Oracle® Cloud at Customer

Customer Deployment Guide

18.1.4
E65766-10
February 2020

ORACLE

Oracle Cloud at Customer Customer Deployment Guide, 18.1.4

E65766-10

Primary Authors: Salvador Hernández, Tushar Pandit, Ashish Thomas, Gavin Parish, Albert Leigh, Shynitha Shanthakumar

Contents

Preface

Audience vi
Revision History vi
Documentation Accessibility vi
Conventions vi

1 Introduction

Overview 1-1
Subscription Models 1-2
Minimum Configurations 1-2
Oracle Cloud at Customer Control Plane Subscription 1-3
Scaling Out the Configuration 1-3

2 Physical Requirements

Space 2-1
Access Route 2-2
Weight 2-2
Electrical Power 2-3
Facilities Power 2-4
Temperature and Humidity 2-4
Ventilation and Cooling 2-5

3 Network Requirements

Physical Network Requirements 3-1
Logical Network Requirements 3-2

A Temperature and Humidity Requirements

B Data Center Environmental Requirements

C Power Distribution Units Specification

Index

List of Tables

2-1	Oracle Cloud at Customer Space Requirements	2-1
2-2	Oracle Cloud at Customer Access Route Requirements	2-2
2-3	Oracle Cloud at Customer Flooring Requirements	2-2
A-1	Oracle Cloud at Customer Temperature and Humidity Requirements	A-1
B-1	Power, Cooling, Weight, and Dimensions Requirements for all Oracle Cloud at Customer Configurations	B-1
C-1	PDU specifications for low voltage	C-1
C-2	PDU specifications for high voltage	C-2

Preface

This guide describes physical, network, and cloud services requirements to deploy Oracle Cloud at Customer on a customer data center.

Audience

This document is intended for customer's data center and infrastructure engineers looking at deploying Oracle Cloud at Customer.

Revision History

- E65766-04, December 2017: Several additions to the appendix Power Distribution Units Specification. Added more information about the type of transceivers required in the Physical Network requirements (short-wave multi-mode transceivers).
- E65766-03, October 2017: Addition of requirements and specification tables as appendixes.
- E65766-02, June 2017: Minor changes and format fixes.
- E65766-01, May 2017: First version of the document.

Documentation Accessibility

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at http://www.oracle.com/pls/topic/lookup?ctx=acc&id=docacc.

Access to Oracle Support

Oracle customers that have purchased support have access to electronic support through My Oracle Support. For information, visit http://www.oracle.com/pls/topic/lookup?ctx=acc&id=info or visit http://www.oracle.com/pls/topic/lookup?ctx=acc&id=trs if you are hearing impaired.

Conventions

The following text conventions are used in this document:

Convention	Meaning
boldface	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.

Convention	Meaning
italic	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.
`monospace`	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

1

Introduction

Topics

- Overview
- Subscription Models
- Minimum Configurations
- Oracle Cloud at Customer Control Plane Subscription
- Scaling Out the Configuration

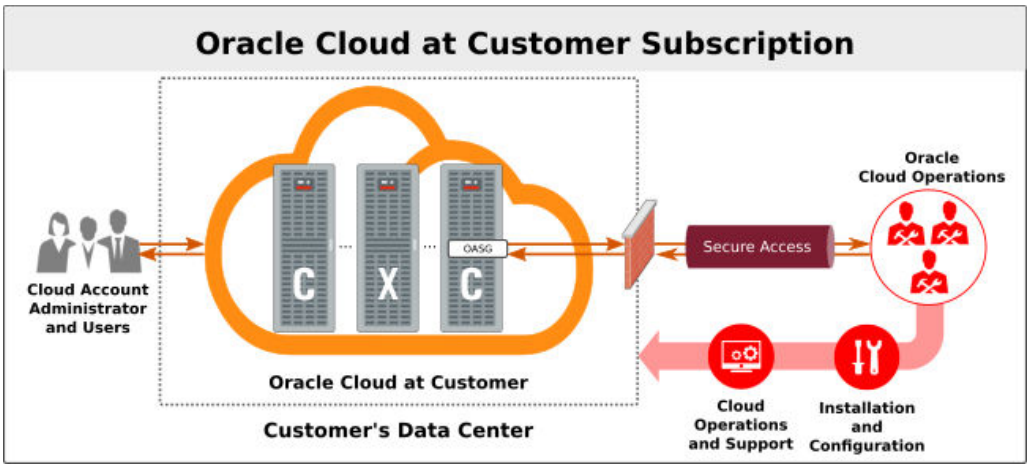
Overview

Oracle Cloud at Customer is a cloud offering that gives you new choices for the Oracle Cloud Platform by bringing the Oracle Cloud to your data center. Leveraging our Public Cloud's PaaS and IaaS capabilities, it enables the innovation that cloud provides, at the same time meeting the business and regulatory requirements behind your firewall.

