

Sun Oracle Database Machine Site Planning Guide



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Preface

This site planning guide describes the physical, environmental, and electrical specification requirements of Sun Oracle Database Machine rack systems. Use this document to prepare to turn a Sun Oracle Database Machine sales order into a successfully installed system at the customer site. Site checklists are provided.

Due to the amount of time required to plan and properly prepare a site for installation of this system, you must fulfill all of the requirements outlined in this manual before your equipment arrives.

How This Document Is Organized

This manual contains the following chapters.

TABLE P-1 Sun Oracle Database Machine Site Planning Guide Chapters

Chapter	Describes:
Chapter 1	Before Installation Begins describes what you are expected to know about the Sun Oracle Database Machine before planning server installation.
Chapter 2	Physical Site Requirements includes physical plant and access issues that affect preparing a site before installing a Sun Oracle Database Machine.
Chapter 3	Environmental and Electrical Specifications describes environmental and electrical power factors that affect preparing a site before installing a Sun Oracle Database Machine.
Chapter 4	Installation Planning contains an overview for installing the Sun Oracle Database Machine.
Chapter 5	Site Planning Checklist contains a site checklist for the Sun Oracle Database Machine.

Documents Online

The following table shows where to find documents online.

TABLE P-2 Sun Oracle Database Machine Online Documents

Sun Function	URL	Description
Documentation	http://docs.sun.com	Navigate to the product page, download PDF and view HTML documents.
Support	http://www.sun.com/support/	Obtain technical support and download patches.
Training	http://www.sun.com/training/	Learn about courses.
Feedback	http://www.sun.com/hwdocs/feedback/	Submit your comments.

Related Documentation

The following table lists the available documents.

TABLE P-3 Sun Oracle Database Machine Related Documentation

Application	Title	Part Number
Rack site planning	<i>Sun Oracle Database Machine Site Planning Guide</i>	E17431
Rack installation	<i>Sun Oracle Database Machine Installation Guide</i>	E17432
Rack service	<i>Sun Oracle Database Machine Service Manual</i>	E17433
Rack upgrade	<i>Sun Oracle Database Machine Upgrade Guide</i>	E17434
Inter-rack cabling	<i>Sun Oracle Database Machine Multi-Rack Cabling Guide</i>	E17435

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Sun Oracle Database Machine Site Planning Guide, part number E17431-01

Before Installation Begins

Ensure that you read the complete *Sun Oracle Database Machine Site Planning Guide*, and fill in the checklists provided in this guide, before beginning data center site installation. Before the installation begins, verify the space, access route, power, grounding, and air flow requirements of the Sun Oracle Database Machine.

This chapter contains the following sections:

- [Section 1.1, “About the Sun Oracle Database Machine” on page 1-1](#)
- [Section 1.2, “Sun Oracle Database Machine Components” on page 1-2](#)
- [Section 1.3, “Multiple-Rack Configurations” on page 1-9](#)
- [Section 1.4, “Rack Spares and Accessories Kits” on page 1-11](#)

1.1 About the Sun Oracle Database Machine

The Sun Oracle Database Machine provides an optimal solution for all database workloads, ranging from scan-intensive data warehouse applications to highly concurrent OLTP applications. With its combination of smart Oracle Exadata Storage Server Software, complete and intelligent Oracle Database software, and the latest industry standard hardware components from Sun, the Database Machine delivers extreme performance in a highly available, highly secure environment.

With Oracle's unique clustering and workload management capabilities, the Database Machine is also well suited for consolidating multiple databases onto a single grid. Delivered as a complete preoptimized and preconfigured package of software, servers, and storage, the Sun Oracle Database Machine is simple and fast to implement and ready to tackle your large-scale business applications.

1.2 Sun Oracle Database Machine Components

This section contains the following topics:

- [Section 1.2.1, “Determining the System Type” on page 1-2](#)
- [Section 1.2.2, “Rack Configurations” on page 1-8](#)

Plan for the requirements in [TABLE 5-3](#) regarding Sun Oracle Database Machine components.

1.2.1 Determining the System Type

The Sun Oracle Database Machine Full Rack, the Sun Oracle Database Machine Half Rack and the Sun Oracle Database Machine Quarter Rack use the same Sun Rack II 42U cabinet. Refer to the following sections and illustrations to determine if the Sun Oracle Database Machine is one of the following:

- [Sun Oracle Database Machine Full Rack](#)
- [Sun Oracle Database Machine Half Rack](#)
- [Sun Oracle Database Machine Quarter Rack](#)

1.2.1.1 Sun Oracle Database Machine Full Rack

The Sun Oracle Database Machine Full Rack consists of the following major components:

- 8 Sun Fire X4170 Oracle Database Servers
- 14 Exadata Storage Servers
- 3 Sun Datacenter 36-port Managed QDR InfiniBand switches
- 1 48-port Ethernet switch
- Keyboard, Video, Mouse (KVM) hardware
- 2 Redundant 15 kVA PDUs
(Single Phase or Three Phase, High Voltage or Low Voltage)

[FIGURE 1-1](#) shows a Sun Oracle Database Machine Full Rack.

FIGURE 1-1 Sun Oracle Database Machine Full Rack



1.2.1.2 Sun Oracle Database Machine Half Rack

The Sun Oracle Database Machine Half Rack consists of the same 42U cabinet and similar components as the Sun Oracle Database Machine Full Rack, but the upper components are replaced by filler panels:

- 4 Sun Fire X4170 Oracle Database Servers
- 7 Exadata Storage Servers
- 2 Sun Datacenter 36-port Managed QDR InfiniBand switches
- 1 48-port Ethernet switch
- Keyboard, Video, Mouse (KVM) hardware
- 2 Redundant 15 kVA PDUs
(Single Phase or Three Phase, High Voltage or Low Voltage)

[FIGURE 1-2](#) shows a Sun Oracle Database Machine Half Rack.

FIGURE 1-2 Sun Oracle Database Machine Half Rack



1.2.1.3 Sun Oracle Database Machine Quarter Rack

The Sun Oracle Database Machine Quarter Rack consists of the same 42U cabinet and similar components as the Sun Oracle Database Machine Half Rack, but more components are replaced by filler panels:

- 2 Sun Fire X4170 Oracle Database Servers
- 3 Exadata Storage Servers
- 2 Sun Datacenter 36-port Managed QDR InfiniBand switches
- 1 48-port Ethernet switch
- Keyboard, Video, Mouse (KVM) hardware
- 2 Redundant 15 kVA PDUs
(Single Phase or Three Phase, High Voltage or Low Voltage)

[FIGURE 1-3](#) shows a Sun Oracle Database Machine Quarter Rack.

FIGURE 1-3 Sun Oracle Database Machine Quarter Rack



1.2.2 Rack Configurations

[TABLE 1-1](#) lists the configurations for the Sun Oracle Database Machine Full Rack, Half Rack, and Quarter Rack systems. U1 is the bottom of the rack and U42 is the top.

TABLE 1-1 Sun Oracle Database Machine 42U Rack Components

Component	Full Rack	Half Rack	Quarter Rack
1U Sun Fire™ X4170 Oracle Database Server	8 total 4 each U16-19 4 each U25-28	4 U16-U19	2 U16-U17
2U Exadata Storage Servers	14 total 7 each U2-15 7 each U29-42	7 U2-15	3 U2-U7
1U Sun Datacenter 36-port Managed QDR InfiniBand switch: Sun Datacenter Switch IB-36, Utilizes standard QSFP connectors.	3 U1, U20, U24	2 U20, U24	2 U20, U24
1U Rackmount KVM tray with keyboard, TFT monitor Rackmount 17" LCD SUN USB	1 U23	1 U23	1 U23
1U KMM IP Console switch with Virtual Media 32-port KVM-over-IP Switch, Dual Power	1 U22	1 U22	1 U22
1U 48-port Gigabit Ethernet Switch: A wire-speed, low-latency, layer 2 to 4, fixed-configuration switch for rack-optimized server switching.	1 U21	1 U21	1 U21
Standard rack power and data cabling: factory installed, labeled and integrated into telescopic cable management arms (CMA)			

1.3 Multiple-Rack Configurations

The following items must be considered before installing more than one Sun Oracle Database Machine in a data center:

- Multi-rack cabling requires purchase of a Multi-rack Cabling Service. The Multi-rack Cabling Service allows cabling together of more than one Sun Oracle Database Machine Full Rack only. Sun Oracle Database Machine Half Racks and Quarter Racks are excluded.
- Cabling more than three racks together requires the purchase of additional cables from either Sun or an approved third-party vendor.
- Cabling the Sun Oracle Database Machine together with an existing HP Oracle Database Machine requires purchase of additional cables from a third-party provider and a custom Multi-Rack Cabling Service installation.

Note – This configuration is a custom installation that might require additional installation time and materials. Contact your sales representative to verify additional costs incurred by a custom installation.

Refer to the *Sun Oracle Database Machine Multi-rack Cabling Guide*.

Confirm that the multiple rack requirements in [TABLE 1-2](#) have been addressed.

TABLE 1-2 Multiple Rack Requirements Checklist

Requirements	Yes	No	NA
Do you plan to connect multiple Full Racks together?			
Are there more than 3 Full Racks being cabled together? • If yes, you may have to buy additional cables.			
Are any of the existing racks HP Oracle Racks? • If yes, you must purchase cables. Note - This configuration is not supported under standard installations. This configuration is a custom installation that might require additional installation time and materials. Contact your sales representative to verify additional costs incurred by a custom installation.			
Are the cables routed overhead, or racks not next to each other, or no raised floor. • If yes, you must purchase custom length cables. Note - This configuration is not supported under standard installations. This configuration is a custom installation that might require additional installation time and materials. Contact your sales representative to verify additional costs incurred by a custom installation.			
Is this is a custom cabling service to cover situations not listed above?			
Comments			

1.4 Rack Spares and Accessories Kits

This section contains the following topics:

- [Section 1.4.1, “Full Rack Spares and Accessories Kit” on page 1-11](#)
- [Section 1.4.2, “Half Rack Spares and Accessories Kit” on page 1-11](#)
- [Section 1.4.3, “Quarter Rack Spares and Accessories Kit” on page 1-12](#)

1.4.1 Full Rack Spares and Accessories Kit

[TABLE 1-3](#) lists the Sun Oracle Database Machine Full Rack Spares and Accessories.

