



Unit 16

Printers and queues



Unit objectives

After completing this unit, you should be able to:

- Describe the purpose and the benefits of a queuing system
- Identify the major components that are responsible for processing a print request
- Add a printer queue and device
- Submit jobs for printing
- Manage jobs in the queue

AIX 6.1 printing environments

- Print subsystems:
 - AIX print subsystem
 - System V print subsystem
- Print directly to local printer device
- Print directly to a remote printer via a socket program
- Infoprint Manager (or similar advanced print management system)

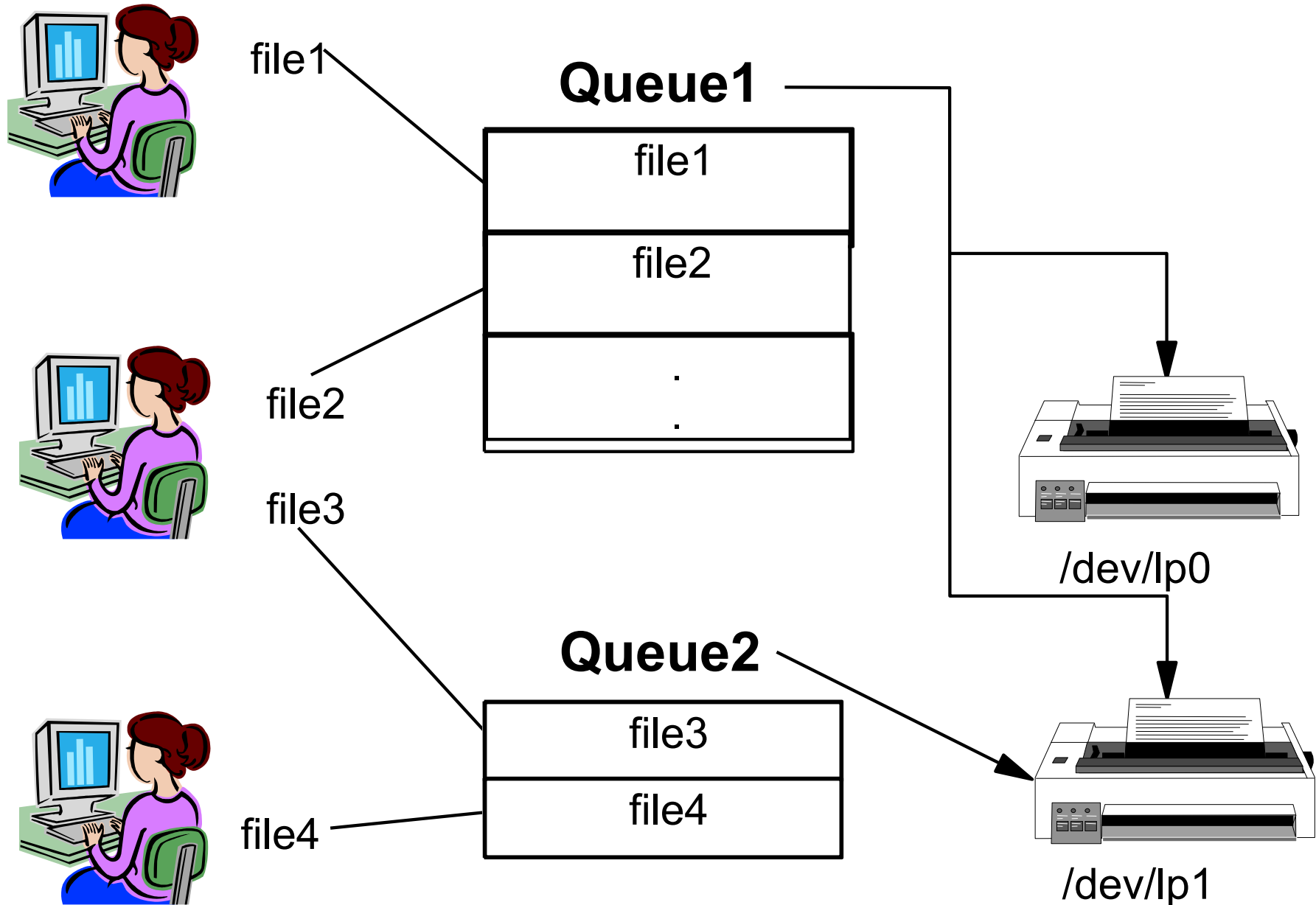
AIX print subsystem: Advantages

- Powerful and flexible printer drivers
- System management tools:
 - Limits fields and options validation
 - Easy printer customization
 - Single step print device and queue creation
- Customizable spooling subsystem

