



Printing

CIS 68C1

UNIX System Administration

Printing

- Two Flavors of UNIX Printing
 - × BSD
 - × Red Hat, FreeBSD
 - × Utilities: **lpr**, **lpc**, **lpd**, **lprm**, etc.
 - × Provides printing over the network
 - × System V
 - × Solaris, HP-UX
 - × Utilities: **lp**, **lpadmin**, **lpsched**, etc.
 - × Did not support printing to network printers
 - × However, Sun and HP added this support to their versions

Printing

□ Terminology

✗ Spooler

- ✗ A place where print jobs are queued until they are printed

✗ PDL – Page Description Language

- ✗ Language to abstractly define how images are placed on a page

✗ PostScript

- ✗ Standard, default PDL, developed by and licensed from Adobe
- ✗ Commonly used on UNIX

✗ PCL

- ✗ PDL used by HP printers, developed by HP
- ✗ Commonly used on w/PCs

Printing

□ Terminology

✗ RIP - Raster Image Processor

- ✗ Converts PDL documents to bitmaps for the printer
- ✗ Typically done by the RIP within the printer itself

✗ Bitmap

- ✗ Rows / columns of dots that defines the actual image

✗ Filters

- ✗ Programs that modify or act on print jobs
- ✗ Filters act on jobs in route from print spooler to printer

Printing

□ Printer Classifications

✗ Physical Connection

✗ Serial Port

- ✗ Setup requires knowing baud rates, flags, BIOS settings, etc.
- ✗ Linux device: `/dev/ttySN`

✗ Parallel Port

- ✗ Easier to configure and faster than serial printers
- ✗ Found generally only on PCs
- ✗ Linux device: `/dev/parportN` or `/dev/lpN`

✗ Network

- ✗ Built-in network card, printer attaches to network
- ✗ Many include a built-in **lpd** server

Printing

□ Printer Classifications

✗ Data Format

- ✗ PostScript, PCL, text, or others such as WinPrinter

- ✗ PostScript Printers

 - ✗ Work well with UNIX

 - ✗ UNIX uses the PostScript PDL to print

- ✗ Non-PostScript Printers

 - ✗ Many inkjets, cheap laser printers, old line printers, etc. do not support PostScript

 - ✗ Require translation programs (filters) from PostScript -> printer's data format

Printing

- BSD-Style Printing
 - × De-facto standard
 - × Works well locally or over a network
 - × Supports sharing printers and spoolers
 - × Programs that print end up calling **lpr**
 - × Components
 - × **lpr**
 - × User program used to submit a print job to a printer
 - × **lpd**
 - × Printer daemon that accepts, processes, and transfers jobs to printers