TABLE 1-3 Sun Oracle Database Machine Full Rack Spares and Accessories Kit

Item	Quantity
Hard Disks (600 GB 15K RPM SAS or 2 TB 7.2K RPM SATA)	2
96GB Sun Flash Accelerator F20 PCIe Card	2
QSFP QDR 3m InfiniBand Passive Copper Cable	6
QSFP QDR 5m InfiniBand Passive Copper Cable	10
Serial Cable Set for Sun Datacenter 36-port Managed QDR InfiniBand switch	2

1.4.2 Half Rack Spares and Accessories Kit

[TABLE 1-4](#) lists the Sun Oracle Database Machine Half Rack Spares and Accessories.

TABLE 1-4 Sun Oracle Database Machine Half Rack Spares and Accessories Kit

Item	Quantity
Hard Disk (600GB 15K RPM SAS or 2 TB 7.2K RPM SATA)	1
96GB Sun Flash Accelerator F20 PCIe Card	1
QSFP QDR 5m InfiniBand Passive Copper Cable	8
Serial Cable Set for Sun Datacenter 36-port Managed QDR InfiniBand switch	2

1.4.3 Quarter Rack Spares and Accessories Kit

TABLE 1-5 lists the Sun Oracle Database Machine Quarter Rack Spares and Accessories.

TABLE 1-5 Sun Oracle Database Machine Quarter Rack Spares and Accessories Kit

Item	Quantity
Hard Disk (600GB 15K RPM SAS or 2 TB 7.2K RPM SATA)	1
96GB Sun Flash Accelerator F20 PCIe Card	1
QSFP QDR 5m InfiniBand Passive Copper Cable	4
Serial Cable Set for Sun Datacenter 36-port Managed QDR InfiniBand switch	2

Physical Site Requirements

This chapter describes physical plant and access issues that affect preparing a site before installing a Sun Oracle Database Machine rack system.

This chapter contains the following sections:

- [Section 2.1, “Access Route” on page 2-1](#)
- [Section 2.2, “Data Center Room Specifications” on page 2-6](#)

Note – The Sun Oracle Database Machine Basic System does not include a rack and can be installed in any compatible rack in the data center. Refer to the *Sun Oracle Database Machine Basic System Site Planning Guide*.

2.1 Access Route

This section contains the following topics:

- [Section 2.1.1, “Cabinet Dimensions” on page 2-2](#)
- [Section 2.1.2, “Packaging Dimensions” on page 2-4](#)
- [Section 2.1.3, “Access Route Guidelines” on page 2-5](#)

Plan for the requirements in [TABLE 5-4](#) before you move the Sun Oracle Database Machine to its installation destination.

2.1.1 Cabinet Dimensions

TABLE 2-1 lists the Sun Rack II cabinet dimensions.

TABLE 2-1 Sun Rack Dimensions (Without Packaging)

Dimension	Measurement
Height	2000 mm / 78.74 in.
Width	600 mm / 23.62 in.
Depth (front door handle to rear door handle)	1200 mm / 47.24 in.
Depth (doors removed)	1112 mm / 43.78 in.
Weight	
QuarterRack	411.4 kg / 905 lbs.
HalfRack	594.1 kg / 1307 lbs.
Full Rack	963.2 kg / 2119 lbs.
Rack units (RU)	42 RU (1867 mm / 73.5 in.) [U42 at top]
Depth between front and rear RETMA rails (Radio Electronics Television Manufacturers Association)	685.8 mm / 27 in. - Adjustable from 615.8 mm (24.24 in.) to 825.8 mm (32.5 in.)
Caution - Adjusting the RETMA rails can make the rack less stable. If you adjust the RETMA rails, always install the equipment after you place the rack at the installation site. Do not move the rack after installing the equipment.	

FIGURE 2-1 shows the 42 RU rack Sun Oracle Database Machine dimensions.

FIGURE 2-1 Sun Rack Top and Front Dimensions

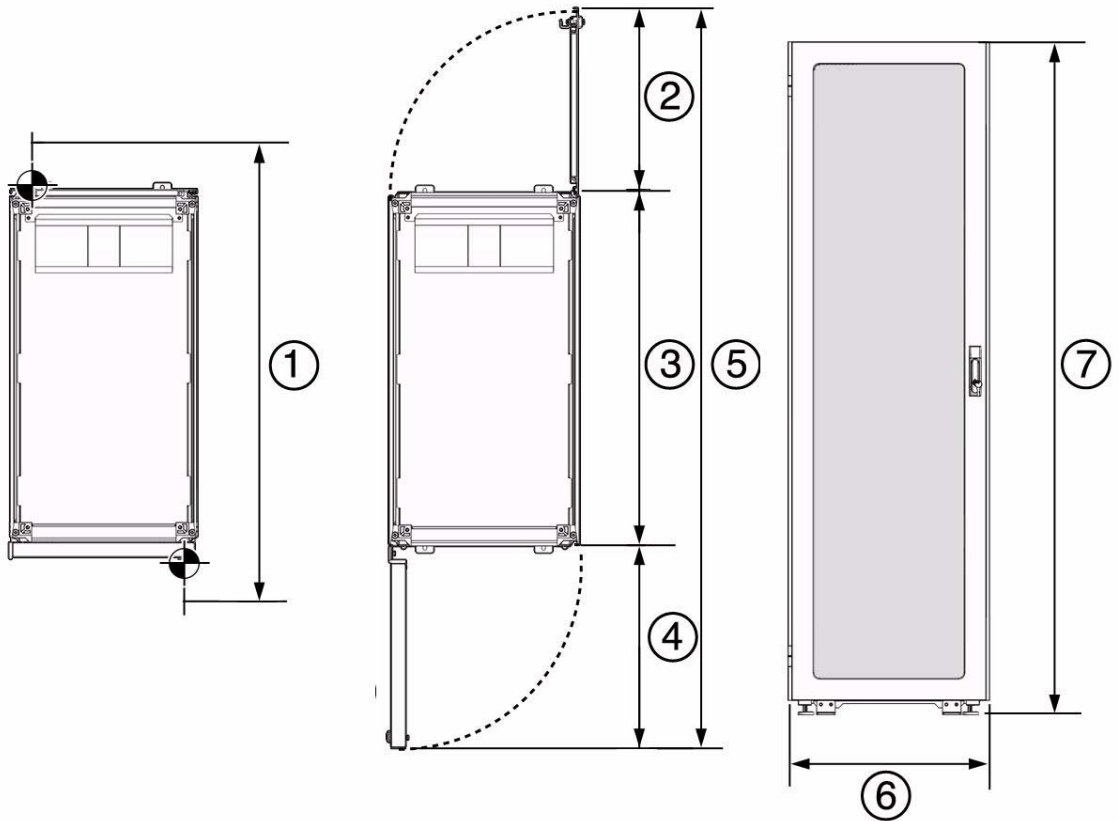


Figure Legend

-
- 1 Depth from front door handle to rear door handle – 1200 mm / 47.24 in.
 - 2 Distance from rear of rack to opened rear door – 590 mm / 23.23 in.
 - 3 Depth with doors removed – 1112 mm / 43.78 in.
 - 4 Distance from front of rack to opened front door – 638 mm / 25.12 in.
 - 5 Depth with doors opened – 2340 mm / 92.1 in.
 - 6 Width – 600 mm / 23.62 in.
 - 7 Height – 1998 mm / 78.66 in.
-

Note – The datum point symbol  denotes the outside edge of the door handles.

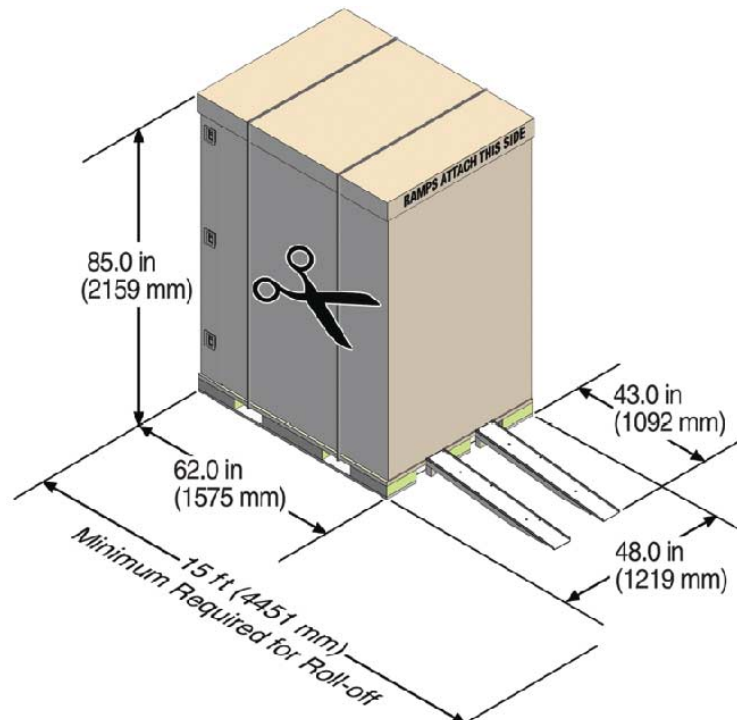
2.1.2 Packaging Dimensions

See [TABLE 2-2](#) for packaging dimensions. [FIGURE 2-2](#) shows the Sun Oracle Database Machine shipping crate.

TABLE 2-2 Sun Oracle Database Machine Packaging Dimensions

Package Dimension	Sun Rack Packaging	
Shipping height	2159 mm	85.0 in.
Shipping width	1219 mm	48.0 in.
Shipping depth	1575 mm	62.0 in.
Shipping weight: Quarter Rack	490 kg	1078 lbs.
Shipping weight: Half Rack	675.5 kg	1486 lbs.
Shipping weight: Full Rack	1046.8 kg	2303 lbs.
Shipping weight of packaging	125 kg	275 lbs.

FIGURE 2-2 Sun Oracle Database Machine in Shipping Crate



2.1.3 Access Route Guidelines

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 rack. If not, you must provide a standard forklift or other means to unload the rack, or request that the rack be shipped in a truck with a lift gate.

Leave the rack in its shipping packaging until it reaches its final destination. Use a conditioned space to remove the packing materials to reduce particles before entering the data center. The entire access route to the installation site should be free of raised patterns that can cause vibration.

The access route must meet the requirements listed in [TABLE 2-3](#).

