

Rack Installation Guide

Notes, Notices, and Cautions



NOTE: A NOTE indicates important information that helps you make better use of your computer.



NOTICE: A NOTICE indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.



CAUTION: A CAUTION indicates a potential for property damage, personal injury, or death.

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CAUTION: Safety Instructions


Use the following safety guidelines to ensure your own personal safety and to help protect your system and working environment from potential damage. For complete safety and regulatory information, see the *Product Information Guide* that shipped with your system. Warranty information might be included in this document or as a separate document.

SAFETY: Rack Mounting of Systems

Observe the following precautions for rack stability and safety. Also refer to the rack installation documentation accompanying the system and the rack for specific caution statements and procedures.

Systems are considered to be components in a rack. Thus, "component" refers to any system as well as to various peripherals or supporting hardware.


 **CAUTION:** Before installing systems in a rack, install front and side stabilizers on stand-alone racks or the front stabilizer on racks joined to other racks. Failure to install stabilizers accordingly before installing systems in a rack could cause the rack to tip over, potentially resulting in bodily injury under certain circumstances. Therefore, always install the stabilizer(s) before installing components in the rack.

 **CAUTION:** After installing system/components in a rack, never pull more than one component out of the rack on its slide assemblies at one time. The weight of more than one extended component could cause the rack to tip over and may result in serious injury.



NOTE: Your system is safety-certified as a free-standing unit and as a component for use in a Dell rack cabinet using the customer rack kit. The installation of your system and rack kit in any other rack cabinet has not been approved by any safety agencies. It is your responsibility to ensure that the final combination of system and rack complies with all applicable safety standards and local electric code requirements. Dell disclaims all liability and warranties in connection with such combinations.

- System rack kits are intended to be installed in a rack by trained service technicians. If you install the kit in any other rack, be sure that the rack meets the specifications of a Dell rack.

 **CAUTION:** Do not move racks by yourself. Due to the height and weight of the rack, a minimum of two people should accomplish this task.

- Before working on the rack, make sure that the stabilizers are secured to the rack, extended to the floor, and that the full weight of the rack rests on the floor. Install front and side stabilizers on a single rack or front stabilizers for joined multiple racks before working on the rack.
- Always load the rack from the bottom up, and load the heaviest item in the rack first.
- Make sure that the rack is level and stable before extending a component from the rack.
- Use caution when pressing the component rail release latches and sliding a component into or out of a rack; the slide rails can pinch your fingers.
- Do not overload the AC supply branch circuit that provides power to the rack. The total rack load should not exceed 80 percent of the branch circuit rating.
- Ensure that proper airflow is provided to components in the rack.
- Do not step on or stand on any component when servicing other components in a rack.

General Installation Instructions

This installation guide provides instructions for trained service technicians installing one or more systems in an open-frame relay rack or in a rack cabinet. The RapidRails™ rack kit can be installed without tools in manufacturer's rack cabinets that have square holes; the VersaRails™ rack kit can be installed in most industry-standard rack cabinets that have square or round holes. The procedures for installing both RapidRails and VersaRails rack kits are similar. One rack kit is required for each system installed in the rack.



CAUTION: Do not install rack kit components designed for another system. Use only the rack kit for your system. Using the rack kit for another system may result in damage to the system and personal injury.



NOTE: If your system is a tower version, you must install a tower-to-rack kit. Instructions for installing this kit are included in a separate document.

The RapidRails rack kit can be installed in most industry-standard rack cabinets.



NOTICE: The VersaRails rack kit is intended to be installed by trained service technicians in a rack that meets the specifications of American National Standards Institute (ANSI)/Electronic Industries Association (EIA) standard ANSI/EIA-310-D-92, International Electrotechnical Commission (IEC) 297, and Deutsche Industrie Norm (DIN) 41494. One rack kit is required for each system that is installed in a rack.

Before You Begin

Before you begin installing your system in the rack, carefully read "CAUTION: Safety Instructions" on page 5, as well as the safety instructions found in your *Product Information Guide* for additional information.



CAUTION: When installing multiple systems in a rack, complete all of the procedures for the current system before attempting to install the next system.



CAUTION: Rack cabinets can be extremely heavy and move easily on the casters. The cabinet has no brakes. Use extreme caution while moving the rack cabinet. Retract the leveling feet when relocating the rack cabinet. Avoid long or steep inclines or ramps where loss of cabinet control may occur. Extend the leveling feet for support and to prevent the cabinet from rolling.

Important Safety Information

Observe the safety precautions in the following subsections when installing your system in the rack.



CAUTION: You must strictly follow the procedures in this document to protect yourself as well as others who may be involved. Your system may be very large and heavy, and proper preparation and planning are important to prevent injury to yourself and to others. This becomes increasingly important when systems are installed high up in the rack.

Rack Stabilizer Feet



CAUTION: Before installing systems in a rack, install front and side stabilizers on stand-alone racks or the front stabilizer on racks joined to other racks. Failure to install stabilizers accordingly before installing systems in a rack could cause the rack to tip over, potentially resulting in bodily injury under certain circumstances. Therefore, always install the stabilizer(s) before installing components in the rack.



