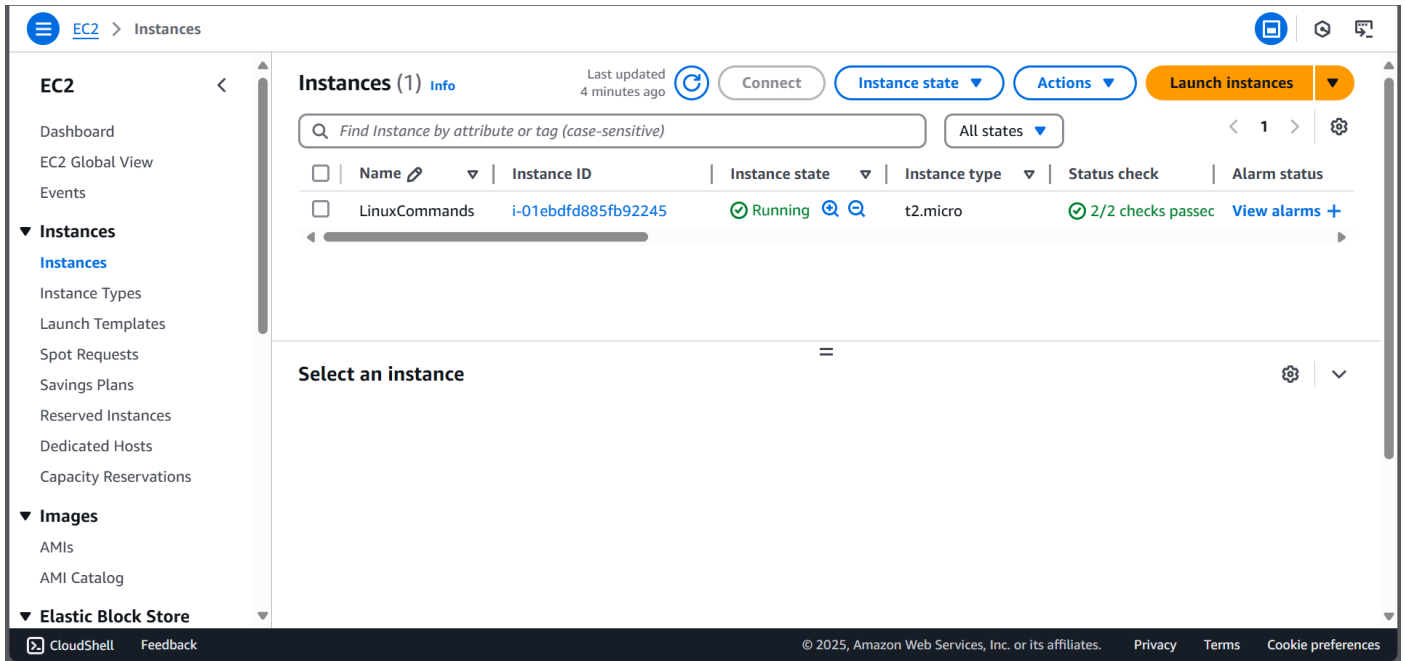


LAB ASSIGNMENTS 1: Linux command On EC2 instance



System and hardware information

```
ubuntu@ip-172-31-9-161:~$  
ubuntu@ip-172-31-9-161:~$ ls  
ubuntu@ip-172-31-9-161:~$ cd ~  
ubuntu@ip-172-31-9-161:~$ cd ~  
ubuntu@ip-172-31-9-161:~$ ls  
ubuntu@ip-172-31-9-161:~$ whoami  
ubuntu  
ubuntu@ip-172-31-9-161:~$ sudo su  
root@ip-172-31-9-161:/home/ubuntu# ls  
root@ip-172-31-9-161:/home/ubuntu# cd ..  
root@ip-172-31-9-161:/home# ls  
ubuntu  
root@ip-172-31-9-161:/home# cd ..  
root@ip-172-31-9-161:/# cd ..\  
>  
root@ip-172-31-9-161:/# cd ..  
root@ip-172-31-9-161:/# ls  
bin          boot  etc  lib          lib64  media  opt  root  sbin          snap  sys  usr  
bin.usr-is-merged dev  home lib.usr-is-merged lost+found mnt  proc run  sbin.usr-is-merged srv  tmp  var  
root@ip-172-31-9-161:/#
```

```
root@ip-172-31-9-161:/# uname -a  
Linux ip-172-31-9-161 6.8.0-1021-aws #23-Ubuntu SMP Mon Dec 9 23:59:34 UTC 2024 x86_64 x86_64 x86_64 GNU/Linux  
root@ip-172-31-9-161:/# uname -r  
6.8.0-1021-aws  
root@ip-172-31-9-161:/# uptime  
11:16:01 up 17 min, 2 users, load average: 0.00, 0.00, 0.00  
root@ip-172-31-9-161:/# hostname  
ip-172-31-9-161  
root@ip-172-31-9-161:/# last  
ubuntu pts/0 106.51.71.16 Thu Feb 20 11:06 still logged in  
ubuntu pts/0 106.51.71.16 Thu Feb 20 11:03 - 11:06 (00:02)  
reboot system boot 6.8.0-1021-aws Thu Feb 20 10:58 still running  
  
wtmp begins Thu Feb 20 10:58:39 2025  
root@ip-172-31-9-161:/# date  
Thu Feb 20 11:16:14 UTC 2025
```

```
root@ip-172-31-9-161:/# cal
  February 2025
Su Mo Tu We Th Fr Sa
                1
 2  3  4  5  6  7  8
 9 10 11 12 13 14 15
16 17 18 19 20 21 22
23 24 25 26 27 28

root@ip-172-31-9-161:/# free
              total        used        free      shared  buff/cache   available
Mem:           980396       348984       181980          908       613492       631412