TABLE 2-3 Access Route Requirements

	With Shipping Pallet	Without Shipping Pallet
Minimum door height	2184 mm / 86 in.	2040 mm / 80.32 in.
Minimum door width	1270 mm / 50 in.	640 mm / 25.19 in.
Minimum elevator depth	1625.6 mm / 64 in.	1240 mm / 48.82 in.
Maximum incline	6°	6°
Minimum elevator, pallet jack, and floor loading capacity (maximum weight per rack)	1088 kg / 2394 lbs. maximum weight of Full Rack with full capacity. Caution - Verify weight capacities of elevators, floor, and jack against the weight of shipping equipment before transporting rack.	

2.2 Data Center Room Specifications

This section provides information about the physical characteristics of the Sun Oracle Database Machine, including dimensions, space needs, cable sizes, and limitations.

This section contains the following topics:

- [Section 2.2.1, “System Location” on page 2-6](#)
- [Section 2.2.2, “Maintenance Access Requirements” on page 2-10](#)
- [Section 2.2.3, “Cabinet Stabilization” on page 2-10](#)

Plan for the requirements in [TABLE 5-5](#) regarding Sun Oracle Database Machine specifications.

2.2.1 System Location

The following items must be considered when determining the Sun Oracle Database Machine location in the data center:

- [Section 2.2.1.1, “Floor Cutouts for Cables” on page 2-6](#)
- [Section 2.2.1.2, “Leveling Feet and Caster Dimensions” on page 2-9](#)
- [Section 2.2.1.3, “Ceiling Height” on page 2-10](#)

2.2.1.1 Floor Cutouts for Cables

If you are going to route data or PDU power cords down through the bottom of the rack, you need to cut out a hole in your installation site’s floor. Cut out a rectangular hole below the rear portion of the rack, safely between the two rear casters and behind the rear RETMA rails. [FIGURE 2-3](#) shows the location and dimensions of the floor cutout.



Caution – Avoid creating a hole where the rack’s casters or leveling feet brackets will be. See [“Leveling Feet and Caster Dimensions” on page 2-9](#) for the location of these parts.

FIGURE 2-3 Bottom View of Rack Showing Mounting Hole and Floor Cutout Dimensions

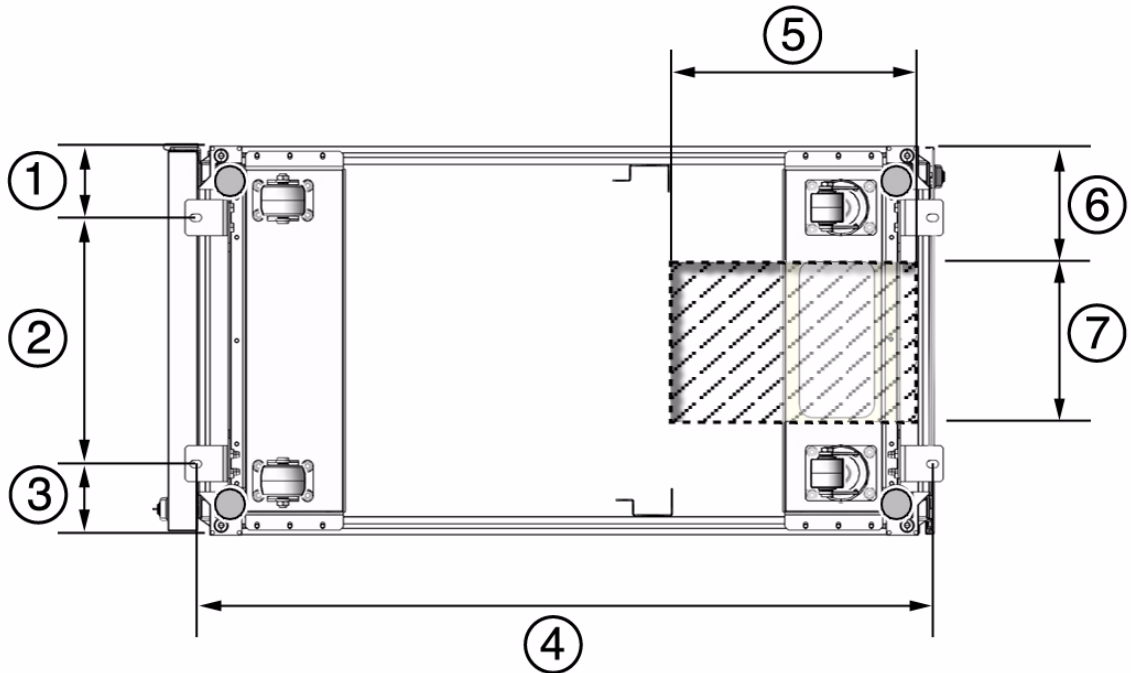


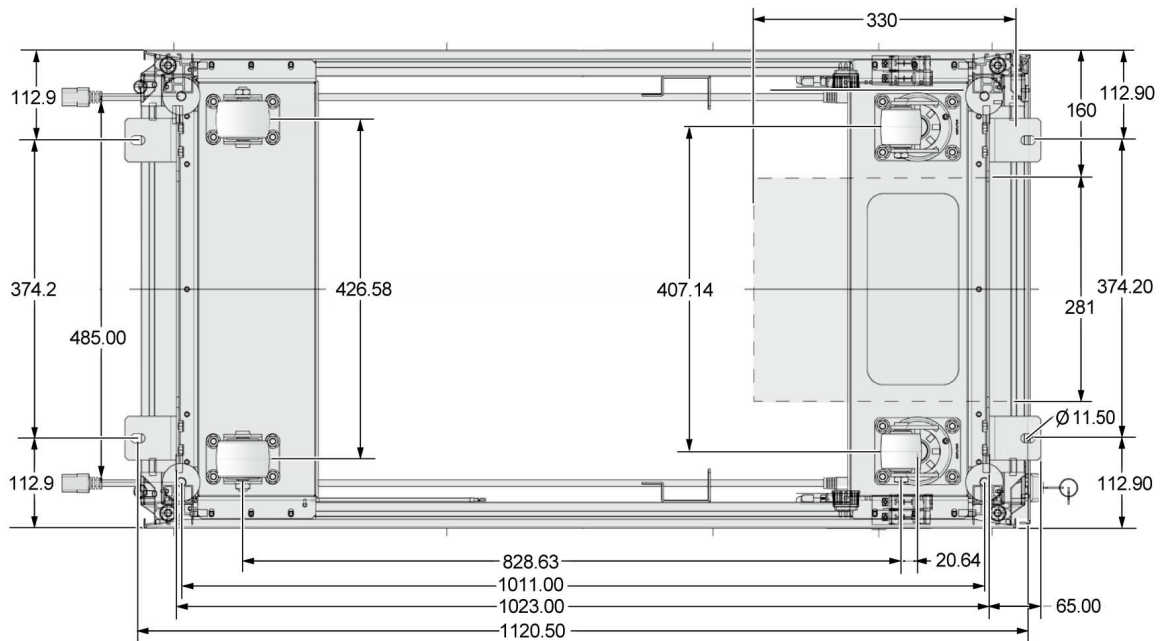
Figure Legend

-
- | | |
|---|---|
| 1 | Distance from mounting bracket to the edge of the rack – 113 mm / 4.45 in. |
| 2 | Width between the centers of the mounting hole slots – 374 mm / 14.72 in. |
| 3 | Distance between mounting bracket to the edge of the rack – 113 mm / 4.45 in. |
| 4 | Distance between the centers of the front and rear mounting hole slots – 1120.5 mm / 44.1 in. |
| 5 | Depth of cable-routing floor cutout – 330 mm / 13 in. |
| 6 | Distance between the floor cutout and the edge of the rack – 160 mm / 6.3 in. |
| 7 | Width of cable-routing floor cutout – 281.0 mm / 11 in. |
-

Note – The distance between the front edge of the front mounting bracket to the rear edge of the rear mounting bracket is 1154.0 mm (43.43 in.).

FIGURE 2-4 shows the base position to measure.

FIGURE 2-4 Base Position To Measure (Bottom View of Rack)



2.2.1.2 Leveling Feet and Caster Dimensions

FIGURE 2-5 shows the dimensions of the rack leveling feet and casters.

Note – In the figure, the datum point symbols  denote the centers of the casters.

FIGURE 2-5 Bottom View of Sun Rack Showing Feet and Caster Dimensions

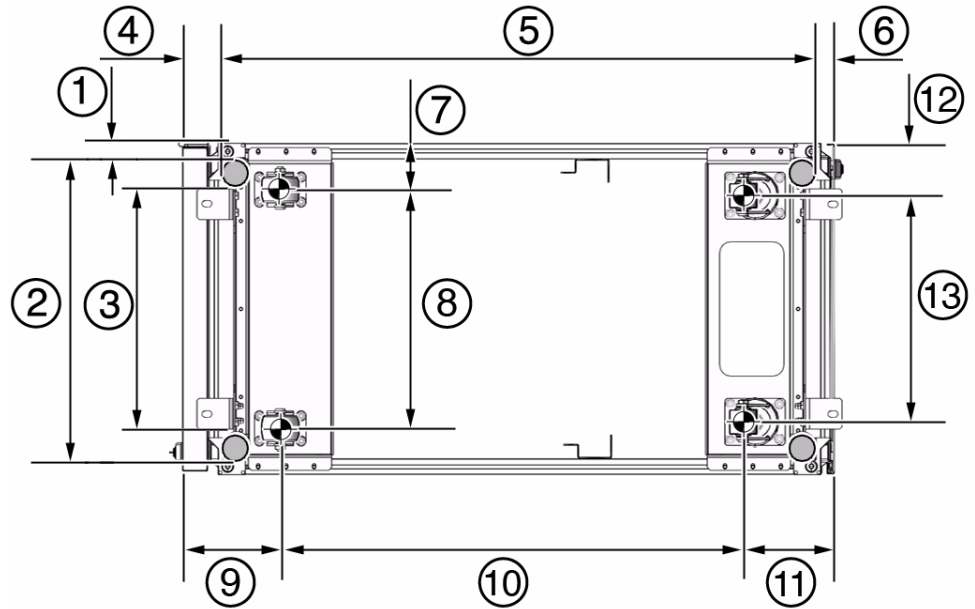


Figure Legend

- | | |
|----|--|
| 1 | Distance from the edge of the mounting feet to the side of the rack – 33.75 mm / 1.33 in. |
| 2 | Width from the outside edges of the leveling feet – 532.5 mm / 20.96 in. |
| 3 | Width from the inside edges of the leveling feet – 429 mm / 16.89 in. |
| 4 | Distance from the edge of the feet to the front rack surface – 73.75 mm / 2.90 in. |
| 5 | Depth of the outside edges of the leveling feet – 1058.5 mm / 41.67 in. |
| 6 | Distance from the edge of the leveling feet to the rear rack surface – 32.5 mm / 1.28 in. |
| 7 | Distance from the center of front casters to the side of the rack – 86.7 mm / 3.41 in. |
| 8 | Width between the center of the front casters – 426.6 mm / 16.80 in. |
| 9 | Distance from the center of the rear casters to the rear of the rack – 173.7 mm / 6.83 in. |
| 10 | Depth between the front and rear casters – 828.6 mm / 32.62 in. |
| 11 | Distance between the rear casters and the rear of the rack – 162.4 mm / 6.39 in. |
| 12 | Distance from the center of rear casters to the side of the rack – 96.4 mm / 3.80 in. |
| 13 | Width between the center of the rear casters – 407.2 mm / 16.03 in. |

2.2.1.3 Ceiling Height

The suggested minimum ceiling height for the Sun Oracle Database Machine cabinet is 2914mm or 2.9m (9.6ft), measured from the true floor or a raised floor, whichever is higher. This height includes an additional 914 mm (36 inches) suggested for top clearance.

