Remote printing in a Heterogeneous Network

It is no secret that UNIX comes in many flavors and nowhere is there more variation among the different versions than in how printing devices and spooling to them is handled than in the printing subsystems of the various UNIX versions. Add Windows (NT and 2000) to the scene and combinations are numerous.

With regard to UNIX we will discuss the BSD, System V, and AIX spooling subsystems and how to print/plot between those and between those and Windows NT/Windows 2000.

The BSD Spooling Facility. SunOS, IRIX, Compaq True64, and Linux use the spooling subsystems developed for BSD. AIX offers BSD-compatibel user commands.

System V Printing. The System V printing system is used on a wide range of systems from microcomputers to high-end mainframes. It is used by HP-UX, SCO UNIX, Solaris and IRIX systems. AIX supports the System V user commands as an alternate interface to its own queuing system.

The AIX Queueing Facility. AIX offers a third approach to printing based upon AIX's general queueing system.

Windows NT and Windows 2000 offers possibilities for installation of lpr (BSD) for integration in a heterogeneous Network
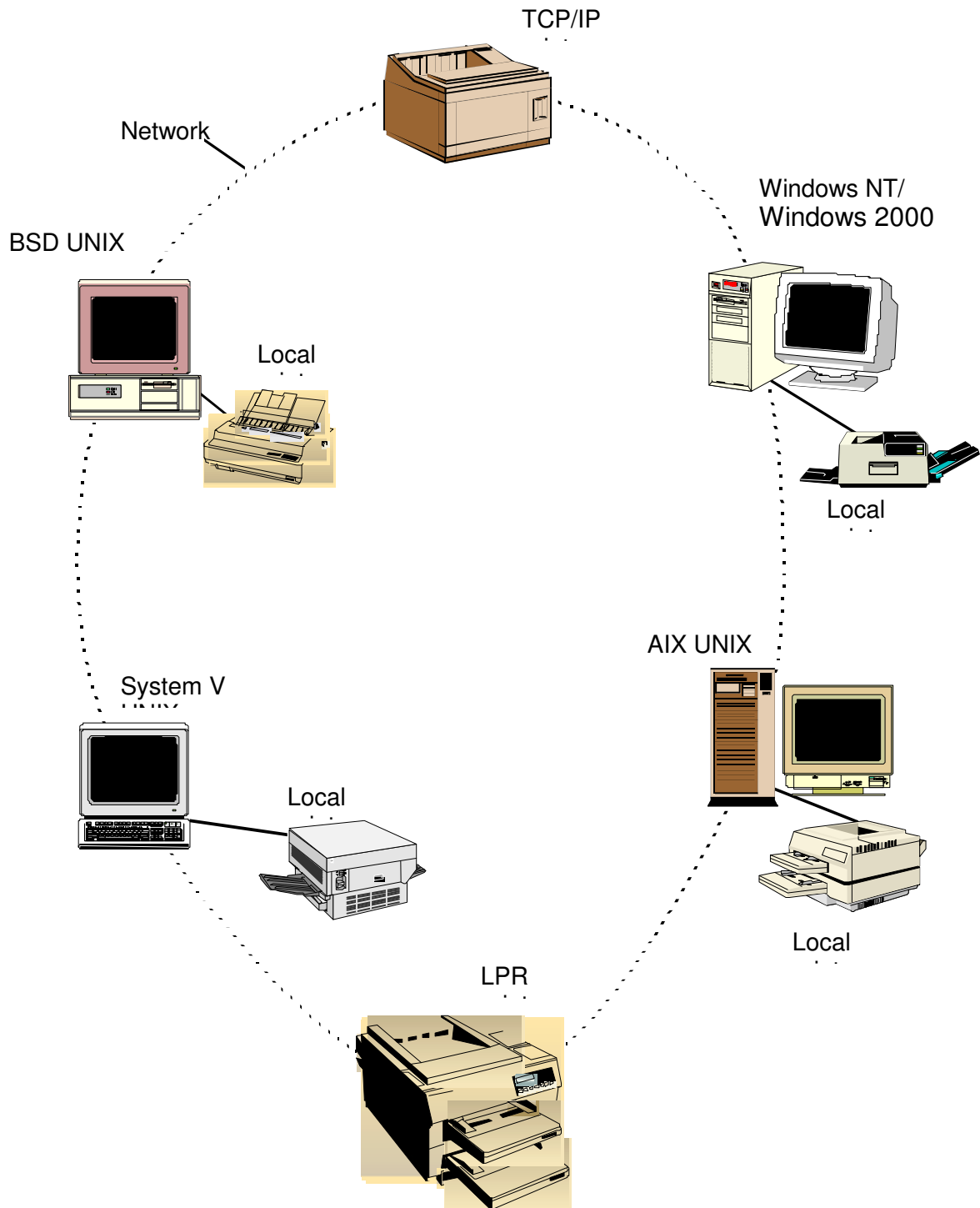
Contents:

A) Illustration of network with different printing options

B) Setting up your system to accept print requests from network clients

C) Different printing combinations:

TCP/IP

Network

BSD UNIX

Local

Windows NT/
Windows 2000

Local

System V

Local

AIX UNIX

Local

LPR

On all systems, you must have root/administrator permissions to perform some of the actions described in this document.

