Oracle Dual Port QDR InfiniBand Adapter M4 User's Guide

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Contents

Using This Documentation

- **Overview** – Describes how to install and administer the Oracle Dual Port QDR InfiniBand Adapter M4.
- **Audience** – Technicians, system administrators, and authorized service providers.
- **Required knowledge** – Advanced experience troubleshooting and replacing hardware.

In this document, the term “adapter” refers to the Oracle Dual Port QDR InfiniBand Adapter M4.

Product Documentation Library

Documentation and resources for this product and related products are available at http://www.oracle.com/goto/dual_port_qdr_infiniband_m4/docs.

Feedback

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

Understanding the Installation Process

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

Installation Task Overview (Oracle Solaris)

Step	Description	Links
1.	Understand the adapter.	"Understanding the Adapter" on page 11
2.	Confirm the adapter specifications and technical requirements.	"Confirming Specifications and Requirements" on page 17
3.	Install the adapter and verify the installation.	"Installing the Adapter" on page 21
4.	Enable Ethernet and verify IB support.	"IB Overview (Oracle Solaris)" on page 30 "Enable Virtualization (Oracle Solaris)" on page 31 "Enable Ethernet Over IB for the Oracle IB Switch IS2-46 or Oracle IB Switch IS2-254 (Oracle Solaris)" on page 33 "Disable Ethernet Over IB for the Oracle IB Switch IS2-46 or Oracle IB Switch IS2-254 (Oracle Solaris)" on page 34 "Verify IB Connectivity (Oracle Solaris)" on page 35
5.	If your OS is out of date, update the entire OS image, or download and apply the latest OS patch. If necessary, update the firmware.	"Update the OS (Oracle Solaris)" on page 45 "Update the Firmware (Oracle Solaris)" on page 47

Related Information

- "Understanding the Adapter" on page 11
- "Confirming Specifications and Requirements" on page 17
- "Installing the Adapter" on page 21
- "Enabling IB on the Adapter" on page 29

- “Updating Software and Firmware” on page 45

Installation Task Overview (Oracle Linux)

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

Step	Description	Links
1.	Understand the adapter.	“Understanding the Adapter” on page 11
2.	Confirm the adapter specifications and technical requirements.	“Confirming Specifications and Requirements” on page 17
3.	Install the adapter and verify the installation.	“Installing the Adapter” on page 21
4.	Enable Ethernet and verify IB support.	“IB Overview (Oracle Linux)” on page 37 “Prepare to Enable Virtualization (Oracle Linux)” on page 37 “Enable Virtualization (Oracle Linux)” on page 38 “Enable Ethernet Over IB for the Oracle IB Switch IS2-46 or Oracle IB Switch IS2-254 (Oracle Linux)” on page 39 “Disable Ethernet Over IB for the Oracle IB Switch IS2-46 or Oracle IB Switch IS2-254 (Oracle Linux)” on page 41 “Verify IB Connectivity (Oracle Linux)” on page 41
5.	If your OS is out of date, update the entire OS image, or download and apply the latest OS patch. If necessary, update the firmware.	“Updating Software and Firmware” on page 45 “Update the Firmware (Oracle Linux)” on page 48

Related Information

- “Understanding the Adapter” on page 11
- “Confirming Specifications and Requirements” on page 17
- “Installing the Adapter” on page 21
- “Enabling IB on the Adapter” on page 29
- “Updating Software and Firmware” on page 45

Understanding the Adapter

These topics provide an overview of the adapter.

Related Information

- "Understanding the Installation Process" on page 9
- "Confirming Specifications and Requirements" on page 17
- "Installing the Adapter" on page 21
- "Enabling IB on the Adapter" on page 29
- "Updating Software and Firmware" on page 45

Shipping Kit Contents

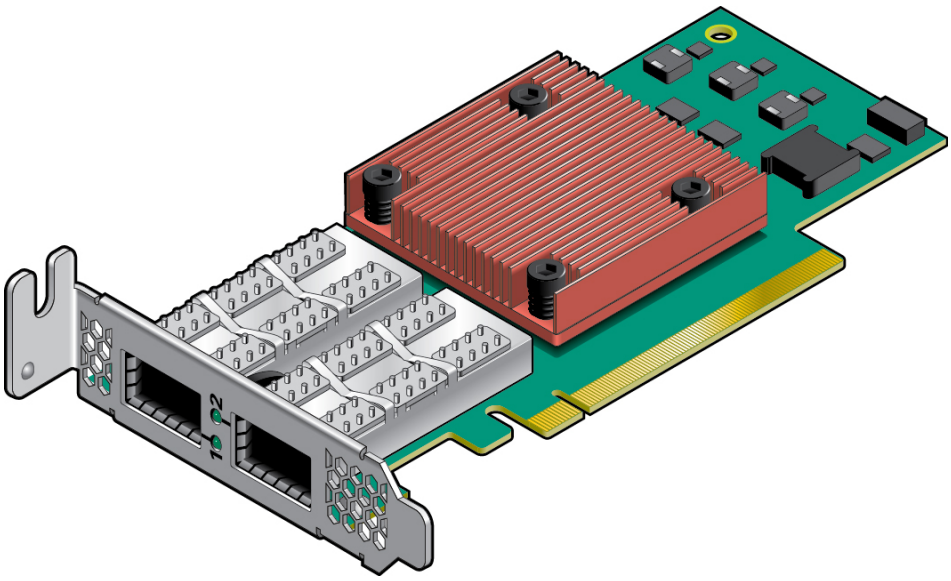
The carton in which the adapter was shipped should contain these items:

- Adapter with short mounting bracket attached
- *Oracle Dual Port QDR InfiniBand Adapter M4 Where To Find Documentation*

Related Information

- "Adapter Overview" on page 12
- "Front Panel Connectors and LEDs" on page 13
- "Rear Panel" on page 14

Adapter Overview



Feature	Description
Data rate supported per port	2 IB 4x ports, speed support: 10 Gbps, 20 Gbps, or 40 Gbps (QDR)
IB	IBTA v1.3 compliant, autonegotiation SDR, DDR, and QDR: ■ Links: 1x/4x ■ Compliant with the *InfiniBand Architecture Specification, Release 1.2*. The adapter has two compliant 4x IB ports, 1 and 2. The adapter provides access to these ports by means of two 4x IB QSFP+ connectors for external IB cables. Connector 1 connects to Port 1 of the device, while connector 2 connects to Port 2.
Connector	QSFP+ IB (copper and optical)
QoS	8 IB virtual lanes for each port
RDMA support	All ports
Bus type	PCIe v3.0 compliant, 1.1 and 2.0 compatible 8.0 GTps
Bus width	x16, x8, x4, x1 lane PCIe
Conforms to Ethernet standard	802.1
Boot ROM	4 Mb SPI Flash
EMI	FCC Class A

Feature	Description
Safety	IEC/EN 60950-1:2006, ETSI EN 300 019-2-2
Environmental	IEC 60068-2- 64, 29, 32
RoHS	RoHS-R6
PCIe interface	■ Standard low-profile PCIe form factor ■ PCIe Base 3.0 compliant, 1.1 and 2.0 compatible ■ 2.5 GT/sec. 5.0 GT/sec or 8.0 GT/s link x16 (to 256 GT/s bidirectional)

