

shell prompt

Super User
\$ normal user

simple commands

date display current date and time
cal display current month calendar
df displays disk usages
free display memory usage

Navigation

cd change the current diretcory
ls list the directory

cd - : change to previous working directory
cd ~username : change to home directory

Exploring Filesystem

file Determine file type
less view file contents

ls
-l diplay in long format
-h human readable
-a list all files even those hidden,
-d directory
-F option will append an indictor charactor
to the end of listed names
-r display result in reverse order
-S sort by file Size
-t modification time

Manipulating Files and Directories

cp copy the files
mv move the files from one folder to
other
mkdir creates a directory
rm remove files and directories

Manipulating Files and Directories (cont)

ln create Hard and symbolic link
* any character
? any single character
[character] any character that is a member
of character
[! character] any character that is not a
member of character
[[:class:]] any character that is a member of
class

command Options : cp, mv

i interactive same
in mv
a copy files and directories of all -
attributes, ownership and
permission
r recursively copies directories same
and contents in mv
u copy the files that don't exists same
in mv
v verbose, informative message same
in mv

Command Substitution

echo \$(ls)
ls -l \$(which cp) new method
ls -l which cp back tick, old method

Process

ps reports snap shot of current process
top diskplays task
jobs list active jobs
bg place a job in the background
fg place a job in the foreground
kill send a signal to process
killall kill process by name

Process commands

ps aux BSD style ouptut
fg %1 jobs
kill -1 13456 kill process id 13456
SIGNALS: HUP, INT, KILL, TERM, C-
ONT, STOP, QUIT, SEGV, TSTP, WINCH

Find command

cmin match attributes/files/dir
modified, n minutes
cnewer match file/dir whose content or
attribute were last modified n*24
ago
ctime n match file or direct whose
content or attribute were
modified n*24 hrs ago
empty match empty files and direct-
ories
group name match files or direc belonging to
group name
iname pattern like the iname test but
case insensitive
inum n match files with inode number
mmin n match files or dir whose content
were modified n minutes ago
mtime n match files or dir whose content
were modified n*24 hours ago
name match files and dir with specified
pattern wildcard pattern
nouser match files and dir that don't
belong to valid user
nogroup match files and dir that don't
belong to valid group

By **SathyaNarayanan**
(Sathyanarayanan)

cheatography.com/sathyanarayanan/

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Find command (cont)

perm mode	match files and directories set to specified mode
samefile	matches files that share the same inode number as file name
size n	match file size of n
type c	match file type of c
user	match file and directories belong to user

```
find %test %action %options
find ~
find ~ | wc -l
find ~ -type d | wc -l
```

```
-----
b block
c character special device
d directory
f regular file
l symbolic link
```

Find Logical Operator

```
and
or
not
find ~ \( -type f -not -perm 0600 \) -or \( -type d -not -perm -700 \)
```

find -actions

```
delete
ls
print
quite
find ~ -type f -name '*.BAR] -print
find ~ -type f -and -name '*.BAR -and -print

Userdefined actions
-exec comman{}

find ~ -type f -name 'foo*' -exec ls -l '{}' +
find ~ -type f -name 'foo*' -exec ls -l '{}' ;'
```

Find Options - scope

depth	to process a directory files before the dir itself
maxdepth	max num of level that find will descend into a directory when performing test and action
mindepth	min num of level that find will descend into a directory when performing test and action
mount	direct find not to traverse directories that mounter on other filesystem

Tricks

```
clear clears the screen
history stores the history
script capture all command execution in file a file

history: CTRL + {R, P }
!!number : command history number
!! : last command
!?string : history containing last string
!string : history containing last string
export HISTCONTROL=ignoredups
export HISTSIZE=10000
```

Working With Commands

type	Indicate how command name is interpreted
which	display which executable program will be executed
man	Display manual page
apropos	Display appropriate command
info	Display command Info entry
whatis	Display brief description of command

Working With Commands (cont)

alias create an alias for command

man page options

- 1 User commands
- 2 Programming interface for system calls
- 3 Programming interface for C Library
- 4 Special files such devies nodes and drivers
- 5 file formats
- 6 Games and screen savers
- 7 misc
- 8 system administrator commands

Redirection

```
cat concatenates files
sort sort the file
uniq report or omit repeated lines
grep print lines matching pattern
head prints first few lines of file
tail prints las few lines of file
tee reads stdin and send output to stdout and file
wc count number of line, words, and bytes
```