A) Illustration of network with different printing options

B1) How to make BSD printers available to TCP/IP clients

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Requires: - *The remote client and its IP-adress must be in the /etc/hosts file*

The systems in the /etc/hosts.lpd file are allowed to use the lpd-service. It is more restrictive than /etc/hosts.equiv, which allows systems to do a remote login without a password, as long as the same user name exist on the receiving host. When a remote print request arrives to the system, the system checks to see if the /etc/host.lpd file exists. If it does, it is used, if not the /etc/hosts.equiv is be used. That means that if /etc/host.lpd exist, and the host name is not in it, then remote printing will not be allowed from this host, even if the name is in /etc/hosts.equiv.

Depending on your wishes (your site), you will have to do one of the following things:

1) Adding the remote client to the /etc/hosts.lpd file

❋ Check if the hostname is already in the /etc/hosts.lpd file. The file has a line for each host, containing its hostname.
❋ If not, add it with a text editor - if the file does not exist, create it.

OR

2) Adding the remote client to the /etc/hosts.equiv file

❋ Check if the hostname is already in the /etc/hosts.equiv file. The file has a line for each host, containing its hostname.
❋ If not, add it with a text editor - if the file does not exist, create it.

B2) How to make SystemV printers available to TCP/IP clients

Requires: - *The remote client and its IP-adress must be in the /etc/hosts file*

Unfortunately, SystemV spooling is not just SystemV spooling; it is IRIX, HP-UX, Solaris or SCO-UNIX spooling, and remote printing is handled differently in each system. It is therefore neccesary to consider each system and its specific facilities for remote printing separately.

How to make IRIX printers available to TCP/IP clients

For most systems, it is enough to add the remote host name to /etc/hosts.lpd or /etc/hosts.equiv - it doesn't matter which one, and it works fine with the name only in /etc/hosts.equiv, even if /etc/hosts.lpd does exist. Remote printing from another IRIX system requires that the host name is in the .rhosts file in the useres home directory. The .rhosts file is a little bit different from the above mentioned files, because it allows account level equivalence instead of host level equivalence. This means that only a user with an account on the system and a .rhosts file in her home directory can gain remote access to the system. Of course, the system can still have the /etc/hosts.lpd and /etc/hosts.equiv files. It is recommended to use the addclient utility to introduce IRIX clients to the system - it alters the .rhosts file.

Depending on your wishes (your site), you will have to do one of the following things:

1) Adding the remote client to the /etc/hosts.lpd file

❋ Check if the hostname is already in the /etc/hosts.lpd file. The file has a line for each host, containing its hostname.
❋ If not, add it with a text editor - if the file does not exist, create it.

OR

2) Adding the remote client to the /etc/hosts.equiv file

❋ Check if the hostname is already in the /etc/hosts.equiv file. The file has a line for each host, containing its hostname.

    ✳   If not, add it with a text editor - if the file does not exist, create it.

3) Adding the remote client to the .rhosts file with the addclient tool

    ✳   `addclient <remote system>.`

If your IRIX system uses BSD spooling, please refer to section B1.

How to make HP-UX printers available to TCP/IP clients

Depending on your wishes (your site), you will have to do one of the following things:

1) Adding the remote client to the `/etc/hosts.lpd` file

    ✳   Check if the hostname is already in the `/etc/hosts.lpd` file. The file has a line for each host, containing its hostname.
    ✳   If not, add it with a text editor - if the file does not exist, create it.

           OR

2) Adding the remote client to the `/etc/hosts.equiv` file

    ✳   Check if the hostname is already in the `/etc/hosts.equiv` file. The file has a line for each host, containing its hostname.
    ✳   If not, add it with a text editor - if the file does not exist, create it.

3) Adding the remote client to the .rhosts file in the lp daemon's home directory with your favourite text editor.
    ✳   Check if the hostname is already in the `/etc/hosts.equiv` file. The file has a line for each host, containing its hostname.
    ✳   If not, add it with a text editor - if the file does not exist, create it.

How to make Solaris printers available to TCP/IP clients

1) Starting the tcp port monitor

    ✳   First check if the tcp port monitor is already running:
                `sacadm -l`
           The output should be something like this:

```
PMTAG           PMTYPE FLGS   RCNT    STATUS          COMMAND
zsmon           ttymon -      0       ENABLED/usr/lib/saf/ttymon #
tcp             listen -      0       ENABLED/usr/lib/saf/listen tcp#
```

    ✳   If the tcp line is missing, you must make the port monitor yourself, using the command
           `sacadm -a -p tcp -t listen -c "/usr/lib/saf/listen tcp" -v`nlsadmin- V``

