Oracle® Exadata Database Machine Installation and Configuration Guide for Exadata Database Machine



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B Database High Availability Checklist

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
- Documentation Accessibility
- Diversity and Inclusion
- Related Documentation
- Conventions

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

The following guides contain additional information for Oracle Exadata:

Oracle Exadata System Guides



- Oracle Exadata Database Machine System Overview
- Oracle Exadata System Software User's Guide
- Oracle Exadata Database Machine Maintenance Guide
- Oracle Exadata Database Machine Security Guide
- Oracle Exadata Database Machine Extending and Multi-Rack Cabling Guide
- Oracle Engineered System Safety and Compliance Guide

Oracle Exadata Hardware Guides

- Exadata Server X10M Service Manual at https://docs.oracle.com/en/engineered-systems/servers/ exadata/x10m/dbmhw/index.html
- Oracle Exadata X9-2 Database Server Service Manual at https://docs.oracle.com/en/ servers/x86/x9-2/exa-database/index.html
- Oracle Exadata Storage Server X9-2 EF, HC, and XT Service Manual at https:// docs.oracle.com/en/servers/x86/x9-2l/exa-storage/index.html
- Oracle Exadata X8-2 Database Server Service Manual at https://docs.oracle.com/en/ servers/x86/x8-2l/exadata-db-service-manual/
- Oracle Exadata Storage Server X8-2 EF, HC, and XT Service Manual at https:// docs.oracle.com/en/servers/x86/x8-2l/exadata-storage-service-manual/
- Oracle Exadata Database Server X8-8 Service Manual at https://docs.oracle.com/en/ servers/x86/x8-8/exadata-storage-service-manual/index.html
- 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
- Oracle Flash Accelerator F640 PCIe Card User Guide at https://docs.oracle.com/cd/ E87231_01/html/E87233/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-ethernetswitch/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.

Site Requirements for Oracle Exadata and Oracle Exadata Storage Expansion Rack

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

- Ensuring That the Site is Ready
- General Environmental Requirements
- Space Requirements
- Receiving, Unpacking, and Access Route Requirements Before your Oracle Exadata Rack arrives, ensure that the receiving area is large enough for the package.
- Maintenance Access Requirements The maintenance area must be large enough for Oracle Exadata Rack, and have the required access space.
- Flooring Requirements Oracle Exadata Rack may be installed on raised floor or solid floor environments.
- Electrical Power Requirements The Oracle Exadata Rack can operate effectively over a wide range of voltages and frequencies. However, each rack must have a reliable power source.
- Temperature and Humidity Requirements Excessive internal temperatures may result in full or partial shut down of Oracle Exadata.
- Ventilation and Cooling Requirements
 Always provide adequate space in front and behind the rack to allow for proper ventilation.
- Network Connection and IP Address Requirements for Oracle Exadata Rack

Related Topics

Site Checklists

1.1 Ensuring That the 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 Understand the Networking Requirements and Options

Review Understanding the Network Requirements for Oracle Exadata to discern the networking requirements and configuration decisions that you must make.

Task 3 Run Oracle Exadata Deployment Assistant (OEDA)

Run OEDA to create the necessary configuration files. See Using Oracle Exadata Deployment Assistant.

Task 4 Configure the Network

Configure the network using the files from OEDA. This includes registering the networks in the Domain Name System (DNS), assigning IP addresses, and configuring data center switches and firewalls.

Task 5 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.

Review the procedures in Installing Oracle Exadata or Oracle Exadata Storage Expansion Rack at the Site.

1.2 General Environmental Requirements

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

- General Environmental Requirements for Oracle Exadata Rack X6 and Later
- General Environmental Requirements for Oracle Exadata X5-2
- General Environmental Requirements for Oracle Exadata Database Machine X5-8
- General Environmental Requirements for Oracle Exadata Database Machine X4-2
- General Environmental Requirements for Oracle Exadata Database Machine X4-8 with Exadata Storage Server X5-2 Servers
- General Environmental Requirements for Oracle Exadata Database Machine X4-8 Full Rack
- General Environmental Requirements for Oracle Exadata Database Machine X3-2
- General Environmental Requirements for Oracle Exadata Database Machine X3-8 Full Rack with Exadata Storage Server X4-2L Servers
- General Environmental Requirements for Oracle Exadata Database Machine X3-8 Full Rack with Exadata Storage Server X3-2 Servers
- General Environmental Requirements for Oracle Exadata Database Machine X2-2
- General Environmental Requirements for Oracle Exadata Database Machine X2-8 Full Rack
- General Environmental Requirements for Oracle Exadata Storage Expansion Rack X5-2
- General Environmental Requirements for Oracle Exadata Storage Expansion Rack X4-2
- General Environmental Requirements for Oracle Exadata Storage Expansion Rack X3-2
- General Environmental Requirements for Oracle Exadata Storage Expansion Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers
- General Environmental Requirements for Single Servers



1.2.1 General Environmental Requirements for Oracle Exadata Rack X6 and Later

Starting with X6 models of Oracle Exadata and Oracle Exadata Storage Expansion Rack, use Oracle Exadata Configuration Assistant (OECA) to determine environmental requirements, such as size, weight, acoustic level, power, cooling, and airflow. This includes all X6, X7, X8, X8M, X9M, and later models.

Related Topics

Oracle Exadata Configuration Assistant (OECA) Downloads

1.2.2 General Environmental Requirements for Oracle Exadata X5-2

The environmental requirements for Oracle Exadata X5-2 depend on the size of the system. The following table shows the general environmental requirements for Oracle Exadata X5-2.

Environmental Component	Oracle Exadata X5-2 Full Rack	Oracle Exadata X5-2 Half Rack	Oracle Exadata X5-2 Quarter Rack	Oracle Exadata 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	Extreme Flash drives	Extreme Flash	Extreme Flash	Extreme Flash
See Also:		drives	drives	drives
Electrical Power	Maximum:	Maximum: 8.5	Maximum: 4.2	Maximum: 3.5
Requirements	15.7 kVA	kVA	kVA	kVA
	Typical: 11.0	Typical: 5.9	Typical: 3.0	Typical: 2.4
	kVA (varies	kVA (varies	kVA (varies	kVA (varies
	based on	based on	based on	based on
	application	application	application	application
	load)	load)	load)	load)
	 High capacity	 High capacity	 High capacity	 High capacity
	drives	drives	drives	drives
	Maximum:	Maximum: 8.4	Maximum: 4.2	Maximum: 34
	15.6 kVA	kVA	kVA	kVA
	Typical: 10.9	Typical: 5.9	Typical:	Typical: 2.4
	kVA (varies	kVA (varies	2.9kVA (varies	kVA (varies
	based on	based on	based on	based on
	application	application	application	application
	load)	load)	load)	load)

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



Environmental Component	Oracle Exadata X5-2 Full Rack	Oracle Exadata X5-2 Half Rack	Oracle Exadata X5-2 Quarter Rack	Oracle Exadata 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/ 	 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/ 	 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/ 	 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/
Air flow front-to- back (subject to actual data center environment) See Also: Temperature and Humidity Requirements, and Ventilation and Cooling Requirements	 hour) 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 	 hour) Extreme Flash drives Maximum: Approximately 1,315 CFM Typical: Approximately 920 CFM High capacity drives Maximum: Approximately 1,302 CFM Typical: Approximately 912 CFM 	 hour) Extreme Flash drives Maximum: Approximately 657 CFM Typical: Approximately 460 CFM High capacity drives Maximum: Approximately 652 CFM Typical: Approximately 456 CFM 	 hour) 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 RDMA Network Fabric	38 for Ethernet network, assuming single cluster Up to 18 for RDMA Network Fabric	22 for Ethernet network, assuming single cluster Up to 8 for RDMA Network Fabric	22 for Ethernet network, assuming single cluster Up to 8 for RDMA Network Fabric

Table 1-1	(Cont.) Environmer	ital Requirements for	[•] Oracle Exadata X5-2
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Environmental Component	Oracle Exadata X5-2 Full Rack	Oracle Exadata X5-2 Half Rack	Oracle Exadata X5-2 Quarter Rack	Oracle Exadata 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 RDMA Network Fabric ports	12 x 1 GbE/10 GbE Ethernet ports 8 x 10 GbE Ethernet ports At least 12 RDMA Network Fabric ports	6 x 1 GbE/10 GbE Ethernet ports 4 x 10 GbE Ethernet ports At least 12 RDMA Network Fabric ports	6 x 1 GbE/10 GbE Ethernet ports 4 x 10 GbE Ethernet ports At least 12 RDMA Network Fabric ports

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

1.2.3 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.

Environmental Component	Oracle Exadata Database Machine X5-8 Full Rack	Oracle Exadata Database Machine X5-8 Half Rack	
Weight See Also: "Flooring	Extreme Flash drives: 1826.5 lbs (828.1 kg)	Extreme Flash drives: 1160.1 lbs (526.2 kg)	
Requirements"	High capacity drives: 1980.5 lbs (898.3 kg)	High capacity drives: 1193.1 lbs (541.2 kg)	
Acoustic levels	8.68	8.58	
Power	Extreme Flash drives:	Extreme Flash drives:	
See Also: "Electrical Power Requirements"	 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) 	 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 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	Extreme Flash drives:	Extreme Flash drives:
See Also: "Temperature and Humidity Requirements", and "Ventilation and Cooling Requirements"	 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) 	 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)	Extreme Flash drives: Max: 2590 CFM	Extreme Flash drives: Max: 1502 CFM
See Also: "Temperature and Humidity Requirements", and "Ventilation and Cooling Requirements"	 Typical: 1813 CFM High capacity drives: Max: 2565 CFM Typical: 1796 CFM 	 Typical: 1051 CFM High capacity drives: Max: 1496 CFM Typical: 1048 CFM

Table 1-2(Cont.) Environmental Requirements for Oracle Exadata Database MachineX5-8

1.2.4 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.

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	852.8 kg (1880 lbs)	525.3 kg (1158 lbs)	365.6 kg (806 lbs)	365.6 kg (806 lbs)
See Also: "Flooring Requirements"				
Acoustic levels	93 db(A)	89 db(A)	85 db(A)	85 db(A)

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
Power	 High	 High	 High	 High
See Also:	performance	performance	performance	performance
"Electrical Power	drives	drives	drives	drives
Requirements"	Maximum;	Maximum: 6.8	Maximum: 3.4	Maximum: 3.1
	 12.4 kVA Typical: 8.7 kVA (varies based on application load) High capacity drives 	kVA Typical: 4.8 kVA (varies based on application load) • High capacity drives	 kVA Typical: 2.5 kVA (varies based on application load) High capacity drives 	 kVA Typical: 2.2 kVA (varies based on application load) High capacity drives
	Maximum:	Maximum: 6.3	Maximum: 3.2	Maximum: 2.9
	11.4 kVA	kVA	kVA	kVA
	Typical: 8.1	Typical: 4.4	Typical: 2.3	Typical: 2.1
	kVA (varies	kVA (varies	kVA (varies	kVA (varies
	based on	based on	based on	based on
	application	application	application	application
	load)	load)	load)	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 	 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 	 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 	 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)	kJ/hour)	kJ/hour)	kJ/hour)
	Typical: 27,000	Typical: 14,700	Typical: 7,500	Typical: 6,600
	BTU/hour	BTU/hour	BTU/hour	BTU/hour
	(28,500 kJ/	(15,500 kJ/	(7,900 kJ/	(7,000 kJ/
	hour)	hour)	hour)	hour)

Table 1-3(Cont.) Environmental Requirements for Oracle Exadata Database MachineX4-2

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 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

Table 1-3(Cont.) Environmental Requirements for Oracle Exadata Database MachineX4-2

1.2.5 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	h 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 MachineX4-8 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

1.2.6 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	867.3 kg (1912 lbs)	
See Also: "Flooring Requirements"		
Acoustic levels	93 db(A)	
Power	High performance drives	
See Also: "Electrical Power Requirements"	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)	

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

Table 1-5 (Cont.) Environmental Requirements for Oracle Exadata Database MachineX4-8 Full Rack

1.2.7 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.

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	871.4 kg (1921 lbs)	543.9 kg (1199 lbs)	368.8 kg (813 lbs)	368.8 kg (813 lbs)
See Also: "Flooring Requirements"				
Acoustic levels	87 db(A)	84 db(A)	81 db(A)	81 db(A)



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
Power	 High	 High	 High	 High
See Also:	performance	performance	performance	performance
"Electrical Power	drives	drives	drives	drives
Requirements"	Maximum:	Maximum: 6.6	Maximum: 3.3	Maximum: 3.0
	12.1 kVA	kVA	kVA	kVA
	Typical: 8.6	Typical: 4.7	Typical: 2.4	Typical: 2.1
	kVA (varies	kVA (varies	kVA (varies	kVA (varies
	based on	based on	based on	based on
	application	application	application	application
	load)	load)	load)	load)
	 High capacity	 High capacity	 High capacity	 High capacity
	drives	drives	drives	drives
	Maximum:	Maximum: 6.1	Maximum: 3.1	Maximum: 2.8
	11.1 kVA	kVA	kVA	kVA
	Typical: 7.8	Typical: 4.3	Typical: 2.2	Typical: 2.0
	kVA (varies	kVA (varies	kVA (varies	kVA (varies
	based on	based on	based on	based on
	application	application	application	application
	load)	load)	load)	load)
Cooling	High performance drives	 High	 High	 High
See Also:		performance	performance	performance
"Temperature and		drives	drives	drives
Humidity Requirements", and "Ventilation and Cooling Requirements"	Maximum: 40,600 BTU/ hour (42,800 kJ/hour)	Maximum: 22,200 BTU/ hour (23,400 kJ/hour)	Maximum: 10,900 BTU/ hour (11,500 kJ/hour)	Maximum: 9,900 BTU/ hour (10,500 kJ/hour)
	Typical: 28,700 BTU/hour (30,300 kJ/ hour)	Typical: 15,700 BTU/hour (16,600 kJ/ hour)	Typical: 7,850 BTU/hour (8,300 kJ/ hour)	Typical: 6,800 BTU/hour (7,200 kJ/ hour)
	 High capacity drives 	 High capacity drives 	 High capacity drives 	 High capacity drives
	Maximum: 37,200 BTU/ hour (39,250 kJ/hour)	Maximum: 20,500 BTU/ hour (21,600 kJ/hour)	Maximum: 10,200 BTU/ hour (10,800 kJ/hour)	Maximum: 9,200 BTU/ hour (9,700 kJ/ hour)
	Typical: 26,000	Typical: 14,300	Typical: 7,200	Typical: 6,500
	BTU/hour	BTU/hour	BTU/hour	BTU/hour
	(27,400 kJ/	(15,100 kJ/	(7,600 kJ/	(6,850 kJ/
	hour)	hour)	hour)	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
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

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



1.2.8 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 DatabaseMachine X3-8 Full Rack with Exadata Storage Server X4-2L Servers. The other sections in thischapter 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 	
Cooling See Also: "Temperature and Humidity Requirements", and "Ventilation and Cooling Requirements"	 load) 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	



1.2.9 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 DatabaseMachine X3-8 Full Rack with Exadata Storage Server X3-2 Servers. The other sections in thischapter 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	929.9 kg (2050 lbs)		
See Also: "Flooring Requirements"			
Acoustic levels	84 db(A)		
Power	High performance drives		
See Also: "Electrical Power Requirements"	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	High performance drives		
See Also: "Temperature and Humidity	Maximum: 51,200 BTU/hour (54,000 kJ/hour)		
Requirements", and "Ventilation and Cooling	Typical: 35,900 BTU/hour (37,900 kJ/hour)		
Requirements"	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	High performance drives		
environment)	Maximum: Approximately 2,400 CFM		
See Also: "Temperature and Humidity Requirements", and "Ventilation and Cooling	Typical: Approximately 1,700 CFM		
Requirements"	High capacity drives		
	Maximum: Approximately 2,200 CFM		
	Typical: Approximately 1,550 CFM		
IP Addresses	45 for Ethernet network, assuming single cluster		
See Also: "Network Connection and IP Address Requirements for Oracle Exadata Database Machine"	22 for InfiniBand network		
Network drops	Minimum of 5 network drops		
See Also: "Network Connection and IP Address Requirements for Oracle Exadata Database Machine"			
External connectivity	16 x 1 GbE Ethernet ports		
See Also: "Network Connection and IP Address	16 x 10 GbE Ethernet SFP+ ports		
Requirements for Oracle Exadata Database Machine"	12 InfiniBand ports		

1.2.10 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.

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	966.6 kg (2131 lbs)	602.8 kg (1329 lbs)	409.1kg (902 lbs)
See Also: "Flooring Requirements"			
Acoustic levels	89 db(A)	86 db(A)	83 db(A)
Power See Also: "Electrical	Maximum: 14.0 kW (14.3 kVA)	Maximum: 7.2 kW (7.3 kVA)	Maximum: 3.6 kW (3.7 kVA)
Power Requirements"	Typical: 9.8 kW (10.0 kVA) (varies based on application load)	Typical: 5.1 kW (5.2 kVA) (varies based on application load)	Typical: 2.7 kW (2.75kVA) (varies based on application load)
Cooling See Also: "Temperature	Maximum: 47,800 BTU/ hour (50,400 kJ/hour)	Maximum: 26,400 BTU/ hour (25,950 kJ/hour)	Maximum: 12,300 BTU/ hour (13,000 kJ/hour)
and Humidity Requirements", and "Ventilation and Cooling Requirements"	Typical: 33,400 BTU/ hour (35,300 kJ/hour)	Typical: 17,400 BTU/ hour (35,300 kJ/hour)	Typical: 9,200 BTU/hour (9,700 kJ/hour)
Air flow front-to-back (subject to actual data	Maximum: Approximately 2,200	Maximum: Approximately 1,130	Maximum: Approximately 550 CFM
center environment) See Also: "Temperature and Humidity Requirements", and "Ventilation and Cooling Requirements"	CFM Typical: Approximately 1,560 CFM	CFM Typical: Approximately 840 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
Network drops	Minimum of 12 network	Minimum of 8 network	Minimum of 6 network
See Also: "Network Connection and IP Address Requirements for Oracle Exadata Database Machine"	drops	drops	drops

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
External connectivity See Also: "Network	24 x 1 GbE Ethernet ports	12 x 1 GbE Ethernet ports	6 x 1 GbE Ethernet ports
Connection and IP Address Requirements for Oracle Exadata	16 x 10 GbE Ethernet ports (valid for M2 servers only)	8 x 10 GbE Ethernet ports (valid for M2 servers only)	4 x 10 GbE Ethernet ports (valid for M2 servers only)
Database Machine"	At least 12 InfiniBand ports	At least 12 InfiniBand ports	At least 12 InfiniBand ports

Table 1-9 (Cont.) Environmental Requirements for Oracle Exadata Database MachineX2-2

1.2.11 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.

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	Maximum: 17.0 kW (17.4 kVA)	Maximum: 17.7 kW (18.1 kVA)	
See Also: "Electrical Power Requirements"	Typical: 11.9 kW (12.2 kVA) (varies based on application load)	Typical: 12.4 kW (112.7 kVA) (varies based on application load)	
Cooling See Also: "Temperature and	Maximum: 58,050 BTU/hour (61,200 kJ/hour)	Maximum: 60,350 BTU/hour (63,630 kJ/hour)	
Humidity Requirements", and "Ventilation and Cooling Requirements"	Typical: 40,630 BTU/hour (42,840 kJ/hour)	Typical: 42,280 BTU/hour (44,580 kJ/hour)	
Air flow front-to-back (subject to actual data center environment)	Maximum: Approximately 2,690 CFM	Maximum: Approximately 2,781CFM	
See Also: "Temperature and Humidity Requirements", and "Ventilation and Cooling Requirements"	Typical: Approximately 1,880 CFM	Typical: Approximately 1,950 CFM	
IP Addresses	45 for Ethernet network,	45 for Ethernet network,	
See Also: "Network Connection	assuming single cluster	assuming single cluster	
and IP Address Requirements for Oracle Exadata Database Machine"	22 for InfiniBand network	22 for InfiniBand network	

Table 1-10Environmental Requirements for Oracle Exadata Database Machine X2-8Full 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)
Network drops	Minimum of 5 network drops	Minimum of 5 network drops
See Also: "Network Connection and IP Address Requirements for Oracle Exadata Database Machine"		
External connectivity	16 x 1 GbE Ethernet ports	16 x 1 GbE Ethernet ports
See Also: "Network Connection and IP Address Requirements for Oracle Exadata Database Machine"	16 x 10 GbE Ethernet SFP+ ports 12 InfiniBand ports	16 x 10 GbE Ethernet SFP+ ports 12 InfiniBand ports

Table 1-10(Cont.) Environmental Requirements for Oracle Exadata Database MachineX2-8 Full Rack

1.2.12 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.

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	 Extreme Flash drives 	 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)	Typical: 4.2 kVA (varies based on application load) • High capacity 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)

Table 1-11Environmental Requirements for Oracle Exadata Storage Expansion RackX5-2

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
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)
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 cluster38 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

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

1.2.13 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.

Environmental Component	Oracle Exadata Storage Expansior 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)
Power	High performan drives	ce • High performance drives	High performance drives
	Maximum: 10.2		Maximum: 2.9 kVA
	Typical: 7.1 kVA (varies based o application load	n (varies based on l) application load)	Typical: 2.0 kVA (varies based on application load)
	High capacity d Maximum: 9.1 k		 High capacity drives Maximum: 2.7 kVA
	Typical: 6.3 kVA (varies based o application load	n (varies based on	Typical: 2.0 kVA (varies based on application load)
Cooling	High performan drives	ce • High performance drives	High performance drives
	Maximum: 34,1 BTU/hour (36,0 kJ/hour)		Maximum: 9,500 BTU/hour (10,000 kJ/hour)
	Typical: 23,900 BTU/hour (25,2 kJ/hour)	kJ/hour)	Typical: 6,700 BTU/ hour (7,000 kJ/hour) High capacity drives
	 High capacity d Maximum: 30,4 BTU/hour (32,1 kJ/hour) 	00 Maximum: 17,400	Maximum: 8,900 BTU/hour (9,400 kJ/ hour) Typical: 6,500 BTU/
	Typical: 21,200 BTU/hour (22,4 kJ/hour)	Typical: 12,300	hour (6,900 kJ/hour)
Air flow front-to-back (subject to actual data	 High performan drives 	• High performance drives	 High performance drives
center environment)	Maximum: Approximately 1,600 CFM	Maximum: Approximately 900 CFM	Maximum: Approximately 440 CFM
	Typical: Approximately 1,100 CFM	Typical: Approximately 650 CFM	Typical: Approximately 310 CFM
	 High capacity d Maximum: 	rives • High capacity drives Maximum:	 High capacity drives Maximum:
	Approximately 1,410 CFM	Approximately 810 CFM	Approximately 410 CFM
	Typical: Approximately S CFM	Typical: Approximately 570 CFM	Typical: Approximately 300 CFM
IP Addresses	42 for Ethernet netw assuming single clust		13 for Ethernet network, assuming single cluster
	36 for InfiniBand network	18 for InfiniBand network	8 for InfiniBand network

Table 1-12Environmental Requirements for Oracle Exadata Storage Expansion RackX4-2



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
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

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

1.2.14 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.

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	 High performance drives 	 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)	 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) 	 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)
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 	 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)

Table 1-13Environmental Requirements for Oracle Exadata Storage Expansion RackX3-2



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
Air flow front-to-back (subject to actual data center environment)	High performance drives Maximum: Approximately 1.600 CFM	 High performance drives Maximum: Approximately 900 CEM 	 High performance drives Maximum: Approximately 440 CEM
	Typical: Approximately 1,100 CFM	Typical: Approximately 650 CFM	Typical: Approximately 310 CFM
	High capacity drives Maximum: Approximately 1,375 CFM	High capacity drives Maximum: Approximately 790 CFM	 High capacity drives Maximum: Approximately 400 CFM
	Typical: Approximately 960 CFM	Typical: Approximately 550 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

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

1.2.15 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 Exadat	a 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)

Environmental Component	Oracle Exadata Storage Expansion Full Rack	Oracle Exadata Storage Expansion Half Rack	Oracle Exadata Storage Expansion Quarter Rack
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

Table 1-14 (Cont.) Environmental Requirements for Oracle Exadata Storage ExpansionRack with Exadata Storage Server with Sun Fire X4270 M2 Servers

1.2.16 General Environmental Requirements for Single Servers

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

 Table 1-15
 Environmental Requirements for Oracle Exadata X10M Single Servers

Environmen tal Component	Database Server X10M	Database Server X10M - 3 TB RAM Configurati on	Exadata Storage Server X10M - High Capacity	Exadata Storage Server X10M Eighth Rack - High Capacity	Exadata Storage Server X10M - Extreme Flash	Exadata Storage Server X10M XT Server
Weight	23.6 kg (52 lbs)	24 kg (53 lbs)	33.6 kg (74 lbs)	28.6 kg (63 lbs)	27.2 kg (60 lbs)	30.8 kg (68 lbs)
Acoustic Noise	84 dB	86 dB	84 dB	84 dB	82 dB	81 dB



Environmen tal Component	Database Server X10M	Database Server X10M - 3 TB RAM Configurati on	Exadata Storage Server X10M - High Capacity	Exadata Storage Server X10M Eighth Rack - High Capacity	Exadata Storage Server X10M - Extreme Flash	Exadata Storage Server X10M XT Server
Power	Maximum: 1.3 kW (1.3 kVA) Typical: 0.9 kW (0.9 kVA) (varies based on application load)	Maximum: 1.5 kW (1.5 kVA) Typical: 1 kW (1.1 kVA) (varies based on application load)	Maximum: 1 kW (1.1 kVA) Typical: 0.7 kW (0.7 kVA) (varies based on application load)	Maximum: 0.8 kW (0.8 kVA) Typical: 0.5 kW (0.6 kVA) (varies based on application load)	Maximum: 1 kW (1 kVA) Typical: 0.7 kW (0.7 kVA) (varies based on application load)	Maximum: 0.4 kW (0.5 kVA) Typical: 0.3 kW (0.3 kVA) (varies based on application load)
Cooling	At max usage: 4,299 BTU/hour (4,536 kJ/ hour) At typical usage: 3,010 BTU/hour (3,175 kJ/ hour	At max usage: 5,050 BTU/hour (5,328 kJ/ hour) At typical usage: 3,535 BTU/hour (3,729 kJ/ hour	At max usage: 3,559 BTU/hour (3,755 kJ/ hour) At typical usage: 2,491 BTU/hour (2,628 kJ/ hour)	At max usage: 2,634 BTU/hour (2,778 kJ/ hour) At typical usage: 1,843 BTU/hour (1,945 kJ/ hour)	At max usage: 3,337 BTU/hour (3,521 kJ/ hour) At typical usage: 2,336 BTU/hour (2,464 kJ/ hour)	At max usage: 1,512 BTU/hour (1,595 kJ/ hour) At typical usage: 1,058 BTU/hour (1,116 kJ/ hour)
Air flow front- to-back (subject to actual data center environment)	At max usage: Approximatel y 199 CFM At typical usage: Approximatel y 139 CFM	At max usage: Approximatel y 234 CFM At typical usage: Approximatel y 164 CFM	At max usage: Approximatel y 165 CFM At typical usage: Approximatel y 115 CFM	At max usage: Approximatel y 122 CFM At typical usage: Approximatel y 85 CFM	At max usage: Approximatel y 154 CFM At typical usage: Approximatel y 108 CFM	At max usage: Approximatel y 70 CFM At typical usage: Approximatel y 49 CFM

Table 1-15	(Cont.) Environmental Requirements for Oracle Exadata X10M Single
Servers	

Table 1-16 Environmental Requirements for X9M-2 Single Servers

Environmental Component	Database Server X9M-2	Exadata Storage Server X9M-2 - High Capacity	Exadata Storage Server X9M-2 Eighth Rack - High Capacity	Exadata Storage Server X9M-2 - Extreme Flash	Exadata Storage Server X9M-2 XT Server
Weight	20.7 kg (45.6 lbs)	34.8 kg (76.7 lbs)	30.6 kg (67.5 lbs)	27.5 kg (60.6 lbs)	30.2 kg (66.7 lbs)
Acoustic Noise	79 dB	80 dB	80 dB	80 dB	80 dB



Environmental Component	Database Server X9M-2	Exadata Storage Server X9M-2 - High Capacity	Exadata Storage Server X9M-2 Eighth Rack - High Capacity	Exadata Storage Server X9M-2 - Extreme Flash	Exadata Storage Server X9M-2 XT Server
Power	Maximum: 0.9	Maximum: 0.9	Maximum: 0.6	Maximum: 0.9	Maximum: 0.5
	kW (0.9 kVA)	kW (0.9 kVA)	kW (0.6 kVA)	kW (0.9 kVA)	kW (0.5 kVA)
	Typical: 0.7 kW	Typical: 0.5 kW	Typical: 0.4 kW	Typical: 0.6 kW	Typical: 0.4 kW
	(0.7 kVA)	(0.6 kVA)	(0.4 kVA)	(0.6 kVA)	(0.4 kVA)
	(varies based	(varies based	(varies based	(varies based	(varies based
	on application	on application	on application	on application	on application
	load)	load)	load)	load)	load)
Cooling	At max usage:	At max usage:	At max usage:	At max usage:	At max usage:
	3,153 BTU/hour	2,883 BTU/hour	2,134 BTU/hour	2,907 BTU/hour	1,720 BTU/hour
	(3,326 kJ/hour)	(3,042 kJ/hour)	(2,251 kJ/hour)	(3,067 kJ/hour)	(1,814 kJ/hour)
	At typical	At typical	At typical	At typical	At typical
	usage: 2,207	usage: 2,018	usage: 1,494	usage: 2,035	usage: 1,204
	BTU/hour	BTU/hour	BTU/hour	BTU/hour	BTU/hour
	(2,328 kJ/hour	(2,129 kJ/hour)	(1,576 kJ/hour)	(2,147 kJ/hour)	(1,270 kJ/hour)
Air flow front-to-	At max usage:	At max usage:	At max usage:	At max usage:	At max usage:
back (subject to	Approximately	Approximately	Approximately	Approximately	Approximately
actual data	146 CFM	133 CFM	99 CFM	135 CFM	80 CFM
center environment)	At typical usage: Approximately 102 CFM	At typical usage: Approximately 93 CFM	At typical usage: Approximately 69 CFM	At typical usage: Approximately 94 CFM	At typical usage: Approximately 56 CFM

 Table 1-16
 (Cont.) Environmental Requirements for X9M-2 Single Servers

Table 1-17	Environmental Req	uirements for	X8M-2 Single	Servers
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Environmental Component	Database Server X8M-2	Exadata Storage Server X8M-2 - High Capacity	Exadata Storage Server X8M-2 Eighth Rack - High Capacity	Exadata Storage Server X8M-2 - Extreme Flash	Exadata Storage Server X8M-2 XT Server
Weight	20.7 kg (45.6	34.8 kg (76.7	30.6 kg (67.5	27.5 kg (60.6	30.2 kg (66.7
	lbs)	lbs)	lbs)	lbs)	lbs)
Acoustic Noise	77 dB	82 dB	82 dB	82 dB	82 dB
Power	Maximum: 0.7	Maximum: 0.8	Maximum: 0.6	Maximum: 0.8	Maximum: 0.5
	kW (0.7 kVA)	kW (0.8 kVA)	kW (0.6 kVA)	kW (0.8 kVA)	kW (0.5 kVA)
	Typical: 0.5 kW	Typical: 0.5 kW	Typical: 0.4 kW	Typical: 0.6 kW	Typical: 0.3 kW
	(0.5 kVA)	(0.6 kVA)	(0.4 kVA)	(0.6 kVA)	(0.3 kVA)
	(varies based	(varies based	(varies based	(varies based	(varies based
	on application	on application	on application	on application	on application
	load)	load)	load)	load)	load)
Cooling	At max usage:	At max usage:	At max usage:	At max usage:	At max usage:
	2,409 BTU/hour	2,631 BTU/hour	1,947 BTU/hour	2,730 BTU/hour	1570 BTU/hour
	(2,541 kJ/hour)	(2,775 kJ/hour)	(2,054 kJ/hour)	(2,880 kJ/hour)	(1,656 kJ/hour)
	At typical	At typical	At typical	At typical	At typical
	usage: 1,686	usage: 1,842	usage: 1,363	usage: 1,911	usage: 1,099
	BTU/hour	BTU/hour	BTU/hour	BTU/hour	BTU/hour
	(1,779 kJ/hour	(1,943 kJ/hour)	(1,438 kJ/hour)	(2,016 kJ/hour)	(1,159 kJ/hour)



Environmental Component	Database Server X8M-2	Exadata Storage Server X8M-2 - High Capacity	Exadata Storage Server X8M-2 Eighth Rack - High Capacity	Exadata Storage Server X8M-2 - Extreme Flash	Exadata Storage Server X8M-2 XT Server
Air flow front-to- back (subject to actual data	At max usage: Approximately 112 CFM	At max usage: Approximately 122 CFM	At max usage: Approximately 90 CFM	At max usage: Approximately 126 CFM	At max usage: Approximately 73 CFM
center environment)	At typical usage: Approximately 78 CFM	At typical usage: Approximately 85 CFM	At typical usage: Approximately 63 CFM	At typical usage: Approximately 88 CFM	At typical usage: Approximately 51 CFM

Table 1-17	(Cont.) Environme	ental Requirements for	X8M-2 Single Servers
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Table 1-18 Environmental Requirements for X8-2 Single Servers

Environmental Component	Database Server X8-2	Exadata Storage Server X8-2 - High Capacity	Exadata Storage Server X8-2 Eighth Rack - High Capacity	Exadata Storage Server X8-2 - Extreme Flash	Exadata Storage Server X8-2 XT Server
Weight	20.7 kg (45.6	34.8 kg (76.7	30.6 kg (67.5	27.5 kg (60.6	30.2 kg (66.7
	lbs)	lbs)	lbs)	lbs)	lbs)
Acoustic Noise	77 dB	82 dB	82 dB	82 dB	82 dB
Power	Maximum: 0.7	Maximum: 0.7	Maximum: 0.5	Maximum: 0.7	Maximum: 0.5
	kW (0.7 kVA)	kW (0.7 kVA)	kW (0.5 kVA)	kW (0.7 kVA)	kW (0.5 kVA)
	Typical: 0.5 kW	Typical: 0.5 kW	Typical: 0.4 kW	Typical: 0.5 kW	Typical: 0.3 kW
	(0.5 kVA)	(0.5 kVA)	(0.4 kVA)	(0.5 kVA)	(0.3 kVA)
	(varies based	(varies based	(varies based	(varies based	(varies based
	on application	on application	on application	on application	on application
	load)	load)	load)	load)	load)
Cooling	At max usage:	At max usage:	At max usage:	At max usage:	At max usage:
	2,409 BTU/hour	2,317 BTU/hour	1,714 BTU/hour	2,283 BTU/hour	1570 BTU/hour
	(2,541 kJ/hour)	(2,444 kJ/hour)	(1,809 kJ/hour)	(2,408 kJ/hour)	(1,656 kJ/hour)
	At typical	At typical	At typical	At typical	At typical
	usage: 1,686	usage: 1,622	usage: 1,200	usage: 1,598	usage: 1,099
	BTU/hour	BTU/hour	BTU/hour	BTU/hour	BTU/hour
	(1,779 kJ/hour	(1,711 kJ/hour)	(1,266 kJ/hour)	(1,686 kJ/hour)	(1,159 kJ/hour)
Air flow front-to-	At max usage:	At max usage:	At max usage:	At max usage:	At max usage:
back (subject to	Approximately	Approximately	Approximately	Approximately	Approximately
actual data	112 CFM	107 CFM	79 CFM	106 CFM	73 CFM
center environment)	At typical usage: Approximately 78 CFM	At typical usage: Approximately 75 CFM	At typical usage: Approximately 56 CFM	At typical usage: Approximately 74 CFM	At typical usage: Approximately 51 CFM

Environmental Component	Exadata Storage Server X7-2 - Extreme Flash	Exadata Storage Server X7-2 Eighth Rack - High Capacity	Exadata Storage Server X7-2 - High Capacity	Database Server X7-2
Weight	27.5 kg (61 lbs)	30.1 kg (66.3 lbs)	34.4 kg (76 lbs)	20.7 kg (46 lbs)
Acoustic Noise	82 dB(A)	79 dB(A)	82 dB(A)	77 dB(A)
Power	Maximum: 0.6 kW	Maximum: 0.5 kW	Maximum: 0.6 kW	Maximum: 0.8 kW
	(0.6 kVA)	(0.5 kVA)	(0.6 kVA)	(0.8 kVA)
	Typical: 0.4 kW	Typical: 0.3 kW	Typical: 0.4 kW	Typical: 0.5 kW
	(0.5 kVA) (varies	(0.3 kVA) (varies	(0.4 kVA) (varies	(0.6 kVA) (varies
	based on	based on	based on	based on
	application load)	application load)	application load)	application load)
Cooling	Maximum: 2,167	Maximum: 1,588	Maximum: 2,146	Maximum: 2,631
	BTU/hour (2,286	BTU/hour (1,676	BTU/hour (2,264	BTU/hour (2,775
	kJ/hour)	kJ/hour)	kJ/hour)	kJ/hour)
	Typical: 1,600 BTU/ hour (1,378 kJ/ hour)	Typical: 1,112 BTU/ hour (1,173 kJ/ hour)	Typical: 1,502 BTU/ hour (1,585 kJ/ hour)	Typical: 1,842 BTU/ hour (1,943 kJ/hour
Air flow front-to-	Maximum:	Maximum:	Maximum:	Maximum:
back (subject to	Approximately 100	Approximately 74	Approximately 99	Approximately 122
actual data center	CFM	CFM	CFM	CFM
environment)	Typical:	Typical:	Typical:	Typical:
	Approximately 70	Approximately 51	Approximately 70	Approximately 85
	CFM	CFM	CFM	CFM

Table 1-19 Environmental Requirements for X7-2 Single Server	Table 1-19	Environmental Requirements for X7-2 Single Servers
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Table 1-20 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 Noise	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

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 Noise	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 1-21 Environmental Requirements for A5-2 Single Servers	Table 1-21	Environmental Requirements for X5-2 Single Servers
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Table 1-22 Environmental Requirements for 8-Socket Servers, Model X4-8 and Later

Environmental	Database Server	Database Server	Database Server	Database Server
Component	X8M-8 and X9M-8	X7-8 and X8-8	X5-8 and X6-8	X4-8
Weight	90.2 kg (198.8 lbs)	90.2 kg (198.8 lbs)	93.4 kg (206 lbs)	93.4 kg (206 lbs)
Acoustic Noise	87 dB	87 dB	81 dB(A)	81 dB(A)
Power	Maximum: 3.6 kVA	Maximum: 3.6 kVA	Maximum: 3.5 kVA	Maximum: 3.7 kVA
	Typical: 2.5 kVA	Typical: 2.5 kVA	Typical: 2.4 kVA	Typical: 2.6 kVA
	(varies based on	(varies based on	(varies based on	(varies based on
	application load)	application load)	application load)	application load)
Cooling	Maximum: 11,953	Maximum: 11,942	Maximum: 11,601	Maximum: 12,284
	BTU/hour (12,610	BTU/hour (12,599	BTU/hour (12,239	BTU/hour (12,959
	kJ/hour)	kJ/hour)	kJ/hour)	kJ/hour)
	Typical: 8,367 BTU/	Typical: 8,360 BTU/	Typical: 8,121 BTU/	Typical: 8,599 BTU/
	hour (8,827 kJ/	hour (8,820 kJ/	hour (8,568 kJ/	hour (9,072 kJ/
	hour)	hour)	hour)	hour)
Air flow front-to- back (subject to actual data center environment)	Maximum: Approximately 553 CFM Typical: Approximately 387 CFM	Maximum: Approximately 553 CFM Typical: Approximately 387 CFM	Maximum: Approximately 537 CFM Typical: Approximately 376 CFM	Maximum: Approximately 569 CFM Typical: Approximately 398 CFM

1.3 Space Requirements

For all Oracle Exadata X7, X8, X8M, X9M, and later models, use Oracle Exadata Configuration Assistant (OECA) to determine the size of each rack.

In addition to the rack height, 914 mm (36 inches) of space is required above the rack height for maintenance access, as described in Table 1-24.



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.

Space Requirements for Racks up to Oracle Exadata X6
 All racks up to Oracle Exadata X6-2 and X6-8 use the same hardware rack, and have the same space requirements.

Related Topics

Oracle Exadata Configuration Assistant (OECA) Downloads

1.3.1 Space Requirements for Racks up to Oracle Exadata X6

All racks up to Oracle Exadata X6-2 and X6-8 use the same hardware 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 1-24. 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.

1.4 Receiving, Unpacking, and Access Route 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)

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.

Caution:

Prior to moving the rack, always make sure that all four leveling and stabilizing feet are raised and out of the way.

Table 1-23	Access Route Requirements
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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)

- Rack Weights for Oracle Exadata Review the weight of your Oracle Exadata Rack to ensure that it can be delivered and located safely.
- Rack Weights for Oracle Exadata Storage Expansion Rack

1.4.1 Rack Weights for Oracle Exadata

Review the weight of your Oracle Exadata Rack to ensure that it can be delivered and located safely.

For all Oracle Exadata X6, X7, X8, X8M, X9M, and later models, use Oracle Exadata Configuration Assistant (OECA) to determine the net rack weight. In addition to the net rack weight, allow approximately 180 kg (400 lbs) for packaging materials.

