

Oracle® Dual Port 25 Gb Ethernet Adapter User's Guide

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Using This Documentation

- **Overview** – Provides specifications and describes how to install and administer the Oracle Dual Port 25 Gb Ethernet Adapter.
- **Audience** – Technicians, system administrators, and authorized service providers.
- **Required knowledge** – Advanced experience troubleshooting and replacing hardware.

In this document, the term “adapter” refers to the Oracle Dual Port 25 Gb Ethernet Adapter, the term “x86” refers to 64-bit and 32-bit systems manufactured using processors compatible with the AMD64, Intel Xeon, or Intel Pentium product families , and the term “Oracle Solaris” refers to Oracle Solaris 11.3 SRU23 for x86.

Product Documentation Library

Documentation and resources for this product and related products are available at https://docs.oracle.com/cd/E87266_01/.

Feedback

Provide feedback about this documentation at <http://www.oracle.com/goto/docfeedback>.

Understanding the Installation Process

These topics provide an overview of the installation process for the adapter:

- [“Installation Task Overview \(Oracle Solaris x86\)” on page 11](#)
- [“Installation Task Overview \(Linux\)” on page 12](#)
- [“Installation Task Overview \(Windows\)” on page 13](#)

Related Information

- [“Understanding the Adapter” on page 15](#)
- [“Confirming Specifications and Requirements” on page 19](#)
- [“Updating Software and Firmware” on page 23](#)
- [“Installing the Driver” on page 25](#)
- [“Installing the Adapter” on page 31](#)
- [“Troubleshooting the Adapter \(Oracle Solaris x86\)” on page 77](#)

Installation Task Overview (Oracle Solaris x86)

Step	Description	Links
1.	Understand the adapter.	“Understanding the Adapter” on page 15
2.	Confirm the adapter specifications and technical requirements.	“Physical Specifications” on page 19 “Electrical Specifications” on page 20 “Environmental Specifications” on page 20
3.	Determine if the driver is supported on your server and the driver is up to date.	“Hardware and Software Requirements” on page 21
4.	If your OS is out of date, update the entire OS image, or download and apply the latest OS patch.	“Update the OS (Oracle Solaris x86)” on page 23
5.	Verify the driver installation.	“Verify the bnxt Driver (Oracle Solaris x86)” on page 25

Step	Description	Links
6.	Install and verify the adapter.	“Install the Adapter” on page 34
7.	Configure the network.	“Verify the Adapter Installation (Oracle Solaris x86)” on page 37 “Configure the Network Interface (Oracle Solaris x86)” on page 40 “Boot Over a 10GbE Network (Oracle Solaris x86 and Linux)” on page 42
8.	Configure the driver parameters.	“Set Driver Parameters (Oracle Solaris x86)” on page 53
10.	(Optional) Configure link aggregation .	“Configure a Link Aggregation (Oracle Solaris x86)” on page 61
11.	(Optional) Configure a VLAN or a VXLAN .	“Configure VLANs (Oracle Solaris x86)” on page 66 “Configure VXLANs (Oracle Solaris x86)” on page 68
12.	If desired, remove a driver.	“Remove the bnxt Driver (Oracle Solaris x86)” on page 71
13.	Upgrade the adapter.	“Install the Upgrade Package” on page 73
14.	Troubleshoot adapter issues.	“Troubleshooting the Adapter (Oracle Solaris x86)” on page 77

Related Information

- [“Installation Task Overview \(Linux\)” on page 12](#)
- [“Installation Task Overview \(Windows\)” on page 13](#)

Installation Task Overview (Linux)

Step	Description	Links
1.	Understand the adapter.	“Understanding the Adapter” on page 15
2.	Confirm the adapter specifications and technical requirements.	“Physical Specifications” on page 19 “Electrical Specifications” on page 20 “Environmental Specifications” on page 20
3.	Determine if the driver is supported on your server and the driver is up to date.	“Hardware and Software Requirements” on page 21
4.	If your OS is out of date, update the entire OS image, or download and apply the latest OS patch.	“Updating Software and Firmware” on page 23
5.	Install and verify the driver.	“Download and Install the bnxt_en Driver (Linux)” on page 26 “Verify the bnxt_en Driver (Linux)” on page 27
6.	Install and verify the adapter.	“Install the Adapter” on page 34 “Verify the Adapter Installation (Linux)” on page 37

Step	Description	Links
7.	Boot over the network.	“Boot Over a 10GbE Network (Oracle Solaris x86 and Linux)” on page 42
8.	Configure the driver parameters.	“Set Driver Parameters (Linux)” on page 55 “Driver Parameters (Linux)” on page 56
9.	(Optional) Configure jumbo frames.	“Configure Jumbo Frames (Linux)” on page 58
10.	(Optional) Configure VLANs.	“Configure VLANs (Linux)” on page 67
11.	(Optional) Remove a driver.	“Remove the bnxt_en Driver (Linux)” on page 72
12.	Upgrade the adapter.	“Install the Upgrade Package” on page 73

Related Information

- [“Installation Task Overview \(Oracle Solaris x86\)” on page 11](#)
- [“Installation Task Overview \(Windows\)” on page 13](#)

Installation Task Overview (Windows)

Step	Description	Links
1.	Understand the adapter.	“Understanding the Adapter” on page 15
2.	Confirm the adapter specifications and technical requirements.	“Physical Specifications” on page 19 “Electrical Specifications” on page 20 “Environmental Specifications” on page 20
3.	Determine if the driver is supported on your server and the driver is up to date.	“Hardware and Software Requirements” on page 21
4.	If your OS is out of date, update the entire OS image, or download and apply the latest OS patch.	“Updating Software and Firmware” on page 23
5.	Verify the driver installation.	“Download and Install the bnxt_en Driver (Windows)” on page 28
6.	Install the adapter and verify the installation.	“Install the Adapter” on page 34 “Verify the Adapter Installation (Windows)” on page 38
7.	Boot over the network.	“Configure the Network Interface (Windows)” on page 40
8.	Configure jumbo frames.	“Configure Jumbo Frames (Windows)” on page 59
9.	Configure a VLAN.	“Configure VLANs (Windows)” on page 67
10.	If desired, remove a driver.	“Remove the bnxt_en Driver (Windows)” on page 72
11.	Upgrade the adapter.	“Install the Upgrade Package” on page 73

Related Information

- [“Installation Task Overview \(Oracle Solaris x86\)” on page 11](#)
- [“Installation Task Overview \(Linux\)” on page 12](#)
- [“Understanding the Adapter” on page 15](#)

Understanding the Adapter

These topics provide an overview of the adapter:

- [“Shipping Kit Contents” on page 15](#)
- [“Adapter Overview” on page 16](#)
- [“Front Panel Connectors and LEDs” on page 17](#)

Related Information

- [“Understanding the Installation Process” on page 11](#)
- [“Confirming Specifications and Requirements” on page 19](#)
- [“Updating Software and Firmware” on page 23](#)
- [“Installing the Driver” on page 25](#)
- [“Installing the Adapter” on page 31](#)
- [“Configuring the Network” on page 39](#)
- [“Configuring Driver Parameters” on page 53](#)
- [“Configuring Jumbo Frames” on page 57](#)
- [“Configuring a Link Aggregation \(Oracle Solaris x86\)” on page 61](#)
- [“Configuring VLANs and VXLANs” on page 65](#)
- [“Removing the Driver” on page 71](#)
- [“Troubleshooting the Adapter \(Oracle Solaris x86\)” on page 77](#)

Shipping Kit Contents

The carton in which the adapter was shipped contains these items:

- Adapter with a low-profile bracket attached
- *Dual Port 25Gb Ethernet Adapter Where To Find* documentation

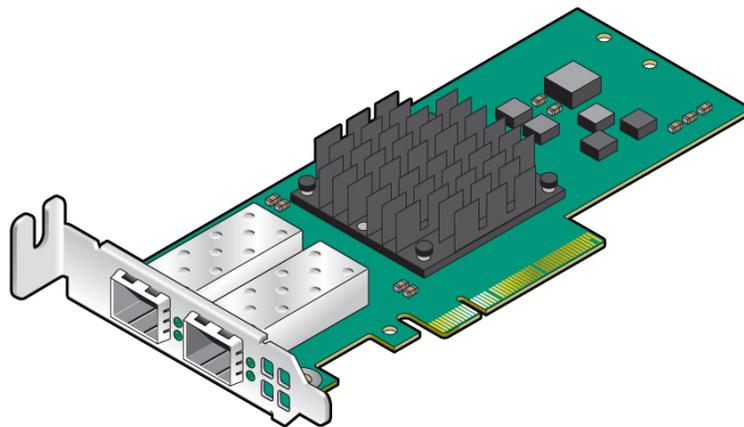
Related Information

- [“Adapter Overview” on page 16](#)
- [“Front Panel Connectors and LEDs” on page 17](#)

Adapter Overview

The Dual Port 25Gb Ethernet Adapter is a standalone card that is used for virtualized cloud deployments and network virtualization. Each adapter port uses a [25GbE SFP28 optical transceiver](#) with an [LC/LC](#) cable or a copper [DAC](#) that has transceivers attached at each end. Both ports operate at the same speed. The adapter is a PCIe 3.0 x8 low-profile card.

Feature	Specification
Data rate supported per port	2 x 25 GbE, where both ports operate at 25 Gbps Gbps per port
Bus type	PCIe V3.0, 8.0 GTps
Bus width	8-lane PCIe bus connector
Conforms to Ethernet standard	802.3
Boot ROM	8 Mb SPI Flash
EMI	FCC Class A

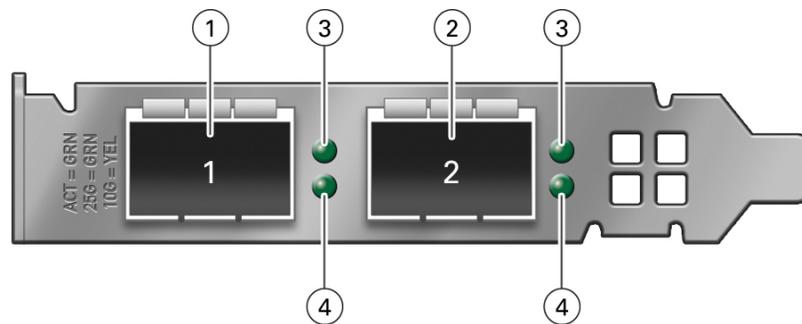


Related Information

- “Shipping Kit Contents” on page 15
- “Front Panel Connectors and LEDs” on page 17

Front Panel Connectors and LEDs

On the front panel, two LEDs display the port speed and activity for each port. Both ports operate at the same speed. This figure and the table explain the meaning of the LEDs for ports 1 and 2. The LEDs are the same for a full panel and a half-height panel.



Note - If your adapter is installed horizontally, the ports are numbered 1 and 2, left to right. In a vertical orientation, the ports are numbered 1-2 bottom to top.

