Oracle® Quad Port 10GBase-T Adapter User's Guide

Part No: E75876-02
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Référence: E75876-02

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Contents

Using This Documentation

- **Overview** – Provides specifications and describes how to install and administer the Oracle Quad Port 10GBase-T 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 Quad Port 10GBase-T 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 SRU22.

Product Documentation Library

Documentation and resources for this product and related products are available at https://docs.oracle.com/cd/E75871_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:

Related Information

Installation Task Overview (Oracle Solaris)

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 21

Step	Description	Links
		"Electrical Specifications" on page 22
		"Environmental Specifications" on page 22
3.	Determine if the driver is supported on your server and the driver is up to date.	"Hardware and Software Requirements" on page 23
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6.	Install the adapter and verify the installation.	"Installing the Adapter" on page 37
7.	Configure the network.	"Configuring the Network" on page 47
8.	Configure the driver parameters.	"Configuring Driver Parameters" on page 55
9.	(Optional) Configure jumbo frames.	"Configuring Jumbo Frames" on page 61
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		"Configure VXLANs (Oracle Solaris)" on page 73
12.	If desired, remove a driver.	"Remove the `i40e/i40evf` Driver (Oracle Solaris)" on page 76
13.	Troubleshoot adapter issues.	"Troubleshooting the Adapter (Oracle Solaris)" on page 83

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 21
		"Electrical Specifications" on page 22
		"Environmental Specifications" on page 22
3.	Determine if the driver is supported on your server and the driver is up to date.	"Hardware and Software Requirements" on page 23

Step	Description	Links
4.	If your OS is out of date, update the entire OS image, or download and apply the latest OS patch.	“Updating Software” on page 25
5.	Verify the driver installation.	“Download and Install the `i40e` Driver (Linux)” on page 30 “Download and Install the `i40evf` Driver (Linux)” on page 32
6.	Install the adapter and verify the installation.	“Installing the Adapter” on page 37
7.	Boot over the network.	“Boot Options” on page 48 “Boot Over a 10GbE Network (Oracle Solaris x86/x64 and Linux)” on page 49
8.	Configure the driver parameters.	“Set Driver Parameters (Linux)” on page 58 “Driver Parameters (Linux)” on page 59
9.	(Optional) Configure jumbo frames.	“Configure Jumbo Frames (Linux)” on page 62
10.	(Optional) Configure VLANs.	“VLANs Overview” on page 69 “Configure VLANs (Linux)” on page 71
11.	If desired, remove a driver.	“Remove the `i40e` Driver (Linux)” on page 76 “Remove the `i40e` Driver (Linux)” on page 76

Related Information

- “Installation Task Overview (Oracle Solaris)” 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 21 “Electrical Specifications” on page 22 “Environmental Specifications” on page 22
3.	Determine if the driver is supported on your server and the driver is up to date.	“Hardware and Software Requirements” on page 23
4.	If your OS is out of date, update the entire OS image, or download and apply the latest OS patch.	“Updating Software” on page 25
5.	Verify the driver installation.	“Download and Install the `i40e` Driver (Windows)” on page 34

Step	Description	Links
		"Download and Install the `i40evf` Driver (Windows)" on page 35
6.	Install the adapter and verify the installation.	"Installing the Adapter" on page 37
7.	(Optional) Configure VLANs.	"VLANs Overview" on page 69
		"Configure VLANs (Windows)" on page 72
8.	If desired, remove a driver.	"Remove the `i40e` Driver (Windows)" on page 77
		"Remove the `i40evf` Driver (Windows)" on page 77

Related Information

- "Installation Task Overview (Oracle Solaris)" on page 11
- "Installation Task Overview (Linux)" on page 12
- Oracle Quad Port 10GBase-T Adapter User's Guide Product Page (`https://www.oracle.com/networking/index.html`).

Understanding the Adapter

These topics provide an overview of the adapter.

Related Information

Shipping Kit Contents

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

- Adapter with a low-profile bracket attached
- *Oracle Quad Port 10GBase-T Adapter Where To Find Documentation*

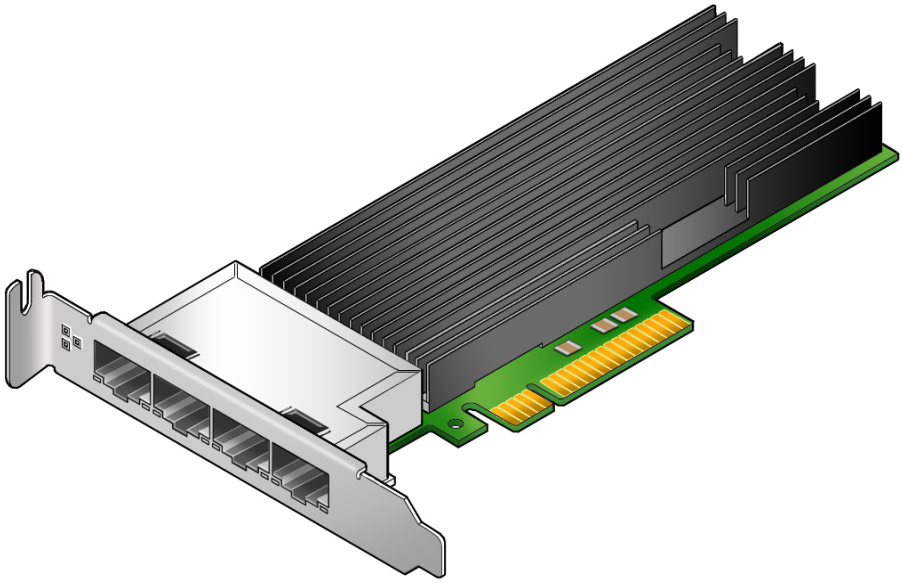
Related Information

- “Adapter Overview” on page 16
- “Front Panel Connectors and LEDs” on page 17

Adapter Overview

The Quad Port 10GBase-T Adapter is a standalone PCIe 3.0 x8 card that can be low profile or full height. This adapter has four independent ports, and you can configure and operate each port a different speed. An RJ45 Ethernet cable connects to each port. The adapter is used for virtualized cloud deployments and network virtualization.

Feature	Specification
Data rate supported per port	■ 4x10GbE, where each port is split into four physical functions that operate at 10Gbps. ■ 100BASE-T, 1000BASE-T, and 10GBASE-T.
Bus type	PCIe 3.0, 8.0 Gbps
Bus width	x8, x4, x1 lane PCIe
Conforms to Ethernet standard	802.3
Boot ROM	32 Mb Flash
EMI	FCC Class A

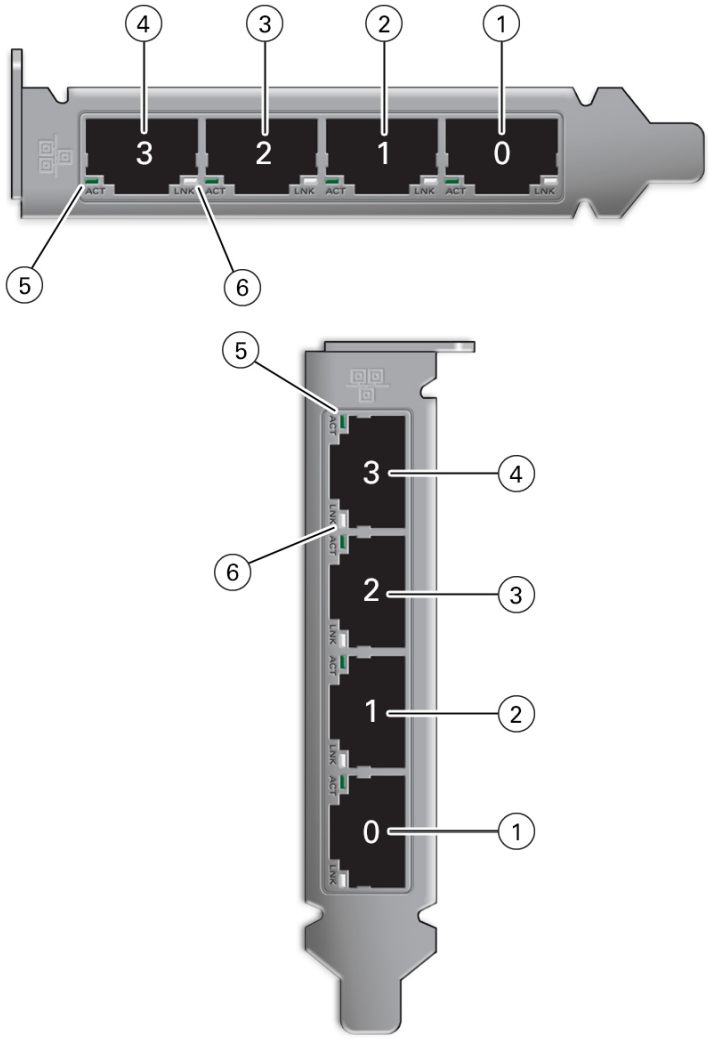


Related Information

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

Front Panel Connectors and LEDs

On the front panel between the four ports, two LEDs display the activity and port speed for each port. You can configure the four ports independently, and operate each port at a different speed. This figure and the table explain the meaning of the LEDs for ports 0, 1, 2, and 3. The LEDs are the same for a full panel and a half-height panel.



