

# Cloud Platform Development

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## Q1. use systemctl to View the status of sshd services

```
root@localhost:~  
[root@localhost ~]# systemctl status sshd  
● sshd.service - OpenSSH server daemon  
   Loaded: loaded (/usr/lib/systemd/system/ssh.service; enabled; preset: enabled)  
   Active: active (running) since Tue 2025-03-25 18:48:13 EET; 2min 19s ago  
     Docs: man:ssh(8)  
           man:ssh_config(5)  
   Main PID: 903 (sshd)  
     Tasks: 1 (limit: 10727)  
    Memory: 2.6M  
       CPU: 18ms  
    CGroup: /system.slice/ssh.service  
            └─903 "sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups"  
  
Mar 25 18:48:12 localhost.localdomain systemd[1]: Starting OpenSSH server daemon...  
Mar 25 18:48:13 localhost.localdomain sshd[903]: Server listening on 0.0.0.0 port 22.  
Mar 25 18:48:13 localhost.localdomain sshd[903]: Server listening on :: port 22.  
Mar 25 18:48:13 localhost.localdomain systemd[1]: Started OpenSSH server daemon.  
[root@localhost ~]#
```

## Q2. use systemctl to view the status of all the system services

```
[root@localhost ~]# sudo systemctl list-units --type=service
```

UNIT	LOAD	ACTIVE	SUB	DESCRIPTION
accounts-daemon.service	loaded	active	running	Accounts Service
alsa-state.service	loaded	active	running	Manage Sound Card State (restore and store)
atd.service	loaded	active	running	Deferred execution scheduler
auditd.service	loaded	active	running	Security Auditing Service
avahi-daemon.service	loaded	active	running	Avahi mDNS/DNS-SD Stack
chronyd.service	loaded	active	running	NTP client/server
colord.service	loaded	active	running	Manage, Install and Generate Color Profiles
crond.service	loaded	active	running	Command Scheduler
cups.service	loaded	active	running	CUPS Scheduler
dbus-broker.service	loaded	active	running	D-Bus System Message Bus
dracut-shutdown.service	loaded	active	exited	Restore /run/initramfs on shutdown
firewalld.service	loaded	active	running	firewalld - dynamic firewall daemon
fwupd.service	loaded	active	running	Firmware update daemon
gdm.service	loaded	active	running	GNOME Display Manager
kdump.service	loaded	active	exited	Crash recovery kernel arming
kmod-static-nodes.service	loaded	active	exited	Create List of Static Device Nodes
libstoragemgmt.service	loaded	active	running	libstoragemgmt plug-in server daemon
lvm2-monitor.service	loaded	active	exited	Monitoring of LVM2 mirrors, snapshots etc. using dmeventd or progress polling
mcelog.service	loaded	active	running	Machine Check Exception Logging Daemon
ModemManager.service	loaded	active	running	Modem Manager
NetworkManager-wait-online.service	loaded	active	exited	Network Manager Wait Online
NetworkManager.service	loaded	active	running	Network Manager
nis-domainname.service	loaded	active	exited	Read and set NIS domainname from /etc/sysconfig/network
packagekit.service	loaded	active	running	PackageKit Daemon
plymouth-quit-wait.service	loaded	active	exited	Hold until boot process finishes up
plymouth-read-write.service	loaded	active	exited	Tell Plymouth To Write Out Runtime Data
plymouth-start.service	loaded	active	exited	Show Plymouth Boot Screen
polkit.service	loaded	active	running	Authorization Manager

Q3.