System V print subsystem: Advantages

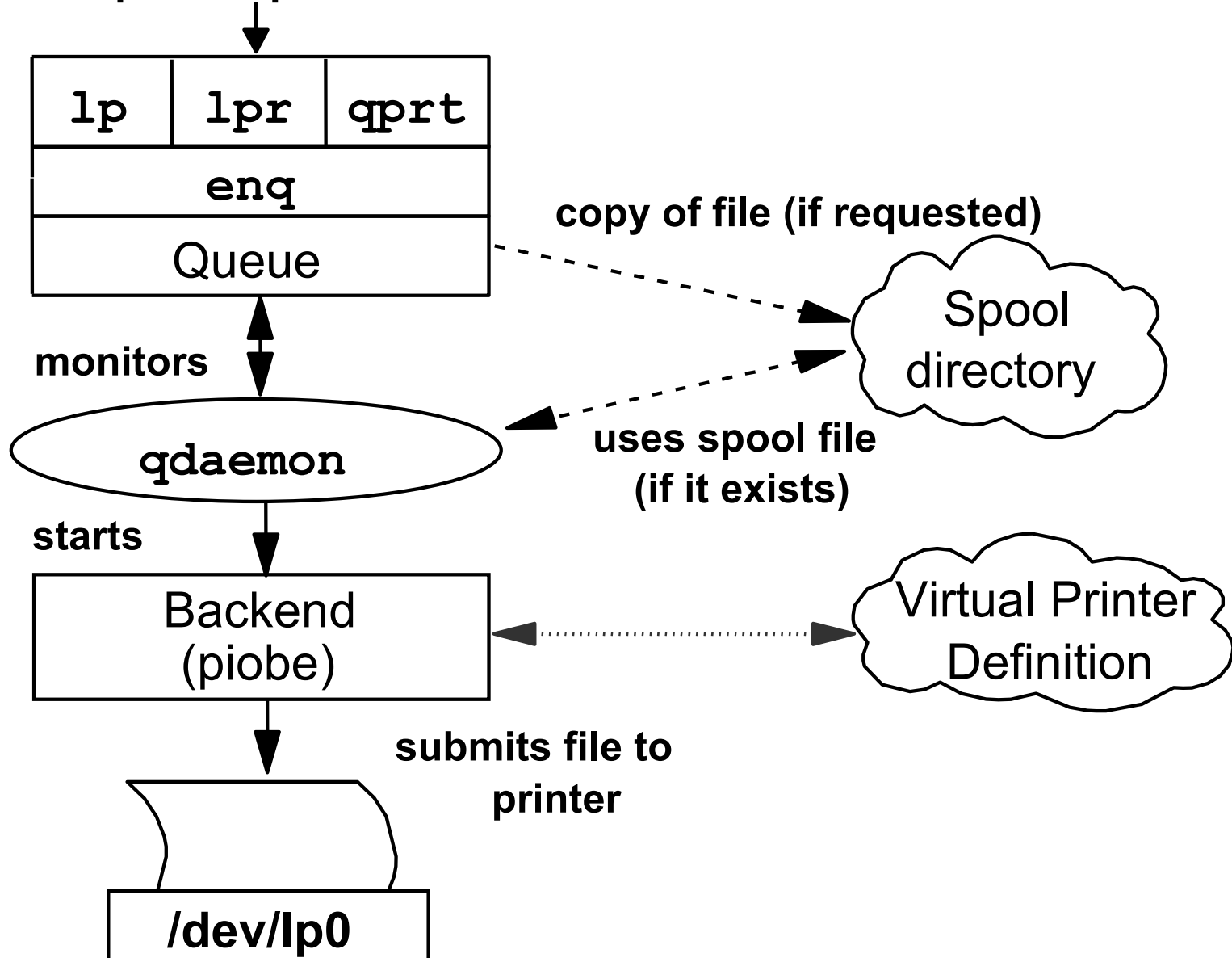
- Compatibility
- Availability of interface programs
- Security
- Support for forms
- Standard PostScript filters
- Long term strategy

Concepts of queues



Printer data flow

`qprt -Pps [-c] file`
print request



System files associated with printing

/etc/qconfig	Queue configuration files
/var/spool/*	Spooling directories
/var/spool/lpd/qdir/*	Queue requests
/var/spool/qdaemon/*	Temporary enqueued files
/var/spool/lpd/stat/*	Line printer status information
/var/spool/lpd/pio/@local	Virtual printer directories

qdaemon

- Manages queues
- Started in the **/etc/inittab** file
- Invokes the backend programs
- Optionally records accounting data