No.	Description
1	Port 0
2	Port 1
3	Port 2
4	Port 3
5	ACT indicates Port status and activity:

No.	Description
	■ Solid Green – Port is up. ■ Blinking Green – Traffic is occurring on the port. ■ Off – Port is not active.
6	LNK indicates Link speed: ■ Solid Green – 10GbE. ■ Solid Yellow – 1GbE. ■ Off – 100 Mb.

Related Information

- “Shipping Kit Contents” on page 15
- “Adapter Overview” on page 16

Confirming Specifications and Requirements

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

Related Information

Physical Specifications

Description	U.S.	Metric
Length	6.665 in.	169.30 mm
Height	3.154 in.	80.11 mm
Weight	0.390 lbs.	0.177 kg

Related Information

- “Electrical Specifications” on page 22
- “Environmental Specifications” on page 22
- “Hardware and Software Requirements” on page 23

Electrical Specifications

Description	Value
Max power consumption	28.95W if operating all ports at 10GbE
	18.08W if operating all ports at 1GbE
	14.92W if operating all ports at 100 Mbps
Typical active power	24.69W if operating all ports at 10GbE
	12.04W if operating all ports at 1GbE
	9.21W if operating all ports at 100 Mbps
Supply voltage	12V ± 8%
	3.3Vaux ± 9%

Related Information

- “Physical Specifications” on page 21
- “Environmental Specifications” on page 22
- “Hardware and Software Requirements” on page 23

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
Altitude	3000 meters (9842.5) at 35°C (95°F) ambient 1,219 meters (4,000 feet) at 35°C (95°F) ambient	12,000 meters (39,370 feet)
Vibration	0.15 G z-axis; 0.10 G in x- and y-axes (5-500 Hz sine)	0.50 G z-axis; 0.25 G 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 Threshold testing of castors at 0.75 m/s
Airflow	400 LFM at 55°C (131°F) local ambient temperature	

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

Related Information

- “Physical Specifications” on page 21
- “Electrical Specifications” on page 22
- “Hardware and Software Requirements” on page 23

Hardware and Software Requirements

Hardware and software support changes over time. For the latest information concerning I/O options supported by your server, refer to `http://www.oracle.com/networking/index.html`.

For Oracle Solaris OS systems, the minimum supported version is Solaris 11.3 SRU22.

Related Information

- “Physical Specifications” on page 21
- “Electrical Specifications” on page 22
- “Environmental Specifications” on page 22

Supported Cables

The Oracle Quad Port 10GBase-T Adapter supports 10GBase-T, 1000Base-T, and 100Base-T cables. When you install a cable, follow the guidelines in “Cable Cautions” on page 38.

Speed	Cable Type	Maximum Distance Supported
10GBase-T	CAT 6	55m
	CAT 6a	100m
1000Base-T / 100Base-T	CAT 6	100m
	CAT 6a	
	CAT 5e	

Related Information

- “Hardware and Software Requirements” on page 23
- “Updating Software” on page 25

Updating Software

This topic provides information on updating the adapter software:

- “Update the OS (Oracle Solaris)” on page 25

Related Information

- “Understanding the Installation Process” on page 11
- “Understanding the Adapter” on page 15
- “Installing the Driver” on page 27
- “Installing the Adapter” on page 37
- “Troubleshooting the Adapter (Oracle Solaris)” on page 83

▼ Update the OS (Oracle Solaris)

For the latest list of supported platforms and operating systems, see “Hardware and Software Requirements” on page 23.

For Solaris OS systems, the minimum supported version is required, which is Oracle Solaris 11.3 SRU22.

1. **Update the entire OS image on the client server.**
2. **Ensure that Oracle Solaris 11.3 SRU22 is 22 is installed.**

   For information on upgrading the firmware for the adapter, see “Firmware Update Tool Overview” on page 79.

   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 79

- “Installing the Driver” on page 27

Installing the Driver

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

Description	Links
Verify the driver on an Oracle Solaris platform.	“Verify the `i40e` Driver (Oracle Solaris)” on page 28 “Verify the `i40evf` Driver (Oracle Solaris)” on page 29
Download and install the driver on a Linux platform.	“Download and Install the `i40e` Driver (Linux)” on page 30 “Download and Install the `i40evf` Driver (Linux)” on page 32
Download and install the driver on a Windows platform.	“Download and Install the `i40e` Driver (Windows)” on page 34 “Download and Install the `i40evf` Driver (Windows)” on page 35

Related Information

- “Understanding the Installation Process” on page 11
- “Understanding the Adapter” on page 15
- “Confirming Specifications and Requirements” on page 21
- “Updating Software” on page 25
- “Installing the Adapter” on page 37
- “Configuring the Network” on page 47
- “Configuring Driver Parameters” on page 55
- “Configuring Jumbo Frames” on page 61
- “Configuring a Link Aggregation” on page 65
- “Configuring VLANs and VXLANs” on page 69
- “Removing the Driver” on page 75
- “Troubleshooting the Adapter (Oracle Solaris)” on page 83

Verify the i40e Driver (Oracle Solaris)

The i40e and i40evf software package comes bundled in the Oracle Solaris software. Two device drivers are available for this adapter:

- i40e - Physical function (PF) driver
- i40evf - Virtual function (VF) driver

Note - Oracle Solaris 11.3 SRU22 OS is the first release to support this adapter. You can upgrade to or install 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 SRU22 OS 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)
   ```

   You can also check the version of the bnxt package:

   ```
   % pkg info bnxt
   <Add input from Mamta>
   ```

   For more information, see "Hardware and Software Requirements" on page 23 for more information.

2. **Manually load the driver.**

   ```
   # modload /kernel/drv/arch/i40e
   ```

   where *arch* is amd64 for 64-bit Intel server or sparcv9 for Oracle SPARC servers.

3. **If you removed the driver and would like to reinstall the driver, install the i40e package.**

Note - Before installing the package, ensure that your publishers are pointing to the correct repository.

```
# pkg install i40e
# ls -l /kernel/drv/$(isainfo -n)/i40e
-rwxr-xr-x 1 root sys 350616 Apr 16 15:23 /kernel/drv/sparcv9/i40e
```

or

```
# ls -l /kernel/drv/$(isainfo -n)/i40e
-rwxr-xr-x 1 root sys 384920 Apr 16 18:48 /kernel/drv/amd64/i40e
# add_drv -i '"pciex8086,154b" "pciex8086,1572" "pciex8086,1573" "pciex8086,1574"
 "pciex8086,157f" "pciex8086,1580" "pciex8086,1581" "pciex8086,1582" "pciex8086,1589"
 "pciex8086,1584" "pciex8086,1585"' i40e
```

where *pciex8086,1572 pciex8086,1573 pciex8086,157f* list the PCIe drivers.

Related Information

- "Verify the i40evf Driver (Oracle Solaris)" on page 29
- "Download and Install the i40e Driver (Linux)" on page 30
- "Download and Install the i40evf Driver (Linux)" on page 32
- "Download and Install the i40e Driver (Windows)" on page 34
- "Download and Install the i40evf Driver (Windows)" on page 35

Verify the i40evf Driver (Oracle Solaris)

The i40e and i40evf software package comes bundled in the Oracle Solaris software. Two device drivers are available for this adapter:

- i40e - Physical function (PF) driver
- i40evf - Virtual function (VF) driver

Note - The Oracle Solaris 11.3 SRU22 OS is the first release to support this adapter. You can upgrade to or install 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 SRU22 OS 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)
```

You can also check the version of the bnxt package:

```
% pkg info bnxt
<Add input from Mamta>
```

For more information, see "Hardware and Software Requirements" on page 23 for more information.

2. **Manually load the driver.**

```
# modload /kernel/drv/arch/i40evf
```

If the i40evf is not installed, do so now.

```
# add_drv -i '"pciex8086,154c" "pciex8086,1571"' i40evf
```

Note - If the i40evf driver is not listed, the driver might not be loaded. You can use the modload command to load the driver if needed.

```
# modload /kernel/drv/arch/i40evf
```

where *arch* is amd64 for 64-bit Intel servers or sparcv9 for Oracle SPARC servers.

Related Information

- "Verify the i40e Driver (Oracle Solaris)" on page 28
- "Download and Install the i40e Driver (Linux)" on page 30
- "Download and Install the i40evf Driver (Linux)" on page 32
- "Download and Install the i40e Driver (Windows)" on page 34
- "Download and Install the i40evf Driver (Windows)" on page 35

▼ Download and Install the i40e Driver (Linux)

If your server uses the Red Hat or SUSE Linux OS, you must download the i40e device driver to install it.

