Oracle 64-Bit Installation for CyFlex®

Version 8

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Developed by Transportation Laboratories

Version History

Version	Date	Revision Description
1	7/10/2023	Initial publication
2	8/28/2023	Added install-related commands to step 4.a in *Section 4 Installing CyFlex* on page 42
3	10/24/2023	Revised step 2 in *Section 3.2.1 Peak USB Adapters* on page 39 to add full path specification to `sudo enable/disable_candbc_nopasswd` commands
4	1/18/2024	Rebrand to TRP Laboratories Inserted Section heading *2.5.1 Panel Intellihide* on page 25 that contains existing content. Added *Section 2.5.2 Showing Running Applications in the Taskbar* on page 26
5	5/29/2024	Added note *to Section 1.1 Configuring Network and Host Name* on page 14 to state that some on-board network ports may not be recognized by the initial kernel from the ISO with a recommendation to alleviate this potential condition.
6	8/21/2024	Added *Section 5 Configuring Oracle Linux 8.x to Capture a Crash Dump* on page 44
7	12/23/2024	Revised command string for step 2 in *Section 5 Configuring Oracle Linux 8.x to Capture a Crash Dump* on page 44
8	2/26/2025	Revised Step 4 in *Section 4 Installing CyFlex* on page 42

Document Conventions

This document uses the following typographic and syntax conventions.

- Commands, command options, file names or any user-entered input appear in Courier type. Variables appear in Courier italic type.

  Example: Select the `cmdapp-`*`relVersion-buildVersion`*`.zip` file….

- User interface elements, such as field names, button names, menus, menu commands, and items in clickable dropdown lists, appear in Arial bold type.

  Example: **Type**: Click **Select Type** to display drop-down menu options.

- Cross-references are designated in Arial italics.
  Example: Refer to *Figure 1*…
- Click intra-document cross-references and page references to display the stated destination.
  Example: Refer to *Section 1 Installation Procedure* on page 1.
  The clickable cross-references in the preceding example are *1*, *Installation Procedure*, and on page 1.

CyFlex Documentation

CyFlex manuals are available at https://cyflex.com/. View **Help & Docs** topics or use the **Search** facility to find topics of interest.

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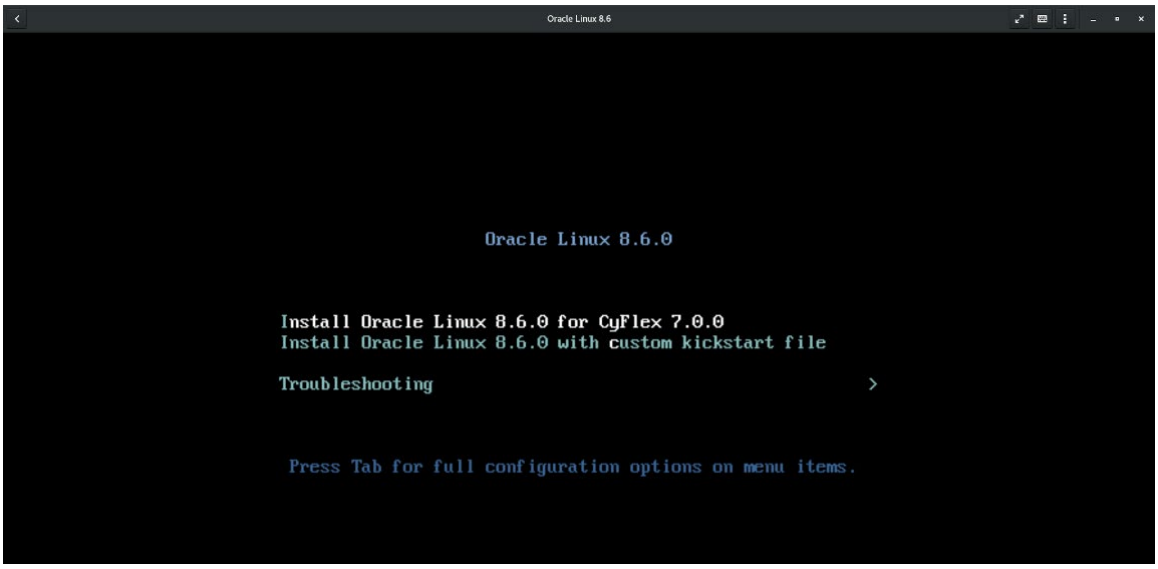
1 Installation Procedure

Execute the following steps:

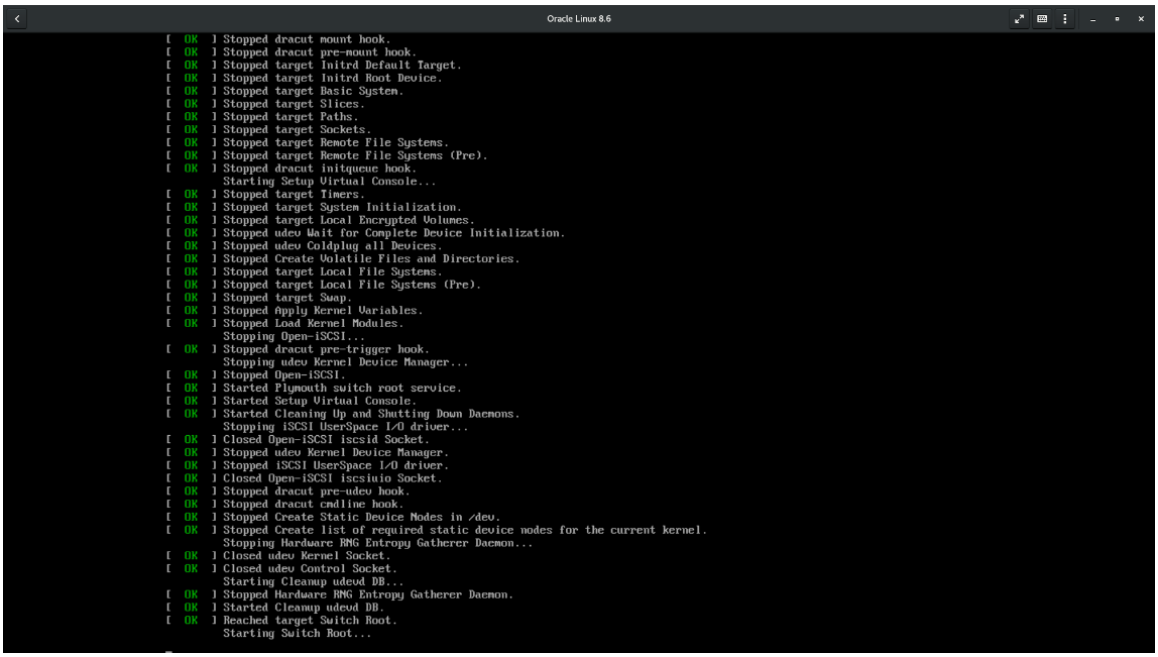
1. BEFORE installing the operating system, boot into the BIOS of your computer and ensure `SECURE BOOT` is set to `OFF`.
2. Boot the Oracle Linux machine to display the initial boot screen as in *Figure 1*.

Figure 1: Initial Boot Screen



3. Ensure **Install Oracle Linux 8.6.0 for CyFlex 7.0.0** is selected and then press `Enter` to continue. Scrolling startup information is displayed as in *Figure 2*.

Figure 2: Startup Information



4. Upon boot completion, the Oracle Linux **Installation Summary** screen is displayed as in *Figure 3*. Certain items such as **Installation Source**, **Installation Destination**, and **Network and Hostname** must be configured before clicking the **Begin Installation** button. Before these are completed, the button will be grayed out. Refer to *Table 1* for screen instructions.

Figure 3: Oracle Linux Installation Summary

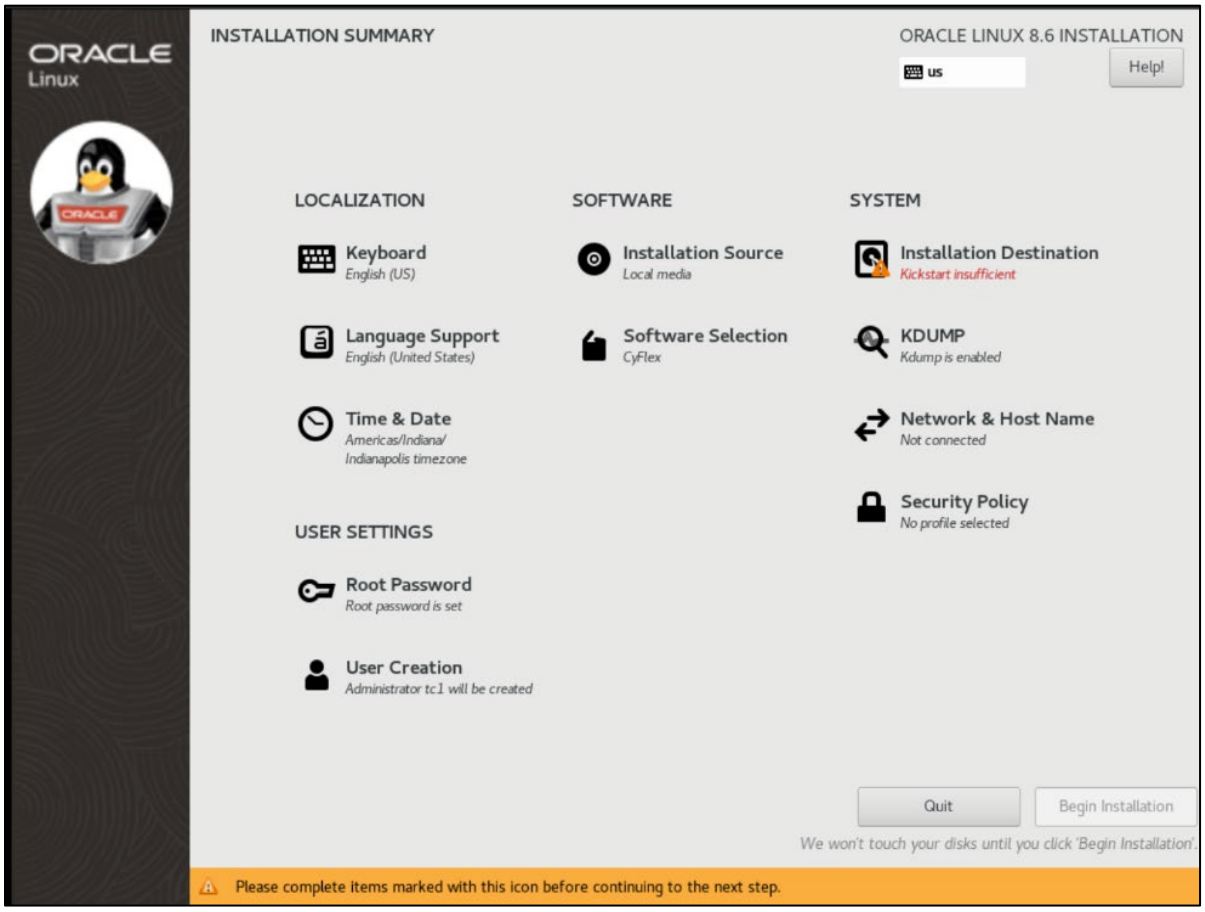


Table 1: Installation Summary Category Descriptions

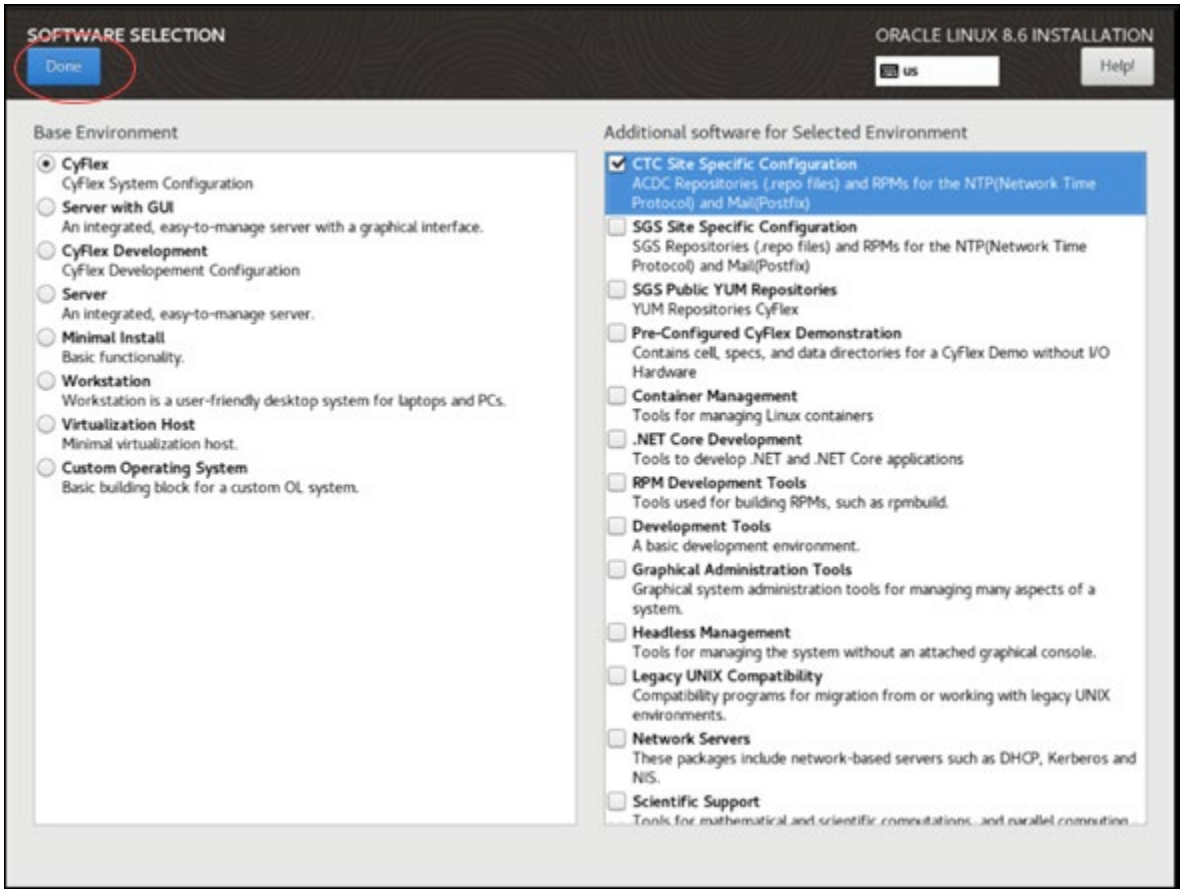
Category	Description
Keyboard	Default is English.
Language Support	Default is English.
Time and Date	Default is Indianapolis time zone. If syncing the machine's time with your organization's time server, the selection does not matter. If not, select the local time zone.
Root Password	Default root password is used. If desired, click **Root Password** to change it.
User Creation	Default username is `tc1` with a default password. If desired, click **User Creation** to set a different username and password.

Category	Description
Installation Source	No action is required.
Software Selection	Select **CyFlex** for the Base Environment and choose which repository files to use based on the current site: • Cummins sites: choose **CTC Site Specific Configuration** • TRP Laboratories Internal users: select **TRP Laboratories Site Specific Configuration** • All others: select **Public YUM Repositories**
Installation Destination	Select this to format your hard drive(s).
KDUMP	Enabled by default. No action is required.
Network & Host Name	Configure the network and hostname here or do this after completing the OS installation and have booted from your hard drive. Refer to Section *1.1 Configuring Network and Host Name* on page 14
Security Policy	No action is required.