Swap:              0              0              0

root@ip-172-31-9-161:/# lscpu
Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Address sizes:          46 bits physical, 48 bits virtual
Byte Order:             Little Endian
CPU(s):                 1
On-line CPU(s) list:   0
Vendor ID:              GenuineIntel
BIOS Vendor ID:         Intel
Model name:             Intel(R) Xeon(R) CPU E5-2686 v4 @ 2.30GHz
BIOS Model name:        CPU @ 2.3GHz
BIOS CPU family:        1
CPU family:             6
Model:                  79
Thread(s) per core:    1
Core(s) per socket:    1
Socket(s):              1
Stepping:               1
BogoMIPS:               4599.99
```

```
root@ip-172-31-9-161:/# date
Thu Feb 20 11:21:34 UTC 2025
root@ip-172-31-9-161:/# pwd
/
root@ip-172-31-9-161:/# lf
Command 'lf' not found, but can be installed with:
apt install lf
root@ip-172-31-9-161:/# df
Filesystem      1K-blocks    Used Available Use% Mounted on
/dev/root        7034376 1984944   5033048  29% /
tmpfs            490196      0     490196   0% /dev/shm
tmpfs            196080      896    195184   1% /run
tmpfs             5120        0      5120   0% /run/lock
/dev/xvda16      901520    77044    761348  10% /boot
/dev/xvda15     106832    6246    100586   6% /boot/efi
tmpfs            98036      12     98024   1% /run/user/1000
root@ip-172-31-9-161:/# echo

root@ip-172-31-9-161:/# echo hi
hi
root@ip-172-31-9-161:/# █
```

```
root@ip-172-31-9-161:/# history
 1  ls
 2  cd ..
 3  ls
 4  cd ..
 5  cd ../\
 6  cd ..
 7  ls
 8  uname -a
 9  uname -r
10  uptime
11  hostname
12  last
13  date
14  cal
15  apt get ncal
16  apt install ncal
17  cal
18  apt-get update
19  apt install ncal
20  cal
21  free
22  lscpu
23  date
24  pwd
25  lf
26  df
27  echo
28  echo hi
29  history
root@ip-172-31-9-161:/# id
uid=0(root) gid=0(root) groups=0(root)
root@ip-172-31-9-161:/# █
```

