
Mac OS X Server
Print Service Administration
For Version 10.5 Leopard

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Contents

About This Guide

This guide describes the print service you can set up using Mac OS X Server. It also explains how to configure printing on Mac OS X client computers.

Mac OS X Server enables you to configure print service to access a printer on the network or on its USB port, and share it as a queue or class (printer pool) to client computers.

Print service relies on Common Unix Printing System (CUPS) for spooling, queue and job control, security, and error feedback. Print service provides sharing of print queues over Internet Printing Protocol (IPP) and Line Printer Remote (LPR) via CUPS, SMB via Samba 3.0, and AppleTalk.

Print service lets clients of Mac OS X Server print documents in a flexible, managed printing environment over a network. You can assign your client users specific printers for their printing tasks and manage access to other printers through authentication or user quotas. You can also manage printer use more effectively by balancing the load across a pool of printers handling the same queue.

What's in This Guide

This guide includes the following chapters:

- Chapter 1, "Understanding Print Service," explains printing concepts and terms.
- Chapter 2, "Setting Up Print Service," includes everything you need to set up and configure print service.
- Chapter 3, "Setting Up Printing for Clients," provides information about configuring client computers to print.
- Chapter 4, "Managing Print Service," provides step-by-step information for ongoing print server maintenance, administration, and monitoring.
- Chapter 5, "Solving Problems," describes common problems and provides information on what to do if you encounter problems while printing.

In addition, the Glossary provides brief definitions of terms used in this guide.

Note: Because Apple periodically releases new versions and updates to its software, images shown in this book may be different from what you see on your screen.

Using This Guide

The following list contains suggestions for using this guide:

- Read the guide in its entirety. Subsequent sections might build on information and recommendations discussed in prior sections.
- The instructions in this guide should always be tested in a nonoperational environment before deployment. This nonoperational environment should simulate, as much as possible, the environment where the computer will be deployed.

Using Onscreen Help

You can get task instructions onscreen in Help Viewer while you're managing Leopard Server. You can view help on a server or an administrator computer. (An administrator computer is a Mac OS X computer with Leopard Server administration software installed on it.)

To get help for an advanced configuration of Leopard Server:

- Open Server Admin or Workgroup Manager and then:
  - Use the Help menu to search for a task you want to perform.
  - Choose Help > Server Admin Help or Help > Workgroup Manager Help to browse and search the help topics.

The onscreen help contains instructions taken from *Server Administration* and other advanced administration guides described in "Mac OS X Server Administration Guides," next.

To see the most recent server help topics:

- Make sure the server or administrator computer is connected to the Internet while you're getting help.

  Help Viewer automatically retrieves and caches the most recent server help topics from the Internet. When not connected to the Internet, Help Viewer displays cached help topics.

Mac OS X Server Administration Guides

Getting Started covers installation and setup for standard and workgroup configurations of Mac OS X Server. For advanced configurations, *Server Administration* covers planning, installation, setup, and general server administration. A suite of additional guides, listed below, covers advanced planning, setup, and management of individual services. You can get these guides in PDF format from the Mac OS X Server documentation website:

www.apple.com/server/documentation.

This guide...	tells you how to:
Getting Started and *Installation & Setup Worksheet*	Install Mac OS X Server and set it up for the first time.
Command-Line Administration	Install, set up, and manage Mac OS X Server using UNIX command-line tools and configuration files.
File Services Administration	Share selected server volumes or folders among server clients using the AFP, NFS, FTP, and SMB protocols.
iCal Service Administration	Set up and manage iCal shared calendar service.
iChat Service Administration	Set up and manage iChat instant messaging service.
Mac OS X Security Configuration	Make Mac OS X computers (clients) more secure, as required by enterprise and government customers.
Mac OS X Server Security Configuration	Make Mac OS X Server and the computer it's installed on more secure, as required by enterprise and government customers.
Mail Service Administration	Set up and manage IMAP, POP, and SMTP mail services on the server.
Network Services Administration	Set up, configure, and administer DHCP, DNS, VPN, NTP, IP firewall, NAT, and RADIUS services on the server.
Open Directory Administration	Set up and manage directory and authentication services, and configure clients to access directory services.
Podcast Producer Administration	Set up and manage Podcast Producer service to record, process, and distribute podcasts.
Print Service Administration	Host shared printers and manage their associated queues and print jobs.
QuickTime Streaming and Broadcasting Administration	Capture and encode QuickTime content. Set up and manage QuickTime streaming service to deliver media streams live or on demand.
Server Administration	Perform advanced installation and setup of server software, and manage options that apply to multiple services or to the server as a whole.
System Imaging and Software Update Administration	Use NetBoot, NetInstall, and Software Update to automate the management of operating system and other software used by client computers.
Upgrading and Migrating	Use data and service settings from an earlier version of Mac OS X Server or Windows NT.
User Management	Create and manage user accounts, groups, and computers. Set up managed preferences for Mac OS X clients.
Web Technologies Administration	Set up and manage web technologies, including web, blog, webmail, wiki, MySQL, PHP, Ruby on Rails, and WebDAV.
Xgrid Administration and High Performance Computing	Set up and manage computational clusters of Xserve systems and Mac computers.
Mac OS X Server Glossary	Learn about terms used for server and storage products.

Viewing PDF Guides on Screen

While reading the PDF version of a guide onscreen:

- Show bookmarks to see the guide's outline, and click a bookmark to jump to the corresponding section.
- Search for a word or phrase to see a list of places where it appears in the document. Click a listed place to see the page where it occurs.
- Click a cross-reference to jump to the referenced section. Click a web link to visit the website in your browser.

Printing PDF Guides

If you want to print a guide, you can take these steps to save paper and ink:

- Save ink or toner by not printing the cover page.
- Save color ink on a color printer by looking in the panes of the Print dialog for an option to print in grays or black and white.
- Reduce the bulk of the printed document and save paper by printing more than one page per sheet of paper. In the Print dialog, change Scale to 115% (155% for *Getting Started*). Then choose Layout from the untitled pop-up menu. If your printer supports two-sided (duplex) printing, select one of the Two-Sided options. Otherwise, choose 2 from the Pages per Sheet pop-up menu, and optionally choose Single Hairline from the Border menu. (If you're using Mac OS X v10.4 or earlier, the Scale setting is in the Page Setup dialog and the Layout settings are in the Print dialog.)

You may want to enlarge the printed pages even if you don't print double sided, because the PDF page size is smaller than standard printer paper. In the Print dialog or Page Setup dialog, try changing Scale to 115% (155% for *Getting Started*, which has CD-size pages).

Getting Documentation Updates

Periodically, Apple posts revised help pages and new editions of guides. Some revised help pages update the latest editions of the guides.

- To view new onscreen help topics for a server application, make sure your server or administrator computer is connected to the Internet and click "Latest help topics" or "Staying current" in the main help page for the application.
- To download the latest guides in PDF format, go to the Mac OS X Server documentation website:

  www.apple.com/server/documentation

Getting Additional Information

For more information, consult these resources:

- *Read Me documents*—important updates and special information. Look for them on the server discs.
- *Mac OS X Server website* (www.apple.com/server/macosx)—gateway to extensive product and technology information.
- *Mac OS X Server Support website* (www.apple.com/support/macosxserver)—access to hundreds of articles from Apple's support organization.
- *Apple Training website* (www.apple.com/training)—instructor-led and self-paced courses for honing your server administration skills.
- *Apple Discussions website* (discussions.apple.com)—a way to share questions, knowledge, and advice with other administrators.
- *Apple Mailing Lists website* (www.lists.apple.com)—subscribe to mailing lists so you can communicate with other administrators using email.

Understanding Print Service

1

Mac OS X Server print service helps you set up a managed printing environment on your network.

With a print server, you share printers by setting up print queues that are accessible by users over a network connection. When a user prints to a shared queue, the print job waits on the server until the printer is available or until scheduling criteria are met.

More administrator features are available by using a Mac OS X print server. For example:

- Setting page quotas for individual users on specific print queues
- Keeping logs summarizing printer use

The Mac OS X Server print service is built on top of the standard Mac OS X client printing architecture, which, in turn, is built on the Common UNIX Printing System (CUPS). Print service is based on four common protocols:

- Internet Printing Protocol (IPP)—For printing from Macintosh, Windows, or UNIX computers. Requires CUPS
- Line Printer Remote (LPR)—For printing from UNIX computers and from Macintosh computers running Mac OS 8.1 or later
- Server Message Block (SMB)—For printing from Windows computers
- AppleTalk—For printing from Macintosh computers

Use the following Mac OS X Server applications to set up and manage print services:

- **Server Admin.** Use Server Admin to turn on and configure individual file services for each protocol.
- **Workgroup Manager.** Use Workgroup Manager to create share points and set access privileges.

You can also perform most setup and management tasks by typing commands at a command prompt in Terminal. For more information, see the print service chapter of *Command-Line Administration*.

