Oracle® Public Cloud Machine

Deploying Oracle Big Data Cloud Machine

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Oracle Public Cloud Machine Deploying Oracle Big Data Cloud Machine,

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Contents

Preface

Using Oracle Big Data Cloud Machine describes how to prepare for an installation of Oracle Big Data Cloud Machine.

Topics

Audience

Deploying Oracle Big Data Cloud Machine is intended for data center and infrastructure engineers who are preparing to deploy Oracle Big Data Cloud Machine.

Documentation Accessibility

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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.
italic	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.

Convention	Meaning
`monospace`	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

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Site Requirements for Oracle Big Data Cloud Machine

This chapter describes the site requirements for Oracle Big Data Cloud Machine.

This chapter contains these sections:

General Environmental Requirements

The environmental requirements for Oracle Big Data Cloud Machine depend on the model and the size of the system. The following tables provide an overview of the rack requirements. Measurements are approximate. The other sections in this chapter provide detailed information.

Environmental Requirements for Oracle Big Data Cloud Machine X6-2

The following table identifies the general environmental requirements for an Oracle Big Data Cloud Machine X6-2 rack.

Environmental Component	Starter Rack (6 Nodes)	Full Rack (18 Nodes)
Net Weight See also Flooring Requirements	415 kg (915 lb)	836 kg (1843 lb)
Acoustic levels	8.4 Bel	8.5 Bel
Power See also Electrical Power Requirements	Maximum: 5.2 kW Typical: 3.6 kW	Maximum: 13.0 kW Typical: 9.1 kW

Environmental Component	Starter Rack (6 Nodes)	Full Rack (18 Nodes)
Cooling See also Temperature and Humidity Requirements and Ventilation and Cooling Requirements	Maximum: 17,521 BTU/hour (18,485 kJ/hour) Typical: 12,265 BTU/hour (12,940 kJ/hour)	Maximum: 44,136 BTU/hour (46,564 kJ/hour) Typical: 30,895 BTU/hour 32,594 kJ/hour)
Air flow front-to-back (subject to actual data center environment) See also Temperature and Humidity Requirements and Ventilation and Cooling Requirements	Maximum: 811 CFM Typical: 568 CFM	Maximum: 2043 CFM Typical: 1430 CFM
IP addresses See also Understanding the Network Requirements.	12 for Ethernet network 6 for InfiniBand network	24 for Ethernet network 18 for InfiniBand network
Network drops See also Understanding the Network Requirements.	One network connection	One network connection
External connectivity See also Understanding the Network Requirements.	1 x 1 Gbps Ethernet port 6 x 10 Gbps Ethernet ports	1 x 1 Gbps Ethernet ports 18 x 10 Gbps Ethernet ports

Environmental Requirements for Oracle Big Data Cloud Machine X6-2 plus Infiniband Infrastructure

The following table identifies the general environmental requirements for an Oracle Big Data Cloud Machine X6-2 High Capacity Node plus Infiniband Infrastructure.

Environmental Component	Each Node plus Infiniband Infrastructure
Height	3.5 inches (87.6 mm)
Width	17.5 inches (445.0 mm)
Depth	29.0 inches (737.0 mm)
Net Weight See also Flooring Requirements	33.1 kg (73.0 lb)
Power See also Electrical Power Requirements	Maximum: 0.7 kW Typical: 0.5 kW (Typical power usage varies by application workload)

Environmental Component	Each Node plus Infiniband Infrastructure
Cooling See also Electrical Power Requirements and Ventilation and Cooling Requirements	Maximum: 2,481 BTU/hour (2617 kJ/hour) Typical: 1,736 BTU/hour (1831 kJ/hour)
Air flow front-to-back (subject to actual data center environment) See also Electrical Power Requirements and Ventilation and Cooling Requirements	Maximum: 115 CFM Typical: 80 CFM

Space Requirements

The space requirements for Oracle Big Data Cloud Machine are as follows:

- Height: 200 cm (79 inches)
- Width: 60 cm with side panels (24 inches)
- Depth: 120 cm (47.5 inches)

The minimum ceiling height for the cabinet is 230 cm (90 inches), measured from the true floor or raised floor, whichever is higher. An additional 92 cm (36 inches) is required above the rack height in the front and rear aisle space for maintenance access. The space surrounding the cabinet must not restrict the movement of cool air between the air conditioner and the front of the systems within the cabinet, or the movement of hot air coming out of the rear of the cabinet.

