

Sun Dual Port 10GBase-T Adapter

User's Guide



Part No.: E25544-02
July 2012

Copyright © 2012, Oracle and/or its affiliates. All rights reserved.

This software and related documentation are provided under a license agreement containing restrictions on use and disclosure and are protected by intellectual property laws. Except as expressly permitted in your license agreement or allowed by law, you may not use, copy, reproduce, translate, broadcast, modify, license, transmit, distribute, exhibit, perform, publish, or display any part, in any form, or by any means. Reverse engineering, disassembly, or decompilation of this software, unless required by law for interoperability, is prohibited.

The information contained herein is subject to change without notice and is not warranted to be error-free. If you find any errors, please report them to us in writing.

If this is software or related software documentation that is delivered to the U.S. Government or anyone licensing it on behalf of the U.S. Government, the following notice is applicable:

U.S. GOVERNMENT END USERS. Oracle programs, including any operating system, integrated software, any programs installed on the hardware, and/or documentation, delivered to U.S. Government end users are "commercial computer software" pursuant to the applicable Federal Acquisition Regulation and agency-specific supplemental regulations. As such, use, duplication, disclosure, modification, and adaptation of the programs, including any operating system, integrated software, any programs installed on the hardware, and/or documentation, shall be subject to license terms and license restrictions applicable to the programs. No other rights are granted to the U.S. Government.

This software or hardware is developed for general use in a variety of information management applications. It is not developed or intended for use in any inherently dangerous applications, including applications that may create a risk of personal injury. If you use this software or hardware in dangerous applications, then you shall be responsible to take all appropriate fail-safe, backup, redundancy, and other measures to ensure its safe use. Oracle Corporation and its affiliates disclaim any liability for any damages caused by use of this software or hardware in dangerous applications.

Oracle and Java are registered trademarks of Oracle and/or its affiliates. Other names may be trademarks of their respective owners.

Intel and Intel Xeon are trademarks or registered trademarks of Intel Corporation. All SPARC trademarks are used under license and are trademarks or registered trademarks of SPARC International, Inc. AMD, Opteron, the AMD logo, and the AMD Opteron logo are trademarks or registered trademarks of Advanced Micro Devices. UNIX is a registered trademark of The Open Group.

This software or hardware and documentation may provide access to or information on content, products, and services from third parties. Oracle Corporation and its affiliates are not responsible for and expressly disclaim all warranties of any kind with respect to third-party content, products, and services. Oracle Corporation and its affiliates will not be responsible for any loss, costs, or damages incurred due to your access to or use of third-party content, products, or services.

Copyright © 2012, Oracle et/ou ses affiliés. Tous droits réservés.

Ce logiciel et la documentation qui l'accompagne sont protégés par les lois sur la propriété intellectuelle. Ils sont concédés sous licence et soumis à des restrictions d'utilisation et de divulgation. Sauf disposition de votre contrat de licence ou de la loi, vous ne pouvez pas copier, reproduire, traduire, diffuser, modifier, breveter, transmettre, distribuer, exposer, exécuter, publier ou afficher le logiciel, même partiellement, sous quelque forme et par quelque procédé que ce soit. Par ailleurs, il est interdit de procéder à toute ingénierie inverse du logiciel, de le désassembler ou de le décompiler, excepté à des fins d'interopérabilité avec des logiciels tiers ou tel que prescrit par la loi.

Les informations fournies dans ce document sont susceptibles de modification sans préavis. Par ailleurs, Oracle Corporation ne garantit pas qu'elles soient exemptes d'erreurs et vous invite, le cas échéant, à lui en faire part par écrit.

Si ce logiciel, ou la documentation qui l'accompagne, est concédé sous licence au Gouvernement des Etats-Unis, ou à toute entité qui délivre la licence de ce logiciel ou l'utilise pour le compte du Gouvernement des Etats-Unis, la notice suivante s'applique :

U.S. GOVERNMENT END USERS. Oracle programs, including any operating system, integrated software, any programs installed on the hardware, and/or documentation, delivered to U.S. Government end users are "commercial computer software" pursuant to the applicable Federal Acquisition Regulation and agency-specific supplemental regulations. As such, use, duplication, disclosure, modification, and adaptation of the programs, including any operating system, integrated software, any programs installed on the hardware, and/or documentation, shall be subject to license terms and license restrictions applicable to the programs. No other rights are granted to the U.S. Government.

Ce logiciel ou matériel a été développé pour un usage général dans le cadre d'applications de gestion des informations. Ce logiciel ou matériel n'est pas conçu ni n'est destiné à être utilisé dans des applications à risque, notamment dans des applications pouvant causer des dommages corporels. Si vous utilisez ce logiciel ou matériel dans le cadre d'applications dangereuses, il est de votre responsabilité de prendre toutes les mesures de secours, de sauvegarde, de redondance et autres mesures nécessaires à son utilisation dans des conditions optimales de sécurité. Oracle Corporation et ses affiliés déclinent toute responsabilité quant aux dommages causés par l'utilisation de ce logiciel ou matériel pour ce type d'applications.

Oracle et Java sont des marques déposées d'Oracle Corporation et/ou de ses affiliés. Tout autre nom mentionné peut correspondre à des marques appartenant à d'autres propriétaires qu'Oracle.

Intel et Intel Xeon sont des marques ou des marques déposées d'Intel Corporation. Toutes les marques SPARC sont utilisées sous licence et sont des marques ou des marques déposées de SPARC International, Inc. AMD, Opteron, le logo AMD et le logo AMD Opteron sont des marques ou des marques déposées d'Advanced Micro Devices. UNIX est une marque déposée d'The Open Group.

Ce logiciel ou matériel et la documentation qui l'accompagne peuvent fournir des informations ou des liens donnant accès à des contenus, des produits et des services émanant de tiers. Oracle Corporation et ses affiliés déclinent toute responsabilité ou garantie expresse quant aux contenus, produits ou services émanant de tiers. En aucun cas, Oracle Corporation et ses affiliés ne sauraient être tenus pour responsables des pertes subies, des coûts occasionnés ou des dommages causés par l'accès à des contenus, produits ou services tiers, ou à leur utilisation.



Adobe PostScript

Contents

Using This Documentation vii

Understanding the Installation Process 1

Installation Overview (Oracle Solaris 10) 2

Installation Overview (Oracle Solaris 11) 3

Installation Overview (Linux) 4

Installation Overview (Windows) 5

Understanding the Adapter 7

Shipping Kit Contents 8

Product Description 8

Configuration Options 9

Front Panel Connectors and LEDs 11

Physical Characteristics 13

Performance Specifications 14

Power and Environmental Requirements 14

OS Patches and Updates 15

Installing the Driver 17

▼ Verify the Driver Version (Oracle Solaris 10) 18

▼ Verify the Driver Version (Oracle Solaris 11) 19

▼ Remove the Driver (Oracle Solaris OS) 19

- ▼ Download and Install the Driver (Linux) 20
- ▼ Remove the Driver (Linux) 22
- ▼ Download and Install the Driver (Windows) 22
- ▼ Remove the Driver (Windows) 24

Installing the Adapter 25

- ▼ Install the Adapter 26
- ▼ Verify the Installation (Oracle SPARC) 27
- ▼ Verify the Installation (Oracle Solaris x86) 30
- ▼ Verify the Installation (Linux) 31
- ▼ Verify the Installation (Windows) 31

Configuring the Network 33

- ▼ Create Driver Instance Files (Oracle Solaris 10) 34
- ▼ Configure the Network Host Files (Oracle Solaris 10) 34

Boot Options 35

- ▼ Boot Over the Network (PXE) 36
- ▼ Boot Over a 10 GbE Network (Oracle Solaris x86 and Linux) 36
- ▼ Install Oracle Solaris 10 Over a Network (Oracle SPARC) 38

Administering Driver Parameters and Jumbo Frames 43

Driver Parameters (Oracle Solaris OS) 44

- ▼ Set Driver Parameters (Oracle Solaris OS) 45

Driver Parameters (Linux) 46

- ▼ Set Driver Parameters (Linux) 47

Configuring Jumbo Frames (Oracle Solaris OS) 48

- ▼ Change the MTU Permanently 48
- ▼ Change the MTU Temporarily (Oracle Solaris 10) 48
- ▼ Change the MTU Temporarily (Oracle Solaris 11) 49
- ▼ Configure Jumbo Frames (Linux) 50

Configuring Link Aggregation 51

Link Aggregation Overview 52

- ▼ Configure Link Aggregations (Oracle Solaris 10) 52
- ▼ Display Information About Link Aggregations (Oracle Solaris 10) 53
- ▼ Delete Link Aggregations (Oracle Solaris 10) 54

Configuring VLANs 57

VLAN Overview 58

VLAN Configuration 61

VLAN Naming Format 61

- ▼ Configure Static VLANs (Oracle Solaris 10) 62
- ▼ Configure VLANs (Linux) 63
- ▼ Configure VLANs (Windows) 64

Troubleshooting the Adapter 67

- ▼ Analyze Why the Device Link Is Missing 68
- ▼ Analyze a Port Hang 69
- ▼ Analyze Slow Network Performance 69

Glossary 71

Index 77

Using This Documentation

This guide provides hardware and software installation instructions for the Sun Dual Port 10GBase-T Adapter from Oracle. The instructions are meant for enterprise system administrators who have experience installing network hardware and software.

Important: The Sun Dual Port 10GBase-T Adapter was formerly named the Sun Dual Port 10 GbE PCIe 2.0 Low Profile Adapter, Base-T. The former product name might still appear in the product and document. The product name change does not indicate any change in product features or functionality.

Note – In this document, 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.

