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Preface

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

Audience

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

Documentation Accessibility

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

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

Related Documentation

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

- **Oracle Exadata Database Machine System Overview**
- **Oracle Exadata Database Machine Security Guide**
- **Oracle Engineered System Safety and Compliance Guide, Compliance Model No.: ESY27**
- **Oracle Exadata Database Machine Extending and Multi-Rack Cabling Guide**
- **Oracle Exadata Database Machine Maintenance Guide**
- **Oracle Exadata System Software User’s Guide**
• 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

Conventions

The following text conventions are used in this document:

<table>
<thead>
<tr>
<th>Convention</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>boldface</strong></td>
<td>Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.</td>
</tr>
<tr>
<td><em>italic</em></td>
<td>Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.</td>
</tr>
<tr>
<td>monospace</td>
<td>Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.</td>
</tr>
<tr>
<td>$ prompt</td>
<td>The dollar sign ($) prompt indicates a command run as the oracle user.</td>
</tr>
<tr>
<td># prompt</td>
<td>The pound (#) prompt indicates a command that is run as the root user.</td>
</tr>
</tbody>
</table>
Site Requirements for Oracle Exadata Database Machine and Oracle Exadata Storage Expansion Rack

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

**Note:**

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

**Related Topics:**
- Site Checklists (page A-1)

### 1.1 General Environmental Requirements

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

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

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


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

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

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Weight</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Extreme Flash drives</td>
<td>804.9 kg (1774 lbs)</td>
<td>525.9 kg (1160 lbs)</td>
<td>366.3 kg (808 lbs)</td>
<td>366.3 kg (808 lbs)</td>
</tr>
<tr>
<td>• High capacity drives</td>
<td>874.8 kg (1928 lbs)</td>
<td>560.9 kg (1236 lbs)</td>
<td>381.2 kg (841 lbs)</td>
<td>381.2 kg (841 lbs)</td>
</tr>
<tr>
<td><strong>Acoustic levels</strong></td>
<td>86 db(A)</td>
<td>85 db(A)</td>
<td>83 db(A)</td>
<td>83 db(A)</td>
</tr>
<tr>
<td><strong>Power</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Extreme Flash drives</td>
<td>Maximum: 15.7 kVA</td>
<td>Maximum: 8.5 kVA</td>
<td>Maximum: 4.2 kVA</td>
<td>Maximum: 3.5 kVA</td>
</tr>
<tr>
<td></td>
<td>Typical: 11.0 kVA (varies based on application load)</td>
<td>Typical: 5.9 kVA (varies based on application load)</td>
<td>Typical: 3.0 kVA (varies based on application load)</td>
<td>Typical: 2.4 kVA (varies based on application load)</td>
</tr>
<tr>
<td>• High capacity drives</td>
<td>Maximum: 15.6 kVA</td>
<td>Maximum: 8.4 kVA</td>
<td>Maximum: 4.2 kVA</td>
<td>Maximum: 34 kVA</td>
</tr>
<tr>
<td></td>
<td>Typical: 10.9 kVA (varies based on application load)</td>
<td>Typical: 5.9 kVA (varies based on application load)</td>
<td>Typical: 2.9 kVA (varies based on application load)</td>
<td>Typical: 2.4 kVA (varies based on application load)</td>
</tr>
</tbody>
</table>

See Also: "Flooring Requirements (page 1-34)"
See Also: "Electrical Power Requirements (page 1-34)"
Table 1-1 (Cont.) Environmental Requirements for Oracle Exadata Database Machine X5-2

<table>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Cooling</strong> See Also:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Extreme Flash drives</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• High capacity drives</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Typical: 36,437 BTU/hour (38,441 kJ/hour)</td>
<td>Extreme Flash drives Maximum: 28,133 BTU/hour (29,680 kJ/hour) Typical: 19,693 BTU/hour (20,776 kJ/hour)</td>
<td>Extreme Flash drives Maximum: 14,082 BTU/hour (14,856 kJ/hour) Typical: 9,857 BTU/hour (10,399 kJ/hour)</td>
<td>Extreme Flash drives Maximum: 11,530 BTU/hour (12,164 kJ/hour) Typical: 8,071 BTU/hour (8,515 kJ/hour)</td>
<td>Extreme Flash drives Maximum: 11,530 BTU/hour (12,164 kJ/hour) Typical: 8,071 BTU/hour (8,515 kJ/hour)</td>
</tr>
<tr>
<td>• Extreme Flash drives</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• High capacity drives</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**IP Addresses** See Also: "Network Connection and IP Address Requirements for Oracle Exadata Database Machine (page 1-47)"

<table>
<thead>
<tr>
<th>68 for Ethernet network, assuming single cluster</th>
<th>38 for Ethernet network, assuming single cluster</th>
<th>22 for Ethernet network, assuming single cluster</th>
<th>22 for Ethernet network, assuming single cluster</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 36 for InfiniBand network</td>
<td>Up to 18 for InfiniBand network</td>
<td>Up to 8 for InfiniBand network</td>
<td>Up to 8 for InfiniBand network</td>
</tr>
</tbody>
</table>
Table 1-1  (Cont.) Environmental Requirements for Oracle Exadata Database Machine X5-2

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Network drops</td>
<td>Minimum of 11 network drops</td>
<td>Minimum of 7 network drops</td>
<td>Minimum of 5 network drops</td>
<td>Minimum of 5 network drops</td>
</tr>
<tr>
<td>See Also:</td>
<td>&quot;Network Connection and IP Address Requirements for Oracle Exadata Database Machine (page 1-47)&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>18 x 1 GbE/10 GbE Ethernet ports</td>
<td>12 x 1 GbE/10 GbE Ethernet ports</td>
<td>6 x 1 GbE/10 GbE Ethernet ports</td>
<td>6 x 1 GbE/10 GbE Ethernet ports</td>
</tr>
<tr>
<td></td>
<td>16 x 10 GbE Ethernet ports</td>
<td>8 x 10 GbE Ethernet ports</td>
<td>4 x 10 GbE Ethernet ports</td>
<td>4 x 10 GbE Ethernet ports</td>
</tr>
<tr>
<td></td>
<td>At least 12 InfiniBand ports</td>
<td>At least 12 InfiniBand ports</td>
<td>At least 12 InfiniBand ports</td>
<td>At least 12 InfiniBand ports</td>
</tr>
</tbody>
</table>

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

Table 1-2 (page 1-4) shows the general environmental requirements for Oracle Exadata Database Machine X5-8. Other sections in this chapter provide detailed information.

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

<table>
<thead>
<tr>
<th>Environmental Component</th>
<th>Oracle Exadata Database Machine X5-8 Full Rack</th>
<th>Oracle Exadata Database Machine X5-8 Half Rack</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>Extreme Flash drives: 1826.5 lbs (828.1 kg)</td>
<td>Extreme Flash drives: 1160.1 lbs (526.2 kg)</td>
</tr>
<tr>
<td></td>
<td>High capacity drives: 1980.5 lbs (898.3 kg)</td>
<td>High capacity drives: 1193.1 lbs (541.2 kg)</td>
</tr>
<tr>
<td>See Also: &quot;Flooring Requirements (page 1-34)&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acoustic levels</td>
<td>8.68</td>
<td>8.58</td>
</tr>
</tbody>
</table>
### Table 1-2 (Cont.) Environmental Requirements for Oracle Exadata Database Machine X5-8

<table>
<thead>
<tr>
<th>Environmental Component</th>
<th>Oracle Exadata Database Machine X5-8 Full Rack</th>
<th>Oracle Exadata Database Machine X5-8 Half Rack</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Power</strong></td>
<td>Extreme Flash drives:</td>
<td>Extreme Flash drives:</td>
</tr>
<tr>
<td></td>
<td>• Max: 16.4 kW (16.7 kVA)</td>
<td>• Max: 9.5 kW (9.7 kVA)</td>
</tr>
<tr>
<td></td>
<td>• Typical: 11.5 kW (11.7 kVA)</td>
<td>• Typical: 6.7 kW (6.8 kVA)</td>
</tr>
<tr>
<td></td>
<td>High capacity drives:</td>
<td>High capacity drives:</td>
</tr>
<tr>
<td></td>
<td>• Max: 16.2 kW (16.6 kVA)</td>
<td>• Max: 9.5 kW (9.7 kVA)</td>
</tr>
<tr>
<td></td>
<td>• Typical: 11.4 kW (11.6 kVA)</td>
<td>• Typical: 6.6 kW (6.8 kVA)</td>
</tr>
<tr>
<td><strong>Cooling</strong></td>
<td>Extreme Flash drives:</td>
<td>Extreme Flash drives:</td>
</tr>
<tr>
<td></td>
<td>• Max: 55,935 BTU/hour (59,012 kJ/hour)</td>
<td>• Max: 32,436 BTU/hour (34,220 kJ/hour)</td>
</tr>
<tr>
<td></td>
<td>• Typical: 39,155 BTU/hour (41,308 kJ/hour)</td>
<td>• Typical: 22,705 BTU/hour (23,954 kJ/hour)</td>
</tr>
<tr>
<td></td>
<td>High capacity drives:</td>
<td>High capacity drives:</td>
</tr>
<tr>
<td></td>
<td>• Max: 55,410 BTU/hour (58,457 kJ/hour)</td>
<td>• Max: 32,323 BTU/hour (34,101 kJ/hour)</td>
</tr>
<tr>
<td></td>
<td>• Typical: 38,787 BTU/hour (40,920 kJ/hour)</td>
<td>• Typical: 22,626 BTU/hour (23,871 kJ/hour)</td>
</tr>
<tr>
<td><strong>Air flow front-to-back (subject to actual data center environment)</strong></td>
<td>Extreme Flash drives:</td>
<td>Extreme Flash drives:</td>
</tr>
<tr>
<td></td>
<td>• Max: 2590 CFM</td>
<td>• Max: 1502 CFM</td>
</tr>
<tr>
<td></td>
<td>• Typical: 1813 CFM</td>
<td>• Typical: 1051 CFM</td>
</tr>
<tr>
<td></td>
<td>High capacity drives:</td>
<td>High capacity drives:</td>
</tr>
<tr>
<td></td>
<td>• Max: 2565 CFM</td>
<td>• Max: 1496 CFM</td>
</tr>
<tr>
<td></td>
<td>• Typical: 1796 CFM</td>
<td>• Typical: 1048 CFM</td>
</tr>
</tbody>
</table>

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

The environmental requirements for Oracle Exadata Database Machine X4-2 depend on the size of the system. Table 1-3 (page 1-6) shows the general environmental requirements for Oracle Exadata Database Machine X4-2. The other sections in this chapter provide detailed information.
Table 1-3  Environmental Requirements for Oracle Exadata Database Machine X4-2

<table>
<thead>
<tr>
<th>Environmental Component</th>
<th>Oracle Exadata Database Machine X4-2 Full Rack</th>
<th>Oracle Exadata Database Machine X4-2 Half Rack</th>
<th>Oracle Exadata Database Machine X4-2 Quarter Rack</th>
<th>Oracle Exadata Database Machine X4-2 Eighth Rack</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>852.8 kg (1880 lbs)</td>
<td>525.3 kg (1158 lbs)</td>
<td>365.6 kg (806 lbs)</td>
<td>365.6 kg (806 lbs)</td>
</tr>
<tr>
<td>Acoustic levels</td>
<td>93 db(A)</td>
<td>89 db(A)</td>
<td>85 db(A)</td>
<td>85 db(A)</td>
</tr>
<tr>
<td>Power</td>
<td>• High performance drives Maximum: 12.4 kVA</td>
<td>• High performance drives Maximum: 6.8 kVA</td>
<td>• High performance drives Maximum: 3.4 kVA</td>
<td>• High performance drives Maximum: 3.1 kVA</td>
</tr>
<tr>
<td></td>
<td>Typical: 8.7 kVA (varies based on application</td>
<td>Typical: 4.8 kVA (varies based on application</td>
<td>Typical: 2.5 kVA (varies based on application</td>
<td>Typical: 2.2 kVA (varies based on application</td>
</tr>
<tr>
<td></td>
<td>load)</td>
<td>load)</td>
<td>load)</td>
<td>load)</td>
</tr>
<tr>
<td></td>
<td>• High capacity drives Maximum: 11.4 kVA</td>
<td>• High capacity drives Maximum: 6.3 kVA</td>
<td>• High capacity drives Maximum: 3.2 kVA</td>
<td>• High capacity drives Maximum: 2.9 kVA</td>
</tr>
<tr>
<td></td>
<td>Typical: 8.1 kVA (varies based on application</td>
<td>Typical: 4.4 kVA (varies based on application</td>
<td>Typical: 2.3 kVA (varies based on application</td>
<td>Typical: 2.1 kVA (varies based on application</td>
</tr>
<tr>
<td></td>
<td>load)</td>
<td>load)</td>
<td>load)</td>
<td>load)</td>
</tr>
</tbody>
</table>

See Also: "Flooring Requirements (page 1-34)"
### Table 1-3 (Cont.) Environmental Requirements for Oracle Exadata Database Machine X4-2

<table>
<thead>
<tr>
<th>Environmental Component</th>
<th>Oracle Exadata Database Machine X4-2</th>
<th>Oracle Exadata Database Machine X4-2</th>
<th>Oracle Exadata Database Machine X4-2</th>
<th>Oracle Exadata Database Machine X4-2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Full Rack</td>
<td>Half Rack</td>
<td>Quarter Rack</td>
<td>Eighth Rack</td>
</tr>
<tr>
<td><strong>Cooling</strong></td>
<td>High performance drives</td>
<td>High performance drives</td>
<td>High performance drives</td>
<td>High performance drives</td>
</tr>
<tr>
<td>See Also:</td>
<td>&quot;Temperature and Humidity Requirements (page 1-44)&quot;</td>
<td>&quot;Ventilation and Cooling Requirements (page 1-45)&quot;</td>
<td>&quot;Temperature and Humidity Requirements (page 1-44)&quot;</td>
<td>&quot;Ventilation and Cooling Requirements (page 1-45)&quot;</td>
</tr>
<tr>
<td></td>
<td>Maximum: 41,300 BTU/hour (43,600 kJ/hour)</td>
<td>Maximum: 22,500 BTU/hour (23,750 kJ/hour)</td>
<td>Maximum: 11,300 BTU/hour (11,900 kJ/hour)</td>
<td>Maximum: 10,200 BTU/hour (10,700 kJ/hour)</td>
</tr>
<tr>
<td></td>
<td>Typical: 29,000 BTU/hour (30,600 kJ/hour)</td>
<td>Typical: 16,000 BTU/hour (16,900 kJ/hour)</td>
<td>Typical: 8,200 BTU/hour (8,700 kJ/hour)</td>
<td>Typical: 7,100 BTU/hour (7,500 kJ/hour)</td>
</tr>
<tr>
<td></td>
<td>High capacity drives</td>
<td>High capacity drives</td>
<td>High capacity drives</td>
<td>High capacity drives</td>
</tr>
<tr>
<td></td>
<td>Maximum: 38,300 BTU/hour (40,400 kJ/hour)</td>
<td>Maximum: 21,200 BTU/hour (22,400 kJ/hour)</td>
<td>Maximum: 10,600 BTU/hour (11,200 kJ/hour)</td>
<td>Maximum: 9,500 BTU/hour (10,000 kJ/hour)</td>
</tr>
<tr>
<td></td>
<td>Typical: 27,000 BTU/hour (28,500 kJ/hour)</td>
<td>Typical: 14,700 BTU/hour (15,500 kJ/hour)</td>
<td>Typical: 7,500 BTU/hour (7,900 kJ/hour)</td>
<td>Typical: 6,600 BTU/hour (7,000 kJ/hour)</td>
</tr>
<tr>
<td><strong>Air flow front-to-back</strong></td>
<td>High performance drives</td>
<td>High performance drives</td>
<td>High performance drives</td>
<td>High performance drives</td>
</tr>
<tr>
<td>See Also:</td>
<td>&quot;Temperature and Humidity Requirements (page 1-44)&quot;</td>
<td>&quot;Ventilation and Cooling Requirements (page 1-45)&quot;</td>
<td>&quot;Temperature and Humidity Requirements (page 1-44)&quot;</td>
<td>&quot;Ventilation and Cooling Requirements (page 1-45)&quot;</td>
</tr>
<tr>
<td></td>
<td>Maximum: Approximately 1,900 CFM</td>
<td>Maximum: Approximately 1,050 CFM</td>
<td>Maximum: Approximately 520 CFM</td>
<td>Maximum: Approximately 470 CFM</td>
</tr>
<tr>
<td></td>
<td>Typical: Approximately 1,350 CFM</td>
<td>Typical: Approximately 750 CFM</td>
<td>Typical: Approximately 365 CFM</td>
<td>Typical: Approximately 325 CFM</td>
</tr>
<tr>
<td></td>
<td>High capacity drives</td>
<td>High capacity drives</td>
<td>High capacity drives</td>
<td>High capacity drives</td>
</tr>
<tr>
<td></td>
<td>Maximum: Approximately 1,780 CFM</td>
<td>Maximum: Approximately 980 CFM</td>
<td>Maximum: Approximately 490 CFM</td>
<td>Maximum: Approximately 440 CFM</td>
</tr>
<tr>
<td></td>
<td>Typical: Approximately 1,250 CFM</td>
<td>Typical: Approximately 680 CFM</td>
<td>Typical: Approximately 350 CFM</td>
<td>Typical: Approximately 310 CFM</td>
</tr>
</tbody>
</table>
Table 1-4 (Cont.) Environmental Requirements for Oracle Exadata Database Machine X4-2

<table>
<thead>
<tr>
<th>Environmental Component</th>
<th>Oracle Exadata Database Machine X4-2 Full Rack</th>
<th>Oracle Exadata Database Machine X4-2 Half Rack</th>
<th>Oracle Exadata Database Machine X4-2 Quarter Rack</th>
<th>Oracle Exadata Database Machine X4-2 Eighth Rack</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP Addresses</td>
<td>68 for Ethernet network, assuming single cluster Up to 36 for InfiniBand network</td>
<td>38 for Ethernet network, assuming single cluster Up to 18 for InfiniBand network</td>
<td>22 for Ethernet network, assuming single cluster Up to 8 for InfiniBand network</td>
<td>22 for Ethernet network, assuming single cluster Up to 8 for InfiniBand network</td>
</tr>
<tr>
<td>Network drops</td>
<td>Minimum of 11 network drops</td>
<td>Minimum of 7 network drops</td>
<td>Minimum of 5 network drops</td>
<td>Minimum of 5 network drops</td>
</tr>
<tr>
<td>External connectivity</td>
<td>18 x 1 GbE/10 GbE Ethernet ports 16 x 10 GbE Ethernet ports At least 12 InfiniBand ports</td>
<td>12 x 1 GbE/10 GbE Ethernet ports 8 x 10 GbE Ethernet ports At least 12 InfiniBand ports</td>
<td>6 x 1 GbE/10 GbE Ethernet ports 4 x 10 GbE Ethernet ports At least 12 InfiniBand ports</td>
<td>6 x 1 GbE/10 GbE Ethernet ports 4 x 10 GbE Ethernet ports At least 12 InfiniBand ports</td>
</tr>
</tbody>
</table>

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

Table 1-4 (page 1-9) 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>
<thead>
<tr>
<th>Environmental Component</th>
<th>Oracle Exadata Database Machine X4-8 Full Rack with Exadata Storage Server X5-2 Servers</th>
<th>Oracle Exadata Database Machine X4-8 Half Rack with Exadata Storage Server X5-2 Servers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>- Extreme Flash drives: 828.1 kg (1826 lbs)</td>
<td>- Extreme Flash drives: 526.2 kg (1160 lbs)</td>
</tr>
<tr>
<td></td>
<td>- High capacity drives: 898.3 kg (1980 lbs)</td>
<td>- High capacity drives: 541.2 kg (1193 lbs)</td>
</tr>
<tr>
<td>Acoustic levels</td>
<td>86 db(A)</td>
<td>85 db(A)</td>
</tr>
<tr>
<td>Power</td>
<td>- Extreme Flash drives Maximum: 17.1 kVA</td>
<td>- Extreme Flash drives Maximum: 10.1 kVA</td>
</tr>
<tr>
<td></td>
<td>Typical: 12.0 kVA (varies based on application load)</td>
<td>Typical: 7.1 kVA (varies based on application load)</td>
</tr>
<tr>
<td></td>
<td>- High capacity drives Maximum: 17.0 kVA</td>
<td>- High capacity drives Maximum: 10.1 kVA</td>
</tr>
<tr>
<td></td>
<td>Typical: 11.9 kVA (varies based on application load)</td>
<td>Typical: 7.0 kVA (varies based on application load)</td>
</tr>
<tr>
<td>Cooling</td>
<td>- Extreme Flash drives Maximum: 57,300 BTU/hour (60,452 kJ/hour)</td>
<td>- Extreme Flash drives Maximum: 33,801 BTU/hour (35,660 kJ/hour)</td>
</tr>
<tr>
<td></td>
<td>Typical: 40,110 BTU/hour (42,316 kJ/hour)</td>
<td>Typical: 23,660 BTU/hour (24,962 kJ/hour)</td>
</tr>
<tr>
<td></td>
<td>- High capacity drives Maximum: 56,775 BTU/hour (59,897 kJ/hour)</td>
<td>- High capacity drives Maximum: 33,688 BTU/hour (35,541 kJ/hour)</td>
</tr>
<tr>
<td></td>
<td>Typical: 39,742 BTU/hour (41,928 kJ/hour)</td>
<td>Typical: 23,582 BTU/hour (24,879 kJ/hour)</td>
</tr>
<tr>
<td>Air flow front-to-back</td>
<td>- Extreme Flash drives Maximum: Approximately 2,653 CFM</td>
<td>- Extreme Flash drives Maximum: Approximately 1,565 CFM</td>
</tr>
<tr>
<td></td>
<td>Typical: Approximately 1,857 CFM</td>
<td>Typical: Approximately 1,095 CFM</td>
</tr>
<tr>
<td></td>
<td>- High capacity drives Maximum: Approximately 2,628 CFM</td>
<td>- High capacity drives Maximum: Approximately 1,560 CFM</td>
</tr>
<tr>
<td></td>
<td>Typical: Approximately 1,840 CFM</td>
<td>Typical: Approximately 1,092 CFM</td>
</tr>
<tr>
<td>IP Addresses</td>
<td>44 for Ethernet network, assuming single cluster Up to 44 for InfiniBand network</td>
<td>22 for Ethernet network, assuming single cluster Up to 22 for InfiniBand network</td>
</tr>
</tbody>
</table>
1.1.6 General Environmental Requirements for Oracle Exadata Database Machine X4-8 Full Rack

Table 1-5 (page 1-10) shows the general environmental requirements for Oracle Exadata Database Machine X4-8 Full Rack. The other sections in this chapter provide detailed information.

<table>
<thead>
<tr>
<th>Environmental Component</th>
<th>Oracle Exadata Database Machine X4-8 Full Rack</th>
<th>Oracle Exadata Database Machine X4-8 Half Rack with Exadata Storage Server X5-2 Servers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network drops</td>
<td>Minimum of 5 network drops</td>
<td>Minimum of 5 network drops</td>
</tr>
<tr>
<td>External connectivity</td>
<td>16 x 1 GbE Ethernet ports</td>
<td>16 x 1 GbE Ethernet ports</td>
</tr>
<tr>
<td></td>
<td>16 x 10 GbE Ethernet SFP+ ports</td>
<td>16 x 10 GbE Ethernet SFP+ ports</td>
</tr>
<tr>
<td></td>
<td>At least 12 InfiniBand ports</td>
<td>At least 12 InfiniBand ports</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Environmental Component</th>
<th>Oracle Exadata Database Machine X4-8 Full Rack</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>867.3 kg (1912 lbs)</td>
</tr>
<tr>
<td>Acoustic levels</td>
<td>93 db(A)</td>
</tr>
<tr>
<td>Power</td>
<td>• High performance drives</td>
</tr>
<tr>
<td></td>
<td>Maximum: 15.3 kVA</td>
</tr>
<tr>
<td></td>
<td>Typical: 10.7 kVA (varies based on application load)</td>
</tr>
<tr>
<td></td>
<td>• High capacity drives</td>
</tr>
<tr>
<td></td>
<td>Maximum: 14.7 kVA</td>
</tr>
<tr>
<td></td>
<td>Typical: 10.3 kVA (varies based on application load)</td>
</tr>
</tbody>
</table>
Table 1-5 (Cont.) Environmental Requirements for Oracle Exadata Database Machine X4-8 Full Rack

<table>
<thead>
<tr>
<th>Environmental Component</th>
<th>Oracle Exadata Database Machine X4-8 Full Rack</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cooling</strong></td>
<td>• High performance drives</td>
</tr>
<tr>
<td>See Also: &quot;Temperature and Humidity Requirements (page 1-44)&quot;, and &quot;Ventilation and Cooling Requirements (page 1-45)&quot;</td>
<td>Maximum: 51,200 BTU/hour (54,000 kJ/hour)</td>
</tr>
<tr>
<td></td>
<td>Typical: 36,400 BTU/hour (38,400 kJ/hour)</td>
</tr>
<tr>
<td></td>
<td>• High capacity drives</td>
</tr>
<tr>
<td></td>
<td>Maximum: 49,110 BTU/hour (52,000 kJ/hour)</td>
</tr>
<tr>
<td></td>
<td>Typical: 34,400 BTU/hour (36,300 kJ/hour)</td>
</tr>
<tr>
<td><strong>Air flow front-to-back (subject to actual data center environment)</strong></td>
<td>• High performance drives</td>
</tr>
<tr>
<td>See Also: &quot;Temperature and Humidity Requirements (page 1-44)&quot;, and &quot;Ventilation and Cooling Requirements (page 1-45)&quot;</td>
<td>Maximum: Approximately 2,410 CFM</td>
</tr>
<tr>
<td></td>
<td>Typical: Approximately 1,700 CFM</td>
</tr>
<tr>
<td></td>
<td>• High capacity drives</td>
</tr>
<tr>
<td></td>
<td>Maximum: Approximately 2,280 CFM</td>
</tr>
<tr>
<td></td>
<td>Typical: Approximately 1,600 CFM</td>
</tr>
<tr>
<td><strong>IP Addresses</strong></td>
<td>44 for Ethernet network, assuming single cluster</td>
</tr>
<tr>
<td>See Also: &quot;Network Connection and IP Address Requirements for Oracle Exadata Database Machine (page 1-47)&quot;</td>
<td>Up to 36 for InfiniBand network</td>
</tr>
<tr>
<td><strong>Network drops</strong></td>
<td>Minimum of 5 network drops</td>
</tr>
<tr>
<td>See Also: &quot;Network Connection and IP Address Requirements for Oracle Exadata Database Machine (page 1-47)&quot;</td>
<td></td>
</tr>
<tr>
<td><strong>External connectivity</strong></td>
<td>16 x 1 GbE Ethernet ports</td>
</tr>
<tr>
<td>See Also: &quot;Network Connection and IP Address Requirements for Oracle Exadata Database Machine (page 1-47)&quot;</td>
<td>16 x 10 GbE Ethernet SFP+ ports</td>
</tr>
<tr>
<td></td>
<td>12 InfiniBand ports</td>
</tr>
</tbody>
</table>

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

The environmental requirements for Oracle Exadata Database Machine X3-2 depend on the size of the system. Table 1-6 (page 1-12) shows the general environmental requirements for Oracle Exadata Database Machine X3-2. The other sections in this chapter provide detailed information.
Table 1-6  Environmental Requirements for Oracle Exadata Database Machine X3-2

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>See Also: “Flooring Requirements (page 1-34)”</td>
<td>See Also: “Electrical Power Requirements (page 1-34)”</td>
<td>See Also: “Electrical Power Requirements (page 1-34)”</td>
<td>See Also: “Electrical Power Requirements (page 1-34)”</td>
</tr>
<tr>
<td></td>
<td>Weight</td>
<td>Weight</td>
<td>Weight</td>
<td>Weight</td>
</tr>
<tr>
<td></td>
<td>871.4 kg (1921 lbs)</td>
<td>543.9 kg (1199 lbs)</td>
<td>368.8 kg (813 lbs)</td>
<td>368.8 kg (813 lbs)</td>
</tr>
<tr>
<td>Acoustic levels</td>
<td>87 db(A)</td>
<td>84 db(A)</td>
<td>81 db(A)</td>
<td>81 db(A)</td>
</tr>
<tr>
<td>Power</td>
<td>High performance drives Maximum: 12.1 kVA</td>
<td>High performance drives Maximum: 6.6 kVA</td>
<td>High performance drives Maximum: 3.3 kVA</td>
<td>High performance drives Maximum: 3.0 kVA</td>
</tr>
<tr>
<td></td>
<td>Typical: 8.6 kVA (varies based on application load)</td>
<td>Typical: 4.7 kVA (varies based on application load)</td>
<td>Typical: 2.4 kVA (varies based on application load)</td>
<td>Typical: 2.1 kVA (varies based on application load)</td>
</tr>
<tr>
<td></td>
<td>High capacity drives Maximum: 11.1 kVA</td>
<td>High capacity drives Maximum: 6.1 kVA</td>
<td>High capacity drives Maximum: 3.1 kVA</td>
<td>High capacity drives Maximum: 2.8 kVA</td>
</tr>
<tr>
<td></td>
<td>Typical: 7.8 kVA (varies based on application load)</td>
<td>Typical: 4.3 kVA (varies based on application load)</td>
<td>Typical: 2.2 kVA (varies based on application load)</td>
<td>Typical: 2.0 kVA (varies based on application load)</td>
</tr>
<tr>
<td>-------------------------</td>
<td>------------------------------------------------</td>
<td>------------------------------------------------</td>
<td>-------------------------------------------------</td>
<td>------------------------------------------</td>
</tr>
<tr>
<td><strong>Cooling</strong></td>
<td>• High performance drives</td>
<td>• High performance drives</td>
<td>• High performance drives</td>
<td>• High performance drives</td>
</tr>
<tr>
<td></td>
<td>Maximum: 40,600 BTU/hour (42,800 kJ/hour)</td>
<td>Maximum: 22,200 BTU/hour (23,400 kJ/hour)</td>
<td>Maximum: 10,900 BTU/hour (11,500 kJ/hour)</td>
<td>Maximum: 9,900 BTU/hour (10,500 kJ/hour)</td>
</tr>
<tr>
<td></td>
<td>Typical: 28,700 BTU/hour (30,300 kJ/hour)</td>
<td>Typical: 15,700 BTU/hour (16,600 kJ/hour)</td>
<td>Typical: 7,850 BTU/hour (8,300 kJ/hour)</td>
<td>Typical: 6,800 BTU/hour (7,200 kJ/hour)</td>
</tr>
<tr>
<td></td>
<td>• High capacity drives</td>
<td>• High capacity drives</td>
<td>• High capacity drives</td>
<td>• High capacity drives</td>
</tr>
<tr>
<td></td>
<td>Maximum: 37,200 BTU/hour (39,250 kJ/hour)</td>
<td>Maximum: 20,500 BTU/hour (21,600 kJ/hour)</td>
<td>Maximum: 10,200 BTU/hour (10,800 kJ/hour)</td>
<td>Maximum: 9,200 BTU/hour (9,700 kJ/hour)</td>
</tr>
<tr>
<td></td>
<td>Typical: 26,000 BTU/hour (27,400 kJ/hour)</td>
<td>Typical: 14,300 BTU/hour (15,100 kJ/hour)</td>
<td>Typical: 7,200 BTU/hour (7,600 kJ/hour)</td>
<td>Typical: 6,500 BTU/hour (6,850 kJ/hour)</td>
</tr>
<tr>
<td><strong>Air flow front-to-back</strong></td>
<td>• High performance drives</td>
<td>• High performance drives</td>
<td>• High performance drives</td>
<td>• High performance drives</td>
</tr>
<tr>
<td><strong>(subject to actual data center environment)</strong></td>
<td>Maximum: Approximately 1,900 CFM</td>
<td>Maximum: Approximately 1,050 CFM</td>
<td>Maximum: Approximately 500 CFM</td>
<td>Maximum: Approximately 460 CFM</td>
</tr>
<tr>
<td></td>
<td>Typical: Approximately 1,350 CFM</td>
<td>Typical: Approximately 750 CFM</td>
<td>Typical: Approximately 375 CFM</td>
<td>Typical: Approximately 325 CFM</td>
</tr>
<tr>
<td></td>
<td>• High capacity drives</td>
<td>• High capacity drives</td>
<td>• High capacity drives</td>
<td>• High capacity drives</td>
</tr>
<tr>
<td></td>
<td>Maximum: Approximately 1,700 CFM</td>
<td>Maximum: Approximately 950 CFM</td>
<td>Maximum: Approximately 470 CFM</td>
<td>Maximum: Approximately 425 CFM</td>
</tr>
<tr>
<td></td>
<td>Typical: Approximately 1,200 CFM</td>
<td>Typical: Approximately 670 CFM</td>
<td>Typical: Approximately 330 CFM</td>
<td>Typical: Approximately 300 CFM</td>
</tr>
</tbody>
</table>
Table 1-6 (Cont.) Environmental Requirements for Oracle Exadata Database Machine X3-2

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>IP Addresses</td>
<td>69 for Ethernet network, assuming single cluster</td>
<td>39 for Ethernet network, assuming single cluster (39 IP addresses are needed for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers))</td>
<td>22 for Ethernet network, assuming single cluster</td>
<td>22 for Ethernet network, assuming single cluster</td>
</tr>
<tr>
<td></td>
<td>22 for InfiniBand network</td>
<td>5 for InfiniBand network</td>
<td>5 for InfiniBand network</td>
<td>5 for InfiniBand network</td>
</tr>
<tr>
<td>Network drops</td>
<td>Minimum of 11 network drops</td>
<td>Minimum of 7 network drops</td>
<td>Minimum of 5 network drops</td>
<td>Minimum of 5 network drops</td>
</tr>
<tr>
<td></td>
<td>See Also: &quot;Network Connection and IP Address Requirements for Oracle Exadata Database Machine (page 1-47)&quot;</td>
<td>See Also: &quot;Network Connection and IP Address Requirements for Oracle Exadata Database Machine (page 1-47)&quot;</td>
<td>See Also: &quot;Network Connection and IP Address Requirements for Oracle Exadata Database Machine (page 1-47)&quot;</td>
<td>See Also: &quot;Network Connection and IP Address Requirements for Oracle Exadata Database Machine (page 1-47)&quot;</td>
</tr>
<tr>
<td>External connectivity</td>
<td>24 x 1 GbE/10 GbE Ethernet ports</td>
<td>12 x 1 GbE/10 GbE Ethernet ports</td>
<td>6 x 1 GbE/10 GbE Ethernet ports</td>
<td>6 x 1 GbE/10 GbE Ethernet ports</td>
</tr>
<tr>
<td></td>
<td>16 x 10 GbE Ethernet ports</td>
<td>8 x 10 GbE Ethernet ports</td>
<td>4 x 10 GbE Ethernet ports</td>
<td>4 x 10 GbE Ethernet ports</td>
</tr>
<tr>
<td></td>
<td>At least 12 InfiniBand ports</td>
<td>At least 12 InfiniBand ports</td>
<td>At least 12 InfiniBand ports</td>
<td>At least 12 InfiniBand ports</td>
</tr>
</tbody>
</table>

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

Table 1-7 (page 1-15) shows the general environmental requirements for Oracle Exadata Database Machine X3-8 Full Rack with Exadata Storage Server X4-2L Servers. The other sections in this chapter provide detailed information.
<table>
<thead>
<tr>
<th>Environmental Component</th>
<th>Oracle Exadata Database Machine X3-8 Full Rack with Exadata Storage Server X4-2L Servers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Weight</strong></td>
<td>911.27 kg (2009 lbs)</td>
</tr>
<tr>
<td><strong>See Also:</strong> &quot;Flooring Requirements (page 1-34)&quot;</td>
<td></td>
</tr>
<tr>
<td><strong>Acoustic levels</strong></td>
<td>84 db(A)</td>
</tr>
<tr>
<td><strong>Power</strong></td>
<td></td>
</tr>
</tbody>
</table>
| **See Also:** "Electrical Power Requirements (page 1-34)" | • High performance drives  
Maximum: 15.3 kVA  
Typical: 10.7 kVA (varies based on application load)  
• High capacity drives  
Maximum: 14.5 kVA  
Typical: 10.2 kVA (varies based on application load) |
| **Cooling** | |
| **See Also:** "Temperature and Humidity Requirements (page 1-44)", and "Ventilation and Cooling Requirements (page 1-45)" | • 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 (page 1-44)", and "Ventilation and Cooling Requirements (page 1-45)" | • 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** | 45 for Ethernet network, assuming single cluster  
Up to 36 for InfiniBand network |
| **See Also:** "Network Connection and IP Address Requirements for Oracle Exadata Database Machine (page 1-47)" | |
| **Network drops** | Minimum of 5 network drops |
| **See Also:** "Network Connection and IP Address Requirements for Oracle Exadata Database Machine (page 1-47)" | |
| **External connectivity** | 16 x 1 GbE Ethernet ports  
16 x 10 GbE Ethernet SFP+ ports  
12 InfiniBand ports |
| **See Also:** "Network Connection and IP Address Requirements for Oracle Exadata Database Machine (page 1-47)" | |
### 1.1.9 General Environmental Requirements for Oracle Exadata Database Machine X3-8 Full Rack with Exadata Storage Server X3-2 Servers

Table 1-8 (page 1-16) shows the general environmental requirements for Oracle Exadata Database Machine X3-8 Full Rack with Exadata Storage Server X3-2 Servers. The other sections in this chapter provide detailed information.

