Oracle® Exadata Database Machine

Installation and Configuration Guide for Exadata Database Machine

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Oracle Exadata Database Machine Installation and Configuration Guide for Exadata Database Machine, 19.1.0

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Primary Author: Janet Stern

Contributing Authors: Glenn Maxey, Caroline Johnston, Lypp-Tek Khoo-Ellis

Contributors: Doug Archambault, Leo Agranonik, Andrew Babb, Bharat Baddepudi, Michael Belef, Nilesh Choudhury, Henry Chow, Kevin Closson, Bob Cyphers, Ravindra Dani, Boris Erlikhman, Jaime Figueroa, Gurmeet Goindi, Roger Hansen, Shrikumar Hariharasubrahmanian, Kevin Jernigan, Sarat Karkarla, Leslie Keller, Frank Kobylanski, Poojan Kumar, René Kundersma, Robert S. Lee, Sue Lee, Jennifer Leung, Yang Liu, Juan Loaiza, Barb Lundhild, Catherine Luu, Varun Malhotra, Bagish Mishra, Valarie Moore, Philip Newlan, Adrian Ng, Dan Norris, Michael Nowak, Bharat Paliwal, Umesh Panchaksharaiah, Hector Pujol, Sugam Pandey, Dmitry Potapov, Darryl Presley, Vince Pulice, Ashish Ray, Samitha Samaranayake, Richard Scales, Olly Sharwood, Jia Shi, Kesavan Srinivasan, Mahesh Subramaniam, Michelle Sun, Krishnadev Telikicherla, Cliff Thomas, Alex Tsukerman, Shreyas Udgaonkar, Kothanda Umamageswaran, Doug Utzig, James Viscusi, Vern Wagman, Zheren Zhang

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Preface

This guide describes Oracle Exadata Database Machine for online transaction processing (OLTP) and enterprise data warehousing. It includes information about site planning and configuration, as well as physical, electrical, and environmental specifications.

Audience

This guide is intended for Oracle Exadata Database Machine customers and those responsible for data center site planning, configuration, and maintenance of Oracle Exadata Database Machine.

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.

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Related Documentation

In addition to the Oracle Exadata Database Machine documentation set, the following guides contain hardware information for Oracle Exadata Database Machine:

- *Oracle Exadata Database Machine System Overview*
- *Oracle Exadata Database Machine Security Guide*
- *Oracle Engineered System Safety and Compliance Guide, Compliance Model No.: ESY27*
- *Oracle Exadata Database Machine Extending and Multi-Rack Cabling Guide*
- *Oracle Exadata Database Machine Maintenance Guide*
- *Oracle Exadata System Software User's Guide*
- *Oracle Server X7-2 Service Manual* at http://docs.oracle.com/cd/E72435_01/html/E72445/index.html
- *Oracle Server X7-2L Service Manual* at http://docs.oracle.com/cd/E72463_01/html/E72474/index.html

- *Oracle Server X7-8 Service Manual* at http://docs.oracle.com/cd/E71925_01/html/E71936/index.html

- *Oracle Server X6-2 Service Manual* at http://docs.oracle.com/cd/E62159_01/html/E62171/index.html

- *Oracle Server X6-2L Service Manual* at http://docs.oracle.com/cd/E62172_01/html/E62184/index.html

- *Oracle Server X5-2 Service Manual* at http://docs.oracle.com/cd/E41059_01/html/E48312/napsm.html

- *Oracle Server X5-2L Service Manual* at http://docs.oracle.com/cd/E41033_01/html/E48325/cnpsm.html#scrolltoc

- *Sun Server X4-8 Service Manual* at http://docs.oracle.com/cd/E40591_01/html/E40317/index.html

- *Sun Server X4-2 Service Manual* at http://docs.oracle.com/cd/E36975_01/html/E38045/gentextid-14757.html#scrolltoc

- *Sun Server X4-2L Service Manual* at http://docs.oracle.com/cd/E36974_01/html/E38145/gentextid-14728.html#scrolltoc

- *Sun Server X3-2 (formerly Sun Fire X4170 M3) Service Manual* at http://docs.oracle.com/cd/E22368_01/html/E27242/gentextid-14840.html#scrolltoc

- *Sun Server X3-2L (formerly Sun Fire X4270 M3) Service Manual* at http://docs.oracle.com/cd/E23393_01/html/E27229/gentextid-14804.html#scrolltoc

- *Sun Server X2-8 (formerly Sun Fire X4800 M2) Service Manual* at http://docs.oracle.com/cd/E20815_01/html/E20819/index.html

- *Sun Fire X4800 Server Service Manual* at http://docs.oracle.com/cd/E19140-01/html/821-0282/index.html

- *Sun Fire X4270 M2 Server Service Manual* at http://docs.oracle.com/cd/E19245-01/E21671/index.html

- *Sun Fire X4170 M2 Server Service Manual* at http://docs.oracle.com/cd/E19762-01/E22369-02/index.html

- *Sun Fire X4170, X4270, and X4275 Servers Service Manual* at http://docs.oracle.com/cd/E19477-01/820-5830-13/index.html

- Sun Datacenter InfiniBand Switch 36 Firmware Version 2.1 Documentation at http://docs.oracle.com/cd/E36265_01/index.html

- Sun Datacenter InfiniBand Switch 36 Firmware Version 2.2 Documentation at http://docs.oracle.com/cd/E76424_01/index.html

- *Sun Flash Accelerator F20 PCIe Card User's Guide* at http://docs.oracle.com/cd/E19682-01/E21358/index.html

- *Sun Flash Accelerator F40 PCIe Card User's Guide* at http://docs.oracle.com/cd/E29748_01/html/E29741/index.html

- *Sun Flash Accelerator F80 PCIe Card User's Guide* at http://docs.oracle.com/cd/E41278_01/html/E41251/index.html

- *Oracle Flash Accelerator F160 PCIe Card User Guide* at http://docs.oracle.com/cd/E54943_01/html/E54947/index.html

- *Oracle Flash Accelerator F320 PCIe Card User Guide* at http://docs.oracle.com/cd/E65386_01/html/E65387/index.html

- Sun Storage 6 Gb SAS PCIe RAID HBA Documentation at `http://docs.oracle.com/cd/E19221-01/`

- Oracle Storage 12 Gb/s SAS PCIe RAID HBA, Internal Documentation Library at `http://docs.oracle.com/cd/E52363_01/index.html`

- Oracle Integrated Lights Out Manager (ILOM) Documentation at `http://www.oracle.com/goto/ilom/docs`

- "Cisco Catalyst 4948E and 4948E-F Ethernet Switches Data Sheet" at `https://www.cisco.com/c/en/us/products/collateral/switches/catalyst-4948e-ethernet-switch/data_sheet_c78-598933.html`

- "Cisco Nexus 9300-EX and 9300-FX Platform Switches Data Sheet at `https://www.cisco.com/c/en/us/products/collateral/switches/nexus-9000-series-switches/datasheet-c78-736651.html`"

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.
`monospace`	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.
$ prompt	The dollar sign ($) prompt indicates a command run as the `oracle` user.
# prompt	The pound (#) prompt indicates a command that is run as the `root` user.

1

Site Requirements for Oracle Exadata Database Machine and Oracle Exadata Storage Expansion Rack

This chapter describes the site requirements for Oracle Exadata Database Machine, and Oracle Exadata Storage Expansion Rack.

> **Note:**
>
> For ease of reading, the name "Oracle Exadata Rack" is used when information refers to both Oracle Exadata Database Machine and Oracle Exadata Storage Expansion Rack.

Related Topics

- Site Checklists

1.1 General Environmental Requirements

The following sections describe the general environmental requirements for Oracle Exadata Racks.

1.1.1 General Environmental Requirements for Oracle Exadata Database Machine X6-2, X6-8, and Later

For Oracle Exadata Database Machine X6-2 and later environmental requirements, such as weight, acoustic level, power, cooling, and air flow, use the Oracle Exadata Configuration Assistant, available on Oracle Technology Network:

Oracle Exadata Configuration Assistant (OECA) Downloads

1.1.2 General Environmental Requirements for Oracle Exadata Database Machine X5-2

The environmental requirements for Oracle Exadata Database Machine X5-2 depend on the size of the system. Table 1-1 shows the general environmental requirements for Oracle Exadata Database Machine X5-2. The other sections in this chapter provide detailed information.

Table 1-1   Environmental Requirements for Oracle Exadata Database Machine X5-2

Environmental Component	Oracle Exadata Database Machine X5-2 Full Rack	Oracle Exadata Database Machine X5-2 Half Rack	Oracle Exadata Database Machine X5-2 Quarter Rack	Oracle Exadata Database Machine X5-2 Eighth Rack
Weight **See Also:** "Flooring Requirements"	• Extreme Flash drives: 804.9 kg (1774 lbs) • High capacity drives: 874.8 kg (1928 lbs))	• Extreme Flash drives: 525.9 kg (1160 lbs) • High capacity drives: 560.9 kg (1236 lbs)	• Extreme Flash drives: 366.3 kg (808 lbs) • High capacity drives: 381.2 kg (841 lbs)	• Extreme Flash drives: 366.3 kg (808 lbs) • High capacity drives: 381.2 kg (841 lbs)
Acoustic levels	86 db(A)	85 db(A)	83 db(A)	83 db(A)
Power **See Also:** "Electrical Power Requirements"	• Extreme Flash drives Maximum: 15.7 kVA Typical: 11.0 kVA (varies based on application load) • High capacity drives Maximum: 15.6 kVA Typical: 10.9 kVA (varies based on application load)	• Extreme Flash drives Maximum: 8.5 kVA Typical: 5.9 kVA (varies based on application load) • High capacity drives Maximum: 8.4 kVA Typical: 5.9 kVA (varies based on application load)	• Extreme Flash drives Maximum: 4.2 kVA Typical: 3.0 kVA (varies based on application load) • High capacity drives Maximum: 4.2 kVA Typical: 2.9kVA (varies based on application load)	• Extreme Flash drives Maximum: 3.5 kVA Typical: 2.4 kVA (varies based on application load) • High capacity drives Maximum: 34 kVA Typical: 2.4 kVA (varies based on application load)

Table 1-1 (Cont.) Environmental Requirements for Oracle Exadata Database Machine X5-2

Environmental Component	Oracle Exadata Database Machine X5-2 Full Rack	Oracle Exadata Database Machine X5-2 Half Rack	Oracle Exadata Database Machine X5-2 Quarter Rack	Oracle Exadata Database Machine X5-2 Eighth Rack
Cooling **See Also:** "Temperature and Humidity Requirements", and "Ventilation and Cooling Requirements"	• Extreme Flash drives Maximum: 52,578 BTU/hour (55,469 kJ/hour) Typical: 36,804 BTU/hour (38,829 kJ/hour) • High capacity drives Maximum: 52,052 BTU/hour (54,915 kJ/hour) Typical: 36,437 BTU/hour (38,441 kJ/hour)	• Extreme Flash drives Maximum: 28,396 BTU/hour (29,958 kJ/hour) Typical: 19,877 BTU/hour (20,970 kJ/hour) • High capacity drives Maximum: 28,133 BTU/hour (29,680 kJ/hour) Typical: 19,693 BTU/hour (20,776 kJ/hour)	• Extreme Flash drives Maximum: 14,195 BTU/hour (14,975 kJ/hour) Typical: 9,936 BTU/hour (10,483 kJ/hour) • High capacity drives Maximum: 14,082 BTU/hour (14,856 kJ/hour) Typical: 9,857 BTU/hour (10,399 kJ/hour)	• Extreme Flash drives Maximum: 11,674 BTU/hour (12,317 kJ/hour) Typical: 8,172 BTU/hour (8,622 kJ/hour) • High capacity drives Maximum: 11,530 BTU/hour (12,164 kJ/hour) Typical: 8,071 BTU/hour (8,515 kJ/hour)
Air flow front-to-back (subject to actual data center environment) **See Also:** "Temperature and Humidity Requirements", and "Ventilation and Cooling Requirements"	• Extreme Flash drives Maximum: Approximately 2,434 CFM Typical: Approximately 1,704 CFM • High capacity drives Maximum: Approximately 2,410 CFM Typical: Approximately 1,687 CFM	• Extreme Flash drives Maximum: Approximately 1,315 CFM Typical: Approximately 920 CFM • High capacity drives Maximum: Approximately 1,302 CFM Typical: Approximately 912 CFM	• Extreme Flash drives Maximum: Approximately 657 CFM Typical: Approximately 460 CFM • High capacity drives Maximum: Approximately 652 CFM Typical: Approximately 456 CFM	• Extreme Flash drives Maximum: Approximately 540 CFM Typical: Approximately 378 CFM • High capacity drives Maximum: Approximately 534 CFM Typical: Approximately 374 CFM
IP Addresses **See Also:** "Network Connection and IP Address Requirements for Oracle Exadata Database Machine"	68 for Ethernet network, assuming single cluster Up to 36 for InfiniBand network	38 for Ethernet network, assuming single cluster Up to 18 for InfiniBand network	22 for Ethernet network, assuming single cluster Up to 8 for InfiniBand network	22 for Ethernet network, assuming single cluster Up to 8 for InfiniBand network

Table 1-1   (Cont.) Environmental Requirements for Oracle Exadata Database Machine X5-2

Environmental Component	Oracle Exadata Database Machine X5-2 Full Rack	Oracle Exadata Database Machine X5-2 Half Rack	Oracle Exadata Database Machine X5-2 Quarter Rack	Oracle Exadata Database Machine X5-2 Eighth Rack
Network drops **See Also:** "Network Connection and IP Address Requirements for Oracle Exadata Database Machine"	Minimum of 11 network drops	Minimum of 7 network drops	Minimum of 5 network drops	Minimum of 5 network drops
External connectivity **See Also:** "Network Connection and IP Address Requirements for Oracle Exadata Database Machine"	18 x 1 GbE/10 GbE Ethernet ports 16 x 10 GbE Ethernet ports At least 12 InfiniBand ports	12 x 1 GbE/10 GbE Ethernet ports 8 x 10 GbE Ethernet ports At least 12 InfiniBand ports	6 x 1 GbE/10 GbE Ethernet ports 4 x 10 GbE Ethernet ports At least 12 InfiniBand ports	6 x 1 GbE/10 GbE Ethernet ports 4 x 10 GbE Ethernet ports At least 12 InfiniBand ports

1.1.3 General Environmental Requirements for Oracle Exadata Database Machine X5-8

Table 1-2 shows the general environmental requirements for Oracle Exadata Database Machine X5-8. Other sections in this chapter provide detailed information.

Table 1-2   Environmental Requirements for Oracle Exadata Database Machine X5-8

Environmental Component	Oracle Exadata Database Machine X5-8 Full Rack	Oracle Exadata Database Machine X5-8 Half Rack
Weight **See Also:** "Flooring Requirements"	Extreme Flash drives: 1826.5 lbs (828.1 kg) High capacity drives: 1980.5 lbs (898.3 kg)	Extreme Flash drives: 1160.1 lbs (526.2 kg) High capacity drives: 1193.1 lbs (541.2 kg)
Acoustic levels	8.68	8.58
Power **See Also:** "Electrical Power Requirements"	Extreme Flash drives: • Max: 16.4 kW (16.7 kVA) • Typical: 11.5 kW (11.7 kVA) High capacity drives: • Max: 16.2 kW (16.6 kVA) • Typical: 11.4 kW (11.6 kVA)	Extreme Flash drives: • Max: 9.5 kW (9.7 kVA) • Typical: 6.7 kW (6.8 kVA) High capacity drives: • Max: 9.5 kW (9.7 kVA) • Typical: 6.6 kW (6.8 kVA)

Table 1-2   (Cont.) Environmental Requirements for Oracle Exadata Database Machine X5-8

Environmental Component	Oracle Exadata Database Machine X5-8 Full Rack	Oracle Exadata Database Machine X5-8 Half Rack
Cooling **See Also:** "Temperature and Humidity Requirements", and "Ventilation and Cooling Requirements"	Extreme Flash drives: • Max: 55,935 BTU/hour (59,012 kJ/hour) • Typical: 39,155 BTU/hour (41,308 kJ/hour) High capacity drives: • Max: 55,410 BTU/hour (58,457 kJ/hour) • Typical: 38,787 BTU/hour (40,920 kJ/hour)	Extreme Flash drives: • Max: 32,436 BTU/hour (34,220 kJ/hour) • Typical: 22,705 BTU/hour (23,954 kJ/hour) High capacity drives: • Max: 32,323 BTU/hour (34,101 kJ/hour) • Typical: 22,626 BTU/hour (23,871 kJ/hour)
Air flow front-to-back (subject to actual data center environment) **See Also:** "Temperature and Humidity Requirements", and "Ventilation and Cooling Requirements"	Extreme Flash drives: • Max: 2590 CFM • Typical: 1813 CFM High capacity drives: • Max: 2565 CFM • Typical: 1796 CFM	Extreme Flash drives: • Max: 1502 CFM • Typical: 1051 CFM High capacity drives: • Max: 1496 CFM • Typical: 1048 CFM

1.1.4 General Environmental Requirements for Oracle Exadata Database Machine X4-2

The environmental requirements for Oracle Exadata Database Machine X4-2 depend on the size of the system. Table 1-3 shows the general environmental requirements for Oracle Exadata Database Machine X4-2. The other sections in this chapter provide detailed information.

Table 1-3   Environmental Requirements for Oracle Exadata Database Machine X4-2

Environmental Component	Oracle Exadata Database Machine X4-2 Full Rack	Oracle Exadata Database Machine X4-2 Half Rack	Oracle Exadata Database Machine X4-2 Quarter Rack	Oracle Exadata Database Machine X4-2 Eighth Rack
Weight **See Also:** "Flooring Requirements"	852.8 kg (1880 lbs)	525.3 kg (1158 lbs)	365.6 kg (806 lbs)	365.6 kg (806 lbs)
Acoustic levels	93 db(A)	89 db(A)	85 db(A)	85 db(A)

Table 1-3   (Cont.) Environmental Requirements for Oracle Exadata Database Machine X4-2

Environmental Component	Oracle Exadata Database Machine X4-2 Full Rack	Oracle Exadata Database Machine X4-2 Half Rack	Oracle Exadata Database Machine X4-2 Quarter Rack	Oracle Exadata Database Machine X4-2 Eighth Rack
Power **See Also:** "Electrical Power Requirements"	• High performance drives Maximum: 12.4 kVA Typical: 8.7 kVA (varies based on application load) • High capacity drives Maximum: 11.4 kVA Typical: 8.1 kVA (varies based on application load)	• High performance drives Maximum: 6.8 kVA Typical: 4.8 kVA (varies based on application load) • High capacity drives Maximum: 6.3 kVA Typical: 4.4 kVA (varies based on application load)	• High performance drives Maximum: 3.4 kVA Typical: 2.5 kVA (varies based on application load) • High capacity drives Maximum: 3.2 kVA Typical: 2.3 kVA (varies based on application load)	• High performance drives Maximum: 3.1 kVA Typical: 2.2 kVA (varies based on application load) • High capacity drives Maximum: 2.9 kVA Typical: 2.1 kVA (varies based on application load)
Cooling **See Also:** "Temperature and Humidity Requirements", and "Ventilation and Cooling Requirements"	• High performance drives Maximum: 41,300 BTU/hour (43,600 kJ/hour) Typical: 29,000 BTU/hour (30,600 kJ/hour) • High capacity drives Maximum: 38,300 BTU/hour (40,400 kJ/hour) Typical: 27,000 BTU/hour (28,500 kJ/hour)	• High performance drives Maximum: 22,500 BTU/hour (23,750 kJ/hour) Typical: 16,000 BTU/hour (16,900 kJ/hour) • High capacity drives Maximum: 21,200 BTU/hour (22,400 kJ/hour) Typical: 14,700 BTU/hour (15,500 kJ/hour)	• High performance drives Maximum: 11,300 BTU/hour (11,900 kJ/hour) Typical: 8,200 BTU/hour (8,700 kJ/hour) • High capacity drives Maximum: 10,600 BTU/hour (11,200 kJ/hour) Typical: 7,500 BTU/hour (7,900 kJ/hour)	• High performance drives Maximum: 10,200 BTU/hour (10,700 kJ/hour) Typical: 7,100 BTU/hour (7,500 kJ/hour) • High capacity drives Maximum: 9,500 BTU/hour (10,000 kJ/hour) Typical: 6,600 BTU/hour (7,000 kJ/hour)

Table 1-3   (Cont.) Environmental Requirements for Oracle Exadata Database Machine X4-2

Environmental Component	Oracle Exadata Database Machine X4-2 Full Rack	Oracle Exadata Database Machine X4-2 Half Rack	Oracle Exadata Database Machine X4-2 Quarter Rack	Oracle Exadata Database Machine X4-2 Eighth Rack
Air flow front-to-back (subject to actual data center environment) **See Also:** "Temperature and Humidity Requirements", and "Ventilation and Cooling Requirements"	• High performance drives Maximum: Approximately 1,900 CFM Typical: Approximately 1,350 CFM • High capacity drives Maximum: Approximately 1,780 CFM Typical: Approximately 1,250 CFM	• High performance drives Maximum: Approximately 1,050 CFM Typical: Approximately 750 CFM • High capacity drives Maximum: Approximately 980 CFM Typical: Approximately 680 CFM	• High performance drives Maximum: Approximately 520 CFM Typical: Approximately 365 CFM • High capacity drives Maximum: Approximately 490 CFM Typical: Approximately 350 CFM	• High performance drives Maximum: Approximately 470 CFM Typical: Approximately 325 CFM • High capacity drives Maximum: Approximately 440 CFM Typical: Approximately 310 CFM
IP Addresses **See Also:** "Network Connection and IP Address Requirements for Oracle Exadata Database Machine"	68 for Ethernet network, assuming single cluster Up to 36 for InfiniBand network	38 for Ethernet network, assuming single cluster Up to 18 for InfiniBand network	22 for Ethernet network, assuming single cluster Up to 8 for InfiniBand network	22 for Ethernet network, assuming single cluster Up to 8 for InfiniBand network
Network drops **See Also:** "Network Connection and IP Address Requirements for Oracle Exadata Database Machine"	Minimum of 11 network drops	Minimum of 7 network drops	Minimum of 5 network drops	Minimum of 5 network drops
External connectivity **See Also:** "Network Connection and IP Address Requirements for Oracle Exadata Database Machine"	18 x 1 GbE/10 GbE Ethernet ports 16 x 10 GbE Ethernet ports At least 12 InfiniBand ports	12 x 1 GbE/10 GbE Ethernet ports 8 x 10 GbE Ethernet ports At least 12 InfiniBand ports	6 x 1 GbE/10 GbE Ethernet ports 4 x 10 GbE Ethernet ports At least 12 InfiniBand ports	6 x 1 GbE/10 GbE Ethernet ports 4 x 10 GbE Ethernet ports At least 12 InfiniBand ports

1.1.5 General Environmental Requirements for Oracle Exadata Database Machine X4-8 with Exadata Storage Server X5-2 Servers

Table 1-4 shows the general environmental requirements for Oracle Exadata Database Machine X4-8 with Exadata Storage Server X5-2 Servers. The other sections in this chapter provide detailed information.

Table 1-4   Environmental Requirements for Oracle Exadata Database Machine X4-8 Racks with Exadata Storage Server X5-2 Servers

Environmental Component	Oracle Exadata Database Machine X4-8 Full Rack with Exadata Storage Server X5-2 Servers	Oracle Exadata Database Machine X4-8 Half Rack with Exadata Storage Server X5-2 Servers
Weight **See Also:** "Flooring Requirements"	• Extreme Flash drives: 828.1 kg (1826 lbs) • High capacity drives: 898.3 kg (1980 lbs))	• Extreme Flash drives: 526.2 kg (1160 lbs) • High capacity drives: 541.2 kg (1193 lbs)
Acoustic levels	86 db(A)	85 db(A)
Power **See Also:** "Electrical Power Requirements"	• Extreme Flash drives Maximum: 17.1 kVA Typical: 12.0 kVA (varies based on application load) • High capacity drives Maximum: 17.0 kVA Typical: 11.9 kVA (varies based on application load)	• Extreme Flash drives Maximum: 10.1 kVA Typical: 7.1 kVA (varies based on application load) • High capacity drives Maximum: 10.1 kVA Typical: 7.0 kVA (varies based on application load)
Cooling **See Also:** "Temperature and Humidity Requirements", and "Ventilation and Cooling Requirements"	• Extreme Flash drives Maximum: 57,300 BTU/hour (60,452 kJ/hour) Typical: 40,110 BTU/hour (42,316 kJ/hour) • High capacity drives Maximum: 56,775 BTU/hour (59,897 kJ/hour) Typical: 39,742 BTU/hour (41,928 kJ/hour)	• Extreme Flash drives Maximum: 33,801 BTU/hour (35,660 kJ/hour) Typical: 23,660 BTU/hour (24,962 kJ/hour) • High capacity drives Maximum: 33,688 BTU/hour (35,541 kJ/hour) Typical: 23,582 BTU/hour (24,879 kJ/hour)
Air flow front-to-back (subject to actual data center environment) **See Also:** "Temperature and Humidity Requirements", and "Ventilation and Cooling Requirements"	• Extreme Flash drives Maximum: Approximately 2,653 CFM Typical: Approximately 1,857 CFM • High capacity drives Maximum: Approximately 2,628 CFM Typical: Approximately 1,840 CFM	• Extreme Flash drives Maximum: Approximately 1,565 CFM Typical: Approximately 1,095 CFM • High capacity drives Maximum: Approximately 1,560 CFM Typical: Approximately 1,092 CFM

Table 1-4   (Cont.) Environmental Requirements for Oracle Exadata Database Machine X4-8 Racks with Exadata Storage Server X5-2 Servers

Environmental Component	Oracle Exadata Database Machine X4-8 Full Rack with Exadata Storage Server X5-2 Servers	Oracle Exadata Database Machine X4-8 Half Rack with Exadata Storage Server X5-2 Servers
IP Addresses **See Also:** "Network Connection and IP Address Requirements for Oracle Exadata Database Machine"	44 for Ethernet network, assuming single cluster Up to 44 for InfiniBand network	22 for Ethernet network, assuming single cluster Up to 22 for InfiniBand network
Network drops **See Also:** "Network Connection and IP Address Requirements for Oracle Exadata Database Machine"	Minimum of 5 network drops	Minimum of 5 network drops
External connectivity **See Also:** "Network Connection and IP Address Requirements for Oracle Exadata Database Machine"	16 x 1 GbE Ethernet ports 16 x 10 GbE Ethernet SFP+ ports At least 12 InfiniBand ports	16 x 1 GbE Ethernet ports 16 x 10 GbE Ethernet SFP+ ports At least 12 InfiniBand ports

1.1.6 General Environmental Requirements for Oracle Exadata Database Machine X4-8 Full Rack

Table 1-5 shows the general environmental requirements for Oracle Exadata Database Machine X4-8 Full Rack. The other sections in this chapter provide detailed information.

Table 1-5   Environmental Requirements for Oracle Exadata Database Machine X4-8 Full Rack

Environmental Component	Oracle Exadata Database Machine X4-8 Full Rack
Weight **See Also:** "Flooring Requirements"	867.3 kg (1912 lbs)
Acoustic levels	93 db(A)

Power
See Also: "Electrical Power Requirements"
	• High performance drives
	  Maximum: 15.3 kVA
	  Typical: 10.7 kVA (varies based on application load)
	• High capacity drives
	  Maximum: 14.7 kVA
	  Typical: 10.3 kVA (varies based on application load)

Table 1-5   (Cont.) Environmental Requirements for Oracle Exadata Database Machine X4-8 Full Rack

Environmental Component	Oracle Exadata Database Machine X4-8 Full Rack
Cooling **See Also:** "Temperature and Humidity Requirements", and "Ventilation and Cooling Requirements"	• High performance drives 　Maximum: 51,200 BTU/hour (54,000 kJ/hour) 　Typical: 36,400 BTU/hour (38,400 kJ/hour) • High capacity drives 　Maximum: 49,110 BTU/hour (52,000 kJ/hour) 　Typical: 34,400 BTU/hour (36,300 kJ/hour)
Air flow front-to-back (subject to actual data center environment) **See Also:** "Temperature and Humidity Requirements", and "Ventilation and Cooling Requirements"	• High performance drives 　Maximum: Approximately 2,410 CFM 　Typical: Approximately 1,700 CFM • High capacity drives 　Maximum: Approximately 2,280 CFM 　Typical: Approximately 1,600 CFM
IP Addresses **See Also:** "Network Connection and IP Address Requirements for Oracle Exadata Database Machine"	44 for Ethernet network, assuming single cluster Up to 36 for InfiniBand network
Network drops **See Also:** "Network Connection and IP Address Requirements for Oracle Exadata Database Machine"	Minimum of 5 network drops
External connectivity **See Also:** "Network Connection and IP Address Requirements for Oracle Exadata Database Machine"	16 x 1 GbE Ethernet ports 16 x 10 GbE Ethernet SFP+ ports 12 InfiniBand ports

1.1.7 General Environmental Requirements for Oracle Exadata Database Machine X3-2

The environmental requirements for Oracle Exadata Database Machine X3-2 depend on the size of the system. Table 1-6 shows the general environmental requirements for Oracle Exadata Database Machine X3-2. The other sections in this chapter provide detailed information.

Table 1-6   Environmental Requirements for Oracle Exadata Database Machine X3-2

Environmental Component	Oracle Exadata Database Machine X3-2 Full Rack	Oracle Exadata Database Machine X3-2 Half Rack	Oracle Exadata Database Machine X3-2 Quarter Rack	Oracle Exadata Database Machine Eighth Rack
Weight **See Also:** "Flooring Requirements"	871.4 kg (1921 lbs)	543.9 kg (1199 lbs)	368.8 kg (813 lbs)	368.8 kg (813 lbs)
Acoustic levels	87 db(A)	84 db(A)	81 db(A)	81 db(A)
Power **See Also:** "Electrical Power Requirements"	• High performance drives Maximum: 12.1 kVA Typical: 8.6 kVA (varies based on application load) • High capacity drives Maximum: 11.1 kVA Typical: 7.8 kVA (varies based on application load)	• High performance drives Maximum: 6.6 kVA Typical: 4.7 kVA (varies based on application load) • High capacity drives Maximum: 6.1 kVA Typical: 4.3 kVA (varies based on application load)	• High performance drives Maximum: 3.3 kVA Typical: 2.4 kVA (varies based on application load) • High capacity drives Maximum: 3.1 kVA Typical: 2.2 kVA (varies based on application load)	• High performance drives Maximum: 3.0 kVA Typical: 2.1 kVA (varies based on application load) • High capacity drives Maximum: 2.8 kVA Typical: 2.0 kVA (varies based on application load)
Cooling **See Also:** "Temperature and Humidity Requirements", and "Ventilation and Cooling Requirements"	• High performance drives Maximum: 40,600 BTU/hour (42,800 kJ/hour) Typical: 28,700 BTU/hour (30,300 kJ/hour) • High capacity drives Maximum: 37,200 BTU/hour (39,250 kJ/hour) Typical: 26,000 BTU/hour (27,400 kJ/hour)	• High performance drives Maximum: 22,200 BTU/hour (23,400 kJ/hour) Typical: 15,700 BTU/hour (16,600 kJ/hour) • High capacity drives Maximum: 20,500 BTU/hour (21,600 kJ/hour) Typical: 14,300 BTU/hour (15,100 kJ/hour)	• High performance drives Maximum: 10,900 BTU/hour (11,500 kJ/hour) Typical: 7,850 BTU/hour (8,300 kJ/hour) • High capacity drives Maximum: 10,200 BTU/hour (10,800 kJ/hour) Typical: 7,200 BTU/hour (7,600 kJ/hour)	• High performance drives Maximum: 9,900 BTU/hour (10,500 kJ/hour) Typical: 6,800 BTU/hour (7,200 kJ/hour) • High capacity drives Maximum: 9,200 BTU/hour (9,700 kJ/hour) Typical: 6,500 BTU/hour (6,850 kJ/hour)

Table 1-6   (Cont.) Environmental Requirements for Oracle Exadata Database Machine X3-2

Environmental Component	Oracle Exadata Database Machine X3-2 Full Rack	Oracle Exadata Database Machine X3-2 Half Rack	Oracle Exadata Database Machine X3-2 Quarter Rack	Oracle Exadata Database Machine Eighth Rack
Air flow front-to-back (subject to actual data center environment) **See Also:** "Temperature and Humidity Requirements", and "Ventilation and Cooling Requirements"	• High performance drives Maximum: Approximately 1,900 CFM Typical: Approximately 1,350 CFM • High capacity drives Maximum: Approximately 1,700 CFM Typical: Approximately 1,200 CFM	• High performance drives Maximum: Approximately 1,050 CFM Typical: Approximately 750 CFM • High capacity drives Maximum: Approximately 950 CFM Typical: Approximately 670 CFM	• High performance drives Maximum: Approximately 500 CFM Typical: Approximately 375 CFM • High capacity drives Maximum: Approximately 470 CFM Typical: Approximately 330 CFM	• High performance drives Maximum: Approximately 460 CFM Typical: Approximately 325 CFM • High capacity drives Maximum: Approximately 425 CFM Typical: Approximately 300 CFM
IP Addresses **See Also:** "Network Connection and IP Address Requirements for Oracle Exadata Database Machine"	69 for Ethernet network, assuming single cluster 22 for InfiniBand network	39 for Ethernet network, assuming single cluster (39 IP addresses are needed for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers)) 11 for InfiniBand network	22 for Ethernet network, assuming single cluster 5 for InfiniBand network	22 for Ethernet network, assuming single cluster 5 for InfiniBand network
Network drops **See Also:** "Network Connection and IP Address Requirements for Oracle Exadata Database Machine"	Minimum of 11 network drops	Minimum of 7 network drops	Minimum of 5 network drops	Minimum of 5 network drops

Table 1-6   (Cont.) Environmental Requirements for Oracle Exadata Database Machine X3-2

Environmental Component	Oracle Exadata Database Machine X3-2 Full Rack	Oracle Exadata Database Machine X3-2 Half Rack	Oracle Exadata Database Machine X3-2 Quarter Rack	Oracle Exadata Database Machine Eighth Rack
External connectivity **See Also:** "Network Connection and IP Address Requirements for Oracle Exadata Database Machine"	24 x 1 GbE/10 GbE Ethernet ports 16 x 10 GbE Ethernet ports At least 12 InfiniBand ports	12 x 1 GbE/10 GbE Ethernet ports 8 x 10 GbE Ethernet ports At least 12 InfiniBand ports	6 x 1 GbE/10 GbE Ethernet ports 4 x 10 GbE Ethernet ports At least 12 InfiniBand ports	6 x 1 GbE/10 GbE Ethernet ports 4 x 10 GbE Ethernet ports At least 12 InfiniBand ports

1.1.8 General Environmental Requirements for Oracle Exadata Database Machine X3-8 Full Rack with Exadata Storage Server X4-2L Servers

Table 1-7 shows the general environmental requirements for Oracle Exadata Database Machine X3-8 Full Rack with Exadata Storage Server X4-2L Servers. The other sections in this chapter provide detailed information.

Table 1-7   Environmental Requirements for Oracle Exadata Database Machine X3-8 Full Rack with Exadata Storage Server X4-2L Servers

Environmental Component	Oracle Exadata Database Machine X3-8 Full Rack with Exadata Storage Server X4-2L Servers
Weight **See Also:** "Flooring Requirements"	911.27 kg (2009 lbs)
Acoustic levels	84 db(A)

Power
See Also: "Electrical Power Requirements"
	• High performance drives
	  Maximum: 15.3 kVA
	  Typical: 10.7 kVA (varies based on application load)
	• High capacity drives
	  Maximum: 14.5 kVA
	  Typical: 10.2 kVA (varies based on application load)

Table 1-7 (Cont.) Environmental Requirements for Oracle Exadata Database Machine X3-8 Full Rack with Exadata Storage Server X4-2L Servers

Environmental Component	Oracle Exadata Database Machine X3-8 Full Rack with Exadata Storage Server X4-2L Servers
Cooling **See Also:** "Temperature and Humidity Requirements", and "Ventilation and Cooling Requirements"	• High performance drives Maximum: 51,200 BTU/hour (54,000 kJ/hour) Typical: 35,900 BTU/hour (37,900 kJ/hour) • High capacity drives Maximum: 48,500 BTU/hour (51,200 kJ/hour) Typical: 34,200 BTU/hour (36,100 kJ/hour)
Air flow front-to-back (subject to actual data center environment) **See Also:** "Temperature and Humidity Requirements", and "Ventilation and Cooling Requirements"	• High performance drives Maximum: Approximately 2,400 CFM Typical: Approximately 1,700 CFM • High capacity drives Maximum: Approximately 2,250 CFM Typical: Approximately 1,600 CFM
IP Addresses **See Also:** "Network Connection and IP Address Requirements for Oracle Exadata Database Machine"	45 for Ethernet network, assuming single cluster Up to 36 for InfiniBand network
Network drops **See Also:** "Network Connection and IP Address Requirements for Oracle Exadata Database Machine"	Minimum of 5 network drops
External connectivity **See Also:** "Network Connection and IP Address Requirements for Oracle Exadata Database Machine"	16 x 1 GbE Ethernet ports 16 x 10 GbE Ethernet SFP+ ports 12 InfiniBand ports

1.1.9 General Environmental Requirements for Oracle Exadata Database Machine X3-8 Full Rack with Exadata Storage Server X3-2 Servers

Table 1-8 shows the general environmental requirements for Oracle Exadata Database Machine X3-8 Full Rack with Exadata Storage Server X3-2 Servers. The other sections in this chapter provide detailed information.

Table 1-8   Environmental Requirements for Oracle Exadata Database Machine X3-8 Full Rack with Exadata Storage Server X3-2 Servers

Environmental Component	Oracle Exadata Database Machine X3-8 Full Rack with Exadata Storage Server X3-2 Servers
Weight **See Also:** "Flooring Requirements"	929.9 kg (2050 lbs)
Acoustic levels	84 db(A)

Power
See Also: "Electrical Power Requirements"
	• High performance drives
	  Maximum: 15.3 kVA
	  Typical: 10.7 kVA (varies based on application load)
	• High capacity drives
	  Maximum: 14.3 kVA
	  Typical: 10.0 kVA (varies based on application load)

Cooling
See Also: "Temperature and Humidity Requirements", and "Ventilation and Cooling Requirements"
	• High performance drives
	  Maximum: 51,200 BTU/hour (54,000 kJ/hour)
	  Typical: 35,900 BTU/hour (37,900 kJ/hour)
	• High capacity drives
	  Maximum: 47,800 BTU/hour (50,400 kJ/hour)
	  Typical: 33,500 BTU/hour (35,300 kJ/hour)

Air flow front-to-back (subject to actual data center environment)
See Also: "Temperature and Humidity Requirements", and "Ventilation and Cooling Requirements"
	• High performance drives
	  Maximum: Approximately 2,400 CFM
	  Typical: Approximately 1,700 CFM
	• High capacity drives
	  Maximum: Approximately 2,200 CFM
	  Typical: Approximately 1,550 CFM

IP Addresses **See Also:** "Network Connection and IP Address Requirements for Oracle Exadata Database Machine"	45 for Ethernet network, assuming single cluster 22 for InfiniBand network
Network drops **See Also:** "Network Connection and IP Address Requirements for Oracle Exadata Database Machine"	Minimum of 5 network drops
External connectivity **See Also:** "Network Connection and IP Address Requirements for Oracle Exadata Database Machine"	16 x 1 GbE Ethernet ports 16 x 10 GbE Ethernet SFP+ ports 12 InfiniBand ports

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1.1.10 General Environmental Requirements for Oracle Exadata Database Machine X2-2

The environmental requirements for Oracle Exadata Database Machine X2-2 depend on the size of the system. Table 1-9 shows the general environmental requirements for Oracle Exadata Database Machine X2-2. The other sections in this chapter provide detailed information.

Table 1-9   Environmental Requirements for Oracle Exadata Database Machine X2-2

Environmental Component	Oracle Exadata Database Machine X2-2 Full Rack	Oracle Exadata Database Machine X2-2 Half Rack	Oracle Exadata Database Machine X2-2 Quarter Rack
Weight **See Also:** "Flooring Requirements"	966.6 kg (2131 lbs)	602.8 kg (1329 lbs)	409.1kg (902 lbs)
Acoustic levels	89 db(A)	86 db(A)	83 db(A)
Power **See Also:** "Electrical Power Requirements"	Maximum: 14.0 kW (14.3 kVA) Typical: 9.8 kW (10.0 kVA) (varies based on application load)	Maximum: 7.2 kW (7.3 kVA) Typical: 5.1 kW (5.2 kVA) (varies based on application load)	Maximum: 3.6 kW (3.7 kVA) Typical: 2.7 kW (2.75kVA) (varies based on application load)
Cooling **See Also:** "Temperature and Humidity Requirements", and "Ventilation and Cooling Requirements"	Maximum: 47,800 BTU/hour (50,400 kJ/hour) Typical: 33,400 BTU/hour (35,300 kJ/hour)	Maximum: 26,400 BTU/hour (25,950 kJ/hour) Typical: 17,400 BTU/hour (35,300 kJ/hour)	Maximum: 12,300 BTU/hour (13,000 kJ/hour) Typical: 9,200 BTU/hour (9,700 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: Approximately 2,200 CFM Typical: Approximately 1,560 CFM	Maximum: Approximately 1,130 CFM Typical: Approximately 840 CFM	Maximum: Approximately 550 CFM Typical: Approximately 410 CFM
IP Addresses **See Also:** "Network Connection and IP Address Requirements for Oracle Exadata Database Machine"	70 for Ethernet network, assuming single cluster 22 for InfiniBand network	40 for Ethernet network, assuming single cluster (39 IP addresses are needed for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers)) 11 for InfiniBand network	23 for Ethernet network, assuming single cluster 5 for InfiniBand network

Table 1-9   (Cont.) Environmental Requirements for Oracle Exadata Database Machine X2-2

Environmental Component	Oracle Exadata Database Machine X2-2 Full Rack	Oracle Exadata Database Machine X2-2 Half Rack	Oracle Exadata Database Machine X2-2 Quarter Rack
Network drops **See Also:** "Network Connection and IP Address Requirements for Oracle Exadata Database Machine"	Minimum of 12 network drops	Minimum of 8 network drops	Minimum of 6 network drops
External connectivity **See Also:** "Network Connection and IP Address Requirements for Oracle Exadata Database Machine"	24 x 1 GbE Ethernet ports 16 x 10 GbE Ethernet ports (valid for M2 servers only) At least 12 InfiniBand ports	12 x 1 GbE Ethernet ports 8 x 10 GbE Ethernet ports (valid for M2 servers only) At least 12 InfiniBand ports	6 x 1 GbE Ethernet ports 4 x 10 GbE Ethernet ports (valid for M2 servers only) At least 12 InfiniBand ports

1.1.11 General Environmental Requirements for Oracle Exadata Database Machine X2-8 Full Rack

Table 1-10 shows the general environmental requirements for Oracle Exadata Database Machine X2-8 Full Rack. The other sections in this chapter provide detailed information.

Table 1-10   Environmental Requirements for Oracle Exadata Database Machine X2-8 Full Rack

Environmental Component	Oracle Exadata Database Machine X2-8 Full Rack (Sun Fire X4800 Oracle Database Servers)	Oracle Exadata Database Machine X2-8 Full Rack (Sun Server X2-8 Oracle Database Servers)
Weight **See Also:** "Flooring Requirements"	943.5 kg (2080 lbs)	980.7 kg (2162 lbs)
Acoustic levels	85 db(A)	85 db(A)
Power **See Also:** "Electrical Power Requirements"	Maximum: 17.0 kW (17.4 kVA) Typical: 11.9 kW (12.2 kVA) (varies based on application load)	Maximum: 17.7 kW (18.1 kVA) Typical: 12.4 kW (112.7 kVA) (varies based on application load)
Cooling **See Also:** "Temperature and Humidity Requirements", and "Ventilation and Cooling Requirements"	Maximum: 58,050 BTU/hour (61,200 kJ/hour) Typical: 40,630 BTU/hour (42,840 kJ/hour)	Maximum: 60,350 BTU/hour (63,630 kJ/hour) Typical: 42,280 BTU/hour (44,580 kJ/hour)

Table 1-10   (Cont.) Environmental Requirements for Oracle Exadata Database Machine X2-8 Full Rack

Environmental Component	Oracle Exadata Database Machine X2-8 Full Rack (Sun Fire X4800 Oracle Database Servers)	Oracle Exadata Database Machine X2-8 Full Rack (Sun Server X2-8 Oracle Database Servers)
Air flow front-to-back (subject to actual data center environment) **See Also:** "Temperature and Humidity Requirements", and "Ventilation and Cooling Requirements"	Maximum: Approximately 2,690 CFM Typical: Approximately 1,880 CFM	Maximum: Approximately 2,781CFM Typical: Approximately 1,950 CFM
IP Addresses **See Also:** "Network Connection and IP Address Requirements for Oracle Exadata Database Machine"	45 for Ethernet network, assuming single cluster 22 for InfiniBand network	45 for Ethernet network, assuming single cluster 22 for InfiniBand network
Network drops **See Also:** "Network Connection and IP Address Requirements for Oracle Exadata Database Machine"	Minimum of 5 network drops	Minimum of 5 network drops
External connectivity **See Also:** "Network Connection and IP Address Requirements for Oracle Exadata Database Machine"	16 x 1 GbE Ethernet ports 16 x 10 GbE Ethernet SFP+ ports 12 InfiniBand ports	16 x 1 GbE Ethernet ports 16 x 10 GbE Ethernet SFP+ ports 12 InfiniBand ports

1.1.12 General Environmental Requirements for Oracle Exadata Storage Expansion Rack X6-2 and later

For Oracle Exadata Storage Expansion Rack X6-2 and more recent systems, to get the environmental requirements, such as weight, acoustic level, power, cooling, and air flow, use the Oracle Exadata Configuration Assistant, available on Oracle Technology Network:

Oracle Exadata Configuration Assistant (OECA) Downloads

1.1.13 General Environmental Requirements for Oracle Exadata Storage Expansion Rack X5-2

The environmental requirements for Oracle Exadata Storage Expansion Rack X5-2 depend on the size of the system. Table 1-11 shows the general environmental requirements for each type of Oracle Exadata Storage Expansion Rack X5-2.

Table 1-11   Environmental Requirements for Oracle Exadata Storage Expansion Rack X5-2

Environmental Component	Oracle Exadata Storage Expansion X5-2 Full Rack	Oracle Exadata Storage Expansion X5-2 Half Rack	Oracle Exadata Storage Expansion X5-2 Quarter Rack
Weight	• Extreme Flash drives: 821 kg (1810 lbs) • High capacity drives: 915.8 kg (2019 lbs)	• Extreme Flash drives: 546.6 kg (1205 lbs) • High capacity drives: 591.5 kg (1304 lbs)	• Extreme Flash drives: 364.5 kg (804 lbs) • High capacity drives: 384.4 kg (848 lbs)
Acoustic levels	82 db(A)	79 db(A)	76 db(A)
Power	• Extreme Flash drives Maximum: 13.1 kVA Typical: 9.2 kVA (varies based on application load) • High capacity drives Maximum: 12.8 kVA Typical: 8.9 kVA (varies based on application load)	• Extreme Flash drives Maximum: 5.9 kVA Typical: 4.2 kVA (varies based on application load) • High capacity drives Maximum: 6.9 kVA Typical: 4.8 kVA (varies based on application load)	• Extreme Flash drives Maximum: 3.7 kVA Typical: 2.6 kVA (varies based on application load) • High capacity drives Maximum: 3.7 kVA Typical: 2.6 kVA (varies based on application load)
Cooling	• Extreme Flash drives Maximum: 43,765 BTU/hour (46,170 kJ/hour) Typical: 30,635 BTU/hour (32,320 kJ/hour) • High capacity drives Maximum: 42,670 BTU/hour (45,020 kJ/hour) Typical: 29,870 BTU/hour (31,515 kJ/hour)	• Extreme Flash drives Maximum: 19,880 BTU/hour (20,970 kJ/hour) Typical: 13,915 BTU/hour (14,680 kJ/hour) • High capacity drives Maximum: 22,950 BTU/hour (24,210 kJ/hour) Typical: 16,065 BTU/hour (16,950 kJ/hour	• Extreme Flash drives Maximum: 12,362 BTU/hour (13,042 kJ/hour) Typical: 8,654 BTU/hour (9,129 kJ/hour) • High capacity drives Maximum: 12,212 BTU/hour (12,884 kJ/hour) Typical: 8,548 BTU/hour (9,019 kJ/hour)

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Table 1-11 (Cont.) Environmental Requirements for Oracle Exadata Storage Expansion Rack X5-2

Environmental Component	Oracle Exadata Storage Expansion X5-2 Full Rack	Oracle Exadata Storage Expansion X5-2 Half Rack	Oracle Exadata Storage Expansion X5-2 Quarter Rack
Air flow front-to-back (subject to actual data center environment)	• Extreme Flash drives Maximum: Approximately 2,030 CFM Typical: Approximately 1,420 CFM • High capacity drives Maximum: Approximately 1,975 CFM Typical: Approximately 1,385 CFM	• Extreme Flash drives Maximum: Approximately 920 CFM Typical: Approximately 645 CFM • High capacity drives Maximum: Approximately 1,065 CFM Typical: Approximately 745 CFM	• Extreme Flash drives Maximum: Approximately 565 CFM Typical: Approximately 396 CFM • High capacity drives Maximum: Approximately 572 CFM Typical: Approximately 401 CFM
IP Addresses	44 for Ethernet network, assuming single cluster 38 for InfiniBand network	24 for Ethernet network, assuming single cluster 18 for InfiniBand network	13 for Ethernet network, assuming single cluster 8 for InfiniBand network
Network drops	Minimum of 1 network drop	Minimum of 1 network drop	Minimum of 1 network drop
External connectivity	12 InfiniBand ports	12 InfiniBand ports	12 InfiniBand ports

1.1.14 General Environmental Requirements for Oracle Exadata Storage Expansion Rack X4-2

The environmental requirements for Oracle Exadata Storage Expansion Rack X4-2 depend on the size of the system. Table 1-12 shows the general environmental requirements for each type of Oracle Exadata Storage Expansion Rack X4-2.

Table 1-12 Environmental Requirements for Oracle Exadata Storage Expansion Rack X4-2

Environmental Component	Oracle Exadata Storage Expansion X4-2 Full Rack	Oracle Exadata Storage Expansion X4-2 Half Rack	Oracle Exadata Storage Expansion X4-2 Quarter Rack
Weight	824.2 kg (1817 lbs)	513.0 kg (1131 lbs)	346.5 kg (764 lbs)
Acoustic levels	82 db(A)	79 db(A)	76 db(A)

Table 1-12   (Cont.) Environmental Requirements for Oracle Exadata Storage Expansion Rack X4-2

Environmental Component	Oracle Exadata Storage Expansion X4-2 Full Rack	Oracle Exadata Storage Expansion X4-2 Half Rack	Oracle Exadata Storage Expansion X4-2 Quarter Rack
Power	• High performance drives Maximum: 10.2 kVA Typical: 7.1 kVA (varies based on application load) • High capacity drives Maximum: 9.1 kVA Typical: 6.3 kVA (varies based on application load)	• High performance drives Maximum: 5.7 kVA Typical: 4.1 kVA (varies based on application load) • High capacity drives Maximum: 5.2 kVA Typical: 3.7 kVA (varies based on application load)	• High performance drives Maximum: 2.9 kVA Typical: 2.0 kVA (varies based on application load) • High capacity drives Maximum: 2.7 kVA Typical: 2.0 kVA (varies based on application load)
Cooling	• High performance drives Maximum: 34,100 BTU/hour (36,000 kJ/hour) Typical: 23,900 BTU/hour (25,200 kJ/hour) • High capacity drives Maximum: 30,400 BTU/hour (32,100 kJ/hour) Typical: 21,200 BTU/hour (22,400 kJ/hour)	• High performance drives Maximum: 19,100 BTU/hour (20,150 kJ/hour) Typical: 13,650 BTU/hour (14,400 kJ/hour) • High capacity drives Maximum: 17,400 BTU/hour (18,400 kJ/hour) Typical: 12,300 BTU/hour (13,000 kJ/hour)	• High performance drives Maximum: 9,500 BTU/hour (10,000 kJ/hour) Typical: 6,700 BTU/hour (7,000 kJ/hour) • High capacity drives Maximum: 8,900 BTU/hour (9,400 kJ/hour) Typical: 6,500 BTU/hour (6,900 kJ/hour)
Air flow front-to-back (subject to actual data center environment)	• High performance drives Maximum: Approximately 1,600 CFM Typical: Approximately 1,100 CFM • High capacity drives Maximum: Approximately 1,410 CFM Typical: Approximately 980 CFM	• High performance drives Maximum: Approximately 900 CFM Typical: Approximately 650 CFM • High capacity drives Maximum: Approximately 810 CFM Typical: Approximately 570 CFM	• High performance drives Maximum: Approximately 440 CFM Typical: Approximately 310 CFM • High capacity drives Maximum: Approximately 410 CFM Typical: Approximately 300 CFM

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Table 1-12   (Cont.) Environmental Requirements for Oracle Exadata Storage Expansion Rack X4-2

Environmental Component	Oracle Exadata Storage Expansion X4-2 Full Rack	Oracle Exadata Storage Expansion X4-2 Half Rack	Oracle Exadata Storage Expansion X4-2 Quarter Rack
IP Addresses	42 for Ethernet network, assuming single cluster 36 for InfiniBand network	24 for Ethernet network, assuming single cluster 18 for InfiniBand network	13 for Ethernet network, assuming single cluster 8 for InfiniBand network
Network drops	Minimum of 1 network drop	Minimum of 1 network drop	Minimum of 1 network drop
External connectivity	12 InfiniBand ports	12 InfiniBand ports	12 InfiniBand ports

1.1.15 General Environmental Requirements for Oracle Exadata Storage Expansion Rack X3-2

The environmental requirements for Oracle Exadata Storage Expansion Rack X3-2 depend on the size of the system. Table 1-13 shows the general environmental requirements for each type of Oracle Exadata Storage Expansion Rack X3-2.

Table 1-13   Environmental Requirements for Oracle Exadata Storage Expansion Rack X3-2

Environmental Component	Oracle Exadata Storage Expansion X3-2 Full Rack	Oracle Exadata Storage Expansion X3-2 Half Rack	Oracle Exadata Storage Expansion X3-2 Quarter Rack
Weight	827.4 kg (1824 lbs)	516.2 kg (1138 lbs)	349.7 kg (771 lbs)
Acoustic levels	82 db(A)	79 db(A)	76 db(A)

Power	• High performance drives
	
	  Maximum: 10.2 kVA
	
	  Typical: 7.1 kVA (varies based on application load)
	• High capacity drives
	
	  Maximum: 8.9 kVA
	
	  Typical: 6.2 kVA (varies based on application load)
		• High performance drives
		
		  Maximum: 5.7 kVA
		
		  Typical: 4.1 kVA (varies based on application load)
		• High capacity drives
		
		  Maximum: 5.1 kVA
		
		  Typical: 3.6 kVA (varies based on application load)
			• High performance drives
			
			  Maximum: 2.9 kVA
			
			  Typical: 2.0 kVA (varies based on application load)
			• High capacity drives
			
			  Maximum: 2.6 kVA
			
			  Typical: 1.9 kVA (varies based on application load)

Table 1-13   (Cont.) Environmental Requirements for Oracle Exadata Storage Expansion Rack X3-2

Environmental Component	Oracle Exadata Storage Expansion X3-2 Full Rack	Oracle Exadata Storage Expansion X3-2 Half Rack	Oracle Exadata Storage Expansion X3-2 Quarter Rack
Cooling	• High performance drives Maximum: 34,100 BTU/hour (36,000 kJ/hour) Typical: 23,900 BTU/hour (25,200 kJ/hour) • High capacity drives Maximum: 29,700 BTU/hour (31,300 kJ/hour) Typical: 20,800 BTU/hour (21,950 kJ/hour)	• High performance drives Maximum: 19,100 BTU/hour (20,150 kJ/hour) Typical: 13,650 BTU/hour (14,400 kJ/hour) • High capacity drives Maximum: 17,100 BTU/hour (18,000 kJ/hour) Typical: 11,950 BTU/hour (12,600 kJ/hour)	• High performance drives Maximum: 9,500 BTU/hour (10,000 kJ/hour) Typical: 6,700 BTU/hour (7,000 kJ/hour) • High capacity drives Maximum: 8,500 BTU/hour (9,000 kJ/hour) Typical: 6,150 BTU/hour (6,500 kJ/hour)
Air flow front-to-back (subject to actual data center environment)	• High performance drives Maximum: Approximately 1,600 CFM Typical: Approximately 1,100 CFM • High capacity drives Maximum: Approximately 1,375 CFM Typical: Approximately 960 CFM	• High performance drives Maximum: Approximately 900 CFM Typical: Approximately 650 CFM • High capacity drives Maximum: Approximately 790 CFM Typical: Approximately 550 CFM	• High performance drives Maximum: Approximately 440 CFM Typical: Approximately 310 CFM • High capacity drives Maximum: Approximately 400 CFM Typical: Approximately 285 CFM
IP Addresses	42 for Ethernet network, assuming single cluster 18 for InfiniBand network	24 for Ethernet network, assuming single cluster 9 for InfiniBand network	13 for Ethernet network, assuming single cluster 4 for InfiniBand network
Network drops	Minimum of 1 network drop	Minimum of 1 network drop	Minimum of 1 network drop
External connectivity	12 InfiniBand ports	12 InfiniBand ports	12 InfiniBand ports

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1.1.16 General Environmental Requirements for Oracle Exadata Storage Expansion Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers

The environmental requirements for Oracle Exadata Storage Expansion Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers depend on the size of the system. Table 1-14 shows the general environmental requirements for each type of Oracle Exadata Storage Expansion Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers.

Table 1-14   Environmental Requirements for Oracle Exadata Storage Expansion Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers

Environmental Component	Oracle Exadata Storage Expansion Full Rack	Oracle Exadata Storage Expansion Half Rack	Oracle Exadata Storage Expansion Quarter Rack
Weight	917.6 kg (2023 lbs)	578.3 kg (1275 lbs)	396.8 kg (875 lbs)
Acoustic levels	83 db(A)	82 db(A)	81 db(A)
Power	Maximum: 12.6 kW (12.9 kVA) Typical: 8.8 kW (9.0 kVA) (varies based on application load)	Maximum: 6.9 kW (7.1 kVA) Typical: 4.8 kW (5.0 kVA) (varies based on application load)	Maximum: 3.4 kW (3.5 kVA) Typical: 2.4 kW (2.5kVA) (varies based on application load)
Cooling	Maximum: 43,000 BTU/hour (45,400 kJ/hour) Typical: 30,100 BTU/hour (31,800 kJ/hour)	Maximum: 23,600 BTU/hour (24,900 kJ/hour) Typical: 16,500 BTU/hour (17,400 kJ/hour)	Maximum: 11,600 BTU/hour (12,250 kJ/hour) Typical: 8,100 BTU/hour (8,600 kJ/hour)
Air flow front-to-back (subject to actual data center environment)	Maximum: Approximately 1,980 CFM Typical: Approximately 1,390 CFM	Maximum: Approximately 1,090 CFM Typical: Approximately 760 CFM	Maximum: Approximately 530 CFM Typical: Approximately 375 CFM
IP Addresses	43 for Ethernet network, assuming single cluster 18 for InfiniBand network	25 for Ethernet network, assuming single cluster 9 for InfiniBand network	14 for Ethernet network, assuming single cluster 4 for InfiniBand network
Network drops	Minimum of 2 network drops	Minimum of 2 network drops	Minimum of 2 network drops
External connectivity	12 InfiniBand ports	12 InfiniBand ports	12 InfiniBand ports

1.1.17 General Environmental Requirements for Single Servers

The environmental requirements for single servers are shown in the following tables.

Table 1-15   Environmental Requirements for X7-2 Single Servers

Environmental Component	Exadata Storage Server X7-2 - Extreme Flash	Exadata Storage Server X7-2 - High Capacity	Database Server X7-2
Weight	28.1 kg (62 lbs)	33.1 kg (73 lbs)	20.4 kg (45 lbs)
Acoustic levels	78 db(A)	78 db(A)	78 db(A)
Power	Maximum: 0.6 kVA Typical: 0.4 kVA (varies based on application load)	Maximum: 0.6 kVA Typical: 0.4 kVA (varies based on application load)	Maximum: 0.665 kW (0.678 kVA) Typical: 0.466 kW (0.475 kVA) (varies based on application load)
Cooling	Maximum: 1,866 BTU/hour (1,969 kJ/hour) Typical: 1,307 BTU/hour (1,378 kJ/hour)	Maximum: 2,006 BTU/hour (2,117 kJ/hour) Typical: 1,404 BTU/hour (1,482 kJ/hour)	Maximum: 2,269 BTU/hour (2,394 kJ/hour) Typical: 1,588 BTU/hour (1,676 kJ/hour
Air flow front-to-back (subject to actual data center environment)	Maximum: Approximately 86 CFM Typical: Approximately 60 CFM	Maximum: Approximately 93 CFM Typical: Approximately 65 CFM	Maximum: Approximately 105 CFM Typical: Approximately 74 CFM

Table 1-16   Environmental Requirements for X6-2 Single Servers

Environmental Component	Exadata Storage Server X6-2 - Extreme Flash	Exadata Storage Server X6-2 - High Capacity	Database Server X6-2
Weight	28.1 kg (62 lbs)	33.1 kg (73 lbs)	20.4 kg (45 lbs)
Acoustic levels	78 db(A)	78 db(A)	78 db(A)
Power	Maximum: 0.6 kVA Typical: 0.4 kVA (varies based on application load)	Maximum: 0.6 kVA Typical: 0.4 kVA (varies based on application load)	Maximum: 0.665 kW (0.678 kVA) Typical: 0.466 kW (0.475 kVA) (varies based on application load)
Cooling	Maximum: 1,866 BTU/hour (1,969 kJ/hour) Typical: 1,307 BTU/hour (1,378 kJ/hour)	Maximum: 2,006 BTU/hour (2,117 kJ/hour) Typical: 1,404 BTU/hour (1,482 kJ/hour)	Maximum: 2,269 BTU/hour (2,394 kJ/hour) Typical: 1,588 BTU/hour (1,676 kJ/hour
Air flow front-to-back (subject to actual data center environment)	Maximum: Approximately 86 CFM Typical: Approximately 60 CFM	Maximum: Approximately 93 CFM Typical: Approximately 65 CFM	Maximum: Approximately 105 CFM Typical: Approximately 74 CFM

Table 1-17   Environmental Requirements for X5-2 Single Servers

Environmental Component	Exadata Storage Server X5-2 - Extreme Flash	Exadata Storage Server X5-2 - High Capacity	Database Server X5-2
Weight	28.1 kg (62 lbs)	33.1 kg (73 lbs)	20.4 kg (45 lbs)
Acoustic levels	78 db(A)	78 db(A)	78 db(A)
Power	Maximum: 0.6 kVA Typical: 0.4 kVA (varies based on application load)	Maximum: 0.6 kVA Typical: 0.4 kVA (varies based on application load)	Maximum: 0.7 kVA Typical: 0.5 kVA (varies based on application load)
Cooling	Maximum: 2,037 BTU/hour (2,149 kJ/hour) Typical: 1,426 BTU/hour (1,504 kJ/hour)	Maximum: 2,000 BTU/hour (2,109 kJ/hour) Typical: 1,400 BTU/hour (1,477 kJ/hour)	Maximum: 2,481 BTU/hour (2,617 kJ/hour) Typical: 1,736 BTU/hour (1,832 kJ/hour
Air flow front-to-back (subject to actual data center environment)	Maximum: Approximately 94 CFM Typical: Approximately 66 CFM	Maximum: Approximately 93 CFM Typical: Approximately 65 CFM	Maximum: Approximately 115 CFM Typical: Approximately 80 CFM

Table 1-18   Environmental Requirements for X4-8, X5-8, and X6-8 Single Servers

Environmental Component	Database Server X5-8 and X6-8	Database Server X4-8
Weight	93.4 kg (206 lbs)	93.4 kg (206 lbs)
Acoustic levels	81 db(A)	81 db(A)
Power	Maximum: 3.5 kVA Typical: 2.4 kVA (varies based on application load)	Maximum: 3.7 kVA Typical: 2.6 kVA (varies based on application load)
Cooling	Maximum: 11,601 BTU/hour (12,239 kJ/hour) Typical: 8,121 BTU/hour (8,568 kJ/hour)	Maximum: 12,284 BTU/hour (12,959 kJ/hour) Typical: 8,599 BTU/hour (9,072 kJ/hour)
Air flow front-to-back (subject to actual data center environment)	Maximum: Approximately 537 CFM Typical: Approximately 376 CFM	Maximum: Approximately 569 CFM Typical: Approximately 398 CFM

1.2 Space Requirements

Oracle Exadata Database Machine X7-2 and X7-8

The Oracle Exadata X7-2 and X7-8 racks use a different rack than its predecessors. The space requirements are as follows:

- Height: 2000 mm (78.74 inches)

- Width: 600 mm (23.62 inches)

- Depth: 1235 mm with doors attached, from handle to handle (48.6 inches)

The minimum ceiling height for the cabinet is 2914 mm (114.72 inches), measured from the true floor or raised floor, whichever is higher. This includes an additional 914 mm (36 inches) of space required above the rack height for maintenance access, as described in Table 1-22. 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.

Oracle Exadata Racks up to Oracle Exadata Database Machine X6-8

All Oracle Exadata Racks up to Oracle Exadata X6-8 use the same rack, and have the same space requirements. The space requirements are as follows:

- Height: 1998 mm (78.66 inches)

- Width: 600 mm with side panels (23.62 inches)

- Depth: 1200 mm (47.24 inches)

The minimum ceiling height for the cabinet is 2912 mm (114.65 inches), measured from the true floor or raised floor, whichever is higher. This includes an additional 914 mm (36 inches) of space required above the rack height for maintenance access, as described in Table 1-22. 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.

1.2.1 Receiving and Unpacking Requirements

Before your Oracle Exadata Rack arrives, ensure that the receiving area is large enough for the package.

Use the following package dimensions for Oracle Exadata Rack:

- Shipping height: 2159 mm (85 inches)

- Shipping width: 1219 mm (48 inches)

- Shipping depth: 1575 mm (62 inches)

For weight information for Oracle Exadata Database Machine X6-8, X7-2 and X7-8, use the Oracle Exadata Configuration Assistant, available on Oracle Technology Network: Oracle Exadata Configuration Assistant (OECA) Downloads

- Table 1-19 lists the shipping and net weights for Oracle Exadata Database Machines.

- Table 1-20 lists the shipping and net weights for Oracle Exadata Storage Expansion Racks:

- Table 1-21 lists the access route requirements for Oracle Exadata Rack.

Table 1-19   Rack Weights for Oracle Exadata Database Machine

Type of Rack	Shipping Weight	Net Weight
Oracle Exadata Database Machine X7-2 Full Rack	Extreme Flash: 974.0 kg (2147.2 lbs) High Capacity: 1071.1 kg (2361.4 lbs)	Extreme Flash: 815.1 kg (1797.2 lbs) High Capacity: 912.4 kg (2011.4 lbs)
Oracle Exadata Database Machine X7-2 Half Rack	Extreme Flash: 698.4 kg (1539.6 lbs) High Capacity: 746.9 kg (1646.7 lbs)	Extreme Flash: 539.6 kg (1189.6 lbs) High Capacity: 558.8 kg (1296.7 lbs)
Oracle Exadata Database Machine X7-2 Quarter Rack	Extreme Flash: 551.1 kg (1215.0 lbs) High Capacity: 571.9 kg (1260.9 lbs)	Extreme Flash: 392.4 kg (865.0 lbs) High Capacity: 413.2 kg (910.9 lbs)
Oracle Exadata Database Machine X7-2 Eighth Rack	Extreme Flash: 548.8 kg (1209.9 lbs) High Capacity: 558.9 kg (1232.2 lbs)	Extreme Flash: 390.1 kg (859.9 lbs) High Capacity: 400.1 kg (882.2 lbs)
Oracle Exadata Database Machine X7-8 Full Rack	Extreme Flash drives: 894.7 kg (1972.5 lbs) High capacity drives: 964.6 kg (2126.5 lbs)	Extreme Flash drives: 828.5 kg (1826.5 lbs) High capacity drives: 898.3 kg (1980.5 lbs)
Oracle Exadata Database Machine X6-2 Full Rack	Extreme Flash: 871.1 kg (1920.5 lbs) High Capacity: 941.0 kg (2074.5 lbs)	Extreme Flash: 794.5 kg (1751.5 lbs) High Capacity: 864.3 kg (1905.5 lbs)
Oracle Exadata Database Machine X6-2 Half Rack	Extreme Flash: 592.2 kg (1305.5 lbs) High Capacity: 627.1 kg (1382.5 lbs)	Extreme Flash: 515.5 kg (1136.5 lbs) High Capacity: 550.4 kg (1213.5 lbs)
Oracle Exadata Database Machine X6-2 Quarter Rack	Extreme Flash: 432.5 kg (953.5 lbs) High Capacity: 447.5 kg (986.5 lbs)	Extreme Flash: 366.3 kg (807.5 lbs) High Capacity: 381.2 kg (840.5 lbs)
Oracle Exadata Database Machine X6-2 Eighth Rack	Extreme Flash: 432.5 kg (953.5 lbs) High Capacity: 433.8 kg (956.3 lbs)	Extreme Flash: 366.3 kg (807.5 lbs) High Capacity: 376.6 kg (810.3 lbs)
Oracle Exadata Database Machine X5-8 or X6-8 Full Rack	Extreme Flash drives: 894.7 kg (1972.5 lbs) High capacity drives: 964.6 kg (2126.5 lbs)	Extreme Flash drives: 828.5 kg (1826.5 lbs) High capacity drives: 898.3 kg (1980.5 lbs)
Oracle Exadata Database Machine X6-8 Half Rack	Extreme Flash drives: 592.2 kg (1305.5 lbs) High capacity drives: 607.1 kg (1338.5 lbs)	Extreme Flash drives: 525.9 kg (1159.5 lbs) High capacity drives: 540.9 kg (1192.5 lbs)

Table 1-19   (Cont.) Rack Weights for Oracle Exadata Database Machine

Type of Rack	Shipping Weight	Net Weight
Oracle Exadata Database Machine X5-8 Half Rack	Extreme Flash drives: 592.4 kg (1306.1 lbs) High capacity drives: 607.4 kg (1339.1 lbs)	Extreme Flash drives: 526.2 kg (1160.1 lbs) High capacity drives: 541.2 kg (1193.1 lbs)
Oracle Exadata Database Machine X5-2 Full Rack	984.8 kg (2171 lbs)	901.3 kg (1987 lbs)
Oracle Exadata Database Machine X5-2 Half Rack	639.6 kg (1410 lbs)	587.4 kg (1295 lbs)
Oracle Exadata Database Machine X5-2 Quarter Rack	453.1 kg (999 lbs)	418.2 kg (922 lbs)
Oracle Exadata Database Machine X5-2 Eighth Rack	453.1 kg (999 lbs)	418.2 kg (922 lbs)
Oracle Exadata Database Machine X4-2 Full Rack	936 kg (2064 lbs)	852.8 kg (1880 lbs)
Oracle Exadata Database Machine X4-2 Half Rack	577 kg (1273 lbs)	525.3 kg (1158 lbs)
Oracle Exadata Database Machine X4-2 Quarter Rack	401 kg (883 lbs)	365.6 kg (806 lbs)
Oracle Exadata Database Machine X4-2 Eighth Rack	401 kg (883 lbs)	365.6 kg (806 lbs)
Oracle Exadata Database Machine X4-8 Full Rack	High performance drives: 951 kg (2097 lbs) High capacity drives: 1019 kg (2247 lbs)	High performance drives: 867 kg (1912 lbs) High capacity drives: 936 kg (2063 lbs)
Oracle Exadata Database Machine X3-2 Full Rack	954.8 kg (2105 lbs)	871.4 kg (1921 lbs)
Oracle Exadata Database Machine X3-2 Half Rack	596.0 kg (1314 lbs)	543.9 kg (1199 lbs)
Oracle Exadata Database Machine X3-2 Quarter Rack	403.7 kg (890 lbs)	368.8 kg (813 lbs)
Oracle Exadata Database Machine X3-2 Eighth Rack	403.7 kg (890 lbs)	368.8 kg (813 lbs)
Oracle Exadata Database Machine X3-8 Full Racks with Exadata Storage Server X4-2L Servers	994.7 kg (2193 lbs)	911.3 kg (2009 lbs)
Oracle Exadata Database Machine X3-8 Full Racks	1013.3 kg (2234 lbs)	929.9 kg (2050 lbs)
Oracle Exadata Database Machine X2-2 Full Rack	1050.1 kg (2315 lbs)	966.61 kg (2131 lbs)
Oracle Exadata Database Machine X2-2 Half Rack	684.1 kg (1508 lbs)	602.8 kg (1329 lbs)
Oracle Exadata Database Machine X2-2 Quarter Rack	487.6 kg (1075 lbs)	409.1 kg (902 lbs)

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Table 1-19   (Cont.) Rack Weights for Oracle Exadata Database Machine

Type of Rack	Shipping Weight	Net Weight
Oracle Exadata Database Machine X2-8 Full Rack with Sun Fire X4800 Oracle Database Servers	1026.9 kg (2264 lbs)	943.8 kg (2080 lbs)
Oracle Exadata Database Machine X2-8 Full Rack with Sun Server X2-8 Oracle Database Servers	1036.0 kg (2284 lbs)	980.7 kg (2162 lbs)

Table 1-20   Rack Weights for Oracle Exadata Storage Expansion Rack

Type of Rack	Shipping Weight	Net Weight
Oracle Exadata Storage Expansion X7-2 Full Rack	Extreme Flash: 850.3 kg (1874.5 lbs) High Capacity: 945.1 kg (2083.5 lbs)	Extreme Flash: 784.0 kg (1728.5 lbs) High Capacity: 878.8 kg (1937.5 lbs)
Oracle Exadata Storage Expansion X7-2 Half Rack	Extreme Flash: 569.0 kg (1254.5 lbs) High Capacity: 613.9 kg (1353.5 lbs)	Extreme Flash: 502.8 kg (1108.5 lbs) High Capacity: 547.7 kg (1207.5 lbs)
Oracle Exadata Storage Expansion X7-2 Quarter Rack	Extreme Flash: 430.7 kg (949.5 lbs) High Capacity: 450.6 kg (993.5 lbs)	Extreme Flash: 364.5 kg (803.5 lbs) High Capacity: 384.4 kg (847.5 lbs)
Oracle Exadata Storage Expansion X6-2 Full Rack	Extreme Flash: 850.3 kg (1874.5 lbs) High Capacity: 945.1 kg (2083.5 lbs)	Extreme Flash: 784.0 kg (1728.5 lbs) High Capacity: 878.8 kg (1937.5 lbs)
Oracle Exadata Storage Expansion X6-2 Half Rack	Extreme Flash: 569.0 kg (1254.5 lbs) High Capacity: 613.9 kg (1353.5 lbs)	Extreme Flash: 502.8 kg (1108.5 lbs) High Capacity: 547.7 kg (1207.5 lbs)
Oracle Exadata Storage Expansion X6-2 Quarter Rack	Extreme Flash: 430.7 kg (949.5 lbs) High Capacity: 450.6 kg (993.5 lbs)	Extreme Flash: 364.5 kg (803.5 lbs) High Capacity: 384.4 kg (847.5 lbs)
Oracle Exadata Storage Expansion X5-2 Full Rack	994.7 kg (2193 lbs)	915.8 kg (2019 lbs)
Oracle Exadata Storage Expansion X5-2 Half Rack	640.9 kg (1413 lbs)	591.5 kg (1304 lbs)
Oracle Exadata Storage Expansion X5-2 Quarter Rack	444.5 kg (980 lbs)	411 kg (906.1 lbs)
Oracle Exadata Storage Expansion X4-2 Full Rack	903.1 kg (1991 lbs)	824.2 kg (1817.1 lbs)
Oracle Exadata Storage Expansion X4-2 Half Rack	562.4 kg (1239.9 lbs)	513.0 kg (1131 lbs)

Table 1-20   (Cont.) Rack Weights for Oracle Exadata Storage Expansion Rack

Type of Rack	Shipping Weight	Net Weight
Oracle Exadata Storage Expansion X4-2 Quarter Rack	380.1 kg (838 lbs)	346.5 kg (764 lbs)
Oracle Exadata Storage Expansion X3-2 Full Rack	906.3 kg (1998 lbs)	827.4 kg (1824.1 lbs)
Oracle Exadata Storage Expansion X3-2 Half Rack	565.6 kg (1247 lbs)	516.2 kg (1138 lbs)
Oracle Exadata Storage Expansion X3-2 Quarter Rack	383.3 kg (845 lbs)	349.7 kg (771 lbs)
Oracle Exadata Storage Expansion Full Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers	1001.1 kg (2207 lbs)	917.6 kg (2023 lbs)
Oracle Exadata Storage Expansion Half Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers	659.6 kg (1454.2 lbs)	578.3 kg (1275 lbs)
Oracle Exadata Storage Expansion Quarter Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers	475.3 kg (1047.9 lbs)	396.8 kg (874.8 lbs)

If your loading dock meets the height and ramp requirements for a standard freight carrier truck, then you can use a pallet jack to unload the rack. If the loading dock does not meet the requirements, then you must provide a standard forklift or other means to unload the rack. You can also request that the rack be shipped in a truck with a lift gate.

When Oracle Exadata Rack arrives, leave the rack in its shipping packaging until it arrives at its installation site. Use a conditioned space to remove the packaging material to reduce particles before entering the data center. The entire access route to the installation site should be free of raised-pattern flooring that can cause vibration.

Allow enough space for unpacking it from its shipping cartons. Ensure that there is enough clearance and clear pathways for moving Oracle Exadata Rack from the unpacking location to the installation location.

Table 1-21   Access Route Requirements

Access Route Item	With Shipping Pallet	Without Shipping Pallet
Minimum door height	2184 mm (86 inches)	2040 mm (80.32 inches)
Minimum door width	1270 (50 inches)	640 mm (25.19 inches)
Minimum elevator depth	1625.6 mm (64 inches)	1240 mm (48.82 inches)
Maximum incline	6 degrees	6 degrees
Minimum elevator, pallet jack, and floor loading capacity	1134 kg (2500 lbs)	1134 kg (2500 lbs)

1.2.2 Maintenance Access Requirements

The maintenance area must be large enough for Oracle Exadata Rack, and have the required access space. For example, the required space to remove the side panels is 675. 64 mm (26.6 inches). Front access space requirement is typically the length of the longest chassis supported in the rack, plus the distance the rails need to travel out to install and remove equipment from the front. Rear access space requirement is the space needed for a person working behind the Oracle Exadata Rack. Top access space requirement is for a person standing on a ladder to be able service components installed in the top of the rack.

> **Note:**
>
> • Open tiles are required for electrical access.
> • Oracle Exadata Racks can be placed side-by-side when interconnecting the racks.

The following table lists the maintenance access requirements.

Table 1-22   Maintenance Access Requirements for Oracle Exadata Database Machine (All Models)

Location	Maintenance Access Requirement
Rear maintenance	914 mm (36 inches)
Front maintenance	1232 (48.5 inches)
Top maintenance	914 mm (36 inches)

1.3 Flooring Requirements

Oracle recommends that Oracle Exadata Rack be installed on raised flooring. The site floor and the raised flooring must be able to support the total weight of Oracle Exadata Rack.

Table 1-23 lists the floor load requirements.