For earlier models, use the following table to determine the rack weight:

Type of Rack	Shipping Weight	Net Weight
Oracle Exadata X5-2 Full Rack	984.8 kg (2171 lbs)	901.3 kg (1987 lbs)
Oracle Exadata X5-2 Half Rack	639.6 kg (1410 lbs)	587.4 kg (1295 lbs)
Oracle Exadata X5-2 Quarter Rack	453.1 kg (999 lbs)	418.2 kg (922 lbs)
Oracle Exadata X5-2 Eighth Rack	453.1 kg (999 lbs)	418.2 kg (922 lbs)
Oracle Exadata X5-8 Full Rack	Extreme Flash drives: 894.7 kg (1972.5 lbs)	Extreme Flash drives: 828.5 kg (1826.5 lbs)
	High capacity drives: 964.6 kg (2126.5 lbs)	High capacity drives: 898.3 kg (1980.5 lbs)
Oracle Exadata X5-8 Half Rack	Extreme Flash drives: 592.4 kg (1306.1 lbs)	Extreme Flash drives: 526.2 kg (1160.1 lbs)
	High capacity drives: 607.4 kg (1339.1 lbs)	High capacity drives: 541.2 kg (1193.1 lbs)
Oracle Exadata X4-2 Full Rack	936 kg (2064 lbs)	852.8 kg (1880 lbs)
Oracle Exadata X4-2 Half Rack	577 kg (1273 lbs)	525.3 kg (1158 lbs)



Type of Rack	Shipping Weight	Net Weight
Oracle Exadata X4-2 Quarter Rack	401 kg (883 lbs)	365.6 kg (806 lbs)
Oracle Exadata X4-2 Eighth Rack	401 kg (883 lbs)	365.6 kg (806 lbs)
Oracle Exadata X4-8 Full Rack	High performance drives: 951 kg (2097 lbs)	High performance drives: 867 kg (1912 lbs)
	High capacity drives: 1019 kg (2247 lbs)	High capacity drives: 936 kg (2063 lbs)
Oracle Exadata X3-2 Full Rack	954.8 kg (2105 lbs)	871.4 kg (1921 lbs)
Oracle Exadata X3-2 Half Rack	596.0 kg (1314 lbs)	543.9 kg (1199 lbs)
Oracle Exadata X3-2 Quarter Rack	403.7 kg (890 lbs)	368.8 kg (813 lbs)
Oracle Exadata X3-2 Eighth Rack	403.7 kg (890 lbs)	368.8 kg (813 lbs)
Oracle Exadata X3-8 Full Racks with Exadata Storage Server X4-2L Servers	994.7 kg (2193 lbs)	911.3 kg (2009 lbs)
Oracle Exadata X3-8 Full Racks	1013.3 kg (2234 lbs)	929.9 kg (2050 lbs)
Oracle Exadata X2-2 Full Rack	1050.1 kg (2315 lbs)	966.61 kg (2131 lbs)
Oracle Exadata X2-2 Half Rack	684.1 kg (1508 lbs)	602.8 kg (1329 lbs)
Oracle Exadata X2-2 Quarter Rack	487.6 kg (1075 lbs)	409.1 kg (902 lbs)
Oracle Exadata X2-8 Full Rack with Sun Fire X4800 Oracle Database Servers	1026.9 kg (2264 lbs)	943.8 kg (2080 lbs)
Oracle Exadata X2-8 Full Rack with Sun Server X2-8 Oracle Database Servers	1036.0 kg (2284 lbs)	980.7 kg (2162 lbs)

Related Topics

Oracle Exadata Configuration Assistant (OECA) Downloads

1.4.2 Rack Weights for Oracle Exadata Storage Expansion Rack

For all Oracle Exadata Storage Expansion Rack X6-2, X7-2, X8-2, X8M-2, and later models, use Oracle Exadata Configuration Assistant (OECA) to determine the net rack weight. In addition to the net rack weight, allow approximately 180 kg (400 lbs) for packaging materials.

For earlier models, use the following table to determine the rack weight:

Type of Rack	Shipping Weight	Net Weight
Oracle Exadata Storage Expansion Rack X5-2 Full Rack	994.7 kg (2193 lbs)	915.8 kg (2019 lbs)
Oracle Exadata Storage Expansion Rack X5-2 Half Rack	640.9 kg (1413 lbs)	591.5 kg (1304 lbs)



Type of Rack	Shipping Weight	Net Weight
Oracle Exadata Storage Expansion Rack X5-2 Quarter Rack	444.5 kg (980 lbs)	411 kg (906.1 lbs)
Oracle Exadata Storage Expansion Rack X4-2 Full Rack	903.1 kg (1991 lbs)	824.2 kg (1817.1 lbs)
Oracle Exadata Storage Expansion Rack X4-2 Half Rack	562.4 kg (1239.9 lbs)	513.0 kg (1131 lbs)
Oracle Exadata Storage Expansion Rack X4-2 Quarter Rack	380.1 kg (838 lbs)	346.5 kg (764 lbs)
Oracle Exadata Storage Expansion Rack X3-2 Full Rack	906.3 kg (1998 lbs)	827.4 kg (1824.1 lbs)
Oracle Exadata Storage Expansion Rack X3-2 Half Rack	565.6 kg (1247 lbs)	516.2 kg (1138 lbs)
Oracle Exadata Storage Expansion Rack X3-2 Quarter Rack	383.3 kg (845 lbs)	349.7 kg (771 lbs)
Oracle Exadata Storage Expansion Rack 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 Rack 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 Rack Quarter Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers	475.3 kg (1047.9 lbs)	396.8 kg (874.8 lbs)

Related Topics

Oracle Exadata Configuration Assistant (OECA) Downloads

1.5 Maintenance Access Requirements

The maintenance area must be large enough for Oracle Exadata Rack, and have the required access space.

The required space to remove the side panels is 675.64 mm (26.6 inches). Side panel access is not required for normal maintenance.

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.

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

Table 1-24 Maintenance Access Requirements for Oracle Exadata Rack (All Models)

Note:

- In raised floor data centers, an adjacent tile at the rear of the rack must be able to be opened to access any cabling going under the floor.
- Oracle Exadata Racks can be placed side-by-side when interconnecting the racks.

1.6 Flooring Requirements

Oracle Exadata Rack may be installed on raised floor or solid floor environments.

The site floor or the raised flooring must be able to support the total weight of Oracle Exadata Rack.

Table 1-25	Floor Load Requirements for Oracle Exadata Rack
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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)

Note:

If you want to route data or power cables through the bottom of the rack, you can cut out a rectangular hole in the floor below the rear portion of the rack. However, avoid creating a hole that impacts the rack casters or leveling feet. For details, see Floor Cutout Dimensions in Oracle Rack Cabinet 1242 User's Guide.

1.7 Electrical Power Requirements

The Oracle Exadata Rack can operate effectively over a wide range of voltages and frequencies. However, each rack 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.

• PDU Power Requirements

Each Oracle Exadata Rack configuration contains two power distribution units (PDUs). Various PDUs are available to cater for different circumstances. Select the correct PDU for your data center and Oracle Exadata Rack configuration.

- Facility Power Requirements To prevent catastrophic failures, design the input power sources to ensure adequate power is provided to the PDUs.
- Circuit Breaker Requirements If computer equipment is subjected to repeated power interruptions and fluctuations, then it is susceptible to a higher rate of component failure.
- Electrical Grounding Guidelines The cabinets for Oracle Exadata Rack are shipped with grounding-type power cords.

1.7.1 PDU Power Requirements

Each Oracle Exadata Rack configuration contains two power distribution units (PDUs). Various PDUs are available to cater for different circumstances. Select the correct PDU for your data center and Oracle Exadata Rack configuration.

The following are the PDUs used in Oracle Exadata:

- Low-Voltage 15 kVA Single Phase PDU for North America, South America, Japan and Taiwan
- Low-Voltage 22 kVA Single Phase PDU for North America, South America, Japan and Taiwan
- Low-Voltage 15 kVA Three Phase PDU for North America, South America, Japan and Taiwan
- Low-Voltage 24 kVA Three Phase PDU for North America, South America, Japan and Taiwan
- High-Voltage 15 kVA Single Phase PDU for Europe, the Middle East and Africa (EMEA), and Asia Pacific (APAC), except for Japan and Taiwan
- High-Voltage 22 kVA Single Phase PDU for Europe, the Middle East and Africa (EMEA), and Asia Pacific (APAC), except for Japan and Taiwan
- High-Voltage 15 kVA Three Phase PDU for Europe, the Middle East and Africa (EMEA), and Asia Pacific (APAC), except for Japan and Taiwan
- High-Voltage 24 kVA Three Phase PDU for Europe, the Middle East and Africa (EMEA), and Asia Pacific (APAC), except for Japan and Taiwan



1.7.1.1 Low-Voltage 15 kVA Single Phase PDU for North America, South America, Japan and Taiwan

Note:

The following specifications are for a single PDU. Every Oracle Exadata Rack configuration contains two PDUs.

Table 1-26Specifications for each Low-Voltage 15 kVA Single Phase PDU for NorthAmerica, South America, Japan and Taiwan

Specification	Value
Number of Inputs	3
Source Voltage	200-240V
Frequency	50/60 Hz
Max Line Current	24A
Phase Current	N/A
Nominal Power Rating	15kVA
Recommended Circuit Breaker	30A
Outlets	42 x C13, 6 x C19
Outlet Groups	6
Max Group Current	20A
Output Voltage	200-240V
Data Center Receptacle	1ph 2W + ground 30A NEMA L6-30

1.7.1.2 Low-Voltage 22 kVA Single Phase PDU for North America, South America, Japan and Taiwan

Note:

The following specifications are for a single PDU. Every Oracle Exadata Rack configuration contains two PDUs.

Table 1-27Specifications for each Low-Voltage 22 kVA Single Phase PDU for NorthAmerica, South America, Japan and Taiwan

Specification	Value
Number of Inputs	3
Source Voltage	200-240V
Frequency	50/60 Hz
Max Line Current	36.8A
Phase Current	N/A
Nominal Power Rating	22kVA
Recommended Circuit Breaker	50A



Specification	Value
Outlets	42 x C13, 6 x C19
Outlet Groups	6
Max Group Current	20A
Output Voltage	200-240V
Data Center Receptacle	1ph 2W + ground 30A NEMA L6-30

Table 1-27(Cont.) Specifications for each Low-Voltage 22 kVA Single Phase PDU forNorth America, South America, Japan and Taiwan

1.7.1.3 Low-Voltage 15 kVA Three Phase PDU for North America, South America, Japan and Taiwan

Note:

The following specifications are for a single PDU. Every Oracle Exadata Rack configuration contains two PDUs.

Table 1-28Specifications for each Low-Voltage 15 kVA Three Phase PDU for NorthAmerica, South America, Japan and Taiwan

Specification	Value
Number of Inputs	1
Source Voltage	200-220V
Frequency	50/60 Hz
Max Line Current	40A
Phase Current	23A
Nominal Power Rating	15kVA
Recommended Circuit Breaker	50A
Outlets	42 x C13, 6 x C19
Outlet Groups	6
Max Group Current	20A
Output Voltage	200-240V
Data Center Receptacle	3ph 3W + ground 60A IEC60309

1.7.1.4 Low-Voltage 24 kVA Three Phase PDU for North America, South America, Japan and Taiwan

Note:

The following specifications are for a single PDU. Every Oracle Exadata Rack configuration contains two PDUs.



Specification	Value
Number of Inputs	2
Source Voltage	200-220V
Frequency	50/60 Hz
Max Line Current	34.6A
Phase Current	20A
Nominal Power Rating	24kVA
Recommended Circuit Breaker	50A
Outlets	42 x C13, 6 x C19
Outlet Groups	6
Max Group Current	20A
Output Voltage	200-240V
Data Center Receptacle	3ph 3W + ground 60A IEC60309

Table 1-29Specifications for each Low-Voltage 24 kVA Three Phase PDU for NorthAmerica, South America, Japan and Taiwan

1.7.1.5 High-Voltage 15 kVA Single Phase PDU for Europe, the Middle East and Africa (EMEA), and Asia Pacific (APAC), except for Japan and Taiwan

Note:

The following specifications are for a single PDU. Every Oracle Exadata Rack configuration contains two PDUs.

Table 1-30Specifications for each High-Voltage 15 kVA Single Phase PDU for Europe,the Middle East and Africa (EMEA), and Asia Pacific (APAC), except for Japan andTaiwan

Specification	Value
Number of Inputs	3 x 25A 1ph
Voltage	220 - 240 VAC
Frequency	50/60 Hz
Current	25A maximum (per input)
Power Rating	15 kVA
Output Current	72A (3 x 24A)
Outlets	42 x C13, 6 x C19
Outlet Groups	6
Group Protection (UL489 1-pole circuit breaker)	20A
Data Center Receptacle	IEC309 32A 3 PIN 250 VAC IP44

Note:

The high-voltage 15 kVA single phase PDU is no longer available. The high-voltage 22kVA single phase PDU is the recommended replacement.

1.7.1.6 High-Voltage 22 kVA Single Phase PDU for Europe, the Middle East and Africa (EMEA), and Asia Pacific (APAC), except for Japan and Taiwan

Note:

The following specifications are for a single PDU. Every Oracle Exadata Rack configuration contains two PDUs.

Table 1-31Specifications for each High-Voltage 22 kVA Single Phase PDUs for Europe,the Middle East and Africa (EMEA), and Asia Pacific (APAC), except for Japan andTaiwan

Specification	Value
Number of Inputs	3
Source Voltage	200-240V
Frequency	50/60 Hz
Max Line Current	32A
Phase Current	N/A
Nominal Power Rating	22kVA
Recommended Circuit Breaker	30A
Outlets	42 x C13, 6 x C19
Outlet Groups	6
Max Group Current	20A
Output Voltage	200-240V
Data Center Receptacle	1ph 2W + ground 32A IEC60309 3P 6H 230V

1.7.1.7 High-Voltage 15 kVA Three Phase PDU for Europe, the Middle East and Africa (EMEA), and Asia Pacific (APAC), except for Japan and Taiwan

Note:

The following specifications are for a single PDU. Every Oracle Exadata Rack configuration contains two PDUs.

Specification	Value
Number of Inputs	1
Source Voltage	220/380 - 240/415VAC 3Ø
Frequency	50/60 Hz
Max Line Current	21A
Phase Current	21A
Nominal Power Rating	15kVA
Recommended Circuit Breaker	25A
Outlets	42 x C13, 6 x C19
Outlet Groups	6
Max Group Current	20A
Output Voltage	220-240V
Data Center Receptacle	3ph 4W + ground 32A IEC60309 5P 6h 400V

Table 1-32Specifications for each High-Voltage 15 kVA Three Phase PDU for Europe,the Middle East and Africa (EMEA), and Asia Pacific (APAC), except for Japan andTaiwan

1.7.1.8 High-Voltage 24 kVA Three Phase PDU for Europe, the Middle East and Africa (EMEA), and Asia Pacific (APAC), except for Japan and Taiwan

Note:

The following specifications are for a single PDU. Every Oracle Exadata Rack configuration contains two PDUs.

Table 1-33Specifications for each High-Voltage 24 kVA Three Phase PDU for Europe,the Middle East and Africa (EMEA), and Asia Pacific (APAC), except for Japan andTaiwan

Specification	Value
Number of Inputs	2
Source Voltage	220/380 - 240/415VAC 3Ø
Frequency	50/60 Hz
Max Line Current	16A
Phase Current	16A
Nominal Power Rating	24kVA
Recommended Circuit Breaker	25A
Outlets	42 x C13, 6 x C19
Outlet Groups	6
Max Group Current	18A
Output Voltage	220-240V
Data Center Receptacle	3ph 4W + ground 32A IEC60309 5P 6h 400V



1.7.2 Facility Power Requirements

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 of America and Canada, ensure that the overall system AC input current load does not exceed 80 percent of the branch circuit AC current rating.

Note:

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.

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.

1.7.3 Circuit Breaker Requirements

If computer equipment is subjected to repeated power interruptions and fluctuations, then it is susceptible to a higher rate of component failure.

You are responsible for supplying the circuit breakers. One circuit breaker is required for each power cord. In addition to circuit breakers, provide a stable power source, such as an uninterruptible power supply (UPS) to reduce the possibility of component failures.

Use dedicated AC breaker panels for all power circuits that supply power to the server. Servers require electrical circuits be grounded to the Earth.

Note:

Electrical work and installations must comply with applicable local, state, or national electrical codes.

1.7.4 Electrical Grounding Guidelines

The cabinets for Oracle Exadata Rack are shipped with grounding-type power cords.

- Always connect the cords to grounded power outlets.
- Check the grounding type, because different grounding methods are used depending on your location.
- 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.



1.8 Temperature and Humidity Requirements

Excessive internal temperatures may result in full or partial shut down of Oracle Exadata.

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.

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

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

Table 1-34 Temperature, Humidity and Altitude Requirements

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.

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.

1.9 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:

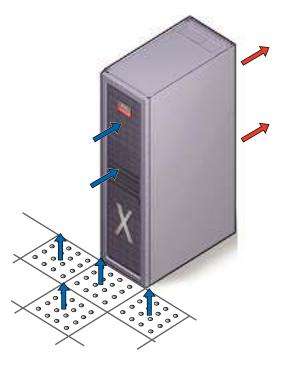
Type of Oracle Exadata Database Machine or Oracle Exadata Storage Expansion Rack	Recommended Number of Floor Tiles
Oracle Exadata full rack systems	4



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

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

Figure 1-1 Typical Data Center Configuration for Perforated Floor Tiles



1.10 Network Connection and IP Address Requirements for Oracle Exadata Rack

This section describes the requirements to connect Oracle Exadata Database Machine or Oracle Exadata Storage Expansion Rack to your existing network infrastructure.

- Network Connection Requirements for Oracle Exadata Rack
- DNS Configuration for Oracle Exadata Rack
- IP Address Requirements for Oracle Exadata Rack
- Secure Fabric Requirements for Oracle Exadata

1.10.1 Network Connection Requirements for Oracle Exadata Rack

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



Network	Connection Requirements	
Administration Network	 Mandatory: 1 uplink for the Management Network Switch. Recommended: 2 uplinks for remote monitoring of the power distribution units (PDUs). Optional: 1 uplink for ILOM on each database server or storage server if using a separate ILOM network. For X2 models only: 1 uplink for the KVM switch. 	
Client Network	 For bonded network configurations: 2 uplinks for each database server. For non-bonded network configurations: 1 uplink for each database server. Note: Non-bonded network configurations are not supported on Oracle Exadata X7 and later systems. 	
Additional Network(s)	 For bonded network configurations: 2 uplinks for each database server and additional network. For non-bonded network configurations: 1 uplink for each database server and additional network. Note: Non-bonded network configurations are not supported on Oracle Exadata X7 and later systems. 	
RDMA Network Fabric (Private Network)	No uplinks are required. The RDMA Network Fabric is completely self-contained within Oracle Exadata.	

The same requirements apply to Oracle Exadata Storage Expansion Rack. However, since Oracle Exadata Storage Expansion Rack contains no database servers, there are no corresponding database server uplink requirements.

Related Topics

Understanding the Network Requirements for Oracle Exadata
 Review the network requirements for Oracle Exadata before installing or configuring the
 hardware.

1.10.2 DNS Configuration for Oracle Exadata Rack

Prior to receiving your Oracle Exadata Rack, you must use Oracle Exadata Deployment Assistant (OEDA) to generate files that drive the configuration of the system. The system configuration files contain network host names and IP addresses for the management network, client network, and additional public networks, which should be registered in Domain Name System (DNS) prior to initial configuration. In particular, 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:

During configuration using OEDA, Grid Naming Service (GNS) is not configured on Oracle Exadata Database Machine.

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

1.10.3 IP Address Requirements for Oracle Exadata Rack

Oracle Exadata Database Machine and Oracle Exadata Storage Expansion Rack require a dedicated allocation of host names and IP addresses. The number of required IP addresses primarily depends on the size of the system and whether it is configured to use virtual machines (VMs).

The detailed network configuration, including host names and IP addresses, is generated from information supplied to Oracle Exadata Deployment Assistant (OEDA).

You should configure the IP addresses in your existing networks after you run OEDA. All IP addresses in the configuration 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 RDMA Network Fabric IP 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 and the internal network.

You can use the information in the following sections to calculate the IP address requirement for Oracle Exadata. However, ensure that you use the configuration information generated in OEDA as your authoritative guide.

Rack-Level IP Address Requirements

The following table outlines the rack-level IP address requirements for Oracle Exadata Database Machine. These addresses are required regardless of the configuration options that are selected for the system. For Oracle Exadata Storage Expansion Rack, no further IP addresses are required beyond these rack-level IP addresses.



Network	IP Address Requirements
Administration Network	 1 IP address for the administration network interface on each database server or storage server.
	 1 IP address for the ILOM network interface on each database server or storage server.
	Note: By default, the database server and storage server ILOM interfaces reside in the administration network. However, starting with Oracle Exadata System Software release 19.1.0, the ILOM interfaces can reside in a separate management network. Either way, the number of required IP addresses remains the same.
	 1 IP address for the management interface on each RDMA Network Fabric switch.
	 1 IP address for the management interface on the Management Network Switch switch.
	 1 IP address for the management interface in each power distribution unit (PDU).
	 For X2 models only: 1 IP address for the KVM switch.
RDMA Network Fabric (Private Network)	2 IP addresses for each database server or storage server.
	Note: Older configurations (typically X3 and prior) may be configured with Linux Ethernet bonding, which uses 1 IP address for each database server or storage server.

Bare-Metal IP Address Requirements

When Oracle Exadata Database Machine is configured without VMs (otherwise known as a bare-metal configuration), one additional set of cluster-level IP addresses is required in addition to the rack-level addresses outlined in the previous table. Use the following table to determine the additional IP addresses required for a bare-metal configuration.

Network	IP Address Requirements
Client Network	 1 IP address for the client network interface on each database server. 1 IP address for the virtual (VIP) network interface on each database server. 3 IP addresses for SCAN network services.
Additional Network(s)	1 IP address for each additional network interface on each database server.

VM Cluster IP Address Requirements

When Oracle Exadata Database Machine is configured with virtual machines (VMs), each VM cluster requires a separate set of IP addresses, which are in addition to the system-level addresses outlined previously. Use the following table to determine the additional IP addresses required for each VM cluster.

Network	IP Address Requirements
Administration Network	1 IP address for the administration network interface on each database server VM.
Client Network	 1 IP address for the client network interface on each database server VM. 1 IP address for the virtual (VIP) network interface on each database server VM. 3 IP addresses for SCAN network services.
Additional Network(s)	1 IP address for each additional network interface on each database server VM.
RDMA Network Fabric (Private Network)	2 IP addresses for each database server VM.

Related Topics

- Single Client Access Name (SCAN)
- Using Oracle Exadata Deployment Assistant

1.10.4 Secure Fabric Requirements for Oracle Exadata

Starting in October 2024, Exadata Secure RDMA Fabric Isolation is recommended by default on all new Oracle Exadata configurations.

Exadata Secure RDMA Fabric Isolation enables strict network isolation for virtual machine (VM) clusters on Oracle Exadata systems that use RDMA over Converged Ethernet (RoCE).

Secure Fabric provides critical infrastructure for secure consolidation of multiple tenants on Oracle Exadata, where each tenant resides in a dedicated VM cluster. Using this feature ensures that:

- Database servers in separate clusters cannot communicate with each other. They are completely isolated from each other on the network.
- Database servers in multiple clusters can share all of the storage server resources. However, even though the different clusters share the same storage network, no crosscluster network traffic is possible.

To use Secure Fabric you must:

1. Configure the RoCE Network Fabric switch hardware to enable Secure Fabric. After you complete the switch configuration, the leaf switch ports become trunk ports, which can carry network traffic with multiple VLAN IDs.

The switch configuration must occur before initial system deployment using OEDA. See Configuring the RoCE Network Fabric Switches to Enable Exadata Secure RDMA Fabric Isolation.

 As part of initial system deployment using OEDA, select the option to enable Secure Fabric and specify VLAN IDs for the cluster and storage network partitions associated with each VM cluster.

In the OEDA Web user interface, the option to enable Secure Fabric is one of the advanced options associated with the **Cluster Networks** page. When the option to enable Secure Fabric is selected, the **Cluster Networks** page automatically displays additional fields to specify the VLAN IDs required to configure Secure Fabric.

Commencing with the October 2024 Oracle Exadata System Software release updates (24.1.5, 23.1.19, and 22.1.28), the option to enable Secure Fabric is selected by default for all new configurations using VM clusters.

See Using the Browser-based Version of Oracle Exadata Deployment Assistant.

Related Topics

Using Exadata Secure RDMA Fabric Isolation



2

Understanding the Network Requirements for Oracle Exadata

Review the network requirements for Oracle Exadata before installing or configuring the hardware.

Note:

For ease of reading, the name "Oracle Exadata Rack" is used when information refers to both Oracle Exadata and Oracle Exadata Storage Expansion Rack.

Overview of Network Requirements

In addition to the database and storage servers, Oracle Exadata includes equipment to connect the system to your network. The network connections allow clients to connect to the database servers and also enables remote system administration.

- Network Channel Bonding Support
- Network Partitioning on Oracle Exadata
- 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).
- Default IP Addresses
 Starting with Oracle Exadata System Software release 12.1.2.1.0, the default
 administration network IP addresses are assigned dynamically by the elastic configuration
 procedure during the first start of the system.
- Default Port Assignments

2.1 Overview of Network Requirements

In addition to the database and storage servers, Oracle Exadata includes equipment to connect the system to your network. The network connections allow clients to connect to the database servers and also enables remote system administration.

Use the information in this section in conjunction with Oracle Exadata Deployment Assistant (OEDA) to configure your Oracle Exadata environment.

To deploy Oracle Exadata ensure that you meet the minimum network requirements. Oracle Exadata requires a minimum of three networks, and there are interfaces available for additional networks. Each network must be on a separate and distinct subnet. The network descriptions are as follows:

• Administration Network: Also known as the management network, this required network connects to your existing management network infrastructure, and is used for administrative work on all components of Oracle Exadata. By default, the administration network connects the database servers, storage servers, server Integrated Lights Out



Manager (ILOM) interfaces, and RDMA Network Fabric switches to the Management Network Switch in the rack. One uplink is required from the Management Network Switch to your management network.

Each database server and storage server has two network interfaces for administration. One interface provides management access to the operating system through a dedicated Ethernet port. The other network interface is dedicated to ILOM. By default, Oracle Exadata is delivered with both interfaces connected to the Management Network Switch. Cabling or configuration changes to these interfaces is not permitted, except that starting with Oracle Exadata System Software release 19.1.0, the ILOM interfaces can be connected to a dedicated ILOM network, which is separate from the administration network. The administration network interfaces on the database servers should not be used for client or application network traffic.

Notes:

- Separate uplinks to your management network are also recommended for remote monitoring of each power distribution unit (PDU). This configuration enables you to easily differentiate between system outages caused by PDU failure as opposed to failure of the Management Network Switch.
- A properly secured configuration requires full isolation of the administration network from all other networks.
- Client 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 databases 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. Non-bonded network configurations are not supported on Oracle Exadata X7 and later systems.
- **Private Network**: Also known as the RDMA Network Fabric, storage network, or interconnect. This network connects the database servers and storage servers. Oracle Database uses this network for Oracle RAC cluster interconnect traffic and for accessing data on the Oracle Exadata Storage Servers. The private network is automatically configured during installation. It is non-routable, fully contained in Oracle Exadata, and does not connect to your existing networks.

Starting with Oracle Exadata X8M, the private network uses RDMA over Converged Ethernet (RoCE).

Previously, the private network was built using InfiniBand technology. RoCE Network Fabric uses different switches and cables from those used by InfiniBand Network Fabric.

 Additional Networks: Database servers can optionally connect to additional networks using the available open ports not used by the administration network and the client network.

By using the OEDA Web user interface, you can create up to two additional networks. In OEDA, the first additional network is known as the **Backup Network**, and the second additional network is known as the **Other Network**. You can create more additional networks by using the OEDA command-line interface (OEDACLI).

Like the client network, the additional networks support channel bonding to maximize bandwidth and availability. Non-bonded network configurations are not supported on Oracle Exadata X7 and later systems.

Additional Network(s) **Client Network** Administration Network 8888 -----**Ethernet Switch** PDU PDU -|| Additional Admin ILOM Admin ILOM Client Network Network (BONDETHn) (BONDETHO) **Exadata Database Server** Exadata Storage Server **RDMA Network** Fabric Switch RDMA Network Fabric Switch

The following diagram displays how the various Oracle Exadata components connect to the different networks.

Related Topics

- Using Oracle Exadata Deployment Assistant
- Hardware Components of Oracle Exadata Database Machine

2.2 Network Channel Bonding Support

A pair of database server network ports can be bonded to provide higher network availability or bandwidth for the client network and additional networks.

Non-bonded network configurations are not supported on Oracle Exadata X7 and later systems.

In a bonded network configuration:

- Use Oracle Exadata Deployment Assistant (OEDA) to specify the physical network interfaces that you want to bond for the client network and the additional networks, if configured. OEDA generates bonded network interfaces that amalgamate two physical network interfaces.
- Manual changes to the OEDA-generated bonding configuration are allowed but are discouraged. Oracle will not support questions or issues associated with non-standard bonding configurations. In any event, bonding configurations having fewer than two networking interfaces are not permitted.
- The bonded client network interface name is bondeth0. The bonded interface name for the first additional network, also known in OEDA as the Backup Network, is bondeth1. The



bonded interface name for the second additional network, also known in OEDA as the Other Network, is bondeth2, and so on.

- The XML configuration file generated by OEDA includes detailed information that maps the bonded network interfaces to the underlying Ethernet ports.
- During the initial configuration using OEDA, the Linux bonding module is configured to use active-backup mode (mode=active-backup) by default. Additional configuration of other bonding parameters is allowed but is outside the scope of installation services and must be performed by customer network engineers. Reconfiguration to enable a different bonding policy is permitted but is discouraged.

For further details, refer to the "Linux Ethernet Bonding Driver HOWTO" at https:// www.kernel.org/doc/Documentation/networking/bonding.txt.

• You must provide network infrastructure (switches) capable of supporting the chosen bonding mode. For example, if Link Aggregation Control Protocol (LACP) is enabled (mode=802.3ad), then you must supply and configure the network switches accordingly.

Requirements for specific bonding policies are documented in the "Linux Ethernet Bonding Driver HOWTO" at https://www.kernel.org/doc/Documentation/networking/bonding.txt

2.3 Network Partitioning on Oracle Exadata

Oracle Exadata supports network partitioning using a variety of mechanisms.

- VLAN Support on Customer-Facing Networks
 Oracle Exadata can use VLANs to implement network partitioning in conjunction with the client, backup, administration, and ILOM networks.
- Access VLAN Support with RoCE Network Fabric Oracle Exadata can use Access VLAN settings to implement server-level isolation across the RoCE Network Fabric.
- Using Exadata Secure RDMA Fabric Isolation
- Using InfiniBand Partitioning for Network Isolation with InfiniBand Network Fabric An InfiniBand partition defines a group of InfiniBand nodes or members that are allowed to communicate with one another.

2.3.1 VLAN Support on Customer-Facing Networks

Oracle Exadata can use VLANs to implement network partitioning in conjunction with the client, backup, administration, and ILOM networks.

By default, the network switches are minimally configured, without VLAN tagging. If VLAN tagging is to be used, then it can be configured by the customer during the initial deployment. Customers can also configure VLAN tagging after the initial deployment. This applies to both physical and virtual machine (VM) deployments.



Notes:

- Oracle Exadata Deployment Assistant (OEDA) supports VLAN tagging for both physical and VM deployments.
- Network VLAN tagging is supported for Oracle Real Application Clusters (Oracle RAC) on the public network.
- Client and backup VLAN networks must be bonded. The administration network is never bonded.
- 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.
- VLAN tagging on the client and backup networks is supported with IPv4 and IPv6 on all hardware models. For IPv6 support on Oracle Database version 12.1.0.2, and later, patch 22289350 is also required.
- VM deployments do not support IPv6 VLANs.
- VLAN tagging on the administration network is only supported with IPv4 addresses on X3-2 and above for two-socket servers, and X4-8 and above for eight-socket servers.
- If the client network uses VLAN tagging and your system uses more than 10 Oracle Clusterware virtual IP (VIP) addresses, then you must use 3-digit VLAN IDs. Do not use 4-digit VLAN IDs because the VLAN name can exceed the operating system interface name limit, which is the 15 characters.

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)
- Implementing Tagged VLAN Interfaces in KVM based Oracle VM Environments on Exadata (My Oracle Support Doc ID 2710712.1)

2.3.2 Access VLAN Support with RoCE Network Fabric

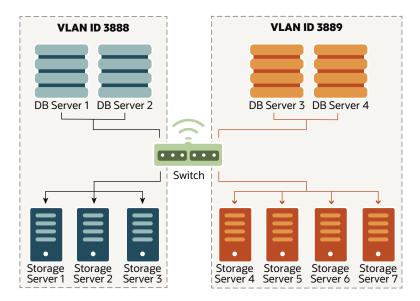
Oracle Exadata can use Access VLAN settings to implement server-level isolation across the RoCE Network Fabric.

By default, Oracle Exadata uses Access VLAN ID 3888 for all RoCE Network Fabric private network traffic, on the server re0 and re1 interfaces. This setting enables all database servers and storage servers to communicate freely with each other, and is suitable for many system configurations. However, you can change the Access VLAN ID to a non-default value to implement server-level isolation.

You can use this capability to create isolated groups of servers in an Oracle Exadata X8M system. For example, in a Half Rack X8M-2 system you might want to create two isolated server groups:



- Database servers 1 and 2, and storage servers 1, 2, and 3 using VLAN ID 3888
- Database servers 3 and 4, and storage servers 4, 5, 6, and 7 using VLAN ID 3889



With this configuration:

- Database servers 1 and 2 can only access storage servers 1, 2, and 3. But, they cannot access storage servers 4, 5, 6 or 7.
- Database servers 3 and 4 can only access storage servers 4, 5, 6 and 7. But, they cannot access storage servers 1, 2, and 3.
- Oracle Linux KVM guests on database servers 1 and 2 can communicate with each other, but cannot communicate with guests on database servers 3 and 4.
- Oracle Linux KVM guests on database servers 3 and 4 can communicate with each other, but cannot communicate with guests on database servers 1 and 2.

Related Topics

Using Access VLANs with RoCE Network Fabric

2.3.3 Using Exadata Secure RDMA Fabric Isolation

Starting with Oracle Exadata System Software release 20.1.0, you can configure the RoCE Network Fabric to enable Exadata Secure RDMA Fabric Isolation. Furthermore, from October 2024, Secure Fabric is recommended by default on all new configurations.

Exadata Secure RDMA Fabric Isolation enables strict network isolation for virtual machine (VM) clusters on Oracle Exadata systems that use RDMA over Converged Ethernet (RoCE).

Secure Fabric provides critical infrastructure for secure consolidation of multiple tenants on Oracle Exadata, where each tenant resides in a dedicated VM cluster. Using this feature ensures that:

- Database servers in separate clusters cannot communicate with each other. They are completely isolated from each other on the network.
- Database servers in multiple clusters can share all of the storage server resources. However, even though the different clusters share the same storage network, no crosscluster network traffic is possible.



Exadata Secure RDMA Fabric Isolation uses RoCE VLANs to ensure that a VM cluster cannot see network packets from another VM cluster. Secure Fabric uses a double VLAN tagging system, where one tag identifies the network partition and the other tag specifies the membership level of the server in the partition. Within each network partition, a partition member with full membership can communicate with all other partition members, including other full and limited members. Partition members with limited membership cannot communicate with other limited membership partition members. However, a partition member with limited membership can communicate with other full membership partition members.

With Secure Fabric, each database cluster uses a dedicated network partition and VLAN ID for cluster networking between the database servers, which supports Oracle Real Application Clusters (Oracle RAC) inter-node messaging. In this partition, all of the database servers are full members. They can communicate freely within the partition but cannot communicate with database servers in other partitions.

Another partition, with a separate VLAN ID, supports the storage network partition. The storage servers are full members in the storage network partition, and every database server VM is also a limited member. By using the storage network partition:

- Each database server can communicate with all of the storage servers.
- Each storage server can communicate with all of the database servers that they support.
- Storage servers can communicate directly with each other to perform cell-to-cell operations.

The following diagram illustrates the network partitions that support Exadata Secure RDMA Fabric Isolation. In the diagram, the line connecting the Sales VMs illustrates the Sales cluster network. The Sales cluster network is the dedicated network partition that supports cluster communication between the Sales VMs. The line connecting the HR VMs illustrates the HR cluster network. The HR cluster network is another dedicated network partition that supports cluster communication between the HR VMs. The lines connecting the database server VMs (Sales and HR) to the storage servers illustrate the storage network. The storage network is the shared network partition that supports communications between the database server VMs and the storage servers. But, it does not allow communication between the Sales and HR clusters.

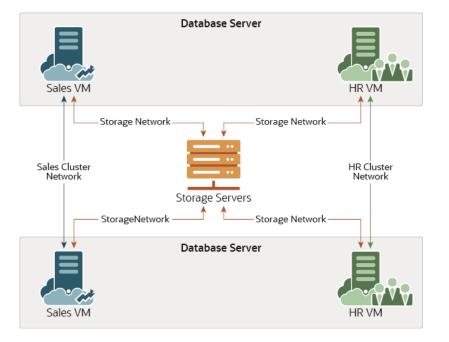


Figure 2-1 Secure Fabric Network Partitions



As illustrated in the diagram, each database server (KVM host) can support multiple VMs in separate database clusters. However, Secure Fabric does not support configurations where one database server contains multiple VMs belonging to the same database cluster. In other words, using the preceding example, one database server cannot support multiple Sales VMs or multiple HR VMs.

To support the cluster network partition and the storage network partition, each database server VM is plumbed with 4 virtual interfaces:

- clre0 and clre1 support the cluster network partition.
- stre0 and stre1 support the storage network partition.

Corresponding stre0 and stre1 interfaces are also plumbed on each storage server.

On each server, the RoCE network interface card acts like a switch on the hypervisor, which performs VLAN tag enforcement. Since this is done at the KVM host level, cluster isolation cannot be bypassed by any software exploits or misconfiguration on the database server VMs.

You can only enable Secure Fabric as part of the initial system deployment using Oracle Exadata Deployment Assistant (OEDA). You cannot enable Secure Fabric on an existing system without wiping the system and re-deploying it using OEDA. When enabled, Secure Fabric applies to all servers and clusters that share the same RoCE Network Fabric.

To use Secure Fabric you must:

1. Configure the RoCE Network Fabric switch hardware to enable Secure Fabric. After you complete the switch configuration, the leaf switch ports become trunk ports, which can carry network traffic with multiple VLAN IDs.

The switch configuration must occur before initial system deployment using OEDA. See Configuring the RoCE Network Fabric Switches to Enable Exadata Secure RDMA Fabric Isolation.

 As part of initial system deployment using OEDA, select the option to enable Secure Fabric and specify VLAN IDs for the cluster and storage network partitions associated with each VM cluster.

In the OEDA Web user interface, the option to enable Secure Fabric is one of the advanced options associated with the **Cluster Networks** page. When the option to enable Secure Fabric is selected, the **Cluster Networks** page automatically displays additional fields to specify the VLAN IDs required to configure Secure Fabric.

Commencing with the October 2024 Oracle Exadata System Software release updates (24.1.5, 23.1.19, and 22.1.28), the option to enable Secure Fabric is selected by default for all new configurations using VM clusters.

See Using the Browser-based Version of Oracle Exadata Deployment Assistant.

2.3.4 Using InfiniBand Partitioning for Network Isolation with InfiniBand Network Fabric

An InfiniBand partition defines a group of InfiniBand nodes or members that are allowed to communicate with one another.

InfiniBand partitioning enables network separation between different clusters on systems with InfiniBand Network Fabric.

InfiniBand partitions are created and managed by the master subnet manager. Each partition is identified by a unique partition key, and partition members use the key for communication within the partition. Members within a partition can only communicate among themselves.



With Oracle Exadata, each database cluster uses a dedicated network partition for cluster networking between the database servers. All of the database servers can communicate freely within the partition, other but cannot communicate with database servers in other partitions. Another partition enables communication between each database cluster and the storage servers. By using this partition, database servers can communicate with all of the storage servers, storage servers can communicate with all of the database servers that they support, and storage servers can communicate directly with each other to perform cell-to-cell operations.

You can use InfiniBand partitioning on physical or virtual machine (VM) deployments.

For details see Configuring InfiniBand Partitioning.

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).

Before Oracle Exadata System Software release 19.1.0, the Exadata servers and ILOM interfaces must have network access to each other for certain features, such as alert notification. Starting with Oracle Exadata System Software release 19.1.0, this network dependency is removed while maintaining all of the previously supported features. Now, you can configure ILOM interfaces on a completely separate network.

- 1. Use the OEDA Web Configurator to configure the settings for your Oracle Exadata Rack.
- On the Rack Networks page, check the box Separate ILOM Network to configure a separate network for ILOM.

	ORACLE' Engineered System Configurator		
Hardware	Default gateway for database servers		
Operating System	Gateway *	Start IP Address *	
Rack Networks	Subnet Mask	Domain Name *	
Users	255.255.255.0 💌		
Clusters	Separate ILOM Network		
Diskgroups	Gateway *	Start IP Address *	
Database Home	Subnet Mask	Domain Name *	
Database	255.255.255.0		
Cluster Networks	Modify Masks		

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.

- 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 Default IP Addresses

Starting with Oracle Exadata System Software release 12.1.2.1.0, the default administration network IP addresses are assigned dynamically by the elastic configuration procedure during the first start of the system.

The default administration network IP addresses are in the 172.16.2.1 to 172.16.7.254 range. In earlier releases, Oracle Exadata had default IP addresses set at the factory, and the range of IP addresses was 192.168.1.1 to 192.168.1.203.

Note:

Prior to connecting Oracle Exadata 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 have been created, but before the Oracle Exadata 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. See Verifying the Network Configuration Prior to Configuring the Rack.

If you run OEDA on a Microsoft Windows system, then the generated script is checkip.bat.

2.6 Default Port Assignments

The following table lists ports used by services on Oracle Exadata. The table shows default port assignments, which may vary from system to system based on implementation-specific customizations. Review the list and open the necessary ports to enable network communication through a firewall.

