Sun SPARC® Enterprise Equipment Rack Mounting Guide

Sun Rack 1000

Sun Rack 900

Sun Rack II

Sun Microsystems, Inc.
www.sun.com

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Contents

Preface

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

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

Related Documentation

The documents listed as online are available at:

http://docs.sun.com/app/docs/prod/sparc.m3k#hic

http://docs.sun.com/app/docs/prod/sparc.m4k#hic

For late-breaking information about hardware, software, or documentation for the Sun SPARC Enterprise M3000/M4000/M5000 servers, refer to the *Sun SPARC Enterprise M3000 Server Product Notes* and the *Sun SPARC Enterprise M4000/M5000 Servers Product Notes*.

Application	Title	Format	Location
Site Planning	*Sun SPARC Enterprise M3000 Site Planning Guide*	PDF HTML	Online
Site Planning	*Sun SPARC Enterprise M4000/M5000 Servers Site Planning Guide*	PDF HTML	Online
Getting Started	*Sun SPARC Enterprise M3000 Server Getting Started Guide*	Printed PDF	Shipping kit Online
Getting Started	*Sun SPARC Enterprise M4000/M5000 Servers Getting Started Guide*	Printed PDF	Shipping kit Online
Installation	*Sun SPARC Enterprise M3000 Server Installation Guide*	PDF	Online
Installation	*Sun SPARC Enterprise M4000/M5000 Servers Installation Guide*	Printed PDF	Online
Service	*Sun SPARC Enterprise M3000 Server Service Manual*	PDF	Online
Service	*Sun SPARC Enterprise M3000/M4000/M5000 Servers Service Manual*	PDF	Online
Glossary	*Sun SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers Glossary*	PDF HTML	Online
Hardware/Software Product Notes	*Sun SPARC Enterprise M3000 Server Product Notes*	PDF HTML	Online
Hardware/Software Product Notes	*Sun SPARC Enterprise M4000/M5000 Servers Product Notes*	PDF HTML	Online

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Sun SPARC Enterprise Equipment Rack Mounting Guide, part number 819-5367-14

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 and FIGURE 1-2 illustrates Sun Rack 1000/900 with one modular power supply (MPS) and Two MPSs.

FIGURE 1-1 Sun Rack 900 With One Modular Power Supplies

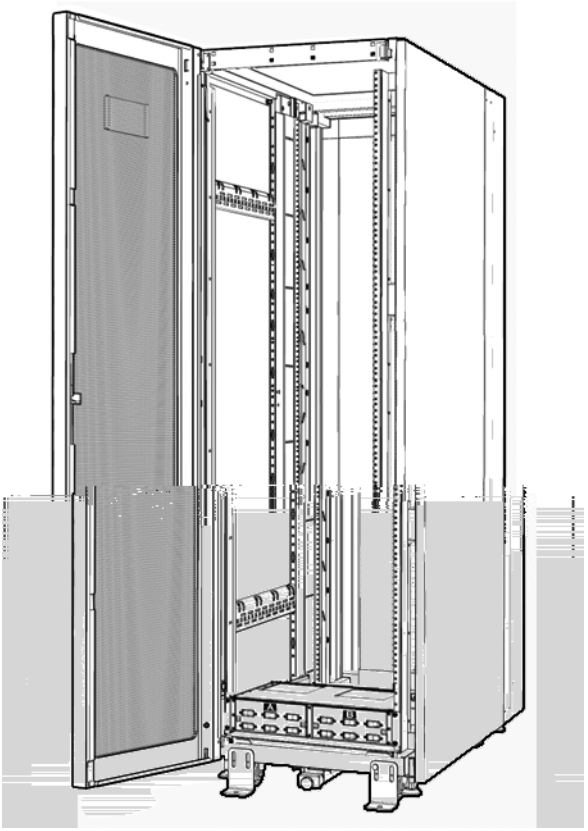
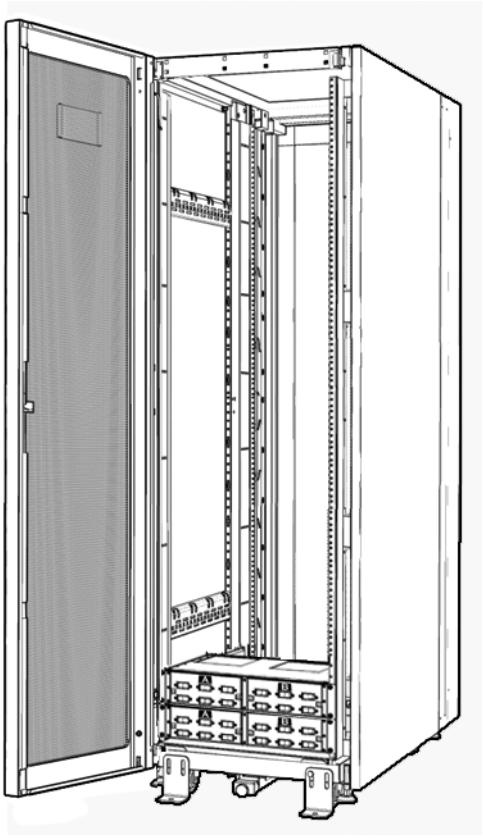


FIGURE 1-2 Sun Rack 900 With Two Modular Supplies



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 1-3 illustrates the Sun Rack 1000 42U shipping crate dimensions.

FIGURE 1-3 Sun Rack 1000- 42/38-Rack Unit Shipping Dimensions

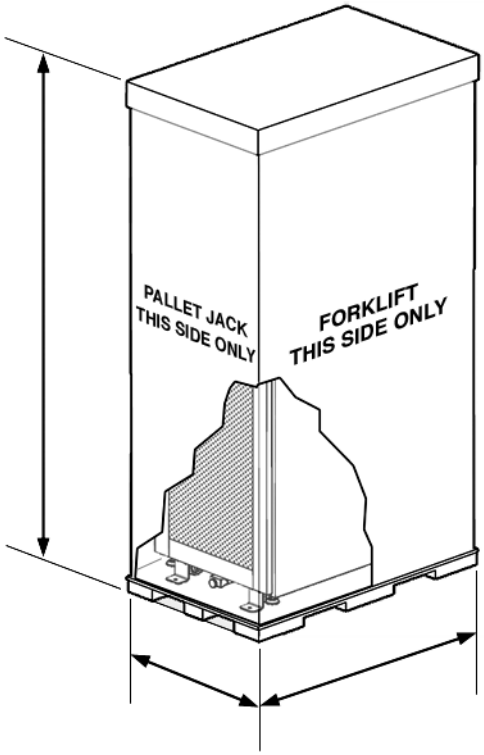


FIGURE 1-4 illustrates the top and front dimensions of a Sun equipment cabinet.

FIGURE 1-4 Sun Rack 900 With Cabinet Extender Top and Front Dimensions

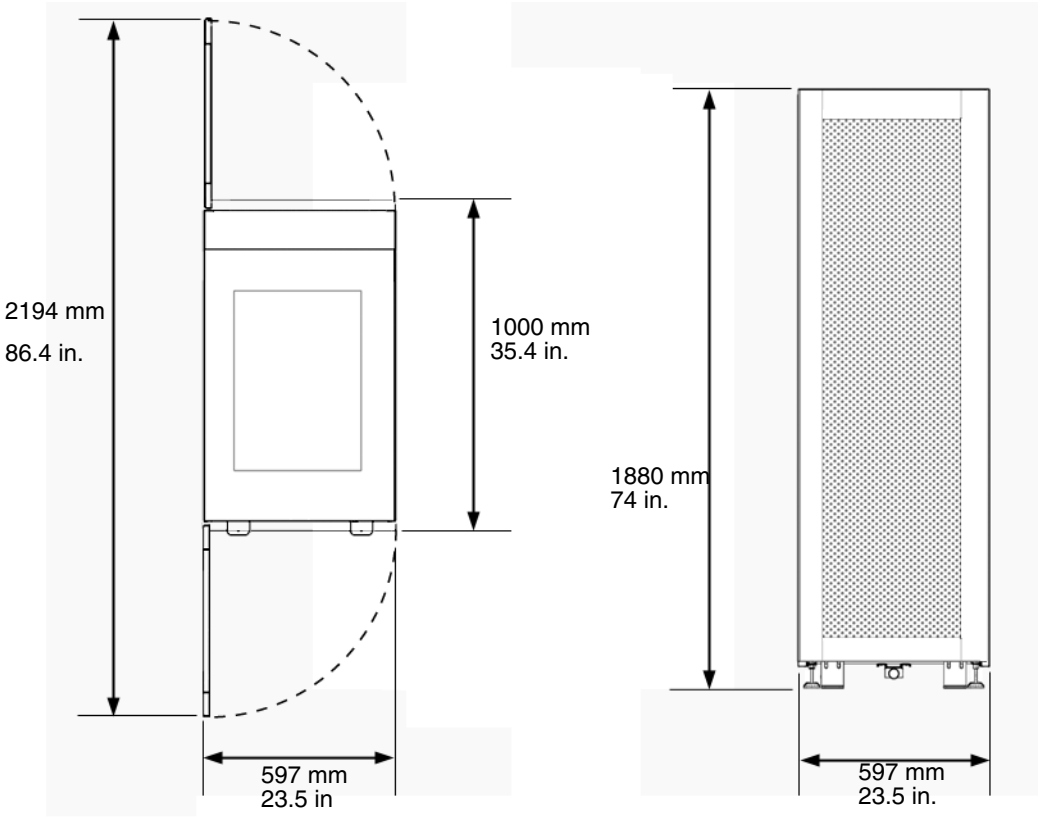


FIGURE 1-5 and FIGURE 1-6 illustrates the footprint of a Sun Rack 1000 and Sun Rack 900.

FIGURE 1-5 Sun Rack 1000 Bottom View

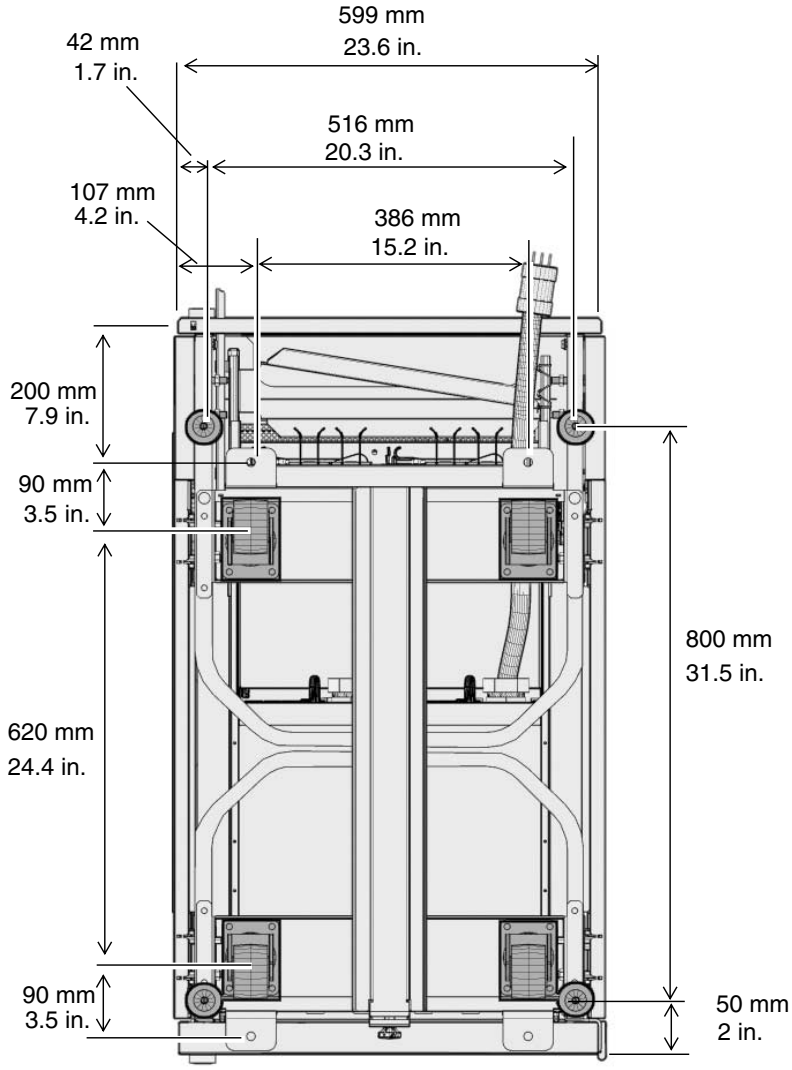
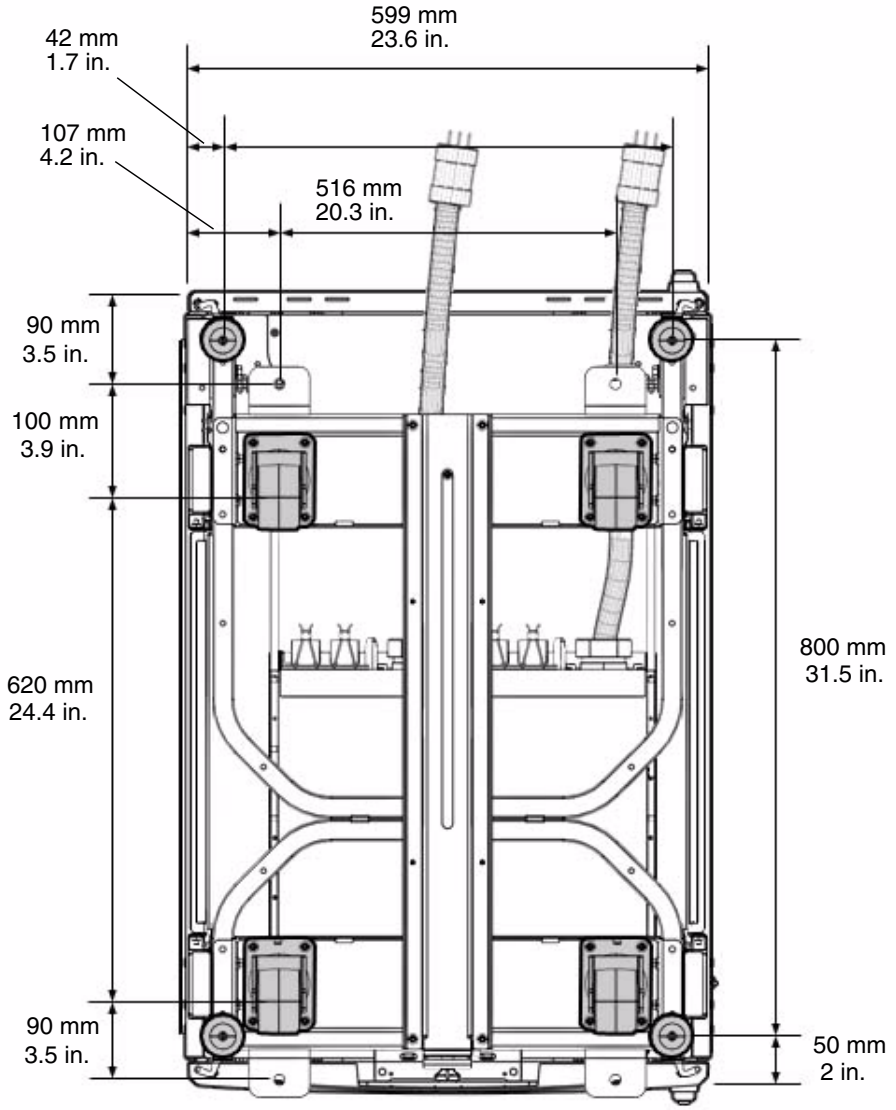


FIGURE 1-6 Sun Rack 900 Bottom View



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 equipment cabinets require a minimum of four feet to the front, three feet to the rear, and three feet from the top. Equipment cabinets 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 equipment cabinet (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 1-7 Front and Rear Maintenance Access and Thermal Specifications

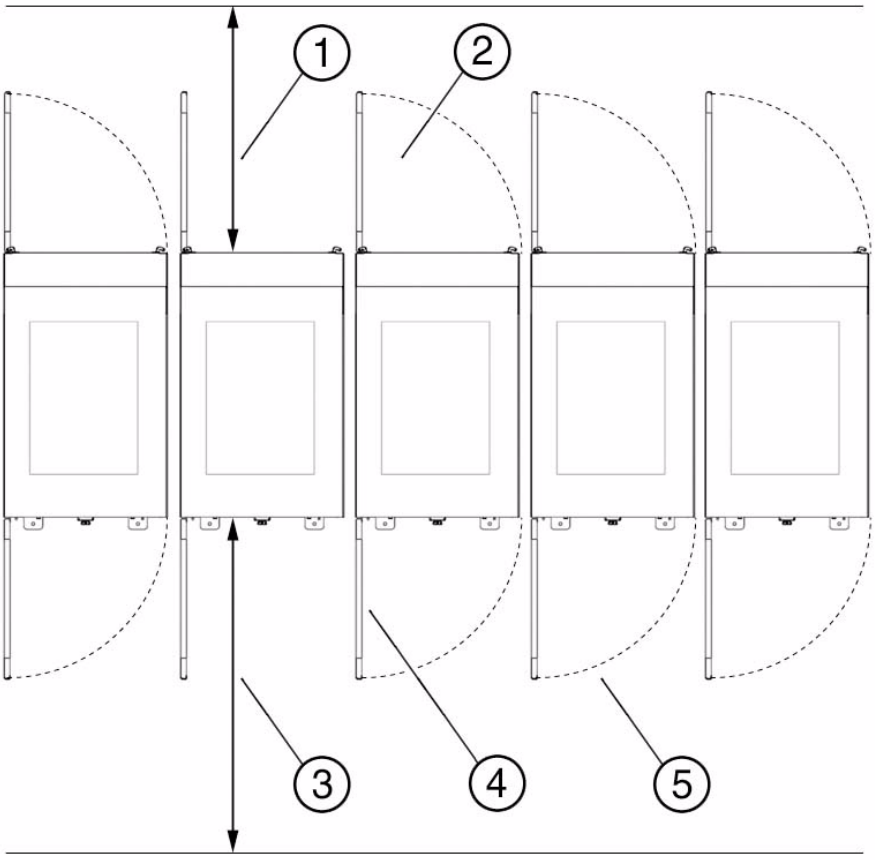


Figure Legend

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 equipment cabinet 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 equipment cabinet 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 equipment cabinets, keep these conditions in mind:

- *Each* equipment cabinet containing midrange servers requires its own power cords, connected to separate power outlets. See Section 1.1.2, "Electrical Specifications" on page 1-9, 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.

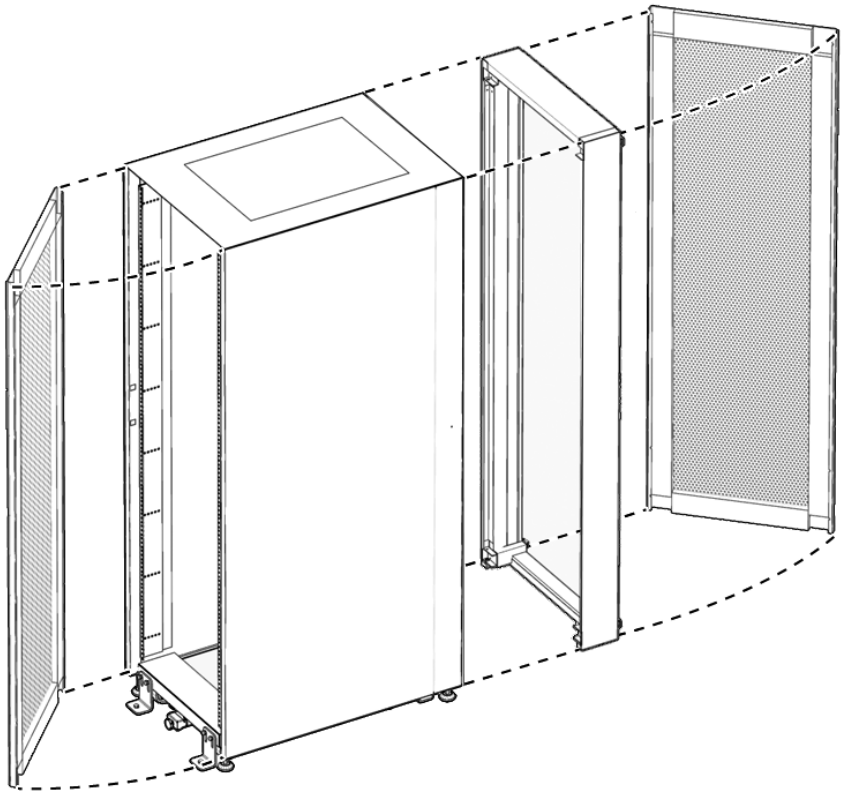
1.2 Mounting Specifications

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 equipment cabinet from the rear to enable the door to close.

