

# Oracle Fabric Interconnect Hardware User's Guide

**ORACLE**

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## Using This Documentation

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- **Overview** – Describes how to install and replace parts in the Oracle Fabric Interconnect F1-15 and Oracle Fabric Interconnect F1-4, and how to use and maintain the system.
- **Audience** – Technicians, system administrators, authorized service providers, and users who have advanced experience troubleshooting and replacing hardware.
- **Required knowledge** – Advanced experience with Fabric Interconnect devices.

## Product Documentation Library

Documentation and resources for this product and related products are available at <http://www.oracle.com/goto/oracle-virtual-networking/docs>.

## Feedback

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



# Installing the Fabric Interconnect

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This chapter describes the physical installation and cabling of the Oracle Fabric Interconnect. Installation in a 4-post equipment rack and a standard Sun/Oracle 27" rack are described.

This chapter contains the following sections:

- [“Oracle Fabric Interconnect Overview” on page 11](#)
- [“Site Preparation” on page 13](#)
- [“Unpacking the System” on page 16](#)
- [“Installing the Fabric Interconnect F1-15 in a 4-Post Rack” on page 20](#)
- [“Installing the Cable Management Assembly” on page 37](#)
- [“Installing the Fabric Interconnect F1-4 in a 4-Post Rack” on page 45](#)
- [“Understanding Chassis Components and Indicators” on page 58](#)
- [“Installing an I/O Module” on page 69](#)
- [“Install a Host Channel Adapter” on page 75](#)
- [“Connecting the Fabric Interconnect to Other Equipment” on page 77](#)

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**Note** - Identify and resolve any potential installation or cabling issues before beginning the installation and cabling procedures in this chapter.

---

## Oracle Fabric Interconnect Overview

Oracle Fabric Interconnect is a service-oriented platform that interconnects data-center resources based on application demands. The Fabric Interconnect is a product family consisting of Oracle Fabric Interconnect F1-15 and Oracle Fabric Interconnect F1-4.

## Oracle Fabric Interconnect F1-15

The Oracle Fabric Interconnect F1-15 is an enterprise-class, 4 rack-unit Fabric Interconnect which provides server connectivity to network and storage resources. The Oracle Fabric Interconnect F1-15 supports 1 GE and 10 GE modules for network connectivity, and Fibre

Channel modules for SAN connectivity. The Fabric Interconnect F1-15 supports any mixture of up to 15 I/O modules for network and SAN connectivity.

Server connectivity is supported through the Fabric Interconnect's Fabric Board, can be ordered for specific connection types:

- InfiniBand (IB) connections of Double Data Rate (DDR) are supported through an InfiniBand Fabric Board that has 24 individual server ports. The IB server connections are at 10 Gbps or Double Data Rate (DDR) at 20 Gbps based on the speeds supported in your network.
- InfiniBand connections of Quadruple Data Rate (QDR) are supported through an InfiniBand Fabric Board that has 20 individual server ports. The IB server connections are at 20 Gbps (DDR), or Quadruple Data Rate at 40 Gbps based on the speeds supported in your network.

[Figure 30, “Fabric Interconnect F1-15 Front and Rear Panel Components,” on page 59](#) shows the front and back of the Fabric Interconnect F1-15. Additional information for the Fabric Interconnect F1-15 hardware platform can be found in this document.

## Oracle Fabric Interconnect F1-4

The Oracle Fabric Interconnect F1-4 is an enterprise-class, 2 rack-unit Fabric Interconnect which provides server connectivity to network and storage resources. The Fabric Interconnect F1-4 supports up to 4 of the same 1 GE, 10 GE, and Fibre Channel modules as Oracle Fabric Interconnect F1-15 flagship product.

Server connectivity is supported through the Fabric Interconnect's Fabric Board, can be ordered for specific connection types:

- InfiniBand (IB) connections of Double Data Rate (DDR) are supported through an InfiniBand Fabric Board that has 24 individual server ports. The IB server connections are at 20 Gbps (DDR) based on the speeds supported in your network.
- InfiniBand connections of Quadruple Data Rate (QDR) are supported through an InfiniBand Fabric Board that has 20 individual server ports. The IB server connections are at 20 Gbps (DDR), or Quadruple Data Rate at 40 Gbps based on the speeds supported in your network.

Because the Fabric Interconnect F1-4 is half the size of the Fabric Interconnect F1-15, the Fabric Interconnect F1-4's smaller form factor allows for higher rack density by consuming fewer rack units when compared to the Fabric Interconnect F1-15. [Figure 32, “Fabric Interconnect F1-4 Front and Rear Panel Components,” on page 60](#) shows the front and back of the Fabric Interconnect F1-4. Additional information for the Fabric Interconnect F1-4 hardware platform can be found in this document.

## Site Preparation

The Fabric Interconnect product family consists of the Fabric Interconnect F1-15 and the Fabric Interconnect F1-4. Before installing either system, make sure that the site meets the proper requirements.

### Fabric Interconnect F1-15 Site Criteria

Verify that your installation site meets the following criteria for the Fabric Interconnect F1-15:

- Power: 100-127 / 200-240 VAC 12 A at 100 volts or 7.68 A at 180 volts 47- 63 Hz 1220 W (maximum) with chassis fully loaded  
Each power supply should be connected to a separate 15-20 A AC branch circuit. Do not exceed the maximum power cord length of 15 feet (4.57 m).
- Environmental: Operating Temperature 5-35 °C Maximum Recommended Operating Temperature (Ambient) 35 °C Relative Humidity (non-condensing) 10-80% at 35 °C Operating Altitude 2000m (maximum)
- Cooling: The front and back of the chassis must be free of any obstruction to the airflow (front-to-back)



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**Caution** - Air vents must not be blocked and must have free access to the room ambient air for cooling. Installation of the equipment in a rack should be such that the amount of airflow required for safe operation of the equipment is not compromised.

---

- System Noise: 72 decibels (dB) with all fans operating at full speed
- Rack Type: 4-post EIA rack
- Client Servers: InfiniBand interface required

Select a location in the rack in which to install the Fabric Interconnect. The location must accept a chassis with the following dimensions, as shown in [Figure 1, “Verifying Rack Space,” on page 14](#):

- Height: 7 inches (17.8cm)
- Weight: 100 pounds in shipping configuration (no I/O modules installed) 130 pounds with modules installed (the fully loaded weight will differ depending on the number and type of modules installed.)
- Width: 17-13/16 inches (45.4cm)
- Depth: 28-1/4 inches (71.8cm)

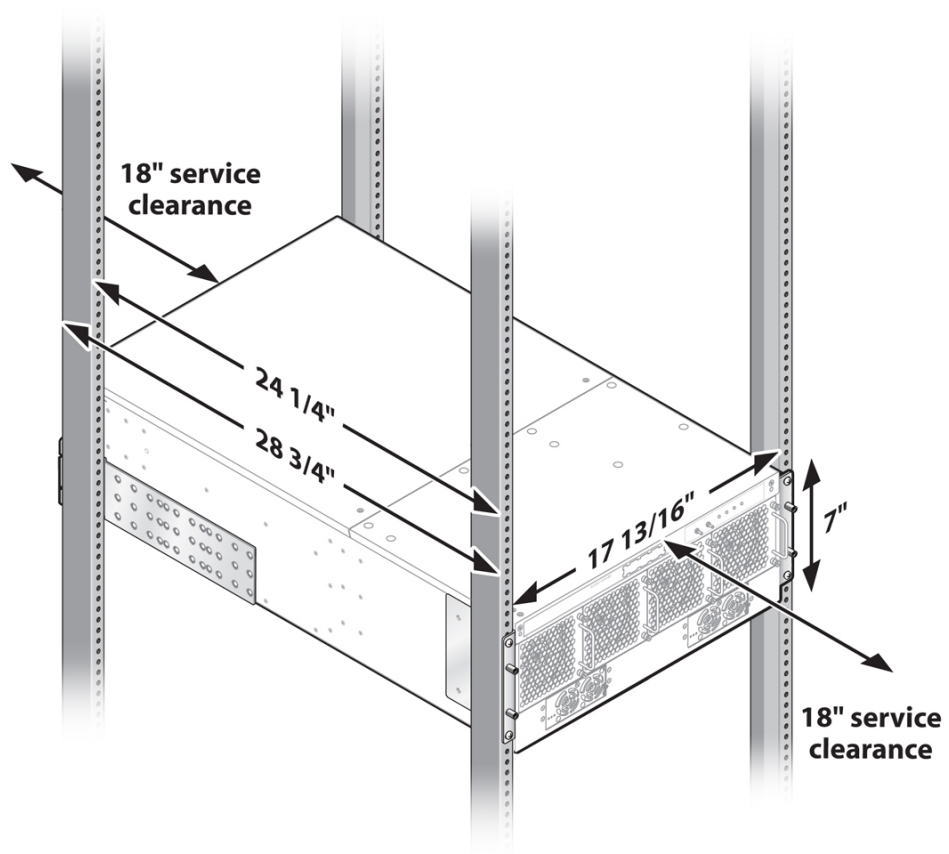
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**Note** - The Oracle Fabric Interconnect has cable-management brackets that can be mounted on the chassis as an option. It is your choice whether or not install the cable-management brackets.

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- Service Clearance: 18 inches (45.7cm) (front and rear)

**FIGURE 1** Verifying Rack Space



## Fabric Interconnect F1-4 Site Criteria

Verify that your installation site meets the following criteria for the Fabric Interconnect F1-4:

- Power: 100-127 / 200-240 VAC 8.5 A at 100 volts or 4 A at 180 volts 50 - 60 Hz 750 W (maximum) with chassis fully loaded

Each power supply should be connected to a separate 15-20 A AC branch circuit. Do not exceed the maximum power cord length of 15 feet (4.57 m).



---

**Caution** - For the Oracle Fabric Interconnect F1-4 only, input power cords are used as the main AC power disconnect. As a result, the facility power socket outlet shall be installed near the equipment and shall be easily accessible.

---

- Environmental: Operating Temperature 5-35°C Maximum Recommended Operating Temperature (Ambient) 35°C Relative Humidity (non-condensing) 10-80% at 35°C Operating Altitude 2000m (maximum)
- Cooling: The front and back of the chassis must be free of any obstruction to the airflow (front-to-back)



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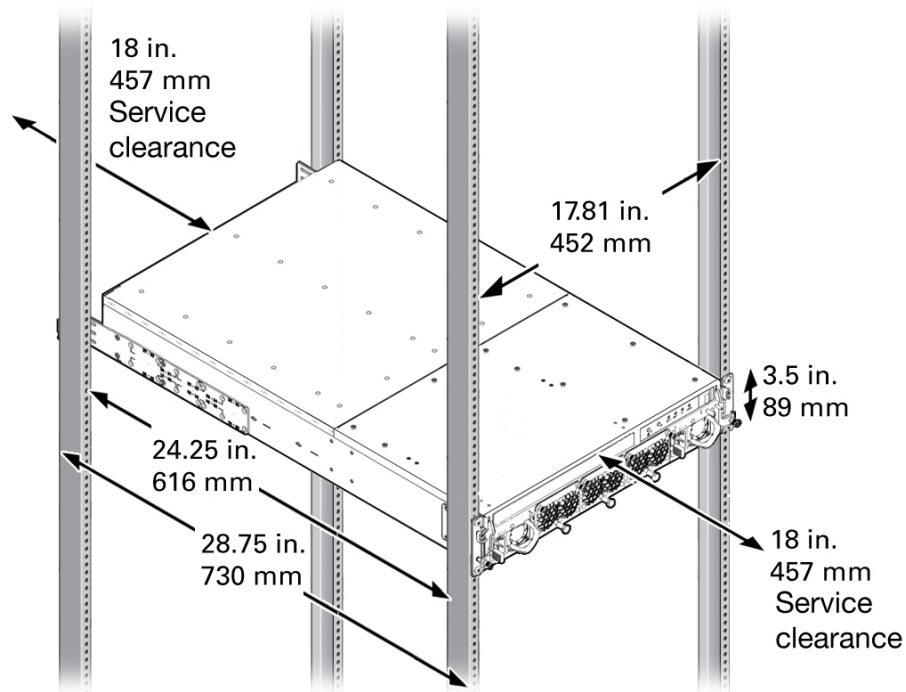
**Caution** - Air vents must not be blocked and must have free access to the room ambient air for cooling. Installation of the equipment in a rack should be such that the amount of airflow required for safe operation of the equipment is not compromised.

---

- Rack Type: 4-post EIA rack
- Client Servers: InfiniBand interface required

Select a location in the rack in which to install the Oracle Fabric Interconnect. The location must accept a chassis with the following dimensions, as shown in [Figure 2, “Verifying Rack Space,” on page 16](#):

- Height: 3 1/2 inches (8.9 cm)
- Weight: 45 lbs. (20.5 Kg) in shipping configuration (no I/O Modules installed) 53 lbs. with I/O modules installed (the fully loaded weight might differ depending on the number and type of modules installed.)
- Width: 17-13/16 inches (45.4 cm)
- Depth: 28-1/4 inches (71.8 cm)
- Service Clearance: 18 inches (45.7 cm) (front and rear)

**FIGURE 2** Verifying Rack Space

## Unpacking the System

This section documents unpacking the different models of Fabric Interconnect and verifying the contents of the shipping container. The two models of Fabric Interconnect—the Fabric Interconnect F1-15 and Fabric Interconnect F1-4—contain much of the same hardware and system elements, but there are some slight differences depending on which model you ordered.

Before unpacking the Fabric Interconnect, perform a visual inspection of the shipping container. If a shipping container shows any signs of damage, contact the shipping agent immediately. If the shipping container is not damaged, you can unpack the Fabric Interconnect. See the appropriate section for your Fabric Interconnect:

- [“Unpack the Fabric Interconnect F1-15” on page 17](#)
- [“Unpack the Fabric Interconnect F1-4” on page 19](#)



---

**Note** - The topics documented in this section are for stand-alone Fabric Interconnect deployments only. The Fabric Interconnect is orderable as a complete, engineered system called the Oracle Virtual Compute Appliance (VCA), which has different contents and installation procedures. If you are deploying a stand-alone (non-VCA) Fabric Interconnect, continue to use this documentation. If you are deploying an VCA Fabric Interconnect, do not use this documentation. Instead, use the documentation that accompanied your VCA shipment.

---

## ▼ Unpack the Fabric Interconnect F1-15

The Fabric Interconnect F1-15 is a 4 rack-unit Fabric Interconnect with capacity for 15 I/O modules and either 24 InfiniBand server connections at DDR speeds, or 20 InfiniBand server connections at QDR speeds.



---

**Caution** - The Fabric Interconnect chassis weighs 100 - 130 pounds (45 - 59 kilograms) depending on its configuration. Removing the chassis from the shipping container and installing it in an equipment rack requires a minimum of two people. Attempting to unpack and install this system alone could result in equipment damage or personal injury.

---

To unpack the system, you will need the following tools:

- #2 Phillips (cross-head) screwdriver
- Box cutter

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**Note** - Because the number and types of I/O modules are determined by the customer, I/O modules are shipped in separate boxes.

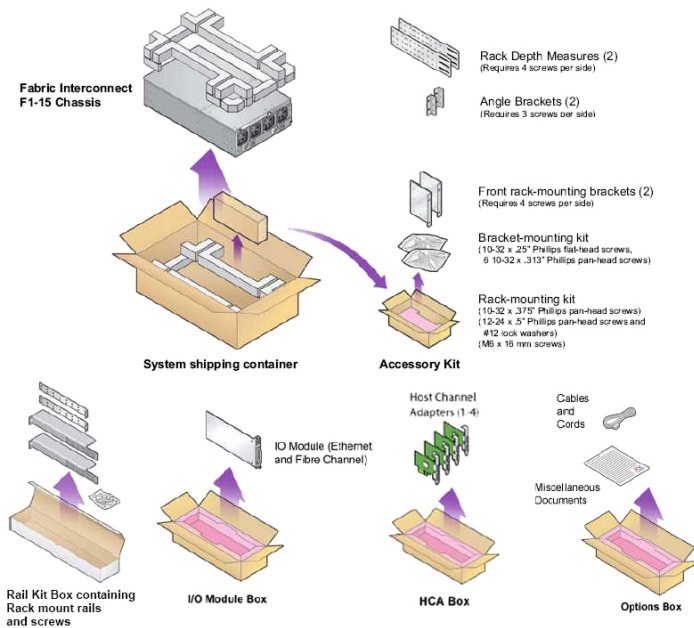
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Follow this procedure for unpacking your Fabric Interconnect:

1. **Locate the shipping list and verify that the following containers are present:**
  - **System shipping container**
  - **I/O module box (1 to 15)**
  - **HCA box**
  - **Options box**

- Rail Kit box
  - Accessory Kit
  - System information packet
2. Open the containers and verify their contents against the illustration in [Figure 3, “Unpacking Shipping Containers and Examining Contents,”](#) on page 18.

**FIGURE 3** Unpacking Shipping Containers and Examining Contents



**Note** - Although not pictured, a cable management assembly (CMA) is included in a separate box. In addition, a module retention bracket (also not shown) is attached to the F1-15 chassis to keep modules and blanks secure while shipping. The CMA can be installed as an option (see [“Installing the Cable Management Assembly”](#) on page 37). However, to install I/O Modules, you must remove the module retention bracket.

3. Unpack the Fabric Interconnect chassis and place it on a flat, stable surface capable of supporting up to 170 pounds (77.11kg).

## ▼ Unpack the Fabric Interconnect F1-4

The Fabric Interconnect F1-4 is a 2 rack-unit Fabric Interconnect with capacity for 4 I/O modules and either 24 InfiniBand server connections at DDR speeds, or 20 InfiniBand server connections at QDR speeds.



---

**Caution** - The Fabric Interconnect chassis weighs 45 - 53 pounds (20 - 24 kilograms) depending on its configuration. Removing the chassis from the shipping container and installing it in an equipment rack requires a minimum of two people. Attempting to unpack and install this system alone could result in equipment damage or personal injury.

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To unpack the system, you will need the following tools:

- #2 Phillips (cross-head) screwdriver
- Box cutter

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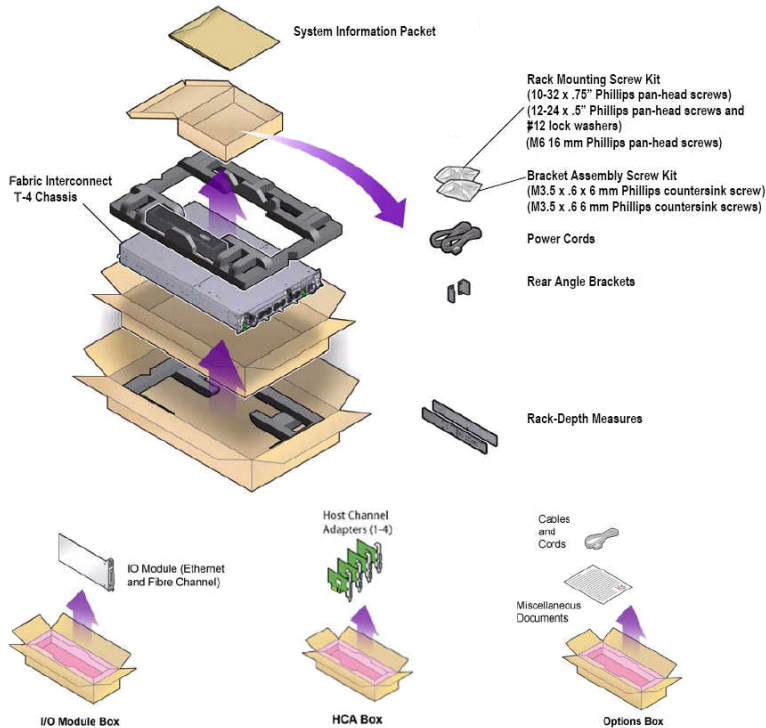
**Note** - Because the number and types of I/O modules are determined by the customer, I/O modules are shipped in separate boxes.

---

Follow this procedure for unpacking your Fabric Interconnect:

1. **Locate the shipping list and verify that the following containers are present:**
  - **System shipping container**
  - **I/O module box (1 to 15)**
  - **HCA box**
  - **Options box**
  - **Accessory Kit**
  - **System information packet**
2. **Open the containers and verify their contents against the illustration in [Figure 4, “Unpacking Shipping Containers and Examining Contents,”](#) on page 20.**

**FIGURE 4** Unpacking Shipping Containers and Examining Contents



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**Note** - Although not pictured, a cable management assembly (CMA) is included in a separate box.

---

3. **Unpack the Fabric Interconnect chassis and place it on a flat, stable surface capable of supporting up to 55 pounds (25 kilograms).**

## Installing the Fabric Interconnect F1-15 in a 4-Post Rack

This section documents how to install the Fabric Interconnect F1-15 in a 4-post equipment rack.

The procedure in this section documents installing a Fabric Interconnect F1-15 by using the standard rail kit that comes with the Fabric Interconnect. The rail kit is useful as a “rack helper” to temporarily hold the chassis in place in the rack while attaching rack-mount hardware,

inserting screws, and so on. You can leave the rail kit in the rack if you choose, but be aware that doing so will consume rack units that could be devoted to additional equipment.

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**Note** - The topics documented in this section are for stand-alone Fabric Interconnect deployments only. The Fabric Interconnect is orderable as a complete, engineered system called the Oracle Virtual Compute Appliance (VCA), which has different contents and installation procedures. If you are deploying a stand-alone (non-VCA) Fabric Interconnect, continue to use this documentation. If you are deploying a VCA Fabric Interconnect, do not use this documentation. Instead, use the documentation that accompanied your VCA shipment.

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## Fabric Interconnect F1-15 Locking Modules

The Fabric Interconnect F1-15's I/O Modules have a locking mechanism to secure the modules into the chassis. The locking mechanism (a quarter-turn Pawl) is embedded in the I/O Module handle, which has a slotted head. By using a screwdriver, you can turn the I/O module handle in a 90-degree arc to lock or unlock the I/O module. For more information, see [“Using the I/O Module Lock” on page 70](#).

## Required Equipment

For this procedure, you will need the following equipment:

- #2 Phillips (cross-head) screwdriver
- Marker or tape
- Screws for attaching brackets and side rails to the Fabric Interconnect:
  - Fourteen (14) 10-32 x .25” Phillips flat-head screws
- Screws for Fabric Interconnect rack install. The screws come in a large bag that contains 3 smaller bags for different types of common equipment racks:
  - Eight (8) 10-32 x .375” Phillips pan-head screws
  - Eight (8) 12-24 x .5” Phillips pan-head screws
  - Eight (8) #12 lock washers that are used with the 12-24 screws
  - 16) M6 x 16 mm screws)
  - Sixteen (16) M6 cage nuts, EIA rack, M6/BL2, 5/9x9

---

**Note** - You do not need to use all of these screws. The different types of screws are supplied to allow successful installation in a wide variety of common equipment racks. You will use only the type of screw that is appropriate for the type of rack in which you are installing the Fabric Interconnect.

---

- Rail kit (rack mount rails) which are contained in a separate box within the Fabric Interconnect shipping container, consist of four individual pieces (two pieces per rail):
  - Two slotted pieces that are folded to create a horizontal surface on which the Fabric Interconnect can slide. One end of this piece also contains an angled surface that provides an attachment point to the rack.
  - Two pieces with threaded standoffs. One end of this piece also contains an angled surface that provides an attachment point to the rack.
- Rack mount rail screws, contained in two separate bag in the rack mount rails box. In one bag, you will find the following screws:
  - short screws (10-32 x .25" Phillips pan-head screws), which assemble the two pieces of each rack mount rail.
  - long screws (10-32 x .625" or 12-24 x .625" Phillips pan-head screws), which attach the assembled rack mount rails to a standard equipment rack.

In a separate bag, you will find additional long screws (M6 x 20 mm Phillips pan-head), which attach the assembled rack mount rails to a metric equipment rack.

You will use only one type of screw—either M6 screws for a metric rack, or the 10-32 or 12-24 screws for a standard rack.

## Pre-Installation Considerations

Be aware of the following considerations before beginning the installation procedure.

- You will find it helpful to determine the depth of the rack to know where to attach the side panels to the chassis.
- Sun/Oracle Rack — For a 27" rack (a standard Sun/Oracle rack), you will need a separate mounting bracket, which is part number 7068910 Rev 03 or later. This number is silk-screened on the part. Otherwise, all the other hardware is the same. If you are installing the Fabric Interconnect in a 27" Sun Oracle rack, be aware that you will need to use this specific part.

---

**Note** - In a Sun/Oracle Rack, you will need to measure where the Fabric Interconnect will go as well as the CMA, and make sure that all the cage nuts for each are installed before you install the Fabric Interconnect. If you install the Fabric Interconnect, and then attempt to install the CMA's cage nuts, you will not have enough space to put the CMA's cage nuts in place.

---

- Cable management is supported through a standard Oracle cable management assembly (CMA). This part is not mandatory, but it is recommended as part of the installation. If used, the CMA must be installed after the Fabric Interconnect is successfully rack mounted. For information about installing the CMA, see ["Installing the Cable Management Assembly" on page 37](#).

- The Fabric Interconnect comes with a module retention bracket attached to the chassis. Although you can rack install the Fabric Interconnect with the module retention bracket attached to the chassis, you will find it easier to remove the bracket before beginning the installation procedure. You should retain the module retention bracket for future use.
- Also, make sure to install the Fabric Interconnect without the I/O modules in the chassis. By installing the chassis without the I/O modules, the Fabric Interconnect is lighter and easier to install.
- Some steps in this procedure require you to install or assemble components from the inside of the rack. This requirement occurs to allow for situations where no side access to the Fabric Interconnect is available.

The Fabric Interconnect installation procedure follows these basic guidelines:

1. Assemble the rack mount rails.
2. Install the rack mount rails in the equipment rack.
3. Remove the module retention bracket (if you've not already done so)
4. Install the chassis.
5. Remove the rack mount rails (optional).
6. Install the cable management assembly (optional)

---

**Note** - The rack mount rails are intended as an installation tool to assist in inserting the chassis into the equipment rack. It is not mandatory to leave the rails installed after the Fabric Interconnect is installed and secured to the equipment rack. It is your choice whether or not to remove the rack mount rails. Be aware that the rack mount rails are 1U high, so you must have at least 1 rack unit of open space below the Fabric Interconnect. If you choose to leave the rails installed, be aware that the rack will have one less rack unit of vertical space available for additional equipment.

---

## ▼ Install the Fabric Interconnect F1-15



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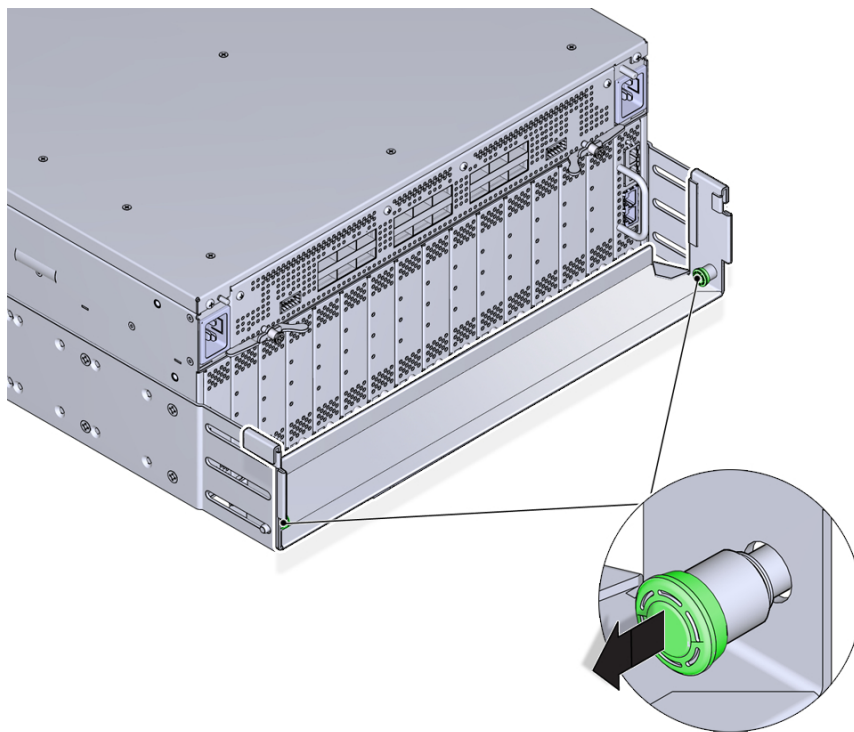
**Caution** - A minimum of two people are required to perform this installation safely. Also, make sure to measure out the locations for the Fabric Interconnect and CMA and place all the cage nuts for each before attempting to install the Fabric Interconnect. Failure to install all the cage nuts for the Fabric Interconnect and CMA before the Fabric Interconnect is in place can prevent you from installing the CMA's cage nuts in the correct location.

---

1. **Select the location in the rack where the Fabric Interconnect will be installed.**
2. **Make sure that at least one rack unit of space exists below the location where the Fabric Interconnect will be installed.**

3. Choose the correct mounting screws for your rack. The Fabric Interconnect is shipped with three complete sets of mounting screws (10-32, 12-24 and M6), which support a wide variety of common equipment racks.
4. If you are using an untapped rack, for example a Sun/Oracle rack, insert the M6 cage nuts now if you have not already done so. Later in the procedure, you will then use M6 screws to secure the chassis to the rack.
5. Mark each of the rack posts at the locations that will correspond to the bottom of the Fabric Interconnect when it is installed. Verify that all four marks are level. This mark also indicates the top of the rail kit.
6. Inside the module retention bracket, locate the two spring-loaded pins as shown in [Figure 5, "Module Retention Bracket's Compression Pins,"](#) on page 24.

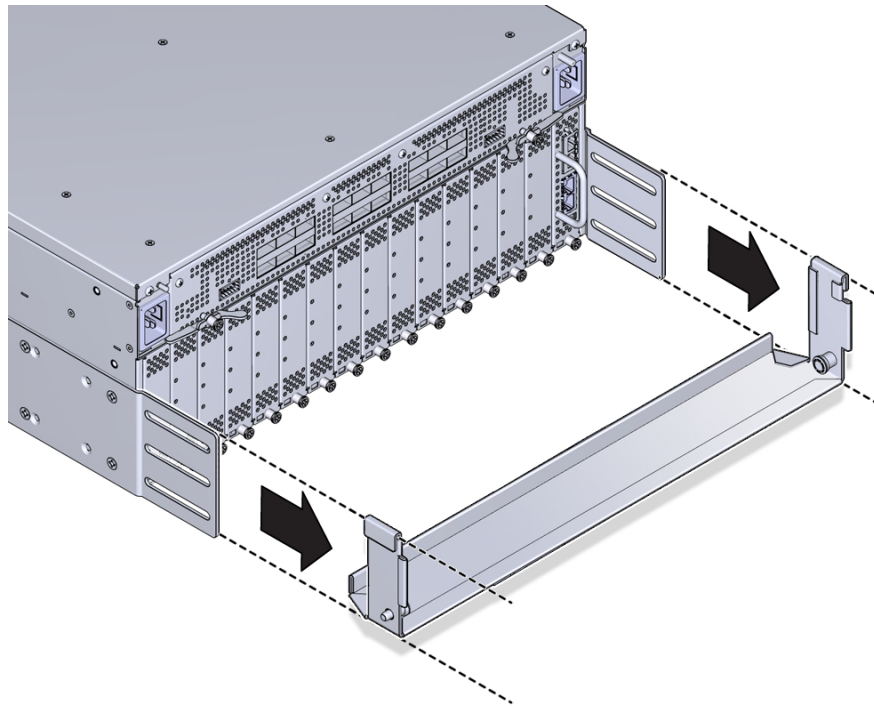
**FIGURE 5** Module Retention Bracket's Compression Pins





7. Simultaneously pull the two pins inward (toward each other), and slide the module retention bracket off of the Fabric Interconnect chassis. See [Figure 6, "Removing the Module Retention Bracket,"](#) on page 25.

**FIGURE 6** Removing the Module Retention Bracket



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**Note** - The module retention bracket is used to hold modules and blanks in place while the product is in transit. After removing the module retention bracket, keep it for future use.

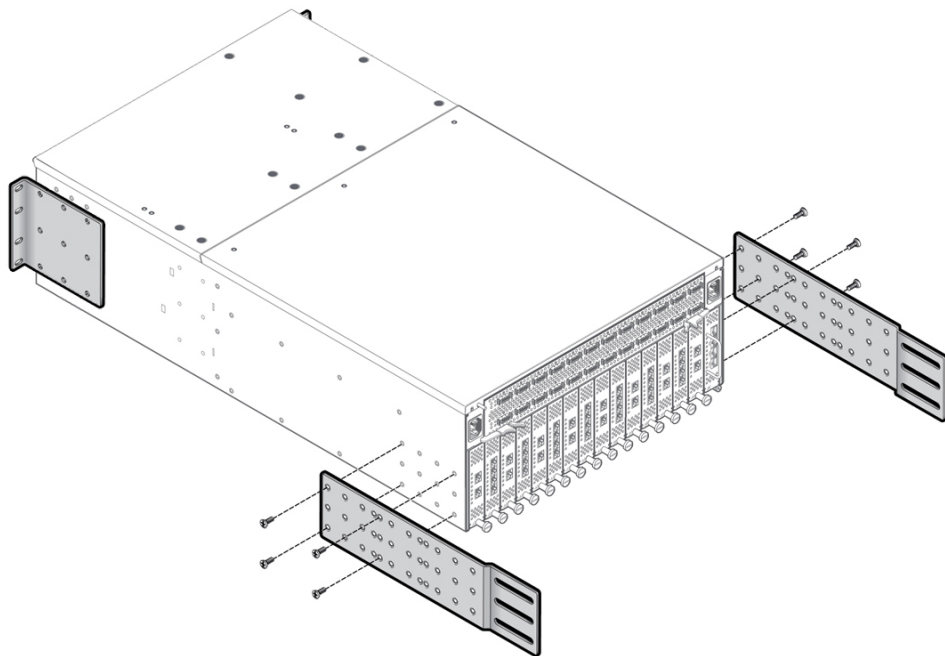
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8. If you have not already done so, you must determine the depth of the rack to determine where to attach the side panels to the chassis.
9. Align the side panels with screw holes at the I/O-module end of the chassis, and insert 4 flat-head screws through the side panels into the screw holes in the chassis.
10. Align the mounting brackets with the screw holes in the fan-unit end of the chassis, and insert 4 flat-head screws through each mounting bracket into the screw holes in the chassis.

11. **Using the flat-head screws, attach the side panels (4 screws per side panel) and mounting brackets (4 screws per bracket) to the Fabric Interconnect. [Figure 7, “Installing the Mounting Brackets and Side Panels,”](#) on page 26 shows installing these components.**

Use four (4) 10-32 x .25” Phillips flat-head screws per bracket

**FIGURE 7** Installing the Mounting Brackets and Side Panels



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**Note** - Depending on your order, the brackets (long rails) shown in [Figure 7, “Installing the Mounting Brackets and Side Panels,”](#) on page 26 might already be installed. This procedure documents installing these parts for completeness in case they are not already installed when you remove the Fabric Interconnect from the shipping container.

---

12. **Align the rack mount rails with the slotted piece inside the piece with the standoffs. Leave some overlap between the ends of each piece.**
13. **From the bags of screws that came with the rack mount rails, insert the 10-32 x .25” pan-head screws (4 per rail) through the slotted rail piece into the piece with the threaded standoff. Do not completely tighten the screws. You want to leave some slack in the rails so that they can slide lengthwise to accommodate the**

depth of the rack. [Figure 8, “Assembling the Rack Mount Rails,” on page 27](#) shows assembling the rack mount rails.

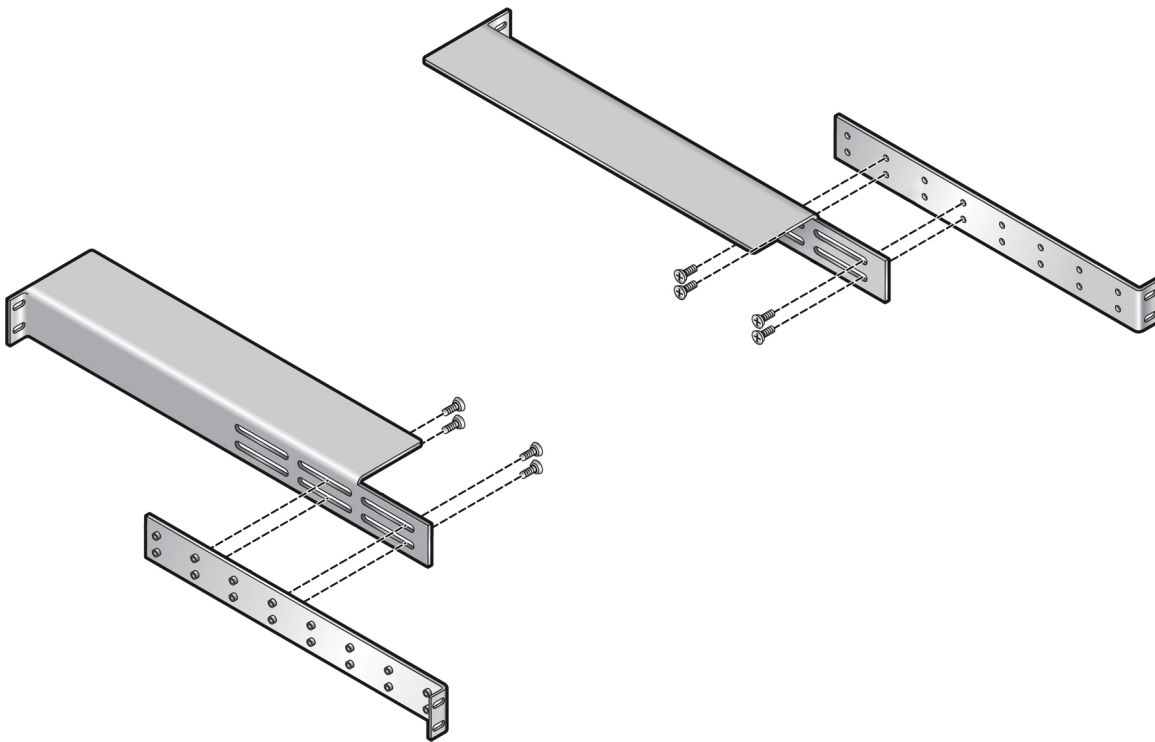
Use short pan-head screws (10-32 x .25”) from the rail kit box.

---

**Note** - The rack mount rails have 3 slots. [Figure 8, “Assembling the Rack Mount Rails,” on page 27](#) shows the rails being assembled through an end slot and a middle slot. For deeper racks, you can use the end slots to lengthen the rack mount rails as needed.

---

**FIGURE 8** Assembling the Rack Mount Rails



14. Repeat [Step 12](#) and [Step 13](#) to assemble the second rack mount rail.
15. When both rails are assembled, use the 10-24, 10-32, or M6 pan-head screws (4 screws per rail) from the rack mount box to install rails into the rack as shown in [Figure 9, “Installing Assembled Rack Mount Rails into Equipment Rack,” on page 29](#). Because you did not completely tighten the screws when

**you assembled the rails, you should be able to slide the rails lengthwise to accommodate the depth of the rack.**

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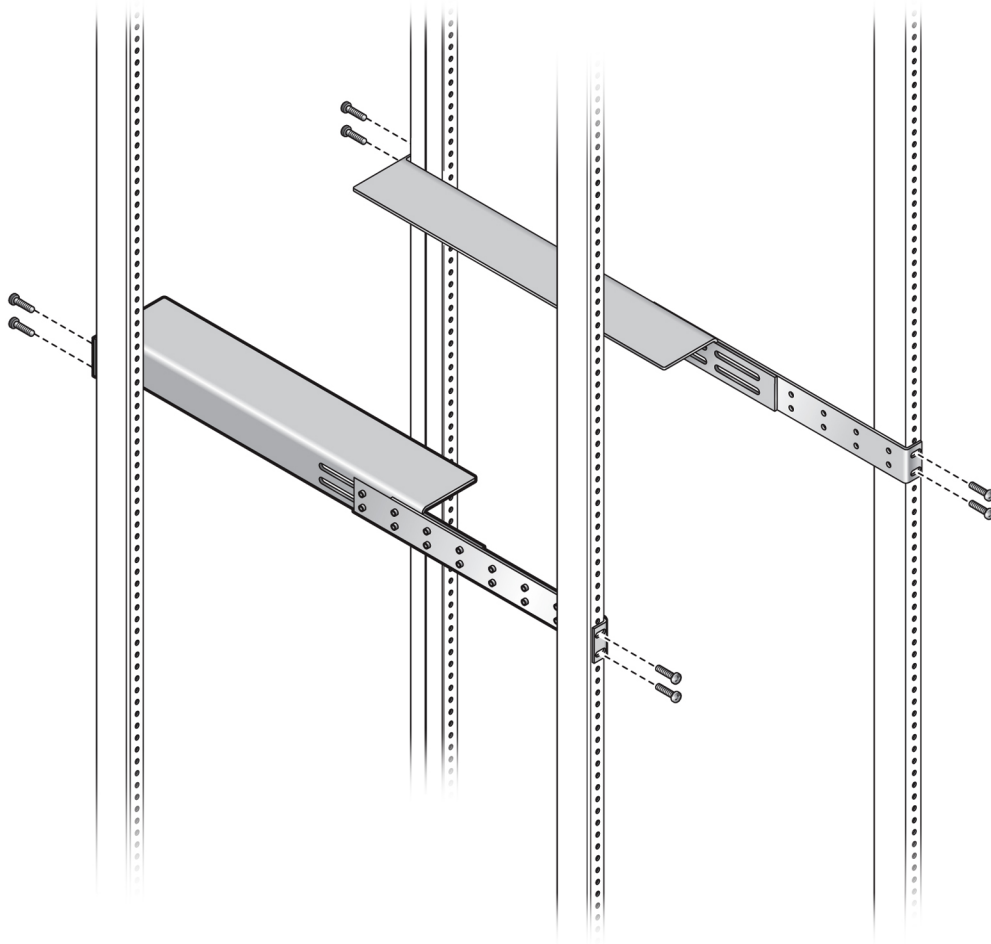
**Note** - If you are installing into a rack tapped for 12-24 screws, you must use the accompanying #12 lock washers. For 12-24 racks, insert the screw into the lock washer before installing the screw into the rack.

