

Project3: Linux Project

Lab Exercise 1: File Manipulation and Permissions

1. Create a directory named "lab_files" and set its permissions to read, write, and execute for the owner, read and execute for the group, and read-only for others.
2. Inside "lab_files", create a file named "data.txt" containing some text.
3. Change the ownership of "data.txt" to another user.
4. Set the sticky bit on "lab_files" directory.
5. Find all files with ".txt" extension in "lab_files" directory and its subdirectories.

[1] <https://www.redhat.com/sysadmin/linux-file-permissions-explained>

[2] <https://www.redhat.com/sysadmin/create-delete-files-directories-linux>

[3] <https://www.geeksforgeeks.org/how-to-create-a-text-file-using-the-command-line-in-linux/>

```
roul      D5rm7r m pv5 &mzr ymn svyr6
5rmp pv5Vmzr
zxp5 pv5Vmzr

roul      15vtv&my 2r5zv66v1&
y6 y t5r2 pv5Vmzr

roul      ms7r5 z1pvsvrp
ouz1p pv5Vmzr
y6 y t5r2 pv5Vmzr

roul      D5rm7r pm7m 7:7 v& ymn svyr6 slypr5
5rmp svyrVmzr
zxp5 ymn svyr6 svyrVmzr

roul      15vtv&my 1.&r56uv2
y6 y ymn svyr6 t5r2 svyrVmzr

roul      o5rm7r m &r. 86r5
5rmp 86r5Vmzr
68p1 86r5mpp p 865 86r5Vmzr o &r. 86r5 s15 ymn t ro 86r5 2 6ro5r7 6 865 nv&
68p1 ou1.& d 86r5Vmzr ymn svyr6 pm7m 7:7

roul      &r. 1.&r56uv2
y6 y ymn svyr6 t5r2 svyrVmzr

roul      6r7 67vox" nv7 1& ymn svyr6 pv5
ouz1p 7 ymn svyr6
y6 y t5r2 ymn svyr6

roul      sv&p svyr6 .v7u 7:7 r:7r&6v1& v& ymn svyr6
sv&p ymn svyr6 &mzr 7:7
```

```
[ec2-user@ip-172-31-16-99 ~]$ sh exe1.sh
>>> Create a dir name lab_files
lab_files
>>> original permission
drwxr-xr-x. 2 ec2-user ec2-user 6 Jul 2 22:14 lab_files
>>> after modified
drwxr-xr-x. 2 ec2-user ec2-user 6 Jul 2 22:14 lab_files
>>> Create data.txt in lab_files folder
data.txt
>>> original ownership
drwxr-xr-x. 2 ec2-user ec2-user 6 Jul 2 22:14 data.txt
>>> create a new user
jason
>>> new ownership
drwxr-xr-x. 2 jason ec2-user 6 Jul 2 22:14 data.txt
>>> set sticky bit on lab_files dir
drwxr-xr-T. 3 ec2-user ec2-user 22 Jul 2 22:14 lab_files
>>> find files with .txt extension in lab_files
lab_files/data.txt
```

Lab Exercise 2: User and Group Management

1. Create a new group named "developers".
2. Add the user "intern" to the "developers" group.
3. List all groups the "intern" user belongs to.
4. Display detailed information about the "developers" group.

[1] <https://www.redhat.com/sysadmin/linux-user-group-management>

```
roul      o5rm7r m &r. t5182 &mzrp pr9ry12r56
5rmp t5182Vmzr
68p1 t5182mpp t5182Vmzr

roul      o5rm7r m 86r5 &mzr v&7r5& m&p mpp 71 7ur pr9ry12r56 t5182
5rmp 86r5Vmzr
68p1 86r5mpp p 865 86r5Vmzr o v&7r5& 86r5 s15 ymn t ro 86r5 2 6ro5r7 6 865
68p1 t2m66.p U 86r5Vmzr t5182Vmzr

roul      myy t51826 7ur v&7r5& 86r5 nry1&t6 71
r
vp N& 86r5Vmzr

roul      pr7mvyrp v&s1 mn187 7ur pr9ry12r56 t5182
tr7r&7 t5182 t5182Vmzr
```

```
[ec2-user@ip-172-31-16-99 ~]$ sh exe2.sh
>>> create a new group named developers
developers
>>> create a user name intern and add to the developers group
intern
>>> all groups the intern user belongs to:
ec2-user developers
>>> detailed info about the developers group
developers:x:1001:intern
```

