Linux Boot Process (REHL 7)

1- The machine is powered on. The system firmware (BIOS --Basic Input/Output System or UEFI -- Unified Extensible Firmware Interface) runs POST, and starts to initialize some of the hardware.

You can configure this using F2 on your system/ server.

2- The system firmware searches for a bootable device, either configured on BIOS or UEFI boot firmware or by searching master boot record (MBR).This order is configured in BIOS.

You can configure this using F2 screen for by pressing certain key combination.

3- The system firmware reads a boot loader from disk, then passes control of the system to boot loader. On REHL 7 this will be GRUB2 and earlier LILO is a boot loader for Linux.

You can configure this using grub2-install

4- The boot loader loads configuration from disk and presents the user with possible configuration to boot.

You can configure this using /boot/grub2/grub.cfg

5- Either user makes a choice or automatic timeout happens, the boot loader loads the configured KERNEL and INITRAMFS from disk and places then in memory. An INITRAMFS is a gzip-ed CPIO archive containing kernel modules for all hardware necessary at boot, init-scripts and more. ON RHEL 7, the INITRAMFS contains an entire usable system by itself.

You can configure using: /etc/dracut.conf

6- The boot loader hands control of the system over to kernel, passing in any options specified on kernel command line in boot loader and the location of the INITRAMFS in memory.

You can configure using: /etc/grub.d/ /etc/default/grub, and /boot/grub2/grub.cfg

7- Now the kernel initializes all hardware for which it can find a driver in the initramfs, then executes /sbin/init (as PID 1).

On REHL 7 the initramfs contains a working copy of systemd as /sbin/init, as we all a udev daemon.

Configure using init and command line parameters.

8- The systemd instance from the initramfs executes all unit of initrd.target target. This includes actual mounting on /sysroot

configure using /etc/fstab

9- The kernel root file system is switched form initramfs root file system, to system root file system that was previously mounted on /sysroot.systemd then re-executes itself using a copy of systemd installed on the system.

10- Systemd looks for a default target, either passed from the kernel command line or configured on the system, then starts (and stops) units to comply with the configuration for that target, solving dependencies between units automatically. In its essence, a systemd target is a set of units that should be activated to reach a desired system state. These targets will typically include at least a text-bases login or a graphical login screen with appear.

**4) What is Linux Kernel?**

The Linux Kernel is a low-level systems software whose main role is to manage hardware resources for the user. It is also used to provide an interface for user-level interaction.

#systemctl get-default

# systemctl set-default multi-user.target

*/etc/inittab*file to decide what "runlevel" the system should be booted to

1. When power on it loads some basic h/w
2. Then system firmware searches for bootable device configured in uefi or bios or search in MBR
3. When found boot loader loads grub file from disk whick presents us with diff. bootable config.s and gets control from system firmware to bootloader
4. Then kernel and initramfs is loaded in the memory, initramfs consists of required devices and drivers needed to boot up the system.
5. Then boot loader handsover the control to kernel
6. Then loads the driver for the h/w it finds the executes /sbin/init is or systemd in rhel7
7. Then all the mountpoints are loaded including sysroot
8. After this actual system root filesystem gets loaded and gets the control
9. Then as mentioned run level will ran in case of rhel 7 targets.