Installing Gnome on CentOS 7
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This "how to" describes a process to install the Gnome GUI on a CentOS 7 virtual machine using the Oracle VirtualBox hypervisor on a Windows 10 host. This "how to" is part of a series and continues from the point where a CentOS 7 "Minimal" distribution ISO has been downloaded and used to install and configure CentOS 7, Oracle XE, Java and Tomcat.

Up to this point in our CentOS 7 series of "how to" articles, we've used our CentOS server strictly in run-level 3, not requiring the use of a graphical user interface (GUI). However, in future articles, we'll be installing application that do have graphical installation tools that can make a complex installation process much easier to manage, not to mention much more rewarding to experience.

This "how to" demonstrates taking a minimal CentOS 7 installation and adding core X11 graphical capabilities and then adding Gnome-specific session support and tools.

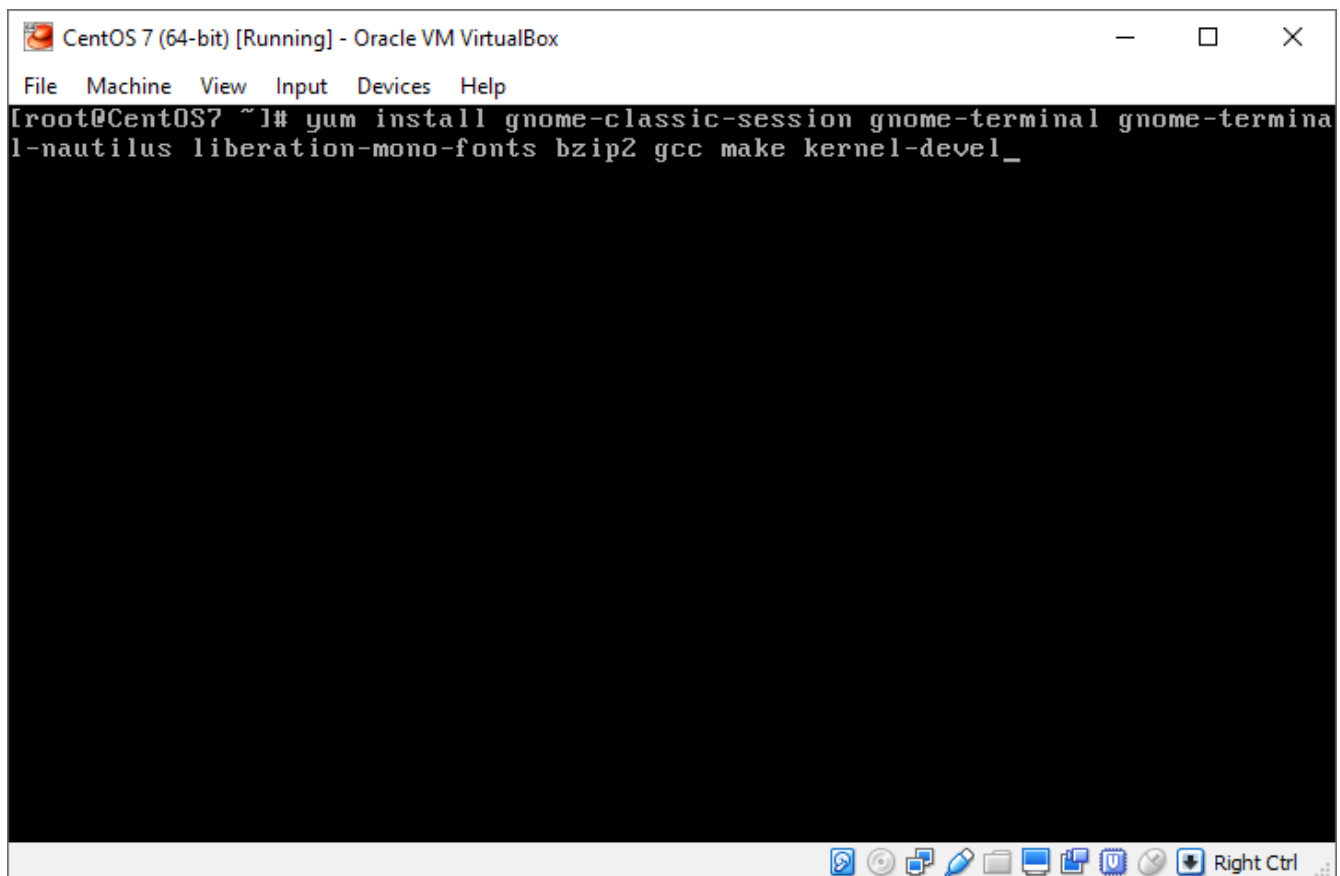First, start by launching the CentOS 7 virtual machine and logging in as the "root" user.
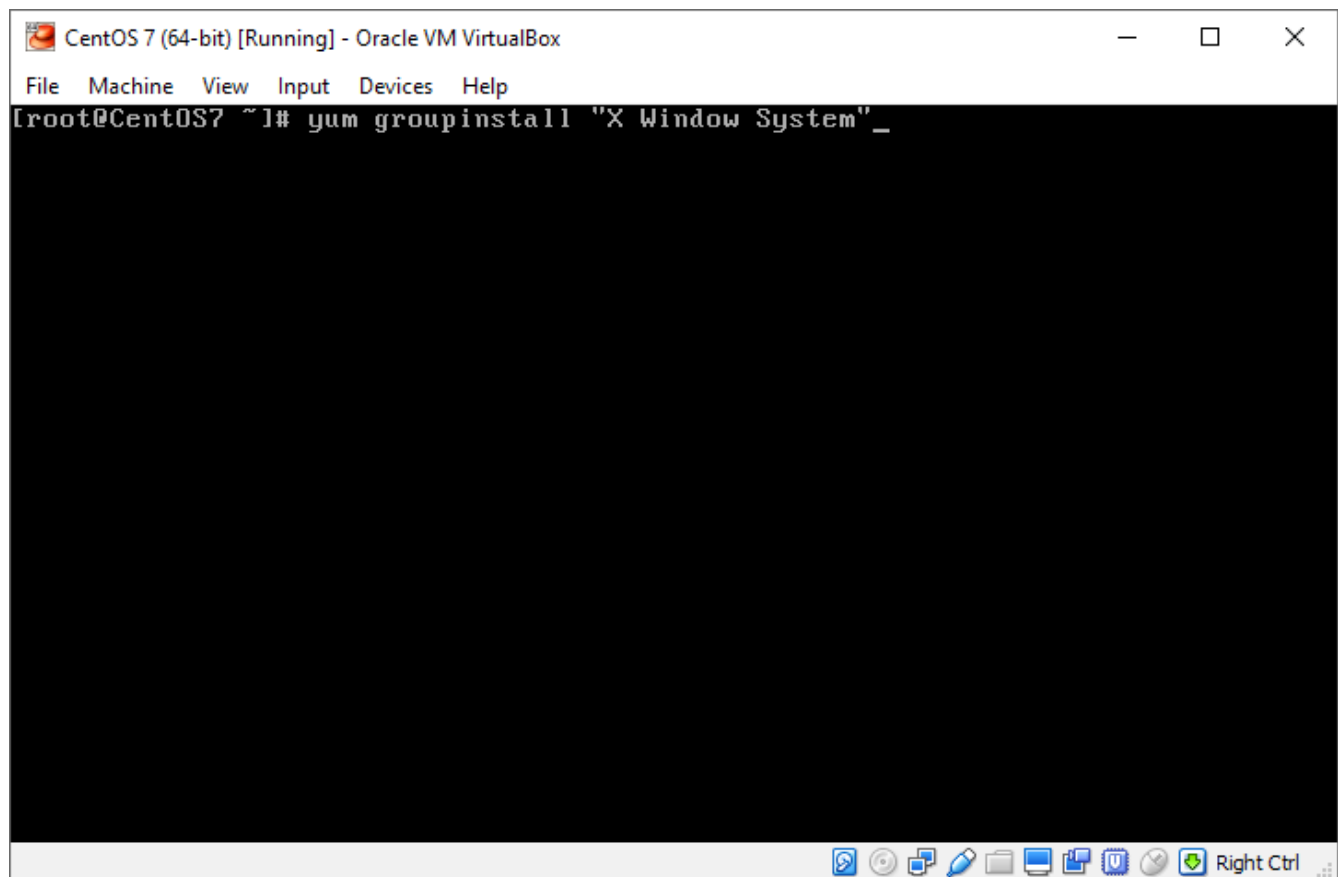
We use the "groupinstall" option of the "yum" utility to install all packages in the "X Window System" group.

```
xorg-x11-drv-ati           x86_64   7.6.1-3.20160215gitd41fccc.el7     base   148 k
xorg-x11-drv-dummy         x86_64   0.3.6-21.el7                       base    16 k
xorg-x11-drv-evdev         x86_64   2.9.2-2.el7                        base    46 k
xorg-x11-drv-fbdev         x86_64   0.4.3-20.el7                       base    20 k
xorg-x11-drv-intel         x86_64   2.99.917-22.20151206.el7           base   656 k
xorg-x11-drv-nouveau       x86_64   1:1.0.11-4.el7                     base   101 k
xorg-x11-drv-qxl           x86_64   0.1.1-18.el7                       base    91 k
xorg-x11-drv-synaptics     x86_64   1.8.2-1.el7                        base    82 k
xorg-x11-drv-v4l           x86_64   0.2.0-42.el7                       base    20 k
xorg-x11-drv-vesa          x86_64   2.3.2-20.el7                       base    24 k
xorg-x11-drv-vmmouse       x86_64   13.0.0-12.el7                      base    23 k
xorg-x11-drv-vmware        x86_64   13.0.2-7.20150211git8f0cf7c.el7    base    78 k
xorg-x11-drv-void          x86_64   1.4.1-1.el7                        base    14 k
xorg-x11-drv-wacom         x86_64   0.29.0-1.el7                       base   293 k
xorg-x11-server-common     x86_64   1.17.2-22.el7                      base    52 k
xorg-x11-server-utils      x86_64   7.7-14.el7                         base   176 k
xorg-x11-xkb-utils         x86_64   7.7-12.el7                         base   103 k

Transaction Summary
================================================================================
Install   10 Packages (+71 Dependent packages)

Total download size: 23 M
Installed size: 73 M
Is this ok [y/d/N]: _
```
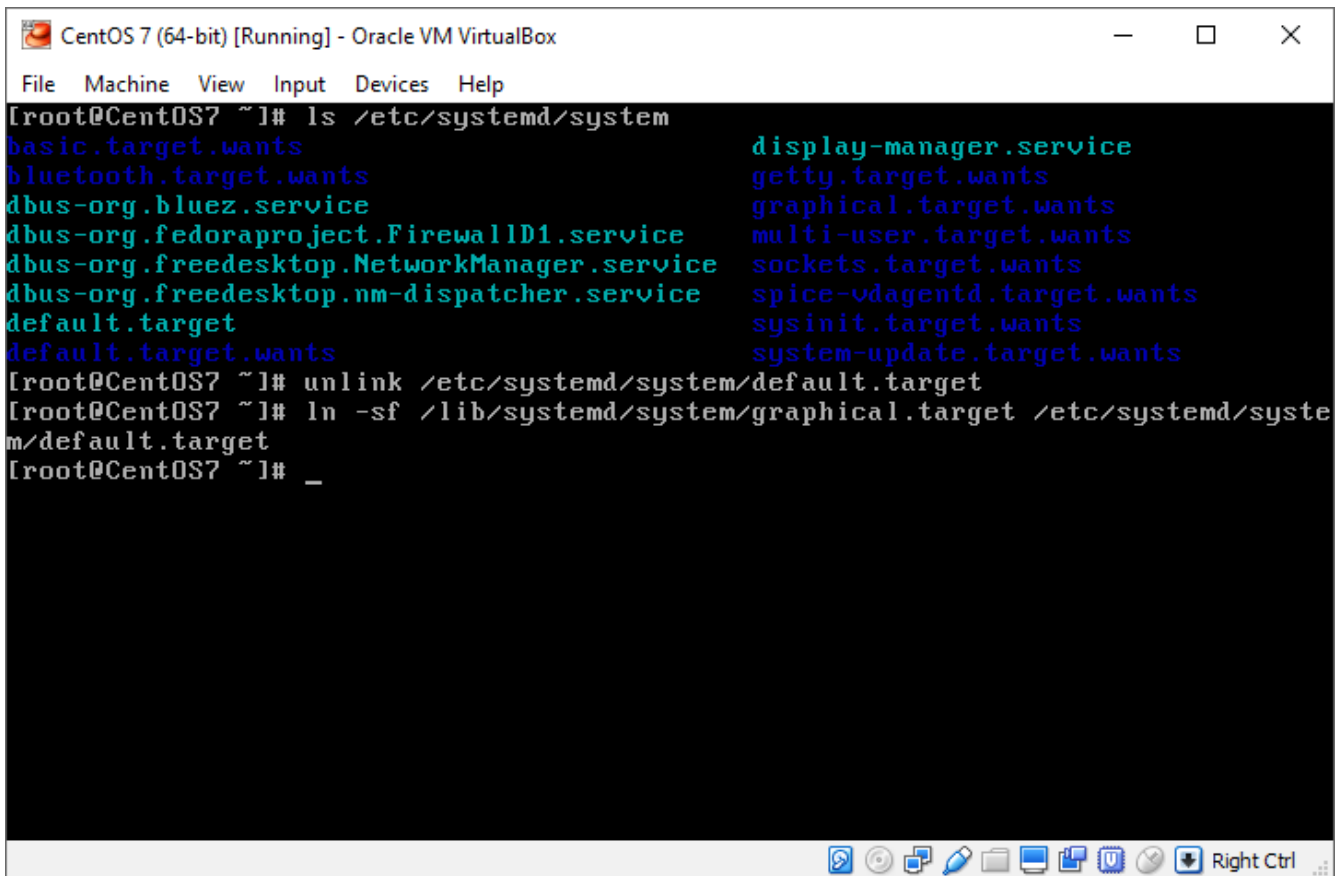
Right Ctrl