Oracle Cloud at Customer provides a stepping-stone in the journey to cloud, as it allows you to get the advantages of cloud faster, easier, and with less disruption. As an on-premises implementation of Oracle Cloud, Oracle Cloud at Customer lets you run your applications seamlessly wherever you want, as workloads are completely portable between the public cloud and your data center.

You can now leverage the latest innovations for rapid development that cloud provides, all while meeting any data sovereignty and residence requirements. Oracle Cloud at Customer also provides subscription-based pricing in your data center, managed by Oracle, with single vendor accountability.

The following diagram describes a typical deployment of Oracle Cloud at Customer on a customer's data center. The Oracle Cloud Operations team provides the installation, configuration, and support for the machine.



Subscription Models

Oracle Cloud at Customer is offered in different subscription models.

Control Plane

The Oracle Cloud At Customer Control Plane provides the infrastructure required to run Oracle Cloud on premises. It consists of dedicated compute and storage components required to run Oracle Cloud. The Control Plane is required for all Cloud At Customer deployments, including Exadata Cloud at Customer, and Big Data Cloud at Customer, and other offerings to come. One Control Plane can manage a single site of Cloud At Customer.

The Control Plane hardware and software is installed, configured, and managed entirely by the Oracle Cloud Operations Team.

Customer-Usable Building Blocks

In addition to the Control Plane, Oracle Cloud at Customer provides powerful and flexible compute and storage capabilities for running customer services and applications.

The compute and storage resources available to customers are assembled from one or more of the following basic building blocks:

- Oracle Cloud at Customer X6 Compute. Customer has access to 40 usable compute cores with each Oracle Cloud at Customer X6 compute subscription.
- Oracle Cloud at Customer ZS5 Block Storage. Customer has access to approximately 32 TB of usable block storage with each Oracle Cloud at Customer ZS5 block storage subscription.
- Oracle Cloud at Customer X6 Object Storage. Customer has access to approximately 128TB of usable object storage with each Oracle Cloud at Customer X6 Object Storage subscription.

Minimum Configurations

The following minimum configurations for an Oracle Cloud at Customer deployment are offered.

- Control Plane only: consisting of a Control Plane Subscription. This configuration is used only when running other Cloud Machines.
- IaaS only: it consists of a Control Plane Subscription and three Compute Subscriptions.

> **Note:**
>
> Object Storage is highly recommended. IaaS VMs will have restricted use to certain features that require Object Storage.

- PaaS and IaaS. Containing a Control Plane Subscription, three Compute Subscriptions, and one Object Storage Subscription.

A Block Storage subscription is not required in the minimum configuration for OCC IaaS or PaaS customers, as these customers can use the block storage that is provided as part of the Control Plane.

> **Note:**
>
> Customers have at least 22 TB of usable block storage that is part of the control plane. This customer-usable block storage on OCC control plane is only for customers that subscribed to IaaS and/or PaaS services on OCC. The customer-usable block storage is not available to customers that only subscribed to the OCC control plane subscription.

Oracle Cloud at Customer Control Plane Subscription

Oracle Cloud at Customer Control Plane is a standalone offering to manage Cloud At Customer deployments, that could also include other cloud machines such as Oracle Cloud at Customer, Exadata Cloud Machine (ExaCC), Bigdata Cloud at Customer (BDCC), and future offerings.

The control plane consists of the required hardware and Oracle cloud services, including services dashboards and metering and monitoring services.

Scaling Out the Configuration

You can scale out the configuration of Oracle Cloud at Customer.

From the minimum configuration, customers can build a customized configuration that can handle a wide variety of workloads, adding one or more additional compute, block or object subscriptions to the site as required.

When adding subscriptions, Oracle determines if the physical hardware resides in existing Cloud Machine racks, or if a new physical rack is required. If an existing rack can be used, Oracle ships the subscription's hardware profile to your site and installs and configures it in the existing footprint. If a new rack is required, Oracle will contact you to discuss the additional power and cooling requirements and organize for the scale up to occur.