1.2.1 Installing the Cabinet Extender (Optional)

1. **Remove the rear door of the equipment cabinet and set it aside.**
2. **Place the cabinet extender onto the door hinge pins at the rear of the equipment cabinet and secure in place. (**FIGURE 1-8**)**
3. **Mount the rear door on the cabinet extender.**

FIGURE 1-8 Installing the Cabinet Extender

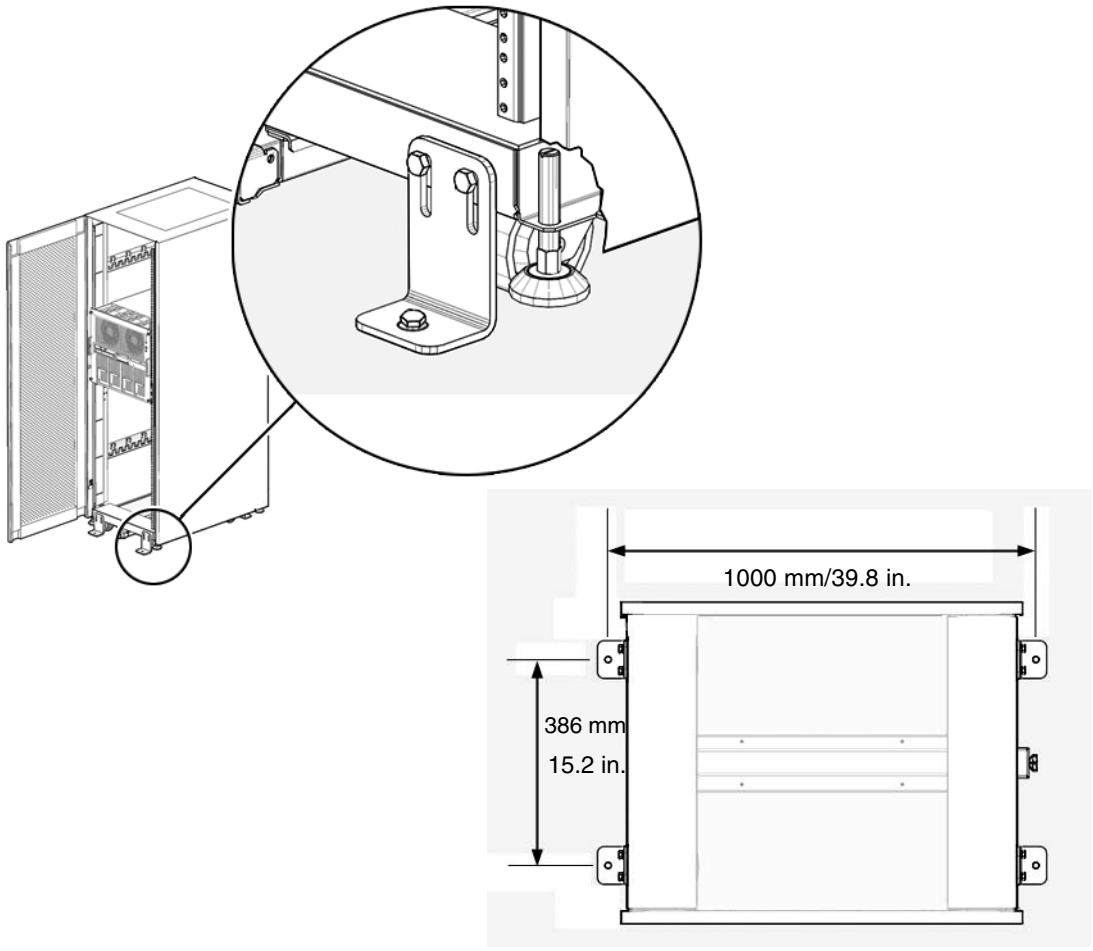


1.3 Stabilizing the Cabinet

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 1-9 illustrates a mounting bracket on a Sun Rack 1000 and the hole spacing required to secure the cabinet permanently to the floor.

FIGURE 1-9 Sun Rack 1000 Mounting Brackets and Hole Spacing for Floor Mounting



CHAPTER 2

Sun Rack II Cabinet

The Sun Rack II cabinet can enclose Sun 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.

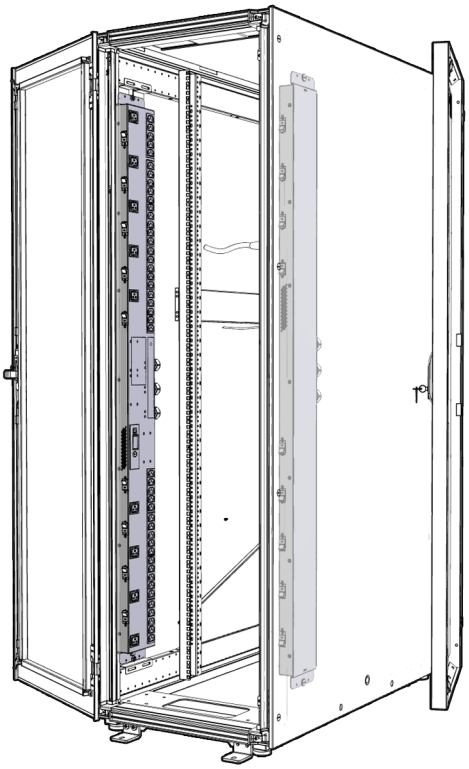
Note – The Sun Rack II cabinet has square RETMA rail holes.

Refer to the *Sun Rack II User's Guide* and the *Sun Rack II Power Distribution Units User's Guide* at: `//docs.sun.com/app/docs` 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 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 Sun 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 Sun SPARC Enterprise M3000 Server in an Equipment Cabinet

This chapter describes how to mount an M3000 server in a Sun Rack 1000, Sun Rack 900, and Sun Rack II cabinet. It contains the following sections:

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 1-13.

3.1 M3000 Server Slide Rail Kit

The server is mounted in the equipment cabinet 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 cabinet.

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

3.2 Installing the M3000 Server

3.2.1 For the Sun Rack 1000/900

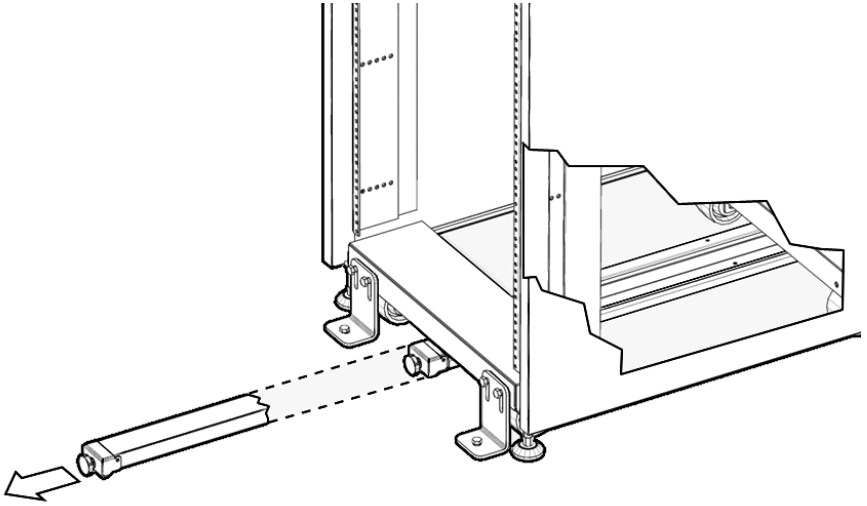
1. Extend the cabinet stabilizer.

Caution – The cabinet stabilizer must be extended or the equipment cabinet might topple when the server is installed on the extended slide rails.

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

a. Pull the end of the antitilt bar out to its fully extended position (FIGURE 3-1**).**

FIGURE 3-1 Extending the Cabinet Stabilizer on the Sun Rack 1000



b. Rotate the foot 90 degrees and adjust the height of the foot so that it rests on the floor.

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 equipment cabinet. 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 cabinet and carefully pushing in until you hear a click and the server stops.

The server will stop mid-way in the cabinet 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 cabinet.

5. Tighten the thumbscrews in the chassis bezel to hold the chassis securely in the equipment cabinet.

3.2.2 For the Sun Rack II Equipment Cabinet

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

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

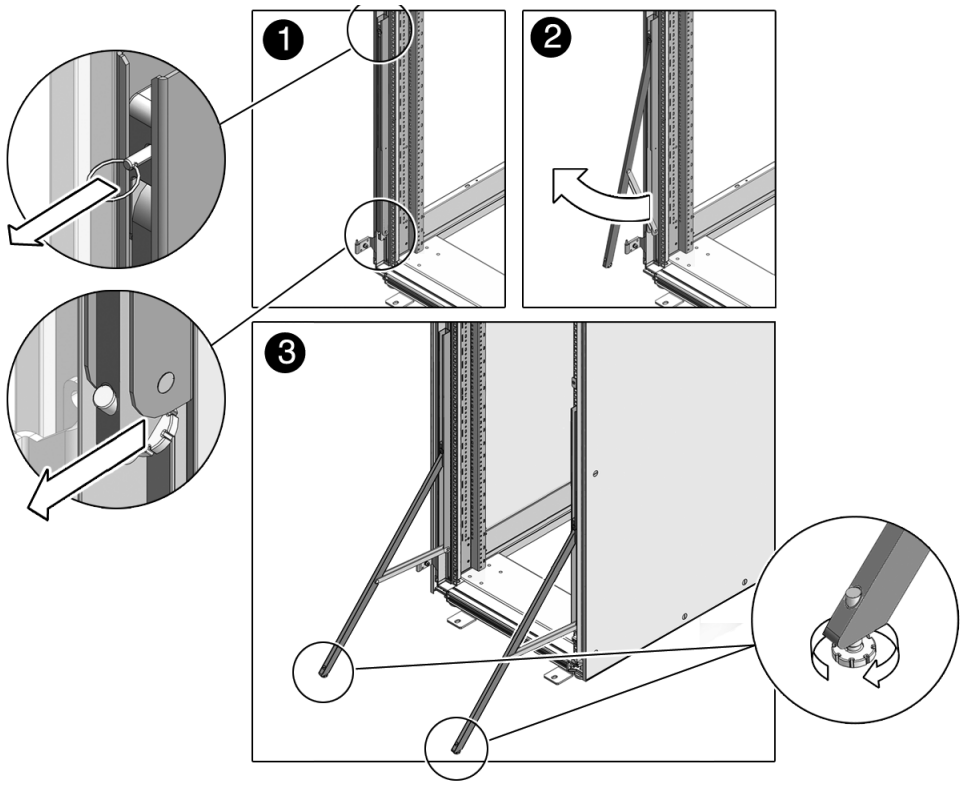
1. **Extend the anti-tilt legs.**

   a. **Pull on the top release pin to unlock the anti-tilt leg from the cabinet frame (Number 1 in** FIGURE 3-2**).**

   b. **Pull the bottom foot of the anti-tilt leg away from the cabinet until it extends fully (Number 2 in** FIGURE 3-2**).**

      The leg support will lock in place.

FIGURE 3-2 Extending the Anti-Tilt Legs



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

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

d. **Repeat Step a through Step c to extend the other anti-tilt leg.**

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 equipment cabinet. 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 cabinet and carefully pushing in until you hear a click and the server stops.**

   The server will stop mid-way in the cabinet 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 cabinet.**

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

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 3-3 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

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

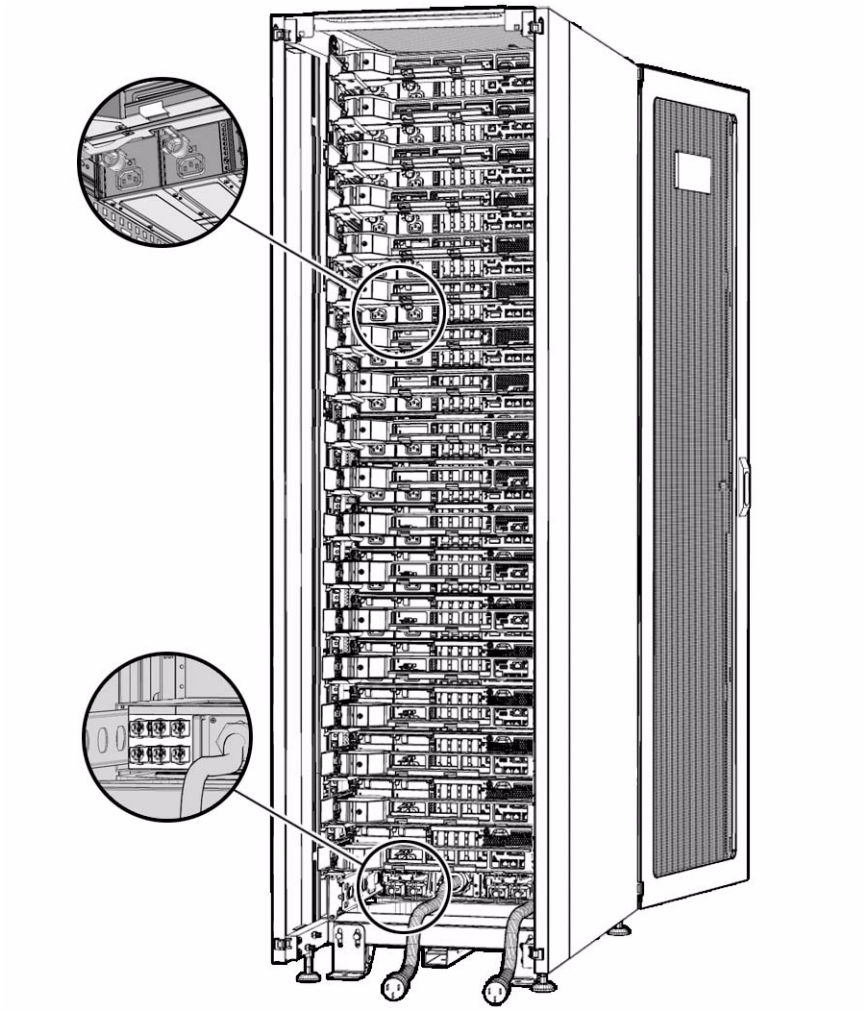
Server	PSU_1	PSU_0
M3000_11_14_17	MPS_1-B5	MPS_1-A5
M3000_10_13_16	MPS_1-B4	MPS_1-A4
M3000_9_12_15	MPS_1-B3	MPS_1-A3
M3000_2_5_8	MPS_0-B2	MPS_0-A2
M3000_1_4_7	MPS_0-B1	MPS_0-A1
M3000_0_3_6	MPS_0-B0	MPS_0-A0

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

Note – For M3000 servers in positions twelve and above, use power cords that are 2.5m in length to reach from the servers to the MPS units.

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



Note – The numbering in a Sun equipment cabinet 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. Sun 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

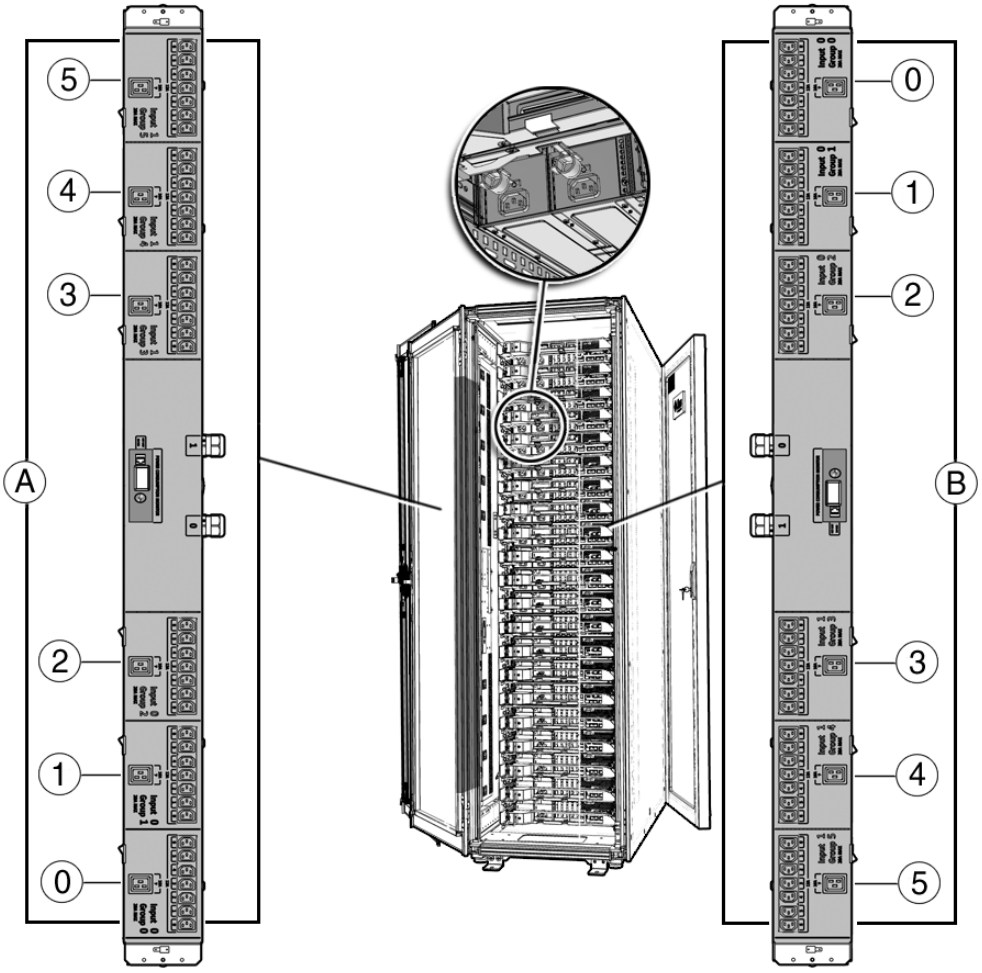
Server	PSU_1	PSU_0
M3000_18_19_20	PDU_A Group_5	PDU_B Group_0
M3000_15_16_17	PDU_A Group_4	PDU_B Group_1
M3000_12_13_14	PDU_A Group_3	PDU_B Group_2
M3000_8_9_10_11	PDU_A Group_2	PDU_B Group_3
M3000_4_5_6_7	PDU_A Group_1	PDU_B Group_4
M3000_0_1_2_3	PDU_A Group_0	PDU_B Group_5

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 Sun equipment cabinet reads from bottom to top and right to left.

FIGURE 3-4 Sun Rack II with Twenty-One M3000 Servers and Two PDUs



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 Sun SPARC Enterprise M4000 Server in an Equipment Cabinet

This chapter describes how to mount an M4000 server in a Sun Rack 1000, Sun Rack 900, and Sun Rack II. It contains the following sections:

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.

Up to six 6U M4000 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 4-1 M4000 Server External Dimensions

Width	Depth	Height	Weight
444 mm (17.5 in.)	810 mm (31.9 in.)	263 mm (10.4 in.) 6U	84 kg (185 lb)

The M4000 server is designed to be mounted in a standard 19-inch rack with a depth of 1000 mm or *more*. 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 1-13.

4.1 M4000 Server Slide Assembly Kit

The servers are mounted in the equipment rack using slide assemblies.

FIGURE 4-1 M4000 Server Slide Assembly Kit Contents

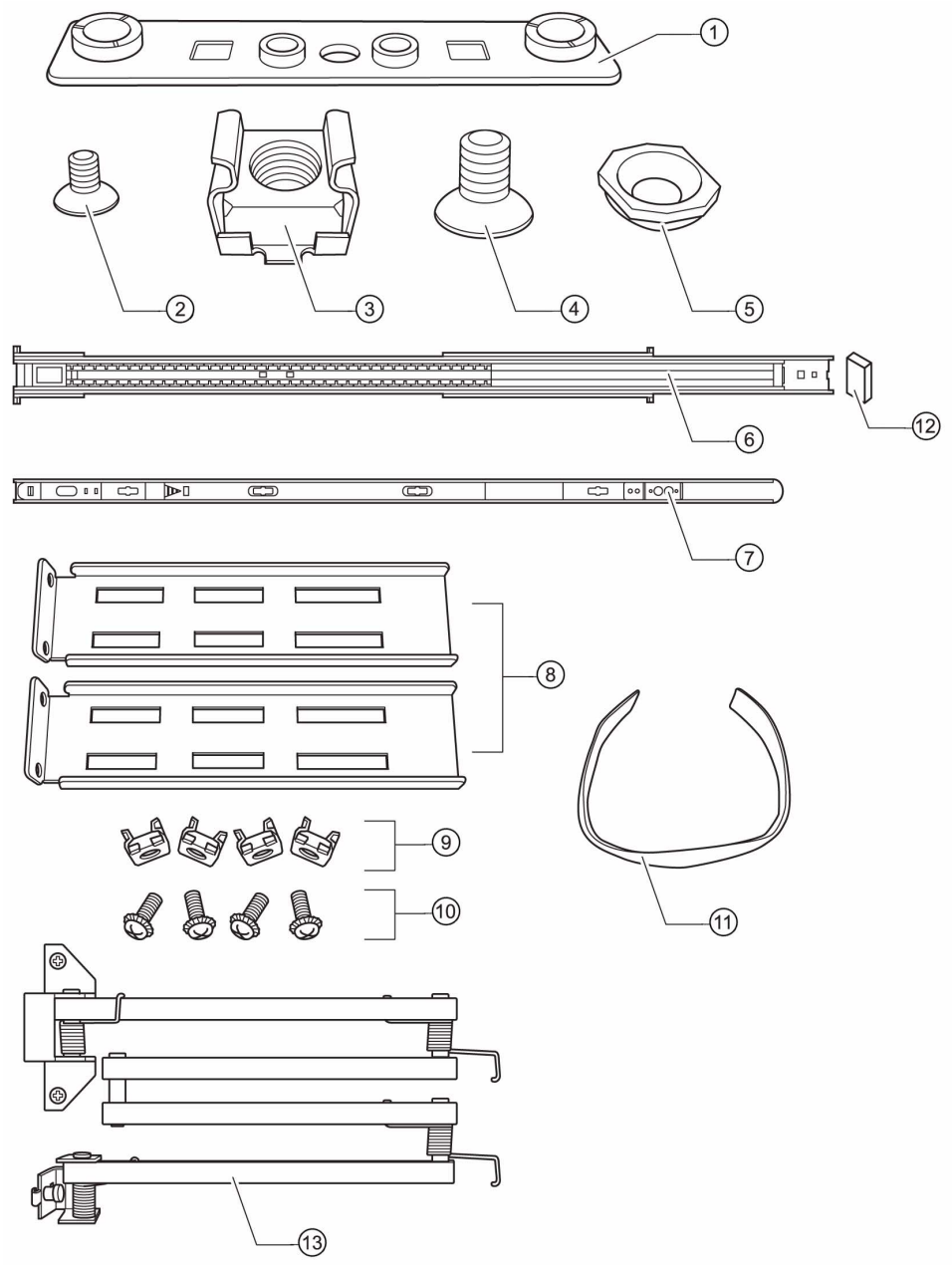


Figure Legend

1	Nut bar (4)
2	M2.5 flathead screw (8)
3	M5 cage nut (8)
4	M5 Flathead screw (8)
5	Washer (8)
6	Slide rail (2)
7	Inner rail (2)
8	Cable bracket (2)
9	M5 cage nut (8)
10	M5 Screw (8)
11	Hook and loop strap (10)
12	End cap (2)
13	Cable management arm (1)

Note – Depending upon which equipment cabinet the M4000 server is mounted in, not all parts in the assembly kit will be used.