As of this writing, the "X Window System" group prompts us to install 10 packages plus 71 additional packages that are dependices. Accept this install by typing "y" and pressing Enter.

```
CentOS 7 (64-bit) [Running] - Oracle VM VirtualBox                    —    □    ×

File   Machine   View   Input   Devices   Help
[root@CentOS7 ~]# yum install gnome-classic-session gnome-terminal gnome-termina
l-nautilus liberation-mono-fonts bzip2 gcc make kernel-devel_
```

After installing the base "X Window System" group, there are several other packages we will need to install the Gnome desktop UI and some usability features we're interested in.

The "gnome-classic-session" package installs most of the packages we need. It provides the essential graphical session. The "gnome-terminal" provides us with a text UI console application. The "gnome-terminal-nautilus" package adds an "Open Terminal" option to the right-click menu that opens on the Gnome desktop. This provides us with quick access to open a terminal window. The "liberation-mono-fonts" packages adds some font options to our terminal preferences. We'll use one of these fonts in our terminal. Finally, the "bzip2", "gcc", "make" and "kernel-devel" packages installs support for a specific form of compression and basic build tools that are used during the installation of VIrtualBox Linux Guest Additions, which provides a set of extended capabilities when running Linux as a virtual machine on VirtualBox. We'll install the Linux Guest Additions as part of our configuring the Gnome desktop.

```
CentOS 7 (64-bit) [Running] - Oracle VM VirtualBox                    —    □    ×

File   Machine   View   Input   Devices   Help
[root@CentOS7 ~]# ls /etc/systemd/system
basic.target.wants                          display-manager.service
bluetooth.target.wants                      getty.target.wants
dbus-org.bluez.service                      graphical.target.wants
dbus-org.fedoraproject.FirewallD1.service   multi-user.target.wants
dbus-org.freedesktop.NetworkManager.service sockets.target.wants
dbus-org.freedesktop.nm-dispatcher.service  spice-vdagentd.target.wants
default.target                              sysinit.target.wants
default.target.wants                        system-update.target.wants
[root@CentOS7 ~]# unlink /etc/systemd/system/default.target
[root@CentOS7 ~]# ln -sf /lib/systemd/system/graphical.target /etc/systemd/syste
m/default.target
[root@CentOS7 ~]# _
```

Now, with all the packages installed, we need to update a symbolic link in /etc/systemd/system where the current "default.target" points to the target file for multi-user mode. We remove the existing link using the "unlink" command. Then we create a new link pointing the "default.target" to the graphical targer. This will inform CentOS 7 on the appropriate target file on reboot into the multi-user graphical run level.