The space above the cabinet and its surroundings must not restrict the movement of:

- The cooling air between the air conditioner and the bottom of the cabinet.
- The hot air coming out of the top of the cabinet.

2.2.2 Maintenance Access Requirements

Before starting to assemble a Sun Oracle Database Machine installation, secure a service area (maintenance area) that is large enough for each rack (cabinet) plus required service access space for each component.

Open tiles are required for electrical access. Required spacing to remove side panels is 26.6 in. width. For maintenance access, see [TABLE 2-4](#) for exact measurements.

TABLE 2-4 Sun Rack Maintenance Access Requirements

Dimension	Measurement
Rear maintenance access	914 mm / 36 in.
Front maintenance access	914 mm / 36 in.
Top maintenance access	914 mm / 36 in.

2.2.3 Cabinet Stabilization

After moving the Sun Oracle Database Machine to the installation site, you should stabilize the rack to ensure that it does not move or tip over when installing equipment. To stabilize the rack permanently, use one, or both, of the following methods:

- Mounting brackets
- Extending the rack's leveling feet

After installation, you can use these brackets and feet to stabilize the rack during everyday use. The *Sun Oracle Database Machine Installation Guide* describes how to secure a Sun Oracle Database Machine cabinet to prevent the rack from shifting due to vibration.

You can permanently mount the rack to the installation site floor using the same mounting brackets that secured the rack to the shipping pallet. If you plan on stabilizing the rack using these mounting brackets, prepare the installation site by drilling four holes into the floor.

The Sun rack cabinet is secured to its heavy-duty shipping pallet with four mounting brackets. Use the four brackets (two front and two rear) to stabilize the rack securely to the installation site floor. Refer to the *Sun Oracle Database Machine Installation Guide* for mounting instructions.

FIGURE 2-6 shows the elevation and mounting bracket location and dimensions.

FIGURE 2-6 Mounting Bracket and Elevation Dimensions

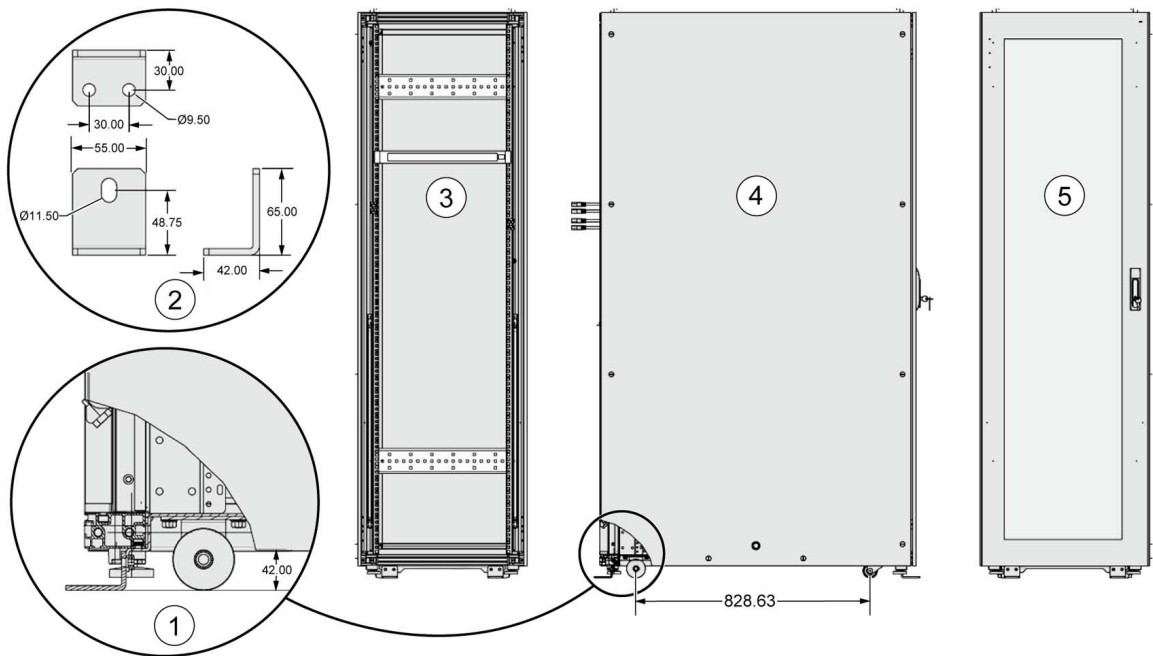


Figure Legend

- 1 Mounting bracket location
- 2 Mounting bracket dimensions
- 3 Rack rear
- 4 Rack side
- 5 Rack front

Environmental and Electrical Specifications

This chapter describes environmental and electrical power factors that affect preparing a data center site before installing a Sun Oracle Database Machine. Networking information is also included for reference.

This chapter contains the following topics:

- [Section 3.1, “Data Center Environmental, Ventilation, and Cooling Requirements” on page 3-1](#)
- [Section 3.2, “Data Center Power Requirements” on page 3-8](#)
- [Section 3.3, “Networking Guidelines” on page 3-15](#)

3.1 Data Center Environmental, Ventilation, and Cooling Requirements

This section contains the following topics:

- [Section 3.1.1, “Data Center Environmental Requirements” on page 3-2](#)
- [Section 3.1.2, “Cooling Guidelines” on page 3-2](#)
- [Section 3.1.3, “Ventilation Requirements” on page 3-3](#)
- [Section 3.1.4, “Airflow Requirements” on page 3-4](#)

Plan for the requirements in [TABLE 5-6](#) regarding environmental conditions for the Sun Oracle Database Machine in a data center.

3.1.1 Data Center Environmental Requirements

Set temperature and humidity in the optimal ranges to minimize any chance of Sun Oracle Database Machine downtime due to component failure (recommended). Operating the server for extended periods at or near the operating range limits or installing the server in an environment where it remains at or near the non-operating range limits could significantly increase hardware component failure.

[TABLE 3-1](#) lists the environmental requirements for the Sun Oracle Database Machine. Sun Oracle Database Machine Full Racks, Half Racks, and Quarter Racks can all be installed in an environment with the operating ranges shown in [TABLE 3-1](#).

TABLE 3-1 Sun Oracle Database Machine Environmental Requirements

Specification	Operating Range (Equipment On)	Note	Non-Operating Range (Equipment Off)
Ambient temperature	15°C to 32°C (59°F to 89.6°F)	For optimal rack cooling, data center temperatures from 21°C to 23°C (70°F to 73.4°F) are recommended.	-40 °C to 70 °C (-40 °F to 158 °F)
Relative humidity	10% RH to 90% RH, non-condensing	For optimal data center rack cooling, 45% RH to 50% RH is recommended.	Up to 93% RH, non-condensing
Altitude restriction	3,048 m (10,000 ft) max.	Ambient temperature is derated by 1° C per 300 m above 900 m altitude above sea level.	12,000 m (40,000 ft)

3.1.2 Cooling Guidelines

Be aware of the following cooling rules and guidelines:

- The room should have sufficient air-conditioning capacity to cool the rack to the specified operating temperature.
- The data center environmental control system design—such as computer room air-conditioning units—must ensure that intake air to the servers complies with the limits specified in this section.
- The air-conditioning system should have controls that prevent excessive temperature changes.
- To avoid overheating, avoid directing any warm air toward the front of the equipment rack and toward the server access panels.

The Sun Oracle Database Machine draws cool air in through the front of the rack and exhausts warm air out through the rear of the rack. [TABLE 3-2](#) lists the cooling and air-conditioning requirements for the Sun Oracle Database Machine.

TABLE 3-2 Sun Oracle Database Machine Cooling and Air-Conditioning Requirements

Type	Cooling Max	Cooling Typical	Exhaust Airflow CFM Max	Exhaust Airflow CFM Typical*	Noise Level dBA
Quarter Rack	12,300 BTUs/hr 13,000 kJ/hr	9,200 BTUs/hr 9,700 kJ/hr	550	410	8.3 Bels #
Half Rack	24,600 BTUs/hr 25,950 kJ/hr	17,400 BTUs/hr 18,400 kJ/hr	1130	840	8.5 Bels
Full Rack	47,800 BTUs/hr 50,400 kJ/hr	33,400 BTUs/hr 33,300 kJ/hr	2200	1560	8.8 Bels #

* Typical airflow values apply to room temperatures from 21°C to 23°C (70°F to 73.4°F).
CFM: cubic feet per minute.

Estimated

3.1.3 Ventilation Requirements

Always provide adequate space in front of and behind the rack to allow for proper ventilation. Do not obstruct the front or rear of the rack with equipment or objects that might prevent air from flowing through the rack. There is no airflow requirement for the left and right sides due to front-to-back cooling.

The Sun Oracle Database Machine Half Rack ships with both solid and ventilated filler panels in unused rack slots for optimal cooling. Cover empty gaps with filler panels. If the rack is not completely filled with components, the remaining gaps between the components can adversely affect the air flow and cooling within the rack. Refer to the *Sun Oracle Database Machine Installation Guide* for installation instructions.

3.1.4 Airflow Requirements

This section contains the following topics:

- [Section 3.1.4.1, “General Airflow Guidelines” on page 3-4](#)
- [Section 3.1.4.2, “Sun Oracle Database Machine Full Rack Airflow” on page 3-5](#)
- [Section 3.1.4.3, “Sun Oracle Database Machine Half Rack Airflow” on page 3-6](#)
- [Section 3.1.4.4, “Sun Oracle Database Machine Quarter Rack Airflow” on page 3-7](#)

3.1.4.1 General Airflow Guidelines

Sun Oracle Database Machines have been designed to function while mounted in a natural convection airflow. The rack has front-to-back cooling. The air inlet is at the front of the rack. The rack front door is perforated. The exhaust exits from the rear of the rack.