Flooring Requirements

Oracle recommends that Oracle Big Data Cloud Machine be installed on raised flooring. The site floor and the raised flooring must be able to support the total weight.

The following table lists the floor load requirements.

Description	Requirement
Maximum allowable weight of installed rack equipment	952.5 kg (2100 lb)
Maximum allowable weight of installed power distribution units	52 kg (115 lb)
Maximum dynamic load (maximum allowable weight of installed equipment including PDUs)	1050 kg (2315 lb)

Electrical Power Requirements

Oracle Big Data Cloud Machine 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 Oracle Big Data Cloud Machine:

- 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 Oracle Big Data Cloud Machine from such disturbances, you should have a dedicated power distribution system, power-conditioning equipment, and lightning arresters or power cables to protect from electrical storms.

Each rack has two preinstalled power distribution units (PDUs). The PDUs accept different power sources. You must specify the type of PDU that is correct for your Oracle Big Data Cloud Machine and data center.

Temperature and Humidity Requirements

Airflow through Oracle Big Data Cloud Machine is from front to back. See the table below for information about cooling and airflow.

Note:

Studies show that temperature increases of 10 degrees Celsius (15 degrees Fahrenheit) above 20 degrees Celsius (70 degrees Fahrenheit) reduce long-term electronics reliability by 50 percent.

Excessive internal temperatures may result in full or partial shutdown of Oracle Big Data Cloud Machine.

The following table lists the temperature, humidity, and altitude requirements for operating and nonoperating systems.

Condition	Operating Requirement	Nonoperating Requirement	Optimum
Temperature	5 to 35 degrees Celsius (40 to 95 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, noncondensing	Up to 93 percent relative humidity	For optimal data center rack cooling, 45 to 50 percent, noncondensing
Altitude	3,000 meters (9,840 feet) maximum	12,000 meters (39,400 feet) maximum	Ambient temperature is reduced by 1 degree Celsius for each 300 meters above 900 meters altitude above sea level

Set conditions to the optimal temperature and humidity ranges to minimize the chance of downtime due to component failure. Operating Oracle Big Data Cloud Machine for extended periods at or near the operating range limits, or installing it in an

environment where it remains at or near nonoperating 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. Most computer equipment can operate in a wide temperature range, but near 22 degrees Celsius (72 degrees Fahrenheit) is desirable because it is easier to maintain safe humidity levels. Operating in this temperature range provides a safety buffer if the air conditioning system fails.

The ambient relative humidity range of 45 to 50 percent is suitable for safe data processing operations. Most computer equipment can operate in a wide range (20 to 80 percent), 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 if the air conditioner control fails.
- Helps avoid failures or temporary malfunctions caused by intermittent interference from static discharges that may occur when relative humidity is too low.

Note:

Electrostatic discharge (ESD) is easily generated and hard to dissipate in areas of low relative humidity, such as below 35 percent. ESD becomes critical when humidity drops below 30 percent. Maintaining humidity in a data center is not difficult, because a high-efficiency vapor barrier and a low rate of air changes are normally present.

Ventilation and Cooling Requirements

Always provide adequate space in front 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. Rack-mountable servers and equipment typically draw cool air in through the front of the rack and let out warm air through the rear of the rack. There is no air flow requirement for the left and right sides due to front-to-back cooling.

If the rack is not completely filled with components, then cover the empty sections with filler panels. Gaps between components can adversely affect air flow and cooling within the rack.

Relative humidity is the percentage of the total water vapor that can exist in the air without condensing, and it is inversely proportional to air temperature. Humidity goes down when the temperature rises, and goes up when the temperature drops. For example, air with a relative humidity of 45 percent at a temperature of 24 degrees Celsius (75 degrees Fahrenheit) has a relative humidity of 65 percent at a temperature of 18 degrees Celsius (64 degrees Fahrenheit). As the temperature drops, the relative humidity rises to more than 65 percent, and water droplets form.