FIGURE 4-2 M4000 Shipping Bracket Kit Contents

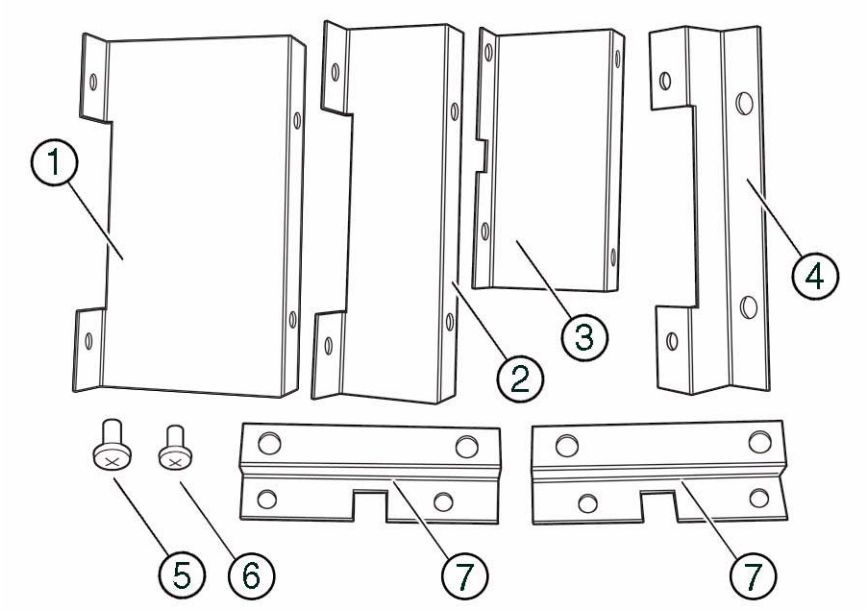


Figure Legend

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

Note – Depending upon which equipment cabinet the M4000 server is mounted in, not all parts in the assembly kit will be used.

For the Sun Rack 1000/900 with the cabinet extender kit, the two deepest brackets (one short, one long) are used to anchor the M4000 chassis to the equipment rack prior to shipping. The short bracket is attached on the IOU side, mounting to the M4000 chassis with two M5 screws. Two M6 screws anchor the short bracket to the rack column. The deepest bracket is similarly attached to the other side of the chassis to the other rear rail.

4.2 Installing the M4000 Server

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

4.2.1 For the Sun Rack 1000/900

1. **Determine the mounting holes in the equipment rack by using the mounting hole matrix in the following table.**

TABLE 4-2 Sun Rack 1000/900 Mounting Hole Matrix

M4000 server	Hole number
5	98 and 102
4	80 and 84
3	62 and 66
2	44 and 48
1	26 and 30
0	9 and 13

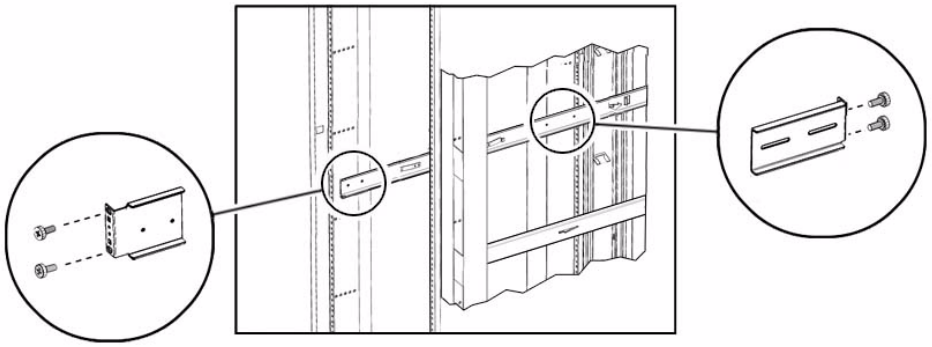
Note – The M4000 server slide rail kit includes a slide rail template which can also be used to determine hole locations for the slide rails in the cabinet.

2. **Install slide assemblies in the equipment rack, using four (4) M6 screws to secure the slide assemblies in the selected mounting holes (**FIGURE 4-3).

   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.

Caution – For safe rack mounting, ensure that the bearing cards 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.

FIGURE 4-3 Mounting a Slide Assembly to the Equipment Rack



3. **Secure the inner parts of the slide rails in place on the server (**FIGURE 4-4**).**

   a. **Confirm the inner rail attachment orientation.**

   b. **Align the center holes in the inner rails with the pins on the server (**FIGURE 4-4**).**

   c. **Slide the inner rails toward the front of the server to lock them in place by the holes at the rear of the lock mechanism.**

FIGURE 4-4 Aligning Center Holes With Pins on the Server

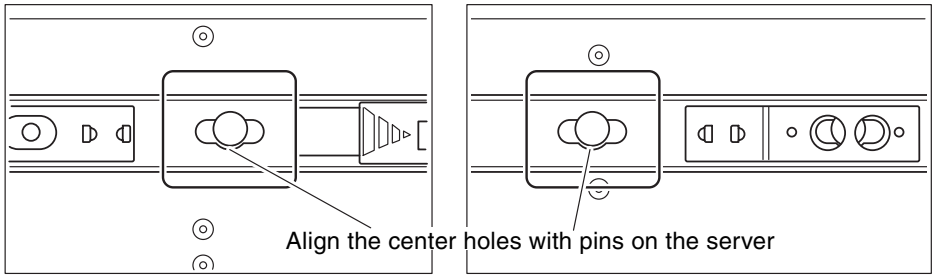
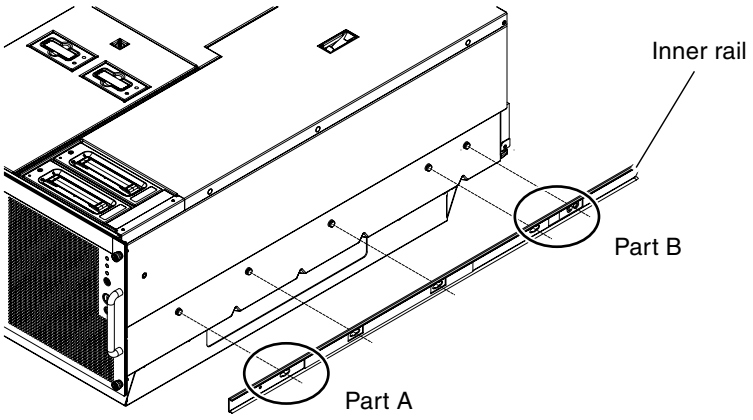


FIGURE 4-5 Securing Inner Part of the Slide Rail to the Server



Removing the Inner Rails

To remove an inner rail, slide the inner rail to align with the center holes on the inner rail with the pins on the server and then remove the inner rail.

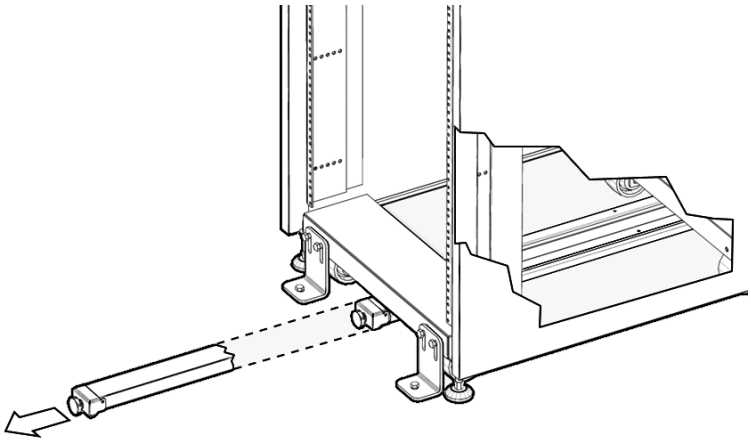
4. Extend the rack stabilizer.

Caution – The rack stabilizer must be extended or the equipment rack will topple when the server is installed on the extended slide rails.

a. Pull the end of the anti-tilt bar out to its fully extended position.

b. Rotate the foot 90 degrees and adjust the height of the foot so that it rests on the floor.

FIGURE 4-6 Extending the Rack Stabilizer on the Sun Rack 1000



5. **Extend the slide rails from the slide assemblies.**
6. **Position the bearing cars on the interior of the slide rails in full forward position until they are stopped by the black plastic alignment guides.**

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

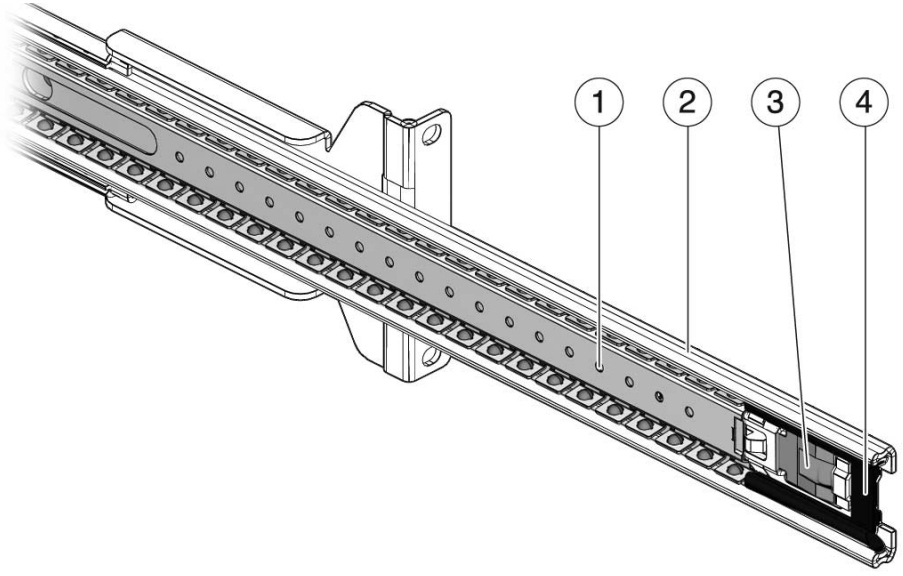


Figure Legend

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 cards 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.

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.

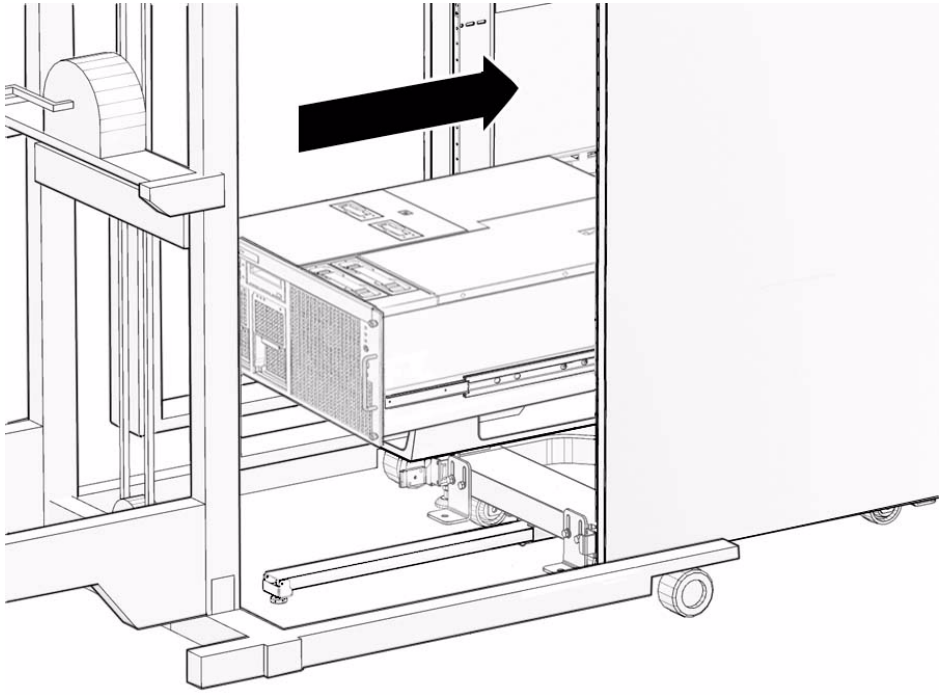
7. **Place the forks of the computer equipment lift inside the plinth on the underside of the system.**

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

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

   The M4000 server slides have keyholes that fit over pins on the sides of the server.

FIGURE 4-8 Example of Mating the Server on Slides



9. **Secure the server to the slides.**

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

---

   a. **Place the keyholes over the pins on the side of the server.**

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

10. **Remove the plinth from the bottom of the server (**FIGURE 4-9**).**

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.**

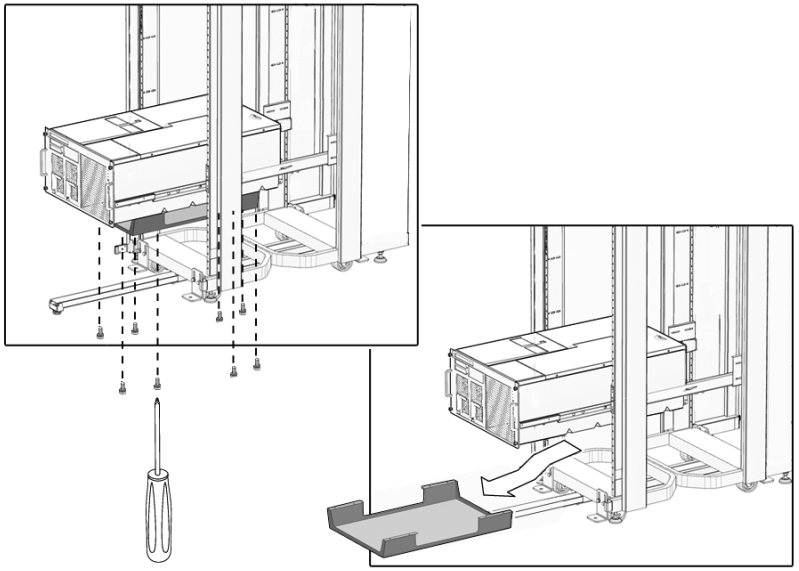
c. **Slide the plinth toward the rear of the server less than an inch until the plinth is released from the screws.**

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 4-9 Example of Removing the Plinth

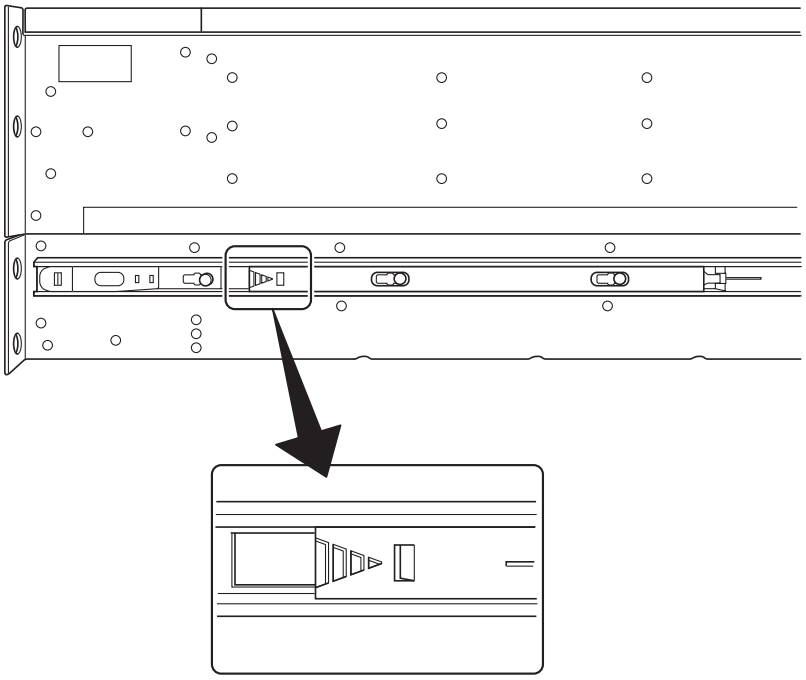


11. **Withdraw the computer lifting device.**

12. **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 4-10 Locking Mechanism on the M4000 Slide Rail



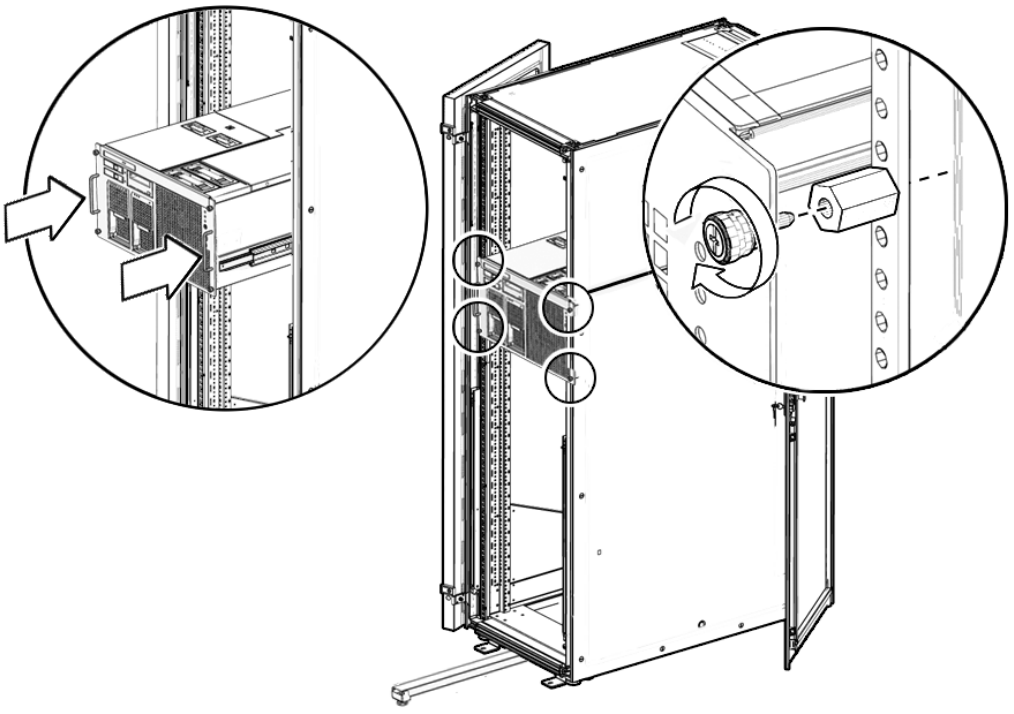
13. **If you are securing the CMA at this time, proceed to** Section 4.3, "Installing the Cable Management Arm for the M4000 Server" on page 4-27**.**

    If the CMA is not to be installed at this time, proceed to Step 14.

14. **Secure the spacers at the front of the equipment cabinet (**FIGURE 4-11**).**

    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 4-11 Example of Spacers Aligned With Captive Screws



4.2.2 For the Sun Rack II

1. **Attach four (4) M5 cage nuts to the front rack columns: center hole on the 1U and the center hole on the 6U (**FIGURE 4-12**).**

   Each rack unit is marked off on the rack column. There are three holes per rack unit, identified as upper hole, center hole, and lower hole.

FIGURE 4-12 Cage Nut Hole Locations for the M4000 Server

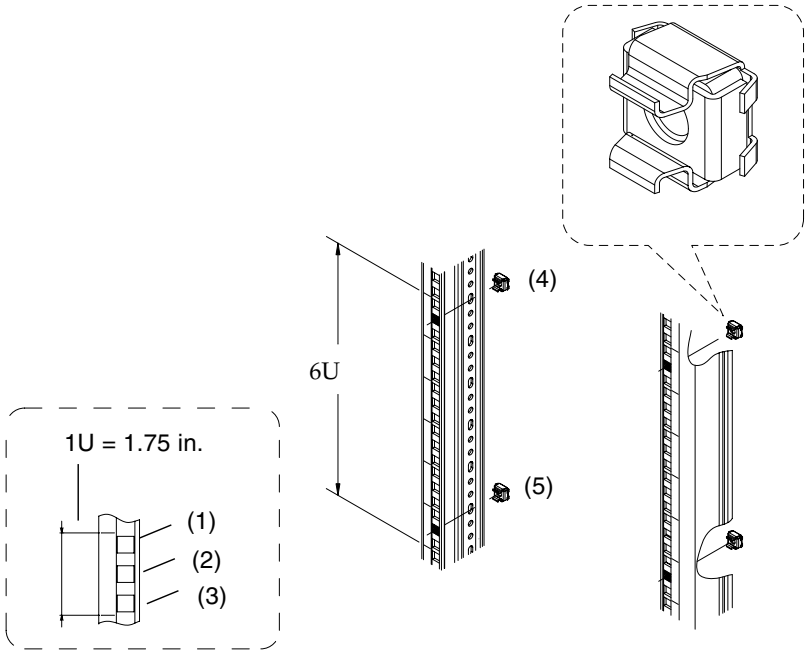


Figure Legend

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

2. **Using the cage nut insertion tool, secure the cage nuts on the rack columns.**

   The cage nut insertion tool is found in the equipment cabinet ship kit.