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

<table>
<thead>
<tr>
<th>Environmental Component</th>
<th>Oracle Exadata Database Machine X3-8 Full Rack with Exadata Storage Server X3-2 Servers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Weight</strong></td>
<td>929.9 kg (2050 lbs)</td>
</tr>
<tr>
<td><strong>Acoustic levels</strong></td>
<td>84 db(A)</td>
</tr>
<tr>
<td><strong>Power</strong></td>
<td>• High performance drives&lt;br&gt;Maximum: 15.3 kVA&lt;br&gt;Typical: 10.7 kVA (varies based on application load)&lt;br&gt;• High capacity drives&lt;br&gt;Maximum: 14.3 kVA&lt;br&gt;Typical: 10.0 kVA (varies based on application load)</td>
</tr>
<tr>
<td><strong>Cooling</strong></td>
<td>• High performance drives&lt;br&gt;Maximum: 51,200 BTU/hour (54,000 kJ/hour)&lt;br&gt;Typical: 35,900 BTU/hour (37,900 kJ/hour)&lt;br&gt;• High capacity drives&lt;br&gt;Maximum: 47,800 BTU/hour (50,400 kJ/hour)&lt;br&gt;Typical: 33,500 BTU/hour (35,300 kJ/hour)</td>
</tr>
<tr>
<td><strong>IP Addresses</strong></td>
<td>45 for Ethernet network, assuming single cluster&lt;br&gt;22 for InfiniBand network</td>
</tr>
</tbody>
</table>
Table 1-8 (Cont.) Environmental Requirements for Oracle Exadata Database Machine X3-8 Full Rack with Exadata Storage Server X3-2 Servers

<table>
<thead>
<tr>
<th>Environmental Component</th>
<th>Oracle Exadata Database Machine X3-8 Full Rack with Exadata Storage Server X3-2 Servers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network drops</td>
<td>Minimum of 5 network drops</td>
</tr>
<tr>
<td><strong>See Also:</strong></td>
<td>&quot;Network Connection and IP Address Requirements for Oracle Exadata Database Machine (page 1-47)&quot;</td>
</tr>
<tr>
<td>External connectivity</td>
<td>16 x 1 GbE Ethernet ports</td>
</tr>
<tr>
<td><strong>See Also:</strong></td>
<td>&quot;Network Connection and IP Address Requirements for Oracle Exadata Database Machine (page 1-47)&quot;</td>
</tr>
<tr>
<td></td>
<td>16 x 10 GbE Ethernet SFP+ ports</td>
</tr>
<tr>
<td></td>
<td>12 InfiniBand ports</td>
</tr>
</tbody>
</table>

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

The environmental requirements for Oracle Exadata Database Machine X2-2 depend on the size of the system. Table 1-9 (page 1-17) shows the general environmental requirements for Oracle Exadata Database Machine X2-2. The other sections in this chapter provide detailed information.

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

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>966.6 kg (2131 lbs)</td>
<td>602.8 kg (1329 lbs)</td>
<td>409.1 kg (902 lbs)</td>
</tr>
<tr>
<td><strong>See Also:</strong></td>
<td>&quot;Flooring Requirements (page 1-34)&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acoustic levels</td>
<td>89 db(A)</td>
<td>86 db(A)</td>
<td>83 db(A)</td>
</tr>
<tr>
<td><strong>See Also:</strong></td>
<td>&quot;Electrical Power Requirements (page 1-34)&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power</td>
<td>Maximum: 14.0 kW (14.3 kVA)</td>
<td>Maximum: 7.2 kW (7.3 kVA)</td>
<td>Maximum: 3.6 kW (3.7 kVA)</td>
</tr>
<tr>
<td></td>
<td>Typical: 9.8 kW (10.0 kVA) (varies based on application load)</td>
<td>Typical: 5.1 kW (5.2 kVA) (varies based on application load)</td>
<td>Typical: 2.7 kW (2.75kVA) (varies based on application load)</td>
</tr>
<tr>
<td>Cooling</td>
<td>Maximum: 47,800 BTU/hour (50,400 kJ/hour)</td>
<td>Maximum: 26,400 BTU/hour (25,950 kJ/hour)</td>
<td>Maximum: 12,300 BTU/hour (13,000 kJ/hour)</td>
</tr>
<tr>
<td><strong>See Also:</strong></td>
<td>&quot;Temperature and Humidity Requirements (page 1-44)”, and &quot;Ventilation and Cooling Requirements (page 1-45)&quot;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 1-9 (Cont.) Environmental Requirements for Oracle Exadata Database Machine X2-2

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>IP Addresses</td>
<td>70 for Ethernet network, assuming single cluster 22 for InfiniBand network</td>
<td>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</td>
<td>23 for Ethernet network, assuming single cluster 5 for InfiniBand network</td>
</tr>
<tr>
<td>Network drops</td>
<td>Minimum of 12 network drops</td>
<td>Minimum of 8 network drops</td>
<td>Minimum of 6 network drops</td>
</tr>
<tr>
<td>External connectivity</td>
<td>24 x 1 GbE Ethernet ports 16 x 10 GbE Ethernet ports (valid for M2 servers only) At least 12 InfiniBand ports</td>
<td>12 x 1 GbE Ethernet ports 8 x 10 GbE Ethernet ports (valid for M2 servers only) At least 12 InfiniBand ports</td>
<td>6 x 1 GbE Ethernet ports 4 x 10 GbE Ethernet ports (valid for M2 servers only) At least 12 InfiniBand ports</td>
</tr>
</tbody>
</table>

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

Table 1-10 (page 1-19) shows the general environmental requirements for Oracle Exadata Database Machine X2-8 Full Rack. The other sections in this chapter provide detailed information.
### Table 1-10  Environmental Requirements for Oracle Exadata Database Machine X2-8 Full Rack

<table>
<thead>
<tr>
<th>Environmental Component</th>
<th>Oracle Exadata Database Machine X2-8 Full Rack (Sun Fire X4800 Oracle Database Servers)</th>
<th>Oracle Exadata Database Machine X2-8 Full Rack (Sun Server X2-8 Oracle Database Servers)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>943.5 kg (2080 lbs)</td>
<td>980.7 kg (2162 lbs)</td>
</tr>
<tr>
<td>Acoustic levels</td>
<td>85 db(A)</td>
<td>85 db(A)</td>
</tr>
<tr>
<td>Power</td>
<td>Maximum: 17.0 kW (17.4 kVA)</td>
<td>Maximum: 17.7 kW (18.1 kVA)</td>
</tr>
<tr>
<td></td>
<td>Typical: 11.9 kW (12.2 kVA) (varies based on application load)</td>
<td>Typical: 12.4 kW (112.7 kVA) (varies based on application load)</td>
</tr>
<tr>
<td>Cooling</td>
<td>Maximum: 58,050 BTU/hour (61,200 kJ/hour)</td>
<td>Maximum: 60,350 BTU/hour (63,630 kJ/hour)</td>
</tr>
<tr>
<td></td>
<td>Typical: 40,630 BTU/hour (42,840 kJ/hour)</td>
<td>Typical: 42,280 BTU/hour (44,580 kJ/hour)</td>
</tr>
<tr>
<td>Air flow front-to-back</td>
<td>Maximum: Approximately 2,690 CFM</td>
<td>Maximum: Approximately 2,781 CFM</td>
</tr>
<tr>
<td></td>
<td>Typical: Approximately 1,880 CFM</td>
<td>Typical: Approximately 1,950 CFM</td>
</tr>
<tr>
<td>IP Addresses</td>
<td>45 for Ethernet network, assuming single cluster</td>
<td>45 for Ethernet network, assuming single cluster</td>
</tr>
<tr>
<td></td>
<td>22 for InfiniBand network</td>
<td>22 for InfiniBand network</td>
</tr>
<tr>
<td>Network drops</td>
<td>Minimum of 5 network drops</td>
<td>Minimum of 5 network drops</td>
</tr>
<tr>
<td>External connectivity</td>
<td>16 x 1 GbE Ethernet ports</td>
<td>16 x 1 GbE Ethernet ports</td>
</tr>
<tr>
<td></td>
<td>16 x 10 GbE Ethernet SFP+ ports</td>
<td>16 x 10 GbE Ethernet SFP+ ports</td>
</tr>
<tr>
<td></td>
<td>12 InfiniBand ports</td>
<td>12 InfiniBand ports</td>
</tr>
</tbody>
</table>
1.1.12 General Environmental Requirements for Oracle Exadata Storage Expansion Rack X6-2 and later

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

Oracle Exadata Configuration Assistant (OECA) Downloads

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

The environmental requirements for Oracle Exadata Storage Expansion Rack X5-2 depend on the size of the system. Table 1-11 (page 1-20) shows the general environmental requirements for each type of Oracle Exadata Storage Expansion Rack X5-2.

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

<table>
<thead>
<tr>
<th>Environmental Component</th>
<th>Oracle Exadata Storage Expansion X5-2 Full Rack</th>
<th>Oracle Exadata Storage Expansion X5-2 Half Rack</th>
<th>Oracle Exadata Storage Expansion X5-2 Quarter Rack</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>• Extreme Flash drives: 821 kg (1810 lbs)</td>
<td>• Extreme Flash drives: 546.6 kg (1205 lbs)</td>
<td>• Extreme Flash drives: 364.5 kg (804 lbs)</td>
</tr>
<tr>
<td></td>
<td>• High capacity drives: 915.8 kg (2019 lbs)</td>
<td>• High capacity drives: 591.5 kg (1304 lbs)</td>
<td>• High capacity drives: 384.4 kg (848 lbs)</td>
</tr>
<tr>
<td>Acoustic levels</td>
<td>82 db(A)</td>
<td>79 db(A)</td>
<td>76 db(A)</td>
</tr>
<tr>
<td>Power</td>
<td>• Extreme Flash drives</td>
<td>• Extreme Flash drives</td>
<td>• Extreme Flash drives</td>
</tr>
<tr>
<td></td>
<td>Maximum: 13.1 kVA</td>
<td>Maximum: 5.9 kVA</td>
<td>Maximum: 3.7 kVA</td>
</tr>
<tr>
<td></td>
<td>Typical: 9.2 kVA</td>
<td>Typical: 4.2 kVA</td>
<td>Typical: 2.6 kVA</td>
</tr>
<tr>
<td></td>
<td>(varies based on application load)</td>
<td>(varies based on application load)</td>
<td>(varies based on application load)</td>
</tr>
<tr>
<td></td>
<td>• High capacity drives</td>
<td>• High capacity drives</td>
<td>• High capacity drives</td>
</tr>
<tr>
<td></td>
<td>Maximum: 12.8 kVA</td>
<td>Maximum: 6.9 kVA</td>
<td>Maximum: 3.7 kVA</td>
</tr>
<tr>
<td></td>
<td>Typical: 8.9 kVA</td>
<td>Typical: 4.8 kVA</td>
<td>Typical: 2.6 kVA</td>
</tr>
<tr>
<td></td>
<td>(varies based on application load)</td>
<td>(varies based on application load)</td>
<td>(varies based on application load)</td>
</tr>
</tbody>
</table>
Table 1-11 (Cont.) Environmental Requirements for Oracle Exadata Storage Expansion Rack X5-2

<table>
<thead>
<tr>
<th>Environmental Component</th>
<th>Oracle Exadata Storage Expansion X5-2 Full Rack</th>
<th>Oracle Exadata Storage Expansion X5-2 Half Rack</th>
<th>Oracle Exadata Storage Expansion X5-2 Quarter Rack</th>
</tr>
</thead>
</table>
| 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 cluster  
                               38 for InfiniBand network | 24 for Ethernet network, assuming single cluster  
                               18 for InfiniBand network | 13 for Ethernet network, assuming single cluster  
                               8 for InfiniBand network |
| Network drops           | Minimum of 1 network drop | Minimum of 1 network drop | Minimum of 1 network drop |
| External connectivity   | 12 InfiniBand ports | 12 InfiniBand ports | 12 InfiniBand ports |
1.1.14 General Environmental Requirements for Oracle Exadata Storage Expansion Rack X4-2

The environmental requirements for Oracle Exadata Storage Expansion Rack X4-2 depend on the size of the system. Table 1-12 (page 1-22) shows the general environmental requirements for each type of Oracle Exadata Storage Expansion Rack X4-2.

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

<table>
<thead>
<tr>
<th>Environmental Component</th>
<th>Oracle Exadata Storage Expansion X4-2 Full Rack</th>
<th>Oracle Exadata Storage Expansion X4-2 Half Rack</th>
<th>Oracle Exadata Storage Expansion X4-2 Quarter Rack</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>824.2 kg (1817 lbs)</td>
<td>513.0 kg (1131 lbs)</td>
<td>346.5 kg (764 lbs)</td>
</tr>
<tr>
<td>Acoustic levels</td>
<td>82 db(A)</td>
<td>79 db(A)</td>
<td>76 db(A)</td>
</tr>
<tr>
<td>Power</td>
<td>• High performance drives</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maximum: 10.2 kVA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Typical: 7.1 kVA (varies based on application load)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• High capacity drives</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maximum: 9.1 kVA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Typical: 6.3 kVA (varies based on application load)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• High performance drives</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maximum: 5.7 kVA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Typical: 4.1 kVA (varies based on application load)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• High capacity drives</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maximum: 5.2 kVA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Typical: 3.7 kVA (varies based on application load)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooling</td>
<td>• High performance drives</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maximum: 34,100 BTU/hour (36,000 kJ/hour)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Typical: 23,900 BTU/hour (25,200 kJ/hour)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• High capacity drives</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maximum: 30,400 BTU/hour (32,100 kJ/hour)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Typical: 21,200 BTU/hour (22,400 kJ/hour)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• High performance drives</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maximum: 19,100 BTU/hour (20,150 kJ/hour)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Typical: 13,650 BTU/hour (14,400 kJ/hour)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• High capacity drives</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maximum: 17,400 BTU/hour (18,400 kJ/hour)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Typical: 12,300 BTU/hour (13,000 kJ/hour)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• High performance drives</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maximum: 9,500 BTU/hour (10,000 kJ/hour)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Typical: 6,700 BTU/hour (7,000 kJ/hour)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• High capacity drives</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maximum: 8,900 BTU/hour (9,400 kJ/hour)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Typical: 6,500 BTU/hour (6,900 kJ/hour)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 1-12 (Cont.) Environmental Requirements for Oracle Exadata Storage Expansion Rack X4-2

<table>
<thead>
<tr>
<th>Environmental Component</th>
<th>Oracle Exadata Storage Expansion X4-2 Full Rack</th>
<th>Oracle Exadata Storage Expansion X4-2 Half Rack</th>
<th>Oracle Exadata Storage Expansion X4-2 Quarter Rack</th>
</tr>
</thead>
</table>
| Air flow front-to-back (subject to actual data center environment) | • High performance drives  
Maximum: Approximately 1,600 CFM  
Typical: Approximately 1,100 CFM  
• High capacity drives  
Maximum: Approximately 1,410 CFM  
Typical: Approximately 980 CFM | • High performance drives  
Maximum: Approximately 900 CFM  
Typical: Approximately 650 CFM  
• High capacity drives  
Maximum: Approximately 810 CFM  
Typical: Approximately 570 CFM | • High performance drives  
Maximum: Approximately 440 CFM  
Typical: Approximately 310 CFM  
• High capacity drives  
Maximum: Approximately 410 CFM  
Typical: Approximately 300 CFM |
| IP Addresses | 42 for Ethernet network, assuming single cluster  
36 for InfiniBand network | 24 for Ethernet network, assuming single cluster  
18 for InfiniBand network | 13 for Ethernet network, assuming single cluster  
8 for InfiniBand network |
| Network drops | Minimum of 1 network drop | Minimum of 1 network drop | Minimum of 1 network drop |
| External connectivity | 12 InfiniBand ports | 12 InfiniBand ports | 12 InfiniBand ports |

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

The environmental requirements for Oracle Exadata Storage Expansion Rack X3-2 depend on the size of the system. Table 1-13 (page 1-23) shows the general environmental requirements for each type of Oracle Exadata Storage Expansion Rack X3-2.

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

<table>
<thead>
<tr>
<th>Environmental Component</th>
<th>Oracle Exadata Storage Expansion X3-2 Full Rack</th>
<th>Oracle Exadata Storage Expansion X3-2 Half Rack</th>
<th>Oracle Exadata Storage Expansion X3-2 Quarter Rack</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>827.4 kg (1824 lbs)</td>
<td>516.2 kg (1138 lbs)</td>
<td>349.7 kg (771 lbs)</td>
</tr>
<tr>
<td>Acoustic levels</td>
<td>82 db(A)</td>
<td>79 db(A)</td>
<td>76 db(A)</td>
</tr>
</tbody>
</table>
### Table 1-13 (Cont.) Environmental Requirements for Oracle Exadata Storage Expansion Rack X3-2

<table>
<thead>
<tr>
<th>Environmental Component</th>
<th>Oracle Exadata Storage Expansion X3-2 Full Rack</th>
<th>Oracle Exadata Storage Expansion X3-2 Half Rack</th>
<th>Oracle Exadata Storage Expansion X3-2 Quarter Rack</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Power</strong></td>
<td>• 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)</td>
<td>• High performance drives Maximum: 5.7 kVA Typical: 4.1 kVA (varies based on application load) • High capacity drives Maximum: 5.1 kVA Typical: 3.6 kVA (varies based on application load)</td>
<td>• High performance drives Maximum: 2.9 kVA Typical: 2.0 kVA (varies based on application load) • High capacity drives Maximum: 2.6 kVA Typical: 1.9 kVA (varies based on application load)</td>
</tr>
<tr>
<td><strong>Cooling</strong></td>
<td>• 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)</td>
<td>• High performance drives Maximum: 19,100 BTU/hour (20,150 kJ/hour) Typical: 13,650 BTU/hour (14,400 kJ/hour) • High capacity drives Maximum: 17,100 BTU/hour (18,000 kJ/hour) Typical: 11,950 BTU/hour (12,600 kJ/hour)</td>
<td>• 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)</td>
</tr>
<tr>
<td><strong>Air flow front-to-back</strong> (subject to actual data center environment)</td>
<td>• High performance drives Maximum: Approximately 1,600 CFM Typical: Approximately 1,100 CFM • High capacity drives Maximum: Approximately 1,375 CFM Typical: Approximately 960 CFM</td>
<td>• High performance drives Maximum: Approximately 900 CFM Typical: Approximately 650 CFM • High capacity drives Maximum: Approximately 790 CFM Typical: Approximately 550 CFM</td>
<td>• High performance drives Maximum: Approximately 440 CFM Typical: Approximately 310 CFM • High capacity drives Maximum: Approximately 400 CFM Typical: Approximately 285 CFM</td>
</tr>
</tbody>
</table>
Table 1-14 (Cont.) Environmental Requirements for Oracle Exadata Storage Expansion Rack X3-2

<table>
<thead>
<tr>
<th>Environmental Component</th>
<th>Oracle Exadata Storage Expansion X3-2 Full Rack</th>
<th>Oracle Exadata Storage Expansion X3-2 Half Rack</th>
<th>Oracle Exadata Storage Expansion X3-2 Quarter Rack</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP Addresses</td>
<td>42 for Ethernet network, assuming single cluster</td>
<td>24 for Ethernet network, assuming single cluster</td>
<td>13 for Ethernet network, assuming single cluster</td>
</tr>
<tr>
<td></td>
<td>18 for InfiniBand network</td>
<td>9 for InfiniBand network</td>
<td>4 for InfiniBand network</td>
</tr>
<tr>
<td>Network drops</td>
<td>Minimum of 1 network drop</td>
<td>Minimum of 1 network drop</td>
<td>Minimum of 1 network drop</td>
</tr>
<tr>
<td>External connectivity</td>
<td>12 InfiniBand ports</td>
<td>12 InfiniBand ports</td>
<td>12 InfiniBand ports</td>
</tr>
</tbody>
</table>

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

The environmental requirements for Oracle Exadata Storage Expansion Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers depend on the size of the system. Table 1-14 (page 1-25) shows the general environmental requirements for each type of Oracle Exadata Storage Expansion Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers.

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

<table>
<thead>
<tr>
<th>Environmental Component</th>
<th>Oracle Exadata Storage Expansion Full Rack</th>
<th>Oracle Exadata Storage Expansion Half Rack</th>
<th>Oracle Exadata Storage Expansion Quarter Rack</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>917.6 kg (2023 lbs)</td>
<td>578.3 kg (1275 lbs)</td>
<td>396.8 kg (875 lbs)</td>
</tr>
<tr>
<td>Acoustic levels</td>
<td>83 db(A)</td>
<td>82 db(A)</td>
<td>81 db(A)</td>
</tr>
<tr>
<td>Power</td>
<td>Maximum: 12.6 kW (12.9 kVA)</td>
<td>Maximum: 6.9 kW (7.1 kVA)</td>
<td>Maximum: 3.4 kW (3.5 kVA)</td>
</tr>
<tr>
<td></td>
<td>Typical: 8.8 kW (9.0 kVA) (varies based on application load)</td>
<td>Typical: 4.8 kW (5.0 kVA) (varies based on application load)</td>
<td>Typical: 2.4 kW (2.5kVA) (varies based on application load)</td>
</tr>
<tr>
<td>Cooling</td>
<td>Maximum: 43,000 BTU/hour (45,400 kJ/hour)</td>
<td>Maximum: 23,600 BTU/hour (24,900 kJ/hour)</td>
<td>Maximum: 11,600 BTU/hour (12,250 kJ/hour)</td>
</tr>
<tr>
<td></td>
<td>Typical: 30,100 BTU/hour (31,800 kJ/hour)</td>
<td>Typical: 16,500 BTU/hour (17,400 kJ/hour)</td>
<td>Typical: 8,100 BTU/hour (8,600 kJ/hour)</td>
</tr>
</tbody>
</table>
Table 1-14  (Cont.) Environmental Requirements for Oracle Exadata Storage Expansion Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers

<table>
<thead>
<tr>
<th>Environmental Component</th>
<th>Oracle Exadata Storage Expansion Full Rack</th>
<th>Oracle Exadata Storage Expansion Half Rack</th>
<th>Oracle Exadata Storage Expansion Quarter Rack</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air flow front-to-back (subject to actual data center environment)</td>
<td>Maximum: Approximately 1,980 CFM Typical: Approximately 1,390 CFM</td>
<td>Maximum: Approximately 1,090 CFM Typical: Approximately 760 CFM</td>
<td>Maximum: Approximately 530 CFM Typical: Approximately 375 CFM</td>
</tr>
<tr>
<td>IP Addresses</td>
<td>43 for Ethernet network, assuming single cluster 18 for InfiniBand network</td>
<td>25 for Ethernet network, assuming single cluster 9 for InfiniBand network</td>
<td>14 for Ethernet network, assuming single cluster 4 for InfiniBand network</td>
</tr>
<tr>
<td>Network drops</td>
<td>Minimum of 2 network drops</td>
<td>Minimum of 2 network drops</td>
<td>Minimum of 2 network drops</td>
</tr>
<tr>
<td>External connectivity</td>
<td>12 InfiniBand ports</td>
<td>12 InfiniBand ports</td>
<td>12 InfiniBand ports</td>
</tr>
</tbody>
</table>

1.1.17 General Environmental Requirements for Single Servers

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

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

<table>
<thead>
<tr>
<th>Environmental Component</th>
<th>Exadata Storage Server X7-2 - Extreme Flash</th>
<th>Exadata Storage Server X7-2 - High Capacity</th>
<th>Database Server X7-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>28.1 kg (62 lbs)</td>
<td>33.1 kg (73 lbs)</td>
<td>20.4 kg (45 lbs)</td>
</tr>
<tr>
<td>Acoustic levels</td>
<td>78 db(A)</td>
<td>78 db(A)</td>
<td>78 db(A)</td>
</tr>
<tr>
<td>Power</td>
<td>Maximum: 0.6 kVA Typical: 0.4 kVA (varies based on application load)</td>
<td>Maximum: 0.6 kVA Typical: 0.4 kVA (varies based on application load)</td>
<td>Maximum: 0.665 kW (0.678 kVA) Typical: 0.466 kW (0.475 kVA) (varies based on application load)</td>
</tr>
<tr>
<td>Cooling</td>
<td>Maximum: 1,866 BTU/hour (1,969 kJ/hour) Typical: 1,307 BTU/hour (1,378 kJ/hour)</td>
<td>Maximum: 2,006 BTU/hour (2,117 kJ/hour) Typical: 1,404 BTU/hour (1,482 kJ/hour)</td>
<td>Maximum: 2,269 BTU/hour (2,394 kJ/hour) Typical: 1,588 BTU/hour (1,676 kJ/hour)</td>
</tr>
</tbody>
</table>
### Table 1-16 Environmental Requirements for X6-2 Single Servers

<table>
<thead>
<tr>
<th>Environmental Component</th>
<th>Exadata Storage Server X6-2 - Extreme Flash</th>
<th>Exadata Storage Server X6-2 - High Capacity</th>
<th>Database Server X6-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>28.1 kg (62 lbs)</td>
<td>33.1 kg (73 lbs)</td>
<td>20.4 kg (45 lbs)</td>
</tr>
<tr>
<td>Acoustic levels</td>
<td>78 db(A)</td>
<td>78 db(A)</td>
<td>78 db(A)</td>
</tr>
<tr>
<td>Power</td>
<td>Maximum: 0.6 kVA Typical: 0.4 kVA (varies based on application load)</td>
<td>Maximum: 0.6 kVA Typical: 0.4 kVA (varies based on application load)</td>
<td>Maximum: 0.665 kW (0.678 kVA) Typical: 0.466 kW (0.475 kVA) (varies based on application load)</td>
</tr>
<tr>
<td>Cooling</td>
<td>Maximum: 1,866 BTU/hour (1,969 kJ/hour) Typical: 1,307 BTU/hour (1,378 kJ/hour)</td>
<td>Maximum: 2,006 BTU/hour (2,117 kJ/hour) Typical: 1,404 BTU/hour (1,482 kJ/hour)</td>
<td>Maximum: 2,269 BTU/hour (2,394 kJ/hour) Typical: 1,588 BTU/hour (1,676 kJ/hour)</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Environmental Component</th>
<th>Exadata Storage Server X5-2 - Extreme Flash</th>
<th>Exadata Storage Server X5-2 - High Capacity</th>
<th>Database Server X5-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>28.1 kg (62 lbs)</td>
<td>33.1 kg (73 lbs)</td>
<td>20.4 kg (45 lbs)</td>
</tr>
<tr>
<td>Acoustic levels</td>
<td>78 db(A)</td>
<td>78 db(A)</td>
<td>78 db(A)</td>
</tr>
<tr>
<td>Power</td>
<td>Maximum: 0.6 kVA Typical: 0.4 kVA (varies based on application load)</td>
<td>Maximum: 0.6 kVA Typical: 0.4 kVA (varies based on application load)</td>
<td>Maximum: 0.7 kVA Typical: 0.5 kVA (varies based on application load)</td>
</tr>
<tr>
<td>Cooling</td>
<td>Maximum: 2,037 BTU/hour (2,149 kJ/hour) Typical: 1,426 BTU/hour (1,504 kJ/hour)</td>
<td>Maximum: 2,000 BTU/hour (2,109 kJ/hour) Typical: 1,400 BTU/hour (1,477 kJ/hour)</td>
<td>Maximum: 2,481 BTU/hour (2,617 kJ/hour) Typical: 1,736 BTU/hour (1,832 kJ/hour)</td>
</tr>
</tbody>
</table>

---

Chapter 1

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

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

### 1.2 Space Requirements

**Oracle Exadata Database Machine X7-2 and X7-8**

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

- Height: 2000 mm (78.74 inches)
- Width: 600 mm (23.62 inches)
- Depth: 1235 mm with doors attached, from handle to handle (48.6 inches)

The minimum ceiling height for the cabinet is 2914 mm (114.72 inches), measured from the true floor or raised floor, whichever is higher. This includes an additional 914 mm (36 inches) of space required above the rack height for maintenance access, as described in Table 1-22 (page 1-34). The space surrounding the cabinet must not restrict the movement of cool air between the air conditioner and the front of the systems within the cabinet, or the movement of hot air coming out of the rear of the cabinet.

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

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

- Height: 1998 mm (78.66 inches)
- Width: 600 mm with side panels (23.62 inches)
- Depth: 1200 mm (47.24 inches)

The minimum ceiling height for the cabinet is 2912 mm (114.65 inches), measured from the true floor or raised floor, whichever is higher. This includes an additional 914 mm (36 inches) of space required above the rack height for maintenance access, as described in Table 1-22 (page 1-34). The space surrounding the cabinet must not
restrict the movement of cool air between the air conditioner and the front of the systems within the cabinet, or the movement of hot air coming out of the rear of the cabinet.

### 1.2.1 Receiving and Unpacking Requirements

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

Use the following package dimensions for Oracle Exadata Rack:

- **Shipping height**: 2159 mm (85 inches)
- **Shipping width**: 1219 mm (48 inches)
- **Shipping depth**: 1575 mm (62 inches)

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

- **Table 1-19** (page 1-29) lists the shipping and net weights for Oracle Exadata Database Machines.
- **Table 1-20** (page 1-31) lists the shipping and net weights for Oracle Exadata Storage Expansion Racks:
- **Table 1-21** (page 1-33) lists the access route requirements for Oracle Exadata Rack.

#### Table 1-19 Rack Weights for Oracle Exadata Database Machine

<table>
<thead>
<tr>
<th>Type of Rack</th>
<th>Shipping Weight</th>
<th>Net Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oracle Exadata Database Machine X7-2 Full Rack</td>
<td>Extreme Flash: 974.0 kg (2147.2 lbs)</td>
<td>Extreme Flash: 815.1 kg (1797.2 lbs)</td>
</tr>
<tr>
<td></td>
<td>High Capacity: 1071.1 kg (2361.4 lbs)</td>
<td>High Capacity: 912.4 kg (2011.4 lbs)</td>
</tr>
<tr>
<td>Oracle Exadata Database Machine X7-2 Half Rack</td>
<td>Extreme Flash: 698.4 kg (1539.6 lbs)</td>
<td>Extreme Flash: 539.6 kg (1189.6 lbs)</td>
</tr>
<tr>
<td></td>
<td>High Capacity: 746.9 kg (1646.7 lbs)</td>
<td>High Capacity: 558.8 kg (1296.7 lbs)</td>
</tr>
<tr>
<td>Oracle Exadata Database Machine X7-2 Quarter Rack</td>
<td>Extreme Flash: 551.1 kg (1215.0 lbs)</td>
<td>Extreme Flash: 392.4 kg (865.0 lbs)</td>
</tr>
<tr>
<td></td>
<td>High Capacity: 571.9 kg (1260.9 lbs)</td>
<td>High Capacity: 413.2 kg (910.9 lbs)</td>
</tr>
<tr>
<td>Oracle Exadata Database Machine X7-2 Eighth Rack</td>
<td>Extreme Flash: 548.8 kg (1209.9 lbs)</td>
<td>Extreme Flash: 390.1 kg (859.9 lbs)</td>
</tr>
<tr>
<td></td>
<td>High Capacity: 558.9 kg (1232.2 lbs)</td>
<td>High Capacity: 400.1 kg (882.2 lbs)</td>
</tr>
<tr>
<td>Oracle Exadata Database Machine X7-8 Full Rack</td>
<td>Extreme Flash drives: 894.7 kg (1972.5 lbs)</td>
<td>Extreme Flash drives: 828.5 kg (1826.5 lbs)</td>
</tr>
<tr>
<td></td>
<td>High capacity drives: 964.6 kg (2126.5 lbs)</td>
<td>High capacity drives: 898.3 kg (1980.5 lbs)</td>
</tr>
</tbody>
</table>
Table 1-19  (Cont.) Rack Weights for Oracle Exadata Database Machine

<table>
<thead>
<tr>
<th>Type of Rack</th>
<th>Shipping Weight</th>
<th>Net Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Oracle Exadata Database Machine X6-2 Full Rack</strong></td>
<td>Extreme Flash: 871.1 kg (1920.5 lbs)</td>
<td>Extreme Flash: 794.5 kg (1751.5 lbs)</td>
</tr>
<tr>
<td></td>
<td>High Capacity: 941.0 kg (2074.5 lbs)</td>
<td>High Capacity: 864.3 kg (1905.5 lbs)</td>
</tr>
<tr>
<td><strong>Oracle Exadata Database Machine X6-2 Half Rack</strong></td>
<td>Extreme Flash: 592.2 kg (1305.5 lbs)</td>
<td>Extreme Flash: 515.5 kg (1136.5 lbs)</td>
</tr>
<tr>
<td></td>
<td>High Capacity: 627.1 kg (1382.5 lbs)</td>
<td>High Capacity: 550.4 kg (1213.5 lbs)</td>
</tr>
<tr>
<td><strong>Oracle Exadata Database Machine X6-2 Quarter Rack</strong></td>
<td>Extreme Flash: 432.5 kg (953.5 lbs)</td>
<td>Extreme Flash: 366.3 kg (807.5 lbs)</td>
</tr>
<tr>
<td></td>
<td>High Capacity: 447.5 kg (986.5 lbs)</td>
<td>High Capacity: 381.2 kg (840.5 lbs)</td>
</tr>
<tr>
<td><strong>Oracle Exadata Database Machine X6-2 Eighth Rack</strong></td>
<td>Extreme Flash: 432.5 kg (953.5 lbs)</td>
<td>Extreme Flash: 366.3 kg (807.5 lbs)</td>
</tr>
<tr>
<td></td>
<td>High Capacity: 433.8 kg (956.3 lbs)</td>
<td>High Capacity: 376.6 kg (810.3 lbs)</td>
</tr>
<tr>
<td><strong>Oracle Exadata Database Machine X5-8 or X6-8 Full Rack</strong></td>
<td>Extreme Flash drives: 894.7 kg (1972.5 lbs)</td>
<td>Extreme Flash drives: 828.5 kg (1826.5 lbs)</td>
</tr>
<tr>
<td></td>
<td>High capacity drives: 964.6 kg (2126.5 lbs)</td>
<td>High capacity drives: 898.3 kg (1980.5 lbs)</td>
</tr>
<tr>
<td><strong>Oracle Exadata Database Machine X6-8 Half Rack</strong></td>
<td>Extreme Flash drives: 592.2 kg (1305.5 lbs)</td>
<td>Extreme Flash drives: 525.9 kg (1159.5 lbs)</td>
</tr>
<tr>
<td></td>
<td>High capacity drives: 607.1 kg (1338.5 lbs)</td>
<td>High capacity drives: 540.9 kg (1192.5 lbs)</td>
</tr>
<tr>
<td><strong>Oracle Exadata Database Machine X5-8 Half Rack</strong></td>
<td>Extreme Flash drives: 592.4 kg (1306.1 lbs)</td>
<td>Extreme Flash drives: 526.2 kg (1160.1 lbs)</td>
</tr>
<tr>
<td></td>
<td>High capacity drives: 607.4 kg (1339.1 lbs)</td>
<td>High capacity drives: 541.2 kg (1193.1 lbs)</td>
</tr>
<tr>
<td><strong>Oracle Exadata Database Machine X5-2 Full Rack</strong></td>
<td>984.8 kg (2171 lbs)</td>
<td>901.3 kg (1987 lbs)</td>
</tr>
<tr>
<td><strong>Oracle Exadata Database Machine X5-2 Half Rack</strong></td>
<td>639.6 kg (1410 lbs)</td>
<td>587.4 kg (1295 lbs)</td>
</tr>
<tr>
<td><strong>Oracle Exadata Database Machine X5-2 Quarter Rack</strong></td>
<td>453.1 kg (999 lbs)</td>
<td>418.2 kg (922 lbs)</td>
</tr>
<tr>
<td><strong>Oracle Exadata Database Machine X5-2 Eighth Rack</strong></td>
<td>453.1 kg (999 lbs)</td>
<td>418.2 kg (922 lbs)</td>
</tr>
<tr>
<td><strong>Oracle Exadata Database Machine X4-2 Full Rack</strong></td>
<td>936 kg (2064 lbs)</td>
<td>852.8 kg (1880 lbs)</td>
</tr>
<tr>
<td><strong>Oracle Exadata Database Machine X4-2 Half Rack</strong></td>
<td>577 kg (1273 lbs)</td>
<td>525.3 kg (1158 lbs)</td>
</tr>
<tr>
<td><strong>Oracle Exadata Database Machine X4-2 Quarter Rack</strong></td>
<td>401 kg (883 lbs)</td>
<td>365.6 kg (806 lbs)</td>
</tr>
<tr>
<td><strong>Oracle Exadata Database Machine X4-2 Eighth Rack</strong></td>
<td>401 kg (883 lbs)</td>
<td>365.6 kg (806 lbs)</td>
</tr>
</tbody>
</table>
### Table 1-19  (Cont.) Rack Weights for Oracle Exadata Database Machine

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

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

<table>
<thead>
<tr>
<th>Type of Rack</th>
<th>Shipping Weight</th>
<th>Net Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oracle Exadata Storage Expansion X7-2 Full Rack</td>
<td>Extreme Flash: 850.3 kg (1874.5 lbs)</td>
<td>Extreme Flash: 784.0 kg (1728.5 lbs)</td>
</tr>
<tr>
<td></td>
<td>High Capacity: 945.1 kg (2083.5 lbs)</td>
<td>High Capacity: 878.8 kg (1937.5 lbs)</td>
</tr>
<tr>
<td>Oracle Exadata Storage Expansion X7-2 Half Rack</td>
<td>Extreme Flash: 569.0 kg (1254.5 lbs)</td>
<td>Extreme Flash: 502.8 kg (1108.5 lbs)</td>
</tr>
<tr>
<td></td>
<td>High Capacity: 613.9 kg (1353.5 lbs)</td>
<td>High Capacity: 547.7 kg (1207.5 lbs)</td>
</tr>
</tbody>
</table>
Table 1-20  (Cont.) Rack Weights for Oracle Exadata Storage Expansion Rack

<table>
<thead>
<tr>
<th>Type of Rack</th>
<th>Shipping Weight</th>
<th>Net Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oracle Exadata Storage Expansion X7-2 Quarter Rack</td>
<td>Extreme Flash: 430.7 kg (949.5 lbs) High Capacity: 450.6 kg (993.5 lbs)</td>
<td>Extreme Flash: 364.5 kg (803.5 lbs) High Capacity: 384.4 kg (847.5 lbs)</td>
</tr>
<tr>
<td>Oracle Exadata Storage Expansion X6-2 Full Rack</td>
<td>Extreme Flash: 850.3 kg (1874.5 lbs) High Capacity: 945.1 kg (2083.5 lbs)</td>
<td>Extreme Flash: 784.0 kg (1728.5 lbs) High Capacity: 878.8 kg (1937.5 lbs)</td>
</tr>
<tr>
<td>Oracle Exadata Storage Expansion X6-2 Half Rack</td>
<td>Extreme Flash: 569.0 kg (1254.5 lbs) High Capacity: 613.9 kg (1353.5 lbs)</td>
<td>Extreme Flash: 502.8 kg (1108.5 lbs) High Capacity: 547.7 kg (1207.5 lbs)</td>
</tr>
<tr>
<td>Oracle Exadata Storage Expansion X6-2 Quarter Rack</td>
<td>Extreme Flash: 430.7 kg (949.5 lbs) High Capacity: 450.6 kg (993.5 lbs)</td>
<td>Extreme Flash: 364.5 kg (803.5 lbs) High Capacity: 384.4 kg (847.5 lbs)</td>
</tr>
<tr>
<td>Oracle Exadata Storage Expansion X5-2 Full Rack</td>
<td>994.7 kg (2193 lbs)</td>
<td>915.8 kg (2019 lbs)</td>
</tr>
<tr>
<td>Oracle Exadata Storage Expansion X5-2 Half Rack</td>
<td>640.9 kg (1413 lbs)</td>
<td>591.5 kg (1304 lbs)</td>
</tr>
<tr>
<td>Oracle Exadata Storage Expansion X5-2 Quarter Rack</td>
<td>444.5 kg (980 lbs)</td>
<td>411 kg (906.1 lbs)</td>
</tr>
<tr>
<td>Oracle Exadata Storage Expansion X4-2 Full Rack</td>
<td>903.1 kg (1991 lbs)</td>
<td>824.2 kg (1817.1 lbs)</td>
</tr>
<tr>
<td>Oracle Exadata Storage Expansion X4-2 Half Rack</td>
<td>562.4 kg (1239.9 lbs)</td>
<td>513.0 kg (1131 lbs)</td>
</tr>
<tr>
<td>Oracle Exadata Storage Expansion X4-2 Quarter Rack</td>
<td>380.1 kg (838 lbs)</td>
<td>346.5 kg (764 lbs)</td>
</tr>
<tr>
<td>Oracle Exadata Storage Expansion X3-2 Full Rack</td>
<td>906.3 kg (1998 lbs)</td>
<td>827.4 kg (1824.1 lbs)</td>
</tr>
<tr>
<td>Oracle Exadata Storage Expansion X3-2 Half Rack</td>
<td>565.6 kg (1247 lbs)</td>
<td>516.2 kg (1138 lbs)</td>
</tr>
<tr>
<td>Oracle Exadata Storage Expansion X3-2 Quarter Rack</td>
<td>383.3 kg (845 lbs)</td>
<td>349.7 kg (771 lbs)</td>
</tr>
<tr>
<td>Oracle Exadata Storage Expansion Full Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers</td>
<td>1001.1 kg (2207 lbs)</td>
<td>917.6 kg (2023 lbs)</td>
</tr>
<tr>
<td>Oracle Exadata Storage Expansion Half Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers</td>
<td>659.6 kg (1454.2 lbs)</td>
<td>578.3 kg (1275 lbs)</td>
</tr>
<tr>
<td>Oracle Exadata Storage Expansion Quarter Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers</td>
<td>475.3 kg (1047.9 lbs)</td>
<td>396.8 kg (874.8 lbs)</td>
</tr>
</tbody>
</table>
If your loading dock meets the height and ramp requirements for a standard freight carrier truck, then you can use a pallet jack to unload the rack. If the loading dock does not meet the requirements, then you must provide a standard forklift or other means to unload the rack. You can also request that the rack be shipped in a truck with a lift gate.