5. If you are a Cummins site, **even if you are a remote site and not CTC**, in the **Software Installation** screen, **CyFlex** is pre-selected for **Base Environment**. In addition to this, select the following for **Additional software for Selected Environment**:
   a. **CTC Site Specific Configuration**
      This downloads the `.repo` files you will need later, along with other Cummins-specific settings such as mail and ntp. **All Cummins sites should check this box.**
   b. **TRP Laboratories Site Specific Configuration**
      This downloads the `.repo` files you will need later, along with other TRP Laboraties-specific settings such as mail and ntp. **All TRP Laboratories sites should check this box.**
   c. **TRP Laboratories Public YUM Repositories**
      This downloads the `.repo` files you will need later. **All non-Cummins and non-TRP Laboratories sites should check this box**

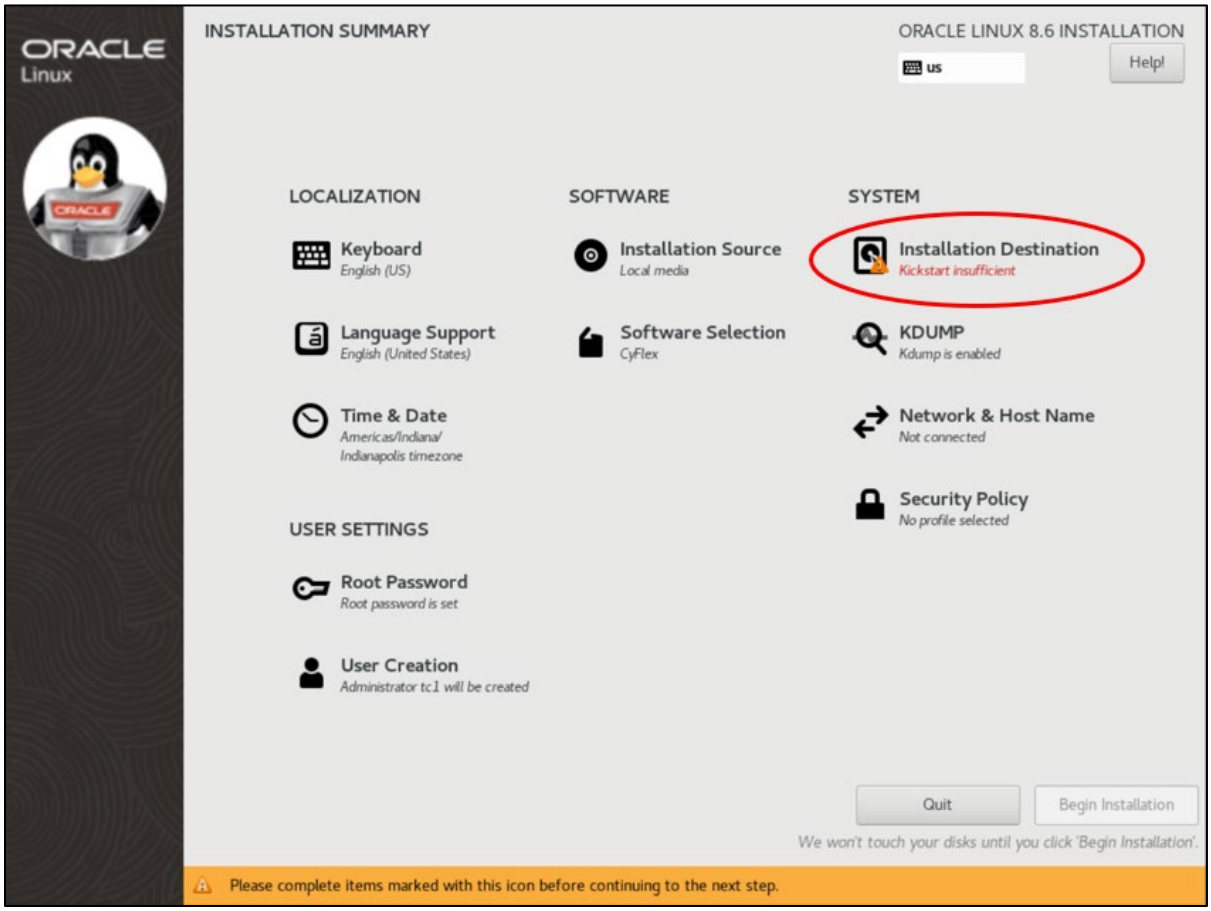
6. Select **CyFlex** under **Base Environment** on the resulting **Software Selection** screen and then select **Done** as indicated in *Figure 4*.

Figure 4: Software Selection



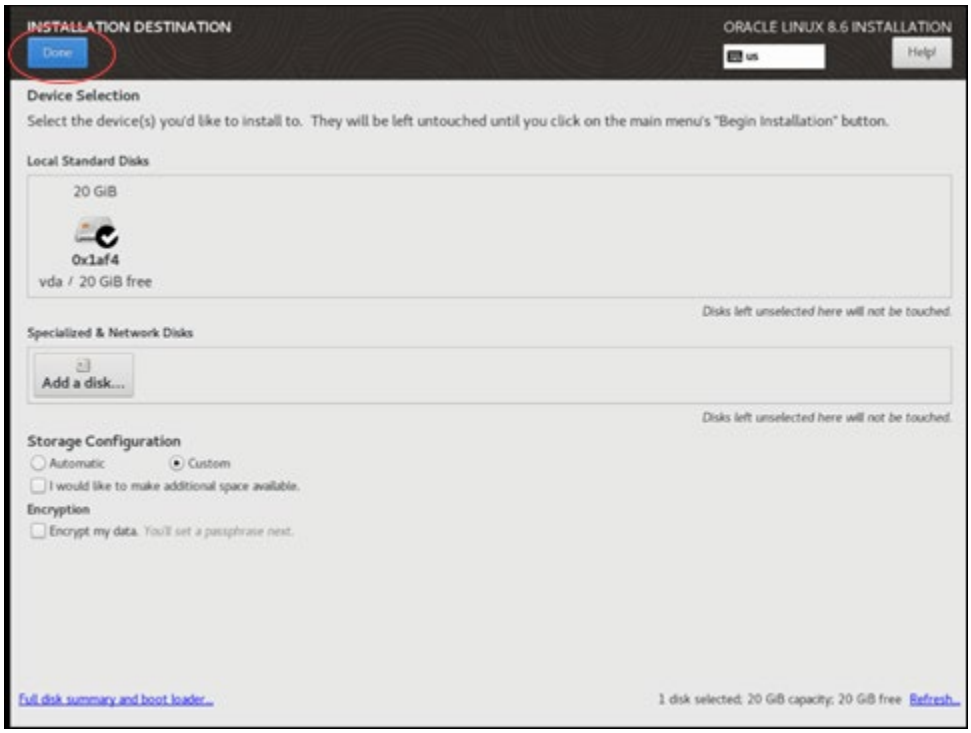
7. On the resulting **Installation Summary** screen, select **Installation Destination** as indicated in *Figure 5*.

Figure 5: Select Installation Destination



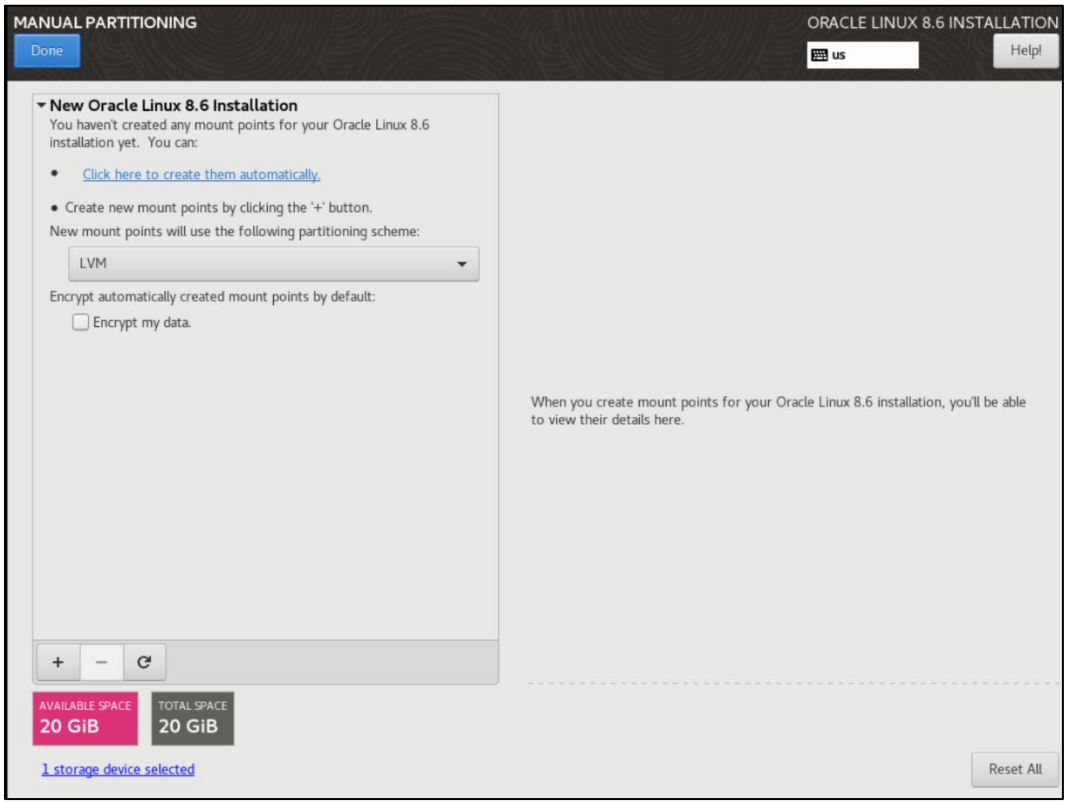
8. On the resulting **Installation Destination** screen, select:
    a. A **Local Standard Disk**.
    b. **Custom** under **Storage Configuration**
    c. Select **Done** to configure the installation destination as indicated in *Figure 6*.

Figure 6: Select Local Disk to Configure



9. The **Manual Partitioning** screen is displayed.

Figure 7: Manual Partitioning Screen



If partitions exist on your hard drives, delete them by selecting them and then click the − sign. **DO NOT** delete your USB drive partition.

When there are no existing partitions, the **AVAILABLE SPACE** entry at the bottom of the screen will display roughly the amount of storage available on your hard drive. Partition your hard drive at this point.

Table 2 on page 8 lists recommended minimum values to use, along with additional recommendations. Each site may need to partition their hard drives differently based on the file structure used at the particular site. There is no *one size fits all* partitioning scheme for all customers.

Table 2: Recommended Minimum Partition Size Values

Partition	Minimum Recommended Size	Size Considerations	SSD or HDD*	Device Type	File System
/home	20 GB	This partition is **optional** but **recommended**. This is where user-specific directories are created such as Documents, Downloads, Pictures, etc. as well as files necessary for gnome and other OS-related functions. For some sites, the specs and cell directories are symbolically linked to here. Review your site's current configuration and consider future growth requirements when allocating this partition.	SSD / NVMe	LVM	xfs
/data	100 GB	This is the default storage location for logger files, error files, error databases, darts data, delta history files, integrity files, and many other files. If your computer has 2 hard drives, one SSD and one HDD, it is recommended to put the /data partition on the HDD. Otherwise, this partition can be left on the SSD.	HDD	Standard Partition	xfs
/boot	1024 MB	Required	SSD / NVMe	Standard Partition	xfs
/boot/efi	600 MB	Required	SSD / NVMe	Standard Partition	EFI System Partition

Partition	Minimum Recommended Size	Size Considerations	SSD or HDD*	Device Type	File System
`/swap`	8 GB	Memory allocation when too much RAM is used	SSD / NVMe	LVM	swap
`/`	100 GB	This is where system files reside, as well as CyFlex. It is important that this is on the SSD or NVMe drive when using multiple hard drives to maximize performance. On systems where the `/esvd_data` directory contains numerous different specs directories for different configurations, along with emissions logger files, ensure that the `/` partition is large enough to accommodate those.	SSD / NVMe	LVM	xfs

*This column is ONLY applicable for systems with multiple hard drives of different types.

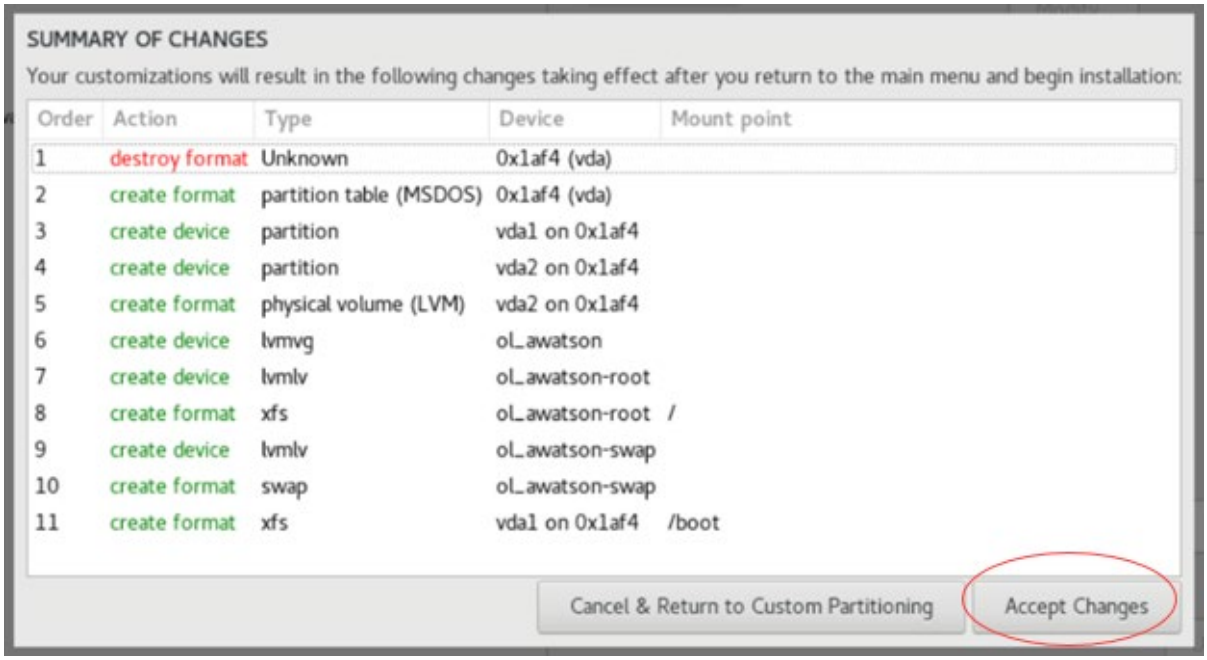
Note:

Sometimes the partitioning tool will not allow you to select between available hard drives when creating partitions of the type **LVM**. To work around this, create the partition as **Standard Partition**, then select the hard drive you want that partition to go on, then switch the device type back to **LVM**

10. When done partitioning your hard drive(s), click the **DONE** button in the top left of the **Manual Partitioning** window.

11. The resulting **Summary of Changes** screen lists the changes requested to this point. Review the list and when satisfied, click **Accept Changes** as indicated in *Figure 8*.