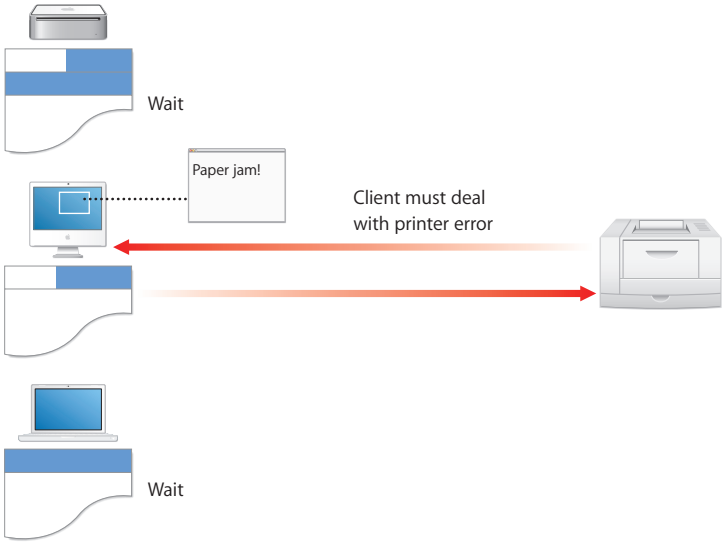
Overview of Network Printing

You can benefit from shared network printing without using a server. However, a quick comparison of network printing with and without a server-based print service shows what a print service can do to make things easier for your users and for you as an administrator.

Without Print Service

Providing shared printers to your users, even without using a server, is relatively easy: connect the printers to your network so that users can choose a printer that best suits their needs.

When a user prints a document, the resulting print job waits in a queue on the user's computer until the printer can accept the job (in common printing terminology, the job is "spooled to a queue"). The following illustration shows several users and a single printer without a print server. The print job remains in the user's print queue until the printer becomes available.



Jobs wait in queues on clients

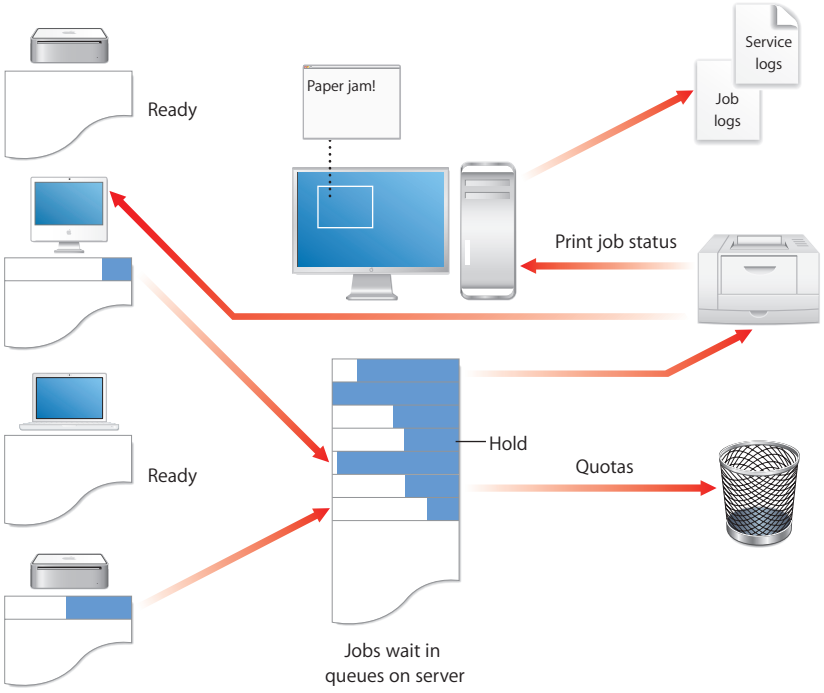
Although this way of providing access to printers is easy to set up, it has the following disadvantages:

- Users must make sure their jobs finish printing before they turn off their computers or, in the case of mobile clients, disconnect their computers from the network.
- Error messages from the printer (for example, "out of paper" or "paper jam") go directly to the user currently printing.
- It is difficult for you, as administrator, to track or control how many pages are printed by a user.

With Print Service

For better network efficiency, use print service to set up queues for printers. Users choose from these queues instead of choosing printers directly.

When a user prints a document, the resulting print job moves quickly from the queue on the user's computer to the queue on the server. The following illustration shows several users and a single printer with a print server. The print jobs move from user print queues to the server print queue for better management and efficiency.



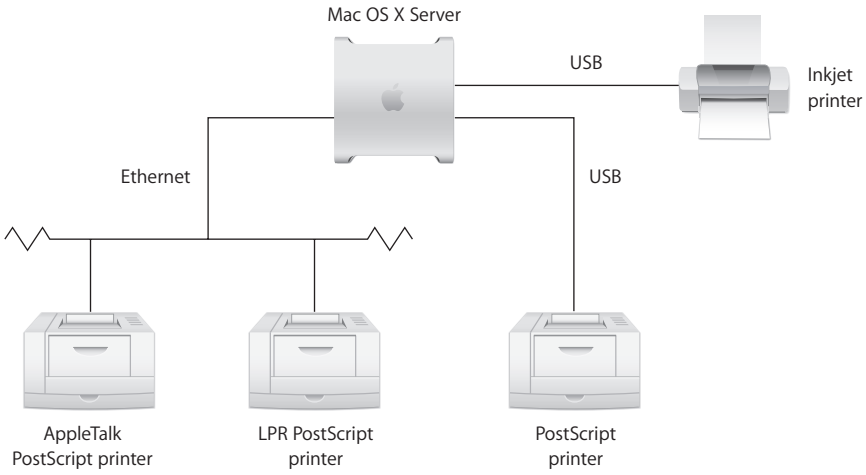
This way of providing printer access has advantages over simple network printing:

- Print jobs transfer quickly from client computers to the server's queue, so users can turn off or disconnect their computers soon after sending the print job to the server.
- Printer error conditions are reported on the server rather than on client computers.
- You can easily limit and track the number of pages a user prints on a specific printer.
- You can control when and in what order jobs print.

Supported Printers

Print service supports the following types of printers:

- PostScript-compatible printers connected to your network that use IPP, LPR, AppleTalk, or SMB protocols
- PostScript printers connected to the server through Universal Serial Bus (USB)
- Inkjet (raster) printers connected to the server through USB

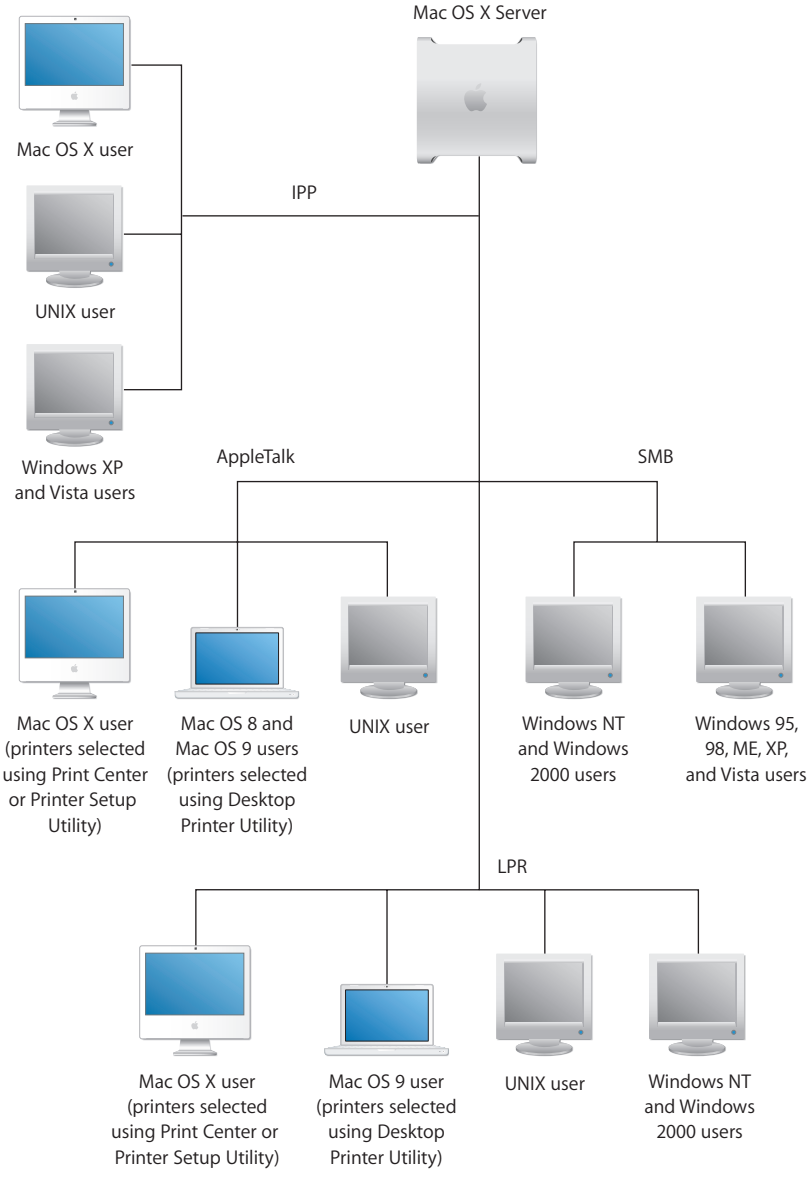


Client computers using LPR, AppleTalk, and SMB use only PostScript to transfer jobs to print queues on the server. However, IPP clients format the job data according to the OEM print driver for the destination printer, either PostScript or binary.

When Mac OS X Server receives a PostScript print job, it sends it to the queue of a PostScript printer (networked or directly connected), or it uses the ps2pdf converter to produce a PDF file for output to an inkjet printer.