- “Product Notes” on page vii
- “Related Documentation” on page viii
- “Feedback” on page viii
- “Support and Accessibility” on page ix

Product Notes

For late-breaking information and known issues about this product, refer to the product notes at:

http://www.oracle.com/pls/topic/lookup?ctx=SDP_10GbE-PCIe2.0-LPA_BASE-T

Related Documentation

Documentation	Links
All Oracle products	http://www.oracle.com/documentation
Sun Dual Port 10GBase-T Adapter	http://www.oracle.com/pls/topic/lookup?ctx=SDP_10GbE-PCIe2.0-LPA_BASE-T
Oracle Solaris 10 OS	http://docs.oracle.com/cd/E23823_01/index.html
Oracle Solaris 11 OS	http://docs.oracle.com/cd/E23824_01/index.html
Oracle Solaris OS and systems software library	http://www.oracle.com/technetwork/indexes/documentation/index.html#sys_sw

Feedback

Provide feedback on this documentation at:

<http://www.oracle.com/goto/docfeedback>

Support and Accessibility

Description	Links
Access electronic support through My Oracle Support	http://support.oracle.com For hearing impaired: http://www.oracle.com/accessibility/support.html
Learn about Oracle's commitment to accessibility	http://www.oracle.com/us/corporate/accessibility/index.html

Understanding the Installation Process

These topics provide an overview of the installation process for the Sun Dual Port 10GBase-T Adapter:

- [“Installation Overview \(Oracle Solaris 10\)”](#) on page 2
- [“Installation Overview \(Oracle Solaris 11\)”](#) on page 3
- [“Installation Overview \(Linux\)”](#) on page 4
- [“Installation Overview \(Windows\)”](#) on page 5

Related Information

- [“Understanding the Adapter”](#) on page 7
- [“Installing the Driver”](#) on page 17
- [“Installing the Adapter”](#) on page 25
- [“Configuring the Network”](#) on page 33
- [“Administering Driver Parameters and Jumbo Frames”](#) on page 43
- [“Configuring Link Aggregation”](#) on page 51
- [“Configuring VLANs”](#) on page 57
- [“Troubleshooting the Adapter”](#) on page 67

Installation Overview (Oracle Solaris 10)

Follow these steps to install the Adapter on an Oracle Solaris 10 platform.

Step	Description	Links
1.	Understand the Adapter.	“Understanding the Adapter” on page 7
2.	Verify the driver installation.	“Verify the Driver Version (Oracle Solaris 10)” on page 18
3.	Install the Adapter.	“Install the Adapter” on page 26
4.	Verify the Adapter installation.	“Verify the Installation (Oracle SPARC)” on page 27 “Verify the Installation (Oracle Solaris x86)” on page 30
5.	Configure the network.	“Create Driver Instance Files (Oracle Solaris 10)” on page 34 “Configure the Network Host Files (Oracle Solaris 10)” on page 34
6.	Configure the driver parameters.	“Driver Parameters (Oracle Solaris OS)” on page 44 “Set Driver Parameters (Oracle Solaris OS)” on page 45
7.	(Optional) Boot over the network.	“Boot Over the Network (PXE)” on page 36 “Boot Over a 10 GbE Network (Oracle Solaris x86 and Linux)” on page 36
8.	(Optional) Install the OS over the network.	“Install Oracle Solaris 10 Over a Network (Oracle SPARC)” on page 38
9.	(Optional) Configure jumbo frames.	“Change the MTU Permanently” on page 48
10.	(Optional) Configure link aggregation.	“Link Aggregation Overview” on page 52 “Configure Link Aggregations (Oracle Solaris 10)” on page 52 “Display Information About Link Aggregations (Oracle Solaris 10)” on page 53 “Delete Link Aggregations (Oracle Solaris 10)” on page 54
11.	(Optional) Configure VLANs.	“VLAN Overview” on page 58 “VLAN Configuration” on page 61 “Configure Static VLANs (Oracle Solaris 10)” on page 62

Installation Overview (Oracle Solaris 11)

The installation, configuration, and administration of software packages, driver parameters, and network layers have changed in the Oracle Solaris 11 OS. The instructions for these procedures are in Oracle Solaris 11 documentation, located here:

http://docs.oracle.com/cd/E23824_01/index.html

Follow these steps to install the Adapter on an Oracle Solaris 11 platform.

Step	Description	Links
1.	Understand the Adapter.	“Understanding the Adapter” on page 7
2.	Verify the driver installation.	“Verify the Driver Version (Oracle Solaris 11)” on page 19
3.	Install the Adapter.	“Install the Adapter” on page 26
4.	Verify the Adapter installation.	Refer to <i>Adding and Updating Oracle Solaris 11 Software Packages</i> .
5.	Configure the network.	Refer to <i>Creating and Administering Boot Environments After Installation</i> .
6.	Configure the driver parameters.	“Administering Driver Parameters and Jumbo Frames” on page 43
7.	(Optional) Boot over the network.	Refer to <i>Creating and Administering Boot Environments After Installation</i> .
8.	(Optional) Install the OS over the network.	Refer to <i>Adding and Updating Oracle Solaris 11 Software Packages</i> .
9.	(Optional) Configure jumbo frames.	“Configuring Jumbo Frames (Oracle Solaris OS)” on page 48
10.	(Optional) Configure link aggregation.	“Link Aggregation Overview” on page 52 Refer to <i>Oracle Solaris Administration: Network Interfaces and Network Virtualization</i> .
11.	(Optional) Configure VLANs.	“VLAN Overview” on page 58 “VLAN Configuration” on page 61 Refer to <i>Oracle Solaris Administration: Network Interfaces and Network Virtualization</i> .

Installation Overview (Linux)

Follow these steps to install the Adapter on a Linux platform.

Step	Description	Links
1.	Understand the Adapter.	“Understanding the Adapter” on page 7
2.	Install the driver.	“Download and Install the Driver (Linux)” on page 20
3.	Install the Adapter.	“Install the Adapter” on page 26
4.	Verify the Adapter installation.	“Verify the Installation (Linux)” on page 31
5.	Boot over the network.	“Boot Over a 10 GbE Network (Oracle Solaris x86 and Linux)” on page 36
6.	Configure the driver parameters.	“Driver Parameters (Linux)” on page 46 “Set Driver Parameters (Linux)” on page 47
7.	(Optional) Configure jumbo frames.	“Configure Jumbo Frames (Linux)” on page 50
8.	(Optional) Configure VLANs.	“VLAN Overview” on page 58 “VLAN Configuration” on page 61 “Configure VLANs (Linux)” on page 63

Installation Overview (Windows)

Follow these steps to install the Adapter on a Windows platform.

Step	Description	Links
1.	Understand the Adapter.	“Understanding the Adapter” on page 7
2.	Install the driver.	“Download and Install the Driver (Windows)” on page 22
3.	Install the Adapter.	“Install the Adapter” on page 26
4.	Verify the Adapter installation.	“Verify the Installation (Windows)” on page 31
5.	(Optional) Configure VLANs.	“VLAN Overview” on page 58 “VLAN Configuration” on page 61 “Configure VLANs (Windows)” on page 64

Understanding the Adapter

These topics provide an overview of the Sun Dual Port 10GBase-T Adapter.

Description	Links
Understand the Adapter.	“Shipping Kit Contents” on page 8 “Product Description” on page 8 “Front Panel Connectors and LEDs” on page 11 “Physical Characteristics” on page 13 “Performance Specifications” on page 14 “Power and Environmental Requirements” on page 14
Understand the hardware and software requirements.	For lists of supported platforms, operating systems, and applications, go here: http://www.oracle.com/goto/sun-dual-port-pcie-20-gigabit
Understand the maintenance requirements.	“OS Patches and Updates” on page 15

Related Information

- [“Understanding the Adapter” on page 7](#)
- [“Installing the Driver” on page 17](#)
- [“Installing the Adapter” on page 25](#)
- [“Configuring the Network” on page 33](#)
- [“Administering Driver Parameters and Jumbo Frames” on page 43](#)
- [“Configuring Link Aggregation” on page 51](#)
- [“Configuring VLANs” on page 57](#)
- [“Troubleshooting the Adapter” on page 67](#)

Shipping Kit Contents

The carton in which the LPA was shipped should contain the following items:

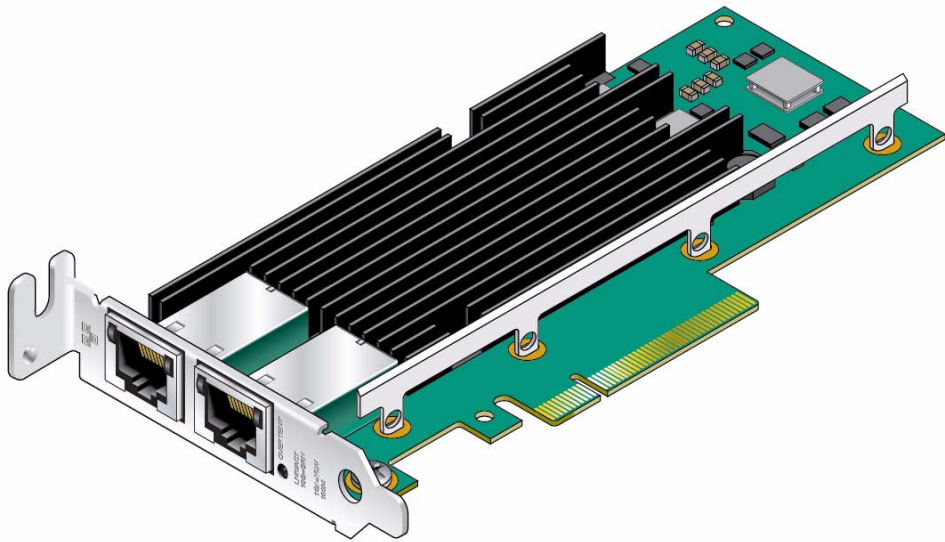
- Sun Dual Port 10GBase-T Adapter with a low profile bracket attached
- Standard height bracket, screws and washer
- *Sun Network Interface Card Products Getting Started Guide*

Related Information

- [“Product Description” on page 8](#)
- [“Front Panel Connectors and LEDs” on page 11](#)
- [“Physical Characteristics” on page 13](#)
- [“Performance Specifications” on page 14](#)
- [“Power and Environmental Requirements” on page 14](#)
- [“OS Patches and Updates” on page 15](#)

Product Description

The Sun Dual Port 10GBase-T Adapter is a 10 GbE NIC for PCIe systems. The adapter offers a high density multi-port design for Sun racks and blade servers. This adapter addresses the multi-port network connectivity needs of data center environments. The module is ideal for slot-constrained servers, providing a simplified low-cost alternative to multiple 10 GbE server adapters for Oracle’s Sun portfolio of SPARC and x86 servers.



