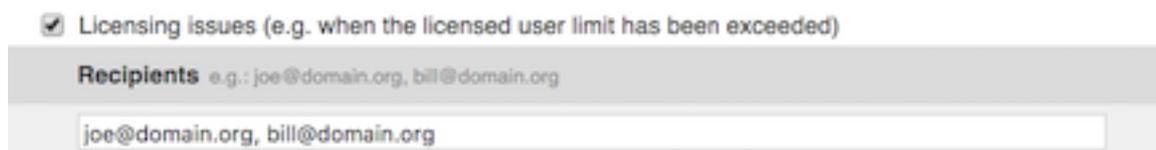
To enable and configure error level event notifications:

1. Navigate to **Options > Notifications**.
2. Check that the SMTP server settings have been configured correctly.

3. Select the **Error level events** check box.
4. To customize the notification message:
  - a. Click the arrow icon below the **Error level events** check box.
  - b. In **Notification Message**, change the message text.
5. In **Recipients**, enter each recipients email address separated by a comma.

## Licensing issues notifications

Licensing issues notifications draw the administrator's attention to events where the licensing restrictions have been, or are about to be, exceeded. For example, a notification would be sent if the user limit is exceeded.



You can specify a set of email recipients to receive notifications for all printers and devices. You can enter multiple email addresses by separating them with a comma, for example, `joe@domain.org, bill@domain.org`.

To enable and configure licensing issues notifications:

1. Navigate to **Options > Notifications**.
2. Check that the SMTP server settings have been configured correctly.
3. Select the **Licensing issues** check box.
4. In **Recipients**, enter each recipients email address separated by a comma.

## Pending refund request notifications

Pending refund requests notifications draw the administrator's attention to pending refund requests. By default, daily notification messages are sent at 7 a.m.

Pending refund requests

▼ Notify

**Notification message**

There are %num\_requests% pending refund requests.  
Please login to the admin interface to action them via Printers -> Refunds.

This message is displayed along with the notification details

**Recipients** e.g.: joe@domain.org, bill@domain.org

By default pending refund request notifications are sent once per day. If there are no pending refund requests, the notification is not sent. If responsiveness to refund requests is important to you, you could change the frequency of these emails so that a notification is sent every hour.

You can use the following special fields in pending refund request notifications:

**Table 98: Fields available in pending refund request notifications**

Field	Description
%num_requests%	The number of pending refund requests.

You can specify a set of email recipients to receive notifications for all printers and devices. You can enter multiple email addresses by separating them with a comma, for example, joe@domain.org, bill@domain.org.

To enable and configure pending refund request notifications:

1. Navigate to **Options > Notifications**.
2. Check that the SMTP server settings have been configured correctly.
3. Select the **Pending refund requests** check box.
4. To customize the notification message:
  - a. Click the arrow icon below the **Pending refund requests** check box.
  - b. In **Notification Message**, change the message text.
5. In **Recipients**, enter each recipients email address separated by a comma.

### 5.1.5.3. Testing Notification Methods

Once the system notifications are configured, test that messages can be delivered. PaperCut MF provides a function to send test messages to users. This allows you to verify that notifications are working without having to try to produce notifications artificially. To send a test notification:

1. Navigate to the **Options > Notifications**.
2. Scroll to the bottom of the page to the **Test Notifications** section.
3. Enter the username of the user to send the message to.
4. Select the delivery method to use.
5. Enter the notification message to send.
6. Click **Send Test Notification**.
7. Verify that the notification was received.

### 5.1.6. System Security Options

The default installation of PaperCut MF is configured to be secure by default. After initial installation only the `admin` user-defined during the setup process is permitted to administer the system. To allow additional users to administer PaperCut MF follow the instructions defined in [Assigning Administrator Level Access](#).

#### 5.1.6.1. Application Server Connections

By default PaperCut MF runs an internal web server on port 9191. All communication with the server uses HTTP to this port and includes connections by:

- administrators to connect to the administration interface
- users to connect to the end-user interface
- the User Client to communicate with the server to get the user balance and receive notifications; and
- the information providers (see [Key Features](#)) to send information to the server

It is therefore important that all of the above clients can access this port on the server from across the entire network. If your organization uses firewalls between departments or campuses, then allow inbound HTTP connections on port 9191 to the PaperCut MF Application Server.

You can change the Application Server port from 9191 to any other value.



**Important:** If the Application Server port is changed, the port number also must be changed in the applications that connect to the server. i.e, the Print Provider and the User Client.

To change the Application Server port:

1. On the server, navigate to the `[app-path]\server\` directory.
2. Open the file `server.properties`.
3. Change the `server.port` to setting to the desired port.
4. Change the server port in all providers installed on your network. The server port is set in the `print-provider.conf` file in the provider directory.
5. Change the server port in the User Client config file: `[app-path]\client\config.properties`.



**Important:** If the client is installed locally on workstations, then change the config file on each workstation. On Linux/Unix systems, the server runs under the privilege of a non-root account. Some systems prevent non-root users from binding to ports lower than 1024. An alternate option is to use kernel level TCP port redirection (e.g. `iptables`).

6. Restart the Application Server. (See [Stopping and Starting the Application Server](#)).

### 5.1.6.2. Provider Connection Security

The PaperCut MF architecture (see [Architecture Overview](#) and [Print Monitoring Architecture](#)) involves having a central Application Server and multiple information providers that send data to the server to process. One example of a provider is the Print Provider, which monitors printing and sends the printer activity to the central server.

PaperCut MF supports an unlimited number of information providers and they can be located on anywhere on the network. By default PaperCut MF allows these providers to connect from any machine on the network. You can restrict this to a reduced set of machines by specifying a list of IP addresses or subnets that are allowed to submit information to the Application Server.

To define the list of addresses that providers can connect from:

1. Navigate to **Options > Advanced**.
2. Scroll down to the **Security** section.
3. Enter the list of IP addresses or subnet masks to allow. The list of addresses is comma separated. The format of the subnet is `X.X.X.X/Y.Y.Y.Y` (where X represents the address and Y the subnet mask).
4. Click **Apply**.
5. It is then recommended to test all providers to ensure that they can still submit information to the Application Server. To test the Print Provider, perform a test print job to the server that the provider is running on.

### 5.1.6.3. Release Station Connection Security

You can restrict the address ranges from which standard Release Stations (see [Standard Release Station](#)) access the Application Server. This measure only applies to standard Release Stations and does not affect print release at an embedded device or from a web browser.

1. Navigate to **Options** and select **Config Editor (Advanced)**.
2. Search for the config key: `auth.release-station.allowed-addresses`
3. Enter the list of IP addresses or subnet masks to allow. The list of addresses is comma separated. The format of the subnet is `X.X.X.X/Y.Y.Y.Y` (where X represents the address and Y the subnet mask).
4. Click `Update`.
5. It is then recommended to test all standard Release Stations to ensure that they can still successfully start-up and connect to the Application Server.

### 5.1.6.4. Web Session Inactivity Timeout

For security reasons all the web sessions log out (timeout) after periods of inactivity. Clicking a link or refreshing a page resets the inactivity timer. Closing the browser window/tab also ends the session (i.e. the session cookies are not persistent). The default timeout periods for different login types are described in the table below:

**Table 99: Default Web Session Inactivity  
Timeout Values**

Login Type	Default value
Admin web interface	1440 minutes (24 hours)
Web based Release Station	1440 minutes (24 hours)
Web Cashier	1440 minutes (24 hours)
User web interface	60 minutes (1 hour)

These timeout values (a period given in minutes) are configurable via the config keys below. A value of 0 indicates that the session never times out. The special value **DEFAULT** indicates that the PaperCut defaults (in the above table) are used (the PaperCut defaults might change in future versions).

**Table 100: Timeout Web Session Config Keys**

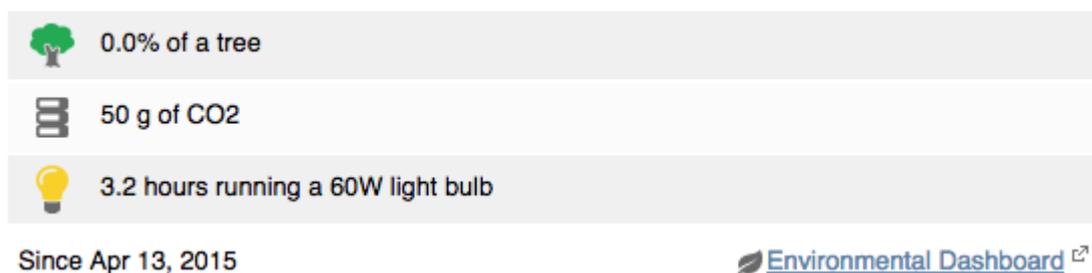
Config name	Description
web-login.admin.session-timeout-mins	Inactivity timeout for the admin web interface.
web-login.web-cashier.session-timeout-mins	Inactivity timeout for Web Cashier.
web-login.release.session-timeout-mins	Inactivity timeout for the web based Release Station.
web-login.user.session-timeout-mins	Inactivity timeout for the user web interface.

See [Using the Config Editor](#) for information about changing config keys.

Changing the inactivity timeout values take effect the next time users log in. Note that some pages periodically refresh the page (or data on the page), such as the dashboard and the web based Release Station. A session does not time out if a browser is left on these pages, as it is considered active.

## 5.1.7. Environmental Impact

One of the primary aims of PaperCut MF is to reduce printing levels by changing a user's printing behavior. Implementing monitoring, quotas and charging are a good way of drawing a user's attention to their habits. The topic of the environment, global warming, and waste management is currently an area of debate and interest to many. Highlighting the environmental aspects of their activities is another good way of modifying a user's behavior.



The *Environmental Impact* section is available to end-users via their web summary page (See [Environmental Impact](#) for more details). Administrators also can view the impact of a user and a printer via the details pages in the admin interface.

The meaning of the reported values and how they are calculated are detailed below:

**Table 101: Environmental Impact Reporting**

Field	Description
Trees	<p>This value corresponds to percentage of a tree that has gone into making the paper. The value assumes the user is printing on standard A4 or Letter sheets and 8,333 sheets make up a tree.</p> <div data-bbox="343 526 1393 683" style="border: 1px solid #ccc; padding: 5px;"> <p> <b>Note:</b> A single tree can produce about 8,333 sheets of paper according to Tom Soder's study and reported in Claudia Thompson's book <i>Recycled Papers: The Essential Guide</i>, Cambridge: The MIT Press, 1992.</p> </div> <p>This value is set by the config key: <code>environment.sheets-per-tree</code></p>
Carbon	<p>This value corresponds to greenhouse gases released in the production of the paper (CO<sub>2</sub> equivalent). The value assumes that the user is printing on standard A4 or Letter sheets and one sheet equals 12.7g CO<sub>2</sub>. This amount is equal to 2.5 metric tons of CO<sub>2</sub> carbon equivalents per metric ton of paper.</p> <div data-bbox="343 1064 1393 1220" style="border: 1px solid #ccc; padding: 5px;"> <p> <b>Note:</b> Environmental impact estimates were made using the Environmental Paper Network Paper Calculator Version 3.2. For more information visit <a href="http://www.papercalculator.org">www.papercalculator.org</a>.</p> </div> <div data-bbox="343 1243 1393 1400" style="border: 1px solid #ccc; padding: 5px;"> <p> <b>Note:</b> The <i>Conservatree</i> organization indicates that there are about 200,000 paper sheets in a ton, <a href="http://conservatree.org/learn/EnviroIssues/TreeStats.shtml">http://conservatree.org/learn/EnviroIssues/TreeStats.shtml</a>, retrieved April 2015.</p> </div> <p>. The default value takes in account CO<sub>2</sub> produced as a byproduct of the paper production only. It does not take into account the power consumed by the printer or power associated with the ink / toner use and production. Finding referenced figures on these values is difficult, and one could argue that the printer power consumption is not a function of the user's usage as the printer would be there consuming power even if they do not use the device. This value is set by the config key: <code>environment.co2-grams-per-sheet</code></p>
Energy	<p>This value represents the manufacturing energy used to produce the paper minus an energy credit created by burning the paper. The energy value is represented by relating it to the equivalent energy consumed by a standard</p>

Field	Description
	<p>light bulb. This provides users with a real world understanding of the value. This value assumes the user is printing a standard A4 or Letter sheet and that the manufacturing cost per sheet is 48Wh.</p> <p> <b>Note:</b> This is an appropriate amount for virgin office paper. 32Wh is more appropriate for 100% recycled paper.</p> <p>This value is set by the config key: <code>environment.watt-hours-per-sheet</code></p>



**Tip:** config keys are set in **Options > Config editor (advanced)**.

## 5.1.8. Logging

PaperCut has two types of logging within the Administration pages; Application and Audit logging. Both log views are accessible via the Logs tab for users with sufficient administrative rights to view these. In both cases, there are some minor configuration changes an administrator might want to tune.

### 5.1.8.1. Application Logs

The Application Log retains a complete history of system events (errors, notifications, alerts, etc), unless configured otherwise.

**Table 102: Application Log Configuration Keys**

Config key	Description
<code>delete.app-log.days</code>	The number of days to retain the application logging. A value of -1 indicates no limit

### 5.1.8.2. Audit Logs

The Audit Log retains a complete history of administration changes to a user, unless configured otherwise.

You can disable this if a customer does not want to retain this information via **Options > Advanced > Diagnostics > Enable audit logging**

Additional config options exist in the Config Editor :

**Table 103: Application Log Configuration Keys**

Config key	Description
<code>logging.audit-logging-max-days</code>	The number of days to retain the audit logging.

## 5.1.9. Privacy Options

As a print tracking system, most organizations and users expect PaperCut to record all printing activity. For organizations concerned that users might require more privacy than the default level of tracking affords, you can enable or disable features to suit. E.g. if the content of documents should not be viewed by PaperCut administrators, disable the Print Archiving feature. You can enable and disable many features at **Options > General**.

Additional privacy-specific options are available at **Options > General > Privacy Options**.

### 5.1.9.1. Privacy Options

#### Omit document names from the print log

If this option is enabled, the document name of print jobs is not logged. Document names can include identifying information about a user or the nature of their print job.

#### Anonymize jobs (don't link jobs with users)

When processing a job (print, copy, scan or fax), PaperCut needs to know the originating user to handle the job correctly, e.g. to provide the user with the correct account selection settings. When this option is enabled, once PaperCut has finished processing a job it, "forgets" the original user and clear any information from the database that links the two.

This anonymization is achieved by re-assigning the job to a different, specified user once the job has completed. The default and recommended approach is to assign jobs to a user called `anonymous`. If this user does not exist at the time the feature is enabled then a new internal (non-domain) user with the configured name is created (this user has no password, so cannot be used to log in).

Viewing the Job Log for this anonymous user shows all jobs in the system. The transactions (charging) for jobs are still applied to the original user, however, so that features such as print quotas continue to work as expected. Transaction times and job log times could be cross-referenced to potentially determine a link, as they will be close together in time. If this is a concern, then use the options at **Options > Backups > Automatic Backups** to delete transaction logs older than a given age.

Enabling this option means that any functionality requiring a link between a user and a job (once the job has completed) is no longer be available. This includes user-based reporting and job refunds. It is recommended that this option is only enabled if strictly required.

## 5.1.10. Using the Config Editor

Most of the settings in PaperCut MF are easily accessible via the main admin interface (e.g. the Options tab). Some advanced settings are, however, only accessible via the Config Editor. The Config Editor stores keys or information used by PaperCut MF to configure various options and functions. This is very similar to the Windows System Registry database.

Administrator can edit config keys using the following procedure:

1. Log in to the system as an administrator (e.g. the built-in admin account).
2. Click **Options**.
3. In the **Actions** list on the left, click **Config editor (advanced)**.
4. In **Quick find**, enter the config key name; then click **Go**.
5. Locate the required key and enter a new value.
6. Click **Update** to apply the change.

Example of some keys that are often changed by administrators include:

- **client.config.show-link** - Indicates whether or not the link at the top of the User Client is displayed.
- **client.config.show-details-link** - Indicates whether or not the "Details" link that points to the user web interface is displayed.
- **display.login-instruction** - Used to display login instructions on the user/password screen.



**Important:** Take care when using the Config Editor. If you use the Config Editor incorrectly, you can cause serious problems that can only be fixed by reinstalling the application.

## 5.2. Advanced Server Management

This section contains advanced configuration related to PaperCut's internal web server (powered by Apache Jetty). The configuration options mentioned here should generally only be used as a reference for specific requirements, as some changes could negatively impact on system functionality.

### 5.2.1. Server Address

### 5.2.1.1. Server address presented to users

Some features in PaperCut require being able to create a link or address for the Application Server. One example of this is when using Email to Print - the verification email sent to users contains a link that they must click. This link must resolve to the PaperCut server both from the internet and from the local network.

The default address presented in these cases is an automatically detected IP address. In some cases this might not be suitable, for example, where it needs to be resolved from the internet.

The recommended approach is to configure a DNS name for your PaperCut server that can be resolved and accessed wherever your users require it. This can involve creating a public/external DNS name and opening the appropriate ports in your firewall. After the name is configured, navigate to **Options > Advanced > Server Address > Server address presented to users**, select **DNS name** and enter your chosen (fully qualified) name.

### Server port presented to users

In some circumstances, you might also need to customize the server HTTP port presented to users. An example scenario is when a reverse proxy server for WebAuth or Shibboleth SSO is placed in front of the PaperCut MF server. For this situation, PaperCut provides two advanced config keys to allow the user facing server port to be customized: `system.network-port-http.user-facing` and `system.network-port-https.user-facing`. (See [Using the Config Editor](#) for instructions on using the Config Editor.)

### 5.2.1.2. Server address presented to external components

In some cases PaperCut publishes its address to external components (e.g. MFDs) to allow them to establish a connection back to the server. The published address is an automatically detected IP address by default. If your server has multiple IP addresses then the detected IP might not be suitable and could cause components to fail to connect.

To resolve this you can configure the network address (e.g. DNS name or IP address) that PaperCut publishes to these external components. To do this use the Config Editor (see [Using the Config Editor](#)) to change the `system.network-address` to your chosen address.

This is configured separately from the **Server address presented to users** to provide the option to use an IP address for components and a DNS name for users (for example, to avoid DNS look-ups on devices that do not cache the result).

PaperCut Site Servers can have their published network address configured by navigating to **Sites > (site name) > Configuration > Network address used by devices**.

## 5.2.2. Changing the network interface that PaperCut listens on

PaperCut listens on all available network interfaces by default. If your server has multiple IP addresses (i.e. is multi-homed), PaperCut accepts connections to all these addresses. Alternatively, you can configure it to listen on a single, defined interface. To configure PaperCut to listen on a single network interface:

1. Open `[app-path]/server/server.properties` in a text editor.

Add a new line:

```
server.listen-interface=1.2.3.4
```

2. where `1.2.3.4` is the (static) IP address of the network interface for PaperCut to listen on.
3. Restart the service **PaperCut Application Server**

## 5.2.3. Overriding the "Host" header for redirects

PaperCut's web server requires the ability to redirect users to new pages. When performing a redirect, the target location is based on the *Host* header that the web browser requested. If the host header is omitted (e.g. by manually crafting an HTTP request), the target location is based on the server's own hostname or IP address. In a NAT environment this might not be ideal if the server's IP address is considered private.

This can also apply if security audit software reports *Web Server HTTP Header Internal IP Disclosure* or similar.

To configure PaperCut to always forward to a specified host:

1. Open `[app-path]/server/server.properties` in a text editor.

Add a new line:

```
server.force-host-header=printing.uni.edu
```

where `printing.uni.edu` is the fully qualified host name on which all users will access PaperCut.

2. Restart the service **PaperCut Application Server**
3. Test access to the web interface (using both HTTP and HTTPS if applicable).

Note that when this option is used, PaperCut should not be accessed using any hostname other than the one configured. Doing so can cause problems.

## 5.3. Tools - database, server-command scripting, and APIs (Advanced)

This section outlines the command line tools and advanced programming tools that come with PaperCut MF. Using these tools is discussed throughout this manual, however, this provides a reference guide to these tools and their use.

**A Caution:** The advanced tools provided with PaperCut MF are very powerful and offer opportunities for all manner of customizations and enhancements. However, if used incorrectly, these tools could lead to unexpected results. Many of the advanced tools are written for software and script developers. It is expected that readers intending to use advanced tools are comfortable with using the command-prompt, and developing system management and server monitoring programs.

### 5.3.1. Server Commands (server-command)

The `server-command` tool provides access to dozens of server operations ranging from user management, system maintenance, account manipulation and printer control. The `server-command` tool is ideal for controlling the PaperCut MF *Application Server* via the command-line or automating via scripts.

Some examples of how an Administrator might use the `server-command` tool:

- Scheduling of online backups and data snapshots.
- Scheduling user and/or group synchronization tasks.
- Automating the addition of new users after the accounts are added to the network.
- Performing account transactions such as adding funds/quota to user accounts.
- Automating user account creation using custom scripts.
- Disabling/Enabling printers.
- Disabling/Enabling printing for users.
- Controlling user restriction levels.
- Managing shared accounts.

The `server-command` program is a command-line tool. It accepts the commands as arguments and outputs the results of the command on the console (standard-out). For security reasons only users with read access to the `server.properties` (normally only the `Administrators` group) have rights to execute the commands.

Typical use on a Windows system:

Add \$10.00 to a user named 'testuser':

```
C:\> cd [app-path]\server\bin\win
C:\> server-command adjust-user-account-balance "testuser"
10.00 \ "Added $10.00 to your account"
```

**Note:**

Backslash indicates text should be on the same line.

### 5.3.1.1. Accessing Server Commands remotely

Server commands can also be called remotely using standard remote command tools.