- a- Send mail to the root user and Verify that you have received this mail
- b- Use systemctl utility to stop postfix/sendmail service
- c- Send mail again to the root user and Verify that you have received this mail
- d- Use systemctl utility to start postfix/sendmail service
- e- Verify that you have received this mail

```
root@localhost:~  
[root@localhost ~]# echo "Test email" | mail root  
[root@localhost ~]# systemctl stop postfix  
[root@localhost ~]# echo "Test email 2" | mail root  
[root@localhost ~]# systemctl start postfix  
[root@localhost ~]# echo "Test email 3" | mail root  
You have new mail in /var/spool/mail/root  
[root@localhost ~]# cat /var/spool/mail/root  
From root@localhost.localdomain Tue Mar 25 19:22:46 2025  
Return-Path: <root@localhost.localdomain>  
X-Original-To: root  
Delivered-To: root@localhost.localdomain  
Received: by localhost.localdomain (Postfix, from userid 0)  
        id D5C33216E20B; Tue, 25 Mar 2025 19:21:47 +0200 (EET)  
Date: Tue, 25 Mar 2025 19:21:47 +0200  
To: root@localhost.localdomain  
User-Agent: s-nail v14.9.22  
Message-Id: <20250325172246.D5C33216E20B@localhost.localdomain>  
From: root <root@localhost.localdomain>  
  
Test email  
  
From root@localhost.localdomain Tue Mar 25 19:22:46 2025  
Return-Path: <root@localhost.localdomain>  
X-Original-To: root  
Delivered-To: root@localhost.localdomain  
Received: by localhost.localdomain (Postfix, from userid 0)  
        id E45F5216E20C; Tue, 25 Mar 2025 19:22:13 +0200 (EET)  
Date: Tue, 25 Mar 2025 19:22:13 +0200  
To: root@localhost.localdomain  
User-Agent: s-nail v14.9.22  
Message-Id: <20250325172246.E45F5216E20C@localhost.localdomain>  
From: root <root@localhost.localdomain>
```

Q4. switch to the multi-user target manually without rebooting

Q5. display default target

Q6. change the default target back to multi-user.target and reboot

Q7. set the default systemd target back to graphical.target

```
CentOS Stream 9
Kernel 5.14.0-522.el9.x86_64 on an x86_64

Activate the web console with: systemctl enable --now cockpit.socket

localhost login: moaaz
Password:
Last login: Tue Mar 25 18:48:58 on tty2
moaaz@localhost ~]$
```

```
CentOS Stream 9
Kernel 5.14.0-522.el9.x86_64 on an x86_64

Activate the web console with: systemctl enable --now cockpit.socket

localhost login: moaaz
Password:
Last login: Tue Mar 25 18:48:58 on tty2
moaaz@localhost ~]$ ^C
moaaz@localhost ~]$ systemctl get-default
graphical.target
moaaz@localhost ~]$
moaaz@localhost ~]$ systemctl set-default multi-user.target
==== AUTHENTICATING FOR org.freedesktop.systemd1.manage-unit-files ====
Authentication is required to manage system service or unit files.
Authenticating as: Moaaz (moaaz)
Password:
==== AUTHENTICATION COMPLETE ====
Removed "/etc/systemd/system/default.target".
Created symlink /etc/systemd/system/default.target + /usr/lib/systemd/system/multi-user.target.
moaaz@localhost ~]$ reboot_
```

```
CentOS Stream 9
Kernel 5.14.0-522.el9.x86_64 on an x86_64

Activate the web console with: systemctl enable --now cockpit.socket

localhost login: root
Password:
Last login: Tue Mar 25 18:50:07 on pts/0
[root@localhost ~]# systemctl set-default graphical.target
```

Q8.Display the status of sshd service, note the PID of the daemon.

Q9. Restart the sshd service and view the status, The PID of the daemon has changed

Q10. Reload the sshd service and view the status, The PID of the daemon has not changed and connection has not be interrupted