Figure 8: Summary of Changes



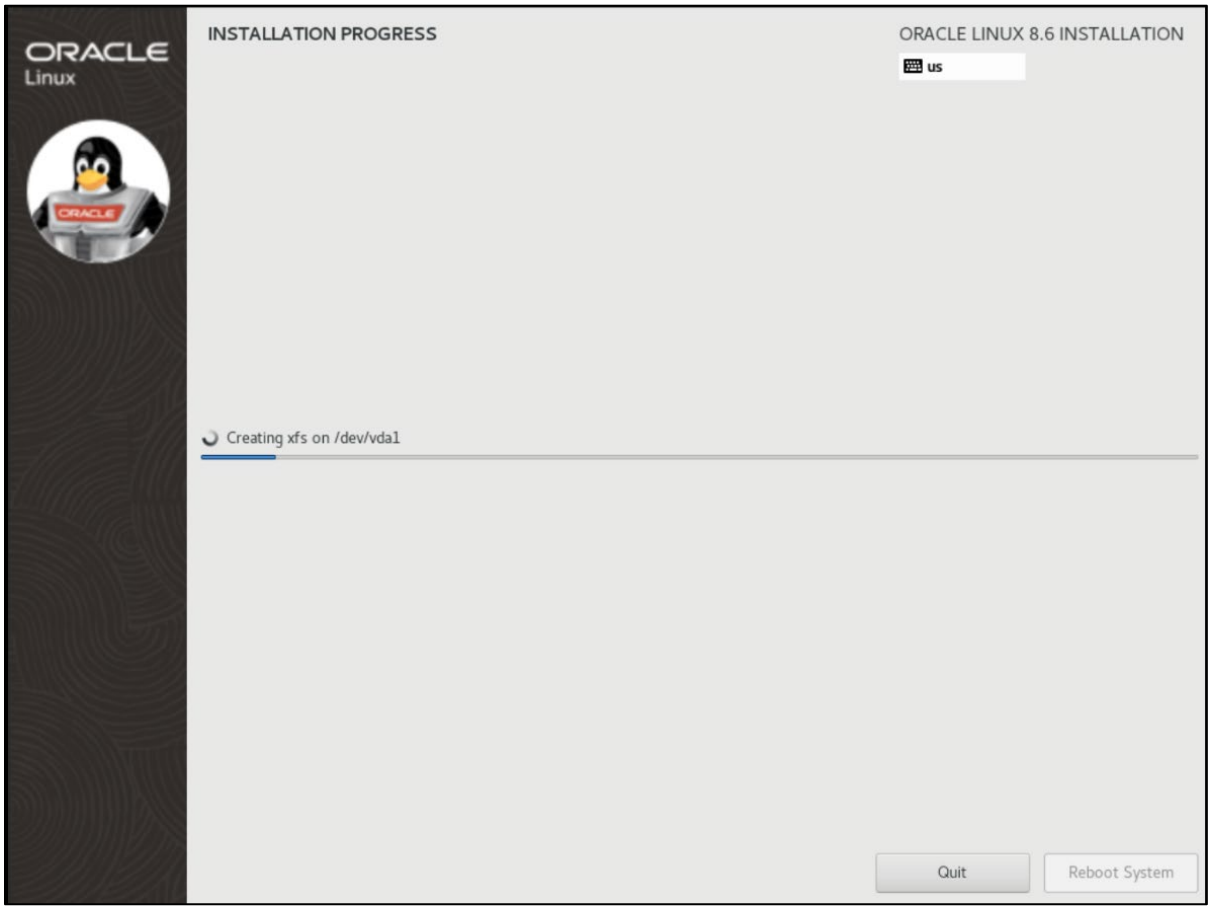
12. When all required information is completed, the **Begin Installation** button is activated and selectable as indicated in *Figure 9*. **Note** that network ports may be configured at this time if desired by clicking **Network & Host Name**. They may also be configured after the OS has installed and you have booted from the hard drive rather than the USB. Refer to Section *1.1 Configuring Network and Host Name* on page 14

Figure 9: Begin Installation

Select **Begin Installation**.

13. Installation progress is displayed as in *Figure 10*.

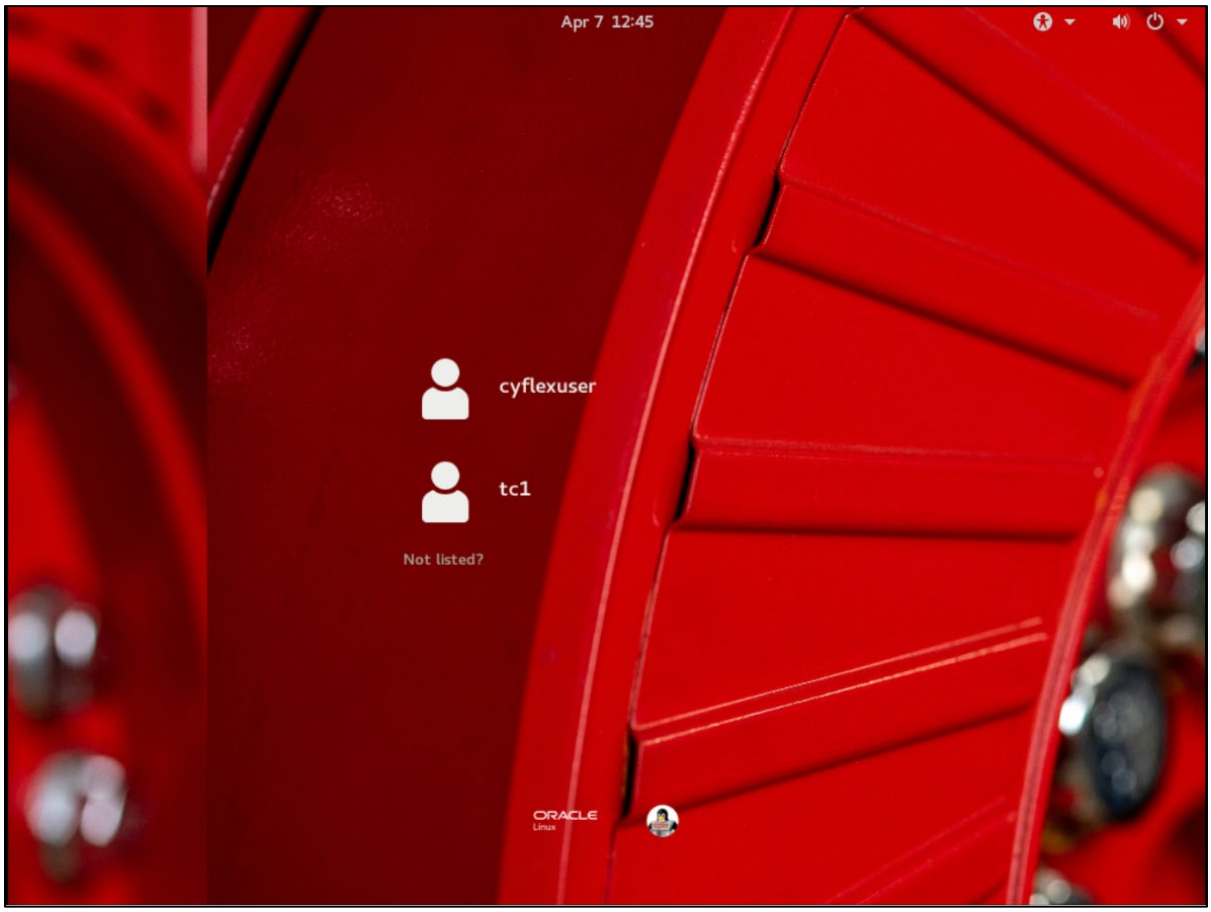
Figure 10: Copying Packages



14. Once the installation is complete, the computer will automatically reboot. Remove the flash drive once the computer is fully shut down. If not removed in time, the computer will boot from the flash drive again. If this occurs, press and hold the power button on the computer to perform a hard shutdown, then remove the flash drive and power the computer back up so it can boot from the hard drive.

    Once completed correctly, the login screen appears as in *Figure 11*. Select your user account, enter the **Password,** and then select **Sign In.**

Figure 11: Login Screen



15. After installation, the desktop will resemble the sample in *Figure 12*.

Figure 12: Desktop Sample after Completed Installation

1.1 Configuring Network and Host Name

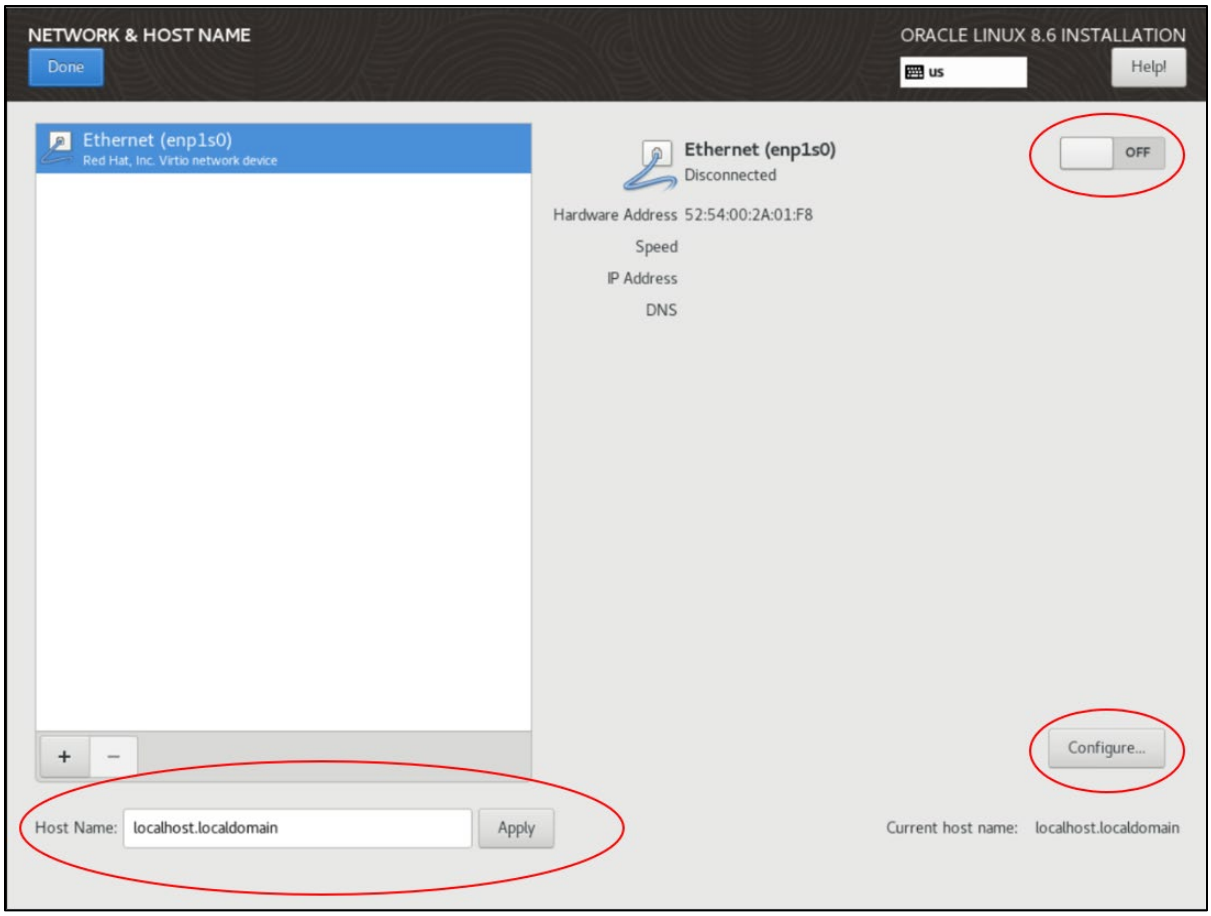
Select clicking **Network & Host Name** on the Installation Summary screen to configure network ports. Network ports may also be configured after the OS is installed and you have booted from the hard drive rather than the USB.

1. In the **Network & Host Name** screen shown in *Figure 13* on page 15 configure the **Host Name** in the bottom left, then click **Apply**.
2. Turn the port on in the top right. DHCP settings will be the default.
3. To configure a static IP, click the **Configure** button in the bottom right as in *Figure 13* on page 15.

Note:

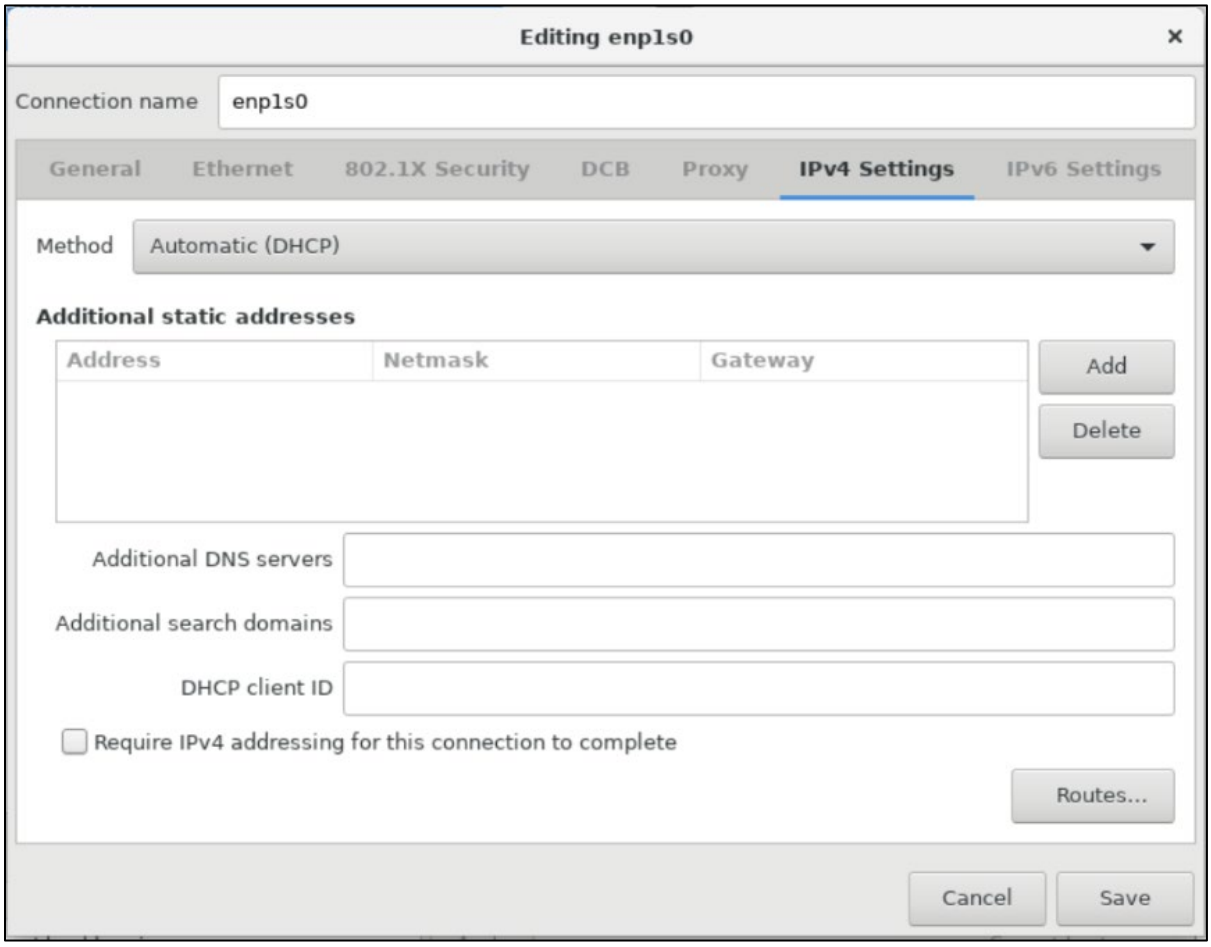
Some on-board network ports may not be recognized by the initial kernel from the ISO so it may be beneficial to configure after the kernel update script is executed. Refer to step 2 in *Section 3.1 Post install Yum Updates* on page 31.

Figure 13: Network & Host Name Screen



4. After clicking **Configure**, the resulting screen is similar to *Figure 14*. Navigate to the **IPv4 Settings** tab to add a static IP.

Figure 14: Edit Connection Name



5. Change the **Method** dropdown selection from **Automatic (DHCP)** to **Manual**,
6. Click the **Add** button and fill out the information for your static configuration.
7. Click **Save**.

2 User Interface Overview

The default GNOME user interface uses different navigation tools than a Windows or KDE user interface. *Figure 15* shows some of the basic navigation tools:

Figure 15:GNOME Interface Basic Navigation Tools

Table 3:User Interface Element Descriptions

User Interface Element	Description
File Browser	GUI application for navigating the file system
Software Center	GUI application for finding and downloading software
GNOME Help	Guide for getting used to the GNOME user interface. Contains instructional videos to help with familiarization with the new UI.
Terminal Shortcut	Shortcut for opening the GNOME terminal
Applications Menu	Menu to access applications, similar to the KDE K-menu or Windows Start Menu
Power, Network and Sound Settings	Access Power options to power down or restart the computer as well as access account settings, log out the current user, and network settings

2.1 The Super Key

The most notable difference to many users will be the lack of a taskbar showing applications at the bottom to switch between applications. Within GNOME, use the “Super Key” or the “Windows Key” to switch between applications or start new applications. On most keyboards this key will look similar to *Figure 16*.

Figure 16: Windows Key

Pressing the super key when no applications have been started presents options to change workspaces, open pinned applications, search for applications, or start new applications based on the icon. Refer to *Figure 17*.