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

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

Table 1-21  Access Route Requirements

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

1.2.2 Maintenance Access Requirements

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

Note:

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

The following table lists the maintenance access requirements.
Table 1-22 Maintenance Access Requirements for Oracle Exadata Database Machine (All Models)

<table>
<thead>
<tr>
<th>Location</th>
<th>Maintenance Access Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rear maintenance</td>
<td>914 mm (36 inches)</td>
</tr>
<tr>
<td>Front maintenance</td>
<td>1232 (48.5 inches)</td>
</tr>
<tr>
<td>Top maintenance</td>
<td>914 mm (36 inches)</td>
</tr>
</tbody>
</table>

1.3 Flooring Requirements

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

Table 1-23 (page 1-34) lists the floor load requirements.

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

<table>
<thead>
<tr>
<th>Description</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum allowable weight of installed rack equipment</td>
<td>952.5 kg (2100 lbs)</td>
</tr>
<tr>
<td>Maximum allowable weight of installed power distribution units</td>
<td>52.16 kg (115 lbs)</td>
</tr>
<tr>
<td>Maximum dynamic load (maximum allowable weight of installed equipment including PDUs)</td>
<td>1004.66 kg (2215 lbs)</td>
</tr>
</tbody>
</table>

1.4 Electrical Power Requirements

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

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

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

1.4.1 PDU Power Requirements

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

- **Table 1-24** (page 1-35) Low-voltage 15 kVA Single Phase PDUs for North America, South America, Japan and Taiwan (2 PDUs per Rack)
- **Table 1-25** (page 1-36) Low-voltage 15 kVA Three Phase PDUs for North America, South America, Japan and Taiwan (2 PDUs per Rack)
- **Table 1-26** (page 1-37) High-voltage 15 kVA Single Phase PDUs for Europe, the Middle East and Africa (EMEA), and Asia Pacific (APAC), except for Japan and Taiwan (2 PDUs per Rack)
- **Table 1-27** (page 1-38) High-voltage 15 kVA Three Phase for Europe, the Middle East and Africa (EMEA), and Asia Pacific (APAC), except for Japan and Taiwan (2 PDUs per Rack)
- **Table 1-28** (page 1-39) Low-voltage 22 kVA Single Phase PDUs for North America, South America, Japan and Taiwan (2 PDUs per Rack)
- **Table 1-29** (page 1-39) High-voltage 22 kVA Single Phase PDUs for Europe, the Middle East and Africa (EMEA), and Asia Pacific (APAC), except for Japan and Taiwan (2 PDUs per Rack)
- **Table 1-30** (page 1-40) Low-voltage 24 kVA Three Phase PDUs for North America, South America, Japan and Taiwan (2 PDUs per Rack)
- **Table 1-31** (page 1-41) High-voltage 24 kVA Three Phase PDUs for Europe, the Middle East and Africa (EMEA), and Asia Pacific (APAC), except for Japan and Taiwan (2 PDUs per Rack)
- **Table 1-32** (page 1-42) Low-voltage 37 kVA Three Phase PDUs for North America, South America, Japan and Taiwan (2 PDUs per Rack)
- **Table 1-33** (page 1-42) High-voltage 37 kVA Three Phase PDUs for Europe, the Middle East and Africa (EMEA), and Asia Pacific (APAC), except for Japan and Taiwan (2 PDUs per Rack)

**Table 1-24** (page 1-35) lists the requirements for low-voltage single-phase PDUs for North America, South America, Japan, and Taiwan. There are two PDUs per rack. The following specifications are per PDU.

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

<table>
<thead>
<tr>
<th>Option</th>
<th>Requirement, per PDU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>200 - 240 VAC</td>
</tr>
<tr>
<td>Frequency</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Current</td>
<td>24 A maximum per input</td>
</tr>
<tr>
<td>Power rating</td>
<td>15 kVA</td>
</tr>
<tr>
<td>Output current</td>
<td>72 A (3 x 24 A)</td>
</tr>
<tr>
<td>Outlets</td>
<td>42 x C13; 6 x C19</td>
</tr>
<tr>
<td>Outlet groups</td>
<td>6</td>
</tr>
<tr>
<td>Group protection (UL489 2-pole circuit breaker)</td>
<td>20A</td>
</tr>
</tbody>
</table>
Table 1-24  (Cont.) Low-voltage 15 kVA Single Phase PDUs for North America, South America, Japan and Taiwan (2 PDUs per Rack)

<table>
<thead>
<tr>
<th>Option</th>
<th>Requirement, per PDU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data center receptacle</td>
<td>15kVA, with three 30A/250V 2-pole/3-wire NEMA L6-30P plugs</td>
</tr>
</tbody>
</table>

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

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

Figure 1-1 (page 1-36) shows the low-voltage, single phase PDU power connector for North America, South America, Japan and Taiwan.

Figure 1-1  Low-voltage Single Phase Power Connector

![Low-voltage Single Phase Power Connector](image)

Table 1-25 (page 1-36) lists the requirements for low-voltage three-phase PDUs for North America, South America, Japan, and Taiwan. There are two PDUs per rack. The following specifications are per PDU.

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

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

The following are needed to connect an Oracle Exadata system to a low-voltage three-phase power source:
• 2 power cords for two PDUs, 60 amperes at 190 - 220 VAC three-phase
• 2 receptacles to connect the PDUs to 2 IEC 60309 60A 4-pin 250VAC 3ph IP67 data center receptacles

**Figure 1-2** (page 1-37) shows the low-voltage, three phase PDU power connector for North America, South America, Japan and Taiwan.

**Figure 1-2  Low-voltage Three Phase Power Connector**

**Table 1-26** (page 1-37) lists the requirements for 15 kVA high-voltage three-phase PDUs for Europe, the Middle East, Africa, and Asia Pacific, except Japan and Taiwan. There are two PDUs per rack.

The following specifications are per PDU.

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

<table>
<thead>
<tr>
<th>Option</th>
<th>Requirement, per PDU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>220 - 240 VAC</td>
</tr>
<tr>
<td>Frequency</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Current</td>
<td>24 A maximum per input</td>
</tr>
<tr>
<td>Power rating</td>
<td>15 kVA</td>
</tr>
<tr>
<td>Output current</td>
<td>72 A (3 x 24 A)</td>
</tr>
<tr>
<td>Outlets</td>
<td>42 x C13; 6 x C19</td>
</tr>
<tr>
<td>Outlet groups</td>
<td>6</td>
</tr>
<tr>
<td>Group protection (UL489 2-pole circuit breaker)</td>
<td>20A</td>
</tr>
<tr>
<td>Data center receptacle</td>
<td>15kVA, IEC309-2P3W-IP44 32A 250VAC (Hubbell equivalent is HBL332R6W)</td>
</tr>
</tbody>
</table>

**Figure 1-3** (page 1-37) shows the high-voltage single phase PDU power connector for EMEA, and APAC, except for Japan and Taiwan.

**Figure 1-3  High-voltage Single Phase Power Connector**
Table 1-27 (page 1-38) lists the requirements for 15 kVA high-voltage three-phase PDUs for Europe, the Middle East, Africa, and Asia Pacific, except Japan and Taiwan. There are two PDUs per rack. The following specifications are per PDU.

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

<table>
<thead>
<tr>
<th>Option</th>
<th>Requirement, per PDU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>220/380 - 240/415 VAC 3-phase</td>
</tr>
<tr>
<td>Frequency</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Current</td>
<td>25 A maximum per phase</td>
</tr>
<tr>
<td>Power rating</td>
<td>14.4 kVA</td>
</tr>
<tr>
<td>Output current</td>
<td>62.7 A (3 x 20.9 A)</td>
</tr>
<tr>
<td>Outlets</td>
<td>42 x C13; 6 x C19</td>
</tr>
<tr>
<td>Outlet groups</td>
<td>6</td>
</tr>
<tr>
<td>Group protection (UL489 1-pole circuit breaker)</td>
<td>20A</td>
</tr>
<tr>
<td>Data center receptacle</td>
<td>15kVA, three phase, 5-pin, IEC 60309 32A, 5-pin 230/400V, three phase IP44</td>
</tr>
</tbody>
</table>

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

- 2 power cords for two PDUs, 25 amperes at 220/380 - 240/415 VAC three-phase
- 2 receptacles to connect the PDUs to 2 IEC 60309 32A 5-pin 230/400VAC 3ph IP44 data center receptacles

Figure 1-4 (page 1-38) shows the high-voltage three phase PDU power connector for EMEA, and APAC, except for Japan and Taiwan.

Figure 1-4  High-voltage Three Phase Power Connector

Table 1-28 (page 1-39) lists the requirements for low-voltage 22 kVA single phase PDUs for North America, South America, Japan, and Taiwan. There are two PDUs per rack. The following specifications are per PDU.
Table 1-28  Low-voltage 22 kVA Single Phase PDUs for North America, South America, Japan and Taiwan (2 PDUs per Rack)

<table>
<thead>
<tr>
<th>Option</th>
<th>Requirement, per PDU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>200 - 240 VAC</td>
</tr>
<tr>
<td>Frequency</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Current</td>
<td>36.8 A maximum per input / 110.4 A Maximum per PDU</td>
</tr>
<tr>
<td>Power rating</td>
<td>22 kVA</td>
</tr>
<tr>
<td>Output current</td>
<td>110.4A (3 x 36.8)</td>
</tr>
<tr>
<td>Outlets</td>
<td>42 x C13; 6 x C19</td>
</tr>
<tr>
<td>Outlet groups</td>
<td>6</td>
</tr>
<tr>
<td>Group protection (UL489 2-pole circuit breaker)</td>
<td>20A</td>
</tr>
<tr>
<td>Data center receptacle</td>
<td>Hubbell CS8265C</td>
</tr>
</tbody>
</table>

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

- 3 power cords for two PDUs
- 6 receptacles to connect the PDUs

Figure 1-5 (page 1-39) shows the low-voltage, 22 kVA single phase PDU power connector for North America, South America, Japan and Taiwan. This power connector is different from the power connector for the low-voltage 15 kVA single phase PDU.

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

Table 1-29 (page 1-39) lists the requirements for 22 kVA high-voltage one-phase PDUs for Europe, the Middle East, Africa, and Asia Pacific, except Japan and Taiwan. There are two PDUs per rack. The following specifications are per PDU.

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

<table>
<thead>
<tr>
<th>Option</th>
<th>Requirement, per PDU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>220-240 VAC</td>
</tr>
</tbody>
</table>
Table 1-29  (Cont.) High-voltage 22 kVA Single Phase PDUs for Europe, the Middle East and Africa (EMEA), and Asia Pacific (APAC), except for Japan and Taiwan (2 PDUs per Rack)

<table>
<thead>
<tr>
<th>Option</th>
<th>Requirement, per PDU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Current</td>
<td>32 A maximum per input</td>
</tr>
<tr>
<td>Power rating</td>
<td>22 kVA</td>
</tr>
<tr>
<td>Output current</td>
<td>96 A (3 x 32 A)</td>
</tr>
<tr>
<td>Outlets</td>
<td>42 x C13; 6 x C19</td>
</tr>
<tr>
<td>Outlet groups</td>
<td>6</td>
</tr>
<tr>
<td>Group protection (UL489 1-pole circuit breaker)</td>
<td>20A</td>
</tr>
<tr>
<td>Data center receptacle</td>
<td>IEC309-2P3W-IP44 32A 250VAC (Hubbell equivalent is HBL332R6W)</td>
</tr>
</tbody>
</table>

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

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

- 6 power cords for two PDUs, 25 amperes at 220/380 - 240/415 VAC 1-phase voltage
- 6 receptacles to connect the PDUs to 2 IEC 60309 32A 3-pin 250VAC IP44 data center receptacles, and requires 22 kVA, 1-phase

Figure 1-3 (page 1-37) shows the high-voltage single phase PDU power connector for EMEA, and APAC, except for Japan and Taiwan.

Table 1-30 (page 1-40) lists the requirements for low-voltage 24 kVA three phase PDUs. There are two PDUs per rack. The following specifications are per PDU.

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

<table>
<thead>
<tr>
<th>Option</th>
<th>Requirement, per PDU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>200 - 208 VAC 3-phase</td>
</tr>
<tr>
<td>Frequency</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Current</td>
<td>34.6 A maximum per phase</td>
</tr>
<tr>
<td>Power rating</td>
<td>25 kVA</td>
</tr>
<tr>
<td>Output current</td>
<td>120 A (6 x 20 A)</td>
</tr>
</tbody>
</table>
Table 1-30  (Cont.) Low-voltage 24 kVA Three Phase PDUs for North America, South America, Japan and Taiwan (2 PDUs per Rack)

<table>
<thead>
<tr>
<th>Option</th>
<th>Requirement, per PDU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outlets</td>
<td>42 x C13; 6 x C19</td>
</tr>
<tr>
<td>Outlet groups</td>
<td>6</td>
</tr>
<tr>
<td>Group protection (UL489 2-pole circuit breaker)</td>
<td>20A</td>
</tr>
<tr>
<td>Data center receptacle</td>
<td>IEC309-3P4W-IP67 60A 250VAC 3ph (Hubbell equivalent is HBL460R9W)</td>
</tr>
</tbody>
</table>

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

- 4 power cords for two PDUs
- 4 receptacles to connect the PDUs

Table 1-31 (page 1-41) lists the PDU requirements for high-voltage 24 kVA three phase PDUs. The following specifications are per PDU.

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

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

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

- 4 power cords for two PDUs
- 4 receptacles to connect the PDUs

Table 1-32 (page 1-42) lists the requirements for 37 kVA low-voltage three-phase PDUs for Oracle Exadata Database Machine X6-8, X5-8, and X4-8 with more than four database servers. There are two PDUs per rack. The following specifications are per PDU.
Table 1-32  Low-voltage 37 kVA Three Phase PDUs for North America, South America, Japan and Taiwan (2 PDUs per Rack)

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

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

- 3 power cords for each PDU, 60 amperes at 190 - 220 VAC three-phase
- 3 receptacles to connect the PDUs to 2 IEC 60309 60A 4-pin 250VAC 3ph IP67 data center receptacles
- Figure 1-2 (page 1-37) shows the low-voltage 37 kVA single phase PDU power connector for North America, South America, Japan and Taiwan.

Table 1-33 (page 1-42) lists the requirements for 37 kVA high-voltage three-phase PDUs for Oracle Exadata Database Machine X6-8, X5-8, and X4-8 with more than four database servers. There are two PDUs per rack. The following specifications are per PDU.

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

<table>
<thead>
<tr>
<th>Option</th>
<th>Requirement, per PDU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>220/380 - 240/415 VAC</td>
</tr>
<tr>
<td>Frequency</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Current</td>
<td>18 A maximum per phase</td>
</tr>
<tr>
<td>Power rating</td>
<td>37 kVA</td>
</tr>
<tr>
<td>Output current</td>
<td>163 A (9 x 18.1 A)</td>
</tr>
<tr>
<td>Outlets</td>
<td>45 C13 and 9 C19</td>
</tr>
<tr>
<td>Outlet groups</td>
<td>6</td>
</tr>
<tr>
<td>Group protection (UL489 1-pole circuit breaker)</td>
<td>20 A</td>
</tr>
<tr>
<td>Data center receptacle</td>
<td>IEC 309-4P5W-IP44</td>
</tr>
</tbody>
</table>
The following are needed to connect an Oracle Exadata system to a low-voltage three-phase power source:

- 2 power cords for two PDUs, 60 amperes at 190 - 220 VAC three-phase
- 3 receptacles to connect the PDUs to 2 IEC 60309 60A 4-pin 250VAC 3ph IP67 data center receptacles
- Figure 1-4 (page 1-38) shows the high-voltage 37 kVA three phase PDU power connector for Europe, the Middle East and Africa (EMEA), and Asia Pacific (APAC), except for Japan and Taiwan.

1.4.2 Facility Power Requirements

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

To prevent catastrophic failures, design the input power sources to ensure adequate power is provided to the PDUs. Use dedicated AC breaker panels for all power circuits that supply power to the PDU. When planning for power distribution requirements, balance the power load between available AC supply branch circuits. In the United States and Canada, ensure that the overall system AC input current load does not exceed 80 percent of the branch circuit AC current rating.

PDU power cords are 4 meters (13.12 feet) long, and 1 to 1.5 meters (3.3 to 4.9 feet) of the cord is routed within the rack cabinet. The installation site AC power receptacle must be within 2 meters (6.6 feet) of the rack.

1.4.3 Circuit Breaker Requirements

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

In addition to circuit breakers, provide a stable power source, such as an uninterruptible power supply (UPS) to reduce the possibility of component failures. If computer equipment is subjected to repeated power interruptions and fluctuations, then it is susceptible to a higher rate of component failure.

---

Note:

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

1.4.4 Grounding Guidelines

The cabinets for Oracle Exadata Rack are shipped with grounding-type power cords. Always connect the cords to grounded power outlets. Because different grounding methods are used, depending on location, check the grounding type, and refer to documentation, such as IEC documents, for the correct grounding method. Ensure
that the facility administrator or qualified electrical engineer verifies the grounding method for the building, and performs the grounding work.

1.5 Temperature and Humidity Requirements

Airflow through Oracle Exadata Rack is from front to back. Refer to General Environmental Requirements (page 1-1) for information on cooling and airflow.

Note:

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

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

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

Table 1-34 Temperature, Humidity and Altitude Requirements

<table>
<thead>
<tr>
<th>Condition</th>
<th>Operating Requirement</th>
<th>Non-operating Requirement</th>
<th>Optimum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>5 to 32 degrees Celsius (41 to 89.6 degrees Fahrenheit)</td>
<td>-40 to 70 degrees Celsius (-40 to 158 degrees Fahrenheit)</td>
<td>For optimal rack cooling, data center temperatures from 21 to 23 degrees Celsius (70 to 74 degrees Fahrenheit)</td>
</tr>
<tr>
<td>Relative humidity</td>
<td>10 to 90 percent relative humidity, non-condensing</td>
<td>Up to 93 percent relative humidity.</td>
<td>For optimal data center rack cooling, 45 to 50 percent, non-condensing</td>
</tr>
<tr>
<td>Altitude</td>
<td>3048 meters (10000 feet) maximum</td>
<td>12000 meters (40000 feet).</td>
<td>Ambient temperature is reduced by 1 degree Celsius per 300 m above 900 m altitude above sea level</td>
</tr>
</tbody>
</table>

Set conditions to the optimal temperature and humidity ranges to minimize the chance of downtime due to component failure. Operating Oracle Exadata Rack for extended periods at or near the operating range limits, or installing it in an environment where it remains at or near non-operating range limits could significantly increase hardware component failure.

The ambient temperature range of 21 to 23 degrees Celsius (70 to 74 degrees Fahrenheit) is optimal for server reliability and operator comfort. Most computer equipment can operate in a wide temperature range, but near 22 degrees Celsius (72 degrees Fahrenheit) is desirable because it is easier to maintain safe humidity levels.
Operating in this temperature range provides a safety buffer in the event that the air conditioning system goes down for a period of time. The ambient relative humidity range of 45 to 50 percent is suitable for safe data processing operations. Most computer equipment can operate in a wide range (20 to 80 percent), but the range of 45 to 50 percent is recommended for the following reasons:

- Optimal range helps protect computer systems from corrosion problems associated with high humidity levels.
- Optimal range provides the greatest operating time buffer in the event of air conditioner control failure.
- This range helps avoid failures or temporary malfunctions caused by intermittent interference from static discharges that may occur when relative humidity is too low.

**Note:**

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

### 1.6 Ventilation and Cooling Requirements

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

Do not obstruct the front or rear of the rack with equipment or objects that might prevent air from flowing through the rack. Rack-mountable servers and equipment typically draw cool air in through the front of the rack and let out warm air out the rear of the rack. There is no air flow requirement for the left and right sides due to front-to-back cooling.

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

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

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

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

- Ensure there is adequate air flow through the server.
- Ensure the server has front-to-back cooling. The air inlet is at the front of the server, and the air is let out the rear.
- Allow a minimum clearance of 1219.2 mm (48 inches) at the front of the server, and 914 mm (36 inches) at the rear of the server for ventilation.

Use perforated tiles, approximately 400 CFM/tile, in front of the rack for cold air intake. The tiles can be arranged in any order in front of the rack, as long as cold air from the tiles can flow into the rack. Inadequate cold air flow could result in a higher inlet temperature in the servers due to exhaust air recirculation. The following table describes the recommended number of floor tiles:

<table>
<thead>
<tr>
<th>Type of Oracle Exadata Database Machine or Oracle Exadata Storage Expansion Rack</th>
<th>Recommended Number of Floor Tiles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oracle Exadata full rack systems</td>
<td>4</td>
</tr>
<tr>
<td>Oracle Exadata half rack systems</td>
<td>3</td>
</tr>
<tr>
<td>Oracle Exadata quarter and eighth rack systems</td>
<td>1</td>
</tr>
</tbody>
</table>

*Figure 1-6 (page 1-46) shows a typical installation of the floor tiles for Oracle Exadata Database Machine Full Rack in a typical data center.*

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

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

1.7.1 Network Connection Requirements for Oracle Exadata Database Machine

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

- **Management network connection requirements for all Oracle Exadata Database Machine systems except for X2-n systems:**
  - 1 Ethernet connection for the Ethernet switch in the rack to the existing management network.

- **Management network connection requirements for Oracle Exadata Database Machine X2-n:**
  - 1 Ethernet connection for the Ethernet switch in the rack to the existing management network.
  - 1 Ethernet connection for the KVM switch in the rack to the existing management network.

- **Client access network connection requirements**
  - One Ethernet connection per database server to the client access network. The number depends on the system type (Oracle Exadata Database Machine Full Rack, Oracle Exadata Database Machine Half Rack, or Oracle Exadata Database Machine Quarter Rack), and whether network channel bonding is used. Use the following formula to determine the number of connections you need:
    - For bonded configurations, you need two network connections for each database node.
    - For non-bonded configurations, you need one network connection for each database node.

- **Additional network NET2 connection requirements**
  - One Ethernet connection per database server to connect NET2 to your existing network. The number depends on the system type, as follows:
    - For bonded configurations, you need two network connections for each database node.
    - For non-bonded configurations, you need one network connection for each database node.
Note:

- This network is unavailable if network channel bonding is used for the client access network.
- This network is optional. A cable is not required unless the network is configured during deployment.

Additional network NET3 connection requirements

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

- 8 connections for Oracle Exadata Database Machine 2-socket, full rack systems
- 4 connections for Oracle Exadata Database Machine 2-socket, half rack systems
- 2 connections for Oracle Exadata Database Machine 2-socket, quarter rack systems
- 2 connections for Oracle Exadata Database Machine 8-socket, full rack systems

Note:

This network is optional. A cable is not required unless the network is configured during deployment.

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

The following table shows examples of connection requirements for different sample environments. The table applies to two-socket x86 Oracle Exadata Database Machine X3-2 and later.

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

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Network Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core Requirements</td>
<td>• 1 for Ethernet switch</td>
</tr>
<tr>
<td></td>
<td>• 2 for PDU monitoring</td>
</tr>
<tr>
<td>Bonded network configuration, and connected to a dedicated backup network</td>
<td>• 2 per database node for client access for bonded Ethernet interface on database servers</td>
</tr>
<tr>
<td></td>
<td>• 1 per database node for backup network access for database servers</td>
</tr>
<tr>
<td></td>
<td>Total = 3 + (3 * number of database nodes)</td>
</tr>
</tbody>
</table>
Table 1-35  (Cont.) Examples of Network Configurations and Connection Requirements for Oracle Exadata Database Machine 2-Socket Systems X3-2 and Later

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Network Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-bonded network configuration, and connected to a dedicated backup</td>
<td>• 1 for each database node for client access for the database servers</td>
</tr>
<tr>
<td>network and a dedicated disaster recovery network</td>
<td>• 1 per database node for backup network access for the database servers</td>
</tr>
<tr>
<td></td>
<td>• 1 per database node for disaster recovery network access for the database servers</td>
</tr>
<tr>
<td></td>
<td>Total = 3 + (3 * number of database nodes)</td>
</tr>
<tr>
<td>Non-bonded network configuration, and not connected to an additional</td>
<td>• 1 per database node for database servers</td>
</tr>
<tr>
<td>network</td>
<td>Total = 3 + (1 * database node)</td>
</tr>
<tr>
<td>Non-bonded network configuration, and connected to a dedicated backup</td>
<td>• 1 for each database node for client access for the database servers</td>
</tr>
<tr>
<td>network</td>
<td>• 1 per database node for backup network access for the database servers</td>
</tr>
<tr>
<td></td>
<td>Total = 3 + (2 * number of database nodes)</td>
</tr>
</tbody>
</table>

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

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

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Network Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oracle Exadata Database Machine X2-2 Full Rack using a bonded network</td>
<td>Requires 28 connections to your existing networks</td>
</tr>
<tr>
<td>configuration, and connected to a dedicated backup network</td>
<td>• 1 for Ethernet switch</td>
</tr>
<tr>
<td></td>
<td>• 1 for KVM switch</td>
</tr>
<tr>
<td></td>
<td>• 16 for database client access for bonded Ethernet interface on database servers</td>
</tr>
<tr>
<td></td>
<td>• 8 for backup network access for database servers</td>
</tr>
<tr>
<td></td>
<td>• 2 for monitoring the PDUs</td>
</tr>
<tr>
<td>Oracle Exadata Database Machine X2-2 Full Rack using a non-bonded</td>
<td>Requires 28 connections to your existing networks</td>
</tr>
<tr>
<td>network configuration, and connected to a dedicated backup network and</td>
<td>• 1 for Ethernet switch</td>
</tr>
<tr>
<td>a dedicated disaster recovery network</td>
<td>• 1 for KVM switch</td>
</tr>
<tr>
<td></td>
<td>• 8 for database client access for the database servers</td>
</tr>
<tr>
<td></td>
<td>• 8 for backup network access for the database servers</td>
</tr>
<tr>
<td></td>
<td>• 8 for disaster recovery network access for the database servers</td>
</tr>
<tr>
<td></td>
<td>• 2 for monitoring the PDUs</td>
</tr>
</tbody>
</table>
Table 1-36  (Cont.) Examples of Network Configurations and Connection Requirements for Oracle Exadata Database Machine X2-2

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Network Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oracle Exadata Database Machine X2-2 Half Rack using a non-bonded network configuration, and not connected to an additional network</td>
<td>Requires 8 connections to your existing networks</td>
</tr>
<tr>
<td></td>
<td>• 1 for Ethernet switch</td>
</tr>
<tr>
<td></td>
<td>• 1 for KVM switch</td>
</tr>
<tr>
<td></td>
<td>• 4 for database servers</td>
</tr>
<tr>
<td></td>
<td>• 2 for monitoring the PDUs</td>
</tr>
<tr>
<td>Oracle Exadata Database Machine X2-2 Quarter Rack using a non-bonded network configuration, and connected to a dedicated backup network</td>
<td>Requires 8 connections to your existing networks</td>
</tr>
<tr>
<td></td>
<td>• 1 for Ethernet switch</td>
</tr>
<tr>
<td></td>
<td>• 1 for KVM switch</td>
</tr>
<tr>
<td></td>
<td>• 2 for database client access for the database servers</td>
</tr>
<tr>
<td></td>
<td>• 2 for backup network access for the database servers</td>
</tr>
<tr>
<td></td>
<td>• 2 for monitoring the PDUs</td>
</tr>
</tbody>
</table>

Related Topics:

- Understanding the Network Requirements for Oracle Exadata Database Machine (page 2-1)

1.7.2 DNS Configuration for Oracle Exadata Database Machine

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

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

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

Note:

Grid Naming Service (GNS) is not configured on Oracle Exadata Database Machine during initial configuration.
1.7.3 IP Address Requirements for Oracle Exadata Database Machine

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

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

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

The following table lists the IP address requirements for Oracle Exadata Database Machine X5-2 and later systems:
<table>
<thead>
<tr>
<th>Type of Oracle Exadata Database Machine</th>
<th>Management Network Requirements</th>
<th>Client Access Network Requirements</th>
<th>Additional Networks (NET2 and NET3) Requirements</th>
<th>InfiniBand Private Network Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oracle Exadata Database Machine X5-2 and later Full Rack</td>
<td>Minimum of 49 IP addresses • 8 IP addresses for administration, one per database server • 14 IP addresses for administration, one per Exadata Storage Server • 8 IP addresses for ILOM, one per database server • 14 IP addresses for ILOM, one per Exadata Storage Server • 3 IP addresses for switches: 2 for InfiniBand, and 1 for Ethernet • 2 IP addresses for monitoring electric current of the PDUs</td>
<td>Minimum of 19 IP address • 8 IP addresses for public access, one per database server • 8 IP addresses for Oracle RAC VIP addresses, one per database server • 3 IP addresses for SCAN addresses for Oracle RAC</td>
<td>Minimum of 8 IP addresses for each additional network • 8 IP addresses for the database servers, one per database server If using a bonded network configuration for the client access network, then NET2 cannot be used as an additional network</td>
<td>44 IP addresses • 16 IP addresses, two per database server • 28 IP addresses, two per Exadata Storage Server</td>
</tr>
</tbody>
</table>
Table 1-37  (Cont.) IP Address Requirements for Oracle Exadata Database Machine X5-2 and Later Systems

<table>
<thead>
<tr>
<th>Type of Oracle Exadata Database Machine</th>
<th>Management Network Requirements</th>
<th>Client Access Network Requirements</th>
<th>Additional Networks (NET2 and NET3) Requirements</th>
<th>InfiniBand Private Network Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oracle Exadata Database Machine X5-2 and later Half Rack</td>
<td>Minimum of 27 IP addresses • 4 IP addresses for administration, one per database server • 7 IP addresses for administration, one per Exadata Storage Server • 4 IP addresses for ILOM, one per database server • 7 IP addresses for ILOM, one per Exadata Storage Server • 3 IP addresses for switches: 2 for InfiniBand, and 1 for Ethernet • 2 IP addresses for monitoring electric current of the PDUs</td>
<td>Minimum of 11 IP addresses • 4 IP addresses for public access, one per database server • 4 IP addresses for Oracle RAC VIP addresses, one per database server • 3 IP addresses for SCAN addresses for Oracle RAC.</td>
<td>Minimum of 4 IP addresses for each additional network • 4 IP addresses for the database servers, one per database server If using a bonded network configuration for the client access network, then NET2 cannot be used as an additional network.</td>
<td>For X6-2 and X5-2 Half Rack: 22 IP addresses: • 8 IP addresses, two per database server • 14 IP addresses, two per Exadata Storage Server</td>
</tr>
</tbody>
</table>
### Table 1-37 (Cont.) IP Address Requirements for Oracle Exadata Database Machine X5-2 and Later Systems

<table>
<thead>
<tr>
<th>Type of Oracle Exadata Database Machine</th>
<th>Management Network Requirements</th>
<th>Client Access Network Requirements</th>
<th>Additional Networks (NET2 and NET3) Requirements</th>
<th>InfiniBand Private Network Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oracle Exadata Database Machine X5-2 and later Quarter Rack</td>
<td>Minimum of 15 IP addresses • 2 IP addresses for administration, one per database server • 3 IP addresses for administration, one per Exadata Storage Server • 2 IP addresses for ILOM, one per database server • 3 IP addresses for ILOM, one per Exadata Storage Server • 3 IP addresses for switches: 2 for InfiniBand, and 1 for Ethernet • 2 IP addresses for monitoring electric current of the PDUs</td>
<td>Minimum of 7 IP addresses • 2 IP addresses for public access, one per database server • 2 IP addresses for Oracle RAC VIP addresses, one per database server • 3 IP addresses for SCAN addresses for Oracle RAC.</td>
<td>Minimum of 2 IP addresses for each additional network • 2 IP addresses for the database servers, one per database server If using a bonded network configuration for the client access network, then NET2 cannot be used as an additional network.</td>
<td>For X5-2 and X6-2: 10 IP addresses: • 4 IP addresses, two per database server • 6 IP addresses, two per Exadata Storage Server</td>
</tr>
<tr>
<td>Oracle Exadata Database Machine X5-2 and later Eighth Rack</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 1-37  (Cont.) IP Address Requirements for Oracle Exadata Database Machine X5-2 and Later Systems