Related Information

- “Shipping Kit Contents” on page 8
- “Front Panel Connectors and LEDs” on page 11
- “Physical Characteristics” on page 13
- “Performance Specifications” on page 14
- “Power and Environmental Requirements” on page 14
- “OS Patches and Updates” on page 15

Configuration Options

You can use these networking cards in various server system configurations, such as:

- Rackmounted or pedestal servers
- Blade servers
- Add-on NIC or LOM design
- Switch add-on cards and network applications

FIGURE: NIC Example Configuration Options

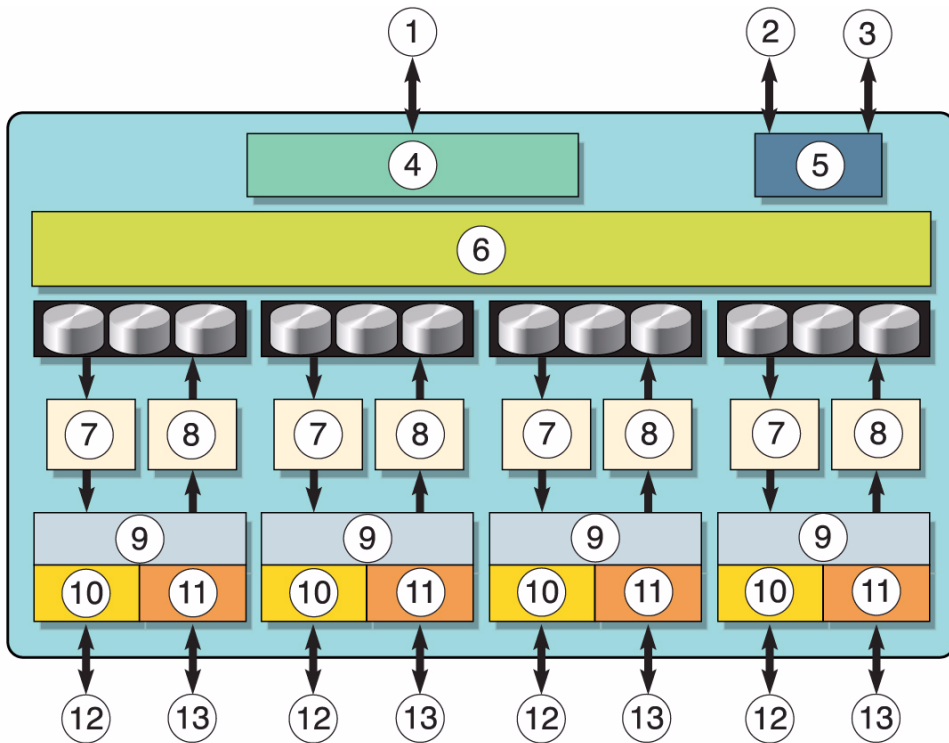


Figure Legend

1	PCIe 2.0 (5 Gbps)	8	RX FIFO
2	NC-SI	9	GbE MAC
3	SMBus	10	SerDes
4	PCIe	11	PHY
5	Management	12	SerDes/SGMII
6	Queue management and DMA	13	1000BASE-T
7	TX FIFO		

Related Information

- [“Shipping Kit Contents”](#) on page 8
- [“Configuration Options”](#) on page 9
- [“Front Panel Connectors and LEDs”](#) on page 11
- [“Physical Characteristics”](#) on page 13

- “Performance Specifications” on page 14
- “Power and Environmental Requirements” on page 14
- “OS Patches and Updates” on page 15

Front Panel Connectors and LEDs

On the front panel, there is one LED dedicated to signal the port speed, state, and activity. The following figure and table explain the meaning of the LED.

FIGURE: Front Face of the Adapter

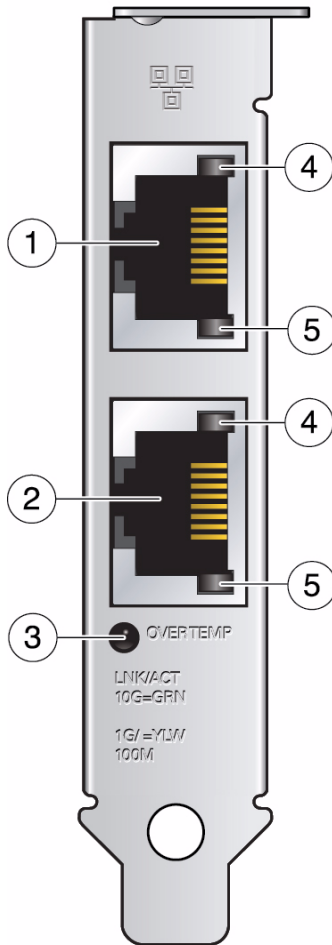


Figure Legend

-
- 1 Port 0
 - 2 Port 1
 - 3 OVERTEMP LED (unused)
 - 4 Speed LED
 - 5 LNK/ACT (link/activity)
-

LED	Color	State	Meaning
Speed	None	Off	Link is down.
	Green	Steady on	1 GbE
	Yellow	Steady on	10 GbE
Link/activity	None	Off	Link is down.
	Green	Steady on	Link is up.
	Green	Blinking	Activity on the link.
OVERTEMP	N/A	N/A	Not used.

Related Information

- [“Shipping Kit Contents” on page 8](#)
- [“Product Description” on page 8](#)
- [“Performance Specifications” on page 14](#)
- [“Power and Environmental Requirements” on page 14](#)
- [“OS Patches and Updates” on page 15](#)

Physical Characteristics

Dimension	Measurement
Length	13.54 cm (5.3 in.)
Height	6.89 cm (2.71 in.)

Related Information

- [“Shipping Kit Contents” on page 8](#)
- [“Product Description” on page 8](#)
- [“Front Panel Connectors and LEDs” on page 11](#)
- [“Performance Specifications” on page 14](#)
- [“Power and Environmental Requirements” on page 14](#)
- [“OS Patches and Updates” on page 15](#)

Performance Specifications

Feature	Specification
Data rate supported per port	10 Gbps, 1 Gbps, 100 Mbps
Bus type	PCIe V2.0, 5.0 GTps
Bus width	x8 lane PCIe
Conforms to Ethernet standard	802.3
Boot ROM	4 Mb SPI Flash
EMI	FCC Class A

Related Information

- [“Shipping Kit Contents” on page 8](#)
- [“Product Description” on page 8](#)
- [“Front Panel Connectors and LEDs” on page 11](#)
- [“Power and Environmental Requirements” on page 14](#)
- [“OS Patches and Updates” on page 15](#)

Power and Environmental Requirements

Specification	Operation	Storage
Typical power consumption	25 W	
Main host power supply	12V \pm 15%	
Temperature	-5°C to 55°C (-5°C to 131°F), noncondensing	-40°C to 70°C (-40°F to 158°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	3,302 meters (10,833.3 feet) at 35°C (95°F) ambient	12,000 meters (39,370.1 feet)
Vibration	0.20 G in all axes (5-500 Hz sine)	1.0 G in all axes (5-500 Hz sine)
Shock	5 G (11 ms half-sine)	30 G (11 ms half-sine)
Airflow	100 LFM at 55°C (131°F)	

Related Information

- “Shipping Kit Contents” on page 8
- “Product Description” on page 8
- “Front Panel Connectors and LEDs” on page 11
- “Physical Characteristics” on page 13
- “Performance Specifications” on page 14
- “OS Patches and Updates” on page 15

OS Patches and Updates

Before you patch the current OS due to version differences, you should update the entire OS image, if possible, on the client system. For JumpStart environments, ensure that you update the entire OS on the JumpStart server.

If you cannot update the entire OS image, download the latest patch that contains the software driver.

<http://support.oracle.com>

For additional information, check the product web page at:

<http://www.oracle.com/goto/sun-dual-port-pcie-20-gigabit>

Related Information

- “Shipping Kit Contents” on page 8
- “Product Description” on page 8
- “Front Panel Connectors and LEDs” on page 11
- “Physical Characteristics” on page 13
- “Performance Specifications” on page 14
- “Power and Environmental Requirements” on page 14

Installing the Driver

The SUNWixgbe software package comes bundled in the Oracle Solaris software. These topics explain how to verify the ixgbe(7D) device driver on an Oracle x86 or Oracle SPARC system that uses the Oracle Solaris OS. The topics also explain how to download and install the ixgbe(7D) driver on Linux and Windows systems.

Note – The Oracle Solaris 10 8/10 OS and the Oracle Solaris 11 OS are the first releases to support the Sun Dual Port 10GBase-T Adapter. You can upgrade to or install either one of these releases, but the version of the driver must be the same on both the client system and the server system.

Description	Links
Verify or remove the driver on an Oracle Solaris platform.	“Verify the Driver Version (Oracle Solaris 10)” on page 18 “Verify the Driver Version (Oracle Solaris 11)” on page 19 “Remove the Driver (Oracle Solaris OS)” on page 19
Download, install, or remove the driver on a Linux platform.	“Download and Install the Driver (Linux)” on page 20 “Remove the Driver (Linux)” on page 22
Download, install, or remove the driver on a Windows platform.	“Download and Install the Driver (Windows)” on page 22 “Remove the Driver (Windows)” on page 24

Related Information

- [“Understanding the Installation Process” on page 1](#)
- [“Understanding the Adapter” on page 7](#)
- [“Installing the Adapter” on page 25](#)
- [“Configuring the Network” on page 33](#)
- [“Administering Driver Parameters and Jumbo Frames” on page 43](#)
- [“Configuring Link Aggregation” on page 51](#)
- [“Configuring VLANs” on page 57](#)
- [“Troubleshooting the Adapter” on page 67](#)

▼ Verify the Driver Version (Oracle Solaris 10)

Oracle Solaris 10 10/11 is the first release of the Oracle Solaris 10 OS to support the Sun Dual Port 10GBase-T Adapter. Depending on your version of the Oracle Solaris 10 OS, you might or might not need to download the updated driver.

1. Check the version of the installed driver.

```
# modinfo | grep ixgbe
173 7b762000 17998 100 1 ixgbe (Intel 10Gb Ethernet 1.0.1)
```

If the version number is not at least 1.0.1, you must install the latest driver, or you can reinstall the OS. See [“OS Patches and Updates”](#) on page 15.

Note – If the `ixgbe(7D)` driver is not listed, the driver might not be loaded. You can use the `modload(1M)` command to load the driver if needed.

2. Manually load the module.

```
# modload /kernel/drv/arch/ixgbe
```

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

Related Information

- [“Verify the Driver Version \(Oracle Solaris 11\)”](#) on page 19
- [“Remove the Driver \(Oracle Solaris OS\)”](#) on page 19

▼ Verify the Driver Version (Oracle Solaris 11)

1. Check the version of the installed driver.

```
# strings /kernel/drv/arch/ixgbe | grep ixgbe
...
ixgbe 1.1.9
```

If the version number is not at least 1.1.9, you must install the latest driver, or you can reinstall the OS. See [“OS Patches and Updates”](#) on page 15.