Supported Clients

Any client computer using IPP, LPR, AppleTalk, or SMB can print to queues shared through the Mac OS X print service, as shown in the following illustration:



Macintosh computers communicate with printers using IPP, AppleTalk, or LPR. Windows computers use IPP, LPR, or SMB. UNIX computers use IPP or LPR. For more information about printing from a specific kind of computer, see Chapter 3, "Setting Up Printing for Clients."

Workload Distribution Using Printer Pools

Each print service queue you set up is assigned to a single printer. CUPS supports a special queue called a printer class or printer pool, which is essentially a queue with more than one printer assigned to it.

A printer pool offers a number of advantages over single-printer queues in high-volume or high-availability printing environments:

- Print jobs are assigned to the next available printer in the pool, so you can have as many jobs printing simultaneously as you have printers assigned to the pool.
- If a printer assigned to the pool becomes unavailable, the other printers in the pool continue to print waiting jobs.

To set up a printer pool, use Server Admin to configure print service. For more information, see "Creating a Printer Pool" on page 30. After creating the pool, add and manage the resulting pool queue in print service as you would any other queue.

Things to Consider When Creating a Printer Pool

The purpose of a printer pool is to increase printer use efficiency. A printer pool is not intended to compete with individual printer queues; instead, it is meant to replace them. A good practice is to not share a printer individually when it's also shared in a pool.

It is also good strategy to group printers of similar make and model so each printer in a pool has the same printing capabilities. For instance, it defeats the purpose of a printer pool if all but one printer is capable of printing color.

Important: The capabilities of printers in a printer pool are typically defined by the first printer in the pool list. If print service assigns a job to a less capable printer in the pool, the job might be rejected by the assigned printer and fail.

You can also create a printer pool using commands in Terminal. For more information, see the chapter on print service in *Command-Line Administration*.

Multiple Network Interface Support

In Mac OS X Server, print service operates across all interfaces that TCP/IP-based printing protocols are configured for. These include CUPS/IPP, LPR, and SMB.

Similarly, print service operates across the interface that AppleTalk is enabled for. For more information about AppleTalk setup and limitations, see *File Services Administration*.

Security Considerations

AppleTalk and LPR printer queues do not support authentication. Print service relies on the client to provide user information. Although standard Macintosh and Windows clients provide correct information, a malicious user could change the client to submit false information and thereby avoid print quotas.

SMB service supports authentication, which requires users to log in before using SMB printers.

Basic and Digest (MD5) authentication is built into CUPS software on which print service relies. This authentication method supports IPP.

Tools for Managing Print Service

The Workgroup Manager and Server Admin applications provide a graphical interface for managing print service in Mac OS X Server. In addition, you can manage print service from the command line by using Terminal.

These applications are included with Mac OS X Server and can be installed on another computer with Mac OS X v10.5 Leopard, making that computer an administrator computer. For more information on setting up an administrator computer, see the server administration chapter of *Getting Started*.

Server Admin

The Server Admin application provides access to tools you use to set up, manage, and monitor print service and other services. You use Server Admin to:

- Set up Mac OS X Server as a print server. For instructions, see Chapter 2.
- Manage and monitor print service. For instructions, see Chapter 4.

For more information about using Server Admin, see *Server Administration*. This includes information about:

- Opening and authenticating in Server Admin
- Working with specific servers
- Administering services
- Using SSL for remote server administration
- Customizing the Server Admin environment

Server Admin is installed in /Applications/Server/.

Workgroup Manager

The Workgroup Manager application provides comprehensive management of clients of Mac OS X Server. You use Workgroup Manager to:

- Set up and manage print quotas. For instructions, see Chapter 2.

For basic information about using Workgroup Manager, see *User Management*. This includes:

- Opening and authenticating in Workgroup Manager
- Administering accounts
- Customizing the Workgroup Manager environment

Workgroup Manager is installed in /Applications/Server/.

Command-Line Tools

A full range of command-line tools is available for administrators who prefer to use command-driven server administration. For remote server management, submit commands in a Secure Shell (SSH) session. You can enter commands on Mac OS X servers and computers using the Terminal application, located in the /Applications/Utilities/ folder.

For information about useful command-line tools, see *Command-Line Administration*.

Setting Up Print Service

2

This chapter shows how to set up print queues and change print service settings using Server Admin.

Use Server Admin to set up and configure printers and monitor print queues across your organization. With Server Admin, you can also create printer pools so you can improve the efficiency of clients printing.

Setup Overview

Here is an overview of the steps for setting up print service:

Step 1: Before you begin
For issues you should keep in mind before you setup print service, read "Planning for Print Service" on page 24.

Step 2: Turn print service on
Before you configure print service, the service must be turned on. See "Turning Print Service On" on page 25.

Step 3: Secure print service
For added security you can use SACLs to restrict who has administrator access to print service. Additionally, you can configure Kerberos for print service. See "Securing Print Service" on page 25.

Step 4: Configure print queues
Use Server Admin to create queues for your printers on the server. Users see these queues as printers. See "Configuring Print Queues" on page 27.

Step 5: Configure print settings
Use Server Admin to specify the default LPR queue and set print service log options. See "Configuring Print Settings" on page 28.

Step 6: Start print service
Use Server Admin to start print service on the server and make the queues available to clients. See "Starting Print Service" on page 29.

Step 7: (Optional) Set print quotas
If you want to limit the number of pages users can print, set print quotas for user accounts and enforce quotas on print queues. See "Setting Print Quotas" on page 31.

Step 8: Set up client computers
Add, or show your users how to add, server queues to printing setups on their computers. See Chapter 3, "Setting Up Printing for Clients."

Planning for Print Service

Although printer setup is simple, take the time to understand the options available for configuring printers. With careful planning, you can maximize the use of each printer on your network and avoid printing delays. You should note which protocols your clients use for printing. Print service supports AppleTalk, LPR, IPP, and SMB protocols.

Print Service Performance

There are no specific performance guidelines for print service due to the nature of printing. Throughput is the combination of the size of the job file (100K, 10M, 1G), the network transfer time between the client and server (the speed of any data transfer the computers are capable of for any service), the wait time in the queue (zero to infinity), and the time it takes for the destination printer to image all pages (depends on model, speed of processor, and printer memory). Little or no processing occurs on the server because print spooling is almost entirely comprised of network and file I/O.

Print Service Limitations

Consider the following print service limitations when you set up the service.

- Print clients are connected to the server only for the duration of the job data transfer. There is a default limit of 500 concurrent connections from all client computers and 100 concurrent connections from any one client computer.
- The number of print queues per server is limited only by the available resources on the server (CPU usage, memory, and file descriptors). Printing through a large number of queues (100 or more) simultaneously will likely result in some performance degradation.

Print Service Security

For setting up a more secure Print service, consider the following:

- Print service supports Service Access Control Lists (SACL). SACLs are used to restrict access to print service so that only authorized users can print. For more information, see "Configuring Service Access Control" on page 25.
- Mac OS X Server version 10.5 provides Kerberos support for print service. Kerberos support is only available over IPP connections. When configured, this kerberized support (included as part of CUPS 1.3) permits single sign-on authentication for any client that is accessing the server to print.

Kerberos authentication must be configured using the CUPS web interface tools. For more information, see "Configuring Kerberos" on page 26.

Turning Print Service On

Before you can configure print service settings, you must turn print service on in Server Admin.

To turn print service on:

1. Open Server Admin and connect to the server.
2. Click Settings, then click Services.
3. Select the Print checkbox.
4. Click Save.

Securing Print Service

Print service is often an overlooked part of a security configuration. Important information passes into your networked printers and it is important that your printers are not misused. To increase security of your print service, configure service access controls and Kerberos.

Configuring Service Access Control

You can configure SACLs using Server Admin, which enable you to specify which administrators have access to print service. This is not to restrict use of the service.

SACLs provide you with greater control over which administrators have access to monitor and manage the service. Only users and groups listed in an SACL have access to its corresponding service. For example, if you want to give administrator access to users or groups for the print service on your server, add them to the print service SACL.

To set administrator SACL permissions for print service:

1. Open Server Admin and connect to the server.
2. Click Settings, then click Access.
3. Click Administrators.
4. Select the level of restriction that you want for the services.

   To restrict access to all services, select "For all services."

   To set access permissions for individual services, select "For selected services below" and then select print service from the Service list.
5. Click the Add (+) button to open the Users and Groups list.
6. Drag users and groups from Users and Groups to the list.
7. Set the user's permission.

To grant administrator access, choose Administrator from the Permission pop-up menu next to the user name.

To grant monitoring access, choose Monitor from the Permission pop-up menu next to the user name.

8 Click Save.

Configuring Kerberos

You can configure Kerberos support for print service IPP shared queues using CUPS v1.3 online web tools. The print service will then use the local Kerberos server to authorize clients to print.

In order for your client computers to utilize Kerberos with print service, the clients must be part of the same Kerberos realm. For information on how to join your client computers to a Kerberos realm, see *Open Directory Administration*. In addition to joining the Kerberos realm, client computers must also use CUPS online web tools to configure Kerberos settings. The steps for configuring CUPS are the same on the client and server computers.

To configure Kerberos for print service:

1 Open Safari browser.

2 Navigate to the CUPS online web administration tool at http://localhost:631.

3 Click the Administration tab.

4 Under Basic Server Settings, select the "Use Kerberos Authentication" checkbox.

5 Click Change Settings and authenticate if prompted.

The print service is restarted and Kerberos is enabled.

