

Q1: View the status of the sshd service

```
[moe404@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 14:29:27 EET; 11min ago
     Docs: man:sshd(8)
           man:sshd_config(5)
   Main PID: 986 (sshd)
     Tasks: 1 (limit: 4285)
    Memory: 148.0K
       CPU: 17ms
    CGroup: /system.slice/sshd.service
            └─986 "sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups"

Mar 25 14:29:27 localhost.localdomain systemd[1]: Starting OpenSSH server daemon...
Mar 25 14:29:27 localhost.localdomain sshd[986]: Server listening on 0.0.0.0 port 22.
Mar 25 14:29:27 localhost.localdomain sshd[986]: Server listening on :: port 22.
Mar 25 14:29:27 localhost.localdomain systemd[1]: Started OpenSSH server daemon.
[moe404@localhost ~]$
```

Q2: View the status of all system services

```
[moe404@localhost ~]$ 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)
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 Col
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 shutdo
firewalld.service	loaded	active	running	firewalld - dynamic firewall dae
flatpak-system-helper.service	loaded	active	running	flatpak system helper
fwupd.service	loaded	active	running	Firmware update daemon
gdm.service	loaded	active	running	GNOME Display Manager
geoclue.service	loaded	active	running	Location Lookup Service
kdump.service	loaded	active	exited	Crash recovery kernel arming
kmod-static-nodes.service	loaded	active	exited	Create List of Static Device Nod
ldconfig.service	loaded	active	exited	Rebuild Dynamic Linker Cache
libstoragemgmt.service	loaded	active	running	libstoragemgmt plug-in server da
lvm2-monitor.service	loaded	active	exited	Monitoring of LVM2 mirrors, snap
mcelog.service	loaded	active	running	Machine Check Exception Logging

Q3: a. Send mail to the root user:

```
[moe404@localhost ~]$ echo "Test mail" | mail -s "Test Subject" root
[moe404@localhost ~]$ su root
Password:
[root@localhost moe404]# cat /var/mail/root
From moe404@localhost.localdomain Tue Mar 25 16:25:44 2025
Return-Path: <moe404@localhost.localdomain>
Received: from localhost.localdomain (localhost [127.0.0.1])
    by localhost.localdomain (8.16.1/8.16.1) with ESMTPS id 52PEPiAd120601
    (version=TLSv1.3 cipher=TLS_AES_256_GCM_SHA384 bits=256 verify=NOT)
    for <root@localhost.localdomain>; Tue, 25 Mar 2025 16:25:44 +0200
Received: (from moe404@localhost)
    by localhost.localdomain (8.16.1/8.16.1/Submit) id 52PEPiHP120600
    for root; Tue, 25 Mar 2025 16:25:44 +0200
From: Mohamed Eid <moe404@localhost.localdomain>
Message-Id: <202503251425.52PEPiHP120600@localhost.localdomain>
Date: Tue, 25 Mar 2025 16:25:44 +0200
To: root@localhost.localdomain
Subject: Test Subject
User-Agent: s-nail v14.9.22

Test mail
```

b- Use systemctl utility to stop postfix/sendmail service

```
[moe404@localhost ~]$ systemctl stop postfix sendmail
[moe404@localhost ~]$ systemctl status postfix sendmail
○ postfix.service - Postfix Mail Transport Agent
   Loaded: loaded (/usr/lib/systemd/system/postfix.service; disabled; preset: disabled)
   Active: inactive (dead)

○ sendmail.service - Sendmail Mail Transport Agent
   Loaded: loaded (/usr/lib/systemd/system/sendmail.service; disabled; preset: disabled)
   Active: inactive (dead)
```

c- Send mail again to the root user and Verify that you have received this mail

```
[moe404@localhost ~]$ echo "Test mail after stopping service" | mail -s "Test Subject" root
```

d- Use systemctl utility to start postfix/sendmail service

```
[moe404@localhost ~]$ systemctl start postfix sendmail
```

e- Verify that you have received this mail