2) Starting the lp, lpd and 0 tcp services

    ✳   When the port monitor is running, you must make sure that the neccesary services are also running. If the tcp port monitor was already running, the services may also be running. If you made the port monitor yourself, you will also have to make the services yourself. The following command will show you which services are running: `pmadm -l`. The output should look like this:

```
PMTAG           PMTYPE          SVCTAG          FLGS ID         <PMSPECIFIC>
tcp             listen          lpd             -    root
\x000202030000000000000000000000000 - p - /var/spool/lp/fifos/listenBSD #
tcp             listen          0               -    root
\x00020ACE0000000000000000000000000 - c - /usr/lib/saf/nlps_server #
zsmon           ttymon          ttya            u    root       /dev/term/a I -
```

```
/usr/bin/login - 9600 ldterm,ttcompat ttya login:  - tvi925 y  #
zsmon          ttymon          ttyb          u   root    /dev/term/b I -
/usr/bin/login - 9600 ldterm,ttcompat ttyb login:  - tvi925 y  #
```

If the output contains the services you need, you don't have to do the rest of step 2. The services you need are lpd for making printing available for bsd-hosts, lp for making printing available for SystemV-hosts, and furthermore service 0 in both cases. In the example, the lpd service and the 0 service are present.

❋   The lp service is started with the following command:
```
pmadm -a -p tcp -s lp -i root -v `nlsadmin -V` -m "`nlsadmin -o
/var/spool/lp/fifos/listenS5`"
```

❋   Before the lpd service can be started, it is neccesary to get the systems *universal address*:

```
lpsystem -A
```
which will output a number like
```
00020203000000000000000000000000
```
The lpd service is started with the following command:
```
pmadm -a -p tcp -s lpd -i root -v `nlsadmin -V` -m "`nlsadmin -o
/var/spool/lp/fifos/listenBSD -
A'\x00020203000000000000000000000000'`"
```

```
The lpsystem -A will only work if your system's name or address
Is listed in the /etc/inet/hosts file, and the printer service
is in the /etc/inet/services.
```

❋   Before the 0 service can be started, it is neccesary to get the systems *modified address*, which is the universal address whith the 5. to 8. digit replaced by 0ACE.
Get universal address:
```
lpsystem -A
00020203000000000000000000000000
```
The modified address will be 00020ACE000000000000000000000000.
The 0 service is started with the following command:
```
pmadm -a -p tcp -s 0 -i root -v `nlsadmin -V` -m "`nlsadmin -c
usr/lib/saf/nlps_server -
A'\x00020ACE000000000000000000000000'`"
```

3) To register the remote system with lpsystem

❋   Each host from which you want to be able to remote print to Solaris must be registred by name.
It is done with the lpsystem command:
```
lpsystem -ttype hostname
```
where *type* can be either S5 (default) or bsd.
Default is all requests accepted.

How to make SCO-UNIX printers available to TCP/IP clients

The systems in the /etc/hosts.lpd file are allowed to use the lpd-service. It is supposed to be more restrictive than /etc/hosts.equiv, which allows systems to do a remote login without a password, as long as the same user name exist on the receiving host.. When a remote print request arrives to the system, the system checks to see if the hosts is in one of the files. SCO-UNIX does not care which one.

Depending on your wishes (your site), you will have to do one of the following things:

1) Adding the remote client to the /etc/hosts.lpd file

❋   Check if the hostname is already in the /etc/hosts.lpd file. The file has a line for each host, containing its hostname.
❋   If not, add it with a text editor - if the file does not exist, create it.

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2) Adding the remote client to the `/etc/hosts.equiv` file

❧   Check if the hostname is already in the `/etc/hosts.equiv` file. The file has a line for each host, containing its hostname.

❧   If not, add it with a text editor - if the file does not exist, create it.

In both cases:

3) Start the lpd daemon if necessary

❧   SCO_UNIX uses a BSD-like lpd daemon for remote printing. Make sure the lpd daemon is running. The command
```
ps –e |grep lpd
```
must output a line with information about the running lpd. If the daemon is not running, start it with the following command:
```
/usr/lib/lpd
```

4) Add the printer to `/etc/printcap`

❧   SCO-UNIX does remote printing in BSD style. Eventhough the local spool queue has already been made on the local system using the SystemV `lpadmin` command, it must also be added to the `/etc/printcap` file with the `rlpconf` command before it is available for remote printing. The `/etc/printcap` file is in normal BSD-format, but editing it directly is not sufficient - rlpconf does some other stuff, too.

❧   Using the `rlpconf` command: Type `rlpconf` at the command prompt. You will be asked for the printer name - type it. Next question is whether the printer is remote or local (r/l). Answer local (type l). Now you are prompted for the device. Enter the device corresponding to the printer. The information will be displayed, and you will be asked to confirm (y/n). The spool directory will be created for you.

❧   Please be aware that you are not *creating* a local printer, but merely making an existing printer available to network clients. The printer name and device must correspond to a local printer already created on the local system.

B3) How to make Windows NT printers available to TCP/IP clients

Requires: -   *Windows NT Server 4.0 / Windows NT workstation 4.0*[1]
              -    *The printer you want to make available is created and working with Windows NT*
              -    *Have your Windows NT CD-ROM (or other media with installation files) ready*

1) Installing the Windows NT LPR service

❧   Click on the "Start Menu". Select "Settings", select "Control Panel". In the "Control Panel", double click on the "Networks" icon.

❧   In the "Networks" dialog box, select services, and click on the "Add" button.

❧   A new dialog box appears, with a list of available services. Select "Microsoft TCP/IP Printing", and click "OK".