Table 1-23   Floor Load Requirements for Oracle Exadata Database Machine

Description	Requirement
Maximum allowable weight of installed rack equipment	952.5 kg (2100 lbs)
Maximum allowable weight of installed power distribution units	52.16 kg (115 lbs)
Maximum dynamic load (maximum allowable weight of installed equipment including PDUs)	1004.66 kg (2215 lbs)

1.4 Electrical Power Requirements

Oracle Exadata Racks can operate effectively over a wide range of voltages and frequencies. However, they must have a reliable power source. Damage may occur if the ranges are exceeded. Electrical disturbances such as the following may damage Oracle Exadata Rack:

- 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 Exadata Rack from such disturbances, you should have a dedicated power distribution system, power-conditioning equipment, as well as lightning arresters or power cables to protect from electrical storms.

1.4.1 PDU Power Requirements

Each rack has two pre-installed power distribution units (PDUs). The PDUs accept different power sources. You must specify the type of PDU that is correct for your Oracle Exadata Rack and data center.

The following are the PDUs that Exadata currently supports or has supported in the past:

- Table 1-24 Low-voltage 15 kVA Single Phase PDUs for North America, South America, Japan and Taiwan (2 PDUs per Rack)

- Table 1-25 Low-voltage 15 kVA Three Phase PDUs for North America, South America, Japan and Taiwan (2 PDUs per Rack)

- Table 1-26 High-voltage 15 kVA Single Phase PDUs for Europe, the Middle East and Africa (EMEA), and Asia Pacific (APAC), except for Japan and Taiwan (2 PDUs per Rack)

- Table 1-27 High-voltage 15 kVA Three Phase for Europe, the Middle East and Africa (EMEA), and Asia Pacific (APAC), except for Japan and Taiwan (2 PDUs per Rack)

- Table 1-28 Low-voltage 22 kVA Single Phase PDUs for North America, South America, Japan and Taiwan (2 PDUs per Rack)

- Table 1-29 High-voltage 22 kVA Single Phase PDUs for Europe, the Middle East and Africa (EMEA), and Asia Pacific (APAC), except for Japan and Taiwan (2 PDUs per Rack)

- Table 1-30 Low-voltage 24 kVA Three Phase PDUs for North America, South America, Japan and Taiwan (2 PDUs per Rack)

- Table 1-31 High-voltage 24 kVA Three Phase PDUs for Europe, the Middle East and Africa (EMEA), and Asia Pacific (APAC), except for Japan and Taiwan (2 PDUs per Rack)

- Table 1-32 Low-voltage 37 kVA Three Phase PDUs for North America, South America, Japan and Taiwan (2 PDUs per Rack)

- Table 1-33 High-voltage 37 kVA Three Phase PDUs for Europe, the Middle East and Africa (EMEA), and Asia Pacific (APAC), except for Japan and Taiwan (2 PDUs per Rack)

Table 1-24 lists the requirements for low-voltage single-phase PDUs for North America, South America, Japan, and Taiwan. There are two PDUs per rack. The following specifications are per PDU.

Table 1-24   Low-voltage 15 kVA Single Phase PDUs for North America, South America, Japan and Taiwan (2 PDUs per Rack)

Option	Requirement, per PDU
Voltage	200 - 240 VAC
Frequency	50/60 Hz
Current	24 A maximum per input
Power rating	15 kVA
Output current	72 A (3 x 24 A)
Outlets	42 x C13; 6 x C19
Outlet groups	6
Group protection (UL489 2-pole circuit breaker)	20A
Data center receptacle	15kVA, with three 30A/250V 2-pole/3-wire NEMA L6-30P plugs

The following are needed to connect an Oracle Exadata system to a low-voltage one-phase power source:

- 6 power cords for two PDUs, 30 amperes at 200 - 240 VAC
- 6 receptacles to connect the PDUs to 6 NEMA L6-30 data center receptacles

Figure 1-1 shows the low-voltage, single phase PDU power connector for North America, South America, Japan and Taiwan.

Figure 1-1   Low-voltage Single Phase Power Connector

Table 1-25 lists the requirements for low-voltage three-phase PDUs for North America, South America, Japan, and Taiwan. There are two PDUs per rack. The following specifications are per PDU.

Table 1-25   Low-voltage 15 kVA Three Phase PDUs for North America, South America, Japan and Taiwan (2 PDUs per Rack)

Option	Requirement, per PDU
Voltage	190 - 220 VAC
Frequency	50/60 Hz
Current	40 A maximum per phase
Power rating	14.4 kVA
Output current	69.3 A (3 x 23.1A)
Outlets	42 x C13; 6 x C19
Outlet groups	6
Group protection (UL489 2-pole circuit breaker)	20A
Data center receptacle	IEC309-3P4W-IP67 60A 250VAC 3ph (Hubbell equivalent is HBL460R9W)

The following are needed to connect an Oracle Exadata system to a low-voltage three-phase power source:

- 2 power cords for two PDUs, 60 amperes at 190 - 220 VAC three-phase
- 2 receptacles to connect the PDUs to 2 IEC 60309 60A 4-pin 250VAC 3ph IP67 data center receptacles

Figure 1-2 shows the low-voltage, three phase PDU power connector for North America, South America, Japan and Taiwan.

Figure 1-2   Low-voltage Three Phase Power Connector
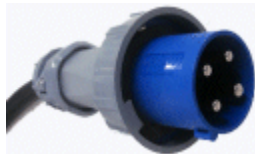
Table 1-26 lists the requirements for 15 kVA high-voltage three-phase PDUs for Europe, the Middle East, Africa, and Asia Pacific, except Japan and Taiwan. There are two PDUs per rack.

The following specifications are per PDU.

Table 1-26   High-voltage 15 kVA Single Phase PDUs for Europe, the Middle East and Africa (EMEA), and Asia Pacific (APAC), except for Japan and Taiwan (2 PDUs per Rack)

Option	Requirement, per PDU
Voltage	220 - 240 VAC
Frequency	50/60 Hz

Table 1-26   (Cont.) High-voltage 15 kVA Single Phase PDUs for Europe, the Middle East and Africa (EMEA), and Asia Pacific (APAC), except for Japan and Taiwan (2 PDUs per Rack)

Option	Requirement, per PDU
Current	24 A maximum per input
Power rating	15 kVA
Output current	72 A (3 x 24 A)
Outlets	42 x C13; 6 x C19
Outlet groups	6
Group protection (UL489 2-pole circuit breaker)	20A
Data center receptacle	15kVA, IEC309-2P3W-IP44 32A 250VAC (Hubbell equivalent is HBL332R6W

Figure 1-3 shows the high-voltage single phase PDU power connector for EMEA, and APAC, except for Japan and Taiwan.

Figure 1-3   High-voltage Single Phase Power Connector

Table 1-27 lists the requirements for 15 kVA high-voltage three-phase PDUs for Europe, the Middle East, Africa, and Asia Pacific, except Japan and Taiwan. There are two PDUs per rack. The following specifications are per PDU.

Table 1-27   High-voltage 15 kVA Three Phase for Europe, the Middle East and Africa (EMEA), and Asia Pacific (APAC), except for Japan and Taiwan (2 PDUs per Rack)

Option	Requirement, per PDU
Voltage	220/380 - 240/415 VAC 3-phase
Frequency	50/60 Hz
Current	25 A maximum per phase
Power rating	14.4 kVA
Output current	62.7 A (3 x 20.9 A)
Outlets	42 x C13; 6 x C19
Outlet groups	6

Table 1-27   (Cont.) High-voltage 15 kVA Three Phase for Europe, the Middle East and Africa (EMEA), and Asia Pacific (APAC), except for Japan and Taiwan (2 PDUs per Rack)

Option	Requirement, per PDU
Group protection (UL489 1-pole circuit breaker)	20A
Data center receptacle	15kVA, three phase, 5-pin, IEC 60309 32A, 5-pin 230/400V, three phase IP44

The following are needed to connect an Oracle Exadata system to a high-voltage three-phase power source:

- 2 power cords for two PDUs, 25 amperes at 220/380 - 240/415 VAC three-phase

- 2 receptacles to connect the PDUs to 2 IEC 60309 32A 5-pin 230/400VAC 3ph IP44 data center receptacles

Figure 1-4 shows the high-voltage three phase PDU power connector for EMEA, and APAC, except for Japan and Taiwan.

Figure 1-4   High-voltage Three Phase Power Connector

Table 1-28 lists the requirements for low-voltage 22 kVA single phase PDUs for North America, South America, Japan, and Taiwan. There are two PDUs per rack. The following specifications are per PDU.

Table 1-28   Low-voltage 22 kVA Single Phase PDUs for North America, South America, Japan and Taiwan (2 PDUs per Rack)

Option	Requirement, per PDU
Voltage	200 - 240 VAC
Frequency	50/60 Hz
Current	36.8 A maximum per input / 110.4 A Maximum per PDU
Power rating	22 kVA
Output current	110.4A (3x 36.8)
Outlets	42 x C13; 6 x C19
Outlet groups	6

Table 1-28   (Cont.) Low-voltage 22 kVA Single Phase PDUs for North America, South America, Japan and Taiwan (2 PDUs per Rack)

Option	Requirement, per PDU
Group protection (UL489 2-pole circuit breaker)	20A
Data center receptacle	Hubbell CS8265C

The following are needed to connect an Oracle Exadata system to a low-voltage single-phase power source:

- 3 power cords for two PDUs

- 6 receptacles to connect the PDUs

Figure 1-5 shows the low-voltage, 22 kVA single phase PDU power connector for North America, South America, Japan and Taiwan. This power connector is different from the power connector for the low-voltage 15 kVA single phase PDU.

Figure 1-5   Low-voltage 22 kVA Single Phase Power Connector

Table 1-29 lists the requirements for 22 kVA high-voltage one-phase PDUs for Europe, the Middle East, Africa, and Asia Pacific, except Japan and Taiwan. There are two PDUs per rack. The following specifications are per PDU.

Table 1-29   High-voltage 22 kVA Single Phase PDUs for Europe, the Middle East and Africa (EMEA), and Asia Pacific (APAC), except for Japan and Taiwan (2 PDUs per Rack)

Option	Requirement, per PDU
Voltage	220-240 VAC
Frequency	50/60 Hz
Current	32 A maximum per input
Power rating	22 kVA
Output current	96 A (3 x 32 A)
Outlets	42 x C13; 6 x C19
Outlet groups	6
Group protection (UL489 1-pole circuit breaker)	20A

Table 1-29   (Cont.) High-voltage 22 kVA Single Phase PDUs for Europe, the Middle East and Africa (EMEA), and Asia Pacific (APAC), except for Japan and Taiwan (2 PDUs per Rack)

Option	Requirement, per PDU
Data center receptacle	IEC309-2P3W-IP44 32A 250VAC (Hubbell equivalent is HBL332R6W)

> **Note:**
>
> The high-voltage 15kVA single phase PDU is no longer available. The high-voltage 22kVA is a compatible replacement with the same receptacle and breaker requirements

The following are needed to connect an Oracle Exadata system to a high-voltage one-phase power source:

- 6 power cords for two PDUs, 25 amperes at 220/380 - 240/415 VAC 1-phase voltage

- 6 receptacles to connect the PDUs to 2 IEC 60309 32A 3-pin 250VAC IP44 data center receptacles, and requires 22 kVA, 1-phase

Figure 1-3 shows the high-voltage single phase PDU power connector for EMEA, and APAC, except for Japan and Taiwan.

Table 1-30 lists the requirements for low-voltage 24 kVA three phase PDUs. There are two PDUs per rack. The following specifications are per PDU.

Table 1-30   Low-voltage 24 kVA Three Phase PDUs for North America, South America, Japan and Taiwan (2 PDUs per Rack)

Option	Requirement, per PDU
Voltage	200 - 208 VAC 3-phase
Frequency	50/60 Hz
Current	34.6 A maximum per phase
Power rating	25 kVA
Output current	120 A (6 x 20 A)
Outlets	42 x C13; 6 x C19
Outlet groups	6
Group protection (UL489 2-pole circuit breaker)	20A
Data center receptacle	IEC309-3P4W-IP67 60A 250VAC 3ph (Hubbell equivalent is HBL460R9W)

The following are needed to connect an Oracle Exadata system to a low-voltage three-phase power source:

- 4 power cords for two PDUs

- 4 receptacles to connect the PDUs

Table 1-31 lists the PDU requirements for high-voltage 24 kVA three phase PDUs. The following specifications are per PDU.

Table 1-31   High-voltage 24 kVA Three Phase PDUs for Europe, the Middle East and Africa (EMEA), and Asia Pacific (APAC), except for Japan and Taiwan (2 PDUs per Rack)

Option	Requirement, per PDU
Voltage	220/380 - 240/415 VAC 3-phase
Frequency	50/60 Hz
Current	18.1 A maximum per phase
Power rating	25 kVA
Output current	108.6A (6 x 18.1 A)
Outlets	42 x C13; 6 x C19
Outlet groups	6
Group protection (UL489 1-pole circuit breaker)	20A
Data center receptacle	IEC309-4P5W-IP44 32A 400VAC 3ph (Hubbell equivalent is HBL532R6W)

The following are needed to connect an Oracle Exadata system to a high-voltage three-phase power source:

- 4 power cords for two PDUs

- 4 receptacles to connect the PDUs

Table 1-32 lists the requirements for 37 kVA low-voltage three-phase PDUs for Oracle Exadata Database Machine X6-8, X5-8, and X4-8 with more than four database servers. There are two PDUs per rack. The following specifications are per PDU.

Table 1-32   Low-voltage 37 kVA Three Phase PDUs for North America, South America, Japan and Taiwan (2 PDUs per Rack)

Option	Requirement, per PDU
Voltage	200 - 208 VAC
Frequency	50/60 Hz
Current	34.6 A maximum per phase
Power rating	37 kVA
Output current	180 A (9 x 20 A)
Outlets	44 C13 and 9 C19
Outlet groups	6
Group protection (UL489 1-pole circuit breaker)	20 A
Data center receptacle	IEC 309-3P4W-IP67 plugs

The following are needed to connect an Oracle Exadata system to a low-voltage three-phase power source:

- 3 power cords for each PDU, 60 amperes at 190 - 220 VAC three-phase

- 3 receptacles to connect the PDUs to 2 IEC 60309 60A 4-pin 250VAC 3ph IP67 data center receptacles

- Figure 1-2 shows the low-voltage 37 kVA single phase PDU power connector for North America, South America, Japan and Taiwan.

Table 1-33 lists the requirements for 37 kVA high-voltage three-phase PDUs for Oracle Exadata Database Machine X6-8, X5-8, and X4-8 with more than four database servers. There are two PDUs per rack. The following specifications are per PDU.

Table 1-33   High-voltage 37 kVA Three Phase PDUs for Europe, the Middle East and Africa (EMEA), and Asia Pacific (APAC), except for Japan and Taiwan (2 PDUs per Rack)

Option	Requirement, per PDU
Voltage	220/380 - 240/415 VAC
Frequency	50/60 Hz
Current	18 A maximum per phase
Power rating	37 kVA
Output current	163 A (9 x 18.1 A)
Outlets	45 C13 and 9 C19
Outlet groups	6
Group protection (UL489 1-pole circuit breaker)	20A
Data center receptacle	IEC 309-4P5W-IP44

The following are needed to connect an Oracle Exadata system to a low-voltage three-phase power source:

- 2 power cords for two PDUs, 60 amperes at 190 - 220 VAC three-phase

- 3 receptacles to connect the PDUs to 2 IEC 60309 60A 4-pin 250VAC 3ph IP67 data center receptacles

- Figure 1-4 shows the high-voltage 37 kVA three phase PDU power connector for Europe, the Middle East and Africa (EMEA), and Asia Pacific (APAC), except for Japan and Taiwan.

1.4.2 Facility Power Requirements

Electrical work and installations must comply with applicable local, state, or national electrical codes. 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 PDUs. Use dedicated AC breaker panels for all power circuits that supply power to the PDU. 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 meters (13.12 feet) long, and 1 to 1.5 meters (3.3 to 4.9 feet) of the cord is routed within the rack cabinet. The installation site AC power receptacle must be within 2 meters (6.6 feet) of the rack.

1.4.3 Circuit Breaker Requirements

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

In addition to circuit breakers, 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.

> **Note:**
>
> Circuit breakers are supplied by the customer. One circuit breaker is required for each power cord.

1.4.4 Grounding Guidelines

The cabinets for Oracle Exadata Rack are shipped with grounding-type power cords. 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. Ensure that the facility administrator or qualified electrical engineer verifies the grounding method for the building, and performs the grounding work.

1.5 Temperature and Humidity Requirements

Airflow through Oracle Exadata Rack is from front to back. Refer to General Environmental Requirements for information on cooling and airflow.

> **Note:**
>
> Studies have shown 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 shut down of Oracle Exadata Database Machine.

The following table lists the temperature, humidity and altitude requirements for operating and non-operating machines.

Table 1-34   Temperature, Humidity and Altitude Requirements

Condition	Operating Requirement	Non-operating Requirement	Optimum
Temperature	5 to 32 degrees Celsius (41 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

Set conditions to the optimal temperature and humidity ranges to minimize the chance of downtime due to component failure. Operating Oracle Exadata Rack for extended periods at or near the operating range limits, or installing it in an environment where it remains at or near 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. 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 in the event that the air conditioning system goes down for a period of time.

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:

- Optimal range helps protect computer systems from corrosion problems associated with high humidity levels.

- Optimal range provides the greatest operating time buffer in the event of air conditioner control failure.

- This range 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. It is not difficult to maintain humidity in a data center because of the high-efficiency vapor barrier and low rate of air changes normally present.

1.6 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 out 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 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 are formed.

Air conditioning facilities usually do not precisely monitor or control temperature and humidity throughout an entire computer room. Generally, monitoring is done at individual points corresponding to multiple exhaust vents in the main unit, and other units in the room. Special consideration should be paid to humidity when using underfloor ventilation. When underfloor ventilation is used, monitoring is done at each point close to an exhaust vent. Distribution of the temperature and humidity across the entire room is uneven.

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

- 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.

- Allow a minimum clearance of 1219.2 mm (48 inches) at the front of the server, and 914 mm (36 inches) at the rear of the server for ventilation.

Use perforated tiles, approximately 400 CFM/tile, in front of the rack for cold air intake. The 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. Inadequate cold air flow could result in a higher inlet

temperature in the servers due to exhaust air recirculation. The following table describes the recommended number of floor tiles:

Type of Oracle Exadata Database Machine or Oracle Exadata Storage Expansion Rack	Recommended Number of Floor Tiles
Oracle Exadata full rack systems	4
Oracle Exadata half rack systems	3
Oracle Exadata quarter and eighth rack systems	1

Figure 1-6 shows a typical installation of the floor tiles for Oracle Exadata Database Machine Full Rack in a typical data center.

Figure 1-6   Typical Data Center Configuration for Perforated Floor Tiles
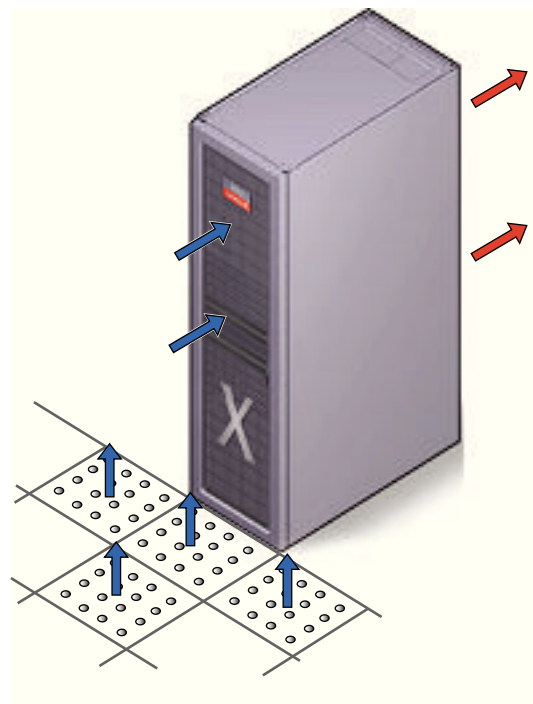
1.7 Network Connection and IP Address Requirements for Oracle Exadata Database Machine

The network cables must be run from your network equipment to the location of Oracle Exadata Database Machine. The requirements to connect to your existing Ethernet network infrastructure are described in the following sections:

1.7.1 Network Connection Requirements for Oracle Exadata Database Machine

Prior to installation, network cables must be run from your existing network infrastructure to the installation site. The requirements to connect Oracle Exadata Database Machine to your existing network infrastructure are as follows:

- Management network connection requirements for all Oracle Exadata Database Machine systems except for X2-n systems:

  – 1 Ethernet connection for the Ethernet switch in the rack to the existing management network.

- Management network connection requirements for Oracle Exadata Database Machine X2-n:

  – 1 Ethernet connection for the Ethernet switch in the rack to the existing management network.

  – 1 Ethernet connection for the KVM switch in the rack to the existing management network.

- Client access network connection requirements

  – One Ethernet connection per database server to the client access network. The number depends on the system type (Oracle Exadata Database Machine Full Rack, Oracle Exadata Database Machine Half Rack, or Oracle Exadata Database Machine Quarter Rack), and whether network channel bonding is used. Use the following formula to determine the number of connections you need:

    For bonded configurations, you need two network connections for each database node.

    For non-bonded configurations, you need one network connection for each database node.

- Additional network NET2 connection requirements

  One Ethernet connection per database server to connect NET2 to your existing network. The number depends on the system type, as follows:

  For bonded configurations, you need two network connections for each database node.

  For non-bonded configurations, you need one network connection for each database node.

  > ✎ **Note:**
  >
  > – This network is unavailable if network channel bonding is used for the client access network.
  >
  > – This network is optional. A cable is not required unless the network is configured during deployment.

- Additional network NET3 connection requirements

One Ethernet connection per database server to connect NET3 to your existing network. The number depends on the system type, as follows:

– 8 connections for Oracle Exadata Database Machine 2-socket, Full Rack systems

– 4 connections for Oracle Exadata Database Machine 2-socket, Half Rack systems

– 2 connections for Oracle Exadata Database Machine 2-socket, Quarter Rack systems

– 2 connections for Oracle Exadata Database Machine 8-socket, Full Rack systems

> **Note:**
>
> This network is optional. A cable is not required unless the network is configured during deployment.

Oracle Exadata Database Machine X2-8 Full Rack has a total of 16 Ethernet ports per server. The additional networks for Oracle Exadata Database Machine X2-8 Full Rack are NET2 through NET15.

The following table shows examples of connection requirements for different sample environments. The table applies to two-socket Oracle Exadata Database Machine models X3-2 to X6-2.

Table 1-35   Examples of Network Configurations and Connection Requirements for Oracle Exadata Database Machine 2-Socket Systems X3-2 to X6-2

Scenario	Network Requirements
Core Requirements	• 1 for Ethernet switch • 2 for PDU monitoring
Bonded network configuration, and connected to a dedicated backup network	• 2 per database node for client access for bonded Ethernet interface on database servers • 1 per database node for backup network access for database servers Total = 3 + (3 * number of database nodes)
Non-bonded network configuration, and connected to a dedicated backup network and a dedicated disaster recovery network	• 1 for each database node for client access for the database servers • 1 per database node for backup network access for the database servers • 1 per database node for disaster recovery network access for the database servers Total = 3 + (3 * number of database nodes)
Non-bonded network configuration, and not connected to an additional network	• 1 per database node for database servers Total = 3 + (1 * database node)

Table 1-35   (Cont.) Examples of Network Configurations and Connection Requirements for Oracle Exadata Database Machine 2-Socket Systems X3-2 to X6-2

Scenario	Network Requirements
Non-bonded network configuration, and connected to a dedicated backup network	• 1 for each database node for client access for the database servers • 1 per database node for backup network access for the database servers Total = 3 + (2 * number of database nodes)

The following table shows examples of connection requirements for different sample environments with Oracle Exadata Database Machine X2-2.

Table 1-36   Examples of Network Configurations and Connection Requirements for Oracle Exadata Database Machine X2-2

Scenario	Network Requirements
Oracle Exadata Database Machine X2-2 Full Rack using a bonded network configuration, and connected to a dedicated backup network	Requires 28 connections to your existing networks • 1 for Ethernet switch • 1 for KVM switch • 16 for database client access for bonded Ethernet interface on database servers • 8 for backup network access for database servers • 2 for monitoring the PDUs
Oracle Exadata Database Machine X2-2 Full Rack using a non-bonded network configuration, and connected to a dedicated backup network and a dedicated disaster recovery network	Requires 28 connections to your existing networks • 1 for Ethernet switch • 1 for KVM switch • 8 for database client access for the database servers • 8 for backup network access for the database servers • 8 for disaster recovery network access for the database servers • 2 for monitoring the PDUs
Oracle Exadata Database Machine X2-2 Half Rack using a non-bonded network configuration, and not connected to an additional network	Requires 8 connections to your existing networks • 1 for Ethernet switch • 1 for KVM switch • 4 for database servers • 2 for monitoring the PDUs

Table 1-36   (Cont.) Examples of Network Configurations and Connection Requirements for Oracle Exadata Database Machine X2-2

Scenario	Network Requirements
Oracle Exadata Database Machine X2-2 Quarter Rack using a non-bonded network configuration, and connected to a dedicated backup network	Requires 8 connections to your existing networks • 1 for Ethernet switch • 1 for KVM switch • 2 for database client access for the database servers • 2 for backup network access for the database servers • 2 for monitoring the PDUs

Related Topics

•   Understanding the Network Requirements for Oracle Exadata Database Machine

1.7.2 DNS Configuration for Oracle Exadata Database Machine

Prior to receiving your Oracle Exadata Database Machine, use Oracle Exadata Database Machine Deployment Assistant. The assistant generates a file to be used when setting up the system. The host names and IP addresses specified in the assistant-generated file for the management network, client access network, and additional networks should be registered in Domain Name System (DNS) prior to initial configuration. In addition, all public addresses, single client access name (SCAN) addresses, and VIP addresses should be registered in DNS prior to installation.

The assistant-generated file defines the SCAN as a single name with three IP addresses on the client access network. The three SCAN addresses provide service access for clients to Oracle Exadata Database Machine. Configure DNS for round robin resolution for the SCAN name to these three SCAN addresses.

All addresses registered in DNS must be configured for both forward resolution and reverse resolution. Reverse resolution must be forward confirmed (forward-confirmed reverse DNS) such that both the forward and reverse DNS entries match each other.

> **Note:**
>
> Grid Naming Service (GNS) is not configured on Oracle Exadata Database Machine during initial configuration.

> ✎ **See Also:**
>
> - "Using Oracle Exadata Deployment Assistant"
>
> - *Oracle Grid Infrastructure Installation and Upgrade Guide for Linux* for additional information about SCAN addresses
>
> - Your DNS vendor documentation for additional information about configuring round robin name resolution

1.7.3 IP Address Requirements for Oracle Exadata Database Machine

Oracle Exadata Database Machine requires a large number of host names and IP addresses during initial configuration. The number of IP addresses required for a particular network, such as the management network, depends on the type of system. The network configuration, such as host names and IP addresses, used during installation is generated from information when completing the Oracle Exadata Database Machine Deployment Assistant.

Configure the new IP addresses in your existing networks only after you have run Oracle Exadata Database Machine Deployment Assistant. All IP addresses in the assistant-generated file must be unassigned at the time of initial configuration. In addition, all IP addresses must be statically-assigned IP addresses, not dynamically-assigned (DHCP) addresses.

All InfiniBand addresses must be in the same subnet, with a minimum subnet mask of 255.255.240.0 (or /20). The subnet mask chosen should be wide enough to accommodate possible future expansion of the Oracle Exadata Database Machine and InfiniBand network.

The following table lists the IP address requirements for Oracle Exadata Database Machine X5-2 and later systems:

Table 1-37   IP Address Requirements for Oracle Exadata Database Machine X5-2 and Later Systems

Type of Oracle Exadata Database Machine	Management Network Requirements	Client Access Network Requirements	Additional Networks (NET2 and NET3) Requirements	InfiniBand Private Network Requirements
Oracle Exadata Database Machine X5-2 and later Full Rack	Minimum of 49 IP addresses • 8 IP addresses for administration, one per database server • 14 IP addresses for administration, one per Exadata Storage Server • 8 IP addresses for ILOM, one per database server • 14 IP addresses for ILOM, one per Exadata Storage Server • 3 IP addresses for switches: 2 for InfiniBand, and 1 for Ethernet • 2 IP addresses for monitoring electric current of the PDUs	Minimum of 19 IP address • 8 IP addresses for public access, one per database server • 8 IP addresses for Oracle RAC VIP addresses, one per database server • 3 IP addresses for SCAN addresses for Oracle RAC	Minimum of 8 IP addresses for each additional network • 8 IP addresses for the database servers, one per database server If using a bonded network configuration for the client access network, then NET2 cannot be used as an additional network.	44 IP addresses • 16 IP addresses, two per database server • 28 IP addresses, two per Exadata Storage Server

Table 1-37   (Cont.) IP Address Requirements for Oracle Exadata Database Machine X5-2 and Later Systems

Type of Oracle Exadata Database Machine	Management Network Requirements	Client Access Network Requirements	Additional Networks (NET2 and NET3) Requirements	InfiniBand Private Network Requirements
Oracle Exadata Database Machine X5-2 and later Half Rack	Minimum of 27 IP addresses • 4 IP addresses for administration, one per database server • 7 IP addresses for administration, one per Exadata Storage Server • 4 IP addresses for ILOM, one per database server • 7 IP addresses for ILOM, one per Exadata Storage Server • 3 IP addresses for switches: 2 for InfiniBand, and 1 for Ethernet • 2 IP addresses for monitoring electric current of the PDUs	Minimum of 11 IP addresses • 4 IP addresses for public access, one per database server • 4 IP addresses for Oracle RAC VIP addresses, one per database server • 3 IP addresses for SCAN addresses for Oracle RAC.	Minimum of 4 IP addresses for each additional network • 4 IP addresses for the database servers, one per database server If using a bonded network configuration for the client access network, then NET2 cannot be used as an additional network.	For X6-2 and X5-2 Half Rack: 22 IP addresses: • 8 IP addresses, two per database server • 14 IP addresses, two per Exadata Storage Server

Table 1-37   (Cont.) IP Address Requirements for Oracle Exadata Database Machine X5-2 and Later Systems

Type of Oracle Exadata Database Machine	Management Network Requirements	Client Access Network Requirements	Additional Networks (NET2 and NET3) Requirements	InfiniBand Private Network Requirements
• Oracle Exadata Database Machine X5-2 and later Quarter Rack • Oracle Exadata Database Machine X5-2 and later Eighth Rack	Minimum of 15 IP addresses • 2 IP addresses for administration, one per database server • 3 IP addresses for administration, one per Exadata Storage Server • 2 IP addresses for ILOM, one per database server • 3 IP addresses for ILOM, one per Exadata Storage Server • 3 IP addresses for switches: 2 for InfiniBand, and 1 for Ethernet • 2 IP addresses for monitoring electric current of the PDUs	Minimum of 7 IP addresses • 2 IP addresses for public access, one per database server • 2 IP addresses for Oracle RAC VIP addresses, one per database server • 3 IP addresses for SCAN addresses for Oracle RAC.	Minimum of 2 IP addresses for each additional network • 2 IP addresses for the database servers, one per database server If using a bonded network configuration for the client access network, then NET2 cannot be used as an additional network.	For X5-2 and X6-2: 10 IP addresses: • 4 IP addresses, two per database server • 6 IP addresses, two per Exadata Storage Server

Table 1-37   (Cont.) IP Address Requirements for Oracle Exadata Database Machine X5-2 and Later Systems

Type of Oracle Exadata Database Machine	Management Network Requirements	Client Access Network Requirements	Additional Networks (NET2 and NET3) Requirements	InfiniBand Private Network Requirements
Oracle Exadata Database Machine X5-8 and X6-8 Full Rack	Minimum of 37 IP addresses • 2 IP addresses for administration, one per database server • 14 IP addresses for administration, one per Exadata Storage Server • 2 IP addresses for ILOM, one per database server • 14 IP addresses for ILOM, one per Exadata Storage Server • 3 IP addresses for switches: 2 for InfiniBand, and 1 for Ethernet • 2 IP addresses for monitoring electric current of the PDUs	Minimum of 7 IP addresses • 2 IP addresses for public access, one per database server • 2 IP addresses for Oracle RAC VIP addresses, one per database server • 3 IP addresses for SCAN addresses for Oracle RAC		44 IP addresses • 16 IP addresses, two per database server • 28 IP addresses, two per Exadata Storage Server

Table 1-37   (Cont.) IP Address Requirements for Oracle Exadata Database Machine X5-2 and Later Systems

Type of Oracle Exadata Database Machine	Management Network Requirements	Client Access Network Requirements	Additional Networks (NET2 and NET3) Requirements	InfiniBand Private Network Requirements
Oracle Exadata Database Machine X5-8 and X6-8 Half Rack	Minimum of 15 IP addresses • 2 IP addresses for administration, one per database server • 3 IP addresses for administration, one per Exadata Storage Server • 2 IP addresses for ILOM, one per database server • 3 IP addresses for ILOM, one per Exadata Storage Server • 3 IP addresses for switches: 2 for InfiniBand, and 1 for Ethernet • 2 IP addresses for monitoring electric current of the PDUs	Minimum of 7 IP addresses • 2 IP addresses for public access, one per database server • 2 IP addresses for Oracle RAC VIP addresses, one per database server • 3 IP addresses for SCAN addresses for Oracle RAC		22 IP addresses • 16 IP addresses, two per database server • 6 IP addresses, two per Exadata Storage Server

The following table lists the IP address requirements for Oracle Exadata Database Machine X4-2, and Oracle Exadata Database Machine X4-8 Full Rack:

Table 1-38   IP Address Requirements for Oracle Exadata Database Machine X4-2 and X4-8 Full Rack

Type of Oracle Exadata Database Machine	Management Network Requirements	Client Access Network Requirements	Additional Networks (NET2 and NET3) Requirements	InfiniBand Private Network Requirements
Oracle Exadata Database Machine X4-2 Full Rack	Minimum of 49 IP addresses • 8 IP addresses for administration, one per database server • 14 IP addresses for administration, one per Exadata Storage Server • 8 IP addresses for ILOM, one per database server • 14 IP addresses for ILOM, one per Exadata Storage Server • 3 IP addresses for switches: 2 for InfiniBand, and 1 for Ethernet • 2 IP addresses for monitoring electric current of the PDUs	Minimum of 19 IP address • 8 IP addresses for public access, one per database server • 8 IP addresses for Oracle RAC VIP addresses, one per database server • 3 IP addresses for SCAN addresses for Oracle RAC	Minimum of 8 IP addresses for each additional network • 8 IP addresses for the database servers, one per database server If using a bonded network configuration for the client access network, then NET2 cannot be used as an additional network.	44 IP addresses • 16 IP addresses, two per database server • 28 IP addresses, two per Exadata Storage Server

Table 1-38   (Cont.) IP Address Requirements for Oracle Exadata Database Machine X4-2 and X4-8 Full Rack

Type of Oracle Exadata Database Machine	Management Network Requirements	Client Access Network Requirements	Additional Networks (NET2 and NET3) Requirements	InfiniBand Private Network Requirements
Oracle Exadata Database Machine X4-2 Half Rack	Minimum of 27 IP addresses • 4 IP addresses for administration, one per database server • 7 IP addresses for administration, one per Exadata Storage Server • 4 IP addresses for ILOM, one per database server • 7 IP addresses for ILOM, one per Exadata Storage Server • 3 IP addresses for switches: 2 for InfiniBand, and 1 for Ethernet • 2 IP addresses for monitoring electric current of the PDUs	Minimum of 11 IP addresses • 4 IP addresses for public access, one per database server • 4 IP addresses for Oracle RAC VIP addresses, one per database server • 3 IP addresses for SCAN addresses for Oracle RAC.	Minimum of 4 IP addresses for each additional network • 4 IP addresses for the database servers, one per database server If using a bonded network configuration for the client access network, then NET2 cannot be used as an additional network.	22 IP addresses • 8 IP addresses, two per database server • 14 IP addresses, two per Exadata Storage Server

Table 1-38   (Cont.) IP Address Requirements for Oracle Exadata Database Machine X4-2 and X4-8 Full Rack

Type of Oracle Exadata Database Machine	Management Network Requirements	Client Access Network Requirements	Additional Networks (NET2 and NET3) Requirements	InfiniBand Private Network Requirements
Oracle Exadata Database Machine X4-2 Quarter Rack and Oracle Exadata Database Machine X4-2 Eighth Rack	Minimum of 15 IP addresses • 2 IP addresses for administration, one per database server • 3 IP addresses for administration, one per Exadata Storage Server • 2 IP addresses for ILOM, one per database server • 3 IP addresses for ILOM, one per Exadata Storage Server • 3 IP addresses for switches: 2 for InfiniBand, and 1 for Ethernet • 2 IP addresses for monitoring electric current of the PDUs	Minimum of 7 IP addresses • 2 IP addresses for public access, one per database server • 2 IP addresses for Oracle RAC VIP addresses, one per database server • 3 IP addresses for SCAN addresses for Oracle RAC.	Minimum of 2 IP addresses for each additional network • 2 IP addresses for the database servers, one per database server If using a bonded network configuration for the client access network, then NET2 cannot be used as an additional network.	10 IP addresses • 4 IP addresses, two per database server • 6 IP addresses, two per Exadata Storage Server

Table 1-38   (Cont.) IP Address Requirements for Oracle Exadata Database Machine X4-2 and X4-8 Full Rack

Type of Oracle Exadata Database Machine	Management Network Requirements	Client Access Network Requirements	Additional Networks (NET2 and NET3) Requirements	InfiniBand Private Network Requirements
Oracle Exadata Database Machine X4-8 Full Rack	Minimum of 37 IP addresses • 2 IP addresses for administration, one per database server • 14 IP addresses for administration, one per Exadata Storage Server • 2 IP addresses for ILOM, one per database server • 14 IP addresses for ILOM, one per Exadata Storage Server • 4 IP addresses for switches: 3 for InfiniBand, and 1 for Ethernet • 2 IP addresses for monitoring electric current of the PDUs	Minimum 7 IP addresses • 2 IP addresses for public access, one per database server • 2 IP addresses for Oracle RAC VIP addresses, one per database server • 3 IP addresses for SCAN addresses for Oracle RAC.	Minimum of 2 IP addresses for each additional network • 2 IP addresses for the database servers, one per database server If using a bonded network configuration for the client access network, then NET2 cannot be used as an additional network.	16 IP addresses • 2 IP addresses, one per database server • 14 IP addresses, one per Exadata Storage Server

The following table lists the IP address requirements for Oracle Exadata Database Machine X3-2 and Oracle Exadata Database Machine X3-8 Full Rack:

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Table 1-39   IP Address Requirements for Oracle Exadata Database Machine X3-2 and Oracle Exadata Database Machine X3-8 Full Rack

Type of Oracle Exadata Database Machine	Management Network Requirements	Client Access Network Requirements	Additional Networks (NET2 and NET3) Requirements	InfiniBand Private Network Requirements
Oracle Exadata Database Machine X3-2 Full Rack	Minimum of 50 IP addresses • 8 IP addresses for administration, one per database server • 14 IP addresses for administration, one per Exadata Storage Server • 8 IP addresses for ILOM, one per database server • 14 IP addresses for ILOM, one per Exadata Storage Server • 4 IP addresses for switches: 3 for InfiniBand, and 1 for Ethernet • 2 IP addresses for monitoring electric current of the PDUs	Minimum of 19 IP address • 8 IP addresses for public access, one per database server • 8 IP addresses for Oracle RAC VIP addresses, one per database server • 3 IP addresses for SCAN addresses for Oracle RAC	Minimum of 8 IP addresses for each additional network • 8 IP addresses for the database servers, one per database server If using a bonded network configuration for the client access network, then NET2 cannot be used as an additional network.	22 IP addresses • 8 IP addresses, one per database server • 14 IP addresses, one per Exadata Storage Server

Table 1-39   (Cont.) IP Address Requirements for Oracle Exadata Database Machine X3-2 and Oracle Exadata Database Machine X3-8 Full Rack

Type of Oracle Exadata Database Machine	Management Network Requirements	Client Access Network Requirements	Additional Networks (NET2 and NET3) Requirements	InfiniBand Private Network Requirements
Oracle Exadata Database Machine X3-2 Half Rack	Minimum of 28 IP addresses • 4 IP addresses for administration, one per database server • 7 IP addresses for administration, one per Exadata Storage Server • 4 IP addresses for ILOM, one per database server • 7 IP addresses for ILOM, one per Exadata Storage Server • 4 IP addresses for switches: 3 for InfiniBand, and 1 for Ethernet • 2 IP addresses for monitoring electric current of the PDUs	Minimum of 11 IP addresses • 4 IP addresses for public access, one per database server • 4 IP addresses for Oracle RAC VIP addresses, one per database server • 3 IP addresses for SCAN addresses for Oracle RAC.	Minimum of 4 IP addresses for each additional network • 4 IP addresses for the database servers, one per database server If using a bonded network configuration for the client access network, then NET2 cannot be used as an additional network.	11 IP addresses • 4 IP addresses, one per database server • 7 IP addresses, one per Exadata Storage Server

Table 1-39   (Cont.) IP Address Requirements for Oracle Exadata Database Machine X3-2 and Oracle Exadata Database Machine X3-8 Full Rack

Type of Oracle Exadata Database Machine	Management Network Requirements	Client Access Network Requirements	Additional Networks (NET2 and NET3) Requirements	InfiniBand Private Network Requirements
Oracle Exadata Database Machine X3-2 Quarter Rack	Minimum of 15 IP addresses • 2 IP addresses for administration, one per database server • 3 IP addresses for administration, one per Exadata Storage Server • 2 IP addresses for ILOM, one per database server • 3 IP addresses for ILOM, one per Exadata Storage Server • 3 IP addresses for switches: 2 for InfiniBand, and 1 for Ethernet • 2 IP addresses for monitoring electric current of the PDUs	Minimum of 7 IP addresses • 2 IP addresses for public access, one per database server • 2 IP addresses for Oracle RAC VIP addresses, one per database server • 3 IP addresses for SCAN addresses for Oracle RAC.	Minimum of 2 IP addresses for each additional network • 2 IP addresses for the database servers, one per database server If using a bonded network configuration for the client access network, then NET2 cannot be used as an additional network.	5 IP addresses • 2 IP addresses, one per database server • 3 IP addresses, one per Exadata Storage Server

Table 1-39   (Cont.) IP Address Requirements for Oracle Exadata Database Machine X3-2 and Oracle Exadata Database Machine X3-8 Full Rack

Type of Oracle Exadata Database Machine	Management Network Requirements	Client Access Network Requirements	Additional Networks (NET2 and NET3) Requirements	InfiniBand Private Network Requirements
Oracle Exadata Database Machine X3-8 Full Rack with Exadata Storage Server X4-2L Servers	Minimum of 38 IP addresses • 2 IP addresses for administration, one per database server • 14 IP addresses for administration, one per Exadata Storage Server • 2 IP addresses for ILOM, one per database server • 14 IP addresses for ILOM, one per Exadata Storage Server • 4 IP addresses for switches: 3 for InfiniBand, and 1 for Ethernet • 2 IP addresses for monitoring electric current of the PDUs	Minimum of 7 IP address • 2 IP addresses for public access, one per database server • 2 IP addresses for Oracle RAC VIP addresses, one per database server • 3 IP addresses for SCAN addresses for Oracle RAC	Minimum of 2 IP addresses for each additional network • 2 IP addresses for the database servers, one per database server If using a bonded network configuration for the client access network, then NET2 cannot be used as an additional network.	36 IP addresses • 8 IP addresses, one per database server • 28 IP addresses, two per Exadata Storage Server

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Table 1-39   (Cont.) IP Address Requirements for Oracle Exadata Database Machine X3-2 and Oracle Exadata Database Machine X3-8 Full Rack

Type of Oracle Exadata Database Machine	Management Network Requirements	Client Access Network Requirements	Additional Networks (NET2 and NET3) Requirements	InfiniBand Private Network Requirements
Oracle Exadata Database Machine X3-8 Full Rack with Exadata Storage Server X3-2 Servers or Exadata Storage Server with Sun Fire X4270 M2 Servers	Minimum of 38 IP addresses • 2 IP addresses for administration, one per database server • 14 IP addresses for administration, one per Exadata Storage Server • 2 IP addresses for ILOM, one per database server • 14 IP addresses for ILOM, one per Exadata Storage Server • 4 IP addresses for switches: 3 for InfiniBand, and 1 for Ethernet • 2 IP addresses for monitoring electric current of the PDUs	Minimum of 7 IP address • 2 IP addresses for public access, one per database server • 2 IP addresses for Oracle RAC VIP addresses, one per database server • 3 IP addresses for SCAN addresses for Oracle RAC	Minimum of 2 IP addresses for each additional network • 2 IP addresses for the database servers, one per database server If using a bonded network configuration for the client access network, then NET2 cannot be used as an additional network.	22 IP addresses • 8 IP addresses, one per database server • 14 IP addresses, one per Exadata Storage Server

The following table lists the IP address requirements for Oracle Exadata Database Machine X2-2 and Oracle Exadata Database Machine X2-8 Full Rack:

Table 1-40   IP Address Requirements for Oracle Exadata Database Machine X2-2 and Oracle Exadata Database Machine X2-8 Full Rack

Type of Oracle Exadata Database Machine	Management Network Requirements	Client Access Network Requirements	Additional Networks (NET2 and NET3) Requirements	InfiniBand Private Network Requirements
Oracle Exadata Database Machine X2-2 Full Rack	Minimum of 51 IP addresses • 8 IP addresses for administration, one per database server • 14 IP addresses for administration, one per Exadata Storage Server • 8 IP addresses for ILOM, one per database server • 14 IP addresses for ILOM, one per Exadata Storage Server • 5 IP addresses for switches: 3 for InfiniBand, 1 for Ethernet, and 1 for KVM • 2 IP addresses for monitoring electric current of the PDUs	Minimum of 19 IP address • 8 IP addresses for public access, one per database server • 8 IP addresses for Oracle RAC VIP addresses, one per database server • 3 IP addresses for SCAN addresses for Oracle RAC	Minimum of 8 IP addresses for each additional network • 8 IP addresses for the database servers, one per database server If using a bonded network configuration for the client access network, then NET2 cannot be used as an additional network.	22 IP addresses • 8 IP addresses, one per database server • 14 IP addresses, one per Exadata Storage Server

Table 1-40   (Cont.) IP Address Requirements for Oracle Exadata Database Machine X2-2 and Oracle Exadata Database Machine X2-8 Full Rack

Type of Oracle Exadata Database Machine	Management Network Requirements	Client Access Network Requirements	Additional Networks (NET2 and NET3) Requirements	InfiniBand Private Network Requirements
Oracle Exadata Database Machine X2-2 Half Rack	Minimum of 29 IP addresses (28 IP addresses are needed for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers)) • 4 IP addresses for administration, one per database server • 7 IP addresses for administration, one per Exadata Storage Server • 4 IP addresses for ILOM, one per database server • 7 IP addresses for ILOM, one per Exadata Storage Server • 5 IP addresses for switches: 3 for InfiniBand, 1 for Ethernet, and 1 for KVM 4 IP addresses are needed for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers): 2 for InfiniBand, 1 for Ethernet, and 1 for KVM • 2 IP addresses for monitoring electric current of the PDUs	Minimum of 11 IP addresses • 4 IP addresses for public access, one per database server • 4 IP addresses for Oracle RAC VIP addresses, one per database server • 3 IP addresses for SCAN addresses for Oracle RAC.	Minimum of 4 IP addresses for each additional network • 4 IP addresses for the database servers, one per database server If using a bonded network configuration for the client access network, then NET2 cannot be used as an additional network.	11 IP addresses • 4 IP addresses, one per database server • 7 IP addresses, one per Exadata Storage Server

Table 1-40   (Cont.) IP Address Requirements for Oracle Exadata Database Machine X2-2 and Oracle Exadata Database Machine X2-8 Full Rack

Type of Oracle Exadata Database Machine	Management Network Requirements	Client Access Network Requirements	Additional Networks (NET2 and NET3) Requirements	InfiniBand Private Network Requirements
Oracle Exadata Database Machine X2-2 Quarter Rack	Minimum of 16 IP addresses • 2 IP addresses for administration, one per database server • 3 IP addresses for administration, one per Exadata Storage Server • 2 IP addresses for ILOM, one per database server • 3 IP addresses for ILOM, one per Exadata Storage Server • 4 IP addresses for switches: 2 for InfiniBand, 1 for Ethernet, and 1 for KVM • 2 IP addresses for monitoring electric current of the PDUs	Minimum of 7 IP addresses • 2 IP addresses for public access, one per database server • 2 IP addresses for Oracle RAC VIP addresses, one per database server • 3 IP addresses for SCAN addresses for Oracle RAC.	Minimum of 2 IP addresses for each additional network • 2 IP addresses for the database servers, one per database server If using a bonded network configuration for the client access network, then NET2 cannot be used as an additional network.	5 IP addresses • 2 IP addresses, one per database server • 3 IP addresses, one per Exadata Storage Server

Table 1-40   (Cont.) IP Address Requirements for Oracle Exadata Database Machine X2-2 and Oracle Exadata Database Machine X2-8 Full Rack

Type of Oracle Exadata Database Machine	Management Network Requirements	Client Access Network Requirements	Additional Networks (NET2 and NET3) Requirements	InfiniBand Private Network Requirements
Oracle Exadata Database Machine X2-8 Full Rack	Minimum of 38 IP addresses • 2 IP addresses for administration, one per database server • 14 IP addresses for administration, one per Exadata Storage Server • 2 IP addresses for ILOM, one per database server • 14 IP addresses for ILOM, one per Exadata Storage Server • 4 IP addresses for switches: 3 for InfiniBand, and 1 for Ethernet • 2 IP addresses for monitoring electric current of the PDUs	Minimum of 7 IP address • 2 IP addresses for public access, one per database server • 2 IP addresses for Oracle RAC VIP addresses, one per database server • 3 IP addresses for SCAN addresses for Oracle RAC	Minimum of 2 IP addresses for each additional network • 2 IP addresses for the database servers, one per database server If using a bonded network configuration for the client access network, then NET2 cannot be used as an additional network.	22 IP addresses • 8 IP addresses, one per database server • 14 IP addresses, one per Exadata Storage Server

Related Topics

- Calculating the IP Address Requirements when Using Oracle VMs
- Using Oracle Exadata Deployment Assistant

1.7.3.1 Calculating the IP Address Requirements when Using Oracle VMs

The number of IP addresses depends on the physical deployment, as well as the number of virtual user domains. The following equations show how to calculate the number of IP addresses required for the physical deployment and Oracle VM deployment.

Physical deployment with a single cluster:

```
Number of management network IP addresses =
     (number of databases servers)*2 +          \
     (number of storage servers)*2 +            \
     (number of PDUs) +                          \
     (number of IB switches) +                   \
```

```
        (number of Ethernet switches)

Number of client access network IP addresses =
    (number of database servers)*2 + 3

Number of InfiniBand network IP addresses =
    (number of database servers)*2 +           \
    (number of storage servers)*2

Number of additional network IP addresses =
    (number of database servers) * (number of additional networks)
```

Oracle VM deployment:

```
Number of management network IP addresses =
    (number of databases servers)*2 +          \
    (number of Oracle VM user domains) +       \
    (number of storage servers)*2 +            \
    (number of PDUs) +                         \
    (number of IB switches) +                  \
    (number of Ethernet switches)              \

Number of client access network IP addresses =
    (number of Oracle VM user domains)*2 +          \
    (number of Oracle RAC VM clusters)*3

Number of InfiniBand network IP addresses =
    (number of Oracle VM user domains)*2 +          \
    (number of storage servers)*2

Number of additional network IP addresses =
    (number of database servers) * (number of Oracle VM user domains)
```

Table 1-41 shows the network requirements by component. The IP address numbers are per component, not rack.

Table 1-41   IP Address Requirements by Component

Component	Management Network	Client Access Network	Additional Networks (NET2 and NET3)	InfiniBand Private Network
Database server	Physical deployment • 1 IP address for administration • 1 IP address for ILOM Oracle VM deployment • 1 IP address for administration of management domain • 1 IP address for ILOM • 1 IP address for each user domain for administration	Physical deployment • 1 IP address for public access • 1 IP address for Oracle RAC VIP • 3 IP addresses for each Oracle RAC cluster SCAN addresses Oracle VM deployment • 1 IP address for each user domain public access • 1 IP address for each user domain Oracle RAC VIP • 3 IP addresses for each Oracle RAC VM SCAN addresses	Physical deployment • 1 IP address for each additional configured network Oracle VM deployment • 1 IP address for each user domain for each additional configured network	Physical deployment • 2 IP addresses when using active-active bonding, or 1 IP address when not using active-active bonding Oracle VM deployment • 2 IP addresses for each user domain when using active-active bonding, or 1 IP address for each user domain when not using active-active bonding
Exadata Storage Server	• 1 IP address for administration • 1 IP address for ILOM	None	None	2 IP addresses when using active-active bonding, or 1 IP address when not using active-active bonding.
InfiniBand switch	1 IP address	None	None	None
Ethernet switch	1 IP address	None	None	None
PDU	1 IP address	None	None	None

Table 1-42 shows examples of IP addresses requirements when using Oracle VMs.

Table 1-42   Examples of IP Address Requirements when Using Oracle VMs

Deployment	IP Address Requirements
Oracle Exadata Database Machine X6-2 Quarter Rack and Oracle Exadata Database Machine X5-2 Quarter Rack with the following configuration: • Oracle VM deployment with two 2-node Oracle RAC VM clusters (2 clusters and 4 user domains total) • No additional networks • Active-active bonding on the InfiniBand network	• 19 IP addresses for the management network • 14 IP addresses for the client access network • No IP addresses for the additional networks • 14 IP addresses for the InfiniBand network
Oracle Exadata Database Machine X6-2 Full Rack and Oracle Exadata Database Machine X5-2 Full Rack with the following configuration: • Oracle VM deployment with one 8-node Oracle RAC VM cluster, and five 2-node Oracle RAC VM clusters (6 clusters and 18 user domains total) • No additional networks • Active-active bonding on the InfiniBand network	• 67 IP addresses for the management network • 54 IP addresses for the client access network • No IP addresses for the additional networks • 64 IP addresses for the InfiniBand network
Oracle Exadata Database Machine X6-2 Elastic Configuration and Oracle Exadata Database Machine X5-2 Elastic Configuration with the following configuration: • 3 database servers, 9 Exadata Storage Servers, and 2 InfiniBand switches • Oracle VM deployment with two 3-node Oracle RAC VM clusters (2 clusters and 6 user domains total) • Dedicated backup network • Active-active bonding on the InfiniBand network	• 37 IP addresses for the management network • 18 IP addresses for the client access network • 6 IP addresses for the additional networks • 30 IP addresses for the InfiniBand network

1.8 Network Connection and IP Address Requirements for Oracle Exadata Storage Expansion Rack

Prior to installation, network cables must be run from your existing network infrastructure to the installation site.

The requirements to connect Oracle Exadata Storage Expansion Rack to Oracle Exadata Database Machine are as follows:

• Management network connection requirements for Oracle Exadata Storage Expansion Rack X4-2 and later:

– 1 Ethernet connection from the ILOM to each Exadata Storage Server. For Oracle Exadata Storage Expansion Full Rack, there are 18 connections, for Oracle Exadata Storage Expansion Half Rack there are 9 connections, and for Oracle Exadata Storage Expansion Quarter Rack there are 4 connections.

- – 1 Ethernet connection for each Sun Datacenter InfiniBand Switch 36.

- – 1 Ethernet connection for each Exadata Storage Server. For Oracle Exadata Storage Expansion Full Rack, there are 18 connections, for Oracle Exadata Storage Expansion Half Rack there are 9 connections, and for Oracle Exadata Storage Expansion Quarter Rack there are 4 connections.

- – 1 Ethernet connection for the Ethernet switch in the rack to the existing management network.

- – 1 Ethernet connection for each of the two PDUs. Network connectivity to the PDUs is only required if the electric current is monitored remotely.

- Management network connection requirements for Oracle Exadata Storage Expansion Rack X3-2

  - – 1 Ethernet connection from the ILOM to each Exadata Storage Server. For Oracle Exadata Storage Expansion Full Rack, there are 18 connections, for Oracle Exadata Storage Expansion Half Rack there are 9 connections, and for Oracle Exadata Storage Expansion Quarter Rack there are 4 connections.

  - – 1 Ethernet connection for each Sun Datacenter InfiniBand Switch 36.

  - – 1 Ethernet connection for each Exadata Storage Server. For Oracle Exadata Storage Expansion Full Rack, there are 18 connections, for Oracle Exadata Storage Expansion Half Rack there are 9 connections, and for Oracle Exadata Storage Expansion Quarter Rack there are 4 connections.

  - – 1 Ethernet connection for the Ethernet switch in the rack to the existing management network.

  - – 1 Ethernet connection for each of the two PDUs. Network connectivity to the PDUs is only required if the electric current is monitored remotely.

- Management network connection requirements for Oracle Exadata Storage Expansion Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers

  - – 1 Ethernet connection from the ILOM to each Exadata Storage Server. For Oracle Exadata Storage Expansion Full Rack, there are 18 connections, for Oracle Exadata Storage Expansion Half Rack there are 9 connections, and for Oracle Exadata Storage Expansion Quarter Rack there are 4 connections.

  - – 1 Ethernet connection for each Sun Datacenter InfiniBand Switch 36.

  - – 1 Ethernet connection for each Exadata Storage Server. For Oracle Exadata Storage Expansion Full Rack, there are 18 connections, for Oracle Exadata Storage Expansion Half Rack there are 9 connections, and for Oracle Exadata Storage Expansion Quarter Rack there are 4 connections.

  - – 1 Ethernet connection for the Ethernet switch in the rack to the existing management network.

  - – 1 Ethernet connection for the KVM switch in the rack to the existing management network. This connection is only for Oracle Exadata Database Machine X2-2 racks.

  - – 1 Ethernet connection for each of the two PDUs. Network connectivity to the PDUs is only required if the electric current is monitored remotely.

The following table lists the IP address requirements for Oracle Exadata Storage Expansion Racks:

Table 1-43   IP Address Requirements for Oracle Exadata Storage Expansion Rack

Type of Oracle Exadata Storage Expansion Rack	Network Requirements
Oracle Exadata Storage Expansion X4-2 Full Rack and later	Up to a total of 78 IP addresses (42 for the management network, and up to 36 for the private InfiniBand network) • 18 IP addresses for administration, one per Exadata Storage Server • 18 IP addresses for ILOM, one per Exadata Storage Server • 4 IP addresses for switches (3 for InfiniBand, and 1 for Ethernet) • 2 IP addresses for monitoring electric current of the PDUs • Up to 36 IP addresses for the private InfiniBand network
Oracle Exadata Storage Expansion X4-2 Half Rack	Up to a total of 42 IP addresses (24 for the management network, and up to 18 for the private InfiniBand network) • 9 IP addresses for administration, one per Exadata Storage Server • 9 IP addresses for ILOM, one per Exadata Storage Server • 4 IP addresses for switches (3 for InfiniBand, and 1 for Ethernet) • 2 IP addresses for monitoring electric current of the PDUs • Up to 18 IP addresses for the private InfiniBand network
Oracle Exadata Storage Expansion X4-2 Quarter Rack	Up to a total of 21 IP addresses (13 for the management network, and up to 8 for the private InfiniBand network) • 4 IP addresses for administration, one per Exadata Storage Server • 4 IP addresses for ILOM, one per Exadata Storage Server • 3 IP addresses for switches (2 for InfiniBand, and 1 for Ethernet) • 2 IP addresses for monitoring electric current of the PDUs • Up to 8 IP addresses for the private InfiniBand network

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Table 1-43   (Cont.) IP Address Requirements for Oracle Exadata Storage Expansion Rack

Type of Oracle Exadata Storage Expansion Rack	Network Requirements
Oracle Exadata Storage Expansion X3-2 Full Rack	Total of 60 IP addresses (42 for the management network, and 18 for the private InfiniBand network) • 18 IP addresses for administration, one per Exadata Storage Server • 18 IP addresses for ILOM, one per Exadata Storage Server • 4 IP addresses for switches (3 for InfiniBand, and 1 for Ethernet) • 2 IP addresses for monitoring electric current of the PDUs • 18 IP addresses for the private InfiniBand network
Oracle Exadata Storage Expansion X3-2 Half Rack	Total of 33 IP addresses (24 for the management network, and 9 for the private InfiniBand network) • 9 IP addresses for administration, one per Exadata Storage Server • 9 IP addresses for ILOM, one per Exadata Storage Server • 4 IP addresses for switches (3 for InfiniBand, and 1 for Ethernet) • 2 IP addresses for monitoring electric current of the PDUs • 9 IP addresses for the private InfiniBand network
Oracle Exadata Storage Expansion X3-2 Quarter Rack	Total of 17 IP addresses (13 for the management network, and 4 for the InfiniBand network) • 4 IP addresses for administration, one per Exadata Storage Server • 4 IP addresses for ILOM, one per Exadata Storage Server • 3 IP addresses for switches (2 for InfiniBand, and 1 for Ethernet) • 2 IP addresses for monitoring electric current of the PDUs • 4 IP addresses for the private InfiniBand network

1.9 Ensuring Site is Ready

Before Oracle Exadata Rack is delivered to the site, the following tasks must be performed to ensure the site is ready:

Task 1 Review Site Requirements
Review the site requirements in this chapter and use the checklists in Site Checklists to understand the requirements for Oracle Exadata Rack.

Task 2 Run the Oracle Exadata Database Machine Deployment Assistant
Run the Oracle Exadata Database Machine Deployment Assistant to create the necessary files.

Task 3 Configure the Network
Configure the network using the files from Oracle Exadata Database Machine Deployment Assistant. This includes registering the networks in the Domain Name System (DNS), assigning IP addresses, and configuring data center switches and firewalls.

Task 4 Prepare the Site Based on Requirements
Prepare the site based on the requirements, such as, install the network cables and power supplies, prior to the arrival of Oracle Exadata Rack:

1. Review the safety guidelines.

2. Note problems or peculiarities at the site that require special equipment. For example, ensure the doors are tall enough and wide enough for Oracle Exadata Rack.

3. Verify that the installation site flooring has a strength rating to withstand the combined weight of Oracle Exadata Rack and any other installed equipment.

4. Install network cables for Oracle Exadata Rack.

5. Install all necessary electrical equipment, and ensure that sufficient power is provided for Oracle Exadata Rack.

6. Ensure that the installation site provides adequate air conditioning.

7. Operate the air conditioning system for 48 hours to bring the room temperature to the appropriate level.

8. Clean and vacuum the area thoroughly in preparation for installation.

Related Topics

- Using Oracle Exadata Deployment Assistant

- Ventilation and Cooling Requirements
  Always provide adequate space in front and behind the rack to allow for proper ventilation.

- Electrical Power Requirements

- Network Connection and IP Address Requirements for Oracle Exadata Database Machine

- Flooring Requirements

- Space Requirements

- Reviewing Safety Guidelines
  Before Oracle Exadata Rack arrives, the following safety precautions should be reviewed to ensure the site is safe, as well as ready for delivery.

- Network Channel Bonding Support

- Configuring Oracle Exadata Database Machine

2

Understanding the Network Requirements for Oracle Exadata Database Machine

This chapter describes the network requirements for Oracle Exadata Database Machine.

> **Note:**
>
> For ease of reading, the name "Oracle Exadata Rack" is used when information refers to both Oracle Exadata Database Machine and Oracle Exadata Storage Expansion Rack.

2.1 Overview of Network Requirements

Oracle Exadata Deployment Assistant (OEDA) includes database servers, storage servers, as well as equipment to connect the servers to your network. The network connections allow the servers to be administered remotely, and clients to connect to the database servers.

The information in this section should be used in conjunction with Oracle Exadata Deployment Assistant (OEDA) to configure your environment for Oracle Exadata Database Machine.

> **Note:**
>
> The name used for the InfiniBand interface changed from BONDIB0 to IB0 and IB1 on Oracle Exadata Database Machine X4-2 systems using release 11.2.3.3.0 and later.
>
> As of release 11.2.2.1.0, the names used for bonding changed. The names are BONDIB0 for the InfiniBand bonding and BONDETH0 for Ethernet bonding. In earlier releases, the names were BOND0 and BOND1, respectively.

To deploy Oracle Exadata Database Machine ensure that you meet the minimum network requirements. Oracle Exadata Database Machine requires a minimum of three networks, and there are interfaces available for additional networks. Each network must be on a distinct and separate subnet from the others. Oracle recommends one common additional network for backup, which you can configure with OEDA. The network descriptions are as follows:

- **Management network**: This required network connects to your existing management network, and is used for administrative work for all components of

Oracle Exadata Database Machine. It connects the servers, Integrated Lights Out Manager (ILOM), and switches connected to the Ethernet switch in the rack. There is one uplink from the Ethernet switch in the rack to your management network, one uplink from the KVM switch in the rack to your management network, and one uplink for each power distribution unit (PDU).

> **✎ Notes:**
>
> – Network connectivity to the PDUs is only required if the electric current is monitored remotely.
>
> – A properly secured configuration requires the management network to be fully isolated from all other networks.
>
> – Starting with Oracle Exadata System Software release 19.1.0, the Exadata database and storage servers can be on a separate network from the ILOM.

Each database server and storage server has two network interfaces for management. One provides management access to the operating system through the embedded NET0 Ethernet port on Oracle Exadata Database Machine Two-Socket systems, or the NEM0/NET1 Ethernet port on Oracle Exadata Database Machine Eight-Socket systems. The other network interface provides access to the ILOM through the NET MGT Ethernet port. Oracle Exadata Database Machines are delivered with the NET MGT and NET0 or NEM0/NET0 ports connected to the Ethernet switch in the rack. The NET0 or NEM0/NET0 port on the database servers should not be used for client or application network traffic. Cabling or configuration changes to these interfaces on Oracle Exadata Storage Servers is not permitted.

- **Client access network**: This required network connects the database servers to your existing client network and is used for client access to the database servers. Applications access the database through this network using Single Client Access Name (SCAN) and Oracle RAC Virtual IP (VIP) addresses. Database servers support channel bonding to provide higher bandwidth or availability for client connections to the database. Oracle recommends channel bonding for the client access network.

  The following list describes the channel bonding configurations:

  – Oracle Exadata Database Machine Two-Socket systems, use either:

    * The embedded NET1 and NET2 ports

    * The two 10 GbE ports or two 10/25GbE ports on Oracle Exadata Database Machine X7-2

  – Oracle Exadata Database Machine Eight-Socket systems, X4-8 or higher

    * Use two ports, with each port on a different PCIe card

  – Oracle Exadata Database Machine X3-8 Full Rack and Oracle Exadata Database Machine X2-8 Full Rack

    * Use ports from each Network Express Module (NEM)

      For the Oracle Exadata Database Machine X3-8 Full Rack andOracle Exadata Database Machine X2-8 Full Rack database servers, using the

same ports on the Network Express Modules, such as NEM0/NET1 and NEM0/NET2, works but does not provide for high availability.

> **Note:**
>
> If your system will use more than 10 VIP addresses in the cluster and you have VLAN configured for the Oracle Clusterware client network, then you must use 3 digit VLAN ids. Do not use 4 digit VLAN ids because the VLAN name can exceed the 15 character operating system interface name limit.

- **Additional networks (optional)**: Database servers can connect to additional existing networks using the available open ports not used by the management and client networks.

- **InfiniBand private network**: This network connects the database servers and storage servers using the InfiniBand switches on the rack. Starting with the Oracle Exadata Storage Server X4-2L servers, the InfiniBand fabric is connected using the IB0 and IB1 interfaces. Oracle Exadata Storage Server X3-2L servers and earlier use the BONDIB0 interface. Oracle Database uses this network for Oracle RAC cluster interconnect traffic and for accessing data on Oracle Exadata Storage Servers. This non-routable network is fully contained in Oracle Exadata Database Machine, and does not connect to your existing network. This network is automatically configured during installation.

> **Note:**
>
> All networks must be on distinct and separate subnets from each other. For better security, the management network should be isolated from all other networks.

Oracle Exadata Database Machine database server networking requirements are identical with the following exceptions:

- Oracle Exadata Database Machine X7-2 embedded ports are 1/10/25 GbE.

- Oracle Exadata Database Machine X6-2, Oracle Exadata Database Machine X5-2, Oracle Exadata Database Machine X4-2, and Oracle Exadata Database Machine X3-2 embedded ports are 1 GbE/10 GbE.

- Oracle Exadata Database Machine X2-2 embedded ports are 1 GbE.

- Only Oracle Exadata Database Machine X2-2 has a KVM.

At start time on an 8-socket system, each database server generates a `cellaffinity.ora` configuration file. The `cellaffinity.ora` file resides in the `/etc/oracle/cell/network-config` directory, and must be readable by the Oracle database.

The file contains a mapping between the NUMA node numbers and the IP address of the network interface card closest to each node. Oracle Database uses the file to select the closest network interface card when communicating with the storage servers, thereby optimizing performance. This file is only generated and used on an 8-socket system. On a 2-socket system, there is no performance to be gained in this

manner, and no `cellaffinity.ora` file. The file is not intended to be directly edited with a text editor.

The following image shows the default network diagram for Oracle Exadata Database Machine X7-2. Use the files from OEDA to verify the cable connections when cabling Oracle Exadata Database Machine to the existing network.

Figure 2-1   Network Diagram for Oracle Exadata Database Machine X7-2
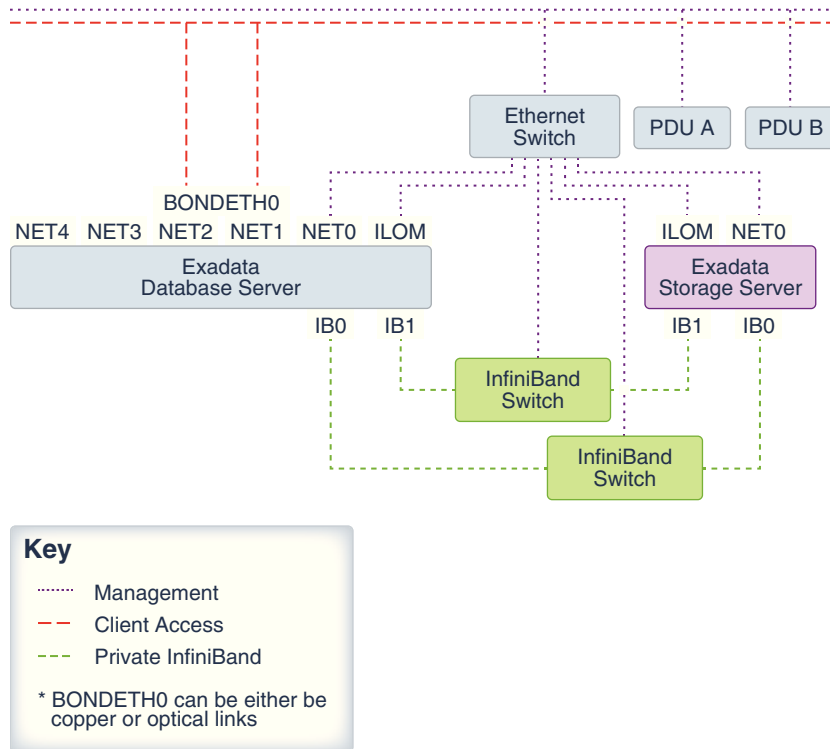
The following image shows the default network diagram for Oracle Exadata Database Machine X4-2 and later models. Use the files from OEDA to verify the cable connections when cabling Oracle Exadata Database Machine to the existing network.

Figure 2-2   Network Diagram for Oracle Exadata Database Machine X4-2 and Later Models
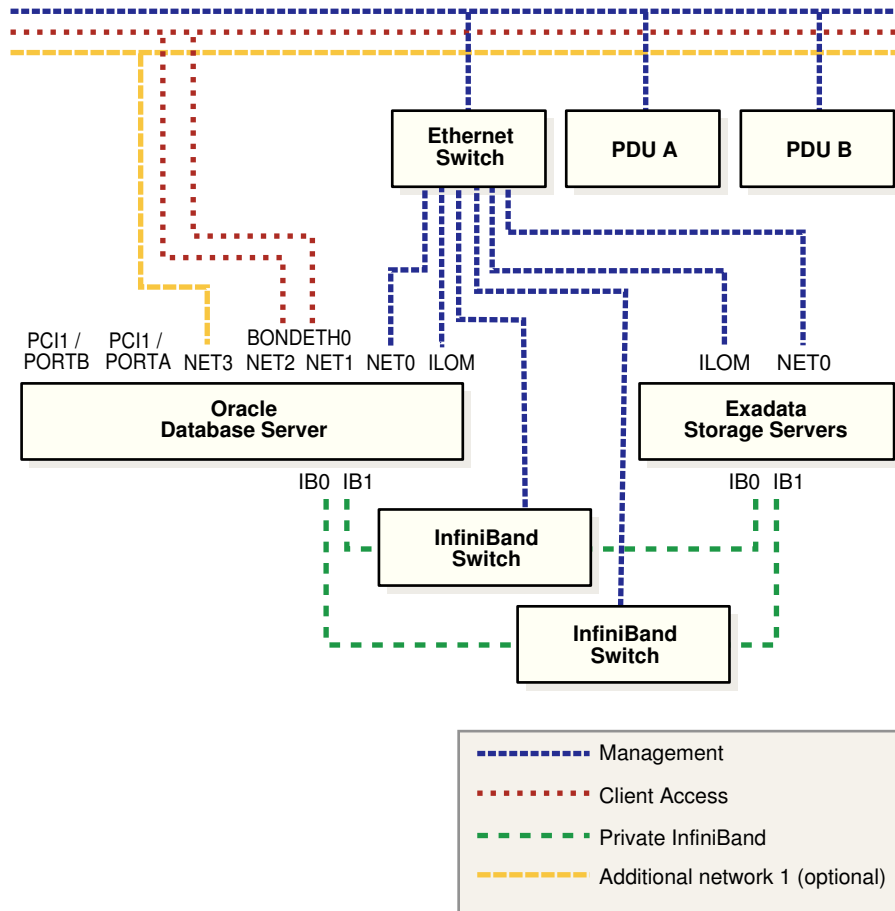
The following image shows the default network diagram for Oracle Exadata Database Machine X3-2 and Oracle Exadata Database Machine X2-2. Use the files from OEDA to verify the cable connections when cabling Oracle Exadata Database Machine to the existing network.

Figure 2-3   Network Diagram for Oracle Exadata Database Machine X3-2 and Oracle Exadata Database Machine X2-2
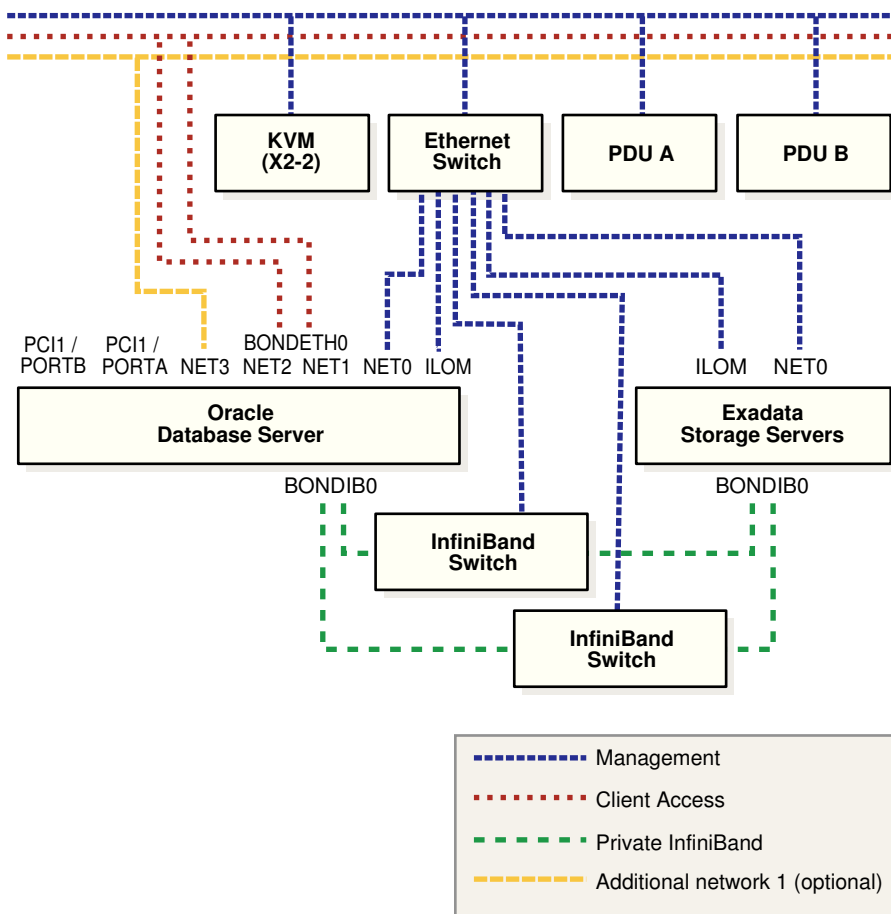
Notes:

- Oracle Exadata Database Machine X3-8 Full Rack, and Oracle Exadata Database Machine X2-8 Full Rack have BONDIB0, BONDIB1, and so on for the InfiniBand private network.

- The KVM switch is only available in Oracle Exadata Database Machine X2-2 racks.

- Additional configuration, such as defining multiple virtual local area networks (VLANs) or enabling routing, may be required for the switch to operate properly in your environment, and is not included in the installation service. If additional configuration is needed, then the network administrator performs the necessary configuration during Oracle Exadata Database Machine installation.

Related Topics

- Using Oracle Exadata Deployment Assistant

2.2 Network Components and Interfaces

Each Oracle Exadata Database Machine contains several network components and interfaces.

- Oracle Exadata Database Machine X7-2 Database Server
- Oracle Exadata Database Machine X5-2 and X6-2 Database Server
- Oracle Exadata Database Machine X5-8 and X6-8 Full Rack Database Server
- Oracle Exadata Database Machine X4-2 Database Server
- Oracle Exadata Database Machine X4-8 Full Rack Database Server
- Oracle Exadata Database Machine X3-2 Database Server
- Oracle Exadata Database Machine X3-8 Full Rack and Oracle Exadata Database Machine X2-8 Full Rack Database Server

2.2.1 Oracle Exadata Database Machine X7-2 Database Server

Each Oracle Exadata Database Machine X7-2 database server consists of the following network components and interfaces:

- 1 embedded 1 GbE/10 GbE port (eth0 copper)
- 2 embedded 1 GbE/10 GbE ports (copper) or 2 embedded 10 GbE/25GbE ports (optical)
- 1 dual-port 4X QDR (40 Gb/s) InfiniBand Host Channel Adapter (HCA)
- 1 embedded Ethernet port for Sun Integrated Lights Out Manager (ILOM) remote management
- 1 dual-port 25GbE PCIe 3.0 network card with Broadcom BCM57414 10Gb/25Gb Ethernet Controller

> ✎ **Note:**
>
> The SFP28 modules for the 25GbE PCIe 3.0 network cards are purchased separately.

2.2.2 Oracle Exadata Database Machine X5-2 and X6-2 Database Server

Each Oracle Exadata Database Machine X5-2 and X6-2 database server consists of the following network components and interfaces:

- 4 embedded 1 GbE/10 GbE ports
- Oracle Exadata Database Machine X6-2 or X5-2: 1 dual-port 4X QDR (40 Gb/s) InfiniBand Host Channel Adapter (HCA)

- 1 embedded Ethernet port for Sun Integrated Lights Out Manager (ILOM) remote management
- 1 dual-port 10 GbE PCIe 2.0 network card with Intel 82599 10 GbE controller

> **Note:**
>
> The Small Form-Factor Pluggable (SFP) modules for the 10 GbE PCIe 2.0 network cards are purchased separately.

