

Workshop on Essentials of Linux Operating System

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File System Commands

About directories

Present working directory

```
#pwd
```

How to change directory?

```
#cd destination_path
```

.

current directory

..

parent of current directory

Short list of files

```
#ls
```

Long list of files

```
#ls -l
```

Long List

type, permission, owner, group, size, date, name

List of all files (including hiddens)

```
#ls -a
```

Create Files and Directories

Create an empty file

```
#touch path
```

Create an empty directory

```
#mkdir path
```

Remove a file

```
#rm path
```

Remove a directory

```
#rm -r Path
```

Copy Files and Directories

Copy files

```
#cp 1.txt 2.txt
```

Copy directories

```
#cp -r dir1 dir2
```

Copy directories and view the progress

```
#cp -v dir1 dir2
```

Move Files and Directories

Move files

```
#mv 1.txt 2.txt
```

Move directories

```
#mv dir1 dir2
```

Move directories and view the progress

```
#mv -v dir1 dir2
```

Rename (replace) a file or directory?

```
#mv path1 path2
```

Shell Special Features

Wildcards

*

Representing zero or more characters

?

Representing one character

[]

Specify range for a Single character

{ }

Specify of a set of options, seperated by commas

Wildcards Examples

*.txt

All files with .txt extension

ab*.txt

Name begins with "ab" and have .txt extension

cp -r dir1/* dir2

Copy all files and directories in dir1 to dir2

a?c.txt

Beginning with "a", ending in "c", .txt extension

1 a[1-4]b.txt

Beginning with "a", ending in "b", numbers in between

a1b.txt, a2b.txt, a3b.txt, a4b.txt

a[1-9][0-9].txt

Beginning with "a", have .txt extension

a10.txt, ..., a99.txt

touch a{1,b,hello}.txt

Create files a1.txt, ab.txt, ahello.txt

Shell Redirections

>

Redirect Output

<

Redirect Input

>>

Append to end of file

&&

Run multiple commands, one after one

|

Output of one command as input of another one

Editing Files Using Vim

Vim Modes

Insert mode

Normal Mode

Visual Mode

Press Esc

Press :

Normal Mode

y

d

p

u

Ctrl+r

G

100G

gg

Command-line Mode

:w

:q

:q!

:wq

Search in Vim

/"str"

N

n

Press i to change mode to Insert mode

Moving and modification of text

Press v to change mode to visual

Change to Normal Mode.

Change to Command-line mode

yank (copy) one line to memory

copy current line to memory, then remove it

paste previously copied lines from memory

undo one previous modification

redo one previous undo modification

go to end of the file

go to line 100 of the file

go to first line of the file

write changes to file

quit file if nothing has been changed

quit without considering changes to file

write changes to file and quit

search for string 'str' in text

find previous search result

find next search result

Editing Files using Emacs

Basic Operations

Open	(Ctrl-c Ctrl-f)
Close	(Ctrl-x Ctrl-c)
Copy	(Alt-w)
Cut	(Ctrl-w)
Paste	(Ctrl-y)
Save	(Ctrl-c Ctrl-s)

Moving Around

Previous	Ctrl-p
Next	Ctrl-n
Before	Ctrl-b
Forward	Ctrl-f
First of file	Alt-<
End of file	Alt->

Manage Windows

Unsplit All	Ctrl-x 1
Split Window Below	Ctrl-x 2
Split Window Right	Ctrl-x 3

Search	(Ctrl-s Ctrl-r)
Replace	(Alt-%)

cat, Concatenate Files Easily

Append 1.txt and 2.txt to 3.txt

Dump 1.txt and 2.txt to 3.txt

Viewing Files

less

less -N

head

head -n

head -v

tail

tail -n

tail -v

Searching

find

find / -name "pattern"

find /home -name "*.txt"

find /home -maxdepth 1

find /home -type d

locate

locate "pattern"

locate -b "\pattern"

sudo updatedb

grep

grep -e "ptr"

grep -i

grep -n

grep -c

grep -v

```
#cat 1.txt 2.txt >> 3.txt
```

```
#cat 1.txt 2.txt > 3.txt
```

Print input in another page

Print input in a page with line number

Print first 10 lines of a file

Print first n lines of a file

Print file name

Print last 10 lines of a file

Print last n lines of a file

Print file name

Search by pattern and characteristics of target file

Search / and all subdirectories for "pattern"

