Tutorial on Linux Basics

KARUNYA LINUX CLUB
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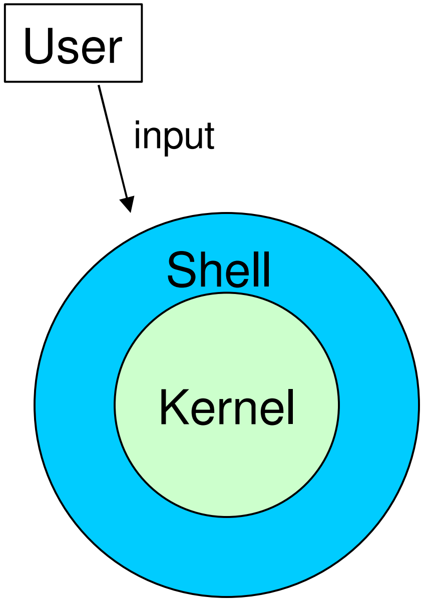
Outline

1. Overview of Linux System
2. Basic Commands
3. Relative & Absolute Path
4. Redirect, Append and Pipe
5. Permission
6. Process Management
7. Install Software
8. Text Editor

Overview of Linux System

Kernel & Shell

- Linux is operating system (OS).
- Linux system is described as kernel & shell.
- Kernel is a main program of Linux system.It controls hard wares, CPU, memory, hard disk, network card etc.
- Shell is an interface between user and kernel. Shell interprets your input as commands and pass them to kernel.



Linux Overview (cont.)

Multi-user & Multi-process

- Many people can use one machine at the same time.

File & Process

- Data, directory, process, hard disk etc (almost everything) are expressed as a file.
- Process is an running program identified by a unique id (PID).

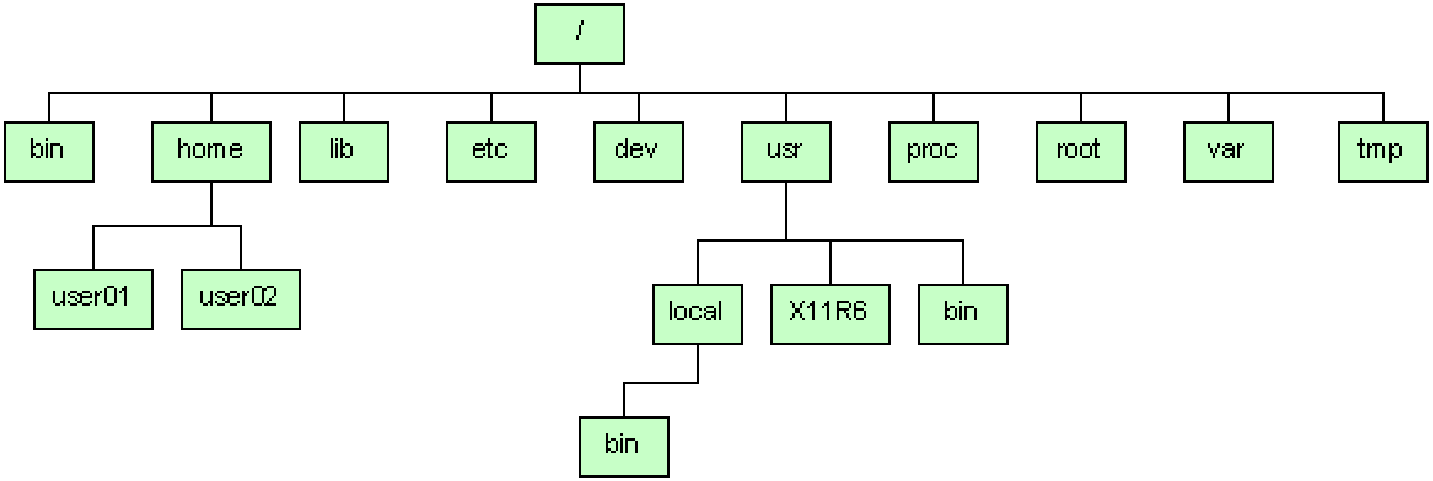
Linux Overview (cont.)

Directory Structure

- Files are put in a directory.
- All directories are in a hierarchical structure (tree structure).
- User can put and remove any directories on the tree.
- Top directory is “/”, which is called slash or root.
- Users have the own directory. (home directory)

Linux Overview (cont.)