The following rules must be followed to meet the environmental specification.

- Ensure adequate airflow through the rack. Inadequate cold air flow could result in higher air inlet temperatures in the servers.
- Allow a minimum clearance of 36 inches (914 mm) at the front of the rack and 36 inches (914 mm) at the rear of the rack for adequate ventilation.

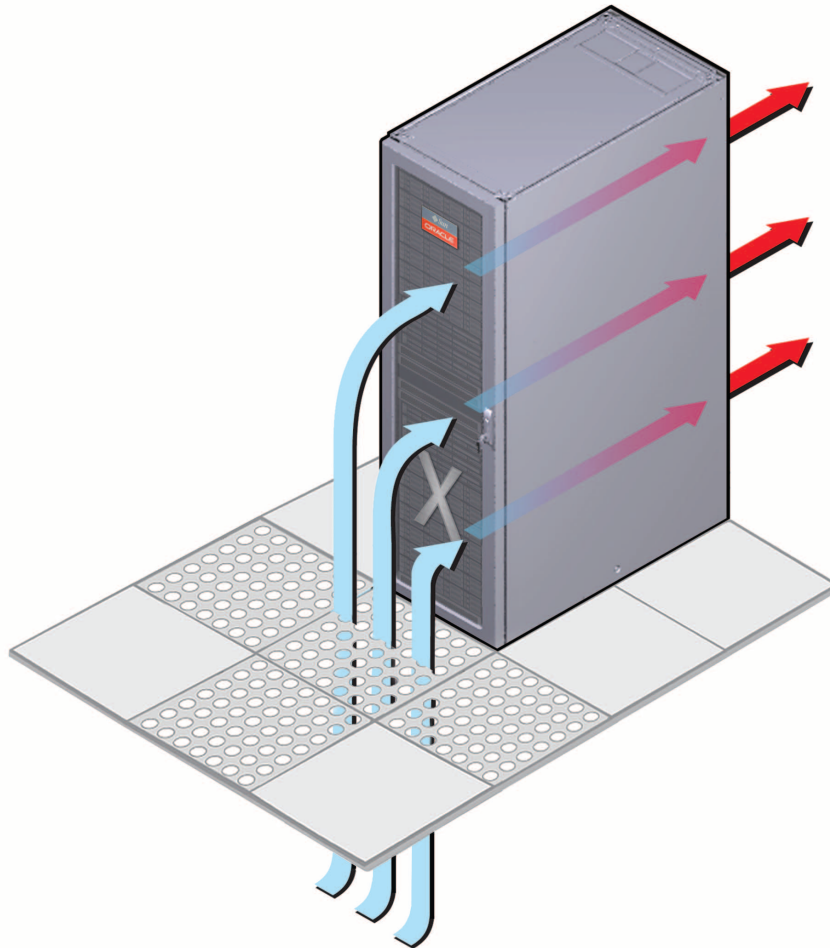
Because each data center has a unique environment, a universal optimal deployment airflow specification is not possible. The following floor tile guidelines cover a typical airflow configuration with raised-floor cooling. Your particular facility's configuration might vary.

3.1.4.2 Sun Oracle Database Machine Full Rack Airflow

Sun Oracle Database Machine Full Rack front-to-back airflow is 1,560 CFM typical, and 2,200 CFM maximum, subject to actual data center environment. Four perforated tiles are recommended in front of the full rack for adequate cold air intake, assuming that 400-CFM-per-tile perforated tiles are available. Tiles can be arranged in any order in front of the rack as long as cold air from the tiles can flow into the rack.

FIGURE 3-1 shows the Sun Oracle Database Machine Full Rack airflow requirements.

FIGURE 3-1 Sun Oracle Database Machine Full Rack Airflow Requirements

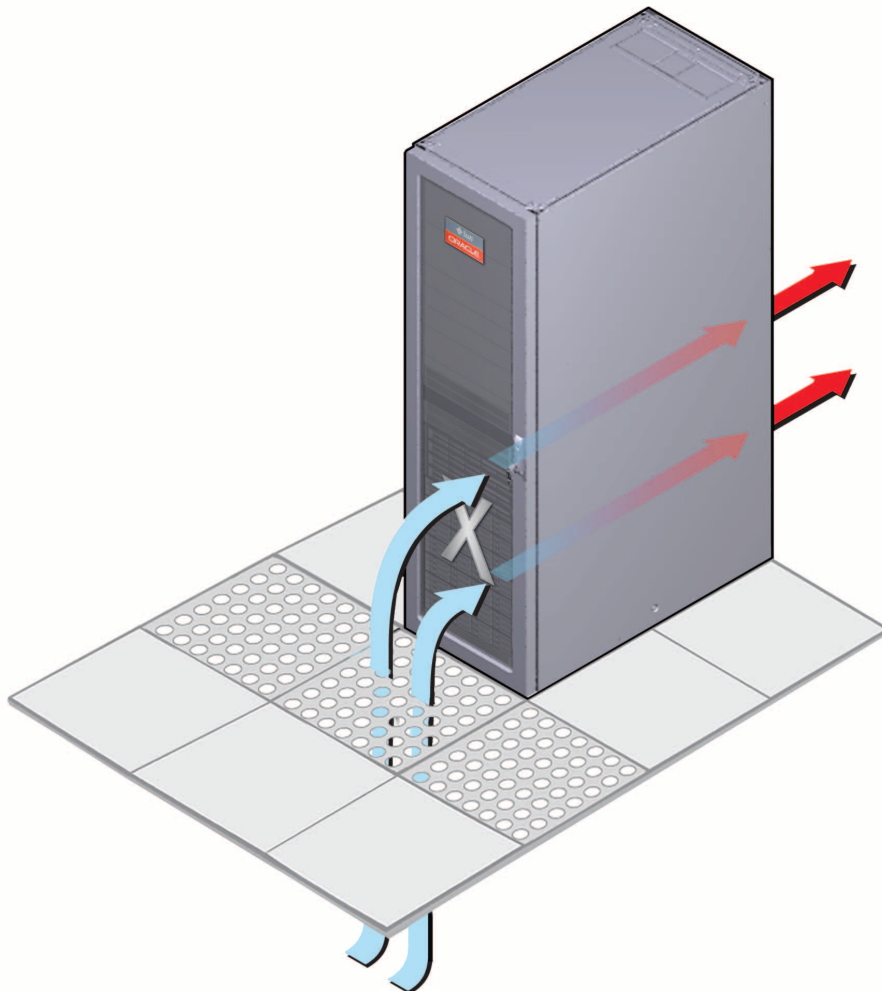


3.1.4.3 Sun Oracle Database Machine Half Rack Airflow

Sun Oracle Database Machine Half Rack front-to-back airflow is 840 CFM typical, and 1,130 CFM maximum, subject to actual data center environment. Three perforated tiles are recommended in front of the half rack for adequate cold air intake, assuming that 400-CFM-per-tile perforated tiles are available. Tiles can be arranged in any order in front of the rack as long as cold air from the tiles can flow into the rack.

[FIGURE 3-2](#) shows the Sun Oracle Database Machine Half Rack airflow requirements.

FIGURE 3-2 Sun Oracle Database Machine Half Rack Airflow Requirements

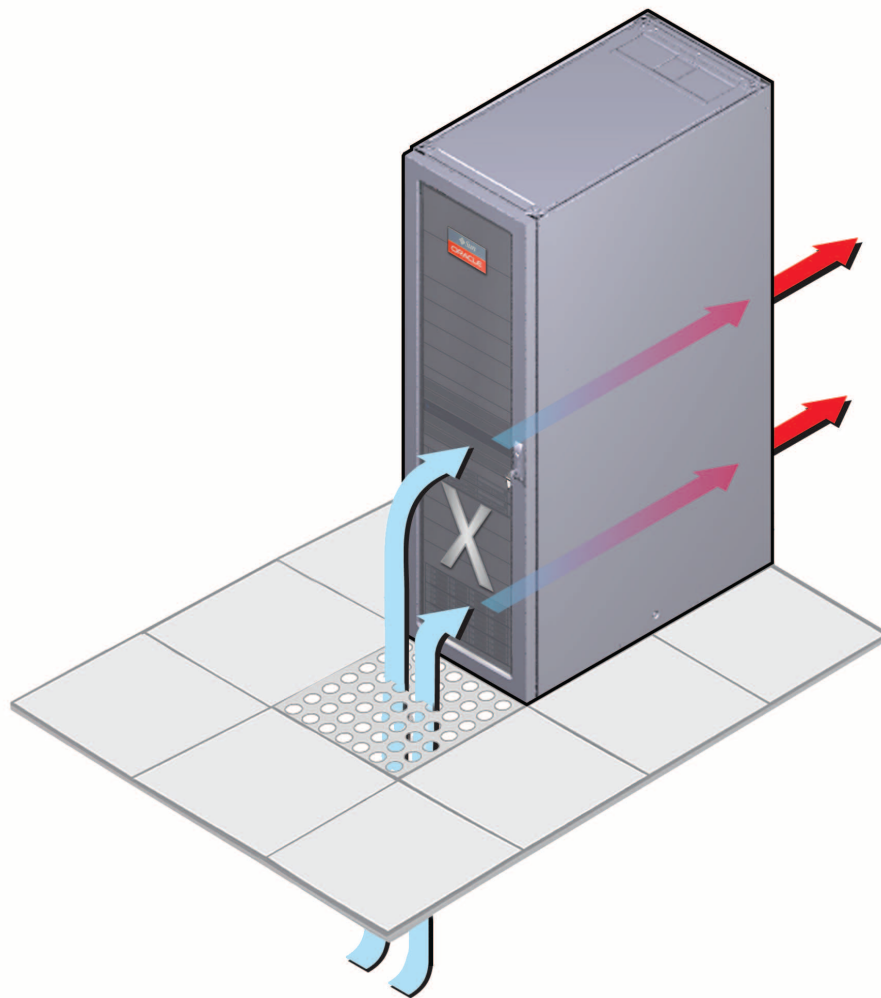


3.1.4.4 Sun Oracle Database Machine Quarter Rack Airflow

Sun Oracle Database Machine Quarter Rack front-to-back airflow is 410 CFM typical, and 550 CFM maximum, subject to actual data center environment. One perforated tile is recommended in front of the quarter rack for adequate cold air intake, assuming that 400-CFM-per-tile perforated tiles are available.