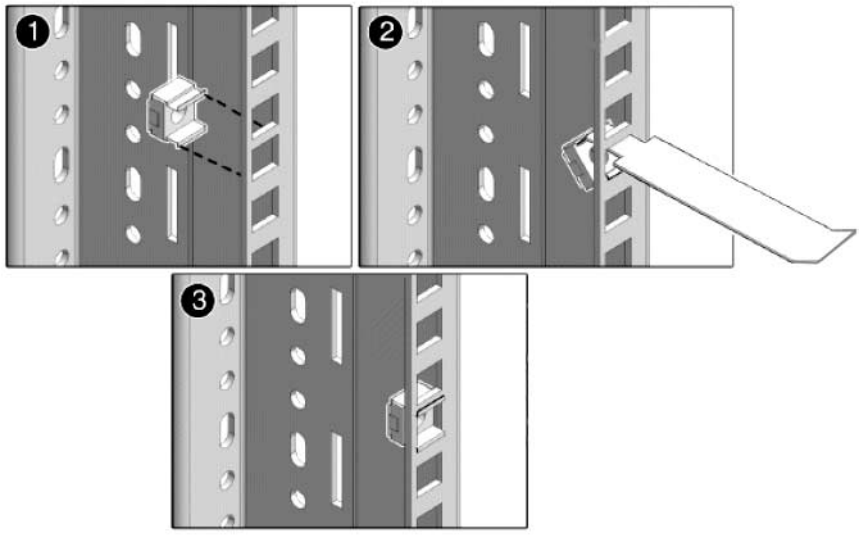
Caution – The insertion tool has sharp edges. Use with care.

a. **Hook the bottom lip of the nut in the square rail hole ((Number 1 in FIGURE 4-13).**

b. **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 4-13).**

c. **Using the insertion tool, pull the cage nut through the hole until the top lip snaps into place ((Number 3 in FIGURE 4-13).**

FIGURE 4-13 Inserting Cage Nuts in Square Holes Using the Insertion Tool



3. **Attach the four nut bars to their corresponding locations on the slide rails (front right, front left, rear right, and rear left) with two M2.5 flathead screws at each location.**

FIGURE 4-14 Attaching Nut Bars with Brackets

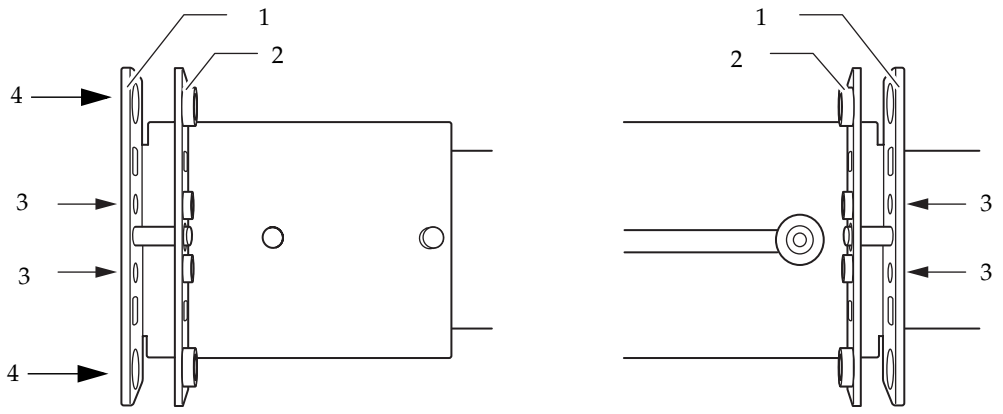


Figure Legend

1	Bracket
2	Nut bar
3	M2.5 Screw
4	M5 Screw

4. **Determine the location of the 6U M4000 server in the cabinet.**

   Slide rails will be secured at the upper hole of the 1U and lower hole of the 3U (FIGURE 4-15).

5. **Position the slide rail behind the rack columns.**

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

6. **Secure the slide rails to the rack columns with screws (two M5 flathead screws at each of four locations) and washers (two at each of the four locations).**

   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.

Caution – For safe rack mounting operations, ensure that the green clips and 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.

FIGURE 4-15 Installing Slide Rails in the Cabinet

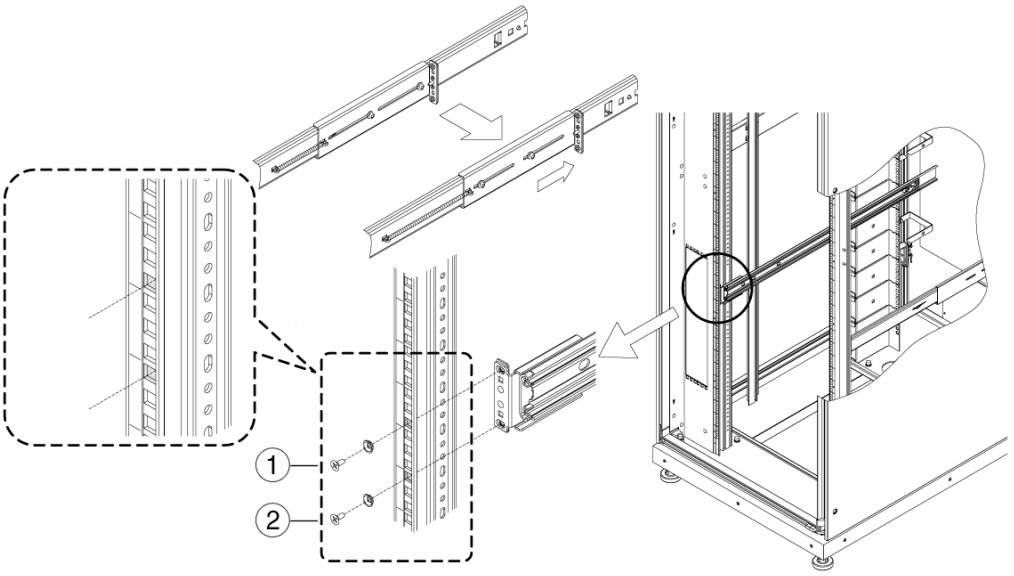


Figure Legend

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

7. Secure the inner parts of the slide rails in place on the server (FIGURE 4-16).

a. Confirm the inner rail attachment orientation.

b. Align the center holes in the inner rails with the pins on the server (FIGURE 4-17).

FIGURE 4-16 Securing Inner Part of the Slide Rail to the Server

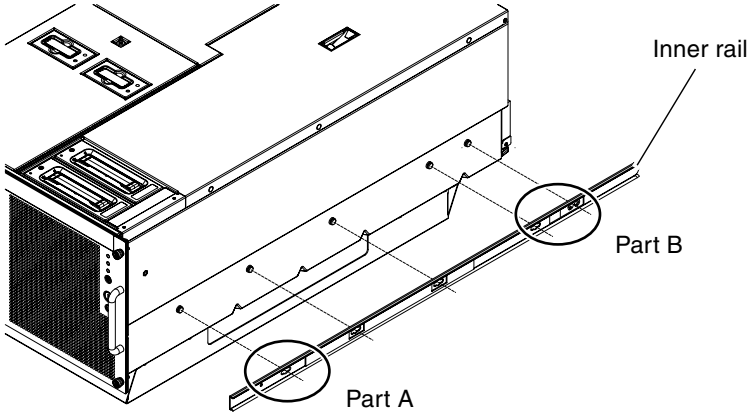
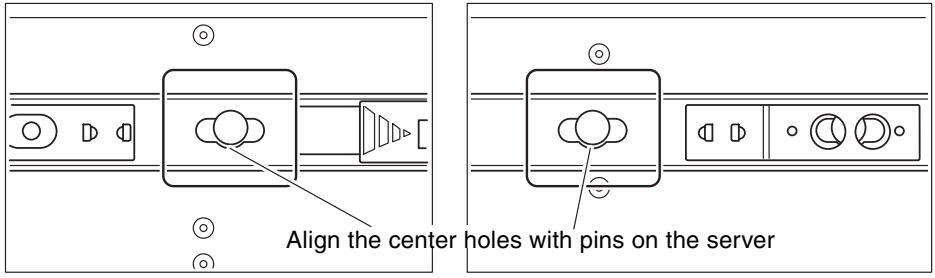


FIGURE 4-17 Aligning Center Holes With Pins on the Server



c. Slide the inner rails toward the front of the server to lock them in place by the holes at the rear of the lock mechanism.

Removing the Inner Rails

To remove an inner rail, slide the inner rail to align with the center holes on the inner rail with the pins on the server and then remove the inner rail.

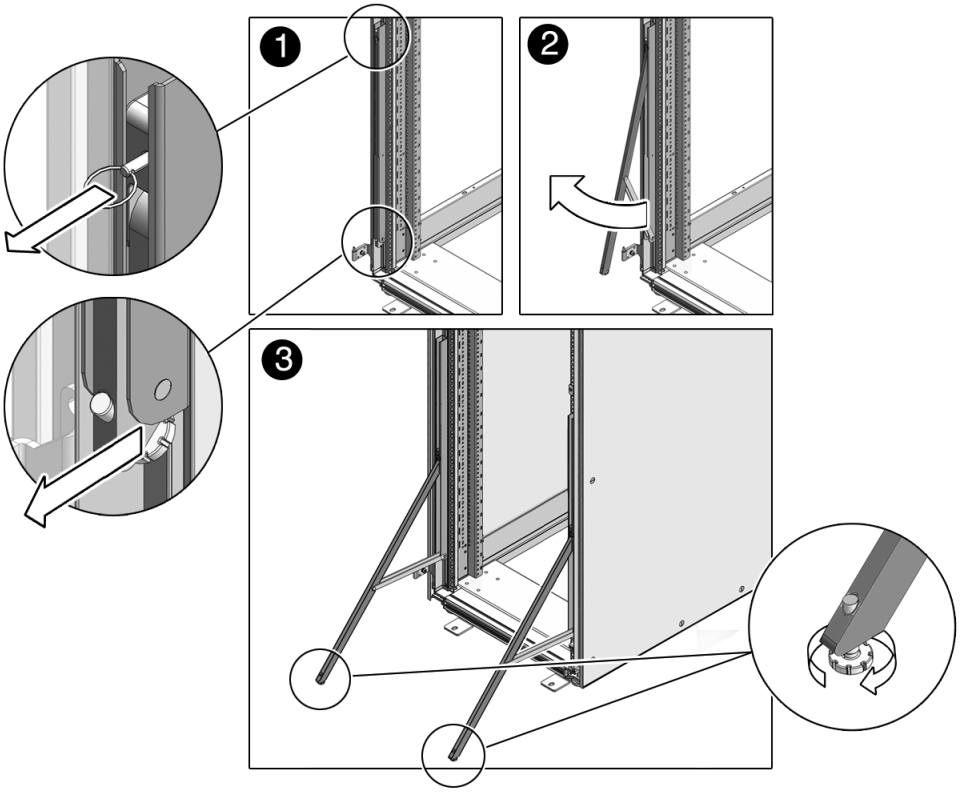
8. Extend the anti-tilt legs (FIGURE 4-18**).**

a. Pull on the top release pin to unlock the anti-tilt leg from the cabinet frame (Number 1 in FIGURE 4-18**).**

b. Pull the bottom foot of the anti-tilt leg away from the cabinet until it extends fully (Number 2 in FIGURE 4-18).

c. The leg support will lock in place.

FIGURE 4-18 Extending the Anti-Tilt Legs



d. Rotate the leg's rubber foot clockwise until it touches the floor (Number 3 in FIGURE 4-18).

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

e. Repeat Step a through Step d to extend the other anti-tilt leg.

9. Extend the slide rails from the slide assemblies.

10. Position the bearing cars on the interior of the slide rails in full forward position until they are stopped by the black plastic alignment guides.

FIGURE 4-19 Bearing Car in Full Forward Position Inside the Slide Rail

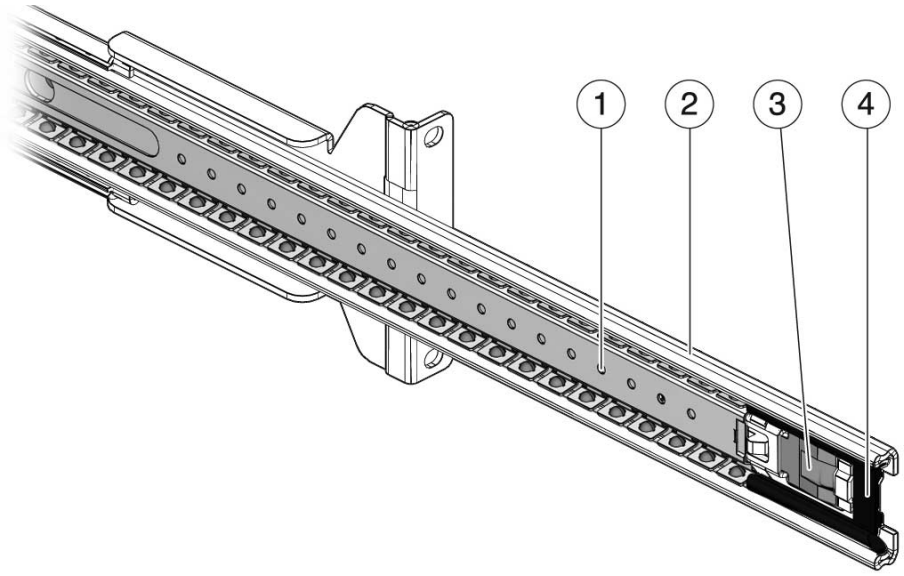


Figure Legend

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 cards are 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.

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 cabinet. The handles will not support the weight of the server.

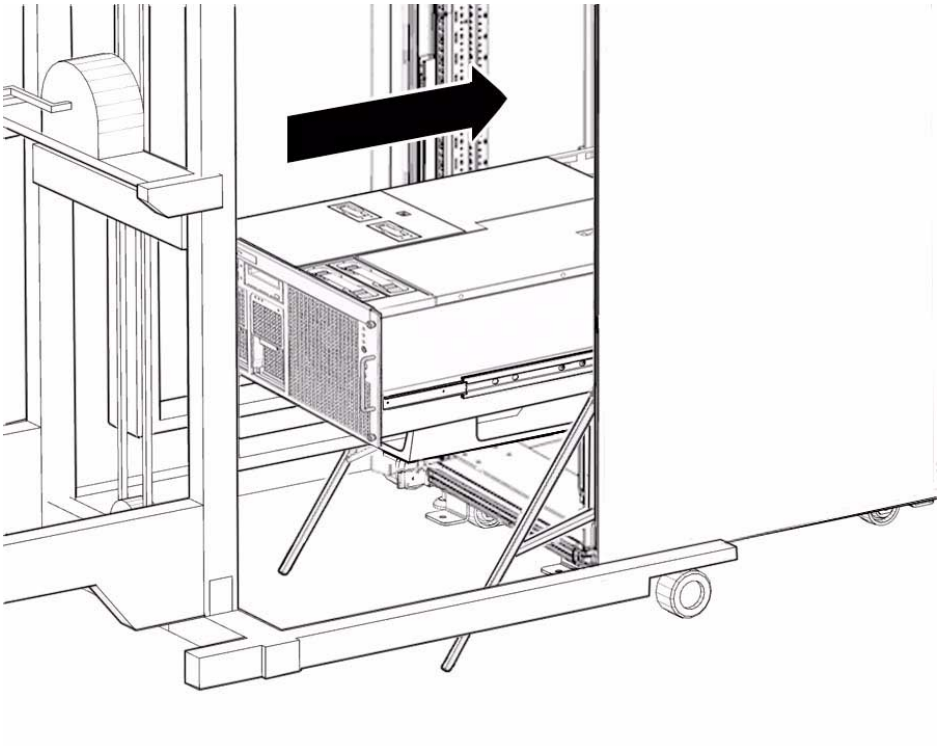
11. **Place the forks of the computer equipment lift inside the plinth on the underside of the system.**

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

12. **Raise the server and gently push it towards the equipment cabinet until the holes and pins align.**

    The M4000 server slides have keyholes that fit over pins on the sides of the server.

FIGURE 4-20 Mating the Server on Slides



13. **Secure the server to the slides.**

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

---

    a. **Place the keyholes over the pins on the side of the server.**

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

14. **Remove the plinth from the bottom of the server (**FIGURE 4-21**).**

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.**

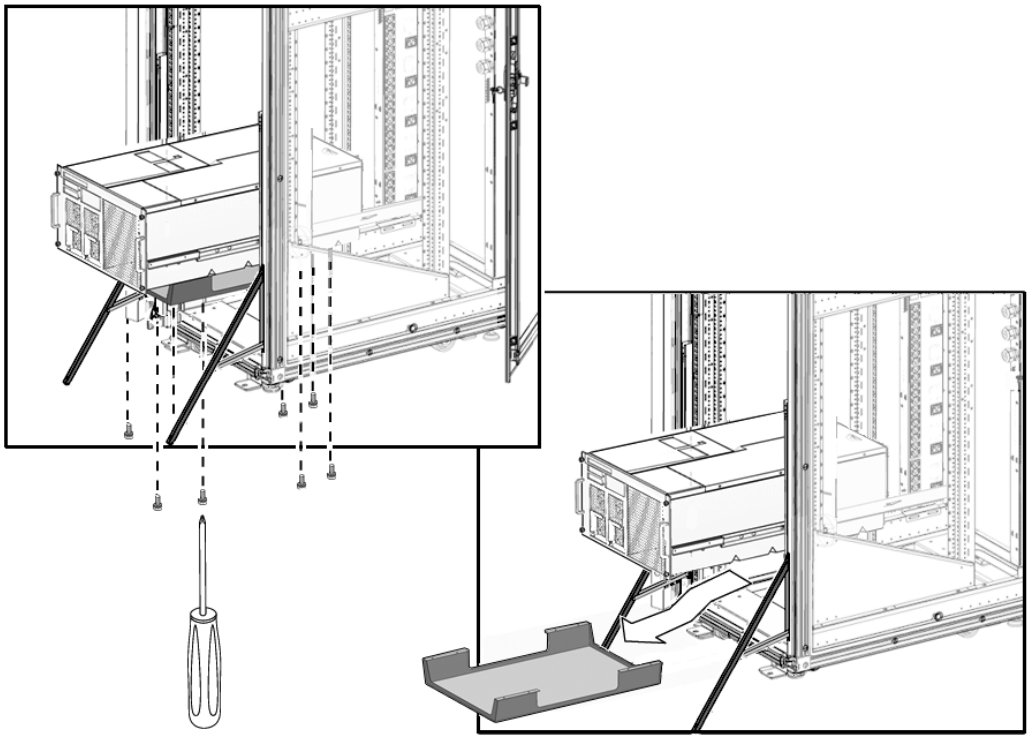
c. **Slide the plinth toward the rear of the server less than an inch until the plinth is released from the screws.**

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 cabinet stabilizer must be extended or the equipment cabinet will topple when the lifting device is withdrawn.

FIGURE 4-21 Removing the Plinth From the Server

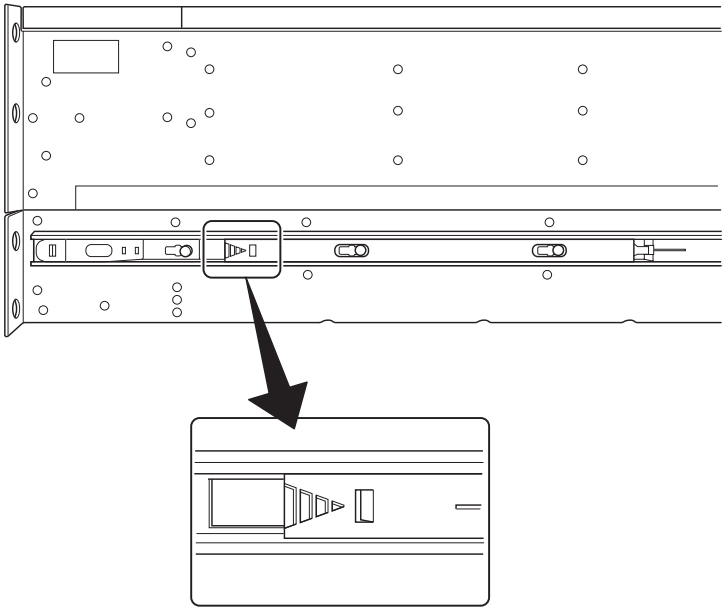


15. **Withdraw the computer lifting device.**

16. **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 4-22 Locking Mechanism on the M4000 Slide Rail



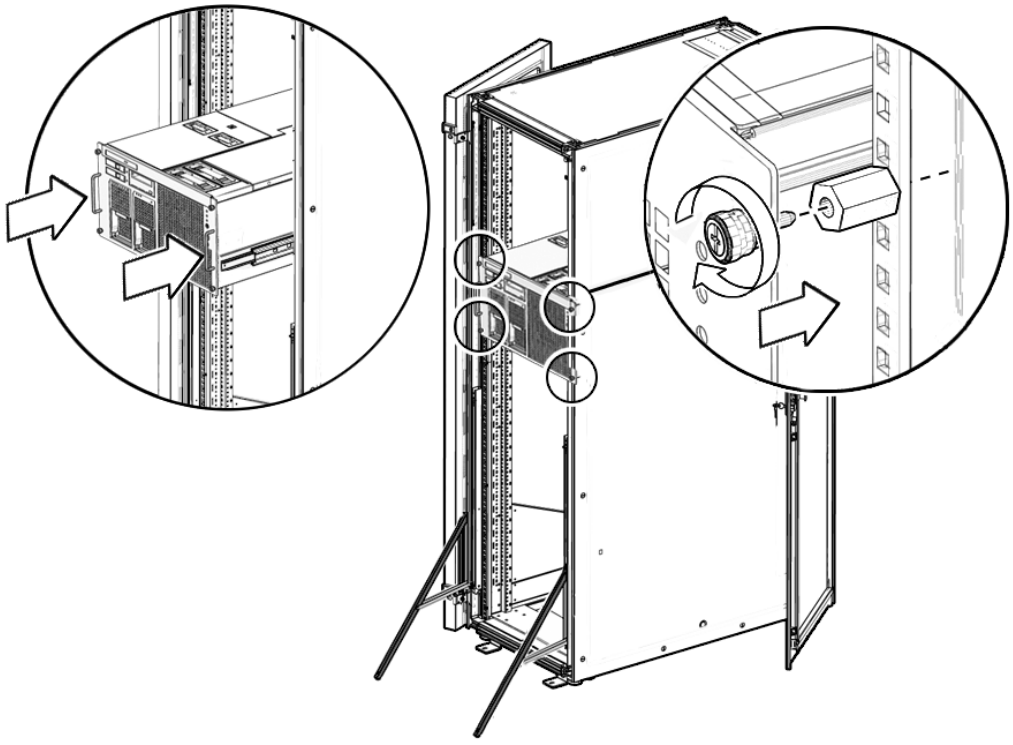
17. **If you are securing the CMA at this time, proceed to** Section 4.3, "Installing the Cable Management Arm for the M4000 Server" on page 4-27**.**

    If the CMA is not to be installed at this time, proceed to Step 18.