CAUTION: After installing system/components in a rack, never pull more than one component out of the rack on its slide assemblies at one time. The weight of more than one extended component could cause the rack to tip over and may result in serious injury.

The stabilizer feet help prevent the rack from tipping over when a system or other component is pulled out of the rack with the slide assemblies fully extended. See the documentation provided with the rack cabinet for instructions on installing and anchoring the stabilizer feet.

Installation Tasks

Installing a rack kit involves performing the following tasks (described in detail in subsequent sections) in their numbered order:

- 1 Removing the rack doors (if necessary)
- 2 Marking the rack (if necessary)
- 3 Configuring the sliding rail assemblies
- 4 Installing the mounting rails in the rack
 - RapidRails installation
 - VersaRails installation
- 5 Installing the system in the rack
- 6 Attaching the cable tray
- 7 Attaching the cable-management arm
- 8 Routing cables
- 9 Attaching the cable-management arm retainer
- 10 Replacing the rack doors (if necessary)

Recommended Tools and Supplies

- A #2 Phillips screwdriver (VersaRails only)
- Masking tape or a felt-tipped pen for marking the mounting holes to be used
- A measuring ruler or tape measure

Rack Kit Contents

The rack kit includes the following items (see Figure 1-1):

- One pair of mounting rails with rotating brackets



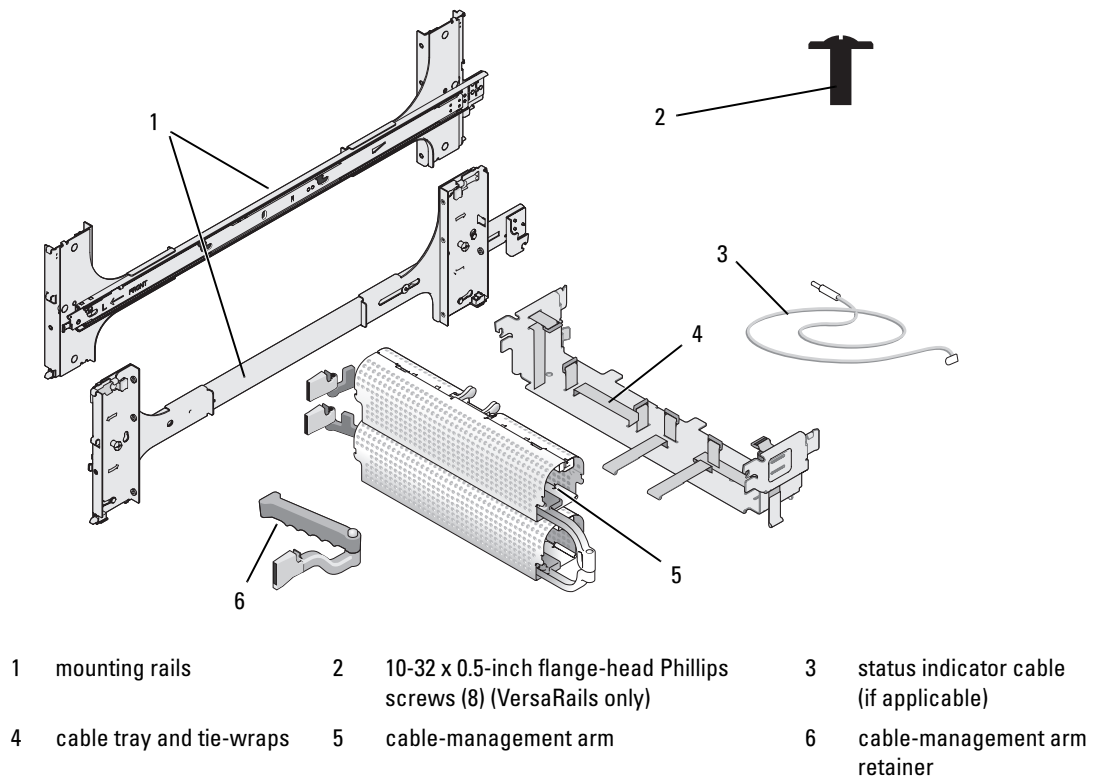
NOTE: You can configure the sliding rail assemblies as either RapidRails or VersaRails using the rotating brackets.

- One cable tray
- One cable-management arm
- One cable-management arm retainer
- One status indicator cable (if applicable)
- Eight 10-32 x 0.5-inch flange-head Phillips screws



NOTE: The nonmetric screws described in illustrations and in procedural steps are identified by size and number of threads per inch. For example, a #10 Phillips-head screw with 32 threads per inch is identified as a 10-32 screw.

Figure 1-1. Rack Kit Contents



1 mounting rails

2 10-32 x 0.5-inch flange-head Phillips screws (8) (VersaRails only)

3 status indicator cable (if applicable)

4 cable tray and tie-wraps

5 cable-management arm

6 cable-management arm retainer

Removing the Rack Doors

See the procedures for removing doors in the documentation provided with your rack cabinet.

