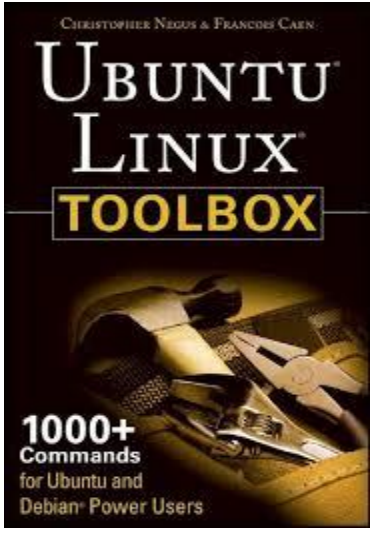
Ubuntu – Linux
Useful commands

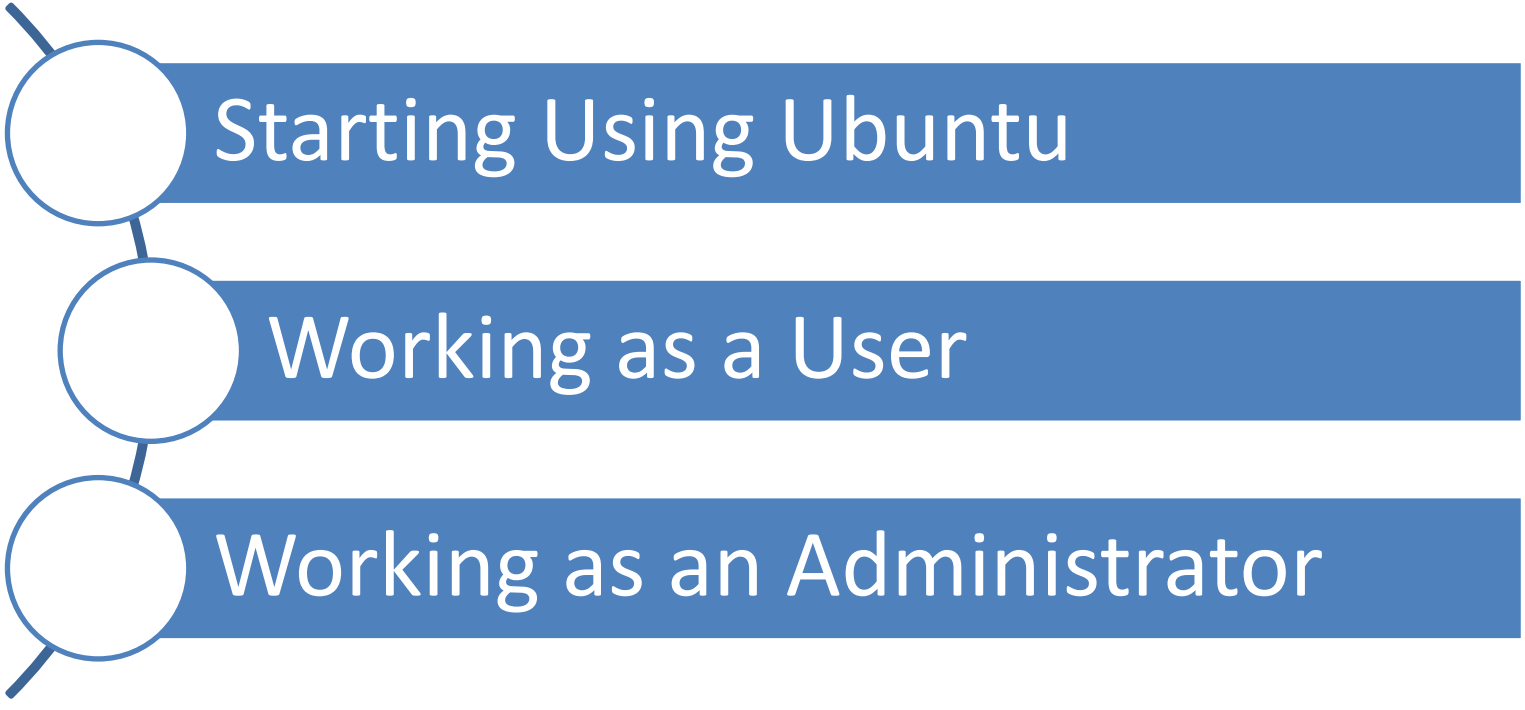


Editor: Nguyen Duc Minh Khoi
Email: ducminhkhoi@gmail.com
Website: http://nguyenducminhkhoi.blogspot.com
HCMC University of Technology @ Summer 2013
Main reference: Ubuntu Linux Toolbox by Christopher Negus François Caen

Forward

- This presentation just give you some basic commands to work with Ubuntu – Linux environment, specially for non-developer users.
- If you want to look more information, search on the Internet with the keyword: “Ubuntu x command” or “Ubuntu + function”
- Please refer to the main reference as much as possible you can
- If you have opportunity, you should buy the main reference book because it explains clearly for you to understand.
- I just give you some examples taken from that book for you to easily lookup as a reference book :D

Contents


Starting Using Ubuntu
Working as a User
Working as an Administrator

Section 1

STARTING USING UBUNTU

Basic Linux Commands

- Every Linux Command have this format:

`NameOfCommand (Options)* (Argument)*`

  – Options usually start with – or -- character

- Using help message:

```
$ ls --help
Usage: ls [OPTION]... [FILE]...
List information about the FILEs (the current directory by default).

$ ls --help | more
...
```

man Command

- **To find information about a command**

```
$ man crontab
Reformatting crontab(1), please wait...
CRONTAB(1)                                                    CRONTAB(1)

NAME
       crontab - maintain crontab files for individual users (V3)
```

Table 1-4: man Command Options

Option	Description
`man -a crontab`	Shows all man page sections, in succession, for `crontab`
`man 5 crontab`	Shows the section 5 man page for `crontab`
`man crontab -P more`	Uses the pager program `more` for paging through the `crontab` man page
`man -f crontab`	Equivalent to the `whatis` command
`man -k crontab`	Equivalent to the `apropos` command

Other useful commands

- Print main page descriptions that match keyword

```
$ apropos route
NETLINK_ROUTE (7)      - Linux IPv4 routing socket
route (8)              - show / manipulate the IP routing table
traceroute6 (8)        - traces path to a network host
$ whatis route
route (8)              - show / manipulate the IP routing table
```

- Using info documents

```
$ info ls
```

Keystroke	Movement
?	Display the basic commands to use in info screens.
Shift+l	Go back to the previous node you were viewing.
n , p, u	Go to the node that is next, previous, or up, respectively.
Enter	Go to the hyperlink that is under the cursor.
Shift+r	Follow a cross reference.
q or Shift+q	Quit and exit from info.

Managing Software with APT

APT Command	What It Does
`sudo apt-get update`	Consults `/etc/apt/sources.list` and updates the database of available packages. Be sure to run this command whenever `sources.list` is changed.
`apt-cache search <keyword>`	Case-insensitive search of the package database for the keyword given. The package names and descriptions are returned where that keyword is found.
`sudo apt-get install <package>`	Download and install the given package name as found in the package database. Starting with APT version 0.6, this command will automatically verify package authenticity for gpg keys it knows about (`http://wiki.debian.org/SecureApt`).

Managing Software with APT (cont.)

