

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 <u>https://cyflex.com/</u>. 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.



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 tcl 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 you hard drive. Refer to Section <i>1.1 Configuring Network and</i> <i>Host Name</i> 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 . <code>repo</code> 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.

Done Done	ORACLE LINUX 8.6 INSTALLATIO
Base Environment	Additional software for Selected Environment
 CyFlex CyFlex System Configuration Server with GUI An integrated, easy-to-manage server with a graphical interface. CyFlex Development CyFlex Development Configuration Server An integrated, easy-to-manage server. Minimal Install Basic functionality. Workstation Workstation is a user-friendly desktop system for laptops and PCs. Virtualization Host Minimal virtualization host. Custom Operating System Basic building block for a custom OL system. 	 CTC Site Specific Configuration ACDC Repositories (repo files) and RPMs for the NTP(Network Time Protocol) and Mal(Postfix) SGS Site Specific Configuration SGS Repositories (repo files) and RPMs for the NTP(Network Time Protocol) and Mal(Postfix) SGS Public YUM Repositories YUM Repositories CyFlex Pre-Configured CyFlex Demonstration Contains cell, specs, and data directories for a CyFlex Demo without I/O Hardware Container Management Tools for managing Linux containers .NET Core Development Tools to develop .NET and .NET Core applications RPM Development Tools Tools used for building RPMs, such as rpmbuild. Development Tools A basic development Tools Graphical system administration tools for managing many aspects of a system. Headless Management Tools for managing the system without an attached graphical console. Legacy UNIX Compatibility Compatibility programs for migration from or working with legacy UNIX environments. Network Servers These packages include network-based servers such as DHCP, Kerberos and NIS. Scientific Support Tools for mathematical and scientific compatibilityand narallel commution.

Figure 4: Software Selection

L



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

	ORACLE LINUX 8.6 INSTALLATION
Device Selection	
Select the device(s) you'd like to install to. They will be left untou	ched until you click on the main menu's "Begin Installation" button.
Local Residual Pola	
Local scandard Libks	
20 GIB	
2 A A A A A A A A A A A A A A A A A A A	
vda / 20 GiB free	
	Party laborated and have self and have been deal
Specialized & Network Disks	Lasks left unselected here will not be couched
Add a disk	
	Disks left unselected here will not be touched
Storage Configuration	
Used like to make additional score analishin	
Encretion	
Encrypt my data. You'll set a passphrase next.	
full disk summary and boot loader	1 disk selected; 20 GiB capacity; 20 GiB free Befresh



9. The Manual Partitioning screen is displayed.



NUAL PARTITIONING	ORACLE LINUX 8.6 INSTALLATIO
one	🖽 us Help
New Oracle Linux 8.6 Installation You haven't created any mount points for your Oracle Linux 8.6 installation yet. You can: Click here to create them automatically. Create new mount points by clicking the '+' button. New mount points will use the following partitioning scheme: LVM Encrypt automatically created mount points by default: Encrypt my data.	When you create mount points for your Oracle Linux 8.6 installation, you'll be able to view their details here.
+ – C AVAILABLE SPACE 20 GiB TOTAL SPACE 20 GiB	
1 storage device selected	Reset /

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.



Partition	Minimum	Size Considerations	SSD	Device	File
	Recommended		or	Туре	System
	Size		HDD*		
/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 nartition	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

Table 2: Recommended Minimum Partition Size Values



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	SSD / NVMe	LVM	xfs
		contains numerous different specs directories for different configurations, along with emissions logger files, ensure that the / partition is large enough to			

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

ØNote:

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.

9



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*.

Order	Action	Туре	Device	Mount point
1	destroy format	Unknown	Oxlaf4 (vda)	
2	create format	partition table (MSDOS)	Oxlaf4 (vda)	
3	create device	partition	vdal on 0x1af4	
4	create device	partition	vda2 on 0x1af4	
5	create format	physical volume (LVM)	vda2 on 0x1af4	
6	create device	lvmvg	ol_awatson	
7	create device	tymty	ol_awatson-root	
8	create format	xfs	ol_awatson-root	/
9	create device	tymty	ol_awatson-swap	
10	create format	swap	ol_awatson-swap	
11	create format	xfs	vdal on 0x1af4	/boot

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*.

