SPARC Enterprise
Sun Rack 1000/900/II

Equipment Rack Mounting Guide for the SPARC Enterprise M3000/M4000/M5000 Servers

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Contents

Preface

This rack mounting guide provides technical information and rackmounting instructions for SPARC Enterprise M3000/M4000/M5000 servers in a Sun Rack 1000, Sun Rack 900, and Sun Rack II.

The terms M3000 server and entry-level server refer to the SPARC Enterprise M3000 server. The terms M4000 server, M5000 server, and midrange server refer to the SPARC Enterprise M4000/M5000 servers. The term Sun cabinet or rack refers to the Sun Rack 1000 or the Sun Rack 900 or the Sun Rack II.

This section inlcudes:

Related Documentation

All documents for your sever are available online at the following locations:

Documentation	Link
Sun Oracle software-related manuals (Oracle Solaris OS, and so on)	http://www.oracle.com/technetwork/documentation/index.html
Oracle M3000 server documents	http://www.oracle.com/pls/topic/lookup?ctx=E19867-01
Oracle M4000 server documents	http://www.oracle.com/pls/topic/lookup?ctx=E19855-01
Oracle M5000 server documents	http://www.oracle.com/pls/topic/lookup?ctx=E19580-01

The following table lists titles of related documents:

SPARC Enterprise M3000/M4000/M5000 Servers Documents
SPARC Enterprise M3000 Site Planning Guide
SPARC Enterprise M4000/M5000 Site Planning Guide
SPARC Enterprise M3000 Server Getting Started Guide
SPARC Enterprise M4000/M5000 Servers Getting Started Guide
SPARC Enterprise M3000 Server Installation Guide
*SPARC Enterprise M4000/M5000 Servers Installation Guide**
SPARC Enterprise M3000 Server Service Manual
SPARC Enterprise M4000/M5000 Servers Service Manual
SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers Glossary
SPARC Enterprise M3000 Server Product Notes
SPARC Enterprise M4000/M5000 Servers Product Notes
SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers Product Notes†

* This is a printed document.

† Beginning with the XCP 1100 release.

Text Conventions

This manual uses the following fonts and symbols to express specific types of information.

Fonts/symbols	Meaning	Example
AaBbCc123	What you type, when contrasted with on-screen computer output. This font represents the example of command input in the frame.	`XSCF> adduser jsmith`

AaBbCc123	The names of commands, files, and directories; on-screen computer output.
	This font represents the example of command input in the frame.
		`XSCF> showuser -P`
		`User Name: jsmith`
		`Privileges: useradm`
		`auditadm`

Italic	Indicates the name of a reference manual	See the *SPARC Enterprise M/3000/4000/M5000/M8000/M9000 Servers XSCF User's Guide*.
" "	Indicates names of chapters, sections, items, buttons, or menus	See Chapter 2, "System Features."

Notes on Safety

Read the following documents thoroughly before using or handling any SPARC Enterprise M3000/M4000/M5000 server.

- *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers Important Legal and Safety Information*
- *SPARC Enterprise M3000/M4000/M5000 Servers Safety and Compliance Guide*

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CHAPTER 1

Sun Rack 1000 and Sun Rack 900 Cabinets

The Sun Rack 1000 and the Sun Rack 900 cabinets can enclose Sun SPARC Enterprise M3000/M4000/M5000 servers, storage products, and qualified third-party equipment.

This document contains the following sections:

1.1 Technical Information

The Sun Rack 1000 comes as a 42-rack unit (U) or a 38U enclosure. The Sun Rack 900 comes as a 38U or 36U enclosure. Entry-level and midrange servers can be mounted or preinstalled in these equipment cabinets.

Note – The Sun Rack 1000/900 cabinets have round RETMA rail holes.

FIGURE 1-1 illustrates Sun Rack 1000/900 with one modular power supply (MPS) and Two MPSs.

FIGURE 1-1 Sun Rack 900 With Modular Power Supplies

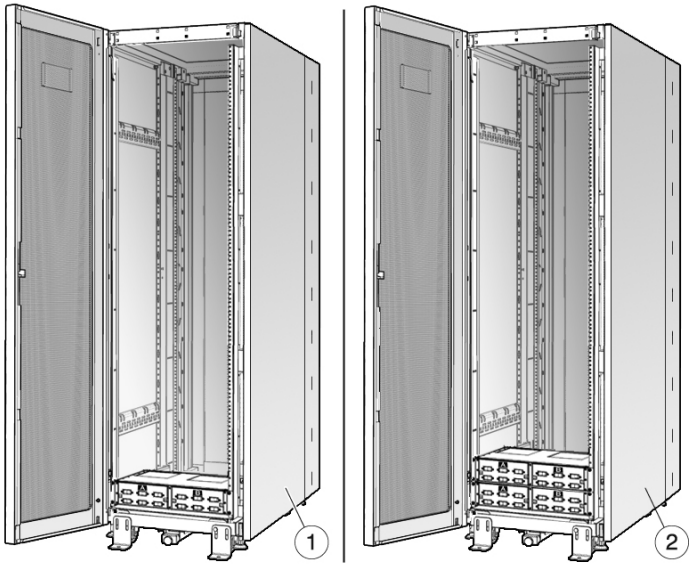

Figure Legend

1	Sun Rack 900 With One Modular Power Supply
2	Sun Rack 900 With Two Modular Supplies

1.1.1 Physical Specifications

Use the following table to determine space requirements for the Sun Rack 1000 and the Sun Rack 900.

TABLE 1-1 Sun Rack 1000 Dimensions

Characteristic	42U	38U
Height	2019 mm/79.5 in.	1880 mm/74 in.
Width	597 mm/23.5 in.	597 mm/23.5 in.
Depth	1000 mm/39.8 in.	1000 mm/39.8 in.
Weight	193 kg/426 lb	168 kg/370 lb

TABLE 1-2 Sun Rack 900 Dimensions

Characteristic	38U	36U
Height	1880 mm/74 in.	1880 mm/74 in.
Width	597 mm/23.5 in.	597 mm/23.5 in.
Depth	900 mm/35.4 in.	900 mm/35.4 in.
Weight	168 kg/370 lb	172 kg/380 lb

FIGURE 1-2 illustrates the Sun Rack 1000 42U shipping crate dimensions.

FIGURE 1-2 Sun Rack 1000- 42/38-Rack Unit Shipping Dimensions

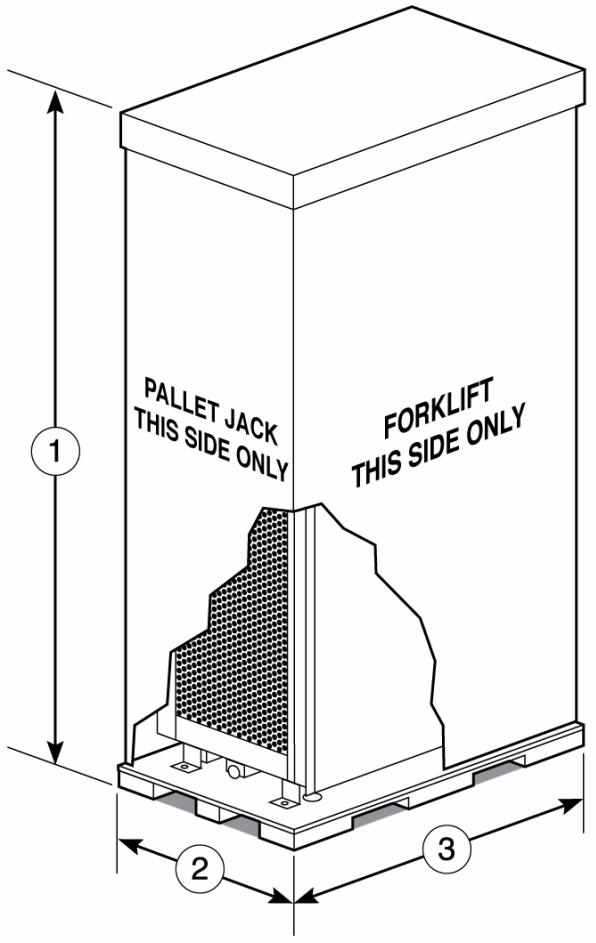

Figure Legend

1	Height, 2184 mm/86 in.
2	Width, 1080 mm/42.5 in.
3	Depth, 1506 mm/59.3 in.

FIGURE 1-3 illustrates the top and front dimensions of a Sun rack.

FIGURE 1-3 Sun Rack 900 With Cabinet Extender Top and Front Dimensions

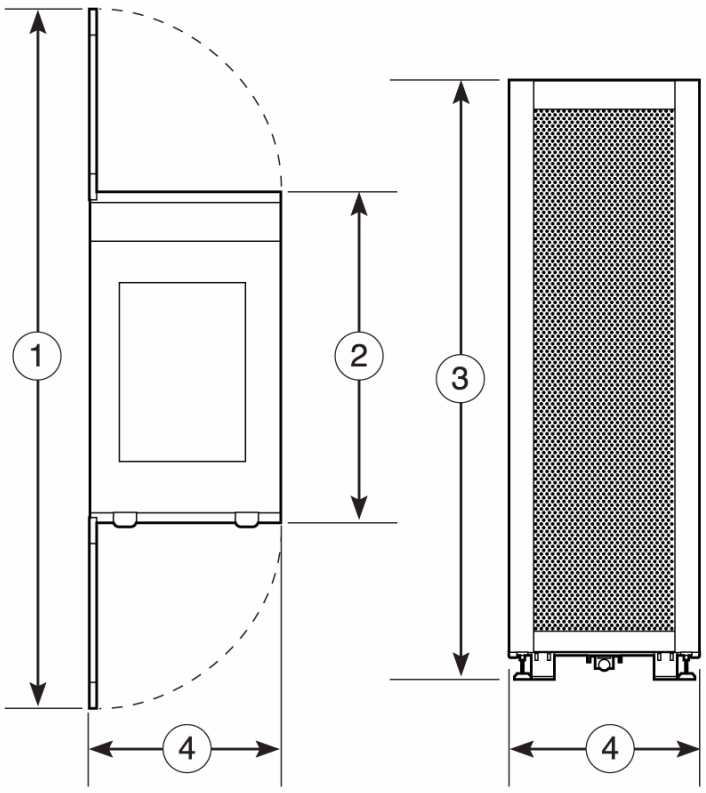

Figure Legend

1	Length, doors open, 2194 mm/86.4 in.
2	Length, doors closed, 1000 mm/35.4 in.
3	Height, 1880 mm/74 in.
4	Width, 597 mm/23.5 in.

FIGURE 1-4 and FIGURE 1-5 illustrate the footprint of a Sun Rack 1000 and Sun Rack 900.

FIGURE 1-4 Sun Rack 1000 Bottom View

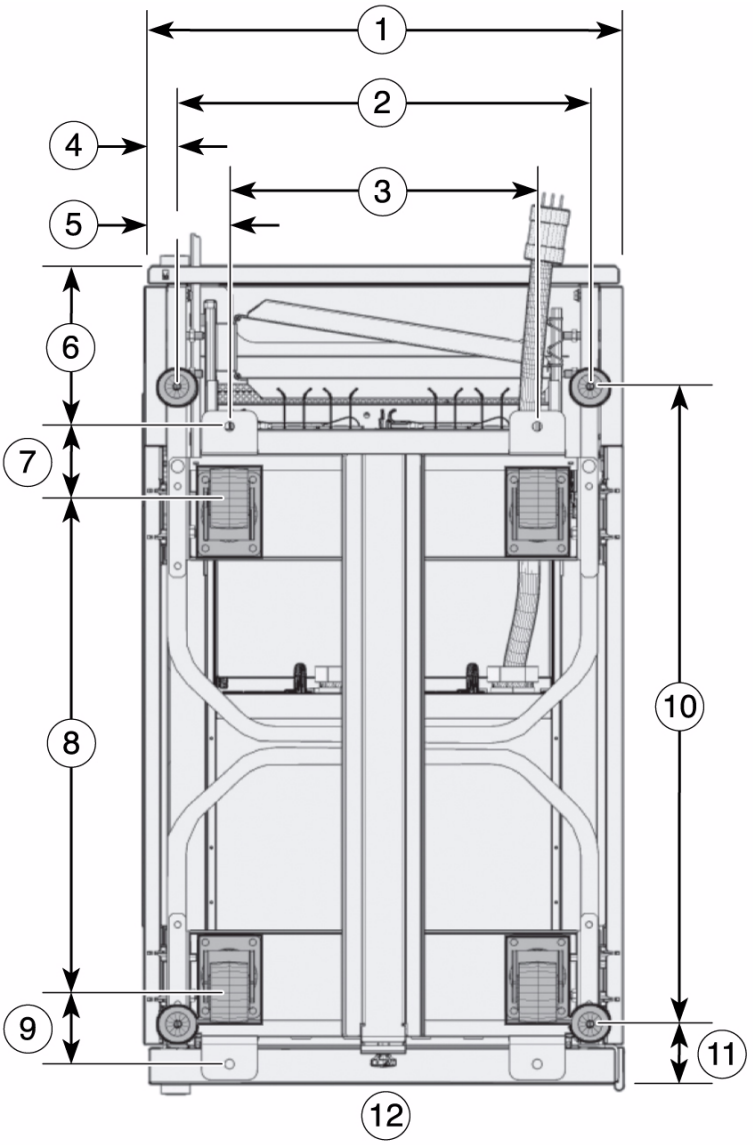

Figure Legend

1	Cabinet width, 599 mm/23.6 in.	**7**	Depth, hole to caster center, 90 mm/3.5 in.
2	Width between pad centers, 516 mm/20.3 in.	**8**	Depth between casterx, 620 mm/24.4 in.
3	Width between holes, 386 mm/15.2 in.	**9**	Depth, caster to hole, 90 mm/3.5 in.
4	Width, side to pad center, 42 mm/1.7 in.	**10**	Depth between pads, 800 mm/31.5 in.
5	Width, side to hole, 107 mm/4.2 in.	**11**	Depth, pad to rear, 50 mm/2 in.
6	Depth, front to hole, 200 mm/7.9 in.	**12**	Front of cabinet

FIGURE 1-5 Sun Rack 900 Bottom View

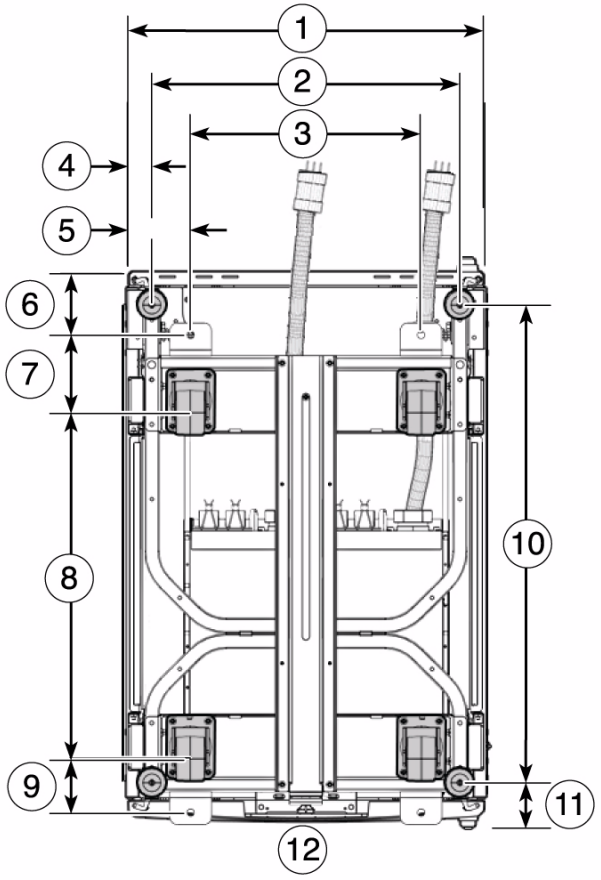

Figure Legend

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3	Width between holes, 386 mm/15.2 in.	**9**	Depth, caster to hole, 90 mm/3.5 in.
4	Width, side to pad center, 42 mm/1.7 in.	**10**	Depth between pads, 800 mm/31.5 in.
5	Width, side to hole, 107 mm/4.2 in.	**11**	Depth, pad to rear, 50 mm/2 in.
6	Depth, front to hole, 90 mm/3.5 in.	**12**	Front of cabinet

1.1.2 Electrical Specifications

TABLE 1-3 and TABLE 1-4 display system electrical specifications and receptacle model numbers.

TABLE 1-3 Sun Cabinet (Modular Power System) Electrical Specifications—Americas, Japan, Taiwan

Parameter		Value
Input current	Voltage range	208 VAC three phase
	Current, maximum	45A at 208 VAC per phase
	Current frequency range	50–60 Hz
Volt-Ampere rating		16200 VA
Connector type	North American, Japan, Taiwan	2 60A IEC 309 4 Pin for 208 VAC three phase, preinstalled with the cabinet
Receptacle type	North American, Japan, Taiwan	2 60A IEC 309 4 Pin for 208 VAC three phase, Hubbell C460P9W or equivalent

TABLE 1-4 Sun Cabinet (Modular Power System) Electrical Specification—Other Countries

Parameter		Value
Input current	Voltage range	230/400 VAC three phase
	Current, maximum	32A per phase
	Current frequency range	50–60 Hz
Volt-Ampere rating		22080 VA
Connector type	Other	2 32A IEC 309 5 Pin for 230/400 VAC three phase, preinstalled with the cabinet.
Receptacle type	Other	2 32A IEC 309 5 Pin for 230/400 VAC three phase, Hubbell C532R6S or equivalent

1.1.3 Vibration Limitations

TABLE 1-5 lists the allowable vibration for M3000/M4000/M5000 servers in a Sun Rack 1000/900.

TABLE 1-5 Allowable Vibration for the M3000/M4000/M5000 Servers

Operating	Non-Operating
Vertical: 0.15g Horizontal: 0.10g 5 to 500 Hz, swept-sine	Vertical: 3.0 mm pk-pk/0.5g, 5 to 500 Hz, swept-sine Horizontal: 3.0 mm pk-pk/0.25g, 5 to 500 Hz, swept-sine

1.1.4 Space and Thermal Specifications

For maintenance access, entry-level and midrange servers in racks require a minimum of four feet to the front, three feet to the rear, and three feet from the top. racks can be placed next to each other since there are no side clearance requirements during operation.

Both entry-level and midrange servers must maintain the minimum thermal distance between the rear of the server in an rack (914 mm/36 in.) and any obstructions or walls.

1.1.5 Service Area

The Sun SPARC Enterprise M3000/M4000/M5000 servers are accessed from the top surfaces. A stepladder may be required for maintenance depending upon the height these servers are mounted in the cabinet. Ensure an adequate service area for maintenance work.

FIGURE 1-6 Front and Rear Maintenance Access and Thermal Specifications

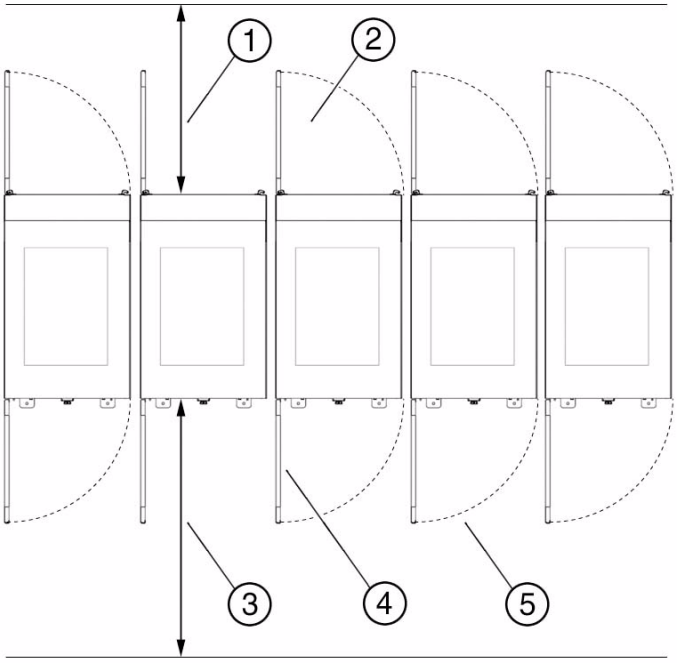


Figure Legend

1	914 mm (36 inches) access at rear
2	Rear door
3	1219 mm (48 inches) access at front
4	Front door
5	914 mm (36 inches) access from the top

1.1.6 Access Route

If your existing loading dock meets height or ramp requirements for a standard freight carrier truck, you can use a pallet jack to unload the server. If not, you must provide a standard forklift or other means to unload the server, or request the server be shipped in a truck with a lift gate.

All servers not shipped in an rack should be lifted only by proper computer-lifting equipment to prevent personal injury or damage to server equipment.

Each server that is not preinstalled in an rack is shipped in a separate crate. A pallet jack is required to move each shipping crate to the server location.

Leave each server in its shipping crate until it reaches its final destination. If the crate does not fit through the planned access route, partially disassemble it.

The entire access route to your computer room should be free of raised patterns that can cause vibration, and the route must meet the requirements listed in TABLE 1-6.

TABLE 1-6 Access Route Requirements

	With Shipping Pallet	Without Shipping Pallet
Minimum door height	2184 mm/86 in.	2019 mm/79.5 in.
Minimum elevator depth	1506 mm/59.3 in.	1506 mm/59.3 in.
Maximum incline	10°	10°
Minimum elevator, pallet jack, and floor loading capacity (maximum weight per server)	544 kg (1200 lb)	

1.1.7 Server Guidelines

As you plan your space needs for the Sun racks, keep these conditions in mind:

- *Each* rack containing midrange servers requires its own power cords, connected to separate power outlets. See Section 1.1.2, "Electrical Specifications" on page 1-8, for details on electrical requirements.
- Circuit breakers are supplied by the customer as required by local, state, or national electrical codes.
- The servers require electrical circuits that are grounded to earth.