Air conditioning facilities usually do not precisely monitor or control temperature and humidity throughout an entire computer room. Generally, you should monitor individual points corresponding to multiple exhaust vents in the main unit and other units in the room, because the distribution of temperature and humidity is uneven

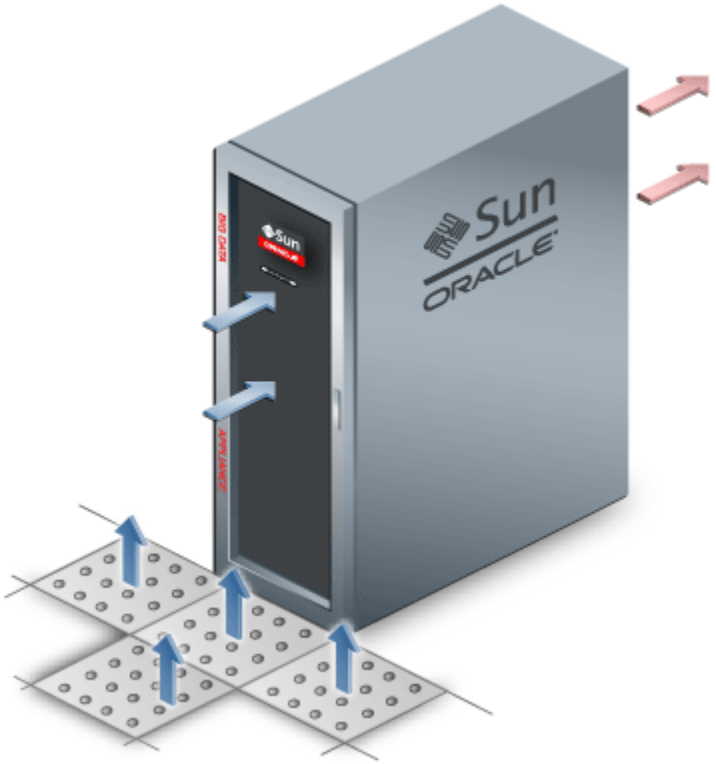
across the room. Pay special consideration to humidity when using underfloor ventilation.

Oracle Big Data Cloud Machine is designed to function while mounted in a natural convection air flow. Follow these requirements to meet the environmental specification:

- Ensure that the rack has adequate air flow.
- Ensure that the rack has front-to-back cooling. The air inlet is at the front of the server, and the air outlet is at the rear.
- Allow a minimum clearance of 91.4 cm (36 inches) at the front of the rack and 91.4 cm (36 inches) at the rear of the rack for ventilation.

Use perforated tiles, rated for 400 cubic feet per minute (CFM) per tile air flow, in front of the rack for cold air intake. The tiles can be arranged in any order in front of the rack, if cold air from the tiles can flow into the rack. Inadequate cold air flow could result in a higher inlet temperature in the servers due to exhaust air recirculation. Oracle recommends four floor tiles for Oracle Big Data Cloud Machine.

The following illustration shows a typical installation of the floor tiles for Oracle Big Data Cloud Machine in a typical data center.



Network Connection Requirements

Before installation, network cables must run from your existing network infrastructure to the installation site. The requirements to connect Oracle Big Data Cloud Machine to your existing network infrastructure are as follows:

- Management network connection requirements

  - One 1 Gbps Ethernet connection for the management switch in the rack
  - One 1 Gbps Ethernet connection for the KVM switch in the rack (Sun Fire X4270 M2-based racks only)
- Client access network connection requirements
  - 2 (minimum) to 16 (maximum) 10 Gbps Ethernet connections split between the two Sun Network QDR InfiniBand Gateway switches in the rack. The exact number of connections depends on your bandwidth requirements.

See Also:

Understanding the Network Requirements

Ensuring That the Site Is Ready

Before Oracle Big Data Cloud Machine is delivered to the site, perform these tasks to ensure that the site is ready:

Task	Instructions
Review Site Requirements	Review the site requirements in this document to understand the requirements of Oracle Big Data Cloud Machine and ensure you are ready for delivery.