FIGURE 3-3 shows the Sun Oracle Database Machine Quarter Rack airflow requirements.

FIGURE 3-3 Sun Oracle Database Machine Quarter Rack Airflow Requirements



3.2 Data Center Power Requirements

This section describes the data center power supply requirements for Sun Oracle Database Machine racks.

This section contains the following topics:

- [Section 3.2.1, “Electrical Specifications” on page 3-8](#)
- [Section 3.2.2, “Facility Power Requirements” on page 3-9](#)
- [Section 3.2.3, “Selecting an Input Power Source” on page 3-9](#)
- [Section 3.2.4, “Grounding Guidelines” on page 3-14](#)

Plan for the requirements in [TABLE 5-7](#) regarding power conditions for the Sun Oracle Database Machine in a data center.

3.2.1 Electrical Specifications

This section provides the required operating voltages and electrical current levels of the Sun Oracle Database Machine and associated equipment. [TABLE 3-3](#) lists the electrical specifications for the Sun Oracle Database Machine racks.

TABLE 3-3 Sun Oracle Database Machine Electrical Specifications

Type	Maximum		Typical	
	Power kW	Power kVA	Power kW	Power kVA
Full Rack	14.0 kW	14.3 kVA	9.8 kW	10.0 kVA
Half Rack	7.2 kW	7.3 kVA	5.1 kW	5.2 kVA
Quarter Rack	3.6 kW	3.7 kVA	2.7 kW	2.75 kVA

Each rack has 2 Power Distribution Units (PDUs) preinstalled. You must specify the correct PDU type for the power source that supplies your data center. Obtain the appropriate PDU after confirming the power requirements and power source for the Sun Oracle Database Machine to be installed.

3.2.2 Facility Power Requirements

To prevent catastrophic failures, design your input power sources to ensure that adequate power is provided to the power distribution units. Use dedicated AC breaker panels for all power circuits that supply power to the PDU.

While the PDU power cords are 4 m (13.12 ft.) long, 1 to 1.5 m (3.3 to 4.9 ft.) of the cords will be routed within the rack cabinet. The installation site's AC power receptacle must be within 2 m (6.6 ft.) of the rack.

Electrical work and installations must comply with applicable local, state, or national electrical codes. Contact your facilities manager or a qualified electrician to determine what type of power is supplied to your building.

When planning for power distribution requirements for installed rack equipment:

- Balance the power load between available AC supply branch circuits.
- In the United States and Canada, ensure that the overall system AC input current load does not exceed 80% of the branch circuit AC current rating.

3.2.3 Selecting an Input Power Source

PDUs accept different power sources listed below. Choose one of the following input power sources.

Input Power Source	See
Low-voltage single-phase	“Low-Voltage Single-Phase Power Source” on page 3-10
Low-voltage three-phase	“Low-Voltage Three-Phase Power Source” on page 3-11
High-voltage single-phase	“High-Voltage Single-Phase Power Source” on page 3-12
High-voltage three-phase	“High-Voltage Three-Phase 5-Wire Wye Power Source” on page 3-13

3.2.3.1 Low-Voltage Single-Phase Power Source

Sun Oracle Database Machines connected to a low-voltage single-phase power source require:

- 6 power cords: For 2 power distribution units (PDUs), 30 amps @ 200-240 VAC.
- 6 receptacles: The 2 Sun Oracle Database Machine PDUs connect to 6 NEMA L6-30 Datacenter receptacles.

Low-Voltage PDUs for North and South America, Japan, and Taiwan

See [TABLE 3-4](#) for the low-voltage PDU electrical specifications, including the number and type of connectors and receptacles.

TABLE 3-4 Low-Voltage One-Phase PDU Specifications - 2 PDUs Per Rack - North and South America, Japan, and Taiwan

Specification (per 1 PDU)	15 kVA, 1ph	
Number of Inputs	3 x 30A 1ph	Note - There are 2 PDUs per rack and the specifications shown in the table are per PDU.
Voltage	200 - 240VAC	
Frequency	50/60Hz	
Current	24A max. per input	
Power Rating	15 kVA	
Output Current	72A (3 x 24A)	
Outlets	42 x C13; 6 x C19	
Outlet Groups	6	
Group Protection	20A	
Data Center Receptacle	NEMA L6-30	

[FIGURE 3-4](#) shows a low-voltage power cable and connector for North and South America, Japan, and Taiwan PDUs.

FIGURE 3-4 One-Phase Power Connector - Low-Voltage (North and South America, Japan, and Taiwan PDU)



3.2.3.2 Low-Voltage Three-Phase Power Source

Sun Oracle Database Machines connected to a 4-wire low-voltage 3-phase power source require:

- 2 power cords: For 2 power distribution units (PDUs), 60 amps @ 110/190-127/220VAC 3-phase.
- 2 receptacles: The 2 Sun Oracle Database Machine PDUs connect to 2 IEC-309 60A 4-pin 250VAC 3ph IP67 Datacenter receptacles.

Low-Voltage PDUs for North and South America, Japan, and Taiwan

See [TABLE 3-5](#) for the low-voltage PDU electrical specifications, including the number and type of connectors and receptacles.

TABLE 3-5 Low-Voltage Three-Phase PDU Specifications - 2 PDUs Per Rack - North and South America, Japan, and Taiwan

Specification (per 1 PDU)	15 kVA, 3ph	
Number of Inputs	1 x 60A 3ph 4 wire	Note - There are 2 PDUs per rack and the specifications shown in the table are per PDU.
Voltage	110/190-127/220VAC 3ph	
Frequency	50/60Hz	
Current	40A max. per phase	
Power Rating	14.4 kVA	
Output Current	69A (3 x 23A)	
Outlets	42 x C13; 6 x C19	
Outlet Groups	6	
Group Protection	20A	
Data Center Receptacle	IEC309 60A 4-PIN 250VAC 3ph IP67	

[FIGURE 3-5](#) shows a power cable and connector for North and South America, Japan, and Taiwan Low-Voltage PDUs.

FIGURE 3-5 Three-Phase Power Connector - Low-Voltage (North and South America, Japan, and Taiwan PDU)



3.2.3.3 High-Voltage Single-Phase Power Source

Sun Oracle Database Machines connected to a high-voltage single-phase power source require:

- 6 power cords: For 2 power distribution units (PDUs), requiring 15 kVA, 25 amps @ 220-240VAC 1-phase voltage.
- 6 receptacles: The 2 Sun Oracle Database Machine PDUs connect to 2 IEC309 32A 3-PIN 250VAC IP44 Datacenter receptacles.

High-Voltage PDUs for EMEA and APAC, Except Japan and Taiwan

See [TABLE 3-6](#) for the high-voltage single-phase PDU electrical specifications, including the number and type of connectors and receptacles.

TABLE 3-6 High-Voltage One-Phase PDU Specifications - 2 PDUs Per Rack

Specification (per 1 PDU)	15 kVA, 1ph	
Number of Inputs	3 x 25A 1ph	Note - There are 2 PDUs per rack and the specifications shown in the table are per PDU.
Voltage	220-240VAC	
Frequency	50/60Hz	
Current	25A max. per input	
Power Rating	15 kVA	
Output Current	72A (3 x 24A)	
Outlets	42 x C13; 6 x C19	
Outlet Groups	6	
Group Protection	20A	
Data Center Receptacle	IEC309 32A 3-PIN 250VAC IP44	

[FIGURE 3-6](#) shows a high-voltage PDU power cable and connector for Europe, Middle East, and Africa (EMEA) and Asia and Pacific (APAC), except Japan and Taiwan.

FIGURE 3-6 One-Phase Power Connector (EMEA and APAC High-Voltage PDU)



3.2.3.4 High-Voltage Three-Phase 5-Wire Wye Power Source

Sun Oracle Database Machines connected to a high-voltage 3-phase power source require:

- 2 power cords: For dual power distribution units (PDUs), 25 amps @ 220/380-240/415 VAC 3-phase.
- 2 receptacles: The 2 Sun Oracle Database Machine PDUs connect to 2 IEC 309 32A 5-PIN 230/400V 3ph IP44 Datacenter receptacles.

High-Voltage PDUs for EMEA and APAC, Except Japan and Taiwan

See [TABLE 3-7](#) for the high-voltage PDU electrical specifications, including the number and type of connectors and receptacles.

TABLE 3-7 High-Voltage Three-Phase PDU Specifications - 2 PDUs Per Rack

Specification (per 1 PDU)	15 kVA, 3ph	
Number of Inputs	1 x 25A 3ph 5 wire	Note - There are 2 PDUs per rack and the specifications shown in the table are per PDU.
Voltage	220/380 - 240/415VAC 3ph	
Frequency	50/60Hz	
Current	25A max. per phase	
Power Rating	14.4 kVA	
Output Current	62.7A (3 x 20.9A)	
Outlets	42 x C13; 6 x C19	
Outlet Groups	6	
Group Protection	20A	
Data Center Receptacle	IEC 309 32A 5-PIN 230/400V 3ph IP44	

[FIGURE 3-7](#) shows a high-voltage PDU power cable and connector for Europe, Middle East, and Africa (EMEA) and Asia and Pacific (APAC), except Japan and Taiwan.

FIGURE 3-7 Three-Phase Power Connector (EMEA and APAC High-Voltage PDU)



3.2.4 Grounding Guidelines

Cabinets are shipped with grounding-type power cords. Always connect the cords into grounded power outlets. Each power cord also supplies your server with proper earth ground.