`sudo apt-get -d install <package>`	Download the package only, placing it in `/var/cache/apt/archives`.
`apt-cache show <package>`	Display information about the software from the named package.
`sudo apt-get upgrade`	Check updates for all installed packages and then prompt to download and install them.
`sudo apt-get clean`	Removes all cached packages from `/var/cache/apt/archives` to free up disk space.
`sudo apt-get --purge remove <package>`	Remove the named package and all its configuration files. Remove the `--purge` keyword to keep config files.
`apt-cache depends`	Print dependencies for a package (whether it's installed or not).

Managing Software with aptitude

aptitude Command	What It Does
`sudo aptitude`	Starts the curses interface. Use Ctrl+t to access the menu and the q key to quit.
`aptitude help`	Lists help for aptitude usage.
`aptitude search <keyword>`	Lists packages matching the given keyword.
`sudo aptitude update`	Updates the available package indexes from the APT sources.
`sudo aptitude upgrade`	Upgrades all packages in use to their latest versions.
`aptitude show <package>`	Lists information about the given package, installed or not.
`sudo aptitude download <package>`	Downloads the given package, but does not install it.
`sudo aptitude clean`	Removes all downloaded `.deb` files from the `/var/cache/apt/archives` directory.

Managing Software with aptitude (cont.)

aptitude Command	What It Does
`sudo aptitude autoclean`	Removes all outdated `.deb` files from the `/var/cache/apt/archives` directory. This maintains a current cache without filling up the disk.
`sudo aptitude install <package>`	Installs the given package to the system. *Note:* There are several options for selecting specific versions and using wildcards.
`sudo aptitude remove <package>`	Removes the given package from the system.

Important shortcuts with Shell

- Open shell on the new tab: **Ctrl + Shift + t**
- Open new terminal window: **Ctrl + Shift + n**
- Close tab with: **Ctrl + Shift + w**
- Highlight text and copy: **Ctrl + Shift + c**
- Paste it in shame or different window: **Ctrl + Shift + v** or click center button on the mouse
- Full screen mode: **F11**
- Zoom in: **Ctrl + Shift + +**, zoom out: **Ctrl + -**
- Switch among tabs: **Alt + 1, Alt + 2, Alt + 3** and so on
- Exit the shell: **Ctrl + d**
- Switch to another virtual console: **Ctrl + Alt + F1, Ctrl + Alt + F2**

History commands

- List entire history:

```
$ history 5
975  mkdir extras
976  mv *doc extras/
977  ls -CF
978  vi house.txt
979  history
```

- Search for a string in history:

```
# <Ctrl+r>
(reverse-i-search)`ss': sudo /usr/bin/less /var/log/messages
```

Press Ctrl+r repeatedly to **search backwards through your history list** for other occurrences of the ss string.

Redirect stdin and stdout

By default, all output is directed to the screen. Use the greater-than sign (>) to **direct output to a file**. More specifically, you can direct the standard output stream (using >) or standard error stream (using 2>) to a file. Here are examples:

```
$ ls /tmp /tmmp > output.txt
ls: /tmpp: No such file or directory

$ ls /tmp /tmmp 2> errors.txt
/tmp/:
gconfd-fcaen  keyring-b41WuB  keyring-ItEWbz  mapping-fcaen  orbit-fcaen

$ ls /tmp /tmmp 2> errors.txt > output.txt

$ ls /tmp /tmmp > everything.txt 2>&1
```

Redirect stdin and stdout (cont.)

- To append a file instead of overwrite it:

```
$ ls /tmp >> output.txt
```

- Direct output stream to a special bucket file:

```
$ ls /tmp 2> /dev/null
```

- Pipe with ls commands

```
$ ls /tmp | sort
```

- Pipe and redirection combine:

```
$ ls /tmp/ /tmmp 2> /dev/null | sort
```

Using Alias

- List Alias that are currently set:

```
$ alias
alias cp='cp -i'
alias ls='ls --color=auto'
alias mv='mv -i'
alias rm='rm -i'
```

- Define your own alias for the current bash section:

```
$ alias la='ls -la'
```

- Remove an alias:

```
$ unalias la          Unalias the previously aliased la command
$ unalias -a          Unalias all aliased commands
```

- **Remember: Use tab key for suggestions**

Other Useful Commands

- Acquiring Super User Power

```
$ sudo useradd -m joe          As root user, add a new user named joe
$ sudo bash          Open a shell as root user
$ sudo passwd root          Set the root user's password
```

- Using Environment Variable:
  - Display all environment Variable:
  - Set or reset variable yourself:

```
$ ABC=123
$ echo $ABC
123
```

  - Concatenate a string with existing variable:

```
$ export PATH=$PATH:/home/fcaen
```

```
$ set | less
BASH=/bin/bash
COLORS=/etc/DIR_COLORS.xterm
COLUMNS=118
DISPLAY=:0.0
HOME=/home/fcaen
HOSTNAME=einstein
...
```

To list your bash's environment variables:

```
$ env
```

Using regular files

- Regular files consist of data files (documents, music, images, archives, and so on) and commands (binaries and scripts)
- Use the file commands to see some file types:

```
$ cd /usr/share/doc/
$ file doc-base/install-docs.html
doc-base/install-docs.html: XML 1.0 document text
$ file doc-base/copyright
doc-base/copyright: ASCII English text
$ file doc-base/doc-base.html
doc-base/doc-base.html/: directory
```

Using regular files (cont.)

```
$ touch /tmp/newfile.txt          Create a blank file
$ > /tmp/newfile2.txt             Create a blank file
```

Doing a long list on a file is another way to determine its file type. For example:

```
$ ls -l /tmp/newfile2.txt         List a file to see its type
-rw-r--r--  1 chris chris 0 Sep 5 14:19 newfile2
```

- Using directories

```
$ mkdir /tmp/new            Create "new" directory in /tmp
$ mkdir -p /tmp/a/b/c/new   Create parent directories as needed for "new"
$ mkdir -m 700 /tmp/new2    Create new2 with drwx------ permissions
$ file /tmp/new
/tmp/new: directory
$ ls -l /tmp
...
drwxr-xr-x 2 ericfj ericfj 4096 2007-09-11 07:25 new
...
```

Setting File/Directory Permissions

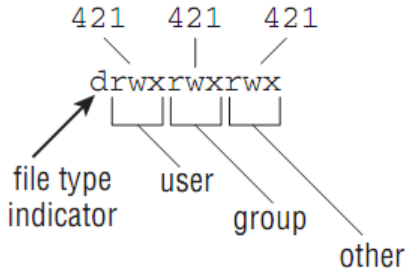


Figure 4-1: Read, write, and execute permissions are set for files and directories.

chmod command (octal or letters)	Original Permission	New Permission	Description
`chmod 0700`	any	`drwx------`	The directory's owner can read or write files in that directory as well as change to it. All other users (except root) have no access.

- Changing permission with chmod

The `-R` option is a handy feature of the `chmod` command. With `-R`, you can recursively change permissions of all files and directories starting from a point in the file system. Here are some examples:

```
$ sudo chmod -R 700 /tmp/test    Open permission only to owner below /tmp/test
$ sudo chmod -R 000 /tmp/test    Close all permissions below /tmp/test
$ sudo chmod -R a+rwx /tmp/test  Open all permissions to all below /tmp/test
```

Setting File/Directory Permissions (cont.)