```
From moe404@localhost.localdomain Tue Mar 25 16:36:44 2025
Return-Path: <moe404@localhost.localdomain>
Received: from localhost.localdomain (localhost [127.0.0.1])
    by localhost.localdomain (8.16.1/8.16.1) with ESMTPS id 52PEaiUT120940
    (version=TLSv1.3 cipher=TLS_AES_256_GCM_SHA384 bits=256 verify=NOT)
    for <root@localhost.localdomain>; Tue, 25 Mar 2025 16:36:44 +0200
Received: (from moe404@localhost)
    by localhost.localdomain (8.16.1/8.16.1/Submit) id 52PEX40p120812
    for root; Tue, 25 Mar 2025 16:33:04 +0200
From: Mohamed Eid <moe404@localhost.localdomain>
Message-Id: <202503251433.52PEX40p120812@localhost.localdomain>
Date: Tue, 25 Mar 2025 16:33:04 +0200
To: root@localhost.localdomain
Subject: Test Subject
User-Agent: s-nail v14.9.22

Test mail after stopping service
```

Q4: Switch to the multi-user target without rebooting

```
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: moe404
Password:
Last login: Tue Mar 25 14:36:57 on tty2
[moe404@localhost ~]$_
```

Q5: Display the default target

```
[moe404@localhost ~]$_ systemctl get-default
graphical.target
[moe404@localhost ~]$_
```

Q6: Change the default target to multi-user.target and reboot

```
[moe404@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: Mohamed Eid (moe404)
Password:
==== AUTHENTICATION COMPLETE ====
Removed "/etc/systemd/system/default.target".
Created symlink /etc/systemd/system/default.target → /usr/lib/systemd/system/multi-user.target.
[moe404@localhost ~]# reboot
```

Q7: Set the default target back to graphical.target

```
localhost login: moe404
Password:
Last login: Tue Mar 25 16:45:11 on tty1
[moe404@localhost ~]# systemctl set-default graphical.target
==== AUTHENTICATING FOR org.freedesktop.systemd1.manage-unit-files ====
Authentication is required to manage system service or unit files.
Authenticating as: Mohamed Eid (moe404)
Password:
==== AUTHENTICATION COMPLETE ====
Removed "/etc/systemd/system/default.target".
Created symlink /etc/systemd/system/default.target → /usr/lib/systemd/system/graphical.target.
[moe404@localhost ~]#
```

Q8: Display the status of sshd and note its PID

```
[moe404@localhost ~]# systemctl status sshd
● sshd.service - OpenSSH server daemon
   Loaded: loaded (/usr/lib/systemd/system/ssh.service; enabled; preset: ena>
   Active: active (running) since Tue 2025-03-25 17:42:39 EET; 1min 40s ago
     Docs: man:sshd(8)
           man:sshd_config(5)
   Main PID: 924 (sshd)
```

PID: 924

Q9: Restart sshd and verify the PID has changed

```
[moe404@localhost ~]# systemctl restart sshd
systemctl status sshd
● sshd.service - OpenSSH server daemon
   Loaded: loaded (/usr/lib/systemd/system/ssh.service; enabled; preset: ena>
   Active: active (running) since Tue 2025-03-25 17:45:44 EET; 20ms ago
     Docs: man:sshd(8)
           man:sshd_config(5)
   Main PID: 3053 (sshd)
```

PID: 3053

Q10: Reload sshd and check that the PID has not changed

```
[moe404@localhost ~]# systemctl reload sshd
systemctl status sshd
● sshd.service - OpenSSH server daemon
   Loaded: loaded (/usr/lib/systemd/system/ssh.service; enabled; preset: ena>
   Active: active (running) since Tue 2025-03-25 17:45:44 EET; 1min 11s ago
     Docs: man:sshd(8)
           man:sshd_config(5)
   Process: 3121 ExecReload=/bin/kill -HUP $MAINPID (code=exited, status=0/SUC>
   Main PID: 3053 (sshd)
```

Q11: Verify that chronyd service is running