No.	Description	Device	Mbit
1	Port 1		
2	Port 2		
3	Activity LED	Off Blinking Green	No activity Traffic flowing activity
4	Link LED	Off Solid Green Solid Yellow	No link Linked at 25 Gbps Linked at 1 Gbps or 10 Gbps

Related Information

- [“Shipping Kit Contents” on page 15](#)
- [“Adapter Overview” on page 16](#)
- [“Confirming Specifications and Requirements” on page 19](#)

Confirming Specifications and Requirements

These topics provide technical information and airflow precautions you need to understand before installing the adapter:

- [“Physical Specifications” on page 19](#)
- [“Electrical Specifications” on page 20](#)
- [“Environmental Specifications” on page 20](#)
- [“Hardware and Software Requirements” on page 21](#)

Related Information

- [“Understanding the Installation Process” on page 11](#)
- [“Understanding the Adapter” on page 15](#)
- [“Updating Software and Firmware” on page 23](#)
- [“Installing the Driver” on page 25](#)
- [“Installing the Adapter” on page 31](#)
- [“Configuring the Network” on page 39](#)
- [“Configuring Driver Parameters” on page 53](#)
- [“Configuring Jumbo Frames” on page 57](#)
- [“Configuring a Link Aggregation \(Oracle Solaris x86\)” on page 61](#)
- [“Configuring VLANs and VXLANs” on page 65](#)
- [“Removing the Driver” on page 71](#)
- [“Troubleshooting the Adapter \(Oracle Solaris x86\)” on page 77](#)

Physical Specifications

Description	U.S.	Metric
Length	3.154 in.	169.30 mm

Description	U.S.	Metric
Height	6.665 in.	80.11 mm
Weight	0.201 lbs.	0.091 kg

Related Information

- [“Electrical Specifications” on page 20](#)
- [“Environmental Specifications” on page 20](#)
- [“Hardware and Software Requirements” on page 21](#)

Electrical Specifications

Description	Value
Max power consumption	9.9W at 12V
Typical active power	9.1W at 2x25GbE mode; 5% traffic
Supply voltage	12V ± 15%

Related Information

- [“Physical Specifications” on page 19](#)
- [“Environmental Specifications” on page 20](#)
- [“Hardware and Software Requirements” on page 21](#)

Environmental Specifications

Specification	Operation	Storage
Temperature [†]	5°C to 35°C (-23°C to 95°F), noncondensing	-40°C to 65°C (-40°F to 149°F), noncondensing
Humidity	10% to 90% noncondensing relative humidity at 27°C (80.6°F) maximum wet bulb	93% noncondensing relative humidity at 38°C (100.4°F) maximum wet bulb

Specification	Operation	Storage
Altitude	3000 meters (9842.5) at 35°C (95°F) ambient	12,000 meters (39,370 feet)
Vibration	1,219 meters (4,000 feet) at 35°C (95°F) ambient	0.50 G z-axis; 0.25 G x- and y-axes (5-500 Hz sine)
	0.15 G z-axis; 0.10 G in x- and y-axes (5-500 Hz sine)	
Shock	3 G, 11 msec half-sine	1 inch roll-off front to back, 20 mm step-up
Airflow	400 LFM at 55°C (131°F) local ambient temperature	Threshold testing of castors at 0.75 m/s

[†]Temperature listed is for the server where the card is installed. The actual internal ambient inside the server local to the card might be higher.

Related Information

- [“Physical Specifications” on page 19](#)
- [“Electrical Specifications” on page 20](#)
- [“Hardware and Software Requirements” on page 21](#)

Hardware and Software Requirements

Hardware and software support changes over time. For the latest information concerning I/O options that are supported by your server, refer to the [Product Page](#).

For Oracle Solaris OS systems, the minimum supported version is Oracle Solaris 11.3 SRU23.

Related Information

- [“Physical Specifications” on page 19](#)
- [“Electrical Specifications” on page 20](#)
- [“Environmental Specifications” on page 20](#)
- [“Updating Software and Firmware” on page 23](#)

Updating Software and Firmware

This topic provides information on updating the adapter software and firmware:

- [“Update the OS \(Oracle Solaris x86\)” on page 23](#)
- [“Firmware Update Tool Overview” on page 24](#)

Related Information

- [“Understanding the Installation Process” on page 11](#)
- [“Understanding the Adapter” on page 15](#)
- [“Confirming Specifications and Requirements” on page 19](#)
- [“Installing the Driver” on page 25](#)
- [“Installing the Adapter” on page 31](#)
- [“Configuring the Network” on page 39](#)
- [“Configuring Driver Parameters” on page 53](#)
- [“Configuring Jumbo Frames” on page 57](#)
- [“Configuring a Link Aggregation \(Oracle Solaris x86\)” on page 61](#)
- [“Configuring VLANs and VXLANs” on page 65](#)
- [“Removing the Driver” on page 71](#)
- [“Troubleshooting the Adapter \(Oracle Solaris x86\)” on page 77](#)

▼ Update the OS (Oracle Solaris x86)

For the latest list of supported platforms and operating systems, see [“Hardware and Software Requirements” on page 21](#).

For Solaris OS systems, the minimum supported version is Oracle Solaris 11.3 SRU23.

1. **Update the entire OS image on the client server.**
2. **Ensure that you are using at least Oracle Solaris 11.3 SRU23.**

For more information, refer to My Oracle Support at <https://support.oracle.com> or to the [Product Page](#).

Related Information

- [“Firmware Update Tool Overview” on page 24](#)

Firmware Update Tool Overview

Use the firmware update tool to update the firmware. You can get the tool in these ways for the Oracle Solaris x86, Linux, and Windows environment:

- Oracle System Assistant (OSA), a built-in tool on x86 servers or a USB thumb drive shipped with the server, which contains the firmware update tool. Refer to the text files in OSA for instructions on updating your firmware.
- Hardware Management Pack (HMP), which includes the firmware update tool. Refer to the text files in HMP for instructions on updating your firmware.
- The fwupdate Automatic Mode command. For more information on this command, refer to the [Hardware Management Pack 2.3.x Documentation \(http://docs.oracle.com/cd/E52095_01/index.html\)](http://docs.oracle.com/cd/E52095_01/index.html).

Related Information

- [“Update the OS \(Oracle Solaris x86\)” on page 23](#)
- [“Firmware Update Tool Overview” on page 24](#)
- [“Installing the Driver” on page 25](#)

Installing the Driver

These topics describe how to install the driver on all server types:

Description	Links
Verify the driver on an Oracle Solaris x86 platform.	“Verify the bnxt Driver (Oracle Solaris x86)” on page 25
Download and install the driver on a Linux platform.	“Download and Install the bnxt_en Driver (Linux)” on page 26 “Verify the bnxt_en Driver (Linux)” on page 27
Download and install the driver on a Windows platform.	“Download and Install the bnxt_en Driver (Windows)” on page 28

Related Information

- [“Understanding the Installation Process” on page 11](#)
- [“Updating Software and Firmware” on page 23](#)
- [“Installing the Adapter” on page 31](#)
- [“Configuring Driver Parameters” on page 53](#)
- [“Troubleshooting the Adapter \(Oracle Solaris x86\)” on page 77](#)

▼ Verify the bnxt Driver (Oracle Solaris x86)

The bnxt software package comes bundled in the Oracle Solaris software. The bnxt driver does not support SRIOV.

Note - The Oracle Solaris 11.3 SRU23 OS is the first release to support this adapter. You can install or upgrade to this release, but the version of the driver must be the same on both the client and the server.

1. **Check the version of the Oracle Solaris SRU.**

You must have at least Oracle Solaris 11.3 SRU23 installed. For example:

```
$ pkg info entire
Name: entire
  Summary: entire incorporation including Support Repository Update
           (Oracle Solaris 11.3.22.4.0).
  ...
  <output omitted>
  ...
Version: 0.5.22 (Oracle Solaris 11.3.22.4.0)
```

See [“Hardware and Software Requirements” on page 21](#) for more information.

2. Check the version of the bnxt driver.

```
# pkg info bnxt
```

3. Manually load the driver.

```
# modload /kernel/drv/arch/bnxt
```

Note - If the bnxt driver is not listed, the driver might not be loaded. You can use the modload command to load the driver.

If the bnxt driver is not installed, install it. Determine the device ID for the device using the scanpci command or equivalent. For more information, refer to the Oracle Solaris [scanpci\(1\)](#) man page.

```
# add_drv -i ""pciex14e4,16d7" "pciex14e4,16ca" bnxt
```

4. If you removed the driver and would like to reinstall the driver, install Oracle Solaris 11.3 SRU23.

Related Information

- [“Verify the bnxt Driver \(Oracle Solaris x86\)” on page 25](#)
- [“Download and Install the bnxt_en Driver \(Linux\)” on page 26](#)
- [“Download and Install the bnxt_en Driver \(Windows\)” on page 28](#)

▼ Download and Install the bnxt_en Driver (Linux)

If your server uses the Oracle Linux OS, you must download the bnxt_en device driver to install it. The bnxt_en driver is supported on Oracle Linux 6.8, 6.9, and 7.3.

1. **Log in to your server.**
2. **In a browser, log in to My Oracle Support.**
Go to <https://myoraclesupport.com>.
3. **Search for the Oracle Dual Port 25 Gb Ethernet Adapter.**
4. **Open the readme.txt file and follow the download and installation instructions.**
5. **Review and accept the software license agreement.**
6. **Verify that the bnxt_en driver has been installed.**

```
# lsmod | grep bnxt_en
```

The output should be similar to this:

```
bnxt_en      118052  0
```

Related Information

- [“Verify the bnxt_en Driver \(Linux\)” on page 27](#)
- [“Download and Install the bnxt_en Driver \(Windows\)” on page 28](#)

▼ Verify the bnxt_en Driver (Linux)

1. **Check the version of the bnxt_en driver.**

```
# modinfo bnxt_en
filename:      /lib/modules/4.1.12-94.el7uek.x86_64/updates/bnxt_en.ko
version:       1.7.30
description:   Broadcom BCM573xx network driver
license:       GPL
srcversion:    7EEACBE0D0FBD47E43A386D
alias:         pci:v000014E4d000016E5sv*sd*bc*sc*i*
alias:         pci:v000014E4d000016E1sv*sd*bc*sc*i*
<..output omitted..>
alias:         pci:v000014E4d000016C8sv*sd*bc*sc*i*
alias:         pci:v000014E4d000016C0sv*sd*bc*sc*i*
depends:        vxlan
vermagic:     4.1.12-94.el7uek.x86_64 SMP mod_unload modversions
```

If the bnxt_en driver is not listed, the driver might not be loaded.

2. **If the bnxt_en driver is not loaded, load it.**

```
# modprobe bnxt_en
```

3. **View additional information about the driver.**

For example:

```
# ethtool -i ens2f0
driver: bnxt_en
version: 1.7.30
firmware-version: 20.6.133/1.7.8 pkg 20.06.04.01
expansion-rom-version:
bus-info: 0000:c0:00.0
supports-statistics: yes
supports-test: yes
supports-eprom-access: yes
supports-register-dump: no
supports-priv-flags: no
```

Related Information

- [“Download and Install the bnxt_en Driver \(Windows\)” on page 28](#)
- [“Download and Install the bnxt_en Driver \(Linux\)” on page 26](#)
- [“Installing the Adapter” on page 31](#)

▼ **Download and Install the bnxt_en Driver (Windows)**

If the server uses Windows10, Windows8, Windows7, or Windows Vista XP, perform this procedure to download and install the device driver.