Next, reboot the CentOS 7 virtual machine.
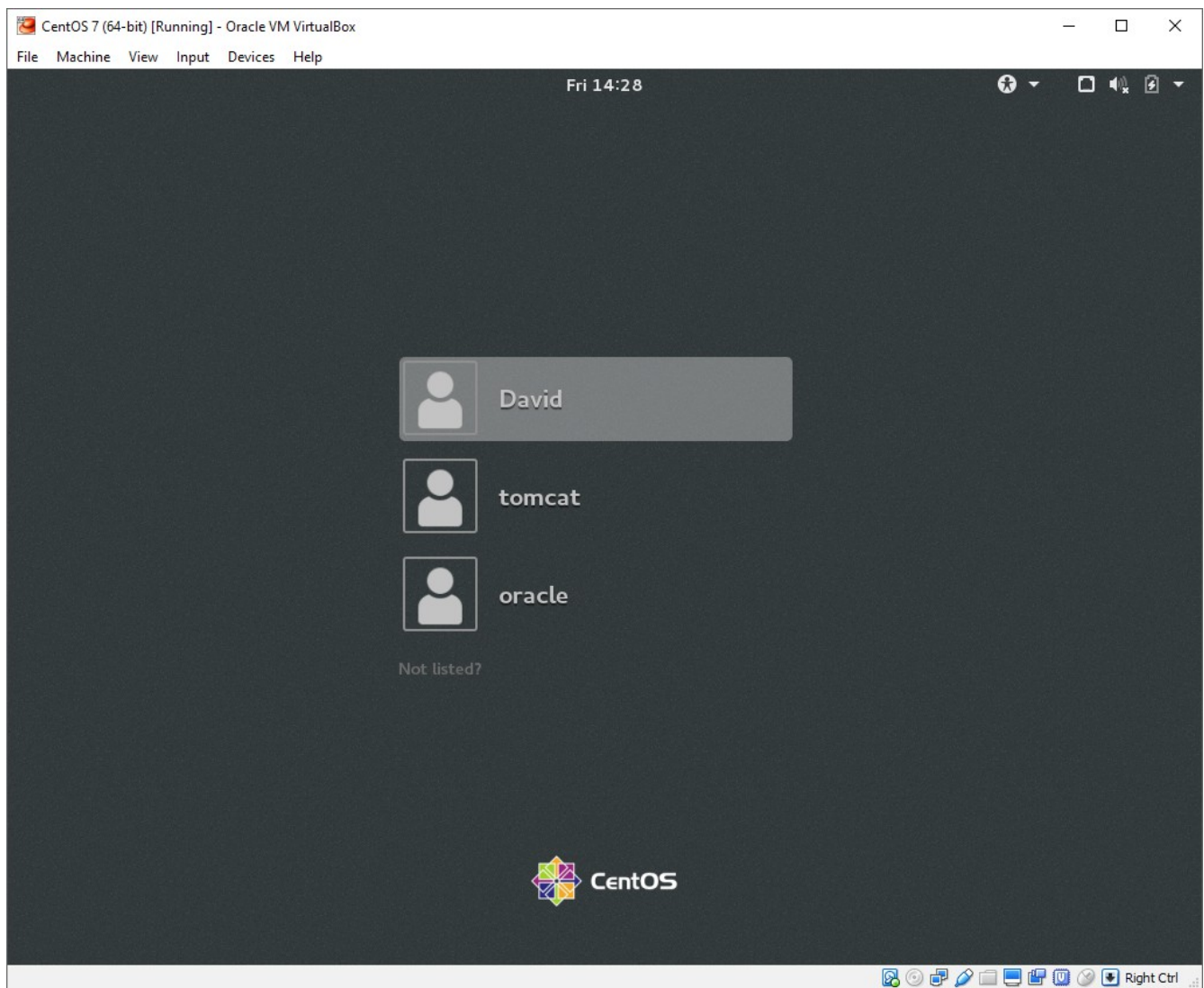
Now, when CentOS boots, we are taken into a graphical desktop. The login screen presents non-root users for selection. If we want to log in as the "root" user, click the "not listed?" text and a prompt to enter a user name will be displayed.