1. **Log in to your server.**

2. **In a browser, go to:**

   http://downloadcenter.intel.com/download/24411

3. **Select Downloads and Drivers.**

4. **Select Linux as the OS.**

5. **Select this driver:**

   Network Adapter Virtual Function Driver for 40 Gigabit Network Connections.

6. **Select Download.**

   The download begins. The file named `i40e-`*x.x.xx*`.tar.gz` is saved in the `~/Desktop` directory of your server.

   Note - The primary driver link is a buildable source archive that works with Linux 2.6.*x* kernels only, and requires that the currently running kernel match the SRC RPM kernel files and headers in order to build the driver. Refer to the bundled `README` file in the unpacked archive from Intel for more information.

   For this example, assume that the file is named `i40e-1.2.3.4.tar.gz`. The actual file might have different version or subversion numbers.

7. **Review and accept the software license agreement.**

8. **Copy the file containing the driver from `~/Desktop` to `/temp`.**

9. **Uncompress and untar the file.**

   ```
   # tar -zxvf i40e-1.2.3.4.tar.gz
   ```

10. **Go to the newly created `src` directory.**

    ```
    # cd /temp/i40e-1.2.3.4/src
    ```

11. **Compile the driver source file.**

    ```
    # make
    # make install
    ```

12. **Load the `i40e` driver.**

    ```
    # modprobe i40e
    ```

13. **Verify that the `i40e` driver has been installed.**

```
# lsmod | grep i40e
```

The output should be similar to this:

```
i40e      118052   0
```

14. **Check the `i40e` driver version.**

```
# modinfo i40e | grep ver
```

For example, the output might be similar to this:

```
filename: /lib/modules/2.6.18-53.el5/kernel/drivers/net/i40e/i40e.ko
version: 1.2.3.4ro
description: Intel(R) Gigabit PCI Express Network Driver
srcversion: 5CFF6AEBA251050F8A4B746
vermagic: 2.6.18-53.el5 SMP mod_unload gcc-4.1
```

Related Information

- “Verify the i40e Driver (Oracle Solaris)” on page 28
- “Verify the i40evf Driver (Oracle Solaris)” on page 29
- “Download and Install the i40evf Driver (Linux)” on page 32
- “Download and Install the i40e Driver (Windows)” on page 34
- “Download and Install the i40evf Driver (Windows)” on page 35

▼ Download and Install the `i40evf` Driver (Linux)

If your server uses the Red Hat or SUSE Linux operating system, you must download the `i40evf` device driver to install it.

1. **Log in to your server.**
2. **In a browser, go to `http://downloadcenter.intel.com/download/24693`.**
3. **Select Downloads and Drives.**
4. **Select Linux as the OS.**
5. **Select the *Network Adapter Virtual Function Driver for 40 Gigabit Network Connections* driver.**

6. **Select Download.**

   The download begins. The file named `i40evf-x.x.xx.tar.gz` is saved in the `~/Desktop` directory of your server.

   Note - The primary driver link is a buildable source archive that works with Linux 2.6.*x* kernels only and requires that the currently running kernel match the SRC RPM kernel files and headers in order to build the driver. See the bundled `README` file in the unpacked archive from Intel for more information.

   For this example, assume that the file is named `i40evf-1.2.3.4.tar.gz`. The actual file might have different version or subversion numbers.

7. **Review and accept the software license agreement.**

8. **Copy the file containing the driver from `~/Desktop` to `/temp`.**

9. **Uncompress and untar the file.**

   ```
   # tar -zxvf i40evf-1.2.3.4.tar.gz
   ```

10. **Go to the newly created `src` directory.**

    ```
    # cd /temp/i40evf-1.2.3.4/src
    ```

11. **Compile the driver source file.**

    ```
    # make
    # make install
    ```

12. **Load the `i40evf` driver.**

    ```
    # modprobe i40evf
    ```

13. **Verify that the `i40evf` driver has been installed.**

    ```
    # lsmod | grep i40evf
    ```

    The output should be similar to this:

    ```
    i40evf       118052    0
    ```

14. **Check the `i40evf` driver version.**

    ```
    # modinfo i40evf | grep ver
    ```

    For example, the output might be similar to this:

```
filename: /lib/modules/2.6.18-53.el5/kernel/drivers/net/i40evf/i40evf.ko
version: 1.2.3.4ro
description: Intel(R) Gigabit PCI Express Network Driver
srcversion: 5CFF6AEBA251050F8A4B746
vermagic: 2.6.18-53.el5 SMP mod_unload gcc-4.1
```

Related Information

- “Verify the i40e Driver (Oracle Solaris)” on page 28
- “Verify the i40evf Driver (Oracle Solaris)” on page 29
- “Download and Install the i40e Driver (Linux)” on page 30
- “Download and Install the i40e Driver (Windows)” on page 34
- “Download and Install the i40evf Driver (Windows)” on page 35

▼ Download and Install the i40e Driver (Windows)

If the server uses the Windows Server 2003 or 2008 OS, perform the following procedure to download and install the device driver.

1. **Log in to the server.**
2. **In a browser, go to http://www.intel.com/p/en_US/support/highlights/network/ecna-x540-t2.**
3. **Select Downloads and Drives.**
4. **Select Windows Server 2012 or 2012R2 Standard x64 as the OS.**
5. **Select the latest driver.**
6. **Click the Download button next to the appropriate file for your server.**
7. **Review and accept the software license agreement.**
8. **Click on the .exe files to install the driver.**
9. **Follow the instructions in the installation wizard.**
10. **If the Found New Hardware Wizard screen is displayed, click Cancel.**

    The autorun utility automatically runs after you have extracted the files.

Related Information

- “Verify the i40e Driver (Oracle Solaris)” on page 28
- “Verify the i40evf Driver (Oracle Solaris)” on page 29
- “Download and Install the i40e Driver (Linux)” on page 30
- “Download and Install the i40evf Driver (Linux)” on page 32
- “Download and Install the i40evf Driver (Windows)” on page 35

▼ Download and Install the i40evf Driver (Windows)

If the server uses the Windows Server 2003 or 2008 OS, perform the following procedure to download and install the device driver.

1. **Log in to the server.**
2. **In a browser, go to:**
   http://www.intel.com/p/en_US/support/highlights/network/ecna-x540-t2
3. **Select Downloads and Drives.**
4. **Select Windows Server 2012 or 2012R2 Standard x64 as the OS.**
5. **Select the latest driver.**
6. **Click the Download button next to the appropriate file for your system.**
7. **Review and accept the software license agreement.**
8. **Click on the .exe files to install the driver.**
9. **Follow the instructions in the installation wizard.**
10. **If the Found New Hardware Wizard screen is displayed, click Cancel.**
    The autorun utility automatically runs after you have extracted the files.

Related Information

- “Verify the i40e Driver (Oracle Solaris)” on page 28
- “Verify the i40evf Driver (Oracle Solaris)” on page 29
- “Download and Install the i40e Driver (Linux)” on page 30

- "Download and Install the i40evf Driver (Linux)" on page 32
- "Download and Install the i40e Driver (Windows)" on page 34

Installing the Adapter

These topics describe how to install the adapter.

Description	Links
If necessary, order additional adapters.	“Adapter Description” on page 37
Follow cable cautions.	“Cable Cautions” on page 38
Understand the connectors.	“Front Panel Connectors and LEDs” on page 17
Install the adapter.	“Install the Adapter” on page 40
Verify the adapter installation.	“Verify the Adapter Installation (Oracle SPARC)” on page 41 “Verify the Adapter Installation (Oracle Solaris x86)” on page 43 “Verify the Adapter Installation (Linux)” on page 44 “Verify the Adapter Installation (Windows)” on page 45

Related Information

- “Understanding the Installation Process” on page 11
- “Understanding the Adapter” on page 15
- “Updating Software” on page 25
- “Installing the Driver” on page 27
- “Configuring the Network” on page 47
- “Configuring Driver Parameters” on page 55
- “Removing the Driver” on page 75
- “Troubleshooting the Adapter (Oracle Solaris)” on page 83

Adapter Description

The Oracle Quad Port 10GBase-T Adapter is a 4x10G adapter, and supports twisted-pair copper cabling.