File and Directory Commands

```
root@ip-172-31-9-161:/# ls
bin          boot      etc       lib       lib64     media    opt      root    sbin      snap  sys  usr
bin.usr-is-merged dev  home  lib.usr-is-merged lost+found mnt      proc    run      sbin.usr-is-merged srv  tmp  var
root@ip-172-31-9-161:/# ls -l
total 76
lrwxrwxrwx  1 root root    7 Apr 22  2024 bin -> usr/bin
drwxr-xr-x  2 root root  4096 Feb 26  2024 bin.usr-is-merged
drwxr-xr-x  5 root root  4096 Jan 15  08:46 boot
drwxr-xr-x 16 root root 3240 Feb 20  10:58 dev
drwxr-xr-x 108 root root 4096 Feb 20  10:58 etc
drwxr-xr-x  3 root root  4096 Feb 20  10:58 home
lrwxrwxrwx  1 root root    7 Apr 22  2024 lib -> usr/lib
drwxr-xr-x  2 root root  4096 Apr  8  2024 lib.usr-is-merged
lrwxrwxrwx  1 root root    9 Apr 22  2024 lib64 -> usr/lib64
drwx----- 2 root root 16384 Jan 15  08:43 lost+found
drwxr-xr-x  2 root root  4096 Jan 15  08:40 media
drwxr-xr-x  2 root root  4096 Jan 15  08:40 mnt
drwxr-xr-x  2 root root  4096 Jan 15  08:40 opt
dr-xr-xr-x 172 root root    0 Feb 20  10:58 proc
drwx----- 4 root root  4096 Feb 20  10:58 root
drwxr-xr-x 28 root root   900 Feb 20  11:19 run
lrwxrwxrwx  1 root root    8 Apr 22  2024 sbin -> usr/sbin
drwxr-xr-x  2 root root  4096 Mar 31  2024 sbin.usr-is-merged
drwxr-xr-x  6 root root  4096 Jan 15  08:46 snap
drwxr-xr-x  2 root root  4096 Jan 15  08:40 srv
dr-xr-xr-x 13 root root    0 Feb 20  10:58 sys
drwxrwxrwt 12 root root  4096 Feb 20  11:19 tmp
drwxr-xr-x 12 root root  4096 Jan 15  08:40 usr
drwxr-xr-x 13 root root  4096 Feb 20  10:58 var
root@ip-172-31-9-161:/# ls -a
.  bin          boot      etc       lib       lib64     media    opt      root    sbin      snap  sys  usr
.. bin.usr-is-merged dev  home  lib.usr-is-merged lost+found mnt      proc    run      sbin.usr-is-merged srv  tmp  var
root@ip-172-31-9-161:/# ls -t
sys run dev home proc snap      usr      opt mnt lib  sbin      sbin.usr-is-merged
tmp root etc var boot lost+found media srv bin lib64 lib.usr-is-merged bin.usr-is-merged
root@ip-172-31-9-161:/# █

root@ip-172-31-9-161:/# cd home/ubuntu
root@ip-172-31-9-161:/home/ubuntu# ls
root@ip-172-31-9-161:/home/ubuntu# mkdir -p p1/p2/p3
root@ip-172-31-9-161:/home/ubuntu# ls
p1
root@ip-172-31-9-161:/home/ubuntu# cd p1/p2/p3

root@ip-172-31-9-161:/home/ubuntu# ls
p1
root@ip-172-31-9-161:/home/ubuntu# ls -R
.:
p1

./p1:
p2

./p1/p2:
p3

./p1/p2/p3:
a.txt
```