You can also edit the configuration file in CUPS by clicking Edit Configuration File in the Administration tab to open the etc/cups/cupsd.conf file. Change the default authentication type from Basic to Negotiate, as shown:

```
# Default authentication type, when authentication is required...
DefaultAuthType Negotiate
```

Setting Up Print Service

This section explains each print service setting.

You set up print service by configuring the following print service settings in Server Admin:

- **Queues.** Create and configure print queues and printer pools, and enforce print quotas.
- **Settings.** Specify the default queue for LPR, determine how much information is recorded in the print log, and set the maximum log size.

The following subsections describe how to configure these settings. A final subsection tells you how to start up print service when you've finished.

Configuring Print Queues

Use Queues settings to configure print queues that network printers can share.

To configure Queues settings:

1. Open Server Admin and connect to the server.
2. Click the triangle to the left of the server.

   The list of services appears.
3. Click Print.
4. Click Queues.
5. Click the Add (+) button to add a print queue for a specific printer; then provide the printer information for the printer the queue is created for.

   From the pop-up menu, choose the protocol used by the printer.

   For an AppleTalk printer, select the printer in the list and click OK.

   For an LPR printer, enter the printer IP address or DNS name and click OK.

   For an Open Directory printer, select the printer in the list and click OK.

   Enter the Internet address or DNS name for the printer.

   If you don't want to use the printer default queue, deselect "Use default queue on server," enter a queue name, and click OK.
6. Select the queue you added to the queue list.

   To verify that you selected the correct queue, make sure the queue name matches the name next to Printer.

   Note: Changing the Sharing Name also changes the queue name that appears in Print & Fax preferences on the server.
7. In the Sharing Name field, enter the queue name you want clients to see.

   Make sure the name is compatible with naming restrictions imposed by your clients. For example, some LPR clients do not support names that contain spaces, and some Windows clients restrict names to 12 characters. Queue names shared using LPR or SMB must not contain characters other than A–Z, a–z, 0–9, and _ (underscore).

   AppleTalk queue names cannot be longer than 32 bytes; this might be fewer than 32 typed characters. The queue name is encoded according to the language used on the server and might not be readable on client computers using another language.
8. Select the printing protocols your client computers use.

   If you select "SMB," make sure you start SMB service.

   If you select "AppleTalk," make sure that AppleTalk networking is enabled.

9 If you want to enforce the print quotas you establish for users in Workgroup Manager, select the "Enforce quotas for this queue" checkbox.

10 If you want the printer to add a cover sheet to every job, choose the title of the cover sheet from the Cover Sheet pop-up menu; otherwise, choose "None."

11 Click Save.

Configuring Print Settings

Use print service Settings in Server Admin to specify a default LPR queue for the server and to set print logging options.

Print service keeps a general service log and individual logs for each shared queue. When a log is archived, new events are recorded in a new, empty log file. You can also specify the level of detail in the logs and how often the logs are archived.

To configure print service Settings:

1 Open Server Admin and connect to the server.

2 Click the triangle to the left of the server.

The list of services appears.

3 Click Print.

4 Click Settings.

5 From the pop-up menu, choose the default queue.

If the queue you want to use is not in the list, it might not currently be shared using LPR.

A user can add the default LPR queue to his or her computer's printer list without knowing the queue's name by choosing "Use default queue on server" when adding the printer.

6 Select "Archive server log."

If you don't want to archive server logs, deselect the checkbox next to "Archive server log."

7 If you want to archive the log, from the Maximum log size pop-up menu choose the maximum size that the log file can grow to before it is archived.

8 From the Log Level pop-up menu, choose the amount of detail to be recorded in the log file.

9 Click Save.

Both current and archived logs are stored in /Library/Logs/PrintService/.

From the Command Line

You can also set the log archival interval using the `serveradmin` command in Terminal. For more information, see the print service chapter of *Command-Line Administration*.

Starting Print Service

Use Server Admin to start print service. Once you start print service, it restarts whenever the server is restarted.

To start print service:

1. Open Server Admin and connect to the server.
2. Click the triangle to the left of the server.

   The list of services appears.
3. Click Print.
4. Click Start Print (below the Servers list).

From the Command Line

You can also start print service using the `serveradmin` command in Terminal. For more information, see the print service chapter of *Command-Line Administration*.

Advertising an LPR Queue Using Bonjour

You can make it easier for your users to find shared LPR queues by advertising them using Bonjour.

To advertise a queue using Bonjour:

1. Open Server Admin and connect to the server.
2. Click the triangle to the left of the server.

   The list of services appears.
3. Click Print.
4. Click Queues.
5. Select the queue you want to advertise.
6. Under LPR in the Protocol section, select "Show name in Bonjour."
7. Click Save.

Listing an LPR Queue in Open Directory

You can make it easier for your users to find shared LPR queues by listing them in Open Directory. If you include the PostScript Printer Description (PPD) printer model name in the directory, users can choose the exact printer model they want.

To list a queue in Open Directory:

1. If you haven't already done so, create the queue.

   For more information, see "Creating a Print Queue" on page 43.
2. Open Workgroup Manager.

3. If you don't see the Inspector buttons, choose Workgroup Manager > Preferences and select "Show All Records tab and inspector."
4. If necessary, switch to the correct directory domain.
5. Click the All Records button (it looks like a bull's-eye, next to the Users, Groups, and Computers buttons).
6. From the pop-up menu below the All Records button, choose Printers and click New Record.
7. In the attribute list, select RecordName (with "untitiled_1" next to it) and click Edit.
8. In the Text field, enter the name you want your users to see when they're browsing for the printer and click OK.
9. From the Attribute Name pop-up menu, click New Attribute and choose PrinterLPRHost.
10. Click in the Text field, enter the IP address or DNS name of the server that hosts the queue, and click OK.
11. If the queue you are listing is not the default LPR queue on the server, click New Attribute, choose PrinterLPRQueue from the pop-up menu, enter the queue name in the Text field, and click OK.
12. If you want to specify the printer model, click New Attribute, choose Printer Type from the pop-up menu, enter the model name, and click OK.

    Important: Make sure the model name you enter exactly matches the value of the `*ModelName` attribute in the PPD file. To confirm the value of this attribute, try either of the following:

    - Open Print & Fax preferences and click Printing; click the Add (+) button, click IP Printer, choose the printer protocol from the Protocol pop-up menu, and find the model name in the Print Using pop-up menu.
    - Make a copy of the PPD file, use the `gunzip` command in Terminal to decompress it, then open it in TextEdit or another text editor and search for "*ModelName." The PPD files are in /Library/Printer/PPDs/Contents/Resources/en.lproj.
13. Click Save.

Creating a Printer Pool

You can create a printer pool using Server Admin.

To create a printer pool:

1. Open Server Admin and connect to the server.
2. Click the triangle to the left of the server.

   The list of services appears.

3. Click Print.
4. Click Queues.
5. Create two or more print queues.

   For more information about creating a print queue, see "Configuring Print Queues" on page 27.

   Important: Pooled printers must be the same make and model so that output is consistent. Users might lose printer functionality if fully-featured printers are pooled with printers having fewer features.
6. Select two or more printers from the Queues list.

   The Create Printer Pool button is activated.
7. Click Create Printer Pool.
8. Enter a name to identify the print pool.

   This name becomes the sharing name, by which users identify the print pool.
9. Click OK.
10. Select the printing protocols your client computers use.

    If you select "SMB," make sure you start SMB service.
11. If you want to enforce the print quotas you establish for users in Workgroup Manager, select "Enforce quotas for this queue."
12. If you want the printer to create a cover sheet, choose the title of the cover sheet from the Cover Sheet pop-up menu; otherwise, choose "None."
13. Click Save.

Setting Print Quotas

A print quota is the total number of pages a user is permitted to print during a specified time period. When a user has printed the specified number of pages, he or she cannot print again until the quota period ends and the quota is automatically renewed. Alternatively, you can explicitly renew the quota.

For each user, you can set either a single quota that covers all printers they use, or you can set individual quotas for each printer:

- In the case of a single quota, every page printed counts against a user's quota, regardless of the printer used.
- In the case of per-queue quotas, you can vary the quota from printer to printer or you can choose not to enforce quotas on some printers while restricting the use of others.

The procedure for setting up a print quota involves two steps:

- Use Workgroup Manager to specify the quota and time period for each user.

- Use Server Admin to set print service to enforce quotas for individual queues.

Specifying User Print Quotas

Use Workgroup Manager to specify print quotas for individual users.

To set a user's quota:

1. Open Workgroup Manager, click Accounts, and select the user.
2. Click Print Quota.
3. To set one quota for all queues, select All Queues, then enter the number of pages and the number of days after which the quota is restarted.

   To set a quota for a particular queue, select Per Queue, choose the queue from the pop-up menu, and enter the quota and quota period.

   If the queue is not in the list, click Add and change "untitled" in the Queue Name field to the queue name, then enter the IP address or DNS name of the server hosting the queue and enter the user's page quota and quota period.
4. Click Save.

The quotas are not enforced until you use Server Admin to turn on quota enforcement for specific queues.

Enforcing Print Quotas for a Queue

Users are not subject to print quotas you set for them in Workgroup Manager until you also use Server Admin to turn on quota enforcement for specific print queues in print service.