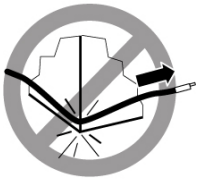
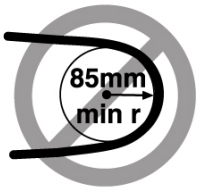
4x10GbE Mode	Part Number
Oracle Quad Port 10GBase-T Adapter	■ 7111182, factory installed ■ 7111181, Xoption

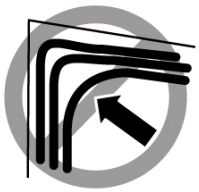
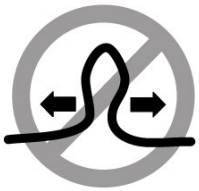
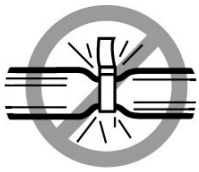
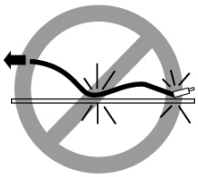
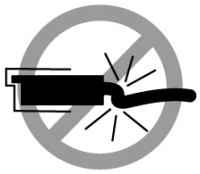
Related Information

- “Cable Cautions” on page 38
- “Install the Adapter” on page 40
- “Verify the Adapter Installation (Oracle SPARC)” on page 41
- “Verify the Adapter Installation (Oracle Solaris x86)” on page 43
- “Verify the Adapter Installation (Linux)” on page 44
- “Verify the Adapter Installation (Windows)” on page 45

Cable Cautions

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

	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.		Do not step on the cable or connectors. Plan cable paths away from foot traffic or rolling loads.
	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.		Do not bend the cables to a radius tighter than 85 mm (3.4 inches). Ensure that cable turns are as wide as possible.

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

Related Information

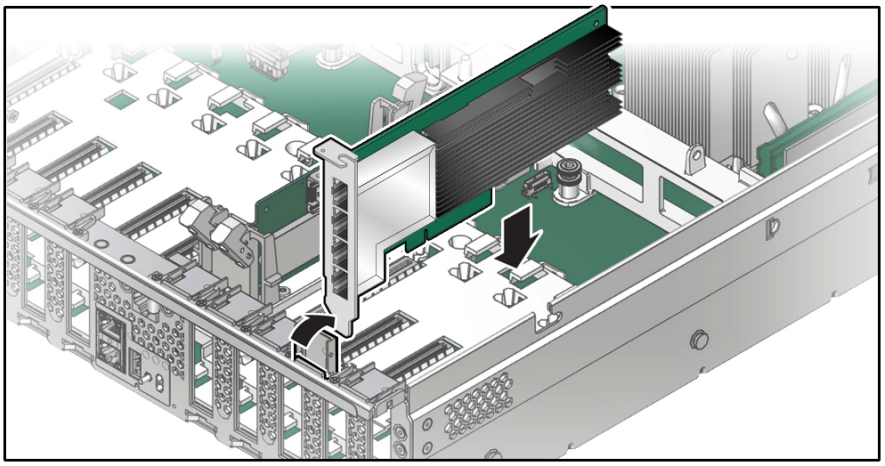
- "Adapter Description" on page 37
- "Install the Adapter" on page 40
- "Verify the Adapter Installation (Oracle SPARC)" on page 41
- "Verify the Adapter Installation (Oracle Solaris x86)" on page 43
- "Verify the Adapter Installation (Linux)" on page 44
- "Verify the Adapter Installation (Windows)" on page 45

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.

I removed the previous Step 1 below, which said to ensure that you have the appropriate additional hardware.

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. **Connect the RJ45 cables to the ports.**
11. **Verify the installation.**

    Follow the instructions in the appropriate section.

    "Verify the Adapter Installation (Oracle SPARC)" on page 41

    "Verify the Adapter Installation (Oracle Solaris x86)" on page 43

    "Verify the Adapter Installation (Linux)" on page 44

    "Verify the Adapter Installation (Windows)" on page 45

Related Information

- "Adapter Description" on page 37
- "Cable Cautions" on page 38
- "Verify the Adapter Installation (Oracle SPARC)" on page 41
- "Verify the Adapter Installation (Oracle Solaris x86)" on page 43
- "Verify the Adapter Installation (Linux)" on page 44
- "Verify the Adapter Installation (Windows)" on page 45

▼ Verify the Adapter Installation (Oracle SPARC)

Note - Verification is not required if the server supports DR.

1. **Power on the server.**
2. **When the banner appears, press the Stop-A keys or send the break signal to interrupt the boot process and display the OpenBoot (`ok`) prompt.**
3. **List the network devices.**

```
ok show-nets
```

```
a) /niu@480/network@0
b) /pci@400/pci@2/pci@0/pci@c/network@0,3
c) /pci@400/pci@2/pci@0/pci@c/network@0,2
d) /pci@400/pci@2/pci@0/pci@c/network@0,1
e) /pci@400/pci@2/pci@0/pci@c/network@0
f) /pci@400/pci@2/pci@0/pci@a/network@0,1
g) /pci@400/pci@2/pci@0/pci@a/network@0
q) NO SELECTION
Enter Selection, q to quit: q
```

4. Check the `.properties` output for each device.

Note - Checking the `.properties` output for each device is the surest way to identify the device.

These examples assume that `/pci@400/pci@2/pci@0/pci@c/network@0` is a port on the adapter.

a. Change to the device directory.

```
ok cd /pci@400/pci@2/pci@0/pci@c/network@0
```

b. Display properties for the device.

```
ok .properties
```

The output should be similar to this:

```
vf-assigned-addresses    c3050000 00000041 01010000 00000000 00010000
                         c3050003 00000041 01210000 00000000 00004000
assigned-addresses       c3050010 00000041 00000000 00000000 01000000
                         c305001c 00000041 01000000 00000000 00008000
                         82050030 00000000 00200000 00000000 00080000
vf-reg                   43050000 00000000 00000000 00000000 00010000
                         43050003 00000000 00000000 00000000 00004000
reg                      00050000 00000000 00000000 00000000 00000000
                         43050010 00000000 00000000 00000000 01000000
                         4305001c 00000000 00000000 00000000 00008000
                         02050030 00000000 00000000 00000000 00080000
local-mac-address        3c fd fe 50 00 f0
version                  Oracle Quad Port 10GBase-T Adapter FCode 3.7 10/18/2016
board-model              7096675
model                    7111181/7111182
compatible               pciex8086,1589.108e.7b1c.1
                         pciex8086,1589.108e.7b1c
                         pciex8086,1589.1
                         pciex8086,1589
```

```
                          pciexclass,020000
                          pciexclass,0200
address-bits              00000030
max-frame-size            00002400
network-interface-type    ethernet
device_type               network
name                      network
fcode-rom-offset          00059c00
vf-stride                 00000001
first-vf-offset           00000010
total-vfs                 00000020
initial-vfs               00000020
#vfs                      00000020
port-type                 PCIE-Endpoint
interrupts                00000001
cache-line-size           00000010
class-code                00020000
subsystem-id              00007b1c
subsystem-vendor-id       0000108e
revision-id               00000002
device-id                 00001589
vendor-id                 00008086
{0} ok
```

If you do not see the device listed, check that the adapter is properly seated. If necessary, reinstall the adapter.

c. Type:

```
ok device-end
```

Related Information

- “Adapter Description” on page 37
- “Cable Cautions” on page 38
- “Install the Adapter” on page 40
- “Verify the Adapter Installation (Oracle Solaris x86)” on page 43
- “Verify the Adapter Installation (Linux)” on page 44
- “Verify the Adapter Installation (Windows)” on page 45

▼ 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 SRU22 OS 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)
```

   For more information, see “Hardware and Software Requirements” on page 23 for more information.

3. **Check to see if the adapter is properly installed and recognized by the OS.**

```
# grep i40e /etc/path_to_inst
```

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

```
root@t7-1a:~# grep i40 /etc/path_to_inst
“/pci@302,/pci@1/ethernet@0” 8 “i40e”
“/pci@302,/pci@1/ethernet@0,1” 9 “i40e”
“/pci@302,/pci@1/ethernet@0,2” 10 “i40e”
“/pci@302,/pci@1/ethernet@0,3” 11 “i40e”
“/pci@302,/pci@1/ethernet@0” 4 “i40e”
```

Related Information

- “Adapter Description” on page 37
- “Cable Cautions” on page 38
- “Install the Adapter” on page 40
- “Verify the Adapter Installation (Oracle SPARC)” on page 41
- “Verify the Adapter Installation (Linux)” on page 44
- “Verify the Adapter Installation (Windows)” on page 45

▼ Verify the Adapter Installation (Linux)

- **Verify the new network interface instances corresponding to the adapter.**

```
# ifconfig -a | grep eth
eth3   Link encap:Ethernet  HWaddr 00:1B:21:17:67:B0
```

