LPIC-1 102-500 – Lesson 12

108.4 Manage printers and printing

Linux Printing Systems

All Linux systems use the concept of print queue where all printing jobs are send in a spool. Every print queue represent a physical or virtual printer (e.g “print” to pdf).

- Legacy systems:
  - **System V** printing system (basic command is **lp**)
  - **Berkeley** printing system (protocol **LPD/LPR**)
- Modern systems:
  - **LPRng**: modern implementation of the LPR protocol providing backward compatibility with the Berkeley system
  - **CUPS**: the most populat printing system which supports both legacy systems like System V and Berkeley but also modern protocols like IPP.

System V Printing System

- Used in proprietary Unix systems like SCO and Solaris. ~~OpenSolaris~~ illumos provides a free/open implementation. Its commands are:
- **lp**: printing command available to all users.
- **lpstat**: show the printing queue.
- **cancel**: remove a job from the printing queue.
- **lpadmin**: manage the printing system
- **lpmove**: move a job from one queue (printer) to an other

Berkeley Printing system

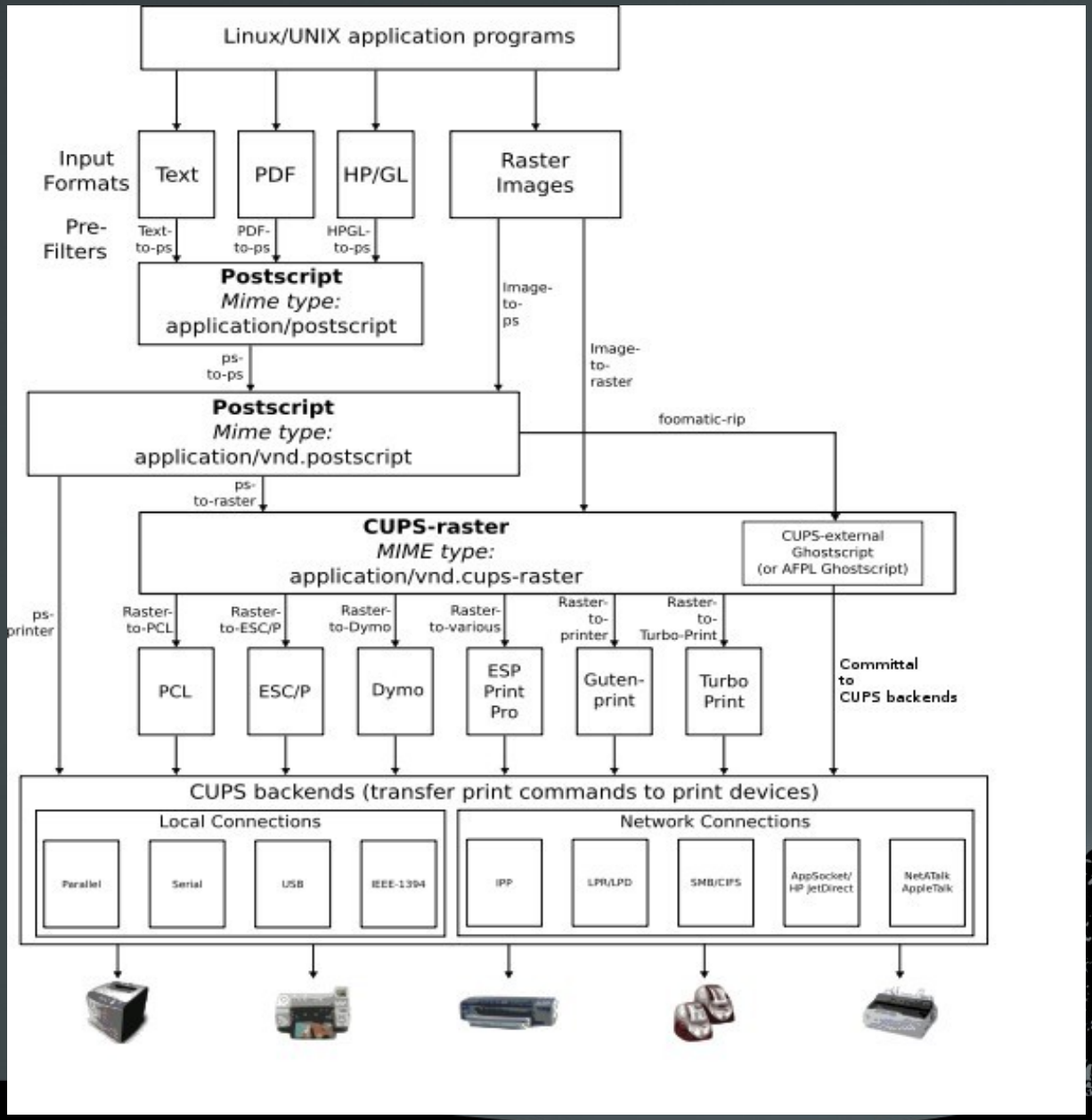
- Developed by the Berkeley Software Distribution (BSD Unix) and inherited by its derivatives: FreeBSD, NetBSD and OpenBSD. Its commands are:
- **lpr**: printing command available to all users.
- **lpq**: show the printing queue.
- **lprm**: remove a job from the queue.
- **lpd**: the printing daemon running the system.