Source	Target	Protocol	Port	Network	Application
Any	Database servers, Exadata Storage Servers, network switches, and Integrated Lights Out Manager (ILOM) interfaces	SSH over TCP	22	Administration	SSH
Exadata Storage Servers	SMTP e-mail server	SMTP	25	Administration	SMTP (Simple Mail Transfer Protocol)
Database servers	DNS servers	UDP or TCP	53	Client	DNS (Domain Name System)

Table 2-1 Default Port Assignments



Source	Target	Protocol	Port	Network	Application
Database servers, Exadata Storage Servers, network switches, and ILOM interfaces	DNS servers	UDP or TCP	53	Administration	DNS
Any	ILOM interfaces on database servers, Exadata Storage Servers, and ILOM-enabled network switches	HTTP	80	Administration	ILOM Web interface (user configurable, Default: redirection to port 443)
Any	rpcbind	ТСР	111	Administration	rpcbind
Database servers	NTP servers	NTP over UDP	123	Client	Outgoing Network Time Protocol (NTP)
Database servers, Exadata Storage Servers, network switches, and ILOM interfaces	NTP servers	NTP over UDP	123	Administration	Outgoing NTP
Any	ILOM interfaces on database servers, Exadata Storage Servers, and ILOM-enabled network switches	SNMP over UDP	161	Administration	SNMP (Simple Network Management Protocol) (user configurable)
Any	PDU	SNMP over UDP	161	Administration	SNMP (user configurable)
Exadata Storage Servers	SNMP subscriber such as Oracle Enterprise Manager Cloud Control or an SNMP manager	SNMP	162	Administration	SNMP version 1 (SNMPv1) outgoing traps (user- configurable)

Table 2-1 (Cont.) Default Port Assignments

Source	Target	Protocol	Port	Network	Application
Database servers, Exadata Storage Servers, network switches, and ILOM interfaces	ASR Manager	SNMP	162	Administration	Telemetry messages sent to ASR Manager
ILOM interfaces on database servers, Exadata Storage Servers, and ILOM-enabled network switches	Any	IPMI over UDP	162	Administration	Outgoing Intelligent Platform Management Interface (IPMI) Platform Event Trap (PET)
Exadata Storage Server ILOMs	Management Server (MS)	SNMPv3	162	Administration	Exadata Storage Server ILOM SNMP notification rules
PDU	SNMP trap receivers	SNMP over UDP	162	Administration	Outgoing SNMPv2 traps
Any	Management Server (MS) on Exadata Storage Servers	HTTPS	443	Administration	Requests from ExaCLI and/or RESTful API calls
Any	ILOM interfaces on database servers, Exadata Storage Servers, and ILOM-enabled network switches	HTTPS	443	Administration	ILOM Web interface (user configurable)
Any	PDU	HTTPS	443	Administration	PDU Web interface
Exadata Storage Servers	SMTPS client	SMTPS	465	Administration	Simple Mail Transfer Protocol, Secure (if configured)

Table 2-1 (Cont.) Default Port Assignments



Table 2-1	(Cont.) Default Port Assignments	
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Source	Target	Protocol	Port	Network	Application
Database servers, Exadata Storage Servers, network switches, and ILOM interfaces	Syslog server	Syslog over UDP	514	Administration	Outgoing Syslog
PDU	Syslog server	Syslog over UDP	514	Administration	Outgoing Syslog
Any	ILOM interfaces on database servers, Exadata Storage Servers, and ILOM-enabled network switches	IPMI over UDP	623	Administration	IPMI
Any	plathwsvcd	ТСР	723	Administration	plathwsvcd
Any	evnd	ТСР	791	Administration	evnd
Any	partitiond	ТСР	867	Administration	partitiond
Any	Database servers	ТСР	1521	Client	Database listener
Any	tgtd	ТСР	3260	Administration	SCSI target daemon
Any	Database servers	ТСР	3872	Administration	Java EM agent
Any	Exadata Storage Servers	ТСР	5053	Administration	Fast node death detection (FNDD) on RDMA over Converged Ethernet (RoCE) systems
Any	ILOM interfaces on database servers and Exadata Storage Servers	ТСР	5120	Administration	ILOM remote console: CD
Any	ILOM interfaces on database servers and Exadata Storage Servers	ТСР	5121	Administration	ILOM remote console: keyboard and mouse

Source	Target	Protocol	Port	Network	Application
Any	ILOM interfaces on database servers and Exadata Storage Servers	ТСР	5123	Administration	ILOM remote console: diskette
Any	ILOM interfaces on database servers and Exadata Storage Servers	ТСР	5555	Administration	ILOM remote console: encryption
Any	ILOM interfaces on database servers and Exadata Storage Servers	ТСР	5556	Administration	ILOM remote console: authentication
ASR Manager	ILOM interfaces on database servers and Exadata Storage Servers	HTTP	6481	Administration	Service tag listener for asset activation
Any	ILOM interfaces on database servers and Exadata Storage Servers	ТСР	6481	Administration	ILOM remote console: Servicetag daemon
Any	ILOM interfaces on database servers and Exadata Storage Servers	ТСР	7578	Administration	ILOM remote console: video
Any	ILOM interfaces on database servers and Exadata Storage Servers	ТСР	7579	Administration	ILOM remote console: serial
Any	Database servers and Exadata Storage Servers	ТСР	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 2-1 (Cont.) Default Port Assignments



Source	Target	Protocol	Port	Network	Application
Any	Management Server (MS) on database	ТСР	7878 8888	Administration	MS access through Oracle WebLogic
	servers and Exadata Storage Servers				Note: Applies only to Oracle Exadata System Software before release 20.1.0.
Any	Management Server (MS) on database servers	HTTPS	7879	Administration	Requests from ExaCLI and/or RESTful API calls
Database servers and Exadata Storage Servers	ASR Manager	HTTPS	8100 16161	Administration	Diagpack uploads
Database server ILOM interfaces	Management Server (MS)	SNMPv3	8162	Administration	Database Server ILOM SNMP notification rules
Any	rpc.statd	ТСР	21408	Administration	rpc.statd
			40801		
			41460		
			47431		

Table 2-1 (Cont.) Default Port Assignments

See Also:

Managing Oracle Database Port Numbers in Oracle Real Application Clusters Installation Guide for Linux and UNIX.

Using Oracle Exadata Deployment Assistant

This chapter describes how to use the Oracle Exadata Deployment Assistant, which is not only used for Exadata but also Zero Data Loss Recovery Appliance and other Oracle Engineered Systems. The information that you enter in it is used to create the Recovery Appliance configuration files. These files work with installation utility to automate the installation process.

- Overview of Oracle Exadata Deployment Assistant Use Oracle Exadata Deployment Assistant (OEDA) to specify the system configuration details and drive the system configuration processes.
- Getting Started with the OEDA Browser-based User Interface The OEDA application server is available for Linux, OSX and Windows.
- Using the Browser-based Version of Oracle Exadata Deployment Assistant

3.1 Overview of Oracle Exadata Deployment Assistant

Use Oracle Exadata Deployment Assistant (OEDA) to specify the system configuration details and drive the system configuration processes.

OEDA provides a graphical user interface to gather your configuration details and create the Oracle Exadata Rack configuration file. The configuration file drives the automated installation and configuration processes for Oracle Exadata Rack.

Note:

For ease of reading, Oracle Exadata Rack is used when information refers to both Oracle Exadata and Oracle Exadata Storage Expansion Rack.

You can also use the OEDA command-line interface (OEDACLI) to perform Oracle Exadata Rack life-cycle management tasks.

You can download the latest version of OEDA from Exadata Database Machine and Exadata Storage Server Supported Versions (Doc ID 888828.1). OEDA is also available on Oracle Technology Network.

In addition to Oracle Exadata Rack, OEDA is also used for Oracle Zero Data Loss Recovery Appliance and Oracle SuperCluster.

Oracle Exadata System Software release 19.1.0 introduced the Web-based interface for OEDA, which replaces the previous Java-based user interface as the graphical user interface for configuring Oracle Exadata Rack.

The following outlines how OEDA is used during the implementation of Oracle Exadata Rack:

- Before your engineered system arrives, do the following:
 - 1. Work with your network and database administrators to evaluate the current network settings, such as current IP address use and network configuration. OEDA supports IPv6 addresses.



- 2. Define the settings for the rack, such as network configuration and backup method.
- 3. Download the latest version of OEDA from Oracle Technology Network.
- 4. Unzip and run the configuration script on a supported platform, and select the type of system to configure.
- 5. Go through every page in OEDA and supply values for all required fields. You cannot advance to the next page if you do not supply all of the required values. You must provide naming details and DNS, NTP, and networking details.
- 6. At the end of the dialogue with OEDA, configuration files are generated on the client. The files are also listed at the bottom of the InstallationTemplate.html file that is generated by OEDA. Depending on your engineered system and configuration, OEDA generates all or some of the following files:
 - databasemachine.xml
 - CustomerName-rackname.xml
 - CustomerName-rackname-preconf_GUID.csv
 - CustomerName-rackname-InstallationTemplate.html
 - CustomerName-rackname-platinum.csv
 - CustomerName-rackname-checkip.sh
 - CustomerName-rackname.zip
 - pkey_GUID.csv and pkey_racknamehostname_GUID.csv if you enabled InfiniBand partitioning for your virtual environments

The CustomerName-hostname.zip file contains all the generated files.

- 7. Review the InstallationTemplate.html file to check the entire configuration and verify all information was entered correctly.
- Shortly before your engineered system arrives, or is scheduled to be configured, validate the network configuration, as directed by Oracle. See Verifying the Network Configuration Prior to Configuring the Rack.
- After your engineered system arrives, the configuration files are copied to a database server, and the validation and installation is completed. See Configuring Oracle Exadata Database Machine Using OEDA.
- Considerations and Requirement for Using OEDA Review this information before using Oracle Exadata Deployment Assistant (OEDA).

3.1.1 Considerations and Requirement for Using OEDA

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

- Oracle Exadata ships with the Oracle Linux operating system installed on the servers.
- The rack prefix is used to generate host names for all components. For example, if you specify dbm0 for the rack prefix:
 - The database server host names are like dbm0db01
 - The storage server host names are like dbm0cel01
 - The InfiniBand Network Fabric switch names are like dbm0sw-iba1
 - The RoCE Network Fabric switch names are like dbm0sw-roceal



Note:

The rack prefix can contain a maximum of 20 letters and numbers. Spaces and symbols are not permitted; for example, exclamation (!), hyphen (-), and so on.

In you have multiple racks, then, each rack prefix should be a unique value that identifies the rack. Oracle recommends using dbm01 for the first rack, dbm02 for the second, dbm03 for the third, and so on.

- If you configure Oracle Exadata with storage management using Oracle Automatic Storage Management (Oracle ASM), the backup method and redundancy protection levels you use determine how to size the Oracle ASM disk groups that are created during installation.
 - If you configure internal backups, then the database backups are created on disk in the Fast Recovery Area in the RECO disk group for the database. The Fast Recovery Area also contains Archived Redo Logs and Flashback Log Files. The division of disk space between the DATA disk group and the RECO disk group is 40% and 60%, respectively.
 - If you configure external backups, then database backups are created on disk or tape media that is external to currently deployed Oracle Exadata. The Fast Recovery Area contains only objects such as Archived Redo Logs and Flashback Log Files.

Because you do not need to reserve additional space in the RECO disk group for backups, the division of disk space between the DATA disk group and the RECO disk group is now 80% and 20%, respectively.

• If you configure Oracle Exadata with storage management using Oracle Automatic Storage Management (Oracle ASM), Oracle recommends the use of high redundancy disk groups for mission critical applications. Use the following guidelines to assist in sizing the disk groups based on the redundancy levels for the disk groups:

Oracle ASM Redundancy Level for DATA Disk Group	Oracle ASM Redundancy Level for RECO Disk Group	DATA Group Contents	RECO Group Contents
High	High	Data files	Archive logs
		Temporary files	Flashback log files
		Online redo logs	
		Control file	
High	Normal	Data files	Archive logs
		Online redo logs	Temporary files
		Control file.	Flashback log files
Normal	High	Data files	Online redo logs
		Temporary files	Control file
			Archive logs
			Flashback log files
Normal	Normal	Data files	Archive logs
		Temporary files	Flashback log files
		Online redo logs	
		Control file	

Table 3-1 Protection Levels and Disk Group Contents



- A valid time zone name is required when installing Oracle Exadata. Time zone values provided for Oracle Exadata and Oracle Linux comes from the Time Zone Database. You must specify a valid time zone name for each server using the TZ environment variable. The variable value is of the form *Area/Location*. For example, America/New_York is a valid TZ value; EST, EDT, and UTC-4 are invalid values.
- OEDA configures all Exadata components, including the database servers (with or without virtualization), storage servers, and the RDMA Network Fabric. For successful configuration, OEDA requires access to:
 - The client and administration network interfaces on the database servers, including the VM server host and the VM guests where applicable.
 - The administration network interfaces on the storage servers.
 - The administration network interfaces on the RDMA Network Fabric switches.

Ensure that you run the OEDA deployment phase on a host with access to all of the required network interfaces.

Related Topics

- iana Time Zone Database
- Maximum Availability with Oracle ASM

3.2 Getting Started with the OEDA Browser-based User Interface

The OEDA application server is available for Linux, OSX and Windows.

The Oracle Exadata Deployment Assistant (OEDA) Web-based user interface is available starting with the October 2018 OEDA release. The OEDA Web-based interface can import previous OEDA XML configuration files created with the Java-based version of OEDA.

Note:

The OEDA Web-based interface is supported only on Chrome and Firefox browsers.

To set up the OEDA application server and start the Web-based user interface, perform the following steps.

- 1. Download the latest OEDA release from My Oracle Support note 888828.1 and copy the archive to the system where you want to run the OEDA application server.
- On the system where you want to run the OEDA application server, extract the contents of the downloaded compressed file. The extracted contents is written to a directory based on the operating system, such as linux-x64, macosx-x64, or windows-i586. This is referred to as the OEDA_HOME directory.
- 3. Launch the OEDA application server (located in the OEDA_HOME directory).
 - On Linux, OSX, and UNIX run:

installOedaServer.sh [-p port-number] [-g]

On Microsoft Windows run:

```
installOedaServer.cmd [-p port-number] [-g]
```



In the command:

 -p port-number — optionally specifies the port number for the OEDA application server.

If not specified, the default port number is 7072. However, you can specify any unused port number. It is not recommended to use port numbers less than 1024.

 -g — optionally specifies that the OEDA application server accepts connections on all available network interfaces.

If not specified, the OEDA application server only listens on the localhost interface (127.0.0.1).

You can run the installOedaServer program using a non-privileged OS user account. You do not need to be logged in as an OS administrator.

When you run the installOedaServer program, previous OEDA application server instances are stopped and removed before starting the latest OEDA application server version.

4. Access the OEDA Web-based user interface.

After you start the OEDA application server, you can access the Web-based interface by opening a browser and entering the following URL:

http://host-name:port-number/oeda

In the URL:

- *host-name* is the application server host name.
- *port-number* is the network port number that you specified when starting the installOedaServer program. For example, 7072.

If you did not specify the -g option when starting the OEDA application server, then you must run the browser on the same host as the OEDA application server and specify localhost as the application server host name.

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

Use the Oracle Exadata Deployment Assistant (OEDA) for initial configuration, and when modifying or adding to an existing deployment. You can import an existing configuration when adding new components or modifying an existing deployment.

Have the following available before running OEDA:

- IP addresses
- Machine names
- DNS and NTP information

The following options are available in the **Options** drop-down menu:

- About: View version information for OEDA.
- 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 diagnose issues with the OEDA Web interface.
- Preferences: Specify your preferences for how the Web interface behaves.
- Validate (OEDA Step 1): Check the current configuration for completeness and correctness.
- Checklp: Checks the IP addresses.
- Installation Template: Generates the Installation Template report, which summarizes the current configuration.
- OEDA Keyboard Shortcut Keys: Describes keyboard shortcuts for navigating the OEDA Web interface.

The following list describes the configuration flow in the OEDA Web interface.

- 1. Specify the hardware for the deployment on the **Select Hardware** page. This page also captures customer information and various rack-level configuration options.
- Use the Choose Operating System page to choose whether to configure virtualization on the database servers.

Note:

In a virtualized configuration, each Exadata database server may only contain a limited number of VMs up to the supported maximum.

For Exadata X8M-2 and later systems, see Oracle Linux KVM Deployment Specifications and Limits. Otherwise, see Oracle VM Deployment Specifications and Limits.

- Enter the administration network and private network information on the Rack Networks page.
- 4. Specify the configuration of database server operating system users and groups on the **Users** page.

You can choose between a Default, Role Separated, or Custom configuration.

- 5. Configure the Exascale cluster and storage pool on the Exascale page.
- 6. Define the Oracle Grid Infrastructure (GI) clusters on the **Clusters** page.

Each cluster definition specifies the database and storage servers that are associated with the cluster.

In a virtualized configuration, each cluster definition also specifies the CPU and memory resources allocated to each VM. You can also customize the configuration of the guest user filesystem (/u01) and optionally add others (/u02, and so on).

- 7. Define the Oracle ASM disk group layout on the **Diskgroups** page.
- 8. Specify the Oracle Database home information for each Oracle home on the **Database Home** page.
- 9. Specify databases and their attributes on the **Database** page.



Note:

To create databases on Exadata, Oracle recommends using Oracle Exadata Deployment Assistant (OEDA) or the OEDA Command Line Utility (OEDACLI), as both utilities implement the latest Exadata best-practice configuration settings for your Exadata system configuration. The Oracle Database Configuration Assistant (DBCA) is also available in the Oracle Database software bundle. However, DBCA is not recommended for new database creation on Exadata because it does not integrate with the OEDA XML configuration file and may not implement the recommended Exadata-specific configuration settings.

10. Enter the network information on the **Cluster Networks** page.

Note:

Commencing with the October 2024 Oracle Exadata System Software release updates (24.1.5, 23.1.19, and 22.1.28), the option to enable Secure Fabric is selected by default for all new configurations using VM clusters. To configure Secure Fabric, you must also specify VLAN IDs for the private network partitions on the **Cluster Networks** page.

- **11.** Configure the email alerts, SNMP alerts, Auto Service Request, Oracle Config Manager, and Enterprise Manager alerting on the **Alerting** page.
- 12. 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.
- **13.** 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.
- 14. 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.



4 OEDA Command Line Interface

When you run the oedacli program, it starts the OEDA command line interface.

- About the OEDA Command Line Interface You can use the OEDA command-line interface (OEDACLI) to perform Exadata life cycle management tasks.
- Starting the OEDACLI Utility
- OEDACLI Command Reference These OEDACLI commands are arranged by the object they act upon.

4.1 About the OEDA Command Line Interface

You can use the OEDA command-line interface (OEDACLI) to perform Exadata life cycle management tasks.

Supported tasks include:

- Add nodes to and remove nodes from a VM cluster
- Add or remove Oracle Database home directories
- Add or remove storage cells
- Resize Oracle ASM disk groups
- Add or remove additional databases

Note:

To create databases on Exadata, Oracle recommends using Oracle Exadata Deployment Assistant (OEDA) or the OEDA Command Line Utility (OEDACLI), as both utilities implement the latest Exadata best-practice configuration settings for your Exadata system configuration. The Oracle Database Configuration Assistant (DBCA) is also available in the Oracle Database software bundle. However, DBCA is not recommended for new database creation on Exadata because it does not integrate with the OEDA XML configuration file (es.xml) and may not implement the recommended Exadata-specific configuration settings.

See ADD DATABASE.

OEDACLI supports life cycle management tasks for Oracle Exadata systems only. OEDACLI does not support life cycle management operations on Oracle SuperCluster and Oracle Zero Data Loss Recovery Appliance (ZDLRA).

OEDACLI allows you to update an existing Exadata configuration file (es.xml). The updates are called Actions. An **Action** is a single atomic task.

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]

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
- Displaying Help Output for OEDACLI You can display syntax help for the OEDACLI utility using the HELP command.
- Displaying Help Output for an OEDACLI Command This example shows the help output listing the OEDACLI ALTER DATABASE command.

Related Topics

 OEDA Deployment - Generating new or non-default hash password for root and non-root users (My Oracle Support Doc ID 2163751.1)

4.2.1 Displaying Help Output for OEDACLI

You can display syntax help for the OEDACLI utility using the HELP command.

Example 4-1 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 DOMOS
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
```

4.2.2 Displaying Help Output for an OEDACLI Command

This example shows the help output listing the OEDACLI ALTER DATABASE command.

Example 4-2 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:
               : Default: 8192, not required for PDB
  <blocksize>
  <characterset> : Default: AL32UTF8, not required for PDB
                : *The DATA diskgroup, not required for PDB
   <datadg>
   <dblang>
                 : Default: all langs, not required for PDB
```



<dbname></dbname>	: *Database name
<dbtemplate></dbtemplate>	: Default: ADMIN, otherwise ADMIN or DW, not required for
PDB	
<dbtype></dbtype>	: Default: normal DB, otherwise CDB or PDB
<hostnames></hostnames>	: Default: list of nodes from db home
<recodg></recodg>	: *The RECO diskgroup, not required for PDB
Where:	
<databaseid></databaseid>	: The es xml id of the database
<clusternumber></clusternumber>	\cdot : The cluster number in the es xml, starting at 1
<clustername></clustername>	: The name of the cluster
<clusterid></clusterid>	: The es xml id of the cluster
<databasename></databasename>	: The name of the database in the cluster

4.3 OEDACLI Command Reference

These OEDACLI commands are arranged by the object they act upon.

- ACFSVOLUME You can add, alter, delete, or list Oracle ACFS volumes.
- ACTION You can save, merge, and deploy OEDACLI actions.
- ALERT You can create, alter, delete, or list Oracle alerts.
- CELL You can clone, delete, or list Oracle Exadata storage cells.
- CLUSTER You can alter or list the Oracle RAC Clusters on the Oracle Exadata Database Machine.
- COMPUTE
 Use these commands to add or delete a physical compute node as a cluster member.
- CURRENTACTION
 You can clear or list the current action in OEDACLI.
- DATABASE You can add, alter, delete, or list the Oracle databases.
- DATABASEHOME You can add, alter, delete, or list the Oracle Database homes.
- DISKGROUP You can add, alter, delete, or list the Oracle ASM disk groups.
- DOM0

You can list Oracle VM management domains (dom0s).

- DOMAIN
 You can get live information from a domain.
- ES

You can discover an engineered system or alter a limited number of attributes of an engineered system.

- EXASCALE
- EXASCALECLUSTER
- EXITONERROR You can set the exit status for OEDACLI.



- FILE You can manage the Engineered System XML file (es.xml).
- GUEST You can clone or delete an Oracle VM guest.
- ILOM You can alter or list the ILOMS in the loaded es.xml file.
- LOGIN
 You can check remote login to a machine or cluster.
- MACHINE You can alter or list the machines in the es.xml file.
- NETWORK You can add, alter, delete, or list the networks defined in the XML configuration file.
- PASSWORD You can specify the default passwords.
- PROPERTY You can set OEDA properties.
- RACK
 You can manage an Engineered System rack.
- REQUIREDFILES
 You can display information about required files.
- **REMOTE** You can run a command on a remote host.
- SCAN You can add, alter, delete, or list the SCANs for a cluster.
- SECURITY You can manage security settings.
- SOFTWAREVERSIONS You can check supported software versions.

SSHKEYS

You can generate and deploy SSH keys for ${\tt root}$ user authentication on Oracle Exadata Rack.

• STEPS

You can display the steps for a virtual CREATE CLUSTER deployment.

- STORAGEPOOL
- STORAGETEMPLATES
- SWITCH You can display and manage the switches.
- SU Controls use of the su command.
- ULOC You can display the location of rack items.
- VAULT
- VIP

You can add, alter, delete, or list the Oracle Clusterware VIPs.



VOLUME

You can display and manage storage volumes.

XMLACTION

You can manage actions relating to the Engineered System XML file.

4.3.1 ACFSVOLUME

You can add, alter, delete, or list Oracle ACFS volumes.

- ADD ACFSVOLUME
- ALTER ACFSVOLUME
- DELETE ACFSVOLUME
- LIST ACFSVOLUMES

4.3.1.1 ADD ACFSVOLUME

This command adds Oracle Advanced Cluster File System (Oracle ACFS) volumes.

Syntax

```
ADD ACFSVOLUME

VOLUMENAME=volume_name

VOLUMESIZE=volume_size

MOUNTPATH=mount_path

WHERE

{ DISKGROUPID=diskgroup_id |

CLUSTERNUMBER=cluster_number DISKGROUPNAME=diskgroup_name |

CLUSTERNAME=cluster_name DISKGROUPNAME=diskgroup_name |

CLUSTERID=cluster_id DISKGROUPNAME=diskgroup_name }
```

Arguments

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

4.3.1.2 ALTER ACFSVOLUME

This command alters an existing Oracle Advanced 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

4.3.1.3 DELETE ACFSVOLUME

This command deletes an existing Oracle Advanced 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

4.3.1.4 LIST ACFSVOLUMES

This command lists the Oracle Advanced Cluster File System (Oracle ACFS) volumes.

Syntax

```
LIST ACFSVOLUMES
[ WHERE
{ ID=acfs_volume_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

4.3.2 ACTION

You can save, merge, and deploy OEDACLI actions.

- SAVE ACTION
- MERGE ACTIONS
- DEPLOY ACTIONS



4.3.2.1 SAVE ACTION

Use this command to save the current action to in-memory copy of the Engineered System XML configuration.

Syntax

SAVE ACTION [FORCE]

Arguments

Specify FORCE to auto-merged the action into the Engineered System model.

Note:

The Engineered System configuration should be saved as a file using a subsequent $\ensuremath{\mathsf{SAVE}}$ FILE command.

4.3.2.2 MERGE ACTIONS

Use this command to merge the current actions into 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.

Note:

The Engineered System configuration should be saved as a file using a subsequent SAVE FILE command.

4.3.2.3 DEPLOY ACTIONS

Use this command to run all actions from the Engineered System XML file.

Syntax

DEPLOY ACTIONS

Example 4-3 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
```

4.3.3 ALERT

You can create, alter, delete, or list Oracle alerts.

- ALTER ALERT
- DELETE ALERT
- LIST ALERTS

4.3.3.1 ALTER ALERT

This command creates or alters an Oracle alert.

Syntax

```
ALTER ALERT
   { RECIPIENTS='recipients'
     FROMNAME='from name'
     FROMEMAIL=from email
     SMTPHOST=smtp host
     [ SSL=uses_ssl ]
     [ PORT=smtp port ]
   | SNMPHOST=snmp host
     [ PORT=snmp port ]
     [ COMMUNITY=snmp community ]
   | ASRHOST=asr host
     CONTACT=asr_contact
     EMAIL=asr email
     MOSACCOUNT=asr mos account
     [ PROXYHOST=asr_proxy_host ]
     [ PROXYPORT=asr proxy port ]
     [ PROXYUSER=asr_proxy_user ]
   | [ EMAIL=ocm email ]
     [ HUBHOST=ocm hub host ]
     [ HUBUSER=ocm hub user ]
     [ PROXYHOST=ocm_proxy_host ]
     [ PROXYPORT=ocm_proxy_port ]
     [ PROXYUSER=ocm_proxy_user ]
   | EMBASE=em base
     [ OMSHOST=oms host ]
     PORT=oms port }
WHERE
   { ID=alert_id |
     TYPE=alert_type |
     HOSTNAME=host name TYPE=alert type |
     CLUSTERNUMBER=cluster number TYPE=alert type |
     CLUSTERNAME=cluster_name TYPE=alert_type |
     CLUSTERID=cluster_id TYPE=alert_type }
```



Arguments

You can specify various attributes according to the alert type.

- For SMTP alerts:
 - RECIPIENTS : Specifies a list of email addresses. The list entries are separated by a space or a comma and the list is surrounded by single quotation marks
 - FROMNAME : Specifies the name of the email sending user, surrounded by single quotation marks
 - FROMEMAIL : Specifies the email address of the email sending user
 - SMTPHOST : Specifies the hostname of the SMTP email server
 - SSL: Optionally, set to true to use SSL. Default value is false.
 - PORT : Optionally, specifies the SMTP email server port. Default value is 25.
- For SNMP alerts:
 - SNMPHOST : Specifies the hostname of the SNMP server
 - PORT : Optionally, specifies the SNMP server port. Default value is 162.
 - COMMUNITY : Optionally, specifies the SNMP community value. Default value is public.
- For Oracle Auto Service Request (ASR) alerts:
 - ASRHOST : Specifies the hostname of the ASR server
 - CONTACT : Specifies the ASR contact name
 - EMAIL : Specifies the ASR email address
 - MOSACCOUNT : Specifies the ASR My Oracle Support (MOS) email address
 - PROXYHOST : Optionally, specifies the proxy hostname for connectivity to the ASR server
 - PROXYPORT : Optionally, specifies the proxy port for connectivity to the ASR server
 - PROXYUSER : Optionally, specifies the proxy username for connectivity to the ASR server
- For Oracle Configuration Manager (OCM) alerts:
 - EMAIL : Specifies the OCM email address
 - HUBHOST : Specifies the hostname of the OCM hub
 - HUBUSER : Specifies the OCM hub user name
 - PROXYHOST : Optionally, specifies the proxy hostname for connectivity to the OCM hub
 - PROXYPORT : Optionally, specifies the proxy port for connectivity to the OCM hub
 - PROXYUSER : Optionally, specifies the proxy username for connectivity to the OCM hub
- For Oracle Enterprise Manager (EM) alerts:
 - EMBASE : Optionally, specifies the EM base directory. Default value is /u01/app/ oracle/product/EMbase.
 - OMSHOST : Specifies the hostname of the Oracle Management Server (OMS)
 - PORT : Optionally, specifies the OMS server port. Default value is 4900.



The following arguments are available in the WHERE clause:

- ID: Specifies the es.xml ID for an existing alert
- TYPE : Specifies the alert type: SNMP, SMTP, ASR, OCM, or EM
- HOSTNAME : Specifies the target server hostname
- 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

4.3.3.2 DELETE ALERT

This command deletes a specific alert.

Syntax

```
DELETE ALERT
WHERE
{ ID=alert_id |
HOSTNAME=host_name [ TYPE=alert_type ] |
CLUSTERNUMBER=cluster_number [ TYPE=alert_type ] |
CLUSTERNAME=cluster_name [ TYPE=alert_type ] |
CLUSTERID=cluster_id [ TYPE=alert_type ] }
```

Arguments

The following arguments are available in the WHERE clause:

- ID : Specifies the es.xml ID for an existing alert
- HOSTNAME : Specifies the target server hostname
- TYPE : Specifies the alert type: SNMP, SMTP, ASR, OCM, or EM
- 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

4.3.3.3 LIST ALERTS

This command lists alerts.

Syntax

```
LIST ALERTS
[ WHERE
{ ID=alert_id |
TYPE=alert_type |
HOSTNAME=host name [ TYPE=alert type ] } ]
```

Arguments

The following arguments are available in the WHERE clause:



- ID : Specifies the es.xml ID for an existing alert
- TYPE : Specifies the alert type: SNMP, SMTP, ASR, OCM, or EM
- HOSTNAME : Specifies the target server hostname

4.3.4 CELL

You can clone, delete, or list Oracle Exadata storage cells.

- CLONE CELL
- CLONE NEWCELL
- DELETE CELL
- DELETE NEWCELL
- LIST CELLS

4.3.4.1 CLONE CELL

This command clones an existing storage cell.

Note:

This command is deprecated and replaced by CLONE NEWCELL.

Syntax

```
CLONE CELL

SRCNAME=source_cell

[ TGTNAME=new_cell_name ]

[ WAIT=wait ]

[ POWER=power ]

[ WHERE STEPNAME=step ]

SET ADMINNET NAME=admin_name IP=admin_ip [ NETMASK=netmask ]

[ GATEWAY=gatewayip ]

SET PRIVNET NAME1=priv_name_1 IP1=priv_ip1 NAME2=priv_name_2 IP2=priv_ip2

SET ILOMNET NAME=ilom_name IP=ilom_ip [ NETMASK=netmask ]

[ GATEWAY=gatewayip ]

SET RACK NUM=rack_number ULOC=ulocation
```

Arguments

- SRCNAME: Specifies the name of an existing cell from which the new cell is derived.
- TGTNAME: Specifies the name of the new cell being added.
- WAIT: Default is true, in which case the command waits for completion of the ASM rebalance operation prior to completion. Optionally, set to false to return control without waiting for the ASM rebalance operation.
- POWER : Optionally, specifies the ASM rebalance power limit. The range of valid values is 1 1024.



- STEPNAME: Specifies the deployment step to perform, which is one of the following:
 - CONFIG_CELL
 - CREATE_GRIDDISKS
 - ADD_DISKS_TO_ASM
 - REBALANCE

You can set the following options for a cloned cell:

- ADMINNET : Specifies the DNS name and IP address to use for the administration network. The DNS name may optionally include the domain name. You can also optionally specify the netmask and gateway for the administration network.
- PRIVNET : Specifies the names and IP addresses to use for the first and second private networks. The names may optionally include the domain name.
- ILOMNET : Specifies the DNS name and IP address to use for the ILOM network. The DNS
 name may optionally include the domain name. You can also optionally specify the
 netmask and gateway for the ILOM network.
- RACK : Specifies the rack number in a multi-rack configuration, where 1 is the first rack, and the physical location (slot number) of the cell in the rack.

The following example shows the command sequence for adding cell dbm01celadm14 by cloning dbm01celadm09.

```
# Clone
CLONE CELL SRCNAME=dbm01celadm09 TGTNAME=dbm01celadm14 where
STEPNAME=CONFIG CELL
SET ADMINNET NAME=dbm01celadm14 IP=203.0.161.160
SET PRIVNET NAME1=dbm01celadm14-priv1 IP1=192.168.160.19 NAME2=dbm01celadm14-
priv2 IP2=192.168.160.20
SET ILOMNET NAME=dbm01celadm14-ilom IP=203.0.161.182
SET RACK NUM=1, ULOC=12
SAVE ACTION
MERGE ACTIONS
DEPLOY ACTIONS
# Create Griddisks
CLONE CELL SRCNAME=dbm01celadm09 TGTNAME=dbm01celadm14 where
STEPNAME=CREATE GRIDDISKS
SAVE ACTION
MERGE ACTIONS
DEPLOY ACTIONS
# Add Griddisks to ASM Diskgroups
CLONE CELL SRCNAME=dbm01celadm09 TGTNAME=dbm01celadm14 where
STEPNAME=ADD DISKS TO ASM
SAVE ACTION
MERGE ACTIONS
DEPLOY ACTIONS
# Rebalance ASM Diskgroups
CLONE CELL SRCNAME=dbm01celadm09 TGTNAME=dbm01celadm14 where
```



STEPNAME=REBALANCE

SAVE ACTION MERGE ACTIONS DEPLOY ACTIONS

4.3.4.2 CLONE NEWCELL

This command clones an existing storage cell.

This command replaces the deprecated CLONE CELL command. Instead of using the STEPNAME argument, CLONE NEWCELL works in conjunction with the ALTER CLUSTER ADDCELLS command to add the new storage into an existing cluster.

Syntax

```
CLONE NEWCELL

SRCNAME=source_cell

TGTNAME=new_cell_name

[ TYPE=cell_type ]

SET ADMINNET NAME=admin_name IP=admin_ip [ NETMASK=netmask ]

[ GATEWAY=gatewayip ]

SET PRIVNET NAME1=priv_name_1 IP1=priv_ip1 NAME2=priv_name_2 IP2=priv_ip2

SET ILOMNET NAME=ilom_name IP=ilom_ip [ NETMASK=netmask ]

[ GATEWAY=gatewayip ]

SET RACK NUM=rack_number ULOC=ulocation
```

Arguments

- SRCNAME: Specifies the name of an existing cell from which the new cell is derived.
- TGTNAME: Specifies the name of the new cell being added.
- TYPE: Optionally specifies the cell type. Use this option only for situations where the clone source is a high capacity (HC) storage server, and the target is an extended (XT) storage server. The following values are allowed:
 - X8XT: Specifies that the target is an XT storage server with InfiniBand Network Fabric.
 - X8MXT: Specifies that the target is an XT storage server with RoCE Network Fabric.

You can set the following options for a cloned cell:

- ADMINNET : Specifies the DNS name and IP address to use for the administration network. The DNS name may optionally include the domain name. You can also optionally specify the netmask and gateway for the administration network.
- PRIVNET : Specifies the names and IP addresses to use for the first and second private networks. The names may optionally include the domain name.
- ILOMNET : Specifies the DNS name and IP address to use for the ILOM network. The DNS name may optionally include the domain name. You can also optionally specify the netmask and gateway for the ILOM network.
- RACK : Specifies the rack number in a multi-rack configuration, where 1 is the first rack, and the physical location (slot number) of the cell in the rack.



The following example shows the command sequence for adding cell dbm02celadm06 by cloning dbm02celadm01.

```
# Clone
CLONE NEWCELL SRCNAME=dbm02celadm01 TGTNAME=dbm02celadm06
SET ADMINNET NAME=dbm02celadm06 IP=203.0.96.17
SET PRIVNET NAME1=dbm02cell06vm1str-priv1 IP1=192.168.3.47
NAME2=dbm02cell06vm1str-priv2 IP2=192.168.3.48
SET ILOMNET NAME=dbm02celadm06-ilom IP=203.0.10.103
SET RACK NUM=1 ULOC=12
```

SAVE ACTION

```
# Add Cell to Cluster
ALTER CLUSTER ADDCELLS='dbm02celadm06' POWER=4 WHERE CLUSTERNUMBER=1
```

SAVE ACTION MERGE ACTIONS DEPLOY ACTIONS

4.3.4.3 DELETE CELL

This command deletes a cell from the OEDA XML configuration file (es.xml).

Syntax

```
DELETE CELL
WHERE
SRCNAME=cell hostname
```

Arguments

• SRCNAME : Specifies the hostname of the cell being deleted.

Usage Notes

- The command performs no deployment actions, and no deployed cells are affected.
- Use SAVE ACTION FORCE to save changes to the XML configuration file.
- To remove a deployed cell, use the ALTER CLUSTER command instead of DELETE CELL.

4.3.4.4 DELETE NEWCELL

This command deletes a cell from an OEDA configuration file (es.xml).

Syntax

```
DELETE NEWCELL
WHERE
{ SRCNAME=cell_host_name |
     SRCNAMES=cell host names }
```



Arguments

WHERE clause arguments:

- SRCNAME : Specifies the host name of the cell being deleted from es.xml.
- SRCNAMES : Specifies a comma-separated list of host names for the cells being deleted from es.xml.

Usage Notes

Use SAVE ACTION FORCE to save changes only to es.xml. No deployment actions are performed.

4.3.4.5 LIST CELLS

This command lists the storage cells.

Syntax

LIST CELLS

Usage Notes

This command is deprecated. Instead, use:

LIST MACHINES WHERE TYPE=CELL

4.3.5 CLUSTER

You can alter or list the Oracle RAC Clusters on the Oracle Exadata Database Machine.

- ALTER CLUSTER
- CREATE CLUSTER

Use this command to create virtual guests for a virtual machine (VM) cluster, including the steps to configure and deploy an Oracle RAC database.

- DESTROY CLUSTER This command is used to cleanly remove a running virtual machine (VM) cluster in one operation.
- DOWNGRADE CLUSTER
 Use this command downgrade a previously upgraded cluster.
- LIST CLUSTER
 This command lists a specific Exadata cluster.
- LIST CLUSTERS
 This command lists the existing Exadata clusters.
- UPGRADE CLUSTER Use this command upgrade an Oracle Grid Infrastructure cluster.

4.3.5.1 ALTER CLUSTER

This command alters Oracle Grid Infrastructure (GI) cluster attributes.



Syntax

```
ALTER CLUSTER
   { CLUSTERNAME=cluster_name |
    GIVERSION=grid version |
     GIHOMELOC=grid home location |
     INVLOC=inventory location |
     BASEDIR=oracle base dir |
     PATCHLIST=patch list |
     VCPU=vcpu |
     VMEM=vmem
     ASMSCOPEDSECURITY=asm scoped_security |
     HOMESIZE=home size |
     INSTALLTYPE={ CLONE | ZIP }
   } ...
WHERE
   { CLUSTERNUMBER=cluster number |
     CLUSTERNAME=cluster name |
     ID=cluster id }
ALTER CLUSTER
   { ADDCELLS='add cells' | DROPCELLS='drop cells' }
     [ DISKGROUPS='asm diskgroups' ] [ POWER=power ] [ WAIT={ TRUE |
FALSE }]
WHERE
   { CLUSTERNUMBER=cluster number |
    CLUSTERNAME=cluster name |
     ID=cluster id }
   [ STEPNAME=step name ]
```

Arguments

You can modify the following attributes of the GI cluster:

- CLUSTERNAME: Specifies a new, unique name for the cluster
- GIVERSION: Specifies the clusterware version, including the release update (RU). For example: 12.1.0.2.170418
- GIHOMELOC: Specifies a new path for the Grid home location
- INVLOC: Specifies a new path for the software inventory
- BASEDIR: Specifies a new path for the Oracle base directory
- PATCHLIST: Specifies a comma-separated list of patches. The list must be enclosed in single quotes. By default, the patch list is derived from the RU included in the GIVERSION.
- VCPU: Specifies the number of virtual CPUs for each virtual machine (VM) in a VM cluster. This option only applies to a cluster in a VM deployment.
- VMEM: Specifies the amount of memory (in GB) for each virtual machine (VM) in a VM cluster. This option only applies to a cluster in a VM deployment.
- ASMSCOPEDSECURITY: Specify true to enable ASM scoped security. The default value is false.
- HOMESIZE: Specifies the cluster home size (in GB).



- INSTALLTYPE: Specifies the software installation method to use. The options are:
 - CLONE: Uses image files to clone a software installation. The image files include the base software release, and may also include additional patches and updates. By including updates in the image files, this method reduces deployment time and improves deployment consistency.

The CLONE software installation method is the only supported method for a cluster in a virtual machine (VM) deployment. This option is also available for clusters in a physical (bare metal) deployment.

 ZIP: Performs a fresh software installation by using compressed (zip) files that contain the software release. This method does not include additional patches or updates.

The ZIP software installation method is the default method for clusters in a physical (bare metal) deployment. This option is not available for clusters in a virtual machine (VM) deployment.

- ADDCELLS: Specifies a comma-separated list of cells to add to the disk groups. The list must be enclosed in single quotes. If multiple cells are specified, they are all added in one operation, and the data is rebalanced once at the end of the process.
- DROPCELLS: Specifies a comma-separated list of cells to drop from the disk groups. The list must be enclosed in single quotes. If multiple cells are specified, they are all dropped in one operation, and the data is rebalanced once at the end of the process.
- DISKGROUPS: Specifies a comma-separated list of disk groups from which you want to add or remove cells specified in ADDCELLS or DROPCELLS. The list must be enclosed in single quotes. If not specified, then the specified cells are added to or removed from all of the disk groups.
- POWER: Specifies the ASM rebalance power limit. The range of valid values is 1 1024.
- WAIT: Specifies whether or not to wait for the completion of the ASM rebalance operation that occurs during the ADD_DISKS_TO_ASM step of an ADDCELLS or DROPCELLS operation. This option is only applicable when the WHERE clause contains STEPNAME=ADD DISKS_TO_ASM.

Specify false to proceed without waiting for the ASM rebalance operation to complete. Specify true to wait for the ASM rebalance operation to complete. The default value is true.

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
- ID: Specifies the es.xml ID of the cluster
- STEPNAME: Specifies one of the following steps for an ADDCELLS or DROPCELLS operation:
 - CONFIG CELL
 - CREATE_GRIDDISKS
 - ADD DISKS TO ASM

For an ADDCELLS operation, the steps are performed in the following order:

- CONFIG_CELL: Configures the storage server, including cell connectivity and cell disk creation.
- 2. CREATE GRIDDISKS: Creates grid disks for use by the specified cluster.