```
• chronyd.service - NTP client/server
   Loaded: loaded (/usr/lib/systemd/system/chronyd.service; enabled; preset: >
   Active: active (running) since Tue 2025-03-25 17:42:37 EET; 4h 2min ago
   Docs: man:chronyd(8)
         man:chrony.conf(5)
```

Q12: a. Check if chronyd is enabled at boot:

```
[moe404@localhost ~]$ systemctl is-enabled chronyd
enabled
[moe404@localhost ~]$
```

b. Reboot and check status:

```
[moe404@localhost ~]$ systemctl status chronyd
• chronyd.service - NTP client/server
   Loaded: loaded (/usr/lib/systemd/system/chronyd.service; enabled; preset: >
   Active: active (running) since Wed 2025-03-26 00:01:55 EET; 1min 20s ago
```

Q13:

a. Disable chronyd and check its status:

```
[moe404@localhost ~]$ sudo systemctl disable chronyd
Removed "/etc/systemd/system/multi-user.target.wants/chronyd.service".
[moe404@localhost ~]$ sudo systemctl status chronyd
• chronyd.service - NTP client/server
   Loaded: loaded (/usr/lib/systemd/system/chronyd.service; disabled; preset: >
   Active: active (running) since Wed 2025-03-26 00:01:55 EET; 4min 8s ago
```

b. Reboot and verify:

```
[moe404@localhost ~]$ systemctl status chronyd
○ chronyd.service - NTP client/server
   Loaded: loaded (/usr/lib/systemd/system/chronyd.service; disabled; preset: >
   Active: inactive (dead)
   Docs: man:chronyd(8)
         man:chrony.conf(5)
lines 1-5/5 (END)
```

Q14: Display all static services

```
[moe404@localhost ~]$ systemctl list-unit-files --type=service --state=static
```

UNIT	FILE	STATE	PRESET
alsa-restore.service		static	-
alsa-state.service		static	-
bolt.service		static	-
cockpit-issue.service		static	-
cockpit-session-socket-user.service		static	-
cockpit-session@.service		static	-
cockpit-wsinstance-http.service		static	-
cockpit-wsinstance-https-factory@.service		static	-
cockpit-wsinstance-https@.service		static	-
cockpit-wsinstance-socket-user.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	-

Q15. What difference Between enable,disable,static,mask Service

Enable: Starts the service at boot.

Disable: Prevents automatic start at boot.

Static: The service cannot be enabled or disabled (it runs as a dependency).

Mask: Completely prevents the service from starting.

Q16. Display all logs from the current boot

