CIT348 – System Administration

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Printing

Printer Administration

- Being able to print is commonly required by most users on a Linux system
- Printing log files and system configuration information is good procedure
  - In case of a system failure
  - Printing reports
  - Etc.

The Common UNIX Printing System

- Common Unix Printing System (CUPS)
  - Most common printing system used on Linux
- Print job
  - Set of information sent to a printer at the same time
  - Can consist of a file, several files, or the output of a command
- **`lp`** command
  - Sends a print job to a printer
  - E.g.,
    - **`$ lp -d PRINTERNAME -o media=legal -o sides=two-sided-long-edge filename`**
    - Send **filename** to **PRINTERNAME** on legal, two-sided, long-edged (portrait)

CUPS

- CUPS daemon (cupsd)
  - Responsible for printing in CUPS printing system
- Print job ID
  - Print job's unique identifier
  - Assigned by cupsd
- Print queue
  - Directory holding print jobs waiting to be printed
  - Typically /var/spool/cups

CUPS

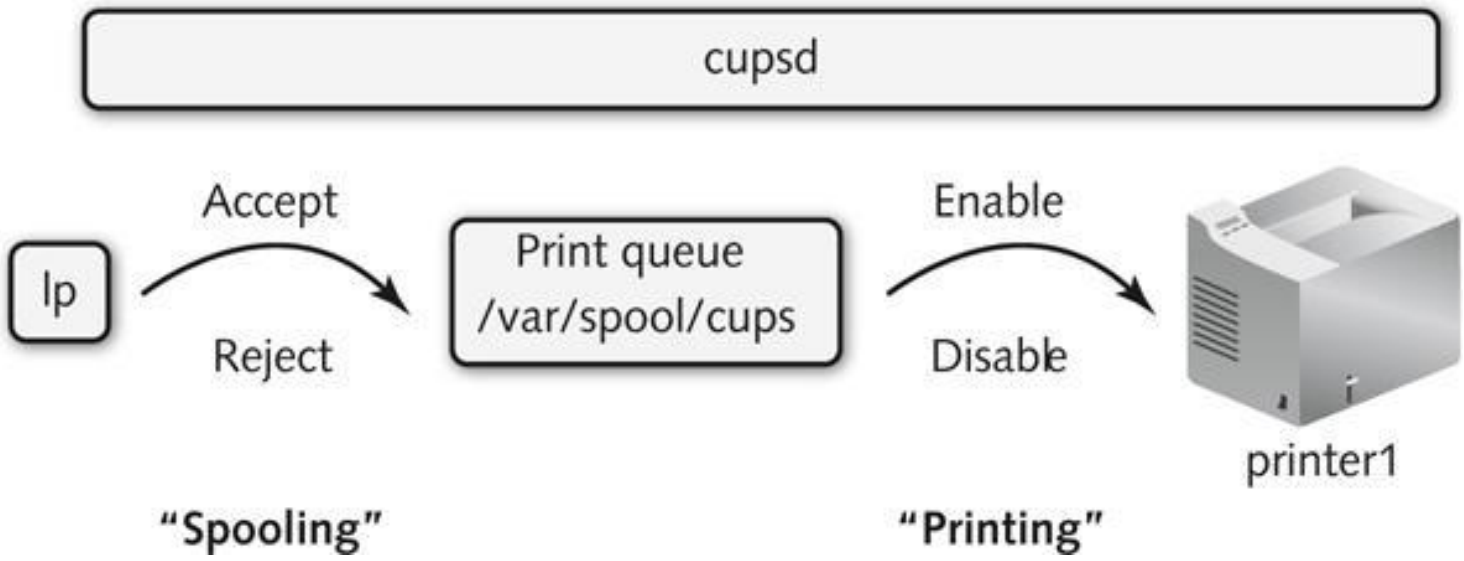

Figure 10-1: The print process

CUPS

- Printer can accept or reject request to print
  - If rejected, CUPS gives an error message
- Spooling or queuing
  - Accepting print jobs into a print queue
- Spooler
  - Software that manages print jobs
  - Receive, store, queue, and sending jobs to printer
  - Run as a daemon process

