

Linux printing on heterogeneous networks

EASY PRINTING ON ANY NETWORK

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Thanks to Samba, printing from Linux and Windows machines on heterogeneous networks is not a problem. Although established printing systems such as Berkeley and System V have by now got competition they are still the most commonly used. We are going to tell you how to print on heterogeneous networks, irrespective of the operating system.



Linux users tend to be quite spoilt when it comes to the networkability of their system. After all, Linux – as a member of the great UNIX family – acquired the TCP/IP protocol suite in its infancy. These protocols also form the basis of all Linux printing. These days all operating systems understand TCP/IP and it is therefore not difficult for a Linux machine to act as print server or client in any network.

Setting up a server under Linux

First of all, let's look at the server: the central element is the print daemon `lpd`, which runs as a background service and administers all of the user application's print jobs (Figure 1). Only `lpd` needs to be set up for a Linux print server, while for Windows workstations the Samba server is required as well.

Current Linux distributions will install `lpd` as standard. The quickest way to find out whether it is active is with a `ps` command:

```
[user@host]$ ps ax | grep lpd
459 ?      S      0:00 lpd
725 tty1   S      0:00 grep lpd
[user@host]$
```

If necessary, the daemon must be started or – very rarely – installed. Starting and stopping is done using a script that has the same name as the daemon and can be found in the runlevel scripts directory (`/etc/init.d`, `/etc/rc.d` or `/etc/rc.d/init.d`). If there are problems starting the daemon this is also where you can see whether one or more system variables need to be set, for instance `START_LPD` for SuSE Linux or `NETWORKING` for Red Hat.

Configuration files for the lpd print daemon

Name	Contents
<code>apsfilterrc.*</code>	Special printer driver configuration
<code>printcap</code>	Configuration of the print queue
<code>hosts.lpd</code>	Print server access control by host

A special configuration program for the relevant distribution will normally help with this. For installation you need the package `lpd-*.rpm` or `lpr-*.rpm`, both of which are bound to be included with your distribution. Developed at Berkeley University, it is still the most widespread version of the print daemon, its configuration files are in the `/etc` directory and are listed in the following table.

The most important of the three files is `/etc/printcap`. Here the capabilities of the printers and queues are specified. The print data are deposited in a directory below `/var/spool/lpd`, while the actual printing is a background process carried out by the `lpd` daemon.

Manual `printcap` configuration is complicated and prone to errors. It is therefore advisable to use the relevant tool from your Linux distributor (YaST for SuSE, `printtool` for Red Hat).

The same is true for the configuration file `apsfilterrc`, which normally does not need to be amended. That leaves `/etc/hosts.lpd`. Because the Berkeley print daemon does not handle user authentication, access to the server is limited by host, as a safety measure. The file administrator simply lists the names or IP addresses of all hosts

that are permitted access. This type of operation does not require the print server to be rebooted. Windows workstations do not have to be included on this list if the Samba server is running on the same machine as `lpd`.

Printing with Linux on Linux

A Linux workstation that's going to use a remote Berkeley-type print server must also have `lpd` set up. The only difference is the configuration of the print queue. Again, the Linux distributor's tool can help. The short listing in the box shows an example of a resulting `printcap` entry.

Remote print queue

```
lpremote|laser printing on adamix:\
:lp=/dev/null:\
:rp=lp:\
:rm=adamix.paradix.own:\
:sd=/var/spool/lpd/lpremate:\
:lf=/var/spool/printers/lpremate/log:\
:bk:sh:mx#0:
```

The remote printer `rp`, the remote machine `rm` and the local spool directory `sd` are mandatory entries, and `:lp=/dev/null:` must always be present as well. For a local printer the print device will be indicated here.

Filtering of the data to be printed, as is required on local printers, is not necessary. The local `lpd` simply puts the files into the pigeonhole of his colleague on the server, so to speak, who then has to work out what to do with them. This is why it is so important to choose that print queue on the server as your remote printer that best ensures the correct processing of the selected data.

When selecting the name, it's always worth having a look at the server's `/etc/printcap`. In most cases you will want to use the `auto` queue, which is simply called `lp` on almost every system and which – apart from other little luxuries – can also determine automatically from the file content how it should be prepared for printing.