The /etc/qconfig file

<pre>lp0: device = lp0dev up = TRUE discipline = fcfs</pre>	* 1 queue pointing to 1 device
<pre>lp0dev: file = /dev/lp0 backend = /usr/lib/lpd/piobe header = group trailer = never feed = never</pre>	
<pre>lpq: device = lpqdev1,lpqdev2</pre>	* 1 queue pointing to 2 devices
<pre>lpqdev1: file = /dev/lp1 backend = /usr/lib/lpd/piobe</pre>	
<pre>lpqdev2: file = /dev/lp2 backend = /usr/lib/lpd/piobe</pre>	
<pre>ps: device = psdev</pre>	* 2 queues pointing to 1 device
<pre>psdev: file = /dev/lp3 backend = /usr/lib/lpd/piobe</pre>	
<pre>asc: device = ascdev</pre>	
<pre>ascdev: file = /dev/lp3 backend = /usr/lib/lpd/piobe</pre>	

Printer menu

```
# smit spooler_choice
```

Print Spooling

Move cursor to desired item and press Enter.

AIX Print Spooling

System V Print Spooling

F1=Help

F9=Shell

F2=Refresh

F10=Exit

F3=Cancel

Enter=Do

F8=Image

AIX printer menu

```
# smit spooler
```

AIX Print Spooling

Move cursor to desired item and press Enter.

```
Start a Print Job
Manage Print Jobs
List All Print Queues
Manage Print Queues
Add a Print Queue
Add an Additional Printer to an Existing Print Queue
Change / Show Print Queue Characteristics
Change / Show Printer Connection Characteristics
Remove a Print Queue
Manage Print Server
Programming Tools

Change / Show Current Print Subsystem
```

F1=Help

F2=Refresh

F3=Cancel F8=Image

F9=Shell

F10=Exit

Enter=Do

Configuring a printer with a queue

AIX Print Spooling

Move cursor to desired item and press Enter.

Add a Print Queue

Move cursor to desired item and press Enter. Use arrow keys to scroll.

#ATTACHMENT TYPE	DESCRIPTION
local	Printer Attached to Local Host
remote	Printer Attached to Remote Host
xstation	Printer Attached to Xstation
ascii	Printer Attached to ASCII Terminal
hpJetDirect	Network Printer (HP JetDirect)
file	File (in /dev directory)
ibmNetPrinter	IBM Network Printer
ibmNetColor	IBM Network Color Printer
other	User Defined Backend

F1=Help

F2=Refresh

F3=Cancel

F8=Image

F10=Exit

Enter=Do

/=Find

n=Find Next

Selecting a printer type (1 of 2)

AIX Print Spooling

Move cursor to desired item and press Enter.

Printer Type

Move cursor to desired item and press Enter.

Bull

Canon

Dataproducts

Hewlett-Packard

IBM

Lexmark

OKI

Printronic

QMS

Texas Instruments

Other (select this if your printer is not listed above)

F1=Help

F2=Refresh

F3=Cancel

F8=Image

F10=Exit

Enter=Do

/=Find

n=Find Next

Selecting a printer type (2 of 2)

AIX Print Spooling

Printer Type

Move cursor to desired item and press Enter.

[MORE...8]

ibm2391-2	IBM 2391 Plus printer (Model 2)
ibm3112	IBM 3112 Page Printer
ibm3116	IBM 3116 Page Printer
ibm3130	IBM 3130 LaserPrinter
ibm3812-2	IBM 3812 Model 2 Page Printer
ibm3816	IBM 3816 Page Printer
ibm4019	IBM 4019 LaserPrinter
ibm4029	IBM 4029 LaserPrinter
ibm4037	IBM 4037 LP printer
ibm4039	IBM 4039 LaserPrinter

[MORE...49]

F1=Help
Esc+8=Image
/=Find

F2=Refresh
Esc+0=Exit
n=Find Next

F3=Cancel
Enter=Do

Printer attachment

Printer Interface

Move cursor to desired item and press Enter.

parallel
rs232
rs422

Parent Adapter

Move cursor to desired item and press Enter.

ppa0 Available 01-G0 Standard Parallel Port Adapter

Add the print queues

Add a Print Queue

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

[Entry Fields]