Search /home and all subdirectories .txt files

List all files in /home directory

List files in /home with type *directory*

Find by names

Search for files whose name matches the "pattern"

Search for files whose name equals "pattern"

Update database files which will be used by `#locate`

Search for a pattern among lines

ptr = search for pattern 'ptr' in input strings

Case insensitive search

Print number of matched lines

Count number of matched lines

Search for non-matching lines

Ownership and Permissions

Ownership

Change owner

Change owner and group

Change group

Change owner of directory recursively

Each file belongs to an owner and a group

```
#chown owner fileName
```

```
#chown owner:group fileName
```

```
#chgrp group fileName
```

```
#chmod -R owner dirName
```

Permissions

Permission

Permissions

Each file has a set of permissions for each user

Three operations: Read, Write, and Execute

Octal value for each permission

Read

4

Write

2

Execute

1

Possible permission sets

7

read + write + execute

6

read + write

5

read + exec

4

read only

3

write + execute

2

write only

1

execute only

0

nothing

Change permissions

```
#chmod 755 1.txt
```

```
#chmod 755 1.txt
```

```
#chmod 755 1.txt
```

```
#chmod owner_group_others path
```

Change permissions for file 1.txt

full permission (7=4+2+1) for owner

read and execute (5=4+0+1) for group and others

Processes

Processes

How to print a list of running processes?

How to find pid by processName?

How to have list of processes at every moment?

How to terminate a process?

Machine code + Memory + PID

#ps -aux

#pidof process_name

#top

#kill -9 pid

Users and Group

Each user has a user id

Each group has a group id

uid

gid

List of all users on system

Each line is /etc/passwd

List of all groups on system

Each line in /etc/group

Current user?

Current user?

How to add a user?

How to add a group?

Modify a user account

Switch user

Execute a command as another user

/etc/passwd

name:password:uid:gid:username:home:shell

/etc/group

group_name : password : gid : userlist

#whoami

#id

#useradd

#groupadd

#usermod

#su

#sudo

Environmental Variables

Shell Variable

Environmental Variable

Only available to the current shell

Available to current shell and its children

Access to Remote Machine

SSH (Secure shell)

Connect to 192.168.89.100 as *root*

Runing script on remote machine

SCP

Copy directory to remoteMachine

SFTP

SFTP example

winSCP (ftp, scp, sftp)

Putty

Install New Applications

Installing using *apt* Package Manager

Search for a package

Install an application

Remove an application

Reinstall an application

update repository database

Upgrade all packages

Upgrade distribution

List of all installed pacakges

Add a new repository

Installing using Binary Package

Install package using *Debian Package Mgr.*

Fix broken package dependencies

Install Using Source Code

Extract Package

Read README file in Installation Package

Change Permissions for executive file

Run the executive file

Access to shell on remote machine

```
#ssh username@host (ssh root@192.168.89.100)
```

```
# ssh username@host 'bash -s' < localScript.sh
```

Secure Copy Protocol

```
#scp -r path-on-localHost destination-on-remoteMachine
```

Secure File Transfer Protocol

```
#sftp username@host
```

Access remotely to Linux from Windows (Graphical)

Provide a remote shell on Linux machines

```
#apt-cache search
```

```
#apt-get install
```

```
#apt-get remove
```

```
#apt-get install --reinstall
```

```
#apt-get update
```

```
#apt-get upgrade
```

```
#apt-get dist-upgrade
```

```
#apt list
```

```
#add-apt-repository
```

```
#dpkg -i pathToPackage
```

```
#apt-get install -f
```

```
#tar -xzf packageName.tar.gz
```

```
#chmod 755 exec_file
```

```
#./exec_file
```