3. ADD_DISKS_TO_ASM: Adds the newly created grid disks to the ASM disk groups associated with the specified cluster.

For a DROPCELLS operation, the steps are performed in reverse order:

- 1. ADD_DISKS_TO_ASM: Removes the grid disks from the ASM disk groups associated with the specified cluster.
- 2. CREATE GRIDDISKS: Deletes grid disks associated with the specified cluster.
- 3. CONFIG CELL: Deletes the cell configuration on the storage server.

Example 4-4 Deploying a Cluster Change

The following example shows an OEDACLI session that uses the ALTER CLUSTER command along with typical output at each step.

```
oedacli> alter cluster clustername=cluster-c1 where id=Cluster-c6e838fe4-e317-
ee1a-dd89-53f0b49a689b id
oedacli> save action
oedacli> merge actions
processMerge
processMergeActions
Merging Action : alter cluster clustername=cluster-c1 where id=Cluster-
c6e838fe4-e317-ee1a-dd89-53f0b49a689b id
Merging ALTER CLUSTER
Action Validated and Merged OK
oedacli> deploy actions
Deploying Action ID : 1 alter cluster clustername=cluster-c1 where
id=Cluster-c6e838fe4-e317-ee1a-dd89-53f0b49a689b id
Deploying ALTER CLUSTER
Done...
Done
```

4.3.5.2 CREATE CLUSTER

Use this command to create virtual guests for a virtual machine (VM) cluster, including the steps to configure and deploy an Oracle RAC database.

Syntax

```
CREATE CLUSTER
[ STEPS='step_short_names' [ DELETEDB={ true | false } ] |
SKIPSTEPS='step_short_names' [ DELETEDB={ true | false } ] |
DELETEDB={ true | false } ]
[ WHERE
{ CLUSTERNAME=cluster_name |
CLUSTERNUMBER=cluster_number |
ID=cluster_id } ]
```

Arguments

• STEPS : Optionally, specifies the steps to run.

The list consists of space-separated step short names and the entire list is enclosed in single quotes.

Use the LIST STEPS command to view the available steps.



• SKIPSTEPS : Optionally, specifies steps to skip.

The list consists of space-separated step short names and the entire list is enclosed in single quotes.

Use the LIST STEPS command to view the available steps.

• DELETEDB : Optionally, specify true to delete the default Oracle RAC database after cluster creation. The default value is false.

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 command can only create a cluster in a VM deployment. You cannot use this command to create the cluster in a physical (bare-metal) deployment.
- The simplest form of this command does not require any arguments. However, if the XML configuration file (es.xml) contains more than one cluster, then the WHERE clause is mandatory.

Example 4-5 Using the STEPS Parameter with CREATE CLUSTER

Use the following command to only create the guest domains for the Cluster-c1 cluster:

CREATE CLUSTER STEPS='CREATEVM' WHERE CLUSTERNAME=Cluster-c1

Example 4-6 Using the SKIPSTEPS and DELETEDB Parameters with CREATE CLUSTER

Use the following command to create the Cluster-c1 cluster, skipping the specified SKIPSTEPS and deleting the default database.

```
CREATE CLUSTER SKIPSTEPS='VALIDATE CALIBRATE RESECURE' DELETEDB=true WHERE CLUSTERNAME=Cluster-c1
```

4.3.5.3 DESTROY CLUSTER

This command is used to cleanly remove a running virtual machine (VM) cluster in one operation.

Syntax

```
DESTROY CLUSTER
[ 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

- No WHERE clause is required if the XML file contains one cluster only.
- The MERGE step indicates the machines that will be destroyed and the affected cells.

Example 4-7 Using the DESTROY CLUSTER Command

The following example shows the simplest case, where there is only a single cluster in the XML file.

oedacli> DESTROY CLUSTER
oedacli> SAVE ACTION
oedacli> MERGE ACTIONS
oedacli> DEPLOY ACTIONS

4.3.5.4 DOWNGRADE CLUSTER

Use this command downgrade a previously upgraded cluster.

Syntax

```
DOWNGRADE CLUSTER
WHERE
{ CLUSTERNAME=cluster_name [ STEPNAME=step_name ] |
    CLUSTERNUMBER=cluster_number [ STEPNAME=step_name ] |
    ID=cluster id [ STEPNAME=step_name ] }
```

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
- ID: Specifies the es.xml ID of the cluster
- STEPNAME : Optionally, specifies the individual downgrade step:
 - 1. RUN_ROOTSCRIPT
 - 2. CONFIG HOME
 - ADD_HOME

Usage Notes

- To use the command, you must use the es.xml that contains the upgraded cluster.
- The command can only downgrade a cluster in a VM deployment. You cannot use this command to downgrade the cluster in a physical (bare-metal) deployment.
- The command can only run if the DELETE_OLDHOME step has not been run on the upgraded cluster.



Example 4-8 Cluster Downgrade

The following example shows an OEDACLI session that uses the DOWNGRADE CLUSTER command along with typical output at each step.

```
oedacli> downgrade cluster where clusternumber=1
oedacli> save action
oedacli> merge actions
processMerge
processMergeActions
Merging Action : downgrade cluster where clusternumber=1
Merging DOWNGRADE CLUSTER
Action Validated and Merged OK
oedacli> deploy actions
Deploying Action ID : 4 downgrade cluster where clusternumber=1
Deploying DOWNGRADE CLUSTER
Downgrading Cluster
Validating Target cluster version 12.2.0.1
Validating Target Clusterware Home.. /u01/app/12.2.0.1/grid
Checking Cluster status...
Checking status of cluster ...
Checking clustereware file system /u01/app/12.2.0.1/grid
Validating active cluster version.
Active cluster version found on cluster ovmClus8 is 18.0.0.0
Validating Inventory...
Clusterware Home /u01/app/12.2.0.1/grid validation completed successfully
Downgrading clusterware to 12.2.0.1
Running rootcrs.sh on node dbm01adm01vm08.example.com
Running rootcrs.sh on node dbm01adm02vm08.example.com
Deregistering Clustereware Home /u01/app/18.13.0.0/grid from oracle inventory
Registering Clusterware Home /u01/app/12.2.0.1/grid with oracle inventory
Starting Clusterware stack using software home /u01/app/12.2.0.1/grid
Removing /u01/app/18.13.0.0/grid from Oracle inventory...
Updating inventory on dbm01adm01vm08.example.com
Updating inventory on dbm01adm02vm08.example.com
Unmounting file systems.....
Unmounting file system /u01/app/18.13.0.0/grid on dbm01adm01vm08.example.com
Unmounting file system /u01/app/18.13.0.0/grid on dbm01adm02vm08.example.com
Updating /etc/fstab entries...
Active cluster version after downgraded 12.2.0.1.0
Clusterware successfully downgraded to 12.2.0.1.190115
```

4.3.5.5 LIST CLUSTER

This command lists a specific Exadata cluster.

```
LIST CLUSTER
WHERE
{ NAME=cluster_name |
ID=cluster id }
```



Arguments

The following arguments are available in the WHERE clause:

- NAME: Specifies the name of the cluster
- ID: Specifies the es.xml ID of the cluster

4.3.5.6 LIST CLUSTERS

This command lists the existing Exadata clusters.

Syntax

```
LIST CLUSTERS
[ WHERE
{ CLUSTERNUMBER=cluster_number |
CLUSTERNAME=cluster_name |
ID=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
- ID: Specifies the es.xml ID of the cluster

Usage Notes

The WHERE clause is optional.

Example 4-9 Using the LIST CLUSTERS Command

This example shows how to identify the Oracle RAC clusters on the host.

```
OEDACLI> LIST CLUSTERS
version : "CloneInstall"
clusterName : "DBMclu1"
clusterOwner : "grid"
clusterVersion : "19.3.0.0.190416"
clusterHome : "/u01/app/19.0.0.0/grid"
inventoryLocation : "/u01/app/oraInventory"
asmScopedSecurity : "false"
```

4.3.5.7 UPGRADE CLUSTER

Use this command upgrade an Oracle Grid Infrastructure cluster.

```
UPGRADE CLUSTER
GIVERSION=Grid_relnum
GIHOMELOC=Grid home dir
```



WHERE

```
{ CLUSTERNAME=cluster_name [ STEPNAME=step_name ] |
  CLUSTERNUMBER=cluster_number [ STEPNAME=step_name ] |
  ID=cluster_id [ STEPNAME=step_name ] }
```

Arguments

- GIVERSION: The version of the Oracle Grid Infrastructure software you are upgrading to, including the release update (RU). For example: 12.1.0.2.170418
- GIHOMELOC: The target location of the Oracle Grid Infrastructure home directory

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
- ID: Specifies the es.xml ID of the cluster
- STEPNAME : Optionally, specifies the individual upgrade step:
 - 1. ADD_HOME
 - 2. CONFIG HOME
 - 3. RUN ROOTSCRIPT
 - 4. DELETE OLDHOME

Usage Notes

- The command can only upgrade a cluster in a VM deployment. You cannot use this command to upgrade the cluster in a physical (bare-metal) deployment.
- If STEPNAME is not specified, then the ADD HOME and CONFIG HOME steps are performed.
- The RUN_ROOTSCRIPT step runs the rootupgrade.sh script sequentially in a rolling mode on all nodes. This step also restarts the database instances on each of the nodes.
- After you run the DELETE_OLDHOME step in conjunction with the UPGRADE CLUSTER command, you cannot later use the DOWNGRADE CLUSTER command to roll back the upgrade.

Example 4-10 Using the UPGRADE CLUSTER Command

This example shows the first three steps (ADD_HOME, CONFIG_HOME, and RUN_ROOTSCRIPT) in a step-by-step cluster upgrade. At the end of this example, the cluster is upgraded, but downgrade is still possible because the DELETE OLDHOME step has not been run.

```
oedacli> upgrade cluster giversion=18.13.0.0.210119 gihomeloc=/u01/app/
18.13.0.0/grid where clusternumber=1 stepname=add_home
oedacli> save action
oedacli> merge actions
processMerge
processMergeActions
Merging Action : upgrade cluster giversion=18.13.0.0.210119
gihomeloc=/u01/app/18.13.0.0/grid where clusternumber=1 stepname=add_home
Merging UPGRADE CLUSTER
Action Validated and Merged OK
oedacli> deploy actions
Deploying Action ID : 1 upgrade cluster giversion=18.13.0.0.210119
gihomeloc=/u01/app/18.13.0.0/grid where clusternumber=1 stepname=add_home
```



```
Deploying UPGRADE CLUSTER
Upgrading Cluster
Performing Upgrade Validations...
Validating target Clusterware version 18.13.0.0...
Validating source Clusterware version 12.2.0.1.190115...
Checking Cluster status...
Checking status of cluster...
Active cluster version on cluster ovmClus8 is 12.2.0.1.0
Validating Target Clusterware Home.. /u01/app/18.13.0.0/grid
Checking to see if /u01/app/18.13.0.0/grid is already mounted
SUCCESS: 18.13.0.0 is supported version for upgrade.
SUCCESS: Current Cluster Version 12.2.0.1.190115 is supported for Upgrade
using this Utility.
SUCCESS:
SUCCESS: Required Image Version 21.2.0.0.0 for Oracle18c found on
dbm01adm01vm08
SUCCESS: Required Image Version 21.2.0.0.0 for Oracle18c found on
dbm01adm02vm08
SUCCESS: Cluster verification completed successfully
SUCCESS: Find the valid upgrading version from 12.2.0.1 to 18.13.0.0
SUCCESS: Target Cluster Version is valid..
SUCCESS: Target Clusterware Home /u01/app/18.13.0.0/grid is not already
mounted.
SUCCESS: Found valid target clusterware version.
SUCCESS: Valid Bundle Patch / RU Version found.
Validating required files...
Extracting files..
Copying files...
Creating new disk image file ..
Attaching disk image to Virtual Machine dbm01adm01vm08.example.com
Attaching disk image to Virtual Machine dbm01adm02vm08.example.com
Completed adding new Clusterware home /u01/app/18.13.0.0/grid on Cluster
ovmClus8
Done...
Done
oedacli> upgrade cluster giversion=18.13.0.0.210119 gihomeloc=/u01/app/
18.13.0.0/grid where clusternumber=1 stepname=config home
oedacli> save action
oedacli> merge actions
processMerge
processMergeActions
Merging Action : upgrade cluster giversion=18.13.0.0.210119
gihomeloc=/u01/app/18.13.0.0/grid where clusternumber=1 stepname=config home
Merging UPGRADE CLUSTER
Action Validated and Merged OK
oedacli> deploy actions
Deploying Action ID : 2 upgrade cluster giversion=18.13.0.0.210119
gihomeloc=/u01/app/18.13.0.0/grid where clusternumber=1 stepname=config home
Deploying UPGRADE CLUSTER
Upgrading Cluster
Configuring new clusterware home at /u01/app/18.13.0.0/grid
Running Cluster Verification Utility for upgrade readiness..
Pre-upgrade Validation completed successfully.
Setting up new clusterware home...
Relinking binaries with RDS /u01/app/18.13.0.0/grid
Upgrading software..
```

```
Completed configuring new Clusterware home /u01/app/18.13.0.0/grid
Done...
Done
oedacli> upgrade cluster giversion=18.13.0.0.210119 gihomeloc=/u01/app/
18.13.0.0/grid where clusternumber=1 stepname=RUN ROOTSCRIPT
oedacli> save action
oedacli> merge actions
processMerge
processMergeActions
Merging Action : upgrade cluster giversion=18.13.0.0.210119
gihomeloc=/u01/app/18.13.0.0/grid where clusternumber=1
stepname=RUN ROOTSCRIPT
Merging UPGRADE CLUSTER
Action Validated and Merged OK
oedacli> deploy actions
Deploying Action ID : 3 upgrade cluster giversion=18.13.0.0.210119
gihomeloc=/u01/app/18.13.0.0/grid where clusternumber=1
stepname=RUN ROOTSCRIPT
Deploying UPGRADE CLUSTER
Upgrading Cluster
Running Cluster Verification Utility for upgrade readiness..
Pre-upgrade Validation completed successfully.
Running rootupgrade.sh on node dbm01adm01vm08.example.com
Checking file
root dbm01adm01vm08.example.com 2021-05-07 16-35-47-279774287.log on node
dbm01adm01vm08.example.com
Checking status of cluster on dbm01adm01vm08.example.com
Running rootupgrade.sh on node dbm01adm02vm08.example.com
Checking file
root dbm01adm02vm08.example.com 2021-05-07 16-55-09-777507261.log on node
dbm01adm02vm08.example.com
Checking status of cluster on dbm01adm02vm08.example.com
Running Configuration Assistants on dbm01adm01vm08.example.com
Active cluster version after upgrade 18.0.0.0.0
Clusterware successfully upgraded to 18.13.0.0.210119
Applying Security Fixes...
Done...
Done
```

4.3.6 COMPUTE

Use these commands to add or delete a physical compute node as a cluster member.

- CLONE COMPUTE Use this command to clone an existing physical compute cluster node.
- DELETE COMPUTE

This command deletes an existing compute node, removes the instance, home and clusterware from the cluster.

4.3.6.1 CLONE COMPUTE

Use this command to clone an existing physical compute cluster node.

Syntax

```
CLONE COMPUTE
  { SRCNAME=source_compute_node TGTNAME=target_compute_node |
    TGTNAMES=target_compute_nodes }
[ WHERE
    STEPNAME=stepname ]

SET ADMINNET NAME=admin_name IP=admin_ip
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 ]
[ SET BACKUP NAME=backup_name IP=backup_ip ]
SET ILOMNET NAME=ilom_name IP=ilom_ip
SET RACK NUM=rack number ULOC=ulocation
```

Arguments

- SRCNAME: Specifies the name of an existing compute server from which the compute server is derived.
- TGTNAME: Specifies the name of the new compute server to add.
- TGTNAMES: Specifies a comma-separated list of new compute servers to add.
- STEPNAME: Optionally specifies the deployment step to perform, which is one of the following:
 - CREATE_USERS
 - CELL_CONNECTIVITY
 - ADD NODE
 - EXTEND DBHOME
 - ADD INSTANCE

If STEPNAME is not specified, then all steps are performed.

You can set the following options for a cloned compute node:

- ADMINNET : Specifies the DNS name and IP address to use for the administration network. The DNS name may optionally include the domain name.
- PRIVNET : Specifies the names and IP addresses to use for the first and second private networks. The names may optionally include the domain name.
- INTERCONNECT: Only required if the compute nodes are configured with Exadata Secure RDMA Fabric Isolation or InfiniBand security (PKEYS). Specifies the names and IP addresses to use for the first and second private networks. The names may optionally include the domain name.
- CLIENTNET : Specifies the DNS name and IP address to use for the client network. The DNS name may optionally include the domain name. Not required on virtual machine (VM) hosts (Oracle Linux KVM or Oracle VM).



- VIPNET : Specifies the DNS name and IP address to use for the virtual IP (VIP) network. The DNS name may optionally include the domain name. Not required on virtual machine (VM) hosts (Oracle Linux KVM or Oracle VM).
- BACKUP : Specifies the DNS name and IP address to use for the backup network. The DNS
 name may optionally include the domain name. Not required on servers without a backup
 network.
- ILOMNET: Specifies the DNS name and IP address to use for the ILOM network. The DNS name may optionally include the domain name.
- RACK : Specifies the rack number in a multi-rack configuration, where 1 is the first rack, and the physical location (slot number) of the server in the rack.

Usage Notes

- For configurations with Exadata Secure RDMA Fabric Isolation or InfiniBand security (PKEYS), INTERCONNECT defines the private network that connects the database nodes and PRIVNET defines the private storage network.
- Use TGTNAMES to clone multiple compute servers simultaneously in the DEPLOY ACTIONS. Use TGTNAMES without additional SET statements. Use SAVE ACTION FORCE prior to using this argument. See the example below.

Example 4-11 Cloning a Compute Node

This example clones the dbadm13 compute server to a new server, dbadm14.

```
CLONE COMPUTE srcname=dbadm13 tgtname=dbadm14
SET ADMINNET name=dbadm04 ip=10.128.161.192
SET PRIVNET name1=dbadm04-priv1 ip1=192.168.161.195 name2=dbadm04-priv2
ip2=192.168.161.196
SET CLIENTNET name=dbadm04-client ip=198.51.100.112
SET VIPNET name=dbadm04-vip ip=10.128.177.116
SET ILOMNET name=dbadm04-ilom ip=10.128.161.203
SET RACK num=1 uloc=17
SAVE ACTION
```

MERGE ACTIONS DEPLOY ACTIONS

Example 4-12 Cloning Multiple Compute Nodes Using TGTNAMES

This example clones dbadm23 and creates the new compute servers dbadm24 and dbadm25. By using the TGTNAMES argument, both new nodes are deployed at the same time in the final DEPLOY ACTIONS.

```
CLONE COMPUTE SRCNAME='dbadm23' TGTNAME='dbadm24'
SET ADMINNET name=dbadm24 ip=10.128.161.192
SET PRIVNET name1=dbadm24-priv1 ip1=192.168.161.195 name2=dbadm24-priv2
ip2=192.168.161.196
...
SAVE ACTION FORCE
CLONE COMPUTE SRCNAME='dbadm23' TGTNAME='dbadm25'
SET ADMINNET name=dbadm25 ip=10.128.161.193
...
SAVE ACTION FORCE
```



```
CLONE COMPUTE TGTNAMES='dbadm24,dbadm25'
```

SAVE ACTION MERGE ACTIONS DEPLOY ACTIONS

Example 4-13 Cloning a Compute Node Using Steps

This example clones the dbadm33 compute server to a new server, dbadm34, running individual steps. The example shows only the first three steps and does not show all the steps involved in cloning the compute node.

```
CLONE COMPUTE srcname=dbadm33 tgtname=dbadm34 WHERE STEPNAME=CREATE_USERS
SET ADMINNET name=dbadm04 ip=10.128.161.192
SET PRIVNET name1=dbadm04-priv1 ip1=192.168.161.195 name2=dbadm04-priv2
ip2=192.168.161.196
SET CLIENTNET name=dbadm04-client ip=198.51.100.112
SET VIPNET name=dbadm04-vip ip=10.128.177.116
SET ILOMNET name=dbadm04-ilom ip=10.128.161.203
SET RACK num=1 uloc=17
```

SAVE ACTION MERGE ACTIONS DEPLOY ACTIONS

CLONE COMPUTE compute srcname=dbadm33 tgtname=dbadm34 WHERE STEPNAME=CELL CONNECTIVITY

SAVE ACTION MERGE ACTIONS DEPLOY ACTIONS

CLONE COMPUTE srcname=dbadm33 tgtname=dbadm34 WHERE STEPNAME=ADD NODE

SAVE ACTION MERGE ACTIONS DEPLOY ACTIONS

. . .

4.3.6.2 DELETE COMPUTE

This command deletes an existing compute node, removes the instance, home and clusterware from the cluster.

```
DELETE COMPUTE
WHERE
{ SRCNAME=host_name [ STEPNAME=step_name ] |
     SRCNAMES=host_names [ STEPNAME=step_name ] }
```



Arguments

SRCNAME specifies the host name of the guest that you want to remove.

SRCNAMES specifies a comma-separated list host names of the guests that you want to remove.

STEPNAME is used to clean up steps from a failed CREATE COMPUTE command. Specify the name of the individual creation step to be reverted. The values for *step_name* are:

- ADD_INSTANCE
- EXTEND DBHOME
- ADD NODE
- CELL_CONNECTIVITY
- CREATE USERS

Example 4-14 Deleting a Compute Node - Simple Case

This example removes the dbadm04 compute node from the cluster.

```
LOAD FILE NAME=4-4compute.xml
DELETE COMPUTE where srcname=dbadm04
SAVE ACTION
MERGE ACTIONS
DEPLOY ACTIONS
SAVE FILE name=3-4compute.xml
```

Example 4-15 Deleting a Compute Node with Individual Steps

This example removes the dbadm04 compute node from the cluster, running each step individually. This example does not show all the steps involved in removing the compute node.

```
LOAD FILE NAME=4-4compute.xml
DELETE COMPUTE where srcname=dbadm04 stepname=ADD_INSTANCE
SAVE ACTION
MERGE ACTIONS
DELETE COMPUTE where srcname=dbadm04 stepname=EXTEND_DBHOME
SAVE ACTION
MERGE ACTIONS
DELETE COMPUTE where srcname=dbadm04 stepname=ADD_NODE
SAVE ACTION
MERGE ACTIONS
DEPLOY ACTIONS
....
```

4.3.7 CURRENTACTION

You can clear or list the current action in OEDACLI.

CLEAR CURRENTACTION



LIST CURRENTACTION

4.3.7.1 CLEAR CURRENTACTION

Clears the current action in OEDACLI.

Syntax

CLEAR CURRENTACTION

4.3.7.2 LIST CURRENTACTION

Lists the current action in OEDACLI.

Syntax

LIST CURRENTACTION

4.3.8 DATABASE

You can add, alter, delete, or list the Oracle databases.

- ADD DATABASE
- ALTER DATABASE
- DELETE DATABASE
- LIST DATABASES

4.3.8.1 ADD DATABASE

This command adds an Oracle database; either a non-container database (non-CDB), container database (CDB), or pluggable database (PDB) to an existing CDB.

```
ADD DATABASE
  DBNAME=database name
   [ BLOCKSIZE=blocksize ]
   [ CHARSET=database character set ]
   [ DBLANG=database language ]
   [ UNIQUENAME=database unique name ]
   [ DBTEMPLATE=database template ]
   [ DBTYPE=database type ]
   [ HOSTNAMES='host names' ]
   [ DATADG=data diskgroup RECODG=reco diskgroup ]
   [ VAULTLIST=exascale vault list EXASCALECLUSTER=exascale cluster name
     [ STORAGETEMPLATE = exascale_storage_template_name ]]
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:

- DBNAME : Specifies the name of the new database.
- BLOCKSIZE : Optionally, specifies the block size for the new database. The default value is 8192. This argument is not required for pluggable databases.
- CHARSET : Optionally, specifies the character set to use for the new database. The default value is AL32UTF8. This argument is not required for pluggable databases.
- DBLANG : Optionally, specifies the language to use for the new database. The default value is all langs. This argument is not required for pluggable databases.
- UNIQUENAME : Specifies the unique name of the new database. The default value is dbname.
- 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 : Optionally, specifies the type of database to create:
 - normal DB : Adds a non-container database (non-CDB). This is the default value.
 - CDB : Adds a container database.
 - PDB : Adds a pluggable database to an existing CDB.
- HOSTNAMES : Optionally, 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.
- DATADG : Specifies the name of the DATA disk group for the new database.

This argument is required when adding a database using Oracle ASM storage. It does not apply to pluggable databases (PDBs) or databases using Exascale storage.

• RECODG : Specifies the name of the RECO disk group for the new database.

This argument is required when adding a database using Oracle ASM storage. It does not apply to pluggable databases (PDBs) or databases using Exascale storage.

• VAULTLIST : Specifies a comma-separated list of Exascale vaults used to store the database.

This argument is required when adding a database using Exascale storage. It does not apply to pluggable databases (PDBs) or databases using Oracle ASM storage.

• EXASCALECLUSTER : Specifies the name of the Exascale cluster that contains the Exascale vaults used to store the database.

This argument is required when adding a database using Exascale storage. It does not apply to pluggable databases (PDBs) or databases using Oracle ASM storage.

• STORAGETEMPLATE : Optionally, specifes the Exascale storage template applied to the Oracle Database data files.

You can use the OEDACLI LIST STORAGETEMPLATES command to view the list of available templates. If not specified, the default template (DATAFILE) applies.



For example, you can specify DATA_EF_HIGHREDUNDANCY to use the built-in Exascale template that places data files on Extreme Flash (EF) storage media (if available) using high redundancy (triple mirroring).

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=PDB

Example 4-16 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"
```

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
```

4.3.8.2 ALTER DATABASE

This command alters an existing Oracle database definition.

```
ALTER DATABASE
   { { BLOCKSIZE=blocksize |
       CHARSET=database character set |
       DATADG=data diskgroup |
       VAULT='vaultlist' [ EXASCALECLUSTER=exascaleclustername ] |
       DBLANG=database language |
       DBNAME=database name |
       UNIQUENAME=database unique name |
       DBTEMPLATE=database template |
       DBTYPE=database type |
       HOSTNAMES='host names' |
       RECODG=reco diskgroup } ... |
     { DBHOMELOC=new dbhome loc | DBHOMEID=new dbhome id } }
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:

- BLOCKSIZE: The block size for the new database. The default value is 8192. This argument is not required for pluggable databases.
- CHARSET: The character set to use for the new database. The default value is AL32UTF8. This argument is not required for pluggable databases.
- DATADG: The name of the DATA disk group for the new database. This argument is not required for pluggable databases.
- VAULT: If using Exascale, specify a vault or space-seperated list of two vaults for the database. Note that the value is also surrounded by single quotes (as displayed in the command syntax).
- EXASCALECLUSTER: Specifies the Exascale cluster that contains the specified vault or vaults. This option is required only if the vault specification cannot uniquely identify the Exascale cluster.
- DBLANG: The language to use for the new database. The default value is all_langs. This argument is not required for pluggable databases.
- DBNAME: The name of the new database.
- UNIQUENAME: The unique name of the new database. The default value is dbname.
- DBTEMPLATE : 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: The type of database to create:
 - normal DB: Specifies a non-container database (non-CDB). This is the default value.
 - CDB: Specifies a container database.
 - PDB: Specifies a pluggable database to an existing CDB.
- HOSTNAMES: 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: The name of the RECO disk group for the new database. This argument is not required for pluggable databases.
- DBHOMELOC : The location of the database home that you want to move the database to. This argument is not required for pluggable databases.
- DBHOMEID: The es.xml ID of the database home that you want to move the database to. 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



Usage Notes

For moving the database to use a different database home, specify only the new home location (DBHOMELOC) or the ID of the new database home (DBHOMEID).

4.3.8.3 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 4-17 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
```

 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
```

4.3.8.4 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

4.3.9 DATABASEHOME

You can add, alter, delete, or list the Oracle Database homes.

- ADD DATABASEHOME
- ALTER DATABASEHOME
- DELETE DATABASEHOME
- LIST DATABASEHOMES

4.3.9.1 ADD DATABASEHOME

This command adds an Oracle database home to an existing cluster.

```
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 ]
   [ INSTALLTYPE={ CLONE | ZIP } ]
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 release update (RU), 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.
- INSTALLTYPE: Specifies the software installation method to use. The options are:
 - CLONE: Uses image files to clone a software installation. The image files include the base software release, and may also include additional patches and updates. By including updates in the image files, this method reduces deployment time and improves deployment consistency.

The CLONE software installation method is the only supported method for database homes in a virtual machine (VM) deployment. This option is also available for database homes in a physical (bare metal) deployment.

 ZIP: Performs a fresh software installation by using compressed (zip) files that contain the software release. This method does not include additional patches or updates.

This option is not available for database homes in a virtual machine (VM) deployment.

If you do not specify the INSTALLTYPE setting, then the default setting matches the INSTALLTYPE setting in the containing cluster.

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 4-18 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 release update (RU). In this example, we are setting up a new Oracle



```
database home with 12.1.0.2.170418. 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 20f2.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
nodeladm01.example.com
Copying file: linuxamd64 12102 database 2of2.zip to node
nodeladm01.example.com
Copying file: p26022196 121020 Linux-x86-64.zip to node
nodeladm01.example.com
Copying file: p26027162 121020 Linux-x86-64.zip to node
```

```
nodeladm01.example.com
Copying file: p26022196_121020_Linux-x86-64.zip to node
nodeladm02.example.com
Copying file: p26027162_121020_Linux-x86-64.zip to node
nodeladm02.example.com
Completed copying files...
Extracting files...
Completed extracting files...
Validating nodes for database readiness...
Installing database software ...
Running database installer on node nodeladm01.example.com ... Please wait...
After running database installer...
Patching...
Done...
```

4.3.9.2 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 |
     INSTALLTYPE={ CLONE | ZIP } } ...
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 release update (RU), 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.
- INSTALLTYPE: Specifies the software installation method to use. The options are:
 - CLONE: Uses image files to clone a software installation. The image files include the base software release, and may also include additional patches and updates. By including updates in the image files, this method reduces deployment time and improves deployment consistency.

The CLONE software installation method is the only supported method for database homes in a virtual machine (VM) deployment. This option is also available for database homes in a physical (bare metal) deployment.

 ZIP: Performs a fresh software installation by using compressed (zip) files that contain the software release. This method does not include additional patches or updates.

This option is not available for database homes in a virtual machine (VM) deployment.

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.

4.3.9.3 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 4-19 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
```

4.3.9.4 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



4.3.10 DISKGROUP

You can add, alter, delete, or list the Oracle ASM disk groups.

- ADD DISKGROUP
- ALTER DISKGROUP
- ALTER DISKGROUPS
- DELETE DISKGROUP
- LIST DISKGROUPS

4.3.10.1 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
   [ DISKGROUPLOCATION=diskgroup location ]
   DISKGROUPSIZE=diskgroup size
   [ OCRVOTE=ocr voting disks included ]
   [ QUORUMDISK=quorum disks included ]
   REDUNDANCY=redundancy level
   SLICESIZE=slice size
   [ SPARSE=sparse ]
   [ 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 disk group
- 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
- DISKGROUPLOCATION : Specifies the media type where the disk group is located. The valid values are FLASHDISK or HARDDISK. The default value is HARDDISK.

The same disk group location is recommended for all non-RECO disk groups across all clusters in the Exadata configuration file (es.xml). If the RECO disk group location is FLASHDISK, then FLASHDISK is the recommended location for all disk groups.



- 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.
- QUORUMDISK : A boolean variable, where TRUE indicates the disk group requires a quorum
- REDUNDANCY : (Mandatory) Specifies the redundancy level for the disk group. The valid 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.
- TYPE : Specifies the disk group 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

Example 4-20 Adding a Disk Group

The following example shows an OEDACLI session that uses the ADD DISKGROUP command along with typical output at each step.

```
oedacli> add diskgroup diskgroupname=OTHER7 diskgroupsize=1TB
redundancy=HIGH
celllist='dbm01celadm07.example.com,dbm01celadm08.example.com,dbm01celadm09.ex
ample.com' where clustername=Cluster-c1
oedacli> save action
oedacli> merge actions
processMerge
processMergeActions
Merging Action : add diskgroup diskgroupname=OTHER7 diskgroupsize=1TB
redundancy=HIGH
celllist='dbm01celadm07.example.com,dbm01celadm08.example.com,dbm01celadm09.ex
ample.com' where clustername=Cluster-c1
Merging ADD DISKGROUP
Action Validated and Merged OK
oedacli> deploy actions
Deploying Action ID : 3 add diskgroup diskgroupname=OTHER7
diskgroupsize=1TB redundancy=HIGH
celllist='dbm01celadm07.example.com,dbm01celadm08.example.com,dbm01celadm09.ex
ample.com' where clustername=Cluster-c1
Deploying ADD DISKGROUP
Diskgroup OTHER7 will be created on Storage Servers
[dbm01celadm07.example.com, dbm01celadm08.example.com,
dbm01celadm09.example.com]
Validating free space ....
Creating Grid Disks for ASM Disk Group OTHER7
Creating ASM Disk Group OTHER7
```



```
Updating ASM Diskstring...
Checking ASM Disk Group status...
Completed creation of ASM Disk Group OTHER7
Done...
Done
```

4.3.10.2 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 |
     DISKGROUPLOCATION=diskgroup location |
     DISKGROUPSIZE=diskgroup size |
     OCRVOTE=ocr voting disks included |
     QUORUMDISK=quorum disks included |
     REDUNDANCY=redundancy level |
     SLICESIZE=slice size |
     SPARSE=sparse } ...
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 disk group
- ACFSPATH : Specifies the new path for the Oracle ACFS file system
- ACFSSIZE : Specifies a new size for the Oracle ACFS volume on this disk group
- CELLLIST : A comma separated list of cells for this disk group, enclosed in single quotes
- DISKGROUPNAME : Specifies a new name for the disk group
- DISKGROUPLOCATION : Specifies the media type where the disk group is located. The valid values are FLASHDISK or HARDDISK. The default value is HARDDISK.

The same disk group location is recommended for all non-RECO disk groups across all clusters in the Exadata configuration file (es.xml). If the RECO disk group location is FLASHDISK, then FLASHDISK is the recommended location for all disk groups.

- 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 valid 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.

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

- With the ALTER DISKGROUP command, you can only deploy the following modifications to an existing disk group:
 - You can alter the size of an existing disk group by setting the DISKGROUPSIZE attribute.
 - You can change the storage servers that contain the disk group by setting the CELLLIST attribute. However, if you remove a storage server from a disk group, you must ensure that the remaining storage servers have enough space to accommodate the existing data.

Changes to all other disk group attributes may only be saved to the OEDA XML configuration file (es.xml). Consequently, you cannot use the ALTER DISKGROUP command in conjunction with the DEPLOY ACTIONS command to change the name of an existing disk group, for example.

 If you modify the redundancy, the volume size will be maintained, however the slice size will be recalculated.

Example 4-21 Resizing an Oracle ASM Disk Group 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.example.com Original Grid Disk Size 2953 GB, new size 138 GB on node1celadm03.example.com Original Grid Disk Size 2953 GB, new size 138 GB on node1celadm01.example.com Updated/New Disk Group size 2484 GB, original size 53154 GB. Done... Done

4.3.10.3 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. The sum of DATASPLIT and RECOSPLIT cannot exceed 100.
- RECOSPLIT : Specifies a percentage of the Oracle ASM volume allocated to the RECO disk group. The sum of DATASPLIT and RECOSPLIT cannot exceed 100.
- 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 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

4.3.10.4 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

Example 4-22 Deleting a Disk Group

The following example shows an OEDACLI session that uses the DELETE DISKGROUP command along with typical output at each step.

```
oedacli> delete diskgroup where id=10dff870-b824-cdb7-0542-8a03a88e9653
oedacli> save action
oedacli> merge actions
processMergeActions
Merging Action : delete diskgroup where id=10dff870-b824-
cdb7-0542-8a03a88e9653
Merging DELETE DISKGROUP
Action Validated and Merged OK
oedacli> deploy actions
Deploying Action ID : 4 delete diskgroup where id=10dff870-b824-
cdb7-0542-8a03a88e9653
Deploying DELETE DISKGROUP
```



```
Dropping ASM Disk Group DATAC1
ASM Disk Group DATAC1 does not exist..
Grid Disks for Disk Group DATAC1 exist on cells dbm01celadm07.example.com
Grid Disks for Disk Group DATAC1 exist on cells dbm01celadm08.example.com
Grid Disks for Disk Group DATAC1 exist on cells dbm01celadm09.example.com
Dropping Grid Disks on [dbm01celadm07.example.com,
dbm01celadm08.example.com, dbm01celadm09.example.com]
Deleting quorum devices...
Completed dropping ASM Disk Group DATAC1
Done...
Done
```

4.3.10.5 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

4.3.11 DOM0

You can list Oracle VM management domains (dom0s).

LIST DOM0S

4.3.11.1 LIST DOM0S

This command lists Oracle VM management domains (dom0s).

Syntax

LIST DOMOS



Usage Notes

This command is deprecated. Instead, use:

LIST MACHINES WHERE TYPE=DOMO

4.3.12 DOMAIN

You can get live information from a domain.

GET DOMAIN

4.3.12.1 GET DOMAIN

This command displays live domain information from a running system.

Syntax

```
GET DOMAIN
   ACTION=action
WHERE
   { ID=id |
    HOSTNAME=hostname |
    CLUSTERNUMBER=cluster_number { COMPUTENUMBER=compute_number |
   STORAGENUMBER=storage_number } |
   CLUSTERNAME=cluster_name { COMPUTENUMBER=compute_number |
   STORAGENUMBER=storage_number } |
   CLUSTERID=cluster_id { COMPUTENUMBER=compute_number |
   STORAGENUMBER=storage_number } }
```

Arguments

ACTION : Specifies the information that the command returns.

If the action is applied to a guest, then the command displays specific information for the guest.

If the action is applied to the host, then the command displays information for the hypervisor.

- LISTIMAGES: Displays image file details.
- LISTDOMAIN: Displays domain details.
- LISTMEMORY: Displays memory details.
- LISTVCPU: Displays CPU details.

The following arguments are available in the WHERE clause:

- ID: Specifies the es.xml ID for the target machine
- HOSTNAME : Specifies the current hostname 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 es.xml compute node number in the cluster, starting at 1



STORAGENUMBER : Specifies the es.xml storage server number in the cluster, starting at 1

4.3.13 ES

You can discover an engineered system or alter a limited number of attributes of an engineered system.

- ALTER ES This command alters the attributes of an engineered system.
- DISCOVER ES This command discovers an existing configuration of an engineered system.
- VALIDATE ES

4.3.13.1 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.

4.3.13.2 DISCOVER ES

This command discovers an existing configuration of an engineered system.

Syntax

```
DISCOVER ES
HOSTNAMES = host_names
LOCATION = directory name
```

Arguments

You can use the following arguments when discovering an engineered system configuration:

- HOSTNAMES: Specifies the list of nodes to be discovered, with each host name separated by a ',' or a space. The list must be enclosed in quotation marks, for example, 'node1, node2' or 'node1 node2'. For virtual environments with user domains, you need to provide a list of only management domain (dom0) host names and storage servers.
- LOCATION: Specifies the target directory for file creation.



Usage Notes

The following are requirements and limitations of the **DISCOVER** ES command:

- Supported only on Exadata. ZDLRA is not supported.
- All hosts must have the same root password.
- Discover will not work with custom Operating System profiles and customized SQL*Plus prompts.
- Only RAC databases are discovered. Single instance databases and SIHA databases are not discovered.
- Oracle Clusterware must be running.
- Only online databases are discovered.
- If DISCOVER ES cannot log into databases as SYSDBA using Operating System authentication databases are skipped.
- Only database resources registered with Oracle Clusterware are discovered.
- Virtual machines that are not running are not discovered.

4.3.13.3 VALIDATE ES

Validates certain aspects of an OEDA XML configuration file (es.xml).

Syntax

VALIDATE ES

4.3.14 EXASCALE

DEPLOY EXASCALE

This command performs Exascale deployment actions.

4.3.14.1 DEPLOY EXASCALE

This command performs Exascale deployment actions.

Syntax

```
DEPLOY EXASCALE

ACTION = action

WHERE

{ CLUSTERNUMBER = clusternumber [ DATABASENAME = databasename ] |

CLUSTERNAME = clustername [ DATABASENAME = databasename ] |

CLUSTERID = clusterid [ DATABASENAME = databasename ] |

DATABASENAME = databasename }
```

Arguments

 ACTION: Specifies the Exascale deployment action, which is one of the following: CONFIGURECELLS, CONFIGURECOMPUTES, CREATEDBWALLET, CREATEGIVAULT, CREATEDBVAULT,



UNDOCONFIGURECELLS, UNDOCONFIGURECOMPUTES, UNDOCREATEDBWALLET, UNDOCREATEGIVAULT, UNDOCREATEDBVAULT.

The following arguments are available in the WHERE clause:

- CLUSTERNUMBER : Specifies the cluster number in the OEDA configuration file (es.xml), starting at 1.
- CLUSTERNAME : Specifies the name of the cluster.
- CLUSTERID : Specifies the OEDA configuration file (es.xml) ID of the cluster.
- DATABASENAME : Specifies the name of the database.

Usage Notes

- The CONFIGURECELLS action must be performed before the CONFIGURECOMPUTES action.
- The CONFIGURECELLS and CONFIGURECOMPUTES actions must be performed before any wallet or vault actions.
- The CONFIGURECOMPUTES action creates an Exascale wallet for the Oracle Grid Infrastructure operating system (OS) owner. This wallet also supports Oracle Database in a non-role-separated Exadata configuration, where the Oracle Grid Infrastructure OS owner is the same as the Oracle Database OS owner.
- The CREATEDBWALLET action only creates an Exascale wallet for an Oracle Database OS owner in a role-separated Exadata configuration, where the Oracle Database OS owner is not the same as the Oracle Grid Infrastructure OS owner.
- Undo actions must be performed in the following order: UNDOCREATEDBVAULT, UNDOCREATEGIVAULT, UNDOCREATEDBWALLET, UNDOCONFIGURECOMPUTES and UNDOCONFIGURECELLS.

4.3.15 EXASCALECLUSTER

- ADD EXASCALECLUSTER This command adds a new Exascale cluster.
- ALTER EXASCALECLUSTER
 This command alters an existing Exascale cluster.
- DELETE EXASCALECLUSTER This command deletes an existing Exascale cluster.
- LIST EXASCALECLUSTER
 This command displays details for an existing Exascale cluster.
- LIST EXASCALECLUSTERS
 This command displays details for all Exascale clusters.

