

Linux Open Server for Workgroups

*David Przybyla and J Wolfgang Goerlich
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Business Abstract

Many small businesses today have a mixture of Microsoft Windows and Apple Macintosh computers. They are often setup in a peer-to-peer network. It may be difficult for the Windows computers to share data with the Macintoshes. There may be a business risk because there is no centralized control or protection for business information.

As the Linux platform matures, using it as a small business server begins to be a viable proposition. This whitepaper documents the installation and maintenance of a Linux Open Server. This server joins Windows and Macintosh workstations, centralizes business information, and provides a base for future growth.

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Section 1. Introduction

Overview

This whitepaper documents the installation and maintenance of a Linux Open Server for workgroups. It utilizes Samba on a Linux server for file and print services to Windows 9x and Mac OS computers.

The manual describes the standard Open Server setup, although individual installations may be tailored for the workgroup. For example, we assume that only basic file and print services are desired. The Samba configuration includes a home directory for each user as well as a public directory. Users are forbidden access to anything besides these directories unless specified by the client. The default installation provides no special groups or permissions. Printers are available to all users.

When necessary, the manual describes separate procedures for Windows and Mac OS computers.

Conventions Used in this Manual

The Linux Open Server for workgroups paper must cover Linux basics at the same time it describes how to configure the server. Some Linux commands and procedures are explained when they arise, while others are covered in Appendix G. Any text typed at a prompt or in a text editor, such as Linux commands or configuration files are written in *Courier* font; Linux directories appear in **bold** type; the names of Linux text files are *italicized*. When menu X must be clicked to reach menu Y, it is written as X>>Y.

Section 2. Installation of Caldera Linux

Pre Installation Checklist

Before installation, verify that the server hardware is known to be good. Compile a list of the server hardware and the network information listed in Appendix E. Depending on the installation, some of the information might not be needed, but it is safer to know all the hardware in the server. This list will include:

1. Model and manufacturer of network card
2. Model and manufacturer of video card
3. Model and manufacturer of SCSI adapter
4. Model and manufacturer of sound card
5. Model and manufacturer of modem card
6. Type of hard drive (SCSI or IDE)
7. Model and manufacturer of tape drive
8. Model and manufacturer of monitor
9. Type of Keyboard (101 key, 104 key)
10. Type of mouse (PS/2, serial)
11. Amount of RAM
12. Server's IP Address, Subnet Mask, hostname

The configuration files on the Open Server floppy assumes an internal PCI modem on COM4. Linux names this port ttyS3. If this will not be true, the following configuration files must be changed: `inittab`, `mgetty.config`, `options.ttyS3`. For example, instead of an internal modem on COM 4, the server has an external modem on COM 1 or COM 2 (ttyS0 or ttyS1).

Verify that all hardware is compatible with Caldera Open Linux by visiting the Caldera hardware compatibility site

<http://www.calderasystems.com/support/hardware/2.3/>

Installation Materials

Floppy Disks: Open Linux-Boot/Install Disk, Open Server Floppy
CD-ROM: Open Linux-Linux Kernel and Installation

Installation Begins: Keyboard, Mouse, and Video

Place the Open Linux-Boot /Install Disk and the Open Linux-Linux Kernel and Installation CD in the computer; if the computer has a bootable CD-ROM drive, the Boot/Install Disk is not needed and the CD-ROM will suffice. Turn on the computer. The machine now boots from a Linux kernel found on the floppy or CD-ROM. This process may take a few minutes. Then the graphical installation interface appears and the user is prompted through a series of screens that define the Linux installation and setup. On each screen, press the Next button to go to next screen.

Select a language. If the mouse does not yet work, use the tab and return keys to select the Next button.

The installer will now search for the mouse. Move the mouse slightly. In most cases this will allow the installer to automatically find the right type of mouse and its COM port. There is also an option for 3-button emulation; this is not necessary for Open Server.

Select the keyboard type and the language of the key layout.

Next the installer will attempt to recognize the video card. If the video card is supported, the installer will probably find it. If it is supported and the installer does not find it, select the video card from the pull down menu. Otherwise, choose Generic SVGA compatible video card. Then press the Probe button. A dialog will appear and explain that probing may take a few seconds. Press Probe within the dialog box. Then a message will appear stating that probing was successful. Close this message and press the Next button.

Select the monitor manufacturer and model, then press the Next button.