file editing and navigation inside files

```
root@ip-172-31-9-161:/home/ubuntu# cd ./p1/p2/p3
root@ip-172-31-9-161:/home/ubuntu/p1/p2/p3# ls
a.txt
root@ip-172-31-9-161:/home/ubuntu/p1/p2/p3# rm a.txt
root@ip-172-31-9-161:/home/ubuntu/p1/p2/p3# ls
root@ip-172-31-9-161:/home/ubuntu/p1/p2/p3# vim a.txt
root@ip-172-31-9-161:/home/ubuntu/p1/p2/p3# vim a.txt
root@ip-172-31-9-161:/home/ubuntu/p1/p2/p3# vim a.txt
root@ip-172-31-9-161:/home/ubuntu/p1/p2/p3# cat a.txt
India is a country in Asia.
sky is blue
India is the second most populated country in the world
India is the largest democracy in the world
India has many different cultures and religions
India is famous for its food, music, and dance
India has many beautiful places to visit, such as the Taj Mahal and the Himalayas
India is a land of great diversity, with people from all walks of life
India is a country with a rich history and culture
India is a country with a bright future
```

Piping and i/o redirection

```
root@ip-172-31-9-161:/home/ubuntu/p1/p2/p3# cd ..
root@ip-172-31-9-161:/home/ubuntu/p1/p2# mkdir p31
root@ip-172-31-9-161:/home/ubuntu/p1/p2# ls
p3 p31
root@ip-172-31-9-161:/home/ubuntu/p1/p2# cp ./p3/a.txt ./p31
root@ip-172-31-9-161:/home/ubuntu/p1/p2# ls ./p31
a.txt
root@ip-172-31-9-161:/home/ubuntu/p1/p2# cd p3
root@ip-172-31-9-161:/home/ubuntu/p1/p2/p3# touch delhi
root@ip-172-31-9-161:/home/ubuntu/p1/p2/p3# ls ./p31
ls: cannot access './p31': No such file or directory
root@ip-172-31-9-161:/home/ubuntu/p1/p2/p3# ls
a.txt delhi
root@ip-172-31-9-161:/home/ubuntu/p1/p2/p3# cd delhi
bash: cd: delhi: Not a directory
root@ip-172-31-9-161:/home/ubuntu/p1/p2/p3# mv a.txt b.txt
root@ip-172-31-9-161:/home/ubuntu/p1/p2/p3# ls
b.txt delhi
root@ip-172-31-9-161:/home/ubuntu/p1/p2/p3# █

root@ip-172-31-9-161:/home/ubuntu/p1/p2# cd p31
root@ip-172-31-9-161:/home/ubuntu/p1/p2/p31# ls
a.txt
root@ip-172-31-9-161:/home/ubuntu/p1/p2/p31# cd ../p3
root@ip-172-31-9-161:/home/ubuntu/p1/p2/p3# ls
b.txt delhi mydate.txt prgm.txt
root@ip-172-31-9-161:/home/ubuntu/p1/p2/p3# diff mydate.txt prgm.txt
1c1
< Mon Feb 24 10:24:04 UTC 2025
---
> I love prgm
root@ip-172-31-9-161:/home/ubuntu/p1/p2/p3# du mydate.txt
4      mydate.txt
root@ip-172-31-9-161:/home/ubuntu/p1/p2/p3# wc -c mydate.txt
29 mydate.txt
root@ip-172-31-9-161:/home/ubuntu/p1/p2/p3# sort prgm.txt
I love prgm
root@ip-172-31-9-161:/home/ubuntu/p1/p2/p3# █
```

