Red Hat

Lab 1

Lab 1

1. Use systemctl to view the status of all the system services.

```
maryamabdelraheem@localhost:~/Desktop$ systemctl list-unit-files --type=service
UNIT FILE                                  STATE           PRESET
accounts-daemon.service                    enabled         enabled
alsa-restore.service                       static          -
alsa-state.service                         static          -
arp-ethers.service                         disabled        disabled
atd.service                                enabled         enabled
audit-rules.service                        enabled         enabled
auditd.service                             enabled         enabled
autovt@.service                            alias           -
avahi-daemon.service                       enabled         enabled
blk-availability.service                   disabled        disabled
bluetooth.service                          enabled         enabled
bolt.service                               static          -
brltty.service                             disabled        disabled
canberra-system-bootup.service             disabled        disabled
canberra-system-shutdown-reboot.service    disabled        disabled
canberra-system-shutdown.service           disabled        disabled
capsule@.service                           static          -
chrony-wait.service                        disabled        disabled
chronyd-restricted.service                 disabled        disabled
chronyd.service                            enabled         enabled
cockpit-issue.service                      static          -
cockpit-session-socket-user.service        static          -
lines 1-23
```

2. Change the default run level back to multi-user.target and reboot.

```
maryamabdelraheem@localhost:~$ systemctl set-default multi-user.target
```

```
Red Hat Enterprise Linux 10.1 (Coughlan)
Kernel 6.12.0-124.8.1.el10_1.aarch64 on aarch64

Web console: https://localhost:9090/ or https://192.168.64.6:9090/

localhost login: maryamabdelraheem
Password:
Last login: Tue Jan 27 13:48:43 on tty2
maryamabdelraheem@localhost:~$ sudo systemctl set-default graphical.target
[sudo] password for maryamabdelraheem:
Removed '/etc/systemd/system/default.target'.
Created symlink '/etc/systemd/system/default.target' → '/usr/lib/systemd/system/graphical.target'.
maryamabdelraheem@localhost:~$
```

3. Send mail to the root user.

```
root@localhost:~# systemctl start postfix
root@localhost:~# echo "confirm your application" | mail -s "Postfix test" root
root@localhost:~# mail
s-nail version v14.9.24.  Type `?' for help
/var/spool/mail/root: 2 messages 1 new 2 unread
 U  1 Super User            2026-01-27 19:11   16/530   "Postfix test
►N  2 Super User            2026-01-27 19:15   15/533   "Postfix test
& q
Held 2 messages in /var/spool/mail/root
root@localhost:~# echo "confirm your application" | mail -s "confirm your mail" root
root@localhost:~# mail
s-nail version v14.9.24.  Type `?' for help
/var/spool/mail/root: 3 messages 1 new 3 unread
 U  1 Super User            2026-01-27 19:11   16/530   "Postfix test
 U  2 Super User            2026-01-27 19:15   16/543   "Postfix test
►N  3 Super User            2026-01-27 19:15   15/538   "confirm your mail
&
```

4. Verify that you have received this mail.

```
root@localhost:~# mail
s-nail version v14.9.24.  Type `?' for help
/var/spool/mail/root: 3 messages 3 unread
►U  1 Super User            2026-01-27 19:11   16/530   "Postfix test                                "
 U  2 Super User            2026-01-27 19:15   16/543   "Postfix test                                "
 U  3 Super User            2026-01-27 19:15   16/548   "confirm your mail                           "
& 1
[-- Message  1 -- 16 lines, 530 bytes --]:
Date: Tue, 27 Jan 2026 19:11:23 +0200
To: root@localhost.localdomain
Subject: Postfix test
Message-Id: <20260127171124.040EA315E07B@localhost.localdomain>
From: Super User <root@localhost.localdomain>

Test mail 1

& 2
[-- Message  2 -- 16 lines, 543 bytes --]:
Date: Tue, 27 Jan 2026 19:15:13 +0200
To: root@localhost.localdomain
Subject: Postfix test
Message-Id: <20260127171513.11B64315E076@localhost.localdomain>
From: Super User <root@localhost.localdomain>

confirm your application

& 3
[-- Message  3 -- 16 lines, 548 bytes --]:
Date: Tue, 27 Jan 2026 19:15:40 +0200
To: root@localhost.localdomain
Subject: confirm your mail
Message-Id: <20260127171540.70F3B315E076@localhost.localdomain>
From: Super User <root@localhost.localdomain>

confirm your application

& 4
s-nail: 4: Invalid message number
s-nail: There are messages in the error ring, manageable via `errors' command
&
```