Now select the video mode and press the button to Test Mode. If the test indicates a bad mode, choose a lower resolution or a lower refresh within the same resolution. When possible, err towards a lower refresh rate. It is possible that monitor settings that test well here will still not work when Linux later starts KDE. In that case, after the first reboot, a lot of garbage will scroll past on the screen indicating a failure to start KDE. Then launch LISA (Linux Installation and System Administration) from the command line by typing `lisa`; the installation procedure does not describe how to use LISA. However, if the video mode tests well, press the Next button.

Installation Continues: Hard Drive Partitioning and Package Selection

Hard drive partitioning in Linux provides opportunities for creativity. The minimum partitioning scheme requires only two partitions: a swap partition and a root partition. A better scheme gives other directories their own partition. In most Linux installations, the `/var`, `/usr`, `/home`, and `/public` directories are good candidates for partitions. Open Server does not need a `/usr` partition, since we will not be installing Linux applications for users. System logs are stored in `/var`, and creating a partition for these keeps the logs from running amok and eating up storage space.

A good partitioning scheme for Open Server has the following partitions:

```
/
/var
/home
/swap,
```

with `/public` being subdirectory of `/home`.

Keep the root partition within the first 1024 cylinders of the hard drive. Linux cannot put LILO, the Linux boot loader, in the root partition if this condition is not fulfilled. It is possible to fix this problem after installation, but the fix is not always successful. This manual assumes the root partition will not comprise more than the first 1024 cylinders,

and does not describe the fix. If the root partition exceeds the first 1024 cylinders, the Open Linux installer will provide a warning before formatting the partitions (the next installation screen). At that point, use the Back button to backtrack and repartition the hard drive.

On the Installation Target screen, choose Custom, then press the Next button.

Now partition the hard drive. The installer will display the hard drive in a table as `/dev/sda`, with possible partitions below: `/dev/sda1`, `/dev/sda2`, `/dev/sd3`, `/dev/sda4`. Highlight `/dev/sda1`, then select the Edit button. A dialog appears with an area called Partition Boundaries. Set the end boundary so that the size of the partition is about 800 MB. There is also tab below to select the mount point, which should be `/`. The System Type should be Linux. This partition is complete, so press OK.

Highlight `/dev/sda2` and select Edit. Set the start boundary one greater than the end boundary of `/dev/sda1`. Set the end boundary so that the partition is 128 MB, but it cannot be greater than 128 MB. Set the System Type to Swap. For a Swap partition, there is no mount point option.

Highlight `/dev/sda3` and select Edit. Set the start boundary to one greater than the end boundary of `/dev/sda2`, and the end boundary to the highest value available for the hard drive. Set the System Type to Linux, and the Mount Point to `/home`.

Press the Write button. When the Next button is no longer grayed out, press it.

The Partition Information screen is next. Press “Format chosen partitions.” This may take a minute or two. The Next button will be grayed out until this is complete. Select the Next button when it becomes available.

Choose the Standard Installation. This requires about 650 MB of hard drive space and includes Samba. The packages comprising the Standard Installation are copied while the parade of setup screens continues. Go through the setup screens while the packages are installed.

Installation Finishes: Sound Card, Users and Passwords, Network Numbers

The installer now detects the sound card if one exists. This process should be automatic.

Now type in a root user password. The test setup uses “visionary” as the root password, in honor of the esteemed author of this manual. This password can be changed later, but doing so will probably accumulate bad karma.

The installer now prompts for usernames and passwords. It is not essential to enter all user names and passwords yet, though it is possible. However, at least one must be entered to continue.

The installer now finds the Ethernet card. If there are two cards, still enter the information found in Appendix E. These numbers will correspond to eth0 and the local network. The second card eth1 will be configured later.

Put Linux loader in the default partition.

Select the time zone. Set the hardware clock to local time.

The installer wants you to play Tetris while installation continues. First the packages are copied, then there is a post install. Once the post install progress bar reaches 100%, select Finish.

Remove the Open Linux CD-ROM and floppy disk.

The system will now boot up to a login screen. Login as root with the password chosen in step 16. After login, Caldera Open Linux defaults to the KDE desktop.

Section 3. Post Installation Hardware Configuration

The Linux installation does not include SCSI tape drivers or PCI modem configuration. These devices must be enabled after the system has booted for the first time.

Adding SCSI Tape Drivers to the Kernel

The standard installation of Caldera Open Linux does not include SCSI tape drivers.