Wildcard chars

```
root@ip-172-31-9-161:/home/ubuntu/p1/p2/p3# ls -l *.txt
-rw-r--r-- 1 root root 506 Feb 24 10:12 b.txt
-rw-r--r-- 1 root root 29 Feb 24 10:24 mydate.txt
-rw-r--r-- 1 root root 13 Feb 24 10:25 prgm.txt
root@ip-172-31-9-161:/home/ubuntu/p1/p2/p3# ls -l ?.txt
-rw-r--r-- 1 root root 506 Feb 24 10:12 b.txt
root@ip-172-31-9-161:/home/ubuntu/p1/p2/p3# ls -l ????.txt
ls: cannot access '????.txt': No such file or directory
root@ip-172-31-9-161:/home/ubuntu/p1/p2/p3# ls -l [bp]*
-rw-r--r-- 1 root root 506 Feb 24 10:12 b.txt
-rw-r--r-- 1 root root 13 Feb 24 10:25 prgm.txt
root@ip-172-31-9-161:/home/ubuntu/p1/p2/p3# ls -l *[m]*
-rw-r--r-- 1 root root 29 Feb 24 10:24 mydate.txt
-rw-r--r-- 1 root root 13 Feb 24 10:25 prgm.txt
root@ip-172-31-9-161:/home/ubuntu/p1/p2/p3# █
```

Services and Process mgt

```
root@ip-172-31-9-161:/home/ubuntu/p1/p2/p3# systemctl start apache2
root@ip-172-31-9-161:/home/ubuntu/p1/p2/p3# systemctl status apache2
● apache2.service - The Apache HTTP Server
   Loaded: loaded (/usr/lib/systemd/system/apache2.service; enabled; preset: enabled)
   Active: active (running) since Mon 2025-02-24 10:40:11 UTC; 2min 4s ago
     Docs: https://httpd.apache.org/docs/2.4/
    Main PID: 10108 (apache2)
      Tasks: 55 (limit: 1130)
     Memory: 5.4M (peak: 5.6M)
        CPU: 37ms
    CGroup: /system.slice/apache2.service
            └─10108 /usr/sbin/apache2 -k start
              └─10110 /usr/sbin/apache2 -k start
                └─10129 /usr/sbin/apache2 -k start

Feb 24 10:40:11 ip-172-31-9-161 systemd[1]: Starting apache2.service - The Apache HTTP Server...
Feb 24 10:40:11 ip-172-31-9-161 systemd[1]: Started apache2.service - The Apache HTTP Server.
root@ip-172-31-9-161:/home/ubuntu/p1/p2/p3# █
```

```

root@ip-172-31-9-161:/home/ubuntu/p1/p2/p3# systemctl stop apache2
root@ip-172-31-9-161:/home/ubuntu/p1/p2/p3# systemctl status apache2
○ apache2.service - The Apache HTTP Server
   Loaded: loaded (/usr/lib/systemd/system/apache2.service; enabled; preset: enabled)
   Active: inactive (dead) since Mon 2025-02-24 10:43:12 UTC; 1s ago
   Duration: 3min 799ms
   Docs: https://httpd.apache.org/docs/2.4/
   Process: 10408 ExecStop=/usr/sbin/apachectl graceful-stop (code=exited, status=0/SUCCESS)
   Main PID: 10108 (code=exited, status=0/SUCCESS)
   CPU: 57ms

Feb 24 10:40:11 ip-172-31-9-161 systemd[1]: Starting apache2.service - The Apache HTTP Server...
Feb 24 10:40:11 ip-172-31-9-161 systemd[1]: Started apache2.service - The Apache HTTP Server.
Feb 24 10:43:12 ip-172-31-9-161 systemd[1]: Stopping apache2.service - The Apache HTTP Server...
Feb 24 10:43:12 ip-172-31-9-161 systemd[1]: apache2.service: Deactivated successfully.
Feb 24 10:43:12 ip-172-31-9-161 systemd[1]: Stopped apache2.service - The Apache HTTP Server.
root@ip-172-31-9-161:/home/ubuntu/p1/p2/p3# systemctl disable apache2
Synchronizing state of apache2.service with SysV service script with /usr/lib/systemd/systemd-sysv-install.
Executing: /usr/lib/systemd/systemd-sysv-install disable apache2
Removed "/etc/systemd/system/multi-user.target.wants/apache2.service".
root@ip-172-31-9-161:/home/ubuntu/p1/p2/p3# systemctl status apache2
○ apache2.service - The Apache HTTP Server
   Loaded: loaded (/usr/lib/systemd/system/apache2.service; disabled; preset: enabled)
   Active: inactive (dead) since Mon 2025-02-24 10:43:12 UTC; 13s ago
   Duration: 3min 799ms
   Docs: https://httpd.apache.org/docs/2.4/
   Main PID: 10108 (code=exited, status=0/SUCCESS)
   CPU: 57ms

Feb 24 10:40:11 ip-172-31-9-161 systemd[1]: Starting apache2.service - The Apache HTTP Server...
Feb 24 10:40:11 ip-172-31-9-161 systemd[1]: Started apache2.service - The Apache HTTP Server.
Feb 24 10:43:12 ip-172-31-9-161 systemd[1]: Stopping apache2.service - The Apache HTTP Server...
Feb 24 10:43:12 ip-172-31-9-161 systemd[1]: apache2.service: Deactivated successfully.
Feb 24 10:43:12 ip-172-31-9-161 systemd[1]: Stopped apache2.service - The Apache HTTP Server.
root@ip-172-31-9-161:/home/ubuntu/p1/p2/p3#

