

Linux Intermediate

This cheat sheet introduces you to more Linux commands that every developer/sysadmin should know.

`more` command lets you view output in a scrollable manner.

```
more /etc/passwd
```

`ls -ll | more`

Up arrow and Down arrow let you scroll through the output.

`Space` key scrolls down one page.

`b` key scrolls up one page.

`/` search in the text.

`sed` is used among other things to apply substitution, nd or replace les content.

```
sed 's/blue/red/' colors.txt # changes the first occurrence in each line containing the blue word to red
```

```
sed 's/blue/red/2' colors.txt # changes the second occurrence in each line containing the blue word to red
```

```
sed 's/blue/red/g' colors.txt # changes all the occurrences containing the blue word to red
```

```
sed '1,3 s/blue/red/g' colors.txt # changes all the occurrences from line number 1 to 3 containing the blue word to red
```

```
sed '5d' colors.txt # deletes line number 5
```

```
sed '12,$d' colors.txt # deletes from line 12 to last line
```

The `sed` command also supports regular expression.

`awk` is a text manipulation tool implementing a powerful scripting language.

```
awk '/red/ {print}' colors.txt # prints lines matching the given pattern
```

```
awk '{print $1,$4}' colors.txt # split each line in columns (whitespace as separator) and prints column 1 and 4
```

```
awk 'NR==3, NR==6 {print NR,$0}' colors.txt # prints from line 3 to 6 prefixed with the line number (NR)
```

```
awk 'NR > 1 {print}' colors.txt # prints from line 2 to end of file
```

`top` command shows the Linux processes providing a dynamic real-time view of the system.

top

top -u # order process by CPU usage
top -o mem # order process by memory
top -n 5 # only shows 5 processes

```
top - 08:09:59 up 5 min, 1 user, load average: 0.97, 1.03, 0.51
Tasks: 198 total, 1 running, 197 sleeping, 0 stopped, 0 zombie
%Cpu(s): 10.5 us, 7.1 sy, 0.0 ni, 68.7 id, 2.0 wa, 5.4 hi, 6.1 si, 0.0 st
MiB Mem : 2904.9 total, 68.3 free, 1248.0 used, 1588.7 buff/cache
MiB Swap: 9644.0 total, 9639.5 free, 4.5 used. 1457.9 avail Mem
```

PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND
970	root	20	0	1088820	366364	22284	S	14.6	12.3	0:50.91	packagekitd
1428	osboxes	20	0	4041856	458692	126312	S	2.0	15.4	0:15.71	gnome-shell
97	root	20	0	0	0	0	S	0.3	0.0	0:00.21	kswapd0
1569	root	20	0	259096	29812	8296	S	0.3	1.0	0:00.50	sssd_kcm
1620	osboxes	20	0	907828	99104	48328	S	0.3	3.3	0:05.01	gnome-software
2148	osboxes	20	0	847028	57192	43912	S	0.3	1.9	0:03.17	gnome-terminal-
1	root	20	0	174688	16980	11192	S	0.0	0.6	0:01.39	systemd
2	root	20	0	0	0	0	S	0.0	0.0	0:00.00	kthreadd
3	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	rcu_gp
4	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	rcu_par_gp
5	root	20	0	0	0	0	I	0.0	0.0	0:00.02	kworker/0:0-events
6	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker/0:0H-kblockd
7	root	20	0	0	0	0	I	0.0	0.0	0:00.03	kworker/0:1-ata_sff
8	root	20	0	0	0	0	I	0.0	0.0	0:00.08	kworker/u2:0-flush-8:0
9	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	mm_percpu_wq
10	root	20	0	0	0	0	S	0.0	0.0	0:00.35	ksoftirqd/0
11	root	20	0	0	0	0	I	0.0	0.0	0:00.09	rcu_sched
12	root	rt	0	0	0	0	S	0.0	0.0	0:00.00	migration/0
13	root	20	0	0	0	0	S	0.0	0.0	0:00.00	cpuhp/0
14	root	20	0	0	0	0	S	0.0	0.0	0:00.00	kdevtmpfs
15	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	netns
16	root	20	0	0	0	0	S	0.0	0.0	0:00.00	rcu_tasks_kthre
17	root	20	0	0	0	0	S	0.0	0.0	0:00.00	rcu_tasks_rude_
18	root	20	0	0	0	0	S	0.0	0.0	0:00.00	rcu_tasks_trace

find command is used to search and locate files or directories that meet certain conditions.

find /home -name users.txt # finds users.txt file under /home and deep

find /home -iname users.txt # finds users.txt file ignoring case under /home and deep

find . -type f -name "*.java" # finds all Java files from current dir and deep

find / -type f -perm 0777 # finds all files

find / -perm /a=x # finds all executable files

find /home -user asotobu # finds all files that belong to asotobu

find /home -group developer # finds all files that belong to the developer group

find / -mtime 10 # finds all files modified in the last 10 days

find / -amin -10 # finds all files accessed in the last 10 minutes

`pwd` prints the current working directory.

```
pwd
```

```
/home/asotobu/git
```

