*** How to Troubleshoot OS During Booting Related Issues ***

What is BIOS in machine ?

- BIOS is firmware used to perform hardware initialization during the booting process, and to provide runtime services for operating systems and programs.

- The BIOS firmware comes pre-installed on a personal computer's system board, and it is the first software to run when powered on

- BIOS also manages data flow between the computer's operating system and attached devices such as the hard disk, video adapter, keyboard, mouse and printer.

What is MBR ?

- The Master Boot Record (MBR) is the information in the first sector of any hard disk

  that identifies how and where an operating system is located so that it can be boot (loaded) into the computer's main storage or random access memory.

- A master boot record (often shortened as MBR) is a kind of boot sector stored on a hard disk drive or other storage device that contains the necessary computer code to start the boot process.

- The MBR is the first sector of the computer hard drive. It tells the computer how the hard drive is partitioned, and how to load the operating system.

What is Bootloader ?

- A boot loader is a small program which is started from the Master Boot

  Record.

- The role of a boot loader is to load an operating system from a storage

  device.

- In Linux we are using LILO (Linux Loader) , Grub (Grand unified Boot loader), and GRUB-2 (version-2 latest) in rhel 7 + 8.

- All booting files are stored in /boot directory.

- Configuration file is /boot/grub2/grub.cfg & /boot/grub/grub.conf

What is Kernel ?

- The Linux kernel is the main component of a Linux operating system (OS) and is the core interface between a computer's hardware and its processes.

- It is also responsible for the efficient management of the system's resources such as memory management, process and task management, and disk management.

- Vmlinuz file is the name of Linux kernel executable , by other word its a compressed Linux kernel and it is bootable .

- Vmlinuz is located in /boot directory.

What is the initramfs or initrd image file and what is the use of this image ?

- initrd (initial ram disk) is a scheme for loading a temporary root file system into memory, which may be used as part of the Linux startup process.

- The initrd contains various executables and drivers that permit the real root file system to be mounted, after which the initrd RAM disk is unmounted and its memory freed.

- At boot time, the boot loader loads the kernel and the initramfs image into memory and starts the kernel.

- initrd provides the capability to load a RAM disk by the bootloader.

- This RAM disk can then be mounted as the root filesystem and programs can be run from it.

- initrd is mainly designed to allow system startup to occur in two phases, where the kernel comes up with a minimum set of compiled in drivers, and where additional modules are loaded from initrd.

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