

- 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 SysAdmins.

The `PCClient` client can accept command line options as explained in [Configure the User Client using the command-line](#). 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 knowledge of general Unix/Linux system management including using the command-line, creating users, editing configuration files and understanding file permissions.

### Step 1: System requirements

Before proceeding with the installation the SysAdmin should take a few moments to verify system requirements.

- Is the operating system version supported and are patches up-to-date? (see [PaperCut MF 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.
- Ensure that printers are configured correctly and work.

## 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:

These instructions assume 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 sufficient resource limits, such as the ability to open many files. On `systemd` Linux distributions, this limit is automatically configured so you do not need to do anything. For other distributions, the methods of setting user-level `ulimit` levels vary, 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.

## Step 3: Download and install PaperCut MF

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 MF 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.

## Step 4: Run the Configuration Wizard

After installation, you are prompted to open a web browser at :

```
http://[server-name]:9191/admin
```

The configuration stages are explained below:

## 1. Administrative password

**PaperCutMF**

This wizard will help you configure initial options and ready the system for use.

If this is the first time installing the application, we highly recommend reading the quick start guide in the user manual. [Open manual](#)

- Create Account
- Choose Organization Type
- Set Default Costs
- Sync Users
- Finish!

### Create account

Type in the password to be assigned to the master administrator account. Please keep this password secure.

Username: admin

Password: [masked]

Verify password: [masked]

Your system location is currently set to English (Australia). If this is not correct, please change the setting below. The location defines default currency and date formats.

Location: System Default - English (Australia) ▼

Next →

a. Complete the following fields:

- **Password**—enter the master password for the main in-built admin account. This password is independent of the operating system or domain passwords. The password must be at least six characters.



### Tip:

Keep this password secure. If you forget your password, you can reset it. For more information, see [Resetting the Admin Password](#).

- **Verify password**—re-enter the password.
- **Location**—select the system's physical location and language.

b. Click **Next**.

## 2. Organization type

The **Organization type** screen is displayed.

**PaperCutMF**

- ✓ Create Account
- Choose Organization Type
- Set Default Costs
- Sync Users
- Finish!

### Organization type

Select an organization type to tailor the system defaults for your environment.

Education  
Schools, colleges and universities.

Small/Medium Enterprise (SME) or Corporate  
Businesses intending to monitor, report and control printing (e.g. print policies).

Professional (Client Billing)  
Businesses intending to charge-back printing to customers or projects via a pop-up (e.g. engineering, architects, legal, etc).

← Previous   **Next →**

This selection determines which system defaults are used.

- Select **Education**.
- Select **Small/Medium Enterprise (SME) or Corporate**.
- Select **Professional (Client Billing)**.
- Click **Next**.

### 3. Default cost for printing

The **Default costs for printing** screen is displayed.

**PaperCutMF**

- ✓ Create Account
- ✓ Choose Organization Type
- Set Default Costs
- Sync Users
- Finish!

### Default costs for printing

In Australia, an appropriate cost for a grayscale printer would be \$0.10.

Color (cost per page)

Grayscale (cost per page)

After setup you will have the option to change costs if required.

← Previous   **Next →**



#### Important:

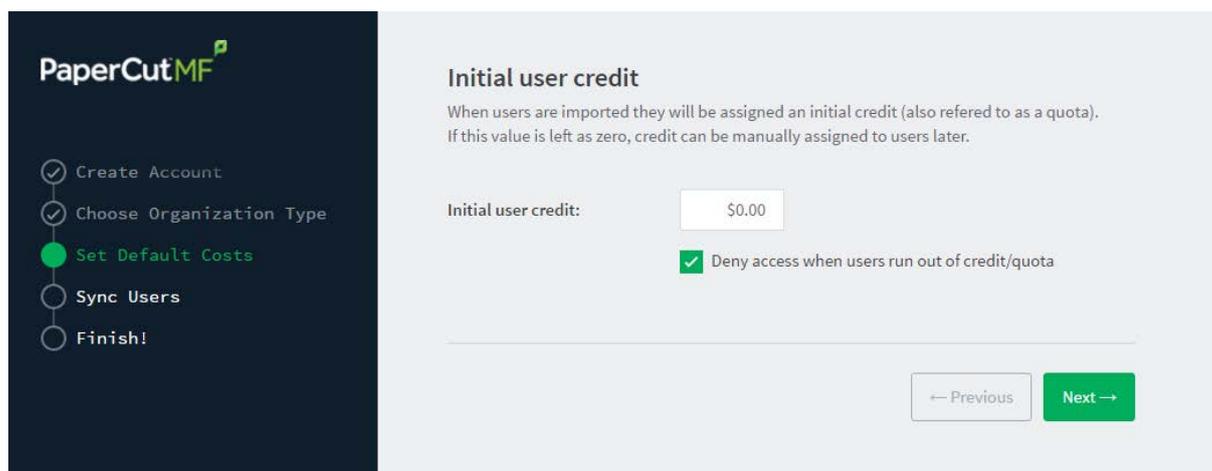
For an education implementation, where users are charged for their printing, leave these values as zero during the implementation stage, otherwise, students will not be able to print as they cannot yet add credit to their account.

