Cisco UCS VIC Drivers Installation Guide for UCS Manager 4.0

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Preface

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Audience

This guide is intended primarily for data center administrators with responsibilities and expertise in one or more of the following:

- Server administration
- Storage administration
- Network administration
- Network security

Conventions

Text Type	Indication
GUI elements	GUI elements such as tab titles, area names, and field labels appear in **this font**. Main titles such as window, dialog box, and wizard titles appear in **this font**.
Document titles	Document titles appear in *this font*.
TUI elements	In a Text-based User Interface, text the system displays appears in `this font`.
System output	Terminal sessions and information that the system displays appear in `this font`.
CLI commands	CLI command keywords appear in **this font**. Variables in a CLI command appear in *this font*.
[ ]	Elements in square brackets are optional.

Text Type	Indication
{x | y | z}	Required alternative keywords are grouped in braces and separated by vertical bars.
[x | y | z]	Optional alternative keywords are grouped in brackets and separated by vertical bars.
string	A nonquoted set of characters. Do not use quotation marks around the string or the string will include the quotation marks.
< >	Nonprinting characters such as passwords are in angle brackets.
[ ]	Default responses to system prompts are in square brackets.
!, #	An exclamation point (!) or a pound sign (#) at the beginning of a line of code indicates a comment line.

Note Means *reader take note*. Notes contain helpful suggestions or references to material not covered in the document.

Tip Means *the following information will help you solve a problem*. The tips information might not be troubleshooting or even an action, but could be useful information, similar to a Timesaver.

Timesaver Means *the described action saves time*. You can save time by performing the action described in the paragraph.

Caution Means *reader be careful*. In this situation, you might perform an action that could result in equipment damage or loss of data.

Warning IMPORTANT SAFETY INSTRUCTIONS

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device.

SAVE THESE INSTRUCTIONS

Related Cisco UCS Documentation

Documentation Roadmaps

For a complete list of all B-Series documentation, see the *Cisco UCS B-Series Servers Documentation Roadmap* available at the following URL: https://www.cisco.com/c/en/us/td/docs/unified_computing/ucs/overview/guide/UCS_roadmap.html

For a complete list of all C-Series documentation, see the *Cisco UCS C-Series Servers Documentation Roadmap* available at the following URL: https://www.cisco.com/c/en/us/td/docs/unified_computing/ucs/overview/guide/ucs_rack_roadmap.html.

For information on supported firmware versions and supported UCS Manager versions for the rack servers that are integrated with the UCS Manager for management, refer to Release Bundle Contents for Cisco UCS Software.

Other Documentation Resources

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CHAPTER 1

Installing Linux Drivers

Prerequisites for Installing Linux Drivers

Ensure that you adhere to the following best practice for installing the drivers. Upgrade the infrastructure in the following order before installing or upgrading the drivers.

- Upgrade the infrastructure firmware which includes the UCS Manager, the Fabric Interconnects, and the chassis I/O Modules.

- Upgrade the server and adapter firmware.

⚠️

Caution Failure to adhere to the proper upgrade sequence can cause the server to crash.

Installing Linux Drivers During OS Install

✎

Note The examples shown in this procedure are on Linux operating system distribution RHEL.

Procedure

Step 1 Enable CDN from the BIOS settings.

Step 2 Boot the server using RHEL installation .ISO image through vMedia.

Step 3 In **Red Hat Installation** menu, select **Install Red Hat Enterprise Linux**, but do not press **Enter** yet.

Step 4 Press **Tab** to edit the configuration options.

Step 5   At the end of **vmlinuz** line, add **dd** and press **Enter**.

To configure Consistent Device Name (CDN), add **biosdevname=1** option next to **dd**.

Step 6   When **Driver disk device selection** menu is displayed, un-map installation .ISO image and map the driver .ISO image.

Step 7   Press **r** to refresh the menu.

A driver list is displayed.

Step 8   Enter the corresponding driver number to install the driver.

Step 9   Un-map the driver .ISO image and map the installation .ISO image back.

Step 10   Press **r** to ensure that the correct .ISO image is loaded.

Step 11   Press **c** to continue the installation. For further details, refer to the RHEL 7.X Deployment Guide.

Step 12   Complete the RHEL installation.

Step 13   Verify that the default RHEL driver was replaced by the driver in the driver .ISO image.

For the eNIC driver, `cat /sys/module/enic/version`.

For the fNIC driver, `cat /sys/module/fnic/version`.

To read the CDN label assigned to a given VNIC, use the command `biosdevname -d` in the host terminal.

Installing Linux to SAN Storage and fNIC Driver

The examples shown in this procedure are on Linux operating system distribution RHEL.