---

Use four (4) long screws from the rail kit box to attach each mounting rail to the rack. Use the appropriate screw for your type of rack:

- 10-32 x .375" Phillips pan-head screws
- 12-24 x .5" Phillips pan-head screws with lock washer already attached to the screw
- M6 x 16 mm Phillips pan-head screws

**FIGURE 9** Installing Assembled Rack Mount Rails into Equipment Rack



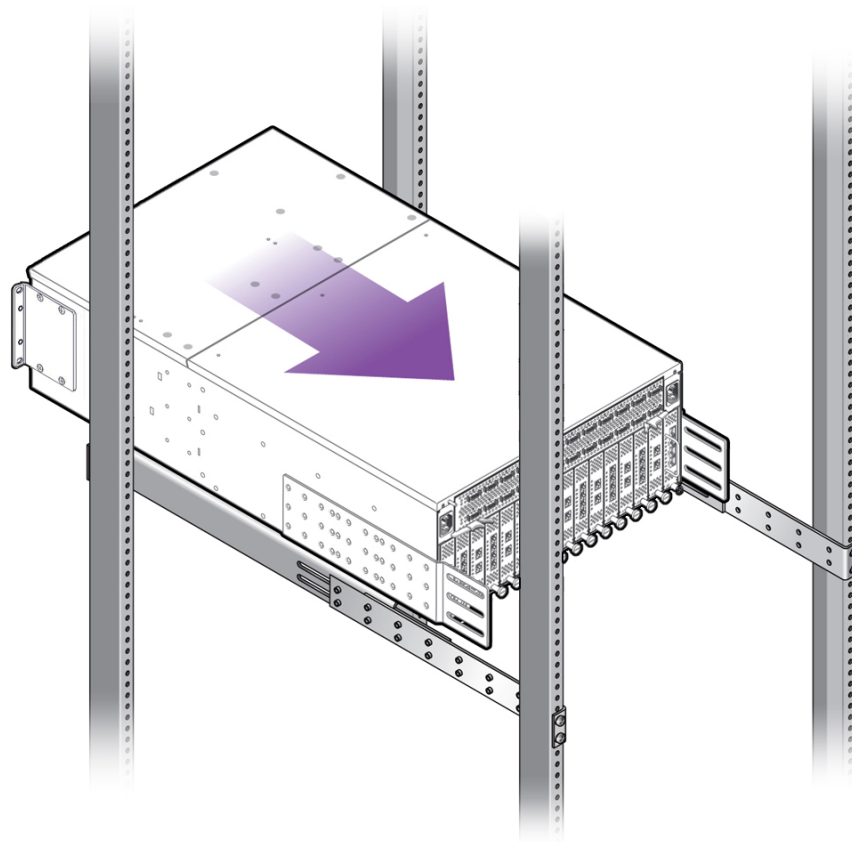
16. When the rails are attached to the rack posts, tighten all screws that connect the pieces of the rail, as well as the screws that attach each assembled rail to the rack.



**Caution** - All screws that assemble the rails and attach the rails to the rack must be tightened before resting the chassis on the rails.

17. Load the chassis into the rack so that the I/O-module side is supported on the horizontal surface of the rails. See [Figure 9, “Installing Assembled Rack Mount Rails into Equipment Rack,”](#) on page 29 for the horizontal surface of the rails.
18. Begin sliding the chassis into the rack on the horizontal surface created by the rails. [Figure 10, “Inserting the Fabric Interconnect F1-15 into the Equipment Rack,”](#) on page 30 shows inserting the chassis into the rack.

**FIGURE 10** Inserting the Fabric Interconnect F1-15 into the Equipment Rack



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**Note** - [Figure 10, “Inserting the Fabric Interconnect F1-15 into the Equipment Rack,”](#) on page 30 shows installing the Fabric Interconnect from the rear of the rack. Whether you install back-to-front, as shown, or front-to-back is irrelevant as long as the chassis is inserted so that it is supported on the horizontal surface of the rails. The horizontal surface is required to support the Fabric Interconnect as it slides into the rack.

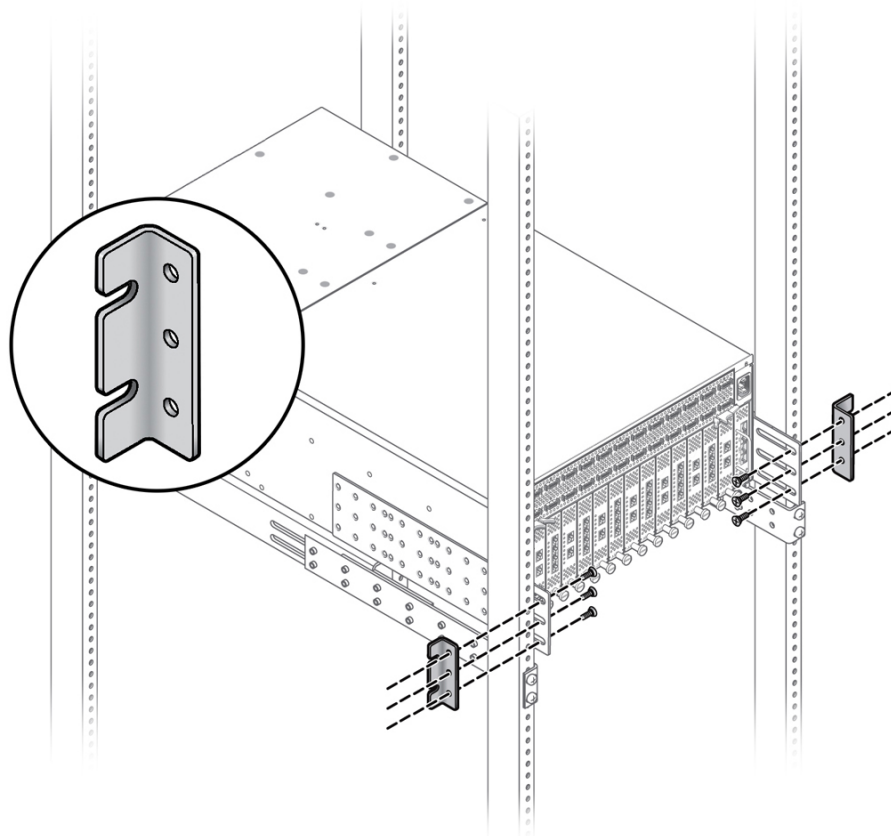
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19. Continue to slide the Fabric Interconnect into the rack until the mounting brackets contact the vertical rack post. The chassis is completely inserted into the rack when the mounting brackets lie flush against the vertical rack post.
20. When the chassis can no longer slide into the rack, insert the pan-head screws through the mounting brackets on the fan-unit side of the chassis, and tighten them to secure the chassis to the rack posts. In this example, the rear mounting brackets will secure the chassis to the rear rack posts.
21. Choose either of the following workflows based on whether you have a standard 4-post rack or a 27" Sun/Oracle rack:
  - [“Attach the Right Angle Bracket” on page 31](#)
  - [“Attach the Right Angle Bracket in a 27” Sun/Oracle Rack” on page 35](#)

## ▼ Attach the Right Angle Bracket

1. Align the angle bracket with the screw holes on the outside of the side panels. Make sure the screw holes in the angle brackets lie flush against the slotted edge of the side panels. The slotted edge of the angle bracket will attach to the rack post.
2. From inside the side panels, insert the 10-32 flat-head screws through the slots in the side panel and into the angle bracket's screw holes. Each angle bracket requires 3 screws. [Figure 11, “Attaching Angle Brackets to Side Panels,” on page 32](#) shows aligning the angle brackets and inserting the screws. When the angle brackets are correctly installed, the slotted surface will lie flush against the rack posts.

**FIGURE 11** Attaching Angle Brackets to Side Panels



3. When the angle brackets are installed on the side panel, insert the pan-head screws (10-32, 12-24, or M6) through the slotted edge of the angle bracket, into the chassis and tighten the screws to attach the chassis to the rack. Each point of attachment to the rack requires two screws. [Figure 12, “Attaching the Chassis to the Rack Posts,” on page 33](#) shows attaching the chassis to the rack.

Use eight (8) pan-head screws per side. Use the appropriate screw for your rack type:

- 10-32 x .375” Phillips pan-head screws
- 12-24 x .5” Phillips pan-head screws with lock washers already attached to screws
- M6 x 16 mm screws

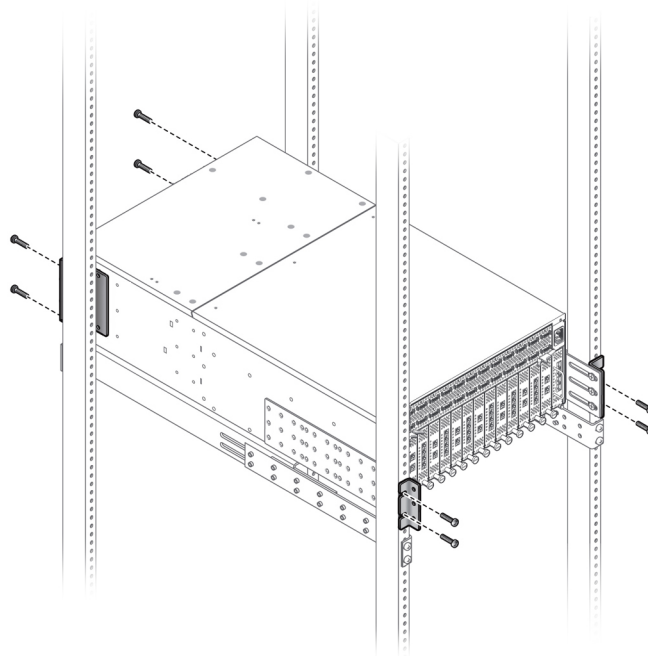


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**Note** - If you are installing into a rack tapped for 12-24 screws, you must use the accompanying #12 lock washers. For 12-24 racks, insert the screw into the lock washer before installing the screw into the rack.

---

**FIGURE 12** Attaching the Chassis to the Rack Posts



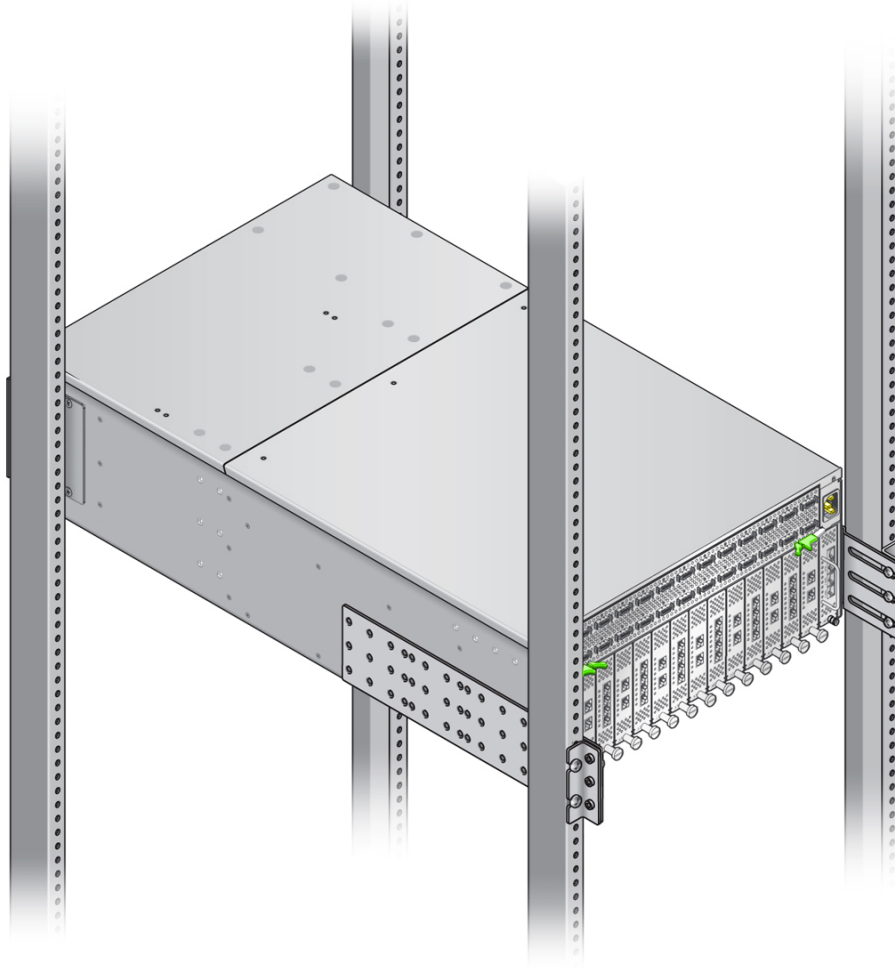
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**Caution** - When the chassis is completely installed, check all screws to make sure they are tight. If any screws are loose, make sure to tighten them. All screws must be tightened before removing the rail kit.

---

4. When all screws are tightened, and the chassis is installed and secured to the rack, you can remove the rail kit as shown in [Figure 13, "Installed Fabric Interconnect F1-15 Fabric Interconnect," on page 34.](#)

**FIGURE 13** Installed Fabric Interconnect F1-15 Fabric Interconnect



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**Note** - It is not mandatory to remove the rail kit, but if you do, an extra 1U of vertical rack space becomes available.

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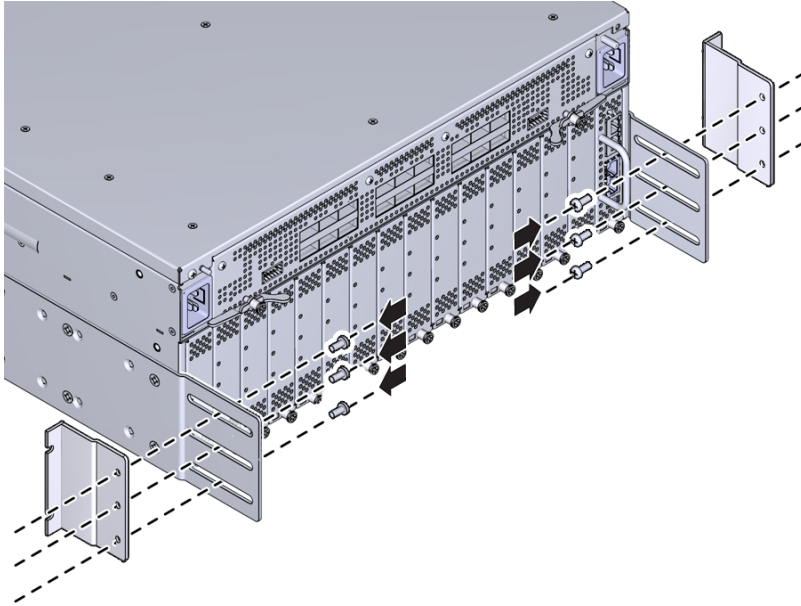
5. As an option, you can install cable management assembly (CMA). If you want to install the CMA, see [“Installing the Cable Management Assembly”](#) on page 37.

## ▼ Attach the Right Angle Bracket in a 27" Sun/Oracle Rack

With the chassis on the rail kit, follow these steps to install the right angle brackets for a 27" Sun/Oracle equipment rack:

1. **Align the 27" angle bracket (7068910 Rev 03 or later) so that it is outside of the side panels. Make sure that the angle bracket's fold fits together with the fold in the side panel.**
2. **From inside the side panels, insert the 10-32 flat-head screws through the slots in the side panel and into the angle bracket's screw holes. Each angle bracket requires 3 screws. [Figure 14, "Attaching Angle Brackets for 27" Rack to the Side Panels,"](#) on page 35 shows aligning the angle brackets and inserting the screws. When the angle brackets are correctly installed, the slotted surface will lie flush against the rack posts.**

**FIGURE 14** Attaching Angle Brackets for 27" Rack to the Side Panels



Make sure the screw holes in the angle brackets lie flush against the slotted edge of the side panels. The slotted edge of the angle bracket will attach to the rack post.

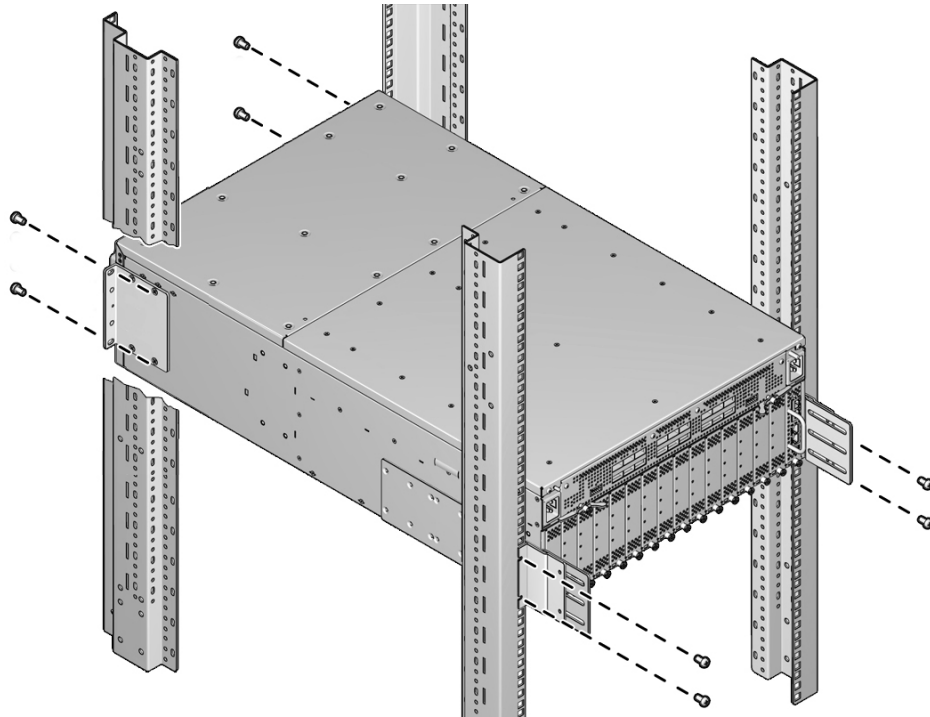
3. When the angle brackets are installed on the side panel, insert the pan-head screws (10-32, 12-24, or M6) through the slotted edge of the angle bracket, into the chassis and tighten the screws to attach the chassis to the rack. Each point of attachment to the rack requires two screws. [Figure 15, "Attaching the Chassis to the Rack Posts,"](#) on page 36 shows attaching the chassis to the rack.

---

**Note** - The Oracle/Sun 27" rack is untapped, so you will need to use cage clips to attach equipment. You will need to install the M6 cage nuts into the blanks in the rack, then use the M6 screws to secure the equipment into the rack.

---

**FIGURE 15** Attaching the Chassis to the Rack Posts



**Caution** - When the chassis is completely installed, check all screws to make sure they are tight. If any screws are loose, make sure to tighten them. All screws must be tightened before removing the rail kit.

---

4. When all screws are tightened, and the chassis is installed and secured to the rack, you can remove the rail kit.

---

**Note** - It is not mandatory to remove the rail kit, but if you do, an extra 1U of vertical rack space becomes available.

---

5. **Install I/O modules as documented in [“Installing an I/O Module” on page 69](#).**
6. **As an option, you can install the cable management assembly (CMA). If you want to install the CMA, see [“Installing the Cable Management Assembly” on page 37](#).**

## Installing the Cable Management Assembly

The cable management assembly shipped with the Fabric Interconnect F1-15 is the standard CMA used in Oracle 4-post equipment racks. The CMA consists of the following parts:

- two stand-off brackets, which attach to the equipment rack.
- the comb, which is a crenelated metal piece that has “slots” in which cables rest. This piece attaches to the two stand-off brackets.
- the plate, which is a flat metal piece that covers the top of the “slots” in the comb so that cables cannot be accidentally lifted out of the slots in the comb.
- screws of different types (M6, 10-32, or 12-24) that match with many common types of equipment rack. Be aware that racks can be either tapped or not. If the rack is not tapped, to install the CMA, you will need to use either cage nuts with the M6 screws, or locking washers with the 12-24 screws

---

**Note** - The CMA must be installed after the Fabric Interconnect is installed because the stand-off brackets for the CMA will prevent the rack-mount brackets for the Fabric Interconnect chassis from being installed. Make sure to install the Fabric Interconnect completely before attempting to install the CMA.

---

## Required Equipment

For this procedure, you will need the following equipment:

- #2 Phillips (cross-head) screwdriver
- Marker or tape to indicate a level plane on which the stand-off brackets will be installed
- Four (4) M6 cage nuts
- Four (4) M6 x 16 mm screws

- Four (4) 10-32 x .375 inch Phillips pan-head screws
- Four (4) 12-24 x .5 inch Phillips pan-head screws
- Four (4) #12 locking washers (for use with 12-24 screws)
- Four (4) M4 x 10 mm Phillips flat-head screws

---

**Note** - Oracle provides four of each type of screw for mounting the CMA to the rack. The type of screw that you will use depends on the type of rack you have. For example, if you have a Sun/Oracle rack, you will use the M6 cage nuts and the M6 screws to attach the CMA to the rack. Be aware that you will not use every type of screw, just the type appropriate for your equipment rack.

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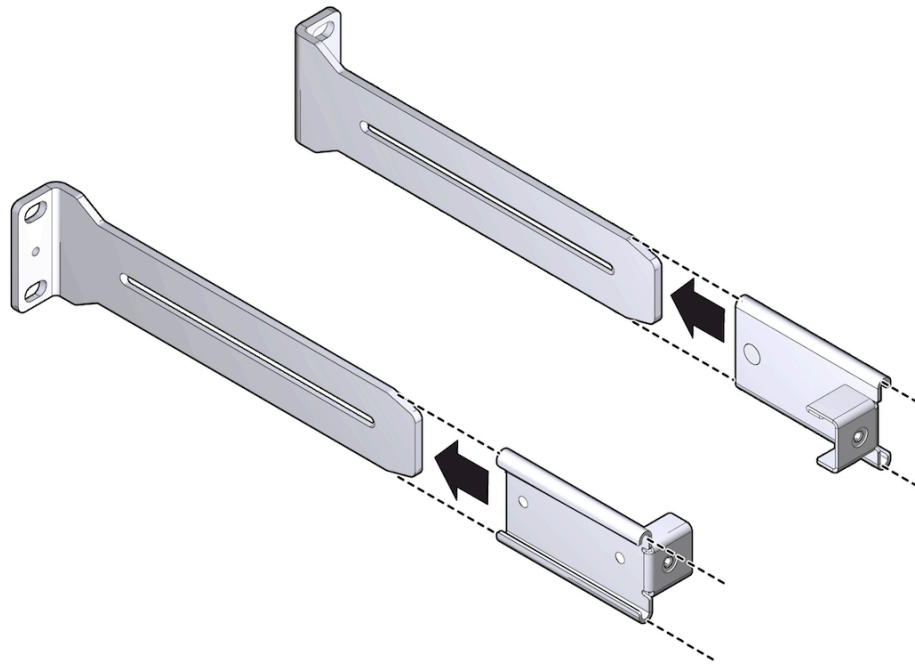
## ▼ Install the CMA

To install the CMA, follow this procedure:

1. **Using tape or a marker, make two horizontal marks, one on each of two rack posts. These marks must be level because they will indicate where the CMA will be attached to the rack.**
2. **Slide the attachment bracket over the extender, so that the tab on the bracket is opposite the flange on the extender as shown in [Figure 16, "Attachment Bracket sliding over the Long Rail,"](#) on page 39.**

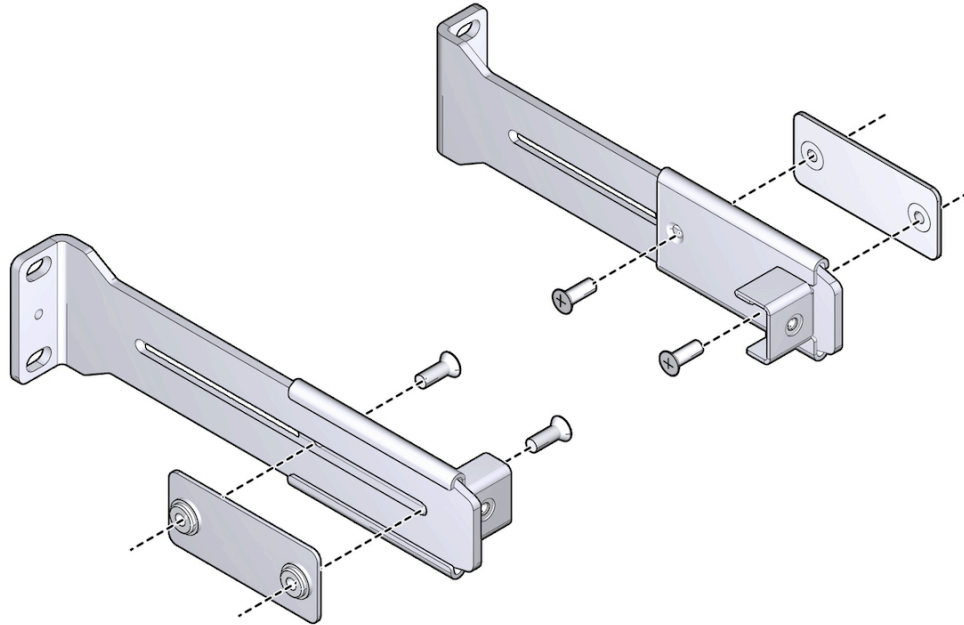
The open end of the tab is toward the flange. The flat end of the tab is toward the rear of the extender.

**FIGURE 16** Attachment Bracket sliding over the Long Rail



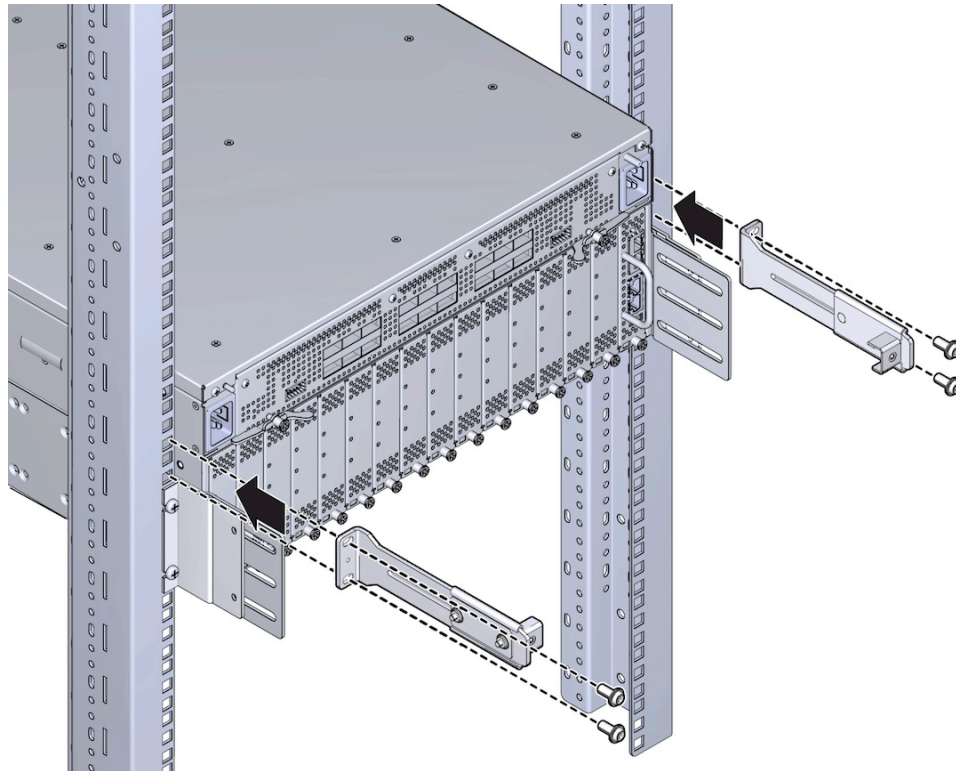
3. Place the attachment plate on the flange side of the extender, opposite the attachment bracket.
4. Use two M4 screws to sandwich the attachment bracket and plate to the extender, in the position farthest from the flange as shown in [Figure 17, “Bracket and Plate Sandwiching to the Rail,”](#) on page 40.

**FIGURE 17** Bracket and Plate Sandwiching to the Rail



5. Using a No. 2 Phillips screwdriver, tighten the two screws.
6. Repeat [Step 2](#) through [Step 5](#) for the other cable management extender.
7. Place the long rail to the mounting location (see [Step 1](#)) on the post of the rack. Make sure that these rails are flush with the side of the Fabric Interconnect chassis, with the flange pointing outward as shown in [Figure 18](#), “[front brackets being installed](#),” on page 41.



**FIGURE 18** front brackets being installed

8. **Secure the assembly to the post with the correct screw type for the rack (10-32, 12-24, or M6) by inserting the screw through the slotted end of the CMA and into the rack or cage nut.**

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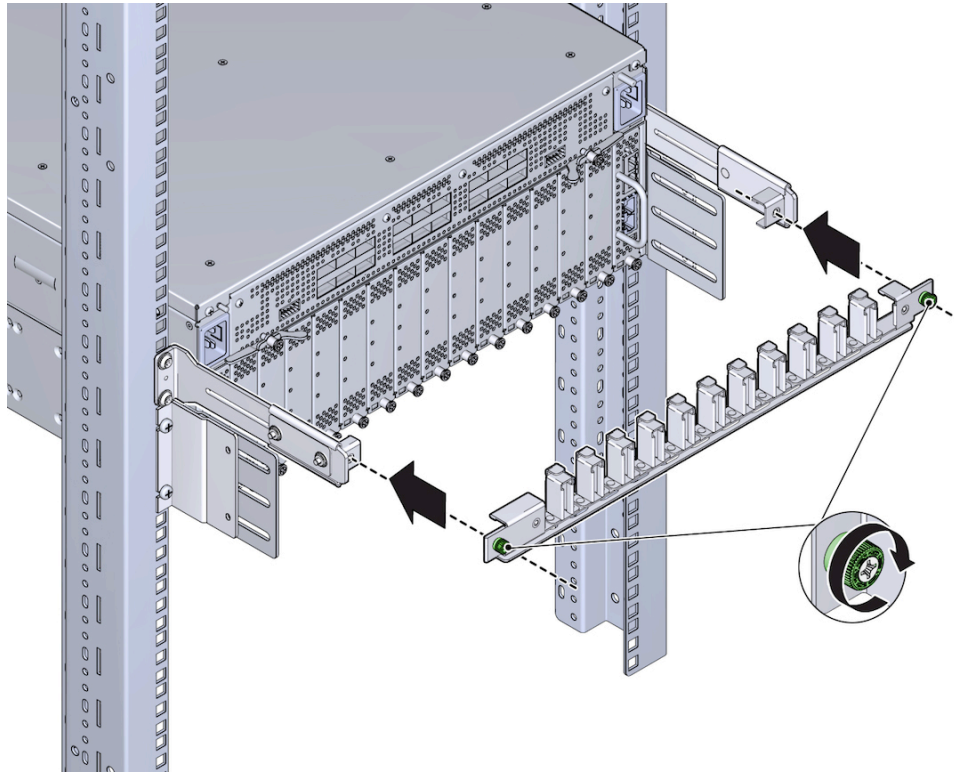
**Note** - If you are installing into a rack tapped for 12-24 screws, you must use the accompanying #12 lock washers. For 12-24 racks, insert the screw into the lock washer before installing the screw into the rack.

---

9. **Repeat [Step 7](#) to [Step 8](#) for the other cable management extender and long rail.**
10. **If needed, disassemble the CMA comb and plate by loosening the green captive screws.**

11. Align the green captive screws in the comb with the two screw holes in the tabs as shown in [Figure 19, “Installing the CMA's Comb,” on page 42.](#)

**FIGURE 19** Installing the CMA's Comb



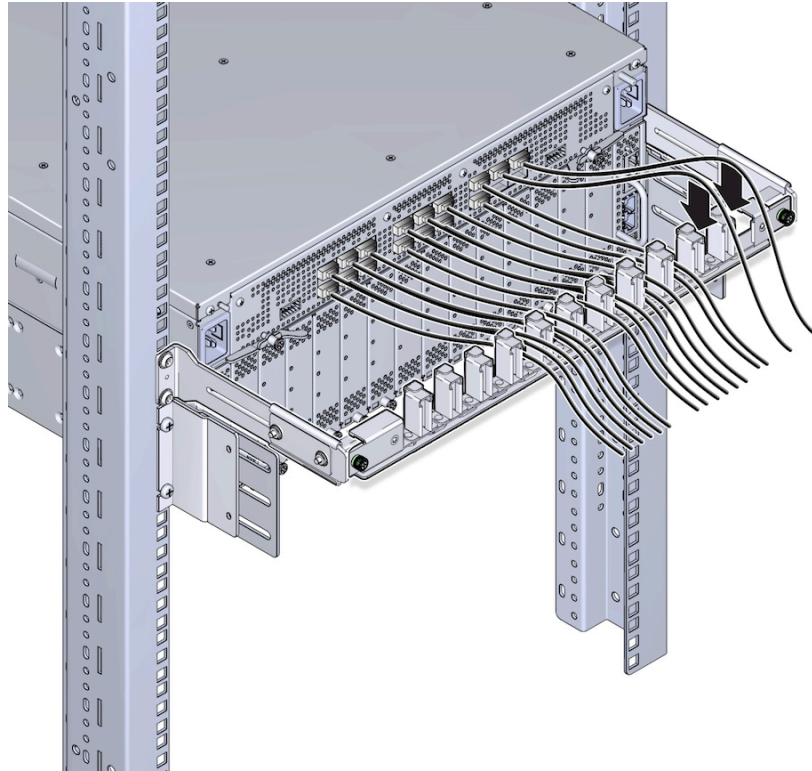
12. Using a Phillips-head screwdriver, tighten the green captive screws to attach the comb to the standoffs.
13. When the CMA's comb is installed, connect cables and drape them into the slots in the comb as shown in [Figure 20, “Connecting Cables and Draping Them Through the Comb,” on page 43.](#)

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**Note** - Make sure not to exceed the allowed bend radius for any cables you route through the comb. Also, wherever possible, make sure to drape equal numbers of cables in each slot to apply the cable weight equally along the CMA.

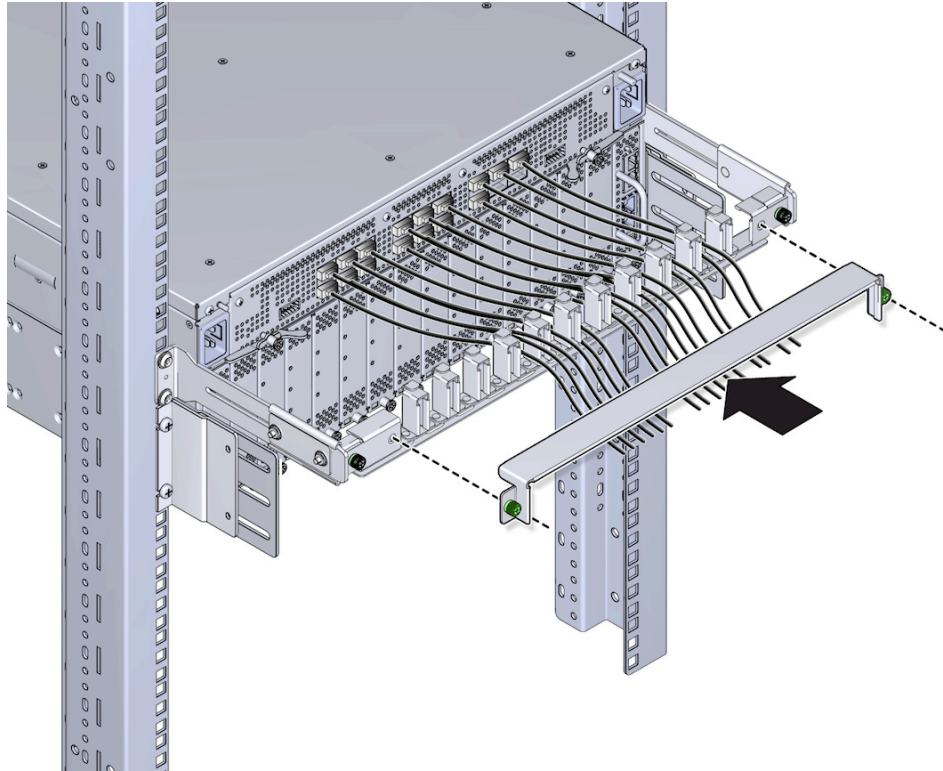
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**FIGURE 20** Connecting Cables and Draping Them Through the Comb



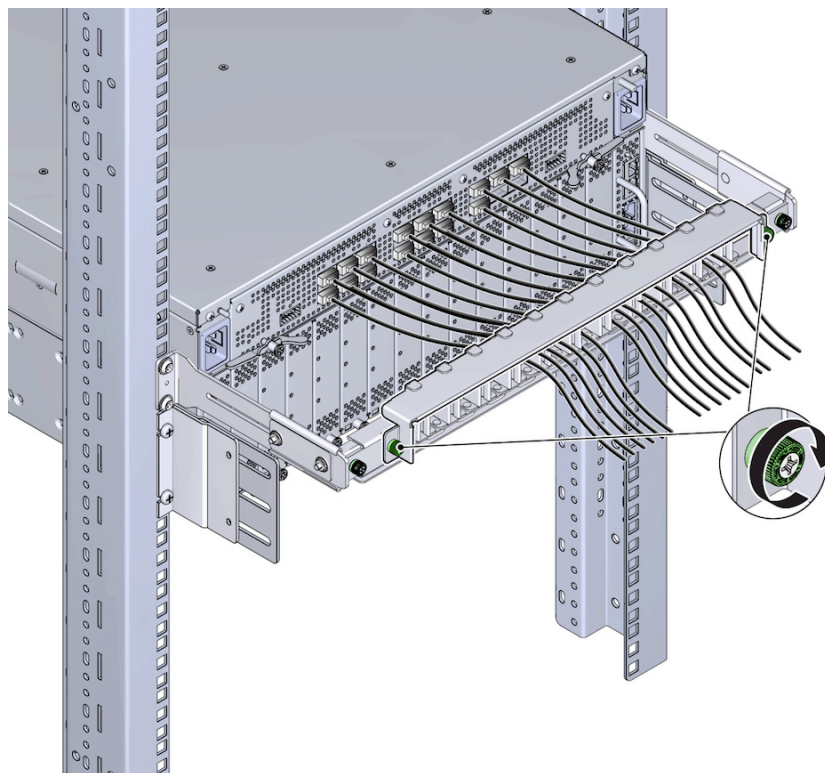
14. When all cables are connected, align the captive screws in the top of the CMA with the screw holes in the CMA's comb as shown in [Figure 21, "Installing the Top of the CMA,"](#) on page 44.

**FIGURE 21** Installing the Top of the CMA



15. Using a Phillips-head screwdriver, tighten the screws to secure the plate to the comb as shown in [Figure 22, “Completing Assembly of the CMA,”](#) on page 45.

**FIGURE 22** Completing Assembly of the CMA



## Installing the Fabric Interconnect F1-4 in a 4-Post Rack

This section documents how to install the Fabric Interconnect F1-4 in a four-post equipment rack.

The procedure in this section documents installing a Fabric Interconnect F1-4 by using the mounting hardware that comes with the Fabric Interconnect.

---

**Note** - The topics documented in this section are for stand-alone Fabric Interconnect deployments only. The Fabric Interconnect is orderable as a complete, engineered system called the Oracle Virtual Compute Appliance (VCA), which has different contents and installation procedures. If you are deploying a stand-alone (non-VCA) Fabric Interconnect, continue to use this documentation. If you are deploying an VCA Fabric Interconnect, do not use this documentation. Instead, use the documentation that accompanied your VCA shipment.

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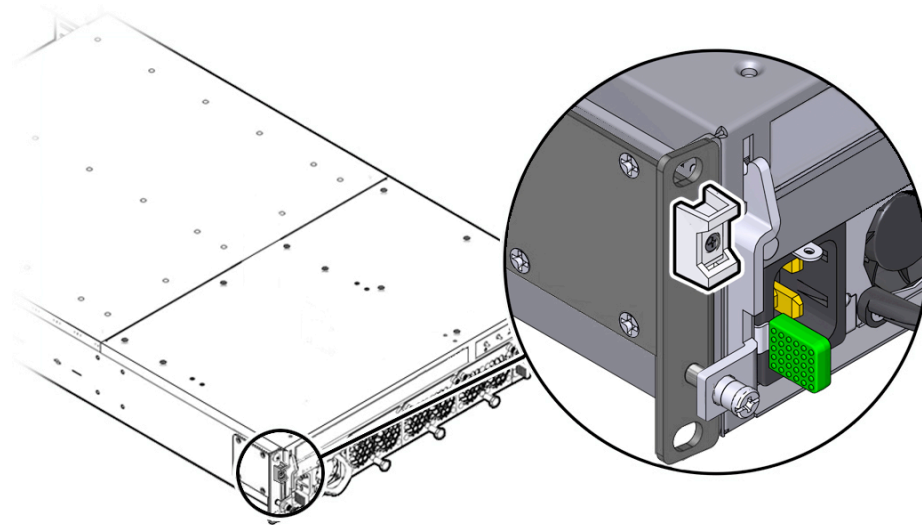
## Fabric Interconnect F1-4 Locking I/O Modules

The Fabric Interconnect F1-4's I/O Modules have a locking mechanism to secure the modules into the chassis. The locking mechanism (a quarter-turn Pawl) is embedded in the I/O Module handle, which has a slotted head. By using a screwdriver, you can turn the I/O module handle in a 90-degree arc to lock or unlock the I/O module. For more information, see [“Using the I/O Module Lock” on page 70](#).

By default, the Fabric Interconnect F1-4 is shipped with module blanks instead of the actual I/O Modules. I/O module blanks also have the locking mechanism. Be aware that when you initially install the Fabric Interconnect F1-4, the I/O module blanks will need to be unlocked and removed before installing I/O Modules.

## Power Cord Management

The Fabric Interconnect F1-4 power supply units (PSUs) are on the front of the chassis, and as a result, they are not used with the standard cable management brackets which mount at the rear of the chassis. The power cords have their own management system which anchors them to a pre-installed part that sits on the front mounting brackets. [Figure 23, “Power Cord Anchor,” on page 47](#) shows one of the power cord anchors.

**FIGURE 23** Power Cord Anchor

The power cord management system consists of:

- two (2) plastic anchors, one per mounting bracket. Each anchor has slots at the bottom and top.
- two (2) tie wraps, one for each power cord. Each tie wrap is reusable and has a tab that allows for loosening and tightening the tie wrap. The tie wraps are part of the accessory kit that comes in the shipping container.

When the tie wrap is inserted through both slots in the anchor, it wraps the cable and secures it in place.

- After each power cord is anchored, check the amount of protrusion (the distance that the anchored power cord stands out from the face of the Fabric Interconnect). The power cord can protrude a maximum of 2 5/16" (60 mm).

It is a best practice to tie the power cords so that they protrude no more than the documented distance.

- After each power cord is anchored and complies with the protrusion limits, clip the tie wrap with no more than an inch of spare length.

It is a best practice to clip the cable tie wraps to the documented length. By doing so, you allow enough tie wrap length to make adjustments to the cable bend radius and protrusion distance at a later date (if needed).



---

**Caution** - For the Fabric Interconnect F1-4 only, input power cords are used as the main AC power disconnect. As a result, the facility power socket outlet shall be installed near the equipment and shall be easily accessible.