If required, you can change this setting after installation.

- a. Complete the following fields:
  - **Color (cost per page)**—enter the default cost per page for color printing on all printers.
  - **Grayscale (cost per page)**—enter the default cost per page for grayscale printing on all printers.
- b. Click **Next**.

#### 4. Initial user credit (Education organization type only)

If you selected **Education** as the organization type, the **Initial user credit** screen is displayed.



If you selected **Small/Medium Enterprise (SME) or Corporate) or Professional (Client Billing)** as the organization type, go to step 5.

- a. Complete the following fields:
  - **Initial user credit**—enter the amount of credit each/quota each user will receive when the system is first enabled. You can change these settings after setup.
  - **Deny access when users run out of credit/quota**—select this check box to prevent users from printing when they run out of credit/quota.



#### Tip:

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.

- b. Click **Next**.

#### 5. User/group synchronization

The **User/group synchronization** screen is displayed.

PaperCut MF extracts user information out of the system or domain.

**Tip:**

During evaluation, most sites import all users from the system/domain into PaperCut MF.

**PaperCut<sup>™</sup>MF** Configuration Wizard

### 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:**  ▼

Import all users

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

- a. In **User source**, select the source of user account data:
  - **Unix Standard** (PAM, Local NetInfo, etc.)—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.
  - **Samba**—if the central user directory is a Windows Domain. The Samba option is available only if Samba is installed on the system. The Samba option is appropriate on medium to small networks currently operating in a Windows Domain environment.
  - **Azure AD Secure LDAP**—for organizations using Microsoft Azure AD Secure LDAP as a cloud based user directory service.
  - **LDAP** (Open Directory)—for large networks with existing Open Directory domains. This includes networks running Open LDAP and Windows domains running Active Directory. PaperCut MF does its best to auto-discover LDAP settings, but some knowledge of LDAP and/or Open Directory is required.
- b. Select one of the following options:
  - **Import all users**—import all domain user accounts.
  - **Import users from selected groups**—import a subset of users from a given group. This is useful when only a subset of users will use the printers.
- c. Click **Next**.
- d. For Samba, LDAP, and Azure AD Secure LDAP, the Server Details page is displayed.

Complete the following as required:

### Samba

- i. Complete the following fields:
    - **Domain Server**—The name of the Windows domain server.
    - **Admin username**—The username of the user who has permission to connect to and query the domain server. The username/password you specify here is an Admin user on your Windows domain that has permission to add machines to the domain.
    - **Admin password**—The password for the above user.
  - ii. Click **Test Samba Settings** to test and confirm your settings before continuing.
  - iii. Click **Next**.
- 

### LDAP

- i. Complete the following fields:
  - **LDAP Server Type**—Determines which LDAP fields are used to get user and group information. PaperCut MF supports the following server types:
    - Unix / Open Directory
    - Microsoft Active Directory
    - Novell eDirectory

However, it is easy to support other server types by adjusting the LDAP fields PaperCut MF searches. For more information, see [Advanced LDAP configuration](#).

  - **LDAP Server 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**—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=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 only has 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=Administrator, CN=Users, DC=domain, DC=com. The exact format of the DN depends on the LDAP server. Some examples:

- Windows Active Directory:  
CN=Administrator, CN=Users, DC=domain, DC=com
- Windows Active Directory (in organizational unit):  
CN=admin, 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=ldapadmin, DC=domain, DC=com
- Novell eDirectory: CN=root, DC=domain, DC=com, or CN=ldapadmin, 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 **Admin DN** and **Admin password** blank.

- ii. Click **Test LDAP settings** to test and confirm your settings before continuing.
- iii. Click **Next**.