## On Windows

Use [PsExec](#) - a remote command program provided by the Sysinternals team at Microsoft. For example, (all on one line):

```
psexec.exe \\remoteserver \
"C:\Program Files\PaperCut MF\server\bin\win\server-com-
mand.exe" \
disable-printer printsrv1 labprinter -1
```

## On Linux/Novell/Mac

Use [SSH](#) - a secure remote command/shell program. You can run SSH non-interactively in scripts with the use of an authorized public key added under the papercut account's `~/.ssh/authorized_keys` list. For example, (all on one line):

```
ssh papercut@remoteserver \
"/home/papercut/server/bin/linux-[x64|i686]/server-command \
disable-printer printsrv1 labprinter -1"
```

### 5.3.1.2. Available Commands

A full list of commands is available via `server-command --help`.

```
Usage: server-command COMMAND [ARGS...]
COMMAND : The server command name.
ARGS : A list of arguments to supply to the command.
```

**COMMANDS:**

```
user-exists <username>
    Test to see if a user exists.
    <username> - the username to test.

get-user-account-balance <username> [<account>]
    Get a user's current account balance.
    <username> - the user's username.
```

[<account>] - Optional personal account name. Only used when multiple personal accounts are enabled. Leave blank to get total balance.

get-user-property <username> <property>

Gets a user property.

<username> - the name of the user.

<property> - the name of the property to get. Valid properties include:

balance - the user's current account balance

primary-card-number - the user's primary card number

secondary-card-number - the user's secondary card number

card-pin - the user's card pin number

default-shared-account - the user's default shared account name

auto-shared-account - the user's automatically selected shared account name

department - the user's department

disabled-net - whether or not the user's internet access is currently disabled (deprecated)

disabled-print - whether or not the user's printing is currently disabled

email - the user's email

full-name - the user's full name

home - the user's home folder (a double-quoted UNC path)

notes - notes for the user

office - the user's office

print-stats.job-count - the total print job count for the user

print-stats.page-count - the total printed page count for the user

net-stats.data-mb - the internet data (in MB) used by the user (deprecated)

net-stats.time-hours - the internet time (in hours) used by the user (deprecated)

restricted - whether or not the user is currently restricted

account-selection.mode - the user's current account selection mode

account-selection.can-charge-personal - whether or not the user can charge to their personal account

account-selection.can-charge-shared-from-list - whether or not the user can charge to a shared account, selected from a list

account-selection.can-charge-shared-by-pin - whether or not the user can charge to a shared account, selected by PIN  
other-emails - the user's other emails  
username-alias - the user's alias. Only used when username aliasing is enabled.

set-user-property <username> <property> <value>

Sets a user property.

<username> - the name of the user.

<property> - the name of the property to set. Valid properties and values include:

balance - the user's current account balance (a decimal number)

primary-card-number - the user's card number (any text)

secondary-card-number - the user's secondary card number (any text)

card-pin - the user's card pin number (any text)

default-shared-account - the user's default shared account name

department - the user's department (any text)

disabled-net - whether or not the user's internet access is currently disabled (TRUE or FALSE) (deprecated)

disabled-print - whether or not the user's printing is currently disabled (TRUE or FALSE)

email - the user's email (an email address, or any text)

full-name - the user's full name (any text)

home - the user's home folder (a double-quoted UNC path)

notes - notes for the user (any text)

office - the user's office (any text)

password - the user's password (for internal users only) (any text)

restricted - whether or not the user is currently restricted (TRUE or FALSE)

other-emails - the user's other emails (a comma separated list). Use blank to clear all other emails

username-alias - the user's alias. Only used when username aliasing is enabled.

<value> - the value to set (see <property> for valid values).

adjust-user-account-balance <username> <adjustment> <comment> [  
<account>]

Adjust a user's account balance.

<username> - the user's username.  
<adjustment> - the adjustment amount as a number. +ve or -ve.  
<comment> - a comment to be associated with the transaction.  
[<account>] - Optional personal account name. Only used when multiple personal accounts are enabled.

adjust-user-account-balance-if-available <username> <adjustment> \

<comment> [<account>]

Adjust a user's account balance if there is enough credit available.

<username> - the user's username.  
<adjustment> - the adjustment amount as a number. +ve or -ve.  
<comment> - a comment to be associated with the transaction.  
[<account>] - Optional personal account name. Only used when multiple personal accounts are enabled.

adjust-user-account-balance-if-available-leave-remaining <username> \

<adjustment> <leave-remaining> <comment> [<account>]

Adjust a user's account balance if there is enough credit available

to leave the given amount available in the account.

<username> - the user's username.  
<adjustment> - the adjustment amount as a number. +ve or -ve.  
<leave-remaining> - the amount to leave in the account.  
<comment> - a comment to be associated with the transaction.  
[<account>] - Optional personal account name. Only used when multiple personal accounts are enabled.

adjust-user-account-balance-by-group <group> <adjustment> <comment> \

[<account>]

Adjust the account balance for all users in a group. This process happens in the background.

<group> - the group for which all users' accounts are to be adjusted.  
<adjustment> - the adjustment amount as a number. +ve or -ve.  
<comment> - a comment to be associated with the transaction.

[<account>] - Optional personal account name. Only used when multiple personal accounts are enabled.

adjust-user-account-balance-by-group-up-to <group> <adjustment>  
<limit>

<comment> [<account>]

Adjust the account balance for all users in a group, but don't increase user balance beyond the given limit.

This process happens in the background.

<group> - the group for which all users' accounts are to be adjusted.

<adjustment> - the adjustment amount as a number. Must be +ve.

<limit> - don't increase user balance beyond this limit.

<comment> - a comment to be associated with the transaction.

[<account>] - Optional personal account name. Only used when multiple personal accounts are enabled.

set-user-account-balance <username> <balance> <comment>  
[<account>]

Set a user's account balance to a set value.

<username> - the user's username.

<balance> - set the account to this value. +ve or -ve.

<comment> - a comment to be associated with the transaction.

[<account>] - Optional personal account name. Only used when multiple personal accounts are enabled.

set-user-account-balance-by-group <group> <balance> <comment>  
[<account>]

Set the balance for each member of a group to the given value. This process happens in the background.

<group> - the group for which all users' balance is to be set.

<balance> - the value to set all users' balance to. +ve or -ve.

<comment> - a comment to be associated with the transaction.

[<account>] - Optional personal account name. Only used when multiple personal accounts are enabled.

reset-user-counts <username> <reset\_by>

Reset the page and job counts associated with a user.

<username> - the user's username.

<reset\_by> - name of the user/script/process resetting the counts.

`re-apply-initial-user-settings <username>`  
Re-applies initial settings on the user. Initial user settings are based on group membership.  
<username> - the user's username.

`disable-printing-for-user <username> <minutes_disabled>`  
Disable printing for a user for a set period of time.  
<username> - the name of the user to disable printing for.  
<minutes\_disabled> - the time in minutes to disable. -1 indicates forever.

`add-new-user <username>`  
Trigger the process of adding a new user account. Assuming the user exists in the OS/Network/Domain user directory, the account is created with the correct initial settings as defined by the rules set up in the admin interface under the Groups section.  
<username> - the user's system username.

`rename-user <current_username> <new_username>`  
Rename the given existing user. Use this method with care. Renaming a user should be performed in conjunction with renaming the user in the OS/Network/Domain.  
<current\_username> - the name of the user to rename.  
<new\_username> - the user's new name.

`delete-existing-user <username>`  
Delete a user account from the system. Use this method with care. Calling this permanently deletes the user account from the user list (print history records remain).  
<username> - the user's system username.

`add-new-internal-user <username> <password> <full_name> <email> <card-id> <pin>`  
Create a new internal user. Username and password are required. You can omit other properties. Properties can be changed after creation using 'set-user-property'. For more information about internal users, see the user manual section 'Internal users'.  
<username> - (required) the username of the new internal user.  
<password> - (required) user's password.  
<full\_name> - (optional) user's full name.  
<email> - (optional) user's email address.  
<card-id> - the user's card or identity number.  
<pin> - the user's card/id PIN.

look-up-user-name-by-id-no <id-no>

Looks up the user with the given user id number and prints out their user name. If no match was found an empty line is printed out.

<id-no> - The user id number to look up.

look-up-user-name-by-card-no <card-no>

Looks up the user with the given user card number and prints out their user name. If no match was found an empty line is printed out.

<card-no> - The user card number to look up.

add-user-to-group <username> <group>

Add a user to the specified group. It changes the group membership within the application not in the OS/Network/Domain user directory.

<username> - the name of the user.

<group> - the name of the group to which the user needs to be added.

remove-user-from-group <username> <group>

Remove a user from the specified group. It changes the group membership within the application not in the OS/Network/Domain user directory.

<username> - the name of the user.

<group> - the name of the group from which the user needs to be removed.

add-admin-access-user <username>

Add a user as an admin with default admin rights.

<username> - the name of the user.

remove-admin-access-user <username>

Remove an admin user from the list of admins.

<username> - the name of the user.

add-admin-access-group <groupname>

Add a group as an admin group with default admin rights.

<groupname> - the name of the group.

remove-admin-access-group <groupname>

Remove a group from the list of admin groups.

<groupname> - the name of the group.

set-user-account-selection-auto-select-shared-account

<username>

<account\_name>

<charge\_personal>

Sets a user's account selection to charge to a single shared account.

<username> - the name of the user.

<account\_name> - Full name of the shared account to charge to.

<charge\_personal> - whether or not personal account will be charged. (TRUE or FALSE)

set-user-account-selection-auto-charge-personal <username>  
Sets a user's account selection to automatically charge to personal. account.

<username> - the name of the user.

set-user-account-selection-standard-popup  
<username>  
<allow\_personal>  
<allow\_list\_selection>  
<allow\_pin\_code>  
<allow\_printing\_as\_another\_user>  
<charge\_to\_personal>  
[<default\_shared\_account>]  
Sets a user's account selection to standard account selection popup.

<username> - the name of the user.

<allow\_personal> - allow user to charge to personal account.

<allow\_list\_selection> - allow user to select a shared account from list. (TRUE or FALSE) <allow\_pin\_code> - allow user to select a shared account using pin.

<allow\_printing\_as\_another\_user> - allow user to print as another user.

<charge\_to\_personal> - when shared account is selected charge to personal account. (TRUE or FALSE)

[<default\_shared\_account>] - Optional default shared account

list-user-accounts  
List the names of all the user accounts in the system, sorted by username, one per line.

get-total-users  
Gets a count of all the users in the system.

list-shared-accounts  
List the names of all the shared accounts in the system, sorted by shared account name, one per line.

list-user-shared-accounts <username> [<ignoreAccountMode>]

List the names of all the shared accounts accessible by the given user sorted by account name, one per line.

<username> - User for which to list accounts

[<ignoreAccountMode>] - Optional. Specify TRUE to ignore user's account selection mode. (TRUE or FALSE)

shared-account-exists <account\_name>

Test to see if a shared account exists.

<account\_name> - the shared account name to test.

get-shared-account-account-balance <account\_name>

Get shared account's current account balance.

<account\_name> - the shared account's full name.

get-shared-account-property <account\_name> <property>

Gets a shared account property.

<account\_name> - the name of the user.

<property> - the name of the property to get. Valid properties include:

access-groups - the shared account's access groups (a comma separated list). Use blank to clear all groups

access-users - the shared account's access users (a comma separated list). Use blank to clear all users

balance - the shared account's current balance

comment-option - the shared account's commenting option

disabled - whether or not the shared account is currently disabled

invoice-option - the shared account's invoicing option

notes - notes for the shared account

pin - the shared account's PIN

restricted - whether or not the shared account is currently restricted

set-shared-account-property <account\_name> <property> <value>

Sets a shared account property.

<account\_name> - the name of the shared account.

<property> - the name of the property to set. Valid properties and values include:

access-groups - the shared account's access groups) (a comma separated list)

access-users - the shared account's access users (a comma separated list)

balance - the shared account's current balance (a decimal number)

comment-option - the shared account's commenting option. One of:  
 NO\_COMMENT - no comment can be entered  
 COMMENT\_REQUIRED - a comment must be entered  
 COMMENT\_OPTIONAL - the user can enter a comment or not  
 disabled - whether or not the shared account is currently disabled (TRUE or FALSE)  
 invoice-option - the shared account's invoicing option. One of:  
 ALWAYS\_INVOICE - print jobs are always be invoiced  
 NEVER\_INVOICE - print jobs are never be invoiced  
 USER\_CHOICE\_ON - the user can choose (default on/yes)  
 USER\_CHOICE\_OFF - the user can choose (default off/no)  
 notes - notes for the shared account (any text)  
 pin - the shared account's PIN (any text, must be unique)  
 restricted - whether or not the shared account is currently  
 restricted (TRUE or FALSE)  
 <value> - the value to set (see <property> for valid values).

adjust-shared-account-account-balance <account\_name> <adjustment> <comment>

Adjust a shared account's account balance.  
 <account\_name> - the shared account's full name.  
 <adjustment> - the adjustment amount as a number. +ve or -ve.  
 <comment> - a comment to be associated with the transaction.

set-shared-account-account-balance <account\_name> <balance> <comment>

Set a shared account's balance to a set value.  
 <account\_name> - the shared account's full name.  
 <balance> - set the account to this value. +ve or -ve.  
 <comment> - a comment to be associated with the transaction.

add-new-shared-account <shared\_account\_name>

Add a new shared account.  
 <shared\_account\_name> - the name of the shared account.

rename-shared-account <curr\_shared\_account\_name> <new\_shared\_account\_name>

Rename an existing shared account.  
 <curr\_shared\_account\_name> - Current shared account name.  
 Use a '\' to denote a subaccount e.g.: 'parent\sub'

<new\_shared\_account\_name> - New shared account name.

delete-existing-shared-account <shared\_account\_name>

Delete a shared account from the system. Use this method with care. Calling this permanently deletes it from the shared account list (print history records remain).

<shared\_account\_name> - the name of the shared account to delete.

add-shared-account-access-user <shared\_account\_name> <username>

Allow the given user access to the given shared account without using a pin.

<shared\_account\_name> - the name of the shared account to allow access to.

<username> - the name of the user to give access to.

add-shared-account-access-group <shared\_account\_name> <group\_name>

Allow the given group access to the given shared account without using a pin.

<shared\_account\_name> - the name of the shared account to allow access to.

<group\_name> - the name of the group to give access to.

remove-shared-account-access-user <shared\_account\_name> <username>

Revoke the given user's access to the given shared account.

<shared\_account\_name> - the name of the shared account to revoke access to. <username> - the name of the user to revoke access for.

remove-shared-account-access-group <shared\_account\_name>  
<group\_name>

Revoke the given group's access to the given shared account.

<shared\_account\_name> - the name of the shared account to revoke access to.

<group\_name> - the name of the group to revoke access for.

get-printer-property <server\_name> <printer\_name> <property>

Gets a printer property.

<server\_name> - the name of the server the printer is hosted on.

<printer\_name> - the name of the printer.

<property> - the name of the property to get. Valid properties include:

disabled - whether or not the printer is currently disabled

print-stats.job-count - the total print job count for this printer

print-stats.page-count - the total printed page count for this printer

cost-model - the cost model used by the printer (e.g. SIMPLE)

custom-field-1 - the value for custom field 1 if set.

custom-field-2 - the value for custom field 2 if set.

custom-field-3 - the value for custom field 3 if set.

custom-field-4 - the value for custom field 4 if set.

custom-field-5 - the value for custom field 5 if set.

custom-field-6 - the value for custom field 6 if set.

set-printer-property <server\_name> <printer\_name> <property>  
<value>

Sets a printer property.

<server\_name> - the name of the server the printer is hosted on.

<printer\_name> - the name of the printer.

<property> - the name of the property to set. Valid properties and

values include:

disabled - whether or not the printer is currently disabled (TRUE or FALSE)

custom-field-1 - the value for custom field 1

custom-field-2 - the value for custom field 2

custom-field-3 - the value for custom field 3

custom-field-4 - the value for custom field 4

custom-field-5 - the value for custom field 5

custom-field-6 - the value for custom field 6

override-user-level-settings - whether or not printer should override user level settings. (TRUE or FALSE)

override-user-level-settings-charge-to - the name of the shared account. Use "[personal]" for personal account. Use blank to disable charge to settings.

<value> - the value to set (see <property> for valid values).

list-printers

List the names of all the printers in the system, sorted by printer name, one per line.

set-printer-cost-simple <server\_name> <printer\_name> <cost\_per\_page>

Sets the printer's page cost (using SIMPLE charging model).

<server\_name> - the name of the server the printer is hosted on.  
<printer\_name> - the name of the printer.  
<cost\_per\_page> - the cost per page (simple charging model)

get-printer-cost-simple <server\_name> <printer\_name>  
Get the printer's page cost (using SIMPLE charging model).  
<server\_name> - the name of the server the printer is hosted on.  
<printer\_name> - the name of the printer.

reset-printer-counts <server\_name> <printer\_name> <reset\_by>  
Reset the page and job counts associated with a printer.  
<server\_name> - the name of the server hosting the printer.  
<printer\_name> - the printer's name.  
<reset\_by> - name of the user/script/process resetting the counts.

add-printer-group <server\_name> <printer\_name> <printer\_group\_name>  
Add a printer to a single printer group in addition to existing printer group membership.  
<server\_name> - the name of the server hosting the printer.  
<printer\_name> - the printer's name.  
<printer\_group\_name> - name of a printer group.

set-printer-groups <server\_name> <printer\_name> <printer\_group\_names>  
Set the printer groups a printer belongs to, overwriting any existing group membership.  
<server\_name> - the name of the server hosting the printer.  
<printer\_name> - the printer's name.  
<printer\_group\_names> - a comma separated list of printer group names. To clear all group association set to "".

enable-printer <server\_name> <printer\_name>  
Enable a printer.  
<server\_name> - the name of the server hosting the printer.  
<printer\_name> - the printer's name.

disable-printer <server\_name> <printer\_name> <minutes\_disabled>  
Disable a printer for a set period of time.  
<server\_name> - the name of the server hosting the printer.  
<printer\_name> - the printer's name.  
<minutes\_disabled> - the time in minutes to disable. -1 indicates forever.

delete-printer <server\_name> <printer\_name>

Delete a printer.

<server\_name> - the name of the server hosting the printer.  
<printer\_name> - the printer's name. Use "[All Printers]"  
to delete all printers on the specified server.

```
rename-printer <server_name> <printer_name> <new_server_name>  
             <new_printer_name>
```

Rename a printer. This is useful after migrating a print queue or print server (i.e. the printer retains its history and settings under the new name). Note that in some cases case sensitivity is important, so take care to enter the name exactly as it is displayed in the OS.

<server\_name> - the existing printer's server name  
<printer\_name> - the existing printer's queue name  
<new\_server\_name> - the new printer's server name  
<new\_printer\_name> - the new printer's queue name

```
add-printer-access-group <server_name> <printer_name> <group_name>
```

Adds the user group to the printer's access group list.

<server\_name> - the printer's server name  
<printer\_name> - the printer's queue name  
<group\_name> - the name of the user group that needs to be added.

```
remove-printer-access-group <server_name> <printer_name>  
<group_name>
```

Removes the user group from the printer's access group list.

<server\_name> - the printer's server name  
<printer\_name> - the printer's queue name  
<group\_name> - the name of the user group that needs to be removed.

```
add-new-group <group_name>
```

Add a new group to the system's group list. The group should already exist in network directory.

<group\_name> - The name of the group to add.

```
sync-group <group_name>
```

Syncs an existing group with the configured directory server, updates group membership in the system.

<group\_name> - The name of the group to sync.

```
remove-group <group_name>
```

Removes the group.

<group\_name> - The name of the group to remove.

`get-user-groups <user_name>`

Retrieves all groups a single user belongs to.  
<user\_name> - The name of the user to query.

`list-user-groups`

List the names of all the user groups in the system, sorted by groupname, one per line.

`group-exists <group_name>`

Test to see if a group exists.  
<group\_name> - the group name to test.

`set-group-quota <group_name> <quota_amount> <period> <quota_max_accum>`

<group\_name> - the name of the group to set.  
<quota\_amount> - the quota amount.  
<period> - the schedule period (i.e. DAILY, WEEKLY, MONTHLY).  
<quota\_max\_accum> - the quota maximum accumulation amount.  
Set to 0.0 to have no limit.

`get-group-quota <group_name>`

Get the group quota allocation settings on a given group. Returns the quota amount, the schedule period and the quota maximum accumulation amount.  
<group\_name> - the name of the group to get.

`use-card <user_name> <card_number>`

Redeem a card and place the credit on the user's account.  
<user\_name> - the name of the user with the account to credit.  
<card\_number> - the number of the card to use.

`perform-online-backup`

Start an online backup. The back file is written to ~/server/data/backups. as a dated, zipped XML file. This process happens in the background.

`perform-group-sync`

Start the process of synchronizing the system's group membership with the OS/Network/Domain's group membership. A call to this method starts the sync process and the operation completes in the background.

`perform-user-and-group-sync`

Start a full user and group synchronization. This is equivalent to clicking "Synchronize Now" in the admin interface. No existing users are removed. Whether or

not full details for existing users are updated depends on the current user/group sync settings as defined in the admin interface. A call to this method starts the sync process and the operation completes in the background.

`perform-user-and-group-sync-advanced <delete_old_users>  
<update_details>`

An advanced version of the user and group synchronization process providing control over the sync settings. A call to this method starts the sync process and the operation completes in the background.

`<delete_old_users>` - set to TRUE remove old users, else FALSE.

`<update_details>` - set to TRUE if existing users details (e.g. email, full-name, etc) are to be updated.

`add-new-users`

Calling this method starts a specialized user and group synchronization process optimized for tracking down adding any new users who exist in the OS/Network/Domain user directory and not in the system. Any existing user accounts are not modified. A group synchronization is performed only if new users are actually added to the system.

`is-task-complete`

Returns TRUE if a long running task such as `perform-group-sync`, `perform-user-and-group-sync`, or `add-new-users` has completed.

`get-task-status`

Returns status information such as progress, completion status and, error messages, on the current or last run long running task such as `perform-group-sync`, `perform-user-and-group-sync`, or `add-new-users`.