PID changed in case of restart from 878 to 2921

```
[root@localhost ~]# systemctl status sshd
● sshd.service - OpenSSH server daemon
   Loaded: loaded (/usr/lib/systemd/system/sshd.service; enabled; preset: enabled)
   Active: active (running) since Tue 2025-03-25 18:59:19 EET; 1min 45s ago
     Docs: man:sshd(8)
           man:sshd_config(5)
  Main PID: 878 (sshd)
    Tasks: 1 (limit: 10728)
   Memory: 2.6M
      CPU: 25ms
  CGroup: /system.slice/sshd.service
          └─878 "sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups"

Mar 25 18:59:19 localhost.localdomain systemd[1]: Starting OpenSSH server daemon...
Mar 25 18:59:19 localhost.localdomain sshd[878]: Server listening on 0.0.0.0 port 22.
Mar 25 18:59:19 localhost.localdomain sshd[878]: Server listening on :: port 22.
Mar 25 18:59:19 localhost.localdomain systemd[1]: Started OpenSSH server daemon.
[root@localhost ~]# systemctl restart sshd
[root@localhost ~]# systemctl status sshd
● sshd.service - OpenSSH server daemon
   Loaded: loaded (/usr/lib/systemd/system/sshd.service; enabled; preset: enabled)
   Active: active (running) since Tue 2025-03-25 19:01:15 EET; 2s ago
     Docs: man:sshd(8)
           man:sshd_config(5)
  Main PID: 2921 (sshd)
    Tasks: 1 (limit: 10728)
   Memory: 1.4M
      CPU: 14ms
  CGroup: /system.slice/sshd.service
          └─2921 "sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups"

Mar 25 19:01:15 localhost.localdomain systemd[1]: Starting OpenSSH server daemon...
```

## Q11. Verify that the chronyd service is running

```
[root@localhost ~]# systemctl status chronyd
● chronyd.service - NTP client/server
   Loaded: loaded (/usr/lib/systemd/system/chronyd.service; enabled; preset: enabled)
   Active: active (running) since Tue 2025-03-25 18:59:13 EET; 3min 20s ago
     Docs: man:chronyd(8)
           man:chrony.conf(5)
  Process: 740 ExecStart=/usr/sbin/chronyd $OPTIONS (code=exited, status=0/SUCCESS)
 Main PID: 771 (chronyd)
    Tasks: 1 (limit: 10728)
   Memory: 4.2M
      CPU: 82ms
   CGroup: /system.slice/chronyd.service
           └─771 /usr/sbin/chronyd -F 2

Mar 25 18:59:12 localhost systemd[1]: Starting NTP client/server...
Mar 25 18:59:13 localhost chronyd[771]: chronyd version 4.6 starting (+CMDMON +NTP +REFCLOCK +RTC +PRIVDROP +SCFILTER +SIGND +ASYNCDNS +NTS +SECHASH +IPV6 +D
Mar 25 18:59:13 localhost chronyd[771]: Loaded 0 symmetric keys
Mar 25 18:59:13 localhost chronyd[771]: Using right/UTC timezone to obtain leap second data
Mar 25 18:59:13 localhost chronyd[771]: Frequency 0.046 +/- 9.267 ppm read from /var/lib/chrony/drift
Mar 25 18:59:13 localhost chronyd[771]: Loaded seccomp filter (level 2)
Mar 25 18:59:13 localhost systemd[1]: Started NTP client/server.
Mar 25 18:59:27 localhost.localdomain chronyd[771]: Selected source 102.64.113.151 (2.centos.pool.ntp.org)
Mar 25 18:59:27 localhost.localdomain chronyd[771]: System clock TAI offset set to 37 seconds
lines 1-22/22 (END)
```

Q12.

a- Determine if the chronyd service is enabled to start at the system boot

b- Reboot the system, then view the status of the chronyd service

```
root@localhost:~# systemctl is-enabled chronyd
enabled
root@localhost ~]#
```