Description

IBM 4029 LaserPrinter

Names of NEW print queues to add

ASCII	[asc]
GL Emulation	[]
PCL Emulation	[]
PostScript	[ps]

Printer connection characteristics

* PORT number	[p]	+
Type of PARALLEL INTERFACE	[standard]	+
Printer TIME OUT period (seconds)	[600]	+#
STATE to be configured at boot time	available	+

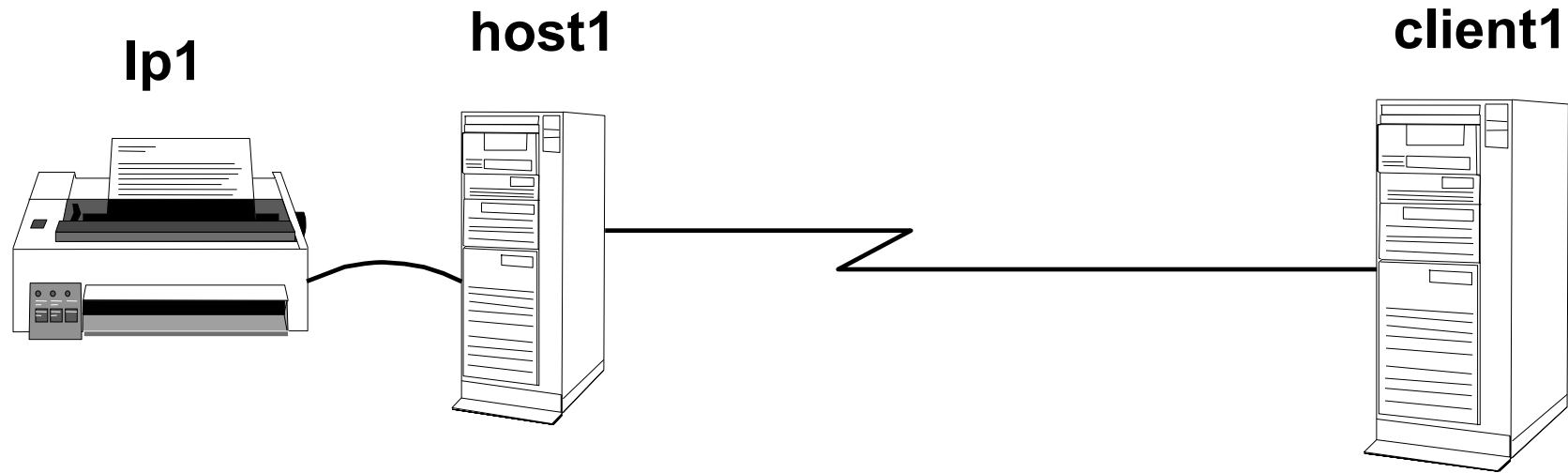
F1=Help
F5=Reset
F9=Shell

F2=Refresh
F6=Command
F10=Exit

F3=Cancel
F7=Edit
Enter=Do

F4=List
F8=Image

Remote printing



- ✓ Set up local print queue
- ✓ Define client machines in **/etc/hosts.lpd**
- ✓ Start the **lpd** daemon

- ✓ Configure a remote queue

Client authorization

```
# smit mkhostslpd
```

Add Print Access for a Remote Client

Type or select values in entry fields.

Press Enter AFTER making all desired changes.

[Entry Fields]

* Name of REMOTE CLIENT

[client1]

(Hostname or dotted decimal address)

F1=Help

F2=Refresh

F3=Cancel

F4=List

F5=Reset

F6=Command

F7=Edit

F8=Image

F9=Shell

F10=Exit

Enter=Do

Start lpd

smit mkitab_lpd

Start the Print Server Subsystem

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

	[Entry Fields]
Start subsystem now, on system restart, or both	[both] +
TRACE lpd daemon activity to syslog?	[no] +
EXPORT directory containing print attributes?	[no] +

Note:

Exporting this print server's directory containing its print attributes will allow print clients to mount the directory. The clients can use this server's print attributes to display and validate print job attributes when starting print jobs destined for this print server. Note that the Network File System (NFS) program product must be installed and running

F1=Help
F5=Reset
F9=Shell

F2=Refresh
F6=Command
F10=Exit

F3=Cancel
F7=Edit
Enter=Do

F4=List
F8=Image

Add a remote print queue

AIX Print Spooling

Move cursor to desired item and press Enter.

Add a Print Queue

Move cursor to desired item and press Enter. Use arrow keys to scroll.

