

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

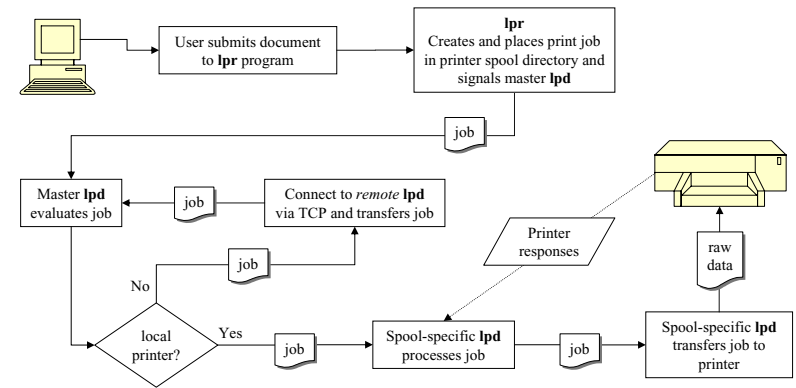
Printing

□ BSD-Style Printing

- ✗ A printer can be selected in one of several ways
- ✗ Prioritized mechanisms for selecting a printer
 - ✗ Program's `-Pprintername` 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/papart0:
rlp|remotelp|Remote Printer:\
:sd=/var/spool/lpd/rlp:\
:sh:rm=printhost: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