The following chapters describe the requirements depending on the hardware configuration.

2
Physical Requirements

Topics

- Space
- Access Route
- Weight
- Electrical Power
- Facilities Power
- Temperature and Humidity
- Ventilation and Cooling

Space

All Oracle Cloud at Customer models use the same rack, and have the same space requirements.

The space requirements are as follows:

Table 2-1 Oracle Cloud at Customer Space Requirements

Description	Measurement
Height	1998 mm
	78.66 inches
Minimum ceiling height for the cabinet (measured from true or raised floor)	2914 mm (rack height of 2000 mm + 914 mm for maintenance access)
	114 inches (rack height of 78 inches + 36 inches for maintenance access)
Width	600 mm with side panels
	23.62 inches
Required space to remove the side panels	675. 64 mm
	26.6 inches
Depth from front door handle to rear door handle	1200 mm
	47.24 inches
Depth with doors removed	1112 mm
	43.78 inches
Top, front, and rear maintenance access requirement	914 mm
	36 inches

> **Note:**
>
> For non-raised floor installations, the installation site AC power receptacle must be routed to the top of the rack and within 2000 mm (78.74 inches) of the top of the rack.

Access Route

Review the access route requirements for Oracle Cloud at Customer.

Consider the following to allow the delivery team to unpack and move the Oracle Cloud at Customer system effectively:

- Use a different space or room to remove the packaging material to reduce particles before entering the data center.
- Allow enough space for unpacking it from its shipping cartons.
- Make sure that the entire access route to the installation site is free of raised-pattern flooring that can cause vibration.

The following table lists the access route requirements for Oracle Cloud at Customer:

Table 2-2 Oracle Cloud at Customer Access Route Requirements

Access Route Item	With Shipping Pallet	Without Shipping Pallet
Minimum door height	2184 mm	2040 mm
	86 inches	80.32 inches
Minimum door width	1220 mm	600 mm
	48 inches	23.62 inches
Minimum elevator depth	1575 mm	1200 mm
	62 inches	47.24 inches
Maximum incline	6 degrees	6 degrees
Minimum elevator, pallet jack, and floor loading capacity	1134 kg	1134 kg
	2500 lbs	2500 lbs

Weight

Oracle recommends that Oracle Cloud at Customer is installed on raised flooring. The site floor and the raised flooring must be able to support the total weight of Cloud at Customer.

The following table lists the floor load requirements for Oracle Cloud at Customer.

Table 2-3 Oracle Cloud at Customer Flooring Requirements

Description	Weight
Oracle Cloud at Customer Control Plane only	540 kg
	1191 lbs

Table 2-3 (Cont.) Oracle Cloud at Customer Flooring Requirements

Description	Weight
Oracle Cloud at Customer PaaS minimum	720 kg
	1588 lbs
Oracle Cloud at Customer compute only full rack	880 kg
	1941 lbs
Maximum allowable weight of installed power distribution units	52.16 kg
	115 lbs
Maximum dynamic load (maximum allowable weight of installed equipment including Power Distribution Units)	1004.71 kg
	2215 lbs

> **Note:**
>
> Individual configurations might differ from the specification described on the table. Contact Oracle for more information about the weight requirements for your specific configuration.

Electrical Power

Oracle Cloud at Customer can operate effectively over a wide range of voltages and frequencies. However, it must have a reliable power source.

Damage may occur if the ranges are exceeded. Electrical disturbances such as the following may damage an Oracle Cloud at Customer:

- Fluctuations caused by brownouts
- Wide and rapid variations in input voltage levels or in input power frequency
- Electrical storms
- Faults in the distribution system, such as defective wiring

To protect the system, dedicated power distribution system and power-conditioning equipment should be used. Lightning arresters or power cables should be used to protect from electrical storms.

Each rack has two pre-installed Power Distribution Units (PDUs). The PDUs accept different power sources. You must select the type of PDU that meets the requirements for your data center.

> **Note:**
>
> PDUs have either two or three power cables (whips) each, therefore four or six power cables require connecting per rack. All power cables of the rack must be connected to the electrical outlets of the data center.

See Power Distribution Units Specification for more information about low and high voltage PDUs and the regions where they can be used.

Facilities Power

Review the facilities electrical power requirements for Oracle Cloud at Customer.