```

```

root@ip-172-31-9-161:/home/ubuntu/p1/p2/p3# ps
  PID TTY          TIME CMD
 1428 pts/1    00:00:00 sudo
 1429 pts/1    00:00:00 su
 1430 pts/1    00:00:00 bash
10782 pts/1    00:00:00 ps
root@ip-172-31-9-161:/home/ubuntu/p1/p2/p3# ps -e
  PID TTY          TIME CMD
   1 ?        00:00:06 systemd
   2 ?        00:00:00 kthreadd
   3 ?        00:00:00 pool_workqueue_release
   4 ?        00:00:00 kworker/R-rcu_g
   5 ?        00:00:00 kworker/R-rcu_p
   6 ?        00:00:00 kworker/R-slub_
   7 ?        00:00:00 kworker/R-netns
  10 ?        00:00:00 kworker/0:0H-events_highpri
  11 ?        00:00:00 kworker/u30:0-events_power_efficient
  12 ?        00:00:00 kworker/R-mm_pe
  13 ?        00:00:00 rcu_tasks_rude_kthread
  14 ?        00:00:00 rcu_tasks_trace_kthread
  15 ?        00:00:00 ksoftirqd/0
  16 ?        00:00:00 rcu_sched
  17 ?        00:00:00 migration/0
  18 ?        00:00:00 idle_inject/0
  19 ?        00:00:00 cpuhp/0
  20 ?        00:00:00 kdevtmpfs
  21 ?        00:00:00 kworker/R-inet_
  23 ?        00:00:00 kauditd
  24 ?        00:00:00 khungtaskd
  25 ?        00:00:00 oom_reaper
  26 ?        00:00:00 kworker/u30:2-flush-202:0
  27 ?        00:00:00 kworker/R-write
  28 ?        00:00:00 kcompactd0
  29 ?        00:00:00 ksm

```

file permission

```

root@ip-172-31-9-161:/home/ubuntu/p1/p2/p3# ls -l b.txt
-rw-r--r-- 1 root root 506 Feb 24 10:12 b.txt
root@ip-172-31-9-161:/home/ubuntu/p1/p2/p3# chmod 776 b.txt
root@ip-172-31-9-161:/home/ubuntu/p1/p2/p3# ls -l b.txt
-rwxrwxr-- 1 root root 506 Feb 24 10:12 b.txt
root@ip-172-31-9-161:/home/ubuntu/p1/p2/p3#

```