Then rebooted

```
root@localhost:~# systemctl status chronyd
● chronyd.service - NTP client/server
   Loaded: loaded (/usr/lib/systemd/system/chronyd.service; enabled; preset: enabled)
   Active: active (running) since Tue 2025-03-25 19:04:02 EET; 1min 30s ago
     Docs: man:chronyd(8)
           man:chrony.conf(5)
  Process: 740 ExecStart=/usr/sbin/chronyd $OPTIONS (code=exited, status=0/SUCCESS)
 Main PID: 756 (chronyd)
    Tasks: 1 (limit: 10728)
   Memory: 4.2M
      CPU: 82ms
   CGroup: /system.slice/chronyd.service
           └─756 /usr/sbin/chronyd -F 2

Mar 25 19:04:01 localhost systemd[1]: Starting NTP client/server...
Mar 25 19:04:02 localhost chronyd[756]: chronyd version 4.6 starting (+CMDMON +NTP +REFCLOCK +RTC +PRIVDROP +SCFILTER +SIGND +ASYNCDNS +NTS +SECHASH +IPV6 +D
Mar 25 19:04:02 localhost chronyd[756]: Loaded 0 symmetric keys
Mar 25 19:04:02 localhost chronyd[756]: Using right/UTC timezone to obtain leap second data
Mar 25 19:04:02 localhost chronyd[756]: Frequency -0.963 +/- 20.212 ppm read from /var/lib/chrony/drift
Mar 25 19:04:02 localhost chronyd[756]: Loaded seccomp filter (level 2)
Mar 25 19:04:02 localhost systemd[1]: Started NTP client/server.
Mar 25 19:04:13 localhost.localdomain chronyd[756]: Selected source 41.175.51.165 (2.centos.pool.ntp.org)
Mar 25 19:04:13 localhost.localdomain chronyd[756]: System clock TAI offset set to 37 seconds
lines 1-22/22 (END)
```



Q13.

a- Disable the chronyd service so that it doesn't start at system boot, then view the status of the service

b- Reboot the system, then view the status of the chronyd service

```
root@localhost:~# systemctl disable chronyd
Removed "/etc/systemd/system/multi-user.target.wants/chronyd.service".
[root@localhost ~]# systemctl status chronyd
● chronyd.service - NTP client/server
   Loaded: loaded (/usr/lib/systemd/system/chronyd.service; disabled; preset: enabled)
   Active: active (running) since Tue 2025-03-25 19:04:02 EET; 2min 6s ago
     Docs: man:chronyd(8)
           man:chrony.conf(5)
  Main PID: 756 (chronyd)
    Tasks: 1 (limit: 10728)
   Memory: 4.2M
      CPU: 82ms
   CGroup: /system.slice/chronyd.service
           └─756 /usr/sbin/chronyd -F 2


Mar 25 19:04:01 localhost systemd[1]: Starting NTP client/server...
Mar 25 19:04:02 localhost chronyd[756]: chronyd version 4.6 starting (+CMDMON +NTP +REFCLOCK +RTC +PRIVDROP +SCFILTER +SIGND +ASYNCDNS +NTS +SECHASH +IPV6 +D
Mar 25 19:04:02 localhost chronyd[756]: Loaded 0 symmetric keys
Mar 25 19:04:02 localhost chronyd[756]: Using right/UTC timezone to obtain leap second data
Mar 25 19:04:02 localhost chronyd[756]: Frequency -0.963 +/- 20.212 ppm read from /var/lib/chrony/drift
Mar 25 19:04:02 localhost chronyd[756]: Loaded seccomp filter (level 2)
Mar 25 19:04:02 localhost systemd[1]: Started NTP client/server.
Mar 25 19:04:13 localhost.localdomain chronyd[756]: Selected source 41.175.51.165 (2.centos.pool.ntp.org)
Mar 25 19:04:13 localhost.localdomain chronyd[756]: System clock TAI offset set to 37 seconds
lines 1-21/21 (END)
```

After reboot

```
moaaz@localhost:~$ systemctl status chronyd
○ chronyd.service - NTP client/server
   Loaded: loaded (/usr/lib/systemd/system/chronyd.service; disabled; preset: enabled)
   Active: inactive (dead)
     Docs: man:chronyd(8)
           man:chrony.conf(5)
[moaaz@localhost ~]$
```