1. **Log in to the server as the administrator.**
2. **Open the Microsoft Device Manager and locate the ORACLE_SSM flash drive.**
The ORACLE_SSM flash drive contains the bnxt_en driver.
3. **Right-click the bnxt_en network driver and choose Update Driver.**
4. **Choose the Broadcom NIC driver for your OS.**
5. **Reboot the server.**
6. **Verify that the driver is installed.**

See [“Verify the Adapter Installation \(Windows\)”](#) on page 38.

Related Information

- [“Download and Install the bnxt_en Driver \(Linux\)”](#) on page 26
- [“Installing the Adapter”](#) on page 31

Installing the Adapter

These topics describe how to install the adapter:

Description	Links
Order additional hardware.	“Adapter Description” on page 32
	“Cable and Transceiver Overview” on page 32
Follow cable cautions.	“Cable Cautions” on page 33
Understand the connectors.	“Front Panel Connectors and LEDs” on page 17
Install the adapter and transceivers.	“Install the Adapter” on page 34
	“Install the SFP28 Transceivers” on page 36
Verify the adapter installation.	“Verify the Adapter Installation (Oracle Solaris x86)” on page 37
	“Verify the Adapter Installation (Linux)” on page 37
	“Verify the Adapter Installation (Windows)” on page 38

Related Information

- [“Understanding the Adapter” on page 15](#)
- [“Confirming Specifications and Requirements” on page 19](#)
- [“Updating Software and Firmware” on page 23](#)
- [“Installing the Driver” on page 25](#)
- [“Configuring the Network” on page 39](#)
- [“Configuring Driver Parameters” on page 53](#)
- [“Troubleshooting the Adapter \(Oracle Solaris x86\)” on page 77](#)

Adapter Description

The Oracle Dual Port 25 Gb Ethernet Adapter comes with the factory default mode of 25Gb, and supports direct attach cables.

25GbE Mode	Part Number
Oracle Dual Port 25 Gb Ethernet Adapter	■ 7118015, factory installed
	■ 7118016, Xoption

If the `bnxt_en` driver is not listed, the driver might not be loaded. Use the `modload` command to load the driver. For instructions, refer to the Oracle Solaris [modload\(1M\)](#) man page.

Connector	Optical/Fibre Cable Support	Direct-Attach Copper Cable Support
Port 1 (A)	25 GbE	2x25 25GbE
Port 2 (B)	25 GbE	

Related Information

- [“Cable Cautions” on page 33](#)
- [“Install the Adapter” on page 34](#)
- [“Verify the Adapter Installation \(Oracle Solaris x86\)” on page 37](#)
- [“Verify the Adapter Installation \(Linux\)” on page 37](#)
- [“Verify the Adapter Installation \(Windows\)” on page 38](#)

Cable and Transceiver Overview

The Oracle Dual 25 Gb Ethernet adapter comes with a factory default port mode of 2x25GbE. This adapter supports two cabling option solutions: copper and optical.

Check the adapter product page for available transceivers and cables at <https://www.oracle.com/networking/index.html>.

- Copper:

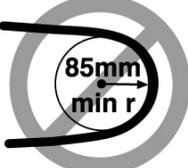
- The copper solution has the SFP28 [transceiver](#) attached.
- A direct-attach SFP28 passive copper cable is available in 1, 2, 3, or 5 meters. The end of the SFP28 direct-attached copper splitter cable connects to the adapter's SFP28 port. The two pigtailed connectors connect to the SFP28 ports 1 and 2 on the adapter.

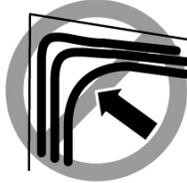
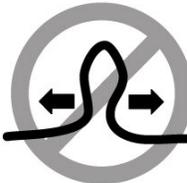
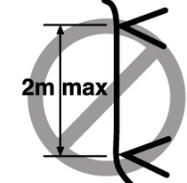
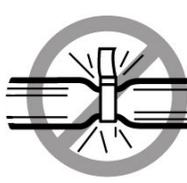
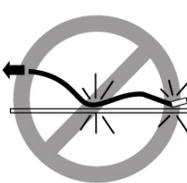
Note - When using SFP28 to SFP28 cables to connect the adapter to a 25 GbE switch, ensure that the SFP28 ports on the switch are configured in the 25GbE mode.

- Optical:
 - A SFP28 SR transceiver connects to the adapter's SFP28 port and the SFP28 optical cable, which is available in 5, 10, 20, 50, or 100 meters. One end of the SFP28 optical cable connects to the SFP28 transceiver on the adapter, while the other end connects to a SFP28 transceiver in a switch or other device that is configured for 25 GbE speed.
 - An SFP28 SR transceiver connects to the adapter's top SFP28 port. The SFP28 end of the splitter cable connects to the SFP28 transceiver on the adapter, while the two pigtailed connectors connect to two different 25 GbE SFP28 transceivers on the switch or other device.

Cable Cautions

To prevent data cable damage, you must follow these cautions.

	<p>Do not uncoil the cable, as a kink might occur. Hold the coil closed as you unroll the cable, pausing to allow the cable to relax as it is unrolled.</p>		<p>Do not step on the cable or connectors. Plan cable paths away from foot traffic or rolling loads.</p>
	<p>Do not pull the cable out of the shipping box, through any opening, or around any corners. Unroll the cable as you lay it down and move it through turns.</p>		<p>Do not bend the cables to a radius tighter than 85 mm (3.4 inches). Ensure that cable turns are as wide as possible.</p>

	<p>Do not twist the cable to open a kink. If it is not severe, open the kink by unlooping the cable.</p>		<p>Do not pack the cable to fit a tight space. Use an alternative cable route.</p>
	<p>Do not straighten the cable to correct a bend that is too tight. Leave the cable bend as is.</p>		<p>Do not hang the cable for a length more than 2 meters (7 feet). Minimize the hanging weight with intermediate retention points.</p>
	<p>Do not drop the cable or connectors from any height. Gently set the cable down, resting the cable connectors on a stable surface.</p>		<p>Do not cinch the cable with hard fasteners or cable ties. Use soft hook-and-loop fastener for bundling and securing cables.</p>
	<p>Do not drag the cable or its connectors over any surface. Carry the entire cable to and from the points of connection.</p>		<p>Do not force the cable connector into the receptacle by pushing on the cable. Apply connection or disconnection forces at the connector only.</p>

Related Information

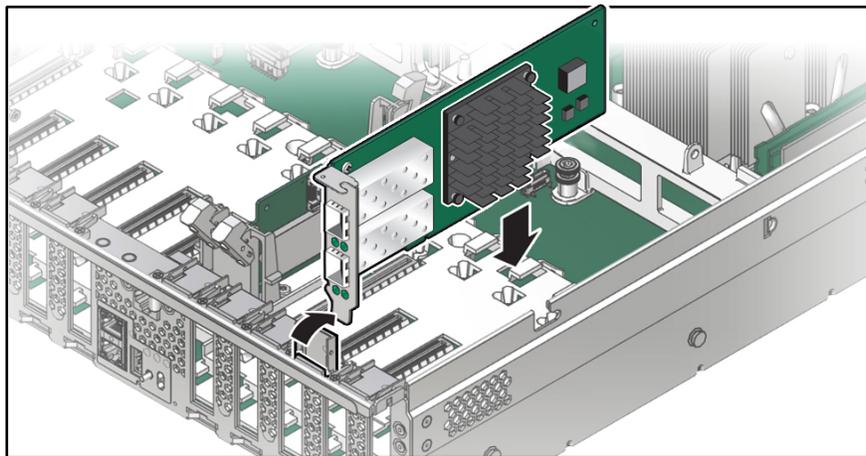
- [“Adapter Description” on page 32](#)
- [“Install the Adapter” on page 34](#)

▼ Install the Adapter

These instructions describe the basic tasks required to install the adapter. Refer to the server's installation or service manual for specific [PCIe](#) installation instructions.

1. **Halt and power off the server.**

2. **Power off all of the peripherals connected to the server.**
3. **Open the server chassis.**
4. **Attach an antistatic wrist strap to the server chassis.**
5. **Remove the slot cover from the chassis.**
6. **Holding the adapter by the edges, align the card edge connector with the PCIe slot.**



7. **Slide the adapter face plate into the small slot at the end of the PCIe opening.**
8. **Applying even pressure at both corners of the adapter, push the adapter until it is firmly seated in the slot.**



Caution - Do not use excessive force when installing the adapter into the PCIe slot. You might damage the adapter's PCIe connector. If the adapter does not seat properly when you apply even pressure, remove the adapter, and carefully reinstall it.

9. **Detach the wrist strap and close the server.**
10. **Verify the installation.**

Follow the instructions in the appropriate section:

- [“Verify the Adapter Installation \(Oracle Solaris x86\)” on page 37](#)
- [“Verify the Adapter Installation \(Linux\)” on page 37](#)
- [“Verify the Adapter Installation \(Windows\)” on page 38](#)

Related Information

- [“Adapter Description” on page 32](#)
- [“Cable Cautions” on page 33](#)
- [“Install the SFP28 Transceivers” on page 36](#)

▼ Install the SFP28 Transceivers

When using the adapter in the 2x25 GbE mode, there are two cabling options. See [“Cable and Transceiver Overview” on page 32](#). The optical transceivers are available from Oracle. For the latest information on available transceivers and cables, refer to Oracle's [Product Page](#).

Note - There are two QSFP connector ports, port 1 (A) and port 1 (B).

1. **Holding the optical transceiver by the edges, align the transceiver with the slot in the adapter and slide the transceiver into the opening.**
2. **Applying even pressure at both corners of the transceiver, push the transceiver until it is firmly seated in the slot.**
3. **Repeat [Step 1](#) and [Step 2](#) to install the second optical transceiver.**
4. **Power on the server.**
5. **Verify the adapter installation.**

Follow the instructions in the appropriate section:

- [“Verify the Adapter Installation \(Oracle Solaris x86\)” on page 37](#)
- [“Verify the Adapter Installation \(Linux\)” on page 37](#)
- [“Verify the Adapter Installation \(Windows\)” on page 38](#)

Related Information

- [“Cable and Transceiver Overview” on page 32](#)
- [“Adapter Description” on page 32](#)

- [“Install the Adapter” on page 34](#)

▼ Verify the Adapter Installation (Oracle Solaris x86)

1. **Power on the server, and then boot the server.**

2. **Check the version of the Oracle Solaris SRU.**

You must have at least Oracle Solaris 11.3 SRU23 installed. For example:

```
$ pkg info entire
Name: entire
  Summary: entire incorporation including Support Repository Update
          (Oracle Solaris 11.3.23.1.0).
  ...
  <output omitted>
  ...
Version: 0.5.23 (Oracle Solaris 11.3.23.1.0)
```

See [“Hardware and Software Requirements” on page 21](#) for more information.