❧   You are now asked for the path to some needed setup files. Insert the Windows NT CD-ROM in your CD-ROM drive, and type the path for the CD-ROM drive and the directory corresponding to your platform (Example: d:\i386\). Windows NT setup will now copy the neccesary files, and update the Windows NT registry database.

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[1]Might be similar in earlier versions of Windows NT, might be different...

✵ Exit the Network dialog box by clicking on the close button. Windows NT updates some bindings and then asks you to restart your computer. *You must restart your computer before the new service can be used.*

2) Starting the TCP/IP Print Server (the LPDSVC service)

✵ Click on the "Start Menu". Select "Settings", select "Control Panel". In the "Control Panel", double click on the "Services" icon.

✵ Select the "TCP/IP Print Server" from the list. Click on the "Start" button.

✵ To make Windows NT start this service up automatically at boot time, click on the "Startup" button, select "Automatic", and click OK.

✵ Use "Close" button to close the "Services" dialog box.

3) Making the printer shared

✵ Click on the "Start Menu". Select "Settings", select "Control Panel". In the "Control Panel", double click on the "Printers" icon
　　　　OR
Click on the "Start Menu". Select "Settings", select "Printers".

✵ Select the printer you want to make shared. Select "Properties" in the file menu, or in the menu which appears when you right click on the printers icon.

✵ Select "Sharing". Choose "Shared", and type the name you want the UNIX clients to use to identify the queue, in the "Share name" box. Click "OK".

B3a) How to make Windows 2000 printers available to TCP/IP clients

Requires:　　-　　*Windows 2000 Server / Windows 2000 workstation*
　　　　　　-　　*The printer you want to make available is created and working with Windows 2000*
　　　　　　-　　*Have your Windows 2000 CD-ROM (or other media with installation files) ready*

1) Installing the Windows 2000 LPR service (if "Print Services for Unix" were not originally installed with Windows)

✵ Click on the "Start Menu". Select "Settings", select "Control Panel". In the "Control Panel", double click on the "Network and Dial-up Connections" icon.

✵ Open the "Advanced" menu in the "Network and Dial-up Connections" panel and select "Optional Net-working Components".

✵ In the "Optional Networking Components Wizard", turn the checkbox "Other Network File and Print Ser-vices" on and click "Details".

✵ In the "Other Network File and Print Services" dialog box, turn the checkbox "Print Services for Unix" on and click "OK".

✵ In the "Optional Networking Components Wizard", click "Next >".

✵ If required by Windows you must now insert the Windows 2000 CD ROM in the CD ROM drive, and follow the instructions.

✵ If required by Windows you must restart the system before the service can be used.

2) Starting the TCP/IP Print Server (the LPDSVC service)

✵ Click on the "Start Menu". Select "Settings", select "Control Panel". In the "Control Panel", double click on the "Administrative Tools" icon.

✵ In the "Administrative Tools" panel, double click on the "Services" icon.

✵ Select the "TCP/IP Print Server" from the list, right click and select "Start".

✵ To make this service start automatically at boot time, right click, select "Properties", choose "Automatic" in

the "Startup type" selection menu, and click "OK".

❋ Close the "Services" dialog box and the "Administrative Tools" panel.

3) Making a printer shared

❋ Click on the "Start Menu". Select "Settings", select "Printers".

❋ Select the printer you want to make shared, right click and select "Sharing".

❋ Choose "Shared as", and type the name you want the UNIX clients to use for identification of the print queue in the text box. Click "OK".

B4) How to make AIX printers available to TCP/IP clients

Requires: - *The remote client and its IP-adress must be in the /etc/hosts file*

The systems in the `/etc/hosts.lpd` file are allowed to use the lpd-service. It is supposed to be more restrictive than `/etc/hosts.equiv`, which allows systems to do a remote login without a password, as long as the same user name exist on the receiving host.. When a remote print request arrives to the system, the system checks to see if the hosts is in one of the files. AIX does not care which one.

Depending on your wishes (your site), you will have to do one of the following things:

1) Adding the remote client to the `/etc/hosts.lpd` file

❋ Check if the hostname is already in the `/etc/hosts.lpd` file. The file has a line for each
❋ If not, add it with a text editor - if the file does not exist, create it.

OR

2) Adding the remote client to the `/etc/hosts.equiv` file

❋ Check if the hostname is already in the `/etc/hosts.equiv` file. The file has a line for each host, containing its hostname.
❋ If not, add it with a text editor - if the file does not exist, create it.

In both cases:

3) Start the lpd if necessary

❋ Make sure the lpd daemon is running: The command
```
ps –e |grep lpd
```
must output a line with information about the running lpd. If the daemon is not running, start it with the following command:
```
startrc –s lpd
```

C1) BSD remote to BSD printer, SystemV printer, Windows NT or 2000 printer, AIX printer or LPR printer

Requires: - *The printer you want to connect to is created and working with its local system*

❋ Make the following entry for the remote printer in the /etc/printcap file with your favourite text editor:

```
printer name:\
        sd=fully qualified path to spool directory:\
        lp=:\
        sh:\
        mx#0:\
        rm=remote hostname:\
```

```
            rp=remote printername:
```

where printer name is the name of the new local queue. It is not nessecary to use a local spool directory - if there is no sd line, jobs are spooled directly to the remote host. The sh entry means suppress headers, and the mx#0 means that there is no limit on job size. Refer to your system documentation for further details.