For now, we'll log in as our administrative user created earlier in a previous "how to". Click the user name.
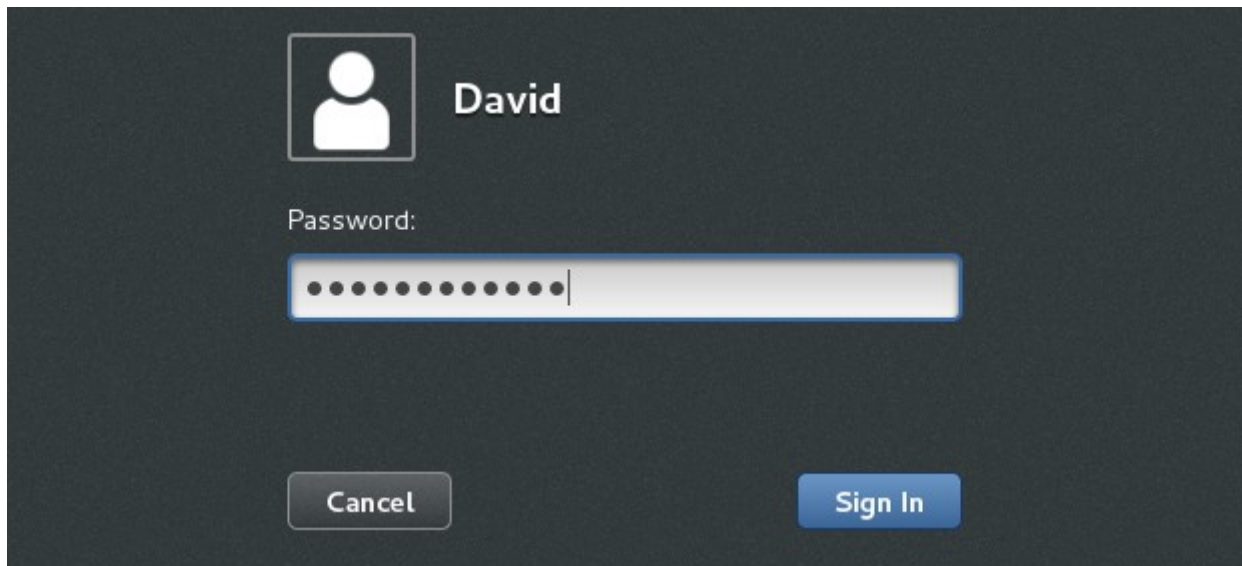
Enter the password we defined for the administrative user. If you accidentally select the incorrect user, use the "Cancel" button to return to the list of users. Once the password is entered, click the "Sign In" button.
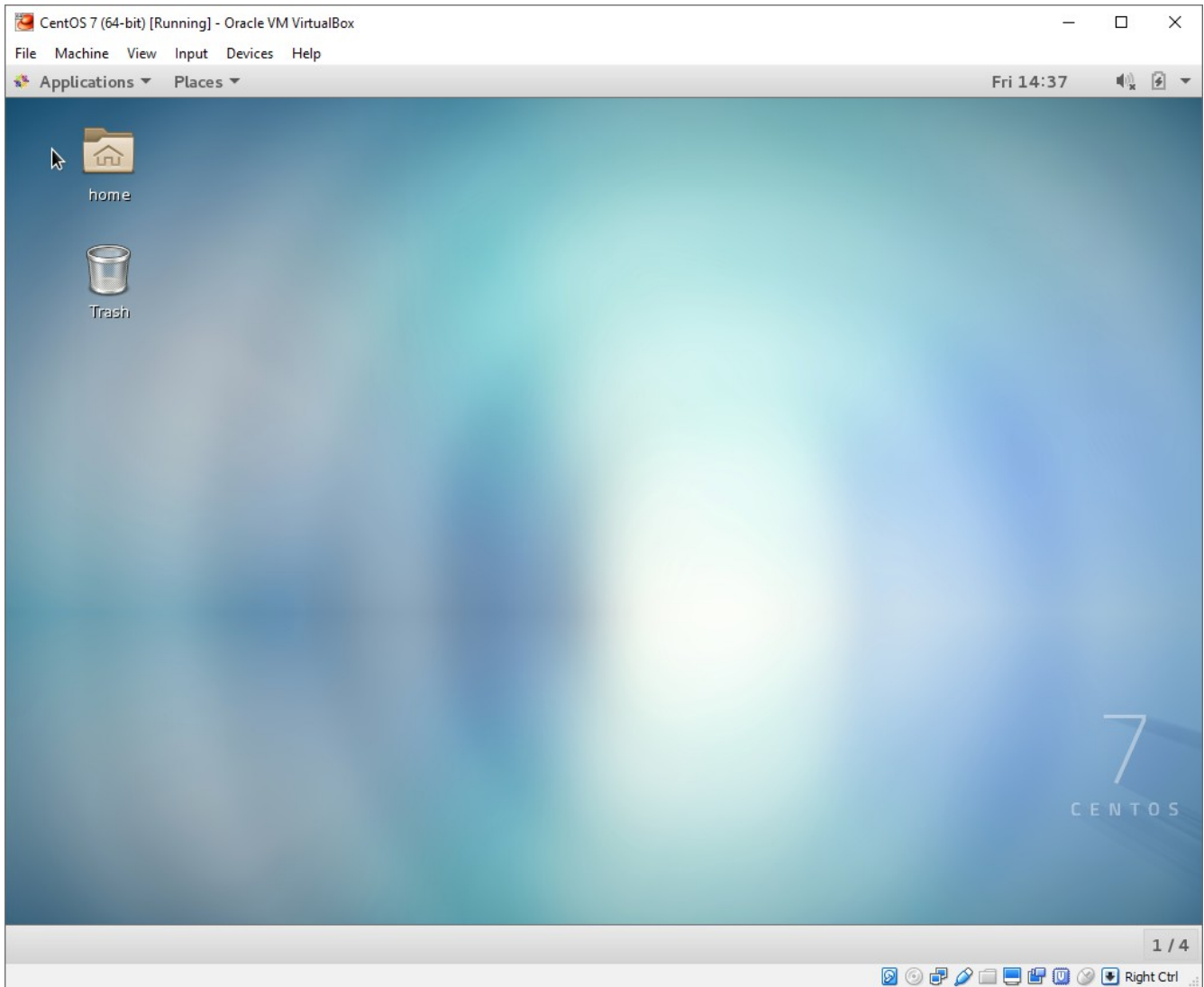
The default Gnome desktop provides icon access to Files as the "Home" level and the wastebasket shown as "Trash" on the icon.
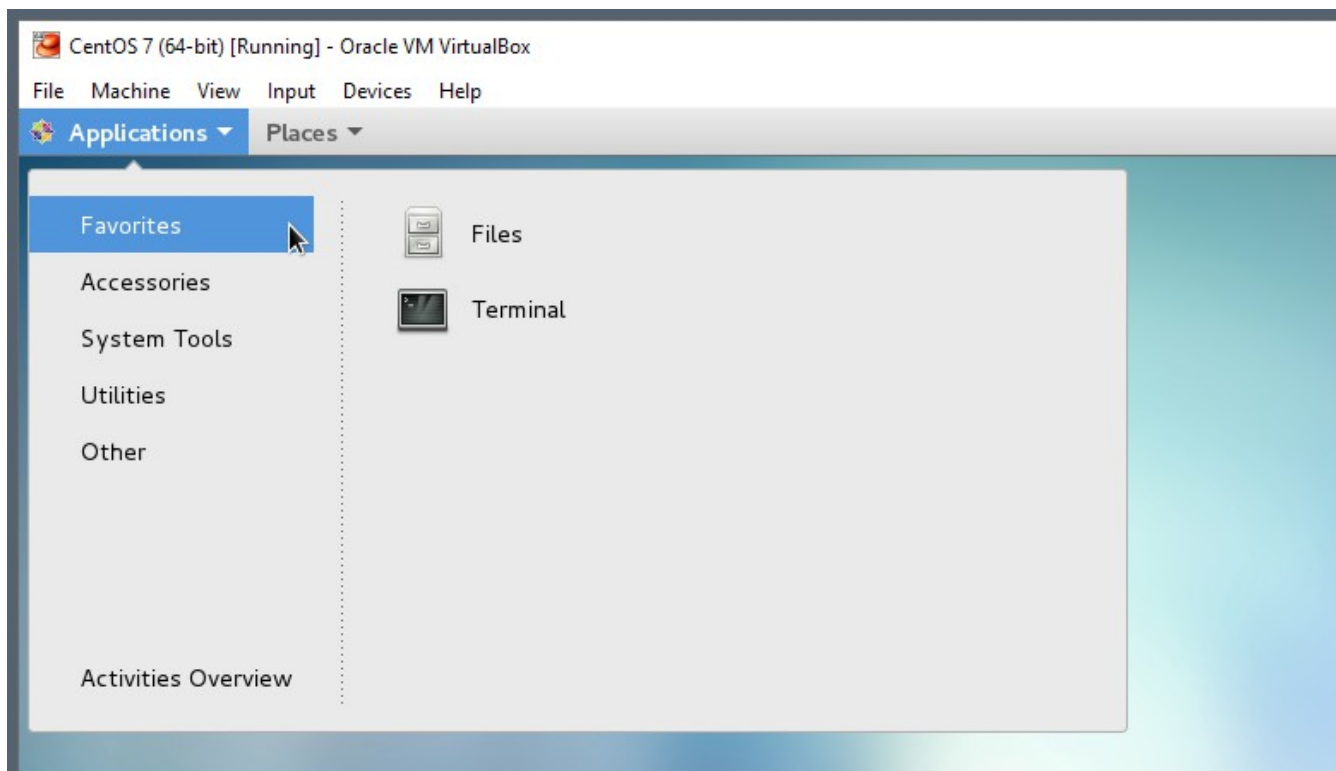
We can find our "terminal" application, installed with the "gnome-terminal" package, under our "Applications" menu in the "Favorites" group.
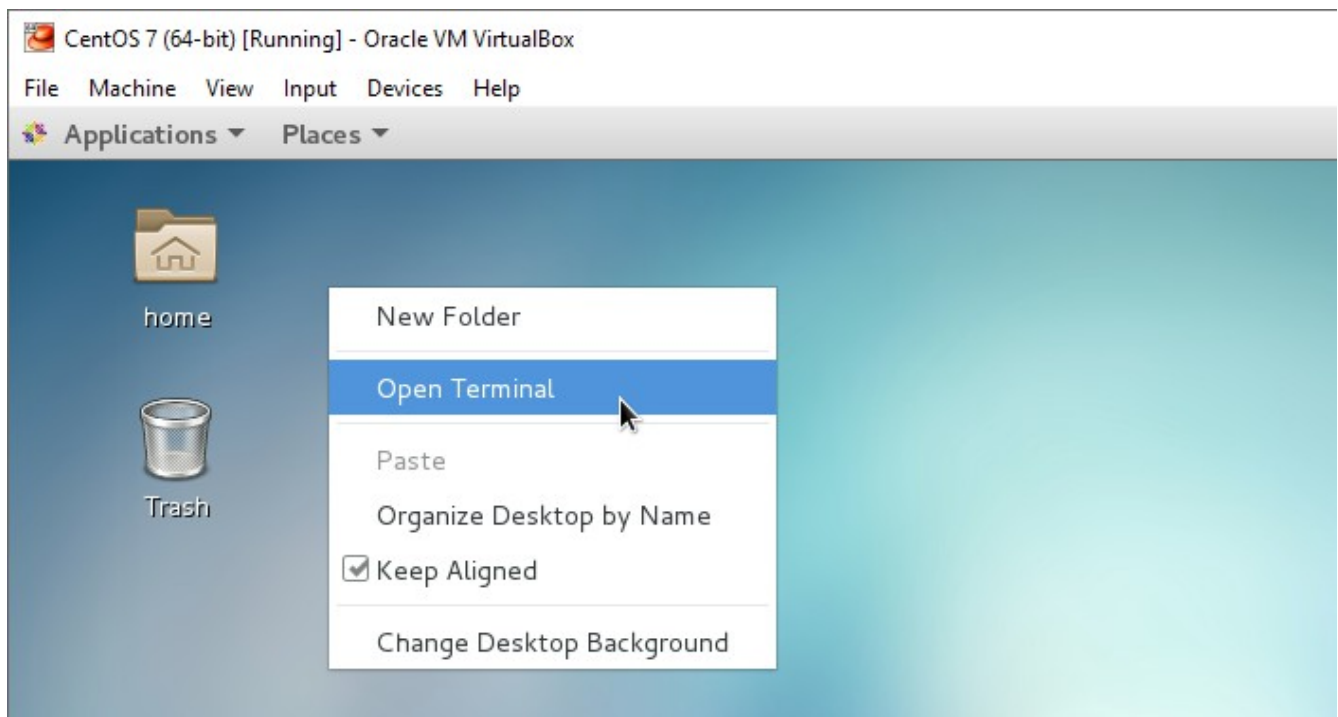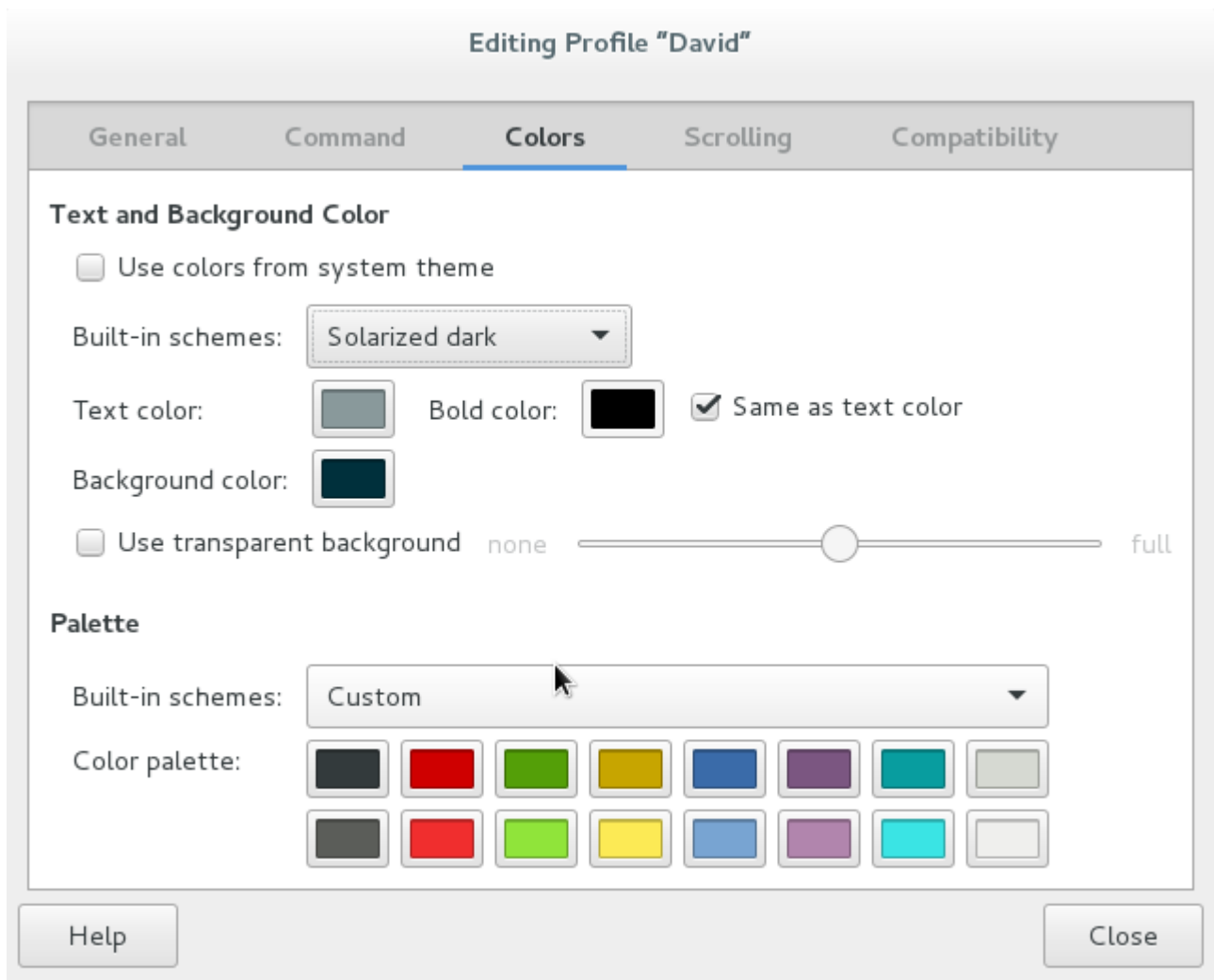