`chmod 0711`	`any`	`drwx--x--x`	Same as for the owner. All others can change to the directory, but not view or change files in the directory. This can be useful for server hardening, where you prevent someone from listing directory contents, but allow access to a file in the directory if someone already knows it's there.
`chmod go+r`	`drwx------`	`drwxr--r--`	Adding read permission to a directory may not give desired results. Without execute on, others can't view the contents of any files in that directory.
`chmod 0777` `chmod a=rwx`	`any`	`drwxrwxrwx`	All permissions are wide open.
`chmod 0000` `chmod a-rwx`	`any`	`d---------`	All permissions are closed. Good to protect a directory from errant changes. However, backup programs that run as non-root may fail to back up the directory's contents.
`chmod 666`	`any`	`-rw-rw-rw-`	Open read/write permissions completely on a file.
`chmod go-rw`	`-rw-rw-rw-`	`-rw-------`	Don't let anyone except the owner view, change, or delete the file.
`chmod 644`	`any`	`-rw-r--r--`	Only the owner can change or delete the file, but all can view it.

Other useful commands

- Changing ownership

```
$ chown chris test/          Change owner to chris
$ chown chris:market test/   Change owner to chris and group to market
$ chgrp market test/         Change group to market
$ chown -R chris test/       Change all files below test/ to owner chris
```

- The traversing the File System

```
$ cd                  Change to your home directory
$ cd $HOME            Change to your home directory
$ cd ~                Change to your home directory
$ cd ~francois        Change to francois' home directory
$ cd -                Change to previous working directory
$ cd $OLDPWD          Change to previous working directory
$ cd ~/public_html    Change to public_html in your home directory
$ cd ..               Change to parent of current directory
$ cd /usr/bin         Change to usr/bin from root directory
$ cd usr/bin          Change to usr/bin beneath current directory
```

```
$ pwd
/home/francois
```

Other useful commands (cont.)

- Copying files:

```
$ cd ; touch index.html
$ mkdir /tmp/html
$ cp -i index.html /tmp/html/
$ cp -il index.html /tmp //html
$ mkdir /tmp/back
$ cp -a /tmp /html /mp/back/
$ cp -R /tmp /html /tmp/back/
```

  - -a: copying all files, retaining ownership and permission settings

- Finding files with locate

```
$ locate e1000
/lib/modules/2.6.20-16-generic/kernel/drivers/net/e1000
/lib/modules/2.6.20-16-generic/kernel/drivers/net/e1000/e1000.ko
/lib/modules/2.6.20-15-generic/kernel/drivers/net/e1000
/lib/modules/2.6.20-15-generic/kernel/drivers/net/e1000/e1000.ko
/usr/src/linux-headers-2.6.20-16-generic/include/config/e1000
/usr/src/linux-headers-2.6.20-16-generic/include/config/e1000/napi.h
/usr/src/linux-headers-2.6.20-16-generic/include/config/e1000.h
/usr/src/linux-headers-2.6.20-15-generic/include/config/e1000
```

Section 2

WORKING AS A USER

Matching using regular expression

Expression	Matches
`a*`	a, ab, abc, and aecjejich
`^a`	Any "a" appearing at the beginning of a line
`*a$`	Any "a" appearing at the end of a line
`a.c`	Three-character strings that begin with a and end with c
`[bcf]at`	bat, cat, or fat
`[a-d]at`	aat, bat, cat, dat, but not Aat, Bat, and so on
`[A-D]at`	Aat, Bat, Cat, and Dat, but not aat, bat, and so on
`1[3-5]7`	137, 147, and 157
`\tHello`	A tab character preceding the word Hello
`\.[tT][xX][Tt]`	.txt, .TXT, .TxT, or other case combinations

Editing text files with nano Editors

```
$ nano memo.txt          Open memo.txt for editing
$ nano -B memo.txt       When saving, back up previous to ~.filename
$ nano -m memo.txt       Turn on mouse to move cursor (if supported)
$ nano +83 memo.txt      Begin editing on line 83
```

- Control keys for nano

Control Code	Function Key	Description
Ctrl+g	F1	Show help text. (Press Ctrl+x to exit help.)
Ctrl+x	F2	Exit nano (or close the current file buffer).
Ctrl+o	F3	Save the current file.
Ctrl+j	F4	Justify the current text in the current paragraph.
Ctrl+r	F5	Insert a file into the current file.
Ctrl+w	F6	Search for text.
Ctrl+y	F7	Go to the previous screen.

Nano Editors (cont.)

Ctrl+v	F8	Go to the next screen.
Ctrl+k	F9	Cut (and store) the current line or marked text.
Ctrl+u	F10	Uncut (paste) the previously cut line into the file.
Ctrl+c	F11	Display the current cursor position.
Ctrl+t	F12	Start spell checking.
Ctrl+-		Go to selected line and column numbers.
Ctrl+\		Search and replace text.
Ctrl+6		Mark text, starting at the cursor (Ctrl+6 to unset mark).
Ctrl+f		Go forward one character.

Ctrl+b	Go back one character.
Ctrl+Space	Go forward one word.
Alt+Space	Go backward one word.
Ctrl+p	Go to the previous line.
Ctrl+n	Go to the next line.
Ctrl+a	Go to the beginning of the current line.
Ctrl+e	Go to the end of the current line.
Alt+(	Go to the beginning of the current paragraph.

Alt+)	Go to the end of the current paragraph.
Alt+\	Go to the first line of the file.
Alt+/	Go to the last line of the file.
Alt+]	Go to the bracket matching the current bracket.
Alt+=	Scroll down one line.
Alt+-	Scroll up the line.

Listing text file

```
$ cat myfile.txt                          Send entire file to the screen
$ cat myfile.txt > copy.txt               Direct file contents to another file
$ cat myfile.txt >> myotherfile.txt       Append file contents to another file
$ cat -s myfile.txt                       Display consecutive blank lines as one
$ cat -n myfile.txt                       Show line numbers with output
$ cat -b myfile.txt                       Show line numbers only on non-blank lines
```

- Output top 10 lines of a file

```
$ head myfile.txt
$ cat myfile.txt | head
```

- View ends of a file

```
$ tail -n 15 myfile.txt          Display the last 15 lines in a file
$ tail -15 myfile.txt            Display the last 15 lines in a file
```

Searching for Text with grep

- **$ grep francois myfile.txt #Show lines containing francois**
- Recursive search
  - **$ grep -R VirtualHost /etc/httpd/conf***
- Find the exact lines
  - **$ grep -Rn VirtualHost /etc/httpd/conf***
- Ignore the case
  - **$ grep -i selinux /var/log/messages #Search file for selinux (any case)**
- Checking word count with wc
  - **$ wc /var/log/dmesg #List counts for a single file**

436 3847 27984 /var/log/dmesg

Other useful commands

- Sort output with sort
  - **`$ dpkg-query -l | grep kernel | sort #Sort in alphanumeric order`**
  - **`$ dpkg-query -l | grep kernel | sort -r #Sort in reverse alphanumeric order`**
- Replacing text with sed
  - **`$ cat myfile.txt | sed s/francois/chris/`**
  - **`$ sed s/francois/chris/g < myfile.txt > mynewfile.txt`**
- Checking different between 2 files:
  - **`$ diff config config.old`**

Working with audio

- Install sox:

```
$ sudo apt-get install sox
```

Type `sox -h` to see audio formats and effects available to use with `play`:

```
$ sox -h
```

- Using play command:

```
$ play inconceivable.wav     Play WAV file (may be ripped from CD)
$ play *.wav                 Play all WAV files in directory (up to 32)
$ play hi.au vol .6          AU file, lower volume (can lower distortion)
$ play -r 14000 short.aiff   AIFF, sampling rate of 14000 hertz
```

Working with audio (cont.)