CAUTION: Because of the size and weight of the rack cabinet doors, never attempt to remove or install them by yourself.

CAUTION: Store the two doors where they will not injure someone if the doors accidentally fall over.

Marking the Rack

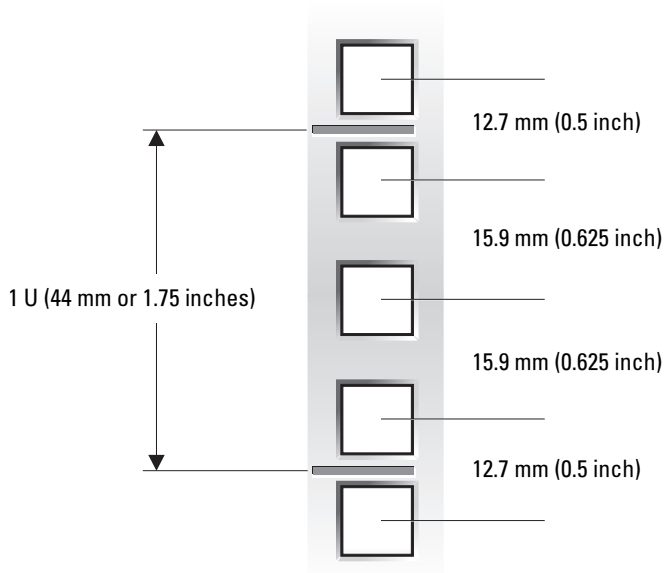
For a 5-U system, you must allow 5 U (8.75 inches) of vertical space for each system you install in the rack (see Figure 1-2).

Rack cabinets that meet EIA-310 standards have an alternating pattern of three holes per rack unit with center-to-center hole spacing (beginning at the top hole of a 1-U space) of 15.9 mm, 15.9 mm, and 12.7 mm (0.625 inch, 0.625 inch, and 0.5 inch) for the front and back vertical rails (see Figure 1-2). Rack cabinets may have round or square holes.

NOTE: The vertical rails may be marked by horizontal lines and numbers in 1-U increments. If you want, you can make a note of the number marking on the rack's vertical rail. It is not necessary to mark or place tape on the rack.

NOTE: Your rack may already be marked and not require this procedure.

Figure 1-2. One Rack Unit



CAUTION: If you are installing more than one system, install the sliding rail assemblies so that the first system is installed in the lowest available position in the rack.

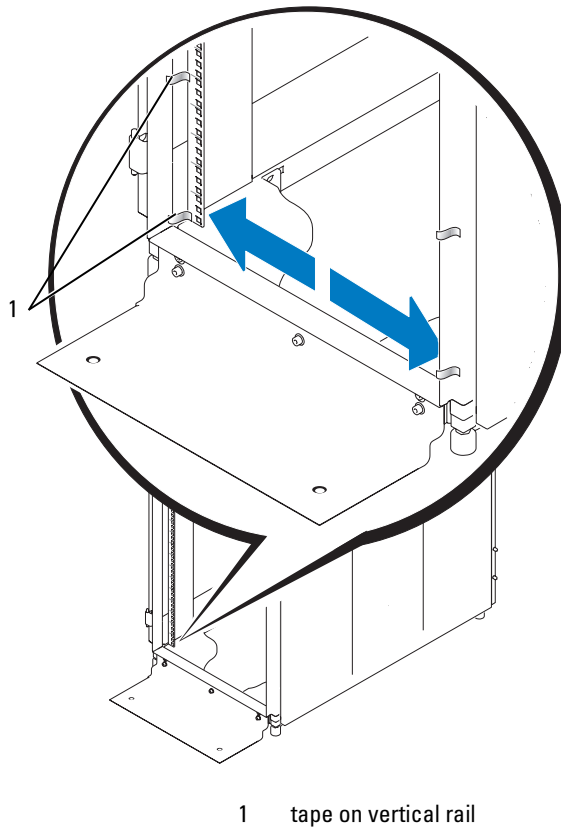
To mark the rack, perform the following steps:

- 1 Place a mark on the rack's front vertical rails where you want to locate the bottom of the system you are installing in the rack cabinet.

The bottom of each 1-U space is at the middle of the narrowest metal area between holes (marked with a horizontal line on some rack cabinets—see Figure 1-3).


- 2 Place a mark approximately 8.75 inches above the original mark you made (or count up 15 holes in a rack that meets EIA-310 standards) and mark the rack's front vertical rails with a felt-tipped pen or masking tape (if you counted holes, place a mark just above the top hole). This mark or piece of tape indicates where the system's upper edge will be located on the vertical rails (see Figure 1-3).