5. Use systemctl utility to stop postfix service

```
root@localhost:~# systemctl stop postfix
root@localhost:~# systemctl status postfix
○ postfix.service - Postfix Mail Transport Agent
     Loaded: loaded (/usr/lib/systemd/system/postfix.service; enabled; preset: disabled)
     Active: inactive (dead) since Tue 2026-01-27 19:18:29 EET; 6s ago
   Duration: 28min 1.676s
 Invocation: 00c6ae05f45d412faa95461d27b4465a
    Process: 7630 ExecStop=/usr/sbin/postfix stop (code=exited, status=0/SUCCESS)
   Main PID: 6061 (code=killed, signal=TERM)
   Mem peak: 6.6M
        CPU: 460ms

Jan 27 19:15:40 localhost.localdomain postfix/cleanup[7563]: 70F3B315E076: message-id=<20260127171540.70F3B3>
Jan 27 19:15:40 localhost.localdomain postfix/qmgr[6063]: 70F3B315E076: from=<root@localhost.localdomain>, s>
Jan 27 19:15:40 localhost.localdomain postfix/local[7565]: 70F3B315E076: to=<root@localhost.localdomain>, or>
Jan 27 19:15:40 localhost.localdomain postfix/qmgr[6063]: 70F3B315E076: removed
Jan 27 19:18:29 localhost.localdomain systemd[1]: Stopping postfix.service - Postfix Mail Transport Agent...
Jan 27 19:18:29 localhost.localdomain postfix[7636]: postfix/postlog: stopping the Postfix mail system
Jan 27 19:18:29 localhost.localdomain postfix/postfix-script[7636]: stopping the Postfix mail system
Jan 27 19:18:29 localhost.localdomain postfix/master[6061]: terminating on signal 15
Jan 27 19:18:29 localhost.localdomain systemd[1]: postfix.service: Deactivated successfully.
Jan 27 19:18:29 localhost.localdomain systemd[1]: Stopped postfix.service - Postfix Mail Transport Agent.
lines 1-20/20 (END)
```

6. Send mail again to the root user.

```
root@localhost:~# echo "you should not see this mail" | mail -s "Postfix stopped test" root
root@localhost:~# mail
s-nail version v14.9.24.  Type `?' for help
/var/spool/mail/root: 3 messages
▸   1 Super User            2026-01-27 19:11   16/531   "Postfix test                                "
    2 Super User            2026-01-27 19:15   16/544   "Postfix test                                "
    3 Super User            2026-01-27 19:15   16/549   "confirm your mail                           "
& q
Held 3 messages in /var/spool/mail/root
root@localhost:~# mailq
postqueue: warning: Mail system is down -- accessing queue directly (Connect to the Postfix showq service: Co
nnection refused)
-Queue ID-  --Size-- ----Arrival Time---- -Sender/Recipient-------
EF3382A28AD     213 Tue Jan 27 19:20:24  root
                                         root

-- 0 Kbytes in 1 Request.
root@localhost:~#
```

7. Verify that you have received this mail.

```
root@localhost:~# echo "you should not see this mail" | mail -s "Postfix stopped test" root
root@localhost:~# mail
s-nail version v14.9.24.  Type `?' for help
/var/spool/mail/root: 3 messages
▸   1 Super User            2026-01-27 19:11   16/531   "Postfix test                                "
    2 Super User            2026-01-27 19:15   16/544   "Postfix test                                "
    3 Super User            2026-01-27 19:15   16/549   "confirm your mail                           "
& q
Held 3 messages in /var/spool/mail/root
```

8. Use systemctl utility to start postfix service

```
root@localhost:~# systemctl start postfix
root@localhost:~# systemctl status postfix
● postfix.service - Postfix Mail Transport Agent
     Loaded: loaded (/usr/lib/systemd/system/postfix.service; enabled; preset: disabled)
     Active: active (running) since Tue 2026-01-27 19:23:00 EET; 6s ago
 Invocation: a0eab4a0d05c4fe6a145e3e6adf093f5
    Process: 8103 ExecStartPre=/usr/sbin/restorecon -R /var/spool/postfix/pid (code=exited, status=0/SUCCESS)
    Process: 8105 ExecStartPre=/usr/libexec/postfix/aliasesdb (code=exited, status=0/SUCCESS)
    Process: 8107 ExecStartPre=/usr/libexec/postfix/chroot-update (code=exited, status=0/SUCCESS)
    Process: 8109 ExecStart=/usr/sbin/postfix start (code=exited, status=0/SUCCESS)
   Main PID: 8178 (master)
      Tasks: 6 (limit: 22596)
     Memory: 4M (peak: 7.8M)
        CPU: 242ms
     CGroup: /system.slice/postfix.service
             ├─8178 /usr/libexec/postfix/master -w
             ├─8179 pickup -l -t unix -u
             ├─8180 qmgr -l -t unix -u
             ├─8183 cleanup -z -t unix -u
             ├─8184 trivial-rewrite -n rewrite -t unix -u
             └─8185 local -t unix

Jan 27 19:23:00 localhost.localdomain systemd[1]: Starting postfix.service - Postfix Mail Transport Agent...
Jan 27 19:23:00 localhost.localdomain postfix[8176]: postfix/postlog: starting the Postfix mail system
Jan 27 19:23:00 localhost.localdomain postfix/postfix-script[8176]: starting the Postfix mail system
Jan 27 19:23:00 localhost.localdomain postfix/master[8178]: daemon started -- version 3.8.5, configuration />
Jan 27 19:23:00 localhost.localdomain systemd[1]: Started postfix.service - Postfix Mail Transport Agent.
Jan 27 19:23:00 localhost.localdomain postfix/pickup[8179]: 6DDDF315E063: uid=0 from=<root>
Jan 27 19:23:00 localhost.localdomain postfix/cleanup[8183]: 6DDDF315E063: message-id=<20260127172300.6DDDF3>
Jan 27 19:23:00 localhost.localdomain postfix/qmgr[8180]: 6DDDF315E063: from=<root@localhost.localdomain>, s>
Jan 27 19:23:00 localhost.localdomain postfix/local[8185]: 6DDDF315E063: to=<root@localhost.localdomain>, or>
Jan 27 19:23:00 localhost.localdomain postfix/qmgr[8180]: 6DDDF315E063: removed
lines 1-30/30 (END)
```