Lab Exercise 3: Process Management

1. Displaying Running Processes

2. Displaying Dynamic View of Processes

3. Terminate a process

4. Adjust process priority

5. Adjust running process priority

[1] <https://www.digitalocean.com/community/tutorials/process-management-in-linux>

```
roul      pv62ym" 58&&v&t 251or66r6  
26  A
```

```
roul      G"&mzvo 9vr. 1s 251or66r6  
712  n  &
```

```
roul      Apw867 251or66 25v15v7"  
&vor  &    9vz  
26  y
```

```
roul      mpw867 58&&v&t 251or66 25v15v7"  
bQG  2t5r2 9vz  
68p1 5r&vor  &    2  bQG  
26  y
```

```
roul      7r5zv&m7r 7ur 9vz 251or66 w867 ym8&ourp  
2xvyy  9vz  
26  y
```

```
>>> display running processes
PID TTY      TIME   CMD
  1 ?        00:00:00 systemd
  2 ?        00:00:00 kthreadd
  3 ?        00:00:00 rcu_gp
  4 ?        00:00:00 rcu_par_gp
  5 ?        00:00:00 slub_flushwq
  6 ?        00:00:00 netns
  8 ?        00:00:00 kworker/0:0H-events_highpri
 10 ?        00:00:00 mm_percpu_wq
 11 ?        00:00:00 rcu_tasks_kthread
 12 ?        00:00:00 rcu_tasks_rude_kthread
 13 ?        00:00:00 rcu_tasks_trace_kthread
 14 ?        00:00:00 ksoftirqd/0
 15 ?        00:00:00 rcu_preempt
 16 ?        00:00:00 migration/0
 17 ?        00:00:00 kworker/0:1-events
 18 ?        00:00:00 cpuhp/0
 20 ?        00:00:00 kdevtmpfs
 21 ?        00:00:00 inet_frag_wq
 22 ?        00:00:00 kauditd
 23 ?        00:00:00 khungtaskd
 24 ?        00:00:00 oom_reaper
 25 ?        00:00:00 kworker/u30:1-events_unbound
 27 ?        00:00:00 writeback
 28 ?        00:00:00 kcompactd0
 29 ?        00:00:00 khugepaged
 30 ?        00:00:00 kintegrityd
 31 ?        00:00:00 kblockd
 32 ?        00:00:00 blkcg_punt_bio
 33 ?        00:00:00 xen-balloon
 34 ?        00:00:00 tpm_dev_wq
 35 ?        00:00:00 md
 36 ?        00:00:00 edac-poller
 37 ?        00:00:00 watchdogd
 38 ?        00:00:00 kworker/0:1H-kblockd
 39 ?        00:00:00 kworker/u30:3-events_unbound
 73 ?        00:00:00 kswapd0
 76 ?        00:00:00 xfsalloc
 77 ?        00:00:00 xfs_mru_cache
 80 ?        00:00:00 kthrotld
 83 ?        00:00:00 kworker/0:2-cgroup_destroy
 95 ?        00:00:00 xenbus
 96 ?        00:00:00 xenwatch
134 ?        00:00:00 nvme-wq
136 ?        00:00:00 nvme-reset-wq
138 ?        00:00:00 nvme-delete-wq
161 ?        00:00:00 mld
162 ?        00:00:00 ipv6_addrconf
172 ?        00:00:00 kstrp
181 ?        00:00:00 zswap-shrink
```

```
>>> Dynamic view of processes
top - 22:18:11 up 7 min, 1 user, load average: 0.00, 0.00, 0.07
tasks: 99 total, 1 running, 98 sleeping, 0 stopped, 0 zombie
NCPU(s): 0.0 us, 4.2 sy, 0.0 ni, 93.8 id, 0.0 ws, 0.0 hi, 0.0 si, 0.0 st
MEM Mem : 949.5 total, 599.5 free, 127.7 used, 222.4 buff/cache
MEM Swap: 0.0 total, 0.0 free, 0.0 used, 684.4 avail Mem

  PID USER      PR  NI   VIRT   RES   SHR S  %CPU  %MEM     TIME+ COMMAND
    1 root        0   0 108200 26372 10032 S    0.0   1.7   0:00.00 systemd
    2 root        0   0      0      0      0 S    0.0   0.0   0:00.00 kthreadd
    3 root    0 -20      0      0      0 S    0.1   0.0   0:00.00 rcu_gp
    4 root    0 -20      0      0      0 S    0.1   0.0   0:00.00 rcu_par_gp
    5 root    0 -20      0      0      0 S    0.1   0.0   0:00.00 slub_flushwq
    6 root    0 -20      0      0      0 S    0.1   0.0   0:00.00 netns
    8 root    0 -20      0      0      0 S    0.1   0.0   0:00.00 kworker/0:0H-events_highpri
   10 root    0 -20      0      0      0 S    0.1   0.0   0:00.00 mm_percpu_wq
   11 root    0   0      0      0      0 S    0.1   0.0   0:00.00 rcu_tasks_kthread
   12 root    0   0      0      0      0 S    0.1   0.0   0:00.00 rcu_tasks_rude_kthread
   13 root    0   0      0      0      0 S    0.1   0.0   0:00.00 rcu_tasks_trace_kthread
   14 root    0   0      0      0      0 S    0.0   0.0   0:00.03 ksoftirqd/0
   15 root    0   0      0      0      0 S    0.1   0.0   0:00.05 rcu_preempt
   16 root    0   0      0      0      0 S    0.5   0.0   0:00.00 migration/0