Note – If the `ixgbe(7D)` driver is not listed, the driver might not be loaded. You can use the `modload(1M)` command to load the driver if needed.

2. Manually load the module.

```
# modload /kernel/drv/arch/ixgbe
```

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

Related Information

- [“Verify the Driver Version \(Oracle Solaris 10\)”](#) on page 18
- [“Remove the Driver \(Oracle Solaris OS\)”](#) on page 19

▼ Remove the Driver (Oracle Solaris OS)

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

- **Remove the driver.**

```
# pkgrm SUNWixgbe*
```

See the `pkgrm(1M)` man page for more information.

Related Information

- “Verify the Driver Version (Oracle Solaris 10)” on page 18
- “Verify the Driver Version (Oracle Solaris 11)” on page 19

▼ Download and Install the Driver (Linux)

If your system uses the Red Hat or [SUSE](#) Linux operating system, you must download the `ixgbe` device driver to install it.

1. Log in to your system.

2. In a browser, go to this location:

http://www.intel.com/p/en_US/support/highlights/network/ecna-x540-t2

3. Select this option:

Downloads and Drivers

4. Select Linux as the operating system.

5. Select the following driver:

Network Adapter Driver for PCI-E 10 Gigabit Network Connections under Linux

6. Select Download.

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

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 `ixgbe-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 ixgbe-1.2.3.4.tar.gz
```

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

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

11. Compile the driver source file.

```
# make  
# make install
```

12. Load the `ixgbe(7D)` driver.

```
# modprobe ixgbe
```

13. Verify that the `ixgbe(7D)` driver has been successfully installed.

```
# lsmod | grep ixgbe
```

The output should be similar to the following:

```
ixgbe                118052  0
```

14. Check the ixgbe driver version.

```
# modinfo ixgbe | grep ver
```

For example, the output might be similar to the following:

```
filename:      /lib/modules/2.6.18-53.el5/kernel/drivers/net/ixgbe/ixgbe.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

- [“Remove the Driver \(Linux\)” on page 22](#)

▼ Remove the Driver (Linux)

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

- Use the `rmmod` command.

```
# rmmod ixgbe
```

Related Information

- [“Download and Install the Driver \(Linux\)” on page 20](#)

▼ Download and Install the Driver (Windows)

If your system uses the Windows Server 2003 or 2008 operating system, perform the following procedure to download and install the device driver.

1. **Log in to your system.**

2. In a browser, go to this location:

http://www.intel.com/p/en_US/support/highlights/network/ecna-x540-t2

3. Select this option:

Downloads and Drivers

4. Select one of the following as the operating system:

■ **For a 64-bit driver:**

- Windows Server 2003 Standard x64 Edition
- Windows Server 2008 Standard x64

■ **For a 32-bit driver:**

- Windows Server 2003 Standard Edition
- Windows Server 2008 Standard

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

- [“Remove the Driver \(Windows\)” on page 24](#)

▼ Remove the Driver (Windows)

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

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

- [“Download and Install the Driver \(Windows\)” on page 22](#)

Installing the Adapter

These topics describe how to install the Adapter.

Description	Links
Understand the connectors.	“Front Panel Connectors and LEDs” on page 11
Install the Adapter.	“Install the Adapter” on page 26
Verify the Adapter installation.	“Verify the Installation (Oracle SPARC)” on page 27 “Verify the Installation (Oracle Solaris x86)” on page 30 “Verify the Installation (Linux)” on page 31 “Verify the Installation (Windows)” on page 31

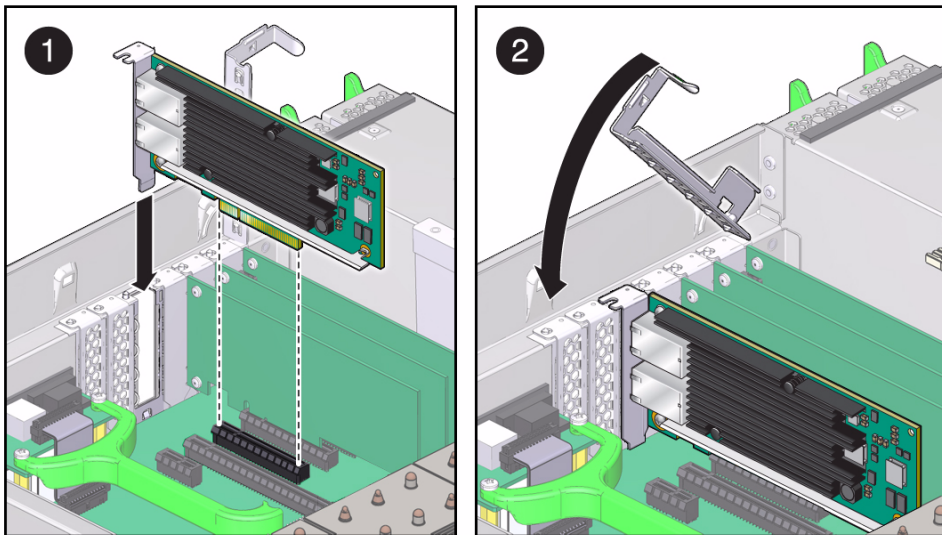
Related Information

- [“Understanding the Installation Process” on page 1](#)
- [“Understanding the Adapter” on page 7](#)
- [“Installing the Driver” on page 17](#)
- [“Configuring the Network” on page 33](#)
- [“Administering Driver Parameters and Jumbo Frames” on page 43](#)
- [“Configuring Link Aggregation” on page 51](#)
- [“Configuring VLANs” on page 57](#)
- [“Troubleshooting the Adapter” on page 67](#)

▼ Install the Adapter

The following instructions describe the basic tasks required to install the Adapter. Refer to your system installation or service manual for specific PCIe installation instructions.

1. Halt and power off your system.
2. Power off all of the peripherals connected to your system.
3. Open the system unit.
4. Attach an antistatic wrist strap to the chassis of the server.
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 system unit.
10. Connect the cables to the ports.
11. Power on the system.

Related Information

- “Verify the Installation (Oracle SPARC)” on page 27
- “Verify the Installation (Oracle Solaris x86)” on page 30
- “Verify the Installation (Linux)” on page 31
- “Verify the Installation (Windows)” on page 31

▼ Verify the Installation (Oracle SPARC)

Note – Verification is not required if your system supports [DR](#).

1. Power on the system.
2. When the banner appears, press the Stop-A key sequence to interrupt the boot process and display the OpenBoot (ok) prompt.
3. List the network devices on your system.

```
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
```

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

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

The following examples assume that

`/pci@400/pci@2/pci@0/pci@a/network@0,1` is a port on the Adapter.

a. Move to the device directory.

```
ok cd /pci@400/pci@2/pci@0/pci@a/network@0,1
```

b. Display properties for the device.

```
ok .properties
```

The output should be similar to the following:

```
assigned-addresses  c30f0010 00000041 00000000 00000000 00200000
                   810f0018 00000000 00006000 00000000 00000020
                   c30f0020 00000041 00200000 00000000 00004000
                   820f0030 00000000 01300000 00000000 00080000
reg                 000f0000 00000000 00000000 00000000 00000000
                   430f0010 00000000 00000000 00000000 00200000
                   010f0018 00000000 00000000 00000000 00000020
                   430f0020 00000000 00000000 00000000 00004000
                   020f0030 00000000 00000000 00000000 00080000
local-mac-address   a0 36 9f 01 2e a0
version              Sun Dual Port 10GBase-T Adapter
                    FCode version 3.11 2/25/12
phy-type             xgc
board-model          701-4776
model                ATO:701-4777, PTO:7011-4773
compatible            pciex8086,1528.108e.7b15.1
                    pciex8086,1528.108e.7b15
                    pciex8086,1528.1
                    pciex8086,1528
                    pciexclass,020000
                    pciexclass,0200
address-bits         00000030
max-frame-size       00002400
network-interface-type ethernet
device_type          network
name                 network
fcode-rom-offset     00000000
interrupts           00000002
cache-line-size      00000010
class-code           00020000
subsystem-id         00007b15
subsystem-vendor-id 0000108e
revision-id          00000001
device-id            00001528
vendor-id            00008086
```

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

- c. Type the following when you finish looking at the `.properties` values.

```
ok device-end
```

Related Information

- [“Install the Adapter” on page 26](#)
- [“Verify the Installation \(Oracle Solaris x86\)” on page 30](#)

▼ Verify the Installation (Oracle Solaris x86)

1. Power on the associated server, and boot the server, if needed.
2. Check the driver version.

```
# modinfo | grep ixgbe
173 7b762000 17998 100 1 ixgbe (Intel 10Gb Ethernet 1.0.1)
```

If the version number is not at least 1.0.1, you must install the latest driver patch. See [“OS Patches and Updates” on page 15](#).

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

```
# grep ixgbe /etc/path_to_inst
```

If the Adapter is properly installed, you should see output similar to the following:

```
"/pci@0,0/pci8086,3c0a@3,2/pci108e,7b15@0" 0 "ixgbe"
"/pci@0,0/pci8086,3c0a@3,2/pci108e,7b15@0,1" 1 "ixgbe"
```

Related Information

- [“Install the Adapter” on page 26](#)

▼ Verify the 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

- [“Install the Adapter” on page 26](#)

▼ Verify the 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 at the Network Connection screen.
3. In the Administration Tool, click Computer Management, Device Manager, and Network Adapter.
4. Check the driver version.
The minimum Windows Server 2003 and 2008 driver version is 14.3.

Related Information

- [“Install the Adapter” on page 26](#)

Configuring the Network

These topics describe how to configure the network for the Sun Dual Port 10GBase-T Adapter.

Description	Links
Configure the network for an Oracle Solaris system.	“Create Driver Instance Files (Oracle Solaris 10)” on page 34 “Configure the Network Host Files (Oracle Solaris 10)” on page 34
Boot over the network.	“Boot Options” on page 35 “Boot Over the Network (PXE)” on page 36 “Boot Over a 10 GbE Network (Oracle Solaris x86 and Linux)” on page 36
Install the Oracle Solaris OS over the network.	“Install Oracle Solaris 10 Over a Network (Oracle SPARC)” on page 38

Related Information

- [“Understanding the Installation Process” on page 1](#)
- [“Understanding the Adapter” on page 7](#)
- [“Installing the Driver” on page 17](#)
- [“Installing the Adapter” on page 25](#)
- [“Administering Driver Parameters and Jumbo Frames” on page 43](#)
- [“Configuring Link Aggregation” on page 51](#)
- [“Configuring VLANs” on page 57](#)
- [“Troubleshooting the Adapter” on page 67](#)

▼ Create Driver Instance Files (Oracle Solaris 10)

Use this procedure to configure the network host files permanently. The new settings will be restored at each reboot.