Q14. display all Static Services

```
[moaaz@localhost ~]$  
[moaaz@localhost ~]$ systemctl list-unit-files --state=static  
UNIT FILE                                STATE PRESET  
-----  
proc-sys-fs-binfmt_misc.automount       static -  
dev-hugepages.mount                     static -  
dev-mqueue.mount                         static -  
sys-fs-fuse-connections.mount            static -  
sys-kernel-config.mount                  static -  
sys-kernel-debug.mount                   static -  
sys-kernel-tracing.mount                  static -  
systemd-ask-password-console.path        static -  
systemd-ask-password-plymouth.path        static -  
systemd-ask-password-wall.path            static -  
alsa-restore.service                     static -  
alsa-state.service                       static -  
bolt.service                             static -  
cockpit-motd.service                      static -  
cockpit-ws-user.service                   static -  
cockpit-wsinstance-http.service           static -  
cockpit-wsinstance-https-factory@.service static -  
cockpit-wsinstance-https@.service         static -  
cockpit.service                           static -  
colord.service                            static -  
configure-printer@.service                static -  
container-getty@.service                  static -  
dm-event.service                          static -  
dnf-makecache.service                     static -  
dnf-system-upgrade-cleanup.service         static -  
dracut-cmdline.service                     static -  
dracut-initqueue.service                   static -  
dracut-mount.service                       static -  
dracut-pre-mount.service                   static -  
dracut-pre-pivot.service                   static -  
dracut-pre-trigger.service                 static -
```



7:08 PM  
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Q15. What difference Between enable,disable,static,mask Service

Enable: Service starts automatically on boot

Disable: Service does not start automatically on boot

Static: Service cannot be enabled/disabled manually, starts only if another service depends on it

Mask: Completely prevents the service from being started, even manually

## Q16. Display all logs from the current boot

```
[moaaz@localhost ~]$ journalctl -b
Mar 25 19:06:49 localhost kernel: Linux version 5.14.0-522.el9.x86_64 (mockbuild@x86-05.stream.rdu2.redhat.com) (gcc (GCC) 11.5.0 20240719 (Red Hat 11.5.0-2))>
Mar 25 19:06:49 localhost kernel: The list of certified hardware and cloud instances for Red Hat Enterprise Linux 9 can be viewed at the Red Hat Ecosystem Cap>
Mar 25 19:06:49 localhost kernel: Command line: BOOT_IMAGE=(hd0,msdos1)/vmlinuz-5.14.0-522.el9.x86_64 root=/dev/mapper/cs-root ro crashkernel=1G-4G:192M,4G-6>
Mar 25 19:06:49 localhost kernel: Disabled fast string operations
Mar 25 19:06:49 localhost kernel: BIOS-provided physical RAM map:
Mar 25 19:06:49 localhost kernel: BIOS-e820: [mem 0x0000000000000000-0x0000000000098bfff] usable
Mar 25 19:06:49 localhost kernel: BIOS-e820: [mem 0x0000000000098c00-0x000000000009ffff] reserved
Mar 25 19:06:49 localhost kernel: BIOS-e820: [mem 0x00000000000dc000-0x00000000000ffff] reserved
Mar 25 19:06:49 localhost kernel: BIOS-e820: [mem 0x0000000000100000-0x00000000007fedffff] usable
Mar 25 19:06:49 localhost kernel: BIOS-e820: [mem 0x00000000007fee0000-0x00000000007fefffff] ACPI data
Mar 25 19:06:49 localhost kernel: BIOS-e820: [mem 0x00000000007feff000-0x00000000007feffff] ACPI NVS
Mar 25 19:06:49 localhost kernel: BIOS-e820: [mem 0x00000000007fff0000-0x00000000007ffff] usable
Mar 25 19:06:49 localhost kernel: BIOS-e820: [mem 0x0000000000f0000000-0x0000000000f7ffff] reserved
Mar 25 19:06:49 localhost kernel: BIOS-e820: [mem 0x0000000000fec00000-0x0000000000fec0ffff] reserved
Mar 25 19:06:49 localhost kernel: BIOS-e820: [mem 0x0000000000fee00000-0x0000000000fee0ffff] reserved
Mar 25 19:06:49 localhost kernel: BIOS-e820: [mem 0x0000000000fffe0000-0x0000000000ffff] reserved
Mar 25 19:06:49 localhost kernel: NX (Execute Disable) protection: active
Mar 25 19:06:49 localhost kernel: APIC: Static calls initialized
Mar 25 19:06:49 localhost kernel: SMBIOS 2.7 present.
Mar 25 19:06:49 localhost kernel: DMI: VMware, Inc. VMware Virtual Platform/440BX Desktop Reference Platform, BIOS 6.00 11/12/2020
Mar 25 19:06:49 localhost kernel: vmware: hypercall mode: 0x02
Mar 25 19:06:49 localhost kernel: Hypervisor detected: VMware
Mar 25 19:06:49 localhost kernel: vmware: TSC freq read from hypervisor : 1799.999 MHz
Mar 25 19:06:49 localhost kernel: vmware: Host bus clock speed read from hypervisor : 66000000 Hz
Mar 25 19:06:49 localhost kernel: vmware: using clock offset of 9044634419 ns
Mar 25 19:06:49 localhost kernel: tsc: Detected 1799.999 MHz processor
Mar 25 19:06:49 localhost kernel: e820: update [mem 0x00000000-0x00000fff] usable ==> reserved
Mar 25 19:06:49 localhost kernel: e820: remove [mem 0x000a0000-0x000ffff] usable
Mar 25 19:06:49 localhost kernel: last_pfn = 0x80000 max_arch_pfn = 0x400000000
Mar 25 19:06:49 localhost kernel: total RAM covered: 3072M
Mar 25 19:06:49 localhost kernel: Found optimal setting for mtrr clean up
```