Review the following requirements:

- Electrical work and installations must comply with applicable local, state, or national electrical codes.
- In US and Canada make sure that the overall system AC input current load doesn't exceed 80% of the branch circuit AC current rating. Other countries might have similar restrictions.
- Contact your facilities manager or qualified electrician to determine what type of power is supplied to the building.
- To prevent catastrophic failures, design the input power sources to ensure adequate power is provided to the Power Distribution Units (PDUs). Dedicated AC breaker panels are required for all power circuits that supply power to the PDUs.
- When planning for power distribution requirements, 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 percent of the branch circuit AC current rating.
- PDU power cords are 4 m (13.12 feet) long, and 1 to 1.5 m (3.3 to 4.9 feet) of the cord will be routed within the rack cabinet.
- The installation site AC power receptacle must be within 3m and 3.5 m (9.8 and 11.5 feet) of the rack.
- Provide a stable power source, such as an uninterruptible power supply (UPS) to reduce the possibility of component failures. If computer equipment is subjected to repeated power interruptions and fluctuations, then it is susceptible to a higher rate of component failure.
- The cabinets for the Oracle Cloud at Customer are shipped with grounding-type power cords (three-wire). Always connect the cords to grounded power outlets. Because different grounding methods are used, depending on location, check the grounding type, and refer to documentation, such as IEC documents, for the correct grounding method.
- Make sure that the facility administrator or qualified electrical engineer verifies the grounding method for the building, and performs the grounding work.

Temperature and Humidity

Review the temperature and humidity requirements for Oracle Cloud at Customer.

Set conditions to the optimal temperature and humidity ranges to minimize the chance of downtime. Operating the system for extended periods near the operating or non-operating range limits could significantly increase hardware component failure.

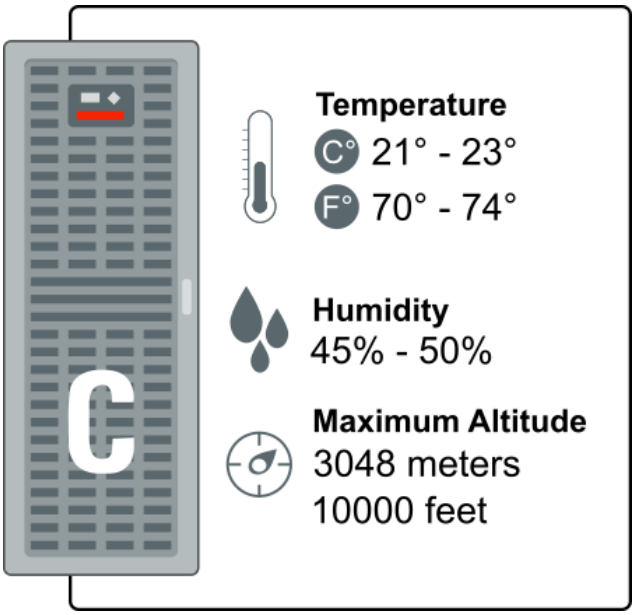
The ambient temperature range of 21 to 23 degrees Celsius (70 to 74 degrees Fahrenheit) is optimal for server reliability and operator comfort. Operating in this

temperature range provides a safety buffer in the event that the air conditioning system goes down for a period of time.

Most computer equipment can operate in a range of 20 to 80 percent of relative humidity, but the range of 45 to 50 percent is recommended for the following reasons:

- Helps protect computer systems from corrosion problems associated with high humidity levels.
- Provides the greatest operating time buffer in the event of air conditioner control failure.
- Helps avoid failures or temporary malfunctions caused by intermittent interference from electrostatic discharges that may occur when relative humidity is too low (below 35 percent).

Figure 2-1 Optimal Temperature, humidity, and Altitude requirements for Oracle Cloud at Customer



See Temperature and Humidity Requirements for more information about temperature, humidity and altitude requirements for operating and non-operating machines.

Ventilation and Cooling

Learn about the ventilation and cooling requirements for Oracle Cloud at Customer.