❊   If a spool directory is given in the printcap entry, create it with the mkdir commmand.

❊   Please note that it is not possible to use a filter before the job is sent to the destination machine. If a filter is given in the printcap entry, it will not be used.

C2) BSD remote to TCP/IP printer

TBS

C3) SystemV remote to BSD printer, Windows NT or 2000 printer, AIX printer or LPR printer

Requires: -   *The printer you want to connect to is created and working with its local system*

IRIX SystemV remote to BSD, Windows, AIX or LPR

The easiest thing to do in this case is to use the GUI facilities (Print manager). Open print manager, click the add button, choose remote and type the name of the new printer, the remote host and the remote printer. Print manager cannot provide you with a list of printers on the remote host when the remote host is a BSD system. It can also be done the command line way:

❊   At the command prompt, type
```
lpadmin –Pprinter –v/dev/null –mnetface
```
where *printer* will become the name of the new printer.

❊   With your favourite text editor, change the following lines in the newly created interface script `/usr/spool/lp/interface/`*printer*:
```
HOSTNAME=        becomes  HOSTNAME=remotehost
HOSTPRINTER=   becomes  HOSTPRINTER=remoteprinter
```
where *remotehost* is the name of the remote bsd-host, and *remoteprinter* is the name of the print queue on that host.

It is possible to install a BSD spool system on your IRIX system (for setting up a BSD remote queue, refer to section C1).

NOTE: This goes for Solaris, too.

HP-UX SystemV remote to BSD, Windows, AIX or LPR

❊   At the command prompt, type
```
/usr/lib/lpadmin –p<printer> –m<model> v/dev/null –orm<remote
host> -orp<remote queue> –ocmrcmodel –osmrsmodel –orc –ob3
```
where `printer` is the name of the new queue and `model` is the name of a script placed in `/usr/spool/lp/model`, which will be used for the interface script.
The `–m` option can be replaced by -e or -i, refer to the lpadmin man page.
`–ocmrcmodel` means that `/usr/spool/lp/cmodel/rcmodel` is used for cancelling remote jobs
`–osmrsmodel` means that `/usr/spool/lp/smodel/rsmodel` is used for obtaining status from the remote system
`–orc` means that a user can only cancel her/his own jobs
`–ob3` will cause the system to use a 3 digit, BSD compatible sequence number
Refer to the lpadmin man page for further options.

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- It is possible to pass BSD options to the remote system from the command line using the following syntax:
  ```
  lp -P<printer> -oBSD<BSDoption> -oBSD<BSDoption> datafile
  ```
  where BSDoption is -l or -c2 or another BSD option. The BSD options are passed to the remote system. Contact to the remote system is taken with remsh.

Solaris SystemV remote to BSD, Windows, AIX or LPR

- Make the remote system known to Solaris with the command
  ```
  lpsystem -t bsd remotehost
  ```
  where t means type, and the allowed types are bsd and s5.

- At the command prompt, type
  ```
  lpadmin -p printer -s 'remotehost\!remote printer'
  ```
  where printer will become the name of the new queue, remotehost is the remote host name and remote printer is the name of the remote print queue. The backslash may not be necessary, depending on whether your shell expand the !.
  The following command will create a queue with the same name as the queue on the remote computer.
  ```
  lpadmin -p remote printer -s remotehost
  ```

- Solaris seems to have a problem with Windows NT and AIX. The remote printing works, but the `lpstat -oprinter` command does not produce any output, even if there are jobs queued. On the other hand, `lpstat -pprinter` outputs the the information that `lpstat -o` was supposed to, although only for the first few jobs in the queue. Cancel only works with the jobnumber which AIX or NT has given the job.

Common for all the above:

- The newly created queue must be told to accept requests with the command `accept printer`, where *printer* is the name of the queue.

- The queue must be enabled with the command `enable printer`.

SCO-UNIX SystemV remote to BSD, Windows, AIX or LPR

- SCO-UNIX does remote printing in BSD-style. An lpd-daemon handles all the remote printing. Remote printers must be added to the `/etc/printcap` file. This is done with the rlpconf tool.

- Type `rlpconf` at the command prompt. You will be asked for the printer name - type it. The next question is whether the printer is remote or local (r/l) - choose remote. You will be prompted for the remote hostname - type it. Then you will be asked if you want to use the extended RLP protocol - answer no. This protocol is only used if the remote host is another SCO-system. Finally you are asked if you want this to be your default printer.

- Start the lpd daemon if nessecary. SCO_UNIX uses a BSD-like lpd daemon for remote printing.Make sure the lpd daemon is running. The command
  ```
  ps -e |grep lpd
  ```
  must output a line with information about the running lpd. If the daemon is not running, start it with the following command:
  ```
  /usr/lib/lpd
  ```

C4) SystemV remote to SystemV printer

Requires: - *The printer you want to connect to is created and working with the local system*

IRIX SystemV to SystemV

✱ At the command prompt, enter
```
mknetpr <local queue> <remote host> <remote queue>
```

mknetpr is a shell script. It finds out whether the specified remote queue exists. If it does, the queue is created, if it doesn't, an error message is returned.
The procedure seems to be some sort of test of the contents of certain directories on the remote host - directories containing information about the print queues. Since these does not exist on BSD systems, mknetpr is not able to find them.