1. **Create a file named `/etc/hostname.ixgbe#` for each `ixgbe(7D)` interface.**
where # is the interface's instance number. In the new files, only insert a text hostname, then save and exit.
2. **Edit the `/etc/hosts` file to include an IP address and host name for each `ixgbe(7D)` interface (that is, for each `/etc/hostname.ixgbe#` file).**
3. **Boot the Oracle Solaris 10 OS.**

Now the `ixgbe(7D)` interfaces will be plumbed up automatically when you boot.

Related Information

- [“Configure the Network Host Files \(Oracle Solaris 10\)” on page 34](#)
- [“Boot Options” on page 35](#)
- [“Boot Over the Network \(PXE\)” on page 36](#)
- [“Boot Over a 10 GbE Network \(Oracle Solaris x86 and Linux\)” on page 36](#)
- [“Install Oracle Solaris 10 Over a Network \(Oracle SPARC\)” on page 38](#)

▼ Configure the Network Host Files (Oracle Solaris 10)

Use this procedure to configure the network host files dynamically on the command line. At reboot, the settings will revert.

1. **Create a file named `/etc/hostname.ixgbe#` for each `ixgbe(7D)` interface.**
where # is the `ixgbe(7D)` interface instance number you plan to use.

For example, to bring up `ixgbe0` at boot, create a file called `/etc/hostname.ixgbe0`, where 0 is the number of the `ixgbe(7D)` interface. If the instance number were 1, the file name would be `/etc/hostname.ixgbe1`. The `/etc/hostname.ixgbe#` file must contain the host name for the appropriate `ixgbe(7D)` interface.

2. Get the ixgbe(7D) instances.

```
# dladm show-dev
```

The output should include lines similar to the following:

ixgbe0	link: up	speed: 10000	Mbps duplex: full
nge0	link: up	speed: 1000	Mbps duplex: full
nge1	link: down	speed: 0	Mbps duplex: unknown
ixgbe1	link: up	speed: 10000	Mbps duplex: full
ixgbe2	link: up	speed: 10000	Mbps duplex: full

3. Use the ifconfig(1M) command to set up the ixgbe(7D) interfaces.

Your `ifconfig` command might look similar to the following:

```
# ifconfig ixgbe0 plumb ip-address netmask 255.255.255.0 broadcast + up
```

Related Information

- [“Create Driver Instance Files \(Oracle Solaris 10\)” on page 34](#)
- [“Boot Options” on page 35](#)
- [“Boot Over the Network \(PXE\)” on page 36](#)
- [“Boot Over a 10 GbE Network \(Oracle Solaris x86 and Linux\)” on page 36](#)
- [“Install Oracle Solaris 10 Over a Network \(Oracle SPARC\)” on page 38](#)

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 \(Oracle SPARC systems supporting LDOMs\)](#)

The *Oracle Solaris Advanced Installation Guide* includes more information about boot options and describes how to create a boot server.

Related Information

- [“Create Driver Instance Files \(Oracle Solaris 10\)” on page 34](#)
- [“Configure the Network Host Files \(Oracle Solaris 10\)” on page 34](#)

- “Boot Over the Network (PXE)” on page 36
- “Boot Over a 10 GbE Network (Oracle Solaris x86 and Linux)” on page 36
- “Install Oracle Solaris 10 Over a Network (Oracle SPARC)” on page 38

▼ Boot Over the Network (PXE)

PXE network boot is an environment to boot computers using a network interface independently of available data storage devices (such as hard disks) or installed operating systems. No boot media is required on the client system. With PXE, you can install 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 *Oracle Solaris 10 Installation Guide: Network-Based Installations* for more information at:

http://docs.oracle.com/cd/E23823_01/index.html

Related Information

- “Create Driver Instance Files (Oracle Solaris 10)” on page 34
- “Configure the Network Host Files (Oracle Solaris 10)” on page 34
- “Boot Options” on page 35
- “Boot Over a 10 GbE Network (Oracle Solaris x86 and Linux)” on page 36
- “Install Oracle Solaris 10 Over a Network (Oracle SPARC)” on page 38

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

1. **Obtain the MAC address of the first Adapter port by checking the label of the Adapter.**

For 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 system.
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 system 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 ixgbe(7D) 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 the boot device priority is changed, the OS installation process will repeat.

Related Information

- “Create Driver Instance Files (Oracle Solaris 10)” on page 34
- “Configure the Network Host Files (Oracle Solaris 10)” on page 34
- “Boot Options” on page 35
- “Boot Over the Network (PXE)” on page 36
- “Install Oracle Solaris 10 Over a Network (Oracle SPARC)” on page 38

▼ Install Oracle Solaris 10 Over a Network (Oracle SPARC)

The *Solaris Advanced Installation Guide* describes the full procedure for installing the Oracle Solaris 10 OS over the network.

1. Prepare an installation server and a client system for installing the Oracle Solaris 10 OS over the network.

- a. Create an installation server that contains the image of the Oracle Solaris 10 CD.

- b. Set up the client system to be installed over the network.

The *Solaris Advanced Installation Guide* describes how to create the installation server and set up the client systems

Note – To install the client system over a network that is not part of the same subnet, you must also create a boot server. The *Oracle Solaris Advanced Installation Guide* describes how to create a boot server.

2. On the client system, shut down and halt the system to get to the OpenBoot (ok) prompt.

```
# shutdown -i0 -g0 -y. . .
(shutdown command messages omitted)
. . .
ok
```


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

The following examples assume that `/pci@7c0/pci@0/pci@9/network@0,1` is a port on the Adapter.

a. Move to the device directory.

```
ok cd /pci@7c0/pci@0/pci@9/network@0,1
```

b. Display properties for the device.

```
ok .properties
```

The output should be similar to the following:

```
assigned-addresses  c30f0010 00000041 00000000 00000000 00200000
                   810f0018 00000000 00006000 00000000 00000020
                   c30f0020 00000041 00200000 00000000 00004000
                   820f0030 00000000 01300000 00000000 00080000
reg                 000f0000 00000000 00000000 00000000 00000000
                   430f0010 00000000 00000000 00000000 00200000
                   010f0018 00000000 00000000 00000000 00000020
                   430f0020 00000000 00000000 00000000 00004000
                   020f0030 00000000 00000000 00000000 00080000
local-mac-address   a0 36 9f 01 2e a0
version             Sun Dual Port 10GBase-T Adapter
                   FCode version 3.11 2/25/12
phy-type            xgc
board-model         701-4776
model               ATO:701-4777, PTO:7011-4773
compatible          pciex8086,1528.108e.7b15.1
                   pciex8086,1528.108e.7b15
                   pciex8086,1528.1
                   pciex8086,1528
                   pciexclass,020000
                   pciexclass,0200
address-bits        00000030
max-frame-size      00002400
network-interface-type ethernet
device_type         network
name                network
fcode-rom-offset    00000000
interrupts          00000002
cache-line-size     00000010
class-code          00020000
subsystem-id        00007b15
subsystem-vendor-id 0000108e
revision-id         00000001
device-id           00001528
vendor-id           00008086
```

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

c. Type the following when you finish looking at the `.properties` values.

```
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) /pci@7c0/pci@0/pci@9/network@0,1
b) /pci@7c0/pci@0/pci@9/network@0
c) /pci@7c0/pci@0/pci@2/network@0,1
d) /pci@7c0/pci@0/pci@2/network@0
e) /pci@780/pci@0/pci@8/network@0,1
f) /pci@780/pci@0/pci@8/network@0
g) /pci@780/pci@0/pci@1/network@0,1
h) /pci@780/pci@0/pci@1/network@0
q) NO SELECTION
Enter Selection, q to quit: q
```

5. At the `ok` prompt, boot the client system using the full device path of the 10 GbE device, for example:

```
ok boot /pci@7c0/pci@0/pci@9/network@0,1
```

The boot takes about several minutes to complete. Then, you should see a menu for continuing to install the Oracle Solaris 10 OS.

6. Proceed with the Oracle Solaris 10 OS installation.

Refer to the *Oracle Solaris Advanced Installation Guide* for more information about installing the Oracle Solaris 10 OS over the network.

7. Install the Adapter software on the client system.

The software installed in [Step 5](#) is required to boot the client system over the 10 GbE interface. You now must install the software in order for the operating system to use the client's 10 GbE interfaces in normal operation.

Before installing the `SUNwixgbe` driver, ensure that the client system does not already have the driver installed.

```
# pkginfo | grep SUNwixgbe*
```

- If the software is installed, this command will return the package name you typed in. In that case, skip to [Step 8](#).
- If the software is not installed, install the software from the download center at:

<http://support.oracle.com>

8. Confirm that the network host files have been configured correctly during the Oracle Solaris 10 installation.

Although the Oracle Solaris 10 software installation creates the client's network configuration files, you might need to edit these files to match your specific networking environment. See [“Configure the Network Host Files \(Oracle Solaris 10\)” on page 34](#) for more information about editing these files.

9. Display the configuration information for all datalinks or the specified datalink.

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

Related Information

- [“Create Driver Instance Files \(Oracle Solaris 10\)” on page 34](#)
- [“Configure the Network Host Files \(Oracle Solaris 10\)” on page 34](#)
- [“Boot Options” on page 35](#)
- [“Boot Over the Network \(PXE\)” on page 36](#)
- [“Boot Over a 10 GbE Network \(Oracle Solaris x86 and Linux\)” on page 36](#)

Administering Driver Parameters and Jumbo Frames

The `ixgbe(7D)` device driver controls the Adapter's interfaces. You can manually set the `ixgbe(7D)` device driver parameters to customize each device in your system.

These topics describe how to administer driver parameters.