3. **Verify that the adapter is properly installed and recognized by the OS.**

```
# grep bnxt /etc/path_to_inst
```

If the adapter is properly installed, you should see output similar to this:

```
grep bnxt /etc/path_to_inst
"/pci@2,0/pci8086,2f08@3/pci108e,3044@0" 0 "bnxt"
"/pci@2,0/pci8086,2f08@3/pci108e,3044@0,1" 1 "bnxt"
```

Related Information

- [“Adapter Description” on page 32](#)
- [“Install the Adapter” on page 34](#)
- [“Verify the Adapter Installation \(Linux\)” on page 37](#)
- [“Verify the Adapter Installation \(Windows\)” on page 38](#)

▼ Verify the Adapter Installation (Linux)

- **Verify the new network interface instances for the adapter.**

```
[root@nsn169-178 Linux]# ifconfig -a | grep 00:0a
```

```
ether 00:0a:f7:97:b1:4e txqueuelen 1000 (Ethernet)
ether 00:0a:f7:97:b1:4f txqueuelen 1000 (Ethernet)
```

Related Information

- [“Adapter Description” on page 32](#)
- [“Install the Adapter” on page 34](#)
- [“Verify the Adapter Installation \(Oracle Solaris x86\)” on page 37](#)
- [“Verify the Adapter Installation \(Windows\)” on page 38](#)

▼ Verify the Adapter Installation (Windows)

1. **Click Control Panel.**

2. **Click Network Connection.**

If the driver is installed correctly, the adapter name *Oracle Dual Port 25 Gb Ethernet Adapter* is displayed in the Network Adapters folder.

3. **In the Administration tool, click Computer Management → Device Manager → Network Adapter.**

4. **Check the driver version.**

For example, the driver version for Microsoft Windows 12/16 is v20.6.123.0.

Related Information

- [“Install the Adapter” on page 34](#)
- [“Configuring the Network” on page 39](#)

Configuring the Network

These topics describe how to configure the network for the adapter:

Description	Links
Configure the network interface.	“Configure the Network Interface (Oracle Solaris x86)” on page 40
Boot over the network.	“Configure the Network Interface (Windows)” on page 40
	“Boot Options” on page 41
	“Boot Over the Network (PXE)” on page 41
Install and Verify RDMA on Converged Ethernet.	“Boot Over a 10GbE Network (Oracle Solaris x86 and Linux)” on page 42
	“Install RoCE (Linux)” on page 48
	“Install RoCE in Windows Kernel Mode” on page 49
	“Install RoCE in Windows User Mode” on page 50
	“Install RoCE in VMware ESXi” on page 50
	“Verify RoCE in Windows” on page 51

Related Information

- [“Updating Software and Firmware” on page 23](#)
- [“Installing the Driver” on page 25](#)
- [“Installing the Adapter” on page 31](#)
- [“Configuring Driver Parameters” on page 53](#)
- [“Configuring Jumbo Frames” on page 57](#)
- [“Configuring a Link Aggregation \(Oracle Solaris x86\)” on page 61](#)
- [“Configuring VLANs and VXLANs” on page 65](#)
- [“Troubleshooting the Adapter \(Oracle Solaris x86\)” on page 77](#)

▼ Configure the Network Interface (Oracle Solaris x86)

1. Display the `bnxt` instances.

```
# dladm show-phys
```

For more information, refer to the Oracle Solaris [dladm\(1M\)](#) man page.

The output should be similar to this:

LINK	MEDIA	STATE	SPEED	DUPLEX	DEVICE
net9	Ethernet	up	25000	full	bnxt1
net8	Ethernet	up	25000	full	bnxt0

2. Set up the `bnxt` interfaces.

For more information, refer to the Oracle Solaris [ipadm\(1M\)](#) man page. Your `ipadm` command might look similar to this:

```
#ipadm create-ip net4
# ipadm create-addr -T static -a local=10.2.3.4/24 net4/v4
```

This command creates another address `10.2.3.5/24` on interface `net1`, but marks the address down until explicitly marked up:

```
#ipadm create-addr -T static -d -a 10.2.3.5/24 net4/v4
```

This command marks the address object `net4/v4a` up that was previously marked down.

```
#ipadm up-addr net4/v4a
```

Related Information

- [“Configure the Network Interface \(Windows\)” on page 40](#)
- [“Boot Options” on page 41](#)
- [“Installing RoCE” on page 47](#)

▼ Configure the Network Interface (Windows)

Use the Network and Sharing Center to configure the network settings for the `bnxt_en` adapter. These steps are for Microsoft Windows7.

1. Ensure that the adapter is installed.

2. Click **Start > Control Panel > Network and Sharing Center > Change Adapter Settings**.
3. Select **Oracle Dual Port 25Gb Ethernet Adapter** and click **Change Settings of This Connection**.

Related Information

- [“Configure the Network Interface \(Oracle Solaris x86\)” on page 40](#)
- [“Boot Options” on page 41](#)
- [“Installing RoCE” on page 47](#)

Boot Options

The adapter supports these boot options:

- [UEFI with PXE](#) with option ROM (Oracle x86)
- [UEFI with iSCSI](#) with option ROM (Oracle x86)

Related Information

- [“Boot Over the Network \(PXE\)” on page 41](#)
- [“Boot Over a 10GbE Network \(Oracle Solaris x86 and Linux\)” on page 42](#)

▼ **Boot Over the Network (PXE)**

PXE network boot is an environment for booting computers using a network interface independently of available data storage devices (such as hard disks) or installed OS. No boot media is required on the client system. With PXE, you can install an OS on an x86-based client over the network by using [DHCP](#).

- **Boot over the network using PXE.**

Refer to the booting with PXE instructions in the [“Booting a System From the Network” in *Booting and Shutting Down Oracle Solaris 11.3 Systems*](#).

Related Information

- [“Boot Over a 10GbE Network \(Oracle Solaris x86 and Linux\)” on page 42](#)
- [“Installing RoCE” on page 47](#)

▼ **Boot Over a 10GbE Network (Oracle Solaris x86 and Linux)**

1. **Obtain the [MAC](#) address of the first adapter port by checking the label of the adapter.**

On the adapter, the MAC address on the label is for the first port. The second port's MAC address is the MAC address from the label, plus 1.

Note -Auto negotiation is not supported when booting with Linux over the network.

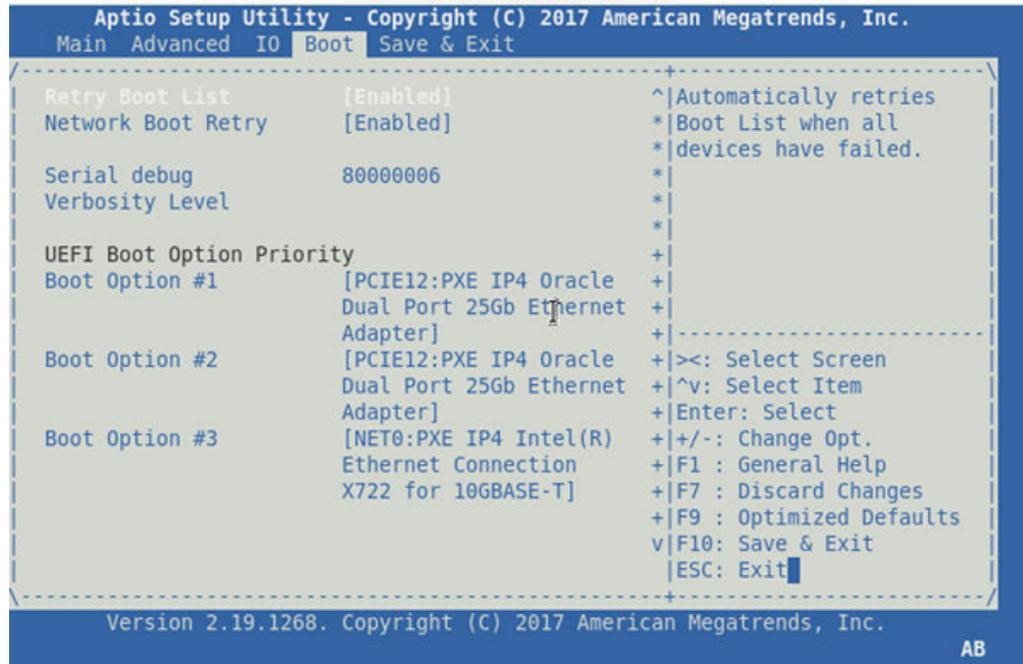
2. **Set up the PXE boot server with the MAC addresses.**
3. **Plug the Ethernet cable into the adapter's port.**
4. **Power on the server.**
5. **Press the F2 key or the Control-E keys to go to the BIOS menu.**
6. **Go to the Boot - Boot Device Priority screen and ensure that the boot order of the network devices is higher than the hard drive.**
7. **Press F10 to save the boot configuration changes and exit BIOS.**

The server should reboot after saving the boot configuration.

8. **On Oracle platforms, press F12 to install the OS from the network.**

If the cable is connected to the correct port, you should see the MAC address that you assigned to your PXE server displayed by BIOS. If your platform does not support the F12 key, you might need to boot from the BIOS.

9. Choose a boot option.



10. Press F10 to save and exit.

The host will perform a PXE boot from the Oracle Dual Port 25 Gb Ethernet adapter port, DHCP, and the UEFI PXE boot server response. This screen appears.

```
>>Checking Media Presence.....
>>Media Present.....
  Downloading NBP file...

  Succeed to download NBP file.
iPXE initialising devices...ok

iPXE 1.0.0+ -- Open Source Network Boot Firmware -- http://ipxe.org
Features: HTTP DNS TFTP EFI Menu

net0: 00:0a:f7:b6:c8:c0 using <NULL> on EFI SNP (open)
  [Link:up, TX:0 TXE:0 RX:0 RXE:0]
DHCP (net0 00:0a:f7:b6:c8:c0)..... ok
net0: 10.129.231.87/255.255.255.0 gw 10.129.231.1
Next server: 10.134.204.29
Filename: http://10.134.204.29/menu.php
http://10.134.204.29/menu.php..... ok
```

11. Choose the UEFI PXE boot server using TFTP protocol.

```

Select an OS install server
QA Automation
Vanquish grub2.efi tftp
Vanquish grub2.efi http
Vanquish grub.efi
Solerator
Windows - read http://installerator/windows.php
VMware vSphere 6.0
VMware vSphere 6.0 (115.2K serial auto)
VMware vSphere 6.5 (TEST 115.2K serial auto)
VMware vSphere 6.5U1 (BETA VGA manual)
HMP (for Casey)
OVM 3.4 TEST
OVM 3.4.2 (UEFI)
t
u
v
Advanced options

```

12. Select Oracle Linux OS from the UEFI PXE boot server for the OS installation.

```

GNU GRUB version 2.02~beta3
-----
| devel 4.12 Not ready yet serial
| devel 4.11 serial
| devel 4.1 serial
| *ol 7.3 serial
| ol 6.9 serial
| ol 6.8 serial
| ol 7.2 serial
| ol 6.7 serial
| ol 7.1 serial
| ol 6.6 serial
| ol 7.0 serial
| rhel 7.1 serial
|-----v
Use the ^ and v keys to select which entry is highlighted.
Press enter to boot the selected OS, `e' to edit the commands
before booting or `c' for a command-line. ESC to return previous
menu.