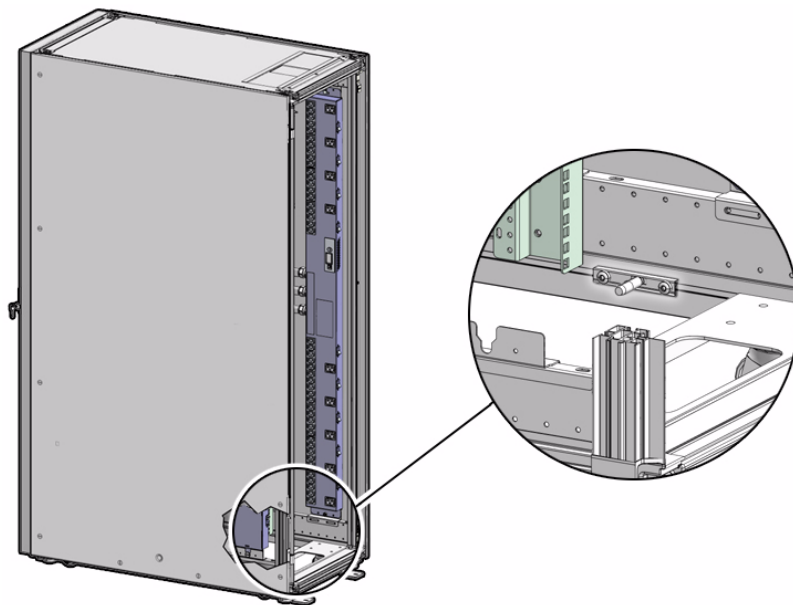
Sun Oracle Database Machine power distribution units (PDUs) achieve earth ground through their power cords. Final chassis ground is achieved when the power cord is connected to a receptacle, where the ground prong contacts the power receptacle.

For additional grounding, you can attach a chassis earth ground cable to the rack. The additional ground point will allow current leakage to dissipate more efficiently.

Because different grounding methods are used depending on the building where the Sun Oracle Database Machine is installed, check the grounding type, and refer to related documents (such as IEC documents) for the correct grounding method. Make sure that the facility administrator or a qualified electrical engineer verifies the grounding method for the building and performs the grounding work. Contact your facilities manager or a qualified electrician to determine what type of power is supplied to your building.

FIGURE 3-8 shows the cabinet ground connection.

FIGURE 3-8 Cabinet Ground Connection



3.3 Networking Guidelines

This section provides an overview of the process for connecting the networks on the Sun Oracle Database Machine. Refer to the *Sun Oracle Database Machine Owners Guide* and *Sun Oracle Database Machine Configuration Guide* for detailed information.

This section contains the following topics:

- [Section 3.3.1, “Network Overview” on page 3-15](#)
- [Section 3.3.2, “Network Configuration Items” on page 3-16](#)
- [Section 3.3.3, “Preparing Your Site for Sun Oracle Database Machine Network Connections” on page 3-16](#)

3.3.1 Network Overview

During initial configuration of the Sun Oracle Database Machine, the following networks are configured.

Network	Description
Management/ ILOM network	The Management/ILOM network is used for administrative duties for all components in the rack. It connects all servers, ILOM, and switches in the rack to your management network via the Ethernet switch in the rack. There is a single uplink from the Ethernet switch to your network.
Client Access network (Sun Fire™ X4170 Oracle Database Servers only)	The Client Access network connects to the Sun Fire™ X4170 Oracle Database Servers only. Applications access the database through this network through Real Application Clusters (RAC) Virtual IP (VIP) and Single Client Access Name (SCAN) addresses.
Private InfiniBand network	The Private InfiniBand network connects all Sun Fire™ X4170 Oracle Database Servers and Exadata Storage Servers. Oracle Database uses this network for storage and RAC cluster interconnect traffic. This non-routable network is fully contained within the Sun Oracle Database Machine.
Additional networks	Sun Fire™ X4170 Oracle Database Servers may be configured to connect to one or two additional existing networks. (Optional, for Sun Fire™ X4170 Oracle Database Servers only)

3.3.2 Network Configuration Items

You must provide network configuration details before machine deployment. All networks must be on distinct, separate subnets from each other. The following information is required:

- Domain name
- Nameserver IP address
- NTP Time Server IP address
- A sequential IP address range, subnet mask, and gateway IP address for the Client Access network
- A sequential IP address range, subnet mask, and gateway IP address for the Management/ILOM network
- A sequential IP address range and subnet mask for the Private InfiniBand network
- A sequential IP address range, subnet mask, and gateway IP address for the additional networks.

3.3.3 Preparing Your Site for Sun Oracle Database Machine Network Connections

To prepare your site for the Sun Oracle Database Machine:

1. **Complete the configuration worksheets from the *Sun Oracle Database Machine Configuration Guide*.**
2. **Provide the configuration worksheets from the *Sun Oracle Database Machine Configuration Guide* to the Oracle technical representative.**
3. **Receive the installation template from Oracle.**
4. **Review the installation template.**
5. **Consult the Oracle technical representative for required site-specific changes.**
6. **Run the network cables from your existing network equipment to the installation site.**

The connections are identified in the installation template. The number of network connections required and the networks to which your system connects depend on the information provided in the installation template.

Refer to the *Sun Oracle Database Machine Owner's Guide*.

7. **Label the network cables that will connect to the Sun Oracle Database Machine.**

8. **Perform the required configuration within your network infrastructure to allow the Sun Oracle Database Machine to use the IP addresses specified in the installation template.**

9. **Register IP addresses in the installation template with DNS.**

Refer to the *Sun Oracle Database Machine Owner's Guide*. The connections are identified in the installation template.

10. **If desired, advise the customer of the need to obtain a SFP Small-Form-factor Pluggable module (for Gigabit Fiber operation).**

SFP is supported in port 48 only of the EV2 Ethernet switch. Sun or Oracle does not supply these modules. The customer should contact their authorized Cisco sales or service provider.

Installation Planning

This chapter contains an overview for installing and starting the Sun Oracle Database Machine. This chapter contains the following topics.

- [Section 4.1, “Installation Workflow” on page 4-1](#)
- [Section 4.2, “Observing Safety Guidelines and Warnings” on page 4-2](#)

4.1 Installation Workflow

This section provides a summary for starting the Sun Oracle Database Machine, including system startup and network connections. Refer to the *Sun Oracle Database Machine Installation Guide* for detailed procedures.

The general process to install a Sun Oracle Database Machine at a data center site is:

1. **Unpack the Sun Oracle Database Machine.**
2. **Place the Sun Oracle Database Machine in its allocated space.**
3. **Connect the Sun Oracle Database Machine power cords.**
4. **Power on the Sun Oracle Database Machine Power Distribution Units.**
5. **Power on the Sun Oracle Database Machine servers and equipment.**
6. **Connect to the customer network.**
7. **Configure Management, Infiniband, and customer network connections.**
8. **Verify all of the hardware.**
9. **Configure Oracle Exadata software.**
10. **Perform final verification of the Sun Oracle Database Machine.**

4.2 Observing Safety Guidelines and Warnings

Before installing the Sun Oracle Database Machine, or installing any server or equipment into the rack, read the *Important Safety Information for Sun Hardware Systems* (816-7190) document included with the rack.

Observe all safety notices printed on the packaging and listed in the *Sun Rack II Safety and Compliance Guide* (820-4762) and the *Sun Rack II Power Distribution Units Users Guide* (820-4760). Go to docs.sun.com to download this guide.

The Sun Oracle Database Machine cabinets can enclose a variety of rackmountable Sun servers, storage products, and other third-party equipment.

Note – Contact your Sun Service representative or Oracle Advanced Customer Services to confirm that Sun has qualified your equipment for installation and use in a Sun Oracle Database Machine. Sun is not liable for any issues when installing or using non-qualified equipment.

Site Planning Checklist

This chapter contains the following sections:

- Section 5.1, “Site Planning Summary” on page 5-2
 - Section 5.1.1, “Installation Customer Information” on page 5-2
 - Section 5.1.2, “Site Readiness Summary” on page 5-3
- Section 5.2, “Site Planning Checklists” on page 5-3
 - Section 5.2.1, “System Components” on page 5-4
 - Section 5.2.2, “Access Route” on page 5-5
 - Section 5.2.3, “Data Center Room” on page 5-6
 - Section 5.2.4, “Data Center Environment” on page 5-7
 - Section 5.2.5, “Facility Power” on page 5-7
 - Section 5.2.6, “Network Specifications” on page 5-8
 - Section 5.2.7, “Logistics” on page 5-9
 - Section 5.2.8, “Safety Items” on page 5-10
- Section 5.3, “What’s Next” on page 5-12

Before the installation begins, on the Sun Oracle Database Machine, confirm that all requirements in the following sections have been addressed.

5.1 Site Planning Summary

5.1.1 Installation Customer Information

Provide installation customer site information in [TABLE 5-1](#).

TABLE 5-1 Installation Customer Information

Checklist	A	B	F	Comments
Site is prepared for installation				
Customer Signature and Date (optional)				
Customer Name				
Customer Address				
Sun Service Request Number				
Overall Site Comments				
Custom Installation Comments				

A	Pass	All is complete and ready to be installed.
B	Conditional Pass	Not ready yet, but will be on a specified date.
F	Fail	Not ready, with some requirements not yet scheduled to be completed.
Comments		Document what did not pass and the date it is scheduled to be completed.

5.1.2 Site Readiness Summary

Confirm that the site is ready for Sun Oracle Database Machine installation in [TABLE 5-2](#). See [Section 5.2, “Site Planning Checklists”](#) on [page 5-3](#) for checklists.

TABLE 5-2 Site Readiness Checklist

Checklist	A	B	F	Comments
System Components				
Access Route				
Data Center Room				
Data Center Environment				
Facility Power				
Network Specifications				
Logistics				
Safety Items				
General Site Comments				

A	Pass	All is complete and ready to be installed.
B	Conditional Pass	Not ready yet, but will be on a specified date.
F	Fail	Not ready, with some requirements not yet scheduled to be completed.
Comments		Document what did not pass and the date it is scheduled to be completed.

5.2 Site Planning Checklists

Use the information contained in this section as an approximate guide. Use the comment section provided in each checklist to describe critical items that receive a “No” status. Describe any custom installation conditions.

5.2.1 System Components

Confirm that the Sun Oracle Database Machine requirements in [TABLE 5-3](#) have been addressed. See [Section 1.2, “Sun Oracle Database Machine Components”](#) on page 1-2 for specifications, illustrations, and details.