<table>
<thead>
<tr>
<th>Type of Oracle Exadata Database Machine X5-8 and X6-8 Full Rack</th>
<th>Management Network Requirements</th>
<th>Client Access Network Requirements</th>
<th>Additional Networks (NET2 and NET3) Requirements</th>
<th>InfiniBand Private Network Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum of 37 IP addresses</td>
<td>2 IP addresses for administration, one per database server</td>
<td>2 IP addresses for public access, one per database server</td>
<td>2 IP addresses for Oracle RAC VIP addresses, one per database server</td>
<td>16 IP addresses, two per database server</td>
</tr>
<tr>
<td>Minimum of 7 IP addresses</td>
<td>14 IP addresses for administration, one per Exadata Storage Server</td>
<td>2 IP addresses for Oracle RAC VIP addresses, one per database server</td>
<td>3 IP addresses for SCAN addresses for Oracle RAC</td>
<td>28 IP addresses, two per Exadata Storage Server</td>
</tr>
<tr>
<td>Oracle Exadata Database Machine X5-8 and X6-8 Full Rack</td>
<td>Minimum of 7 IP addresses</td>
<td>Minimum of 7 IP addresses</td>
<td>44 IP addresses</td>
<td>Minimum of 37 IP addresses</td>
</tr>
<tr>
<td>Minimum of 7 IP addresses</td>
<td>2 IP addresses for administration, one per database server</td>
<td>2 IP addresses for public access, one per database server</td>
<td>2 IP addresses for Oracle RAC VIP addresses, one per database server</td>
<td>16 IP addresses, two per database server</td>
</tr>
<tr>
<td>Minimum of 37 IP addresses</td>
<td>14 IP addresses for administration, one per database server</td>
<td>2 IP addresses for Oracle RAC VIP addresses, one per database server</td>
<td>3 IP addresses for SCAN addresses for Oracle RAC</td>
<td>28 IP addresses, two per Exadata Storage Server</td>
</tr>
</tbody>
</table>

Chapter 1: Network Connection and IP Address Requirements for Oracle Exadata Database Machine

1-55
### Table 1-37  (Cont.) IP Address Requirements for Oracle Exadata Database Machine X5-2 and Later Systems

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

The following table lists the IP address requirements for Oracle Exadata Database Machine X4-2, and Oracle Exadata Database Machine X4-8 Full Rack:
Table 1-38  IP Address Requirements for Oracle Exadata Database Machine X4-2 and X4-8 Full Rack

<table>
<thead>
<tr>
<th>Type of Oracle Exadata Database Machine</th>
<th>Management Network Requirements</th>
<th>Client Access Network Requirements</th>
<th>Additional Networks (NET2 and NET3) Requirements</th>
<th>InfiniBand Private Network Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oracle Exadata Database Machine X4-2 Full Rack</td>
<td>Minimum of 49 IP addresses • 8 IP addresses for administration, one per database server • 14 IP addresses for administration, one per Exadata Storage Server • 8 IP addresses for ILOM, one per database server • 14 IP addresses for ILOM, one per Exadata Storage Server • 3 IP addresses for switches: 2 for InfiniBand, and 1 for Ethernet • 2 IP addresses for monitoring electric current of the PDUs</td>
<td>Minimum of 19 IP address • 8 IP addresses for public access, one per database server • 8 IP addresses for Oracle RAC VIP addresses, one per database server • 3 IP addresses for SCAN addresses for Oracle RAC</td>
<td>Minimum of 8 IP addresses for each additional network • 8 IP addresses for the database servers, one per database server If using a bonded network configuration for the client access network, then NET2 cannot be used as an additional network.</td>
<td>44 IP addresses • 16 IP addresses, two per database server • 28 IP addresses, two per Exadata Storage Server</td>
</tr>
</tbody>
</table>
### Table 1-38  (Cont.) IP Address Requirements for Oracle Exadata Database Machine X4-2 and X4-8 Full Rack

<table>
<thead>
<tr>
<th>Type of Oracle Exadata Database Machine</th>
<th>Management Network Requirements</th>
<th>Client Access Network Requirements</th>
<th>Additional Networks (NET2 and NET3) Requirements</th>
<th>InfiniBand Private Network Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oracle Exadata Database Machine X4-2 Half Rack</td>
<td>Minimum of 27 IP addresses • 4 IP addresses for administration, one per database server • 7 IP addresses for administration, one per Exadata Storage Server • 4 IP addresses for ILOM, one per database server • 7 IP addresses for ILOM, one per Exadata Storage Server • 3 IP addresses for switches: 2 for InfiniBand, and 1 for Ethernet • 2 IP addresses for monitoring electric current of the PDUs</td>
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<td>Minimum of 4 IP addresses for each additional network • 4 IP addresses for the database servers, one per database server If using a bonded network configuration for the client access network, then NET2 cannot be used as an additional network.</td>
<td>22 IP addresses • 8 IP addresses, two per database server • 14 IP addresses, two per Exadata Storage Server</td>
</tr>
</tbody>
</table>
### Table 1-38  (Cont.) IP Address Requirements for Oracle Exadata Database Machine X4-2 and X4-8 Full Rack

<table>
<thead>
<tr>
<th>Type of Oracle Exadata Database Machine</th>
<th>Management Network Requirements</th>
<th>Client Access Network Requirements</th>
<th>Additional Networks (NET2 and NET3) Requirements</th>
<th>InfiniBand Private Network Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oracle Exadata Database Machine X4-2 Quarter Rack and Oracle Exadata Database Machine X4-2 Eighth Rack</td>
<td>Minimum of 15 IP addresses • 2 IP addresses for administration, one per database server • 3 IP addresses for administration, one per Exadata Storage Server • 2 IP addresses for ILOM, one per database server • 3 IP addresses for ILOM, one per Exadata Storage Server • 3 IP addresses for switches: 2 for InfiniBand, and 1 for Ethernet • 2 IP addresses for monitoring electric current of the PDUs</td>
<td>Minimum of 7 IP addresses • 2 IP addresses for public access, one per database server • 2 IP addresses for Oracle RAC VIP addresses, one per database server • 3 IP addresses for SCAN addresses for Oracle RAC.</td>
<td>Minimum of 2 IP addresses for each additional network • 2 IP addresses for the database servers, one per database server If using a bonded network configuration for the client access network, then NET2 cannot be used as an additional network.</td>
<td>10 IP addresses • 4 IP addresses, two per database server • 6 IP addresses, two per Exadata Storage Server</td>
</tr>
</tbody>
</table>
Table 1-38 (Cont.) IP Address Requirements for Oracle Exadata Database Machine X4-2 and X4-8 Full Rack

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

The following table lists the IP address requirements for Oracle Exadata Database Machine X3-2 and Oracle Exadata Database Machine X3-8 Full Rack:
### Table 1-39  IP Address Requirements for Oracle Exadata Database Machine X3-2 and Oracle Exadata Database Machine X3-8 Full Rack

<table>
<thead>
<tr>
<th>Type of Oracle Exadata Database Machine</th>
<th>Management Network Requirements</th>
<th>Client Access Network Requirements</th>
<th>Additional Networks (NET2 and NET3) Requirements</th>
<th>InfiniBand Private Network Requirements</th>
</tr>
</thead>
</table>
| Oracle Exadata Database Machine X3-2 Full Rack | Minimum of 50 IP addresses  
- 8 IP addresses for administration, one per database server  
- 14 IP addresses for administration, one per Exadata Storage Server  
- 8 IP addresses for ILOM, one per database server  
- 14 IP addresses for ILOM, one per Exadata Storage Server  
- 4 IP addresses for switches: 3 for InfiniBand, and 1 for Ethernet  
- 2 IP addresses for monitoring electric current of the PDUs | Minimum of 19 IP address  
- 8 IP addresses for public access, one per database server  
- 8 IP addresses for Oracle RAC VIP addresses, one per database server  
- 3 IP addresses for SCAN addresses for Oracle RAC | Minimum of 8 IP addresses for each additional network  
- 8 IP addresses for the database servers, one per database server  
If using a bonded network configuration for the client access network, then NET2 cannot be used as an additional network. | 22 IP addresses  
- 8 IP addresses, one per database server  
- 14 IP addresses, one per Exadata Storage Server |
### Table 1-39 (Cont.) IP Address Requirements for Oracle Exadata Database Machine X3-2 and Oracle Exadata Database Machine X3-8 Full Rack

<table>
<thead>
<tr>
<th>Type of Oracle Exadata Database Machine</th>
<th>Management Network Requirements</th>
<th>Client Access Network Requirements</th>
<th>Additional Networks (NET2 and NET3) Requirements</th>
<th>InfiniBand Private Network Requirements</th>
</tr>
</thead>
</table>
| Oracle Exadata Database Machine X3-2 Half Rack | Minimum of 28 IP addresses  
• 4 IP addresses for administration, one per database server  
• 7 IP addresses for administration, one per Exadata Storage Server  
• 4 IP addresses for ILOM, one per database server  
• 7 IP addresses for ILOM, one per Exadata Storage Server  
• 4 IP addresses for switches: 3 for InfiniBand, and 1 for Ethernet  
• 2 IP addresses for monitoring electric current of the PDUs | Minimum of 11 IP addresses  
• 4 IP addresses for public access, one per database server  
• 4 IP addresses for Oracle RAC VIP addresses, one per database server  
• 3 IP addresses for SCAN addresses for Oracle RAC | Minimum of 4 IP addresses for each additional network  
• 4 IP addresses for the database servers, one per database server  
If using a bonded network configuration for the client access network, then NET2 cannot be used as an additional network. | 11 IP addresses  
• 4 IP addresses, one per database server  
• 7 IP addresses, one per Exadata Storage Server |
## Table 1-39  (Cont.) IP Address Requirements for Oracle Exadata Database Machine X3-2 and Oracle Exadata Database Machine X3-8 Full Rack

<table>
<thead>
<tr>
<th>Type of Oracle Exadata Database Machine</th>
<th>Management Network Requirements</th>
<th>Client Access Network Requirements</th>
<th>Additional Networks (NET2 and NET3) Requirements</th>
<th>InfiniBand Private Network Requirements</th>
</tr>
</thead>
</table>
| Oracle Exadata Database Machine X3-2 Quarter Rack | Minimum of 15 IP addresses  
  • 2 IP addresses for administration, one per database server  
  • 3 IP addresses for administration, one per Exadata Storage Server  
  • 2 IP addresses for ILOM, one per database server  
  • 3 IP addresses for ILOM, one per Exadata Storage Server  
  • 3 IP addresses for switches: 2 for InfiniBand, and 1 for Ethernet  
  • 2 IP addresses for monitoring electric current of the PDUs | Minimum of 7 IP addresses  
  • 2 IP addresses for public access, one per database server  
  • 2 IP addresses for Oracle RAC VIP addresses, one per database server  
  • 3 IP addresses for SCAN addresses for Oracle RAC. | Minimum of 2 IP addresses for each additional network  
  • 2 IP addresses for the database servers, one per database server  
  If using a bonded network configuration for the client access network, then NET2 cannot be used as an additional network. | 5 IP addresses  
  • 2 IP addresses, one per database server  
  • 3 IP addresses, one per Exadata Storage Server |
### Table 1-39  (Cont.) IP Address Requirements for Oracle Exadata Database Machine X3-2 and Oracle Exadata Database Machine X3-8 Full Rack

<table>
<thead>
<tr>
<th>Type of Oracle Exadata Database Machine</th>
<th>Management Network Requirements</th>
<th>Client Access Network Requirements</th>
<th>Additional Networks (NET2 and NET3) Requirements</th>
<th>InfiniBand Private Network Requirements</th>
</tr>
</thead>
</table>
| Oracle Exadata Database Machine X3-8 Full Rack with Exadata Storage Server X4-2L Servers | Minimum of 38 IP addresses  
- 2 IP addresses for administration, one per database server  
- 14 IP addresses for administration, one per Exadata Storage Server  
- 2 IP addresses for ILOM, one per database server  
- 14 IP addresses for ILOM, one per Exadata Storage Server  
- 4 IP addresses for switches: 3 for InfiniBand, and 1 for Ethernet  
- 2 IP addresses for monitoring electric current of the PDUs | Minimum of 7 IP address  
- 2 IP addresses for public access, one per database server  
- 2 IP addresses for Oracle RAC VIP addresses, one per database server  
- 3 IP addresses for SCAN addresses for Oracle RAC | Minimum of 2 IP addresses for each additional network  
- 2 IP addresses for the database servers, one per database server  
If using a bonded network configuration for the client access network, then NET2 cannot be used as an additional network. | 36 IP addresses  
- 8 IP addresses, one per database server  
- 28 IP addresses, two per Exadata Storage Server |
Table 1-39 (Cont.) IP Address Requirements for Oracle Exadata Database Machine X3-2 and Oracle Exadata Database Machine X3-8 Full Rack

<table>
<thead>
<tr>
<th>Type of Oracle Exadata Database Machine</th>
<th>Management Network Requirements</th>
<th>Client Access Network Requirements</th>
<th>Additional Networks (NET2 and NET3) Requirements</th>
<th>InfiniBand Private Network Requirements</th>
</tr>
</thead>
</table>
| Oracle Exadata Database Machine X3-8 Full Rack with Exadata Storage Server X3-2 Servers or Exadata Storage Server with Sun Fire X4270 M2 Servers | Minimum of 38 IP addresses  
- 2 IP addresses for administration, one per database server  
- 14 IP addresses for administration, one per Exadata Storage Server  
- 2 IP addresses for ILOM, one per database server  
- 14 IP addresses for ILOM, one per Exadata Storage Server  
- 4 IP addresses for switches: 3 for InfiniBand, and 1 for Ethernet  
- 2 IP addresses for monitoring electric current of the PDUs | Minimum of 7 IP address  
- 2 IP addresses for public access, one per database server  
- 2 IP addresses for Oracle RAC VIP addresses, one per database server  
- 3 IP addresses for SCAN addresses for Oracle RAC | Minimum of 2 IP addresses for each additional network  
- 2 IP addresses for the database servers, one per database server | 22 IP addresses  
- 8 IP addresses, one per database server  
- 14 IP addresses, one per Exadata Storage Server |

The following table lists the IP address requirements for Oracle Exadata Database Machine X2-2 and Oracle Exadata Database Machine X2-8 Full Rack:
Table 1-40  IP Address Requirements for Oracle Exadata Database Machine X2-2 and Oracle Exadata Database Machine X2-8 Full Rack

<table>
<thead>
<tr>
<th>Type of Oracle Exadata Database Machine</th>
<th>Management Network Requirements</th>
<th>Client Access Network Requirements</th>
<th>Additional Networks (NET2 and NET3) Requirements</th>
<th>InfiniBand Private Network Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oracle Exadata Database Machine X2-2 Full Rack</td>
<td>Minimum of 51 IP addresses • 8 IP addresses for administration, one per database server • 14 IP addresses for administration, one per Exadata Storage Server • 8 IP addresses for ILOM, one per database server • 14 IP addresses for ILOM, one per Exadata Storage Server • 5 IP addresses for switches: 3 for InfiniBand, 1 for Ethernet, and 1 for KVM • 2 IP addresses for monitoring electric current of the PDUs</td>
<td>Minimum of 19 IP address • 8 IP addresses for public access, one per database server • 8 IP addresses for Oracle RAC VIP addresses, one per database server • 3 IP addresses for SCAN addresses for Oracle RAC</td>
<td>Minimum of 8 IP addresses for each additional network • 8 IP addresses for the database servers, one per database server If using a bonded network configuration for the client access network, then NET2 cannot be used as an additional network.</td>
<td>22 IP addresses • 8 IP addresses, one per database server • 14 IP addresses, one per Exadata Storage Server</td>
</tr>
</tbody>
</table>
## Table 1-40  (Cont.) IP Address Requirements for Oracle Exadata Database Machine X2-2 and Oracle Exadata Database Machine X2-8 Full Rack

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

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Chapter 1

Network Connection and IP Address Requirements for Oracle Exadata Database Machine

1-67
Table 1-40  (Cont.) IP Address Requirements for Oracle Exadata Database Machine X2-2 and Oracle Exadata Database Machine X2-8 Full Rack

<table>
<thead>
<tr>
<th>Type of Oracle Exadata Database Machine</th>
<th>Management Network Requirements</th>
<th>Client Access Network Requirements</th>
<th>Additional Networks (NET2 and NET3) Requirements</th>
<th>InfiniBand Private Network Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oracle Exadata Database Machine X2-2 Quarter Rack</td>
<td>Minimum of 16 IP addresses • 2 IP addresses for administration, one per database server • 3 IP addresses for administration, one per Exadata Storage Server • 2 IP addresses for ILOM, one per database server • 3 IP addresses for ILOM, one per Exadata Storage Server • 4 IP addresses for switches: 2 for InfiniBand, 1 for Ethernet, and 1 for KVM • 2 IP addresses for monitoring electric current of the PDUs</td>
<td>Minimum of 7 IP addresses • 2 IP addresses for public access, one per database server • 2 IP addresses for Oracle RAC VIP addresses, one per database server • 3 IP addresses for SCAN addresses for Oracle RAC.</td>
<td>Minimum of 2 IP addresses for each additional network • 2 IP addresses for the database servers, one per database server If using a bonded network configuration for the client access network, then NET2 cannot be used as an additional network.</td>
<td>5 IP addresses • 2 IP addresses, one per database server • 3 IP addresses, one per Exadata Storage Server</td>
</tr>
</tbody>
</table>
Table 1-40  (Cont.) IP Address Requirements for Oracle Exadata Database Machine X2-2 and Oracle Exadata Database Machine X2-8 Full Rack

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

Related Topics:
- Calculating the IP Address Requirements when Using Oracle VMs (page 1-69)
- Using Oracle Exadata Deployment Assistant (page 3-1)

1.7.3.1 Calculating the IP Address Requirements when Using Oracle VMs

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

Physical deployment with a single cluster:

\[
\text{Number of management network IP addresses} = (\text{number of databases servers}) \times 2 + (\text{number of storage servers}) \times 2 + (\text{number of PDUs}) + (\text{number of IB switches})
\]
Number of client access network IP addresses = 
(number of database servers)*2 + 3

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

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

Oracle VM deployment:

Number of management network IP addresses = 
(number of database servers)*2 + 
(number of Oracle VM user domains) + 
(number of storage servers)*2 + 
(number of PDU's) + 
(number of IB switches) + 
(number of Ethernet switches)

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

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

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

Table 1-41 (page 1-71) shows the network requirements by component. The IP address numbers are per component, not rack.
Table 1-41  IP Address Requirements by Component

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

Table 1-42 (page 1-72) shows examples of IP addresses requirements when using Oracle VMs.
### Table 1-42  Examples of IP Address Requirements when Using Oracle VMs

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

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

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

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

- Management network connection requirements for Oracle Exadata Storage Expansion Rack X4-2 and later:
  - 1 Ethernet connection from the ILOM to each Exadata Storage Server. For Oracle Exadata Storage Expansion Full Rack, there are 18 connections, for Oracle Exadata Storage Expansion Half Rack there are 9 connections, and for Oracle Exadata Storage Expansion Quarter Rack there are 4 connections.
1 Ethernet connection for each Sun Datacenter InfiniBand Switch 36.

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

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

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

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

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

1 Ethernet connection for each Sun Datacenter InfiniBand Switch 36.

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

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

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

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

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

1 Ethernet connection for each Sun Datacenter InfiniBand Switch 36.

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

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

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

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

The following table lists the IP address requirements for Oracle Exadata Storage Expansion Racks:
Table 1-43  IP Address Requirements for Oracle Exadata Storage Expansion Rack

<table>
<thead>
<tr>
<th>Type of Oracle Exadata Storage Expansion Rack</th>
<th>Network Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oracle Exadata Storage Expansion X4-2 Full Rack and later</td>
<td>Up to a total of 78 IP addresses (42 for the management network, and up to 36 for the private InfiniBand network)</td>
</tr>
<tr>
<td></td>
<td>• 18 IP addresses for administration, one per Exadata Storage Server</td>
</tr>
<tr>
<td></td>
<td>• 18 IP addresses for ILOM, one per Exadata Storage Server</td>
</tr>
<tr>
<td></td>
<td>• 4 IP addresses for switches (3 for InfiniBand, and 1 for Ethernet)</td>
</tr>
<tr>
<td></td>
<td>• 2 IP addresses for monitoring electric current of the PDUs</td>
</tr>
<tr>
<td></td>
<td>• Up to 36 IP addresses for the private InfiniBand network</td>
</tr>
<tr>
<td>Oracle Exadata Storage Expansion X4-2 Half Rack</td>
<td>Up to a total of 42 IP addresses (24 for the management network, and up to 18 for the private InfiniBand network)</td>
</tr>
<tr>
<td></td>
<td>• 9 IP addresses for administration, one per Exadata Storage Server</td>
</tr>
<tr>
<td></td>
<td>• 9 IP addresses for ILOM, one per Exadata Storage Server</td>
</tr>
<tr>
<td></td>
<td>• 4 IP addresses for switches (3 for InfiniBand, and 1 for Ethernet)</td>
</tr>
<tr>
<td></td>
<td>• 2 IP addresses for monitoring electric current of the PDUs</td>
</tr>
<tr>
<td></td>
<td>• Up to 18 IP addresses for the private InfiniBand network</td>
</tr>
<tr>
<td>Oracle Exadata Storage Expansion X4-2 Quarter Rack</td>
<td>Up to a total of 21 IP addresses (13 for the management network, and up to 8 for the private InfiniBand network)</td>
</tr>
<tr>
<td></td>
<td>• 4 IP addresses for administration, one per Exadata Storage Server</td>
</tr>
<tr>
<td></td>
<td>• 4 IP addresses for ILOM, one per Exadata Storage Server</td>
</tr>
<tr>
<td></td>
<td>• 3 IP addresses for switches (2 for InfiniBand, and 1 for Ethernet)</td>
</tr>
<tr>
<td></td>
<td>• 2 IP addresses for monitoring electric current of the PDUs</td>
</tr>
<tr>
<td></td>
<td>• Up to 8 IP addresses for the private InfiniBand network</td>
</tr>
</tbody>
</table>
Table 1-43  (Cont.) IP Address Requirements for Oracle Exadata Storage Expansion Rack

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

1.9 Ensuring Site is Ready

Before Oracle Exadata Rack is delivered to the site, the following tasks must be performed to ensure the site is ready:
Task 1 Review Site Requirements
Review the site requirements in this chapter and use the checklists in Site Checklists (page A-1) to understand the requirements for Oracle Exadata Rack.

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

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

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

1. Review the safety guidelines.
2. Note problems or peculiarities at the site that require special equipment. For example, ensure the doors are tall enough and wide enough for Oracle Exadata Rack.
3. Verify that the installation site flooring has a strength rating to withstand the combined weight of Oracle Exadata Rack and any other installed equipment.
4. Install network cables for Oracle Exadata Rack.
5. Install all necessary electrical equipment, and ensure that sufficient power is provided for Oracle Exadata Rack.
6. Ensure that the installation site provides adequate air conditioning.
7. Operate the air conditioning system for 48 hours to bring the room temperature to the appropriate level.
8. Clean and vacuum the area thoroughly in preparation for installation.

Related Topics:
- Using Oracle Exadata Deployment Assistant (page 3-1)
- Ventilation and Cooling Requirements (page 1-45)
  Always provide adequate space in front and behind the rack to allow for proper ventilation.
- Electrical Power Requirements (page 1-34)
- Network Connection and IP Address Requirements for Oracle Exadata Database Machine (page 1-47)
- Flooring Requirements (page 1-34)
- Space Requirements (page 1-28)
- Reviewing Safety Guidelines (page 4-1)
  Before Oracle Exadata Rack arrives, the following safety precautions should be reviewed to ensure the site is safe, as well as ready for delivery.
- Network Channel Bonding Support (page 2-11)
- Configuring Oracle Exadata Database Machine (page 5-1)
Understanding the Network Requirements for Oracle Exadata Database Machine

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

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

### 2.1 Overview of Network Requirements

Oracle Exadata Database Machine includes database servers, Exadata Storage Servers, as well as equipment to connect the servers to your network. The network connections allow the servers to be administered remotely, and clients to connect to the database servers.

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

**Note:**
The name used for the InfiniBand interface changed from BONDIB0 to IB0 and IB1 on Oracle Exadata Database Machine X4-2 systems using release 11.2.3.3.0 and later.

As of release 11.2.2.1.0, the names used for bonding changed. The names are BONDIB0 for the InfiniBand bonding and BONDETH0 for Ethernet bonding. In earlier releases, the names were BOND0 and BOND1, respectively.

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

- **Management network**: This required network connects to your existing management network, and is used for administrative work for all components of
Oracle Exadata Database Machine. It connects the servers, ILOM, and switches connected to the Ethernet switch in the rack. There is one uplink from the Ethernet switch in the rack to your management network, one uplink from the KVM switch in the rack to your management network, and one uplink for each power distribution unit (PDU).

**Notes:**

- Network connectivity to the PDUs is only required if the electric current is monitored remotely.
- A properly secured configuration requires the management network to be fully isolated from all other networks.

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

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

The following list describes the channel bonding configurations:

- Oracle Exadata Database Machine Two-Socket systems, use either:
  * The embedded NET1 and NET2 ports
  * The two 10 GbE ports or two 10/25GbE ports on Oracle Exadata Database Machine X7-2

- Oracle Exadata Database Machine Eight-Socket systems, X4-8 or higher
  * Use two ports, with each port on a different PCIe card

- Oracle Exadata Database Machine X3-8 Full Rack and Oracle Exadata Database Machine X2-8 Full Rack
  * Use ports from each Network Express Module (NEM)

For the Oracle Exadata Database Machine X3-8 Full Rack and Oracle Exadata Database Machine X2-8 Full Rack database servers, using the same ports on the Network Express Modules, such as NEM0/NET1 and NEM0/NET2, works but does not provide for high availability.
### Note:

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

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

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

### Note:

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

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

- Oracle Exadata Database Machine X7-2 embedded ports are 1/10/25 GbE.
- Oracle Exadata Database Machine X6-2, Oracle Exadata Database Machine X5-2, Oracle Exadata Database Machine X4-2, and Oracle Exadata Database Machine X3-2 embedded ports are 1 GbE/10 GbE.
- Oracle Exadata Database Machine X2-2 embedded ports are 1 GbE.
- Only Oracle Exadata Database Machine X2-2 has a KVM.

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

The file contains a mapping between the NUMA node numbers and the IP address of the network interface card closest to each node. Oracle Database uses the file to select the closest network interface card when communicating with Exadata Storage Servers, thereby optimizing performance. This file is only generated and used on an 8-socket system. On a 2-socket system, there is no performance to be gained in this manner, and no cellaffinity.ora file. The file is not intended to be directly edited with a text editor.

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

**Figure 2-1  Network Diagram for Oracle Exadata Database Machine X7-2**

The following image shows the default network diagram for Oracle Exadata Database Machine X4-2 and later models. Use the files from Oracle Exadata Database Machine Deployment Assistant to verify the cable connections when cabling Oracle Exadata Database Machine to the existing network.
The following image shows the default network diagram for Oracle Exadata Database Machine X3-2 and Oracle Exadata Database Machine X2-2. Use the files from Oracle Exadata Database Machine Deployment Assistant to verify the cable connections when cabling Oracle Exadata Database Machine to the existing network.
Figure 2-3  Network Diagram for Oracle Exadata Database Machine X3-2 and Oracle Exadata Database Machine X2-2

Notes:

- Oracle Exadata Database Machine X3-8 Full Rack, and Oracle Exadata Database Machine X2-8 Full Rack have BONDIB0, BONDIB1, and so on for the InfiniBand private network.
- The KVM switch is only available in Oracle Exadata Database Machine X2-2 racks.
- Additional configuration, such as defining multiple virtual local area networks (VLANs) or enabling routing, may be required for the switch to operate properly in your environment, and is not included in the installation service. If additional configuration is needed, then the network administrator performs the necessary configuration during Oracle Exadata Database Machine installation.

Related Topics:
- Using Oracle Exadata Deployment Assistant (page 3-1)
2.2 Network Components and Interfaces

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

- Oracle Exadata Database Machine X7-2 Database Server (page 2-7)
- Oracle Exadata Database Machine X5-2 and X6-2 Database Server (page 2-7)
- Oracle Exadata Database Machine X5-8 and X6-8 Full Rack Database Server (page 2-8)
- Oracle Exadata Database Machine X4-2 Database Server (page 2-8)
- Oracle Exadata Database Machine X4-8 Full Rack Database Server (page 2-9)
- Oracle Exadata Database Machine X3-2 Database Server (page 2-9)
- Oracle Exadata Database Machine X3-8 Full Rack and Oracle Exadata Database Machine X2-8 Full Rack Database Server (page 2-9)

2.2.1 Oracle Exadata Database Machine X7-2 Database Server

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

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

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

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

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

- 4 embedded 1 GbE/10 GbE ports
- Oracle Exadata Database Machine X6-2 or X5-2: 1 dual-port 4X QDR (40 Gb/s) InfiniBand Host Channel Adapter (HCA)
• Oracle Exadata Database Machine SL6 only: 2 dual-port 4X QDR (40 Gb/s) InfiniBand Host Channel Adapters (HCA)
• 1 embedded Ethernet port for Sun Integrated Lights Out Manager (ILOM) remote management
• 1 dual-port 10 GbE PCIe 2.0 network card with Intel 82599 10 GbE controller

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

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

Each Oracle Exadata Database Machine X5-8 or X6-8 Full Rack database server consists of the following network components and interfaces:
• 4 dual-port 4x QDR (40 Gb/s) InfiniBand Host Channel Adapter (HCA)
• 10 x 1 GbE Base-T Ethernet Ports (2 Quad-port PCIe 2.0 network card, and 2 embedded ports based on the Intel I350 1GbE Controller technology)
• 8 x 10 GbE Ethernet SFP+ Ports (4 Dual-port 10GbE PCIe 2.0 network card based on the Intel 82599 10GbE Controller technology)

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

2.2.4 Oracle Exadata Database Machine X4-2 Database Server

Each Oracle Exadata Database Machine X4-2 database server consists of the following network components and interfaces:
• 4 embedded 1 GbE/10 GbE ports
• 1 dual-port 4X QDR (40 Gb/s) InfiniBand Host Channel Adapter (HCA)
• 1 embedded Ethernet port for Sun Integrated Lights Out Manager (ILOM) remote management
• 1 dual-port 10 GbE PCIe 2.0 network card with Intel 82599 10 GbE controller

Note:
The Small Form-Factor Pluggable (SFP) modules for the 10 GbE PCIe 2.0 network cards are purchased separately.
2.2.5 Oracle Exadata Database Machine X4-8 Full Rack Database Server

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

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

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

2.2.6 Oracle Exadata Database Machine X3-2 Database Server

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

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

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

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

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

- 2 Network Express Modules (NEMs) providing the total of the following:
  - 8 x 10 GbE network ports
  - 8 x 1 Gb Ethernet network ports
- 4 dual-port 4X QDR InfiniBand PCIe 2.0 Express Modules (EMs)
• 1 Ethernet port for Sun Integrated Lights Out Manager (ILOM) remote management

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

# 2.3 Using Network VLAN Tagging with Oracle Exadata Database Machine

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

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

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

**Notes:**

• VLANs do not exist in InfiniBand. For equivalent functionality, use InfiniBand partitioning as described in Oracle Exadata Database Machine Maintenance Guide.

• Network VLAN tagging is supported for Oracle Real Application Clusters on the public network.

• If the backup network is on a tagged VLAN network, the client network must also be on a separate tagged VLAN network.

• The backup and client networks can share the same network cables.

• Oracle Exadata Deployment Assistant (OEDA) supports VLAN tagging for both physical and virtual deployments.

• Virtual deployments do not support IPv6 VLANs.

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

The following table shows IPv4/IPv6 support on the admin, client, and backup networks for the different Exadata systems and Oracle Database versions.
<table>
<thead>
<tr>
<th>Version of Oracle Database</th>
<th>VLAN Tagging on Admin Network</th>
<th>Client and Backup Networks</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.2.0.4</td>
<td>Only supported with IPv4 addresses on X3-2 and above for two-socket servers, and X4-8 and above for eight-socket servers.</td>
<td>Supported with IPv4 and IPv6 on all hardware models.</td>
</tr>
<tr>
<td>12.1.0.2</td>
<td>Only supported with IPv4 addresses on X3-2 and above for two-socket servers, and X4-8 and above for eight-socket servers.</td>
<td>Supported with IPv4 on all hardware models. Supported with IPv6 on all hardware models with fix for 22289350.</td>
</tr>
</tbody>
</table>

Related Topics:

- Oracle Exadata Database Machine Maintenance Guide
- My Oracle Support note 1423676.1, “Enabling 802.1Q VLAN Tagging in Exadata Database Machine over client networks”
- My Oracle Support note 2018550.1, “Implementing Tagged VLAN Interfaces in Oracle VM Environments on Exadata”

2.4 Network Channel Bonding Support

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

2.4.1 Bonded Network Configurations

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

The bonded network configuration is the default configuration.

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

- Bonded Network Configuration for Oracle Exadata Database Machine Two-Socket Systems (page 2-12)
- Bonded Network Configuration for Oracle Exadata Database Machine X7-8 (page 2-13)
- Bonded Network Configuration for Oracle Exadata Database Machine X4-8, X5-8, and X6-8 (page 2-14)
- Bonded Network Configuration for Oracle Exadata Database Machine X3-8 Full Rack and Oracle Exadata Database Machine X2-8 Full Rack (page 2-15)
2.4.1.1 Bonded Network Configuration for Oracle Exadata Database Machine Two-Socket Systems

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

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

When channel bonding is configured for the client access network during initial configuration, the Linux bonding module is configured for active-backup mode (mode=1). If a different bonding policy is preferred, then you may reconfigure the bonding module after initial configuration. For configuration details, refer to the Linux Ethernet Bonding Driver HOWTO in the /usr/share/doc/kernel-doc-2.6.39/Documentation/networking/bonding.txt directory on any Oracle Exadata Database Machine database server.

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

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

<table>
<thead>
<tr>
<th>Network</th>
<th>Using 1 GbE Ports</th>
<th>Using 10/25 GbE Ports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management (1 GbE NET0)</td>
<td>• Port: 1 GbE NET0</td>
<td>• Port: 1 GbE NET0</td>
</tr>
<tr>
<td></td>
<td>• Connect to Cisco switch</td>
<td>• Connect to Cisco switch</td>
</tr>
<tr>
<td>The administration network connection uses the 1 GbE port even when using 10 GbE ports for the other networks.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Client (BONDETH0)</td>
<td>• Ports: 1 GbE NET1 and 1 GbE NET2</td>
<td>• Ports: 10/25 GbE PCI Ports 1 and 2</td>
</tr>
<tr>
<td></td>
<td>• Connect to client access 1 GbE switches</td>
<td>• Connect to client access 10/25 GbE switches</td>
</tr>
<tr>
<td>Backup (BONDETH1)</td>
<td>• Ports: 10/25 GbE PCI Ports 1 and 2</td>
<td>• Ports: 10/25 GbE NET2 and NET3</td>
</tr>
<tr>
<td></td>
<td>• Connect to backup 10/25 GbE switches</td>
<td>• Connect to backup 10/25 GbE switches</td>
</tr>
</tbody>
</table>
Table 2-2  Channel Bonding Connections for Other Oracle Exadata Database Machine Two-Socket Systems

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

**Note:**

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

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

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

- Port NET0: Provides access to the operating system using the management network through the ETH0 interface.
- P1 at 3 PCIe 4: Provides access to the database using the client access network, and is bonded with port P1 at 13 PCIe 12, to create the BONDETH0 interface.
- P2 at 13 PCIe 6: Provides access to the database using the client access network, and is bonded with port P2 at 3 PCIe 14 to create the BONDETH1 interface.
- Port NET MGT: Provides access to ILOM using the management network.

The following table shows the port connections for Oracle Exadata Database Machine X7-8 database servers when using channel bonding.
Table 2-3  Channel Bonding Connections for Oracle Exadata Database Machine X7-8

<table>
<thead>
<tr>
<th>Network</th>
<th>Using 1 GbE Ports</th>
<th>Using 25 GbE Ports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management (NET0)</td>
<td>• Port: 1 GbE NET0</td>
<td>• Port: 1 GbE NET0</td>
</tr>
<tr>
<td></td>
<td>• Connect to Cisco switch</td>
<td>• Connect to Cisco switch</td>
</tr>
<tr>
<td>Client (BONDETH0)</td>
<td>• SMOD0 and SMOD1’s Net2</td>
<td>• Port1 in PCIe 4 and 12 cards</td>
</tr>
<tr>
<td></td>
<td>• Connect to client access 1 GbE switches</td>
<td>• Connect to client access 25 GbE switches</td>
</tr>
<tr>
<td>Backup (BONDETH1)</td>
<td>• SMOD0 and SMOD1’s Net3</td>
<td>• Port1 in PCIe 6 and 14 cards</td>
</tr>
<tr>
<td></td>
<td>• Connect to backup 1 GbE switches</td>
<td>• Connect to backup 25 GbE switches</td>
</tr>
</tbody>
</table>

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

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

- Port NET0: Provides access to the operating system using the management network through the ETH0 interface.
- P0 at 3 PCIe3: Provides access to the database using the client access network, and is bonded with port P0 at 13 PCIe3, to create the BONDETH0 interface.
- P0 at 13 PCIe3: Provides access to the database using the client access network, and is bonded with port P0 at 3 PCIe3 to create the BONDETH1 interface.
- Port NET MGT: Provides access to ILOM using the management network.