- Using ogg123 to play ogg file (install ogg123 package first)

```
$ mpg321 yoursong.mp3                Play MP3 file
$ mpg321 -@ mp3list                  Play songs from playlist of MP3s
$ cat mp3list | mpg321 -@ -          Pipe playlist to mpg321
$ mpg321 -z *.mp3                    Play files in pseudo-random order
$ mpg321 -Z *.mp3                    Same as -z, but repeat forever
```

- Using mpg321 to play mp3 file (install mpg321 package first)

```
$ ogg123 mysong.ogg                  Play ogg file
$ ogg123 /usr/share/example-content/ubuntu\ Sax.ogg  Play example file
$ ogg123 http://vorbis.com/music/Lumme-Badloop.ogg   Play web address
$ ogg123 -z *.ogg                    Play files in pseudo-random order
$ ogg123 /var/music/                 Play songs in /var/music and sub dirs
$ ogg123 -@ myplaylist               Play songs from playlist
```

Working with audio (cont.)

- Convert audio files

The following command concatenates two WAV files to a single output file:

```
$ sox head.wav tail.wav output.wav
```

This command mixes two WAV files:

```
$ soxmix sound1.wav sound2.wav output.wav
```

- Display info about a file

```
$ sox sound1.wav -e stat
Samples read:             208512
Length (seconds):       9.456327
Scaled by:         2147483647.0
Maximum amplitude:      0.200592
Minimum amplitude:     -0.224701
Midline amplitude:     -0.012054
```

- Delete seconds of sound

```
$ sox sound1.wav output.wav trim 4       Trim 4 seconds from start
$ sox sound1.wav output.wav trim 2 6     Keep from 2-6 seconds of file
```

Working with Images

- Install ImageMagick package: `$ apt-get install imagemagick`
- Getting info about images:

```
$ identify p2090142.jpg
p2090142.jpg JPEG 2048x1536+0+0 DirectClass 8-bit 402.037kb
$ identify -verbose p2090142.jpg | less
```

- Converting images:

```
$ convert tree.jpg tree.png      Convert a JPEG to a PNG file
$ convert icon.gif icon.bmp      Convert a GIF to a BMP file
$ convert photo.tiff photo.pcx   Convert a TIFF to a PCX file
```

- Resize image:

```
$ convert -resize 1024x768 hat.jpg hat-sm.jpg
$ convert -sample 50%x50% dog.jpg dog-half.jpg
```

Working with Images (cont.)

- Rotate images:

```
$ convert -rotate 270 sky.jpg sky-final.jpg     Rotate image 270 degrees
$ convert -rotate 90 house.jpg house-final.jpg  Rotate image 90 degrees
```

- Add text to images:

```
$ convert -fill black -pointsize 60 -font helvetica   \
    -draw 'text 10,80 "Copyright NegusNet Inc."'   \
    p10.jpg p10-cp.jpg
```

- Creating thumbnails:

```
$ convert -thumbnail 120x120 a.jpg a-a.png
$ convert -thumbnail 120x120 -border 8 a.jpg a-b.png
$ convert -thumbnail 120x120 -border 8 -rotate 8 a.jpg a-c.png
```

- Making image fun and weird:

```
$ convert -sepia-tone 75% house.jpg oldhouse.png
$ convert -charcoal 5 house.jpg char-house.png
$ convert -colorize 175 house.jpg color-house.png
$ convert -swirl 300 photo.pcx weird.pcx
```

Browse the Web

- Use elinks package to view

```
$ elinks                          Prompts for file name or URL
$ elinks www.handsonhistory.com   Opens file name or URL you request
```

Keys	Description	Keys	Description
Esc (or F9/F8)	Toggle menu on and off (then use arrow keys or mouse to navigate menus).	=	View page information.
Down arrow	Go to next link or editable field on page.	Ctrl+r	Reload pag
Up arrow	Go to previous link or editable field on the page.	a	Bookmark
Right arrow or Enter	Go forward to highlighted link. Enter text in high-lighted form field.	t	Open new
Left arrow	Go back to previous page.	>	Go to next

/	Search forward.	<	Go to previous tab.
?	Search backwards.	c	Close current tab.
n	Find next.	d	Download current link.
N	Find previous.	D	View downloads.
PageUp	Scroll one page up.	A	Add current link to bookmarks.
PageDown	Scroll one page down.	s	View bookmarks.
g	Go to a URL.	v	View current image.
q or Ctrl+c	Exit elinks.	h	View global history manager.

Transferring files

- Download file with wget:

```
$  wget https://help.ubuntu.com/7.04/common/img/headerlogo.png
```

- FTP server requires login and password:

```
$ wget ftp://user:password@ftp.example.com/path/to/file
$ wget --user=user --password=password ftp://ftp.example.com/path/to/file
```

- Download a single webpage

```
$ wget http://www.wiley.com          Download only the Web page
$ wget -p http://www.wiley.com       Download Web page and other elements
$ wget -pk http://www.wiley.com      Download pages and use local file names
$ wget -pkK http://www.wiley.com     Rename to local names, keep original
$ wget -E http://www.aspexamples.com     Append .html to downloaded files
$ wget -m http://www.linuxtoys.net
```

Transferring files (cont.)

- Connect to a FTP server with lftp:

```
$ lftp mirrors.kernel.org                 Anonymous connection
lftp mirrors.kernel.org:~>
$ lftp francois@example.com               Authenticated connection
lftp example.com:~>
$ lftp -u francois example.com            Authenticated connection
Password: ******
lftp example.com:~>
$ lftp -u francois,Mypwd example.com      Authentication with password
lftp example.com:~>
$ lftp                                    Start lftp with no connection
lftp :~> open mirrors.kernel.org          Start connection in lftp session
lftp mirrors.kernel.org:~>
```

Copying remote files with scp

```
$ scp myfile francois@server1:/tmp/        Copy myfile to server1
Password: ******
$ scp server1:/tmp/myfile .               Copy remote myfile to local working dir
Password: ******
$ scp -p myfile server1:/tmp/
```

If the SSH service is configured to listen on a port other than the default port 22, use `-P` to indicate that port on the `scp` command line:

```
$ scp -P 12345 myfile server1:/tmp/       Connect to a particular port
```