Redirection Operator

```
ls -l /usr/bin >file default stdout to file
ls -l /usr/bin 2>file redirects stderr to file
ls -l /usr/bin > ls- redirects stderr & output 2>&1 stdout to file
ls -l /usr/bin &> ls- redirects stderr & output stdout to file
```



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Redirection Operator (cont)

ls -l /usr/bin 2> /dev/null
/dev/null bitbucket

Pipelines

| pipelines
ls -l /usr/bin/ | tee reads stdin and writes
tee out | sort to files and stdout

view the world as SHELL viewed

echo * expands all files in the path
echo D* expands all files with starting D
\$((expression)) Arithmetic expression
echo 75
\$((5*2*3))
ls -l which cp backtick instead of expression

Braces Expansion

echo Front-{A,- B,C}-Back Front-A-Back, Front-B-Back, Front-C-Back
echo {Z..A} Z Y X W V UA
mkdir {2009..2011}-0{1..9} creates a directory for 12 months in
{2009..2011}-{1-0..12} 2009 to 2011

Environment

printenv Print part of all of the environment
set set shell options
export export environment to subsequently executed programs

Environment (cont)

alias create an alias for command

Login & Non Login Shell

Login Shells :
/etc/profile : global configuration
~/.bash_profile : personal startup efile
~/.bash_login. : if ~/.bash_profile is not found, bash attempts to read this script
~/.profile : if neither ~/.bash_profile & ~/.bash_login bash reads this file
Non Login shells :
/etc/bash.bashrc : Global configuration
~/.bashrc : User configuration

Quoting

echo This is a test; space is stripped
This is a test
echo This is a test
"This is a test"
echo \$(echo foo) \$((2+2))
'\$(echo foo) \$((2+2))'
echo the \$5 is undefined variable so it total is suppress the value, output will be \$500.00 like the total is 00.00

" " : all special character loses its meaning, exception (\$, \, `)
' ' : all special character loses its meaning, and no exceptions

Searching For Files

locate find files by name
find search for files in a dir
xargs build and exec cmd lines from stdin
touch change the file times

Searching For Files (cont)

stat display file or filesystem status

Networking

Ping Send ICMP packets
traceroute Print route packets to a network
netstat print network connection, routing table, interface stats
ftp/lftp Internet file transfer program
wget Non Interactive network downloader
ssh OpenSSH SSH Client (remote login program)
scp secure copy
sftp Secure File transfer program

OpenSSH package includes two programs that can make use of an SSH encrypted tunnel to copy file across the network.

- a) scp
- b) sftp

SFTP doesn't require ftp server to connect, it needs only SSH running in machines, any machine that has ssh running, we can able to transfer files to server

Archiving and Backup

gzip Compress or expand files
bzip2 A block sorting file compressor
tap tape archiving utility
zip Package and compress files
rsync remote file and dir synchronization
unzip Unzip the gzip files

compression algorithm: Lossy and Lossless

Hacks

Examples:
 ssh remote-sys 'tar cf - Document' | tar xf -
 find playground -name 'file-A' | tar czf playground.tgz -T -
 find playground -name 'file-A' | tar cjf playground.tgz -T -
 rsync -av --delete --rsh=ssh /etc /home /usr/local remote-sys:/backup
 To copy ssh public to remote machine
 ssh-copy-id -i xxxxx_ext_2023-08-22.pub username@hostname

- or Hyphen is the stdin and stdout

Text processing examples

cat -A \$FILE	To find any CTRL character introduced
sort file1.txt file2.txt file3.txt > final_sorted_list.txt	sort all files once
ls -l sort -nr -k 5	key field 5th column
sort --key=1,1 --key=2n distor.txt	key field 1,1 sort and second column sort by numeric
sort foo.txt uniq -c	to find repetition
cut -f 3 distro.txt	cut column 3
cut -c 7-10	cut character 7 - 10
cut -d ':' -f 1 /etc/passwd	delimiter :
sort -k 3.7nbr -k 3.1nbr -k 3.4nbr distro.txt	3 rd field 7 the character, 3rd field 1 character

Text processing examples (cont)

paste file1.txt file2.txt > newfile.txt merge two files
 join file1.txt file2.txt join on common two fields

Text processing

cat	concatenate files and print stdout
sort	sort lines of text files
uniq	report or omite repeated lines
cut	remove section from each line of files
paste	merge lines of files
join	join lines of two files on a common field
comm	compare two sorted files line by line
diff	compare files
patch	apply a diff file to original
tr	translate
sed	stream editor
aspel	interactive spell checker