✱ The queue get a copy of the interface script /usr/spool/lp/model/netface.
The netface script uses rcp to send the file to the remote host, and rsh to execute lp, lpstat and cancel at the remote host.

✱ The queues made by mknetpr does not provide remote status information.

NOTE: Solaris has to be treated as BSD in this case, since mknetpr does not work with Solaris. Please refer to section C3.

HP-UX SystemV to SystemV

✱ At the command prompt, type
```
/usr/lib/lpadmin –p<printer> –m<model> v/dev/null –orm<remote host> –orp<remote queue> –ocmrcmodel –osmrsmodel –orc
```
where printer is the name of the new queue and model is the name of a script placed in /usr/spool/lp/model, which will be used for the interface script.
The –m option can be replaced by -e or -i, refer to the lpadmin man page.
–ocmrcmodel means, that /usr/spool/lp/cmodel/rcmodel is used for cancelling remote jobs
–osmrsmodel means, that /usr/spool/lp/smodel/rsmodel is used for obtaining status from the remote system
-orc means that a user can only cancel her/his own jobs
Refer to the lpadmin man page for further options. Contact to the remote system is taken with remsh.

Solaris SystemV to SystemV

Even though Solaris uses a SystemV spool system, et remote prints in BSD style. All the SystemV spooling systems considered here will work if they are made known to Solaris as a BSD system. The only problem is that if another SystemV needs to remote print *to* Solaris, it might have to be known at Solaris as a s5 system, and it can't be known as both types at the same time.

✱ Make the remote system known to Solaris with the command
```
lpsystem –t bsd remotehost
```
where t means type, and the allowed types are bsd and s5.

✱ At the command prompt, type
```
lpadmin –p printer –s 'remotehost\!remote printer'
```
where printer will become the name of the new queue, remotehost is the remote host name and remote printer is the name of the remote print queue. The backslash may not be necessary, depending on whether your shell expand the !.
The following command will create a queue with the same name as the queue on the remote computer.
```
lpadmin –p remote printer –s remotehost
```

Common for all the above:

✱ The newly created queue must be told to accept requests with the command accept *printer*, where *printer* is the name of the queue.

✱ The queue must be enabled with the command enable *printer*.

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SCO-UNIX SystemV to SystemV

✳   SCO-UNIX does remote printing in BSD-style. It will only remote print to systems capable of receiving BSD-style remote requests. An lpd-daemon handles all the remote printing. Remote printers must be added to the `/etc/printcap` file. This is done with the `rlpconf` tool.

✳   Type `rlpconf` at the command prompt. You will be asked for the printer name - type it. The next question is whether the printer is remote or local (r/l) - choose remote. You will be prompted for the remote hostname - type it. Then you will be asked if you want to use the extended RLP protocol - yes if the remote host is another SCO-UNIX system, otherwise answer no. Finally you are asked if you want this to be your default printer.

✳   The name of the queue on the remote system will also become the name of your local print queue. That is why you are only prompted for one printer name.

✳   Start the lpd daemon if nessecary. SCO_UNIX uses a BSD-like lpd daemon for remote printing. Make sure the lpd daemon is running. The command
```
ps -e |grep lpd
```
must output a line with information about the running lpd. If the daemon is not running, start it with the following command:
```
/usr/lib/lpd
```

C6) Windows NT remote to BSD printer, SystemV printer, AIX printer or LPR printer

Requires: -   *Have your Windows NT CD-ROM or a manufacturers disk with the printer driver ready*
                         Microsoft TCP/IP Printing (see section B3) must be installed
               -       *The printer you want to connect to is created and working with its local system*

✳   Click on the "Start Menu". Select "Settings", select "Control Panel". In the "Control Panel", double click on the "Printers" icon
               OR
Click on the "Start Menu". Select "Settings", select "Printers".

✳   Double click on the "Add Printer" icon.

✳   Select the "My Computer" option, click "Next".

✳   If it exists, check the box corresponding to the port to which your printer is connected. You will probably have to create a new port.
Creating a new LPR port:
            * Click on the "Add Port" button.
            * Select "LPR Port" from the list, and click on the "New Port" button.
            * In the "Name or address of server providing lpd" field, type the IP address of the
             UNIX host.
            * In the "Name of printer or print queue of that server" field, type the name of the
             queue you want to use.
            * Click "OK".
            * Click on the "Close" button.

✳   When the box corresponding to the correct port is checked, click "Next". A list of printer manufacturers and printer models appears. Select the correct manufacturer and model, and click "Next", or insert the manufacturers drivers disk and click "Have Disk".

✳   Windows NT will propose a name for the printer. If you want to change it, type the new name. You also have to choose if you want this to be your default printer. If this is not your first printer, Windows NT will by default select no. You can always change your default printer later. Click "Next".