4.3.15.1 ADD EXASCALECLUSTER

This command adds a new Exascale cluster.

```
ADD EXASCALECLUSTER
NAME = exascaleclustername
```



[VIP = ersvip IP = ersip]

Arguments

- NAME: Specifies the name of the Exascale cluster.
- VIP: Specifies the DNS name for the virtual IP (VIP) interface that provides access to Exascale control services (also known as Exascale RESTful Services or ERS).
- IP: Specifies the IP address for the ERS VIP.

Usage Notes

 The network interface specified by VIP and IP is associated with a highly-available virtual IP (VIP) network interface, which provides a consistent network end point for Exascale control services. The VIP is hosted by one of the Exadata storage servers, which also runs a front-end ERS instance. If the storage server or ERS instance becomes unavailable, then the VIP moves to another server hosting a front-end ERS instance.

You should define the ERS VIP if possible. The option to define an Exascale cluster without an ERS VIP primarily exists to support Exascale configurations on existing Exadata systems that have no spare IP addresses to support the ERS VIP.

4.3.15.2 ALTER EXASCALECLUSTER

This command alters an existing Exascale cluster.

Syntax

```
ALTER EXASCALECLUSTER

[ NAME = newexascaleclustername ]

[ VIP = newersvip ]

[ IP = newersip ]

WHERE

NAME = exascaleclustername
```

Arguments

- NAME: Changes the name of the Exascale cluster.
- VIP: Specifies the DNS name for the virtual IP (VIP) interface that provides access to Exascale control services (also known as Exascale RESTful Services or ERS).
- IP: Specifies the IP address for the ERS VIP.

The following argument is available in the WHERE clause:

NAME: Specifies the name for the Exascale cluster that you want to alter.

Usage Notes

 The network interface specified by VIP and IP is associated with a highly-available virtual IP (VIP) network interface, which provides a consistent network end point for Exascale control services. The VIP is hosted by one of the Exadata storage servers, which also runs a front-end ERS instance. If the storage server or ERS instance becomes unavailable, then the VIP moves to another server hosting a front-end ERS instance.



4.3.15.3 DELETE EXASCALECLUSTER

This command deletes an existing Exascale cluster.

Syntax

```
DELETE EXASCALECLUSTER
WHERE
NAME = exascaleclustername
```

Arguments

The following argument is available in the WHERE clause:

NAME: Specifies the name for the Exascale cluster that you want to delete.

Usage Notes

• You cannot delete an Exascale cluster while it provides resources to Oracle Grid Infrastructure or an Oracle database.

4.3.15.4 LIST EXASCALECLUSTER

This command displays details for an existing Exascale cluster.

Syntax

```
LIST EXASCALECLUSTER
WHERE
NAME = exascaleclustername
```

Arguments

The following argument is available in the WHERE clause:

• NAME: Specifies the name for the Exascale cluster that you want to display.

4.3.15.5 LIST EXASCALECLUSTERS

This command displays details for all Exascale clusters.

Syntax

LIST EXASCALECLUSTERS

4.3.16 EXITONERROR

You can set the exit status for OEDACLI.

SET EXITONERROR

This command controls the exit status for OEDACLI when an error in encountered.



4.3.16.1 SET EXITONERROR

This command controls the exit status for OEDACLI when an error in encountered.

Syntax

SET EXITONERROR ENABLE={ true | false }

Arguments

• ENABLE: When ENABLE=true, a run-time error causes OEDACLI to terminate with exit code 1. This option may be useful when OEDACLI is used inside a script.

4.3.17 FILE

You can manage the Engineered System XML file (es.xml).

- LOAD FILE
- MERGE FILES
- SAVE FILE
- SAVE FILES

4.3.17.1 LOAD FILE

Use this command to load an Engineered System XML file (es.xml) into OEDACLI memory for further use.

Syntax

LOAD FILE NAME=file name

Arguments

NAME : Specifies the name of an existing Engineered System XML file

Example 4-23 Loading a File into OEDACLI for Editing

```
oedacli> LOAD FILE NAME=Oracle-test12.xml
SUCCESS - file loaded OK
Customer : testadm01 - Oracle
```

4.3.17.2 MERGE FILES

Use this command to merge multiple Engineered System XML files into a new file.

Syntax

```
MERGE FILES
INPUT='input_files'
OUTPUT=output_file
```



Arguments

- INPUT: Specifies a space-separated list of Engineered System XML files to merge. The list of input files is surrounded by single quotes (').
- OUTPUT: Specifies the new target Engineered System XML file. The file is overwritten if it already exists.

4.3.17.3 SAVE FILE

Use this command to save a current set of actions to an Engineered System XML file.

Syntax

```
SAVE FILE
[ NAME=file_name ]
[ MAC={ true | false } ]
```

Arguments

- NAME: Optionally specifies the name of a new Engineered System XML file. If you do not specify the NAME argument, then the command overwrites the source file.
- MAC: When MAC=true, OEDACLI updates the Engineered System XML file with MAC addresses for the system components. The ILOM interfaces must be available for this operation.

4.3.17.4 SAVE FILES

Use this command to generate a full set of OEDA configuration files.

Syntax

```
SAVE FILES
LOCATION=dir_name
[ MAC={ true | false } ]
```

Arguments

- LOCATION: Specifies the name of a target directory for file creation.
- MAC: When MAC=true, OEDACLI updates the Engineered System XML file with MAC addresses for the system components. The ILOM interfaces must be available for this operation.

Usage Notes

The specified LOCATION directory is created if it does not already exist.

4.3.18 GUEST

You can clone or delete an Oracle VM guest.



CLONE GUEST

This command clones an existing VM guest and creates a new fully functional guest with storage, users, and Oracle RAC instances.

DELETE GUEST

This command deletes an existing Oracle VM guest, and removes all of its configuration: instances, software installations, storage, and users from the cluster.

4.3.18.1 CLONE GUEST

This command clones an existing VM guest and creates a new fully functional guest with storage, users, and Oracle RAC instances.

Prerequisites

Before you can clone an virtual machine (VM) guest, you must download the appropriate software images from My Oracle Support and extract the files. Place the extracted "klone.zip" files for Oracle Grid Infrastructure and Oracle Database in the /EXAVMIMAGES/onecommand/ <platform>/WorkDir directory in the VM host where the new guest clone will be created.

Syntax

```
CLONE GUEST
{ SRCNAME=source_guest TGTNAME=target_guest |
    TGTNAMES=target_guests }
[ WHERE
    STEPNAME=stepname ]
SET PARENT NAME=parent_name
[ SET ADMINNET NAME=admin_name IP=admin_ip [ GATEWAY=gateway
NETMASK=netmask ] ]
[ SET BACKUPNET NAME=backup_name IP=backup_ip ]
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 [ NATHOSTNAME=nat_host_name
NATIP=nat_ip NATDOMAINNAME=nat_domain_name, NATNETMASK=nat_netmask ]
```

SET VIPNET NAME=vip_name, IP=vip_ip

[SET VCPU COUNT=guest_cpu]
[SET VMEM SIZE=guest memory]

Arguments

- SRCNAME: Specifies the name of an existing guest VM from which the new guest VM is derived.
- TGTNAME: Specifies the host name of the new guest VM that you are creating with the clone operation.
- TGTNAMES: Specifies a comma-separated list of new guest VMs to add.
- STEPNAME: Specifies the deployment step to perform, which is one of the following:
 - CREATE GUEST
 - CREATE USERS
 - CELL CONNECTIVITY



- CONFIG CLUSTERWARE
- RUN ROOTSCRIPT
- EXTEND DBHOME
- ADD_INSTANCE

You can specify the following additional settings when specifying CLONE GUEST with the WHERE STEPNAME=CREATE_GUEST clause or when specifying CLONE GUEST without using any WHERE STEPNAME clause:

- PARENT: Specifies the name of the virtual machine (VM) host (Oracle Linux KVM or Oracle VM) that hosts the new guest.
- ADMINNET : Specifies the DNS name and IP address to use for the administration network. Also, optionally specifies the gateway and netmask for the administration network.
- BACKUPNET : Specifies the DNS name and IP address to use for the backup network. The DNS name may optionally include the domain name. Not required on guests without a backup network.
- PRIVNET : Specifies the names and IP addresses to use for the first and second private networks.
- INTERCONNECT: Only required if the compute nodes are configured with Exadata Secure RDMA Fabric Isolation or InfiniBand security (PKEYS). Specifies the names and IP addresses to use for the first and second private networks.
- CLIENTNET : Specifies the DNS name and IP address to use for the client network. May optionally include host name, IP address, domain name, and netmask details to support Network Address Translation (NAT).
- VIPNET : Specifies the DNS name and IP address to use for the virtual IP (VIP) network.

Usage Notes

- For configurations with Exadata Secure RDMA Fabric Isolation or InfiniBand security (PKEYS), INTERCONNECT defines the private network that connects the database nodes and PRIVNET defines the private storage network.
- When you load the XML configuration file to use when cloning a guest domain, the XML file should have the management domain (dom0) node of the source VM defined but not allocated to the cluster that is being extended into the guest domain.
- You should save the modified XML file after the actions are merged so that you have a new XML file that reflects the addition of the new guest domain.
- You can use the CLONE GUEST command to add a VM to a server that already contains a VM in the same cluster. Consequently, you can create a configuration where one VM host contains multiple VMs that are members of the same cluster. However, this capability is only available on systems not configured with Exadata Secure RDMA Fabric Isolation.
- During deployment, the cloned guest inherits various configuration attributes from the source guest, including the client network configuration and the backup network configurations (if present).

If all of the KVM hosts have the same network configuration, then the inherited attributes work as expected.

However, if the new KVM host uses a different physical network configuration, deployment of the cloned guest will fail. This situation is most likely when an Exadata system contains different versions of compute node hardware. For example, when adding an X10M server to an X8M-2 rack.



In this case, you must manually adjust the relevant network definition by using the ALTER NETWORK command before deployment. Contact Oracle Support for details.

Example 4-24 Cloning a Guest VM

This example shows how to clone a new guest from an existing node in the cluster. In this example, the source node name is exa0ladm01vm01.example.com and the new node is exa0ladm03vm01.example.com. A series of SET commands are used to specify the configuration for the new guest VM.

The XML file loaded at the beginning of this example has the dom0 node (host01adm01.example.com) defined but not allocated to the cluster that is being extended into the guest.

```
oedacli> LOAD FILE NAME=exa01-pre-cloning-node3.xml
oedacli> CLONE GUEST SRCNAME='exa01adm01vm01.example.com'
TGTNAME='exa01adm03vm01.example.com'
oedacli> SET PARENT NAME='exa01adm03.example.com' IP='10.xxx.xx.x'
oedacli> SET ADMINNET NAME='exa01adm03vm01.example.com' IP='10.xxx.xx.x'
oedacli> SET CLIENTNET NAME='exa01client03vm01.example.com' IP='10.xxx.xx.x'
oedacli> SET PRIVNET NAME1='exa01adm03vm01-priv' IP1='192.168.16.8'
NAME2='exa01adm01vm03-priv2' IP2='192.168.16.9'
oedacli> SET VIPNET NAME='exa01client03m01-vip.example.com' IP='10.xxx.xx.x'
oedacli> SET VIPNET NAME='exa01client03m01-vip.example.com' IP='10.xxx.xx.x'
oedacli> SET VIPNET NAME='exa01client03m01-vip.example.com' IP='10.xxx.xx.x'
oedacli> SAVE ACTION
oedacli> SAVE FILE NAME='exa01-cloned-node3-rac.xml'
oedacli> DEPLOY ACTIONS
```

Example 4-25 Cloning Multiple Guests Using TGTNAMES

This example clones dbguest23 and creates the new guests dbguest24 and dbguest25. By using the TGTNAMES argument, both new guests are deployed at the same time in the final DEPLOY ACTIONS.

```
CLONE GUEST SRCNAME='dbguest23' TGTNAME='dbguest24'
SET ADMINNET name='dbguest24' ip='10.128.161.202'
...
SAVE ACTION FORCE
CLONE GUEST SRCNAME='dbguest23' TGTNAME='dbguest25'
SET ADMINNET name='dbguest25' ip='10.128.161.203'
...
SAVE ACTION FORCE
CLONE GUEST TGTNAMES='dbguest24,dbguest25'
SAVE ACTION
MERGE ACTIONS
DEPLOY ACTIONS
```

Related Topics

- Expanding an Oracle VM RAC Cluster on Exadata Using OEDACLI
- Expanding an Oracle RAC Cluster in Oracle Linux KVM Using OEDACLI



4.3.18.2 DELETE GUEST

This command deletes an existing Oracle VM guest, and removes all of its configuration: instances, software installations, storage, and users from the cluster.

Syntax

```
DELETE GUEST
WHERE
{ SRCNAME=node_name [ STEPNAME=stepname ] |
     SRCNAMES='node_names' [ STEPNAME=stepname ] }
```

Arguments

- SRCNAME specifies the host name of an existing DomU that you want to delete.
- SRCNAMES specifies a comma-separated list of host names for existing guests that you want to delete. The specified list of host names must be surrounded by quotation marks.
- STEPNAME allows you to undo individual steps of the clone operation.

The value of stepname can be one of the following:

- ADD_INSTANCE
- EXTEND DBHOME
- RUN ROOTSCRIPT
- CONFIG CLUSTERWARE
- CELL CONNECTIVITY
- CREATE_USERS
- CREATE_GUEST

When used with DELETE GUEST, the STEPNAME clauses should be used in the reverse order of CLONE GUEST steps, and you should not skip any steps. For example, if you want to undo the ADD_NODE and ADD_INSTANCE steps, you would use the following commands:

```
DELETE GUEST WHERE SRCNAME=node_name STEPNAME=ADD_INSTANCE
DELETE GUEST WHERE SRCNAME=node_name STEPNAME=EXTEND_DBHOME
DELETE GUEST WHERE SRCNAME=node_name STEPNAME=ADD_NODE
```

Example 4-26 Deleting a Guest

The following example shows an OEDACLI session that uses the DELETE GUEST command along with typical output at each step.

```
oedacli> delete guest where srcname='dbm01vm103.example.com'
oedacli> save action
oedacli> merge actions
processMergeActions
Merging Action : delete guest where srcname='dbm01vm103.example.com'
Merging DELETE GUEST
Action Validated and Merged OK
oedacli> deploy actions
```

```
Deploying Action ID : 1 delete quest where srcname='dbm01vm103.example.com'
Deploying DELETE GUEST
Delete Guest
Removing Cell Connectivity...
Deleting cellip.ora and cellinit.ora on node dbm01vm103.example.com
Done deleting cellip.ora and cellinit.ora on dbm01vm103.example.com
Successfully completed removing cell connectivity [elapsed Time [Elapsed =
5018 mS [0.0 minutes] Wed May 05 10:29:51 PDT 2021]]
Deleting users on dbm01vm103.example.com ...
Deleting cluster users on node dbm01vm103.example.com
Deleting cluster users...
Deleting groups...
Done deleting users and groups on node dbm01vm103.example.com
Successfully completed deleting users on node(s)
dbm01vm103.example.com[elapsed Time [Elapsed = 6043 mS [0.0 minutes] Wed May
05 10:29:57 PDT 2021]]
Deleting KVM Guest dbm01vm103.example.com from dom0 dbm01adm03.example.com
KVM Guest dbm01vm103.example.com deleted successfully.
Done...
Done
```

4.3.19 ILOM

You can alter or list the ILOMS in the loaded ${\tt es.xml}$ file.

- ALTER ILOM
- LIST ILOMS

4.3.19.1 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=host_name |
ILOMNAME=ilom_host_name }
}
```

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

4.3.19.2 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.

4.3.20 LOGIN

You can check remote login to a machine or cluster.

CHECK LOGIN

4.3.20.1 CHECK LOGIN

This command checks remote login to a machine or cluster.

Syntax

```
CHECK LOGIN
WHERE
{ CLUSTERNUMBER=cluster_number |
CLUSTERNAME=cluster_name |
CLUSTERID=cluster_id |
HOSTNAME=host name }
```

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
- HOSTNAME : Specifies the name of an individual host

4.3.21 MACHINE

You can alter or list the machines in the es.xml file.

- ALTER MACHINE
- ALTER MACHINES
- LIST MACHINES

4.3.21.1 ALTER MACHINE

This command modifies attributes of an Engineered System machine, which is a physical server or virtual machine (VM) guest.

Syntax

```
ALTER MACHINE
   { { DNSSERVERS='dnsservers' |
      GATEWAYADAPTER=gatewayadapter |
       HOSTNAMEADAPTER=hostnameadapter |
      NTPSERVERS='ntpservers' |
       TIMEZONE=timezone |
      VSWITCH={ true | false } |
       TYPE=newmachinetype |
       ORADISKSIZE=oradisksize |
       ORADISKPATH=oradiskpath }...
     | ACTION={ START [ WAIT={ true | false } ] |
                  STOP [ WAIT={ true | false } ] |
                  RESTART [ WAIT={ true | false } ]
                  CREATEIMAGE IMAGEFILE=imagefile SIZE=size
[ FILESYSTEM=filesystem ] [ ZIPFILE=zipfile ] |
                  ATTACHDISK IMAGEFILE=imagefile MOUNTPATH=mountpath
[ FILESYSTEM=filesystem ] |
                  DETACHDISK IMAGEFILE=imagefile [ DELETE=delete ] |
                  SETVCPU [ VCPU=vcpu ] [ MAXVCPU=maxvcpu ] [ REBOOT={ true |
false } ] |
                  SETVMEM VMEM=vmem [ REBOOT={ true | false } ] } 
WHERE
   { ID=id |
     HOSTNAME=hostname |
     CLUSTERNUMBER=clusternumber { COMPUTENUMBER=computenumber |
STORAGENUMBER=storagenumber }
     CLUSTERNAME=clustername { COMPUTENUMBER=computenumber |
STORAGENUMBER=storagenumber } |
     CLUSTERID=clusterid { COMPUTENUMBER=computenumber |
STORAGENUMBER=storagenumber } }
```

Arguments

You can specify the following arguments for the machine:



- DNSSERVERS: Comma-separated list of DNS servers for the machine. Enclose the list in single quotes (').
- GATEWAYADAPTER: Network adapter to use for the machine gateway: ADMIN or CLIENT
- HOSTNAMEADAPTER: Network adapter to use for the machine hostname: ADMIN or CLIENT
- NTPSERVERS: Comma-separated list of NTP servers for the machine. Enclose the list in single quotes (').
- TIMEZONE: Timezone specification for the machine
- VSWITCH: Specifies if the machine is connected to a vswitch. Default is false.
- TYPE: Sets a machine as new type. For example: X8XT
- ORADISKSIZE: Size (in GB) of the Oracle software volume (typically /u01). Default is 20, minimum is 10.
- ORADISKPATH: Mount point of the Oracle software volume. Default is /u01. For non-default values, take great care to ensure other paths are compatible with the setting.
- ACTION: Action to perform against the specified VM guest machine. One of the following:
 - START: Starts the specified guest. The action completes when the machine is ready for SSH connections. There is no error if the machine is already started.
 - STOP: Stops the specified guest. The action completes when the machine is shut down.
 There is no error if the machine is already stopped.
 - RESTART: Stops and then starts the specified guest. The action completes when the machine is ready for SSH connections. There is no error if the machine is already stopped.
 - CREATEIMAGE: Creates a disk image in the hypervisor for subsequent ATTACHDISK commands.
 - ATTACHDISK: Attaches a disk image from the hypervisor to a running guest and mounts the file system in the guest. FILESYSTEM must be specified if the default (xfs) is not used.
 - DETACHDISK: Unmount the file system and detach a disk image from a guest, and optionally delete the disk image.
 - SETVCPU: Changes the CPU resource allocation for a guest. The action allows allocation increases and reductions within the limit specified by the maxcpu value in the vm.cfg file. The action can operate on a running guest. A reboot is not required to enable changes.
 - SETVMEM: Changes the RAM resource allocation for a guest. A reboot is required to enable a change.

The following ACTION arguments are available:

- WAIT: Optionally specifies whether to wait for the associated action to complete.
 Default is true. With WAIT=false, the action starts asynchronously, and the command returns immediately with no indication or guarantee of success.
- IMAGEFILE: Name of the disk image file
- SIZE: Size (in GB) of the disk image file
- FILESYSTEM: File system type used in the disk image. Default is xfs. Alternative is ext4.
- ZIPFILE: Zip file used to optionally populate a new disk image



- MOUNTPATH: Guest directory used to mount the disk image
- DELETE: Optionally specifies whether to delete the disk image. Default is false.
- VCPU: Number of Virtual CPUs allocated to the guest machine
- MAXVCPU: Maximum number of Virtual CPUs allocated to the guest machine
- VMEM: Amount of RAM (in GB) allocated to the guest machine
- REBOOT: Optionally specifies whether to automatically reboot the guest. Default is false.

The following arguments are available in the WHERE clause:

- ID: Specifies the identifier for the target machine in the OEDA XML file (es.xml)
- HOSTNAME: Specifies the current host name of the target machine
- CLUSTERNUMBER: Cluster number associated with target machine in the OEDA XML file (es.xml), starting at 1
- CLUSTERNAME: Name of the cluster associated with target machine in the OEDA XML file (es.xml)
- CLUSTERID: ID of the cluster associated with target machine in the OEDA XML file (es.xml)
- COMPUTENUMBER: The compute node number associated with target machine in the OEDA XML file (es.xml). The numbering of compute nodes starts at 1 for each cluster.
- STORAGENUMBER: The storage server number associated with target machine in the OEDA XML file (es.xml). The numbering of storage servers starts at 1 for each cluster.

Example 4-27 ACTION Examples

The following examples show commands that use the ACTION argument:

• Start a guest:

ALTER MACHINE ACTION=START WHERE HOSTNAME=nodelhostname

• Stop a guest:

ALTER MACHINE ACTION=STOP WHERE HOSTNAME=nodelhostname

Restart a guest:

ALTER MACHINE ACTION=RESTART WHERE HOSTNAME=nodelhostname



Create a disk image:

ALTER MACHINE ACTION=CREATEIMAGE IMAGEFILE=example.img SIZE=2 WHERE HOSTNAME=node1hostname

ALTER MACHINE ACTION=CREATEIMAGE IMAGEFILE=example.img SIZE=2 ZIPFILE=data.zip WHERE HOSTNAME=node1hostname

ALTER MACHINE ACTION=CREATEIMAGE IMAGEFILE=example.img SIZE=2 FILESYTEM=ext4 WHERE HOSTNAME=node1hostname

ALTER MACHINE ACTION=CREATEIMAGE IMAGEFILE=example.img SIZE=2 FILESYTEM=ext4 ZIPFILE=data.zip WHERE HOSTNAME=nodelhostname

Attach a disk image:

ALTER MACHINE ACTION=ATTACHDISK IMAGEFILE=/EXAVMIMAGES/example.img MOUNTPATH=/u02 WHERE HOSTNAME=node1hostname

ALTER MACHINE ACTION=ATTACHDISK IMAGEFILE=/EXAVMIMAGES/example.img MOUNTPATH=/u02 FILESYSTEM=ext4 WHERE HOSTNAME=node1hostname

Detach a disk image:

ALTER MACHINE ACTION=DETACHDISK IMAGEFILE=example.img WHERE HOSTNAME=node1hostname

ALTER MACHINE ACTION=DETACHDISK IMAGEFILE=example.img DELETE=true WHERE HOSTNAME=nodelhostname

Change the CPU resource allocation:

ALTER MACHINE ACTION=SETVCPU MAXVCPU=12 VCPU=12 WHERE HOSTNAME=node1hostname

Change the RAM resource allocation:

ALTER MACHINE ACTION=SETVMEM VMEM=9 WHERE HOSTNAME=node1hostname

4.3.21.2 ALTER MACHINES

This command modifies attributes of a collection of Engineered System machines.

Syntax

```
ALTER MACHINES
{ ORADISKSIZE=oradisksize |
ORADISKPATH=oradiskpath |
IMAGEVERSION=imageversion }...
```



WHERE

```
{ CLUSTERNUMBER=clusternumber |
  CLUSTERNAME=clustername |
  CLUSTERID=clusterid |
  TYPE=GUESTS }
```

Arguments

You can specify the following arguments for the machine:

- ORADISKSIZE: Size (in GB) of the Oracle software volume (typically /u01). Default is 20, minimum is 10.
- ORADISKPATH: Mount point of the Oracle software volume. Default is /u01. For non-default values, take great care to ensure other paths are compatible with the setting.
- IMAGEVERSION: The version of the image to deploy on guest machines. This argument is only applicable to guest machines (WHERE TYPE=GUEST).

The following arguments are available in the WHERE clause:

- CLUSTERNUMBER: Cluster number associated with target machine in the OEDA XML file (es.xml), starting at 1
- CLUSTERNAME: Name of the cluster associated with target machine in the OEDA XML file (es.xml)
- CLUSTERID: ID of the cluster associated with target machine in the OEDA XML file (es.xml)
- TYPE=GUEST: Applies the change to all guest machines. This option is only applicable when setting the IMAGEVERSION.

4.3.21.3 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 |
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, DOMO, GUEST, DOMU, KVM, Or KVMGUEST.
- 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 $\tt WHERE$ clause, then this command lists all the machines defined in the <code>es.xml</code> file.

4.3.22 NETWORK

You can add, alter, delete, or list the networks defined in the XML configuration file.

- ADD NETWORK
- ALTER NETWORK
- ALTER NETWORKS
- DELETE NETWORK
- LIST NETWORKS

4.3.22.1 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
   [ MTU=mtu ]
   [ GATEWAY=gateway ]
   [ SSHENABLED={ true | false } ]
   [ MAC=mac addr ]
   [ LINKSPEED=nic speed ]
   [ SLAVE='slave' ]
   [ PKEY=pkey ]
   [ PKEYNAME=pkey name ]
   [ STATUS = status ]
   [ LACP={ true | false } ]
   [ VLANID=vlan id ]
   [ INTERFACENAME=interface name ]
   [ DESCRIPTION='network_description' ]
   [ VSWITCHNETWORKPARAMS='vswitchnetwork parameters' ]
   [ NATHOSTNAME=nat_host_name ]
   [ NATIP=nat ip addr ]
   [ NATDOMAINNAME=nat domain name ]
   [ NATNETMASK=nat mask ]
WHERE
   { HOSTNAME=hostname |
     CLUSTERNAME=cluster_name { COMPUTENUMBER=compute_number |
STORAGENUMBER=storage number } |
     CLUSTERNUMBER=cluster name { COMPUTENUMBER=compute number |
STORAGENUMBER=storage number } }
```



Arguments

You can specify the following attributes when adding a network:

- NETWORKTYPE: Specifies the type of network, which can be ADMIN, CLIENT, BACKUP, PRIVATE, OTHER, INGESTVIP, REPLICATIONVIP, or ILOM.
- HOSTNAME: Specifies the short host name for the network
- IP: Specifies the IP address of the network
- NETMASK: Specifies the network netmask
- DOMAINNAME: Specifies the domain name of the network
- MASTER: Specifies the primary adapter name
- MTU: Specifies the network MTU (maximum transmission unit). Not applicable for PRIVATE or ILOM networks.
- GATEWAY: Specifies the network subnet gateway
- SSHENABLED: TRUE indicates that SSH should be enabled for this adapter
- MAC: Specifies the MAC address
- LINKSPEED: Either 10000 or 25000. Only for X7-2 or later 2-socket compute nodes.
- SLAVE: Specifies a space-separated list of secondary devices for a bonded network, enclosed in single quotes
- PKEY: Specifies the pkey, for PRIVATE networks only
- PKEYNAME: Specifies the pkey name, for PRIVATE networks only
- STATUS: Specifies the status of the network
- LACP: TRUE indicates that LACP should be enabled
- VLANID: Specifies the VLAN identifier. Applicable if the network is a non-private VLAN network, or a VLAN network on a KVM guest.
- INTERFACENAME: The name for the private network on the VLAN for a KVM guest and cell, clre[0-1] or stre[0-1].
- DESCRIPTION: The text description for this network, surrounded by single quotes.
- VSWITCHNETWORKPARAMS: Parameters required for vswitches, surrounded by single quotes.
- 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

4.3.22.2 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={ true | false } |
    MAC=mac addr |
    MTU=mtu |
    LINKSPEED=nic speed |
     SLAVE='slave' |
    PKEY=pkey |
    PKEYNAME=pkey name |
    STATUS=status |
    LACP={ true | false } |
    VLANID=vlan id |
     INTERFACENAME=interface_name |
     DESCRIPTION='network description' |
    VSWITCHNETWORKPARAMS='vswitchnetwork parameters' |
    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 primary adapter name



- GATEWAY: Specifies the network subnet gateway
- SSHENABLED: TRUE indicates that SSH should be enabled for this adapter
- MAC: Specifies the MAC address
- MTU: Specifies the network MTU (maximum transmission unit). Not applicable for PRIVATE or ILOM networks.
- LINKSPEED: Either 10000 or 25000. Only for X7-2 or later 2-socket compute nodes.
- SLAVE: Specifies a space-separated list of secondary devices for a bonded network, enclosed in single quotes
- PKEY: Specifies the pkey, for PRIVATE networks only
- PKEYNAME: Specifies the pkey name, for PRIVATE networks only
- STATUS: Specifies the status of the network
- LACP: TRUE indicates that LACP should be enabled
- VLANID: Specifies the VLAN identifier. Applicable if the network is a non-private VLAN network, or a VLAN network on a KVM guest.
- INTERFACENAME: The name for the private network on the VLAN for a KVM guest and cell, clre[0-1] or stre[0-1].
- DESCRIPTION: The text description for this network, surrounded by single quotes.
- VSWITCHNETWORKPARAMS: Parameters required for vswitches, surrounded by single quotes.
- 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

4.3.22.3 ALTER NETWORKS

This command modifies the VLAN number for the specified machines.



Syntax

```
ALTER NETWORKS
VLANID=vlan_id
WHERE
HOSTNAMES=hostnames
NETWORKTYPE=network type
```

Arguments

- VLANID: Specifies the VLAN identifier.
- HOSTNAMES: Specifies a comma-separated list of host names
- NETWORKTYPE: Specifies the type of network, which can be ADMIN, CLIENT, BACKUP, PRIVATE (storage private network), or CLUSTERPRIVATE.

Usage Notes

- During corresponding MERGE ACTIONS processing, the VLAN identifier is set even if the specified host does not have an existing VLAN.
- During corresponding DEPLOY ACTIONS processing, the storage cells reboot in parallel to enable the new VLAN identifier.

4.3.22.4 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

4.3.22.5 LIST NETWORKS

This command lists the network details.

Syntax

```
LIST NETWORKS

[ WHERE

    { ID=network_id |

    HOSTNAMES=ALL [ NETWORKTYPE=network_type ] |

    HOSTID=host_id [ NETWORKTYPE=network_type ] |

    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 ] } ]
```

Arguments

The following arguments are available in the WHERE clause:

- ID : Specifies the ID for the network object in the XML configuration file
- HOSTNAMES=ALL : Specifies all hosts
- NETWORKTYPE : Specifies the type of network, which can be ADMIN, CLIENT, BACKUP, PRIVATE, or ILOM.
- HOSTID : Specifies the host ID in the XML configuration file
- HOSTNAME : Specifies the host name for an existing compute node
- 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

4.3.23 PASSWORD

You can specify the default passwords.

 ALTER PASSWORD Modifies the OEDA properties that specifies the default passwords.

4.3.23.1 ALTER PASSWORD

Modifies the OEDA properties that specifies the default passwords.



Syntax

```
ALTER PASSWORD
[ PASSWORD=new_password ]
WHERE
USER={ ROOT | NONROOT }
```

Arguments

- PASSWORD: Specifies the new password.
- USER: Specifies the user type; either ROOT or NONROOT.

Usage Notes

If the PASSWORD argument is not specified, then the user is prompted to specify and verify the password interactively.

4.3.24 PROPERTY

You can set OEDA properties.

- ALTER PROPERTY
 Modifies an OEDA properties parameter.
- LIST PROPERTIES
 Displays information about OEDA properties.

4.3.24.1 ALTER PROPERTY

Modifies an OEDA properties parameter.

Syntax

```
ALTER PROPERTY
NAME=property_name
VALUE=value
WHERE
[ OS=os_name ]
```

Arguments

- NAME: Specifies the name of the property to alter. See LIST PROPERTIES to display the available properties.
- VALUE: Specifies the new property value
- OS: Optionally specifies the operating system that is associated with the property. Permitted values are: LINUX, SPARC, WINDOWS, MAC, OVM, or WEB.

Usage Notes

If the OS argument is not specified, then the property is updated in the main es.properties file is updated.



4.3.24.2 LIST PROPERTIES

Displays information about OEDA properties.

Syntax

```
LIST PROPERTIES
[ WHERE
OS=os_name ]
```

Arguments

• OS: Optionally specifies the operating system that is associated with the properties. Permitted values are: LINUX, SPARC, WINDOWS, MAC, OVM, or WEB.

Usage Notes

If the OS argument is not specified, then the properties in the main es.properties are displayed.

4.3.25 RACK

You can manage an Engineered System rack.

- ADD RACK Add a new rack to the Engineered System XML file.
- ALTER RACK Modify a rack in the Engineered System XML file.
- LIST RACKS
 Displays information about racks in the Engineered System XML file.
- LIST RACKDESCRIPTION
 Displays information about rack types supported by OEDA.

4.3.25.1 ADD RACK

Add a new rack to the Engineered System XML file.

Syntax

```
ADD RACK

TYPE=ELASTIC

MODEL={ X7 | X8 | X8M }

SRCRACK=srcrack

SET ADMIN NAME=admin_name IP=admin_ip

SET LEAF1 NAME=leaf1_name IP=leaf1_ip

SET LEAF2 NAME=leaf2_name IP=leaf2_ip

[ SET SPINE NAME=spine_name IP=spine_ip ]

[ SET PDU1 NAME=pdu1_name IP=pdu1_ip ]

[ SET PDU2 NAME=pdu2_name IP=pdu2_ip ]
```



Arguments

- TYPE: Specifies the ELASTIC rack type.
- MODEL: Specifies the rack model. Permitted values are: X7, X8, or X8M.
- SRCRACK: Specifies the es.xml identifier of the existing rack, which is used as the template for the new rack.

You can set the following options for the new rack:

- ADMIN : Specifies the DNS name and IP address to use for the administration network switch. The DNS name may optionally include the domain name.
- LEAF1 : Specifies the DNS name and IP address to use for the first leaf switch. The DNS name may optionally include the domain name.
- LEAF2 : Specifies the DNS name and IP address to use for the second leaf switch. The DNS name may optionally include the domain name.
- SPINE : Optionally specifies the DNS name and IP address to use for the spine switch. The DNS name may optionally include the domain name.
- PDU1 : Optionally specifies the DNS name and IP address to use for the first PDU. The DNS name may optionally include the domain name.
- PDU2 : Optionally specifies the DNS name and IP address to use for the second PDU. The DNS name may optionally include the domain name.

4.3.25.2 ALTER RACK

Modify a rack in the Engineered System XML file.

Syntax

```
ALTER RACK

ULOC={ ulocation | 0 | GENERATE }

WHERE

RACKNUMBER=rack_number

[ HOSTNAME=host_name ]

ALTER RACK

{ DESCRIPTION=description |

RACKID=rack_type } ...

WHERE
```

```
RACKNUMBER=rack_number
```

Arguments

You can modify the following attributes:

- ULOC: Sets the rack location (uloc) as follows:
 - ULOC=ulocation: Specifies a rack location for a specific host or switch
 - ULOC=0: Sets the rack location to 0 (zero) for all hosts and switches in the specified rack.



- ULOC=GENERATE: Assigns valid rack locations to all hosts and switches in the specified rack.
- DESCRIPTION: Sets the rack description
- RACKID: Sets the rack type

The following arguments are available in the WHERE clause:

- RACKNUMBER: Specifies the number of the rack in the Engineered System XML file, starting at 1
- HOSTNAME: Specifies the host name for a specific host or switch

Usage Notes

If you use the ULOC argument and supply a specific rack location (ULOC=ulocation), then you must specify HOSTNAME=host name in the WHERE clause.

4.3.25.3 LIST RACKS

Displays information about racks in the Engineered System XML file.

Syntax

LIST RACKS

4.3.25.4 LIST RACKDESCRIPTION

Displays information about rack types supported by OEDA.

Syntax

```
LIST RACKDESCRIPTION [ WHERE
TYPE=rack ]
```

Arguments

TYPE: Optionally specifies the rack model that you want to use to limit the command output.

Usage Notes

If the WHERE clause is omitted, all rack types are displayed.

4.3.26 REQUIREDFILES

You can display information about required files.

LIST REQUIREDFILES

Displays information about required installation files for Oracle Grid Infrastructure or Oracle Database.

4.3.26.1 LIST REQUIREDFILES

Displays information about required installation files for Oracle Grid Infrastructure or Oracle Database.



Syntax

```
LIST REQUIREDFILES
{
GRID |
DATABASE |
GIVERSION='<giversion>' |
DBVERSION='<dbversion>' }
}
```

Arguments

- GRID: Displays information about required files for Oracle Grid Infrastructure
- DATABASE: Displays information about required files for Oracle Database
- GIVERSION: Specifies the Oracle Grid Infrastructure version including the release update (RU). For example: 12.1.0.2.170418.
- DBVERSION: Specifies the Oracle Database version including the release update (RU). For example: 12.1.0.2.170418.

Usage Notes

- Use GIVERSION or DBVERSION when no es.xml file is loaded.
- Use LIST SOFTWAREVERSIONS { GRID | DATABASE } to display information about software versions.

4.3.27 REMOTE

You can run a command on a remote host.

• EXEC REMOTE Runs a command on remote hosts.

4.3.27.1 EXEC REMOTE

Runs a command on remote hosts.

Syntax

```
EXEC REMOTE
COMMAND='command'
WHERE
HOSTNAMES='host names'
```

Section Title

- COMMAND: Specifies the command to run on the specified hosts.
- HOSTNAMES: Specifies the comma-separated list of remote hosts.

4.3.28 SCAN

You can add, alter, delete, or list the SCANs for a cluster.

ADD SCAN



- ALTER SCAN
- DELETE SCAN
- LIST SCANS

4.3.28.1 ADD SCAN

This command adds a SCAN to the an Oracle Grid Infrastructure cluster.