Figure 1-3. Marking the Vertical Rails



Configuring the Sliding Rail Assemblies

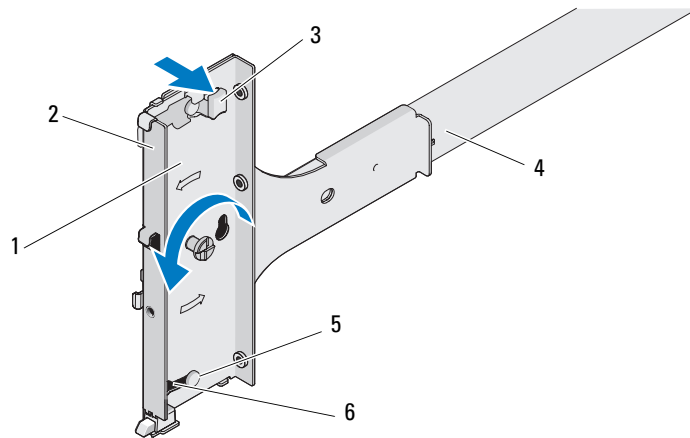
The rotating mounting brackets on the mounting rails allow you to configure them as either RapidRails or VersaRails. The mounting-bracket flange on the RapidRails configuration has two hooks and a push button (see Figure 1-5). The mounting-bracket flange on the VersaRail has three holes (see Figure 1-6).

 **NOTE:** The rack kit ships with the sliding rail assemblies in the RapidRails configuration.

To rotate the mounting bracket and change the mounting rails from RapidRails to VersaRails (see Figure 1-4):

- 1 Lift the release lever on the rotating mounting bracket.
- 2 Rotate the bracket and slide it up off the two shoulder standoffs.
- 3 Continue to rotate the bracket 180 degrees until you can set the notches back over the shoulder standoffs.
- 4 Rotate the bracket back in the opposite direction on the shoulder standoffs until the bracket clicks into place.

Figure 1-4. Rotating the Mounting Bracket



- | | | |
|-----------------------------|---|-----------------|
| 1 rotating mounting bracket | 2 mounting-bracket flange
(RapidRails version shown) | 3 release lever |
| 4 mounting rails | 5 shoulder standoff | 6 notch |

Installing the Mounting Rails in the Rack

Installing the RapidRails



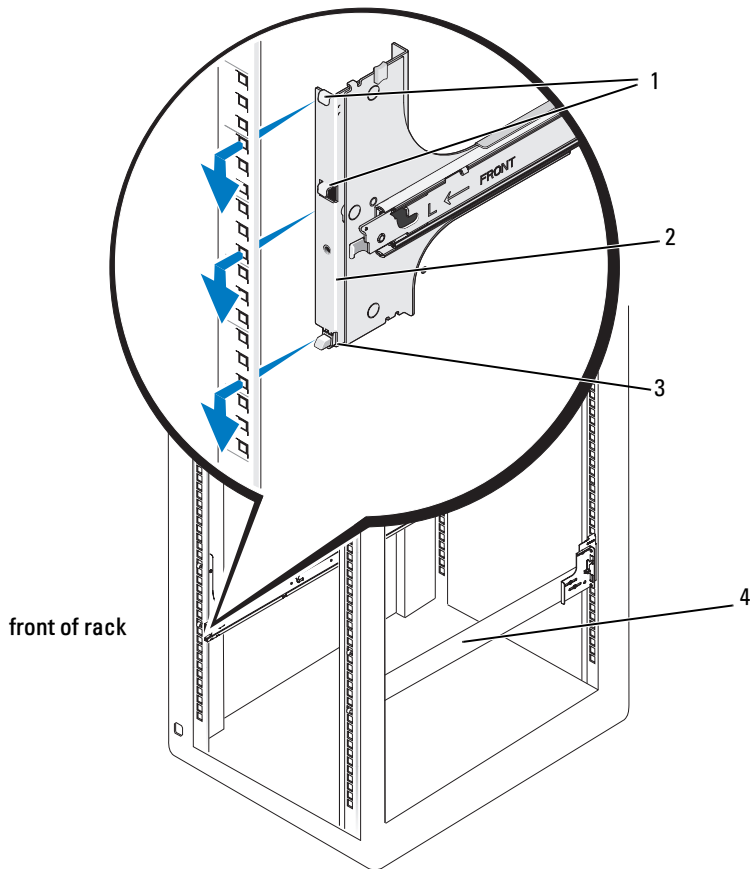
NOTE: Ensure that the rotating mounting brackets on the mounting rails are in the RapidRail configuration as shown in Figure 1-5.

- 1 At the front of the rack cabinet, position one of the mounting rails so that the flange fits between the marks or numbered locations on the vertical rails (see "Marking the Rack" on page 9).
- 2 Place the top mounting hook in the square hole just below the upper mark on the vertical rail and place the next mounting hook in its corresponding square hole on the vertical rail (see Figure 1-5).
- 3 Push down on the flange to firmly attach the front of the RapidRail to the vertical rail. The push button at the bottom of the mounting flange will then engage its corresponding square hole on the vertical rail (see Figure 1-5).
- 4 At the back of the cabinet, place the mounting hooks in their corresponding square holes on the back vertical rail, and push down on the flange until the mounting hooks and push button seat into place.
- 5 Repeat steps 1 through 4 for the mounting rails on the other side of the rack.