18. **Secure the spacers at the front of the equipment cabinet. (**FIGURE 4-23**)**

    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 4-23 Example of Spacers Aligned With Captive Screws



4.3 Installing the Cable Management Arm for the M4000 Server

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.**

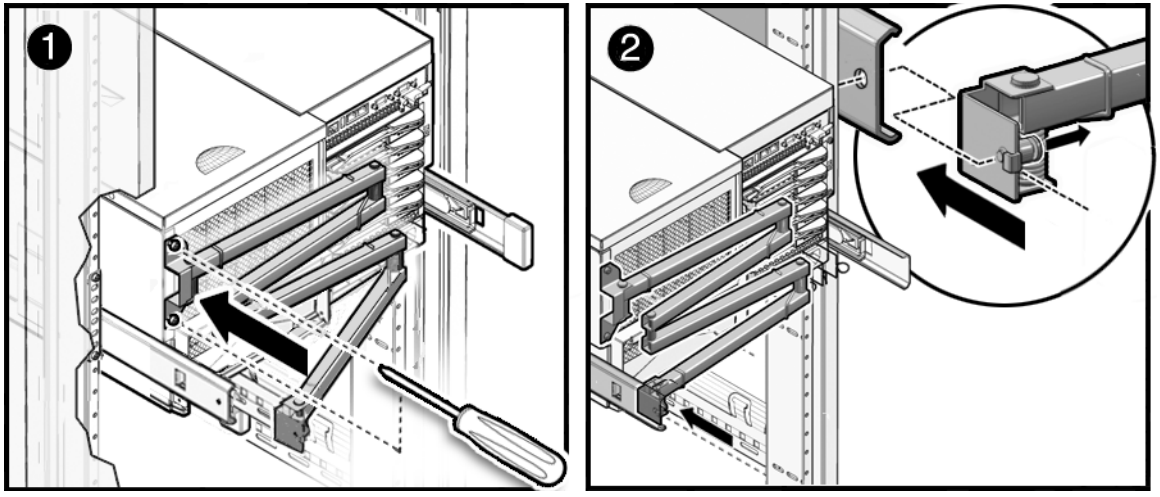
Caution – You must hold both ends of the CMA while it is taut to keep the spring-loaded arm from striking yourself or nearby equipment.

2. **Secure the small end of the CMA to the server by using the two (2) captive screws (**FIGURE 4-24**).**

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

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

FIGURE 4-24 Installing the Cable Management Arm



4.4 Attaching End Caps to the Rails

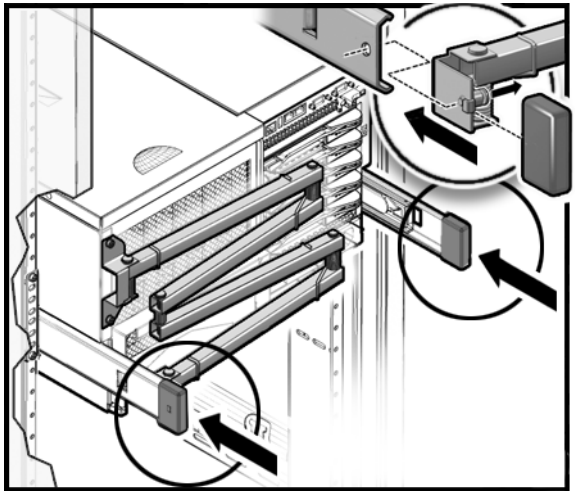
After securing the CMA to the M4000 servers, attach the provided end caps to the rails.

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

   An end cap is attached to both the right and left rear rails (FIGURE 4-25).

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 4-25 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.**

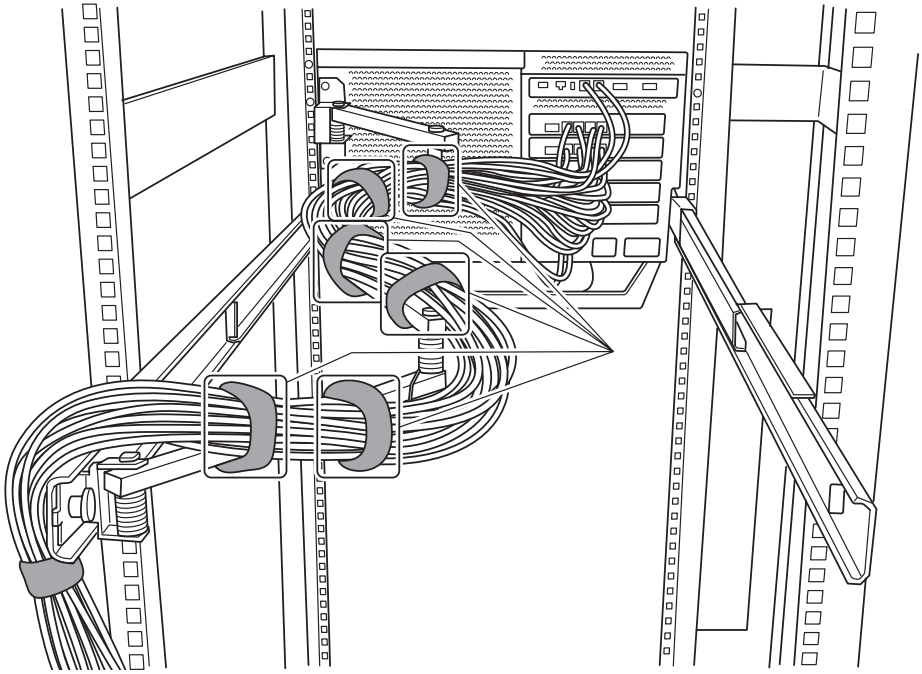
Caution – Do not connect the power cables to a power source at this time.

---

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.

FIGURE 4-26 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 4.5, "Installing the Cable Holding Brackets (Optional)" on page 4-31.

---

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

   FIGURE 4-27 shows how the CMA extends and retracts.

FIGURE 4-27 CMA Extended and Retracted on the M4000 Server

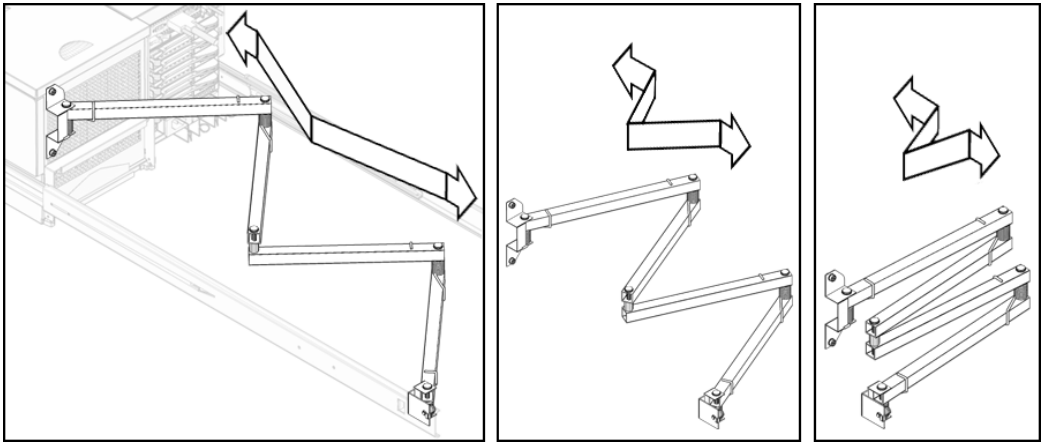
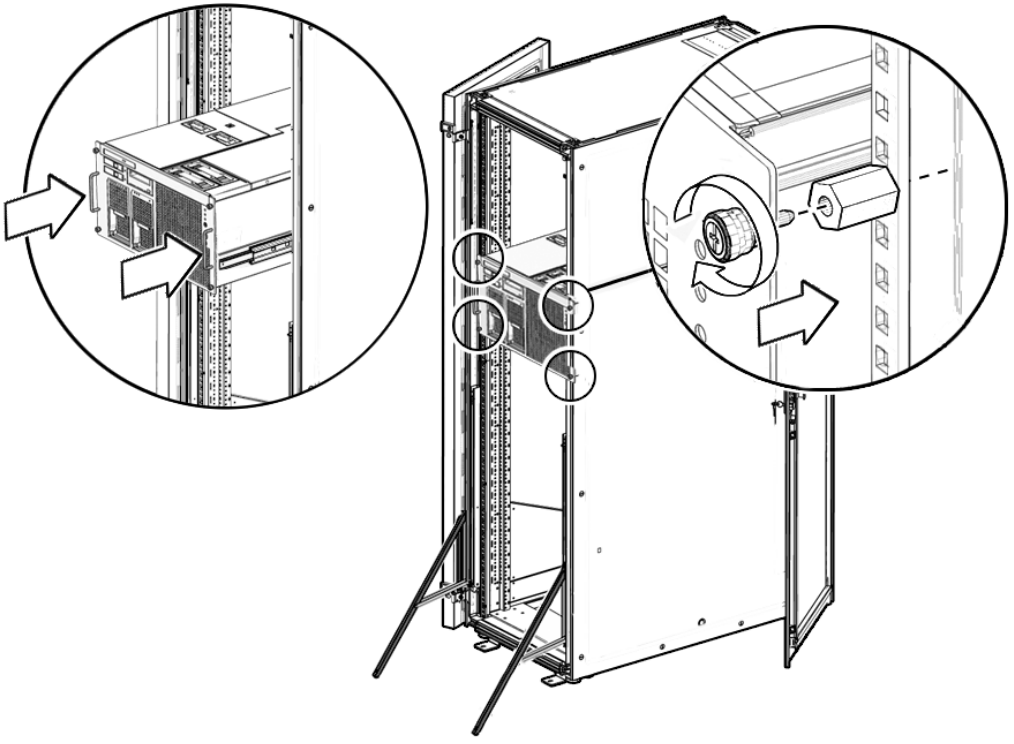


FIGURE 4-28 Securing the Server in the Equipment Cabinet



5. **Slide the server into the equipment cabinet.**
6. **Tighten the four (4) captive screws at the front of the server to secure the server in the equipment cabinet.**
7. **Replace the cabinet stabilizer to its original position.**

4.5 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)
- Hook and loop straps (14)

These brackets can be used with or without the CMA for the M4000 server.

1. **Extend the cabinet stabilizer or anti-tilt legs on the equipment cabinet.**
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.**

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 1000/900

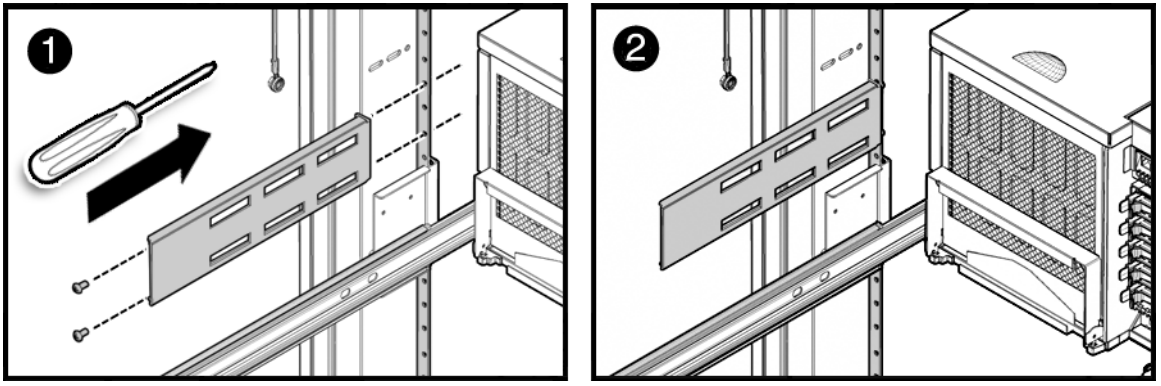
a. **Position the cage nuts behind the rack column and insert the two (2) screws through the bracket and rack column (**FIGURE 4-29**).**

   Brackets should be positioned near the top level of the server or slightly below it.

b. **Twist the cage nuts onto the screws from behind the rack ears.**

   The flat edges of the cage nuts should be aligned with the rack columns to prevent the cage nuts from scraping against the server.

FIGURE 4-29 Installing the Extra Brackets in a Sun Rack 1000

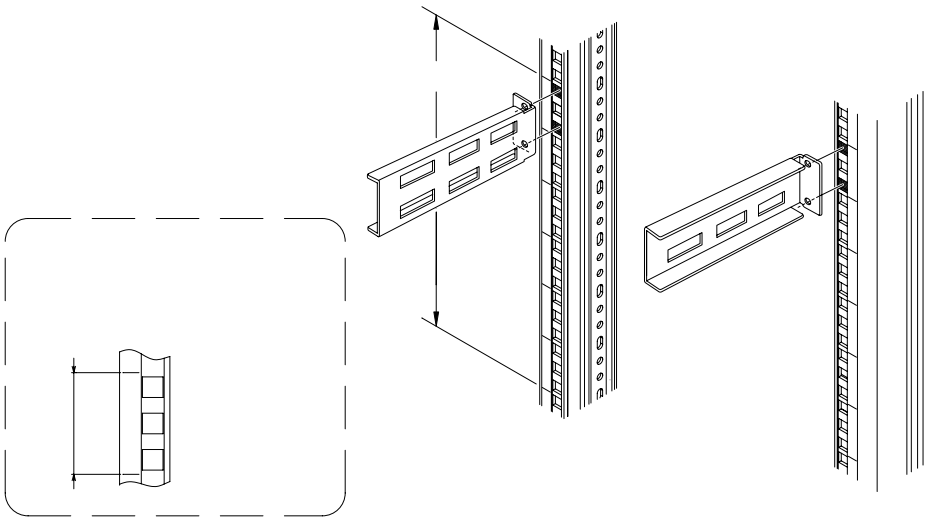


For the Sun Rack II

a. **Secure the cable holding brackets in the upper and lower hole on the 5U location of the rack column (**FIGURE 4-30**).**

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

FIGURE 4-30 Attaching the Cable Holding Brackets



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 equipment cabinet.**

6. **Replace the cabinet stabilizer to its original position.**

4.6 Power Wiring Configurations

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.

4.6.1 For the M4000 Server 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 4-3 Recommended Wiring Configurations for Six M4000 Servers With Two 30A 3-Phase MPS

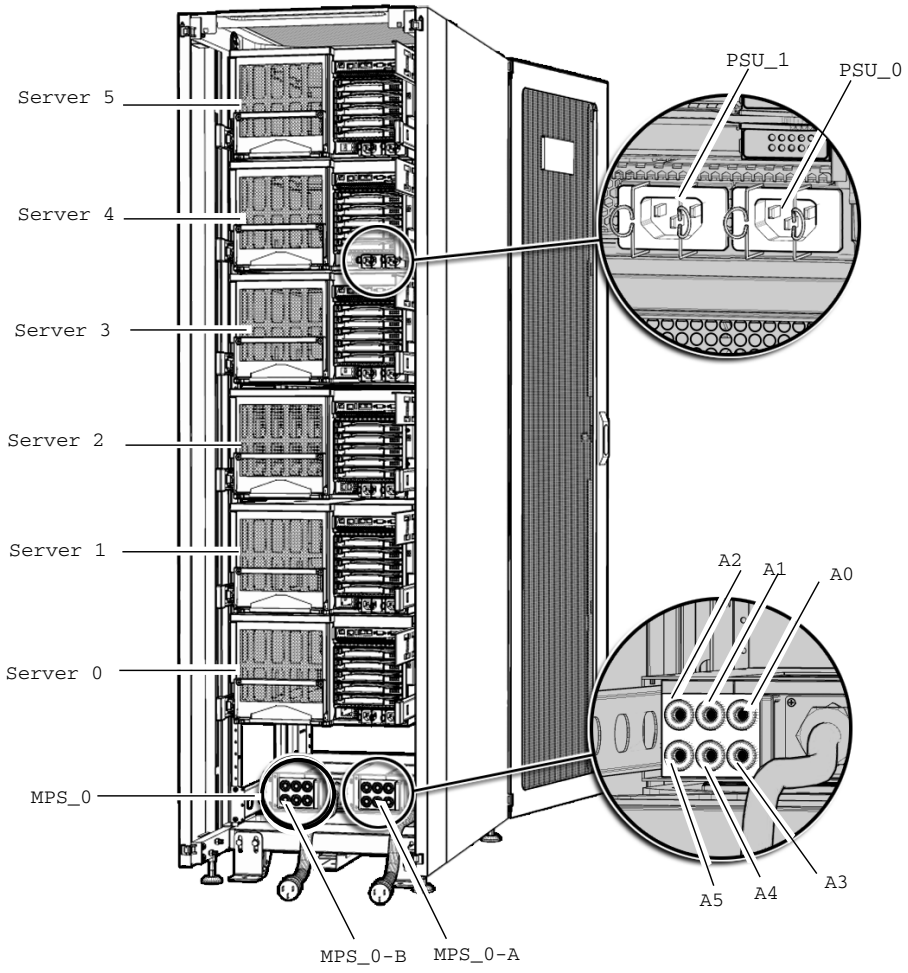
Server	PSU_1	PSU_0
M4000_5	MPS_1-B5	MPS_1-A5
M4000_4	MPS_0-B4	MPS_0-A4
M4000_3	MPS_1-B3	MPS_1-A3

TABLE 4-3 Recommended Wiring Configurations for Six M4000 Servers With Two 30A 3-Phase MPS

Server	PSU_1	PSU_0
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 4-31 Sun Rack 1000 With Six M4000 Servers and One MPS



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

4.6.2 For the M4000 Server in a Sun Rack II

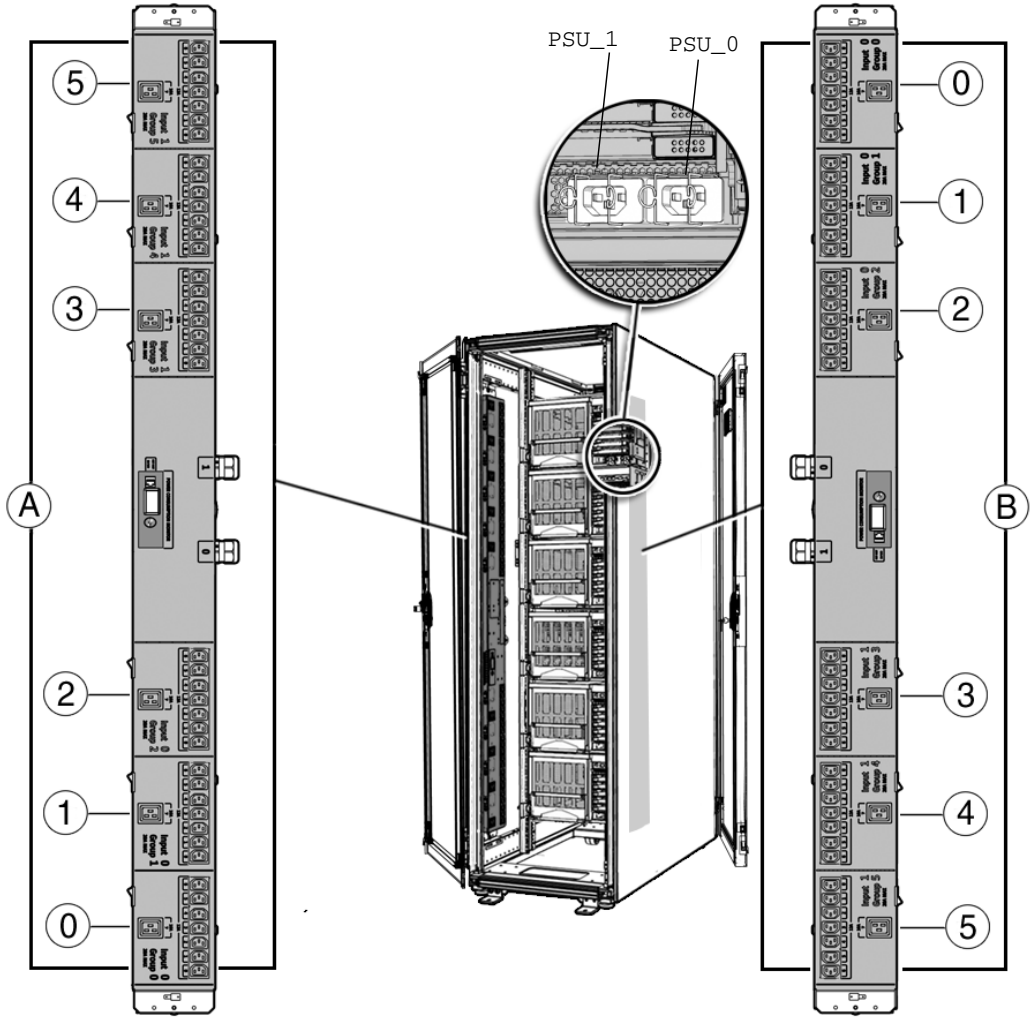
To ensure redundant power sourcing, use the recommended power wiring configurations for the M4000 server in a Sun Rack II.

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 4-32 Sun Rack II With Six Sun SPARC Enterprise M4000 Servers and Two PDUs



4.6.3 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.

4.6.4 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 5

Installing the Sun SPARC Enterprise M5000 Server in an Equipment Cabinet

This chapter describes how to mount M5000 servers in a Sun Rack 1000, Sun Rack 900, and Sun Rack II. It contains the following sections:

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 equipment cabinet.