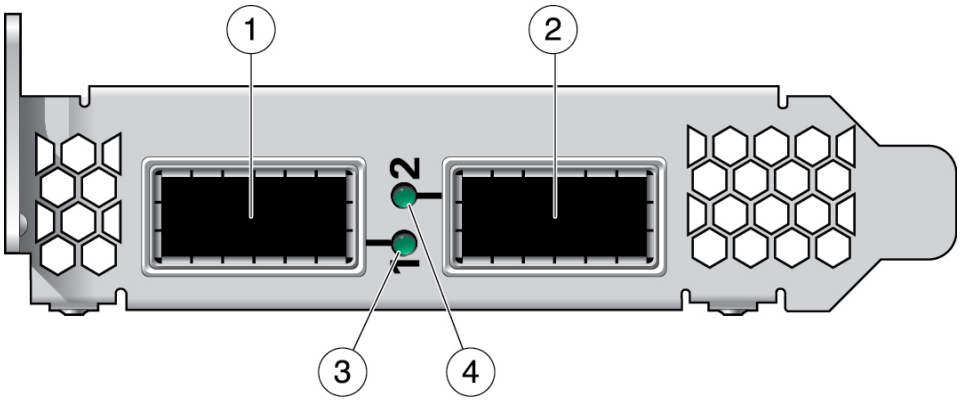
Related Information

- “Shipping Kit Contents” on page 11
- “Front Panel Connectors and LEDs” on page 13
- “Rear Panel” on page 14

Front Panel Connectors and LEDs

On the front panel between the two ports, two LEDs signal the port speed, state, and activity.

Note - LEDs are visible through the PCIe bracket by means of light pipes.



No.	Name	Description
1	Port 1	IB Port 1 (QSFP+)
2	Port 2	IB Port 2 (QSFP+)
3	Green LED	Port 1, Physical Link
4	Green LED	Port 2, Physical Link

The LEDs for each port have the meanings described in this table.

TABLE 1 Green LED Meanings

LED Name	LED State	Meaning
Physical Link	Lit	The link bringup process has successfully completed, and the link width, link speed, link polarity, and link reversal have been negotiated with the neighbor port on the other end of the cable.
	Unlit	A physical connection has not been established.

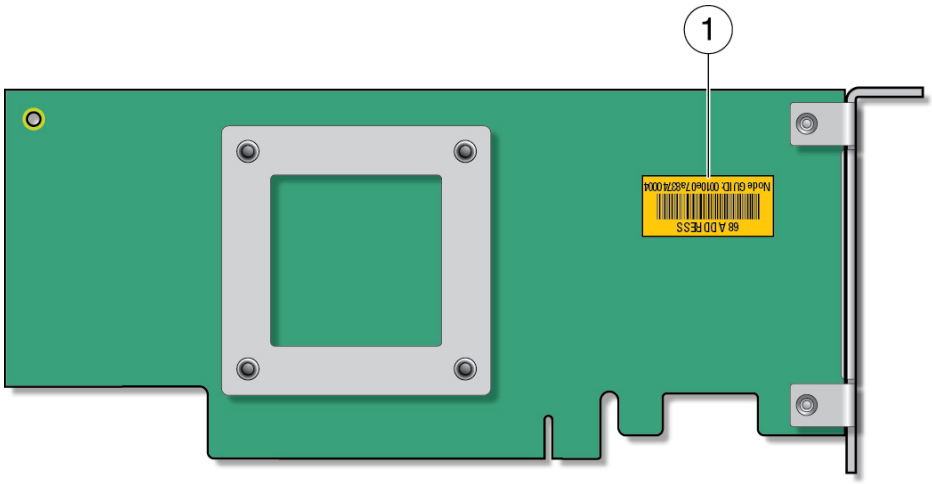
Related Information

- “Shipping Kit Contents” on page 11
- “Adapter Overview” on page 12
- “Rear Panel” on page 14

Rear Panel

A label on the back of the adapter displays the 64-bit GUID. This GUID uniquely identifies this adapter in the server and on the IB fabric.

Note - For accurate IB device information, such as GUID identification in a server with more than one IB device, use the `ibstat` command. See Step 7 in “Verify IB Connectivity (Oracle Linux)” on page 41.



No.	Description
1	Label showing node GUID location on the rear panel.

Related Information

- “Shipping Kit Contents” on page 11
- “Adapter Overview” on page 12
- “Front Panel Connectors and LEDs” on page 13

Confirming Specifications and Requirements

These topics provide technical information that you need to understand before installing the adapter.

Related Information

- “Understanding the Installation Process” on page 9
- “Understanding the Adapter” on page 11
- “Installing the Adapter” on page 21
- “Enabling IB on the Adapter” on page 29
- “Updating Software and Firmware” on page 45

Physical Specifications

Description	Metric	U.S.
Length	167.64 mm	6.60 in.
Height	63.50 mm	2.50 in.
Weight	0.30 kg	0.66 lb

Related Information

- “Electrical Specifications” on page 18
- “Environmental Specifications” on page 18
- “Hardware and Software Requirements” on page 19

Electrical Specifications

Description	Value
Maximum power consumption	18.6W
Typical power consumption	15W
Operating voltage	12V

Related Information

- “Physical Specifications” on page 17
- “Environmental Specifications” on page 18
- “Hardware and Software Requirements” on page 19

Environmental Specifications

Specification	Operation	Storage
Temperature[†]	0°C to 55°C (32°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
Altitude	1,829 (6,000 feet) at 45°C (113°F) ambient	12,000 meters (39,370.1 feet)
	1,219 (4,000 feet) at 35°C (95°F) ambient	
Vibration	0.20 G in all axes (20-500 Hz sine)	1.0 G in all axes (20-500 Hz sine)
Shock	1.75g, 32 seconds (VERTEQII -Zone 4 waveform)	100 m/s2 (11 ms half-sine)
	40 m/s2 22 ms shock type L	
Airflow	100 LFM (min) at 35°C (95°F) local ambient temperature	
	500 LFM (min) at 55°C (131°F) local ambient temperature	

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

Related Information

- “Physical Specifications” on page 17
- “Electrical Specifications” on page 18

- “Hardware and Software Requirements” on page 19

Hardware and Software Requirements

For the latest list of supported platforms and operating systems, refer to the *Oracle Dual Port QDR InfiniBand Adapter M4 Product Notes* at `http://www.oracle.com/goto/dual_port_qdr_infiniband_m4/docs`.

For Oracle Solaris OS systems, Oracle Solaris 11.3 SRU9 or newer is required.

For Oracle Linux systems, these versions are supported with UEK4:

- Oracle Linux 6.7 and newer
- Oracle Linux 7.1 and newer
- OVM 3.4.1

For more information on updating software and firmware, see “Updating Software and Firmware” on page 45.

Related Information

- “Physical Specifications” on page 17
- “Electrical Specifications” on page 18
- “Environmental Specifications” on page 18

Installing the Adapter

These topics describe how to install the adapter and verify its installation.

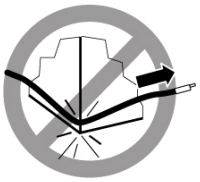
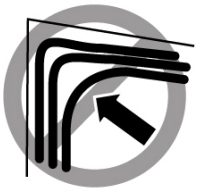
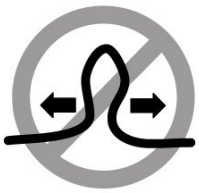
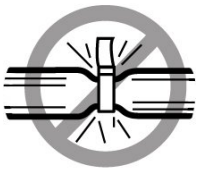
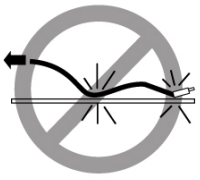
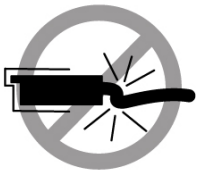
Related Information

- “Understanding the Installation Process” on page 9
- “Understanding the Adapter” on page 11
- “Confirming Specifications and Requirements” on page 17
- “Enabling IB on the Adapter” on page 29
- “Updating Software and Firmware” 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.