Important: When you enforce a print quota on a queue, users can't print to the queue unless they have a valid, unexpired quota defined for them in Workgroup Manager.

To enforce quotas for a print queue:

1. Open Server Admin and connect to the server.
2. Click the triangle to the left of the server.

   The list of services appears.
3. Click Print.
4. Click Queues.
5. Select a queue from the queue list.

   To verify that you have selected the correct queue, make sure the queue name matches the name next to Printer.
6. Select the "Enforce quotas for this queue" checkbox.
7. Click Save.

From the Command Line

You can also set quota enforcement for a queue using the `serveradmin` command in Terminal. For more information, see the print service chapter of *Command-Line Administration*.

Restarting a User's Print Quota

Use Workgroup Manager to restart a user's quota period or change the user's page quota.

To restart quotas for a print queue:

1. Open Workgroup Manager, click Accounts, and select the user.
2. Click Print Quota and select All Queues or Per Queue.
3. Restart the quota period by clicking Restart Print Quota.
4. To change the number of pages permitted during the current quota period, enter a new value in the "Limit to" field.

   Note: If you change the duration of a user's print quota, print service restarts the quota's period.
5. Click Save.

Setting Up Printing for Clients

3

This chapter shows you how to set up clients to use the printers offered by your print service.

Before client computers can access network printers, they must be configured properly. The print service supports four classes of clients:

- Mac OS X clients
- Mac OS 9 and Mac OS 8 clients
- Windows clients
- UNIX clients

About PPD Files

A PostScript Printer Description (PPD) file contains specialized information about a specific printer model. Your users need the PPD file to take advantage of a printer's special features and capabilities. Without the right PPD file, users can't do things such as choose from multiple paper trays, use special paper sizes, or print on both sides of the page.

Viewing PPD Files

Mac OS X and Mac OS X Server come with PPD files already installed for most popular printers.

To view available PPD files:

1. Open Print & Fax preferences.
2. Click the Add (+) button and click IP.
3. From the Protocol pop-up menu, choose "Internet Printing Protocol - IPP."
4. In the Address field enter the host name or IP address of the printer.
5. From the Print Using pop-up menu, choose a vendor.

   If you can't find a PPD for the printer you want to use, contact the manufacturer for a PPD installer for that particular model. As a last resort, try using the Generic PPD file, which enables basic printing on most printers.

The proper PPD file must be chosen on the client computer when the print queue is added.

Mac OS X Clients

To use queues offered by a server, Mac OS X users must add the queues to their printer lists using Print & Fax preferences, just as they would to add any other printer. Mac OS X supports AppleTalk and LPR printers.

Adding an IPP Print Queue

Print service queues that you share through IPP appear in the client's Default Browser list in Print & Fax preferences and in the print dialog of all Mac OS X applications.

There are two important advantages to using IPP queues over AppleTalk, SMB, or LPR PostScript queues:

- After the job is spooled to the server print queue, you can use Print & Fax preferences to monitor the progress of the job, and even delete the job from the server.
- When printing to an IPP queue for a non-PostScript printer, you can use the printer's native driver (if installed on your Mac OS X computer) to take advantage of all the printer's features. This option is not available to clients printing to non-PostScript printers shared through AppleTalk, LPR, or SMB.

Adding an AppleTalk Print Queue

You can use Print & Fax preferences to add print queues to a computer's printer list.

To add an AppleTalk print queue:

1. On the client computer, open Print & Fax preferences.
2. Click the Add (+) button and click Default.
3. Select a printer from the list.
4. From the Print Using pop-up menu, choose the printer type.

   If you're not sure of the type, Generic PostScript Printer works for most printing needs.
5. Click Add.

Adding an LPR Print Queue

You can use Print & Fax preferences to add an LPR print queue to a computer's printer list. The way you add an LPR printer depends on whether the printer is shared by IP address or DNS name only, advertised through Bonjour, or listed in Open Directory.

To add an LPR print queue by IP address or DNS name:

1. On the client computer, open Print & Fax preferences.
2. Click the Add (+) button and click IP.
3. From the Protocol pop-up menu, choose "Internet Printing Protocol – IPP."

4 In the Address field, enter the server's DNS name or IP address (not the printer's name or address).

5 In the Queue field, enter the queue name.

If you want to use the server's default queue, leave the Queue field blank.

If you have not set up a default LPR queue on the server, or if you want to use a different queue, enter a queue name in the Queue field.

6 From the Print Using pop-up menu, choose the printer type.

If you're not sure of the type, Generic PostScript Printer works for most printing needs.

7 Click Add.

If you set up your server to advertise LPR print queues using Bonjour or Open Directory, a client can browse for an LPR queue instead of needing to know the address of the server and the name of the queue when adding a printer.

To add an LPR print queue that is advertised through Bonjour or Open Directory:

1 On the client computer, open Print & Fax preferences.

2 Click the Add (+) button and click Default.

3 Select the print queue from the list.

4 From the Print Using pop-up menu, choose the printer type.

If you're not sure of the type, Generic PostScript Printer works for most printing needs.

5 Click Add.

For help with advertising a printer using Bonjour, see "Advertising an LPR Queue Using Bonjour" on page 29.

For help with listing a printer in Open Directory, see "Listing an LPR Queue in Open Directory" on page 29.

Troubleshooting

If a Mac OS X client is having trouble printing, see Chapter 5, "Solving Problems."

Mac OS 8 and Mac OS 9 Clients

To use shared queues offered by a server, Mac OS 8 and Mac OS 9 users must add the queues just as they would add any other printer, using the Chooser for AppleTalk printers or the Desktop Printer Utility for LPR printers.

The Desktop Printer Utility is usually located in the Apple Extras/LaserWriter Software/ folder or in /Applications/Utilities/.

Adding an AppleTalk Print Queue

On a computer running Mac OS 8 or Mac OS 9, use the Chooser to set up an AppleTalk queue.

To add an AppleTalk print queue:

1. Open the Chooser.
2. Select the LaserWriter 8 icon or the icon for your printer's model.

   The LaserWriter 8 icon works well in most cases. Use a printer-specific icon, if available, to take advantage of special features that might be offered by that printer.
3. From the list on the right, select the queue and click Create.
4. When the dialog appears, select the PPD for the printer.
5. Close the Chooser.

Adding an LPR Print Queue

On a computer running Mac OS 8 or Mac OS 9, use the Desktop Printer Utility to set up LPR printers.

To add an LPR print queue:

1. Open the Desktop Printer Utility, select Printer (LPR), and click OK.
2. In the PostScript Printer Description (PPD) File section, click Change and select the PPD file for the printer.

   If you do not know the printer type, choose Generic.
3. In the LPR Printer Selection section, click Change in the Printer Address field and enter the server's IP address or domain name.
4. Enter the name of the print queue on the server configured for sharing through LPR or leave the field blank if you want to print to the default LPR queue.
5. Click Verify to confirm that print service is accepting jobs through LPR.
6. Click OK, then click Create.
7. Enter a name for the printer, choose a location for the desktop printer icon, and then click Save.

   The default printer name is the printer's IP address, and the default icon location is Desktop.

Troubleshooting

If a Mac OS 8 or 9 client is having trouble printing, see Chapter 5, "Solving Problems."

Windows Clients

Print service supports Windows clients via SMB, IPP, or LPR.

Most versions of Windows support SMB to one degree or another. Additionally, print service can also support Windows clients through IPP and LPR, with IPP and LPR support being built into Windows XP and Vista. LPR client support for Windows 95, Windows 98, and Windows Millennium Edition (ME) is available through third party add-ons.

In general, Windows does not support AppleTalk printing, except for Windows NT and Windows 2000 servers.

To enable printing by Windows users who submit jobs using SMB, make sure that SMB service is running and that one or more print queues are available for SMB use.

Note: Third-party LPR drivers are available for Windows computers that do not have built-in LPR support.

Adding a Print Queue

Windows users can use the Add Printer Wizard to connect to Mac OS X Server print queues. The wizard allows users to browse the network for a printer or to specify the printer address using the universal naming convention (UNC) format:
*servername**printqueuename*

The *servername* is the NetBIOS name of the PDC server or a Windows domain member server where you want the user share point stored. For more information, see "Viewing the Server NetBIOS Name" on page 39.

The *printqueuename* is the sharing name assigned to the print queue on the server.

For more information, see "Viewing the Print Queue Name" on page 40.

Viewing the Server NetBIOS Name

Use Server Admin to view the server name for SMB service.

To view the server name:

1. Open Server Admin and connect to the server.
2. Click the triangle to the left of the server.

   The list of services appears.
3. From the expanded Servers list, select SMB.
4. Click Settings, then click General.
5. Look at the Computer Name field.

Viewing the Print Queue Name

Use Server Admin to view the print queue sharing name.

To view the print queue sharing name:

1. Open Server Admin and connect to the server.
2. Click the triangle to the left of the server.

   The list of services appears.
3. From the expanded Servers list, select Print.
4. Click Queues.
5. Look at the Sharing Name field.

Troubleshooting

If a Windows client is having trouble printing, see Chapter 5, "Solving Problems."

UNIX Clients

UNIX computers support LPR for connecting to networked printers without the installation of more software.

Managing Print Service

4

This chapter shows how to perform routine management tasks for print service after it is running.

You can manage Print service using Server Admin. Server Admin allows you to verify the overall status of the service and print queues, to review logs, and to view print jobs.