Syntax

```
ADD SCAN

SCANNAME=scan_name

[ SCANFORT=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 : Optionally 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

4.3.28.2 ALTER SCAN

This command modifies the attributes of a SCAN for an Oracle Grid Infrastructure 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

4.3.28.3 DELETE SCAN

This command removes the SCAN for an Oracle Grid Infrastructure 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

4.3.28.4 LIST SCANS

This command lists the SCAN details for all Oracle Grid Infrastructure clusters or for an individual cluster.

Syntax

```
LIST SCANS
[ WHERE
{ ID=scan_id |
CLUSTERNAME=cluster_name |
CLUSTERNUMBER=cluster_number |
CLUSTERID=cluster_id } ]
```

Arguments

The following arguments are available in the WHERE clause:

- ID : 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.

4.3.29 SECURITY

You can manage security settings.

SET SECURITY

This command performs security-related actions, like setting the non-default root password for the OEDACLI session or controlling password-based authentication.

4.3.29.1 SET SECURITY

This command performs security-related actions, like setting the non-default root password for the OEDACLI session or controlling password-based authentication.

Prerequisites

Before you can use this command with the ENABLEPASSWORDLOGIN option, you must configure SSH key-based authentication on the target system. See DEPLOY SSHKEYS.

Syntax

```
SET SECURITY
PASSWORD=root_password
```

```
SET SECURITY
ENABLEPASSWORDLOGIN={ true | false }
[ HOSTNAMES="host1[,host2[,host3 ...]]" ]
```

Arguments

- PASSWORD: Specifies the non-default root password for the OEDACLI session
- ENABLEPASSWORDLOGIN: Specifies whether to enable or disable password-based authentication for the root user
- HOSTNAMES: Optionally specifies the list of host names on which to act

Usage Notes

If the HOSTNAMES argument is not specified, then the command acts on the currently loaded Engineered System XML file.

4.3.30 SOFTWAREVERSIONS

You can check supported software versions.

LIST SOFTWAREVERSIONS

Displays information about supported versions of Oracle Grid Infrastructure and Oracle Database.



4.3.30.1 LIST SOFTWAREVERSIONS

Displays information about supported versions of Oracle Grid Infrastructure and Oracle Database.

Syntax

LIST SOFTWAREVERSIONS [GRID | DATABASE]

Arguments

- GRID: Displays information about supported versions of Oracle Grid Infrastructure
- DATABASE: Displays information about supported versions of Oracle Database

Usage Notes

• If neither argument (GRID or DATABASE) is specified, then LIST SOFTWAREVERSIONS displays information about supported software versions for Oracle Grid Infrastructure and Oracle Database.

4.3.31 SSHKEYS

You can generate and deploy SSH keys for root user authentication on Oracle Exadata Rack.

DEPLOY SSHKEYS

This command configures SSH key-based authentication on all hosts in the Engineered System XML file (es.xml), or the host names specified in the command.

• GENERATE SSHKEYS

This command generates SSH key pairs for all hosts in the Engineered System XML file (es.xml), or the host names specified in the command. The keys are saved in the OEDA <code>WorkDir</code>.

SET SSHKEYS

This command enables and disables SSH key-based authentication for remote commands run by OEDACLI.

4.3.31.1 DEPLOY SSHKEYS

This command configures SSH key-based authentication on all hosts in the Engineered System XML file (es.xml), or the host names specified in the command.

Syntax

```
DEPLOY SSHKEYS
[ PASSWORD=root_password ]
[ ENABLEPASSWORDLOGIN={ true | false } ]
[ HOSTNAMES="host1[,host2[,host3 ...]]" ]
```

Arguments

 PASSWORD: Optionally specifies the non-default root password for connecting to the hosts to set up SSH key access



- ENABLEPASSWORDLOGIN: Optionally specifies whether to enable or disable password-based authentication for the root user after SSH key access is set up
- HOSTNAMES: Optionally specifies the list of host names on which to deploy SSH keys

Usage Notes

- If the SSH key pairs are not located in the OEDA WorkDir, then the command also generates them.
- If the HOSTNAMES argument is not specified, then the command acts on the currently loaded Engineered System XML file.

Example 4-28 Deploy SSH keys for all hosts of an XML file

```
oedacli> LOAD FILE NAME=es.xml
SUCCESS - file loaded
edacli> DEPLOY SSHKEYS ENABLEPASSWORDLOGIN=false
```

Example 4-29 Deploy SSH keys for specified hosts

oedacli> DEPLOY SSHKEYS ENABLEPASSWORDLOGIN=false PASSWORD="password" HOSTNAMES="dbm01adm05.example.com,dbm01adm06.example.com"

4.3.31.2 GENERATE SSHKEYS

This command generates SSH key pairs for all hosts in the Engineered System XML file (es.xml), or the host names specified in the command. The keys are saved in the OEDA WorkDir.

Syntax

GENERATE SSHKEYS [HOSTNAMES="host1[, host2[, host3 ...]]"]

Arguments

HOSTNAMES optionally specifies the list of host names for which to generate SSH keys.

Usage Notes

 If the HOSTNAMES argument is not specified, then the command acts on the currently loaded Engineered System XML file.

Example 4-30 Generate SSH keys for all hosts of an XML file

```
oedacli> LOAD FILE NAME=es.xml
SUCCESS - file loaded
edacli> GENERATE SSHKEYS
Creating SSH Key Pairs for hosts [dbm01adm01.example.com,
dbm01adm02.example.com, ...]...
Generated SSH Keys for [dbm01adm01.example.com, dbm01adm02.example.com, ...]
```



Example 4-31 Generate SSH keys for specified hosts

```
oedacli> GENERATE SSHKEYS
HOSTNAMES="dbm02adm05.example.com,dbm02adm06.example.com"
Creating SSH Key Pairs for hosts [dbm02adm06.example.com,
dbm02adm05.example.com]...
Generated SSH Keys for [dbm02adm06.example.com, dbm02adm05.example.com]
```

4.3.31.3 SET SSHKEYS

This command enables and disables SSH key-based authentication for remote commands run by OEDACLI.

Prerequisites

Before you can use this command, you must configure SSH key-based authentication on the target system. See DEPLOY SSHKEYS.

Syntax

```
SET SSHKEYS ENABLE={ true | false }
```

Arguments

• ENABLE specifies whether or not to enable SSH key-based authentication for remote commands run by OEDACLI.

4.3.32 STEPS

You can display the steps for a virtual CREATE CLUSTER deployment.

LIST STEPS

This command lists the steps for a virtual CREATE CLUSTER deployment.

4.3.32.1 LIST STEPS

This command lists the steps for a virtual CREATE CLUSTER deployment.

Each step is named, for example Create Virtual Machine. Each step also has a one word identifier, for example, CREATEVM. The short name identifier is used when specifying STEPS or SKIPSTEPS in other commands, such as the CREATE CLUSTER command.

The list of valid steps for a cluster depends on the features selected for the cluster. The steps listed are valid for the identified cluster. If the XML file contains only 1 cluster, then there is no need to identify the cluster explicitly.

The step numbers listed may change depending on features implemented for the cluster, but the short name identifier is always the same for a given step.

Syntax

```
LIST STEPS
[ WHERE
{ CLUSTERNUMBER=cluster number |
```



```
CLUSTERNAME=cluster_name |
ID=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
- ID: Specifies the es.xml ID of the cluster

Example 4-32 Listing the Steps for a Specific Cluster

```
oedacli> LIST STEPS WHERE CLUSTERNAME = Cluster-c1
{
  "step" : [ {
    "stepName" : "Validate Configuration File",
    "shortName" : "VALIDATE",
    "id" : "1"
  }, {
    "stepName" : "Create Virtual Machine",
    "shortName" : "CREATEVM",
    "id" : "2"
  }, {
    "stepName" : "Create Users",
    "shortName" : "USERS",
    "id" : "3"
  }, {
    "stepName" : "Setup Cell Connectivity",
    "shortName" : "CELLCONN",
    "id" : "4"
  }, {
    "stepName" : "Calibrate Cells",
    "shortName" : "CALIBRATE",
    "id" : "5"
  }, {
    "stepName" : "Create Cell Disks",
    "shortName" : "CELLDISKS",
    "id" : "6"
 }, {
    "stepName" : "Create Grid Disks",
    "shortName" : "GRIDDISKS",
    "id" : "7"
  }, {
    "stepName" : "Install Cluster Software",
    "shortName" : "INSTALLGI",
    "id" : "8"
  }, {
    "stepName" : "Initialize Cluster Software",
    "shortName" : "INITGI",
    "id" : "9"
  }, {
    "stepName" : "Install Database Software",
    "shortName" : "INSTALLDB",
    "id" : "10"
```



```
}, {
 "stepName" : "Relink Database with RDS",
 "shortName" : "RELINK",
  "id" : "11"
}, {
  "stepName" : "Create ASM Diskgroups",
  "shortName" : "ASMDG",
  "id" : "12"
}, {
  "stepName" : "Create Databases",
  "shortName" : "DATABASE",
  "id" : "13"
}, {
  "stepName" : "Apply Security Fixes",
  "shortName" : "APPLYFIXES",
  "id" : "14"
}, {
  "stepName" : "Install Exachk",
  "shortName" : "EXACHK",
  "id" : "15"
}, {
  "stepName" : "Create Installation Summary",
  "shortName" : "INSTALLSUMMARY",
  "id" : "16"
}, {
  "stepName" : "Resecure Machine",
  "shortName" : "RESECURE",
  "id" : "17"
} ]
```

4.3.33 STORAGEPOOL

}

- ADD STORAGEPOOL This command adds a new Exascale storage pool.
- ALTER STORAGEPOOL
 This command alters an existing Exascale storage pool.
- DELETE STORAGEPOOL
 This command deletes an existing Exascale storage pool.
- LIST STORAGEPOOL
 This command displays details for an existing Exascale storage pool.
- LIST STORAGEPOOLS
 This command displays details for existing Exascale storage pools.

4.3.33.1 ADD STORAGEPOOL

This command adds a new Exascale storage pool.

Syntax

```
ADD STORAGEPOOL
NAME = storagepoolname
```



```
[ SIZE = size ]
[ TYPE = storagetype ]
CELLLIST = 'celllist'
[ WHERE
EXASCALECLUSTER = exascaleclustername ]
```

Arguments

- NAME: Specifies the name of the Exascale storage pool.
- SIZE: Optionally, specifies the size of the storage pool in GB. If not specified, then the storage pool receives all of the available space in the specified cells.
- TYPE: Specify EF to create a flash-based storage pool using High Capacity Exadata storage servers. Otherwise, the storage pool media type is derived from the Exadata storage server type.
- CELLLIST: Specifies the list of Exadata storage servers to use for the storage pool. The
 value is a space-seperated list of cell names, or use ALL to specify all available cells in the
 OEDA configuration file (es.xml). Note that the value is also surrounded by single quotes
 (as displayed in the command syntax).

The following argument is available in the WHERE clause:

• EXASCALECLUSTER: Specifies the name for the Exascale cluster that contains the new storage pool.

Usage Notes

- When you use the ADD STORAGEPOOL command, there is no immediate check to validate the specified storage pool size. However, deployment fails with an error if there is insufficient space.
- The WHERE clause is optional if the OEDA configuration file (es.xml) contains only one Exascale cluster. Otherwise, the WHERE clause is mandatory.

4.3.33.2 ALTER STORAGEPOOL

This command alters an existing Exascale storage pool.

Syntax

```
ALTER STORAGEPOOL

[ NAME = storagepoolname ]

[ SIZE = size ]

[ TYPE = storagetype ]

[ ADDCELLS = 'addcelllist' ]

[ DROPCELLS = 'dropcelllist' ]

WHERE

[ EXASCALECLUSTER = exascaleclustername ]

NAME = storagepoolname
```

Arguments

- NAME: Changes the name of the Exascale storage pool.
- SIZE: Changes the size (in GB) of the storage pool.



- TYPE: Specify EF to create a flash-based storage pool using High Capacity Exadata storage servers. Otherwise, the storage pool media type is derived from the Exadata storage server type.
- ADDCELLS: Specifies the list of Exadata storage servers to add to the storage pool. The value is a space-seperated list of cell names. Note that the value is also surrounded by single quotes (as displayed in the command syntax).
- DROPCELLS: Specifies the list of Exadata storage servers to remove from the storage pool. The value is a space-seperated list of cell names. Note that the value is also surrounded by single quotes (as displayed in the command syntax).

The following arguments are available in the WHERE clause:

- EXASCALECLUSTER: Specifies the name of the Exascale cluster that contains the storage pool. This argument is optional if the OEDA configuration file (es.xml) contains only one Exascale cluster.
- NAME: Specifies the name for the Exascale storage pool that you want to alter.

Usage Notes

• When you use the ALTER STORAGEPOOL command, there is no immediate check to validate the specified storage pool size. However, deployment fails with an error if there is insufficient space.

4.3.33.3 DELETE STORAGEPOOL

This command deletes an existing Exascale storage pool.

Syntax

```
DELETE STORAGEPOOL
WHERE
[ EXASCALECLUSTER = exascaleclustername ]
NAME = storagepoolname
```

Arguments

The following arguments are available in the WHERE clause:

- EXASCALECLUSTER: Specifies the name of the Exascale cluster that contains the storage pool. This argument is optional if the OEDA configuration file (es.xml) contains only one Exascale cluster.
- NAME: Specifies the name for the Exascale storage pool that you want to delete.

Usage Notes

• You cannot delete an Exascale storage pool while it provides resources to Oracle Grid Infrastructure or an Oracle database.

4.3.33.4 LIST STORAGEPOOL

This command displays details for an existing Exascale storage pool.



Syntax

```
LIST STORAGEPOOL
WHERE
[ EXASCALECLUSTER = exascaleclustername ]
NAME = storagepoolname
```

Arguments

The following arguments are available in the WHERE clause:

- EXASCALECLUSTER: Specifies the name of the Exascale cluster that contains the storage pool. This argument is optional if the OEDA configuration file (es.xml) contains only one Exascale cluster.
- NAME: Specifies the name for the Exascale storage pool that you want to display.

4.3.33.5 LIST STORAGEPOOLS

This command displays details for existing Exascale storage pools.

Syntax

```
LIST STORAGEPOOLS
[ WHERE
EXASCALECLUSTER = exascaleclustername ]
```

Arguments

The following arguments are available in the WHERE clause:

• EXASCALECLUSTER: Specifies the name of an existing Exascale cluster.

4.3.34 STORAGETEMPLATES

LIST STORAGETEMPLATES

This command displays details for the Exascale storage templates.

4.3.34.1 LIST STORAGETEMPLATES

This command displays details for the Exascale storage templates.

Syntax

LIST STORAGEPOOLTEMPLATES

4.3.35 SWITCH

You can display and manage the switches.

ADD SWITCH

Add a new switch to a rack in the Engineered System XML file.



- ALTER SWITCH
- LIST SWITCHES

4.3.35.1 ADD SWITCH

Add a new switch to a rack in the Engineered System XML file.

Syntax

```
ADD SWITCH

WHERE

{ RACKID=rack_id |

RACKNUMBER=rack_number }

SET ADMINNET NAME=admin_name, IP=admin_ip [, GATEWAY=gateway,

NETMASK=netmask ]

SET DESCRIPTION VALUE=description

[ SET IBPARTITIONMEMBERSHIP VALUE=pkey_membership ]

[ SET ULOC VALUE=ulocation ]

[ SET ULOC VALUE=ulocation ]

[ SET TIMEZONE VALUE=timezone ]

[ SET DNSSERVERS IP1=dns_ip1, IP2=dns_ip2, IP3=dns_ip3 ]

[ SET NTPSERVERS IP1=ntp_ip1, IP2=ntp_ip2, IP3=ntp_ip3 ]
```

Arguments

The following arguments are available in the WHERE clause:

- RACKID: Specifies the rack identifier in the XML configuration file
- RACKNUMBER: Specifies the rack number in the XML configuration file

You can set the following options for the new rack:

- ADMINNET: Specifies the details for the administration network.
- DESCRIPTION: Specifies a description for the switch
- IBPARTITIONMEMBERSHIP: Specifies the switch pkey membership
- ULOC: Specifies physical rack location for the switch
- TIMEZONE: Specifies a valid time zone for the switch
- DNSSERVERS: Specifies the DNS servers to set in the switch configuration
- NTPSERVERS: Specifies the NTP servers to set in the switch configuration

4.3.35.2 ALTER SWITCH

This command alters attributes of an individual switch.

Syntax

```
ALTER SWITCH
{ DNSSERVERS='dns_servers' |
NTPSERVERS='ntp_servers' |
TIMEZONE=time_zone |
DESCRIPTION=description |
```

```
ULOC=ulocation |
    IBPARTITIONMEMBERSHIP=pkey_membership } ...
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
- DESCRIPTION: Specifies a description for the switch
- ULOC: Specifies physical rack location for the switch
- IBPARTITIONMEMBERSHIP: Specifies the switch pkey membership

The following arguments are available in the WHERE clause:

- ID: Specifies the switch identifier in the XML configuration file
- HOSTNAME: Specifies the host name of the switch

4.3.35.3 LIST SWITCHES

This command displays 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 identifier in the XML configuration file
- HOSTNAME : Specifies the host name of the switch

Usage Notes

If you do not specify a WHERE clause, then the command displays the details for all switches.

4.3.36 SU

Controls use of the su command.

SET SU

This command enables and disables using su from the root user to run remote non-root commands from OEDACLI.



4.3.36.1 SET SU

This command enables and disables using su from the root user to run remote non-root commands from OEDACLI.

Syntax

SET SU ENABLE={ true | false }

Arguments

• ENABLE: Specifies whether or not OEDACLI uses su from the root user to run remote nonroot commands.

4.3.37 ULOC

You can display the location of rack items.

LIST ULOC

4.3.37.1 LIST ULOC

This command displays the location of defined rack items and new rack items.

Syntax

```
LIST ULOC
[ NEWCOMPUTES={ new_computes_count | 'new_computes_list' } ]
[ NEWCELLS={ new_cells_count | 'new_cells_list' } ]
[ WHERE
RACKUMBER=rack number ]
```

Arguments

- NEWCOMPUTES: Optionally specifies the number of new compute nodes to be added, or a comma-separated list of new compute node host names. Default is 0.
- NEWCELLS: Optionally specifies the number of new storage cells to be added, or a commaseparated list of new storage cell host names. Default is 0.

The following arguments are available in the WHERE clause:

RACKNUMBER: Specifies the rack number in the XML configuration file

Usage Notes

If you do not specify a WHERE clause, then the command displays the details for rack number 1.

4.3.38 VAULT

ADD VAULT

This command adds a new Exascale vault.



- ALTER VAULT This command alters an existing Exascale vault.
- DELETE VAULT This command deletes an existing Exascale vault.
- LIST VAULT This command displays details for an existing Exascale vault.
- LIST VAULTS

This command displays details for existing Exascale vaults.

4.3.38.1 ADD VAULT

This command adds a new Exascale vault.

Syntax

```
ADD VAULT

NAME = vaultname

[ HC = hcsize ]

[ EF = efsize ]

[ WHERE

EXASCALECLUSTER = exascaleclustername ]
```

Arguments

- NAME: Specifies the name of the Exascale vault.
- HC: Optionally, provisions the vault with the specified amount of storage space in the High Capacity storage pool. You can specify a size in GB or TB, or specify a percentage of the High Capacity storage pool.
- EF: Optionally, provisions the vault with the specified amount of storage space in the Extreme Flash storage pool. You can specify a size in GB or TB, or specify a percentage of the Extreme Flash storage pool.

The following argument is available in the WHERE clause:

• EXASCALECLUSTER: Specifies the name for the Exascale cluster that contains the new vault.

Usage Notes

- If you specify any combination of the size arguments (HC, EF), then the vault is provisioned to use only the specified storage resources. If you do not specify any size arguments, then the vault is provisioned with unlimited access to all of the available storage pools.
- The WHERE clause is optional if the OEDA configuration file (es.xml) contains only one Exascale cluster. Otherwise, the WHERE clause is mandatory.

4.3.38.2 ALTER VAULT

This command alters an existing Exascale vault.

Syntax

```
ALTER VAULT
[ NAME = vaultname ]
[ HC = hcsize ]
```



```
[ EF = efsize ]
WHERE
[ EXASCALECLUSTER = exascaleclustername ]
NAME = vaultname
```

Arguments

- NAME: Changes the name of the Exascale vault.
- HC: Optionally, provisions the vault with the specified amount of storage space in the High Capacity storage pool. You can specify a size in GB or TB, or specify a percentage of the High Capacity storage pool.
- EF: Optionally, provisions the vault with the specified amount of storage space in the Extreme Flash storage pool. You can specify a size in GB or TB, or specify a percentage of the Extreme Flash storage pool.

The following arguments are available in the WHERE clause:

- EXASCALECLUSTER: Specifies the name of the Exascale cluster that contains the vault. This
 argument is optional if the OEDA configuration file (es.xml) contains only one Exascale
 cluster.
- NAME: Specifies the name of the Exascale vault that you want to alter.

Usage Notes

• If you alter any of the size arguments (HC, EF), then ensure that you set all of the required size arguments.

4.3.38.3 DELETE VAULT

This command deletes an existing Exascale vault.

Syntax

```
DELETE VAULT
WHERE
[ EXASCALECLUSTER = exascaleclustername ]
NAME = vaultname
```

Arguments

The following arguments are available in the WHERE clause:

- EXASCALECLUSTER: Specifies the name of the Exascale cluster that contains the vault. This
 argument is optional if the OEDA configuration file (es.xml) contains only one Exascale
 cluster.
- NAME: Specifies the name of the Exascale vault that you want to delete.

Usage Notes

 You cannot delete an Exascale vault while it provides resources to Oracle Grid Infrastructure or an Oracle database.



4.3.38.4 LIST VAULT

This command displays details for an existing Exascale vault.

Syntax

```
LIST VAULT
WHERE
[ EXASCALECLUSTER = exascaleclustername ]
NAME = vaultname
```

Arguments

The following arguments are available in the WHERE clause:

- EXASCALECLUSTER: Specifies the name of the Exascale cluster that contains the vault. This
 argument is optional if the OEDA configuration file (es.xml) contains only one Exascale
 cluster.
- NAME: Specifies the name of the Exascale vault that you want to display.

4.3.38.5 LIST VAULTS

This command displays details for existing Exascale vaults.

Syntax

```
LIST VAULTS
[ WHERE
EXASCALECLUSTER = exascaleclustername
[ STORAGEPOOL = storagepoolname ]]
```

Arguments

The following arguments are available in the WHERE clause:

- EXASCALECLUSTER: Specifies the name of the Exascale cluster that contains the vault.
- STORAGEPOOL: Specifies the name of the Exascale storage pool for which you want to display associated vaults.

4.3.39 VIP

You can add, alter, delete, or list the Oracle Clusterware VIPs.

- ADD VIP
- ALTER VIP
- DELETE VIP
- LIST VIPS



4.3.39.1 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=host_name |

CLUSTERNAME=cluster_name COMPUTENUMBER=compute_number |

CLUSTERNUMBER=cluster_number COMPUTENUMBER=compute_number |

CLUSTERID=cluster id COMPUTENUMBER=compute number }
```

Arguments

You must 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.

4.3.39.2 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=host_name |
   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

4.3.39.3 DELETE VIP

This command removes a VIP from an individual node in a cluster.

Syntax

```
DELETE VIP
WHERE
{ ID=vip_id |
HOSTNAME=host_name |
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

4.3.39.4 LIST VIPS

This command lists the VIPs for all clusters or for an individual node in a cluster.



Syntax

```
LIST VIPS
[ WHERE
{ HOSTNAME=host_name |
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.

4.3.40 VOLUME

You can display and manage storage volumes.

- ADD VOLUME
- DELETE VOLUME
- LIST VOLUMES

4.3.40.1 ADD VOLUME

This command adds a storage volume to a KVM guest.

Syntax

```
ADD VOLUME
MOUNTPATH=mount_path
SIZE=size
WHERE
HOSTNAME=host name
```

Arguments

You must specify the following attributes when adding a volume:

- MOUNTPATH: Specifies the mount point directory for the volume
- SIZE: Specifies the volume size in GB. Must be an integer value.



The following arguments are available in the WHERE clause:

HOSTNAME: Specifies the host name for the KVM guest

Usage Notes

You can use this command to add a custom sized volume for the /u01 filesystem.

4.3.40.2 DELETE VOLUME

This command deletes a storage volume from a KVM guest.

Syntax

```
DELETE VOLUME
WHERE
HOSTNAME=host_name
MOUNTPATH=mount path
```

Arguments

The following arguments are required in the WHERE clause:

- HOSTNAME: Specifies the host name for the KVM guest
- MOUNTPATH: Specifies the mount point directory for the volume

4.3.40.3 LIST VOLUMES

This command lists the volumes defined for an individual KVM guest.

Syntax

LIST VOLUMES WHERE HOSTNAME=host_name

Arguments

The following arguments are required in the WHERE clause:

HOSTNAME: Specifies the host name for the KVM guest

4.3.41 XMLACTION

You can manage actions relating to the Engineered System XML file.

- ALTER XMLACTION
- DELETE XMLACTION
- LIST XMLACTION
- LIST XMLACTIONS



4.3.41.1 ALTER XMLACTION

This command alters a specific OEDACLI action.

Syntax

```
ALTER XMLACTION
ID=action_identifer
CMDID=command_identifer
CMD=command
```

Arguments

- ID: Specifies the action identifier. See output from LIST XMLACTIONS.
- CMDID: Specifies the command identifier. See output from LIST XMLACTIONS.
- CMD: Specifies the command for the action.

4.3.41.2 DELETE XMLACTION

This command removes a specific OEDACLI action.

Syntax

```
DELETE XMLACTION
ID=action identifer
```

Arguments

ID: Specifies the action identifier. See output from LIST XMLACTIONS.

4.3.41.3 LIST XMLACTION

This command lists a specific OEDACLI action.

Syntax

LIST XMLACTION ID=action identifer

Arguments

ID: Specifies the action identifier. See output from LIST XMLACTIONS.

4.3.41.4 LIST XMLACTIONS

This command lists the current actions created by OEDACLI.

Syntax

LIST XMLACTIONS



Installing Oracle Exadata 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 and Oracle Exadata Storage Expansion Rack.

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.

- Unpacking and Installing Oracle Exadata Rack
- Acclimating Oracle Exadata
 Oracle recommends an acclimation period of 24 hours for Oracle Exadata.
- Powering on the System the First Time

5.1 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

5.2 Unpacking and Installing Oracle Exadata Rack

Oracle Rack Cabinet 1242 is the rack cabinet used for all Oracle Exadata Rack models since Oracle Exadata X7.

Use the following resources for information on unpacking and installing Oracle Exadata Rack:

- For an outline of the recommended procedures, see the Oracle Rack Cabinet 1242 Getting Started Guide at https://docs.oracle.com/cd/E85660_01/html/E85665/index.html.
- For additional details, consult the Oracle Rack Cabinet 1242 User's Guide at https:// docs.oracle.com/en/servers/options/rack-cabinet-1242/user-guide/index.html.



5.3 Acclimating Oracle Exadata

Oracle recommends an acclimation period of 24 hours for Oracle Exadata.

The recommended acclimation period applies to all hardware, including racks and cables. Acclimation to the surrounding environment prevents damage as a result of condensation.

5.4 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.

- 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.
- Connecting Power Cords
- Powering on Oracle Exadata Rack This procedure describes how to power on Oracle Exadata Rack.

5.4.1 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.

5.4.2 Connecting Power Cords

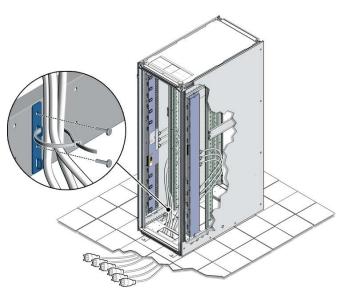
The following procedure describes how to connect power cords to Oracle Exadata Rack:

- **1.** Open the rear cabinet door.
- 2. Ensure that the correct power connectors have been supplied.
- 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 5-1.



- 5. Secure the power cords in bundles as shown in Figure 5-1.
- 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.





5.4.3 Powering on Oracle Exadata Rack

This procedure describes how to power on Oracle Exadata Rack.

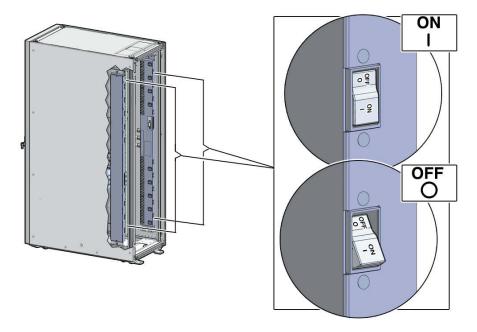


Oracle Exadata Database Machine X2-8 Full Rack database servers may take up to 15 minutes to start through the normal BIOS POST tests.

 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 5-2 PDU Switch Locations



- 2. Verify the expected power LEDs are on. The LEDs are located as follows:
 - Database servers: Right-hand LED
 - Storage Servers: Top LED
 - Cisco Management Network Switch: Left LED (viewed from front) is green, and the other LEDs are red
 - InfiniBand Network Fabric switches: Left LED (viewed from front) labeled PS0, or right LED (viewed from front) labeled PS1
 - Cisco RoCE Network Fabric switches: Left LED (viewed from front) labeled P1, or right LED (viewed from front) labeled P2
 - 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.
- 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
 Before Oracle Exadata Rack arrives, the following safety precautions should be reviewed to ensure the site is safe, as well as ready for delivery.



6

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.
- Verifying the Network Configuration Prior to Configuring the Rack
 Use the checkip.sh script to ensure there are no IP address conflicts between the existing
 network and your new Oracle Exadata Rack.
- Configuring the RDMA Network Fabric Switch You must perform an initial configuration of the RDMA Network Fabric switch.
- Setting the Subnet Manager Master on Oracle Exadata Database Machine Full Rack and Oracle Exadata Database Machine Half Rack
- Configuring the Management Network Switch You must perform an initial configuration of the Management Network Switch.
- Configuring the Power Distribution Units
 The power distribution units (PDUs) are configured with a static IP address to connect to
 the network for monitoring.
- Configuring the Threshold Settings for the Power Distribution Units
- Checking Exadata Storage Servers After powering up the rack, check the Oracle Exadata Storage Servers.
- Checking Oracle Exadata Database Servers Before installing the software, check the configuration of the Oracle Exadata Database Servers.
- Performing Additional Checks and Configuration Perform these additional checks and steps to verify the configuration of your Oracle Exadata Rack.
- Verifying the RoCE Network Fabric Configuration This procedure describes how to verify the RoCE Network Fabric configuration.



- Verifying the InfiniBand Network Fabric Network
 This procedure describes how to verify the InfiniBand Network Fabric network.
- Imaging a New System You have different options for preparing an Oracle Exadata system for deployment.
- Performing Initial Elastic Configuration of Oracle Exadata This topic provides background information on elastic configuration and describes how to perform the initial configuration of Oracle Exadata.
- Adding Additional Elastic Nodes to an Existing Rack You can add nodes to an existing rack using elastic configuration.
- Using the OEDA setuprootssh Utility You can set up key-based authentication for the root user by using the setuprootssh.sh utility included with OEDA.
- Loading the Configuration Information and Installing the Software You can use Oracle Exadata Deployment Assistant to configure your rack, or you can do it manually.
- Using the OEDA changePassword Utility You can change the password of the grid and oracle users across all clusters by using the changePassword.sh utility included with OEDA.
- Installing Oracle Enterprise Manager Cloud Control
- Adding a VM Cluster to Oracle Exadata Database Machine Using OEDA You can use Oracle Exadata Deployment Assistant (OEDA) to add a virtual machine (VM) cluster to an existing Oracle Exadata Database Machine deployment.

Related Topics

Oracle Sun Database Machine Setup/Configuration Best Practices (My Oracle Support Doc ID 1274318.1)

6.1 Verifying the Network Configuration Prior to Configuring the Rack

Use the checkip.sh script to ensure there are no IP address conflicts between the existing network and your new Oracle Exadata Rack.

The checkip.sh script performs a pre-installation check to verify that the IP addresses and host names that you specified in Oracle Exadata Deployment Assistant (OEDA) are defined in the DNS, that the NTP servers and gateways are available, and that private addresses are not pingable. Running this script before the hardware arrives help to avoid additional delays that would be caused by misconfigured network services, such as Domain Name System (DNS) and NTP.

The checkip.sh script is created in a format that matches the operating system of the client on which you ran OEDA. Because this script is run before the engineered system rack has arrived, you typically do not run this script on an engineered system server, but on a client. The client must have access to the same network where the engineered system will be deployed. The script is also available in the ZIP file generated by OEDA.

- 1. On the client where OEDA was run, copy the checkip.sh script generated by OEDA and the XML file *CustomerName_hostname.xml* to the same directory (one directory level up) as the OEDA config.sh script.
- 2. Run the checkip.sh script on the client machine or existing server.



Use a command similar to the following, where *configuration_file* is the name of the configuration generated by the Oracle Exadata Deployment Assistant for the rack being installed.

```
# ./checkip.sh -cf configuration file
```

If the command is run from a Microsoft Windows machine, then the command is $\mbox{checkip.cmd}$.

If this engineered system rack is an addition for an existing installation, then run the checkip.sh script from an existing engineered system server. This enables the script to identify in-use IP addresses in the fabric. Not identifying existing IP addresses may cause IP collisions after installation of the new engineered system rack. To create a checkip.sh that can run on an existing server, you must run OEDA on a server or client that uses the same operating system as the existing engineered system server. OEDA supports IPv6 addresses.

The output from the script is a file that contains status messages such as GOOD or ERROR.

If there are conflicts that you are unable to resolve, then work with your assigned Oracle representative to correct the problems.

6.2 Configuring the RDMA Network Fabric Switch

You must perform an initial configuration of the RDMA Network Fabric switch.

- Configuring the Cisco Nexus 9336C-FX2 Switch The RoCE Network Fabric switch supplied with the engineered system rack is minimally configured during installation.
- Configuring the RoCE Network Fabric Switches to Enable Exadata Secure RDMA Fabric Isolation
 You can configure your RoCE Network Fabric switches to enable Exadata Secure RDMA
- Configuring Sun Datacenter InfiniBand Switch 36 Switch

6.2.1 Configuring the Cisco Nexus 9336C-FX2 Switch

The RoCE Network Fabric switch supplied with the engineered system rack is minimally configured during installation.

During initial system configuration, you can reset and configure the switch.

- 1. Connect from the RoCE Network Fabric 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.

3. Power on the switch.

Fabric Isolation.

4. Log in as the admin user.

```
User Access Verification
dbm0sw-rocea0 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.

dbm0sw-rocea0# write erase

Warning: This command will erase the startup-configuration.

Do you wish to proceed anyway? (y/n) [n] ${f y}$

6. Restart the system so you can perform the automated setup.

dbm0sw-rocea0# **reload**

This command will reboot the system. (y/n)? [n] \mathbf{y}

2017 Aug 31 01:09:00 dbm0sw-rocea0 %\$ 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.

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-rocea0.

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-rocea0

 Respond yes when asked to configure Out-of-band management configuration, and specify appropriate network addresses when prompted.

```
Continue with Out-of-band (mgmt0) management configuration? (yes/no) [y]:

yes

Mgmt0 IPv4 address : 100.104.10.21

Mgmt0 IPv4 netmask : 255.255.248.0

Configure the default gateway? (yes/no) [y]:

IPv4 address of the default gateway : 100.104.10.1
```

11. Respond yes when asked to configure advanced IP options.

Configure advanced IP options? (yes/no) [n]: yes

12. Respond yes when asked to configure static route (this can be changed later).

Configure static route? (yes/no) [n]: yes

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. Configure the DNS IPv4 addresses.

Configure the DNS IPv4 address? (yes/no) [n]: yes DNS IP address: 10.100.100.2

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 strict.

```
Configure default interface layer (L3/L2) [L2]:
Configure default switchport interface state (shut/noshut) [noshut]:
Configure CoPP system profile (strict/moderate/lenient/dense) [strict]:
strict
```

18. After reviewing the configuration, save the configuration.

```
The following configuration will be applied:
  no password strength-check
   switchname test123sw-rocea0
   ip route 100.104.8.0 255.255.248.0 100.104.10.1
   vrf context management
   ip route 0.0.0.0/0 100.104.10.1
   exit
   no feature telnet
    ssh key rsa 1024 force
   feature ssh
    ntp server 100.104.10.1
    system default switchport
   no system default switchport shutdown
   copp profile strict
   interface mgmt0
   ip address 100.104.10.21 255.255.248.0
   no shutdown
Would you like to edit the configuration? (yes/no) [n]:
Use this configuration and save it? (yes/no) [y]: yes
```

19. Enable the scp server feature on the switch.

```
test123sw-rocea0# feature scp-server
```

20. Save the running configuration to flash.

21. Apply the golden configuration on the switch.



- Starting with Oracle Exadata System Software release 20.1.0, use the procedure described in Applying Golden Configuration Settings on RoCE Network Fabric Switches, in Oracle Exadata Database Machine Maintenance Guide.
- Otherwise, use the following procedure to apply the golden configuration on the switch:
- a. Delete the configuration file on the switch for the target configuration.

Note:

If you do not remove the file you are replacing, then when you attempt to overwrite the file you will get a 'permission denied' error.

Log in to the switch, enter configuration mode, then run a command similar to the following:

```
test123sw-rocea0# delete bootflash:roce_leaf_switch.cfg
Do you want to delete "/roce_leaf_switch.cfg" ? (yes/no/abort) [y] y
test123sw-rocea0#
```

b. Log in to a server that has SSH access to the switch, and contains the latest RDMA Network Fabric patch ZIP file.

To find the available RDMA Network Fabric patches, search for '**RDMA network switch**' in My Oracle Support document 888828.1. Download and use the latest patch for your Oracle Exadata System Software release.

- c. Unzip the RDMA Network Fabric patch ZIP file and change directories to the location of the patchmgr utility.
- d. Locate the golden configuration files in the RDMA Network Fabric patch bundle.

The files are located within the roce switch templates directory.

The golden configuration files are as follows:

- Single rack leaf (leaf): roce leaf switch.cfg
- Multi-rack spine (mspine): roce_spine_switch_multi.cfg
- Multi-rack leaf (mleaf): roce_leaf_switch_multi.cfg
- Single rack leaf with Secure Fabric support (sfleaf): roce sf leaf switch.cfg
- Multi-rack leaf with Secure Fabric support (msfleaf): roce sf leaf switch multi.cfg
- Single rack leaf configured with 23 host ports (leaf23): roce leaf switch 23hosts.cfg
- Multi-rack leaf configured with 23 host ports (mleaf23): roce_leaf_switch_23hosts_multi.cfg
- Multi-rack leaf configured with 14 inter-switch links (mleaf_u14): roce_leaf_switch_14uplinks_multi.cfg
- Multi-rack leaf configured with 14 inter-switch links and with Secure Fabric support (msfleaf_u14): roce_sf_leaf_switch_14uplinks_multi.cfg
- Multi-rack leaf configured with 23 host ports and 13 inter-switch links (mleaf23_u13): roce_leaf_switch_23hosts_13uplinks_multi.cfg



e. Copy the golden configuration file to the switch.

In the following example, 100.104.10.21 represents the IP address of the switch you are configuring.

```
# scp roce_leaf_switch.cfg admin@100.104.10.21:/
User Access Verification
Password:
roce leaf switch.cfg 100% 23KB 23.5KB/s 00:00
```

f. Apply the golden configuration file on the switch.

Use the run-script command while connected directly to the switch.

```
test123sw-rocea0# run-script bootflash:roce_leaf_switch.cfg | grep
'none'
```

Note:

This command may take up to 1-2 minutes on a single-rack switch and up to 3-4 minutes on a multi-rack switch.

g. Verify the switch configuration.

Use the patchmgr utility on the server that has SSH access to the switch, and contains the latest RDMA Network Fabric patch bundle.

In the following command, roceswitch.lst is a file that contains the switch host name or IP address.

./patchmgr --roceswitches roceswitch.lst --verify-config

22. Backup up the switch configuration.

Follow the steps in Backing Up Settings on the ROCE Switch, in *Oracle Exadata Database Machine Maintenance Guide*.

 Optional: Set the clock, using the same procedure as in Setting the Clock on the Cisco 93108-1G or 9348 Ethernet Switch.

Related Topics

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

6.2.2 Configuring the RoCE Network Fabric Switches to Enable Exadata Secure RDMA Fabric Isolation

You can configure your RoCE Network Fabric switches to enable Exadata Secure RDMA Fabric Isolation.

Secure Fabric enables network separation between different clusters on systems with RoCE Network Fabric. This capability is conceptually similar to InfiniBand Network Fabric partitioning. Secure Fabric support is available starting with Oracle Exadata System Software release 20.1.0.



To use Secure Fabric, you must enable Secure Fabric support in the RoCE Network Fabric switch hardware before initial system deployment using Oracle Exadata Deployment Assistant (OEDA):

For each RoCE Network Fabric leaf switch, perform the basic configuration steps outlined in Configuring the Cisco Nexus 9336C-FX2 Switch.

Then, on each RoCE Network Fabric leaf switch, you must apply a specific golden configuration to enable Secure Fabric support. Use the procedure described in Applying Golden Configuration Settings on RoCE Network Fabric Switches, in *Oracle Exadata Database Machine Maintenance Guide*. However, when you specify the configuration type for each leaf switch, ensure that you specify the configuration type that enables Secure Fabric support.

After you complete the switch configuration, the leaf switch ports become trunk ports, which can carry network traffic with multiple VLAN IDs.

6.2.3 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 ${\tt root}$ user, then contact Oracle Support Services.

 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.

- 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
```

enablesm

12. Enable the InfiniBand Subnet Manager using the following command:

```
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)

6.3 Setting the Subnet Manager Master on Oracle Exadata Database Machine Full Rack and Oracle Exadata Database Machine Half Rack

Oracle Exadata X3-2 systems and Oracle Exadata X2-2 systems have three Sun Datacenter InfiniBand Switch 36 switches. Starting with Oracle Exadata X4-2, Oracle Exadata Systems have two Sun Datacenter InfiniBand Switch 36 switches.

Note:

This procedure does not apply to Oracle Exadata X8M racks with RoCE Network Fabric.

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 Two-Socket Systems (X3-2 and later): rack unit 20 (U20) and rack unit 22 (U22)
- Oracle Exadata X2-2 racks: rack unit 20 (U20) and rack unit 24 (U24)
- Oracle Exadata 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 Network Fabric 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 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 Network Fabric 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:

- 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 Fabric 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 Half Racks with Sun Fire X4170 Oracle Database Servers, and Oracle Exadata 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

6.4 Configuring the Management Network Switch

You must perform an initial configuration of the Management Network Switch.

- Configuring the Cisco Catalyst 4948 Ethernet Switch The Cisco Catalyst 4948 Ethernet switch supplied with Oracle Exadata Rack is minimally configured during installation.
- 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.

6.4.1 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.

The following procedure describes how to configure the Cisco Ethernet switch. Configuration should be done with the network administrator.

- 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 switch.

```
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 Oracle Exadata X6 is IPBASEK9-MZ, which includes telnet and ssh support. Currently the full release version string is cat4500e-ipbasek9-mz.152-3.E2.bin.



 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 ]
```

 If IP routing is not used on the switch, this step is required. Disable the default IP routing setting, and configure the default gateway.

```
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 ]
```

 If IP routing is required on the switch, then leave the IP routing setting as the default, and configure the default gateway. Replace 10.7.7.1 with the IP address of the gateway for the installation:

```
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 ]
```

8. Set the host name of the switch.

This example sets the name to exa1sw-ip:

```
Switch#configure terminal
Enter configuration commands,one per line.End with CNTL/Z.
Switch(config)#hostname exalsw-ip
exalsw-ip(config)#end
exalsw-ip#write memory
Building configuration...
Compressed configuration from 3789 bytes to 1469 bytes [OK ]
```

The system host name is used as the prompt name.



 Configure up to three DNS servers. Replace the domain name and IP addresses used in this example with the values for the installation:

```
exalsw-ip#configure terminal
Enter configuration commands,one per line.End with CNTL/Z.
exalsw-ip(config)#ip domain-name example.com
exalsw-ip(config)#ip name-server 10.7.7.3
exalsw-ip(config)#ip name-server 198.51.100.5
exalsw-ip(config)#ip name-server 10.8.160.1
exalsw-ip(config)#end
*Sep 15 14:26:37.045:%SYS-5-CONFIG_I:Configured from console by console
exalsw-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 so that you can configure the SSH keys.

10. (Optional) Set the password.

```
exalsw-ip# configure terminal
Enter configuration commands,one per line. End with CNTL/Z.
exalsw-ip(config)# enable password password
exalsw-ip(config)# enable secret password
exalsw-ip(config)# end
exalsw-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 ]
```

 Verify telnet access is disabled. Telnet is not secure, and should not be enabled unless there is a compelling reason. To enable telnet, set a password. To disable it, remove the password.

```
exalsw-ip#configure terminal
Enter configuration commands,one per line. End with CNTL/Z.
exalsw-ip(config)#line vty 0 15
exalsw-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
exalsw-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 telnet access is not yet disabled so should be disabled now.

```
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. To configure a secure shell (SSH) on the Ethernet switch:

```
exalsw-ip# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
exalsw-ip(config) # crypto key generate rsa
% You already have RSA keys defined named exalsw-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]
exalsw-ip(config) # username admin password 0 welcome1
exalsw-ip(config) # line vty 0 15
exalsw-ip(config-line)# transport input ssh
exalsw-ip(config-line)# exit
exalsw-ip(config) # aaa new-model
exalsw-ip(config) # ip ssh time-out 60
exalsw-ip(config) # ip ssh authentication-retries 3
exalsw-ip(config) # ip ssh version 2
exalsw-ip(config) # end
*Sep 15 14:26:37.045: %SYS-5-CONFIG I: Configured from console by console
exalsw-ip# write memory
Building configuration...
Compressed configuration from 2603 bytes to 1158 bytes[OK]
```

- 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.

The ordering of commands is important when setting the local time and time zone. For example, to set the local time to US Eastern time:

```
exalsw-ip# configure terminal
Enter configuration commands,one per line. End with CNTL/Z.
exalsw-ip(config)# clock timezone EST -5
exalsw-ip(config)# clock summer-time EDT recurring
exalsw-ip(config)# end
exalsw-ip# clock set 21:00:00 August 09 2018
exalsw-ip# write memory
Building configuration...
Compressed configuration from 3784 bytes to 1465 bytes [OK ]
exalsw-ip# show clock
21:00:06.643 EST Mon Aug 9 2018
```

14. After setting the local time zone, you can configure up to two NTP servers. Replace the IP addresses used in this example with the values for the installation:

```
exalsw-ip# configure terminal
Enter configuration commands,one per line. End with CNTL/Z.
exalsw-ip(config)# ntp server 10.7.7.32 prefer
exalsw-ip(config)# ntp server 198.51.100.19
exalsw-ip(config)# end
*Sep 15 14:51:08.665:%SYS-5-CONFIG_I:Configured from console by console
exalsw-ip# write memory
Building configuration...
Compressed configuration from 2654 bytes to 1163 bytes [OK ]
exalsw-ip# show ntp status
<output will vary per network>
.
exalsw-ip# show clock
```

```
21:00:23.175 EST Mon Aug 9 2018
```

The NTP server is synchronized to local time when you connect the Cisco switch to the network and it has access to NTP.