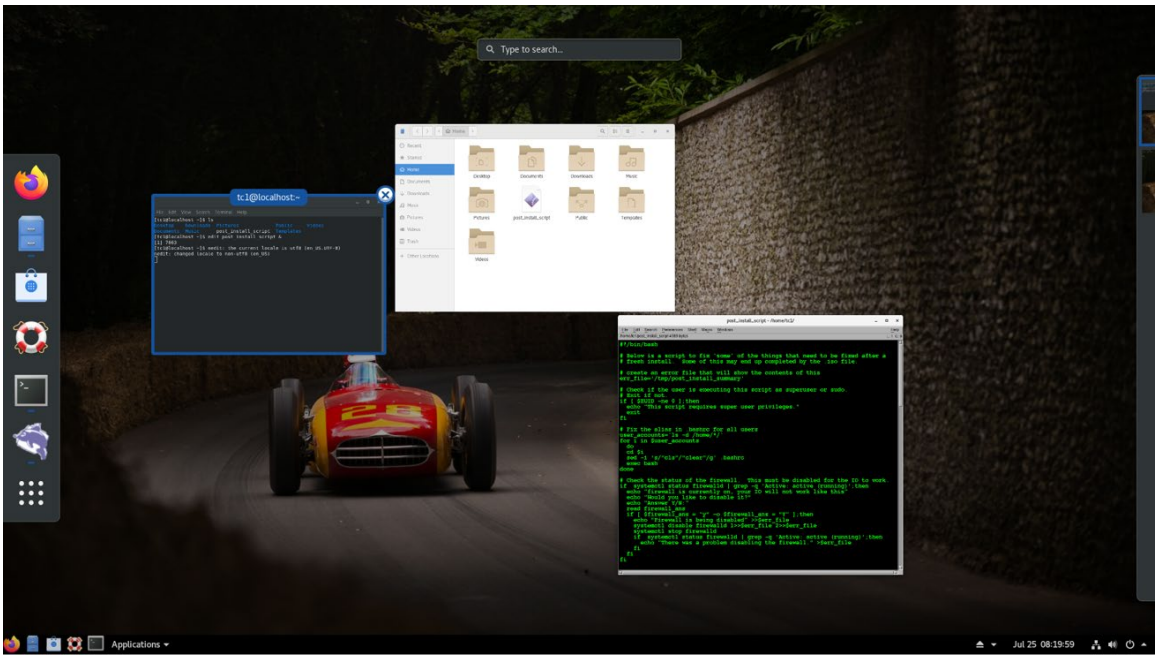
Figure 17: Workspace and Application Options

As desired, click the applications menu icon to switch between **Frequent** and **All** to open new applications as shown in *Figure 18*.

Figure 18: Switch Between Frequent and All Applications

With multiple applications open, as desired, press the Super Key to use arrow keys or mouse select to switch between applications as shown in *Figure 19*.

Figure 19: Switch Between Applications



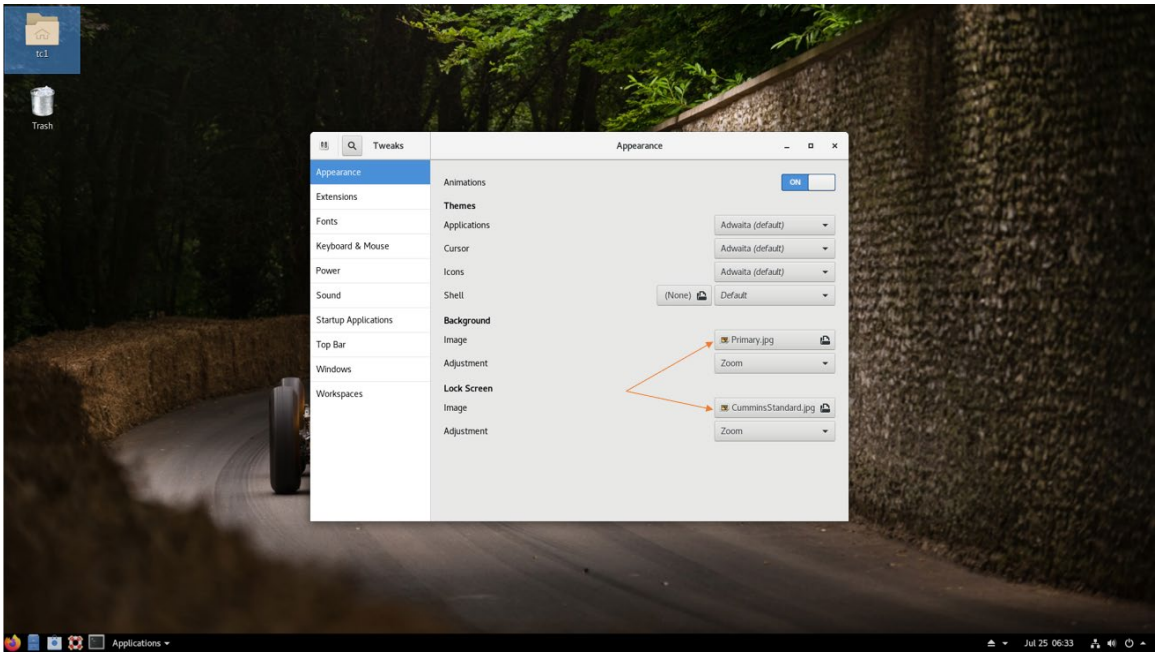
2.2 GNOME Tweaks

Many GNOME settings can be ‘tweaked’ using the Tweaks application. To open this, press the Super Key and search for “Tweaks”, then click the icon as shown in *Figure 20*.

Figure 20: Search for and Click Tweaks

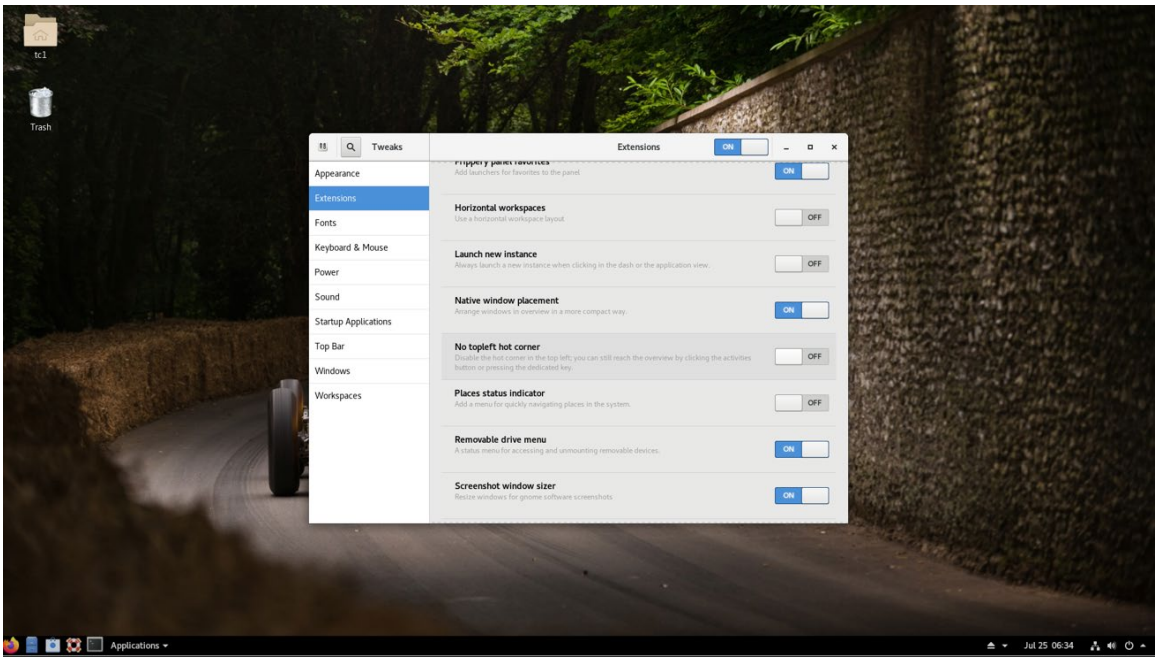
Use the menu shown in *Figure 21* to change these image files as desired. Place a desired image file in the `/usr/share/backgrounds` folder before opening this menu in order to update the background image.

Figure 21: Tweaks Menu



If operating at a test cell, sometimes it is desirable to disable the 'Hot Corner' feature. When **No topleft hot corner** is OFF as in *Figure 22*, moving the mouse to the top left of the screen is the equivalent of pressing the Super Key. To disable it in Tweaks, click the **Extensions** tab and set **No topleft hot corner** to ON. Note the double negative here, if this selection is OFF then Hot Corner is ON.

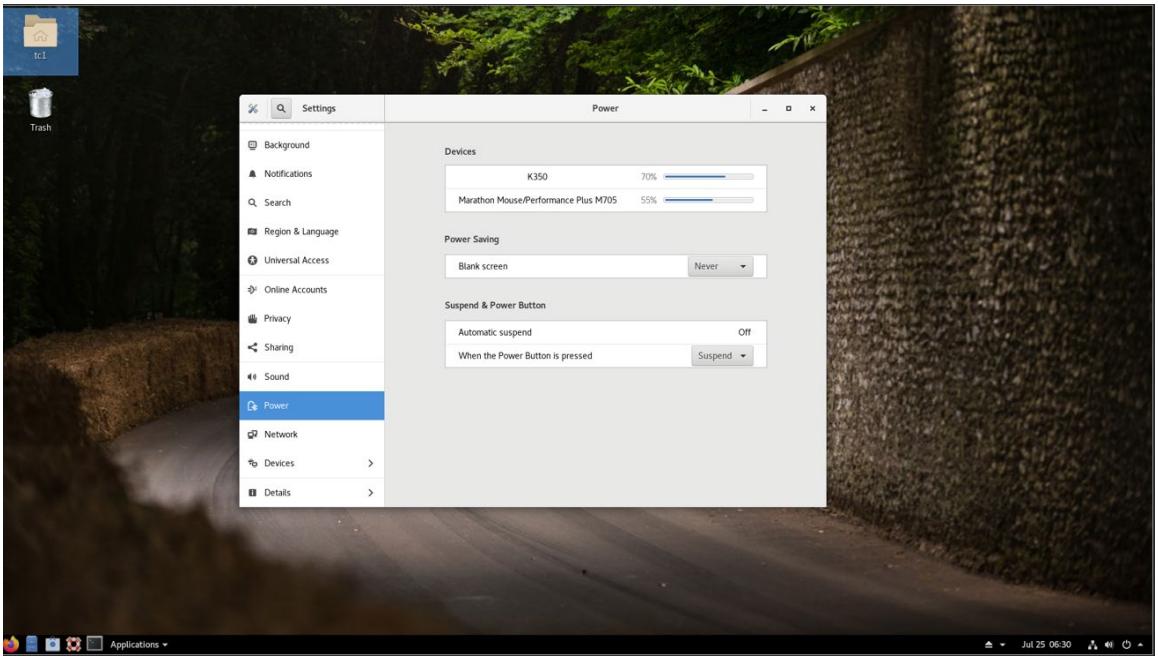
Figure 22: Hot Corner Options



2.3 Power settings

Open the **Settings** menu by pressing the Super Key, enter `Settings`, and then click the **Settings** icon. Click the **Power** tab and select **Never** for the **Power Saving** - **Blank Screen** setting as in *Figure 23* to always illuminate the screen as is often the required case for test cells.

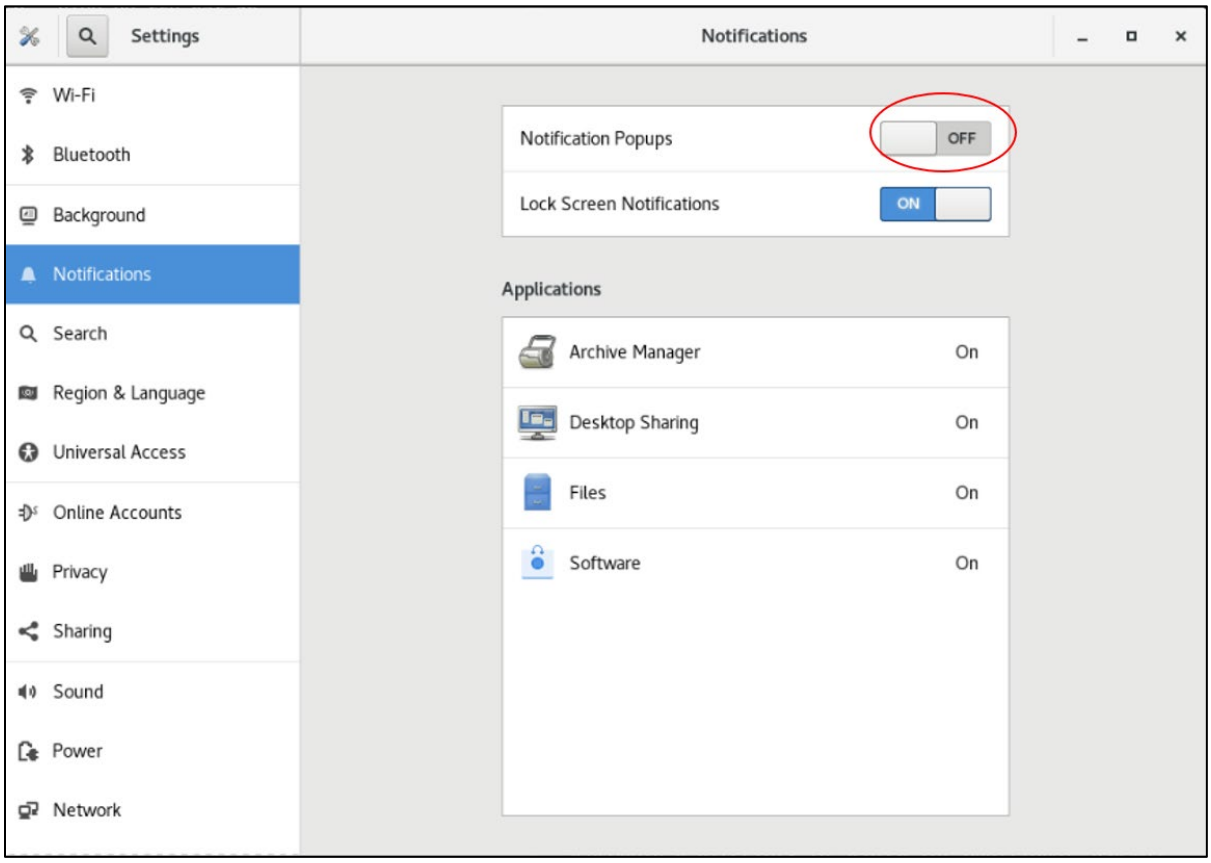
Figure 23: Power Saving - Blank Screen Setting



2.4 2.Disabling Software Update Notifications

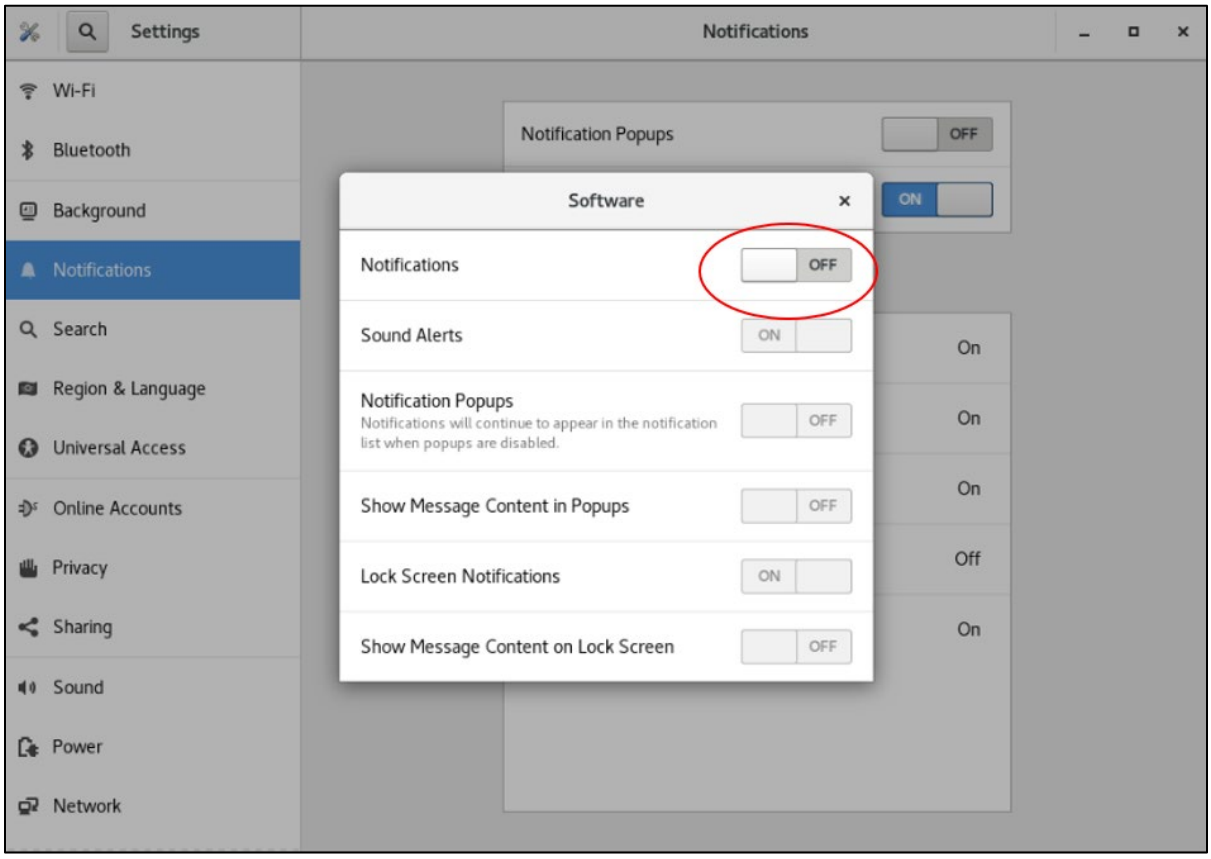
1. In the **Settings** menu, under the **Notifications** tab, switch **Notification Popups** to “OFF” as in *Figure 24*.