`batch-import-shared-accounts <import_file> <test>`

`<delete_non_existent_accounts>`

Import the shared accounts contained in the given tab-delimited import file.

`<import_file>` - the import file location.

`<test>` - (TRUE or FALSE) If TRUE, perform a test only. The printed statistics show what would have occurred if testing wasn't enabled. No accounts are modified.

<delete\_non\_existent\_accounts> - (TRUE or FALSE) If TRUE, accounts that do not exist in the import file but exist in the system are deleted. If FALSE, they are ignored.

batch-import-users <import\_file> <create\_new\_users>

Import the users contained in the given tab-delimited import file. See the user manual section 'Batch User Data Import and Update' for a description of the file format.

<import\_file> - the import file location.

<create\_new\_users>

If TRUE, users only existing in the import file are newly created, otherwise ignored.

batch-import-internal-users <import\_file> <overwrite\_existing\_passwords>

<overwrite\_existing\_pins>

Import the internal users contained in the given tab-delimited import file. See the user manual section section 'Batch internal user import file format' for a description of the file format.

<import\_file> - the import file location.

<overwrite\_existing\_passwords> (optional, default TRUE) - (TRUE or FALSE) If TRUE, passwords from the import file overwrite existing passwords where a user already has a password set. If FALSE, existing passwords are not changed.

<overwrite\_existing\_pins> (optional, default TRUE) - (TRUE or FALSE). If TRUE, PINs from the import file overwrite existing PINs where a user already has a PIN set. If FALSE, existing PINs are not changed.

batch-import-user-card-id-numbers <import\_file> <overwrite\_existing\_pins>

Import the user card/ID numbers and PINs contained in the given tab-delimited import file. See the user manual section 'Advanced User Management' for a description of the file format).

<import\_file> - the import file location.

<overwrite\_existing\_pins> (optional, default TRUE) - (TRUE or FALSE). If TRUE, PINs from the import file overwrites existing PINs where a user already has a PIN set. If FALSE, existing PINs are not changed.

create-user-client-accounts-file

Saves a file containing shared accounts data for the User Client. See the manual for more information on how you can use this feature. The file is saved on the server to the location:

```
[app-path]\server\data\client\client-accounts.dat
```

If this file already exists it is over-written.

```
get-config <config-name>
```

Gets the value of the given config value printing the result. If the config value does not exist, a blank string is displayed.

<config-name> - the name of the config value to get.

```
set-config <config-name> <config-value>
```

Sets the value of the give config item.

NOTE: Take care updating config values. You might cause serious problems that can be fixed only by reinstallation of the application. Use the set-config command at your own risk.

<config-name> - the name of the config value to set.

<config-value> - the value to set.

```
process-job <job-details>
```

Takes the details of a job and logs and charges as if it were a "real" job. Jobs processed via this method are not susceptible to filters, popups, hold/release queues etc., they are logged. See the user manual section "Importing Job Details" for more information and the format of <job-details>.

<job-details> - the details of the job to log.

```
run-command command-name [command args]
```

Runs a custom command on the server. By default the server does not include any custom commands. The command arguments depend on the custom command being run.

**Tip:**

- `server-command` is ideal for scripting via batch files or shell scripts. You can find some example scripts at `[app-path]/server-  
/examples/scripting/`. Administrators wanting to control PaperCut MF using a programming language such as C#, Java, Visual Basic, Perl, Ruby or Python should consider the XML Web Services APIs. All commands available via the `server-command` tool are also accessible via



calls to the Web Services layer. More information on the XML Web Services API is available in [The XML Web Services API](#).

- Checking for errors: generally `server-command` returns an exit value of 0. When writing your script you should check the string value that `server-command` prints on standard output instead. `server-command` return a non-zero return value if it detects an error with the parameters passed on the command line.
- Some commands (e.g. `batch-import-internal-users`) expect values that are `true` or `false`. In this case the command parameter is compared to the value `true` using a case insensitive compare, all other values are assumed to be `false`.
- If you need to use PaperCut MF's built-in group's name (i.e. "All users" group) in a server command, then use the group name exactly as it is displayed in the administration interface. (e.g. `remove-user-from-group guest-user "[Internal Users]"`)

## 5.3.2. Database Tool (db-tools)

The `db-tools` command-line tool provides a variety of functionality manipulating the PaperCut MF database and data. The tool is located in `[app-path]/server/bin/<platform>/` and needs to be executed from a command prompt. The syntax of the command is:

```
db-tools command [options]
```

The valid commands are:

- `export-db` - export/backup the database data
- `import-db` - import/restore the database data
- `init-db` - create tables and initial data in a new database
- `delete-old-logs` - delete old log data (transaction, print, app log, etc)

`db-tools` is a command-line application accessed via the Command Prompt on Windows, or a Command Shell (e.g. `bash` or a terminal) on Linux and Mac. On Linux or Mac the command must be run as the `papercut` user. Example use on the Apple Mac:

```
sudo su - papercut
db-tools import-db -f /Users/bob/papercut-backup.zip
```

A Windows example is:

```
cd "C:\Program Files\PaperCut MF\server\bin\win\"
```

```
db-tools delete-old-logs 90
```

An Apple Mac example is:

```
sudo su - papercut
cd "/Applications/PaperCut MF/server/bin/mac/"
db-tools import-db /Users/bob/papercut-backup.zip
```

`db-tools` needs exclusive access to the database. It is important that any PaperCut MF services and processes are stopped before executing any commands. Failure to do so results in a "database in use" error message. The `db-tools` command is a powerful low-level utility so carefully consider its use on a production system. The available commands are discussed in detail below.

### 5.3.2.1. export-db Command

The `export-db` command exports the data from the database. The Application Server must be stopped before performing the export. The syntax and options for the `export-db` command are:



**Tip:** If you want to perform an online backup without stopping the Application Server you can use the inbuilt `perform-online-backup server` command. More information on the server commands is available in [Server Commands \(server-command\)](#).

```
usage: db-tools export-db [options]
-d,--dir <dir> Exports the database to the given directory.
-f,--file <file> Exports the database to the given file.
-h,--help Displays this help.
```

If no options are specified then the database export file is created in the `[app-path]\server-data\backups` directory and the file is named `export-[date-time].zip`.

The `--dir` option is used to override the default backup directory. The filename will still be named `export-[date-time].zip`.

The `--file` option is used to specify the full path and filename where the backup is saved.



**Caution:** If the directory or filename parameters contains space, then the argument needs to be quoted.

### 5.3.2.2. import-db Command

The `import-db` command imports the data (from a previous export) into the database. The Application Server must be stopped to perform the import. The syntax and options for the `import-db` command are:

```
usage: db-tools import-db [options] import-file
-f,--force Deletes any existing data before loading the data.
-h,--help Displays this help.
```

The `--force` option is required when the data is loaded into a database that already contains data. In this situation, the force option indicates that existing data is deleted first.

**Caution:** If the import-file contains spaces, quote this argument.

### 5.3.2.3. `init-db` Command

The `init-db` command initializes a database, creating the required tables and initial data. The Application Server must be stopped before you initialize the database. The syntax and options for the `init-db` command are:

```
usage: db-tools init-db [options]
-f,--force Re-initializes the database even if it already
exists.
-h,--help Displays this help.
```

The `--force` option is required to initialize a database that already contains the tables and data. In this case, the force option drops the existing tables before recreating the tables.

### 5.3.2.4. `delete-old-logs` Command

The `delete-old-logs` is used to delete old log data from the system. This command permanently deletes the following data.

- Printer usage logs - Record all print history and statistics
- Account transactions - Record all adjustments to user and shared accounts
- Application logs - Record application status and error messages

```
usage: db-tools delete-old-logs [options] delete-older-than-
days
-n,--non-interactive Perform deletion without confirmation.
-h,--help Displays this help.
```

The `--non-interactive` option performs the deletion without confirmation from the user. This is useful when automating this deletion through a scheduled task or cron job.

The `delete-older-than-days` option determines what data is deleted. If `delete-older-than-days` is 90, then all log data more than 90 days old is deleted. A value of zero (0) removes *all* historical log data from the system.

## 5.3.3. The XML Web Services API

Any quality software product comes with a comprehensive API for deep integration, and PaperCut is no exception! Our industry standard Web Services API allows you to integrate with PaperCut with a programming language of your choice. Web Services data is transmitted over standard HTTP or HTTPS and uses standardized XML mark-up.

There are two main Web Services implementations used for Remote Procedure Call (RPC):

- SOAP/WSDL
- XML-RPC

PaperCut MF uses XML-RPC. XML-RPC is a lightweight web services implementation and has good support for all major programming and scripting languages such as C#, Java, Visual Basic, Perl, Ruby and Python.

API methods are accessed by the URL `http://[server_name]:9191/rpc/api/xmlrpc`, or `https://[server_name]:9192/rpc/api/xmlrpc` for secure connections. Ensure you are making your API call from an authorized address. More information on API usage is provided [below](#).

**Table 104: XML Web Services Methods**

Method	Description
<code>api.isUserExists</code>	Test to see if a user exists in the system/database.
<code>api.getUserAccountBalance</code>	Get the user's current account balance.
<code>api.getUserProperty</code>	Gets a user property. Properties include the user's full name, department, email, home folder, notes, office and restriction status among others.
<code>api.getUserProperties</code>	Get multiple user properties at once. Properties include the user's full name, department, email, home folder, notes, office and restriction status among others.
<code>api.setUserProperty</code>	Sets a user property. Properties include the user's full name, department, email, home folder, notes, office, password (for internal

Method	Description
	users) and restriction status among others.
<code>api.setUserProperties</code>	Set multiple user properties at once. Properties include the user's full name, department, email, home folder, notes, office, password (for internal users) and restriction status among others.
<code>api.adjustUserAccountBalance</code>	Adjust a user's account balance by an adjustment amount. An adjustment can be positive (add to the user's account) or negative (subtract from the account).
<code>api.adjustUserAccountBalanceIfAvailable</code>	Adjust a user's account balance if there is enough credit available.
<code>api.adjustUserAccountBalanceIfAvailableLeaveRemaining</code>	Adjust a user's account balance if there is enough credit available to leave the given amount available in the account.
<code>api.adjustUserAccountBalanceByGroup</code>	Adjust the account balance for all users in a group by an adjustment amount. An adjustment can be positive (add to the user's account) or negative (subtract from the account).

Method	Description
<code>api.- adjustUserAccountBalanceByGroupUpTo</code>	Adjust the account balance for all users in a group by an adjustment amount, but not above the given limit. An adjustment can be positive (add to the user's account) or negative (subtract from the account).
<code>api.setUserAccountBalance</code>	Set the balance on a user's account to a set value. This is conducted as a transaction.
<code>api.setUserAccountBalanceByGroup</code>	Set the balance for each member of a group to the given value.
<code>api.resetUserCounts</code>	Reset the counts (pages and job counts) associated with a user account.
<code>api.reapplyInitialUserSettings</code>	Re-applies initial settings on the user. Initial user settings are based on group membership.
<code>api.disablePrintingForUser</code>	Disable printing for a user for selected period of time.
<code>api.addNewUser</code>	Triggers the process of adding a new user account defined by a given <code>username</code> . Assuming the user exists in the OS/Net-

Method	Description
	work/Domain user directory, the account is created with the correct initial settings as defined by the rules set up in the admin interface under the Group's section. Calling this method is equivalent to triggering the "new user" event when a new user performs printing for the first time.
<code>api.renameUserAccount</code>	Rename a user account. Useful when the user has been renamed in the domain / directory, so that usage history can be maintained for the new username. Perform this in conjunction with a rename of the user in the domain / user directory, as all future usage and authentication uses the new username.
<code>api.getUserGroups</code>	Retrieves all groups a single user is a member of.
<code>api.deleteExistingUser</code>	Delete/remove an existing user from the user list. Use this method with care. Calling this permanently deletes the user account

Method	Description
	from the user list (print and transaction history records remain).
<code>api.addNewInternalUser</code>	Creates and sets up a new internal user account. In PaperCut MF all internal usernames must contain only characters that can be printed (e.g. <i>not</i> <code>newline</code> ) and must not contain <code>/</code> , <code>\</code> or <code>@</code> .
<code>api.lookupUserNameByIDNo</code>	Looks up the user with the given user id number and returns their user name. If no match was found an empty string is returned.
<code>api.lookupUserNameByCardNo</code>	Looks up the user with the given user card number and returns their user name. If no match was found an empty string is returned.
<code>api.addAdminAccessUser</code>	Add a user as an admin with default admin rights.
<code>api.removeAdminAccessUser</code>	Remove an admin user from the list of admins.
<code>api.addAdminAccessGroup</code>	Add a group as an admin group with default admin rights.

Method	Description
<code>api.removeAdminAccessGroup</code>	Remove a group from the list of admin groups.
<code>api.- setUser- AccountSelectionAutoSelectSharedAccount</code>	Sets a user's account selection to charge to a single shared account.
<code>api.- setUser- AccountSelectionAutoChargePersonal</code>	Sets a user's account selection to automatically charge to personal account
<code>api.- setUserAccountSelectionStandardPopup</code>	Sets a user's account selection to standard account selection popup.
<code>api.listUserAccounts</code>	List all user accounts (sorted by username) starting at <code>offset</code> and ending at <code>limit</code> . Use this to enumerate all user accounts in 'pages'. When retrieving a list of all user accounts, the recommended page size / limit is 1000. Batching in groups of 1000 ensures efficient transfer and processing. E.g.: <pre>listUserAccounts ("authToken", 0, 1000) - returns users 0 through 999 listUserAccounts ("authToken", 1000, 1000) - returns users 1000 through 1999</pre>

Method	Description
	<pre>listUserAccounts ("authToken", 2000, 1000) - returns users 2000 through 2999</pre>
<pre>api.getTotalUsers</pre>	<p><b>Gets a count of all the users in the system.</b></p>
<pre>api.listSharedAccounts</pre>	<p><b>List all shared accounts (sorted by account name) starting at <code>offset</code> and ending at <code>limit</code>. Use this to enumerate all shared accounts in 'pages'. When retrieving a list of all accounts, the recommended page size / limit is 1000. Batching in groups of 1000 ensures efficient transfer and processing.</b></p> <p><b>E.g.:</b></p> <pre>listSharedAccounts ("authToken", 0, 1000) - returns shared accounts 0 through 999 listSharedAccounts ("authToken", 1000, 1000) - returns shared accounts 1000 through 1999 listSharedAccounts ("authToken", 2000, 1000) -</pre>

Method	Description
	<pre>returns shared accounts 2000 through 2999</pre>
<pre>api.listUserSharedAccounts</pre>	<p>List all shared accounts the user has access to (sorted by account name), starting at <code>offset</code> and ending at <code>limit</code>. Use this to enumerate the accounts in 'pages'. When retrieving a list of all accounts, the recommended page size / limit is 1000. Batching in groups of 1000 ensures efficient transfer and processing. You can optionally specify <code>TRUE</code> to list accounts even if the user is currently not configured to charge to a shared account.</p> <p>E.g.:</p> <pre>listUser- SharedAccounts ("authToken", "username", 0, 1000) - returns shared accounts 0 through 999 listUser- SharedAccounts ("authToken", "username", 1000, 1000) - returns shared accounts 1000 through 1999</pre>

Method	Description
	<pre>listUser-SharedAccounts("authToken", "username", 2000, 1000) - returns shared accounts 2000 through 2999</pre> <pre>listUser-SharedAccounts("authToken", "username", 0, 1000, TRUE) - returns shared accounts 0 through 999 even if "username" is not configured to charge to a shared account.</pre>
<code>api.isSharedAccountExists</code>	Test to see if a shared account exists in the system/database.
<code>api.setSharedAccountAccountBalance</code>	Sets a shared account's current account balance.
<code>api.getSharedAccountAccountBalance</code>	Gets a shared account's current account balance.
<code>api.setSharedAccountProperty</code>	Sets a shared account property. Properties include access groups, balance, comment options, disabled status, notes, pin and restriction status among others.
<code>api.setSharedAccountProperties</code>	Sets multiple shared account properties at once.

Method	Description
	Properties include access groups, balance, comment options, disabled status, notes, pin and restriction status among others.
<code>api.getSharedAccountProperty</code>	Gets a shared account property. Properties include access groups, balance, comment options, disabled status, notes, pin and restriction status among others.
<code>api.getSharedAccountProperties</code>	Gets multiple shared account properties at once. Properties include access groups, balance, comment options, disabled status, notes, pin and restriction status among others.
<code>api.adjustSharedAccountAccountBalance</code>	Adjust a shared account's account balance by an adjustment amount. An adjustment can be positive (add to the account) or negative (subtract from the account).
<code>api.setSharedAccountAccountBalance</code>	Set the balance on a shared account to a set value. This is conducted as a transaction.

Method	Description
<code>api.addNewSharedAccount</code>	Create a new shared account with the given name.
<code>api.deleteExistingSharedAccount</code>	Delete a shared account from the system. Use this method with care. Deleting a shared account permanently deletes it from the shared account list (print history records remain).
<code>api.addSharedAccountAccessUser</code>	Allow the given user access to the given shared account without using a pin.
<code>api.renameSharedAccount</code>	Rename an existing shared account.
<code>api.deleteExistingSharedAccount</code>	Delete a shared account from the system. Use this method with care. Calling this permanently deletes it from the shared account list.
<code>api.addSharedAccountAccessGroup</code>	Allow the given group access to the given shared account without using a pin.
<code>api.removeSharedAccountAccessUser</code>	Revoke the given user's access to the given shared account.

Method	Description
<code>api.removeSharedAccountAccessGroup</code>	Revoke the given group's access to the given shared account.
<code>api.disableSharedAccount</code>	Disables a shared account for a selected period of time.
<code>api.getPrinterProperty</code>	Gets a printer property. Available properties include: disabled, print-status.job-count, print-status.page-count.
<code>api.setPrinterProperty</code>	Sets a printer property.
<code>api.listPrinters</code>	List all printers (sorted by printer name), starting at <code>offset</code> and ending at <code>limit</code> . Use this to enumerate the printers in 'pages'. When retrieving a list of all printers, the recommended page size / limit is 1000. Batching in groups of 1000 ensures efficient transfer and processing. E.g.: <pre>listPrinters ("authToken", 0, 1000) - returns printers 0 through 999 listPrinters ("authToken", 1000, 1000) - returns printers</pre>

Method	Description
	1000 through 1999  listPrinters ("authToken", 2000, 1000) - returns printers 2000 through 2999
<code>api.setPrinterCostSimple</code>	Set a page cost using the Simple Charging Model.
<code>api.getPrinterCostSimple</code>	Get the page cost if, and only if, the printer is using the Simple Charging Model.
<code>api.resetPrinterCounts</code>	Reset the counts (pages and job counts) associated with a printer.
<code>api.addPrinterGroup</code>	Add a printer to a single printer group.
<code>api.setPrinterGroups</code>	Set the printer groups a printer belongs to, overwriting any existing group.
<code>api.enablePrinter</code>	Enables a printer.
<code>api.disablePrinter</code>	Disable a printer for select period of time.
<code>api.deletePrinter</code>	Delete a printer. Use the special text "[All Printers]" to delete all printers on the specified server.
<code>api.renamePrinter</code>	Rename a printer. This is useful after migrating a print queue or print server (i.e.

Method	Description
	the printer retains its history and settings under the new name). Note that in some cases case sensitivity is important, so take care to enter the name exactly as it is displayed in the OS.
<code>api.addPrinterAccessGroup</code>	Add a user group to the printer's access group list.
<code>api.removePrinterAccessGroup</code>	Remove a user group from the printer's access group list.
<code>api.addNewGroup</code>	Add a new group to system's group list.
<code>api.RemoveGroup</code>	Remove a group.
<code>api.listUserGroups</code>	List all groups (sorted by group name), starting at <code>offset</code> and ending at <code>limit</code> . Use this to enumerate the groups in 'pages'. When retrieving a list of all groups, the recommended page size / limit is 1000. Batching in groups of 1000 ensures efficient transfer and processing. E.g.: <pre>listUserGroups ("authToken", 0, 1000) - returns groups 0</pre>

Method	Description
	through 999 listUserGroups ("authToken", 1000, 1000) - returns groups 1000 through 1999 listUserGroups ("authToken", 2000, 1000) - returns groups 2000 through 2999
<code>api.isGroupExists</code>	Test to see if a group exists in the system.
<code>api.addUserToGroup</code>	Adds a user to a specified group. Changes the group membership within the application, not in the OS/Network/Domain user directory.
<code>api.removeUserFromGroup</code>	Removes a user from a specified group. Changes the group membership within the application, not in the OS/Network/Domain user directory.
<code>api.setGroupQuota</code>	Set the group quota allocation settings on a given group.
<code>api.getGroupQuota</code>	Get the group quota allocation settings on a given group.
<code>api.useCard</code>	Redeem a card and place the credit on the user's

Method	Description
	account.
<code>api.performOnlineBackup</code>	Instigate an online backup. This process is equivalent to clicking <b>Manual Backup</b> in the web based admin interface. The data is exported into the server- /data/backups directory as a timestamped, zipped XML file.
<code>api.performGroupSync</code>	Start the process of synchronizing the system's group membership with the OS/Network/Domain's group membership. A call to this method starts the sync process and the operation completes in the background.
<code>api.performUserAndGroupSync</code>	Start a full user and group synchronization. This is equivalent to clicking <b>Synchronize Now</b> in the admin interface. No existing users are removed. Whether or not full details for existing users are updated depends on the current user/group sync settings as defined in the admin interface. A call

Method	Description
	to this method starts the sync process and the operation completes in the background.
<code>api.performUserAndGroupSyncAdvanced</code>	An advanced version of the user and group synchronization process providing control over the sync settings. A call to this method starts the sync process and the operation completes in the background.
<code>api.addNewUsers</code>	Calling this method starts a specialized user and group synchronization process optimized for tracking down and adding any new users who exist in the OS/Network/Domain user directory and not in the system. Any existing user accounts are not modified. A group synchronization is performed only if new users are actually added to the system.
<code>api.getTaskStatus</code>	Return the status (completed flag and a status message) associated with a backgrounded task such as

Method	Description
	<p>a sync operation started by the <code>performGroupSync</code> API.</p> <p>This method returns a struct (hashtable/map) containing elements with keys <code>completed</code> and <code>message</code>. You can poll this method can be polled to determine if a sync has completed.</p>
<code>api.batchImportSharedAccounts</code>	Import the shared accounts contained in the given tab separated import file (located on the server).
<code>api.batchImportUsers</code>	Import the users contained in the given tab-delimited import file (located on the server). See <a href="#">Batch User Data Import and Update</a> for a description of the file format.
<code>api.batchImportInternalUsers</code>	Import the internal users contained in the given tab-delimited import file (located on the server). See <a href="#">Batch internal user import and update</a> for details of the required file format.
<code>api.batchImportUserCardIdNumbers</code>	Import the user card/ID numbers and PINs contained in

Method	Description
	the given tab-delimited import file.
<code>api.createUserClientAccountsFile</code>	Saves a file containing shared accounts data for the User Client. See the manual for more information on how you can use this feature. The file is saved on the server to the location: [app-path] \server- \data\client-ent\client-accounts.dat If this file already exists it is over-written.
<code>api.getConfigValue</code>	Gets the value of a configuration settings.
<code>api.setConfigValue</code>	Sets the value of a configuration setting. NOTE: Take care updating config values. You can cause serious problems which can only be fixed by reinstallation of the application. Use the setConfigValue API at your own risk.
<code>api.processJob</code>	Takes the details of a job and logs and charges as if it were a "real" job. Jobs

Method	Description
	processed via this method are not susceptible to filters, popups, hold/release queues etc., they are only logged. See the user manual section "Importing Print Job Details" for more information and the format.