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

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

<table>
<thead>
<tr>
<th>Network</th>
<th>Using 1 GbE Ports</th>
<th>Using 10 GbE Ports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management (NET0)</td>
<td>• Port: 1 GbE NET0</td>
<td>• Port: 1 GbE NET0</td>
</tr>
<tr>
<td></td>
<td>• Connect to Cisco switch</td>
<td>• Connect to Cisco switch</td>
</tr>
<tr>
<td>Client (BONDETH0)</td>
<td>• 1 GbE Ports: P0 at 3 PCIe3, and at 13 PCIe3</td>
<td>• 10 GbE Ports: 2 PCIe3 PORTA, and 4 PCIe 3 PORTA</td>
</tr>
<tr>
<td></td>
<td>• Connect to client access 1 GbE switches</td>
<td>• Connect to client access 10 GbE switches</td>
</tr>
</tbody>
</table>
Table 2-4  (Cont.) Channel Bonding Connections for Oracle Exadata Database Machine X4-8, X5-8, and X6-8

<table>
<thead>
<tr>
<th>Network</th>
<th>Using 1 GbE Ports</th>
<th>Using 10 GbE Ports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Backup (BONDETH1)</td>
<td>• 10 GbE ports: 2 PCIe3 PORTA, and 4 PCIe3 PORTA</td>
<td>• 1 GbE ports: P0 at 3 PCIe3, and at 13 PCIe3</td>
</tr>
<tr>
<td></td>
<td>• Connect to backup 10 GbE switches</td>
<td>• Connect to backup 1 GbE switches</td>
</tr>
</tbody>
</table>

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

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

- Port NEM0/NET0: Provides access to the operating system using the management network through the ETH0 interface.
- Port NEM0/NET1: Provides access to the database using the client access network, and is bonded with port NEM1/NET3 to create the BONDETH0 interface.
- Port NEM1/NET3: Provides access to the database using the client access network, and is bonded with port NEM0/NET1 to create the BONDETH0 interface.
- Port NET MGT: Provides access to ILOM using the management network.

Table 2-5 (page 2-15) shows the port connections for Oracle Exadata Database Machine X3-8 Full Rack and Oracle Exadata Database Machine X2-8 Full Rack database servers when using channel bonding. The NEM0 ports are on the left, and the NEM1 ports are on the right.

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

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

When channel bonding is configured for the client access network during initial configuration, the Linux bonding module is configured for active-backup mode (mode=1). If a different bonding policy is preferred, then you may reconfigure the bonding module after initial configuration. For configuration details, refer to the Linux Ethernet Bonding...

**Note:**

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

### 2.4.2 Non-bonded Network Configuration

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

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

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

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

- Port NET0: Provides access to the operating system using the management network through the ETH0 interface.
- Port NET1: Provides access to the database using the client access network through the ETH1 interface. The Oracle RAC SCAN and VIP addresses are defined on this interface.
- Port NET MGT: Provides access to the Integrated Lights Out Manager (ILOM) using the management network.

The following diagram shows the network diagram for Oracle Exadata Database Machine Two-Socket Systems when not using bonding.
2.4.2.2 Non-bonded Network Configuration for Oracle Exadata Database Machine X5-8, X6-8, and X7-8

When using a non-bonded network configuration for Oracle Exadata Database Machine X5-8, X6-8, and X7-8, the database servers are configured as follows:

- **Port NET0**: Provides access to the operating system using the management network through the ETH0 interface.
- **Port NET1**: Provides access to the database using the client access network through the ETH1 interface. The Oracle RAC SCAN and VIP addresses are defined on this interface.
- **Port NET MGT**: Provides access to the ILOM using the management network.
2.4.2.3 Non-bonded Network Configuration for Oracle Exadata Database Machine X4-8 Full Rack

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

- Port NET0: Provides access to the operating system using the management network through the ETH0 interface.
- Port NET1: Provides access to the database using the client access network through the ETH1 interface. The Oracle RAC SCAN and VIP addresses are defined on this interface.
- Port NET MGT: Provides access to the ILOM using the management network.

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

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

- Port NEM0/NET0: Provides access to the operating system using the management network through the ETH0 interface. This network must use the 1 GbE port.
- Port NEM0/NET1: Provides access to the database using the client access network through the ETH1 interface. The Oracle RAC SCAN and VIP addresses are defined on this interface.
- Port NET MGT: Provides access to the Integrated Lights Out Manager (ILOM) using the management network.
2.4.3 Additional Networks

- On Oracle Exadata Database Machine X7-2:
  - Non-bonded network configuration— There are four open ports (2x 1/10GbE copper or 2x 10/25GbE optical ports and two additional 10/25GbE PCI ports) on each database server.
  - Bonded network configuration— There are two open ports (10/25GbE PCI ports) on each database server.

- On Oracle Exadata Database Machine two-socket systems (X2-2 to X6-2):
  - Non-bonded network configuration— There are four open ports (NET2, NET3, and two additional 10 GbE ports) on each database server
  - Bonded network configuration— There are three open ports (NET3 and two additional 10 GbE ports) on each database server

- On Oracle Exadata Database Machine X7-8:
  - Non-bonded network configuration— There are 14 open ports (6 1/10GbE ports and 8 10/25GbE PCI ports) on each database server
  - Bonded network configuration— There are 13 open ports (5 1/10 GbE ports and 8 10/25 GbE PCI ports) on each database server

- On Oracle Exadata Database Machine X5-8 and X6-8:
  - Non-bonded network configuration— There are 18 open ports (10 1GbE ports and 8 10GbE ports) on each database server
  - Bonded network configuration— There are 15 open ports (7 1 GbE ports and 8 open 10 GbE ports) on each database server

- On Oracle Exadata Database Machine X4-8 Full Rack:
  - Non-bonded network configuration— There are 16 open ports (8 1GbE ports and 8 10GbE ports) on each database server
  - Bonded network configuration— There are 15 open ports (7 1 GbE ports and 8 open 10 GbE ports) on each database server

- On Oracle Exadata Database Machine X3-8 Full Rack and X2-8 Full Rack:
  - Non-bonded network configuration— There are 14 open ports (NEM0/NET2, NEM0/NET3, NEM1/NET0, NEM1/NET1, NEM1/NET2, NEM1/NET3, and eight additional 10 GbE ports) on each database server
  - Bonded network configuration— There are 13 open ports (NEM0/NET2, NEM0/NET3, NEM1/NET0, NEM1/NET1, NEM1/NET2, and eight additional 10 GbE ports) on each database server

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

## 2.5 Default IP Addresses

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

### Note:

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

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

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

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

<table>
<thead>
<tr>
<th>Component</th>
<th>NET0 IP Addresses</th>
<th>ILOM IP Addresses</th>
<th>InfiniBand Active Bonded IP Addresses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exadata Storage Server 14</td>
<td>Assigned during first start of the system</td>
<td>192.168.1.122</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Exadata Storage Server 13</td>
<td>Assigned during first start of the system</td>
<td>192.168.1.121</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Exadata Storage Server 12</td>
<td>Assigned during first start of the system</td>
<td>192.168.1.120</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Exadata Storage Server 11</td>
<td>Assigned during first start of the system</td>
<td>192.168.1.119</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Exadata Storage Server 10</td>
<td>Assigned during first start of the system</td>
<td>192.168.1.118</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Exadata Storage Server 9</td>
<td>Assigned during first start of the system</td>
<td>192.168.1.117</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Component</td>
<td>NET0 IP Addresses</td>
<td>ILOM IP Addresses</td>
<td>InfiniBand Active Bonded IP Addresses</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>-----------------------------------</td>
<td>-------------------</td>
<td>--------------------------------------</td>
</tr>
<tr>
<td>Exadata Storage Server 8</td>
<td>Assigned during first start of the system</td>
<td>192.168.1.116</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Oracle Database server 8</td>
<td>Assigned during first start of the system</td>
<td>192.168.1.115</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Oracle Database server 7</td>
<td>Assigned during first start of the system</td>
<td>192.168.1.114</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Oracle Database server 6</td>
<td>Assigned during first start of the system</td>
<td>192.168.1.113</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Oracle Database server 5</td>
<td>Assigned during first start of the system</td>
<td>192.168.1.112</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Oracle Database server 4</td>
<td>Assigned during first start of the system</td>
<td>192.168.1.111</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Oracle Database server 3</td>
<td>Assigned during first start of the system</td>
<td>192.168.1.110</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Oracle Database server 2</td>
<td>Assigned during first start of the system</td>
<td>192.168.1.109</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Oracle Database server 1</td>
<td>Assigned during first start of the system</td>
<td>192.168.1.108</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Exadata Storage Server 7</td>
<td>Assigned during first start of the system</td>
<td>192.168.1.107</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Exadata Storage Server 6</td>
<td>Assigned during first start of the system</td>
<td>192.168.1.106</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Exadata Storage Server 5</td>
<td>Assigned during first start of the system</td>
<td>192.168.1.105</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Exadata Storage Server 4</td>
<td>Assigned during first start of the system</td>
<td>192.168.1.104</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Exadata Storage Server 3</td>
<td>Assigned during first start of the system</td>
<td>192.168.1.103</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Exadata Storage Server 2</td>
<td>Assigned during first start of the system</td>
<td>192.168.1.102</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Exadata Storage Server 1</td>
<td>Assigned during first start of the system</td>
<td>192.168.1.101</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Sun Datacenter InfiniBand Switch 36 switch 3</td>
<td>192.168.1.203</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Sun Datacenter InfiniBand Switch 36 switch 2</td>
<td>192.168.1.202</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Sun Datacenter InfiniBand Switch 36 switch 1</td>
<td>192.168.1.201</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Ethernet switch</td>
<td>192.168.1.200</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>
The following table lists the default IP addresses for Oracle Exadata Database Machine X4-2. The subnet mask is 255.255.252.0.

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

<table>
<thead>
<tr>
<th>Component</th>
<th>NET0 IP Addresses</th>
<th>ILOM IP Addresses</th>
<th>InfiniBand Active Bonded IP Addresses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exadata Storage Server 14</td>
<td>192.168.1.22</td>
<td>192.168.1.122</td>
<td>192.168.10.44 192.168.10.43</td>
</tr>
<tr>
<td>Exadata Storage Server 13</td>
<td>192.168.1.21</td>
<td>192.168.1.121</td>
<td>192.168.10.42 192.168.10.41</td>
</tr>
<tr>
<td>Exadata Storage Server 12</td>
<td>192.168.1.20</td>
<td>192.168.1.120</td>
<td>192.168.10.40 192.168.10.39</td>
</tr>
<tr>
<td>Exadata Storage Server 10</td>
<td>192.168.1.18</td>
<td>192.168.1.118</td>
<td>192.168.10.36 192.168.10.35</td>
</tr>
<tr>
<td>Exadata Storage Server 9</td>
<td>192.168.1.17</td>
<td>192.168.1.117</td>
<td>192.168.10.34 192.168.10.33</td>
</tr>
<tr>
<td>Exadata Storage Server 8</td>
<td>192.168.1.16</td>
<td>192.168.1.116</td>
<td>192.168.10.32 192.168.10.31</td>
</tr>
<tr>
<td>Oracle Database server 8</td>
<td>192.168.1.15</td>
<td>192.168.1.115</td>
<td>192.168.10.30 192.168.10.29</td>
</tr>
<tr>
<td>Oracle Database server 7</td>
<td>192.168.1.14</td>
<td>192.168.1.114</td>
<td>192.168.10.28 192.168.10.27</td>
</tr>
<tr>
<td>Oracle Database server 6</td>
<td>192.168.1.13</td>
<td>192.168.1.113</td>
<td>192.168.10.26 192.168.10.25</td>
</tr>
<tr>
<td>Oracle Database server 5</td>
<td>192.168.1.12</td>
<td>192.168.1.112</td>
<td>192.168.10.24 192.168.10.23</td>
</tr>
<tr>
<td>Oracle Database server 4</td>
<td>192.168.1.11</td>
<td>192.168.1.111</td>
<td>192.168.10.22 192.168.10.21</td>
</tr>
<tr>
<td>Oracle Database server 3</td>
<td>192.168.1.10</td>
<td>192.168.1.110</td>
<td>192.168.10.20 192.168.10.19</td>
</tr>
<tr>
<td>Oracle Database server 2</td>
<td>192.168.1.9</td>
<td>192.168.1.109</td>
<td>192.168.10.18 192.168.10.17</td>
</tr>
<tr>
<td>Oracle Database server 1</td>
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<td>192.168.1.108</td>
<td>192.168.10.16 192.168.10.15</td>
</tr>
<tr>
<td>Exadata Storage Server 6</td>
<td>192.168.1.6</td>
<td>192.168.1.106</td>
<td>192.168.10.12 192.168.10.11</td>
</tr>
<tr>
<td>Exadata Storage Server 5</td>
<td>192.168.1.5</td>
<td>192.168.1.105</td>
<td>192.168.10.10 192.168.10.9</td>
</tr>
</tbody>
</table>
Table 2-7  (Cont.) Default IP Addresses for Oracle Exadata Database Machine X4-2

<table>
<thead>
<tr>
<th>Component</th>
<th>NET0 IP Addresses</th>
<th>ILOM IP Addresses</th>
<th>InfiniBand Active Bonded IP Addresses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exadata Storage Server 4</td>
<td>192.168.1.4</td>
<td>192.168.1.104</td>
<td>192.168.10.8 192.168.10.7</td>
</tr>
<tr>
<td>Exadata Storage Server 3</td>
<td>192.168.1.3</td>
<td>192.168.1.103</td>
<td>192.168.10.6 192.168.10.5</td>
</tr>
<tr>
<td>Exadata Storage Server 2</td>
<td>192.168.1.2</td>
<td>192.168.1.102</td>
<td>192.168.10.4 192.168.10.3</td>
</tr>
<tr>
<td>Exadata Storage Server 1</td>
<td>192.168.1.1</td>
<td>192.168.1.101</td>
<td>192.168.10.2 192.168.10.1</td>
</tr>
<tr>
<td>Sun Datacenter InfiniBand Switch 36 switch 3</td>
<td>192.168.1.203</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Sun Datacenter InfiniBand Switch 36 switch 2</td>
<td>192.168.1.202</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Sun Datacenter InfiniBand Switch 36 switch 1</td>
<td>192.168.1.201</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Ethernet switch</td>
<td>192.168.1.200</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

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

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

<table>
<thead>
<tr>
<th>Component</th>
<th>NET0 IP Addresses</th>
<th>ILOM IP Addresses</th>
<th>InfiniBand Bonded IP Addresses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exadata Storage Server 14 (Oracle Exadata Database Machine Full Rack only)</td>
<td>192.168.1.22</td>
<td>192.168.1.122</td>
<td>192.168.10.22</td>
</tr>
<tr>
<td>Exadata Storage Server 13 (Oracle Exadata Database Machine Full Rack only)</td>
<td>192.168.1.21</td>
<td>192.168.1.121</td>
<td>192.168.10.21</td>
</tr>
<tr>
<td>Exadata Storage Server 12 (Oracle Exadata Database Machine Full Rack only)</td>
<td>192.168.1.20</td>
<td>192.168.1.120</td>
<td>192.168.10.20</td>
</tr>
<tr>
<td>Component</td>
<td>NET0 IP Addresses</td>
<td>ILOM IP Addresses</td>
<td>InfiniBand Bonded IP Addresses</td>
</tr>
<tr>
<td>-----------</td>
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<td>------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>Exadata Storage Server 10 (Oracle Exadata Database Machine Full Rack only)</td>
<td>192.168.1.18</td>
<td>192.168.1.118</td>
<td>192.168.10.18</td>
</tr>
<tr>
<td>Exadata Storage Server 9 (Oracle Exadata Database Machine Full Rack only)</td>
<td>192.168.1.17</td>
<td>192.168.1.117</td>
<td>192.168.10.17</td>
</tr>
<tr>
<td>Exadata Storage Server 8 (Oracle Exadata Database Machine Full Rack only)</td>
<td>192.168.1.16</td>
<td>192.168.1.116</td>
<td>192.168.10.16</td>
</tr>
<tr>
<td>Oracle Database server 8 (Oracle Exadata Database Machine Full Rack only)</td>
<td>192.168.1.15</td>
<td>192.168.1.115</td>
<td>192.168.10.15</td>
</tr>
<tr>
<td>Oracle Database server 7 (Oracle Exadata Database Machine Full Rack only)</td>
<td>192.168.1.14</td>
<td>192.168.1.114</td>
<td>192.168.10.14</td>
</tr>
<tr>
<td>Oracle Database server 6 (Oracle Exadata Database Machine Full Rack only)</td>
<td>192.168.1.13</td>
<td>192.168.1.113</td>
<td>192.168.10.13</td>
</tr>
<tr>
<td>Oracle Database server 5 (Oracle Exadata Database Machine Full Rack only)</td>
<td>192.168.1.12</td>
<td>192.168.1.112</td>
<td>192.168.10.12</td>
</tr>
<tr>
<td>Oracle Database server 4 (Oracle Exadata Database Machine Full Rack and Half Rack only)</td>
<td>192.168.1.11</td>
<td>192.168.1.111</td>
<td>192.168.10.11</td>
</tr>
<tr>
<td>Component</td>
<td>NET0 IP Addresses</td>
<td>ILOM IP Addresses</td>
<td>InfiniBand Bonded IP Addresses</td>
</tr>
<tr>
<td>-----------</td>
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</tr>
<tr>
<td>Oracle Database server 3 (Oracle Exadata Database Machine Full Rack and Half Rack only)</td>
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<td>192.168.1.110</td>
<td>192.168.10.10</td>
</tr>
<tr>
<td>Oracle Database server 2</td>
<td>192.168.1.9</td>
<td>192.168.1.109</td>
<td>192.168.10.9</td>
</tr>
<tr>
<td>Oracle Database server 1</td>
<td>192.168.1.8</td>
<td>192.168.1.108</td>
<td>192.168.10.8</td>
</tr>
<tr>
<td>Exadata Storage Server 7 (Oracle Exadata Database Machine Full Rack and Half Rack only)</td>
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<td>192.168.1.107</td>
<td>192.168.10.7</td>
</tr>
<tr>
<td>Exadata Storage Server 6 (Oracle Exadata Database Machine Full Rack and Half Rack only)</td>
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<td>192.168.1.106</td>
<td>192.168.10.6</td>
</tr>
<tr>
<td>Exadata Storage Server 5 (Oracle Exadata Database Machine Full Rack and Half Rack only)</td>
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<td>192.168.1.105</td>
<td>192.168.10.5</td>
</tr>
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<td>192.168.1.4</td>
<td>192.168.1.104</td>
<td>192.168.10.4</td>
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<tr>
<td>Exadata Storage Server 3</td>
<td>192.168.1.3</td>
<td>192.168.1.103</td>
<td>192.168.10.3</td>
</tr>
<tr>
<td>Exadata Storage Server 2</td>
<td>192.168.1.2</td>
<td>192.168.1.102</td>
<td>192.168.10.2</td>
</tr>
<tr>
<td>Exadata Storage Server 1</td>
<td>192.168.1.1</td>
<td>192.168.1.101</td>
<td>192.168.10.1</td>
</tr>
<tr>
<td>Sun Datacenter InfiniBand Switch 36 switch 3</td>
<td>192.168.1.203</td>
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<td>Not applicable</td>
</tr>
<tr>
<td>Sun Datacenter InfiniBand Switch 36 switch 2</td>
<td>192.168.1.202</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Sun Datacenter InfiniBand Switch 36 switch 1 (Oracle Exadata Database Machine Full Rack and Half Rack only)</td>
<td>192.168.1.201</td>
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</tbody>
</table>
Table 2-8  (Cont.) Default IP Addresses for Oracle Exadata Database Machine X3-2 and Oracle Exadata Database Machine X2-2

<table>
<thead>
<tr>
<th>Component</th>
<th>NET0 IP Addresses</th>
<th>ILOM IP Addresses</th>
<th>InfiniBand Bonded IP Addresses</th>
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</thead>
<tbody>
<tr>
<td>Ethernet switch</td>
<td>192.168.1.200</td>
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<td>Not applicable</td>
</tr>
</tbody>
</table>

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

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

<table>
<thead>
<tr>
<th>Component</th>
<th>NET0 IP Addresses</th>
<th>ILOM IP Addresses</th>
<th>InfiniBand Bonded IP Addresses</th>
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</thead>
<tbody>
<tr>
<td>Exadata Storage Server 14</td>
<td>192.168.1.22</td>
<td>192.168.1.122</td>
<td>192.168.10.43</td>
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<td></td>
<td></td>
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<td>192.168.10.44</td>
</tr>
<tr>
<td>Exadata Storage Server 13</td>
<td>192.168.1.21</td>
<td>192.168.1.121</td>
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<tr>
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<td>192.168.10.42</td>
</tr>
<tr>
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<td>192.168.1.20</td>
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<td>192.168.10.38</td>
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<tr>
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<tr>
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<td>192.168.10.36</td>
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<tr>
<td>Exadata Storage Server 9</td>
<td>192.168.1.17</td>
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<td>192.168.10.34</td>
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<td>192.168.10.16</td>
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<tr>
<td>Component</td>
<td>NET0 IP Addresses</td>
<td>ILOM IP Addresses</td>
<td>InfiniBand Bonded IP Addresses</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>-------------------</td>
<td>------------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>Exadata Storage Server 5</td>
<td>192.168.1.5</td>
<td>192.168.1.105</td>
<td>192.168.10.9   192.168.10.10</td>
</tr>
<tr>
<td>Exadata Storage Server 4</td>
<td>192.168.1.4</td>
<td>192.168.1.104</td>
<td>192.168.10.7   192.168.10.10</td>
</tr>
<tr>
<td>Exadata Storage Server 3</td>
<td>192.168.1.3</td>
<td>192.168.1.103</td>
<td>192.168.10.5   192.168.10.6</td>
</tr>
<tr>
<td>Exadata Storage Server 2</td>
<td>192.168.1.2</td>
<td>192.168.1.102</td>
<td>192.168.10.3   192.168.10.4</td>
</tr>
<tr>
<td>Exadata Storage Server 1</td>
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<td>192.168.1.101</td>
<td>192.168.10.1   192.168.10.2</td>
</tr>
<tr>
<td>Sun Datacenter InfiniBand Switch 36 switch 3</td>
<td>192.168.1.203</td>
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<td>Not applicable</td>
</tr>
<tr>
<td>Sun Datacenter InfiniBand Switch 36 switch 2</td>
<td>192.168.1.202</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Sun Datacenter InfiniBand Switch 36 switch 1</td>
<td>192.168.1.201</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Ethernet switch</td>
<td>192.168.1.200</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

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

**Note:**

For Oracle Exadata Database Machine X4-8 racks with Exadata Storage Server X5-2 Servers, the NETO IP addresses are assigned during the elastic configuration process.
Table 2-10  Default IP Addresses for Oracle Exadata Database Machine X4-8
Full Rack

<table>
<thead>
<tr>
<th>Component</th>
<th>NET0 IP Addresses</th>
<th>ILOM IP Addresses</th>
<th>InfiniBand Bonded IP Addresses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exadata Storage Server 14</td>
<td>192.168.1.22</td>
<td>192.168.1.122</td>
<td>192.168.10.43 192.168.10.44</td>
</tr>
<tr>
<td>Exadata Storage Server 13</td>
<td>192.168.1.21</td>
<td>192.168.1.121</td>
<td>192.168.10.41 192.168.10.42</td>
</tr>
<tr>
<td>Exadata Storage Server 12</td>
<td>192.168.1.20</td>
<td>192.168.1.120</td>
<td>192.168.10.39 192.168.10.40</td>
</tr>
<tr>
<td>Exadata Storage Server 10</td>
<td>192.168.1.18</td>
<td>192.168.1.118</td>
<td>192.168.10.35 192.168.10.36</td>
</tr>
<tr>
<td>Exadata Storage Server 9</td>
<td>192.168.1.17</td>
<td>192.168.1.117</td>
<td>192.168.10.33 192.168.10.34</td>
</tr>
<tr>
<td>Exadata Storage Server 8</td>
<td>192.168.1.16</td>
<td>192.168.1.116</td>
<td>192.168.10.31 192.168.10.32</td>
</tr>
<tr>
<td>Exadata Storage Server 5</td>
<td>192.168.1.5</td>
<td>192.168.1.105</td>
<td>192.168.10.9   192.168.10.10</td>
</tr>
<tr>
<td>Exadata Storage Server 4</td>
<td>192.168.1.4</td>
<td>192.168.1.104</td>
<td>192.168.10.7   192.168.10.10</td>
</tr>
</tbody>
</table>
### Table 2-10  (Cont.) Default IP Addresses for Oracle Exadata Database Machine X4-8 Full Rack

<table>
<thead>
<tr>
<th>Component</th>
<th>NET0 IP Addresses</th>
<th>ILOM IP Addresses</th>
<th>InfiniBand Bonded IP Addresses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exadata Storage Server 3</td>
<td>192.168.1.3</td>
<td>192.168.1.103</td>
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<td></td>
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<td>192.168.10.6</td>
</tr>
<tr>
<td>Exadata Storage Server 2</td>
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<td>Not applicable</td>
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<tr>
<td>Sun Datacenter InfiniBand Switch 36 switch 2</td>
<td>192.168.1.202</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Sun Datacenter InfiniBand Switch 36 switch 1</td>
<td>192.168.1.201</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Ethernet switch</td>
<td>192.168.1.200</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

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

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

<table>
<thead>
<tr>
<th>Component</th>
<th>NET0 IP Addresses</th>
<th>ILOM IP Addresses</th>
<th>InfiniBand Bonded IP Addresses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exadata Storage Server 14</td>
<td>192.168.1.22</td>
<td>192.168.1.122</td>
<td>192.168.10.22</td>
</tr>
<tr>
<td>Exadata Storage Server 13</td>
<td>192.168.1.21</td>
<td>192.168.1.121</td>
<td>192.168.10.21</td>
</tr>
<tr>
<td>Exadata Storage Server 12</td>
<td>192.168.1.20</td>
<td>192.168.1.120</td>
<td>192.168.10.20</td>
</tr>
<tr>
<td>Exadata Storage Server 10</td>
<td>192.168.1.18</td>
<td>192.168.1.118</td>
<td>192.168.10.18</td>
</tr>
<tr>
<td>Exadata Storage Server 9</td>
<td>192.168.1.17</td>
<td>192.168.1.117</td>
<td>192.168.10.17</td>
</tr>
<tr>
<td>Exadata Storage Server 8</td>
<td>192.168.1.16</td>
<td>192.168.1.116</td>
<td>192.168.10.16</td>
</tr>
</tbody>
</table>
Table 2-11  (Cont.) Default IP Addresses for Oracle Exadata Database Machine X3-8 Full Rack and Oracle Exadata Database Machine X2-8 Full Rack

<table>
<thead>
<tr>
<th>Component</th>
<th>NET0 IP Addresses</th>
<th>ILOM IP Addresses</th>
<th>InfiniBand Bonded IP Addresses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oracle Database server 2</td>
<td>192.168.1.9</td>
<td>192.168.1.109</td>
<td>192.168.10.15</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>192.168.10.14</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>192.168.10.13</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>192.168.10.12</td>
</tr>
<tr>
<td>Oracle Database server 1</td>
<td>192.168.1.8</td>
<td>192.168.1.108</td>
<td>192.168.10.11</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>192.168.10.10</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>192.168.10.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>192.168.10.8</td>
</tr>
<tr>
<td>Exadata Storage Server 7</td>
<td>192.168.1.7</td>
<td>192.168.1.107</td>
<td>192.168.10.7</td>
</tr>
<tr>
<td>Exadata Storage Server 6</td>
<td>192.168.1.6</td>
<td>192.168.1.106</td>
<td>192.168.10.6</td>
</tr>
<tr>
<td>Exadata Storage Server 5</td>
<td>192.168.1.5</td>
<td>192.168.1.105</td>
<td>192.168.10.5</td>
</tr>
<tr>
<td>Exadata Storage Server 4</td>
<td>192.168.1.4</td>
<td>192.168.1.104</td>
<td>192.168.10.4</td>
</tr>
<tr>
<td>Exadata Storage Server 3</td>
<td>192.168.1.3</td>
<td>192.168.1.103</td>
<td>192.168.10.3</td>
</tr>
<tr>
<td>Exadata Storage Server 2</td>
<td>192.168.1.2</td>
<td>192.168.1.102</td>
<td>192.168.10.2</td>
</tr>
<tr>
<td>Exadata Storage Server 1</td>
<td>192.168.1.1</td>
<td>192.168.1.101</td>
<td>192.168.10.1</td>
</tr>
<tr>
<td>Sun Datacenter InfiniBand Switch 36 switch 3</td>
<td>192.168.1.203</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Sun Datacenter InfiniBand Switch 36 switch 2</td>
<td>192.168.1.202</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Sun Datacenter InfiniBand Switch 36 switch 1</td>
<td>192.168.1.201</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Ethernet switch</td>
<td>192.168.1.200</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

The following table lists the default IP addresses for Oracle Exadata Storage Expansion Rack X4-2.
### Table 2-12  Default IP Addresses for Oracle Exadata Storage Expansion Rack X4-2

<table>
<thead>
<tr>
<th>Component</th>
<th>NET0 IP Addresses</th>
<th>ILOM IP Addresses</th>
<th>InfiniBand Active Bonded IP Addresses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exadata Storage Server 17</td>
<td>192.168.1.67</td>
<td>192.168.1.167</td>
<td>192.168.10.84 192.168.10.83</td>
</tr>
<tr>
<td>Exadata Storage Server 16</td>
<td>192.168.1.66</td>
<td>192.168.1.166</td>
<td>192.168.10.82 192.168.10.81</td>
</tr>
<tr>
<td>Exadata Storage Server 15</td>
<td>192.168.1.65</td>
<td>192.168.1.165</td>
<td>192.168.10.80 192.168.10.79</td>
</tr>
<tr>
<td>Exadata Storage Server 14</td>
<td>192.168.1.64</td>
<td>192.168.1.164</td>
<td>192.168.10.78 192.168.10.77</td>
</tr>
<tr>
<td>Exadata Storage Server 13</td>
<td>192.168.1.63</td>
<td>192.168.1.163</td>
<td>192.168.10.76 192.168.10.75</td>
</tr>
<tr>
<td>Exadata Storage Server 12</td>
<td>192.168.1.62</td>
<td>192.168.1.162</td>
<td>192.168.10.74 192.168.10.73</td>
</tr>
<tr>
<td>Exadata Storage Server 11</td>
<td>192.168.1.61</td>
<td>192.168.1.161</td>
<td>192.168.10.72 192.168.10.71</td>
</tr>
<tr>
<td>Exadata Storage Server 10</td>
<td>192.168.1.60</td>
<td>192.168.1.160</td>
<td>192.168.10.70 192.168.10.69</td>
</tr>
<tr>
<td>Exadata Storage Server 9</td>
<td>192.168.1.59</td>
<td>192.168.1.159</td>
<td>192.168.10.68 192.168.10.67</td>
</tr>
<tr>
<td>Exadata Storage Server 8</td>
<td>192.168.1.58</td>
<td>192.168.1.158</td>
<td>192.168.10.66 192.168.10.65</td>
</tr>
<tr>
<td>Exadata Storage Server 7</td>
<td>192.168.1.57</td>
<td>192.168.1.157</td>
<td>192.168.10.64 192.168.10.63</td>
</tr>
<tr>
<td>Exadata Storage Server 6</td>
<td>192.168.1.56</td>
<td>192.168.1.156</td>
<td>192.168.10.62 192.168.10.61</td>
</tr>
<tr>
<td>Exadata Storage Server 5</td>
<td>192.168.1.55</td>
<td>192.168.1.155</td>
<td>192.168.10.60 192.168.10.59</td>
</tr>
<tr>
<td>Exadata Storage Server 4</td>
<td>192.168.1.54</td>
<td>192.168.1.154</td>
<td>192.168.10.58 192.168.10.57</td>
</tr>
<tr>
<td>Exadata Storage Server 2</td>
<td>192.168.1.52</td>
<td>192.168.1.152</td>
<td>192.168.10.54 192.168.10.53</td>
</tr>
<tr>
<td>Exadata Storage Server 1</td>
<td>192.168.1.51</td>
<td>192.168.1.151</td>
<td>192.168.10.52 192.168.10.51</td>
</tr>
</tbody>
</table>
### Table 2-12  (Cont.) Default IP Addresses for Oracle Exadata Storage Expansion Rack X4-2

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

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

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

<table>
<thead>
<tr>
<th>Component</th>
<th>NET0 IP Addresses</th>
<th>ILOM IP Addresses</th>
<th>InfiniBand Bonded IP Addresses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exadata Storage Server 18</td>
<td>192.168.1.68</td>
<td>192.168.1.168</td>
<td>192.168.10.68</td>
</tr>
<tr>
<td>Exadata Storage Server 17</td>
<td>192.168.1.67</td>
<td>192.168.1.167</td>
<td>192.168.10.67</td>
</tr>
<tr>
<td>Exadata Storage Server 16</td>
<td>192.168.1.66</td>
<td>192.168.1.166</td>
<td>192.168.10.66</td>
</tr>
<tr>
<td>Exadata Storage Server 15</td>
<td>192.168.1.65</td>
<td>192.168.1.165</td>
<td>192.168.10.65</td>
</tr>
<tr>
<td>Exadata Storage Server 14</td>
<td>192.168.1.64</td>
<td>192.168.1.164</td>
<td>192.168.10.64</td>
</tr>
<tr>
<td>Exadata Storage Server 13</td>
<td>192.168.1.63</td>
<td>192.168.1.163</td>
<td>192.168.10.63</td>
</tr>
<tr>
<td>Exadata Storage Server 12</td>
<td>192.168.1.62</td>
<td>192.168.1.162</td>
<td>192.168.10.62</td>
</tr>
<tr>
<td>Exadata Storage Server 11</td>
<td>192.168.1.61</td>
<td>192.168.1.161</td>
<td>192.168.10.61</td>
</tr>
</tbody>
</table>
### Table 2-13 (Cont.) Default IP Addresses for Oracle Exadata Storage Expansion Rack X3-2, and Oracle Exadata Storage Expansion Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers

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

### 2.6 Port Assignments When Using a Firewall

The following table lists the ports used by services on Oracle Exadata Database Machine. When network communication requires access through a firewall, review the list and open the necessary ports. All ports are on the management network, except for port 1521 which is on the client network.
## Table 2-14  Open Ports for Firewall

<table>
<thead>
<tr>
<th>Source</th>
<th>Target</th>
<th>Protocol</th>
<th>Port</th>
<th>Network</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any</td>
<td>Database servers, storage cells, and ILOMs for database servers, Exadata Storage Servers, and InfiniBand switches</td>
<td>SSH over TCP</td>
<td>22</td>
<td>Management</td>
<td>SSH</td>
</tr>
<tr>
<td>Any</td>
<td>KVM</td>
<td>SSH over TCP</td>
<td>22</td>
<td>Management</td>
<td>SSH for serial sessions to MPUIQ-SRL module</td>
</tr>
<tr>
<td>Exadata Storage Servers</td>
<td>SMTP e-mail server</td>
<td>SMTP</td>
<td>25</td>
<td>Management</td>
<td>SMTP (Simple Mail Transfer Protocol)</td>
</tr>
<tr>
<td>Any</td>
<td>ILOMs for database servers, Exadata Storage Servers, and InfiniBand switches</td>
<td>HTTP</td>
<td>80</td>
<td>Management</td>
<td>Web (user configurable)</td>
</tr>
<tr>
<td>Any</td>
<td>PDU</td>
<td>HTTP</td>
<td>80</td>
<td>Management</td>
<td>Browser interface</td>
</tr>
<tr>
<td>Any</td>
<td>KVM</td>
<td>HTTP</td>
<td>80</td>
<td>Management</td>
<td>Avocent video viewer download for Java applet</td>
</tr>
<tr>
<td>Any</td>
<td>rpcbind</td>
<td>TCP</td>
<td>111</td>
<td>Management</td>
<td>rpcbind</td>
</tr>
<tr>
<td>Database management</td>
<td>NTP servers</td>
<td>NTP over UDP</td>
<td>123</td>
<td>Client</td>
<td>Outgoing Network Time Protocol (NTP)</td>
</tr>
<tr>
<td>Database servers, Exadata Storage Servers, ILOMs, InfiniBand switches, and Cisco switch</td>
<td>NTP servers</td>
<td>NTP over UDP</td>
<td>123</td>
<td>Management</td>
<td>Outgoing NTP</td>
</tr>
<tr>
<td>Source</td>
<td>Target</td>
<td>Protocol</td>
<td>Port</td>
<td>Network</td>
<td>Application</td>
</tr>
<tr>
<td>--------</td>
<td>--------</td>
<td>----------</td>
<td>------</td>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td>Any</td>
<td>ILOMs for database servers, Exadata Storage Servers, and InfiniBand switches</td>
<td>SNMP over UDP</td>
<td>161</td>
<td>Management</td>
<td>SNMP (Simple Network Management Protocol) (user configurable)</td>
</tr>
<tr>
<td>Any</td>
<td>PDU</td>
<td>SNMP over UDP</td>
<td>161</td>
<td>Management</td>
<td>SNMP (user configurable)</td>
</tr>
<tr>
<td>Any</td>
<td>KVM</td>
<td>SNMP over UDP</td>
<td>161</td>
<td>Management</td>
<td>SNMP (user configurable)</td>
</tr>
<tr>
<td>Exadata Storage Servers</td>
<td>SNMP subscriber such as Oracle Enterprise Manager Grid Control or an SNMP manager</td>
<td>SNMP</td>
<td>162</td>
<td>Management</td>
<td>SNMP version 1 (SNMPv1) outgoing traps (user-configurable)</td>
</tr>
<tr>
<td>Database servers, Exadata Storage Servers, and ILOMs for database servers, Exadata Storage Servers, and InfiniBand switches</td>
<td>ASR Manager</td>
<td>SNMP</td>
<td>162</td>
<td>Management</td>
<td>Telemetry messages sent to ASR Manager</td>
</tr>
<tr>
<td>ILOMs for database servers, Exadata Storage Servers, and InfiniBand switches</td>
<td>Any</td>
<td>IPMI over UDP</td>
<td>162</td>
<td>Management</td>
<td>Outgoing IPMI (Intelligent Platform Management Interface) Platform Event Trap (PET)</td>
</tr>
<tr>
<td>PDU</td>
<td>SNMP trap receivers</td>
<td>SNMP over UDP</td>
<td>162</td>
<td>Management</td>
<td>Outgoing SNMPv2 traps</td>
</tr>
<tr>
<td>KVM</td>
<td>SNMP trap receivers</td>
<td>SNMP over UDP</td>
<td>162</td>
<td>Management</td>
<td>Outgoing SNMPv2 traps</td>
</tr>
</tbody>
</table>
Table 2-14  (Cont.) Open Ports for Firewall