2.2.3 Oracle Exadata Database Machine X5-8 and X6-8 Full Rack Database Server

Each Oracle Exadata Database Machine X5-8 or X6-8 Full Rack database server consists of the following network components and interfaces:

- 4 dual-port 4x QDR (40 Gb/s) InfiniBand Host Channel Adapter (HCA)
- 10 x 1 GbE Base-T Ethernet Ports (2 Quad-port PCIe 2.0 network card, and 2 embedded ports based on the Intel I350 1GbE Controller technology)
- 8 x 10 GbE Ethernet SFP+ Ports (4 Dual-port 10GbE PCIe 2.0 network card based on the Intel 82599 10GbE Controller technology)

> **Note:**
>
> The Small Form-Factor Pluggable (SFP) modules for the 10 GbE PCIe 2.0 network cards are purchased separately.

2.2.4 Oracle Exadata Database Machine X4-2 Database Server

Each Oracle Exadata Database Machine X4-2 database server consists of the following network components and interfaces:

- 4 embedded 1 GbE/10 GbE ports
- 1 dual-port 4X QDR (40 Gb/s) InfiniBand Host Channel Adapter (HCA)
- 1 embedded Ethernet port for Sun Integrated Lights Out Manager (ILOM) remote management
- 1 dual-port 10 GbE PCIe 2.0 network card with Intel 82599 10 GbE controller

> **Note:**
>
> The Small Form-Factor Pluggable (SFP) modules for the 10 GbE PCIe 2.0 network cards are purchased separately.

2.2.5 Oracle Exadata Database Machine X4-8 Full Rack Database Server

Each Oracle Exadata Database Machine X4-8 Full Rack database server consists of the following network components and interfaces:

- 4 dual-port 4x QDR (40 Gb/s) InfiniBand Host Channel Adapter (HCA)

- 10 x 1 GbE Base-T Ethernet Ports (2 Quad-port PCIe 2.0 network card, and 2 embedded ports based on the Intel I350 1GbE Controller technology)

- 8 x 10 GbE Ethernet SFP+ Ports (4 Dual-port 10GbE PCIe 2.0 network card based on the Intel 82599 10GbE Controller technology)

> **Note:**
>
> The Small Form-Factor Pluggable (SFP) modules for the 10 GbE PCIe 2.0 network cards are purchased separately.

2.2.6 Oracle Exadata Database Machine X3-2 Database Server

Each Oracle Exadata Database Machine X3-2 database server consists of the following network components and interfaces:

- 4 embedded 1 GbE ports

- 1 dual-port 4X QDR (40 Gb/s) InfiniBand Host Channel Adapter (HCA)

- 1 embedded Ethernet port for Sun Integrated Lights Out Manager (ILOM) remote management

- 1 dual-port 10 GbE PCIe 2.0 network card with Intel 82599 10 GbE controller

> **Note:**
>
> The Small Form-Factor Pluggable (SFP) modules for the 10 GbE PCIe 2.0 network cards are purchased separately.

2.2.7 Oracle Exadata Database Machine X3-8 Full Rack and Oracle Exadata Database Machine X2-8 Full Rack Database Server

Each Oracle Exadata Database Machine X3-8 Full Rack and Oracle Exadata Database Machine X2-8 Full Rack database server consists of the following network components and interfaces:

- 2 Network Express Modules (NEMs) providing the total of the following:
  - 8 x 10 GbE network ports
  - 8 x 1 Gb Ethernet network ports
- 4 dual-port 4X QDR InfiniBand PCIe 2.0 Express Modules (EMs)

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- 1 Ethernet port for Sun Integrated Lights Out Manager (ILOM) remote management

> **Note:**
>
> The SFP+ modules for the NEMs are purchased separately.

2.3 Network Channel Bonding Support

The network port on a database server used for the client access network can be bonded with another network on the database server to provide higher bandwidth or availability for client connections to the database. In a bonded network configuration, Oracle RAC SCAN and VIP addresses are defined on the BONDETH0 interface on database servers.

2.3.1 Bonded Network Configurations

A bonded network configuration is used when there is a need to aggregate multiple network interfaces together for client connections to the database.

The bonded network configuration is the default configuration.

The following sections describe the bonded network configuration for Oracle Exadata Database Machine:

- Bonded Network Configuration for Oracle Exadata Database Machine Two-Socket Systems
- Bonded Network Configuration for Oracle Exadata Database Machine X7-8
- Bonded Network Configuration for Oracle Exadata Database Machine X4-8, X5-8, and X6-8
- Bonded Network Configuration for Oracle Exadata Database Machine X3-8 Full Rack and Oracle Exadata Database Machine X2-8 Full Rack

2.3.1.1 Bonded Network Configuration for Oracle Exadata Database Machine Two-Socket Systems

When using a bonded network configuration for database client access on Oracle Exadata Database Machine Two-Socket Systems, the database servers are configured as follows:

- Port NET0: Provides access to the operating system using the management network through the ETH0 interface.
- Port NET1: Provides access to the database using the client access network, and is bonded with NET2 port to create the BONDETH0 interface.
- Port NET2: Provides access to the database using the client access network, and is bonded with NET1 port to create the BONDETH0 interface.
- Port NET MGT: Provides access to ILOM using the management network.

When channel bonding is configured for the client access network during initial configuration, the Linux bonding module is configured for active-backup mode (`mode=1`).

If a different bonding policy is preferred, then you may reconfigure the bonding module after initial configuration. For configuration details, refer to the Linux Ethernet Bonding Driver HOWTO in the `/usr/share/doc/kernel-doc-2.6.39/Documentation/networking/bonding.txt` directory on any Oracle Exadata Database Machine database server.

The following table shows the port connections for Oracle Exadata Database Machine Two-Socket Systems database servers when using channel bonding. The client access network and the backup network must use different ports, in that one network must use the embedded GbE ports and the other network must use the PCIe ports.

Table 2-1   Channel Bonding Connections for Oracle Exadata Database Machine X7-2

Network	Using 1 GbE Ports	Using 10/25 GbE Ports
Management (1 GbE NET0) The administration network connection uses the 1 GbE port even when using 10 GbE ports for the other networks.	• Port: 1 GbE NET0 • Connect to Cisco switch	• Port: 1 GbE NET0 • Connect to Cisco switch
Client (BONDETH0)	• Ports: 1 GbE NET1 and 1 GbE NET2 • Connect to client access 1 GbE switches	• Ports: 10/25 GbE PCI Ports 1 and 2 • Connect to client access 10/25 GbE switches
Backup (BONDETH1)	• Ports: 10/25 GbE PCI Ports 1 and 2 • Connect to backup 10/25 GbE switches	• Ports: 10/25 GbE NET2 and NET3 • Connect to backup 10/25 GbE switches

Table 2-2   Channel Bonding Connections for Other Oracle Exadata Database Machine Two-Socket Systems

Network	Using 1 GbE Ports	Using 10 GbE Ports
Management (1 GbE NET0) The administration network connection uses the 1 GbE port even when using 10 GbE ports for the other networks.	• Port: 1 GbE NET0 • Connect to Cisco switch	• Port: 1 GbE NET0 • Connect to Cisco switch
Client (BONDETH0)	• Ports: 1 GbE NET1 and 1 GbE NET2 • Connect to client access 1 GbE switches	• Ports: 10 GbE PCI1/PORTA and 10 GbE PCI1/PORTB • Connect to client access 10 GbE switches
Backup (BONDETH1)	• Ports: 10 GbE PCI1/PORTA and 10 GbE PCI1/PORTB • Connect to backup 10 GbE switches	• Ports: 1 GbE NET2 and 1 GbE NET3 • Connect to backup 1 GbE switches

> **✎ Note:**
>
> When using a bonded network configuration, you must provide a network switch capable of supporting the chosen bonding mode. For example, if mode 4 is configured (IEEE 802.3ad Dynamic link aggregation), then you must supply and configure the network switch capable of supporting this bonding mode. Requirements for specific bonding policies are documented in the Linux Ethernet Bonding Driver HOWTO in the `/usr/share/doc/kernel-doc-2.6.39/Documentation/networking/bonding.txt` directory on any Oracle Exadata Database Machine database server.

2.3.1.2 Bonded Network Configuration for Oracle Exadata Database Machine X7-8

When using a bonded network configuration for database client access on Oracle Exadata Database Machine X7-8, the database servers are configured as follows:

- Port NET0: Provides access to the operating system using the management network through the ETH0 interface.

- P1 at 3 PCIe 4: Provides access to the database using the client access network, and is bonded with port P1 at 13 PCIe 12, to create the BONDETH0 interface.

- P2 at 13 PCIe 6: Provides access to the database using the client access network, and is bonded with port P2 at 3 PCIe 14 to create the BONDETH1 interface.

- Port NET MGT: Provides access to ILOM using the management network.

The following table shows the port connections for Oracle Exadata Database Machine X7-8 database servers when using channel bonding.

Table 2-3   Channel Bonding Connections for Oracle Exadata Database Machine X7-8

Network	Using 1 GbE Ports	Using 25 GbE Ports
Management (NET0) The administration network connection uses the 1 GbE port even when using 10 GbE ports for the other networks.	• Port: 1 GbE NET0 • Connect to Cisco switch	• Port: 1 GbE NET0 • Connect to Cisco switch
Client (BONDETH0)	• SMOD0 and SMOD1's Net2 • Connect to client access 1 GbE switches	• Port1 in PCIe 4 and 12 cards • Connect to client access 25 GbE switches
Backup (BONDETH1)	• SMOD0 and SMOD1's Net3 • Connect to backup 1 GbE switches	• Port1 in PCIe 6 and 14 cards • Connect to backup 25 GbE switches

2.3.1.3 Bonded Network Configuration for Oracle Exadata Database Machine X4-8, X5-8, and X6-8

When using a bonded network configuration for database client access on Oracle Exadata Database Machine X4-8, X5-8, and X6-8, the database servers are configured as follows:

- Port NET0: Provides access to the operating system using the management network through the ETH0 interface.

- P0 at 3 PCIe3: Provides access to the database using the client access network, and is bonded with port P0 at 13 PCIe3, to create the BONDETH0 interface.

- P0 at 13 PCIe3: Provides access to the database using the client access network, and is bonded with port P0 at 3 PCIe3 to create the BONDETH1 interface.

- Port NET MGT: Provides access to ILOM using the management network.

The following table shows the port connections for Oracle Exadata Database Machine X4-8, X5-8, and X6-8 database servers when using channel bonding.

Table 2-4   Channel Bonding Connections for Oracle Exadata Database Machine X4-8, X5-8, and X6-8

Network	Using 1 GbE Ports	Using 10 GbE Ports
Management (NET0) The administration network connection uses the 1 GbE port even when using 10 GbE ports for the other networks.	• Port: 1 GbE NET0 • Connect to Cisco switch	• Port: 1 GbE NET0 • Connect to Cisco switch
Client (BONDETH0)	• 1 GbE Ports: P0 at 3 PCIe3, and at 13 PCIe3 • Connect to client access 1 GbE switches	• 10 GbE Ports: 2 PCIe3 PORTA, and 4 PCIe 3 PORTA • Connect to client access 10 GbE switches
Backup (BONDETH1)	• 10 GbE ports: 2 PCIe3 PORTA, and 4 PCIe3 PORTA • Connect to backup 10 GbE switches	• 1 GbE ports: P0 at 3 PCIe3, and at 13 PCIe3 • Connect to backup 1 GbE switches

2.3.1.4 Bonded Network Configuration for Oracle Exadata Database Machine X3-8 Full Rack and Oracle Exadata Database Machine X2-8 Full Rack

When using a bonded network configuration for database client access on Oracle Exadata Database Machine X3-8 Full Rack and Oracle Exadata Database Machine X2-8 Full Rack, the database servers are configured as follows:

- Port NEM0/NET0: Provides access to the operating system using the management network through the ETH0 interface.

- Port NEM0/NET1: Provides access to the database using the client access network, and is bonded with port NEM1/NET3 to create the BONDETH0 interface.

- Port NEM1/NET3: Provides access to the database using the client access network, and is bonded with port NEM0/NET1 to create the BONDETH0 interface.
- Port NET MGT: Provides access to ILOM using the management network.

Table 2-5 shows the port connections for Oracle Exadata Database Machine X3-8 Full Rack and Oracle Exadata Database Machine X2-8 Full Rack database servers when using channel bonding. The NEM0 ports are on the left, and the NEM1 ports are on the right.

Table 2-5   Channel Bonding Connections for Oracle Exadata Database Machine X2-8 and X3-8 Full Rack

Network	Using 1 GbE Ports	Using 10 GbE Ports
Management (NET0)	• Port: 1 GbE NET0 • Connect to Cisco switch	• Port: 1 GbE NET0 • Connect to Cisco switch
Client (BONDETH0)	• Ports: 1 GbE NET1 and 1 GbE NET2 • Connect to client access 1 GbE switches	• Ports: 10 GbE NEM0/ PORTA and 10 GbE NEM1/PORTB • Connect to client access 10 GbE switches
Backup (BONDETH1)	• Ports: 10 GbE NEM0/ PORTA and 10 GbE NEM1/PORTB • Connect to backup 10 GbE switches	• Ports: 1 GbE NET1 and 1 GbE NET2 • Connect to backup 1 GbE switches

When channel bonding is configured for the client access network during initial configuration, the Linux bonding module is configured for active-backup mode (`mode=1`). If a different bonding policy is preferred, then you may reconfigure the bonding module after initial configuration. For configuration details, refer to the Linux Ethernet Bonding Driver HOWTO in the `/usr/share/doc/kernel-doc-2.6.18/Documentation/networking/ bonding.txt` directory on any Oracle Exadata Database Machine database server.

> **✏ Note:**
>
> When using a bonded network configuration, you must provide a network switch capable of supporting the chosen bonding mode. For example, if mode 4 is configured (IEEE 802.3ad Dynamic link aggregation), then you must supply and configure the network switch capable of supporting this bonding mode. Requirements for specific bonding policies are documented in the Linux Ethernet Bonding Driver HOWTO.

2.3.2 Non-bonded Network Configuration

A non-bonded network configuration is used when there is no need or ability to implement network bonding.

> **✎ Note:**
>
> Non Bonded networks are not supported for Oracle Exadata Database Machine X7-2 and X7-8.

The following sections describe the non-bonded network configuration for Oracle Exadata Database Machine:

2.3.2.1 Non-bonded Network Configuration for Oracle Exadata Database Machine Two-Socket Systems

When using a non-bonded network configuration for Oracle Exadata Database Machine Two-Socket Systems, the database servers are configured as follows:

- Port NET0: Provides access to the operating system using the management network through the ETH0 interface.

- Port NET1: Provides access to the database using the client access network through the ETH1 interface. The Oracle Real Application Clusters (Oracle RAC) SCAN and VIP addresses are defined on this interface.

- Port NET MGT: Provides access to the Integrated Lights Out Manager (ILOM) using the management network.

The following diagram shows the network diagram for Oracle Exadata Database Machine Two-Socket Systems when not using bonding.

Figure 2-4   Network Diagram for Oracle Exadata Database Machine Two-Socket Systems When Not Using Bonding
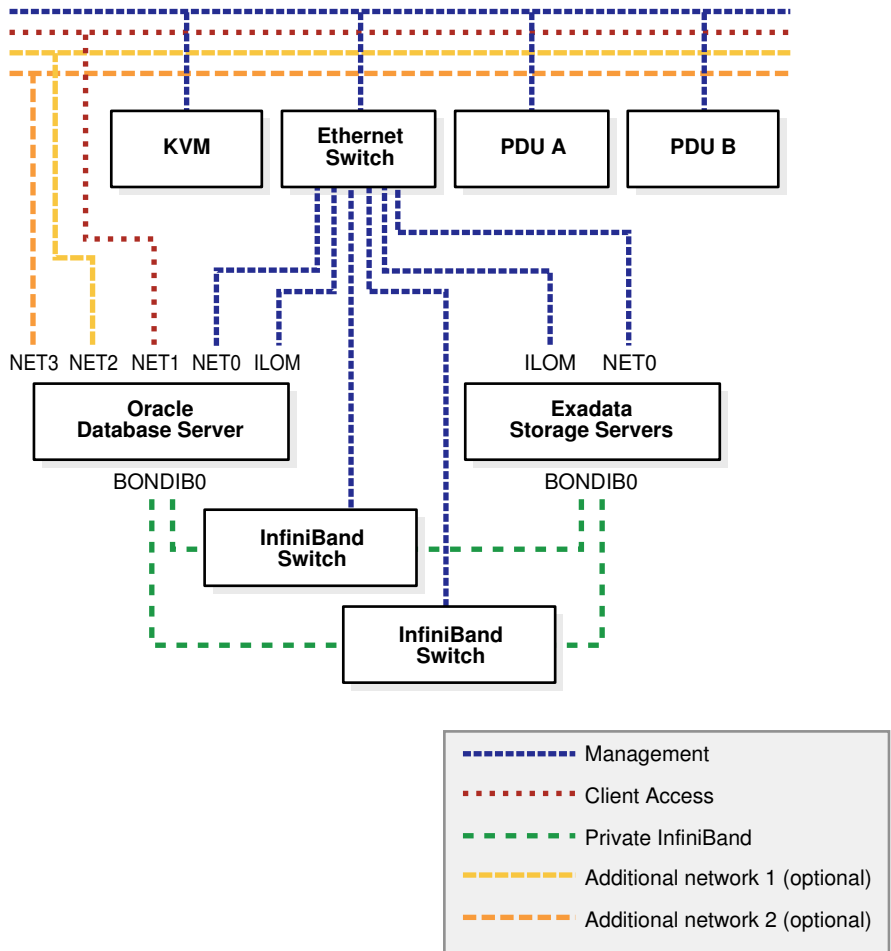
2.3.2.2 Non-bonded Network Configuration for Oracle Exadata Database Machine X5-8 and X6-8

When using a non-bonded network configuration for Oracle Exadata Database Machine X5-8 and X6-8, the database servers are configured as follows:

- Port NET0: Provides access to the operating system using the management network through the ETH0 interface.

- Port NET1: Provides access to the database using the client access network through the ETH1 interface. The Oracle Real Application Clusters (Oracle RAC) SCAN and VIP addresses are defined on this interface.

- Port NET MGT: Provides access to the ILOM using the management network.

> **Note:**
>
> Oracle Exadata Database Machine X5-8 and X6-8 have BONDIB0,
> BONDIB1, and so on for the InfiniBand private network.

2.3.2.3 Non-bonded Network Configuration for Oracle Exadata Database Machine X4-8 Full Rack

When using a non-bonded network configuration for Oracle Exadata Database Machine X4-8 Full Rack, the database servers are configured as follows:

- Port NET0: Provides access to the operating system using the management network through the ETH0 interface.

- Port NET1: Provides access to the database using the client access network through the ETH1 interface. The Oracle RAC SCAN and VIP addresses are defined on this interface.

- Port NET MGT: Provides access to the ILOM using the management network.

> **Note:**
>
> Oracle Exadata Database Machine X4-8 Full Rack has BONDIB0, BONDIB1,
> and so on for the InfiniBand private network.

2.3.2.4 Non-bonded Network Configuration for Oracle Exadata Database Machine X3-8 Full Rack and Oracle Exadata Database Machine X2-8 Full Rack

When using a non-bonded network configuration for Oracle Exadata Database Machine X4-8 Full Rack, Oracle Exadata Database Machine X3-8 Full Rack and Oracle Exadata Database Machine X2-8 Full Rack, the database servers are configured as follows:

- Port NEM0/NET0: Provides access to the operating system using the management network through the ETH0 interface. This network must use the 1 GbE port.

- Port NEM0/NET1: Provides access to the database using the client access network through the ETH1 interface. The Oracle RAC SCAN and VIP addresses are defined on this interface.

- Port NET MGT: Provides access to the Integrated Lights Out Manager (ILOM) using the management network.

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> **✎ Note:**
>
> Oracle Exadata Database Machine X4-8 Full Rack, Oracle Exadata
> Database Machine X3-8 Full Rack, and Oracle Exadata Database Machine
> X2-8 Full Rack have BONDIB0, BONDIB1, and so on for the InfiniBand
> private network.

2.3.3 Additional Networks

- On Oracle Exadata Database Machine X7-2:

    – Bonded network configuration— There are two open ports (10/25GbE PCI
    ports) on each database server.

- On Oracle Exadata Database Machine two-socket systems (X2-2 to X6-2):

    – Non-bonded network configuration— There are four open ports (NET2, NET3,
    and two additional 10 GbE ports) on each database server

    – Bonded network configuration— There are three open ports (NET3 and two
    additional 10 GbE ports) on each database server

- On Oracle Exadata Database Machine X7-8:

    – Bonded network configuration— There are 13 open ports (5 1/10 GbE ports
    and 8 open 10/25 GbE PCI ports) on each database server

- On Oracle Exadata Database Machine X5-8 and X6-8:

    – Non-bonded network configuration— There are 18 open ports (10 1GbE ports
    and 8 10GbE ports) on each database server

    – Bonded network configuration— There are 15 open ports (7 1 GbE ports and 8
    open 10 GbE ports) on each database server

- On Oracle Exadata Database Machine X4-8 Full Rack:

    – Non-bonded network configuration— There are 16 open ports (8 1GbE ports
    and 8 10GbE ports) on each database server

    – Bonded network configuration— There are 15 open ports (7 1 GbE ports and 8
    open 10 GbE ports) on each database server

- On Oracle Exadata Database Machine X3-8 Full Rack and X2-8 Full Rack:

    – Non-bonded network configuration— There are 14 open ports (NEM0/NET2,
    NEM0/NET3, NEM1/NET0, NEM1/NET1, NEM1/NET2, NEM1/NET3, and
    eight additional 10 GbE ports) on each database server

    – Bonded network configuration— There are 13 open ports (NEM0/NET2,
    NEM0/NET3, NEM1/NET0, NEM1/NET1, NEM1/NET2, and eight additional 10
    GbE ports) on each database server

Use of these additional network ports is optional, and the configuration varies
depending on your requirements and available network infrastructure. For example,
these interfaces may be used for connectivity to a dedicated tape backup network or
connectivity to a disaster recovery network.

2.4 Configuring a Separate Network for ILOM

When configuring or re-imaging an Oracle Exadata Rack, you can use Oracle Exadata Deployment Assistant (OEDA) to configure a separate network for Integrated Lights Out Manager (ILOM).

Exadata servers and ILOM are required to have network access to each other for certain features, like alert notification in Oracle Exadata System Software releases prior to 19.1.0. Oracle Exadata System Software release 18.2.0 or later eliminates this network dependency while maintaining all the features previously supported. You can configure the network so that the database and storage servers and ILOM are completely separate from each other.

1. Use the OEDA Web Configurator to configure the settings for your Oracle Exadata Rack.

2. On the Rack Networks page, check the box **Separate ILOM Network** to configure a separate network for ILOM.

A new section appears on the page, with the heading of ILOM. In this area you specify the information required to configure the ILOM network.

3. Provide the required values for the ILOM network:

    • Gateway

- • Start IP Address

- • Subnet Mask

- • Domain Name

4. Optional: If you do not want to use the default names and values for the ILOM network, click the **Modify Masks** button and customize the network settings.

2.5 Using Network VLAN Tagging with Oracle Exadata Database Machine

Compute nodes and storage nodes can use VLANs for the management network, ILOM, client network, and the backup access network.

By default, the network switch is minimally configured, without VLAN tagging. If VLAN tagging is to be used, then it must be enabled by the customer after the initial deployment. This applies to both physical and Oracle VM deployments.

Client and backup VLAN networks must be bonded. The admin network is never bonded.

> **Notes:**
>
> - • VLANs do not exist in InfiniBand. For equivalent functionality, use InfiniBand partitioning as described in *Oracle Exadata Database Machine Maintenance Guide*.
>
> - • Network VLAN tagging is supported for Oracle Real Application Clusters (Oracle RAC) on the public network.
>
> - • If the backup network is on a tagged VLAN network, the client network must also be on a separate tagged VLAN network.
>
> - • The backup and client networks can share the same network cables.
>
> - • Oracle Exadata Deployment Assistant (OEDA) supports VLAN tagging for both physical and virtual deployments.
>
> - • Virtual deployments do not support IPv6 VLANs.
>
> - • If your system will use more than 10 VIP addresses in the Oracle RAC cluster and you have VLAN configured for the Oracle Clusterware client network, then you must use 3 digit VLAN ids. Do not use 4 digit VLAN ids because the VLAN name can exceed the 15 character operating system interface name limit.

The following table shows IPv4/IPv6 support on the admin, client, and backup networks for the different Oracle Exadata Database Machine systems and Oracle Database versions.

Version of Oracle Database	VLAN Tagging on Admin Network	Client and Backup Networks
11.2.0.4	Only supported with IPv4 addresses on X3-2 and above for two-socket servers, and X4-8 and above for eight-socket servers.	Supported with IPv4 and IPv6 on all hardware models.
12.1.0.2	Only supported with IPv4 addresses on X3-2 and above for two-socket servers, and X4-8 and above for eight-socket servers.	Supported with IPv4 on all hardware models. Supported with IPv6 on all hardware models with fix for 22289350.

Related Topics

- Implementing InfiniBand Partitioning across Oracle VM Oracle RAC Clusters on Oracle Exadata

- Enabling 802.1Q VLAN Tagging in Exadata Database Machine over client networks (My Oracle Support Doc ID 1423676.1)

- Implementing Tagged VLAN Interfaces in Oracle VM Environments on Exadata (My Oracle Support Doc ID 2018550.1)

2.6 Default IP Addresses

Starting with Oracle Exadata System Software release 12.1.2.1.0, the NET0 IP addresses are assigned dynamically by the elastic configuration procedure during the first start of the system. The addresses are in the 172.16.2.1 to 172.16.7.254 range. In earlier releases, Oracle Exadata Database Machine had default IP addresses set at the factory, and the range of IP addresses was 192.168.1.1 to 192.168.1.203. The subnet mask is 255.255.252.0.

> **Note:**
>
> Prior to connecting Oracle Exadata Database Machine to the network, ensure these IP addresses do not conflict with other addresses on the network. Use the `checkip.sh` script generated by Oracle Exadata Deployment Assistant (OEDA) to check for conflicts. You run the `checkip.sh` script on the network after the DNS entries for the Oracle Exadata Database Machine have been created, but before the Oracle Exadata Database Machine is configured or connected to the network. Oracle recommends running the script to avoid configuration delays, even if a check was performed as part of planning process before the machine was delivered.
>
> If you ran OEDA on a Windows system, then the generated script is `checkip.bat`.

The following table lists the default IP addresses for Oracle Exadata Database Machine X5-2, X6-2, and X7-2. The subnet mask is 255.255.252.0.

Table 2-6   Default IP Addresses for Oracle Exadata Database Machine X5-2 and Higher

Component	NET0 IP Addresses	ILOM IP Addresses	InfiniBand Active Bonded IP Addresses
Exadata Storage Server 14	Assigned during first start of the system	192.168.1.122	Not applicable
Exadata Storage Server 13	Assigned during first start of the system	192.168.1.121	Not applicable
Exadata Storage Server 12	Assigned during first start of the system	192.168.1.120	Not applicable
Exadata Storage Server 11	Assigned during first start of the system	192.168.1.119	Not applicable
Exadata Storage Server 10	Assigned during first start of the system	192.168.1.118	Not applicable
Exadata Storage Server 9	Assigned during first start of the system	192.168.1.117	Not applicable
Exadata Storage Server 8	Assigned during first start of the system	192.168.1.116	Not applicable
Oracle Database server 8	Assigned during first start of the system	192.168.1.115	Not applicable
Oracle Database server 7	Assigned during first start of the system	192.168.1.114	Not applicable
Oracle Database server 6	Assigned during first start of the system	192.168.1.113	Not applicable
Oracle Database server 5	Assigned during first start of the system	192.168.1.112	Not applicable
Oracle Database server 4	Assigned during first start of the system	192.168.1.111	Not applicable
Oracle Database server 3	Assigned during first start of the system	192.168.1.110	Not applicable
Oracle Database server 2	Assigned during first start of the system	192.168.1.109	Not applicable
Oracle Database server 1	Assigned during first start of the system	192.168.1.108	Not applicable
Exadata Storage Server 7	Assigned during first start of the system	192.168.1.107	Not applicable
Exadata Storage Server 6	Assigned during first start of the system	192.168.1.106	Not applicable
Exadata Storage Server 5	Assigned during first start of the system	192.168.1.105	Not applicable
Exadata Storage Server 4	Assigned during first start of the system	192.168.1.104	Not applicable
Exadata Storage Server 3	Assigned during first start of the system	192.168.1.103	Not applicable
Exadata Storage Server 2	Assigned during first start of the system	192.168.1.102	Not applicable

Table 2-6   (Cont.) Default IP Addresses for Oracle Exadata Database Machine X5-2 and Higher

Component	NET0 IP Addresses	ILOM IP Addresses	InfiniBand Active Bonded IP Addresses
Exadata Storage Server 1	Assigned during first start of the system	192.168.1.101	Not applicable
Sun Datacenter InfiniBand Switch 36 switch 3	192.168.1.203	Not applicable	Not applicable
Sun Datacenter InfiniBand Switch 36 switch 2	192.168.1.202	Not applicable	Not applicable
Sun Datacenter InfiniBand Switch 36 switch 1	192.168.1.201	Not applicable	Not applicable
Ethernet switch	192.168.1.200	Not applicable	Not applicable

The following table lists the default IP addresses for Oracle Exadata Database Machine X4-2. The subnet mask is 255.255.252.0.

Table 2-7   Default IP Addresses for Oracle Exadata Database Machine X4-2

Component	NET0 IP Addresses	ILOM IP Addresses	InfiniBand Active Bonded IP Addresses
Exadata Storage Server 14	192.168.1.22	192.168.1.122	192.168.10.44 192.168.10.43
Exadata Storage Server 13	192.168.1.21	192.168.1.121	192.168.10.42 192.168.10.41
Exadata Storage Server 12	192.168.1.20	192.168.1.120	192.168.10.40 192.168.10.39
Exadata Storage Server 11	192.168.1.19	192.168.1.119	192.168.10.38 192.168.10.37
Exadata Storage Server 10	192.168.1.18	192.168.1.118	192.168.10.36 192.168.10.35
Exadata Storage Server 9	192.168.1.17	192.168.1.117	192.168.10.34 192.168.10.33
Exadata Storage Server 8	192.168.1.16	192.168.1.116	192.168.10.32 192.168.10.31
Oracle Database server 8	192.168.1.15	192.168.1.115	192.168.10.30 192.168.10.29
Oracle Database server 7	192.168.1.14	192.168.1.114	192.168.10.28 192.168.10.27
Oracle Database server 6	192.168.1.13	192.168.1.113	192.168.10.26 192.168.10.25

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Table 2-7   (Cont.) Default IP Addresses for Oracle Exadata Database Machine X4-2

Component	NET0 IP Addresses	ILOM IP Addresses	InfiniBand Active Bonded IP Addresses
Oracle Database server 5	192.168.1.12	192.168.1.112	192.168.10.24 192.168.10.23
Oracle Database server 4	192.168.1.11	192.168.1.111	192.168.10.22 192.168.10.21
Oracle Database server 3	192.168.1.10	192.168.1.110	192.168.10.20 192.168.10.19
Oracle Database server 2	192.168.1.9	192.168.1.109	192.168.10.18 192.168.10.17
Oracle Database server 1	192.168.1.8	192.168.1.108	192.168.10.16 192.168.10.15
Exadata Storage Server 7	192.168.1.7	192.168.1.107	192.168.10.14 192.168.10.13
Exadata Storage Server 6	192.168.1.6	192.168.1.106	192.168.10.12 192.168.10.11
Exadata Storage Server 5	192.168.1.5	192.168.1.105	192.168.10.10 192.168.10.9
Exadata Storage Server 4	192.168.1.4	192.168.1.104	192.168.10.8 192.168.10.7
Exadata Storage Server 3	192.168.1.3	192.168.1.103	192.168.10.6 192.168.10.5
Exadata Storage Server 2	192.168.1.2	192.168.1.102	192.168.10.4 192.168.10.3
Exadata Storage Server 1	192.168.1.1	192.168.1.101	192.168.10.2 192.168.10.1
Sun Datacenter InfiniBand Switch 36 switch 3	192.168.1.203	Not applicable	Not applicable
Sun Datacenter InfiniBand Switch 36 switch 2	192.168.1.202	Not applicable	Not applicable
Sun Datacenter InfiniBand Switch 36 switch 1	192.168.1.201	Not applicable	Not applicable
Ethernet switch	192.168.1.200	Not applicable	Not applicable

The following table lists the default IP addresses for Oracle Exadata Database Machine X3-2 and Oracle Exadata Database Machine X2-2.

Table 2-8   Default IP Addresses for Oracle Exadata Database Machine X3-2 and Oracle Exadata Database Machine X2-2

Component	NET0 IP Addresses	ILOM IP Addresses	InfiniBand Bonded IP Addresses
Exadata Storage Server 14 (Oracle Exadata Database Machine Full Rack only)	192.168.1.22	192.168.1.122	192.168.10.22
Exadata Storage Server 13 (Oracle Exadata Database Machine Full Rack only)	192.168.1.21	192.168.1.121	192.168.10.21
Exadata Storage Server 12 (Oracle Exadata Database Machine Full Rack only)	192.168.1.20	192.168.1.120	192.168.10.20
Exadata Storage Server 11 (Oracle Exadata Database Machine Full Rack only)	192.168.1.19	192.168.1.119	192.168.10.19
Exadata Storage Server 10 (Oracle Exadata Database Machine Full Rack only)	192.168.1.18	192.168.1.118	192.168.10.18
Exadata Storage Server 9 (Oracle Exadata Database Machine Full Rack only)	192.168.1.17	192.168.1.117	192.168.10.17
Exadata Storage Server 8 (Oracle Exadata Database Machine Full Rack only)	192.168.1.16	192.168.1.116	192.168.10.16
Oracle Database server 8 (Oracle Exadata Database Machine Full Rack only)	192.168.1.15	192.168.1.115	192.168.10.15
Oracle Database server 7 (Oracle Exadata Database Machine Full Rack only)	192.168.1.14	192.168.1.114	192.168.10.14

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Table 2-8   (Cont.) Default IP Addresses for Oracle Exadata Database Machine X3-2 and Oracle Exadata Database Machine X2-2

Component	NET0 IP Addresses	ILOM IP Addresses	InfiniBand Bonded IP Addresses
Oracle Database server 6 (Oracle Exadata Database Machine Full Rack only)	192.168.1.13	192.168.1.113	192.168.10.13
Oracle Database server 5 (Oracle Exadata Database Machine Full Rack only)	192.168.1.12	192.168.1.112	192.168.10.12
Oracle Database server 4 (Oracle Exadata Database Machine Full Rack and Half Rack only)	192.168.1.11	192.168.1.111	192.168.10.11
Oracle Database server 3 (Oracle Exadata Database Machine Full Rack and Half Rack only)	192.168.1.10	192.168.1.110	192.168.10.10
Oracle Database server 2	192.168.1.9	192.168.1.109	192.168.10.9
Oracle Database server 1	192.168.1.8	192.168.1.108	192.168.10.8
Exadata Storage Server 7 (Oracle Exadata Database Machine Full Rack and Half Rack only)	192.168.1.7	192.168.1.107	192.168.10.7
Exadata Storage Server 6 (Oracle Exadata Database Machine Full Rack and Half Rack only)	192.168.1.6	192.168.1.106	192.168.10.6
Exadata Storage Server 5 (Oracle Exadata Database Machine Full Rack and Half Rack only)	192.168.1.5	192.168.1.105	192.168.10.5
Exadata Storage Server 4 (Oracle Exadata Database Machine Full Rack and Half Rack only)	192.168.1.4	192.168.1.104	192.168.10.4
Exadata Storage Server 3	192.168.1.3	192.168.1.103	192.168.10.3

Table 2-8   (Cont.) Default IP Addresses for Oracle Exadata Database Machine X3-2 and Oracle Exadata Database Machine X2-2

Component	NET0 IP Addresses	ILOM IP Addresses	InfiniBand Bonded IP Addresses
Exadata Storage Server 2	192.168.1.2	192.168.1.102	192.168.10.2
Exadata Storage Server 1	192.168.1.1	192.168.1.101	192.168.10.1
Sun Datacenter InfiniBand Switch 36 switch 3	192.168.1.203	Not applicable	Not applicable
Sun Datacenter InfiniBand Switch 36 switch 2	192.168.1.202	Not applicable	Not applicable
Sun Datacenter InfiniBand Switch 36 switch 1 (Oracle Exadata Database Machine Full Rack and Half Rack only)	192.168.1.201	Not applicable	Not applicable
Ethernet switch	192.168.1.200	Not applicable	Not applicable

The following table lists the default IP addresses for Oracle Exadata Database Machine X5-8, X6-8, and X7-8 Full Rack. The subnet mask is 255.255.252.0.

Table 2-9   Default IP Addresses for Oracle Exadata Database Machine X5-8 and Higher Full Rack Systems

Component	NET0 IP Addresses	ILOM IP Addresses	InfiniBand Bonded IP Addresses
Exadata Storage Server 14	192.168.1.22	192.168.1.122	192.168.10.43 192.168.10.44
Exadata Storage Server 13	192.168.1.21	192.168.1.121	192.168.10.41 192.168.10.42
Exadata Storage Server 12	192.168.1.20	192.168.1.120	192.168.10.39 192.168.10.40
Exadata Storage Server 11	192.168.1.19	192.168.1.119	192.168.10.37 192.168.10.38
Exadata Storage Server 10	192.168.1.18	192.168.1.118	192.168.10.35 192.168.10.36
Exadata Storage Server 9	192.168.1.17	192.168.1.117	192.168.10.33 192.168.10.34
Exadata Storage Server 8	192.168.1.16	192.168.1.116	192.168.10.31 192.168.10.32

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Table 2-9   (Cont.) Default IP Addresses for Oracle Exadata Database Machine X5-8 and Higher Full Rack Systems

Component	NET0 IP Addresses	ILOM IP Addresses	InfiniBand Bonded IP Addresses
Oracle Database server 2	192.168.1.9	192.168.1.109	192.168.10.29 192.168.10.30 192.168.10.27 192.168.10.28 192.168.10.25 192.168.10.26 192.168.10.23 192.168.10.24
Oracle Database server 1	192.168.1.8	192.168.1.108	192.168.10.21 192.168.10.22 192.168.10.19 192.168.10.20 192.168.10.17 192.168.10.18 192.168.10.15 192.168.10.16
Exadata Storage Server 7	192.168.1.7	192.168.1.107	192.168.10.13 192.168.10.14
Exadata Storage Server 6	192.168.1.6	192.168.1.106	192.168.10.11 192.168.10.12
Exadata Storage Server 5	192.168.1.5	192.168.1.105	192.168.10.9 192.168.10.10
Exadata Storage Server 4	192.168.1.4	192.168.1.104	192.168.10.7 192.168.10.
Exadata Storage Server 3	192.168.1.3	192.168.1.103	192.168.10.5 192.168.10.6
Exadata Storage Server 2	192.168.1.2	192.168.1.102	192.168.10.3 192.168.10.4
Exadata Storage Server 1	192.168.1.1	192.168.1.101	192.168.10.1 192.168.10.2
Sun Datacenter InfiniBand Switch 36 switch 3	192.168.1.203	Not applicable	Not applicable
Sun Datacenter InfiniBand Switch 36 switch 2	192.168.1.202	Not applicable	Not applicable
Sun Datacenter InfiniBand Switch 36 switch 1	192.168.1.201	Not applicable	Not applicable
Ethernet switch	192.168.1.200	Not applicable	Not applicable

The following table lists the default IP addresses for Oracle Exadata Database Machine X4-8 Full Rack. The subnet mask is 255.255.252.0.

> **Note:**
>
> For Oracle Exadata Database Machine X4-8 racks with Oracle Exadata Storage Server X5-2 Servers, the NETO IP addresses are assigned during the elastic configuration process.

Table 2-10   Default IP Addresses for Oracle Exadata Database Machine X4-8 Full Rack

Component	NET0 IP Addresses	ILOM IP Addresses	InfiniBand Bonded IP Addresses
Exadata Storage Server 14	192.168.1.22	192.168.1.122	192.168.10.43 192.168.10.44
Exadata Storage Server 13	192.168.1.21	192.168.1.121	192.168.10.41 192.168.10.42
Exadata Storage Server 12	192.168.1.20	192.168.1.120	192.168.10.39 192.168.10.40
Exadata Storage Server 11	192.168.1.19	192.168.1.119	192.168.10.37 192.168.10.38
Exadata Storage Server 10	192.168.1.18	192.168.1.118	192.168.10.35 192.168.10.36
Exadata Storage Server 9	192.168.1.17	192.168.1.117	192.168.10.33 192.168.10.34
Exadata Storage Server 8	192.168.1.16	192.168.1.116	192.168.10.31 192.168.10.32
Oracle Database server 2	192.168.1.9	192.168.1.109	192.168.10.29 192.168.10.30 192.168.10.27 192.168.10.28 192.168.10.25 192.168.10.26 192.168.10.23 192.168.10.24
Oracle Database server 1	192.168.1.8	192.168.1.108	192.168.10.21 192.168.10.22 192.168.10.19 192.168.10.20 192.168.10.17 192.168.10.18 192.168.10.15 192.168.10.16

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Table 2-10   (Cont.) Default IP Addresses for Oracle Exadata Database Machine X4-8 Full Rack

Component	NET0 IP Addresses	ILOM IP Addresses	InfiniBand Bonded IP Addresses
Exadata Storage Server 7	192.168.1.7	192.168.1.107	192.168.10.13 192.168.10.14
Exadata Storage Server 6	192.168.1.6	192.168.1.106	192.168.10.11 192.168.10.12
Exadata Storage Server 5	192.168.1.5	192.168.1.105	192.168.10.9 192.168.10.10
Exadata Storage Server 4	192.168.1.4	192.168.1.104	192.168.10.7 192.168.10.
Exadata Storage Server 3	192.168.1.3	192.168.1.103	192.168.10.5 192.168.10.6
Exadata Storage Server 2	192.168.1.2	192.168.1.102	192.168.10.3 192.168.10.4
Exadata Storage Server 1	192.168.1.1	192.168.1.101	192.168.10.1 192.168.10.2
Sun Datacenter InfiniBand Switch 36 switch 3	192.168.1.203	Not applicable	Not applicable
Sun Datacenter InfiniBand Switch 36 switch 2	192.168.1.202	Not applicable	Not applicable
Sun Datacenter InfiniBand Switch 36 switch 1	192.168.1.201	Not applicable	Not applicable
Ethernet switch	192.168.1.200	Not applicable	Not applicable

The following table lists the default IP addresses for Oracle Exadata Database Machine X3-8 Full Rack and Oracle Exadata Database Machine X2-8 Full Rack. The subnet mask is 255.255.252.0.

Table 2-11   Default IP Addresses for Oracle Exadata Database Machine X3-8 Full Rack and Oracle Exadata Database Machine X2-8 Full Rack

Component	NET0 IP Addresses	ILOM IP Addresses	InfiniBand Bonded IP Addresses
Exadata Storage Server 14	192.168.1.22	192.168.1.122	192.168.10.22
Exadata Storage Server 13	192.168.1.21	192.168.1.121	192.168.10.21
Exadata Storage Server 12	192.168.1.20	192.168.1.120	192.168.10.20
Exadata Storage Server 11	192.168.1.19	192.168.1.119	192.168.10.19

Table 2-11   (Cont.) Default IP Addresses for Oracle Exadata Database Machine X3-8 Full Rack and Oracle Exadata Database Machine X2-8 Full Rack

Component	NET0 IP Addresses	ILOM IP Addresses	InfiniBand Bonded IP Addresses
Exadata Storage Server 10	192.168.1.18	192.168.1.118	192.168.10.18
Exadata Storage Server 9	192.168.1.17	192.168.1.117	192.168.10.17
Exadata Storage Server 8	192.168.1.16	192.168.1.116	192.168.10.16
Oracle Database server 2	192.168.1.9	192.168.1.109	192.168.10.15 192.168.10.14 192.168.10.13 192.168.10.12
Oracle Database server 1	192.168.1.8	192.168.1.108	192.168.10.11 192.168.10.10 192.168.10.9 192.168.10.8
Exadata Storage Server 7	192.168.1.7	192.168.1.107	192.168.10.7
Exadata Storage Server 6	192.168.1.6	192.168.1.106	192.168.10.6
Exadata Storage Server 5	192.168.1.5	192.168.1.105	192.168.10.5
Exadata Storage Server 4	192.168.1.4	192.168.1.104	192.168.10.4
Exadata Storage Server 3	192.168.1.3	192.168.1.103	192.168.10.3
Exadata Storage Server 2	192.168.1.2	192.168.1.102	192.168.10.2
Exadata Storage Server 1	192.168.1.1	192.168.1.101	192.168.10.1
Sun Datacenter InfiniBand Switch 36 switch 3	192.168.1.203	Not applicable	Not applicable
Sun Datacenter InfiniBand Switch 36 switch 2	192.168.1.202	Not applicable	Not applicable
Sun Datacenter InfiniBand Switch 36 switch 1	192.168.1.201	Not applicable	Not applicable
Ethernet switch	192.168.1.200	Not applicable	Not applicable

The following table lists the default IP addresses for Oracle Exadata Storage Expansion Rack X4-2.

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Table 2-12   Default IP Addresses for Oracle Exadata Storage Expansion Rack X4-2

Component	NET0 IP Addresses	ILOM IP Addresses	InfiniBand Active Bonded IP Addresses
Exadata Storage Server 18	192.168.1.68	192.168.1.168	192.168.10.86 192.168.10.85
Exadata Storage Server 17	192.168.1.67	192.168.1.167	192.168.10.84 192.168.10.83
Exadata Storage Server 16	192.168.1.66	192.168.1.166	192.168.10.82 192.168.10.81
Exadata Storage Server 15	192.168.1.65	192.168.1.165	192.168.10.80 192.168.10.79
Exadata Storage Server 14	192.168.1.64	192.168.1.164	192.168.10.78 192.168.10.77
Exadata Storage Server 13	192.168.1.63	192.168.1.163	192.168.10.76 192.168.10.75
Exadata Storage Server 12	192.168.1.62	192.168.1.162	192.168.10.74 192.168.10.73
Exadata Storage Server 11	192.168.1.61	192.168.1.161	192.168.10.72 192.168.10.71
Exadata Storage Server 10	192.168.1.60	192.168.1.160	192.168.10.70 192.168.10.69
Exadata Storage Server 9	192.168.1.59	192.168.1.159	192.168.10.68 192.168.10.67
Exadata Storage Server 8	192.168.1.58	192.168.1.158	192.168.10.66 192.168.10.65
Exadata Storage Server 7	192.168.1.57	192.168.1.157	192.168.10.64 192.168.10.63
Exadata Storage Server 6	192.168.1.56	192.168.1.156	192.168.10.62 192.168.10.61
Exadata Storage Server 5	192.168.1.55	192.168.1.155	192.168.10.60 192.168.10.59
Exadata Storage Server 4	192.168.1.54	192.168.1.154	192.168.10.58 192.168.10.57
Exadata Storage Server 3	192.168.1.53	192.168.1.153	192.168.10.56 192.168.10.55
Exadata Storage Server 2	192.168.1.52	192.168.1.152	192.168.10.54 192.168.10.53
Exadata Storage Server 1	192.168.1.51	192.168.1.151	192.168.10.52 192.168.10.51

Table 2-12   (Cont.) Default IP Addresses for Oracle Exadata Storage Expansion Rack X4-2

Component	NET0 IP Addresses	ILOM IP Addresses	InfiniBand Active Bonded IP Addresses
Sun Datacenter InfiniBand Switch 36 switch 3	192.168.1.223	Not applicable	Not applicable
Sun Datacenter InfiniBand Switch 36 switch 2	192.168.1.222	Not applicable	Not applicable
Sun Datacenter InfiniBand Switch 36 switch 1 (Oracle Exadata Database Machine Full Rack and Half Rack only)	192.168.1.221	Not applicable	Not applicable
Ethernet switch	192.168.1.220	Not applicable	Not applicable
PDU-A	192.168.1.212	Not applicable	Not applicable
PDU-B	192.168.1.213	Not applicable	Not applicable

The following table lists the default IP addresses for Oracle Exadata Storage Expansion Rack X3-2, and Oracle Exadata Storage Expansion Rack with Oracle Exadata Storage ServerExadata Storage Server with Sun Fire X4270 M2 Servers.

Table 2-13   Default IP Addresses for Oracle Exadata Storage Expansion Rack X3-2, and Oracle Exadata Storage Expansion Rack with Oracle Exadata Storage Server with Sun Fire X4270 M2 Servers

Component	NET0 IP Addresses	ILOM IP Addresses	InfiniBand Bonded IP Addresses
Exadata Storage Server 18	192.168.1.68	192.168.1.168	192.168.10.68
Exadata Storage Server 17	192.168.1.67	192.168.1.167	192.168.10.67
Exadata Storage Server 16	192.168.1.66	192.168.1.166	192.168.10.66
Exadata Storage Server 15	192.168.1.65	192.168.1.165	192.168.10.65
Exadata Storage Server 14	192.168.1.64	192.168.1.164	192.168.10.64
Exadata Storage Server 13	192.168.1.63	192.168.1.163	192.168.10.63
Exadata Storage Server 12	192.168.1.62	192.168.1.162	192.168.10.62
Exadata Storage Server 11	192.168.1.61	192.168.1.161	192.168.10.61

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Table 2-13   (Cont.) Default IP Addresses for Oracle Exadata Storage Expansion Rack X3-2, and Oracle Exadata Storage Expansion Rack with Oracle Exadata Storage Server with Sun Fire X4270 M2 Servers

Component	NET0 IP Addresses	ILOM IP Addresses	InfiniBand Bonded IP Addresses
Exadata Storage Server 10	192.168.1.60	192.168.1.160	192.168.10.60
Exadata Storage Server 9	192.168.1.59	192.168.1.159	192.168.10.59
Exadata Storage Server 8	192.168.1.58	192.168.1.158	192.168.10.58
Exadata Storage Server 7	192.168.1.57	192.168.1.157	192.168.10.57
Exadata Storage Server 6	192.168.1.56	192.168.1.156	192.168.10.56
Exadata Storage Server 5	192.168.1.55	192.168.1.155	192.168.10.55
Exadata Storage Server 4	192.168.1.54	192.168.1.154	192.168.10.54
Exadata Storage Server 3	192.168.1.53	192.168.1.153	192.168.10.53
Exadata Storage Server 2	192.168.1.52	192.168.1.152	192.168.10.52
Exadata Storage Server 1	192.168.1.51	192.168.1.151	192.168.10.51
Sun Datacenter InfiniBand Switch 36 switch 3	192.168.1.223	Not applicable	Not applicable
Sun Datacenter InfiniBand Switch 36 switch 2	192.168.1.222	Not applicable	Not applicable
Sun Datacenter InfiniBand Switch 36 switch 1	192.168.1.221	Not applicable	Not applicable
Ethernet switch	192.168.1.220	Not applicable	Not applicable
PDU-A	192.168.1.212	Not applicable	Not applicable
PDU-B	192.168.1.213	Not applicable	Not applicable

2.7 Port Assignments When Using a Firewall

The following table lists the ports used by services on Oracle Exadata Database Machine. When network communication requires access through a firewall, review the list and open the necessary ports. All ports are on the management network, except for port 1521 which is on the client network.

Table 2-14   Open Ports for Firewall

Source	Target	Protocol	Port	Network	Application
Any	Database servers, storage cells, and ILOMs for database servers, Exadata Storage Servers, and InfiniBand switches	SSH over TCP	22	Management	SSH
Any	KVM	SSH over TCP	22	Management	SSH for serial sessions to MPUIQ-SRL module
Exadata Storage Servers	SMTP e-mail server	SMTP	25	Management	SMTP (Simple Mail Transfer Protocol)
Any	ILOMs for database servers, Exadata Storage Servers, and InfiniBand switches	HTTP	80	Management	Web (user configurable)
Any	PDU	HTTP	80	Management	Browser interface
Any	KVM	HTTP	80	Management	Avocent video viewer download for Java applet
Any	rpcbind	TCP	111	Management	rpcbind
Database management	NTP servers	NTP over UDP	123	Client	Outgoing Network Time Protocol (NTP)
Database servers, Exadata Storage Servers, ILOMs, InfiniBand switches, and Cisco switch	NTP servers	NTP over UDP	123	Management	Outgoing NTP

Table 2-14   (Cont.) Open Ports for Firewall

Source	Target	Protocol	Port	Network	Application
Any	ILOMs for database servers, Exadata Storage Servers, and InfiniBand switches	SNMP over UDP	161	Management	SNMP (Simple Network Management Protocol) (user configurable)
Any	PDU	SNMP over UDP	161	Management	SNMP (user configurable)
Any	KVM	SNMP over UDP	161	Management	SNMP (user configurable)
Exadata Storage Servers	SNMP subscriber such as Oracle Enterprise Manager Grid Control or an SNMP manager	SNMP	162	Management	SNMP version 1 (SNMPv1) outgoing traps (user-configurable)
Database servers, Exadata Storage Servers, and ILOMs for database servers, Exadata Storage Servers, and InfiniBand switches	ASR Manager	SNMP	162	Management	Telemetry messages sent to ASR Manager
ILOMs for database servers, Exadata Storage Servers, and InfiniBand switches	Any	IPMI over UDP	162	Management	Outgoing IPMI (Intelligent Platform Management Interface) Platform Event Trap (PET)
PDU	SNMP trap receivers	SNMP over UDP	162	Management	Outgoing SNMPv2 traps
KVM	SNMP trap receivers	SNMP over UDP	162	Management	Outgoing SNMPv2 traps

Table 2-14   (Cont.) Open Ports for Firewall

Source	Target	Protocol	Port	Network	Application
ASR Manager	ASR backend	HTTPS	443	Management	Telemetry messages sent to ASR backend
ASR Manager	ASR backend	HTTPS	8100 16161	Management	DiagPack uploads
Any	ILOMs for database servers, Exadata Storage Servers, and InfiniBand switches	HTTPS	443	Management	Web (user configurable)
Any	PDU	HTTPS	443	Management	Browser interface
Any	KVM	HTTPS	443	Management	Browser interface for MergePoint Utility switch and KVM sessions
Exadata Storage Servers	SMTPS client	SMTPS	465	Management	Simple Mail Transfer Protocol, Secure (if configured)
Database servers, Exadata Storage Servers, and ILOMs for database servers, Exadata Storage Servers, and InfiniBand switches	Syslog server	Syslog over UDP	514	Management	Outgoing Syslog
PDU	Syslog server	Syslog over UDP	514	Management	Outgoing Syslog
KVM	Syslog server	Syslog over UDP	514	Management	Outgoing Syslog

Table 2-14   (Cont.) Open Ports for Firewall

Source	Target	Protocol	Port	Network	Application
Any	ILOMs for database servers, Exadata Storage Servers, and InfiniBand switches	IPMI over UDP	623	Management	IPMI
Any	plathwsvcd	TCP	723	Management	
Any	evnd	TCP	791	Management	
Any	partitiond	TCP	867	Management	
Any	Database servers	TCP	1521	Client	Database listener
Any	KVM	TCP	2068	Management	KVM session data for keyboard and mouse transmission, or for video transmission
Any	tgtd	TCP	3260	Management	SCSI target daemon
Any		TCP	3872	Management	Java EM agent
Any	Cisco Smart Install	TCP	4786	Management	Cisco Smart Install
Any	ILOMs for database servers, and Exadata Storage Servers	TCP	5120	Management	ILOM remote console: CD
Any	ILOMs for database servers, and Exadata Storage Servers	TCP	5121	Management	ILOM remote console: keyboard and mouse
Any	ILOMs for database servers, and Exadata Storage Servers	TCP	5123	Management	ILOM remote console: diskette

Table 2-14   (Cont.) Open Ports for Firewall

Source	Target	Protocol	Port	Network	Application
Any	ILOMs for database servers, and Exadata Storage Servers	TCP	5555	Management	ILOM remote console: encryption
Any	ILOMs for database servers, and Exadata Storage Servers	TCP	5556	Management	ILOM remote console: authentication
Any	Oracle Notification Service	TCP	6200	Management	Oracle Notification Service
ASR Manager	ILOMs for database servers, and Exadata Storage Servers	HTTP	6481	Management	Service tag listener for asset activation
Any	ILOMs for database servers, and Exadata Storage Servers	TCP	6481	Management	ILOM remote console: Servicetag daemon
Any	ILOMs for database servers, and Exadata Storage Servers	TCP	7578	Management	ILOM remote console: video
Any	ILOMs for database servers, and Exadata Storage Servers	TCP	7579	Management	ILOM remote console: serial
Any	Database servers and Exadata Storage Servers	TCP	7777	Both	Oracle Enterprise Manager Grid Control HTTP console port
Any	Database servers and Exadata Storage Servers	TCP	7799	Both	Oracle Enterprise Manager Grid Control HTTPS console port

Table 2-14   (Cont.) Open Ports for Firewall

Source	Target	Protocol	Port	Network	Application
Any	Oracle WebLogic	TCP	7878 8888	Management	Java WebLogic
Diagpack uploads	Database servers and Exadata Storage Servers		8100 16161		
Any	rpc.statd	TCP	21408 40801 41460 47431	Management	rpc.statd
Any	gpnpd.bin	TCP	19193 (IPv6) 25194	Management	gpnpd.bin

> **✎ See Also:**
>
> Appendix E, "Managing Oracle Database Port Numbers", in the *Oracle Real Application Clusters Installation Guide for Linux and UNIX*.

3

Using Oracle Exadata Deployment Assistant

Oracle Exadata Deployment Assistant creates the Oracle Exadata Rack configuration file. The file automates the installation process. The utility is available from My Oracle Support. Refer to My Oracle Support note 888828.1 for additional information.

> **Note:**
>
> For ease of reading, the name "Oracle Exadata Rack" is used when information refers to both Oracle Exadata Database Machine and Oracle Exadata Storage Expansion Rack.

- Overview of Oracle Exadata Deployment Assistant
- OEDA Browser-based User Interface
- OEDA Graphical User Interface
- OEDA Command Line Interface

Related Topics

- Exadata Database Machine and Exadata Storage Server Supported Versions (My Oracle Support Doc ID 888828.1)

3.1 Overview of Oracle Exadata Deployment Assistant

Use the deployment assistant to create the configuration file for Oracle Exadata Rack. The deployment assistant is used for Oracle Exadata Database Machine, Zero Data Loss Recovery Appliance, and Oracle SuperCluster.

Before Oracle Exadata Rack arrives:

1. Work with your network and database administrators to evaluate the current network settings, such as current IP address use and network configuration.

2. Define the settings for Oracle Exadata Rack, such as network configuration and backup method.

3. Run the deployment assistant, and select the type of system. Options are Oracle Exadata Database Machine, Zero Data Loss Recovery Appliance, and Oracle SuperCluster.

> **Note:**
>
> All fields in the deployment assistant are required unless otherwise indicated.

4. Generate the configuration file.

Oracle Exadata Deployment Assistant has two main phases:

In phase 1, the customer provides naming, DNS, NTP, and networking details. This information is collected using the Oracle Exadata Deployment Assistant user interface. At the end of the dialogue with OEDA, configuration files are generated on the client.

In phase 2, the configuration files are copied to the database node, and the validation and installation is completed. See Configuring Oracle Exadata Database Machine Using OEDA.

Accessibility Note: If you are using Oracle Exadata Deployment Assistant with assistive technology (for accessibility) on Windows, you need to enable Java Access Bridge.

3.1.1 Considerations when Using Oracle Exadata Deployment Assistant

Review this information when using Oracle Exadata Deployment Assistant (OEDA).

Note the following when using Oracle Exadata Deployment Assistant:

- Oracle Exadata Rack ships with the Oracle Linux operating system installed on the database servers, with the Oracle Linux as the default.

- The rack name is used to generate host names for network interfaces for all systems. For example, a value of `dm01` results in database server host names of `dm01db01`, `dm01db02`, `dm01db03`, and so on, and Exadata Storage Server host names of `dm01cel01`, `dm01cel02`, `dm01cel03`, and so on.

  In a multi-rack configuration, each Oracle Exadata Rack name should be a unique name that identifies the machine. Oracle recommends using `dm01` for the first Oracle Exadata Rack, `dm02` for the second, `dm03` for the third, and so on. Up to eighteen Oracle Exadata Racks can be cabled together without additional Sun Datacenter InfiniBand Switch 36 switches.

- The backup method information is used to size the Oracle Automatic Storage Management (Oracle ASM) disk groups created during installation. The amount of usable disk space varies depending on the backup method. The backup methods are as follows:

  – Backups internal to Oracle Exadata Rack mean database backups are created only on disk in the Fast Recovery Area (FRA). In addition to the database backups, there are other objects such as Archived Redo Logs and Flashback Log Files stored in the FRA. The division of disk space between the DATA disk group and the RECO disk group (the FRA) is 40% and 60%, respectively.

  – Backups external to Oracle Exadata Rack mean database backups are created on disk or tape media that is external to currently deployed Oracle Exadata Database Machine, and not on existing Exadata Storage Servers. If you are performing backups to disk storage external to Oracle Exadata Database Machine, such as to additional dedicated Exadata Storage Servers, an NFS server, virtual tape library or tape library, then do not reserve additional space in the RECO disk group when using Oracle Exadata Deployment Assistant.

    When choosing this option, the FRA internal to Oracle Exadata Rack contains objects such as archived redo log files and flashback log files. The division of

disk space between the DATA disk group and the RECO disk group (the FRA)
is 80% and 20%, respectively.

- Oracle recommends the use of high redundancy disk groups for mission critical
applications. The location of the backup files depends on the backup method. To
reserve more space for the DATA disk group, choose external backups. This is
especially important when the RECO disk group is high redundancy. The following
table shows the backup options and settings.

Table 3-1   Protection Levels and Backup Methods

Description	DATA Group Contains...	RECO Group Contains...	Oracle ASM Redundancy Level for DATA Disk Group	Oracle ASM Redundancy Level for RECO Disk Group
High Redundancy for ALL	Data files Temporary files Online redo logs Control file	Archive logs Flashback log files	High	High
High Redundancy for DATA	Data files Online redo logs Control file.	Archive logs Temporary files Flashback log files	High	Normal
High Redundancy for Log and RECO	Data files Temporary files	Online redo logs Control file Archive logs Flashback log files	Normal	High
Normal Redundancy	Data files Temporary files Online redo logs Control file	Online redo logs Archive logs Flashback log files	Normal	Normal

- A valid time zone name is required for Oracle Exadata Database Machine
installation. Time zone data provided with Oracle Exadata Database Machine and
Oracle Linux comes from the zoneinfo database. A valid time zone name is
suitable as a value for the TZ environment variable consisting of form *Area/
Location*. For example, a valid entry is `America/New_York`. Invalid entries are EST,
EDT, UTC-5, and UTC-4.

Related Topics

- iana Time Zone Database
- *Oracle Exadata System Software User's Guide*

3.1.2 Using Oracle Exadata Deployment Assistant on Systems with Non-Default root Passwords

You can use the `-p` option to prompt for a password instead of resetting the root
password to the expected default value.

Starting with the November 2016 release, Oracle Exadata Deployment Assistant supports deployment on Exadata environments that already have non-default root passwords. You can perform the deployment without having to change the root password back to the default. In earlier releases, OEDA expected the root password to be the default on all the servers in an Exadata environment.

With the new non-default password feature, root passwords can be same or different and also non-default on each node in a rack. If non-default passwords are already set, add the `-p` option to the existing command line options when you start up OEDA. For example:

```
./install.sh -cf <config.xml> -s 1 -p
```

The `-p` option causes OEDA to prompt for the root password. Make sure you enter the correct password because an incorrect password will disable root access for 5 minutes by default, and after 5 failed login attempts, the server will be locked down.

If you want to change the root password on database and storage servers, use the `changePassword.sh` utility included with OEDA. It is located in the same directory as `install.sh`.

The following example changes the root password:

```
./changePassword.sh -cf <config.xml> -userName root
```

The utility will prompt for the current root password and will allow password changes of any users in the rack. Note that this option assumes that the storage servers are not locked down.

Related Topics

- *Oracle Exadata Database Machine Security Guide*

3.2 OEDA Browser-based User Interface

The web-based interface for Oracle Exadata Deployment Assistant (OEDA) is available starting with the release October 2018 of OEDA. OEDA Web is available for Linux, OSX and Windows.

You can use this interface to enter configuration details for new racks and also import configuration files from the old OEDA interface. Use the **Menu** button to import and save.

To use the Web-based version of OEDA, perform the following steps.

1. Download the latest release of OEDA.

   Extract the contents of the downloaded compressed file. When you extract the contents, it creates a directory based on the operating system, such as `linux-x64`, `macosx-x64`, or `windows-i586`, to store the extracted files. This is referred to as the OEDA_HOME directory.

2. Install the software.

   Before you can use the web-based interface, you must install and run the Web Application Server. In the created directed, locate and run the `installWls` program. You do not have to be logged in as an administrator user to run this program. Use one of the following commands, where the `-p` option specifies the port number:

   - On Linux, Apple, and UNIX:

```
./installWls.sh -p 7001
```

- On Microsoft Windows:

```
installWls.cmd -p 7001
```

> **✎ Note:**
>
> You can specify a non-default port (for example 8002) by using a value
> other than 7001. However, it is not recommended to use port numbers
> less than 1024.

When you run the `installWls` program, it first stops and removes any previous
installation of the OEDA Web Server. Then it installs and starts the latest version
of the OEDA Web Server on the local system.

3. Access the local OEDA Web Server.

   After the OEDA Web Server has been installed, you can access the web-based
   application by opening a browser and entering the following URL:

   ```
   http://localhost:7001/oeda
   ```

Refer to My Oracle Support note 2460104.1 for more information.

New features in the OEDA web interface:

- Ability to support single instance homes
- Ability to have Oracle RAC One Node and single instance databases
- Ability to have more than two users and groups
- Ability to have more than 2 disk groups
- Ability to have more than one database
- Ability to have more than one database home
- Ability to have more than one pluggable database (PDB)
- Ability to have separate Integrated Lights Out Manager (ILOM) subnet
- Ability to have separate ILOM domains
- Network flow provides better support for Oracle VM

3.2.1 Using the Browser-based Version of Oracle Exadata Deployment Assistant

Use the deployment assistant for initial configuration, and when adding to an existing
deployment. You can import an existing configuration when adding new racks or
components.

Have the following available before running the deployment assistant:

- IP addresses
- Machine names
- DNS information

- NTP information for the rack

The following options are available from the OEDA **Menu** drop-down list:

- About: View information about the web interface software.

- New: Start a new configuration.

- Import: Import an existing configuration file. The file format is XML.

- Save: Save the current configuration to an XML file.

- Diagnostics: Creates a ZIP file that can be used to troubleshoot and diagnosis issues with the OEDA web interface.

- Preferences: Specify your preferences for how the web interface behaves.

- Validate: Check the current configuration for completeness and correctness.

- Exit: Exit OEDA

The following list describes the configuration information you specify in OEDA:

1. Select the hardware for the deployment on the Select Hardware page. Also provide customer information on this page.

2. Choose whether to configuration Oracle VM on the nodes.

3. Enter the management network and private network information on the Rack Networks page.

4. Specify the user and group configuration on the Users and Groups page. You can choose between Default, Role Separated, or a Custom configuration.

5. Define the clusters on the Define Clusters page for each cluster.

6. Define the disk group layout on the Diskgroups page.

7. Specify the Oracle Database home information for each Oracle home on the Create Database Home page.

8. Enter the client and backup network information on the Cluster Networks page

9. Configure the email alerts, SNMP alerts, Auto Service Request, Oracle Config Manager, and Enterprise Manager alerting on the Alerting page.

10. Answer the configuration questionnaire and provide additional information about the deployment in the text field on the Comments page. Information entered in this field appears at the bottom of the `InstallationTemplate.html` file.

11. Click **Save and Download** to create the configuration files. You are prompted to choose a location in which to save a ZIP file to your local computer.

12. Copy the ZIP file to a directory on the first database server in Oracle Exadata Rack. Use a subdirectory of `/u01`, such as the `/u01/oeda` directory. These files are used by the field engineer to configure the Oracle Exadata Rack.

3.2.2 Select Hardware Page

Select the hardware type being configured and provide customer details.

- **Oracle Exadata Database Machine**

  Supply the following additional information for this choice:

  – **Rack Size**: The size of the rack you are configuring. Your choices are:

* **Elastic**: (X4-8 and later) A customized number of database servers and storage servers.

* **Full**: A standard configuration consisting of:

  * 2-socket models (X7-2, X6-2, and so on): Eight 2-socket database servers and 14 storage servers

  * 8-socket models (X7-8, X6-8, and so on): Two 8-socket database severs and 14 storage servers.

  * Storage Expansion Racks (X2, X3, and X4): 18 storage servers

* **Half**: A standard configuration consisting of:

  * 2-socket models (X7-2, X6-2, and so on): Four 2-socket database servers and 7 storage servers

  * Storage Expansion Racks (X2, X3, and X4): Nine storage servers

* **Quarter**: A standard configuration consisting of:

  * 2-socket models (X7-2, X6-2, and so on): Two 2-socket database servers and 3storage servers

  * Storage Expansion Racks (X2, X3, and X4): Four storage servers

* **Eighth**: A standard configuration consisting of 2 database servers and 3 storage servers with only half the cores enabled in each server. Available for 2-socket systems model X3-2 and later.

* **Eighth Elastic**: A customizable configuration with 2 database servers and 3 storage servers. Available for 2-socket systems model X4-2 and later.

– **Compute Node**, **Storage Cell**, and **Disk Size**: The values you can select for each successive field are determined by the value you selected for the previous fields:

* **X7-2** Compute Node

  * **X7** Storage Cell

    * **HC 10TB** (High Capacity 10 TB drives)

    * **EF 6.4 TB** (Extreme Flash 6.4 TB drives)

* **X7-8** Compute Node

  * **X7** Storage Cell

    * **HC 10TB** (High Capacity 10 TB drives)

    * **EF 6.4 TB** (Extreme Flash 6.4 TB drives)

* **X6-2** Compute Node

  * **X6** Storage Cell

    * **EF 3.2TB** (Extreme Flash 3.2 TB drives)

    * **HC 8TB** (High Capacity 8 TB drives)

* **X6-8** Compute Node

  * **X6** Storage Cell

    * **EF 3.2TB** (Extreme Flash 3.2 TB drives)

    * **HC 8TB** (High Capacity 8 TB drives)

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* **X5-8** Compute Node
    * **X5** Storage Cell
        * **EF 1.6TB** (Extreme Flash 1.6 TB drives)
        * **HC 8TB** (High Capacity 8 TB drives)
* **X5-2** Compute Node
    * **X5** Storage Cell
        * **EF 1.6TB** (Extreme Flash 1.6 TB drives)
        * **HC 8TB** (High Capacity 8 TB drives)
        * **HC 4TB** (High Capacity 4 TB drives)
* **X4-8** Compute Node
    * **X5** Storage Cell
        * **EF 1.6TB** (Extreme Flash 1.6 TB drives)
        * **HC 8TB** (High Capacity 8 TB drives)
        * **HC 4TB** (High Capacity 4 TB drives)
    * **X4** Storage Cell
        * **HP 1.2TB** (High Performance 1.2 TB drives)
        * **HC 4TB** (High Capacity 4 TB drives)
* **X4-2** Compute Node
    * **X4** Storage Cell
        * **HP 1.2TB** (High Performance 1.2 TB drives)
        * **HC 4TB** (High Capacity 4 TB drives)
        * **HC 8TB** (High Capacity 8 TB drives)
* **X4 Storage Expansion** Compute Node
    * **X4** Storage Cell
        * **HP 1.2TB** (High Performance 1.2 TB drives)
        * **HC 4TB** (High Capacity 4 TB drives)
        * **HC 8TB** (High Capacity 8 TB drives)
* **X3-2** Compute Node
    * **X3** Storage Cell
        * **HP** (High Performance drives)
        * **HC 3TB** (High Capacity 3 TB drives)
        * **HC 4TB** (High Capacity 4 TB drives)
        * **HC 8TB** (High Capacity 8 TB drives)
* **X3-8** Compute Node
    * **X4** Storage Cell
        * **HP 1.2TB** (High Performance 1.2 TB drives)
        * **HC 4TB** (High Capacity 4 TB drives)

* * **X3** Storage Cell

    * * **HP** (High Performance drives)

    * * **HC 3TB** (High Capacity 3 TB drives)

    * * **HC 8TB** (High Capacity 8 TB drives)

* * **X3 Storage Expansion** Compute Node

    * * **X3** Storage Cell

        * * **HP** (High Performance drives)

        * * **HC 3TB** (High Capacity 3 TB drives)

        * * **HC 8TB** (High Capacity 8 TB drives)

* * **X2-2** Compute Node

    * * **X2** Storage Cell

        * * **HP** (High Performance drives)

        * * **HC 2TB** (High Capacity 2 TB drives)

        * * **HC 3TB** (High Capacity 3 TB drives)

        * * **HC 4TB** (High Capacity 4 TB drives)

        * * **HC 8TB** (High Capacity 8 TB drives)

* * **X2-8** Compute Node

    * * **X2** Storage Cell

        * * **HP** (High Performance drives)

        * * **HC 2TB** (High Capacity 2 TB drives)

        * * **HC 3TB** (High Capacity 3 TB drives)

        * * **HC 8TB** (High Capacity 8 TB drives)

    * * **X2 Storage Expansion** Compute Node

        * * **X2** Storage Cell

            * * **HP** (High Performance drives)

            * * **HC 2TB** (High Capacity 2 TB drives)

            * * **HC 3TB** (High Capacity 3 TB drives)

- **Add Rack (+)**: Click this button after you have selected the hardware to add the rack to the configuration and display the Rack Details options.

• **Zero Data Loss Recovery Appliance**

   Supply the following additional information for this choice:

   - **ZDLRA Server, Capacity, and Cell Count**: The model of the ZDLRA rack, the disk storage types and the cell count. The values you can select for each successive field are determined by the value you selected for the previous fields:

      * Server **X7-2**

         * Capacity **HC 10TB** (High Capacity)

      * Server **X6-2**

      *   Capacity **HC 8TB** (High Capacity)

    *   Server **X5-2**

      *   Capacity **HC 4TB** (High Capacity)

      *   Capacity **HC 8TB**

    *   Server **X4 Zdlra**

      *   Capacity: **HC 4TB** (High Capacity)

      *   Cell Count: The number of cells in the rack. Choose the value from the drop-down list. Available values are from 3 to 13. You can also use the Search field in the drop-down list to find a value.

–   **Add Rack (+)**: Click this button after you have selected the hardware to add the rack to the configuration and display the Rack Details options.

- **Exadata Cloud**

  Supply the following additional information for this choice:

  –   **Exadata cloud options**: Select the Exadata deployment option from the list, for example, Cloud at Customer.

  –   **Rack Size**: The size of the rack you are configuring. Your choices are:

      *   **Full**: A standard configuration consisting of eight 2-socket database servers and 12 storage servers.

      *   **Half**: A standard configuration consisting of four 2-socket database servers and 6 storage servers.

      *   **Quarter**: A standard configuration consisting of two 2-socket database servers and 3 storage servers.

      *   **Base Rack**: A configuration consisting of 2 database servers and 3 storage servers. You can specify the minimum and maximum number of compute cores (OCPUs) to enable on each database server.

  –   **Compute Node**, **Storage Cell**, and **Disk Size**: The values you can select for each successive field are determined by the value you selected for the previous fields:

      *   **X7-2** Compute Node

         X7 Storage Cell

         HC 10TB (High Capacity 10 TB drives)

      *   **X6-2** Compute Node

         X6 Storage Cell

         HC 8TB (High Capacity 8 TB drives)

  –   **Add Rack (+)**: Click this button after you have selected the hardware to add the rack to the configuration and display the Rack Details options.

Rack Details

Provide additional information about the rack and how it will be deployed.

- **Rack Name**: Value is supplied automatically based on the inputs in the previous section.

- **Rack Prefix**: Defines the prefix for network interfaces. The prefix can contain any alphanumeric character. The prefix *cannot* contain spaces. The maximum length is 20 characters. This field cannot be empty. The default value is `dm01`.

  For example, a value of `dm01` results in a database server host name of `dm01db01`, and a storage server host name of `dm01cel01`.

- **Spine Switch**: Click the check box if you want to include a spine switch as part of the rack configuration. Do this for each rack that will have a spine switch.

Customer Details

Provide information about the environment in which the rack will be deployed.

- **Customer Name**: Identifies the customer. This is a free-form field that can contain any alphanumeric characters, including spaces. This field cannot be empty.

- **Application Name**: Identifies the application used with the rack. This is a free-form field that can contain any alphanumeric characters, including spaces. This field cannot be empty.

- **Region**: Sets the region for the rack. Choose a value from the drop-down list. You can also use the Search field to locate a region. Your choices are:
  - Africa
  - America
  - Antarctica
  - Arctic
  - Asia
  - Atlantic
  - Australia
  - Europe
  - Indian
  - Other
  - Pacific

- **Timezone**: Sets the time zone where the rack will be installed. The time zones shown are based on the selected region. Choose a value from the drop-down list.

- **Compute Node #**: (only for X5-2 and X6-2 ZDLRA Elastic Rack) Specifies the number of compute nodes to configure

- **Storage Node #**: (only for X5-2 and X6-2 ZDLRA Elastic Rack) Specifies the number of storage nodes to configure

- **DNS Servers**: Sets the DNS IP Address. At least one IP address must be entered. For Exadata Cloud, these values are provided for you.

- **NTP Servers**: Sets the IP Address for the Network Time Protocol (NTP) server. At least one IP address must be entered. For Exadata Cloud, these values are provided for you.

WriteBack Flash Cache

Specify whether to enable WriteBack Flash Cache when the rack is deployed. WriteBack flash cache provides the ability to cache write I/Os directly to PCI flash in addition to read I/Os. This option is not available for Exadata Cloud.

Your choices are:

- **Automatic**: Default value. When selected, WriteBack Flash Cache will be enabled if the rack is running a software version that supports WriteBack Flash Cache, and if using WriteBack Flash Cache is a best practice for that software version.

- **Disable**: This options disables WriteBack Flash Cache, and only read IOs are stored in the Flash Cache.

- **Enable**: This option enables storing both read and write IOs in the Flash Cache.

Capacity on Demand

(Available for only Exadata racks X3 and later) Click this check box to reduce the initial number of active cores on the servers.

If you select this option, a slider bar appears which allows to select the number of active cores, with a range that is specific to the hardware model of the database server.

> **Note:**
>
> To qualify for Capacity on Demand, within 3 months after installation, this Exadata system must use either Platinum Services, Oracle Enterprise Manager Harvester (in disconnected or connected mode) or Oracle Configuration Manager (in connected mode).

Add Additional Racks

You can start at the top of the page and provide the information for an additional rack. Click the **Add Rack (+)** button to add the rack to the configuration. An additional tab appears in the Rack Details section.

Save

After you have entered all the information for the racks being configured, click the **Save** button in the lower right corner of the page.

3.2.3 Choose Operating System Page

Select the operating system to install on the servers in the rack.

This page is not available for Exadata Cloud configurations.

For Oracle Exadata Rack, your choices are:

- **All Linux Ovm**: All database servers running Oracle VMs on Oracle Linux.

- **All Linux Physical**: All database servers installed with Oracle Linux without Oracle VMs.

- **Custom**: Specify which database servers are installed with Oracle VMs, and which are not.