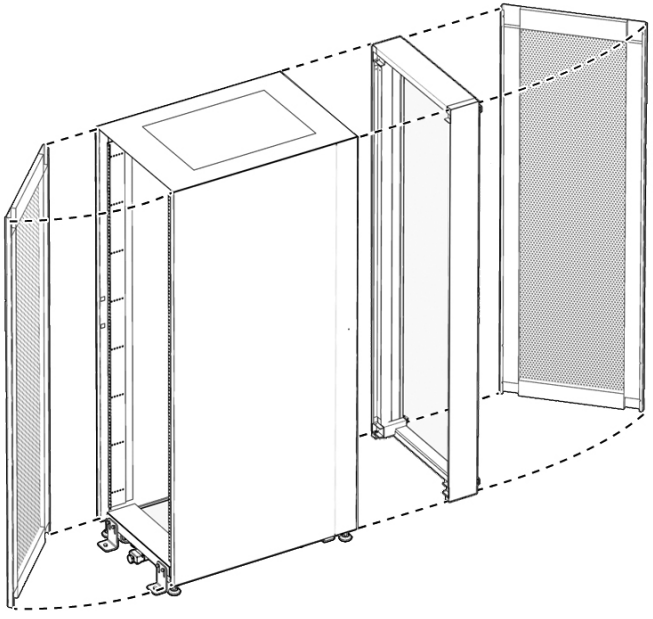
1.2 Mounting Specifications

The Sun Rack 1000/900 can enclose up to twenty-one 2U M3000 servers, six 6U M4000 servers and three 10U M5000 servers. If you are mounting servers in a Sun Rack 900, an optional cabinet extender is available to extend the depth of the rack from the rear to enable the door to close.

1.2.1 Installing the Cabinet Extender (Optional)

1. **Remove the rear door of the rack and set it aside.**
2. **Place the cabinet extender onto the door hinge pins at the rear of the rack and secure in place. (**FIGURE 1-7**)**
3. **Mount the rear door on the cabinet extender.**

FIGURE 1-7 Installing the Cabinet Extender



1.3 Stabilizing the Cabinet

The Sun cabinet can be permanently mounted to the floor using the same brackets that secured the cabinet to the shipping pallet. The cabinet side of the mounting brackets are slotted to allow for vertical positioning.

FIGURE 1-8 illustrates a mounting bracket on a Sun Rack 1000 and the hole spacing required to secure the cabinet permanently to the floor.

FIGURE 1-8 Sun Rack 1000 Mounting Brackets and Hole Spacing for Floor Mounting

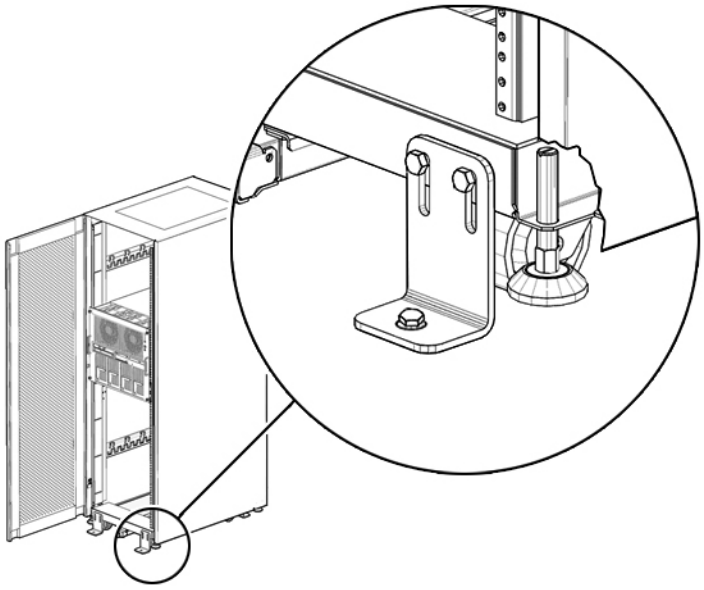


FIGURE 1-9 Hole Spacing for Floor Mounting

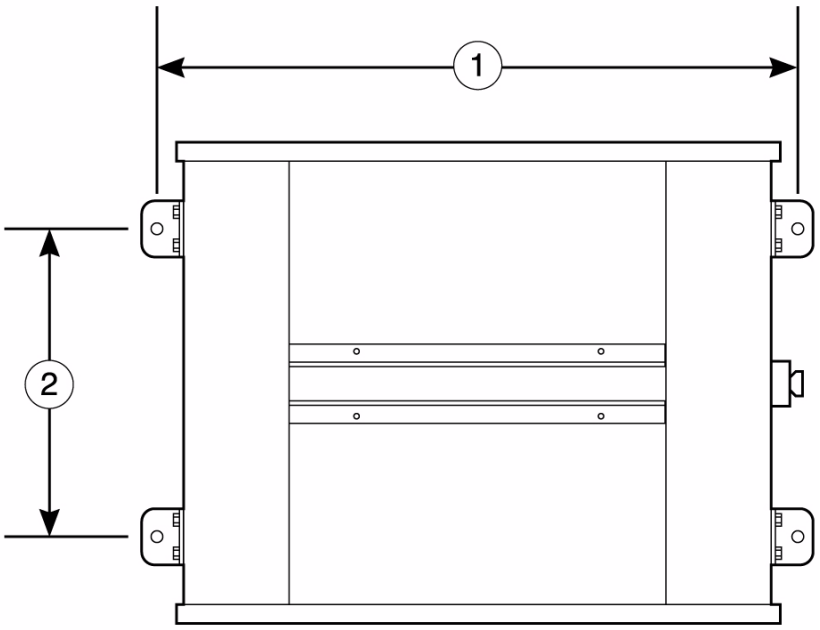


Figure Legend

1	Width, 1000 mm/39.5 in.
2	Depth, 388 mm/15.2 in.

CHAPTER 2

Sun Rack II Cabinet

The Sun Rack II cabinet can enclose SPARC Enterprise M3000/M4000/M5000 entry-level and midrange servers, storage products, and qualified third-party equipment.

2.1 Technical Information

The Sun Rack II cabinet can enclose up to twenty-one 2U M3000 servers, six 6U M4000 servers, or three 10U M5000 servers.

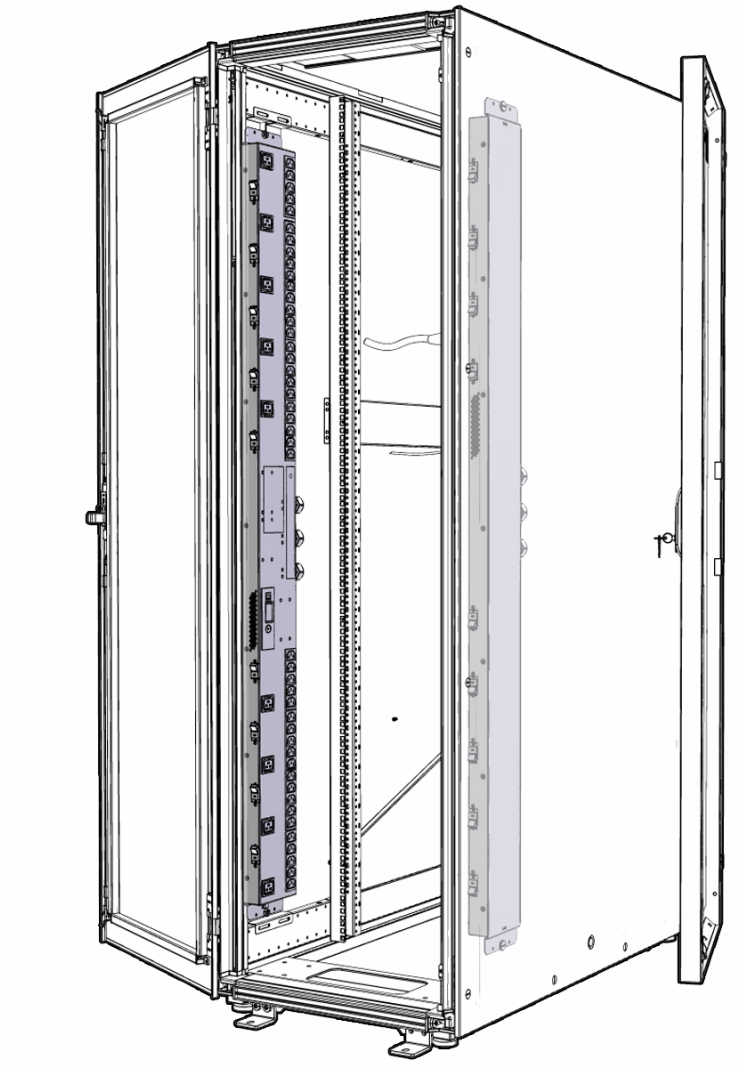
Note – The Sun Rack II cabinet has square RETMA rail holes, which use cage nuts. If you are not familiar with cage nuts, see Appendix A.

Refer to the *Sun Rack II User's Guide* and the *Sun Rack II Power Distribution Units User's Guide* at: `http://download.oracle.com/docs/cd/E19657-01/` for the following technical information and specifications:

- Physical specifications
- Electrical specifications
- Space and thermal specifications
- Access route
- Server guidelines
- Mounting specifications
- Stabilizing the Cabinet

FIGURE 2-1 illustrates the Sun Rack II with two side-mounted power distribution units (PDUs).

FIGURE 2-1 Sun Rack II With Two PDUs



2.1.1 Vibration Limitations

TABLE 2-1 lists the allowable vibration for SPARC Enterprise M3000/M4000/M5000 servers in a Sun Rack II.

TABLE 2-1 Allowable Vibration for M3000/M4000/M5000 Servers

Operating	Non-Operating
Vertical: 0.15g Horizontal: 0.10g 5 to 500 Hz, swept-sine	Vertical: 3.0 mm pk-pk/0.5g, 5 to 500 Hz, swept-sine Horizontal: 3.0 mm pk-pk/0.25g, 5 to 500 Hz, swept-sine

CHAPTER 3

Installing the SPARC Enterprise M3000 Server in a Sun Rack

This chapter describes how to mount an M3000 server in a Sun Rack 1000, Sun Rack 900, and Sun Rack II.

The following topics are in this chapter:

Caution – The M3000 server can weigh up to 23 kg (50.7 lb). Two people are required to mount the server safely in the cabinet.

Up to twenty-one 2U M3000 servers can be mounted in the following cabinets:

- Sun Rack 1000, which comes as a 42-rack unit (U) or a 38U cabinet
- Sun Rack 900, which comes as a 38U or 36U cabinet
- Sun Rack II cabinet, which comes in a 42U cabinet

TABLE 3-1 M3000 Server External Dimensions

Width	Depth	Height	Weight
440 mm (17.4 in.)	657 mm (25.9 in.)	87mm (3.4in.) 2U	23 kg (50.7 lb)

The M3000 server is designed to be mounted in a standard 19-inch rack with a depth of 1000 mm or more. See Section 1.2, "Mounting Specifications" on page 1-12.

3.1 M3000 Server Slide Rail Kit

The server is mounted in the rack using slide rail assemblies. Refer to the instructions packaged with the slide rail kit for assembling and attaching the rail kit and cable management arm (CMA) to the SPARC Enterprise M3000 server, in preparation for installing the server in the rack.

Caution – For stability, populate the rack with the servers at the lowest location before filling in the higher areas.

3.2 Installing the M3000 Server in a Rack

1. **Extend the anti-tilt bar or anti-tilt legs.**

   For details on extending the anti-tilt bar or anti-tilt legs, see Appendix B, "Extending the Anti-Tilt Bar or Anti-Tilt Legs" on page 1.

Caution – The anti-tilt bar must be extended or the rack might topple when the server is installed on the extended slide rails.

Caution – For stability, populate the rack with the servers at the lowest location before filling in the higher areas.

2. **Extend the slide rails from the slide assemblies.**

Caution – Do not use the handles on the front of the server to lift the server. The front handles are designed for sliding the server in and out of the rack. The handles will not support the weight of the server.

3. **With the assistance of another person, install the chassis into the cabinet by aligning the chassis rails with the rail parts in the rack and carefully pushing in until you hear a click and the server stops.**

   The server will stop mid-way in the rack after the sound of the click.

4. **Release the latches on the sides of the server and continue to push in the server until completely seated in the rack.**

5. **Tighten the thumbscrews in the chassis bezel to hold the chassis securely in the rack.**

3.3 Power Wiring Configurations

To prevent catastrophic failures, the design of your input power sources must ensure that adequate power is provided to your servers. Use dedicated AC breaker panels for all power circuits that supply power to your server. Electrical work and installations must comply with applicable local, state, or national electrical codes.

3.3.1 For the M3000 Server in a Sun Rack 1000/900

The Sun Rack 1000/900 can fit up to two modular power supplies (MPS). Each MPS is 2U. The MPS must be installed in the bottom of the cabinet.

TABLE 3-2 and FIGURE 3-1 show an example of the recommended wiring configurations for the M3000 servers with one MPS.

TABLE 3-2 Recommended Wiring Configurations for Eighteen M3000 Servers With One 60A 3-Phase MPS

Server	PSU_1	PSU_0
M3000_11_14_17	MPS B5	MPS A5
M3000_10_13_16	MPS B4	MPS A4
M3000_9_12_15	MPS B3	MPS A3
M3000_2_5_8	MPS B2	MPS A2
M3000_1_4_7	MPS B1	MPS A1
M3000_0_3_6	MPS B0	MPS A0

Note – For M3000 servers in positions twelve and above, use power cords that are

TABLE 3-3 Recommended Wiring Configurations for Eighteen M3000 Servers With Two 30A 3-Phase MPS

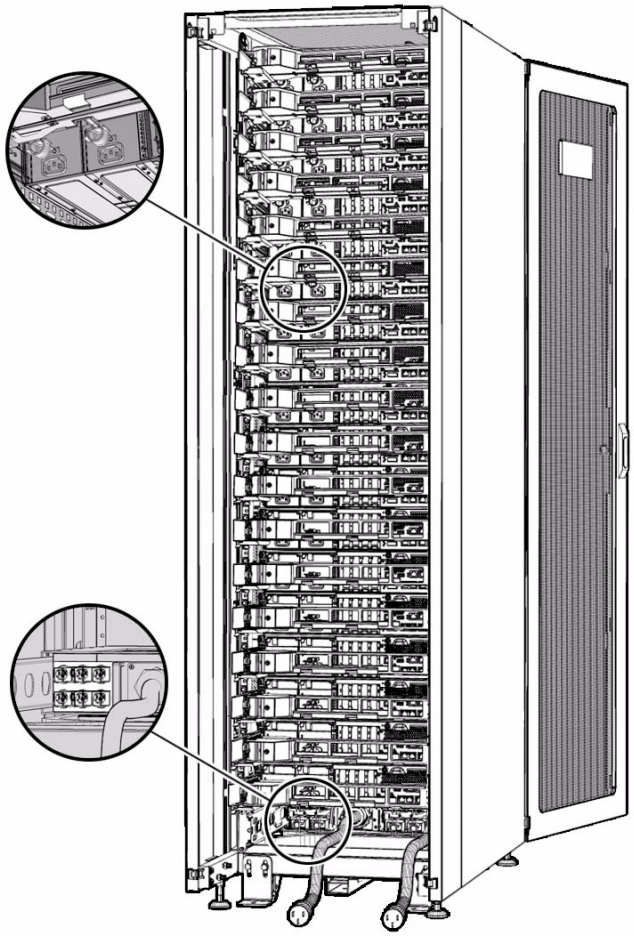
Server	PSU_1	PSU_0
M3000_11_14_17	MPS_1-B5	MPS_1-A5
M3000_10_13_16	MPS_1-B4	MPS_1-A4
M3000_9_12_15	MPS_1-B3	MPS_1-A3
M3000_2_5_8	MPS_0-B2	MPS_0-A2
M3000_1_4_7	MPS_0-B1	MPS_0-A1
M3000_0_3_6	MPS_0-B0	MPS_0-A0

TABLE 3-4 Recommended Wiring Configurations for Twelve M3000 Servers With One 30A 3-Phase MPSs

Server	PSU_1	PSU_0
M3000_8_11	MPS_B5	MPS_A5
M3000_7_10	MPS_B4	MPS_A4
M3000_6_9	MPS_B3	MPS_A3
M3000_2_5	MPS_B2	MPS_A2
M3000_1_4	MPS_B1	MPS_A1
M3000_0_3	MPS_B0	MPS_A0

2.5m in length to reach from the servers to the MPS units.

FIGURE 3-1 Sun Rack 1000 With M3000 Servers and One MPS



Note – The numbering in a rack reads from bottom to top and right to left.

3.3.2 For the M3000 Server in a Sun Rack II

To ensure redundant power sourcing, use the recommended power wiring configurations for the M3000 server in a Sun Rack II.

Sun supports up to two PDUs in a Sun Rack II cabinet, one on either side. SPARC Enterprise M3000 servers can use PDU types 15k, 25k, or 35k. For more information on PDUs in a Sun Rack II, refer to the *Sun Rack II User's Guide*.

TABLE 3-5 Recommended Wiring Configurations for Eight M3000 Servers With 5kVA 1ph PDUs

Server	PSU_1	PSU_0
M3000_6_7	PDU_A Group_2	PDU_B Group_3
M3000_3_4_5	PDU_A Group_1	PDU_B Group_4
M3000_0_1_2	PDU_A Group_0	PDU_B Group_5

TABLE 3-6 Recommended Wiring Configurations for Sixteen M3000 Servers With 10kVA 1ph PDUs

Server	PSU_1	PSU_0
M3000_14_15	PDU_A Group_5	PDU_B Group_0
M3000_11_12_13	PDU_A Group_4	PDU_B Group_1
M3000_8_9_10	PDU_A Group_3	PDU_B Group_2
M3000_6_7	PDU_A Group_2	PDU_B Group_3
M3000_3_4_5	PDU_A Group_1	PDU_B Group_4
M3000_0_1_2	PDU_A Group_0	PDU_B Group_5

TABLE 3-7 Recommended Wiring Configurations for Twenty-one M3000 Servers With 15kVA 1ph PDUs

Server	PSU_1	PSU_0
M3000_18_19_20	PDU_A Group_5	PDU_B Group_0
M3000_15_16_17	PDU_A Group_4	PDU_B Group_1
M3000_12_13_14	PDU_A Group_3	PDU_B Group_2
M3000_8_9_10_11	PDU_A Group_2	PDU_B Group_3
M3000_4_5_6_7	PDU_A Group_1	PDU_B Group_4
M3000_0_1_2_3	PDU_A Group_0	PDU_B Group_5

TABLE 3-8 Recommended Wiring Configurations for Twenty-one M3000 Servers With 3ph PDUs

Server	PSU_1	PSU_0
M3000_14_17_20	PDU_A Group_5	PDU_B Group_0
M3000_13_16_19	PDU_A Group_4	PDU_B Group_1
M3000_12_15_18	PDU_A Group_3	PDU_B Group_2
M3000_2_5_8_11	PDU_A Group_2	PDU_B Group_3
M3000_1_4_7_10	PDU_A Group_1	PDU_B Group_4
M3000_0_3_6_9	PDU_A Group_0	PDU_B Group_5

Note – The numbering in a rack reads from bottom to top and right to left.

FIGURE 3-2 Sun Rack II with Twenty-One M3000 Servers and Two PDUs

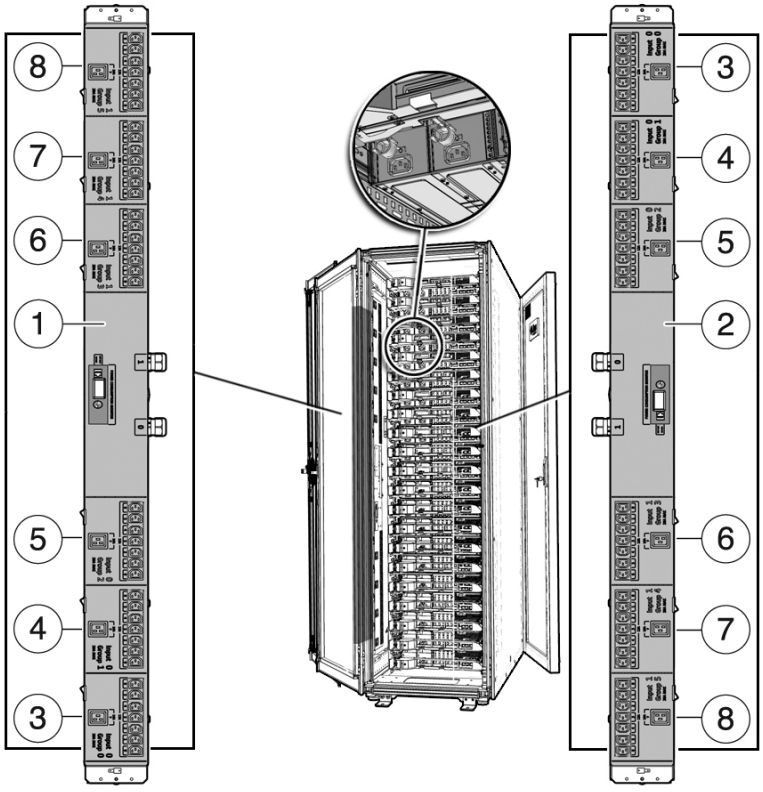


Figure Legend

1	PDU A	**5**	Group_2
2	PDU B	**6**	Group_3
3	Group_0	**7**	Group_4
4	Group_1	**8**	Group_5

3.3.3 Circuit Breaker Capacity and Characteristics

Qualified equipment cabinets housing these midrange servers require their own customer-supplied circuit breaker and AC receptacle for each power cord. Provide a stable power source, such as an uninterruptible power system (UPS), to reduce the possibility of component failures. If the computer equipment is subjected to repeated power interruptions and fluctuations, it is susceptible to a higher component failure rate than it would be with a stable power source.