9. Verify that you have received this mail.

```
root@localhost:~# mail
s-nail version v14.9.24.  Type `?' for help
/var/spool/mail/root: 4 messages 1 new
    1 Super User            2026-01-27 19:11   16/531   "Postfix test
    2 Super User            2026-01-27 19:15   16/544   "Postfix test
    3 Super User            2026-01-27 19:15   16/549   "confirm your mail
▸N  4 Super User            2026-01-27 19:20   15/545   "Postfix stopped test
& 4
[-- Message  4 -- 15 lines, 545 bytes --]:
Date: Tue, 27 Jan 2026 19:20:24 +0200
To: root@localhost.localdomain
Subject: Postfix stopped test
Message-Id: <20260127172300.6DDDF315E063@localhost.localdomain>
From: Super User <root@localhost.localdomain>

you should not see this mail

&
```

10. Edit in the GRUB2 configuration file and change the timeout variable equal 20 seconds.

```
 GNU nano 8.1                                /etc/default/grub                                Modified
#GRUB_TIMEOUT=5
GRUB_TIMEOUT=20

GRUB_DISTRIBUTOR="$(sed 's, release .*$,,g' /etc/system-release)"
GRUB_DEFAULT=saved
GRUB_DISABLE_SUBMENU=true
GRUB_TERMINAL_OUTPUT="console"
GRUB_CMDLINE_LINUX="crashkernel=2G-4G:256M,4G-64G:320M,64G-:576M rd.lvm.lv=rhel/root rd.lvm.lv=rhel/swap"
GRUB_DISABLE_RECOVERY="true"
GRUB_ENABLE_BLSCFG=true
```

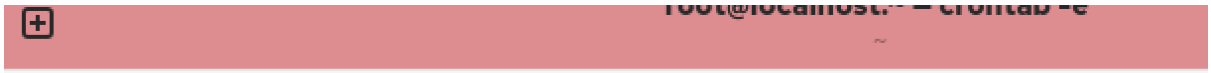
```
root@localhost:~# nano /etc/default/grub
root@localhost:~# grub2-mkconfig -o /boot/grub2/grub.cfg
Generating grub configuration file ...
Adding boot menu entry for UEFI Firmware Settings ...
done
```

```
root@localhost:~# awk '/timeout=/ {print $0}' /boot/grub2/grub.cfg
  set timeout=20
  set timeout=20
    set timeout=60
    set orig_timeout=${timeout}
      # timeout_style=menu + timeout=0 avoids the countdown code keypress check
      set timeout=0
      set timeout=1
    set timeout="${menu_show_once_timeout}"
root@localhost:~#
```

11. Edit in the GRUB2 configuration file and change your default operating system

```
root@localhost:~# awk -F\' '/menuentry / {print i++ " : " $2}' /boot/grub2/grub.cfg
0 : UEFI Firmware Settings
root@localhost:~# grep -i "menuentry '" /boot/grub2/grub.cfg
               menuentry 'UEFI Firmware Settings' $menuentry_id_option 'uefi-firmware' {
root@localhost:~#
```

12. You want to know some information about the status of the system every ten minutes today
between the hours of 8:00 AM and 5:00 PM. to help investigate some performance issues you
have been having. You suspect it might be memory related and want to keep an eye on those
resources.



```
*/10 8-17 * * * free -h >> /root/memory_log.txt
~
~
```

```
root@localhost:~# crontab -e
crontab: installing new crontab
Backup of root's previous crontab saved to /root/.cache/crontab/crontab.bak
root@localhost:~# crontab -l
*/10 8-17 * * * free -h >> /root/memory_log.txt
```

```
root@localhost:~# echo "==== $(date) ====" >> /root/memory_log.txt
free -h >> /root/memory_log.txt
cat /root/memory_log.txt
==== Tue Jan 27 08:00:34 PM EET 2026 ====
               total        used        free      shared  buff/cache   available
Mem:           3.5Gi       2.7Gi       167Mi        59Mi       902Mi       858Mi
Swap:          3.0Gi       524Ki       3.0Gi
root@localhost:~#
```