Figure 24: Disable Software Update Notification Popups



2. Click **Software** under **Applications** and switch **Notifications** to OFF as in *Figure 25*.

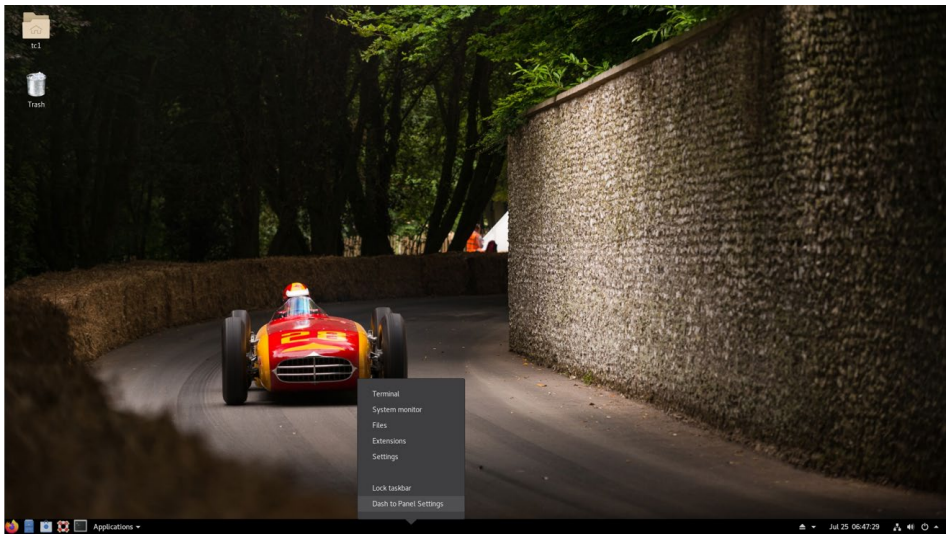
Figure 25: Disable Software Notifications



2.5 Dash-to-panel Settings

Dash to Panel is a GNOME extension installed by default. To access and customize these settings, right click the Dash at the bottom of the screen and then click **Dash to Panel Settings** as in *Figure 26*.

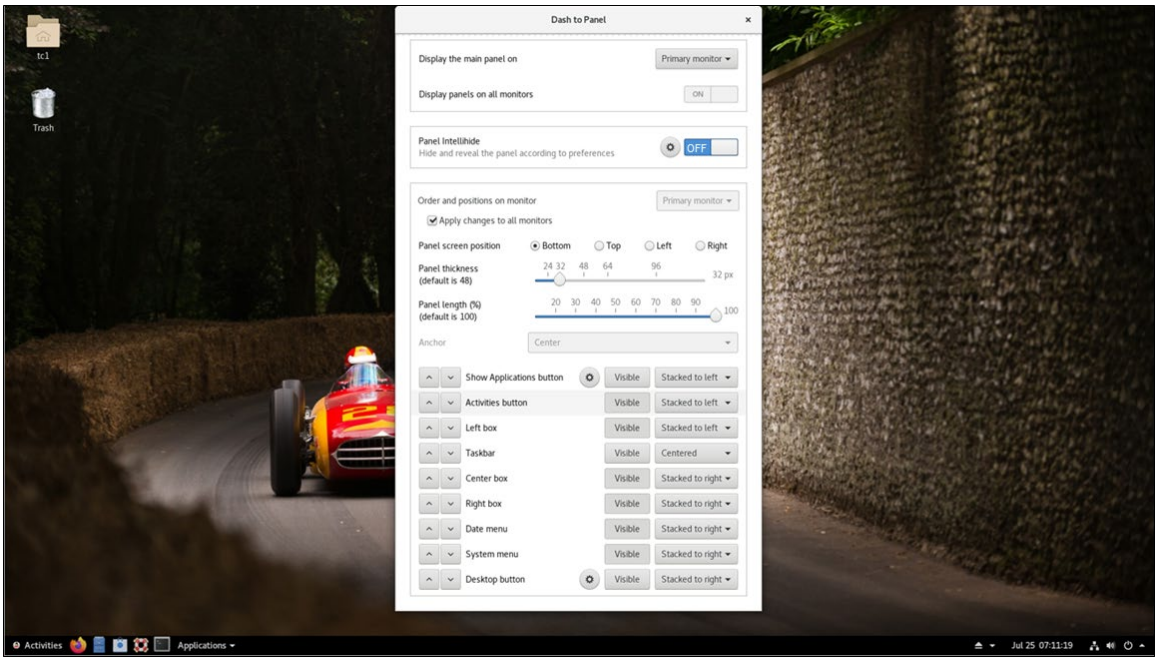
Figure 26: Dash to Panel



2.5.1 Panel Intellihide

Panel intellihide is a common feature that defaults to ON that may cause operator confusion. The default setting causes the dash panel at the bottom of the screen to disappear when maximizing the window. It will reappear when hovering the mouse to the bottom of the screen. Switching this to OFF will maintain visibility of the **Dash to Panel** options at the bottom of the screen as in *Figure 27*.

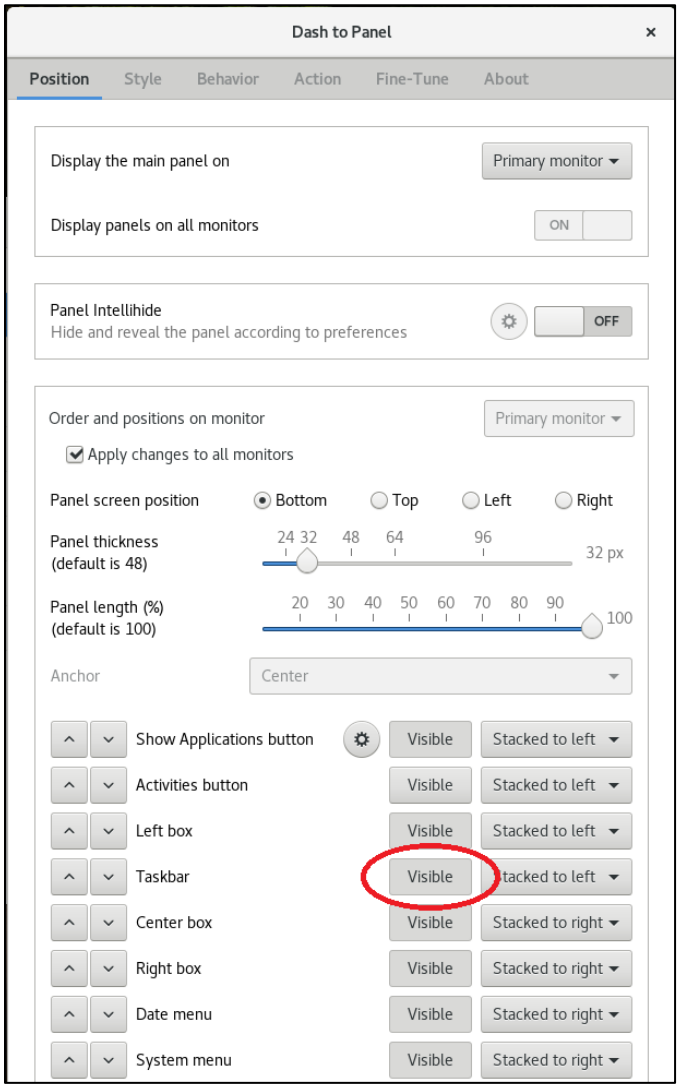
Figure 27: Panel intellihide Option



2.5.2 Showing Running Applications in the Taskbar

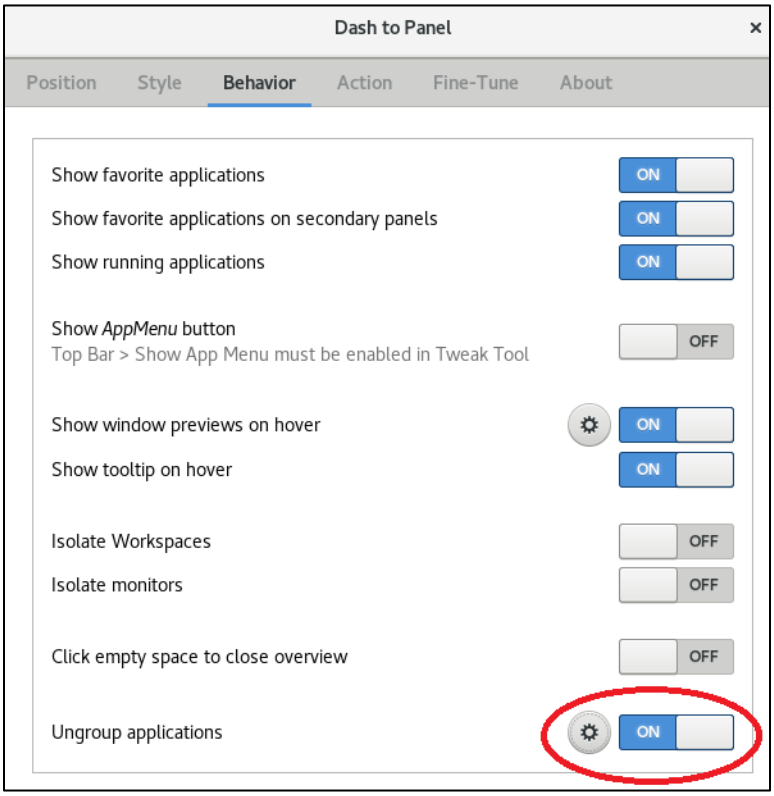
To show running applications in the Windows taskbar, select the **Position** tab and then toggle the **Taskbar** as in *Figure 28* .

Figure 28: Position Tab - Toggle Taskbar Option



To show multiple instances of the same application as different icons in the taskbar, select the **Behavior** tab and then set the **Ungroup applications** toggle switch to **On** as in *Figure 29*.

Figure 29: Behavior Tab - Ungroup Applications

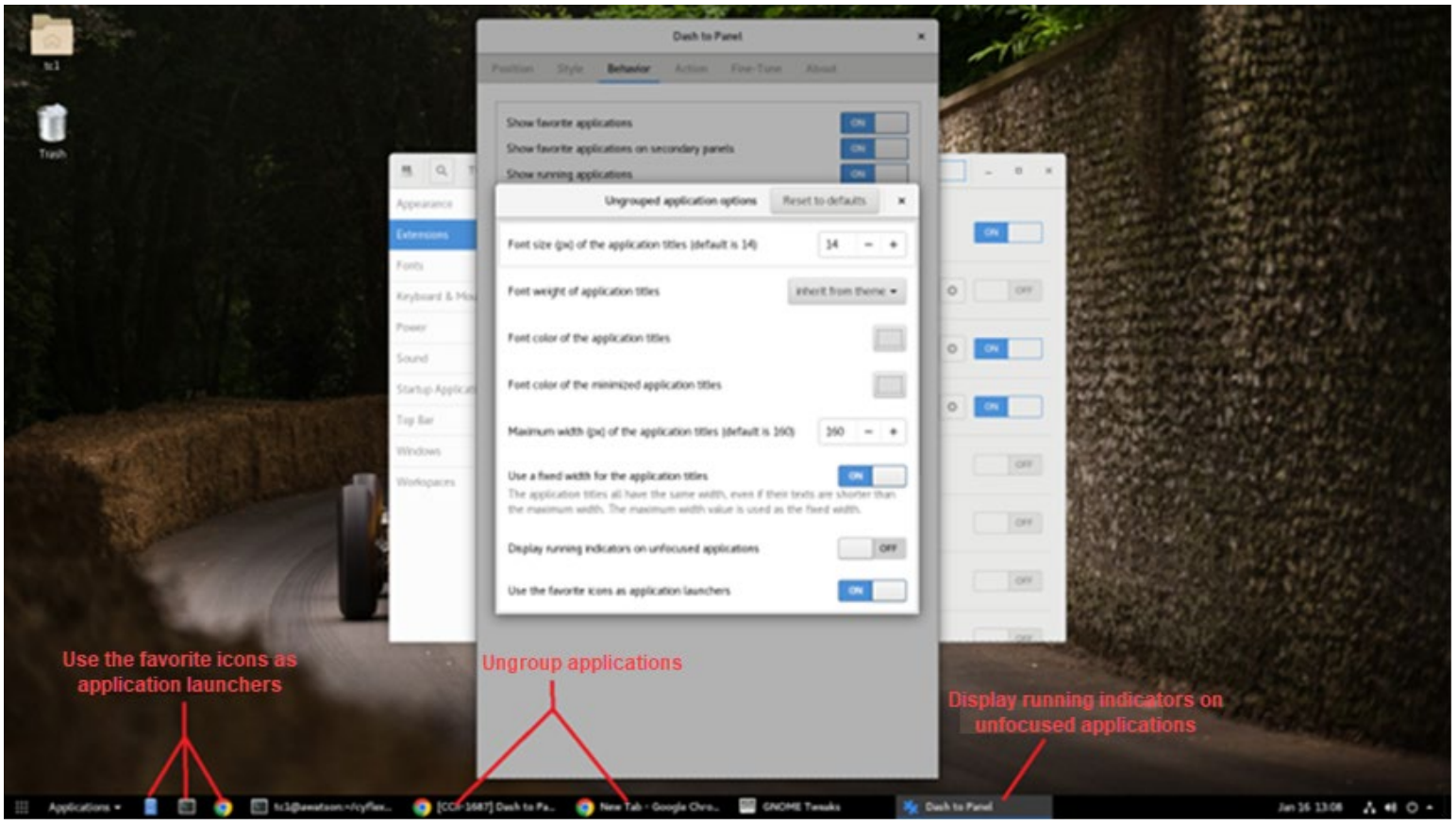


As desired, click the gear icon for **Ungroup applications** to configure additional taskbar settings.

As in *Figure 30*:

- Set **Display running indicators on unfocused applications** to **OFF** so only the application in the foreground is highlighted. This helps distinguish which program is active.
- Set **Use favorite icons as application launchers** to **ON** to display a permanent set of icons for launching your favorite applications (terminal, files, browser, etc.).