When we right-click on the desktop, we see the "Open Terminal" option. This was added when we installed the "gnome-terminal-nautilus" package.
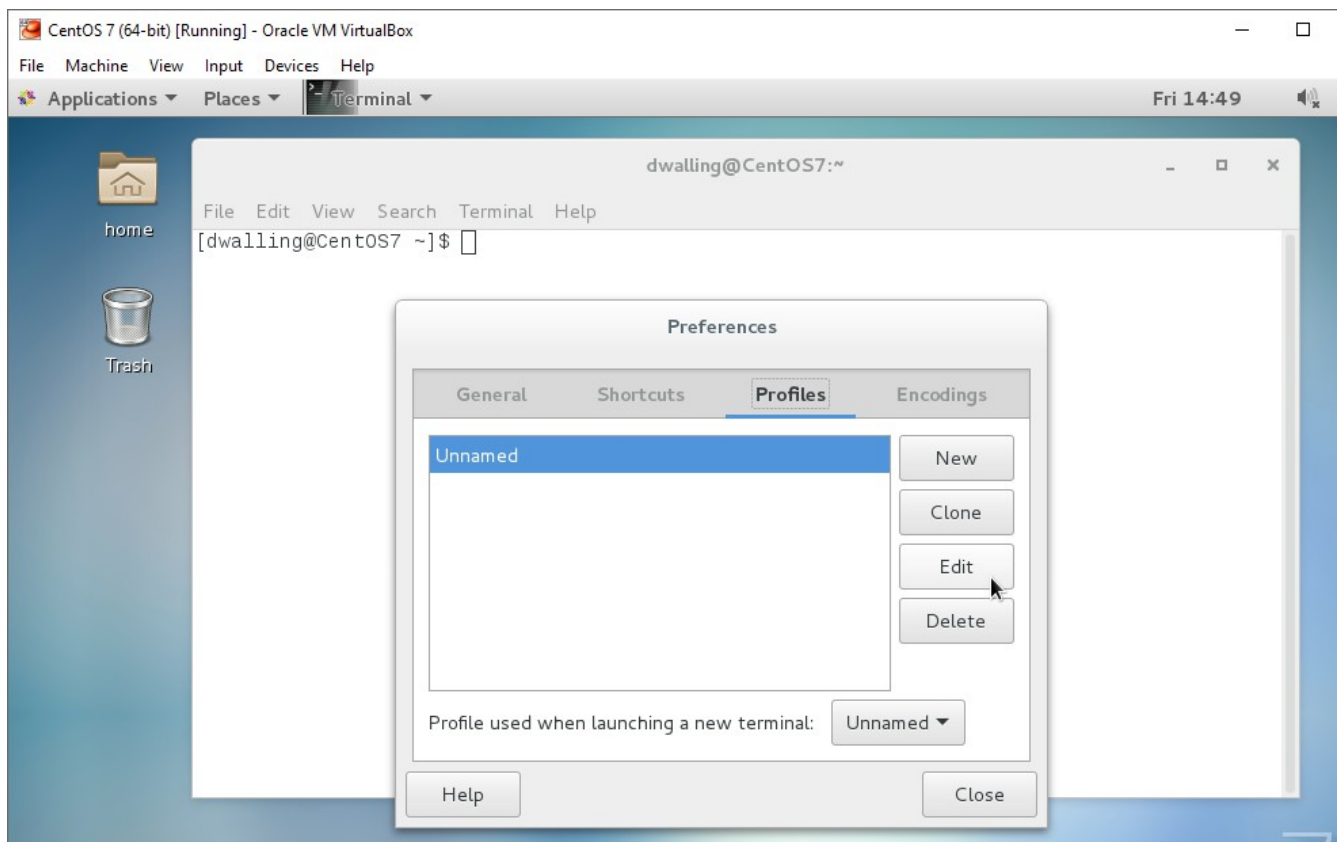
After launching Terminal, we can open the Preferences dialog from the "Edit" menu. To update the font, click on the "Profiles" tab and click "Edit" to open the current profile. We will also rename the profile.
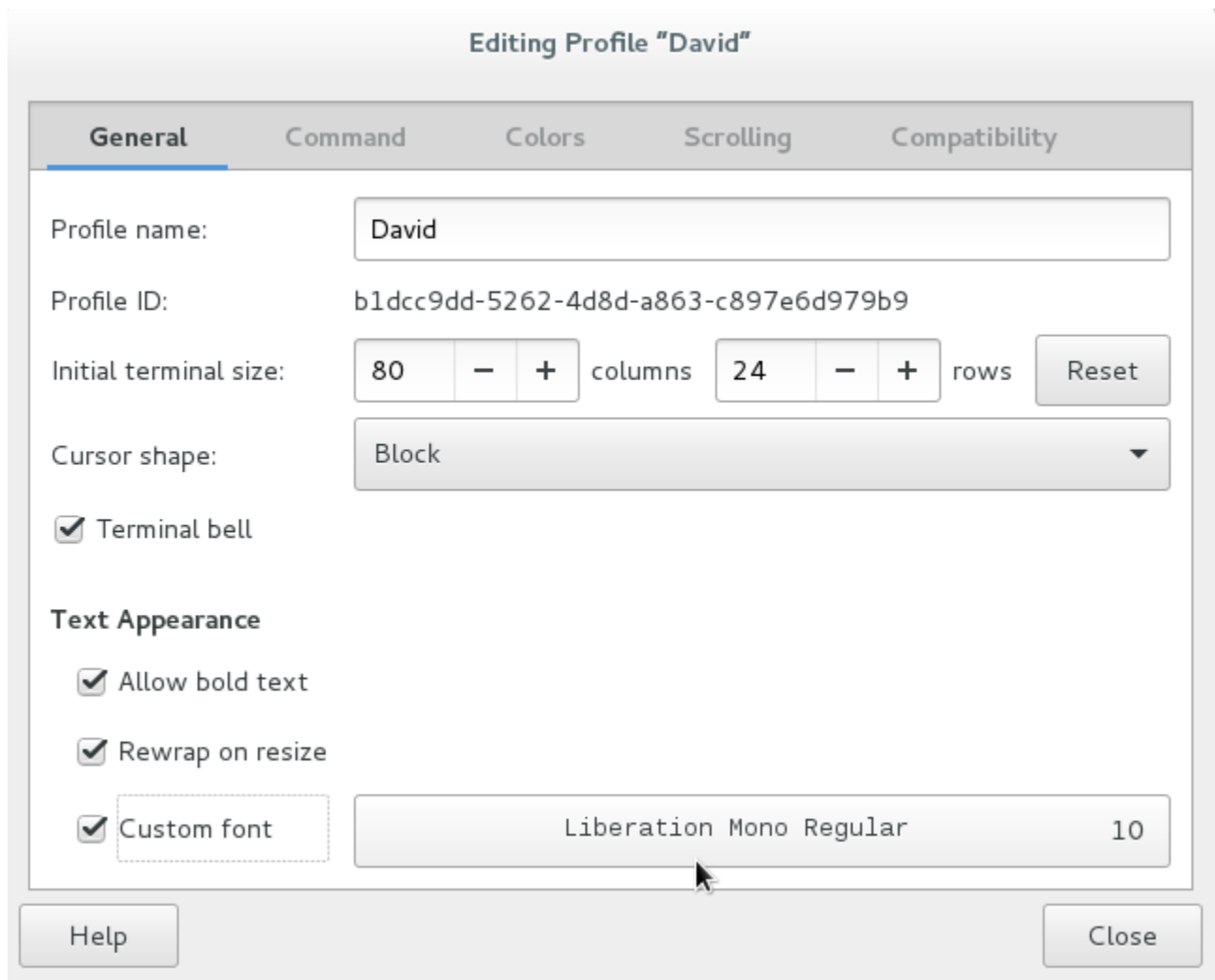
On the profile edit dialog, we will update the Profile Name and the font. To change the font, check the "Custom font" checkbox. Then click the font name to open the font select list. Here, we select the "Liberation Mono Regular" font which was included when we installed the liberation-mono-fonts package.