`df` gets a summary of available and used disk space usage of the le system.

```
df
```

```
Filesystem      1K-blocks    Used Available Use% Mounted on
devtmpfs        1466868         0   1466868  0% /dev
tmpfs           1487316         0   1487316  0% /dev/shm
tmpfs           594928        1352   593576  1% /run
/dev/sda2      242531772  7477332 222664860  4% /
tmpfs          1487320         104   1487216  1% /tmp
/dev/sda1       999320      186056   744452  20% /boot
/dev/sda5     262140036   89320 248665092  1% /home
tmpfs          297460         160   297300  1% /run/user/1000
```

Disk space in human-readable format.

```
df -h
```

```
Filesystem      Size  Used Avail Use% Mounted on
devtmpfs        1.4G     0  1.4G  0% /dev
tmpfs           1.5G     0  1.5G  0% /dev/shm
tmpfs           581M  1.4M  580M  1% /run
/dev/sda2      232G  7.2G  213G  4% /
tmpfs           1.5G  104K  1.5G  1% /tmp
/dev/sda1       976M  182M  728M  20% /boot
/dev/sda5     250G   88M  238G  1% /home
tmpfs           291M  160K  291M  1% /run/user/1000
```

`du` is used to check the information of disk usage of les and directories.

```
du
```

```
4      ./etc
4      ./bin
4      ./sbin
4      ./games
4      ./share/man/man5
4      ./share/man/man1x
4      ./share/man/mann
4      ./share/man/man8
4      ./share/man/man5x
4      ./share/man/man2x
4      ./share/man/man4x
4      ./share/man/man9x
4      ./share/man/man6
4      ./share/man/man7
4      ./share/man/man3
4      ./share/man/man6x
4      ./share/man/man3x
4      ./share/man/man4
4      ./share/man/man1
4      ./share/man/man8x
4      ./share/man/man7x
4      ./share/man/man2
4      ./share/man/man9
80     ./share/man
8      ./share/applications
4      ./share/info
96     ./share
4      ./lib
4      ./libexec
4      ./include
4      ./src
4      ./lib64/bpf
8      ./lib64
140    .
```

Disk space in human-readable format.

du -h

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```
4.0K  ./etc
4.0K  ./bin
4.0K  ./sbin
4.0K  ./games
4.0K  ./share/man/man5
4.0K  ./share/man/man1x
4.0K  ./share/man/mann
4.0K  ./share/man/man8
4.0K  ./share/man/man5x
4.0K  ./share/man/man2x
4.0K  ./share/man/man4x
4.0K  ./share/man/man9x
4.0K  ./share/man/man6
4.0K  ./share/man/man7
4.0K  ./share/man/man3
4.0K  ./share/man/man6x
4.0K  ./share/man/man3x
4.0K  ./share/man/man4
4.0K  ./share/man/man1
4.0K  ./share/man/man8x
4.0K  ./share/man/man7x
4.0K  ./share/man/man2
4.0K  ./share/man/man9
80K   ./share/man
8.0K  ./share/applications
4.0K  ./share/info
96K   ./share
4.0K  ./lib
4.0K  ./libexec
4.0K  ./include
4.0K  ./src
4.0K  ./lib64/bpf
8.0K  ./lib64
140K  .
```

This command displays the differences in the files by comparing the files line by line.
Symbols are:

- a for add
- c for change
- d for delete

```
diff first.txt second.txt
```

```
2,3d1  
< mv  
< comm
```

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```
4a3,4  
> diff  
> comm
```

2,3d1 means from line 2 to 3 in file 1 needs to be deleted to match line 1 of the second file.
4a2,3 means that line 4 in file 1 need to add lines 3 and 4 from the second file.
diff -c first.txt second.txt

```
*** first.txt Mon Feb 8 16:28:26 2021  
--- second.txt Mon Feb 8 16:28:38 2021  
*****  
*** 1,4 ****  
   cat  
- mv  
- comm  
  cp  
--- 1,4 ----  
  cat  
  cp  
+ diff  
+ comm
```

Aliases are custom shortcuts to Linux commands. Some aliases are provided by out-of-the-box:

alias

```
l='ls -lah'  
la='ls -lAh'  
ll='ls -lh'  
ls='ls -G'  
lsa='ls -lah'  
md='mkdir -p'
```

To create custom aliases:

```
alias k=kubectl
```

ping checks network connectivity issues by sending one or more ICMP Echo Request packages to a specified destination IP. ping
google.com

```
PING google.com (216.58.211.238): 56 data bytes
```

```
64 bytes from 216.58.211.238: icmp_seq=0 ttl=116 time=10.584 ms
64 bytes from 216.58.211.238: icmp_seq=1 ttl=116 time=11.002 ms
64 bytes from 216.58.211.238: icmp_seq=2 ttl=116 time=10.802 ms
```

```
ping -c 2 google.com # sends only 2 packets
```

```
ping -w 25 google.com # sends packets during 25 seconds
```

```
ping -i 0.5 google.com # sends packets with an interval of 0.5 seconds
```

`traceroute` elicits a response from the router at each hop from your computer to the destination.