Note - Unplugged fiber cable ends should be covered with dust caps whenever possible to increase protection against damage or contamination.

Related Information

- “Install the Adapter” on page 23
- “Standard MT Cables” on page 25
- “Verify the Adapter Installation (Oracle Solaris)” on page 26
- “Verify the Adapter Installation (Oracle Linux)” on page 27

- “Remove the Adapter” on page 28

Install the Adapter

Refer to the server's installation guide or service manual for detailed instructions for this.

Caution - Electronic components on printed circuit boards are extremely sensitive to static electricity. Ordinary amounts of static electricity generated by your clothing or work environment can damage electronic equipment. When installing the adapter in a system, use antistatic grounding straps and antistatic mats to help prevent damage due to electrostatic discharge.

1. **Attach an antistatic wrist strap to your wrist and to the server.**

2. **If applicable, power off the server, using the standard shutdown procedures described in the server's service manual.**

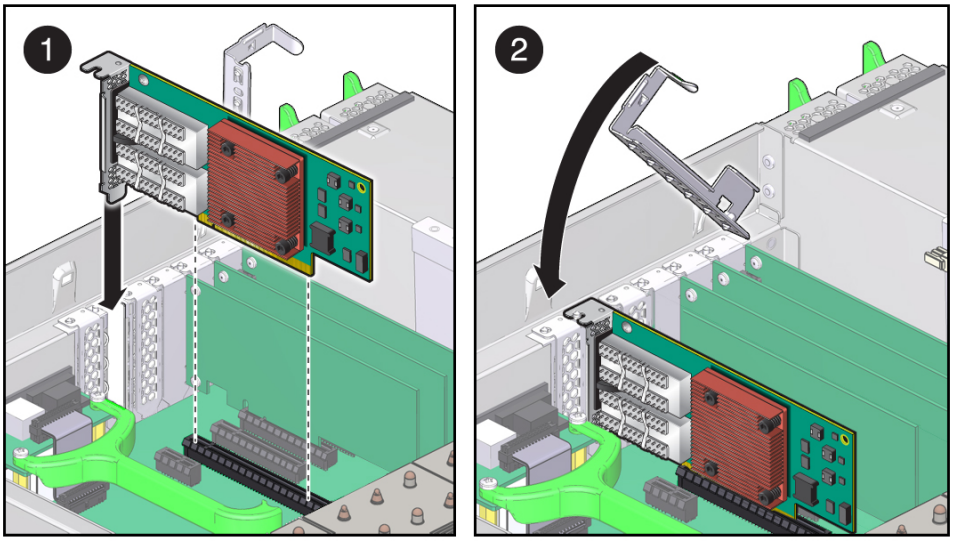
   Product documentation for Oracle servers is available at `http://docs.oracle.com`.

3. **If applicable, remove the cover from the server to access the adapter slots and connectors.**

4. **Select an available PCIe x16 slot.**

   Remove the blank filler panel for that slot. If you are replacing an existing adapter in that slot, remove the adapter.

5. **Install the adapter into the slot, pushing the adapter's edge connector into the connector on the server.**



6. **Ensure that the front panel on the adapter mounts flush with the server panel opening.**

7. **If applicable, install the screw in the front panel to secure the adapter into the server.**

8. **If applicable, replace the cover on the chassis.**

9. **Attach the 4x end of each IB cable to an adapter port connector.**

   See “Standard MT Cables” on page 25.

10. **Ensure that the connectors are properly engaged.**

11. **If not already connected, connect the other end of the IB I/O cables to the appropriate ports on the IB switches.**

    The adapter ports can be connected to different ports on the same IB switch or to ports on different IB switches.

12. **If applicable, power on the server and allow the server to reboot.**

    This step completes the hardware installation.

13. **Verify the installation.**

See “Verify the Adapter Installation (Oracle Solaris)” on page 26 or “Verify the Adapter Installation (Oracle Linux)” on page 27.

Related Information

- “Cable Cautions” on page 21
- “Standard MT Cables” on page 25
- “Verify the Adapter Installation (Oracle Solaris)” on page 26
- “Verify the Adapter Installation (Oracle Linux)” on page 27
- “Remove the Adapter” on page 28

Standard MT Cables

The most common connector for QDR is the Standard MT cables, with standard MT ferrules which are black in color and function by way of physical contact between fiber tips.

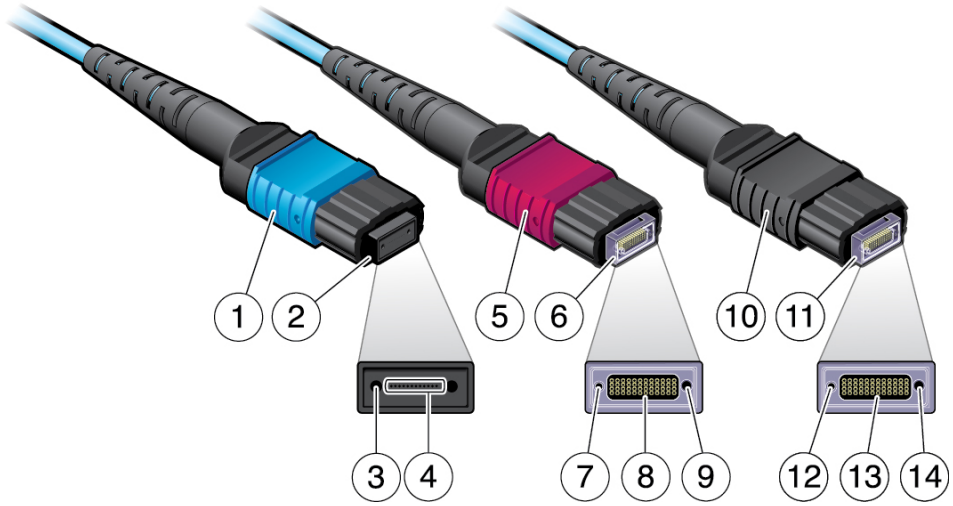
This table identifies Standard MT cable end types by the features of ferrule type, shell color, alignment method, and describes what that cable end type connects with.

Technology	Ferrule	Shell Color	Alignment Method	Connects With
4x MPO optical cable	Standard MT	Aqua	Post and hole	QDR 4x transceivers, for example, QSFP+ 40GBASE-SR4 transceivers
4x MPO optical cable	Standard MT	Black	Post and hole	QDR 4x Transceivers, for example, QSFP+ 40GBASE-SR4 transceivers

Note - Some supported cables have a Standard MT connector on one end and a PrizmMT MPO connector on the other. Pay close attention when connecting this cable, to identify which connector is which, and not confuse the two.

Oracle supplies IB cables that are supported with this adapter. For more information, see the product web page at `https://www.oracle.com/networking/dual-port-qdr-infiniband-adapter-m4/index.html`.

Visually comparing the design of the three cables, note the differences between the Standard MT MPO cable on the left, and the PrizmMT MPO cables in the middle and on the right.