### 5.3.3.1. Web Services Example Code

The best way to demonstrate how to use the Web Services interface is using example code. PaperCut MF ships with example code for Java, C#, Python and Ruby located in:

```
[app-path]/server/examples/webservices/
```

The C# and Java examples also include a full documented Proxy class - a proxy is a common program design pattern. The Proxy wraps and exposes the Web Services methods as standard methods. The setup and use of the underlying XML-RPC library is all handled in the proxy class meaning you can just focus on calling the methods.

See the `README.txt` files in the examples directories for more information. The Java example includes full Javadoc style documentation under

```
[app-path]/server/examples/webservices/java/docs/api
```

Developers using other languages, such as, Perl or Python need to use an XML-RPC library to call the methods directly. All methods are exposed via the URL `http://[server_name]:9191/rpc/api/xmlrpc`.



**Tip:** All the XML Web Services commands are also accessible via the `server-command` program. An alternative to using a full programming environment to automate PaperCut MF via Web Services is to use the `server-command` program to call the commands via a script such as a batch file or shell script. This is a simpler solution for common automation tasks such as scheduling a User/Group synchronization each night. For more information on the `server-command` program, see [Server Commands \(server-command\)](#).



**Tip:** Programmers often report that they get an error message "ERROR: java.lang.NoSuchMethodException:" and this is frequently because they are calling the API method with the wrong number or type of parameters. Consult the Javadoc API documentation (see above) for information on what parameters to use.

### 5.3.3.2. Security

The Web Services API's provide full access to the system's internals so must be secured. PaperCut MF secures access using two security layers:

1. IP address level security
2. Authentication tokens - required for each method call

The IP address level security is used to control which systems, denoted by IP address, are allowed to connect to the server and call the API's. By default this is restricted to `localhost` (127.0.0.1) only. If the program/script making use of the API's resides on another system, then add this system's IP address to the list of approved addresses under **Options > Advanced > Allowed XML Web Services callers** .

The first argument to all method calls is an authentication token (`authToken`). In the default setup the authentication token is the built-in `admin` user's password (This is password defined for the `admin` during the initial configuration wizard). Optionally, you can define an alternative web service authentication token via configuration (see below). This token *must* be supplied with all method calls.

You can specify an alternative web service authentication token to avoid using/sharing the built-in `admin` user's password:

1. Log in to the system.
2. Navigate to the **Options** tab.
3. In the list of actions, click **Config editor (advanced)**.
4. Find the `auth.webservices.auth-token` config setting.
5. Enter a new value that is the new web services authentication token.
6. Click **Update** to the right to apply the change.
7. This authentication token can now be used in addition to the built-in `admin` user's password.

### 5.3.4. SSL/HTTPS Key Generation

During the install process, PaperCut MF generates a self-signed key/certificate issued for the host's machine name. This key is used by default when the system is accessed via HTTPS on port 9192.

The default SSL certificate provides good security, however, there are two downsides to using a self-signed certificate:

1. When users access the HTTPS site using a fully-qualified domain name, the browser issues a "Domain mismatch warning". To avoid this warning, re-create the self-signed certificate with the machine's fully qualified domain name, see [Re-create the self-signed certificate](#).
2. The browser also warns the user that the certificate is not signed by a trusted authority. To overcome this you must obtain a certificate signed by a trusted authority, see [Creating and installing a purchased SSL Certificate](#), or if you already have one, see [Importing an existing SSL key](#).

Eliminating these warnings provides a smoother experience for the end users of PaperCut MF.

This section describes how to recreate the self-signed certificate, use your own SSL certificate and further customise the SSL certificates that you want to use. This is a technically complex area and there is an assumed level of experience with SSL certificates in general.

### 5.3.4.1. Re-create the self-signed certificate

Use the tool `create-ssl-keystore` to re-create the key/certificate (stored in a keystore file) for a different hostname eliminating the browser domain mismatch warning. An example of the command's use:

```
cd [app-path]/server/bin/win
create-ssl-keystore -f "myserver.fullname.com"
```

More information is available via the `--help` command line option.

```
Usage: create-ssl-keystore [-f] [-k FILE] [SYSTEM_NAME]
-f Force. Overwrite any existing keystore file.
-k FILE: Define a keystore file location. If not set the keystore is created in the default location (server/data/default-ssl-keystore).
SYSTEM_NAME: The name of the computer/server used to generate keystore. If not defined, the current computer name is used.
```



**Caution:** For backwards compatibility with 3rd party systems the default self-signed certificate is generated with a SHA1 algorithm. See [Can I use other algorithms such as SHA2/SHA256?](#)

### 5.3.4.2. Creating and installing a purchased SSL Certificate

Large organizations might want to use their own SSL key signed by a commercial certificate authority (CA) that is recognized by all popular web browsers including Internet Explorer, Mozilla Firefox, Safari and Chrome. A complete list is in Windows under **Control Panel > Internet Options > Content > Certificates > Trusted Root Certification Authorities**.

Some large organizations also operate a certificate authority of their own that is recognized by their users' web browsers by way of a root certificate that is installed into all users' web browsers in a manual or automated way.

The advantage of a signed certificate is that it eliminates the browser warning, "The security certificate presented by this website was not issued by a trusted certificate authority."

If you are already in possession of a signed SSL key and certificate for the domain name of the PaperCut Application Server, see [Importing an existing SSL key](#) below.

The high-level steps are:

- Create the SSL keystore and create the private key
- Create the Certificate Signing Request (CSR)
- Send the CSR to your Certificate Authority
- Receive your signed certificate

Optionally you will receive one or more intermediary certificates that you must install as well

- Install any intermediary certificates and then your new certificate
- Restart the PaperCut MF Application Server and confirm that everything is working as expected

To create your own SSL key and have it signed by a commercial or intra-organizational certificate authority you can use the 'keytool' tool supplied in the directory `[app-path]/runtime/jre/bin`.

1. Open a command prompt window and change to the directory `[app-path]/runtime/jre/bin`. Any existing files called 'my-ssl-keystore' in this directory are likely leftovers from previous attempts and need to be renamed or deleted at this point.
2. Enter this command to produce the SSL key:

```
keytool -keystore [app-path]\server\custom\my-ssl-keystore  
-alias jetty -genkeypair -keyalg RSA
```



**Caution:** This process creates a 'my-ssl-keystore' file. Don't lose this file! You need it when adding the public key later. We recommend making a copy of this 'my-ssl-keystore' and keeping it in a safe place. If it is lost or changed, your certificate needs to be re-issued, often resulting in costs from your Certificate Authority. If you are renewing your SSL certificate, review [Renewing your SSL certificate](#)

As *keystore password* choose 'password' or another simple password as it is not very important. Enter the same password again later when asked for a *key password*.

**Note:**

Some organizations require larger key sizes than the default 1024 bit. In this case add the "-keysize 2048" or "-keysize 4096" parameter to the end of the above command line.

You will be asked a series of questions. Enter the exact fully-qualified domain name of the PaperCut MF Application Server where it asks you for "first and last name". The server name must be the exact one that users will enter into their browsers to access PaperCut MF's web interface, e.g. 'printing.myschool.edu'. Depending on the certification authority's requirements, you might also need to fill in some of the other fields.

```
Enter keystore password: password
What is your first and last name?
[Unknown]: printing.myschool.edu
What is the name of your organizational unit?
[Unknown]:
What is the name of your organization?
[Unknown]:
What is the name of your City or Locality?
[Unknown]:
What is the name of your State or Province?
[Unknown]:
What is the two-letter country code for this unit?
[Unknown]:
Is CN=printing.myschool.edu, OU=Unknown, O=Unknown,
L=Unknown, ST=Unknown, C=Unknown correct?
[no]: yes
Enter key password for <jetty>
(RETURN if same as keystore password): password
```

### 3. Prepare your new SSL key for certification by the certificate authority:

```
keytool -certreq -alias jetty -keystore [app-path]\server-
\custom\my-ssl-keystore
-file [app-path]\server\custom\jetty.csr
```

Paste the contents of the resulting `jetty.csr` into the online order forms of commercial certificate authorities or pass them to your organization's own certificate authority.

When the certification process has completed, the authority provides you with a certificate file that you can download from the authority's web site. The filename usually ends in `.crt`, `.cer` or `.cert`. The contents of the file should look something like this:

```
-----BEGIN CERTIFICATE-----
MIIDLTCAPagAwIBAgIQJc/MOTjAW0HrPI/4rGtDCDANBgkqhkiG9w0BAQ-
UFADCB
```

```

hzELMAkGA1UEBhMCWkExIjAgBgNVBAgTGUZPUiBURVNUSU5HIFBVU1BPU0V-
TIE9O
... more here ...
Awjh-
fz9EfxN2l1UYp15xZZyNO4DO3X/LliCG9p-
dFf4hUH18tRnhQBvRR1F0v9UHB
PC6L9jNjMbQUoQ9NG/S8Nn7ZcSHNy+P53ntIBaEfTv7+qvXNWvSb5wj4p-
d05wGF1
Bw== -----
END CERTIFICATE-----

```

Save the file as `jetty.crt`.



**Caution:** If you have not already, take the opportunity now to backup your `my-ssl-keystore` at this time.

- Before you can make use of your newly obtained certificate, you might have to import the certificate authorities "root certificate". PaperCut comes with a number of root certificates pre-installed that you can list using this command (still from the directory `[app-path]/runtime/jre/bin` as above):

```

keytool -keystore ../lib/security/cacerts -storepass
changeit -list

```

Add the option `"-v"` at the end to obtain the same list with more details, such as expiration dates.

If your certificate authority is not listed there, or you have been notified that they have recently started using new root certificates, first import the certificate authority's root certificate into your keystore before importing your newly obtained own certificate. The CA's root certificate is available for download on the CA's web site as a file ending on `.pem` or `.crt`. Save the file using a filename indicative of the CA's name, e.g. `globaltrust.pem`. Import the root certificate using this command, specifying an `alias` that is indicative of the CA's name (type this all in one line):

```

keytool -keystore [app-path]\server\custom\my-ssl-keystore
-importcert -alias globaltrustroot -file glob-
altrustroot.pem

```

When asked whether to trust this certificate, answer yes:

```

Trust this certificate? [no]: yes

```

Some certificate authorities also provide additional "intermediate certificates" that must be imported the same way as the root certificate. You should use a different `alias` each time. For example:

```
keytool -keystore [app-path]\server\custom\my-ssl-keystore
-importcert -alias globaltrustinter -file glob-
altrustinter.pem
```

5. Now you can import your own certificate previously saved as `jetty.crt` (type this all in one line):

```
keytool -keystore [app-path]\server\custom\my-ssl-keystore
-import -alias jetty -file jetty.crt -trustcacerts
```



**Caution:** The 'my-ssl-keystore' in the above command is the original my-ssl-keystore you created in step 2.

6. Your new keystore file `my-ssl-keystore` is now ready. Move it to the location `[app-path]/server/custom`.

Now that you have your keystore file, follow the instructions in [Configuring PaperCut to use the new certificate](#) to install it and start serving up your new SSL certificate.

### 5.3.4.3. Importing an existing SSL key

If you have an existing SSL key with certificate you can import it into the PaperCut MF keystore. Reasons for having an existing signed key include:

- You have obtained an SSL key specifically for use with your PaperCut MF Application Server using a method other than using 'keytool' as described above. As a result you have - on Windows - a certificate with an attached private key either stored in the Windows certificate store or in a so-called PCKS#12 file (`*.p12/* .pfx`), or, - on Linux - separate 'PEM encoded' key and certificate files.
- Your organization's intranet as served by Internet Information Server (Windows), Apache (Linux) or another web server uses a certificate that you can re-use for PaperCut MF. NOTE: Unless your intranet server and PaperCut MF run on the same server (i.e. on different ports), the server name of your intranet server is different to your PaperCut MF Application Server. E.g. the intranet address might be `internal.myschool.edu` while the PaperCut MF Application Server is reached at `printing.myschool.edu`. In this case the certificate can only be re-used if it is a so-called wild-card certificate that allows arbitrary subdomains under the `myschool.edu` domain name that it was issued for.

On Windows, if the certificate with key exist in the Windows certificate store only, export it:

1. Open the **Windows Control Panel**; then select **Internet Options**.
2. On the **Content** tab, click **Certificates**.
3. On the **Personal** tab, select the certificate; then click **Export**.
4. Click **Next** at the initial screen.

5. Select **Yes, export the private key**; then click **Next**.  
If you selected the last option correctly, you can export only as a .PFX file.
6. Select the **Include all the certificates in the certification path if possible** check box.
7. Clear the **Enable strong protection** check box.
8. Clear the **Delete the private key if the export is successful** check box.
9. Type a password for the PFX file. This is only used temporarily.
10. Save the PFX file with the extension .pfx. (This is just temporary, you MUST delete this file later on.)
11. Finish the wizard to export the certificate.

On Windows, if the certificate with key exists in the IIS Server Certificates store, export it:

1. Open the Windows management console, select your IIS server and open "Server Certificates".
2. Right-click the certificate; then click **Export**.
3. Choose a filename with the extension .pfx. (This is just temporary, you MUST delete this file later on.)
4. Type a password for the PFX file. This is only used temporarily.
5. Click **OK**.

On Linux, if the key and certificate are in separate 'PEM encoded' files:

- Use the 'OpenSSL' tool that is part of many Linux distributions to combine both files to a PKCS#12 file with the following command (type this all in one line):

```
openssl pkcs12 -export -inkey <key file> -in <certificate file> -out <pfx file>
```

<pfx file> is the target PKCS#12 file for which you should choose a filename with the extension .pfx. (This is just temporary, you MUST delete this file later on.)

Then import the certificate into your own PaperCut MF keystore:

1. Open a command prompt and change to the installation directory. E.g. on Windows:

```
cd "c:\Program Files\PaperCut MF\"
```

2. Enter the following command (type this all in one line):

```
"runtime/jre/bin/java" -classpath server/lib/jetty-6.1.22.-  
jar org.mortbay.jetty.security.PKCS12Import "<pfx file>"  
server/custom/my-ssl-keystore
```

Substitute `<pfx file>` with the `.pfx` or `.p12` file containing your certificate and key.

*The Jetty version number (6.1.22) changes from time to time. If you receive a `NoClassDefFoundError` message look for a `jetty-*.jar` file in the `[app-path]/server/lib/` directory and update the command as appropriate.*

3. Enter the 'input keystore passphrase'. Enter the password that you used when you saved the file.
4. Enter the 'output keystore passphrase'. Enter a new password such as 'password'. Once this command completes, a new file is created at `[app-path]/server/custom/my-ssl-keystore`. This file is your keystore and contains your certificate and key.
5. Now that you have your keystore file, follow the instructions in [Configuring PaperCut to use the new certificate](#) to install it and start serving up your new SSL certificate.

### 5.3.4.4. Configuring PaperCut to use the new certificate

The previous sections described how to create a keystore file - [Creating and installing a purchased SSL Certificate](#) for putting a new certificate from a certificate authority into a keystore, and [Importing an existing SSL key](#) for generating and putting your own "self-signed" certificate in a keystore. This section describes how to install your keystore so that PaperCut can start serving up your new certificate.



**Important:** Changes are not applied until the PaperCut MF Application Server is restarted.

To configure the PaperCut Application Server to use the new key/certificate:

1. Copy your signed keystore onto the server running the PaperCut MF Application Server. The suggested location is `[app-path]/server/custom/my-ssl-keystore`
2. Open the file `[app-path]/server/server.properties` with a text editor (e.g. Notepad).
3. Locate the section titled `SSL Key/Certificate`.
4. Remove the # (hash) comment marker from all lines starting with `"server.ssl"`.
5. Define the location of your keystore, keystore password and key password as chosen previously. The file should look something like this:

```
server.ssl.keystore=custom/my-ssl-keystore
server.ssl.keystore-password=password
server.ssl.key-password=password
```

**NOTE:** On Mac OS, specify the FULL path to your keystore, e.g. `/Applications/PaperCut MF/server/custom/my-ssl-keystore`

- Restart the PaperCut MF Application Server and verify all is working. If the server fails to start, error messages are recorded in logs located in the server's `logs` directory.



**Important:** Now that you have a working SSL certificate for your PaperCut MF server, it's time to set a reminder in your calendar (or similar) to ensure that your SSL certificate is renewed before it expires! Go do that now!

### 5.3.4.5. Renewing your SSL certificate

To ensure that the trust mechanisms in SSL are adhered to, SSL certificates are designed to expire so that your environment is kept up-to-date. To renew your SSL certificate you need to retrace your steps when originally creating a new SSL certificate. See: [Creating and installing a purchased SSL Certificate](#). However, the exact steps depend on your Certificate Authority as some require you to submit a brand new CSR, some allow you to just request a new SSL certificate.

The easiest way to do this is to use a new keystore, e.g. you substitute `my-ssl-keystore` with `my-ssl-keystore-20151217`

The new `my-ssl-keystore-20151217` is put into production only after you've modified the `server.properties` as per the [Configuring PaperCut to use the new certificate](#). and have restarted the PaperCut MF Application Server. This means you have time to create the private key, complete the CSR and receive the signed certificate before using the new keystore. If there is an issue with the new certificate or setup, you can quickly revert back to the original `my-ssl-keystore`.

For example, the SSL key generation command originally was

```
keytool -keystore [app-path]\server\custom\my-ssl-keystore -
alias jetty -genkeypair
-keyalg RSA
```

and it becomes

```
keytool -keystore [app-path]\server\custom\my-ssl-keystore-
20151217 -alias jetty -genkeypair
-keyalg RSA
```

### 5.3.4.6. Further customization

## Extended keytool.exe usage

This documentation provides the more common scenarios around `keytool.exe` usage. If you require further customisation, review the documentation available from Oracle:

- PaperCut MF version 15.2 and newer: [Java 8 \(1.8\) keytool Documentation](#)
- PaperCut MF version 14.0 and newer: [Java 7 \(1.7\) keytool Documentation](#)

3. PaperCut MF version 13.5 and older: [Java 6 \(1.6\) keytool Documentation](#)

## Can I have more than one hostname / FQDN?

One of the benefits of using a SSL certificate is making sure that the URL matches the certificate, preventing a 3rd party from masquerading as you. If you have more than one URL or Fully Qualified Domain Name (FQDN) that PaperCut MF is available from, then you have two main options:

1. Obtain a "wildcard" certificate from your Certificate Authority. Contact your Certificate Authority for further details as to this service.
2. Use a "Subject Alternative Name" or "SAN" when creating the SSL certificate. This should require no special action from your Certificate Authority as this is done as part of the certificate generation process with keytool.exe.

**Note:**

You require keytool.exe for PaperCut MF version 14.0 and newer.

An example is:

```
keytool.exe -keystore "my-ssl-keystore" -alias jetty -gen-  
keypair -keyalg RSA -ext san=dns:external.company.com
```

Then, when asked for your "first and last name", enter the other FQDN:

```
What is your first and last name?  
[Unknown]: internal.company.lan
```

Confirm that the information is correct. You will see similar to:

```
Is CN=internal.company.lan, OU=Unknown, O=Unknown,  
L=Unknown, ST=Unknown, C=Unknown correct?
```

Once you have received your certificate from your Certificate Authority you can confirm your "Subject" and "Subject Alternative Name" are valid. Make sure that you test the new certificate with multiple operating systems, browsers and hardware environments including laptops, mobile devices and printers/copiers.

## Can I use other algorithms, such as, SHA2/SHA256?

Yes. As we use keytool.exe, you can use the documentation above in [Extended keytool.exe usage](#).