```

13. Ensure that the OS installation begins on the Oracle Dual Port 25 Gb Ethernet adapter.

```
Starting installer, one moment...
anaconda 21.48.22.93-1 for Oracle Linux 7.3 started.
* installation log files are stored in /tmp during the installation
* shell is available on TTY2
* when reporting a bug add logs from /tmp as separate text/plain attachments
08:26:56 Not asking for VNC because of an automated install
08:26:56 Not asking for VNC because text mode was explicitly asked for in kickstart

[anaconda] 1:main* 2:shell 3:log 4:storage-lo> Switch tab: Alt+Tab | Help: F1
```

14. Ensure that the OS installer completes and begins the post-installation steps.

```
Installing iwl5000-firmware (508/528)
Installing iwl3945-firmware (509/528)
Installing iwl100-firmware (510/528)
Installing ivtv-firmware (511/528)
Installing iwl3160-firmware (512/528)
Installing iwl6000-firmware (513/528)
Installing iwl7260-firmware (514/528)
Installing iwl6050-firmware (515/528)
Installing iwl7265-firmware (516/528)
Installing iwl2030-firmware (517/528)
Installing iwl1000-firmware (518/528)
Installing iwl5150-firmware (519/528)
Installing man-pages (520/528)
Installing iwl2000-firmware (521/528)
Installing iwl135-firmware (522/528)
Installing iwl4965-firmware (523/528)
Installing iwl6000g2a-firmware (524/528)
Installing NetworkManager-config-server (525/528)
Installing iwl6000g2b-firmware (526/528)
Installing iwl105-firmware (527/528)
Installing words (528/528)
Performing post-installation setup tasks
[anaconda] 1:main* 2:shell 3:log 4:storage-lo> Switch tab: Alt+Tab | Help: F1
```

15. After the OS installation completes, use the BIOS to change the boot device priority to boot from hard disk to boot up the newly installed OS.

Unless you change the boot device priority, the OS installation process repeats.

Related Information

- [“Boot Over the Network \(PXE\)” on page 41](#)
- [“Installing RoCE” on page 47](#)

Installing RoCE

The [RDMA](#) software allows computers in a network to exchange data in main memory without involving the processor, cache, or OS of either computer. RDMA can improve throughput and performance because it frees up resources, and it can also facilitate a faster data transfer rate.

RDMA over Converged Ethernet (RoCE) is the network protocol that allows RDMA over an Ethernet network.

RoCE functionality is available in user mode and kernel mode application for Windows. RoCE PF and SRIOV VF are available in single function mode and in multifunction mode (NIC Partitioning mode). You can install and configure RoCE in Windows, Linux, and VMWare.

Refer to these sites for more information on supporting RoCE:

- Windows – [https://technet.microsoft.com/en-us/library/jj134210\(v=ws.11\).aspx](https://technet.microsoft.com/en-us/library/jj134210(v=ws.11).aspx)
- OEL Linux – http://www.mellanox.com/page/products_dyn?product_family=79
- VMWare – <https://docs.vmware.com/en/VMware-vSphere/6.5/com.vmware.vsphere.networking.doc/GUID-4A5EBD44-FB1E-4A83-BB47-BBC65181E1C2.html>

▼ Install RoCE (Linux)

Before You Begin Locate these files before you install and configure RoCE in Oracle Linux:

- The `bnxt_en-roce` file – RoCE-supported `bnxt_en` driver, which is part of released gzip compressed tar archive.
- The `bnxt_re` file – RoCE driver.
- The `libbnxtre` file – User mode RoCE library module.

The `bnxt_re` driver requires a special RoCE-enabled version of `bnxt_en`, which is included in the `netxtremebnxt_en-1.7.9.tar.gz` (or newer) package. The `bnxt_re` driver compilation depends whether IB stack is available along with the OS distribution or if an external OFED is required.

1. Upgrade the NIC NVRAM.

Use the RoCE supported firmware packages starting with Software Release 20.06.04.01.2.

2. Uncompress, build, and install the BCM5741X Linux L2 and RoCE drivers.

a. In a terminal window, uncompress the drivers.

```
# tar -xzf netxtreme-bnxt_en-1.7.9.tar.gz
```

b. Change to the directory where driver files are stored.

```
# cd netxtreme-bnxt_en-bnxt_re
```

c. Build and install the drivers.

```
# make build && make install
```

3. Uncompress, build, and install the NetXtreme-E Linux RoCE User Library.

a. Uncompress the RoCE User Library file.

```
# tar xzf libbnxtre-0.0.18.tar.gz
```

b. Change to the directory where RoCE files are stored.

```
# cd libbnxtre-0.0.18
```

c. Build and install the RoCE User Library.

```
# configure && make && make install.
```

d. Copy the driver file to the working directory.

```
# cp bnxtre.driver /etc/libibverbs.d/
```

e. Display the output.

```
# echo "/usr/local/lib" >> /etc/ld.so.conf
```

f. Create the necessary links and cache to the shared libraries you specified.

```
# ldconfig -v
```

Refer to the `bnxt_re README.txt` file for more details on configurable options and recommendations.

▼ Install RoCE in Windows Kernel Mode

RoCE functionality is available in user mode and kernel mode application. Starting with the Windows Server 2012 release, the RDMA capability in the NIC for SMB file traffic is enabled if both ends are enabled for RDMA. Broadcom NDIS miniport `bnxtnd.sys` starting with version 20.6.2 supports RoCEv1 and RoCEv2 with the NDKPI interface. The default setting is RoCEv1.

1. **Upgrade the NIC NVRAM using the appropriate board packages. In CCM or in UEFI HII, enable support for RDMA.**

2. Enable each miniport.

You can go to the adapter's Advanced Properties page and set Network Direct Functionality to Enabled for each BCM5741X miniport.

You can also run this command in the PowerShell window:

```
Set-NetAdapterAdvancedProperty -RegistryKeyword *NetworkDirect -RegistryValue 1
```

3. Verify that RDMA is enabled.

These PowerShell commands return `true` if Network Direct is enabled.

- a. `Get-NetOffLoadGlobalSetting`
- b. `Get-NetAdapterRDMA`

▼ Install RoCE in Windows User Mode

RoCE functionality is available in user mode and kernel mode application. Perform this procedure before you run a user mode application that writes to NDSPI.

1. **Copy the `bxndspi.dll` user mode driver file to the `C:\Windows\System32` directory.**
2. **Install the driver.**

```
rundll32.exe .\bxndspi.dll,Config install|more
```

▼ Install RoCE in VMware ESXi

Before You Begin You must have at least ESXi-6.5.0 GA build 4564106 installed before you perform this procedure.

You must also have at least ESX6.5 L2 driver version 20.6.9.0 (RoCE supported L2 driver) installed.

1. **Ensure that the BNXTNET L2 driver is installed with the `disable_roce=0` module parameter.**

If the driver is not already installed with the parameter, set the module parameter:

```
# esxcfg-module -s "disable_roce=0" bnxtnet
```

2. **Copy the `bnxtroce-driver version.vib` file in the `/var/log/vmware` directory.**

```
$ esxcli software vib install --no-sig-check -v bnxtroce-driver version.vib
```

3. **Reboot the machine.**
4. **Verify that the drivers are installed correctly.**

```
# esxcli software vib list | grep bnxtroce
```

Tip - By default, ECN is disabled for RoCE traffic. To disable RoCE traffic, use the `tos_ecn=0` module parameter for `bnxtroce`.

Verifying RoCE

▼ Verify RoCE in Windows

1. **Create a file share on the remote system and open that share.**

Open that share with Windows Explorer or the `net use` command. To avoid a speed bottleneck when the hard disk is reading or writing, use a RAM disk as the network share.

2. **Run these commands from the PowerShell.**

```
Get-SmbMultichannelConnection | fl *RDMA*
ClientRdmaCapable : True
ServerRdmaCapable : True
```

If both Client and Server are True, any file transfers over this SMB connection use SMB.

3. **Enable or disable SMB Multichannel support.**

On the Server side:

```
Enable: Set-SmbServerConfiguration -EnableMultiChannel $true
Disable: Set-SmbServerConfiguration -EnableMultiChannel $false
```

On the Client side:

```
Enable: Set-SmbClientConfiguration -EnableMultiChannel $true
Disable: Set-SmbClientConfiguration -EnableMultiChannel $false
```

Note - By default, the driver sets up two RDMA connections for each network share per IP address (on a unique subnet). You can increase the number of RDMA connections by adding multiple IP addresses, each with different a subnet, for the same physical port under test. Multiple network shares can be created and mapped to each link partner using the unique IP addresses that you created.

Configuring Driver Parameters

The `bnxt` and `bnxt_en` device drivers control the adapter's interfaces. You can manually set the device driver parameters to customize each device in the server.

These topics describe how to configure driver parameters:

Description	Links
Configure driver parameters in the Oracle Solaris x86 OS.	“Set Driver Parameters (Oracle Solaris x86)” on page 53 “Driver Parameters (Oracle Solaris x86)” on page 55
Configure driver parameters in Linux.	“Set Driver Parameters (Linux)” on page 55 “Driver Parameters (Linux)” on page 56

Related Information

- [“Understanding the Installation Process” on page 11](#)
- [“Understanding the Adapter” on page 15](#)
- [“Updating Software and Firmware” on page 23](#)
- [“Installing the Driver” on page 25](#)
- [“Installing the Adapter” on page 31](#)
- [“Configuring the Network” on page 39](#)
- [“Troubleshooting the Adapter \(Oracle Solaris x86\)” on page 77](#)

▼ Set Driver Parameters (Oracle Solaris x86)

1. **Locate the path names and the associated instance numbers in the `/etc/path_to_inst` file.**

For example, on an Oracle Solaris x86 server, you should see output similar to this:

```
# grep bnxt /etc/path_to_inst
"/pci@0,0/pci8086,3c0a@3,2/pci108e,7b15@0" 0 "bnxt"
"/pci@0,0/pci8086,3c0a@3,2/pci108e,7b15@0,1" 1 "bnxt"
```

In these preceding examples:

- The first part within the double quotes specifies the hardware node name in the device tree.
- The number not enclosed in quotes is the instance number (shown in bold for emphasis).
- The last part in double quotes is the driver name.

Note - To unambiguously identify a PCIe device in the `bnxt.conf` file, use the name, parent name, and unit address for the device. In the example, the name is `pci108e,7b15`, the parent is `/pci@0,0/pci8086,3c0a@3,2`, and the unit address is `0`. Refer to the Oracle Solaris [pci\(4\)](#) man page for more information about the PCIe device specification.

2. Set the parameters for the `bnxt.conf` devices in one of these ways:

a. Copy the `bnxt.conf` file to the `/kernel/drv/` and edit the copied file.