Task	Instructions
Prepare the Site Based on Requirements	Prepare the site based on the requirements described earlier in this chapter, such as installing the network cables and power supplies, before the arrival of Oracle Big Data Cloud Machine: **1.** Review the safety guidelines. See Safety Guidelines. **2.** Note problems or peculiarities at the site. For example, ensure that the doors are tall enough and wide enough for Oracle Big Data Cloud Machine. See Space Requirements. **3.** Verify that the installation site flooring has a strength rating to withstand the combined weight of Oracle Big Data Cloud Machine and any other installed equipment. See Flooring Requirements **4.** Install all necessary electrical equipment, and ensure that sufficient power is provided for Oracle Big Data Cloud Machine. See *Sun Rack II Power Distribution Units User's Guide* for the power distribution unit (PDU) power requirements at Electrical Power Requirements and `http://docs.oracle.com/cd/E19844-01/`. **5.** Ensure that the installation site provides adequate air conditioning. See Ventilation and Cooling Requirements. **6.** Operate the air conditioning system for 48 hours to bring the room temperature to the appropriate level. See Temperature and Humidity Requirements. **7.** Install the network cables for Oracle Big Data Cloud Machine. See Network Connection Requirements **8.** Clean and vacuum the area thoroughly in preparation for installation.

Safety Guidelines

Before Oracle Big Data Cloud Machine arrives, review the following safety precautions to ensure that the site is safe and ready for delivery. Failing to observe these precautions can result in injury, equipment damage, or malfunction.

- Do not block ventilation openings.
- Do not install Oracle Big Data Cloud Machine in a location that is exposed to direct sunlight or near a device that may become hot.
- Do not install Oracle Big Data Cloud Machine in a location that is exposed to excessive dust, corrosive gases, or air with high salt concentrations.
- Do not install Oracle Big Data Cloud Machine in a location that is exposed to frequent vibrations. Install it on a flat, level surface.
- Use a power outlet that provides proper grounding. For shared grounding, the grounding resistance must not be greater than 10 ohms. Ensure that your facility administrator or a qualified electrical engineer verifies the grounding method for the building and performs the grounding work.

- Be sure that each grounding wire used for Oracle Big Data Cloud Machine is used exclusively for Oracle Big Data Cloud Service. Observe the precautions, warnings, and notes about handling that appear on labels on the equipment.
- Do not place cables under the equipment or stretch the cables tightly.
- Do not disconnect power cords from the equipment while its power is on.
- If you cannot reach the connector lock when disconnecting LAN cables, then press the connector lock with a flathead screwdriver to disconnect the cable. You could damage the system board if you force your fingers into the gap rather than using a flathead screwdriver.
- Do not place anything on top of Oracle Big Data Cloud Machine or perform any work directly above it.
- Do not let the room temperature rise sharply, especially in winter. Sudden temperature changes can cause condensation to form inside Oracle Big Data Cloud Machine. Allow for a sufficient warm-up period before operation.
- Do not install Oracle Big Data Cloud Machine near a photocopier, air conditioner, welding machine, or any other equipment that generates loud, electronic noises.
- Avoid static electricity at the installation location. Static electricity transferred to Oracle Big Data Cloud Machine can cause malfunctions. Static electricity is often generated on carpets.
- Confirm that the supply voltage and frequency match the electrical ratings indicated for Oracle Big Data Cloud Machine.
- Do not insert anything into any Oracle Big Data Cloud Machine opening, unless doing so is part of a documented procedure.

  WARNING: Oracle Big Data Cloud Machine contains high-voltage parts. If a metal object or other electrically conductive object enters an opening in Oracle Big Data Cloud Machine, then it could cause a short circuit. This could result in personal injury, fire, electric shock, and equipment damage.

- When using single-phase power distribution units (PDUs), note the following:
  - PDU A input 0 and PDU B input 2 must be on the same phase.
  - PDU A input 1 and PDU B input 1 must be on the same phase.
  - PDU A input 2 and PDU B input 0 must be on the same phase.

  The inputs are labeled where they come out of the PDU. Connecting cables as described ensures that the phases are balanced on both sides, A and B, in a failover.

See also:

- Important Safety Information for Sun Hardware Systems (816-7190) included with the rack and available online at

  http://docs.oracle.com/cd/E19115-01/mod.dc.d20/816-7190-12/816-7190-12.pdf

- *Oracle Big Data Appliance Safety and Compliance Guide* and all safety notices printed on the packaging.

- Sun Rack II Power Distribution Units User's Guide at http://docs.oracle.com/cd/E19844-01/.

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Understanding the Network Requirements

This chapter describes the network requirements for Oracle Big Data Cloud Machine. This chapter contains these sections:

Overview of Network Requirements

Oracle Big Data Cloud Machine includes five or more servers and the equipment to connect the servers to your network. The network connections enable the servers to be administered remotely and enable clients to connect to them. Use the information in this chapter to configure the environment for Oracle Big Data Cloud Machine.