#ATTACHMENT TYPE

DESCRIPTION

local

Printer Attached to Local Host

remote

Printer Attached to Remote Host

xstation

Printer Attached to Xstation

ascii

Printer Attached to ASCII Terminal

hpJetDirect

Network Printer (HP JetDirect)

file

File (in /dev directory)

ibmNetPrinter

IBM Network Printer

ibmNetColor

IBM Network Color Printer

other

User Defined Backend

F1=Help

F2=Refresh

F3=Cancel

F8=Image

F10=Exit

Enter=Do

/=Find

n=Find Next

Define the print server on the client

Add a Standard Remote Print Queue

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

	[Entry Fields]
*Name of QUEUE to add	[rq1]
*HOSTNAME of remote server	[host1]
*Name of QUEUE on remote server	[lp1]
Type of print spooler on remote server	AIX Version 3 or 4 +
Backend TIME OUT period (minutes)	[] #
Send control file first?	no +
TO turn on debugging, specify output file pathname	[]
DESCRIPTION of printer on remote server	[]

F1=Help

F2=Refresh

F3=Cancel

F4=List

F5=Reset

F6=Command

F7=Edit

F8=Image

F9=Shell

F10=Exit

Enter=Do

Let's review

1. True or false? The **qdaemon** is responsible for printing jobs.

- To set up remote printing, what daemons are needed and do they run on the server, the client or both?

- What does the **up = TRUE** indicate in the **/etc/qconfig** file?

- What does **discipline** mean in reference to the **/etc/qconfig** file? What are its possible values?

Let's review solution

- True or false? The **qdaemon** is responsible for printing jobs. False. The printer backend is responsible for printing. The qdaemon manages jobs in queue. The qdaemon hands the jobs off to the backend for printing.
- To set up remote printing, what daemons are needed and do they run on the server, the client or both? qdaemon and lpd on the server
qdaemon only on the client
- What does the **up = TRUE** indicate in the **/etc/qconfig** file? It means the queue is accepting jobs. If it were FALSE, the user would be notified that the queue is not accepting jobs.
- What does **discipline** mean in reference to the **/etc/qconfig** file? What are its possible values? discipline is read by qdaemon to determine the sorting order for jobs in the queue. The values supported are fcfs (first come first server) and sjn (shortest job next).

Submitting print jobs

- AIX print systems offer compatibility to System V print commands
- To submit a job to a queue:

System V

`lp`

BSD

`lpr`

AIX

`qprt`

```
$ lp -d queuename filename
```

- OR -

```
$ qprt -P queuename filename
```

Listing jobs in a queue

- To list jobs in a queue:

SYSTEM V

lpstat

BSD

lpq

AIX

qchk

For example:

```
$ qchk
```

Queue	Dev	Status	Job	Files	User	PP	%	Blks	Cp	Rnk
ps	lp0	DOWN								
		QUEUE	569	/etc/motd	root			1	1	1

Change characteristics of a queue

```
# smit chpq
```

Print Queue to Change / Show

Type or select values in entry fields.

Press Enter AFTER making all desired changes.

[Entry Fields]

PRINT QUEUE name

[ps]

+

Characteristics to Change / Show

Move the cursor to the desired item and press Enter.

- Printer Setup
- Default Print Job Attributes
- Accounting File
- Queuing Discipline

Removing a queue

```
# smit rmpq
```

Remove a Print Queue

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

	[Entry Fields]
Print queue to remove	ps:lp0
Local printer device	/dev/lp0
KEEP the local printer device?	no +

F1=Help
F5=Reset
F9=Shell

F2=Refresh
F6=Command
F10=Exit

F3=Cancel
F7=Edit
Enter=Do

F4=List
F8=Image

Managing queues

```
# smit pqmanage
```

Manage Print Queues

Move the cursor to the desired item and press Enter.

Show Status of Print Queues

Stop a Print Queue

Start a Print Queue

Set the System's Default Print Queue

F1=Help

F2=Refresh

F3=Cancel

F8=Image

F9=Shell

F10=Exit

Enter=Do

Understanding queue status

Queue	Dev	Status	Job	Files	User	PP	%	Bks	Cp	Rnk
ps	lp0	DOWN QUEUED	1569	/etc/motd	root			1	1	1

State	Description
DEV_BUSY	Printer is busy servicing other print requests
DEV_WAIT	Queue is waiting for the printer
DOWN	Queue is down and no jobs will be serviced from this queue until it is brought up
OPR_WAIT	The queue is waiting for operator intervention
QUEUED	Job is queued and waiting
READY	Everything is ready to receive a print request
RUNNING	Print file is printing
UNKNOWN	Problem with the queue - need to investigate further to determine cause