Go to COAS>>Kernel.

A dialog box announces that Linux is probing for new hardware. The button on the bottom first reads Abort then Done. Press the button when it reads Done.

The next dialog has a scrolling menu on the left and right sides. The menu on the left lists modules not installed in the kernel, the menu on the right lists installed kernel modules. Scroll down the left menu to the “st” module.

Select the st module, then press Load. The Kernel Module Configuration dialog for the st module appears. No changes are necessary. Press OK.

Another dialog appears explaining that the st module depends on the “scsi_mod” module. Press continue, and both modules are loaded.

The st and scsi_mod modules are now in the menu at the right and will load at next system boot. Press OK.

Configuring a PCI Modem

Install the modem in an empty PCI slot. Boot the computer into Linux. In the terminal, list all the PCI devices in the computer with the command

```
less /proc/pci
```

Look for the modem among the devices, searching for the model name and manufacturer. If the model and manufacturer are not listed, look for a PCI device that contains the phrase “serial controller.” This is probably the modem.

The modem information will contain values for the IRQ and I/O ports. Note these, using the first I/O value and not the value in parentheses.

Now list all IRQs for the computer with the command

```
/proc/interrupts
```

If the modem has the same IRQ as another device, shutdown the computer and move the modem to another PCI slot. Continue the procedure until the modem is given a free IRQ.

Type the command

```
setserial /dev/ttyS3 uart 16550A port y irq z
```

where y and z are replaced by the I/O and IRQ values found in step 4. This command tells Linux to give the modem COM 4. The remainder of this manual assumes the modem is located at ttyS3 (i.e., COM4).

Now go to Kmenu>>Internet>>Kppp. Press the Setup button.

Select the Device tab. In the pull down menu to the right of “Modem Device,” choose /dev/ttyS3.

Select the Modem tab. Press the Query Modem button. A box now appears that displays the progress of the modem query. If the query is successful, the modem is properly configured. Press close when the query is complete. Kppp is no longer needed.

Navigate to the /etc/rc.d directory. Right-click on the text file rc.serial and open it in a Text editor. About ten lines down from the beginning of the file, the first uncommented line reads “exit 0.” Add a new line just before this line and type in the following two lines:

```
#Assign the PCI modem COM 4 at system boot.  
setserial /dev/ttyS3 uart 16550A port y irq z
```

This assigns the modem a serial port each time the system is booted.

Section 4. Configuring Samba File Services

Configuring Network Properties for Samba

Before configuring Samba for file and print serving, Linux must be configured for Samba. Read Appendix A to gain basic information on using the KDE desktop.

First, check that the server has the proper IP Address, the proper daemons are started when the system boots, and that the server has the proper hostname.

Use the file manager to reach the **/etc** directory. Open the *hosts* text file and check that the IP Address of the server is correct. This number will appear below the comment line First IP Interface.

Also check this IP address in the Caldera Open Administration System (COAS) through COAS>>Network>>Ethernet Interfaces. These should both be the same. This is the address of eth0, the first ethernet card. Section 6 describes how to configure a second ethernet card for internet access as eth1.

Go to COAS>>System>>Daemons and check that the proper daemons are running. A daemon is running at system boot if its box is checked. Make sure that the SMB server processes daemon is checked so that Samba will start at system boot. The following daemons are not needed and should be unchecked:

- Automount Daemon (NFS & local)
- Batch Sever (atd)
- Mail Transfer Agent
- Networked file-systems support
- Web Server

Active daemons that are not needed only consume system resources. After this is done, click OK.

The server hostname is set with the command

```
hostname server.y.com
```

Tailor the hostname to the client by substituting a client-specific word for the letter y. For example, a host name for Computers and Concepts might be Open Server.cnc.com. Caldera Open Linux wants a name in this format. This command will update the hosts file in the */etc* to include this hostname.

Configuring User Properties for Samba

Next, give the users accounts on the server. When creating a new user, Caldera Open Linux also creates a home directory with appropriate permissions for that user at **/home/username**.

Go to COAS>>System>>Accounts.

Go to User>>Create user.

Enter the Login Name of the new user (i.e., username), then press OK.

Now the Edit user dialog appears detailing information about the new user. In the text box next to Full Name, type in the user's real name. By default, the user's home directory has the path /home/username. However, a different path can be substituted into the appropriate text box if desired.