7:10 PM  
3/25/2025

## Q17. View logs for the sshd service




```
moaaz@localhost:~  
[moaaz@localhost ~]$ journalctl -u sshd  
Mar 25 19:07:04 localhost.localdomain systemd[1]: Starting OpenSSH server daemon...  
Mar 25 19:07:04 localhost.localdomain sshd[883]: Server listening on 0.0.0.0 port 22.  
Mar 25 19:07:04 localhost.localdomain sshd[883]: Server listening on :: port 22.  
Mar 25 19:07:04 localhost.localdomain systemd[1]: Started OpenSSH server daemon.  
[moaaz@localhost ~]$
```

## Q18. Follow (live-tail) new log entries

```
moaaz@localhost:~ — journalctl -f
[moaaz@localhost ~]$ journalctl -f
Mar 25 19:08:14 localhost.localdomain systemd[1]: systemd-hostnamed.service: Deactivated successfully.
Mar 25 19:08:21 localhost.localdomain realmd[1740]: quitting realmd service after timeout
Mar 25 19:08:21 localhost.localdomain realmd[1740]: stopping service
Mar 25 19:08:21 localhost.localdomain systemd[1]: realmd.service: Deactivated successfully.
Mar 25 19:08:34 localhost.localdomain systemd[1832]: Starting Virtual filesystem metadata service...
Mar 25 19:08:34 localhost.localdomain systemd[1832]: Started Virtual filesystem metadata service.
Mar 25 19:08:44 localhost.localdomain gnome-shell[1930]: Source ID 1753 was not found when attempting to remove it
Mar 25 19:10:23 localhost.localdomain systemd[1832]: Starting Mark boot as successful...
Mar 25 19:10:23 localhost.localdomain systemd[1832]: Finished Mark boot as successful.
Mar 25 19:10:43 localhost.localdomain gnome-shell[1930]: Source ID 3018 was not found when attempting to remove it
```