   17 root    0   0      0      0      0 S    0.1   0.0   0:00.02 kworker/0:1-xfs-buf/xvda1
   18 root    0   0      0      0      0 S    0.5   0.0   0:00.00 cpuhp/0
   20 root    0   0      0      0      0 S    0.5   0.0   0:00.00 kdevtmpfs
   21 root    0 -20      0      0      0 S    0.1   0.0   0:00.00 inet_frag_wq
   22 root    0   0      0      0      0 S    0.5   0.0   0:00.00 kauditd
   23 root    0   0      0      0      0 S    0.5   0.0   0:00.00 khungtaskd
   24 root    0   0      0      0      0 S    0.5   0.0   0:00.00 oom_reaper
   25 root    0   0      0      0      0 S    0.1   0.0   0:00.05 kworker/u30:1-xfs-cil/xvda1
   27 root    0 -20      0      0      0 S    0.1   0.0   0:00.00 writeback
   28 root    0   0      0      0      0 S    0.5   0.0   0:00.01 kcompactd0
   29 root    39 19      0      0      0 S    0.5   0.0   0:00.00 khugepaged
   30 root    0 -20      0      0      0 S    0.1   0.0   0:00.00 kintegrityd
   31 root    0 -20      0      0      0 S    0.1   0.0   0:00.00 kblockd
   32 root    0 -20      0      0      0 S    0.1   0.0   0:00.00 blkcg_punt_bio
   33 root    0   0      0      0      0 S    0.5   0.0   0:00.00 xen-balloon
   34 root    0 -20      0      0      0 S    0.1   0.0   0:00.00 tpm_dev_wq
   35 root    0 -20      0      0      0 S    0.1   0.0   0:00.00 md
   36 root    0 -20      0      0      0 S    0.1   0.0   0:00.00 edac-poller
   37 root   -61  0      0      0      0 S    0.5   0.0   0:00.00 watchdogd
   38 root    0 -20      0      0      0 S    0.1   0.0   0:00.01 kworker/0:1H-xfs-log/xvda1
   39 root    0   0      0      0      0 S    0.1   0.0   0:00.00 kworker/u30:3-events_unbound
   73 root    0   0      0      0      0 S    0.5   0.0   0:00.00 kswapd0
   76 root    0 -20      0      0      0 S    0.1   0.0   0:00.00 xfsalloc
   77 root    0 -20      0      0      0 S    0.1   0.0   0:00.00 xfs_mru_cache
   80 root    0 -20      0      0      0 S    0.1   0.0   0:00.00 kthrotld
   83 root    0   0      0      0      0 S    0.0   0.0   0:00.01 kworker/0:2-cgroup_destroy
```

```

2911 root      20    0   15768   7360   6440 S    0.0   0.8   0:00.00 systemd-userwor
2912 root      20    0   15652   6664   5808 S    0.0   0.7   0:00.00 systemd-userwor
2913 root      20    0   15652   6500   5648 S    0.0   0.7   0:00.00 systemd-userwor
2929 root      20    0         0         0 I    0.0   0.0   0:00.00 kworker/0:3-events
3047 ec2-user   20    0  222948   3216   2964 S    0.0   0.3   0:00.00 sh
3049 ec2-user  20    0  223784   3156   2680 R    0.0   0.3   0:00.00 top
>>> Adjust process priority
F S  UID      PID      PPID    C PRI  NI ADDR SZ WCHAN  TTY          TIME CMD
Vim: Warning: Input is not from a terminal
0 S  1000      2358      2357    0 80   0 - 56040 do_wai pts/0        00:00:00 bash
0 S  1000      3047      2358    0 80   0 - 55737 do_wai pts/0        00:00:00 sh
0 R  1000      3050      3047    0 99  19 - 56858 -        pts/0        00:00:00 vim
0 R  1000      3051      3047    0 80   0 - 55858 -        pts/0        00:00:00 ps
>>> adjust running process priority
3050 (process ID) old priority 19, new priority 5
F S  UID      PID      PPID    C PRI  NI ADDR SZ WCHAN  TTY          TIME CMD
0 S  1000      2358      2357    0 80   0 - 56040 do_wai pts/0        00:00:00 bash
0 S  1000      3047      2358    0 80   0 - 55737 do_wai pts/0        00:00:00 sh
0 S  1000      3050      3047    0 85   5 - 56858 hrtime pts/0        00:00:00 vim
0 R  1000      3057      3047    0 80   0 - 55858 -        pts/0        00:00:00 ps
>>> terminate the vim process just launched
exe3.sh: line 18: 3050 Killed                  nice -n 19 vim
F S  UID      PID      PPID    C PRI  NI ADDR SZ WCHAN  TTY          TIME CMD
0 S  1000      2358      2357    0 80   0 - 56040 do_wai pts/0        00:00:00 bash
0 S  1000      3047      2358    0 80   0 - 55866 do_wai pts/0        00:00:00 sh
0 R  1000      3059      3047    0 80   0 - 55858 -        pts/0        00:00:00 ps