Symbols that precede the show clock display indicate that the time is the following:

- * Not authoritative
- . Authoritative, but NTP is not synchronized.
- Authoritative (blank space).
- 15. Verify the Ethernet configuration using the following command:

```
exa1sw-ip# show running-config
Building configuration...
Current configuration : 3923 bytes
```



```
version 15.2
no service pad
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
service compress-config
```

Note:

If any setting is incorrect, then 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:

```
exalsw-ip#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
exalsw-ip(config)# no ip default-gateway 10.7.7.1
exalsw-ip(config)# end
exalsw-ip#
*Sep 15 14:13:26.013: %SYS-5-CONFIG_I: Configured from console by
console
exalsw-ip(config)# write memory
Building configuration...
Compressed configuration from 2502 bytes to 1085 bytes[OK]
```

16. 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]
```

17. Exit from the session using the following command:

```
exalsw-ip# exit
exalsw-ip con0 is now available
Press RETURN to get started.
```

18. 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.

19. To check the Cisco switch, attach a laptop computer to port 48, and ping the IP address of the internal management network to check the configuration.



Related Topics

- Network Connection and IP Address Requirements for Oracle Exadata Rack
- Network Configuration Checklist Use this checklist to ensure that the network configuration requirements have been addressed.

6.4.2 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

During the initial configuration, you reset the switch and use the Basic System Configuration Dialog to configure the switch.

• 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.

6.4.2.1 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]: ${\bf no}$

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
```

 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.

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.

24. Optional: Set the clock, as described in the next topic.

6.4.2.2 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
```

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.

6.5 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 Management Network Switch. Note that for full rack systems, you cannot connect PDUs to the Management Network Switch 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.
- 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 Management Network Switch. The equipment currently using the Management Network 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 labeled 0.
 - On PDUs with three power input leads, connect the middle power lead to the power source. The middle power lead is labeled 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 Management Network Switch.
- **13.** Reconnect the two cables that were originally connected to the Management Network 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.

6.6 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.

- PDU Thresholds for Oracle Exadata Database Machine X5-2 and Later
- PDU Thresholds for Oracle Exadata Database Machine X4-2
- PDU Thresholds for Oracle Exadata Database Machine X3-2
- PDU Thresholds for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers)
- PDU Thresholds for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers)
- 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.
- PDU Thresholds for Oracle Exadata Database Machine X3-8 Full Rack
- PDU Thresholds for Oracle Exadata Database Machine X2-8 Full Rack
- PDU Thresholds for Oracle Exadata Storage Expansion Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers

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 and later systems
- Oracle Exadata Database Machine Maintenance Guide for information about monitoring components

6.6.1 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/oecadownload-2817713.html

If for some reason you are unable to utilize OECA, contact Oracle Support.

6.6.2 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.

- PDU Thresholds for Oracle Exadata Database Machine X4-2 Full Rack
- PDU Thresholds for Oracle Exadata Database Machine X4-2 Half Rack
- PDU Thresholds for Oracle Exadata Database Machine X4-2 Quarter Rack

6.6.2.1 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 6-1 Threshold Values for Oracle Exadata Database Machine X4-2 Full Rack with Single-phase, Low-voltage PDU
- Table 6-2 Threshold Values for Oracle Exadata Database Machine X4-2 Full Rack with Three-phase, Low-voltage PDU
- Table 6-3 Threshold Values for Oracle Exadata Database Machine X4-2 Full Rack with Single-phase, High-voltage PDU
- Table 6-4 Threshold Values for Oracle Exadata Database Machine X4-2 Full Rack with Three-phase, High-voltage PDU

 Table 6-1 lists the threshold values for Oracle Exadata Database Machine X4-2 Full Rack

 using a single-phase, low-voltage PDU.

Table 6-1	Threshold Values for Oracle Exadata Database Machine X4-2 Full Rack with
Single-pha	ase, Low-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
А	Module 1, phase 1	0	20	24
A	Module 1, phase 2	0	17	22
A	Module 1, phase 3	0	19	24
В	Module 1, phase 1	0	19	24
В	Module 1, phase 2	0	17	22



Table 6-1 (Cont.) Threshold Values for Oracle Exadata Database Machine X4-2 FullRack with Single-phase, Low-voltage PDU

PDU	Module/Phase		Pre Warning Threshold	Alarm Threshold
В	Module 1, phase 3	0	20	24

Table 6-2 lists the threshold values for Oracle Exadata Database Machine X4-2 Full Rack using a three-phase, low-voltage PDU.

Table 6-2Threshold Values for Oracle Exadata Database Machine X4-2 Full Rack withThree-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 6-3 lists the threshold values for Oracle Exadata Database Machine X4-2 Full Rack using a single-phase, high-voltage PDU.

Table 6-3Threshold Values for Oracle Exadata Database Machine X4-2 Full Rack withSingle-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
В	Module 1, phase 1	0	18	23
В	Module 1, phase 2	0	16	20
В	Module 1, phase 3	0	18	23

Table 6-4 lists the threshold values for Oracle Exadata Database Machine X4-2 Full Rack using a three-phase, high-voltage PDU.

Table 6-4Threshold Values for Oracle Exadata Database Machine X4-2 Full Rack withThree-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



6.6.2.2 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 6-5 Threshold Values for Oracle Exadata Database Machine X4-2 Half Rack with Single-phase, Low-voltage PDU
- Table 6-6 Threshold Values for Oracle Exadata Database Machine X4-2 Half Rack with Three-phase, Low-voltage PDU
- Table 6-7 Threshold Values for Oracle Exadata Database Machine X4-2 Half Rack with Single-phase, High-voltage PDU
- Table 6-8 Threshold Values for Oracle Exadata Database Machine X4-2 Half Rack with Three-phase, High-voltage PDU

Table 6-5 lists the threshold values for Oracle Exadata Database Machine X4-2 Half Rack using a single-phase, low-voltage PDU.

Table 6-5Threshold Values for Oracle Exadata Database Machine X4-2 Half Rack withSingle-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
В	Module 1, phase 1	0	0.1	0.2
В	Module 1, phase 2	0	10	13
В	Module 1, phase 3	0	20	24

Table 6-6 lists the threshold values for Oracle Exadata Database Machine X4-2 Half Rack using a three-phase, low-voltage PDU.

Table 6-6Threshold Values for Oracle Exadata Database Machine X4-2 Half Rack withThree-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 6-7 lists the threshold values for Oracle Exadata Database Machine X4-2 Half Rack using a 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
В	Module 1, phase 1	0	0.1	0.2
В	Module 1, phase 2	0	9	12
В	Module 1, phase 3	0	18	23

Table 6-7Threshold Values for Oracle Exadata Database Machine X4-2 Half Rack withSingle-phase, High-voltage PDU

 Table 6-8 lists the threshold values for Oracle Exadata Database Machine X4-2 Half Rack

 using a three-phase, high-voltage PDU.

Table 6-8Threshold Values for Oracle Exadata Database Machine X4-2 Half Rack withThree-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

6.6.2.3 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 6-9 Threshold Values for Oracle Exadata Database Machine X4-2 Quarter Rack with Single-phase, Low-voltage PDU
- Table 6-10 Threshold Values for Oracle Exadata Database Machine X4-2 Quarter Rack with Three-phase, Low-voltage PDU
- Table 6-11 Threshold Values for Oracle Exadata Database Machine X4-2 Quarter Rack with Single-phase, High-voltage PDU
- Table 6-12 Threshold Values for Oracle Exadata Database Machine X4-2 Quarter Rack with Three-phase, High-voltage PDU

Table 6-9 lists the threshold values for Oracle Exadata Database Machine X4-2 Quarter Rack using a single-phase, low-voltage PDU.

Table 6-9Threshold Values for Oracle Exadata Database Machine X4-2 Quarter Rackwith 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



PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A	Module 1, phase 3	0	0.1	0.2
В	Module 1, phase 1	0	0.1	0.2
В	Module 1, phase 2	0	5	7
В	Module 1, phase 3	0	10	13

Table 6-9 (Cont.) Threshold Values for Oracle Exadata Database Machine X4-2 QuarterRack with Single-phase, Low-voltage PDU

Table 6-10 lists the threshold values for Oracle Exadata Database Machine X4-2 Quarter Rack using a three-phase, low-voltage PDU.

Table 6-10Threshold Values for Oracle Exadata Database Machine X4-2 Quarter Rackwith 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 6-11 lists the threshold values for Oracle Exadata Database Machine X4-2 Quarter Rack using a single-phase, high-voltage PDU.

Table 6-11Threshold Values for Oracle Exadata Database Machine X4-2 Quarter Rackwith 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
В	Module 1, phase 1	0	0.1	0.2
В	Module 1, phase 2	0	5	7
В	Module 1, phase 3	0	9	12

Table 6-12 lists the threshold values for Oracle Exadata Database Machine X4-2 Quarter Rack using a three-phase, high-voltage PDU.

Table 6-12Threshold Values for Oracle Exadata Database Machine X4-2 Quarter Rackwith 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



Table 6-12 (Cont.) Threshold Values for Oracle Exadata Database Machine X4-2Quarter Rack with Three-phase, High-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A and B	Module 1, phase 3	0	3	4

6.6.3 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.

- PDU Thresholds for Oracle Exadata Database Machine X3-2 Full Rack
- PDU Thresholds for Oracle Exadata Database Machine X3-2 Half Rack
- PDU Thresholds for Oracle Exadata Database Machine X3-2 Quarter Rack

6.6.3.1 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 6-13 Threshold Values for Oracle Exadata Database Machine X3-2 Full Rack with Single-phase, Low-voltage PDU
- Table 6-14 Threshold Values for Oracle Exadata Database Machine X3-2 Full Rack with Three-phase, Low-voltage PDU
- Table 6-15 Threshold Values for Oracle Exadata Database Machine X3-2 Full Rack with Single-phase, High-voltage PDU
- Table 6-16

Threshold Values for Oracle Exadata Database Machine X3-2 Full Rack with Three-phase, High-voltage PDU

 Table 6-13 lists the threshold values for Oracle Exadata Database Machine X3-2 Full Rack

 using a single-phase, low-voltage PDU.

Table 6-13Threshold Values for Oracle Exadata Database Machine X3-2 Full Rack withSingle-phase, Low-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A	Module 1, phase 1	0	20	24



PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A	Module 1, phase 2	0	14	18
A	Module 1, phase 3	0	19	24
В	Module 1, phase 1	0	19	24
В	Module 1, phase 2	0	14	18
В	Module 1, phase 3	0	20	24

Table 6-13 (Cont.) Threshold Values for Oracle Exadata Database Machine X3-2 FullRack with Single-phase, Low-voltage PDU

Table 6-14 lists the threshold values for Oracle Exadata Database Machine X3-2 Full Rack using a three-phase, low-voltage PDU.

Table 6-14Threshold Values for Oracle Exadata Database Machine X3-2 Full Rack withThree-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 6-15 lists the threshold values for Oracle Exadata Database Machine X3-2 Full Rack using a single-phase, high-voltage PDU.

Table 6-15	Threshold Values for Oracle Exadata Database Machine X3-2 Full Rack with
Single-phas	se, 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
В	Module 1, phase 1	0	18	22
В	Module 1, phase 2	0	13	17
В	Module 1, phase 3	0	18	23

Table 6-16 lists the threshold values for Oracle Exadata Database Machine X3-2 Full Rack using a three-phase, high-voltage PDU.

Table 6-16Threshold Values for Oracle Exadata Database Machine X3-2 Full Rack withThree-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



Table 6-16 (Cont.) Threshold Values for Oracle Exadata Database Machine X3-2 FullRack with Three-phase, High-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
A and B	Module 1, phase 2	0	17	21
A and B	Module 1, phase 3	0	15	19

6.6.3.2 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 6-17 Threshold Values for Oracle Exadata Database Machine X3-2 Half Rack with Single-phase, Low-voltage PDU
- Table 6-18 Threshold Values for Oracle Exadata Database Machine X3-2 Half Rack with Three-phase, Low-voltage PDU
- Table 6-19 Threshold Values for Oracle Exadata Database Machine X3-2 Half Rack with Single-phase, High-voltage PDU
- Table 6-20 Threshold Values for Oracle Exadata Database Machine X3-2 Half Rack with Three-phase, High-voltage PDU

 Table 6-17 lists the threshold values for Oracle Exadata Database Machine X3-2 Half Rack

 using a single-phase, low-voltage PDU.

Table 6-17Threshold Values for Oracle Exadata Database Machine X3-2 Half Rack withSingle-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
В	Module 1, phase 1	0	0	0
В	Module 1, phase 2	0	9	11
В	Module 1, phase 3	0	20	24

 Table 6-18 lists the threshold values for Oracle Exadata Database Machine X3-2 Half Rack

 using a three-phase, low-voltage PDU.

Table 6-18Threshold Values for Oracle Exadata Database Machine X3-2 Half Rack withThree-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 6-19 lists the threshold values for Oracle Exadata Database Machine X3-2 Half Rack using a single-phase, high-voltage PDU.

Table 6-19	Threshold Values for Oracle Exadata Database Machine X3-2 Half Rack with
Single-phas	se, High-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
А	Module 1, phase 1	0	18	23
A	Module 1, phase 2	0	8	10
A	Module 1, phase 3	0	0	0
В	Module 1, phase 1	0	0	0
В	Module 1, phase 2	0	8	10
В	Module 1, phase 3	0	18	23

Table 6-20 lists the threshold values for Oracle Exadata Database Machine X3-2 Half Rack using a three-phase, high-voltage PDU.

Table 6-20Threshold Values for Oracle Exadata Database Machine X3-2 Half Rack withThree-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

6.6.3.3 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 6-21 Threshold Values for Oracle Exadata Database Machine X3-2 Quarter Rack
 with Single-phase, Low-voltage PDU
- Table 6-22 Threshold Values for Oracle Exadata Database Machine X3-2 Quarter Rack
 with Three-phase, Low-voltage PDU
- Table 6-23 Threshold Values for Oracle Exadata Database Machine X3-2 Quarter Rack with Single-phase, High-voltage PDU
- Table 6-24 Threshold Values for Oracle Exadata Database Machine X3-2 Quarter Rack with Three-phase, High-voltage PDU

 Table 6-21 lists the threshold values for Oracle Exadata Database Machine X3-2 Quarter Rack

 using a 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
В	Module 1, phase 1	0	0	0
В	Module 1, phase 2	0	5	6
В	Module 1, phase 3	0	10	13

Table 6-21Threshold Values for Oracle Exadata Database Machine X3-2 Quarter Rackwith Single-phase, Low-voltage PDU

Table 6-22 lists the threshold values for Oracle Exadata Database Machine X3-2 Quarter Rack using a three-phase, low-voltage PDU.

Table 6-22Threshold Values for Oracle Exadata Database Machine X3-2 Quarter Rackwith 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 6-23 lists the threshold values for Oracle Exadata Database Machine X3-2 Quarter Rack using a single-phase, high-voltage PDU.

Table 6-23	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
В	Module 1, phase 1	0	0	0
В	Module 1, phase 2	0	4	6
В	Module 1, phase 3	0	9	11

Table 6-24 lists the threshold values for Oracle Exadata Database Machine X3-2 Quarter Rack using a 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

Table 6-24Threshold Values for Oracle Exadata Database Machine X3-2 Quarter Rackwith Three-phase, High-voltage PDU

6.6.4 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.

- PDU Thresholds for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Full Rack
- PDU Thresholds for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Half Rack
- PDU Thresholds for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Quarter Rack

6.6.4.1 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 6-25 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 6-26 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 6-27 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 6-28 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 6-25 lists the threshold values for Oracle Exadata Database Machine Full Rack using a 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
В	Module 1, phase 1	0	18	23
В	Module 1, phase 2	0	22	24
В	Module 1, phase 3	0	18	23

Table 6-25Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170M2 and X4270 M2 servers) Full Rack with Single-phase, Low-voltage PDU

Table 6-26 lists the threshold values for Oracle Exadata Database Machine Full Rack using a three-phase, low-voltage PDU.

Table 6-26Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170M2 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 6-27 lists the threshold values for Oracle Exadata Database Machine Full Rack using a single-phase, high-voltage PDU.

Table 6-27	Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170
M2 and X42	70 M2 servers) Full Rack with Single-phase, High-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
А	Module 1, phase 1	0	16	20
A	Module 1, phase 2	0	20	21
A	Module 1, phase 3	0	16	20
В	Module 1, phase 1	0	16	20
В	Module 1, phase 2	0	20	21
В	Module 1, phase 3	0	16	20

Table 6-28 lists the threshold values for Oracle Exadata Database Machine Full Rack using a 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

Table 6-28Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170M2 and X4270 M2 servers) Full Rack with Three-phase, High-voltage PDU

6.6.4.2 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 6-29 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 6-30 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 6-31 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 6-32 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 6-29 lists the threshold values for Oracle Exadata Database Machine Half Rack using a single-phase, low-voltage PDU.

Table 6-29	Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170	
M2 and X42	70 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
В	Module 1, phase 1	0	0	0
В	Module 1, phase 2	0	13	17
В	Module 1, phase 3	0	18	23

Table 6-30 lists the threshold values for Oracle Exadata Database Machine Half Rack using a three-phase, low-voltage PDU.

Table 6-30Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170M2 and X4270 M2 servers) Half Rack with Three-phase, Low-voltage PDU

PDU	Module/Phase		Pre Warning Threshold	Alarm Threshold
A and B	Module 1, phase 1	0	18	23



Table 6-30(Cont.) Threshold Values for Oracle Exadata Database Machine X2-2 (withX4170 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 2	0	17	22
A and B	Module 1, phase 3	0	18	23

Table 6-31 lists the threshold values for Oracle Exadata Database Machine Half Rack using a single-phase, high-voltage PDU.

Table 6-31Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170M2 and X4270 M2 servers) Half Rack with Single-phase, High-voltage PDU

PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
А	Module 1, phase 1	0	16	20
A	Module 1, phase 2	0	12	15
A	Module 1, phase 3	0	0	0
В	Module 1, phase 1	0	0	0
В	Module 1, phase 2	0	12	15
В	Module 1, phase 3	0	16	20

Table 6-32 lists the threshold values for Oracle Exadata Database Machine Half Rack using a three-phase, high-voltage PDU.

Table 6-32	Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170
M2 and X42	70 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

6.6.4.3 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 6-33 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 6-34 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 6-35 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 6-36 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 6-33 lists the threshold values for Oracle Exadata Database Machine Quarter Rack using a single-phase, low-voltage PDU.

Table 6-33Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170M2 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
В	Module 1, phase 1	0	0	0
В	Module 1, phase 2	0	6	8
В	Module 1, phase 3	0	10	13

Table 6-34 lists the threshold values for Oracle Exadata Database Machine Quarter Rack using a three-phase, low-voltage PDU.

Table 6-34Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170M2 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 6-35 lists the threshold values for Oracle Exadata Database Machine Quarter Rack using a single-phase, high-voltage PDU.

Table 6-35Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170M2 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
A	Module 1, phase 3	0	0	0
В	Module 1, phase 1	0	0	0
В	Module 1, phase 2	0	5	7
В	Module 1, phase 3	0	9	12

Table 6-36 lists the threshold values for Oracle Exadata Database Machine Quarter Rack using a 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

Table 6-36Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170M2 and X4270 M2 servers) Quarter Rack with Three-phase, High-voltage PDU

6.6.5 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.

- PDU Thresholds for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Full Rack
- PDU Thresholds for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Half Rack
- PDU Thresholds for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Quarter Rack

6.6.5.1 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 6-37 Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Full Rack with Single-phase, Low-voltage PDU
- Table 6-38 Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Full Rack with Three-phase, Low-voltage PDU
- Table 6-39 Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Full Rack with Single-phase, High-voltage PDU
- Table 6-40 Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Full Rack with Three-phase, High-voltage PDU

Table 6-37 lists the threshold values for Oracle Exadata Database Machine Full Rack using a 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
В	Module 1, phase 1	0	21	24
В	Module 1, phase 2	0	22	24
В	Module 1, phase 3	0	22	24

Table 6-37 Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Full Rack with Single-phase, Low-voltage PDU

Table 6-38 lists the threshold values for Oracle Exadata Database Machine Full Rack using a three-phase, low-voltage PDU.

Table 6-38Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170and 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
A and B	Module 1, phase 3	0	38	45

Table 6-39 lists the threshold values for Oracle Exadata Database Machine Full Rack using a single-phase, high-voltage PDU.

Table 6-39	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
В	Module 1, phase 1	0	19	21
В	Module 1, phase 2	0	20	21
В	Module 1, phase 3	0	20	21

Table 6-40 lists the threshold values for Oracle Exadata Database Machine Full Rack using a 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

Table 6-40Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170and X4275 servers) Full Rack with Three-phase, High-voltage PDU

6.6.5.2 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 6-41 Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Half Rack with Single-phase, Low-voltage PDU
- Table 6-42 Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Half Rack with Three-phase, Low-voltage PDU
- Table 6-43 Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Half Rack with Single-phase, High-voltage PDU
- Table 6-44 Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Half Rack with Three-phase, High-voltage PDU

Table 6-41 lists the threshold values for Oracle Exadata Database Machine Half Rack using a single-phase, low-voltage PDU.

Table 6-41	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
В	Module 1, phase 1	0	0	0
В	Module 1, phase 2	0	13	17
В	Module 1, phase 3	0	21	24

Table 6-42 lists the threshold values for Oracle Exadata Database Machine Half Rack using a three-phase, low-voltage PDU.

Table 6-42Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170and 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



Table 6-42(Cont.) Threshold Values for Oracle Exadata Database Machine X2-2 (withX4170 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 2	0	20	25
A and B	Module 1, phase 3	0	19	24

Table 6-43 lists the threshold values for Oracle Exadata Database Machine Half Rack using a single-phase, high-voltage PDU.

Table 6-43Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170and 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
В	Module 1, phase 1	0	0	0
В	Module 1, phase 2	0	12	15
В	Module 1, phase 3	0	19	21

Table 6-44 lists the threshold values for Oracle Exadata Database Machine Half Rack using a three-phase, high-voltage PDU.

Table 6-44	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

6.6.5.3 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 6-45

Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Quarter Rack with Single-phase, Low-voltage PDU

• Table 6-46

Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Quarter Rack with Three-phase, Low-voltage PDU



• Table 6-47

Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Quarter Rack with Single-phase, High-voltage PDU

• Table 6-48

Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Quarter Rack with Three-phase, High-voltage PDU

Table 6-45 lists the threshold values for Oracle Exadata Database Machine Quarter Rack using a single-phase, low-voltage PDU.

Table 6-45Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170and 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
В	Module 1, phase 1	0	0	0
В	Module 1, phase 2	0	6	8
В	Module 1, phase 3	0	12	15

Table 6-46 lists the threshold values for Oracle Exadata Database Machine Quarter Rack using a three-phase, low-voltage PDU.

Table 6-46Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170and 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 6-47 lists the threshold values for Oracle Exadata Database Machine Quarter Rack using a single-phase, high-voltage PDU.

Table 6-47Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170and 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
A	Module 1, phase 2	0	5	7
A	Module 1, phase 3	0	0	0
В	Module 1, phase 1	0	0	0
В	Module 1, phase 2	0	5	7



Table 6-47 (Cont.) Threshold Values for Oracle Exadata Database Machine X2-2 (withX4170 and X4275 servers) Quarter Rack with Single-phase, High-voltage PDU

PDU	Module/Phase		Pre Warning Threshold	Alarm Threshold
В	Module 1, phase 3	0	11	14

Table 6-48 lists the threshold values for Oracle Exadata Database Machine Quarter Rack using a three-phase, high-voltage PDU.

Table 6-48Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170and 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

6.6.6 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.

6.6.7 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 6-49 Threshold Values for Oracle Exadata Database Machine X3-8 Full Rack with Single-phase, Low-voltage 22 kVA PDU
- Table 6-50 Threshold Values for Oracle Exadata Database Machine X3-8 Full Rack with Three-phase, Low-voltage 24 kVA PDU
- Table 6-51 Threshold Values for Oracle Exadata Database Machine X3-8 Full Rack with Single-phase, High-voltage 22 kVA PDU
- Table 6-52 Threshold Values for Oracle Exadata Database Machine X3-8 Full Rack with Three-phase, High-voltage 24 kVA PDU

Table 6-49 lists the threshold values for Oracle Exadata Database Machine X3-8 Full Rackusing a 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
В	Module 1, phase 1	0	24	30
В	Module 1, phase 2	0	26	33
В	Module 1, phase 3	0	25	31

Table 6-49Threshold Values for Oracle Exadata Database Machine X3-8 Full Rack withSingle-phase, Low-voltage 22 kVA PDU

Table 6-50 lists the threshold values for Oracle Exadata Database Machine X3-8 Full Rackusing a three-phase, low-voltage 24 kVA PDU.

Table 6-50Threshold Values for Oracle Exadata Database Machine X3-8 Full Rack withThree-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
В	Module 1, phase 1	0	20	25
В	Module 1, phase 2	0	21	27
В	Module 1, phase 3	0	23	29
В	Module 2, phase 1	0	21	27
В	Module 2, phase 2	0	23	30
В	Module 2, phase 3	0	22	28

Table 6-51 lists the threshold values for Oracle Exadata Database Machine X3-8 Full Rackusing a single-phase, high-voltage 22 kVA PDU.

Table 6-51Threshold Values for Oracle Exadata Database Machine X3-8 Full Rack withSingle-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 6-52 lists the threshold values for Oracle Exadata Database Machine X3-8 Full Rack using a 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
A	Module 2, phase 2	0	13	17
A	Module 2, phase 3	0	11	15
В	Module 1, phase 1	0	10	13
В	Module 1, phase 2	0	13	17
В	Module 1, phase 3	0	11	15
В	Module 2, phase 1	0	12	16
В	Module 2, phase 2	0	13	17
В	Module 2, phase 3	0	10	13

Table 6-52Threshold Values for Oracle Exadata Database Machine X3-8 Full Rack withThree-phase, High-voltage 24 kVA PDU

6.6.8 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 6-53 Threshold Values for Oracle Exadata Database Machine X2-8 Full Rack with Single-phase, Low-voltage 22 kVA PDU
- Table 6-54 Threshold Values for Oracle Exadata Database Machine X2-8 Full Rack with Three-phase, Low-voltage 24 kVA PDU
- Table 6-55 Threshold Values for Oracle Exadata Database Machine X2-8 Full Rack with Single-phase, High-voltage 22 kVA PDU
- Table 6-56 Threshold Values for Oracle Exadata Database Machine X2-8 Full Rack with Three-phase, High-voltage 24 kVA PDU

Table 6-53 lists the threshold values for Oracle Exadata Database Machine X2-8 Full Rackusing a single-phase, low-voltage 22 kVA PDU.

Table 6-53Threshold Values for Oracle Exadata Database Machine X2-8 Full Rack withSingle-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
А	Module 1, phase 3	0	35	37



PDU	Module/Phase	Info Low Threshold	Pre Warning Threshold	Alarm Threshold
В	Module 1, phase 1	0	35	37
В	Module 1, phase 2	0	35	37
В	Module 1, phase 3	0	36	37

Table 6-53 (Cont.) Threshold Values for Oracle Exadata Database Machine X2-8 FullRack with Single-phase, Low-voltage 22 kVA PDU

Table 6-54 lists the threshold values for Oracle Exadata Database Machine X2-8 Full Rack using a three-phase, low-voltage 24 kVA PDU.

Table 6-54Threshold Values for Oracle Exadata Database Machine X2-8 Full Rack withThree-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 6-55 lists the threshold values for Oracle Exadata Database Machine X2-8 Full Rack using a single-phase, high-voltage 22 kVA PDU.

Table 6-55Threshold Values for Oracle Exadata Database Machine X2-8 Full Rack withSingle-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 6-56 lists the threshold values for Oracle Exadata Database Machine X2-8 Full Rack using a three-phase, high-voltage 24 kVA PDU.

Table 6-56Threshold Values for Oracle Exadata Database Machine X2-8 Full Rack withThree-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



6.6.9 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.

- PDU Thresholds for Oracle Exadata Storage Expansion Full Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers
- PDU Thresholds for Oracle Exadata Storage Expansion Half Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers
- PDU Thresholds for Oracle Exadata Storage Expansion Quarter Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers

6.6.9.1 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 6-57 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 6-58 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 6-59 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 6-60 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 6-57 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.

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
В	Module 1, phase 1	0	18	23
В	Module 1, phase 2	0	22	24
В	Module 1, phase 3	0	18	23

Table 6-57Threshold Values for Oracle Exadata Storage Expansion Full Rack withExadata Storage Server with Sun Fire X4270 M2 Servers with Single-phase, Low-voltagePDU



Table 6-58 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 6-58Threshold Values for Oracle Exadata Storage Expansion Full Rack withExadata Storage Server with Sun Fire X4270 M2 Servers with Three-phase, Low-voltagePDU

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 6-59 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 6-59 Threshold Values for Oracle Exadata Storage Expansion Full Rack withExadata Storage Server with Sun Fire X4270 M2 Servers with Single-phase, High-voltagePDU

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
В	Module 1, phase 1	0	16	20
В	Module 1, phase 2	0	20	21
В	Module 1, phase 3	0	16	20

Table 6-60 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 6-60 Threshold Values for Oracle Exadata Storage Expansion Full Rack withExadata Storage Server with Sun Fire X4270 M2 Servers with Three-phase, High-voltagePDU

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



6.6.9.2 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 6-61 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 6-62 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 6-63 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 6-64 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 6-61 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.

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
В	Module 1, phase 1	0	0	0
В	Module 1, phase 2	0	13	17
В	Module 1, phase 3	0	18	23

Table 6-61 Threshold Values for Oracle Exadata Storage Expansion Half Rack withExadata Storage Server with Sun Fire X4270 M2 Servers with Single-phase, Low-voltagePDU

Table 6-62 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 6-62Threshold Values for Oracle Exadata Storage Expansion Half Rack withExadata Storage Server with Sun Fire X4270 M2 Servers with Three-phase, Low-voltagePDU

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 6-63 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 6-63 Threshold Values for Oracle Exadata Storage Expansion Half Rack withExadata Storage Server with Sun Fire X4270 M2 Servers with Single-phase, High-voltagePDU

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
В	Module 1, phase 1	0	0	0
В	Module 1, phase 2	0	12	15
В	Module 1, phase 3	0	16	20

Table 6-64 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 6-64Threshold Values for Oracle Exadata Storage Expansion Half Rack withExadata Storage Server with Sun Fire X4270 M2 Servers with Three-phase, High-voltagePDU

PDU	Module/Phase		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

6.6.9.3 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 6-65 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 6-66 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
- Table 6-67 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 6-68 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 6-65 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 6-65Threshold Values for Oracle Exadata Storage Expansion Quarter Rack withExadata Storage Server with Sun Fire X4270 M2 Servers with Single-phase, Low-voltagePDU

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
В	Module 1, phase 1	0	0	0
В	Module 1, phase 2	0	6	8
В	Module 1, phase 3	0	10	13

Table 6-66 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 6-66Threshold Values for Oracle Exadata Storage Expansion Quarter Rack withExadata Storage Server with Sun Fire X4270 M2 Servers with Three-phase, Low-voltagePDU

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 6-67 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 6-67 Threshold Values for Oracle Exadata Storage Expansion Quarter Rack withExadata Storage Server with Sun Fire X4270 M2 Servers with Single-phase, High-voltagePDU

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
В	Module 1, phase 1	0	0	0
В	Module 1, phase 2	0	5	7
В	Module 1, phase 3	0	9	12



Table 6-68 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 6-68Threshold Values for Oracle Exadata Storage Expansion Quarter Rack withExadata Storage Server with Sun Fire X4270 M2 Servers with Three-phase, High-voltagePDU

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

6.7 Checking Exadata Storage Servers

After powering up the rack, check the Oracle Exadata Storage Servers.

Perform the following checks on each Exadata Storage Server:

1. Connect to the storage server console.

Use one of the following connection options:

• Attach a serial cable between a console and the SER MGT port on the server.

Connections through the modular jack serial port must use shielded cables to comply with radio frequency emission limits.

Set the terminal device communication properties to these values: 9600 baud, 8 bit, no parity, 1 stop bit.

After you connect to ILOM, run the start $\space{start}\space=start\space{start}\space{start}\space{start}\s$

For more details, see Connect to Oracle ILOM.

 Attach an Ethernet cable to the NET MGT port on the server and then connect using a workstation on the network.

After you connect to ILOM, run the start $\space{start}\space=start\space{start}\space{start}\space{start}\s$

For more details, see Connect to Oracle ILOM.

- Connect using the KVM switch, if one is available.
- 2. Log in to the storage server as the root user.

Note:

If you do not have the password for the ${\tt root}$ user, then contact Oracle Support Services.



 Verify the SysSN label for the storage 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 =0937XFG03B
->Session closed
Disconnected
```

4. 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 the following steps.

- 5. Verify the disks on the server are visible and online using the following command. The disks are numbered slot 0 to slot 11.
 - If you are using Oracle Exadata System Software release 19c or later, then get the enclosure ID:

```
# cd /opt/MegaRAID/storcli
# ./storcli64 /c0/eall show
Controller = 0
Status = Success
Description = None
Properties :
_____
_____
_____
EID State Slots PD PS Fans TSs Alms SIM Port#
ProdID VendorSpecific
_____
_____
 8 OK 14 12 0 0 0 0 0 Port 0 - 3 & Port 4 - 7 x8
X5-2L SPMS v`
252 OK 8 0 0 0 0 0 1 Internal
SGPIO
_____
_____
```

EID-Enclosure Device ID |PD-Physical drive count |PS-Power Supply count| TSs-Temperature sensor count |Alms-Alarm count |SIM-SIM Count

Then show the state of the physical devices in that enclosure:

```
# cd /opt/MegaRAID/storcli
# ./storcli64 /c0/e8/sall show all | grep "8:"
8:0 16 Onln 0 7.151 TB SAS HDD N N 512B H7280A520SUN8.0T U
```

8:1 17	Onln	1 7.151	TB SAS	HDD N	N	512B H7280A520SUN8.0T	U
8:2 20	Onln	2 7.151	TB SAS	HDD N	Ν	512B H7280A520SUN8.0T	U
8:3 15	Onln	3 7.151	TB SAS	HDD N	Ν	512B H7280A520SUN8.0T	U
8:4 12	Onln	4 7.151	TB SAS	HDD N	Ν	512B H7280A520SUN8.0T	U
8:5 18	Onln	5 7.151	TB SAS	HDD N	Ν	512B H7280A520SUN8.0T	U
8:6 11	Onln	6 7.151	TB SAS	HDD N	Ν	512B H7280A520SUN8.0T	U
8:7 9	Onln	7 7.151	TB SAS	HDD N	Ν	512B H7280A520SUN8.0T	U
8:8 14	Onln	8 7.151	TB SAS	HDD N	Ν	512B H7280A520SUN8.0T	U
8:9 21	Onln	11 7.151	TB SAS	HDD N	Ν	512B H7280B520SUN8.0T	U
8:10 13	Onln	9 7.151	TB SAS	HDD N	Ν	512B H7280A520SUN8.0T	U
8:11 10	Onln	10 7.151	TB SAS	HDD N	N	512B H7280A520SUN8.0T	U

The rows displayed are from a table that displays the following information:

```
EID:Slt DID State DG Size Intf Med SED PI SeSz Model Sp
....
EID-Enclosure Device ID|Slt-Slot No.|DID-Device ID|DG-DriveGroup
DHS-Dedicated Hot Spare|UGood-Unconfigured Good|GHS-Global Hotspare
UBad-Unconfigured Bad|Onln-Online|Offln-Offline|Intf-Interface
Med-Media Type|SED-Self Encryptive Drive|PI-Protection Info
SeSz-Sector Size|Sp-Spun|U-Up|D-Down|T-Transition|F-Foreign
UGUnsp-Unsupported|UGShld-UnConfigured shielded|HSPShld-Hotspare
shielded
CFShld-Configured shielded|Cpybck-CopyBack|CBShld-Copyback Shielded
```

 If you are using Oracle Exadata System Software release 18c or earlier, then use the following command:

```
# 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

6. If applicable, verify the PMEM modules are visible.

```
# cellcli -e list physicaldisk where disktype=PMEM
```

7. Verify the flash modules are visible. The number of cards and modules varies depending on the model.

cellcli -e list physicaldisk where disktype=flashdisk

If any flash modules are missing, then power cycle the system, and wait 10 minutes after restarting before checking again. If this does not resolve the problem, then re-seat the module and flash card. If the problem continues, then replace the card with the on-site spare.

8. Check the rear of the rack to ensure the flash card LEDs are green all the way across. If any LED is amber, then check again after the next step. If the LED is still amber after restart, then re-seat the card and ESM or flash module. 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.

9. Log out of the system using the following command:

logout

6.8 Checking Oracle Exadata Database Servers

Before installing the software, check the configuration of the Oracle Exadata Database Servers.

Perform the following checks on each Exadata database server:

1. Connect to the database server console.

Use one of the following connection options:

Attach a serial cable between a console and the SER MGT port on the server.

Connections through the modular jack serial port must use shielded cables to comply with radio frequency emission limits.

Set the terminal device communication properties to these values: 9600 baud, 8 bit, no parity, 1 stop bit.

After you connect to ILOM, run the start $\space{\space{1.5}}\space{\$

For more details, see Connect to Oracle ILOM.

 Attach an Ethernet cable to the NET MGT port on the server and then connect using a workstation on the network.



After you connect to ILOM, run the start /SP/console command to connect to the host console.

For more details, see Connect to Oracle ILOM.

- Connect using the KVM switch, if one is available.
- 2. Log in as the root user to the database server.

Note:

If you do not have the password for the ${\tt root}$ user, then contact Oracle Support Services.

3. 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
```

4. Change to the /opt/oracle.SupportTools/firstconf directory.

cd /opt/oracle.SupportTools/firstconf

5. Create a group file with the list of server IP addresses to use in the dcli utility commands, if required.

If you are configuring Oracle Exadata Rack X8M, then you must manually create a file and add the IP addresses.

On racks that use InfiniBand Network Fabric, you can use the following command to identify the servers and copy the results into a text file.

ibhosts | awk '/elastic/ {print \$8}' | cut -c1-14 > group file

In the preceding command, *group_file* is name of the file to create with the server IP addresses.

6. 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 Integrated Lights Out Manager (ILOM), and wait 10 minutes before powering on the system.

- 7. Verify the disks on the server are visible and online.
 - If you are using Oracle Exadata System Software release 19c or later, then use the following command:

```
# cd /opt/MegaRAID/storcli
# ./storcli64 /call show | grep "Physical Drives" -A 25
Physical Drives = 8
PD LIST :
_____
_____
_____
EID:Slt DID State DG Size Intf Med SED PI SeSz Model
Sp Type
_____
_____
39:0
     31 Onln 0 278.464 GB SAS HDD N N 512B ST930003SSUN300G
U -
39:1 35 Onln 0 278.464 GB SAS HDD N N 512B ST930003SSUN300G
U -
39:2
     41 Onln 0 278.464 GB SAS HDD N N 512B H103030SCSUN300G
U -
39:3
     37 Onln 0 278.464 GB SAS HDD N
                                  N 512B ST930003SSUN300G
U -
39:4
      38 Onln 0 278.464 GB SAS HDD N
                                  N 512B ST930003SSUN300G
U -
39:5
     44 Onln 0 278.464 GB SAS HDD N
                                  N 512B H109030SESUN300G
U -
39:6
     33 Onln 0 278.464 GB SAS HDD N N 512B ST930003SSUN300G
U -
39:7
     43 Onln 0 278.464 GB SAS HDD N N 512B ST930003SSUN300G
U –
```



EID-Enclosure Device ID|Slt-Slot No.|DID-Device ID|DG-DriveGroup DHS-Dedicated Hot Spare|UGood-Unconfigured Good|GHS-Global Hotspare UBad-Unconfigured Bad|Onln-Online|Offln-Offline|Intf-Interface Med-Media Type|SED-Self Encryptive Drive|PI-Protection Info SeSz-Sector Size|Sp-Spun|U-Up|D-Down|T-Transition|F-Foreign

UGUnsp-Unsupported|UGShld-UnConfigured shielded|HSPShld-Hotspare shielded

CFShld-Configured shielded|Cpybck-CopyBack|CBShld-Copyback Shielded

 If you are using Oracle Exadata System Software release 18c or earlier, then use the following command:

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

- 8. Examine the output of the following command:
 - If you are using Oracle Exadata System Software release 19c or later, then use the following command:

/opt/MegaRAID/storcli/storcli64 -LdInfo -LAll -aAll

 If you are using Oracle Exadata System Software release 18c or earlier, then you can use the following command:

/opt/MegaRAID/MegaCli/MegaCli64 -LdInfo -LAll -aAll



 (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.

10. 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

- **11.** Log out of the system using the following command:
 - # logout

6.9 Performing Additional Checks and Configuration

Perform these additional checks and steps to verify the configuration of your Oracle Exadata Rack.

- 1. (Oracle Exadata 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

- Create a group file with the list of IP addresses to use in the dcli utility commands, if you
 want to query multiple racks.
- Verify the rack master serial number is set correctly using the following command:

```
# dcli -l root -g group_file_name "ipmitool sunoem cli 'show \
/SP system_identifier'" | grep "system_identifier =" > /tmp/show-rack-
msn.out
```

more /tmp/show-rack-msn.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, where *rack_type* is the rack designation, such as X8-8 and the string *serial_number* represents the serial number:

```
# ipmitool sunoem cli 'set /SP system_identifier= \
"Exadata Database Machine rack type serial number"'
```



5. If you are running an Oracle Exadata System Software release earlier than 18.1, then 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, where LUNn is the LUN number, such as L2:

MegaCli64 -LDSetProp -DisDskCache -LUNn -a0

6.10 Verifying the RoCE Network Fabric Configuration

This procedure describes how to verify the RoCE Network Fabric configuration.

 Verify the proper oracle-rdma-release software versions are being used on the database servers.

```
[root@dbm01adm08 ~]# rpm -qa |grep oracle-rdma-release
oracle-rdma-release-0.11.0-1.el7ora.x86 64
```

The oracle-rdma-release software and adapter firmware versions are automatically maintained on the Oracle Exadata storage servers.

2. Check the adapter firmware versions on the database servers.

Use the CheckHWnFWProfile script to check firmware versions for the RDMA Network Fabric adapters.