## Q19. Show logs from the last 30 minutes

```
[moaaz@localhost ~]$ journalctl --since "30 minutes ago"
Mar 25 19:06:49 localhost kernel: Linux version 5.14.0-522.el9.x86_64 (mockbuild@x86-05.stream.rdu2.redhat.com) (gcc (GCC) 11.5.0 20240719 (Red Hat 11.5.0-2)>
Mar 25 19:06:49 localhost kernel: The list of certified hardware and cloud instances for Red Hat Enterprise Linux 9 can be viewed at the Red Hat Ecosystem Ca>
Mar 25 19:06:49 localhost kernel: Command line: BOOT_IMAGE=(hd0,msdos1)/vmlinuz-5.14.0-522.el9.x86_64 root=/dev/mapper/cs-root ro crashkernel=1G-4G:192M,4G-6>
Mar 25 19:06:49 localhost kernel: Disabled fast string operations
Mar 25 19:06:49 localhost kernel: BIOS-provided physical RAM map:
Mar 25 19:06:49 localhost kernel: BIOS-e820: [mem 0x0000000000000000-0x00000000000098bfff] usable
Mar 25 19:06:49 localhost kernel: BIOS-e820: [mem 0x00000000000098c00-0x0000000000009fffff] reserved
Mar 25 19:06:49 localhost kernel: BIOS-e820: [mem 0x000000000000dc000-0x000000000000fffff] reserved
Mar 25 19:06:49 localhost kernel: BIOS-e820: [mem 0x00000000000100000-0x000000000007fedffff] usable
Mar 25 19:06:49 localhost kernel: BIOS-e820: [mem 0x000000000007fee0000-0x000000000007fefefff] ACPI data
Mar 25 19:06:49 localhost kernel: BIOS-e820: [mem 0x000000000007feff000-0x000000000007fefffff] ACPI NVS
Mar 25 19:06:49 localhost kernel: BIOS-e820: [mem 0x000000000007fff0000-0x000000000007fffffff] usable
Mar 25 19:06:49 localhost kernel: BIOS-e820: [mem 0x00000000000f0000000-0x00000000000f7fffff] reserved
Mar 25 19:06:49 localhost kernel: BIOS-e820: [mem 0x00000000000fec00000-0x00000000000fec0ffff] reserved
Mar 25 19:06:49 localhost kernel: BIOS-e820: [mem 0x00000000000fee00000-0x00000000000fee0ffff] reserved
Mar 25 19:06:49 localhost kernel: BIOS-e820: [mem 0x00000000000fffe0000-0x00000000000fffffff] reserved
Mar 25 19:06:49 localhost kernel: NX (Execute Disable) protection: active
Mar 25 19:06:49 localhost kernel: APIC: Static calls initialized
Mar 25 19:06:49 localhost kernel: SMBIOS 2.7 present.
Mar 25 19:06:49 localhost kernel: DMI: VMware, Inc. VMware Virtual Platform/440BX Desktop Reference Platform, BIOS 6.00 11/12/2020
Mar 25 19:06:49 localhost kernel: vmware: hypercall mode: 0x02
Mar 25 19:06:49 localhost kernel: Hypervisor detected: VMware
Mar 25 19:06:49 localhost kernel: vmware: TSC freq read from hypervisor : 1799.999 MHz
Mar 25 19:06:49 localhost kernel: vmware: Host bus clock speed read from hypervisor : 66000000 Hz
Mar 25 19:06:49 localhost kernel: vmware: using clock offset of 9044634419 ns
Mar 25 19:06:49 localhost kernel: tsc: Detected 1799.999 MHz processor
Mar 25 19:06:49 localhost kernel: e820: update [mem 0x00000000-0x00000ffff] usable ==> reserved
Mar 25 19:06:49 localhost kernel: e820: remove [mem 0x000a0000-0x000fffff] usable
Mar 25 19:06:49 localhost kernel: last_pfn = 0x80000 max_arch_pfn = 0x400000000
Mar 25 19:06:49 localhost kernel: total RAM covered: 3072M
Mar 25 19:06:49 localhost kernel: Found optimal setting for mtrr clean up
Mar 25 19:06:49 localhost kernel: ...
```