Fiaure	10:	Copv	ina P	ackages
riguic	10.	Copy	''y '	achages

ORACLE	INSTALLATION PROGRESS	ORACLE LINUX 8	3.6 INSTALLATION
	Creating xfs on /dev/vda1		
The Mu			
		Quit	Reboot System



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.

ØNote:

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 1	3:	Network	&	Host	Name	Screen
----------	----	---------	---	------	------	--------

NETWORK & HOST NAME		ORACLE LINUX 8.6 INSTALLATION
Ethernet (enp1s0) Red Hat, Inc. Virtio network device	Ethernet (enp1s0) Disconnected Hardware Address 52:54:00:2A:01:F8 Speed IP Address DNS	OFF
+ – Host Name: localhost.localdomain Apple		Configure Current host name: localhost.localdomain



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

Contract of Contract	Editin	g enpls0		×
Connection name enpls0]
General Ethernet	802.1X Security	DCB Proxy	IPv4 Settings	IPv6 Settings
Method Automatic (DHC	2)			•
Additional static address	es			
Address	Netmask	Netmask Gateway		
				Delete
Additional DNS server	5			
Additional search domain	S			
DHCP client I				
Require IPv4 addressi	ng for this connection to a	complete		
				Routes
			Can	icel Save

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:





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*.



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*.







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*.







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.

		A.S. C. S.S.Y		
Trash		A LANS C. STORAGE		
	18 Q Tweaks	Extensions ON	×	
	Appearance	Add launchers for favorities to the panel		
	Extensions	Horizontal workspaces	Contraction of the	NOT BE DANTIN.
	Fonts		OFF	这些性的 。
	Keyboard & Mouse	Launch new instance	OFF	
	Power			State Baller
	Sound	Native window placement Arrange windows in overview in a more compact way.		的 的 的 和 。
	Startup Applications		Contraction of the second	
	Top Bar	No topleft hot corner Disable the hot corner in the top left; you can still reach the overview by clicking the activities	OFF	
	Windows		The second second	
	Workspaces	Places status indicator Add a menu for quickly navigating places in the system.	OFF	and a second
		Removable drive menu A status menu for accessing and unmounting removable devices.		
		Screenshot window sizer Resize windows for gnome software screenshots	ON	
A R R C Anticology -				

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*

h	% Q Settings		Power -	×	
	Background	Devices			· · · · · · · · · · · · · · · · · · ·
	Notifications	K350	70%		
	Q Search	Marathon Mouse/Performance Plus	M705 55%		
	Ragion & Language	Power Saving			
	Universal Access	Blank screen	Never 👻		
	Online Accounts ■ Privacy	Suspend & Power Button		an an ta' in 2000. A tai biang diseana Ang tai biang diseana	en and Amile PALINE Market Amile PALINE Market Amile PALINE
		Automatic suspend	Off	100 C (10 - 10 - 10 - 10 - 10 - 10 - 10 - 10	2013年1月1日日本部代日本
	< snaring	When the Power Button is pressed	Suspend 👻	and the second se	
	40 Sound			Statistics of	
	Ge Power			12 经历史	
	g7 Network				
	to Devices >				
and the second second	El Details >				
				The loss of the second s	



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

% Q Settings	Notifications	-	۰	×
₽ Wi-Fi				
Bluetooth	Notification Popups OFF)		
Background	Lock Screen Notifications			
Notifications	Applications			
Q Search	Archive Manager On			
Region & Language	Deskton Sharing On			
Universal Access				
S Online Accounts	Files On			
illi Privacy	Software On			
< Sharing				
 €0 Sound 				
C Power				
⊈⊋ Network				



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

Figure 25: Disable Software Notifications

% Q Settings	Notifications					
😨 Wi-Fi						
\$ Bluetooth	Notification Popups OFF					
Background	Software × ON					
Notifications	Notifications OFF					
Q Search	Sound Alerts ON On					
📾 Region & Language	Notification Popups					
O Universal Access	list when popups are disabled.					
D ^s Online Accounts	Show Message Content in Popups OFF On					
i Privacy	Lock Screen Notifications ON Off					
Sharing	Show Message Content on Lock Screen OFF On					
() Sound						
Ce Power						
₽ Network						

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*.