<table>
<thead>
<tr>
<th>Source</th>
<th>Target</th>
<th>Protocol</th>
<th>Port</th>
<th>Network</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASR Manager</td>
<td>ASR backend</td>
<td>HTTPS</td>
<td>443</td>
<td>Management</td>
<td>Telemetry messages sent to ASR backend</td>
</tr>
<tr>
<td>Any</td>
<td>ILOMs for database servers, Exadata Storage Servers, and InfiniBand switches</td>
<td>HTTPS</td>
<td>443</td>
<td>Management</td>
<td>Web (user configurable)</td>
</tr>
<tr>
<td>Any</td>
<td>PDU</td>
<td>HTTPS</td>
<td>443</td>
<td>Management</td>
<td>Browser interface</td>
</tr>
<tr>
<td>Any</td>
<td>KVM</td>
<td>HTTPS</td>
<td>443</td>
<td>Management</td>
<td>Browser interface for MergePoint Utility switch and KVM sessions</td>
</tr>
<tr>
<td>Exadata Storage Servers</td>
<td>SMTPS client</td>
<td>SMTPS</td>
<td>465</td>
<td>Management</td>
<td>Simple Mail Transfer Protocol, Secure (if configured)</td>
</tr>
<tr>
<td>Database servers, Exadata Storage Servers, and ILOMs for database servers, Exadata Storage Servers, and InfiniBand switches</td>
<td>Syslog server</td>
<td>Syslog over UDP</td>
<td>514</td>
<td>Management</td>
<td>Outgoing Syslog</td>
</tr>
<tr>
<td>PDU</td>
<td>Syslog server</td>
<td>Syslog over UDP</td>
<td>514</td>
<td>Management</td>
<td>Outgoing Syslog</td>
</tr>
<tr>
<td>KVM</td>
<td>Syslog server</td>
<td>Syslog over UDP</td>
<td>514</td>
<td>Management</td>
<td>Outgoing Syslog</td>
</tr>
<tr>
<td>Any</td>
<td>ILOMs for database servers, Exadata Storage Servers, and InfiniBand switches</td>
<td>IPMI over UDP</td>
<td>623</td>
<td>Management</td>
<td>IPMI</td>
</tr>
<tr>
<td>Any</td>
<td>plathwsvcd</td>
<td>TCP</td>
<td>723</td>
<td>Management</td>
<td></td>
</tr>
</tbody>
</table>
### Table 2-14 (Cont.) Open Ports for Firewall

<table>
<thead>
<tr>
<th>Source</th>
<th>Target</th>
<th>Protocol</th>
<th>Port</th>
<th>Network</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any</td>
<td>evnd</td>
<td>TCP</td>
<td>791</td>
<td>Management</td>
<td></td>
</tr>
<tr>
<td>Any</td>
<td>partitiond</td>
<td>TCP</td>
<td>867</td>
<td>Management</td>
<td></td>
</tr>
<tr>
<td>Any</td>
<td>Database servers</td>
<td>TCP</td>
<td>1521</td>
<td>Client</td>
<td>Database listener</td>
</tr>
<tr>
<td>Any</td>
<td>KVM</td>
<td>TCP</td>
<td>2068</td>
<td>Management</td>
<td>KVM session data for keyboard and mouse transmission, or for video transmission</td>
</tr>
<tr>
<td>Any</td>
<td>tgtd</td>
<td>TCP</td>
<td>3260</td>
<td>Management</td>
<td>SCSI target daemon</td>
</tr>
<tr>
<td>Any</td>
<td></td>
<td>TCP</td>
<td>3872</td>
<td>Management</td>
<td>Java EM agent</td>
</tr>
<tr>
<td>Any</td>
<td>Cisco Smart Install</td>
<td>TCP</td>
<td>4786</td>
<td>Management</td>
<td>Cisco Smart Install</td>
</tr>
<tr>
<td>Any</td>
<td>ILOMs for database servers, and Exadata Storage Servers</td>
<td>TCP</td>
<td>5120</td>
<td>Management</td>
<td>ILOM remote console: CD</td>
</tr>
<tr>
<td>Any</td>
<td>ILOMs for database servers, and Exadata Storage Servers</td>
<td>TCP</td>
<td>5121</td>
<td>Management</td>
<td>ILOM remote console: keyboard and mouse</td>
</tr>
<tr>
<td>Any</td>
<td>ILOMs for database servers, and Exadata Storage Servers</td>
<td>TCP</td>
<td>5123</td>
<td>Management</td>
<td>ILOM remote console: diskette</td>
</tr>
<tr>
<td>Any</td>
<td>ILOMs for database servers, and Exadata Storage Servers</td>
<td>TCP</td>
<td>5555</td>
<td>Management</td>
<td>ILOM remote console: encryption</td>
</tr>
<tr>
<td>Any</td>
<td>ILOMs for database servers, and Exadata Storage Servers</td>
<td>TCP</td>
<td>5556</td>
<td>Management</td>
<td>ILOM remote console: authentication</td>
</tr>
</tbody>
</table>
### Table 2-14  (Cont.) Open Ports for Firewall

<table>
<thead>
<tr>
<th>Source</th>
<th>Target</th>
<th>Protocol</th>
<th>Port</th>
<th>Network</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any</td>
<td>Oracle Notification Service</td>
<td>TCP</td>
<td>6200</td>
<td>Management</td>
<td>Oracle Notification Service</td>
</tr>
<tr>
<td>ASR Manager</td>
<td>ILOMs for database servers, and Exadata Storage Servers</td>
<td>HTTP</td>
<td>6481</td>
<td>Management</td>
<td>Service tag listener for asset activation</td>
</tr>
<tr>
<td>Any</td>
<td>ILOMs for database servers, and Exadata Storage Servers</td>
<td>TCP</td>
<td>6481</td>
<td>Management</td>
<td>ILOM remote console: Servicetag daemon</td>
</tr>
<tr>
<td>Any</td>
<td>ILOMs for database servers, and Exadata Storage Servers</td>
<td>TCP</td>
<td>7578</td>
<td>Management</td>
<td>ILOM remote console: video</td>
</tr>
<tr>
<td>Any</td>
<td>ILOMs for database servers, and Exadata Storage Servers</td>
<td>TCP</td>
<td>7579</td>
<td>Management</td>
<td>ILOM remote console: serial</td>
</tr>
<tr>
<td>Any</td>
<td>Database servers and Exadata Storage Servers</td>
<td>TCP</td>
<td>7777</td>
<td>Both</td>
<td>Oracle Enterprise Manager Grid Control HTTP console port</td>
</tr>
<tr>
<td>Any</td>
<td>Database servers and Exadata Storage Servers</td>
<td>TCP</td>
<td>7799</td>
<td>Both</td>
<td>Oracle Enterprise Manager Grid Control HTTPS console port</td>
</tr>
<tr>
<td>Any</td>
<td>Oracle WebLogic</td>
<td>TCP</td>
<td>7878</td>
<td>Management</td>
<td>Java WebLogic</td>
</tr>
<tr>
<td>Any</td>
<td>rpc.statd</td>
<td>TCP</td>
<td>21408</td>
<td>Management</td>
<td>rpc.statd</td>
</tr>
<tr>
<td>Any</td>
<td>gpnpd.bin</td>
<td>TCP</td>
<td>19193</td>
<td>Management</td>
<td>gpnpd.bin</td>
</tr>
<tr>
<td>Any</td>
<td>Java agent (yuehou)</td>
<td>TCP</td>
<td>26222</td>
<td>Management</td>
<td>Java agent (yuehou)</td>
</tr>
</tbody>
</table>
Table 2-14  (Cont.) Open Ports for Firewall

<table>
<thead>
<tr>
<th>Source</th>
<th>Target</th>
<th>Protocol</th>
<th>Port</th>
<th>Network</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any</td>
<td>Java agent (sveerana)</td>
<td>TCP</td>
<td>42034 (IPv6)</td>
<td>Management</td>
<td>Java agent (sveerana)</td>
</tr>
<tr>
<td>Any</td>
<td>Java EM Agent</td>
<td>TCP</td>
<td>47632</td>
<td>Management</td>
<td></td>
</tr>
</tbody>
</table>

See Also:

Appendix E, "Managing Oracle Database Port Numbers", in the Oracle Real Application Clusters Installation Guide for Linux and UNIX.
3

Using Oracle Exadata Deployment Assistant

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

**Note:**

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

- Overview of Oracle Exadata Deployment Assistant (page 3-1)
- OEDA Graphical User Interface (page 3-4)
- OEDA Command Line Interface (page 3-30)

**Related Topics:**

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

### 3.1 Overview of Oracle Exadata Deployment Assistant

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

Before Oracle Exadata Rack arrives:

1. Work with your network and database administrators to evaluate the current network settings, such as current IP address use and network configuration.
2. Define the settings for Oracle Exadata Rack, such as network configuration and backup method.
3. Run the deployment assistant, and select the type of system. Options are Oracle Exadata Database Machine, Zero Data Loss Recovery Appliance, and Oracle SuperCluster.

**Note:**

All fields in the deployment assistant are required unless otherwise indicated.

4. Generate the configuration file.
Oracle Exadata Deployment Assistant has two main phases:

In phase 1, the customer provides naming, DNS, NTP, and networking details. This information is collected using the Oracle Exadata Deployment Assistant user interface. A configuration file is generated.

In phase 2, the configuration file is pushed to the database node, and the validation and installation is completed.

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

### 3.1.1 Considerations when Using Oracle Exadata Deployment Assistant

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

Note the following when using Oracle Exadata Deployment Assistant:

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

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

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

- The **backup method** information is used to size the Oracle Automatic Storage Management (Oracle ASM) disk groups created during installation. The amount of usable disk space varies depending on the backup method. The backup methods are as follows:
  
  - **Backups internal to Oracle Exadata Rack** mean database backups are created only on disk in the Fast Recovery Area (FRA). In addition to the database backups, there are other objects such as Archived Redo Logs and Flashback Log Files stored in the FRA. The division of disk space between the DATA disk group and the RECO disk group (the FRA) is 40% and 60%, respectively.
  
  - **Backups external to Oracle Exadata Rack** mean database backups are created on disk or tape media that is external to currently deployed Oracle Exadata Database Machine, and not on existing Exadata Storage Servers. If you are performing backups to disk storage external to Oracle Exadata Database Machine, such as to additional dedicated Exadata Storage Servers, an NFS server, virtual tape library or tape library, then do not reserve additional space in the RECO disk group when using Oracle Exadata Deployment Assistant.

  When choosing this option, the FRA internal to Oracle Exadata Rack contains objects such as archived redo log files and flashback log files. The division of disk space between the DATA disk group and the RECO disk group (the FRA) is 80% and 20%, respectively.
• Oracle recommends the use of high redundancy disk groups for mission critical applications. The location of the backup files depends on the backup method. To reserve more space for the DATA disk group, choose external backups. This is especially important when the RECO disk group is high redundancy. The following table shows the backup options and settings.

Table 3-1 Protection Levels and Backup Methods

<table>
<thead>
<tr>
<th>Description</th>
<th>DATA Group Contains...</th>
<th>RECO Group Contains...</th>
<th>Oracle ASM Redundancy Level for DATA Disk Group</th>
<th>Oracle ASM Redundancy Level for RECO Disk Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Redundancy for ALL</td>
<td>Data files</td>
<td>Archive logs</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Temporary files</td>
<td>Flashback log files</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Online redo logs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Control file</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High Redundancy for DATA</td>
<td>Data files</td>
<td>Archive logs</td>
<td>High</td>
<td>Normal</td>
</tr>
<tr>
<td></td>
<td>Online redo logs</td>
<td>Temporary files</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Control file</td>
<td>Flashback log files</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High Redundancy for Log and RECO</td>
<td>Data files</td>
<td>Online redo logs</td>
<td>Normal</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Temporary files</td>
<td>Control file</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Online redo logs</td>
<td>Archive logs</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Control file</td>
<td>Flashback log files</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal Redundancy</td>
<td>Data files</td>
<td>Online redo logs</td>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td></td>
<td>Temporary files</td>
<td>Archive logs</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Online redo logs</td>
<td>Flashback log files</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Control file</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

Related Topics:
• iana Time Zone Database
• Oracle Exadata System Software User's Guide

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

Starting with the November 2016 release, Oracle Exadata Deployment Assistant supports deployment on Exadata environments that already have non-default root passwords. You can perform the deployment without having to change the root password back to the default. In earlier releases, OEDA expected the root password to be the default on all the servers in an Exadata environment.
With the new non-default password feature, root passwords can be same or different
and/or non-default on each node in a rack. If non-default passwords are already set,
add the “-p” option to the existing command line options when you start up OEDA. For
example:

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

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

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

The following example changes the root password:

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

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

3.2 OEDA Graphical User Interface

When you run the config.sh program, it starts the OEDA graphical user interface.

The OEDA GUI walks you through several configuration details screens, where you
provide information about how your Exadata system should be configured.

3.2.1 Using Oracle Exadata Deployment Assistant

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

Have the following available before running the deployment assistant:

- IP addresses
- Machine names
- DNS information
- NTP information for the rack

The following buttons are available on each Oracle Exadata Deployment Assistant
page:

- Help: View context-sensitive help.
- Import: Import an existing configuration file. The file format is XML.
- Back: View the previous page.
- Next: View the next page.
- Cancel: Cancel the configuration process.

The following procedure describes how to use the deployment assistant:
Notes:

Explanations for each field on the pages are provided in the other sections of this chapter.

1. Ensure the machine that is used to run Oracle Exadata Deployment Assistant has Oracle JRE 1.6 or later.

Accessibility Note: For screen reader and screen magnifier users: Accessibility testing is conducted only on the Windows platform. The JRE version must be 1.7.0_80 for the Java Access Bridge to function correctly with the assistive technology such as JAWS and ZoomText. JRE 1.7.0_80 is shipped with Oracle Exadata Deployment Assistant for Windows in the November 2015 release.

2. Copy the operating system-specific directory to the machine that will run Oracle Exadata Deployment Assistant. The following directories are available:

- linux-x64
- macos-x64
- solaris-sparcv9
- solaris-x64
- windows-i586

Note:

- The deployment assistant is available in the directory of the latest Bundle Patch.
- The operating system-specific directory should match the operating system of the machine that will run the deployment assistant.

3. Start the deployment assistant using one of the following commands:

- On Linux, Apple, or UNIX:
  ./config.sh
- On Microsoft Windows:
  ./config.cmd

The Oracle Exadata Deployment Assistant window appears.

4. Click Next.

5. Enter the customer details on the Customer Details page, and click Next.

6. Select the hardware for the deployment on the Hardware Selection page, and click Next.

7. Enter the customer information on the Define Customer Network page, and click Next.

8. Enter the information for the management network on the Administration Network page, and click Next.
9. Enter the client network information on the Client Ethernet Network page, and click **Next**.

**Note:**
To change the default names of the client network, click **Modify**. After changing the fields, click **Save** to save the changes.

10. Enter the InfiniBand information on the InfiniBand Network page, and click **Next**.

**Note:**
To change the default names of the InfiniBand network, click **Modify**. After changing the fields, click **Save** to save the changes.

11. (Optional) Enter the backup information on the Backup Network page, and click **Next**.

**Note:**
To change the default names of the backup network, click **Modify**. After changing the fields, click **Save** to save the changes.

12. Enter the operating system information on the Identify Compute Node Base OS configuration page, and click **Next**.

13. Review, and edit the information for the management and private networks, and click **Next**.

14. Define the clusters on the Define Clusters page for each cluster, and click **Next**.

15. Review and edit the cluster information for each cluster, and click **Next**.

16. (Optional) Enter the e-mail alert information on the Cell Alerting page, and click **Next**.

17. (Optional) Enter the Oracle Configuration Manager information on the Oracle Configuration Manager page, and click **Next**.

18. (Optional) Enter the Auto Service Request (ASR) information on the Auto Service Request page, and click **Next**.

19. (Optional) Enter the Oracle Enterprise Manager Grid Control information on the Grid Control Agent page, and click **Next**.
20. (Optional) Enter additional information about the deployment in the text field. Information entered in the field appears at the bottom of the InstallationTemplate.html file.

21. Click Next to create the configuration file.

22. Enter a file name, and click OK to create the file, or Cancel to not create the file.

23. Copy the configuration files to a directory in the /u01 directory, such as the /u01/oeda directory, on the first database server in Oracle Exadata Rack.

The file is located in the /tmp/OneCommand directory on Linux, Apple, and UNIX systems, and the drive:\OneCommand directory on Microsoft Windows systems. The drive depends on the where deployment assistant was run on the Microsoft Windows system.

### See Also:

"Running Oracle Exadata Deployment Assistant on Windows" in Oracle Exadata System Software User’s Guide

### 3.2.2 Customer Details Configuration Page

Define the customer information on this page. Table 3-2 (page 3-7) lists the customer details fields.

### Note:

The domain specified on this page is used as the domain for all networks. If different domains are used for the client and backup networks, then specify the administration network on this page. The client and backup networks can be changed on the Review and Edit SCAN, Client, VIP and Optional Backup Networks page.

### Table 3-2  Customer Details Page

<table>
<thead>
<tr>
<th>Customer Details Field</th>
<th>Description</th>
</tr>
</thead>
</table>
| Customer name                | Identifies the customer.  
Note: The name can contain any alphanumeric characters, including spaces. The field cannot be empty. |
| Application                  | Identifies the application used with the rack.                              |
| Network Domain Name          | Identifies the network domain.  
Note: Use lowercase letters for the name. |
Table 3-2 (Cont.) Customer Details Page

<table>
<thead>
<tr>
<th>Customer Details Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name Prefix</td>
<td>Defines the prefix for network interfaces. <strong>Note:</strong> The prefix can contain any alphanumeric character. The prefix cannot contain spaces. The maximum length is 20 characters. The field cannot be empty. The default is dm01. <strong>Example:</strong> A value of dm01 results in a database server host name of dm01db01, and a storage server host name of dm01cel01.</td>
</tr>
<tr>
<td>Region</td>
<td>Sets the region for the rack. <strong>Note:</strong> Select a region from the list.</td>
</tr>
<tr>
<td>Timezone</td>
<td>Sets the time zone where the rack will be installed. <strong>Note:</strong> The time zones shown are based on the selected region.</td>
</tr>
</tbody>
</table>

3.2.3 Hardware Selection Configuration Page

Select your hardware from the list on the left. The list on the right contains the hardware for your environment.

3.2.4 Rack Details Configuration Page

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

3.2.5 Customer Network Configuration Page

*Table 3-3* (page 3-8) lists the number of required IP addresses for the customer network.

Table 3-3 Customer Network Configuration Page

<table>
<thead>
<tr>
<th>Customer Details Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bonded/Non-Bonded</td>
<td>Identifies type of network bonding. <strong>Note:</strong> The Admin and InfiniBand networks are non-bonded networks. This field is not available on X7 systems.</td>
</tr>
<tr>
<td>Subnet Mask</td>
<td>Sets the IP address mask for the subnet.</td>
</tr>
</tbody>
</table>
### Table 3-3 (Cont.) Customer Network Configuration Page

<table>
<thead>
<tr>
<th>Customer Details Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gateway</td>
<td>Sets the IP address for the gateway.</td>
</tr>
<tr>
<td>Client or Backup Network Format</td>
<td>Selects the Ethernet cards, based on cable type.</td>
</tr>
<tr>
<td><strong>Options prior to X7-2:</strong></td>
<td></td>
</tr>
<tr>
<td>• 1/10 GbE Base-T when using copper cables</td>
<td></td>
</tr>
<tr>
<td>• 10 GbE Optical when using fiber optic</td>
<td></td>
</tr>
<tr>
<td>cables</td>
<td></td>
</tr>
<tr>
<td><strong>Note:</strong></td>
<td>The Admin network uses 1/10 GbE Base-T Ethernet cables. The network format</td>
</tr>
<tr>
<td></td>
<td>for the private network is InfiniBand.</td>
</tr>
<tr>
<td><strong>Options for X7-2 Systems:</strong></td>
<td></td>
</tr>
<tr>
<td>On X7-2 systems, there are 3 available</td>
<td></td>
</tr>
<tr>
<td>formats for client and backup networks.</td>
<td></td>
</tr>
<tr>
<td>• RJ45/SFP28 Combined on Motherboard</td>
<td></td>
</tr>
<tr>
<td>• RJ45 10 GBit</td>
<td></td>
</tr>
<tr>
<td>• SFP28 10 GBit</td>
<td></td>
</tr>
<tr>
<td>• SFP28 25GBit</td>
<td></td>
</tr>
<tr>
<td>• SFP28 PCI Dual Port Card</td>
<td></td>
</tr>
<tr>
<td>• SFP28 10 GBit</td>
<td></td>
</tr>
<tr>
<td>• SFP28 25GBit</td>
<td></td>
</tr>
<tr>
<td>• RJ45 PCI Quad Port Card (extra cost option)</td>
<td></td>
</tr>
<tr>
<td><strong>Options for X7-8 Systems:</strong></td>
<td></td>
</tr>
<tr>
<td>On X7-8 systems, there are 2 available</td>
<td></td>
</tr>
<tr>
<td>formats for client and backup networks:</td>
<td></td>
</tr>
<tr>
<td>• RJ45 on Motherboard</td>
<td></td>
</tr>
<tr>
<td>• SFP28 PCI Dual Port Cards</td>
<td></td>
</tr>
<tr>
<td>• SFP28 10 GBit</td>
<td></td>
</tr>
<tr>
<td>• SFP28 25GBit</td>
<td></td>
</tr>
<tr>
<td>If you select one of the SFP28 network types</td>
<td></td>
</tr>
<tr>
<td>on X7-2 or X7-8 systems, you must</td>
<td></td>
</tr>
<tr>
<td>additionally specify whether to use 10 GBit</td>
<td></td>
</tr>
<tr>
<td>or 25 GBit connections.</td>
<td></td>
</tr>
<tr>
<td><strong>Available Network:</strong></td>
<td>Enables an additional subnet for backup, replication, or data recovery.</td>
</tr>
<tr>
<td><strong>Note:</strong></td>
<td>This subnet is optional.</td>
</tr>
<tr>
<td><strong>Advanced Options</strong></td>
<td>Click this button to display VLAN options.</td>
</tr>
</tbody>
</table>
### Table 3-3  (Cont.) Customer Network Configuration Page

<table>
<thead>
<tr>
<th>Customer Details Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>VLAN ID</td>
<td>This field is displayed only when the Advanced Options button is clicked. For the Admin network, the VLAN ID is a numeric value between 1 and 4079. If this field is empty, then VLAN is not enabled. For the Client network, the VLAN ID is a numeric value between 1 and 4095. You also need to select the &quot;Bonded&quot; option to enable VLAN. If the VLAN ID field is empty, then VLAN is not enabled. For the Backup network, the VLAN ID is a numeric value between 1 and 4095. If the VLAN ID field is empty, then VLAN is not enabled. If the Backup network uses VLAN, then the Client network must also be configured to use VLAN. You also need to select the &quot;Bonded&quot; option for the Backup network to enable VLAN. If the backup network shares the same cable as the client network, ensure that: • the &quot;Share Client Network ports&quot; box is selected, and • the &quot;Network Format&quot; is the same type for both client and backup networks. Note that for all networks, the customer is responsible for configuring VLAN on the switch.</td>
</tr>
</tbody>
</table>

---

**Note:**

Each IP address pool should consist of consecutive IP addresses. If consecutive IP addresses are not available, then modify the IP addresses at the end of the Oracle Exadata Deployment Assistant process.

---

### 3.2.6 Administration Network Configuration Page

Each database server and Exadata Storage Server has two network interfaces for administration. One network provides management access to the operating system through the Ethernet interface, and the other network provides access to the Integrated Lights Out Manager (ILOM) through the ILOM Ethernet interface.

The following table lists the administration network fields. Sample host name formats are shown, based on the prefix entered on the Customer Details page. To modify the name formats, click **Modify**.
### Table 3-4  Administration Network Page

<table>
<thead>
<tr>
<th>Administration Network Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starting IP Address for Pool</td>
<td>Assigns the starting IP address for the administration network port of the servers, and switches.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> These addresses are also assigned to the ILOM ports on the database and storage servers. The pool should consist of consecutive IP addresses. If consecutive IP addresses are not available, then specific IP addresses can be modified during the configuration process.</td>
</tr>
<tr>
<td>Pool Size</td>
<td>Defined by the hardware selection.</td>
</tr>
<tr>
<td>Ending IP Address for Pool</td>
<td>Defined by the starting IP address and the pool size.</td>
</tr>
<tr>
<td>Is the default gateway for database servers</td>
<td>Specifies that the gateway IP address is the default gateway for the database servers.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> This option is not usually selected for the database servers.</td>
</tr>
<tr>
<td>Defines the Hostname for the Compute Nodes</td>
<td>Select this option if the adapter name defines the host names for the database servers.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> This option is usually selected for the database servers.</td>
</tr>
</tbody>
</table>

**Related Topics:**
- [Overview of Network Requirements](#) (page 2-1)

#### 3.2.6.1 Modifying the Default Administration Network Host Names

Default administration network host names are usually changed to meet corporate naming standards or compatibility with existing systems. **Table 3-5** (page 3-12) lists the administration network format mask fields.

**Note:**
- Oracle recommends using the same starting IDs for the servers and server ILOMs.
- All fields must be filled in.
- The percent signs (%) in the names are replaced by the numbers entered into the Starting ID fields.
Table 3-5  Administration Network Format Masks Page

<table>
<thead>
<tr>
<th>Administration Network Format Masks Field</th>
<th>Description</th>
</tr>
</thead>
</table>
| Compute Node Name                        | Sets the administration name for the first database server in this rack.  
  | Note: The name contains alphanumeric characters. |
| Compute Node Starting ID                 | Defines the starting numeric ID for the first database server in this rack. |
| Compute ILOM Name                        | Sets the administration name for the first database server ILOM in this rack.  
  | Note: The name contains alphanumeric characters. |
| Compute ILOM Starting ID                 | Defines the starting numeric ID for the first database server ILOM in this rack. |
| Cell Node Name                           | Sets the administration name for the first Exadata Storage Server in this rack.  
  | Note: The name contains alphanumeric characters. |
| Cell Node Starting ID                    | Defines the starting numeric ID for the first Exadata Storage Server in this rack.  
  | Note: |
| Cell Node ILOM                           | Sets the administration name for the first Exadata Storage Server ILOM in this rack.  
  | Note: The name contains alphanumeric characters. |
| Cell ILOM Starting ID                    | Defines the starting numeric ID for the first Exadata Storage Server ILOM in this rack.  
  | Note: |
| Cisco Switch                             | Sets the administration name for the Cisco switch in this rack.  
  | Note: The name contains alphanumeric characters. |
| KVM Switch                               | Sets the administration name for the KVM switch in this rack.  
  | Note: The name contains alphanumeric characters. |
| PDU-A                                    | Sets the administration name for PDU-A (power distribution unit A) in this rack.  
  | Note: The name contains alphanumeric characters. |
| PDU-B                                    | Sets the administration name for PDU-B in this rack.  
  | Note: The name contains alphanumeric characters. |
Table 3-5  (Cont.) Administration Network Format Masks Page

<table>
<thead>
<tr>
<th>Administration Network Format Masks Field</th>
<th>Description</th>
</tr>
</thead>
</table>
| InfiniBand Spine                         | Sets the administration name for the InfiniBand spine switch in this rack.  
  **Note:**  
  The name contains alphanumeric characters. |
| InfiniBand Leaf                          | Sets the administration name for the first InfiniBand leaf switch in this rack.  
  **Note:**  
  The name contains alphanumeric characters. |
| InfiniBand Leaf                          | Sets the administration name for the second InfiniBand leaf switch in this rack.  
  **Note:**  
  The name contains alphanumeric characters. |

3.2.7 Client Ethernet Configuration Page

Applications access the database through the client Ethernet network using Single Client Access Name (SCAN) and Oracle RAC Virtual IP (VIP) addresses.

If VLAN tagging is to be used, then it must be enabled by the customer after the initial deployment. See the My Oracle Support notes for details.

The following table lists the client network fields. Sample database client name formats are based on the prefix entered on the Customer Details page. To modify the name formats, click **Modify**.

Table 3-6  Client Ethernet Page

<table>
<thead>
<tr>
<th>Client Ethernet Field</th>
<th>Description</th>
</tr>
</thead>
</table>
| Starting IP Address for Pool             | Assigns the starting IP address for the client network port of the servers, and switches.  
  **Note:** These addresses are also assigned to the ILOM ports on the database and storage servers.  
  The pool should consist of consecutive IP addresses. If consecutive IP addresses are not available, then specific IP addresses can be modified during the configuration process. |
| Pool Size                                | Defined by the hardware selection. |
| Ending IP Address for Pool               | Defined by the starting IP address and the pool size. |
| Is the default gateway for database servers | Specifies that the gateway IP address is the default gateway for the database servers.  
  **Note:** This option is usually selected for the database servers. |
Table 3-6  (Cont.) Client Ethernet Page

<table>
<thead>
<tr>
<th>Client Ethernet Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defines the Hostname for the Compute Nodes</td>
<td>Specifies that the adapter name defines the host names for the database servers.</td>
</tr>
<tr>
<td></td>
<td>Note: This option is not usually selected for the database servers.</td>
</tr>
</tbody>
</table>

Related Topics:

- Overview of Network Requirements (page 2-1)
- Enabling 802.1Q VLAN Tagging in Exadata Database Machine over client networks (My Oracle Support Doc ID 1423676.1)
- Implementing Tagged VLAN Interfaces in Oracle VM Environments on Exadata (My Oracle Support Doc ID 2018550.1)

3.2.7.1 Modifying the Default Client Ethernet Network Names

Default client network names are usually changed to meet corporate naming standards or compatibility with existing systems. The following table lists the client network format mask fields.

Note:

- All fields must be filled in.
- The percent signs (%) in the names are replaced by the numbers entered into the Starting ID fields.

Table 3-7  Client Network Format Masks Page

<table>
<thead>
<tr>
<th>Client Network Format Masks Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Client Access Name</td>
<td>Assigns the client access name for this rack.</td>
</tr>
<tr>
<td>Note: The name contains alphanumeric characters.</td>
<td></td>
</tr>
<tr>
<td>Client Access Starting ID</td>
<td>Assigns the starting numeric ID for the client access name in this rack.</td>
</tr>
<tr>
<td>VIP Name</td>
<td>Assigns the VIP name for this rack.</td>
</tr>
<tr>
<td>Note: The name contains alphanumeric characters.</td>
<td></td>
</tr>
<tr>
<td>VIP Starting ID</td>
<td>Sets the starting numeric ID for the VIP name in this rack.</td>
</tr>
<tr>
<td>SCAN Details</td>
<td>Assigns the SCAN name for this rack.</td>
</tr>
<tr>
<td>Note: The name contains alphanumeric characters.</td>
<td></td>
</tr>
</tbody>
</table>
3.2.8 InfiniBand Network Configuration Page

The InfiniBand network is the private network between database servers and storage servers. The following table lists the InfiniBand network fields.

**Note:**
Sample name formats are based on the prefix entered on the Customer Details page. To modify the name formats, click **Modify**.

### Table 3-8 InfiniBand Network Page

<table>
<thead>
<tr>
<th>InfiniBand Network Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starting IP Address for Pool</td>
<td>Assigns the starting IP address for the private network port. <strong>Note:</strong> The pool should consist of consecutive IP addresses. If consecutive IP addresses are not available, then specific IP addresses can be modified during the configuration process.</td>
</tr>
<tr>
<td>Pool Size</td>
<td>Defined by the hardware selection.</td>
</tr>
<tr>
<td>Ending IP Address for Pool</td>
<td>Defined by the starting IP address and the pool size.</td>
</tr>
</tbody>
</table>

**Related Topics:**
- [Overview of Network Requirements](page 2-1)

#### 3.2.8.1 Modifying the Default InfiniBand Network Names

The following table lists the InfiniBand network format mask fields.

**Note:**
The percent signs (%) in the names are replaced by the numbers entered into the Starting ID fields.

### Table 3-9 Private (IB) Network Format Masks Page

<table>
<thead>
<tr>
<th>Private (IB) Network Format Masks Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compute Private Name</td>
<td>Sets the InfiniBand access name for the database servers. <strong>Note:</strong> The name contains alphanumeric characters. This field cannot be empty.</td>
</tr>
</tbody>
</table>
### 3.2.9 Backup Network Configuration Page

The following table lists the backup network fields.

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Note: The pool should consist of consecutive IP addresses. If consecutive IP addresses are not available, then IP addresses can be modified during the configuration process.</td>
</tr>
</tbody>
</table>

#### Table 3-10  Backup/Data Guard Ethernet Network Page

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Note: The ID contains numeric characters. This field cannot be empty.</td>
</tr>
</tbody>
</table>

### Related Topics:
- [Additional Networks](page 2-19)

#### 3.2.9.1 Modifying the Default Backup Network Name

The following table lists the backup network format mask fields.
Note:
The percent signs (%) in the names are replaced by the numbers entered into the Starting ID fields.

<table>
<thead>
<tr>
<th>Table 3-11 Backup Network Format Masks Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Backup Network Format Masks Field</strong></td>
</tr>
<tr>
<td>Name</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Starting ID</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

3.2.10 Identify Compute Node OS and Enable Capacity-on-Demand Configuration Page

Operating system configuration is based on processor type. Oracle Exadata Racks with Intel processors support Oracle Linux.

Click **Enable Capacity-on-Demand** to reduce the initial number of active cores on the servers, and then set the number of active cores.

3.2.11 Review and Edit Management and Private Networks

Review and update entries for the node specific data for the Management, ILOM, and private networks for the compute nodes, storage cells, and the switches used in the rack.

To check the validity of the network configuration data, click the **Lookup IP** button. OEDA will highlight fields in red if:

- The IP address or host name could not be resolved through DNS lookup
- The user input differs from what is the DNS and the fields were edited to match the DNS

If you go back and make changes to any of the previous configuration pages, click **Regenerate Data** on this page, and then click **Next**.

Accessibility note for screen reader users: The **Lookup IP** button in this screen provides no feedback to a screen reader user once it is activated. The node names are checked using DNS lookup when this button is activated and any node name that cannot be resolved will have an asterisk prefixed to the name of the field. You may hear the word “star” in front of such fields.

For screen magnifier users: There is text above the **Lookup IP** button that indicates that fields with an asterisk indicate node names that could not be resolved through
DNS lookup. Such fields also have a red box around them. The **Lookup IP** also highlights the field in red if the user input differs from what is found in DNS.

### 3.2.12 Define Clusters

More than one cluster can be defined for Oracle Exadata Rack environments. Larger environments support multiple clusters. Each cluster requires a minimum of two physical database servers, and three Exadata Cells.

If one cluster is used, then click **All** to move all components to the cluster. If more then one cluster is used, then enter the number of clusters. For each cluster, select its subtab, then select the components for the cluster, and then click **Add**.

### 3.2.13 Define Clusters Details

The following table lists the cluster fields. Most fields are filled in based on earlier configuration pages.