## Q20. List all running services

```
[moaaz@localhost ~]$ systemctl list-units --type=service --state=running
```

UNIT	LOAD	ACTIVE	SUB	DESCRIPTION
accounts-daemon.service	loaded	active	running	Accounts Service
alsa-state.service	loaded	active	running	Manage Sound Card State (restore and store)
atd.service	loaded	active	running	Deferred execution scheduler
auditd.service	loaded	active	running	Security Auditing Service
avahi-daemon.service	loaded	active	running	Avahi mDNS/DNS-SD Stack
colord.service	loaded	active	running	Manage, Install and Generate Color Profiles
crond.service	loaded	active	running	Command Scheduler
cups.service	loaded	active	running	CUPS Scheduler
dbus-broker.service	loaded	active	running	D-Bus System Message Bus
firewalld.service	loaded	active	running	firewalld - dynamic firewall daemon
fwupd.service	loaded	active	running	Firmware update daemon
gdm.service	loaded	active	running	GNOME Display Manager
libstoragemgmt.service	loaded	active	running	libstoragemgmt plug-in server daemon
mcelog.service	loaded	active	running	Machine Check Exception Logging Daemon
ModemManager.service	loaded	active	running	Modem Manager
NetworkManager.service	loaded	active	running	Network Manager
polkit.service	loaded	active	running	Authorization Manager
power-profiles-daemon.service	loaded	active	running	Power Profiles daemon
rsyslog.service	loaded	active	running	System Logging Service
rtkit-daemon.service	loaded	active	running	RealtimeKit Scheduling Policy Service
sshd.service	loaded	active	running	OpenSSH server daemon
sssd-kcm.service	loaded	active	running	SSSD Kerberos Cache Manager
switcheroo-control.service	loaded	active	running	Switcheroo Control Proxy service
systemd-journald.service	loaded	active	running	Journal Service
systemd-logind.service	loaded	active	running	User Login Management
systemd-udevd.service	loaded	active	running	Rule-based Manager for Device Events and Files
udisks2.service	loaded	active	running	Disk Manager
upower.service	loaded	active	running	Daemon for power management
user@1000.service	loaded	active	running	User Manager for UID 1000
vgauthd.service	loaded	active	running	VGAUTH Service for open-vm-tools

7:13 PM  
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## Q21. Create Custom Service

```
[root@localhost ~]# mkdir -p /opt/scripts
[root@localhost ~]# nano /opt/scripts/custom-script.sh
[root@localhost ~]# chmod +x /opt/scripts/custom-script.sh
[root@localhost ~]# nano /etc/systemd/system/custom-service.service
[root@localhost ~]# systemctl daemon-reload
[root@localhost ~]# systemctl enable custom-service
Created symlink /etc/systemd/system/multi-user.target.wants/custom-service.service → /etc/systemd/system/custom-service.service.
[root@localhost ~]# systemctl start custom-service
[root@localhost ~]# systemctl status custom-service
● custom-service.service - Custom Example Service
   Loaded: loaded (/etc/systemd/system/custom-service.service; enabled; preset: disabled)
   Active: active (running) since Tue 2025-03-25 19:17:53 EET; 12s ago
 Main PID: 2809 (custom-script.s)
    Tasks: 2 (limit: 10727)
   Memory: 716.0K
      CPU: 8ms
   CGroup: /system.slice/custom-service.service
           └─2809 /bin/bash /opt/scripts/custom-script.sh
             └─2811 sleep 60

Mar 25 19:17:53 localhost.localdomain systemd[1]: Started Custom Example Service.
[root@localhost ~]#
```

### Custom-script.sh

```
GNU nano 5.6.1 /opt/scripts/custom-script.sh Modified
#!/bin/bash
while true; do
    echo "Custom service running at $(date)" >> /var/log/custom-service.log
    sleep 60
done
```

### Custom-service.service

```
GNU nano 5.6.1 /etc/systemd/system/custom-service.service Modified
[Unit]
Description=Custom Example Service
After=network.target

[Service]
ExecStart=/opt/scripts/custom-script.sh
Restart=always
User=root

[Install]
WantedBy=multi-user.target
```

### Service logs

```
root@localhost:~
[root@localhost ~]# journalctl -u custom-service
Mar 25 19:17:53 localhost.localdomain systemd[1]: Started Custom Example Service.
[root@localhost ~]#

[root@localhost ~]# tail -f /var/log/custom-service.log
Custom service running at Tue Mar 25 07:17:53 PM EET 2025
Custom service running at Tue Mar 25 07:18:53 PM EET 2025
```

### Managing custom service

```
[root@localhost ~]# journalctl -u custom-service
Mar 25 19:17:53 localhost.localdomain systemd[1]: Started Custom Example Service.
[root@localhost ~]# systemctl stop custom-service
[root@localhost ~]# systemctl disable custom-service
Removed "/etc/systemd/system/multi-user.target.wants/custom-service.service".
[root@localhost ~]#
```