Click on the button to the right of Password. A dialog box appears in which to enter the password. Enter the password, then re-enter it in the appropriate boxes. Press OK. Press OK again.

Go back to step 2 and repeat until all the new users have been added. When done select File>>Exit.

Create a common or "public" directory where all users can store and retrieve files. Issue the following command from the terminal window:

```
mkdir /home/public
```

However, since root made this folder, only root will have access. The permissions must be changed. Type the command

```
chmod 777 /home/public
```

and all users can now read and write to the directory.

Configuring Group Properties for Samba

This aspect is particularly important for the public directory. All users must have full access to everything in this directory. The Samba defaults only give the owner (or creator) of a file or directory both read and write permission for that file or directory. Thus, other users could not add items to a directory created by another user inside the public directory. This is a problem we solve in two ways. First, the Samba configuration file forces all files and directories placed in the public directory to be readable and

writable by both the owner and the group, where the group includes all users. In fact, the group is called “users.”

We must put all the users in this group.

Go to COAS>>System>>Accounts.

After the Accounts window opens, go to Groups>>Manage Groups.

Scroll down the box on the left side of the window until “users” appears. Select users and then go to Groups>>Group membership.

Another window opens. The box on the left side of the window is empty. In the box on the right side of the window, select one username and then press the button with the “<<” arrow. The username will appear in the box on the left side of the window. This means the username has been added to the group “users.”

Select each username in turn and add them to the users group. When done, press the OK button.

Press the OK button.

Select File>>Exit.

Creating the Samba Configuration File

One text file contains all the configuration information for Samba. Thus, a known good configuration file can be provided and then customized for the particular situation. Appendix B explains some basic information about Samba.

Navigate to the **/etc/samba.d** directory with the file manager.

Insert the Open Server floppy into the machine and mount it on the desktop. (Mounting a floppy is described in Appendix A). Click once on the floppy to open a window that shows its contents.

Drag the *smb.conf* file from the Open Server floppy window to the file manager window. A small window will appear containing copy and move. Choose copy. Thus, the *smb.conf* file is copied from the floppy to the **/etc/samba.d** directory.

Use the [username] template to create a section of the configuration file for each user.

The “hosts allow” configuration line contains the IP Addresses of all computers that can access Samba shares. Open Server uses the 192.168.10.x IP scheme, and so writing 192.168.10. encompasses all possible clients and network printers in our IP scheme. Localhost must also be included as a host so that the server can use the loopback address. Our stock Samba configuration file has the “hosts allow” properly configured. The purpose of this discussion is to note that the “hosts allow” must be changed if the IP scheme of the network is changed.

Create a Samba username and password for each user. These usernames and passwords should be identical to those of the Linux home directories. From a terminal window, create Samba usernames and passwords with the command

```
smbpasswd -a username password
```

The configuration file synchronizes the Samba and Linux passwords for administrative ease. In other words, if the administrator changes the Samba password, Samba will automatically issue the command to also change the Linux password.

Configuring a Windows Workstation for Samba

Samba is configured so that it acts as a Windows NT Primary Domain Controller. Thus, when the Windows workstation starts up, the user will be prompted to logon to the Domain. This ensures that no further passwords will be required to view permitted shares, such as the home directory and the public directory.

This configuration requires a known good workstation with a known good NIC and properly configured Windows 9x.

Go to >>Start>>Settings>>Control Panel.

Open the Network Control Panel.

Select the Identification tab.

Assign the workstation an appropriate Computer Name and computer description.

Enter the Workgroup specified in the Samba configuration file.

In the Configuration tab, select and then Remove each network component. Press OK.

Go to Start>>Shutdown..., and select Restart. Press OK.

Go to >>Start>>Settings>>Control Panel.

Open the Network Control Panel.

In the Configuration tab, select Add.

Select Client, then press Add.

Select Client for Microsoft Networking, then press OK.

Select Protocol, then press Add.

Select Microsoft >> TCP/IP. Press OK.

Press Ok

Let Windows load the appropriate files, then go to Start>>Shutdown..., and select Restart. Press OK.

Go to >>Start>>Settings>>Control Panel

Open the Network Control Panel.

In the Configuration tab, select and Remove IPX/SPX.

Select and Remove NetBEUI.

Select Client for Microsoft Networks and press the Properties button.

Check Log on to Windows NT domain, and then enter Open Server in the Windows NT domain text box.