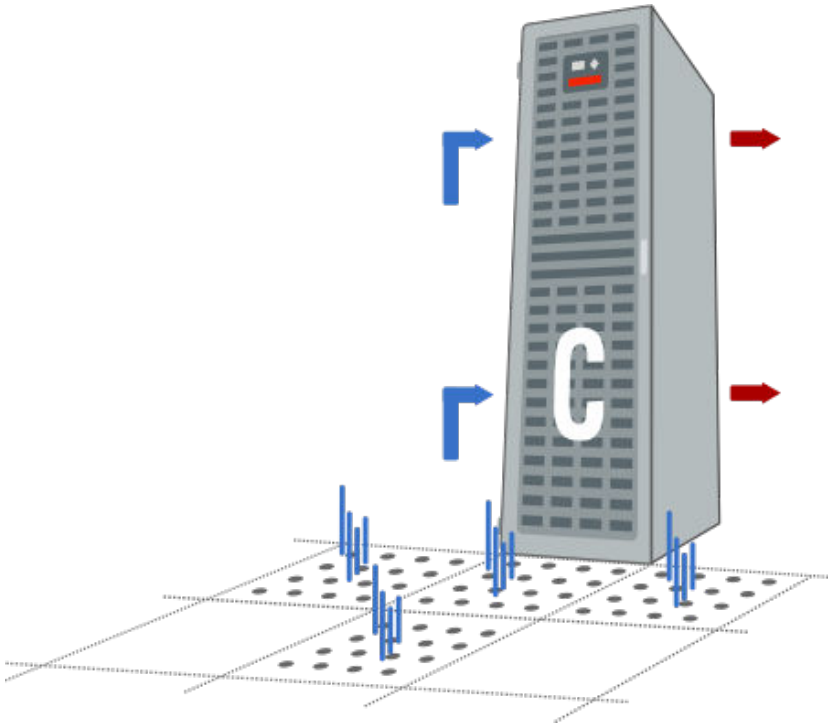
Oracle Cloud at Customer systems have been designed to function while mounted in a natural convection air flow. The following requirements must be followed to meet the environmental specification:

- Allow a minimum clearance of 914 mm (36 inches) at the front of the server, and 914 mm (36 inches) at the rear of the server for ventilation.
- Ensure there is adequate air flow through the server.

- Ensure the server has front-to-back cooling. The air inlet is at the front of the server, and the air is let out the rear.
- Use perforated floor tiles that provide approximately 400 CFM (Cubic Feet per Minute) of air, in front of the rack for cold air intake: three perforated floor tiles for a Control Plane subscription, and four for other configurations.

The following figure shows an installation of the floor tiles for Oracle Cloud at Customer.

Figure 2-2 Typical Data Center Configuration for Perforated Floor Tiles



See Data Center Environmental Requirements for more information about cooling and airflow maximum and typical requirements for Oracle Cloud at Customer.

3
Network Requirements

Topics

- Physical Network Requirements
- Logical Network Requirements

Physical Network Requirements

Review the physical network requirements to deploy Oracle Cloud at Customer.

Determine the bandwidth you require for the workload that you are implementing on Oracle Cloud at Customer.

The following table shows the minimum physical network requirements to install an Oracle Cloud at Customer rack:

Network Requirement	Description
1 GbE management network connections	• Oracle Cloud at Customer requires 1 GbE connections to your data center for management. • Layer 3 configuration is required on the data center 1 GbE switches. • A minimum of one physical connection (RJ45 or SFP+) per rack is required. The SFP+ transceivers are provided by the customer for the Cisco 4948 switch if they choose the fiber option instead of the copper RJ45 option. • One 1 GbE network drop is required for each Oracle Cloud at Customer control plane.

Network Requirement	Description
10 GbE and 40 GbE (MPO-MPO) infrastructure	• Oracle Cloud at Customer requires 10 or 40 GbE connections to your data center infrastructure. • At least one physical connection per switch: symmetrical connections from switch pairs and support for MPO–4LC and MPO–MPO cables. • Oracle provides all cabling to connect to the data center's gateway (MPO–to-4LC fiber splitter cables or MPO–to-MPO cables). • The customer provides the necessary end-point transceivers and 10 or 40 GbE switches. A minimum of two (one per MPO-4LC) SFP+ transceivers (female LC) or a minimum of two QSFP+ transceivers are required. The customer must provide short-wave multi-mode transceivers on their switch side. • Layer 3 configuration is required on the data center's 10 or 40 GbE switches. • A minimum of two 10 or 40 GbE network drops are required for each Oracle Cloud at Customer control plane. • The maximum 10 GbE network drops per Oracle Cloud at Customer rack is 16. • The maximum number of 40 GbE transceivers is four. • Connect to redundant upstream switches to ensure continuity of service. • Data path cabling is provided as part of the service. All data path cabling is fibre, copper is not supported. • Downstream transceivers are provided, upstream (customer connected) transceivers are not provided.