13. Use mail as the root user to check for e-mail from the cron jobs you have scheduled.

```
root@localhost:~# mail
s-nail version v14.9.24.  Type `?' for help
/var/spool/mail/root: 4 messages
▸   1 Super User            2026-01-27 19:11   16/531   "Postfix test
    2 Super User            2026-01-27 19:15   16/544   "Postfix test
    3 Super User            2026-01-27 19:15   16/549   "confirm your mail
    4 Super User            2026-01-27 19:20   16/556   "Postfix stopped test
& q
Held 4 messages in /var/spool/mail/root
```

14. How could you send the output from these cron jobs to another e-mail address (the manager user)?

```
root@localhost:~ — crontab -e
~
MAILTO="manager"
*/10 8-17 * * * free -h
~
~
~
~
```

15. Use mail as the manager user to check for e-mail from the cron jobs you have scheduled.

```
root@localhost:~# su - manager
Last login: Wed Jan 28 14:56:06 EET 2026 on pts/0
manager@localhost:~$ mail
s-nail: No mail for manager at /var/spool/mail/manager
manager@localhost:~$
```

16. Grand your colleagues a collective directory called /opt/research, where they can store generated
research results. Only members of group profs and grads should be able to create new files in the
directory, and new file should have the following properties:
the directory should be owned by root
new files should be group owned by group grads
group profs should automatically have read/write access to new files
group interns should automatically have read only access to new files
other users should not be able to access the directory and its contents at all.

```
root@localhost:~# getfacl /opt/research
getfacl: Removing leading '/' from absolute path names
# file: opt/research
# owner: root
# group: grads
# flags: -s-
user::rwx
group::rwx
other::---

root@localhost:~# setfacl -m g:profs:rwx /opt/research
setfacl: Option -m: Invalid argument near character 3
root@localhost:~# getent group grads
grads:x:1002:
root@localhost:~# getent group profs
root@localhost:~# getent group interns
root@localhost:~# groupadd profs
root@localhost:~# groupadd interns
root@localhost:~# getent group profs
profs:x:1003:
root@localhost:~# getent group interns
interns:x:1004:
root@localhost:~# setfacl -m g:profs:rwx /opt/research
root@localhost:~# setfacl -m g:interns:rx /opt/research
root@localhost:~# setfacl -d -m g:grads:rw /opt/research
root@localhost:~# setfacl -d -m g:profs:rw /opt/research
root@localhost:~# setfacl -d -m g:interns:r /opt/research
```

```
root@localhost:~# getfacl /opt/research
getfacl: Removing leading '/' from absolute path names
# file: opt/research
# owner: root
# group: grads
# flags: -s-
user::rwx
group::rwx
group:profs:rwx
group:interns:r-x
mask::rwx
other::---
default:user::rwx
default:group::rwx
default:group:grads:rw-
default:group:profs:rw-
default:group:interns:r--
default:mask::rwx
default:other::---

root@localhost:~#
```

17. Display your MAC address by 2 different ways.

1.ifconfig

```
root@localhost:~# ifconfig
enp0s1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.64.6  netmask 255.255.255.0  broadcast 192.168.64.255
        inet6 fe80::b816:53ff:fe6d:d2cf  prefixlen 64  scopeid 0x20<link>
        inet6 fdfa:ce36:4c3f:7cd8:b816:53ff:fe6d:d2cf  prefixlen 64  scopeid 0x0<global>
        ether ba:16:53:6d:d2:cf  txqueuelen 1000  (Ethernet)
        RX packets 371305  bytes 532675373 (507.9 MiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 149158  bytes 13444179 (12.8 MiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 26  bytes 2592 (2.5 KiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 26  bytes 2592 (2.5 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

2. Ip link

```
root@localhost:~# ip link
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN mode DEFAULT group defau
lt qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
2: enp0s1: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP mode DEFAULT g
roup default qlen 1000
    link/ether ba:16:53:6d:d2:cf brd ff:ff:ff:ff:ff:ff
    altname enxba16536dd2cf
root@localhost:~#
```

18. Display the network settings of all active interfaces.

```
root@localhost:~# ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc 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: enp0s1: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default
qlen 1000
    link/ether ba:16:53:6d:d2:cf brd ff:ff:ff:ff:ff:ff
    altname enxba16536dd2cf
    inet 192.168.64.6/24 brd 192.168.64.255 scope global dynamic noprefixroute enp0s1
       valid_lft 2589sec preferred_lft 2589sec
    inet6 fdfa:ce36:4c3f:7cd8:b816:53ff:fe6d:d2cf/64 scope global dynamic noprefixroute
       valid_lft 2591939sec preferred_lft 604739sec
    inet6 fe80::b816:53ff:fe6d:d2cf/64 scope link noprefixroute
       valid_lft forever preferred_lft forever
You have new mail in /var/spool/mail/root
root@localhost:~#
```

19. Display the network setting of all interfaces both active inactive.