For example, generating the private SSL key:

```
keytool -genkey -alias server -keyalg rsa -sigalg sha256withrsa  
-keysize 2048 -keystore sha256
```

and generating the CSR:

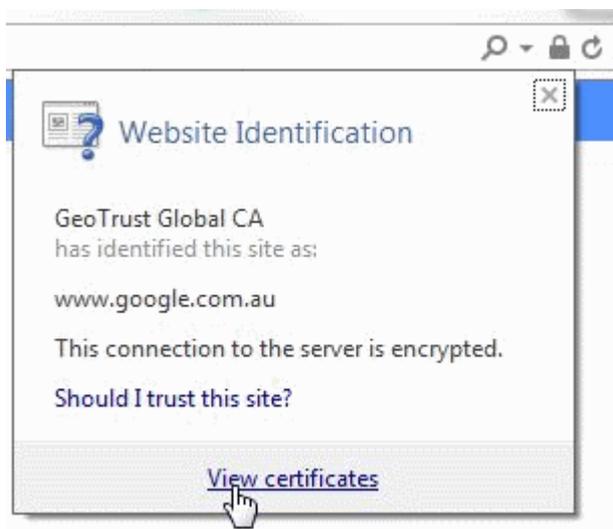
```
keytool -certreq -alias server -keystore sha256 -file 256.csr -  
sigalg sha256withrsa
```

### 5.3.4.7. Troubleshooting SSL

## Verify certificate path in Windows

If you are getting errors with your new SSL certificate one of the first things to check is that the intermediary certificates have been loaded correctly. You can do this via Internet Explorer, and every other modern web browser, the steps differ slightly.

Load Internet Explorer and visit the HTTPs URL for your PaperCut MF server then click the padlock near the URL bar as below.



Then click View Certificates and navigate to the Certificate Path and verify it is correct.



If the path is invalid, confirm that you have correctly inserted the required intermediary certificates. See [Creating and installing a purchased SSL Certificate](#)

## Verify certificate path via command line with OpenSSL

A quick way to easily validate the chain output by the server. This requires either Linux or Cygwin with openssl's packages installed:

```
openssl s_client -connect [server]:[port] -crlf
```

Once the text has been output, type in:

```
QUIT
```

For example, a self-signed certificate looks like this:

```
openssl s_client -connect localhost:9192 -crlf
CONNECTED(00000003)
depth=0 C = Unknown, ST = Unknown, L = Unknown, O = Unknown, OU
= Unknown, CN = print-server
verify error:num=18:self signed certificate
verify return:1
depth=0 C = Unknown, ST = Unknown, L = Unknown, O = Unknown, OU
= Unknown, CN = print-server
verify return:1
--- Certificate chain
0 s:/C-
C=Unknown/ST=Unknown/L=Unknown/O=Unknown/OU=Unknown/CN=print-
server
i:/C-
C=Unknown/ST=Unknown/L=Unknown/O=Unknown/OU=Unknown/CN=print-
server
---
```

An example of a certificate that uses a chain, note the 0, 1, 2 and how the i: (issuer) matches with the s:(subject): of the next certificate.

```
$ openssl s_client -connect www.google.com:443 -crlf
CONNECTED(00000003)
depth=2 C = US, O = GeoTrust Inc., CN = GeoTrust Global CA
verify error:num=20:unable to get local issuer certificate
---
Certificate chain
0 s:/C=US/ST=California/L=Mountain View/O=Google Inc/CN-
N=www.google.com
i:/C=US/O=Google Inc/CN=Google Internet Authority G2
1 s:/C=US/O=Google Inc/CN=Google Internet Authority G2
i:/C=US/O=GeoTrust Inc./CN=GeoTrust Global CA
2 s:/C=US/O=GeoTrust Inc./CN=GeoTrust Global CA
i:/C=US/O=Equifax/OU=Equifax Secure Certificate Authority ---
```

## ERR\_SSL\_VERSION\_OR\_CIPHER\_MISMATCH & SSLHandshakeException: no cipher suites in common

If you receive an error message of ERR\_SSL\_VERSION\_OR\_CIPHER\_MISMATCH in your web browser or notice SSLHandshakeException: no cipher suites in common in the [app-path]\server\logs\server.log it is likely that the certificate chain is not complete or the SSL certificate is in the wrong alias in the key-store. See [Check that the correct Alias has been used in the keystore](#) to confirm the correct alias is in use.

## Check that the correct Alias has been used in the key-store

PaperCut MF is configured to use the alias "jetty". If your SSL certificate is installed into another alias it will not load correctly. To confirm run the following command:

```
keytool -list -v -keystore my-ssl-keystore-20151217
Enter keystore password: [password]

Keystore type: JKS
Keystore provider: SUN

Your keystore contains 1 entry

Alias name: jetty
Creation date: 17/12/2015
Entry type: PrivateKeyEntry
```

The `PrivateKeyEntry` needs to be present in the `jetty` Alias. If it has been imported into another alias, you can use `keytool.exe` to rename it. See [Extended keytool.exe usage](#)

### 5.3.5. User Client Options

The User Client is used to display user balances, system notifications and request information from the users. This is discussed in more detail in [User Client](#). The User Client implements a number of command-line options that change its behavior.

#### 5.3.5.1. Command-line options

**Table 105: User Client command-line options**

Option	Description
<code>--silent</code>	The silent option tells the client not to report errors if it has problems connecting to the server. If the server is unavailable at time of startup (e.g. the client is not connected to the network), or if the user does not currently exist in the database, the client sleeps, waiting for the condition to change. This option can also be set by adding a <code>silent=Y</code> line to the client <code>config.properties</code> .
<code>--debug</code>	The debug option tells the client to log activity to a file

Option	Description
	called <code>user-client.log</code> , which is created in the user's home directory. This option can also be set by adding a <code>debug=Y</code> line to the <code>client config.properties</code> .
<code>--minimized</code>	The <code>minimized</code> option tells the client to start minimized. On Windows, the client is minimized to the task tray. This option is recommended if the user's balance is not important to the user. For example, if a user is only allowed to assign print jobs to a shared account, then their personal balance is of little importance, so the User Client should be minimized. This option can also be set by adding a <code>minimized=Y</code> line to the <code>client config.properties</code> .
<code>--noquit</code>	Stops the user from closing or quitting the client where possible. This option can also be set by adding a <code>noquit=Y</code> line to the <code>client config.properties</code> .
<code>--disable-tasktrayicon</code>	The option tells the client to hide the task tray icon. This option can also be set by adding a <code>disable-tasktrayicon=Y</code> line to the <code>client config.properties</code> .
<code>--disable-balloon-tips</code>	This option instructs the client to display messages in dialog boxes rather than notification area balloon tips. (Windows only) This option can also be set by adding a <code>disable-balloon-tips=Y</code> line to the <code>client config.properties</code> .
<code>--hide-balance</code>	This option instructs the client to hide the user balance. On Windows, the balance window is not displayed. On other platforms, the balance is hidden from the balance window. This option can also be set by adding a <code>hide-balance=Y</code> line to the <code>client config.properties</code> .

Option	Description
	<code>fig.properties.</code>
<code>--user &lt;username&gt;</code>	The user option allows the client to be run using a different username. This is useful if the user is logged into a machine with a username different to the username authenticated with the server/printers. For example, if a user is using a laptop that is not a part of the domain. This option can also be set by adding a <code>user=&lt;username&gt;</code> line to the client <code>config.properties.</code>
<code>--cache &lt;cache directory&gt;</code>	This argument is actioned by <code>pc-client-local-cache.exe</code> . It defines the location of the globally writable cache directory on the system's local hard drive. The cache is used to minimize network traffic on future launches. The default location is <code>C:\Cache</code> . Standard users need <i>WRITE</i> and <i>READ</i> access to this directory. You can also use system variables, such as, <code>--cache %TEMP%</code> to write to e.g. <code>C:\Users\[username]\AppData\Local\Temp</code> , in order to minimize potential permissions issues for non admin users writing to the C: drive.
<code>--neverrequestidentity</code>	The client uses the username of the logged-in user to identify itself with the server. In a domain environment, users always log in using their network identity and the names always match. However, on non-domain systems where local accounts are used (e.g. laptops), these names might not match. The client displays a popup requesting the user to confirm their identity. This option suppresses this dialog. This option can also be set by adding a <code>neverrequestidentity=Y</code> line to the client <code>con-</code>

Option	Description
	<code>fig.properties.</code>
<pre>--windowposition &lt;position&gt;</pre>	<p>Specify where the client window should be displayed. The valid options include <code>top-left</code>, <code>top-right</code>, <code>bottom-left</code> or <code>bottom-right</code>. In addition to the above set of fixed positions, coordinates of the window can also be specified by setting the <code>&lt;position&gt;</code> parameter to <code>XY&lt;x&gt;, &lt;y&gt;</code>. The <code>&lt;x&gt;</code> value sets the x-coordinate of the window (if negative, the value indicates the distance from the right of screen). The <code>&lt;y&gt;</code> value sets the y-coordinate of the window (if negative, the value indicates the distance from the bottom of screen). Some examples include:</p> <ul style="list-style-type: none"> <li>• <code>XY100, 100</code> - position the window 100 pixels from the left and 100 pixels from the top of the screen.</li> <li>• <code>XY-50, 100</code> - position the window 50 pixels from the right and 100 pixels from the top of the screen.</li> <li>• <code>XY50, -100</code> - position the window 50 pixels from the left and 100 pixels from the bottom of the screen.</li> </ul> <p>The window position can also be set by adding a <code>windowposition=&lt;position&gt;</code> line to the client <code>config.properties</code>.</p>
<pre>--windowtitle &lt;title&gt;</pre>	<p>Allows the window title to be customized. If the <code>&lt;title&gt;</code> includes <code>{0}</code> then this is replaced by the user's username. The window title can also be set by adding a <code>windowtitle=&lt;title&gt;</code> line to the client <code>config.properties</code>.</p>
<pre>--background-color &lt;color&gt;</pre>	<p>Changes the background color of the client's balance window. The colors are coded in standard hexadecimal RGB ("web colors", see <a href="http://en.wikipedia.org/wiki/Web_colors">http://en.wikipedia.org/wiki/Web_colors</a> for an explanation). E.g. to set the background color to red, use:</p>

Option	Description
	<pre>--background-color=FF0000</pre> <p>The balance window background color can also be set by adding a <code>background-color=&lt;color&gt;</code> line to the client <code>config.properties</code>.</p>
<pre>--text-color &lt;color&gt;</pre>	<p>Changes the text color of the client's balance window. The colors are coded in standard hexadecimal RGB ("web colors", see <a href="http://en.wikipedia.org/wiki/Web_colors">http://en.wikipedia.org/wiki/Web_colors</a> for an explanation). E.g. to set the text color to blue, use:</p> <pre>--text-color=0000FF</pre> <p>The balance window text color can also be set by adding a <code>text-color=&lt;color&gt;</code> line to the client <code>config.properties</code>.</p>
<pre>--link-color &lt;color&gt;</pre>	<p>Changes the color of the link on the client's balance window. The colors are coded in standard hexadecimal RGB ("web colors", see <a href="http://en.wikipedia.org/wiki/Web_colors">http://en.wikipedia.org/wiki/Web_colors</a> for an explanation). E.g. to set the link color to a dark gray, use:</p> <pre>--link-color=333333</pre> <p>The balance window link color can also be set by adding a <code>link-color=&lt;color&gt;</code> line to the client <code>config.properties</code>.</p>
<pre>--link-hover-color &lt;color&gt;</pre>	<p>Changes the color of the mouseover link on the client's balance window. The colors are coded in standard hexadecimal RGB ("web colors", see <a href="http://en.wikipedia.org/wiki/Web_colors">http://en.wikipedia.org/wiki/Web_colors</a> for an explanation). E.g. to set the link color to a black, use:</p> <pre>--link-hover-color=000000</pre> <p>The balance window mouseover link color can also be set by adding a <code>link-hover-color=&lt;color&gt;</code> line to the client <code>config.properties</code>.</p>

Option	Description
<pre>--default-selection &lt;option&gt;</pre>	<p>Specifies the default selected option on the account selection popup. Use this option to save mouse clicks / keyboard presses by setting the default selected option to the one that is most commonly used. Options include:</p> <ul style="list-style-type: none"> <li>● <code>charge-personal</code> - The "Charge to my personal account" option is selected.</li> <li>● <code>charge-account-list</code> - The "Charge to shared account" option is selected.</li> <li>● <code>charge-account-pin</code> - The "Charge to shared account using PIN / Code" option is selected.</li> <li>● <code>print-as-user</code> - The "Perform print as user" option is selected.</li> </ul> <p>For example, applying a default selection of <code>charge-account-list</code> ensures that the option <b>Charge to shared account</b> is selected, and the drop-down list of accounts is highlighted. This allows the user to begin navigating the list of shared accounts immediately via the keyboard, and saves them having to select the option first. This option can also be set by adding or enabling the <code>default-selection=&lt;option&gt;</code> line in the client <code>config.properties</code> file.</p>
<pre>--default-account &lt;option&gt;</pre>	<p>Specifies the default selected account on the account selection popup. Use this option to save mouse clicks / keyboard presses by setting the default selected account to the one that is most commonly used.</p> <p>NOTE: The default shared account can also be set on the user's account selection options. See <a href="#">The Account Selection Popup</a>. For example, setting the default account to "sales\invoices" results in this account</p>

Option	Description
	<p>being selected when the account selection popup shows. This allows the user to quickly confirm the selection by just clicking OK when the print should be charged to this account. The selection can still be changed if the print should not be charged to this account. This option can also be set by adding or enabling the <code>default-account=&lt;option&gt;</code> line in the client <code>config.properties</code> file. If set, this overrides the default account setting on the user's account selection options.</p>
<pre>--default-account-pin &lt;option&gt;</pre>	<p>Specifies the default account PIN entered on the account selection popup. Use this option to save typing by setting the default account PIN to the one that is most commonly used. Without this option, the account PIN field on the account selection popup shows the account PIN last entered in this field. If the option is specified but left blank (<code>--default-account-pin ""</code>), the account PIN field is blank on every popup. You can also specify this option by adding or enabling the <code>default-account-pin=&lt;option&gt;</code> line in the client <code>config.properties</code> file.</p>
<pre>--accounts-file &lt;account-file-path&gt;</pre>	<p>Specifies the location of the local accounts file to load. For more information, see <a href="#">Managing large client billing databases</a>.</p>
<pre>--auth-ttl-values &lt;ttl-value-mins&gt;</pre>	<p>Comma-separated list of authentication time-to-live values in minutes. This overrides the values configured on the server. See <a href="#">Popup authentication</a>. This option can also be set by adding or enabling the <code>auth-ttl-values=</code> line in the client <code>config.properties</code> file.</p>

Option	Description
<code>--auth-ttl-default</code> <code>&lt;default-mins&gt;</code>	The default time-to-live value automatically selected when the login authentication window displays. This overrides the value configured on the server. This option can also be set by adding or enabling the <code>auth-ttl-default=</code> line in the client <code>config.properties</code> file.
<code>--lockdir</code> <code>&lt;lockdir&gt;</code>	Define an alternate lock directory location.
<code>--disable-auth-by-id-number</code>	Reverts user authentication method to user/password instead of ID Number and PIN.

The command-line arguments listed above are usually used in the area/method used to start the client - a login script, shortcut, or the relevant registry key in `HKEY_LOCAL_MACHINE\Software\Microsoft\Windows\CurrentVersion\Run\`.

### 5.3.5.2. Configuration properties file

The command-line arguments can also be set in the `config.properties` file. This is particularly helpful on Apple Mac systems where command-line arguments are difficult to implement. The `config.properties` file is located in the same directory as the client executable on Linux and Windows. On the Mac it is located at:

```
[app-path]/PCClient.app/Contents/Resources/config.properties
```

Additionally, you can change the settings at the user-level by placing a file in the user's Library Preferences folder located at:

```
~/Library/Preferences/PCClient/config.properties
```

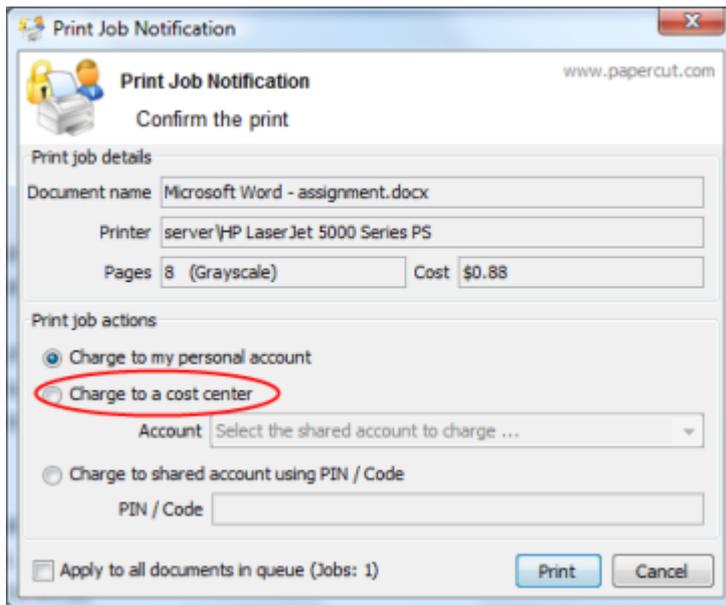
The file should contain the options in a properties file form like:

```
user=mary
minimized=Y
windowposition=top-left
windowtitle=Print Balance: {0}
```

Other options allow text in the Print Job Notification window to be customized. For example:

```
account-from-list-text=Charge to a cost center
```

makes the Print Job Notification window look like the image below after the client is restarted. The full set of options is defined in the `config.properties.tpl` file in the client directory above.



### 5.3.5.3. Changing the time after which jobs are deleted when awaiting popup response

If a user does not respond to the account selection popup after a defined time, their print job is automatically deleted. This is to prevent a buildup of old jobs in the print queue. The default timeout is 10 minutes. Change the timeout as follows:

1. Navigate to the **Options** tab.
2. In the section **Client Software**, find the option **Delete jobs awaiting popup response after**.
3. Enter the number of minutes to wait for users to respond to the popup before their job is deleted.
4. Click **Apply**.

### 5.3.6. Stopping and Starting the Application Server

Most of the time you will not need to stop or start the server; however, there are some circumstances where this is required:

- Performing an offline backup
- Upsizing the database to an external database
- Upgrading the application

The procedure for stopping the server depends on the platform the server is run on.



**Important:** When you start the Application Server, wait approximately 15-20 seconds for the service to start before accessing the admin interface. This gives the system time to initialize.

### 5.3.6.1. Stopping and Starting the Application Server on Windows

The PaperCut MF Application Server runs as a Windows service when installed on Windows. You can stop or start it using the Services control panel applet. To stop/start/restart the Application Server:

1. Open the services control panel. ( **Start > Control Panel > Administrative Tools > Services** )
2. Find the service named **PaperCut Application Server**.
3. Right-click the service.
4. Select the option you want to perform (e.g. Stop/Start/Restart).

An alternative to using the services applet is to run the batch files located in the directory `[app-path]\server\bin\win`. Using the batch files might be more convenient when the process needs to be automated (like scripting a database backup). The batch files to stop/start the server are called:

- `start-server.bat` - starts the service
- `stop-server.bat` - stops the service

### 5.3.6.2. Stopping and Starting the Application Server on Mac

You can stop or start the PaperCut MF Application Server on Mac by using the following scripts found at `[app-path]/server/bin/mac/`:

- `start-server.command` - starts the Application Server
- `stop-server.command` - stops the Application Server

### 5.3.6.3. Stopping and Starting the Application Server on Linux and Novell

You can start or stop the PaperCut MF Application Server on Linux and Novell by using the following scripts found at `[app-path]/server/bin/linux-[x64|i686]/`:

- `start-server` - starts the Application Server
- `stop-server` - stops the Application Server

## 5.3.7. Automating / Streamlining Installation on Windows

You can streamline the installation of PaperCut MF or a particular PaperCut MF component for automating deployment. For example, when installing on many secondary print servers, or installing the User Client tool locally on many desktops (although the recommended installation procedure is the "zero install" strategy - see [User Client Deployment](#)).

The installer command-line options provide the ability to pre-select the installer options; there is no need to click through them when installing. The options in the table below are valid for the Windows installers having those options available for PaperCut MF (the main installer), the User Client tool and the card wizard.

**Table 106: Windows installer command-line options**

Option	Description
<code>/SILENT</code> or <code>/VERYSILENT</code>	Instructs the installer to be 'silent' or 'very silent'. When silent the installation begins immediately, and only the progress window is displayed. When very silent, installation begins immediately with nothing displayed. If any errors are encountered, the error messages are still displayed with either option.
<code>/DIR="x:\dirname"</code>	Overrides the default installation directory. Use this to install PaperCut MF to a different directory than the default.
<code>/TYPE=secondary_print</code>	Selects the install type/options: Server installer: <ul style="list-style-type: none"> <li>• <code>full</code> - The PaperCut MF server. The default option.</li> <li>• <code>secondary_print</code> - Install option to set up a secondary print server. Only installs the Print Provider component.</li> <li>• <code>secondary_web_print</code> - Only install the Web Print component.</li> </ul>
<code>/GROUP="folder name"</code>	Overrides the default Start menu group / folder into which PaperCut MF is installed.
<code>/NOICONS</code>	Disables the creation of a Start menu group / folder.

Option	Description
/LANG=language	<p>Specifies the language to use during installation. By default this is automatically detected based on your language settings, but can be overridden by specifying a language. The available languages are:</p> <ul style="list-style-type: none"> <li>● de - German</li> <li>● en - English</li> <li>● es - Spanish</li> <li>● fi - Finnish</li> <li>● fr - French</li> <li>● it - Italian</li> <li>● nl - Dutch</li> <li>● pt - Portuguese</li> <li>● pt_BR - Brazilian Portuguese</li> <li>● zh_CN - Chinese (Simplified)</li> <li>● zh_HK - Chinese (Traditional)</li> </ul> <p><i>Note:</i> This option only specifies the language during installation. More languages and regional options are available in PaperCut MF once installed, which are configured separately.</p>

### 5.3.8. Importing Print Job Details

You can import print jobs that have been tracked by external or third party systems into PaperCut MF. This could be because the external system is not easily tracked directly, or to import data that was previously tracked for logging and reporting purposes.

Job details can be imported using the `server-command` scripting tool (`process-job` command, see [Server Commands \(server-command\)](#)) or using the web services API (`api.processJob` call, see [The XML Web Services API](#)). To import multiple jobs in a batch, run the command/call multiples times (e.g. via a script or program).