Description	Links
Administrate driver parameters in the Oracle Solaris OS.	"Driver Parameters (Oracle Solaris OS)" on page 44 "Set Driver Parameters (Oracle Solaris OS)" on page 45
Administrate driver parameters in Linux.	"Driver Parameters (Linux)" on page 46 "Set Driver Parameters (Linux)" on page 47
Configure jumbo frames.	"Configuring Jumbo Frames (Oracle Solaris OS)" on page 48 "Configure Jumbo Frames (Linux)" on page 50

Related Information

- ["Understanding the Installation Process" on page 1](#)
- ["Understanding the Adapter" on page 7](#)
- ["Installing the Driver" on page 17](#)
- ["Installing the Adapter" on page 25](#)
- ["Configuring the Network" on page 33](#)
- ["Configuring Link Aggregation" on page 51](#)
- ["Configuring VLANs" on page 57](#)
- ["Troubleshooting the Adapter" on page 67](#)

Driver Parameters (Oracle Solaris OS)

You can configure these parameters on each `ixgbe(7D)` interface

Type	Keyword	Description
Jumbo frames	<code>default_mtu=<i>u</i></code>	Size of the default MTU (payload without the Ethernet header). Allowed values: 1500 to 15500 (default = 1500)
Flow control	<code>flow_control</code>	Ethernet flow control. Allowed values: 0 - Disable (default in Oracle Solaris 11 OS) 1 - Receive only 2 - Transmit only 3 - Receive and transmit (default in Oracle Solaris 10 OS) 4 - Use NVRAM-programmed factory default setting
Transmit queues	<code>tx_queue_number</code>	1 to 16 (default = 8)
Transmit queue size	<code>tx_ring_size</code>	Number of the transmit descriptors per transmit queue. Allowed values: 64 to 4096 (default = 1024)
Receive queues	<code>rx_queue_number</code>	1 to 16 (default = 8)
Receive queue size	<code>rx_ring_size</code>	Number of the transmit descriptors per receive queue. Allowed values: 64 to 4096 (default = 1024)

Related Information

- [“Set Driver Parameters \(Oracle Solaris OS\)” on page 45](#)
- [“Configuring Jumbo Frames \(Oracle Solaris OS\)” on page 48](#)

▼ Set Driver Parameters (Oracle Solaris OS)

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

For example, on an Oracle SPARC system, you should see output similar to the following:

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

On an Oracle Solaris x86 system, you should see output similar to the following:

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

In the preceding example:

- 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 `ixgbe.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 `ixgbe(7D)` devices in the `/kernel/drv/ixgbe.conf` file.**

For example, to set the `flow_control` parameter to 3 for `ixgbe0`:

```
name = "pci108e,7b15"
parent = "/pci@0,0/pci8086,3c0a@3,2"
unit-address = "0"
flow_control = 3;
```

3. Save the `ixgbe.conf` file.

4. Reboot the system.

Related Information

- [“Driver Parameters \(Oracle Solaris OS\)” on page 44](#)
- [“Configuring Jumbo Frames \(Oracle Solaris OS\)” on page 48](#)

Driver Parameters (Linux)

The following table lists the tunable `ixgbe(7D)` driver parameters for Linux operating systems and describes their function.

Keyword	Valid Range	Default Value	Description
<code>FlowControl</code>	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.	This parameter controls the automatic generation (TX) and response (RX) to Ethernet PAUSE frames.
<code>RxDescriptors</code>	64 to 4096	512	This value is the 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 will be either 4056, 8192, or 16384 bytes. The maximum MTU size is 16114.

Keyword	Valid Range	Default Value	Description
RxIntDelay	0 to 65535 (0=off)	72	This value 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	This value is the 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 47](#)
- [“Configure Jumbo Frames \(Linux\)” on page 50](#)

▼ Set Driver Parameters (Linux)

- Use the `ethtool` utility or the `configtool` utility to set parameters on a Linux platform.

Related Information

- [“Driver Parameters \(Linux\)” on page 46](#)
- [“Configure Jumbo Frames \(Linux\)” on page 50](#)

Configuring Jumbo Frames (Oracle Solaris OS)

Jumbo frames can support up to 15500 MTU. The default value is 1500 MTU. Use the following steps to set the size permanently.

- [“Change the MTU Permanently” on page 48](#)
- [“Change the MTU Temporarily \(Oracle Solaris 10\)” on page 48](#)
- [“Change the MTU Temporarily \(Oracle Solaris 11\)” on page 49](#)

▼ Change the MTU Permanently

1. Add the following line in the `/kernel/drv/ixgbe.conf` file:

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

The *desired-frame-size* value can range from 1500 to 15500.

2. Reboot the server.

Related Information

- [“Driver Parameters \(Oracle Solaris OS\)” on page 44](#)
- [“Set Driver Parameters \(Oracle Solaris OS\)” on page 45](#)
- [“Change the MTU Temporarily \(Oracle Solaris 10\)” on page 48](#)
- [“Change the MTU Temporarily \(Oracle Solaris 11\)” on page 49](#)

▼ Change the MTU Temporarily (Oracle Solaris 10)

- Use the `ifconfig(1M)` command to increase MTUs to allow transmission of jumbo frames.

For example, where the device name is `ixgbe0`, the following command increases MTUs to the maximum:

```
# ifconfig ixgbe0 plumb mtu 15500 up
```

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

Related Information

- “Driver Parameters (Oracle Solaris OS)” on page 44
- “Set Driver Parameters (Oracle Solaris OS)” on page 45
- “Change the MTU Permanently” on page 48
- “Change the MTU Temporarily (Oracle Solaris 11)” on page 49

▼ Change the MTU Temporarily (Oracle Solaris 11)

- Use the `dladm(1M)` command to increase MTUs to allow transmission of jumbo frames.

For example, where the device name is `ixgbe0`, the following command increases MTUs to the maximum:

```
# dladm -t mtu=15500 ixgbe0
```

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

Related Information

- “Driver Parameters (Oracle Solaris OS)” on page 44
- “Set Driver Parameters (Oracle Solaris OS)” on page 45
- “Change the MTU Permanently” on page 48
- “Change the MTU Temporarily (Oracle Solaris 10)” on page 48

▼ Configure Jumbo Frames (Linux)

Jumbo frames can support up to 15500 MTU. The default value is 1500 MTU.

- Use the `ifconfig(1M)` command to increase MTUs to allow transmission of jumbo frames.

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 15500 up
```

Related Information

- [“Driver Parameters \(Linux\)” on page 46](#)
- [“Set Driver Parameters \(Linux\)” on page 47](#)

Configuring Link Aggregation

These topics describe how to configure link aggregation in the Oracle Solaris 10 OS. For instructions on how to configure link aggregations in the Oracle Solaris 11 OS, refer to *Oracle Solaris Administration: Network Interfaces and Network Virtualization* in the Oracle Solaris 11 documentation library.

Description	Links
Understand link aggregation.	“Link Aggregation Overview” on page 52
Manage link aggregations in the Oracle Solaris OS.	“Configure Link Aggregations (Oracle Solaris 10)” on page 52 “Display Information About Link Aggregations (Oracle Solaris 10)” on page 53 “Delete Link Aggregations (Oracle Solaris 10)” on page 54

Related Information

- [“Understanding the Installation Process” on page 1](#)
- [“Understanding the Adapter” on page 7](#)
- [“Installing the Driver” on page 17](#)
- [“Installing the Adapter” on page 25](#)
- [“Configuring the Network” on page 33](#)
- [“Administering Driver Parameters and Jumbo Frames” on page 43](#)
- [“Configuring VLANs” on page 57](#)
- [“Troubleshooting the Adapter” on page 67](#)

Link Aggregation Overview

Link aggregation enables one or more network links to be aggregated together to form a link aggregation group. This link aggregation group appears to MAC clients as a regular link. Link aggregation, which is defined by IEEE 802.3ad, provides the following benefits:

- Increased bandwidth
- Linearly incremental bandwidth
- Load sharing
- Automatic configuration
- Rapid configuration and reconfiguration
- Deterministic behavior
- Low risk of duplication or misordering
- Support of existing IEEE 802.3ad MAC clients
- Single port failover

Related Information

- [“Configure Link Aggregations \(Oracle Solaris 10\)” on page 52](#)
- [“Display Information About Link Aggregations \(Oracle Solaris 10\)” on page 53](#)
- [“Delete Link Aggregations \(Oracle Solaris 10\)” on page 54](#)

▼ Configure Link Aggregations (Oracle Solaris 10)

The example in this procedure aggregates sample interfaces `ixgbe0`, `ixgbe1`, `ixgbe2`, and `ixgbe3`. Arbitrary key numbers (1 and 2) are used for each aggregation.

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

1. Unplumb the interfaces to be aggregated.

```
# ifconfig ixgbe0 unplumb
# ifconfig ixgbe1 unplumb
# ifconfig ixgbe2 unplumb
# ifconfig ixgbe3 unplumb
```

2. Create a link aggregation group with key 1 containing the first two interfaces, and bring up the link group.

In this example, the `-l active` option turns on [LACP](#) mode:

```
# dladm create-aggr -l active -d ixgbe0 -d ixgbe1 1
# ifconfig aggr1 plumb
# ifconfig aggr1 192.2.2.84 up
```

3. Create a link aggregation group with key 2 containing the other two interfaces, and bring up the link group.

No mode is specified for the link aggregation group in this example:

```
# dladm create-aggr -d ixgbe2 -d ixgbe3 2
# ifconfig aggr2 plumb
# ifconfig aggr2 193.2.2.84 up
```

Related Information

- [“Link Aggregation Overview” on page 52](#)
- [“Display Information About Link Aggregations \(Oracle Solaris 10\)” on page 53](#)
- [“Delete Link Aggregations \(Oracle Solaris 10\)” on page 54](#)

▼ Display Information About Link Aggregations (Oracle Solaris 10)

The `ifconfig(1M)` and `dladm(1M)` commands provide different details about link aggregations, as in the following examples.

- Use the appropriate command to obtain the desired results.
 - Use the `ifconfig(1M)` command to examine the details about a link aggregation.

The following examples display the information about the two link aggregations created in “Configure Link Aggregations (Oracle Solaris 10)” on page 52.

```
# 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 aggr2
aggr2: 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.
- Use the `dladm show-aggr -s` command to show link aggregation statistics.
- Use the `dladm show-aggr -L` command to display LACP-specific information.