Note – If the appropriate electrical receptacle is not available in your country, the connector may be removed from the cord. The cord can then be permanently connected to a dedicated branch circuit by a qualified electrician. Check local electrical codes for proper installation requirements.

3.3.4 Grounding

Both midrange servers are shipped with grounding-type (three-wire) power cords. Always connect the cords into grounded power outlets. Each power cord will also supply your server with proper earth ground. Sun has tested the equipment cabinets for radiated and conducted emissions and have determined there is no difference in emissions with or without a ground strap grounding the equipment cabinets. No additional earth grounding is necessary but it may be added if desired.

Contact your facilities manager or a qualified electrician to determine what type of power is supplied to your building.

CHAPTER 4

Installing the SPARC Enterprise M4000 Server in a Rack

This chapter describes how to mount a SPARC Enterprise M4000 server in a rack. The instructions cover Sun Rack 1000, Sun Rack 900, and Sun Rack II.

The following topics are in this chapter:

4.1 About the M4000 Server

The M4000 server is designed for a standard 19-inch rack with a depth of 1000 mm or more. The M4000 is 6 rack units tall (6U) and weighs 84 kg (185 lb).

When mounted in a Sun Rack 900, the cabinet extender option is required to enable the rear door to close. See Section 1.2, "Mounting Specifications" on page 1-12.

Caution – Do not use the handles on the front of the server to lift the server. The front handles are designed for sliding the server in and out of the equipment rack. The handles will not support the weight of the server.

Caution – The M4000 server can weigh up to 84 kg (185 lb). Two people using a computer equipment lift are required to mount the server safely in the equipment rack.

4.1.1 Variations in M4000 Rail Kits

There are two rail kit options for M4000 servers. The following figure shows that the main visible difference between the two rail kits is the height of the rail brackets.

The installation procedure gives the installation steps for both styles of rail.

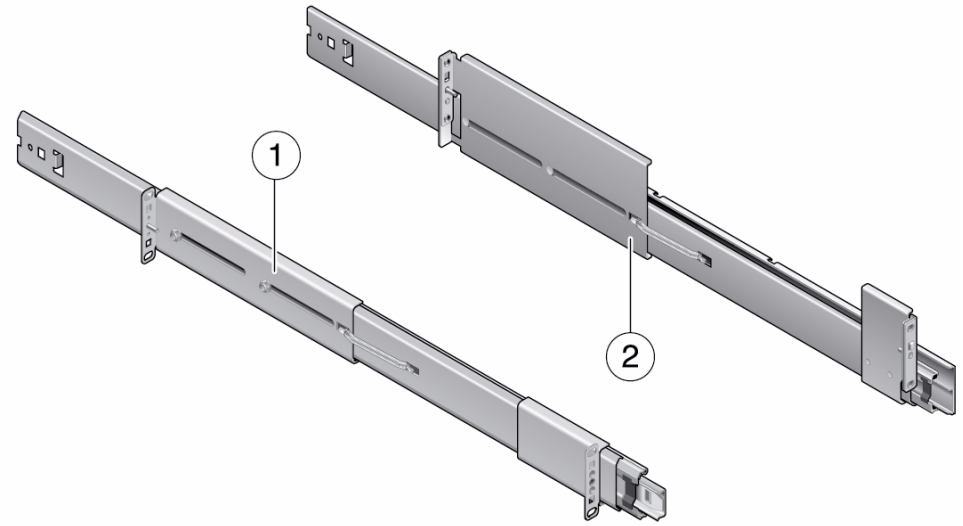


Figure Legend

1	Version 1 rail
2	Version 2 rail

4.1.2 Contents of the Rail Kit

FIGURE 4-1 shows the contents of the version 1 rail kit. The version 2 rail kit is similar and uses the same assorted parts.

FIGURE 4-1 M4000 Server Rail Kit Contents

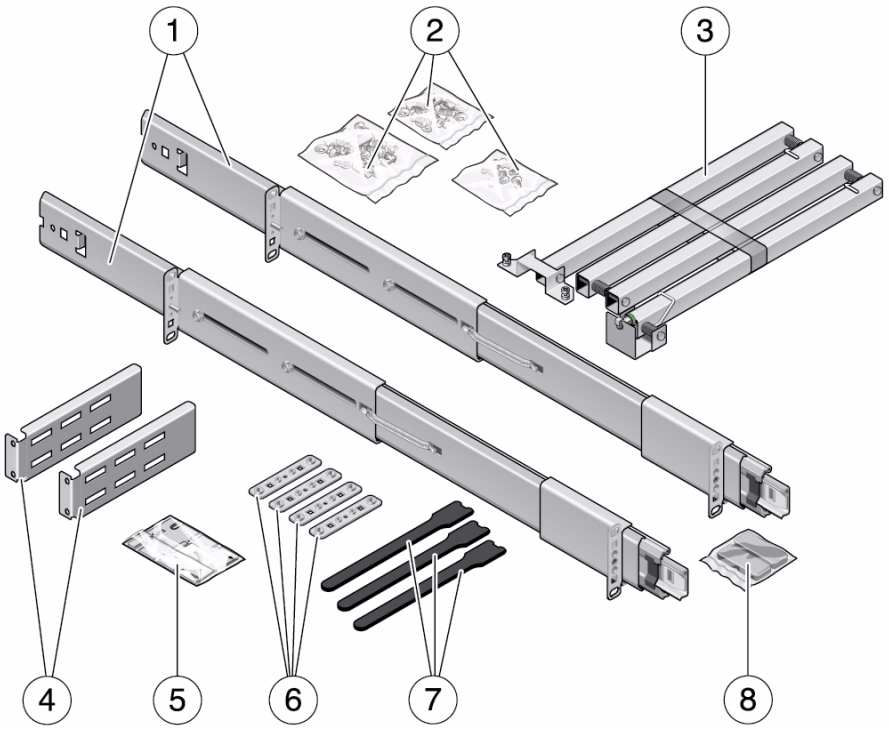


Figure Legend

1	Slide rails (2)
2	Bag of parts -M3 flathead screw (8), M5 cage nut (8), M5 flathead screw, washer (8)
3	Cable management arm (CMA)
4	Cable holding brackets (2)
5	Mounting guide template
6	Nut bar (4)
7	Hook and loop straps (10)
8	End cap (2)

Note – Not all parts in the rail kit will be used. For example, cage nuts are not used in Sun Rack 1000 or 900 racks.

4.1.3 M4000 Shipping Brackets

Shipping brackets are included in the rail kit. Installation of the brackets is optional.

FIGURE 4-2 Contents of the M4000 Shipping Bracket Kit

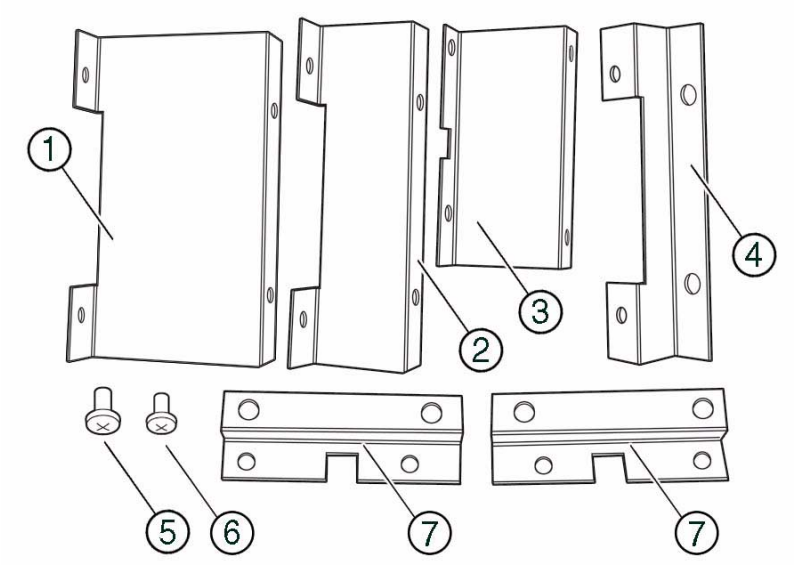


Figure Legend

1	Long deep bracket
2	Long medium bracket
3	Short deep bracket
4	Long shallow bracket
5	M5 screws (4)
6	M6 screws (4)
7	Short shallow bracket (2)

Note – Different sizes of brackets are included to fit different racks, so not all parts in the kit will be used.

4.1.4 Selecting a Mounting Location

Determine a location for the M4000 server in the equipment rack. The M4000 server is six rack units tall.

Caution – For rack stability, place the M4000 server at the lowest open location before filling in the higher areas. Keep the rack's center of gravity as low as possible.

Note – The M4000 server rail kit includes a mounting guide template which can be used to determine hole locations for the rails in the rack.

4.2 Preparing a Sun Rack II

Instructions for Sun Rack 1000 and 900 start in Section 4.3, "Installing Slide Rails in the Rack" on page 4-8.

For a Sun Rack II, you must first install cage nuts in the rack. You must also add nut bar brackets to the rails.

4.2.1 Installing Cage Nuts

Screw hole numbers and rack unit numbers start from the bottom and work upwards. Note that two sizes of cage nuts are used in this procedure.

If you are not familiar with cage nuts, see Appendix A.

1. **Install M6 cage nuts for standoffs.**

   a. **Install cage nuts at screw hole #2 at U1 and screw hole #17 at U6 in the left front rack rail.**

   b. **Repeat Step a for the right front rail.**

      The rear rails will not have standoffs. This procedure uses a total of four M6 cage nuts.

FIGURE 4-3 Cage Nut Hole Locations for the M4000 Server

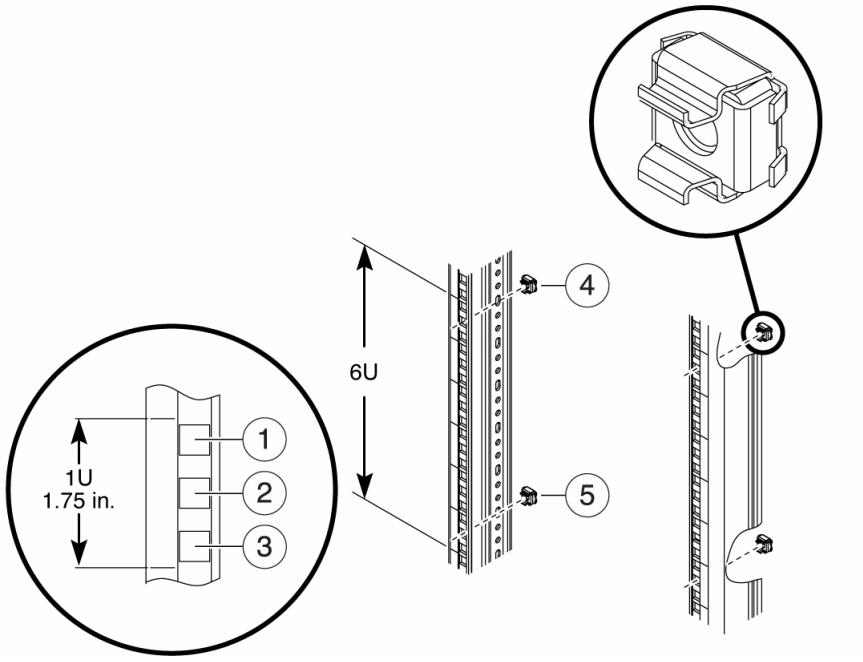


Figure Legend

1	Upper hole
2	Center hole
3	Lower hole
4	Center hole on 6U
5	Center hole on 1U

2. **Install M5 cage nuts for slide rails.**

   a. **Install cage nuts at screw hole #6 at U2 and #10 at U4 in both front rack rails.**

   b. **Repeat** Step a **for the rear rack rails.**

      This procedure uses a total of eight M5 cage nuts.

4.2.2 Installing Nut Bars

This procedure applies to Sun Rack II only.

- **Attach nut bars to the front and rear brackets on each slide rail.**

  See FIGURE 4-4. Use two M2.5 flathead screws for each nut bar.

FIGURE 4-4 Attaching Nut Bars with Brackets

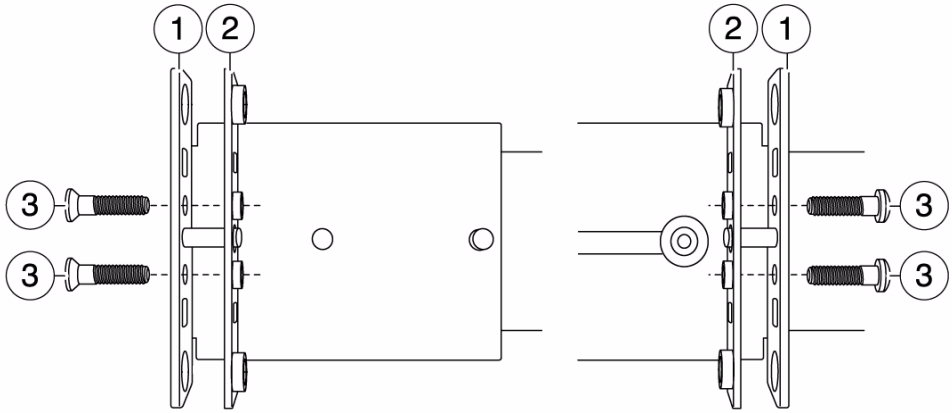


Figure Legend

1	Bracket
2	Nut bar
3	M3 Screw

4.3 Installing Slide Rails in the Rack

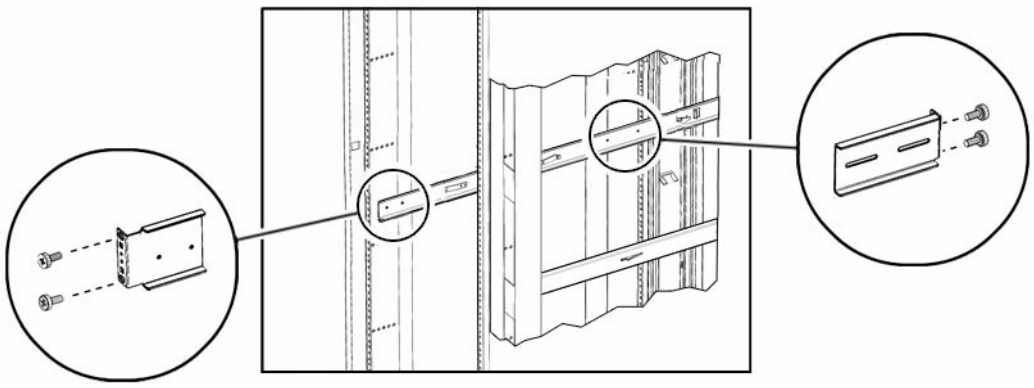
To identify the left and right rails:

- The version 1 rails are interchangeable. Either rail can be used on the left or right side.
- The version 2 rails are not interchangeable. The brackets on the rails extend upward, not downward.

1. **Identify the locations for the slide rails in the rack (**FIGURE 4-5**).**

   The slide rails attach at the second and fourth rack units. The screw holes should align with the top hole of U2 and the bottom hole of U4.

FIGURE 4-5 Installing a Slide Rail



2. **Starting with the front of the rack, hook the front bracket on the rack column.**

   The brackets on the slide rails have pins and hooks to hold them in place while they are being secured.

3. **Slide the rear bracket horizontally to hook onto the rear rack column.**
4. **Install the remaining slide rail in the same manner.**
5. **Verify that the slide rails are at the same height.**
6. **Fasten each slide rail in place with four screws.**
   - For Sun Rack 1000 or 900, use M6 screws.
   - For Sun Rack II, use M5 screws.

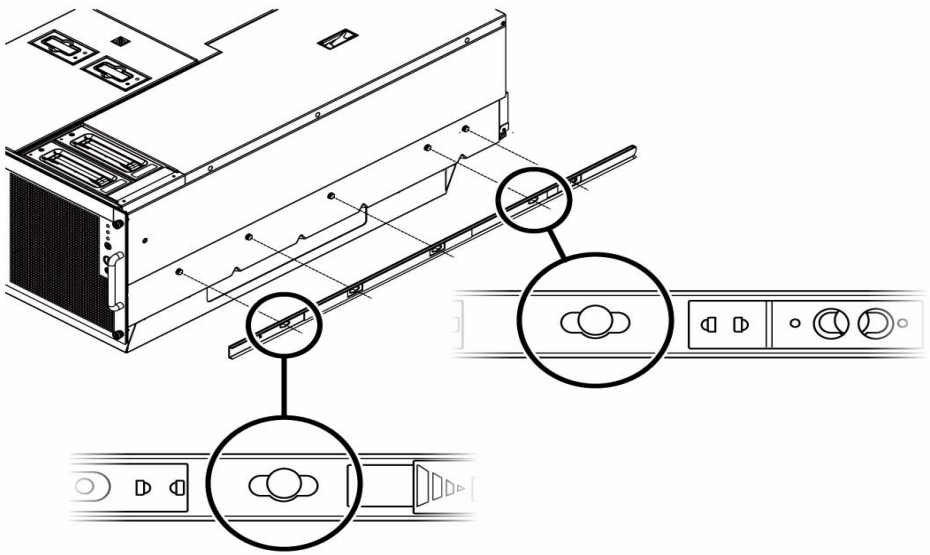
4.4 Preparing the Server

For version 1 slide rails, use this procedure to attach the inner slides to the sides of the server.

For version 2 slide rails, skip this procedure and go instead to Section 4.5, "Mounting the Server in the Rack" on page 4-10.

1. **If the inner slides are packed separately in the shipping kit, go to Step 3.**
2. **Remove the inner slides from the slide rails as follows.**
   a. **Pull the inner slide out approximately 850 mm (34 in), until it locks in the fully extended position.**
   b. **Release the slide rail by pressing the green tab on the inner slide, then pull the inner slide completely out of the slide rail.**
3. **Attach the inner slides to the sides of the server.**
   a. **Orient the flat side of the inner slide toward the server so that the pins on the side of the server pass through the holes on the inner slide (FIGURE 4-6).**
   b. **Slide the inner rails toward the front of the server to lock them in place.**

FIGURE 4-6 Securing a Slide to the Server



4.5 Mounting the Server in the Rack

Caution – The anti-tilt bar or anti-tilt legs must be extended or the equipment rack will topple when the server is installed on the extended slide rails.

Caution – Do not use the handles on the front of the server to lift the server. The front handles are designed for sliding the server in and out of the equipment rack. The handles will not support the weight of the server.

1. **Extend the anti-tilt bar or anti-tilt legs.**

   For details on extending the anti-tilt bar in a Sun Rack 1000, 900 or Sun Rack II, see Appendix B, "Extending the Anti-Tilt Bar or Anti-Tilt Legs" on page 1.

2. **Extend the slide rails or bearing cars (**FIGURE 4-7**) until they lock in place.**

FIGURE 4-7 Bearing Car in Full Forward Position Inside the Slide Rail

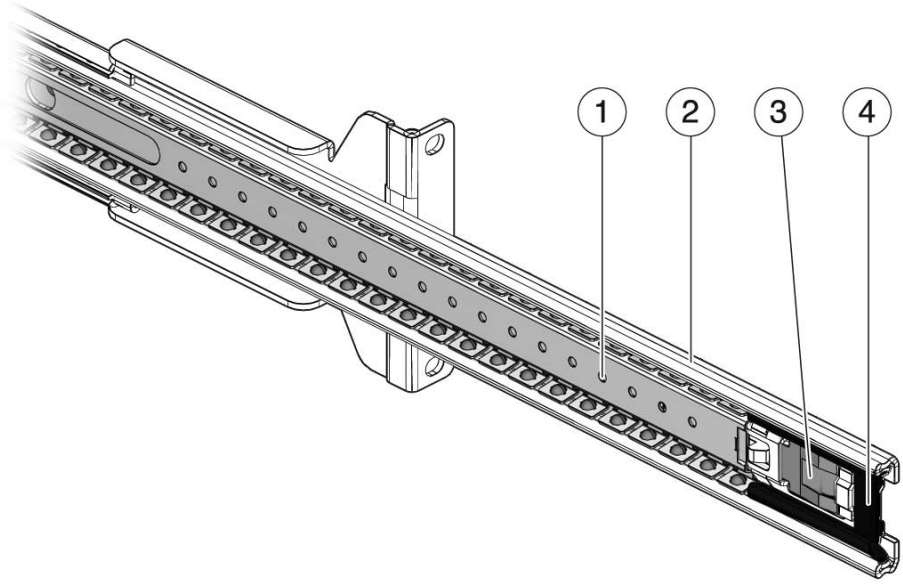


Figure Legend

1	Bearing car
2	Slide assembly (interior view)
3	Green bearing car holder clip
4	Black alignment guide

Caution – For safe rack mounting, ensure that the bearing cars are positioned all the way forward inside the slide rails. Also ensure the black plastic rail alignment guides are securely attached at the end of the inside of the slide rails. These guides will assist in the initial mating of the inner rails attached to the sides of the server.