- ✱ If you want to provide access to the printer from other locations, choose "Shared". In "Share Name" type the name you want the queue to be know under at your network. If you don't want to make your printer shared, choose "Not Shared".

- ✱ You will be asked by Windows NT whether you want to print a test page. You should answer yes, so that you can see if your print queue works correctly.

- ✱ Windows NT will now copy the necessary files from the Windows NT disk or manufacturers disk, and your print queue should be ready for use.

C6a) Windows 2000 remote to BSD printer, SystemV printer, AIX printer or LPR printer

Requires: -   *Have your Windows 2000 CD or a manufacturers disk with the printer driver ready. "Print Services for Unix" must be installed (see sect. ???)*
     -      *The printer you want to connect to is created and working with its local system*

- ✱ Click on the "Start Menu". Select "Settings", select "Printers".
- ✱ Double click on the "Add Printer" icon. Click "Next >" in the "Add Printer Wizard" dialog.
- ✱ Select "Local Printer" and click "Next >".
- ✱ Normally you now need to create a new port, but if the port already exists choose "Use the following port", select the port, and skip the rest of this step.

  Otherwise, choose "Create a new port", select "LPR port", and click "Next >". Type the IP address of the Unix host in the "Name or address of server providing lpd" field. Type the name of the print queue you want to use in the "Name of printer or print queue of that server" field. Click "OK".
- ✱ Select "Manufacturer" and "Printer Model" and click "Next >" – or insert printer manufacturers disk and click "Have Disk"
- ✱ Windows proposes a name for the printer. If you want to change it, type the new name.
- ✱ Decide if you want Windows programs to use this printer as the default (select "Yes" or "No") and click "Next >".
- ✱ You may choose to share the printer, for example to let other Windows computers in your network use the printer (thus using this computer as a print server). To make the printer shared, select "Share as" and type the name you want other computers to use for accessing the printer. Click "Next >".
- ✱ Complete the fields "Location" and "Comment" with any appropriate description. Click "Next >".
- ✱ Windows suggests that you print a test page. This is recommended so that you can verify that the printer port you have set up works correctly.
- ✱ Click "Finish" to close the "Add Printer Wizard". Windows will now copy the necessary files from the Windows CD or manufacturers disk, and print your test page.

C7) Windows NT remote to Windows NT or 2000 printer

Requires: -   *Have your Windows NT CD-ROM or a manufacturers disk with the printer driver ready*
     -      *The printer you want to connect to is created and working with its local system*

There are 2 ways to remote print between WindowsNT systems: Creating a local print queue, which is pointing to a remote printer, or simply connecting to a remote printer. The first method was described in section C6 - access to the printer was achieved by defining an LPR-port by a hostname and a remote printer name. This can be done exactly the same way with 2 Windows NT systems as it is done with a Windows NT client and a UNIX system. Refer to section C6.

The second option, connecting to the printer, is described below:

- ✱ Click on the "Start Menu". Select "Settings", select "Control Panel". In the "Control Panel", double

click on the "Printers" icon

OR

Click on the "Start Menu". Select "Settings", select "Printers".

❋   Double click on the "Add Printer" icon.

❋   Select the "Network Printer Server" option, click "Next".

❋   Type the network name of the printer (including the path) in the "printer" box, or click on the wanted printer in the "Shared Printer" box below. The "Shared Printer" box shows all the computers and all the shared printers on the network. Click "Next".

❋   You will be asked if you want to make this your default Windows printer. Click in the yes or no box, and click next.

❋   Your system informs you that the printer has been installed successfully - click "Finish" and your print queue connection should be ready for use.

❋   On the first print request, Windows NT will now automatically download the necessary driver files from the Windows NT print server (the remote Windows NT system providing the printer you just connected to), or if this is not possible, ask you for the location of the necessary files.

❋   Connecting to a Windows NT printer like this is possible from Windows (NT, 2000. 95/98/me) systems only.

❋   Windows NT 4.0 workstation as print server provides service for only 10 clients, Windows NT 4.0 server has no such limitations, and is optimized for providing fast print service.

C7a) Windows 2000 remote to Windows NT or 2000 printer

Requires: -   *Have your Windows CD or the manufacturers media with the printer driver ready*
                 -       *The printer you want to connect to is created and working with its local system*

From Windows 2000 you can print to another Windows system in two ways:

1) The "standard Windows way" as described below.

2) The "LPR way" as described in section XXX. The method described for creating an LPR port is the same no matter if the remote host is a UNIX system or a Windows system.

Client setup for remote printing between Windows systems following the "standard Windows way" is the following:

❋   Click on the "Start Menu". Select "Settings", select "Printers".

❋   Double click on the "Add Printer" icon. Click "Next >" in the "Add Printer Wizard" dialog.

❋   Select "Network Printer" and click "Next >".

❋   Click "Next >" again in the "Add Printer Wizard" to browse the network (or type the full network name of the printer if you know it).

❋   Browsing the network will display a list of all shared printers that are available. Click on the printer you want and click "Next >".

❋   Decide if you want Windows programs to use this printer as the default (select "Yes" or "No") and click "Next >".

❋   Click "Finish" to close the "Add Printer Wizard". The printer is now ready.