Bringing queues up and down

```
# lpstat
```

Queue	Dev	Status	Job	Files	User	PP	%	Bks	Cp	Rnk
draft	lp0	DOWN								
		QUEUED	132	/etc/motd	team01			1	1	1
Quality	lp0	READY								

- To enable a queue whose status is DOWN:

```
# enable draft
```

- To disable a queue whose status is READY:

```
# disable quality
```

You must be a member of the **printq** group or **root**

Manage Print Jobs

```
# smit jobs
```

Manage Print Jobs

Move the cursor to the desired item and press Enter.

Cancel a Print Job

Show the Status of Print Jobs

Prioritize a Print Job

Hold / Release a Print Job

Move a Job between Print Queues

F1=Help

F2=Refresh

F3=Cancel

F8=Image

F9=Shell

F10=Exit

Enter=Do

Cancel a Print Job

```
# smit qcan
```

Cancel a Print Job

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

	[Entry Fields]
PRINT QUEUE containing job (required for remote jobs)	[] +
* Print JOB NUMBER	[] + #

F1=Help

F2=Refresh

F3=Cancel

F4=List

F5=Reset

F6=Command

F7=Edit

F8=Image

F9=Shell

F10=Exit

Enter=Do

Job priority example

```
# qchk -L
Queue      Dev      Status  Job
           Submitted
ps         lp0     DOWN
          QUEUED 569 /etc/qconfig root root
          1/07/03 09:39:25
                        1  15    2    1
                        /etc/qconfig

          QUEUED 570 /etc/motd   root root
          1/07/03 09:40:15      2  15    1    1
                        /etc/motd
```

```
# qpri -#570 -a 25
# qchk -L
Queue      Dev      Status  Job
           Submitted
ps         lp0     DOWN
          QUEUED 570 /etc/motd   root root
          1/07/03 09:40:15      1  25    1    1
                        /etc/motd

          QUEUED 569 /etc/qconfig root root
          1/07/03 09:39:25      2  15    2    1
                        /etc/qconfig
```

Holding a job in a queue

```
# qchk
```

<u>Queue</u>	<u>Dev</u>	<u>Status</u>	<u>Job</u>	<u>Files</u>	<u>User</u>	<u>PP%</u>	<u>Blks</u>	<u>Cp</u>	<u>Rnk</u>
ps	lp0	DEV_BUSY							
		QUEUED	1493	/etc/qconfig	root	1	1	1	1

```
# qhld -#1493
```

```
# qchk
```

<u>Queue</u>	<u>Dev</u>	<u>Status</u>	<u>Job</u>	<u>Files</u>	<u>User</u>	<u>PP%</u>	<u>Blks</u>	<u>Cp</u>	<u>Rnk</u>
ps	lp0	DEV_BUSY							
		HELD	1493	/etc/qconfig	root	1	1	1	1

```
# qhld -r -#1493
```

```
# qchk
```

<u>Queue</u>	<u>Dev</u>	<u>Status</u>	<u>Job</u>	<u>Files</u>	<u>User</u>	<u>PP%</u>	<u>Blks</u>	<u>Cp</u>	<u>Rnk</u>
ps	lp0	DEV_BUSY							
		QUEUED	1493	/etc/qconfig	root	1	1	1	1