Click the Logon and restore network connections radio button.

Press Ok to apply. Then press OK again to close the Network Control Panel.

Mounting Volumes at Startup on a Windows Workstation

Samba supports the execution of Windows logon scripts. These scripts are stored on the server and then executed when the user logs on. A good use of a logon script is to mount a user's Samba share when he logs into his Windows workstation.

Create a directory to hold the logon scripts by issuing the command

```
mkdir /etc/samba.d/logon
```

Write the desired scripts using a DOS or Windows editor. Because Windows loads and executes the scripts at each workstation, they must consist of DOS formatted carriage-return/linefeed characters instead of Linux carriage returns.

Scripts should be named in the format *username.bat*, with one script per user. Appendix C contains a sample logon script.

Place the scripts on a floppy and mount the floppy to the KDE desktop; alternately, the scripts can be directly transferred to the server from a workstation to which it is connected. Open the file manager to the **/etc/samba.d/logon** directory. Copy the logon scripts into this directory.

Open Server will use the following conventions. The user's home directory will be mapped to drive H, the public directory will be mapped to drive P, and a group directory will be mapped to drive G. Appendix C contains a simple script to map the home and public directories.

Configuring a Mac OS Workstation for Samba

Samba employs the smb protocol native to Windows and masquerades as an Windows NT server. Mac OS computers use the DAVE software to enable smb communication. Eventually, Open Server may provide native AppleTalk services via Netatalk (the analog of Samba for the Mac OS), but that is not a priority – DAVE does an excellent job with minimal setup.

Insert the DAVE installation CD into the Macintosh.

A window opens on the desktop displaying the contents of the CD. Double-click on the Install DAVE icon.

The first dialog box is the Dave Read Me. Press Continue.

The next dialog box is the license agreement. Press Continue, then press Agree.

Next select the destination drive for installation from the pull-down menu. The default drive will be the startup drive. Press Select.

Select the type of DAVE installation from the pull-down menu. By default the Recommended Installation will be chosen. Unless there is a specific reason to tailor a custom installation, accept this choice and press Start.

A warning appears stating all open application will be quit before. Press Continue.

After the installation is complete, press Restart.

After restart, the DAVE Setup application launches. Navigate through the windows via the buttons in the lower left. A counter between the forward and back arrows shows the number of the current window.

Advance to window 2. Select the “Home or small office” radio button.

Advance to window 6. Press the Open TCP/IP button to launch the TCP/IP Control Panel. In the Control Panel, select Ethernet from the Connect Via drop-down menu. Select Manually from the Configure drop-down menu. Enter the following values in the text boxes.

IP Address: 192.168.10.x
Subnet mask: 255.255.255.0
Router address: 192.168.10.1
Name server addr: Empty
Search domains: Empty

Close the TCP/IP Control Panel and select Save when prompted.

Enter a name, organization, and license code for this copy of DAVE.

Select the No radio button. This is Open Server, not Windows NT! Enter the name of the workstation.

Advance to window 20. Enter Open Server as the workgroup.

Advance to window 21. Enter a description for the computer such as its owner or location. This description appears when browsing the network. Though not necessary, the description is useful.

Advance to window 23. Examine the information about the computer to verify it is correct. If not, go back to previous windows and make changes. This information can later be changed through the NetBIOS Control Panel.

Advance to window 24. The default selection is to not share local files. Do not change this.

Advance to window 25 and press OK.

DAVE setup is now complete and the software is fully functional. However, there are a few more customizations before we release it to the Open Server client. The customizations remove most of the DAVE naming, enabling clients to see Open Server rather than DAVE. This is only a cosmetic change, since the DAVE name will still appear within Control Panels and the Get Info command.

Open the System Folder.

Open the Apple Menu Items folder. Rename the DAVE application Open Server.

Open the Contextual Menu Items folder. Throw away "DAVE Sharing CM."

Open the Control Panels folder. Rename the "DAVE Sharing" Control Panel "Open Server Sharing."

Open the Control Strip Modules folder. Throw away "DAVE Control Strip."

Open the Extensions folder. Rename the following extensions.

DAVE Client → Open Server Client

DAVE Message Popup → Open Server Message Popup

DAVE Plug-ins → Open Server Plug-ins

DAVE Sharing Extension → Do not change, otherwise the extension will not function!

Within the Extensions folder, open the Location Manager Modules and remove the DAVE module if one is present.

