

## 4.2.6 GRUB2 Bootloader Facts

GRUB2, the updated version of the Grand Unified Bootloader (GRUB) utility, is any version of GRUB 1.98 or later.

This lesson covers the following topics:

- Determining GRUB versions
- Configuring GRUB2
- GRUB Menu Display
- Boot Security

### Determining GRUB Versions

The following commands can be used to view the version of GRUB used by the Linux distribution you have installed. The actual command used will vary between distributions:

- **grub-install -V** or **grub-install --version**
- **grub2-install -V** or **grub2-install --version**

Earlier versions of GRUB are sometimes called GRUB Legacy.

### Configuring GRUB2

Be aware of the following details about GRUB2 configurations:

- The configuration files for GRUB2 are `/boot/grub/grub.cfg` or `/boot/grub2/grub.cfg` (depending upon the distribution). These files are similar to the GRUB Legacy's `/boot/grub/menu.lst` or `/boot/grub/grub.conf` files.
- Depending on the distribution, the **update-grub** or **grub2-mkconfig** commands generate the `/boot/grub2/grub.cfg` or `/boot/grub/grub.cfg` files. Specifically, these commands use the `/etc/default/grub` file and the scripts in the `/etc/grub.d/` directory to generate the `/boot/grub2/grub.cfg` or `/boot/grub/grub.cfg` configuration files.
- Some distributions, such as Fedora and Centos, create an `/etc/grub2/grub.cfg` file. This file is a symbolic link to the `/boot/grub2/grub.cfg` file. Other distributions, such as Ubuntu and Debian, typically store the file as `/boot/grub/grub.cfg`.
- The `/etc/grub.d/` directory holds script files that are read when the **update-grub** or the **grub2-mkconfig** commands are used.

The **grub.cfg** file should not be edited directly. Instead, the appropriate configuration file below should be edited when a change needs to be made. Then run either the **update-grub** or **grub2-mkconfig** command.

### GRUB Menu Display

Common script files in the `/etc/grub.d/` directory that control the GRUB2 menu include the following:

Script File	Description
00_header	Sets initial appearance items, such as the graphics mode, default selection, timeout, etc. These settings are typically imported from the <code>/etc/default/grub</code> file.
10_linux	Identifies all Linux kernels installed on the root device and creates corresponding GRUB2 menu entries for each one. This allows you to select which Linux kernel you want to load when you initially boot the system.
30_os-prober	Executes <b>os-prober</b> to search for other operating systems (such as Microsoft Windows) and automatically creates GRUB2 menu items for them.
40_custom	Allows for custom menu entries, which are imported directly into <code>/boot/grub/grub.cfg</code> without any changes.

The `/etc/default/grub` file is the primary configuration file for changing menu display settings. The following table describes several common options in the configuration file:

Option	Description	Examples
<b>GRUB_DEFAULT</b>	Sets the default menu entry. Typical entries include: <ul style="list-style-type: none"><li>▪ Numeric (such as 0, 1, 2)</li><li>▪ Complete menu entry quotation (such as "Ubuntu,</li></ul>	<b>GRUB_DEFAULT=0</b> sets the first menu entry as the default. <b>GRUB_DEFAULT="Ubuntu, Linux 20.4.2"</b> sets this menu entry as the default.

	Linux 20.4.2")	
<b>GRUB_SAVEDEFAULT</b>	Sets the last selected OS from the menu as the default OS on the next boot. <b>GRUB_DEFAULT=saved</b> is also required for this option to work correctly.	<b>GRUB_SAVEDEFAULT=true</b> sets the last selected OS from the menu as the default OS on the next boot.
<b>GRUB_HIDDEN_TIMEOUT</b>	<p>Determines how long a blank screen will be displayed. While the screen is blank, the user can press the Shift key to display the GRUB2 menu. Options include, <b>0</b>, <b>X</b>, and (null):</p> <ul style="list-style-type: none"> <li>▪ <b>0</b> disables this functionality.</li> <li>▪ <b>X</b> (an integer value) pauses and shows a blank screen for <i>X</i> seconds.</li> <li>▪ (null) uses the value specified in the GRUB_TIMEOUT entry.</li> </ul>	<p><b>GRUB_HIDDEN_TIMEOUT=0</b> disables this functionality.</p> <p><b>GRUB_HIDDEN_TIMEOUT=3</b> displays a blank screen for 3 seconds and then boots to the default OS if there is no user interaction.</p>
<b>GRUB_HIDDEN_TIMEOUT_QUIET</b>	<p>Works in conjunction with the GRUB_HIDDEN_TIMEOUT parameter. It displays a counter (countdown) while the screen is blank. Options include <b>true</b> and <b>false</b>:</p> <ul style="list-style-type: none"> <li>▪ <b>true</b> does not display a counter.</li> <li>▪ <b>false</b> displays the counter for the duration specified in the GRUB_HIDDEN_TIMEOUT entry.</li> </ul>	<b>GRUB_HIDDEN_TIMEOUT_QUIET=true</b> does not display a counter.
<b>GRUB_TIMEOUT</b>	<p>Determines how long to wait for user interaction before booting the default operating system. Options include <b>X</b> and <b>-1</b>:</p> <ul style="list-style-type: none"> <li>▪ <b>X</b> (an integer value of 1 or higher) sets the display duration in seconds.</li> <li>▪ <b>-1</b> causes the menu to display until the user makes a selection.</li> </ul> <p>The GRUB2 menu is hidden by default unless another OS is detected by the system.</p>	<p><b>GRUB_TIMEOUT=4</b> causes the menu to display for four seconds and then boots into the default operating system.</p> <p><b>GRUB_TIMEOUT=-1</b> causes the menu to display until the user makes a selection.</p>
<b>GRUB_CMDLINE_LINUX</b>	Passes options to the kernel. With the GRUB Legacy bootloader, this was done by adding options to the end of the kernel line. In GRUB2, this is done using the GRUB_CMDLINE_LINUX parameter.	
<b>GRUB_GFXMODE</b>	Sets the resolution of the graphical GRUB2 menu. Multiple resolutions may be specified if they are separated by commas.	<b>GRUB_GFXMODE=1440x900x24</b> sets the screen resolution to 1440 x 900 with a color depth of 24 bits.
<b>GRUB_BACKGROUND</b>	Sets the background image during the GRUB2 menu display. The full path should be used. Must be in the PNG, TGA, or JPG/JPEG file formats.	<b>GRUB_BACKGROUND=/usr/share/images/back.png</b> displays back.png as the background image.
<b>GRUB_DISABLE_OS_PROBER</b>	Enables and disables the os-prober check of other partitions for operating	<b>GRUB_DISABLE_OS_PROBER=true</b> disables the os-prober.

systems, including Windows and Linux, during execution of the **update-grub** command. If the os-prober is enabled, operating systems are placed in the GRUB2 menu.

**GRUB\_DISABLE\_OS\_PROBER=false** enables the os-prober and adds found operating systems to the GRUB2 menu.

## Boot Security

With all computer systems, maintaining security of your data should be of utmost concern. Most operating systems provide login security, but this just prevents people from logging into your operating system. To further protect you Linux computers, you should consider including UEFI/BIOS and bootloader passwords.

Security type	Description
Bootloader password	These passwords prevent a person from accessing the bootloader menu without knowing the password. Bootloader passwords can be implemented on one or all of the available boot menu options. For example, this can prevent a user from loading a Linux kernel.
UEFI/BIOS	These passwords allow you set low-level passwords to restrict people from booting the computer, booting from removable devices, and changing BIOS or UEFI settings without knowing the password.

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