Save the `bnxt.conf` file and reboot the system. See “[Driver Parameters \(Oracle Solaris x86\)](#)” on page 55.

```
"/pci@2,0/pci8086,2f08@3/pci108e,3044@0" 0 "bnxt"
"/pci@2,0/pci8086,2f08@3/pci108e,3044@0,1" 1 "bnxt"
```

b. Set the properties.

```
# dladm show-linkprop -p flowctrl net5
LINK      PROPERTY  PERM VALUE      EFFECTIVE  DEFAULT  POSSIBLE
net5      flowctrl  rw  no             no        no       no,tx,rx,bi,
                                     pfc,auto
```

```
flow_control = 3;
```

For bidirectional flow control:

```
# dladm set-linkprop -p flowctrl=bi net5
```

For more information, refer to the Oracle Solaris [dladm\(5\)](#) man page.

Related Information

- “[Driver Parameters \(Oracle Solaris x86\)](#)” on page 55
- “[Set Driver Parameters \(Linux\)](#)” on page 55

Driver Parameters (Oracle Solaris x86)

You can configure these parameters on each bnxt interface.

Type	Keyword	Description
Jumbo frames	<code>default_mtu=mtu</code>	Size of the default MTU (payload without the Ethernet header). Allowed values: 1500 to 9500 (default = 1500)
Flow control	<code>flow_control</code>	Ethernet flow control. Allowed values: 0 - Disable (default in Oracle Solaris 11) 1 - Receive only 2 - Transmit only 3 - Receive and transmit
Transmit queue size	<code>tx_ring_size</code>	Number of the transmit descriptors per transmit queue. The actual value is rounded up to the next multiple of 8. Allowed values: 64 to 4096 (default = 1024)
Receive queue size	<code>rx_ring_size</code>	Number of the transmit descriptors per receive queue. The actual value is rounded up to the next multiple of 8. Allowed values: 64 to 4096 (default = 1024)

Related Information

- [“Set Driver Parameters \(Oracle Solaris x86\)” on page 53](#)
- [“Set Driver Parameters \(Linux\)” on page 55](#)

▼ Set Driver Parameters (Linux)

- **Use the `ethtool` utility or the `configtool` utility to set parameters on a Linux platform.**
See [“Driver Parameters \(Linux\)” on page 56](#).

Related Information

- [“Driver Parameters \(Linux\)” on page 56](#)

- [“Set Driver Parameters \(Oracle Solaris x86\)” on page 53](#)

Driver Parameters (Linux)

This table lists the tunable `bnxt_en` driver parameters for Linux OS and describes their functions.

Keyword	Valid Range	Default Value	Description
FlowControl	0 to 3 (0=none, 1=RX only, 2=TX only, 3=RX and TX)	Read from the EEPROM. If EEPROM is not detected, default is 3.	Controls the automatic generation (TX) and response (RX) to Ethernet PAUSE frames.
RxDescriptors	64 to 4096	512	Number of receive descriptors allocated by the driver. Increasing this value allows the driver to buffer more incoming packets. Each descriptor is 16 bytes. A receive buffer is also allocated for each descriptor and can be either 2048, 4056, 8192, or 16384 bytes, depending on the MTU setting. When the MTU size is 1500 or less, the receive buffer size is 2048 bytes. When the MTU is greater than 1500, the receive buffer size is either 4056, 8192, or 16384 bytes. The maximum MTU size is 16114.
RxIntDelay	0 to 65535 (0=off)	72	Delays the generation of receive interrupts in units of 0.8192 microseconds. Receive interrupt reduction can improve CPU efficiency if properly tuned for specific network traffic. Increasing this value adds extra latency to frame reception and can end up decreasing the throughput of TCP traffic. If the system is reporting dropped receives, this value might be set too high, causing the driver to run out of available receive descriptors.
TxDescriptors	80 to 4096	256	Number of transmit descriptors allocated by the driver. Increasing this value allows the driver to queue more transmits. Each descriptor is 16 bytes.
XsumRX	0 to 1	1	A value of 1 indicates that the driver should enable IP checksum offload for received packets (both UDP and TCP) to the Ethernet adapter hardware.

Related Information

- [“Set Driver Parameters \(Linux\)” on page 55](#)
- [“Set Driver Parameters \(Oracle Solaris x86\)” on page 53](#)
- [“Configuring Jumbo Frames” on page 57](#)

Configuring Jumbo Frames

Jumbo frames can support up to 9500 MTU. The default value is 1500 MTU.

These topics describe how to configure jumbo frames:

- [“Change the MTU Permanently \(Oracle Solaris x86\)” on page 57](#)
- [“Change the MTU Temporarily \(Oracle Solaris x86\)” on page 58](#)
- [“Configure Jumbo Frames \(Linux\)” on page 58](#)
- [“Configure Jumbo Frames \(Windows\)” on page 59](#)

Related Information

- [“Understanding the Installation Process” on page 11](#)
- [“Installing the Driver” on page 25](#)
- [“Installing the Adapter” on page 31](#)
- [“Configuring the Network” on page 39](#)
- [“Configuring a Link Aggregation \(Oracle Solaris x86\)” on page 61](#)
- [“Configuring VLANs and VXLANs” on page 65](#)
- [“Troubleshooting the Adapter \(Oracle Solaris x86\)” on page 77](#)

▼ Change the MTU Permanently (Oracle Solaris x86)

- **Perform one of these actions to permanently change the MTU.**
 - Add this line in the `/etc/driver/drv/bnxt.conf` file and reboot the server.

```
default_mtu = desired-frame-size;
```

where the *desired-frame-size* value can range from 1500 to 9500.

Note - Adding this line will make changes to all instances of bnxt. To make changes for specific instances, see [Step 2](#) in “[Set Driver Parameters \(Oracle Solaris x86\)](#)” on page 53.

- Type:

```
# dladm set-linkprop -p mtu=9500 net0
```

Related Information

- “[Change the MTU Temporarily \(Oracle Solaris x86\)](#)” on page 58
- “[Configure Jumbo Frames \(Linux\)](#)” on page 58

▼ Change the MTU Temporarily (Oracle Solaris x86)

- **Change the MTU temporarily with the `dladm(1M)` command.**

For example, where the device name is `xnet0`, this command increases MTUs to the maximum:

```
# dladm set-linkprop [-t] -p mtu=9500 net0
```

The temporary setting lasts only until the next reboot of the server.

Related Information

- “[Change the MTU Permanently \(Oracle Solaris x86\)](#)” on page 57
- “[Configure Jumbo Frames \(Linux\)](#)” on page 58
- “[Configure Jumbo Frames \(Windows\)](#)” on page 59

▼ Configure Jumbo Frames (Linux)

Jumbo frames can support up to 9500 MTU. The default value is 1500 MTU.

- **Set the value for jumbo frames with the `ifconfig(1M)` command.**

For example, where the IP address for `eth7` is `192.1.1.200`, this command increases MTUs to the maximum:

```
# ifconfig eth7 192.1.1.200 mtu 9500 up
```

For more information, refer to the Oracle Solaris [ifconfig\(1M\)](#) man page.

Related Information

- [“Configure Jumbo Frames \(Windows\)” on page 59](#)
- [“Configuring VLANs and VXLANs” on page 65](#)

▼ **Configure Jumbo Frames (Windows)**

1. **Click Control Panel.**
2. **Click Device Manager and open the Network Adapters folder.**
3. **Right-click the Oracle Dual 25G Ethernet Adapter and choose Properties.**
4. **Click Configure.**
5. **Highlight the jumbo frames item and select the desired setting.**
6. **Click Apply for each port.**

Related Information

- [“Configure Jumbo Frames \(Linux\)” on page 58](#)
- [“Configuring VLANs and VXLANs” on page 65](#)

Configuring a Link Aggregation (Oracle Solaris x86)

These topics describe how to configure [link aggregation](#) using the Oracle Solaris x86 OS:

- [“Configure a Link Aggregation \(Oracle Solaris x86\)”](#) on page 61
- [“Display Information About a Link Aggregation \(Oracle Solaris x86\)”](#) on page 62
- [“Delete a Link Aggregation \(Oracle Solaris x86\)”](#) on page 63

Related Information

- [“Understanding the Installation Process”](#) on page 11
- [“Understanding the Adapter”](#) on page 15
- [“Confirming Specifications and Requirements”](#) on page 19
- [“Updating Software and Firmware”](#) on page 23
- [“Installing the Driver”](#) on page 25
- [“Installing the Adapter”](#) on page 31
- [“Configuring the Network”](#) on page 39
- [“Configuring Driver Parameters”](#) on page 53
- [“Configuring Jumbo Frames”](#) on page 57
- [“Configuring VLANs and VXLANs”](#) on page 65
- [“Removing the Driver”](#) on page 71
- [“Troubleshooting the Adapter \(Oracle Solaris x86\)”](#) on page 77

▼ **Configure a Link Aggregation (Oracle Solaris x86)**

The example in this procedure aggregates sample interfaces `bnxt0`, `bnxt1`, `bnxt2`, and `bnxt3`. Arbitrary key numbers (1 and 2) are used for each aggregation.

Note - These commands change the contents of the `/etc/aggregation.conf` file.

- **Configure the link aggregation containing the `bnxt` interfaces in the default mode.**

For example:

```
# dladm create-aggr -l net5 -l net6 aggr1
# dladm show-aggr
# ipadm create-ip aggr1
# ipadm create-addr -a 192.1.1.14/24 aggr1
```

For more information on link aggregation, refer to “Creating a Link Aggregation” in *Managing Network Datalinks in Oracle Solaris 11.3*.

Related Information

- “Display Information About a Link Aggregation (Oracle Solaris x86)” on page 62
- “Delete a Link Aggregation (Oracle Solaris x86)” on page 63

▼ Display Information About a Link Aggregation (Oracle Solaris x86)

The `ipadm` and `dladm` commands provide different details about link aggregations, as shown in these examples.

For more information, refer to “Creating a Link Aggregation” in *Managing Network Datalinks in Oracle Solaris 11.3*.

For more information on the commands, refer to the Oracle Solaris `ifconfig(1M)` man page and the `dladm(5)` man page.

- **Use the appropriate command to obtain the desired results.**
 - **Use the `ifconfig` command to examine the details about a link aggregation.**

```
# ifconfig aggr1
aggr1: flags=1000843<UP,BROADCAST,RUNNING,MULTICAST,IPv4> mtu 1500 index 32
  inet 192.2.2.84 netmask ffffffff broadcast 192.2.2.255
  ether 0:15:17:75:ff:81

# ifconfig aggr2aggr2: flags=1000843<UP,BROADCAST,RUNNING,MULTICAST,IPv4> mtu 1500
index 33
  inet 193.2.2.84 netmask ffffffff broadcast 193.2.2.255
  ether 0:15:17:75:ff:83
```

- **Use the `dladm show-aggr` command to show link aggregation status.**

Related Information

- [“Configure a Link Aggregation \(Oracle Solaris x86\)” on page 61](#)
- [“Delete a Link Aggregation \(Oracle Solaris x86\)” on page 63](#)

▼ Delete a Link Aggregation (Oracle Solaris x86)

1. **Delete the IP interface that is configured over the link aggregation.**

For example: type:

```
# ipadm delete-ip ip-aggr1
```

where `ip-aggr1` is the IP interface over the link aggregation.