---

## Required Equipment

For this procedure you will need:

- #2 Phillips (cross-head) screwdriver
- Marker or tape
- Ruler or measuring tape.
- Screws for Fabric Interconnect bracket mounting. The screws come in a large bag. The large bag contains fourteen (14) M3.5 x .6 x 6 mm Phillips countersink screws for attaching the rack-depth measures and optional cable management brackets.
- Screws for Fabric Interconnect rack install. The screws come in a large bag that contains 3 smaller bags for different types of common equipment racks:
  - Eight (8) 10-32 x .75" Phillips pan-head screws
  - Eight (8) 12-24 x .75" Phillips pan-head screws
  - Eight (8) #12 lock washers
  - Sixteen (16) M6 x 20 mm Phillips pan-head screws
  - Sixteen (16) M6 cage nuts, EIA rack, M6/BL2, 5/9x9

---

**Note** - You do not need all 3 bags of screws. The different bags of screws are supplied to allow successful installation in a wide variety of common equipment racks. You will use only the bag of screws that is appropriate for type of rack in which you are installing the Fabric Interconnect.

---

- Oracle rack mounting hardware:
  - Rack-depth measures
  - Right angle brackets

## Pre-Installation Considerations

Be aware of the following considerations before beginning the installation procedure.

- You will find it helpful to determine the depth of the rack to know where to attach the side panels to the chassis.



- For a 27-inch rack (a standard Sun/Oracle rack), you need a separate mounting bracket for the Oracle Fabric Interconnect F1-4. Additionally, the to-chassis mounting hardware for the Oracle Fabric Interconnect F1-4 is metric, the to-chassis mounting hardware for the Oracle Fabric Interconnect F1-15 is English. The to-rack mounting hardware is rack dependent.



**Caution** - In a 27-inch Sun/Oracle rack, you will need to measure where the Oracle Fabric Interconnect will go, as well as the CMA, and make sure that all the cage nuts for each are installed *before* you install the Oracle Fabric Interconnect. If you install the Oracle Fabric Interconnect, and then attempt to install the CMA's cage nuts, you will not have enough space to install the cage nuts for the CMA.

- Cable management is supported through a standard Oracle cable management assembly (CMA). This part is not mandatory, but it is recommended as part of the installation. If used, the CMA must be installed after the Fabric Interconnect is successfully rack mounted. For information about installing the CMA, see [“Installing the Cable Management Assembly” on page 37](#).
- The power cords have their own cable management system which allows them to be tied to plastic anchors that sit on each front mounting bracket. There are some considerations about how power cords must be tied. See [“Power Cord Management” on page 46](#).
- Make sure to install the Fabric Interconnect without the I/O modules in the chassis. By installing the chassis without the I/O modules, the Fabric Interconnect is lighter and easier to install.
- While installing the Fabric Interconnect, you will attach the rear of the chassis to the equipment rack before you attach the front end. Make sure to support the Fabric Interconnect and keep it level while until both ends are attached to the equipment rack. If the system is not kept level while one end is attached and the other is not, you can put unnecessary stress on the mounting hardware that is already attached to the rack.

## ▼ Install the Fabric Interconnect F1-4

When the Fabric Interconnect F1-4 is shipped from the factory, it contains all hardware except I/O modules. I/O module blanks are shipped in a separate box, and should be installed only after the unit is installed in the equipment rack. By installing the I/O Modules after the Fabric Interconnect is rack mounted, the Fabric Interconnect is lighter and easier to lift into position in the rack.

The installation procedure has the following main phases, which are documented in this section:

- Determining the rack location for the Fabric Interconnect F1-4
- Attaching the mounting hardware
- Rack Mounting the Fabric Interconnect F1-4

The installation procedure finishes with the following phases, which are documented in other sections of this chapter:

- Installing the I/O Modules
- Connecting the Fabric Interconnect F1-4 to other equipment and AC power.



---

**Caution** - The Fabric Interconnect F1-4 weighs approximately 55 pounds (25 Kg). As a result, two people will be required to install the Fabric Interconnect F1-4. This installation assumes two people for installing the Fabric Interconnect F1-4.

---

To install the Fabric Interconnect, follow this procedure:

1. **Select the location in the rack where the Fabric Interconnect will be installed.**
2. **Measure the depth of the rack (if not already known). You will use the rack depth you measure to determine where to install the rack-depth measures on the Fabric Interconnect.**
3. **Mark the exterior face of each of the rack posts at the locations where the Fabric Interconnect will be installed. These marks are where the Fabric Interconnect F1-4's mounting brackets will be installed. The marks must be on the exterior faces of the rack posts.**
4. **Verify that all four marks (two on the exterior of the front rack posts, and two on the exterior of the rear rack posts) are level.**
5. **Get eight mounting screws for the Fabric Interconnect's mounting brackets, which are the M3.5 Phillips countersink screws.**
6. **If you are using an untapped rack, for example a Sun/oracle rack, insert all the required M6 cage nuts now if you have not already done so.**

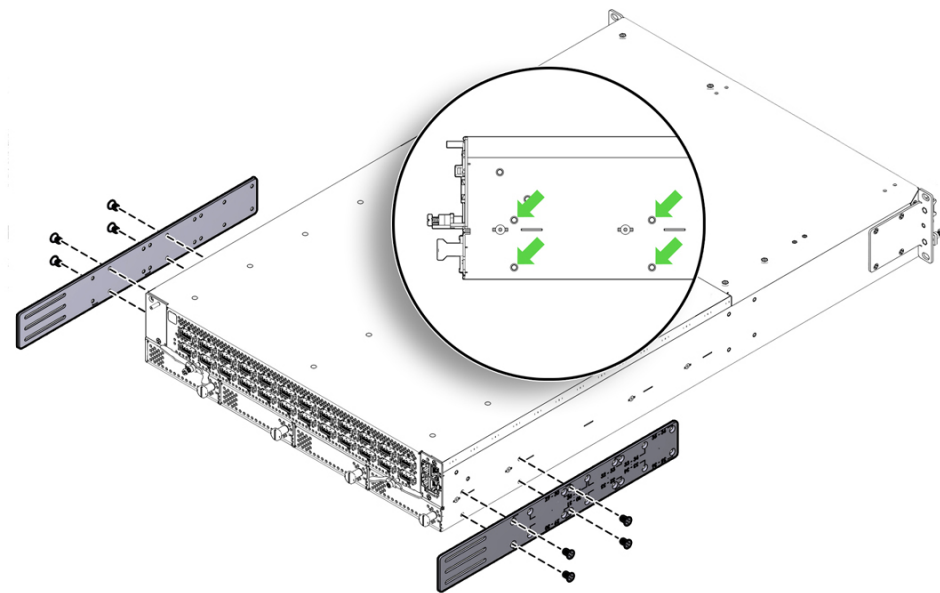
Later in this procedure, you will use the M6 screws to secure the chassis to the rack.

7. **Align the rack-depth measures for the appropriate rack depth with the screw holes at the I/O-module end of the chassis (the rear). The rack-depth measures show the mounting points for different rack depths, and since you measured the rack depth in [Step 2](#), you will know which set of screw holes to use on the rack-depth measures.**
8. **When the side panel screw holes are aligned with the screw holes in the Fabric Interconnect chassis, attach the rack-depth measures (4 screws per side panel) to the Fabric Interconnect. [Figure 24](#), "Installing the Rack Depth Measures," on [page 51](#) shows installing these components.**

Use four (4) M3.5 x .6 x 6 mm Phillips countersink screws per bracket.

**Note** - [Figure 24, “Installing the Rack Depth Measures,” on page 51](#) shows installing the rack-depth measures for one depth. Your rack depth might differ, so the rack-depth measures might need to slide forward or backward depending on the depth of your rack.

**FIGURE 24** Installing the Rack Depth Measures



9. **Choose the correct rack-mounting screws for your rack. The Fabric Interconnect is shipped with three complete sets of rack-mounting screws (10-32, 12-24 and M6), which support a wide variety of common equipment racks.**
10. **Find the right angle brackets (7089458) and use the correct rack-mounting screw to attach the angle brackets to the exterior face of the rear rack posts. The right angle brackets must be mounted on the outside of the rear posts. See [Figure 25, “Attaching Right Angle Brackets to the Equipment Rack,” on page 52.](#)**

Use two (2) pan-head screws per bracket. Use the appropriate screw for your rack type:

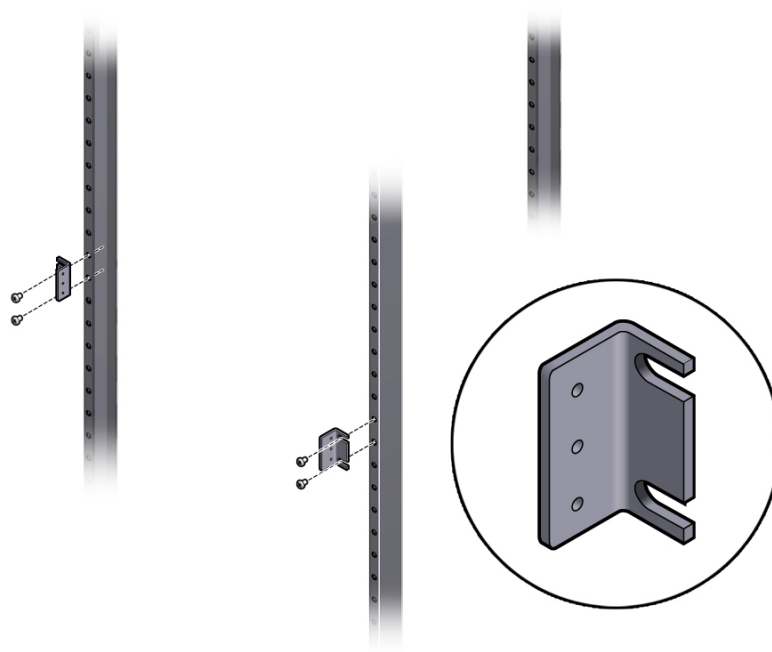
- 10-32 x .75” Phillips pan-head screws
- 12-24 x .75” Phillips pan-head screws
- M6 x 20 mm Phillips pan-head screws

---

**Note** - If you marked the rack posts as documented in [Step 3](#), you should know where the right angle brackets need to be attached to the rack. Before attaching the brackets, make sure that the marks you made on the front and rear rack posts are level.

---

**FIGURE 25** Attaching Right Angle Brackets to the Equipment Rack



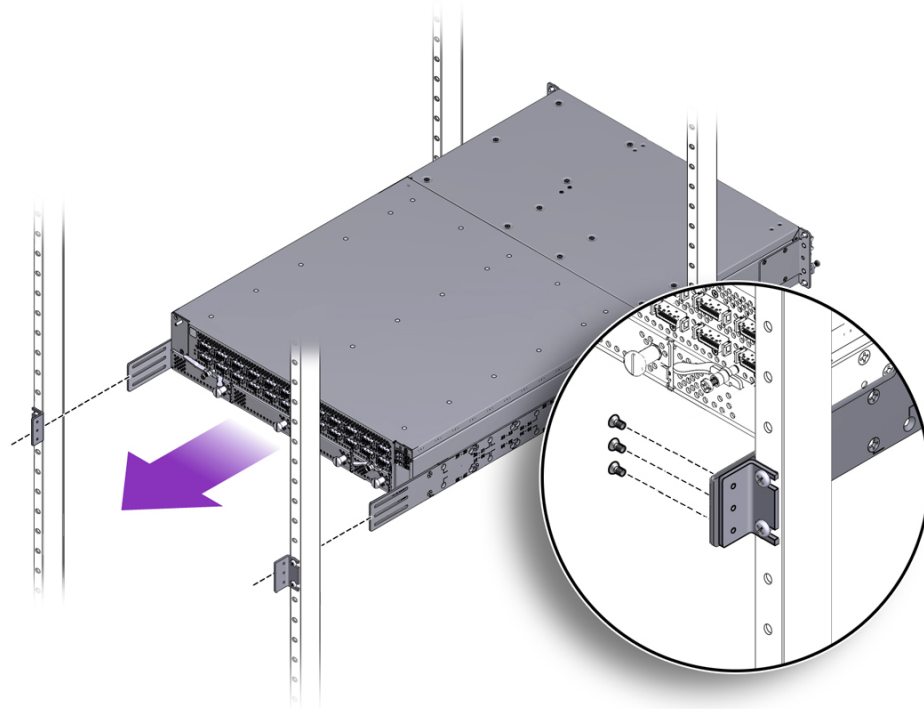
11. Orient the Fabric Interconnect so that the rack-depth measures are pointing towards the opposite end of the equipment rack shown in [Figure 25](#), “Attaching Right Angle Brackets to the Equipment Rack,” on page 52.
12. While supporting the Fabric Interconnect, hold it level and slide it into the rack (1). See [Figure 26](#), “Attaching the Rack Depth Measures to the Angle Brackets,” on page 53. You can use the marks you made in [Step 3](#) to make sure you are sliding the Fabric Interconnect F1-4 into the correct location.
13. Choose either of the following workflows based on the whether you have a standard 4-post rack or a 27” Sun/Oracle rack:
  - “Attach the Right Angle Bracket” on page 31

- [“Attach the Right Angle Bracket in a 27” Sun/Oracle Rack” on page 35](#)

## ▼ Attach the Right Angle Bracket

1. Slide the Fabric Interconnect into the rack until the front mounting brackets make contact with the front rack posts. See [Figure 26, “Attaching the Rack Depth Measures to the Angle Brackets,” on page 53.](#)

**FIGURE 26** Attaching the Rack Depth Measures to the Angle Brackets

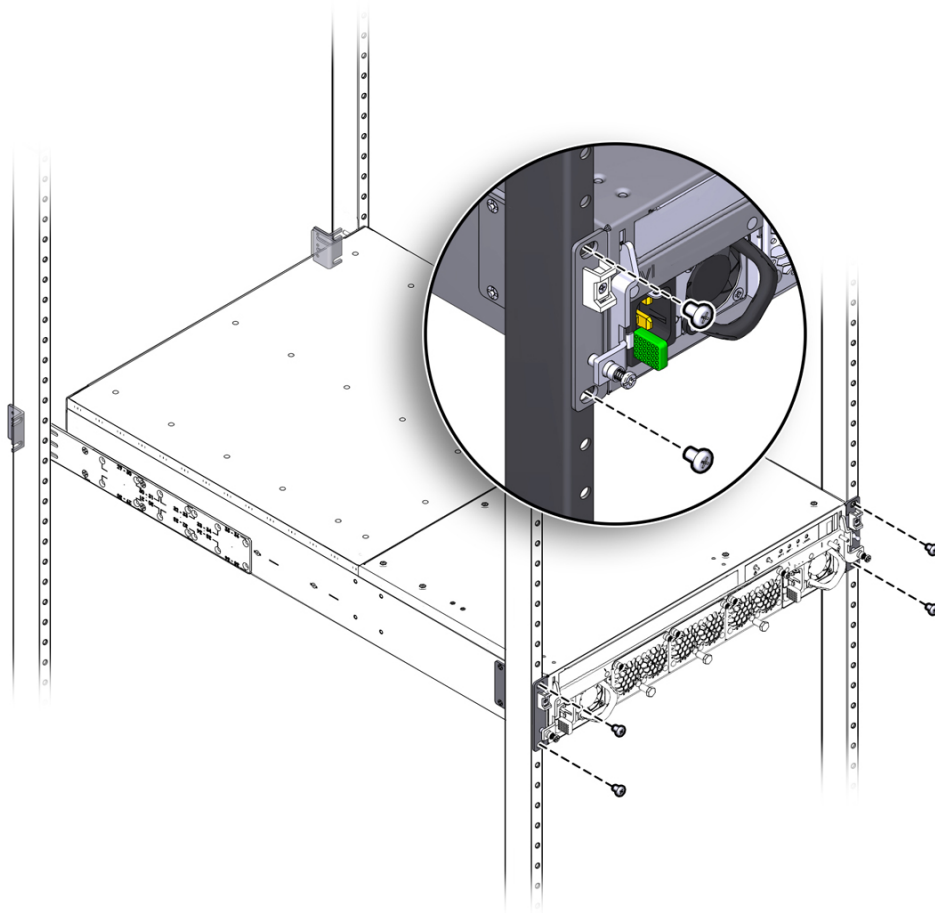


2. Keeping the Fabric Interconnect level, insert the appropriate rack mounting screws (10-32, 12-24, or M6) into the mounting brackets on the front of the Fabric Interconnect (the fan unit end). See [Figure 27, “Securing the Front Mounting Brackets to the Equipment Rack,” on page 54.](#)

Use two (2) pan-head screws per bracket. Use the appropriate screw for your rack type:

- 10-32 x .75" Phillips pan-head screws
- 12-24 x .75" Phillips pan-head screws
- M6 x 20 mm Phillips pan-head screws

**FIGURE 27**     Securing the Front Mounting Brackets to the Equipment Rack



**Caution** - Make sure that all screws are tight before proceeding.

---

3. **Align the slots in the rack-depth rails with the screw holes in the right angle brackets, and insert the 6 M3.5 x .6 x 6 mm Phillips flat-head screws through the**

**slots in the rack-depth rails and tighten them into the screw holes in the right angle brackets (2).**

---

**Note** - You might find it helpful to tighten the screws to finger tightness or just less. By doing so, you allow the Fabric Interconnect to slide forward and backward in the rack-depth rail's slots, and as a result, you can make minor adjustments to the Fabric Interconnect's depth in the rack (if needed).

---

4. **Install the Cable Management Assembly (CMA) as documented in [“Installing the Cable Management Assembly” on page 37.](#)**

The same CMA is supported for both the Oracle Fabric Interconnect F1-15 and Oracle Fabric Interconnect F1-4, so use the same procedure. Where illustrations show the Oracle Fabric Interconnect F1-15, you will substitute the Oracle Fabric Interconnect F1-4.

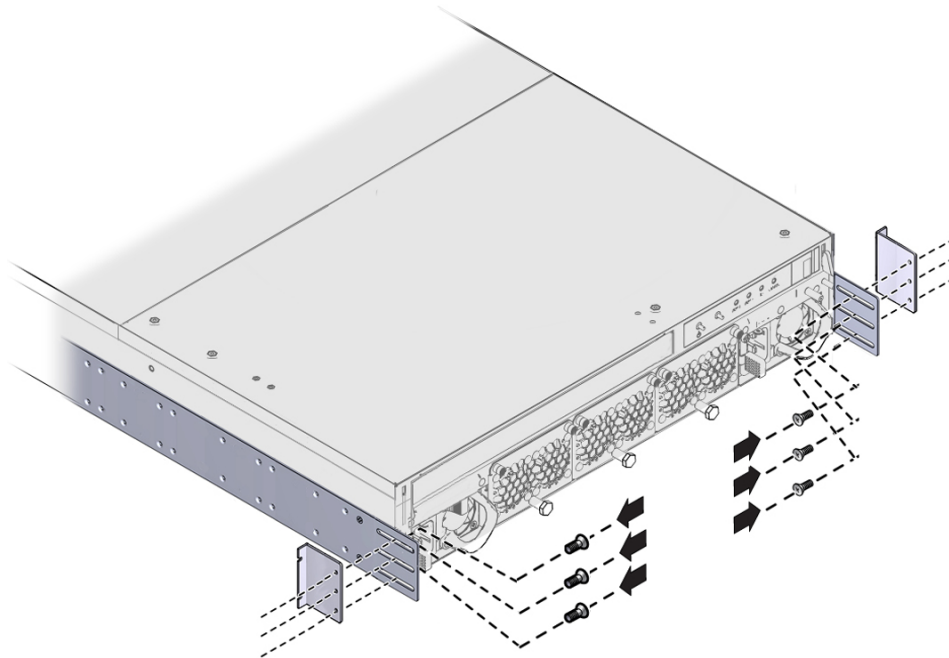
5. **Install the I/O modules as documented in [“Installing an I/O Module” on page 69.](#)**
6. **Cable the Fabric Interconnect F1-4 as documented in [“Connecting the Fabric Interconnect to Other Equipment” on page 77.](#)**
7. **When the Fabric Interconnect F1-4 is installed on the rack and cabled to the other equipment, you will plug in the power cords and anchor the power cables in place as documented in [“AC Power” on page 89.](#)**

## ▼ **Attach the Right Angle Bracket in a 27-Inch Sun/Oracle Rack**

1. **Align the 27-inch angle bracket for the Oracle Fabric Interconnect F1-4 so that it is outside of the side panels.**
2. **From inside the side panels, insert the M3.5 flat-head screws through the slots in the side panel and into the angle bracket's screw holes.**

See [Figure 28, “Aligning the Angle Brackets and Inserting the Screws,” on page 56.](#) Each angle bracket requires 3 screws.

**FIGURE 28**     Aligning the Angle Brackets and Inserting the Screws



- 3. Make sure that screw holes in the angle brackets lie flush against the slotted edge of the side panels.**

The slotted edge of the angle bracket will attach to the rack post.

---

**Note** - Leave the M3.5 screws loose enough to adjust the Oracle Fabric Interconnect's depth in the rack. While the screws are loose, you can slide the chassis along the slots in the mounting brackets until the chassis is flush with the rack, or whatever depth is your preference.

---

- 4. Insert the M6 pan-head rack screw through the slotted edge of the angle bracket, and into the chassis.**

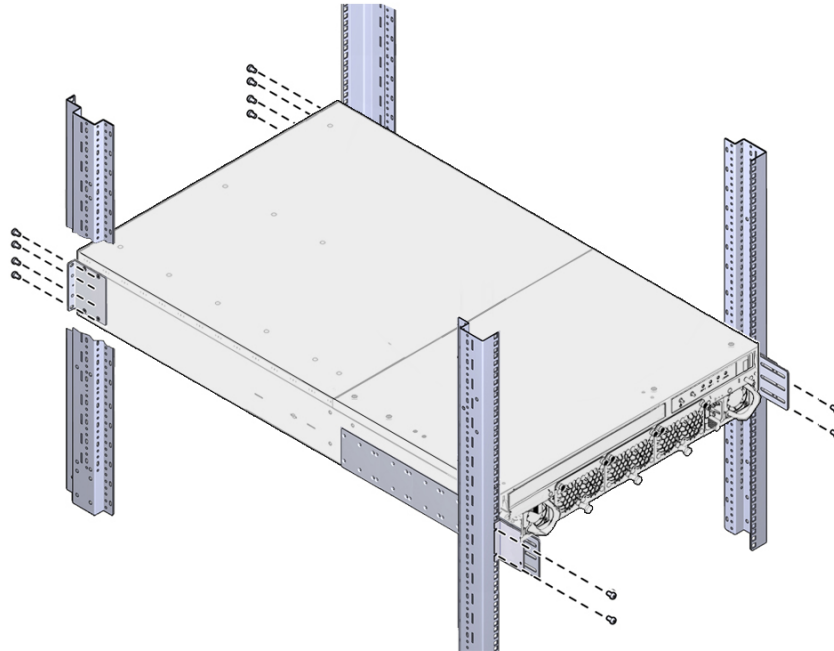
The Sun/Oracle rack is untapped, so you should have already installed the M6 cage nuts into the rack. For the Sun/Oracle rack, use only the M6 screws to attach the chassis to the rack.

- 5. Tighten the pan-head rack screws to secure the chassis to the rack.**



See [Figure 29, “Inserting Screws Through the Angle Brackets and Into the Rack Posts,”](#) on [page 57](#). Each point of the attachment through the angle bracket requires two screws to secure the chassis to the rack.

**FIGURE 29** Inserting Screws Through the Angle Brackets and Into the Rack Posts



6. **With the chassis adjusted to your preferred rack depth, tighten the M3.5 screws.**



**Caution** - When the chassis is completely installed, check all screws to make sure they are tight. If any screws are loose, make sure you tighten them. All screws must be tightened for the chassis to be completely, and safely, installed.

7. **Install the Cable Management Assembly (CMA) as documented in [“Installing the Cable Management Assembly”](#) on [page 37](#).**

The same CMA is supported for both the Oracle Fabric Interconnect F1-15 and Oracle Fabric Interconnect F1-4, so use the same procedure. Where illustrations show the Oracle Fabric Interconnect F1-15, you will substitute the Oracle Fabric Interconnect F1-4.

8. **Install the I/O modules as documented in [“Installing an I/O Module” on page 69.](#)**
9. **Cable the Fabric Interconnect F1-4 as documented in [“Connecting the Fabric Interconnect to Other Equipment” on page 77.](#)**
10. **When the Fabric Interconnect F1-4 is installed in the rack and cabled to the other equipment, you will plug in the power cords and anchor the power cables in place as documented in [“AC Power” on page 89.](#)**

## Understanding Chassis Components and Indicators

Refer to the following illustrations for the locations of the chassis components, controls, and indicators for the Fabric Interconnect F1-15 and Fabric Interconnect F1 - 4.

### Fabric Interconnect Chassis Components

The Fabric Interconnect comes in different models and connectivity types:

- a Fabric Interconnect F1-15 with different speeds of InfiniBand connectivity (DDR or QDR).
- a Fabric Interconnect F1-4 with different speeds of InfiniBand connectivity (DDR or QDR).

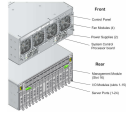
Fabric Interconnect speed and connectivity for servers is determined by the type of Fabric Board installed in the system. For more information, see [“Connecting to Client Servers” on page 77.](#)

Also, different I/O Modules will be connected to network, storage, and other resources depending on the type of module, for more information, see [“Connecting to Switches, Routers and Other Equipment” on page 80.](#)

### Fabric Interconnects

[Figure 30, “Fabric Interconnect F1-15 Front and Rear Panel Components,” on page 59](#) shows the Fabric Interconnect F1-15's chassis components on the front and rear panels. The following illustration shows a Fabric Interconnect F1-15 supporting DDR connectivity.

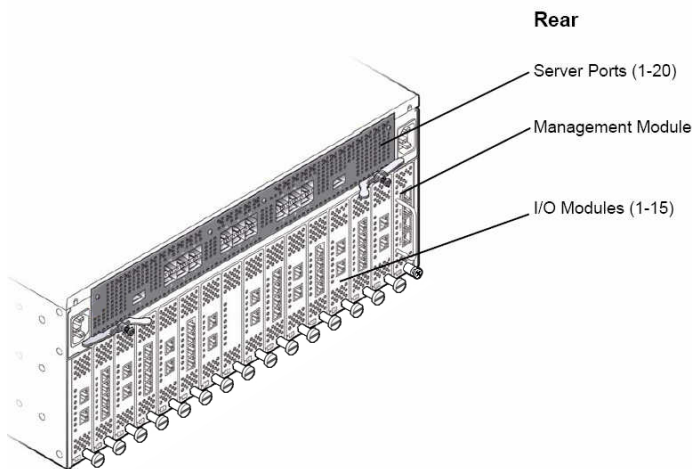
**FIGURE 30** Fabric Interconnect F1-15 Front and Rear Panel Components



The Fabric Interconnect F1-15 can also support InfiniBand connections at Quad Data Rate (QDR) speeds. [Figure 31, “QDR Fabric Interconnect F1-15 Rear Panel Components,” on page 59](#) shows the Fabric Interconnect F1-15's rear panel with a QDR Fabric Board installed. The QDR Fabric Board is easily identifiable by the different layout of its 20 physical ports.

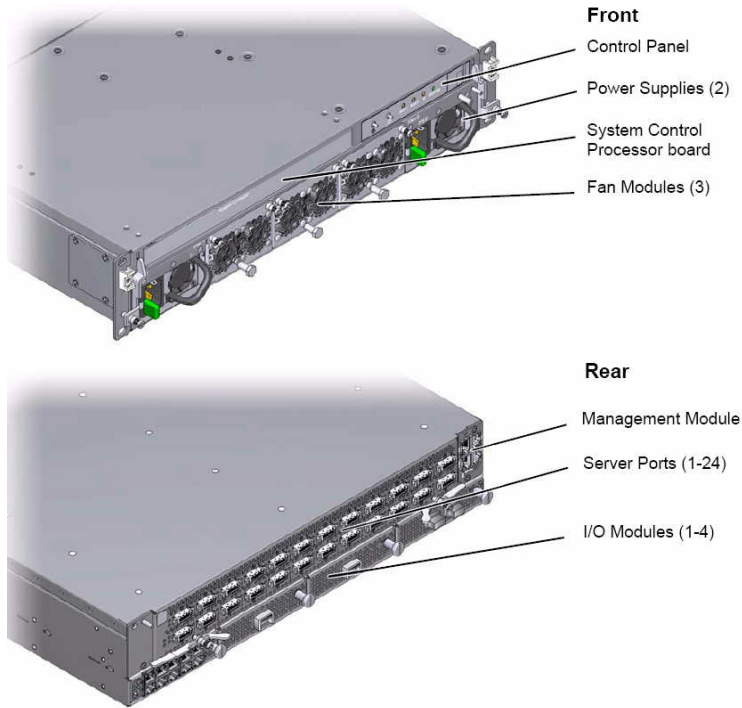
The front of a QDR Fabric Interconnect F1-15 has the same standard equipment—for example, power supplies, fans, and so on are the same between a QDR Fabric Interconnect F1-15 and DDR Fabric Interconnect F1-15.

**FIGURE 31** QDR Fabric Interconnect F1-15 Rear Panel Components



[Figure 32, “Fabric Interconnect F1-4 Front and Rear Panel Components,” on page 60](#) shows the Fabric Interconnect F1-4's chassis components on the front and rear panels. The following illustration shows an InfiniBand Fabric Interconnect F1-4 supporting DDR connectivity.

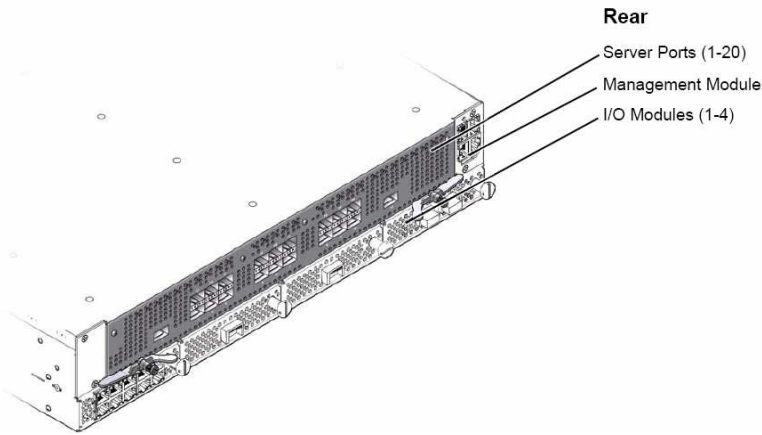
**FIGURE 32** Fabric Interconnect F1-4 Front and Rear Panel Components



The Fabric Interconnect F1-4 can also support InfiniBand connections at Quad Data Rate (QDR) speeds. [Figure 33, “QDR Fabric Interconnect F1-4 Rear Panel Components,”](#) on page 61 shows the Fabric Interconnect F1-4's rear panel with a QDR Fabric Board installed. The QDR Fabric Board is easily identifiable by the different layout of its 20 physical ports.

The front of a QDR Fabric Interconnect F1-4 has the same standard equipment—for example, power supplies, fans, and so on are the same between a QDR Fabric Interconnect F1-4 and DDR Fabric Interconnect F1-4.

**FIGURE 33** QDR Fabric Interconnect F1-4 Rear Panel Components



## Fabric Interconnect Control Panel

The Fabric Interconnect control panel contains LEDs that provide indicators of the system's status as well as a power LED and power button for hard power on and off.

[Figure 34, “Fabric Interconnect F1-15 Control Panel,” on page 61](#) shows the Fabric Interconnect control panel on a Fabric Interconnect F1-15. The Control Panel is on the front of the Fabric Interconnect F1-15 chassis.

**FIGURE 34** Fabric Interconnect F1-15 Control Panel

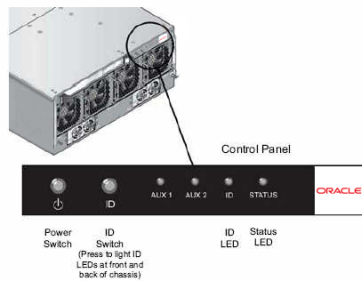
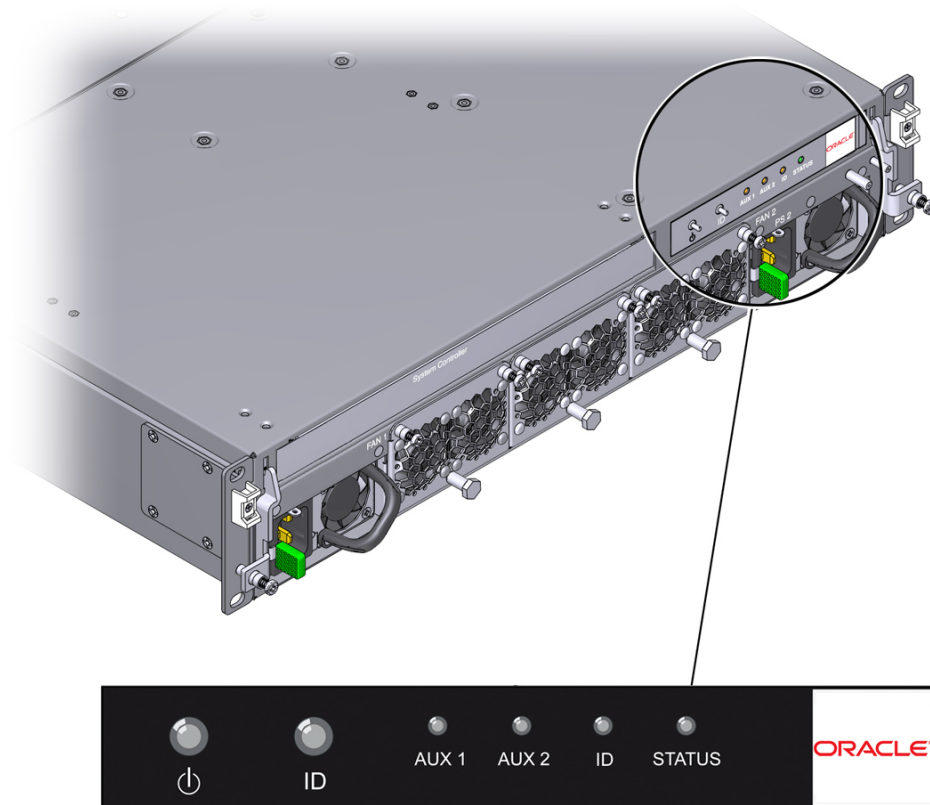


Figure 35, “Fabric Interconnect F1-4 Control Panel,” on page 62 shows the Fabric Interconnect control panel on a Fabric Interconnect F1-4. The control panel is on the front of the Fabric Interconnect F1-4 chassis.

**FIGURE 35** Fabric Interconnect F1-4 Control Panel



## Fabric Interconnect I/O Modules

Fabric Interconnects have different models of I/O Modules that provide connectivity to network and storage resources.

- For network connectivity, Gigabit Ethernet modules are supported in either 1 Gigabit per second or 10 Gigabit per second bandwidths. Gigabit I/O Modules offer different numbers of ports for various connectivity options:

- 10 GE Module, which has one 10 Gbps Ethernet port. The 10 GE Module supports full duplex 10 Gbps Ethernet traffic. The 10 GE module supports copper and fiber cables. This module is hot swappable and supports robust network software features.
- 10-Port GE Module, which has 10 individual ports. Each port supports full duplex 1 Gbps Ethernet traffic. the 1-Port GE module is shipped with port cages that accept SFP + transceivers, and each port can support active or fiber cables. This module is hot-swappable and supports robust network software features.
- 4-Port 10 GE Module, which has 4 independent ports. Each port supports full duplex 10 Gbps Ethernet traffic. The 4-Port 10 GE module is shipped with port cages that accept SFP+ transceivers, and each port can support passive or active fibre or copper cables. For information about supported cables, see “Cables and Connectors for 4-Port 10 GE Module” on page 300. The 4-Port 10 GE Module is hot swappable and supports robust network software features. If you are upgrading from a 10 GE module or 10-Port GE module to the 4-Port 10 GE module, follow the procedure documented in “Upgrading to a 4-Port 10 GE Module” on page 272.
- For storage connectivity, the following module is available:
  - The 2x8 Line-Rate FC Module provides 2 ports. This Fibre Channel module has aggregate line rate of 16 Gbps full duplex, so the ports can be configured at 2 Gbps, 4 Gbps, or 8 Gbps. The ports will auto negotiate to the maximum allowed speed when connected to the Fibre Channel switch port. For example, if the port on the FC Module is connected to a 16Gbps FC switch port, then the port pair will auto negotiate to the maximum allowed—8 Gbps. If the port on the FC module is connected to a 4 Gbps FC switch port, then the port pair will auto negotiate to the maximum allowed—4 Gbps. The line-rate Fibre Channel module is supported by all models of the Fabric Interconnect.

Figure 36, “Fabric Interconnect F1-15 I/O Modules and Indicators,” on page 64 shows I/O modules in a Fabric Interconnect F1-15. I/O Modules are installed vertically in the rear of the Fabric Interconnect.

**FIGURE 36** Fabric Interconnect F1-15 I/O Modules and Indicators

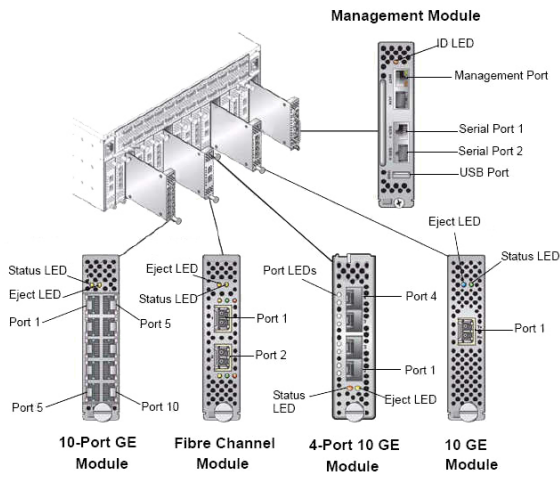
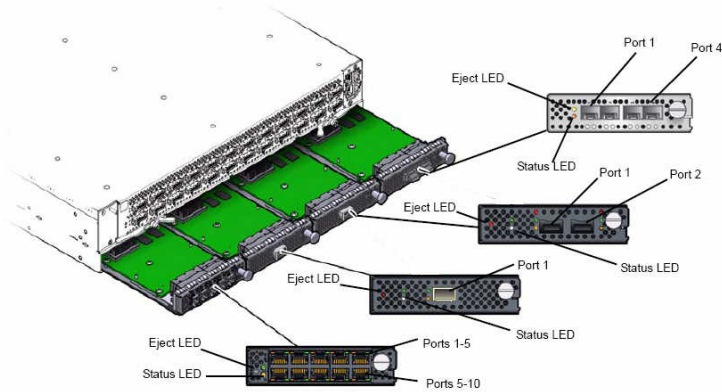


Figure 37, “Fabric Interconnect F1-4 I/O Modules and Indicators,” on page 64 shows I/O modules in a Fabric Interconnect F1-4. I/O Modules are installed horizontally in the rear of the Fabric Interconnect.

**FIGURE 37** Fabric Interconnect F1-4 I/O Modules and Indicators





## 10 GE Ethernet I/O Module LED Codes

Figure 38, “LED Codes — 10 Gigabit Ethernet Module,” on page 65 shows the 10 Gigabit Ethernet module LED codes. The 10 Gigabit Ethernet module is supported by all models of Fabric Interconnect F1-15 and Fabric Interconnect F1-4.

**FIGURE 38** LED Codes — 10 Gigabit Ethernet Module

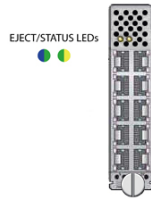


Eject	Status	Description
Blinking green	Blinking green	I/O card is running diagnostics
Off	Blinking green	I/O card is booting
Off	Solid green	I/O card is up/running
Off	Solid amber	Fault detected
Solid blue	Solid green	I/O card is down (power to card is off)
Blinking blue	Solid green	I/O card is shutting down

## 10-Port GE Ethernet I/O Module LED Codes

Figure 39, “LED Codes — 10-Port Gigabit Ethernet Module,” on page 66 shows the 10-Port Gigabit Ethernet module LED codes. The 10-Port Gigabit Ethernet module is supported by all models of Fabric Interconnect F1-15 and Fabric Interconnect F1-4.

**FIGURE 39** LED Codes — 10-Port Gigabit Ethernet Module



Eject	Status	Description
Blinking green	Blinking green	I/O card is running diagnostics
Off	Blinking green	I/O card is booting
Off	Solid green	I/O card is up/running
Off	Solid amber	Fault detected
Solid blue	Solid green	I/O card is down (power to card is off)
Blinking blue	Solid green	I/O card is shutting down

## 4-Port GE Ethernet I/O Module LED Codes

Status LEDs show information for the module and each port. The module has two LEDs that show status and power status for the module:

- the Module Status LED indicates the module's runtime or boot time status, which is affected by whether the module is inserted or being ejected.
- the Power Status LED indicates the condition of power to the module:

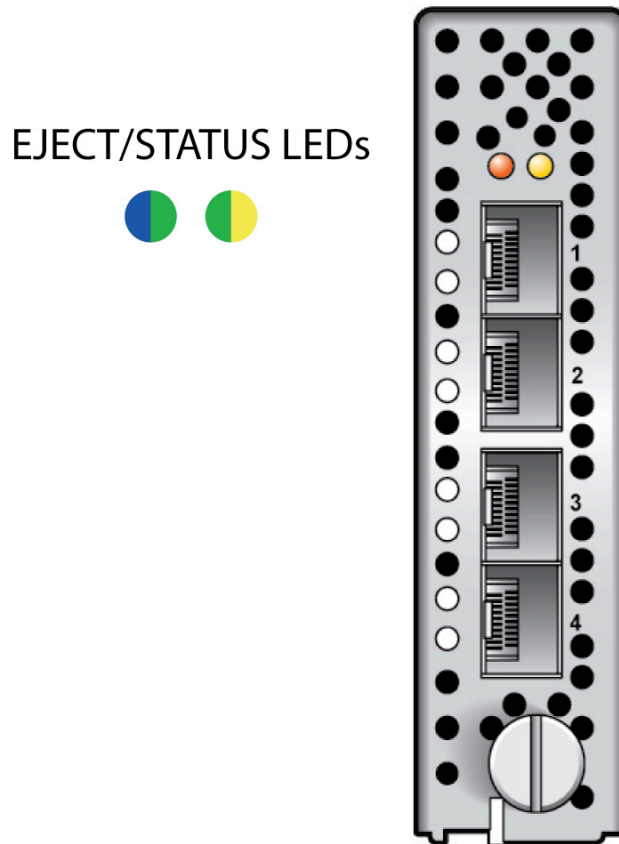
Each Gigabit Ethernet port has two LEDs that indicate the state of the port:

- one LED indicates physical link. If the port is enabled and the physical link is up, the LED glows steady green. If the port is enabled and the physical link is down, the LED blinks green. If the port is disabled or not receiving power, the LED is dark.
- one LED indicates traffic activity on the port. If the physical link is up and traffic is detected, the LED blinks yellow whenever traffic exists on the link. If the link is up but has no traffic activity, the LED glows steady yellow (not blinking). If the port is disabled, the link is down, or the port is not receiving power, the LED is dark.