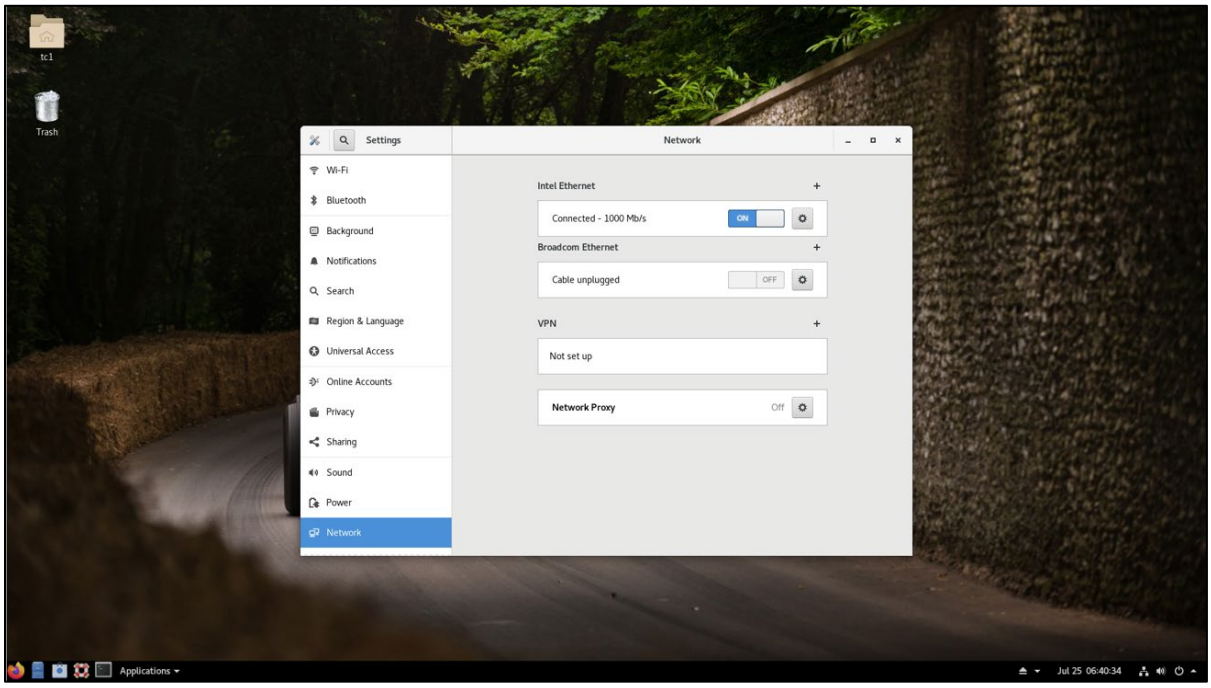
Figure 30: Additional Taskbar Configuration Options



3 Network Configuration

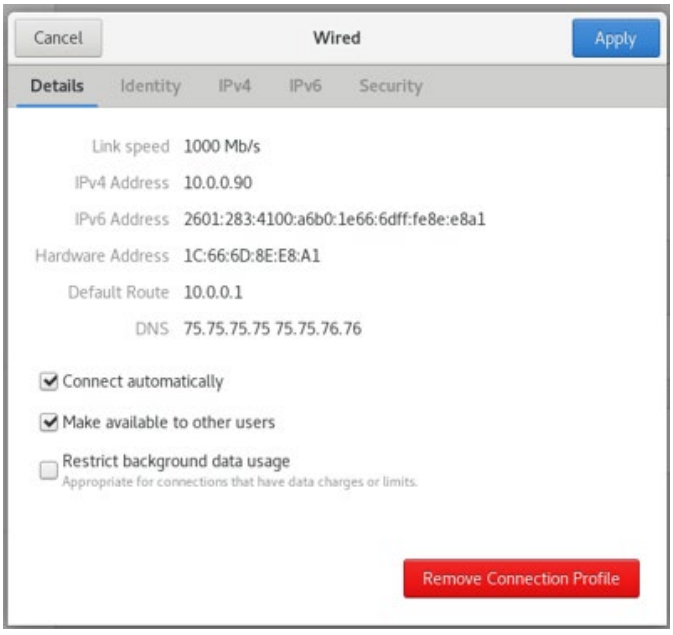
1. To configure network settings, press the Super Key, enter `Settings`, and then select the **Network** tab as in *Figure 31*.

Figure 31: Network Tab



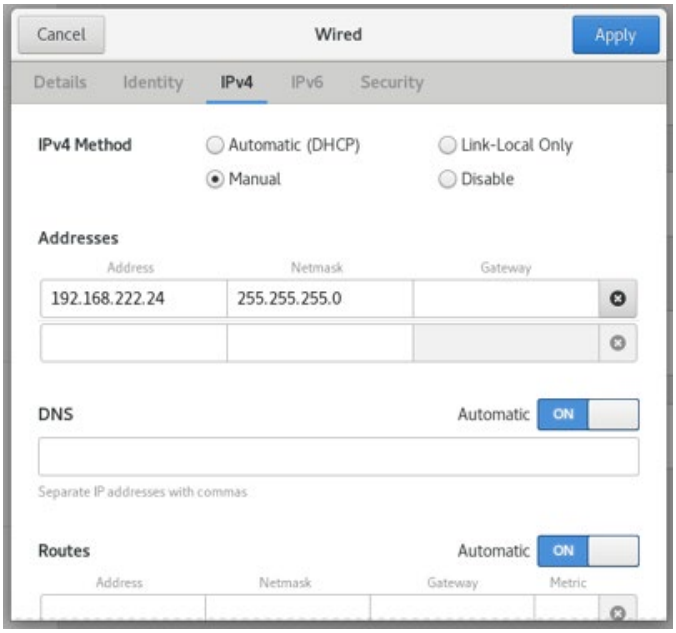
2. Click the gear icon to adjust the settings for the port to configure. If the port will always be used, ensure **Connect Automatically** is checked as in *Figure 32*.

Figure 32: Port Configuration Settings



3. Click the **IPv4** tab to configure static IP settings or DHCP. For static, click the **Manual** radio button and then configure the settings as in *Figure 33*.

Figure 33: IPv4 Settings



For Private IO networks, it is recommended to disable the **IPv4** Routes which are enabled by default, and disable IPv6 entirely within the IPv6 tab by selecting the **Disable** radio button. These will not be the default settings, you must manually change them.

In Oracle Linux, improvements have been made to the naming of network ports to make them more descriptive than in Scientific Linux. To learn about the new naming convention, read the *About Network Interface Names* section in the Oracle documentation page below:

https://docs.oracle.com/en/operating-systems/oracle-linux/8/network/network-ConfiguringtheSystemsNetwork.html#ol-netconf-nic

It is recommended to leave this naming convention as it is. However, if you have a specific need to alter the naming convention, refer to instructions in *Appendix A. Renaming Network Devices* on page 45.

3.1 Post install Yum Updates

All of the following commands must be executed directly on the computer. They cannot be executed over ssh. Executing over VNC will (most likely) not work after the kernel update, which means downloads will not complete for the necessary rpms for CyFlex to function.

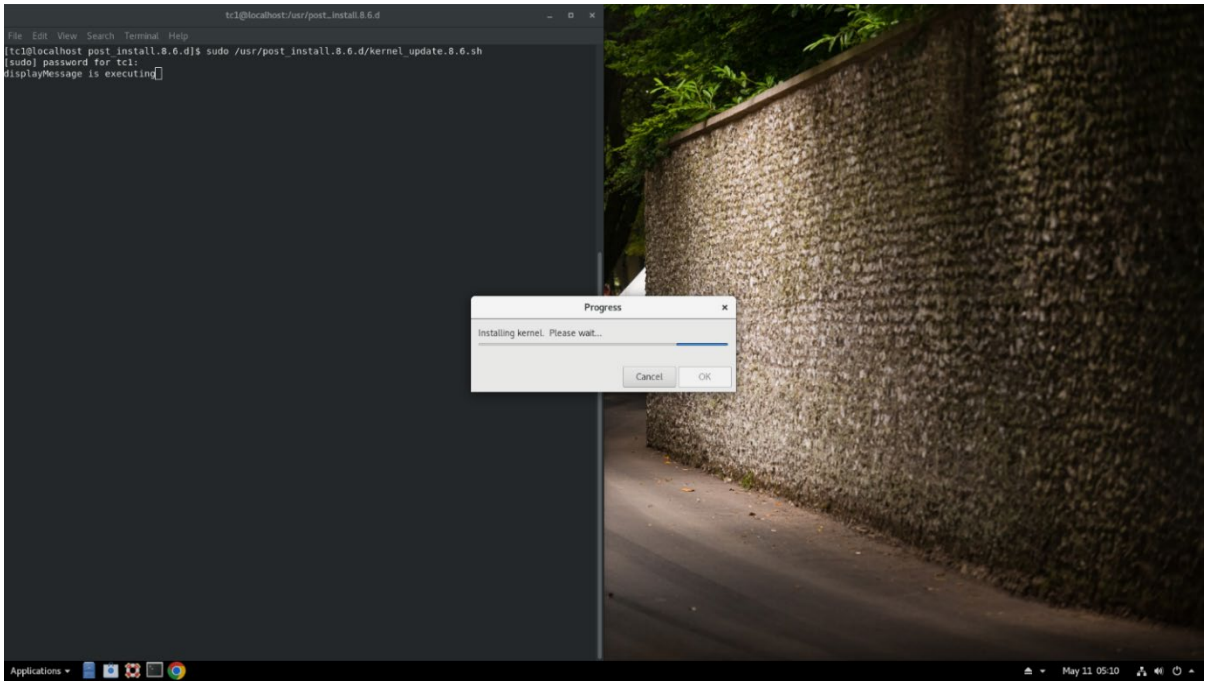
1. Download the post-installation files, enter:
   `sudo yum install post_install.8.6`

   If this does not download files and ends by saying the installation is “Complete!”, then you may have an issue with your network or your `.repo` files. See Appendix *C. Troubleshooting* on page 47 for details.

2. Open a terminal and execute the following command:
   `sudo /usr/post_install.8.6.d/kernel_update.8.6.sh`

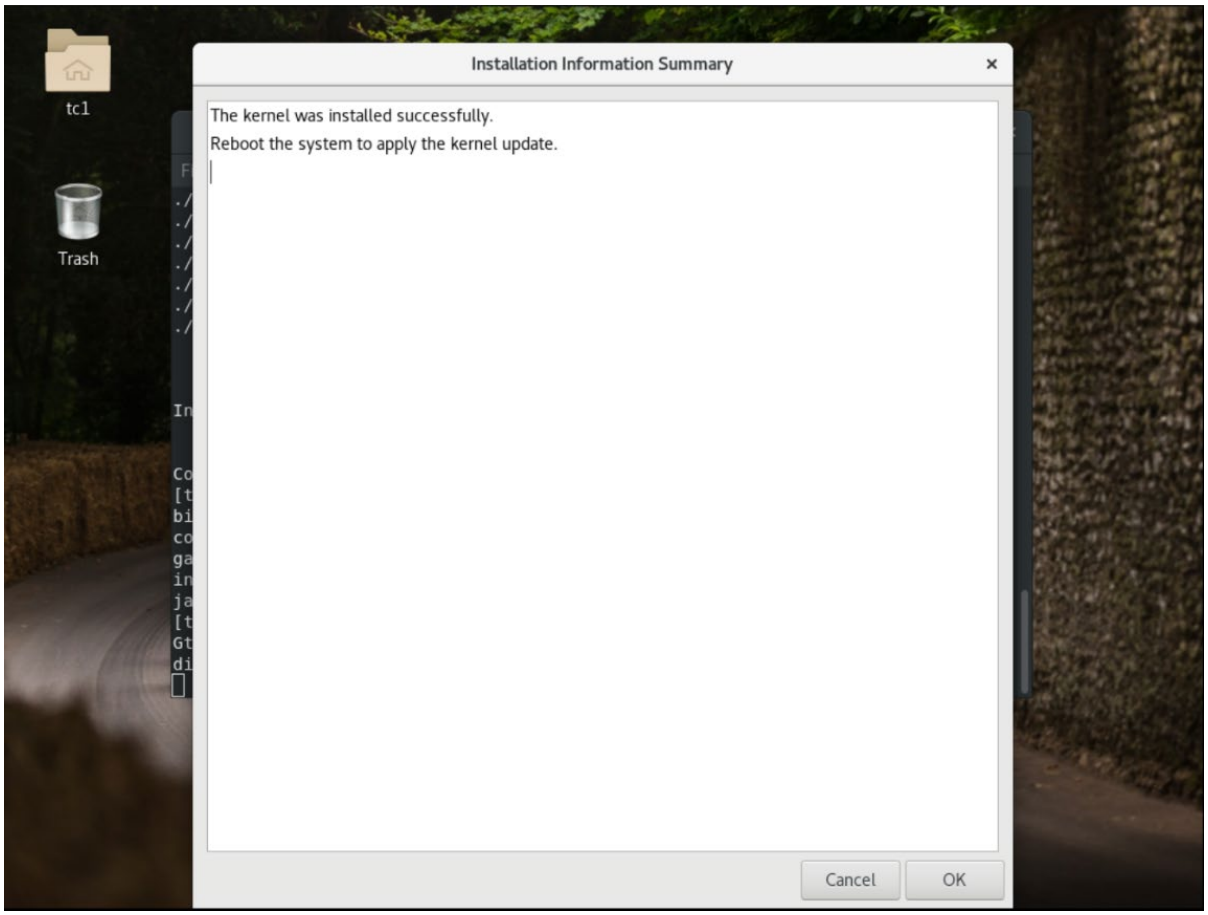
   Installation progress is displayed as in *Figure 34*.

Figure 34: Kernel Update Progress



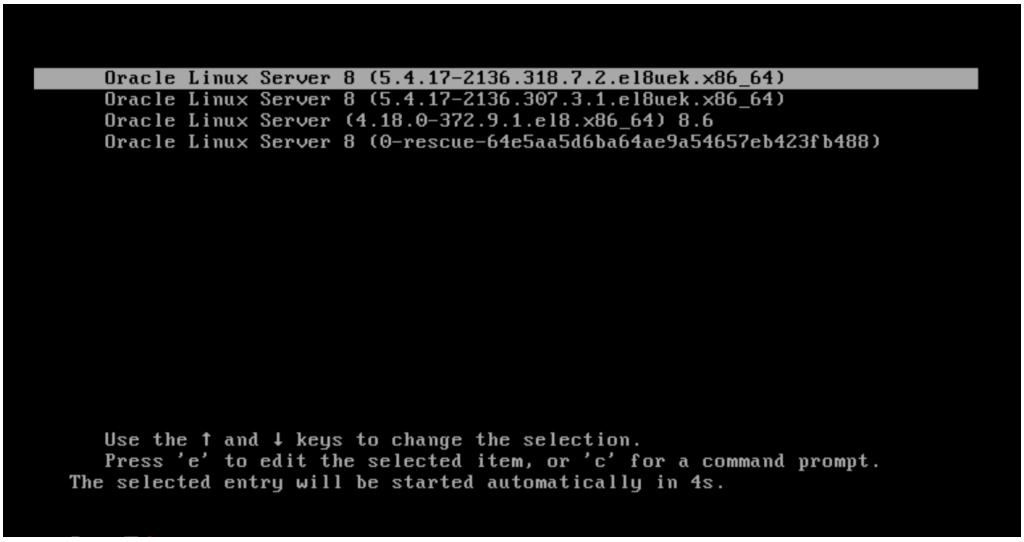
When the kernel update is complete, the installation summary is displayed as in *Figure 35* on page 32.

Figure 35: Installation Information Summary



3. Click **OK** on the **Installation Information Summary** screen and reboot the computer. As the computer reboots, it should default to boot into the `5.4.17-2136.318.7.2.el8uek.x86_64` kernel as in *Figure 36*. Do not change this.

Figure 36: Default Boot Settings



4. Once the computer has rebooted, verify the kernel update worked. Execute the following in a terminal:

   `uname -r`

   Should return the following:

   `5.4.17-2136.318.7.2.el8uek.x86_64`

   Contact TRP Laboratories if a different result occurs.