The `server-command` and web services call accept a single argument (string) containing all the job details. Each field is specified as a name-value pair separated by an equals sign (i.e. `name=value`), and fields are separated by commas.

For example, to process a job and specify the user, printer server and printer name (the minimum required details):

```
user=bob,server=papercut,printer=My Printer
```

If any fields contain a comma, surround the name-value pair with quotation marks ("). E.g. for a printer named `Library, rear`:

```
user=bob,server=papercut,"printer=Library, rear"
```

Spreadsheet applications such as Excel will automatically add quotation marks as above when saving a document in CSV format.

If any fields contain quotation marks, escape them by adding another quotation mark, i.e. two in a row. E.g. for a printer named `"John Smith" Library`:

```
user=bob,server=papercut,printer=""John Smith"" Library
```

The names of all the available fields are listed in the table below.

**Table 107: Fields for Importing Print Job Details**

Field	Required	Description	Default
user	Yes	The username of the user associated with the job.	N/A
server	Yes	The name of the server the job was submitted to.	N/A
printer	Yes	The name of the printer or print queue the job was submitted to.	N/A
time	No	The time the job was submitted/printed. This is formatted as an ISO8601 simple date-time: yyyyMMddTHHmmss. E.g. "20091224T133602" represents the 24th of December 2009 at 13:36:02 (1:36 pm, local time).	(current time)
cost	No	The cost of the job. If the cost is not set it is automatically calculated as for a normal job (based on the job details and configuration of the printer, user etc.).	(auto)
total-pages	No	The total number of pages in the job.	1
total-color-pages	No	The total number of color pages in the job.	(same as)

Field	Required	Description	Default
			total-pages)
copies	No	The number of copies in the job.	1
document-name	No	The document name.	(empty)
duplex	No	TRUE or FALSE to indicate if the job is duplex (printed on both sides)	FALSE
grayscale	No	TRUE or FALSE to indicate if the job is grayscale (no color)	FALSE
job-type	No	The type of job to import. Options include: COPY, FAX, PRINT, SCAN.	PRINT
paper-size-name	No	The name of a standard paper size, e.g. "Letter" or "A4".	(empty)
paper-width-mm	No	The width of the paper in millimeters. Determined automatically if using paper-size-name.	(empty)
paper-height-mm	No	The height of the paper in millimeters. Determined automatically if using paper-size-name.	(empty)
document-size-kb	No	The size of the document's spool file in kilobytes.	0
invoice	No	TRUE to mark the job as invoiced, FALSE to mark as not invoiced. The default value is determined automatically, as for a regular job.	(auto)
comment	No	A comment to be associated with the job.	(empty)
client-machine	No	The hostname of the client machine the job was submitted from.	(empty)
client-ip	No	The IP address of the client machine the job was submitted from.	(empty)

Field	Required	Description	Default
shared-account	No	The name of the shared account to charge this job to. Sub-accounts can be selected using a back-slash, i.e. "parent\child".	(empty)

### 5.3.9. Monitoring PaperCut MF system health

You can use 3rd party monitoring tools (such as, Nagios, Pingdom, Zabbix) to monitor the PaperCut MF Application Server status. PaperCut MF provides a System Health API that exposes a REST API endpoint, which monitors the current state of the database. To perform a status check, configure the 3rd party tool to send an HTTP GET request to the following Ping URL: `http://[primary_server]:[port]/rpc/api/rest/public/status`. This test performs a server check to test if the back end database is available. If the status check succeeds, an HTTP response status 200 is sent back with the following JSON response:

- if the database is available

```
{
  "database": {
    "online": true,
    "reason": ""
  }
}
```

- if the database is unavailable (the actual reason might be different to the one in this example)

```
{
  "database": {
    "online": false,
    "reason": "Cannot connect to the database."
  }
}
```

For more information about the System Health API, see [Monitoring Your Servers using the System Health API](#).

#### Tip:

- For customers using Site Servers, you can reference those servers directly: `http://[site_server]:[port]/rpc/api/rest/public/status`
- For customers using external tools (such as Pingdom), open the relevant ports in your firewall.

## 5.4. PDL Transform Language

*PDL Transforms are an advanced PaperCut MF feature. This section is written assuming the reader has an understanding of printer description languages, and a basic knowledge of scripting.*

A transform is a process that defines how to convert an input into a different output. In PaperCut MF, transforms are defined as simple scripts. There are a number of reasons for performing transforms on a print job. These include:

### Extending Compatibility

The output produced by one driver (such as PostScript) might not work on other printer brands without modification. For example, "TRAY = 1" on one printer might map to "TRAY = UPPER" on another. Use transforms to automatically make this adjustment to a print job. This is particularly important in a Find-Me printing environment where a job rendered by one driver cannot print correctly on another printer type without modifying the print job.

### Modify Behaviour/Output

Much is possible with the power of transforms. Maybe it's always enabling the "eco print" mode when an email is printed, or automatically removing the "stapling" option if accidentally selected on a printer that does not support stapling. Another use-case is "virtual stationery". Legacy reports could, for example, have a logo automatically added to each page.

Of note, PaperCut performs page analysis before transforms are applied. As such, a color logo added to a grayscale page, are recorded in PaperCut as grayscale.

#### 5.4.1. Definitions

Before covering the details of the transform language, it's important to understand the following terms:

##### Page Description Language (PDL)

A language used to describe the appearance of a printed page e.g. PostScript, Printer Control Language (PCL).

##### Printer Job Language (PJM) Header

Attributes in a PJM header define print job characteristics such as duplex, color, paper sizes, or media trays. Many printers rely on a PJM header, though many attributes are printer/manufacturer specific.

##### Transform Script

A transform script defines a transform process to apply to a print job's PDL. Transform scripts are written in a very simple scripting Domain Specific Language (DSL).

### Source & Target

The transform process refers to source and target print queues. A desired transform is applied when a job is transferred from a specific source queue (a global queue) to a specific target queue.

## 5.4.2. Writing a transform

Transforms are text files placed in a location (directory structure) that determines when the script applies. The file's name and location must conform to the following path:

```
[install-path]/providers/print/[platform]/transforms/custom/  
[language]/[source]/[target].transform
```

- `language` - the PDL language of the print job (e.g. Postscript).
- `source` - the name of the queue that first received the print job (e.g. a global queue).
- `target` - the name of the queue the job is being transferred to print to.

For example, to apply a transform when a job is transferred from the queue named "Global Queue" to "Printer A", the transform file should be located at:

```
[install-path]/providers/print/[platform]/trans-  
forms/custom/postscript/global queue/printer a.transform
```

## Matching rules for running a transform script

The following steps select the transform script to run for a redirection from printer type *source* to printer type *destination*, which both use printer language *language*.

1. Look first in the the *custom* directory then in the *system* directory.
2. Find the subdirectory whose name matches *language* e.g. if *language* is *PostScript* then look in *custom/postscript*.
3. Find the subdirectory whose name matches *source*. e.g. if *source* is *PaperCut Global PostScript* then look in *custom/postscript/pc-win*. (NOTE: On PaperCut MF systems, *pc-win* is an alias that matches printer type *PaperCut Global PostScript*).
4. Find the file whose name matches *destination*. e.g. if *destination* is *HP Color LaserJet* then look for *custom/postscript/pc-win/hp.color.laserjet.transform*. This does not exist so back-track.
5. Backtracking takes you to *custom/postscript/pc-win/default.transform*, which does not exist, then *custom/postscript/default.transform*, which does not exist, then *system/postscript/pc-*

*win/hp.color.laserjet.type.transform*, which does exist. (NOTE: printer type is matched against *\*.type.transform* and printer name is matched against *\*.name.transform* before printer type and name are matched against *\*.transform\**)

- Thus *system/postscript/pc-win/hp.color.laserjet.transform* is selected.

### 5.4.3. Examples

There are two example sources that script authors might find useful as starting points or reference:

```
[install-path]/providers/print/[platform]/transforms/examples
[install-path]/providers/print/[platform]/transforms/system
```



**Important:** Transforms in the system directory are used by the PaperCut Global Print Driver. They are system provided. Do not place your own scripts in the system directory. Place your own scripts in the custom directory. Any changes made in the system directory are overwritten in an upgrade.

### 5.4.4. Transform Language Functions & Specification

**Table 108: PDL transform command functions**

Command	Description
<i>var = expression</i>	Evaluate the <b>expression</b> and assign the variable <b>var</b> with the result.
<i>IF condition THEN statement</i>	Evaluate the <b>condition</b> expression, and if true execute the <b>statement</b> .
<i>FIND pattern [options]</i>	Find the <b>pattern</b> in the spool file, and assign <b>\$0</b> , <b>\$1</b> , ... with the regular expression capture group.
<i>FIND pattern REPLACE text [options]</i>	<b>FIND</b> as above, then replace the string matched by the <b>pattern</b> with <b>text</b> .
<i>STRIP_HEADER</i>	Strip any PjL, XPIF, PostScript or other header in the spool file.
<i>DELETE_UNTIL text</i>	Delete from the start of the spool file up to but not including the first occurrence of <b>text</b> .
<i>INSERT ofs len text</i>	Insert the string <b>text</b> at the spool file offset <b>ofs</b> , after deleting <b>len</b> bytes.
<i>DELETE ofs, len</i>	Delete <b>len</b> bytes from the spool file, starting at the offset <b>ofs</b> .
<i>REPEAT_ALL num_copies</i>	Make <b>num_copies</b> of the input spool file in the output spool file after applying all other modifications.



### *FIND "string" [REPLACE text] [options]*

**FIND** searches for the **pattern** (a string or a regex) in the spool file and assigns \$0, \$1, ... from the resulting regular expression capture groups. If the **pattern** is a string, then only \$0 is assigned.

e.g

```
FIND /<<. *? \ / ProcessColorModel \s* \ /
(DeviceCMYK | DeviceGray) . *? >> \s* setpagedevice /
```

could set \$0 to "<< /ProcessColorModel /DeviceCMYK >> setpagedevice" and \$1 to "DeviceCMYK" on a match.

## Options

- **FIRST**: Return the first match in the spool file. This is the default
- **LAST**: Return the last match in the spool file.
- **n**: Any positive integer. Search **n** bytes of the spool file. The default is to search one megabyte. A value of zero (0) searches through the entire spool file.

## FIND REPLACE

### *FIND pattern REPLACE text [options]*

where the **pattern** is a regular expression (regex) or string.

e.g

```
FIND "Letter" REPLACE "A4"
FIND /(\w+) \s= \sGrayscale/ REPLACE "$1 = BlackAndWhite"
FIND /MODE = \w+/ REPLACE "MODE = %my_var%"
FIND /MODE = \w+/ REPLACE "MODE = %my_var%" 2000
```

The **FIND** works as described above. Then **REPLACE** substitutes all the \$[N] and %variable% values in the **text**, before replacing the string matched in the spool file with the substituted **text**.

## ADD\_HEADER

### *ADD\_HEADER text*

e.g.

```
ADD_HEADER my_header
```

Insert the string **text** as a header in the spool file.

## STRIP\_HEADER

*STRIP\_HEADER*

Strip any PJI, XPIF, PostScript or other header (that our developers know about) from the spool file.

## DELETE\_UNTIL

*DELETE\_UNTIL text*

e.g

```
DELETE_UNTIL "%!PS-Adobe-3.0"
```

Delete from the start of the spool file up to but not including the first occurrence of **text**.

## REPEAT\_ALL

*REPEAT\_ALL num\_copies*

e.g

```
REPEAT_ALL 3
```

Make **num\_copies** of the input spool file in the output spool file after applying all other modifications.

Use this option for printers that don't support spool files copies commands, typically printers without hard disks. You usually detect the copies command in the source spool file then use **REPEAT\_ALL** to repeat the source spool files the same number of copies.



**Important:** Changes to the number of copies of a printed made here are not reflected in the Job Log.

## INSERT

*INSERT ofs len text*

e.g

```
INSERT regex_ofs regex_len my_replacement
```

Insert the string **text** at the spool file offset **ofs**, after deleting **len** bytes.

Setting **ofs** to  $-1$  appends **text** to the end of the spool file. In general, setting **ofs** to  $-n$  inserts **text**  $n - 1$  bytes before the end of the spool file.

## DELETE

*DELETE ofs len*

e.g

```
DELETE regex_ofs regex_len
```

Delete **len** bytes from the spool file, starting at offset **ofs**.

It is equivalent to:

*INSERT ofs len ""*

## Pre-Populated Variables

**Table 109: Pre-populated PDL transform script variables**

Variable	Description	Example	Type
<i>pc_pages</i>	Number of pages in the spool file	11	number
<i>pc_copies</i>	Number of copies in copies command in spool file, if one is detected. 1 otherwise.	1	number
<i>pc_page_width</i>	Page width in mm	210	number
<i>pc_page_height</i>	Page height in mm	297	number
<i>pc_paper_name</i>	Paper size name	"A4"	string
<i>pc_grayscale</i>	Is the document grayscale?	True	boolean
<i>pc_duplex</i>	Is the document duplex?	False	boolean
<i>pc_tumble</i>	Is the back side of a duplex job rotated 180 degrees?	False	boolean
<i>pc_docname</i>	Name of the document	"Homework.doc"	string
<i>pc_user</i>	Name of the user	"Josh"	string
<i>pc_server</i>	Print server name	"Server1"	string
<i>pc_printer</i>	Printer name	"Hall printer"	string
<i>pc_driver</i>	Name of the printer driver	"HP Color LaserJet CM4540 MFP PCL 6 (0.3.1545.9108)"	string

Variable	Description	Example	Type
<code>pc_iso_date</code>	Current date in ISO format	"2014-08-15"	string
<code>pc_uid</code>	A randomly generated ID	"580459f0-2d19-11e4-b70a-f8b156c33bc3"	string
<code>pc_docname_clean__</code>	'Cleaned' version of <code>pc_docname</code> . All character that will prevent display in PostScript, PjL or XML removed.	"Homework.doc"	string
<code>pc_user_clean__</code>	'Cleaned' version of <code>pc_user</code> .	"Josh"	string

### 5.4.5. Test Mode

Test mode is designed to accelerate the development, testing and debugging of transform scripts. Test mode is enabled by adding the following line to a transform script:

```
ENABLE_TEST_MODE
```

or by setting

```
EnableTransformTestMode=on
```

in the `print-provider.conf` file. The test mode option should only be enabled while developing scripts.

Test mode causes the system to output additional log files to assist in developing and validating transforms. These files are located at:

```
[install-path]/providers/print/[platform]/transforms/logs/
```

The test mode files created are:

**Table 110: PDL transform test mode output files**

<code>[job-id].-log</code>	This file contains logging information to help you understand the transform script's state and variables.
<code>[job-id].-before</code>	The print job spool file BEFORE transformation.
<code>[job-id].after</code>	The print job spool file AFTER transformation.



**Tip:** Consider using a "visual diff" program to help compare before and after files.



**Important:** Always disable test mode after developing your transform script. Test mode adds a considerable performance overhead and should not be used in a production environment.

## 5.4.6. Tips & Tricks

- Develop your scripts in TEST\_MODE to help compare script behavior.
- Use existing examples as starting points.
- Print the same documents from source and destination printer drivers, and diff the resulting spool files. In most cases the things you need to modify are in the diff. e.g. One file has a header and the other does not, or one file sets color/grayscale with one string and the other file uses a different string.
- Look at a PostScript Printer Description (PPD) file of the destination printer, and copy PostScript snippets into a transform.

## 5.5. Upgrading From a Previous Version

This section describes the PaperCut MF standard upgrade procedure. PaperCut MF supports upgrades using a simple *install-over-the-top* procedure. Review all steps prior to commencing the upgrade procedure.

### 5.5.1. Upgrade process

#### 5.5.1.1. Before you start

1. A PaperCut MF system might comprise many software components, such as [secondary servers](#), locally installed User Clients and Release Stations. It is generally not required to upgrade these components along with an Application Server upgrade. However, we do recommend that you upgrade all components as best practice.

By contrast, all [Site Servers](#) *must* normally be upgraded at the same time as your Application Server.

2. Check the release notes to determine if a database schema upgrade is to be performed. If the release does require a database schema upgrade, allow extra time for the upgrade process.

#### 5.5.1.2. The recommended upgrade procedure

1. Download the PaperCut MF installer for your platform. In accordance with best practice, archive your install programs just in case you need to reinstall in the future or roll back to a previous version.
2. Download the PaperCut MF installer for your platform. In accordance with best practice, archive your install programs just in case you need to reinstall in the future or roll back to a previous version. Take some time to read the release notes for this version as they highlight considerations during upgrades.

3. Schedule approximately 10 minutes downtime. Select a time of day with minimal network activity. If there is a large volume of data in the system (for example, if the system has been running for more than a year, or there are more than 5,000 users) the upgrade takes longer. With very large installations, schedule an hour or more of downtime.
4. Take a point-in-time backup of the data by clicking **Backup Now** located under **Options > Backups** . This ensures you have a copy of the important data.
5. As a precaution on very large systems, back up the whole PaperCut MF directory. Existing overnight backups might have taken care of this task, however, take a few moments to grab an up-to-date backup now. For example, create a zip archive of the directory:

```
C:\Program Files\PaperCut MF\
```

or the equivalent path on Linux or Mac.

6. Run the installer downloaded in step 1 and install into the *same* location as the existing install.
7. When the install is complete, allow a few minutes before accessing the system. The system might perform a database upgrade and this is done in the background. If you try to access the application while a database upgrade is in progress a message displaying the upgrade status is displayed. *IMPORTANT: Do not shutdown the application while an upgrade is in progress. Wait for the upgrade to complete.*
8. After the install is complete, log in to the system and perform some tests to ensure all is working as expected and the system is monitoring user activity as expected. Sites running on Novell OES Linux are advised to restart their iPrint Print Manager.

Administrators might find the [post upgrade test plan](#) useful.

## 5.6. Upgrading from PaperCut Quota

This section describes the process for moving from PaperCut Quota to PaperCut MF, and includes instruction of importing user balances and restriction settings from the old PaperCut Quota installation.

These instructions assume that PaperCut MF is installed on the same machine as PaperCut Quota, however, the instructions can also be applied when PaperCut MF is installed on a new machine.

### 5.6.1. Upgrade process

#### 5.6.1.1. Step 1 - Stop and disable PaperCut Quota

Firstly, stop the PaperCut Quota services to ensure they do not interfere with PaperCut MF. Do not uninstall PaperCut Quota at this stage because you need the user database to import user balances into PaperCut MF.

To stop and disable the PaperCut Quota services:

1. Open the Windows services manager ( **Start > Control Panel > Administrative Tools > Services** ).
2. Find the *PaperCut Print Charging* service.
3. Right-click the server and select the **Properties** menu.
4. Change the **Startup Type** to **Disabled**
5. Click **Stop** to stop the service.
6. Click **OK** to save the settings changes.

### 5.6.1.2. Step 2 - Install PaperCut MF

Install PaperCut MF. For more information, see [Installation](#).

During the setup wizard, it is recommended that the user import settings be set up in the same way as was configured in PaperCut Quota. For example, if you import users from the full Active Directory domain in PaperCut Quota, also set this up in PaperCut MF.

Check that the users have been imported correctly. To adjust the user import settings and re-perform the user synchronization process, go to the **Options > User/Group Sync** screen. This is similar to the *Tune-up* function in PaperCut Quota.

Once installed it is recommended that the groups are set up in the same way as in PaperCut Quota. Groups are used to determine the default settings for new users and also how quotas are allocated. For more information on groups see [Groups in PaperCut MF](#).

### 5.6.1.3. Step 3 - Configure and test printers

The next step is to set up the printers in PaperCut MF to reflect the require page costs and print restrictions. To do this:

1. Navigate to the **Printers** section.
2. Select the printer to adjust by clicking the printer name.
3. Enter the cost and filter settings.
4. Click **OK** or **Apply** to save the changes.

For a detailed explanation of setting printer costs and restrictions, see [Advanced Printer Management](#).



**Tip:** If all your printers are configured with similar costs and filters, copy the settings from one printer to the other printers. For more information, see [Copying Printer Settings](#).



**Tip:** It is recommended that the administrator set up the [template printer]. This printer is used as a template when new printers are added to the system. For more information about the template printer, see [The Template Printer](#).

To ensure that the printers are setup correctly, perform a test print to one of the configured printers. Once printed, check the print log (**Printers > Print Log**) that the job was recorded and the correct cost calculated.

#### 5.6.1.4. Step 4 - Import the existing User Balances

In Professional (Client Billing) installations, this step is optional because shared accounts are used instead of user account balances. If you do not want to import user balances, skip to the next step.

Moving the user balances and restricted status from PaperCut Quota to PaperCut MF is a simple process. If the server is running Windows then:

1. Navigate to the **Users** section.
2. In the Actions menu, click **Batch import** (on the left).
3. Click **Browse**; then locate the PaperCut Quota user database (PCUserDB.mdb). This is typically located at: C:\Program Files\PaperCut\Database\PCUserDB.mdb
4. Click **Import** to start the import process.
5. Upon successful completion, the number of users updated and created are displayed.
6. Perform some checks of the user balances and restricted statuses to ensure they are set to the values from PaperCut Quota.

If the PaperCut MF server is not running on Windows, you can run the PaperCut Quota database converter manually on a Windows system, and the resulting text file can then be imported in a process similar to the above. To convert the PaperCut Quota user database manually:

1. Copy the [app-path]/server/bin/win/PCQuotaExport.exe file from the server (running the non-windows OS), to the Windows machine running PaperCut Quota. Copy the exporter to the PaperCut Quota database directory (usually c:\Program Files\PaperCut\Database).
2. Open the command prompt, by running cmd.exe from **Start > Run**.
3. Change to the PaperCut Quota database directory. e.g.  

```
cd "c:\Program Files\PaperCut\Database"
```
4. Run the converter, with the location of the PCUserDB.mdb as the argument. For example:  

```
PCQuotaExport.exe "PCUserDB.mdb" > user-export.txt
```

If running the exporter from a different directory to the database, provide the full path to the

database.