Editing Profile "David"

| General | Command | **Colors** | Scrolling | Compatibility |

Text and Background Color

☐ Use colors from system theme

Built-in schemes: [Solarized dark ▼]

Text color: [   ]   Bold color: [■]   ☑ Same as text color

Background color: [■]

☐ Use transparent background   none ————○————— full

Palette

Built-in schemes: [Custom ▼]

Color palette: [palette swatches]

[Help]   [Close]

On the "Colors" tab of the Profile Edit dialog, we've unchecked the "Use colors from system theme" checkbox and have selected the "Solarized dark" theme from the Built-in schemes select list. Click the "Close" button when you've made all the changes you want in the Profile Edit dialog.
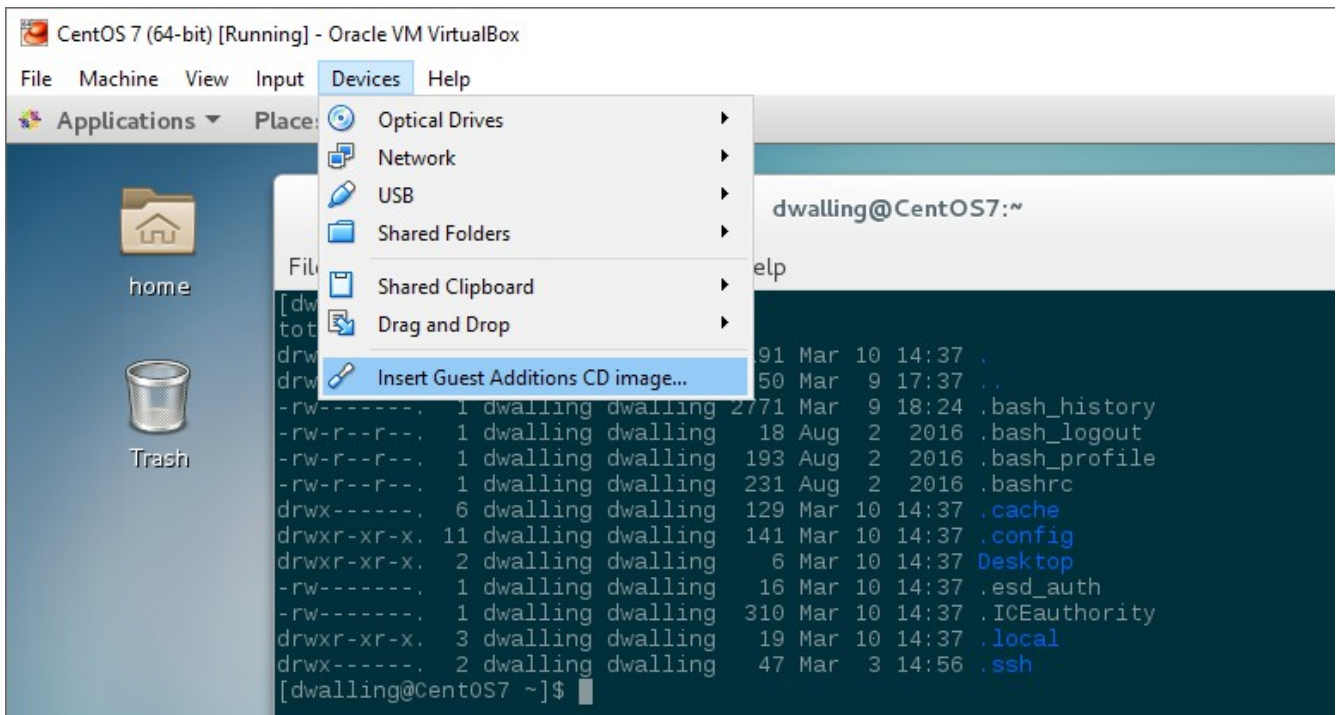
Now we'll install the VirtualBox Linux Guest Additions. The source of these extensions are already available within the VirtualBox as a CD image. Use the VirtualBox "Devices" menu and select the "Insert Guest Additions CD image..." menu option.
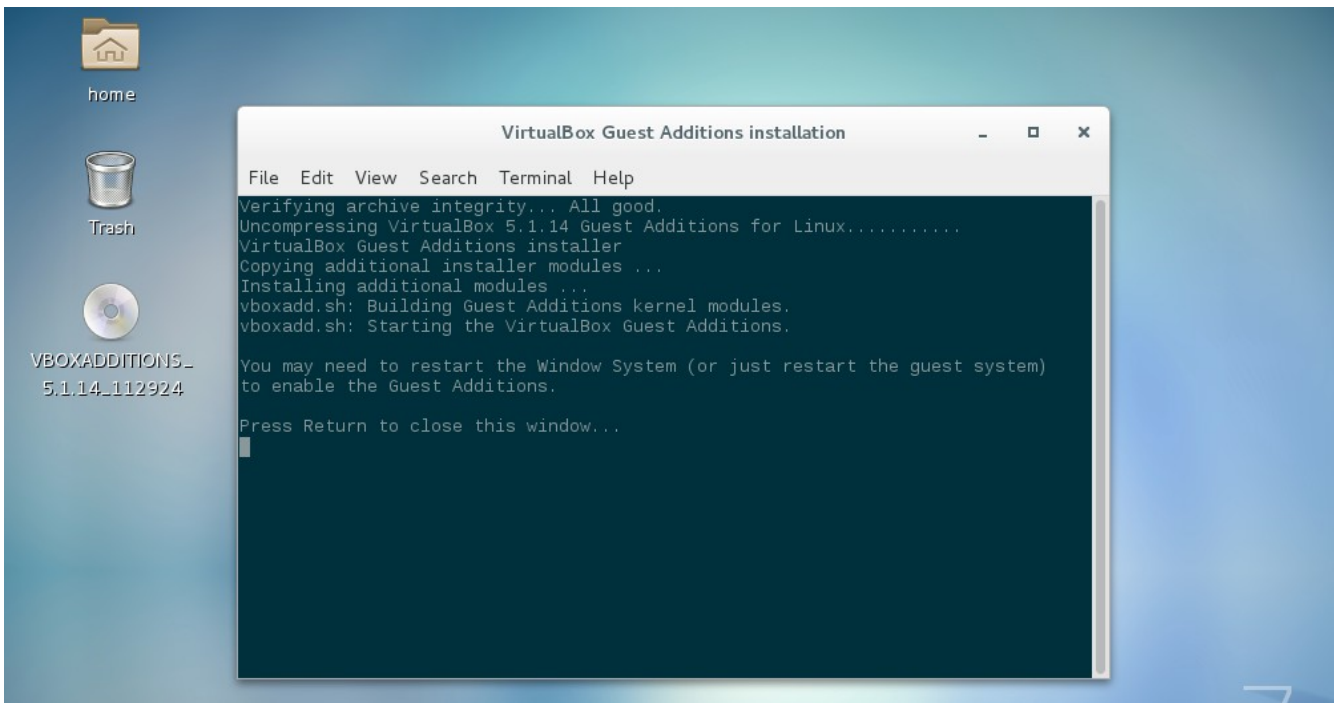
Remember, this step will only work properly if you have installed the required packages we installed in an earlier step above.
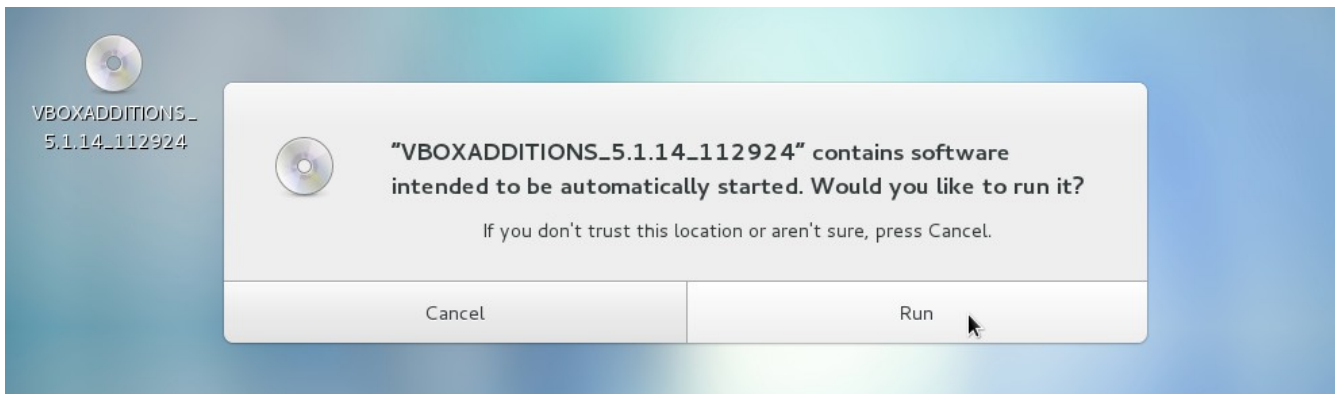