CUPS

- After a print job is in the print queue
  - If printer is enabled and ready to accept print jobs
    - CUPS daemon sends the print job from the print queue to the printer
  - The copy of the print job is removed from the print queue
  - If printer is disabled, print job remains in the print queue

CUPS

- `lpstat` command: with `-t` (total) option
  - Lists all printers and their status
- `cupsaccept`, `cupsreject`, `cupsenable`, and `cupsdisable` commands:
  - Manipulate the status of a printer
  - `-r` option: used to specify reason for `cupsdisable` and `cupsreject` commands

Local and Network Printers

- Local
  - Directly connected to workstation
  - Parallel connection: /dev/lp*
  - Serial connection: /dev/ttyS*
  - USB connection: /dev/usb/lp*

Local and Network Printers

- Network
  - IPP (internet printing protocol)
    - CUPS addressing: ipp://hostname/ipp
  - LPD (line printer daemon)
    - Connected to host that supports LPD
    - lpd://hostname/queue
  - SMB (service message block)
    - File / print sharing on Windows networks
    - Linux-accessible using Samba
    - smb://servername/sharename → Sharename is printer name
  - Direct networking
    - Printer with built-in networking
    - http://ip_address:port

Installed PDF Printer

- sudo yum install cups-pdf
  - PDF writer
  - “Save as PDF”
  - Accessible as ‘cups-pdf’ when doing these demos
  - Changed output of configuration file to always print to $HOME directory
    - /etc/cups/cups-pdf.conf
    - sudo service cups restart

Managing Print Jobs

- `lp -d` command: print to a specified printer
  - If `-d` option is omitted, prints to default printer
- `lpoptions -d` command: sets default printer
- Each user can set his own default printer
  - Add name of the default printer to .lpoptions file in their home directory
  - Use the PRINTER or LPDEST variable

Demo (some pseudocode here)

```
sudo lpoptions -d Cups-PDF                          (make printer default)

sudo cupsreject-r “testing” cups-pdf
lpstat -t
lp –d Cups-PDF 1.sh
sudo cupsaccept Cups-PDF
sudo cupsenable                                     (if necessary)
lp –d Cups-PDF 1.sh
check $HOME
ls /var/log/cups                                    (show cups-pdf log)

~~~

sudo cupsdisable Cups-PDF
lpstat -t
print
check $HOME
sudo cupsenable Cups-PDF
ls /var/log/cups                                    (show error_log)
```

Managing Print Jobs

Option	Description
`-d printername`	Specifies the name of printer to send the print job.
`-i print job ID`	Specifies a certain print job ID to modify.
`-n number`	Prints a certain *number* of copies.
`-m`	Mails you confirmation of print job completion.
`-o option`	Specifies certain printing options. Common printing options include the following: `cpi=number`—Sets the characters per inch to *number*. `landscape`—Prints in landscape orientation. `number-up=number`—Prints *number* pages on a single page, where *number* is 1, 2, or 4. `sides=string`—Sets double-sided printing, where *string* is either 'two-sided-short-edge' or 'two-sided-long-edge'.
`-q priority`	Specifies a print job priority from 1 (low priority) to 100 (high priority). By default, all print jobs have a priority of 50.

Table 10-1: Common options to the `lp` command

Managing Print Jobs

- `lp` command accepts information from Standard Input
  - You can place the `lp` command at the end of a pipe
- `lpstat` command can list the print jobs in the queue for a printer
- `cancel` command: remove print jobs from print queue
  - Receives print job IDs as arguments
  - `-u` option: remove all the jobs sent by specified user