```
root@localhost:~# ifconfig -a
enp0s1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.64.6  netmask 255.255.255.0  broadcast 192.168.64.255
        inet6 fe80::b816:53ff:fe6d:d2cf  prefixlen 64  scopeid 0x20<link>
        inet6 fdfa:ce36:4c3f:7cd8:b816:53ff:fe6d:d2cf  prefixlen 64  scopeid 0x0<global>
        ether ba:16:53:6d:d2:cf  txqueuelen 1000  (Ethernet)
        RX packets 471388  bytes 678585708 (647.1 MiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 184905  bytes 16193963 (15.4 MiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 31  bytes 2871 (2.8 KiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 31  bytes 2871 (2.8 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

root@localhost:~# ip link show
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN mode DEFAULT group defau
lt qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
2: enp0s1: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP mode DEFAULT g
roup default qlen 1000
    link/ether ba:16:53:6d:d2:cf brd ff:ff:ff:ff:ff:ff
    altname enxba16536dd2cf
root@localhost:~#
```

20. Bring your interface down.

```
root@localhost:~# ifconfig enp0s1 down
root@localhost:~# show enp0s1
bash: show: command not found...
root@localhost:~# ip link show enp0s1
2: enp0s1: <BROADCAST,MULTICAST> mtu 1500 qdisc fq_codel state DOWN mode DEFAULT group defau
lt qlen 1000
    link/ether ba:16:53:6d:d2:cf brd ff:ff:ff:ff:ff:ff
    altname enxba16536dd2cf
root@localhost:~#
```

21. Configure your network card to have static IP.

```
root@localhost:~# ip addr add 192.168.64.50/24 dev enp0s1
root@localhost:~# ip route add default via 192.168.64.1
root@localhost:~# ip a show enp0s1
2: enp0s1: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default
qlen 1000
    link/ether ba:16:53:6d:d2:cf brd ff:ff:ff:ff:ff:ff
    altname enxba16536dd2cf
    inet 192.168.64.6/24 brd 192.168.64.255 scope global dynamic noprefixroute enp0s1
       valid_lft 3544sec preferred_lft 3544sec
    inet 192.168.64.50/24 scope global secondary enp0s1
       valid_lft forever preferred_lft forever
    inet6 fdfa:ce36:4c3f:7cd8:b816:53ff:fe6d:d2cf/64 scope global dynamic noprefixroute
       valid_lft 2591956sec preferred_lft 604756sec
    inet6 fe80::b816:53ff:fe6d:d2cf/64 scope link noprefixroute
       valid_lft forever preferred_lft forever
root@localhost:~#
```

22. Bring your interface up.

```
root@localhost:~# ip link show enp0s1
2: enp0s1: <BROADCAST,MULTICAST> mtu 1500 qdisc fq_codel state DOWN mode DEFAULT group defau
lt qlen 1000
    link/ether ba:16:53:6d:d2:cf brd ff:ff:ff:ff:ff:ff
    altname enxba16536dd2cf
root@localhost:~# ifconfig enp0s1 up
root@localhost:~# ip link show enp0s1
2: enp0s1: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP mode DEFAULT g
roup default qlen 1000
    link/ether ba:16:53:6d:d2:cf brd ff:ff:ff:ff:ff:ff
    altname enxba16536dd2cf
root@localhost:~#
```

23. Verify your network setting using ifconfig command

```
root@localhost:~# ifconfig
enp0s1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.64.6  netmask 255.255.255.0  broadcast 192.168.64.255
        inet6 fe80::b816:53ff:fe6d:d2cf  prefixlen 64  scopeid 0x20<link>
        inet6 fdfa:ce36:4c3f:7cd8:b816:53ff:fe6d:d2cf  prefixlen 64  scopeid 0x0<global>
        ether ba:16:53:6d:d2:cf  txqueuelen 1000  (Ethernet)
        RX packets 477660  bytes 683210294 (651.5 MiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 189237  bytes 17472480 (16.6 MiB)
        TX errors 0  dropped 4 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 35  bytes 3083 (3.0 KiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 35  bytes 3083 (3.0 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

root@localhost:~#
```

24. Configure your network card to have dynamic IP using network manager command.

```
root@localhost:~# nmcli con mod enp0s1 ipv4.method auto
root@localhost:~# nmcli con up enp0s1
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkManager/Active
Connection/3)
root@localhost:~# ifconfig
enp0s1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.64.6  netmask 255.255.255.0  broadcast 192.168.64.255
        inet6 fe80::b816:53ff:fe6d:d2cf  prefixlen 64  scopeid 0x20<link>
        inet6 fdfa:ce36:4c3f:7cd8:b816:53ff:fe6d:d2cf  prefixlen 64  scopeid 0x0<global>
        ether ba:16:53:6d:d2:cf  txqueuelen 1000  (Ethernet)
        RX packets 479470  bytes 683561730 (651.8 MiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 190432  bytes 17869999 (17.0 MiB)
        TX errors 0  dropped 4 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 275  bytes 22763 (22.2 KiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 275  bytes 22763 (22.2 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

root@localhost:~#
```

25. Check using ifconfig then check its configuration file.