Procedure

Step 1   Create a vHBA on the Cisco VIC card.

Step 2   In Cisco UCS Manager, mark the vHBA bootable and add the WWPN of the SAN storage.

For more information on how to do this step, see the *Cisco UCS Manager Configuration Guide*.

Step 3   Boot the server using the RHEL installation DVD through vMedia.

Step 4   For the installation target, choose the SAN storage device.

Step 5   Finish the OS installation.

Step 6   After the OS installation is complete, install the fNIC driver from Cisco driver .ISO image.

Step 7   After the driver is successfully installed, reboot the server.

Installing Linux Drivers using RPM

If the management connection is over the eNIC, Cisco recommends using the serial or KVM console to complete the driver installation. Completing an rmmod of the current driver results in a loss of eNIC network connectivity.

Note

On SLES 12 SP1 and later, the Cisco eNIC and usNIC drivers are bundled together in to a single RPM (vs. being packaged in separate RPMs, as they are for other Linux distributions). Bundling both drivers into a single RPM is necessary because of how kernel module dependencies are managed in SLES 12 SP1 and later. If you are not using Cisco usNIC functionality, the usNIC driver will effectively be ignored.

The eNIC and usNIC drivers have their own distinct version numbers. If you install the `cisco-enic-usnic` RPM on SLES 12 SP1 or later, once those drivers are loaded into the running kernel (e.g., via rebooting), use **cat /sys/module/enic/version** and **cat /sys/module/usnic_verbs/version** to view their respective version numbers. The `cisco-enic-usnic` RPM has its own distinct version number as well. Because it represents the packaging of the eNIC and usNIC drivers, the RPM version number may look similar, but does not reflect the specific version of either driver. You can also query the Description of the RPM to see exactly what versions of the drivers will be installed.

The following shows a sample query of the Description of the RPM to view the driver versions to be installed:

```
$ rpm -qip cisco-enic-usnic-kmp-default-<RPM_VERSION>.x86_64.rpm
Name       : cisco-enic-usnic-kmp-default  Relocations: (not relocatable)
...
Summary    : Cisco VIC Ethernet NIC drivers
Description :
This RPM contains both the Cisco VIC Linux Ethernet driver (enic.ko,
version <ENIC_VERSION>) and the Cisco Userspace NIC (usNIC) Linux
Ethernet driver (usnic_verbs.ko, version <USNIC_VERSION>).  Some
Linux distros require both kernel modules to be in the same RPM in
order to properly test for symbol compatibility (because
usnic_verbs.ko depends on enic.ko) when installing into post-GA
upgrade kernels.
```

Procedure

Step 1　**Note**　If installing usNIC functionality, refer to the *usNIC Deployment Guide* for version packaging considerations.

Install the binary RPM by entering the corresponding command for your driver:

Driver	Command
eNIC driver on RHEL	**rpm -ivh kmod-enic-*version*.x86_64.rpm**
eNIC driver on SLES 12 and earlier	**rpm -ivh cisco-enic-kmp-default-*version*.x86_64.rpm**
eNIC driver on SLES 12 and earlier with XEN support	**rpm -ivh cisco-enic-kmp-xen-*version*.x86_64.rpm**

Driver	Command
eNIC and usNIC drivers on SLES 12 SP1 and later	**rpm -ivh cisco-enic-usnic-kmp-default-***version***.x86_64.rpm**
eNIC and usNIC drivers on SLES 12 SP1 and later with XEN support	**rpm -ivh cisco-enic-usnic-kmp-default-***version***.x86_64.rpm**
fNIC driver on RHEL	**rpm -ivh kmod-fnic-***version***.x86_64.rpm**
fNIC driver on SLES	**rpm -ivh cisco-fnic-kmp-default-***version***.x86_64.rpm**

The driver is installed but not loaded.

Step 2 Load the driver in one of the following ways:

- Reboot the host.

- Load the driver manually while the host is running by entering the **modprobe**{**enic** | **fnic**} command.

Note If an error message displays that the module is in use, remove any modules that are using the driver, then remove the driver. Issuing the **lsmod** | **grep** {**enic** | **fnic**} command can help determine which modules are in use. Use **rmmod** *{enic | fnic}* to remove the driver.

If there are many references to the eNIC or fNIC module and it is not possible to remove all of the dependencies, reboot the system.

Step 3 Verify the driver installation by entering the **sbin/lsmod | grep** {**enic** | **fnic**} command.