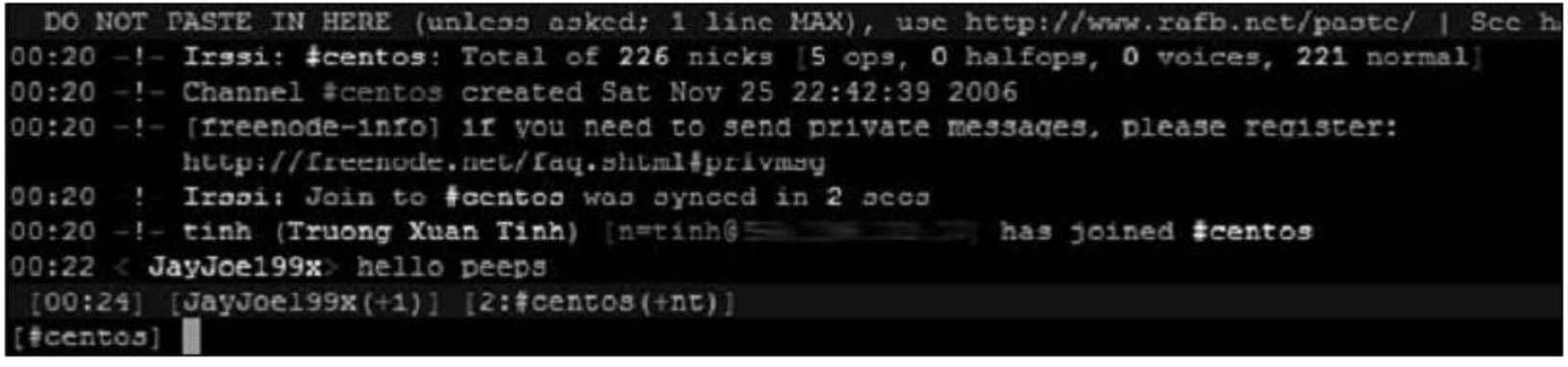
To do recursive copies, from a particular point in the remote file system, use the `-r` option:

```
$ scp -r mydir francois@server1:/tmp/     Copies all mydir to remote /tmp
```

Although `scp` is most useful when you know the exact locations of the file(s) you need to copy, sometimes it's more helpful to browse and transfer files interactively.

Chatting with friends in IRC

- Install IRC package:
```
$ sudo  apt-get install irssi
$ irssi -n JayJoe199x
```
- Connect to freenode server: `/connect chat.freenode.net`
- Joining the centos IRC channel: `/join #centos`



Configuring SSH

- Install OpenSSH: `$ sudo apt-get install openssh-server`
- Logging remote with ssh:

```
$ ssh -l francois myserver
$ ssh francois@myserver
```

- Accessing ssh on different port:

```
$ ssh -p 12345 francois@turbosphere.com   Connect to SSH on port 12345
```

Mastering time

- Your computer running Linux keeps time in two different ways:
  - a system clock (which Linux uses to keep track of time)
  - a hardware clock (that sets the system time when Linux boots up).
- Change current time zone:

```
$ sudo cp /usr/share/zoneinfo/America/Chicago /etc/localtime
```

- Change system date and time

```
$ sudo date 081215212008          Set date/time to Aug. 12, 2:21PM, 2008
Tue Aug 12 11:42:00 CDT 2008
$ sudo date --set='+7 minutes'    Set time to 7 minutes later
Sun Aug 12 11:49:33 CDT 2008
$ sudo date --set='-1 month'      Set date/time to one month earlier
Sun Jul 12 11:50:20 CDT 2008
```

Mastering time (cont.)

- Displaying and Setting on your system clock

```
$ date                              Display current date, time and time zone
Sun Aug 12 01:26:50 CDT 2007
$ date '+%A %B %d %G'               Display day, month, day of month, year
Sunday August 12 2007
$ date '+The date today is %F.'     Add words to the date output
The date today is 2007-08-12
$ date --date='4 weeks'             Display date four weeks from today
Sun Sep  9 10:51:18 CDT 2007
$ date --date='8 months 3 days'     Display date 8 months 3 days from today
Tue Apr 15 10:59:44 CDT 2008
$ date --date='4 Jul' +%A           Display day on which July 4 falls
Wednesday
```

Mastering time (cont.)

- Display dates by month

```
$ cal                    Show current month calendar (today is highlighted)
    August 2007
Su Mo Tu We Th Fr Sa
           1  2  3  4
 5  6  7  8  9 10 11
12 13 14 15 16 17 18
19 20 21 22 23 24 25
26 27 28 29 30 31
```

```
$ cal -j                 Show Julian calendar (numbered from January 1)
August 2007
Sun Mon Tue Wed Thu Fri Sat
                213 214 215 216
217 218 219 220 221 222 223
224 225 226 227 228 229 230
231 232 233 234 235 236 237
238 239 240 241 242 243
```

```
$ cal 2007               Show whole year's calendar
                              2007
       January                  February                 March
Su Mo Tu We Th Fr Sa   Su Mo Tu We Th Fr Sa   Su Mo Tu We Th Fr Sa
    1  2  3  4  5  6                1  2  3                1  2  3
 7  8  9 10 11 12 13    4  5  6  7  8  9 10    4  5  6  7  8  9 10
14 15 16 17 18 19 20   11 12 13 14 15 16 17   11 12 13 14 15 16 17
21 22 23 24 25 26 27   18 19 20 21 22 23 24   18 19 20 21 22 23 24
28 29 30 31            25 26 27 28            25 26 27 28 29 30 31
```

Mastering time (cont.)

- View the current time from hardware clock:

```
$ hwclock -r              Display current hardware clock settings
Sun 12 Aug 2007 03:45:40 PM CDT   -0.447403 seconds
```

- Reset your system clock:

```
$ sudo hwclock --hctosys      Reset system clock from hardware clock
```

- Set hardware clock from system clock:

```
# hwclock --systohc      Reset hardware clock from system clock
```

- Using network time:

```
$ sudo apt-get install ntp   Install ntp package if necessary, start the service
$ sudo ntpdate pool.ntp.org
15 Aug 00:37:12 ntpdate[9706]:
adjust time server 66.92.68.11 offset 0.009204 sec
```

Section 3

WORKING AS AN ADMINISTRATOR

File system basics

- The **ext3** file system type is based on the **ext2** file system type, adding a feature called journaling to its predecessor.
- Journaling can improve data integrity and recovery, especially after unclean system shutdowns.
- Time-consuming file system checks are avoided during the next reboot after an unclean shutdown, because the changes that occurred since the most recent write to disk are saved and ready to be restored.

Work with partitions

```
$ sudo fdisk -l                          List disk partitions for every disk
Disk /dev/sda: 82.3 GB, 82348277760 bytes
255 heads, 63 sectors/track, 10011 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes
```

- Work with specific disk:

```
$ sudo fdisk /dev/sda              Start interactive fdisk session with disk 1
Command (m for help): m            Type m to list help text as shown
Command action
   a   toggle a bootable flag
```

- Copying partition tables with sfdisk:

```
$ sudo sfdisk -d /dev/sda > sda-table       Back up partition table to file
$ sudo sfdisk /dev/sda < sda-table          Restore partition table from file
$ sudo sfdisk -d /dev/sda | sfdisk /dev/sdb Copy partition table from disk to disk
```

- Creating and using swap partition:

```
$ sudo mkswap /dev/sda1              Format sda1 as a swap partition
Setting up swapspace version 1, size = 205594 kB
```

Listing Active Process

- Use **ps** and **top** commands

```
$ ps                    List processes of current user at current shell
 PID TTY          TIME CMD
2552 pts/0    00:00:00 bash
3438 pts/0    00:00:00 ps
$ ps -u chris           Show all chris' running processes (simple output)
PID   TTY  TIME COMMAND
2678  tty1 0:00 startx
2689  tty1 0:00 xinit
2710  tty1 0:06 gnome-session
  ...
$ ps -u chris u         Show all chris' running processes (with CPU/MEM)
USER    PID %CPU %MEM   VSZ   RSS TTY   STAT START TIME COMMAND
chris  2678  0.0  0.0  4328   852 tty1  S+   Aug14 0:00 /bin/sh startx
chris  2689  0.0  0.1  2408   488 tty1  S+   Aug14 0:00 xinit
chris  2710  0.0  1.1 22016  5496 tty1  S    Aug14 0:06 gnome-session
```