No.	Description
1	Aqua colored shell (Standard MT MPO)
2	Standard ferrule (Standard MT MPO)
3	Alignment pin holes (Standard MT MPO)
4	Contact type optical fibers (Standard MT MPO)
5, 10	Magenta and black colored shell (PrizmMT MPO)
6, 11	Prizm ferrule (PrizmMT MPO)
7, 12	Alignment post (PrizmMT MPO)
8, 13	Focused optical fiber array (PrizmMT MPO)
9, 14	Alignment hole (PrizmMT MPO)

Related Information

- “Cable Cautions” on page 21
- “Install the Adapter” on page 23
- “Verify the Adapter Installation (Oracle Solaris)” on page 26
- “Verify the Adapter Installation (Oracle Linux)” on page 27
- “Remove the Adapter” on page 28

▼ Verify the Adapter Installation (Oracle Solaris)

1. **Install the adapter in the server.**
   See “Install the Adapter” on page 23.

2. **Verify that the adapter is viewed through the PCIe interface.**

```
# scanpci|grep -i 2088
pci bus 0x0004 cardnum 0x00 function 0x00: vendor 0x108e device 0x2088
```

Related Information

- “Cable Cautions” on page 21
- “Install the Adapter” on page 23
- “Standard MT Cables” on page 25
- “Verify the Adapter Installation (Oracle Linux)” on page 27
- “Remove the Adapter” on page 28

▼ Verify the Adapter Installation (Oracle Linux)

1. **Install the adapter in the server.**

   See “Install the Adapter” on page 23.

2. **Verify that the adapter is viewed through the PCIe interface and determine the adapter type.**

```
# lspci -d :2088 -v
13:00.0 Infiniband controller: Oracle/SUN Device 2088 (rev 03)
        Subsystem: Oracle/SUN Device 6278
        Physical Slot: 4
        Flags: bus master, fast devsel, latency 0
        Memory at 383ff8104000 (64-bit, prefetchable) [size=16K]
        Memory at 383ff0000000 (64-bit, prefetchable) [size=128M]
        Memory at 383ff8100000 (64-bit, prefetchable) [size=16K]
        Expansion ROM at c7100000 [disabled] [size=1M]
        Capabilities: [40] Power Management version 3
        Capabilities: [70] Express Endpoint, MSI 00
        Capabilities: [b0] MSI-X: Enable+ Count=48 Masked-
        Capabilities: [100] Advanced Error Reporting
        Capabilities: [148] Alternative Routing-ID Interpretation (ARI)
        Capabilities: [158] #19
        Capabilities: [188] Single Root I/O Virtualization (SR-IOV)
        Capabilities: [1c8] Transaction Processing Hints
        Capabilities: [298] Address Translation Service (ATS)
        Kernel driver in use: sif
```

Related Information

- “Cable Cautions” on page 21
- “Install the Adapter” on page 23

- "Standard MT Cables" on page 25
- "Verify the Adapter Installation (Oracle Solaris)" on page 26
- "Remove the Adapter" on page 28

Remove the Adapter

1. **Attach an antistatic wrist strap to your wrist and to the server.**
2. **If applicable, power off the server before you remove the adapter.**
3. **Disconnect all IB cables from the adapter port connector.**

   See "Standard MT Cables" on page 25.
4. **If applicable, remove the cover on the chassis.**
5. **If applicable, remove the screw in the front panel that secures the adapter into the server.**
6. **Using two fingers at the top front and rear of the adapter, carefully lift the adapter from the server slot connector.**
7. **Install the replacement adapter.**

   See "Install the Adapter" on page 23.

Related Information

- "Cable Cautions" on page 21
- "Install the Adapter" on page 23
- "Standard MT Cables" on page 25
- "Verify the Adapter Installation (Oracle Solaris)" on page 26
- "Verify the Adapter Installation (Oracle Linux)" on page 27

Enabling IB on the Adapter

These topics describe how to enable and verify IB for the adapter.

Description	Links
Enable IB on an adapter on an Oracle Solaris server.	"IB Overview (Oracle Solaris)" on page 30 "Prepare to Enable Virtualization (Oracle Solaris)" on page 31 "Enable Virtualization (Oracle Solaris)" on page 31 "Enable Ethernet Over IB for the Oracle IB Switch IS2-46 or Oracle IB Switch IS2-254 (Oracle Solaris)" on page 33 "Disable Ethernet Over IB for the Oracle IB Switch IS2-46 or Oracle IB Switch IS2-254 (Oracle Solaris)" on page 34 "Verify IB Connectivity (Oracle Solaris)" on page 35
Enable IB on an adapter on an Oracle Linux server.	"IB Overview (Oracle Linux)" on page 37 "Prepare to Enable Virtualization (Oracle Linux)" on page 37 "Enable Virtualization (Oracle Linux)" on page 38 "Enable Ethernet Over IB for the Oracle IB Switch IS2-46 or Oracle IB Switch IS2-254 (Oracle Linux)" on page 39 "Disable Ethernet Over IB for the Oracle IB Switch IS2-46 or Oracle IB Switch IS2-254 (Oracle Linux)" on page 41 "Verify IB Connectivity (Oracle Linux)" on page 41

Related Information

- "Understanding the Installation Process" on page 9
- "Understanding the Adapter" on page 11
- "Confirming Specifications and Requirements" on page 17
- "Installing the Adapter" on page 21
- "Updating Software and Firmware" on page 45

IB Overview (Oracle Solaris)

IB is a network architecture for the large-scale interconnection of computing and I/O nodes through a high-speed switched fabric. To operate IB on an Oracle server, you need an IB HCA (the adapter) and an IB software stack.

IB software is bundled with the Oracle Solaris OS. For Oracle Solaris 11.3, the package containing the device driver for the adapter is `driver/infiniband/sif`.

Note - You must use the `driver/infiniband/sif` package that is available in Oracle Solaris 11.3 and newer releases.

If you don't have the package on the system or your system is running an older release of Oracle Solaris, you must use the `pkg install/update` utility to add or update the package prior to using the adapter.

For details about IB software supported in Oracle Solaris OS releases, refer to these documents in the Oracle Solaris OS Release and Installation Collection at `http://www.oracle.com/goto/Solaris11/docs`:

- *Oracle Solaris 11 What's New*
- *Oracle Solaris 11 Release Notes*
- *Oracle Solaris 11 Package List*

The IB software stack, consisting of the upper-layer protocols and transport framework, is included in all of the Oracle Solaris software groups described in the *Oracle Solaris Installation Guide*.

For details about IB software stack configurations in an Oracle Solaris OS update release, refer to the *System Administration Guide: Devices and File Systems* document in the *Solaris 11 System Administrator Collection* at `http://www.oracle.com/goto/Solaris11/docs`.

Related Information

- "Prepare to Enable Virtualization (Oracle Solaris)" on page 31
- "Enable Virtualization (Oracle Solaris)" on page 31
- "Enable Ethernet Over IB for the Oracle IB Switch IS2-46 or Oracle IB Switch IS2-254 (Oracle Solaris)" on page 33
- "Disable Ethernet Over IB for the Oracle IB Switch IS2-46 or Oracle IB Switch IS2-254 (Oracle Solaris)" on page 34
- "Verify IB Connectivity (Oracle Solaris)" on page 35

Prepare to Enable Virtualization (Oracle Solaris)

SRIOV is automatically enabled by the driver. The driver configures the hardware for 16 VFs by default.