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```
traceroute google.com
```

```
1 192.168.1.1 (192.168.1.1) 0.708 ms 0.479 ms 1.094 ms
2 239.red-81-46-38.customer.xxxxxxxxx.net (81.46.38.239) 2.685 ms 1.551 ms 2.544 ms
3 166.red-81-46-45.customer.xxxxxxxxx.net (81.46.45.166) 10.314 ms 12.277 ms 13.097 ms
4 * 241.red-81-46-45.customer.xxxxxxxxx.net (81.46.45.241) 26.055 ms 15.976 ms
5 * * *
6 176.52.253.93 (176.52.253.93) 10.825 ms 10.848 ms 11.337 ms
7 72.14.211.154 (72.14.211.154) 11.168 ms
  5.53.1.74 (5.53.1.74) 10.799 ms
  72.14.211.154 (72.14.211.154) 11.604 ms
8 * * *
9 108.170.253.241 (108.170.253.241) 12.260 ms
  142.250.62.202 (142.250.62.202) 12.149 ms
  209.85.142.100 (209.85.142.100) 11.195 ms
10 108.170.253.247 (108.170.253.247) 13.657 ms
  108.170.253.229 (108.170.253.229) 13.035 ms
  74.125.253.197 (74.125.253.197) 11.983 ms
11 mad07s09-in-f14.1e100.net (172.217.17.14) 10.121 ms
  74.125.37.217 (74.125.37.217) 11.999 ms
  mad07s09-in-f14.1e100.net (172.217.17.14) 10.890 ms
```

`nslookup` displays DNS details.

```
nslookup google.com
Server: 80.58.61.254
Address: 80.58.61.254#53
```

Non-authoritative answer:

```
Name: google.com
Address: 216.58.211.238
```

`hostname` shows the computer's hostname and domain name.

```
hostname
```

```
localhost.localdomain
```

```
hostname -l # display all the network addresses
```

10.0.2.15

`history` command shows all of the last commands that have been recently used.

`history`

```
9982 pwd
9983 cd ..
9984 cd tmp9
9985 vi first.txt
9986 vi second.txt
9987 diff first.txt second.txt
9988 diff -c first.txt second.txt
9989 ping google.com
```

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```
9990 uname -a
9991 traceroute
9992 traceroute google.com
9993 ll
9994 alias
9995 finger
9996 groups
9997 nslookup google.com
9998 sestatus
9999 hostname -d
10000 hostname -A
10001 code .
```

You can run any of the commands by appending exclamation (!) to the number of the command (i.e `!9982` runs `pwd`).

`uname` displays basic information about the operating system and hardware.

```
uname
Linux
```

```
uname -a
Linux localhost.localdomain 5.8.15-301.fc33.x86_64 # SMP Thu Oct 15 16:58:06 UTC 2020 x86_64 x86_64 x86_64 GNU/Linux
```

`sestatus` shows the current status of the SELinux.

```
sestatus
```

```
SELinux status: enabled
SELinuxfs mount: /sys/fs/selinux
SELinux root directory: /etc/selinux
Loaded policy name: targeted
Current mode: enforcing
Mode from config file: enforcing
Policy MLS status: enabled
Policy deny_unknown status: allowed
Memory protection checking: actual (secure)
Max kernel policy version: 28
```

`finger` shows user information of all the users logged in.

`finger`

```
Login Name TTY Idle Login Time Office Phone
```

```
asotobu Alex Soto tty2 9:51 Mon 09:26
```

`groups` prints the names of the primary and any supplementary groups of a username or of the current process.

`groups`

```
osboxes wheel
```

```
groups root # set groups of a given username
```

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```
root : root
```

`useradd` command creates a new user on the Linux system.

```
sudo useradd alex
```

```
sudo useradd -m alexandra # creates the user with home directory
```

```
sudo useradd -u 1500 ada # creates the user with User Id
```

```
sudo useradd -g users alex # creates the user with Group Id
```

```
sudo useradd -g users -G wheel,developers alex # creates the user with primary and secondary groups
```

```
sudo useradd -s /usr/bin/zsh alex # creates the user with specific shell
```

```
sudo useradd -e 2019-01-22 alex # creates the user with the expiration date
```

`groupadd` command creates a new group account on the Linux system.

```
sudo groupadd developers
```

```
sudo groupadd -g 1010 mygroup # creates the group with Group Id
```

```
sudo groupadd -K GID_MIN=500 -K GID_MAX=700 mygroup # creates the group overriding /etc/login.defs values
```

`userdel` deletes a user account and related files.

```
sudo userdel -f dev
```

```
sudo userdel -r newuser2 # user's home directory is removed
```

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