Each server has the following network components and interfaces:

- 1 Dual-port 4X QDR (40 Gbps) InfiniBand Host Channel Adapter network interface card
- 1 Ethernet port for Oracle Integrated Lights Out Manager v3.1 for remote management (v3.0 for Sun Fire X4270 M2 servers)
- 4 10-Gigabit Ethernet ports (1-Gigabit Ethernet ports for Sun Fire X4270 M2)

Cabling the Client Network

Each of the two Sun Network QDR InfiniBand Gateway switches in Oracle Big Data Cloud Machine has eight 10 GbE ports. The two switches enable you to create up to 16 10 GbE connections for each rack. You can determine how many connections to create based on the bandwidth needed for the client network. For proper functioning, at least one of the eight ports of each gateway switch must have an active connection to the site's 10 GbE network. Oracle recommends that the two switches have the same number of active 10 GbE connections, so that failover does not result in a loss of available client network bandwidth.

Factory Network Settings

This initial network configuration is set at the factory for Oracle Big Data Cloud Machine:

- **Gateway**: 192.168.1.254 in all devices as required
- **Subnet Mask**: 255.255.255.0 in all devices as required

- **IP Address Range**: 192.168.1.1 to 192.168.1.211

The following table lists the default IP addresses for Oracle Big Data Cloud Machine.

Host	Administrative IP Addresses	Oracle ILOM IP Addresses	InfiniBand Bonded IP Addresses
bda18[1]	192.168.1.18	192.168.1.118	192.168.10.18
bda17[1]	192.168.1.17	192.168.1.117	192.168.10.17
bda16[1]	192.168.1.16	192.168.1.116	192.168.10.16
bda15[1]	192.168.1.15	192.168.1.115	192.168.10.15
bda14[1]	192.168.1.14	192.168.1.114	192.168.10.14
bda13[1]	192.168.1.13	192.168.1.113	192.168.10.13
bda12[2]	192.168.1.12	192.168.1.112	192.168.10.12
bda11[2]	192.168.1.11	192.168.1.111	192.168.10.11
bda10[2]	192.168.1.10	192.168.1.110	192.168.10.10
bdasw-ib3	192.168.1.203		
Cisco Switch	192.168.1.200		
bdasw-ib2	192.168.1.202		
bda9[2]	192.168.1.9	192.168.1.109	192.168.10.9
bda8[2]	192.168.1.8	192.168.1.108	192.168.10.8
bda7[2]	192.168.1.7	192.168.1.107	192.168.10.7
bda6	192.168.1.6	192.168.1.106	192.168.10.6
bda5	192.168.1.5	192.168.1.105	192.168.10.5
bda4	192.168.1.4	192.168.1.104	192.168.10.4
bda3	192.168.1.3	192.168.1.103	192.168.10.3
bda2	192.168.1.2	192.168.1.102	192.168.10.2
bda1	192.168.1.1	192.168.1.101	192.168.10.1
bdasw-ib1	196.168.1.201		
PDU A	192.168.1.210		
PDU B	192.168.1.211		

1 Full racks only

2 Full racks or starter racks with additional servers only

Port Assignments for Oracle Big Data Cloud Machine Software

The following table identifies the port numbers used by Oracle Big Data Cloud Machine software.

For port numbers used by Cloudera CDH, CM, and other Cloudera products, see the Cloudera documentation library.

Port	Used by
22	ssh
80	yumrepos (only during installation)
111	portmap
162	Auto Service Request Manager (optional)
443	Auto Service Request Manager (optional)
668	rpc.statd
3306	MySQL Database
5042	Oracle Big Data SQL
6481	Auto Service Request Manager service tags listener (optional)
8139	Puppet nodes
8140	Puppet parent
20910	Oracle Data Integrator agent
30920	Automated Service Monitor (ASM)

The following table identifies the port numbers used by Oracle Big Data Discovery software.

Note: The port assignments described in the following table exist only on the 5th node of the primary cluster and only when Oracle Big Data Discovery is installed.

Port	Service	Configuration Property Name
7001	WebLogic	ADMIN_SERVER_PORT
7002	WebLogic	ADMIN_SERVER_SECURE_PORT
7003	WebLogic	MANAGED_SERVER_PORT
7004	WebLogic	MANAGED_SERVER_SECURE_PORT