Up to three 10U 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

TABLE 5-1 M5000 Server External Dimensions

Width	Depth	Height	Weight
444 mm (17.5 in.)	810 mm (31.9 in.)	440 mm (17.3 in.) 10U	125 kg (275 lb)

The M5000 server is designed to be mounted in a standard 19-inch rack with a depth of 1000 mm or more. When mounted in a Sun Rack 900, the cabinet extender option is required to enable the rear door to close. See Section 1.2.1, “Installing the Cabinet Extender (Optional)” on page 1-13.

5.1 M5000 Server Slide Assembly Kit

The servers are mounted in the equipment cabinet using slide assemblies. Items shown in Figure 5-1 are not to scale relative to each other.

FIGURE 5-1 M5000 Server Slide Assembly Kit Contents

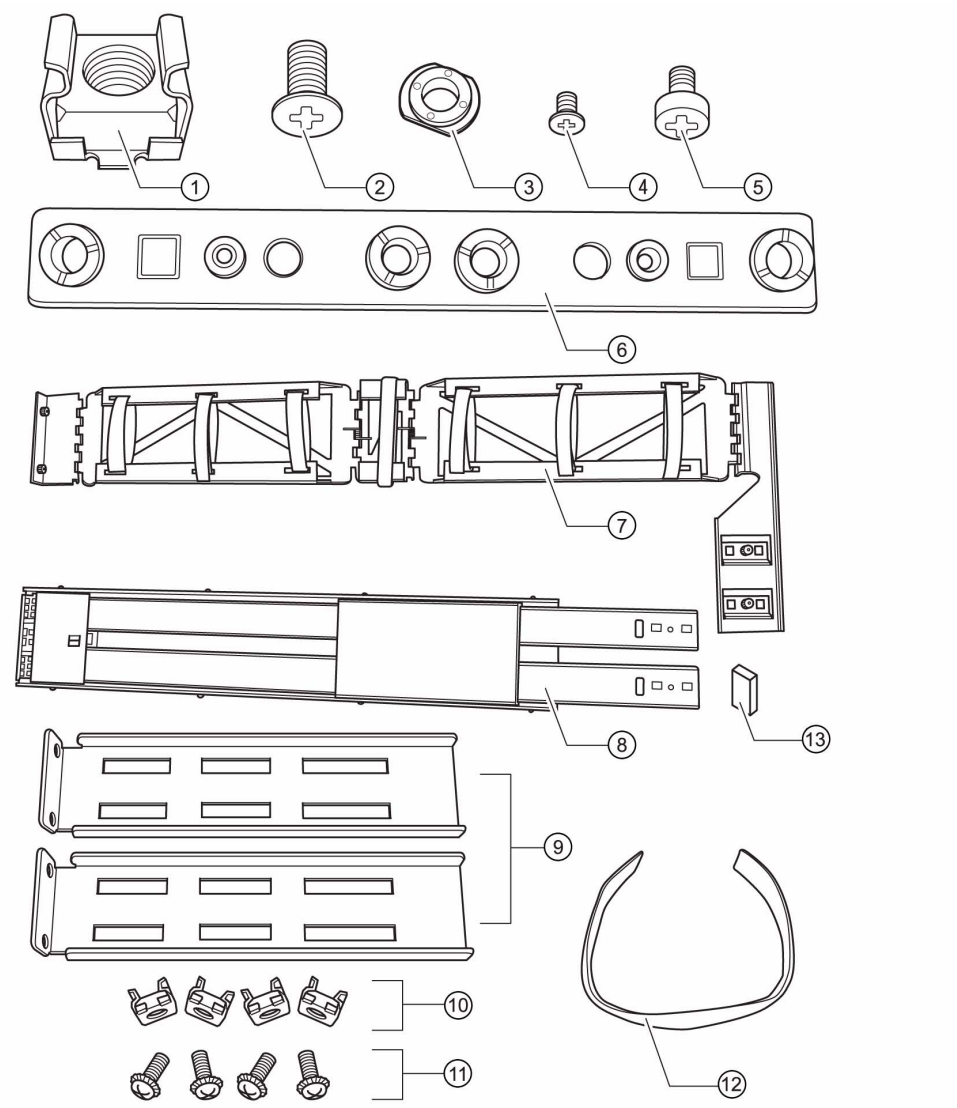


Figure Legend

Item number	Item	Quantity
1, 10	M5 cage nut	8
2	M5 flathead screw	16
3	washer	16
4	M2.5 flathead screw	8
5	M4 screw	6
6	bracket	4
7	Cable management arm (CMA)	1
8	slide rail	2
9	cable bracket	2
11	M5 screw	8
12	hook and loop straps	14
13	end caps	4

Note – Depending upon which equipment cabinet the M5000 server is mounted in, not all parts in the assembly kit will be used.

FIGURE 5-2 M5000 Shipping Bracket Kit Contents

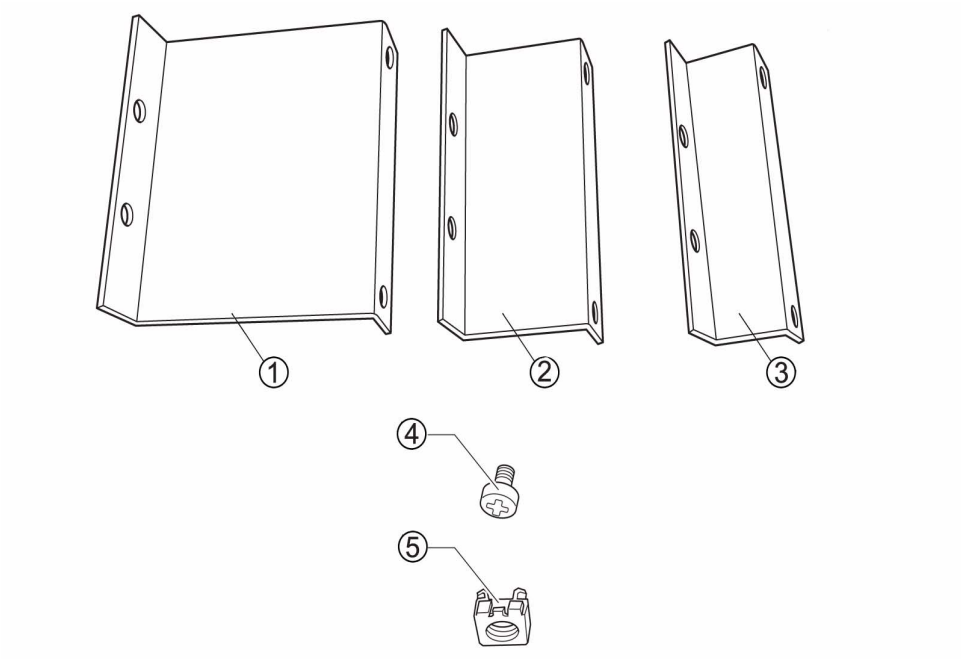


Figure Legend

1	Large Bracket (2)
2	Medium Bracket (2)
3	Small Bracket (2)
4	M5 flathead screw (6)
5	M5 cage nut (2)

For the Sun Rack 1000/900 with the cabinet extender kit, the two large brackets are used to anchor the M5000 server to the equipment cabinet 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 equipment cabinets.

5.2 Installing the M5000 Server

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

5.2.1 For the Sun Rack 1000/900

1. **Determine the mounting holes in the equipment cabinet by using the mounting hole matrix in the following table.**

TABLE 5-2 Sun Rack 1000/900 Mounting Hole Matrix

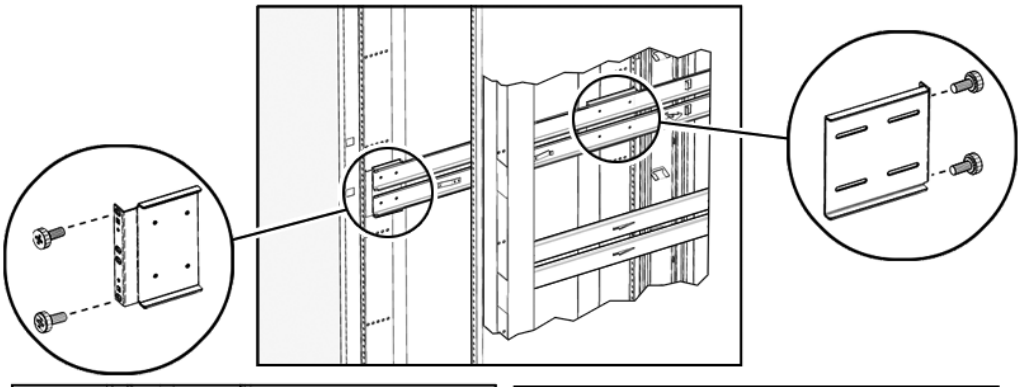
M5000 server location in the cabinet	Hole number
2	75 and 82
1	42 and 49
0	12 and 19

Note – The M5000 server slide rail kit includes a slide rail template which can also be used to determine hole locations for the slide rails in the cabinet.

2. **Install slide assemblies in the equipment cabinet, using four (4) M6 screws to secure the slide assemblies in the selected mounting holes (**FIGURE 5-3**).**

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 5-3 Mounting a Slide Assembly to the Equipment Cabinet



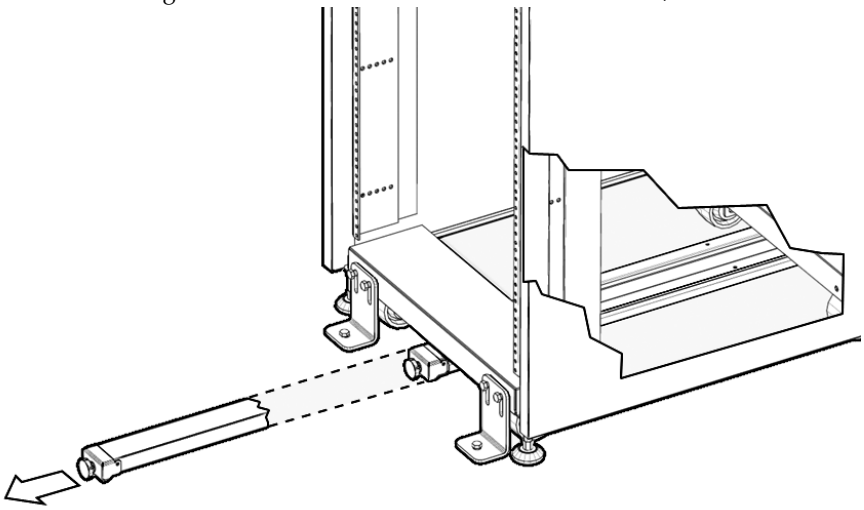
3. **Extend the cabinet stabilizer.**

Caution – The cabinet stabilizer must be extended or the equipment cabinet will topple when the server is installed on the extended slide rails.

a. **Pull the end of the anti-tilt bar out to its fully extended position (**FIGURE 5-4**).**

b. **Rotate the foot 90 degrees and adjust the height of the foot so that it rests on the floor.**

FIGURE 5-4 Extending the Cabinet Stabilizer on the Sun Rack 1000/900



4. **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 equipment cabinet. The handles will not support the weight of the server.

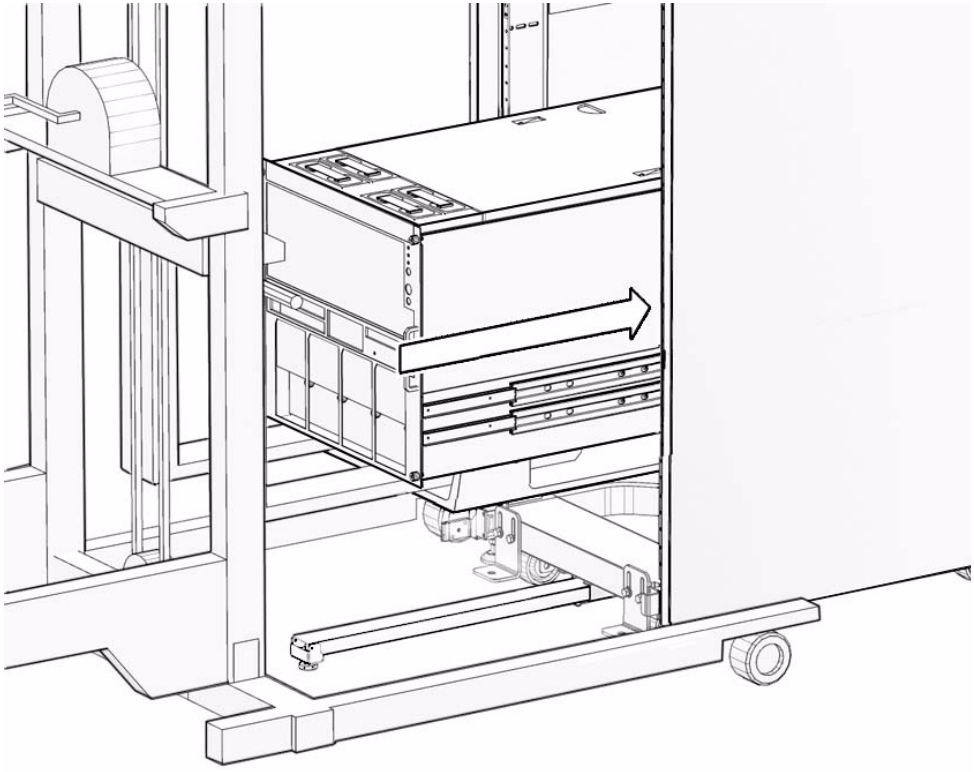
5. **Place the forks of the computer equipment lift inside the plinth on the underside of the system.**

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

6. **Raise the server and gently push it towards the equipment cabinet until the holes and pins align.**

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

FIGURE 5-5 Mating the Server on Slide Rails



7. Secure the server to the slide rails.

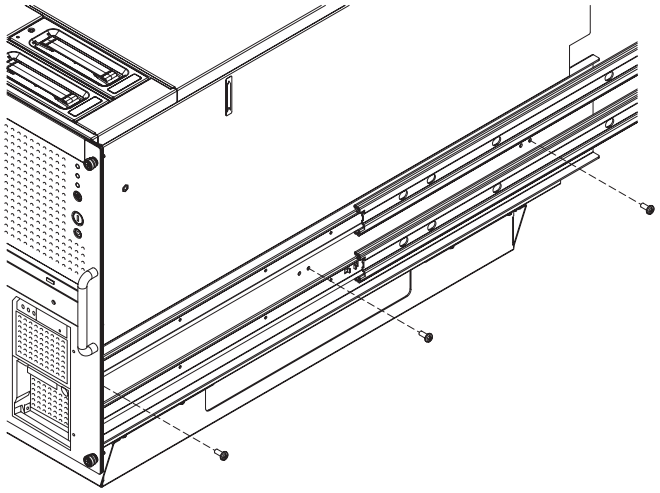
Note – Labels are located on the side of each server to help identify the mounting points.

---

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

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

FIGURE 5-6 Securing the Slide Rails



8. Remove the plinth from the bottom of the server ().

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 cabinet stabilizer must be extended or the equipment cabinet will topple when the lifting device is withdrawn

FIGURE 5-7 Example of Removing the Plinth

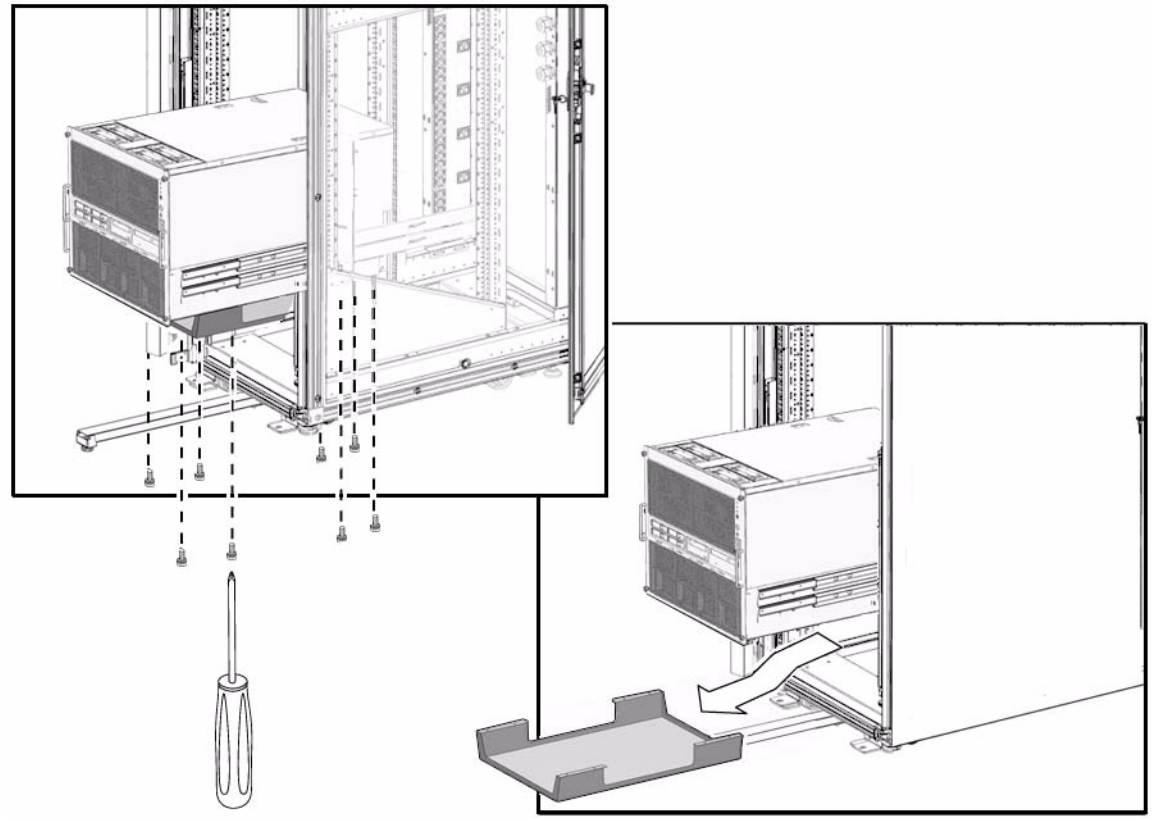
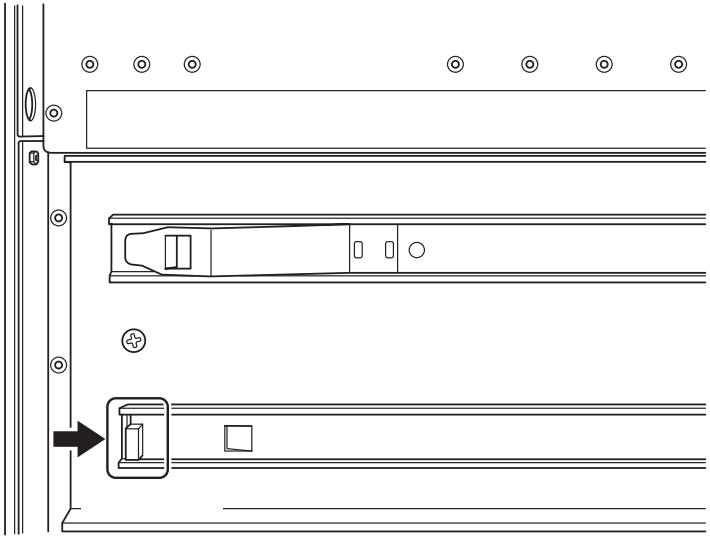


FIGURE 5-8 Unlocking the M5000 Slide Rail



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 cabinet.**

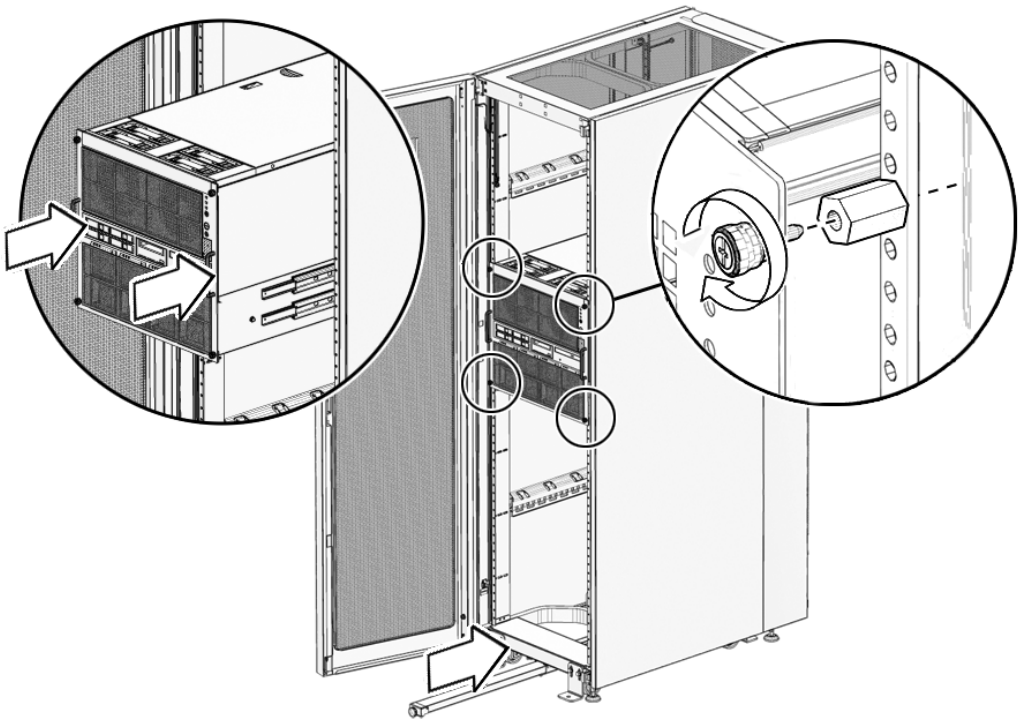
11. **If you are securing the CMA at this time, proceed to** Section 5.3, "Installing the Cable Management Arm for the M5000 Server" on page 5-24**.**

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

12. **Secure the spacers at the front of the equipment cabinet. (**FIGURE 5-9**)**

    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 5-9 Spacers Aligned With Captive Screw



5.2.2 For the Sun Rack II

1. **Attach four (4) M6 cage nuts (which shipped with the cabinet) to the front rack columns: center hole on the 1U and the center hole on the 10U (**FIGURE 5-10**).**

   Each rack unit is marked off on the rack column. There are three holes per one rack unit, identified as upper hole, center hole, and lower hole.