Logical Network Requirements

Learn about the network requirements for Oracle Cloud at Customer.

The following table shows the other network requirements:

Type of Network Requirement	Description
Data center network services	• DNS forwarder is required to forward all lookups to oraclecloudatcustomer.com that are cloud service endpoints on Oracle Cloud at Customer. • SMTP server is required to forward cloud notification emails, for example, FQDN along with port number and credentials, if required. • A customer NTP server is required for Exadata Cloud at Customer (ExaCC) deployment. • Firewall and routing rules for Oracle Advanced Support Gateway to access Oracle Cloud at Customer. See Oracle Advanced Support Gateway for Cloud at Customer Security Guide for more information.
Out of Band Management	• Three IP address for the Oracle Advanced Support Gateway are required from the customer.

Type of Network Requirement	Description
Client IP Pool	• Pool of IP addresses for software defined networking models. • The consumers are guest VMs and cloud services. • As a minimum, provide an IP address for each virtual machine participating in shared and IP-networking models. • Gather the information for the CIDRs, gateways, and IP ranges you are using. • It is recommended that you provide dedicated subnets. This reduces the workload on upstream-switch management.

Note:

Discuss with the Oracle representative for additional details on data center network integration.

A

Temperature and Humidity Requirements

This topic describes the environmental requirements of the data center where an Oracle Cloud at Customer is being installed.

Table A-1 Oracle Cloud at Customer Temperature and Humidity Requirements

Condition	Operating Requirement	Non-operating Requirement	Optimal Requirement
Temperature	5 to 32 degrees Celsius (59 to 89.6 degrees Fahrenheit)	-40 to 70 degrees Celsius (-40 to 158 degrees Fahrenheit).	For optimal rack cooling, data center temperatures from 21 to 23 degrees Celsius (70 to 74 degrees Fahrenheit).
Relative humidity	10 to 90 percent relative humidity, non-condensing	Up to 93 percent relative humidity.	For optimal data center rack cooling, 45 to 50 percent, non-condensing.
Altitude	3048 meters (10000 feet) maximum	12000 meters (40000 feet).	Ambient temperature is reduced by 1 degree Celsius per 300 m above 900 m altitude above sea level.

B

Data Center Environmental Requirements

This topic describes the environmental requirements of the data center where Oracle Cloud at Customer is being installed.

Table B-1 Power, Cooling, Weight, and Dimensions Requirements for all Oracle Cloud at Customer Configurations

Requirement	Specification	Unit	1x Control Plane	1x Compute Model	1x Block Storage Model	1x Object Storage Model	1x Base Rack	Oracle Advanced Support Gateway
Power	**Maximum**	kW	9.66	0.72	3.43	2.51	1.43	0.72
		kVA	9.85	0.73	3.50	2.56	1.46	0.73
	Typical	kW	6.76	0.50	2.40	1.76	1.00	0.50
		kVA	6.90	0.52	2.45	1.80	1.02	0.52
Cooling	**Maximum**	BTU/hour	32963	2455	11717	8576	4883	2455
		kJ/hour	34776	2591	12362	9048	5152	2591
	Typical	BTU/hour	23075	1719	8202	6004	3419	1719
		kJ/hour	24345	1814	8654	6335	3608	1814
Airflow	**Maximum**	CFM	1527	114	543	398	227	114
	Typical	CFM	1069	80	381	279	159	80
Weight	**Installed**	kg	500.8	18.1	150	120	224.1	18.1
		lbs	1105	40	331	265	495	40
	Shipping	kg	567				290.3	
		lbs	1251				641	
Dimensions	**Installed**	mm	600 (width) x 1200 (depth) x 1998 (height)	1 RU	12 RU	8 RU	600 x 1200 x 1998	1 RU
		inches	23.62 x 47.24 x 78.66				23.62 x 47.24 x 78.66	
	Shipping	mm	1219 x 1575 x 2159				1219 x 1575 x 2159	
		inches	48 x 62 x 85				48 x 62 x 85	

> **Note:**
>
> Individual configurations might differ from the specification described on the table. Contact Oracle for more information about ventilation requirements for your specific configuration.

> **Note:**
>
> See Physical Requirements for more information about requirements.

C

Power Distribution Units Specification

This topic describes the specification of the available PDUs depending on your region and Oracle Cloud at Customer configuration.