**Note** - The traffic activity LED (yellow LED) states are conditional on the presence of a physical link. They are valid only if the Link LED is solid green, which indicates the port is enabled and link is present. If the port is not enabled and link is not present, traffic activity cannot occur, and as a result, the traffic activity LED will be dark.

Figure 40, “LED Codes 4-Port 10 Gigabit Ethernet Module,” on page 67 shows the LED codes for the 4-Port 10 GE Modules. The 10-Port Gigabit Ethernet module is supported by all models of Fabric Interconnect F1-15 and Fabric Interconnect F1-4.

**FIGURE 40** LED Codes 4-Port 10 Gigabit Ethernet Module



Eject	Status	Description
Blinking green	Blinking green	I/O card is running diagnostics
Off	Blinking green	I/O card is booting
Off	Solid green	I/O card is up/running
Off	Solid amber	Fault detected
Solid blue	Solid green	I/O card is down (power to card is off)
Blinking blue	Solid green	I/O card is shutting down

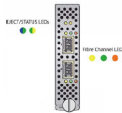
## Fibre Channel I/O Module LED Codes

The Fabric Interconnect supports the 2x8 Line-Rate FC Module which provides 2 ports.

**Note** - The 2x8 FC Module is supported on InfiniBand DDR Fabric Interconnects only. Do not install this module in a Fabric Interconnect running an SDR InfiniBand fabric.

Figure 41, “LED Codes — Fibre Channel Module,” on page 68 shows the Fibre Channel I/O module LED codes.

**FIGURE 41** LED Codes — Fibre Channel Module



These are general LED codes for the entire module:

Eject	Status	Description
Blinking green	Blinking green	I/O card is running diagnostics
Off	Blinking green	I/O card is booting
Off	Solid green	I/O card is up/running
Off	Solid amber	Fault detected
Solid blue	Solid green	I/O card is down (power to card is off)
Blinking blue	Solid green	I/O card is shutting down

These are specific LED codes for each Fibre Channel:

Yellow	Green	Amber	Description
Off	Off	Off	Power off
On	On	On	Power on (before FC initialization)
Flash Simultaneously			Power on (after FC initialization)
Flash in series: yellow, green, amber			FW fault
Off	Off	On	1 Gb link up/active
Off	On	Off	2 Gb link up/active
On	Off	Off	4 Gb link up/active

## Fabric Interconnect Front Panel LED Codes

Figure 42, “LED Codes — Fabric Interconnect Front Panel,” on page 69 shows the Fabric Interconnect front panel LED codes, which are the same for all models of Fabric Interconnect.

**FIGURE 42** LED Codes — Fabric Interconnect Front Panel



Aux 1	Aux 2	ID	Status	Description
N/A	N/A	Blinking green	Blinking green	Front panel card is running diagnostics.
N/A	N/A	Off	Blinking green	Front panel processor is booting.
N/A	N/A	Off	Solid green	The chassis controller process is Up.
N/A	N/A	Off	Solid amber	Fault detected.
N/A	N/A	Solid yellow	Solid green	The chassis is Up and the yellow chassis locator LED has been turned on.

## Installing an I/O Module

This section documents how to install the Fabric Interconnect's I/O modules. See the appropriate section:

- “Install I/O Modules in a Fabric Interconnect F1 - 15” on page 70
- “Install I/O Modules in a Fabric Interconnect F1 - 4” on page 71



**Caution** - When installing the I/O Modules: - wear an ESD wrist strap - When the hardware is out of its shipping package or the Fabric Interconnect chassis, make sure you place it in an ESD safe bag or on a grounded work surface such as a rubberized work mat.

## Using the I/O Module Lock

The I/O module lock operates in a 90-degree arc, and the slot in the handle indicates the position of the module's lock. [Table 1, "I/O Module Lock Positions," on page 70](#) shows the positions for the locking I/O Modules. This locking mechanism is supported on all models of Fabric Interconnect.

**TABLE 1** I/O Module Lock Positions

Position	Slot on Handle	Comments
Closed/ Locked	For the Fabric Interconnect F1-15, the locked position is horizontal (0 degree angle)	When the module lock is closed, the module cannot be removed or inserted. In this position, the module is held in place by a metal tab that contacts the Fabric Interconnect's frame and prohibits moving the module around in its slot.
	For the Fabric Interconnect F1-4, the locked position is vertical (90 degree angle)	To unlock the module, use a screwdriver to turn the module handle 90 degrees counter- clockwise until the handle is in the "open" position.
Open/ Unlocked	For the Fabric Interconnect F1-15, the open position is vertical (90 degree angle)	When the module lock is open, the module can be removed and inserted. In this position, the module is held in its slot by only the module socket connecting to the Fabric Interconnect's midplane.
	For the Fabric Interconnect F1-4, the open position is horizontal (0 degree angle)	This position is not supported for runtime operating of any I/O module. Modules should be unlocked only temporarily, for example during a module swap, then locked into place for runtime operation.  To lock the module in place by turning the knob 90 degrees clockwise until the handle is in the "closed" position.

## ▼ Install I/O Modules in a Fabric Interconnect F1 - 15

To install I/O Modules in a Fabric Interconnect F1-15, you will need a #2 Phillips (cross-head) screwdriver.

With the exception of the Management module, which must be installed in Slot 16 of the chassis, the I/O modules may be installed in any of the remaining 15 slots. All I/O modules may be installed or removed while the system is running. This procedure is supported by all models of Fabric Interconnect F1-15.

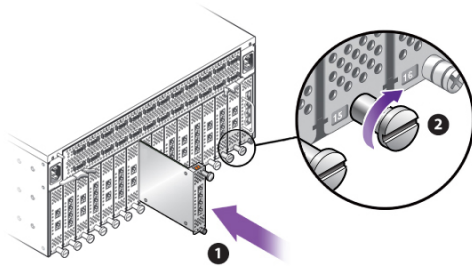


**Caution** - When tightening screws, make sure to tighten them to lightly snug. Do not overtighten screws or they can break.

To install I/O modules, follow this procedure:

1. **Install the I/O modules as shown in the following illustration (1). Ensure that the module's component side is facing towards the right edge of the chassis. Also, ensure that the module's top and bottom edges are correctly aligned with the upper and lower tracks at the left edge of each module slot. See [Figure 43, "Installing a Fabric Interconnect F1-15 I/O Module,"](#) on page 71.**

**FIGURE 43** Installing a Fabric Interconnect F1-15 I/O Module



2. **Secure the module in the slot by tightening the securing screw (2), located at the bottom edge of the module's rear panel.**

## ▼ Install I/O Modules in a Fabric Interconnect F1 - 4

The Fabric Interconnect F1-4 I/O Modules contain a locking mechanism (a quarter-turn Pawl) that is built-in to the module's handle. The lock is used to secure the module in place while it is inserted in the chassis, and has been designed with enough resistance that it cannot be unlocked or completely locked with your fingers. As a result, the module's handle is slotted to accept a screwdriver, which you will need to use to generate enough torque to lock or unlock the module.

By default, the Fabric Interconnect F1-4 is shipped with module blanks instead of the actual I/O Modules. I/O module blanks also have the locking mechanism. When you are initially installing I/O Modules, make sure to use the lock and unlocked positions appropriately—for example, make sure that you lock the modules when you are done installing them.

Oracle recommends that you keep all module blanks.



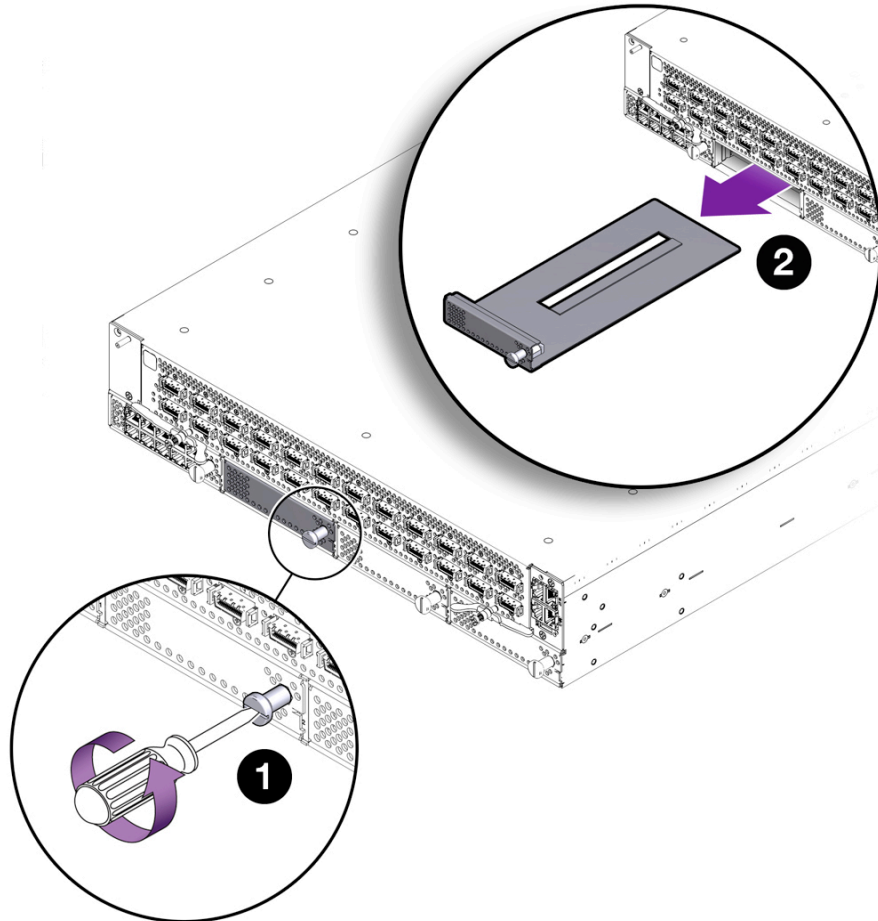
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**Caution** - When using the screwdriver to lock or unlock an I/O Module, make sure not to dull or mar the slot in the I/O Module's handle. Also, if you apply excessive force, it might be possible to over-rotate the handle, which will skew the I/O module's open and closed positions. When using the screwdriver to lock or unlock an I/O Module, make sure to apply only enough force to the locking mechanism, and rotate the handle only enough to unlock or lock the module.

---

1. **When handling I/O modules, make sure that you are using ESD safety precautions, such as a grounding strap that is properly attached to an earth ground source.**
2. **Using a slotted screwdriver, unlock the I/O module blank by turning it 90 degrees counterclockwise (1) as shown in [Figure 44, "Removing an I/O Module Blank," on page 73.](#)**

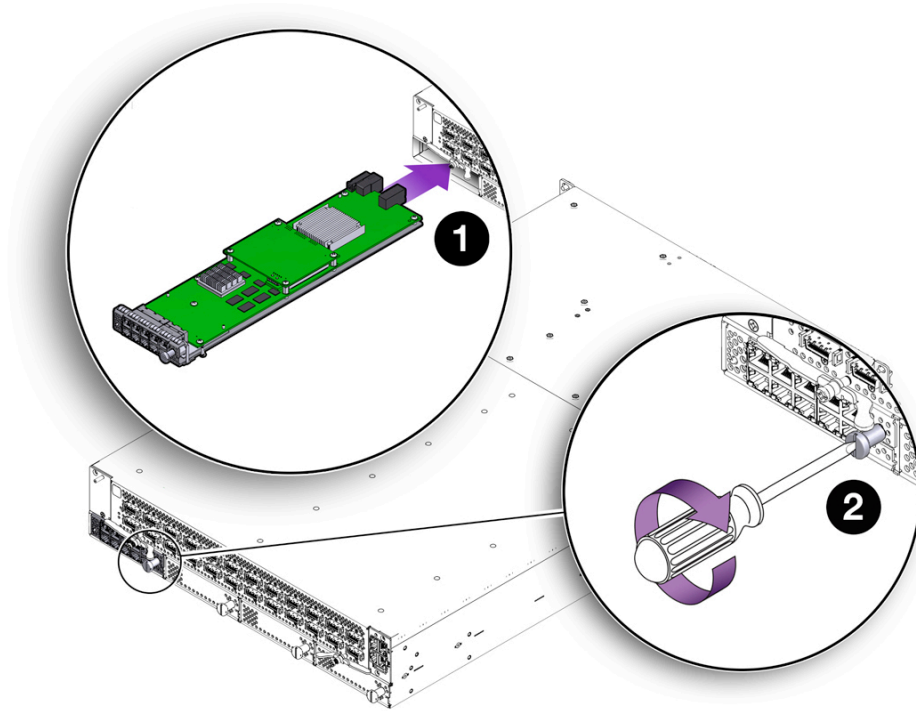


**FIGURE 44** Removing an I/O Module Blank

3. Grasp the module handle and remove the I/O module blank (2).
4. Get the I/O module you will be installing, and make sure that the I/O module is in the unlocked position. Modules can be inserted into the Fabric Interconnect F1-4 only if they are in the unlocked position.
5. Gently insert the I/O module (1) as shown in [Figure 45, “Inserting a Fabric Interconnect F1-4 I/O Module,”](#) on page 74. Ensure that the I/O module is oriented so that the sheet metal side is facing down and the module's faceplate

is facing you. Also, ensure that the module is aligned with the slot before sliding it into the chassis.

**FIGURE 45** Inserting a Fabric Interconnect F1-4 I/O Module



When the I/O Module is almost completely inserted, you will feel some resistance, which is the I/O Module's connector meeting its midplane socket. Continue to apply gentle pressure until the connector is seated in the socket.

6. **When the module is completely inserted, it should lie flush with the face of the Fabric Interconnect F1-4.**
7. **Using a slotted screwdriver, lock the I/O Module into the chassis (2) by turning the lock 90 degrees clockwise.**
8. **Repeat this procedure as needed to remove all the I/O module blanks and install all the I/O modules.**

## Installing a Host Channel Adapter

Host Channel Adapter (HCA) cards are only required for servers that do not have InfiniBand interfaces. Check the manufacturer's documentation to determine if your server requires an HCA card. If you must install an HCA card, refer to your server's service label or user manual for information.

Different servers have different methods for installing an HCA card. This section documents one HCA installation procedure for a common server. You can use the procedure as a general guideline for installing the HCA card, but Oracle recommends you also consult the documentation from the server's manufacturer for specific installation information.

---

**Note** - When using Gore InfiniBand cables, push the connector lock towards the cable's end, as far as possible, before inserting the cable into the connector.

---

To install an HCA card, you will need the following equipment:

- Various screwdrivers and/or hex-head wrenches (depending on the cable and connector types)
- ESD wrist strap



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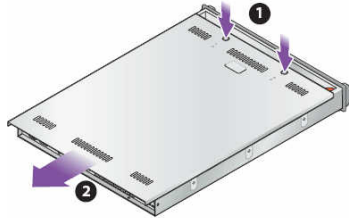
**Caution** - Observe proper ESD procedures when handling HCA cards.

---

### ▼ Install a Host Channel Adapter

1. **Power down the server, and un-cable as necessary to gain access to the server's PCI slots.**
2. **Refer to the server's documentation to select the correct slot in which to install the HCA card.**
3. **Remove the server's cover. See [Figure 46, "Removing the Server's Cover,"](#) on [page 76](#). The illustration shows applying downward pressure on securing tabs (1), before sliding the cover off of the server (2).**

**FIGURE 46** Removing the Server's Cover



---

**Note** - Some servers have a different method of securing the cover to the server. For example, some servers have a securing screw at the rear of the server that holds the cover in place. If your server's cover is held in place by a different method than the illustration shows, consult the manufacturer's documentation for the correct way to remove the cover.

---

4. **Remove the protective faceplate (if any) at the rear of the server (2). When the protective faceplate is removed, the open slot is where the HCA's card will be installed. See [Figure 47, "Removing the HCA Slot's Protective Faceplate,"](#) on [page 76](#).**

---

**Note** - Some servers have a latch that secures the HCA card to the chassis when the card is installed, as shown in the illustration. If your server has a latch, open it before installing the HCA card (1).

---

**FIGURE 47** Removing the HCA Slot's Protective Faceplate



5. **Align the HCA card so that the leads are pointing towards the socket, and the HCA's InfiniBand port is at the rear of the server chassis.**

In this position, the components on the HCA card will be facing down, and the HCA's InfiniBand port will be facing out of the rear of the chassis.

6. **Slide the HCA card into the socket making sure to fit the HCA faceplate into place (1), then secure the HCA faceplate to the rear of the server (2). See [Figure 48, "Inserting the HCA card and Locking it in Place,"](#) on page 77.**

**FIGURE 48** Inserting the HCA card and Locking it in Place




---

**Note** - The illustration shows a latching mechanism securing the HCA (2). Some servers have other methods of securing the HCA to the chassis. For example, some servers have a captive screw on the rear of the chassis that holds the HCA in place. If your server does not use a latching mechanism, consult your server's documentation for information about the proper method for securing the HCA card.

---

7. **When the HCA is installed, replace the cover and reattach cables per the server manufacturer's instructions.**

## Connecting the Fabric Interconnect to Other Equipment

When you connect the Fabric Interconnect to other equipment and to facility power, follow this order:

1. Client server(s)
2. Network switches and routers
3. AC power

## Connecting to Client Servers

Client servers are connected to the Fabric Interconnect through the Fabric Interconnect's Fabric Board. The Fabric Interconnect has models which feature different Fabric Board options.

### Fabric Interconnects

Oracle offers Fabric Interconnects with InfiniBand Fabric Boards:

- The Fabric Interconnect F1-15 with a QDR Fabric Board

This option contains 20 InfiniBand ports that connect to client servers. Each port is a quad data rate (QDR) link to the server and operates at 40 Gbps, but is capable of auto negotiating down to 20 Gbps for Double Data Rate (DDR), or 10 Gbps Single Data Rate (SDR) depending on the speed of your network. Ports are numbered left to right starting at the bottom left-hand corner. Ports 1 and 11 are single ports, but all other ports are grouped together into three individual clusters with six ports in each.

- the Fabric Interconnect F1-4 with a QDR Fabric Board

This option contains 20 InfiniBand ports that connect to client servers. Each port is a quad data rate (QDR) link to the server and operates at 40 Gbps, but is capable of auto negotiating down to 20 Gbps for Double Data Rate (DDR), or 10 Gbps Single Data Rate (SDR) depending on the speed of your network. Ports are numbered left to right starting at the bottom left-hand corner. Ports 1 and 11 are single ports, but all other ports are grouped together into three individual clusters with six ports in each.

Use InfiniBand cables to connect the client servers to the Fabric Interconnect. Attach a cable from each server's InfiniBand interface (or optional HCA card) to one of the 24 server port on the Fabric Board. Additional cables may be ordered from Oracle.

[Figure 49, “InfiniBand Ports for Fabric Interconnect F1-15 Client Server Connections,” on page 79](#) shows an InfiniBand port connection to a Fabric Interconnect F1-15 with a DDR Fabric Board.

**FIGURE 49** InfiniBand Ports for Fabric Interconnect F1-15 Client Server Connections

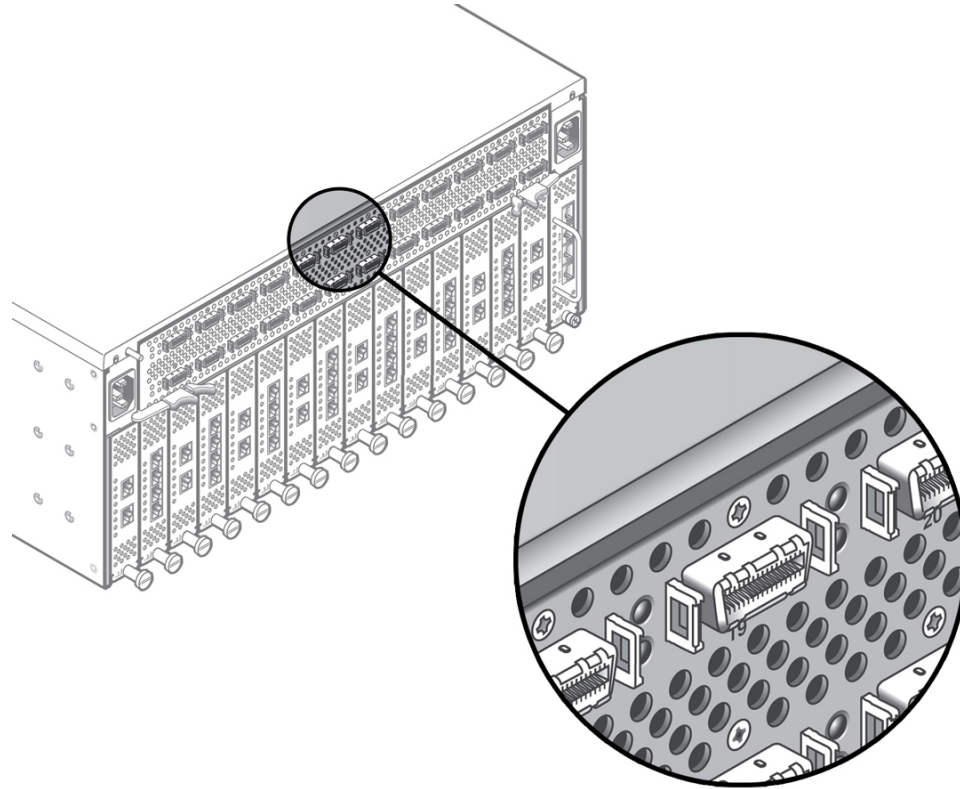
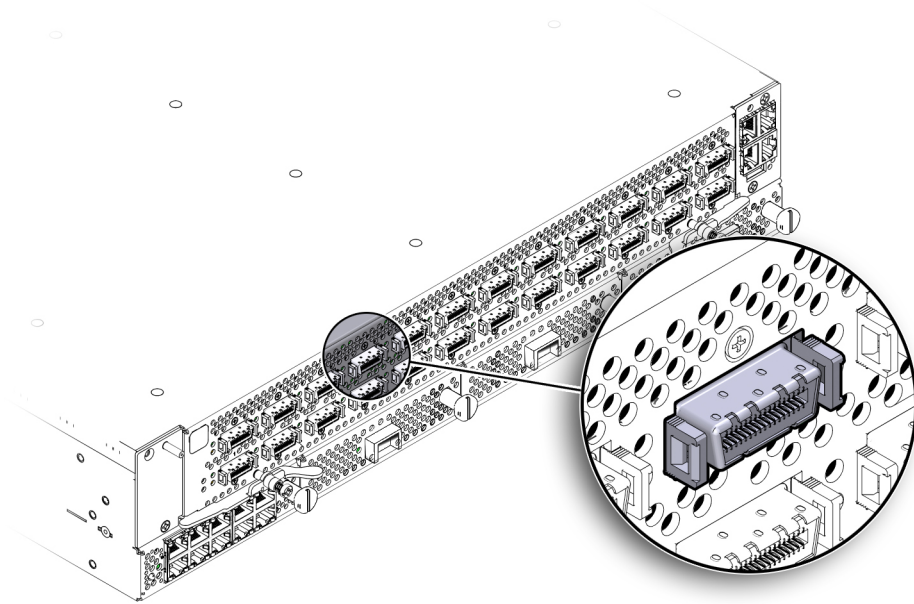


Figure 50, “InfiniBand Ports for Fabric Interconnect F1-4 Client Server Connections,” on page 80 shows an InfiniBand port connection on the Fabric Interconnect F1-4 with a DDR Fabric Board.

**FIGURE 50** InfiniBand Ports for Fabric Interconnect F1-4 Client Server Connections



## Connecting to Switches, Routers and Other Equipment

Connect switches, routers and storage devices to the Fabric Interconnect using Ethernet and/or Fibre Channel cables, as required for the Fabric Interconnect F1-15 or Fabric Interconnect F1-4.

[Figure 51, “Fabric Interconnect F1-15 Fibre Channel and Gigabit Ethernet Modules and Connectors,” on page 81](#) shows storage and network connections for a Fabric Interconnect F1-15.



**FIGURE 51** Fabric Interconnect F1-15 Fibre Channel and Gigabit Ethernet Modules and Connectors

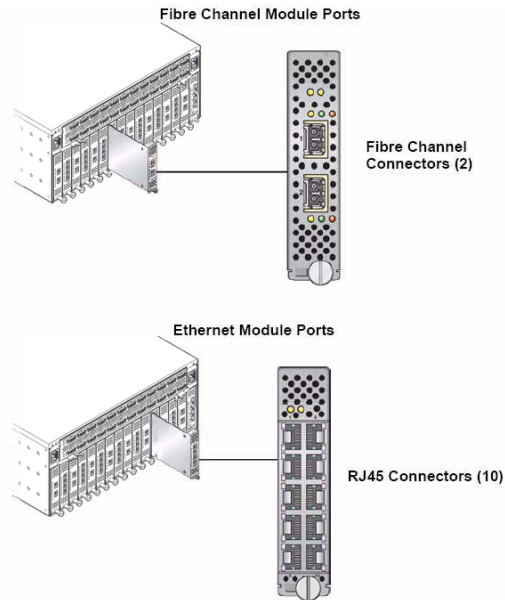
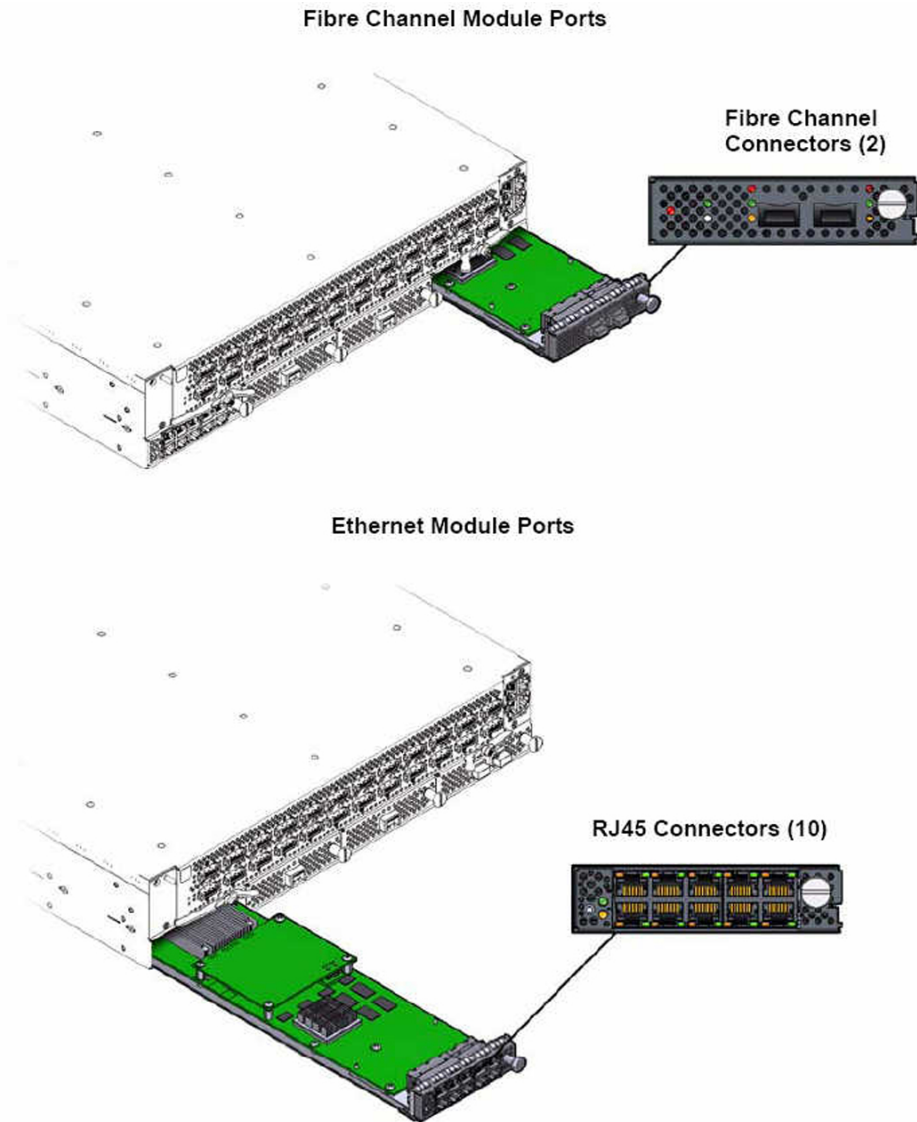


Figure 51, “Fabric Interconnect F1-15 Fibre Channel and Gigabit Ethernet Modules and Connectors,” on page 81 shows an example of the 10-Port GE module, but the 10 GE module (which has one 10 GE port) is also supported.

Figure 52, “Fabric Interconnect F1-4 Fibre Channel Module and Connectors,” on page 82 shows the storage and network connections for a Fabric Interconnect F1 - 4.

**FIGURE 52** Fabric Interconnect F1-4 Fibre Channel Module and Connectors



## ▼ Connect the 4-Port 10 GE Module to Other Equipment

The 4-Port 10 GE module can be connected to network equipment through different methods, which are determined by the type of cables and connectors you ordered.

- If you are using SFP+ passive or active copper cables, the port transceivers are integrated into the cable. With the transceiver already present on the cable, you will insert one end of the cable into the I/O Module and the other end into a 10 Gbps-capable port on the peer device.
- If you are using the SFP+ optical transceivers, you will need to connect both the transceiver and cable. The following procedure documents using the standalone SFP+ optical transceivers, which is the more involved procedure.

To connect the 4-Port 10 GE Module using SFP+ optical transceivers, follow this procedure:

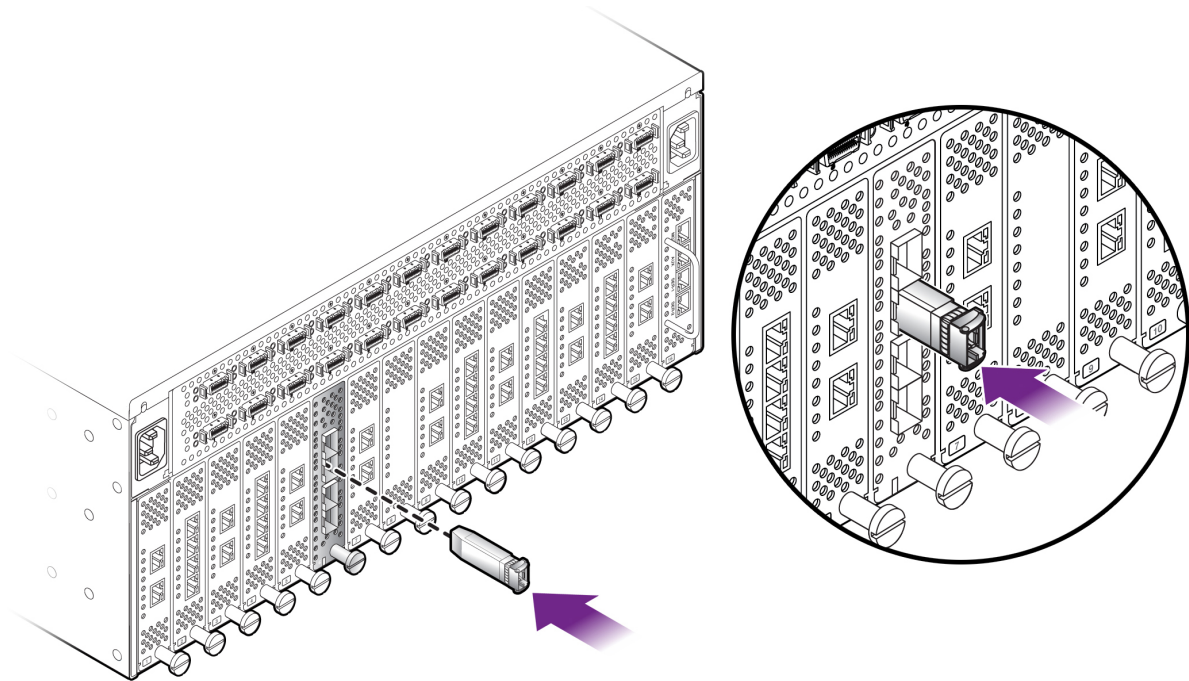
1. **Insert the 4-Port 10 GE Module into the Fabric Interconnect, and allow it to power on.**
2. **Align the optical transceiver with the port cage on the I/O Module. The transceiver is keyed so that it can only be inserted in the correct orientation.**
3. **When the module has completely booted, insert the SFP+ optical transceiver into the port cage on the 4-Port 10 GE module. See [Figure 53, “Inserting the Optical Transceiver into the 4-Port 10 GE Module,”](#) on page 84.**

---

**Note** - Make sure that the optical transceiver is fully inserted, and make sure that the transceiver's handle lies flush with the face of the transceiver. If the handle does not lie flush, it can interfere with inserting or removing the cable.

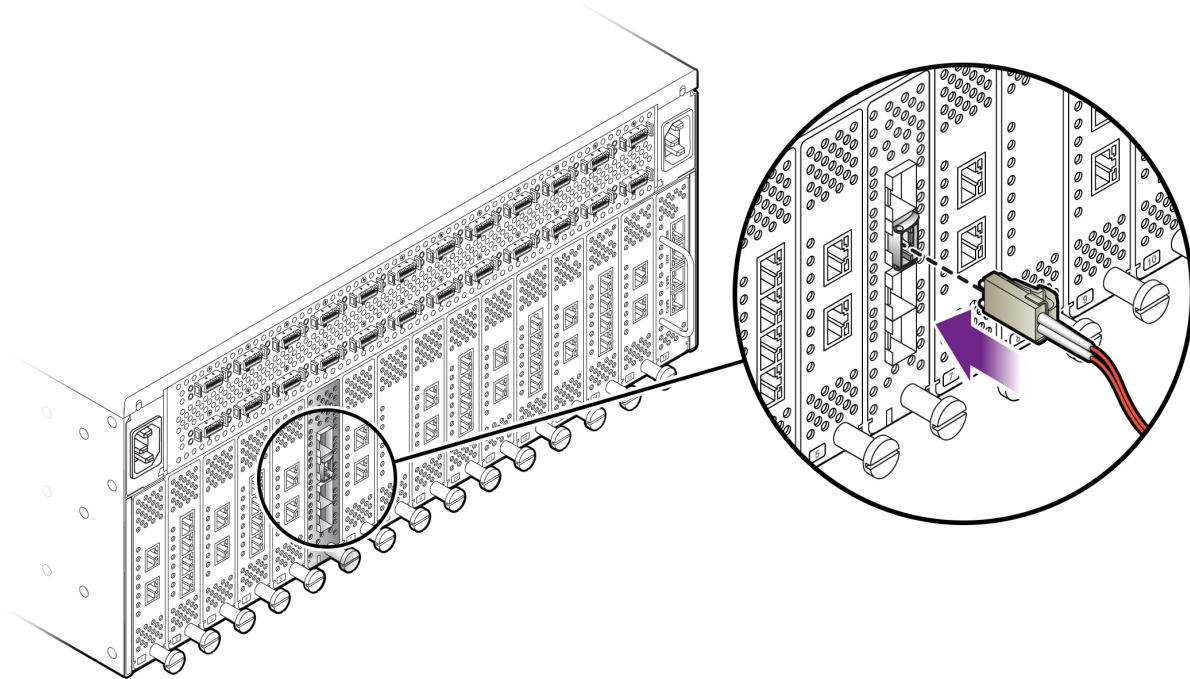
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**FIGURE 53** Inserting the Optical Transceiver into the 4-Port 10 GE Module



4. Insert one end of the optical cable into the SFP+ transceiver. See [Figure 54, “Inserting the Optical Cable into the Optical Transceiver,”](#) on page 85.

**FIGURE 54** Inserting the Optical Cable into the Optical Transceiver



5. **Connect the other end of the cable to a 10 Gbps port on a peer device, such as a 10 Gbps Ethernet switch.**
6. **Check the Link LED on the 4-Port 10 GE module's port to make sure that the port detects the cable. The Link LED should be glowing steady green.**
7. **Check the Link LED on the peer device. The Link LED on the peer device should show that a physical link has been successfully established.**
8. **Check the Activity LED. If traffic is being transmitted or received between the 4-Port 10 GE Module and the peer device, the Activity LED blink amber whenever traffic is detected on the link.**

## Management Module Connections

This section documents the Management module and its port connections. Some ports on the Management module are inactive, so you should not use them. When the Fabric Interconnect is shipped from the factory, inactive ports are capped with a black rubber plug. Oracle recommends that you leave these plugs in place.

See the appropriate section:

- [“Connect to a Fabric Interconnect F1-15's Management Module” on page 86](#)
- [“Connect to a Fabric Interconnect F1-4's Management Module” on page 87](#)

### Connecting the Management Port to a DB9 Serial Port

Some of the following options require an adapter that supports straight-through CAT-5 cable (or the equivalent). These are the adapter's pin assignments.

Management Port		DB9 Serial Port	
Pin	Signal Name	Pin	Signal Name
1	RTS	8	CTS
2	DTR	6	DSR
3	TXD	2	RXD
4	GND	5	GND
5	DCD	1	DCD
6	RXD	3	TXD
7	DSR	4	DTR
8	CTS	7	RTS

### ▼ Connect to a Fabric Interconnect F1-15's Management Module

The procedure in this section documents using a serial connection to the Fabric Interconnect's management port. However, a default address is set for the Management port (192.168.1.1), so you can also use an Ethernet connection for initial configuration of the Fabric Interconnect.

To connect to the Management Module on a Fabric Interconnect F1-15:

1. **Connect a laptop or a remote console to the Serial 1 port on the Management module. (This connection is required for the initial system configuration.)** See [Figure 55, “Fabric Interconnect F1-15 Management Module for Connection to Management Console,” on page 87](#).

**FIGURE 55** Fabric Interconnect F1-15 Management Module for Connection to Management Console



There are two ways to connect to the serial port on the Fabric Interconnect Management module:

- **Connect directly to the Serial 1 port on the Management module. This step requires an adaptor that supports straight-through CAT-5 cable (or the equivalent). See [“Connecting the Management Port to a DB9 Serial Port” on page 86.](#)**
  - **Connect a remote system to the Serial 1 port using a serial console terminal concentrator (for example, Cyclades).**
2. **Verify that the serial port on your system is set up as follows:**
- **115200 baud**
  - **8 bits, no parity**
  - **VT100 encoding**
  - **1 stop bit**

---

**Note** - The Serial 2 port is used for debug purposes only.

---

## ▼ **Connect to a Fabric Interconnect F1-4's Management Module**

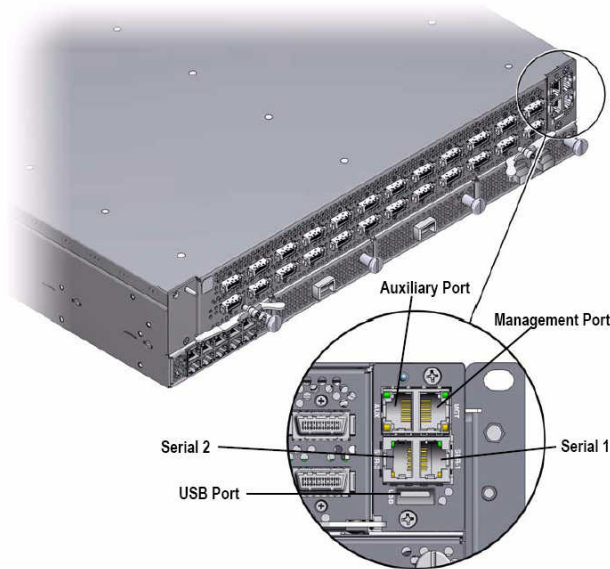
The procedure in this section documents using a serial connection to the Fabric Interconnect's management port. However, a default address is set for the Management port (192.168.1.1), so you can also use an Ethernet connection for initial configuration of the Fabric Interconnect.

To connect to the Management Module on a Fabric Interconnect F1-4:

1. **Connect a laptop or a remote console to the Serial 1 port on the Management module. (This connection is required for the initial system configuration.) See**

**Figure 56, “Fabric Interconnect F1-4 Management Module for Connection to Management Console,” on page 88.**

**FIGURE 56** Fabric Interconnect F1-4 Management Module for Connection to Management Console



There are two ways to connect to the serial port on the Fabric Interconnect Management module:

- **Connect directly to the Serial 1 port on the Management module. This step requires an adaptor that supports straight-through CAT-5 cable (or the equivalent). See “[Connecting the Management Port to a DB9 Serial Port](#)” on page 86.**
  - **Connect a remote system to the Serial 1 port using a serial console terminal concentrator (for example, Cyclades).**
2. **Verify that the serial port on your system is set up as follows:**
- **115200 baud**
  - **8 bits, no parity**
  - **VT100 encoding**



- **1 stop bit**

---

**Note** - The Serial 2 port is used for debug purposes only.

---

## AC Power

Your system is shipped with power cords that are suitable for your location. However, Oracle recommends that you inspect the cords to ensure that they are of the correct type.

See the appropriate section:

- [“Connect Power to the Fabric Interconnect F1-15” on page 89](#)
- [“Connect Power for the Fabric Interconnect F1-4” on page 90](#)

### ▼ **Connect Power to the Fabric Interconnect F1-15**

The Fabric Interconnect F1-15's power supplies are located on the front of the chassis, and the power plugs are on the rear of the chassis as shown in [Figure 57, “Fabric Interconnect F1-15 Power Supplies for Connecting to AC Facility Power,” on page 90](#).