Within the Extensions folder, open the Printing Plug-ins folder and make the following change.

DAVE Desktop Printing → Open Server Desktop Printing

Open the Shutdown Items folder. Rename "Shutdown DAVE Sharing" as "Shutdown Open Server Sharing."

Browsing Shares in the Mac OS

The first method of browsing shares will be the most familiar to Macintosh users.

1. Go to Apple Menu>>Chooser.
2. The left side of the Chooser contains the AppleShare icon, the printer icons, and the Open Server Client icon. Select the Open Server Client icon. The Open Server server appears on the right side of the Chooser, as well as other workstations on the network.
3. Double-click on the Open Server server icon. Enter the username and password, then press Connect.
4. Now a window appears showing the available shares. Select a share, then press OK. To select multiple shares, hold down the shift key during selection. If the user has permission to view the share, it will show up as a volume on the desktop. Otherwise, the user is prompted for another password to view that share.

The second method of browsing shares mimics the Windows Network Neighborhood.

1. Go to Apple Menu>>Open Server.
2. A window appears showing the Open Server server and the workstations in the workgroup. If the window is in list view, view the shares by clicking on the triangle to the left of the server name; alternately, double-click on the server name to view the shares in a new window.
3. Enter the username and password if so prompted. The shares are now available.

Mounting Volumes at Startup on a Mac OS Workstation

1. Open the Chooser and select the Open Server Client icon.
2. In the window to the left, double-click on Open Server.
3. Enter the user name and password, then press Connect.
4. Select the name of the desired share. Check the box to the right of the share name.
5. Press OK to continue mounting the share. Now, next time the computer starts up, the user will be asked for a user name and password, and the share icon will then appear on the desktop.

Final Server Configuration Settings

After Caldera Open Linux has been configured for Samba, we want to change the text file that automatically boots Linux to a graphical login screen. Then users will be presented with an unfamiliar interface should they attempt to logon to the actual server. This will help prevent accidental configuration changes. We will also change the greeting after a successful login to one relating to Open Server.

Navigate to the **/etc** directory with the file manager.

Open the *inittab* file in a text editor.

About twenty lines from the beginning of the file are the lines

```
#Default run level
id:5:initdefault:
```

Replace the “5” with a “3.” Now the server will boot to a command line login rather than a graphical login.

Navigate to the **/etc/config.d/shells** directory.

Replace the *OL-greeting* file with the *OL-greeting* file from the Open Server floppy. When prompted, overwrite the current file. Now, after a command line login, the server will print a custom greeting.

Right click on the *OL-greeting* file and choose properties. Select the Permissions tab and check the box to give User, Group and Other executable permission. If the permissions are not changed, even root will not get this greeting.

Section 5. Configuring Printers for Samba

Open Server only supports network printing for laser printers at this time.

Configuring Printers Connected to the Samba Server

Linux support of laser printers is quite good, but support of ink jet printers lags behind. It is important to know which printers are connected to the network as early as possible so that drivers can be found if Caldera Open Linux does not have native support. The Samba configuration file is designed to include configuration of all printers so it will not need to be altered. By Default, Caldera Open Linux uses the lprng printing system.

First set up the printer so that it prints from the server. Go to COAS>>Peripherals>>Printer.

Under the Printer menu, select Add.

Select the appropriate printer model.

Give the printer a name. This is the name workstations will see.

The next screen allows the printer attributes to be modified to a limited extent. Nothing should be altered here.

The next screens stops and restarts the printer daemon. This needs to be done every time printer attributes are changed. Press done when prompted.

Now the main printer list appears. To edit printer attributes, highlight a printer and select Edit from the File menu. This is a more complete attribute list than offered in step 5. Highlight the new printer and select Edit. Check the Suppress Header box.

Leave COAS, saving changes where applicable.

Now the workstations must be set up to use the new printer. This procedure must be followed for each Windows machine that will use the printer. The new printer should appear in the Network Neighborhood with the name given it above.

Double-click on the printer icon to begin the setup. This will use Windows drivers, and when complete will allow the computer to access a printer connected to the server.

Configuring Network Printers

A network printer is directly connected to a hub with Cat-5 cable. Once a network printer is configured it will appear as just another share to Windows and Mac OS clients. There is no way to avoid creating a custom printer configuration file. Even though the printer appears as a share, the workstations will still require the printer driver locally to configure the printer.