Listing Active Process (cont.)

```
$ pstree            Show processes alphabetically in tree format
init-+-Xorg
     |-at-spi-registry
     |-atd
     |-auditd-+-audispd
     |        `-{auditd}
 ...
     |-sshd-+-sshd---sshd---bash---pstree
     |      |-sshd---sshd---bash---su---bash
     |      `-sshd---sshd---bash---su---bash---su---bash---vim
 ...
```

- Custom view Processes:

```
$ ps -eo ppid,user,%mem,size,vsize,comm --sort=-size        Sort by mem use
 PPID USER     %MEM    SZ    VSZ COMMAND
    1 root     27.0 68176  84264 yum-updatesd
```

```
$ ps -U chris,francois -o pid,ruser,tty,stat,args  See info for 2 users
  PID RUSER    TT       STAT COMMAND
 1010 chris    pts/0    Ss   -bash
 5951 francois pts/1    Ss+  /bin/bash
```

Watching active Process with top

```
$ top
top - 01:39:43 up 4 days,  1:53,  6 users,  load average: 1.25, 1.08, 1.11
Tasks: 119 total,   1 running, 117 sleeping,   0 stopped,   1 zombie
Cpu(s): 46.8% us,  3.3% sy,  0.0% ni, 49.5% id,  0.0% wa,  0.3% hi,  0.0% si
Mem:    482992k total,   472688k used,    10304k free,    24312k buffers
Swap:  5863716k total,   534512k used,  5329204k free,    68072k cached

  PID USER      PR  NI  VIRT  RES  SHR S %CPU %MEM    TIME+  COMMAND
 2690 root      15   0  344m  76m 7116 S 32.2 16.2   2349:08 X
 2778 chris     15   0 16212 7992 4836 S  1.7  1.7   4:30.61 metacity
22279 chris     15   0  227m 109m  23m S  1.0 23.3  34:34.00 firefox-bin
```

```
$ top -d 5          Change update delay to 5 seconds (from default 3)
$ top -u francois   Only see processes of effective user name francois
$ top -p 190,2690   Only display processes 190 and 2690
$ top -n 10         Refresh the screen 10 times before quitting
$ top -b            Run in non-interative non-screen-oriented mode
```

Finding and Controlling Processes

- Using grep:

```
$ pgrep init          Show PID for any process including 'init' string
1
2689

$ pgrep -l init       Show PID and name for any process including 'init' string
1 init
2689 xinit
```

- Using fuser

```
$ fuser -mauv /boot       Verbose output of processes with /boot open
                     USER        PID ACCESS COMMAND
/boot/grub/:         root       3853 ..c.. (root)bash
                     root      19760 ..c.. (root)bash
                     root      28171 F.c.. (root)vi
                     root      29252 ..c.. (root)man
                     root      29255 ..c.. (root)sh
                     root      29396 F.c.. (root)vi
```

Changing Running Process

- Adjust process priority with nice
  - nice value that can be used to tell the Linux process scheduler what priority should be given to that process.
  - The default nice value is 0. You can use the nice command to run a process at a higher or lower priority than the default. The priority number can range from –20 (most favorable scheduling priority) to 19 (least favorable scheduling priority).
  - Although the root user can raise or lower any user's nice value, a regular user can only lower the priorities of a process (setting a higher nice value).
  - See current nice value

```
$ nice                  Run nice to determine current niceness
0
```

  - Changing nice value:

```
$ sudo nice -n -10 gimp                    Launch gimp at higher priority
```

Changing Running Process (cont.)

- Changing process nice value:

```
$ renice +2 -u francois                    Renice francois' processes +2
$ renice +5 4737                           Renice PID 4737 by +5
$ sudo renice -3 `pgrep -u chris spamd`    Renice chris' spamd processes -3
9688: old priority -1, new priority -3
20279: old priority -1, new priority -3
20282: old priority -1, new priority -3
```

- Running process in background and foreground

```
$ gimp                          Run gimp in the foreground
<Ctrl+z>                        Stop process and place in background
[1]+  Stopped       gimp
$ bg 1                          Start process running again in backgroun
$ fg 1                          Continue running process in foreground
gimp
<Ctrl+c>                        Kill process
```

Changing Running Process (cont.)

- Manage background jobs:

```
$ jobs                  Display background jobs for current shell
[1]    Running              gimp &
[2]    Running              xmms &
[3]-   Running              gedit &
[4]+   Stopped              gtali
$ jobs -l               Display PID with each job's information
[1]  31676 Running             gimp &
[2]  31677 Running             xmms &
[3]- 31683 Running             gedit &
[4]+ 31688 Stopped             gtali
$ jobs -l %2            Display information only for job %2
[2]  31677 Running             xmms &
```

- Kill process:

```
$ kill 28665            Send SIGTERM to process with PID 28665
$ kill -9 4895          Send SIGKILL to process with PID 4895
$ kill -SIGCONT 5254    Continue a stopped process (pid 5254)
```

Monitoring Resources

- First install sysstat package: `$ sudo apt-get install sysstat`
- See how much memory is being used

```
$ free              List memory usage in kilobytes (-k default)
             total       used       free     shared    buffers     cached
Mem:        742476     725108      17368          0     153388     342544
-/+ buffers/cache:     229176     513300
Swap:      1020116         72    1020044
$ free -m           List memory usage in megabytes
             total       used       free     shared    buffers     cached
Mem:           725        706         18          0        148        333
-/+ buffers/cache:        223        501
Swap:          996          0        996
$ free -b          List memory usage in blocks
             total       used       free     shared    buffers     cached
Mem:    760295424  742510592   17784832          0  157114368  350765056
-/+ buffers/cache: 234631168  525664256
Swap: 1044598784      73728 1044525056
$ free -mt       List memory usage with totals displayed (Swap + Mem)
             total       used       free     shared    buffers     cached
Mem:           725        708         16          0        149        334
-/+ buffers/cache:        223        501
Swap:          996          0        996
Total:        1721        708       1013
$ free -g          List memory usage in gigabytes
$ free -s 5        Continuously display memory usage every 5 seconds
```

Monitoring Resources (cont.)

- View memory used over a give period:

```
$ vmstat 3
procs -----------memory--------- --swap-- ----io---- --system-- -----cpu-----
 r  b   swpd   free  buff  cache  si   so   bi    bo   in   cs us sy id wa st
 1  0  97740  32488  3196 148360   0    0    0     1   26 3876 85 15  0  0  0
 1  1  98388   7428  3204 151472   0  216    0   333   30 3200 82 18  0  0  0
 1  0 113316   8148  2980 146968   0 4980    4  5121   79 3846 77 23  0  0  0
```

- View info about processor itself

```
$ cat /proc/cpuinfo      View CPU information from /proc
processor       : 0
vendor_id       : AuthenticAMD
cpu family      : 6
model           : 4
model name      : AMD Athlon(tm) processor
stepping        : 4
```

Monitoring Resources (cont.)