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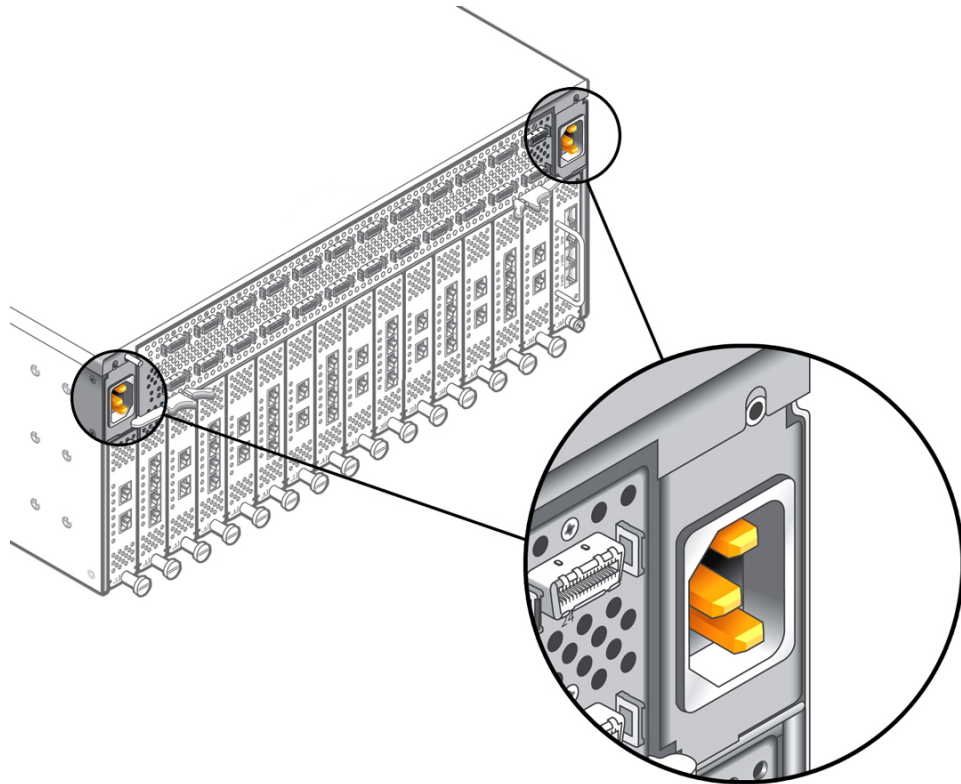
**Caution** - Verify that your AC power source, as well as any equipment installed between the power source and the Fabric Interconnect (such as surge suppressors, plug bars, and so on) meet these requirements: – 100 - 127 / 200 - 240 V AC – 12 - 7.68 A – 47 - 63 Hz – 1220 W (maximum)

---

To connect Oracle Fabric Interconnect F1-15 to facility power, follow this procedure:

1. **Connect the dual power supplies to an AC power source. See [Figure 57, “Fabric Interconnect F1-15 Power Supplies for Connecting to AC Facility Power,” on page 90](#).**

**FIGURE 57** Fabric Interconnect F1-15 Power Supplies for Connecting to AC Facility Power



2. On the opposite side of Oracle Fabric Interconnect, simultaneously switch all power supplies to the “On” position.

### ▼ Connect Power for the Fabric Interconnect F1-4

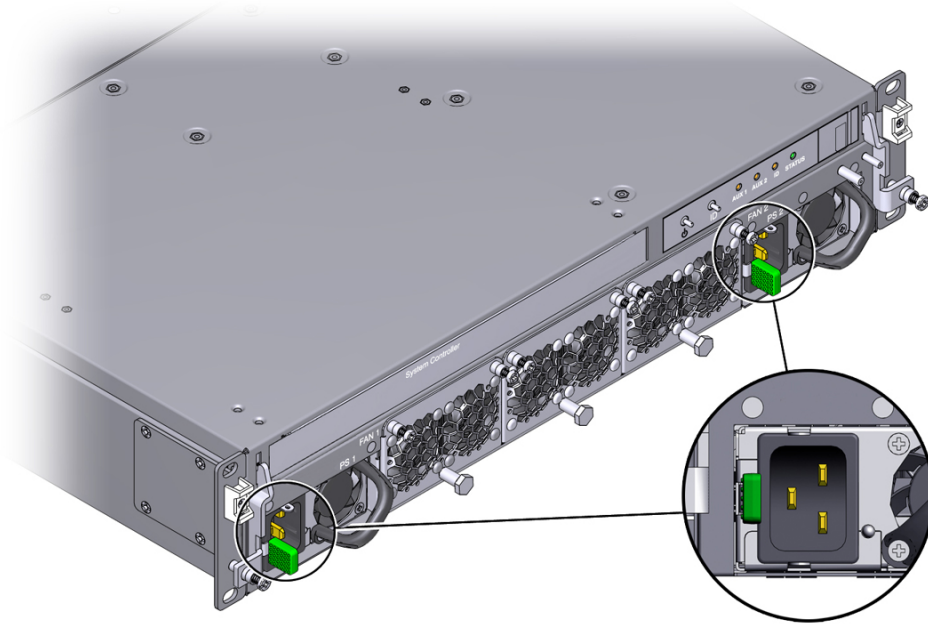
The Fabric Interconnect F1-4's power supplies and power plugs are located on the front of the chassis. See below.



---

**Caution** - Verify that your AC power source, as well as any equipment installed between the power source and the Fabric Interconnect (such as surge suppressors, plug bars, and so on) meet these requirements: – 100 - 127 / 200 - 240 V AC – 4 - 8.5 A – 50 - 60 Hz – 750 W (maximum)

---



1. Get the two cable tie wraps from the accessory kit. Notice that one side is smooth and one side has teeth.

---

**Note** - You will find it helpful to orient the cable tie as follows: - the smooth side is facing the chassis and the ribbed side is facing you. - the release tab is at the top of the tie wrap. Orienting the cable tie this way facilitates locking and releasing the power cable (if needed) when the cable tie is in use.

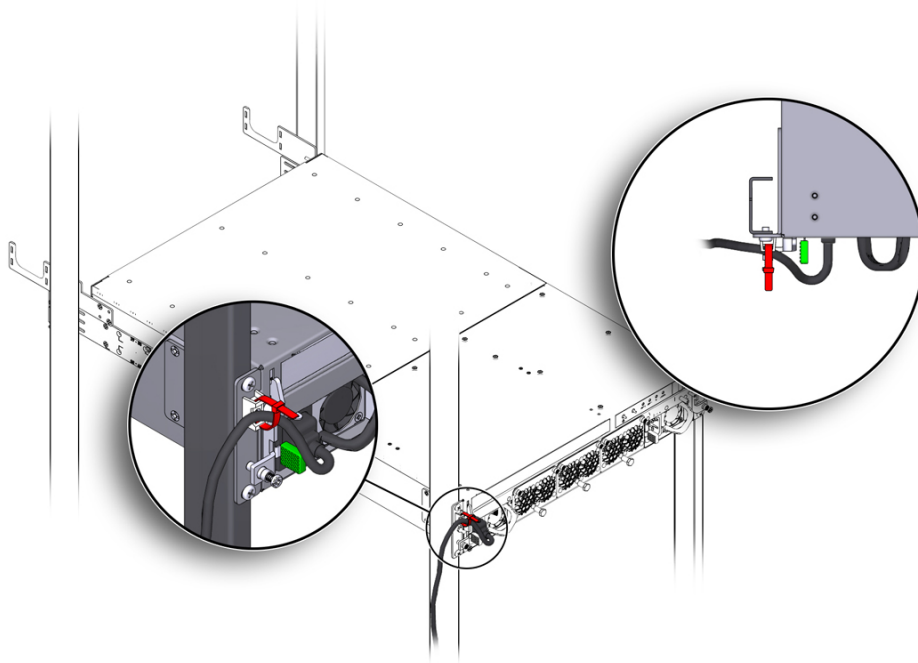
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2. Insert the cable tie through the top slot of the anchor first, then the bottom slot. [Figure 23, "Power Cord Anchor," on page 47](#) shows the location of the anchors. Make sure that the cable tie is threaded through both the top and bottom slots.
3. Plug the power cord into the power socket on the Fabric Interconnect F1-4, but do not connect the power cord to facility power yet.
4. Hold the power cable taut against the anchor, and pull the tie wrap tight to hold the power cord in place. There should be little or no slack in the cable tie due to considerations with the power cords.

**Note** - If you have a ruler or tape measure, check the power cord's protrusion from the face of the Fabric Interconnect F1-4. Power cords cannot protrude more than 2 5/16" (60 mm) as documented in ["Power Cord Management" on page 46](#).

---

**FIGURE 58** Fabric Interconnect F1-4 Power Cord Anchored



5. When the power cord is in place and complies with the considerations in ["Power Cord Management" on page 46](#), clip the tie wrap so that it has no more than 1" (2.54 cm) of excess length.
6. Repeat [Step 3](#) through [Step 5](#) for the other power supply. When both power cords installed correctly, proceed to [Step 7](#).
7. Connect the dual power supplies to a facility AC power source. The Fabric Interconnect F1-4's power supplies do not have a power switch, so the Fabric Interconnect F1-4 will power up when the power cord is connected to facility power.

8. **When the Oracle Fabric Interconnect F1-4 has I/O modules and is cabled to facility power, network, storage, and server resources, you can power it on and perform initial configuration through the Oracle Configuration Wizard. See [“Performing Initial Configuration” on page 95.](#)**



# Performing Initial Configuration

---

This chapter guides you through the initial setup and configuration of Oracle Fabric Interconnect. The setup procedure is offered as an example of a typical, basic configuration and is not intended to be a comprehensive reference.

This chapter documents the following topics:

- Log in to the Oracle Fabric Interconnect through the serial port and perform the initial system configuration using the Oracle Configuration Wizard. See [“Run the Oracle Configuration Wizard” on page 96](#).
- Change the Oracle Fabric Interconnect's root password. See [“Change the Root Password” on page 98](#).

You will also need to install host drivers on the host server(s) in your network. For more information, refer to the following guides:

- *Oracle Virtual Networking for ESX Hosts Installation and Boot Guide*
- *Oracle Virtual Networking for Oracle Solaris Hosts Installation and Boot Guide*
- *Oracle Virtual Networking for Windows Hosts Installation and Boot Guide*

## Initial Configuration

This section documents how to initially configure the Fabric Interconnect. The first time the Fabric Interconnect is started, a configuration tool called the Oracle Configuration Wizard runs to help you configure enough of the system for basic network connectivity. After you complete the Oracle Configuration Wizard, the Fabric Interconnect should be reachable through your network so that you can continue with more detailed configuration remotely.

Before beginning this procedure, collect the following information:

- Host name of the Fabric Interconnect
- Name of the domain in which the Fabric Interconnect will be operating
- IP address and netmask for the Fabric Interconnect (required only if assigning a static address)
- Default Gateway address(es)

- DNS server names or IP addresses (required only if assigning a static address)
- NTP server names or IP address(es)

You will also find it helpful to determine:

- whether you want the Fabric Interconnect or a third-party subnet manager to manage the InfiniBand subnet. By default, the wizard sets this to “true” so that the Fabric Interconnect assumes the role of IB subnet manager. The following prompt in the Oracle Configuration Wizard controls whether the Fabric Interconnect is the InfiniBand Subnet Manager:

Is this Interconnect to be designated as the IB subnet manager? [Y/n]

- whether you want the Fabric Interconnect to periodically transmit encrypted diagnostic information to Oracle Technical Assistance for proactive system monitoring. By default, the wizard sets this to “true” so that diagnostic information is sent to Oracle Technical Assistance. In the Oracle First Boot script, the diagnostic information is controlled through a software feature called Oracle Phone Home. The following prompt in the Oracle First Boot script controls the Oracle Phone Home diagnostic information:

Do you want this Interconnect to send diagnostic data to Oracle periodically? [Y/n]

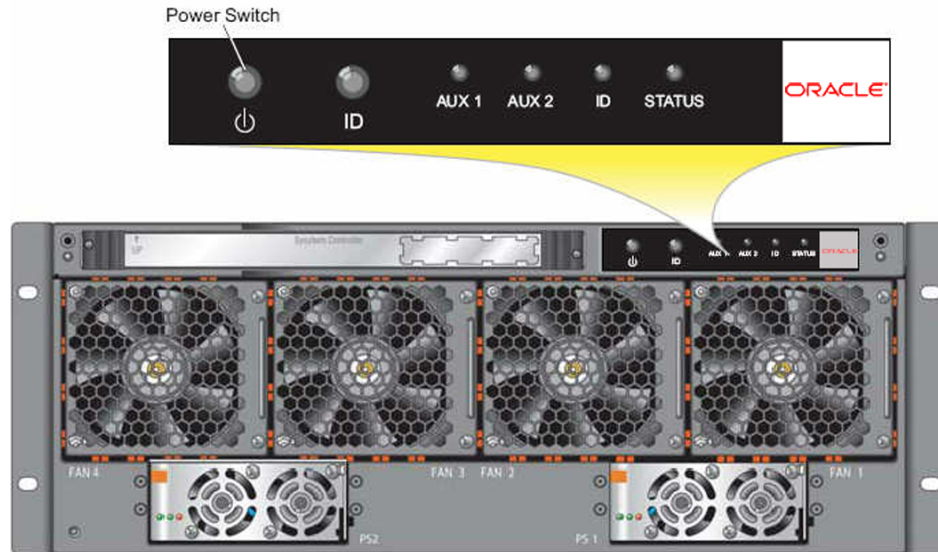
If enabled (Y), the following phone home defaults are used for transmission of diagnostic data:

- periodic transmission
- weekly transmission at midnight every Sunday
- port 3128
- IP address and private information is stripped.

## ▼ Run the Oracle Configuration Wizard

1. **If the Fabric Interconnect is not currently running, press and hold the Power switch for 5 seconds. See [Figure 59, “Fabric Interconnect Power Switch,” on page 97.](#)**



**FIGURE 59** Fabric Interconnect Power Switch

When the Fabric Interconnect completes the boot process, a prompt is displayed on the serial console.

2. **Using the system that you connected to the Management module's Serial 1 port, log in to the Fabric Interconnect by entering:**

```
XsigoLinux 120 (2006/09/07 11:43:18) local ttyS0
local login: admin
Password: admin
```

Once you have successfully logged in, the Configuration Wizard will automatically launch.

3. **Enter the values (indicated by the bold text) that are appropriate for your system environment.**

```
Would you like to use the Oracle Configuration Wizard? [Y/n] y
Hostname: ovn123
Domain: oracle.com (or blank)Is this Interconnect to be designated as the IB subnet manager? [Y/n] y
Do you want this Interconnect to send diagnostic data to Oracle periodically? [Y/n] y
Please input the 'admin' password: **** (unlimited length)
Please confirm the 'admin' password: ****
```

```
Please input the 'recovery-password': **** (unlimited length)
Please confirm the 'recovery-password': ****
IP Address [static/DHCP]: DHCP
Management IP Address [X.X.X.X]: (appears only if static    addressing is selected)
Subnet Mask [X.X.X.X]: (appears only if static    IP addressing is selected)
Default Gateway [X.X.X.X]: (appears only if static IP    addressing is selected)
Enter DNS Server 1: (appears only if static IP    addressing is selected)
Enter DNS Server 2: (appears only if static IP    addressing is selected)
Enter DNS Server 3:
Enter NTP Server 1: hostname, IP address, or blank
Enter NTP Server 2: hostname, IP address, or blank
Enter NTP Server 3:
Supply the SNMP Read Community Name (leave blank if you want to keep the default of 'public')
```

When you have completed the configuration, the Oracle Configuration Wizard closes and returns you to the `admin@<system_name>` prompt.

## ▼ Change the Root Password

When you have completed the Oracle Configuration Wizard, log in to the Fabric Interconnect, and change the root password:

### 1. Log in to the Fabric Interconnect as root by entering:

```
login as: root
Password: root
```

### 2. Change the root password:

```
# passwd
Enter new UNIX password:
Retype new UNIX password:
passwd: password updated successfully
#
```

### 3. Log out of the Oracle Fabric Interconnect.

```
# logout
```

There is no further need for the direct serial port connection. You can continue with the system configuration using the direct connection if you wish. Or, you can close the connection and complete the system configuration remotely, over a network using SSH.

## Performing Service Tasks

---

This chapter describes the basic service tasks including installation and removal of field-replaceable components. These instructions are provided for informational purposes only, and should not be followed by anyone who has not received training from Oracle.

The field-replaceable components are:

- Fans. See [“Removing Fan Modules” on page 103](#)
- Power supplies. See [“Removing Power Supplies” on page 106](#)
- Fabric board, which can be a field replacement of the same type of Fabric Board, or a field upgrade to a different type of Fabric Board:
  - See [“Replacing a Fabric Board” on page 112](#) (field replacement)
  - See [“Upgrading a DDR Fabric Board to a QDR Fabric Board” on page 128](#) (field upgrade)
- I/O modules (Ethernet, Gigabit Ethernet, and Fibre Channel). See [“Removing and Installing I/O Modules” on page 139](#). If you are upgrading an existing 10:
  - If you are upgrading from an existing 10 GE module or 10-Port GE module to the 4-Port 10 GE module, follow the procedure documented in [“Upgrade to a 4-Port 10 GE Module” on page 142](#).
- Management module. See [“Removing and Installing the Management Module” on page 147](#).

---

**Note** - The Management module for Oracle Fabric Interconnect F1-15 is a field replaceable part, but the Management module for Oracle Fabric Interconnect F1-4 is not. Also, with Oracle XgOS version 3.6.0 and later, the USB drive on the Management Module is now disabled by default for compliance with security mandates in data centers that require high security. However, some Fabric Interconnects that are already in service might still have the USB device enabled, so a procedure is documented to disable the USB in the field. See [“Disable the USB Drive on the Management Module” on page 149](#).

---

- Front panel assembly (includes SCP board). See [“Removing and Installing the Front Panel Assembly” on page 151](#)
- Replacing an FP-1 (previous generation Front Panel) with an FP-2 (current generation). See [“Replacing an FP-1 Front Panel with an FP-2 Front Panel” on page 156](#)

The Fabric Interconnect also supports a locator LED to indicate a Fabric Interconnect. See [“The ID LED” on page 101](#)



---

**Caution** - All of the Fabric Interconnect chassis components must be installed or removed by a qualified service technician. For customer training and service information, contact Oracle Customer Support.

---



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**Caution** - To prevent electric shock, do not remove the cover. No user-serviceable parts inside. This equipment contains hazardous voltages and should only be opened by a trained and qualified technician.

---

## Compatibility of Fabric Interconnect F1 - 15 and F1-4 Hardware

Oracle has designed the Fabric Interconnect F1-4 with forward compatibility in mind. As a result, the I/O Modules have been designed for interchangeability between the Fabric Interconnect F1-15 and the Fabric Interconnect F1-4:

- 10 GE modules
- 10-Port GE modules
- 4-Port 10 GE modules
- Fibre Channel modules

The Front Panel is also interchangeable, but the behavior of the Fabric Interconnect F1-4 is different than the Fabric Interconnect F1-15 when the SCP reconnects to the Fabric Interconnect's midplane:

- When removing the Front Panel from a Fabric Interconnect F1-15, the Fabric Interconnect remains online but tasks affecting the configuration (which resides on the SCP) do not complete. For example, traffic on vNICs and vHBAs will remain intact, but config exports, imports, system upgrades, and such will not complete.
- When the Front Panel is inserted into a Fabric Interconnect F1-15, the Fabric Interconnect will shutdown. This will cause a service interruption, and powering the Fabric Interconnect F1-15 back on again requires physically pressing the Power button on the Front Panel. (For information about powering on the Fabric Interconnect F1-15, see [“Remove and Install a Fabric Interconnect F1-15 Front Panel Assembly” on page 151.](#))
- When the Front Panel is removed from a Fabric Interconnect F1-4, the Fabric Interconnect gracefully powers down when the SCP disconnects from the midplane. Because the power down causes a service interruption, if you will be removing a Front Panel from the Fabric Interconnect F1-4, Oracle strongly recommends that you perform this action in a service window or some other time when service interruptions are tolerable.

- When the Front Panel is inserted into a Fabric Interconnect F1-4, the Fabric Interconnect remains powered down until you physically press the Power button on the Front Panel. (For information about powering on the Fabric Interconnect F1-15, see [“Remove a Fabric Interconnect F1-4 Front Panel Assembly” on page 153](#)). Software command that restart the Fabric Interconnect do not take affect. Instead, you must press the Power button.

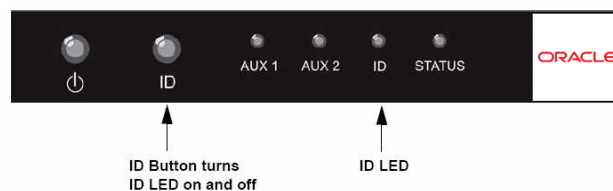
Due to the different form factor between the Fabric Interconnect F1-15 and Fabric Interconnect F1-4, some hardware elements are not interchangeable between the Fabric Interconnect F1-15 and Fabric Interconnect F1-4:

- Front Panel
- PSUs
- Fans
- Management Module

## The ID LED

The ID indicator LED (ID LED) on the Fabric Interconnect front panel provides a visual indicator of the Fabric Interconnect if it needs service. You can turn on the ID LED to allow a Oracle-certified technician to find the Fabric Interconnect that needs service. See [Figure 60, “ID Button and ID LED Location,” on page 101](#).

**FIGURE 60** ID Button and ID LED Location



### ▼ Activate and Deactivate the ID LED

**Note** - For information about the LED codes for the ID LED, see [Figure 42, “LED Codes — Fabric Interconnect Front Panel,” on page 69](#).

The ID LED can be controlled through software or through the ID button. To activate the ID LED, follow this procedure:

1. **Log in to the Oracle Fabric Interconnect that needs service.**
2. **Activate the ID LED by issuing the `set system id-led` command. For example:**

```
set system id-led on
```

When you issue this command, the amber ID LED illuminates. The service technician should be able to locate the Fabric Interconnect by looking for Fabric Interconnect with the glowing amber LED.

3. **When work on the Fabric Interconnect is finished, the technician can press the ID button to deactivate the ID LED.**
4. **Verify that the ID LED has been deactivated by issuing the `show chassis detail` command. For example:**

```
admin@nerf [ovn] show chassis detail
-----
dn                chassis
mod
descr            nerf
id               1
type            chassisIb15Slot
model-num       XC1DH41ZZZ-1
part-num        705-00005-01
part-num-major  01
part-num-minor  05
assembly-id     715-00005-01
assembly-id-major 01
assembly-id-minor 05
serial-num      050610240
manufacture-date 01-03-2006
mac-addr        00:13:97:01:80:00
mac-addr-mask   12
wnn             50:01:39:70:00:00:80:00
wnn-mask        12
locator-led-on  false
num-of-io-slots 15
phone-home      true
phone-home-notification false
strip-private   true
snd-alarms      true
copyurl        barkely.xsigo.com:5000
customer-name   Customer XYZ
contact-email-addr dude1@xsigo.com
contact-phone-nums 800 111 2222, 333 333 3333
httpproxy-host  ubb
httpproxy-user  proxyuser1
httpproxy-password passproxy
```

```
httpproxy-port      3128
phone-home-frequency weekly
-----
```

```
1 record displayed
```

In this example, the bold text highlights the current state of the ID LED. True indicates that the LED is on (illuminated), and false indicates that the LED is off (dark).

5. **If the LED is on (the locator-led-on parameter shows true), deactivate it when the service call is completed. For example:**

```
set system id-led off
```

## Removing Fan Modules

This section documents how to remove and install a fan module. You can do this procedure on one fan module at a time without powering down the Fabric Interconnect. To remove fan modules, you will need a #2 Phillips (cross-head) screwdriver.



**Caution** - When tightening screws, make sure to tighten them to lightly snug. Do not overtighten screws or they can break.



**Caution** - When replacing the Fan Modules: - wear an ESD wrist strap - When the hardware is out of its shipping package or not in the Fabric Interconnect chassis, make sure you place it in an ESD safe bag or on a grounded work surface such as a rubberized work mat.

See the appropriate section:

- [“Remove Fabric Interconnect F1-15 Fan Modules” on page 103](#)
- [“Remove Fabric Interconnect F1-4 Fan Modules” on page 105](#)

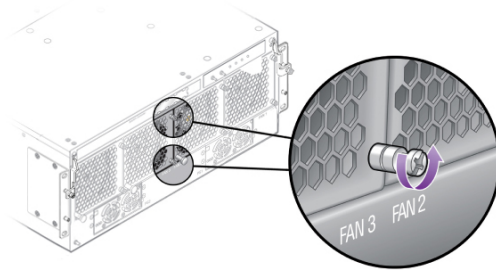
### ▼ Remove Fabric Interconnect F1-15 Fan Modules

Fabric Interconnect F1-15 fan modules are located on the front of the chassis.

To remove and install a Fabric Interconnect F1-15 fan module, follow this procedure:

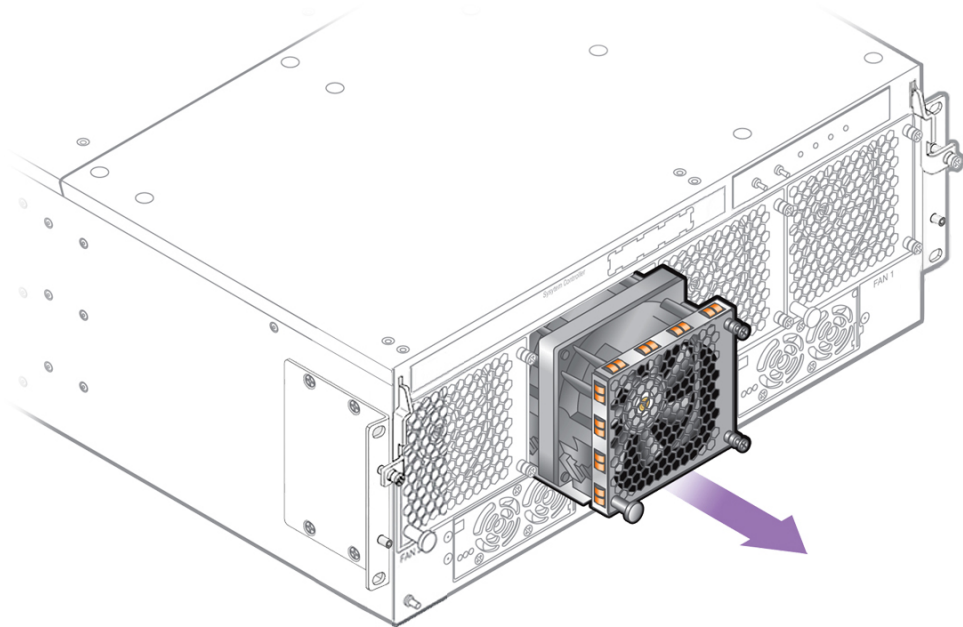
1. **Use a Phillips screwdriver to release the two spring-loaded securing screws located at the right edge of each fan module. See [Figure 61, “Releasing the Fabric Interconnect F1-15 Fan’s Securing Screws,” on page 104.](#)**

**FIGURE 61** Releasing the Fabric Interconnect F1-15 Fan's Securing Screws



2. **Grasp the handle and slide the fan module out of the chassis. See [Figure 62, "Removing a Fabric Interconnect F1-15 Fan Module,"](#) on page 104.**

**FIGURE 62** Removing a Fabric Interconnect F1-15 Fan Module





Installation is the reverse of this procedure.

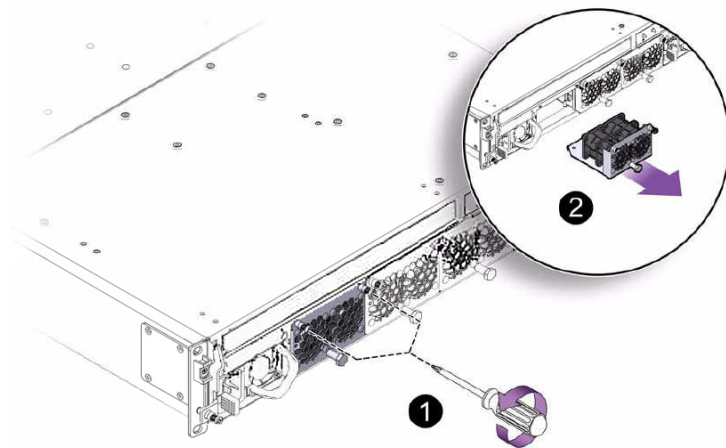
## ▼ Remove Fabric Interconnect F1-4 Fan Modules

Fabric Interconnect F1-4 fan modules are located on the front of the chassis.

To remove a Fabric Interconnect F1-4 fan module, follow this procedure:

1. Use a Phillips screwdriver to release the two spring-loaded securing screws located at the top corners of the each fan module (1). See [Figure 63, “Removing a Fabric Interconnect F1-4 Fan Module,”](#) on page 105.

**FIGURE 63** Removing a Fabric Interconnect F1-4 Fan Module



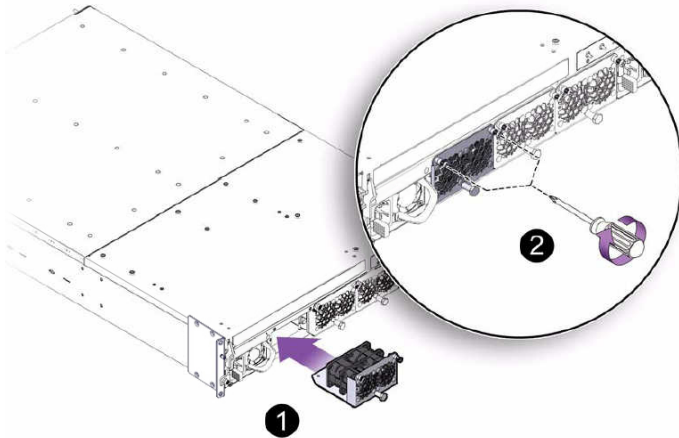
2. Grasp the handle and slide the fan module out of the chassis (2).

## ▼ Insert a Fabric Interconnect F1-4 Fan Module

1. Orient the fan module so that the sheet metal side is facing down and the handle is facing you, and align the fan module with the empty fan module bay in the chassis.

- 
2. **Grasp the fan module by the handle, and gently slide the fan module into the chassis (1).** [Figure 64, “Inserting a Fabric Interconnect F1-4 Fan Module,” on page 106](#) shows inserting the fan module.

**FIGURE 64** Inserting a Fabric Interconnect F1-4 Fan Module



When the fan module is almost all the way inserted, you might feel some resistance, which is caused by the fan module's power socket meeting its mating part. Continue to apply gentle pressure until the fan module is fully seated in the Fabric Interconnect F1-4 chassis. The fan module is correctly seated when the fan module sits flush with the face of the Fabric Interconnect F1-4.

- 
- 
3. **When the fan module is correctly seated, use the screwdriver to tighten the screws on the top corners of the fan module (2).**

## Removing Power Supplies

This section documents how to remove and install a power supply (PSU). You can replace one PSU at a time without powering down the Fabric Interconnect. For this procedure, you will need a #2 Phillips (cross-head) screwdriver.



---

**Caution** - When tightening screws, make sure to tighten them to lightly snug. Do not overtighten screws or they can break.

---



**Caution** - When replacing the Power Supplies: - wear an ESD wrist strap - When the hardware is out of its shipping package or not in the Fabric Interconnect chassis, make sure you place it in an ESD safe bag or on a grounded work surface such as a rubberized work mat.

See the appropriate section:

- [“Remove Fabric Interconnect F1-15 Power Supplies” on page 107](#)
- [“Remove Fabric Interconnect F1-4 Power Supplies” on page 108](#)

## ▼ Remove Fabric Interconnect F1-15 Power Supplies

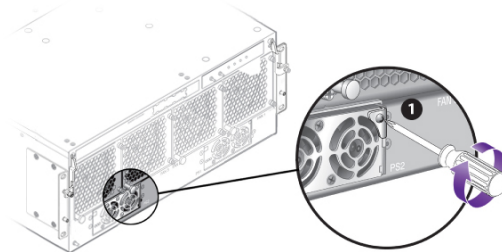
When you hot swap a Fabric Interconnect F1-15 PSU, the Fabric Interconnect polls for hardware status every 30 seconds. Polling starts when the Fabric Interconnect senses a PSU disconnect from the system's power channel.

When a PSU is disconnected, you must wait for at least 30 seconds before re-inserting it. This 30-second wait period is required to properly raise alarms and update the PSU part number, serial number, and other pertinent information for the system's hardware inventory. When hot swapping a PSU for a Fabric Interconnect F1-15, make sure to wait for more than 30 seconds before re-inserting a PSU.

To remove and insert a Fabric Interconnect F1-15 power supply, follow this procedure:

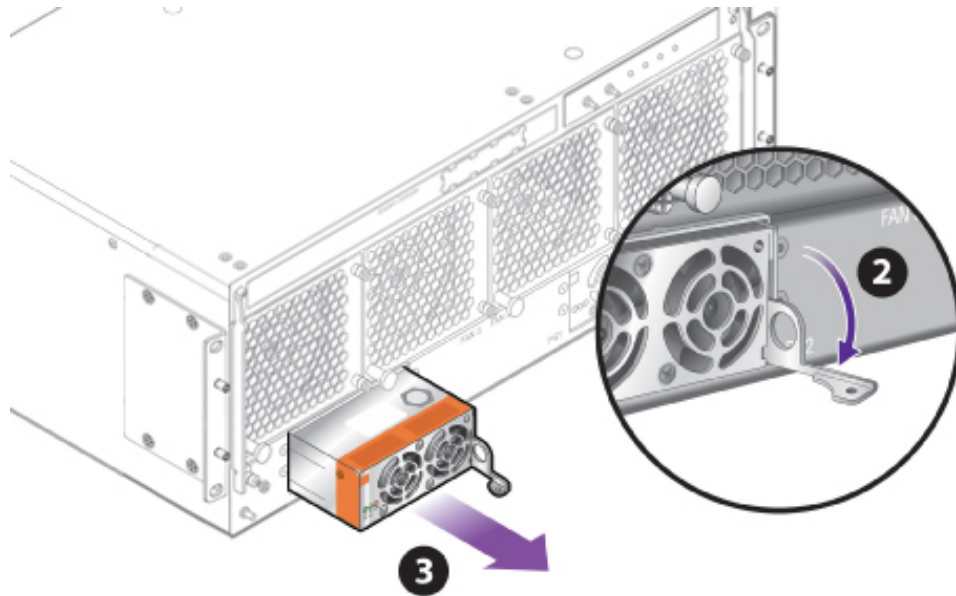
1. **Using the screwdriver, loosen the locking screw in the PSU locking lever. See [Figure 65, “Loosening the Fabric Interconnect F1-15 PSU Lock Screw,” on page 107.](#)**

**FIGURE 65** Loosening the Fabric Interconnect F1-15 PSU Lock Screw



2. **Pull the locking lever out and down until the finger hole in the lever is accessible (2).** See [Figure 66, “Removing the Fabric Interconnect F1-15 PSU from the Chassis,” on page 108.](#)

**FIGURE 66** Removing the Fabric Interconnect F1-15 PSU from the Chassis



3. **Use the finger hole in the locking lever to remove the power supply from the chassis (3).**

Installation is the reverse of this procedure. The supply is fully reinserted in the chassis when the locking lever rotates upward to its original, locked position. Make sure to properly tighten the locking screw.

## ▼ Remove Fabric Interconnect F1-4 Power Supplies

The Fabric Interconnect F1-4 power supply units (PSUs) are on the front of the chassis. The Fabric Interconnect F1-4 power cords have their own cable management system which anchors them to a pre-installed part that sits on the front mounting brackets. The Fabric Interconnect F1-4 power cord management system consists of:

- two (2) plastic anchors, one per side

- the anchor has slots at the bottom and top
- two (2) tie wraps, one for each power cord. Each tie wrap is reusable and has a tab that allows for loosening and tightening the tie wrap.

Removing a Fabric Interconnect F1-4 power supply does not require the system to be powered down. The Fabric Interconnect F1-4 can operate fully on one PSU. However, if both PSUs must be removed at the same time, the system will shut down due to having no power. In cases where both PSUs must be removed, Oracle recommends swapping one power supply at a time (if possible) to avoid service interruptions.

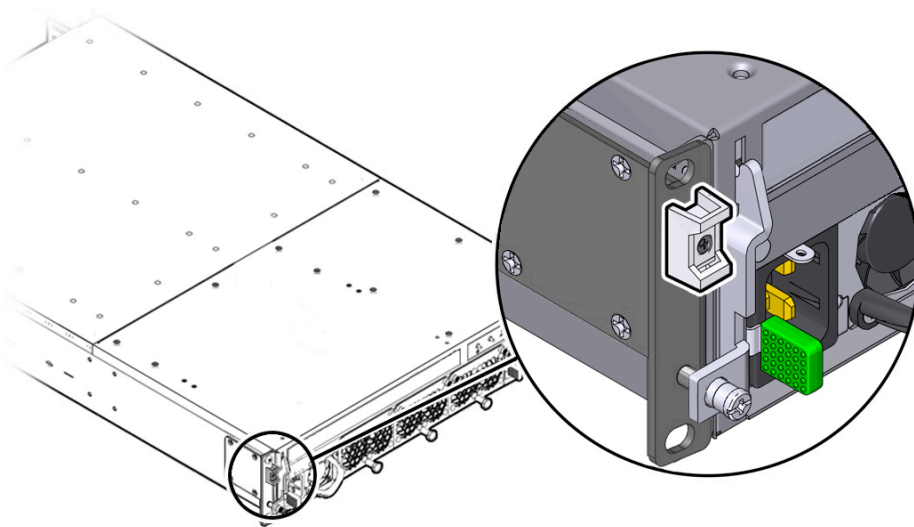
When you hot swap a Fabric Interconnect F1-4 PSU, the Fabric Interconnect polls for hardware status every 30 seconds. Polling starts when the Fabric Interconnect senses a PSU disconnect from the system's power channel.

When a PSU is disconnected, you must wait for at least 30 seconds before re-inserting it. This 30-second wait period is required to properly raise alarms and update the PSU part number, serial number, and other pertinent information for the system's hardware inventory. When hot swapping a PSU for a Fabric Interconnect F1-4, make sure to wait for more than 30 seconds before re-inserting a PSU.



**Caution** - This product may have multiple AC power cords installed. To de-energize this equipment, disconnect all power cords from the device.

This figure shows one of the power cord anchors. One anchor exists on each front mounting bracket.



---

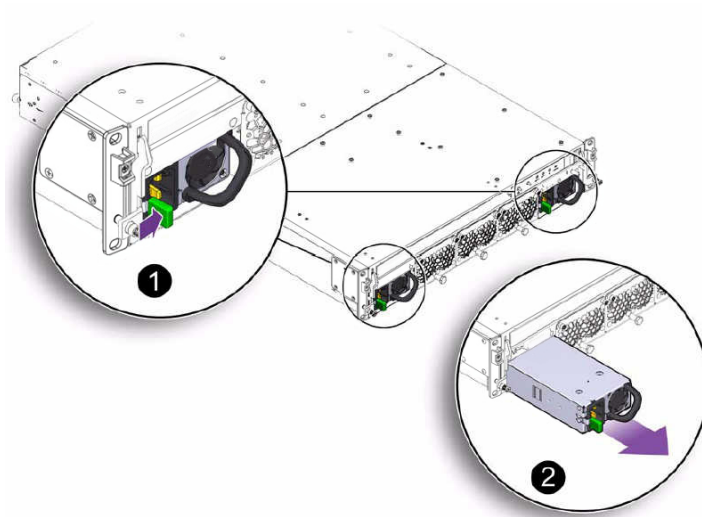
**Note** - When removing Fabric Interconnect F1-4 power supplies, be aware that the power cords might jostle in the cable tie. When reconnecting power cords after servicing the power supplies, make sure read the requirements documented in [“Power Cord Management”](#) on page 46.

---

1. **Unplug the power supply that needs to be removed.**
2. **Grasp the PSU handle with one or more fingers so that your thumb rests on the locking tab, shown in [Figure 67, “Removing a Fabric Interconnect F1-4 PSU,”](#) on page 110.**
3. **Simultaneously, press the locking tab to the right (1) and pull the PSU out of the Fabric Interconnect F1-4 (2) as shown in [Figure 67, “Removing a Fabric Interconnect F1-4 PSU,”](#) on page 110.**

While sliding the power supply out of the chassis, you will need to hold the locking tab in long enough to allow the locking pins on the side of the power supply to clear the chassis' sheet metal.

**FIGURE 67** Removing a Fabric Interconnect F1-4 PSU



---

**Note** - Both PSUs are oriented in the same direction, so both locking tabs pull to the right.

---

## ▼ Install Fabric Interconnect F1-4 Power Supplies

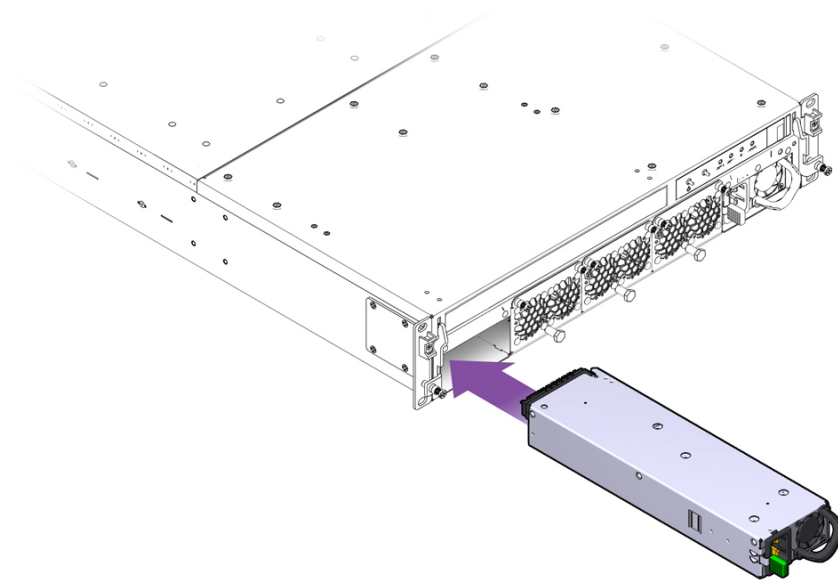
---

**Note** - When a PSU is disconnected, you must wait for at least 30 seconds before re-inserting it. This 30-second wait period is required to properly raise alarms and update the PSU part number, serial number, and other pertinent information for the system's hardware inventory. When hot swapping a PSU for a Fabric Interconnect F1-4, make sure to wait for more than 30 seconds before re-inserting a PSU.

---

1. Orient the new PSU so that the locking tab is at the bottom left corner when the PSU is facing you.
2. Align the PSU with the empty PSU bay, and gently slide the PSU into the chassis by pressing on the handle until the locking tab clicks back into place. See [Figure 68, "Inserting a Fabric Interconnect F1-4 PSU,"](#) on page 111.

**FIGURE 68** Inserting a Fabric Interconnect F1-4 PSU



When the PSU is almost all the way inserted, you might feel some resistance, which is caused by the PSU's power socket meeting its mating part on the Fabric Interconnect F1-4 midplane. Continue to apply gentle pressure until the PSU is fully seated in the Fabric Interconnect F1-4 chassis.

The PSU is correctly seated when the locking tab clicks into place.

3. **Reconnect the power cord. Be aware that the power cord might have jostled in the tie wrap.**

---

**Note** - When reconnecting power cords after servicing the power supplies, make sure read the requirements documented in [“Power Cord Management” on page 46.](#)

---

## Replacing a Fabric Board

The Fabric Interconnect contains 24 InfiniBand ports that connect to client servers. Each port is a double data rate (DDR) link to the server and operates at 20 Gbps, but will auto negotiate down to Single Data Rate (SDR) based on the devices that the Fabric Interconnect is connected to. Ports are numbered left to right starting at the bottom left-hand corner.

This section documents how to replace the InfiniBand Fabric Board. For this procedure, you will need to power off the Fabric Interconnect.

To perform this procedure, you will need the following tools:

- #2 Phillips (cross-head) screwdriver
- an ESD wrist strap



---

**Caution** - When tightening screws, make sure to tighten them to lightly snug. Do not overtighten screws or they can break.

---



---

**Caution** - When replacing the Fabric Board: - wear an ESD wrist strap - When the hardware is out of its shipping package or not in the Fabric Interconnect chassis, make sure you place it in an ESD safe bag or on a grounded work surface such as a rubberized work mat.