▼ Enable Virtualization (Oracle Solaris)

1. **List the devices on the server.**

```
# ldm ls-io -l

    NAME                                      TYPE   BUS      DOMAIN    STATUS
    ----                                      ----   ---      ------    ------
    pci_1                                     BUS    pci_1    primary   IOV
    [pci@340]
    pci_0                                     BUS    pci_0    primary
    [pci@300]
    pci_3                                     BUS    pci_3    primary
    [pci@3c0]
    pci_2                                     BUS    pci_2    primary   IOV
    [pci@380]
    /SYS/MB/PCIE5                             PCIE   pci_1    primary   OCC
    [pci@340/pci@1/pci@0/pci@4]
        pciex108e,2088@0/ibport@1,0,ipib
        pciex108e,2088@0/ibport@2,0,ipib
    [pci@380/pci@1/pci@0/pci@6]
    /SYS/MB/PCIE4                             PCIE   pci_2    primary   OCC
    [pci@380/pci@1/pci@0/pci@7]
        pciex108e,2088@0/ibport@1,0,ipib
        pciex108e,2088@0/ibport@2,0,ipib
        pciex108e,2089@0,1
        pciex108e,2089@0,2
        pciex108e,2089@0,3
        pciex108e,2089@0,4
    /SYS/MB/PCIE5/IOVGEN.PF0                  PF     pci_1    primary
    [pci@340/pci@1/pci@0/pci@4/pciex108e,2088@0]
        maxvfs = 32
    /SYS/MB/NET0/IOVNET.PF0                   PF     pci_0    primary
```

```
[pci@300/pci@1/pci@0/pci@1/network@0]
    maxvfs = 63
/SYS/MB/NET0/IOVNET.PF1                    PF     pci_0    primary
[pci@300/pci@1/pci@0/pci@1/network@0,1]
    maxvfs = 63
/SYS/MB/NET2/IOVNET.PF0                    PF     pci_3    primary
[pci@3c0/pci@1/pci@0/pci@1/network@0]
    maxvfs = 63
/SYS/MB/NET2/IOVNET.PF1                    PF     pci_3    primary
[pci@3c0/pci@1/pci@0/pci@1/network@0,1]
    maxvfs = 63
/SYS/MB/PCIE4/IOVGEN.PF0                   PF     pci_2    primary
[pci@380/pci@1/pci@0/pci@7/pciex108e,2088@0]
    maxvfs = 32
```

2. **Verify the device ID from the output in Step 1.**

```
/SYS/MB/PCIE5/IOVGEN.PF0                   PF     pci_1    primary
[pci@340/pci@1/pci@0/pci@4/pciex108e,2088@0]
```

where `2088` is the device ID.

3. **Initiate a delayed reconfiguration operation on the primary domain.**

All configuration changes for other domains are disabled until the primary domain reboots, at which time the new configuration for the primary domain will also take effect.

```
#ldm start-reconf primary
```

4. **Create VFs on the PFs.**

```
#ldm create-vf /SYS/MB/PCIE4/IOVGEN.PF0
```

5. **Reboot the server.**

6. **Add the VFs to the LDOM.**

```
#ldm add-io /SYS/MB/PCIE4/IOVGEN.PF0.VF0 ldom
```

Note - While adding VF to LDOM, LDOM should be in bound/inactive state.

For additional information on VFs, refer to the *Oracle VMServer for SPARC 3.3 Administration Guide* at `http://www.oracle.com/technetwork/documentation/vm-sparc-194287.html`.

Related Information

- "IB Overview (Oracle Solaris)" on page 30
- "Prepare to Enable Virtualization (Oracle Solaris)" on page 31

Enable Ethernet Over IB for the Oracle IB Switch IS2-46 or Oracle IB Switch IS2-254 (Oracle Solaris)

1. **Ensure that the VNIC has been created on the switch.**

   For information on creating VNICs on the switch, refer to *Configuring a VNIC* in the *Oracle Fabric OS 1.0 Administration Guide*.

2. **On the server, log in to the Oracle Solaris host to ensure that the VNIC has been successfully created.**

```
# prtconf -D | grep xs
ibport, instance #0 (driver name: xstn)
    vnic0, instance #4 (driver name: xsvnic)
```

   where `vnic0` is the VNIC name.

3. **Display the corresponding interface.**

```
#  dladm show-phys
LINK          MEDIA          STATE    SPEED  DUPLEX    DEVICE
net4          Infiniband     up       32000  unknown    ibp0
net0          Ethernet       up       1000   full      ixgbe0
net2          Ethernet       unknown  0      unknown   ixgbe2
net6          Ethernet       up       10     full      usbecm2
net3          Ethernet       unknown  0      unknown   ixgbe3
net1          Ethernet       unknown  0      unknown   ixgbe1
net5          Infiniband     down     0      unknown   ibp1
net9          Infiniband     down     0      unknown   ibp3
net10         Infiniband     down     0      unknown   ibp2
net11         Ethernet       unknown  0      unknown   xsvnic4
```

   Where the interface for VNIC is net11.

4. **Manually configure the IP address for the VNIC.**

```
# ipadm create-ip net11
# ipadm create-addr -T static -a 7.7.7.56/24 net11net11/v4
# ipadm

NAME      CLASS/TYPE STATE        UNDER      ADDR
lo0       loopback   ok           --         --
lo0/v4    static     ok           --         127.0.0.1/8
lo0/v6    static     ok           --         ::1/128
net0      ip         ok           --         --
net0/v4   static     ok           --         10.129.87.58/24
net0/v6   addrconf   ok           --         fe80::210:e0ff:fe58:3cd4/10
net0/v6   addrconf   ok           --         2606:b400:418:17a9:210:e0ff:fe58:3cd4/64
net6      ip         ok           --         --
net6/v4   static     ok           --         169.254.182.77/24
net11     ip         ok           --         --
net11/v4  static     ok           --         7.7.7.56/24
```

Related Information

- “IB Overview (Oracle Solaris)” on page 30
- “Prepare to Enable Virtualization (Oracle Solaris)” on page 31
- “Enable Virtualization (Oracle Solaris)” on page 31
- “Disable Ethernet Over IB for the Oracle IB Switch IS2-46 or Oracle IB Switch IS2-254 (Oracle Solaris)” on page 34
- “Verify IB Connectivity (Oracle Solaris)” on page 35

▼ Disable Ethernet Over IB for the Oracle IB Switch IS2-46 or Oracle IB Switch IS2-254 (Oracle Solaris)

1. **On the Oracle Solaris host, delete the interface created on that host.**

```
# ipadm delete-ip interface-created-on-solaris-host
```

2. **On the switch, remove the VNIC you created.**

```
# remove vnic vnic-name
```

For information on VNICs on the switch, refer to *Configuring a VNIC* in the *Oracle Fabric OS 1.0 Administration Guide*.

Related Information

- “IB Overview (Oracle Solaris)” on page 30
- “Prepare to Enable Virtualization (Oracle Solaris)” on page 31
- “Enable Virtualization (Oracle Solaris)” on page 31
- “Enable Ethernet Over IB for the Oracle IB Switch IS2-46 or Oracle IB Switch IS2-254 (Oracle Solaris)” on page 33
- “Verify IB Connectivity (Oracle Solaris)” on page 35

▼ Verify IB Connectivity (Oracle Solaris)

1. **Ensure that the adapter is properly installed in the server.**

   See “Install the Adapter” on page 23.