> **Note:**
>
> 15kVA are available for Control Plane and certain smaller configurations only. For more details, contact the sales team.

Table C-1 PDU specifications for low voltage

Specification	Low Voltage 15 kVA, 1–phase	Low Voltage 15 kVA, 3–phase	Low Voltage 22 kVA, 1–phase	Low Voltage 24 kVA, 3–phase
Typical Region	North America, South America, Japan and Taiwan.	North America, South America, Japan and Taiwan.	North America, South America, Japan and Taiwan.	North America, South America, Japan and Taiwan.
Phase	1 ph	3 ph	1 ph	3 ph
Marketing Part Number	6442 A	6440 A	7100873	XSR-24K-IEC309-4P / 6444A
Voltage	200 - 240 VAC	200 - 208 VAC 3ph	200-240 VAC 1ph	200-208 VAC 3 ph
Frequency	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
Current	24 A maximum per input	40 A maximum per phase	36.8 A maximum per input	34.6 A maximum per phase
Power Rating	15 kVA	14.4 kVA	22 kVA	25 kVA
Output Current	72 A (3 x 24 A)	69 A (3 x 23 A)	110.4 A (3 x 36.8 A)	120 A (6 × 20 A)
Outlets	42 x C13 6 x C19	42 x C13 6 x C19	42 x C13, 6 x C19	42 x C13, 6 x C19
Outlet Groups	6	6	6	6
Group Protection	20 A (UL489 2-pole circuit breaker)	20 A (UL489 2-pole circuit breaker)	20 A (UL489 2-pole circuit breaker)	20 A (UL489 2-pole circuit breaker)
Data Center Receptacle	NEMA L6-30	IEC309 60 A 4 PIN 250VAC 3ph IP67	Hubbell CS8265C	IEC309-3P4W-IP67 60 A 250 VAC 3 ph (Hubbell equivalent is HBL460R9W)
Number of PDUs per Rack	2	2	2	2

Table C-1 (Cont.) PDU specifications for low voltage

Specification	Low Voltage 15 kVA, 1–phase	Low Voltage 15 kVA, 3–phase	Low Voltage 22 kVA, 1–phase	Low Voltage 24 kVA, 3–phase
Number of Outlets per PDU	3	1	3	2
Number of Outlets Per Rack	6	2	6	4

Table C-2 PDU specifications for high voltage

Specification	High Voltage 15 kVA, 3–phase	High Voltage 22 kVA, 1–phase	High Voltage 24 kVA, 3–phase
Typical Region	Europe, Middle East, Africa (EMEA), and Asia Pacific (APAC), except Japan and Taiwan.	Europe, Middle East, Africa (EMEA), and Asia Pacific (APAC), except Japan and Taiwan.	Europe, Middle East, Africa (EMEA), and Asia Pacific (APAC), except Japan and Taiwan.
Phase	3 ph	1 ph	3 ph
Marketing Part Number	6441 A	7100874	XSR-24K-IEC309-5P
Voltage	220/380 – 240/415 VAC 3ph	220-240 VAC 1 ph	220/380-240/415 VAC 3 ph
Frequency	50/60 Hz	50/60 Hz	50/60 Hz
Current	25 A maximum per phase	32 A maximum per input	18.1 A maximum per phase
Power Rating	14.4 kVA	22 kVA	25 kVA
Output Current	62.7 A (3 x 20.9 A)	96 A (3 x 32 A)	108.6 A (6 × 18.1 A)
Outlets	42 x C13 6 x C19	42 x C13, 6 x C19	42 x C13, 6 x C19
Outlet Groups	6	6	6
Group Protection	20 A (UL489 1-pole circuit breaker)	20 A (UL489 1-pole circuit breaker)	20 A (UL489 1-pole circuit breaker)
Data Center Receptacle	IEC309 32 A 5 PIN 230/400V 3ph IP44	IEC309-2P3W-IP44 32 A 250 VAC (Hubbell equivalent is HBL332R6W)	IEC309-4P5W-IP44 32 A 400 VAC 3 ph (Hubbell equivalent is HBL532R6W)
Number of PDUs per Rack	2	2	2
Number of Outlets per PDU	1	3	2
Number of Outlets Per Rack	2	6	4

Note:

Take note of the number of outlets required per rack. Oracle Cloud at Customer requires all power whips to be connected during installation due to the balanced power configuration of the racks. The customer is required to provide power receptacles for all the outlets that are available for the PDUs.