```
[moe404@localhost ~]$ journalctl -b
```

Mar 26 00:06:43 localhost kernel: **Linux version 5.14.0-573.el9.x86_64 (mockbuil**
Mar 26 00:06:43 localhost kernel: **The list of certified hardware and cloud inst**
Mar 26 00:06:43 localhost kernel: Command line: BOOT_IMAGE=(hd0,msdos1)/vmlinuz
Mar 26 00:06:43 localhost kernel: BIOS-provided physical RAM map:
Mar 26 00:06:43 localhost kernel: BIOS-e820: [mem 0x0000000000000000-0x00000000>
Mar 26 00:06:43 localhost kernel: BIOS-e820: [mem 0x0000000000009ec00-0x00000000>
Mar 26 00:06:43 localhost kernel: BIOS-e820: [mem 0x000000000000dc000-0x00000000>
Mar 26 00:06:43 localhost kernel: BIOS-e820: [mem 0x00000000000100000-0x00000000>
Mar 26 00:06:43 localhost kernel: BIOS-e820: [mem 0x0000000003fee0000-0x00000000>
Mar 26 00:06:43 localhost kernel: BIOS-e820: [mem 0x0000000003feff000-0x00000000>
Mar 26 00:06:43 localhost kernel: BIOS-e820: [mem 0x0000000003ff00000-0x00000000>
Mar 26 00:06:43 localhost kernel: BIOS-e820: [mem 0x000000000f0000000-0x00000000>
Mar 26 00:06:43 localhost kernel: BIOS-e820: [mem 0x00000000fec000000-0x00000000>
Mar 26 00:06:43 localhost kernel: BIOS-e820: [mem 0x00000000fee000000-0x00000000>
Mar 26 00:06:43 localhost kernel: BIOS-e820: [mem 0x00000000fffe00000-0x00000000>
Mar 26 00:06:43 localhost kernel: NX (Execute Disable) protection: active
Mar 26 00:06:43 localhost kernel: APIC: Static calls initialized
Mar 26 00:06:43 localhost kernel: SMBIOS 2.7 present.
Mar 26 00:06:43 localhost kernel: DMI: VMware, Inc. VMware Virtual Platform/440>
Mar 26 00:06:43 localhost kernel: vmware: hypercall mode: 0x02
Mar 26 00:06:43 localhost kernel: Hypervisor detected: VMware
Mar 26 00:06:43 localhost kernel: vmware: TSC freq read from hypervisor : 1497.>
Mar 26 00:06:43 localhost kernel: vmware: Host bus clock speed read from hyperv>

Q17. View logs for the sshd service

```
[moe404@localhost ~]$ journalctl -u sshd
Mar 26 00:06:49 localhost.localdomain systemd[1]: Starting OpenSSH server daemon.
Mar 26 00:06:50 localhost.localdomain sshd[921]: Server listening on 0.0.0.0 port 22.
Mar 26 00:06:50 localhost.localdomain sshd[921]: Server listening on :: port 22.
Mar 26 00:06:50 localhost.localdomain systemd[1]: Started OpenSSH server daemon.
lines 1-4/4 (END)
```

Q18. Follow (live-tail) new log entries

```
[moe404@localhost ~]$ journalctl -f
Mar 26 00:11:07 localhost.localdomain NetworkManager[882]: <info> [1742940667.8937] device (ens33): carrier: link connected
Mar 26 00:11:42 localhost.localdomain kernel: e1000: ens33 NIC Link is Down
Mar 26 00:11:48 localhost.localdomain kernel: e1000: ens33 NIC Link is Up 1000 Mbps Full Duplex, Flow Control: None
Mar 26 00:11:48 localhost.localdomain NetworkManager[882]: <info> [1742940708.8541] device (ens33): carrier: link connected
Mar 26 00:12:25 localhost.localdomain PackageKit[1869]: daemon quit
Mar 26 00:12:25 localhost.localdomain systemd[1]: packagekit.service: Deactivated successfully.
Mar 26 00:12:25 localhost.localdomain systemd[1]: packagekit.service: Consumed 2.750s CPU time.
Mar 26 00:13:03 localhost.localdomain systemd[2159]: Created slice User Background Tasks Slice.
Mar 26 00:13:03 localhost.localdomain systemd[2159]: Starting Cleanup of User's Temporary Files and Directories...
Mar 26 00:13:03 localhost.localdomain systemd[2159]: Finished Cleanup of User's Temporary Files and Directories.
```

Q19. Show logs from the last 30 minutes