2. **Power on the server and cable the server to an operational IB switch.**

   Refer to the documentation for the server.

3. **Ensure that the cables are connected to the adapter and IB switch.**

4. **Verify that the IB switch is in operation on the network.**

   Refer to the documentation for your network hardware for more information at `http://www.oracle.com/us/products/networking/overview/index.html`.

5. **Check that the green LED is lit for each port that is connected to the IB switch.**

   If the green LED is not on, check the cable connections at the adapter and the IB switch.

6. **Ensure that the required OS has been installed.**

   See “IB Overview (Oracle Solaris)” on page 30.

7. **Verify that the adapter ports are up and the driver is attached.**

   a. **Obtain the state of the installed device.**

```
# cfgadm -als "cols=ap_id:condition" hca
Ap_Id                          Condition
hca:10E07A83740004              ok
```

   If more than one IB HCA device is installed in the server, a row is displayed for each. Look for the row displaying `hca:`*GUID* where *GUID* is the 64-bit number from the physical label on the adapter. See “Rear Panel” on page 14.

The `Condition` column must display `ok` to indicate that the driver has discovered the hardware and is bound to it. Refer to the `cfgadm_ib`(1m) man page for details about the IB-specific extensions.

b. Obtain port GUIDs for each port on the adapter.

```
# cfgadm -als "cols=ap_id:info" hca
Ap_Id                          Information
hca:10E07A83740004              VID: 0x108e, PID: 0x2088,
#ports: 0x2, port1 GUID: 0x10E07A83740005, port2 GUID: 0x10E07A83740006
```

If more than one IB HCA device is installed in the server, a row is displayed for each device. Look for the row displaying `hca:`*GUID*, where *GUID* is the 64-bit number from the physical label on the adapter. See "Rear Panel" on page 14.

Use the port number and GUID displayed by this command for your IB HCA device in the following step.

c. Verify that the IB ports and partitions are configured by the Subnet Manager.

```
# dladm show-ib
LINK HCAGUID          PORTGUID        PORT STATE GWNAME GWPORT  PKEYS
net7 10E07A83740004   10E07A83740005   1    up     --     --     8002,8005,FFFF
net8 10E07A83740004   10E07A83740006   2    up     --     --     8002,8005,FFFF
```

The command displays the `AP_ID` column, where each row has the format of `ib:`*Port GUID*, *P_Key*,`ipib`. Match the Port GUIDs from the command in Step 7b with these port GUIDs. There must be one row corresponding to the port and *P_Key* setup by the Subnet Manager. If an entry is missing, check the Subnet Manager configuration.

```
# dladm show-part
LINK         PKEY  OVER         STATE    FLAGS
ibd0         FFFF  net7         up       ----
ibd1         FFFF  net8        up       ----
```

Related Information

- "IB Overview (Oracle Solaris)" on page 30
- "Prepare to Enable Virtualization (Oracle Solaris)" on page 31
- "Enable Virtualization (Oracle Solaris)" on page 31
- "Enable Ethernet Over IB for the Oracle IB Switch IS2-46 or Oracle IB Switch IS2-254 (Oracle Solaris)" on page 33
- "Disable Ethernet Over IB for the Oracle IB Switch IS2-46 or Oracle IB Switch IS2-254 (Oracle Solaris)" on page 34

IB Overview (Oracle Linux)

IB is a network architecture for the large-scale interconnection of computing and I/O nodes through a high-speed switched fabric. To operate IB on an Oracle server, you need an IB HCA (the adapter) and an IB software stack.

Note - An IB software stack is part of the Oracle Linux OS distribution.

These Linux versions are supported with UEK4:

- Oracle Linux 6.7 and newer
- Oracle Linux 7.1 and newer
- OVM 3.4.1

For the latest information on UEK4, refer to the *Oracle Linux Release Notes for Unbreakable Enterprise Kernel Release 4* at `https://docs.oracle.com/cd/E52668_01/E69348/html/index.html`.

For the latest list of supported platforms and operating systems, refer to the *Oracle Dual Port EDR InfiniBand Adapter Product Notes*. This document is available at `http://www.oracle.com/goto/dual_port_qdr_infiniband_m4/docs`.

Related Information

- “Prepare to Enable Virtualization (Oracle Linux)” on page 37
- “Enable Virtualization (Oracle Linux)” on page 38
- “Enable Ethernet Over IB for the Oracle IB Switch IS2-46 or Oracle IB Switch IS2-254 (Oracle Linux)” on page 39
- “Disable Ethernet Over IB for the Oracle IB Switch IS2-46 or Oracle IB Switch IS2-254 (Oracle Linux)” on page 41
- “Verify IB Connectivity (Oracle Linux)” on page 41

▼ Prepare to Enable Virtualization (Oracle Linux)

1. **Prepare the adapter to configure the firmware for virtualization and run in an Oracle Virtual Server with OVM 4.3.1 using UEK4.**

2. **Enable the number of VFs in the VMs, using the `pflash` command.**

   `pflash` is the name of the firmware update tool. See “Update the Firmware (Oracle Linux)” on page 48 for more information.

```
pflash -d  device-path  num_vfs 4
```

where *device-path* is the path to flash device, in [domain:]<bus>:<slot>.<func> format. . The sample output above displays the value `num_vfs 4` which enables four VFs. Valid `num_vfs` include `0,1,2,4,8,16, or 32` to show or configure supported number of VFs.

The value `0` reverts back to a nonvirtualized mode or PF. This setting is persistent with reboots.

3. **Reboot the server to verify the new configuration.**

```
pflash -d  device-path  num_vfs
```

4. **Enable virtualization.**

See "Enable Virtualization (Oracle Linux)" on page 38.

Related Information

- "IB Overview (Oracle Linux)" on page 37
- "Enable Virtualization (Oracle Linux)" on page 38
- "Enable Ethernet Over IB for the Oracle IB Switch IS2-46 or Oracle IB Switch IS2-254 (Oracle Linux)" on page 39
- "Disable Ethernet Over IB for the Oracle IB Switch IS2-46 or Oracle IB Switch IS2-254 (Oracle Linux)" on page 41
- "Verify IB Connectivity (Oracle Linux)" on page 41

▼ Enable Virtualization (Oracle Linux)

1. **Locate the device(s) on the server.**

```
#lspci -d :2088
a0:00.0 Infiniband controller: Oracle/SUN Device 2088 (rev 03)
```

where `2088` is the vendor ID.

2. **Find the directory to set the number of VFs using the device ID from Step 2.**

```
# find /sys/devices | egrep "a0:00.0" | head -1
/sys/devices/pci0000:80/0000:80:03.0/0000:a0:00.0
```

3. **Change to the directory.**

```
# cd /sys/devices/pci0000:80/0000:80:03.0/0000:a0:00.0
```

4. **Type the number of VFs into the directory `sriov_numvfs`.**

```
# echo 4  sriov_numvfs
```

where 4 is the sample number of VFs.

5. **Change to the directory.**

```
# cd  /sys/bus/pci/drivers/pci-stub/
```

6. **Type the device ID to the *new_id*file.**

```
# echo "108e 2089" > /sys/bus/pci/drivers/pci-stub/new_id
```

Repeat Steps 3 to Step 6 after each server reboot.