		Dash to	Panel	×				
Position	Style Behavio	or Action	Fine-Tune	About				
Display the	e main panel on			Primary monitor -				
Display pa	Display panels on all monitors							
Panel Inte Hide and r	Panel Intellihide OFF Hide and reveal the panel according to preferences Image: Control of the panel of							
Order and	Order and positions on monitor Primary monitor Apply changes to all monitors							
Panel scre	en position	 Bottom 	🔿 Тор) Left i 🔘 Right				
Panel thick (default is	(ness 48)	24 32 4	8 64 I	96 32 px				
Panel leng (default is	th (%) 100)	20 30 I I	40 50 60 I I I	70 80 90				
Anchor		Center		•				
~ ~	Show Applicatio	ns button	Visible	Stacked to left 💌				
~ ~	Activities button		Visible	Stacked to left 👻				
~ ~	Left box		Visible	Stacked to left 👻				
~ ~	Taskbar		Visible	tacked to left 👻				
~ ~	Center box		Visible	Stacked to right 👻				
~ ~	Right box		Visible	Stacked to right 🕶				
~	Date menu		Visible	Stacked to right 🕶				
~ ~	System menu		Visible	Stacked to right 🕶				



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*.

	Dash to Panel					
Position	Style	Behavior	Action	Fine-Tune	About	
Show fa	avorite app	lications			ON	
Show fa	avorite app	lications on se	condary pan	els	ON	
Show ru	unning app	lications			ON	
Show A Top Bar	ppMenu bu > Show Ap	tton op Menu must	be enabled	in Tweak Tool		OFF
Show w	indow prev	views on hove	r			
Show to	ooltip on ho	over			ON	
Isolate	Workspace	s				OFF
Isolate i	monitors					OFF
Click en	npty space	to close over	view			OFF
Ungrou	p applicatio	ns				

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.).

	Dash to Panel *	
al	Position Style Behavior Action Free-Tone About	
Tradit Tradit	Show favorite applications Show favorite applications on secondary panels Show narring applications Upgrouped application options Peset to defaults X	
Extensions From	Fort size (pa) of the application titles (default is 34) 34 4 + +	
Reyboard & M	Fort weight of application titles	• •
Powr	Part calor of the application titles	
Startup Apple	Fort color of the minimized application titles	
Top for	Maximum width (pc) of the application titles (default is 390) 250 - +	
TERMS	Use a fand with for the application stiles The application titles all have the same eddh, event if their toxis are shorter than the maximum width. The maximum width value is used as the fixed width.	
	Use the favorite icons as application launchers	
Use the favorite icons as application launchers	Ungroup applications	Display running indicators on unfocused applications
	2647] Daub ta Pa. 👩 New Tab - Google Olivo. 🔤 GNOME Tawaka 🏾 🎉	See 16 13 08 ↓ 48 ○ +

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

-% Q Settings Network _ 0 × ♥ Wi-Fi Intel Ethernet Connected - 1000 Mb/s • Background om Ethernet Cable unplugged OFF 🗘 Q Se Region & Language VPN O Universal Access Not set up Network Proxy Off Ø < Sharing Sound Ce Powe) 📄 🛍 🗱 🖂 /

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

Cancel	Wired	Apply
Details Identit	y IPv4 IPv6 Security	
Link speed	1000 Mb/s	
IPv4 Address	10.0.0.90	
IPv6 Address	2601:283:4100:a6b0:1e66:6dff:fe8e:e8a1	
Hardware Address	1C:66:6D:8E:E8:A1	
Default Route	10.0.0.1	
DNS	75.75.75.75 75.75.76.76	
Connect autom	atically	
Make available	to other users	
Restrict backgro	ound data usage mections that have data charges or limits.	
	Remove C	
	Remove Co	onnection Profile



 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

Cancel	Wired	Appl
Details Identity	/ IPv4 IPv6 See	curity
IPv4 Method	O Automatic (DHCP)	C Link-Local Only
	 Manual 	O Disable
Addresses		
Address	Netmask	Gateway
192.168.222.24	255.255.255.0	0
		0
DNS		Automatic ON
Separate IP addresses w	ith commas	
-		Automatic ON
Routes		

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 <u>must</u> 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.





	Installation Information Summary		×	
tc1 Trash Trash	The kernel was installed successfully. Reboot the system to apply the kernel update.			
	Car	ncel	OK	

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 <u>not optional</u>, even if upgrading an existing system. Many rpms need to be updated after the kernel update, failing to execute the <code>post_install.8.6.sh</code> 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*.