Note: LPRng is a newer generation of the Berkeley Printing System.

Common Unix Printing System – CUPS

- Developed by Apple Inc and it is the default printing system in most Linux distributions.
- Supports local printing with parallel ports (IEEE 1284), serial (RS-232), USB and FireWire (IEEE-1394).
- It supports printing over network and supports legacy systems like System V and BSD but also new protocols like IPP (Internet Printing Protocol), HP Jetdirect (AppSocket), SMB/CIFS and AppleTalk.

CUPS Block Diagram



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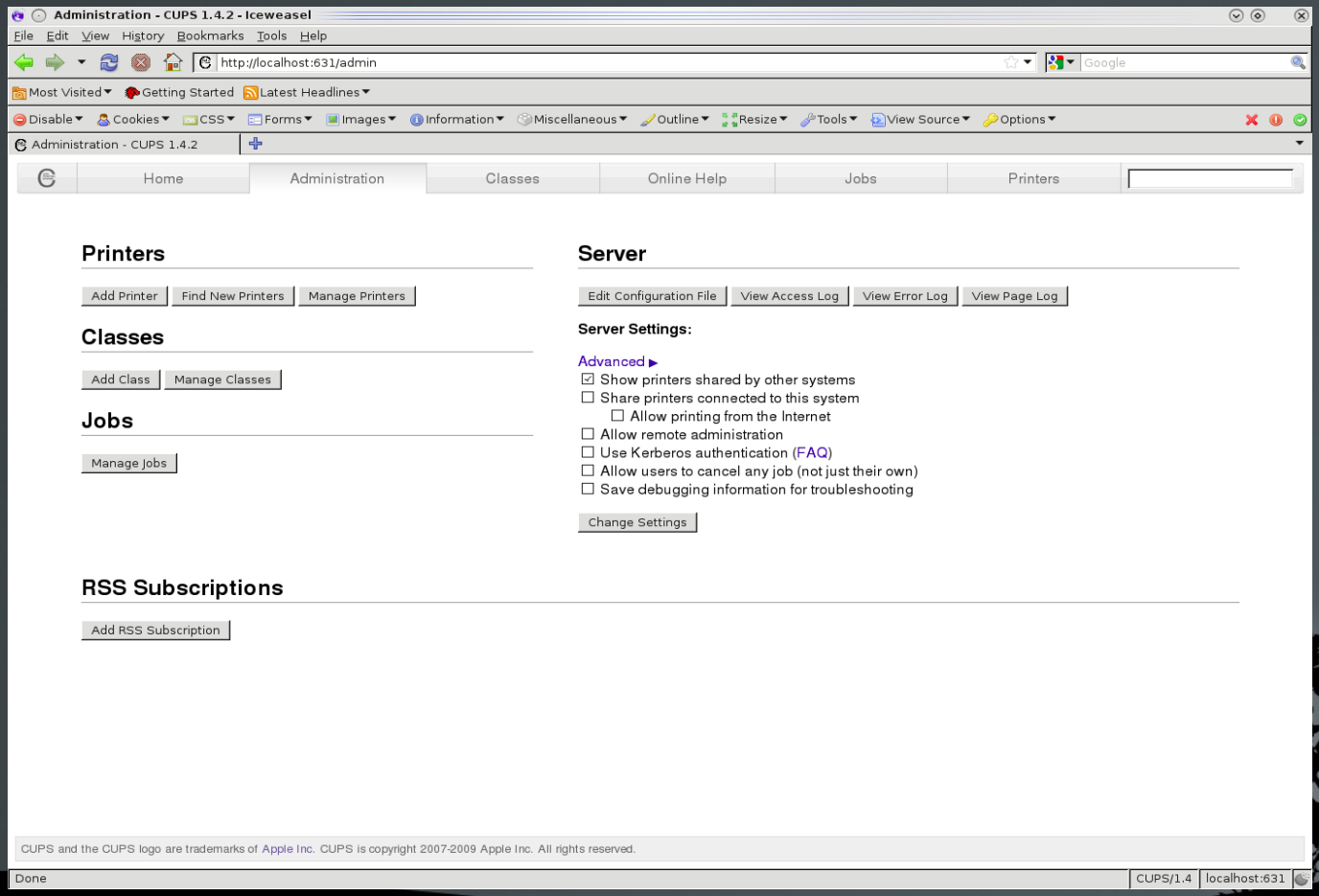
Setting up CUPS

- The standar way of setting up **CUPS** is pointing your browser to its internal web page: Try this address in your browser: **http://localhost:631**



CUPS configuration files

- **/etc/cup/cupsd.conf**: this is the basic CUPS configuration file. Its format is similar to the Apache webserver configuration files.
- **/etc/cups/printers.conf**: this file defines the installed printing queues (printers). It is automatically create and we should not modify it while **cupsd** is running.
- **/etc/printcap**: the is the legacy configuration file of the **BSD** printing systems. **CUPS** preservers this file for backward compatibility with legacy applications. It is automatically created alongside **printers.conf** and we should not modify its contents.