Related Information

- "IB Overview (Oracle Linux)" on page 37
- "Prepare to Enable Virtualization (Oracle Linux)" on page 37
- "Enable Ethernet Over IB for the Oracle IB Switch IS2-46 or Oracle IB Switch IS2-254 (Oracle Linux)" on page 39
- "Disable Ethernet Over IB for the Oracle IB Switch IS2-46 or Oracle IB Switch IS2-254 (Oracle Linux)" on page 41
- "Verify IB Connectivity (Oracle Linux)" on page 41

▼ Enable Ethernet Over IB for the Oracle IB Switch IS2-46 or Oracle IB Switch IS2-254 (Oracle Linux)

1. **Ensure that the VNIC has been created on the switch.**

```
# admin@nsn156-46.us.oracle.com[OFOS] show physical-server
    ------------------------------------------------------------------------------
    name            nsn156-32      guid            10e07a850c0005
    descr      port            nsn156-46.us.oracle.com:ServerPort19
    os              Linux/4.1.12-32.el6uek.x86_64/x86_64
    version         0.58.0/3.0.0/xg-6.0.8020      server-profile  nsn156-32
```

```
------------------------------------------------------------------------------
name            nsn156-32      guid            10e07a850c0006
descr      port            nsn156-46.us.oracle.com:ServerPort18
os              Linux/4.1.12-32.el6uek.x86_64/x86_64
version         0.58.0/3.0.0/xg-6.0.8020      server-profile
```

For more information on creating VNICs on the switch, refer to *Configuring a VNIC* in the *Oracle Fabric OS 1.0 Administration Guide*.

2. **On the server, ensure that the appropriate VNIC drivers are installed.**

```
# modinfo xve
 filename:      /lib/modules/4.1.12-32.el6uek.x86_64/kernel/drivers/infiniband/ulp/
xsigo/xve/xve.ko
 version:        6.0.8020
 license:        Dual BSD/GPL
 description:    OVN Virtual Ethernet driver
 author:         Oracle corp (OVN-linux-drivers@oracle.com)
```

3. **Identify the VNIC.**

```
# show vnic

name                   state     mac-addr           ipaddr          if              if-
state  type    vlans

vn40_t.nsn156-32-LAG   up/down   00:13:97:5D:C0:19  200.40.25.32/24  pub25(125)      up
 static  none
vn40_t.nsn156-36-LAG   up/down   00:13:97:5D:C0:1A  200.40.25.36/24  pub26(126)
 up        static  none
vnLAG01.nsn156-32-LAG  up/up     00:13:97:5D:C0:05  200.10.22.32/24  pubnetLAG01
(211) up        static  65
vnLAG03.nsn156-36-LAG  up/up     00:13:97:5D:C0:11                   pubnetLAG03
(213) up                65
4 records displayed
```

Related Information

- “IB Overview (Oracle Linux)” on page 37
- “Prepare to Enable Virtualization (Oracle Linux)” on page 37
- “Enable Virtualization (Oracle Linux)” on page 38
- “Disable Ethernet Over IB for the Oracle IB Switch IS2-46 or Oracle IB Switch IS2-254 (Oracle Linux)” on page 41
- “Verify IB Connectivity (Oracle Linux)” on page 41

Disable Ethernet Over IB for the Oracle IB Switch IS2-46 or Oracle IB Switch IS2-254 (Oracle Linux)

- **Remove the VNIC from the switch.**

  ```
  # remove vnic vnic-name
  ```

  For information on VNICs on the switch, refer to *Configuring a VNIC* in the *Oracle Fabric OS 1.0 Administration Guide*.

Related Information

- "IB Overview (Oracle Linux)" on page 37
- "Prepare to Enable Virtualization (Oracle Linux)" on page 37
- "Enable Virtualization (Oracle Linux)" on page 38
- "Enable Ethernet Over IB for the Oracle IB Switch IS2-46 or Oracle IB Switch IS2-254 (Oracle Linux)" on page 39
- "Verify IB Connectivity (Oracle Linux)" on page 41

Verify IB Connectivity (Oracle Linux)

1. **Ensure that the adapter is properly installed in the server.**
   See "Install the Adapter" on page 23.
2. **Power on the server and cable it to an operational peer IB switch.**
   Refer to the documentation for your network hardware for more information at http://docs.oracle.com/cd/E36265_01/index.html or http://docs.oracle.com/cd/E36256_01/index.html.
3. **Ensure that the cables are connected to the adapter and IB switches.**
4. **Verify that the Subnet Manager is running on the IB switch or a host within the subnet.**
   Refer to the documentation for your network hardware for more information at http://docs.oracle.com/cd/E36265_01/index.html or http://docs.oracle.com/cd/E36256_01/index.html.
5. **Check that the green LED is lit for each port that is connected to the switch.**
   If the green LED is not on, check the cable connections at the adapter and the IB switch.
6. **Ensure that the required OS has been installed.**

See “IB Overview (Oracle Linux)” on page 37.

7. **Verify that the ports are up and the driver is attached.**

```
# ibstat
CA 'sif0'
        CA type: PSIF
        Number of ports: 2
        Firmware version:  0.53.0
        Hardware version: 0
        Node GUID: 0x0010e07abcd40004
        System image GUID: 0x0010e07abcd40007
        Port 1:
                State: Active
                Physical state: LinkUp
                Rate: 40
                Base lid: 22
                LMC: 0
                SM lid: 14
                Capability mask: 0x02014008
                Port GUID: 0x0010e07abcd40005
                Link layer: InfiniBand
        Port 2:
                State: Active
                Physical state: LinkUp
                Rate: 40
                Base lid: 24
                LMC: 0
                SM lid: 14
                Capability mask: 0x02014008
                Port GUID: 0x0010e07abcd40006
                Link layer: InfiniBand
```

The output shows system diagnostic messages that have the string `sif` in the message (the name of the Linux driver). Included in the output is a message that indicates whether the port is up or down.

Note - For accurate IB device information, such as GUID identification in a server with more than one IB device, use the `ibstat` command.

Related Information

- “IB Overview (Oracle Linux)” on page 37
- “Prepare to Enable Virtualization (Oracle Linux)” on page 37
- “Enable Virtualization (Oracle Linux)” on page 38
- “Enable Ethernet Over IB for the Oracle IB Switch IS2-46 or Oracle IB Switch IS2-254 (Oracle Linux)” on page 39

- “Disable Ethernet Over IB for the Oracle IB Switch IS2-46 or Oracle IB Switch IS2-254 (Oracle Linux)” on page 41

Updating Software and Firmware

These topics provide information on updating the adapter software and firmware.

Related Information

- "Understanding the Installation Process" on page 9
- "Understanding the Adapter" on page 11
- "Confirming Specifications and Requirements" on page 17
- "Installing the Adapter" on page 21
- "Enabling IB on the Adapter" on page 29

▼ Update the OS (Oracle Solaris)

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

   - **Update the entire OS image on the server.**

   - **If you cannot update the entire OS image, download the latest patch that contains the software driver at `https://support.oracle.com`.**

     For instructions on installing the latest SIF Package, refer to the *Oracle Dual Port QDR InfiniBand Adapter M4 Product Notes*. This document is available at `http://www.oracle.com/goto/dual_port_qdr_infiniband_m4/docs`.

2. **Verify that these packages are installed on the server.**

```
# pkg info -r sif
# pkg info network/open-fabrics
# pkg contents siftools
```

```
# pkginfo SUNWstc-infiniband-ofuv
```

Related Information

- "Update the Firmware (Oracle Solaris)" on page 47

Update the OS (Oracle Linux)

For the latest list of supported platforms and operating systems, refer to the *Oracle Dual Port QDR InfiniBand Adapter M4 Product Notes* at http://www.oracle.com/goto/dual_port_qdr_infiniband_m4/docs.