  Choosing this option displays a list of available database servers. You must select one of the following options for each database server:

  – **Linux Physical**: No Oracle VM

  – **Linux Dom0**: Oracle VM

  You can also select the option just under the heading Linux Physical or Linux Dom0 to select that option for all the database servers in the list.

For ZDLRA racks, your choices are:

- **All Linux Physical**: All compute nodes installed with Oracle Linux without Oracle VMs.

- **Custom**: You can manually select the compute nodes to configure as Linux Physical nodes.

3.2.4 Rack Networks Page

Provide the information necessary to configure the administration and private networks on the rack.

Each compute node and storage server has two network interfaces for administration. One network provides management access to the operating system through the Ethernet interface, and the other network provides access to the Integrated Lights Out Manager (ILOM) through the ILOM Ethernet interface. Default administration network host names are usually changed to meet corporate naming standards or compatibility with existing systems.

In the upper right corner of the Admin Network section is a line that displays the Total IP Addresses that will be configured for the rack. This value is based on the hardware you selected on the Hardware page.

You provide the following information on this page:

Admin Network

Supply values for the following fields. For Exadata Cloud, these values are provided for you.

- **Default gateway for database servers**: A check box that indicates that the gateway IP address is the default gateway for the database servers.

- **Gateway**: Sets the IP address for the gateway. This field cannot be empty.

- **Start IP Address**: Assigns the starting IP address for the administration network of the servers and switches. This field cannot be empty.

  Oracle Exadata Deployment Assistant (OEDA) generates a pool of consecutive IP addresses based on the specified Start IP Address. If consecutive IP addresses are not available, then specific IP addresses can be modified during the configuration process.

> **Note:**
>
> These addresses are also assigned to the ILOM ports on the database and storage servers

- **Subnet Mask**: Sets the IP address mask for the subnet. You can choose a subnet mask from the drop-down list which contains supported values from `255.0.0.0` to `255.255.255.252`

- **Domain Name**: Sets the network domain name. Use lowercase letters for the name. This field cannot be empty.

  The domain name specified on this page is used as the domain for all networks. If different domains are used for the client and backup networks, then specify the administration network on this page. The client and backup networks can be changed on the Cluster Networks page.

- **Separate ILOM Network**: (Not available with Exadata Cloud) A check box that indicates that Integrated Lights Out Manager (ILOM) uses a network that is different from the administration network. If you check this option, you must specify the following additional information for the ILOM network:

  - **Gateway**

  - **Start IP Address**

  - **Subnet Mask**

  - **Domain Name**

Advanced

(Not available with Exadata Cloud) If you click the Advanced button in the upper right corner of this page, you can select the following options:

- **Remove PDU's** — Select this option if you do not want to add administration IP addresses to the PDUs. If you select this option, then OEDA does not allocate IP addresses for each of the two PDUs in the rack, and the administration names do not appear in the Admin network Review and Edit section of this page.

- **Enable Vlan** — Allows you to create VLANs on database servers and storage servers for the admin network, ILOM, client and the backup access network. If you select this option, then the following additional fields are visible on the Admin Network page:

  - **Vlan** — Specifies the VLAN identifier. The value must be a positive integer.

    > **Note:**
    >
    > * If your system will use more than 10 VIP addresses in the cluster and you have VLAN configured for the Oracle Clusterware client network, then you must use 3 digit VLAN ids.
    >
    > * Do not use 4 digit VLAN ids because the VLAN name can exceed the 15 character operating system interface name limit.

Modify Masks

(Not available with Exadata Cloud) If you click the button **Modify Masks**, it opens a popup window where you can enter the following information:

- Compute Name Mask — There is a preview field at the bottom of this window that shows how the generated administration names will appear based on the values you specify for the following fields:

  > **Note:**
  >
  > In the following fields, the name prefix can contain alphanumeric characters. The percent signs (`%`) in the names are replaced by the numbers entered into the Start ID field. At least one percent sign is required in each mask field. If you use more than one percent sign in a mask field, the symbols must be contiguous. For example, you can use `test%%-ilom`, but not `test%new%-ilom`.

  - **Compute Name Mask**: The string used to generate administration names for each database server in this rack. The default string is `{Rack Prefix}adm%%`, which results in names such as `dbm0adm01`, `dbm0adm02`, and so on. This field cannot be empty.

  - **Compute Name Start Id**: The starting value to use when generating the database server administration names. The default value is 1. This field cannot be empty.

- Compute ILOM Mask — There is a preview field at the bottom of this section that shows how the generated administration names will appear based on the values you specify for the following fields:

  - **Compute ILOM Mask**: The string used to generate administration names for each database server ILOM in this rack. The default string is `{Compute Name Mask}%-ilom`, which results in names such as `dbm0adm01-ilom`, `dbm0adm02-ilom`, and so on. This field cannot be empty.

  - **ILOM Name Start Id**: The starting value to use when generating the ILOM administration names. The default value is the same value as Compute Name Start Id. This field cannot be empty.

    > **Note:**
    >
    > Oracle recommends using the same starting IDs for the servers and server ILOMs.

- Storage Name Mask — There is a preview field at the bottom of this section that shows how the generated administration names will appear based on the values you specify for the following fields:

  - **Storage Name Mask**: The string used to generate administration names for each storage server. The default string is `{Rack Prefix}celadm%%`, which results in names such as `dbm0celadm01`, `dbm0celadm02`, and so on. This field cannot be empty.

- **Storage Name Start Id**: The starting value to use when generating the storage server network names. The default value is 1. This field cannot be empty.

- Storage ILOM Mask — There is a preview field at the bottom of this section that shows how the generated server names will appear based on the values you specify for the following fields:

  - **Storage ILOM Mask**: The string used to generate administration names for each storage server ILOM in this rack. The default string is `{Storage Name Mask}%-ilom`, which results in names such as `dbm0celadm01-ilom`, `dbm0celadm02-ilom`, and so on. This field cannot be empty.

  - **Storage Name Start Id**: The starting value to use when generating the ILOM network names. The default value is the same value as Storage Name Start Id. This field cannot be empty.

  > **Note:**
  >
  > Oracle recommends using the same starting IDs for the servers and server ILOMs.

- Switches and PDUs

  - **Cisco Switch** — The string used to generate the administration name for the Cisco switch in this rack. The default value is `{Rack Prefix}sw-adm%`, which results in names such as `dbm0sw-adm1`.

  - **InfiniBand Spine Switch** — The string used to generate the administration names for the spine switch, if your rack is configured with one. The default value is `{Rack Prefix}sw-ibs%`, which results in names such as `dbm0sw-ibs1`.

  - **InfiniBand Leaf Switch** — The string used to generate the administration names for the second InfiniBand Leaf switch in this rack. The default value is `{Rack Prefix}sw-iba%`, which results in names such as `dbm0sw-iba1`.

  - **InfiniBand Leaf Switch** — The string used to generate the administration names for the first InfiniBand Leaf switch in this rack. The default value is `{Rack Prefix}sw-ibb%`, which results in names such as `dbm0sw-ibb1`.

  - **PDU-A** — The string used to generate the administration names for Power Distribution Unit (PDU) A in this rack. The default value is `{Rack Prefix}sw-pdua%`, which results in names such as `dbm0sw-pdua1`.

  - **PDU-B** — The string used to generate the administration names for Power Distribution Unit (PDU) B in this rack. The default value is `{Rack Prefix}sw-pdub%`, which results in names such as `dbm0sw-pdub1`.

  - **KVM Switch** — (Exadata X2-2 only) The string used to generate the administration name for the keyboard, video, and mouse (KVM) switch. The default value is `{Rack Prefix}sw-kvm%`, which results in names such as `dbm0sw-kvm1`.

After you have entered the custom network name masks, click the **Save** button at the bottom of the page. To undo your changes, you can either close the window or click the **Cancel** button at the bottom of the page.

Admin network Review and Edit

After you save the input provided for the admin network, the Admin network Review and Edit section appears above the Private Network section. Here you can view all the IP addresses and administration names that will be configured for your rack, and modify them if needed. If you make any modifications to the administration name or their IP addresses, click the **Update** button when you have finished to save your changes.

If you are connected to the same network on which the rack will be deployed, you can check the validity of the network configuration data. Click the **Lookup IP** button at the bottom of this section. OEDA will display any invalid IP addresses. The **Lookup IP** button is not available with Exadata Cloud.

Private Network

Provide the information necessary to configure the private network on the rack.

In the upper right corner of the Private Network section is a line that displays the Total IP Addresses that will be configured for the rack. This value is based on the hardware you selected on the Hardware page. For Exadata Cloud, these values are provided for you.

- **Enable active bonding** — (Exadata and ZDLRA racks only, X4-2 or higher) Specifies whether active bonding should be enabled for only the private network on compute nodes. By default this option is selected. You should only use a non-default option if you are adding a compute node to a cluster that contains other compute nodes that are X3 or earlier models.

- **Start IP Address**: Assigns the starting IP address for the private network of the servers. This field cannot be empty.

  OEDA generates a pool of consecutive IP addresses based on the specified Start IP Address. If consecutive IP addresses are not available, then specific IP addresses can be modified during the configuration process.

- **Subnet Mask**: Sets the IP address mask for the subnet. You can choose a subnet mask from the drop-down list. The list contains supported values from `255.255.240.0` to `255.255.255.252`

- **Domain Name**: Sets the network domain name. The default value is the domain name value entered for the Admin Network. Use lowercase letters for the name. This field cannot be empty.

(Not available with Exadata Cloud) If you click the **Modify Masks** button, it opens a popup window where you can modify the generated names for the database and storage server private names. There are preview fields at the bottom of this window that shows how the generated private names will appear based on the values in the name mask fields. The default strings used to generate the private names are:

- Compute private name mask: `{Rack prefix}adm%%-priv`, which results in names such as `dbm0adm01-priv`, `dbm0adm02-priv`, and so on

- Cell private name mask: `{Rack Prefix}celadm%%-priv`, which results in names such as `dbm0celadm01-priv`, `dbm0celadm02-priv`, and so on.

After you have entered the custom private network name masks, click the **Save** button at the bottom of the page. To undo your changes, you can either close the window or click the **Cancel** button at the bottom of the page.

After you have entered the private network configuration information, click the **Save** button at the bottom of the page.

Private network Review and Edit

After you save the input provided for the private network, the Private network Review and Edit section appears above the User(s) and Groups section. Here you can view all the IP addresses and private host names that will be configured for your rack, and modify them if needed. If you make any modifications to the private host names or their IP addresses, click the **Update** button at the bottom of this section when you have finished to save your changes.

3.2.5 Users and Groups

Provide information about the operating system users to use when installing Oracle software. The user information you provide is saved in a collection, that can be referenced later in the configuration process.

For Exadata Cloud, the Role Separated option is selected by default and all the values are populated automatically. The only values you can change are the group ID numbers. For ZDLRA racks, the Default option is selected automatically, and the only values you can modify are the user and group IDs.

The first selection is the type of users you want to define. Your options are:

- **Default**: (Not available for Exadata Cloud) Use the default installation user information. This option creates a single operating system user to own the Oracle Grid Infrastructure and Oracle Database software.

- **Role Separated**: (Not available for ZDLRA) Create users for specific roles for the software installation. The new users are granted only the privileges necessary for that role.

- **Custom**: (Exadata racks only) Create software installation users that have combined roles or special roles and privileges.

If you plan to have multiple installations of Oracle software on your rack that require different operating system users, then, after you have entered the user information, you can click the **Add group (+)** button. The information you entered is saved with the label `UserCollection-1_id`. A new section appears on the page where you can enter information for an additional group of software installation users with distinct names and permissions. The new user information collection is automatically assigned the label `UserCollection-2_id`.

If you want to remove a user information collection, click the **Delete Group (-)** button next to the ID of the group you want to remove.

After you have entered all the user information, click the **Save** button at the lower right side of the page to continue.

Default User Information

If you selected to create Default users, then you must supply the following information:

- **User Name**: The operating system user name for the database software owner. This field cannot be empty. The default value is `oracle`.

- **User Id**: The operating system identification number for this user. This field cannot be empty. The default value is `1001`.

- **Home Directory**: The user home directory. This field cannot be empty. The default value is `/home/oracle`.

- User Type: This field is not available if you select the Default option. The named user will be created as the Grid and Database software owner.

- **Group Name**: The name of the operating system group that will be the DBA group. All the operating system privileges necessary for managing the Oracle Database software are granted to this group. This field cannot be empty. The default value is `dba`.

- **Group Id**: The operating system identification number for this group. This field cannot be empty. The default value is `1001`.

- Group Type: This field is not available if you select the Default option. The named group will be created as an `DBA GROUP` group.

- **Group Name**: The name of the operating system group that will be the installation owner group. All the operating system privileges necessary for installing the Oracle Grid Infrastructure and Oracle Database software are granted to this group. This field cannot be empty. The default value is `oinstall`.

- **Group Id**: The operating system identification number for this group. This field cannot be empty. The default value is `1002`.

- Group Type: This field is not available if you select the Default option. The named group will be created as an `OINSTALL` group.

Role Separated User Information

If you selected to create Role Separated users, then there are two types of users for which you must provide user information: `Grid` and `database`. The page is split into two sections, one for each user type. The first section defines the `Grid` users and the second section defines the `database` users.

- User Type: Grid

  In this section you specify the user to own the Oracle Grid Infrastructure installation, and the role-separated groups used to manage Oracle ASM. You must provide information for 3 administrative operating system groups, and the installation group. The default administrative group types are ASMDBA, ASMOPER, and ASMADMIN. The group type can be one of the following:

  - `OINSTALL`

  - `OSDBA`

  - `OSOPER`

  - `OSASM`

  - `ORADBA`

  - `DBA GROUP`

  - `OPER GROUP`

  - `ASMDBA`

  - `ASMOPER`

  - `ASMADMIN`

  - Software installation user information:

* **User Name**: The operating system user name for the Oracle Grid Infrastructure software owner. This field cannot be empty. The default value is `grid`.

* **User ID**: The operating system identification number for this user. This field cannot be empty. The default value is `1000`.

* **Home Dir**: The user home directory. This field cannot be empty. The default value is `/home/grid`.

– Oracle ASM DBA group information:

* **Group Name**: The name of the operating system group that will be the Oracle ASM DBA group. The default value is `asmdba`. Membership in this group enables access to the files managed by Oracle ASM. This field cannot be empty.

* **Group Id**: The operating system identification number for the Oracle ASM DBA group. This field cannot be empty. The default value is `1004`.

* **Group Type**: The group type. The default value is `ASMDBA`.

– Oracle ASM Operator group information:

* **Group Name**: The name of the operating system group that will be the Oracle ASM Operator group. The default value is `asmoper`. This group of operating system users has a limited set of Oracle ASM instance administrative privileges that includes starting and stopping the Oracle ASM instance. This field cannot be empty.

* **Group Id**: The operating system identification number for the Oracle ASM Operator group. This field cannot be empty. The default value is `1005`.

* **Group Type**: The group type. The default value is `ASMOPER`.

– Oracle ASM Administrator group information:

* **Group Name**: The name of the operating system group that will be the Oracle ASM Administrator group. The default value is `asmadmin`. This field cannot be empty.

  This group uses SQL to connect to an Oracle ASM instance as SYSASM using operating system authentication. The SYSASM privileges permit mounting and dismounting of disk groups, and other storage administration tasks. SYSASM privileges provide no access privileges on an Oracle Database instance.

* **Group Id**: The operating system identification number for the Oracle ASM Administrator group. This field cannot be empty. The default value is `1006`.

* **Group Type**: The group type. The default value is `ASMADMIN`.

– Oracle software installation group information:

* **Group Name**: The name of the operating system group that owns the Oracle Inventory. The default value is `oinstall`. This field cannot be empty.

* **Group Id**: The operating system identification number for the Oracle Inventory group. This field cannot be empty. The default value is `1001`.

* Group Type: The group type. This value is automatically set to `OINSTALL` and cannot be changed.

• User Type: database

In this section you specify the user to own the Oracle Database installation, and the role-separated groups used to manage Oracle Database. You must provide information for 2 administrative operating system groups, and the installation group. The default administrative group types are ORADBA and RACOPER. The group type can be one of the following:

— OINSTALL

— OSDBA

— OSOPER

— OSASM

— ORADBA

— DBA GROUP

— OPER GROUP

— ASMDBA

— ASMOPER

— ASMADMIN

— Software installation user information:

* **User Name**: The operating system user name for the Oracle Database software owner. This field cannot be empty. The default value is oracle.

* **User ID**: The operating system identification number for this user. This field cannot be empty. The default value is 1001.

* **Home Dir**: The user home directory. This field cannot be empty. The default value is /home/oracle.

— Oracle Database DBA group information:

* **Group Name**: The name of the operating system group that will be the Oracle Database DBA group. The default value is dba. This field cannot be empty.

* **Group Id**: The operating system identification number for the Oracle Database DBA group. This field cannot be empty. The default value is 1002.

* **Group Type**: The group type. The default value is ORADBA.

— Oracle RAC Operator group information:

* **Group Name**: The name of the operating system group that will be the Oracle RAC Operator group, or other group type you select. The default value is racoper. This group of operating system users has a limited set of Oracle RAC instance administrative privileges that includes starting and stopping the Oracle RAC database instances. This field cannot be empty.

* **Group Id**: The operating system identification number for the Oracle RAC Operator group, or other group type that you select. This field cannot be empty. The default value is 1003.

* **Group Type**: The group type. The default value is RACOPER.

— Oracle software installation group information:

* **Group Name**: The name of the operating system group that owns the Oracle Inventory. The default value is `oinstall`. This field cannot be empty.

* **Group Id**: The operating system identification number for the Oracle Inventory group. This field cannot be empty. The default value is `1001`.

* Group Type: The group type. This value is automatically set to `OINSTALL` and cannot be changed.

Custom User and Group Information

If you selected the Custom option, then you must provide user and group information for managing the Oracle software installations. You can specify multiple users. You provide information for the software administrative operating system groups and users. The group type can be one of the following:

* `OINSTALL`

* `OSDBA`

* `OSOPER`

* `OSASM`

* `ORADBA`

* `DBA GROUP`

* `OPER GROUP`

* `ASMDBA`

* `ASMOPER`

* `ASMADMIN`

For each user you must provide the following information:

* **User Name**: The operating system user name that will own the Oracle software. This field cannot be empty. The default value is `oracle`.

* **User Id**: The operating system identification number for this user. This field cannot be empty.

* **Home Directory**: The user home directory. This field cannot be empty. The default value is `/home/username`.

* **User Type**: The type of software user. You can choose from the following values:

  – Grid and Database: The user will have permissions for both the Oracle Database and the Oracle Grid Infrastructure software installations.

  – Grid: The user will have permissions for the Oracle Grid Infrastructure software installation.

  – Database: The user will have permissions for the Oracle Database software installation.

  – custom: The user type does not fit a pre-defined model.

* **Group Name**: The name of the operating system group to which the user will be assigned. This field cannot be empty.

* **Group Id**: The operating system identification number for the operating system group. This field cannot be empty.

- **Group Type**: The group type. You can choose from the list of pre-defined group types.

After you have entered the user and group information, you can click the **Add User (+)** button to add a new section. You can also click the **Add Group (+)** button to add an additional operating system group for the specified user.

Save

After you have entered all the information for the racks being configured, click the **Save** button in the lower right corner of the page.

3.2.6 Define Clusters

More than one cluster can be defined for a hardware racks. Larger environments support multiple clusters. Each cluster requires a minimum of two physical or virtual compute nodes, and three storage cells. You cannot mix physical and virtual compute nodes in the same cluster. If you selected **All Linux Ovm** on the Operating System page and you have specified multiple clusters, then the compute nodes can appear in more than one cluster and OEDA will creates a guest for each cluster on the node. Each cluster is independent and can have different software versions.

For Exadata Cloud configurations, there is one cluster created. You can specify the name of the cluster and the usable space for the cluster, but all other details are not modifiable.

Provide the information for the first cluster and assign nodes to the cluster using the **Add Node (>)** button to move selected nodes or the **Add All Nodes (>>)** button to assign all available nodes to the cluster. If you want to add a second cluster, then click the **Add Cluster (+)** button next to the cluster name tab.

Provide the following information for each cluster in the rack:

- **Cluster Name**: The cluster name, which must be unique across your enterprise. The cluster name is case-insensitive, must be at least one character long and no more than 15 characters in length, must be alphanumeric, cannot begin with a numeral, and may contain hyphens (-). Underscore characters (_) are not allowed. This field cannot be empty.

- **Inventory Location**: The Oracle inventory (`oraInventory`) directory path. The default value is `/u01/app/oraInventory`.

- **Grid Home Owner**: Use the drop-down list to select the collection of user information previously created on the Users page. By default, the first user collection is selected.

- **Grid Infrastructure Home Location**: The Oracle Grid Infrastructure directory path, which typically includes the software release number. The default value is `/u01/app/release_number/grid`, for example, `/u01/app/18.2.0.0/grid`. This value is automatically set depending on the value selected for Cluster Version. You can overwrite the default value.

- **Cluster Version**: After you select the nodes to assign to this cluster, you will be able to select the cluster version from the drop-down list. The list contains all supported versions of the Oracle Grid Infrastructure. Choose any of the supported values.

- **Base Directory**: The base directory for the Oracle Grid Infrastructure software. The default value is `/u01/app/grid`.

After you assign nodes to the cluster, you can modify the default values for each cluster, if needed. The following customer information fields appear below the Available Machines list:

- **Customer Name**: The customer name. The default value is the value you provided earlier on the Hardware page in the Customer Details section.

- **Application**: The application name or description. The default value is the value you provided earlier on the Hardware page in the Customer Details section.

- **Region**: The geographical location of the rack. The default value is the value you provided earlier on the Hardware page in the Customer Details section.

- **Time zone**: The time zone in which the rack is located. The default value is the value you provided earlier on the Hardware page in the Customer Details section.

- **DNS Servers**: The IP addresses for the DNS servers. The default values are the values you provided earlier on the Hardware page in the Customer Details section.

- **NTP Servers**: The IP addresses for the NTP servers. The default values are the values you provided earlier on the Hardware page in the Customer Details section.

The following additional information fields help allocate resources across multiple clusters:

- **Cores**: The number of cores to use for each guest VM for this cluster. This field cannot be empty.

- **Memory**: The amount of memory in GB allocated to the guest VMs, or user domains (domU), for this cluster. This field cannot be empty.

- **Local Disk(GB)**: The amount of local disk space to use on the servers for this cluster. This field cannot be empty.

If you assign Oracle VMs to your cluster, then you need to provide the following information:

- **Guest Image Version**: The Oracle Exadata System Software image version for guest VMs. Use the drop-down list to select the value. Selecting the `default` option sets the guest image version to match the image version of dom0.

> **Note:**
>
> The guest image version must be the same as or an earlier version than the image version of the management domain (dom0).

3.2.7 Diskgroups

Define the Oracle ASM disk groups and their sizes for each cluster in the rack. This page is not available for Exadata Cloud.

If you specified more than one cluster, use the tabs at the top of this page to select each cluster and provide the disk group information.

ZDLRA Racks

For ZDLRA racks, the following information is used:

- Diskgroup name: Automatically set to CATALOG and DELTA

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- Diskgroup Type: Automatically set to CATALOG and DELTA

- Redundancy: The CATALOG disk group is configured to use NORMAL redundancy. For the DELTA disk group, you can choose either HIGH or NORMAL (default).

- Size: The CATALOG disk group has a size of Default, and the DELTA disk group has a size of 95%.

- Size Type: The disk group sizes are specified as percent.

After you have entered the values for the disk groups and clicked Save, the following fields are then populated with the estimated values:

- CATALOG disk group — The usable space and raw size are set to default.

- DELTA disk group — The values depends on the hardware selected, for example, with NORMAL redundancy selected, there is 312007GB of usable space and 624013GB raw disk size for HC 10TB disks.

Exadata Racks

For Exadata racks, you must provide the following information:

- **Diskgroup layout**: The ratios to use when creating the disk groups. The options are:

  - **Legacy 80% 20%** — Useful when using external backups. The DATA disk group is assigned 80% of the available disk space and the RECO disk group is assigned 20% of the available disk space.

  - **Legacy 40% 60%** — Useful when using internal backups. The DATA disk group is assigned 40% of the available disk space and the RECO disk group is assigned 60% of the available disk space.

  - **Custom** — Select this option when you want a non-standard layout for the disk groups. For example, if you want to create additional disk groups, or use percentages that are not 20%, 40%, 60%, or 80%.

- **Diskgroup name**: The name for the disk group. You must specify a name for each disk group you specify. Default names are provided, such as DBFSC1, DATAC1 and RECOC1.

  > **Note:**
  >
  > If you selected X7 hardware, then you cannot specify any information for the DBFS disk group.

- **Type**: The type of data to store in the disk group. Possible values are `DATA`, `RECO`, `DBFS` (automatically supplied).

- **Redundancy**: The redundancy level for the disk group. Possible values are `HIGH`, `NORMAL`, or `UNUSED`.

  > **Note:**
  >
  > Oracle recommends the use of `HIGH` redundancy disk groups for mission critical applications.

- **Size**: The amount of available disk space to use when creating this disk group. You can enter either a percentage, such as `40%`, or the actual size specified in GB or TB, such as `250GB`. For the DBFS disk group, the size is set to `Default`.

- **Size Type**: Whether the value specified was a percentage or actual disk size. The drop-down list contains the values `percent`, `usable size`, or `slice size`. You must use the same Size Type for all disk groups.

You can configure additional disk groups by clicking the **Add new diskgroup (+)** button. Enter the same information for the new diskgroup as you did for the DATA and RECO disk groups. For the Type, you must specify a different type, such as DBFS_DG. If you try to create more than one DATA or one RECO disk group, you will get an error when you click Save. If you want to remove a disk group, you can click the **remove last diskgroup (-)** button. You must have at least one DATA and one RECO disk group.

After you have entered the values for the disk groups, click **Save**. The following fields are then populated with the estimated values:

- Usable Space — The amount of usable disk space available in the disk group, accounting for redundancy, for example 204355GB.

- Raw Size — The total disk space used by the disk group, for example 613066GB.

Advanced Options

In the upper right corner of this page is a check box labeled Advanced. If you click this box, then the following options are available:

- **Enable sparse diskgroup** — Enables the creation of sparse disk groups. Sparse grid disks can be used to create a sparse disk group to store database files that will use a small portion of their allocated space. Sparse grid disks allocate space as new data is written to the disk, and therefore have a virtual size that can be much larger than the actual physical size.

  > **✎ Note:**
  >
  > To create a sparse disk group, the version of Oracle Grid Infrastructure software needs to be release 12.1.0.2 BP5 or later.

  If you choose this option, a new disk group appears in the list, with a default name of SPARSEC1. Also, the Type field for this disk group is set to `SPARSE`.

- **Configure Acfs** — a button that opens a popup window where you can configure Oracle ASM Cluster File System (Oracle ACFS). Oracle ACFS provides a general purpose file system. The following information is required to configure Oracle ACFS:

  – **Enable ACFS for disk group** — you must check this option.

  – **Diskgroup** — The disk group to use as the Oracle ACFS disk group, The drop-down list contains the names of the disk groups specified on the Diskgroups page.

> **✎ Note:**
>
> You should use a different group than DATA or RECO for Oracle ACFS. Use the **Add new diskgroup (+)** button on the Diskgroups page to add another disk group.

- **ACFS Volume Name** — The volume name to associate with this disk group. This field cannot be empty.

- **ACFS Volume Size** — The size of the Oracle ACFS volume. This field cannot be empty.

- **ACFS Mount Path** — The mount path for the Oracle ACFS volume. This field cannot be empty.

When you have finished configuring Oracle ACFS, click the **Save** button in the ACFS Configuration window.

3.2.8 Database Home

Provide information for configuring the Oracle Database software installation.

This page is not available for Exadata Cloud configurations.

Specify how to configure the Oracle Database software installation by providing the following information:

- **DB Home Type**: The type of Oracle Database deployment — either RAC Home (for Oracle Real Application Clusters (Oracle RAC) or Oracle RAC One Node) or single instance.

- **Select Cluster**: The cluster on which to deploy the Oracle Database software. This is a drop-down list that is populated with the cluster names specified on the Clusters page. By default, the first cluster is selected.

- **Database Home Name**: A name given to the Oracle Database software installation. This name identifies the program group associated with a particular home and the Oracle services installed on this home. The Oracle home name must be between 1 to 127 characters long, and can include only alphanumeric characters and underscores. This field cannot be empty. The default value is `DbHome_1`.

- **Database Home Version**: The version of the Oracle Database software to install in the cluster. Choose the value from the drop-down list. The most recent version is selected by default.

- **Database Home Location**: A directory path where the Oracle Database software will be installed. This value is set automatically based on the value specified for the Database Home Version. For example, if you select version `12.1.0.2 DBBP13`, then the Database Home Location is set to `/u01/app/oracle/product/12.1.0.2/dbhome_1`. After specifying the Database Home Version, you can type over the default value to use a different location, if needed. This field cannot be empty.

- **Database Home Owner**: Use the drop-down list to select the collection of user information previously created on the Users page. By default, the first user collection is selected.

- **Base Directory**: The Oracle Base directory location. The Oracle Database binary home is located underneath the Oracle base path. You can use the same Oracle base directory for multiple installations of Oracle software. If different operating system users install Oracle software on the same system, then you must create a separate Oracle base directory for each installation owner. This field cannot be empty. The default value is `/u01/app/oracle`.

- **Available Computes** and **Selected Computes** — If you chose Single Instance Home for the DB Home Type, then you select the database servers on which you want to install the Oracle Database software. If you selected RAC Home for the DB Home Type, then the Oracle Database software is automatically installed on every database server in the specified cluster.
  Use the **Add Node (>)** or **Add All Nodes (>>)** buttons to move servers from the Available Computes list to the Selected Computes list. Use the **Delete Node (>)** or **Delete All Nodes (>>)** buttons to remove servers from the Selected Computes list.

To specify multiple Oracle homes, use the **Add Database Home (+)** button at the top of this page, next to the tab for the existing Oracle home. To remove an Oracle Home, click the **X** on the tab, next to the name of the Oracle home.

When you have finished configuring the Oracle home information, click **Save**.

3.2.9 Database

Provide information about the databases to create in the specified database home directories.

For Exadata Cloud configurations, you can specify the name of the database. All other options are pre-configured and cannot be modified.

- **Database Type**: (Exadata racks only) The type of database to create in the database home selected. If the database software was installed with the type Oracle Real Application Clusters (Oracle RAC) (as specified on the Database Home page), then you can choose to create either a Oracle RAC database or an Oracle RAC One Node database. If you selected a DB Home Type of single instance for the database home, then the Single Instance DB option is selected automatically and cannot be changed.

- **Database Name**: The name of the database you want to create in the database home. The database name (`DB_UNIQUE_NAME`) portion is a string of no more than 30 characters that can contain alphanumeric, underscore (_), dollar ($), and pound (#) characters, but must begin with an alphabetic character. No other special characters are permitted in a database name. The `DB_NAME` parameter for a database is set to the first 8 characters of the database name. The domain portion of the global database name (`DB_DOMAIN`) uses the value you provided for the domain when configuring the networks. The values for `DB_UNIQUE_NAME.DB_DOMAIN` in its entirety must be unique within the enterprise. This field cannot be empty.

- **Database Home**: The name of the Database Home in which you want to create the database. This value is automatically populated with the first home specified on the Database Home page. Use the drop down list to select the database home name if you specified multiple database homes on the Database Home page.

- **Database Owner**: Use the drop-down list to select the collection of user information previously created on the Users page. By default, the first user collection is selected.

- **Character Sets**: (Exadata racks only) Specifies the character set to use with the database. Use the drop-down list to select one of the available values. Character sets are the encoding schemes used to display characters on your computer screen. The character set determines what languages can be represented in the database. The recommended value is Unicode AL32UTF8.

- **Database Template**: (Exadata racks only) The template to use when configuring the database. Preconfigured databases are based on templates that Oracle provides or that you create. Each Oracle-provided template is optimized for a particular workload type. The two options are online transaction processing (OLTP) or data warehousing (DW).

- **Block Size**: (Exadata racks only) The database block size. The default value is 8192. You can use the drop-down list to select a different value. Supported values range from 8KB to 32KB.

- **DATA Diskgroup**: (Exadata racks only) The name of the Oracle ASM disk group to use when creating data files for the database. You can use the drop-down list to select one of the disk groups you configured on the Diskgroups page. The disk group selected must have disk group type set to DATA.

- **RECO Diskgroup**: (Exadata racks only) The name of the Oracle ASM disk group to use when creating the recovery area for the database. You can use the drop-down list to select one of the disk groups you configured on the Diskgroups page. The disk group selected must have disk group type set to RECO.

- **Enable CDB**: (Exadata racks only) Select this check box to create the database as a Oracle Multitenant container database (CDB) with a single pluggable database (PDB). See "Deciding Between Multitenant Container Databases and Non-CDBs in Oracle RAC" in *Oracle Real Application Clusters Installation Guide for Linux and UNIX* for information about whether to select this option. If you select this option, then you must provide the following additional information:

  – **PDB Name**: The name of the PDB to create in the container database.

  You can use the **Add Pdb Name (+)** button to add additional PDBs to the configuration. If you want to remove a PDB, you can use the **Remove Pdb Name (-)** button that appears to the right to the PDB name you want to remove.

- **Available Computes** and **Selected Computes** — (Exadata racks only) If you chose RAC One Node DB or Single Instance DB for the Database Type, then you select the database servers on which you want to create the database instance. Selecting one node deploys Oracle RAC One Node on a single node. Oracle recommends that you select all nodes in the cluster to which you want Oracle RAC One Node to be able to fail over.

  Use the **Add Node (>)** or **Add All Nodes (>>)** buttons to move servers from the Available Computes list to the Selected Computes list. Use the **Delete Node (>)** or **Delete All Nodes (>>)** buttons to remove servers from the Selected Computes list.

When you have finished configuring the database configuration information, click **Save**.

3.2.10 Cluster Networks

For Exadata racks and Exadata Cloud configurations, configure the client and backup networks for the rack. For ZDLRA racks, configure the Ingest and Replication networks.

Applications access the database servers or compute nodes through the client Ethernet network using Single Client Access Name (SCAN) and Oracle RAC Virtual IP (VIP) addresses. Oracle databases running in Oracle VM guests on Oracle Exadata Database Machine are accessed through the client Ethernet network as defined in this section. Client network configuration in both the management domain (dom0) and user domains (domUs) is done automatically when the OEDA installation tool creates the first user domain during initial deployment.

If VLAN tagging is to be used, then it must be enabled by the customer after the initial deployment. See the My Oracle Support notes for details.

In the upper right corner of the Cluster Networks page is a line that displays the Total IP Addresses that will be configured for the rack. This value is based on the hardware you selected on the Hardware page. At the top of the section are tabs, each designating one of the clusters you specified on the Clusters page.

Admin Network

For some Exadata rack configurations, at the top of the Cluster Networks section, on the right side, is a check box **Enable Admin network**. You can use this option to configure an Admin network inside a virtual compute server. This option is not required. If you select this option, you can fill in the following information:

- **Default gateway for database servers**: Select this option if the gateway IP address is the default gateway for all database servers

- **Defines Domu admin hostname for database servers**: Select this option if you want the name used for the Admin network on a virtual compute server to be used as the host name for the virtual compute server. If you do not select this option, then the virtual compute server uses the network name assigned to the client network as the host name.

- **Gateway**: Sets the IP address for the gateway for the client network. This field cannot be empty.

- **Start IP Address**: The first IP address that will be used for client access to the database servers. This value is filled in automatically, based on the value supplied for the gateway. OEDA generates a pool of consecutive IP addresses based on the specified Start IP Address. If consecutive IP addresses are not available, then specific IP addresses can be modified using the **Modify Masks** button. This field cannot be empty.

- **Subnet Mask**: Sets the IP address mask for the subnet. You can choose a subnet mask from the drop-down list which contains supported values from `255.0.0.0` to `255.255.255.252`.

- **Domain Name**: Sets the network domain name for client connections. Use lowercase letters for the name. This field cannot be empty. For Exadata Cloud configurations, this value is provided for you.

After you have specified all the configuration details for the Admin network, click the **Save** button at the bottom of the section, or click **Modify Masks** to customize the network configuration.

Client Network or Ingest Network

Provide the following information to configure the Client networks for Exadata or Ingest networks for ZDLRA racks.

For Exadata racks and ZDLRA racks (but not for Exadata Cloud):

- **Default gateway for database servers**: Select this option if the gateway IP address is the default gateway for all database or compute servers.

- **Default hostname for database servers**: Select this option if the network names define the host names for the database or compute servers.

- **Network Media**: (Not for Exadata X7 racks or X7-2 ZDLRA racks) Select the network cable type, either Optical or Copper.

- **Client (Ingest) network format**: (For Exadata X7 racks or X7-2 ZDLRA racks) Specifies the Ethernet cards, based on the hardware selected on the first page and the type of cable being used.

  Options for X7-2 Systems:

  On Exadata X7-2 racks and X7-2 ZDLRA racks, there are 3 available formats for client networks or ingest networks:

  – RJ45/SFP28 Combined on Motherboard

    * RJ45 1/10 Gbit

    * SFP28 10 Gbit

    * SFP28 25 Gbit

  – SFP28 PCI Dual Port Card

    * SFP28 10 Gbit

    * SFP28 25 Gbit

  – RJ45 PCI Quad Port Card (extra cost option)

  Options for Exadata X7-8 Systems:

  On Exadata X7-8 systems, there are 2 available formats for client and backup networks:

  – RJ45 on Motherboard

  – SFP28 PCI Dual Port Cards

    * SFP28 10 Gbit

    * SFP28 25 Gbit

  If you select one of the SFP28 network types on X7-2 or X7-8 systems, you must additionally specify whether to use 10 Gbit or 25 Gbit connections.

For Oracle Exadata racks, ZDLRA racks, and Exadata Cloud:

- **Bonded**: (Not available on X7 Exadata or X7-2 ZDLRA racks, or Exadata Cloud) Select this option if using a bonded network. For X7 racks and Exadata Cloud, only bonded networks are supported.

- **LACP**: Check this option to enable the Link Aggregation Control Protocol (LACP) on the network.

- **Gateway**: Sets the IP address for the gateway for the network. This field cannot be empty.

- **Start IP Address**: The first IP address that will be used for access to the database servers on this network. This value is filled in automatically, based on the value supplied for the gateway. OEDA generates a pool of consecutive IP addresses based on the specified Start IP Address. If consecutive IP addresses are not

available, then specific IP addresses can be modified using the **Modify Masks** button. This field cannot be empty.

- **Subnet Mask**: Sets the IP address mask for the subnet. You can choose a subnet mask from the drop-down list which contains supported values from `255.0.0.0` to `255.255.255.252`.

- **Domain Name**: Sets the network domain name for client or ingest connections. Use lowercase letters for the name. This field cannot be empty. For Exadata Cloud configurations, this value is provided for you.

After you have specified all the configuration details for the client or ingest network configuration, click the **Save** button at the bottom of the section.

Modify Masks

If you click the **Modify Masks** button, it opens a pop-up window where you can modify the generated names for the client or ingest network. There are preview fields at the bottom of each section that show how the generated network names will appear based on the values in the name mask fields. The default strings used to generate the network names are:

- Client Access Details:

    - **Name**:

        * Exadata racks: `{Rack prefix}db%%`, which results in names such as `dbm0db01`, `dbm0db02`, and so on

        * ZDLRA racks: `ingest%%`, which results in names such as `ingest01`, `ingest02`, and so on

    - **Start id**: The number to start with when generating sequential names.

- Vip details:

    - **Name**:

        * Exadata racks: `{Rack prefix}db%%-vip`, which results in names such as `dbm0db01`, `dbm0db02`, and so on

        * ZDLRA racks: `ingest%%-vip`, which results in names such as `ingest01-vip`, `ingest02-vip`, and so on

    - **Start id**: The number to start with when generating sequential names.

- Scan details: The configuration details for the single client access network (SCAN) listener.

    - **Name**: The name of the listener. The default value is `{Rack prefix}-scan1`.

    - **Port**: The network port which the SCAN listener monitors for incoming connection requests. The default value is 1521.

After you have completed the modifications to the client or ingest network configuration, click the **Save** button at the bottom of the Client Network Masks window. To undo your changes, you can either close the window or click the **Cancel** button at the bottom of the Client Network Masks window.

Advanced

At the very top of the Cluster Networks section, before the Client Network or Ingest Network configuration details, there is a button for **Advanced** configuration. If you click

this button, the Advanced options window appears. There are two options you can select in this window:

- **Enable Vlan**: Select this option if there is a need for virtual deployments on the rack to access additional virtual local area networks (VLANs) on the network, such as enabling network isolation across user domains.

  If you select this option, then in the client or ingest network configuration details, an additional field appears:

  - Vlan: The VLAN identifier. The VLAN ID is a numeric value between 1 and 4095. You also need to select the `Bonded` option to enable VLAN. If the Backup or Replication network uses VLAN, then the Client or Ingest network must also be configured to use VLAN. If the VLAN ID field is empty, then VLAN is not enabled.

  > **Note:**
  >
  > For all networks, you are responsible for configuring VLAN on the switch.

- **Enable InfiniBand Partitioning**: Enables InfiniBand partitioning for virtualized Exadata environments. InfiniBand partitions can be defined on a per-cluster basis. If storage servers are shared among multiple clusters, then all clusters will use the same storage partition key. This option is automatically selected for Exadata Cloud configurations.

Client network or Ingest network Review and Edit

After you save the input provided for the client or ingest network, the Client network Review and Edit or Ingest network Review and Edit section appears. Here you can view all the host names and IP addresses that will be configured for client access to the database servers in the rack. You can modify any of the settings if needed. If you make any modifications to the administration name or their IP addresses, click the **Update** button when you have finished to save your changes.

If you are connected to the same network on which the rack will be deployed, you can check the validity of the network configuration data. Click the **Lookup IP** button at the bottom of this section. OEDA will display any invalid IP addresses.

Private Network

This section appears only if you select the Advanced network option Enable InfiniBand Partitioning or if you selected Exadata Cloud for the hardware.

In the upper right corner of the Private Network section is a line that displays the Total IP Addresses that will be configured for the rack for this section. At the top of the section are tabs, each designating one of the clusters you specified on the Clusters page.

You provide the following information for each cluster to configure InfiniBand Partitioning:

- Cluster pkey:

  - **Pkey**: (Not available for Exadata Cloud) Sets the address for the database servers or compute nodes. This address is used by all database servers or compute nodes in the cluster. The first cluster address is set to `0xa010`, the second cluster address is set to `0xa011`, and so on.

> **Note:**
>
> Each cluster must have a unique address.

- **Domain Name**: (Not available for Exadata Cloud) The domain name for the InfiniBand network, if it is different.

- **Start IP Address**: Sets the starting IP address for the cluster's network. Oracle recommends using the default IP address.

- **Subnet Mask**: (Not available for Exadata Cloud) Sets the subnet mask for the InfiniBand network. The drop-down list contains values from `255.255.240.0` to `255.255.255.252`.

- **Name Mask**: (Not available for Exadata Cloud) Defines the mask used to generate network names for this cluster. The default value is `{Rack Prefix}adm %%-priv`, which results in names such as `dbm0adm01-priv`, `dbm0adm02-priv`, and so on.

- **Start Id**: (Not available for Exadata Cloud) Sets the starting identifier for this cluster. The default value is `1`.

- Storage pkey (Not available for Exadata Cloud):

  - **Pkey**: Sets the address for the storage servers or cells. This address is used by all storage servers or cells in the rack. The default value is `0xaa10`.

  - **Domain Name**: The domain name for the InfiniBand network for the storage servers or cells, if it is different.

Private network Review and Edit

If you enabled InfiniBand Partitioning, then this section appears after you save the input provided for the private InfiniBand network. Here you can view all the host names and IP addresses that will be configured for the private network. You can modify any of the settings if needed. If you make any modifications to the Cluster pkey Name or Cluster pkey IP addresses, click the **Update** button when you have finished to save your changes.

Backup Network or Replication Network

In the upper right corner of the Backup Network section for Exadata is the option **Enable Backup network**. For ZDLRA racks, this option is labeled **Enable replication network**. If you select this option, it enables the configuration of a network dedicated to backups or replication. The **Enable Backup network** option is automatically selected for Exadata Cloud.

In the upper right corner of the Backup Network or Replication Network section is a line that displays the Total IP Addresses that will be configured for each cluster. At the top of the section are tabs, each designating one of the clusters you specified on the Clusters page.

Provide the following information to configure the backup network or replication network for each cluster:

- **Shared client network port**: (Not available for Exadata Cloud) Select this option if the client and backup networks use the same physical network cables. This option requires that both networks have VLAN enabled and share the same network

interface cards (NIC). If this option is not selected, then you must use one set of cables for the client network and a separate set of cables for the backup network.

- **Network Media**: (For Exadata X6 racks and earlier and ZDLRA racks) Select the network cable type, either Optical or Copper.

- **Backup network format**: (For Exadata X7 racks and X7-2 ZDLRA racks only) (Not available for Exadata Cloud) Specifies the Ethernet cards, based on the hardware selected on the first page and the type of cable being used.

  Options for Exadata X7-2 racks and X7-2 ZDLRA racks:

  On X7-2 racks, there are 3 available formats for client networks.

  – RJ45/SFP28 Combined on Motherboard

    * RJ45 1/10 Gbit

    * SFP28 10 Gbit

    * SFP28 25 Gbit

  – SFP28 PCI Dual Port Card

    * SFP28 10 Gbit

    * SFP28 25 Gbit

  – RJ45 PCI Quad Port Card (extra cost option)

  Options for Exadata X7-8 Racks:

  On Exadata X7-8 racks, there are 2 available formats for client and backup networks:

  – RJ45 on Motherboard

  – SFP28 PCI Dual Port Cards

    * SFP28 10 Gbit

    * SFP28 25 Gbit

  If you select one of the SFP28 network types on X7-2 or Exadata X7-8 racks, you must additionally specify whether to use 10 Gbit or 25 Gbit connections.

- **Bonded**: (Not available on Exadata X7 racks or Exadata Cloud) Select this option to use network bonding. For Exadata X7 racks, X7-2 ZDLRA racks, and Exadata Cloud, only bonded networks are supported.

- **LACP**: Check this option to enable the Link Aggregation Control Protocol (LACP) on the network.

- **Gateway**: Sets the IP address for the gateway for the network. This field cannot be empty.

- **Start IP Address**: The first IP address that will be used for the network. This value is filled in automatically, based on the value supplied for the gateway. OEDA generates a pool of consecutive IP addresses based on the specified Start IP Address. If consecutive IP addresses are not available, then specific IP addresses can be modified using the **Modify Masks** button. This field cannot be empty.

- **Subnet Mask**: Sets the IP address mask for the subnet. You can choose a subnet mask from the drop-down list which contains supported values from 255.0.0.0 to 255.255.255.252.

- **Domain Name**: (Not available for Exadata Cloud) Sets the network domain name for network connections. Use lowercase letters for the name. This field cannot be empty.

After you have specified all the configuration details for the network configuration, click the **Save** button at the bottom of the section.

(Not available for Exadata Cloud) If you click the **Modify Masks** button, it opens a pop-up window where you can modify the generated names for the network. There is a preview field at the bottom of the window that shows how the generated network names will appear based on the values in the name mask fields. The default strings used to generate the network names are:

- **Name**:

  - Exadata racks: `{Rack prefix}db%%dr`, which results in names such as `dbm0db01dr`, `dbm0db02dr`, and so on

  - ZDLRA racks: `{Rack prefix}repl%%`, which results in names such as `dbm0repl01`, `dbm0repl02`, and so on

- **Start id**: The number to start with when generating sequential names.

- VIP **Name**: (For ZDLRA racks) `{Rack prefix}repl%%-vip`, which results in names such as `dbm0repl01-vip`, `dbm0repl02-vip`, and so on

- Vip **Start id**: The number to start with when generating sequential names for the VIP addresses.

(Not available for Exadata Cloud) After you have completed the modifications to the backup or replication network configuration, click the **Save** button at the bottom of the Backup Network Masks or Replication Network Masks page. To undo your changes, you can either close the window or click the **Cancel** button at the bottom of the window.

After you have specified all the configuration details for the backup or replication network configuration, click the **Save** button at the bottom of the Backup Network or Replication Network section.

Backup or Replication network Review and Edit

If you enabled the Backup network or the Replication network option, then this section appears after you save the input provided for the network. Here you can view all the host names and IP addresses that will be configured for the network. You can modify any of the settings if needed. If you make any modifications, then click the **Update** button when you have finished to save your changes.

(Not available for Exadata Cloud) If you are connected to the same network on which the rack will be deployed, you can check the validity of the network configuration data. Click the **Lookup IP** button at the bottom of this section. OEDA will display any invalid IP addresses.

Related Topics

- Enabling 802.1Q VLAN Tagging in Exadata Database Machine over client networks (My Oracle Support Doc ID 1423676.1)

- Implementing Tagged VLAN Interfaces in Oracle VM Environments on Exadata (My Oracle Support Doc ID 2018550.1)

3.2.11 Alerting

In this section you configure alerting (Not available for Exadata Cloud).

You use the following methods for receiving or handling alerts:

- Email with Simple Mail Transfer Protocol (SMTP)
- Simple Network Management Protocol (SNMP)
- Oracle Auto Service Request (ASR)
- Oracle Configuration Manager
- Oracle Enterprise Manager

For ZDLRA, you must configure at least one of the following alerting options:

- Oracle ASR
- SMTP or SNMP alerting
- Oracle Configuration Manager
- Oracle Platinum Services
- **Enable Email Alerting**: Enables alerts to be delivered automatically through email.
  - **Name**: Sets the SMTP email user name that appears in the alert notifications, for example, `Oracle Exadata Database Machine`. This field cannot be empty.
  - **Email Address**: Sets the SMTP email server used to send alert notifications, for example, `mail.example.com`. This field cannot be empty.
  - **SMTP Server**: Sets the SMTP email address that sends alert notifications, for example, `dm0db01@example.com`. This field cannot be empty.
  - **Port**: Sets the SMTP email server port used to send alert notifications, for example, `25` or `465`. This field cannot be empty.
  - **Send Email Alerts to**: Sets the email address for the recipients of the alerts. You can click the **Add Email (+)** button to add additional recipients. You can use the **Remove Email (-)** button to remove an email address that you added.
- **Enable SNMP Alerting**: Enables using SNMP to deliver alerts.
  - **SNMP Server**: Sets the SNMP server host name., for example, `snmp.example.com`. This field cannot be empty.

  > **✎ Note:**
  >
  > Additional SNMP targets may be defined after installation of the Exadata rack. Refer to the `ALTER CELL` CellCLI command or the `ALTER DBSERVER` DBMCLI command.

  - **Port**: Sets the SNMP email server port used to send alert notifications. The default value is `162`. This field cannot be empty.
  - **Community**: Sets the SNMP server community. The default value is `public`. This field cannot be empty.

- **Enable ASR Alerting**: Enables Oracle Auto Service Request (ASR). Oracle ASR is designed to automatically open service requests when specific rack hardware faults occur.

  Oracle recommends that you install Oracle ASR Manager on an external, standalone server. The server must be installed have connectivity to the Exadata servers or Recovery Appliance nodes and an outbound Internet connection using HTTPS or an HTTPS proxy. This server must run an Oracle Solaris or Linux operating system.

  – **ASR Manager Request**: The host name of the Oracle ASR Manager server. This field cannot be empty.

  – **HTTP Proxy Host**: If you want to enable an HTTP proxy to upload to Oracle ASR, then specify the proxy server host name.

  – **Contact Name**: The name of the technical contact person for the rack. This field cannot be empty.

  – **Contact Email**: The e-mail address of the technical contact for the rack. This field cannot be empty.

  – **HTTP Proxy User**: If you want to enable an HTTP proxy to upload to Oracle ASR, then specify the proxy server user name.

  – **Port**: If you want to enable an HTTP proxy to upload to Oracle ASR, then specify the HTTP proxy server port number.

  – **My Oracle Support Account Name**: The email address of the My Oracle Support account. This field cannot be empty.

- **Enable OCM Alerting**: Enables Oracle Configuration Manager to collect configuration information.

  Oracle Configuration Manager is used to collect configuration information and upload it to an Oracle repository, for access when needed by Oracle Support Services.

  – **MOS Email Address**: The My Oracle Support account (email address) to receive updates from My Oracle Support. This field cannot be empty.

  – **HTTP Proxy Host**: If you use an HTTP proxy to upload configuration information to the Oracle repository, then specify the proxy server host name. The proxy server may be between the following:

    * Database (compute) servers and Oracle (applicable when you do not have Oracle Support Hub)

    * Database (compute) servers and Oracle Support Hub (applicable when you have only Oracle Support Hub)

    * Oracle Support Hub and Oracle

    If passwords are needed, then provide them during installation.

  – **Support Hub Hostname**: The Support Hub server host name. Oracle Support Hub allows Oracle Configuration Manager instances to connect to a single internal port (the Oracle Support Hub), and upload configuration data. This eliminates the need for each individual Oracle Configuration Manager instance in the database servers to access the Internet. This field cannot be empty.

  – **HTTP Proxy User**: If you want to enable an HTTP proxy to upload configuration information to the Oracle repository, then specify the HTTP proxy server user name.

- **Hub User Name**: The Oracle Support Hub operating system user name. This field cannot be empty.

- **Port**: If you want to enable an HTTP proxy to upload configuration information to the Oracle repository, then specify the HTTP proxy server port number. The default value is `80`.

- **Enable EM Alerting**: Enables alerts in Oracle Enterprise Manager.

  Oracle Enterprise Manager Cloud Control or Oracle Enterprise Manager Grid Control is used to monitor the rack. When Oracle Enterprise Manager agents are installed on the rack, they can send information to the Oracle Management Server. If you do not have an existing Oracle Management Server, then install a new Oracle Management Server on a separate host.

  - **EM Home Base Location**: The base directory for the Oracle Enterprise Manager agents installed on the database or compute servers. The default value is `/u01/app/oracle/product/EMbase`. This field cannot be empty.

  - **OMS HTTPS Upload Port**: The port the Oracle Enterprise Manager agent should use to upload information to the Oracle Management Server. The default value is `4900`. This field cannot be empty.

  - **OMS Host Name**: The name of the server or host where the Oracle Management Server repository is installed. This field cannot be empty.

3.2.12 Tape Library Connectivity

On ZDLRA racks only, you can configure network connection information for tape backups.

You can configure the tape library for ZDLRA only if you use Oracle Secure Backup as the media manager for tape backups. You can manually configure other media managers as clients only.

- **Use Tape**: Select this option if you plan to use Oracle Secure Backup as the media manager for tape backups. Then you can enter the configuration details.

- **Vip IP Address**: The IP address of the VIP.

- **Vip Name**: The alphanumeric name of the VIP. The default value is `osbadminvip. {domain_name}`.

  If you are connected to the same network on which the rack will be deployed, you can check the validity of the tape library address information. Click the **Lookup IP** button at the bottom of this section. OEDA will display any invalid IP addresses.

- **Number of tape libraries**: The number of tape libraries available to the ZDLRA rack. The default is 1. All tape libraries must be hosted in the same domain. If you select a value greater than 1, a new tab appears for each tape library. You can enter the configuration details for each tape library on the separate tabs.

- **ACLS ACS API**: Use the Automated Cartridge System Library Software (ACSLS) API for the tape library. Fill out the following additional fields:

  - **ACSLS Server**: The name of the server running ACSLS

  - **ACS ID**: The ACS identification number

- **ACSLS FC-SCSI**: Use the Automated Cartridge System Library Software (ACSLS) FC-SCSI for the tape library. Fill out the following additional fields:

  - **ACSLS Server**: The name of the server running ACSLS

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–   **Logical Library ID**: The logical library identification number
- **SCSI**: Use SCSI to communicate with the tape library. The Simple SAN tape library has no configuration fields. This is the default option.

3.2.13 Comments

Enter any additional information about the deployment in the text field.

For Oracle Exadata Rack, this section contains a list of questions about the configuration to help ensure a smooth installation and configuration process for your rack. You can type in the answers in the text field.

For all deployments, you can provide additional comments about your environment or the deployment in this field.

When you have finished providing the information, click **Save and Download**. You are prompted to save a ZIP file containing the deployment and configuration files. The main configuration files are:

> **Note:**
>
> Do not edit or modify any of the generated files.

- *Customer_name-rack_prefix*.xml: This is the main configuration file used by the installation process.

- *Customer_name-rack_prefix*-checkip.sh: A script you run on the installed rack to verify all the IP addresses you specified in OEDA are available and ready for deployment.

- *Customer_name-rack_prefix*-InstallationTemplate.html: This file is an HTML report of all the data captured in the web user interface. The questions and answers from the Comments section of OEDA appear at the bottom of this file.

- *Customer_name-rack_prefix*-platinum.csv: This file is used when first imaging of the nodes in the rack by Oracle Advanced Customer Support.

- *Customer_name-rack_prefix*-preconf_*pkey*.csv: If you configured InfiniBand partitioning, this file is created. This file is used when PKEY security is enabled in the interconnect.

3.3 OEDA Graphical User Interface

The Oracle Exadata Deployment Assistant (OEDA) Java-based interface walks you through several configuration details screens, where you provide information about how Oracle Exadata Rack should be configured.

OEDA runs on a client. The client must run one of the following operating systems:

- Oracle Linux x86-64
- Oracle Linux SPARC (64-bit)
- Oracle Solaris x86-64 (64-bit)

- Oracle Solaris SPARC (64-bit)

- Microsoft Windows

- Apple OS X (64-bit)

Download the appropriate file for the client operating system. For example, if you want to run OEDA on a Microsoft Windows client, then download the Microsoft Windows file. The operating system of the client on which you run OEDA does not have to match the operating system of the engineered system.

When you run the `config.sh` program, it starts the OEDA graphical user interface.

The OEDA interface walks you through several configuration details screens, where you provide information about your Oracle Exadata Rack configuration, and then generates a configuration file. The configuration file is then used to configure the Oracle Exadata Rack.

3.3.1 Using the GUI Interface for Oracle Exadata Deployment Assistant

Use the deployment assistant for initial configuration, and when adding to an existing deployment. You can import an existing configuration when adding new racks or components.

Have the following information available before running the deployment assistant:

- IP addresses

- Machine names

- DNS information

- NTP information for the rack

The following buttons are available on each Oracle Exadata Deployment Assistant page:

- Help: View context-sensitive help.

- Import: Import an existing configuration file. The file format is XML.

- Back: View the previous page.

- Next: View the next page.

- Cancel: Cancel the configuration process.

The following procedure describes how to use the deployment assistant:

> **✏ Notes:**
>
> Explanations for each field on the pages are provided in the other sections of this chapter.

1. Ensure the machine that is used to run Oracle Exadata Deployment Assistant has Oracle JRE 1.6 or later.

   Accessibility Note: For screen reader and screen magnifier users: Accessibility testing is conducted only on the Windows platform. The JRE version must be

1.7.0_80 for the Java Access Bridge to function correctly with the assistive technology such as JAWS and ZoomText. JRE 1.7.0_80 is shipped with Oracle Exadata Deployment Assistant for Windows in the November 2015 release.

2. Copy the operating system-specific directory to the machine that will run Oracle Exadata Deployment Assistant. The following directories are available:

```
linux-x64
macos-x64
solaris-sparcv9
solaris-x64
windows-i586
```

> **Note:**
>
> - The deployment assistant is available in the directory of the latest Bundle Patch.
>
> - The operating system-specific directory should match the operating system of the machine that will run the deployment assistant.

3. Start the deployment assistant using one of the following commands:

   - On Linux, Apple, or UNIX:

     ```
     ./config.sh
     ```

   - On Microsoft Windows:

     ```
     ./config.cmd
     ```

   The Oracle Exadata Deployment Assistant window appears.

4. Click **Next**.

5. Enter the customer details on the Customer Details page, and click **Next**.

6. Select the hardware for the deployment on the Hardware Selection page, and click **Next**.

7. Enter the customer information on the Define Customer Network page, and click **Next**.

8. Enter the information for the management network on the Administration Network page, and click **Next**.

> **Note:**
>
> To change the default names of the administration network, click **Modify**. After changing the fields, click **Save** to save the changes.

9. Enter the client network information on the Client Ethernet Network page, and click **Next**.

> **Note:**
>
> To change the default names of the client network, click **Modify**. After changing the fields, click **Save** to save the changes.

10. Enter the InfiniBand information on the InfiniBand Network page, and click **Next**.

> **Note:**
>
> To change the default names of the InfiniBand network, click **Modify**. After changing the fields, click **Save** to save the changes.

11. Enter the backup information on the Backup Network page, and click **Next**.

> **Note:**
>
> To change the default names of the backup network, click **Modify**. After changing the fields, click **Save** to save the changes.

12. Enter the operating system information on the Identify Compute Node Base OS configuration page, and click **Next**.

13. Review, and edit the information for the management and private networks, and click **Next**.

14. Define the clusters on the Define Clusters page for each cluster, and click **Next**.

15. Review and edit the cluster information for each cluster, and click **Next**.

16. Enter the e-mail alert information on the Cell Alerting page, and click **Next**.

17. Enter the Oracle Configuration Manager information on the Oracle Configuration Manager page, and click **Next**.

18. Enter the Auto Service Request (ASR) information on the Auto Service Request page, and click **Next**.

19. Enter the Oracle Enterprise Manager Grid Control information on the Grid Control Agent page, and click **Next**.

20. Enter additional information about the deployment in the text field. Information entered in the field appears at the bottom of the `InstallationTemplate.html` file.

21. Click **Next** to create the configuration file.

22. Enter a file name, and click **OK** to create the file, or **Cancel** to not create the file.

23. Copy the configuration files to a directory in the `/u01` directory, such as the `/u01/oeda` directory, on the first database server in Oracle Exadata Rack.

    The file is located in the `/tmp/OneCommand` directory on Linux, Apple, and UNIX systems, and the `drive:\OneCommand` directory on Microsoft Windows systems. The *drive* depends on the where deployment assistant was run on the Microsoft Windows system.

> **✎ See Also:**
>
> "Running Oracle Exadata Deployment Assistant on Windows" in *Oracle Exadata System Software User's Guide*

3.3.2 Customer Details Configuration Page

Define the customer information on this page. Table 3-2 lists the customer details fields.

> **✎ Note:**
>
> The domain specified on this page is used as the domain for all networks. If different domains are used for the client and backup networks, then specify the administration network on this page. The client and backup networks can be changed on the Review and Edit SCAN, Client, VIP and Optional Backup Networks page.

Table 3-2   Customer Details Page

Customer Details Field	Description
Customer name	Identifies the customer. **Note:** The name can contain any alphanumeric characters, including spaces. The field cannot be empty.
Application	Identifies the application used with the rack.
Network Domain Name	Identifies the network domain. **Note:** Use lowercase letters for the name.
Name Prefix	Defines the prefix for network interfaces. **Note:** The prefix can contain any alphanumeric character. The prefix cannot contain spaces. The maximum length is 20 characters. The field cannot be empty. The default is `dm01`. **Example:** A value of `dm01` results in a database server host name of `dm01db01`, and a storage server host name of `dm01cel01`.
Region	Sets the region for the rack. **Note:** Select a region from the list.

Table 3-2   (Cont.) Customer Details Page

Customer Details Field	Description
Timezone	Sets the time zone where the rack will be installed. **Note:** The time zones shown are based on the selected region.

3.3.3 Hardware Selection Configuration Page

Select your hardware from the list on the left. The list on the right contains the hardware for your environment.

3.3.4 Rack Details Configuration Page

Click the check box if you want to include a spine switch as part of the rack configuration. Do this for each rack that will have a spine switch.

3.3.5 Customer Network Configuration Page

Table 3-3 lists the number of required IP addresses for the customer network.

Table 3-3   Customer Network Configuration Page

Customer Details Field	Description
Bonded/Non-Bonded	Identifies type of network bonding. **Note:** The Admin and InfiniBand networks are non-bonded networks. This field is not available on X7 systems.
Subnet Mask	Sets the IP address mask for the subnet.
Gateway	Sets the IP address for the gateway.

Table 3-3   (Cont.) Customer Network Configuration Page

Customer Details Field	Description

Client or Backup Network Format	Selects the Ethernet cards, based on cable type.
	
	Options prior to X7-2:
	
	• `1/10 GbE Base-T` when using copper cables
	• `10 GbE Optical` when using fiber optic cables
	
	Note: The Admin network uses 1/10 GbE Base-T Ethernet cables. The network format for the private network is InfiniBand.
	
	Options for X7-2 Systems:
	
	On X7-2 systems, there are 3 available formats for client and backup networks.
	
	• RJ45/SFP28 Combined on Motherboard
	  – RJ45 10 GBit
	  – SFP28 10 GBit
	  – SFP28 25GBit
	• SFP28 PCI Dual Port Card
	  – SFP28 10 GBit
	  – SFP28 25GBit
	• RJ45 PCI Quad Port Card (extra cost option)
	
	Options for X7-8 Systems:
	
	On X7-8 systems, there are 2 available formats for client and backup networks:
	
	• RJ45 on Motherboard
	• SFP28 PCI Dual Port Cards
	  – SFP28 10 GBit
	  – SFP28 25GBit
	
	If you select one of the SFP28 network types on X7-2 or X7-8 systems, you must additionally specify whether to use 10 GBit or 25 GBit connections.

Available Network	Enables an additional subnet for backup, replication, or data recovery. **Note:** This subnet is optional.
Advanced Options	Click this button to display VLAN options.

Table 3-3   (Cont.) Customer Network Configuration Page

Customer Details Field	Description
VLAN ID	This field is displayed only when the Advanced Options button is clicked.
	For the Admin network, the VLAN ID is a numeric value between 1 and 4079. If this field is empty, then VLAN is not enabled.
	For the Client network, the VLAN ID is a numeric value between 1 and 4095. You also need to select the "Bonded" option to enable VLAN. If the VLAN ID field is empty, then VLAN is not enabled.
	For the Backup network, the VLAN ID is a numeric value between 1 and 4095. If the VLAN ID field is empty, then VLAN is not enabled. If the Backup network uses VLAN, then the Client network must also be configured to use VLAN. You also need to select the "Bonded" option for the Backup network to enable VLAN.
	If the backup network shares the same cable as the client network, ensure that: • the "Share Client Network ports" box is selected, and • the "Network Format" is the same type for both client and backup networks. Note that for all networks, the customer is responsible for configuring VLAN on the switch.

> **Note:**
>
> Each IP address pool should consist of consecutive IP addresses. If consecutive IP addresses are not available, then modify the IP addresses at the end of the Oracle Exadata Deployment Assistant process.

3.3.6 Administration Network Configuration Page

Each database server and Exadata Storage Server has two network interfaces for administration. One network provides management access to the operating system through the Ethernet interface, and the other network provides access to the Integrated Lights Out Manager (ILOM) through the ILOM Ethernet interface.

The following table lists the administration network fields. Sample host name formats are shown, based on the prefix entered on the Customer Details page. To modify the name formats, click **Modify**.

Table 3-4   Administration Network Page

Administration Network Field	Description
Starting IP Address for Pool	Assigns the starting IP address for the administration network port of the servers, and switches.
	Note: These addresses are also assigned to the ILOM ports on the database and storage servers.
	The pool should consist of consecutive IP addresses. If consecutive IP addresses are not available, then specific IP addresses can be modified during the configuration process.
Pool Size	Defined by the hardware selection.
Ending IP Address for Pool	Defined by the starting IP address and the pool size.
Is the default gateway for database servers	Specifies that the gateway IP address is the default gateway for the database servers.
	Note: This option is not usually selected for the database servers.
Defines the Hostname for the Compute Nodes	Select this option if the adapter name defines the host names for the database servers.
	Note: This option is usually selected for the database servers.

Related Topics

- [Overview of Network Requirements](#)

3.3.6.1 Modifying the Default Administration Network Host Names

Default administration network host names are usually changed to meet corporate naming standards or compatibility with existing systems. Table 3-5 lists the administration network format mask fields.

> **Note:**
>
> - Oracle recommends using the same starting IDs for the servers and server ILOMs.
>
> - All fields must be filled in.
>
> - The percent signs (%) in the names are replaced by the numbers entered into the Starting ID fields.

Table 3-5   Administration Network Format Masks Page

Administration Network Format Masks Field	Description
Compute Node Name	Sets the administration name for the first database server in this rack. **Note:** The name contains alphanumeric characters.
Compute Node Starting ID	Defines the starting numeric ID for the first database server in this rack.
Compute ILOM Name	Sets the administration name for the first database server ILOM in this rack. **Note:** The name contains alphanumeric characters.
Compute ILOM Starting ID	Defines the starting numeric ID for the first database server ILOM in this rack. **Note:**
Cell Node Name	Sets the administration name for the first Exadata Storage Server in this rack. **Note:** The name contains alphanumeric characters.
Cell Node Starting ID	Defines the starting numeric ID for the first Exadata Storage Server in this rack. **Note:**
Cell Node ILOM	Sets the administration name for the first Exadata Storage Server ILOM in this rack. **Note:** The name contains alphanumeric characters.
Cell ILOM Starting ID	Defines the starting numeric ID for the first Exadata Storage Server ILOM in this rack. **Note:**
Cisco Switch	Sets the administration name for the Cisco switch in this rack. **Note:** The name contains alphanumeric characters.
KVM Switch	Sets the administration name for the KVM switch in this rack. **Note:** The name contains alphanumeric characters.
PDU-A	Sets the administration name for PDU-A (power distribution unit A) in this rack. **Note:** The name contains alphanumeric characters.
PDU-B	Sets the administration name for PDU-B in this rack. **Note:** The name contains alphanumeric characters.

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Table 3-5   (Cont.) Administration Network Format Masks Page

Administration Network Format Masks Field	Description
InfiniBand Spine	Sets the administration name for the InfiniBand spine switch in this rack. **Note:** The name contains alphanumeric characters.
InfiniBand Leaf	Sets the administration name for the first InfiniBand leaf switch in this rack. **Note:** The name contains alphanumeric characters.
InfiniBand Leaf	Sets the administration name for the second InfiniBand leaf switch in this rack. **Note:** The name contains alphanumeric characters.

3.3.7 Client Ethernet Configuration Page

Applications access the database through the client Ethernet network using Single Client Access Name (SCAN) and Oracle RAC Virtual IP (VIP) addresses.

If VLAN tagging is to be used, then it must be enabled by the customer after the initial deployment. See the My Oracle Support notes for details.

The following table lists the client network fields. Sample database client name formats are based on the prefix entered on the Customer Details page. To modify the name formats, click **Modify**.

Table 3-6   Client Ethernet Page

Client Ethernet Field	Description
Starting IP Address for Pool	Assigns the starting IP address for the client network port of the servers, and switches. **Note**: These addresses are also assigned to the ILOM ports on the database and storage servers. The pool should consist of consecutive IP addresses. If consecutive IP addresses are not available, then specific IP addresses can be modified during the configuration process.
Pool Size	Defined by the hardware selection.
Ending IP Address for Pool	Defined by the starting IP address and the pool size.
Is the default gateway for database servers	Specifies that the gateway IP address is the default gateway for the database servers. **Note:** This option is usually selected for the database servers.

Table 3-6   (Cont.) Client Ethernet Page

Client Ethernet Field	Description
Defines the Hostname for the Compute Nodes	Specifies that the adapter name defines the host names for the database servers. **Note:** This option is not usually selected for the database servers.

Related Topics

- Overview of Network Requirements
- Enabling 802.1Q VLAN Tagging in Exadata Database Machine over client networks (My Oracle Support Doc ID 1423676.1)
- Implementing Tagged VLAN Interfaces in Oracle VM Environments on Exadata (My Oracle Support Doc ID 2018550.1)

3.3.7.1 Modifying the Default Client Ethernet Network Names

Default client network names are usually changed to meet corporate naming standards or compatibility with existing systems. The following table lists the client network format mask fields.

> **Note:**
>
> - All fields must be filled in.
> - The percent signs (%) in the names are replaced by the numbers entered into the Starting ID fields.

Table 3-7   Client Network Format Masks Page

Client Network Format Masks Field	Description
Client Access Name	Assigns the client access name for this rack. **Note:** The name contains alphanumeric characters.
Client Access Starting ID	Assigns the starting numeric ID for the client access name in this rack.
VIP Name	Assigns the VIP name for this rack. **Note:** The name contains alphanumeric characters.
VIP Starting ID	Sets the starting numeric ID for the VIP name in this rack.
SCAN Details	Assigns the SCAN name for this rack. **Note:** The name contains alphanumeric characters.

3.3.8 InfiniBand Network Configuration Page

The InfiniBand network is the private network between database servers and storage servers. The following table lists the InfiniBand network fields.

> **Note:**
>
> Sample name formats are based on the prefix entered on the Customer Details page. To modify the name formats, click **Modify**.

Table 3-8   InfiniBand Network Page

InfiniBand Network Field	Description
Starting IP Address for Pool	Assigns the starting IP address for the private network port. **Note**: The pool should consist of consecutive IP addresses. If consecutive IP addresses are not available, then specific IP addresses can be modified during the configuration process.
Pool Size	Defined by the hardware selection.
Ending IP Address for Pool	Defined by the starting IP address and the pool size.

Related Topics

- [Overview of Network Requirements](#)

3.3.8.1 Modifying the Default InfiniBand Network Names

The following table lists the InfiniBand network format mask fields.

> **Note:**
>
> The percent signs (%) in the names are replaced by the numbers entered into the Starting ID fields.

Table 3-9   Private (IB) Network Format Masks Page

Private (IB) Network Format Masks Field	Description
Compute Private Name	Sets the InfiniBand access name for the database servers. **Note:** The name contains alphanumeric characters. This field cannot be empty.

Table 3-9   (Cont.) Private (IB) Network Format Masks Page

Private (IB) Network Format Masks Field	Description
Compute Private Starting ID	Sets the starting ID for the InfiniBand access name for the database servers. **Note:** The ID contains numeric characters. This field cannot be empty.
Cell Private Name	Sets the InfiniBand access name for the storage servers. **Note:** The name contains alphanumeric characters. This field cannot be empty.
Cell Private Starting ID	Sets the starting ID for the InfiniBand access name for the storage servers. **Note:** The ID contains numeric characters. This field cannot be empty.

3.3.9 Backup Network Configuration Page

The following table lists the backup network fields.

> **✏ Note:**
>
> Sample name formats are based on the prefix entered on the Customer Details page. To modify the name formats, click **Modify**.

Table 3-10   Backup/Data Guard Ethernet Network Page

Backup/Data Guard Ethernet Network Field	Description
Starting IP Address for Pool	Assigns starting IP address for the backup network. **Note**: The pool should consist of consecutive IP addresses. If consecutive IP addresses are not available, then IP addresses can be modified during the configuration process.
Pool Size	Defined by the hardware selection.
Ending IP Address for Pool	Defined by the starting IP address and the pool size.

Related Topics

- Additional Networks

3.3.9.1 Modifying the Default Backup Network Name

The following table lists the backup network format mask fields.

> **✏ Note:**
>
> The percent signs (%) in the names are replaced by the numbers entered into the Starting ID fields.

Table 3-11   Backup Network Format Masks Page

Backup Network Format Masks Field	Description
Name	Sets the name for the backup access network. **Note:** The name contains alphanumeric characters. This field cannot be empty.
Starting ID	Sets the starting ID for the database servers in this rack. **Note:** The ID contains numeric characters. This field cannot be empty.

3.3.10 Review and Edit Management and Private Networks

Review and update entries for the node specific data for the Management, ILOM, and private networks for the compute nodes, storage cells, and the switches used in the rack.

To check the validity of the network configuration data, click the **Lookup IP** button. OEDA will highlight fields in red if:

- The IP address or host name could not be resolved through DNS lookup

- The user input differs from what is the DNS and the fields were edited to match the DNS

If you go back and make changes to any of the previous configuration pages, click **Re-Generate Data** on this page, and then click **Next**.

Accessibility note for screen reader users: The **Lookup IP** button in this screen provides no feedback to a screen reader user once it is activated. The node names are checked using DNS lookup when this button is activated and any node name that cannot be resolved will have an asterisk prefixed to the name of the field. You may hear the word "star" in front of such fields.

For screen magnifier users: There is text above the **Lookup IP** button that indicates that fields with an asterisk indicate node names that could not be resolved through DNS lookup. Such fields also have a red box around them. The **Lookup IP** also highlights the field in red if the user input differs from what is found in DNS.

3.3.11 Identify Compute Node OS and Enable Capacity-on-Demand Configuration Page

Operating system configuration is based on processor type. Oracle Exadata Racks with Intel processors support Oracle Linux.

Click **Enable Capacity-on-Demand** to reduce the initial number of active cores on the servers, and then set the number of active cores.

3.3.12 Define Clusters

More than one cluster can be defined for Oracle Exadata Rack environments. Larger environments support multiple clusters. Each cluster requires a minimum of two physical database servers, and three Exadata Cells.

If one cluster is used, then click **All** to move all components to the cluster. If more then one cluster is used, then enter the number of clusters. For each cluster, select its subtab, then select the components for the cluster, and then click **Add**.

3.3.13 Define Clusters Details

The following table lists the cluster fields. Most fields are filled in based on earlier configuration pages.

Table 3-12   Cluster Configuration Page

OS Field	Description
Cluster name	Assigns the cluster name. **Note:** The name can contain alphanumeric characters, periods (.), and hyphens (-). The name must start with an alphanumeric character. This field cannot be empty.
Prefix	Assigns the prefix for the cluster.
DNS	Sets the DNS IP Address. **Note:** At least one IP address must be entered.
NTP	Sets the NTP IP Address. **Note:** At least one IP address must be entered.
Domain Name	Sets the cluster domain name.
Region	Sets the region for the cluster.
Timezone	Sets the time zone for the cluster.
Role Separated	Allows the responsibilities and privileges to be separated by role. **Note:** Providing system privileges for the storage tier using the SYSASM privilege instead of the SYSDBA privilege provides a clear division of responsibility between Oracle ASM administration and database administration. When used with Oracle ASM and database-scoped security, role separation helps to prevent different databases using the same storage from accidentally overwriting each other's files.

Table 3-12   (Cont.) Cluster Configuration Page

OS Field	Description
User name	Sets the user name for the database owner. This option is not available if using role-separated authentication.
User ID	Assigns the database owner ID. This option is not available if using role-separated authentication.
User base	Sets the database directory. This option is not available if using role-separated authentication.
DBA Group name	Sets the DBA group name. This option is not available if using role-separated authentication.
DBA Group ID	Assigns the DBA group ID. This option is not available if using role-separated authentication.
Grid ASM Home OS User	Sets the Oracle ASM owner name. The default value is `grid`. This is the user that owns the Oracle Grid Infrastructure software installation. This option is available when using role-separated authentication.
Grid ASM Home OS User ID	Assigns Oracle ASM owner ID. The default value is `1000`. This option is available when using role-separated authentication.
Grid ASM Home base	Sets the Oracle Grid Infrastructure directory. The default value is `/u01/app/grid`. This option is available when using role-separated authentication.
ASM DBA Group	Sets the Oracle ASM DBA group name. The default value is `asmdba`. Membership in this group enables access to the files managed by Oracle ASM. This option is available when using role-separated authentication.
ASM DBA Group ID	Assigns the Oracle ASM DBA group ID. The default value is `1004`. This option is available when using role-separated authentication.