`:sh:` suppresses unnecessary banner pages, `:mx#0:` removes the file size limit. As with local configuration it is also possible for network printers to have several entries in `/etc/printcap` and to label them with their own device names, depending on what is to be printed in each case and how. If you want the printer `lpremote` to also act as standard printer for the client at the same time, prefix the relevant `printcap` entry with `lp` as another alias name:

```
lp|lpremote|laser printer on adamix: \ ...
```

After each creation or amendment of a print queue the appropriate print daemon needs to be restarted. Calling the startup script with the parameter `restart`,

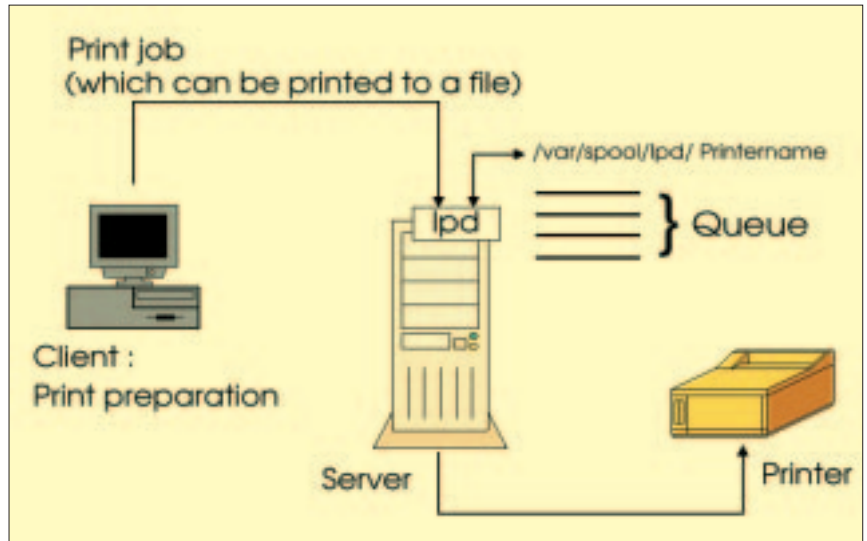


Figure 1: It is simple to print under Linux

or a `HUP` signal to the running process is normally sufficient. Configuration programs will usually take care of this step automatically.

From Windows to Linux

The Samba daemon also provides print services and uses the Linux spool system to do this, so setup shouldn't pose any problems. All that is required is a section in the file `/etc/smb.conf` that gives access to all print queues set up under Linux and has the following structure:

```
[printers]
comment = Linux print server
path = /var/spool/smb
print ok = Yes
guest ok = Yes
browseable = No
```

This section often already exists or can be quickly created with SWAT. After restarting the `smbd` and `nmbd` daemons the Linux queue is available to Windows machines on the same network.

Whether they will also be visible in the network environment depends on several factors:

- TCP/IP has been set up on the workstation and is bound to the network card.
- The network client on the workstation is bound to TCP/IP.
- Client and server machines are in the same Windows workgroup or domain.
- If you have not set `guest ok` in `/etc/smb.conf` then you must be logged on to the Windows workstation with a name that also exists as a Samba user on the Linux station.

If the requirements have been met, the result in Windows Explorer should be similar to Figure 2: on the left you can see the workgroup computers, on the right – apart from the shared directories (folder