Gnome will prompt you to confirm that you want to run the installation script on the CD image. Click "Run".

Since we're not logged in as "root", enter the administrative user's password to authenticate the installation.
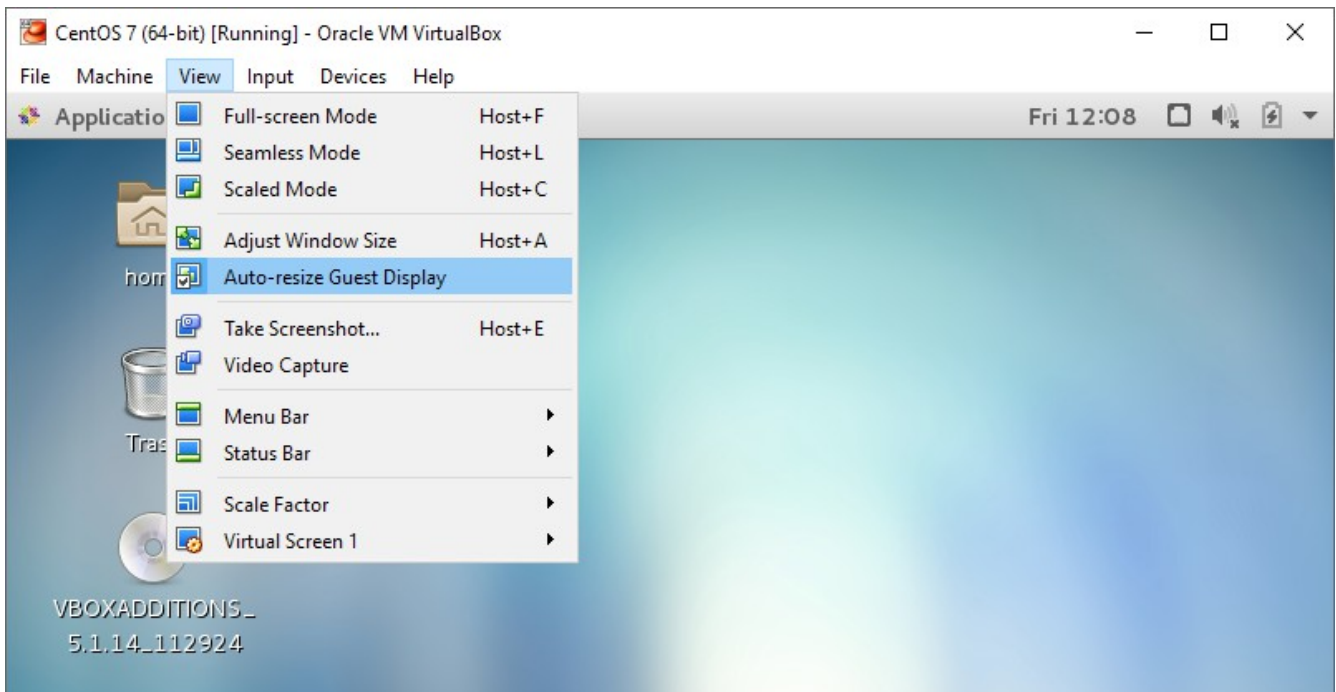