Table 3-12   (Cont.) Cluster Configuration Page

OS Field	Description
ASM Home Oper Group	Sets the Oracle ASM operator group name. The default value is `asmoper`. This group of operating system users has a limited set of Oracle ASM instance administrative privileges including starting up and stopping the Oracle ASM instance. This option is available when using role-separated authentication.
ASM Home Oper Group ID	Assigns the Oracle ASM operator group ID. The default value is `1005`. This option is available when using role-separated authentication.
ASM Home Admin Group	Sets the Oracle ASM administration group name. The default value is `asmadmin`. This group uses SQL to connect to an Oracle ASM instance as SYSASM using operating system authentication. The SYSASM privileges permit mounting and dismounting of disk groups, and other storage administration tasks. SYSASM privileges provide no access privileges on an Oracle Database instance. This option is available when using role-separated authentication.
ASM Home Admin Group ID	Assigns the Oracle ASM administration group ID. The default value is `1006`. This option is available when using role-separated authentication.
RDBMS Home OS User	Sets the Oracle Database software installation owner name. The default value is `oracle`. This option is available when using role-separated authentication.
RDBMS Home OS User ID	Assigns the Oracle Database software installation owner ID. The default value is `1001`. This option is available when using role-separated authentication.
RDBMS Home base	Sets the Oracle Database software installation directory. The default value is `/u01/app/oracle`. This option is available when using role-separated authentication.
RDBMS DBA Group	Sets the DBA group name. The default value is `dba`. This option is available when using role-separated authentication.

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Table 3-12   (Cont.) Cluster Configuration Page

OS Field	Description
RDBMS DBA Group ID	Assigns the DBA group ID. The default value is `1002`. This option is available when using role-separated authentication.
RDBMS Home Oper Group	Sets the Oracle Database operator group name. The default value is `racoper`. This option is available when using role-separated authentication.
RDBMS Home Oper Group ID	Assigns the Oracle Database operator group ID. The default value is `1003`. This option is available when using role-separated authentication.
OINSTALL group	Sets the Oracle Inventory group name. The default value is `oinstall`.
OINSTALL Group ID	Assigns the Oracle Inventory group ID. The default value is `1001`.
Inventory Location	Sets the Oracle inventory (oraInventory) directory path. The default value is `/u01/app/oraInventory`.
Grid Infrastructure Home	Sets the Oracle Grid Infrastructure software release and the directory path. The default value is `/u01/app/`*`release_number`*`/grid`.
Database Home Location	Sets the Oracle Database software release and the directory path. The default value is `/u01/app/oracle/product/`*`release_number`*`/dbhome_1`.
Software Languages	Defines the languages installed for the database. The default value is English (`en`).
Diskgroup Layout	Sets the disk group layout. The options are: • `80% 20%` for DATA and RECO when using external backups. • `40% 60%` for DATA and RECO when using internal backups. The disk group layout options with sparse disk group are: • `72% 18% 10%` for DATA, RECO, and SPARSE when using external backups. • `34% 56% 10%` for DATA, RECO, and SPARSE when using internal backups. **Note:** On X7 systems, you cannot specify any sizes for the DBFS_DG.
Virtual Guest Size	Sets the size of a virtual guest. The options are `Small`, `Medium`, and `Large`. You can use the sliders to customize the definitions of small, medium, and large for your environment.

Table 3-12   (Cont.) Cluster Configuration Page

OS Field	Description
Guest Image Version	Sets the image version for virtual guests. The options are `default` and `12.1.2.*.*`. Selecting the `default` option sets the guest image version to match dom0's image version. **Note:** The guest image version needs to be the same as or earlier than dom0's image version.
DBFS DiskGroup	Sets the DBFS disk group name. **Note:** This field does not exist for X7 systems.
DATA Disk Group	Sets the DATA disk group name, redundancy and size. The redundancy options are `NORMAL` and `HIGH`. **Note:** Oracle recommends the use of `HIGH` redundancy disk groups for mission critical applications.
RECO Disk Group	Sets the RECO name, redundancy and size. The redundancy options are `NORMAL` and `HIGH`. **Note:** Oracle recommends the use of `HIGH` redundancy disk groups for mission critical applications.
Sparse Disk Group	Sets the sparse disk group name, redundancy, and size. The redundancy options are `NORMAL` and `HIGH`. Click the **Advanced Options** button, and then select **Enable Sparse Disk Group**. **Note:** To create a sparse disk group, the version of Oracle Grid Infrastructure software needs to be release 12.1.0.2 BP5 or later.
Database name	Sets the database name.
Block size	Sets the database block size. The default value is `8192`. To use a different block size, select the block size from the list
Database Type	Defines the type of workload that runs on the database. The options are `OLTP` for online transaction processing, and `DW` for data warehouse.
Base Adapter	Sets the physical network for the client network. The default value is `client`. **Note:** Oracle recommends using the default.
Domain	Defined on the Customer Details page.
Start IP	Defined on the Customer Details page.
Pool Size	Defined on the Customer Details page.
Gateway IP	Defined on the Customer Details page.
VLAN ID	Specifies a VLAN tag on a per cluster basis. This is a numeric value between 1 and 4095.

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Table 3-12   (Cont.) Cluster Configuration Page

OS Field	Description
Name Mask	Defined on the Customer Details page.
Start Id	Defined on the Customer Details page.
VIP Name mask	Defined on the Customer Details page.
Start Id	Defined on the Customer Details page.
SCAN Name	Defined on the Customer Details page.
Base Adapter	Sets the backup network. The options are `Not in use`, and `Backup`.
Domain	Defined on the Customer Details page.
Start IP	Defined on the Customer Network page.
Pool size	Defined on the Customer Network page.
Name mask	Defined on the Customer Network page.
Start Id	Defined on the Customer Network page.

> **See Also:**
>
> - "Understanding Data Security for Oracle Exadata System Software" in the *Oracle Exadata System Software User's Guide* for additional information about Oracle ASM and database-scoped security
> - "Setting up Oracle Exadata Storage Snapshots" chapter in the *Oracle Exadata System Software User's Guide* for information about sparse disk groups

3.3.13.1 Configuring Automatic Cluster File System (ACFS)

> **Note:**
>
> Automatic Cluster File System (ACFS) requires Grid Infrastructure 12.1.0.2 or later.

To configure ACFS during software deployment, perform these steps:

1. On the "Define Clusters Details" page, click the **Advanced Options** button.

2. In the pop-up window, select **Enable ACFS Configuration**, and click **OK**.

3. Click the **Configure ACFS** button in the Disk Group Details pane, which opens a pop-up window.

4. Select **Enable ACFS for Disk Group**.

5. In the **Disk Group** dropdown, select the disk group in which you would like to create ACFS.

6. For **ACFS Volume Name**, accept the default volume name, or enter a new ACFS volume name.

   The volume name must be between 1 and 11 alphanumeric characters, and must start with an alphabetic character.

7. For **ACFS Volume Size**, enter the desired size of the ACFS volume.

8. For **ACFS Mount Point**, accept the default mount point, or enter a new ACFS mount point.

3.3.14 Review and Edit SCAN, Client, VIP and Optional Backup Networks

Review and update entries for the clusters and client network, then click **Re-Generate Data**, and then click **Next**.

> **Note:**
>
> The domain specified on Customer Details page is used as the domain for all networks. If different domains are used for the client and backup networks, then specify those domains on this page.

3.3.15 Cell Alerting Configuration Page

Cell alert delivery may be configured during or after installation.

Cell alerts can be delivered using Simple Mail Transfer Protocol (SMTP), Simple Network Management Protocol (SNMP), or both. The following table lists the cell alert configuration options.

Table 3-13   Cell Alerting Configuration Page

Cell Alerting Field	Description
Enable Email Alerting	Enables cell alerts to be delivered automatically.
Recipients Addresses	Sets the e-mail addresses for the recipients of the cell alerts. Multiple addresses can be entered in the dialog box. The number of e-mail addresses is shown.
SMTP Server	Sets the SMTP e-mail server used to send alert notifications **Example:** `mail.example.com`
Uses SSL	Enables Secure Socket Layer (SSL) security when sending alert notifications.
Port	Sets the SMTP e-mail server port used to send alert notifications **Example:** `25` or `465`

Table 3-13   (Cont.) Cell Alerting Configuration Page

Cell Alerting Field	Description
Name	Sets the SMTP e-mail user name that appears in the alert notifications. **Example:** `Oracle Exadata Database Machine`
Email Address	Sets the SMTP e-mail address that sends alert notifications. **Example:** `dm01@example.com`
Enable SNMP Alerting	Enables using SNMP to deliver alerts.
SNMP Server	Sets the SNMP server host name. **Example:** `snmp.example.com` **Note:** Additional SNMP targets may be defined after installation. Refer to *Oracle Exadata System Software User's Guide*.
Port	Sets the SNMP server port. The default value is `162`.
Community	Sets the SNMP server community. The default value is `public`.

Related Topics

• *Oracle Exadata System Software User's Guide*

3.3.16 Platinum Configuration Page

Oracle Platinum Service provides enhanced support at no additional cost for qualified engineered systems. This is a connected service and requires Oracle Advanced Support Gateway (OASG) to be provisioned within the environment. The configuration for OASG is defined with the user information that is used by the Platinum Service monitoring agent. The following table lists the Oracle Platinum Service configuration options.

Table 3-14   Platinum Configuration Page.

Platinum Field	Description
Capture data for Platinum configuration	Enables collection of Oracle Platinum Service configuration.
Customer Name	Defined on the Customer Details page. This field can be edited. **Note:** The customer name must match the My Oracle Support portrait name.
CSI	Sets the hardware customer support identifier (CSI) for the system.
My Oracle Support email	Sets the e-mail address for access to the system CSI.
Use Existing Gateway	Enables use of an existing OASG gateway.

Table 3-14   (Cont.) Platinum Configuration Page.

Platinum Field	Description
Gateway Machine Description	Describes the gateway system, such as Oracle Exadata Database Machine X4-2.
Platinum Gateway Hostname	Sets the OASG host name. Name format is `ct-customer_name-2_digit_number`.
Primary IP Address	Sets the primary IP address for OASG.
Subnet Mask	Sets the subnet mask for the OASG primary network.
VPN	Sets the VPN connection type for access to the gateway from Oracle Continuously Connected Network (OCCN). SSL is the default method. **Note:** Oracle recommends using Secure Socket Layer (SSL).
Gateway to Exadata Link	Defines the OASG location in the network. **Note:** Oracle recommends using DMZ as the connection.
Static Routes	Lists the number of static routes. Click **Modify** to change the routes for the gateway.
Static Routes: Destination Network This field is available after clicking **Modify**.	Defines the remote network for the router. Network format is CIDR format, such as 192.0.2.1/255.
Static Routes: Gateway IP This field is available after clicking **Modify**.	Defines the remote network gateway IP address. The address must be in the OASG primary IP subnet.
Gateway machine has an ILOM	Specifies that OASG is an Oracle system with an ILOM service processor.
ILOM IP Address	Sets the ILOM IP address.
Subnet Mask	Sets the ILOM subnet mask.
Gateway IP Address	Sets the OASG ILOM primary subnet gateway.
HTTP Proxy Required	Enables a proxy service for OASG to connect to the required Oracle sites.
Proxy Hostname	Sets the proxy host name used to connect to Oracle sites.
Port	Sets the proxy port number.
HTTP Proxy Requires Authentication	Enables authentication for the proxy network traffic.
Proxy Username	Sets the OASG user name to connect to the proxy. The password is provided by the Oracle engineer during installation.
Agent OS User name	Sets the user name for the Platinum agent. The default name is `orarom`.

Table 3-14 (Cont.) Platinum Configuration Page.

Platinum Field	Description
Allow Agent sudo privileges	Allows the Agent OS user sudo privileges. Selecting this option allows Oracle service engineers to collect logs and other information for a service request.
Agent OS Group name	Sets the Platinum group name. The default name is `orarom`. The messages file on Linux systems is changed to allow the Platinum agent the ability to read the file.
Agent OS Group ID	Assigns the Agent group ID. The default ID is `1010`.
Agent OS User home	Sets the home directory for the Platinum agent user.
Agent Software home	Sets the home directory for the software agent.
Agent Port	Sets the port number for the Platinum agent. The default port is `1830`.
SNMP Community string	Sets the SNMP trap community string.

Related Topics

- Oracle Platinum Services information
- Oracle Advanced Support Gateway Hardware Minimum Requirements
- Oracle Advanced Support Gateway Documentation Library

3.3.17 Auto Service Request Configuration Page

Auto Service Request (ASR) is designed to automatically open service requests when specific Oracle Exadata Rack hardware faults occur. The following table lists the ASR configuration options.

Table 3-15 Auto Service Request Configuration Page

Auto Service Request Field	Description
Enable Auto Service Request	Enables ASR.
ASR Manager Hostname	Sets the ASR server host name. **Note:** Oracle recommends a standalone server that has connectivity to the rack.
ASR Technical Contact Name	Sets the technical contact name for the rack.
Technical Contact Email	Sets the e-mail address of the technical contact for the rack.
My Oracle Support Account Name	Sets the My Oracle Support account name.
HTTP Proxy used in upload to ASR	Enables an HTTP proxy to upload to ASR.
HTTP Proxy Host	Sets the proxy server host name.

Table 3-15   (Cont.) Auto Service Request Configuration Page

Auto Service Request Field	Description
Proxy Port	Sets the HTTP proxy server port number. The default is `80`.
HTTP Proxy requires authentication	Enables HTTP proxy server authentication.
HTTP Proxy User	Sets the proxy server user name.

Related Topics

- *Oracle Exadata Database Machine Maintenance Guide*

3.3.18 Oracle Configuration Manager Configuration Page

Oracle Configuration Manager is used to collect configuration information and upload it to the Oracle repository. The following table lists the Oracle Configuration Manager configuration options.

Table 3-16   Oracle Configuration Manager Configuration Page

Oracle Configuration Manager Field	Description
Enable Oracle Configuration Manager	Enables Oracle Configuration Manager to collect configuration information.
Receive updates via MOS	Enables My Oracle Support updates to be received automatically.
MOS Email Address	Sets the My Oracle Support address to receive My Oracle Support updates.
Access Oracle Configuration Manager via Support Hub	Enables Support Hub to access Oracle Configuration Manager. Oracle Support Hub allows Oracle Configuration Manager instances to connect to a single internal port (the Support Hub), and upload configuration data. This eliminates the need for each individual Oracle Configuration Manager instance in the database servers to access the Internet.
Support Hub Hostname	Sets the Support Hub server host name.
Hub User name	Sets the Support Hub operating system user name.
HTTP Proxy used in upload to Oracle Configuration Manager	Enables an HTTP proxy to upload configuration information to the Oracle repository.

Table 3-16   (Cont.) Oracle Configuration Manager Configuration Page

Oracle Configuration Manager Field	Description
HTTP Proxy Host	Enables the HTTP proxy server to connect to Oracle. The proxy server may be between the following: • Database servers and Oracle (applicable when you do not have Oracle Support Hub) • Database servers and Support Hub (applicable when you have only Oracle Support Hub) • Support Hub and Oracle If passwords are needed, then provide them during installation. **Example:** `[`*`proxy_user@`*`]`*`proxy_host`*`[`*`:proxy_port`*`]` The `proxy_host` and `proxy_port` entries are optional.
Proxy Port	Sets the HTTP proxy server port number. The default is `80`.
HTTP Proxy requires authentication	Enables HTTP proxy authentication.
HTTP Proxy User	Sets the HTTP proxy server user name.

Related Topics

• Oracle Technical Support Policies

• *Oracle Configuration Manager Companion Distribution Guide*

3.3.19 Grid Control Agent Configuration Page

Oracle Enterprise Manager Grid Control is used to monitor Oracle Exadata Rack. Oracle Enterprise Manager Grid Control installs agents on the database servers and points the agents to an existing Oracle Enterprise Manager Grid Control environment, or installs a new Oracle Enterprise Manager Grid Control infrastructure on a separate host.

Table 3-17 lists the Oracle Enterprise Manager Grid Control configuration options.

Table 3-17   Oracle Enterprise Manager Grid Control Configuration Page

Oracle Enterprise Manager Grid Control Field	Description
Enable Oracle Enterprise Manager Grid Control Agent	Enables Oracle Enterprise Manager Grid Control to monitor the rack.
EM Home Base Location	Sets the base directory for the agents installed on the database servers.
OMS Hostname	Sets the host name for the Oracle Enterprise Manager Grid Control repository.

Table 3-17   (Cont.) Oracle Enterprise Manager Grid Control Configuration Page

Oracle Enterprise Manager Grid Control Field	Description
OMS HTTPS Upload Port	Sets the port Oracle Enterprise Manager Grid Control agent should use to upload information. **Note:** The default is `4900`.

3.4 OEDA Command Line Interface

When you run the `oedacli` program, it starts the OEDA command line interface.

- About the OEDA Command Line Interface
- Starting the OEDACLI Utility
- OEDACLI Command Reference

3.4.1 About the OEDA Command Line Interface

The primary goal of `oedacli` is to assist in completing various Exadata life cycle management tasks.

The OEDA command-line interface is a new interface that allows you to update an existing `es.xml` file. These updates are called Actions. An **Action** is a single atomic task. You can use the command line interface to perform any of the following tasks:

- Add node to or remove node from a Virtual Cluster on Exadata
- Add database home to or remove database home from physical cluster
- Add or remove Storage cell
- Resize Oracle ASM disk groups
- Add or remove additional Databases
- Add or remove additional database homes to an Oracle VM cluster

An Action can have many sub commands, however most actions are single commands. Examples of multi-command steps are - CLONE GUEST and CLONE CELL

`oedacli` has two operating modes:

- Edit mode
  - Used against an `es.xml` file *before* you run the `install.sh` command steps
  - Used to edit an XML file, for example to add a second Database Home, then save the XML file
  - Can be used as a logical XML editor for the `es` model prior to deployment
- Deploy mode
  - Used to edit an `es.xml` file *after* you have run the `install.sh` command steps

- Can be used to Clone Oracle VM Guests or grow or shrink Oracle ASM Disk groups

- Has a smaller list of supported changes than Edit mode

- Can be used as a logical XML editor and deployment tool after the initial deployment

Edit mode workflow

1. When the command line interface starts, it has no target `es.xml` file to work on, so you first load an `es.xml` file.

   ```
   LOAD FILE name=es.xml
   ```

2. Modify an in-memory version of the `es.xml`. Specify the additional actions to perform during deployment. For example, to clone an Oracle VM guest to a new guest:

   ```
   clone guest srcname=asd
   set privnet name1='test08adm01-priv1',ip1='192.168.216.102',name2='testadm01-
   priv2',ip2='192.168.216.103'
   set parent name='test08adm01a'
   set adminnet name='test08adm01vm02',ip='10.128.218.70'
   set clientnet name='test08client01vm02',ip='10.128.196.63'
   set vipnet name='test08client01vm02-vip',ip='10.128.196.71'
   ```

3. After you have provided all the commands for an action, save the action to a list of actions to be processed within the command line interface. At this point, the data in the `es.xml` file is not yet updated.

   ```
   SAVE ACTION
   ```

4. Merge the actions into the main body of the in-memory copy of the `es.xml` using the `FORCE` keyword.

   ```
   MERGE ACTIONS FORCE
   ```

5. Save the memory copy of the `es.xml`, overwriting the input file or writing to a new file that you specify.

   ```
   SAVE FILE [name=new_es.xml]
   ```

Deploy mode workflow

1. When the command line interface starts, it has no target `es.xml` file to work on, so you first load an `es.xml` file.

   ```
   LOAD FILE name=es.xml
   ```

2. Modify an in-memory version of the `es.xml`. Specify the actions to perform.

3. After you have provided all the commands for an action, save the action to a list of actions to be processed within the command line interface. At this point, the data in the `es.xml` file is not yet updated.

   ```
   SAVE ACTION
   ```

4. Merge the actions into the main body of the in-memory copy of the `es.xml`.

   ```
   MERGE ACTIONS
   ```

5. Deploy the actions into the main body of the `es.xml` file. This step will perform the specified actions such as creating the new Oracle VM guest.

```
DEPLOY ACTIONS
```

6. Save the memory copy of the `es.xml`, overwriting the input file or writing to a new file that you specify.

```
SAVE FILE [name=new_es.xml]
```

3.4.2 Starting the OEDACLI Utility

Starting with August 2017 Release of Oracle Exadata Deployment Assistant (OEDA), a command-line utility — `oedacli` — can be used for various routine tasks on Exadata.

Prerequisites

To use `oedacli`, you must meet the following requirements:

- Download the August 2017 release or later of OEDA. The August 2017 release of OEDA is only supported on Oracle Linux.

- Have the original OEDA configuration XML file used for deployment

- Use the default password on the nodes in the cluster (for the `root`, `oracle` and `grid` users)

> **Note:**
>
> If your environment does not use the default passwords for the specified users, then refer to My Oracle Support Doc ID 2163751.1.

File Path

The directory that contains the unzipped files from the OEDA download. For example `/u01/joc/linux-x64`.

Syntax

```
./oedacli
```

Usage Notes

To display the help output, use one of the following:

- `HELP`

- `HELP command name`

Related Topics

- OEDA Deployment - Generating new or non-default hash password for root and non-root users (My Oracle Support Doc ID 2163751.1)

3.4.2.1 Displaying Help Output for OEDACLI

You can display syntax help for the OEDACLI utility using the `HELP` command.

Example 3-1   Help Output for OEDACLI

This example shows the help output listing the available objects and command for the OEDACLI 18c (18.1.0) release:

```
oedacli> HELP
 HELP [topic]
   Available Objects:
 ACFSVOLUME
        LIST ACFSVOLUMES
 CELL
        LIST CELLS
 CLUSTER
        LIST CLUSTERS
 DISKGROUP
        LIST DISKGROUPS
 DATABASE
        LIST DATABASES
 DATABASEHOME
        LIST DATABASEHOMES
 DOM0
        LIST DOM0S
 GUEST
        CLONE GUEST
        DELETE GUEST
        LIST GUESTS
 ILOM
        LIST ILOMS
 MACHINE
        LIST MACHINES
 NETWORK
        LIST NETWORKS
 SCAN
        LIST SCANS
 SWITCH
        LIST SWITCHES
 VIP
        LIST VIPS
 CLI COMMANDS
        LOAD FILE
        SAVE FILE
        SAVE FILES
        LIST XMLACTIONS
        SAVE ACTION
        MERGE ACTIONS
        DEPLOY ACTIONS
```

3.4.2.2 Displaying Help Output for an OEDACLI Command

This example shows the help output listing the OEDACLI ALTER DATABASE command.

Example 3-2   Help Output for the OEDACLI ALTER DATABASE command

This example shows how to display the syntax for the ALTER DATABASE command of OEDACLI. The help output is shown for the 18c (18.1.0) release.

```
oedacli> HELP ALTER DATABASE
 Usage:
 ALTER DATABASE
  BLOCKSIZE = <blocksize> |
  CHARSET = <characterset> |
```

```
                          DATADG = <datadg> |
                          DBLANG = <dblang> |
                          DBNAME = <dbname> |
                          DBTEMPLATE = <dbtemplate> |
                          DBTYPE = <dbtype> |
                          HOSTNAMES = <hostnames> |
                          RECODG = <recodg>
                        WHERE
                          ID = <databaseid> |
                          CLUSTERNUMBER = <clusternumber> DATABASENAME = <databasename> |
                          CLUSTERNAME = <clustername> DATABASENAME = <databasename> |
                          CLUSTERID = <clusterid> DATABASENAME = <databasename>

                        Purpose:
                          Alters an existing database
                        Arguments:
                          <blocksize>    :  Default: 8192,  not required for PDB
                          <characterset> :  Default: AL32UTF8,  not required for PDB
                          <datadg>       : *The DATA diskgroup, not required for PDB
                          <dblang>       :  Default: all_langs, not required for PDB
                          <dbname>       : *Database name
                          <dbtemplate>   :  Default: ADMIN, otherwise ADMIN or DW, not required for PDB
                          <dbtype>       :  Default: normal DB, otherwise CDB or PDB
                          <hostnames>    :  Default:  list of nodes from db home
                          <recodg>       : *The RECO diskgroup, not required for PDB
                        Where:
                          <databaseid>    : The es xml id of the database
                          <clusternumber> : The cluster number in the es xml, starting at 1
                          <clustername>   : The name of the cluster
                          <clusterid>     : The es xml id of the cluster
                          <databasename>  : The name of the database in the cluster
```

3.4.3 OEDACLI Command Reference

These OEDACLI commands are arranged by the object they act upon.

- OEDACLI Commands

- ACFSVOLUME

- CELL

- CLUSTER

- DISKGROUP

- DATABASE

- DATABASE HOME

- ES

- GUEST

- ILOM

- MACHINE

- NETWORK

- SCAN

- SWITCH

- VIP

3.4.3.1 OEDACLI Commands

These commands are used to interact with OEDACLI, to load and save files, and to merge, save, and deploy actions.

- LOAD FILE
- SAVE ACTION
- MERGE ACTIONS
- DEPLOY ACTIONS
- SAVE FILE
- SAVE FILES
- LIST XMLACTIONS

3.4.3.1.1 LOAD FILE

Use this command to load an engineered system XML file (es.xml) into OEDACLI memory for editing.

Syntax

```
 LOAD FILE NAME=filename
```

Arguments

- `NAME` : Specifies the name of an existing engineered system XML file

Example 3-3   Loading a File into OEDACLI for Editing

```
oedacli> LOAD FILE NAME=Oracle-test12.xml
SUCCESS - file loaded OK
Customer : testadm01 - Oracle
```

3.4.3.1.2 SAVE ACTION

Use this command to save the current action to engineered system XML memory copy.

Syntax

```
SAVE ACTION [FORCE]
```

Arguments

Specify `FORCE` if the action should be auto-merged into the engineered system model.

> ✎ **Note:**
>
> The engineered system configuration should be saved as a file using a subsequent `SAVE FILE` command.

3.4.3.1.3 MERGE ACTIONS

Use this command to merge the current actions into the other actions in the Engineered System model.

Syntax

```
MERGE ACTIONS [FORCE]
```

Arguments

Specify `FORCE` if you do not want this action to be processed by a `DEPLOY ACTIONS` command.

3.4.3.1.4 DEPLOY ACTIONS

Use this command to execute all actions from the Actions section of the engineered systems XML file.

Syntax

```
DEPLOY ACTIONS
```

Example 3-4   Deploying the Actions to Add a Database

```
oedacli> DEPLOY ACTIONS
Deploying Action ID : 4 add database dbname='testdb' DATADG='DATAC1' RECODG='
RECOC1' where DBHOMEID='c0_databaseHome'
Deploying ADD DATABASE
Running datapatch on database 'testdb'
Done...
Done
```

3.4.3.1.5 SAVE FILE

Use this command to save a current set of actions to a new engineered system XML file.

Syntax

```
SAVE FILE [ NAME=filename ]
```

Arguments

The optional argument, `NAME`, is used to specify the name of a new engineered system XML file. If you do not specify the `NAME` argument, then this command overwrites the source file.

3.4.3.1.6 SAVE FILES

Use this command to generate a new set of configuration files from OEDA.

Syntax

```
SAVE FILES LOCATION = dirname
```

Arguments

The LOCATION argument specifies the directory in which the new file set will be created.

Usage Notes

If the specified directory does not exist, it will be created.

3.4.3.1.7 LIST XMLACTIONS

This command lists the current actions created by OEDACLI.

Syntax

```
LIST XMLACTIONS
```

3.4.3.2 ACFSVOLUME

You can add, alter, delete, or list Oracle ACFS volumes.

- ADD ACFSVOLUME
- ALTER ACFSVOLUME
- DELETE ACFSVOLUME
- LIST ACFSVOLUME

3.4.3.2.1 ADD ACFSVOLUME

This command adds Oracle ASM Cluster File System (Oracle ACFS) volumes.

Syntax

```
ADD ACFSVOLUME
   VOLUMENAME = volume_name |
   VOLUMESIZE = volume_size |
   MOUNTPATH = mountpath
WHERE
 DISKGROUPID = diskgroup_id |
 CLUSTERNUMBER = cluster_number DISKGROUPNAME = diskgroup_name |
 CLUSTERNAME = cluster_name DISKGROUPNAME diskgroup_name |
 CLUSTERID = cluster_id DISKGROUPNAME = diskgroup_name
```

Arguments

You can specify the following attributes for the new Oracle ACFS volume:

- VOLUMENAME : Specifies a unique name for the new volume
- VOLUMESIZE : A number that specifies the size of the new volume in GB
- MOUNTPATH : Specifies the file system mount path for the new volume

The following arguments are available in the WHERE clause:

- DISKGROUPID : Specifies the es.xml ID for the container disk group
- CLUSTERNUMBER : Specifies the cluster number in the es.xml, starting at 1
- CLUSTERNAME : Specifies the name of the cluster

- CLUSTERID : Specifies the es.xml ID of the cluster

- DISKGROUPNAME : Specifies the name of the container disk group

3.4.3.2.2 ALTER ACFSVOLUME

This command alters an existing Oracle ASM Cluster File System (Oracle ACFS) volume.

Syntax

```
ALTER ACFSVOLUME
    VOLUMENAME = volume_name |
    VOLUMESIZE = volume_size |
    MOUNTPATH = mountpath
WHERE
 ID = acfs_volume_id |
 DISKGROUPID = diskgroup_id VOLUMENAME = volume_name|
 CLUSTERNUMBER = cluster_number DISKGROUPNAME = diskgroup_name VOLUMENAME =
volume_name|
 CLUSTERNAME = cluster_name DISKGROUPNAME diskgroup_name VOLUMENAME = volume_name|
 CLUSTERID = cluster_id DISKGROUPNAME = diskgroup_name VOLUMENAME = volume_name
```

Arguments

You can modify the following attributes of the Oracle ACFS volume:

- VOLUMENAME : Specifies a new, unique volume name

- VOLUMESIZE : A number that specifies the new size of the volume in GB

- MOUNTPATH : Specifies the new file system mount path for the volume

The following arguments are available in the WHERE clause:

- ID : Specifies the es.xml ID for an existing Oracle ACFS volume

- DISKGROUPID : Specifies the es.xml ID for the container disk group

- CLUSTERNUMBER : Specifies the cluster number in the es.xml, starting at 1

- CLUSTERNAME : Specifies the name of the cluster

- CLUSTERID : Specifies the es.xml ID of the cluster

- DISKGROUPNAME : Specifies the name of the container disk group

- VOLUMENAME : Specifies the name of the existing Oracle ACFS volume

3.4.3.2.3 DELETE ACFSVOLUME

This command deletes an existing Oracle ASM Cluster File System (Oracle ACFS) volume.

Syntax

```
DELETE ACFSVOLUME
WHERE
 ID = acfs_volume_id |
 DISKGROUPID = diskgroup_id VOLUMENAME = volume_name|
 CLUSTERNUMBER = cluster_number DISKGROUPNAME = diskgroup_name VOLUMENAME =
volume_name|
```

```
CLUSTERNAME = cluster_name DISKGROUPNAME diskgroup_name VOLUMENAME = volume_name|
CLUSTERID = cluster_id DISKGROUPNAME = diskgroup_name VOLUMENAME = volume_name
```

Arguments

The following arguments are available in the WHERE clause:

- `ID` : Specifies the `es.xml` ID for the Oracle ACFS volume
- `DISKGROUPID` : Specifies the `es.xml` ID for the container disk group
- `CLUSTERNUMBER` : Specifies the cluster number in the `es.xml`, starting at 1
- `CLUSTERNAME` : Specifies the name of the cluster
- `CLUSTERID` : Specifies the `es.xml` ID of the cluster
- `DISKGROUPNAME` : Specifies the name of the container disk group
- `VOLUMENAME` : Specifies the name of the existing Oracle ACFS volume

3.4.3.2.4 LIST ACFSVOLUME

This command lists the Oracle ASM Cluster File System (Oracle ACFS) volumes.

Syntax

```
LIST ACFSVOLUMES
WHERE
 ID = id |
 DISKGROUPID = diskgroup_id |
 CLUSTERNUMBER = cluster_number [DISKGROUPNAME = diskgroup_name] |
 CLUSTERNAME = cluster_name [DISKGROUPNAME diskgroup_name] |
 CLUSTERID = cluster_id [DISKGROUPNAME = diskgroup_name]
```

Arguments

The following arguments are available in the WHERE clause:

- `ID` : Specifies the `es.xml` ID for the Oracle ACFS volume
- `DISKGROUPID` : Specifies the `es.xml` ID for the container disk group
- `CLUSTERNUMBER` : Specifies the cluster number in the `es.xml`, starting at 1
- `CLUSTERNAME` : Specifies the name of the cluster
- `CLUSTERID` : Specifies the `es.xml` ID of the cluster
- `DISKGROUPNAME` : Specifies the name of the container disk group

Usage Notes

There is no `WHERE` clause that will list all the Oracle ACFS volumes in the `es.xml` file.

3.4.3.3 CELL

You can clone, delete, or list Oracle Exadata storage cells.

- CLONE CELL
- DELETE CELL
- LIST CELLS

3.4.3.3.1 CLONE CELL

This command clones an existing storage cell.

Syntax

```
CLONE CELL SRCNAME = source_cell
  SET ADMINNET NAME=admin_name,IP=IP_admin
  SET PRIVNET NAME1=priv_name_1,IP1=priv_ip1,NAME2=priv_name_2,IP2=priv_ip2
  SET ILOMNET NAME=ilom_name,IP=ilom_ip
  SET RACK NUM=rack_number,ULOC=ulocation
```

Arguments

SRCNAME is used to specify the name of an existing cell from which the new cell is derived.

The following arguments are available in the SET clauses:

- ADMINNET : Specifies the DNS name (*admin_name*) with an optional domain name and the IP address to be used for the admin network.

- PRIVNET : Specifies the name with an optional domain name and the IP address to be used for the first and second private networks.

- ILOMNET : Specifies the DNS name with an optional domain name and the IP address to be used for the ILOM network.

- RACK : Specifies the rack number in a multi-rack configuration, where 1 is the first rack, and the physical Ulocation (slot) of the cell in that rack.

3.4.3.3.2 DELETE CELL

This command deletes an existing storage cell.

Syntax

```
DELETE CELL WHERE SRCNAME = cell_host_name
```

Arguments

SRCNAME is used to specify the host name of an existing cell that you want to remove.

3.4.3.3.3 LIST CELLS

This command lists the storage cells.

Syntax

```
LIST CELLS
```

3.4.3.4 CLUSTER

You can alter or list the Oracle RAC Clusters on the Oracle Exadata Database Machine.

- ALTER CLUSTER
- LIST CLUSTERS

3.4.3.4.1 ALTER CLUSTER

This command alters attributes for an existing Oracle RAC Cluster.

Syntax

```
ALTER CLUSTER { CLUSTERNAME = cluster_name | GIVERSION = grid_version |
    GIHOMELOC = grid_home_location | INVLOC = inventory_location|
    BASEDIR = oracle_base_directory |  PATCHLIST = patch_list }
WHERE
    CLUSTERNUMBER = cluster_number |
    CLUSTERNAME = cluster_name |
    CLUSTERID = cluster_id
```

Arguments

You can modify the following attributes of the Oracle RAC Cluster:

- CLUSTERNAME : Specifies a new, unique name for the cluster

- GIVERSION : Specifies the clusterware version, including the bundle patch, for
  example 12.1.0.2.170418

- GIHOMELOC : Specifies a new path for the Grid home

- INVLOC : Specifies a new path for the inventory

- BASEDIR : Specifies a new path for the Oracle base directory

- PATCHLIST : Specifies a full list of patches separated by commas and enclosed in
  single quotes. By default, this is derived from the bundle patch specified by
  GIVERSION.

The following arguments are available in the WHERE clause:

- CLUSTERNUMBER : Specifies the cluster number in the es.xml, starting at 1

- CLUSTERNAME : Specifies the name of the cluster

- CLUSTERID : Specifies the es.xml ID of the cluster

3.4.3.4.2 LIST CLUSTERS

This command lists the existing Oracle RAC clusters.

Syntax

```
LIST CLUSTERS
 [ WHERE
    CLUSTERNUMBER = cluster_number |
    CLUSTERNAME = cluster_name |
    CLUSTERID = cluster_id ]
```

Arguments

The following arguments are available in the WHERE clause:

- CLUSTERNUMBER : Specifies the cluster number in the es.xml, starting at 1

- CLUSTERNAME : Specifies the name of the cluster

- CLUSTERID : Specifies the es.xml ID of the cluster

Usage Notes

The `WHERE` clause is optional.

3.4.3.5 DISKGROUP

You can add, alter, delete, or list the Oracle ASM disk groups.

- ADD DISKGROUP
- ALTER DISKGROUP
- ALTER DISKGROUPS
- DELETE DISKGROUP
- LIST DISKGROUPS

3.4.3.5.1 ADD DISKGROUP

This command adds an Oracle ASM disk group.

Syntax

```
ADD DISKGROUP
    [ ACFSNAME=acfs_name ]
    [ ACFSPATH=acfs_path ]
    [ ACFSSIZE=acfs_size ]
    [ CELLLIST='cell_list' ]
    DISKGROUPNAME=diskgroup_name
    DISKGROUPSIZE=diskgroup_size
    [ OCRVOTE=ocr_voting_disks_included ]
    [ QUORUMDISK=quorum_disks_included ]
    REDUNDANCY=redundancy_level
    SLICESIZE=slice_size
    [ SPARSE=sparse ]
    [ SPARSEVIRTUALSIZE=sparse_virtual_size ]
    [ TYPE = diskgroup_type [ DATABASENAME = database_name ]]
WHERE
    CLUSTERNUMBER = cluster_number |
    CLUSTERNAME = cluster_name |
    CLUSTERID = cluster_id
```

Arguments

You can specify the following attributes for the new Oracle ASM disk group:

- `ACFSNAME` : Specifies the name for the Oracle ACFS volume on this diskgroup

- `ACFSPATH` : Specifies the path for the Oracle ACFS file system

- `ACFSSIZE` : Specifies the size for the Oracle ACFS volume on this diskgroup

- `CELLLIST` : A comma separated list of cells for this disk group, enclosed in single quotes

- `DISKGROUPNAME` : (Mandatory) Specifies the name of the disk group

- `DISKGROUPSIZE` : (Mandatory) Specifies the size of the disk group

- `OCRVOTE` : A boolean variable, where `TRUE` indicates the disk group should store the OCR and voting disks for the cluster.

ORACLE

- `QUORUMDISK` : A boolean variable, where `TRUE` indicates the disk group requires a quorum

- `REDUNDANCY` : (Mandatory) Specifies the redundancy level for the disk group. The accepted values are `NORMAL` or `HIGH`.

- `SLICESIZE` : (Mandatory) Specifies the slice size on disk for each grid disk for this disk group.

- `SPARSE` : A boolean variable, where `TRUE` indicates this should be sparse disk group.

- `SPARSEVIRTUALSIZE` : Specifies the sparse virtual size.

- `TYPE` : Specifies the diskgroup type, which can be `DATA`, `RECO`, `DBFS` or `OTHER`. The default value is `OTHER`. If you want the database to use this disk group, then the type must be set to `DATA` or `RECO`.

- `DATABASENAME` : Specifies the name of the target database for disk groups of type `DATA` or `RECO`.

The following arguments are available in the `WHERE` clause:

- `CLUSTERNUMBER` : Specifies the cluster number in the `es.xml`, starting at 1

- `CLUSTERNAME` : Specifies the name of the cluster

- `CLUSTERID` : Specifies the `es.xml` ID of the cluster

3.4.3.5.2 ALTER DISKGROUP

This command alters attributes for an existing Oracle ASM disk group.

Syntax

```
ALTER DISKGROUP {
    ACFSNAME=acfs_name|
    ACFSPATH=acfs_path |
    ACFSSIZE=acfs_size |
    CELLLIST='cell_list' |
    DISKGROUPNAME=diskgroup_name |
    DISKGROUPSIZE=diskgroup_size |
    OCRVOTE=ocr_voting_disks_included |
    QUORUMDISK=quorum_disks_included |
    REDUNDANCY=redundancy_level |
    SLICESIZE=slice_size |
    SPARSE=sparse |
    SPARSEVIRTUALSIZE=sparse_virtual_size }
WHERE {
    ID = diskgroup_id|
    CLUSTERNUMBER = cluster_number DISKGROUPNAME = diskgroup_name|
    CLUSTERNAME = cluster_name DISKGROUPNAME = diskgroup_name|
    CLUSTERID = cluster_id DISKGROUPNAME = diskgroup_name }
```

Arguments

You can modify the following attributes of an Oracle ASM disk group:

- `ACFSNAME` : Specifies a new name for the Oracle ACFS volume on this diskgroup

- `ACFSPATH` : Specifies the new path for the Oracle ACFS file system

- `ACFSSIZE` : Specifies a new size for the Oracle ACFS volume on this diskgroup

- CELLLIST : A comma separated list of cells for this disk group, enclosed in single quotes

- DISKGROUPNAME : Specifies a new name for the disk group

- DISKGROUPSIZE : Specifies a new size for the disk group

- OCRVOTE : A boolean variable, where TRUE indicates the disk group should store the OCR and voting disks for the cluster.

- QUORUMDISK : A boolean variable, where TRUE indicates the disk group requires a quorum

- REDUNDANCY : Specifies the redundancy level for the disk group. The accepted values are NORMAL or HIGH.

- SLICESIZE : Specifies the slice size on disk for each grid disk for this disk group.

- SPARSE : A boolean variable, where TRUE indicates this should be sparse disk group.

- SPARSEVIRTUALSIZE : Specifies the sparse virtual size.

The following arguments are available in the WHERE clause:

- ID : Specifies the es.xml ID for the disk group

- CLUSTERNUMBER : Specifies the cluster number in the es.xml, starting at 1

- CLUSTERNAME : Specifies the name of the cluster

- CLUSTERID : Specifies the es.xml ID of the cluster

- DISKGROUPNAME : Specifies the name of the disk group

Usage Notes

If you modify the redundancy, the volume size will be maintained, however the slice size will be recalculated.

Example 3-5   Resizing an Oracle ASM Diskgroup Using OEDACLI

This example shows how to resize an existing Oracle ASM disk group using OEDACLI.

1. Load the OEDA XML configuration file.

```
oedacli> LOAD FILE NAME=Oracle-test.xml
SUCCESS - file loaded OK
Customer : ora07adm01 - Oracle
```

2. Use the command LIST DISKGROUPS to view the disk group details.

```
oedacli> LIST DISKGROUPS
version : "PhysicalLayoutLegacy"
diskGroupName : "DBFS_DG"
redundancy : "NORMAL"
sliceSize : "default"
machines :
machine :
...
...
cellDisks : "ALL"
diskGroupSize : "436G"
ocrVote : "true"
quorumDisk : "false"
id : "c0_dbfsdg"
```

```
version : "PhysicalLayoutLegacy"
diskGroupName : "DATAC1"
redundancy : "NORMAL"
sliceSize : "2953G"
machines :
..
..
cellDisks : "ALL"
diskGroupSize : "53154G"
ocrVote : "false"
quorumDisk : "false"
id : "c0_datadg"
version : "PhysicalLayoutLegacy"
diskGroupName : "RECOC1"
redundancy : "NORMAL"
sliceSize : "ALL"
machines :
..
..
cellDisks : "ALL"
diskGroupSize : "13284G"
ocrVote : "false"
quorumDisk : "false"
id : "c0_recodg"
```

3. Create an action for resizing the disk group.

```
oedacli> ALTER DISKGROUP DISKGROUPSIZE='2500G' WHERE CLUSTERNUMBER=1 DISKGROUPN
AME='DATAC1'
```

4. Save the action.

```
oedacli> SAVE ACTION
```

5. Merge all actions.

```
oedacli> MERGE ACTIONS
processMerge
processMergeActions
Merging Action : alter diskgroup diskgroupsize='2500G' where diskgroupname='DAT
AC1' clusternumber=1
Merging ALTER DISKGROUP
Action Validated and Merged OK
```

6. Deploy the actions.

```
oedacli> DEPLOY ACTIONS
Deploying Action ID : 3 alter diskgroup diskgroupsize='2500G' where diskgroupna
me='DATAC1'
Deploying ALTER DISKGROUP
Deploying Action ID : 4 alter diskgroup diskgroupsize='2500G' where diskgroupna
me='DATAC1' clusternumber=1
Deploying ALTER DISKGROUP
Validating ASM Disk status..
Disks in ASM Disk Group DATAC1 have valid status
Shrinking Disk Group size to 2500 GB
Resizing ASM Disk Group..
Checking Reblance operations in disk group DATAC1
Rebalance operations completed in disk group DATAC1
Original Grid Disk Size 2953 GB, new size 138 GB on node1celadm02.us.oracle.com
Original Grid Disk Size 2953 GB, new size 138 GB on node1celadm03.us.oracle.com
Original Grid Disk Size 2953 GB, new size 138 GB on node1celadm01.us.oracle.com
Updated/New Disk Group size 2484 GB, original size 53154 GB.
```

```
        Done...
        Done
```

3.4.3.5.3 ALTER DISKGROUPS

This command alters disk group sizing attributes for existing Oracle ASM disk groups.

Syntax

```
ALTER DISKGROUPS
    DATASPLIT=data_split_percent
    RECOSPLIT=reco_split_percent
    DATAREDUNDANCY=data_redundancy_level
    RECOREDUNDANCY=reco_redundancy_level
    SPLITDISK=percent_of_cell_disk
WHERE
    DATADG = data_diskgroup
    RECODG = reco_diskgroup
    CLUSTERNAME = cluster_name | CLUSTERNUMBER = cluster_number |
        CLUSTERID = cluster_id
```

Arguments

You can modify the following sizing attributes of the `DATA` and `RECO` Oracle ASM disk groups:

- `DATASPLIT` : Specifies a percentage of the Oracle ASM volume allocated to the DATA disk group

- `RECOSPLIT` : Specifies a percentage of the Oracle ASM volume allocated to the RECO disk group

- `DATAREDUNDANCY` : Specifies the redundancy level for the DATA disk group. The accepted values are `NORMAL` or `HIGH`.

- `RECOREDUNDANCY` : Specifies the redundancy level for the RECO disk group. The accepted values are `NORMAL` or `HIGH`.

- `SPLITDISK` : Specifies the percentage of the cell disk to allocate to the DATA and RECO disk groups. The specified value must be less an integer between 1 and 100.

The following arguments are available in the `WHERE` clause:

- `DATADG` : Specifies the name of the DATA disk group in the cluster

- `RECODG` : Specifies the name of the RECO disk group in the cluster

- `CLUSTERNUMBER` : Specifies the cluster number in the `es.xml`, starting at 1

- `CLUSTERNAME` : Specifies the name of the cluster

- `CLUSTERID` : Specifies the `es.xml` ID of the cluster

3.4.3.5.4 DELETE DISKGROUP

This command deletes an existing Oracle ASM disk group.

Syntax

```
DELETE DISKGROUP
WHERE
    ID = diskgroup_id|
```

```
CLUSTERNUMBER = cluster_number DISKGROUPNAME = diskgroup_name|
CLUSTERNAME = cluster_name DISKGROUPNAME = diskgroup_name|
CLUSTERID = cluster_id DISKGROUPNAME = diskgroup_name
```

Arguments

The following arguments are available in the WHERE clause:

- ID : Specifies the es.xml ID for the disk group

- CLUSTERNUMBER : Specifies the cluster number in the es.xml, starting at 1

- CLUSTERNAME : Specifies the name of the cluster

- CLUSTERID : Specifies the es.xml ID of the cluster

- DISKGROUPNAME : Specifies the name of the disk group

3.4.3.5.5 LIST DISKGROUPS

This command lists the existing Oracle ASM disk groups.

Syntax

```
LIST DISKGROUPS
[ WHERE
  ID = diskgroup_id|
  CLUSTERNUMBER = cluster_number |
  CLUSTERNAME = cluster_name |
  CLUSTERID = cluster_id ]
```

Arguments

The following arguments are available in the WHERE clause:

- ID : Specifies the es.xml ID for the disk group

- CLUSTERNUMBER : Specifies the cluster number in the es.xml, starting at 1

- CLUSTERNAME : Specifies the name of the cluster

- CLUSTERID : Specifies the es.xml ID of the cluster

- DISKGROUPNAME : Specifies the name of the disk group

3.4.3.6 DATABASE

You can add, alter, delete, or list the Oracle databases.

- ADD DATABASE
- ALTER DATABASE
- DELETE DATABASE
- LIST DATABASES

3.4.3.6.1 ADD DATABASE

This command adds an Oracle database, or a CDB or PDB to an existing CDB.

Syntax

```
ADD DATABASE
    [ BLOCKSIZE = blocksize ]
    [ CHARSET = database_character_set
    DATADG = data_diskgroup
    [ DBLANG = database_language ]
    DBNAME = database_name
    [ DBTEMPLATE = database_template ]
    [ DBTYPE = database_type ]
    [ HOSTNAMES = 'host_names' ]
    RECODG = reco_diskgroup
WHERE
    { DBHOMEID = database_home_id |
    CLUSTERNUMBER = cluster_number DBHOMELOC = database_home_location |
    CLUSTERNAME = cluster_name DBHOMELOC = database_home_location |
    CLUSTERID = cluster_id DBHOMELOC = database_home_location |
    CLUSTERNUMBER = cluster_number CDBNAME = container_database_name |
    CLUSTERNAME = cluster_name CDBNAME = container_database_name |
    CLUSTERID = cluster_id CDBNAME = container_database_name }
```

Arguments

You can specify the following attributes for the new Oracle database:

- `BLOCKSIZE` : Specifies the block size for the new database. The default value is 8192. This argument is not required for pluggable databases.

- `CHARSET` : Specifies the character set to use for the new database. The default value is `AL32UTF8`. This argument is not required for pluggable databases.

- `DATADG` : (Mandatory) Specifies the name of the DATA disk group for the new database. This argument is not required for pluggable databases.

- `DBLANG` : Specifies the language to use for the new database. The default value is `all_langs`. This argument is not required for pluggable databases.

- `DBNAME` : (Mandatory) Specifies the name of the new database.

- `DBTEMPLATE` : Specifies the template to use when creating the new database, `ADMIN` or `DW`. The default value is `ADMIN`. This argument is not required for pluggable databases.

- `DBTYPE` : Specifies the type of database to create. The accepted values are `normal DB`, `CDB`, or `PDB`. The default value is `normal DB`.

- `HOSTNAMES` : Specifies a comma-separated list of host names on which the database should run. The default value is the list of nodes registered with the database home.

- `RECODG` : (Mandatory) Specifies the name of the RECO disk group for the new database. This argument is not required for pluggable databases.

The following arguments are available in the `WHERE` clause:

- `DBHOMEID` : Specifies the `es.xml` ID of the database home.

- `CLUSTERNUMBER` : Specifies the cluster number in the `es.xml`, starting at 1

- `CLUSTERNAME` : Specifies the name of the cluster

- `CLUSTERID` : Specifies the `es.xml` ID of the cluster

- `DBHOMELOCATION` : Specifies the path for the target database home.

- `CDBNAME` : Specifies the database name for the container database. This argument is required only when `DBTYPE` is set to PDB.

Example 3-6   Adding a New Oracle Database Using OEDACLI

This example shows how to add a new database to the configuration.

1. Load the OEDA XML configuration file.

   ```
   oedacli> LOAD FILE NAME=Oracle-test.xml
   SUCCESS - file loaded OK
   Customer : ora07adm01 - Oracle
   ```

2. Use the command `LIST DATABASEHOMES` to identify the `databasehome_id` associated with the target database home. This database home will be used to create the new database.

   ```
   oedacli> LIST DATABASEHOMES
   version : "CloneInstall"
   cluster :
   id : "c0_clusterHome"
   databaseHomeName : "c0_DbHome_0"
   databaseSwOwner : "c0_oracle"
   databaseVersion : "12.2.0.1.170718"
   databaseHomeLoc : "/u01/app/oracle/product/12.2.0.1/dbhome_1"
   inventoryLocation : "/u01/app/oraInventory"
   language : "all_langs"
   machines :
   machine : ...
   ...
   patches :
   patch :
   patchNumber : "26133434"
   basedir : "/u01/app/oracle"
   useZfs : "false"
   id : "c0_databaseHome1"
   ```

3. Create an action for creating the new database. You must provide a name for the new database, and the names of the DATA and RECO disk groups that the new database should use. Also, use the ID retrieved in the previous step to specify the Oracle Home in which to create this database.

   ```
   oedacli> ADD DATABASE DBNAME='testdb' DATADG='DATAC1' RECODG='RECOC1'
   WHERE DBHOMEID='c0_databaseHome'
   ```

4. Save the action.

   ```
   oedacli> SAVE ACTION
   ```

5. Merge all actions.

   ```
   oedacli> MERGE ACTIONS
   processMerge
   processMergeActions
   Merging Action : add database dbname='testdb' DATADG='DATAC1' RECODG='RECOC1'
   where DBHOMEID='c0_databaseHome'
   Merging ADD DATABASE
   Action Validated and Merged OK
   ```

6. Save the action to a new Engineered Systems XML configuration file.

   ```
   oedacli> SAVE FILE NAME ='cli-test-2databases.xml'
   File : cli-test-2databases.xml saved OK
   ```

7. Deploy the actions.

```
oedacli> DEPLOY ACTIONS
Deploying Action ID : 4 add database dbname='testdb' DATADG='DATAC1' RECODG='
RECOC1' where DBHOMEID='c0_databaseHome'
Deploying ADD DATABASE
Running datapatch on database 'testdb'
Done...
Done
```

3.4.3.6.2 ALTER DATABASE

This command alters an existing Oracle database.

Syntax

```
ALTER DATABASE
    [ BLOCKSIZE = blocksize ]
    [ CHARSET = database_character_set
    DATADG = data_diskgroup
    [ DBLANG = database_language ]
    DBNAME = database_name
    [ DBTEMPLATE = database_template ]
    [ DBTYPE = database_type ]
    [ HOSTNAMES = 'host_names' ]
    RECODG = reco_diskgroup
WHERE
    ID = database_id |
    CLUSTERNUMBER = cluster_number DATABASENAME = database_name |
    CLUSTERNAME = cluster_name DATABASENAME = database_name |
    CLUSTERID = cluster_id DATABASENAME = database_name
```

Arguments

You can modify the following attributes for the Oracle database:

- `BLOCKSIZE` : Specifies the new block size for the database. The default value is 8192. This argument is not required for pluggable databases.

- `CHARSET` : Specifies the new character set to use for the database. The default value is `AL32UTF8`. This argument is not required for pluggable databases.

- `DATADG` : (Mandatory) Specifies the name of the DATA disk group for the database. This argument is not required for pluggable databases.

- `DBLANG` : Specifies the new language to use for the database. The default value is `all_langs`. This argument is not required for pluggable databases.

- `DBNAME` : (Mandatory) Specifies the name of the database.

- `DBTEMPLATE` : Specifies the template to use when creating the database, `ADMIN` or `DW`. The default value is `ADMIN`. This argument is not required for pluggable databases.

- `DBTYPE` : Specifies the type of database to create. The accepted values are `normal DB`, `CDB`, or `PDB`. The default value is `normal DB`.

- `HOSTNAMES` : Specifies a comma-separated list of host names on which the database should be created. The default value is the list of nodes registered with the database home.

- `RECODG` : (Mandatory) Specifies the name of the RECO disk group for the database. This argument is not required for pluggable databases.

The following arguments are available in the WHERE clause:

- ID : Specifies the es.xml ID of the database

- CLUSTERNUMBER : Specifies the cluster number in the es.xml, starting at 1

- CLUSTERNAME : Specifies the name of the cluster

- CLUSTERID : Specifies the es.xml ID of the cluster

- DATABASENAME : Specifies the name of the database in the cluster

3.4.3.6.3 DELETE DATABASE

This command deletes an existing Oracle database.

Syntax

```
DELETE DATABASE
WHERE
    ID = database_id |
    CLUSTERNUMBER = cluster_number DATABASENAME = database_name |
    CLUSTERNAME = cluster_name DATABASENAME = database_name |
    CLUSTERID = cluster_id DATABASENAME = database_name
```

Arguments

The following arguments are available in the WHERE clause:

- ID : Specifies the es.xml ID of the database

- CLUSTERNUMBER : Specifies the cluster number in the es.xml, starting at 1

- CLUSTERNAME : Specifies the name of the cluster

- CLUSTERID : Specifies the es.xml ID of the cluster

- DATABASENAME : Specifies the name of the database in the cluster

Example 3-7   Deleting an Oracle Database Using OEDACLI

This example shows how to delete an existing database from the configuration.

1. Load the OEDA XML configuration file.

   ```
   oedacli> LOAD FILE NAME=Oracle-test.xml
   SUCCESS - file loaded OK
   Customer : ora07adm01 - Oracle
   ```

2. List the databases contained in the XML configuration file, so that you can identify the database ID associated with the database you want to delete.

   ```
   oedacli> LIST DATABASES
   version : "2"
   databaseOwner : "c0_oracle"
   databaseSid : "dbm01"
   databaseBlockSize : "8192"
   characterset : "AL32UTF8"
   databaseHome :
   id : "c0_databaseHome"
   machines :
   machine :
   .....
   .....
   diskGroups :
   ```

```
diskGroup :
id : "c0_datadg"
id : "c0_recodg"
id : "c0_dbm01"
.....
.....
databaseHome :
id : "c0_databaseHome3"
machines :
machine :
....
....
databaseTemplate : "OLTP"
databaseStyle : "ADMIN"
language : "all_langs"
diskGroups :
diskGroup :
id : "c0_datadg"
id : "c0_recodg"
id : "c0_testdb01"
```

3. Create an action to delete the target database. Use the database id identified in the previous step

   ```
   oedacli> delete database where id='c0_testdb01'
   ```

4. Save the action.

   ```
   oedacli> SAVE ACTION
   ```

5. Merge all actions.

   ```
   oedacli> MERGE ACTIONS
   processMerge
   processMergeActions
   Merging Action : delete database where id='c0_testdb01'
   Merging DELETE DATABASE
   Action Validated and Merged OK
   ```

6. Deploy the actions into the current configuration.

   ```
   oedacli> DEPLOY ACTIONS
   Deploying Action ID : 1 delete database where id='c0_testdb01'
   Deploying DELETE DATABASE
   Deleting database testdb
   Done...
   Done
   ```

3.4.3.6.4 LIST DATABASES

This command lists the existing Oracle databases.

Syntax

```
LIST DATABASES
[ WHERE
  ID = database_id |
  CLUSTERNUMBER = cluster_number  |
  CLUSTERNAME = cluster_name  |
  CLUSTERID = cluster_id  ]
```

Arguments

The following arguments are available in the `WHERE` clause:

- `ID` : Specifies the `es.xml` ID of the database

- `CLUSTERNUMBER` : Specifies the cluster number in the `es.xml`, starting at 1

- `CLUSTERNAME` : Specifies the name of the cluster

- `CLUSTERID` : Specifies the `es.xml` ID of the cluster

3.4.3.7 DATABASE HOME

You can add, alter, delete, or list the Oracle database homes.

- [ADD DATABASEHOME](#)

- [ALTER DATABASEHOME](#)

- [DELETE DATABASEHOME](#)

- [LIST DATABASEHOMES](#)

3.4.3.7.1 ADD DATABASEHOME

This command adds an Oracle database home to an existing cluster.

Syntax

```
ADD DATABASEHOME
    OWNER = owner DBVERSION = version
    DBHOMELOC = database_home_path [DBHOMENAME = database_home_name]
    [INVLOC = inventory_location] [DBLANG = database_language]
    [MACHINELIST = 'machine_list'] [PATCHLIST = 'patch_list']
    [BASEDIR = base_directory] [VOLUMESIZE = volume_size]
WHERE
    { CLUSTERNUMBER = cluster_number | CLUSTERNAME = cluster_name |
      CLUSTERID = cluster_id }
```

Arguments

You can specify the following attributes for the new Oracle database home:

- `OWNER` : (Mandatory) Specifies the operating system user that owns the Oracle home.

- `DBVERSION` : (Mandatory) Specifies the version of the software in the database home, including the bundle patch, for example 12.1.0.2.170418.

- `DBHOMELOC` : (Mandatory) Specifies the file system path for the new Oracle database home directory.

- `DBHOMENAME` : Specifies the name of the new database home. The default value is the standard template name, for example, `dbhome_1`.

- `INVLOC` : Specifies the location of the Oracle inventory directory. The default value is derived from the cluster home.

- `DBLANG` : Specifies the language to use with the Oracle home. The default value is `all_langs`.

- `MACHINELIST` : Specifies a list of nodes to create the Oracle home on. The default value is list of nodes registered with the Grid home.

- `PATCHLIST` : Specifies a comma-separated list of patches for the database home. The default value is derived from `DBVERSION`.

- `BASEDIR` : Specifies the location of the Oracle Base directory. The default value is derived from `OWNER`.

- `VOLUMESIZE` : Specifies the size of the home directory volume. The default value is 50 GB. This argument is applicable only for database homes for Oracle VM clusters.

The following arguments are available in the `WHERE` clause:

- `CLUSTERNUMBER` : Specifies the cluster number in the `es.xml`, starting at 1

- `CLUSTERNAME` : Specifies the name of the cluster

- `CLUSTERID` : Specifies the `es.xml` ID of the cluster

Example 3-8   Adding a Database Home to a Deployment using OEDACLI

This example shows how to add a new Oracle home. `dbversion` should specify both the base version and the target Bundle Patch version. In this example, we are setting up a new Oracle database home with 12.1.0.2 DBBP 170418. The software will be installed under `/u01/app/oracle/product/12.1.0.2/dbhome_2`.

```
./oedacli

oedacli> LOAD FILE NAME=Oracle-test12.xml
SUCCESS - file loaded OK
Customer : ora07adm01 - Oracle

oedacli> ADD DATABASEHOME OWNER='oracle' DBVERSION='12.1.0.2.170418' DBHOMELOC='/u0
1/app/oracle/product/12.1.0.2/dbhome_2' WHERE CLUSTERNUMBER=1

oedacli> SAVE ACTION

oedacli> MERGE ACTIONS
processMerge
processMergeActions
Merging Action : add databasehome owner='oracle' dbversion='12.1.0.2.170418'
dbhomeloc='/u01/app/oracle/product/12.1.0.2/dbhome_2' where clusternumber=1
Merging ADD DATABASEHOME
Action Validated and Merged OK

oedacli> DEPLOY ACTIONS
Deploying Action ID : 1 add databasehome owner='oracle' dbversion='12.1.0.2.170418'
 dbhomeloc='/u01/app/oracle/product/12.1.0.2/dbhome_2' where clusternumber=1
Deploying ADD DATABASEHOME
Checking local files..
Required files are:
SUCCESS: Required file /scratch/cpabba/Oeda/main/linux-x64/WorkDir/p26022196_121020
_Linux-x86-64.zip exists...
SUCCESS: Required file /scratch/cpabba/Oeda/main/linux-x64/WorkDir/p26027162_121020
_Linux-x86-64.zip exists...
SUCCESS: Required file /scratch/cpabba/Oeda/main/linux-x64/WorkDir/p6880880_122010_
Linux-x86-64.zip exists...
SUCCESS: Required file /scratch/cpabba/Oeda/main/linux-x64/WorkDir/linuxamd64_12102
_database_2of2.zip exists...
SUCCESS: Required file /scratch/cpabba/Oeda/main/linux-x64/WorkDir/linuxamd64_12102
_database_1of2.zip exists...
```

```
Copying required files...
Checking status of remote files...
Checking status of existing files on remote nodes...
Getting status of local files...
Copying file: linuxamd64_12102_database_1of2.zip to node node1adm01.us.oracle.com
Copying file: linuxamd64_12102_database_2of2.zip to node node1adm01.us.oracle.com
Copying file: p26022196_121020_Linux-x86-64.zip to node node1adm01.us.oracle.com
Copying file: p26027162_121020_Linux-x86-64.zip to node node1adm01.us.oracle.com
Copying file: p26022196_121020_Linux-x86-64.zip to node node1adm02.us.oracle.com
Copying file: p26027162_121020_Linux-x86-64.zip to node node1adm02.us.oracle.com
Completed copying files...
Extracting files...
Completed extracting files...
Validating nodes for database readiness...
Installing database software ...
Running database installer on node node1adm01.us.oracle.com ... Please wait...
After running database installer...
Patching...
Done...
Done
```

3.4.3.7.2 ALTER DATABASEHOME

This command alters an existing Oracle database home.

Syntax

```
ALTER DATABASEHOME
    OWNER = owner |
    DBVERSION = version |
    DBHOMELOC = database_home_path |
    DBHOMENAME = database_home_name |
    INVLOC = inventory_location |
    DBLANG = language |
    MACHINELIST = 'machine_list' |
    PATCHLIST = 'patch_list'  |
    BASEDIR = base_directory
WHERE
    ID = database_home_id |
    CLUSTERNUMBER = cluster_number DBHOMELOC = database_home_path |
    CLUSTERNAME = cluster_name DBHOMELOC = database_home_path |
    CLUSTERID = cluster_id DBHOMELOC = database_home_path
```

Arguments

You can modify the following attributes for the Oracle database home:

- OWNER : Specifies the operating system user that owns the Oracle home.

- DBVERSION : Specifies the version of the software in the database home, including the bundle patch, for example 12.1.0.2.170418.

- DBHOMELOC : Specifies the file system path for the new Oracle database home directory.

- DBHOMENAME : Specifies the new name of the database home. The database home name must be unique within a cluster.

- INVLOC : Specifies the location of the Oracle inventory directory.

- DBLANG : Specifies the supported languages for the Oracle home.

- `MACHINELIST` : Specifies a list of nodes. The nodes must exist within the cluster.
- `PATCHLIST` : Specifies a comma-separated, custom list of patches for the database home.
- `BASEDIR` : Specifies the location of the Oracle Base directory.

The following arguments are available in the `WHERE` clause:

- `ID` : Specifies the `es.xml` ID for the database home
- `CLUSTERNUMBER` : Specifies the cluster number in the `es.xml`, starting at 1
- `CLUSTERNAME` : Specifies the name of the cluster
- `CLUSTERID` : Specifies the `es.xml` ID of the cluster
- `DBHOMELOC` : Specifies the path for the database home directory.

3.4.3.7.3 DELETE DATABASEHOME

This command removes an existing Oracle database home.

Syntax

```
DELETE DATABASEHOME
WHERE
   ID = database_home_id |
   CLUSTERNUMBER = cluster_number DBHOMELOC = database_home_path |
   CLUSTERNAME = cluster_name DBHOMELOC = database_home_path |
   CLUSTERID = cluster_id DBHOMELOC = database_home_path
```

Arguments

The following arguments are available in the `WHERE` clause:

- `ID` : Specifies the `es.xml` ID for the database home
- `CLUSTERNUMBER` : Specifies the cluster number in the `es.xml`, starting at 1
- `CLUSTERNAME` : Specifies the name of the cluster
- `CLUSTERID` : Specifies the `es.xml` ID of the cluster
- `DBHOMELOC` : Specifies the path for the database home directory.

Usage Notes

The database home you are deleting must not contain any dependent databases.

Example 3-9   Removing an Existing Oracle Database Home

This example shows how to delete an existing Oracle Database home directory.

```
oedacli> LOAD FILE NAME=Oracle-test12.xml
SUCCESS - file loaded OK
Customer : ora07adm01 - Oracle

oedacli> DELETE DATABASEHOME WHERE id='c0_databaseHome1'

oedacli> SAVE ACTION

oedacli> MERGE ACTIONS
processMerge
processMergeActions
```

```
Merging Action : delete databasehome where id='c0_databaseHome1'
Merging DELETE DATABASEHOME
Action Validated and Merged OK

oedacli> DEPLOY ACTIONS
Deploying Action ID : 3 delete databasehome where id='c0_databaseHome1'
Deploying DELETE DATABASEHOME
Validating Oracle home..
Deinstalling database home c0_DbHome_1
Unmounting file system..
Updating /etc/fstab entries...
Done...
Done
```

3.4.3.7.4 LIST DATABASEHOMES

This command lists the existing Oracle database homes.

Syntax

```
LIST DATABASEHOMES
[ WHERE
    ID = database_home_id |
    CLUSTERNUMBER = cluster_number NAME = database_home_name |
    CLUSTERNAME = cluster_name NAME = database_home_name |
    CLUSTERID = cluster_id NAME = database_home_name ]
```

Arguments

The following arguments are available in the WHERE clause:

- ID : Specifies the es.xml ID for the target database home

- CLUSTERNUMBER : Specifies the cluster number in the es.xml, starting at 1

- CLUSTERNAME : Specifies the name of the cluster

- CLUSTERID : Specifies the es.xml ID of the cluster

- NAME : Specifies the name of the target database home

3.4.3.8 ES

You can alter a limited number of attributes of an engineered system.

- ALTER ES

3.4.3.8.1 ALTER ES

This command alters the attributes of an engineered system.

Syntax

```
ALTER ES
    PAAS = 'pass_mode' |
    CUSTOMERNAME = customer_name |
    CUSTOMERDEPT = customer_dept
```

Arguments

You can modify the following attributes for the engineered system:

- `PAAS` : A boolean value, `TRUE` or `FALSE`, which specifies whether to enable PaaS mode.
- `CUSTOMERNAME` : Specifies the customer name.
- `CUSTOMERDEPT` : Specifies the customer department.

3.4.3.9 GUEST

You can clone or delete an Oracle VM guest.

- CLONE GUEST
- DELETE GUEST

3.4.3.9.1 CLONE GUEST

This command clones an existing Oracle VM guest.

Syntax

```
CLONE GUEST SRCNAME = source_guest
  SET PARENT NAME=parent_name
  SET ADMINNET NAME=admin_name,IP=IP_admin
  SET PRIVNET NAME1=priv_name_1,IP1=priv_ip1,NAME2=priv_name_2,
    IP2=priv_ip2 [ SET INTERCONNECT NAME1=priv_name_1,IP1=priv_ip1,
    NAME2=priv_name_2, IP2=priv_ip2 ]
  SET CLIENTNET NAME=client_name,IP=client_ip
  SET VIPNET NAME=vip_name,IP=vip_ip
```

Arguments

`SRCNAME` is used to specify the name of an existing DomU from which the new DomU is derived.

The following arguments are available in the SET clauses:

- `PARENT` : Specifies the host name of the Dom0 use to host this new guest
- `ADMINNET` : Specifies the DNS name with an optional domain name and the IP address to be used for the admin network
- `PRIVNET` : Specifies the DNS name with an optional domain name and the IP address to be used for the first and second private networks
- `INTERCONNECT` : Specifies the DNS name with an optional domain name and the IP address to be used for the first and second private interconnects
- `CLIENTNET` : Specifies the DNS name with an optional domain name and the IP address to be used for the client network
- `VIPNET` : Specifies the DNS name with an optional domain name and the IP address to be used for the VIP network

Usage Notes

The `SET INTERCONNECT` clause is only required if the compute nodes are configured with InfiniBand security (PKEYS).

3.4.3.9.2 DELETE GUEST

This command deletes an existing Oracle VM guest, removing the instance, home, and Oracle Clusterware from the cluster.

Syntax

```
DELETE GUEST WHERE SRCNAME = node_name
```

Arguments

`SRCNAME` is used to specify the host name of an existing DomU that you want to delete.

3.4.3.10 ILOM

You can alter or list the ILOMS in the loaded `es.xml` file.

- ALTER ILOM
- LIST ILOMS

3.4.3.10.1 ALTER ILOM

This command alters attributes of an ILOM.

Syntax

```
ALTER ILOM { DNSSERVERS='dns_servers' | NTPSERVERS= 'ntp_servers' |
   TIMEZONE = timezone }
WHERE {
   ID = ilom_id |
   HOSTNAME = hostname |
   ILOMNAME = ilom_hostname }
```

Arguments

You can specify the following attributes for the ILOM:

- `DNSSERVERS` : Specifies a comma-separated list of DNS servers that is enclosed in single quotes.
- `NTPSERVERS` : Specifies a comma-separated list of NTP servers that is enclosed in single quotes.
- `TIMEZONE` : Specifies a valid time zone for the ILOM.

The following arguments are available in the `WHERE` clause:

- `ID` : Specifies the `es.xml` ID for the target ILOM
- `HOSTNAME` : Specifies the current host name of the target machine
- `ILOMNAME` : Specifies the current host name of the ILOM

3.4.3.10.2 LIST ILOMS

This command lists the ILOMs in the `es.xml` file.

Syntax

```
LIST ILOMS
[ WHERE {
    ID = ilom_id |
    HOSTNAME = hostname |
    ILOMNAME = ilom_hostname } ]
```

Arguments

The following arguments are available in the WHERE clause:

- ID : Specifies the es.xml ID for the target ILOM

- HOSTNAME : Specifies the current host name of the target machine

- ILOMNAME : Specifies the current host name of the ILOM

Usage Notes

If you do not specify a WHERE clause, then this command lists all the ILOMs in the es.xml file.

3.4.3.11 MACHINE

You can alter or list the machines in the es.xml file.

- ALTER MACHINE
- LIST MACHINES

3.4.3.11.1 ALTER MACHINE

This command alters attributes of a compute node or storage cell in an engineered system.

Syntax

```
ALTER MACHINE { DNSSERVERS='dns_servers' | GATEWAYADAPTER=gateway_adapter |
    HOSTNAMEADAPTER=hostname_adapter | NTPSERVERS= 'ntp_servers' |
    TIMEZONE = timezone }
WHERE {
    ID = machine_id |
    HOSTNAME = hostname |
    CLUSTERNUMBER = cluster_number COMPUTENUMBER = compute_number |
    CLUSTERNUMBER = cluster_number STORAGENUMBER = storage_number |
    CLUSTERNAME = cluster_name COMPUTENUMBER = compute_number |
    CLUSTERNAME = cluster_name STORAGENUMBER = storage_number |
    CLUSTERID = cluster_id COMPUTENUMBER = compute_number |
    CLUSTERID = cluster_id STORAGENUMBER = storage_number }
```

Arguments

You can specify the following attributes for the machine:

- DNSSERVERS : Specifies a comma-separated list of DNS servers that is enclosed in single quotes.

- GATEWAYADAPTER : Specifies the network adapter to use as the machine gateway. Valid values are ADMIN or CLIENT.

- `HOSTNAMEADAPTER` : Specifies the network adapter to use as the host name. Valid values are `ADMIN` or `CLIENT`.

- `NTPSERVERS` : Specifies a comma-separated list of NTP servers that is enclosed in single quotes.

- `TIMEZONE` : Specifies a valid time zone for the machine.

The following arguments are available in the `WHERE` clause:

- `ID` : Specifies the `es.xml` ID for the target machine

- `HOSTNAME` : Specifies the current host name of the target machine

- `CLUSTERNUMBER` : Specifies the cluster number in the `es.xml`, starting at 1

- `CLUSTERNAME` : Specifies the name of the cluster

- `CLUSTERID` : Specifies the `es.xml` ID of the cluster

- `COMPUTENUMBER` : Specifies the compute node number in the cluster, starting at 1

- `STORAGENUMBER` : Specifies the storage cell number in the cluster, starting at 1

3.4.3.11.2 LIST MACHINES

This command lists the machine available in the `es.xml` file for an engineered system.

Syntax

```
LIST MACHINES
{ WHERE
    TYPE = type |
    ID = machine_id [ TYPE = type ] |
    CLUSTERNUMBER = cluster_number [ TYPE = type ] |
    CLUSTERNAME = cluster_name [ TYPE = type ] |
    CLUSTERID = cluster_id [ TYPE = type ] }
```

Arguments

The following arguments are available in the `WHERE` clause:

- `TYPE` : Specifies the machine type. The valid values are `COMPUTE`, `CELL`, `STORAGE`, `DOM0`, `GUEST`, or `DOMU`.

- `ID` : Specifies the `es.xml` ID for an individual machine

- `CLUSTERNUMBER` : Specifies the cluster number in the `es.xml`, starting at 1

- `CLUSTERNAME` : Specifies the name of the cluster

- `CLUSTERID` : Specifies the `es.xml` ID of the cluster

Usage Notes

If you do not specify a `WHERE` clause, then this command lists all the machines defined in the `es.xml` file.

3.4.3.12 NETWORK

You can add, alter, delete, or list the networks defined in the XML configuration file.

- ADD NETWORK

- [ALTER NETWORK](#)
- [DELETE NETWORK](#)
- [LIST NETWORKS](#)

3.4.3.12.1 ADD NETWORK

This command adds a network record to a machine in the existing configuration.

Syntax

```
ADD NETWORK
    NETWORKTYPE=network_type HOSTNAME=hostname IP=ip_addr
    NETMASK=netmask DOMAINNAME=domain_name MASTER=master
    [ GATEWAY=gateway] [ SSHENABLED=ssh_enabled ] [ MAC=mac_addr ]
    [ NICSPEED=nic_speed [ SLAVE='slave'] [ PKEY=pkey ]
    [ PKEYNAME=pkey_name ] [ STATUS = status ] [ LACP=lacp ]
    [ VLANID=vlan_id ] [ NATHOSTNAME=nat_host_name ] [ NATIP=nat_ip_addr ]
    [ NATDOMAINNAME=nat_domain_name ] [ NATNETMASK=nat_mask ]
WHERE {
    HOSTNAME = hostname |
    CLUSTERNAME = cluster_name COMPUTENUMBER=compute_number |
    CLUSTERNAME = cluster_name STORAGENUMBER=storage_number |
    CLUSTERNUMBER = cluster_number COMPUTENUMBER=compute_number |
    CLUSTERNUMBER = cluster_number STORAGENUMBER=storage_number }
```

Arguments

You can specify the following attributes when adding a network:

- `NETWORKTYPE` : (Mandatory) Specifies the type of network, which can be `ADMIN`, `CLIENT`, `BACKUP`, `PRIVATE`, `OTHER`, `INGESTVIP`, `REPLICATIONVIP`, or `ILOM`.

- `HOSTNAME` : (Mandatory) Specifies the short host name for the network

- `IP` : (Mandatory) Specifies the IP address of the network

- `NETMASK` : (Mandatory) Specifies the netmask of the network

- `DOMAINNAME` : (Mandatory) Specifies the domain name of the network

- `MASTER` : (Mandatory) Specifies the master adapter name

- `GATEWAY` : Specifies the network subnet gateway

- `SSHENABLED` : A Boolean variable where `TRUE` indicates SSH should be enabled for this adapter

- `MAC` : Specifies the MAC address

- `NICSPEED` : (Only for X7 2 socket compute nodes), either 10000 or 25000

- `SLAVE` : Specifies a space-separated list of slave devices for a bonded network, enclosed in single quotes

- `PKEY` : (For Private networks only) Specifies the pkey

- `PKEYNAME` : (For Private networks only) Specifies the pkey name

- `STATUS` : Specifies the status of the network

- `LACP` : A Boolean variable where `TRUE` indicates that LACP should be enabled

- `VLANID` : Specifies the VLAN Id if network is a VLAN network and not private

- `NATHOSTNAME` : Specifies the NAT host name

- `NATIP` : Specifies the NAT IP address

- `NATDOMAINNAME` : Specifies the NAT domain name

- `NATNETMASK` : Specifies the NAT netmask

The following arguments are available in the `WHERE` clause:

- `HOSTNAME` : Specifies the host name for an existing compute node

- `CLUSTERNUMBER` : Specifies the cluster number in the `es.xml`, starting at 1

- `CLUSTERNAME` : Specifies the name of an existing cluster

- `COMPUTENUMBER` : Specifies the number of an existing compute node in the cluster, starting at 1

- `STORAGENUMBER` : Specifies the umber of an existing storage cell in the cluster, starting at 1

3.4.3.12.2 ALTER NETWORK

This command modifies a network record for a machine in the existing configuration.