The printer must have an IP Address. The printer must have a share name.

Go to the `/etc` directory and open the `printcap` file in a text editor. Add the following lines to the end of the `printcap` file. This example is for a Hewlett Packard LaserJet 4.

```
lj-4|remote-hplj:\
:lp=/dev/null:\
:br#57600:\
:rm=192.168.10.193:\
:rp=raw:\
:sd=/var/spool/lpd/lj-4:\
:mx#0:\
:sh:\
:if:
```

In this case, `lj-4` is the Linux name of the printer, and will also be the name of the printer spool file. `Remote-hplj` is the share name of the printer that the clients will see.

Caldera Open Linux uses the `lprng` (`lpr` next generation) printing system. Unlike most other Linux distributions, `lprng` does not require the `:/` or `:` at the end of a `printcap` line. However, they are often left in to provide compatibility with those distributions.

Replace `lj-4` with the desired Linux name of the printer. This cannot be more than eight characters.

Replace `remote-hplj` with the desired share name of the printer.

Replace the number after `:rm=` with the IP Address of the printer.

In the line beginning with `:sd=`, replace `lj-4` with the Linux name of the printer.

Note that a spool directory does not need to be explicitly created. Linux will automatically create the spool directory.

Configuring a Network Printer in Windows

1. Open Start>>Settings>> Printers
2. Double-click the Add Printer icon.
3. Press the Next button.
4. Select Network printer and press Next.
5. Press the Browse button and the search the Network Neighborhood for the desired printer. Press OK, then press Next.
6. The remainder of the setup is identical to that for local printers.

Configuring a Network Printer in the Mac OS

1. Go to Apple Menu>>Chooser. Select the Open Server icon.
2. In the window on the right, double-click the server name.
3. If prompted, enter the user name and password, then press Connect to view the shares on the server.

4. The network printers are listed among the shares. Double-click the name of the desired printer.
5. Press the Continue button to configure the printer. The network printer icon will now appear on the desktop.
6. Select the network printer icon on the desktop. In the Finder's menu, go to Printing>>Change...
7. Click on the PPD for the network printer, then press Select.

Configuring Printers Connected to a Windows Workstation

If the printer is connected to a Windows client, it will be possible to use Windows drivers. Samba can also spool print jobs to printers attached to Windows computers using a tool called smbprint.

The Windows printer must first be set up as a shared resource. Right-click on the Network Neighborhood desktop icon and select Properties.

Press the File and Print Sharing... button. A dialog box appears. Check the box beside "I want to be able to allow others to print to my printer(s)." Press OK.

Press OK again. Restart the computer if Windows prompts for a restart.

Go to Start>>Settings>>Printers.

Right-click on the printer that will be shared. Select Shared...

Click the radio button to allow printer sharing. Give the printer a share name. Leave the password blank so that all users on the network can access the printer. Press OK.

Now add an entry for the printer in the printcap file in the /etc/printcap directory, using the sample samba printcap file as a guide. After editing the printcap file, stop and start the lpd daemon with the commands:

```
/etc/rc.d/init.d/lpd stop
/etc/rc.d/init.d/lpd stop
```

Now create the following directories and execute the permission changes, replacing the variable pname with the name the printer was given in the *printcap* file.

```
mkdir /var/spool/lpd/pname
mkdir /var/spool/lpd/pname/acct
chown daemon.daemon /var/spool/lpd/pname
chown daemon.daemon /var/spool/lpd/pname/acct
```

Create a new text file *.config* in */var/spool/lpd/pname/* with 3 lines:

```
server=windows workgroup name
service=windows printer sharename
password=""
```

Create two print filters in the `/var/spool/lpd/pname` directory: `filter` and `smbprint`.

For these use the provided sample files. Finally, change the ownership of these files with

```
chown daemon.daemon /var/spool/lpd/pname/
```

Configuring Printers Connected to a Mac OS Workstation

1. Open the Open Server Sharing Control Panel.
2. Make sure that File and Print Services are On.
3. Press the Print... button.
4. Press the Add... button.
5. Highlight the desired Desktop printers, then press OK.
6. Leave the Read/Write Password blank. If desired, create a new name for the shared printer.
7. Press OK. Then press OK again.

Now other network computers will have access to the printer. However, the Linux server is no longer the print server. DAVE may allow this to be done exactly as it is done in Windows, but this has not been tested.