```
eth4   Link encap:Ethernet  HWaddr 00:1B:21:17:67:9B
```

Related Information

- “Adapter Description” on page 37
- “Cable Cautions” on page 38
- “Install the Adapter” on page 40
- “Verify the Adapter Installation (Oracle SPARC)” on page 41
- “Verify the Adapter Installation (Oracle Solaris x86)” on page 43
- “Verify the Adapter Installation (Windows)” on page 45

▼ Verify the Adapter Installation (Windows)

1. **Click Control Panel.**
2. **Click Network Connection.**

   If the driver is installed correctly, the Ethernet adapter interfaces labeled as "Intel(R) I450 10-Gigabit Dual Port Network Connection” will be displayed on the Network Connection screen.
3. **In the Administration tool, click Computer Management, Device Manager, and Network Adapter.**

Related Information

- “Adapter Description” on page 37
- “Cable Cautions” on page 38
- “Install the Adapter” on page 40
- “Verify the Adapter Installation (Oracle SPARC)” on page 41
- “Verify the Adapter Installation (Oracle Solaris x86)” on page 43
- “Verify the Adapter Installation (Linux)” on page 44

Configuring the Network

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

Description	Links
Configure the network for an Oracle Solaris server.	“Configure the Network Interface (Oracle Solaris)” on page 48
Boot over the network.	“Boot Options” on page 48 “Boot Over the Network (PXE)” on page 49 “Boot Over a 10GbE Network (Oracle Solaris x86/x64 and Linux)” on page 49
Install the Oracle Solaris OS over the network.	“Install Oracle Solaris 11 Over a Network (Oracle SPARC)” on page 51

Related Information

- “Understanding the Installation Process” on page 11
- “Understanding the Adapter” on page 15
- “Confirming Specifications and Requirements” on page 21
- “Updating Software” on page 25
- “Installing the Driver” on page 27
- “Installing the Adapter” on page 37
- “Configuring Driver Parameters” on page 55
- “Configuring Jumbo Frames” on page 61
- “Configuring a Link Aggregation” on page 65
- “Configuring VLANs and VXLANs” on page 69
- “Removing the Driver” on page 75
- “Troubleshooting the Adapter (Oracle Solaris)” on page 83

▼ Configure the Network Interface (Oracle Solaris)

1. **Display the `i40e` instances.**
   For more information, refer to the Oracle Solaris i40e (7D) man page.

   ```
   # dladm show-phys
   ```

   The output should include lines similar to this:

   ```
   LINK        MEDIA         STATE     SPEED     DUPLEX     DEVICE
   net10       Ethernet      up        10000     full       i40e6
   net11       Ethernet      up        10000     full       i40e7
   net14       Ethernet      up        10000     full       i40e5
   net15       Ethernet      up        10000     full       i40e4
   ```

2. **Use the `ipadm` command to set up the `i40e` 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 (Oracle Solaris)” on page 48
- “Boot Options” on page 48
- “Boot Over the Network (PXE)” on page 49
- “Boot Over a 10GbE Network (Oracle Solaris x86/x64 and Linux)” on page 49
- “Install Oracle Solaris 11 Over a Network (Oracle SPARC)” on page 51

Boot Options

The adapter supports several boot options:

- UEFI with PXE with option ROM (Oracle x86/x64)
- UEFI with iSCSI with option ROM (Oracle x86/x64 and Oracle SPARC)
- OpenBoot PROM (`bootp`) with PF (Oracle SPARC servers supporting LDOMs)

Refer to *Booting and Shutting Down Oracle Solaris 11.3 Systems* for information about boot options and learn how to create a boot server.

Related Information

- "Configure the Network Interface (Oracle Solaris)" on page 48
- "Boot Over the Network (PXE)" on page 49
- "Boot Over a 10GbE Network (Oracle Solaris x86/x64 and Linux)" on page 49
- "Install Oracle Solaris 11 Over a Network (Oracle SPARC)" on page 51

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 "Booting a System From the Network" in *Booting and Shutting Down Oracle Solaris 11.3 Systems*.

Related Information

- "Configure the Network Interface (Oracle Solaris)" on page 48
- "Boot Options" on page 48
- "Boot Over a 10GbE Network (Oracle Solaris x86/x64 and Linux)" on page 49
- "Install Oracle Solaris 11 Over a Network (Oracle SPARC)" on page 51

Boot Over a 10GbE Network (Oracle Solaris x86/x64 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.

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 the F10 key to save the boot configuration changes and exit BIOS.**

   The server should reboot after saving the boot configuration.
8. **On Oracle platforms, press the F12 key 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.

```
Intel(R) Boot Agent GE v1.3.31
Copyright (C) 1997-2009, Intel Corporation

Initializing and establishing link...

        ************************************************
        *           Please select boot device:         *
        ************************************************
        * HDD:P1-SEAGATE ST95001NSSUN500G 111          *
        * PXE:Slot1.F0:IBA XE Slot 0700 v2193          *
        * PXE:Slot1.F1:IBA XE Slot 0701 v2193          *
        * PXE:Slot0.F0:IBA XE Slot 0D00 v2193          *
        * PXE:Slot0.F1:IBA XE Slot 0D01 v2193          *
        * PXE:IBA GE Slot 1F00 v1331                   *
        * PXE:IBA GE Slot 1F01 v1331                   *
        *                                              *
        ************************************************
        *          * and * to move selection           *
        *         ENTER to select boot device          *
        *          ESC to boot using defaults          *
        ************************************************

Intel(R) Boot Agent XE v2.1.93
```

```
Copyright (C) 1997-2011, Intel Corporation

CLIENT MAC ADDR: A0 36 9F 02 37 A4  GUID: FF200008 FFFF FFFF FFFF CE8C75282100
CLIENT IP: 10.134.155.174  MASK: 255.255.255.0  DHCP IP: 10.134.155.4
```

9. **Install the `i40e` driver and configure the adapter.**

10. **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

- "Configure the Network Interface (Oracle Solaris)" on page 48
- "Boot Options" on page 48
- "Boot Over the Network (PXE)" on page 49
- "Install Oracle Solaris 11 Over a Network (Oracle SPARC)" on page 51

▼ Install Oracle Solaris 11 Over a Network (Oracle SPARC)

Refer to Chapter 1, "Overview of Booting and Shutting Down a System" in *Booting and Shutting Down Oracle Solaris 11.3 Systems* for instructions on installing the Oracle Solaris 11 OS over the network.

1. **Prepare an installation server and a client server for installing the Oracle Solaris 11 OS over the network.**

   a. **Create an installation server that contains the image of the Oracle Solaris 11 CD.**

   b. **Set up the client server to be installed over the network.**

      Refer to *Managing Network Virtualization and Network Resources in Oracle Solaris 11.3* to learn how to create the installation server and set up the client server.

Note - To install the client server over a network that is not part of the same subnet, you must also create a boot server. Refer to Chapter 1, "Overview of Booting and Shutting Down a System" in *Booting and Shutting Down Oracle Solaris 11.3 Systems* to learn about boot servers.

---

2. **Shut down and halt the client server to get to the OpenBoot (`ok`) prompt.**

```
# shutdown -i0 -g0 -y. . .
```

```
(shutdown command messages omitted)
. . .
ok
```

3. Check the `.properties` output for each device.

These examples assume that `/pci@400/pci@1/pci@0/pci@8/network@0` is a port on the adapter.

a. Change to the device directory.

```
ok cd /pci@400/pci@1/pci@0/pci@8/network@0
```

b. Display properties for the device.

```
ok .properties
```

The output should be similar to this:

```
vf-assigned-addresses    c3050000 00000041 01010000 00000000 00010000
                         c3050003 00000041 01210000 00000000 00004000
assigned-addresses       c3050010 00000041 00000000 00000000 01000000
                         c305001c 00000041 01000000 00000000 00008000
                         82050030 00000000 00200000 00000000 00080000
vf-reg                   43050000 00000000 00000000 00000000 00010000
                         43050003 00000000 00000000 00000000 00004000
reg                      00050000 00000000 00000000 00000000 00000000
                         43050010 00000000 00000000 00000000 01000000
                         4305001c 00000000 00000000 00000000 00008000
                         02050030 00000000 00000000 00000000 00080000
local-mac-address        3c fd fe 50 00 f0
version                  Oracle Quad Port 10GBase-T Adapter FCode 3.7 10/18/2016
board-model              7096675
model                    7111181/7111182
compatible               pciex8086,1589.108e.7b1c.1
                         pciex8086,1589.108e.7b1c
                         pciex8086,1589.1
                         pciex8086,1589
                         pciexclass,020000
                         pciexclass,0200
address-bits             00000030
max-frame-size           00002400
network-interface-type   ethernet
device_type              network
name                     network
fcode-rom-offset         00059c00
vf-stride                00000001
first-vf-offset          00000010
total-vfs                00000020
```

```
initial-vfs             00000020
#vfs                    00000020
port-type               PCIE-Endpoint
interrupts              00000001
cache-line-size         00000010
class-code              00020000
subsystem-id            00007b1c
subsystem-vendor-id     0000108e
revision-id             00000002
device-id               00001589
vendor-id               00008086
{0} ok
```

If you do not see the device listed, check that the adapter is properly seated. If necessary, reinstall the adapter.

c. **When you finish looking at the `.properties` values, type:**

```
ok device-end
```

4. **At the `ok` prompt, display the device paths.**

You should see the full paths of all of the network devices, including two for the adapter similar to this example.

