Q.1 Write Down the complete process of booting in CentOS9 Stream

1. – Performing POST –

The machine is powered on. From the system firmware, which can be the modern **Universal Extended Firmware Interface** (UEFI) or the classical **Basic Input Output System** (BIOS), the Power-On-Self-Test (POST) is executed, and the hardware that is required to start the system is initialized.

2. Selected the Bootable device – Either from the UEFI boot firmware or from the BIOS, bootable devices are located. Once the bootable device is detected and loaded into the memory, BIOS gives control to it.

3. Loading the boot loader – From the bootable devices, a boot loader is located. On RHEL, this is usually GRUB2.

4. Loading the Kernel – The boot loader may present a boot menu to the user or can be configured to automatically start a default operating system. To load Linux, the Kernel is loaded together with the initramfs containing kernel modules for all hardware that is required to boot the initial script required to proceed to the next stage of booting. On RHEL or CentOS, the initramfs contain a complete operational system (which may be used for troubleshooting purposes).

4. Starting /sbin/init – Once the kernel is loaded into memory, the first process is loaded, but still from the initramfs. This is the /sbin/init process, which on RHEL is linked to Systemd. The udev daemon is loaded as well to take care of further hardware initialization. All this is still happening from the initramfs image.

5. Processing initrd.target –

The Systemd process executes all units from the initrd.target, which prepares a minimal operating environment, where the root file system on disk is mounted on the /sysroot directory. At this point, enough is loaded to pass to the system installation that was written on the hard drive.

6. Switching to the root file system –

The system switches to the root file system that is on disk and at this point can load the Systemd process from disk as well.

7. Running the default target –

Systemd looks for the default target to execute and runs all its units. In this process, a login screen is presented, and the user can authenticate. Note that the login prompt can be prompted before all Systemd unit files have been loaded successfully. So, seeing a login prompt does not necessarily mean that your server is fully operational yet.

The table below summarizes where a specific phase is configured and what you can do to troubleshoot if things go wrong