---

See the appropriate section:

- [“Replace the Fabric Interconnect F1-15 DDR Fabric Board” on page 113](#)
- [“Replace the Fabric Interconnect F1-4 DDR Fabric Board” on page 114](#)
- [“Replace the Fabric Interconnect F1-15 QDR Fabric Board” on page 118](#)
- [“Replace the Fabric Interconnect F1-4 QDR Fabric Board” on page 123](#)
- [“Upgrading a DDR Fabric Board to a QDR Fabric Board” on page 128](#)
- [“Upgrade a Fabric Interconnect F1-15 to a QDR Fabric Board” on page 129](#)
- [“Upgrade a Fabric Interconnect F1-4 to a QDR Fabric Board” on page 134](#)

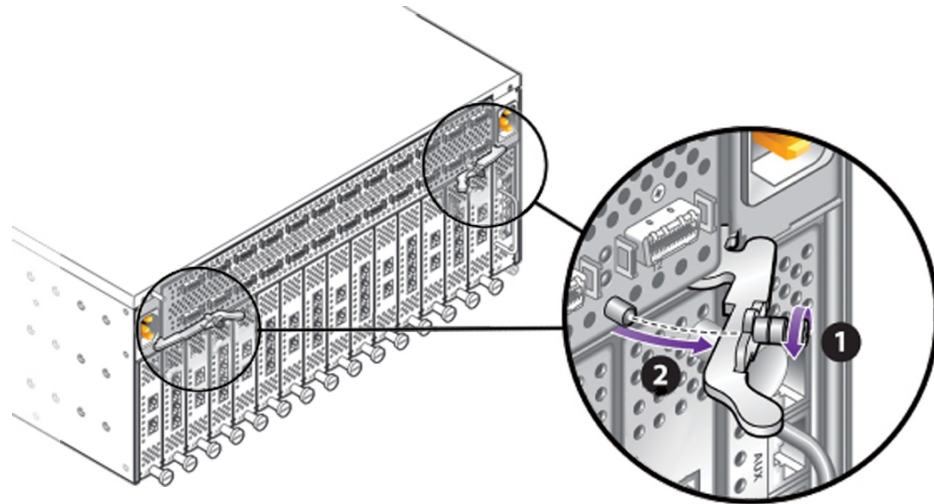


## ▼ Replace the Fabric Interconnect F1-15 DDR Fabric Board

To replace the Fabric Interconnect F1-15 fabric board, follow this procedure:

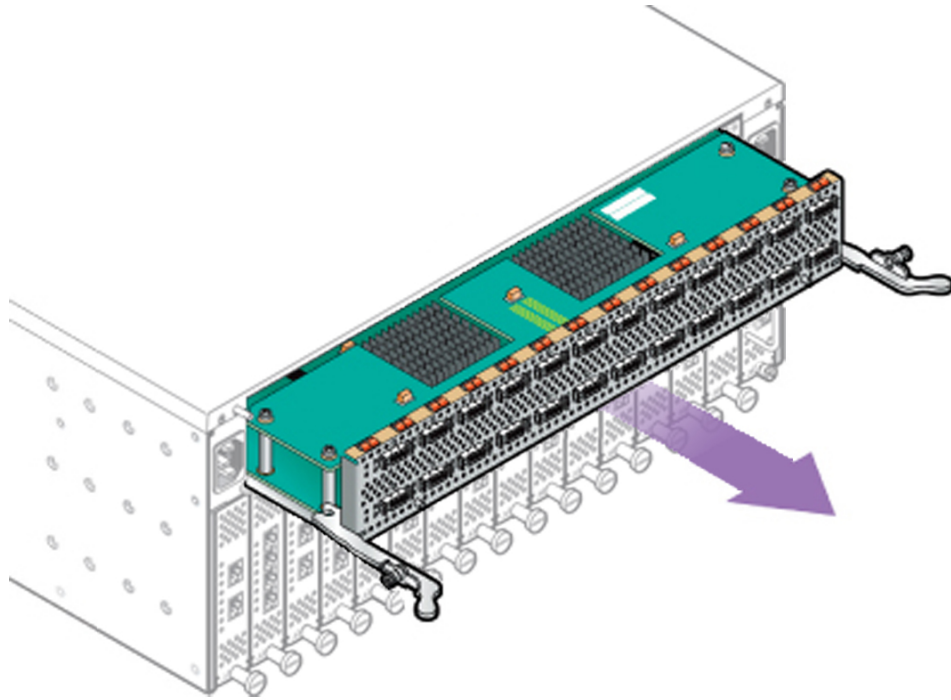
1. **Power down the Fabric Interconnect.**
2. **Disconnect all cables attached to the server ports, as well as any other cables that could interfere with the Fabric Board's removal.**
3. **Using a screwdriver, loosen the captive screws in the release levers by turning them counterclockwise (1). See [Figure 69, "Unlocking the Fabric Interconnect F1-15 Fabric Board,"](#) on page 113.**

**FIGURE 69** Unlocking the Fabric Interconnect F1-15 Fabric Board



4. **Grasp both of the Fabric Board's release levers, and simultaneously swing them outward (2).**
5. **Grasping both of the release levers, slide the Fabric Board out of the chassis. See [Figure 70, "Removing the Fabric Interconnect F1-15 Fabric Board,"](#) on page 114.**

**FIGURE 70** Removing the Fabric Interconnect F1-15 Fabric Board



Installation is the reverse of this procedure.

## ▼ Replace the Fabric Interconnect F1-4 DDR Fabric Board

The Fabric Interconnect F1-4 Fabric Board is on the rear of the chassis, and connects to a threaded standoff on the mounting bracket.

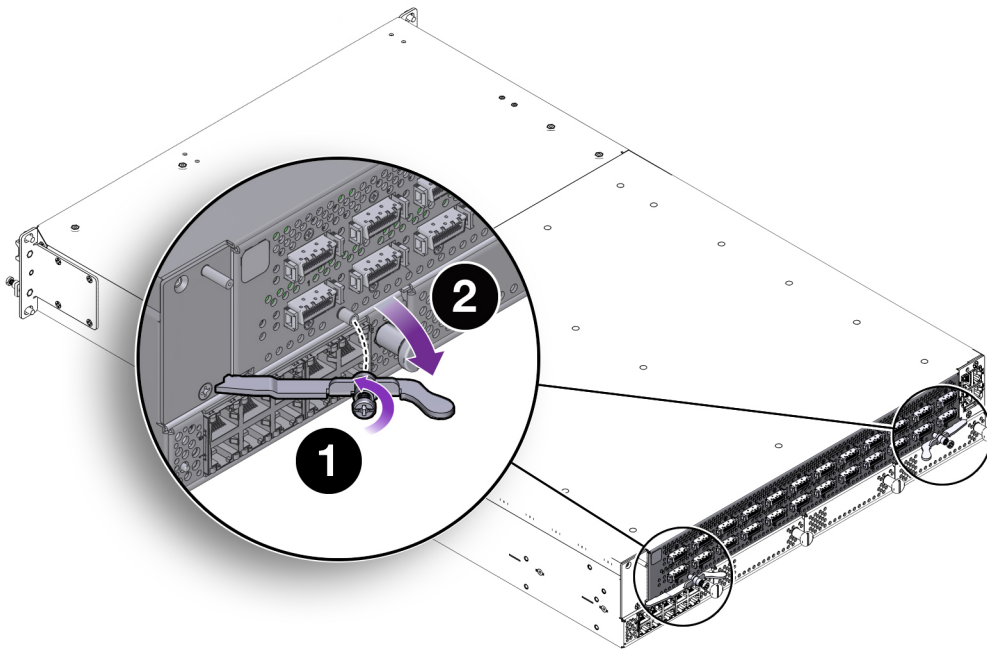
To replace the Fabric Interconnect F1-4 Fabric Board, you will need a #2 Phillips-head screwdriver.

To remove the Fabric Interconnect F1-4 Fabric Board, follow this procedure:

- 1. Power down the Fabric Interconnect.**

2. Disconnect all cables attached to the server ports, as well as any other cables that could interfere with the Fabric Board's removal.
3. Using a screwdriver, loosen the captive screws in the release levers by turning them counterclockwise (1). [Figure 71, "Unlocking the Fabric Interconnect F1-4's Fabric Board," on page 115.](#)

**FIGURE 71** Unlocking the Fabric Interconnect F1-4's Fabric Board



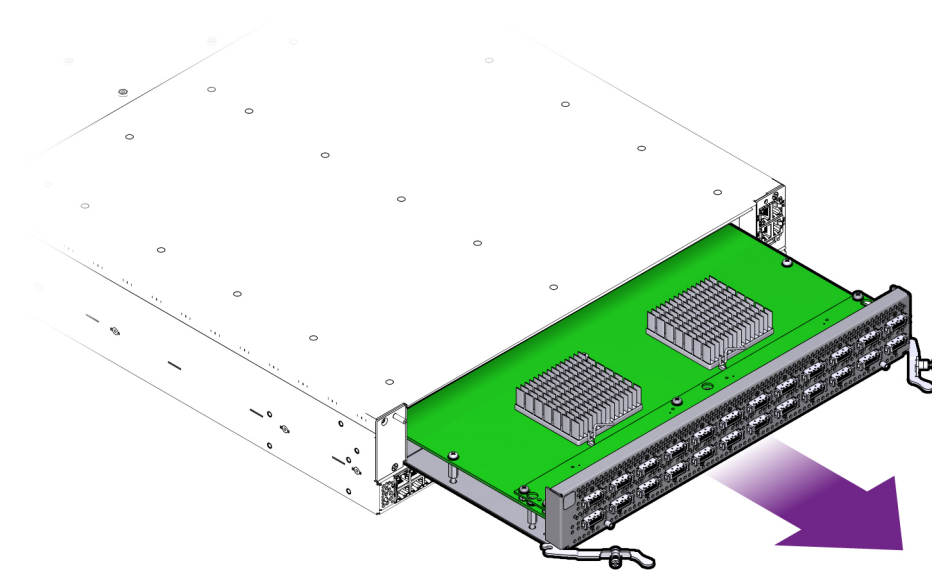
4. When the screws are loose, grasp the Fabric Board's handles and simultaneously pivot them outward (2) as shown in [Figure 71, "Unlocking the Fabric Interconnect F1-4's Fabric Board," on page 115.](#) The handles act as levers that disconnect the Fabric Board from the Fabric Interconnect F1-4 midplane. As a result, you might encounter some resistance when you first apply pressure to pivot the handles outward.



**Caution** - Make sure to pivot the Fabric Board handles in a horizontal plane. Do not apply upward or downward pressure on the Fabric Board's handles when you are removing the Fabric Board. You need to pivot the Fabric Board handles outward just until you feel the Fabric Board disconnect from the midplane. Do not force the Fabric Board handles wider than is required to disconnect the Fabric Board.

5. **After the Fabric Board has disconnected from the Fabric Interconnect F1-4 midplane, gently slide the Fabric Board out of the chassis, making sure to support the Fabric Board from underneath (the sheet metal side). See [Figure 72, "Removing the Fabric Interconnect F1-4 Fabric Board,"](#) on page 116.**

**FIGURE 72** Removing the Fabric Interconnect F1-4 Fabric Board



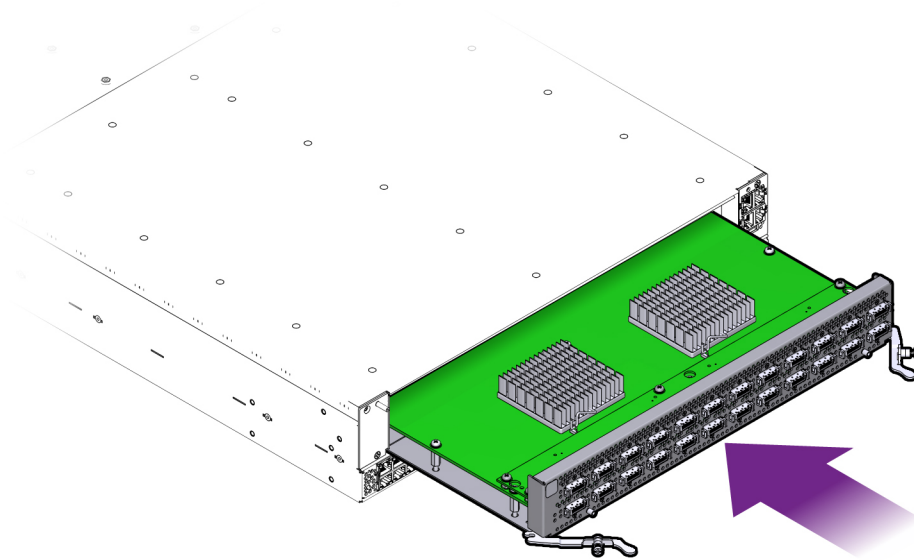
## ▼ Insert a Fabric Interconnect F1-4 DDR Fabric Board

1. **Orient the Fabric Board so that the InfiniBand server ports are facing you and the sheet metal side is facing down.**

Make sure that the Fabric Board handles are in the open position, not flat against the faceplate.

2. **Align the Fabric Board with the empty slot, and gently slide it into the chassis, making sure to support the Fabric Board from underneath (the sheet metal side). See [Figure 73, "Inserting the Fabric Interconnect F1-4 Fabric Board,"](#) on page 117.**

**FIGURE 73** Inserting the Fabric Interconnect F1-4 Fabric Board



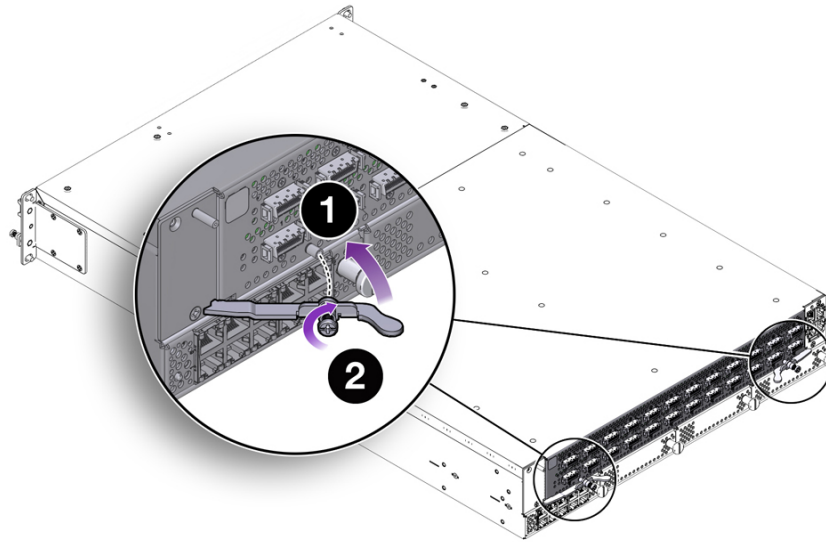
When the Fabric Board is almost completely inserted, you will feel some resistance when the connector at the rear of the Fabric Board contacts its socket on the inside of the chassis.

3. **When you feel the Fabric Board connector and socket meet, grasp the Fabric Board handles and simultaneously press them inward (1). See [Figure 74, "Securing the Fabric Interconnect F1-4's Fabric Board,"](#) on page 118.**



**Caution** - Make sure to pivot the Fabric Board handles in a horizontal plane. Do not apply upward or downward pressure on the Fabric Board's handles when you are installing the Fabric Board. You need to pivot the Fabric Board handles inward until they make contact with the threaded standoff on the Fabric Board's faceplate.

**FIGURE 74** Securing the Fabric Interconnect F1-4's Fabric Board



4. When both Fabric Board handles are in contact with the threaded standoff on the faceplate, use the screwdriver to sink the captive screws (2), which tighten into the threaded standoffs.

## ▼ Replace the Fabric Interconnect F1-15 QDR Fabric Board

The Fabric Interconnect F1-15 Fabric Board is on the rear of the chassis. To replace the Fabric Interconnect F1-4 Fabric Board, you will need a #2 Phillips-head screwdriver.

---

**Note** - This procedure is applicable to replacing a QDR Fabric Board with another QDR Fabric Board. If you are upgrading from a non-QDR Fabric Board to a QDR Fabric Board, use the procedure documented in [“Upgrading a DDR Fabric Board to a QDR Fabric Board” on page 128.](#)

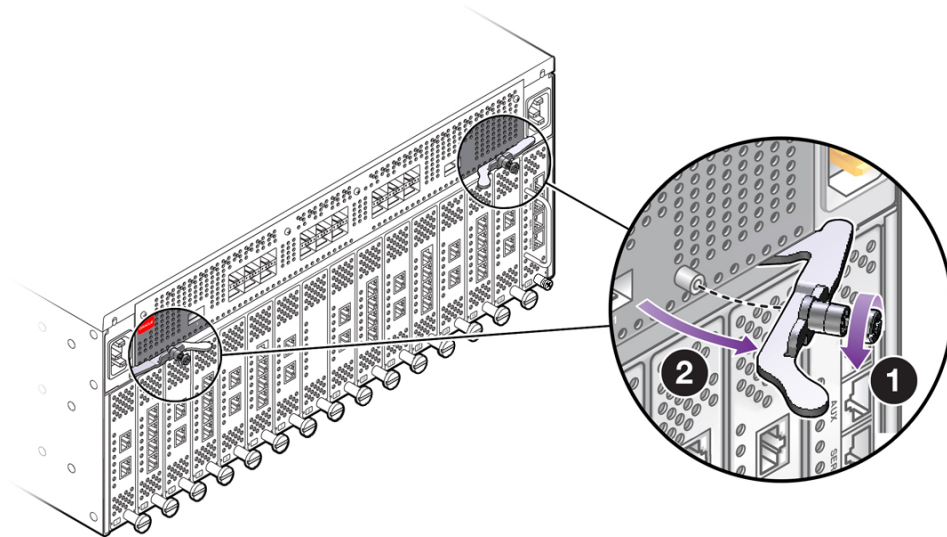
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To replace the Fabric Interconnect F1-15 QDR Fabric Board, follow this procedure:

1. **Power down the Fabric Interconnect.**

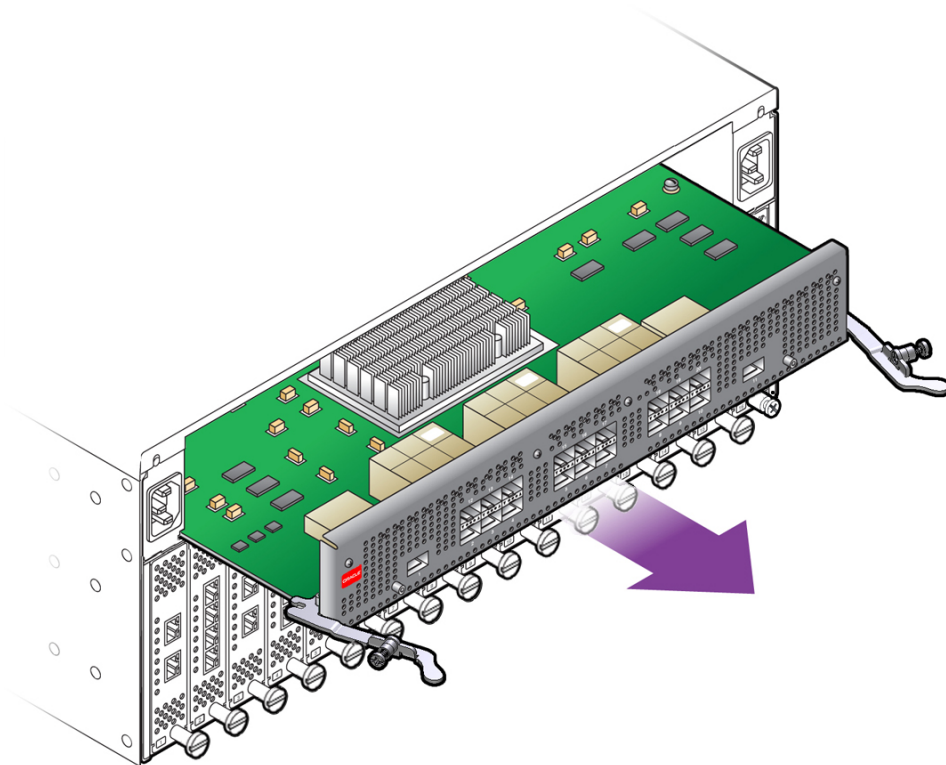
2. Disconnect all cables attached to the server ports, as well as any other cables that could interfere with the Fabric Board's removal.
3. Using a screwdriver, loosen the captive screws in the release levers by turning them counterclockwise (1). See [Figure 75, "Unlocking the Fabric Interconnect F1-15 QDR Fabric Board,"](#) on page 119.

FIGURE 75 Unlocking the Fabric Interconnect F1-15 QDR Fabric Board



4. Grasp both of the Fabric Board's release levers, and simultaneously swing them outward (2).
5. Grasping both of the release levers, slide the Fabric Board out of the chassis. See [Figure 76, "Removing the Fabric Interconnect F1-15 QDR Fabric Board,"](#) on page 120.

**FIGURE 76** Removing the Fabric Interconnect F1-15 QDR Fabric Board



6. **Remove the QDR Fabric Board from the packaging, and orient the module so that it is right side up.**
7. **Orient the QDR Fabric Board so that the sheet metal surface is on the bottom, and pivot the QDR Fabric Board's handles so that they are pointing directly towards you—not flush with the module.**

At the far end of each of the Fabric Board's handles, notice there is a notch. This notch will meet a part in the chassis, and allow you to lock the Fabric Board into the system midplane and power channel.

8. **Supporting the QDR Fabric Board under the sheet metal bottom, hold the Fabric Board level and align it with the empty Fabric Board bay in the Fabric Interconnect. [Figure 77, "Inserting the QDR Fabric Board into a Fabric](#)**

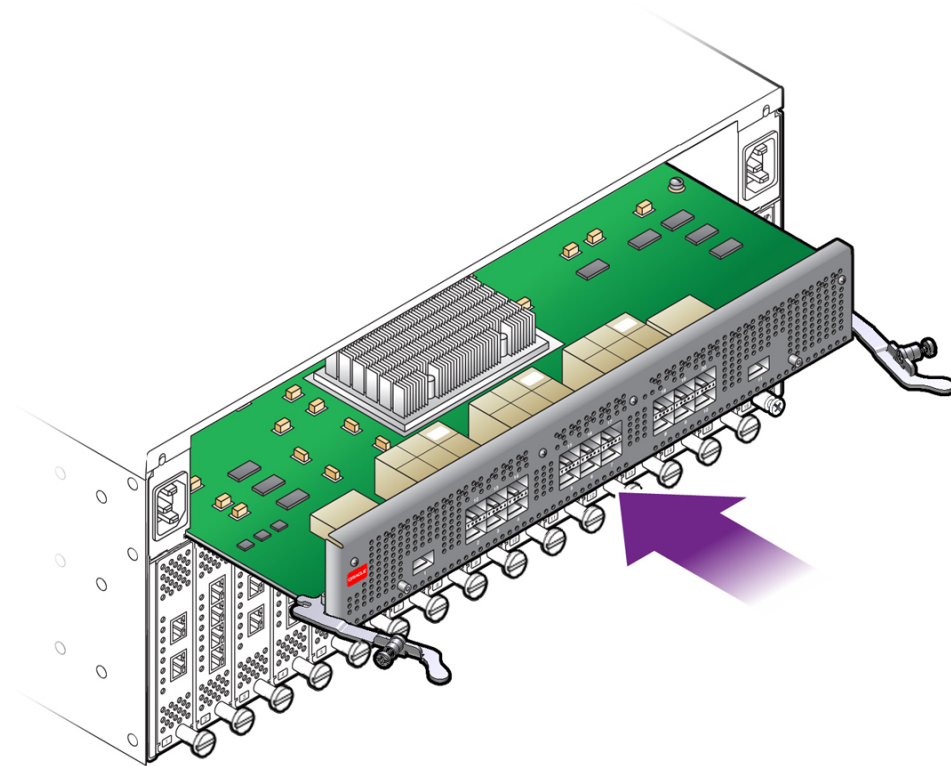


**Interconnect F1-15,” on page 121 shows aligning and inserting the QDR Fabric Board.**



**Caution** - Pay attention to the leading edges of the Fabric Board—the edges that will contact and insert into the chassis first. These edges must be kept horizontal. If you tip one side of the Fabric Board, it is possible to insert the Fabric Board incorrectly. Make sure you hold the Fabric Board level while you insert it.

**FIGURE 77** Inserting the QDR Fabric Board into a Fabric Interconnect F1-15



9. When the Fabric Board is properly aligned, gently slide it in until you feel some resistance, then check the notches at the end of the Fabric Board's handles to make sure they are contacting the guides on the inside of the chassis.



**Caution** - Do not force the Fabric Board into place. If it does not slide in easily, remove it and attempt to insert it again. Make sure that the leading edges are level, and you are keeping the Fabric Board level while you slide it in.

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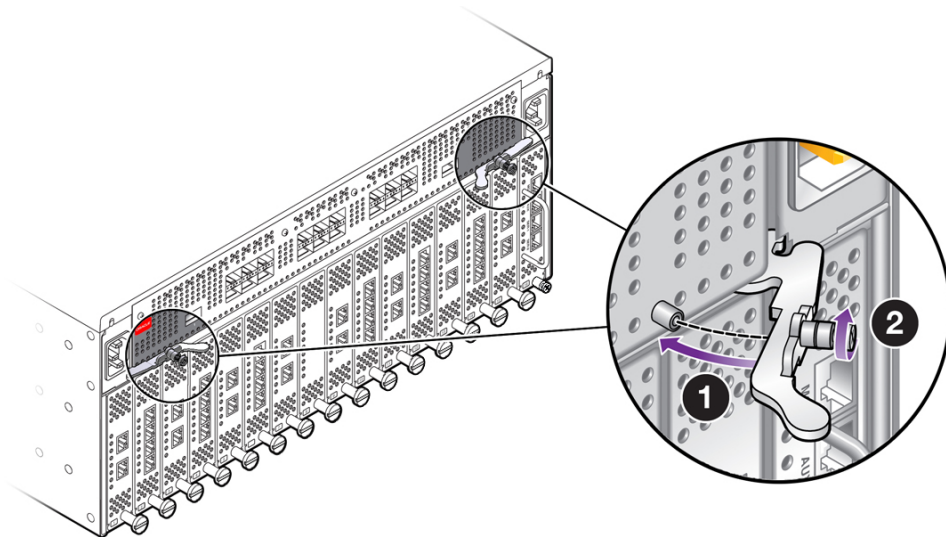
10. **When the notches and guides are properly positioned, press the Fabric Board's handles inward to seat the Fabric Board (1) as shown in Figure 78, "Seating the QDR Fabric Board into a Fabric Interconnect F1-15," on page 122. The Fabric Board is properly seated when it and its handles lie flush against the chassis.**



**Caution** - Do not force the levers. They should glide easily when properly aligned. If you feel uneven resistance or the release levers do not move easily, gently swing the levers away from each other, partially remove the Fabric Board, and attempt [Step 8](#) through [Step 10](#) while paying attention to how the release levers contact the edge of the chassis.

---

**FIGURE 78** Seating the QDR Fabric Board into a Fabric Interconnect F1-15



11. **When the release levers have correctly locked the QDR Fabric Board into the chassis, use the screwdriver to secure the captive screws in the release levers (2).**



**Caution** - When tightening screws, make sure to tighten them to lightly snug. Do not overtighten screws or they can break.

---

- 12. Reconnect the Fabric Interconnect to facility power, then power on the Fabric Interconnect, and allow it to completely boot up.**

The Fabric Board will boot, and when the board completes is bootup and passes to runtime, the Power LED will glow. The Power LED does not glow until the Fabric Board is in runtime.

## ▼ **Replace the Fabric Interconnect F1-4 QDR Fabric Board**

The Fabric Interconnect F1-4 Fabric Board is on the rear of the chassis. To replace the Fabric Interconnect F1-4 QDR Fabric Board, you will need a #2 Phillips-head screwdriver.

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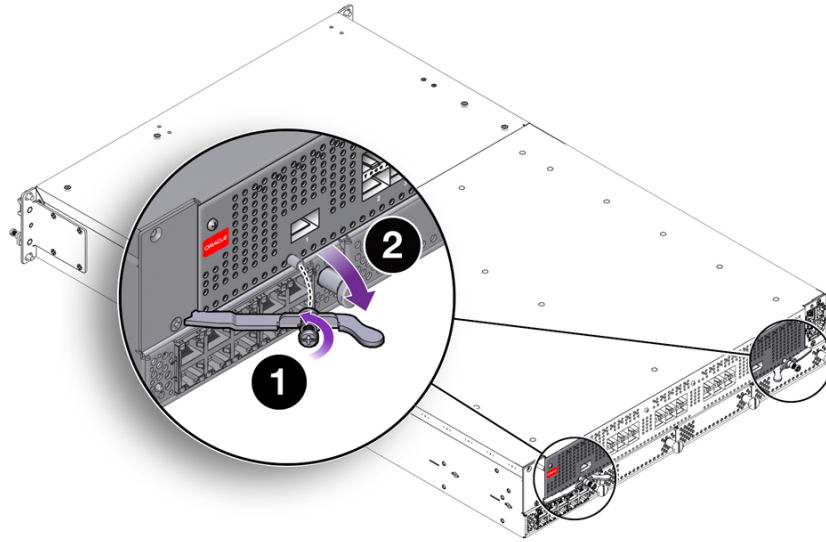
**Note** - This procedure is applicable to replacing a QDR Fabric Board with another QDR Fabric Board. If you are upgrading from a non-QDR Fabric Board to a QDR Fabric Board, use the procedure documented in [“Upgrading a DDR Fabric Board to a QDR Fabric Board” on page 128](#).

---

To replace the Fabric Interconnect F1-4 QDR Fabric Board, follow this procedure:

- 1. Power down the Fabric Interconnect.**
- 2. Disconnect all cables attached to the server ports, as well as any other cables that could interfere with the Fabric Board's removal.**
- 3. Using a screwdriver, loosen the captive screws in the release levers by turning them counterclockwise (1). [Figure 79, “Unlocking the Fabric Interconnect F1-4's Fabric Board,” on page 124](#).**

**FIGURE 79** Unlocking the Fabric Interconnect F1-4's Fabric Board



4. When the screws are loose, grasp the Fabric Board's handles and simultaneously pivot them outward (2) as shown in [Figure 79, "Unlocking the Fabric Interconnect F1-4's Fabric Board," on page 124](#). The handles act as levers that disconnect the Fabric Board from the Fabric Interconnect F1-4 midplane. As a result, you might encounter some resistance when you first apply pressure to pivot the handles outward.



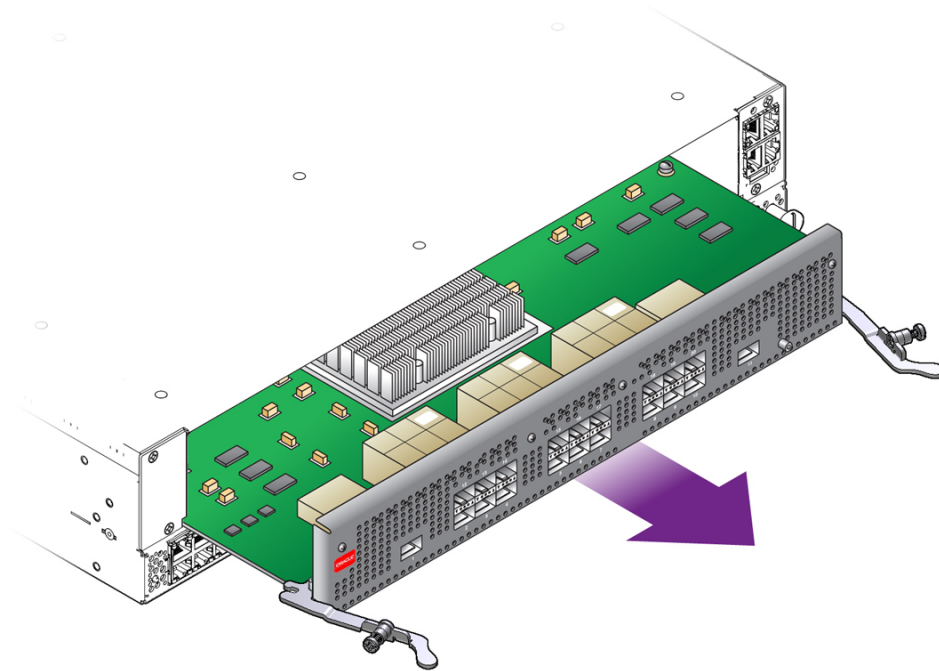
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**Caution** - Make sure to pivot the Fabric Board handles in a horizontal plane. Do not apply upward or downward pressure on the Fabric Board's handles when you are removing the Fabric Board. You need to pivot the Fabric Board handles outward just until you feel the Fabric Board disconnect from the midplane. Do not force the Fabric Board handles wider than is required to disconnect the Fabric Board.

---

5. After the Fabric Board has disconnected from the Fabric Interconnect F1-4 midplane, gently slide the Fabric Board out of the chassis, making sure to support the Fabric Board from underneath (the sheet metal side). See [Figure 80, "Removing the Fabric Interconnect F1-4 Fabric Board," on page 125](#).

**FIGURE 80** Removing the Fabric Interconnect F1-4 Fabric Board



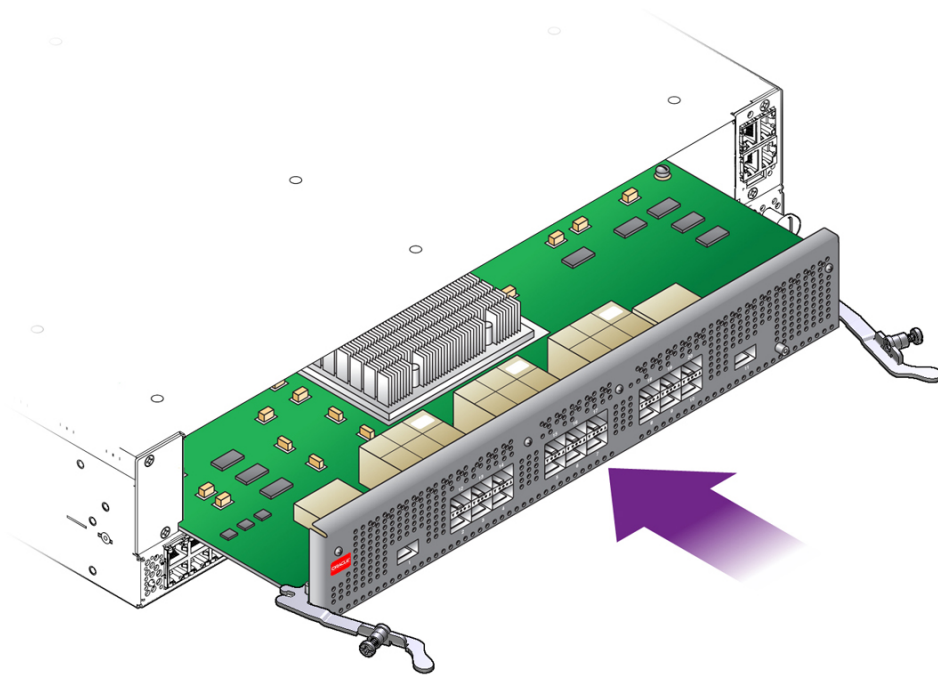
6. **Remove the QDR Fabric Board from the packaging, and orient the module so that it is right side up.**
7. **Orient the QDR Fabric Board so that the sheet metal surface is on the bottom, and pivot the QDR Fabric Board's handles so that they are pointing directly towards you—not flush with the module.**  
 At the far end of each of the Fabric Board's handles, notice there is a notch. This notch will meet a part in the chassis, and allow you to lock the Fabric Board into the system midplane and power channel.
8. **Supporting the QDR Fabric Board under the sheet metal bottom, hold the Fabric Board level and align it with the empty Fabric Board bay in the Fabric Interconnect. [Figure 81, "Inserting a QDR Fabric Board into a Fabric Interconnect F1-4,"](#) on [page 126](#) shows aligning and inserting the Fabric Board.**



**Caution** - Pay attention to the leading edges of the Fabric Board—the edges that will contact and insert into the chassis first. These edges must be kept horizontal. If you tip one side of the Fabric Board, it is possible to insert the Fabric Board incorrectly. Make sure you hold the Fabric Board level while you insert it.

---

**FIGURE 81** Inserting a QDR Fabric Board into a Fabric Interconnect F1-4



9. **When the Fabric Board is properly aligned, gently slide it in until you feel some resistance, then check the notches at the end of the Fabric Board's handles to make sure they are contacting the guides on the inside of the chassis.**



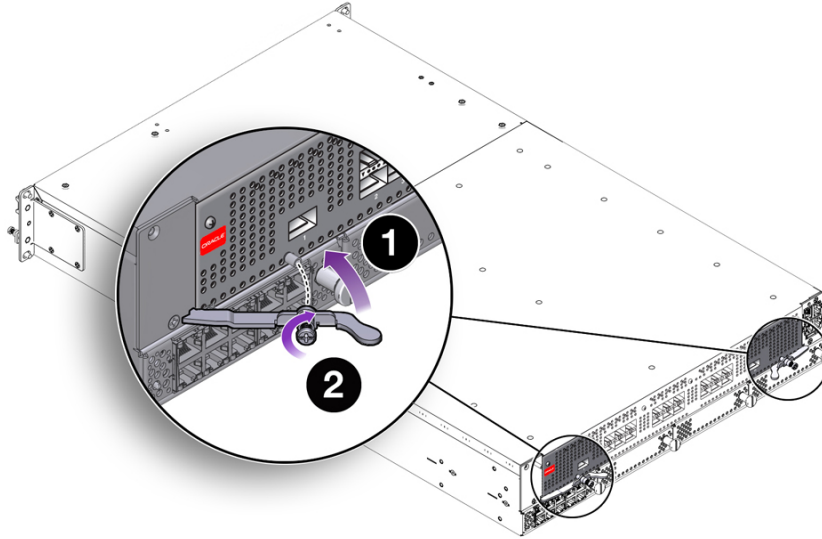
**Caution** - Do not force the Fabric Board into place. If it does not slide in easily, remove it and attempt to insert it again. Make sure that the leading edges are level, and you are keeping the Fabric board level while you slide it in.

---

10. **When the notches and guides are properly positioned, press the Fabric Board's handles inward to seat the Fabric Board (1) as shown in [Figure 82](#), "Seating a**

**QDR Fabric Board into a Fabric Interconnect F1-4,” on page 127. The Fabric Board is properly seated when it and its handles lie flush against the chassis.**

**FIGURE 82** Seating a QDR Fabric Board into a Fabric Interconnect F1-4



**Caution** - Do not force the levers. They should glide easily when properly aligned. If you feel uneven resistance or the release levers do not move easily, gently swing the levers away from each other, partially remove the Fabric Board, and attempt [Step 10](#) through [Step 12](#) in “[Upgrade a Fabric Interconnect F1-4 to a QDR Fabric Board](#)” on page 134 while paying attention to how the release levers contact the edge of the chassis.

- 11. When the release levers have correctly locked the QDR Fabric Board into the chassis, use the screwdriver to secure the captive screws in the release levers (2).**



**Caution** - When tightening screws, make sure to tighten them to lightly snug. Do not overtighten screws or they can break.

- 12. Reconnect the Fabric Interconnect to facility power, then power on the Fabric Interconnect, and allow it to completely boot up.**

The Fabric Board will boot, and when the board completes its bootup and passes to runtime, the Power LED will glow. The Power LED does not glow until the Fabric Board is in runtime.

## Upgrading a DDR Fabric Board to a QDR Fabric Board

Upgrading a DDR Fabric Board to a QDR Fabric Board involves removing the existing Fabric Board from the Fabric Interconnect and replacing with the new QDR Fabric Board. The Fabric Board is not hot swappable, so you will need to power down each Fabric Interconnect that will receive the QDR Fabric Board.

For the upgrade, you will need the following equipment:

- #2 Phillips (cross-head) screwdriver
- an ESD wrist strap
- an ESD-safe workspace for the Fabric Boards when they are not in the Fabric Interconnect. The ESD bag that ships with Oracle modules is an option if a grounded workspace is not available.

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**Note** - Oracle recommends reading this entire procedure to get an overview of it before performing the hardware upgrade.

---

Some considerations exist for upgrading a DDR Fabric Board to a QDR Fabric Board:

- The QDR Fabric Board has 20 ports instead of the 24 ports on the DDR Fabric Board. Due to the difference in number of ports, data centers that use an SNMP management tool can experience port index number problems (`portIfIndex`). If your data center uses an SNMP Management tool, you will need to rediscover the devices through the SNMP manager to correctly enumerate the devices' port IDs.
- Also, due to the different number of ports on the QDR Fabric Board, you might need to “fan out” the IB network. For example, if your existing DDR Fabric Board has full deployment of 24 servers, the servers connected on ports 21 through 24 cannot be connected directly to the 20-port QDR Fabric Board.

To reconnect the servers that were on ports 21 through 24, you will need to connect an IB expansion switch to one of the ports on the QDR Fabric Board. This IB expansion switch will then fan out the IB network, and allow you re-connect the servers that were on ports 21 through 24 of the DDR Fabric Board.

- When the new Fabric Board boots up, QDR fabric ports are brought online at QDR rate if QDR HCAs are installed in the connected servers.
- No license key is required to activate the 40 Gbps QDR fabric.
- To support the QDR Fabric Board, the Fabric Interconnect must be running XgOS version 3.0 or later. There is no minimum firmware version required on the HCAs, but you should always use the latest version of firmware recommended by Oracle.

See the appropriate section:

- [“Upgrade a Fabric Interconnect F1-15 to a QDR Fabric Board” on page 129](#)
- [“Upgrade a Fabric Interconnect F1-4 to a QDR Fabric Board” on page 134](#)



## ▼ Upgrade a Fabric Interconnect F1-15 to a QDR Fabric Board

Upgrading to a QDR Fabric Board requires removing the existing Fabric Board, then installing the QDR Fabric Board.

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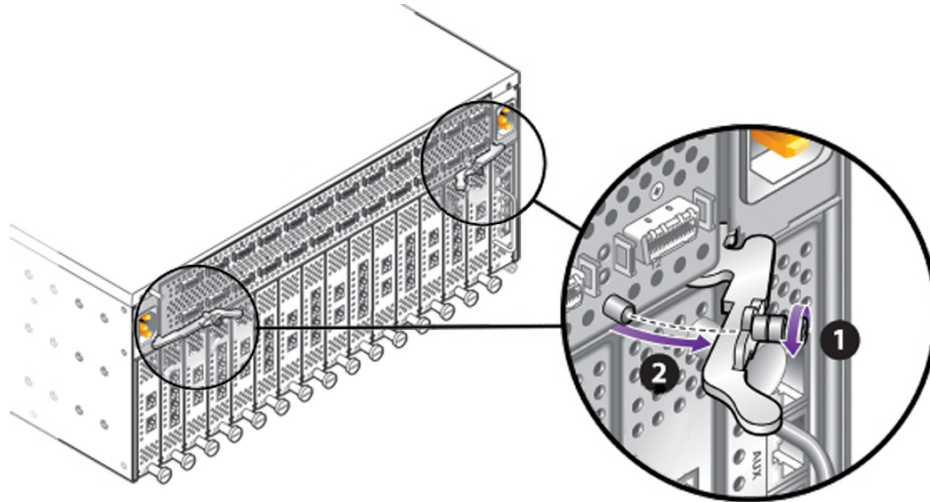
**Note** - This procedure documents the physical procedure of removing a non-QDR Fabric Board, and inserting a QDR Fabric Board. However, there are additional considerations such as: \* reconnecting servers that were on a 24-port DDR Fabric Board the QDR Fabric Board, which has 20 ports. \* considerations for using QDR cables (and their cable lengths) when the DDR Fabric Board you will be replacing was using DDR cables. \* Bringing the Fabric Interconnect with the new QDR Fabric Board online in a data center managed by Oracle Fabric Manager. These additional considerations are addressed in the *QDR Fabric Board Upgrade Guide, Release XgOS 3.0.0*. For full documentation about the entire procedure of bringing the Fabric Interconnect and hosts back online after the QDR Fabric Board Upgrade, consult the *QDR Fabric Board Upgrade Guide*.