/opt/oracle.SupportTools/CheckHWnFWProfile -action list

3. Visually check all the RDMA Network Fabric 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.

4. Complete the steps described in My Oracle Support Doc ID 2587717.1

Related Topics

 Verify RoCE Cabling on Oracle Exadata Database Machine X8M-2 and X8M-8 Servers (My Oracle Support Doc ID 2587717.1)



6.11 Verifying the InfiniBand Network Fabric Network

This procedure describes how to verify the InfiniBand Network Fabric network.

- Visually check all the RDMA Network Fabric 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 Network Fabric 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.

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 Half Rack or Oracle Exadata Quarter Rack. Use the value halfrack or quarterrack, if needed.

The following example shows the output when there is a bad RDMA Network Fabric switch to 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]
Are any hosts connected to spine switch]
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 RDMA Network Fabric cable on a database server:

#./verify-topology



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

Switches 0x21283a87cba0a0 0x21283a87b8a0a0 have 6 connections between them They should have at least 7 links between them

6.12 Imaging a New System

You have different options for preparing an Oracle Exadata system for deployment.

Using a preconf.csv file with the PXE 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.

- Using ISO Images to Image a New System You can download ISO images to use when upgrading your Oracle Exadata.
- Using Elastic Configuration to Image a New System Elastic configuration is now the standard methodology for all new deployments, and applies to Oracle Exadata X4-8 and later servers.
- Using ISO to Image a New System You can use ISO to prepare a new Exadata system for deployment.
- Using PXE to Image a New System You can use PXE to prepare a new Exadata system for deployment.



Updates to Imaging Parameters

Some of the command line options for imaging have changed with 12.1.2.1.0 and above.

6.12.1 Using ISO Images to Image a New System

You can download ISO images to use when upgrading your Oracle Exadata.

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 6-69 ISO Images for 12.1.2.1.1

Version	Туре	Edelivery Part / Notes	ARU Bug #/ULN Channel	Description
12.1.2.1.1	Cell ISO image and md5sum: 90305b9e2c7e050d75 88b8a7d5c731e7 cell_12.1.2.1.1_LINUX. X64_150316.2-1.x86_6 4.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: 39f12722cb338b2d4de 5acba90adf8fe compute_12.1.2.1.1_LI NUX.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 nodeN, 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.



 If you are using virtualization on the database servers (Oracle VM Server or Oracle Linux KVM), then run switch_to_ovm.sh on each database server. The database servers will reboot if you are using Oracle VM Server.

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 system 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
```

 On systems with InfiniBand Network Fabric only, run /opt/oracle.SupportTools/ reclaimdisks.sh -free -reclaim on each database server before installing any software.

The command reclaims disk space reserved for the deployment type not selected, which is not required on RoCE-based Exadata database servers.

The command typically takes less than 5 minutes.

Caution:

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
. . .
         ] Copying /usr/share/grub/x86 64-redhat/* to /boot/grub ...
[INFO
[INFO
         ] Create filesystem on device /dev/sda1
         ] Tune filesystem on device /dev/sda1
[INFO
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. If you have an Oracle Exadata Rack X8 or earlier, then run *ibhosts* and verify that all nodes show the correct IP addresses and host names. There should be no nodes with <code>elasticNode</code> 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)

6.12.2 Using Elastic Configuration to Image a New System

Elastic configuration is now the standard methodology for all new deployments, and applies to Oracle Exadata X4-8 and later servers.

You can also use elastic configuration 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 X4-8 or later systems. You can run elastic configuration at the first time of deployment, and when adding new 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.

To prepare a new Exadata system for deployment using the elastic configuration method, perform the following steps:

1. Download the latest version of 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, then, before you run the OEDA installation tool, 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 DOMO 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 system 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 DOMO system partition
```

 On systems with InfiniBand Network Fabric only, run /opt/oracle.SupportTools/ reclaimdisks.sh -free -reclaim on each database server before installing any software.

The command reclaims disk space reserved for the deployment type not selected, which is not required on RoCE-based Exadata database servers.

The command typically takes less than 5 minutes.

Caution:

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
. . .
         ] Copying /usr/share/grub/x86 64-redhat/* to /boot/grub ...
[INFO
         ] Create filesystem on device /dev/sda1
[INFO
[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
```

- Apply your specific configuration to the nodes by running the applyElasticConfig.sh script that is supplied with OEDA.
- 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.
- Run the OEDA tool to deploy, supplying the name of the configuration file generated by OEDA.

For example, if your rack is named exadm01, then you would use the following command:

```
[root] # ./install.sh -cf ../exadm01.xml -1
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

6.12.3 Using ISO to Image a New System

You can use ISO to prepare a new Exadata system for deployment.

- 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. Run OEDA to generate the preconf.csv file that can be used to image the system.
- 5. Connect to the first database node.

Use one of the following connection options:

• Attach a serial cable between a console and the SER MGT port on the server.

Connections through the modular jack serial port must use shielded cables to comply with radio frequency emission limits.

Set the terminal device communication properties to these values: 9600 baud, 8 bit, no parity, 1 stop bit.

For more details, see Connect to Oracle ILOM.

 Attach an Ethernet cable to the NET MGT port on the server and then connect using a workstation on the network.

For more details, see Connect to Oracle ILOM.

- 6. Obtain the ethO 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, example.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. Prepare and locate the files required for system imaging. The procedure varies depending on the Oracle Exadata System Software version being used.
 - 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 are already in the patch archive.

Use Exadata Database Machine and Exadata Storage Server Supported Versions (My Oracle Support Doc ID 888828.1) to locate the relevant patch archive. Then, unzip the patch archive and follow the steps in the patch README.txt to copy the ISO file and optional preconf.csv file into place.

Note:

 Using ISO with the preconf.csv file 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

 If a newly imaged system does not have access to DHCP, then the imaging procedure will not be able to access the preconf.csv file. In this case, the imaging procedure will attempt to locate the preconf.csv inside a dedicated ISO image located in the same directory and named preconf.iso.

To use this method, you can create the preconf.iso file by using the following command:

```
# mkisofs -1 -input-charset ascii -o preconf.iso preconf.csv
```

- When a preconf.csv file is not being used, the ISO image can be made available as virtual media on the ILOM of the node being re-imaged.
- 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.
- If you are using versions prior to 12.1.2.2.0, use ImageMaker to create the image files as follows:
 - a. 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.

b. After download, unzip the first file, called something similar to V75080-01.zip, and then unzip the subsequent file as well. Finally, extract the resulting archive. Perform the commands as the root user.

```
# 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 ${\tt README_FOR_FACTORY.txt}$ file in the resulting directory for additional details.

c. 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:

- i. (12.1.2.1.0 up to 12.2.1.1.0) Change directory to the dl180 or dl360 directory.
- ii. (12.2.1.1.0 and above) Change directory to the cell or compute directory.
- iii. 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
```

- d. Attach the ISO as virtual media to the ILOM of the database server to be reimaged, and select CDROM as the next boot device.
- 10. Reboot the database node or cell to start the imaging process from the ISO.
- 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 DOMO 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 system 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
```

12. On systems with InfiniBand Network Fabric only, run /opt/oracle.SupportTools/ reclaimdisks.sh -free -reclaim on each database server before installing any software.

The command reclaims disk space reserved for the deployment type not selected, which is not required on RoCE-based Exadata database servers.

The command typically takes less than 5 minutes.

Caution:

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
. . .
         ] Copying /usr/share/grub/x86 64-redhat/* to /boot/grub ...
[INFO
        ] Create filesystem on device /dev/sda1
[INFO
         ] Tune filesystem on device /dev/sda1
[INFO
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> guit
```

- **13.** 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.
- 14. 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 Database Machine and Exadata Storage Server Supported Versions (My Oracle Support Doc ID 888828.1)

6.12.4 Using PXE to Image a New System

You can use PXE to prepare a new Exadata system for deployment.

- Using PXE to Image a New System Using Release 12.1.2.2.0 or Later You can use PXE to prepare a new Exadata system running Oracle Exadata System Software release 12.1.2.2.0 or later for deployment using a simplified method.
- Using PXE to Image a New System for Releases Earlier than 12.1.2.2.0 You can use PXE to prepare a new Exadata system running an Oracle Exadata System Software release earlier than 12.1.2.2.0 for deployment.

6.12.4.1 Using PXE to Image a New System Using Release 12.1.2.2.0 or Later

You can use PXE to prepare a new Exadata system running Oracle Exadata System Software release 12.1.2.2.0 or later for deployment using a simplified method.

- 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.

Use one of the following connection options:

• Attach a serial cable between a console and the SER MGT port on the server.

Connections through the modular jack serial port must use shielded cables to comply with radio frequency emission limits.



Set the terminal device communication properties to these values: 9600 baud, 8 bit, no parity, 1 stop bit.

For more details, see Connect to Oracle ILOM.

 Attach an Ethernet cable to the NET MGT port on the server and then connect using a workstation on the network.

For more details, see Connect to Oracle ILOM.

6. Obtain the eth0 MAC address for each database node.

The ethO MAC address is the fru_macaddress field from /SYS/MB/NETO 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,example.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.

The file name is hostname.xx-xx-xx-xx in the pxelinux.cfg directory. Below are the recommended options for PXE imaging of versions 12.1.2.1.0 and above. The line starting with append should be entered as a single line with no line breaks.

```
kernel vmlinux-iso-file-name
append initrd=img_file pxe factory stit reboot-on-success
notests=diskgroup dhcp
preconf=n.n.n.n.r:/directory/preconf.csv iso-uri=http://web_server/
x86_64/iso/image_n
ame.iso console=ttyS0,115200n8
```

On systems with Oracle Exadata System Software release 20.1.0 or later, you can enable or disable Exadata Secure RDMA Fabric Isolation by adding qinq=yes or qinq=no to the kernel options. For example:

```
kernel vmlinux-iso-file-name
append initrd=img_file pxe factory stit reboot-on-success
notests=diskgroup dhcp
preconf=n.n.n.n.i/directory/preconf.csv iso-uri=http://web_server/
x86_64/iso/image_n
ame.iso console=ttyS0,115200n8 ging=no
```

9. Optionally, configure key-based authentication for the root OS user.

Starting with Oracle Exadata System Software release 20.1.0, you can configure keybased authentication for the root OS user as part of the PXE imaging process. If you want to use this option, then perform the following for each node:

a. Create an RSA public and private key pair using a utility such as ssh-keygen.
 For example:

ssh-keygen -t rsa -b 4096

b. Rename the public key file so that the file name conforms to the following format:

id rsa.*short hostname*.root.pub

In the public key file name, *short_hostname* is the node host name as defined in the first field of the corresponding node entry in the preconf.csv file.

c. Copy the renamed public key file to the directory that contains the preconf.csv file.

This is the same directory that you previously specified in the PXE configuration file preconf parameter, which defines the path to the preconf.csv file.

If you configure key-based authentication, then password-based authentication is disabled after the imaging process. Consequently, root access to the node is only possible using the matching private key. ILOM access using the root password is also disabled.

By default, if the public key file is not named or located correctly, then password-based authentication is enabled for the node. You can also make key-based authentication mandatory by specifying root-ssh-key=yes as a boot option in the PXE configuration file. In this case, the imaging process fails if the public key is not in the correct location.

Regardless of any public keys, you can disable the configuration of key-based authentication by specifying root-ssh-key=no as a boot option in the PXE configuration file.

10. Create the image files, if necessary.

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-iso-ImageName-{cell|compute}
initrd: initrd-iso-ImageName-{cell|compute}.img
image: vmlinux-iso-ImageName-{cell|compute}.tar
```

 Change the boot order using the ILOM to boot from PXE and then restart the server to start the imaging process.

For example, from the Oracle Linux prompt on the host:

- # ipmitool chassis bootdev pxe
- # shutdown -r now
- 12. 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 DOMO 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 system device to /dev/VGExaDb/
LVDbSy
s3 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
```

13. On systems with InfiniBand Network Fabric only, run /opt/oracle.SupportTools/ reclaimdisks.sh -free -reclaim on each database server before installing any software.

The command reclaims disk space reserved for the deployment type not selected, which is not required on RoCE-based Exadata database servers.

The command typically takes less than 5 minutes.

Caution:

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
...
[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

14. 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.

15. Run the OEDA tool to deploy.

Note:

If you configured key-based authentication for the root OS user, then you must first copy the node private keys into the OEDA WorkDir.

```
[root] # ./install.sh -cf ../machine config file.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 Database Machine and Exadata Storage Server Supported Versions (My Oracle Support Doc ID 888828.1)

6.12.4.2 Using PXE to Image a New System for Releases Earlier than 12.1.2.2.0

You can use PXE to prepare a new Exadata system running an Oracle Exadata System Software release earlier than 12.1.2.2.0 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.

Use one of the following connection options:

• Attach a serial cable between a console and the SER MGT port on the server.

Connections through the modular jack serial port must use shielded cables to comply with radio frequency emission limits.

Set the terminal device communication properties to these values: 9600 baud, 8 bit, no parity, 1 stop bit.

For more details, see Connect to Oracle ILOM.

 Attach an Ethernet cable to the NET MGT port on the server and then connect using a workstation on the network.

For more details, see Connect to Oracle ILOM.

6. Obtain the eth0 MAC address for each database node.

The ethO MAC address is the fru_macaddress field from /SYS/MB/NETO 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,example.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 prior to release 12.1.2.2.0. The line starting with append should be entered as a single line with no line breaks.

```
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
```

9. 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.

10. 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, extract the resulting archive.

```
# 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.

11. 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.

Change directory to the d1180 or d1360 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
```

 Change the boot order using the ILOM to boot from PXE and then restart the server to start the imaging process.

For example, from the Oracle Linux prompt on the host:

```
# ipmitool chassis bootdev pxe
```

```
# shutdown -r now
```



 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 DOMO 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
vs1
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 system device to /dev/VGExaDb/
LVDbSy
s3 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
```

14. On systems with InfiniBand Network Fabric only, run /opt/oracle.SupportTools/ reclaimdisks.sh -free -reclaim on each database server before installing any software.

The command reclaims disk space reserved for the deployment type not selected, which is not required on RoCE-based Exadata database servers.

The command typically takes less than 5 minutes.

Caution:

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
. . .
         ] Copying /usr/share/grub/x86 64-redhat/* to /boot/grub ...
[INFO
         ] Create filesystem on device /dev/sda1
[INFO
[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> guit
```

15. 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.

16. Run the OEDA tool to deploy.

```
[root] # ./install.sh -cf ../machine config file.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

6.12.5 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)

6.13 Performing Initial Elastic Configuration of Oracle Exadata

This topic provides background information on elastic configuration and describes how to perform the initial configuration of Oracle Exadata.

You need the configuration file generated by Oracle Exadata Deployment Assistant (OEDA).

Elastic configuration is new in Oracle Exadata System Software release 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 Two-Socket X5 generation and later storage servers
- Oracle Exadata Racks that use an InfiniBand Network Layer or a RoCE Network Layer.

Starting with the Oracle Exadata Two-Socket X5 generation of storage servers, the same process can also be used to add additional database servers or storage servers to an existing configuration.

The process allows initial IP addresses to be assigned to database servers and storage servers, regardless of the exact configuration you ordered. Your 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 storage server in cases where expansion involves adding only storage servers.

Every Oracle Exadata has a predefined method for the cabling of nodes to the RDMA Network Fabric switch ports. Therefore, there is a fixed mapping from each node's location in the rack to



the ports of the RDMA Network Fabric switches. Assuming the rack is always populated following this map, a node's rack unit location can be identified by querying the RDMA Network Fabric to determine the RDMA Network Fabric 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:

- Disk space for unused system partitions must be reclaimed before installing software on all database servers with InfiniBand Network Fabric. Use the following command to reclaim the disk space: /opt/oracle.SupportTools/ reclaimdisks.sh -free -reclaim. This command is not required on RoCEbased Exadata database servers.
- 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.
- 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 storage server instead of a database node.

Note:

The network connection and configuration for Oracle Exadata 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 ${\tt root}$ user, then contact Oracle Support Services.

3. On systems with InfiniBand Network Fabric only, 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. If using virtualization on the rack, configure each database server as follows:

Note:

Starting with Oracle Exadata Database Machine X8M-2, Oracle Linux KVM is the virtualization technology for systems that use RoCE Network Fabric. Otherwise, Oracle VM Server (OVM) is a Xen-based virtualization technology, which is used across Oracle Exadata Database Machine systems that use InfiniBand Network Fabric.

This step applies to both virtualization technologies.

/opt/oracle.SupportTools/switch_to_ovm.sh

The database servers will reboot during this step.

Note:

It is not possible or supported to switch between physical and virtualized configurations.

5. On systems with InfiniBand Network Fabric only, reclaim the unused disk space on the database servers.

Disk space for unused system partitions must be reclaimed before installing software on all database servers with InfiniBand Network Fabric. Use the following command to reclaim the disk space: /opt/oracle.SupportTools/reclaimdisks.sh -free -reclaim. This command is not required on RoCE-based Exadata database servers.

reclaimdisks.sh performs partition reconfiguration and a few other necessary configuration changes that take typically less than a minute to complete.

- 6. On systems with InfiniBand Network Fabric only, verify the disk configuration on the database servers.
 - # /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: DOMO. Layout: DOMO.

- 7. Copy the OEDA configuration files to the database server using one of the following methods. If adding only storage servers, the steps can be run from a storage server.
 - Using a USB flash drive:
 - **a.** Copy the configuration file to a USB flash drive.
 - b. Connect the USB drive to the database server or storage server.
 - 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 Oracle Exadata Storage Server X6 or X5 Extreme Flash (EF) 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 storage server 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 7.c. The following is an example of the command.

mount -t vfat /dev/sdb1 /mnt/usb

g. Copy OEDA and the configuration files from the USB flash drive to the onecommand directory on the database server or storage server 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 storage server.
- Using a temporary network connection:

This option is only needed if there were IP address conflicts, and Oracle Exadata is not already connected to the network.

- 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 storage server 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.

8. Download and unzip the OEDA archive to a host on the same network as the servers in the rack (172.16.*).

The applyElasticConfig.sh script is not configured by default on the servers in the rack.

9. Run the applyElasticConfig.sh script.

For example, if you unzipped the OEDA ZIP file into the /opt/oracle.SupportTools/ onecommand/linux-x64 directory, then use the following commands:

```
# 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 storage servers. All servers restart at the end of the process.

- **10.** Connect the corporate network cable for the management network to the Management Network Switch.
- Connect the corporate network cables for the client access network to the database servers.
- 12. Restart all database servers and storage servers.
- **13.** Log in to the first database server (or storage server, if only storage servers 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 OEDA, and includes the full path.

Note:

- The checkip.sh script can be run on a server outside of Oracle Exadata to verify network connectivity to Oracle Exadata. 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 OEDA for the relevant platform.
- 14. Use OEDA to install and configure the software for Oracle Exadata.

Related Topics

Cabling Information for Oracle Exadata Database Machine



- Powering On and Off Oracle Exadata Rack
- Adding Additional Elastic Nodes to an Existing Rack You can add nodes to an existing rack using elastic configuration.

6.14 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 or later model servers into previous generation racks using this methodology is not supported.

The XML configuration file generated by the Oracle Exadata Deployment Assistant (OEDA) must contain the existing nodes, plus the new nodes to be added.

If you are adding only storage servers, then you can run the <code>applyElasticConfig.sh</code> script from a storage server rather than a database server.

The overall process for adding a new server to an existing rack is:

- 1. Use Oracle Exadata Deployment Assistant (OEDA) to add the new server to the rack configuration and generate the configuration files.
- Download and unzip the OEDA archive to an existing server in the rack where you are adding the new server.
- 3. Install the new server into the rack.
- 4. Review the OEDAconfiguration file for the rack to determine the location within the rack (the ulocation) for the new server. For example:

<uLocation>16</uLocation>

 Log in to the ILOM on the new server using the local serial management connection (SER MGT port), and review the system location in the SP.

For example:

```
-> show /sp/ system_location
/SP
Properties:
    system_location = ru_06
->
```

6. If the location in the ILOM SP is different from the OEDA location, then modify the location in the ILOM SP to match the value from OEDAILOM.

Note:

Ensure that there are no duplicate locations in the OEDA rack configuration XML file.



Set the system location in the ILOM SP with the following command:

-> set /SP/ system location=RU16

7. For a database server with InfiniBand Network Fabric only, log in to the server and reclaim the unused disk space.

Disk space for unused system partitions must be reclaimed before installing software on all database servers with InfiniBand Network Fabric. Use the following command to reclaim the disk space: /opt/oracle.SupportTools/reclaimdisks.sh -free -reclaim. This command is not required on RoCE-based Exadata database servers.

reclaimdisks.sh performs partition reconfiguration and a few other necessary configuration changes that take typically less than a minute to complete.

 Log in to the server where you unzipped the OEDA configuration files and run the applyElasticConfig.sh script.

For example, if you unzipped the OEDA ZIP file into the /opt/oracle.SupportTools/ onecommand/linux-x64 directory, then use the following commands:

cd /opt/oracle.SupportTools/onecommand/linux-x64

./applyElasticConfig.sh -cf customer name-configFile.xml

The applyElasticConfig.sh script performs network configuration for the new servers. The new servers are restarted at the end of the process.

6.15 Using the OEDA setuprootssh Utility

You can set up key-based authentication for the root user by using the setuprootssh.sh utility included with OEDA.

Starting with the April 2020 release of Oracle Exadata Deployment Assistant (OEDA), the setuprootssh.sh utility is located in the same directory as the install and config scripts.

• To set up the required keys for SSH key-based authentication, run the setuprootssh.sh utility.

```
./setuprootssh.sh -cf config.xml
```

For config.xml, specify the full path name to the deployment file created by OEDA.

For each physical and virtual machine (VM) host in the deployment file, the setuprootssh.sh utility creates an SSH key pair. The keys are saved in the OEDA WorkDir using the following file naming conventions:

- Private key: id_rsa.short_hostname.root
- Public key: id_rsa.short_hostname.root.pub

In the key file names, *short_hostname* is the corresponding server host name without any domain name qualification.

Where possible, the utility also installs the public key on the host and disables passwordbased authentication for the root user.

If the utility cannot install the public key on the host, then the key file remains ready for later use in the OEDA WorkDir. For example, this occurs to keys for VM hosts if you run the utility before you create the VMs.

- If your system has a non-default root password, you must specify it by using the -p root password option.
- Use the -h option to display the usage information.

6.16 Loading the Configuration Information and Installing the Software

You can use Oracle Exadata Deployment Assistant to configure your rack, or you can do it manually.

Oracle Exadata Deployment Assistant (OEDA) loads the network settings, creates the user accounts, installs Oracle Database software, and secures the system based on the information the configuration files.

- Configuring Oracle Exadata Database Machine Using OEDA
 Use Oracle Exadata Deployment Assistant (OEDA) to configure your engineered system.
- Using Oracle Exadata Deployment Assistant in Conjunction with Key-Based Authentication You can use the -sshkeys option to use SSH key-based authentication in conjunction with OEDA.
- 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.

🖍 See Also:

Using Oracle Exadata Deployment Assistant for descriptions of the configuration files generated by OEDA.

6.16.1 Configuring Oracle Exadata Database Machine Using OEDA

Use Oracle Exadata Deployment Assistant (OEDA) to configure your engineered system.

The deployment phase of OEDA can be performed on one of the database servers of your new Oracle Exadata or any other host that is connected to the same network as the new engineered system rack. Do not run install.sh from a storage server. If you plan to run OEDA on a host outside of the new rack, then create the OEDA home directory and Workdir, as described below, on the host machine instead.



Note:

OEDA configures all Exadata components, including the database servers (with or without virtualization), storage servers, and the RDMA Network Fabric. For successful configuration, OEDA requires access to:

- The client and administration network interfaces on the database servers, including the VM server host and the VM guests where applicable.
- The administration network interfaces on the storage servers.
- The administration network interfaces on the RDMA Network Fabric switches.

Ensure that you run the OEDA deployment phase on a host with access to all of the required network interfaces.

Note:

Running OEDA from a client machine outside of the rack means the software image files are transferred over the network, causing the process to be slower.

Note:

For this procedure, Oracle VM refers to OVM and KVM. Starting with Oracle Exadata Database Machine X8M-2, Oracle Linux KVM is the virtualization technology for systems that use RoCE Network Fabric. Otherwise, Oracle VM is a Xen-based virtualization technology, which is used across Oracle Exadata Database Machine systems that use InfiniBand Network Fabric.

You must have completed the other tasks described in Overview of Oracle Exadata Deployment Assistant before starting this task.

- 1. If you are installing Oracle VMs on the database servers, then run /opt/ oracle.SupportTools/switch to ovm.sh on each database server.
- Disk space for unused system partitions must be reclaimed before installing software on all database servers with InfiniBand Network Fabric. Use the following command to reclaim the disk space: /opt/oracle.SupportTools/reclaimdisks.sh -free -reclaim. This command is not required on RoCE-based Exadata database servers.
- 3. Create a directory for the extracted OEDA files on the host where you will run install.sh.

OEDA will not run if staged on the root file system (/)of any database server. Create a directory to store the latest version of OEDA and all required files on a file system that has at least 30 GB of available free space.

- For bare-metal database servers, create a directory on the /u01 file system, for example /u01/onecommand or /u01/oeda.
- For Oracle VM servers, create a directory on the /EXAVMIMAGES file system.
- 4. Download the latest version of OEDA for the operating system of the client or server where you will run install.sh.



Unzip the downloaded file into the OEDA home directory you created. This will create a directory like /u01/onecommand/linux-x64. This directory is referred to as the OEDA home directory.

5. Download the required image files for the Oracle software.

OEDA requires patches available from My Oracle Support or Oracle Software Delivery Cloud (https://edelivery.oracle.com). Review the README file for OEDA to determine the file name or patch number, which is based on the version of Oracle software being installed. Place the files in the WorkDir sub-directory in the OEDA home directory.

- If you are installing on a bare-metal database server, then download the patches, as specified in Section 2 of the OEDA README file. After downloading the patch ZIP file, extract the contents into the WorkDir sub-directory.
- If you are configuring Oracle VM on the database servers, then download the gold image files as indicated in the topic "Oracle Exadata Deployment Assistant Support for Oracle Virtual Machines" in the OEDA README file. After downloading the gold image ZIP files, extract the contents into the WorkDir sub-directory.

A gold image is a copy of a software-only, installed Oracle home. It is used to copy an image of an Oracle home to a new host on a new file system to serve as an active, usable Oracle home.

6. Copy the required OEDA configuration files to the WorkDir sub-directory on the database server or Oracle VM.

When you used OEDA to specify the configuration details for your new engineered system, it created several configuration files and a ZIP file that contains all the generated files. The required files are also listed at the bottom of the InstallationTemplate.html file that was generated by OEDA. You can copy the ZIP file and extract it into the WorkDir subdirectory, or copy the required files directly into the WorkDir sub-directory.

- 7. Log in to the database server or Oracle VM and go to the OEDA home directory.
- 8. Run the install.sh script to install and deploy the software on your new engineered system.

In the following command syntax, *configuration_file* is the full path name for the main configuration file, *CustomerName-rackname.xml*

```
# ./install.sh -cf configuration_file [-s step_number | \
        -r step_numberA stepnumberB]
```

You can use the following options with the install.sh script:

- -cf file: Configuration file name
- -h: Help output for the script
- -1: List the steps of OEDA
- $-r \{n-N \mid n\}$: Run steps *n* through *N* of OEDA, or run the specified step.
- -s n: Run step n of OEDA.
- $-u \{n-N \mid n\}$: Undo steps *n* through *N*, or one step.

Note:

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.

The following steps are performed by the OEDA deployment script. 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 deploying an Eighth Rack configuration.

- 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

Related Topics

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

6.16.2 Using Oracle Exadata Deployment Assistant in Conjunction with Key-Based Authentication

You can use the -sshkeys option to use SSH key-based authentication in conjunction with OEDA.

Starting with the April 2020 release of Oracle Exadata Deployment Assistant (OEDA), you can use SSH keys for root user authentication on Oracle Exadata Racks.

To use this feature, you must first set up the required SSH keys. The easiest way to do this is to use the setuprootssh.sh utility included with OEDA. For example:

./setuprootssh.sh -cf config.xml

For more information about the setuprootssh.sh utility, see Using the OEDA setuprootssh Utility.



After you set up the required SSH keys, add the -sshkeys option to the regular command-line options when you start up OEDA. For example:

./install.sh -cf config.xml -s 1 -sshkeys -usesu

When you specify the -sshkeys option, OEDA uses SSH key-based authentication. In conjunction with this option, the OEDA WorkDir must contain the SSH private key for each host in the deployment file (*config.xml*). The private keys must conform to the following file naming convention:

id rsa.short hostname.root

In the key file names, *short_hostname* is the corresponding server host name without any domain name qualification.

As shown in the previous example, when you specify the *-sshkeys* option, you must also specify the *-usesu* option to instruct OEDA to run non-root commands from the root user using su.

When you first log in to a host following the Resecure Machine deployment step, you are prompted to reset the root password. This still occurs even when SSH key-based authentication is enabled, and password-based authentication is disabled.

6.16.3 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 (OEDA) supports deployment on Oracle Exadata Racks 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 Oracle Exadata Rack.

With the new non-default password feature, root passwords can have different values 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 run 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 disables root access for 10 minutes, and after 5 failed login attempts, the server is locked down.

Related Topics

Default Security Settings Enacted by OEDA

6.17 Using the OEDA changePassword Utility

You can change the password of the grid and oracle users across all clusters by using the changePassword.sh utility included with OEDA.

The utility is located in the same directory as the install and config scripts.

You cannot use this utility if the servers are locked down.

• To change the password of both oracle and grid users on all database servers and clusters, run the changePassword command.

./changePassword.sh -cf config.xml -userName root

For config.xml, specify the full path name to the deployment file created by OEDA.

The utility prompts for the current root password and allows you to change the password of any users in the rack.

- To change the password for a specific user, such as oracle or grid, use the -userName user name option with the command.
- To change the password for all users within a specific cluster, use the -clusterName cluster name option with the command.
- Use the -h option with the command to display the usage information.

6.18 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



6.19 Adding a VM Cluster to Oracle Exadata Database Machine Using OEDA

You can use Oracle Exadata Deployment Assistant (OEDA) to add a virtual machine (VM) cluster to an existing Oracle Exadata Database Machine deployment.

The procedure has the following prerequisites:

- The system must support an existing VM deployment.
- You must have free space on your system to accommodate the new VM cluster. Specifically:
 - You must not have the maximum number of VM clusters already deployed.
 - You must have available CPU, memory, and local storage resources on the database servers.
 - You must have available storage space on the storage servers.
- You require a current copy of the OEDA XML system configuration file.

To add a VM cluster to an existing Oracle Exadata Database Machine deployment:

1. Start the OEDA Web-based configuration tool.

See Getting Started with the OEDA Browser-based User Interface.

2. Import the existing XML system configuration file.

Use the **Import** option located in the drop-down menu at the top of the page.

3. Click **Clusters** in the navigation menu on the left of the page.

The **Define Clusters** section displays the configuration information for the existing clusters.

4. Click the Add Clusters button.

The **Add Clusters** button contains the plus symbol (+) and is adjacent to the existing cluster tabs.

Clicking the **Add Clusters** button adds a tab in the **Define Clusters** section to contain the configuration details for the new cluster.

5. In the new cluster tab, specify the configuration details for the new cluster. Then, click **Apply**.

OEDA now displays the **Diskgroups** section.

- 6. In the **Diskgroups** section, click the tab for the storage that is associated with the newly defined cluster.
- 7. Specify the configuration details for the storage that is associated with the new cluster. Then, click **Apply**.

OEDA now displays the Create Database Home section.

8. Click the Add Database Home button, which contains the plus symbol (+) and is adjacent to the existing tabs.

A new tab appears in the **Create Database Home** section to contain the configuration details for a new database home.



9. In the new tab, specify the configuration details for the new database home. Then, click **Apply**.

Ensure that you select the newly defined cluster as the location to contain the new database home.

Afterward, OEDA displays the Create Database section.

 Click the Add Database button, which contains the plus symbol (+) and is adjacent to the existing tabs.

A new tab appears in the **Create Database** section to contain the configuration details for a new database.

11. In the new tab, specify the configuration details for the new database. Then, click **Apply**.

Ensure that you select the newly defined database home to support the new database.

Afterward, OEDA displays the Cluster Networks section.

12. For each network in the **Cluster Networks** section, select the tab that is associated with the new cluster and specify the network settings. Then, click **Apply**.

As you step through the network settings, ensure that you specify valid IP address settings that are compatible with the existing system configuration.

Afterward, OEDA displays the Alerting section.

- **13.** Click **Comments** in the navigation menu. Then, click **Apply and Download** to save the updated system configuration information.
- **14.** Unzip the zip file located in the directory containing the newly saved system configuration information.

The directory containing the newly saved system configuration information contains multiple files, including the updated XML system configuration file and HTML installation template. However, the zip file contains additional cluster-specific XML configuration files.

15. Locate the cluster-specific XML configuration file for the new cluster.

The new cluster-specific XML configuration file is located in the unzipped directory that you created in the previous step. The names of the cluster-specific XML configuration files contain a numeric sequence that reflects the order of cluster creation, with the newest cluster having the highest number.

16. Use the cluster-specific XML configuration file to deploy the new cluster.

Use the OEDA deployment utility (install.sh) in conjunction with the cluster-specific XML configuration file for the new cluster.

Perform all of the deployment steps except for the following, which do not apply. Ensure that you do not perform the following deployment steps as they may impact system performance and availability:

- Update Nodes for Eighth Rack (For Eighth Rack systems only)
- Calibrate Cells
- Create Cell Disks
- Resecure Machine



Also, when you perform the Create Installation Summary step, ensure that you use the -nocalibratecell option to ensure that cell calibration is not performed during that step. For example, if the step number for the Create Installation Summary step is 18:

```
$ ./install.sh -cf cluster4.xml -s 18 -nocalibratecell
```

To view a complete list of the deployment steps and the corresponding step numbers, use install.sh with the -1 option. For example:

```
$ ./install.sh -cf cluster4.xml -1
1. Validate Configuration File
2. Setup Required Files
3. Create Users
4. Setup Cell Connectivity
5. Verify RDMA Network Connectivity
6. Calibrate Cells
7. Create Cell Disks
8. Create Grid Disks
9. Configure Cell Alerting
10. Install Cluster Software
11. Initialize Cluster Software
12. Install Database Software
13. Relink Database with RDS
14. Create ASM Diskgroups
15. Create Databases
16. Apply Security Fixes
17. Setup ASR Alerting
18. Create Installation Summary
19. Resecure Machine
```

To run an individual step, use install.sh with the -s option and specify the step number. For example, to run step 1:

\$./install.sh -cf cluster4.xml -s 1

To run a range of steps, use install.sh with the -r option and specify the step range. For example, to run steps 12-16:

\$./install.sh -cf cluster4.xml -r 12-16

Related Topics

Configuring Oracle Exadata Database Machine Using OEDA
 Use Oracle Exadata Deployment Assistant (OEDA) to configure your engineered system.



A Site Checklists

Complete the checklists in this appendix to ensure the site is prepared for your new Oracle Engineered System.

Note:
For ease of reading, the Oracle Engineered System is sometimes referred to simply as "the rack", which indicates the entire system, not just the cabinet.
System Components Checklist Use this checklist to ensure that the system component considerations have been addressed.
Data Center Room Checklist Use this checklist to ensure that the data center room requirements have been addressed.
Data Center Environment Checklist Use this checklist to ensure that the data center environment requirements have been addressed.
Access Route Checklist Use this checklist to ensure that the access route requirements are addressed.
Facility Power Checklist Use this checklist to ensure that the facility power requirements have been addressed.
Safety Checklist Use this checklist to ensure that the safety requirements have been addressed.
Logistics Checklist Use this checklist to ensure that the logistics requirements have been addressed.
Network Configuration Checklist Use this checklist to ensure that the network configuration requirements have been addressed.
Auto Service Request Checklist Use this checklist if you are planning to use Auto Service Request with the Oracle Exadata Database Machine.
Re-racking Checklists Use these checklists prior to re-racking configurations approved for re-rack by Oracle Exadata Configuration Assistant (OECA) or your Oracle contact.
PDU Checklist for Re-racking Use this checklist to verify the power distribution unit (PDU) requirements when using the re-racking service.
Recycling the Racks Use this checklist when recycling the rack.



A.1 System Components Checklist

Use this checklist to ensure that the system component considerations have been addressed.

The cells in the second column of the following table are intentionally left blank so that the site survey team can fill in the requested information.

Table A-1 System Components Checklist

System Components Checklist Items	Ye s	No	N/ A	Comment
What type of engineered system rack are you installing? (Exadata Database Machine, Big Data Appliance, Oracle Cloud Machine, Exadata Storage Expansion, Zero Data Loss Recovery Appliance, etc.)				
Is the rack installation an extension to an existing system, rather than a new installation?				
If it is an extension to an existing system, refer to the multi- rack cabling information for your Engineered System.				
How many racks will be installed?				
Have you ordered the multi-rack cabling service?				
Are all Engineered System racks adjacent to each other?				
 If the connecting racks are not within the specified proximity, or you are connecting more than 3 racks together, then have you completed the following tasks? Purchased 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? 				
If you are connecting the new rack to other Oracle racks, then does each rack (<i>excluding Eighth Rack configurations</i>) have a spine switch?				
If any of the racks you plan to interconnect using the InfiniBand network are missing a spine switch, then have you ordered the InfiniBand switch and cables?				
If your data center does not have a 10 GbE network infrastructure, then have you ordered an external switch that supports both 1 GbE and 10 GbE (or 40 GbE)?				
Have you purchased the cables and transceivers to connect the InfiniBand Gateway switches to your 10 GbE network infrastructure?				
If the Management Network Switch is being replaced, then have you arranged for the replacement switch installation?				

Table A-1	(Cont.) System Components Checklist			
System Co	mponents Checklist Items	Ye	No	N/

Sy	stem Components Checklist Items	Ye s	No	N/ A	Comment
Wil rac	I additional equipment be attached to or installed in the k?				
lf y	es, then:				
•	Describe the additions				
•	Have you verified that the additional equipment falls within Oracle guidelines?				
•	Is sufficient power and cooling available for the additional equipment?				

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?				

Data Center Room Checklist Items	Yes	No	N/A	Comment
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? 				
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)?				

- Space Requirements
- Flooring Requirements Oracle Exadata Rack may be installed on raised floor or solid floor environments.
- Installing Oracle Exadata or Oracle Exadata Storage Expansion Rack at the Site

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?				
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?				

- Temperature and Humidity Requirements Excessive internal temperatures may result in full or partial shut down of Oracle Exadata.
- 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? 				
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?				



- Table: Access Route Requirements.
- Rack Weights for Oracle Exadata Review the weight of your Oracle Exadata Rack to ensure that it can be delivered and located safely.
- Rack Weights for Oracle Exadata Storage Expansion Rack
- Flooring Requirements Oracle Exadata Rack may be installed on raised floor or solid floor environments.

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 been reviewed?				
Power requirements listed in "Electrical Power Requirements".				
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?				
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?				



Facility Power Considerations	Yes	No	N/A	Comment
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?				



Safety Checklist Considerations	Yes	Νο	N/A	Comment
Is antistatic flooring installed?				
Is the area below the raised floor free of obstacles and blockages?				

Temperature and Humidity Requirements
 Excessive internal temperatures may result in full or partial shut down of Oracle Exadata.

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?				
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?				



Logistics Checklist Considerations	Yes	No	N/A	Comment
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?				
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?				



Logistics Checklist Considerations	Yes	No	N/A	Comment
(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 <i>outside</i> the data center room.				
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?				

Logistics Checklist Considerations	Yes	No	N/A	Comment
Will any special equipment be required to place the rack in the data center room? Examples:				
 Stair walkers Lifters Ramps Steel plates Floor covers 				
Does the delivery carrier require any special equipment, such as non-floor damaging rollers, transport dollies, pallet jacks or fork lifts?				

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 Rack will be installed?				

Network Configuration Considerations	Yes	No	N/A	Comment
Will the network cables that will connect to the Oracle Rack be labeled?				
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 Management Network Switch have IP routing disabled (recommended)?				

Understanding the Network Requirements for Oracle Exadata
 Review the network requirements for Oracle Exadata before installing or configuring the
 hardware.

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?				



Auto Service Request Considerations	Yes	No	N/A	Comment
Are the host name and IP address for the server where ASR Manager will be installed available?				
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 Re-racking Checklists

Use these checklists prior to re-racking configurations approved for re-rack by Oracle Exadata Configuration Assistant (OECA) or your Oracle contact.

Note:

- Customer must purchase both the Oracle Re-racking Service and Oracle Installation Service.
- Oracle does not provide support for customer-supplied equipment.



Re-racking Considerations	Yes	No	N/A	Comment
Has the customer purchased the Oracle Re-racking 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?				
 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 customer must provide compatible PDUs to install in the target rack. 				
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)?				

Re-racking Considerations	Yes	No	N/A	Comment
Does the target rack meet the following minimum load capacity?				
• 19 kg (41.89 lb) / RU				
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?				
Does the target rack have RETMA rail support?				
Note: Oracle Engineered System racks require 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)?				



Re-racking Considerations	Yes	No	N/A	Comment
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 RDMA Network Fabric 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?				
Is there sufficient space for the cable harnesses and the PDUs in the target rack?				
Can a label with the Oracle Engineered System Rack serial number be printed and attached to the target rack?				

A.11 PDU Checklist for Re-racking

Use this checklist to verify the power distribution unit (PDU) requirements when using the reracking service.

PDU Re-racking Considerations	Yes	No	N/A	Comment
Does the target rack support installation of standard Oracle PDUs?				
If not, then complete this checklist.				



PDU Re-racking Considerations	Yes	No	N/A	Comment
Can the customer provide two equivalent PDUs with equivalent power capacity and at least 17 x 10A C13 plugs per PDU?				
Can the customer ensure that each PDU and its circuits can support the Oracle Engineered System Rack power requirements in case one PDU fails?				
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.12 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.				



Recycling Considerations	Yes	Νο	N/A	Comment
If Oracle is recycling the rack, then has the customer completed the appropriate application at the Oracle Hardware Take Back Program website?				

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?				
Will you use Oracle Exadata Database Machine health check after deployment? The health check is available from My Oracle Support note 1070954.1.				



Database High Availability Considerations	Yes	No	N/A	Comment
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?				

- Oracle Database High Availability Overview and Best Practices
- Exadata Patching Overview and Patch Testing Guidelines (My Oracle Support Doc ID 1262380.1)
- Oracle Maximum Availability Architecture website
- Oracle Exadata Database Machine Exachk (My Oracle Support Doc ID 1070954.1)
- Exadata Health and Resource Usage Monitoring Technical 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)