Installing Linux Drivers Using the Source Tarball

Procedure

Step 1 Extract the tarball and build/install the driver:

Example:

```
$ tar xf enic-<version>.tar.bz2
  $ cd enic-<version>
  $ ./autogen.sh
  $ ./configure
  $ make
  # make install (requires administrative privileges)
```

Step 2 After the driver is installed, re-create the boot loader with the new enic driver:

Example:

SLES12:

```
# mkinitrd --force -m enic (make initrd ramfs image with enic module)
```

Note that SLES does not support third-party kernel modules by default. In order to enable the unsupported module, you need to add "allow_unsupported_modules 1" to /etc/modprobe.d/10-unsupported-modules.conf

Note that you will also need to compile and install an updated Cisco usNIC driver as well. The Cisco usNIC driver source code is part of the same UCS Drivers download as the enic sources.

SLES11:

```
# mkinitrd -m enic
```

RHEL/CentOS 6.x, 7.x, XS:

```
# mkinitrd <img file> <kernel version> --force --preload enic
```

Example:

```
# mkinitrd /boot/initramfs-3.10.0-123.el7.x86_64.img \
3.10.0-123.el7.x86_64 --force --preload enic
```

Ubuntu:

```
# mkinitramfs -o /boot/initrd.img-`uname -r` `uname -r`
```

At this point the driver is installed but not loaded in the running kernel.

Step 3   There are two ways to load the updated enic driver:

- Automatically - If the enic driver was successfully installed, rebooting the server should load it into the running kernel. Even if your Linux distribution has an older inbox version of the enic driver, the newly-installed enic driver should take precedence.

- Manually - Manually unloading a previous enic driver and loading a newer enic driver is possible in some scenarios, but is not recommended. For example, SLES does not support rmmod'ing kernel modules from a running kernel; SuSE recommends configuring modules in /etc/modprobe.d/ and rebooting. This procedure requires administrative privileges.

    1. Unload the currently-running driver:

       ```
       # rmmod enic
       ```

       Note   Ensure that you are not connected to the server where you are unloading the enic driver via an enic interface when you execute this command, or your connection will be severed. You may wish to execute this command either on the console or in a KVM session, for example.

    2. Load the updated driver from the local build directory:

       ```
       # /sbin/insmod ./enic.ko
       ```

       Or you can load from lib/modules if the driver was installed:

       ```
       # /sbin/modprobe enic
       ```

Step 4   After updating the enic driver and loading it, you should verify that the kernel is running the updated driver.

a) Check that a driver named "enic" is present in the running kernel: `# /sbin/lsmod | grep enic`
b) Check the kernel log to see the version the enic driver the last time it was loaded: `# /bin/dmesg | grep enic`
c) Check to ensure that the version is what you expect it to be.

d) Be sure to check the enic version from the last time it was loaded in the kernel. For example, dmesg may still show log messages from when the prior enic driver was loaded.

CHAPTER 2

Installing Windows 2016/2019 Drivers

Prerequisite for Installing Windows 2016/2019 Drivers

Ensure that you adhere to the following best practice for installing the Windows drivers. You must upgrade the infrastructure in the following order before upgrading the drivers.

- Upgrade the infrastructure firmware which includes the UCS Manager, the fabric interconnects, and the chassis I/O modules.

- Upgrade the server and adapter firmware.

⚠

Caution   Failure to adhere to the proper upgrade sequence can cause the server to crash.

⚠

Caution   The driver installation file modifies certain registry entries, such as the disk timeout value of the system disk driver. Removing the driver does not restore these values.

✎

Note   Before installing the drivers, the interrupt count should be set to greater than or equal to (2*logical processors + 4) for VIC 14XX adapters. The interrupt value can be rounded up to the nearest second power. For more information on how to set the interrupt field for Ethernet adapter policies in the UCS Manager GUI, refer to the *UCSM Network Management Guide*.

Installing Windows 2016/2019 Drivers During OS Install

If you are installing Windows on a FC or iSCSI LUN, you must install Cisco VIC drivers for Windows during the OS installation. If you do not provide the drivers during the OS installation, the system is not able to detect the LUN.

Note Provide the LUN with single path during Windows OS installation. After the OS is installed, enable MPIO and then add a second path to the boot LUN.

Procedure

Step 1 Start the Windows installation using the installation DVD or virtual media.

Step 2 On the **Where do you want to install Windows** screen, click **Load Driver**.

Step 3 **Browse** to the driver and click **OK**. The driver appears in the **Select the drive to be installed** window.

Step 4 Confirm that the correct driver is displayed on the **Select the drive to be installed** screen and click **Next**.

After the installation, LUN is displayed.

Step 5 Un-map the driver ISO and map back the Windows Install ISO and select the LUN where OS has to be installed and click **Next**.