FIGURE 5-10 Cage Nut Hole Locations for the M5000 Server

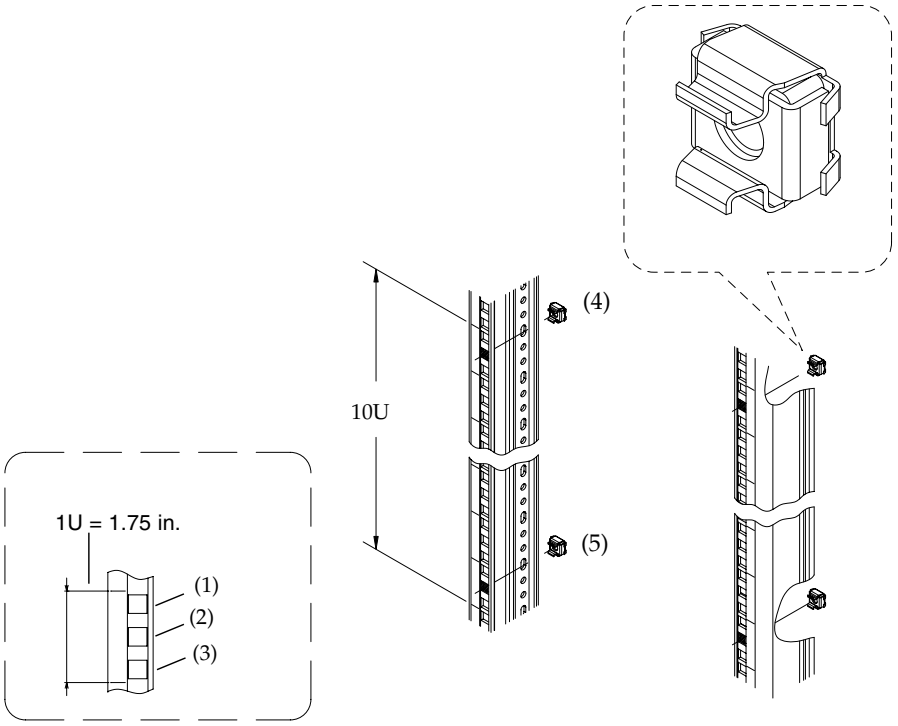


Figure Legend

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

2. **Using the cage nut insertion tool, secure the cage nuts on the rack columns with the M6 cage nuts that shipped with the cabinet.**

   The cage nut insertion tool is found in the equipment cabinet ship kit.

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

   a. **Hook the bottom lip of the nut in the square rail hole (Number 1 in FIGURE 5-11).**

   b. **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 5-11).**

   c. **Using the insertion tool, pull the cage nut through the hole until the top lip snaps into place (Number 3 in FIGURE 5-11).**

FIGURE 5-11 Inserting Cage Nuts in Square Holes Using the Insertion Tool

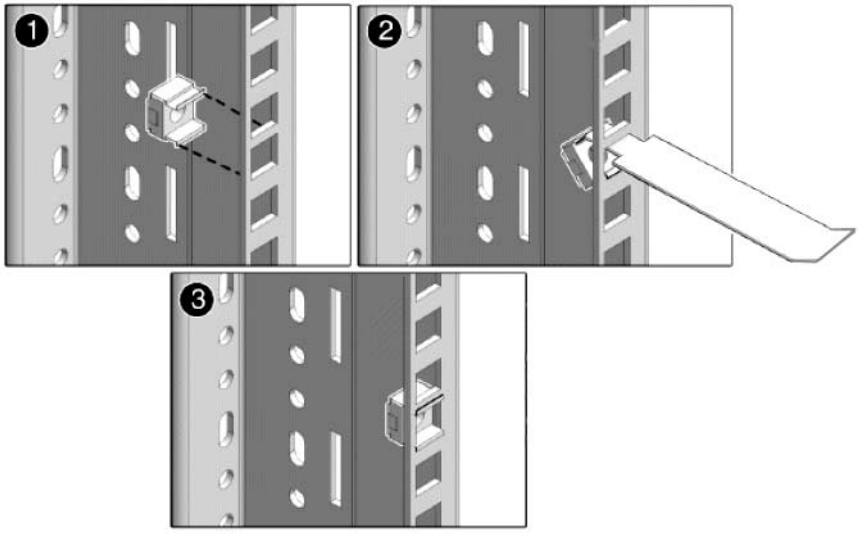
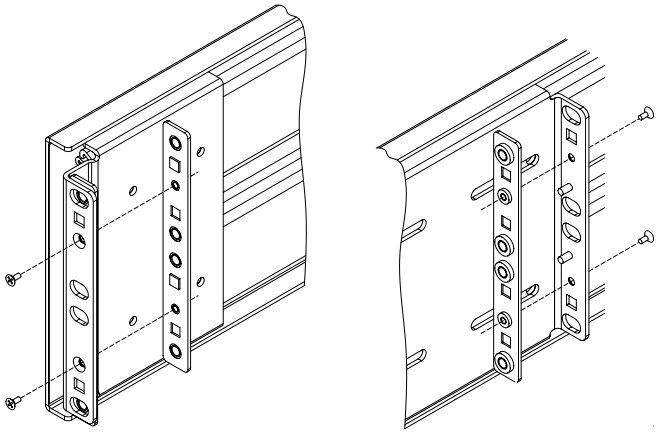


FIGURE 5-12 Attaching Nut Bars on the M5000 Slide Rail



3. **Attach four nut bars to the corresponding locations on the ends of the slide rails (front right, front left, rear right, and rear left) with two (2) M2.5 flathead screws at each location.**

4. **Determine the location of the 10U server in the cabinet.**

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

5. **Install slide assemblies in the equipment cabinet using two (2) M5 flathead screws (at each of four locations) and washers (two at each of the four locations) to secure the slide assemblies in the selected mounting holes (**FIGURE 5-13**).**

   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 5-13 Installing Slide Rails in the Cabinet

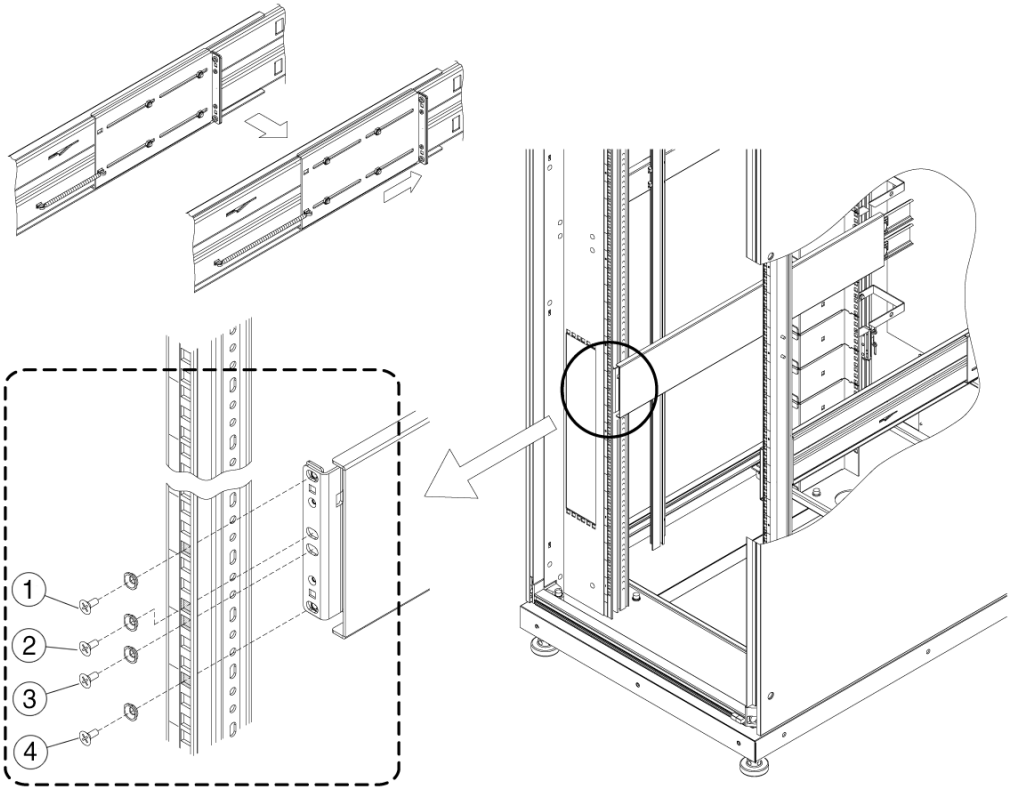


Figure Legend

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

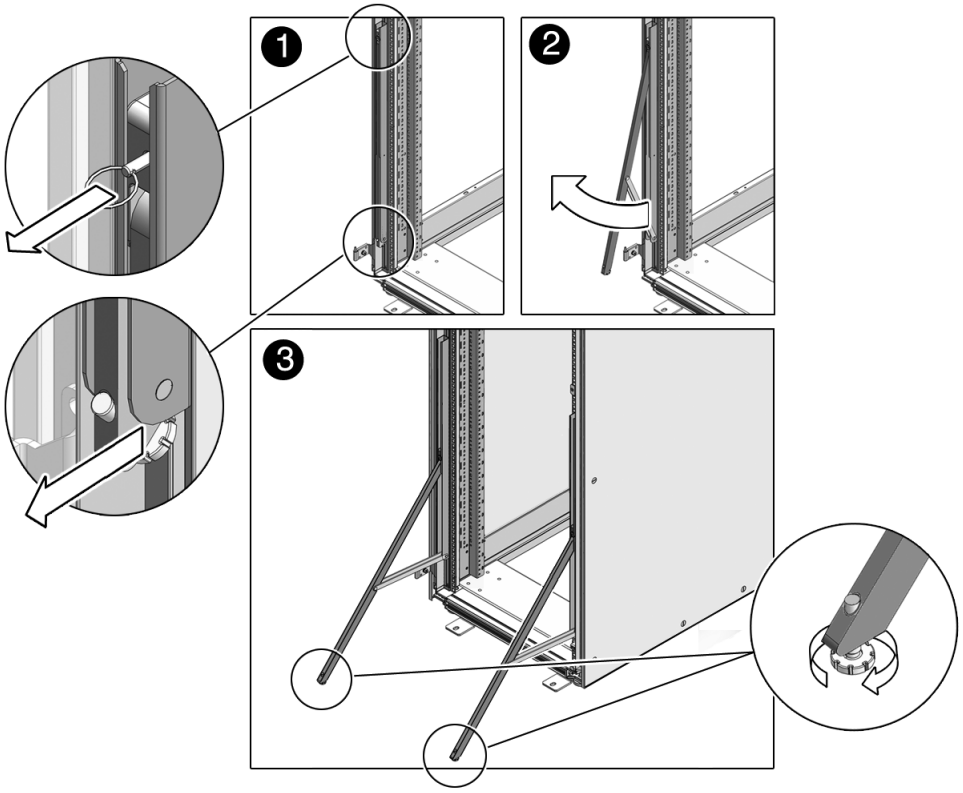
6. **Extend the anti-tilt legs (**FIGURE 5-14**).**

   a. **Pull on the top release pin to unlock the anti-tilt leg from the cabinet frame (Number 1 in** FIGURE 5-14**).**

   b. **Pull the bottom foot of the anti-tilt leg away from the cabinet until it extends fully (Number 2 in** FIGURE 5-14**).**

   c. **The leg support will lock in place.**

FIGURE 5-14 Extending the Anti-Tilt Legs



d. Rotate the leg's rubber foot clockwise until it touches the floor (Number 3 in FIGURE 5-14).

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

e. Repeat Step a through Step d to extend the other anti-tilt leg.

7. 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 equipment cabinet. The handles will not support the weight of the server.

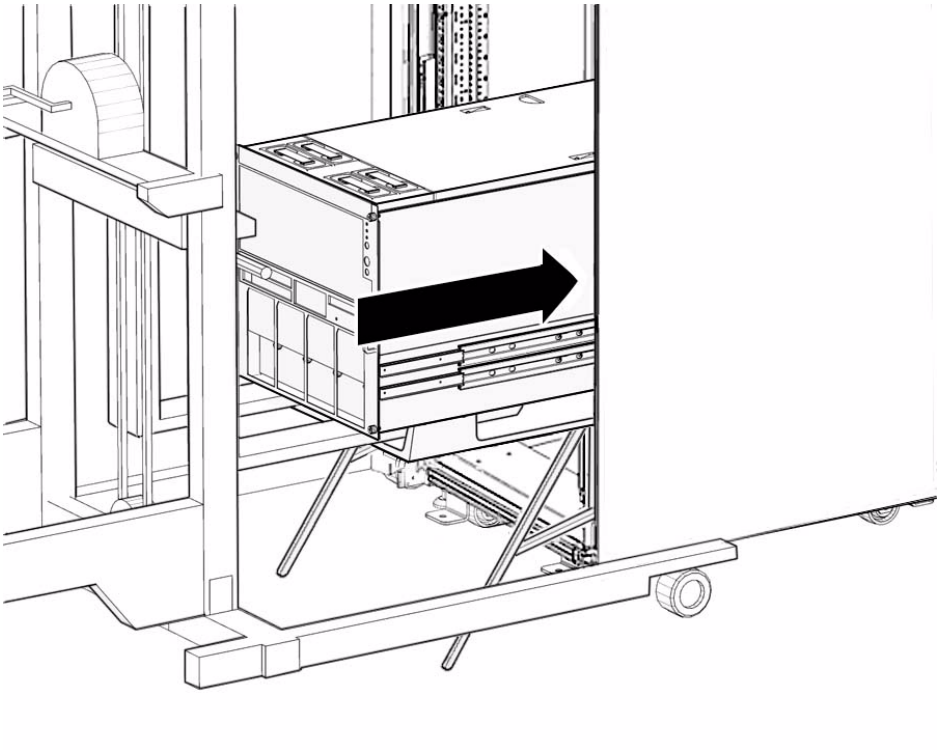
a. Place the forks of the computer equipment lift inside the plinth on the underside of the system.

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

b. Raise the server and gently push it towards the equipment cabinet until the holes and pins align.

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

FIGURE 5-15 Mating the Server on Slide Rails



8. Secure the server to the slide rails.

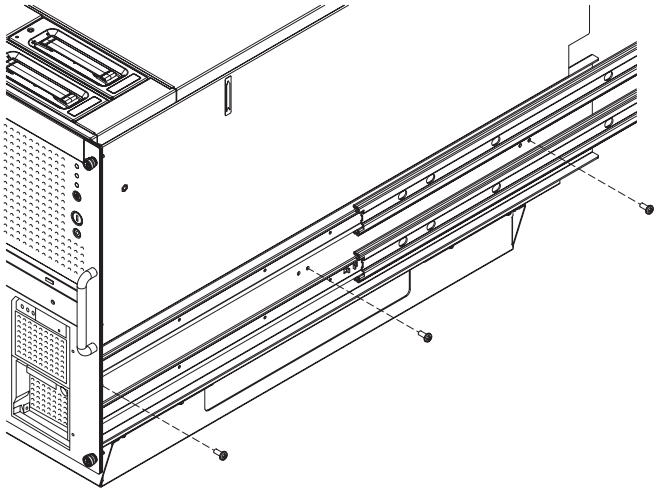
Note – Labels are located on the side of each server to help identify the mounting points.

---

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

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

FIGURE 5-16 Securing the Slide Rails



9. Remove the plinth from the bottom of the server (FIGURE 5-17).

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.

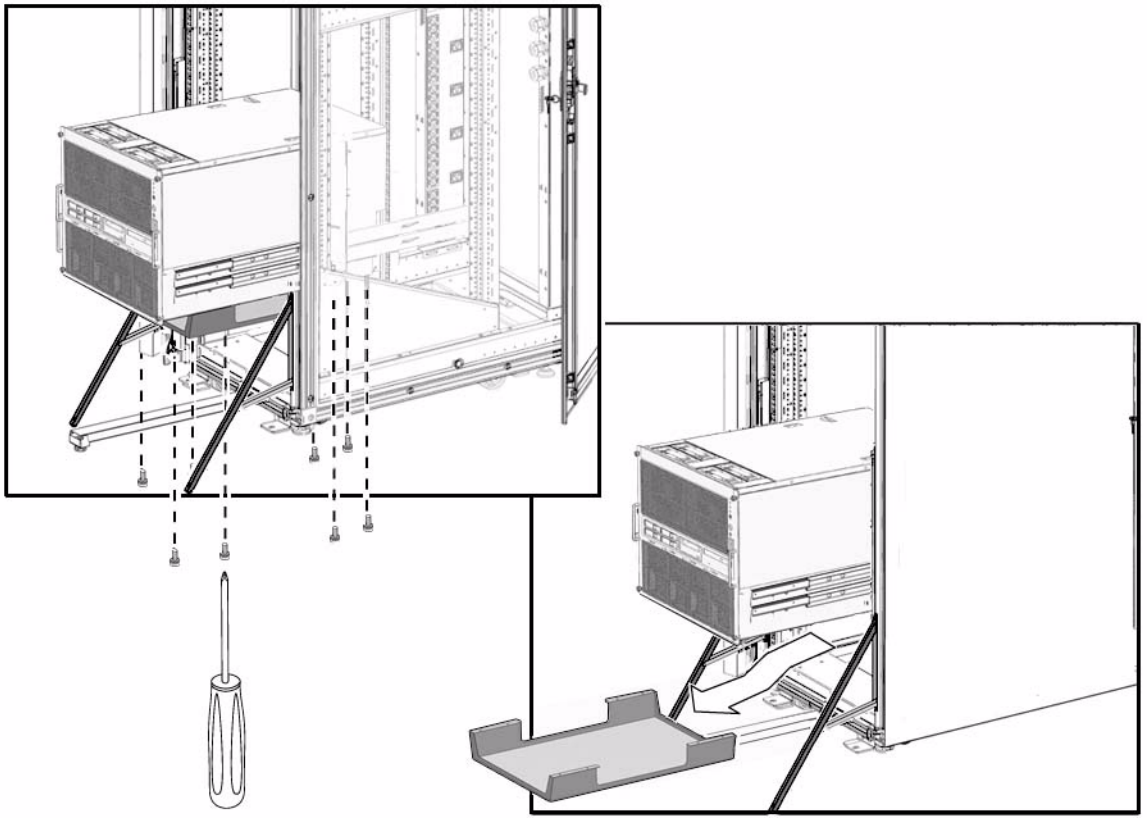
c. Slide the plinth toward the rear of the server less than an inch until the plinth is released from the screws.

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 cabinet stabilizer must be extended or the equipment cabinet will topple when the lifting device is withdrawn.

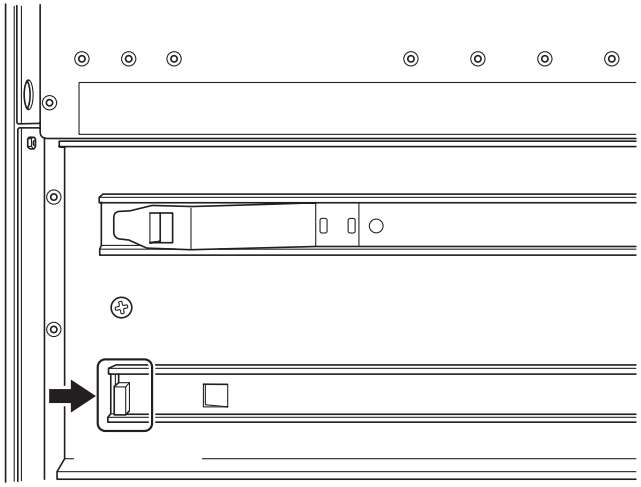
FIGURE 5-17 Example of Removing the Plinth



10. **Withdraw the computer lifting device.**

11. **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.**

FIGURE 5-18 Unlocking the M5000 Slide Rail



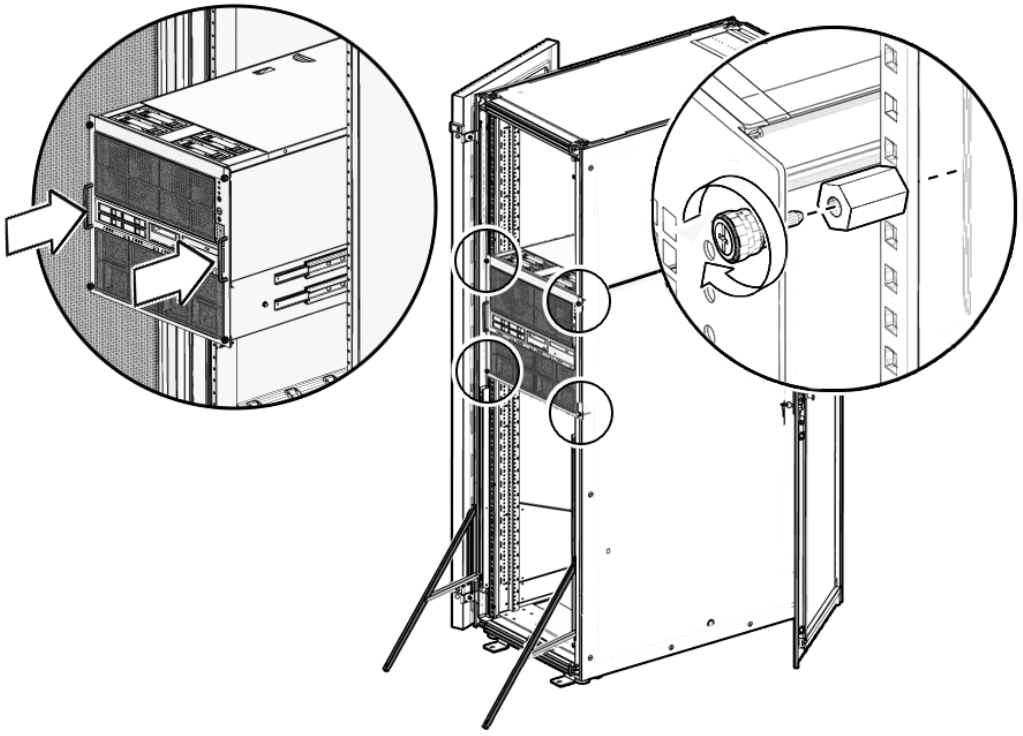
12. **If you are securing the CMA at this time, proceed to** Section 5.3, "Installing the Cable Management Arm for the M5000 Server" on page 5-24**.**

    If the CMA is not to be installed at this time, proceed to Step 13.