5. The above command creates a text file called `user-export.txt` that contains the user data from PaperCut Quota. Open the file in a text editor to review the contents.
6. The file can then be imported into PaperCut MF. First log in to PaperCut MF.
7. Navigate to the **Users** section.
8. Click the **Batch import** action (on the left).
9. Click **Browse**; then locate the `user-export.txt` file, created in the above step.
10. Click **Import** to start the import process.
11. Upon successful completion, the number of users updated and created are displayed.
12. Perform some checks of the user balances and restricted statuses to ensure they are set to the values from PaperCut Quota.

### 5.6.1.5. Step 4b - Import the existing Accounts

Moving the accounts and their settings from PaperCut Quota to PaperCut MF is a simple process, that is described in detail below. This is particularly important in a Professional (Client Billing) installation where shared accounts are used to charge print jobs to client accounts. If this is not important in your environment then skip this step.



**Tip:** When accounts are imported they inherit the access control settings from the `Template Account`. By default the `Template Account` is configured to allow all users access to the account. If you do not want all users to have access the imported accounts, change the security settings on the `Template Account` before importing.

To import the accounts when the server is running Windows then:

1. Navigate to the **Accounts** section.
2. Click **Batch import** (on the left).
3. Click **Browse** and locate the PaperCut Quota database (`PCUserDB.mdb`). This is typically located at: `C:\Program Files\PaperCut\Database\PCUserDB.mdb`. This database contains all of the accounts.
4. Click **Import** to start the import process.

When finished, the number of users updated and created is displayed displayed.

5. Perform some checks of the accounts and settings to ensure they are set to the values from PaperCut Quota.

If the PaperCut MF server is not running on Windows, run the PaperCut Quota database converter manually on a Windows system, and the resulting text file can then be imported in a process similar to the above. To convert the PaperCut Quota user database manually:

1. Copy the `[app-path]/server/bin/win/PCCBAccountExport.exe` file from the server (running the non-windows OS), to the Windows machine running PaperCut Quota. Copy the exporter to the PaperCut Quota database directory (usually `c:\Program Files\PaperCut\Database`).

2. Open the command prompt, by running `cmd.exe` from **Start > Run**.

3. Change to the PaperCut Quota database directory. e.g.

```
cd "c:\Program Files\PaperCut\Database"
```

4. Run the converter, with the location of the `PCUserDB.mdb` as the argument. For example:

```
PCCBAccountExport.exe "PCUserDB.mdb" > account-export.txt
```

If running the exporter from a different directory to the database, provide the full path to the database.

5. The above command creates a text file called `account-export.txt` that contains the user data from PaperCut Quota. Open the file in a text editor to review the contents.
6. The file can then be imported into PaperCut MF. First log in to PaperCut MF.
7. Navigate to the **Accounts** section.
8. Click the **Batch import** action (on the left).
9. Click **Browse** and locate the `account-export.txt` file, created in the above step.
10. Click **Import** to start the import process.  
When finished, the number of accounts updated and created is displayed.
11. Perform some checks of the accounts and settings to ensure they are set to the values from the previous version.

### 5.6.1.6. Step 5 - Upgrade client software

The old PaperCut Quota client software is not compatible with PaperCut MF. The old client software must be uninstalled off all workstations and the new client software deployed. The zero-install deployment method can greatly assist with this process. More information on the client deployment is detailed in [User Client](#).



#### Note:

It is not 100% accurate to claim that the old client software must be removed. Once the



old server-side software is disabled, the old client sits in an inactive state and does no harm. It does, however, consume some system resources on the workstations so we recommend that you uninstall it.

### 5.6.1.7. Step 6 - Optionally uninstall PaperCut Quota

Once the PaperCut MF installation is completed and tested you can optionally uninstall PaperCut Quota. If you want to view historical print data, keep the old application installed so you can view the historical data. If this is not important, then uninstall the application.

To uninstall:

1. On the Windows server running PaperCut Quota, go to: **Start > Control Panel > Add or Remove Programs** ).
2. Find and select PaperCut Quota in the list of installed programs.
3. Click **Remove** to start the uninstall process.

## 5.7. Troubleshooting & Technical FAQ's

There are a number of problems you might encounter in the course of installing and using PaperCut MF. Many are resolved once you get a better idea of how PaperCut MF works, while others might require you to dig deeper into the application's workings.

In addition to this section, some platform specific FAQ's are available at [Linux FAQ](#).

### 5.7.1. Troubleshooting & Installation Questions

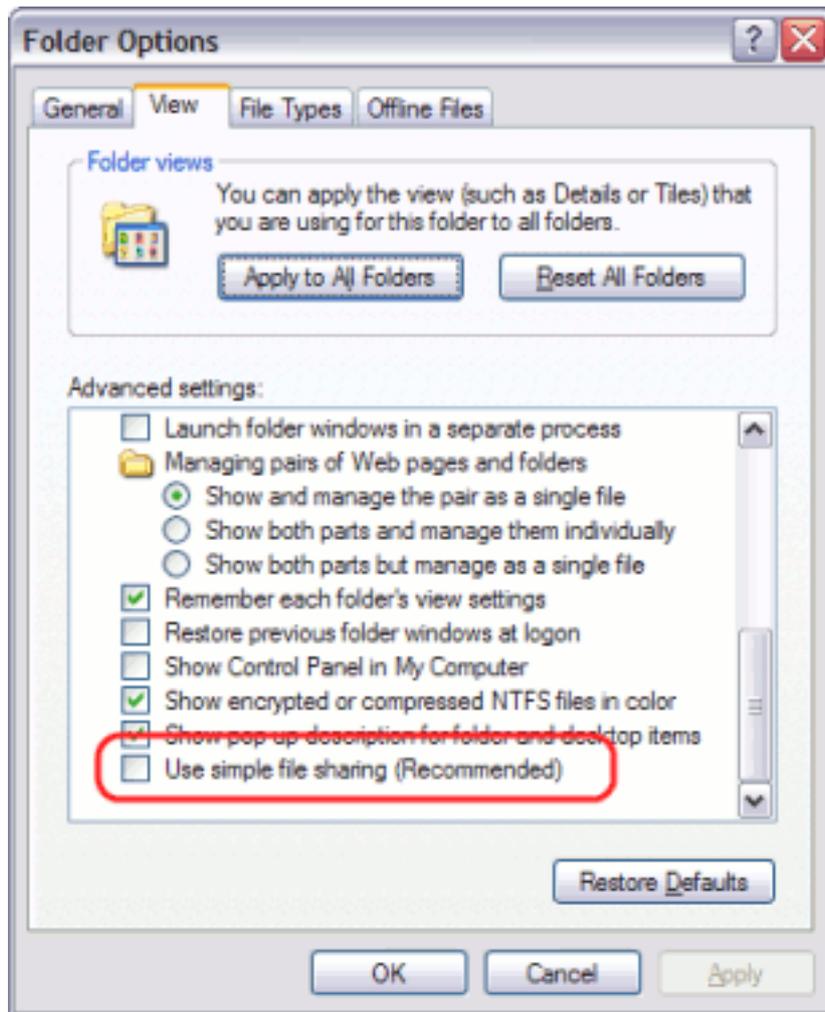
**I am running PaperCut MF server on Windows XP Professional. Is this supported?**

Yes, PaperCut MF server is supported on Windows XP Professional. It is recommended that you disable **Simple File Sharing**. This feature causes Windows XP to authenticate all users as **Guest**, which causes two problems:

- All printing is recorded as being printed by the **Guest** user.
- Username/password authentication does not work correctly, because Windows XP authenticates as **Guest**, even if the username/password is entered incorrectly.

To disable **Simple File Sharing**:

1. Open Windows Explorer.
2. Select **Tools > Folder Options**.
3. On the **View** tab, clear the appropriate option.



**I have just added a print queue to my Windows XP Professional computer that hosts the print queues but PaperCut MF is not tracking it. What could be causing this?**

Due to the way Windows XP handles some print jobs, a small number of changes are made by PaperCut MF. These changes are made when PaperCut MF starts. However, these changes do not take effect until the Windows Print Spooler is restarted. This can be easily done by restarting the Windows XP computer if you have issues tracking print jobs after installing PaperCut MF or creating a new print queue.

This functionality is referred to as the Shared Spool File feature.

**I am running PaperCut MF in a workgroup environment (i.e. not as part of a domain). What do I need to consider?**

See [Running in a Workgroup Environment](#).

**PaperCut MF is not detecting jobs printed from a network clients. How can I fix this?**

There are two main causes of this problem:

- Users are not correctly logging on to your network domain or computer. If the domain server does *NOT* authorize users, PaperCut MF has no way of knowing who submitted the print job. With system policies, you can make login to the domain mandatory, eliminating this problem. Alternatively, you can set printer permissions on the print server to ensure only valid users can print to the printers.
  - Alternatively, you can configure the client computer to print directly to the network interface printer. Ensure all network clients are configured as outlined in the PaperCut MF installation guide. All print jobs must pass through the print server running PaperCut MF.
- 

### PaperCut MF is not counting/detecting pages correctly. What's causing this?

PaperCut MF currently supports about 90% of printers on the market. If a printer's language is not recognized, PaperCut MF cannot detect any pages and record the print job as a zero page count. This is usually accompanied with an error message in the Application Event Log. We recommend you try the following problem resolution actions:

1. Many printers come with a variety of driver options. Install the *Postscript* drivers if one is available for the printer. Do this on both the Print Server and all network clients.
2. Try the drivers included with the Windows CD. PaperCut MF supports the majority of drivers distributed with recent Windows releases.
3. Try turning **Enable advanced printing features** as follows:
  - a. On the *print server*, Start->Settings->Printers.
  - b. *Right-click* the printer and select **Properties**
  - c. Select the **Advanced Tab**.
  - d. Turn *off* (disable) the **Enable advanced printing features**.

For more information, see [Knowledge Base](#).

4. If you're still having problems, email PaperCut Software support. We might be able to recommend a suitable set up or even supply a recent update supporting your hardware.
  5. Specific information on printer compatibility is available in the [PaperCut Knowledge Base](#). Information here might be of assistance.
- 

### How do I ignore (not monitor or delete) a printer?

Configure the *Print Provider* via its configuration to ignore a printer. For more information see [Adding and Removing/Deleting/Ignoring Printers](#).

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### The system is not displaying the correct currency sign.

PaperCut MF formats the currency based off the operating system's default regional settings. If the default regional settings are incorrect, you can change the format by defining your location

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under **Options > General > Display Settings > Location** .

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### **I've setup a secondary print server. The printers on this server are not listed and not being monitored. What's wrong?**

There are a number of possible explanations. The first step is to open the Print Provider's log file on the secondary server. This file often contains error messages indicating the cause or type of error. On a Windows system the log file is located at: `[app-path]\providers\print\win\print-provider.log` Open this file from any text editor such as Notepad.

Some common issues are:

1. Verify that the secondary server's name is correctly defined in the `print-provider.conf` file. Open a command prompt on the secondary server and use the `ping` command to verify that the server can be contacted under this name. A server restart (or a manual restart of the PaperCut Print Provider service) is required for any changes to the file to take effect.
2. Ensure that firewall software on the primary server is not preventing the secondary server from connecting on port 9191. Configure your firewalls to allow all local network traffic on this particular port.

A quick way to see if the secondary server can connect to the primary server is to use the command-line `telnet` program. Simply type: `telnet servername 9191` at a command prompt.

- If you receive an error such as `Could not open connection to host`, then there is probably a network/firewall issue not letting the connection through.
  - If the screen goes blank then the connection was established successfully. Press `Ctrl+]` then type `quit` to close the telnet session.
3. Check that the *Print Provider* process/service is in fact installed and running. On a Windows system this is located under: **Start > Control Panel > Administrative Tools > Services**

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### **The client software is not displaying the user's account balance and is displaying a network error. How do I fix this?**

The client software needs to contact the Application Server. For the technical readers, the client makes an XML web services request to the server on port 9191. Most problems relate to either firewalls blocking access or the Application Server's name is not correctly defined. Ensure that:

1. Any firewalling software on the server allows local network access to port 9191.
2. The `client.properties` file (a text file) lists the correct server name or IP address of the server. If you've used the zero-install deployment option, this file is located on the server in the directory: `[app-path]/client/client.properties`

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### **How do I change the built-in admin user's password?**

The `admin` user's password is set up on initial install during the configuration wizard. You can change this password post-install by logging into the application as the `admin` user and navigating to the **Options > Advanced** tab, and selecting the **Change internal admin password** option.

If you have forgotten the internal admin password, you can reset it by editing the `admin.password` property in the text file located at `[app_dir]/server/server.properties`.

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### **I run a small peer-to-peer network and my users don't log onto the workstations. Can I still use PaperCut MF?**

PaperCut MF is primarily designed for networks managed under a domain and/or authenticated environments. Peer-to-peer networks or Workgroups are, however, supported. The first option to consider is requiring users to log onto the workstations using their username and password. If this is not possible, an alternate option is to set up the user accounts on system hosting the printers (system running the PaperCut MF server software) and configuring the account selection popup with the **Charge to other users option selected**. Users can then enter their username and password in the popup that displays each time they print.

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### **I want to start the user inquiry tool (client software) with the window minimized. Is this possible?**

Yes. You can start the client software minimized by executing the program with a command-line switch `-minimized`. See [User Client Options](#).

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### **How do I stop users from closing/shutting down the client software?**

If the user running the client software is configured to either:

- select shared accounts
- confirm the print job via a popup

the client software must be running at all times. If the user is configured in either of these modes, the client software's exit option is disabled. *Note:* Restart the client software to pick up this option after the user's options have been changed.

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### **Why does PaperCut MF cache the group membership?**

PaperCut MF caches group membership by replicating the user/group relationship structure internally in the system. Typically network group membership is relatively static, and is usually set up when a user account is initially created. PaperCut MF tries to be a good network application by avoiding common no-no's such as flooding domain controllers with group lookup requests. This is achieved by caching. Operations such as **Bulk user operations**, quota allocations, group reports and group filtering all need to do group membership lookups. Caching speeds up these operations and prevents excessive callouts to the domain servers.

The downside to caching is that group membership changes are not immediately reflected inside PaperCut MF. To force PaperCut MF to detect the change perform a User/Group

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synchronization under the Options section. The system also automatically refreshes group membership overnight during low network activity.

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**I have noticed a lot of extra options available under the Config Editor (Advanced) area. Can I change these?**

The config area contains all of the PaperCut MF system wide settings. You can change some of these via the normal options interface while others are designed for internal developer use and tuning and are only accessible via the Config Editor. Take care with any changes made in the Config Editor as an invalid entry might require you to reinstall the system!

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**I want to write some custom extensions. Do you support this?**

One of the business objectives of PaperCut MF was openness. The development team actually encourages this and can assist with detailed API documentation. If you want feedback on your ideas, please email our support team. They would be more than happy to offer advice.

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**What external databases are supported?**

Running PaperCut MF on top of an external database is an advanced option. For more information, see [Deployment on an External Database \(RDBMS\)](#).

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**What is the internal database format?**

PaperCut MF's internal database is Apache Derby - an open source database written by IBM and based on IBM's DB2 Cloudscape database system. The internal database has proven to scale very well and is suitable for networks of all sizes.

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**What language is PaperCut MF developed in?**

PaperCut MF is developed under a number of languages and development environments. The printer monitoring component and other native operating system interfaces such as user authentication are written in C/C++. The Application Server and web services are written in server-side Java.

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**I want to investigate server cluster support?**

The PaperCut MF is designed as a cluster compatible application and supports clustering at all layers of the application. For more information on configuring PaperCut MF in a Microsoft Cluster environment, see [Clustering and High Availability](#). If you want to investigate clustering options on other platforms (Linux), contact our support team.

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**How do I print a spool file?**

If you're utilizing the Print Archiving feature (see [Print Archiving \(viewing and content capture\)](#)), or have otherwise captured a spool file for debugging purposes - you can print this document by copying it to a printer, using it's full network path.

**Windows:**

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```
copy /B my-spool-file.pcl6 \\servername\printer
```

**MacOS and Linux:**