Step 6 Continue with your Windows installation on the LUN or select the LUN on the **Where do you want to install Windows?** screen.

Updating Windows 2016/2019 Drivers

Download the respective driver ISO and pick the driver from the ISO. For example, shown below is the path to the Windows 2016/2019 release:

- `<mounted drive letter>:\Drivers\Windows\Network\Cisco\VIC\W2K16`

Procedure

Step 1 Start the **Device Manager**.
  a) Right-click **My Computer**.
  b) choose **Manage**.
  c) choose **Device Manager**.

Step 2 Expand the adapter.

- For the eNIC driver, expand **Network Adapters**.

- For the fNIC driver, expand **Storage Controllers**.

Step 3   In the **Devices** list, right-click the adapter and choose **Update Driver Software**.

The **Update Driver Software** window opens.

Step 4   Select **Browse my computer for driver software**.

Step 5   Choose your adapter and click **Next**.

Step 6   In the **Install from Disk** window, browse to the driver file and click **OK**.

Step 7   If you are updating the drivers for multiple devices, cancel the operating system reboot request until the last device driver update has completed before rebooting.

Step 8   Click **OK** in the restart pop up to reboot the server.

Step 9   Once the server is rebooted, click **Device Manager** > **Network Adapters** > **Properties**, and ensure that the new driver version is updated.

CHAPTER 3

Installing ESXi Drivers

Prerequisites for Installing ESX Drivers

Ensure that you adhere to the following best practice for installing the drivers. Upgrade the infrastructure in the following order before installing or upgrading the drivers.

- Upgrade the infrastructure firmware which includes the UCS Manager, the Fabric Interconnects, and the chassis I/O Modules.

- Upgrade the server and adapter firmware.

⚠

Caution   Failure to adhere to the proper upgrade sequence can cause the server to crash.

Installing ESXi Drivers During OS Install

You can use a virtual media image in place of the physical media.

Procedure

Step 1   Insert the ESXi installation DVD in the host machine's DVD drive.

Step 2   Restart the ESXi host.

Step 3   Accept the terms of the license agreement.

Step 4   Choose a keyboard type.

Step 5   When prompted for custom drivers, click **Yes** to install custom drivers.

Step 6   Click **Add** to eject the ESXi installation DVD.

Step 7   Place the supplemental eNIC or fNIC driver CD in the DVD driver of the ESXi host and click **Next**.

| Step 8 | Click **Yes** to load the system drivers. |
| Step 9 | Complete the ESXi installation. |

After the drivers are installed, you are prompted to remove the driver CD and reinsert the ESXi installation DVD.

What to do next

You can run the following command to check if the VMware vSphere Installation Bundle(VIB) installed successfully:

```
esxcli software vib list |grep -i vib_name
```

Installing ESXi Drivers

You can use this procedure to install offline bundles that are copied from the driver ISO image to the ESXi host.

Procedure

Step 1	Extract the contents of the ISO image to the ESXi host.
Step 2	Identify the *offline-bundle*.zip file containing the eNIC or fNIC driver being installed.
Step 3	Log into the ESXi host using the vSphere Client with administrator privileges, such as root.
Step 4	Using **DataStore Browser**, upload the *offline-bundle*.zip file to the ESXi host's datastore.
Step 5	Enter the host into maintenance mode.
Step 6	Log into the ESXi console as root through SSH or iLO/DRAC.
Step 7	Copy the *offline-bundle*.zip file to a datastore accessible by the ESXi host by running this command:

```
cp offline-bundle.zip /vmfs/volumes/datastore_name
```

| Step 8 | Run the following command to install drivers using the offline bundle. An absolute path is required to run this command. |

```
esxcli software vib install -d /path/offline-bundle.zip
```

For example:`esxcli software vib install -d /vmfs/volumes/datastore_name/offline_bundle.zip`

| Step 9 | You can run the following command to check that the VMware vSphere Installation Bundle(VIB) is installed successfully: |

```
esxcli software vib list | grep -i vib_name
```

| Step 10 | Restart the host. |
| Step 11 | Exit maintenance mode. |

Updating ESXi Drivers

You can use this procedure to install offline bundles that were copied from the driver ISO image to the ESXi host.

Procedure

Step 1   Extract the contents of the ISO image to the ESXi host.

Step 2   Identify the *offline-bundle*.zip file containing the eNIC or fNIC driver being installed.

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Step 9   You can run the following command to check that the VMware vSphere Installation Bundle(VIB) is installed successfully:

```
esxcli software vib list | grep -i vib_name
```

Step 10   Exit maintenance mode.