13. **Secure the spacers at the front of the equipment cabinet (**FIGURE 5-19**).**

    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 5-19 Spacers Aligned With Captive Screws



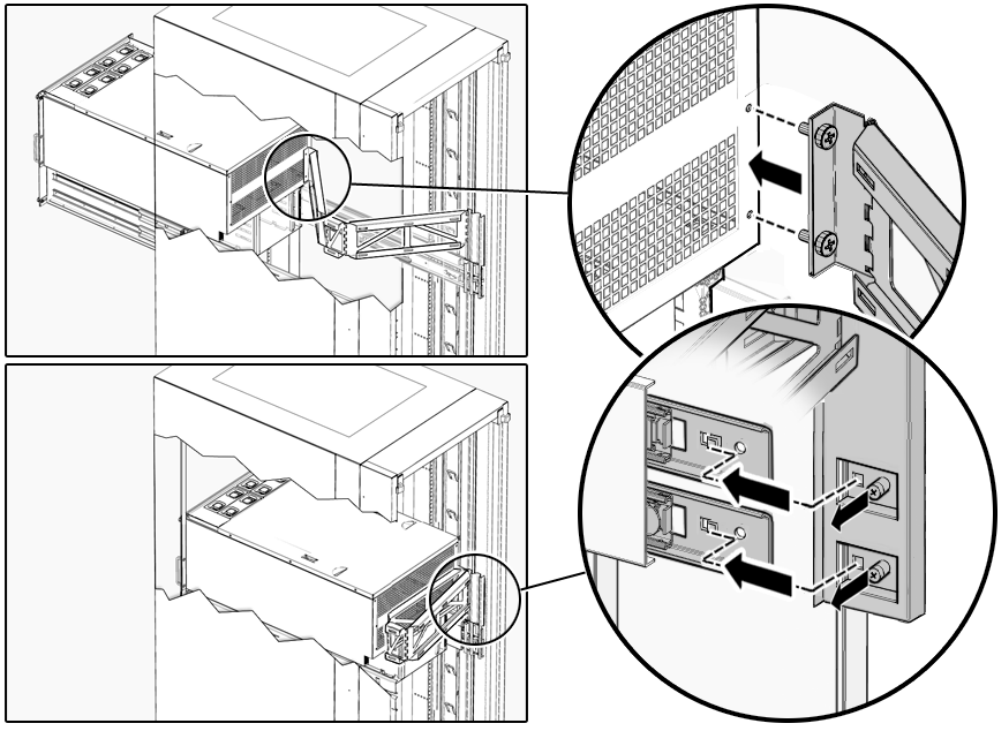
5.3 Installing the Cable Management Arm for the M5000 Server

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 5-20**).**
2. **Secure the large end of the CMA to the rail on the same side of the equipment cabinet (**FIGURE 5-20).

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

FIGURE 5-20 Installing the Cable Management Arm



5.4 Attaching End Caps to the Rails

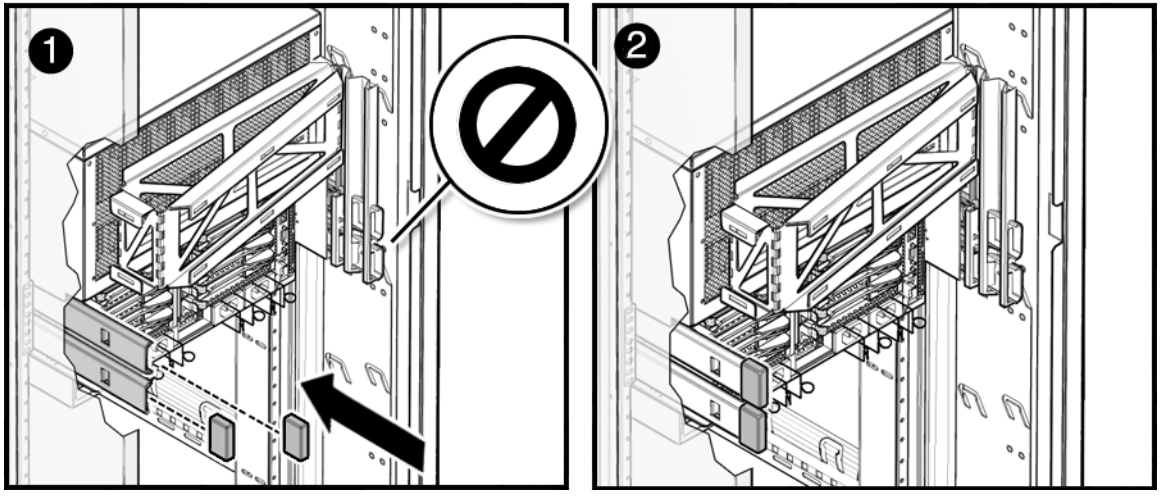
After securing the CMA to the M5000 server, attach the provided end caps to the rails.

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 5-21).

Note – If the CMA is not used, attach all end caps to the rails of the server. The M5000 server uses four end caps.

FIGURE 5-21 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.**

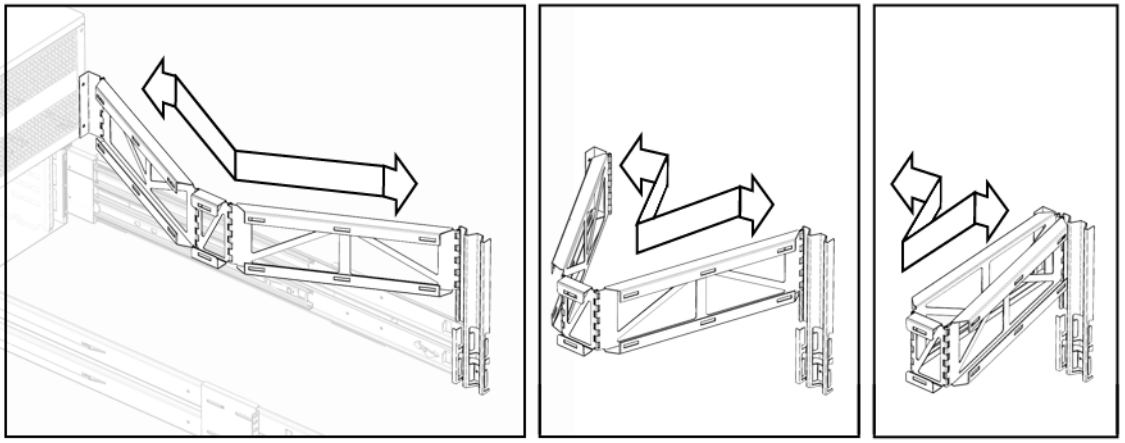
   The power cables and infiniband cables should hang loosely in a service loop behind the server or the CMA might not be able to fully retract.

Note – If additional attachment points are required to route the cables, install the optional bracket kit. See Section 5.5, "Installing the Cable Holding Brackets (Optional)" on page 5-27.

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

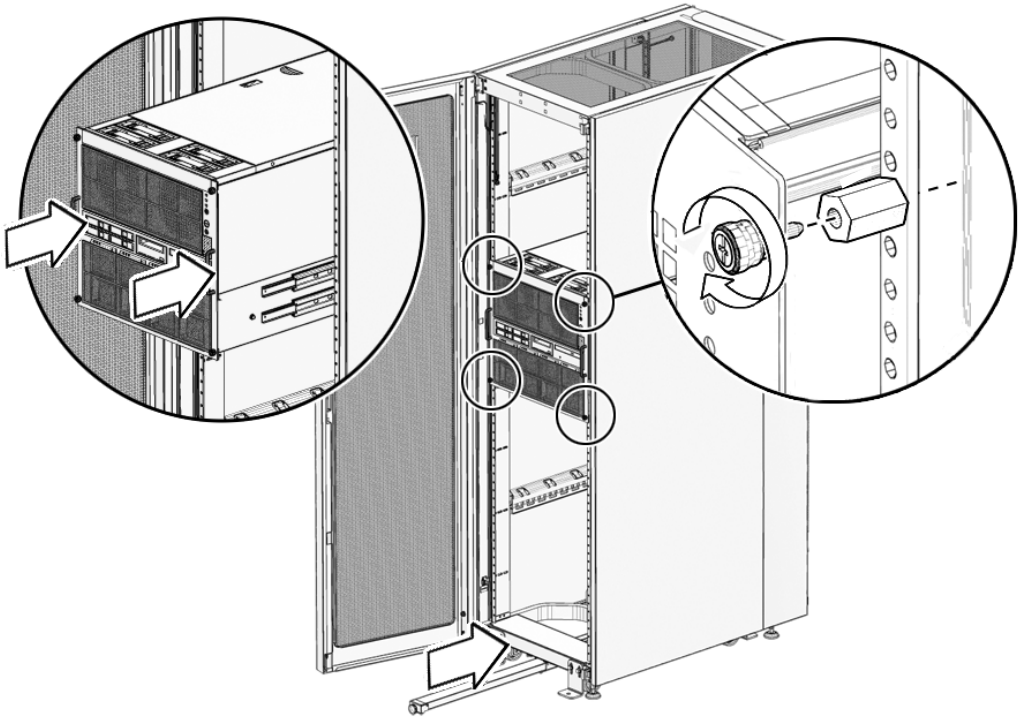
   FIGURE 5-22 shows how the CMA extends and retracts.

FIGURE 5-22 CMA Extended and Retracted on the M5000 Server



5. **Slide the server into the equipment cabinet.**
6. **Attach four M6 cage nuts on the rack columns to align with the captive screws on the front corners of the server.**
7. **Tighten the four (4) captive screws at the front of the server to secure the server in the equipment cabinet.**

FIGURE 5-23 Securing the Server in the Equipment Cabinet



8. **Replace the anti-tilt legs to its original position.**

5.5 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)
- Hook and loop straps (14)

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

1. **Extend the cabinet stabilizer or anti-tilt legs on the equipment cabinet.**
2. **Slide the server out of the cabinet several inches for access to the rear of the equipment cabinet.**
3. **Attach the cable holding brackets on the rack column.**

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.

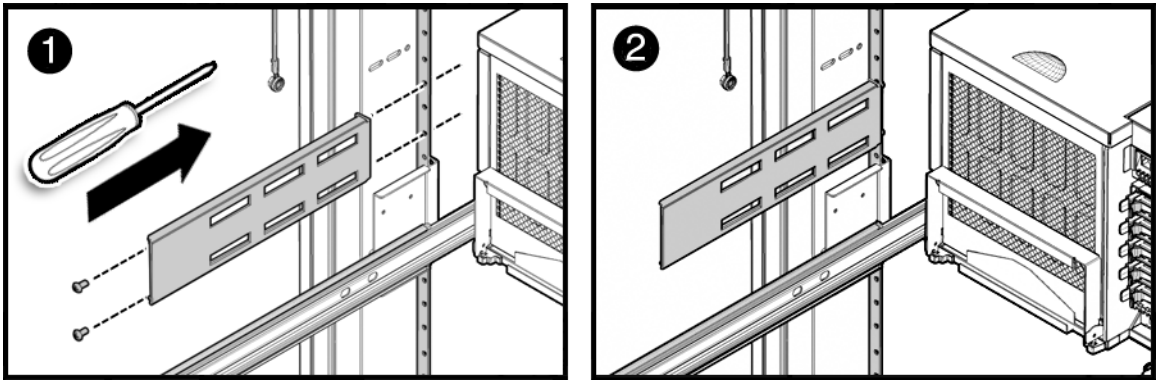
For the Sun Rack 1000/900

a. **Position the cage nuts behind the rack column and insert the two (2) screws through the bracket and rack column (**FIGURE 5-24**).**

b. **Twist the cage nuts onto the screws from behind the rack ears.**

The flat edges of the cage nuts should be aligned with the rack column to prevent the cage nuts from scraping against the server.

FIGURE 5-24 Installing the Extra Brackets in a Sun Rack 1000/900

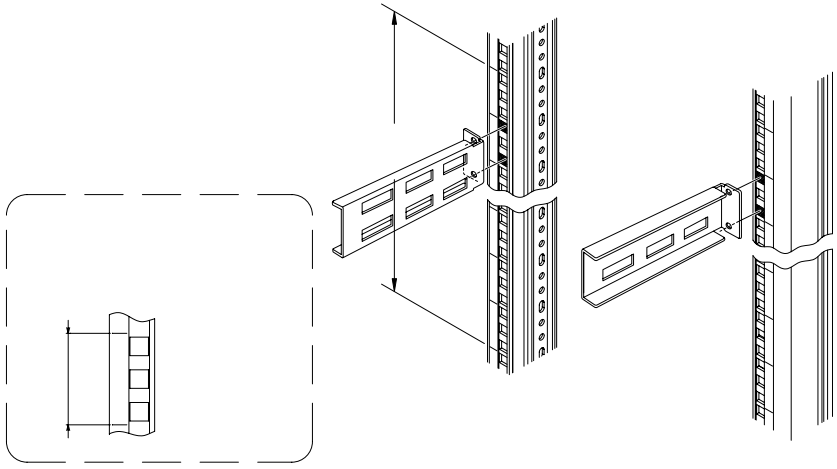


For the Sun Rack II

a. **Secure the cable holding brackets in the upper and lower hole on the 9U location of the rack column (**FIGURE 5-25**).**

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

FIGURE 5-25 Attaching the Cable Holding Brackets



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 equipment cabinet.**

6. **Replace the cabinet stabilizer or anti-tilt legs to its original position.**

5.6 Power Wiring Configurations

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.

5.6.1 For the M5000 Server 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 equipment cabinet reads from bottom to top and right to left.

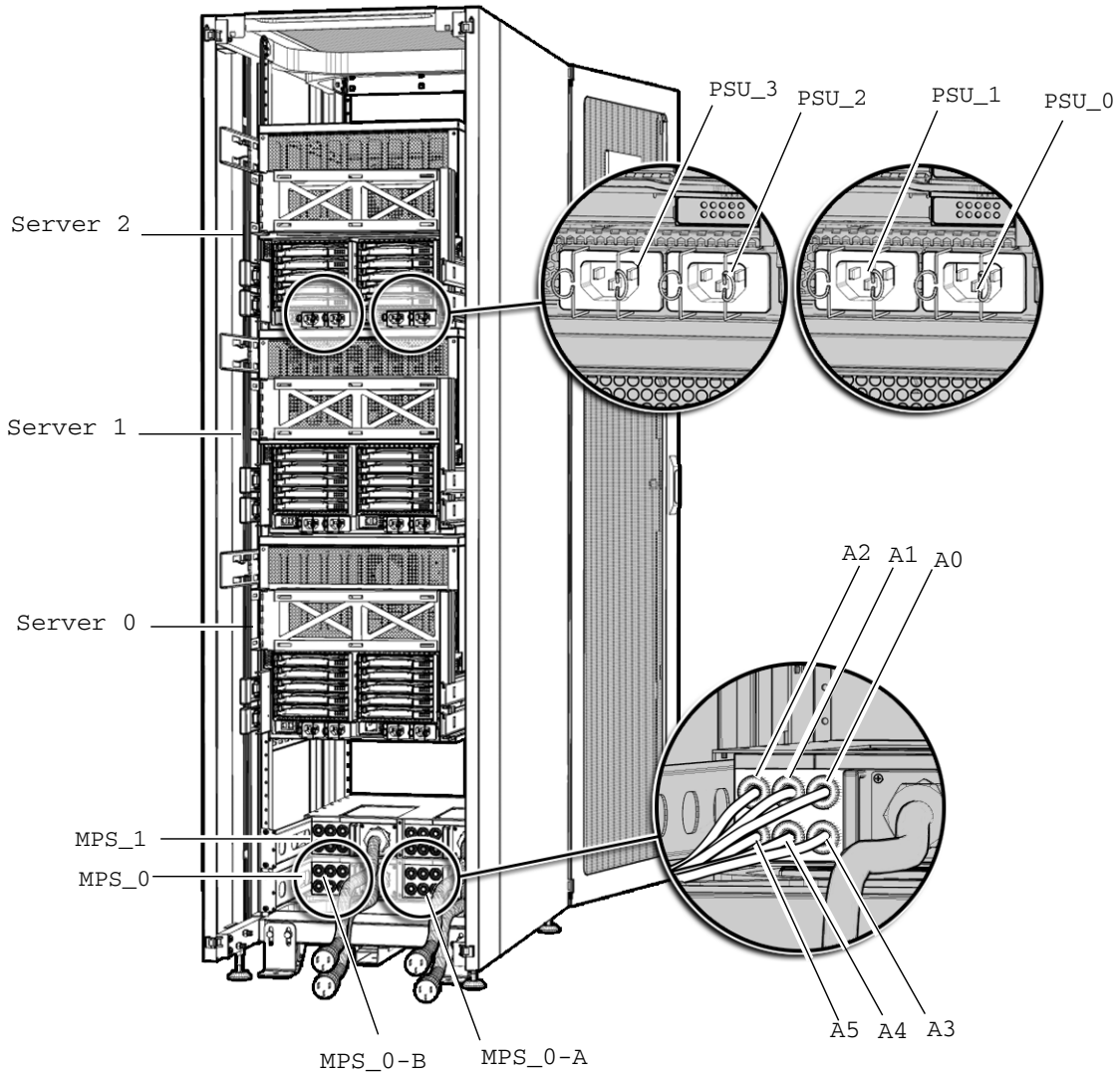
TABLE 5-3 Recommended Wiring Configurations for Three M5000 Servers With One 60A 3-phase MPS

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 5-4 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 5-26 Sun Rack 1000 With Three M5000 Servers and Two MPS



5.6.2 For the M5000 Server 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.

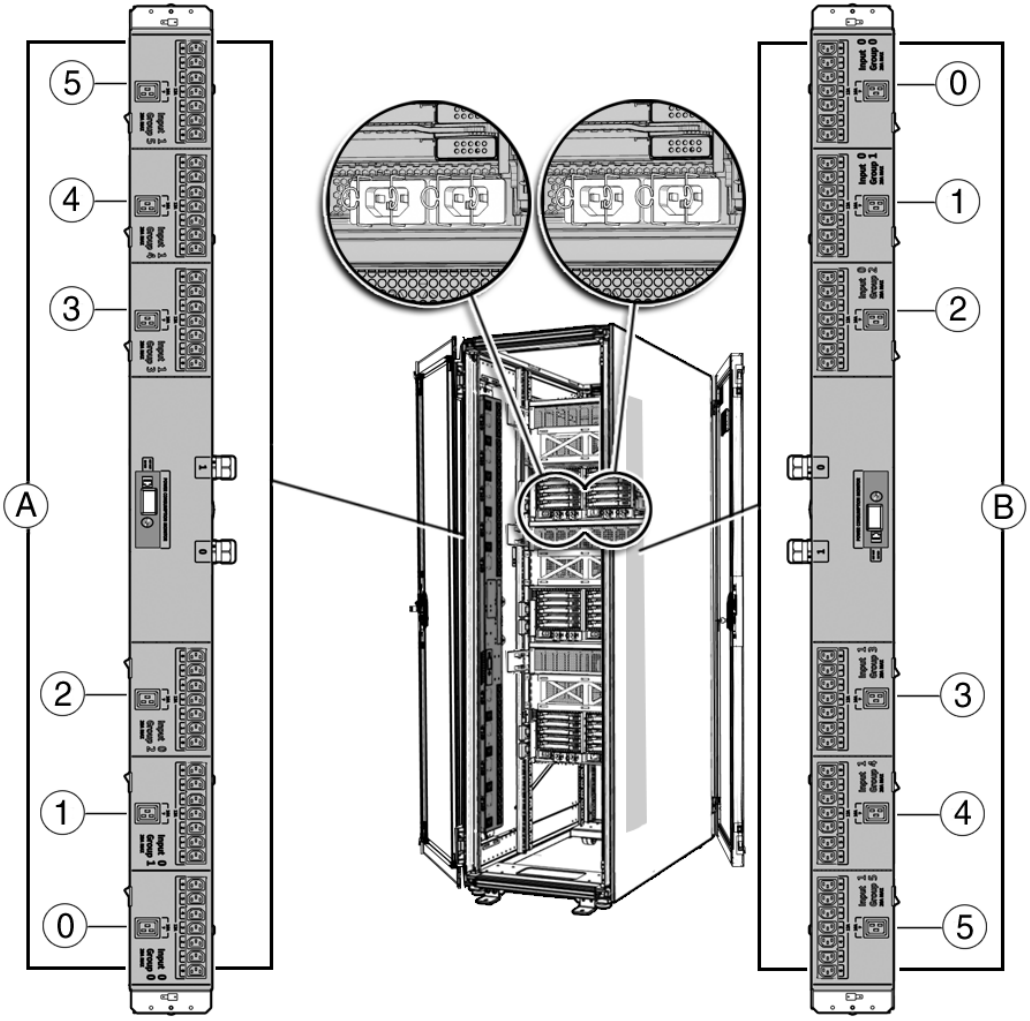
For more information on PDUs in a Run Rack II, refer to the *Sun Rack II User's Guide*.

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 5-5 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 5-27 Sun Rack II With Three M5000 Servers and Two PDUs



5.6.3 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.

5.6.4 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.