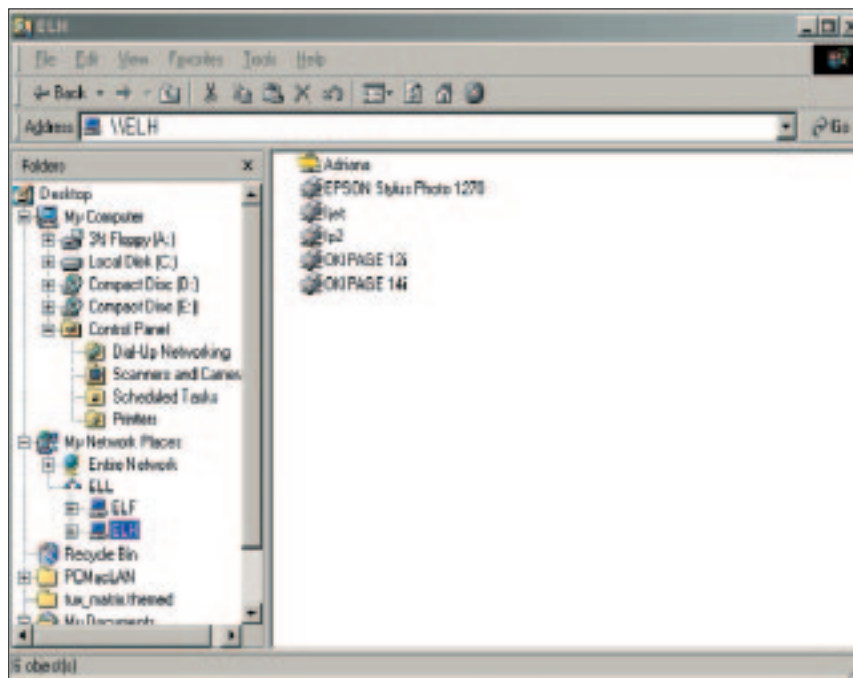


Figure 2: Linux printers become visible in the Windows environment

icon) – are the print queues available to the selected machine.

This example, from Windows Me, should be similar to what you can expect under Windows 95, 98 and NT 4. In Windows 2000 the elaborate security system may at first present you with some stumbling blocks. That subject would be enough in itself to fill a separate article. Documentation is available if you want to find out how to get older versions of Windows (3.1, 3.11, NT 3.5) to print on Linux print servers.

In order to use a Linux print queue under Windows, click on the required printer icon with the right mouse button – preferably on the Linux default printer, which automatically identifies all data formats. It can be recognised by the description *auto*, *lp*, *lp2* or similar.

For older versions of Samba or lpd it may be necessary to use the *raw queue*. In that case the parameter `PRINT_RAW_SUPPRESS_FORMFEED` in the server file `/etc/smbfilterrc`. `<Driver name>` must be set to *yes* to avoid unnecessary form feeds between the individual print jobs.

On the context menu of the print queue use *Install*. Windows will inform your workstation that a printer driver needs to be installed locally. The process is slightly different for each version of Windows, but it always involves the selection of manufacturer and model and the transfer of the required files to the workstation. Once you have successfully managed all of that, a new network printer is available.

From Linux to Windows

Of course, the whole thing also works the other way. In the simplest case, after a good look at the manual pages on `smbclient` you can just build yourself a command line or a script which takes care

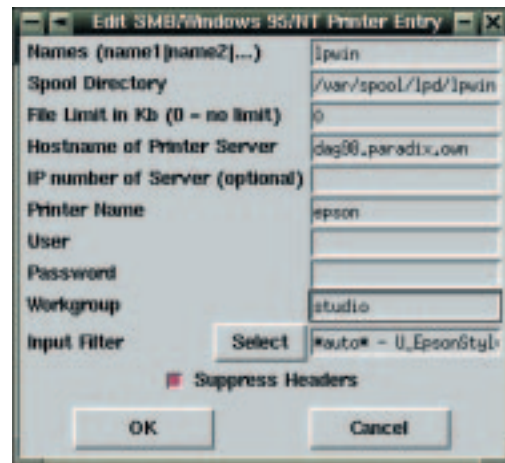


Figure 3: Configuration of a Windows printer under Linux with Red Hat's printtool

of the whole printing process including connecting to the Windows machine and user authentication.

If this seems like too much work to you, don't despair – the distributors have come to your rescue again. Figure 3 shows the configuration of the Linux queue *lpwin*, which establishes a link to a Windows machine and the Epson printer connected to it. We used the Red Hat printtool. The process is very similar with SuSE's YaST: *System administration, Configure network, Address printer via Samba*.

Most Windows systems require a valid user account with password in order to print at all. This is great in terms of security, but the Linux machine's BSD spool system currently stores this information unencrypted, either in `.config` in the spool directory or in the aforementioned `/etc/apsfilterrc`.

To make matters worse, this file is *world readable* in some configurations. As a solution it is therefore normally recommended to set up an additional user on the Windows side specifically for printing, that doesn't own any files. The only possible damage would then be unauthorised printing.

Conclusions

Printing on heterogeneous networks poses no real problems these days. lpd and Samba allow mutual utilisation of Linux and Windows printers. Sophisticated configuration tools from the distributors also play their part in providing simple solutions in term of the setup. However, there is still room for improvement regarding security. ■

Info

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Todd Radermacher, Matthew Gast
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Linux for Windows NT/2000 Administrators: the Secret Decoder Ring
Mark Minasi, York Dan
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