CUPS operation

- **cupsd**: the daemon managing the sytem.
- **/var/spool/cups**: the spool directory of CUPS. This is whete all **print jobs** end up, each one with a different ID.
- **print queues**: this is the logical representation of printers in a system. They are defined in **/etc/cups/printer.conf** and **/etc/printcap**.

CUPS operation

- Supported backends:
  Parallel: e.g. parallel:/dev/lp0
  USB: e.g. usb://hp/lj%2000?serial=adcdef
  IPP: e.g. ipp://prnsrv/laserqueue
  LPD: e.g. lpd://prnsrv/laserqueue
  JetDirect: e.g. socket://prnsrv:9100
  SMB: e.g. smb://user:pass@prnsrv/laserqueue

CUPS operation

- **CUPS Filters**:
  - This system translates the data to be printed to a format understood by the printers.
  - **CUPS** users the **Ghostscript** system which supports formats like **PostScript** and **PDF**.
  - The system reads the information about the printers features and specifications from a PPD (PostScript Printer Description) file, e.g. printing on both sites, color depth, printer drivers, etc.

Printing with `lp`

- **$ lp -d laserj -o media=a4 file** # print the contents of **file** to the **laserj** queue on **A4** paper.
- **$ lp -d laserjet -o cpi=12 -o lpi=8 file** # print the contents of **file** with a density of 12 characters per inch and 8 lines per inch.
- **$ lp -d bar -o scaling=200 image** # print the image file in 200% zoom. That will probably need 4 A$ papers.

Printing with `lpr`

- **$ lpr /etc/fstab** # print file **fstab** to the default queue.
- **$ find /etc -type f | lpr** # print the output of **find** to the default queue.
- **$ lpr -#3 /etc/fstab -Plaserj** # print 3 copies of the **fstab** file in the **laserj** queue.

How print jobs and states with `lpstat`

- **$ lpstat** # show print jobs for the current user.
- # **lpstat** # the root user can see all print jobs in the system.
- # **lpstat -a** # show the print state of all queues.
- # **lpstat -t** # useful troubleshooting information.

Show print jobs with `lpq`

- **$ lpq** # show print jobs in the default queue.
- **$ lpq -l** # show print jobs in long listing.
- **$ lpq -Plaserj** # show print jobs in the **laserj** queue.
- **$ lpq user1** # show print jobs for **user1**.
- **$ lpq -a** # show print jobs in all queues.

Remove print jobs with `cancel`

- **$ cancel 65** # remove job with an ID of 65, of the current user.
- **$ cancel -a laserj** # remove all jobs of the current user from the **laserj** queue.
- **# cancel -a laserj** # remove all jobs from the **laserj** queue.
- **# cancel -a** # remove all jobs from all queues.

Remove print jobs with `lprm`

- **$ lprm 67** # remove job with an ID of 67.
- **$ lprm -** # remove all jobs of the current user.
- # **lprm -Plaserj -** # remove all jobs from the **laserj** queue.
- # **lprm user1** # remove all jobs from **user1**.
- # **lprm -** # remove all jobs from all queues.

Managing printing queues with `lpadmin`

- `# lpadmin -d laserj # set the laserj queue as the default.`
- `# lpadmin -p laserj -o E # enable the laserj queue`
- `# lpadmin -p laserj -o printer-is-shared=true # share the laserj queue with other computers in the network.`
- `# lpadmin -x laserj # delete laserjet queue.`

Note: in BSD systems the **lpc** command had a similar function.

Accept/Reject jobs from queues with `accept/reject`

- `# reject laserj # = cupsreject laserjet.`
  Reject jobs from the **laserj** queue.
- `# accept laserj # = cupsaccept laserjet.`
  Accept jobs to the **laserj** queue.

Enable/Disable queues with `cupsenable/cupsdisable`

- `# cupsdisable laserj # disable the laserj queue. Jobs are accepted but paused.`
- `# cupsenable laserj # enable the laserj queue. Jobs are accepted and printed.`

Other useful commands

- The **lpoptions** command is used to show, set and change printing parameters of the print queues.
- The **lpinfo** shows useful information about queues and their parameters.

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