Managing the Service

This section describes day-to-day tasks you might perform to keep print service running efficiently, to stop the service, and to set up print job cover sheets.

Checking the Status of Print Service

You can use Server Admin to monitor print service.

To check the status of print service:

1. Open Server Admin and connect to the server.
2. Click the triangle to the left of the server.

   The list of services appears.
3. From the expanded Servers list, select Print.
4. Click Overview to see if print service is running, the time it started if it is running, and the number of queues and waiting print jobs.
5. Click Logs.

   Use the Filter field located in the upper right to search for specific entries.
6. Click Queues to see the status of print queues.
7. Click Job Status and choose a queue from the Jobs on Queue pop-up menu to see a list of print jobs waiting in each queue.

From the Command Line

You can also check to see if print service is running using the `serveradmin` command in Terminal. For more information, see the print service chapter of *Command-Line Administration*.

Turning Off Print Service

You can use Server Admin to stop print service.

To stop print service:

1. Open Server Admin and connect to the server.
2. Click the triangle to the left of the server.

   The list of services appears.
3. From the expanded Servers list, select Print.
4. Click Stop Print (below the Servers list).

From the Command Line

You can also start and stop print service using the `serveradmin` command in Terminal. For more information, see the print service chapter of *Command-Line Administration*.

Enabling and Disabling Cover Sheets for Print Jobs

You can use Server Admin to enable or disable cover sheets for print jobs.

To enable or disable cover sheets for print jobs:

1. Open Server Admin and connect to the server.
2. Click the triangle to the left of the server.

   The list of services appears.
3. From the expanded Servers list, select Print.
4. Click Queues.
5. From the queue list, select the queue you want to edit.

   To verify that you have selected the correct queue, make sure the queue name matches the name next to Printer.
6. If you want the printer to create a cover sheet, choose the title of the cover sheet from the Cover Sheet pop-up menu; otherwise, choose "None."
7. Click Save.

Managing Print Queues

This section tells you how to perform day-to-day print queue management.

Creating a Print Queue

You can share any printer that is set up in a print queue on the server. You create print queues using Server Admin.

To create a shared print queue:

1. Open Server Admin and connect to the server.
2. Click the triangle to the left of the server.

   The list of services appears.
3. Click Print.
4. Click Queues.
5. Click the Add (+) button to add a print queue for a specific printer, and provide the following printer information for the printer the queue is created for:

   From the pop-up menu, choose the protocol used by the printer.

   For an AppleTalk printer, select the printer in the list and click OK.

   For an LPR printer, enter the printer IP address or DNS name and click OK.

   For an Open Directory printer, select the printer in the list and click OK.

   Enter the Internet address or DNS name for the printer.

   If you don't want to use the printer's default queue, deselect "Use default queue on server," enter a queue name, and click OK.
6. Select the queue you have added to the queue list.

   To verify that you have selected the correct queue, make sure the queue name matches the name next to Printer.

   Note: Changing the Sharing Name also changes the queue name that appears in Print & Fax preferences on the server.
7. In the Sharing Name field, enter the queue name you want clients to see.

   Make sure the name is compatible with naming restrictions imposed by your clients. For example, some LPR clients do not support names that contain spaces, and some Windows clients restrict names to 12 characters. Queue names shared using LPR or SMB must not contain characters other than A–Z, a–z, 0–9, and _ (underscore).

   AppleTalk queue names cannot be longer than 32 bytes; this might be fewer than 32 typed characters. The queue name is encoded according to the language used on the server and might not be readable on client computers using another language.
8. Select the printing protocols your clients use.

   If you select "SMB," make sure you start SMB service.

9 If you want to enforce the print quotas you establish for users in Workgroup Manager, select the "Enforce quotas for this queue" checkbox.

10 If you want the printer to create a cover sheet, choose the title of the cover sheet from the Cover Sheet pop-up menu; otherwise, choose "None."

11 Click Save.

Viewing Print Queue Status

You can use Server Admin to see the current status of print queues. The Queues pane shows all the settings for the print queues configured for the server. This list includes the queue name, printer type, and how the printer is shared.

To view queue status:

1 Open Server Admin and connect to the server.

2 Click the triangle to the left of the server.

The list of services appears.

3 Click Print.

4 Click Queues to see the list of print queues on the server.

From the Command Line

You can also list the queues using the `serveradmin` command in Terminal. For more information, see the print service chapter of *Command-Line Administration*.

Pausing a Print Queue

To prevent waiting jobs from printing, you can use Server Admin to pause the queue that contains them.

New jobs continue to be added to the queue but do not print until you resume the queue. When you resume the queue, any print job that was interrupted is reprinted from the beginning.

To pause a queue:

1 Open Server Admin and connect to the server.

2 Click the triangle to the left of the server.

The list of services appears.

3 Click Print.

4 Click Job Status to see a list of print queues and print jobs on the server.

5 Select the queue, and then click Pause (below the list).

Resuming a Print Queue

You can use Server Admin to resume printing all waiting jobs in a paused queue.

To resume a print queue:

1. Open Server Admin and connect to the server.
2. Click the triangle to the left of the server.

   The list of services appears.
3. Click Print.
4. Click Job Status to see a list of print queues on the server.

   The Status column indicates if the print queue is stopped.
5. Select a paused queue and click Resume (below the list).

Individual jobs that were on hold remain on hold. If a printing job was interrupted when you paused the queue, that job prints again from the beginning.

Changing Print Queue Settings

You can use Server Admin to view and change the configuration of a print queue.

Note: When you change the configuration of a queue, the queue can become unavailable to users. If this happens, users must set up their computers to use the queue again.

To change the settings of a print queue:

1. Open Server Admin and connect to the server.
2. Click the triangle to the left of the server.

   The list of services appears.
3. Click Print.
4. Click Queues.
5. From the queue list, select the print queue you want to change.

   To verify that you selected the correct queue, make sure the queue name matches the name next to Printer.
6. Make changes, then click Save.

From the Command Line

You can also change queue settings using the `serveradmin` command in Terminal. For more information, see the print service chapter of *Command-Line Administration*.

Renaming a Print Queue

When you add a printer in Print & Fax preferences, the default name of the new queue is the name of the associated printer. You can change this name to help your users choose the right printer or to comply with naming conventions imposed by the protocols your clients use.

Note: If you change the name of a print queue that has already been shared, users must set up their computers again to use the queue with its new name. New jobs that users send to the queue with the old name are not printed.

To rename a queue:

1. Open Server Admin and connect to the server.
2. Click the triangle to the left of the server.

   The list of services appears.
3. Click Print.
4. Click Queues.
5. In the queue list, select the print queue you want to change.

   To verify that you have selected the correct queue, make sure the queue name matches the name next to Printer.
6. In the Sharing Name field, enter a new name.
7. Click Save.

Changing the sharing name for the queue does not change its underlying Print & Fax preferences queue name.

From the Command Line

You can also rename a queue using the `serveradmin` command in Terminal. See the print service chapter of *Command-Line Administration*.

Changing the Default LPR Print Queue

Specifying a default LPR queue simplifies setup for client computers because users can print to the default queue rather than entering the name of a queue.

To change a default print queue:

1. Open Server Admin and connect to the server.
2. Click the triangle to the left of the server.

   The list of services appears.
3. Click Print.
4. Click Settings.
5. From the "Default Queue for LPR" pop-up menu, choose the queue.

If the queue you want to use is not listed, click Queues, select the queue in the queue list, and make sure LPR protocol is selected.

6 Click Save.

From the Command Line

You can also change the default LPR queue using the `serveradmin` command in Terminal. For more information, see the print service chapter of *Command-Line Administration*.

Deleting a Print Queue

When you delete a print queue, jobs in the queue are also deleted. If a job is printing, it is canceled immediately. To permit existing jobs to finish printing while preventing new jobs from arriving, disable the sharing protocols in the queue settings and wait until all jobs finish printing before deleting the queue.

To delete a print queue:

1 Open Server Admin and connect to the server.

2 Click the triangle to the left of the server.

The list of services appears.

3 Click Print.

4 Click Queues.

5 Select the queue from the queue list.

To verify that you have selected the correct queue, make sure the queue name matches the name next to Printer.

6 Click the Delete (–) button.

7 Click Save.

Setting Up a Print Queue for Windows (SMB) Access

You can allow Windows clients to access an existing print queue via SMB, the standard Windows protocol for printer sharing. You use Server Admin to configure queues for shared printers on the server.

To provide SMB access to a print queue:

1 Open Server Admin and connect to the server.

2 Click the triangle to the left of the server.

The list of services appears.

3 Click Print.

4 Click Queues.

5 Select the print queue in the list.

6 Make sure Sharing Name is compatible with SMB sharing.

Changing the Sharing Name also changes the Print & Fax preferences queue name on the server. Names of queues shared using SMB should be 15 characters maximum and should not contain characters other than A–Z, a–z, 0–9, and _ (underscore).

Sharing Name is the queue name, which users see as the name of a printer. Changing Sharing Name does not affect the printer name on the server, which is shown above Sharing Name. You can edit the printer name, kind (model), and location by using Print & Fax preferences.

To avoid conflicts, make sure Sharing Name is not the same as any SMB share point name.

7 For Protocol, select SMB.

8 Click Save.

SMB service must be running to provide SMB access to print queues.