TABLE 5-3 System Components Checklist

Requirements	Yes	No	NA
Is the ordered system a Sun Oracle Database Machine Full Rack?			
Is the ordered system a Sun Oracle Database Machine Half Rack?			
Is the ordered system a Sun Oracle Database Machine Quarter Rack?			
Will more than one rack be installed? If installing more than one rack, how many racks will be installed?			
If installing more than three racks, did you order a cable upgrade kit?			
Is the rack installation a new system or an addition to an existing system? Note - If the rack installation is an addition to an existing system, see Section 1.3, “Multiple-Rack Configurations” on page 1-9			
Are you going to connect the new rack with another existing rack? Note - This configuration is a custom installation that might require additional installation time and materials. Contact your sales representative to verify additional costs incurred by a custom installation.			
Did you purchase an multi-rack cabling service?			
Are all Sun Oracle Database Machine racks adjacent to each other?			
If you will be connecting racks together that are not within the specified proximity: <ul style="list-style-type: none"> • Have you purchased approved longer Infiniband cables from an approved third-party provider? • Will Sun Services provide and schedule the custom multi-rack cabling service along with the installation? Note - This configuration is a custom installation that might require additional installation time and materials. Contact your sales representative to verify additional costs incurred by a custom installation.			
If you are replacing the Ethernet switch, do you have it on site? Have you arranged for the replacement Ethernet switch installation? Note - This configuration is a custom installation that might require additional installation time and materials. Contact your sales representative to verify additional costs incurred by a custom installation.			
Comments			

5.2.2 Access Route

Confirm that the access route requirements in [TABLE 5-4](#) have been addressed. See [Section 2.1, “Access Route” on page 2-1](#) for specifications and details.

TABLE 5-4 Access Route Checklist

Requirements	Yes	No	NA
Has the access route from the receiving location to the designated data center area been checked for adequate space clearance to transport the unpacked or packed equipment?			
Do all entry way dimensions exceed the equipment access route width and height dimension requirements? The access route must meet the requirements listed in TABLE 2-3			
Do all doors meet the height requirement of 87 in. for packaged rack delivery?			
Are any stairs or ramps in the moving path for the new hardware?			
Have you confirmed that all route incline angles are within the permitted range?			
Are there any ramps or thresholds that are of concern? If yes, provide the details below.			
Is the access route free of any obstacles that would expose the device to shock?			
Are all the surfaces acceptable for rolling the new unpacked and packed equipment?			
Does the access route from the receiving location to the designated data center area support the weight of the unpacked and packed equipment?			
Is the path onto the raised floor rated for dynamic loading of equipment?			
If a pallet jack is to be used, have you confirmed the following: <ul style="list-style-type: none"> • That the pallet jack supports the device weight? • That the pallet jack tines are compatible with the shipping pallet? 			
If there is a flight of stairs, is a loading elevator accessible for the equipment?			
If an elevator is to be used, have you confirmed the following: <ul style="list-style-type: none"> • That the elevator car is wide enough for the device to be carried into it? • That the elevator car is high enough for the device to be carried into it? • That the load limit of the elevator is greater than the device weight? • That the elevators can handle up to 2394 lbs [1088 kg] fully loaded rack capacity? • That the elevator door meets the height requirement of 87 in. for packaged rack delivery? 			
Comments			

5.2.3 Data Center Room

Confirm that the data center room requirements in [TABLE 5-5](#) have been addressed. See [Section 2.2, “Data Center Room Specifications”](#) on page 2-6 for specifications and details.

TABLE 5-5 Data Center Room Checklist

Requirements	Yes	No	NA
Has the Sun Oracle Database Machine location been allocated?			
Is the location vacant for the new equipment?			
Does the floor layout meet the equipment maintenance access requirements?			
Is there adequate space available for maintenance?			
Is the floor to ceiling height a minimum of 2914mm or 2.9m (9.6ft)?			
Have cabinet stabilization measures been considered? (Leveling feet or mounting brackets?)			
Do you need to obtain permission to remove floor tiles to accommodate service?			
Does the raised floor satisfy the weight requirements for the new hardware?			
Is the depth of the raised floor a minimum of 46 cm (18 inches)?			
Are there cable routing channels?			
Are there cable routing cutouts?			
Are you providing any additional hardware?			
Is the additional hardware you are providing fully compatible with the Sun Oracle Database Machine?			
Will the new hardware location require any non-standard cable lengths? Note - This configuration is a custom installation that might require additional installation time and materials. Contact your sales representative to verify additional costs incurred by a custom installation.			
Comments			

5.2.4 Data Center Environment

Confirm that the data center environment requirements in [TABLE 5-6](#) have been addressed. See [Section 3.1.1, “Data Center Environmental Requirements”](#) on page 3-2 for specifications and details.

TABLE 5-6 Data Center Environment Checklist

Requirements	Yes	No	NA
Does the computer room air handling meet temperature and humidity requirements?			
Does the installation floor layout satisfy the ventilation requirements?			
Will the equipment be positioned so that the exhaust air of one rack does not enter the air inlet of another rack?			
Are perforated floor tiles each rated at 400 CFM or more?			
Do the computer room air conditioners provide sufficient front to back airflow? <ul style="list-style-type: none">• Full Rack airflow: 2,220 CFM (max)• Half Rack airflow: 1,130 CFM (max)• Quarter Rack airflow: 550 CFM (max)			
Is airflow adequate to prevent hotspots?			
Can the computer room continuously satisfy environmental requirements? <ul style="list-style-type: none">• Full Rack cooling: 47,800 BTU/Hr• Half Rack cooling: 26,400 BTU/Hr• Quarter Rack cooling: 12,300 BTU/Hr			
Can more vented floor tiles be obtained if required?			
Comments			

5.2.5 Facility Power

Confirm that the facility power requirements in [TABLE 5-7](#) have been addressed. See [Section 3.2.1, “Electrical Specifications”](#) on page 3-8 for specifications and details.

TABLE 5-7 Facility Power Checklist

Requirements	Yes	No	NA
Do you know the required operating voltages and electrical current levels of the device and peripherals?			
Did you order a three-phase power option (low-voltage or high-voltage)? OR			

TABLE 5-7 Facility Power Checklist (*Continued*)

Requirements (<i>Continued</i>)	Yes	No	NA
Did you order a single-phase power option (low-voltage or high-voltage)?			
Are power outlets available for the new equipment at the designated location?			
Do the power outlets have appropriate socket receptacles for the PDU option ordered (low-voltage or high-voltage; 3-phase or 1-phase)?			
Are enough power outlets provided within 2 meters for each rack?			
Will you attach optional ground cables to the rack?			
Are the circuit breakers for the equipment suitable in terms of voltage and current-carrying capacities?			
Does the power frequency meet the equipment specifications?			
Will system power be delivered from two separate grids?			
Is there a UPS to power the equipment? Note - This configuration is a custom installation that might require additional installation time and materials. Contact your sales representative to verify additional costs incurred by a custom installation.			
Do you have the minimum required power sources to support the power load for the new hardware? Use kilowatt (kW)/kilovolt (kVA) to express power load. <ul style="list-style-type: none"> • Full Rack - 14.0 kW (14.3 kVA) • Half Rack - 7.2 kW(7.3 kVA) • Quarter Rack - 3.6 kW (3.7 kVA) 			
Comments			

5.2.6 Network Specifications

Confirm that the network specification requirements in [TABLE 5-8](#) have been addressed. See [Section 3.3, “Networking Guidelines”](#) on page 3-15 for details.

TABLE 5-8 Network Configuration and System Software Checklist

Requirements	Yes	No	NA
Did you complete all worksheets in the Sun Oracle Database Machine Configuration Guide and provide them to your Oracle technical representative?			
Have you received the site specific installation template from your Oracle technical representative?			

TABLE 5-8 Network Configuration and System Software Checklist (*Continued*)

Requirements (<i>Continued</i>)	Yes	No	NA
Did you review the installation template and consult with your Oracle technical representative regarding site-specific changes, if any?			
Did you verify that the IP addresses in the installation template are not currently used?			
Have you performed the required configuration within your network infrastructure to allow the Sun Oracle Database Machine to use the IP addresses specified in the installation template?			
Have you registered IP addresses in the installation template with DNS?			
Did you run the required network cables from your network equipment to the location where the Sun Oracle Database Machine will be installed?			
Did you label the network cables that will connect to the Sun Oracle Database Machine?			
Comments			

5.2.7 Logistics

Confirm that the logistical requirements in [TABLE 5-9](#) have been addressed.

TABLE 5-9 Logistics Checklist

Requirements	Yes	No	NA
Do you have contact information for data center personnel?			
Is there security or access control for the data center?			
Are security background checks/security clearances required for vendor personnel to access the data center and if so, do you have a recommended agency?			
How many days in advance must background checks be completed ?			
Are there any additional security access issues?			
Is computer room access available for installation personnel?			
Are laptops, cell phones, and cameras allowed in the data center?			
Does the building have a delivery dock?			
Is there a delivery/unpacking/staging area?			
Is the delivery inside?			
If the delivery is not inside, is the site prepared for uncrating?			
Is the unpacking/staging area protected from the elements?			

TABLE 5-9 Logistics Checklist (*Continued*)

Requirements (<i>Continued</i>)	Yes	No	NA
Does the building have an adequate receiving area?			
Is the unpacking area air-conditioned to avoid thermal shock for hardware components?			
Is a thermal acclimation period in the installation schedule to prevent thermal shock for hardware components? How much time is required?			
Will sufficient moving personnel be available to install the hardware?			
Is union labor required for any part of the delivery or installation?			
Are you prepared for uncrating and trash removal? Is uncrating of cabinet and cabinet trash removal required?			
Are there any restrictions on delivery truck length, width or height?			
Does the customer allow cardboard boxes and/or other packing material in the computer room?			
If no, do ground level deliveries require a truck with a side rail lift ?			
Is there a time constraint on dock access? If yes, provide time constraints.			
Is tail-lift required on Delivery Carrier to unload the equipment at delivery dock?			
Is delivery only required to end-user's loading bay or is delivery inside required?			
Will any lifters, ramps, steel plates, or floor covers be required to place the equipment in the computer room?			
Is a list of special equipment requirements needed by the delivery carrier available? (Non-Floor Damaging Rollers, Transport Dollies, Pallet Jacks, or Fork Lifts)			
Have any special delivery options (including inside delivery and/or waste removal) been communicated while placing the order?			
Comments			

5.2.8 Safety Items

Confirm that the safety requirements in [TABLE 5-10](#) have been addressed.

TABLE 5-10 Safety Items Checklist

Requirements	Yes	No	NA
Is there an emergency power shutoff? Where?			
Is there a fire protection system in the data center room?			

TABLE 5-10 Safety Items Checklist (*Continued*)

Requirements (<i>Continued</i>)	Yes	No	NA
Is the computer room adequately equipped to extinguish a fire?			
Is antistatic flooring installed?			
Is the floor below the raised floor free of obstacles and blockages?			
Comments			

5.3 What's Next

After you finish all the tasks and checklists in this document, the Sun Oracle Database Machine site planning is complete. Proceed to the Sun Oracle Database Machine installation documentation. Refer to the *Sun Oracle Database Machine Installation Guide* for detailed procedures.