3. **Place the forks of the computer equipment lift inside the plinth on the underside of the system.**

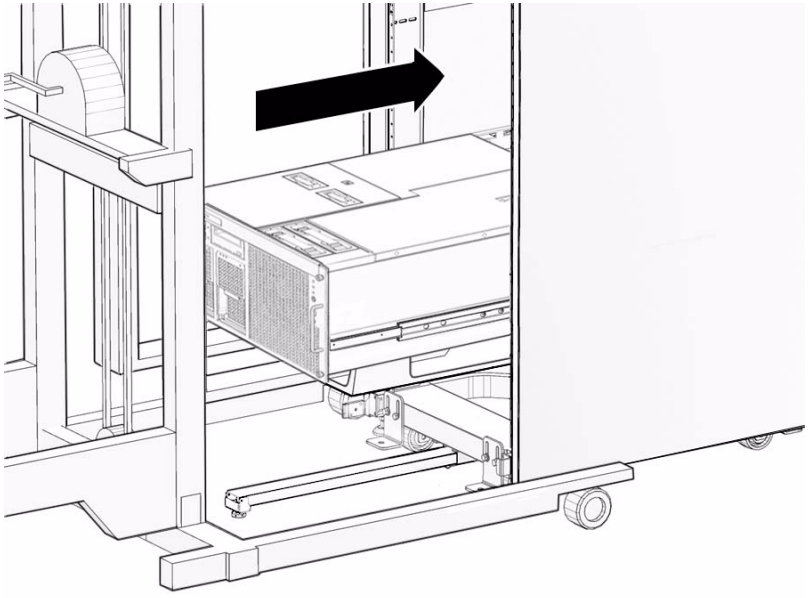
   The plinth protects the underside of the system and keeps the system from sliding off the computer equipment lift.

4. **Attach the server to the slide rails with one of the following procedures.**
   - **For Sun Rack 1000 and 900** (FIGURE 4-8)

a. Raise the server and gently push it towards the equipment rack until the inner rails align with the slide rails.

b. Slide the inner rails into the slide rails until the inner rails lock into place.

FIGURE 4-8 Inserting Inner Slides in Version 1 Slide Rail Bearing Cars



- **For Sun Rack II** (FIGURE 4-9)

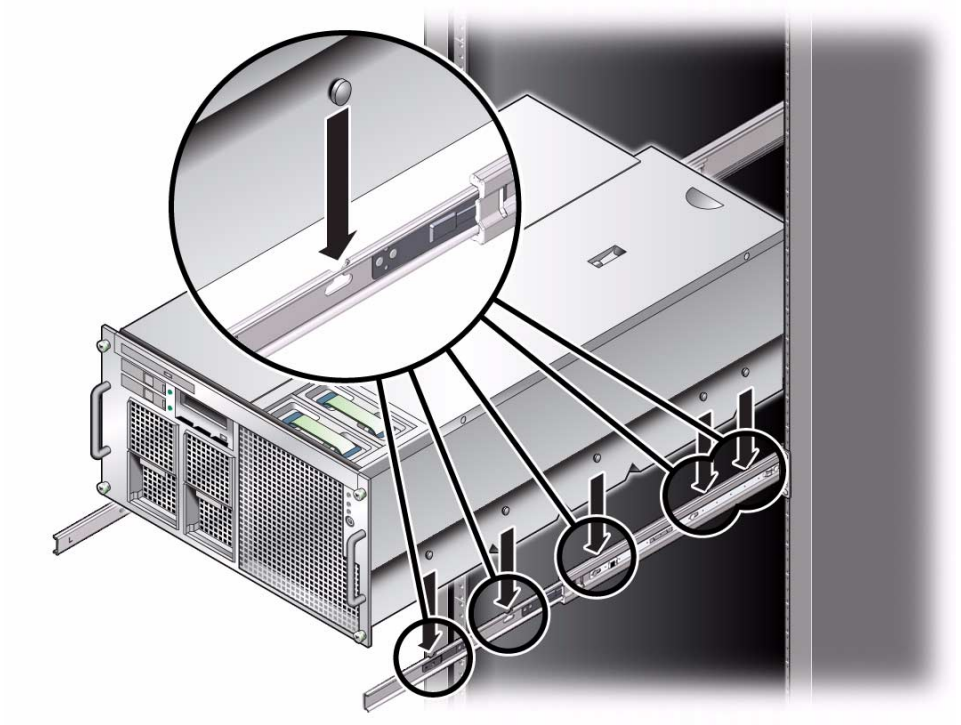
  The slide rails have keyholes that fit over pins on the sides of the server. Labels are located on the side of each server to help identify the mounting points.

a. Raise the server and gently push it towards the equipment rack until the pins on the sides of the server are directly above the keyholes in the slide rails.

b. Lower the server so that the pins on the server enter the keyholes.

c. Push the slides towards the rear of the server to lock them in place.

FIGURE 4-9 Aligning Server Pins With Version 2 Slide Rail Keyholes



5. Remove the plinth from the bottom of the server (FIGURE 4-10).

Caution – Remove the plinth prior to sliding the server into the rack so that the server below is not damaged.

There are eight (8) screws that secure the plinth to the bottom of each server.

a. Remove the two (2) front screws.

b. Loosen the remaining six (6) screws.

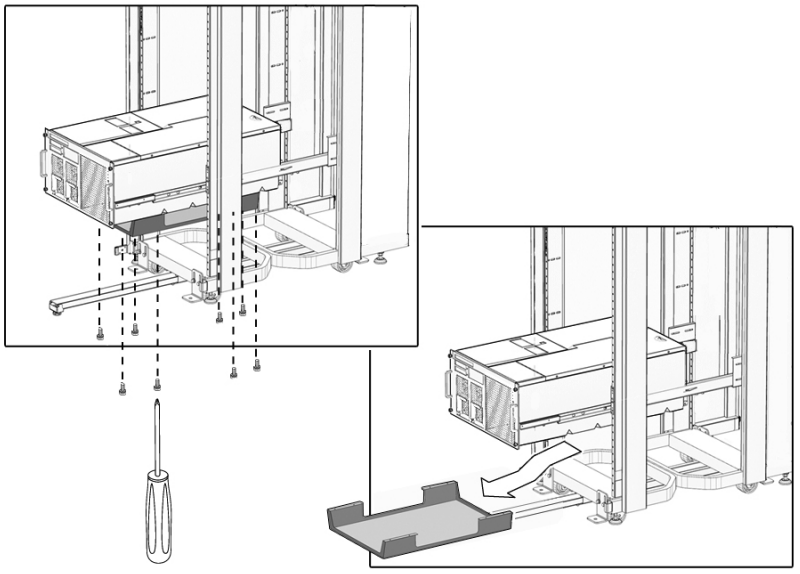
c. Slide the plinth toward the rear of the server less than an inch until the plinth is released from the screws.

Caution – The plinth weighs 2 kg (5 lb). To prevent injury, support the plinth upon release from the screws.

d. Remove the six (6) loosened screws.

Caution – The rack stabilizer must be extended or the equipment rack will topple when the lifting device is withdrawn

FIGURE 4-10 Example of Removing the Plinth

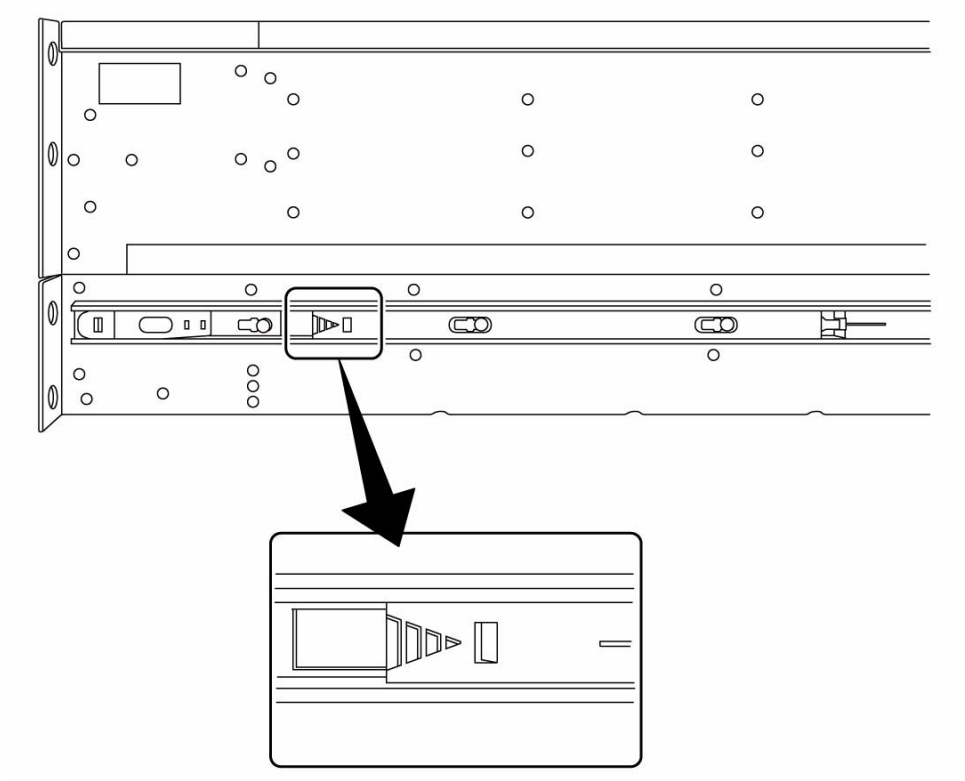


6. Withdraw the computer lifting device.

7. Slide the server into the cabinet.

Note – Labels are located on the sides of the server to assist in fully seating the server in the cabinet.

FIGURE 4-11 Locking Mechanism on the M4000 Slide Rail



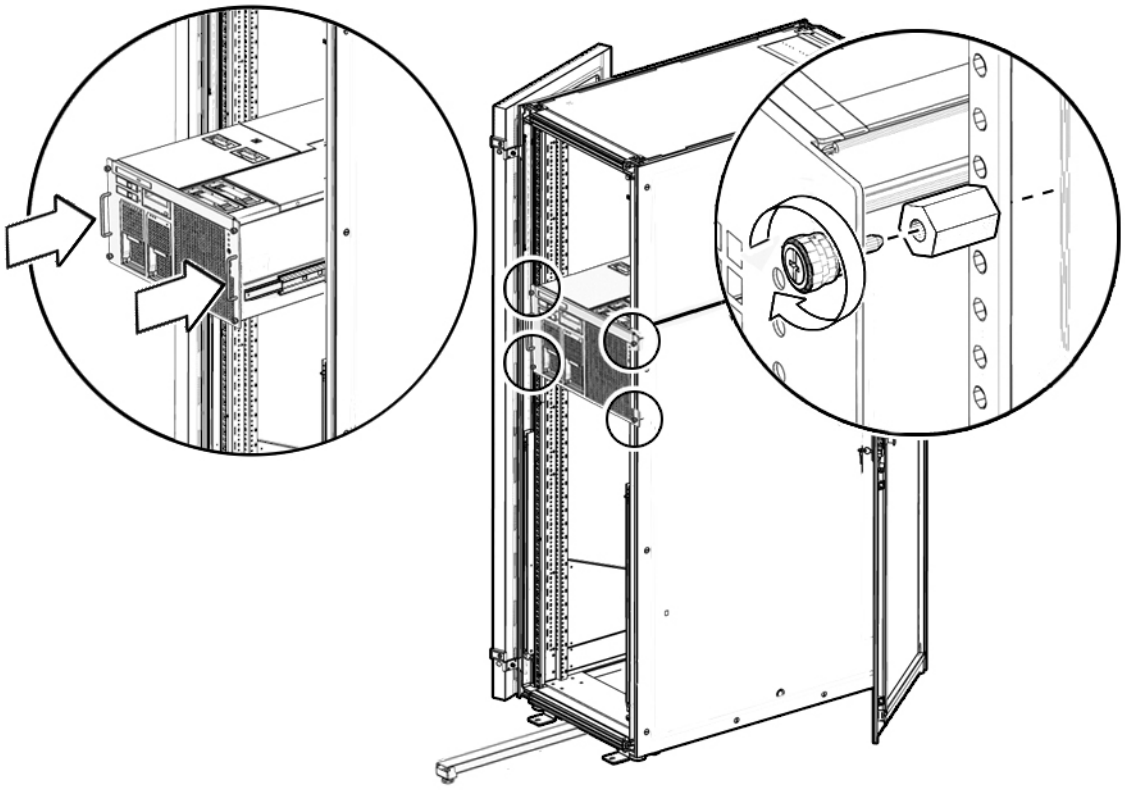
8. **If you are installing the CMA at this time, proceed to** Section 4.6, "Installing the Cable Management Arm" on page 4-17**.**

   If you are not installing the CMA, proceed to Step 9.

9. **Secure the spacers at the front of the rack (**FIGURE 4-12**).**

   The spacer holes are located one hole above and below the server. The spacers should align with the captive screws on the front of the server.

FIGURE 4-12 Example of Spacers Aligned With Captive Screws



4.6 Installing the Cable Management Arm

The cable management arm (CMA) for the M4000 server attaches to the left rear of the server.

1. **Wind the CMA so that the springs are taut and positioned against the arm.**

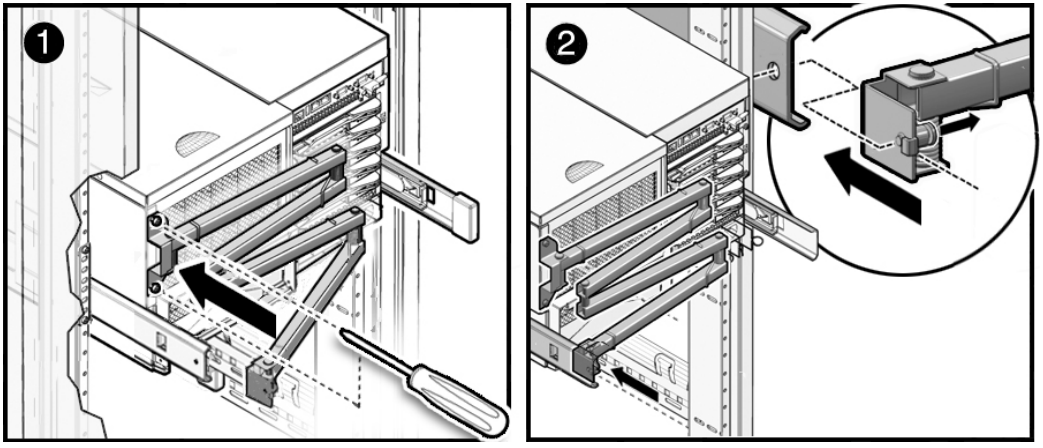
Caution – You must hold both ends of the CMA while it is taut to keep the spring-loaded arm from striking yourself or nearby equipment.

2. **Secure the small end of the CMA to the server by using the two (2) captive screws (**FIGURE 4-13**).**

3. **Secure the large end of the CMA to the rail on the same side of the rack**.

   The CMA attaches using a captive connector to hold it into position on the slide assemblies.

FIGURE 4-13 Installing the Cable Management Arm



4.6.1 Attaching End Caps to the Rails

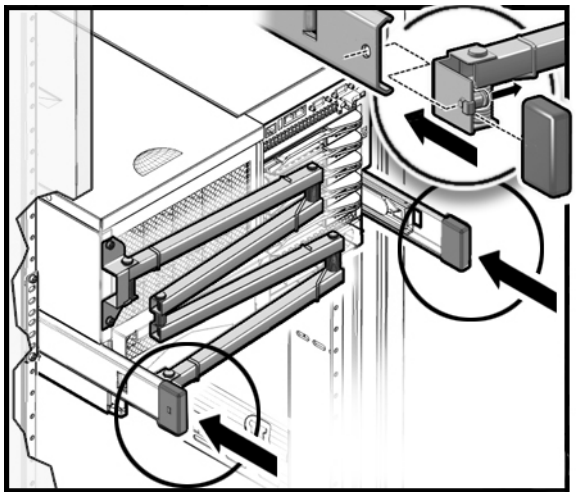
After securing the CMA to the M4000 servers, attach the provided end caps to the rails.

1. **Attach the end caps onto the slide rails.**

   An end cap is attached to both the right and left rear rails (FIGURE 4-14).

Note – If the CMA is not used, attach all end caps to the rails of the server. The M4000 server uses two end caps.

FIGURE 4-14 End Caps on the M4000 Server Slide Rails



2. **Connect the power cables to the rear of the server and secure them with the cable retention clamps.**

Caution – Do not connect the power cables to a power source at this time.

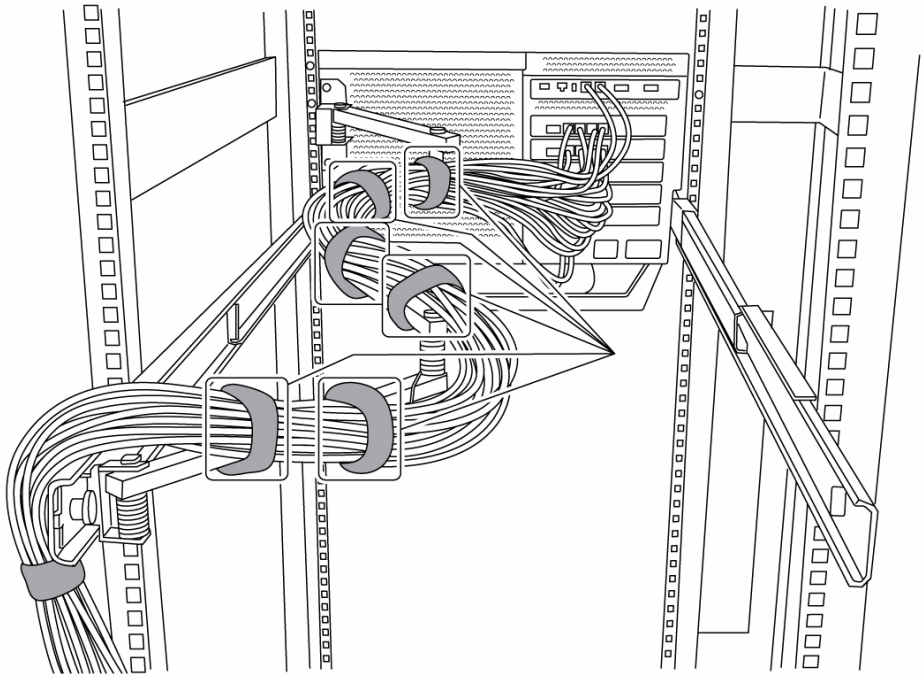
---

3. **Run the power cables along the CMA and secure them in place with tie wraps.**

   The power cables and infiniband cables should hang loosely in a service loop behind the server or the CMA might not be able to fully retract.

Caution – To avoid the cables from bumping into the I/O cable connectors, do not twist the cables around the end of the CMA.

FIGURE 4-15 Example of Bundling Cables in a Cabinet



Note – If additional attachment points are required to route the cables, install the optional bracket kit. See Section 4.7, "Installing the Cable Holding Brackets (Optional)" on page 4-21.

---

4. **Ensure that the server can slide in and out of the rack without dislodging the power cables.**

   FIGURE 4-16 shows how the CMA extends and retracts.

FIGURE 4-16 CMA Extended and Retracted on the M4000 Server

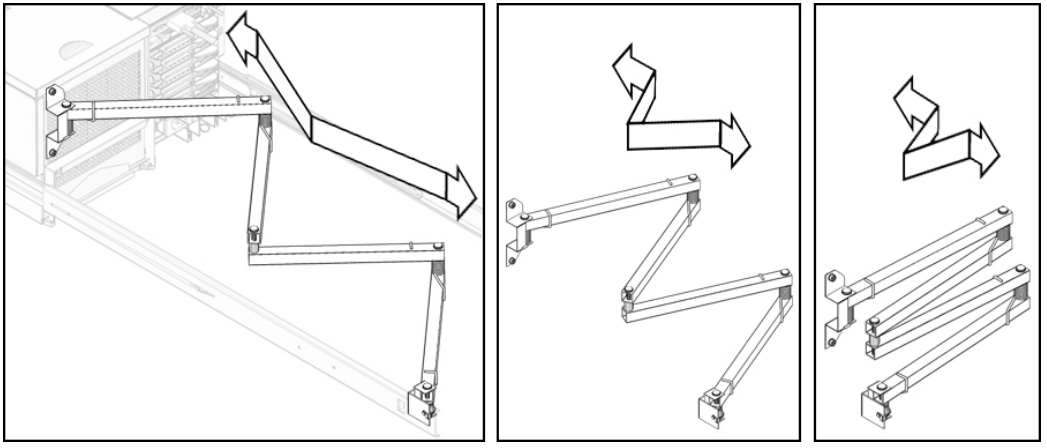
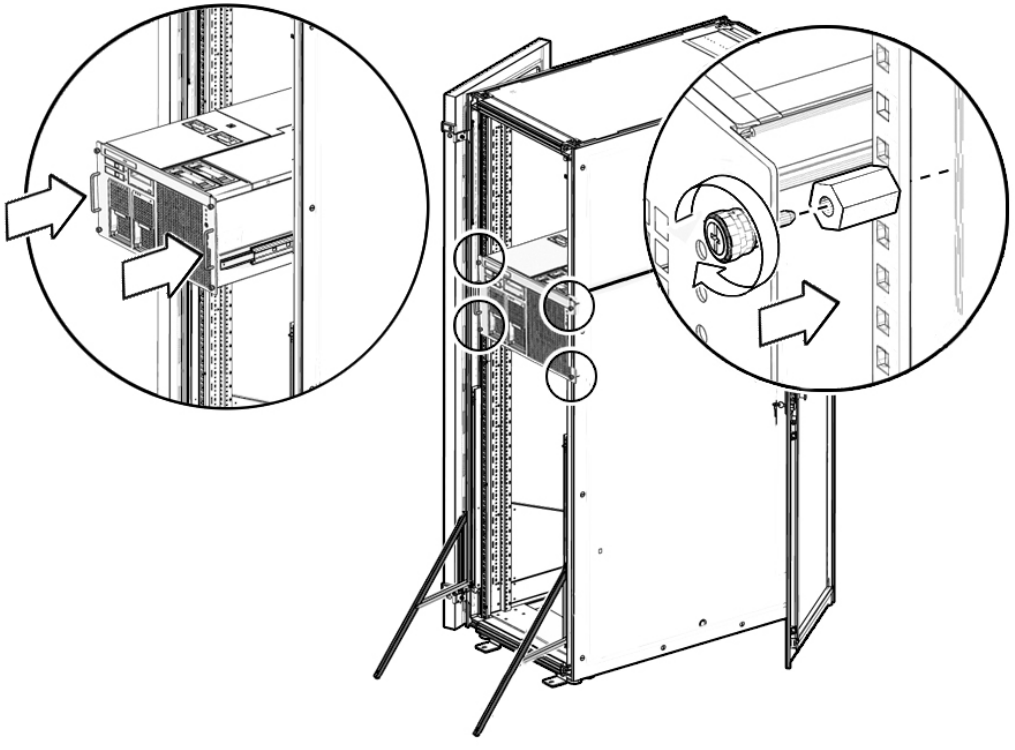


FIGURE 4-17 Securing the Server in the Rack



5. **Slide the server into the rack.**
6. **Tighten the four (4) captive screws at the front of the server to secure the server in the rack.**
7. **Place the anti-tilt bar or anti-tilt legs in the original position.**

4.7 Installing the Cable Holding Brackets (Optional)

If additional attachment points are required to route the cables, you can install the extra cable holding brackets included in the rail assembly kit. The parts needed for the cable holding brackets include the following:

- Brackets (2)
- M5 screws (4)
- Cage nuts (4), for Sun Rack II only
- Hook and loop straps (14)

These brackets can be used with or without the CMA for the server.