```
root@localhost:~# ifconfig
enp0s1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.64.6  netmask 255.255.255.0  broadcast 192.168.64.255
        inet6 fe80::b816:53ff:fe6d:d2cf  prefixlen 64  scopeid 0x20<link>
        inet6 fdfa:ce36:4c3f:7cd8:b816:53ff:fe6d:d2cf  prefixlen 64  scopeid 0x0<global>
        ether ba:16:53:6d:d2:cf  txqueuelen 1000  (Ethernet)
        RX packets 480304  bytes 683767735 (652.0 MiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 190963  bytes 18072659 (17.2 MiB)
        TX errors 0  dropped 4 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 280  bytes 23042 (22.5 KiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 280  bytes 23042 (22.5 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

You have new mail in /var/spool/mail/root
root@localhost:~# ls /etc/NetworkManager/system-connections/
enp0s1.nmconnection
root@localhost:~# sudo cat /etc/NetworkManager/system-connections/"enp0s1"
cat: /etc/NetworkManager/system-connections/enp0s1: No such file or directory
root@localhost:~# sudo cat /etc/NetworkManager/system-connections/enp0s1.nmconnection
[connection]
id=enp0s1
uuid=1163d62f-141a-30b6-a85f-be804d801a1e
type=ethernet
autoconnect-priority=-999
interface-name=enp0s1
timestamp=1770384358

[ethernet]

[ipv4]
method=auto

[ipv6]
addr-gen-mode=eui64
method=auto

[proxy]
root@localhost:~#
```

26. Reconfigure your network card using system-config-network utility to have static IP.

```
root@localhost:~# nmcli connection show
NAME    UUID                                  TYPE      DEVICE
enp0s1  1163d62f-141a-30b6-a85f-be804d801a1e  ethernet  enp0s1
lo      9b58e3bd-fbb9-4b1b-b993-53a2c06a8fd9  loopback  lo
root@localhost:~# nmcli con mod enp0s1 ipv4.method manual ipv4.addresses 192.168.64.50/24 ip
v4.gateway 192.168.64.1 ipv4.dns "8.8.8.8 8.8.4.4"
root@localhost:~# nmcli con up enp0s1
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkManager/Active
Connection/4)
root@localhost:~# ifconfig
enp0s1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.64.50  netmask 255.255.255.0  broadcast 192.168.64.255
        inet6 fe80::b816:53ff:fe6d:d2cf  prefixlen 64  scopeid 0x20<link>
        inet6 fdfa:ce36:4c3f:7cd8:b816:53ff:fe6d:d2cf  prefixlen 64  scopeid 0x0<global>
        ether ba:16:53:6d:d2:cf  txqueuelen 1000  (Ethernet)
        RX packets 524682  bytes 742620783 (708.2 MiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 211220  bytes 20591825 (19.6 MiB)
        TX errors 0  dropped 4 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 280  bytes 23042 (22.5 KiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 280  bytes 23042 (22.5 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

root@localhost:~#
```

27. Configure your network card to have 3 IPs and check that they are all working using ifconfig
command.

```
root@localhost:~# ifconfig enp0s1 192.168.1.10 netmask 255.255.255.0 up
root@localhost:~# ifconfig enp0s1
enp0s1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.64.6  netmask 255.255.255.0  broadcast 192.168.64.255
        inet6 fe80::b816:53ff:fe6d:d2cf  prefixlen 64  scopeid 0x20<link>
        inet6 fdfa:ce36:4c3f:7cd8:b816:53ff:fe6d:d2cf  prefixlen 64  scopeid 0x0<global>
        ether ba:16:53:6d:d2:cf  txqueuelen 1000  (Ethernet)
        RX packets 532376  bytes 745707216 (711.1 MiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 216939  bytes 22115315 (21.0 MiB)
        TX errors 0  dropped 4 overruns 0  carrier 0  collisions 0

root@localhost:~# ifconfig enp0s1:0 192.168.64.7 netmask 255.255.255.0 up
root@localhost:~# ifconfig enp0s1:1 192.168.64.8 netmask 255.255.255.0 up
You have new mail in /var/spool/mail/root
root@localhost:~# ifconfig
enp0s1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.1.10  netmask 255.255.255.0  broadcast 192.168.1.255
        inet6 fe80::b816:53ff:fe6d:d2cf  prefixlen 64  scopeid 0x20<link>
        inet6 fdfa:ce36:4c3f:7cd8:b816:53ff:fe6d:d2cf  prefixlen 64  scopeid 0x0<global>
        ether ba:16:53:6d:d2:cf  txqueuelen 1000  (Ethernet)
        RX packets 533262  bytes 745882530 (711.3 MiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 217597  bytes 22280922 (21.2 MiB)
        TX errors 0  dropped 4 overruns 0  carrier 0  collisions 0

enp0s1:0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.64.7  netmask 255.255.255.0  broadcast 192.168.64.255
        ether ba:16:53:6d:d2:cf  txqueuelen 1000  (Ethernet)

enp0s1:1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.64.8  netmask 255.255.255.0  broadcast 192.168.64.255
        ether ba:16:53:6d:d2:cf  txqueuelen 1000  (Ethernet)