Related Information

- “Link Aggregation Overview” on page 52
- “Configure Link Aggregations (Oracle Solaris 10)” on page 52
- “Delete Link Aggregations (Oracle Solaris 10)” on page 54

▼ Delete Link Aggregations (Oracle Solaris 10)

1. Use the `ifconfig(1M)` command to unplug each link aggregation you want to delete.

For example:

```
# ifconfig aggr1 unplumb
# ifconfig aggr2 unplumb
```


2. Use the `dladm(1M)` command to delete each unwanted link aggregation.

For example:

```
# dladm delete-aggr 1
# dladm delete-aggr 2
```

Related Information

- [“Link Aggregation Overview” on page 52](#)
- [“Configure Link Aggregations \(Oracle Solaris 10\)” on page 52](#)
- [“Display Information About Link Aggregations \(Oracle Solaris 10\)” on page 53](#)

Configuring VLANs

These topics describe how to configure VLANs in the Oracle Solaris 10 OS. For instructions on how to configure VLANs in the Oracle Solaris 11 OS, refer to *Oracle Solaris Administration: Network Interfaces and Network Virtualization* in the Oracle Solaris 11 documentation library.

Note – If you change any of the VLAN configuration parameters, you must reboot the system before the changes take effect. If you make changes and do not reboot, you might experience configuration problems.

Description	Links
Understand VLANs.	“VLAN Overview” on page 58 “VLAN Configuration” on page 61 “VLAN Naming Format” on page 61
Configure VLANs.	“Configure Static VLANs (Oracle Solaris 10)” on page 62 “Configure VLANs (Linux)” on page 63 “Configure VLANs (Windows)” on page 64

Related Information

- [“Understanding the Installation Process” on page 1](#)
- [“Understanding the Adapter” on page 7](#)
- [“Installing the Driver” on page 17](#)
- [“Installing the Adapter” on page 25](#)
- [“Configuring the Network” on page 33](#)
- [“Administering Driver Parameters and Jumbo Frames” on page 43](#)
- [“Configuring Link Aggregation” on page 51](#)
- [“Troubleshooting the Adapter” on page 67](#)

VLAN Overview

With multiple VLANs on a single port, a server with a single adapter can have a logical presence on multiple IP subnets. By default, you can define 128 VLANs for each VLAN-aware adapter on your server. However, you can increase this number by changing the system parameters.

If your network does not require multiple VLANs, you can use the default configuration, in which case no further configuration is necessary.

VLANs enable you to split your physical LAN into logical subparts, providing an essential tool for increasing the efficiency and flexibility of your network.

VLANs are commonly used to separate groups of network users into manageable broadcast domains, to create logical segmentation of workgroups, and to enforce security policies among each logical segment. Each defined VLAN behaves as its own separate network, with its traffic and broadcasts isolated from the others, increasing the bandwidth efficiency within each logical group.

Although VLANs are commonly used to create individual broadcast domains or separate IP subnets, it can be useful for a server to have a presence on more than one VLAN simultaneously. Several Oracle Sun products support multiple VLANs on a per-port or per-interface basis, allowing very flexible network configurations.

The following figure shows an example network that uses VLANs.

FIGURE: Example VLAN Configuration

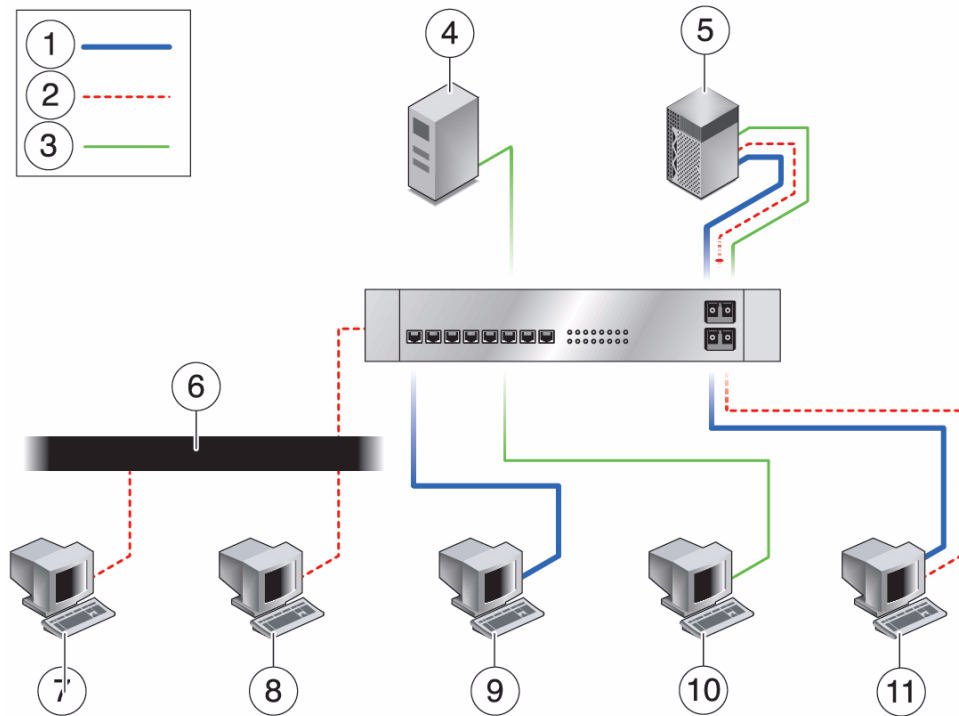


Figure Legend

-
- 1 VLAN 1
 - 2 VLAN 2
 - 3 VLAN 3
 - 4 Accounting server (VLAN 3)
 - 5 Main server with GbE-tagged adapter (all VLANs)
 - 6 Shared media segment
 - 7 PC 1: Software development (VLAN 2)
 - 8 PC 2: Software development (VLAN 2)
 - 9 PC 3: Engineering (VLAN 1)
 - 10 PC 4: Accounting (VLAN 3)
 - 11 PC 5: Software development and engineering with GbE-tagged adapter (VLAN 1 and VLAN 2)
-

The example network has the following features:

The physical LAN network consists of a switch, two servers, and five clients. The LAN is logically organized into three different VLANs, each representing a different IP subnet.

- VLAN 1 is an IP subnet consisting of the Main Server, Client 3, and Client 5. This VLAN represents an engineering group.
- VLAN 2 includes the Main Server, Clients 1 and 2 by means of a shared media segment, and Client 5. This VLAN is a software development group.
- VLAN 3 includes the Main Server, the Accounting Server, and Client 4. This VLAN is an accounting group.

The Main Server is a high-use server that must be accessed from all VLANs and IP subnets. The server has a Sun Dual Port 10GBase-T Adapter installed. All three IP subnets are accessed by means of the single physical Ethernet adapter interface. The server is attached to one of the switch's Gigabit Ethernet ports, which is configured for VLANs 1, 2, and 3. Both the Ethernet adapter and the connected switch port have tagging turned on. Because of the tagging VLAN capabilities of both devices, the server is able to communicate on all three IP subnets in this network, but continues to maintain broadcast separation between all of those subnets. The network contains the following components:

- The Accounting Server is available to only VLAN 3. The Accounting Server is isolated from all traffic on VLANs 1 and 2. The switch port connected to the server has tagging turned off.
- Clients 1 and 2 are attached to a shared media hub that is then connected to the switch. Clients 1 and 2 belong only to VLAN 2. Those clients are logically in the same IP subnet as the Main Server and Client 5. The switch port connected to this segment has tagging turned off.
- Client 3 is a member of VLAN 1. This client can communicate only with the Main Server and Client 5. Tagging is not enabled on Client 3's switch port.
- Client 4 is a member of VLAN 3. This client can communicate only with the servers. Tagging is not enabled on Client 4's switch port.
- Client 5 is a member of both VLANs 1 and 2. This client has a Sun Dual Port 10GBase-T Adapter installed. Client 5 is connected to switch port 10. Both the Ethernet adapter and the switch port are configured for VLANs 1 and 2, and both have tagging enabled.

VLAN tagging must be enabled only on switch ports that:

- Create trunk links to other VLAN-aware Ethernet switches.
- Are connected to tag-capable end-stations, such as servers or workstations with VLAN-aware Ethernet adapters.

Related Information

- [“VLAN Configuration” on page 61](#)
- [“VLAN Naming Format” on page 61](#)
- [“Configure Static VLANs \(Oracle Solaris 10\)” on page 62](#)

VLAN Configuration

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. For each network interface (`ixgbe0`, `ixgbe1`, `ixgbe2`, and so on), 4094 possible VLAN IDs can be selected for each port.

Tagging an Ethernet frame requires the addition of a tag header to the frame. The header is inserted immediately following the destination MAC address and the source MAC address. The tag header consists of two bytes of Ethernet Tag Protocol identifier (TPID, 0x8100) and two bytes of TCP. The TCI consists of a user priority, the CFI, and the VID.

By default, a single VLAN is configured for every port, which groups all ports into the same broadcast domain, just as if there were no VLANs at all. This means that VLAN tagging for the switch port is turned off.

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

- [“VLAN Overview” on page 58](#)
- [“VLAN Naming Format” on page 61](#)
- [“Configure Static VLANs \(Oracle Solaris 10\)” on page 62](#)

VLAN Naming Format

When configuring VLANs, use the following naming format, which includes both the VID and the physical PPA:

VLAN logical PPA = 1000 * VID + Device-PPA

For example, if the virtual ID is 123 and the device PPA is 2, the VLAN interface would be `ixgbe123002`. In another example, on a server with an adapter that has an instance number of 2, belonging to two VLANs with VID 123 and VID 224, the VLAN interfaces would be `ixgbe123002` and `ixgbe224002`, respectively.

This format limits the maximum number of PPAs (instances) that can be configured in the `/etc/path_to_inst` file to 1000.

Related Information

- [“VLAN Overview” on page 58](#)
- [“VLAN Configuration” on page 61](#)
- [“Configure Static VLANs \(Oracle Solaris 10\)” on page 62](#)

▼ Configure Static VLANs (Oracle Solaris 10)

1. **Create one `/etc/hostname.ixgbe#` file for each VLAN that will be configured for each Adapter on the server.**

See [“VLAN Naming Format” on page 61](#).

2. **Use the `ifconfig(1M)` command to configure each VLAN virtual device.**

Include the IP address in the command you type. For example, if the IP address is `192.2.2.84`, type:

```
# ifconfig ixgbe123002 plumb 192.2.2.84 up
```

3. **Use the `ifconfig -a` command to see details about the VLAN devices.**

This example shows the output of `ifconfig -a` on a system having VLAN devices `ixgbe123002` and `ixgbe224002`:

```
ixgbe123002: flags=201000843<UP,BROADCAST,RUNNING,MULTICAST,IPv4,CoS>\
  mtu 1500 index 4
inet 192.2.2.82 netmask ffffffff broadcast 192.2.2.255
ether 0:13:20:f5:f6:dc
ixgbe224002: flags=201000843<UP,BROADCAST,RUNNING,MULTICAST,IPv4,CoS>\
```



```
mtu 1500 index 5
inet 0.0.0.0 netmask ffffffff0
ether 0:13:20:f5:f6:dc
```

Note – In the preceding examples, the second NIC output for `ixgbe224002` was plumbed and enabled (that is, used the `up` option), but had no IP address. By default, the netmask and broadcast addresses are set by the system, which uses IP class C to make that setting `255.255.255.0`. When the address is set, the `ifconfig(1M)` command by default does not display the broadcast address if the explicit IP address is not set.