```
ok show-nets
a) /niu@480/network@0
b) /pci@400/pci@2/pci@0/pci@c/network@0,3
c) /pci@400/pci@2/pci@0/pci@c/network@0,2
d) /pci@400/pci@2/pci@0/pci@c/network@0,1
e) /pci@400/pci@2/pci@0/pci@c/network@0
f) /pci@400/pci@2/pci@0/pci@a/network@0,1
g) /pci@400/pci@2/pci@0/pci@a/network@0
q) NO SELECTION
Enter Selection, q to quit: q
```

5. **At the `ok` prompt, boot the client server using the full device path of the device.**

For example, type:

```
ok boot /pci@400/pci@2/pci@0/pci@c/network@0:dhcp
```

The boot takes several minutes to complete. Then, you should see a menu for continuing to install the Oracle Solaris 11 OS.

6. **Proceed with the Oracle Solaris 11 OS installation.**

Refer to *Managing Network Virtualization and Network Resources in Oracle Solaris 11.3* for more information about installing the Oracle Solaris OS over the network.

7. **Install the adapter software on the client server.**

   The software installed in Step 5 is required to boot the client server over the adapter interface. You now must install the software in order for the OS to use the client's interfaces in normal operation.

   Before installing the `SUNWi40e` driver, ensure that the client server does not already have the driver installed.

   ```
   # pkginfo | grep SUNWi40e*
   ```

   - **If the software is installed, this command will return the package name you typed in. In that case, skip to Step 8.**
   - **If needed, install the software from the download center at My Oracle Support (`https://support.oracle.com`).**

8. **Display the configuration information for all datalinks or the specified datalink.**

   By default, the server is configured to have one datalink for each known network device.

   ```
   # dladm show-phys
   ```

   The output should include lines similar to this:

   ```
   LINK        MEDIA         STATE     SPEED     DUPLEX     DEVICE
   net10       Ethernet      up        10000     full       i40e6
   net11       Ethernet      up        10000     full       i40e7
   net14       Ethernet      up        10000     full       i40e5
   net15       Ethernet      up        10000     full       i40e4
   ```

Related Information

- “Configure the Network Interface (Oracle Solaris)” on page 48
- “Boot Options” on page 48
- “Boot Over the Network (PXE)” on page 49
- “Boot Over a 10GbE Network (Oracle Solaris x86/x64 and Linux)” on page 49

Configuring Driver Parameters

The `i40e` device driver controls the adapter's interfaces. You can manually set the `i40e` 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 OS.	“Set Driver Parameters (Oracle Solaris)” on page 56 “Driver Parameters (Oracle Solaris)” on page 57
Configure driver parameters in Linux.	“Set Driver Parameters (Linux)” on page 58 “Driver Parameters (Linux)” on page 59

Related Information

- “Understanding the Installation Process” on page 11
- “Understanding the Adapter” on page 15
- “Confirming Specifications and Requirements” on page 21
- “Updating Software” on page 25
- “Installing the Driver” on page 27
- “Installing the Adapter” on page 37
- “Configuring the Network” on page 47
- “Configuring Jumbo Frames” on page 61
- “Configuring a Link Aggregation” on page 65
- “Configuring VLANs and VXLANs” on page 69
- “Removing the Driver” on page 75
- “Troubleshooting the Adapter (Oracle Solaris)” on page 83

Set Driver Parameters (Oracle Solaris)

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

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

   ```
   # grep i40e /etc/path_to_inst
   "/pci@500/pci@2/pci@0/pci@a/network@0" 1 "i40e"
   "/pci@500/pci@2/pci@0/pci@a/network@0,1" 2 "i40e"
   ```

   On an Oracle Solaris x86 server, you should see output similar to this:

   ```
   # grep i40e /etc/path_to_inst
   "/pci@0,0/pci8086,3c0a@3,2/pci108e,7b15@0" 0 "i40e"
   "/pci@0,0/pci8086,3c0a@3,2/pci108e,7b15@0,1" 1 "i40e"
   ```

   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 identify a PCIe device unambiguously in the `i40e.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 `pci`(4) man page for more information about the PCIe device specification.

2. **Set the parameters for the `i40e` devices in one of these ways:**

   a. **Copy the i40e.conf file to the `/etc/driver/drv/` and edit the copied file.**

      Save the i40e`.conf` file.

      Reboot the system.

      See “Driver Parameters (Oracle Solaris)” on page 57.

      ```
      # "/pci@340/pci@1/pci@0/pci@5/ethernet@0" 0 "i40e"
      # "/pci@340/pci@1/pci@0/pci@5/ethernet@0,1" 1 "i40e"
      #
      #   name = "pciex8086,1589" parent = "/pci@340/pci@1/pci@0/pci@5"
          unit-address = "0"
      # rx_ring_size = 2048;
      ```

   b. **Use the `dladm` command to set a property.**

```
# 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, type:

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

Related Information

- “Driver Parameters (Oracle Solaris)” on page 57
- “Set Driver Parameters (Linux)” on page 58

Driver Parameters (Oracle Solaris)

You can configure these parameters on each `i40e` interface.

Type	Keyword	Description
Jumbo frames	`default_mtu=`*mtu*	Size of the default MTU (payload without the Ethernet header). Allowed values: `1500` to `9706` (default = `1500`)
Flow control	`flow_control`	Ethernet flow control. Allowed values: `0` - Disable (default in Oracle Solaris 11) `1` - Receive only `2` - Transmit only `3` - Receive and transmit
LAN VSI queue pairs	`num_lan_queue_pairs`	The number of queue pairs for the default LAN VSI. Allowed values: `1` to `64` (default = `32`)
VMDq VSI queue pairs	`num_vmdq_queue_pairs`	The number of queue pairs for VMDq VSI. Allowed values: `1` to `16` (default = `2`)
VMDq VSIs	`num_vmdq_vsis`	The number of VMDq VSIs. Allowed values: `0` to `64` (default = `0`)
Queue pairs	num_lan_queue_pairs	The number of queue pairs for the default LAN VSI Allowed values:

Type	Keyword	Description
		1 - 64 Default value: 32
Transmit queue size	tx_ring_size	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	rx_ring_size	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)
Receive interrupts	rx_itr	The interval of receive interrupts is defined in 2 usec units enabling interval range from zero to 8160 usec (0xFF0). Setting the rx_itr to zero enables immediate interrupt. Allowed values: 0 to 4080 (default = 25)
Transmit interrupts	tx_itr	The interval of transmit interrupts is defined in 2 usec units enabling interval range from zero to 8160 usec (0xFF0). Setting the tx_itr to zero enables immediate interrupt. Allowed values: 0 to 4080 (default = 25)
Rx interrupts	rx_limit_per_intr	Maximum number of packet to receive per interrupt. Allowed values: 16 to 4096 (default = 1024)
Rx bcopy threshold	rx_copy_threshold	Packet size to determine bcopy or not during receive. Allowed values: 0 to 9216 (default = 128)
Tx bcopy threshold	tx_copy_threshold	Packet size to determine bcopy or not during transmit. Allowed values: 0 ~ 9216, 128 by default 0 to 9216 (default = 128)

Related Information

- “Driver Parameters (Oracle Solaris)” on page 57
- “Set Driver Parameters (Linux)” on page 58
- “Driver Parameters (Linux)” on page 59

▼ 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 59.

Related Information

- “Set Driver Parameters (Oracle Solaris)” on page 56
- “Driver Parameters (Oracle Solaris)” on page 57
- “Driver Parameters (Linux)” on page 59

Driver Parameters (Linux)

This table lists the tunable `i40e` 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.
`RxDescriptiors`	`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 (Oracle Solaris)” on page 56

- “Driver Parameters (Oracle Solaris)” on page 57
- “Set Driver Parameters (Linux)” on page 58

Configuring Jumbo Frames

Jumbo frames can support up to 9706 MTU. The default value is 1500 MTU.

Related Information

- "Understanding the Installation Process" on page 11
- "Understanding the Adapter" on page 15
- "Confirming Specifications and Requirements" on page 21
- "Updating Software" on page 25
- "Installing the Driver" on page 27
- "Installing the Adapter" on page 37
- "Configuring the Network" on page 47
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- "Configuring a Link Aggregation" on page 65
- "Configuring VLANs and VXLANs" on page 69
- "Removing the Driver" on page 75
- "Troubleshooting the Adapter (Oracle Solaris)" on page 83

▼ Change the MTU Permanently (Oracle Solaris)

- **Take one of these actions.**
  - Add this line in the `/etc/driver/drv/i40e.conf` file and reboot the server.

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

    where *desired-frame-size* value can range from `1500` to `9706`.

Note - Adding this line will make changes to all instances of i40e. To change for specific instances, see Step 2 in “Set Driver Parameters (Oracle Solaris)” on page 56.