CyFlex Machine Set	up	_ 0	×
Please enter the following information			
Which username owns this CyFlex system?	tcl		•
What is your desired hostname?	sgs-tcl		
Automatically log in after boot?			
Automatically start CyFlex after logging i	n?		
Install VNC?			
Install Rocketport PCI Driver?			
Install Rocketport PCI Express Driver?			
Install EtherCAT driver?			
Install Microsoft Teams?			
Install NVIDIA driver?			
Run CyFlex installer after this is complet	e?		
Install	Help	Cance	el

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.

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

Table 4: CyFlex Machine Setup Options



CyFlex Machine Set	up	-	•	×
Please enter the following information				
Which username owns this CyFlex system?	tc1			•
What is your desired hostname?				
Automatically log in after boot?				
Automatically start CyFlex after logging i	n?			
✓ Install VNC?				
Install Rocketport PCI Driver?				
Install Rocketport PCI Express Driver?				
Install EtherCAT driver?				
☑ Install Microsoft Teams?				
Install NVIDIA driver?				
$\ensuremath{}$ Run CyFlex installer after this is complete	e?			
Install	Help	(Cance	ı

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*.

د tc1						
		tct@ld	ocalnost:~		• × 🚿	and the second
-	File Edit View Search	Terminal Help				Contraction of the second
Trash	[tcl@localhost ~]\$ su [sudo] password for t [tcl@localhost ~]\$ su]	do /usr/post_instal cl: do /usr/post_instal	ll.8.6.d/post_instal	l.8.6.sh l.8.6.sh		
		Insta	lling srr	×		California D
	Ins	alling srr	Cancel	ĸ		
Applications 🗸 🕌				≜ -	May 15 06:34	≛•0 () ▲

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.

		· · · · · · · · · · · · · · · · · · ·		
fc1			- Alexandre	
		tc1@localhost:~	- • ×	and the second
				1000
Trash	<pre>[tc1@localhost ~]\$ sudo /usr/post [sudo] password for tc1: [tc1@localhost ~]\$ sudo /usr/post Gtk-Message: 06:34:50.626: GtkDia discouraged.</pre>	_install.8.6.d/post_install _install.8.6.d/post_install log mapped without a transi	.8.6.sh 8.6.sh .ent parent. This is	
11.2		VNC Password x		Same an All
No. Vi an		Type your password		a contract
TRU	Password	: Cancel OK		
Applications 👻 🁹) 🗐 🗱 🔛		▲ May 15 06:34	. • 0 • •

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

CyFlex Ins	taller	-		×
CyFlex is not currently installed	on this s	ystem.		
Select from the available list of v which you would like to install	resions	cyflex	.7.0.9	b 🕶
	Instal	l	Cance	el



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	
	NVIDIA Driver Installation Requirements	×
8	The NVIDIA driver download is complete, and your current nouveau graphics driver is disabled. The next time you reboot the computer, you may not have graphics or a terminal. You will need to ssh into this machine in order to complete the install.	
	WRITE DOWN THE USERNAME AND IP ADDRESS OF THIS MACHINE NOW BEFORE YOU REBOOT THE COMPUTER!!!	
	MAKE SURE THE NETWORK IS CONFIGURED TO CONNECT AUTOMATICALLY!!!	
	YOU WILL HAVE TO START OVER IF YOU DO NOT DO THIS!!	
	After you reboot and ssh in, execute the following command:	
	sudo /opt/nvidia/390.157/install_nvidia.sh	
	This will install the nvidia driver. Then, reboot the computer again and the NVIDIA graphics should be loaded.	
	You can find these instructions here after the reboot:	
	/home/tc1/Downloads/nvidia_directions	
	OK	

- 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 srripcsrripc102400 87 tc9513[tc84@cmx084 ~]$ lsmod | grep MTLMTL16384 1[tc84@cmx084 ~]$ lsmod | grep tctc951320480 1srripc102400 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 <code>MASTER0_DEVICE="""</code>

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

ØNote:

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/
```

ØNote:

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
- 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 enol 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=<mark>eth0</mark>
[root@testcell network-scripts]# ifconfig eth0 up
[root@testcell network-scripts]# ifup eth0
               successfully
Connection
                               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

```
[tcl@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:

- 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,

[tcl@awatson ~]\$ cd /etc/yum.repos.d

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

```
[tcl@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 <code>baseurl=</code> 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.