1. **Extend the anti-tilt bar or anti-tilt legs on the rack.**
2. **Slide the server out of the cabinet several inches for access to the rear of the cabinet.**
3. **Attach the cable holding brackets on the rack column (**FIGURE 4-18**), as follows.**

Note – Brackets can be installed on both sides, on one side only (right or left side), or two on one side, as desired.

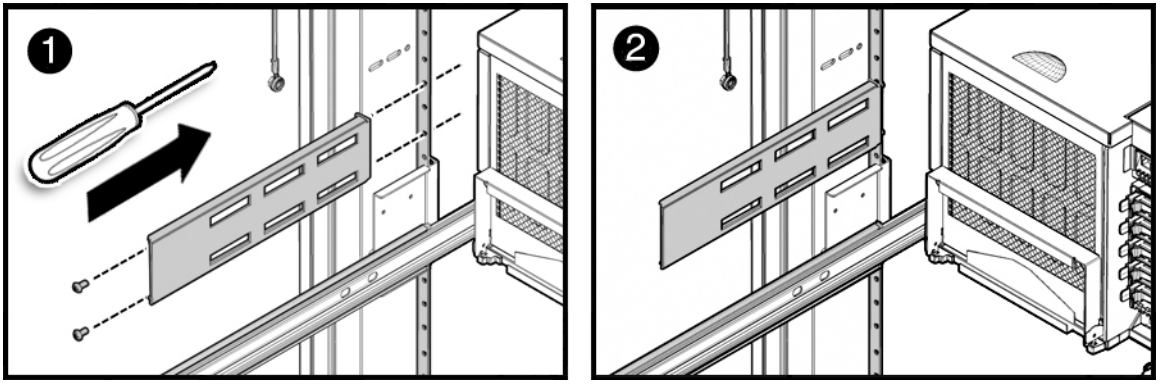
---

   a. **For the Sun Rack II, attach two cage nuts to the rack column.**

      If you are not familiar with cage nuts, see Appendix A.

   b. **Use two screws to attach the bracket to the rack column.**

FIGURE 4-18 Installing the Extra Brackets in a Sun Rack 1000



4. **Insert hook and loop straps in the desired slots of the bracket to hold back cables.**

   Built-in cutouts along the sides of the Sun cabinet can also be used to insert hook and loop straps to hold back cables, as desired.

5. **Slide the server into the rack.**

6. **Place the anti-tilt bar or anti-tilt legs in the original position.**

CHAPTER 5

Power Wiring Configurations For the M4000 Server

This chapter describes your server's input power sources.

The following topics are in this chapter:

To prevent catastrophic failures, the design of your input power sources must ensure that adequate power is provided to your midrange servers. Use dedicated AC breaker panels for all power circuits that supply power to your server. Electrical work and installations must comply with applicable local, state, or national electrical codes.

5.1 In a Sun Rack 1000/900

To ensure redundant power sourcing, use the recommended wiring configurations for the M4000 server in a Sun Rack 1000/900.

The Sun Rack 1000/900 can fit up to two modular power supplies (MPS). Each MPS is two rack units (U) tall. The MPS must be installed in the bottom of the cabinet.

Note – Before using the cords that come with your Sun Rack 1000/900 with MPS units, disconnect the power strips from the MPS and connect the systems directly into the MPS using the cords. The power strips cannot be used to power any additional devices in the cabinet.

TABLE 5-1 Recommended Wiring Configurations for Six M4000 Servers With Two 30A 3-Phase MPS

Server	PSU_1	PSU_0
M4000_5	MPS_1-B5	MPS_1-A5
M4000_4	MPS_0-B4	MPS_0-A4
M4000_3	MPS_1-B3	MPS_1-A3
M4000_2	MPS_0-B2	MPS_0-A2
M4000_1	MPS_1-B1	MPS_1-A1
M4000_0	MPS_0-B0	MPS_0-A0

Note – For M4000 servers in positions 4 and 5, use power cords that are 2.5m in length to reach from the servers to the MPS units.

FIGURE 5-1 Sun Rack 1000 With Six M4000 Servers and One MPS

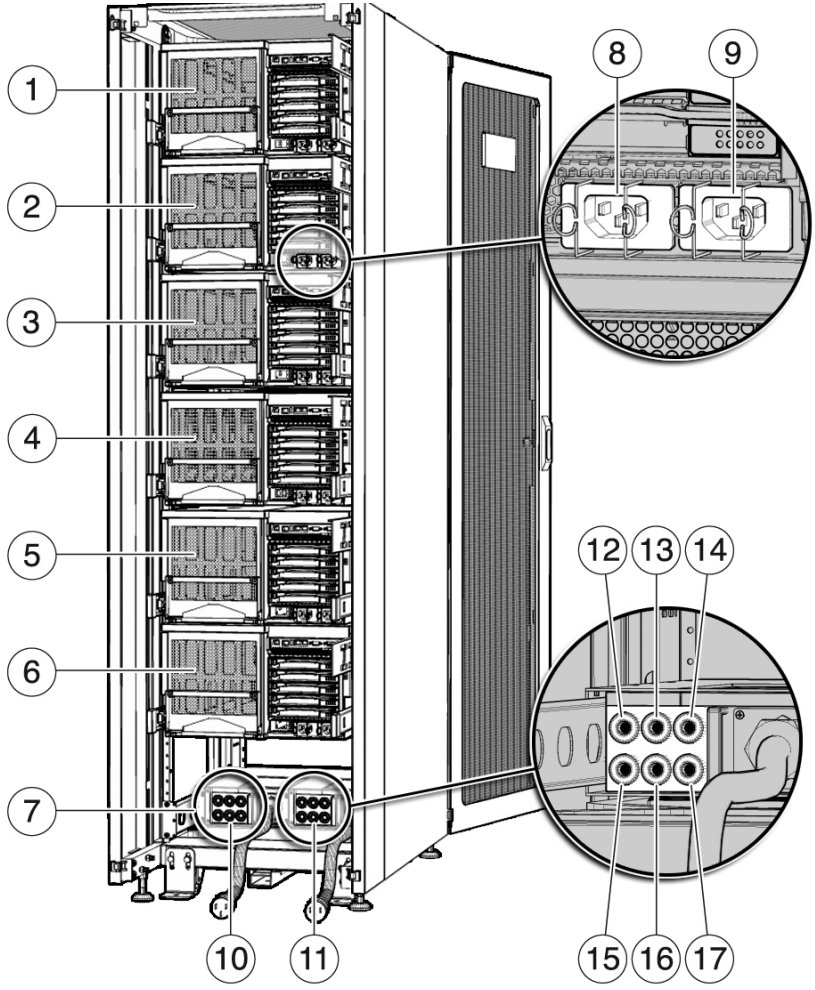


Figure Legend

1	Server 5	**10**	MPS_0-B
2	Server 4	**11**	MPS_0-A
3	Server 3	**12**	A2
4	Server 2	**13**	A1
5	Server 1	**14**	A0
6	Server 0	**15**	A5
7	MPS_0	**16**	A4
8	PSU_1	**17**	A3
9	PSU_0	**18**	

Note – The numbering in a Sun cabinet reads from bottom to top and right to left.

5.2 In a Sun Rack II

To ensure redundant power sourcing, use the recommended power wiring configurations for the M4000 server in a Sun Rack II.

Sun supports up to two PDUs in a Sun Rack II cabinet, one on either side. Sun SPARC Enterprise M4000 servers can use PDU types 15k, 25k, or 35k.

For more information on PDUs in a Run Rack II, refer to the *Sun Rack II User's Guide*.

Note – The PDU numbering in the Sun Rack II reads from the left side, bottom to top and the right side, top to bottom. The M4000 server power supplies are numbered from right to left.

FIGURE 5-2 Sun Rack II With Six M4000 Servers and Two PDUs

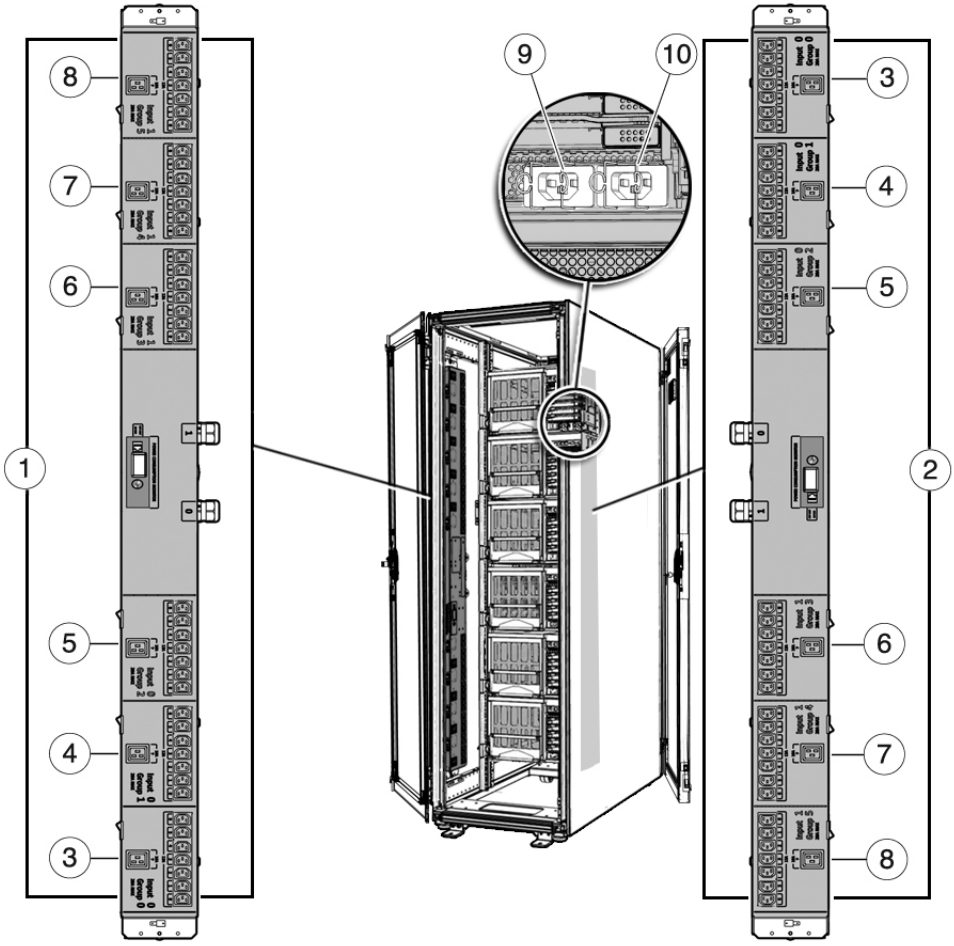


Figure Legend

1	PUD A	**6**	Group_3
2	PDU B	**7**	Group_4
3	Group_0	**8**	Group_5
4	Group_1	**9**	PSU_1
5	Group_2	**10**	PSU_2

5.3 Circuit Breaker Capacity and Characteristics

Qualified equipment cabinets housing these midrange servers require their own customer-supplied circuit breaker and AC receptacle for each power cord. Provide a stable power source, such as an uninterruptible power system (UPS), to reduce the possibility of component failures. If the computer equipment is subjected to repeated power interruptions and fluctuations, it is susceptible to a higher component failure rate than it would be with a stable power source.

Note – If the appropriate electrical receptacle is not available in your country, the connector may be removed from the cord. The cord can then be permanently connected to a dedicated branch circuit by a qualified electrician. Check local electrical codes for proper installation requirements.

5.4 Grounding

Both midrange servers are shipped with grounding-type (three-wire) power cords. Always connect the cords into grounded power outlets. Each power cord will also supply your server with proper earth ground. Sun has tested the equipment cabinets for radiated and conducted emissions and have determined there is no difference in emissions with or without a ground strap grounding the equipment cabinets. No additional earth grounding is necessary but it may be added if desired.

Contact your facilities manager or a qualified electrician to determine what type of power is supplied to your building.

CHAPTER 6

Installing the SPARC Enterprise M5000 Server in a Rack

This chapter describes how to mount M5000 servers in a Sun Rack 1000, Sun Rack 900, and Sun Rack II.

The following topics are in this chapter:

6.1 About the M5000 Server

The M5000 server is designed to be mounted in a standard 19-inch rack with a depth of 1000 mm or more. The M5000 is 10 rack units tall (10U) and weighs 125kg (275 lb).

When mounted in a Sun Rack 900, the cabinet extender option is required to enable the rear door to close. See Section 1.2, "Mounting Specifications" on page 1-12.

Caution – Do not use the handles on the front of the server to lift the server. The front handles are designed for sliding the server in and out of the equipment rack. The handles will not support the weight of the server.

Caution – The M5000 server can weigh up to 125 kg (275 lb). Two people using a computer equipment lift are required to mount the server safely in the rack.

Up to three M5000 servers can be mounted in the following cabinets:

- Sun Rack 1000, which comes as a 42-rack unit (U) or a 38U cabinet
- Sun Rack 900, which comes as a 38U or 36U cabinet
- Sun Rack II cabinet, which comes as a 42U cabinet

6.1.1 Content of the Rail Kit

FIGURE 6-1 shows the contents of the rail kit.

FIGURE 6-1 M5000 Server Slide Assembly Kit Contents

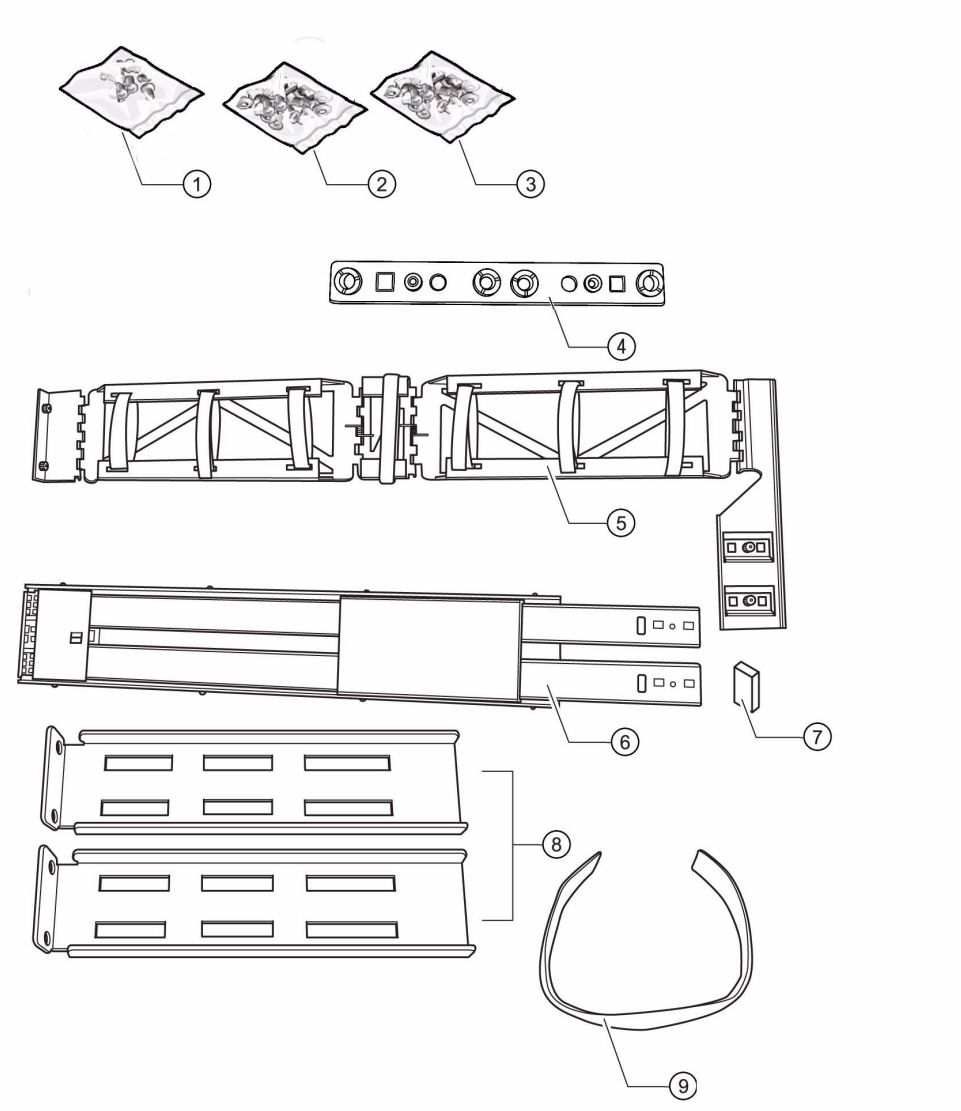


Figure Legend

1	Bag of parts - M5 cage nuts (8), M5 long pan head screws (4), M3 flat head screws (8)
2	Bag of parts - Standoffs (8), M6 cage nuts (12), M4 screws (6)
3	Bag of parts - M5 screws (16), Washers (16), M6 screws (12)
4	Nut bar (4)

Figure Legend

5 Cable management arm (CMA) (1)

6 Slide rails (2)

7 End caps (4)

8 Cable holding brackets (2)

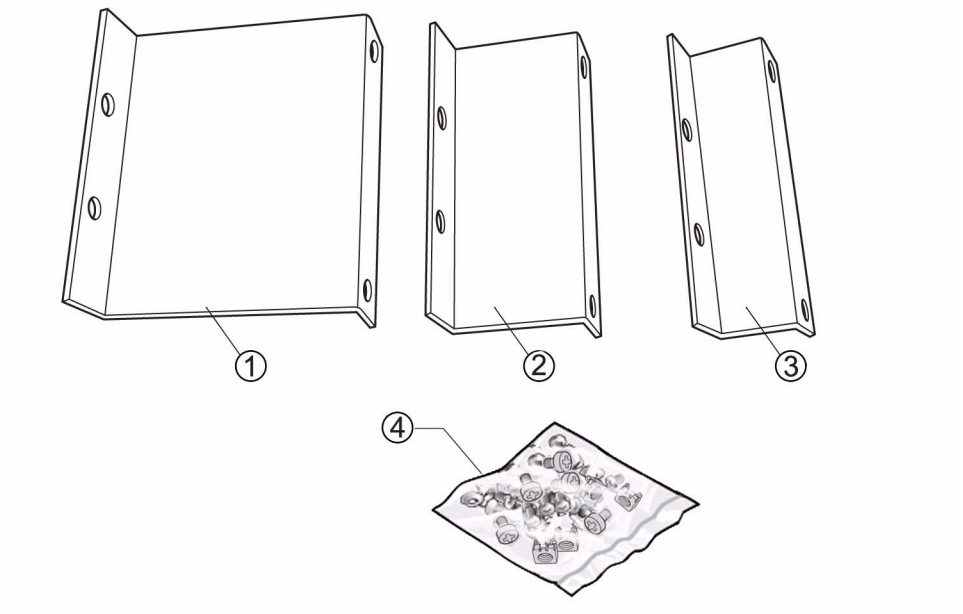
9 Hook and loop straps (14)

Note – Not all parts in the rail kit will be used. For example, cage nuts are not used in Sun Rack 1000 or 900 racks.

6.1.2 M5000 Shipping Brackets

Shipping brackets are included in the rail kit. Installation of the brackets is optional.

FIGURE 6-2 M5000 Shipping Bracket Kit Contents



For the Sun Rack 1000/900 with the cabinet extender kit, the two large brackets are used to anchor the M5000 server to the rack prior to shipping. The two large brackets are attached through the two M5 threaded holes in the top left and top right corners at the rear of the M5000 server.

The medium and small brackets in the shipping bracket kit are not needed for Sun racks.

6.1.3 Selecting a Mounting Location

Determine a location for the M5000 server in the equipment rack. The M5000 server is ten rack units tall.

Caution – For rack stability, place the M5000 server at the lowest open location before filling in the higher areas. Keep the rack's center of gravity as low as possible.

Note – The M5000 server rail kit includes a mounting guide template which can be used to determine hole locations for the rails in the rack.

6.2 Preparing a Sun Rack II

Instructions for Sun Rack 1000 and 900 start in Section 6.3, "Installing Slide Rails in the Rack" on page 6-8.

For a Sun Rack II, you must first install cage nuts in the rack. You must also add nut bar brackets to the rails.

6.2.1 Installing Cage Nuts

Screw hole numbers and rack unit numbers start from the bottom and work upwards. Note that two sizes of cage nuts are used in this procedure.

If you are not familiar with cage nuts, see Appendix A.

1. **Install M6 cage nuts for standoffs.**

   a. **Install cage nuts at screw hole #2 at U1 and screw hole #29 at U10 in the left front rack rail (**FIGURE 6-3**).**

   b. **Repeat** Step a **for the right front rail.**

      The rear rails will not have standoffs. This procedure uses a total of four M6 cage nuts.