- Type:

```
# dladm set-linkprop -p mtu=9706 net0
```

Related Information

- “Change the MTU Temporarily (Oracle Solaris)” on page 62
- “Configure Jumbo Frames (Linux)” on page 62

▼ Change the MTU Temporarily (Oracle Solaris)

- **Use the `dladm` command.**

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

```
# dladm set-linkprop [-t] -p mtu=9706 net0
```

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

Related Information

- “Change the MTU Permanently (Oracle Solaris)” on page 61
- “Configure Jumbo Frames (Linux)” on page 62

▼ Configure Jumbo Frames (Linux)

Jumbo frames can support up to 9706 MTU. The default value is 1500 MTU.

- **Use the `ifconfig` command.**

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

```
# ifconfig eth7 192.1.1.200 mtu 9706 up
```

Related Information

- “Change the MTU Temporarily (Oracle Solaris)” on page 62

- “Change the MTU Permanently (Oracle Solaris)” on page 61

Configuring a Link Aggregation

These topics describe how to configure link aggregation in the Oracle Solaris 11.3 OS. For more instructions on link aggregations in the Oracle Solaris 11 OS, refer to "Creating a Link Aggregation" in *Managing Network Datalinks in Oracle Solaris 11.3*.

Related Information

- "Understanding the Installation Process" on page 11
- "Understanding the Adapter" on page 15
- "Confirming Specifications and Requirements" on page 21
- "Updating Software" on page 25
- "Installing the Driver" on page 27
- "Installing the Adapter" on page 37
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- "Configuring VLANs and VXLANs" on page 69
- "Removing the Driver" on page 75
- "Troubleshooting the Adapter (Oracle Solaris)" on page 83

▼ Configure a Link Aggregation (Oracle Solaris 11)

The example in this procedure aggregates sample interfaces `i40e0`, `i40e1`, `i40e2`, and `i40e3`. 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 `i40e` 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, refer to Chapter 2, "Configuring High Availability by Using Link Aggregations" in *Managing Network Datalinks in Oracle Solaris 11.3*.

Related Information

- "Display Information About a Link Aggregation (Oracle Solaris)" on page 66
- "Delete a Link Aggregation (Oracle Solaris)" on page 67

▼ Display Information About a Link Aggregation (Oracle Solaris)

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

- **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 ffffff00 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 ffffff00 broadcast 193.2.2.255
     ether 0:15:17:75:ff:83
```

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

For more information about link aggregation, refer to Chapter 2, "Configuring High Availability by Using Link Aggregations" in *Managing Network Datalinks in Oracle Solaris 11.3*.

Related Information

- "Configure a Link Aggregation (Oracle Solaris 11)" on page 65
- "Delete a Link Aggregation (Oracle Solaris)" on page 67

▼ Delete a Link Aggregation (Oracle Solaris)

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

   For example:

   ```
   # 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
   ```

   For more information, refer to "How to Delete a Link Aggregation" in *Managing Network Datalinks in Oracle Solaris 11.3*.

Related Information

- "Configure a Link Aggregation (Oracle Solaris 11)" on page 65
- "Display Information About a Link Aggregation (Oracle Solaris)" on page 66

Configuring VLANs and VXLANs

These topics explain how to configure VLANs and VXLANs:

Related Information

- "Understanding the Installation Process" on page 11
- "Understanding the Adapter" on page 15
- "Confirming Specifications and Requirements" on page 21
- "Updating Software" on page 25
- "Installing the Driver" on page 27
- "Installing the Adapter" on page 37
- "Configuring the Network" on page 47
- "Configuring Driver Parameters" on page 55
- "Configuring Jumbo Frames" on page 61
- "Configuring VLANs and VXLANs" on page 69
- "Removing the Driver" on page 75
- "Troubleshooting the Adapter (Oracle Solaris)" on page 83

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.

For more information on administering VLANs, refer to Managing Network Virtualization and Network Resources in Oracle Solaris 11.3.

Related Information

- “Configure VLANs (Oracle Solaris)” on page 70
- “Configure VLANs (Linux)” on page 71
- “Configure VLANs (Windows)” on page 72
- “Configure VXLANs (Oracle Solaris)” on page 73

▼ Configure VLANs (Oracle Solaris)

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

```
# dladm show-phys | grep i40e
net4              Ethernet             up         10000  full      i40e0
net6              Ethernet             up         10000  full      i40e2
net5              Ethernet             up         10000  full      i40e1
net7              Ethernet             up         10000  full      i40e3
```

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

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

where *link* specifies the link on which 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

- “VLANs Overview” on page 69
- “Configure VLANs (Linux)” on page 71
- “Configure VLANs (Windows)” on page 72
- “Configure VXLANs (Oracle Solaris)” on page 73

▼ Configure VLANs (Linux)

1. **Ensure that the `i40e` module is loaded.**

   ```
   # modprobe i40e
   ```

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

   ```
   # ifconfig eth6 ipv6addressup
   ```

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

3. **Add the VID.**

   For example, type:

   ```
   # 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 `i40e` VLAN.**

   For example, type:

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

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

Related Information

- “VLANs Overview” on page 69
- “Configure VLANs (Oracle Solaris)” on page 70

- "Configure VLANs (Windows)" on page 72
- "Configure VXLANs (Oracle Solaris)" on page 73

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 Quad Port 10GBase-T Adapter port, then select Properties.**
5. **Click Configure.**
6. **Click VLAN, then click New.**
7. **Type `VLAN` with *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

- "VLANs Overview" on page 69

- "Configure VLANs (Oracle Solaris)" on page 70
- "Configure VLANs (Linux)" on page 71
- "Configure VXLANs (Oracle Solaris)" on page 73

Configure VXLANs (Oracle Solaris)

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 | grep i40e
net4              Ethernet             up         10000  full      i40e0
net6              Ethernet             up         10000  full      i40e2
net5              Ethernet             up         10000  full      i40e1
net7              Ethernet             up         10000  full      i40e3
```

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

- "VLANs Overview" on page 69
- "Configure VLANs (Oracle Solaris)" on page 70
- "Configure VLANs (Linux)" on page 71
- "Configure VLANs (Windows)" on page 72

Removing the Driver

These topics explain how to remove the `i40e` and `i40evf` device drivers.

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.

Description	Links
Remove the driver on an Oracle Solaris server.	“Remove the `i40e/i40evf` Driver (Oracle Solaris)” on page 76
Remove the driver on a Linux server.	“Remove the `i40e` Driver (Linux)” on page 76 “Remove the `i40evf` Driver (Linux)” on page 76
Remove the driver on a Windows server.	“Remove the `i40e` Driver (Windows)” on page 77 “Remove the `i40evf` Driver (Windows)” on page 77

Related Information

- “Understanding the Installation Process” on page 11
- “Understanding the Adapter” on page 15
- “Confirming Specifications and Requirements” on page 21
- “Updating Software” on page 25
- “Installing the Driver” on page 27
- “Installing the Adapter” on page 37
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- “Configuring Jumbo Frames” on page 61
- “Configuring a Link Aggregation” on page 65
- “Configuring VLANs and VXLANs” on page 69
- “Troubleshooting the Adapter (Oracle Solaris)” on page 83

Remove the i40e/i40evf Driver (Oracle Solaris)

- **Type:**

```
# pkg uninstall i40e
```

Refer to the Oracle Solaris pkg(1M) man page for more information.

Related Information

- "Remove the i40e Driver (Linux)" on page 76
- "Remove the i40evf Driver (Linux)" on page 76
- "Remove the i40e Driver (Windows)" on page 77
- "Remove the i40evf Driver (Windows)" on page 77

Remove the i40e Driver (Linux)

- **Type:**

```
#rmmod i40e
```

Related Information

- "Remove the i40e/i40evf Driver (Oracle Solaris)" on page 76
- "Remove the i40evf Driver (Linux)" on page 76
- "Remove the i40e Driver (Windows)" on page 77
- "Remove the i40evf Driver (Windows)" on page 77

Remove the i40evf Driver (Linux)

- **Type:**

