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 les 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

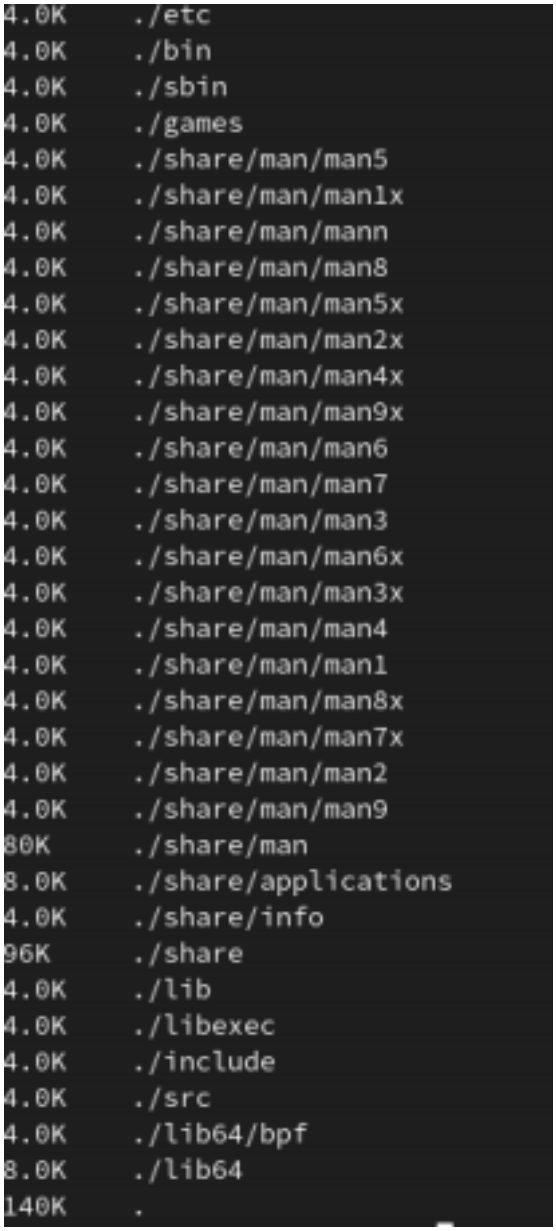
```
Filesystem      Size  Used Avail Use% Mounted on
devtmpfs        1.4G     0  1.4G   0% /dev
tmpfs           1.5G     0  1.5G   0% /dev/shm
tmpfs           581M  1.4M  580M   1% /run
/dev/sda2       232G  7.2G  213G   4% /
tmpfs           1.5G  104K  1.5G   1% /tmp
/dev/sda1       976M  182M  728M  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


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 dierences in the les by comparing the les line by line.
Symbols are:

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

```
diff first.txt second.txt

2,3d1
< mv
< comm
```



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

2,3d1 means from line 2 to 3 in le 1 needs to be delated to match line 1 of the second le.
4a2,3 means that line 4 in le 1 need to add lines 3 and 4 from the second le.

```
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 specied 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.


```
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.xxxxxxxxxx.net (81.46.38.239) 2.685 ms 1.551 ms 2.544 ms
 3 166.red-81-46-45.customer.xxxxxxxxxx.net (81.46.45.166) 10.314 ms 12.277 ms 13.097 ms
 4 * 241.red-81-46-45.customer.xxxxxxxx.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 -I # 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
```



```
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

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 atheuser 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 les.
sudo userdel -f dev

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