```

Lab Exercise 4: Networking

1. Display network interface configuration.
2. Test network connectivity to a remote host(e.g. [google.com](https://www.google.com))
3. Query DNS servers for information about a domain name(e.g. [google.com](https://www.google.com))

[1] <https://www.redhat.com/sysadmin/7-great-network-commands>

```

rou1      Gv62ym" &r7.15x v&7r5smor o1&svt85m7v1&
v2 mpp5 6u1.

rou1      fr67 o1&&ro7v9v7" 71 t11tyr o1z
2v&t  o    t11tyr o1z

rou1      c8r5" GVe 6r59r56 s15 v&s1 mn187 t11tyr o1z plzmv& &mzr

pvt t11tyr o1z

```

```

[ec2-user@ip-172-31-16-99 ~]$ sh exe4.sh
>>> Display network interface configuration
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 adisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host noprefixroute
        valid_lft forever preferred_lft forever
2: enx8: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 9001 qdisc fq_codel state UP group default qlen 1000
    link/ether 0a:ff:ad:b7:93:af brd ff:ff:ff:ff:ff:ff
    altname eni-9ac8b170ba979262b
    altname device-number-0
    inet 172.31.16.99/20 metric 512 brd 172.31.31.255 scope global dynamic enx8
        valid_lft 2248sec preferred_lft 2248sec
    inet6 fe80::8ff:edff:feb7:83a7/64 scope link
        valid_lft forever preferred_lft forever
>>> Test connectivity to google.com
PING google.com (172.253.122.139) 64(84) bytes of data:
64 bytes from bh-in-f139.1e100.net (172.253.122.139): icmp_seq=1 ttl=58 time=1.88 ms
64 bytes from bh-in-f139.1e100.net (172.253.122.139): icmp_seq=2 ttl=58 time=1.90 ms
64 bytes from bh-in-f139.1e100.net (172.253.122.139): icmp_seq=3 ttl=58 time=1.91 ms
64 bytes from bh-in-f139.1e100.net (172.253.122.139): icmp_seq=4 ttl=58 time=1.94 ms
64 bytes from bh-in-f139.1e100.net (172.253.122.139): icmp_seq=5 ttl=58 time=1.93 ms

--- google.com ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4007ms
rtt min/avg/max/ndev = 1.880/1.911/1.937/0.021 ms
>>> Query DNS servers for info about google.com domain name

<<>> DIG 9.16.48-RH <<>> google.com
;; global options: +cmd
;; Got answer:
;;->>HEADER<- opcode: QUERY, status: NOERROR, id: 37180
;; flags: qr rd ra; QUERY: 1, ANSWER: 0, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
;; EDNS: version: 0, flags:;, udp: 4096
;; QUESTION SECTION:
;google.com.
            IN      A

;; ANSWER SECTION:
google.com.    159    IN      A      172.253.122.138
google.com.    159    IN      A      172.253.122.139
google.com.    159    IN      A      172.253.122.100
google.com.    159    IN      A      172.253.122.101
google.com.    159    IN      A      172.253.122.102
google.com.    159    IN      A      172.253.122.113

;; Query time: 0 msec
;; SERVER: 172.31.0.2553(172.31.0.2)
;; WHEN: Tue Jul 02 22:33:19 UTC 2024
;; MSG SIZE rcvd: 136

```

Lab Exercise 5: Install AWS CLI

Install AWS CLI on your environment[1].