```
[moe404@localhost ~]$ journalctl --since "30 minutes ago"
Mar 26 00:06:43 localhost kernel: Linux version 5.14.0-573.el9.x86_64 (mockbuild)
Mar 26 00:06:43 localhost kernel: The list of certified hardware and cloud instances
Mar 26 00:06:43 localhost kernel: Command line: BOOT_IMAGE=(hd0,msdos1)/vmlinuz
Mar 26 00:06:43 localhost kernel: BIOS-provided physical RAM map:
Mar 26 00:06:43 localhost kernel: BIOS-e820: [mem 0x0000000000000000-0x0000000000000000]
Mar 26 00:06:43 localhost kernel: BIOS-e820: [mem 0x00000000000009ec00-0x0000000000000000]
Mar 26 00:06:43 localhost kernel: BIOS-e820: [mem 0x0000000000000dc000-0x0000000000000000]
Mar 26 00:06:43 localhost kernel: BIOS-e820: [mem 0x000000000000100000-0x0000000000000000]
Mar 26 00:06:43 localhost kernel: BIOS-e820: [mem 0x0000000000003fee0000-0x0000000000000000]
Mar 26 00:06:43 localhost kernel: BIOS-e820: [mem 0x0000000000003feff000-0x0000000000000000]
Mar 26 00:06:43 localhost kernel: BIOS-e820: [mem 0x0000000000003ff00000-0x0000000000000000]
Mar 26 00:06:43 localhost kernel: BIOS-e820: [mem 0x000000000000f0000000-0x0000000000000000]
Mar 26 00:06:43 localhost kernel: BIOS-e820: [mem 0x000000000000fec00000-0x0000000000000000]
Mar 26 00:06:43 localhost kernel: BIOS-e820: [mem 0x000000000000fee00000-0x0000000000000000]
Mar 26 00:06:43 localhost kernel: BIOS-e820: [mem 0x000000000000fffe0000-0x0000000000000000]
Mar 26 00:06:43 localhost kernel: NX (Execute Disable) protection: active
Mar 26 00:06:43 localhost kernel: APIC: Static calls initialized
Mar 26 00:06:43 localhost kernel: SMBIOS 2.7 present.
Mar 26 00:06:43 localhost kernel: DMI: VMware, Inc. VMware Virtual Platform/440
Mar 26 00:06:43 localhost kernel: vmware: hypercall mode: 0x02
Mar 26 00:06:43 localhost kernel: Hypervisor detected: VMware
Mar 26 00:06:43 localhost kernel: vmware: TSC freq read from hypervisor : 1497.
Mar 26 00:06:43 localhost kernel: vmware: Host bus clock speed read from hypervisor
```

Q20. List all running services

```
[moe404@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
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
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
fwupd.service	loaded	active	running	Firmware update daemon
gdm.service	loaded	active	running	GNOME Display Manager
geoclue.service	loaded	active	running	Location Lookup Service
libstoragemgmt.service	loaded	active	running	libstoragemgmt plug-in se
mcelog.service	loaded	active	running	Machine Check Exception L
ModemManager.service	loaded	active	running	Modem Manager
NetworkManager.service	loaded	active	running	Network Manager
polkit.service	loaded	active	running	Authorization Manager
postfix.service	loaded	active	running	Postfix Mail Transport Ag
power-profiles-daemon.service	loaded	active	running	Power Profiles daemon
rsyslog.service	loaded	active	running	System Logging Service
rtdk-daemon.service	loaded	active	running	RealtimeKit Scheduling Po

Q21. Create Customer Service

```
[moe404@localhost ~]$ sudo nano /etc/systemd/system/mycustom.service
[sudo] password for moe404:
[moe404@localhost ~]$ sudo systemctl daemon-reload
[moe404@localhost ~]$ sudo systemctl enable mycustom.service
sudo systemctl start mycustom.service
Created symlink /etc/systemd/system/multi-user.target.wants/mycustom.service → /etc/systemd/system/mycustom.service.
[moe404@localhost ~]$ systemctl status mycustom.service
● mycustom.service - My Custom Service
   Loaded: loaded (/etc/systemd/system/mycustom.service; enabled; preset: disabled)
   Active: active (running) since Wed 2025-03-26 00:17:12 EET; 7s ago
     Main PID: 3246 (python3)
       Tasks: 1 (limit: 4280)
      Memory: 17.5M
         CPU: 84ms
       CGroup: /system.slice/mycustom.service
               └─3246 /usr/bin/python3 -m http.server 8080

Mar 26 00:17:12 localhost.localdomain systemd[1]: Started My Custom Service.
lines 1-11/11 (END)
```