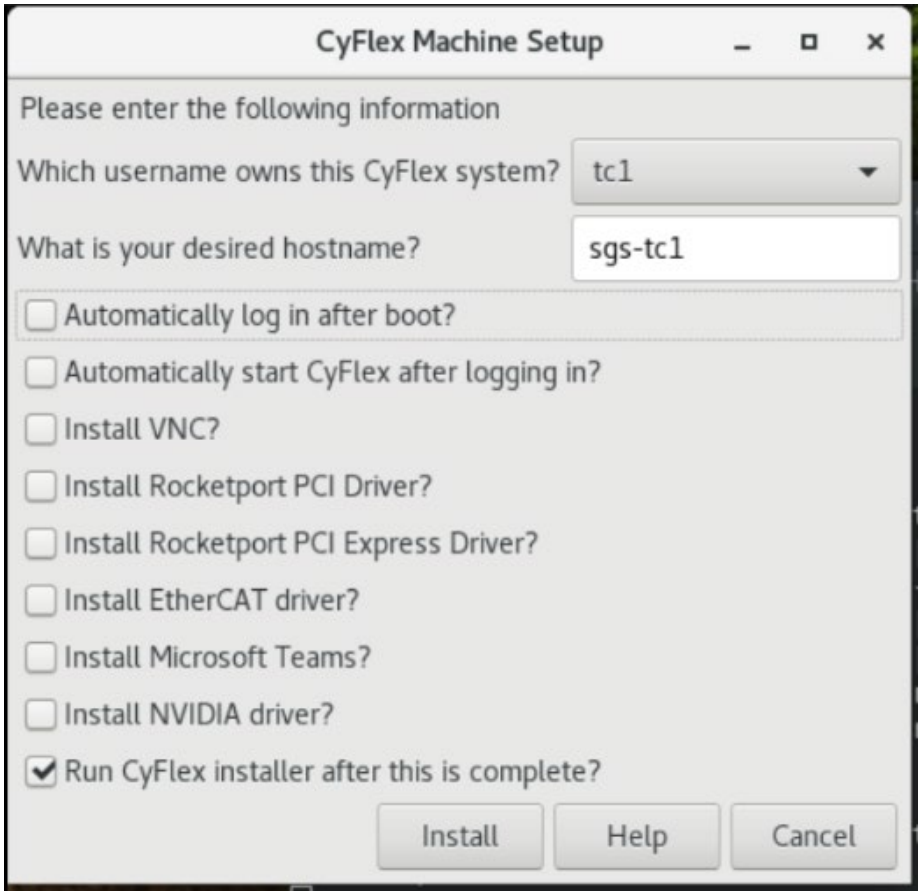
5. Execute the following command in a terminal:

   `sudo /usr/post_install.8.6.d/post_install.8.6.sh`

   This command is not optional, even if upgrading an existing system. Many rpms need to be updated after the kernel update, failing to execute the `post_install.8.6.sh` script will result in a non-functional system.

   Some progress bars may appear while preliminary programs are being installed. After these complete, the **CyFlex Machine Setup** menu appears as in *Figure 37*.

Figure 37: CyFlex Machine Setup Menu



The drop-down menu shows a list of usernames existing on the system. Select the username that will ultimately be used for the test cell account. Some settings, such as VNC, will be configured specifically for this username and will not work if the username is changed afterwards without manual reconfiguration.

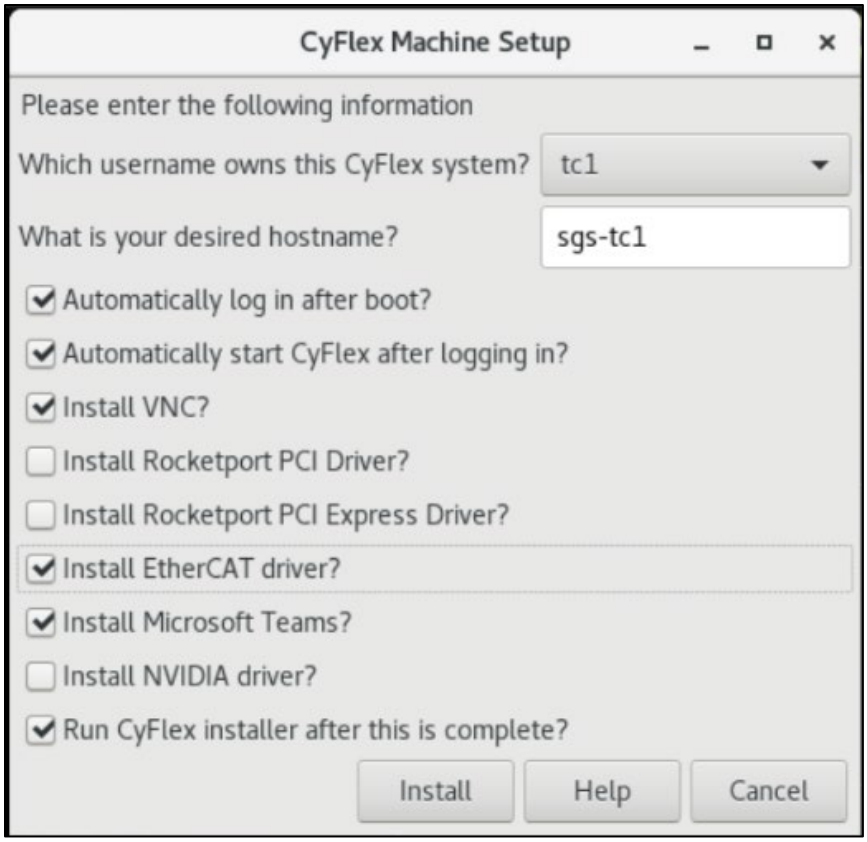
The hostname is pre-populated with the current hostname. To update this, enter a **desired hostname** into the text entry box.

6. Review the checkboxes/options and check the fields based on how you want your system to be configured. Click **Help** to open a copy of this instruction manual. *Table 4* below describes usage. *Figure 38* on page 35 shows a completed example.

Table 4: CyFlex Machine Setup Options

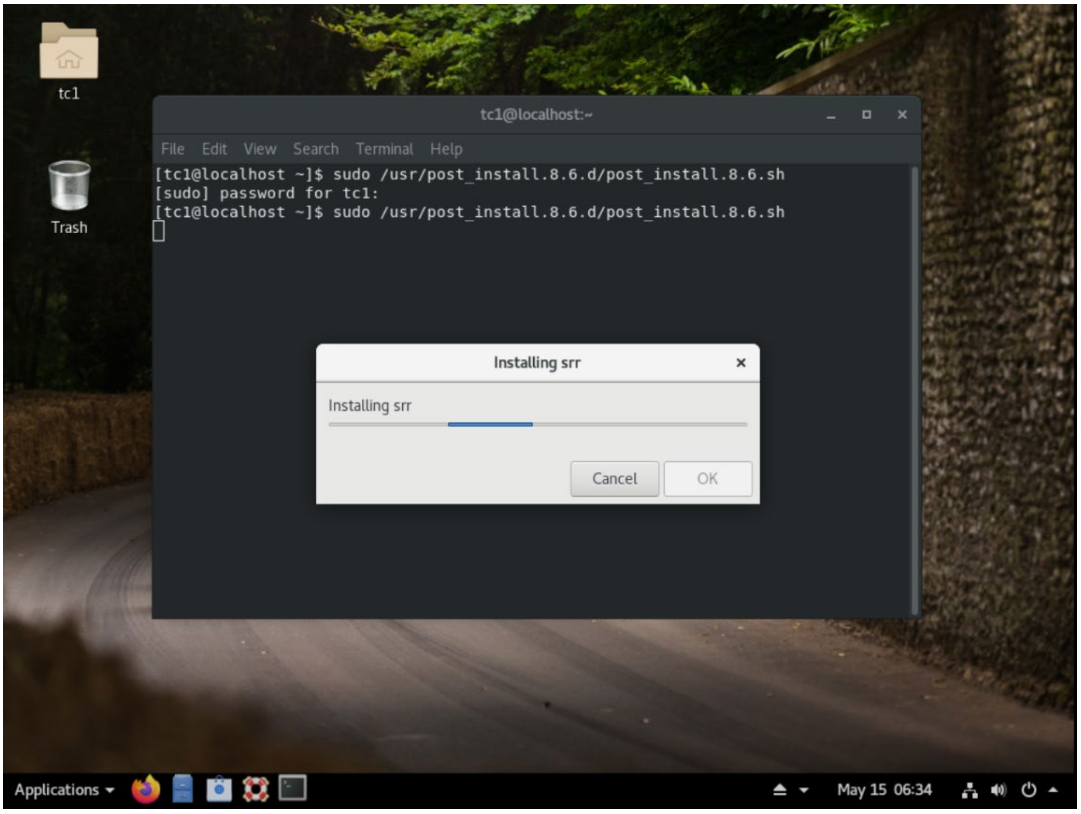
Option	Description
Automatically log in after boot?	If checked, the computer will automatically log into the test cell account specified in the drop-down menu for the username which owns this CyFlex system. A password will therefore not be required for logging into this user account. This is often done on systems located in a secure facility where it is desired to be able to reboot the machine remotely without requiring VNC to log into the system.
Automatically start CyFlex after logging in?	If checked, the computer will automatically run a `go` (start CyFlex) after logging in. This `go` will be executed in the background.
Install VNC?	If checked, TigerVNC will be installed. You will be prompted for a VNC password which will be set so you can remotely view and control the computer.
Install RocketPort PCI Driver?	If your machine uses a Comtrol Rocketport PCI card for serial communications, check this box to install the required driver. **NOTE** that this is the legacy product no longer offered by Comtrol.
Install RocketPort PCI Express Driver?	If your machine uses a Comtrol Rocketport PCI Express card for serial communications, check this box to install the required driver.
Install EtherCAT driver?	Check this box if using EtherCAT communications.
Install Microsoft Teams?	Check this box to install Microsoft Teams.
Install NVIDIA driver?	Check this box if your machine uses an NVIDIA graphics card.
Run CyFlex installer after this is complete?	If checked, a GUI will pop up immediately after this install to ask which version of CyFlex you would like to install and install it.

Figure 38: Completed CyFlex Machine Setup Example



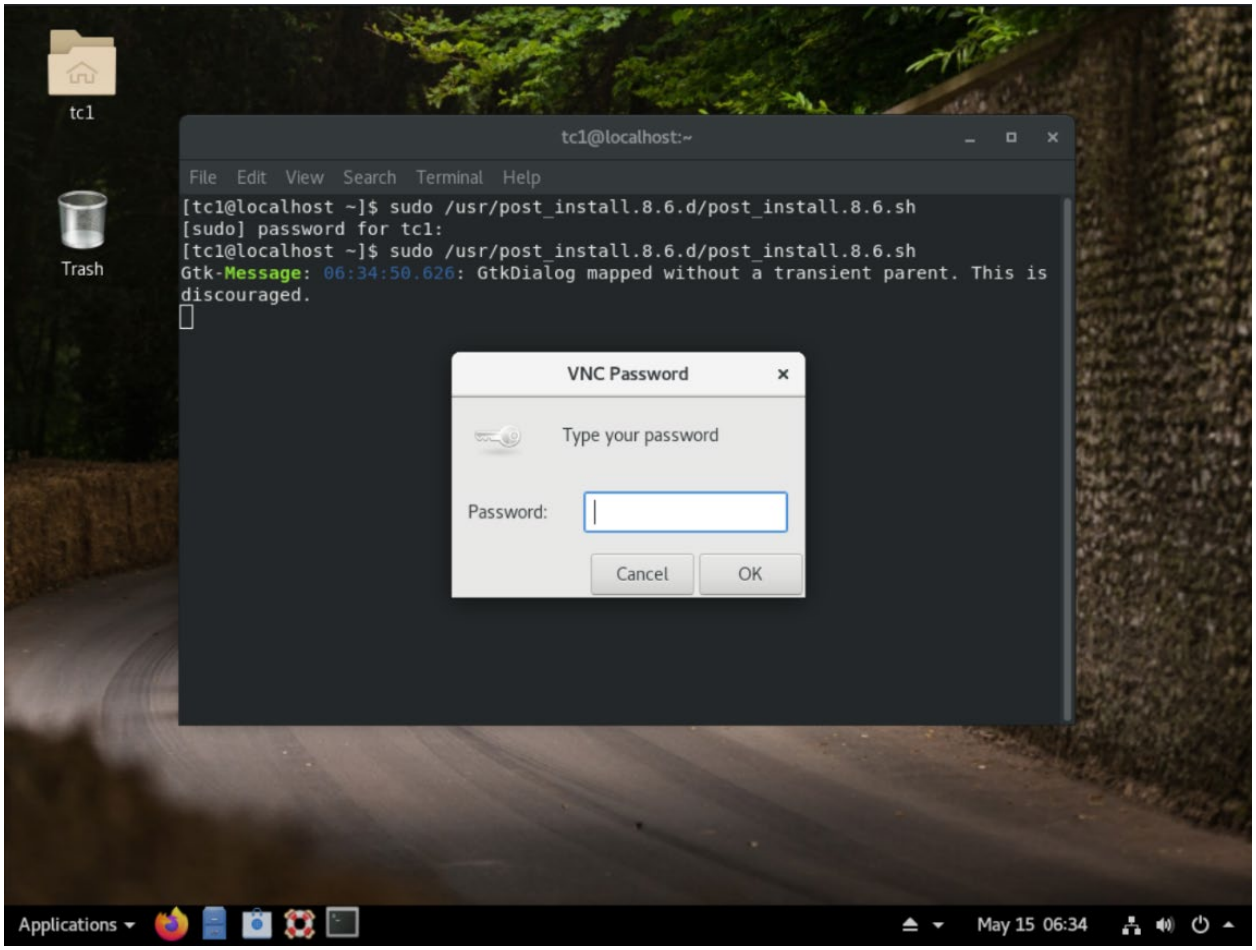
7. Click the **Install** button upon completion of **CyFlex Machine Setup** selections. Expect the installation to take 5-20 minutes depending on connection speed. Installation progress is displayed as in *Figure 39*.

Figure 39: CyFlex Machine Setup Progress Indicator



8. If installing VNC, respond to the prompt for the VNC password as displayed as in *Figure 40*. Skip this step if not installing VNC.

Figure 40: VNC Password Prompt



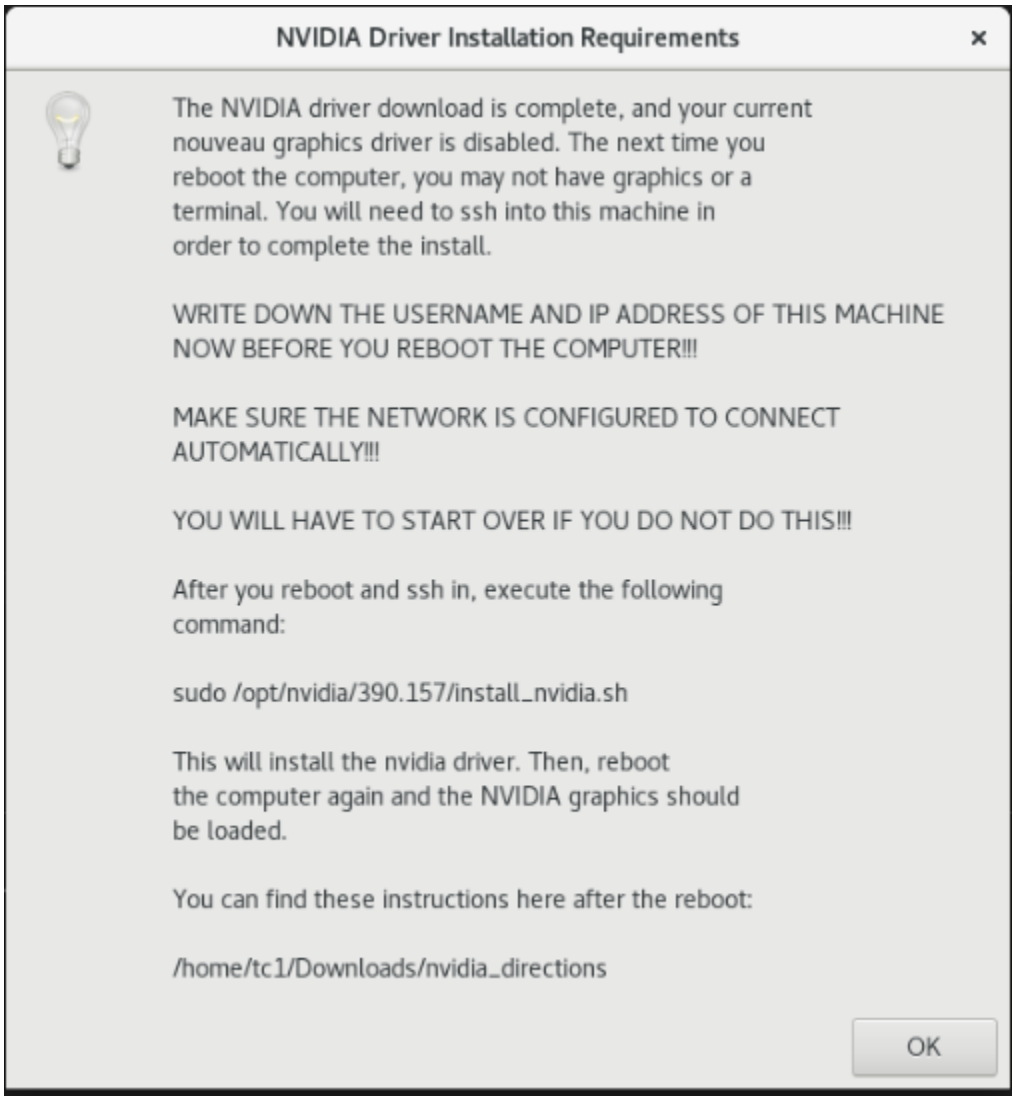
9. If the CyFlex installer option is selected as in *Figure 38* on page 35, the following window will appear asking you which version of CyFlex to install. Select the desired version from the list and then click **Install**.