Syntax

```
ALTER NETWORK {
   [ HOSTNAME=hostname ] [ IP=ip_addr ] [ NETMASK=netmask ]
   [ DOMAINNAME=domain_name] [ MASTER=master] [ GATEWAY=gateway]
   [ SSHENABLED=ssh_enabled ] [ MAC=mac_addr ] [ NICSPEED=nic_speed]
   [ SLAVE='slave'] [ PKEY=pkey ] [ PKEYNAME=pkey_name ]
   [ STATUS = status ] [ LACP=lacp ] [ VLANID=vlan_id ]
   [ NATHOSTNAME=nat_host_name ] [ NATIP=nat_ip_addr ]
   [ NATDOMAINNAME=nat_domain_name ] [ NATNETMASK=nat_mask ] }
WHERE {
   ID = network_id |
   NETWORKHOSTNAME = network_hostname |
   NATHOSTNAME = nat_hostname |
   HOSTNAME = hostname NETWORKTYPE = network_type [PRIVATEID=private_id]|
   CLUSTERNAME = cluster_name { COMPUTENUMBER=compute_number |
STORAGENUMBER=storage_number }
     NETWORKTYPE = network_type [PRIVATEID=private_id] |
   CLUSTERNUMBER = cluster_number { COMPUTENUMBER=compute_number |
STORAGENUMBER=storage_number }
     NETWORKTYPE = network_type [PRIVATEID=private_id] }
```

Arguments

You can specify the following attributes when altering a network:

- `HOSTNAME` : Specifies the short host name for the network

- `IP` : Specifies the IP address of the network

- `NETMASK` : Specifies the netmask of the network

- `DOMAINNAME` : Specifies the domain name of the network

- `MASTER` : Specifies the master adapter name

- `GATEWAY` : Specifies the network subnet gateway

- SSHENABLED : A Boolean variable where TRUE indicates SSH should be enabled for this adapter

- MAC : Specifies the MAC address

- NICSPEED : (Only for X7 2 socket compute nodes), either 10000 or 25000

- SLAVE : Specifies a space-separated list of slave devices for a bonded network, enclosed in single quotes

- PKEY : (For Private networks only) Specifies the pkey

- PKEYNAME : (For Private networks only) Specifies the pkey name

- STATUS : Specifies the status of the network

- LACP : A Boolean variable where TRUE indicates that LACP should be enabled

- VLANID : Specifies the VLAN Id if network is a VLAN network and not private

- NATHOSTNAME : Specifies the NAT host name

- NATIP : Specifies the NAT IP address

- NATDOMAINNAME : Specifies the NAT domain name

- NATNETMASK : Specifies the NAT netmask

The following arguments are available in the WHERE clause:

- ID : Specifies the ID for the target network in the XML configuration file.

- NETWORKHOSTNAME : Specifies the host name for an network object, not the machine host name

- NATHOSTNAME : Specifies the NAT host name for an existing compute node

- HOSTNAME : Specifies the host name for an existing compute node

- NETWORKTYPE : Specifies the type of network, which can be ADMIN, CLIENT, BACKUP, PRIVATE, OTHER, INGESTVIP, REPLICATIONVIP, or ILOM.

- PRIVATEID : Specifies the ID of the private network

- CLUSTERNUMBER : Specifies the cluster number in the XML configuration file, starting at 1

- CLUSTERNAME : Specifies the name of an existing cluster

- COMPUTENUMBER : Specifies the number of an existing compute node in the cluster, starting at 1

- STORAGENUMBER : Specifies the number of an existing storage cell in the cluster, starting at 1

3.4.3.12.3 DELETE NETWORK

This command removes a network record for a machine.

Syntax

```
DELETE NETWORK
WHERE {
   ID = network_id |
  HOSTNAME = network_hostname NETWORKTYPE = network_type |
  CLUSTERNAME = cluster_name { COMPUTENUMBER=compute_number |
    STORAGENUMBER=storage_number } NETWORKTYPE = network_type |
```

```
CLUSTERNUMBER = cluster_number { COMPUTENUMBER=compute_number |
  STORAGENUMBER=storage_number } NETWORKTYPE = network_type |
CLUSTERID = cluster_id { COMPUTENUMBER=compute_number |
  STORAGENUMBER=storage_number } NETWORKTYPE = network_type }
```

Arguments

The following arguments are available in the WHERE clause:

- ID : Specifies the ID for the network object in the XML configuration file.

- HOSTNAME : Specifies the host name for an existing compute node

- NETWORKTYPE : Specifies the type of network, which can be ADMIN, CLIENT, BACKUP, PRIVATE, OTHER, INGESTVIP, REPLICATIONVIP, or ILOM.

- CLUSTERNAME : Specifies the name of an existing cluster

- CLUSTERNUMBER : Specifies the cluster number in the XML configuration file, starting at 1

- CLUSTERID : Specifies the cluster ID in the XML configuration file

- COMPUTENUMBER : Specifies the number of an existing compute node in the cluster, starting at 1

- STORAGENUMBER : Specifies the number of an existing storage cell in the cluster, starting at 1

3.4.3.12.4 LIST NETWORKS

This command lists the network details.

Syntax

```
LIST NETWORKS
[ WHERE {
  ID = network_id |
  HOSTNAME = network_hostname [ NETWORKTYPE = network_type ] |
  CLUSTERNAME = cluster_name { COMPUTENUMBER=compute_number |
    STORAGENUMBER=storage_number } [ NETWORKTYPE = network_type ] |
  CLUSTERNUMBER = cluster_number { COMPUTENUMBER=compute_number |
    STORAGENUMBER=storage_number } [ NETWORKTYPE = network_type ] }   CLUSTERID =
cluster_ID { COMPUTENUMBER=compute_number |
    STORAGENUMBER=storage_number } [ NETWORKTYPE = network_type ] } ]
```

Arguments

The following arguments are available in the WHERE clause:

- ID : Specifies the ID for the network object in the XML configuration file.

- HOSTNAME : Specifies the host name for an existing compute node

- NETWORKTYPE : Specifies the type of network, which can be ADMIN, CLIENT, BACKUP, PRIVATE, or ILOM.

- CLUSTERNAME : Specifies the name of an existing cluster

- CLUSTERNUMBER : Specifies the cluster number in the XML configuration file, starting at 1

- CLUSTERID : Specifies the cluster ID in the XML configuration file

- COMPUTENUMBER : Specifies the number of an existing compute node in the cluster, starting at 1

- STORAGENUMBER : Specifies the number of an existing storage cell in the cluster, starting at 1

3.4.3.13 SCAN

You can add, alter, delete, or list the SCANs for a cluster.

- ADD SCAN
- ALTER SCAN
- DELETE SCAN
- LIST SCANS

3.4.3.13.1 ADD SCAN

This command adds a SCAN to the an individual cluster.

Syntax

```
ADD SCAN SCANNAME=scan_name [ SCANPORT=scan_port ] SCANIPS='scan_ip_addrs'
WHERE
  {   CLUSTERNAME = cluster_name |
      CLUSTERNUMBER = cluster_number |
      CLUSTERID = cluster_id }
```

Arguments

You can specify the following attributes for the new SCAN:

- SCANNAME : Specifies the DNS name for the SCAN

- SCANPORT : Specifies the port for the SCAN. The default value is 1521.

- SCANIPS : A comma-separated list of IP addresses for the SCAN, enclosed in single quotes.

The following arguments are available in the WHERE clause:

- CLUSTERNAME : Specifies the name of the cluster

- CLUSTERNUMBER : Specifies the cluster number in the XML configuration file, starting at 1

- CLUSTERID : Specifies the ID of the cluster in the XML configuration file

3.4.3.13.2 ALTER SCAN

This command modifies the attributes of a SCAN for an individual cluster.

Syntax

```
ALTER SCAN { SCANNAME=scan_name | SCANPORT=scan_port | SCANIPS='scan_ip_addrs' }
 WHERE
  {   CLUSTERNAME = cluster_name |
      CLUSTERNUMBER = cluster_number |
      CLUSTERID = cluster_id }
```

Arguments

You can modify the following attributes for the SCAN:

- `SCANNAME` : Specifies the DNS name for the SCAN
- `SCANPORT` : Specifies the port for the SCAN.
- `SCANIPS` : A comma-separated list of IP addresses for the SCAN, enclosed in single quotes.

The following arguments are available in the `WHERE` clause:

- `CLUSTERNAME` : Specifies the name of the cluster
- `CLUSTERNUMBER` : Specifies the cluster number in the XML configuration file, starting at 1
- `CLUSTERID` : Specifies the ID of the cluster in the XML configuration file

3.4.3.13.3 DELETE SCAN

This command removes a SCAN for an individual cluster.

Syntax

```
DELETE SCAN
 WHERE
 {   CLUSTERNAME = cluster_name |
     CLUSTERNUMBER = cluster_number |
     CLUSTERID = cluster_id }
```

Arguments

The following arguments are available in the `WHERE` clause:

- `CLUSTERNAME` : Specifies the name of the cluster
- `CLUSTERNUMBER` : Specifies the cluster number in the XML configuration file, starting at 1
- `CLUSTERID` : Specifies the ID of the cluster in the XML configuration file

3.4.3.13.4 LIST SCANS

This command lists the SCAN details for all clusters or for an individual cluster.

Syntax

```
LIST SCANS
[ WHERE
 {   SCANID = scan_id |
     CLUSTERNAME = cluster_name |
     CLUSTERNUMBER = cluster_number |
     CLUSTERID = cluster_id } ]
```

Arguments

The following arguments are available in the `WHERE` clause:

- `SCANID` : Specifies the ID of the SCAN object in the XML configuration file

- `CLUSTERNAME` : Specifies the name of the cluster

- `CLUSTERNUMBER` : Specifies the cluster number in the XML configuration file, starting at 1

- `CLUSTERID` : Specifies the ID of the cluster in the XML configuration file

Usage Notes

If you do not specify a WHERE clause, then this command lists details about all the SCANS for all the clusters in the XML configuration file.

3.4.3.14 SWITCH

You can alter or list the switches.

- ALTER SWITCH
- LIST SWITCHES

3.4.3.14.1 ALTER SWITCH

This command alters attributes of an individual switch.

Syntax

```
ALTER SWITCH { DNSSERVERS='dns_servers' | NTPSERVERS= 'ntp_servers' |
   TIMEZONE = timezone }
WHERE {
   ID = switch_id |
   HOSTNAME = switch_name }
```

Arguments

You can modify the following attributes for a switch:

- `DNSSERVERS` : Specifies a comma-separated list of DNS servers that is enclosed in single quotes.

- `NTPSERVERS` : Specifies a comma-separated list of NTP servers that is enclosed in single quotes.

- `TIMEZONE` : Specifies a valid time zone for the switch.

The following arguments are available in the `WHERE` clause:

- `ID` : Specifies the switch ID in the XML configuration file

- `HOSTNAME` : Specifies the host name of the switch

3.4.3.14.2 LIST SWITCHES

This command lists the switch details for all switches or for an individual switch.

Syntax

```
LIST SWITCHES
[ WHERE {
   ID = switch_id |
   HOSTNAME = switch_name } ]
```

Arguments

The following arguments are available in the `WHERE` clause:

- `ID` : Specifies the switch ID in the XML configuration file
- `HOSTNAME` : Specifies the host name of the switch

Usage Notes

If you do not specify a WHERE clause, then this command lists the details for all switches.

3.4.3.15 VIP

You can add, alter, delete, or list the VIPs for the clusters.

- ADD VIP
- ALTER VIP
- DELETE VIP
- LIST VIPS

3.4.3.15.1 ADD VIP

This command adds a VIP for an individual node in a cluster.

Purpose

This command does not add additional VIPs. You should only use this command after previously issuing a `DELETE VIP` command.

Syntax

```
ADD VIP NAME=vip_name DOMAINNAME=domain_name IP=vip_ip_addr
WHERE {
    HOSTNAME = hostname |
    CLUSTERNAME = cluster_name COMPUTENUMBER = compute_number |
    CLUSTERNUMBER = cluster_number COMPUTENUMBER = compute_number |
    CLUSTERID = cluster_id COMPUTENUMBER = compute_number }
```

Arguments

You can specify the following attributes when adding a VIP:

- `NAME` : Specifies the short DNS name for the VIP
- `DOMAINNAME` : Specifies the domain name for the VIP
- `IP` : Specifies the IP address for the VIP

The following arguments are available in the `WHERE` clause:

- `HOSTNAME` : Specifies the host name for the compute node in the cluster
- `CLUSTERNUMBER` : Specifies the cluster number in the `es.xml`, starting at 1
- `CLUSTERNAME` : Specifies the name of the cluster
- `CLUSTERID` : Specifies the `es.xml` ID of the cluster

- `COMPUTENUMBER` : Specifies the compute node number in the cluster, starting at 1

Usage Notes

When adding a VIP to a compute node, the node must not already have a VIP defined.

3.4.3.15.2 ALTER VIP

This command alters the attributes of a VIP for an individual node in a cluster.

Syntax

```
ALTER VIP { NAME=vip_name | DOMAINNAME=domain_name |
    IP=vip_ip_addr }
WHERE {
   HOSTNAME = hostname |
   CLUSTERNAME = cluster_name COMPUTENUMBER = compute_number |
   CLUSTERNUMBER = cluster_number COMPUTENUMBER = compute_number |
   CLUSTERID = cluster_id COMPUTENUMBER = compute_number }
```

Arguments

You can modify the following attributes for the VIP:

- `NAME` : Specifies the short DNS name for the VIP

- `DOMAINNAME` : Specifies the domain name for the VIP

- `IP` : Specifies the IP address for the VIP

The following arguments are available in the `WHERE` clause:

- `HOSTNAME` : Specifies the host name for the compute node in the cluster

- `CLUSTERNUMBER` : Specifies the cluster number in the `es.xml`, starting at 1

- `CLUSTERNAME` : Specifies the name of the cluster

- `CLUSTERID` : Specifies the `es.xml` ID of the cluster

- `COMPUTENUMBER` : Specifies the compute node number in the cluster, starting at 1

3.4.3.15.3 DELETE VIP

This command removes a VIP from an individual node in a cluster.

Syntax

```
DELETE VIP
WHERE {
   ID = vip_id |
   HOSTNAME = hostname |
   CLUSTERNAME = cluster_name COMPUTENUMBER = compute_number |
   CLUSTERNUMBER = cluster_number COMPUTENUMBER = compute_number |
   CLUSTERID = cluster_id COMPUTENUMBER = compute_number }
```

Arguments

The following arguments are available in the `WHERE` clause:

- `ID` : Specifies the ID for the VIP in the XML configuration file

- `HOSTNAME` : Specifies the host name for the compute node in the cluster

- `CLUSTERNUMBER` : Specifies the cluster number in the XML configuration file, starting at 1

- `CLUSTERNAME` : Specifies the name of the cluster

- `CLUSTERID` : Specifies the ID of the cluster in the XML configuration file

- `COMPUTENUMBER` : Specifies the compute node number in the cluster, starting at 1

3.4.3.15.4 LIST VIPS

This command lists the VIPs for all clusters or for an individual node in a cluster.

Syntax

```
LIST VIPS
[ WHERE {
    HOSTNAME = hostname |
    CLUSTERNAME = cluster_name [ COMPUTENUMBER = compute_number ] |
    CLUSTERNUMBER = cluster_number [ COMPUTENUMBER = compute_number ] |
    CLUSTERID = cluster_id [ COMPUTENUMBER = compute_number ] }
```

Arguments

The following arguments are available in the `WHERE` clause:

- `ID` : Specifies the ID for the VIP in the XML configuration file

- `HOSTNAME` : Specifies the host name for the compute node in the cluster

- `CLUSTERNUMBER` : Specifies the cluster number in the XML configuration file, starting at 1

- `CLUSTERNAME` : Specifies the name of the cluster

- `CLUSTERID` : Specifies the ID of the cluster in the XML configuration file

- `COMPUTENUMBER` : Specifies the compute node number in the cluster, starting at 1

Usage Notes

If you do not specify a `WHERE` clause, then this command lists the VIPs for all clusters.

4

Installing Oracle Exadata Database Machine or Oracle Exadata Storage Expansion Rack at the Site

This chapter describes how to move, install and configure the hardware through to powering on the system.

> **✎ Note:**
>
> For ease of reading, the name "Oracle Exadata Rack" is used when information refers to both Oracle Exadata Database Machine and Oracle Exadata Storage Expansion Rack.

4.1 Reviewing Safety Guidelines

Before Oracle Exadata Rack arrives, the following safety precautions should be reviewed to ensure the site is safe, as well as 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 Exadata Rack in a location that is exposed to direct sunlight or near a device that may become hot.

- Do not install Oracle Exadata Rack in a location that is exposed to excessive dust, corrosive gases, or air with high salt concentrations.

- Do not install Oracle Exadata Rack in a location that is exposed to frequent vibrations. Install Oracle Exadata Rack on a flat, level surface.

- Use a power outlet that uses proper grounding. When using 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 Exadata Rack is used exclusively for Oracle Exadata Rack. Also be sure to 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 too 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 Exadata Rack or perform any work directly above the rack.

- Do not let the room temperature rise sharply, especially in winter. Sudden temperature changes can cause condensation to form inside Oracle Exadata Rack. Allow for a sufficient warm-up period prior to server operation.

- Do not install Oracle Exadata Rack near a photocopy machine, 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 Exadata Rack can cause malfunctions. Static electricity is often generated on carpets.

- Confirm the supply voltage and frequency match the electrical ratings indicated for Oracle Exadata Rack.

- Do not insert anything into any Oracle Exadata Rack opening, unless doing so is part of a documented procedure. Oracle Exadata Rack contains high-voltage parts. If a metal object or other electrically-conductive object enters an opening in Oracle Exadata Rack, 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 the phases are balanced on both sides, A and B, in case of a failover.

> **✎ See Also:**
>
> - *Important Safety Information for Sun Hardware Systems* (816-7190) included with the rack
> - *Oracle Engineered System Safety and Compliance Guide, Compliance Model No.: ESY27*

4.2 Unpacking Oracle Exadata Rack

The unpacking location should be determined during the site planning process. The following image shows the Oracle Exadata Rack shipping crate.

Figure 4-1   Oracle Exadata Rack in Shipping Crate
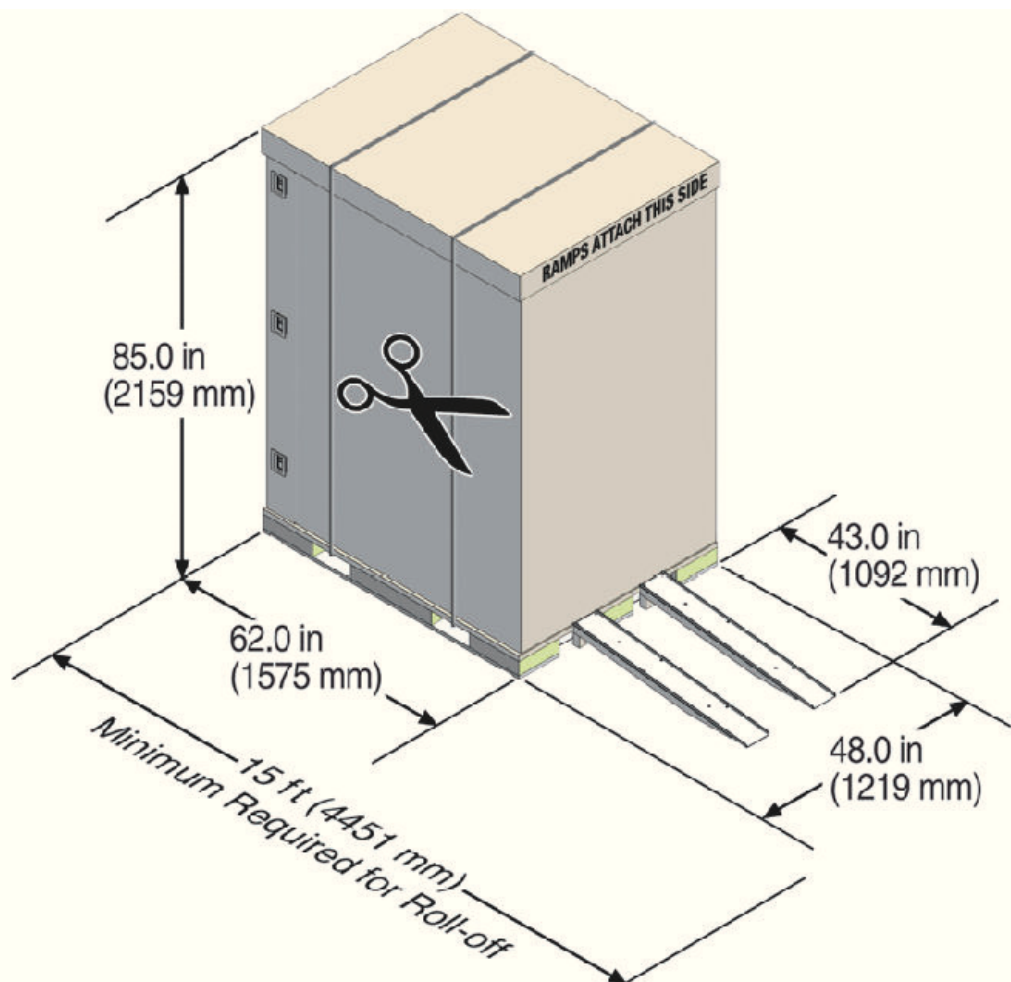
4.2.1 Contents of the Shipping Kit

The Oracle Exadata Rack shipping kit contains the following tools and equipment to install and service the Recovery Appliance rack:

- 16 mm long No. 2 Phillips screw
- T30 Torx cranked wrench key
- T25 Torx cranked wrench key
- 6 mm hexagon Allen wrench key
- SW 12 mm single-headed wrench
- 2 square jumper brackets with 4 M5 Torx screws
- 2 cable management hooks with 4 spring nuts
- Side panel removal tool
- Keys to the front door, rear door, and side panel locks
- 32 M6 cage nuts

- 32 M6 screws
- Cage nut mounting tool
- SW 17 mm single-headed wrench is included on the shipping pallet

> **Note:**
>
> The following items are not included in the shipping kit:
>
> - No. 2 Phillips screwdriver
> - Antistatic wrist strap

4.2.2 Removing Oracle Exadata Rack from the Shipping Crate

> **Note:**
>
> Oracle strongly recommends that you use professional movers when unpacking and installing Oracle Exadata Rack.

The following procedure describes how to unpack Oracle Exadata Rack:

1. Unpack Oracle Exadata Rack carefully from the packaging and shipping pallet as follows:

   > **Note:**
   >
   > Before unpacking the rack from the shipping carton, refer to the labels on the carton and to the instructions that they provide.

   a. Remove the shipping carton bands.

   b. Remove the yellow fasteners and carton top.

   c. Remove the carton sides and inner top.

   > **WARNING:**
   >
   > Rocking or tilting the rack can cause the rack to fall over and cause serious injury or death.

2. Remove the shipping kit.

3. Attach the ramps to the shipping pallet as follows:

   a. Remove the ramps from the pallet sides.

   b. Obtain the parts bag from inside the cabinet.

    c. Adjust the leveling bolts on the ramps and connect the ramps to the pallet wheel track.

    d. Verify that leveling feet are up before moving rack.

4. Carefully roll Oracle Exadata Rack off the shipping pallet as follows:

    a. Unfasten the exterior shipping brackets from the pallet.

    b. Unfasten the interior shipping brackets from the pallet.

> ✎ **Note:**
>
> Use care when removing the shipping brackets from underneath Oracle Exadata Rack. Access to the inside shipping brackets might be limited.

    c. Roll the cabinet down the ramps to the level floor. Oracle recommends having three people available to move the rack down the ramp: two people on both sides to help guide the rack and one person in back.

5. Save the shipping brackets used to secure the rack to the shipping pallet. Do not dispose of these brackets, because you cannot order replacement brackets.

6. Recycle the packaging properly. Follow local laws and guidelines to dispose of the material.

> ✎ **See Also:**
>
> - *Sun Rack II User's Guide* at `https://docs.oracle.com/cd/E19657-01/html/E29153/index.html`
> - *Oracle Rack Cabinet 1242 User's Guide* at `http://docs.oracle.com/cd/E85660_01/html/E87280/index.html` for X7 systems

4.3 Placing Oracle Exadata Rack in Its Allocated Space

This section describes how to position, stabilize, and ground Oracle Exadata Rack.

4.3.1 Moving Oracle Exadata Rack

The following procedure describes how to move Oracle Exadata Rack:

1. Ensure the doors are closed and secured.

2. Ensure the leveling and stabilizing feet on the rack are raised and out of the way.

3. Push Oracle Exadata Rack from behind to the installation site.

When moving Oracle Exadata Rack to the installation site, the front casters do not turn; you must steer the unit by moving the rear casters. You can safely maneuver Oracle Exadata Rack by carefully pushing it. Figure 4-2 shows the correct way to push the rack.

Figure 4-2   Carefully Push Oracle Exadata Rack from Behind
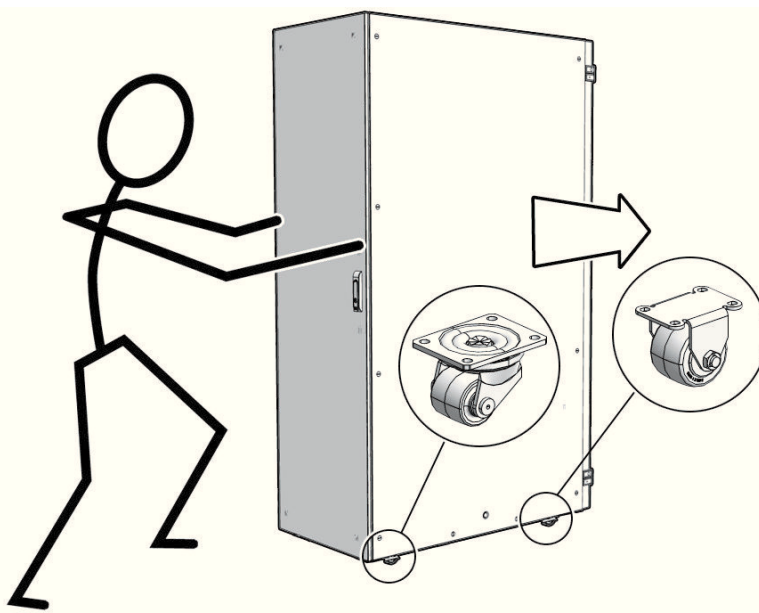
Oracle recommends having two people to move the rack: one person in front and one person in back to help guide the rack. When transporting configured racks from one location to another, take care to move them slowly, 0.65 meters per second (2.13 feet per second) or slower.

Carefully examine the transportation path. Avoid obstacles such as doorways or elevator thresholds that can cause abrupt stops or shocks. Go around obstacles by using ramps or lifts to enable smooth transport.

> ⚠ **WARNING:**
>
> - Never attempt to move Oracle Exadata Rack by pushing on the side panels. Pushing on the side panels can tip the rack over. This can cause serious personal injury or death as well as damage to the equipment.
> - Never tip or rock Oracle Exadata Rack because the rack can fall over.

4.3.2 Stabilizing Oracle Exadata Rack

After moving Oracle Exadata Rack to the installation site, stabilize the rack to ensure that it does not move or tip over.

Oracle does not recommend using the shipping brackets to permanently mount the rack to the floor.

> **⚠ Caution:**
>
> Shipping brackets are not for use for bracing or anchoring the rack during seismic events.

You can stabilize the rack by extending the rack leveling feet.

- Stabilize Oracle Exadata Rack with Leveling Feet
- Stabilize Oracle Exadata Rack X7 with Leveling Feet

4.3.2.1 Stabilize Oracle Exadata Rack with Leveling Feet

The Oracle Exadata Rack contains four leveling feet that can be lowered to stabilize the rack. The leveling feet can be used even when the rack is permanently secured to the floor. The four leveling feet should share the rack load with at least one other support. The following is an acceptable method to share the rack load:

- Casters and leveling feet

To adjust the leveling feet, do the following:

1. Locate the four leveling feet located at the bottom corners of the Oracle Exadata Rack. Figure 4-3 shows the location of the leveling feet on the bottom of the rack.

Figure 4-3   Location of Leveling Feet on Oracle Exadata Rack
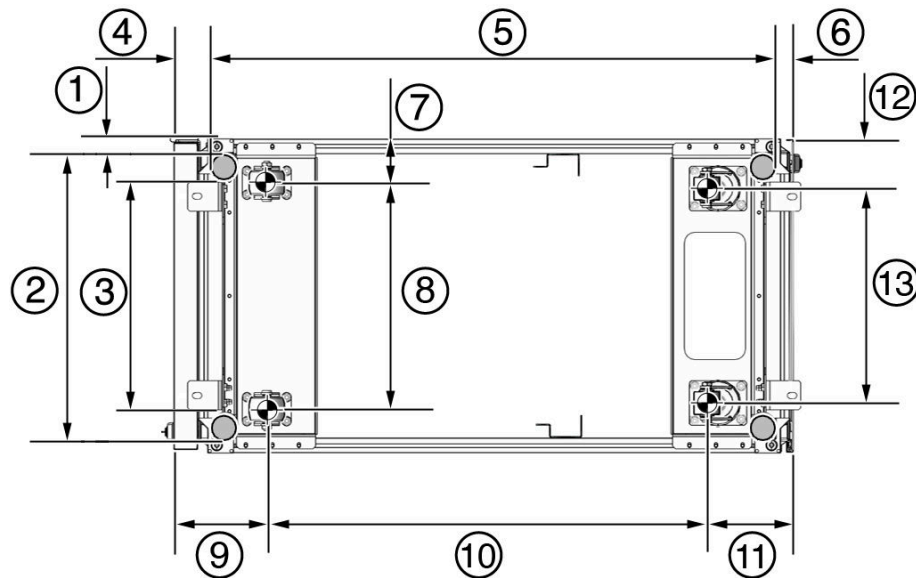
- 1: Distance from the edge of the mounting feet to the side of the rack is 33.75 mm (1.33 inches)

- 2: Width from the outside edges of the leveling feet is 532.5 mm (20.96 inches)

- 3: Width from the inside edges of the leveling feet is 429 mm (16.89 inches)

- 4: Distance from the edge of the feet to the front rack surface is 73.75 m (2.90 inches)
- 5: Depth of the outside edges of the leveling feet is 1058.5 mm (41.67 inches)
- 6: Distance from the edge of the leveling feet to the rear rack surface is 32.5 mm (1.28 inches)
- 7: Distance from the center of front casters to the side of the rack is 86.7 mm (3.41 inches)
- 8: Width between the center of the front casters is 426.6 mm (16.80 inches)
- 9: Distance from the center of the rear casters to the rear of the rack is 173.7 mm (6.83 inches)
- 10: Depth between the front and rear casters is 828.6 mm (32.62 inches)
- 11: Distance between the rear casters and the rear of the rack is 162.4 mm (6.39 inches)
- 12: Distance from the center of rear casters to the side of the rack is 96.4 mm (3.80 inches)
- 13: Width between the center of the rear casters is 407.2 mm (16.03 inches)

2. Lower the leveling feet to the floor to share the load with the casters, as shown in Figure 4-4 using the SW 12 mm wrench.

Figure 4-4   Securing Oracle Exadata Rack Using the Leveling Feet
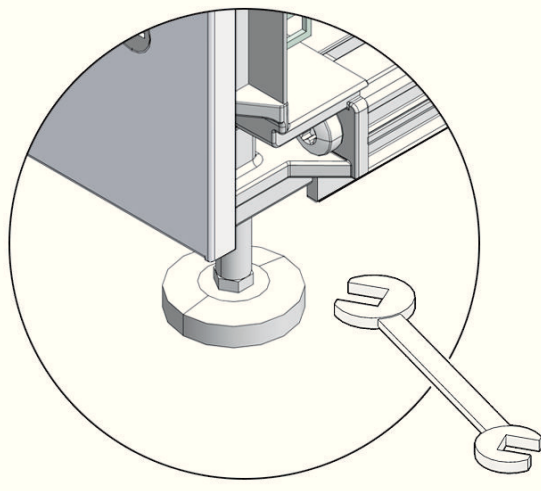
4.3.2.2 Stabilize Oracle Exadata Rack X7 with Leveling Feet

The rack contains four leveling feet that can be lowered to stabilize the rack.

The leveling feet can be used even when the rack is permanently secured to the floor. The four leveling feet share the load with the casters. This increases the footprint of the rack which improves stability and helps prevent rack movement.

To adjust the leveling feet, do the following:

1. Locate the four leveling feet located at the bottom corners of Oracle Exadata Rack. The following figure shows the location of the leveling feet on the bottom of

Oracle Exadata Rack. The image dimensions include the doors attached to the rack.

Figure 4-5   Location of Leveling Feet on Oracle Exadata Rack X7
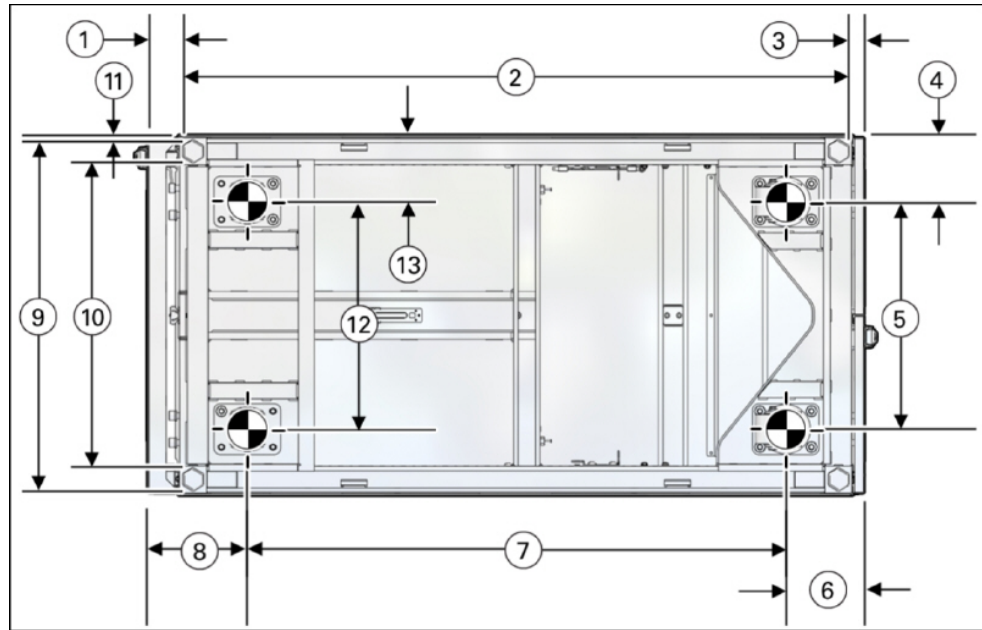
- 1: Distance from the edge of the feet to the Front door surface is 58 mm (2.3 inches)
- 2: Depth of the outside edges of the leveling feet is 1113 mm (43.8 inches)
- 3: Distance from the edge of the leveling feet to the rear door surface is 26 mm (1.0 inches)
- 4: Distance from the center of rear casters to the side of the rack is 96.5 mm (3.8 inches)
- 5: Width between the center of the rear casters is 407 mm (16.0 inches)
- 6: Distance from the center of the rear casters to the rear door surface is 142 mm (5.6 inches)
- 7: Depth between the front and rear casters is 889 mm (35.0 inches)
- 8: Distance between the center of the front casters and the Front door surface is 166 mm (6.5 inches)
- 9: Width from the outside edges of the leveling feet is 583 mm (23.0 inches)
- 10: Width from the inside edges of the leveling feet is 513 mm (20.2 inches)
- 11: Distance from the edge of the mounting feet to the side of the rack is 8.5 mm (0.3 inches)
- 12: Width between the center of the front casters is 410 mm (16.1 inches)
- 13: Distance from the center of front casters to the side of the rack is 95 mm (3.7 inches)

2. Stabilize the rack by lowering the four leveling feet to the floor, using a 6-mm hex wrench or your fingers, as shown in the following image.

Figure 4-6   Securing Oracle Exadata Rack Using the Leveling Feet
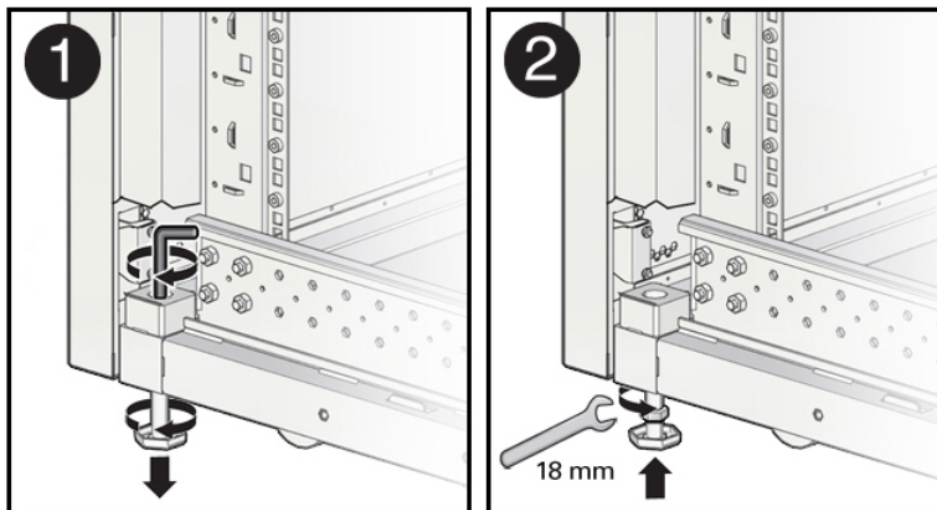
> **See Also:**
>
> *Oracle Rack Cabinet 1242 User's Guide* at `http://docs.oracle.com/cd/E85660_01/html/E87280/index.html` for the rack specifications

4.3.3 Attaching a Ground Cable (Optional)

The Oracle Exadata Rack power distribution units (PDUs) achieve earth ground through their power cords. Final chassis ground is achieved by way of the ground prong when you connect the power cord to a socket. For additional grounding, attach a chassis earth ground cable to Oracle Exadata Rack. The additional ground point enables electrical current leakage to dissipate more efficiently.

> **WARNING:**
>
> The PDU power input lead cords and the ground cable must reference a common earth ground. If they do not, then a difference in ground potential can be introduced. If you are unsure of your facility's PDU receptacle grounding, then do not install a ground cable until you confirm that there is a proper PDU receptacle grounding. If a difference in ground potential is apparent, then you must take corrective action.

> **✎ Note:**
>
> A grounding cable is not shipped with the system.

1. Ensure the installation site has properly grounded the power source in the data center. The facility PDU must have earth ground.

2. Ensure all grounding points, such as raised floors and power receptacles, reference the facility ground.

3. Ensure that direct, metal-to-metal contact is made for this installation. During manufacturing, the ground cable attachment area might have been painted or coated.

4. Attach the ground cable to one of the attachment points located at the bottom rear of the system frame as shown in Figure 4-7. The attachment point is an adjustable bolt that is inside the rear of the Oracle Exadata Rack cabinet on the right side.

Figure 4-7   Earth Ground Attachment Bolt Location
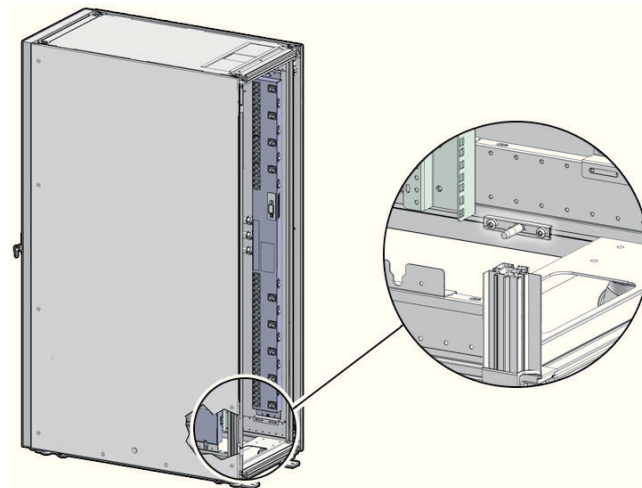
> **✎ See Also:**
>
> *Oracle Exadata Database Machine Extending and Multi-Rack Cabling Guide* if Oracle Exadata Rack will be connected to another Oracle Exadata Rack.

4.4 Acclimating the Oracle Exadata Database Machine

Oracle recommends an acclimation period of 24 hours for the Oracle Exadata Database Machine.

This applies to all hardware, including racks and cables. Acclimation to the surrounding environment prevents damage as a result of condensation.

4.5 Powering on the System the First Time

Before powering on the system for the first time, it is necessary to inspect the machine, and connect the power cords.

4.5.1 Inspecting the Machine After it is in Place

This procedure describes how to visually examine the Oracle Exadata Rack physical system after it is in place, but before power is supplied.

1. Check the rack for damage.

2. Check the rack for loose or missing screws.

3. Check Oracle Exadata Rack for the ordered configuration. Refer to the Customer Information Sheet (CIS) on the side of the packaging.

4. Check that all cable connections are secure and firmly in place as follows:

   a. Check the power cables. Ensure that the correct connectors have been supplied for the data center facility power source.

   b. Check the network data cables.

5. Check the site location tile arrangement for cable access and airflow.

6. Check the data center airflow that leads in to the front of Oracle Exadata Rack.

Related Topics

- Ventilation and Cooling Requirements
  Always provide adequate space in front and behind the rack to allow for proper ventilation.

4.5.2 Connecting Power Cords

The following procedure describes how to connect power cords to Oracle Exadata Rack:

1. Open the rear cabinet door.

2. Ensure that the correct power connectors have been supplied.

3. Unfasten the power cord cable ties. The ties are for shipping only and are no longer needed.

4. Route the power cords to the facility receptacles as shown in Figure 4-8.

5. Secure the power cords in bundles as shown in Figure 4-8.

6. Plug the PDU power cord connectors into the facility receptacles. Ensure the breaker switches are in the OFF position before connecting the power cables.

Figure 4-8   Power Cord Routing Example
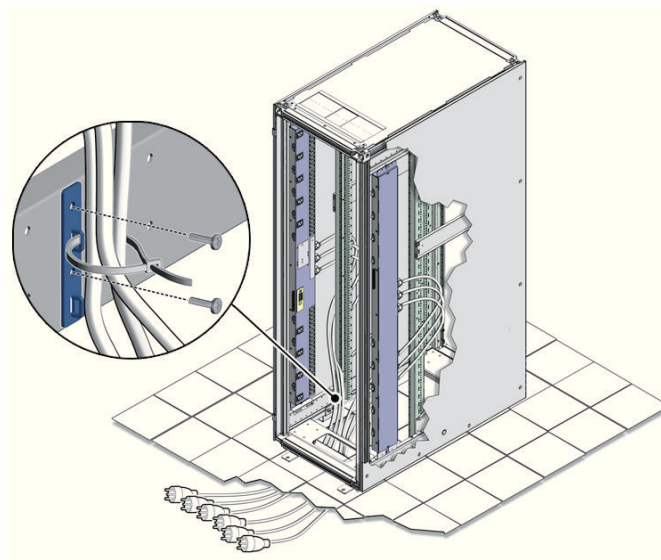
4.5.3 Powering on Oracle Exadata Rack

The following procedure describes how to power on Oracle Exadata Rack:

> **Note:**
>
> Oracle Exadata Database Machine X2-8 Full Rack database servers may take up to 15 minutes to start through the normal BIOS POST tests.

1. Switch on the PDU B circuit breakers, one at a time. PDU B is on the right side of the rack when viewed from the rear. The circuit breakers are on the rear of the Oracle Exadata Rack cabinet as shown in the following figure. Press the ON (|) side of the toggle switch. When the breaker is in the ON position, the breakers are flush with the side of the PDU.

Figure 4-9   PDU Switch Locations
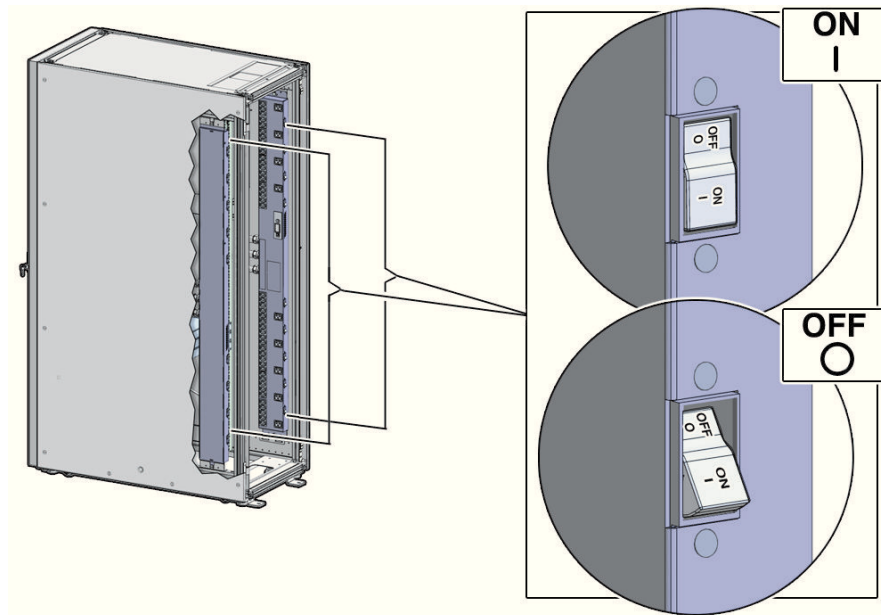
2. Verify the expected power LEDs are on. The LEDs are located as follows:

   • Database servers: Right-hand LED

   • Exadata Storage Servers: Top LED

   • Cisco switch: Left LED (viewed from front) is green, and the other LEDs are red

   • InfiniBand switches: Left LED (viewed from front) labeled PS0, or right LED (viewed from front) labeled PS1

   • KVM switch on Oracle Exadata Database Machine X2-2: Lower LED B

   • KMM switch on Oracle Exadata Database Machine X2-2: Only supplied by PDU B

3. Connect power to PDU A. Ensure the breaker switches are in the OFF position before connecting the power cables.

4. Switch on the PDU A circuit breakers, one at a time.

5. Verify the expected LEDs are on.

6. Perform a visual check of all cable connections in the rack. Do not press every connector to verify connection.

7. Verify the OK LED is blinking standby for all systems. The OK LED blinks on for 0.1 seconds, once every 3 seconds when in standby mode. The OK LED does not blink when the ILOM is starting. The LED remains dark until it goes to standby mode after 2 to 3 minutes.

Related Topics

• Reviewing Safety Guidelines

5

Configuring Oracle Exadata Database Machine

This chapter describes how to configure the system, accounts, and software for Oracle Exadata Database Machine.

> **Note:**
>
> - For ease of reading, the name "Oracle Exadata Rack" is used when information refers to both Oracle Exadata Database Machine and Oracle Exadata Storage Expansion Rack.
>
> - The procedures in this chapter are applicable to Oracle Exadata Storage Expansion Rack as well as Oracle Exadata Database Machine.
>
> - The procedures in this chapter use the information from Oracle Exadata Database Machine Deployment Assistant (OEDA). Be sure to run OEDA before starting the procedures in this chapter.

Related Topics

- Oracle Sun Database Machine Setup/Configuration Best Practices (My Oracle Support Doc ID 1274318.1)

5.1 Configuring Sun Datacenter InfiniBand Switch 36 Switch

The following procedure describes how to configure the Sun Datacenter InfiniBand Switch 36 switches.

1. Log in to the first database server as the `root` user. The first database server is the lowest database server in the rack, which is rack position U16.

    > **Note:**
    >
    > If you do not have the password for the `root` user, then contact Oracle Support Services.

2. Use SSH to log in to the Sun Datacenter InfiniBand Switch 36 switch as the `ilom-admin` user. Find the default IP address for the Sun Datacenter InfiniBand Switch 36 switch for your system in "Default IP Addresses". The following is an example of the command:

    ```
    ssh ilom-admin@192.168.1.201
    ```

3. Use `spsh` to open the Integrated Lights Out Manager (ILOM) command line interface.

4. Configure the network interface using the following commands:

```
set /SP/network pendingipdiscovery=static pendingipaddress=pending_ip \
pendingipgateway=pending_gw pendingipnetmask=pending_nm

set /SP/network commitpending=true
```

In the preceding commands, *pending_ip*, *pending_gw*, and *pending_nm* are IP addresses defined by the network administrator.

5. Use the `exit` command to exit the interface.

6. Edit the `/etc/hosts` file to set the IP address and host name using an editor such as `vi`. The following is an example of the updated file:

```
#Do not remove the following link, or various programs
#that require network functionality will fail.
127.0.0.1       localhost.localdomain localhost
10.7.7.32       dm01sw-ib1-ib2.example.com trnasw-ib2
```

It is required that the second line has both fully-qualified and non-fully-qualified names.

7. Use the ILOM interface to configure the IP address, host name, NTP servers, and DNS servers.

8. Restart the switch.

9. Examine the firmware version using the following command:

```
# version
```

Refer to My Oracle Support Note 888828.1 for the current firmware version.

10. Check the health of the switch using the following command:

```
# showunhealthy
```

```
OK - No unhealthy sensors
```

11. Run the environment test using the following command:

```
# env_test
```

```
NM2 Environment test started:
Starting Voltage test:
Voltage ECB OK
Measured 3.3V Main = 3.28 V
Measured 3.3V Standby = 3.42 V
Measured 12V =12.06 V
Measured 5V =5.03 V
Measured VBAT =3.06 V
Measured 2.5V =2.53 V
Measured 1.8V =1.79 V
Measured I4 1.2V =1.22 V
Voltage test returned OK
Starting PSU test:
PSU 0 present
PSU 1 present
PSU test returned OK
Starting Temperature test:
Back temperature 30.50
Front temperature 33.88
ComEx temperature 34.12
```

```
I4 temperature 56,
maxtemperature 57
Temperature test returned OK
Starting FAN test:
Fan 0 not present
Fan 1 running at rpm 12946
Fan 2 running at rpm 12684
Fan 3 running at rpm 12558
Fan 4 not present
FAN test returned OK
Starting Connector test:
Connector test returned OK
Starting I4 test:
I4 OK
All I4s OK
I4 test returned OK
NM2 Environment test PASSED
```

12. Enable the InfiniBand Subnet Manager using the following command:

```
# enablesm
```

> **Note:**
>
> If you get an error indicating the InfiniBand Subnet Manager is already running, then restart it as follows:
>
> ```
> # disablesm
> ```
>
> ```
> # enablesm
> ```

13. Verify the IP address is correct using the following command:

```
# ifconfig eth0

eth0      Link encap:Ethernet HWaddr 00:E0:4B:2A:07:2B
          inet addr:172.16.10.32 Bcast:172.16.10.255
Mask:255.255.255.0
          inet6 addr:fe80::2e0:3a00:fe2a:61e/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
          RX packets:11927 errors:0 dropped:0 overruns:0 frame:0
          TX packets:89 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:720262 (703.3 KiB)TX bytes:11402 (11.1 KiB)
```

14. Verify the host name is correct using the following command:

```
# hostname

dm01sw-ib2.example.com
```

15. Set the Subnet Manager Master as described in "Setting the Subnet Manager Master on Oracle Exadata Database Machine Full Rack and Oracle Exadata Database Machine Half Rack". This step is needed for Oracle Exadata Database Machine Half Rack and Oracle Exadata Database Machine Full Rack.

16. Log out from the InfiniBand switch using the following command:

```
# exit
```

> **Note:**
>
> If the network settings did not appear after restart, then power cycle the switch by removing both power cords for one minute.

Related Topics

- Exadata Database Machine and Exadata Storage Server Supported Versions (My Oracle Support Doc ID 888828.1)

5.1.1 Setting the Subnet Manager Master on Oracle Exadata Database Machine Full Rack and Oracle Exadata Database Machine Half Rack

Oracle Exadata Database Machine X3-2 systems and Oracle Exadata Database Machine X2-2 systems have three Sun Datacenter InfiniBand Switch 36 switches. Starting with Oracle Exadata Database Machine X4-2, Oracle Exadata Database Machine Two-Socket Systems have two Sun Datacenter InfiniBand Switch 36 switches.

The switch located in rack unit 1 (U1) is referred to as the spine switch. The other two switches are referred to as the leaf switches. The location of the leaf switches is as follows:

- Oracle Exadata Database Machine Two-Socket Systems (X3-2 and later): rack unit 20 (U20) and rack unit 22 (U22)

- Oracle Exadata Database Machine X2-2 racks: rack unit 20 (U20) and rack unit 24 (U24)

- Oracle Exadata Database Machine Eight-Socket Systems (X2-8 and later) Full Racks: Rack unit 21 (U21) and rack unit 23 (U23)

The spine switch is the Subnet Manager Master for the InfiniBand subnet. The Subnet Manager Master has priority 8, and can be verified using the following procedure:

1. Log in to the spine switch as the `root` user.

2. Run the `setsmpriority list` command.

   The command should show that `smpriority` has a value of 8. If `smpriority` has a different value, then do the following:

   a. Use the `disablesm` command to stop the Subnet Manager.

   b. Use the `setsmpriority 8` command to set the priority to 8.

   c. Use the `enablesm` command to restart the Subnet Manager.

The leaf switches are the Standby Subnet Managers with a priority of 5. This can be verified using the preceding procedure, substituting a value of 5 in the `setsmpriority` command above.

> **Note:**
>
> Oracle Exadata Database Machine Half Rack with Sun Fire X4170 Oracle
> Database Servers include two Sun Datacenter InfiniBand Switch 36
> switches, which are set to priority 5.

To determine the Subnet Manager Master, log in as the `root` user on any InfiniBand switch, and run the `getmaster` command. The location of the Subnet Manager Master is displayed. The following is an example of the output from the `getmaster` command:

```
# getmaster
20100701 11:46:38 OpenSM Master on Switch : 0x0021283a8516a0a0 ports 36 Sun DCS 36
QDR switch dm01sw-ib1.example.com enhanced port 0 lid 1 lmc 0
```

The preceding output shows the proper configuration. The Subnet Master Manager is running on spine switch `dm01sw-ib1.example.com`.

If the spine switch is not the Subnet Manager Master, then do the following procedure to set the Subnet Manager Master:

1. Use the `getmaster` command to identify the current location of the Subnet Manager Master.

2. Log in as the `root` user on the leaf switch that is the Subnet Manager Master.

3. Disable Subnet Manager on the switch. The Subnet Manager Master relocates to another switch.

4. Use the `getmaster` command to identify the current location of the Subnet Manager Master. If the spine switch is not Subnet Manager Master, then repeat steps 2 and 3 until the spine switch is the Subnet Manager Master.

5. Enable Subnet Manager on the leaf switches that were disabled during this procedure.

> **Note:**
>
> - If the InfiniBand network consists of four or more racks cabled together, then only the spine switches should run Subnet Manager. The leaf switches should have Subnet Manager disabled on them.
>
> - Oracle Exadata Database Machine Half Racks with Sun Fire X4170 Oracle Database Servers, and Oracle Exadata Database Machine Quarter Racks have two Sun Datacenter InfiniBand Switch 36 switches, and both are set to priority 5. The master is the one with the lowest GUID.

> ✎ **See Also:**
>
> - "Enable the Subnet Manager" in *Sun Datacenter InfiniBand Switch 36 User's Guide*
> - "Disable the Subnet Manager" in *Sun Datacenter InfiniBand Switch 36 User's Guide*
> - *Oracle Exadata Database Machine System Overview* for hardware component information
> - Cabling tables in *Oracle Exadata Database Machine System Overview*

5.2 Configuring the Cisco Ethernet Switch

You must perform an initial configuration of the Cisco Ethernet switch.

- Configuring the Cisco Catalyst 4948 Ethernet Switch
- Configuring the Cisco Nexus 93108-1G or 9348 Ethernet Switch

5.2.1 Configuring the Cisco Catalyst 4948 Ethernet Switch

The Cisco Catalyst 4948 Ethernet switch supplied with Oracle Exadata Rack is minimally configured during installation.

The minimal configuration disables IP routing, and sets the following:

- Host name
- IP address setup
- Subnet mask
- Default gateway
- Domain name
- Name server
- NTP server
- Time
- Time zone

Before configuring the switch, note the following:

- The Cisco Ethernet switch should not be connected until the running configuration has been verified, and any necessary changes have been made by the network administrator.
- The Cisco Ethernet switch should not be connected to the customer network until the IP addresses on all components have been configured in Oracle Exadata Rack. This is to prevent any duplicate IP address conflicts which are possible due to the default addresses set in the components when shipped.

Note that the Cisco 4948E-F switch supports multiple uplinks to the customer network by utilizing ports 49 - 52. This is a more complicated switch setup due to the redundant connectivity, and should be performed by the customer's network administrator.

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The following procedure describes how to configure the Cisco Ethernet switch. Configuration should be done with the network administrator.

1. Connect a serial cable from the Cisco switch console to a laptop or similar device. An Oracle supplied rollover cable is pre-installed on the Cisco serial console port. Obtain the appropriate adapter and connect it at the end of the rollover cable. An Oracle P/N 530-3100 RJ45-DB9 adapter as used on ILOM ports will also work, connected at the end of the network cable.

2. Ensure the terminal session is recorded on the laptop by logging the output. The output can be used as a reference that the switch has been configured correctly. The default serial port speed is 9600 baud, 8 bits, no parity, 1 stop bit, and no handshake.

   ```
   Switch con0 is now available
   Press RETURN to get started.
   ```

3. Change to the enable mode.

   ```
   Switch> enable
   Password: ******
   Switch#
   ```

   > **Note:**
   >
   > If you do not have the password, then contact Oracle Support Services.

4. Check the current version on the swtich.

   ```
   Switch# show version
   Cisco IOS Software, Catalyst 4500 L3 Switch Software (cat4500e-
   IPBASEK9-M), Version 15.2(3)E2, RELEASE SOFTWARE (fc1)
   Technical Support: http://www.cisco.com/techsupport
   Copyright (c) 1986-2014 by Cisco Systems, Inc.
   Compiled Tue 11-Mar-14 18:28 by prod_rel_team

   ROM: 12.2(44r)SG12
   zdlra1sw-ip uptime is 1 minute
   System returned to ROM by reload
   System image file is "bootflash:cat4500e-ipbasek9-mz.152-3.E2.bin"
   Hobgoblin Revision 22, Fortooine Revision 1.40
   ...

   Configuration register is 0x2102

   Switch#
   ```

   The version of the Cisco 4948E-F switch firmware purchased and shipped by Oracle with Exadata Database Machine X6 is IPBASEK9-MZ, which includes `telnet` and `ssh` support. Currently the full release version string is `cat4500e-ipbasek9-mz.152-3.E2.bin`.

5. Configure the network for a single VLAN. The following example assumes you are using IPv4 addressing.

   ```
   Switch# configure terminal
   Enter configuration commands,one per line.End with CNTL/Z.
   Switch(config)# interface vlan 1
   Switch(config-if)# ip address 10.7.7.34 255.255.255.0
   ```

```
Switch(config-if)# end
Switch# *Sep 15 14:12:06.309:%SYS-5-CONFIG_I:Configured from console by console
Switch# write memory
Building configuration...
Compressed configuration from 2474 bytes to 1066 bytes [OK ]
```

6. (Optional) Disable the default IP routing setting, and configure the default gateway. This step is required if IP routing is not used on the switch.

```
Switch#configure terminal
Enter configuration commands,one per line.End with CNTL/Z.
Switch(config)#no ip routing
Switch(config)#ip default-gateway 10.7.7.1
Switch(config)#end
*Sep 15 14:12:46.309:%SYS-5-CONFIG_I:Configured from console by console
Switch#write memory
Building configuration...
Compressed configuration from 2492 bytes to 1070 bytes [OK ]
```

> **✏ Note:**
>
> If IP routing is required on the switch, then leave the IP routing setting as the default, and configure the default gateway.
>
> ```
> Switch#configure terminal
> Enter configuration commands,one per line.End with CNTL/Z.
> Switch(config)#ip route 0.0.0.0 0.0.0.0 10.7.7.1
> Switch(config)#end
> *Sep 15 14:13:26.013:%SYS-5-CONFIG_I:Configured from console by console
> Switch#write memory
> Building configuration...
> Compressed configuration from 2502 bytes to 1085 bytes [OK ]
> ```

7. Set the host name of the switch.

```
Switch#configure terminal
Enter configuration commands,one per line.End with CNTL/Z.
Switch(config)#hostname exa1sw-ip
exa1sw-ip(config)#end
exa1sw-ip#write memory
Building configuration...
Compressed configuration from 3789 bytes to 1469 bytes [OK ]
```

The system host name is used as the prompt name.

8. Configure up to three DNS servers.

```
exa1sw-ip#configure terminal
Enter configuration commands,one per line.End with CNTL/Z.
exa1sw-ip(config)#ip domain-name example.com
exa1sw-ip(config)#ip name-server 10.7.7.3
exa1sw-ip(config)#ip name-server 198.51.100.5
exa1sw-ip(config)#ip name-server 10.8.160.1
exa1sw-ip(config)#end
*Sep 15 14:26:37.045:%SYS-5-CONFIG_I:Configured from console by console
exa1sw-ip#write memory
Building configuration...
Compressed configuration from 2603 bytes to 1158 bytes [OK ]
```

If you do not have DNS service available, you must still set the domain-name for the SSH keys to be configurable.

9. (Optional) Set the password.

```
exa1sw-ip #configure terminal
Enter configuration commands,one per line.End with CNTL/Z.
exa1sw-ip(config)#enable password welcome1
exa1sw-ip(config)#enable secret welcome1
The enable secret you have chosen is the same as your enable password.
This is not recommended.Re-enter the enable secret.
exa1sw-ip(config)#end
exa1sw-ip#write memory
*Sep 15 14:25:05.893:%SYS-5-CONFIG_I:Configured from console by console
Building configuration...
Compressed configuration from 2502 bytes to 1085 bytes [OK ]
```

10. Verify telnet access is disabled.

```
exa1sw-ip#configure terminal
Enter configuration commands,one per line. End with CNTL/Z.
exa1sw-ip(config)#line vty 0 15
exa1sw-ip(config)#login
% Login disabled on line 1, until 'password' is set
% Login disabled on line 2, until 'password' is set
 ...
% Login disabled on line 16, until 'password' is set
exa1sw-ip(config)#end
```

If the login command returns output as shown above, then telnet access has been disabled. If instead you get a prompt, then disable telnet access.

```
exa1sw-ip(config-line)#no password
exa1sw-ip(config-line)#end
exa1sw-ip#write memory
Building configuration...
Compressed configuration from 3786 bytes to 1468 bytes [OK ]
```

11. (Optional) Configure SSH access on the Cisco switch.

```
exa1sw-ip#configure terminal
Enter configuration commands,one per line. End with CNTL/Z.
exa1sw-ip(config)#crypto key generate rsa
% You already have RSA keys defined named exa1sw-ip.example.com.
% Do you really want to replace them? [yes/no]: yes
Choose the size of the key modulus in the range of 360 to 2048 for
your General Purpose Keys. Choosing a key modulus greater than 512
may take a few minutes.

How many bits in the modulus [512]: 768
% Generating 768 bit RSA keys, keys will be non-exportable...[OK]

exa1sw-ip(config)#
exa1sw-ip(config)#username admin password 0 welcome1
exa1sw-ip(config)#line vty 0 15
exa1sw-ip(config-line)#transport input ssh
exa1sw-ip(config-line)#exit
exa1sw-ip(config)#aaa new-model
exa1sw-ip(config)#
exa1sw-ip(config)#ip ssh time-out 60
exa1sw-ip(config)#ip ssh authentication-retries 3
exa1sw-ip(config)#ip ssh version 2
exa1sw-ip(config)#end
```

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```
*Sep 15 14:26:37.045: %SYS-5-CONFIG_I: Configured from console by console
exa1sw-ip#write memory
Building configuration...
Compressed configuration from 2603 bytes to 1158 bytes[OK]
```

If the login command returns output as shown above, then telnet access has been disabled. If instead you get a prompt, then disable telnet access.

```
exa1sw-ip(config-line)#no password
exa1sw-ip(config-line)#end
exa1sw-ip#write memory
Building configuration...
Compressed configuration from 3786 bytes to 1468 bytes [OK ]
```

12. Set the clock and time zone. The switch keeps internal time in Coordinated Universal Time (UTC) format.

   • To use UTC, use the following command:

     ```
     no clock timezone global configuration
     ```

   • To use a time zone, use the following command:

     ```
     clock timezone zone hours-offset [minutes-offset]
     ```

     In the preceding command, *zone* is the time zone to display when standard time in effect, *hours-offset* is the hours offset from UTC, and *minutes-offset* is the minutes offset from UTC.

   • Daylight savings time (or summer time) is disabled by default. To set summer time hours, use the following command:

     ```
     clock summer-time zone recurring [week day monthhh:mm week day month \
     hh:mm[offset]]
     ```

     In the preceding command, *zone* is the time zone to be displayed when summer time is in effect (EDT, for example), *week* is the week of the month (1 to 5 or last), *day* is the day of the week (Sunday, Monday, ...), *month* is the month (January, February, ...), *hh:mm* is the hours and minutes in 24-hour format, and *offset* is the number of minutes to add during summer time. The default offset is 60 minutes.

   • To manually set the clock to any time use the following command, where the time specified is relative to the configured time zone:

     ```
     clock set hh:mm:ss month day year
     ```

     In the preceding command, *hh:mm:ss* is the time in 24-hour format, *day* is the day by date in the month, *month* is the name of the month, and *year* is the 4-digit year.

To set the local time and time zone, ordering is important. For example, to set the local time to US Eastern time:

```
exa1sw-ip#configure terminal
Enter configuration commands,one per line.End with CNTL/Z.
exa1sw-ip(config)#clock timezone EST -5
exa1sw-ip(config)#clock summer-time EDT recurring
exa1sw-ip(config)#end
exa1sw-ip#clock set 21:00:00 August 09 2017
exa1sw-ip#write memory
Building configuration...
Compressed configuration from 3784 bytes to 1465 bytes [OK ]
```

```
exa1sw-ip#show clock
21:00:06.643 EST Mon Aug 9 2017
```

13. After setting the local time zone, you can configure up to two NTP servers.

```
exa1sw-ip#configure terminal
Enter configuration commands,one per line.End with CNTL/Z.
exa1sw-ip(config)#ntp server 10.7.7.32 prefer
exa1sw-ip(config)#ntp server 198.51.100.19
exa1sw-ip(config)#end
*Sep 15 14:51:08.665:%SYS-5-CONFIG_I:Configured from console by
console
exa1sw-ip#write memory
Building configuration...
Compressed configuration from 2654 bytes to 1163 bytes [OK ]
exa1sw-ip#show ntp status
<output will vary per network>
exa1sw-ip#show clock
21:00:23.175 EST Mon Aug 9 2017
```

The preceding should show the NTP server synchronized to local time if the Cisco switch is connected to the network that has access to the NTP server.

14. Verify the configuration using the following command:

```
exa1sw-ip#show running-config

Building configuration...

Current configuration : 3923 bytes
!
!  Last configuration change at 02:40:49 GMT Wed Nov 12 2014
!
version 15.2
no service pad
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
service compress-config
!
hostname exa1sw-ip
!
boot-start-marker
boot system bootflash:cat4500e-ipbasek9-mz.152-3.E2.bin
boot-end-marker
!
enable secret 5 $1$mS8h$EaJrIECUxavfGH6vLZg1T.
enable password welcome1
!
username admin password 0 welcome1
!
aaa new-model
!
!
aaa session-id common
ip subnet-zero
ip domain-name example.com
ip name-server 10.7.7.3
ip name-server 198.51.100.5
ip name-server 10.8.160.1
!
ip vrf mgmtVrf
```

```
!
vtp mode transparent
!
power redundancy-mode redundant
!
!
spanning-tree mode pvst
spanning-tree extend system-id
!
vlan internal allocation policy ascending
!
interface FastEthernet1
 ip vrf forwarding mgmtVrf
 no ip address
 speed auto
 duplex auto
!
interface GigabitEthernet1/1
 spanning-tree portfast
!
interface GigabitEthernet1/2
 spanning-tree portfast
!
...
!
interface GigabitEthernet1/48
 media-type rj45
!
interface Vlan1
 ip address 10.7.7.34 255.255.255.0
!
interface Vlan48
 no ip address
 shutdown
!
ip default-gateway 10.7.7.1
ip http server
!
control-plane
!
line con 0
 stopbits 1
line vty 0 4
 password welcome1
 transport input ssh
line vty 5 15
 password welcome1
 transport input ssh
!
ntp server 10.7.7.32 prefer
ntp server 198.51.100.19
end
```

> **Note:**
>
> If any setting is incorrect, the repeat the appropriate step. To erase a setting, enter `no` in front of the same command. For example, to erase the default gateway, use the following commands:
>
> ```
> exa1sw-ip#configure terminal
> Enter configuration commands, one per line. End with CNTL/Z.
> exa1sw-ip(config)#no ip default-gateway 10.7.7.1
> exa1sw-ip(config)#end
> exa1sw-ip#
> *Sep 15 14:13:26.013: %SYS-5-CONFIG_I: Configured from console by
> console
> exa1sw-ip#write memory
> Building configuration...
> Compressed configuration from 2502 bytes to 1085 bytes[OK]
> ```

15. Save the current configuration.

    ```
    exa1sw-ip#copy running-config startup-config
    Destination filename [startup-config]?
    Building configuration...
    Compressed configuration from 2654 bytes to 1189 bytes[OK]
    ```

16. Exit from the session using the following command:

    ```
    exa1sw-ip#exit

    exa1sw-ip con0 is now available

    Press RETURN to get started.
    ```

17. Disconnect the cable from the Cisco console.

    The Cisco switch must not be connected to the management network at this stage. The switch will be connected later after Oracle has configured the systems with the necessary IP addresses and you have worked with the field service engineer to make any additional changes necessary for connecting to the network.

18. To check the Cisco swtich, attach a laptop computer to port 48, and ping the IP address of the Exadata internal management network to check the configuration.

Related Topics

- Network Connection and IP Address Requirements for Oracle Exadata Database Machine
- Network Configuration Checklist
  Use this checklist to ensure that the network configuration requirements have been addressed.

5.2.2 Configuring the Cisco Nexus 93108-1G or 9348 Ethernet Switch

The Cisco Nexus 93108-1G or 9348 Ethernet switch supplied with Oracle Exadata Rack is minimally configured during installation.

Note that the Cisco Nexus 93108-1G or 9348 switch supports multiple uplinks to the customer network by utilizing the QSFP+ ports. This is a more complicated switch

setup due to the redundant connectivity, and should be performed by the customer's network administrator.

Whether you are configuring the switch for the first time, or configuring a replacement switch, use the following procedures:

- Performing the Initial Switch Configuration for the Cisco Nexus 93108-1G or 9348 Ethernet Switch
- Setting the Clock on the Cisco 93108-1G or 9348 Ethernet Switch

5.2.2.1 Performing the Initial Switch Configuration for the Cisco Nexus 93108-1G or 9348 Ethernet Switch

During the initial configuration, you reset the switch and use the Basic System Configuration Dialog to configure the switch.

Before configuring the switch, note the following:

- The Cisco Ethernet switch should not be connected until the running configuration has been verified, and any necessary changes have been made by the network administrator.
- The Cisco Ethernet switch should not be connected to the customer network until the IP addresses on all components have been configured in Oracle Exadata Rack. This is to prevent any duplicate IP address conflicts which are possible due to the default addresses set in the components when shipped.

Configuration should be done with the network administrator.

1. Connect from the Cisco switch serial console to a laptop or similar device using the available RJ45 cable.

2. Ensure the terminal session is recorded on the laptop by logging the output.

   The output can be used as a reference that the switch has been configured correctly. The default serial port speed is 9600 baud, 8 bits, no parity, 1 stop bit, and no handshake.

3. Power on the switch.

4. Log in as the `admin` user.

   ```
   User Access Verification
   exadatax7-adm0 login: admin
   Password: ********
   ```

   > **Note:**
   >
   > If you do not have the password for the `admin` user, then contact Oracle Support Services.

5. Erase the existing configuration.

   ```
   exadatax7-adm0# write erase

   Warning: This command will erase the startup-configuration.

   Do you wish to proceed anyway? (y/n)  [n] y
   ```

6. Restart the system so you can perform the automated setup.

```
exadatax7-adm0# reload

This command will reboot the system. (y/n)?  [n] y

2017 Aug 31 01:09:00 exadatax7-adm0 %$ VDC-1 %$ %PLATFORM-2-PFM_SYSTEM_RESET:
Manual system restart from Command Line Interface


CISCO SWITCH Ver7.59
Device detected on 0:1:2 after 0 msecs
...
```

7. Switch to normal setup and, when asked if you want to enforce secure password standard, enter no, then enter a new password for the admin user.

```
Running S93thirdparty-script...

Populating conf files for hybrid sysmgr ...
Starting hybrid sysmgr ...
inserting /isan/lib/modules/klm_cisco_nb.o ... done

Abort Auto Provisioning and continue with normal setup ? (yes/no) [n]: yes

        ---- System Admin Account Setup ----

Do you want to enforce secure password standard (yes/no) [y]: no

  Enter the password for "admin":
  Confirm the password for "admin":
```

8. When the Basic System Configuration Dialog appears, choose to enter the basic configuration dialog.

```
        ---- Basic System Configuration Dialog VDC: 1 ----

This setup utility will guide you through the basic configuration of
the system. Setup configures only enough connectivity for management
of the system.

Please register Cisco Nexus9000 Family devices promptly with your
supplier. Failure to register may affect response times for initial
service calls. Nexus9000 devices must be registered to receive
entitled support services.

Press Enter at anytime to skip a dialog. Use ctrl-c at anytime
to skip the remaining dialogs.

Would you like to enter the basic configuration dialog (yes/no): yes
```

9. In the basic configuration, you can use the default inputs until asked to enter the switch name.

In this example, the switch has a name of test123sw-adm0.

```
  Create another login account (yes/no) [n]:
  Configure read-only SNMP community string (yes/no) [n]:
  Configure read-write SNMP community string (yes/no) [n]:
  Enter the switch name : test123sw-adm0
```

10. Respond no when asked to configure Out-of-band management configuration.

```
Continue with Out-of-band (mgmt0) management configuration? (yes/no) [y]: no
```

11. Respond yes when asked to configure advanced IP options.

```
Configure advanced IP options? (yes/no) [n]: yes
```

12. Respond no when asked to configure static route (this will be configured later).

```
Configure static route? (yes/no) [n]: no
```

13. Enter the destination prefix and mask, and other values as prompted.

```
Destination prefix : 10.100.100.0

Destination prefix mask : 255.255.255.0

Next hop IPv4 address : 10.100.100.1
```

14. Skip configuring the DNS IPv4 addresses (this will be configured later).

```
Configure the DNS IPv4 address? (yes/no) [n]: no
```

15. Skip configuring the default domain name (this will be configured later).

```
Configure the default domain name? (yes/no) [n]: no
```

16. Accept the default responses until asked to configure SSH and the NTP server.

```
Enable the telnet service? (yes/no) [n]: no
Enable the ssh service? (yes/no) [y]: yes
    Type of ssh key you would like to generate (dsa/rsa) [rsa]: rsa
    Number of rsa key bits <1024-2048> [1024]: 1024

Configure the ntp server? (yes/no) [n]: yes
     NTP server IPv4 address : 10.100.100.3
```

17. Accept the default responses until asked to specify the CoPP system profile. Enter lenient.

```
 Configure default interface layer (L3/L2) [L2]:
 Configure default switchport interface state (shut/noshut) [noshut]:
 Configure CoPP system profile (strict/moderate/lenient/dense) [strict]: lenient
```

18. After reviewing the configuration, save the configuration.

```
The following configuration will be applied:
   no password strength-check
   switchname test123sw-adm0
  ...

Would you like to edit the configuration? (yes/no) [n]:

Use this configuration and save it? (yes/no) [y]: yes

[########################################] 100%
Copy complete.
```

19. Add the VLAN 1 IP address.

```
test123sw-adm0(config)# feature interface-vlan
test123sw-adm0(config)# interface vlan 1
test123sw-adm0(config-if)# ip address 10.100.100.110/24
test123sw-adm0(config-if)# no shutdown
test123sw-adm0(config-if)# exit
```

20. Set the spanning tree port type for ports 1-47.

```
test123sw-adm0(config)# interface E1/1-47
test123sw-adm0(config-if)# spanning-tree port type edge
test123sw-adm0(config-if)# exit
```

21. Set `switchport` on all 48 ports and set port 48 to a network port (instead of a host port).

```
test123sw-adm0(config)# interface E1/1-48
test123sw-adm0(config-if)# switchport
test123sw-adm0(config-if)# exit
test123sw-adm0(config)# interface E1/48
test123sw-adm0(config-if)# spanning-tree port type network
test123sw-adm0(config-if)# ip route 0.0.0.0/0 10.100.100.1
```

22. Configure the DNS information.

```
test123sw-adm0(config)# ip domain-name example.com
test123sw-adm0(config)# ip name-server 10.100.100.2
test123sw-adm0(config)# exit
```

23. Save the current configuration.

```
test123sw-adm0# copy running-config startup-config
[#####################################] 100%
Copy complete.
```

24. Optional: Set the clock, as described in the next topic.

5.2.2.2 Setting the Clock on the Cisco 93108-1G or 9348 Ethernet Switch

After you have performed the initial configuration, you can adjust the time used by the switch.

1. Log in as the `admin` user.

2. View the current time.

```
test123sw-adm0(config)# show clock
20:44:52.986 UTC Thu Aug 31 2017
Time source is NTP
```

3. Set the timezone appropriately.

```
test123sw-adm0(config)# clock timezone PST -8 0
```

4. View the modified time.

```
test123sw-adm0(config)# show clock
12:46:22.692 PST Thu Aug 31 2017
Time source is NTP
```

5. Save the configuration.

