

## Practical No. 04

Aim: Use GRUB.conf file to access and change system parameters while operating system is loading.

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Name of Practical

**Aim:** Use GRUB config file to access and change system parameters while operating system is loading.

**Theory:**

GRUB menu configuration file:

The configuration file (`/boot/grub/grub.conf`), which is used to create the list of operating systems to boot in GRUB's menu interface, essentially allows the user to select a preset group of commands to execute. The commands given in the GRUB manual can be used as well as some special commands which are only available in the configuration file.

Configuration file structure:

The GRUB menu configuration file is `/boot/grub/grub.conf`. The commands to set the global preferences for the menu interface are placed at the top of the file, followed by stanzas for each operating kernel or operating system listed in the menu.

The following is a very basic GRUB menu configuration file designed to boot either Red Hat Enterprise Linux or Microsoft Windows 2000.

```
default = 0
```

```
timeout = 10
```

```
splashimage = (hd0,0)/grub/splash.xpm.gz
```

```
# Section to load Linux
```

```
title Red Hat Enterprise Linux (2.4.21-1.ent)
```

```
root (hd0,0)
```

```
kernel /vmlinuz-2.4.21-1 ro root=/dev/sda2
```

```
initrd /initrd-2.4.21-1.img
```

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```
#Section to load Windows  
title Windows  
rootnoverify (hd0,0)  
chainloader +1
```

The above file configures GRUB to build a menu with RHEL as the default operating system and sets it to autoboot after 10 seconds. Two sections are given, one for each operating system entry, with commands specific to system disk partition table.

#### Configuration File Directives:

The following are the directives used in the GRUB menu configuration file:

- **chainloader </path/to/file>** - loads the specified file as a chainloader. Replace </path/to/file> with the absolute path to chainloader. If the file is located on the first sector of the specific partition, use the blocklist notation +1.
- **color <normal-color> <selected-color>** - Allows specific colors to be used in the menus where two colors are configured as the foreground or background. Use simple color names such as red/black. For example, color red/black green/blue.
- **default: <integer>** - Replace <integer> with the default entry title number to be loaded if the menu interface timed out.

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- `fallback= <integer>` - Replace `<integer>` with the entry title number to try if the first attempt fails.
- `hiddenmenu` - Prevents the GRUB menu interface from being displayed, loading the default entry with/when the timeout period expires. The user can see the standard GRUB menu by pressing the [Esc] key.
- `initrd </path/to/initrd>` - Enables users to specify an initial RAM disk when booting. Replace `</path/to/initrd>` with the absolute path to the initial RAM disk.
- `Kernel </path/to/kernel> <option-1> <option-n>` - Specifies the kernel file to load when booting the operating system. Replace `</path/to/kernel>` with an absolute path from the partition specified by the root directive. Multiple options can be passed to the kernel when it is loaded.
- `password= <password>` - Prevents a user who does not know the password from editing the entries for this menu option.  
Optionally, it is possible to specify an alternate menu configuration file after the `password= <password>` directive. In this case, GRUB restarts the second stage boot loader and uses the specified alternate configuration file to build the menu. If an alternate menu configuration file is left out of the command, a user who knows the password is allowed to edit the current configuration file.

For more information about securing GRUB, RHEL Security guide can be referred.

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• When we boot up the system, the grub file is loaded first.  
• It loads the kernel and all the files.

• We can change this boot option again after the kernel is mounted.  
• Now let us boot up the system again.  
• After booting up, press  $\text{ctrl} + \text{shift} + \text{F2}$  to enter the terminal.

• Now type  $\text{lsmod}$  which will give us the kernel's module list.  
• Now we can see the modules like  $\text{ext4}$ ,  $\text{loop}$ ,  $\text{vfat}$  etc. present in the system.

• Now type  $\text{modprobe ext4}$  to mount the ext4 file system.  
• Now we can see the ext4 module is loaded in the system.  
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Conclusion: Hence, by performing this practical I used grub file to access and change system parameters while the operating system is loading.

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- `root (<device-type> <device-number>, <partition>)` - Configures the root partition for GRUB, such as (hd 0,0), and mounts the partition.
- `rootnoverify (<device-type> <device-number>, <partition>)` - Configures the root partition for GRUB, just like the root command, but doesn't mount the partition.
- `timeout = <integer>` - Specifies the interval in seconds, that GRUB waits before loading the entry designated in the default command.
- `SplashImage = <path-to-image>` - Specifies the location of the splash screen image to be used when GRUB boots.
- `title group-title` - Specifies the title to be used with a particular group of commands used to load a kernel or operating system.
- Comments can be added to the configuration file using the '#' character.

Conclusion: Hence, by performing this practical, I used GRUB file to access and change system parameters while the operating system is loading.

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