Figure 41: CyFlex Installer

10. If an NVIDIA driver was installed, you may get the following popup window shown in *Figure 42* as well. Follow the steps outlined in the message for your NVIDIA driver to be installed. The file path of the executable, or the location file path of your system, may be different than in *Figure 42*. But once you `ssh` into the system, the file will be in `~/Downloads/nvidia_directions`.

    Click **OK** to acknowledge.

Figure 42: NVIDIA Driver Installation Requirements



11. After the installation is complete, a summary of errors that occurred during the installation, as well as an information summary showing the terminal output from all the yum installs are displayed. Review and resolve as necessary. Create JIRA issues for errors you cannot resolve.
12. When complete, reboot the system for all changes to take effect.

3.2 System Hardware Configuration

3.2.1 Peak USB Adapters

If running `CanDbc`, there are changes to how it must be started. In Scientific Linux, the PEAK USB adapters showed up as a device in the `/dev directory`. In Oracle, they are recognized as a port in `ifconfig`.

A notable difference in Oracle is that by default, root privileges are required to change the baud rate of a CAN port using the `ip` and `link` commands. This means by default, a user would need to enter the root or `sudo` password any time they wanted to start `CanDbc` for the first time, or when changing the baud rate of a port, something that wasn't previously required.

In order to accommodate this change and mimic the desired behavior of many customers, we have made the following updates:

1. `CanDbc` has been modified so that it will check what the current baud rate is, and if you are trying to start the application using that baud rate, it will start without requiring a `sudo` password.

   This means that without any custom modification, if you set the baud rate manually for the current configuration using the `ip link` commands shown below:

   ```
   sudo ip link set can0 down
   sudo ip link set can0 up type can bitrate 250000
   ```

   You can enter a password this one time, and `CanDbc` can subsequently operate with a baud rate of `250000` on the `can0` port without requiring a `sudo` password.

2. Scripts have been created that will modify your Oracle Operating System configuration so a password is not required for the test cell user to execute the `ip` and `link` commands To enable this, execute the following command:

   ```
   sudo /cyflex/cmds/enable_candbc_nopasswd
   ```

   This means `CanDbc` is able to change the baud rate, and you will be able to start new instances of `CanDbc` without ever needing to enter a password again, even if changing the baud rate of a CAN device. Essentially, it will operate exactly as it always has in previous operating systems.

   From a security standpoint, this means anyone with access to the test cell account user will be able to execute the `ip` and `link` commands without needing to know the `sudo` password.

   If you wanted to disable this feature later, the following counter-script has been created for you to execute:

   ```
   sudo /cyflex/cmds/disable_candbc_nopasswd
   ```

   If you attempt to start `CanDbc` and have not configured the system for password-less execution of the `ip` and `link` commands, errors will be generated indicating how you should resolve the situation.

3.2.2 Softing AC1/AC2 Cards

1. Execute the following,
   ```
   sudo yum install cyflex_vcan_kernel_module
   ```
2. Add the following to `/etc/rc.local`:
   ```
   cd /usr/local/share/cyflex/kernel_modules
   /usr/local/share/cyflex/kernel_modules/vcan_load
   cd -
   ```

3.2.3 Dynlink Cards

Dynlink cards are not supported in 64-bit. If the system uses a dynlink card to communicate with a Unico drive, the recommendation is to install a Command Module in the drive to allow for EtherCAT communication between CyFlex and the drive. Contact TRP Laboratories for additional details.

3.2.4 MTL

If using MTL IO, enter:

```
sudo yum install cyflex_mtl_tc_kernel_modules
reboot
```

After the update process has been completed, verify the kernel modules are loaded by running the `lsmod` command to verify the kernel modules are loaded. The output should be similar to the following when executing these commands.

```
 [tc84@cmx084 ~]$ lsmod | grep srripc
srripc                 102400  87 tc9513
[tc84@cmx084 ~]$ lsmod | grep MTL
MTL                     16384  1
[tc84@cmx084 ~]$ lsmod | grep tc
tc9513                  20480  1
srripc                 102400  87 tc9513
```

Contact TRP Laboratories support if they are incorrectly loaded.

3.2.5 EtherCAT

1. If the system is using EtherCAT and you didn't download the EtherCAT driver from the post install GUI by checking the "Install Ethercat" checkbox, execute the following:
   ```
   sudo yum install cyflex-ethercat
   ```
2. Configure the following file:
   ```
   /etc/sysconfig/ethercat
   ```
   This file must include the mac address for the port using EtherCAT between the quotes in `MASTER0_DEVICE=""`
3. Change the bottom of the file to:
   ```
   DEVICE_MODULES="generic"
   ```

3.4 Post-installation Reminders

Below is a list of site-specific common items that should be set up by local individuals during the install process and that are not covered in this document:

1. Local spec file backup scripts
2. Subversion backup
3. Password-less file transfer between local machine and central node
4. Mounting of remote drives
5. Installing a local copy of `/etc/resolv.conf` for local DNS configuration
6. Configuring necessary static IP addresses for private communication and ensure communication is established with the remote devices.

4 Installing CyFlex

Important:

In the steps below that include a 3-digit CyFlex version number (7.0.x), enter the actual CyFlex version to be installed. Example: 7.0.2

Execute the following steps to install CyFlex version 7.0.0 and above:

1. Open a terminal window at the test cell.
2. Execute:

   ```
   $ sudo yum clean all
   ```

   You can install CyFlex using the terminal based CyFlex installation method, or a GUI. When using a terminal, execute the following:

   ```
   $ sudo yum install cummins-cyflex.7.0.x
   ```

   or

   ```
   $ sudo yum install cyflex.7.0.x
   ```

   Example: `sudo yum install cummins-cyflex.7.0.8b`

   Or to use the graphical window-based CyFlex installer to select and download your CyFlex version, execute the following command:

   ```
   $ sudo /usr/post_install.8.6/cyflex_installer.sh
   ```

3. Set up the following directories:
   - `/cell`
   - `/specs`
   - `/data`
   - `/esvd_data`

   Note:

   The directory `/esvd_data` is for emission test cells.

4. Perform (a) if the system does not have a `/cell` and `/specs` directory to use from a previous system which this new system is replacing, otherwise perform (b).
   a. For a template /cell and /specs directory install the `dnf` package, `cyflex_demo_cell_specs_data`.,Enter:

      ```
      $ sudo yum install cyflex_demo_cell_specs_data
      ```

      Then, create a template of the `/data` directory. Enter:

      ```
      $ sudo /cyflex/bin/mk_data_dirs_tc <testcell name or number>
      ```

      Example:

      ```
      $ sudo /cyflex/bin/mk_data_dirs_tc 1
      ```

b. If integrating the `/cell` and `/specs` from a previous cell to use on the new system, then follow these steps.

```
$ sudo mkdir /cell
$ sudo mkdir /specs
$ sudo mkdir /data
$ sudo chmod -R g+rw /data
$ sudo /cyflex/bin/mk_data_dirs_tc <testcell name or number>
```

Example:

```
$ sudo /cyflex/bin/mk_data_dirs_tc 1
$ rsync -av --exclude '.svn'tcl103@ctc-tcl03:cell/* /cell/
$ rsync -av --exclude '.svn'tcl103@ctc-tcl03:specs/* /specs/
$ rsync -av --exclude '.svn'tcl103@ctc-tcl03:data/* /data/
```

Note:

Replace `tcl103` with the username and `ctc-tcl03` with the IP address or host name of the system that is being copied from.

c. Copy the `/data/cell_map_location` file from your central server. You must know the login and IP address of the central server. Enter the following:

```
$ cd /data
$ sudo scp cslogin@cs_ipaddress:/data/cell_map_location .
```

where:

- `cslogin` is the central server login
- `cs_ipaddress` is the central server IP address

d. If the test cell is at CTC, copy these files to enable the Measurement and Testing Equipment (M&TE) feature for the electronic logbook: Otherwise skip this step. Enter the following:

```
$ cp /cyflex/specs.def/samples/mte.def /cell/mte.def
```

5. Start CyFlex. Enter:

```
go
```

This completes the CyFlex installation.

5 Configuring Oracle Linux 8.x to Capture a Crash Dump

Execute the following steps to enable capture of a crash dump document.

1. Install RPMS to use the crash dump utility. Enter the following:

```
$ sudo su -
# yum install crash
# yum install kernel-uek-debuginfo-$(uname -r)
# grubby --update-kernel=ALL --args="crashkernel=auto"
# reboot
```

2. Enter the following to verify the `kdump` service is running:

```
$ systemctl status kdump
```

   If `kdump` is not running, enter the following:

```
$ sudo systemctl enable kdump
$ sudo systemctl start kdump
```

Appendix A. Renaming Network Devices

It is advised to use the default naming convention for assigning network connection device names. However, if your system has a requirement that they be renamed, it can be done using the steps outlined in the example below as root user. In the example, the device name `eno1` is changed to `eth0`.

```
[root@testcell tc1]# ifdown eno1
Connection 'eno1' successfully deactivated (D-Bus active path:
/org/freedesktop/NetworkManager/ActiveConnection/1)
[root@testcell tc1]# ifconfig eno1 down
[root@testcell tc1]# ip link set eno1 name eth0
[root@testcell tc1]# cd /etc/sysconfig/network-scripts/
```

Rename the previous `ifcfg` file to match the new name.

```
[root@testcell network-scripts]# mv ifcfg-eno1 ifcfg-eth0
```

Use any text editor to edit the file and update `DEVICE=` and `NAME=` to match the new device name

```
[root@testcell network-scripts]# cat ifcfg-eth0
# Generated by parse-kickstart
TYPE=Ethernet
DEVICE=eth0
UUID=4d7149b3-19b7-4d96-8011-01bd58cd0452
ONBOOT=yes
BOOTPROTO=dhcp
IPV6INIT=yes
IPV6_AUTOCONF=yes
PROXY_METHOD=none
BROWSER_ONLY=no
DEFROUTE=yes
IPV4_FAILURE_FATAL=no
IPV6_DEFROUTE=yes
IPV6_FAILURE_FATAL=no
NAME=eth0
[root@testcell network-scripts]# ifconfig eth0 up
[root@testcell network-scripts]# ifup eth0
Connection successfully activated (D-Bus active path:
/org/freedesktop/NetworkManager/ActiveConnection/2)
```

Check that the port has been renamed and is UP. Other extraneous output has been removed from output below

```
[tc1@testcell ~]$ ip a
3: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state
UP group default qlen 1000
```

Appendix B. Mounting Remote Drives

In previous Scientific Linux installations, `/etc/rc.local` was used to mount remote drives. The recommended way to mount drives in Oracle Linux is using the `/etc/fstab` file. The link below provides documentation from Oracle on this file.

https://docs.oracle.com/en/learn/file_system_linux_8/#task-8-update-the-fstab-file

Follow steps 1-5 of **Task 8: Update the fstab File** to configure your remote drives.

Appendix C. Troubleshooting

Issue: The Yum install to download the post_install.8.6 rpm has failed

This is most likely due to a network or yum repo configuration issue. To troubleshoot:

1. Verify the network is operational and turned on. See *Section 3 Network Configuration* on page 29. Also verify the network port is configured to **Connect Automatically** by ensuring **Settings** - **Network** – Gear Icon for the network port - **Connect Automatically** is checked.
2. One of your network ports will need to connect to the yum server used at your site. Once verified the network port is correctly configured, see if you can ping the yum server. An example terminal output for this is shown below. If unable to ping the server, there could be issues with your DNS server configuration. Compare your `/etc/hosts` file with another system at your site. If unable to ping another system at your site, you may not be on the network and need to troubleshoot the network port itself, the cable, any network switch you are using, or the configuration.

Go to your repo directory,

```
[tc1@awatson ~]$ cd /etc/yum.repos.d
```

Look at the contents of your `uek-ol8` repo. An example would be

```
[tc1@awatson yum.repos.d]$ cat local-uek-ol8.repo
[local_ol8_x86_64_UEKR6]
name=Local Latest Unbreakable Enterprise Kernel Release 6 for Oracle
Linux $releasever ($basearch)
baseurl=https://max.cybermetrix.com/yum/ol8_repos/ol8_x86_64_UEKR6/
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-oracle
gpgcheck=1
enabled=1

[local_ol8_x86_64_UEKR6_RDMA]
name=Local Oracle Linux 8 UEK6 RDMA ($basearch)
baseurl=https://max.cybermetrix.com/yum/ol8_repos/ol8_x86_64_UEKR6_RDM
A/
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-oracle
gpgcheck=1
enabled=0
```

Paste one of the links from the `baseurl=` into your web browser. If it shows “Not Found”, then you’re not able to connect to the yum server. If it shows links or asks for a password, you are able to connect. You do not need to enter the password, merely being asked means you are able to connect.

If you’re not able to connect to the yum server but have verified the network port is functional by connecting to other nodes on the same network, you may be using the incorrect yum repos for your site. If this is the case, use the ‘yum download’ command on another node at your site that is able to connect to the yum server.

```
cd /tmp
```

For Cummins,
```
sudo yum download acdc_ol8_repos
```

For TRP Laboratories,
```
sudo yum download cyflex_sgs_local_repos
```

For all other sites,
```
sudo yum download cyflex_outside_repos
```

This will put a .repo file in the `/tmp` directory with the base filename of the rpm taken from the command (for example, `/tmp/cyflex_outside_repos.rpm`). Bring this file to the newly built computer, place it in the `/tmp` directory and execute the following commands:

```
sudo yum localinstall /tmp/cyflex_outside_repos.rpm
sudo yum clean all
```

Now try the yum install again for the post_install.8.6 rpm with the correct repos.

Issue: My graphics card isn't supported

Many of the legacy drivers that were used with late model NVIDIA graphics cards have not been created for newer Linux kernels. If you have one of these legacy models (the most common being an NVIDIA GeForce 8400 GS), you have the following options:

1. Use the nouveau driver that comes pre-installed with the operating system. This may be sufficient for your needs, depending on the rest of your machine hardware and demands of your user interface.
2. Buy a newer model graphics card that is supported by one of the drivers we offer on our yum server.
3. Find a driver on the internet for the graphics card you have (or want) that is compatible with the current Linux kernel and attempt the install. If you have issues, contact TRP Laboratories for support. There is no guarantees that it will be possible, and another card may need to be purchased.

Below are links which include the supported models of the drivers we have available on our yum server for NVIDIA cards. NOTE that we do not create or maintain these drivers, we make them available to you from the original creators.

After clicking the link, select "Supported Products" to make sure your model is supported.

https://www.nvidia.com/Download/driverResults.aspx/196213/en-us/
https://www.nvidia.com/Download/driverResults.aspx/204837/en-us/
https://www.nvidia.com/Download/driverResults.aspx/200634/en-us/

Issue: The NVIDIA driver will not load

Make sure secure boot is disabled in the BIOS.

Issue: Computer will not boot from the USB and NVIDIA graphics card

Sometimes the computer will not boot with the graphics card installed from the USB, and you must remove the graphics card to perform the installation using the onboard graphics. Once the OS is installed and booted from the hard drive, shut down the computer, reinstall the graphics card, then switch your cable to use the graphics card, and boot again. At this point, it will usually boot with graphics.