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 2528  bytes 207306 (202.4 KiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 2528  bytes 207306 (202.4 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

root@localhost:~#
```

28. Change your host name in your global network file.
Your boss thinks it’s a great idea to have one central logging server. Satisfy his requirements
Hint:
Set up rsyslogd on the "logging server" machine to accept logging messages from other machines.
On the your "workstation", set up rsyslogd to send messages to the "logging server
Test the new setup by using the logger command on the "workstation" to generate a log message
Does the message appear in the "logging server's" /var/log/messages file?
Why does this message also appear in the "workstation's" /var/log/messages file?

```
root@localhost:~# hostname
localhost.localdomain
root@localhost:~# hostnamectl
   Static hostname: (unset)
Transient hostname: localhost
         Icon name: computer-vm
           Chassis: vm 🖴
        Machine ID: b4ea6e36b50d40dcbd4c1862bfd81dfa
           Boot ID: 2b44a77a306844b7a9cce9d9284a838d
      Product UUID: edae6a91-42b4-4b5f-be0a-cec4bda4beae
    Virtualization: qemu
  Operating System: Red Hat Enterprise Linux 10.1 (Coughlan)
       CPE OS Name: cpe:/o:redhat:enterprise_linux:10.1
            Kernel: Linux 6.12.0-124.8.1.el10_1.aarch64
      Architecture: arm64
   Hardware Vendor: QEMU
    Hardware Model: QEMU Virtual Machine
  Firmware Version: 0.0.0
     Firmware Date: Fri 2015-02-06
      Firmware Age: 11y
root@localhost:~# hostnamectl set-hostname mrym_abdelraheem
root@localhost:~# nano /etc/hostname
root@localhost:~# nano /etc/hosts
root@localhost:~# hostname
mrymabdelraheem
root@localhost:~# hostnamectl
 Static hostname: mrymabdelraheem
 Pretty hostname: mrym_abdelraheem
       Icon name: computer-vm
         Chassis: vm 🖴
      Machine ID: b4ea6e36b50d40dcbd4c1862bfd81dfa
         Boot ID: 2b44a77a306844b7a9cce9d9284a838d
    Product UUID: edae6a91-42b4-4b5f-be0a-cec4bda4beae
  Virtualization: qemu
Operating System: Red Hat Enterprise Linux 10.1 (Coughlan)
     CPE OS Name: cpe:/o:redhat:enterprise_linux:10.1
          Kernel: Linux 6.12.0-124.8.1.el10_1.aarch64
    Architecture: arm64
 Hardware Vendor: QEMU
  Hardware Model: QEMU Virtual Machine
Firmware Version: 0.0.0
   Firmware Date: Fri 2015-02-06
    Firmware Age: 11y
root@localhost:~#
```

29. How could you have the message only appear in the "logging server's" files?

```
 GNU nano 8.1                          /etc/rsyslog.conf
# rsyslog configuration file

# For more information see /usr/share/doc/rsyslog-*/rsyslog_conf.html
# or latest version online at http://www.rsyslog.com/doc/rsyslog_conf.html
# If you experience problems, see http://www.rsyslog.com/doc/troubleshoot.html

#### GLOBAL DIRECTIVES ####

# Where to place auxiliary files
global(workDirectory="/var/lib/rsyslog")

#### MODULES ####

# Use default timestamp format
module(load="builtin:omfile" Template="RSYSLOG_TraditionalFileFormat")

module(load="imuxsock"    # provides support for local system logging (e.g. via logger comm>
       SysSock.Use="off") # Turn off message reception via local log socket;
                          # local messages are retrieved through imjournal now.
module(load="imjournal"             # provides access to the systemd journal
       UsePid="system" # PID nummber is retrieved as the ID of the process the journal entr>
       FileCreateMode="0644" # Set the access permissions for the state file
       StateFile="imjournal.state") # File to store the position in the journal

# Include all config files in /etc/rsyslog.d/
include(file="/etc/rsyslog.d/*.conf" mode="optional")

#module(load="imklog") # reads kernel messages (the same are read from journald)
#module(load="immark") # provides --MARK-- message capability

# Provides UDP syslog reception
# for parameters see http://www.rsyslog.com/doc/imudp.html
#module(load="imudp") # needs to be done just once
#input(type="imudp" port="514")
```

```
# Provides UDP syslog reception
# for parameters see http://www.rsyslog.com/doc/imudp.html
module(load="imudp") # needs to be done just once
input(type="imudp" port="514")

# Provides TCP syslog reception
# for parameters see http://www.rsyslog.com/doc/imtcp.html
module(load="imtcp") # needs to be done just once
input(type="imtcp" port="514")
```