2. **Delete each unwanted link aggregation.**

For example:

```
# dladm delete-aggr aggr2  
# dladm delete-aggr aggr2
```

Related Information

- [“Display Information About a Link Aggregation \(Oracle Solaris x86\)” on page 62](#)
- [“Configuring VLANs and VXLANs” on page 65](#)

Configuring VLANs and VXLANs

These topics explain how to configure VLANs and VXLANs:

- [“VLANs Overview” on page 65](#)
- [“Configure VLANs \(Oracle Solaris x86\)” on page 66](#)
- [“Configure VLANs \(Linux\)” on page 67](#)
- [“Configure VLANs \(Windows\)” on page 67](#)
- [“Configure VXLANs \(Oracle Solaris x86\)” on page 68](#)

Related Information

- [“Understanding the Installation Process” on page 11](#)
- [“Configuring the Network” on page 39](#)
- [“Configuring Driver Parameters” on page 53](#)
- [“Removing the Driver” on page 71](#)
- [“Troubleshooting the Adapter \(Oracle Solaris x86\)” on page 77](#)

VLANs Overview

Virtual LANs enable you to divide the network into subnetworks without having to add to the physical network environment. The subnetworks are virtual and use the same physical network resources. VLANs facilitate network administrations because the smaller groups are easier to maintain.

You can create VLANs according to various criteria, but each VLAN must be assigned a VLAN tag or VLAN ID (VID). The VID is a 12-bit identifier between 1 and 4094 that identifies a unique VLAN.

Note - If you configure a VLAN virtual device for an Ethernet adapter, all traffic sent or received by that Ethernet adapter must be in VLAN-tagged format.

Related Information

- [“Configure VLANs \(Oracle Solaris x86\)” on page 66](#)
- [“Configure VLANs \(Linux\)” on page 67](#)
- [“Configure VLANs \(Windows\)” on page 67](#)
- [“Configure VXLANs \(Oracle Solaris x86\)” on page 68](#)

▼ Configure VLANs (Oracle Solaris x86)

1. **Determine the types of links that are used in the server.**

```
# dladm show-phys
LINK          MEDIA          STATE    SPEED  DUPLEX  DEVICE
net15         Ethernet       up       10000  full    bnxt1
net14         Ethernet       up       10000  full    bnxt0
```

2. **Create a VLAN link over a datalink.**

```
# dladm create-vlan -l link -v vid vlan-link
```

where *link* specifies the link where the VLAN interface is being created, *vid* indicates the VLAN ID number, and *vlan-link* specifies the name of the VLAN, which can also be an administratively-chosen name.

3. **Verify the VLAN configuration.**

```
# dladm show-vlan
```

4. **Create an IP interface over the VLAN.**

```
# ipadm create-ip interface
```

where *interface* uses the VLAN name.

Related Information

- [“Configure VLANs \(Linux\)” on page 67](#)
- [“Configure VLANs \(Windows\)” on page 67](#)
- [“Configure VXLANs \(Oracle Solaris x86\)” on page 68](#)

▼ Configure VLANs (Linux)

1. **Ensure that the `bnxt_en` module is loaded.**

```
# modprobe bnxt_en
```

2. **Plumb the adapter's interface.**

```
# ifconfig eth6 ipv6addressup
```

where *ipv6address* is the IP address of the interface.

3. **Add the VID.**

For example:

```
# vconfig add eth6 5
```

where *eth6* is the interface, and 5 is the [VID](#).

Note - In Linux systems, you can use any single digit as the VID.

4. **Configure the `bnxt_en` VLAN.**

For example:

```
# ifconfig eth6.5 ipv6addressup
```

where *ipv6address* is the IP address of the interface.

Related Information

- [“Configure VLANs \(Oracle Solaris x86\)” on page 66](#)
- [“Configure VLANs \(Windows\)” on page 67](#)
- [“Configure VXLANs \(Oracle Solaris x86\)” on page 68](#)

▼ Configure VLANs (Windows)

1. **Click Control Panel.**
2. **Click Network Connection.**
3. **Click the folder icon from the sub-manual bar.**

4. **Right-click the Oracle Dual Port 25 Gb Ethernet Adapter port, then select Properties.**
5. **Click Configure.**
6. **Click VLAN, then click New.**
7. **Type VLAN and the *ID* (for example, type VLAN10).**
8. **Click OK.**
9. **Open the Local Connections for VLAN window from the Network Connections window (Control Panel → Network Internet → Network Connections).**
10. **Right-click the Properties button, and select the TCP/IPv4 port in the list.**
11. **Click the Properties button, and fill in the desired IP address.**
12. **Click Subnet Mask.**
The value 255 . 255 . 255 . 0 is displayed.
13. **Click OK.**
14. **Repeat [Step 3](#) through [Step 10](#) until all the network ports are VLAN configured.**

Note - Ensure that the firewall is configured to allow VLAN traffic. Otherwise, the VLAN might not operate properly.

Related Information

- [“Configure VLANs \(Oracle Solaris x86\)” on page 66](#)
- [“Configure VLANs \(Linux\)” on page 67](#)
- [“Configure VXLANs \(Oracle Solaris x86\)” on page 68](#)

▼ **Configure VXLANs (Oracle Solaris x86)**

VXLAN is a Layer 2 technology that enables you to create a Layer 2 network on top of a Layer 3 network, thereby providing further network isolation. VXLAN provides a virtual Layer 2 network that stretches over multiple physical Layer 2 networks. Provisioning resources in a cloud environment is not restricted to a single physical Layer 2 network. Physical servers can be a part of an VXLAN network, as long as they are connected by IPv4 or IPv6 networks.

1. Determine the types of links that are used in the system.

```
# dladm show-phys
LINK          MEDIA          STATE    SPEED  DUPLEX  DEVICE
net15        Ethernet      up       10000  full   bnxt1
net14        Ethernet      up       10000  full   bnxt0
```

2. Create an IP interface over the VXLAN.

```
# dladm create-vxlan -p addr=10.10.10.1,vni=100 vxlan1
# dladm create-vxlan -p addr=10.10.10.1,vni=101 vxlan2
```

3. Verify the VXLAN configuration.

```
# dladm show-vxlan
LINK          ADDR          VNI  MGROUP
vxlan1        10.10.10.1    100  224.0.0.1
vxlan2        10.10.10.1    101  224.0.0.1
```

Related Information

- [“Configure VLANs \(Oracle Solaris x86\)” on page 66](#)
- [“Configure VLANs \(Linux\)” on page 67](#)
- [“Configure VLANs \(Windows\)” on page 67](#)
- [“Removing the Driver” on page 71](#)

Removing the Driver

It is not necessary to remove a driver when its associated device is removed from a server. However, if you want to clean up your file systems or conserve space, you can easily remove a driver.

These topics explain how to remove the `bnxt` and `bnxt_en` device drivers:

Description	Links
Remove the driver on an Oracle Solaris x86 server.	“Remove the <code>bnxt</code> Driver (Oracle Solaris x86)” on page 71
Remove the driver on a Linux server.	“Remove the <code>bnxt_en</code> Driver (Linux)” on page 72
Remove the driver on a Windows server.	“Remove the <code>bnxt_en</code> Driver (Windows)” on page 72

Related Information

- [“Installing the Driver” on page 25](#)
- [“Configuring Driver Parameters” on page 53](#)
- [“Troubleshooting the Adapter \(Oracle Solaris x86\)” on page 77](#)

▼ Remove the `bnxt` Driver (Oracle Solaris x86)

- **Remove the `bnxt` driver.**

For example:

```
# pkg uninstall bnxt
Packages to remove: 1
Create boot environment: Yes
Create backup boot environment: No

PHASE                                ITEMS
Removing old actions                 18/18
```

Updating package state database	Done
Updating package cache	1/1
Updating image state	Done
Creating fast lookup database	Done
Updating package cache	1/1

Refer to the Oracle Solaris [pkg\(1\)](#) man page for more information.

Related Information

- [“Remove the bnxt_en Driver \(Linux\)” on page 72](#)
- [“Remove the bnxt_en Driver \(Windows\)” on page 72](#)

▼ Remove the bnxt_en Driver (Linux)

- **Type:**

```
#rmmod bnxt_en
```

Related Information

- [“Remove the bnxt_en Driver \(Windows\)” on page 72](#)
- [“Remove the bnxt Driver \(Oracle Solaris x86\)” on page 71](#)
- [“Remove the bnxt_en Driver \(Linux\)” on page 72](#)

▼ Remove the bnxt_en Driver (Windows)

1. **Click Control Panel.**
2. **Click Device Manager and open the Network Adapters folder.**
3. **Right-click the Oracle Dual 25G Ethernet Adapter and choose Uninstall.**
4. **Click OK.**

Related Information

- [“Remove the bnxt Driver \(Oracle Solaris x86\)” on page 71](#)
- [“Remove the bnxt_en Driver \(Linux\)” on page 72](#)
- [“Upgrading the Adapter \(Linux\)” on page 73](#)

Upgrading the Adapter (Linux)

These topics explain how to upgrade the firmware on the Oracle Dual Port 25 Gb Ethernet Adapter and verify the upgrade.

The upgrade command compares the package version against the currently installed package version to determine if an upgrade should be performed. The command does not check the versions of the individual components in the NVM against those within the specified package file. Therefore, it is important that package files from the same source with the same versioning scheme or format are used for a specific controller.

These topics describe how to upgrade the adapter:

- [“Install the Upgrade Package” on page 73](#)
- [“Verify the Upgrade” on page 74](#)

▼ Install the Upgrade Package

Use the `bnxtnvm` utility to install the NVM upgrade package file.

1. **Log in to your server.**
2. **Determine the version and description of the package file that is currently installed.**

For example:

```
$ bnxtnvm pkgver filename.pkg -v
Package File: filename.pkg
Package version: 1.0.0
```

3. **Change to the `NVRAM_Images` directory.**
4. **Determine how you want to install the package.**

a. Install a package file.

```
$ bnxtnvm install filename.pkg
```

Replace the *filename* with the package name.

b. Install multiple packages for multiple controller types.

```
$ bnxtnvm install *.pkg
```

This command installs multiple packages for multiple controller types by using a wildcard in the *filename* argument. The correct packages are automatically installed into the supported controller devices based on PCI Device-IDs.

c. Install a package that is newer than the one you have.

```
$ bnxtnvm upgrade *.pkg
```

This command checks the discovered and supported devices.

For more information on the packages, refer to the `readme.txt` file in the `bnxtnvm` directory of the firmware package.

5. Verify the upgrade.

See [“Verify the Upgrade” on page 74](#).

▼ Verify the Upgrade

For more information on the packages, refer to the `readme.txt` file in the `bnxtnvm` directory of the firmware package.