**Table 3-12  Cluster Configuration Page**

<table>
<thead>
<tr>
<th>OS Field</th>
<th>Description</th>
</tr>
</thead>
</table>
| Cluster name   | Assigns the cluster name.  
**Note:** The name can contain alphanumeric characters, periods (.), and hyphens (-). The name must start with an alphanumeric character.  
This field cannot be empty.  
| Prefix          | Assigns the prefix for the cluster.  
| DNS             | Sets the DNS IP Address.  
**Note:** At least one IP address must be entered.  
| NTP             | Sets the NTP IP Address.  
**Note:** At least one IP address must be entered.  
| Domain Name     | Sets the cluster domain name.  
| Region          | Sets the region for the cluster.  
| Timezone        | Sets the time zone for the cluster.  
| Role Separated  | Allows the responsibilities and privileges to be separated by role.  
**Note:** Providing system privileges for the storage tier using the SYSASM privilege instead of the SYSDBA privilege provides a clear division of responsibility between Oracle ASM administration and database administration.  
When used with Oracle ASM and database-scoped security, role separation helps to prevent different databases using the same storage from accidentally overwriting each other’s files. |
### Table 3-12  (Cont.) Cluster Configuration Page

<table>
<thead>
<tr>
<th>OS Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>User name</td>
<td>Sets the user name for the database owner. This option is not available if using role-separated authentication.</td>
</tr>
<tr>
<td>User ID</td>
<td>Assigns the database owner ID. This option is not available if using role-separated authentication.</td>
</tr>
<tr>
<td>User base</td>
<td>Sets the database directory. This option is not available if using role-separated authentication.</td>
</tr>
<tr>
<td>DBA Group name</td>
<td>Sets the DBA group name. This option is not available if using role-separated authentication.</td>
</tr>
<tr>
<td>DBA Group ID</td>
<td>Assigns the DBA group ID. This option is not available if using role-separated authentication.</td>
</tr>
<tr>
<td>Grid ASM Home OS User</td>
<td>Sets the Oracle ASM owner name. The default value is <code>grid</code>. This is the user that owns the Oracle Grid Infrastructure installation. This option is available when using role-separated authentication.</td>
</tr>
<tr>
<td>Grid ASM Home OS User ID</td>
<td>Assigns Oracle ASM owner ID. The default value is <code>1000</code>. This option is available when using role-separated authentication.</td>
</tr>
<tr>
<td>Grid ASM Home base</td>
<td>Sets the Oracle grid infrastructure directory. The default value is <code>/u01/app/grid</code>. This option is available when using role-separated authentication.</td>
</tr>
<tr>
<td>OS Field</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>ASM Home Oper Group</td>
<td>Sets the Oracle ASM operator group name. The default value is <code>asmoper</code>. This group of operating system users has a limited set of Oracle instance administrative privileges including starting up and stopping the Oracle ASM instance. This option is available when using role-separated authentication.</td>
</tr>
<tr>
<td>ASM Home Oper Group ID</td>
<td>Assigns the Oracle ASM operator group ID. The default value is <code>1005</code>. This option is available when using role-separated authentication.</td>
</tr>
<tr>
<td>ASM Home Admin Group</td>
<td>Sets the Oracle ASM administration group name. The default value is <code>asmadmin</code>. This group uses SQL to connect to an Oracle ASM instance as SYSASM using operating system authentication. The SYSASM privileges permit mounting and dismounting of disk groups, and other storage administration tasks. SYSASM privileges provide no access privileges on an Oracle Database instance. This option is available when using role-separated authentication.</td>
</tr>
<tr>
<td>ASM Home Admin Group ID</td>
<td>Assigns the Oracle ASM administration group ID. The default value is <code>1006</code>. This option is available when using role-separated authentication.</td>
</tr>
<tr>
<td>RDBMS Home OS User</td>
<td>Sets the Oracle Database installation owner name. The default value is <code>oracle</code>. This option is available when using role-separated authentication.</td>
</tr>
<tr>
<td>RDBMS Home OS User ID</td>
<td>Assigns the Oracle Database installation owner ID. The default value is <code>1001</code>. This option is available when using role-separated authentication.</td>
</tr>
<tr>
<td>RDBMS Home base</td>
<td>Sets the Oracle Database installation directory. The default value is <code>/u01/app/oracle</code>. This option is available when using role-separated authentication.</td>
</tr>
<tr>
<td>RDBMS DBA Group</td>
<td>Sets the DBA group name. The default value is <code>dba</code>. This option is available when using role-separated authentication.</td>
</tr>
<tr>
<td>RDBMS DBA Group ID</td>
<td>Assigns the DBA group ID. The default value is <code>1002</code>. This option is available when using role-separated authentication.</td>
</tr>
</tbody>
</table>
Table 3-12  (Cont.) Cluster Configuration Page

<table>
<thead>
<tr>
<th>OS Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RDBMS Home Oper Group</td>
<td>Sets the Oracle Database operator group name. The default value is racoper. This option is available when using role-separated authentication.</td>
</tr>
<tr>
<td>RDBMS Home Oper Group ID</td>
<td>Assigns the Oracle Database operator group ID. The default value is 1003. This option is available when using role-separated authentication.</td>
</tr>
<tr>
<td>OINSTALL group</td>
<td>Sets the Oracle Inventory group name. The default value is oinstall.</td>
</tr>
<tr>
<td>OINSTALL Group ID</td>
<td>Assigns the Oracle Inventory group ID. The default value is 1001.</td>
</tr>
<tr>
<td>Inventory Location</td>
<td>Sets the Oracle inventory (oraInventory) directory path. The default value is /u01/app/oraInventory.</td>
</tr>
<tr>
<td>Grid Infrastructure Home</td>
<td>Sets the Grid Infrastructure database release and the directory path. The default value is /u01/app/release_number/grid.</td>
</tr>
<tr>
<td>Database Home Location</td>
<td>Sets the Oracle Database release and the directory path. The default value is /u01/app/oracle/product/release_number/dbhome_1.</td>
</tr>
<tr>
<td>Software Languages</td>
<td>Defines the languages installed for the database. The default value is English (en).</td>
</tr>
<tr>
<td>Diskgroup Layout</td>
<td>Sets the disk group layout. The options are:</td>
</tr>
<tr>
<td></td>
<td>• 80% 20% for DATA and RECO when using external backups.</td>
</tr>
<tr>
<td></td>
<td>• 40% 60% for DATA and RECO when using internal backups.</td>
</tr>
<tr>
<td></td>
<td>The disk group layout options with sparse disk group are:</td>
</tr>
<tr>
<td></td>
<td>• 72% 18% 10% for DATA, RECO, and SPARSE when using external backups.</td>
</tr>
<tr>
<td></td>
<td>• 34% 56% 10% for DATA, RECO, and SPARSE when using internal backups.</td>
</tr>
<tr>
<td></td>
<td>Note: On X7 systems, you cannot specify any sizes for the DBFS_DG.</td>
</tr>
<tr>
<td>Virtual Guest Size</td>
<td>Sets the size of a virtual guest. The options are Small, Medium, and Large. You can use the sliders to customize the definitions of small, medium, and large for your environment.</td>
</tr>
</tbody>
</table>
Table 3-12  (Cont.) Cluster Configuration Page

<table>
<thead>
<tr>
<th>OS Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guest Image Version</td>
<td>Sets the image version for virtual guests. The options are default and 12.1.2.<em>.</em>. Selecting the default option sets the guest image version to match dom0's image version. <strong>Note:</strong> The guest image version needs to be the same as or earlier than dom0's image version.</td>
</tr>
<tr>
<td>DBFS DiskGroup</td>
<td>Sets the DBFS disk group name. <strong>Note:</strong> This field does not exist for X7 systems.</td>
</tr>
<tr>
<td>DATA Disk Group</td>
<td>Sets the DATA disk group name, redundancy and size. The redundancy options are NORMAL and HIGH. <strong>Note:</strong> Oracle recommends the use of HIGH redundancy disk groups for mission critical applications.</td>
</tr>
<tr>
<td>RECO Disk Group</td>
<td>Sets the RECO name, redundancy and size. The redundancy options are NORMAL and HIGH. <strong>Note:</strong> Oracle recommends the use of HIGH redundancy disk groups for mission critical applications.</td>
</tr>
<tr>
<td>Sparse Disk Group</td>
<td>Sets the sparse disk group name, redundancy, and size. The redundancy options are NORMAL and HIGH. Click the Advanced Options button, and then select Enable Sparse Disk Group. <strong>Note:</strong> To create a sparse disk group, the version of Grid Infrastructure needs to be 12.1.0.2 BP5 or later.</td>
</tr>
<tr>
<td>Database name</td>
<td>Sets the database name.</td>
</tr>
<tr>
<td>Block size</td>
<td>Sets the database block size. The default value is 8192. To use a different block size, select the block size from the list</td>
</tr>
<tr>
<td>Database Type</td>
<td>Defines the type of workload that runs on the database. The options are OLTP for online transaction processing, and DW for data warehouse.</td>
</tr>
<tr>
<td>Base Adapter</td>
<td>Sets the physical network for the client network. The default value is client. <strong>Note:</strong> Oracle recommends using the default.</td>
</tr>
<tr>
<td>Domain</td>
<td>Defined on the Customer Details page.</td>
</tr>
<tr>
<td>Start IP</td>
<td>Defined on the Customer Details page.</td>
</tr>
<tr>
<td>Pool Size</td>
<td>Defined on the Customer Details page.</td>
</tr>
<tr>
<td>Gateway IP</td>
<td>Defined on the Customer Details page.</td>
</tr>
<tr>
<td>VLAN ID</td>
<td>Specifies a VLAN tag on a per cluster basis. This is a numeric value between 1 and 4095.</td>
</tr>
</tbody>
</table>
Table 3-12 (Cont.) Cluster Configuration Page

<table>
<thead>
<tr>
<th>OS Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name Mask</td>
<td>Defined on the Customer Details page.</td>
</tr>
<tr>
<td>Start Id</td>
<td>Defined on the Customer Details page.</td>
</tr>
<tr>
<td>VIP Name mask</td>
<td>Defined on the Customer Details page.</td>
</tr>
<tr>
<td>Start Id</td>
<td>Defined on the Customer Details page.</td>
</tr>
<tr>
<td>SCAN Name</td>
<td>Defined on the Customer Details page.</td>
</tr>
<tr>
<td>Base Adapter</td>
<td>Sets the backup network. The options are Not in use, and Backup.</td>
</tr>
<tr>
<td>Domain</td>
<td>Defined on the Customer Details page.</td>
</tr>
<tr>
<td>Start IP</td>
<td>Defined on the Customer Network page.</td>
</tr>
<tr>
<td>Pool size</td>
<td>Defined on the Customer Network page.</td>
</tr>
<tr>
<td>Name mask</td>
<td>Defined on the Customer Network page.</td>
</tr>
<tr>
<td>Start Id</td>
<td>Defined on the Customer Network page.</td>
</tr>
</tbody>
</table>

See Also:
- "Setting up Oracle Exadata Storage Snapshots" chapter in the Oracle Exadata System Software User's Guide for information about sparse disk groups.

3.2.13.1 Configuring Automatic Cluster File System (ACFS)

Note:
Automatic Cluster File System (ACFS) requires Grid Infrastructure 12.1.0.2 or later.

To configure ACFS during software deployment, perform these steps:
1. On the "Define Clusters Details" page, click the Advanced Options button.
2. In the pop-up window, select Enable ACFS Configuration, and click OK.
3. Click the Configure ACFS button in the Disk Group Details pane, which opens a pop-up window.
5. In the Disk Group dropdown, select the disk group in which you would like to create ACFS.
6. For **ACFS Volume Name**, accept the default volume name, or enter a new ACFS volume name.  
   The volume name must be between 1 and 11 alphanumeric characters, and must start with an alphabetic character.

7. For **ACFS Volume Size**, enter the desired size of the ACFS volume.

8. For **ACFS Mount Point**, accept the default mount point, or enter a new ACFS mount point.

### 3.2.14 Review and Edit SCAN, Client, VIP and Optional Backup Networks

Review and update entries for the clusters and client network, then click **Re-Generate Data**, and then click **Next**.

**Note:**  
The domain specified on Customer Details page is used as the domain for all networks. If different domains are used for the client and backup networks, then specify those domains on this page.

### 3.2.15 Cell Alerting Configuration Page

Cell alert delivery may be configured during or after installation.

Cell alerts can be delivered using Simple Mail Transfer Protocol (SMTP), Simple Network Management Protocol (SNMP), or both. The following table lists the cell alert configuration options.

<table>
<thead>
<tr>
<th><strong>Table 3-13 Cell Alerting Configuration Page</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cell Alerting Field</strong></td>
</tr>
<tr>
<td>Enable Email Alerting</td>
</tr>
<tr>
<td>Recipients Addresses</td>
</tr>
</tbody>
</table>
| SMTP Server | Sets the SMTP e-mail server used to send alert notifications  
**Example:** mail.example.com |
| Uses SSL | Enables Secure Socket Layer (SSL) security when sending alert notifications  
**Example:** uses secure connection |
| Port | Sets the SMTP e-mail server port used to send alert notifications  
**Example:** 25 or 465 |
Table 3-13  (Cont.) Cell Alerting Configuration Page

<table>
<thead>
<tr>
<th>Cell Alerting Field</th>
<th>Description</th>
</tr>
</thead>
</table>
| Name                | Sets the SMTP e-mail user name that appears in the alert notifications.  
**Example:** Oracle Exadata Database Machine |
| Email Address       | Sets the SMTP e-mail address that sends alert notifications.  
**Example:** dm01@example.com |
| Enable SNMP Alerting| Enables using SNMP to deliver alerts. |
| SNMP Server         | Sets the SNMP server host name.  
**Example:** snmp.example.com  
**Note:** Additional SNMP targets may be defined after installation. Refer to *Oracle Exadata System Software User’s Guide*. |
| Port                | Sets the SNMP server port. The default value is 162. |
| Community           | Sets the SNMP server community. The default value is public. |

**Related Topics:**  
- *Oracle Exadata System Software User’s Guide*

### 3.2.16 Platinum Configuration Page

Oracle Platinum Service provides enhanced support at no additional cost for qualified engineered systems. This is a connected service and requires Oracle Advanced Support Gateway (OASG) to be provisioned within the environment. The configuration for OASG is defined with the user information that is used by the Platinum Service monitoring agent. The following table lists the Oracle Platinum Service configuration options.

Table 3-14  Platinum Configuration Page.

<table>
<thead>
<tr>
<th>Platinum Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capture data for Platinum config.</td>
<td>Enables collection of Oracle Platinum Service configuration.</td>
</tr>
</tbody>
</table>
| Customer Name                   | Defined on the Customer Details page. This field can be edited.  
**Note:** The customer name must match the My Oracle Support portrait name. |
| CSI                             | Sets the hardware customer support identifier (CSI) for the system. |
| My Oracle Support email         | Sets the e-mail address for access to the system CSI. |
| Use Existing Gateway            | Enables use of an existing OASG gateway. |
Table 3-14  (Cont.) Platinum Configuration Page.

<table>
<thead>
<tr>
<th>Platinum Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gateway Machine Description</td>
<td>Describes the gateway system, such as Oracle Exadata Database Machine X4-2.</td>
</tr>
<tr>
<td>Platinum Gateway Hostname</td>
<td>Sets the OASG host name. Name format is <code>ct-customer_name-2_digit_number</code>.</td>
</tr>
<tr>
<td>Primary IP Address</td>
<td>Sets the primary IP address for OASG.</td>
</tr>
<tr>
<td>Subnet Mask</td>
<td>Sets the subnet mask for the OASG primary network.</td>
</tr>
</tbody>
</table>
| VPN                             | Sets the VPN connection type for access to the gateway from Oracle Continuously Connected Network (OCCN). SSL is the default method.  
  Note: Oracle recommends using Secure Socket Layer (SSL). |
| Gateway to Exadata Link         | Defines the OASG location in the network.                                                      |
  Note: Oracle recommends using DMZ as the connection. |
| Static Routes                   | Lists the number of static routes. Click Modify to change the routes for the gateway.         |
  Static Routes: Destination Network  
  This field is available after clicking Modify. | Defines the remote network for the router. Network format is CIDR format, such as 192.0.2.1/255. |
  Static Routes: Gateway IP       | Defines the remote network gateway IP address. The address must be in the OASG primary IP subnet. |
  This field is available after clicking Modify. |
| Gateway machine has an ILOM     | Specifies that OASG is an Oracle system with an ILOM service processor.                         |
| ILOM IP Address                 | Sets the ILOM IP address.                                                                      |
| Subnet Mask                     | Sets the ILOM subnet mask.                                                                      |
| Gateway IP Address              | Sets the OASG ILOM primary subnet gateway.                                                      |
| HTTP Proxy Required             | Enables a proxy service for OASG to connect to the required Oracle sites.                      |
| Proxy Hostname                  | Sets the proxy host name used to connect to Oracle sites.                                      |
| Port                            | Sets the proxy port number.                                                                    |
| HTTP Proxy Requires Authentication | Enables authentication for the proxy network traffic.                                      |
| Proxy Username                  | Sets the OASG user name to connect to the proxy. The password is provided by the Oracle         |
|                                 | engineer during installation.                                                                 |
| Agent OS User name              | Sets the user name for the Platinum agent.                                                      |
|                                 | The default name is `orarom`.                                                                  |
Table 3-14  (Cont.) Platinum Configuration Page.

<table>
<thead>
<tr>
<th>Platinum Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allow Agent sudo privileges</td>
<td>Allows the Agent OS user sudo privileges. Selecting this option allows Oracle service engineers to collect logs and other information for a service request.</td>
</tr>
<tr>
<td>Agent OS Group name</td>
<td>Sets the Platinum group name. The default name is orarom. The messages file on Linux systems is changed to allow the Platinum agent the ability to read the file.</td>
</tr>
<tr>
<td>Agent OS Group ID</td>
<td>Assigns the Agent group ID. The default ID is 1010.</td>
</tr>
<tr>
<td>Agent OS User home</td>
<td>Sets the home directory for the Platinum agent user.</td>
</tr>
<tr>
<td>Agent Software home</td>
<td>Sets the home directory for the software agent.</td>
</tr>
<tr>
<td>Agent Port</td>
<td>Sets the port number for the Platinum agent. The default port is 1830.</td>
</tr>
<tr>
<td>SNMP Community string</td>
<td>Sets the SNMP trap community string.</td>
</tr>
</tbody>
</table>

Related Topics:
- Oracle Platinum Services information
- Oracle Advanced Support Gateway Hardware Minimum Requirements
- Oracle Advanced Support Gateway Documentation Library

3.2.17 Auto Service Request Configuration Page

Auto Service Request (ASR) is designed to automatically open service requests when specific Oracle Exadata Rack hardware faults occur. The following table lists the ASR configuration options.

Table 3-15  Auto Service Request Configuration Page

<table>
<thead>
<tr>
<th>Auto Service Request Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable Auto Service Request</td>
<td>Enables ASR.</td>
</tr>
<tr>
<td>ASR Manager Hostname</td>
<td>Sets the ASR server host name.</td>
</tr>
<tr>
<td></td>
<td>Note: Oracle recommends a standalone server that has connectivity to the rack.</td>
</tr>
<tr>
<td>ASR Technical Contact Name</td>
<td>Sets the technical contact name for the rack.</td>
</tr>
<tr>
<td>Technical Contact Email</td>
<td>Sets the e-mail address of the technical contact for the rack.</td>
</tr>
<tr>
<td>My Oracle Support Account Name</td>
<td>Sets the My Oracle Support account name.</td>
</tr>
<tr>
<td>HTTP Proxy used in upload to ASR</td>
<td>Enables an HTTP proxy to upload to ASR.</td>
</tr>
<tr>
<td>HTTP Proxy Host</td>
<td>Sets the proxy server host name.</td>
</tr>
</tbody>
</table>
Table 3-15  (Cont.) Auto Service Request Configuration Page

<table>
<thead>
<tr>
<th>Auto Service Request Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proxy Port</td>
<td>Sets the HTTP proxy server port number. The default is 80.</td>
</tr>
<tr>
<td>HTTP Proxy requires authentication</td>
<td>Enables HTTP proxy server authentication.</td>
</tr>
<tr>
<td>HTTP Proxy User</td>
<td>Sets the proxy server user name.</td>
</tr>
</tbody>
</table>

Related Topics:

• Oracle Exadata Database Machine Maintenance Guide

3.2.18 Oracle Configuration Manager Configuration Page

Oracle Configuration Manager is used to collect configuration information and upload it to the Oracle repository. The following table lists the Oracle Configuration Manager configuration options.

Table 3-16  Oracle Configuration Manager Configuration Page

<table>
<thead>
<tr>
<th>Oracle Configuration Manager Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable Oracle Configuration Manager</td>
<td>Enables Oracle Configuration Manager to collect configuration information.</td>
</tr>
<tr>
<td>Receive updates via MOS</td>
<td>Enables My Oracle Support updates to be received automatically.</td>
</tr>
<tr>
<td>MOS Email Address</td>
<td>Sets the My Oracle Support address to receive My Oracle Support updates.</td>
</tr>
<tr>
<td>Access Oracle Configuration Manager via Support Hub</td>
<td>Enables Support Hub to access Oracle Configuration Manager. Oracle Support Hub allows Oracle Configuration Manager instances to connect to a single internal port (the Support Hub), and upload configuration data. This eliminates the need for each individual Oracle Configuration Manager instance in the database servers to access the Internet.</td>
</tr>
<tr>
<td>Support Hub Hostname</td>
<td>Sets the Support Hub server host name.</td>
</tr>
<tr>
<td>Hub User name</td>
<td>Sets the Support Hub operating system user name.</td>
</tr>
<tr>
<td>HTTP Proxy used in upload to Oracle Configuration Manager</td>
<td>Enables an HTTP proxy to upload configuration information to the Oracle repository.</td>
</tr>
</tbody>
</table>
Table 3-16  (Cont.) Oracle Configuration Manager Configuration Page

<table>
<thead>
<tr>
<th>Oracle Configuration Manager Field</th>
<th>Description</th>
</tr>
</thead>
</table>
| HTTP Proxy Host                   | Enables the HTTP proxy server to connect to Oracle. The proxy server may be between the following:  
  • Database servers and Oracle (applicable when you do not have Oracle Support Hub)  
  • Database servers and Support Hub (applicable when you have only Oracle Support Hub)  
  • Support Hub and Oracle  
If passwords are needed, then provide them during installation.  
Example:  
[proxy_user@]proxy_host[:proxy_port]  
The proxy_host and proxy_port entries are optional. |
| Proxy Port                        | Sets the HTTP proxy server port number. The default is 80. |
| HTTP Proxy requires authentication | Enables HTTP proxy authentication. |
| HTTP Proxy User                   | Sets the HTTP proxy server user name. |

Related Topics:
- Oracle Technical Support Policies
- Oracle Configuration Manager Companion Distribution Guide

3.2.19 Grid Control Agent Configuration Page

Oracle Enterprise Manager Grid Control is used to monitor Oracle Exadata Rack. Oracle Enterprise Manager Grid Control installs agents on the database servers and points the agents to an existing Oracle Enterprise Manager Grid Control environment, or installs a new Oracle Enterprise Manager Grid Control infrastructure on a separate host.

Table 3-17 (page 3-29) lists the Oracle Enterprise Manager Grid Control configuration options.

Table 3-17  Oracle Enterprise Manager Grid Control Configuration Page

<table>
<thead>
<tr>
<th>Oracle Enterprise Manager Grid Control Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable Oracle Enterprise Manager Grid Control Agent</td>
<td>Enables Oracle Enterprise Manager Grid Control to monitor the rack.</td>
</tr>
<tr>
<td>EM Home Base Location</td>
<td>Sets the base directory for the agents installed on the database servers.</td>
</tr>
</tbody>
</table>
### Table 3-17  (Cont.) Oracle Enterprise Manager Grid Control Configuration Page

<table>
<thead>
<tr>
<th>Oracle Enterprise Manager Grid Control Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>OMS Hostname</td>
<td>Sets the host name for the Oracle Enterprise Manager Grid Control repository.</td>
</tr>
</tbody>
</table>
| OMS HTTPS Upload Port                       | Sets the port Oracle Enterprise Manager Grid Control agent should use to upload information.  
  **Note:**  
  The default is 4900. |

### 3.3 OEDA Command Line Interface

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

- About the OEDA Command Line Interface (page 3-30)
- Starting the OEDACLI Utility (page 3-32)
- OEDACLI Command Reference (page 3-34)

#### 3.3.1 About the OEDA Command Line Interface

The primary goal of `oedacli` is to assist in completing various Exadata life cycle management tasks.

The OEDA command-line interface is a new interface that allows you to update an existing `es.xml` file. These updates are called Actions. An **Action** is a single atomic task. You can use the command line interface to perform any of the following tasks:

- Add node to or remove node from a Virtual Cluster on Exadata
- Add database home to or remove database home from physical cluster
- Add or remove Storage cell
- Resize Oracle ASM disk groups
- Add or remove additional Databases
- Add or remove additional database homes to an Oracle VM cluster

An Action can have many sub commands, however most actions are single commands. Examples of multi-command steps are - `CLONE GUEST` (page 3-58) and `CLONE CELL` (page 3-40)

`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='10.128.196.63'
   set clientnet name='test08client01vm02',ip='10.128.196.71'
   set vipnet name='test08client01vm02-vip',ip='10.128.196.71'

3. After you have provided all the commands for an action, save the action to a list of actions to be processed within the command line interface. At this point, the data in the es.xml file is not yet updated.

   SAVE ACTION

4. Merge the actions into the main body of the in-memory copy of the es.xml using the FORCE keyword.

   MERGE ACTIONS FORCE

5. Save the memory copy of the es.xml, overwriting the input file or writing to a new file that you specify.

   SAVE FILE [name=new_es.xml]

Deploy mode workflow

1. When the command line interface starts, it has no target es.xml file to work on, so you first load an es.xml file.

   LOAD FILE name=es.xml

2. Modify an in-memory version of the es.xml. Specify the actions to perform.

3. After you have provided all the commands for an action, save the action to a list of actions to be processed within the command line interface. At this point, the data in the es.xml file is not yet updated.

   SAVE ACTION

4. Merge the actions into the main body of the in-memory copy of the es.xml.

   MERGE ACTIONS
5. Deploy the actions into the main body of the `es.xml` file. This step will perform the specified actions such as creating the new Oracle VM guest.

```
DEPLOY ACTIONS
```

6. Save the memory copy of the `es.xml`, overwriting the input file or writing to a new file that you specify.

```
SAVE FILE [name=new_es.xml]
```

### 3.3.2 Starting the OEDACLI Utility

Starting with August 2017 Release of Oracle Exadata Deployment Assistant (OEDA), a command-line utility — `oedacli` — can be used for various routine tasks on Exadata.

#### Prerequisites

To use `oedacli`, you must meet the following requirements:

- Download the August 2017 release or later of OEDA. The August 2017 release of OEDA is only supported on Oracle Linux.
- Have the original OEDA configuration XML file used for deployment
- Use the default password on the nodes in the cluster (for the `root`, `oracle` and `grid` users)

**Note:**

If your environment does not use the default passwords for the specified users, then refer to My Oracle Support Doc ID 2163751.1.

#### File Path

The directory that contains the unzipped files from the OEDA download. For example `/u01/joc/linux-x64`.

#### Syntax

```
./oedacli
```

#### Usage Notes

To display the help output, use one of the following:

- `HELP`
- `HELP command name`

#### Related Topics:

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

### 3.3.2.1 Displaying Help Output for OEDACLI

You can display syntax help for the OEDACLI utility using the `HELP` command.
Example 3-1  Help Output for OEDACLI

This example shows the help output listing the available objects and command for the OEDACLI 18c (18.1.0) release:

```
oedacli> HELP
HELP [topic]
   Available Objects:
   ACFSVOLUME
      LIST ACFSVOLUMES
   CELL
      LIST CELLS
   CLUSTER
      LIST CLUSTERS
   DISKGROUP
      LIST DISKGROUPS
   DATABASE
      LIST DATABASES
   DATABASEHOME
      LIST DATABASEHOMES
   DOM0
      LIST DOM0S
   GUEST
      CLONE GUEST
      DELETE GUEST
      LIST GUESTS
   ILOM
      LIST ILOMS
   MACHINE
      LIST MACHINES
   NETWORK
      LIST NETWORKS
   SCAN
      LIST SCANS
   SWITCH
      LIST SWITCHES
   VIP
      LIST VIPS
   CLI COMMANDS
      LOAD FILE
      SAVE FILE
      SAVE FILES
      LIST XMLACTIONS
      SAVE ACTION
      MERGE ACTIONS
      DEPLOY ACTIONS
```

3.3.2.2 Displaying Help Output for an OEDACLI Command

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

Example 3-2  Help Output for the OEDACLI ALTER DATABASE command

This example shows how to display the syntax for the ALTER DATABASE command of OEDACLI. The help output is shown for the 18c (18.1.0) release.

```
oedacli> HELP ALTER DATABASE
Usage:
ALTER DATABASE
   BLOCKSIZE = <blocksize> |
   CHARSET = <characterset> |
```
Purpose:
Alters an existing database

Arguments:
- `<blocksize>` : Default: 8192, not required for PDB
- `<characterset>` : Default: AL12UTF8, not required for PDB
- `<datadg>` : *The DATA diskgroup, not required for PDB
- `<dblang>` : Default: all_langs, not required for PDB
- `<dbname>` : *Database name
- `<dbtemplate>` : Default: ADMIN, otherwise ADMIN or DW, not required for PDB
- `<dbtype>` : Default: normal DB, otherwise CDB or PDB
- `<hostnames>` : Default: list of nodes from db home
- `<recodg>` : *The RECO diskgroup, not required for PDB

Where:
- `<databaseid>` : The es xml id of the database
- `<clusternumber>` : The cluster number in the es xml, starting at 1
- `<clustername>` : The name of the cluster
- `<clusterid>` : The es xml id of the cluster
- `<databasename>` : The name of the database in the cluster

3.3.3 OEDA CLI Command Reference

These OEDA CLI commands are arranged by the object they act upon.

- **OEDA CLI Commands** (page 3-35)
- **ACFSVOLUME** (page 3-37)
- **CELL** (page 3-40)
- **CLUSTER** (page 3-41)
- **DISKGROUP** (page 3-42)
- **DATABASE** (page 3-48)
- **DATABASE HOME** (page 3-53)
- **ES** (page 3-57)
- **GUEST** (page 3-58)
- **ILOM** (page 3-59)
- **MACHINE** (page 3-60)
- **NETWORK** (page 3-62)
- **SCAN** (page 3-66)
- **SWITCH** (page 3-68)
- **VIP** (page 3-69)
3.3.3.1 OEDACLI Commands

These commands are used to interact with OEDACLI, to load and save files, and to merge, save, and deploy actions.

- LOAD FILE (page 3-35)
- SAVE ACTION (page 3-35)
- MERGE ACTIONS (page 3-36)
- DEPLOY ACTIONS (page 3-36)
- SAVE FILE (page 3-36)
- SAVE FILES (page 3-36)
- LIST XMLACTIONS (page 3-37)

3.3.3.1.1 LOAD FILE

Use this command to load an engineered system XML file (es.xml) into OEDACLI memory for editing.

**Syntax**

LOAD FILE NAME=filename

**Arguments**

- **NAME**: Specifies the name of an existing engineered system XML file

**Example 3-3  Loading a File into OEDACLI for Editing**

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

3.3.3.1.2 SAVE ACTION

Use this command to save the current action to engineered system XML memory copy.

**Syntax**

SAVE ACTION [FORCE]

**Arguments**

Specify **FORCE** if the action should be auto-merged into the engineered system model.

**Note:**

The engineered system configuration should be saved as a file using a subsequent **SAVE FILE** command.
3.3.3.1.3 MERGE ACTIONS

Use this command to merge the current actions into the other actions in the Engineered System model.

**Syntax**

MERGE ACTIONS [FORCE]

**Arguments**

Specify `FORCE` if you do not want this action to be processed by a `DEPLOY ACTIONS` command.

3.3.3.1.4 DEPLOY ACTIONS

Use this command to execute all actions from the Actions section of the engineered systems XML file.

**Syntax**

DEPLOY ACTIONS

**Example 3-4  Deploying the Actions to Add a Database**

```
oedacli> DEPLOY ACTIONS
Deploying Action ID : 4 add database dbname='testdb' DATADG='DATAC1' RECODG='RECOC1' where DBHOMEID='c0_databaseHome'
Deploying ADD DATABASE
Running datapatch on database 'testdb'
Done...
Done
```

3.3.3.1.5 SAVE FILE

Use this command to save a current set of actions to a new engineered system XML file.

**Syntax**

SAVE FILE [ NAME=filename ]

**Arguments**

The optional argument, `NAME`, is used to specify the name of a new engineered system XML file. If you do not specify the `NAME` argument, then this command overwrites the source file.

3.3.3.1.6 SAVE FILES

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

**Syntax**

SAVE FILES LOCATION = dirname
Arguments

The **LOCATION** argument specifies the directory in which the new file set will be created.

Usage Notes

If the specified directory does not exist, it will be created.

3.3.3.1.7 **LIST XMLACTIONS**

This command lists the current actions created by OEDACLI.

Syntax

```
LIST XMLACTIONS
```

3.3.3.2 **ACFSVOLUME**

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

- **ADD ACFSVOLUME** (page 3-37)
- **ALTER ACFSVOLUME** (page 3-38)
- **DELETE ACFSVOLUME** (page 3-38)
- **LIST ACFSVOLUME** (page 3-39)

3.3.3.2.1 **ADD ACFSVOLUME**

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

Syntax

```
ADD ACFSVOLUME
  VOLUMENAME = volume_name |  
  VOLUMESIZE = volume_size |  
  MOUNTPATH = mountpath 
WHERE 
  DISKGROUPID = diskgroup_id |  
  CLUSTERNUMBER = cluster_number DISKGROUPNAME = diskgroup_name |  
  CLUSTERNAME = cluster_name DISKGROUPNAME diskgroup_name |  
  CLUSTERID = cluster_id DISKGROUPNAME = diskgroup_name 
```

Arguments

You can specify the following attributes for the new Oracle ACFS volume:

- **VOLUMENAME**: Specifies a unique name for the new volume
- **VOLUMESIZE**: A number that specifies the size of the new volume in GB
- **MOUNTPATH**: Specifies the file system mount path for the new volume

The following arguments are available in the **WHERE** clause:

- **DISKGROUPID**: Specifies the es.xml ID for the container disk group
- **CLUSTERNUMBER**: Specifies the cluster number in the es.xml, starting at 1
- **CLUSTERNAME**: Specifies the name of the cluster
• CLUSTERID: Specifies the es.xml ID of the cluster
• DISKGROUPNAME: Specifies the name of the container disk group

3.3.3.2.2 ALTER ACFSVOLUME

This command alters an existing Oracle ASM Cluster File System (Oracle ACFS) volume.

Syntax

```
ALTER ACFSVOLUME
  VOLUMENAME = volume_name |
  VOLUMESIZE = volume_size |
  MOUNTPATH = mountpath
WHERE
  ID = acfs_volume_id |
  DISKGROUPID = diskgroup_id VOLUMENAME = volume_name|
  CLUSTERNUMBER = cluster_number DISKGROUPNAME = diskgroup_name VOLUMENAME = volume_name|
  CLUSTERNAME = cluster_name DISKGROUPNAME = diskgroup_name VOLUMENAME = volume_name|
  CLUSTERID = cluster_id DISKGROUPNAME = diskgroup_name VOLUMENAME = volume_name
```

Arguments

You can modify the following attributes of the Oracle ACFS volume:

• VOLUMENAME: Specifies a new, unique volume name
• VOLUMESIZE: A number that specifies the new size of the volume in GB
• MOUNTPATH: Specifies the new file system mount path for the volume

The following arguments are available in the WHERE clause:

• ID: Specifies the es.xml ID for an existing Oracle ACFS volume
• DISKGROUPID: Specifies the es.xml ID for the container disk group
• CLUSTERNUMBER: Specifies the cluster number in the es.xml, starting at 1
• CLUSTERNAME: Specifies the name of the cluster
• CLUSTERID: Specifies the es.xml ID of the cluster
• DISKGROUPNAME: Specifies the name of the container disk group
• VOLUMENAME: Specifies the name of the existing Oracle ACFS volume

3.3.3.2.3 DELETE ACFSVOLUME

This command deletes an existing Oracle ASM Cluster File System (Oracle ACFS) volume.

Syntax

```
DELETE ACFSVOLUME
WHERE
  ID = acfs_volume_id |
  DISKGROUPID = diskgroup_id VOLUMENAME = volume_name|
  CLUSTERNUMBER = cluster_number DISKGROUPNAME = diskgroup_name VOLUMENAME = volume_name|
```
Arguments

The following arguments are available in the WHERE clause:

- **ID**: Specifies the es.xml ID for the Oracle ACFS volume
- **DISKGROUPID**: Specifies the es.xml ID for the container disk group
- **CLUSTERNUMBER**: Specifies the cluster number in the es.xml, starting at 1
- **CLUSTERNAME**: Specifies the name of the cluster
- **CLUSTERID**: Specifies the es.xml ID of the cluster
- **DISKGROUPNAME**: Specifies the name of the container disk group
- **VOLUMENAME**: Specifies the name of the existing Oracle ACFS volume

3.3.3.2.4 LIST ACFSVOLUME

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

Syntax

```
LIST ACFSVOLUMES
WHERE
 ID = id |
 DISKGROUPID = diskgroup_id |
 CLUSTERNUMBER = cluster_number [DISKGROUPNAME = diskgroup_name] |
 CLUSTERNAME = cluster_name [DISKGROUPNAME = diskgroup_name] |
 CLUSTERID = cluster_id [DISKGROUPNAME = diskgroup_name]
```

Arguments

The following arguments are available in the WHERE clause:

- **ID**: Specifies the es.xml ID for the Oracle ACFS volume
- **DISKGROUPID**: Specifies the es.xml ID for the container disk group
- **CLUSTERNUMBER**: Specifies the cluster number in the es.xml, starting at 1
- **CLUSTERNAME**: Specifies the name of the cluster
- **CLUSTERID**: Specifies the es.xml ID of the cluster
- **DISKGROUPNAME**: Specifies the name of the container disk group

Usage Notes

There is no WHERE clause that will list all the Oracle ACFS volumes in the es.xml file.

Examples

(Optional) List and briefly describe the examples for executing the command here.

Example 3-5  Example Title

(Optional) Describe the example here.