FIGURE 6-3 Cage Nut Hole Locations for the M5000 Server

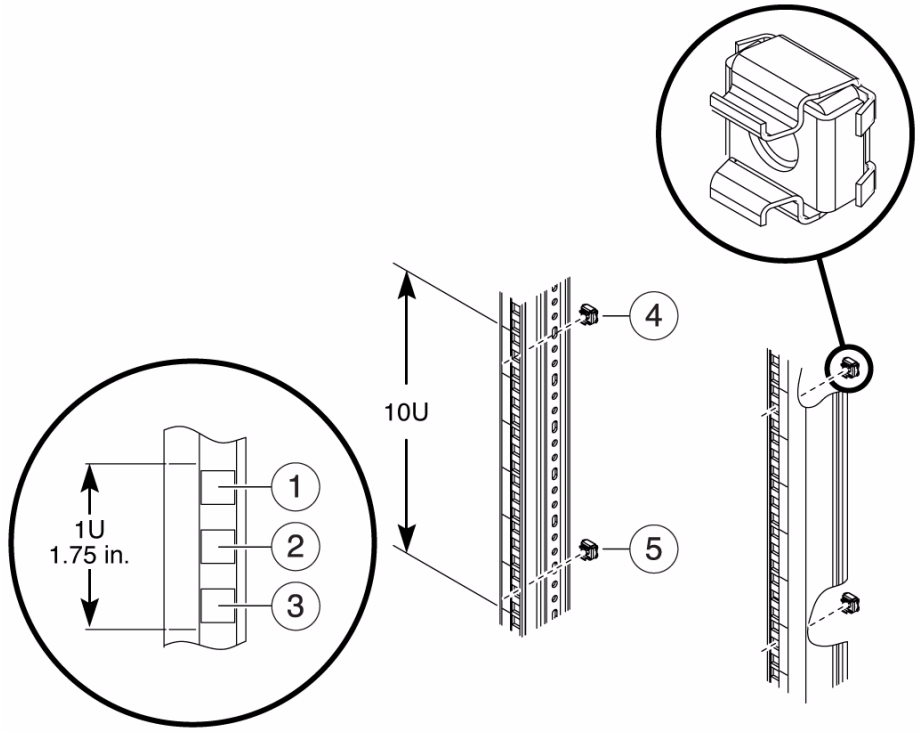


Figure Legend

1	Upper hole
2	Center hole
3	Lower hole
4	Center hole on 10U
5	Center hole on 1U

6.2.2 Installing Nut Bars

This procedure applies to Sun Rack II only.

- **Attach nut bars to the front and rear brackets on each slide rail.**

  See FIGURE 6-4. Use two M3 flathead screws for each nut bar.

FIGURE 6-4 Attaching Nut Bars with Brackets

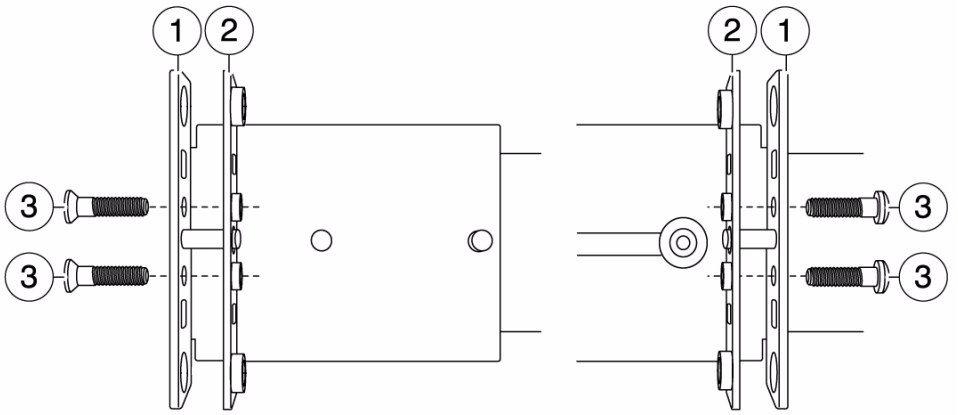


Figure Legend

1	Bracket
2	Nut bar
3	M3 Screw

6.3 Installing Slide Rails in the Rack

- **Identify the locations for the slide rails in the rack.**

TABLE 6-1 Sun Rack 1000 and 900 Mounting Hole Matrix

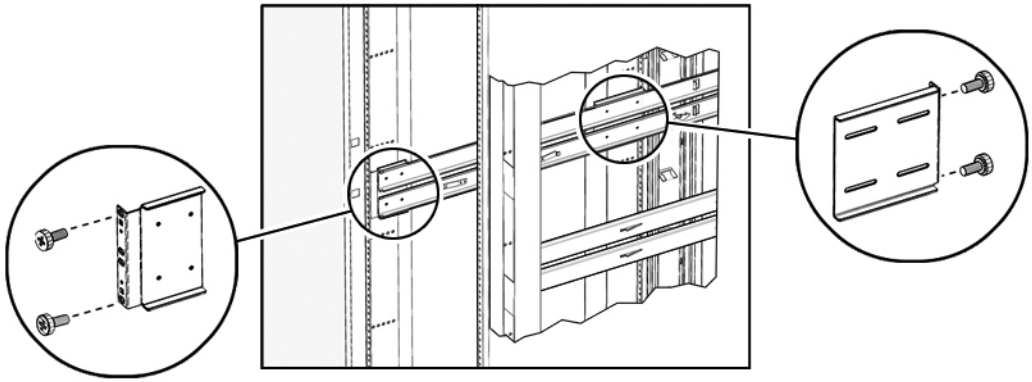
M5000 server location in the cabinet	Hole number
2	75 and 82
1	42 and 49
0	12 and 19

6.3.1 For the Sun Rack 1000 and 900

2. **Install slide rails using four (4) M6 screws in the selected mounting holes (FIGURE 6-5).**

The rails are reversible and can be used on either side of the server. The slide rails are spring-loaded with pins to hold them in place while they are being secured.

FIGURE 6-5 Mounting a Slide Assembly to the Rack



6.3.2 For the Sun Rack II

1. **Identify the locations for the slide rails in the rack.**
2. **Position the slide rail behind the rack column.**
3. **Install the slide assemblies in the rack using four M5 flathead screws and washers (at each of the four locations) to secure the slide assemblies in the selected mounting holes (**FIGURE 6-6).

   The rails are reversible and can be used on either side of the server. The slide rails are spring-loaded with pins to hold them in place while they are being secured.

FIGURE 6-6 Installing Slide Rails in the Cabinet

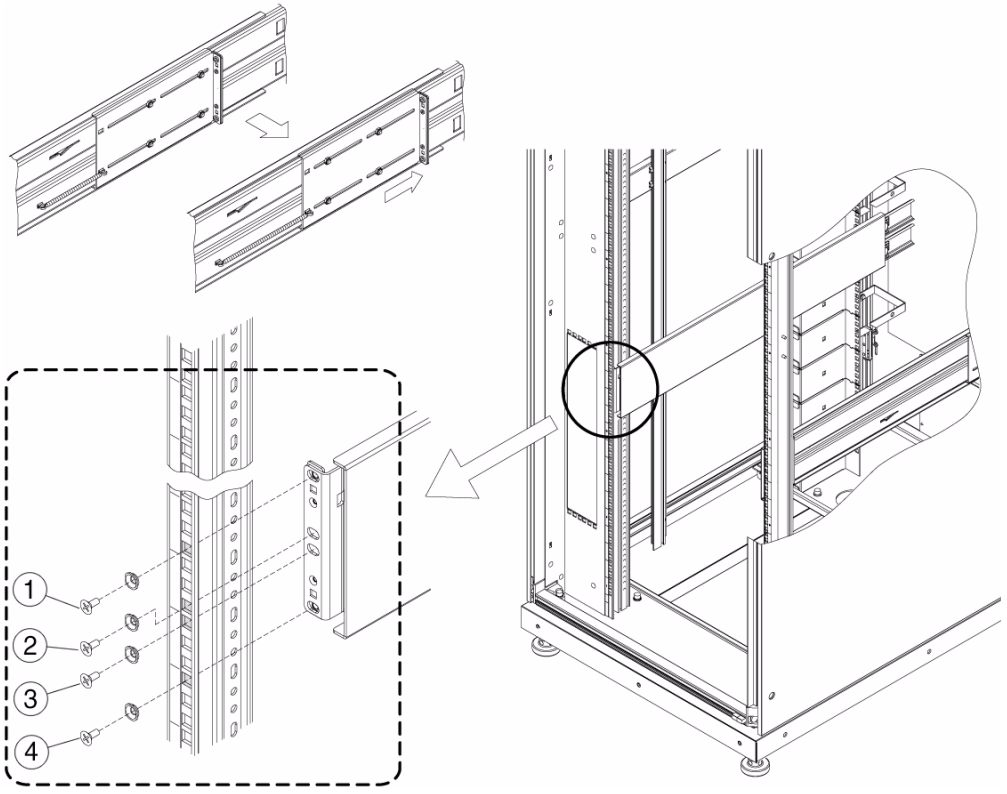


Figure Legend

1	Upper hole on 4U
2	Lower hole on 3U
3	Upper hole on 2U
4	Upper hole on 1U

4. Verify that the slide rails are at the same height.

6.4 Mounting the Server in the Rack

6.4.1 Mounting in a Sun Rack 1000 and 900

1. **Extend the anti-tilt bar.**

   For details on extending the anti-tilt bar in a Sun Rack 1000, or 900, see Appendix B, "Extending the Anti-Tilt Bar or Anti-Tilt Legs" on page 1.

Caution – The anti-tilt bar must be extended or the rack will topple when the server is installed on the extended slide rails.

2. **Extend the slide rails from the slide assemblies.**

Caution – Do not use the handles on the front of the server to lift the server. The front handles are designed for sliding the server in and out of the rack. The handles will not support the weight of the server.

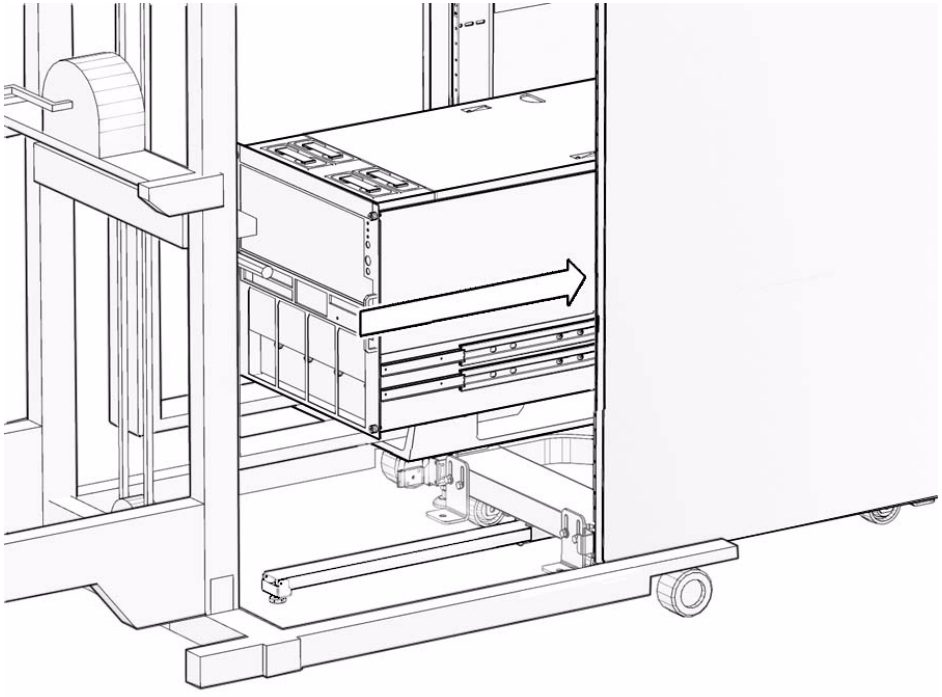
3. **Place the forks of the computer equipment lift inside the plinth on the underside of the server.**

   The plinth protects the underside of the system and keeps the system from sliding off the computer equipment lift.

4. **Raise the server and gently push it towards the rack until the holes and pins align.**

   The slide rails have pins that will fit into holes beneath the overhang of the server.

FIGURE 6-7 Example of Mating the Server on Slide Rails



5. Secure the server to the slide rails.

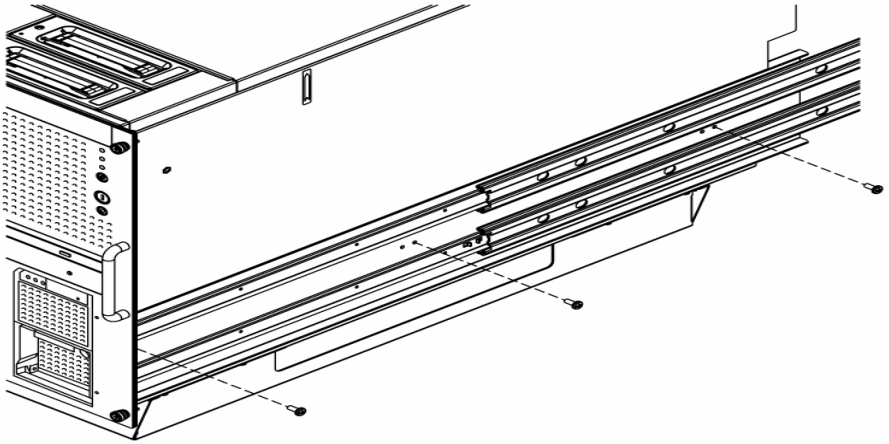
Note – Labels are located on the side of each server to help identify the mounting points.

---

a. Place the pins on the slide rails directly beneath the rear holes on the overhang of the server and gently lower the server onto the pins.

b. Secure the slide rails with six (6) M4 screws (three for each slide).

FIGURE 6-8 Securing the Slide Rails



6. Remove the plinth from the bottom of the server (FIGURE 6-9).

Caution – Remove the plinth prior to sliding the server into the cabinet so that the server below is not damaged.

There are eight (8) screws that secure the plinth to the bottom of each server.

a. Remove the two (2) front screws.

b. Loosen the remaining six (6) screws.

c. Slide the plinth toward the rear of the server less than an inch until the plinth is released from the screws.

Caution – The plinth weighs 2 kg (5 lb). To prevent injury, support the plinth upon release from the screws.

d. Remove the six (6) loosened screws.

Caution – The anti-tilt bar must be extended or the rack will topple when the lifting device is withdrawn

FIGURE 6-9 Example of Removing the Plinth

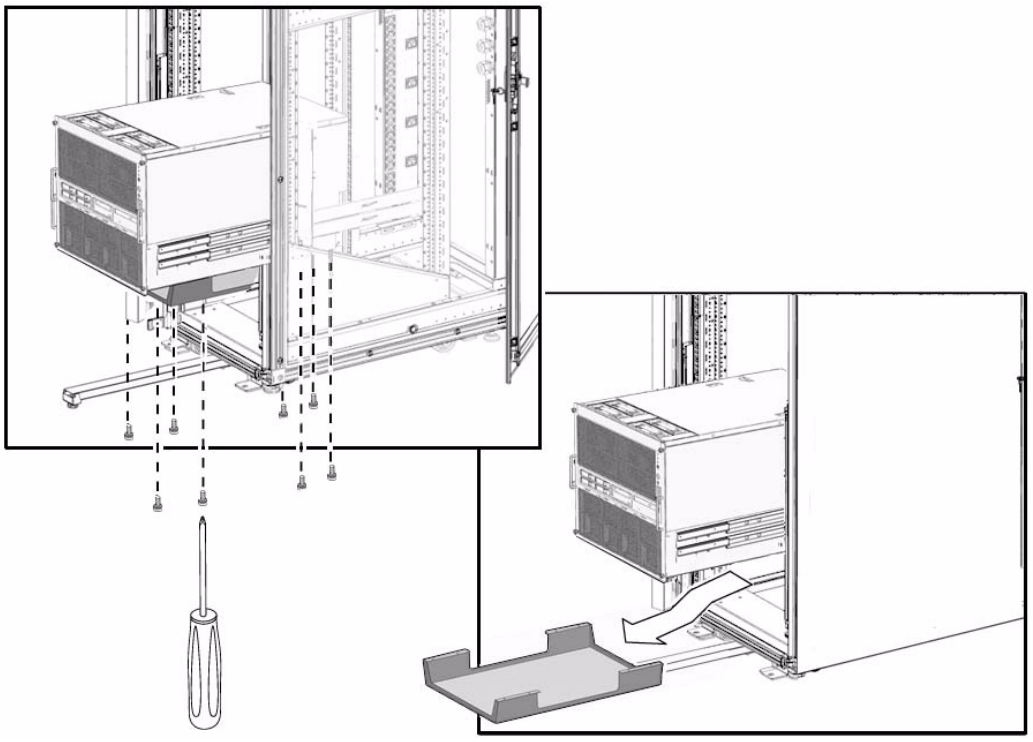
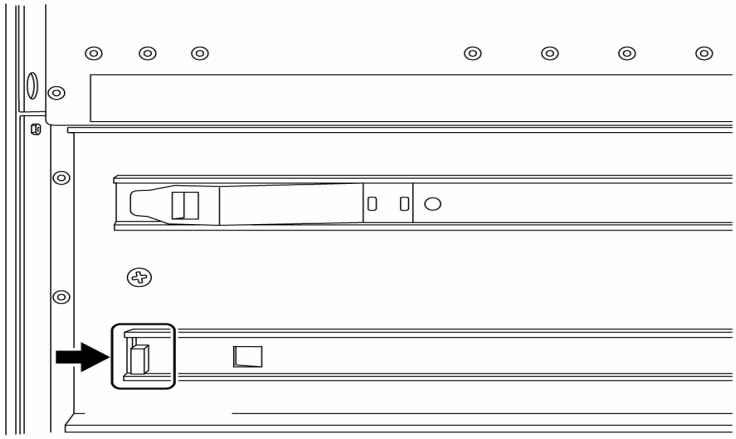


FIGURE 6-10 Unlocking the M5000 Slide Rail

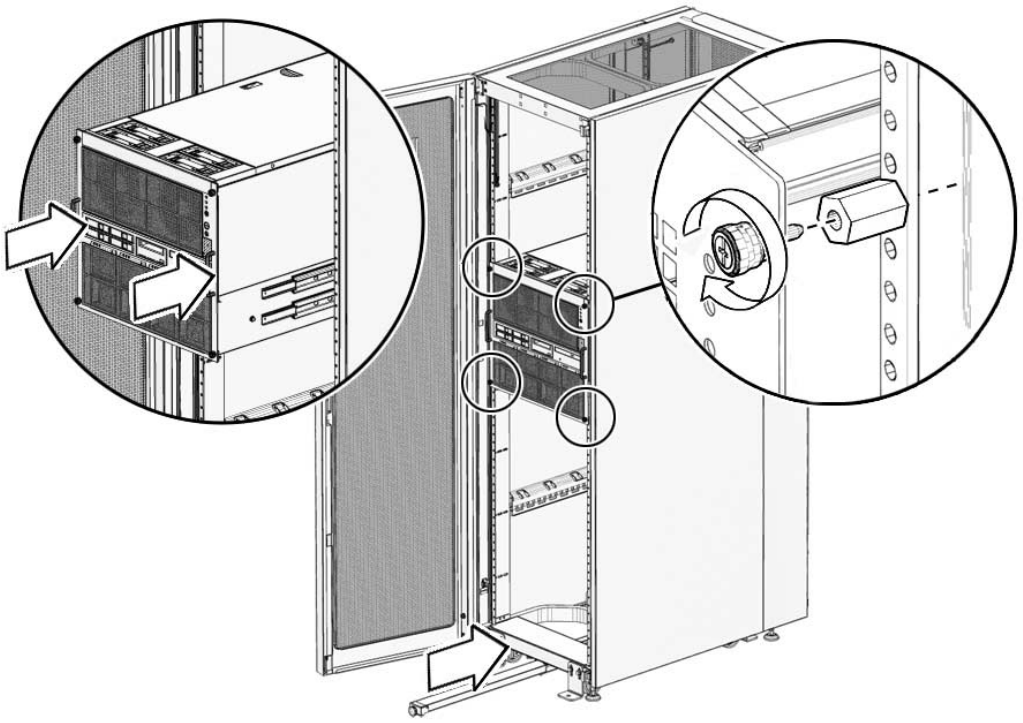


7. **Withdraw the computer lifting device.**
8. **Press the lock button on the slide rail in the direction indicated by the arrow to unlock the rail and insert the server into the cabinet.**
9. **If you are securing the CMA at this time, proceed to** Section 6.5, "Installing the Cable Management Arm" on page 6-22**.**

   If the CMA is not to be installed at this time, proceed to Step 10.
10. **Secure the spacers at the front of the rack. (**FIGURE 6-11**)**

    The spacer holes are located one hole above and below the server. The spacers should align with the captive screws on the front of the server.

FIGURE 6-11 Example of Spacers Aligned With Captive Screw



6.4.2 Mounting in a Sun Rack II

1. **Extend the anti-tilt legs.**

   For details on extending the anti-tilt bar in a Sun Rack 1000, 900 or Sun Rack II, see Appendix B, "Extending the Anti-Tilt Bar or Anti-Tilt Legs" on page 1.

2. **Extend the slide rails from the slide assemblies.**

Caution – Do not use the handles on the front of the server to lift the server. The front handles are designed for sliding the server in and out of the rack. The handles will not support the weight of the server.