When the installation completes successfully, you'll be notified in the console session that was opened during the installation. Press Enter to close the dialog.
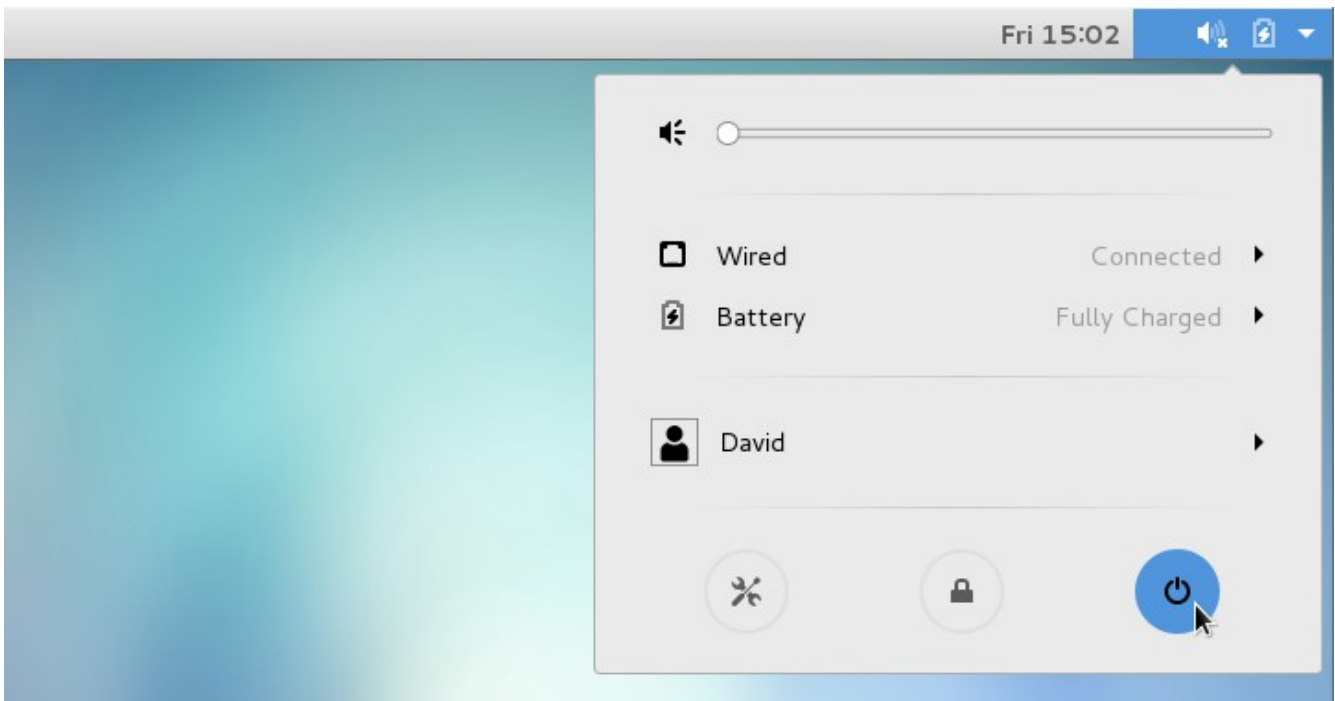
To make the Guest Additions active, we need to restart the Guest OS. Click on the down-arrow in the top-level CentOS icon bar. Then select the Power icon as shown.


Click the "Restart" option on the "Power Off" menu.

After rebooting and loggin in again, note that the Virtul Box "View" menu now has the "Auto-resize Guest Display" selectable. Selecting this option will allow us to resize the Guest OS window dynamically. Or, use the "ctrl F" window to set the Guest OS window to full-screen mode.
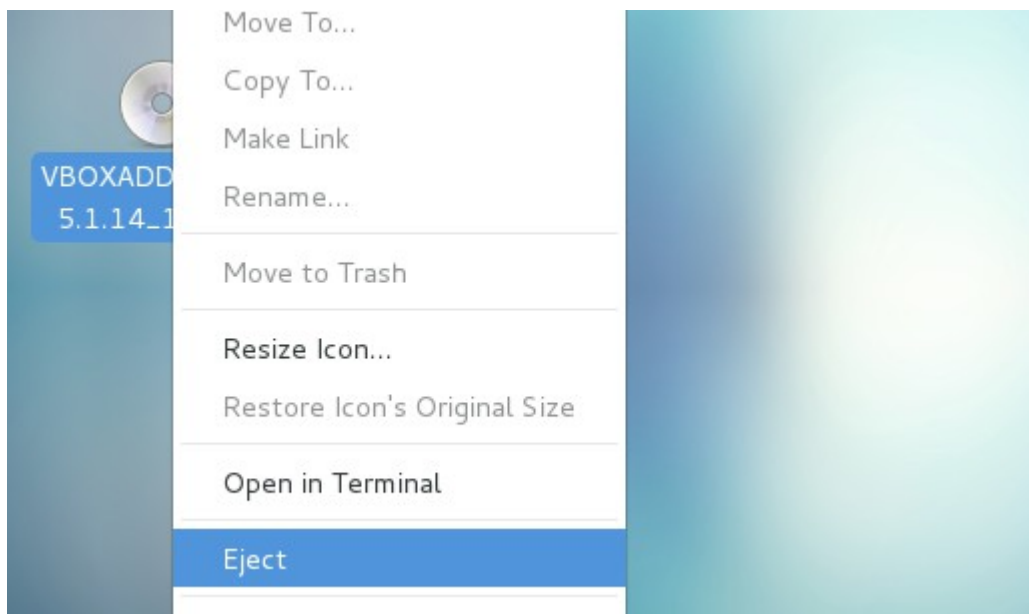
We're done using the VirtualBox Linux Guest Additions CD now. Right-click on the CD icon and select the "Eject" menu option.
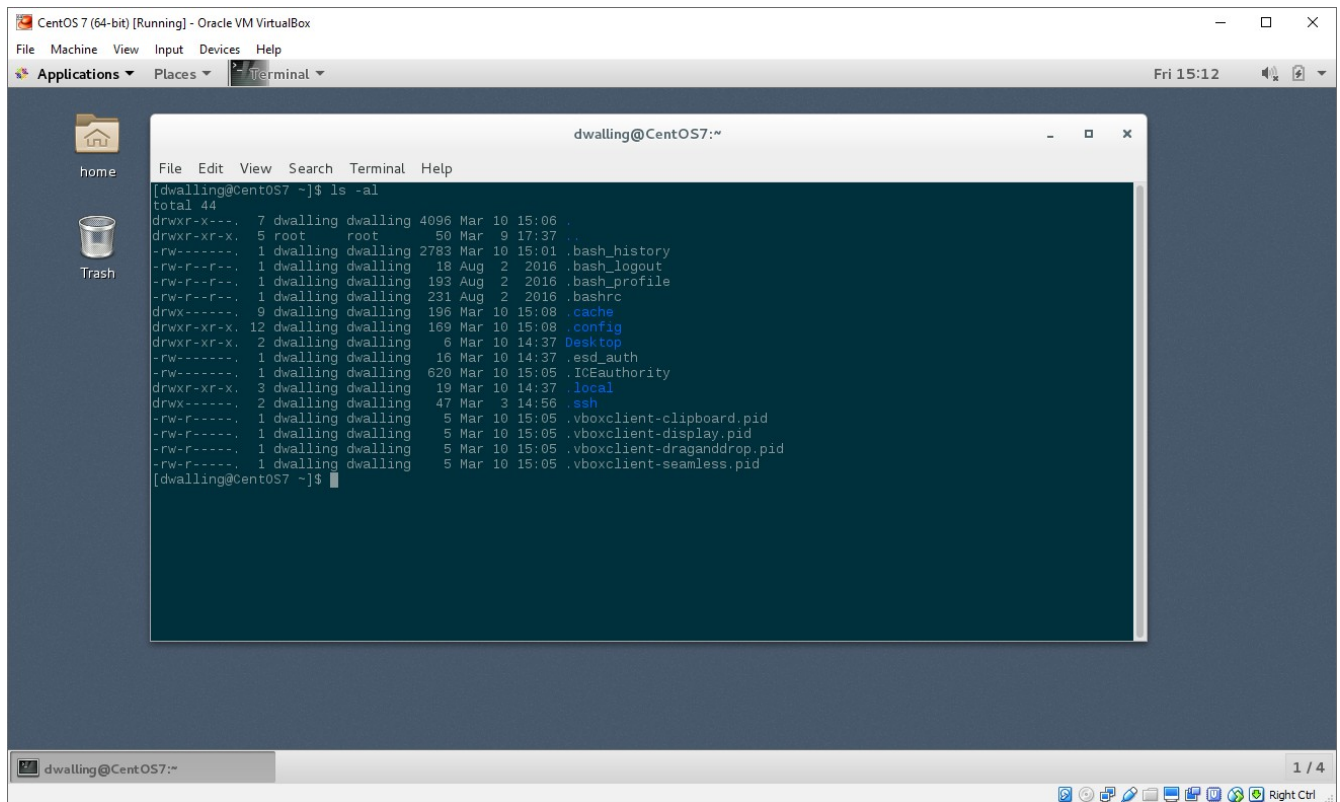
From here, we can optimize our GUI to our heart's content. Now, CentOS 7 is a fully functional workstation, as well as continuing to host the SSH, Oracle and Tomcat services we installed in earlier "how to" articles.