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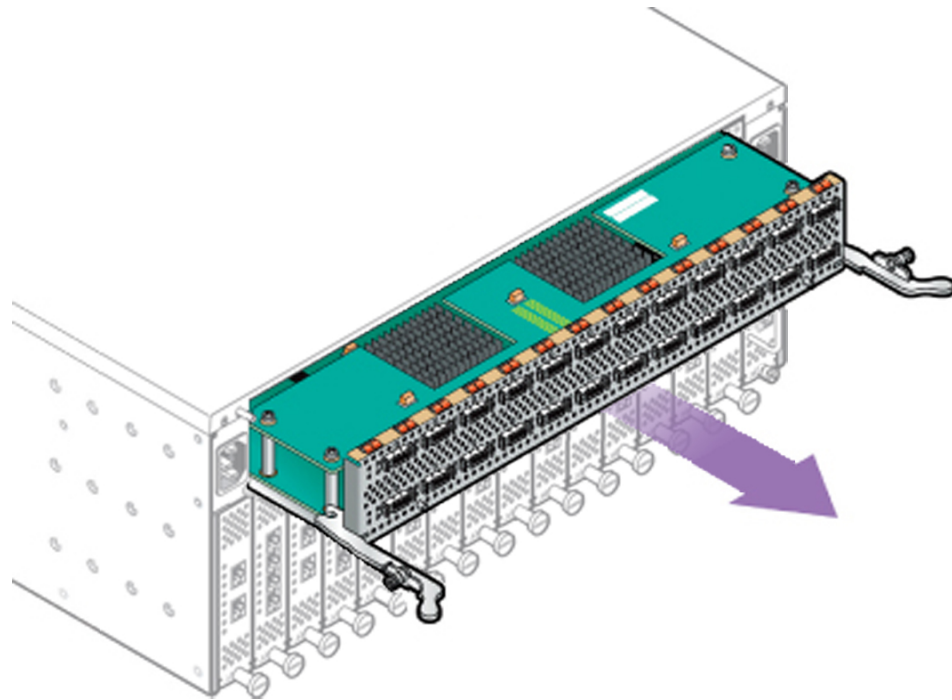
To replace the fabric board, follow this procedure:

1. **If the Fabric Interconnect is not running XgOS 3.0 or later, upgrade your XgOS version to 3.0 or greater for Fabric Interconnects with InfiniBand server ports.**
2. **Move or stop all traffic going through the Fabric Interconnect in either of the following ways:**
  - **In an HA Fabric Interconnect environment, move all traffic to the other Fabric Interconnect for the duration of the Fabric Board upgrade on the first Fabric Interconnect. When the first Fabric Interconnect boots up with a QDR Fabric Board, move all traffic off of the second Fabric Interconnect and upgrade that Fabric Interconnect to a QDR Fabric board.**
  - **In a single Fabric Interconnect environment, stop all traffic going through the chassis. For example, scheduled traffic, such as backups, can be halted. You can also turn down vNICs, vHBAs, or Server Profiles. Or, live traffic will be halted when you power off the Fabric Interconnect.**
3. **Remove the InfiniBand cables from your DDR Fabric Board, and disconnect the Fabric Interconnect from facility power by unplugging the power cables.**
4. **Using a screwdriver, loosen the captive screws in the release levers by turning them counterclockwise (1) as shown in [Figure 83, “Unlocking the DDR Fabric Board from a Fabric Interconnect F1-15,”](#) on page 130.**

**FIGURE 83** Unlocking the DDR Fabric Board from a Fabric Interconnect F1-15



5. Grasp the DDR Fabric Board handles, and keeping the level, pivot them toward you until they are pointing straight at you (2). You should feel the Fabric Board's hinges disconnect it from the Fabric Interconnect's midplane.
6. Grasping both of the release levers, slide the DDR Fabric Board halfway out of the chassis. When the Fabric Board is halfway out, place your hand under the sheet metal bottom to support it, then slide it out of the chassis the rest of the way. [Figure 84, "Removing the DDR Fabric Board from a Fabric Interconnect F1-15," on page 131](#) shows removing the Fabric Board.

**FIGURE 84** Removing the DDR Fabric Board from a Fabric Interconnect F1-15

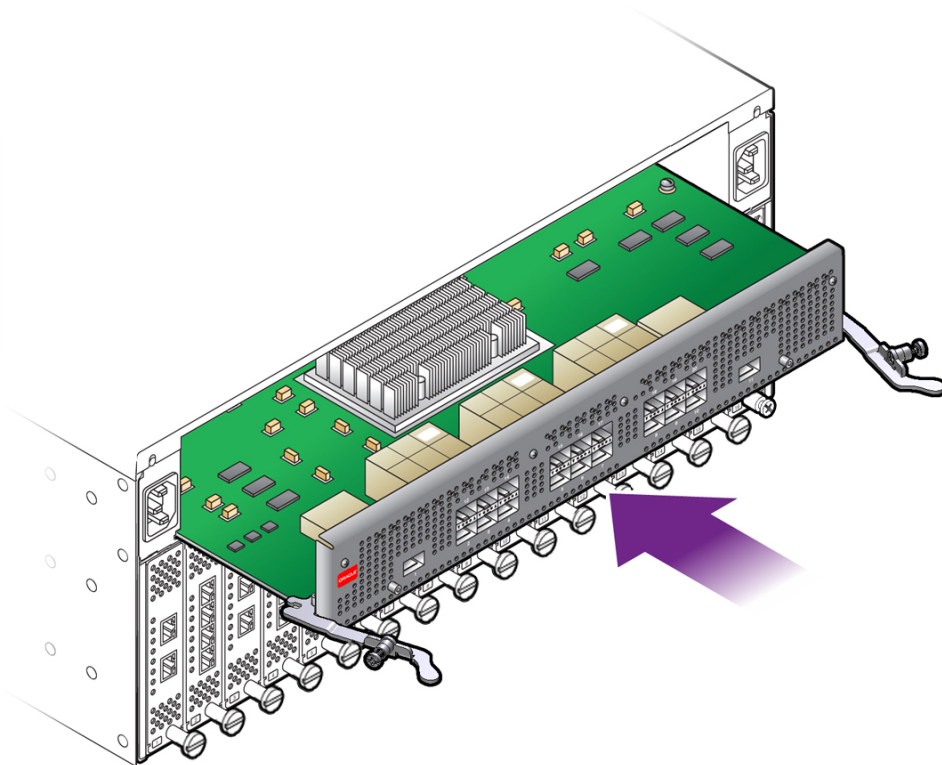
7. Set the DDR Fabric Board on an ESD-safe work surface or in a ESD bag.
8. Remove the QDR Fabric Board from the packaging, and orient the module so that it is right side up.
9. Orient the QDR Fabric Board so that the sheet metal surface is on the bottom, pivot the QDR Fabric Board's handles so that they are pointing directly towards you—not flush with the module.  
At the far end of each of the Fabric Board's handles, notice there is a notch. This notch will meet a part in the chassis, and allow you to lock the Fabric Board into the system midplane and power channel.
10. Supporting the QDR Fabric Board under the sheet metal bottom, hold the Fabric Board level and align it with the empty Fabric Board bay in the Fabric Interconnect. [Figure 85, "Inserting the QDR Fabric Board into a Fabric Interconnect F1-15," on page 132](#) shows aligning and inserting the QDR Fabric Board.



**Caution** - Pay attention to the leading edges of the Fabric Board—the edges that will contact and insert into the chassis first. These edges must be kept horizontal. If you tip one side of the Fabric Board, it is possible to insert the Fabric Board incorrectly. Make sure you hold the Fabric Board level while you insert it.

---

**FIGURE 85** Inserting the QDR Fabric Board into a Fabric Interconnect F1-15



11. **When the Fabric Board is properly aligned, gently slide it in until you feel some resistance, then check the notches at the end of the Fabric Board's handles to make sure they are contacting the guides on the inside of the chassis.**



**Caution** - Do not force the Fabric Board into place. If it does not slide in easily, remove it and attempt to insert it again. Make sure that the leading edges are level, and you are keeping the Fabric Board level while you slide it in.

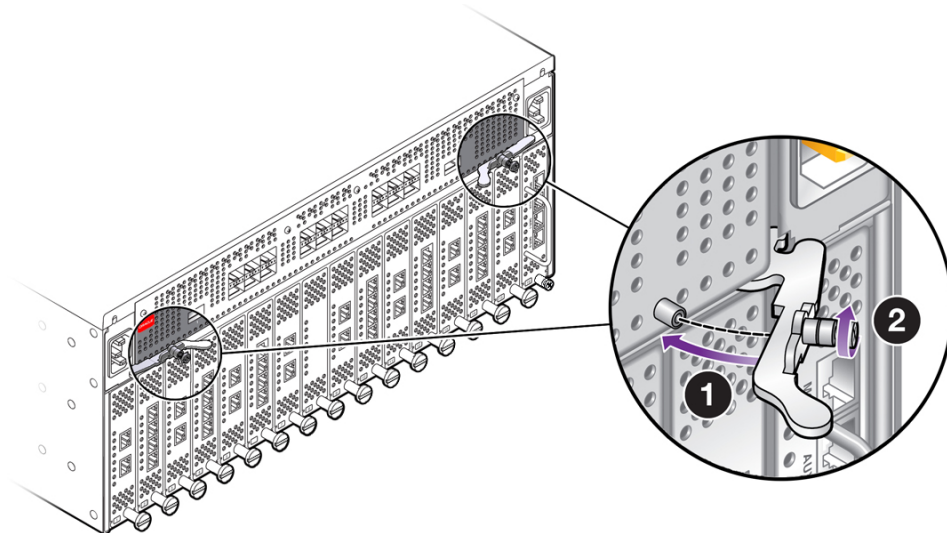
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12. When the notches and guides are properly positioned, press the Fabric Board's handles inward to seat the Fabric Board (1) as shown in [Figure 86, "Seating the QDR Fabric Board into a Fabric Interconnect F1-15," on page 133](#). The Fabric Board is properly seated when it and its handles lie flush against the chassis.



**Caution** - Do not force the levers. They should glide easily when properly aligned. If you feel uneven resistance or the release levers do not move easily, gently swing the levers away from each other, partially remove the Fabric Board, and attempt [Step 10](#) through [Step 12](#) while paying attention to how the release levers contact the edge of the chassis.

**FIGURE 86** Seating the QDR Fabric Board into a Fabric Interconnect F1-15



13. When the release levers have correctly locked the QDR Fabric Board into the chassis, use the screwdriver to secure the captive screws in the release levers (2).



**Caution** - When tightening screws, make sure to tighten them to lightly snug. Do not overtighten screws or they can break.

14. Reconnect the Fabric Interconnect to facility power, then power on the Fabric Interconnect, and allow it to completely boot up.

The Fabric Board will boot, and when the board completes its bootup and passes to runtime, the Power LED will glow. The Power LED does not glow until the Fabric Board is in runtime.

15. **Start a management session on the Fabric Interconnect, and log in.**
16. **Verify that the Fabric Interconnect recognizes the QDR Fabric Board, by issuing `show hardware` then scrolling to the Fabric Board Status section:**
  - **The Model column should show the string `VP-FRU-FB-QDR`**
  - **The State column should show `UP`**
  - **The Speed column should show `QDR`**

If these values are not displayed, the Fabric Interconnect does not recognize the QDR Fabric Board.
17. **Reconnect your servers to the Fabric Interconnect by using QDR cables.**

If your DDR Fabric Board had all 24 ports connected, and you will be reconnecting ports 21 through 24 on the QDR Fabric board, you will need to connect an IB expansion switch to a port on the QDR Fabric Board. The reason for connecting the IB expansion switch is to allow the servers that were on ports 21 through 24 to be connected to the QDR Fabric Board, which has only 20 ports.
18. **If your data center is being managed by an SNMP management tool, through the SNMP Manager, rediscover the devices on the new QDR fabric.**

After rediscovering the devices, the procedure is complete. If you encounter problems with this procedure, you can contact Oracle Technical Support for assistance.

You do not need to return the old Fabric Board. You can keep it as a spare part. But if you choose to return the old Fabric Board, Oracle can dispose of it. If you choose to return the old Fabric Board, you can use the shipping container for the QDR Fabric Board to return the DDR Fabric Board.

## ▼ Upgrade a Fabric Interconnect F1-4 to a QDR Fabric Board

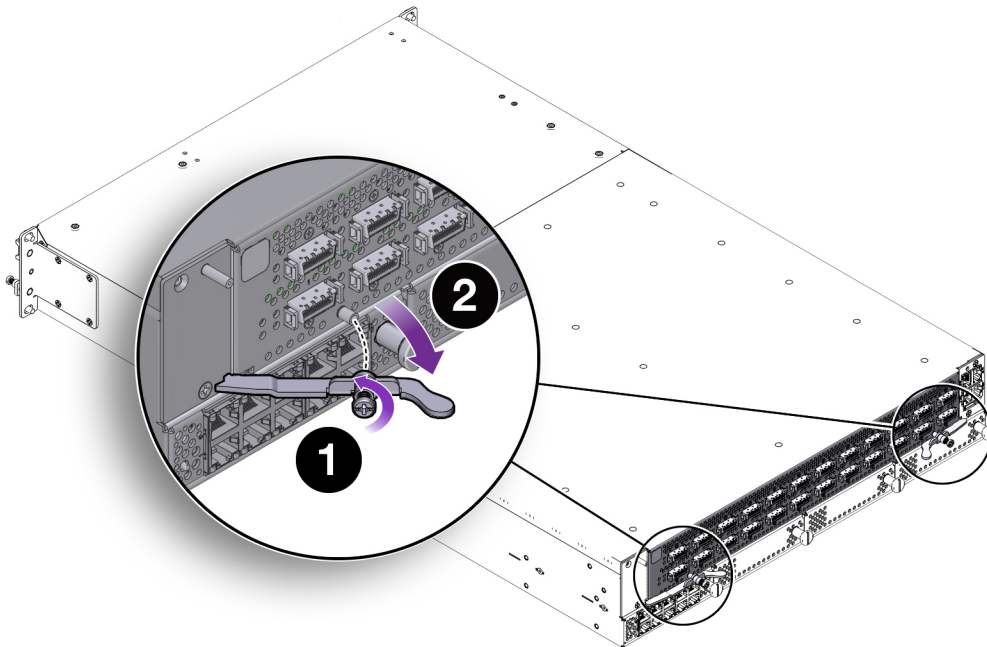
To replace the fabric board, follow this procedure:

1. **If the Fabric Interconnect is not running XgOS 3.0, upgrade your XgOS version to 3.0 or greater for Fabric Interconnects with InfiniBand server ports.**
2. **Move or stop all traffic going through the Fabric Interconnect in either of the following ways:**
  - **In an HA Fabric Interconnect environment, move all traffic to the other Fabric Interconnect for the duration of the Fabric Board upgrade on the**

first Fabric Interconnect. When the first Fabric Interconnect boots up with a QDR Fabric Board, move all traffic off of the second Fabric Interconnect and upgrade that Fabric Interconnect to a QDR Fabric board.

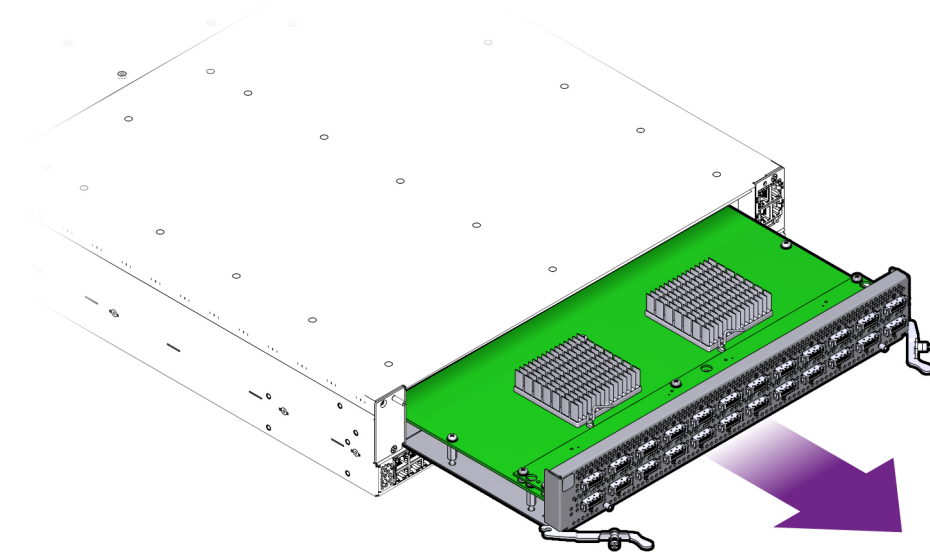
- In a single Fabric Interconnect environment, stop all traffic going through the chassis. For example, scheduled traffic, such as backups, can be halted. You can also turn down vNICs, vHBAs, or Server Profiles. Or, live traffic will be halted when you power off the Fabric Interconnect.
3. Remove the InfiniBand cables from your DDR Fabric Board, and disconnect the Fabric Interconnect from facility power by unplugging the power cables.
  4. Using a screwdriver, loosen the captive screws in the release levers by turning them counterclockwise (1) as shown in [Figure 87, “Unlocking the DDR Fabric Board in a Fabric Interconnect F1-4,” on page 135.](#)

**FIGURE 87** Unlocking the DDR Fabric Board in a Fabric Interconnect F1-4



5. Grasp the DDR Fabric Board handles, and keeping the level, pivot them toward you until they are pointing straight at you (2). You should feel the Fabric Board's hinges disconnect it from the Fabric Interconnect's midplane.
6. Grasping both of the release levers, slide the DDR Fabric Board halfway out of the chassis. When the Fabric Board is halfway out, place your hand under the sheet metal bottom to support it, then slide it out of the chassis the rest of the way. [Figure 88, "Removing the DDR Fabric Board from a Fabric Interconnect F1-4," on page 136](#) shows removing the Fabric Board.

**FIGURE 88** Removing the DDR Fabric Board from a Fabric Interconnect F1-4



7. Set the DDR Fabric Board on an ESD-safe work surface or in a ESD bag.
8. Remove the QDR Fabric Board from the packaging, and orient the module so that it is right side up.
9. Orient the QDR Fabric Board so that the sheet metal surface is on the bottom, pivot the QDR Fabric Board's handles so that they are pointing directly towards you—not flush with the module.

At the far end of each of the Fabric Board's handles, notice there is a notch. This notch will meet a part in the chassis, and allow you to lock the Fabric Board into the system midplane and power channel.

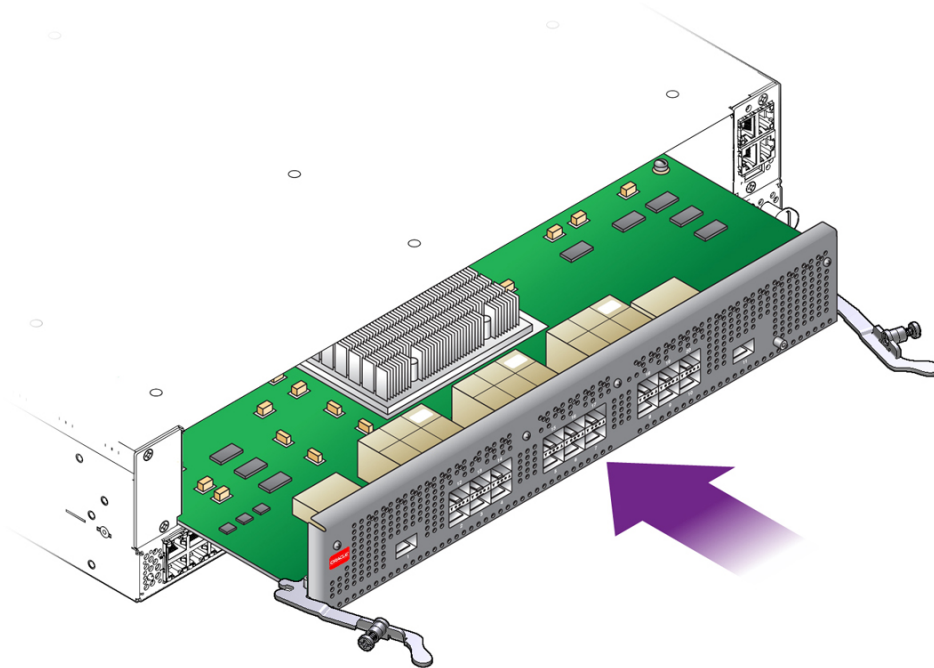


10. **Supporting the QDR Fabric Board under the sheet metal bottom, hold the Fabric Board level and align it with the empty Fabric Board bay in the Fabric Interconnect. [Figure 89, "Inserting a QDR Fabric Board into a Fabric Interconnect F1-4,"](#) on page 137 shows aligning and inserting the Fabric Board.**



**Caution** - Pay attention to the leading edges of the Fabric Board—the edges that will contact and insert into the chassis first. These edges must be kept horizontal. If you tip one side of the Fabric Board, it is possible to insert the Fabric Board incorrectly. Make sure you hold the Fabric Board level while you insert it.

**FIGURE 89** Inserting a QDR Fabric Board into a Fabric Interconnect F1-4



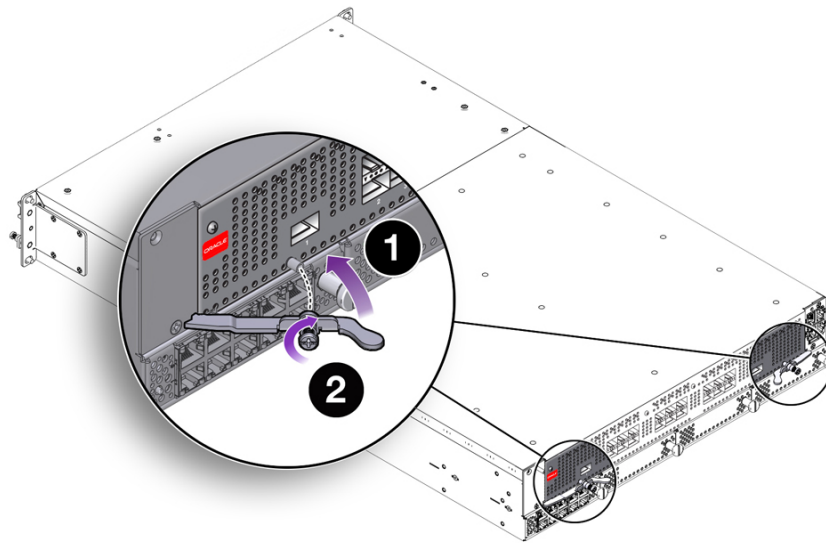
11. **When the Fabric Board is properly aligned, gently slide it in until you feel some resistance, then check the notches at the end of the Fabric Board's handles to make sure they are contacting the guides on the inside of the chassis.**



**Caution** - Do not force the Fabric Board into place. If it does not slide in easily, remove it and attempt to insert it again. Make sure that the leading edges are level, and you are keeping the Fabric board level while you slide it in.

12. When the notches and guides are properly positioned, press the Fabric Board's handles inward to seat the Fabric Board (1) as shown in [Figure 90, "Seating a QDR Fabric Board into a Fabric Interconnect F1-4," on page 138](#). The Fabric Board is properly seated when it and its handles lie flush against the chassis.

**FIGURE 90** Seating a QDR Fabric Board into a Fabric Interconnect F1-4



**Caution** - Do not force the levers. They should glide easily when properly aligned. If you feel uneven resistance or the release levers do not move easily, gently swing the levers away from each other, partially remove the Fabric Board, and attempt [Step 10](#) through [Step 12](#) while paying attention to how the release levers contact the edge of the chassis.

---

13. When the release levers have correctly locked the QDR Fabric Board into the chassis, use the screwdriver to secure the captive screws in the release levers (2).



**Caution** - When tightening screws, make sure to tighten them to lightly snug. Do not overtighten screws or they can break.

---

14. Reconnect the Fabric Interconnect to facility power, then power on the Fabric Interconnect, and allow it to completely boot up.

The Fabric Board will boot, and when the board completes its bootup and passes to runtime, the Power LED will glow. The Power LED does not glow until the Fabric Board is in runtime.

15. **Start a management session on the Fabric Interconnect, and log in.**
16. **Verify that the Fabric Interconnect recognizes the QDR Fabric Board, by issuing `show hardware` then scrolling to the Fabric Board Status section:**
  - **The Model column should show the string `VP-FRU-FB-QDR`**
  - **The State column should show `UP`**
  - **The Speed column should show `QDR`**

If these values are not displayed, the Fabric Interconnect does not recognize the QDR Fabric Board.

17. **Reconnect your servers to the Fabric Interconnect by using QDR cables.**

If your DDR Fabric Board had all 24 ports connected, and you will be reconnecting ports 21 through 24 on the QDR Fabric board, you will need to connect an IB expansion switch to a port on the QDR Fabric Board. The reason for connecting the IB expansion switch is to allow the servers that were on ports 21 through 24 to be connected to the QDR Fabric Board, which has only 20 ports.
18. **If your data center is being managed by an SNMP management tool, through the SNMP Manager, rediscover the devices on the new QDR fabric.**

After rediscovering the devices, the procedure is complete. If you encounter problems with this procedure, you can contact Oracle Technical Support for assistance.

You do not need to return the old Fabric Board. You can keep it as a spare part. But if you choose to return the old Fabric Board, Oracle can dispose of it. If you choose to return the old Fabric Board, you can use the shipping container for the QDR Fabric Board to return the DDR Fabric Board.

## Removing and Installing I/O Modules

This section documents how to remove and install an I/O Module. See the appropriate section:

- [“Remove Fabric Interconnect F1-15 I/O Modules” on page 140](#)
- [“Remove Fabric Interconnect F1-4 I/O Modules” on page 144](#)



---

**Caution** - When replacing the I/O Modules: - wear an ESD wrist strap - When the hardware is out of its shipping package or the Fabric Interconnect chassis, make sure you place it on an ESD safe bag or a grounded work surface such as a rubberized work mat.

---

## ▼ Remove Fabric Interconnect F1-15 I/O Modules

With the exception of the Management module, which must be installed in slot 16 of the Fabric Interconnect F1-15's module bay, the I/O modules can be installed in any of the remaining 15 slots. All I/O modules except the Management module can be installed or removed while the system is running. For information about removing and installing the Management module, see [“Removing and Installing the Management Module” on page 147](#).

To perform this procedure, you will need a #2 Phillips (cross-head) screwdriver.



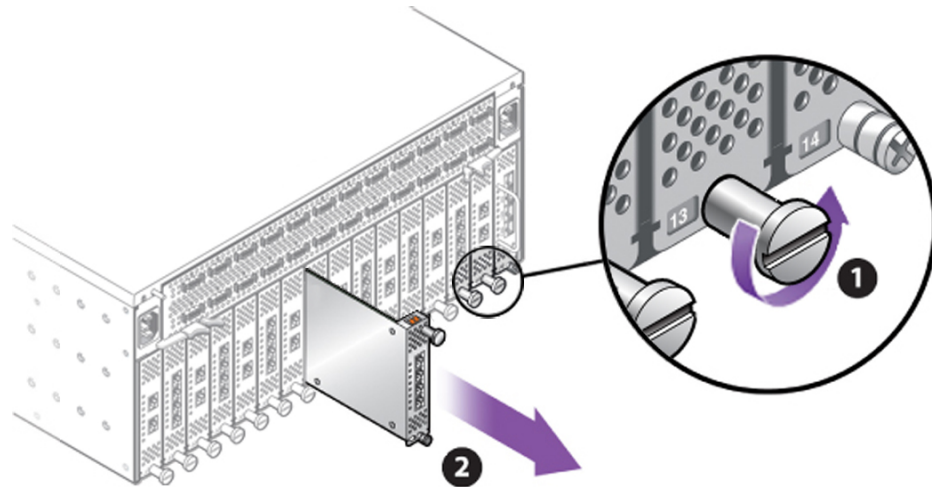
---

**Caution** - When tightening screws, make sure to tighten them to lightly snug. Do not overtighten screws or they can break.

---

To remove and insert a Fabric Interconnect F1-15 I/O module, follow this procedure:

1. **Before removing an I/O module, use XgOS to shutdown the I/O module.**
2. **Disconnect any cables attached to the module.**
3. **Using the screwdriver, turn the locking handle (1) located at the bottom edge of each module 90 degrees counterclockwise. See [Figure 91, “Fabric Interconnect F1-15 I/O Module Locking Handle,” on page 141](#).**

**FIGURE 91** Fabric Interconnect F1-15 I/O Module Locking Handle

4. Grasp the locking handle (2) and slide the module out of the chassis.

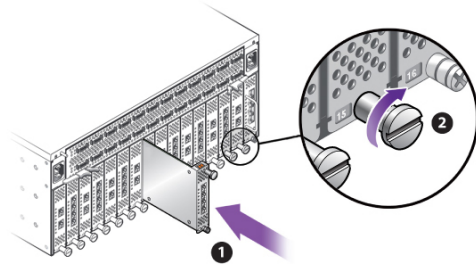
## ▼ Install Fabric Interconnect F1-15 I/O Modules

---

**Note** - When re-installing the I/O modules, ensure that the module's sheet metal side is facing the left edge of the slot. Also, make sure that the module's top and bottom edges are correctly aligned with the upper and lower tracks at the left edge of each module slot.

---

1. Slide the module into the slot until you feel the connectors begin to seat.
2. Carefully, but firmly, press the module into the slot (1) until the module's faceplate is flush with the other I/O modules. See [Figure 92, "Inserting a Fabric Interconnect F1-15 I/O Module," on page 142.](#)

**FIGURE 92** Inserting a Fabric Interconnect F1-15 I/O Module

3. **Tighten the locking handle (2).**
4. **Reattach cables as necessary.**

## ▼ Upgrade to a 4-Port 10 GE Module

The 4-Port 10 GE module can be swapped into a slot that previously contained another type of Ethernet I/O Module. Even though the module will install mechanically in the slot due to all I/O Modules having the same dimensions, the software is not guaranteed to preserve the correct number and configuration of vNICs from the previous module to the 4-Port 10 GE module. For example, if you remove a 1-Port 10 GE module (1x10) and insert a 4-Port 10 GE module, there is no guarantee that the previous configuration from the 1-Port 10 GE module (10x1) will be available when the 4-Port 10 GE module boots up.

As a result, if you will be using a 4-Port 10 GE module, you can either install it in a slot that previously had no other module in it, or you can install it in a module that previously had a GE module. The following procedure documents how to upgrade a previous 10-Port, 1 GE module to the 4-Port 10 GE module. For illustrative purposes, the procedure assumes that a module exists in slot 4, and the 4x10 module will be inserted into that slot. However, the 4-Port GE module does not always need to be inserted in the same slot. You can install it in a different slot if needed.

---

**Note** - While performing any hardware procedures, including swapping or upgrading a module, make sure to observe proper ESD precautions.

---

To upgrade to a 4-Port 10 GE Module follow this procedure:

1. With the previous module installed, set each physical interface supporting a vNIC to none. For example:

```
set vnic <vnic-name> -if=none
set vnic <vnic-name> -if=none
set vnic <vnic-name> -if=none
set vnic <vnic-name> -if=none
```

2. When all vNIC interfaces are set to none, turn off the I/O Module. For example:

```
set ethernet-card 4 down
```

3. Disconnect cables from the 10-Port 1 GE module.

4. Issue the `remove iocard` command.

```
remove iocard 4
```

5. When the command completes, physically remove the previous Ethernet card.

6. Install the 4-Port 10 GE I/O card.

7. Wait for the I/O card to power up.

8. Insert cables.

9. Set the vNICs back to the port(s) where you want them terminated. For example, if you want one vNIC terminated on each port:

```
set vnic <vnic-name> -if=4/1
set vnic <vnic-name> -if=4/2
set vnic <vnic-name> -if=4/3
set vnic <vnic-name> -if=4/4
```

---

**Note** - You do not need to terminate one vNIC on each port. You can re-terminate the vNICs as needed on any port. Terminating one vNIC on each port was chosen only for illustrative purposes in this example.

---

As an alternative, if you are installing the 10-Port GE module into a different slot (for example, slot 5) you can re-terminate the vNICs from the old 10-Port 1 GE module on that new slot. For example:

```
set vnic <vnic-name> -if=5/1
set vnic <vnic-name> -if=5/2
```

```
set vnic <vnic-name> -if=5/3
set vnic <vnic-name> -if=5/4
```

## Removing and Inserting Fabric Interconnect F1-4 I/O Modules

The Fabric Interconnect F1-4 I/O Modules contain a locking mechanism (a quarter-turn Pawl) that is built-in to the module's handle. The lock is used to secure the module in place while it is inserted in the chassis, and has been designed with enough resistance that it cannot be unlocked or completely locked with your fingers. As a result, the module's handle is slotted to accept a screwdriver, which you will need to use to generate enough torque to lock or unlock the module. To perform this procedure, you will need a large slotted screwdriver.



---

**Caution** - When using the screwdriver to lock or unlock an I/O Module, make sure not to dull or mar the slot in the I/O Module's handle. Also, if you apply excessive force, it might be possible to over-rotate the handle, which will skew the I/O module's open and closed positions. When using the screwdriver to lock or unlock an I/O Module, make sure to apply only enough force to move the locking mechanism, and rotate the handle only enough to unlock or lock the module.

---

The I/O module lock operates in a 90-degree arc, and the slot in the handle indicates the position of the module's lock. See [Table 1, "I/O Module Lock Positions," on page 70](#) for handle positions for the locking I/O Modules.

### ▼ Remove Fabric Interconnect F1-4 I/O Modules

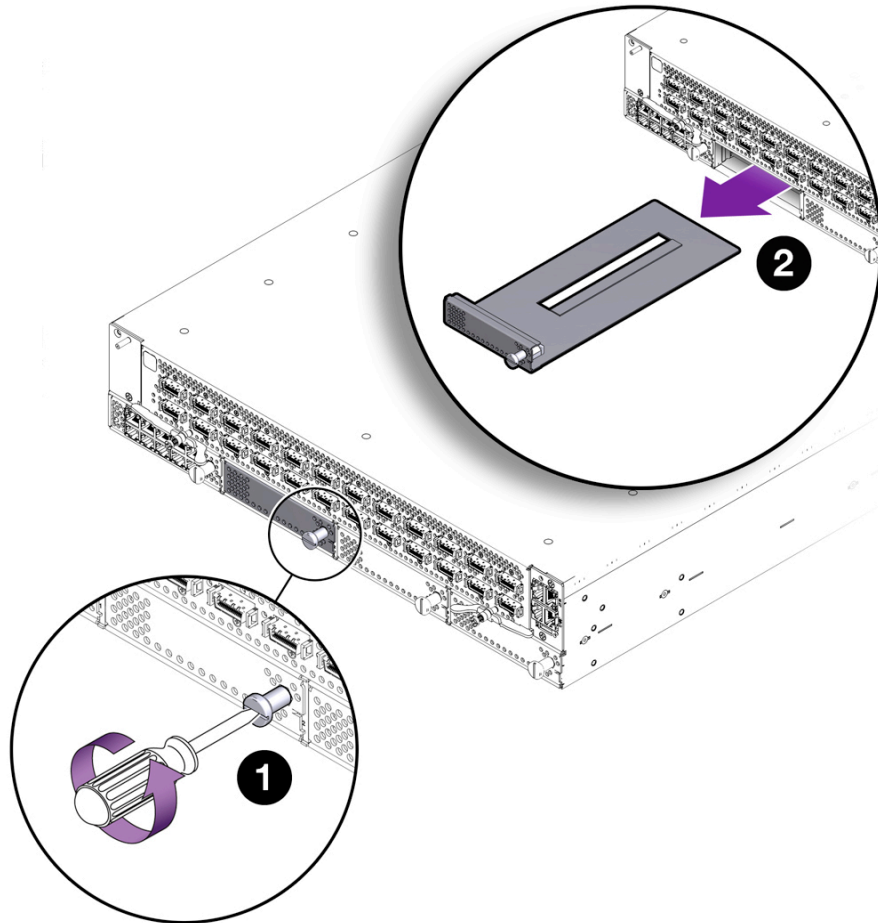
When you are performing field replacement for one or more I/O Modules, make sure to use the lock and unlocked positions appropriately—for example, make sure that you lock the modules when you are done servicing them.

To remove a Fabric Interconnect F1-4 I/O module, follow this procedure:

1. **When handling I/O modules, make sure that you are using ESD safety precautions, such as a grounding strap that is properly attached to an earth ground source.**
2. **Before removing an I/O module, use the XgOS to shutdown the I/O module.**
3. **Using a slotted screwdriver, unlock the I/O module by turning it 90 degrees counterclockwise. See (1) in [Figure 93, "Removing a Fabric Interconnect F1-4 I/O Module," on page 145.](#)**



**FIGURE 93** Removing a Fabric Interconnect F1-4 I/O Module



4. Grasp the module handle and remove the I/O module, while keeping the module level (2) as shown in [Figure 93, “Removing a Fabric Interconnect F1-4 I/O Module,” on page 145.](#)

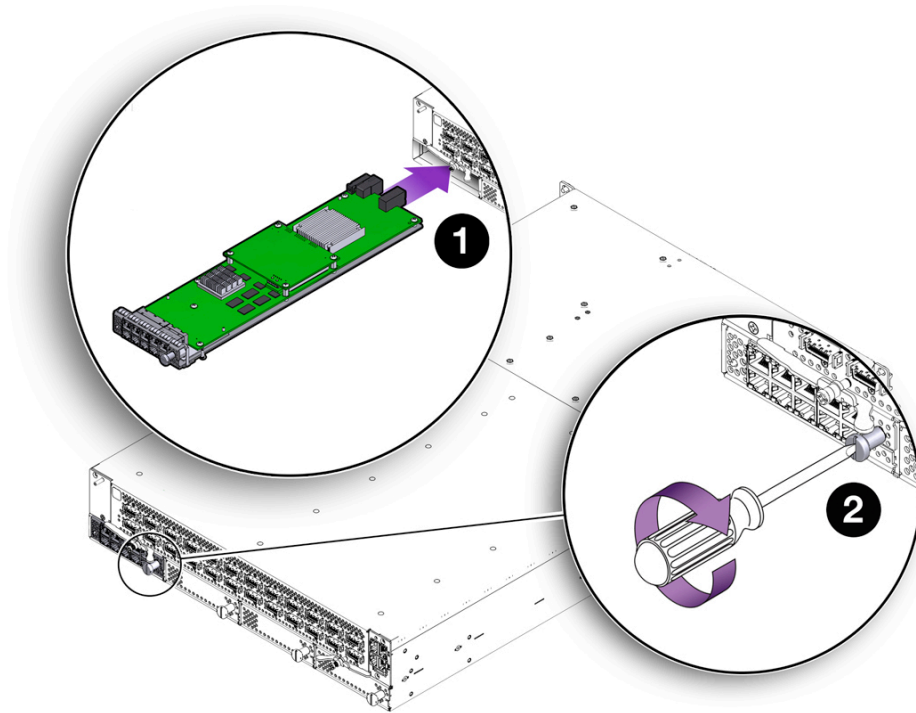
## ▼ Install Fabric Interconnect F1-4 I/O Modules

1. **Get the I/O module you will installing, and make sure that the I/O Module is in the unlocked position. Modules can be inserted into the Fabric Interconnect F1-4 only if they are in the unlocked position.**

Make sure that the I/O Module is oriented so that the sheet metal side is facing down and the module's faceplate is facing you.

2. **Align the module with the slot.**
3. **Holding the module level, gently insert the I/O module into the chassis (1). See [Figure 94, "Installing a Fabric Interconnect F1-4 I/O Module,"](#) on page 146.**

**FIGURE 94** Installing a Fabric Interconnect F1-4 I/O Module



When the I/O Module is almost completely inserted, you will feel some resistance, which is the I/O Module's connector meeting its midplane socket. Continue to apply gentle pressure until the connector is seated in the socket.

4. **When the module is completely inserted, it should lie flush with the face of the Fabric Interconnect F1-4.**
5. **Using a slotted screwdriver, lock the I/O Module into the chassis by turning the lock 90 degrees clockwise (2) as shown in [Figure 94, “Installing a Fabric Interconnect F1-4 I/O Module,” on page 146.](#)**

## Removing and Installing the Management Module

This section documents how to remove and install the Management module. You must power down the Fabric Interconnect to perform this procedure. To perform this procedure, you will need a #2 Phillips (cross-head) screwdriver.



---

**Caution** - When tightening screws, make sure to tighten them to lightly snug. Do not overtighten screws or they can break.

---



---

**Caution** - When replacing the Management Modules: - wear an ESD wrist strap - When the hardware is out of its shipping package or the Fabric Interconnect chassis, make sure you place it in an ESD safe bag or on a grounded work surface such as a rubberized work mat.

---

See the appropriate section:

- [“Remove a Fabric Interconnect F1-15 Management Module” on page 147](#)
- [“Removing and Installing the Fabric Interconnect F1-4 Management Module” on page 149](#)

### ▼ Remove a Fabric Interconnect F1-15 Management Module

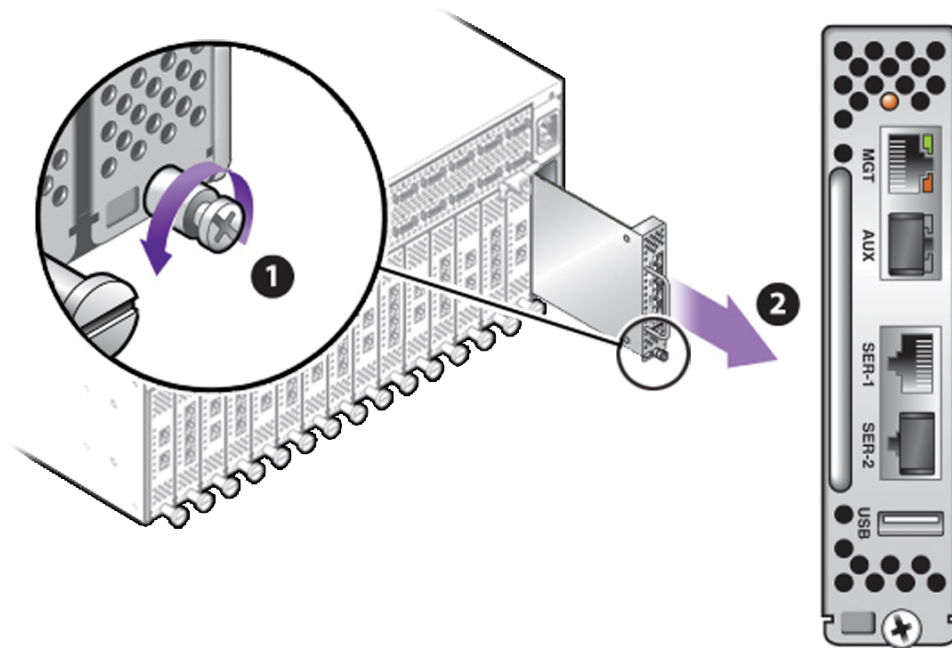
On a Fabric Interconnect F1-15, the Management module can only be installed in slot 16, which is labelled M.