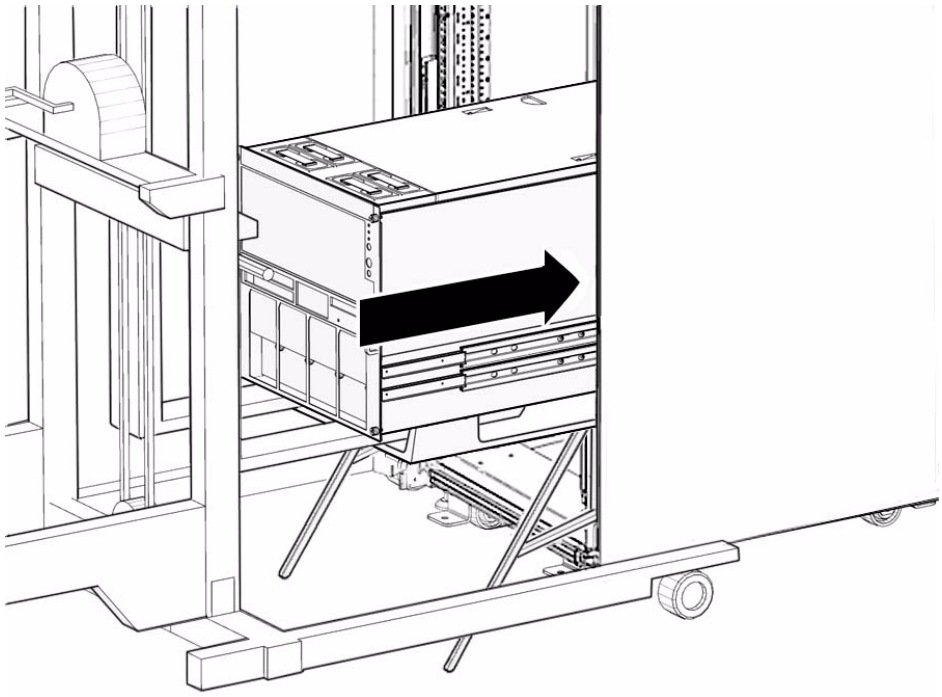
3. **Place the forks of the computer equipment lift inside the plinth on the underside of the system.**

   The plinth protects the underside of the server and keeps the server from sliding off the computer equipment lift.

4. **Raise the server and gently push it towards the rack until the holes and pins align.**

   The slide rails s have pins that will fit into holes beneath the overhang of the server.

FIGURE 6-12 Mating the Server on Slide Rails



5. **Secure the server to the slide rails.**

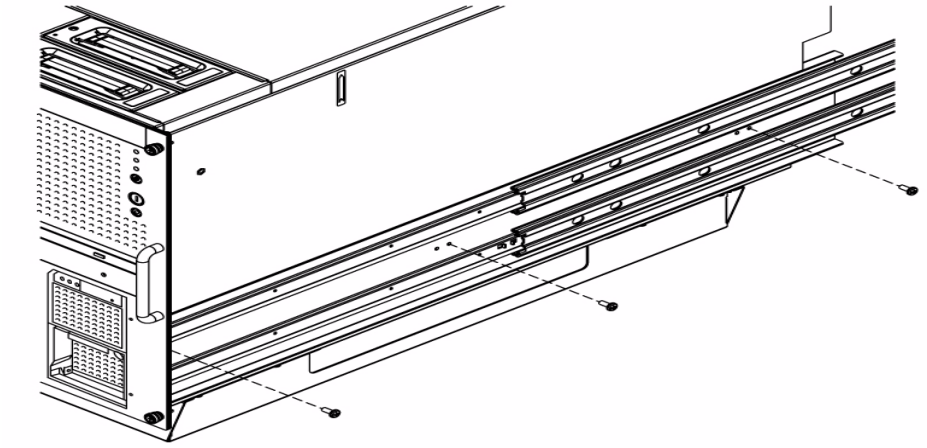
Note – Labels are located on the side of each server to help identify the mounting points.

---

6. **Place the pins on the slide rails directly beneath the rear holes on the overhang of the server and gently lower the server onto the pins.**

7. **Secure the slide rails with six (6) M4 screws (three for each slide).**

FIGURE 6-13 Securing the Slide Rails



8. **Remove the plinth from the bottom of the server (**FIGURE 6-14**).**

Caution – Remove the plinth prior to sliding the server into the cabinet so that the server below is not damaged.

There are eight (8) screws that secure the plinth to the bottom of each server.

a. **Remove the two (2) front screws.**

b. **Loosen the remaining six (6) screws.**

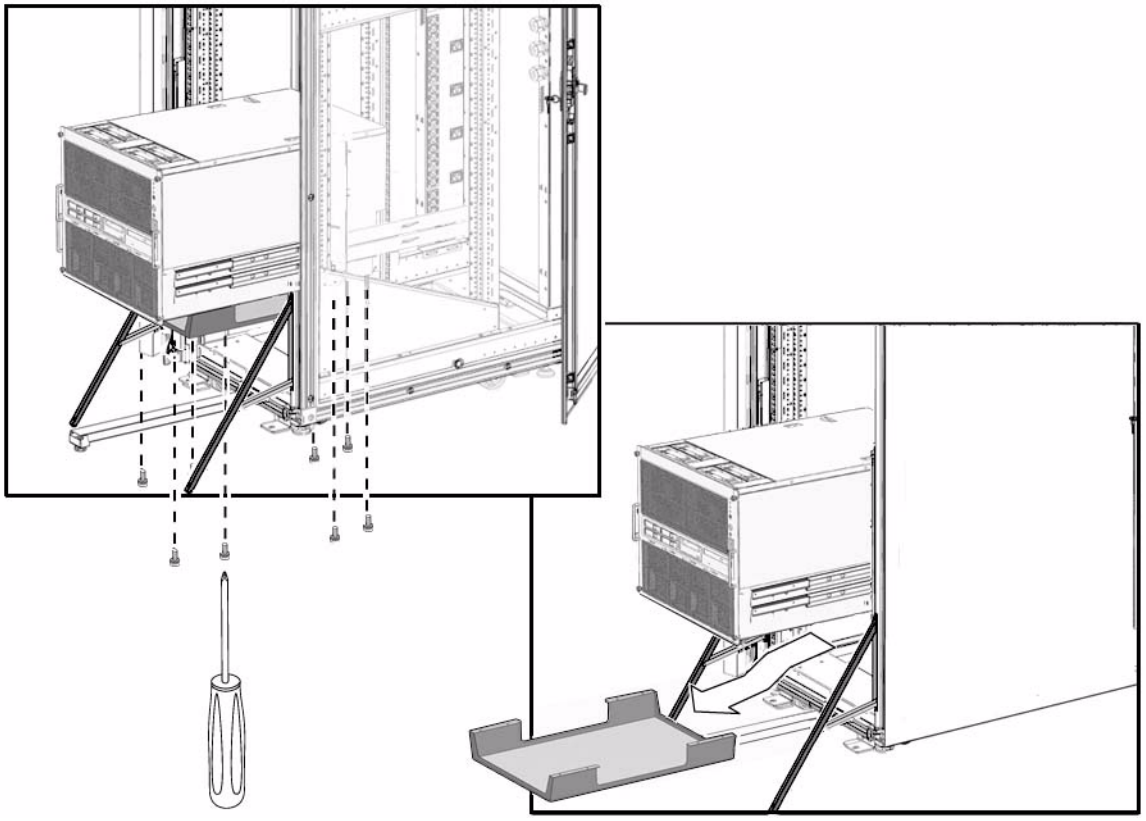
c. **Slide the plinth toward the rear of the server less than an inch until the plinth is released from the screws.**

Caution – The plinth weighs 2 kg (5 lb). To prevent injury, support the plinth upon release from the screws.

d. **Remove the six (6) loosened screws.**

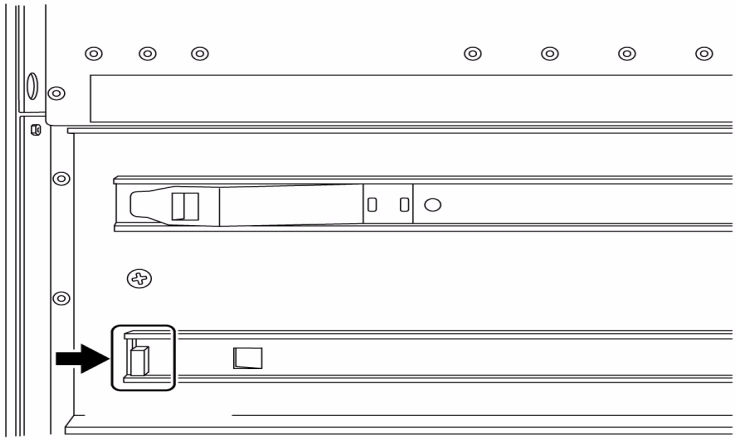
Caution – The anti-tilt legs must be extended or the rack will topple when the lifting device is withdrawn.

FIGURE 6-14 Example of Removing the Plinth



9. **Withdraw the computer lifting device.**
10. **Press the lock button on the slide rail in the direction indicated by the arrow to unlock the rail and insert the server into the rack.**

FIGURE 6-15 Unlocking the M5000 Slide Rail



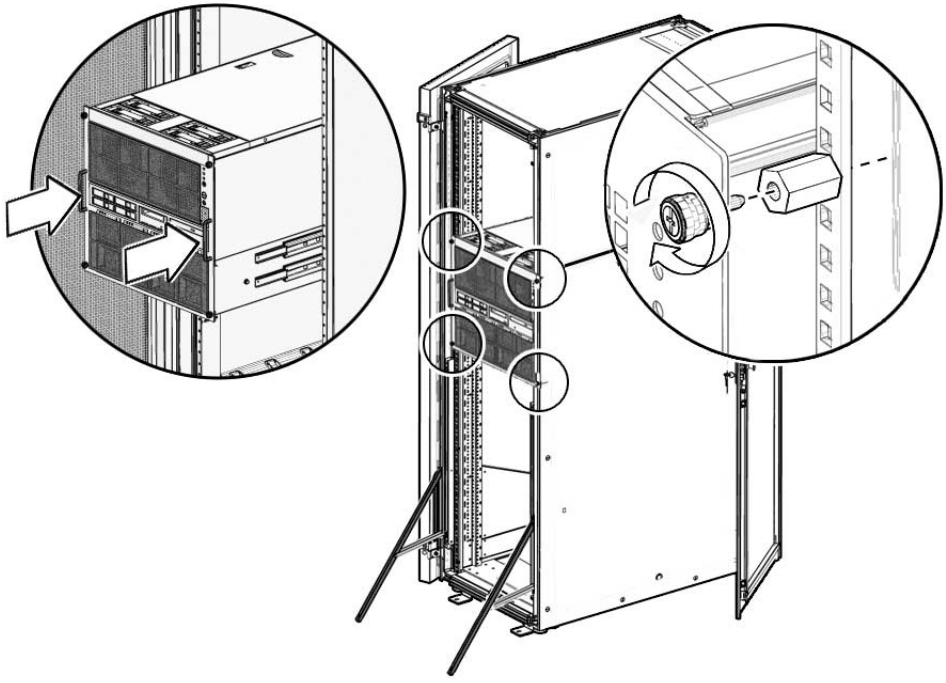
11. **If you are securing the CMA at this time, proceed to** Section 6.5, "Installing the Cable Management Arm" on page 6-22**.**

    If the CMA is not to be installed at this time, proceed to Step 12.

12. **Secure the standoffs at the front of the rack (**FIGURE 6-16**).**

    The spacer holes are located one hole above and below the server. The spacers should align with the captive screws on the front of the server.

FIGURE 6-16 Example of Spacers Aligned With Captive Screws



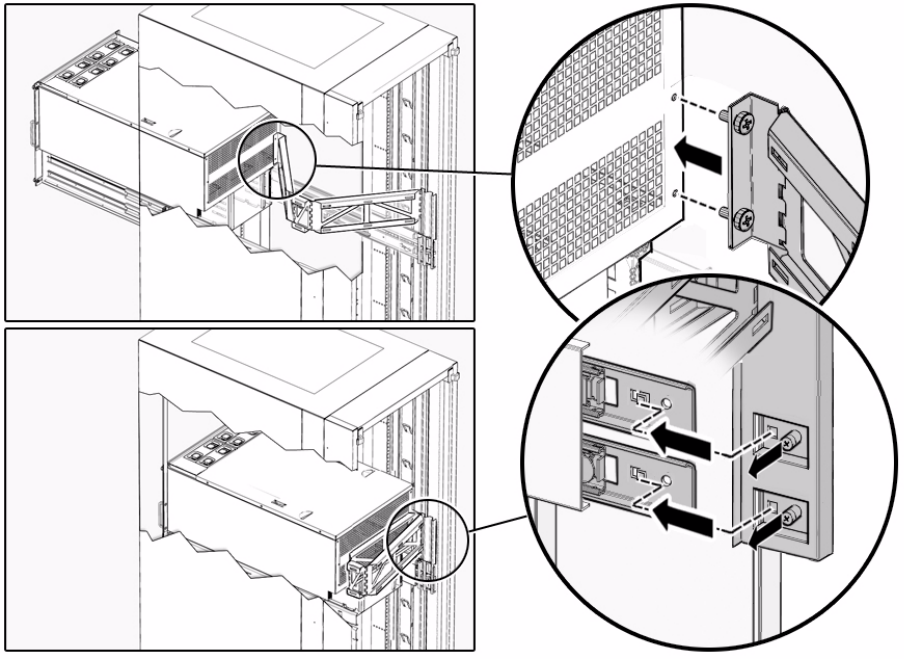
6.5 Installing the Cable Management Arm

The CMA for the M5000 server can attach to the right rear of the server.

1. **Secure the small end of the CMA to the server by using the two (2) captive screws (**FIGURE 6-17**).**
2. **Secure the large end of the CMA to the rail on the same side of the rack (**FIGURE 6-17**).**

   The CMA uses tabs combined with two (2) captive screws.

FIGURE 6-17 Installing the Cable Management Arm



6.6 Attaching End Caps to the Rails

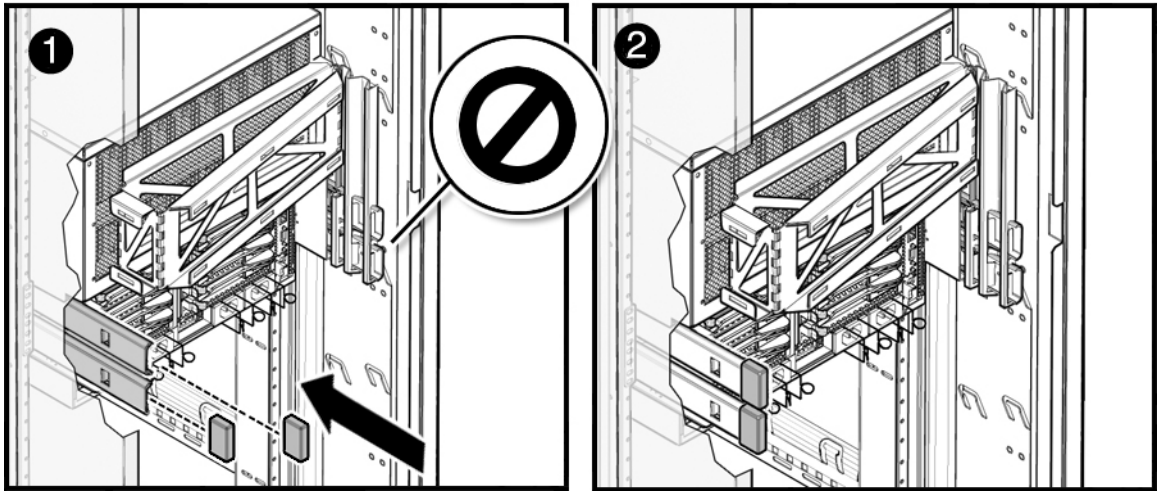
After securing the CMA to the M5000 server, attach the provided end caps to the rails.

1. **Attach the end caps onto the slide rails.**

   Both end caps are attached to the opposite rails on which the CMA is attached (FIGURE 6-18).

Note – If the CMA is not used, attach all four end caps to the rails of the server.

FIGURE 6-18 End Caps on the Left Rear of the M5000 Server Slide Rails



2. **Connect the power cables to the rear of the server and secure them with the cable retention clamps.**

Caution – Do not connect the power cables to a power source at this time.

3. **Run the power cables along the CMA and secure them in place with tie wraps.**

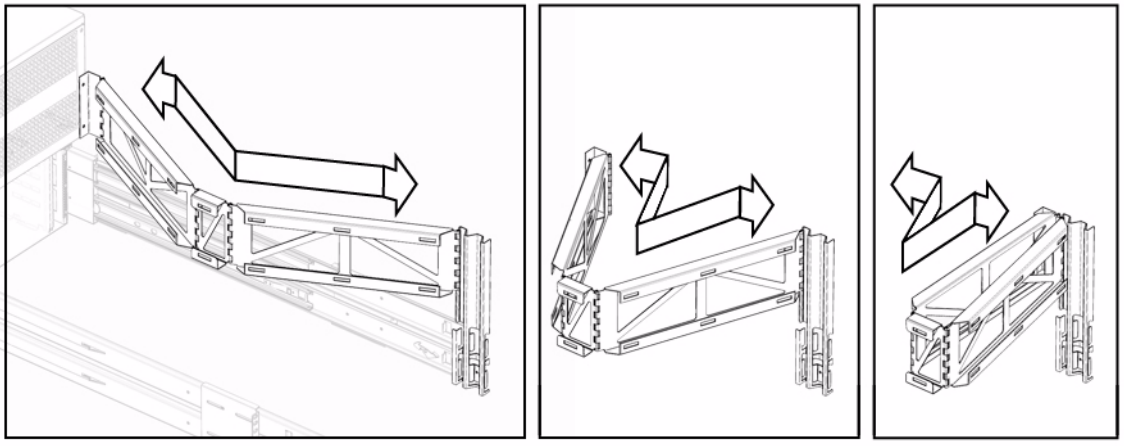
   The power cables and infiniband cables should hang loosely in a service loop behind the server or the CMA might not be able to fully retract.

Caution – To avoid the cables from bumping into the I/O cable connectors, do not twist the cables around the end of the CMA.

Note – If additional attachment points are required to route the cables, install the optional bracket kit. See Section 6.7, "Installing the Cable Holding Brackets (Optional)" on page 6-26.

4. **Ensure that the server can slide in and out of the rack without dislodging the power cables.**

FIGURE 6-19 CMA Extended and Retracted on the M5000 Server



5. **Slide the server into the rack.**

For the Sun Rack 1000/900

a. **Secure the standoffs at the front of the rack (**FIGURE 6-20**).**

   The standoff holes are located one hole above and below the server. The standoffs should align with the captive screws on the front of the server.

b. **Tighten the four (4) captive screws at the front of the server to secure the server in the rack.**

For the Sun Rack II

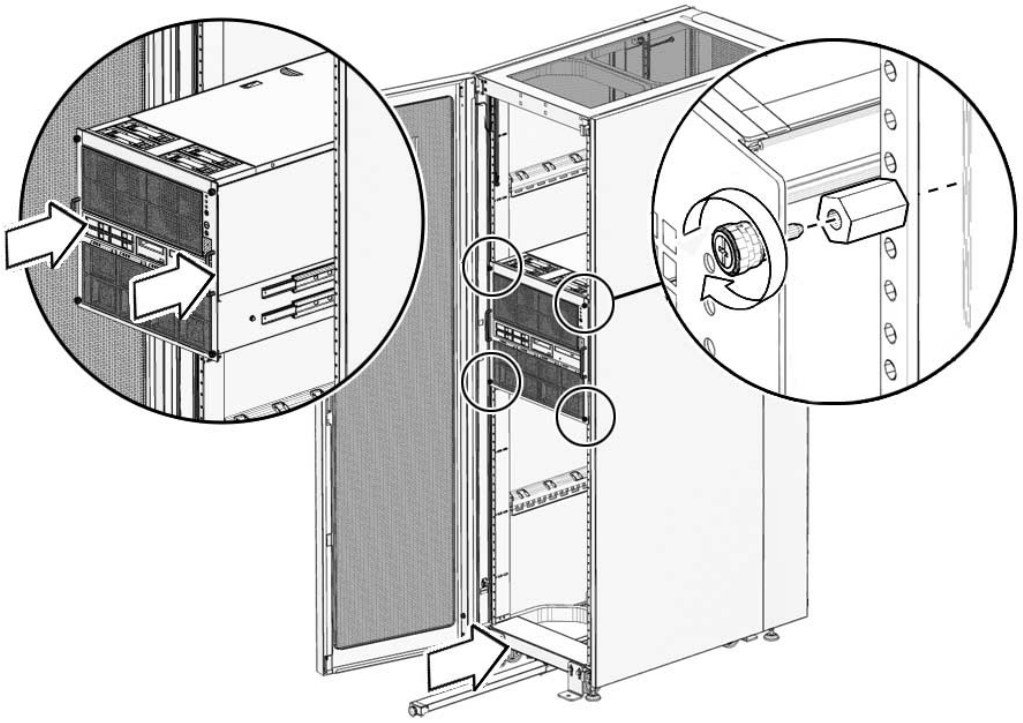
a. **Attach four M6 cage nuts on the rack columns to align with the captive screws on the front corners of the server.**

b. Secure the standoffs at the front of the rack (FIGURE 6-20).

The standoff holes are located one hole above and below the server. The standoffs should align with the captive screws on the front of the server.

c. Tighten the four (4) captive screws at the front of the server to secure the server in the rack.

FIGURE 6-20 Securing the Server in the Rack



6. Replace the anti-tilt legs to its original position.

6.7 Installing the Cable Holding Brackets (Optional)

If additional attachment points are required to route the cables, you can install the extra cable holding brackets included in the rail assembly kit. The parts needed for the cable holding brackets include the following:

- Brackets (2)
- M5 screws (4)
- M5 Cage nuts (4)
- Hook and loop straps (14)

These brackets can be used with or without the CMA for the M5000 server.