Moving a job between queues

```
# qchk -A
```

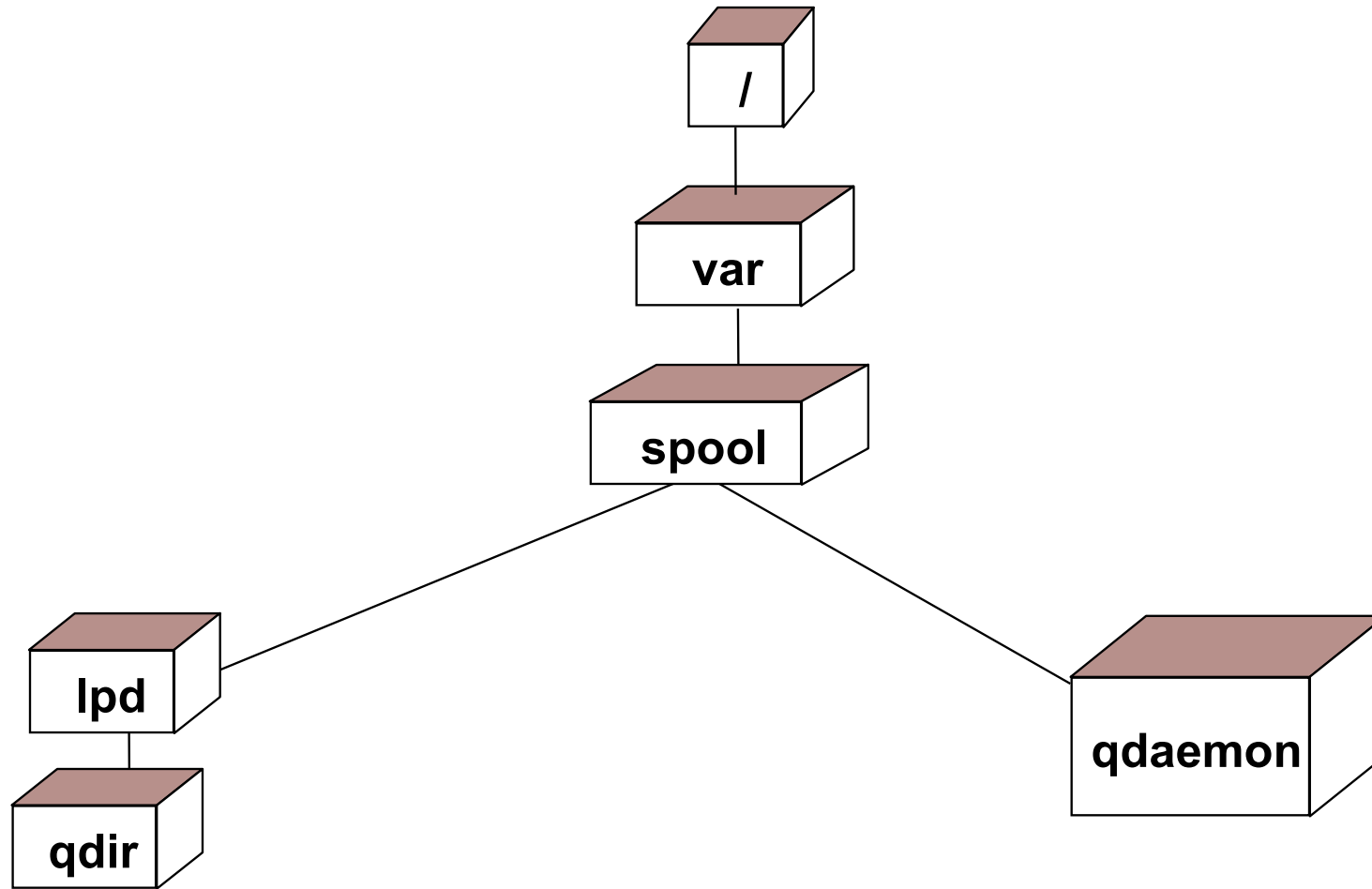
<u>Queue</u>	<u>Dev</u>	<u>Status</u>	<u>Job</u>	<u>Files</u>	<u>User</u>	<u>PP%</u>	<u>Blks</u>	<u>Cp</u>	<u>Rnk</u>
asc	lp0	DOWN							
		QUEUE	11	/etc/qconfigroot			2	1	1
ps	lp0	READY							

```
# qmov -mps -#11
```

```
# qchk -A
```

<u>Queue</u>	<u>Dev</u>	<u>Status</u>	<u>Job</u>	<u>Files</u>	<u>User</u>	<u>PP%</u>	<u>Blks</u>	<u>Cp</u>	<u>Rnk</u>
asc	lp0	DOWN							
ps	lp0	RUNNING	11	/etc/qconfig	root		2	1	1

Printing-related directories to monitor



- Contains queue requests (job description files)

- Temporary copies of enqueued files if spooling

Printing problem checklist

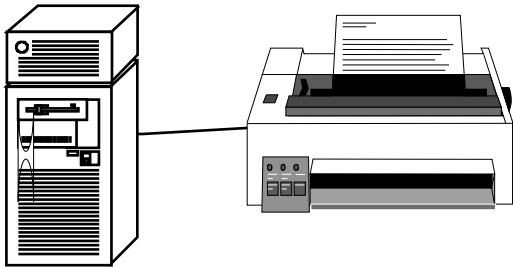
```
# cat file > /dev/lp0
```

Any output?