- List info about disk reads and writes

```
$ vmstat -d          Display disk read, write, and input/output statistics
disk- ------------reads------------ ------------writes-------- -----IO------
      total merged  sectors      ms   total  merged sectors ms       cur  sec
  ...
sda 332773  74844 19022380 2524211 245477 3473801 29758560 37140075   0 1372
sdb  79963 253716  2646922 2158000  76044  977122  8428140 12489809   0  506

$ vmstat -p sda1      Display read/write stats for a disk partition
sda1          reads       read sectors  writes    requested writes
              174060       12993689       2778      22224
```

Managing network interface card

- Use ethtool command:

```
$ ethtool -h |  less          View options to the ethtool command
$ sudo ethtool eth0                  See settings for NIC at eth0
Settings for eth0:
        Supported ports: [ TP MII ]
        Supported link modes:   10baseT/Half 10baseT/Full
                                100baseT/Half 100baseT/Full
        Supports auto-negotiation: Yes
        Advertised link modes:  10baseT/Half 10baseT/Full
$ sudo ethtool -i eth0      Display driver information for NIC
driver: e1000
version: 7.3.15-k2-NAPI
firmware-version: 0.5-7
bus-info: 0000:04:00.0
```

Managing network interface card (cont.)

```
$ sudo ethtool -S eth0      Show statistics for NIC at eth0
NIC statistics:
     rx_packets: 1326384
     tx_packets: 773046
     rx_bytes: 1109944723
     tx bytes: 432773480
```

```
$ sudo ethtool -s eth0 speed 100 duplex full autoneg off  Change NIC settings
```

```
$ netstat -i              Get network interface statistics for eth0
Kernel Interface table
Iface MTU Met RX-OK RX-ERR RX-DRP RX-OVR TX-OK TX-ERR TX-DRP TX-OVR Flg
eth0 1500 0 1757208      6      0      0 996834     4      0      0 BMRU
```

```
$ watch netstat -i        Refresh network statistics (screen oriented)
Every 2.0s: netstat -i                          Wed Aug 22 01:55:48 2007

Kernel Interface table
Iface MTU Met RX-OK RX-ERR RX-DRP RX-OVR TX-OK TX-ERR TX-DRP TX-OVR Flg
eth0 1500 0 1757208      6      0      0 996834     4      0      0 BMRU
```

Ethernet connection

- Show address info and status of eth0 Ethernet interface:

```
$ ifconfig eth0
eth0      Link encap:Ethernet  HWaddr 00:D0:B7:79:A5:35
          inet addr:10.0.0.155  Bcast:10.0.0.255  Mask:255.255.255.0
          inet6 addr: fe80::2d0:b7ff:fe79:a535/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:1413382 errors:6 dropped:0 overruns:0 frame:6
          TX packets:834839 errors:4 dropped:0 overruns:0 carrier:4
          collisions:0 txqueuelen:1000
          RX bytes:1141608691 (1.0 GiB)  TX bytes:470961026 (449.1 MiB)
```

- Get information both active and inactive NICs `$ ifconfig -a`

```
$ ip addr show eth0
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast qlen 1000
    link/ether 00:d0:b7:79:a5:35 brd ff:ff:ff:ff:ff:ff
    inet 10.0.0.155/24 brd 10.0.0.255 scope global eth0
    inet6 fe80::2d0:b7ff:fe79:a535/64 scope link
       valid_lft forever preferred_lft forever
```

Ethernet connection (cont.)

- See info on all interfaces: `$ ip a`

```
$ ip help              View ip usage statement
Usage: ip [ OPTIONS ] OBJECT { COMMAND | help }
       ip [ -force ] [-batch filename
where  OBJECT := { link | addr | route | rule | neigh | ntable | tunnel|
                   maddr | mroute | monitor | xfrm }
       OPTIONS := { -V[ersion] | -s[tatistics] | -r[esolve] |
                    -f[amily] { inet | inet6 | ipx | dnet | link } |
                    -o[neline] | -t[imestamp] }
$ ip addr help      View help for the addr object
$ ip route help     View help for the route object
$ ip tunnel help    View help for the tunnel object
```

Troubleshooting network problems

- Make sure there is IP - connectivity to that gateway

```
$ ping 10.0.0.1
PING 10.0.0.1 (10.0.0.1) 56(84) bytes of data.
64 bytes from 10.0.0.1: icmp_seq=1 ttl=64 time=0.382 ms
64 bytes from 10.0.0.1: icmp_seq=2 ttl=64 time=0.313 ms
64 bytes from 10.0.0.1: icmp_seq=3 ttl=64 time=0.360 ms
64 bytes from 10.0.0.1: icmp_seq=4 ttl=64 time=1.43 ms
$ ping -a 10.0.0.1          Add an audible ping as ping progresses
$ ping -c 4 10.0.0.1        Ping 4 times and exit (default in Windows)
$ ping -q -c 5 10.0.0.1     Show summary of pings (works best with -c)
$ sudo ping -f 10.0.0.1          Send a flood of pings (must be root)
$ ping -i 3 10.0.0.1        Send packets in 3-second intervals
$ sudo ping -I eth0 10.0.0.1  Set source to eth0 (use if multiple NICs)
PING 10.0.0.1 (10.0.0.1) from 10.0.0.155 eth0: 56(84) bytes of data.
$ sudo ping -I 10.0.0.155 10.0.0.1   Set source to 10.0.0.155
```

Troubleshooting network problems (cont.)

- Check your default gateway:

```
$ ip route
10.0.0.0/24 dev eth0  proto kernel  scope link  src 10.0.0.155
169.254.0.0/16 dev eth0  scope link
default via 10.0.0.1 dev eth0
```

- Tracing route to host:

```
$ traceroute boost.turbosphere.com  Follow the route taken to a host
traceroute to boost.turbosphere.com (66.113.99.70),30 hops max,40 byte packets
 1  10.0.0.1 (10.0.0.1)  0.281 ms  0.289 ms  0.237 ms
 2  tl-03.hbci.com (64.211.114.1)  6.213 ms  6.189 ms  6.083 ms
 3  172.17.2.153 (172.17.2.153)  14.070 ms  14.025 ms  13.974 ms
 4  so-0-3-2.ar2.MIN1.gblx.net (208.48.1.117)  19.076 ms  19.053 ms 19.004 ms
 5  so1-0-0-2488M.ar4.SEA1.gblx.net(67.17.71.210)94.697 ms 94.668 ms 94.612ms
 6  64.215.31.114 (64.215.31.114)  99.643 ms  101.647 ms  101.577 ms
 7  dr02-v109.tac.opticfusion.net(209.147.112.50)262.301ms 233.316ms 233.153 ms
 8  dr01-v100.tac.opticfusion.net (66.113.96.1) 99.313 ms 99.401 ms 99.353 ms
 9  boost.turbosphere.com (66.113.99.70)  99.251 ms  96.215 ms  100.220 ms
```

Display netstat connections

```
$ ip route show                 Display basic routing information
10.0.0.0/24 dev eth0  proto kernel  scope link  src 10.0.0.195
169.254.0.0/16 dev eth0  scope link
default via 10.0.0.1 dev eth0
$ ip route                      Display basic routing (example #2)
$ ip r                          Display basic routing (example #3)
$ netstat -s | less         Show summary of TCP, ICMP, UDP activities
$ sudo netstat -tanp            View active TCP connections
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address  Foreign Address  State  PID/Program name
tcp        0      0 127.0.0.1:631  0.0.0.0:*        LISTEN 2039/cupsd
tcp        0      0 127.0.0.1:25   0.0.0.0:*        LISTEN 2088/sendmail
$ sudo netstat -uanp           View active UDP connections
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address     Foreign Address State PID/Program name
udp        0      0 0.0.0.0:631       0.0.0.0:*             2039/cupsd
udp        0      0 192.168.122.1:123 0.0.0.0:*             2067/ntpd
```