❋   If the print server is a Windows 2000 system the necessary parts of the printer driver are down-loaded automatically from the server. The same is the case also if the print server is another Windows flavor, for example Window NT, *only if a printer driver suitable for Windows 2000 has been installed on the server*. If a suitable printer driver is not available on the server you will be notified on exit from the "Add Printer Wizard", and you must install a Windows 2000 printer driver locally on the client machine, either from the Windows CD or from the manufacturers media.

C8) Windows NT or Windows 2000 remote to TCP/IP printer

Requires -　　　　Have your Windows 2000 CD or a manufacturers disk with the printer driver ready.
　　　　　　-　　*The printer must be turned on, connected to the network, and configured with an IP address*

❊　　Click on the "Start Menu". Select "Settings", select "Printers".

❊　　Double click on the "Add Printer" icon. Click "Next >" in the "Add Printer Wizard" dialog.

❊　　Select "Local Printer" and click "Next >".

❊　　Normally you now need to create a new port, but if the port already exists choose "Use the following port", select the port, and skip the rest of this step.

　　　Otherwise, choose "Create a new port", select "Standard TCP/IP Port", and click "Next >".

❊　　Click "Next >" in the "Add Standard TCP/IP Port Wizard".

❊　　Type the IP address of the printer in the "Printer Name or IP Address" field. Windows proposes a name for the port. If you want to change it, type the new name. Click "Next >" and the "Finish" to close the "Add Standard TCP/IP Port Wizard"..

❊　　Select "Manufacturer" and "Printer Model" and click "Next >" – or insert printer manufacturers disk and click "Have Disk".

❊　　Windows proposes a name for the printer. If you want to change it, type the new name.

❊　　Decide if you want Windows programs to use this printer as the default (select "Yes" or "No") and click "Next >".

❊　　You may choose to share the printer, for example to let other Windows computers in your network use the printer (thus using this computer as a print server). To make the printer shared, select "Share as" and type the name you want other computers to use for accessing the printer. Click "Next >".

❊　　Complete the fields "Location" and "Comment" with any appropriate description. Click "Next >".

❊　　Windows suggests that you print a test page. This is recommended so that you can verify that the printer port you have set up works correctly.

❊　　Click "Finish" to close the "Add Printer Wizard". Windows will now copy the necessary files from the Windows CD or manufacturers disk, and print your test page.

C9) AIX remote to BSD printer, Windows NT or 2000 printer or LPR printer

Requires:　　　-　　　　*The printer you want to connect to is created and working with its local system*

❊　　Create the queue with the command

```
mkque -q queue -a "host = bsdhost" -a "rq = bsdqueue" -a
"s_statfilter = /usr/lpd/bsdshort" -a "l_statfilter =
/usr/lpd/bsdlong"
```

where bsdhost is the target host, bsdqueue is the target queue and queue is the name of the queue that is beeing created. S_statfilter and l_statfilter are filters which are used for obtaining status information from the target host. Different sets of filters are used for different types of systems.

❊　　At least one queue device must be created for a queue. If more than one device is created, they are considered equivalent. Create a queue device with the command

```
mkquedev -q queue -d queuedev -a "backend = /usr/lpd/rembak"
```

where backend is the program used for sending data from the queue to it's destination. The rembak program is provided by AIX for remote printing to all systems.

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C10) AIX remote to SystemV printer

Requires: -   *The printer you want to connect to is created and working with its local system*

✿   Create the queue with the command

```
mkque -q queue -a "host = sysvhost" -a "rq = sysvqueue" -a
"s_statfilter = /usr/lpd/attshort" -a "l_statfilter =
/usr/lpd/attlong"
```

where *sysvhost* is the target host, *sysvqueue* is the target queue and *queue* is the name of the queue that is beeing created. S_statfilter and l_statfilter are filters which are used for obtaining status information from the target host. Different sets of filters are used for different types of systems.

✿   At least one queue device must be created for a queue. If more than one device is created, they are considered equivalent. Create a queue device with the command

```
mkquedev -q queue -d queuedev -a "backend = /usr/lpd/rembak"
```

where backend is the program used for sending data from the queue to it's destination. The rembak program is provided by AIX for remote printing to all systems.

C11) AIX remote to AIX printer

Requires: -   *The printer you want to connect to is created and working with its local system*

✿   Create the queue with the command

```
mkque -q queue -a "host = aixvhost" -a "rq = aixvqueue" -a
"s_statfilter = /usr/lpd/aixshort" -a "l_statfilter =
/usr/lpd/aixlong"
```

where *aixhost* is the target host, *aixqueue* is the target queue and *queue* is the name of the queue that is beeing created. S_statfilter and l_statfilter are filters which are used for obtaining status information from the target host. Different sets of filters are used for different types of systems.

✿   At least one queue device must be created for a queue. If more than one device is created, they are considered equivalent. Create a queue device with the command

```
mkquedev -q queue -d queuedev -a "backend = /usr/lpd/rembak"
```

where backend is the program used for sending data from the queue to it's destination. The rembak program is provided by AIX for remote printing to all systems.

C12) AIX remote to TCP/IP printer

TBS

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