Directory Structure



Linux Overview (cont.)

Important Directories

- /bin This contains files that are essential for correct operation of the system. These are available for use by all users.
- /mnt Provides a location for mounting devices,such as remote filesystems and removable media
- /home This is where user home directories are stored.
- /var This directory is used to store files which change frequently, and must be available to be written to.
- /etc Various system configuration files are stored here.

Linux Overview (cont.)

Important Directories

- /dev This contains various devices as files, e.g. hard disk, CD-ROM drive, etc.
- /root This is the root (administrator) user's home directory
- /sbin Binaries which are only expected to be used by the super user.

- /tmp Temporary files.
- /boot Has the bootable Linux kernel and boot loaderconfiguration files(GRUB)
- /usr Contains user documentation,games,graphical files,libraries(lib),etc..

Linux Overview (cont.)

Normal user and Super user

- In Linux system, there is one special user for administrator, which can do anything.
- This special user is called root or superuser.

Case Sensitivity

- Linux like UNIX is case-sensitive.
- MYFILE.doc, Myfile.doc, mYfiLe.Doc are different.

Online Manual

- Linux has well-written online manuals.

Basic Commands

How to run commands

- When you log on Linux machine, you will see,

```
[cswug@hyperion001 cswug]$
```

- One command consists of three parts, i.e. command name, options, arguments.

Example)

```
[cswug~]$ command-name  optionA optionB  argument1  argument2
```

Basic Commands

How to run commands

- Between command name, options and arguments, space is necessary.

- Opitions always start with “-”

- Example)

```
cd  ..
ls  –l  .bashrc
mv  fileA  fileB
```

Basic Commands

Commands

ls	show files in current position
cd	change directory
cp	copy file or directory
mv	move file or directory
rm	remove file or directory
pwd	show current position
mkdir	create directory
rmdir	remove directory
cat	display file contents
less	display file contents pagewise
man	display online manual

Basic Commands

<u>Commands</u>

su	switch user
passwd	change password
useradd	create new user account
userdel	delete user account
mount	mount file system
umount	unmount file system
df	show disk space usage
shutdown	reboot or turn off machine

Practice Basic Commands

1. Type following command in your directory.

```
ls
ls –a
ls –la
ls -Fa
```

2. Make a directory

```
mkdir linux
pwd
cd linux
pwd
cd
pwd
rmdir linux
```

3. In your home directory,

```
ls  .bash_profile
cp  .bash_profile  sample.txt
less  sample.txt  (note: to quit less, press “q”)
rm  sample.txt
```

4. Try to change your password,

```
passwd username
```

(Type current password once, then
type new password twice. You don’t have to change password here. Just a practice)

5. check disk space usage

```
df
df -h
```

Relative & Absolute Path

- Path means a position in the directory tree.
- To express a path, you can use relative path or absolute path.
- In relative path expression, the path is not defined uniquely, depends on your current path.
- In absolute path expression, the path is defined uniquely, does not depend on your current path.

Relative & Absolute Path

- Characters used in relative path

  .   current directory

  ..   parent directory

- Example)

```
cd ..
./a.out
```

- Absolute path starts with “/”

- Example)

```
    cd  /home/user01
   /home/root/a.out
```

Relative & Absolute Path

- Use relative path.
  In home directory, type

  ```
  pwd
  cd .
  pwd
  cd ..
  pwd
  cd ..
  pwd
  cd
  ```

- Use absolute path.
  In home directory, type

  ```
  pwd
  cd /home/cswug
  pwd
  cd /home
  pwd
  cd /
  pwd
  cd /home/cswug
  ```

Redirect, Append and Pipe

Redirect and append

- Output of command is displayed on screen.
- Using “>”, you can redirect the output from screen to a file.
- Using “>>” you can append the output to the bottom of the file.

Pipe

- Some commands require input from a file or other commands.
- Using “|”, you can use output from other command as input to the command.