```
test123sw-adm0# copy running-config startup-config
[#####################################] 100%
Copy complete.
```

5.3 Configuring the Power Distribution Units

The power distribution units (PDUs) are configured with a static IP address to connect to the network for monitoring. Ensure you have the following before connecting the PDU to the network:

- Static IP address

- Subnet mask

- Default gateway

- Ethernet cables

- Laptop computer with either Oracle Solaris or Microsoft Windows

For systems less than full racks, the PDU Ethernet connections may use available ports in the Cisco 4948E-F switch. Note that for full rack systems, you cannot connect PDUs to the Cisco 4948E-F because all the ports on the switch are already reserved for other components.

The following procedure describes how to configure and connect the PDU to the network:

1. Power off the PDU.

2. Disconnect the power leads from the power source.

3. Select an unused LAN network connection from the available network connections on the laptop as follows:

   - For Oracle Solaris:

      a. Log in as a super user.

      b. Use the `dladm show-link` command to find an unused Ethernet interface.

      c. Use the `ifconfig -a` command to determine which interface is being used.

      d. Use the following command to plumb the unused interface:

         ```
         # ifconfig interface plumb up
         ```

         In the preceding command, *interface* is the network interface determined in step 3.c.

      e. Using the following command to assign an IPv4 address and netmask to the interface:

         ```
         # ifconfig interface IPv4_address netmask + netmask \
           broadcast broadcast up
         ```

         In the preceding command, *interface* is the network interface, *IPv4_address* is the IP address, *netmask* is the netmask address, and *broadcast* is the broadcast address.

         > **✎ Note:**
         >
         > The network interfaces configured with the `ifconfig` command do not persist across system restarts.

   - For Microsoft Windows:

      a. Select **Settings** from the Start menu.

      b. Select **Network Connections** from the Settings menu.

      c. Select an unused local area connection from the Network Connections menu.

      d. Double-click **Internet Protocol (TCP/IP)** in the Local Area Connection Properties window. The Internet Protocol (TCP/IP) window appears.

      e. Select **Use the following IP address**.

      f. Enter the IP address in the IP address field. Do not use 192.168.0.1 because that is the default PDU metering unit address.

      g. Enter the IP address in the Subnet mask field.

      h. Leave the Default gateway field blank.

      i. Click **OK**.

4. Connect the PDU and the laptop to two ports on the Cisco switch. The equipment currently using the Cisco switch must be disconnected temporarily.

5. Connect the PDU power input lead to the power source. Only one PDU power input lead needs to be connected, as follows:

- On PDUs with one power input lead, connect the one lead to the power source.

- On PDUs with two power leads, connect the first power lead to the power source. The first power lead is labelled 0.

- On PDUs with three power input leads, connect the middle power lead to the power source. The middle power lead is labelled 1.

6. Use a Web browser to access the PDU metering unit by entering the factory default IP address for the unit, `192.168.0.1`, in the address line of the browser. The Current Measurement page should appear.

7. Click **Network Configuration** in the upper left of the page.

8. Log in as the `admin` user on the PDU metering unit. Change the password after configuring the network.

9. Confirm the DHCP Enable check box is not selected.

10. Enter the following network settings for the PDU metering unit:

- IP address

- Subnet mask address

- Default gateway

11. Click **Submit** to set the network settings, and reset the PDU metering unit.

12. Disconnect the PDU and laptop from the Cisco switch.

13. Reconnect the two cables that were originally connected to the Cisco switch.

14. Connect an Ethernet cable to the PDU metering unit RJ-45 Ethernet port and to the network.

15. Log in to the PDU metering unit using a Web browser. Use the PDU metering unit's static IP address in the browser's address line. If the configuration was successful, then the Current Measurement page is displayed.

16. Connect the remaining PDU power input leads to the power source.

5.3.1 Configuring the Threshold Settings for the Power Distribution Units

The PDU current can be monitored directly or with Oracle Enterprise Manager Grid Control. Configure the threshold settings to monitor the PDUs. The threshold settings depend on the size of Oracle Exadata Rack and type PDU. The configurable threshold values for each metering unit module and phase are `Info low`, `Pre Warning`, and `Alarm`.

> **Note:**
>
> The thresholds must be set in the Param Configuration section of the PDU metering unit. Setting threshold values using the Oracle Enterprise Manager Grid Control plug-in has no effect.

> **See Also:**
>
> - *Oracle Enterprise Manager Exadata Management Getting Started Guide* for information about using Oracle Enterprise Manager Grid Control to collect PDU metrics and events
>
> - *Sun Rack II Power Distribution Units User's Guide* at `https://docs.oracle.com/cd/E19657-01/html/E23956/index.html` for information about configuring and monitoring PDUs
>
> - *Oracle Rack Cabinet 1242 Power Distribution Units User's Guide* at `http://docs.oracle.com/cd/E85660_01/html/E87281/index.html` for X7 systems
>
> - *Oracle Exadata Database Machine Maintenance Guide* for information about monitoring components

5.3.1.1 PDU Thresholds for Oracle Exadata Database Machine X5-2 and Later

Starting with Oracle Exadata Database Machine X5-2, Oracle Exadata Configuration Assistant (OECA) is the only source for PDU thresholds. OECA is available on Oracle Technology Network at http://www.oracle.com/technetwork/database/exadata/oeca-download-2817713.html

If for some reason you are unable to utilize OECA, contact Oracle Support.

5.3.1.2 PDU Thresholds for Oracle Exadata Database Machine X4-2

This section contains the PDU thresholds for Oracle Exadata Database Machine X4-2.

> **Note:**
>
> The values listed here are reliable for use on systems in the configuration received upon deployment and delivery from the Oracle Factory. Any changes to this configuration should be modeled in Oracle Exadata Configuration Assistant (OECA), and the PDU thresholds listed in OECA should then be used. OECA is available on Oracle Technology Network.

5.3.1.2.1 PDU Thresholds for Oracle Exadata Database Machine X4-2 Full Rack

The following tables list the threshold values for Oracle Exadata Database Machine X4-2 Full Rack:

- Table 5-1 Threshold Values for Oracle Exadata Database Machine X4-2 Full Rack with Single-phase, Low-voltage PDU

- Table 5-2 Threshold Values for Oracle Exadata Database Machine X4-2 Full Rack with Three-phase, Low-voltage PDU

- Table 5-3 Threshold Values for Oracle Exadata Database Machine X4-2 Full Rack with Single-phase, High-voltage PDU

- Table 5-4 Threshold Values for Oracle Exadata Database Machine X4-2 Full Rack with Three-phase, High-voltage PDU

Table 5-1 lists the threshold values for Oracle Exadata Database Machine X4-2 Full Rack using a single-phase, low-voltage PDU.

Table 5-1   Threshold Values for Oracle Exadata Database Machine X4-2 Full Rack with Single-phase, Low-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A	Module 1, phase 1	0	20	24
A	Module 1, phase 2	0	17	22
A	Module 1, phase 3	0	19	24
B	Module 1, phase 1	0	19	24
B	Module 1, phase 2	0	17	22
B	Module 1, phase 3	0	20	24

Table 5-2 lists the threshold values for Oracle Exadata Database Machine X4-2 Full Rack using a three-phase, low-voltage PDU.

Table 5-2   Threshold Values for Oracle Exadata Database Machine X4-2 Full Rack with Three-phase, Low-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A and B	Module 1, phase 1	0	32	40
A and B	Module 1, phase 2	0	34	42
A and B	Module 1, phase 3	0	32	40

Table 5-3 lists the threshold values for Oracle Exadata Database Machine X4-2 Full Rack using a single-phase, high-voltage PDU.

Table 5-3   Threshold Values for Oracle Exadata Database Machine X4-2 Full Rack with Single-phase, High-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A	Module 1, phase 1	0	18	23
A	Module 1, phase 2	0	16	20
A	Module 1, phase 3	0	18	23
B	Module 1, phase 1	0	18	23
B	Module 1, phase 2	0	16	20
B	Module 1, phase 3	0	18	23

Table 5-4 lists the threshold values for Oracle Exadata Database Machine X4-2 Full Rack using a three-phase, high-voltage PDU.

Table 5-4   Threshold Values for Oracle Exadata Database Machine X4-2 Full Rack with Three-phase, High-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A and B	Module 1, phase 1	0	18	21
A and B	Module 1, phase 2	0	18	21
A and B	Module 1, phase 3	0	16	21

5.3.1.2.2 PDU Thresholds for Oracle Exadata Database Machine X4-2 Half Rack

The following tables list the threshold values for Oracle Exadata Database Machine X4-2 Half Rack:

- Table 5-5 Threshold Values for Oracle Exadata Database Machine X4-2 Half Rack with Single-phase, Low-voltage PDU

- Table 5-6 Threshold Values for Oracle Exadata Database Machine X4-2 Half Rack with Three-phase, Low-voltage PDU

- Table 5-7 Threshold Values for Oracle Exadata Database Machine X4-2 Half Rack with Single-phase, High-voltage PDU

- Table 5-8 Threshold Values for Oracle Exadata Database Machine X4-2 Half Rack with Three-phase, High-voltage PDU

Table 5-5 lists the threshold values for Oracle Exadata Database Machine X4-2 Half Rack using a single-phase, low-voltage PDU.

Table 5-5   Threshold Values for Oracle Exadata Database Machine X4-2 Half Rack with Single-phase, Low-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A	Module 1, phase 1	0	20	24
A	Module 1, phase 2	0	10	13
A	Module 1, phase 3	0	0.1	0.2
B	Module 1, phase 1	0	0.1	0.2
B	Module 1, phase 2	0	10	13
B	Module 1, phase 3	0	20	24

Table 5-6 lists the threshold values for Oracle Exadata Database Machine X4-2 Half Rack using a three-phase, low-voltage PDU.

Table 5-6   Threshold Values for Oracle Exadata Database Machine X4-2 Half Rack with Three-phase, Low-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A and B	Module 1, phase 1	0	17	22
A and B	Module 1, phase 2	0	19	24
A and B	Module 1, phase 3	0	15	20

Table 5-7 lists the threshold values for Oracle Exadata Database Machine X4-2 Half Rack using a single-phase, high-voltage PDU.

Table 5-7   Threshold Values for Oracle Exadata Database Machine X4-2 Half Rack with Single-phase, High-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A	Module 1, phase 1	0	18	23
A	Module 1, phase 2	0	9	12
A	Module 1, phase 3	0	0.1	0.2
B	Module 1, phase 1	0	0.1	0.2
B	Module 1, phase 2	0	9	12
B	Module 1, phase 3	0	18	23

Table 5-8 lists the threshold values for Oracle Exadata Database Machine X4-2 Half Rack using a three-phase, high-voltage PDU.

Table 5-8   Threshold Values for Oracle Exadata Database Machine X4-2 Half Rack with Three-phase, High-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A and B	Module 1, phase 1	0	11	15
A and B	Module 1, phase 2	0	9	12
A and B	Module 1, phase 3	0	7	10

5.3.1.2.3 PDU Thresholds for Oracle Exadata Database Machine X4-2 Quarter Rack

The following tables list the threshold values for Oracle Exadata Database Machine X4-2 Quarter Rack:

- Table 5-9 Threshold Values for Oracle Exadata Database Machine X4-2 Quarter Rack with Single-phase, Low-voltage PDU

- Table 5-10 Threshold Values for Oracle Exadata Database Machine X4-2 Quarter Rack with Three-phase, Low-voltage PDU

- Table 5-11 Threshold Values for Oracle Exadata Database Machine X4-2 Quarter Rack with Single-phase, High-voltage PDU

- Table 5-12 Threshold Values for Oracle Exadata Database Machine X4-2 Quarter Rack with Three-phase, High-voltage PDU

Table 5-9 lists the threshold values for Oracle Exadata Database Machine X4-2
Quarter Rack using a single-phase, low-voltage PDU.

**Table 5-9   Threshold Values for Oracle Exadata Database Machine X4-2 Quarter
Rack with Single-phase, Low-voltage PDU**

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A	Module 1, phase 1	0	10	13
A	Module 1, phase 2	0	5	7
A	Module 1, phase 3	0	0.1	0.2
B	Module 1, phase 1	0	0.1	0.2
B	Module 1, phase 2	0	5	7
B	Module 1, phase 3	0	10	13

Table 5-10 lists the threshold values for Oracle Exadata Database Machine X4-2
Quarter Rack using a three-phase, low-voltage PDU.

**Table 5-10   Threshold Values for Oracle Exadata Database Machine X4-2
Quarter Rack with Three-phase, Low-voltage PDU**

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A and B	Module 1, phase 1	0	11	14
A and B	Module 1, phase 2	0	10	13
A and B	Module 1, phase 3	0	5	7

Table 5-11 lists the threshold values for Oracle Exadata Database Machine X4-2
Quarter Rack using a single-phase, high-voltage PDU.

**Table 5-11   Threshold Values for Oracle Exadata Database Machine X4-2
Quarter Rack with Single-phase, High-voltage PDU**

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A	Module 1, phase 1	0	9	12
A	Module 1, phase 2	0	5	7
A	Module 1, phase 3	0	0.1	0.2

Table 5-11   (Cont.) Threshold Values for Oracle Exadata Database Machine X4-2 Quarter Rack with Single-phase, High-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
B	Module 1, phase 1	0	0.1	0.2
B	Module 1, phase 2	0	5	7
B	Module 1, phase 3	0	9	12

Table 5-12 lists the threshold values for Oracle Exadata Database Machine X4-2 Quarter Rack using a three-phase, high-voltage PDU.

Table 5-12   Threshold Values for Oracle Exadata Database Machine X4-2 Quarter Rack with Three-phase, High-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A and B	Module 1, phase 1	0	9	11
A and B	Module 1, phase 2	0	3	4
A and B	Module 1, phase 3	0	3	4

5.3.1.3 PDU Thresholds for Oracle Exadata Database Machine X3-2

This section contains the PDU thresholds for Oracle Exadata Database Machine X3-2.

> **Note:**
>
> The values listed here are reliable for use on systems in the configuration received upon deployment and delivery from the Oracle Factory. Any changes to this configuration should be modeled in Oracle Exadata Configuration Assistant (OECA), and the PDU thresholds listed in OECA should then be used. OECA is available on Oracle Technology Network.

5.3.1.3.1 PDU Thresholds for Oracle Exadata Database Machine X3-2 Full Rack

The following tables list the threshold values for Oracle Exadata Database Machine X3-2 Full Rack:

- Table 5-13 Threshold Values for Oracle Exadata Database Machine X3-2 Full Rack with Single-phase, Low-voltage PDU

- Table 5-14 Threshold Values for Oracle Exadata Database Machine X3-2 Full Rack with Three-phase, Low-voltage PDU

- Table 5-15 Threshold Values for Oracle Exadata Database Machine X3-2 Full Rack with Single-phase, High-voltage PDU

- Table 5-16

  Threshold Values for Oracle Exadata Database Machine X3-2 Full Rack with Three-phase, High-voltage PDU

Table 5-13 lists the threshold values for Oracle Exadata Database Machine X3-2 Full Rack using a single-phase, low-voltage PDU.

Table 5-13   Threshold Values for Oracle Exadata Database Machine X3-2 Full Rack with Single-phase, Low-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A	Module 1, phase 1	0	20	24
A	Module 1, phase 2	0	14	18
A	Module 1, phase 3	0	19	24
B	Module 1, phase 1	0	19	24
B	Module 1, phase 2	0	14	18
B	Module 1, phase 3	0	20	24

Table 5-14 lists the threshold values for Oracle Exadata Database Machine X3-2 Full Rack using a three-phase, low-voltage PDU.

Table 5-14   Threshold Values for Oracle Exadata Database Machine X3-2 Full Rack with Three-phase, Low-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A and B	Module 1, phase 1	0	30	38
A and B	Module 1, phase 2	0	32	40
A and B	Module 1, phase 3	0	30	38

Table 5-15 lists the threshold values for Oracle Exadata Database Machine X3-2 Full Rack using a single-phase, high-voltage PDU.

Table 5-15   Threshold Values for Oracle Exadata Database Machine X3-2 Full Rack with Single-phase, High-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A	Module 1, phase 1	0	18	23
A	Module 1, phase 2	0	13	17
A	Module 1, phase 3	0	18	22
B	Module 1, phase 1	0	18	22
B	Module 1, phase 2	0	13	17
B	Module 1, phase 3	0	18	23

Table 5-16 lists the threshold values for Oracle Exadata Database Machine X3-2 Full Rack using a three-phase, high-voltage PDU.

Table 5-16   Threshold Values for Oracle Exadata Database Machine X3-2 Full Rack with Three-phase, High-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A and B	Module 1, phase 1	0	17	21
A and B	Module 1, phase 2	0	17	21
A and B	Module 1, phase 3	0	15	19

5.3.1.3.2 PDU Thresholds for Oracle Exadata Database Machine X3-2 Half Rack

The following tables list the threshold values for Oracle Exadata Database Machine X3-2 Half Rack:

- Table 5-17 Threshold Values for Oracle Exadata Database Machine X3-2 Half Rack with Single-phase, Low-voltage PDU

- Table 5-18 Threshold Values for Oracle Exadata Database Machine X3-2 Half Rack with Three-phase, Low-voltage PDU

- Table 5-19 Threshold Values for Oracle Exadata Database Machine X3-2 Half Rack with Single-phase, High-voltage PDU

- Table 5-20 Threshold Values for Oracle Exadata Database Machine X3-2 Half Rack with Three-phase, High-voltage PDU

Table 5-17 lists the threshold values for Oracle Exadata Database Machine X3-2 Half Rack using a single-phase, low-voltage PDU.

Table 5-17   Threshold Values for Oracle Exadata Database Machine X3-2 Half Rack with Single-phase, Low-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A	Module 1, phase 1	0	20	24
A	Module 1, phase 2	0	9	11
A	Module 1, phase 3	0	0	0
B	Module 1, phase 1	0	0	0
B	Module 1, phase 2	0	9	11
B	Module 1, phase 3	0	20	24

Table 5-18 lists the threshold values for Oracle Exadata Database Machine X3-2 Half Rack using a three-phase, low-voltage PDU.

Table 5-18   Threshold Values for Oracle Exadata Database Machine X3-2 Half Rack with Three-phase, Low-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A and B	Module 1, phase 1	0	16	21
A and B	Module 1, phase 2	0	19	24
A and B	Module 1, phase 3	0	14	18

Table 5-19 lists the threshold values for Oracle Exadata Database Machine X3-2 Half Rack using a single-phase, high-voltage PDU.

Table 5-19   Threshold Values for Oracle Exadata Database Machine X3-2 Half Rack with Single-phase, High-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A	Module 1, phase 1	0	18	23
A	Module 1, phase 2	0	8	10
A	Module 1, phase 3	0	0	0

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Table 5-19   (Cont.) Threshold Values for Oracle Exadata Database Machine X3-2 Half Rack with Single-phase, High-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
B	Module 1, phase 1	0	0	0
B	Module 1, phase 2	0	8	10
B	Module 1, phase 3	0	18	23

Table 5-20 lists the threshold values for Oracle Exadata Database Machine X3-2 Half Rack using a three-phase, high-voltage PDU.

Table 5-20   Threshold Values for Oracle Exadata Database Machine X3-2 Half Rack with Three-phase, High-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A and B	Module 1, phase 1	0	11	15
A and B	Module 1, phase 2	0	9	11
A and B	Module 1, phase 3	0	6	8

5.3.1.3.3 PDU Thresholds for Oracle Exadata Database Machine X3-2 Quarter Rack

The following tables list the threshold values for Oracle Exadata Database Machine X3-2 Quarter Rack:

- Table 5-21 Threshold Values for Oracle Exadata Database Machine X3-2 Quarter Rack with Single-phase, Low-voltage PDU

- Table 5-22 Threshold Values for Oracle Exadata Database Machine X3-2 Quarter Rack with Three-phase, Low-voltage PDU

- Table 5-23 Threshold Values for Oracle Exadata Database Machine X3-2 Quarter Rack with Single-phase, High-voltage PDU

- Table 5-24 Threshold Values for Oracle Exadata Database Machine X3-2 Quarter Rack with Three-phase, High-voltage PDU

Table 5-21 lists the threshold values for Oracle Exadata Database Machine X3-2 Quarter Rack using a single-phase, low-voltage PDU.

Table 5-21   Threshold Values for Oracle Exadata Database Machine X3-2 Quarter Rack with Single-phase, Low-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A	Module 1, phase 1	0	10	13
A	Module 1, phase 2	0	5	6
A	Module 1, phase 3	0	0	0
B	Module 1, phase 1	0	0	0
B	Module 1, phase 2	0	5	6
B	Module 1, phase 3	0	10	13

Table 5-22 lists the threshold values for Oracle Exadata Database Machine X3-2 Quarter Rack using a three-phase, low-voltage PDU.

Table 5-22   Threshold Values for Oracle Exadata Database Machine X3-2 Quarter Rack with Three-phase, Low-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A and B	Module 1, phase 1	0	11	14
A and B	Module 1, phase 2	0	10	13
A and B	Module 1, phase 3	0	4	6

Table 5-23 lists the threshold values for Oracle Exadata Database Machine X3-2 Quarter Rack using a single-phase, high-voltage PDU.

Table 5-23   Threshold Values for Oracle Exadata Database Machine X3-2 Quarter Rack with Single-phase, High-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A	Module 1, phase 1	0	9	11
A	Module 1, phase 2	0	4	6
A	Module 1, phase 3	0	0	0

Table 5-23   (Cont.) Threshold Values for Oracle Exadata Database Machine X3-2 Quarter Rack with Single-phase, High-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
B	Module 1, phase 1	0	0	0
B	Module 1, phase 2	0	4	6
B	Module 1, phase 3	0	9	11

Table 5-24 lists the threshold values for Oracle Exadata Database Machine X3-2 Quarter Rack using a three-phase, high-voltage PDU.

Table 5-24   Threshold Values for Oracle Exadata Database Machine X3-2 Quarter Rack with Three-phase, High-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A and B	Module 1, phase 1	0	9	12
A and B	Module 1, phase 2	0	2	3
A and B	Module 1, phase 3	0	3	4

5.3.1.4 PDU Thresholds for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers)

This section contains the PDU thresholds for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers).

> **✎ Note:**
>
> The values listed here are reliable for use on systems in the configuration received upon deployment and delivery from the Oracle Factory. Any changes to this configuration should be modeled in Oracle Exadata Configuration Assistant (OECA), and the PDU thresholds listed in OECA should then be used. OECA is available on Oracle Technology Network.

5.3.1.4.1 PDU Thresholds for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Full Rack

The following tables list the threshold values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Full Rack:

- Table 5-25 Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Full Rack with Single-phase, Low-voltage PDU

- Table 5-26 Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Full Rack with Three-phase, Low-voltage PDU

- Table 5-27 Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Full Rack with Single-phase, High-voltage PDU

- Table 5-28 Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Full Rack with Three-phase, High-voltage PDU

Table 5-25 lists the threshold values for Oracle Exadata Database Machine Full Rack using a single-phase, low-voltage PDU.

Table 5-25   Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Full Rack with Single-phase, Low-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A	Module 1, phase 1	0	18	23
A	Module 1, phase 2	0	22	24
A	Module 1, phase 3	0	18	23
B	Module 1, phase 1	0	18	23
B	Module 1, phase 2	0	22	24
B	Module 1, phase 3	0	18	23

Table 5-26 lists the threshold values for Oracle Exadata Database Machine Full Rack using a three-phase, low-voltage PDU.

Table 5-26   Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Full Rack with Three-phase, Low-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A and B	Module 1, phase 1	0	32	40
A and B	Module 1, phase 2	0	34	43
A and B	Module 1, phase 3	0	33	42

Table 5-27 lists the threshold values for Oracle Exadata Database Machine Full Rack using a single-phase, high-voltage PDU.

Table 5-27   Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Full Rack with Single-phase, High-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A	Module 1, phase 1	0	16	20
A	Module 1, phase 2	0	20	21
A	Module 1, phase 3	0	16	20
B	Module 1, phase 1	0	16	20
B	Module 1, phase 2	0	20	21
B	Module 1, phase 3	0	16	20

Table 5-28 lists the threshold values for Oracle Exadata Database Machine Full Rack using a three-phase, high-voltage PDU.

Table 5-28   Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Full Rack with Three-phase, High-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A and B	Module 1, phase 1	0	18	21
A and B	Module 1, phase 2	0	18	21
A and B	Module 1, phase 3	0	17	21

5.3.1.4.2 PDU Thresholds for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Half Rack

The following tables list the threshold values for Oracle Exadata Database Machine Half Rack:

- Table 5-29 Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Half Rack with Single-phase, Low-voltage PDU

- Table 5-30 Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Half Rack with Three-phase, Low-voltage PDU

- Table 5-31 Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Half Rack with Single-phase, High-voltage PDU

- Table 5-32 Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Half Rack with Three-phase, High-voltage PDU

Table 5-29 lists the threshold values for Oracle Exadata Database Machine Half Rack using a single-phase, low-voltage PDU.

Table 5-29   Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Half Rack with Single-phase, Low-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A	Module 1, phase 1	0	18	23
A	Module 1, phase 2	0	13	17
A	Module 1, phase 3	0	0	0
B	Module 1, phase 1	0	0	0
B	Module 1, phase 2	0	13	17
B	Module 1, phase 3	0	18	23

Table 5-30 lists the threshold values for Oracle Exadata Database Machine Half Rack using a three-phase, low-voltage PDU.

Table 5-30   Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Half Rack with Three-phase, Low-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A and B	Module 1, phase 1	0	18	23
A and B	Module 1, phase 2	0	17	22
A and B	Module 1, phase 3	0	18	23

Table 5-31 lists the threshold values for Oracle Exadata Database Machine Half Rack using a single-phase, high-voltage PDU.

Table 5-31   Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Half Rack with Single-phase, High-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A	Module 1, phase 1	0	16	20
A	Module 1, phase 2	0	12	15
A	Module 1, phase 3	0	0	0

Table 5-31 (Cont.) Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Half Rack with Single-phase, High-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
B	Module 1, phase 1	0	0	0
B	Module 1, phase 2	0	12	15
B	Module 1, phase 3	0	16	20

Table 5-32 lists the threshold values for Oracle Exadata Database Machine Half Rack using a three-phase, high-voltage PDU.

Table 5-32 Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Half Rack with Three-phase, High-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A and B	Module 1, phase 1	0	9	12
A and B	Module 1, phase 2	0	9	12
A and B	Module 1, phase 3	0	10	13

5.3.1.4.3 PDU Thresholds for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Quarter Rack

The following tables list the threshold values for Oracle Exadata Database Machine Quarter Rack:

- Table 5-33 Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Quarter Rack with Single-phase, Low-voltage PDU

- Table 5-34 Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Quarter Rack with Three-phase, Low-voltage PDU

- Table 5-35 Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Quarter Rack with Single-phase, High-voltage PDU

- Table 5-36 Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Quarter Rack with Three-phase, High-voltage PDU

Table 5-33 lists the threshold values for Oracle Exadata Database Machine Quarter Rack using a single-phase, low-voltage PDU.

Table 5-33   Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Quarter Rack with Single-phase, Low-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A	Module 1, phase 1	0	10	13
A	Module 1, phase 2	0	6	8
A	Module 1, phase 3	0	0	0
B	Module 1, phase 1	0	0	0
B	Module 1, phase 2	0	6	8
B	Module 1, phase 3	0	10	13

Table 5-34 lists the threshold values for Oracle Exadata Database Machine Quarter Rack using a three-phase, low-voltage PDU.

Table 5-34   Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Quarter Rack with Three-phase, Low-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A and B	Module 1, phase 1	0	12	15
A and B	Module 1, phase 2	0	11	14
A and B	Module 1, phase 3	0	5	7

Table 5-35 lists the threshold values for Oracle Exadata Database Machine Quarter Rack using a single-phase, high-voltage PDU.

Table 5-35   Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Quarter Rack with Single-phase, High-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A	Module 1, phase 1	0	9	12
A	Module 1, phase 2	0	5	7

Table 5-35   (Cont.) Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Quarter Rack with Single-phase, High-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A	Module 1, phase 3	0	0	0
B	Module 1, phase 1	0	0	0
B	Module 1, phase 2	0	5	7
B	Module 1, phase 3	0	9	12

Table 5-36 lists the threshold values for Oracle Exadata Database Machine Quarter Rack using a three-phase, high-voltage PDU.

Table 5-36   Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Quarter Rack with Three-phase, High-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A and B	Module 1, phase 1	0	9	12
A and B	Module 1, phase 2	0	3	4
A and B	Module 1, phase 3	0	4	5

5.3.1.5 PDU Thresholds for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers)

This section contains the PDU thresholds for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers).

> **✎ Note:**
>
> The values listed here are reliable for use on systems in the configuration received upon deployment and delivery from the Oracle Factory. Any changes to this configuration should be modeled in Oracle Exadata Configuration Assistant (OECA), and the PDU thresholds listed in OECA should then be used. OECA can be downloaded from Oracle Technology Network.

5.3.1.5.1 PDU Thresholds for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Full Rack

The following tables list the threshold values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Full Rack:

- Table 5-37 Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Full Rack with Single-phase, Low-voltage PDU

- Table 5-38 Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Full Rack with Three-phase, Low-voltage PDU

- Table 5-39 Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Full Rack with Single-phase, High-voltage PDU

- Table 5-40 Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Full Rack with Three-phase, High-voltage PDU

Table 5-37 lists the threshold values for Oracle Exadata Database Machine Full Rack using a single-phase, low-voltage PDU.

Table 5-37   Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Full Rack with Single-phase, Low-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A	Module 1, phase 1	0	22	24
A	Module 1, phase 2	0	22	24
A	Module 1, phase 3	0	21	24
B	Module 1, phase 1	0	21	24
B	Module 1, phase 2	0	22	24
B	Module 1, phase 3	0	22	24

Table 5-38 lists the threshold values for Oracle Exadata Database Machine Full Rack using a three-phase, low-voltage PDU.

Table 5-38   Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Full Rack with Three-phase, Low-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A and B	Module 1, phase 1	0	36	45
A and B	Module 1, phase 2	0	39	44

Table 5-38   (Cont.) Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Full Rack with Three-phase, Low-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A and B	Module 1, phase 3	0	38	45

Table 5-39 lists the threshold values for Oracle Exadata Database Machine Full Rack using a single-phase, high-voltage PDU.

Table 5-39   Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Full Rack with Single-phase, High-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A	Module 1, phase 1	0	20	21
A	Module 1, phase 2	0	20	21
A	Module 1, phase 3	0	19	21
B	Module 1, phase 1	0	19	21
B	Module 1, phase 2	0	20	21
B	Module 1, phase 3	0	20	21

Table 5-40 lists the threshold values for Oracle Exadata Database Machine Full Rack using a three-phase, high-voltage PDU.

Table 5-40   Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Full Rack with Three-phase, High-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A and B	Module 1, phase 1	0	20	21
A and B	Module 1, phase 2	0	21	21
A and B	Module 1, phase 3	0	18	21

5.3.1.5.2 PDU Thresholds for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Half Rack

The following tables list the threshold values for Oracle Exadata Database Machine Half Rack:

- Table 5-41 Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Half Rack with Single-phase, Low-voltage PDU

- Table 5-42 Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Half Rack with Three-phase, Low-voltage PDU

- Table 5-43 Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Half Rack with Single-phase, High-voltage PDU

- Table 5-44 Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Half Rack with Three-phase, High-voltage PDU

Table 5-41 lists the threshold values for Oracle Exadata Database Machine Half Rack using a single-phase, low-voltage PDU.

Table 5-41   Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Half Rack with Single-phase, Low-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A	Module 1, phase 1	0	21	24
A	Module 1, phase 2	0	13	17
A	Module 1, phase 3	0	0	0
B	Module 1, phase 1	0	0	0
B	Module 1, phase 2	0	13	17
B	Module 1, phase 3	0	21	24

Table 5-42 lists the threshold values for Oracle Exadata Database Machine Half Rack using a three-phase, low-voltage PDU.

Table 5-42   Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Half Rack with Three-phase, Low-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A and B	Module 1, phase 1	0	19	24
A and B	Module 1, phase 2	0	20	25
A and B	Module 1, phase 3	0	19	24

Table 5-43 lists the threshold values for Oracle Exadata Database Machine Half Rack using a single-phase, high-voltage PDU.

Table 5-43   Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Half Rack with Single-phase, High-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A	Module 1, phase 1	0	19	21
A	Module 1, phase 2	0	12	15
A	Module 1, phase 3	0	0	0
B	Module 1, phase 1	0	0	0
B	Module 1, phase 2	0	12	15
B	Module 1, phase 3	0	19	21

Table 5-44 lists the threshold values for Oracle Exadata Database Machine Half Rack using a three-phase, high-voltage PDU.

Table 5-44   Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Half Rack with Three-phase, High-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A and B	Module 1, phase 1	0	11	14
A and B	Module 1, phase 2	0	11	14
A and B	Module 1, phase 3	0	10	13

5.3.1.5.3 PDU Thresholds for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Quarter Rack

The following tables list the threshold values for Oracle Exadata Database Machine Quarter Rack:

- Table 5-45

  Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Quarter Rack with Single-phase, Low-voltage PDU

- Table 5-46

  Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Quarter Rack with Three-phase, Low-voltage PDU

- Table 5-47

  Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Quarter Rack with Single-phase, High-voltage PDU

- Table 5-48

  Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Quarter Rack with Three-phase, High-voltage PDU

Table 5-45 lists the threshold values for Oracle Exadata Database Machine Quarter Rack using a single-phase, low-voltage PDU.

Table 5-45   Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Quarter Rack with Single-phase, Low-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A	Module 1, phase 1	0	12	15
A	Module 1, phase 2	0	6	8
A	Module 1, phase 3	0	0	0
B	Module 1, phase 1	0	0	0
B	Module 1, phase 2	0	6	8
B	Module 1, phase 3	0	12	15

Table 5-46 lists the threshold values for Oracle Exadata Database Machine Quarter Rack using a three-phase, low-voltage PDU.

Table 5-46   Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Quarter Rack with Three-phase, Low-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A and B	Module 1, phase 1	0	13	17
A and B	Module 1, phase 2	0	12	15
A and B	Module 1, phase 3	0	5	7

Table 5-47 lists the threshold values for Oracle Exadata Database Machine Quarter Rack using a single-phase, high-voltage PDU.

Table 5-47   Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Quarter Rack with Single-phase, High-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A	Module 1, phase 1	0	11	14

Table 5-47   (Cont.) Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Quarter Rack with Single-phase, High-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A	Module 1, phase 2	0	5	7
A	Module 1, phase 3	0	0	0
B	Module 1, phase 1	0	0	0
B	Module 1, phase 2	0	5	7
B	Module 1, phase 3	0	11	14

Table 5-48 lists the threshold values for Oracle Exadata Database Machine Quarter Rack using a three-phase, high-voltage PDU.

Table 5-48   Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Quarter Rack with Three-phase, High-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A and B	Module 1, phase 1	0	11	14
A and B	Module 1, phase 2	0	2	3
A and B	Module 1, phase 3	0	3	4

5.3.1.6 PDU Thresholds for Oracle Exadata Database Machine X4-8 and Later

This section contains the PDU thresholds for Oracle Exadata Database Machine Eight-Socket systems for X4-8 and later.

Oracle Exadata Configuration Assistant (OECA) is the only source for PDU thresholds for Oracle Exadata Database Machine X4-8 and later systems. OECA is available on Oracle Technology Network at http://www.oracle.com/technetwork/database/exadata/oeca-download-2817713.html

If for some reason you are unable to utilize OECA, contact Oracle Support.

5.3.1.7 PDU Thresholds for Oracle Exadata Database Machine X3-8 Full Rack

This section contains the PDU thresholds for Oracle Exadata Database Machine X3-8 Full Rack.

- Table 5-49 Threshold Values for Oracle Exadata Database Machine X3-8 Full Rack with Single-phase, Low-voltage 22 kVA PDU

- Table 5-50 Threshold Values for Oracle Exadata Database Machine X3-8 Full Rack with Three-phase, Low-voltage 24 kVA PDU

- Table 5-51 Threshold Values for Oracle Exadata Database Machine X3-8 Full Rack with Single-phase, High-voltage 22 kVA PDU

- Table 5-52 Threshold Values for Oracle Exadata Database Machine X3-8 Full Rack with Three-phase, High-voltage 24 kVA PDU

Table 5-49 lists the threshold values for Oracle Exadata Database Machine X3-8 Full Rack using a single-phase, low-voltage 22 kVA PDU.

Table 5-49   Threshold Values for Oracle Exadata Database Machine X3-8 Full Rack with Single-phase, Low-voltage 22 kVA PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A	Module 1, phase 1	0	25	31
A	Module 1, phase 2	0	26	33
A	Module 1, phase 3	0	24	30
B	Module 1, phase 1	0	24	30
B	Module 1, phase 2	0	26	33
B	Module 1, phase 3	0	25	31

Table 5-50 lists the threshold values for Oracle Exadata Database Machine X3-8 Full Rack using a three-phase, low-voltage 24 kVA PDU.

Table 5-50   Threshold Values for Oracle Exadata Database Machine X3-8 Full Rack with Three-phase, Low-voltage 24 kVA PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A	Module 1, phase 1	0	21	27
A	Module 1, phase 2	0	23	30
A	Module 1, phase 3	0	22	28
A	Module 2, phase 1	0	20	25
A	Module 2, phase 2	0	21	27
A	Module 2, phase 3	0	23	29
B	Module 1, phase 1	0	20	25

Table 5-50   (Cont.) Threshold Values for Oracle Exadata Database Machine X3-8 Full Rack with Three-phase, Low-voltage 24 kVA PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
B	Module 1, phase 2	0	21	27
B	Module 1, phase 3	0	23	29
B	Module 2, phase 1	0	21	27
B	Module 2, phase 2	0	23	30
B	Module 2, phase 3	0	22	28

Table 5-51 lists the threshold values for Oracle Exadata Database Machine X3-8 Full Rack using a single-phase, high-voltage 22 kVA PDU.

Table 5-51   Threshold Values for Oracle Exadata Database Machine X3-8 Full Rack with Single-phase, High-voltage 22 kVA PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A and B	Module 1, phase 1	0	22	28
A and B	Module 1, phase 2	0	24	30
A and B	Module 1, phase 3	0	22	28

Table 5-52 lists the threshold values for Oracle Exadata Database Machine X3-8 Full Rack using a three-phase, high-voltage 24 kVA PDU.

Table 5-52   Threshold Values for Oracle Exadata Database Machine X3-8 Full Rack with Three-phase, High-voltage 24 kVA PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A	Module 1, phase 1	0	12	16
A	Module 1, phase 2	0	13	17
A	Module 1, phase 3	0	10	13
A	Module 2, phase 1	0	10	13

Table 5-52   (Cont.) Threshold Values for Oracle Exadata Database Machine X3-8 Full Rack with Three-phase, High-voltage 24 kVA PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A	Module 2, phase 2	0	13	17
A	Module 2, phase 3	0	11	15
B	Module 1, phase 1	0	10	13
B	Module 1, phase 2	0	13	17
B	Module 1, phase 3	0	11	15
B	Module 2, phase 1	0	12	16
B	Module 2, phase 2	0	13	17
B	Module 2, phase 3	0	10	13

5.3.1.8 PDU Thresholds for Oracle Exadata Database Machine X2-8 Full Rack

This section contains the PDU thresholds for Oracle Exadata Database Machine X2-8 Full Rack.

- Table 5-53 Threshold Values for Oracle Exadata Database Machine X2-8 Full Rack with Single-phase, Low-voltage 22 kVA PDU

- Table 5-54 Threshold Values for Oracle Exadata Database Machine X2-8 Full Rack with Three-phase, Low-voltage 24 kVA PDU

- Table 5-55 Threshold Values for Oracle Exadata Database Machine X2-8 Full Rack with Single-phase, High-voltage 22 kVA PDU

- Table 5-56 Threshold Values for Oracle Exadata Database Machine X2-8 Full Rack with Three-phase, High-voltage 24 kVA PDU

Table 5-53 lists the threshold values for Oracle Exadata Database Machine X2-8 Full Rack using a single-phase, low-voltage 22 kVA PDU.

Table 5-53   Threshold Values for Oracle Exadata Database Machine X2-8 Full Rack with Single-phase, Low-voltage 22 kVA PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A	Module 1, phase 1	0	36	37
A	Module 1, phase 2	0	35	37

Table 5-53   (Cont.) Threshold Values for Oracle Exadata Database Machine X2-8 Full Rack with Single-phase, Low-voltage 22 kVA PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A	Module 1, phase 3	0	35	37
B	Module 1, phase 1	0	35	37
B	Module 1, phase 2	0	35	37
B	Module 1, phase 3	0	36	37

Table 5-54 lists the threshold values for Oracle Exadata Database Machine X2-8 Full Rack using a three-phase, low-voltage 24 kVA PDU.

Table 5-54   Threshold Values for Oracle Exadata Database Machine X2-8 Full Rack with Three-phase, Low-voltage 24 kVA PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A and B	Module 1, phase 1	0	32	40
A and B	Module 1, phase 2	0	34	43
A and B	Module 1, phase 3	0	33	42

Table 5-55 lists the threshold values for Oracle Exadata Database Machine X2-8 Full Rack using a single-phase, high-voltage 22 kVA PDU.

Table 5-55   Threshold Values for Oracle Exadata Database Machine X2-8 Full Rack with Single-phase, High-voltage 22 kVA PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A and B	Module 1, phase 1	0	26	32
A and B	Module 1, phase 2	0	25	32
A and B	Module 1, phase 3	0	26	32

Table 5-56 lists the threshold values for Oracle Exadata Database Machine X2-8 Full Rack using a three-phase, high-voltage 24 kVA PDU.

Table 5-56   Threshold Values for Oracle Exadata Database Machine X2-8 Full Rack with Three-phase, High-voltage 24 kVA PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A and B	Module 1, phase 1	0	18	21
A and B	Module 1, phase 2	0	18	21
A and B	Module 1, phase 3	0	17	21

5.3.1.9 PDU Thresholds for Oracle Exadata Storage Expansion Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers

This section contains the PDU thresholds for Oracle Exadata Storage Expansion Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers.

5.3.1.9.1 PDU Thresholds for Oracle Exadata Storage Expansion Full Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers

The following tables list the threshold values for Oracle Exadata Storage Expansion Full Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers Full Rack:

- Table 5-57 Threshold Values for Oracle Exadata Storage Expansion Full Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Single-phase, Low-voltage PDU

- Table 5-58 Threshold Values for Oracle Exadata Storage Expansion Full Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Three-phase, Low-voltage PDU

- Table 5-59 Threshold Values for Oracle Exadata Storage Expansion Full Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Single-phase, High-voltage PDU

- Table 5-60 Threshold Values for Oracle Exadata Storage Expansion Full Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Three-phase, High-voltage PDU

Table 5-57 lists the threshold values for Oracle Exadata Storage Expansion Full Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers using a single-phase, low-voltage PDU.

Table 5-57   Threshold Values for Oracle Exadata Storage Expansion Full Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Single-phase, Low-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A	Module 1, phase 1	0	18	23

Table 5-57   (Cont.) Threshold Values for Oracle Exadata Storage Expansion Full Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Single-phase, Low-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A	Module 1, phase 2	0	22	24
A	Module 1, phase 3	0	18	23
B	Module 1, phase 1	0	18	23
B	Module 1, phase 2	0	22	24
B	Module 1, phase 3	0	18	23

Table 5-58 lists the threshold values for Oracle Exadata Storage Expansion Full Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers using a three-phase, low-voltage PDU.

Table 5-58   Threshold Values for Oracle Exadata Storage Expansion Full Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Three-phase, Low-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A and B	Module 1, phase 1	0	32	40
A and B	Module 1, phase 2	0	34	43
A and B	Module 1, phase 3	0	33	42

Table 5-59 lists the threshold values for Oracle Exadata Storage Expansion Full Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers using a single-phase, high-voltage PDU.

Table 5-59   Threshold Values for Oracle Exadata Storage Expansion Full Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Single-phase, High-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A	Module 1, phase 1	0	16	20
A	Module 1, phase 2	0	20	21

Table 5-59   (Cont.) Threshold Values for Oracle Exadata Storage Expansion Full Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Single-phase, High-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A	Module 1, phase 3	0	16	20
B	Module 1, phase 1	0	16	20
B	Module 1, phase 2	0	20	21
B	Module 1, phase 3	0	16	20

Table 5-60 lists the threshold values for Oracle Exadata Storage Expansion Full Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers using a three-phase, high-voltage PDU.

Table 5-60   Threshold Values for Oracle Exadata Storage Expansion Full Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Three-phase, High-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A and B	Module 1, phase 1	0	18	21
A and B	Module 1, phase 2	0	18	21
A and B	Module 1, phase 3	0	17	21

5.3.1.9.2 PDU Thresholds for Oracle Exadata Storage Expansion Half Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers

The following tables list the threshold values for Oracle Exadata Storage Expansion Half Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers:

- Table 5-61 Threshold Values for Oracle Exadata Storage Expansion Half Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Single-phase, Low-voltage PDU

- Table 5-62 Threshold Values for Oracle Exadata Storage Expansion Half Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Three-phase, Low-voltage PDU

- Table 5-63 Threshold Values for Oracle Exadata Storage Expansion Half Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Single-phase, High-voltage PDU

- Table 5-64 Threshold Values for Oracle Exadata Storage Expansion Half Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Three-phase, High-voltage PDU

Table 5-61 lists the threshold values for Oracle Exadata Storage Expansion Half Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers using a single-phase, low-voltage PDU.

Table 5-61   Threshold Values for Oracle Exadata Storage Expansion Half Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Single-phase, Low-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A	Module 1, phase 1	0	18	23
A	Module 1, phase 2	0	13	17
A	Module 1, phase 3	0	0	0
B	Module 1, phase 1	0	0	0
B	Module 1, phase 2	0	13	17
B	Module 1, phase 3	0	18	23

Table 5-62 lists the threshold values for Oracle Exadata Storage Expansion Half Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers using a three-phase, low-voltage PDU.

Table 5-62   Threshold Values for Oracle Exadata Storage Expansion Half Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Three-phase, Low-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A and B	Module 1, phase 1	0	18	23
A and B	Module 1, phase 2	0	17	22
A and B	Module 1, phase 3	0	18	23

Table 5-63 lists the threshold values for Oracle Exadata Storage Expansion Half Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers using a single-phase, high-voltage PDU.

Table 5-63   Threshold Values for Oracle Exadata Storage Expansion Half Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Single-phase, High-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A	Module 1, phase 1	0	16	20
A	Module 1, phase 2	0	12	15
A	Module 1, phase 3	0	0	0
B	Module 1, phase 1	0	0	0
B	Module 1, phase 2	0	12	15
B	Module 1, phase 3	0	16	20

Table 5-64 lists the threshold values for Oracle Exadata Storage Expansion Half Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers using a three-phase, high-voltage PDU.

Table 5-64   Threshold Values for Oracle Exadata Storage Expansion Half Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Three-phase, High-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A and B	Module 1, phase 1	0	9	12
A and B	Module 1, phase 2	0	9	12
A and B	Module 1, phase 3	0	10	13

5.3.1.9.3 PDU Thresholds for Oracle Exadata Storage Expansion Quarter Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers

The following tables list the threshold values for Oracle Exadata Storage Expansion Quarter Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers:

- Table 5-65 Threshold Values for Oracle Exadata Storage Expansion Quarter Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Single-phase, Low-voltage PDU

- Table 5-66 Threshold Values for Oracle Exadata Storage Expansion Quarter Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Three-phase, Low-voltage PDU

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- Table 5-67 Threshold Values for Oracle Exadata Storage Expansion Quarter Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Single-phase, High-voltage PDU

- Table 5-68 Threshold Values for Oracle Exadata Storage Expansion Quarter Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Three-phase, High-voltage PDU

Table 5-65 lists the threshold values for Oracle Exadata Storage Expansion Quarter Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers using a single-phase, low-voltage PDU.

Table 5-65   Threshold Values for Oracle Exadata Storage Expansion Quarter Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Single-phase, Low-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A	Module 1, phase 1	0	10	13
A	Module 1, phase 2	0	6	8
A	Module 1, phase 3	0	0	0
B	Module 1, phase 1	0	0	0
B	Module 1, phase 2	0	6	8
B	Module 1, phase 3	0	10	13

Table 5-66 lists the threshold values for Oracle Exadata Storage Expansion Quarter Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers using a three-phase, low-voltage PDU.

Table 5-66   Threshold Values for Oracle Exadata Storage Expansion Quarter Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Three-phase, Low-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A and B	Module 1, phase 1	0	12	15
A and B	Module 1, phase 2	0	11	14
A and B	Module 1, phase 3	0	5	7

Table 5-67 lists the threshold values for Oracle Exadata Storage Expansion Quarter Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers using a single-phase, high-voltage PDU.

Table 5-67   Threshold Values for Oracle Exadata Storage Expansion Quarter Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Single-phase, High-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A	Module 1, phase 1	0	9	12
A	Module 1, phase 2	0	5	7
A	Module 1, phase 3	0	0	0
B	Module 1, phase 1	0	0	0
B	Module 1, phase 2	0	5	7
B	Module 1, phase 3	0	9	12

Table 5-68 lists the threshold values for Oracle Exadata Storage Expansion Quarter Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers using a three-phase, high-voltage PDU.

Table 5-68   Threshold Values for Oracle Exadata Storage Expansion Quarter Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Three-phase, High-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A and B	Module 1, phase 1	0	9	12
A and B	Module 1, phase 2	0	3	4
A and B	Module 1, phase 3	0	4	5

5.4 Checking Exadata Storage Servers

The following procedure describes how to check Exadata Storage Servers:

> **Note:**
>
> - When using the KVM switch, and pressing the ESC key, the BIOS may receive two ESC characters, and prompt to exit. Select **CANCEL**.
>
> - If you need to connect to the ILOM serial management port, then the baud rate setting on Exadata Storage Servers is changed from the default ILOM setting 9600 to 115200 baud, 8 bits, no parity, and 1 stop bit.

1. Log in as the `root` user to the first Exadata Storage Server.

> **Note:**
>
> If you do not have the password for the `root` user, then contact Oracle Support Services.

2. Verify the SysSN label for the cell matches the `product_serial_number` value using the following command:

```
#ipmitool sunoem cli "show /SYS product_serial_number"
Connected.Use ^ D to exit.
->show /SYS product_serial_number
/SYS
Properties:
product_serial_number =0937XFG03B
->Session closed
Disconnected
```

3. Check the hardware and firmware using the following command:

```
# /opt/oracle.SupportTools/CheckHWnFWProfile
```

If output does not show success, then examine the output for mismatched hardware or firmware and take steps to correct those as explained in next steps in this section.

4. Verify the disks on the server are visible and online using the following command. The disks are numbered slot 0 to slot 11.

```
#cd /opt/MegaRAID/MegaCli
#./MegaCli64 -Pdlist -aAll |grep "Slot \|Firmware"
Slot Number:0
Firmware state:Online, Spun Up
Slot Number:1
Firmware state:Online, Spun Up
Slot Number:2
Firmware state:Online, Spun Up
Slot Number:3
Firmware state:Online, Spun Up
Slot Number:4
Firmware state:Online, Spun Up
Slot Number:5
Firmware state:Online, Spun Up
Slot Number:6
```

```
Firmware state:Online, Spun Up
Slot Number:7
Firmware state:Online, Spun Up
Slot Number:8
Firmware state:Online, Spun Up
Slot Number:9
Firmware state:Online, Spun Up
Slot Number:10
Firmware state:Online, Spun Up
Slot Number:11
Firmware state:Online, Spun Up
[root@cell01 ~]#
```

5. Verify the flash modules are visible using the following command. There are four cards, and four modules per card.

```
# lsscsi |grep -i marvel
# cellcli -e list lun where disktype=flashdisk
```

The numbering shows the PCI slot number and FMOD number, such as `1_0` is PCI slot 1, FMOD 0 on the card. To confirm the flash disks are mapped that way, use the following command:

```
# cellcli -e list physicaldisk attributes name, id, slotnumber where \
disktype="flashdisk" and 'status! ="not present"'
```

If any FMODs are missing, then power cycle the system, and wait 10 minutes after starting to check. If this does not resolve the problem, then reseat the module and flash card. If the problem continues, then replace the card with the on-site spare.

6. Check the rear of the rack to ensure the flash card LEDs are green all the way across. These LEDs are FMOD, 0, 1, 2, 3, and SuperCAP. If any LED is amber, then check again after the next step. If the LED is still amber after restart, then reseat the card and ESM or FMOD. If the problem continues, then replace the card with the on-site spare.

> **Note:**
>
> This step can be done when all systems are on. It does not have to be done on a per-server basis.

7. Log out of the system using the following command:

```
# logout
```

8. Return to the User Interface on the KVM switch by pressing the Ctrl key on the left to return to the KVM switch, and select **Disconnect Session**, if using the KVM switch to access the server.

9. Select **Target Devices** from Unit View, if using the KVM switch to access the server.

10. Proceed to the next Exadata Storage Server.

5.5 Checking Oracle Database Servers

The following procedure describes how to check the Oracle Database servers. At this point, the operating system is Linux.

1. Log in as the `root` user to the first database server.

   > **Note:**
   >
   > If you do not have the password for the `root` user, then contact Oracle
   > Support Services.

2. Verify the SysSN label for the server matches the `product_serial_number` value
   using the following command:

   ```
   # ipmitool sunoem cli "show /SYS product_serial_number"
   Connected.Use ^ D to exit.
   ->show /SYS product_serial_number
   /SYS
   Properties:
   product_serial_number =093ABCD5001
   ->Session closed
   Disconnected
   ```

3. Change to the `/opt/oracle.SupportTools/firstconf` directory using the following
   command:

   ```
   cd /opt/oracle.SupportTools/firstconf
   ```

4. Create a group file with the list of server IP addresses to use in the dcli utility
   commands, if required, using the following command:

   ```
   # ibhosts | awk '/elastic/ {print $8}' | cut -c1-14 > group_file
   ```

   In the preceding command, *group_file* is the file with the server IP addresses.

5. Verify the hardware profile is correct using the following command. The command
   checks CPU type and count, component firmware, and so on.

   ```
   # dcli -l root -g group_file "/opt/oracle.SupportTools/CheckHWnFWProfile  \
   -c  strict" > /tmp/checkhwfw.out
   ```

   ```
   # more /tmp/checkhwfw.out
   ```

   The following is an example of a check that failed:

   ```
   172.108.1.6:[WARNING ]The hardware and firmware are not supported.
   See details below
   [DiskControllerPCIeSlotWidth ]
   Requires:
   x8
   Found:
   x4
   [WARNING ]The hardware and firmware are not supported.See details
   above
   ```

   If a profile check fails and the firmware needs to be refreshed, then run the
   following command from the system with the problem.

   ```
   # /opt/oracle.SupportTools/CheckHWnFWProfile -U /opt/oracle.cellos/iso/cellbits
   Now updating the ILOM and the BIOS …
   ```

   The command must be entered on a single line. After running the command,
   power off the system, reset the ILOM, and wait 10 minutes before powering on the
   system.

6. Verify the disks on the server are visible and online using the following command.

```
# cd /opt/MegaRAID/MegaCli
# ./MegaCli64 -Pdlist -aAll |grep "Slot \|Firmware"
Slot Number: 0
Firmware state:Online, Spun Up
Device Firmware Level: 0868
Slot Number:1
Firmware state:Online, Spun Up
Device Firmware Level: 0868
Slot Number:2
Firmware state:Online, Spun Up
Device Firmware Level: A2A8
Slot Number:3
...
```

7. Examine the output of the following command:

```
/opt/MegaRAID/MegaCli/MegaCli64 -LdInfo -LAll -aAll
```

8. (Oracle Exadata Database Machine based on Sun Fire X4170 Oracle Database Servers only) Check that the ILOM is configured for the proper fan cooling on each database server using the following command:

```
# ipmitool sunoem cli "show /SP/policy"
```

- If the policy is present and enabled, then no additional steps are needed.

- If the policy is present and disabled, then enable the policy using the following command:

```
# ipmitool sunoem cli "set /SP/policy FLASH_ACCELERATOR_CARD_ \
INSTALLED=enabled"
```

The command must be entered as a single line.

9. Log out of the system using the following command:

```
# logout
```

10. Return to the User Interface on the KVM switch by pressing the Ctrl key on the left to return to the KVM switch, and select **Disconnect Session**, if using the KVM switch to access the server.

11. Select **Target Devices** from Unit View, and proceed to the next database server, if using the KVM switch to access the server.

12. Verify that NTP servers are configured the same for all servers using the following command. The command is run on each database server individually.

```
ntpq -p
```

5.6 Performing Additional Checks and Configuration

The following procedure describes additional checks and configuration steps for Oracle Exadata Rack:

1. (Oracle Exadata Database Machine only) Log in to the first database server as the `root` user.

2. Change to the `firstconf` directory using the following command:

```
# cd /opt/oracle.SupportTools/firstconf
```

3. Create a group file with the list of IP addresses to use in the dcli utility commands, if needed

4. Verify the rack master serial number is set correctly using the following command:

```
# dcli -l root -g group_file "ipmitool sunoem cli 'show          \
/SP system_identifier'" > /tmp/show-rack-csn.out

# more /tmp/show-rack-csn.out
```

If none of the serial numbers are set, then contact Oracle Support Services. If one serial number is not set correctly, then run the following command to correct it:

```
ipmitool sunoem cli 'set /SP system_identifier= \
"Exadata Database Machine rack_type xxxxAKyyyy"'
```

In the preceding command, *rack_type* is X2-2 or X2-8, depending on the rack.

5. Ensure disk cache policy is set to Disabled using the following command as the root user on the first database server in the cluster:

```
dcli -g /opt/oracle.SupportTools/onecommand/all_group -l root \
/opt/MegaRAID/MegaCli/MegaCli64 -LdPdInfo -aALL | grep -i 'Disk Cache Policy'
```

The following is an example of the output from the command:

```
dm01db01: Disk Cache Policy   : Disabled
dm01db02: Disk Cache Policy   : Disabled
dm01db03: Disk Cache Policy   : Disabled
...
dm01cel01: Disk Cache Policy   : Disabled
dm01cel02: Disk Cache Policy   : Disabled
...
```

If any server shows different output, then identify the LUN and use the following command to reset the policy to Disabled:

```
MegaCli64 -LDSetProp -DisDskCache -LUNn -a0
```

In the preceding command, *LUNn* is the LUN number, such as L2.

5.7 Verifying the InfiniBand Network

The following procedure describes how to verify the InfiniBand network:

1. Visually check all the InfiniBand cable connections within the rack. The port lights should be on, and the LEDs should be on. Do not press each connector to verify connectivity.

2. Log in as the root user on any component in the rack.

3. Verify the InfiniBand topology using the following commands:

```
# cd /opt/oracle.SupportTools/ibdiagtools
# ./verify-topology [-t rack_size]
```

The following example shows the output when the network components are correct.

```
[DB Machine Infiniband Cabling Topology Verification Tool ]
Is every external switch connected to every internal switch......[SUCCESS ]
Are any external switches connected to each other...............[SUCCESS ]
```

```
Are any hosts connected to spine switch.........................[SUCCESS ]
Check if all hosts have 2 CAs to different switches.............[SUCCESS ]
Leaf switch check:cardinality and even distribution.............[SUCCESS ]
Check if each rack has an valid internal ring...................[SUCCESS ]
```

In the preceding command, *rack_size* is the size of the rack. The `-t` *rack_size* option is needed if the rack is Oracle Exadata Database Machine Half Rack or Oracle Exadata Database Machine Quarter Rack. Use `halfrack` for Oracle Exadata Database Machine Half Rack, and `quarterrack` for Oracle Exadata Database Machine Quarter Rack.

The following example shows the output when there is a bad InfiniBand switch to InfiniBand cable connection:

```
#./verify-topology
[DB Machine Infiniband Cabling Topology Verification Tool ]
Is every external switch connected to every internal switch......[SUCCESS ]
Are any external switches connected to each other................[SUCCESS ]
Are any hosts connected to spine switch.........................[SUCCESS ]
Check if all hosts have 2 CAs to different switches.............[SUCCESS ]
Leaf switch check:cardinality and even distribution.............[SUCCESS ]
Check if each rack has an valid internal ring...................[ERROR ]

Switches 0x21283a87cba0a0 0x21283a87b8a0a0 have 6 connections between them.
They should have at least 7 links between them
```

The following example shows the output when there is a bad InfiniBand cable on a database server:

```
#./verify-topology
[DB Machine Infiniband Cabling Topology Verification Tool ]
Is every external switch connected to every internal switch......[SUCCESS ]
Are any external switches connected to each other................[SUCCESS ]
Are any hosts connected to spine switch.........................[SUCCESS ]
Check if all hosts have 2 CAs to different switches.............[ERROR ]
Node db01 has 1 endpoints.(Should be 2)
Port 2 of this node is not connected to any switch
--------fattree End Point Cabling verification failed-----
Leaf switch check:cardinality and even distribution.............[ERROR ]
Internal QDR Switch 0x21283a87b8a0a0 has fewer than 4 compute nodes
It has only 3 links belonging to compute nodes                  [SUCCESS ]
Check if each rack has an valid internal ring...................[SUCCESS ]
```

The following example shows the output when there is a bad connection on the switch and the system:

```
#./verify-topology
[DB Machine Infiniband Cabling Topology Verification Tool ]
Is every external switch connected to every internal switch......[SUCCESS ]
Are any external switches connected to each other................[SUCCESS ]
Are any hosts connected to spine switch.........................[SUCCESS ]
Check if all hosts have 2 CAs to different switches.............[ERROR ]

Node burxdb01 has 1 endpoints.(Should be 2)
Port 2 of this node is not connected to any switch
--------fattree End Point Cabling verifation failed-----
Leaf switch check:cardinality and even distribution.............[ERROR ]
Internal QDR Switch 0x21283a87b8a0a0 has fewer than 4 compute nodes
It has only 3 links belonging to compute nodes...................[SUCCESS ]
Check if each rack has an valid internal ring...................[ERROR ]
```

```
Switches 0x21283a87cba0a0 0x21283a87b8a0a0 have 6 connections between them
They should have at least 7 links between them
```

5.8 Imaging a New System

You have different options for preparing an Oracle Exadata system for deployment.

- Using ISO Images to Image a New System
- Using Elastic Configuration to Image a New System
- Using ISO to Image a New System
- Using PXE to Image a New System
- Using USB to Image a New System
- Updates to Imaging Parameters

Using a `preconf.csv` file with the PXE, USB and ISO options enables an unattended first boot configuration and greatly simplifies the installation but is not mandatory. It is possible to boot from the installation media and follow the prompts to configure the system.

Starting with Oracle Exadata System Software release 19.1.0, Secure Eraser is automatically started during re-imaging if the hardware supports Secure Eraser. This significantly simplifies the re-imaging procedure while maintaining performance. Now, when re-purposing a rack, you only have to image the rack and the secure data erasure is taken care of transparently as part of the process.

In release 12.1.2.2.0 and above, the installation media has been simplified, and it is no longer necessary to build files using the ImageMaker process.

Refer to My Oracle Support note 1306961.1 for additional details on valid options for imaging 12.1.2.1.0 and earlier releases.

5.8.1 Using ISO Images to Image a New System

In versions prior to 12.1.2.2.0, ISO images are available as patches that you can download for bare metal imaging an Exadata system. This is now the default method in 12.1.2.2.0 and above. You are no longer required to build the ISO files using imagemaker. Patches are available for both database nodes and cells. You can use the ISO images to boot the server using a virtual media device on the ILOM (from the Devices menu of the ILOM console). For example, the two ISO images available for 12.1.2.1.1 are listed in the following table.

Table 5-69   ISO Images for 12.1.2.1.1

Version	Type	Edelivery Part / Notes	ARU Bug #/ULN Channel	Description
12.1.2.1.1	Cell ISO image and md5sum: 90305b9e2c7e050d7588b8a7d5c731e7 cell_12.1.2.1.1_LINUX.X64_150316.2-1.x86_64.iso	Refer to 12.1.2.1.1 Readme (Doc ID 1959143.1) as well as the readme provided with the download.	20757971	Oracle Database Machine Exadata Storage Cell (X5-2L, X4-2L, X4270M3, X4270M2, X4275) Image 12c Release 1 (12.1.2.1.1) for Linux x86_64
12.1.2.1.1	DB ISO image and md5sum: 39f12722cb338b2d4de5acba90adf8fe compute_12.1.2.1.1_LINUX.X64_150316.2-1.x86_64.iso	Refer to 12.1.2.1.1 Readme (Doc ID 1959143.1) as well as the readme provided with the download.	20757974	Oracle Database Machine Database Host (X4-8, X4800M2, X4800, X5-2, X4-2, X4170M3, X4170M2, X4170) Image 12c Release 1 (12.1.2.1.1) for Linux x86_64

To prepare a new Exadata system for deployment using ISO images, perform the following steps:

1. Obtain the latest Oracle Exadata Deployment Assistant (OEDA).

2. Run the OEDA configuration tool to generate the configuration files. You will need the configuration files when you run `applyElasticConfig.sh` later.

3. Power on all the servers.

   a. Database nodes and cells will automatically assign to themselves unused IP addresses on eth0 in the 172.16 range.

   b. Host names of the nodes will be of the format `node`*N*, where *N* is a number.

4. After booting from the ISO, follow the prompts and imaging will start automatically. You will be prompted to enter IP addresses.

   You can use a `preconf.csv` by following the steps in Using ISO to Image a New System to mount the image on an NFS repository. You need to place the `preconf.csv` file in the same NFS directory.

5. If you are using Oracle VM, run `switch_to_ovm.sh` on each database server. The database servers will reboot.

   For example:

```
# /opt/oracle.SupportTools/switch_to_ovm.sh
2014-12-07 11:58:36 -0800 [INFO] Switch to DOM0 system partition /dev/VGExaDb/
LVDbSys3 (/dev/mapper/VGExaDb-LVDbSys3)
2014-12-07 11:58:36 -0800 [INFO] Active system device: /dev/mapper/VGExaDb-
LVDbSys1
2014-12-07 11:58:36 -0800 [INFO] Active system device in boot area: /dev/mapper/
VGExaDb-LVDbSys1
2014-12-07 11:58:36 -0800 [INFO] Set active systen device to /dev/VGExaDb/
LVDbSys3 in /boot/I_am_hd_boot
```

```
2014-12-07 11:58:36 -0800 [INFO] Reboot has been initiated to switch to the DOM0
system partition
```

6. Run `reclaimdisks.sh` on each database server.

The `/opt/oracle.SupportTools/reclaimdisks.sh -free -reclaim` command reclaims disk space reserved for the deployment type not selected. The command takes less than 5 minutes, approximately. Systems are imaged with disks configured with RAID5; a RAID rebuild is no longer part of the `reclaimdisks.sh` process.

Do not skip this step. Skipping this step results in unused space that can no longer be reclaimed by `reclaimdisks.sh`.

For example:

```
# /opt/oracle.SupportTools/reclaimdisks.sh -free -reclaim
Model is ORACLE SERVER X5-2
Number of LSI controllers: 1
Physical disks found: 4 (252:0 252:1 252:2 252:3)
Logical drives found: 1
Linux logical drive: 0
RAID Level for the Linux logical drive: 5
Physical disks in the Linux logical drive: 4 (252:0 252:1 252:2 252:3)
Dedicated Hot Spares for the Linux logical drive: 0
Global Hot Spares: 0
[INFO     ] Check for DOM0 system disk
[INFO     ] Check for DOM0 with inactive Linux system disk
[INFO     ] Valid DOM0 with inactive Linux system disk is detected
[INFO     ] Number of partitions on the system device /dev/sda: 4
[INFO     ] Higher partition number on the system device /dev/sda: 4
[INFO     ] Last sector on the system device /dev/sda: 3509759999
[INFO     ] End sector of the last partition on the system device /dev/sda:
3509759000
[INFO     ] Unmount /EXAVMIMAGES from ocfs2 partition on /dev/sda3
[INFO     ] Mount ocfs2 partition /dev/sda3 to /EXAVMIMAGES
[INFO     ] Remove inactive system logical volume /dev/VGExaDb/LVDbSys1
[INFO     ] Remove logical volume /dev/VGExaDbOra/LVDbOra1
[INFO     ] Remove volume group VGExaDbOra
[INFO     ] Remove physical volume /dev/sda4
[INFO     ] Remove partition /dev/sda4
[INFO     ] Re-calculate end sector of the last partition after removing of /dev/
sda4 partition
[INFO     ] End sector of the last partition on the system device /dev/sda:
3300035608
[INFO     ] Check for existing first boot system image /EXAVMIMAGES/
System.first.boot.12.1.2.1.0.141205.2.img
[INFO     ] Saving /EXAVMIMAGES/System.first.boot.12.1.2.1.0.141205.2.img
in /var/log/exadatatmp ...
[INFO     ] First boot system image saved in /var/log/exadatatmp/
System.first.boot.12.1.2.1.0.141205.2.img
[INFO     ] Unmount /EXAVMIMAGES from /dev/sda3
[INFO     ] Remove partition /dev/sda3
[INFO     ] Re-calculate end sector of the last partition after removing of /dev/
sda3 partition
[INFO     ] End sector of the last partition on the system device /dev/sda:
240132159
[INFO     ] Create primary ocfs2 partition 3 using 240132160 3509758999
[INFO     ] Create ocfs2 partition on /dev/sda3
[INFO     ] Mount ocfs2 partition on /dev/sda3 to /EXAVMIMAGES
[INFO     ] Restoring /var/log/exadatatmp/System.first.boot.
12.1.2.1.0.141205.2.img into /EXAVMIMAGES ...
[INFO     ] Logical volume LVDbSys2 exists in volume group VGExaDb
```

```
[INFO    ] Grub version in /boot/grub/grub.stage.version: 0.97-81.0.1.el6
[INFO    ] Grub rpm version: 0.97-13.10.0.1.el5
[INFO    ] Copying /usr/share/grub/x86_64-redhat/* to /boot/grub ...
[INFO    ] Create filesystem on device /dev/sda1
[INFO    ] Tune filesystem on device /dev/sda1

GNU GRUB  version 0.97  (640K lower / 3072K upper memory)

[ Minimal BASH-like line editing is supported.  For the first word, TAB
lists possible command completions.  Anywhere else TAB lists the possible
completions of a device/filename.]
grub> root (hd0,0)
 Filesystem type is ext2fs, partition type 0x83
grub> setup (hd0)
 Checking if "/boot/grub/stage1" exists... no
 Checking if "/grub/stage1" exists... yes
 Checking if "/grub/stage2" exists... yes
 Checking if "/grub/e2fs_stage1_5" exists... yes
 Running "embed /grub/e2fs_stage1_5 (hd0)"... failed (this is not fatal)
 Running "embed /grub/e2fs_stage1_5 (hd0,0)"... failed (this is not fatal)
 Running "install /grub/stage1 (hd0) /grub/stage2 p /grub/grub.conf "...
succeeded
Done.
grub> quit
```

7. Run `ibhosts` and verify that all nodes show the correct IP addresses and host names. There should be no nodes with `elasticNode` in the description.

8. Run the OEDA tool to deploy.

```
[root] # ./install.sh -cf ../MAA-dm01.xml -l
1. Validate Configuration File
2. Setup Capacity-on-Demand
3. Create Virtual Machine
4. Create Users
5. Setup Cell Connectivity
6. Create Cell Disks
7. Create Grid Disks
8. Configure Alerting
9. Install Cluster Software
10. Initialize Cluster Software
11. Install Database Software
12. Relink Database with RDS
13. Create ASM Diskgroups
14. Create Databases
15. Apply Security Fixes
16. Install Exachk
17. Setup ASR Alerting
18. Create Installation Summary
19. Resecure Machine
```

Related Topics

- Exadata 12.1.2.1.1 release and patch (20240049) (My Oracle Support Doc ID 1959143.1)

5.8.2 Using Elastic Configuration to Image a New System

Elastic configuration is now the standard methodology for all new deployments, and applies to Oracle Exadata X5, X5-2L, and X4-8b (with X5 storage cells) servers. You can also use the same process to add additional database servers or cells to an

existing configuration. The process allows initial IP addresses to be assigned to database servers and cells, regardless of the exact customer configuration ordered.

Elastic configuration is only applicable to machines shipped from the factory (or to machines imaged exactly to mimic that) and only for X5 and X4-8b systems or later generations. You can run Elastic configuration at the first time of deployment, and when adding new X5 factory-built components to a rack. You cannot use Elastic configuration to configure or reconfigure systems. It is recommended that you use Elastic configuration only with machines shipped from the factory for first-time deployment.

When a server is shipped from the factory, the elastic configuration code is executed when the server is first powered on. At that time, the machine will be assigned an IP address in the 172 range.

To prepare a new Exadata system for deployment using the elastic configuration method, perform the following steps:

1. Obtain the latest Oracle Exadata Deployment Assistant (OEDA).

2. Run the OEDA configuration tool to generate the configuration files.

3. Power on all the servers.

   a. Database nodes and cells will automatically assign to themselves unused IP addresses on eth0 in the 172.16 range.

   b. Host names of the nodes will be of the format "node*N*", where *N* is a number.

4. If you are using Oracle VM, run `switch_to_ovm.sh` on each database server. The database servers will reboot. If you are using physical deployment and not virtualized deployment, then you can skip this step.

   For example:

   ```
   # /opt/oracle.SupportTools/switch_to_ovm.sh
   2014-12-07 11:58:36 -0800 [INFO] Switch to DOM0 system partition /dev/VGExaDb/
   LVDbSys3 (/dev/mapper/VGExaDb-LVDbSys3)
   2014-12-07 11:58:36 -0800 [INFO] Active system device: /dev/mapper/VGExaDb-
   LVDbSys1
   2014-12-07 11:58:36 -0800 [INFO] Active system device in boot area: /dev/mapper/
   VGExaDb-LVDbSys1
   2014-12-07 11:58:36 -0800 [INFO] Set active systen device to /dev/VGExaDb/
   LVDbSys3 in /boot/I_am_hd_boot
   2014-12-07 11:58:36 -0800 [INFO] Reboot has been initiated to switch to the DOM0
   system partition
   ```

5. Run `reclaimdisks.sh` on each database server.

   The `/opt/oracle.SupportTools/reclaimdisks.sh -free -reclaim` command reclaims disk space reserved for the deployment type not selected. The command takes less than 5 minutes, approximately. Systems are imaged with disks configured with RAID5; a RAID rebuild is no longer part of the `reclaimdisks.sh` process.

   Do not skip this step. Skipping this step results in unused space that can no longer be reclaimed by `reclaimdisks.sh`.

   For example:

   ```
   # /opt/oracle.SupportTools/reclaimdisks.sh -free -reclaim
   Model is ORACLE SERVER X5-2
   Number of LSI controllers: 1
   Physical disks found: 4 (252:0 252:1 252:2 252:3)
   Logical drives found: 1
   ```

```
Linux logical drive: 0
RAID Level for the Linux logical drive: 5
Physical disks in the Linux logical drive: 4 (252:0 252:1 252:2 252:3)
Dedicated Hot Spares for the Linux logical drive: 0
Global Hot Spares: 0
[INFO     ] Check for DOM0 system disk
[INFO     ] Check for DOM0 with inactive Linux system disk
[INFO     ] Valid DOM0 with inactive Linux system disk is detected
[INFO     ] Number of partitions on the system device /dev/sda: 4
[INFO     ] Higher partition number on the system device /dev/sda: 4
[INFO     ] Last sector on the system device /dev/sda: 3509759999
[INFO     ] End sector of the last partition on the system device /dev/sda:
3509759000
[INFO     ] Unmount /EXAVMIMAGES from ocfs2 partition on /dev/sda3
[INFO     ] Mount ocfs2 partition /dev/sda3 to /EXAVMIMAGES
[INFO     ] Remove inactive system logical volume /dev/VGExaDb/LVDbSys1
[INFO     ] Remove logical volume /dev/VGExaDbOra/LVDbOra1
[INFO     ] Remove volume group VGExaDbOra
[INFO     ] Remove physical volume /dev/sda4
[INFO     ] Remove partition /dev/sda4
[INFO     ] Re-calculate end sector of the last partition after removing of /dev/
sda4 partition
[INFO     ] End sector of the last partition on the system device /dev/sda:
3300035608
[INFO     ] Check for existing first boot system image /EXAVMIMAGES/
System.first.boot.12.1.2.1.0.141205.2.img
[INFO     ] Saving /EXAVMIMAGES/System.first.boot.12.1.2.1.0.141205.2.img
in /var/log/exadatatmp ...
[INFO     ] First boot system image saved in /var/log/exadatatmp/
System.first.boot.12.1.2.1.0.141205.2.img
[INFO     ] Unmount /EXAVMIMAGES from /dev/sda3
[INFO     ] Remove partition /dev/sda3
[INFO     ] Re-calculate end sector of the last partition after removing of /dev/
sda3 partition
[INFO     ] End sector of the last partition on the system device /dev/sda:
240132159
[INFO     ] Create primary ocfs2 partition 3 using 240132160 3509758999
[INFO     ] Create ocfs2 partition on /dev/sda3
[INFO     ] Mount ocfs2 partition on /dev/sda3 to /EXAVMIMAGES
[INFO     ] Restoring /var/log/exadatatmp/System.first.boot.
12.1.2.1.0.141205.2.img into /EXAVMIMAGES ...
[INFO     ] Logical volume LVDbSys2 exists in volume group VGExaDb
[INFO     ] Grub version in /boot/grub/grub.stage.version: 0.97-81.0.1.el6
[INFO     ] Grub rpm version: 0.97-13.10.0.1.el5
[INFO     ] Copying /usr/share/grub/x86_64-redhat/* to /boot/grub ...
[INFO     ] Create filesystem on device /dev/sda1
[INFO     ] Tune filesystem on device /dev/sda1

GNU GRUB  version 0.97  (640K lower / 3072K upper memory)

[ Minimal BASH-like line editing is supported.  For the first word, TAB
lists possible command completions.  Anywhere else TAB lists the possible
completions of a device/filename.]
grub> root (hd0,0)
 Filesystem type is ext2fs, partition type 0x83
grub> setup (hd0)
 Checking if "/boot/grub/stage1" exists... no
 Checking if "/grub/stage1" exists... yes
 Checking if "/grub/stage2" exists... yes
 Checking if "/grub/e2fs_stage1_5" exists... yes
 Running "embed /grub/e2fs_stage1_5 (hd0)"... failed (this is not fatal)
```

```
 Running "embed /grub/e2fs_stage1_5 (hd0,0)"... failed (this is not fatal)
 Running "install /grub/stage1 (hd0) /grub/stage2 p /grub/grub.conf "...
succeeded
Done.
grub> quit
```

6. Apply your specific configuration to the nodes by running the `applyElasticConfig.sh` script that is supplied with OEDA.

   See My Oracle Support note 1953915.1 for further details on how the elastic configuration process works, and specific examples of how to apply customer IP addresses to the rack.

7. Run `ibhosts` and verify that all nodes show the correct IP addresses and host names. There should be no nodes with "elasticNode" in the description.

8. Run the OEDA tool to deploy.

```
[root] # ./install.sh -cf ../MAA-dm01.xml -l
1. Validate Configuration File
2. Setup Capacity-on-Demand
3. Create Virtual Machine
4. Create Users
5. Setup Cell Connectivity
6. Create Cell Disks
7. Create Grid Disks
8. Configure Alerting
9. Install Cluster Software
10. Initialize Cluster Software
11. Install Database Software
12. Relink Database with RDS
13. Create ASM Diskgroups
14. Create Databases
15. Apply Security Fixes
16. Install Exachk
17. Setup ASR Alerting
18. Create Installation Summary
19. Resecure Machine
```

Related Topics

- [Elastic Configuration on Exadata (My Oracle Support Doc ID 1953915.1)](#)

5.8.3 Using ISO to Image a New System

To prepare a new Exadata system for deployment using ISO, perform the following steps:

1. Obtain the latest Oracle Exadata Deployment Assistant (OEDA).

2. Run the OEDA configuration tool to generate the configuration files.

3. Power on all the servers.

   a. Database nodes and cells will automatically assign to themselves unused IP addresses on eth0 in the 172.16 range.

   b. Host names of the nodes will be of the format $nodeN$, where *N* is a number.

4. Run OEDA to generate the `preconf.csv` file that can be used to image the system.

5. Connect to the first database node. You can do this by connecting a laptop to the ILOM serial management port (9600, 8, N, 1), and then connecting to the console and log in to the database node.

6. Obtain the eth0 MAC address for each database node. This is the `fru_macaddress` field from `/SYS/MB/NET0` in the ILOM (or through `ip addr` if logged into the console).

   a. Connect to the other database nodes using ssh from the console.

   b. Run `ibhosts` to get a list of node names and IP addresses.

7. Insert the MAC addresses using uppercase characters in the seventh field of the `preconf.csv` file for each node. This field should be empty, that is, you should see two consecutive comma characters (`,,`). For example:

```
orhb42-b08-01,us.oracle.com,db,eth0,eth0,Management,00:10:E0:69:34:52,
10.196.3.106,255.255.224.0,10.196.31.250,orhb42-b08-01-priv,Private:ac
tive-bond-ib,192.168.10.15,255.255.255.0,,,America/Los_Angeles
```

8. Run `ipconf` to verify the generated `preconf.csv` file. This can be done on any Exadata server, and although not required, it is useful to ensure the `preconf.csv` is valid before proceeding.