Printing

□ BSD-Style Printing

× Components

× **/etc/printcap**

× Printer configuration file, read by **lpd**

× **lprm**

× Removes print jobs from spool area

× **lpc**

× Administrative printer control program

× **lpq**

× Shows queue of current print jobs

× **lpunlock**

× Red Hat print server unlock script

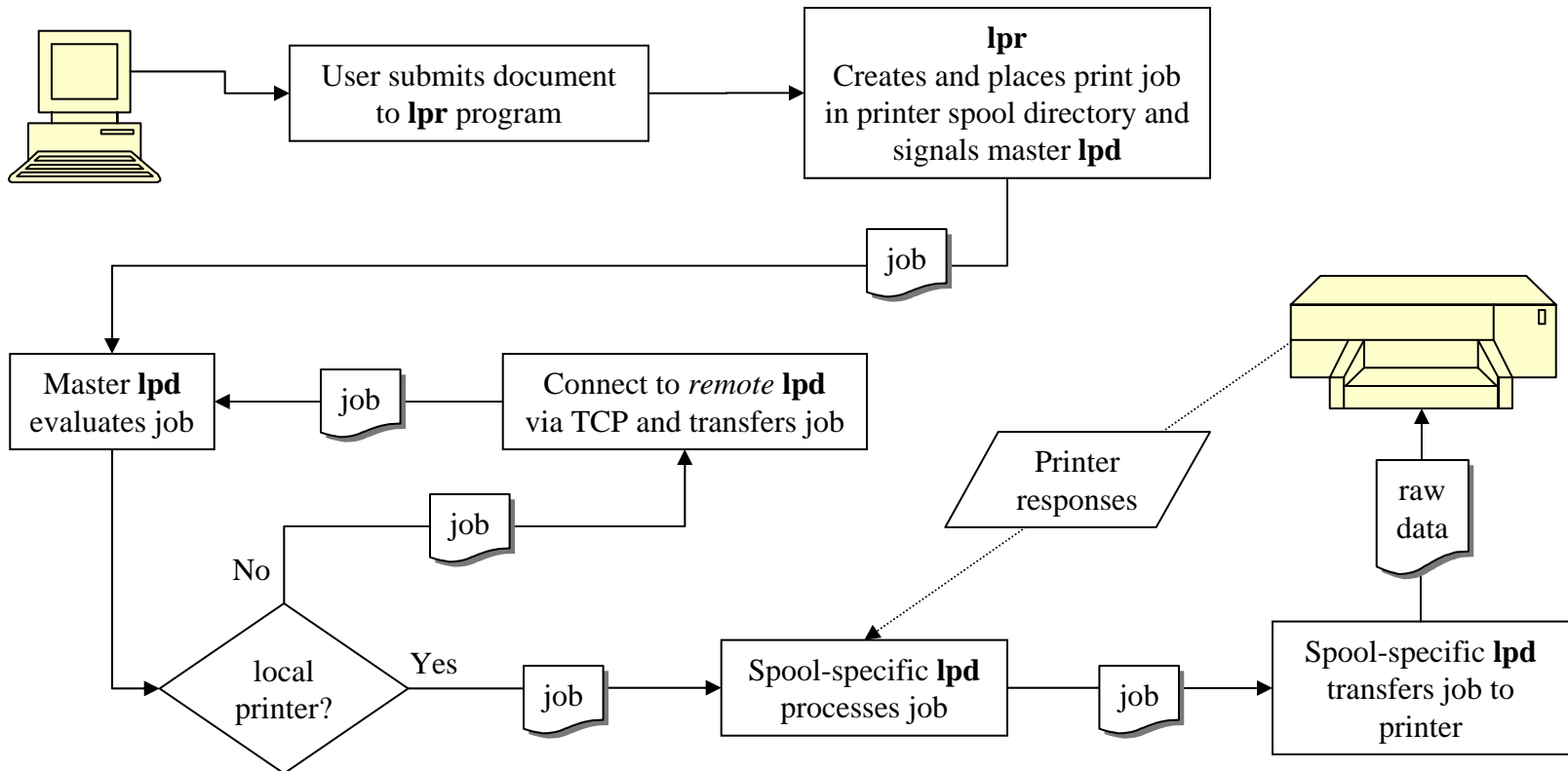
Printing

□ BSD-Style Printing

- ✗ A printer can be selected in one of several ways
- ✗ Prioritized mechanisms for selecting a printer
 - ✗ Program's `-P printername` command line option
 - ✗ Option accepted by printer utilities such as `lpr`, `lprm`, `lpq`, and `lpc` to specify printer
 - ✗ `PRINTER` environment variable
 - ✗ Specifies the name of printer to use for printing
 - ✗ Default printer named **lp** in `/etc/printcap`
 - ✗ First entry in `/etc/printcap`

Printing

□ The Printing Process



Printing

- Configuration - /etc/printcap
 - ✗ Database used by **lpr** & friends to define printers
 - ✗ Note: **printtool** requires **printcap** to be in a precise format
 - ✗ See **man printcap** for full list of capabilities

```
lp|laserwriter|Local laserwriter:\
    :sd=/var/spool/lpd/lp:\
    :mx#0:sh:lp=/dev/parport0:
rlp|remotelp|Remote Printer:\
    :sd=/var/spool/lpd/rlp:\
    :sh:rm=printhead:rp=remotelp:\
    :lpd_bounce=true:mx#0
```

Printing

- Configuration – Red Hat’s **printtool**
 - ✗ The graphical **printtool** makes printer setup and configuration much easier
 - ✗ Vendor-specific
 - ✗ Not available in many other UNIX systems
 - ✗ Modifies the raw database /etc/printcap
 - ✗ Creates necessary spool directories and files
 - ✗ Restarts **lpd** when requested
 - ✗ Only does basic printer setup
 - ✗ More complex needs require manual setup

Printing

- LPRng
 - ✗ Red Hat replaces the BSD package with **LPRng**
 - ✗ Enhanced, replacement print / spooler package
 - ✗ BSD-based
 - ✗ Also has most important System V commands
 - ✗ Backwards compatible with BSD
 - ✗ Features
 - ✗ Increased security
 - ✗ Better diagnostics
 - ✗ Queue management derived from System V **lp** system
 - ✗ Commands have additional functionality and options
 - ✗ The **lpc** control utility is network-aware

Printing

□ Other Printing Systems

× CUPS

- × Cross-platform Common UNIX Printing System
- × Included in Red Hat 7.3

× PDQ

- × Flexible printing system for dynamic environments
- × Simple and reliable