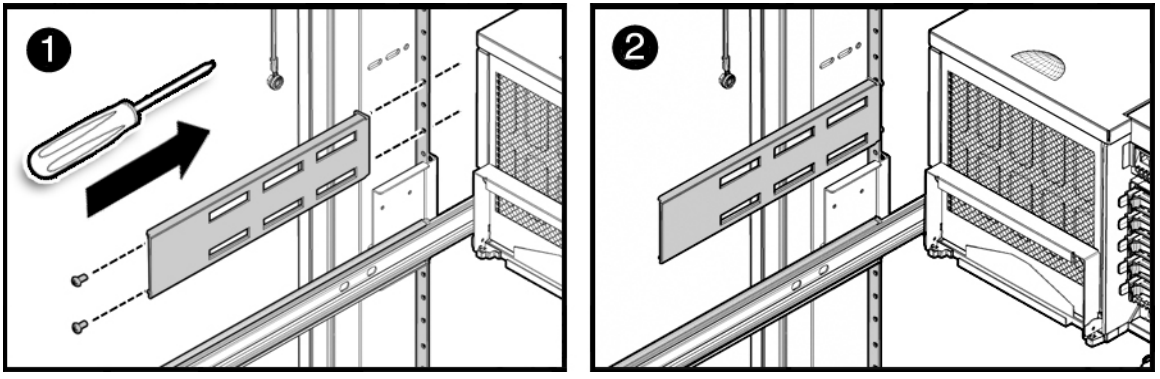
1. **Extend the anti-tilt bar or anti-tilt legs on the rack.**
2. **Slide the server out of the cabinet several inches for access to the rear of the cabinet.**
3. **Attach the cable holding brackets on the rack column (**FIGURE 6-21**), as follows.**

Note – Brackets can be installed one per side, one only (right or left side), or two on one side, as desired for convenience in cable management.

For the Sun Rack 900/1000

a. **Use two (2) screws to attach the bracket to the rack column (**FIGURE 6-21**).**

FIGURE 6-21 Installing the Extra Brackets in a Sun Rack 1000/900



For the Sun Rack II

a. **Attach two (2) cage nuts to the rack column.**

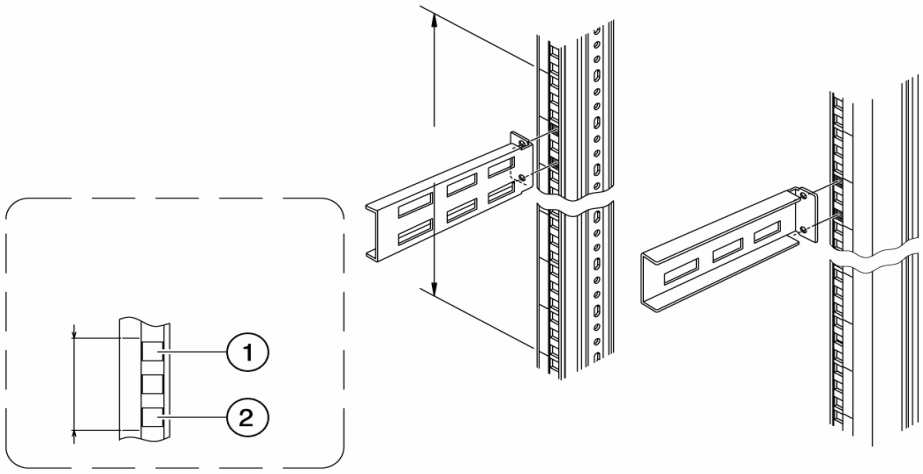
   If you are not familiar with cage nuts, see Appendix A

b. **Use two (2) screws to attach the bracket to the rack column (**FIGURE 6-22**).**

c. **Secure the cable holding brackets in the upper and lower hole on the 9U location of the rack column (**FIGURE 6-22**).**

   Use the M6 screws and M6 cage nuts that come shipped with the Sun Rack II.

FIGURE 6-22 Installing the Extra Brackets in a Sun Rack II



4. **Insert the hook and loop straps in the desired slots of the bracket to hold back cables.**

   Built-in cutouts along the sides of the cabinet can also be used to insert hook and loop straps to hold back cables, as desired.

5. **Slide the server into the rack.**

6. **Place the anti-tilt bar or anti-tilt legs in the original position.**

CHAPTER 7

Power Wiring Configurations For the M5000 Server

This chapter describes your server's input power sources.

The following topics are in this chapter:

To prevent catastrophic failures, the design of your input power sources must ensure that adequate power is provided to your midrange servers. Use dedicated AC breaker panels for all power circuits that supply power to your server. Electrical work and installations must comply with applicable local, state, or national electrical codes.

7.1 In a Sun Rack 1000/900

To ensure redundant power sourcing, use the recommended wiring configurations for the M5000 server in a Sun Rack 1000/900 38/42.

The Sun Rack 1000/900 can fit up to two modular power supplies (MPS). Each MPS is two rack units (U) tall. The MPS must be installed in the bottom of the cabinet.

Note – Before using the cords that come with your Sun Rack 900/1000 with MPS units, disconnect the power strips from the MPS and connect the systems directly into the MPS using the cords. The power strips cannot be used to power any additional devices in the cabinet.

Note – The numbering in a Sun rack reads from bottom to top and right to left.

TABLE 7-1 Recommended Wiring Configurations for Three M5000 Servers With One 60A 3-phase MPS

Server	M5000 PSU_3	M5000 PSU_2	M5000 PSU_1	M5000 PSU_0
M5000_2	MPS_0-B5	MPS_0-A5	MPS_0-B4	MPS_0-A4
M5000_1	MPS_0-B3	MPS_0-A3	MPS_0-B2	MPS_0-A2
M5000_0	MPS_0-B1	MPS_0-A1	MPS_0-B0	MPS_0-A0

TABLE 7-2 Recommended Wiring Configurations for Three M5000 Servers With Two 30A 3-Phase MPS

Server	M5000 PSU_3	M5000 PSU_2	M5000 PSU_1	M5000 PSU_0
M5000_2	MPS_1-B2	MPS_1-A2	MPS_0-B2	MPS_0-A2
M5000_1	MPS_1-B1	MPS_1-A1	MPS_0-B1	MPS_0-A1
M5000_0	MPS_1-B0	MPS_1-A0	MPS_0-B0	MPS_0-A0

FIGURE 7-1 Sun Rack 1000 With Three M5000 Servers and Two MPS

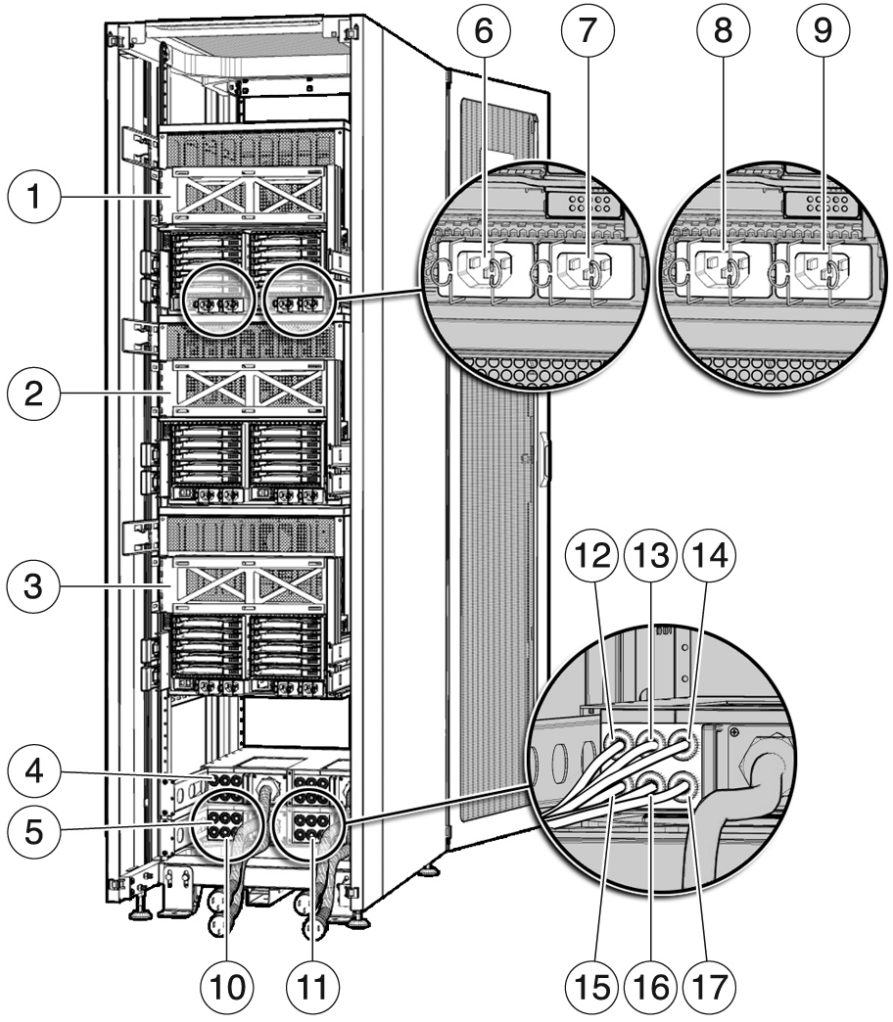


Figure Legend

1	Server 2	**10**	MPS_0-B
2	Server 1	**11**	MPS_0-A
3	Server0	**12**	A2
4	MPS_1	**13**	A1
5	MPS_0	**14**	A0
6	PSU_3	**15**	A

Figure Legend

7	PSU_2	**16**	A4
8	PSU_1	**17**	A3
9	SU_0	**18**	

7.2 In a Sun Rack II

To ensure redundant power sourcing, use the recommended power wiring configurations for the M5000 server in a Sun Rack II.

Sun supports up to two PDUs in a Sun Rack II cabinet, one on either side. Sun SPARC Enterprise M5000 servers can use PDU types 15k, 25k, or 35k.

For more information on PDUs in a Run Rack II, refer to the *Sun Rack II User's Guide*.

Note – The PDU numbering in the Sun Rack II reads from the left side, bottom to top and the right side, top to bottom. The M5000 server power supplies are numbered from right to left.

TABLE 7-3 Recommended Wiring Configurations for Three M5000 Servers With Two PDUs

Server	PSU_3	PSU_2	PSU_1	PSU_0
M5000_2	PDU A, Group 5	PDU B, Group 0	PDU A, Group 4	PDU B, Group 1
M5000_1	PDU A, Group 3	PDU B, Group 2	PDU A, Group 2	PDU B, Group 3
M5000_0	PDU A, Group 1	PDU B, Group 4	PDU A, Group 0	PDU B, Group 5

FIGURE 7-2 Sun Rack II With Three M5000 Servers and Two PDUs

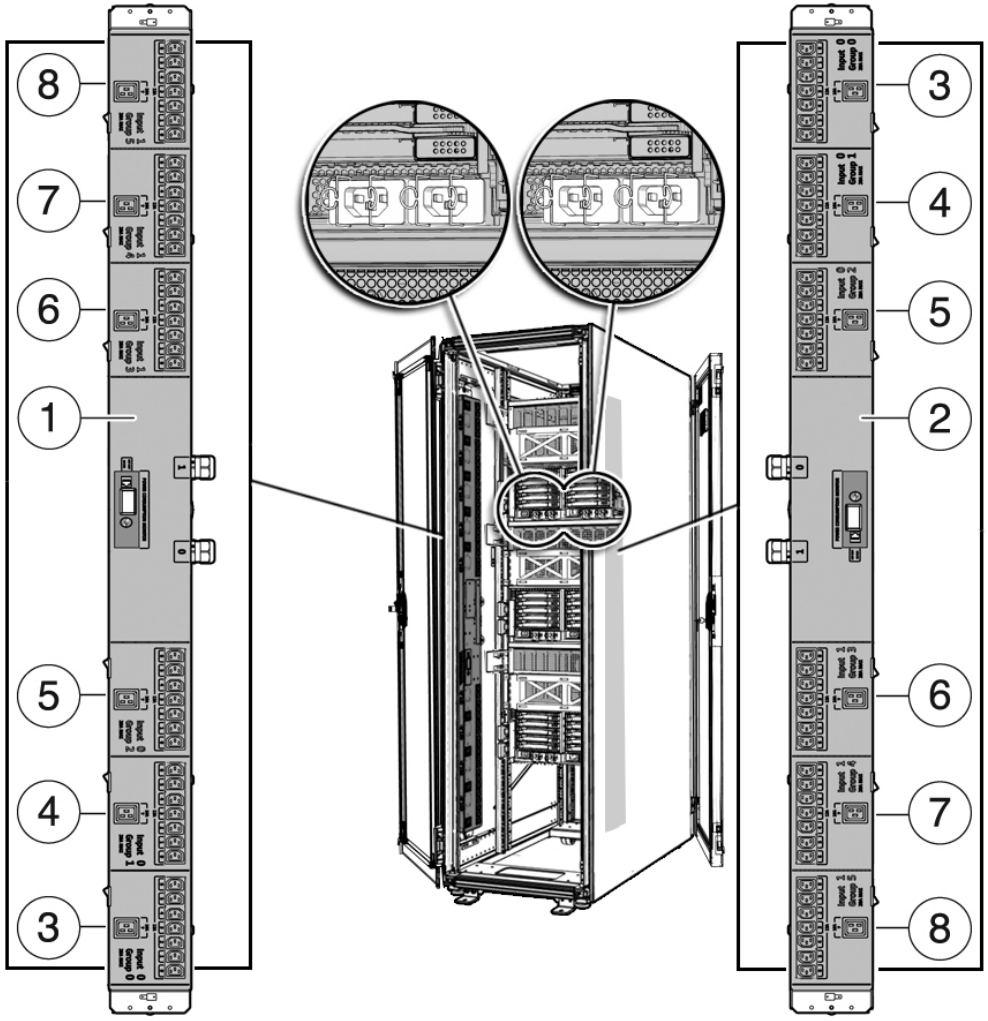


Figure Legend

1	PDU A	**5**	Group_2
2	PDU B	**6**	Group_3
3	Group_0	**7**	Group_4
4	Group_1	**8**	Group_5

7.3 Circuit Breaker Capacity and Characteristics

Qualified racks housing these midrange servers require their own customer-supplied circuit breaker and AC receptacle for each power cord. Provide a stable power source, such as an uninterruptible power system (UPS), to reduce the possibility of component failures. If the computer equipment is subjected to repeated power interruptions and fluctuations, it is susceptible to a higher component failure rate than it would be with a stable power source.

Note – If the appropriate electrical receptacle is not available in your country, the connector may be removed from the cord. The cord can then be permanently connected to a dedicated branch circuit by a qualified electrician. Check local electrical codes for proper installation requirements.

7.4 Grounding

Both midrange servers are shipped with grounding-type (three-wire) power cords. Always connect the cords into grounded power outlets. Each power cord will also supply your server with proper earth ground. Sun has tested the racks for radiated and conducted emissions and have determined there is no difference in emissions with or without a ground strap grounding the racks. No additional earth grounding is necessary but it may be added if desired.

Contact your facilities manager or a qualified electrician to determine what type of power is supplied to your building.

APPENDIX **A**

Working With Cage Nuts

The Sun Rack II and other racks with square rail holes might require cage nuts.

A.1 Cage Nut Insertion Tool

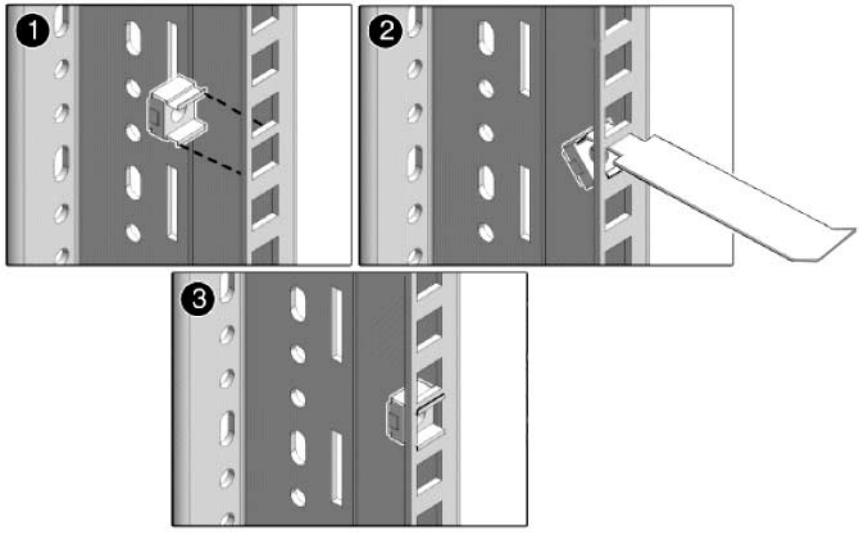
The cage nut insertion tool is found in the Sun Rack II ship kit.

Caution – The insertion tool has sharp edges. Use with care.

To install cage nuts on the rack columns:

1. **Hook the bottom lip of the cage nut in the square rail hole (Number 1 in** FIGURE A-1**).**
2. **Insert the tip of the cage nut insertion tool through the rail hole and hook the top lip of the cage nut ((Number 2 in** FIGURE A-1**).**
3. **Using the insertion tool, pull the cage nut through the hole until the top lip snaps into place ((Number 3 in** FIGURE A-1**).**

FIGURE A-1 Inserting Cage Nuts in Square Holes Using the Insertion Tool



APPENDIX **B**

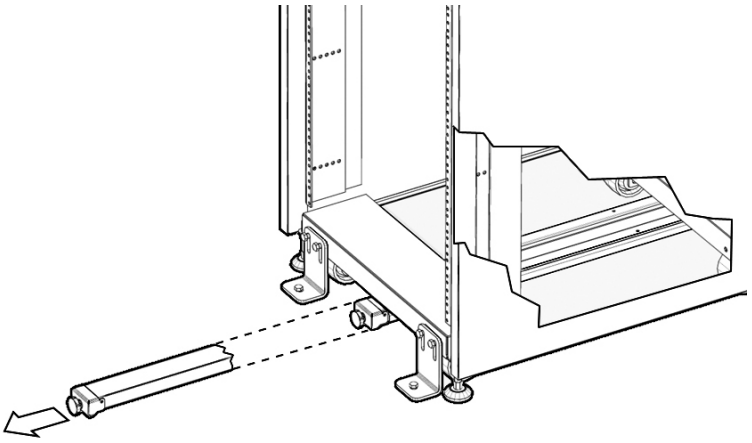
Extending the Anti-Tilt Bar or Anti-Tilt Legs

The anti-tilt bar or anti-tilt legs must be extended or the equipment rack will topple when the server is installed on the extended slide rails.

B.1 For the Sun Rack 1000 or 900

1. **Pull the end of the anti-tilt bar out to its fully extended position.**
2. **Rotate the foot 90 degrees and adjust the height of the foot so that it rests on the floor.**

FIGURE B-1 Extending the Anti-Tilt Bar on the Sun Rack 1000

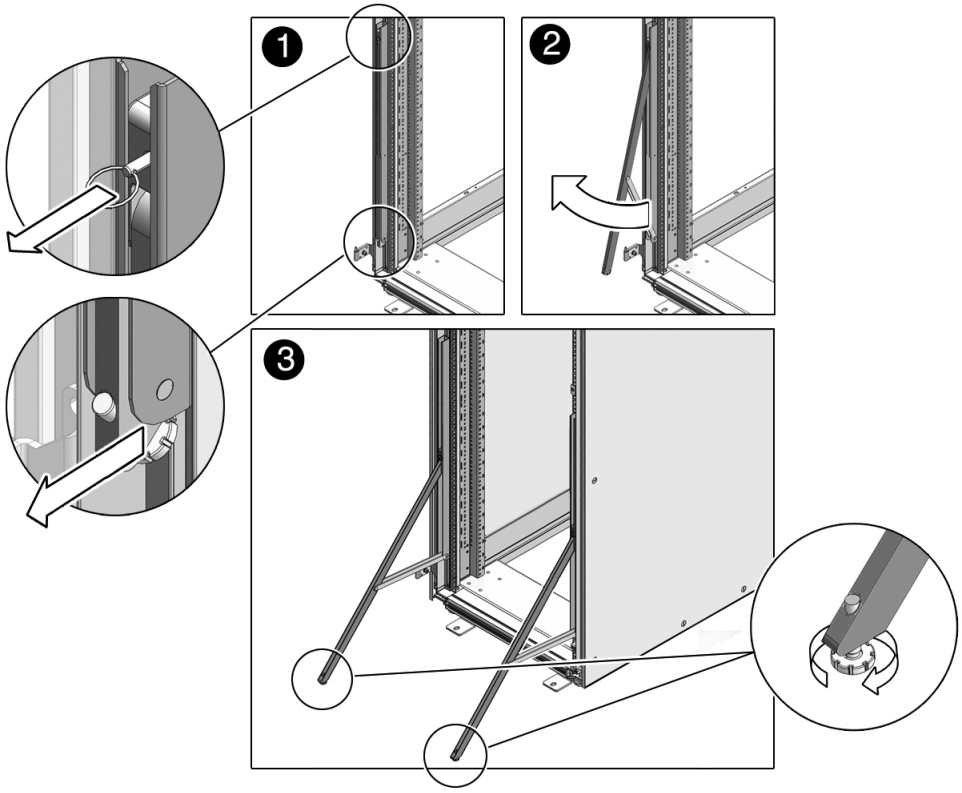


B.2 For Sun Rack II:

1. **Pull the unlocking ring (**FIGURE B-2**).**
2. **Pull the bottom foot of the anti-tilt leg away from the cabinet until it extends fully (Number 2 in** FIGURE B-2**).**

   The leg support will lock in place.

FIGURE B-2 Extending the Anti-Tilt Legs



3. **Rotate the leg's rubber foot clockwise until it touches the floor (Number 3 in** FIGURE B-2**).**

   The foot must touch the floor to stabilize the cabinet securely.

4. **Extend the other anti-tilt leg.**