```
root@localhost:~# firewall-cmd --permanent --add-port=514/tcp
success
root@localhost:~# ^C
root@localhost:~# firewall-cmd --permanent --add-port=514/udp
success
root@localhost:~# firewall-cmd --reload
success
root@localhost:~# firewall-cmd --list-ports
514/tcp 514/udp
root@localhost:~#
```

```
#queue.type="LinkedList"         # run asynchronously
#action.resumeRetryCount="-1"    # infinite retries if host is down
# # Remote Logging (we use TCP for reliable delivery)
# # remote_host is: name/ip, e.g. 192.168.0.1, port optional e.g. 10514
#Target="remote_host" Port="XXX" Protocol="tcp")
*.* @@LOG_SERVER_IP:514


^G Help        ^O Write Out   ^F Where Is    ^K Cut         ^T Execute     ^C Location
^X Exit        ^R Read File   ^\ Replace     ^U Paste       ^J Justify     ^/ Go To Line
```

```
root@localhost:~# nano /etc/rsyslog.conf
You have new mail in /var/spool/mail/root
root@localhost:~# nano /etc/rsyslog.conf
root@localhost:~# systemctl restart rsyslog
root@localhost:~# logger "Test log from workstation"
root@localhost:~# tail -n 20 /var/log/messages
Feb  6 16:40:12 mrymabdelraheem systemd[1]: run-user-1001.mount: Deactivated successfully.
Feb  6 16:40:12 mrymabdelraheem systemd[1]: user-runtime-dir@1001.service: Deactivated succe
ssfully.
Feb  6 16:40:12 mrymabdelraheem systemd[1]: Stopped user-runtime-dir@1001.service - User Run
time Directory /run/user/1001.
Feb  6 16:40:12 mrymabdelraheem systemd[1]: Removed slice user-1001.slice - User Slice of UI
D 1001.
Feb  6 16:41:51 mrymabdelraheem systemd[1]: packagekit.service: Deactivated successfully.
Feb  6 16:41:51 mrymabdelraheem systemd[1]: packagekit.service: Consumed 588ms CPU time, 245
M memory peak.
Feb  6 16:43:10 mrymabdelraheem systemd[1]: Stopping rsyslog.service - System Logging Servic
e...
Feb  6 16:43:11 mrymabdelraheem rsyslogd[8844]: [origin software="rsyslogd" swVersion="8.250
6.0-2.el10" x-pid="8844" x-info="https://www.rsyslog.com"] exiting on signal 15.
Feb  6 16:43:11 mrymabdelraheem systemd[1]: rsyslog.service: Deactivated successfully.
Feb  6 16:43:11 mrymabdelraheem systemd[1]: Stopped rsyslog.service - System Logging Service
.
Feb  6 16:43:11 mrymabdelraheem systemd[1]: Starting rsyslog.service - System Logging Servic
e...
Feb  6 16:43:11 mrymabdelraheem rsyslogd[9400]: [origin software="rsyslogd" swVersion="8.250
6.0-2.el10" x-pid="9400" x-info="https://www.rsyslog.com"] start
Feb  6 16:43:11 mrymabdelraheem rsyslogd[9400]: imjournal: journal files changed, reloading.
..  [v8.2506.0-2.el10 try https://www.rsyslog.com/e/0 ]
Feb  6 16:43:11 mrymabdelraheem systemd[1]: Started rsyslog.service - System Logging Service
.
Feb  6 16:43:11 mrymabdelraheem rsyslogd[9400]: cannot resolve hostname 'LOG_SERVER_IP' [v8.
2506.0-2.el10 try https://www.rsyslog.com/e/2027 ]
Feb  6 16:43:11 mrymabdelraheem rsyslogd[9400]: omfwd: [wrkr 0/281473688924128] no working t
arget servers in pool available, suspending action (state: beginTx) [v8.2506.0-2.el10 try ht
tps://www.rsyslog.com/e/2007 ]
Feb  6 16:43:11 mrymabdelraheem rsyslogd[9400]: action 'action-7-builtin:omfwd' suspended (m
odule 'builtin:omfwd'), retry 0. There should be messages before this one giving the reason
for suspension. [v8.2506.0-2.el10 try https://www.rsyslog.com/e/2007 ]
Feb  6 16:43:11 mrymabdelraheem rsyslogd[9400]: cannot resolve hostname 'LOG_SERVER_IP' [v8.
2506.0-2.el10 try https://www.rsyslog.com/e/2027 ]
Feb  6 16:43:11 mrymabdelraheem rsyslogd[9400]: action 'action-7-builtin:omfwd' suspended (m
odule 'builtin:omfwd'), next retry is Fri Feb  6 16:43:41 2026, retry nbr 0. There should be
 messages before this one giving the reason for suspension. [v8.2506.0-2.el10 try https://ww
w.rsyslog.com/e/2007 ]
Feb  6 16:43:16 mrymabdelraheem root[9419]: Test log from workstation
root@localhost:~#
```