For more information, see *File Services Administration*.

Managing Print Jobs

This section tells you how to perform day-to-day management of print jobs.

Monitoring a Print Job

You can monitor individual print jobs using Server Admin.

To view a print job:

1 Open Server Admin and connect to the server.

2 Click the triangle to the left of the server.

The list of services appears.

3 Click Print.

4 Click Job Status.

5 From the Jobs on Queue pop-up menu, choose a queue.

Jobs are listed in priority order, and include the name of the user who submitted each job, the name of the job, its size, the number of sheets to be printed, the current status of the job, and the number of pages in the job. (If the page column is not visible, scroll to see it.)

Pausing a Print Job

When you put a print job on hold, it is not printed until you resume it. If the job has started to print, printing stops and the job remains in the queue.

While the print job is paused, other jobs in the queue that are not on hold will continue to print. When you resume the job, printing starts from the beginning of the job.

To pause a print job:

1. Open Server Admin and connect to the server.
2. Click the triangle to the left of the server.

   The list of services appears.
3. Click Print.
4. Click Job Status.
5. From the Jobs on Queue pop-up menu, choose a queue.
6. Select a job and click Pause (below the list).

   Shift-click or Command-click to select multiple jobs.

Resuming a Print Job

When a print job is paused, it does not print until you resume the job. When you resume the job, printing starts from the beginning.

Note: If you put the entire print queue on hold, you must resume the queue to print the job. For more information, see "Resuming a Print Queue" on page 45.

To resume a print job:

1. Open Server Admin and connect to the server.
2. Click the triangle to the left of the server.

   The list of services appears.
3. Click Print.
4. Click Job Status.
5. From the Jobs on Queue pop-up menu, choose a queue.
6. Select the job and click Resume (below the list).

   Shift-click or Command-click to select multiple jobs.

The job prints after all other jobs in the queue that have the same priority are printed.

Removing a Print Job

You can use Server Admin to remove a print job.

To remove a print job:

1. Open Server Admin and connect to the server.
2. Click the triangle to the left of the server.

   The list of services appears.
3. Click Print.
4. Click Job Status.
5. From the Jobs on Queue pop-up menu, choose a queue.
6. Select the job and click Remove (below the list).

   Any pages already sent to the printer continue to print even after you remove the job.

Managing Print Quotas

This section tells you how to perform day-to-day management of print quotas.

Suspending Quotas for a Print Queue

You can use Server Admin to enforce and suspend print quotas for specific queues. Suspending quotas for a print queue permits all users to have unlimited printing to the queue.

To suspend quotas for a print queue:

1. Open Server Admin and connect to the server.
2. Click the triangle to the left of the server.

   The list of services appears.
3. Click Print.
4. Click Queues.
5. From the queue list, select the print queue you want to change.

   To verify that you have selected the correct queue, make sure the queue name matches the name next to Printer.
6. Deselect "Enforce quotas for this queue."
7. Click Save.

From the Command Line

You can also disable quotas using the `serveradmin` command in Terminal. For more information, see the print service chapter of *Command-Line Administration*.

Managing Print Logs

This section tells you how to view and archive print service and queue logs.

Viewing Print Service and Queue Logs

Print service keeps two types of logs: a print service log and individual print queue logs.

- The print service log records the time of events such as when print service is started and stopped and when a print queue is put on hold.
- A print queue log records information such as the name of users who submitted jobs and the size of each job.

You can view print service logs using Server Admin.

To view print service logs:

1. Open Server Admin and connect to the server.
2. Click the triangle to the left of the server.

   The list of services appears.
3. Click Print.
4. Click Logs.

   Use the Filter field to search for specific entries.

From the Command Line

You can also view the logs by using the `cat` or `tail` command in Terminal. For more information, see the print service chapter of *Command-Line Administration*.

Archiving Print Service Logs

You can use Server Admin to specify how large the print service logs get before they are archived and new logs are started.

Print service archives logs following the CUPS model. When a print service log file reaches the maximum size, print service moves the file to *log_name*.0, where *log_name* is the name of the log file, and starts a new log file with the previous name (*log_name*). If an archive exists, print service overwrites it.

To specify the maximum size of archive logs:

1. Open Server Admin and connect to the server.
2. Click the triangle to the left of the server.

   The list of services appears.
3. Click Print.
4. Click Settings.
5. From the Log Level pop-up menu, choose a level of log reporting.

Choosing to only log errors produces a less verbose log of events in the log file than choosing to log events at the debug level.

6 Select Archive server log.

This activates the Maximum log size pop-up menu.

7 From the Maximum log size pop-up menu, choose the maximum log size, in megabytes.

If you want to increase log history, set the maximum log size to a higher value.

8 Click Save.

From the Command Line

You can also set the archive interval using the `serveradmin` command in Terminal. For more information, see the print service chapter of *Command-Line Administration*.

Solving Problems

5

This chapter shows how to troubleshoot print service problems.

If you are experiencing any of the following print service problems, see the appropriate section of this chapter for suggestions to alleviate the problem.

- Print service doesn't start
- A user can't add a print queue
- A user can't print
- Jobs in a print queue don't print
- A print queue becomes unavailable
- Windows users can't print

If Print Service Doesn't Start

- Verify that the software serial number for the server is entered correctly and has not expired. To check the number, open Server Admin, select your server, then click Server (below your servers name) in the Servers list. To enter an updated serial number, click General Settings, then click General.
- Check the print service log for indications of problems. Open Server Admin, select Print in the Servers list, and click Logs.

If a User Can't Add a Print Queue

- Make sure print service is running. Open Server Admin and select Print in the Servers list. If the service is not running, click Start (below the Server list).
- Verify that the queue is shared correctly. SMB is for Windows users only. LPR is a standard print protocol that Macintosh, UNIX, some Windows computers, and other computers can use.

If a User Can't Print

- Make sure print service is running. Open Server Admin and select Print in the Servers list. If the service is not running, click Start (below the Servers list).
- Make sure the queue has been added. On Mac OS 8 or Mac OS 9 computers, use the Chooser (for AppleTalk print queues) or Desktop Printer Utility (for LPR print queues) to make sure printer setup is correct. On Mac OS X, use Print & Fax preferences to add print queues to the printer list.
- Verify that Mac OS clients have TCP/IP set up correctly.
- Verify that Windows NT 4.x clients have entered the queue name correctly. Use the DNS host name instead of the printer or server TCP/IP address. If the queue doesn't have a DNS name, enter a queue name containing only letters and numbers.

If Jobs in a Print Queue Don't Print

- Make sure neither the queue nor the jobs in it are on hold. Open Server Admin, select Print in the Servers list, click Jobs, and then choose a queue from the Jobs on the Queue pop-up menu to view the status of jobs.
- Make sure the printer is connected to the server or to the network that the server is connected to.
- Make sure the printer is turned on and that there are no problems with the printer (out of paper, paper jams, and so on).
- Review the print logs for more information. Open Server Admin, select Print in the Servers list, and click Logs.

If a Print Queue Becomes Unavailable

If you changed a print queue name that has already been shared, print jobs that users send to the old queue name are not printed. Users must set up their computers again to use the queue with its new name.

If Windows Users Can't Print

If Windows NT 4.x clients can't print to the server, make sure the queue name is not the TCP/IP address of the printer or server. Use the DNS host name instead of the printer or server address or, if there is none, enter a queue name containing only letters and numbers. The name of an SMB print queue must not exceed 15 characters.

Glossary

AFP Apple Filing Protocol. A client/server protocol used by Apple file service to share files and network services. AFP uses TCP/IP and other protocols to support communication between computers on a network.

address A number or other identifier that uniquely identifies a computer on a network, a block of data stored on a disk, or a location in a computer's memory. See also **IP address**, **MAC address**.

administrator A user with server or directory domain administration privileges. Administrators are always members of the predefined "admin" group.

alias Another email address at your domain that redirects incoming email to an existing user.

Apple Filing Protocol See **AFP**.

automount To make a share point appear automatically on a client computer. See also **mount**.

bit A single piece of information, with a value of either 0 or 1.

Bonjour A protocol developed by Apple for automatic discovery of computers, devices, and services on IP networks. Formerly called Rendezvous, this proposed Internet standard protocol is sometimes referred to as ZeroConf or multicast DNS.

CIFS Common Internet File System. See **SMB**.

client A computer (or a user of the computer) that requests data or services from another computer, or server.

command line The text you type at a shell prompt when using a command-line interface.

command-line interface A way of interacting with the computer (for example, to run programs or modify file system permissions) by entering text commands at a shell prompt. See also **shell**; **shell prompt**.

Common UNIX Printing System See **CUPS**.

CUPS Common UNIX Printing System. A cross-platform printing facility based on the Internet Printing Protocol (IPP). The Mac OS X Print Center, its underlying print system, and the Mac OS X Server print service are based on CUPS. For more information, visit www.cups.org.

daemon A program that runs in the background and provides important system services, such as processing incoming email or handling requests from the network.

DHCP Dynamic Host Configuration Protocol. A protocol used to dynamically distribute IP addresses to client computers. Each time a client computer starts up, the protocol looks for a DHCP server and then requests an IP address from the DHCP server it finds. The DHCP server checks for an available IP address and sends it to the client computer along with a lease period—the length of time the client computer may use the address.

directory domain A specialized database that stores authoritative information about users and network resources; the information is needed by system software and applications. The database is optimized to handle many requests for information and to find and retrieve information quickly. Also called a directory node or simply a directory.