NOTE: Ensure that the mounting rails are mounted at the same vertical position on both sides of the rack.

Figure 1-5. Installing the RapidRails



- | | | | | | |
|---|----------------|---|-------------------------|---|-------------|
| 1 | mounting hooks | 2 | mounting-bracket flange | 3 | push button |
| 4 | mounting rails | | | | |

Installing the VersaRails



NOTE: Ensure that the rotating mounting brackets on the mounting rails are in the VersaRail configuration as shown in Figure 1-6. See "Configuring the Sliding Rail Assemblies" on page 11.

- 1 At the front of the rack cabinet, position one of the mounting rails so that the flange fits between the marks or numbered locations on the vertical rails (see "Marking the Rack" on page 9).
- 2 Install the 10-32 x 0.5-inch flange-head Phillips screws in the mounting flange's top hole and the bottom hole (see Figure 1-6).
- 3 At the back of the cabinet, pull back on the mounting-bracket flange until the mounting holes align with their respective holes on the back vertical rail.

- 4 Install the 10-32 x 0.5-inch flange-head Phillips screws in the back mounting flange's top and bottom holes to secure the mounting rail to the back vertical rail.
- 5 Repeat steps 1 through 4 for the mounting rail on the other side of the rack.


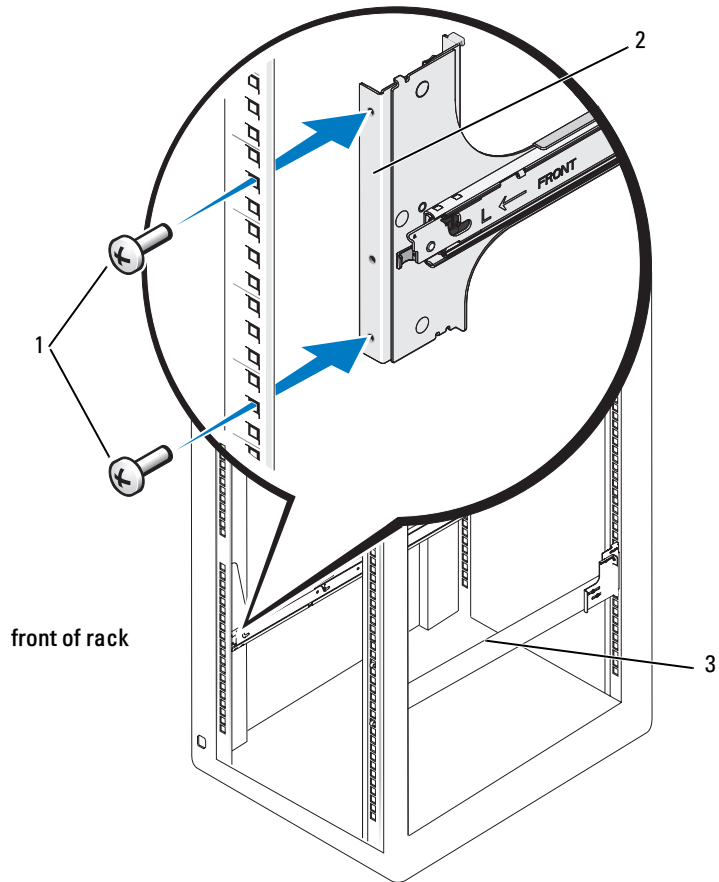



 **NOTE:** Ensure that the mounting rails are mounted at the same vertical position on both sides of the rack.

Figure 1-6. Installing the VersaRails



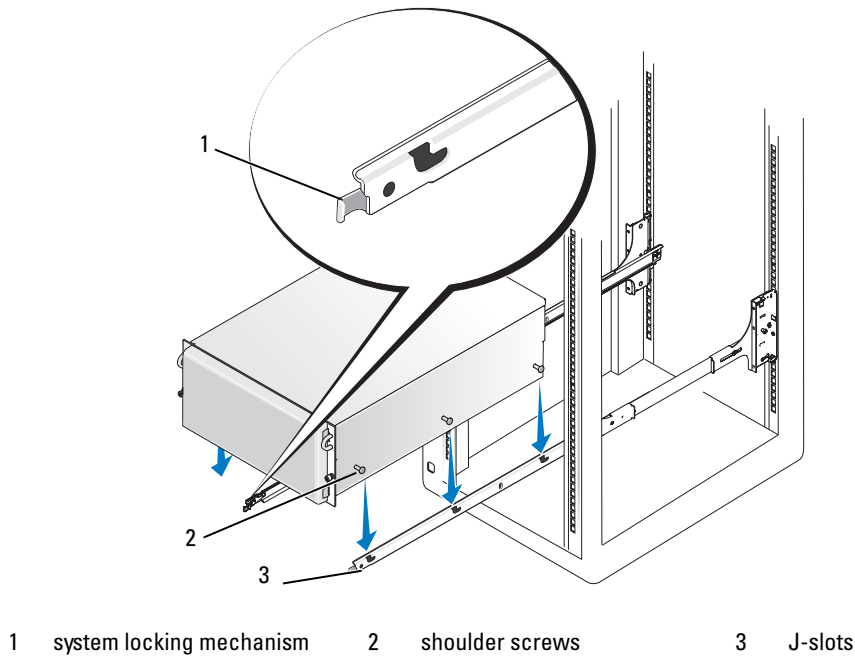
- 1 flange-head Phillips screws 2 mounting-bracket flange 3 mounting rails

Installing the System in the Rack

-  **CAUTION:** If you are installing more than one system, install the first system in the lowest available position in the rack.
 -  **CAUTION:** Because of the size and weight of the system, never attempt to install the system in the mounting rails by yourself.
 -  **CAUTION:** Never pull more than one system out of the rack at a time.
- 1 Pull the two inner slide assemblies out of the rack until they lock in the fully extended position.
 - 2 Lift the system into position above the extended slides.
Using a minimum of two persons, each person should place one hand on the front-bottom of the system and the other hand on the back-bottom of the system.

The three shoulder screws on each side of the system fit into the corresponding J-slots on the inner slide assemblies (see Figure 1-7).
 - 3 Lower the back of the system while aligning the back shoulder screws on the sides of the system with the back J-slots on the slide assemblies.

Figure 1-7. Installing the System in the Rack



- 4 Engage the back shoulder screws into their respective J-slots.
- 5 Lower the front of the system and fit the middle and front shoulder screws into their respective J-slots.
- 6 Push the system inward on the mounting rails until the system-locking mechanism clicks into place, locking the slide to the system.
- 7 Push in the release latches on the side of the slide assemblies, and push the system into the rack.
- 8 Tighten the thumbscrews on the system front panel to secure the system to the rack.

Cable Management

Use the cable tray and cable-management arm to manage your system's I/O and power cables. Use the tie-wraps on the cable tray to bundle the cables together. Use the cable-management arm to contain the cables by routing them through the upper and lower wire baskets.



NOTE: You can attach the cable-management arm to either side of the rack cabinet. If you attach the cable-management arm to the right side of the rack cabinet, you can open both cable baskets without moving the cable-management arm. If you attach it to the left side, you have to swing the cable-management arm out toward you to open the cable baskets.



NOTE: If you attach the cable-management arm to the left side of the rack, you must disconnect the lower release latch on the cable-management arm before you can remove the power supply.



NOTE: You will attach the cable-management arm retainer to the side opposite of where you attach the cable-management arm.

Attaching the Cable Tray

To attach the cable tray to the back of the system:

- 1 Locate the tab slots on the left and right outer edges of the system and the corresponding metal tabs on the left and right edges of the cable tray (see Figure 1-8).
- 2 Align and insert the metal tabs on the cable tray into the tab slots on the system and seat the cable tray into place.
- 3 Push down and tighten the captive thumbscrew on the cable tray to secure it to the system (see Figure 1-8).



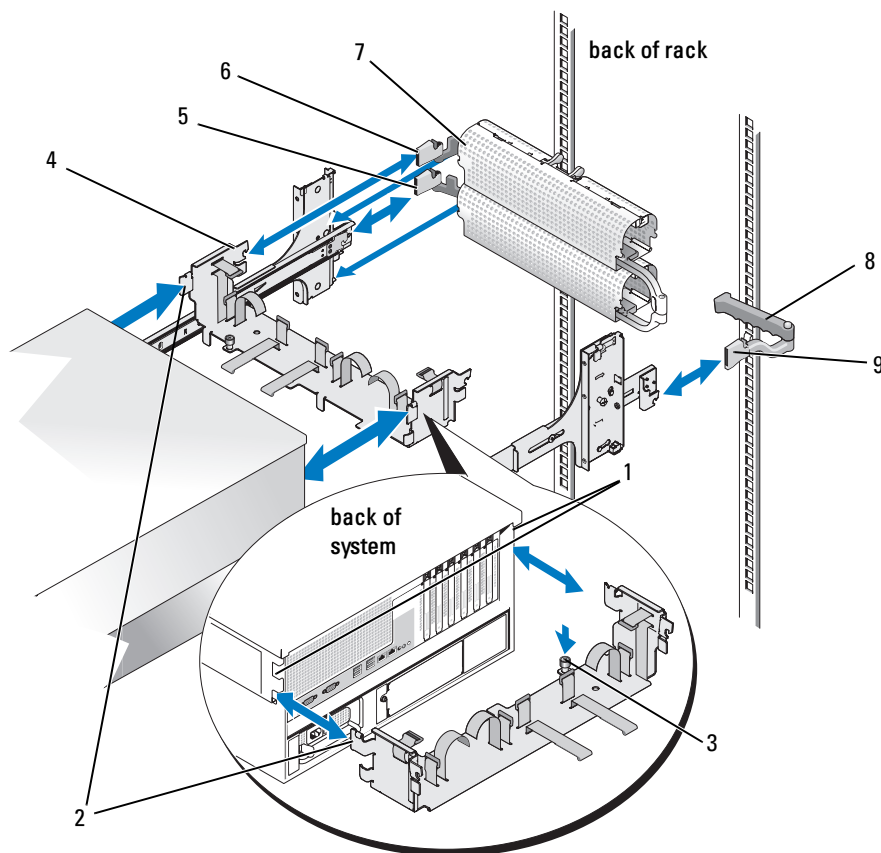
CAUTION: The cable tray cannot support the weight of the system. Do not grasp the cable tray when lifting the system. Lift the system only by the chassis edges.

Attaching the Cable-Management Arm

To attach the cable-management arm:

- 1 Connect the top release latch on the cable-management arm to the tab on the cable tray (see Figure 1-8).
- 2 Connect the bottom release latch on the cable-management arm to the tab on the outer slide assembly (see Figure 1-8).

Figure 1-8. Cable Management



- | | | | | | |
|---|--|---|--|---|--|
| 1 | tab slots on system | 2 | metal tabs (attaches cable tray to system) | 3 | captive thumbscrew |
| 4 | metal tabs (attaches cable tray to cable-management arm) | 5 | bottom release latch on cable-management arm | 6 | top release latch on cable-management arm |
| 7 | cable-management arm | 8 | cable-management arm retainer | 9 | release latch on cable-management arm retainer |

Attaching the System Status-Indicator Cable

- 1 If applicable, attach the system status-indicator cable plug to the back panel of the system (see Figure 1-9).
- 2 Open both baskets on the cable-management arm by squeezing the release latches on each basket. The baskets swing open to enable cables to be routed within the arms (see Figure 1-9).
- 3 Route the system status-indicator cable through the upper basket and then through the lower basket of the cable-management arm. Insert the LED end of the system status-indicator cable into one of the indicator slots on the cable-management arm (see Figure 1-9).

Routing Cables

- 1 Attach the I/O cable connectors and power cable connectors to their respective connectors on the back panel of the system.

For details on cable connections, see your system's *Getting Started Guide* and the *Hardware Owner's Manual*.



NOTE: Use the cable retention brackets (if present) on the back of the power supplies to provide strain relief for the power cables.

- 2 Bundle all cables together using the tie-wraps on the cable tray (see Figure 1-9).



NOTE: To keep the cable-management arm from sagging, it is critical that you use the upper tie-wrap on the cable tray that is on the same side as the cable-management arm (see Figure 1-9).

- 3 If not already open from routing the system status-indicator cable, open both baskets on the cable-management arm by squeezing the release latches on each basket. The baskets swing open to enable cables to be routed within the arms (see Figure 1-9).
- 4 Route cables through the upper basket and then through the lower basket of the cable-management arm.



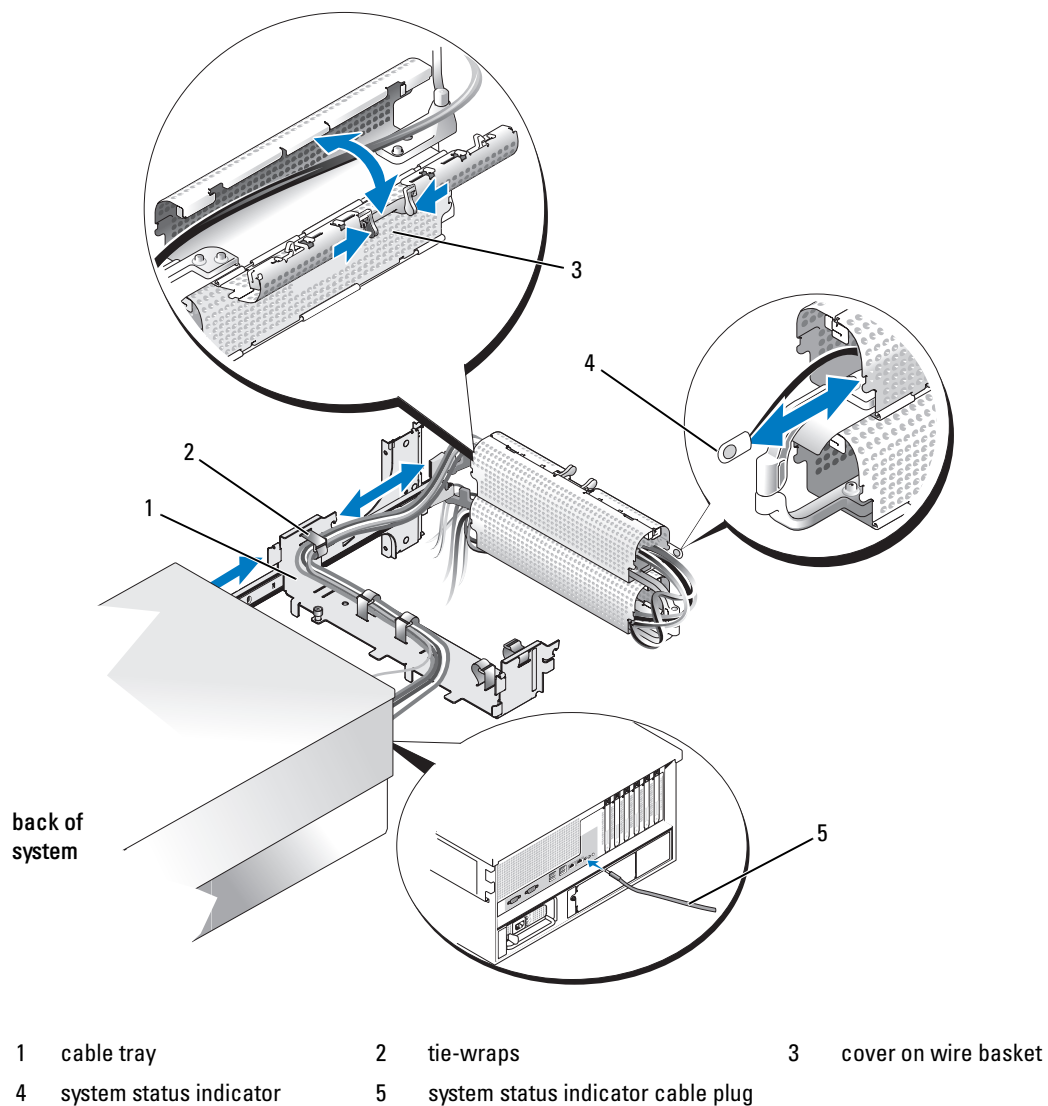
NOTE: For proper system cable installation, you must route the cables first through the upper basket followed by the lower basket.

- 5 Close the cable baskets.
- 6 Unscrew the thumbscrews that secure the front of the system to the front vertical rail.
- 7 Slide the system in and out of the rack to verify that the cables are routed correctly and do not bind, stretch, or pinch with the movement of the cable-management arm. Adjust the cable positioning inside the cable-management arm baskets as needed.



NOTE: If you pull the system out to its furthest extension, the mounting rails will lock in the extended position. To release the lock, press the release latch on the side of the slide assembly and then slide the system into the rack.

Figure 1-9. Routing Cables



Attaching the Cable-Management Arm Retainer

The cable-management arm retainer keeps the cable-management arm in place. To attach the cable-management arm retainer:

- 1 Connect the release latch on the cable-management arm retainer to the tab on the outer slide assembly. See Figure 1-10.



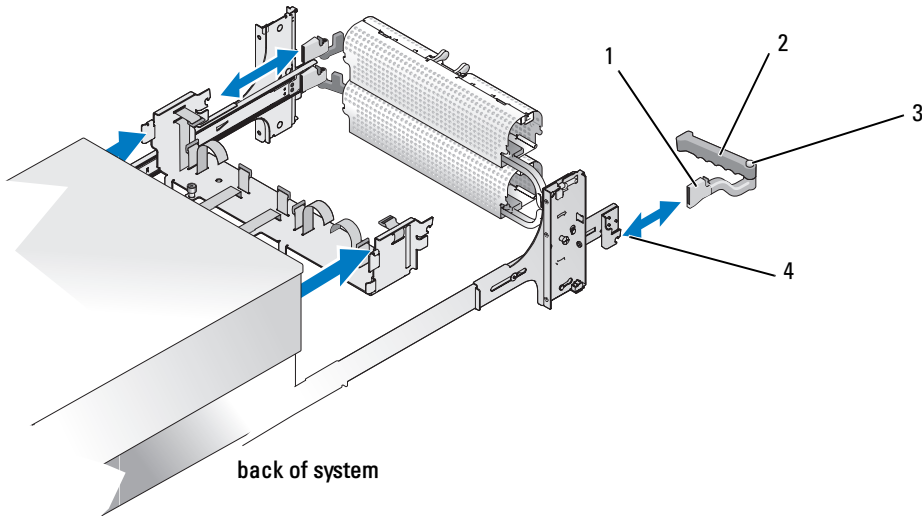
NOTE: Attach the cable-management arm retainer to the side opposite of where you attach the cable-management arm (see Figure 1-10).

- 2 Fold the cable-management arm retainer until it locks into place behind the cable-management arm.

To unlock the cable-management arm retainer:

- 1 Press the blue button on the cable-management arm retainer while lifting the retainer arm.
- 2 Rotate the arm of the retainer to an open position.

Figure 1-10. Cable-Management Arm Retainer



- | | | | | | |
|---|--|---|-------------------------------|---|-------------|
| 1 | release latch on cable-management arm retainer | 2 | cable-management arm retainer | 3 | blue button |
| 4 | metal tab | | | | |

Replacing the Rack Doors

See the procedures for replacing doors in the documentation provided with your rack cabinets. This completes the rack installation of your system.