Redirect, Append and Pipe

Commands

- head show first several lines and omit other lines.
- tail show last several lines and omit other lines.
- grep show lines matching a pattern

Redirect, Append and Pipe

- In home directory, type

```
ls .bash_profile
cp .bash_profile sample.txt
less sample.txt
```

- Use redirect.

```
head -3 sample.txt
head -3 sample.txt > redirect.txt
```

- Use append.

```
tail -3 sample.txt
tail -3 sample.txt >> redirect.txt
less redirect.txt
```

- Use pipe.

```
less redirect.txt
grep PATH redirect.txt
tail redirect.txt | grep PATH
rm sample.txt
rm redirect.txt
```

Permission

- All of files and directories have owner and permission.
- There are three types of permission, readable, writeable and executable.
- Permissions are given to three kinds of group. owner, group member and others.

Example)

```
[cswug@hyperion001 cswug]$ ls -l .bash_profile
 -rw-r--r--    1 cswug    cswug         191 Jan  4 13:11 .bash_profile
```

- r: readable, w:writable, x: executable

Permission

Command

- chmod   change file mode, add or remove permission
- chown   change owner of the file

Example)

```
chmod a+w filename
      add writable permission to all users
chmod o-x  filename
      remove executable permission from others
```

- u: user (owner),   g: group, o: others a: all

Permission

- Check permission

  ```
  ls –l .bash_profile
  cp .bash_profile sample.txt
  ls –l sample.txt
  ```

- Remove readable permission from all.

  ```
  chmod a-r sample.txt
  ls –l sample.txt
  less sample.txt
  ```

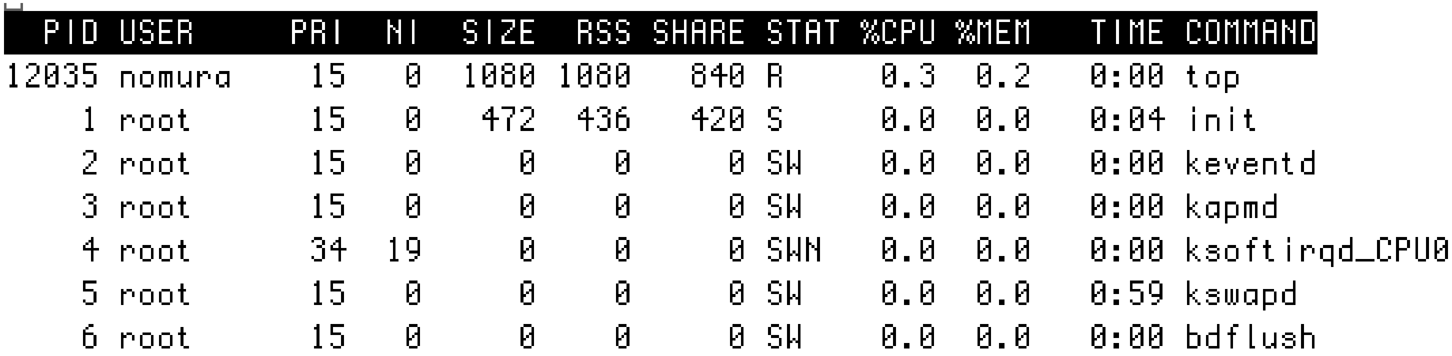
- Add readable & writable premissions to file owner.

  ```
  chmod u+rw sample.txt
  ls –l sample.txt
  less sample.txt
  rm sample.txt
  ```

Process Management

- Process is a unit of running program.
- Each process has some informations, like process ID, owner, priority, etc.

Example) Output of “top” command



```
  PID USER     PRI  NI  SIZE  RSS SHARE STAT %CPU %MEM   TIME COMMAND
12035 nomura    15   0  1080 1080   840 R     0.3  0.2   0:00 top
    1 root      15   0   472  436   420 S     0.0  0.0   0:04 init
    2 root      15   0     0    0     0 SW    0.0  0.0   0:00 keventd
    3 root      15   0     0    0     0 SW    0.0  0.0   0:00 kapmd
    4 root      34  19     0    0     0 SWN   0.0  0.0   0:00 ksoftirqd_CPU0
    5 root      15   0     0    0     0 SW    0.0  0.0   0:59 kswapd
    6 root      15   0     0    0     0 SW    0.0  0.0   0:00 bdflush
```

Process Management

Commands

- kill *Sends specified signal to specified process.This* process is specified by process ID.
- killall Stop a program. The program is specified by command name.
- ps Show process status
- top Show system usage statistics

Process Management

- Check your process.

  ps

  ps –u

- Check process of all users.

  top (To quit top, press “q”)

  ps –e

  ps –ef

- Find your process.

  ps –ef | grep cswug