Working with user and groups

- Adding user accounts:

```
$ useradd -D              Show useradd default values
GROUP=100                 Set group ID to 100 (users)
HOME=/home                Set base home directory to /home
INACTIVE=-1               Password expiration is disabled (-1)
EXPIRE=                   Don't set date to disable user account
SHELL=/bin/sh             Set the default shell to /bin/bash
SKEL=/etc/skel            Copy default config files from /etc/skel to $HOME
CREATE_MAIL_SPOOL=no      Create a mail spool directory
```

- Create new users with home directory: /home/willz

```
$ sudo useradd -m willz
```

- Add password:

```
$ sudo passwd horatio
Changing password for user horatio
New UNIX password: ********
Retype new UNIX password: ********
passwd: all authentication tokens updated successfully.
```

Working with user and groups (cont.)

```
$ sudo useradd -u 1101 -g 1300 skolmes   Use specific UID and GID for user
$ sudo useradd -m -d /home/jj jones      Create /var/x/jj home directory
$ sudo useradd -G support,sales timd     Add user to support and sales groups
$ sudo useradd -c "Tom G. Lotto" tlot    Add user's full name to comment field
$ sudo useradd -s /bin/tcsh joeq         Assign a new default shell (tcsh); you
                                           must install this shell
$ sudo useradd -e 2008-04-01 jerry       Add account to expire April 01, 2008
$ sudo useradd -f 0 jdoe                 Create a disabled account
$ sudo useradd -s /sbin/nologin billt    Keep user from shelling in
$ sudo useradd billyq                    Prevent creation of home directory, no -m
$ groups francois                  List the groups that a user belongs to
francois ftpusers
$ useradd -D                             List default settings for useradd
$ sudo useradd -D -b /home2 -s /bin/csh  Set default base dir and shell
$ sudo useradd -D -e 2009-01-01          Set all new users to expire in 2009
```

Modifying User account

```
$ sudo usermod -c "Thomas Lotto" tlot  Change user's name in comment field
$ sudo usermod -s /bin/sh joeq         Change default shell to sh
$ sudo usermod -L swanson              Lock the user account named swanson
$ sudo usermod -U travis               Unlock user account named travis
$ chsh -s /bin/sh                   Change current user's shell to /bin/sh
$ sudo chsh -s /bin/sh francois     Change a user's shell to /bin/sh
$ sudo chfn \
      -o "B-205"           \       Change office number
      -h "212-555-1212"     \      Change home phone number
      -w "212-555-1957"            Change office phone number
$ finger francois
Login: francois                          Name: Francois Caen
Directory: /home/francois               Shell: /bin/bash
Office: B-205, 212-555-1212          Home Phone: 212-555-1957
On since Sat Aug  4 13:39 (CDT) on tty1    4 seconds idle
No mail.
No Plan.
```

Modifying User account (cont.)

```
# userdel jimbo                 Delete user, not user's home directory
# userdel -r lily               Delete user, home directory, and mail spool
$ passwd                                    Change a regular user's own password
Changing password for user chris.
Changing password for chris.
(current) UNIX password: ********
New UNIX password: *
BAD PASSWORD: it's WAY too short
New UNIX password: *********
Retype new UNIX password: *********
passwd: password updated successfully
$ sudo passwd joseph                        Root can change any user's password
Changing password for user joseph.
New UNIX password: *
Retype new UNIX password: *
passwd: password updated successfully
```

Managing passwords

```
$ sudo passwd -l carl            Lock the user account (carl)
Locking password for user carl.
passwd: Success
$ sudo passwd -u carl            Unlock a locked user account (carl)
Unlocking password for user carl.
passwd: Success
$ sudo passwd -u jordan          Fails to unlock account with blank password
Unlocking password for user jordan.
passwd: Warning: unlocked password would be empty.
passwd: Unsafe operation (use -f to force)
$ sudo passwd -n 2 vern        Set minimum password life to 2 days
$ sudo passwd -x 300 vern      Set maximum password life to 300 days
$ sudo passwd -w 10 vern       Warn of password expiration 10 days in advance
$ sudo passwd -i 14 vern       Days after expiration account is disabled
$ sudo chage -l vern                 View password expiration information
Last password change                                    : Aug 04, 2007
Password expires                                        : May 31, 2008
Password inactive                                       : Jun 14, 2008
Account expires                                         : never
```

Working with groups

```
$ sudo groupadd marketing          Create new group with next available GID
$ sudo groupadd -g 1701 sales      Create new group with GID of 1701
$ sudo groupadd -o -g 74 mysshd    Create group with existing GID

$ sudo groupmod -g 491 myadmin     Modify myadmin to use GID 491
$ sudo groupmod -n myad myadmin    Change name of myadmin group to myad
$ sudo groupdel myad               Remove existing myad group
```

- Getting info about user log on system:

```
$ last                    List the most recent successful logins
greek    tty3                      Sun Aug  5 18:05   still logged in
chris    tty1                      Sun Aug  4 13:39   still logged in
root     pts/4        thompson     Sun Aug  5 14:02   still logged in
chris    pts/1        :0.0         Sat Aug  4 15:47   still logged in
jim      pts/0        10.0.0.50    Fri Aug  3 13:46 - 15:40  (01:53)
francois pts/2                     Thu Aug  2 11:14 - 13:38 (2+02:24)
$ last -a                 Makes it easier to read the remote client hostname
```

Checking on Users

```
$ sudo  lastb              List the most recent unsuccessful logins
julian   ssh:notty    ritchie          Mon Aug  6 12:28 - 12:28  (00:00)
morris   ssh:notty    thompson         Tue Jul 31 13:08 - 13:08  (00:00)
baboon   ssh:notty    10.0.0.50        Sun Jul  8 09:40 - 09:40  (00:00)
francois ssh:notty    000db9034dce.cli Fri Jun 22 17:23 - 17:23  (00:00)
$ who -u                   List who is currently logged in (long form)
greek    tty3    2007-08-05 18:05 17:24    18121
jim      pts/0   2007-08-06 12:29   .      20959 (server1.example.com)
root     pts/3   2007-08-04 18:18 13:46    17982 (server2.example.com)
$ id                  Your identity (UID, GID and group for current shell)
uid=1000(chris) gid=1000(chris) groups=4(adm),20(dialout),24(cdrom),25(floppy),
29(audio),30(dip),44(video),46(plugdev),104(scanner),112(netdev),113(lpadmin),
115(powerdev),117(admin),1000(chris)
$ who am i            Your identity (user, tty, login date, location)
chris    pts/0       Aug 3 2140 (:0.0)
$ finger -s chris     User information (short)
Login    Name          Tty    Idle    Login Time    Office    Office Phone
chris    Chris Negus   tty1     1d    Aug  4 13:39  A-111     555-1212
```

Khoi Nguyen (ducminhkhoi@gmail.com) @ HCMUT 2013

THANKS FOR WATCHING