Permissions

id	display user identity
chmod	change's file mode
umask	set the default file permission
su	Run a shell as another user
sudo	Execute command as another user
chown	changes file's owner
chgrp	change file groups owner
passwd	change a user password

Read,Write, Execute

- | rwx | rw- | r- type | owner | group |
 - world

type
 - regular file
 d directory
 l symbolic link
 c character device
 b block device

File Mode [Octal]

000	---
001	--x
010	-w-
011	-wx
100	r--
101	r-x
110	rw-
111	rwX

chmod 0600 file [rw- is set for owner]

Mode symbolic notation

ugo	user, group, others
u+x	giving exeute permission for user
u=rw,o=x	giveing user read write and others execute perm
chmod u=rw,o=x file.txt	

Packaging Ssystem

Debian Style (.dep)	Debain, ubuntu, xandros, Linspire
RedHat style(.rpm)	Fedora, CentOS, Redhat Enterprise, OpenSUSE, Mandriva, PCLinuxOS

Install from Repo

debian	apt-get install package_name
redhat	yum install package_name

Operation on Package File

Debian :

```
dpkg --install packagefile
apt-get remove package_name
apt-get update
dpkg --list
dpkg --status package_name
apt-cache show package_name (info about package)
dpkg --search file_name (finding which package installed)
```

Redhat :

```
rpm -i packagefile
yum erase package_name
yum update
rpm -u packagefile
rpm -qa. (list)
rpm -q package_name (check package installed)
yum info package_name
rpm -qf file_name (finding which package installed)
```

storage media

```
mount      mount a filesystem
ummount    unmount a file system
fdisk      partition table manipulator
fsck       check and repair filesystem
fdformat   format floppy disk
mkfs       create a file system
dd         write a block oriented data directly to a device
geniso-    create an ISO 9660 image file image
wodim      Write data to optical storage device
```

storage media (cont)

```
md5sum      calculate md5sum
dd if=/dev/cdrom of=ubuntu.iso (create image file)
fsck /dev/sdb1 (check file system)
mkfs -t ext3 /dev/sdb1 (create ext3 file system)
umount /dev/sdb1 (unmount the file system, before changing the partition table)
fdisk /dev/sdb (create a partition table )
Generate 1GB file using uurandom
dd if=/dev/urandom of=sample.txt bs=64M count=16
```

POSIX charcter class

```
character class
alnum, word , alpha blank, cntrl, digit, graph,lowe, punct, print, space, upper, xdigit
format: [ :alnum: ]
echo $LANG
export LANG=POSIX
```

grep Options

```
i  ignore case
v  invert match
c  print number of matches
l  print the name of each file that contain matches
L  print only the names of files that don't match
n  print match line with the number
h  for multiple output supress the output of filename
grep [options] regex [file....]
```

metacharacters : ^ \$. [] { } - ? * + () | \

grep examples

```
grep -h '.zip' file.list      . is any character
grep -h '^zip' file.list     starts with zip
grep -h 'zip$' file.list     ends with zip
grep -h '^zip$' file.list    containing only zip
grep -h '[^bz]zip' file.list not containing b and z
grep -h '^[A-Za-z0-9]' file.list file containing any valid names
```

grep Quantifiers

```
?  match element zero or one time
*  match an element zero or more times
+  Match an element one or more times
{}  match an element specific number of times
```

It always match the preceding element

{n} match the preceding element occurs n times

{n,m} match the preceding element occurs at least n times, but no more than m times

{n,} match the preceding element if it occurs n or more times

{,m} match the preceding element if it occurs no more than m times

grep hacks

```
grep -E '^[0-9]{3}\.[0-9]{3}\.[0-9]{3}$' phone.txt
locate --regex 'bin/(bz|gz|zip)'
```

```
for i in {1..10}; do echo "(${RANDOM:0:3})-${RANDOM:0:3}-${RANDOM:0:3}"; done >>phone.txt
```



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Text Processing Hacks

<code>diff -c</code>	context format
<code>diff -u</code>	unified format
<code>diff -Naur oldfile newfile > diff_file</code>	write the diff to diff file
<code>patch < diff_file</code>	applied to oldfile directly.
<code>echo "secret text" tr a- zA-Z n-za-mN-ZA-M</code>	frperg grkg ROT13 Encoding
<code>echo "frperg grkg" tr a- zA-Z n-za-mN-ZA-M</code>	secret text ROT13 Decoding

-, +, ! : deleted, added, line changes.

```
$diff -Naur file1.txt file2.txt > diff_file.txt
$patch < diff_file.txt
patching file file1.txt
```

rotate by 13 places (ROT13)



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