<https://docs.aws.amazon.com/cli/latest/userguide/getting-started-install.html#getting-started-install-instructions>

```

rou1      G1.&y1mp 7ur v&67myym7v1& svyr 86v&t o85y
o85y      u7726   m.6oyv mzm-1&m.6 o1z m.6oyv r:r yv&8: :      -v2   1   m.6oyv9   -v2

rou1      g&-v2 7ur v&67myyr5
8&-v2 m.6oyv9   -v2

rou1      d8& 7ur v&67myy 251t5mz
68p1      m.6 v&67myy

rou1      hr5vs"
m.6 ury2

```



```
[ec2-user@ip-172-31-16-99 ~]$ sh exe5.sh
>>> Download the installation file using curl
% Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
           Dload  Upload   Total   Spent    Left   Speed

100 57.9M  100 57.9M    0     0  120M      0  --:--:-- --:--:-- --:--:--  120M
>>> Unzip the installer
Archive:  awsciv2.zip
  creating: aws/
  creating: aws/dist/
  inflating: aws/THIRD_PARTY_LICENSES
  inflating: aws/README.md
  inflating: aws/install
  creating: aws/dist/awscli/
  creating: aws/dist/cryptography/
  creating: aws/dist/docutils/
  creating: aws/dist/lib-dynload/
  inflating: aws/dist/aws
  inflating: aws/dist/aws_completer
  inflating: aws/dist/libpython3.11.so.1.0
  inflating: aws/dist/_awsert.abi3.so
  inflating: aws/dist/_cffi_backend.cpython-311-x86_64-linux-gnu.so
  inflating: aws/dist/_ruamel_yaml.cpython-311-x86_64-linux-gnu.so
  inflating: aws/dist/libz.so.1
  inflating: aws/dist/liblzma.so.0
  inflating: aws/dist/libbz2.so.1
  inflating: aws/dist/libffi.so.5
  inflating: aws/dist/libsqlite3.so.0
  inflating: aws/dist/base_library.zip
  inflating: aws/dist/lib-dynload/_pickle.cpython-311-x86_64-linux-gnu.so
  inflating: aws/dist/lib-dynload/_hashlib.cpython-311-x86_64-linux-gnu.so
  inflating: aws/dist/lib-dynload/_sha3.cpython-311-x86_64-linux-gnu.so
  inflating: aws/dist/lib-dynload/_blake2.cpython-311-x86_64-linux-gnu.so
  inflating: aws/dist/lib-dynload/_sha256.cpython-311-x86_64-linux-gnu.so

  inflating: aws/dist/docutils/parsers/rst/include/mmlextra.txt
  inflating: aws/dist/docutils/parsers/rst/include/xhtml1-special.txt
  inflating: aws/dist/docutils/parsers/rst/include/isolat1.txt
  inflating: aws/dist/docutils/parsers/rst/include/isobox.txt
  inflating: aws/dist/docutils/parsers/rst/include/isoamsr.txt
  inflating: aws/dist/docutils/parsers/rst/include/isogrkl.txt
  inflating: aws/dist/docutils/parsers/rst/include/isopub.txt
  inflating: aws/dist/docutils/parsers/rst/include/xhtml1-symbol.txt
>>> Run the install program
You can now run: /usr/local/bin/aws --version
>>> Verify
```

```
aws() AWS()

NAME
    aws -

DESCRIPTION
    The AWS Command Line Interface is a unified tool to manage your AWS
    services.

SYNOPSIS
    aws [options] <command> <subcommand> [parameters]

    Use aws command help for information on a specific command. Use aws
    help topics to view a list of available help topics. The synopsis for
    each command shows its parameters and their usage. Optional parameters
    are shown in square brackets.

GLOBAL OPTIONS
    --debug (boolean)

    Turn on debug logging.

    --endpoint-url (string)

    Override command's default URL with the given URL.

    --no-verify-ssl (boolean)

    By default, the AWS CLI uses SSL when communicating with AWS services.
    For each SSL connection, the AWS CLI will verify SSL certificates. This
    option overrides the default behavior of verifying SSL certificates.

    --no-paginate (boolean)

    Disable automatic pagination.

    --output (string)

    The formatting style for command output.

    o json
    o text
    o table
    o yaml
    o yaml-stream

    --query (string)

    A JMESPath query to use in filtering the response data.

    --profile (string)

    Use a specific profile from your credential file.

    --region (string)

    The region to use. Overrides config/env settings.

    --version (string)

    Display the version of this tool.
```