To remove the Fabric Interconnect F1-15 Management module, follow this procedure:

1. **Power down the Fabric Interconnect.**
2. **Disconnect any cables attached to the Management module.**
3. **Using the screwdriver, release the spring-loaded securing screw (1), located at the bottom edge of the module. See [Figure 95, “Removing the Fabric Interconnect F1-15 Management Module,” on page 148.](#)**

4. **Grasp the handle (2) and withdraw the module from the chassis.**

**FIGURE 95** Removing the Fabric Interconnect F1-15 Management Module



## ▼ Install a Fabric Interconnect F1-15 Management Module

---

**Note** - When re-installing the Management module, ensure that the module's component side is facing towards the right edge of the chassis. Also, make sure that the module's top and bottom edges are correctly aligned with the upper and lower tracks at the left edge of the Management module's slot, which is labelled M.

---

1. **Slide the module into the slot until you feel the connectors begin to seat.**
2. **Carefully, but firmly, press the Management module into the slot until the module's faceplate is flush with those of the other I/O modules.**
3. **Tighten the screw.**

4. **Reattach cables as necessary.**

## Removing and Installing the Fabric Interconnect F1-4 Management Module

The Fabric Interconnect F1-4 Management module has a dedicated, half-height slot in the upper right corner of the rear of the chassis.

The Fabric Interconnect F1-4 Management module is not a field-serviceable part, which is why it has no handle, and is securely screwed into the chassis.




---

**Caution** - Do not attempt to remove or replace the Management Module for a Fabric Interconnect F1-4. If your Fabric Interconnect F1-4 Management module requires service, contact Oracle Customer Support for information about completing the service.

---

### ▼ Disable the USB Drive on the Management Module

Some data centers have strict security requirements—for example, they prohibit any device that can be used to remove data from the premises, such as a USB thumbstick. The Management Module has a USB drive which is useful primarily for recovering the system in the very rare case of a system crash.

Because the USB drive does allow data to be copied off of the Fabric Interconnect to a removable device, it might not comply with the strict data center security requirements. As a result, in XgOS 3.6.0 and later, the USB drive is disabled by default. For new shipments from the factory, the USB is inactive, but some existing Fabric Interconnects that are already deployed might still have the USB active. The USB can be disabled through a software procedure.

Some notes about disabling the USB drive:

- Upgrading to Oracle XgOS 3.6.0 or later from a previous version of software does not cause the USB to be deactivated. You must explicitly disable the USB drive by using the procedure in this section.
- The procedure for disabling the USB drive is relevant to both models of Oracle Fabric Interconnect.
- Disabling the USB device requires entering the Fabric Interconnect BIOS, which might or might not have additional layers of security depending on your department's policies. The procedure in this section assumes that no BIOS security is present. If you have set up BIOS security, make sure to comply with your department's security policies after completing this procedure—for example, reset the BIOS password.
- To enter the Fabric Interconnect's BIOS, you will need the following:

- Interrupt the Fabric Interconnect's boot up sequence in a timely manner. You have approximately 5 seconds after the Fabric Interconnect starts booting.  
If you are watching the console, you will see the BIOS prompt. When you see the prompt, follow the key sequence. If you do not enter the BIOS in a timely manner, you can power off the Fabric Interconnect (for example, remove the power cables) and try again.
- A remote terminal connection (for example, hyperterminal) that uses ANSI encoding. By default, when you connect to the Serial 1 port (SER-1) on the Management Module, the terminal session requires VT100 encoding. However, the BIOS is a special case. In order to enter the Fabric Interconnect BIOS, the terminal connection must be set to ANSI encoding.

1. **Connect to the SER-1 port on the Management Module. See [Figure 95, "Removing the Fabric Interconnect F1-15 Management Module,"](#) on page 148 for the location of the SER-1 port.**
2. **Using a terminal server or other connection appliance that is set to ANSI encoding, open up a terminal window.**
3. **Power on the Fabric Interconnect, and watch the terminal window for a message that gives you the option of entering the system BIOS.**
4. **When prompted with the option of entering BIOS, enter the BIOS by pressing the key sequence indicated in the prompt (which is typically F4 for ANSI terminal connections). Do this in a timely manner.**
5. **In the BIOS's menu-driven interface, select Advanced  $\rightarrow$  USB Configuration  $\rightarrow$  Disable USB Function.**
6. **When the USB device is disabled, press Esc to return to the top level menu system in the BIOS.**
7. **Using the right arrow key, scroll over to the Exit menu, and select Save Changes and Exit. When prompted to save changes, press Enter (for "Yes") to save and quit.**
8. **When you press Enter, the USB devices are deactivated and you exit the BIOS. The Fabric Interconnect will automatically reboot. Do not interrupt this reboot.**  
When the reboot is complete, the USB drive on the Management Module is no longer active.
9. **Disconnect the cable from the SER-1 port, close the terminal window, and restore any security that is required by your department's policies.**

---

**Note** - If the USB device is not active and you need to activate it, you can use this procedure and select Enable USB Function to re-enable the USB drive.

---

## Removing and Installing the Front Panel Assembly

This procedure documents removing and installing the Fabric Interconnect's front panel assembly. You will need to power off the Fabric Interconnect. To perform this procedure, you will need the following equipment:

- #2 Phillips (cross-head) screwdriver
- ESD wrist strap



---

**Caution** - When tightening screws, make sure to tighten them to lightly snug. Do not overtighten screws or they can break.

---



---

**Caution** - When replacing the Front Panel Assembly: - wear an ESD wrist strap - When the hardware is out of its shipping package or the Fabric Interconnect chassis, make sure you place it in an ESD safe bag or on a grounded work surface such as a rubberized work mat.

---

Also, be aware that there are some differences in behavior between the Fabric Interconnect F1-15 and the Fabric Interconnect F1-4 when a Front Panel is inserted, which are due to how the SCP responds to being reconnected to the chassis midplane. For information, see [“Compatibility of Fabric Interconnect F1 - 15 and F1-4 Hardware” on page 100](#).

See the appropriate section:

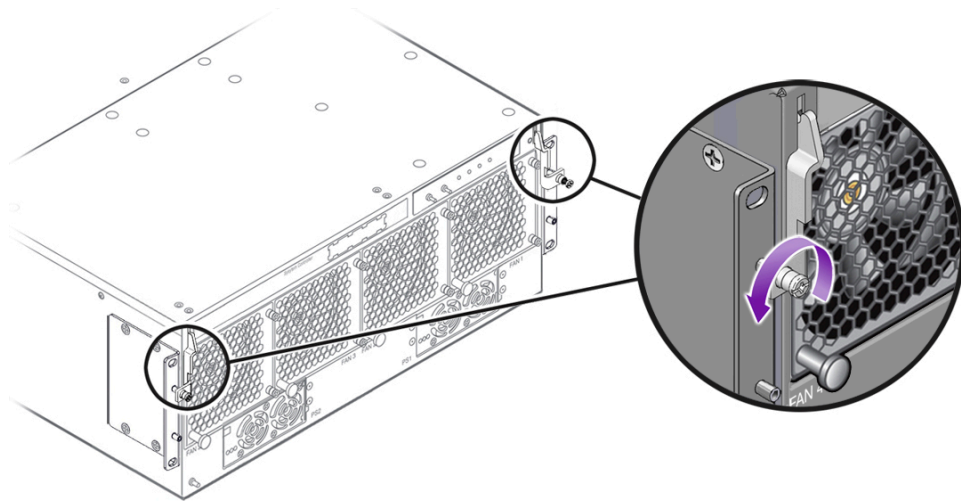
- [“Remove and Install a Fabric Interconnect F1-15 Front Panel Assembly” on page 151](#)
- [“Remove a Fabric Interconnect F1-4 Front Panel Assembly” on page 153](#)

### ▼ Remove and Install a Fabric Interconnect F1-15 Front Panel Assembly

To remove a front panel assembly from Oracle Fabric Interconnect F1-15, follow this procedure:

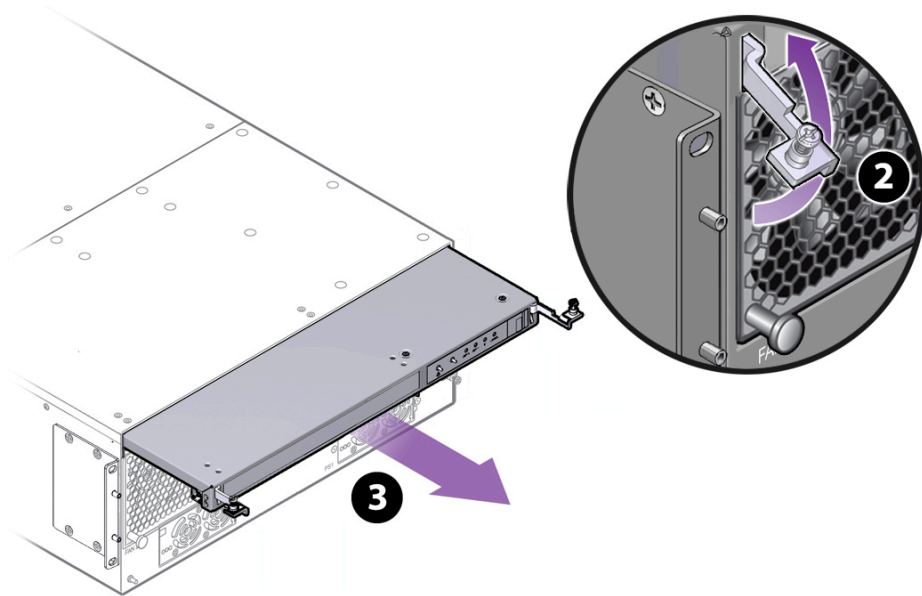
1. **Power down the Fabric Interconnect.**
2. **Using the screwdriver, release the two spring-loaded screws (1) securing the release levers to the chassis. See [Figure 96, “Loosening the Fabric Interconnect F1-15 Front Panel Assembly Screws,” on page 152](#).**

**FIGURE 96** Loosening the Fabric Interconnect F1-15 Front Panel Assembly Screws



3. **Simultaneously grasp both of the release levers and slowly raise them until they are horizontal (2), then use the levers to carefully slide the assembly out of the chassis (3).** See [Figure 97, “Removing the Fabric Interconnect F1-15 Front Panel Assembly,”](#) on page 153.



**FIGURE 97** Removing the Fabric Interconnect F1-15 Front Panel Assembly

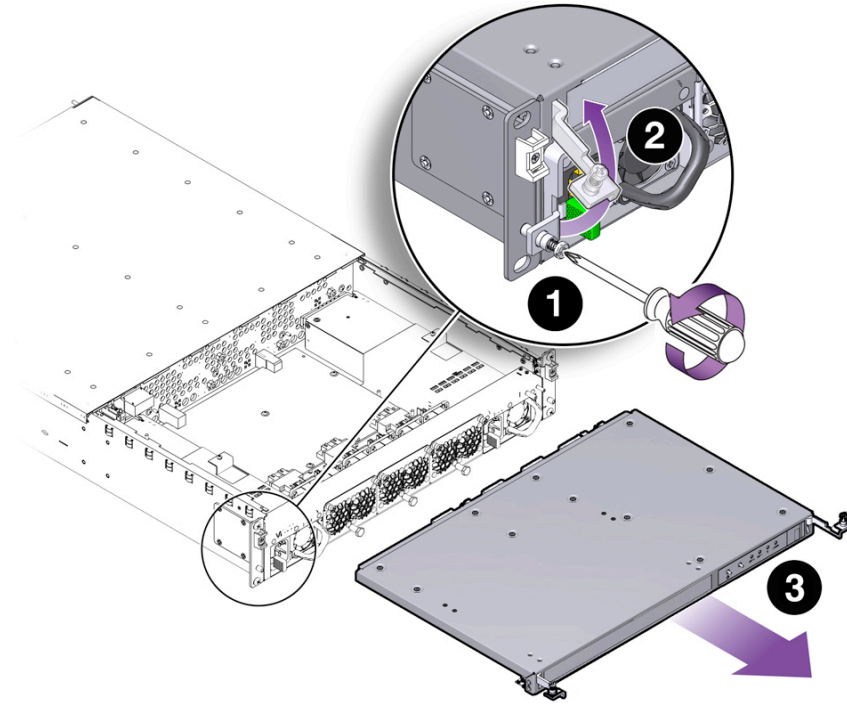
## ▼ Remove a Fabric Interconnect F1-4 Front Panel Assembly

To remove a Fabric Interconnect F1-4 front panel assembly, you will need a #2 Phillips-head screwdriver.

To remove a Fabric Interconnect F1-4 front panel, follow this procedure:

1. **Power down the Fabric Interconnect.**
2. **Using the screwdriver, release the two spring-loaded screws (1) that secure the release levers to the front mounting brackets. See [Figure 98, “Removing the Fabric Interconnect F1-4 Front Panel Assembly,” on page 154.](#)**

**FIGURE 98** Removing the Fabric Interconnect F1-4 Front Panel Assembly

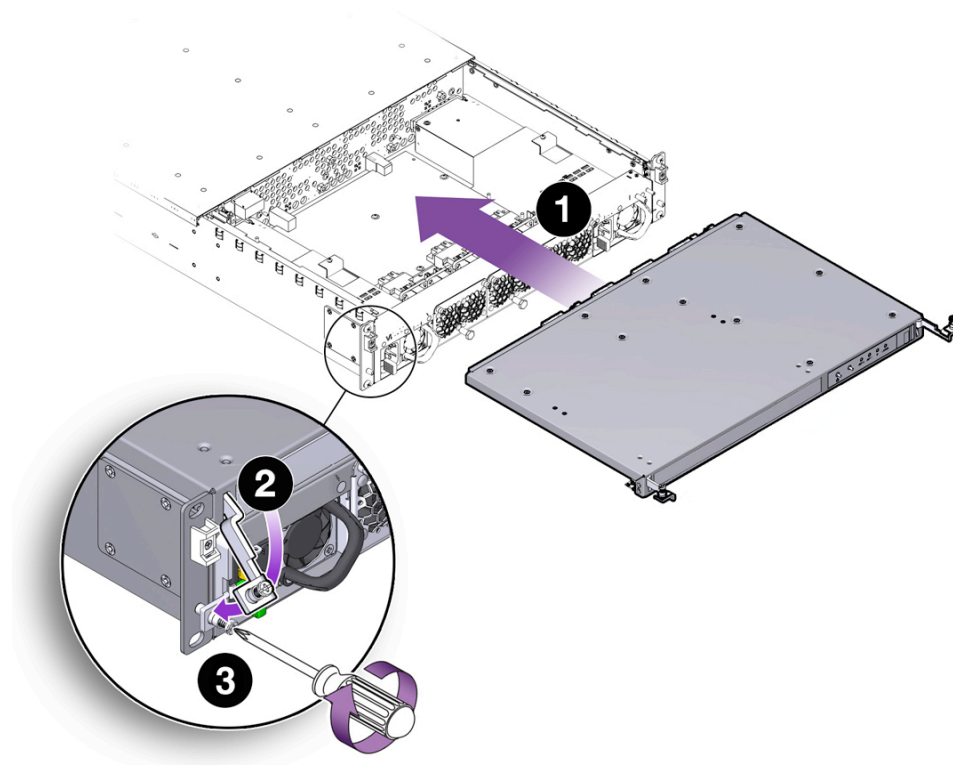


3. When the screws are loose, gently lift the lever arms in a 90 degree upward arc (2) as shown in [Figure 98, “Removing the Fabric Interconnect F1-4 Front Panel Assembly,” on page 154](#). When both arms are lifted, you should feel the Front Panel disengage from the chassis.
4. Holding the lever arms, apply even pressure to both handles and slide the Front Panel towards you (3) until it is completely removed from the Fabric Interconnect F1-4.

## ▼ Install a Fabric Interconnect F1-4 Front Panel Assembly

1. Orient the Front Panel so that the sheet metal side is facing up, and align the left and right sides of the Front Panel with their guides on the left and right sides of the chassis.
2. Holding the lever arms, apply even pressure to both handles and slide the Front Panel into place on the chassis (1). See [Figure 99, “Installing the Fabric Interconnect F1-4 Front Panel Assembly,”](#) on page 155.

FIGURE 99 Installing the Fabric Interconnect F1-4 Front Panel Assembly



As the Front Panel slides into place, you will feel the gaskets at the rear of the Front Panel make contact with the chassis sheet metal.

3. **When the Front Panel is completely seated on the chassis, lower the lever arms in a 90-degree downward arc (2) as shown in [Figure 99, “Installing the Fabric Interconnect F1-4 Front Panel Assembly,” on page 155.](#)**
4. **Align the captive screws in the lever arm's handle with their threaded standoffs in the front mounting bracket.**
5. **Use a #2 Phillips-head screwdriver to tighten the captive screws to their threaded standoffs (3). Do not overtighten the screws.**

## Replacing an FP-1 Front Panel with an FP-2 Front Panel

The FP-1 is no longer available, so if a condition requires replacing the Front Panel, you will receive and FP-2. This topic explains how to replace an FP-1 with an FP-2 and documents important information about mechanical differences between the two parts.

See the following topics:

- [“Installation Considerations” on page 156](#)
- [“Power Down the Oracle Fabric Interconnect” on page 157](#)
- [“Uncable the Oracle Fabric Interconnect” on page 157](#)
- [“Prepare for the Procedure” on page 158](#)
- [“Remove the Oracle Fabric Interconnect from a Four-Post Equipment Rack” on page 158](#)
- [“Remove the Oracle Fabric Interconnect from a 27-Inch Sun/Oracle Equipment Rack” on page 158](#)
- [“Remove the Old Front Panel” on page 160](#)
- [“Remove the Old Mounting Brackets” on page 161](#)
- [“Install the New Mounting Brackets” on page 162](#)
- [“Install the FP-2” on page 164](#)
- [“Install the Oracle Fabric Interconnect” on page 165](#)
- [“Return the Oracle Fabric Interconnect to Service” on page 166](#)

## Installation Considerations

Depending on when you purchased your Oracle Fabric Interconnect, your chassis contains either an FP-1 or an FP-2:

- The FP-1 has long release levers that attach to a threaded standoff near the bottom of the mounting bracket's face
- The FP-2 has short release levers that attach to a threaded standoff near the top of the mounting bracket's face.

- New mounting brackets are required to accept the FP-2. The mounting brackets have two threaded standoff whereas the old mounting brackets have only one threaded standoff.
- Because the new mounting brackets are required to accept the FP-2, you will need to completely unrack, then rerack the Oracle Fabric Interconnect to replace the old mounting brackets with the new ones.
- As part of unracking the Oracle Fabric Interconnect, you will need to uncable the system and remove facility power. Consequently, you will need to schedule a service window to accommodate a service interruption.
- Before beginning this procedure, make a note of how all the cables are connected for the Fabric Board and I/O modules to facilitate returning the Oracle Fabric Interconnect to service.

## ▼ Power Down the Oracle Fabric Interconnect

- Issue the `system shutdown` command and wait for the Oracle Fabric Interconnect to complete its shutdown routine.

## ▼ Uncable the Oracle Fabric Interconnect

1. Make a note of how all cables are connected to facilitate returning the Oracle Fabric Interconnect to service.
2. Disconnect all Infiniband cables from the Fabric Board; all gigabit Ethernet cables from GbE I/O modules; and all FibreChannel cables from the FC I/O modules.
3. Disconnect all power cables from the Oracle Fabric Interconnect.

## Removing the Oracle Fabric Interconnect from the Equipment Rack

To replace an FP-1 with an FP-2 Front Panel, you will need to remove the chassis from the equipment rack.

See the following topics:

- [“Prepare for the Procedure” on page 158](#)
- [“Remove the Oracle Fabric Interconnect from a Four-Post Equipment Rack” on page 158](#)
- [“Remove the Oracle Fabric Interconnect from a 27-Inch Sun/Oracle Equipment Rack” on page 158](#)

## ▼ Prepare for the Procedure

1. **Read important information before beginning this procedure. See [“Installation Considerations” on page 156.](#)**

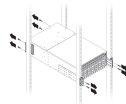
A fully loaded chassis can be heavy. Always follow safety and safe-handling procedures when lifting and handling the equipment.

2. **Gather the necessary tools and prepare a grounded work surface for the Fabric Interconnect chassis.**
3. **Properly affix an ESD wriststrap.**
4. **Find a second person to assist with removing the chassis from the rack and installing it when the new FP2 is installed.**

## ▼ Remove the Oracle Fabric Interconnect from a Four-Post Equipment Rack

You will completely remove the chassis from the rack to get access to the mounting brackets. Also, you will find it helpful to have a cart or sturdy table nearby on which you can place the Oracle Fabric Interconnect when it is removed from the equipment rack. Always follow safety and safe-handling considerations and prerequisites for the procedure.

1. **Remove the screws that secure the chassis to the rack.**



2. **Carefully remove the chassis from the rack and set it on an ESD-safe surface.**
3. **Continue by removing the old mounting brackets.**  
[“Remove the Old Front Panel” on page 160.](#)

## ▼ Remove the Oracle Fabric Interconnect from a 27-Inch Sun/Oracle Equipment Rack

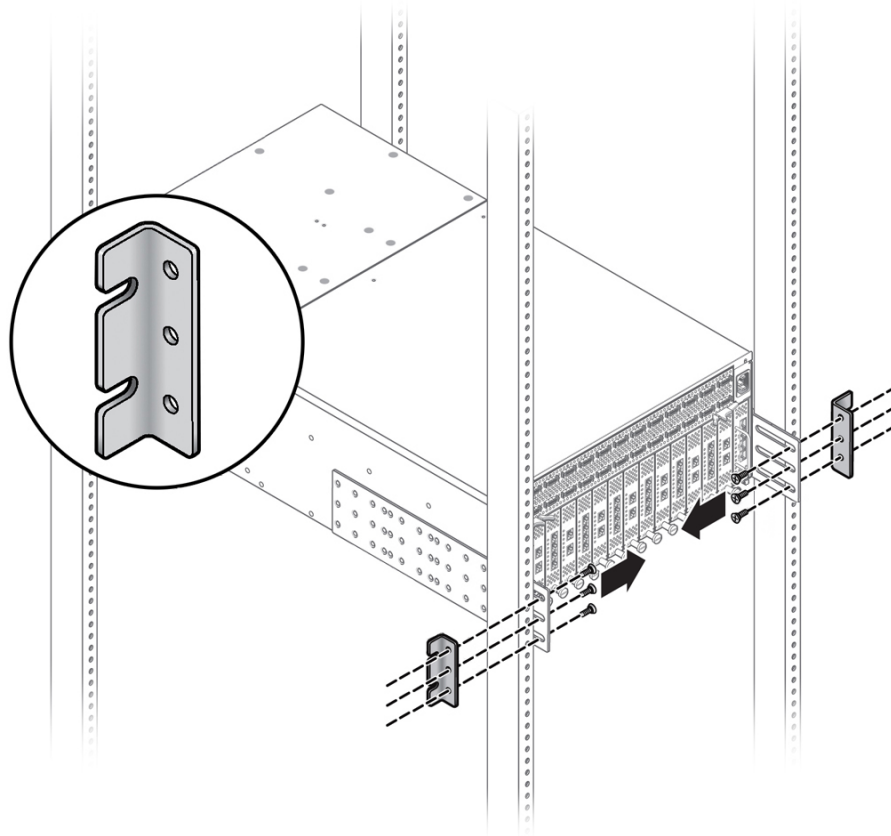
This topic is applicable to Oracle Fabric Interconnects installed in a Sun/Oracle 27-inch equipment rack.

You will find it helpful to have a cart or sturdy table nearby on which you can place the Oracle Fabric Interconnect when it is removed from the equipment rack.

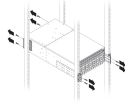


**Caution** - Because of weight, two people are required to remove the Oracle Fabric Interconnect from the rack. Always follow safe lifting procedures when removing and installing the Oracle Fabric Interconnect.

1. **Remove the screws that attach the right angle brackets.**



2. **Remove the screws that secure the chassis to the rack.**



3. **Continue by removing the old mounting brackets.**  
See [“Remove the Old Front Panel” on page 160](#).

## ▼ Remove the Old Front Panel

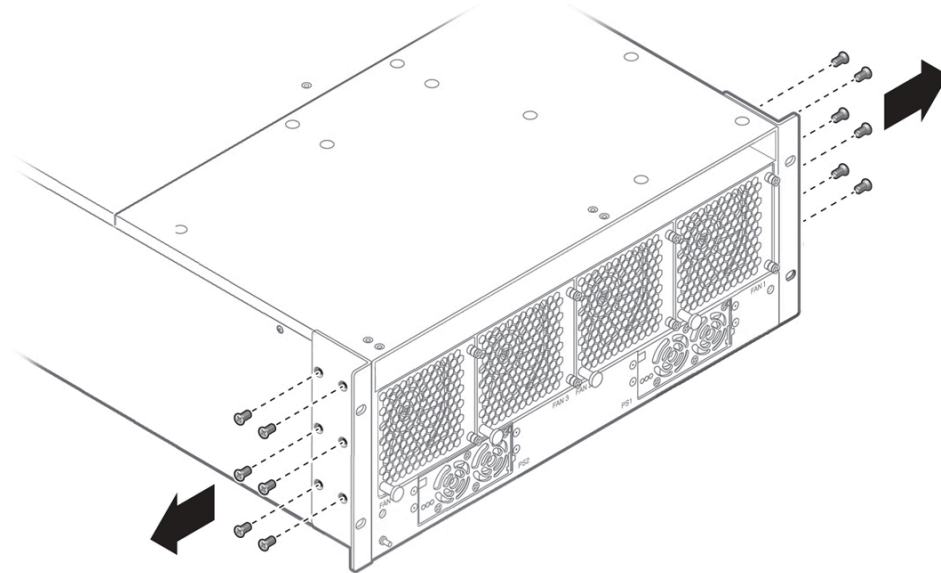
To gain access to the old mounting brackets, which need to be removed, you must disconnect the old front panel.

1. **Disconnect the existing front panel as needed for your model of Oracle Fabric Interconnect:**
  - [“Remove and Install a Fabric Interconnect F1-15 Front Panel Assembly” on page 151](#).
  - [“Remove a Fabric Interconnect F1-4 Front Panel Assembly” on page 153](#)
2. **Continue by removing the old mounting brackets.**  
See [“Remove the Old Mounting Brackets” on page 161](#).



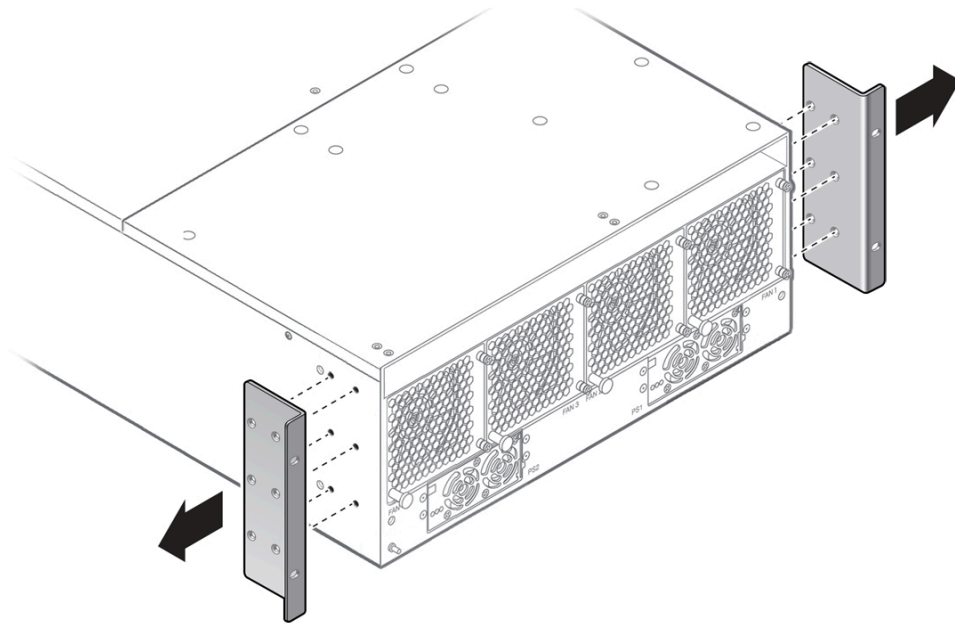
## ▼ Remove the Old Mounting Brackets

1. Remove the screws that attach the old mounting bracket to the chassis.



2. Remove the old mounting brackets.

Pack up the old mounting brackets and return ship in any packaging provided when you return the old Front Panel.



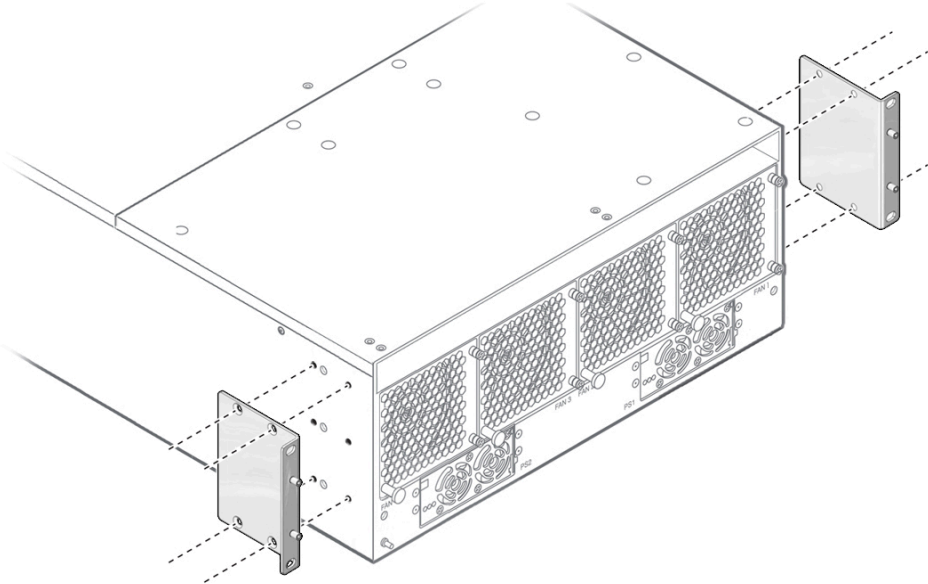
**3. Continue by attaching the new mounting brackets.**

See [“Install the New Mounting Brackets”](#) on page 162.

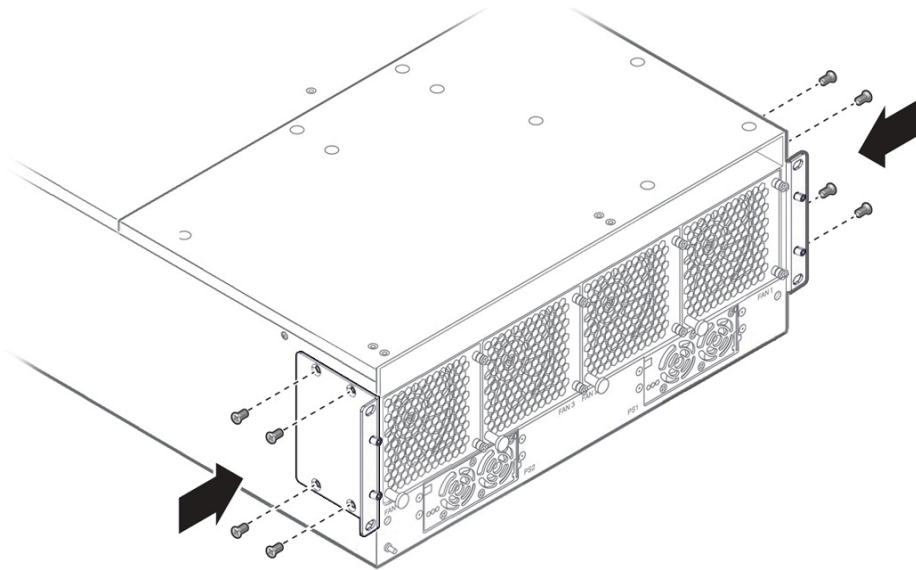
## ▼ Install the New Mounting Brackets

With the old front panel and old mounting brackets removed, you can now begin installing the new parts. You can differentiate the old and new mounting brackets by the presence of a threaded standoff on the new mounting bracket's face.

- 1. Align the new mounting brackets over the screw holes in the chassis.



2. **Insert and tighten the screws to attach the new mounting brackets to the chassis.**



3. **Continue the procedure by inserting the new front panel.**  
See [“Install the FP-2” on page 164](#).

## ▼ Install the FP-2

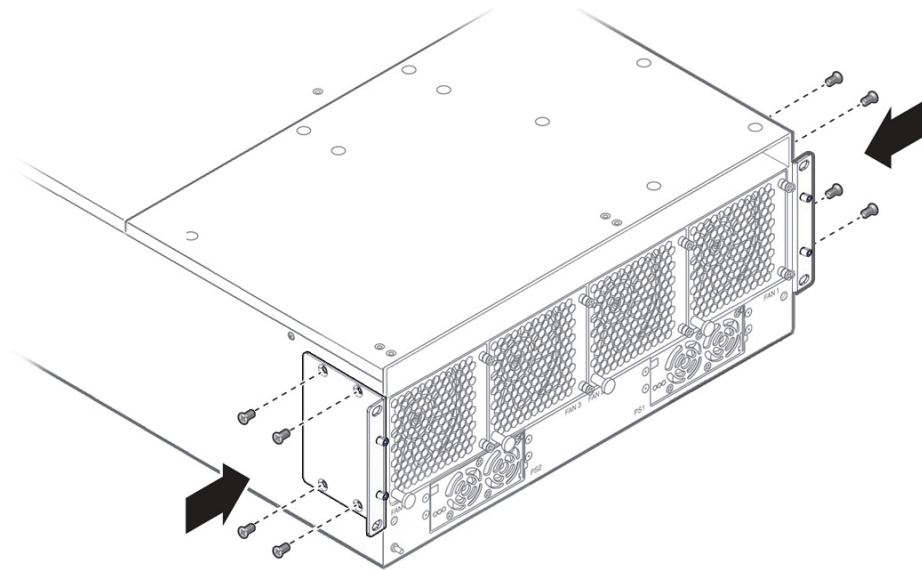
**Before You Begin** To install the new front panel (FP-2), the old front panel must already be removed, and the new mounting brackets must already be installed.

1. **Align the FP-2 with the guides on the inside of the chassis.**  
Make sure that the ejector levers are fully extended so that they are pointing towards you.
2. **Gently slide the FP-2 into the chassis, making sure to apply even pressure so that the FP-2 does not twist or rotate while you are inserting it.**

---

**Note** - When the FP-2 power connector meets the power socket inside the chassis, there will be some resistance.

---



This illustration shows new mounting bracket installation for an Oracle Fabric Interconnect F1-15. For an Oracle Fabric Interconnection F1-4, see [“Install a Fabric Interconnect F1-4 Front Panel Assembly”](#) on page 155.

3. **With the new parts installed, rack install the Oracle Fabric Interconnect.**  
See [“Install the Oracle Fabric Interconnect”](#) on page 165.

## ▼ Install the Oracle Fabric Interconnect

After rack installation, the Oracle Fabric Interconnect you will need to return to this procedure and see [“Return the Oracle Fabric Interconnect to Service”](#) on page 166.




---

**Caution** - Because of weight, two people are required to remove the Oracle Fabric Interconnect from the rack. Always follow safe lifting procedures when removing and installing the Oracle Fabric Interconnect.

---

- **Re-install the Oracle Fabric Interconnect into the rack:**

---

**Note** - The majority of the following chassis-installation procedures is common to both rack types, but be aware that there are extra steps required to install the chassis in a 27-inch Sun/Oracle equipment rack.

---

- For an Oracle Fabric Interconnect F1-15 in a four-post rack or a 27-inch Sun/Oracle rack, see [“Installing the Fabric Interconnect F1-15 in a 4-Post Rack” on page 20.](#)
- For an Oracle Fabric Interconnect F1-4 in a four -post rack or a 27-inch Sun/Oracle rack, see, [“Install the Fabric Interconnect F1-4” on page 49.](#)

## ▼ Return the Oracle Fabric Interconnect to Service

1. **Reconnect the InfiniBand, Gigabit Ethernet, and FibreChannel cables.**  
See [“Connecting the Fabric Interconnect to Other Equipment” on page 77.](#)
2. **Reconnect the Oracle Fabric Interconnect to facility power.**  
See [“AC Power” on page 89.](#)
3. **Complete the Oracle First Boot wizard.**  
See [“Initial Configuration” on page 95.](#)

## Cables and Connectors for 4-Port 10 GE Module

Connection to the 4-Port 10 GE Module is supported through either optical or copper cables. Cables and connectors come in either of the following options:

- Standalone SFP+ port transceivers that plug into an empty port cage on the module. The optical Gigabit Ethernet cable then inserts into the transceiver. Use this arrangement if you will be connecting the 4-Port 10 GE module to an optical environment.
- An SFP+ cable (passive or active copper cabling):
  - Active copper cabling is a Gigabit Ethernet copper cable with the SFP+ port transceiver embedded into both ends of the cable. Because the SFP+ transceiver is part of the cable, the cable then plugs into the empty port cage on the 4-Port 10 GE Module.
  - Passive copper cabling does not have the transceiver embedded. Use this arrangement if you will be connecting the 4-Port 10 GE module to a copper environment.

---

**Note** - Notice that the maximum cable length supported for passive copper cables is 5 meters, as indicated in [Table 3, “Supported SFP+ Copper Cables,” on page 167.](#)

---

Supported transceivers and cables are available from Oracle or a third-party. If you will be purchasing transceivers and cables from a third party vendor, make sure to order one of the supported types listed in [Table 2, “ Supported SFP+ Optical Transceivers,” on page 167](#) or [Table 3, “ Supported SFP+ Copper Cables,” on page 167](#).

**TABLE 2** Supported SFP+ Optical Transceivers

Mode	Manufacturer	Part Number
Short reach	Finisar	FTLX8571D3BCL
Short reach	Sumitomo	SPP5100SR-GL
Short reach	MergeOptics	TRX10GVP2010
Short reach	Opnext	TRS2000EN-S002
Short reach	Opnext	TRS2001EN-0001
Short reach	Oplink	TPP1XGDS0C000E2G
Long reach	Opnext	TRS5020EN-S002
Long reach	Oplink	TPP2XGFLRC000E2G

**TABLE 3** Supported SFP+ Copper Cables

Mode	Manufacturer	Part Number
Passive	FCI, 1 meter	10110818-2010LF
Passive	FCI, 2 meters	10110818-2020LF
Passive	FCI 3 meters	10110818-2030LF
Passive	FCI 5 meters	10110818-3050LF
Passive	Meritec, 1 meter	9841-DNN-01.0
Passive	Meritec, 2 meters	9841-DNN-02.0
Passive	Meritec, 3 meters	9841-DNN-03.0
Passive	Meritec, 5 meters	9841-DNN-05.0
Passive	Tyco, 3 meters	2127932-4
Passive	Tyco, 5 meters	2127932-6
Active	FCI, 1 meter	10101498-1010LF
Active	FCI, 4 meters	10101498-1040LF
Active	FCI, 8 meters	10101498-3080LF
Active	FCI, 12 meters	10101498-4120LF
Active	FCI, 15 meters	10101498-5150LF





## Glossary

---

### A

- ACL (Access Control List)** A collection of rule sets, rules, conditions, and actions that are compared against network traffic to determine if an action should be taken on the traffic.
- ACL action** A single action that can be configured in an ACL rule. The action is the enforced result after network traffic is successfully matched against one or more ACL conditions.
- ACL conditions** Individual network traffic conditions that can be configured in an ACL rule. Some examples of ACL conditions are source/destination addresses that match network traffic, and IPToS bits with a specific value. If multiple conditions are configured in a rule, the conditions are ANDed.
- ACL rule set** A collection of one or more rules that are configured to create an ACL.
- ACL rules** A collection of conditions and an action that are compared to network traffic. If the comparison of the rule to the network traffic results in a match, then the action is enforced. If multiple rules are configured in a rule set, each rule is ORed.

### H

- HA vNICs** High Availability vNIC - A pair of virtual Ethernet interfaces, that are both assigned to the same server profile, but terminated on different physical interfaces.
- HCA** Host Channel Adapter - A hardware card, installed in a physical server, that provides high-speed connectivity and virtual interfaces, based on the InfiniBand interface.

### I

- I/O Card** A physical card that is installed in one of 15 slots in the chassis' card bay. The Fabric Interconnect supports the following types of I/O card: Ethernet, Fibre Channel, and Host Bus Adapter. The Ethernet and Host Bus Adapter modules provide access to Ethernet and Fibre Channel networks, respectively.

**I/O Port** A single port on an Ethernet module, a Host Bus Adapter module, or one of the 24 InfiniBand ports on the Fabric Interconnect InfiniBand Fabric board.

**I/O Slot** A single slot in the Oracle Fabric Interconnect chassis. A slot can be populated with an I/O card, pre-provisioned for a specific I/O card, or not populated with a module.

## M

**Managed Object** An object-oriented representation of a resource managed in a device. This can be a physical or logical resource.

## P

**Policy** Configuration of automatic system behavior (such as, statistics collection, database cleanup, and so on.)

## Q

**Quality of Service** The Quality of Service (QoS) object allows the data traffic of individual applications to be managed. The performance of a particular application can be guaranteed by raising the priority of its dataflow, relative to the other applications.

## R

**Role** One of the privilege levels that a user may be assigned (for example, “Operators” or “Administrators”) that affects what objects in the XgOS the user can add, delete, or modify.

## S

**Server Profile** One instance of a server I/O configuration that is assignable to a single physical server through an IB port.

**System** An object that identifies a given system at the highest (“top”) level in the object model hierarchy.

**U**

**User** An internal or external representation of a person. Users either exist locally or remotely through LDAP, Active Directory, or RADIUS. By default, an “admin” user is created locally.

**V**

**vHBA** Virtual Host Bus Adapter, which is a Fibre Channel storage connection, provided without a physical HBA.

**VLAN** Virtual Local Area Network - A private, independent, logical network that is created within a physical network. A VLAN behaves like an ordinary LAN, but connected devices do not have to be physically connected to the same network segment.

**vNIC** Virtual Network Interface Card - An Ethernet connection, provided without a physical NIC.



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