NO

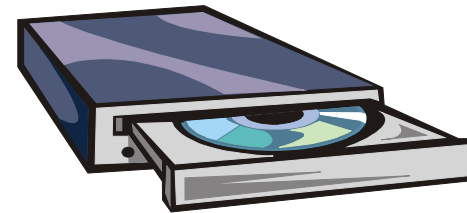
YES

Check hardware



- ✓ Check physical cables
- ✓ Printer online and ready
- ✓ No paper jams
- ✓ Not out of paper

Check software



- ✓ **qdaemon** running
- ✓ Check **/etc/qconfig**
- ✓ Queue enabled
- ✓ **/var** and **/tmp** not full

Checkpoint (1 of 2)

1. True or False? One of the advantages of queues is that each user can have a different default queue set up for them.

- True or False? The **/etc/qconfig** file is read by the backend program to determine what the queue discipline is.

3. True or False? All printer software is automatically installed when you install the base operating system.

4. What is the difference between these two commands?

```
# qprt -Pasc file1  
# qprt -c -Pasc file1
```

Checkpoint solutions (1 of 2)

1. True or False? One of the advantages of queues is that each user can have a different default queue set up for them.
True. This can be accomplished using the **PRINTER** environment variable.
- True or False? The **/etc/qconfig** file is read by the backend program to determine what the queue discipline is.
False. It is read by **qdaemon**.
3. True or False? All printer software is automatically installed when you install the base operating system.
False. Only a handful of printer software is installed by default.
4. What is the difference between these two commands?
 # **qprt -Pasc file1**
 # **qprt -c -Pasc file1**
The **-c** flag produces a spool file.

Checkpoint (2 of 2)

1. What three methods can be used to find out what the system default queue is?
 -
 -
 -
2. What users can bring print queues down?

4. True or False? Once the queue is down, no more jobs can be submitted to the printer.

6. Can users hold all their print jobs in a specific queue? If so, how?

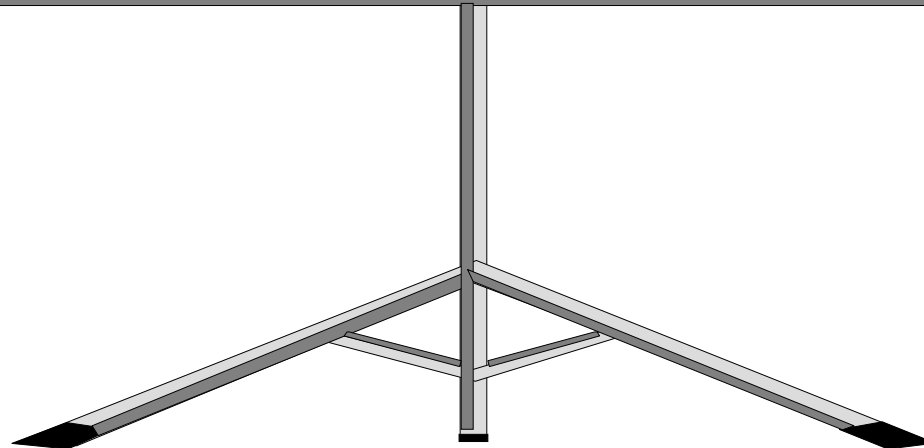
Checkpoint solutions (2 of 2)

1. What three methods can be used to find out what the system default queue is?
 - First entry in **/etc/qconfig** file
 - The output from the **qchk** command with no options
 - The first queue listing from the **lpstat** command
2. What users can bring print queues down?
The **root** user or members of the **printq** group.
4. True or False? Once the queue is down, no more jobs can be submitted to the printer.
False. Jobs can be submitted to the queue. However, they will not be printed until the queue is brought up again.
6. Can users hold all their print jobs in a specific queue? If so, how?
Yes, they can by only specifying a queue name and not individual job numbers.

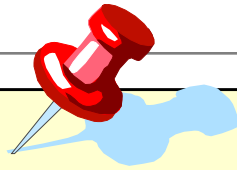
Exercise 18: Printers and queues



- Add a printer and a queue
- Install printer support software (if needed)
- Check the queue
- Change the characteristics of a queue
- Manage jobs in queues
- Troubleshooting printer problems (optional)



Unit summary



- Queues can be added for local or remote printing.
- Queue characteristics can be changed either through SMIT or via high-level commands.
- Queues can be brought up and down by the system administrator.
- The following tasks were considered:
 - Submit and cancel print jobs
 - List the jobs in a queue
 - Hold and release jobs in a queue
 - Move a job from one queue to another
 - Change priorities of a print job