```
#rmmod i40evf
```

Related Information

- "Remove the i40e/i40evf Driver (Oracle Solaris)" on page 76
- "Remove the i40e Driver (Linux)" on page 76

- "Remove the i40e Driver (Windows)" on page 77
- "Remove the i40evf Driver (Windows)" on page 77

Remove the i40e Driver (Windows)

1. **From the Control Panel, double-click Add/Remove Programs.**
2. **Select Intel PRO Network Connections Drivers.**
3. **Click Add/Remove.**
4. **When the confirmation dialog displays, click OK.**

Related Information

- "Remove the i40e/i40evf Driver (Oracle Solaris)" on page 76
- "Remove the i40e Driver (Linux)" on page 76
- "Remove the i40evf Driver (Linux)" on page 76
- "Remove the i40evf Driver (Windows)" on page 77

Remove the i40evf Driver (Windows)

1. **From the Control Panel, double-click Add/Remove Programs.**
2. **Select Intel PRO Network Connections Drivers.**
3. **Click Add/Remove.**
4. **When the confirmation dialog displays, click OK.**

Related Information

- "Remove the i40e/i40evf Driver (Oracle Solaris)" on page 76
- "Remove the i40e Driver (Linux)" on page 76
- "Remove the i40evf Driver (Linux)" on page 76
- "Remove the i40e Driver (Windows)" on page 77

Upgrading the Adapter

The Oracle Solaris 11.3 OS includes the Oracle Hardware Management Pack's `fwupdate` firmware update tool. Use the `fwupdate` tool located in the `system/management` directory to upgrade your adapter.

These topics explain how to upgrade the firmware on the Oracle Quad Port 10GBase-T Adapter and verify the upgrade:

Firmware Update Tool Overview

You can update the firmware using the firmware update tool, which can be obtained in these ways for the Oracle Solaris x86, Linux, and Windows environments:

- 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, which includes the firmware update tool. Refer to the text files in HMP for instructions on updating your firmware.
- `fwupdate` Automatic Mode Command Syntax. 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`).

Related Information

- "Update the OS (Oracle Solaris)" on page 25
- "Firmware Update Tool Overview" on page 79

Upgrade the Adapter Firmware

This task assumes you are upgrading an adapter on Oracle Solaris SPARC. For instructions on Oracle Solaris SPARC and other platforms, refer to "Using fwupdate to Update Firmware" in *Oracle Server CLI Tools User's Guide*.

1. **Log in to your server.**

2. **Check the current firmware to determine if the latest minimum required version is installed.**

   For example:

```
$ fwupdate check sysfw
ERROR: The installed System Firmware or ILOM version is not the latest available. You
 must update it to
obtain the latest security and other fixes.
```

3. **Determine which mode to use to install the package.**

   - Automatic mode
   - Manual mode

   For information on what each mode does, refer to "update Subcommand Overview" in *Oracle Server CLI Tools User's Guide*.

4. **Upgrade the firmware.**

   For instructions, refer to "Update Device Firmware Using Automatic Mode" in *Oracle Server CLI Tools User's Guide* or "Update Device Firmware Using Manual Mode" in *Oracle Server CLI Tools User's Guide*.

5. **Verify the upgrade.**

   See "Verify the Upgrade" on page 80.

Verify the Upgrade

This task assumes you are upgrading an adapter on Oracle Solaris SPARC. For instructions on Oracle Solaris SPARC and other platforms, refer to "Updating Component Firmware" in *Oracle Server CLI Tools User's Guide*.

1. **Log in to your server.**

2. **Check the current firmware version.**

   For example:

```
$ fwupdate check sysfw
ERROR: The installed System Firmware or ILOM version is not the latest available. You
 must update it to
obtain the latest security and other fixes.
```

Note - To reset a device after a firmware upgrade, refer to "Reset a Device After a Firmware Update" in *Oracle Server CLI Tools User's Guide*.

Related Information

- "Updating Software" on page 25
- "Installing the Adapter" on page 37

Troubleshooting the Adapter (Oracle Solaris)

These topics describe how to troubleshoot the installation and operation of the Oracle Quad 10 Gb or Dual 40 Gb Ethernet Adapter on an Oracle SPARC or x86 server running the Oracle Solaris 11 OS. These topics cover basic installation issues and are not intended to be comprehensive.

Related Information

Analyze Why the Device Link Is Missing (Oracle Solaris)

When you use the http://docs.oracle.com/cd/E86824_01/html/E54764/ifconfig-1m.html#scrolltoc or ipadm(1M) man pages and you see an error message similar to the sample below, perform these steps:

```
...
cannot open i40e0; link doesn't exist
...
```

1. **Check the OS.**

   Use the `ipadm`(1M) command to plumb the driver. Refer to the Oracle Solaris `ipadm`(1M) man page for instructions.

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

3. **Use the `prtconf` or `scanpci` command to ensure that the device is installed.**

4. **If the device exists, check the `/etc/driver_aliases` file to ensure that the file contains an `i40e` 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 an `i40e` entry.**

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

Related Information

- “Recover From a Port Hang (Oracle Solaris)” on page 84
- “Analyze Slow Network Performance (Oracle Solaris)” on page 86
- “Analyze Why the Link Is Not Up After Back-To-Back Cable Connection (Oracle Solaris)” on page 87
- “Analyze Why Changing the MTU Does Not Correctly Set the Link Property (Oracle Solaris)” on page 87

Recover From a Port Hang (Oracle Solaris)

1. **Take one of these actions.**

- If the interface encounters a soft hang, replumb the device.

  Use the `ipadm` command.
- If the interface encounters a hard hang, reboot the server.
- If the interface encounters another hard hang, try to capture the trace information by using the `dtrace` command. For example:

  ```
  # detrace -F -m 'i40e{trace(timestamp)}'
  >/tmp/dtrace.out
  ```
- 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 for the driver statistics.

```
# kstat i40e:* :statistics
```

3. Use the following parameters for performance tuning in `i40e.conf`:

Parameters	Description
`rx_itr`	Interval of receive interrupts `0` to `4080`, `25` (`50` usec) by default .
tx_itr	Interval of transmit interrupts `0` to `4080`, `25` (`50` usec) by default.
`rx_limit_per_intr`	Maximum number of packet to receive per interrupt16 ~ 4096, 1024 by default.
`rx_copy_threshold`	Packet size to determine bcopy or not during receive0 ~ 9216, 128 by default.
`tx_copy_threshold`	Packet size to determine bcopy or not during transmit0 ~ 9216, 128 by default

Related Information

- “Analyze Why the Device Link Is Missing (Oracle Solaris)” on page 84
- “Analyze Slow Network Performance (Oracle Solaris)” on page 86
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Analyze Slow Network Performance (Oracle Solaris)

The adapter supports several driver parameters that affect the performance of the ports. See "Driver Parameters (Oracle Solaris)" on page 57 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, try setting logging to dump to the `/tmp` directory. Then, retest to ensure that the new configuration improved performance.

4. **Use the `vmstat` command and the `mpstat` command 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`).

   If the performance issue points to the driver, try to profile the call stack for the `i40e` driver by using the `DTrace` script. For more information about the `DTrace` script, go to `http://support.oracle.com`

Related Information

- "Analyze Why the Device Link Is Missing (Oracle Solaris)" on page 84
- "Recover From a Port Hang (Oracle Solaris)" on page 84
- "Analyze Why the Link Is Not Up After Back-To-Back Cable Connection (Oracle Solaris)" on page 87
- "Analyze Why Changing the MTU Does Not Correctly Set the Link Property (Oracle Solaris)" on page 87

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

1. **Ensure that you are using the correct cable type.**

   See "Supported Cables" on page 24.

2. **Check the auto-neg/link settings on both peers to ensure that they are compatible.**

Related Information

- "Analyze Why the Device Link Is Missing (Oracle Solaris)" on page 84
- "Recover From a Port Hang (Oracle Solaris)" on page 84
- "Analyze Slow Network Performance (Oracle Solaris)" on page 86
- "Analyze Why Changing the MTU Does Not Correctly Set the Link Property (Oracle Solaris)" on page 87

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

The `dladm` command might display this message:

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

The message indicates that some objects defined on the link might need to be removed or plumbed down.

1. **Disable any network objects defined over the link.**

   Depending on your configuration, you might need to use the `dladm delete-vlan` command or the `dladm delete-vnics` command to disable objects. For instructions, refer to "How to Delete a VNIC" in *Managing Network Virtualization and Network Resources in Oracle Solaris 11.3* and "Deleting a VLAN" in *Managing Network Datalinks in Oracle Solaris 11.3*.

2. **Change the MTU.**

```
# dladm set-linkprop -p mtu=9706 net0
```

Related Information

- "Analyze Why the Device Link Is Missing (Oracle Solaris)" on page 84

- "Recover From a Port Hang (Oracle Solaris)" on page 84
- "Analyze Slow Network Performance (Oracle Solaris)" on page 86
- "Analyze Why the Link Is Not Up After Back-To-Back Cable Connection (Oracle Solaris)" on page 87

Glossary

A

ACT Activity LED. Indicates that the port is up and running.

adapter The Oracle Quad Port 10GBase-T Adapter.

D

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 GTs-per-second.

L

LFM Linear Feet per minute.

LNK Link LED. Indicates that the network link is up and running.

M

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

Mb Megabit.

Mbps Megabits-per-second.

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

PCI Peripheral Component Interconnect.

PCIe PCI Express.

PF Physical function.

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

R

ROM Read-only memory.

RPM RPM Package Manager.

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

S

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.

TCP/IP Transmission Control Protocol and Internet Protocol. In this guide, TCP/IP refers to the TCP/IP model, which is a framework for the IP suite.

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

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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