1. Log in to your server.

2. Determine which version of the package is installed.

For example:

```
$ bnxtnvm pkgver
Device: ens2f1d1
Package version: 20.06.04.01
```

To display more details about the device and the currently installed package, use the `-v` option to enable maximum verbosity.

Related Information

- [“Installing the Adapter” on page 31](#)
- [“Troubleshooting the Adapter \(Oracle Solaris x86\)” on page 77](#)

Troubleshooting the Adapter (Oracle Solaris x86)

These topics describe how to troubleshoot the installation and operation of the Oracle Dual Port 25 Gb Ethernet Adapter on an Oracle x86 server running the Oracle Solaris 11.3 OS. These topics cover basic installation issues and are not intended to be comprehensive.

- [“Analyze Why the Device Link Is Missing \(Oracle Solaris x86\)” on page 77](#)
- [“Recover From a Port Hang \(Oracle Solaris x86\)” on page 78](#)
- [“Analyze Slow Network Performance \(Oracle Solaris x86\)” on page 79](#)
- [“Analyze Why the Link Is Not Up After Back-To-Back Cable Connection \(Oracle Solaris x86\)” on page 80](#)
- [“Analyze Why Changing the MTU Does Not Correctly Set the Link Property \(Oracle Solaris x86\)” on page 81](#)

Related Information

- [“Updating Software and Firmware” on page 23](#)
- [“Installing the Driver” on page 25](#)
- [“Installing the Adapter” on page 31](#)
- [“Configuring Driver Parameters” on page 53](#)
- [“Removing the Driver” on page 71](#)

▼ Analyze Why the Device Link Is Missing (Oracle Solaris x86)

When you use the `ifconfig` or `ipadm` commands and you see an error message similar to the one below, perform these steps.

```
...
cannot open bnxt0; link doesn't exist
...
```

1. Check the OS.

To plumb the driver, refer to the Oracle Solaris [ipadm\(1M\)](#) man page. For information on the network interface parameters, refer to the Oracle Solaris [ifconfig\(1M\)](#) man page.

2. Check that the adapter is seated properly in its slot, that the cables are properly attached, and that the LEDs are functioning.

3. Ensure that the device is installed.

Use the `prtconf` or the `scanpci` command to verify that the device is installed. For more information, refer to the Oracle Solaris [prtconf\(1M\)](#) man page or the [scanpci\(1\)](#) man page.

4. If the device exists, check the `/etc/driver_aliases` file to ensure that the file contains a `bnxt` entry that corresponds to the name for the device.

5. If the entry exists, check the `/etc/path_to_inst` file to ensure that the file contains a `bnxt` entry.

Removing a device and reseating it in another slot does not always clean up the device tree. If this occurs, you must remove the device tree and reboot the server. For more information, refer to [Managing Network Virtualization and Network Resources in Oracle Solaris 11.3](#).

Related Information

- [“Recover From a Port Hang \(Oracle Solaris x86\)” on page 78](#)
- [“Analyze Slow Network Performance \(Oracle Solaris x86\)” on page 79](#)
- [“Analyze Why the Link Is Not Up After Back-To-Back Cable Connection \(Oracle Solaris x86\)” on page 80](#)
- [“Analyze Why Changing the MTU Does Not Correctly Set the Link Property \(Oracle Solaris x86\)” on page 81](#)

▼ Recover From a Port Hang (Oracle Solaris x86)

1. Perform one of these actions.

- If the interface encounters a soft hang, replumb the device. For instructions, refer to the Oracle Solaris [ipadm\(1M\)](#) man page.
- If the interface encounters a hard hang, reboot the server.
- If the interface encounters an additional hard hang, capture the trace information by using the `dttrace` command.

For example:

```
# dtrace -F -m 'bnxt{trace(timestamp)}'
>/tmp/dtrace.out
```

For more information, refer to the Oracle Solaris [dtrace\(1M\)](#) man page.

- If the server is panicked, retrieve the crash dump in `/var/crash`.
- If the interface encountered a hard hang or a panic, file a CR at [My Oracle Support](#).
Attach the last page of the `dtrace` command output or the crash dump file to the CR.

2. Check the driver statistics.

```
# kstat bnxt:* :statistics
```

3. Use these parameters for performance tuning in the `bnxt.conf` file.

Parameters	Description
<code>rx_itr</code>	Interval of receive interrupts 0 to 4080, 25 (50 usec) by default.
<code>tx_itr</code>	Interval of transmit interrupts 0 to 4080, 25 (50 usec) by default.
<code>rx_limit_per_intr</code>	Maximum number of packet to receive per interrupt 16 ~ 4096, 1024 by default.
<code>rx_copy_threshold</code>	Packet size to determine bcopy or not during receive 0 ~ 9216, 128 by default.
<code>tx_copy_threshold</code>	Packet size to determine bcopy or not during transmit 0 ~ 9216, 128 by default.

Related Information

- [“Analyze Why the Device Link Is Missing \(Oracle Solaris x86\)” on page 77](#)
- [“Analyze Slow Network Performance \(Oracle Solaris x86\)” on page 79](#)
- [“Analyze Why the Link Is Not Up After Back-To-Back Cable Connection \(Oracle Solaris x86\)” on page 80](#)
- [“Analyze Why Changing the MTU Does Not Correctly Set the Link Property \(Oracle Solaris x86\)” on page 81](#)

▼ Analyze Slow Network Performance (Oracle Solaris x86)

The adapter supports several driver parameters that affect the performance of the ports. See [“Driver Parameters \(Oracle Solaris x86\)” on page 55](#) for more information about the default values.

1. View the network performance.

```
# truss -p PID
```

2. Look for NIS, DNS, and network routing outages.

If you find any issues, fix them before proceeding.

3. View the I/O statistics to ensure that there are no bottlenecks on the disk.

```
# iostat -xcn 5
```

If you discover a bottleneck, set the logging to dump to the /tmp directory. Then retest to ensure that the new configuration improved performance.

4. Use the vmstat and the mpstat commands to check that none of these conditions exist:

- CPU is pegged.
- CPU is receiving too many interrupts.
- Memory is low.
- Page faults are occurring.
- Contention for resources causes too many spins on mutex (smtx).

For more information, refer to the Oracle Solaris [vmstat\(1M\)](#) man page or the [mpstat\(1M\)](#) man page.

If the performance issue points to the driver, profile the call stack for bnxt by using the DTrace script. For more information about the DTrace script, go to [My Oracle Support](#).

Related Information

- [“Analyze Why the Device Link Is Missing \(Oracle Solaris x86\)” on page 77](#)
- [“Recover From a Port Hang \(Oracle Solaris x86\)” on page 78](#)
- [“Analyze Why the Link Is Not Up After Back-To-Back Cable Connection \(Oracle Solaris x86\)” on page 80](#)
- [“Analyze Why Changing the MTU Does Not Correctly Set the Link Property \(Oracle Solaris x86\)” on page 81](#)

▼ Analyze Why the Link Is Not Up After Back-To-Back Cable Connection (Oracle Solaris x86)

1. Ensure that the correct cable type is being used.

See [“Adapter Description” on page 32](#).

2. **Check that the switch ports have been configured to operate in the mode in which the adapter is running.**

Related Information

- [“Analyze Why the Device Link Is Missing \(Oracle Solaris x86\)” on page 77](#)
- [“Recover From a Port Hang \(Oracle Solaris x86\)” on page 78](#)
- [“Analyze Slow Network Performance \(Oracle Solaris x86\)” on page 79](#)
- [“Analyze Why Changing the MTU Does Not Correctly Set the Link Property \(Oracle Solaris x86\)” on page 81](#)

▼ **Analyze Why Changing the MTU Does Not Correctly Set the Link Property (Oracle Solaris x86)**

The `dladm` command might display this message:

```
# dladm: warning: cannot set link property 'mtu' on 'net0': link busy
```

It is possible that some objects defined on the link need to be removed or plumbed down.

- **Remove and retry the command.**

```
# dladm set-linkprop -p mtu=9500 net0
```

For more information, refer to the Oracle Solaris [`dladm\(1M\)`](#) man page.

Related Information

- [“Analyze Why the Device Link Is Missing \(Oracle Solaris x86\)” on page 77](#)
- [“Recover From a Port Hang \(Oracle Solaris x86\)” on page 78](#)
- [“Analyze Slow Network Performance \(Oracle Solaris x86\)” on page 79](#)
- [“Analyze Why the Link Is Not Up After Back-To-Back Cable Connection \(Oracle Solaris x86\)” on page 80](#)

Glossary

A

adapter The Oracle Dual Port 25 Gb Ethernet Adapter.

D

DAC Direct attached cables.

DHCP Dynamic Host Configuration Protocol. Part of the application layer in the Internet protocol suite.

DNS Domain name system. Translates human-readable domain names into numerical identifiers.

E

EEPROM Electronically erasable programmable read-only memory.

EMI Electromagnetic interference. The interference caused by the magnetic fields of electronic components.

G

Gb Gigabyte.

GbE Gigabit Ethernet.

Gbps Gigabits-per-second.

GT Gigabit-transfer.
GTps Gigatransfers per second.

L

LC/LC Little Connector fiber optic cable that connects the [transceiver](#) to the adapter. This LC connector is on a small form-factor pluggable transceiver. LC connectors have replaced SC connectors in corporate networking environments because of their smaller size.

LFM Linear Feet per minute.

link aggregation Link aggregation enables several physical ports to be bundled into a single logical channel.

LOM LAN-on-motherboard. A LAN design.

M

MAC Media access control. Enables the use of a unique address for each device on a network.

Mb Megabit.

MTU Maximum transmission unit. The MTU (payload without the Ethernet header) affects how jumbo frames function.

N

NIS Network Information Service. Originally known as Yellow Pages, NIS is a protocol for distributed system configuration data.

P

PCIe Peripheral Component Interconnect Express.

PF Physical function.

PXE Preboot execution environment. Enables clients to boot over a network interface, independent of the OS or other devices.

R

RDMA Remote Direct Memory Access. Allows computers in a network to exchange data in main memory without involving the processor, cache, or OS of either computer.

RX Response. The automatic response mechanism used by Ethernet PAUSE frames.

S

SPI Serial peripheral interface. A type of flash memory.

SRC Source code. The SRC RPM is used in Linux to build the driver kernel files.

T

TCP Transmission Control Protocol. Part of the transport layer of the Internet protocol suite.

transceiver The 25GbE SFP28 optical transceiver that both ports in the adapter use to transmit data.

TX Generation. The automatic generation mechanism used by the Ethernet PAUSE frames.

U

UDP User Datagram Protocol. Part of the transport layer of the Internet protocol suite.

UEFI Unified Extensible Firmware Interface. Manages the operations between hardware firmware and the OS during the boot time.

V

VF Virtual function.

VID	VLAN identifier. A 12-bit identifier in an Ethernet header.
VLAN	Virtual LAN. Splits the physical LAN into logical subparts. Multiple VLANs are supported on a single port, enabling a server with a single adapter to have a logical presence on multiple IP subnets.
VXLAN	Virtual eXtensive LAN. A tunneling mechanism for providing isolated virtual Layer 2 (L2) segments that can span multiple physical L2 segments.

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