DNS Domain Name System. A distributed database that maps IP addresses to domain names. A DNS server, also known as a name server, keeps a list of names and the IP addresses associated with each name.

DNS domain A unique name of a computer used in the Domain Name System to translate IP addresses and names. Also called a **domain name**.

DNS name A unique name of a computer used in the Domain Name System to translate IP addresses and names. Also called a **domain name**.

domain Part of the domain name of a computer on the Internet. It does not include the top-level domain designator (for example, .com, .net, .us, .uk). Domain name "www.example.com" consists of the subdomain or host name "www," the domain "example," and the top-level domain "com."

domain name See **DNS name**.

Domain Name System See **DNS**.

drop box A shared folder with privileges that allow other users to write to, but not read, the folder's contents. Only the owner has full access. Drop boxes should be created only using AFP. When a folder is shared using AFP, the ownership of an item written to the folder is automatically transferred to the owner of the folder, thus giving the owner of a drop box full access to and control over items put into it.

everyone Any user who can log in to a file server: a registered user or guest, an anonymous FTP user, or a website visitor.

export In the Network File System (NFS), a way of sharing a folder with clients on a network.

file server A computer that serves files to clients. A file server may be a general-purpose computer that's capable of hosting additional applications or a computer capable only of serving files.

file system A scheme for storing data on storage devices that allows applications to read and write files without having to deal with lower-level details.

File Transfer Protocol See **FTP**.

FTP File Transfer Protocol. A protocol that allows computers to transfer files over a network. FTP clients using any operating system that supports FTP can connect to a file server and download files, depending on their access privileges. Most Internet browsers and a number of freeware applications can be used to access an FTP server.

group A collection of users who have similar needs. Groups simplify the administration of shared resources.

guest user A user who can log in to your server without a user name or password.

home folder A folder for a user's personal use. Mac OS X also uses the home folder to store system preferences and managed user settings for Mac OS X users. Also known as a home directory.

host Another name for a server.

host name A unique name for a computer, historically referred to as the UNIX hostname.

Internet A set of interconnected computer networks communicating through a common protocol (TCP/IP). The Internet is the most extensive publicly accessible system of interconnected computer networks in the world.

Internet Protocol See **IP**.

IP Internet Protocol. Also known as IPv4. A method used with Transmission Control Protocol (TCP) to send data between computers over a local network or the Internet. IP delivers data packets and TCP keeps track of data packets.

IP address A unique numeric address that identifies a computer on the Internet.

IP subnet A portion of an IP network, which may be a physically independent network segment, that shares a network address with other portions of the network and is identified by a subnet number.

Kerberos A secure network authentication system. Kerberos uses tickets, which are issued for a specific user, service, and period of time. After a user is authenticated, it's possible to access additional services without retyping a password (called single sign-on) for services that have been configured to take Kerberos tickets. Mac OS X Server uses Kerberos v5.

LDAP Lightweight Directory Access Protocol. A standard client-server protocol for accessing a directory domain.

Line Printer Remote See **LPR**.

local hostname A name that designates a computer on a local subnet. It can be used without a global DNS system to resolve names to IP addresses. It consists of lowercase letters, numbers, or hyphens (except as the last characters), and ends with ".local" (For example, bills-computer.local). Although the default name is derived from the computer name, a user can specify this name in the Sharing pane of System Preferences. It can be changed easily, and can be used anywhere a DNS name or fully qualified domain name is used. It can only resolve on the same subnet as the computer using it.

LPR Line Printer Remote. A standard protocol for printing over TCP/IP.

Mac OS X The latest version of the Apple operating system. Mac OS X combines the reliability of UNIX with the ease of use of Macintosh.

Mac OS X Server An industrial-strength server platform that supports Mac, Windows, UNIX, and Linux clients out of the box and provides a suite of scalable workgroup and network services plus advanced remote management tools.

mount (verb) To make a remote directory or volume available for access on a local system. In Xsan, to cause an Xsan volume to appear on a client's desktop, just like a local disk.

Network File System See **NFS**.

network interface Your computer's hardware connection to a network. This includes (but isn't limited to) Ethernet connections, AirPort cards, and FireWire connections.

NFS Network File System. A client/server protocol that uses Internet Protocol (IP) to allow remote users to access files as though they were local. NFS can export shared volumes to computers based on IP address, and also supports single sign-on (SSO) authentication through Kerberos.

nfsd daemon An NFS server process that runs continuously behind the scenes and processes NFS protocol and mount protocol requests from clients. nfsd can have multiple threads. The more NFS server threads, the better concurrency.

Open Directory The Apple directory services architecture, which can access authoritative information about users and network resources from directory domains that use LDAP, Active Directory protocols, or BSD configuration files, and network services.

open source A term for the cooperative development of software by the Internet community. The basic principle is to involve as many people as possible in writing and debugging code by publishing the source code and encouraging the formation of a large community of developers who will submit modifications and enhancements.

oplocks See **opportunistic locking**.

opportunistic locking Also known as oplocks. A feature of Windows services that prevents users of shared files from changing the same file at the same time. Opportunistic locking locks the file or part of the file for exclusive use, but also caches the user's changes locally on the client computer for improved performance.

owner The owner of an item can change access permissions to the item. The owner may also change the group entry to any group the owner is a member of. By default, the owner has Read & Write permissions.

password An alphanumeric string used to authenticate the identity of a user or to authorize access to files or services.

pathname The location of an item within a file system, represented as a series of names separated by slashes (/).

permissions Settings that define the kind of access users have to shared items in a file system. You can assign four types of permissions to a share point, folder, or file: Read & Write, Read Only, Write Only, and No Access. See also **privileges**.

print queue An orderly waiting area where print jobs wait until a printer is available. The print service in Mac OS X Server uses print queues on the server to facilitate management.

port A sort of virtual mail slot. A server uses port numbers to determine which application should receive data packets. Firewalls use port numbers to determine whether data packets are allowed to traverse a local network. "Port" usually refers to either a TCP or UDP port.

privileges The right to access restricted areas of a system or perform certain tasks (such as management tasks) in the system.

process A program that has started executing and has a portion of memory allocated to it.

protocol A set of rules that determines how data is sent back and forth between two applications.

QTSS QuickTime Streaming Server. A technology that lets you deliver media over the Internet in real time.

queue An orderly waiting area where items wait for some type of attention from the system. See also **print queue**.

QuickTime A set of Macintosh system extensions or a Windows dynamic-link library that supports the composition and playing of movies.

QuickTime Streaming Server See **QTSS**.

Samba Open source software that provides file, print, authentication, authorization, name resolution, and network service browsing to Windows clients using the SMB protocol.

server A computer that provides services (such as file service, mail service, or web service) to other computers or network devices.

Server Message Block See **SMB**.

share point A folder, hard disk (or hard disk partition), or optical disc that's accessible over the network. A share point is the point of access at the top level of a group of shared items. Share points can be shared using AFP, SMB, NFS (an export), or FTP.

short name An abbreviated name for a user. The short name is used by Mac OS X for home folders, authentication, and email addresses.

single sign-on An authentication strategy that relieves users from entering a name and password separately for every network service. Mac OS X Server uses Kerberos to enable single sign-on.

SLP DA Service Location Protocol Directory Agent. A protocol that registers services available on a network and gives users easy access to them. When a service is added to the network, the service uses SLP to register itself on the network. SLP DA uses a centralized repository for registered network services.

SMB Server Message Block. A protocol that allows client computers to access files and network services. It can be used over TCP/IP, the Internet, and other network protocols. SMB services use SMB to provide access to servers, printers, and other network resources.

TCP Transmission Control Protocol. A method used with the Internet Protocol (IP) to send data in the form of message units between computers over the Internet. IP handles the actual delivery of the data, and TCP keeps track of the units of data (called packets) into which a message is divided for efficient routing through the Internet.

ticket, Kerberos A temporary credential that proves a Kerberos client's identity to a service.

Transmission Control Protocol See **TCP**.

UDP User Datagram Protocol. A communications method that uses the Internet Protocol (IP) to send a data unit (called a datagram) from one computer to another on a network. Network applications that have very small data units to exchange may use UDP rather than TCP.

UID User ID. A number that uniquely identifies a user within a file system. Mac OS X computers use the UID to keep track of a user's folder and file ownership.

URL Uniform Resource Locator. The address of a computer, file, or resource that can be accessed on a local network or the Internet. The URL is made up of the name of the protocol needed to access the resource, a domain name that identifies a specific computer on the Internet, and a hierarchical description of a file location on the computer.

USB Universal Serial Bus. A standard for communicating between a computer and external peripherals using an inexpensive direct-connect cable.

User Datagram Protocol See **UDP**.

user ID See **UID**.

user name The long name for a user, sometimes referred to as the user's real name. See also **short name**.

volume A mountable allocation of storage that behaves, from the client's perspective, like a local hard disk, hard disk partition, or network volume. In Xsan, a volume consists of one or more storage pools. See also **logical disk**.

WebDAV Web-based Distributed Authoring and Versioning. A live authoring environment that allows client users to check out webpages, make changes, and then check the pages back in to the site while the site is running.

WINS Windows Internet Naming Service. A name resolution service used by Windows computers to match client names with IP addresses. A WINS server can be located on the local network or externally on the Internet.

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