```
# ipconf -verify -preconf /tmp/preconf.csv
[Info]: ipconf command line: /opt/oracle.cellos/ipconf.pl -verify -preconf /tmp
/preconf -nocodes
[Done]: Pre config verification OK
```

9. If you are using versions prior to 12.1.2.2.0, proceed to step 11 to use ImageMaker to create the image files.

   If you are using version 12.1.2.2.0 or later, it is no longer necessary to use `imagemaker` to create the image files. The relevant PXE, ISO, and USB image files have already been created in the patches themselves. Simply download the patch containing the prebuilt image file from Oracle Software Delivery Cloud and place the downloaded ISO `.iso` image file in the appropriate location. For 12.1.2.2.0 the patch numbers can be obtained from My Oracle Support note 2038073.1. There are separate ImageMaker files for database nodes and cells.

   Note : For image version 12.1.2.2.0 the format of the downloadable image files has changed.

   There will be an image file in the downloaded zip file. For example, the database node zip file will contain:

   ```
   compute_12.1.2.2.0_LINUX.X64_150917-1.x86_64.iso
   ```

   For cell image, the file will be similar to:

   ```
   cell_12.1.2.2.0_LINUX.X64_150917-1.x86_64.iso
   ```

10. (For 12.1.2.2.0 and above) Follow the steps in the patch `README.txt` to copy the ISO file and optional `preconf.csv` file into place.

    a. After download, unzip the file as `root` user for the following ISO image.

       ```
       b2d6d9ac61e2e673d05fba11ec65107d compute_12.1.2.2.0_LINUX.X64_150917-1.x
       86_64.iso
       ```

> **✎ Note:**
>
> - ISO + `preconf.csv` is supported only if the ISO image is mounted on an NFS repository in ILOM and the `preconf.csv` file is located in the same NFS directory. All other methods of mounting the ISO image in ILOM (SAMBA URI and Java Remote Console) and burning ISO image to DVD will not work with the `preconf.csv` file. For instructions on how to mount the ISO image from a NFS central repository, see "Configure a Host Storage Device Redirection Session" in the *Oracle X5 Series Servers Administration Guide*
>
> - Because of possible late echos of text to the console, be aware that the boot process will be waiting for input to complete the interactive `ipconf` by prompting for `Nameserver:`
>
> - Due to a bug, `ipconf` will prompt you twice to enter the network settings.

b. Proceed to step 15, and boot the system with the ISO image and follow installation prompts. The ISO can be made available with a `preconf.csv` following the steps in the Note box above, or as virtual media on the ILOM of the node to be reimaged when a `preconf.csv` is not used.

Steps 11 to 14, which create the image files, can be skipped.

11. Download the `imagemaker` kit to prepare and create the files for the USB drive.

This kit is available publicly on the Oracle Software Delivery Cloud (`edelivery.oracle.com`) site under "Oracle Database Products -> Linux x86-64". There are separate ImageMaker files for database nodes and cells.

12. After download, unzip the first file, called something similar to `V75080-01.zip`, and then unzip the subsequent file as well. Perform the unzips as the root user. Then untar the file.

```
# unzip V75080-01.zip

# unzip cellImageMaker_12.1.2.1.1_LINUX.X64_150316.2-1.x86_64.zip

# tar -pxvf cellImageMaker_12.1.2.1.1_LINUX.X64_150316.2-1.x86_64.tar
```

View the `README_FOR_FACTORY.txt` file in the resulting directory for additional details.

13. Run `makeImageMedia.sh` to build the ISO file for imaging.

For building images for 12.1.2.1.0 and above, the recommended `makeImageMedia.sh` options for building ISO images are:

a. (12.1.2.1.0 up to 12.2.1.1.0) Change directory to the `dl180` or `dl360` directory.

b. (12.2.1.1.0 and above) Change directory to the `cell` or `compute` directory.

c. Make the ISO file.

```
./makeImageMedia.sh -factory -stit -reboot-on-success -nodisktests [-preconf
    preconf_file] filename.iso
```

For ISO imaging, note that you must run `makeImageMedia.sh` from an Oracle Exadata database server if you are using the `-preconf` option.

For example:

```
# ./makeImageMedia.sh -factory -stit -reboot-on-success -nodisktests -preconf
 preconf.csv computenode.iso
[Info]: ipconf command line: /root/imagemaker/compute/initrd/opt/oracle.cellos
/ipconf.pl -preconf preconf.csv -verify -nocodes
[Done]: Pre config verification OK
Please wait. Calculating md5 checksums for cellbits ...
Calculating md5 checksum for exaos.tbz ...
Calculating md5 checksum for dbboot.tbz ...
Calculating md5 checksum for dbfw.tbz ...
Calculating md5 checksum for kernel.tbz ...
Calculating md5 checksum for ofed.tbz ...
Calculating md5 checksum for sunutils.tbz ...
Calculating md5 checksum for commonos.tbz ...
Calculating md5 checksum for debugos.tbz ...
Calculating md5 checksum for dbrpms.tbz ...
Calculating md5 checksum for exaosovs.tbz ...
Calculating md5 checksum for dbovsboot.tbz ...
Calculating md5 checksum for kernelovs.tbz ...
Calculating md5 checksum for ofedovs.tbz ...
Calculating md5 checksum for commonovsos.tbz ...
Calculating md5 checksum for debugosovs.tbz ...
Calculating md5 checksum for dbovsrpms.tbz ...
Calculating md5 checksum for sunovsutils.tbz ...
Calculating md5 checksum for dbvmboot.tbz ...
Calculating md5 checksum for ofedvm.tbz ...
Calculating md5 checksum for sunvmutils.tbz ...
Please wait. Making initrd ...
395864 blocks
Please wait. Calculating md5 checksums for boot ...
Size of boot image is 4 sectors -> No emulation
0.30% done, estimate finish Wed Nov 29 10:47:27 2016
0.60% done, estimate finish Wed Nov 29 10:47:27 2016
0.90% done, estimate finish Wed Nov 29 10:47:27 2016
1.21% done, estimate finish Wed Nov 29 10:47:27 2016
1.51% done, estimate finish Wed Nov 29 10:47:27 2016
1.81% done, estimate finish Wed Nov 29 10:47:27 2016
2.11% done, estimate finish Wed Nov 29 10:47:27 2016
2.41% done, estimate finish Wed Nov 29 10:47:27 2016
2.71% done, estimate finish Wed Nov 29 10:47:27 2016
3.02% done, estimate finish Wed Nov 29 10:47:27 2016
3.32% done, estimate finish Wed Nov 29 10:47:27 2016
3.62% done, estimate finish Wed Nov 29 10:47:27 2016
3.92% done, estimate finish Wed Nov 29 10:47:27 2016
4.22% done, estimate finish Wed Nov 29 10:47:27 2016
4.52% done, estimate finish Wed Nov 29 10:47:27 2016
4.83% done, estimate finish Wed Nov 29 10:47:27 2016
5.13% done, estimate finish Wed Nov 29 10:47:27 2016
5.43% done, estimate finish Wed Nov 29 10:47:27 2016
5.73% done, estimate finish Wed Nov 29 10:47:27 2016
<output truncated>
97.72% done, estimate finish Wed Nov 29 10:47:30 2016
98.02% done, estimate finish Wed Nov 29 10:47:30 2016
98.32% done, estimate finish Wed Nov 29 10:47:30 2016
98.62% done, estimate finish Wed Nov 29 10:47:30 2016
98.92% done, estimate finish Wed Nov 29 10:47:30 2016
99.22% done, estimate finish Wed Nov 29 10:47:30 2016
99.52% done, estimate finish Wed Nov 29 10:47:30 2016
99.83% done, estimate finish Wed Nov 29 10:47:30 2016
Total translation table size: 2048
```

```
Total rockridge attributes bytes: 0
Total directory bytes: 2048
Path table size(bytes): 26
Max brk space used 0
1657890 extents written (3238 MB)
Done creation of installation ISO for compute node
```

14. Attach the ISO as virtual media to the ILOM of the database server to be reimaged, and select CDROM as the next boot device.

15. Reboot the database node or cell to start the imaging process from the ISO.

16. If you are using Oracle VM, run `switch_to_ovm.sh` on each database server. The database servers will reboot.

    For example:

```
# /opt/oracle.SupportTools/switch_to_ovm.sh
2014-12-07 11:58:36 -0800 [INFO] Switch to DOM0 system partition /dev/VGExaDb/
LVDb
Sys3 (/dev/mapper/VGExaDb-LVDbSys3)
2014-12-07 11:58:36 -0800 [INFO] Active system device: /dev/mapper/VGExaDb-
LVDbSys
1
2014-12-07 11:58:36 -0800 [INFO] Active system device in boot area: /dev/
mapper/VG
ExaDb-LVDbSys1
2014-12-07 11:58:36 -0800 [INFO] Set active systen device to /dev/VGExaDb/
LVDbSys3
 in /boot/I_am_hd_boot
2014-12-07 11:58:36 -0800 [INFO] Reboot has been initiated to switch to the DOM0
s
ystem partition
```

17. Run `reclaimdisks.sh` on each database server.

    The `/opt/oracle.SupportTools/reclaimdisks.sh -free -reclaim` command reclaims disk space reserved for the deployment type not selected. The command takes less than 5 minutes, approximately. Systems are imaged with disks configured with RAID5; a RAID rebuild is no longer part of the `reclaimdisks.sh` process.

    Do not skip this step. Skipping this step results in unused space that can no longer be reclaimed by `reclaimdisks.sh`.

    For example:

```
# /opt/oracle.SupportTools/reclaimdisks.sh -free -reclaim
Model is ORACLE SERVER X5-2
Number of LSI controllers: 1
Physical disks found: 4 (252:0 252:1 252:2 252:3)
Logical drives found: 1
Linux logical drive: 0
RAID Level for the Linux logical drive: 5
Physical disks in the Linux logical drive: 4 (252:0 252:1 252:2 252:3)
Dedicated Hot Spares for the Linux logical drive: 0
Global Hot Spares: 0
[INFO     ] Check for DOM0 system disk
[INFO     ] Check for DOM0 with inactive Linux system disk
[INFO     ] Valid DOM0 with inactive Linux system disk is detected
[INFO     ] Number of partitions on the system device /dev/sda: 4
[INFO     ] Higher partition number on the system device /dev/sda: 4
[INFO     ] Last sector on the system device /dev/sda: 3509759999
[INFO     ] End sector of the last partition on the system device /dev/sda:
```

```
350975
9000
[INFO     ] Unmount /EXAVMIMAGES from ocfs2 partition on /dev/sda3
[INFO     ] Mount ocfs2 partition /dev/sda3 to /EXAVMIMAGES
[INFO     ] Remove inactive system logical volume /dev/VGExaDb/LVDbSys1
[INFO     ] Remove logical volume /dev/VGExaDbOra/LVDbOra1
[INFO     ] Remove volume group VGExaDbOra
[INFO     ] Remove physical volume /dev/sda4
[INFO     ] Remove partition /dev/sda4
[INFO     ] Re-calculate end sector of the last partition after removing
of /dev/s
da4 partition
[INFO     ] End sector of the last partition on the system device /dev/sda:
330003
5608
[INFO     ] Check for existing first boot system image /EXAVMIMAGES/
System.first.b
oot.12.1.2.1.0.141205.2.img
[INFO     ] Saving /EXAVMIMAGES/System.first.boot.12.1.2.1.0.141205.2.img in /
var/
log/exadatatmp ...
[INFO     ] First boot system image saved in /var/log/exadatatmp/
System.first.boot
.12.1.2.1.0.141205.2.img
[INFO     ] Unmount /EXAVMIMAGES from /dev/sda3
[INFO     ] Remove partition /dev/sda3
[INFO     ] Re-calculate end sector of the last partition after removing
of /dev/s
da3 partition
[INFO     ] End sector of the last partition on the system device /dev/sda:
240132
159
[INFO     ] Create primary ocfs2 partition 3 using 240132160 3509758999
[INFO     ] Create ocfs2 partition on /dev/sda3
[INFO     ] Mount ocfs2 partition on /dev/sda3 to /EXAVMIMAGES
[INFO     ] Restoring /var/log/exadatatmp/System.first.boot.
12.1.2.1.0.141205.2.im
g into /EXAVMIMAGES ...
[INFO     ] Logical volume LVDbSys2 exists in volume group VGExaDb
[INFO     ] Grub version in /boot/grub/grub.stage.version: 0.97-81.0.1.el6
[INFO     ] Grub rpm version: 0.97-13.10.0.1.el5
[INFO     ] Copying /usr/share/grub/x86_64-redhat/* to /boot/grub ...
[INFO     ] Create filesystem on device /dev/sda1
[INFO     ] Tune filesystem on device /dev/sda1

GNU GRUB  version 0.97  (640K lower / 3072K upper memory)

[ Minimal BASH-like line editing is supported.  For the first word, TAB
lists possible command completions.  Anywhere else TAB lists the possible
completions of a device/filename.]
grub> root (hd0,0)
 Filesystem type is ext2fs, partition type 0x83
grub> setup (hd0)
 Checking if "/boot/grub/stage1" exists... no
 Checking if "/grub/stage1" exists... yes
 Checking if "/grub/stage2" exists... yes
 Checking if "/grub/e2fs_stage1_5" exists... yes
 Running "embed /grub/e2fs_stage1_5 (hd0)"... failed (this is not fatal)
 Running "embed /grub/e2fs_stage1_5 (hd0,0)"... failed (this is not fatal)
 Running "install /grub/stage1 (hd0) /grub/stage2 p /grub/grub.conf "...
succeeded
```

```
Done.
grub> quit
```

18. Run `ibhosts` and verify that all nodes show the correct IP addresses and host names. There should be no nodes with `elasticNode` in the description.

19. Run the OEDA tool to deploy.

```
[root] # ./install.sh -cf ../MAA-dm01.xml -l
1. Validate Configuration File
2. Setup Capacity-on-Demand
3. Create Virtual Machine
4. Create Users
5. Setup Cell Connectivity
6. Create Cell Disks
7. Create Grid Disks
8. Configure Alerting
9. Install Cluster Software
10. Initialize Cluster Software
11. Install Database Software
12. Relink Database with RDS
13. Create ASM Diskgroups
14. Create Databases
15. Apply Security Fixes
16. Install Exachk
17. Setup ASR Alerting
18. Create Installation Summary
19. Resecure Machine
```

Related Topics

- Oracle Software Delivery Cloud
- Exadata 12.1.2.2.0 release and patch (20131726) (My Oracle Support Doc ID 2038073.1)
- Exadata Database Machine and Exadata Storage Server Supported Versions (My Oracle Support Doc ID 888828.1)

5.8.4 Using PXE to Image a New System

You can use PXE to prepare a new Exadata system for deployment.

1. Obtain the latest Oracle Exadata Deployment Assistant (OEDA) from http://www.oracle.com/technetwork/database/exadata/oeda-download-2076737.html.

2. Run the OEDA configuration tool to generate the configuration files.

3. Power on all the servers.

When the system is first started, the following conditions exist:

  a. Database nodes and cells will automatically assign to themselves unused IP addresses on eth0 in the 172.16 range.

  b. Host names of the nodes will be of the format `node`N, where N is a number.

4. Run OEDA to generate the `preconf.csv` file that you will use to image the system.

5. Connect to the first database node.

You can do this by connecting a laptop to the ILOM serial management port (9600, 8, N, 1). Then you can connect to the console and log in to the database node.

6. Obtain the eth0 MAC address for each database node.

   The eth0 MAC address is the `fru_macaddress` field from `/SYS/MB/NET0` in the ILOM (or from `ip addr` if logged into the console).

   a. Connect to the each database node through SSH from the console.

   b. Run `ibhosts` to get a list of node names and IP addresses.

7. Insert the MAC addresses using uppercase characters in the seventh field of the `preconf.csv` file for each node.

   This field should be empty, that is, you should see two consecutive comma characters (`,,`).

   For example:

   ```
   orhb42-b08-01,us.oracle.com,db,eth0,eth0,Management,00:10:E0:69:34:52,10.196.3.
   106,255.255.224.0,10.196.31.250,orhb42-b08-01-priv,Private:active-bond-ib,192.1
   68.10.15,255.255.255.0,,,America/Los_Angeles
   ```

8. Create a PXE configuration file for each node.

   Below are the recommended options for PXE imaging of versions 12.1.2.1.0 and above

   ```
   append initrd=img_file pxe factory stit reboot-on-success notests=diskgroup dhcp
   preconf=n.n.n.n:/directory/preconf.csv sk=n.n.n.n:/directory console=ttyS0,
   115200n8
   ```

   The command above should be entered as a single line with no line breaks.

9. Create the image files, if necessary.

   If you are imaging version earlier than 12.1.2.2.0, continue to step 10 to create the image files using ImageMaker. For versions 12.1.2.2.0 and later, skip ahead to step 13.

   If you are using version 12.1.2.2.0 or later, it is no longer necessary to use ImageMaker to create the image files. The relevant PXE, ISO, and USB image files have already been created in the patches themselves. Simply download the patch containing the pre-built PXE image files from Oracle Software Delivery Cloud and place them into the appropriate directories on the PXE server. For all releases, see My Oracle Support note 888828.1 for the patch numbers. There are separate PXE image patches for database servers and storage servers.

   Note: For image version 12.1.2.2.0 the format of the downloadable image files has changed.

   The downloaded zip file contains four image files:

   • For 12.1.2.2.0 up to 12.2.1.1.0:

     ```
     kernel: vmlinux-version-ImageName-{DL180|DL360}
     initrd: initrd-version-ImageName-{DL180|DL360}.img
     image: nfsimg-version-ImageName-{DL180|DL360}.tar
     image: nfsimg-version-ImageName-{DL180|DL360}.tar.md5
     ```

   • For 12.2.1.1.0 and above:

     ```
     kernel: vmlinux-version-ImageName-{cell|compute}
     initrd: initrd-version-ImageName-{cell|compute}.img
     image: nfsimg-version-ImageName-{cell|compute}.tar
     image: nfsimg-version-ImageName-{cell|compute}.tar.md5
     ```

10. (Releases 12.1.2.2.0 and earlier) Download the ImageMaker kit to prepare and create the files for the PXE server.

    The kit is available publicly on the Oracle Software Delivery Cloud (`edelivery`) site under "Oracle Database Products -> Linux x86-64". There are separate ImageMaker files for database nodes and cells.

11. (Releases 12.1.2.2.0 and earlier) After downloading the kit, as the `root` user, unzip the first file that has a name similar to `V75080-01.zip`, and then unzip the subsequent ZIP file. Finally, untar the file.

    ```
    # unzip V75080-01.zip

    # unzip cellImageMaker_12.1.2.1.1_LINUX.X64_150316.2-1.x86_64.zip

    # tar -pxvf cellImageMaker_12.1.2.1.1_LINUX.X64_150316.2-1.x86_64.tar
    ```

    View the `README_FOR_FACTORY.txt` file in the resulting directory for additional details.

12. (Releases 12.1.2.2.0 and earlier) Run `makeImageMedia.sh` to build the kernel, `initrd`, and image files, if necessary.

    Place the image files in the relevant directories on the PXE server. These files will be sent at boot time to the node being imaged.

    a. Change directory to the `dl180` or `dl360` directory and make the PXE build using:

       ```
       ./makeImageMedia.sh -pxe -pxeout ImageName
       ```

       If the `dl180` or `dl360` directory are not available, then change directory to the `cell` or `compute` directory.

       The `makeImageMedia.sh` command creates four files in the `./PXE` subdirectory:

       ```
       kernel: vmlinux-version-ImageName-{DL180|DL360}
       initrd: initrd-version-ImageName-{DL180|DL360}.img
       image: nfsimg-version-ImageName-{DL180|DL360}.tar
       image: nfsimg-version-ImageName-{DL180|DL360}.tar.md5
       ```

13. Change the boot order using the ILOM to boot from PXE and then reboot to start the imaging process.

    For example, from the Oracle Linux prompt on the host:

    ```
    # ipmitool chassis bootdev pxe

    # reboot
    ```

14. If you are using Oracle VM, run `switch_to_ovm.sh` on all Oracle VM database servers before running the OEDA installation tool.

    When you run this command, the database servers will reboot.

    ```
    # /opt/oracle.SupportTools/switch_to_ovm.sh
    2014-12-07 11:58:36 -0800 [INFO] Switch to DOM0 system partition /dev/VGExaDb/LV
    DbSys3 (/dev/mapper/VGExaDb-LVDbSys3)
    2014-12-07 11:58:36 -0800 [INFO] Active system device: /dev/mapper/VGExaDb-LVDbS
    ys1
    2014-12-07 11:58:36 -0800 [INFO] Active system device in boot area: /dev/mapper/
    VGExaDb-LVDbSys1
    2014-12-07 11:58:36 -0800 [INFO] Set active systen device to /dev/VGExaDb/LVDbSy
    s3 in /boot/I_am_hd_boot
    ```

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```
2014-12-07 11:58:36 -0800 [INFO] Reboot has been initiated to switch to the DOM0
 system partition
```

15. Run `reclaimdisks.sh` on each database server before running the OEDA installation tool.

The `/opt/oracle.SupportTools/reclaimdisks.sh –free –reclaim` command reclaims disk space reserved for the deployment type not selected. The command takes less than 5 minutes, approximately. Systems are imaged with disks configured with RAID5; a RAID rebuild is no longer part of the `reclaimdisks.sh` process.

> **WARNING:**
>
> Do not skip this step. Skipping this step results in unused space that can no longer be reclaimed by `reclaimdisks.sh`.

```
# /opt/oracle.SupportTools/reclaimdisks.sh -free -reclaim
Model is ORACLE SERVER X5-2
Number of LSI controllers: 1
Physical disks found: 4 (252:0 252:1 252:2 252:3)
Logical drives found: 1
Linux logical drive: 0
RAID Level for the Linux logical drive: 5
Physical disks in the Linux logical drive: 4 (252:0 252:1 252:2 252:3)
Dedicated Hot Spares for the Linux logical drive: 0
Global Hot Spares: 0
[INFO     ] Check for DOM0 system disk
[INFO     ] Check for DOM0 with inactive Linux system disk
[INFO     ] Valid DOM0 with inactive Linux system disk is detected
[INFO     ] Number of partitions on the system device /dev/sda: 4
[INFO     ] Higher partition number on the system device /dev/sda: 4
[INFO     ] Last sector on the system device /dev/sda: 3509759999
[INFO     ] End sector of the last partition on the system device /dev/sda: 350
9759000
[INFO     ] Unmount /EXAVMIMAGES from ocfs2 partition on /dev/sda3
[INFO     ] Mount ocfs2 partition /dev/sda3 to /EXAVMIMAGES
[INFO     ] Remove inactive system logical volume /dev/VGExaDb/LVDbSys1
[INFO     ] Remove logical volume /dev/VGExaDbOra/LVDbOra1
[INFO     ] Remove volume group VGExaDbOra
[INFO     ] Remove physical volume /dev/sda4
[INFO     ] Remove partition /dev/sda4
[INFO     ] Re-calculate end sector of the last partition after removing of /de
v/sda4 partition
[INFO     ] End sector of the last partition on the system device /dev/sda: 330
0035608
[INFO     ] Check for existing first boot system image /EXAVMIMAGES/System.firs
t.boot.12.1.2.1.0.141205.2.img
[INFO     ] Saving /EXAVMIMAGES/System.first.boot.12.1.2.1.0.141205.2.img in /v
ar/log/exadatatmp ...
[INFO     ] First boot system image saved in /var/log/exadatatmp/System.first.b
oot.12.1.2.1.0.141205.2.img
[INFO     ] Unmount /EXAVMIMAGES from /dev/sda3
[INFO     ] Remove partition /dev/sda3
[INFO     ] Re-calculate end sector of the last partition after removing of /de
v/sda3 partition
[INFO     ] End sector of the last partition on the system device /dev/sda: 240
132159
```

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```
[INFO     ] Create primary ocfs2 partition 3 using 240132160 3509758999
[INFO     ] Create ocfs2 partition on /dev/sda3
[INFO     ] Mount ocfs2 partition on /dev/sda3 to /EXAVMIMAGES
[INFO     ] Restoring /var/log/exadatatmp/System.first.boot.12.1.2.1.0.141205.2
.img into /EXAVMIMAGES ...
[INFO     ] Logical volume LVDbSys2 exists in volume group VGExaDb
[INFO     ] Grub version in /boot/grub/grub.stage.version: 0.97-81.0.1.el6
[INFO     ] Grub rpm version: 0.97-13.10.0.1.el5
[INFO     ] Copying /usr/share/grub/x86_64-redhat/* to /boot/grub ...
[INFO     ] Create filesystem on device /dev/sda1
[INFO     ] Tune filesystem on device /dev/sda1

GNU GRUB  version 0.97  (640K lower / 3072K upper memory)

[ Minimal BASH-like line editing is supported.  For the first word, TAB
lists possible command completions.  Anywhere else TAB lists the possible
completions of a device/filename.]
grub> root (hd0,0)
 Filesystem type is ext2fs, partition type 0x83
grub> setup (hd0)
 Checking if "/boot/grub/stage1" exists... no
 Checking if "/grub/stage1" exists... yes
 Checking if "/grub/stage2" exists... yes
 Checking if "/grub/e2fs_stage1_5" exists... yes
 Running "embed /grub/e2fs_stage1_5 (hd0)"... failed (this is not fatal)
 Running "embed /grub/e2fs_stage1_5 (hd0,0)"... failed (this is not fatal)
 Running "install /grub/stage1 (hd0) /grub/stage2 p /grub/grub.conf "... succee
ded
Done.
grub> quit
```

16. Run `ibhosts` and verify that all nodes show the correct IP addresses and host names.

    There should be no nodes with `elasticNode` in the description.

17. Run the OEDA tool to deploy.

```
[root] # ./install.sh -cf ../MAA-dm01.xml -l
1. Validate Configuration File
2. Setup Capacity-on-Demand
3. Create Virtual Machine
4. Create Users
5. Setup Cell Connectivity
6. Create Cell Disks
7. Create Grid Disks
8. Configure Alerting
9. Install Cluster Software
10. Initialize Cluster Software
11. Install Database Software
12. Relink Database with RDS
13. Create ASM Diskgroups
14. Create Databases
15. Apply Security Fixes
16. Install Exachk
17. Setup ASR Alerting
18. Create Installation Summary
19. Resecure Machine
```

5.8.5 Using USB to Image a New System

To prepare a new Exadata system for deployment using USB, perform the following steps:

1. Obtain the latest Oracle Exadata Deployment Assistant (OEDA).

2. Run OEDA to generate the `preconf.csv` file that you can use to image the system.

3. Power on all the servers.

    a. Database nodes and cells will automatically assign to themselves unused IP addresses on eth0 in the 172.16 range.

    b. Host names of the nodes will be of the format `node`*N*, where *N* is a number.

4. Connect to the first database node. You can do this by connecting a laptop to the ILOM serial management port (9600, 8, N, 1), and then connecting to the console and logging in to the database node.

5. Obtain the eth0 MAC address for each database node. This is the `fru_macaddress` field from `/SYS/MB/NET0` in the ILOM, or use the command `ip addr` if logged into the console.

    a. Connect to the other database nodes using SSH from the console.

    b. Run `ibhosts` to get a list of node names and IP addresses.

6. Insert the MAC addresses using uppercase characters in the seventh field of the `preconf.csv` file for each node. This field should be empty, that is, you should see two consecutive comma characters (`,,`). For example, if the MAC address is 00:10:E0:69:34:52:

    ```
    orhb42-b08-01,us.oracle.com,db,eth0,eth0,Management,00:10:E0:69:34:52,
    10.196.3.106,255.255.224.0,10.196.31.250,orhb42-b08-01-priv,Private:active-bond-
    ib,
    192.168.10.15,255.255.255.0,,,America/Los_Angeles
    ```

7. Run `ipconf` to verify the generated `preconf.csv` file. This can be done on any Oracle Exadata server, and although not required, it is useful to ensure the `preconf.csv` file is valid before proceeding.

    ```
    # ipconf -verify -preconf /tmp/preconf.csv
    [Info]: ipconf command line: /opt/oracle.cellos/ipconf.pl -verify -preconf /tmp/
    preconf -nocodes
    [Done]: Pre config verification OK
    ```

8. For versions prior to 12.1.2.2.0 proceed to step 11 to use ImageMaker to create the image files.

    If you are using version 12.1.2.2.0 or later, it is no longer necessary to use `imagemaker` to create the image files in version 12.1.2.2.0. The relevant PXE, ISO, and USB image files have already been created in the patches themselves. Simply download the patch containing the prebuilt image file from Oracle Software Delivery Cloud (edelivery) and place the downloaded USB `.img` image file onto the USB drive. For 12.1.2.2.0 the patch numbers can be obtained from My Oracle Support note 2038073.1 . There are separate ImageMaker files for database nodes and cells.

    Note : For image version 12.1.2.2.0 the format of the downloadable image files has changed.

There will be an image file in the downloaded zip file. For example, the database node zip file will contain `computeImageMaker_12.1.2.2.0_LINUX.X64_150917.x86_64.img`. For cell images, the file will be similar to `cellImageMaker_12.1.2.2.0_LINUX.X64_150917.x86_64.img`.

9. (For 12.1.2.2.0 and above) Follow the steps in the patch `README.txt` file to copy the file and optional `preconf.csv` file onto the USB drive.

   a. Place the `computeImageMaker_12.1.2.2.0_LINUX.X64_150917.x86_64.img` file in a directory on a Linux server.

   b. Verify that the md5sums match: `f3daae6a9757d4feb4a0f4262e610945 computeImageMaker_12.1.2.2.0_LINUX.X64_150917.x86_64.img`

   c. Prepare the USB drive using a command similar to the following, where `/dev/sdd` is the name of the inserted USB drive:

      ```
      # dd if=/dev/zero of=/dev/sdd bs=1M count=100 oflag=direct
      ```

      You can determine the exact name of the USB drive by looking in `/var/log/messages` after inserting the USB drive.

   d. Write the `.img` file to the USB drive. This may take 15 minutes or more and no output is shown during the operation.

      ```
      # dd if=filename.img of=/dev/sdd bs=1M oflag=direct
      ```

   e. Rescan the partition table on Linux to recognize the new partition:

      ```
      # partprobe
      ```

   f. Verify that the USB is mountable as long as the system supports ext4 file system. This must be an Oracle Linux 6 system for this step even if the previous `dd` command was run on an Oracle Linux 5 system.

      ```
      mount /dev/sdd1 /mnt
      ```

   g. (Optional) Prepare and place the `preconf.csv` file on the USB drive. The file name must be `preconf.csv` on the USB drive. The `preconf.csv` file must contain MAC addresses for each node in the order to be used during the image. If no `preconf.csv` file is used during imaging, the node will prompt for its network configuration the first time it boots up.

      ```
      # cp /path/preconf.csv /mnt/preconf.csv
      ```

      ```
      # umount /mnt
      ```

      The `umount` command above ensures that the file system is synchronized.

   h. Proceed to step 15. Steps 11 to 14, which create the image files, can be skipped.

10. Download the ImageMaker kit to prepare and create the files for the USB drive. This kit is available publicly on the Oracle Software Delivery Cloud (edelivery) site under "Oracle Database Products -> Linux x86-64". There are separate ImageMaker files for database nodes and cells.

11. After downloading ImageMaker, unzip the first file, which is named similar to `V75080-01.zip`, and then also unzip the subsequent file. Perform the unzip as the `root` user. Then untar the file.

    ```
    # unzip V75080-01.zip
    ```

    ```
    # unzip cellImageMaker_12.1.2.1.1_LINUX.X64_150316.2-1.x86_64.zip
    ```

```
# tar -pxvf cellImageMaker_12.1.2.1.1_LINUX.X64_150316.2-1.x86_64.tar
```

View the `README_FOR_FACTORY.txt` file in the resulting directory for additional details

12. Insert a blank USB device in the slot of the server where ImageMaker was unpacked.

13. Run `makeImageMedia.sh` to build the kernel, `initrd`, and image files for the USB device. `makeImageMedia.sh` will prompt to confirm creation of the image on the USB device. For building 12.1.2.1.0 and above images, the recommended `makeImageMedia.sh` options for building USB bootable media are:

   a. (For 12.1.2.1.0 up to 12.2.1.1.0) Change directory to the `dl180` or `dl360` directory.

   b. (For 12.2.1.1.0 and above) Change directory to the `cell` or `compute` directory.

   c. Make files for the USB.

   ```
   ./makeImageMedia.sh -factory -stit -reboot-on-success -nodisktests [-preconf
   path_to_preconf_file]
   ```

   For USB imaging, note the following:

   • `makeImageMedia.sh` must be run from an Oracle Exadata database server if using the `-preconf` option.

   • Storage servers and database servers can hang during boot when attempting a reimage using a bootable USB created with the `makeImageMedia.sh` script provided with storage cell and Linux database host images available on the Oracle Software Delivery Cloud (edelivery). To work around the issue, see My Oracle Support note 1919001.1

14. After the USB drive has been prepared, place it into the slot of the server to be imaged. Ensure the image type matches the server type (database node or cell).

15. Reboot the database node or cell to start the imaging process from USB.

16. If you are using Oracle VM, run `switch_to_ovm.sh` on each database server. The database servers will reboot.

   For example:

   ```
   # /opt/oracle.SupportTools/switch_to_ovm.sh
   2014-12-07 11:58:36 -0800 [INFO] Switch to DOM0 system partition /dev/VGExaDb/
   LVDbSys3 (/dev/mapper/VGExaDb-LVDbSys3)
   2014-12-07 11:58:36 -0800 [INFO] Active system device: /dev/mapper/VGExaDb-
   LVDbSys1
   2014-12-07 11:58:36 -0800 [INFO] Active system device in boot area: /dev/mapper/
   VGExaDb-LVDbSys1
   2014-12-07 11:58:36 -0800 [INFO] Set active systen device to /dev/VGExaDb/
   LVDbSys3 in /boot/I_am_hd_boot
   2014-12-07 11:58:36 -0800 [INFO] Reboot has been initiated to switch to the DOM0
   system partition
   ```

17. Run `reclaimdisks.sh` on each database server.

   The `/opt/oracle.SupportTools/reclaimdisks.sh -free -reclaim` command reclaims disk space reserved for the deployment type not selected. The command takes less than 5 minutes, approximately. Systems are imaged with disks configured with RAID5; a RAID rebuild is no longer part of the `reclaimdisks.sh` process.

   Do not skip this step. Skipping this step results in unused space that can no longer be reclaimed by `reclaimdisks.sh`.

For example:

```
# /opt/oracle.SupportTools/reclaimdisks.sh -free -reclaim
Model is ORACLE SERVER X5-2
Number of LSI controllers: 1
Physical disks found: 4 (252:0 252:1 252:2 252:3)
Logical drives found: 1
Linux logical drive: 0
RAID Level for the Linux logical drive: 5
Physical disks in the Linux logical drive: 4 (252:0 252:1 252:2 252:3)
Dedicated Hot Spares for the Linux logical drive: 0
Global Hot Spares: 0
[INFO     ] Check for DOM0 system disk
[INFO     ] Check for DOM0 with inactive Linux system disk
[INFO     ] Valid DOM0 with inactive Linux system disk is detected
[INFO     ] Number of partitions on the system device /dev/sda: 4
[INFO     ] Higher partition number on the system device /dev/sda: 4
[INFO     ] Last sector on the system device /dev/sda: 3509759999
[INFO     ] End sector of the last partition on the system device /dev/sda:
3509759000
[INFO     ] Unmount /EXAVMIMAGES from ocfs2 partition on /dev/sda3
[INFO     ] Mount ocfs2 partition /dev/sda3 to /EXAVMIMAGES
[INFO     ] Remove inactive system logical volume /dev/VGExaDb/LVDbSys1
[INFO     ] Remove logical volume /dev/VGExaDbOra/LVDbOra1
[INFO     ] Remove volume group VGExaDbOra
[INFO     ] Remove physical volume /dev/sda4
[INFO     ] Remove partition /dev/sda4
[INFO     ] Re-calculate end sector of the last partition after removing of /dev/
sda4 partition
[INFO     ] End sector of the last partition on the system device /dev/sda:
3300035608
[INFO     ] Check for existing first boot system image /EXAVMIMAGES/
System.first.boot.12.1.2.1.0.141205.2.img
[INFO     ] Saving /EXAVMIMAGES/System.first.boot.12.1.2.1.0.141205.2.img
in /var/log/exadatatmp ...
[INFO     ] First boot system image saved in /var/log/exadatatmp/
System.first.boot.12.1.2.1.0.141205.2.img
[INFO     ] Unmount /EXAVMIMAGES from /dev/sda3
[INFO     ] Remove partition /dev/sda3
[INFO     ] Re-calculate end sector of the last partition after removing of /dev/
sda3 partition
[INFO     ] End sector of the last partition on the system device /dev/sda:
240132159
[INFO     ] Create primary ocfs2 partition 3 using 240132160 3509758999
[INFO     ] Create ocfs2 partition on /dev/sda3
[INFO     ] Mount ocfs2 partition on /dev/sda3 to /EXAVMIMAGES
[INFO     ] Restoring /var/log/exadatatmp/System.first.boot.
12.1.2.1.0.141205.2.img into /EXAVMIMAGES ...
[INFO     ] Logical volume LVDbSys2 exists in volume group VGExaDb
[INFO     ] Grub version in /boot/grub/grub.stage.version: 0.97-81.0.1.el6
[INFO     ] Grub rpm version: 0.97-13.10.0.1.el5
[INFO     ] Copying /usr/share/grub/x86_64-redhat/* to /boot/grub ...
[INFO     ] Create filesystem on device /dev/sda1
[INFO     ] Tune filesystem on device /dev/sda1

GNU GRUB  version 0.97  (640K lower / 3072K upper memory)

[ Minimal BASH-like line editing is supported.  For the first word, TAB
lists possible command completions.  Anywhere else TAB lists the possible
completions of a device/filename.]
grub> root (hd0,0)
```

```
 Filesystem type is ext2fs, partition type 0x83
grub> setup (hd0)
 Checking if "/boot/grub/stage1" exists... no
 Checking if "/grub/stage1" exists... yes
 Checking if "/grub/stage2" exists... yes
 Checking if "/grub/e2fs_stage1_5" exists... yes
 Running "embed /grub/e2fs_stage1_5 (hd0)"... failed (this is not fatal)
 Running "embed /grub/e2fs_stage1_5 (hd0,0)"... failed (this is not fatal)
 Running "install /grub/stage1 (hd0) /grub/stage2 p /grub/grub.conf "...
succeeded
Done.
grub> quit
```

18. Run `ibhosts` and verify that all nodes show the correct IP addresses and host names. There should be no nodes with "elasticNode" in the description.

19. Run the OEDA tool to deploy.

```
[root] # ./install.sh -cf ../MAA-dm01.xml -l
1. Validate Configuration File
2. Setup Capacity-on-Demand
3. Create Virtual Machine
4. Create Users
5. Setup Cell Connectivity
6. Create Cell Disks
7. Create Grid Disks
8. Configure Alerting
9. Install Cluster Software
10. Initialize Cluster Software
11. Install Database Software
12. Relink Database with RDS
13. Create ASM Diskgroups
14. Create Databases
15. Apply Security Fixes
16. Install Exachk
17. Setup ASR Alerting
18. Create Installation Summary
19. Resecure Machine
```

Related Topics

- Oracle Software Delivery Cloud

- Exadata 12.1.2.2.0 release and patch (20131726) (My Oracle Support Doc ID 2038073.1)

- Exadata reimaging using USB fails to boot USB (My Oracle Support Doc ID 1919001.1)

- Exadata Database Machine and Exadata Storage Server Supported Versions (My Oracle Support Doc ID 888828.1)

5.8.6 Updates to Imaging Parameters

Some of the command line options for imaging have changed with 12.1.2.1.0 and above.

The changes are:

- `updfrm`

Do NOT use the `updfrm` option in any form. It will be removed from the imaging options in the future. Allow the firmware to be updated automatically upon initial boot instead.

- `dualboot`

  `dualboot` is no longer required with 12.1.2.1.0 as there is no support for Solaris. It has no meaning in releases 12.1.2.1.0 and above.

- `factory`

  The meaning of the `factory` keyword has changed as of 12.1.2.1.0. The use of "factory" now enforces additional options such as "ovs=yes". This should be used for all imaging, regardless of the ultimate system configuration (Oracle VM, Physical etc.)

- `OVS=yes|no`

  This option defaults to "no". However it is **not recommended** to use this at all because it may change in the future. In its place, use the "factory" option which will override some default options.

There are some additional command line options which may be useful:

- To create a hot spare on dbnodes, use the `enable_hot_spare` option.

  – makeImageMedia.sh option: `-enable_hot_spare`

  – PXE option: `enable_hot_spare`

- To force active bond or no active bond for InfiniBand interfaces (mainly for expansion rack cases), use the `active-bond-ib` option.

  – makeImageMedia.sh option: `-active-bond-ib <yes|no>`

  – PXE option: `active-bond-ib=<yes|no>`

The `README_FOR_FACTORY.txt` file shipped with the imagemaker software explains each option in more detail.

Related Topics

- Exadata 12.1.2.2.0 release and patch (20131726) (My Oracle Support Doc ID 2038073.1)
- Reimaging Exadata Cell Node Guidance (My Oracle Support Doc ID 2151671.1)

5.9 Performing Initial Elastic Configuration of Oracle Exadata Database Machine

This topic provides background information on elastic configuration and describes how to perform the initial configuration of Oracle Exadata Database Machine.

You need the configuration file generated by Oracle Exadata Database Machine Deployment Assistant.

Elastic configuration is new in Exadata version 12.1.2.1.0. It applies to all rack configurations, such as the following:

- Racks ordered with a standard number of database nodes and cells, for example, quarter or half racks
- Rack configurations that feature additional database nodes and cells

- Oracle Exadata Database Machine Two-Socket X5 generation and later Storage Servers

Starting with the Oracle Exadata Database Machine Two-Socket X5 generation of Storage Servers, the same process can also be used to add additional database servers or cells to an existing configuration.

The process allows initial IP addresses to be assigned to database servers and cells, regardless of the exact customer configuration ordered. The customer specific configuration can then be applied to the nodes. The procedure can be run from any database node (usually the first node,) and also from a cell in cases where expansion involves adding only cell nodes.

Every Exadata system has a pre-defined method for the cabling of nodes to the InfiniBand switch ports. Therefore, there is a fixed mapping from each node's location in the rack to the ports of the InfiniBand switches. Assuming the rack is always populated following this map, a node's rack unit location can be identified by querying the InfiniBand fabric to determine the InfiniBand switch port the node is connected to. Once found, that information is used to determine the rack unit location of the node. With this information, nodes can be allocated initial IP addresses based on their rack unit location, with nodes lower in the rack getting lower IP addresses.

> **Note:**
>
> - If a RAID rebuild/reconstruction (that is, a disk replacement or expansion) is in progress, wait until it is finished before performing the steps in this section. The reason is that the `reclaimdisks.sh` script is blocked from running until the RAID rebuild/reconstruction is complete.
>
> - Disk space for unused system partitions must be reclaimed before installing software. Use the following script to reclaim the disk space:
>
>   `/opt/oracle.SupportTools/reclaimdisks.sh –free –reclaim`
>
> - My Oracle Support note 1953915.1 for detailed information about the configuration process.

1. Open a console session to the first database server. The first database server is the lowest database server in the rack, which is rack position U16. In the case of an expansion involving only cells, the procedure should be run from a cell instead of a database node.

   > **Note:**
   >
   > The network connection and configuration for Oracle Exadata Database Machine has not occurred yet.

2. Log in as the `root` user on the first database server.

> **Note:**
>
> If you do not have the password for the `root` user, then contact Oracle Support Services.

3. Verify all servers are configured with the 172.16 IP address for the ETH0 interface using the following command:

```
# ibhosts
```

```
Ca  : 0x0010e00001486fb8 ports 2 "node10 elasticNode 172.16.2.46,172.16.2.46
ETH0"
Ca  : 0x0010e00001491228 ports 2 "node9 elasticNode 172.16.2.45,172.16.2.45 ETH0"
Ca  : 0x0010e000014844f8 ports 2 "node8 elasticNode 172.16.2.44,172.16.2.44 ETH0"
Ca  : 0x0010e00001488218 ports 2 "node4 elasticNode 172.16.2.40,172.16.2.40 ETH0"
Ca  : 0x0010e000014908b8 ports 2 "node2 elasticNode 172.16.2.38,172.16.2.38 ETH0"
Ca  : 0x0010e0000148ca68 ports 2 "node1 elasticNode 172.16.2.37,172.16.2.37 ETH0"
Ca  : 0x0010e00001485fd8 ports 2 "node3 elasticNode 172.16.2.39,172.16.2.39 ETH0"
```

Each server description should be *hostname* `elasticNode.` *ipaddress* `ETH0`.

4. (Optional on database servers) Switch to the Oracle VM when using virtualization on the rack using the following command:

Note that database servers will reboot during this step.

> **Note:**
>
> It is not possible or supported to switch between physical and Oracle VM configuration.

```
# /opt/oracle.SupportTools/switch_to_ovm.sh
```

On database servers, run `reclaimdisks.sh`. This is necessary in all deployment scenarios.

```
# /opt/oracle.SupportTools/reclaimdisks.sh -free -reclaim
```

If Oracle VM was chosen, this step locks in the image as Oracle VM. Going back and forth will not be possible.

`reclaimdisks.sh` performs partition reconfiguration and a few other necessary configuration changes that take typically less than a minute to complete.

5. On database servers, verify disk configuration.

```
# /opt/oracle.SupportTools/reclaimdisks.sh -check
```

If the system is a physical (bare metal) deployment, the last line of output will be the following:

```
Valid. Booted: Linux. Layout: Linux.
```

If the system is an Oracle VM deployment, the last line of output will be the following:

```
Valid. Booted: DOM0. Layout: DOM0.
```

6. Copy Oracle Exadata Database Machine Deployment Assistant configuration files to the database server using one of the following methods. If adding only cell servers, the steps can be run from a cell.

- Using a USB flash drive on Linux:

  a. Copy the configuration file to a USB flash drive.

  b. Connect the USB drive to the database server or cell.

  c. Locate the USB drive using the following command:

  ```
  for x in `ls -1 /sys/block`; do udevadm info --attribute-walk --
  path=/sys/block/$x | grep \
  -iq 'DRIVERS=="usb-storage"'; if [ $? -eq 0 ] ; then echo /dev/${x}1; \
  fi ; done
  ```

  The expected output is similar to:

  ```
  /dev/sdb1
  ```

  > **Note:**
  >
  > If an X6 or X5 EF cell is used, the command will also return the two internal USB drives, usually `/dev/sda1` and `/dev/sdb1`. The newly inserted USB drive will be the additional device, usually `/dev/sdc1`.
  >
  > The expected output is similar to:
  >
  > ```
  > /dev/sda1
  > /dev/sdb1
  > /dev/sdc1
  > ```
  >
  > The internal USBs can be identified by viewing `mdstat`:
  >
  > ```
  > # grep md4 /proc/mdstat | awk '{print $5,$6;}'
  > ```

  d. Create a directory on the database server or cell using the following command:

  ```
  # mkdir /mnt/usb
  ```

  e. Create a directory for the installation using the following command:

  ```
  # mkdir /opt/oracle.SupportTools/onecommand
  ```

  If the directory already exists, then rename the existing one to `onecommand.old`, and then re-create the empty directory.

  Note: Do not use a directory under `/u01` or `/EXAVMIMAGES` because `reclaimdidsks.sh` will fail if there is content in those directories.

  f. Mount the device. Use the device name given in step 6.c. The following is an example of the command.

  ```
  # mount -t vfat /dev/sdb1 /mnt/usb
  ```

g. Copy Oracle Exadata Deployment Assistant and the configuration files from the USB flash drive to the `onecommand` directory on the database server or cell using the following command:

```
# cp /mnt/usb/path_to_file/*.* /opt/oracle.SupportTools/onecommand
```

In the preceding command, *path_to_file* is the directory path to the configuration file on the USB flash drive.

h. Unmount the USB flash drive using the following command:

```
# umount /mnt/usb
```

i. Remove the USB flash drive from the database server or cell.

- Using a temporary network connection:

  This option is only needed if there were IP address conflicts, and Oracle Exadata Database Machine is not already connected to the network.

  a. Connect a network cable to the Ethernet port labeled NET0 on the back of the first database server.

  b. Bring up the eth0:1 interface as follows:

  ```
  # ifconfig eth0:1 real_ip netmask real_netmask up
  ```

  In the preceding command, *real_ip* is the IP address to assign to the database server, and *real_netmask* is the subnet mask to assign to the database server.

  c. Add the default route as follows:

  ```
  # route add -net 0.0.0.0 netmask 0.0.0.0 gw real_gateway
  ```

  In the preceding command, *real_gateway* is the default gateway to use for the database server.

  d. Copy the configuration files to the `/opt/oracle.SupportTools/onecommand` directory on the database server or cell using a file transfer utility such as `scp`.

  e. Disconnect the network cable from Ethernet port NET0.

  > **✎ Note:**
  >
  > It is not necessary to reconfigure the network because the network is reconfigured automatically during the restart step.

7. Verify all servers are configured with the 172.16 IP address for the ETH0 interface using the following command:

```
# ibhosts
```

No server description should include `elasticNode` in its description.

8. Run the `applyElasticConfig.sh` script using the following command:

```
# cd /opt/oracle.SupportTools/onecommand/linux-x64
# ./applyElasticConfig.sh -cf customer_name-configFile.xml
```

The `applyElasticConfig.sh` script performs network configuration for all database servers and Exadata Storage Servers. All servers restart at the end of the process.

9. Connect the corporate network cable for the management network to the Cisco Ethernet switch.

10. Connect the corporate network cables for the client access network to the database servers.

11. Restart all database servers and Exadata Storage Servers.

12. Log in to the first database server (or cell, if only cells were added for expansion) to verify network connectivity using the following commands:

```
# cd /opt/oracle.SupportTools/onecommand/linux-x64
#./checkip.sh -cf configuration_file
```

In the preceding command, *configuration_file* is the name of the configuration file from Oracle Exadata Deployment Assistant, and includes the full path.

> **Note:**
>
> - The `checkip.sh` script can be run on a server outside of Oracle Exadata Database Machine to verify network connectivity to Oracle Exadata Database Machine. Copy the `checkip.sh` file to the external system, and run the command as shown in this step.
>
> - If the command is run from a Microsoft Windows machine, then the command is `checkip.cmd`.
>
> - Download the version of Oracle Exadata Deployment Assistant for the relevant platform.

13. Use Oracle Exadata Deployment Assistant to install and configure the software for Oracle Exadata Database Machine.

> **See Also:**
>
> - *Oracle Exadata Database Machine System Overview* for rack layout information
>
> - *Oracle Exadata Database Machine Maintenance Guide* for information about restarting the servers

Related Topics

- Adding Additional Elastic Nodes to an Existing Rack
  You can add nodes to an existing rack using elastic configuration.

- Elastic Configuration on Exadata (My Oracle Support Doc ID 1953915.1)

> ✏️ **See Also:**

5.10 Adding Additional Elastic Nodes to an Existing Rack

You can add nodes to an existing rack using elastic configuration.

The elastic configuration procedure described in "Performing Initial Elastic Configuration of Oracle Exadata Database Machine" can also be used to add new servers to an existing rack. The new servers and existing servers must be at least X5. The procedure assigns IP addresses to the new database servers and cells, in preparation for adding them into existing setups. The addition of X5, X6, or X7 servers into previous generation racks using this methodology is not supported.

The XML configuration file generated by the Oracle Exadata Deployment Assistant must contain the existing nodes, plus the new nodes to be added. The same elastic configuration procedures described in the previous section should be followed, and the `applyElasticConfig.sh` script that runs as part of step 8 determines which nodes are new, and assigns IP addresses accordingly.

When adding only storage cells, you can run the `applyElasticConfig.sh` script from a cell server rather than a database server.

5.11 Loading the Configuration Information and Installing the Software

Oracle Exadata Deployment Assistant loads the network settings, creates the user accounts, installs Oracle Database software, and secures the system based on the information the configuration files. You can also choose to do the process manually.

> ✏️ **Note:**
>
> - To enable a supported, non-English language, set the following environment variables before starting the configuration:
>
>   ```
>   export  LANG=preferred_language
>   export  LC_ALL=preferred_language
>   ```
>
> - To copy the database image to a USB drive, use the procedure in the database maintenance chapter of *Oracle Exadata Database Machine Maintenance Guide* For releases 12.1.2.1.0 and later, the system used to create the image must be running Oracle Linux 6.

> **See Also:**
>
> Using Oracle Exadata Deployment Assistant for descriptions of the
> configuration files generated by Oracle Exadata Database Machine
> Deployment Assistant

5.11.1 Configuring Oracle Exadata Database Machine Using OEDA

Oracle Exadata Deployment Assistant (OEDA)is used to configure Oracle Exadata
Database Machine.

The deployment assistant works with the information provided in OEDA.

The following procedure describes how to configure Oracle Exadata Database
Machine using OEDA:

1. Go to My Oracle Support.

2. Download the latest OEDA, and follow the steps in the associated README file.

3. Download all necessary Oracle Exadata System Software and Oracle Database
   patches. See My Oracle Support note 888828.1 for details.

4. Log in as the `root` user on the first database server.

   > **Note:**
   >
   > If you do not have the password for the `root` user, then contact Oracle
   > Support Services.

5. Copy the configuration file from the machine that was used to run OEDA to
   the `/opt/oracle.SupportTools/onecommand` directory on the first database
   server of the Oracle Exadata Rack.

6. Create a directory named `WorkDir` on the first database server.

7. Put the downloaded software and patches in the `WorkDir` directory.

8. Apply the OEDA update according to the instructions included in the `README` file.

9. Change to the following directory:

   ```
   # cd /opt/oracle.SupportTools/onecommand
   ```

10. Run the following command to configure Oracle Exadata Rack:

    ```
    # ./install.sh -cf configuration_file [-s step_number | \
        -r step_numberA stepnumberB]
    ```

    > **Note:**
    >
    > If the configuration is run from a Microsoft Windows machine, then the
    > command is `install.cmd`.

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In the preceding command, *configuration_file* is the name of the configuration file, and includes the full path. The options for the script are:

- `-cf file` : Use configuration file. The full path must be included with the file name.

- `-h` : Describe options for the script.

- `-l` : List the steps of OEDA.

- `-r {n-N | n }` : Run steps *n* through *N* of OEDA, or one step.

- `-s n` : Run step *n* of OEDA.

- `-u {n-N | n }` : Undo steps *n* through *N*, or one step.

The following steps are performed by the utility. However, the actual steps for a specific deployment may differ depending on the deployment options chosen. For example, the "Update Nodes for Eighth Rack" step is performed only if you are doing an eighth rack deployment.

```
1. Validate Configuration File
2. Update Nodes for Eighth Rack
3. Create Virtual Machine
4. Create Users
5. Setup Cell Connectivity
6. Create Cell Disks
7. Create Grid Disks
8. Configure Alerting
9. Install Cluster Software
10. Initialize Cluster Software
11. Install Database Software
12. Relink Database with RDS
13. Create ASM Diskgroups
14. Create Databases
15. Apply Security Fixes
16. Install Exachk
17. Setup ASR Alerting
18. Create Installation Summary
19. Resecure Machine
```

> **Note:**
>
> The preceding steps are correct for the current release. However, the steps may differ for other releases. Always use the latest OEDA patch listed in My Oracle Support note 888828.1. Refer to the README in the patch for the latest steps.

Related Topics

- My Oracle Support

- Oracle Exadata Deployment Assistant Downloads

- Exadata Database Machine and Exadata Storage Server Supported Versions (My Oracle Support Doc ID 888828.1)

- Configuring DBFS on Oracle Exadata Database Machine (My Oracle Support Doc ID 1054431.1)

> ✎ **See Also:**
>
> - *Oracle Exadata System Software User's Guide* for additional information about security for Oracle Exadata Database Machine and Oracle Exadata System Software
> - *Oracle Exadata Database Machine Security Guide* for additional information about re-securing Oracle Exadata Database Machine

5.11.2 Configuring Oracle Database and Oracle ASM Instances for Oracle Exadata Database Machine Manually

Oracle Database and Oracle Automatic Storage Management (Oracle ASM) 11*g* Release 2 (11.2) or later must be installed on the database server. Follow the instructions for installing Oracle Database and Oracle ASM provided in the appropriate version of the *Oracle Database Installation Guide* for your platform.

> ✎ **Note:**
>
> To fully utilize the Hardware Assisted Resilient Data (HARD) features, ensure the DB_BLOCK_CHECKSUM initialization parameter is set to TYPICAL (default) or FULL.

When installing Oracle Database, you must select the Oracle ASM storage option. If you are installing Oracle Real Application Clusters (Oracle RAC), then refer to the platform-specific Oracle Clusterware and Oracle RAC installation guides, such as *Oracle Grid Infrastructure Installation and Upgrade Guide* and *Oracle Real Application Clusters Installation Guide*.

If you are consolidating databases and need to have more than one database with the same DB_UNIQUE_NAME on the Oracle Exadata Database Machine, then you must configure Oracle ASM clusters on the storage cells and configure ASM-scoped security.

> ✎ **Note:**
>
> For Oracle RAC, you must shut down the entire cluster, and then restart the cluster after the database and cell software have been installed, and the cell configuration files are in place.

The recommended procedure is to install the latest version of the Oracle software on Oracle Exadata Database Machine using Oracle Exadata Deployment Assistant (OEDA). If you choose to install the software manually, then do the following:

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> **Note:**
>
> Disk space for unused system partitions must be reclaimed before installing software. Use the following script to reclaim the disk space:
>
> ```
> /opt/oracle.SupportTools/reclaimdisks.sh -free -reclaim
> ```
>
> If a RAID rebuild or reconstruction (that is, a disk replacement or expansion) is in progress, wait until it is finished before running the `reclaimdisks.sh` script. The reason is that the `reclaimdisks.sh` script is blocked from running until the RAID rebuild or reconstruction is complete.

1. Install Oracle Grid Infrastructure for a cluster software as described in *Oracle Grid Infrastructure Installation and Upgrade Guide for Linux*.

2. Install Oracle Database software as described in *Oracle Real Application Clusters Installation Guide for Linux and UNIX*.

3. Apply the latest patches for Oracle Database software and Oracle Exadata System Software.

After the cells are configured as described in *Oracle Exadata System Software User's Guide*, and the database and Oracle ASM instances are installed, the instances must be configured to use the cells as part of an Oracle ASM disk group. The required configuration involves updating the initialization parameter file of both the database and Oracle ASM instances. Additionally, Oracle ASM disk groups must be created to access storage cells.

You can update the initialization parameter file of the Oracle ASM or the database instance while the instance is running, but the instance must be restarted if you manually update the initialization parameter file. If you update an initialization parameter dynamically using the SQL `ALTER SYSTEM` or `ALTER SESSION` commands, then there is no need to restart the instance.

In addition, for the database, you can configure a new Oracle Database Resource Manager plan, rather than using the default plans.

Related Topics

- About ASM-Scoped Security Mode
- Exadata Database Machine and Exadata Storage Server Supported Versions (My Oracle Support Doc ID 888828.1)
- List of Critical Patches Required For Oracle 11.2 DBFS and DBFS Client (My Oracle Support Doc ID 1150157.1)
- Configuring DBFS on Oracle Exadata Database Machine (My Oracle Support Doc ID 1054431.1)
- Oracle Exadata Best Practices (My Oracle Support Doc ID 757552.1)

> **See Also:**
>
> - *Oracle Automatic Storage Management Administrator's Guide* for additional information about starting and connecting to an Oracle ASM instance
> - *Oracle Exadata System Software User's Guide* for additional information about I/O resources
> - *Oracle Exadata System Software User's Guide* for information about configuring the database servers to use Oracle Exadata Storage Servers

5.11.2.1 Configuring the Compatible Parameter for a Database Instance

Oracle recommends using the best practices for Oracle Exadata System Software available at My Oracle Support.

To configure a database instance to access cell storage, ensure that the COMPATIBLE parameter is set to 11.2.0.2 or later in the database initialization file.

You can view the initialization parameter file from the operating system or use the SQL*Plus administration command `SHOW PARAMETER` if the database is running. For example:

```
SQL> SHOW PARAMETER
SQL> SHOW PARAMETER compatible
```

If necessary, set the COMPATIBLE initialization parameter in the initialization parameter file to `11.2.0.2` or later. For example:

```
COMPATIBLE='11.2.0.2'
```

The COMPATIBLE parameter cannot be changed dynamically. If you change the value in the initialization parameter file, then the database must be shut down and restarted for the change to take effect.

5.11.2.2 Configuring Initialization Parameters for an Oracle ASM Instance

To enable an Oracle ASM instance to discover and access Exadata Storage Server grid disks, you must configure the ASM_DISKSTRING initialization parameter as follows:

- Set the ASM_DISKSTRING initialization parameter to the empty string (`''`) to discover all grid disks on the cells listed in the `cellip.ora` file. This causes Oracle ASM discovery for `/dev/raw/*` and any ASMLIB disks on any non-Exadata Storage Servers.

- Set the ASM_DISKSTRING initialization parameter to restrict the discovery by Oracle ASM to only specific sets of disks, as shown in the examples.

  – To discover only a subset of cells, use a pattern for the ASM_DISKSTRING value such as the following:

    o/*cell-connect-info-pattern*/*griddisk-name-pattern*.

    For example:

```
ASM_DISKSTRING = 'o/*/data*'
```

– To discover non-Exadata Storage Server disks and all grid disks on all the
cells specified in the `cellip.ora` file, use a wildcard pattern for Exadata
Storage Server grid disks. For example:

```
ASM_DISKSTRING = '/dev/rdsk/disk*', 'o/*/*'
```

You can change the ASM_DISKSTRING initialization parameter when the Oracle ASM
instance is running with the SQL `ALTER SYSTEM` command. If you edit the
ASM_DISKSTRING initialization parameter in the initialization parameter file when the
Oracle ASM instance is running, then the Oracle ASM instance must be shut down
and restarted for the change to take effect.

> **See Also:**
>
> • *Oracle Automatic Storage Management Administrator's Guide* for
>   additional information about the following:
>   – Oracle ASM discovery strings
>   – starting up and connecting to an Oracle ASM instance
> • *Oracle Database Reference* for additional information about the
>   ASM_DISKSTRING initialization parameter
> • *Oracle Database SQL Language Reference* for additional information
>   about the `ALTER SYSTEM` command

5.11.2.3 Using the Same DB_UNIQUE_NAME for Multiple Database Instances

You can create database instances that use the same `DB_UNIQUE_NAME` value if the
databases are associated with separate Oracle ASM clusters.

Starting with Oracle Exadata System Software release 19.1.0, Oracle Multitenant
database clusters sharing the same storage can contain database instances that use
the same `DB_UNIQUE_NAME`.

> **WARNING:**
>
> If you configure databases to have the same `DB_UNIQUE_NAME`, then those
> databases cannot be backed up to Oracle Zero Data Loss Recovery
> Appliance.

1. Create Oracle ASM clusters for the database clusters that use identical
   `DB_UNIQUE_NAME` values for the database instances.

   Each database instance that uses the same `DB_UNIQUE_NAME` must be in a separate
   Oracle ASM cluster. The Oracle ASM cluster name is used to qualify the
   `DB_UNIQUE_NAME` in I/O Resource Management (IORM), Exadata Smart Flash
   Cache, and Exadata Smart Scan Offload operations.

2. Configure ASM-scoped security for each cluster database.

When configuring ASM-scoped security, the Oracle ASM client must be configured as an ASMCLUSTER client.

If you already have ASM-scoped security configured, but the Oracle ASM client is not configured as an ASMCLUSTER client, then you can use the `ASSIGN KEY` command upgrade the key to an ASMCLUSTER key.

3. Create the databases in each cluster using the same `DB_UNIQUE_NAME`.

Related Topics

• Setting Up Oracle ASM-Scoped Security on Oracle Exadata Storage Servers

• Upgrading ASM-Scoped Security Key for ASMCLUSTER

5.12 Installing Oracle Enterprise Manager Cloud Control

Oracle Exadata Database Machine should be monitored using Oracle Enterprise Manager Cloud Control. Ensure that the Enterprise Manager environment is configured for high availability and disaster recovery to ensure sufficient monitoring of the Exadata environments.

Related Topics

• *Oracle Enterprise Manager Cloud Control Basic Installation Guide*

• Installation and Deployment in *Oracle Enterprise Manager Exadata Management Getting Started Guide*

• Configuring Enterprise Manager for High Availability in *Oracle Enterprise Manager Cloud Control Advanced Installation and Configuration Guide*

• *Oracle Enterprise Manager Cloud Control Advanced Installation and Configuration Guide*

• Discovery in *Oracle Enterprise Manager Cloud Control Administrator's Guide*

• How to Configure Oracle Configuration Manager for Oracle Exadata Database Machine (My Oracle Support Doc ID 1319476.1)

• MAA Best Practices website

A
Site Checklists

Complete the checklists in this appendix to ensure the site is prepared for Oracle Exadata Database Machine or Oracle Exadata Cloud Machine.

> **Note:**
>
> For ease of reading, the name "Oracle Exadata Rack" is used when information refers to both Oracle Exadata Database Machine and Oracle Exadata Storage Expansion Rack.

A.1 System Components Checklist

Use this checklist to ensure that the system component considerations have been addressed.

System Components Checklist Items	Yes	No	N/A	Comment
Is it an Oracle Exadata Database Machine, Oracle Exadata Cloud Machine, or Oracle Exadata Storage Expansion Rack?				
How many racks will be installed?				
Is the system going to be connected to other Oracle racks using the InfiniBand network? **Note:** Not applicable for Exadata Cloud Machine.				

System Components Checklist Items	Yes	No	N/A	Comment
If an Oracle Exadata Database Machine will be connected to other Oracle racks using the InfiniBand network, then have a Sun Datacenter InfiniBand Switch 36 (spine switch) and cables been ordered?				
Is the rack installation an addition to an existing system? If yes, refer to the *Oracle Exadata Database Machine Extending and Multi-Rack Cabling Guide* for cabling information.				
Has the multi-rack cabling service been purchased and the correct networking components been ordered?				
Are all Oracle Exadata Database Machine racks adjacent to each other?				

System Components Checklist Items	Yes	No	N/A	Comment
If the connecting racks are not within the specified proximity, then have the following been done: • Purchased approved longer InfiniBand cables from an approved third-party provider? • Asked Oracle Support Services to provide and schedule the custom multi-rack cabling service with the installation?				
Will the Ethernet switch be replaced? If yes, has the customer arranged for the replacement switch installation?				
Will additional equipment be attached to or installed in the rack? If so, ensure that the additional equipment falls within Oracle guidelines and sufficient power and cooling exist for it.				

> **See Also:**
>
> "Oracle Exadata Rack Restrictions" in *Oracle Exadata Database Machine System Overview* for more details on allowed hardware modifications

A.2 Data Center Room Checklist

Use this checklist to ensure that the data center room requirements have been addressed.

Data Center Room Checklist Items	Yes	No	N/A	Comment
Has the rack location been allocated and is vacant?				
Does the floor layout meet the equipment maintenance access requirements?				
Will the rack be positioned so that the exhaust air of one rack does not enter the air inlet of another rack?				
Have cabinet stabilization measures been considered?				
If the data center has a raised floor: • Does the raised floor satisfy the weight requirements for the new hardware? • Is permission required to remove floor tiles for cabling and servicing below the floor?				

Data Center Room Checklist Items	Yes	No	N/A	Comment
Will the new hardware location require any non-standard cable lengths?				
Is the floor to ceiling height a minimum of 2914 mm (114.72 inches)?				
Is the depth of the raised floor a minimum of 46 cm (18 inches)?				

Related Topics

- Space Requirements
- Flooring Requirements
- Stabilize Oracle Exadata Rack with Leveling Feet

A.3 Data Center Environment Checklist

Use this checklist to ensure that the data center environment requirements have been addressed.

Data Center Environment Considerations	Yes	No	N/A	Comment
Does the computer room air conditioning meet temperature and humidity requirements?				
Does the installation floor layout satisfy the ventilation requirements?				

Data Center Environment Considerations	Yes	No	N/A	Comment
If the room cooling is from a raised floor, then: • Are the perforated floor tiles each rated at 400 CFM or greater? • Can additional perforated floor tiles be obtained if required for additional cooling?				
Does the data center air conditioning provide sufficient front-to-back airflow?				
Is airflow adequate to prevent hot spots?				
Can the data center continuously satisfy the environmental requirements?				

Related Topics

- Temperature and Humidity Requirements

- Ventilation and Cooling Requirements
  Always provide adequate space in front and behind the rack to allow for proper ventilation.

- General Environmental Requirements

A.4 Access Route Checklist

Use this checklist to ensure that the access route requirements are addressed.

Access Route Considerations	Yes	No	N/A	Comment
Has the access route been checked for clearances of the rack, in particular, the minimum width and height requirements for all doors on the route? Dimensions of the packaged rack: • Height: 2159 mm (85 inches) • Width: 1219 mm (48 inches) • Depth: 1575 mm (62 inches) Dimensions of the unpackaged rack: • Height: 1998 mm (78.66 inches) • Width: 600 mm with side panels (23.62 inches) • Depth 1200 mm (47.24 inches)				
Are there any stairs, ramps, or thresholds that are of concern? If yes, then provide details.				
Are all access route incline angles within the permitted range (6 degrees)?				
Is the access route free of any obstacles that would expose the equipment to shock?				

Access Route Considerations	Yes	No	N/A	Comment
Are all the surfaces acceptable for rolling the new unpacked and packed equipment?				
If a pallet jack is to be used: • Can the pallet jack support the weight of the rack? • Are the pallet jack tines compatible with the shipping pallet?				
If there are stairs, is a loading elevator available for the equipment?				
If an elevator is to be used: • Is the elevator car wide enough for the device to be carried into it? • Is the elevator car high enough for the device to be carried into it? • Does the elevator door meet the height requirement? • Can the elevator car handle the weight of a fully-loaded rack?				

Access Route Considerations	Yes	No	N/A	Comment
Can the access route support the weight of the unpacked rack?				
Is the access route onto the raised floor rated for dynamic loading of the rack?				

Related Topics

- Table: Access Route Requirements.
- Table: Rack Weights for Oracle Exadata Database Machine
- Table: Rack Weights for Oracle Exadata Storage Expansion Rack
- Flooring Requirements

A.5 Facility Power Checklist

Use this checklist to ensure that the facility power requirements have been addressed.

Facility Power Considerations	Yes	No	N/A	Comment
Have the operating voltage and electric current requirements listed in "Electrical Power Requirements" been reviewed?				
Will single-phase (low-voltage or high-voltage) or 3-phase (low-voltage or high-voltage) power be used?				
Are enough power outlets provided within 2 meters for each rack?				

Facility Power Considerations	Yes	No	N/A	Comment
Do the power outlets have appropriate socket receptacles for the PDU option ordered? Options are low voltage or high voltage, single-phase or 3-phase.				
Will optional ground cables be attached 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?				
Are power outlets available for the new equipment at the designated location?				
Will system power be delivered from two separate grids?				
Is there a UPS to power the equipment?				
Are the minimum required power sources available to support the power load for the new hardware? Use kilowatt (kW) / kilovolt (kVA) to express power load.				

A.6 Safety Checklist

Use this checklist to ensure that the safety requirements have been addressed.

Safety Checklist Considerations	Yes	No	N/A	Comment
Is there an emergency power shut off?				
Is there a fire protection system in the data center room?				
Is the computer room adequately equipped to extinguish a fire?				
Is antistatic flooring installed?				
Is the area below the raised floor free of obstacles and blockages?				

Related Topics

• Temperature and Humidity Requirements

> ✎ **See Also:**
>
> "Powering On and Off Oracle Exadata Rack" in the *Oracle Exadata Database Machine Maintenance Guide*

A.7 Logistics Checklist

Use this checklist to ensure that the logistics requirements have been addressed.

Logistics Checklist Considerations	Yes	No	N/A	Comment
Is contact information for the data center personnel available?				

Logistics Checklist Considerations	Yes	No	N/A	Comment
Is there security or access control for the data center?				
Are there any security background checks or security clearances required for Oracle personnel to access the data center? If yes, then provide the process for Oracle to follow.				
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 allowed in the data center?				
Are cell phones allowed in the data center?				
Are cameras allowed in the data center?				
Does the building have a delivery dock?				
Is there a delivery/ unpacking/ staging area?				

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Logistics Checklist Considerations	Yes	No	N/A	Comment
Is inside delivery planned (direct to the final rack location in the data center room)?				
If the delivery is not inside, then is the site prepared for uncrating?				
Is the delivery/ unpacking/ staging area protected from the elements?				
Does the building have adequate receiving space?				
Is the unpacking area air-conditioned to avoid thermal shock for various hardware components?				
Will sufficient moving personnel be available to transport the rack?				
(If applicable to your country) Is union labor required for any part of the delivery or installation?				
Is the site prepared for uncrating and packaging removal? Package removal should take place *outside* the data center room.				

Logistics Checklist Considerations	Yes	No	N/A	Comment
Is uncrating of cabinet and cabinet packaging removal required?				
Are there any restrictions on delivery truck length, width or height?				
Is there storage space (cabinet) for the ride along spares? If not, does the customer allow cardboard boxes and other packing material in the computer room, since the spares are packed in cardboard boxes?				
Is there a time constraint on dock access? If yes, please provide time constraints.				
Is a tail or side lift required on the delivery carrier to unload the equipment at the delivery dock?				
Will any special equipment be required to place the rack in the data center room? Examples: • Stair walkers • Lifters • Ramps • Steel plates • Floor covers				

Logistics Checklist Considerations	Yes	No	N/A	Comment
Does the delivery carrier require any special equipment, such as non-floor damaging rollers, transport dollies, pallet jacks or fork lifts?				

Related Topics

• Space Requirements

A.8 Network Configuration Checklist

Use this checklist to ensure that the network configuration requirements have been addressed.

Network Configuration Considerations	Yes	No	N/A	Comment
Were any conflicts found while running the `checkip.sh` script before connecting the network? See "Default IP Addresses" for information on the script.				
Will the required network cables be laid from the network equipment to the location where the Oracle Exadata Rack will be installed?				
Will the network cables that will connect to the Oracle Exadata Rack be labeled?				

Network Configuration Considerations	Yes	No	N/A	Comment
Will the 10 GbE or 25 GbE interfaces be used for the client access network?				
Have the optional 10 GbE or 25 GbE SFP+ transceivers and appropriate fiber cables been ordered?				
Will the Cisco Ethernet switch have IP routing disabled (recommended)?				

Related Topics

- Understanding the Network Requirements for Oracle Exadata Database Machine

A.9 Auto Service Request Checklist

Use this checklist if you are planning to use Auto Service Request with the Oracle Exadata Database Machine.

Auto Service Request Considerations	Yes	No	N/A	Comment
Does the customer have a My Oracle Support account to register Auto Service Request?				
Is the Oracle Support Customer Support Identifier (CSI) number available?				
Are the host name and IP address for the server where ASR Manager will be installed available?				

Auto Service Request Considerations	Yes	No	N/A	Comment
Will the system need a proxy server? If so, what is the host name and IP address for the proxy server?				
Is the Customer Technical Contact information for Auto Service Request available? This information should include the first name, last name, and e-mail address of the contact.				

> **See Also:**
>
> "Understanding Auto Service Request" in the *Oracle Exadata Database Machine Maintenance Guide*

A.10 Reracking Checklists

Reracking of Oracle Exadata Database Machine Half Rack or Oracle Exadata Database Machine Quarter Rack is allowed when the customer site requires a specialized infrastructure.

Use these checklists prior to reracking Oracle Exadata Database Machine configurations approved for rerack by Oracle Exadata Configuration Assistant (OECA).

> **Note:**
>
> • Customer must purchase both the Oracle Reracking Service and Oracle Installation Service.
>
> • Oracle does not provide support for customer-supplied equipment.

Reracking Considerations	Yes	No	N/A	Comment
Has the customer purchased the Oracle Reracking Service?				
Is there a cart capable of carrying the weight of the servers to move the components and associated cabling from the supplied rack to the customer supplied rack?				
Is the target rack empty?				
Please attach pictures of the target rack (inside and outside).				
Do the target rack dimensions meet the following requirements? • Height: 42 RU • Width: 600 mm (23.62 inches) • Depth: 1112 mm (43.78 inches) without front and rear doors If the rack is less than 42 RU, then the rack must be at least 30 RU tall and the customer must provide compatible PDUs to install in the target rack.				

Reracking Considerations	Yes	No	N/A	Comment
Is the distance between the front and rear mounting planes between the minimum of 610 mm and the maximum 915 mm (24 inches to 36 inches)?				
Is the clearance depth in the front of the front mounting plane (distance to the front cabinet door) at least 25.4 mm (1 inch)?				
Does the target rack meet the following minimum load capacity? • 19 kg (41.89 lb) / RU • 785 kg (1730.63 lb) total				
Is the rack a four-post rack (mounting at both front and rear)? **Note**: Two-post racks are not compatible.				
Does the target rack's horizontal opening and unit vertical pitch conform to ANSI/EIA 310-D-1992 or IEC 60297 standards?				

Reracking Considerations	Yes	No	N/A	Comment
Does the target rack have RETMA rail support? **Note**: Oracle Exadata Rack requires 19 inches (483 mm) for RETMA rail spacing width. The minimum rack width of 600 mm (23.63 inches) is recommended to accommodate the PDU and cable harnesses on the side. If the rack is less than 600 mm wide, then it must have additional depth to accommodate mounting behind the server CMAs.				
Does the target rack support Oracle cable management arms (CMAs)?				
Does the target rack support installation of Oracle vented and solid filler panels?				
Can the target rack provide tie-downs along the left rear side of the rack to support the InfiniBand cables? The side is left rear side when viewed from the front of the rack.				
Can the target rack provide tie-downs for the Ethernet wiring harness?				

Reracking Considerations	Yes	No	N/A	Comment
Is there sufficient space for the cable harnesses and the PDUs in the target rack?				
Can a label with the Oracle Exadata Rack serial number be printed and attached to the target rack?				

The following checklist is specific to the power distribution units (PDUs) when using the reracking service.

PDU Reracking Considerations	Yes	No	N/A	Comment
Does the target rack support installation of standard Oracle PDUs? If not, then complete this checklist.				
Can the customer provide an equivalent pair of PDUs?				
Can the customer provide two PDUs with capacity of 10 kVA per PDU?				
Can the customer provide at least 17 x 10A C13 plugs per PDU?				
Can the customer provide a single PDU and its circuits to support the Oracle Exadata Rack power requirements in case one PDU fails?				

PDU Reracking Considerations	Yes	No	N/A	Comment
Can the customer ensure power loads are evenly distributed across all circuits of a single PDU?				
Can the customer provide appropriate power drops for the PDUs?				

A.10.1 Recycling the Racks

Use this checklist when recycling the rack.

Recycling Considerations	Yes	No	N/A	Comment
Does the customer want Oracle to take back and recycle the empty rack? If yes, then the Oracle service engineer can pack the empty rack for recycling.				
If Oracle is recycling the rack, then has the customer completed the appropriate application at the Oracle Hardware Take Back Program website?				

Related Topics

• Product Take Back and Recycling website

B

Database High Availability Checklist

Use this checklist to ensure the requirements for high availability are met for Oracle Exadata Database Machine.

Database High Availability Considerations	Yes	No	N/A	Comment
Have high redundancy disk groups been configured for best protection against different storage failures and corruptions?				
Do you have a bonded network for client access?				
Will the pre-optimized and configured database be used after deployment?				
Have you reviewed the Oracle Exadata System Software patching overview and patch testing guidelines in My Oracle Support note 1262380.1?				
Have you reviewed the Oracle Exadata System Software Maximum Availability Architecture (MAA) Web site for post-deployment steps to achieve MAA?				

Database High Availability Considerations	Yes	No	N/A	Comment
Will you use Oracle Exadata Database Machine health check after deployment? The health check is available from My Oracle Support note 1070954.1.				
Will you follow Oracle Exadata Database Machine monitoring best practices available in My Oracle Support note 1920255.1?				
Have you reviewed the recommended software for Oracle Exadata Database Machine in My Oracle Support note 888828.1?				
Have you reviewed Oracle Exadata Database Machine best practices in My Oracle Support note 757552.1?				

Related Topics

- *Oracle Database High Availability Overview*
- Exadata Patching Overview and Patch Testing Guidelines (My Oracle Support Doc ID 1262380.1)
- Oracle Maximum Availability Architecture website
- Oracle Exadata Database Machine exachk or HealthCheck (My Oracle Support Doc ID 1070954.1)
- Exadata Health and Resource Usage Monitoring White Paper (My Oracle Support Doc ID 1920255.1)
- Exadata Database Machine and Exadata Storage Server Supported Versions (My Oracle Support Doc ID 888828.1)
- Oracle Exadata Best Practices (My Oracle Support Doc ID 757552.1)

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