```
lp -h servername -d printer -o raw my-spool-file.pcl6
```

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# Glossary

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## A

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### **active monitoring**

Active monitoring is a control mode that allows you to track your print jobs and also enforce print policies, such as, duplex printing. Active monitoring also allows the use of popups to interact with users.

### **advanced account selection popup**

The advanced account selection popup is a mode for the desktop client that caters for professional businesses with a large number of accounts. It provides powerful features that allow users to quickly assign printing to accounts selected from a large list of clients or projects, such as, keyword search, recently selected accounts, and preferred accounts. You can also apply cost adjustments to a print job at time of print.

### **alternate ID**

An alternate name for printers that normally provides more descriptive information about the location of the printer.

### **anonymous printing**

Anonymous printing provides the ability for guest users to print anonymously using Email to Print. Anonymous email printing can be implemented in three ways: 1. Direct Print—Guests can send their job directly to the anonymous email defined for a physical printer. This is the most convenient way to provide printing access for guests or visitors. 2. Managed Release—Guest users send their job to the printer's anonymous email address where it is held in a hold/release queue. Jobs are released by the receptionist or a trusted person in the organization. Jobs sent by different guests are identified by the guest's email address, which is appended to the document name. 3. Guest Self-Release—Guest users send their job to the printer's anonymous email address where it is held in a hold/release queue. Guests are provided with a common username and password to log in to the MFD and release their job. Jobs are identified by their email address appended to the document name.

## **API**

Application Programming Interface (API) is a set of routines, protocols, and tools for building software and applications. An API expresses a software component in terms of its operations, inputs, outputs, and underlying types, defining functionalities that are independent of their respective implementations, which allows definitions and implementations to vary without compromising the interface.

### **application log**

The application log retains a complete history of system events, such as, security errors (such as, incorrect password attempts), user logins, backup times and scheduled tasks,

any system errors or warning.

### **Application Server**

An Application Server is the primary server program responsible for providing the PaperCut user interface, storing data, and providing services to users. PaperCut uses the Application Server to manage user and account information, manage printers, calculate print costs, provide a web browser interface to administrators and end users, and much more.

### **audit log**

The audit log retains a history of administration changes to users, such as, a user's balance, the email address of a user, the value (if any) of the overdraft for this user, discounts for a user, the user's card numbers and PIN numbers.

## **B**

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### **Bonjour**

Bonjour is Apple's implementation of zero-configuration networking (zeroconf), a group of technologies that includes service discovery, address assignment, and hostname resolution. Bonjour locates devices such as printers, other computers, and the services that those devices offer on a local network using multicast Domain Name System (mDNS) service records.

## **C**

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### **card wizard**

The Card Wizard is a Microsoft Windows application that integrates with Microsoft Word used to create Top-up/Prepaid cards.

### **Central Reports**

Central Reports provide a consolidated data and reporting view across multiple Application Servers. Central Reports provide a large subset of the same reports that provided by the standard PaperCut reporting feature.

### **client/server**

Client software is a small program that runs on each desktop and communicates with a server. The printing process on most networks works on a client/server model with clients (desktops) submitting jobs to a server. PaperCut also uses the client/server model in the optional client software to communicate with end-users.

### **clustering**

Clustering allows your organisation to ensure your services are not affected if anything should happen to your main server. PaperCut is a cluster compatible application and is supported under Windows (Microsoft Cluster Server / MSCS, Microsoft Failover Cluster Manager / MSFCM, Veritas Cluster Server / VCS) and Linux (Novell Cluster

Services / NCS, Linux-HA) at all levels of the application, including: clustering at the print spooler service layer by integrating with clustering services, failover based clustering at the Application Server layer using clustering services, and at the database layer by utilising cluster aware databases such as Microsoft SQL Server, PostgreSQL, or Oracle.

### **Config Editor**

The Config Editor stores information used by PaperCut to configure advanced options and functions. This information is stored in config keys, which are editable by an administrator.

### **config key**

A config key stores information about a specific advanced setting in PaperCut. Config keys are editable by an administrator in the Config Editor.

### **control mode**

The control mode defines how PaperCut interacts with the end-users and controls their usage. The control modes available listed in order of impact are: Silent monitoring (no control, only monitoring), Active monitoring (enforcement of print policies), Quota system, and Up-front payment.

### **conversions**

Conversions are a type of print filter that changes something about the print job, for example, from color to grayscale, or convert to duplex.

### **CUPS**

Common User Printing System (CUPS) is a printing system for Unix operating systems that allows a computer to act as a print server. A computer running CUPS is a host that can accept print jobs from client computers, process them, and send them to the appropriate printer.

## **D**

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### **debug mode**

Debug mode causes PaperCut to produce a detailed text log of activity. The log allows our developers to inspect the internal workings of the PaperCut application and pinpoint the cause of problems.

### **device group**

Device groups allow administrators to tag or group devices by attributes. Group names are user definable and can represent any attribute appropriate for device management. For example, you can group devices by device type, location, make, function, owner, age, and so on. You can report by device group and also send notifications per device group.

**differential charging**

Differential charging allows you to charge different amounts for different types of documents or for different types of printers. You can use this feature to discourage users from using a particular printer for certain types of print jobs. For example, an inkjet color printer is ideal for photos or the occasional color page but should not be used to print 1000-page black and white documents when the heavy duty laser printer is located just down the corridor. You can apply differential charging based on the print job settings. For example, you can charge more for color printing than black and white, more for simplex than duplex, or more for A3 than A4.

**digital signature**

Digital signatures allow you to include metadata, such as, the origin, author, time of print, and other details of print jobs, on print jobs (usually the footer). This helps organizations track documents and encourages employees to be responsible with sensitive information. Digital signatures use either a cryptographically secure HMAC or a Bates number.

**Direct Print Monitor**

The Direct Print Monitor is the Direct Printing component that tracks jobs between desktops and an MFD.

**Direct Printing**

Direct Printing allows you to print directly from a desktop to a printer, without the need for a print server.

**E**

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**Email to Print**

Email to Print allows any device to print documents by sending an email to your network's print devices.

**Environmental Dashboard**

The Environmental Dashboard is a desktop widget that presents data from PaperCut about the environmental impact of printing at both an individual user and organization level. This widget draws a user's attention to their printing impact and allows them to compare their usage to a benchmark.

**escrow**

An escrow is the amount of credit that is temporarily transferred from a PaperCut account to the terminal device. This credit is then used during the copier session and the unused proportion is transferred back into PaperCut at the end of the session. An escrow defines the maximum amount of copying that can be performed in a single session.

## F

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### **failure mode**

Failure mode allows you to control the behaviour under error conditions, such as, connections problems between the Application Server and secondary server.

### **Fast Release**

Fast Release is a print release (Secure/Find-Me Printing) solution that uses off-the-shelf card readers available from multiple manufacturers. A Fast Release terminal is connected to the network (not the printer) allowing it to be used with any printer. A USB card reader is connected to the the Fast Release terminal and users use their proximity card to authenticate. PaperCut releases the users held print jobs to the printer associated with the Fast Release terminal.

### **filters**

Filters allow you to control attributes of the print settings by either forcing a particular attribute or denying a print job that does not meet specific criteria. There are two types of print filters: conversions and restrictions.

### **Find-Me printing**

Find-Me printing allows users to print to a single global print queue without selecting a printer, and then release the print job at any printer (via a Release Station).

## G

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### **GDI printer**

A GDI printer is a printer that has built-in support for Windows Graphical Device Interface (GDI). GDI is used by most Windows applications to display images on a monitor, so when printing from a Windows application to a GDI printer, there is no need to convert the output to another format such as PostScript or PCL. GDI printers are sometimes called host-based printers because they rely on the host computer to rasterize pages.

### **Global Print Driver**

The PaperCut Global Print Driver is a print driver that works across multiple brands of MFPs. Use the Global Print Driver if your organization has a mix of printer brands. The Global Print Driver is a brand independent, maximum compatibility, signed print driver. It is designed to work on the widest possible range of printers out of the box and supports all main print features (duplex, color, paper size and tray selection).

### **Google Cloud Print**

Google Cloud Print is a technology that allows you to print to any printer from any web connected device, such as a phone. Google Cloud Print works on a phone, tablet, Chromebook, PC, and any other web-connected device you want to print from.

**guest user account**

Guest user accounts are accounts for users who do not have a domain login and will print only on an adhoc or short term basis. Guest user accounts can be either Internal Users, shared or generic users, or anonymous printing. Internal users are added directly to PaperCut and are not synced with an external user directory. Internal users may be added by a PaperCut administrator or self-registered. Shared or generic users have a shared username and password for guests to allow them to login and print using company equipment. All guest jobs are logged in against this generic user. Anonymous Printing is for guests not registered in PaperCut are permitted to send jobs to a special email address for printing. Jobs are logged against a single internal guest user.

**H**

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**hardware page count**

Hardware page counts allow PaperCut to determine the actual number of pages printed rather than just the page count from the spool file. The hardware page count is used when jobs do not print completely, for example, the print job is cancelled. These checks are performed at the hardware-level by communicating with the printer via SNMP (Simple Network Management Protocol).

**High-availability clusters**

High-availability clusters (HAC) improve application availability by failing or switching them over in a group of systems—as opposed to high-performance clusters, which improve application performance by running them on multiple systems simultaneously.

**Hold/release queue**

A Hold/release queue is a queue of print jobs on the Release Station that have been placed on hold and are waiting release. A Hold/release queue is a print queue that does not print a job immediately; an action is required to force the job to start. Hold/release queues are available via: Standard Release Station, Mobile print release, End-user web-based Release Station (Web Print only), Web-based Release Station within the administrative UI, Manager-mode web-based Release Station (Release Manager), Fast Release, the MFD, and a hardware terminal connected to the MFD.

**HP JetDirect/Socket**

HP JetDirect Socket describes the process in which the printer is connected to the server-/system. A JetDirect Socket means that the server communicates with the printer via a standard TCP socket connection over the network. This method of connection is often called a Standard TCP/IP Port in other non-HP brands, and the process is commonly referred to as setting up a “networked printer”. The TCP port used for communication is port 9100.

## I

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### **Integrated Scanning**

Integrated Scanning provides a secure, consistent, and easy way for users to scan documents to: their own email address, their own home folders, or other authorized email and folder destinations.

### **internal user account**

Internal users are user accounts that exist only inside PaperCut and are independent of the domain, network, or operating system. Internal user accounts can be self-registered, manually managed, or for non-domain Windows workgroups. Self-registered accounts are created by the user. These are suitable when there are a large number of guest users, for example, a public library. Manually managed accounts are created by the PaperCut administrator. These are suitable when there are only a small number of guest accounts and the administrator wants to control these accounts. Suitable in an environment with a small number of guests.

### **IP Printing**

IP Printing is a generic term used to describe a number of print protocols that are used to exchange print documents between a computer, a server queue, or a physical printer.

### **IPP**

The Internet Printing Protocol (IPP) is an Internet protocol for communication between a print server and its clients. It allows clients to send one or more print jobs to the server and perform administration such as querying the status of a printer, obtaining the status of print jobs, or cancelling individual print jobs. IPP can run locally or over the Internet. Unlike other printing protocols, IPP also supports access control, authentication, and encryption, making it a much more capable and secure printing mechanism than older ones.

### **iPrint**

iPrint is a technology developed by Novell that allows users to install printer-drivers from a web browser and to submit print jobs over the Internet or a local network through the standard Internet Printing Protocol (IPP). Common desktop operating systems such as Windows, Linux, and Mac support iPrint.

## J

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### **job log**

The job log retains a history of all print jobs including the following details: the user who printed (ie. their network user ID), the time of the print event, the number of pages, document attributes such as color, duplex, grayscale, paper size, document area, paper length, where the print job originated from (the workstation name or IP address), and the document name and type (for example, a Word document's file name).

**job redirection**

Job redirection is transferring a print job from one print queue to another. Both Find-Me printing and load balancing involve job redirection.

**L**

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**LDAP**

The Lightweight Directory Access Protocol (LDAP) is a directory service protocol that runs on a layer above the TCP/IP stack. It provides a mechanism used to connect to, search, and modify Internet directories. The LDAP directory service is based on a client-server model.

**load balancing**

Printer load balancing automatically distributes print jobs between two or more printers. Load balancing is generally used to equally distribute print jobs across a pool of printers saving valuable time in document output for the user and at the same time balancing the wear and tear among printer devices.

**LPD**

The Line Printer Daemon protocol (LPD) is a network protocol for submitting print jobs to a remote printer. A server for the LPD/LPR protocol listens for requests on TCP port 515. A request begins with a byte containing the request code, followed by the arguments to the request, and is terminated by an ASCII LF character. An LPD printer is identified by the IP address of the server machine and the queue name on that machine. Many different queue names may exist in one LPD server, with each queue having unique settings. The LPD software is stored on the printer or print server.

**LPD service**

The PaperCut Line Printer Daemon (LPD) service allows continued use of the LPD protocol (Print Services for UNIX, TCP/IP Print Server, LPD Print Service and more) now that Microsoft has removed the LDP protocol from Windows Server 2012 onwards.

**LPR**

The Line Printer Remote protocol (LPR) is a network protocol for submitting print jobs to a remote printer. A server for the LPD/LPR protocol listens for requests on TCP port 515. A request begins with a byte containing the request code, followed by the arguments to the request, and is terminated by an ASCII LF character. An LPD printer is identified by the IP address of the server machine and the queue name on that machine. Many different queue names may exist in one LPD server, with each queue having unique settings. The LPR software is installed on the client device.

## M

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### **manager mode popup**

The manager mode popup is a mode of the account selection popup that allows a user to charge printing to any user or shared account. It also allows the user to apply adjustments to the job costs (for example, additional charge for special paper, binding, etc). The manager mode popup is often used in print rooms where staff perform printing on behalf of other users.

### **Microsoft Cluster Server (MSCS)**

Microsoft Cluster Service (MSCS) is a service that provides high availability for applications such as databases, messaging and file and print services. MSCS attempts to minimize the effect of failure on the system as any node (a server in the cluster) fails or is taken offline.

### **Microsoft Failover Cluster Manager (MSFCM)**

The Microsoft Failover Cluster Manager (MSFCM) snap-in validates failover cluster configurations, creates and manages failover clusters, and migrates some resource settings to a cluster running Windows Server 2008 R2.

### **Mobile Print Release**

Mobile Print Release allows users to release held jobs directly from their mobile device (smartphone or tablet).

## N

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### **Novell eDirectory**

Also called Network Directory Services, Novell eDirectory is directory service software that is used to centrally managing access to resources on multiple servers and computers within a network. The eDirectory software is part of the Novell Compliance Management Platform.

## O

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### **offline policies**

Offline Policies allow an Administrator to define PaperCut's behaviour when there is an outage that disrupts PaperCut normal operations. Offline policies include account selection policy (the default account to charge (default is "Offline account")), offline credit policy (whether to assume credit is available or to deny the job when the Application Server is unavailable), user authentication policy (the behavior in offline mode where PaperCut cannot validate the owner of the job), and User Password Authentication (whether user authentication is attempted during a network outage).

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**P**

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**page-level color detection**

If page-level color detection is enabled, PaperCut charges the color rate only for pages that actually contain color. For example, if a print job has 5 color pages (at 50c per page) and 5 Black and White pages (at 20c per page), then the user is charged \$3.50. If page-level color detection is not enabled, the user would be charged 50c per page for all pages, whether they are color or Black and White.

**payment gateway**

A Payment Gateway is an additional PaperCut component that allows users to transfer funds from an external source into their personal PaperCut account. Funds can be transferred from a wide variety of online payment sources, such as PayPal, Authorize.Net, RBS WorldPay or CyberSource, and many more. Alternatively, education organizations can use the payment gateway module to allow students to transfer small amounts of credit into their print account.

**PDL transform**

A Page Description Language (PDL) is a language used to describe the appearance of a printed page, for example, PostScript, Printer Control Language (PCL). A PDL transform is a process that defines how to convert an input into a different output. In PaperCut, transforms are defined as simple scripts

**personal accounts**

A personal account is the individual user's account that is charged by default. Each user has their own personal account.

**physical identifier**

A physical identifier is a network address or host name that identifies a printer's physical location.

**PJL header**

Attributes in a Printer Job Language (PJL) header define print job characteristics, such as, duplex, color, paper sizes, or media trays. Many printers rely on a PJL header, though many attributes are printer/manufacturer specific.

**popup authentication**

Popup authentication involves matching the source IP address of the print job with the user confirmed to be operating from the popup client IP address. Authentication is provided by the PaperCut NG client software in the form of a popup dialog requesting a username and password. To print with popup authentication the client software must be running on the workstations or laptops.

**prepaid cards**

A prepaid card is a card with a monetary value (for example, \$5, \$10, or \$20) that can be purchased by users or distributed by administrators. The value of the card can then be loaded into a user's account for printing or purchases through Web Cashier. Prepaid cards are also known as Top-up cards, and are most commonly used in a school or university environment.

**Print Archiving**

PaperCut's Print Archiving stores an historic record of all printed content. This allows approved administrators to browse and review the content of past print jobs within their environment.

**print logger**

Print Logger is a free print logging application for Windows systems designed to provide real-time activity logs detailing all printer use. Information tracked includes: the time of print, the name of the user who printed, the total number of pages, document names and titles, other print job attributes such as paper size, color mode and more.

**print policy**

Print policies allow you to remind users via popup to print duplex, route large jobs to dedicated high-volume printers, discourage users from printing emails, discourage printing web pages in color, and print policies can be implemented in PaperCut using advanced scripting.

**Print Provider**

A Print Provider is a monitoring service installed on a secondary print server to allow PaperCut to control and track printers. This monitoring component intercepts the local printing and reports the use back to the primary Application Server.

**print queue**

A print queue displays information about documents that are waiting to be printed, such as, the printing status, document owner, and number of pages to print. You can use the print queue to view, pause, resume, restart, and cancel print jobs.

**print server**

A print server is a system responsible for hosting print queues and sharing printer resources to desktops. Users submit print jobs to a print server rather than directly to the printer itself. A print server can be a dedicated server but on many networks this server also performs other tasks, such as, file serving

**printer driver**

A printer driver or a print processor is a piece of software that converts the data to be printed to the form specific to a printer. The purpose of printer drivers is to allow applications to do printing without being aware of the technical details of each printer model.

**printer group**

Printer groups allow administrators to tag or group printers by attributes. Group names are user definable and can represent any attribute appropriate for printer management. For example, you can group printers by printer type, location, make, function, owner, age, and so on. You can report by printer group and also send notifications per printer group.

**Q**

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**quota system**

The quota system is a control mode that allows you to assign a “budget” on either a daily, weekly or monthly basis to user accounts. It is then the user’s responsibility to manage their own usage to stay within their allocated allowance. When the allowance is exceeded, access to the printing resources is denied. Some organizations allow users to request additional quota with management approval, or to sell buy additional credit using TopUp Cards.

**R**

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**RDBMS**

A Relational database management system (RDBMS) is a program that lets you create, update, and administer a relational database. Most commercial RDBMS's use the Structured Query Language (SQL) to access the database, although SQL was invented after the development of the relational model and is not necessary for its use.

**Release Station**

Print Release Stations place a print job on hold and allow users to release it when required. Often a Release Station is a dedicated PC terminal located next to the printers, however, Release Stations can take other forms such as a web browser based interface. Some common examples where Release Stations can be used include secure printing, approved printing, and authentication. In a secure printing environment jobs are only printed when the user arrives at the print area and confirms his or her identity. This ensures the user is there to collect the job and other users can't "accidentally" collect the document. In some organizations it may be appropriate to hold jobs until they are approved by selected individuals. A good example would be a teacher approving printing on an expensive color printer. Hold/Release queues can be used as a form of authentication in an unauthenticated environment. Users must authenticate prior to releasing their jobs allowing PaperCut NG to confirm their identity.

**restricted users**

Restricted users are not allowed to print when their balance reaches zero, or if they have an overdraft, when the overdraft limit is reached.

**restrictions**

Restrictions are a type of print filter that ensures jobs meet certain criteria (denying those that don't). For example, you can restrict access to one or more printer, define a maximum number of pages allowed in a single job, or allow only duplex.

**S**

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**Samba**

Samba is a Windows interoperability suite of programs for Linux and Unix. It is used to integrate Linux/Unix servers and desktops into Active Directory environments. It can function as both a domain controller or as a regular domain member.

**secondary server**

A PaperCut secondary server is a system that directly hosts a printer, that is, a print server with a Print Provider installed. A secondary server can be a server style system hosting many printers, a desktop style system hosting printer(s) also shared to other network users, or a desktop style system with the printer used only for local users (not shared).

**secure print release**

Secure print release places print jobs in a holding state until the user authenticates and releases the job at the printer. This means sensitive print jobs will not sit uncollected on the printer.

**server-command tool**

The server-command program is a command line tool that accepts commands as arguments, and outputs the results of the command on the console (standard-out). This tool provides access to dozens of server operations ranging from user management, system maintenance, account manipulation and printer control. The server-command tool is ideal for controlling the Application Server via the command-line or for automation via scripts.

**shared account**

A shared account is an account that is shared by multiple users. For example, in business, shared accounts can be used to track printing costs by business unit, project, or client. Organizations like legal firms, engineering firms, or accounting offices often have long lists of accounts, projects, clients, or matters. In a school or university, shared accounts can be used to track printing by departments, classes, or subjects.

**silent monitoring**

In silent monitoring mode, all users have unrestricted privilege so printing access is never denied. Papercut silently collects statistics on activity and its associated cost. All data is reportable and available in the administration interface. Silent monitoring mode is popular in a business environment where management needs information on user activity.

**Site Server**

Site Servers take over the role of a Primary Application Server in the event of network outages. Key roles taken over include authentication, copy and print tracking and Find-Me printing. Site Servers ensure continuous availability of printing resources to support key business functions over unreliable network links or during unplanned network disruptions.

**SMTP**

Simple Mail Transfer Protocol (SMTP) is the mechanism by which an email client program sends emails to an outgoing mail server (SMTP server) for delivery to the intended email address.

**SNMP**

Simple Network Management Protocol (SNMP) is a component of the Internet Protocol Suite as defined by the Internet Engineering Task Force (IETF). It consists of a set of standards for network management, including an application layer protocol, a database schema, and a set of data objects. Devices that typically support SNMP include routers, switches, servers, workstations, printers, modem racks and more.

**spool file**

A print spool file is generated when a user sends a document to a printer. The print spool stores the print job information, and sits in a print queue until it is retrieved and printed by a printer.

**SQL**

Structured Query Language (SQL) is a special-purpose programming language designed for managing data held in a relational database management system (RDBMS), or for stream processing in a relational data stream management system (RDSMS).

**SSL**

Secure Sockets Layer (SSL) is the standard security technology for establishing an encrypted link between a web server and a browser. This link ensures that all data passed between the web server and browsers remain private and integral. The protocol uses a third party, a Certificate Authority (CA), to identify one end or both end of the transactions. To be able to create an SSL connection a web server requires an SSL certificate. When you choose to activate SSL on your web server you will be prompted to complete a number of questions about the identity of your website and your company. Your web server then creates two cryptographic keys - a Private Key and a Public Key.

**SSL certificate**

SSL certificates are small data files that digitally bind a cryptographic key to an organization's details, such as a company's domain name, your company name, your address, your city, your state and your country. When installed on a web server, it activates the padlock and the HTTPS protocol (over port 443) and allows secure connections from a web server to a browser. When a browser connects to a secure site it retrieves the site's

SSL certificate and checks that it has not expired, it has been issued by a Certification Authority the browser trusts, and that it is being used by the website for which it has been issued. If it fails on any one of these checks the browser will display a warning to the end user letting them know that the site is not secured by SSL. SSL certificates can be either self-signed or CA signed.

**SSL key**

In typical public key infrastructure (PKI) arrangements, a digital signature from a certificate authority (CA) attests that a particular public key certificate is valid (i.e., contains correct information). An SSL key can be either a public key (can be disseminated publicly) or a private key (known only to the owner).

**standard account selection popup**

The standard account selection popup is a mode for the account selection popup that provides the basic features required to charge to shared accounts. It is ideal for sites with a small number of accounts.

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**T**

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**time latch**

Time latches allow a printer to be disabled for a predetermined amount of time. After the disable time has expired, the printer is re-enabled without the need for manual intervention.

**TopUp cards**

A Top-up card is a card with a monetary value (for example, \$5, \$10, or \$20) that can be purchased by users or distributed by administrators. The value of the card can then be loaded into a user's account for printing or purchases through Web Cashier. Top-up are also known as Prepaid cards, and are most commonly used in a school or university environment.

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**U**

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**universal driver**

Manufacturer universal drivers are print drivers that work with multiple models across a single brand of MFP. They do not work across multiple brands.

**unrestricted user**

Unrestricted users are able to accumulate a negative balance, for example, their balance can go below zero, or if they have an overdraft, they can go beyond that.

**up-front payment**

Up-front payment is a control mode where users start off with a balance of zero and need to add money to their account before access to printing services is granted. Often

TopUp/Pre-Paid cards (a voucher system) are used as a convenient way to manage the payment process.

### **User Client**

The User Client tool is an add-on that resides on a user's desktop. It allows users to view their current account balance via a popup window, provides users with the opportunity to confirm what they are about to print, allows users to select shared accounts via a popup, if administrators have granted access to this feature, and displays system messages, such as, the "low credit" warning message or print policy popups.

### **user interface**

The User Web Tool is the web user interface. It provide a range of services for users, including a summary of usage and balance history, a list of the shared accounts that the user can use for printing, the current costs for printing usage, ability to add balance by using a TopUp/Pre-Paid Card or an external payment system (when using the payment gateway module), transfer funds to other users, view a history of balance transactions, view a list of the user's recent printing, and view print jobs pending release (when using a Release Station).

## **V**

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### **Veritas Cluster Server (VCS)**

Veritas Cluster Server (VCS) is a high-availability cluster software for Unix, Linux, and Microsoft Windows computer systems. It provides application cluster capabilities to systems running other applications, including databases, network file sharing, and electronic commerce websites.

### **virtual printer**

A virtual printer is a printer driver that resembles the functionalities of a physical printer, but is not actually associated with one. Instead, a virtual printer sends its output to a file, normally in PDF format or in other image formats like JPEG, TIFF or PostScript. A virtual printer acts similarly to a physical printer in that it transforms an electronic document into a form that can be easily read by the target user or device. In PaperCut, virtual printers are used for Find-Me printing.

## **W**

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### **watermarking**

Watermarking is a feature that allows you to print a small portion of text to the top or bottom margin of every page. Typical uses of watermarking include adding a username to the bottom of every page to help identify the owner, writing job metadata in the footer such as print time, printer or document name, and applying a digital signature to help track and verify documents.

**Web Cashier**

Web Cashier is a basic Point of Sale (POS) system to charge items to PaperCut accounts and deposit funds into users' accounts.

**Web Print**

Web Print enables printing from user-owned devices without the need to install printer drivers and manage server authentication.

**web services**

Web services are a standardized way of integrating Web-based applications using the XML, SOAP, WSDL and UDDI open standards over an Internet protocol backbone.

**Windows Live Tile**

The Windows Live Tile allows you to pin the Environmental Dashboard to the Windows Start screen to create a dynamic Live Tile. This Live Tile will communicate over 20 user-specific facts, awards and challenges all generated from real-time PaperCut data.

**winpopup**

Winpopup is a network program for Windows that allows you to send messages from one computer to another on the same network. You do not need to have Internet connectivity to use this feature. When sending PaperCut notifications via winpopup (also known as Net send), you can choose to send notifications either to the user or the workstation.

**workgroups**

Workgroup is Microsoft's term for peer-to-peer local area network. Computers running Microsoft operating systems in the same workgroup can share files, printers, or Internet connection. Workgroup contrasts with a domain, in which computers rely on centralized authentication.