Refer to the documentation that came with your switch for specific instructions for setting VLAN tagging and ports.

Related Information

- [“VLAN Overview” on page 58](#)
- [“VLAN Configuration” on page 61](#)
- [“VLAN Naming Format” on page 61](#)

▼ Configure VLANs (Linux)

1. Ensure that the `ixgbe` module is loaded.

```
# modprobe ixgbe
```

2. Plumb the Adapter's interface.

```
# ifconfig eth6 xxx.xxx.xx.xxx up
```

where `xxx.xxx.xx.xxx` 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 ixgbe VLAN (eth6 in this example).

```
# ifconfig eth6.5 xxx.xxx.xx.xxx up
```

where *xxx.xxx.xx.xxx* is the IP address of the interface.

Related Information

- [“VLAN Overview” on page 58](#)
- [“VLAN Configuration” on page 61](#)

▼ 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 Sun Dual 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

- [“VLAN Overview”](#) on page 58
- [“VLAN Configuration”](#) on page 61

Troubleshooting the Adapter

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

Description	Links
Troubleshoot <code>ifconfig(1M)</code> issues.	“Analyze Why the Device Link Is Missing” on page 68
Troubleshoot outages.	“Analyze a Port Hang” on page 69
Troubleshoot performance.	“Analyze Slow Network Performance” on page 69

Related Information

- [“Understanding the Installation Process” on page 1](#)
- [“Understanding the Adapter” on page 7](#)
- [“Installing the Driver” on page 17](#)
- [“Installing the Adapter” on page 25](#)
- [“Troubleshooting the Adapter” on page 67](#)
- [“Configuring Link Aggregation” on page 51](#)
- [“Configuring VLANs” on page 57](#)

▼ Analyze Why the Device Link Is Missing

If the `ifconfig(1M)` command cannot find a device, the following message is displayed in the output:

```
...
cannot open ixgbe0; link doesn't exist
...
```

1. Check the OS.

- If the OS is Oracle Solaris 10 8/10, skip to [Step 2](#).
- If the OS is Oracle Solaris 11, use the `dladm(1M)` command to plumb the driver. See the `dladm(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(1M)` or `scanpci(1M)` 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 `ixgbe` 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 `ixgbe` 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 system. See *Oracle Solaris Administration: Network Interfaces and Network Virtualization* for more information.

Related Information

- [“Analyze a Port Hang”](#) on page 69
- [“Analyze Slow Network Performance”](#) on page 69

▼ Analyze a Port Hang

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

- For Oracle Solaris 10, use the `ifconfig(1M)` command.
- For Oracle Solaris 11, use the `dladm(1M)` command.

2. If the interface encounters a hard hang, reboot the system.

If the interface encounters another hard hang, try to capture the trace information by using the `dtrace(1M)` command, as in the following example.

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

3. If the system is panicked, retrieve the crash dump in `/var/crash/hostname`.

Note – If the interface encountered a hard hang or a panic, file a CR at Oracle Support. Attach the last page of the `dtrace(1M)` output or the crash dump file to the CR.

Related Information

- [“Analyze Why the Device Link Is Missing”](#) on page 68
- [“Analyze Slow Network Performance”](#) on page 69

▼ Analyze Slow Network Performance

The Adapter supports several driver parameters that affect the performance of the ports. See [“Driver Parameters \(Oracle Solaris OS\)”](#) on page 44 for more information about the default values.

1. Use the `truss(1M)` command against the process ID of the network application to 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. Use the `iostat(1M)` command to 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(1M)` and the `mpstat(1M)` commands to check that none of the following 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 `ixgbe(7D)` 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” on page 68
- “Analyze a Port Hang” on page 69

Glossary

A

ACT (activity) Indicates that the port is up and running.

B

BIOS (basic input/output system) In this guide, the term BIOS refers to the BIOS software on the client or server system.

C

CFI (canonical format indicator) A 1-bit field in the Ethernet header.

CR (change request)

D

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

DMA (direct memory access)

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

DR (dynamic reconfiguration) Used to automatically reconfigure resources within a domain or from one domain to another domain.

E

EEE (energy efficient Ethernet)

EEPROM (electronically erasable programmable read-only memory)

EMI (electromagnetic interference) The interference caused by the magnetic fields of electronic components.

F

FCC (Federal Communications Commission)

FIFO (first-in-first-out)

G

GB (gigabyte)

GbE (Gigabit Ethernet)

Gbps (gigabits-per-second)

GT (gigabit-transfer)

GTps (GTs-per-second)

I

- IEEE** (Institute of Electrical and Electronics Engineers) Publishes standards that guide hardware and software development.
- IP** (Internet Protocol) The principal communications protocol in the IP suite.
- iSCSI** (Internet small computer system interface)

K

- KB** (kilobytes)

L

- LACP** (Link Aggregation Control Protocol) Enables several physical ports to be bundled into a single logical channel.
- LAN** (local area network) Two or more devices connected to each other either physically or logically.
- LED** (light-emitting diode)
- LFM** (linear feet per minute)
- LNK** (link) Indicates that the network link is up and running.
- LOM** (LAN-on-motherboard) A LAN design.
- Adapter** (low profile adapter) Refers to the Sun Dual Port 10GBase-T Adapter, NIC from Oracle.

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

- NIC** (network interface card) Connects clients and servers to a LAN, WAN, or VLAN.
- NIS** (network information service) Originally known as Yellow Pages, NIS is a protocol for distributed system configuration data.
- NVM** (nonvolatile memory)

P

- PCI** (Peripheral Component Interconnect)
- PCIe** (PCI Express)
- PF** (page fault)
- PHY** (physical layer) Controls the physical, analog signal access to a link.
- PPA** (physical point of attachment) Used in constructing VLAN IDs.
- 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)
- RSS** (really simple syndication)
- RX** (response) The automatic response mechanism used by Ethernet PAUSE frames.

S

- SerDes** (serializer/deserializer) A mechanism used in high-speed connections to compensate for limited input or output.
- SGMII** (Serial Gigabit Media Independent Interface) A standard interface used to connect an Ethernet MAC-block to a PHY.
- 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.
- SUSE** (Stanford University School of Education)

T

- TCI** (tag control information) Part of the Ethernet header.
- 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.
- TPID** (tag protocol identifier) Two bytes of information in an Ethernet frame.
- 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.
- UDP/IP** (User Datagram Protocol and Internet Protocol) In this guide, UDP/IP refers to the relationship between the two protocols, which are on different layers of the IP 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.

Index

A

adapter

- front panel, 11
- LEDs, 11
- verifying installation
 - Linux system, 31
 - Oracle SPARC system, 27
 - Oracle x86 system, 30
 - Windows system, 31

B

- boot device priority, 38
- booting over the network, 33
 - Oracle Solaris x86 and Linux systems, 36
 - using PXE, 36
- bottlenecks, 70

C

- configuring the network host files
 - creating driver instance files, 34
 - using `ifconfig`, 34
- configuring VLANs
 - Linux, 63
 - Oracle Solaris 10 OS, 62
 - Windows, 64
- CPU interrupts, 70
- CPU pegging, 70
- crash dump, 69
- creating a boot server, 38

D

- device link, missing, 68
- device tree, cleaning, 68
- DHCP, 36
- displaying
 - datalinks, 42

- driver instances, 35

driver

- downloading and installing
 - Linux, 20
 - Windows, 22
- removing
 - Linux, 22
 - Oracle Solaris 10 OS, 19
 - Windows, 24
- verifying version
 - Oracle Solaris 10 OS, 18

driver parameters

- Linux, 46
- Oracle Solaris 10, 44
- setting in Linux, 47
- setting in Oracle Solaris 10, 45

driver version

- Oracle x86 system, 30
- Windows, 31

DTrace, 69

E

- Ethernet Tag Protocol, 61

F

- finding the device path, 41
- front panel, connectors and LEDs, 11

H

- hard port hang, 69
- hardware components, 8

I

- I/O statistics, 70
- identifying a device, 28
- `ifconfig` command, 62

installation overview

- Linux, 4
- Oracle Solaris 10 OS, 2
- Oracle Solaris 11 OS, 3
- Windows, 5

installation server, 38

installation verification

- Linux system, 31
- Oracle SPARC system, 27
- Oracle x86 system, 30
- Windows system, 31

installing the adapter, 26

interface

- instance number, 34

J

jumbo frames

- Linux, 50
- Oracle Solaris 10, 48

L

link aggregation

- configuring in the Oracle Solaris 10 OS, 52
- deleting, 54
- displaying information about, 53
- overview, 52

M

MAC address, 36

main host power, 14

memory outages, 70

N

network

- configuration files, 42
- performance, 69
- routing outages, 69

networking interfaces, 44

O

OS patches and updates, 15

P

page faults, 70

panic, system, 69

patches

patch clusters, 15

security patches, 15

performance

- bottlenecks, 70
- network, 69

performance specifications, 14

physical

- LAN, 60
- PPA, 61

physical characteristic, 13

plumbing devices, 35

port hang

- hard, 69
- soft, 69

power and environmental requirements, 14

power consumption, 14

product description, 8

R

removing the driver

- Linux, 22
- Oracle Solaris 10 OS, 19
- Windows, 24

resource contention, 70

S

set up

- client system, 38
 - installation server, 38
- ### setting driver parameters, 43
- ### shipping kit contents, 8
- ### soft port hang, 69
- ### statistics, 70
- ### system panic, 69

T

tag control information, 61

TCI, 61

trace information, 69

troubleshooting

- CPU interrupts, 70
- CPU pegging, 70
- crash dump, 69
- device links, 68
- device tree, 68
- DTrace, 69

- memory outages, 70
- page faults, 70
- port hang, 69
- resource contention, 70

V

- virtual device, 62

VLAN

- configuration, 61
- configuring
 - Linux, 63
 - Oracle Solaris 10 OS, 62
 - Windows, 64
- naming format, 61
- overview, 58

- VLAN ID, 61