These Linux versions are supported with UEK4:

- Oracle Linux 6.7 and newer
- Oracle Linux 7.1 and newer
- OVM 3.4.1

For the latest information on UEK4, refer to the *Oracle Linux Release Notes for Unbreakable Enterprise Kernel Release 4* at https://docs.oracle.com/cd/E52668_01/E69348/html/index.html.

1. **Install and upgrade to the latest Oracle Linux.**

   a. **For Oracle Linux 6, refer to the *Oracle Linux Installation Guide for Release 6*at http://www.oracle.com/technetwork/server-storage/linux/documentation/index.html.**

   b. **For Oracle Linux 7, refer to *Oracle Linux Installation Guide for Release 7* at http://www.oracle.com/technetwork/server-storage/linux/documentation/index.html.**

2. **Install and upgrade to the latest UEK4 release.**

   Refer to the Oracle® Linux Release Notes for Unbreakable Enterprise Kernel Release 4 at http://www.oracle.com/technetwork/server-storage/linux/documentation/index.html.

3. **Ensure that the correct IB stack (OFED stack) for UEK4 is installed.**

   Refer to Chapter 3.5 in https://docs.oracle.com/cd/E52668_01/E69348/E69348.pdf or http://www.oracle.com/technetwork/server-storage/linux/documentation/index.html.

4. **Add the `psif` driver and `libsif` library.**

   For the latest driver version, refer to the *Oracle Dual Port QDR InfiniBand Adapter M4 Product Notes* at http://www.oracle.com/goto/dual_port_qdr_infiniband_m4/docs.

Related Information

- "Update the Firmware (Oracle Linux)" on page 48

Update the Firmware (Oracle Solaris)

To use this adapter with the Oracle Solaris OS, use the minimum firmware version. Refer to the *Oracle Dual Port QDR InfiniBand Adapter M4 Product Notes* at `http://www.oracle.com/goto/dual_port_qdr_infiniband_m4/docs`.

1. **Display the revision level of the adapter.**

```
# fwflash -l
List of available devices:
Device[0]  /devices/pci@340/pci@1/pci@0/pci@4/pciex108e,2088@0:devctl
Driver psif
Class [IB]
        GUID : System Image                    - 0010e07a982c0007
               Node Image                      - 0010e07ab4980004   <========================== Node
 GUID
               Port 1                          - 0010e07ab4980005
               Port 2                          - 0010e07ab4980006
        Firmware Revision      EPSC Active     : 0.065 Thu Jun  2 22:57:10 2016  <===== Firmware version

        Firmware Revision      Bootloader      : 0.036 Wed Feb  10 22:01:34 2016

        Vendor  Id                             : ORACLE
        HW Revision                            : 3
        Device  Id                             : 2088
        Description                            : Titan Infiniband HCA
```

Look for the revision number that appears after the `Firmware revision` string. If more than one device is displayed, look for the `Node Image` GUID that matches the GUID displayed on the physical GUID label of the adapter being installed. See "Rear Panel" on page 14.

To display all firmware details, set the `export SIF_FW_ALL_SHOW=1` environment variable.

2. **Select and download the approved firmware tool from My Oracle Support at `https://support.oracle.com/`.**

   For the latest list of supported platforms and operating systems, and the latest software and firmware versions, refer to the *Oracle Dual Port QDR InfiniBand Adapter M4 Product Notes*. This document is available at `http://www.oracle.com/goto/dual_port_qdr_infiniband_m4/docs`.

3. **Install the firmware.**

```
# fwflash -f firmware-image-file -d device-path-of-IB-adapter
```

Sample output:

```
# fwflash -f titan-psif-epsc-0.064.bin -d /devices/pci@340/pci@1/pci@0/pci@4/pciex108e,2088@0:devctl

The current HCA firmware version is    :0.065
Will be updated to HCA firmwarever of :0.064
About to update firmware on /devices/pci@340/pci@1/pci@0/pci@4/pciex108e,2088@0:devctl with file titan-
psif-epsc-0.064.bin.
Do you want to continue? (Y/N): y

fwflash: New firmware will be activated after you reboot
#
```

4. **Reboot the system to enable the new firmware.**

5. **Verify the firmware.**

```
# fwflash -d device-path-of-IB-adapter -r firmware-image-file
```

Related Information

- "Update the OS (Oracle Solaris)" on page 45

Update the Firmware (Oracle Linux)

To use this adapter with Oracle Linux, the minimum firmware version must be used. Refer to the *Oracle Dual Port QDR InfiniBand Adapter M4 Product Notes* at http://www.oracle.com/goto/dual_port_qdr_infiniband_m4/docs.

1. **Display the *device-path* of the IB adapter, using device ID 2088.**

```
# lspci | grep 2088
90:00.0 Infiniband controller: Oracle/SUN Device 2088 (rev 03)
```

The above *device-path* is 90:00.0.

2. **Determine the type of adapter.**

```
# lspci -v -d  :2088| grep -i subsystem
```

```
        Subsystem: Oracle/SUN Device 6278
        Subsystem: Oracle/SUN Device 6278
```

where `pflash` is the name of the firmware update tool.

3. **Select and download the firmware update tool from My Oracle Support at:**

   https://support.oracle.com/.

   For the latest list of supported platforms and operating systems, and the latest software and firmware versions, refer to the *Oracle Dual Port QDR InfiniBand Adapter M4 Product Notes*. This document is available at http://www.oracle.com/goto/dual_port_qdr_infiniband_m4/docs.

4. **Install the firmware.**

   # **pflash -d** *device-path* **-i** *firmware-image-file* **b[urn]**

   where *device-path* is the path to flash device (in [domain:]<bus>:<slot>.<func> format) obtained in Step 1.

   For example, type:

```
# pflash -d 90:00.0 -i /lib/firmware/titan-psif-epsc-0.053.bin burn
Flash burn start
.....................................................................
Flash burn end
```

5. **Reboot the server.**

6. **Check if the IB adapter is up with the firmware version used.**

   # **pflash -d** *device-path* **q [uery]**

Related Information

- "Update the OS (Oracle Linux)" on page 46

Glossary

A

adapter Oracle Dual Port QDR InfiniBand Adapter M4 from Oracle.

B

BDF Bus: Device: Function. Used to succinctly describe PCI and PCIe devices.

D

DDR Double data rate.

DMA Direct memory access.

E

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

G

Gb Gigabyte.

GbE Gigabit Ethernet.

Gbps Gigabits per second.

GT Gigabit-transfer.

GTps Gigatransfers per second.

GUID Globally Unique Identifier.

H

HCA Host channel adapter. A server card that provides a node for IB network connection.

I

IB InfiniBand.

IPoIB Internet Protocol over IB.

L

LAN Local area network. Two or more devices connected to each other either physically or logically.

M

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

N

NIC Network interface card.

P

PCI Peripheral Component Interconnect.

PCIe PCI Express.

Q

QDR Quad Data Rate, 10.0 Gb/s line rate.

QSFP+ Quad Small Form Factor Pluggable Plus. Extended bandwidth four-channel electrical connection system.

S

SDR Single data rate.

SPI Serial peripheral interface. A type of flash memory.

T

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

V

VID VLAN identifier. A 12-bit identifier in an Ethernet header.

LFM Linear feet per minute.

vNIC Virtualized network interface card.

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