---

**Azure AD Secure LDAP**

- i. Complete the following fields as required:
    - **Accept self-signed certificate**—Select this check box if you are using a self-signed certificate that does not need to be validated. If you are using a certificate signed by a trusted authority, clear this check box.
    - **Azure LDAP External Address**—Your LDAP external address copied above from Azure AD.
    - **Base DN**—Your Azure DNS Domain Name. 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=OrgUnit, DC=domain, DC=com, DC=local
```

- **AAD DC Administrator username**—The Azure Active Directory DC administrator username. For example, admin@papercut.com.
  - **Admin password**—The password for the above user.
- ii. Click **Test Settings** to test and confirm your settings before continuing.
  - iii. Click **Next**.

For more information on user/group synchronization on Linux, see [PaperCut MF on Linux](#).

## 6. User Client options (Professional (Client Billing) organization type only)

If you selected **Professional (Client Billing)**, as the organization type, the **User client options** screen is displayed.

If you selected **Education** or **Small/Medium Enterprise (SME)** or **Corporate**, go to step 7.

The User client allows 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.

For more information about the account selection process and shared accounts, see [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.

Select the account implementation strategy:

- **Minimal impact (Initial single user testing)**—the account popup is enabled only for a single user for testing purposes. You need to nominate the testing account; this can be an existing system/domain account used for testing purposes or 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 popup for other users as appropriate.

- **Immediate implementation (Enable for all users)**—enables the account selection popup for all users. Once the client has been deployed, the system is operational. If this option is selected, install the client software on user desktops 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.

b. Click **Next**.

## 7. Confirm setup options

The **Confirm setup options** screen is displayed.

Confirm setup options	
Please confirm that the settings you have entered are correct before continuing.	
Admin username	admin
Admin password	(password hidden)
Initial user credit	\$0.00
Restrict access when credit expired	Yes
User source	Windows Active Directory (Import all users from the selected source)
Default color page cost	\$0.00
Default grayscale page cost	\$0.00

a. Check the settings you have entered. If you want to change anything, you can return to any of the configuration screens to alter the options.

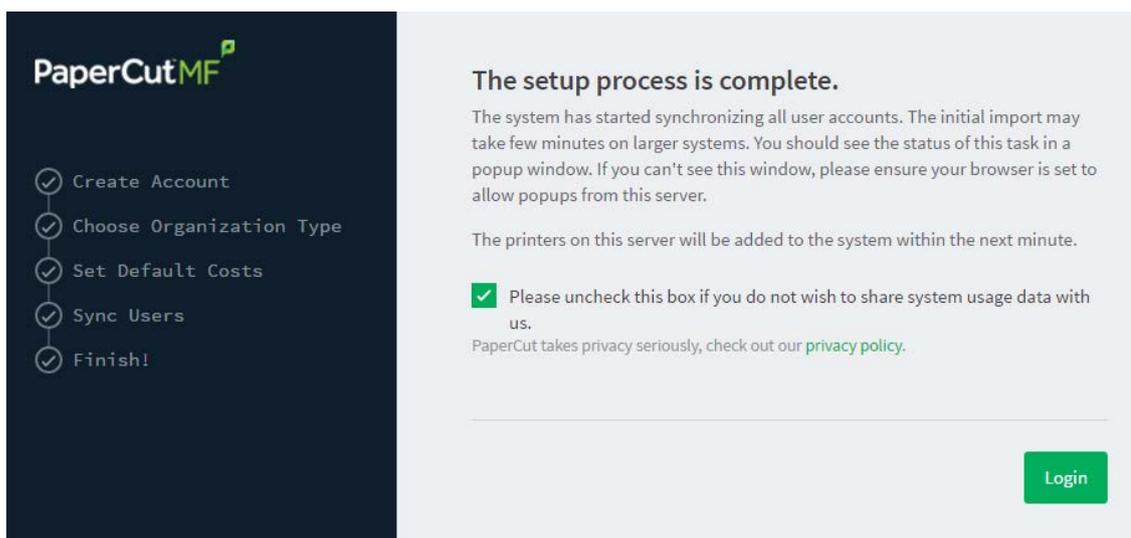
b. Click **Confirm**.

The **Initial user import** screen is displayed.

c. Click **Close**.

## 8. Setup complete

After completing the configuration wizard you are presented with a user synchronization status screen, showing the progress and results of the setup.



- a. Click **Login** to access the Admin web interface and begin familiarizing yourself with the options and features available.

## Step 5: Check the 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.

## Step 6: Share the User 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 SysAdmins 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.

## Step 7: 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

The User 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](#). 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. Click the **Users** tab.  
The **User List** page is displayed.
2. In the **Actions** menu, click **Bulk user actions**.  
The **Bulk User Operations** page is displayed.
3. In **Perform operations on users**, select the target group. To enable for all users select the **[All Users]** group.
4. In the **Change setting** area, select the **Change account selection setting** check box.
5. Select **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, clear the **Allow user to charge to their personal account** check box.
7. Click **OK**.  
A confirmation window is displayed.
8. Click **OK**.

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.

## 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](#).

## What next?

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 MF 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 SysAdmins.

#### 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 SysAdmins 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.
<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</code>	This directory contains a <code>setuid-root</code> 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` back end is incorporated into the print process.

1. On the print server, open a terminal.
2. Type the following commands:

```
cd ~/providers/print/linux-*
sudo ./configure-cups
-h
```

The options available in this tool are displayed.

3. To monitor all printers on your network, type:

```
--add-all
```

4. To monitor a subset of printers in your network:

- a. Type `--list-all`

A list of all printers on your network is displayed.

- b. For each printer you want to add, type `--add <printer name>`

Alternatively, you can do it manually via the CUPS web Admin web 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-
x64/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 be 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-x64/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/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** tab of the Admin web interface. Some additional advanced level logging is maintained in standard text files located at:

```
~/server/logs/*
~/providers/print/linux-x64/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/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 [Manage 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 a 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 User Client 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 SysAdmin.
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 MF 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 SysAdmins 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 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 (`smbclient`) 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. Remove PaperCut MF 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 knowledge of general Novell OES Linux system management including using the command-line, creating users, editing configuration files, and understanding file permissions.

### Step 1: System requirements & printer setup

Before proceeding with the installation the SysAdmin should take a few moments to verify system requirements.

- Is the operating system version supported and are patches up-to-date? (see [PaperCut MF 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.

### 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: