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.**

Contents

1

Four-Post Rack Installation

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.**

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 a rack cabinet. The RapidRails™ rack kit can be installed in all the system manufacturer's rack cabinets without tools, and the VersaRails™ rack kit can be installed in most industry-standard rack cabinets. The procedures for installing both RapidRails and VersaRails rack kits are similar. One rack kit is required for each system to be installed in the rack cabinet.

This section includes procedures for the following four-post rack kits:

- Sliding rails rack kit
- Static rails rack kit (RapidRails and VersaRails versions)

  (See "Two-Post Rack Installation" on page 27 for instructions on installing a static rails kit in a two-post rack.)

Before You Begin

Before you begin installing your system in the rack, carefully read "Safety Instructions," found earlier in this guide, 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 their casters. They do not have 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.**

✍ **NOTE:** For instructions on installing the system itself, see ""Installing the System in the Rack" on page 18.

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 precaution becomes increasingly important when systems are installed high up 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 to yourself and to others.**

Rack Requirements for VersaRails

⊘ **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.

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.**

The stabilizer feet help prevent the rack from tipping over. See the documentation provided with the rack cabinet for instructions on installing and anchoring the stabilizer feet.

Recommended Tools and Supplies

You may need the following items to install the system in a four-post rack cabinet:

- #2 Phillips screwdriver
- Masking tape or a felt-tip pen, for use in marking the mounting holes to be used

Sliding Rails Rack Kit Contents

- One pair of slide assemblies (convertible to RapidRails or VersaRails configuration)
- One cable-management arm
- One tray
- One status indicator cable (if applicable)
- Tie wraps to secure the cables to the cable management arm
- Eight 10-32 x 0.5-inch flange-head Phillips screws (used in VersaRails configuration only)

✍ **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.   Sliding Rails Rack Kit Contents

1	tray	2	slide assemblies (2)	3	10-32 x 0.5-inch flange-head Phillips screws (8) (VersaRails configuration only)
4	tie wraps	5	status indicator cable (if applicable)	6	cable-management arm
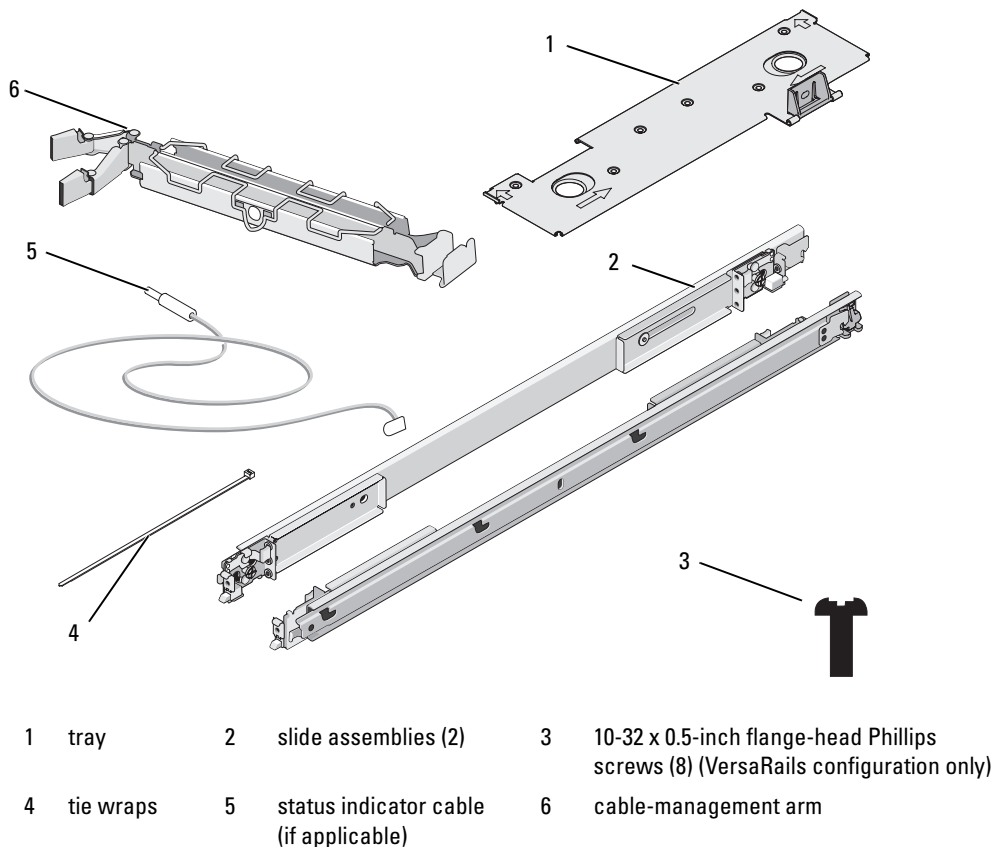
Static Rails Rack Kit Contents

- One pair of static mounting rails with either VersaRails brackets or RapidRails brackets.
- One pair of chassis static rail modules
- 10-32 x 0.5-inch flange-head Phillips screws (8) (VersaRails kits only)
- Releasable tie wraps (2) (not shown in Figure 1-2)

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.
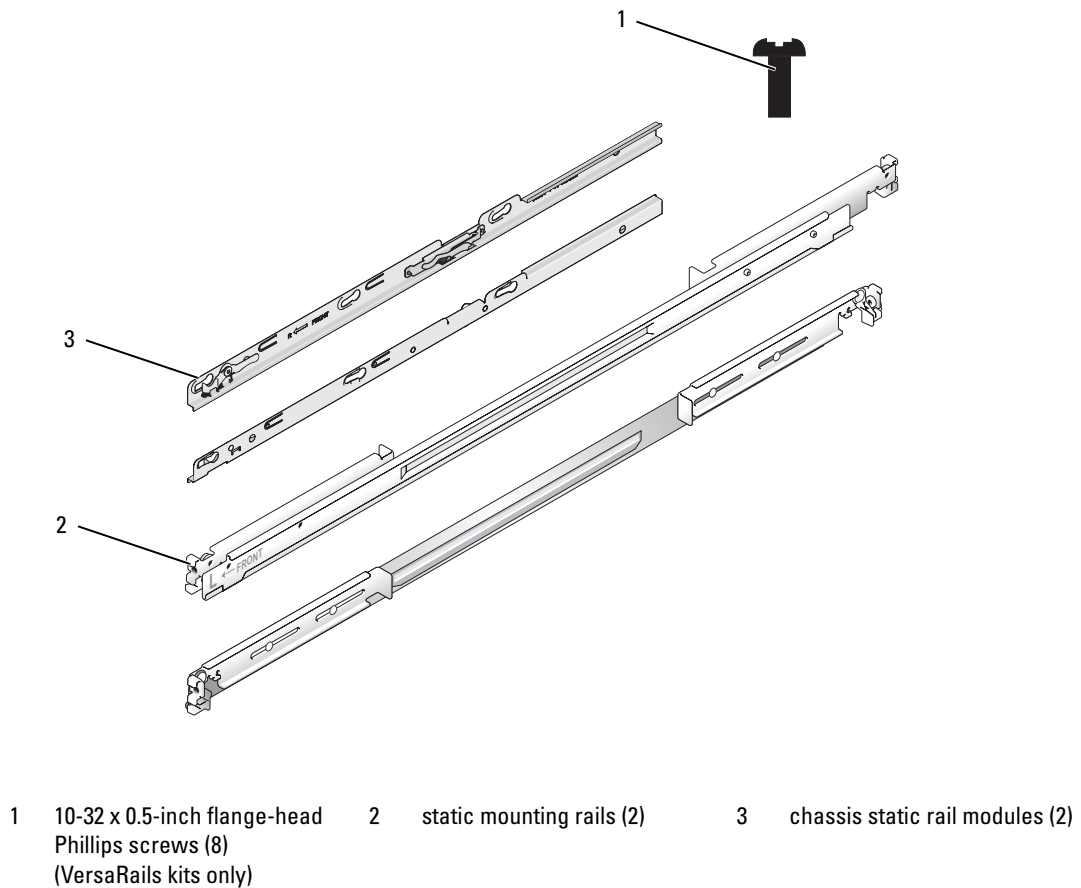
Figure 1-2. Static Rails Rack Kit Contents

| 1 | 10-32 x 0.5-inch flange-head Phillips screws (8) (VersaRails kits only) | 2 | static mounting rails (2) | 3 | chassis static rail modules (2) |

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
2 Marking the rack
3 Configuring the sliding rail assemblies (sliding rail kits only)
4 Installing chassis static rail modules (static rail kits only)
5 Installing the mounting rails in the rack
6 Installing the system in the rack
7 Installing the tray and cable-management arm (sliding rail kits only)
8 Routing cables
9 Replacing the rack doors

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 accidently fall over.**

Marking the Rack

For a 1-U system, you must allow 1 U (44 mm, or 1.75 inches) of vertical space for each system you install in the rack.

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 1-3). 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.

Figure 1-3.   One Rack Unit

12.7 mm (0.5 inch)

15.9 mm (0.625 inch)

1 U (44 mm or 1.75 inches)

15.9 mm (0.625 inch)

12.7 mm (0.5 inch)
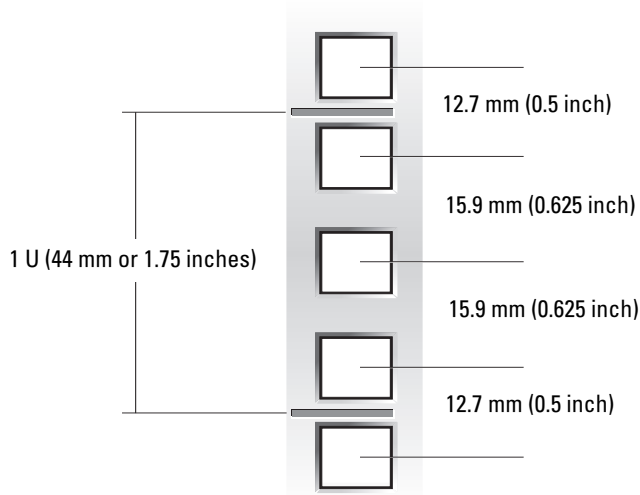
⚠ **CAUTION: If you are installing more than one system, install the mounting rails so that the first system is installed in the lowest available position in the rack.**

To mark the rack, perform the following steps:

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

   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 1-4).

   2 Place a mark 44 mm (1.75 inches) above the original mark you made (or count up three 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 1-4).

Figure 1-4.   Marking the Vertical Rails
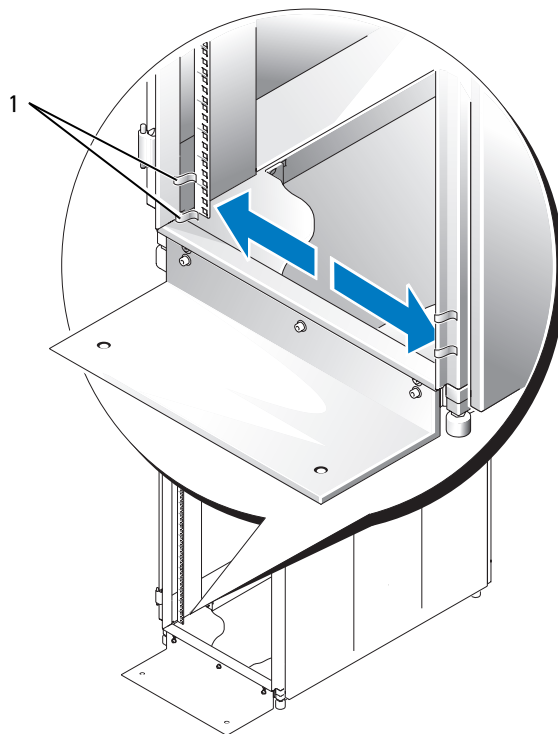
| 1 | marks on vertical rail (2) |

# Configuring the Sliding Rail Assemblies (Sliding Rail Kits Only)

The sliding rail assembly has a rotating mounting bracket at each end of the rail. The position of the bracket determines whether the rail assembly is used as a RapidRail or a VersaRail. The RapidRail side of the bracket has a hook and a latch that secure it to the vertical rail. The VersaRail side of the bracket has three holes and uses screws to attach it to the vertical rail.

Ø **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 1-5):

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 1-5. Changing the Position of the Rotating Mounting Bracket
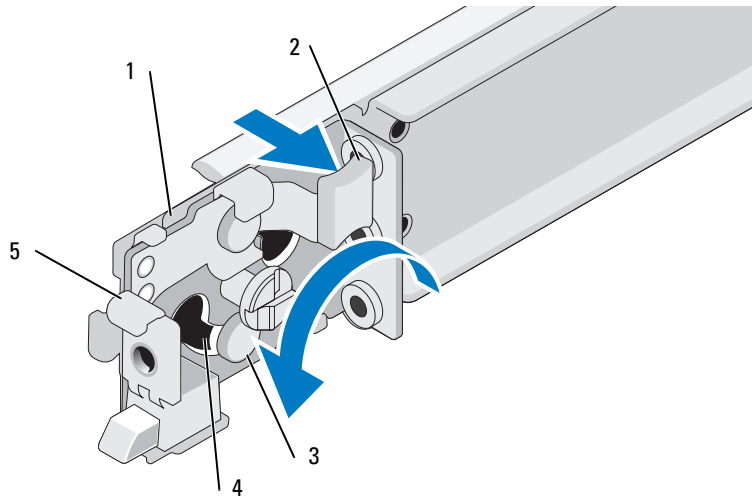
| 1	rotating bracket	2	release lever	3	shoulder standoffs (2)
4	notches (2)	5	mounting bracket flange (RapidRails configuration shown)		

Installing Chassis Static Rail Modules (Static Rail Kits Only)

NOTE: You do not need to remove the optional front bezel to install or remove the chassis static rail modules from the chassis.

1 To install a rail module, locate the three keyhole slots on the rail module and the corresponding shoulder screws on the side of the system (see Figure 1-6).

2 Place the rail module against the side of the system so that the shoulder screws fit through the round portion of the keyhole slots, then slide the module towards the back of the system.

3 Repeat steps 1 and 2 to install the other rail module.

To remove a rail module from the chassis, pull up on the release latch, then slide the rail forward and remove the rail module from the chassis.

Figure 1-6.   Installing and Removing Static Rail Chassis Modules
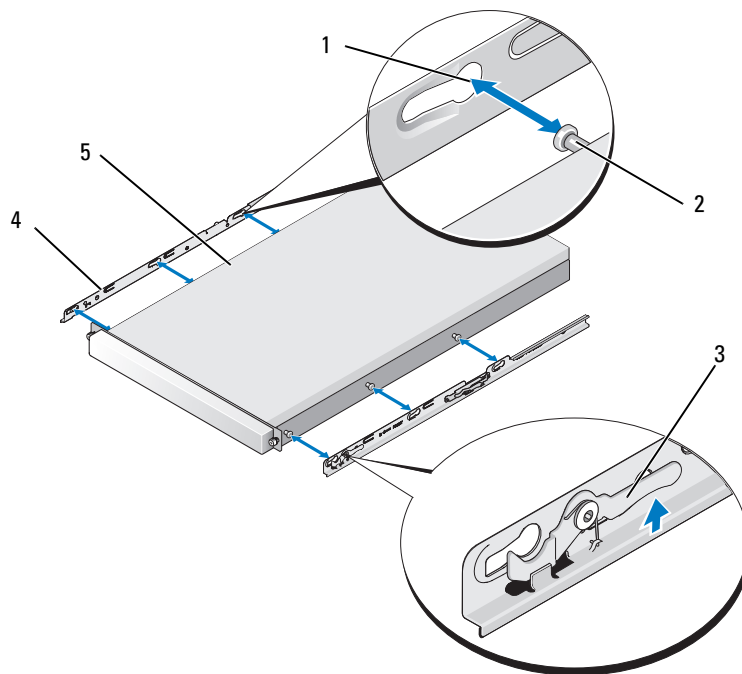
| 1	keyhole slots (6)	2	shoulder screws (6)	3	release latch
4	rail modules (2)	5	system			

Installing the Mounting Rails in the Rack

✐ **NOTE:** The following instructions apply to both sliding mounting rails and static mounting rails.

Installing RapidRails Mounting Rails

1 At the front of the rack cabinet, position one of the mounting rails so that its mounting-bracket flange fits between the marks or tape you placed (or numbered locations) on the vertical rails in "Marking the Rack" (see Figure 1-7).

   The top mounting hook on the front mounting-bracket flange should enter the top hole between the marks you made on the vertical rails.

Figure 1-7. Installing RapidRails Mounting Rails

	1 mounting hooks (2)		2 push buttons (2)		3 mounting rails (2)
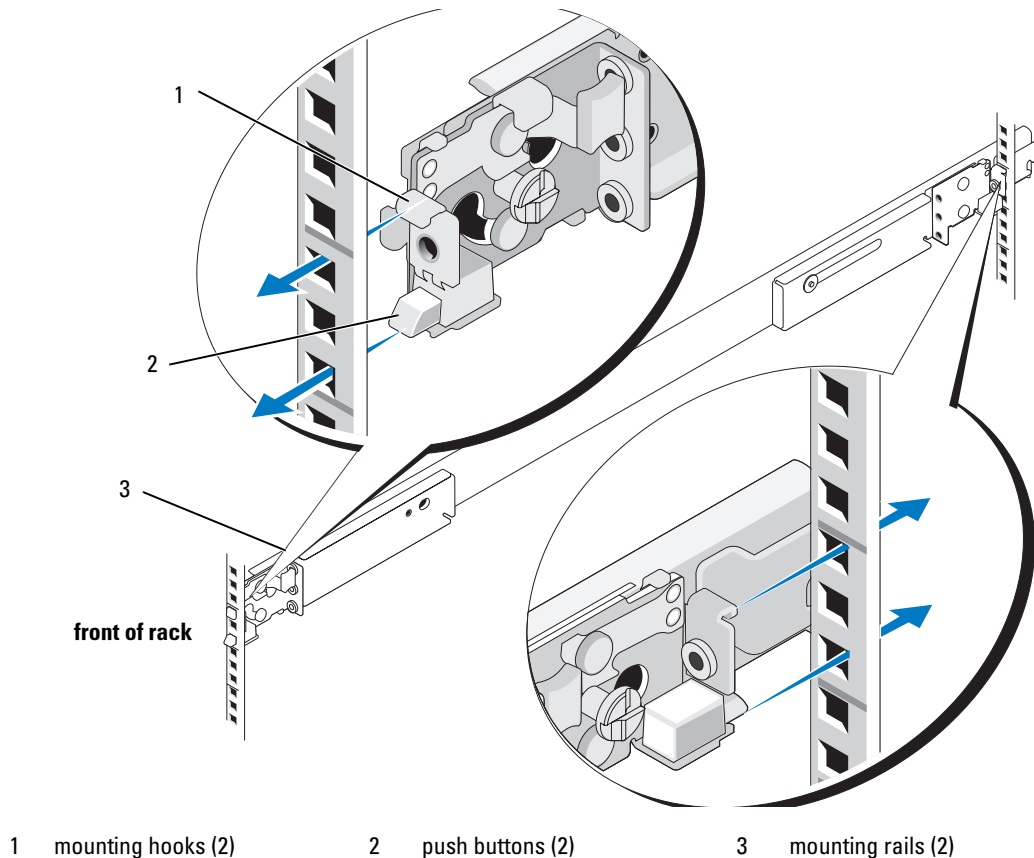
2 Push the mounting rail forward until the mounting hook enters the square hole, and then push down on the mounting-bracket flange until the mounting hook seats and the push button extends through the lower square hole (see Figure 1-7).

3 At the back of the cabinet, pull back on the mounting-bracket flange until the mounting hook enters the upper square hole, and then push down on the flange until the mounting hook seats and the push button extends through the lower square hole.

4 Repeat step 1 through step 3 for the mounting rail on the other side of the rack.

5 Confirm that the mounting rails are mounted at the same vertical position on both sides of the rack.
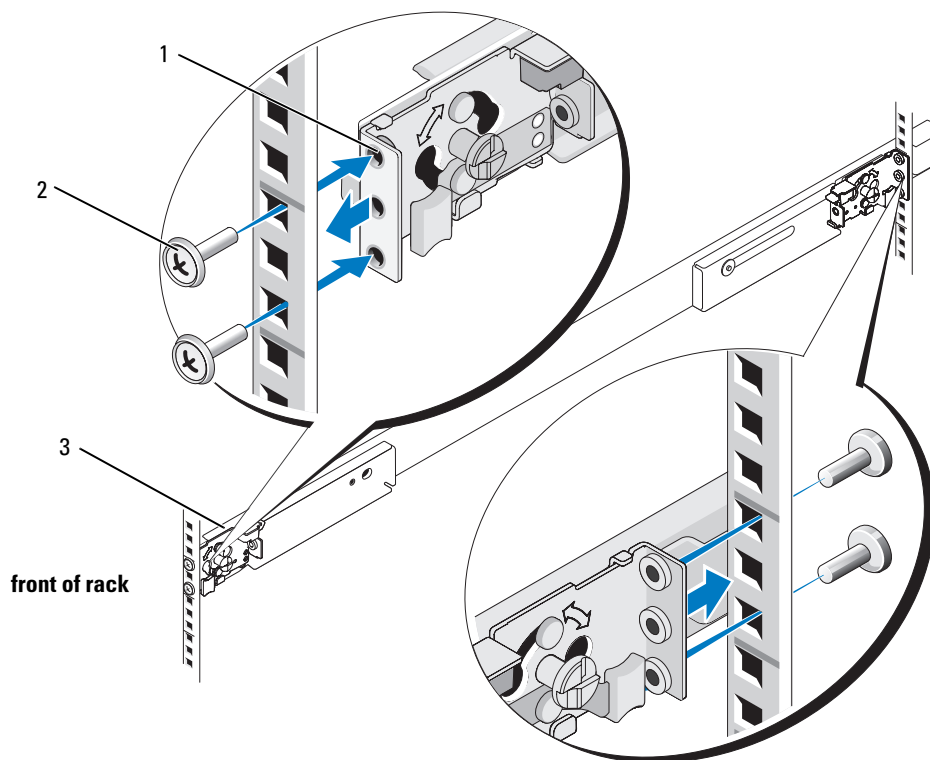
Installing the VersaRails Mounting Rails

1 At the front of the rack cabinet, position one of the mounting rails so that its mounting-bracket flange fits between the marks you placed (or numbered locations) on the vertical rails in "Marking the Rack" (see Figure 1-8).

The three holes on the front of the mounting-bracket flange should align with the holes between the marks you made on the front vertical rail.

2 Install two 10-32 x 0.5-inch flange-head Phillips screws in the upper and lower holes in the mounting-bracket flange to secure the mounting rail to the front vertical rail.

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 two 10-32 x 0.5-inch flange-head Phillips screws in the upper and lower holes in the mounting-bracket flange to secure the mounting rail to the back vertical rail.

5 Repeat step 1 through step 4 for the mounting rail on the other side of the rack.

6 Ensure that the mounting rails are mounted at the same position on the vertical rails on each side of the rack.

Figure 1-8. Installing VersaRails Mounting Rails

| 1 | mounting-bracket flange | 2 | 10-32 x 0.5-inch flange-head Phillips screws (4 per mounting rail) | 3 | mounting rails (2) |

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.**
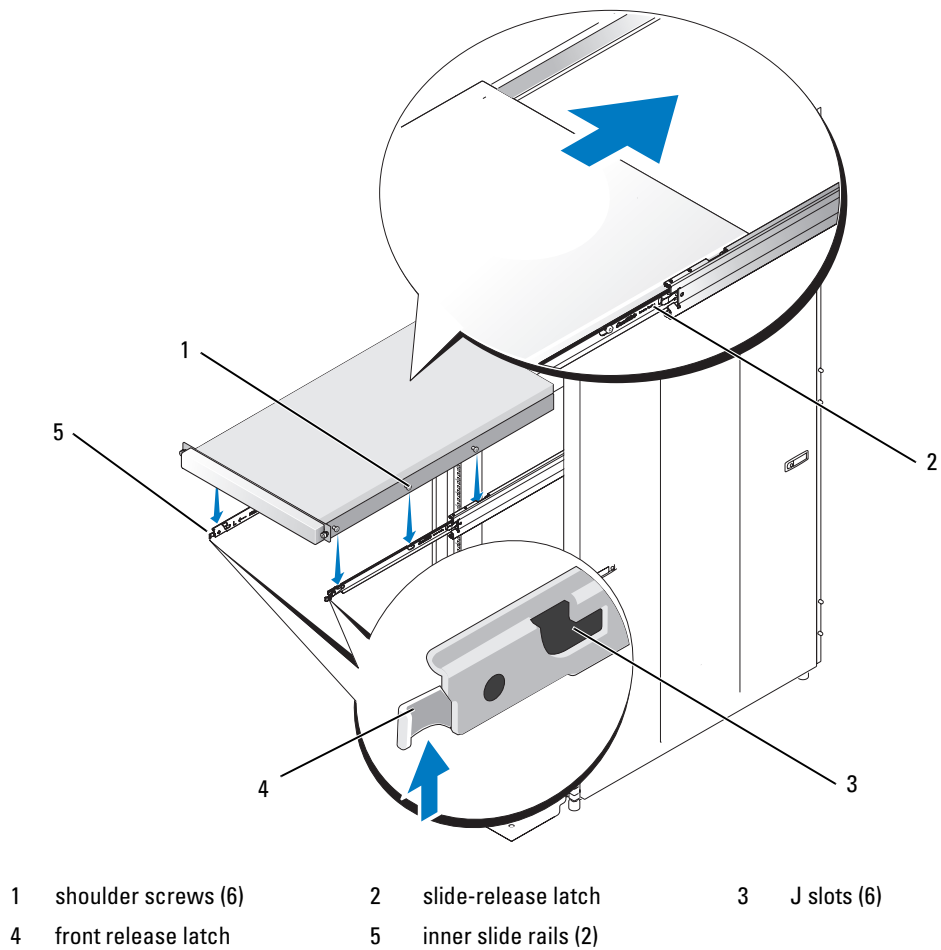
Installing a System With Sliding Rails

1   Pull the two inner slide rails out of the rack until they lock in the fully extended position (see Figure 1-9).

2   Lift the system into position above the extended slides.

    The three shoulder screws on each side of the system fit into the corresponding J-slots on the inner slide assemblies (see Figure 1-9).

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.

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 the J-slots in the slide assemblies.

    The system release latch at the front of the inner slide rail will snap back as the shoulder screw passes into the front slot. Use this system release latch when you wish to remove the system from the slide assemblies.

6   Press the slide-release latch on the outside of each inner slide, then push the system into the rack.

7   Install the cable-management arm. See "Installing the Tray and Cable-Management Arm (Sliding Rail Kits Only)" on page 22.

8   Tighten the thumbscrews on the rack front panel to secure the slide assemblies to the rack.

**Figure 1-9.   Installing a System With Sliding Rails**

1	shoulder screws (6)	2	slide-release latch	3	J slots (6)
4	front release latch	5	inner slide rails (2)		

Installing a System With Static Rails

To install the system on the rack, perform the following procedure:

1   From the front of the system, lift the chassis into position so that the chassis rail modules are aligned with the mounting rails on the rack.

2   Push the chassis back into the mounting rails until the system stops (see Figure 1-10).

3   Secure both thumbscrews on the front panel of the chassis.

4   Install the optional front bezel (if applicable). See the procedures for installing the bezel in the documentation provided with your system.

Figure 1-10.   Installing a System With Static Rails

| 1 | mounting rails (2) | 2 | chassis rail modules (2) | 3 | thumbscrews (2) |
| 4 | release latches (2) | | | | |
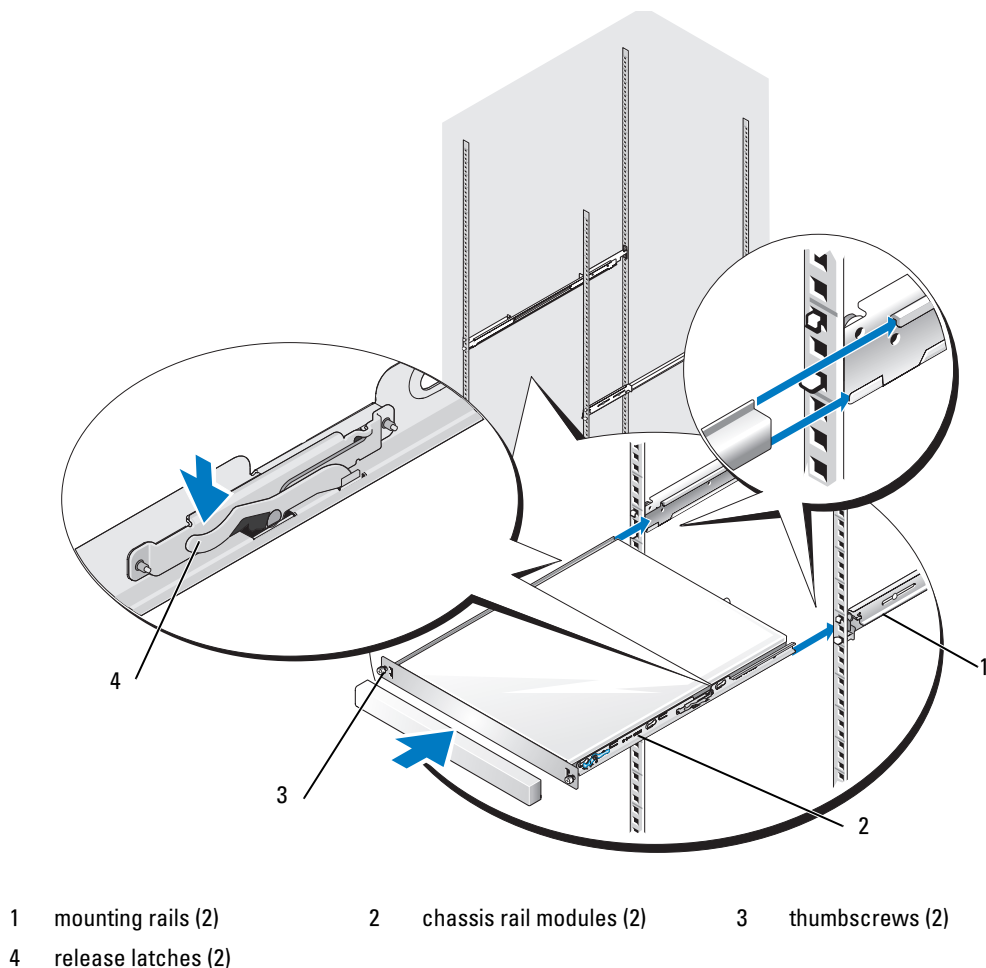
5 Locate the releasable tie wrap attachment points located on the two back mounting-bracket flanges (see Figure 1-11).

These tie wraps are used to secure the system's cables to the mounting rails.

Figure 1-11.   Installing the Releasable Tie Wraps
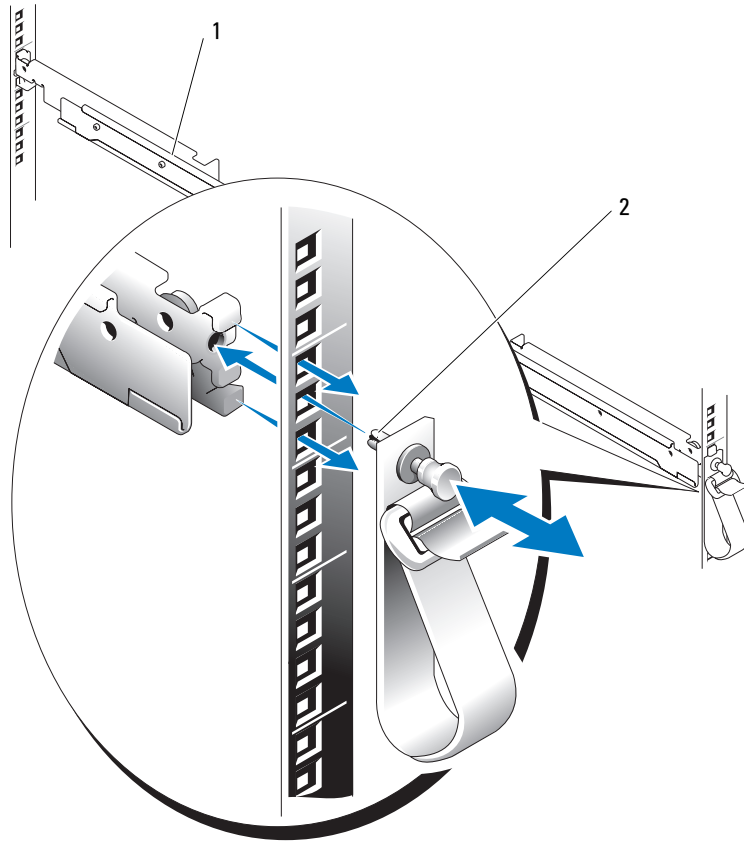
| 1 | mounting rails (2) | 2 | releasable tie wraps (2) |

6 Push the tie wrap's fastener through the attachment point.

7 Push the tie wrap's plunger until it snaps to secure the tie wrap to the mounting rail.

8 Using the releasable tie wrap, secure your system's cables to the mounting rail.

Replacing the Rack Doors

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

⚠ **CAUTION: Because of the size and weight of the rack cabinet doors, never attempt to remove or install them by yourself.**
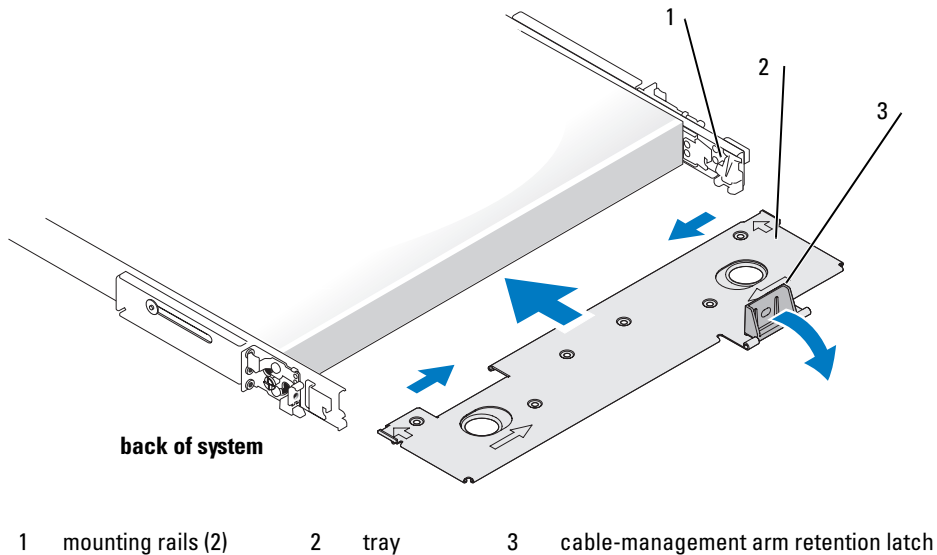
Installing the Tray and Cable-Management Arm (Sliding Rail Kits Only)

✎ **NOTE:** This procedure does not apply to the static rail kit.

Installing the Tray

1. At the back of the system, fit the ends of the tray between the ends of the mounting rails and slide the tray forward until it latches (see Figure 1-12).

2. In preparation for installing the cable-management arm, press the catch at the center of the cable-management arm retention latch and rotate the latch downward (see Figure 1-12).

Figure 1-12.   Installing the Tray

| 1 | mounting rails (2) | 2 | tray | 3 | cable-management arm retention latch |

Installing the Cable-Management Arm

NOTE: You can attach the cable-management arm to either the right or left mounting rail, depending on how you intend to route cables from the system.

1   If necessary, press the catch at the center of the cable-management arm retention latch on the tray, and rotate the latch downwards (see Figure 1-12).

2   At the back of the system, fit the latch on the front end of the cable-management arm onto the innermost bracket on the slide assembly, until the latch engages (see Figure 1-13).

3   Fit the latch on the unattached end of the cable-management arm onto the outermost bracket on the slide assembly, until the latch engages (see Figure 1-13).
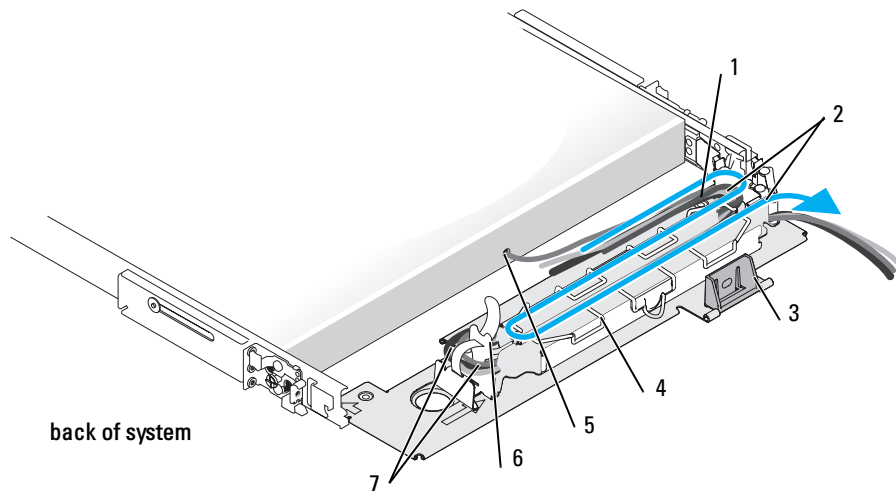
Figure 1-13.   Installing the Cable-Management Arm

1	mounting rails (2)	2	brackets (2)	3	latches (2)
4	cable-management arm				
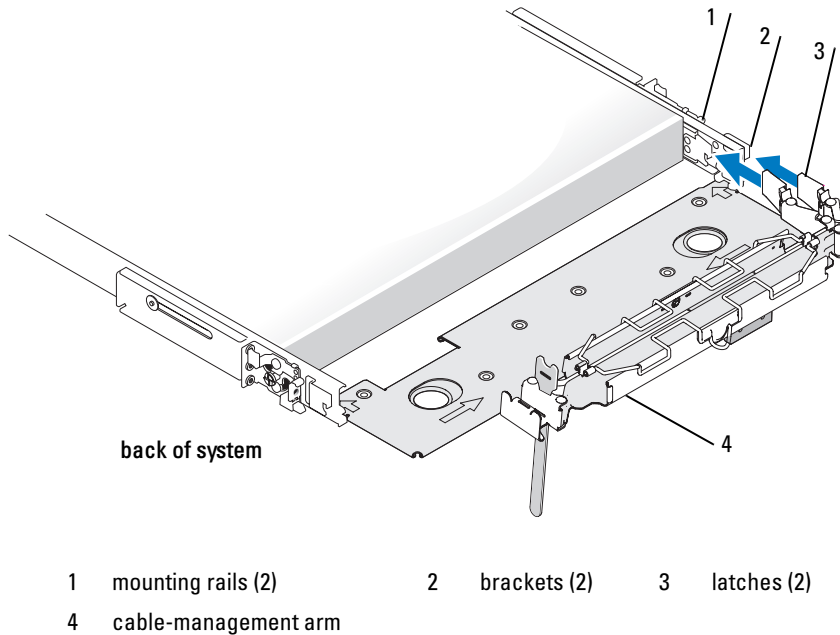
Routing Cables

1 Open the wire cable basket lid on the top of the cable-management arm, to enable cables to be routed within the arms (see Figure 1-14).

Figure 1-14. Routing Cables on the Cable-Management Arm

back of system

1	cable-management arm	2	preinstalled tie wraps	3	cable-management arm retention latch
4	basket lid	5	system status-indicator cable connector	6	Velcro strap
7	preinstalled tie wraps				

2 If applicable, connect the system status-indicator cable to its connector on the system back panel.

Route the system status-indicator cable through the cable-management arm and insert the LED end into the slot on the end of the cable-management arm.

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

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

 NOTE: Use the strain-relief loops on the back of the power supplies to provide strain relief for the power cables.

4 Using the tie-wraps provided in the rack kit, bundle the cables together so that they do not interfere with adjacent systems in the rack.

5   Route the cables through the cable-management arm baskets.

6   Adjust the cable slack as needed at the hinge position and secure the bundled cables with the vertical Velcro strap (see Figure 1-14).

7   Use the preinstalled tie wraps at the inner end and hinge point of the cable-management arm to secure the bundled cables in the cable-management arm channel (see Figure 1-14).

8   Close the cable basket lid.

9   Unscrew the thumbscrews that secure the front of the system to the front vertical rail.

10   Slide the system in and out of the rack to verify that the cables are routed correctly and do not bind, stretch, or interfere with the movement of the cable-management arm. Adjust the cable positioning inside the cable management arm as needed.

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

11   When you are satisfied that the cables are routed correctly, push the system fully into the rack.

12   Lift the cable-management arm retention latch on the tray to secure the arm (see Figure 1-14).

Removing the System From the Rack

Removing a System With Sliding Rails

To remove the system from the rack, perform the following procedure:

1   Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.

2   Remove the I/O cable connectors and power cable connectors from their respective connectors on the system back panel.

3   Loosen the thumbscrews on each side of the front chassis panel that secures the system to the rack.

4   Pull the system out of the rack until it locks with the rails in the extended position.

5   Pull up on the front release latch on each rail (see Figure 1-9) and slide the system forward.

6   Pull the system completely out of the rack.

Removing a System With Static Rails

To remove the system from the rack, perform the following procedure:

1   Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.

2   Loosen the thumbscrews on each side of the front chassis panel that secures the system to the rack.

3   Disconnect all cables from the system.

4   Pull the system out of the rack until it stops because of the release latches.

5   Push down on the release latches on each side of the system (see Figure 1-10).

6   Pull the system completely out of the rack.

2

Two-Post Rack Installation

The two-post rack kit is used to install a system in a two-post, open-frame relay rack, such as those found in telecommunications equipment facilities. Both 7.62-cm or 15.24-cm (3-inch and 6-inch) wide two-post racks with universal hole spacing or wide hole spacing are accommodated. You can install this kit in a center-mount or a flush-mount configuration.

You must properly secure the two-post relay rack to the floor, the ceiling, or upper wall, and where applicable, to adjacent racks, using floor and wall fasteners and bracing specified or approved by the rack manufacturer or by industry standards. See the two-post rack manufacturer's documentation for warnings before attempting this installation.

⚠ **CAUTION: Do not attempt to install the system into a two-post, open-frame relay rack that has not been securely anchored in place. Damage to the system and personal injury to yourself and to others may result.**

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 information, see the *Product Information Guide*.

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: 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.**

- 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.

Before You Begin

Before you begin installing your system in the rack, carefully read "Safety Instructions," found earlier in this guide, 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.**

✎ **NOTE:** For instructions on installing the system itself, see ""Installing the System in the Rack" on page 37."

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 precaution becomes increasingly important when systems are installed high up 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 to yourself and to others.**

### Recommended Tools and Supplies

- #2 Phillips screwdriver
- 3/8-inch wrench or nut driver (if changing bracket to flush-mount configuration)
- Masking tape or felt-tip pen to mark the mounting holes

Rack Kit Contents

The two-post rack kit includes (see Figure 2-1):

- One pair of mounting rails
- 12-24 x 0.5-inch pan-head Phillips screws (8)
- Releasable tie wraps (2) (not shown in Figure 2-1)

Figure 2-1. Two-Post Rack Kit Components
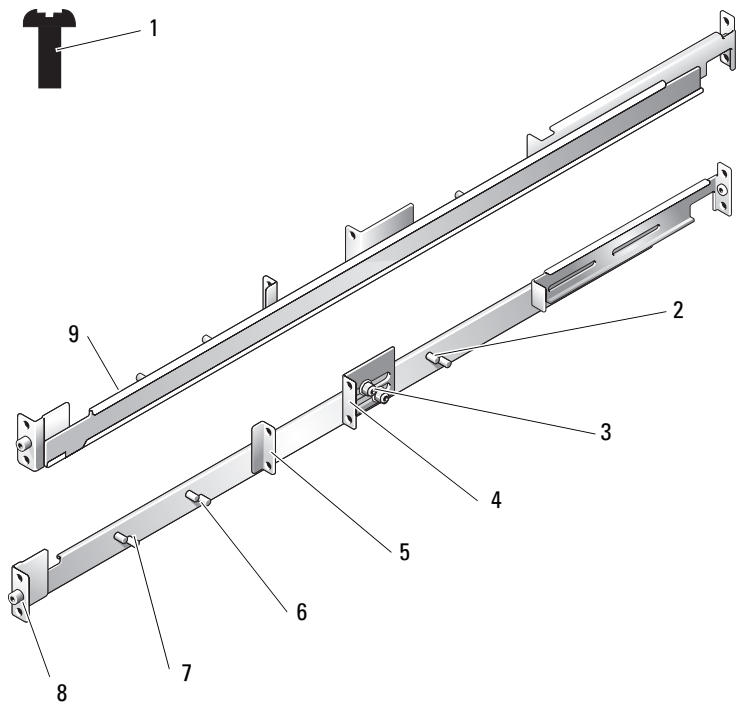
1	12-24 x 0.5-inch pan-head Phillips screws (8)	2	15.24-cm (6-inch) wide, center-mount, threaded studs	3	7.62-cm (3-inch) wide, center-mount, threaded studs
4	adjustable mounting flange	5	center-mount mounting flange	6	15.24-cm (6-inch) wide, flush-mount, threaded studs
7	7.62-cm (3-inch) wide, flush-mount, threaded studs	8	flush-mount mounting flange	9	mounting rails (2)

Installation Tasks

Installing a two-post rack kit includes performing the following tasks in order:

1. Marking the rack
   - Universal-hole spacing rack
   - Wide-hole spacing rack
2. Installing the mounting rails in the rack
   - Center-mount installation
   - Flush-mount installation
3. Installing the system in the rack
4. Routing cables

Marking the Rack

You must allow 1 U (44 mm, or 1.75 inch) of vertical space for each system that you install in the two-post rack.

Universal-Hole Spacing Racks

Racks with universal-hole spacing 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 column of holes (see Figure 2-2).

Figure 2-2.   Two-Post, Open-Frame Relay Rack Universal-Hole Spacing
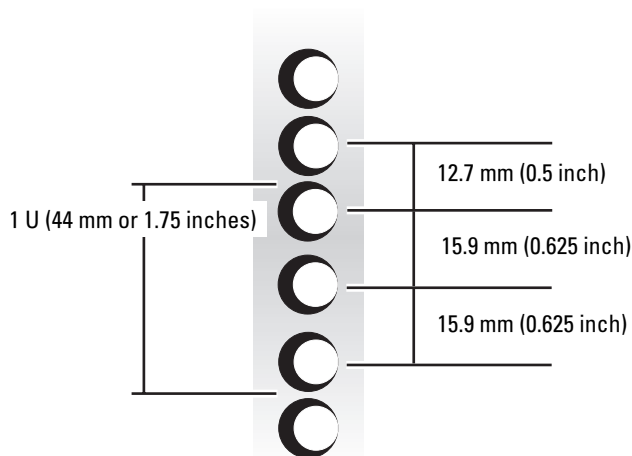
Wide-Hole Spacing Racks

Racks with wide-hole spacing have an alternating pattern of two holes per rack unit with center-to-center hole spacing (beginning at the top hole of a 1-U space) of 31.7 mm and 12.7 mm (1.25 inches and 0.5 inch) for the front and back vertical columns of holes (see Figure 2-3).

Figure 2-3.   Two-Post, Open-Frame Relay Rack Wide-Hole Spacing
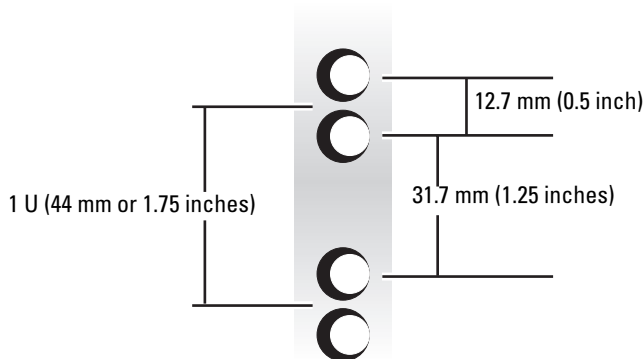
To mark the rack, perform the following steps:

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 two-post rack.

   The bottom of each 1-U space is at the middle of the narrowest metal area between holes.

   NOTE: If your rack has wide-hole spacing, go to step 3.

2   Place a mark 44 mm (1.75 inches) above the original mark you made (or count up three holes in a rack with universal-hole spacing) (see Figure 2-2).

   Each 1 U (44 mm, or 1.75 inches) of vertical space on a rack with universal-hole spacing has three holes with center-to-center spacing between holes (beginning at the top 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) (see Figure 2-2).

   NOTE: If your rack has universal-hole spacing, you have completed the procedure for marking the rack.

3   Place a mark 44 mm (1.75 inches) above the original mark you made (or count up to the next hole in the rack with wide-hole spacing (see Figure 2-3).

   Each 1 U (44 mm, or 1.75 inches) of vertical space on a rack with wide-hole spacing has two holes with center-to-center spacing between holes (beginning at the top of a 1-U space) of 31.7 mm (1.25 inches) (see Figure 2-3).

Installing the Mounting Rails

You can install the mounting rails in a two-post, open-frame rack having either universal-hole spacing (see Figure 2-2) or wide-hole spacing (see Figure 2-3). You can install the mounting rails in either a flush-mount or center-mount configuration.

⚠ **CAUTION: Do not install another system using this rack kit. Use only the rack kit intended for your system. Using the rack kit for another system may result in damage to the system and personal injury to yourself and to others.**

### Center-Mount Installation

The two-post rack kit is shipped with the brackets configured for a 7.62-cm (3-inch) wide center-mount installation. See Figure 2-1 for mounting rail components. To complete the installation, perform the following steps:

1 Locate the right mounting rail and push the adjustable mounting bracket toward the back of the mounting rail (see Figure 2-4).

2 Position the right mounting rail in the two-post rack at the location you marked, push the center-mount adjustable mounting bracket forward against the vertical two-post rack, and secure the mounting flange and adjustable mounting bracket to the rack with four 12-24 x 0.5-inch pan-head Phillips screws (see Figure 2-4).

3 Repeat step 1 and step 2 to install the left mounting rail in the rack.

Figure 2-4.   Installing the Mounting Rails for Center-Mount Configuration
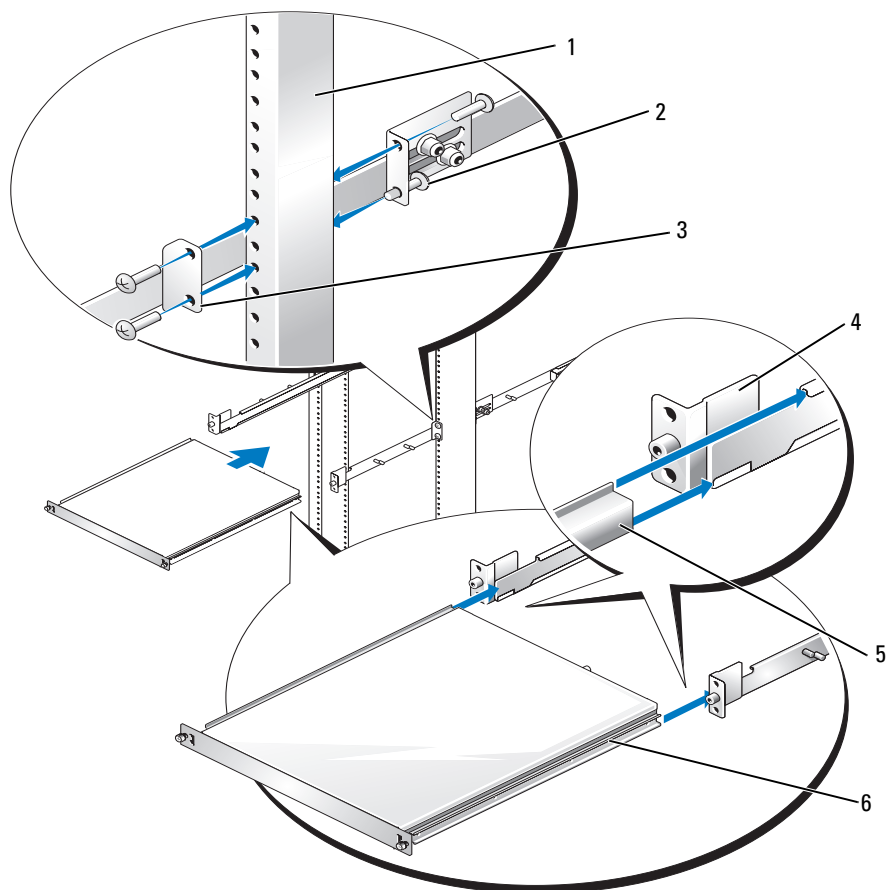
1	two-post open-frame rack	2	12-24 x 0.5-inch pan-head Phillips screws (4 per rail)	3	center-mount mounting flange
2	mounting rails (2)	4	system rails (2)	6	release latch

Flush-Mount Installation

The two-post rack kit is shipped with the brackets configured for a 7.62-cm (3-inch) wide center-mount installation. See Figure 2-1 for mounting rail components. To prepare the mounting rails for flush-mount installation in the two-post rack, perform the following steps:

1 Locate the two mounting rails and place them side by side on a smooth work surface, with the front ends of the mounting rails toward you (see Figure 2-5).

2 Using a 3/8-inch wrench or nut driver, remove two nuts from the adjustable mounting bracket (see Figure 2-5).

3 Remove the bracket and then place the bracket on either the 7.62-cm or 15.24-cm (3-inch or 6-inch) wide flush-mount threaded studs (see Figure 2-5).

4 Using the two nuts that you removed in step 2, tighten the nuts finger tight to secure the adjustable mounting bracket (see Figure 2-5).

5 Repeat step 2 through step 4 to configure the other mounting rail.

**Figure 2-5. Configuring the Adjustable Mounting Bracket for Flush-Mount Installation**
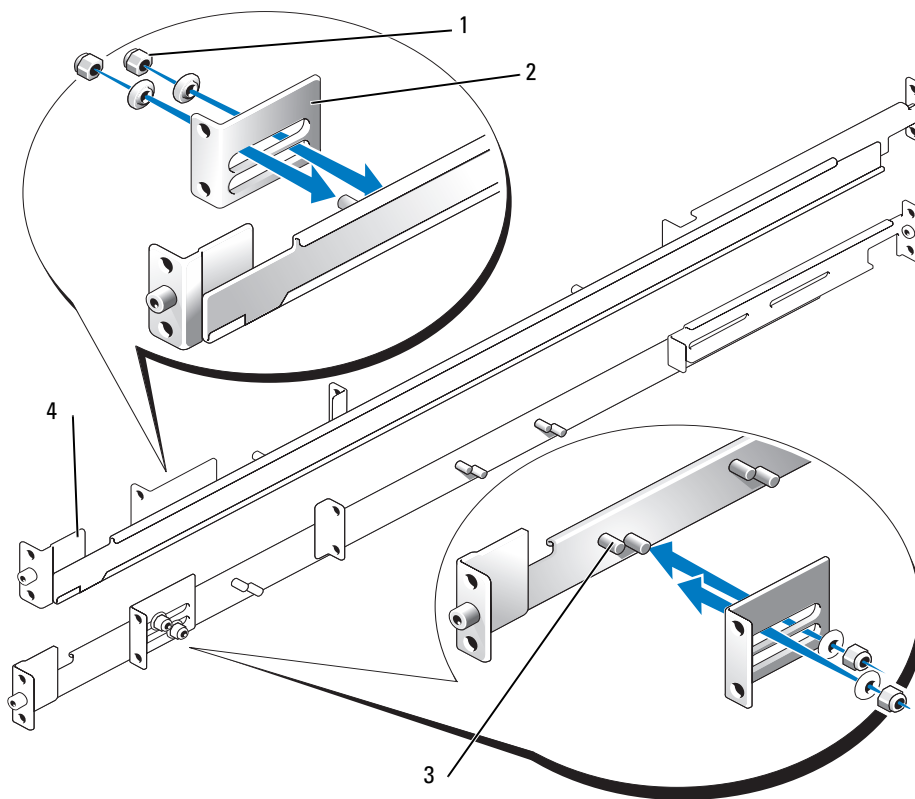
1	nuts (2 per bracket)	2	adjustable mounting bracket	3	7.62-cm (3-inch) wide, flush-mount, threaded studs
4	flush-mount mounting flange				

6 Holding the left mounting rail at the location you marked, position the flush-mount mounting flange against the front of the vertical two-post rack and secure it to the two-post rail with two 12-24 x 0.5-inch pan-head Phillips screws (see Figure 2-6).

7 Slide the adjustable-mounting bracket so that it is against the back of vertical two-post rack and secure it to the two-post rail with two 12-24 x 0.5-inch pan-head Phillips screws (see Figure 2-6).

8 Repeat step 6 and step 7 to install the right mounting rail in the rack.

9 Using a 3/8-inch wrench or nut driver, tighten the nuts on the adjustable mounting brackets on both mounting rails.

**Figure 2-6. Installing the Mounting Rails for Flush-Mount Configuration**

1	two-post open-frame rack	2	12-24 x 0.5-inch pan-head Phillips screws (4 per rail)	3	mounting rails (2)
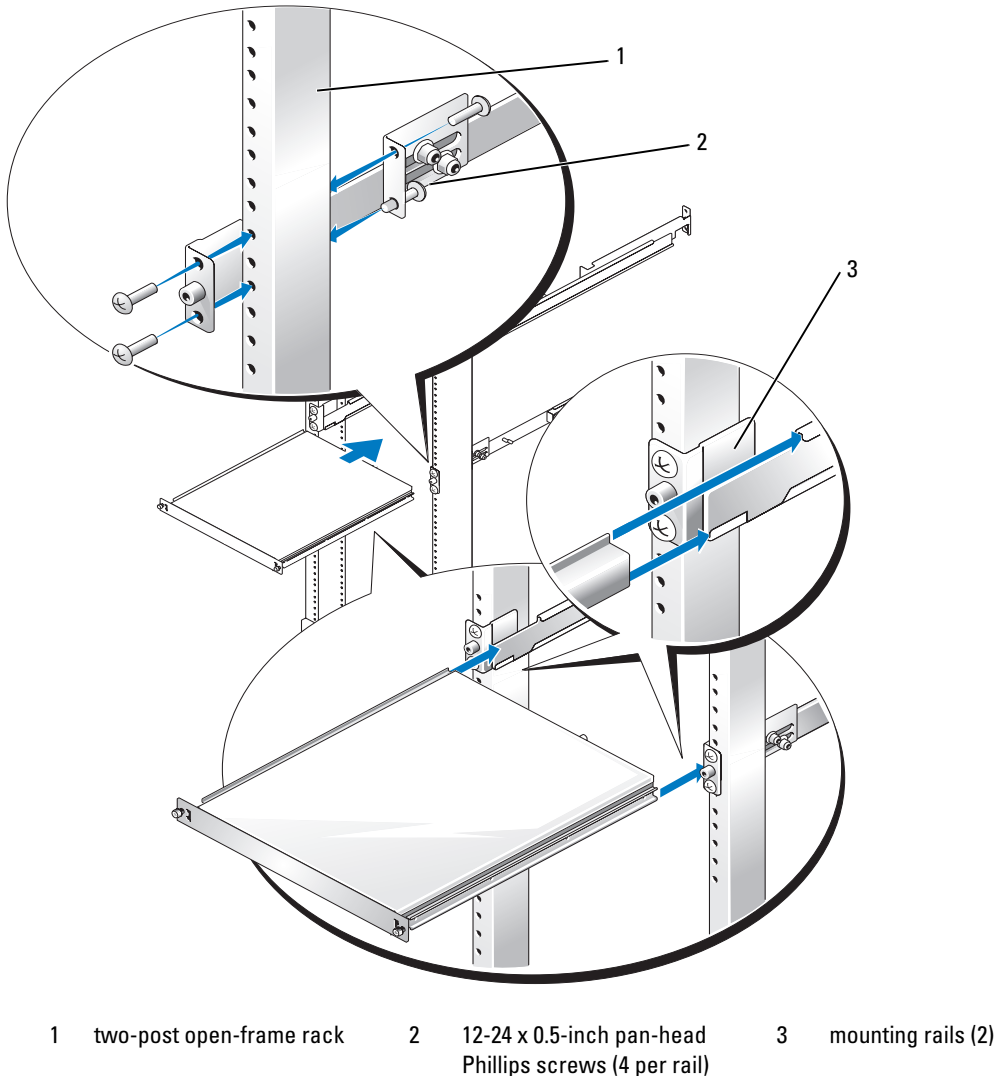
Installing Chassis Static Rail Modules

> ✎ **NOTE:** You do not need to remove the optional front bezel to install or remove the chassis static rail modules from the chassis.

1 To install a rail module, locate the three keyhole slots on the rail module and the corresponding shoulder screws on the side of the system (see Figure 2-7).

2 Place the rail module against the side of the system so that the shoulder screws fit through the round portion of the keyhole slots, then slide the module towards the back of the system.

3 Repeat steps 1 and 2 to install the other rail module.

To remove a rail module from the chassis, pull up on the release latch, then slide the rail forward and remove the rail module from the chassis.

Figure 2-7. Installing and Removing Static Rail Chassis Modules
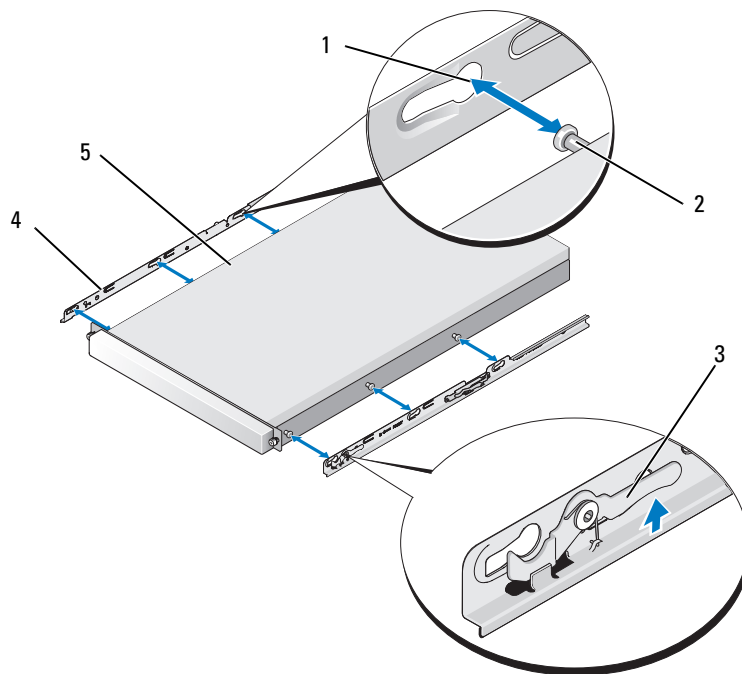
| 1 | keyhole slots (6) | 2 | shoulder screws (6) | 3 | release latch |
| 4 | rail modules (2) | 5 | system | | |

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.**

1 Place one hand on the front-bottom of the system and the other hand on the back-bottom of the system.

2 Lift the system into position so that the side rails at the back of the system are aligned with the mounting rails 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.**

3 Push the system into the mounting rails until the system stops.

4 Push in and turn the thumbscrews on each side of the front chassis panel to secure the system to the rack.

Removing the System From the Rack

To remove the system from the rack, perform the following procedure:

1 Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.

2 Loosen the thumbscrews on each side of the front chassis panel that secures the system to the rack.

3 Disconnect all cables from the system.

4 Pull the system out of the rack until it stops because of the release latches.

5 Push down on the release latches on each side of the system (see Figure 1-10).

6 Pull the system completely out of the rack.

Index