```
echo “hello class!” | lp -d cups-pd
```

Managing Print Jobs

- `lpadmin` command: perform printer administration
  - e.g., restrict specific user access to specific printers

Option	Description
`-a`	Displays a list of printers that are accepting print jobs
`-d`	Displays the default destination printer
`-o printername`	Displays the print jobs in the print queue for `printername` only
`-p`	Displays a list of printers that are enabled
`-r`	Shows whether the CUPS daemon (scheduler) is running
`-t`	Shows all information about printers and their print jobs

Table 10-2: Common options to the **`lpstat`** command

Common Print Admin Tasks

- Set default
  - Default printer for clients / workers to use
    - **lpadmin –d <printer>**

- Enable/disable/delete printers
  - Enable
    - **cupsenable <printer>**
  - Disable
    - **cupsdisable <printer>**
  - Delete
    - **lpadmin –x <printer>**

Common Print Admin Tasks

- Accept and reject printing jobs
  - Why reject?
    - Printer needs service
  - Reject
    - Complete any print jobs in queue and reject new ones
    - /usr/sbin/reject <printer>
      - (Or cupsreject)
    - lpstat –a <printer> provides status

Common Print Admin Tasks

- Manage privileges
  - Any printer managed by CUPS can accept jobs from users
  - Can specify user or group-level access

  - lpadmin –p <printer> -u allow:fredericks,test-user
  - lpadmin –p <printer> -u deny:test-user2
  - lpadmin –p <printer> -u allow:all
  - lpadmin –p <printer> -u allow:@printergroup

- Why?!?!

Configuring Printers

- /etc/cups/cupsd.conf
  - Contains cupsd settings
- /etc/cups/printers.conf
  - Contains each printer's configuration information
- Be default, the CUPS daemon detects locally connected and network-shared printers
  - Automatically adds an entry for them in the printers.conf file
  - For any printers that the CUPS daemon does not detect and configure, you must add manually

Configuring Printers

- The Printers tool within GNOME desktop can be used to create new printers and manage them
  - Administration -> Printers
- Most comprehensive way to create and manage CUPS printers is by using the CUPS Web administration tool
  - Use a Web browser on TCP port 631

Network Print Server Example

- Setup a web interface to access a print server (CUPS)

1. Modify CUPS configuration file (/etc/cups/cupsd.conf)
2. Update firewall (allow port 631) (/etc/sysconfig/iptables)
   - Restart: sudo /etc/init.d/iptables restart
3. Try out interface

- This is **not** a secure print server! Just to show general process!

Modify CUPS Configuration

- By default, CUPS server configured to run locally
  - /etc/cups/cupsd.conf
    - Enable wheel group
    - Enable remote connections to port 631
    - Add Allow all to each <Location> tag (unrestricted access)
  - Add remote administration
    - cupsctl --remote-admin
  - Restart CUPS service
    - service cups restart
- (Will post to Moodle)

Modify firewall

- **firewall-cmd** acts as a firewall
  - Define which ports are blocked or enabled
  - (We'll talk more in depth later when we discuss Networking)

- For now, we need to enable port 631 for CUPS

1. firewall-cmd --permanent --add-port=631/tcp
2. firewall-cmd --reload

Fields (Administration)

- Printers
  - Physical printer
- Jobs
  - Print job
  - Unique identifier
  - # of copies, priorities, etc.
- Classes
  - Collections of printers
  - Jobs sent to printer class go to first available printer
- RSS Subscription
  - Info about print jobs sent to RSS feed

426 Upgrade Required

- Issue with SSL connection

- Add **DefaultEncryption never** to cupsd.conf
  - (Removes encryption though!)

Installing Desktop Environments

- Let's install 3 things:
  - Xfce – lightweight desktop environment
  - Fluxbox – Window manager
  - KDE – competitor to GNOME

Xfce

- sudo yum groupinstall Xfce
  - groupinstall → installs several packages at once
    - “Group of packages”

Fluxbox

- Window manager, not desktop!
- sudo yum install fluxbox

- Pull in settings:
  - Fluxbox Menu → Tools → Regen Menu

KDE

- sudo yum install kde*
  - Pulls in **everything** kde-related (2.5GB)
  - Remove asterisk if you just want the basic desktop environment

- Desktop environments like KDE also install their own specific programs!
  - Konsole
  - Ksystemlog
  - etc.