Enter the example code here.
3.3.3.3 CELL

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

- **CLONE CELL** (page 3-40)
- **DELETE CELL** (page 3-40)
- **LIST CELLS** (page 3-41)

### 3.3.3.3.1 CLONE CELL

This command clones an existing storage cell.

**Syntax**

```
CLONE CELL SRCNAME = source_cell
   SET ADMINNET NAME=admin_name,IP=IP_admin
   SET PRIVNET NAME1=priv_name_1,IP1=priv_ip1,NAME2=priv_name_2,IP2=priv_ip2
   SET ILOMNET NAME=ilom_name,IP=ilom_ip
   SET RACK NUM=rack_number,ULOC=ulocation
```

**Arguments**

- **SRCNAME** is used to specify the name of an existing cell from which the new cell is derived.

The following arguments are available in the SET clauses:

- **ADMINNET**: Specifies the DNS name (*admin_name*) with an optional domain name and the IP address to be used for the admin network.
- **PRIVNET**: Specifies the name with an optional domain name and the IP address to be used for the first and second private networks.
- **ILOMNET**: Specifies the DNS name with an optional domain name and the IP address to be used for the ILOM network.
- **RACK**: Specifies the rack number in a multi-rack configuration, where 1 is the first rack, and the physical Ulocation (slot) of the cell in that rack.

### 3.3.3.3.2 DELETE CELL

This command deletes an existing storage cell.

**Syntax**

```
DELETE CELL WHERE SRCNAME = cell_host_name
```

**Arguments**

- **SRCNAME** is used to specify the host name of an existing cell that you want to remove.
3.3.3.3 LIST CELLS

This command lists the storage cells.

Syntax

LIST CELLS

3.3.3.4 CLUSTER

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

- ALTER CLUSTER (page 3-41)
- LIST CLUSTERS (page 3-41)

3.3.3.4.1 ALTER CLUSTER

This command alters attributes for an existing Oracle RAC Cluster.

Syntax

ALTER CLUSTER { CLUSTERNAME = cluster_name | GIVERSION = grid_version |
  GIHOMELOC = grid_home_location | INVLOC = inventory_location |
  BASEDIR = oracle_base_directory | PATCHLIST = patch_list }

WHERE
  CLUSTERNUMBER = cluster_number |
  CLUSTERNAME = cluster_name |
  CLUSTERID = cluster_id

Arguments

You can modify the following attributes of the Oracle RAC Cluster:

- CLUSTERNAME: Specifies a new, unique name for the cluster
- GIVERSION: Specifies the clusterware version, including the bundle patch, for example 12.1.0.2.170418
- GIHOMELOC: Specifies a new path for the Grid home
- INVLOC: Specifies a new path for the inventory
- BASEDIR: Specifies a new path for the Oracle base directory
- PATCHLIST: Specifies a full list of patches separated by commas and enclosed in single quotes. By default, this is derived from the bundle patch specified by GIVERSION.

The following arguments are available in the WHERE clause:

- CLUSTERNUMBER: Specifies the cluster number in the es.xml, starting at 1
- CLUSTERNAME: Specifies the name of the cluster
- CLUSTERID: Specifies the es.xml ID of the cluster

3.3.3.4.2 LIST CLUSTERS

This command lists the existing Oracle RAC clusters.
Syntax

LIST CLUSTERS
  [ WHERE
    CLUSTERNUMBER = cluster_number | CLUSTERNAME = cluster_name | CLUSTERID = cluster_id ]

Arguments

The following arguments are available in the WHERE clause:

- **CLUSTERNUMBER**: Specifies the cluster number in the es.xml, starting at 1
- **CLUSTERNAME**: Specifies the name of the cluster
- **CLUSTERID**: Specifies the es.xml ID of the cluster

Usage Notes

The WHERE clause is optional.

3.3.3.5 DISKGROUP

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

- **ADD DISKGROUP** (page 3-42)
- **ALTER DISKGROUP** (page 3-43)
- **ALTER DISKGROUPS** (page 3-46)
- **DELETE DISKGROUP** (page 3-47)
- **LIST DISKGROUPS** (page 3-47)

3.3.3.5.1 ADD DISKGROUP

This command adds an Oracle ASM disk group.

Syntax

ADD DISKGROUP
  [ ACFSTYPE=acfs_name ]
  [ ACFSPATH=acfs_path ]
  [ ACFSSIZE=acfs_size ]
  [ CELLLIST="cell_list" ]
  DISKGROUPNAME=diskgroup_name
  DISKGROUPSIZE=diskgroup_size
  [ OCRVOTE=ocr_voting_disks_included ]
  [ QUORUMDISK=quorum_disks_included ]
  REDUNDANCY=redundancy_level
  SLICESIZE=slice_size
  [ SPARSE=sparse ]
  [ SPARSEVIRTUALSIZE=sparse_virtual_size ]
  [ TYPE = diskgroup_type ]
  [ DATABASENAME = database_name ]
WHERE
  CLUSTERNUMBER = cluster_number |
  CLUSTERNAME = cluster_name |
  CLUSTERID = cluster_id
Arguments

You can specify the following attributes for the new Oracle ASM disk group:

- **ACFSNAME**: Specifies the name for the Oracle ACFS volume on this diskgroup.
- **ACFSPATH**: Specifies the path for the Oracle ACFS file system.
- **ACFSSIZE**: Specifies the size for the Oracle ACFS volume on this diskgroup.
- **CELLLIST**: A comma separated list of cells for this disk group, enclosed in single quotes.
- **DISKGROUPNAME**: (Mandatory) Specifies the name of the disk group.
- **DISKGROUPSIZE**: (Mandatory) Specifies the size of the disk group.
- **OCRVOTE**: A boolean variable, where TRUE indicates the disk group should store the OCR and voting disks for the cluster.
- **QUORUMDISK**: A boolean variable, where TRUE indicates the disk group requires a quorum.
- **REDUNDANCY**: (Mandatory) Specifies the redundancy level for the disk group. The accepted values are NORMAL or HIGH.
- **SLICESIZE**: (Mandatory) Specifies the slice size on disk for each grid disk for this disk group.
- **SPARSE**: A boolean variable, where TRUE indicates this should be sparse disk group.
- **SPARSEVIRTUALSIZE**: Specifies the sparse virtual size.
- **TYPE**: Specifies the diskgroup type, which can be DATA, RECO, DBFS or OTHER. The default value is OTHER. If you want the database to use this disk group, then the type must be set to DATA or RECO.
- **DATABASENAME**: Specifies the name of the target database for disk groups of type DATA or RECO.

The following arguments are available in the WHERE clause:

- **CLUSTERNUMBER**: Specifies the cluster number in the es.xml, starting at 1.
- **CLUSTERNAME**: Specifies the name of the cluster.
- **CLUSTERID**: Specifies the es.xml ID of the cluster.

3.3.3.5.2 ALTER DISKGROUP

This command alters attributes for an existing Oracle ASM disk group.

Syntax

```
 ALTER DISKGROUP {
   ACFSNAME=acfs_name | 
   ACFSPATH=acfs_path | 
   ACFSSIZE=acfs_size | 
   CELLLIST=cell_list | 
   DISKGROUPNAME=diskgroup_name | 
   DISKGROUPSIZE=diskgroup_size | 
   OCRVOTE=ocr_voting_disks_included | 
   QUORUMDISK=quorum_disks_included | 
   REDUNDANCY=redundancy_level | 
```
SLICESIZE=slice_size | 
SPARSE=sparse | 
SPARSEVIRTUALSIZE=sparse_virtual_size |
WHERE { 
  ID = diskgroup_id | 
  CLUSTERNUMBER = cluster_number DISKGROUPNAME = diskgroup_name | 
  CLUSTERNAME = cluster_name DISKGROUPNAME = diskgroup_name | 
  CLUSTERID = cluster_id DISKGROUPNAME = diskgroup_name }

Arguments

You can modify the following attributes of an Oracle ASM disk group:

- **ACFSNAME**: Specifies a new name for the Oracle ACFS volume on this diskgroup
- **ACFSPATH**: Specifies the new path for the Oracle ACFS file system
- **ACFSSIZE**: Specifies a new size for the Oracle ACFS volume on this diskgroup
- **CELLLIST**: A comma separated list of cells for this disk group, enclosed in single quotes
- **DISKGROUPNAME**: Specifies a new name for the disk group
- **DISKGROUPSIZE**: Specifies a new size for the disk group
- **OCRVOTE**: A boolean variable, where True indicates the disk group should store the OCR and voting disks for the cluster.
- **QUORUMDISK**: A boolean variable, where True indicates the disk group requires a quorum
- **REDUNDANCY**: Specifies the redundancy level for the disk group. The accepted values are NORMAL or HIGH.
- **SLICESIZE**: Specifies the slice size on disk for each grid disk for this disk group.
- **SPARSE**: A boolean variable, where True indicates this should be sparse disk group.
- **SPARSEVIRTUALSIZE**: Specifies the sparse virtual size.

The following arguments are available in the WHERE clause:

- **ID**: Specifies the es.xml ID for the disk group
- **CLUSTERNUMBER**: Specifies the cluster number in the es.xml, starting at 1
- **CLUSTERNAME**: Specifies the name of the cluster
- **CLUSTERID**: Specifies the es.xml ID of the cluster
- **DISKGROUPNAME**: Specifies the name of the disk group

Usage Notes

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

Example 3-7 Resizing an Oracle ASM Diskgroup Using OEDACLI

This example shows how to resize an existing Oracle ASM disk group using OEDACLI.

1. Load the OEDA XML configuration file.
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_dbfsgd"
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 DISKGROU
    LPNAME='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.

```bash
oedacli> DEPLOY ACTIONS
Deploying Action ID : 3 alter diskgroup diskgroupsiz=2500G where diskgroupname='DATAC1'
Deploying ALTER DISKGROUP
Deploying Action ID : 4 alter diskgroup diskgroupsiz=2500G where diskgroupname='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 nodelceladm02.us.oracle.com
Original Grid Disk Size 2953 GB, new size 138 GB on nodelceladm03.us.oracle.com
Original Grid Disk Size 2953 GB, new size 138 GB on nodelceladm01.us.oracle.com
Updated/New Disk Group size 2484 GB, original size 53154 GB.
Done...
```

3.3.3.5.3 ALTER DISKGROUPS

This command alters disk group sizing attributes for existing Oracle ASM disk groups.

**Syntax**

```
ALTER DISKGROUPS
   DATASPLIT=data_split_percent
   RECONSPLIT=reco_split_percent
   DATAREDUPLICATION=data_redundancy_level
   REDUCREDUNDANCY=reco_redundancy_level
   SPLITDISK=percent_of_cell_disk
WHERE
   DATADG = data_diskgroup
   RECODG = reco_diskgroup
   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
- **RECONSPLIT**: Specifies a percentage of the Oracle ASM volume allocated to the RECO disk group
- **DATAREDUPLICATION**: Specifies the redundancy level for the DATA disk group. The accepted values are **NORMAL** or **HIGH**.
- **REDUCREDUNDANCY**: Specifies the redundancy level for the RECO disk group. The accepted values are **NORMAL** or **HIGH**.
- **SPLITDISK**: Specifies the percentage of the cell disk to allocate to the DATA and RECO disk groups. The specified value must be less than an integer between 1 and 100.

The following arguments are available in the **WHERE** clause:
• **DATADG**: Specifies the name of the DATA disk group in the cluster
• **RECODG**: Specifies the name of the RECO disk group in the cluster
• **CLUSTERNUMBER**: Specifies the cluster number in the `es.xml`, starting at 1
• **CLUSTERNAME**: Specifies the name of the cluster
• **CLUSTERID**: Specifies the `es.xml` ID of the cluster

### 3.3.3.5.4 DELETE DISKGROUP

This command deletes an existing Oracle ASM disk group.

**Syntax**

```
DELETE DISKGROUP
WHERE
   ID = diskgroup_id
   CLUSTERNUMBER = cluster_number
   CLUSTERNAME = cluster_name
   CLUSTERID = cluster_id
   DISKGROUPNAME = diskgroup_name
```

**Arguments**

The following arguments are available in the `WHERE` clause:

• **ID**: Specifies the `es.xml` ID for the disk group
• **CLUSTERNUMBER**: Specifies the cluster number in the `es.xml`, starting at 1
• **CLUSTERNAME**: Specifies the name of the cluster
• **CLUSTERID**: Specifies the `es.xml` ID of the cluster
• **DISKGROUPNAME**: Specifies the name of the disk group

### 3.3.3.5.5 LIST DISKGROUPS

This command lists the existing Oracle ASM disk groups.

**Syntax**

```
LIST DISKGROUPS
[ WHERE
   ID = diskgroup_id
   CLUSTERNUMBER = cluster_number
   CLUSTERNAME = cluster_name
   CLUSTERID = cluster_id
   DISKGROUPNAME = diskgroup_name
```

**Arguments**

The following arguments are available in the `WHERE` clause:

• **ID**: Specifies the `es.xml` ID for the disk group
• **CLUSTERNUMBER**: Specifies the cluster number in the `es.xml`, starting at 1
• **CLUSTERNAME**: Specifies the name of the cluster
• **CLUSTERID**: Specifies the `es.xml` ID of the cluster
• **DISKGROUPNAME**: Specifies the name of the disk group
3.3.6 DATABASE

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

- **ADD DATABASE** (page 3-48)
- **ALTER DATABASE** (page 3-50)
- **DELETE DATABASE** (page 3-51)
- **LIST DATABASES** (page 3-53)

3.3.6.1 ADD DATABASE

This command adds an Oracle database, or a CDB or PDB to an existing CDB.

**Syntax**

```
ADD DATABASE
  [ BLOCKSIZE = blocksize ]
  [ CHARSET = database_character_set ]
  DATADG = data_diskgroup
  [ DBLANG = database_language ]
  DBNAME = database_name
  [ DBTTEMPLATE = database_template ]
  [ DBTYPE = database_type ]
  [ HOSTNAMES = 'host_names' ]
  RECODEV = reco_diskgroup
WHERE
  { DBHOMID = database_home_id } |
  CLUSTERNUMBER = cluster_number DBHOMLOC = database_home_location |
  CLUSTERNAME = cluster_name DBHOMLOC = database_home_location |
  CLUSTERID = cluster_id DBHOMLOC = database_home_location |
  CLUSTERNUMBER = cluster_number CDBNAME = container_database_name |
  CLUSTERNAME = cluster_name CDBNAME = container_database_name |
  CLUSTERID = cluster_id CDBNAME = container_database_name |
```

**Arguments**

You can specify the following attributes for the new Oracle database:

- **BLOCKSIZE**: Specifies the block size for the new database. The default value is 8192. This argument is not required for pluggable databases.
- **CHARSET**: Specifies the character set to use for the new database. The default value is AL32UTF8. This argument is not required for pluggable databases.
- **DATADG**: (Mandatory) Specifies the name of the DATA disk group for the new database. This argument is not required for pluggable databases.
- **DBLANG**: Specifies the language to use for the new database. The default value is all_langs. This argument is not required for pluggable databases.
- **DBNAME**: (Mandatory) Specifies the name of the new database.
- **DBTEMPLATE**: Specifies the template to use when creating the new database, ADMIN or DW. The default value is ADMIN. This argument is not required for pluggable databases.
- **DBTYPE**: Specifies the type of database to create. The accepted values are normal DB, CDB, or PDB. The default value is normal DB.
• **HOSTNAMES**: Specifies a comma-separated list of host names on which the database should run. The default value is the list of nodes registered with the database home.

• **RECODG**: (Mandatory) Specifies the name of the RECO disk group for the new database. This argument is not required for pluggable databases.

The following arguments are available in the **WHERE** clause:

• **DBHOMEID**: Specifies the es.xml ID of the database home.

• **CLUSTERNUMBER**: Specifies the cluster number in the es.xml, starting at 1

• **CLUSTERNAME**: Specifies the name of the cluster

• **CLUSTERID**: Specifies the es.xml ID of the cluster

• **DBHOMELOCATION**: Specifies the path for the target database home.

• **CDBNAME**: Specifies the database name for the container database. This argument is required only when **DBTYPE** is set to PDB.

**Example 3-8 Adding a New Oracle Database Using OEDA CLI**

This example shows how to add a new database to the configuration.

1. Load the OEDA XML configuration file.
   
   ```
   oedacli> LOAD FILE NAME=Oracle-test.xml
   SUCCESS - file loaded OK
   Customer : ora07adm01 - Oracle
   ```

2. Use the command **LIST DATABASEHOMES** to identify the databasehome_id associated with the target database home. This database home will be used to create the new database.
   
   ```
   oedacli> LIST DATABASEHOMES
   version : "CloneInstall"
   cluster :
   id : "c0_clusterHome"
   databaseHomeName : "c0_DbHome_0"
   databaseSwOwner : "c0_oracle"
   databaseVersion : "12.2.0.1.170718"
   databaseHomeLoc : "/u01/app/oracle/product/12.2.0.1/dbhome_1"
   inventoryLocation : "/u01/app/oraInventory"
   language : "all_langs"
   machines :
   machine : ...
   ...
   patches :
   patch :
   patchNumber : "26133434"
   basedir : "/u01/app/oracle"
   useZfs : "false"
   id : "c0_databaseHome1"
   ```

3. Create an action for creating the new database. You must provide a name for the new database, and the names of the DATA and RECO disk groups that the new database should use. Also, use the ID retrieved in the previous step to specify the Oracle Home in which to create this database.
   
   ```
   oedacli> ADD DATABASE DBNAME='testdb' DATADG='DATAC1' RECODG='RECOC1'
   WHERE DBHOMEID='c0_databaseHome'
   ```

4. Save the action.
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


    oedacli> SAVE FILE NAME = 'cli-test-2databases.xml'
    File : cli-test-2databases.xml saved OK

7. Deploy the actions.

    oedacli> DEPLOY ACTIONS
    Deploying Action ID : 4 add database dbname='testdb' DATADG='DATAC1' RECODG='RECOC1'
    where DBHOMEID='c0_databaseHome'
    Deploying ADD DATABASE
    Running datapatch on database 'testdb'
    Done... Done

3.3.3.6.2 ALTER DATABASE

This command alters an existing Oracle database.

Syntax

ALTER DATABASE
    [ BLOCKSIZE = blocksize ]
    [ CHARSET = database_character_set ]
    DATADG = data_diskgroup
    [ DBLANG = database_language ]
    DBNAME = database_name
    [ DBTEMPLATE = database_template ]
    [ DBTYPE = database_type ]
    [ HOSTNAMES = 'host_names' ]
    RECODG = reco_diskgroup

WHERE
    ID = database_id |
    CLUSTERNUMBER = cluster_number DATABASENAME = database_name |
    CLUSTERNAME = cluster_name DATABASENAME = database_name |
    CLUSTERID = cluster_id DATABASENAME = database_name

Arguments

You can modify the following attributes for the Oracle database:

- **BLOCKSIZE**: Specifies the new block size for the database. The default value is 8192. This argument is not required for pluggable databases.

- **CHARSET**: Specifies the new character set to use for the database. The default value is AL32UTF8. This argument is not required for pluggable databases.

- **DATADG**: (Mandatory) Specifies the name of the DATA disk group for the database. This argument is not required for pluggable databases.
• `DBLANG`: Specifies the new language to use for the database. The default value is `all_langs`. This argument is not required for pluggable databases.

• `DBNAME`: (Mandatory) Specifies the name of the database.

• `DBTEMPLATE`: Specifies the template to use when creating the database, `ADMIN` or `DW`. The default value is `ADMIN`. This argument is not required for pluggable databases.

• `DBTYPE`: Specifies the type of database to create. The accepted values are `normal DB`, `CDB`, or `PDB`. The default value is `normal DB`.

• `HOSTNAMES`: Specifies a comma-separated list of host names on which the database should be created. The default value is the list of nodes registered with the database home.

• `RECODG`: (Mandatory) Specifies the name of the RECO disk group for the database. This argument is not required for pluggable databases.

The following arguments are available in the `WHERE` clause:

• `ID`: Specifies the es.xml ID of the database

• `CLUSTERNUMBER`: Specifies the cluster number in the es.xml, starting at 1

• `CLUSTERNAME`: Specifies the name of the cluster

• `CLUSTERID`: Specifies the es.xml ID of the cluster

• `DATABASENAME`: Specifies the name of the database in the cluster

### 3.3.3.6.3 DELETE DATABASE

This command deletes an existing Oracle database.

**Syntax**

```
DELETE DATABASE
WHERE
  ID = database_id | CLUSTERNUMBER = cluster_number DATABASENAME = database_name | CLUSTERNAME = cluster_name DATABASENAME = database_name | CLUSTERID = cluster_id DATABASENAME = database_name
```

**Arguments**

The following arguments are available in the `WHERE` clause:

• `ID`: Specifies the es.xml ID of the database

• `CLUSTERNUMBER`: Specifies the cluster number in the es.xml, starting at 1

• `CLUSTERNAME`: Specifies the name of the cluster

• `CLUSTERID`: Specifies the es.xml ID of the cluster

• `DATABASENAME`: Specifies the name of the database in the cluster

**Example 3-9  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.

   ```bash
   oedacli> LOAD FILE NAME=Oracle-test.xml
   SUCCESS - file loaded OK
   Customer : ora07adm01 - Oracle
   ```
2. List the databases contained in the XML configuration file, so that you can identify the database ID associated with the database you want to delete.

```plaintext
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.

```plaintext
oedacli> delete database where id='c0_testdb01'
```

4. Save the action.

```plaintext
oedacli> SAVE ACTION
```

5. Merge all actions.

```plaintext
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.

```plaintext
oedacli> DEPLOY ACTIONS
Deploying Action ID : 1 delete database where id='c0_testdb01'
Deploying DELETE DATABASE
Deleting database testdb
Done...
Done
```
3.3.3.6.4 LIST DATABASES

This command lists the existing Oracle databases.

Syntax

LIST DATABASES
[ WHERE
   ID = database_id  |
   CLUSTERNUMBER = cluster_number  |
   CLUSTERNAME = cluster_name  |
   CLUSTERID = cluster_id]

Arguments

The following arguments are available in the WHERE clause:

- ID: Specifies the es.xml ID of the database
- CLUSTERNUMBER: Specifies the cluster number in the es.xml, starting at 1
- CLUSTERNAME: Specifies the name of the cluster
- CLUSTERID: Specifies the es.xml ID of the cluster

3.3.3.7 DATABASE HOME

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

- ADD DATABASEHOME (page 3-53)
- ALTER DATABASEHOME (page 3-55)
- DELETE DATABASEHOME (page 3-56)
- LIST DATABASEHOMES (page 3-57)

3.3.3.7.1 ADD DATABASEHOME

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

Syntax

ADD DATABASEHOME
OWNER = owner
DBVERSION = version
DBHOMELOC = database_home_path [DBHOMENAME = database_home_name]
[INVLOC = inventory_location] [DBLANG = database_language]
[MACHINELIST = 'machine_list'] [PATCHLIST = 'patch_list']
[BASEDIR = base_directory] [VOLUMESIZE = volume_size]
WHERE
   { CLUSTERNUMBER = cluster_number   | CLUSTERNAME = cluster_name   |
   CLUSTERID = cluster_id }
• **DBVERSION** *(Mandatory)* Specifies the version of the software in the database home, including the bundle patch, for example 12.1.0.2.170418.

• **DBHOMELOC** *(Mandatory)* Specifies the file system path for the new Oracle database home directory.

• **DBHOMENAME** Specifies the name of the new database home. The default value is the standard template name, for example, dbhome_1.

• **INVLOC** Specifies the location of the Oracle inventory directory. The default value is derived from the cluster home.

• **DBLANG** Specifies the language to use with the Oracle home. The default value is all_langs.

• **MACHINELIST** Specifies a list of nodes to create the Oracle home on. The default value is list of nodes registered with the Grid home.

• **PATCHLIST** Specifies a comma-separated list of patches for the database home. The default value is derived from **DBVERSION**.

• **BASEDIR** Specifies the location of the Oracle Base directory. The default value is derived from **OWNER**.

• **VOLUMESIZE** Specifies the size of the home directory volume. The default value is 50 GB. This argument is applicable only for database homes for Oracle VM clusters.

The following arguments are available in the **WHERE** clause:

• **CLUSTERNUMBER** Specifies the cluster number in the es.xml, starting at 1

• **CLUSTERNAME** Specifies the name of the cluster

• **CLUSTERID** Specifies the es.xml ID of the cluster

**Example 3-10  Adding a Database Home to a Deployment using OEDACLI**

This example shows how to add a new Oracle home. **dbversion** should specify both the base version and the target Bundle Patch version. In this example, we are setting up a new Oracle database home with 12.1.0.2 DBBP 170418. The software will be installed under /u01/app/oracle/product/12.1.0.2/dbhome_2.

```
./oedacli
```

```
oedacli> LOAD FILE NAME=Oracle-test12.xml
SUCCESS - file loaded OK
Customer : ora07adm01 - Oracle
```

```
oedacli> ADD DATABASEHOME OWNER='oracle' DBVERSION='12.1.0.2.170418' DBHOMELOC=':/u01/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'
```

```
Deploying ADD DATABASEHOME
Checking local files...
Required files are:
SUCCESS: Required file /scratch/cpabba/Oeda/main/linux-x64/WorkDir/p26022196_121020_Linux-x86-64.zip exists...
SUCCESS: Required file /scratch/cpabba/Oeda/main/linux-x64/WorkDir/p26027162_121020_Linux-x86-64.zip exists...
SUCCESS: Required file /scratch/cpabba/Oeda/main/linux-x64/WorkDir/p6880880_122010_Linux-x86-64.zip exists...
SUCCESS: Required file /scratch/cpabba/Oeda/main/linux-x64/WorkDir/linuxamd64_12102_database_2of2.zip exists...
SUCCESS: Required file /scratch/cpabba/Oeda/main/linux-x64/WorkDir/linuxamd64_12102_database_1of2.zip exists...
Copying required files...
Checking status of remote files...
Checking status of existing files on remote nodes...
Getting status of local files...
Copying file: linuxamd64_12102_database_1of2.zip to node node1adm01.us.oracle.com
Copying file: linuxamd64_12102_database_2of2.zip to node node1adm01.us.oracle.com
Copying file: p26022196_121020_Linux-x86-64.zip to node nodeladm01.us.oracle.com
Copying file: p26027162_121020_Linux-x86-64.zip to node nodeladm01.us.oracle.com
Copying file: p26022196_121020_Linux-x86-64.zip to node nodeladm02.us.oracle.com
Copying file: p26027162_121020_Linux-x86-64.zip to node nodeladm02.us.oracle.com
Completed copying files...
Extracting files...
Completed extracting files...
Validating nodes for database readiness...
Installing database software ...
Running database installer on node nodeladm01.us.oracle.com ... Please wait...
After running database installer...
Patching...
Done...

3.3.3.7.2 ALTER DATABASEHOME

This command alters an existing Oracle database home.

Syntax

```
ALTER DATABASEHOME
    OWNER = owner
    DBVERSION = version
    DBHOMELOC = database_home_path
    DBHOMENAME = database_home_name
    INVLOC = inventory_location
    DBLANG = language
    MACHINELIST = machine_list
    PATCHLIST = patch_list
    BASEDIR = base_directory
WHERE
    ID = database_home_id
    CLUSTERNUMBER = cluster_number
    CLUSTERNAME = cluster_name
    DBHOMELOC = database_home_path
    CLUSTERID = cluster_id
```

Arguments

You can modify the following attributes for the Oracle database home:
• **OWNER**: Specifies the operating system user that owns the Oracle home.

• **DEVERSION**: Specifies the version of the software in the database home, including the bundle patch, for example 12.1.0.2.170418.

• **DBHOMELOC**: Specifies the file system path for the new Oracle database home directory.

• **DBHOMENAME**: Specifies the new name of the database home. The database home name must be unique within a cluster.

• **INVLOC**: Specifies the location of the Oracle inventory directory.

• **DBLANG**: Specifies the supported languages for the Oracle home.

• **MACHINELIST**: Specifies a list of nodes. The nodes must exist within the cluster.

• **PATCHLIST**: Specifies a comma-separated, custom list of patches for the database home.

• **BASEDIR**: Specifies the location of the Oracle Base directory.

The following arguments are available in the *WHERE* clause:

• **ID**: Specifies the es.xml ID for the database home

• **CLUSTERNUMBER**: Specifies the cluster number in the es.xml, starting at 1

• **CLUSTERNAME**: Specifies the name of the cluster

• **CLUSTERID**: Specifies the es.xml ID of the cluster

• **DBHOMELOC**: Specifies the path for the database home directory.

### 3.3.3.7.3 DELETE DATABASEHOME

This command removes an existing Oracle database home.

**Syntax**

```sql
DELETE DATABASEHOME
WHERE
  ID = database_home_id | CLUSTERNUMBER = cluster_number DBHOMELOC = database_home_path | CLUSTERNAME = cluster_name DBHOMELOC = database_home_path | CLUSTERID = cluster_id DBHOMELOC = database_home_path
```

**Arguments**

The following arguments are available in the *WHERE* clause:

• **ID**: Specifies the es.xml ID for the database home

• **CLUSTERNUMBER**: Specifies the cluster number in the es.xml, starting at 1

• **CLUSTERNAME**: Specifies the name of the cluster

• **CLUSTERID**: Specifies the es.xml ID of the cluster

• **DBHOMELOC**: Specifies the path for the database home directory.

**Usage Notes**

The database home you are deleting must not contain any dependent databases.
Example 3-11  Removing an Existing Oracle Database Home

This example shows how to delete an existing Oracle Database home directory.

```plaintext
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...
```

3.3.3.7.4 LIST DATABASEHOMES

This command lists the existing Oracle database homes.

Syntax

```plaintext
LIST DATABASEHOMES
[ WHERE
   ID = database_home_id |
   CLUSTERNUMBER = cluster_number NAME = database_home_name |
   CLUSTERNAME = cluster_name NAME = database_home_name |
   CLUSTERID = cluster_id NAME = database_home_name ]
```

Arguments

The following arguments are available in the WHERE clause:

- **ID**: Specifies the es.xml ID for the target database home
- **CLUSTERNUMBER**: Specifies the cluster number in the es.xml, starting at 1
- **CLUSTERNAME**: Specifies the name of the cluster
- **CLUSTERID**: Specifies the es.xml ID of the cluster
- **NAME**: Specifies the name of the target database home

3.3.3.8 ES

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

- **ALTER ES** (page 3-58)
3.3.3.8.1 ALTER ES

This command alters the attributes of an engineered system.

Syntax

```
ALTER ES
    PAAS = 'pass_mode' |
    CUSTOMERNAME = customer_name |
    CUSTOMERDEPT = customer_dept
```

Arguments

You can modify the following attributes for the engineered system:

- **PAAS**: A boolean value, TRUE or FALSE, which specifies whether to enable PaaS mode.
- **CUSTOMERNAME**: Specifies the customer name.
- **CUSTOMERDEPT**: Specifies the customer department.

3.3.3.9 GUEST

You can clone or delete an Oracle VM guest.

- **CLONE GUEST** (page 3-58)
- **DELETE GUEST** (page 3-59)

3.3.3.9.1 CLONE GUEST

This command clones an existing Oracle VM guest.

Syntax

```
CLONE GUEST SRCNAME = source_guest
    SET PARENT NAME=parent_name
    SET ADMINNET NAME=admin_name, IP=IP_admin
    SET PRIVNET NAME1=priv_name_1, IP1=priv_ip1, NAME2=priv_name_2, IP2=priv_ip2 |
        SET INTERCONNECT NAME1=priv_name_1, IP1=priv_ip1, NAME2=priv_name_2, IP2=priv_ip2 |
    SET CLIENTNET NAME=client_name, IP=client_ip
    SET VIPNET NAME=vip_name, IP=vip_ip
```

Arguments

**SRCNAME** is used to specify the name of an existing DomU from which the new DomU is derived.

The following arguments are available in the SET clauses:

- **PARENT**: Specifies the host name of the Dom0 use to host this new guest
- **ADMINNET**: Specifies the DNS name with an optional domain name and the IP address to be used for the admin network
- **PRIVNET**: Specifies the DNS name with an optional domain name and the IP address to be used for the first and second private networks
• **INTERCONNECT**: Specifies the DNS name with an optional domain name and the IP address to be used for the first and second private interconnects

• **CLIENTNET**: Specifies the DNS name with an optional domain name and the IP address to be used for the client network

• **VIPNET**: Specifies the DNS name with an optional domain name and the IP address to be used for the VIP network

**Usage Notes**

The **SET INTERCONNECT** clause is only required if the compute nodes are configured with InfiniBand security (PKEYS).

### 3.3.3.9.2 DELETE GUEST

This command deletes an existing Oracle VM guest, removing the instance, home, and Oracle Clusterware from the cluster.

**Syntax**

```
DELETE GUEST WHERE SRCNAME = node_name
```

**Arguments**

The **SRCNAME** is used to specify the host name of an existing DomU that you want to delete.

### 3.3.3.10 ILOM

You can alter or list the ILOMs in the loaded `es.xml` file.

- **ALTER ILOM** (page 3-59)
- **LIST ILOMS** (page 3-60)

#### 3.3.3.10.1 ALTER ILOM

This command alters attributes of an ILOM.

**Syntax**

```
ALTER ILOM { DNSSERVERS='dns_servers' | NTPSERVERS='ntp_servers' | TIMEZONE = timezone }
WHERE { 
  ID = ilom_id | 
  HOSTNAME = hostname | 
  ILOMNAME = ilom_hostname }
```

**Arguments**

You can specify the following attributes for the ILOM:

- **DNSSERVERS**: Specifies a comma-separated list of DNS servers that is enclosed in single quotes.
- **NTPSERVERS**: Specifies a comma-separated list of NTP servers that is enclosed in single quotes.
- **TIMEZONE**: Specifies a valid time zone for the ILOM.

The following arguments are available in the **WHERE** clause:
• ID: Specifies the es.xml ID for the target ILOM
• HOSTNAME: Specifies the current host name of the target machine
• ILOMNAME: Specifies the current host name of the ILOM

3.3.3.10.2 LIST ILOMS

This command lists the ILOMs in the es.xml file.

Syntax

LIST ILOMS
[ WHERE { 
   ID = ilom_id |
   HOSTNAME = hostname |
   ILOMNAME = ilom_hostname ) } ]

Arguments

The following arguments are available in the WHERE clause:

• ID: Specifies the es.xml ID for the target ILOM
• HOSTNAME: Specifies the current host name of the target machine
• ILOMNAME: Specifies the current host name of the ILOM

Usage Notes

If you do not specify a WHERE clause, then this command lists all the ILOMs in the es.xml file.

3.3.3.11 MACHINE

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

• ALTER MACHINE (page 3-60)
• LIST MACHINES (page 3-61)

3.3.3.11.1 ALTER MACHINE

This command alters attributes of a compute node or storage cell in an engineered system.

Syntax

ALTER MACHINE { DNSSERVERS='dns_servers' | GATEWAYADAPTER=gateway_adapter |
    HOSTNAMEADAPTER=hostname_adapter | NTPSERVERS='ntp_servers' |
    TIMEZONE = timezone } 
WHERE { 
   ID = machine_id |
   HOSTNAME = hostname |
   CLUSTERNUMBER = cluster_number COMPUTENUMBER = compute_number |
   CLUSTERNUMBER = cluster_number STORAGENUMBER = storage_number |
   CLUSTERNAME = cluster_name COMPUTENUMBER = compute_number |
   CLUSTERNAME = cluster_name STORAGENUMBER = storage_number |
   CLUSTERID = cluster_id COMPUTENUMBER = compute_number |
   CLUSTERID = cluster_id STORAGENUMBER = storage_number }
Arguments

You can specify the following attributes for the machine:

- **DNSSERVERS**: Specifies a comma-separated list of DNS servers that is enclosed in single quotes.
- **GATEWAYADAPTER**: Specifies the network adapter to use as the machine gateway. Valid values are ADMIN or CLIENT.
- **HOSTNAMEADAPTER**: Specifies the network adapter to use as the host name. Valid values are ADMIN or CLIENT.
- **NTPSERVERS**: Specifies a comma-separated list of NTP servers that is enclosed in single quotes.
- **TIMEZONE**: Specifies a valid time zone for the machine.

The following arguments are available in the WHERE clause:

- **ID**: Specifies the es.xml ID for the target machine
- **HOSTNAME**: Specifies the current host name of the target machine
- **CLUSTERNUMBER**: Specifies the cluster number in the es.xml, starting at 1
- **CLUSTERNAME**: Specifies the name of the cluster
- **CLUSTERID**: Specifies the es.xml ID of the cluster
- **COMPUTENUMBER**: Specifies the compute node number in the cluster, starting at 1
- **STORAGENUMBER**: Specifies the storage cell number in the cluster, starting at 1

### 3.3.3.11.2 LIST MACHINES

This command lists the machine available in the es.xml file for an engineered system.

**Syntax**

```
LIST MACHINES
{ WHERE
  TYPE = type |
  ID = machine_id [ TYPE = type ] |
  CLUSTERNUMBER = cluster_number [ TYPE = type ] |
  CLUSTERNAME = cluster_name [ TYPE = type ] |
  CLUSTERID = cluster_id [ TYPE = type ] }
```

**Arguments**

The following arguments are available in the WHERE clause:

- **TYPE**: Specifies the machine type. The valid values are COMPUTE, CELL, STORAGE, DOM0, GUEST, or DOMU.
- **ID**: Specifies the es.xml ID for an individual machine
- **CLUSTERNUMBER**: Specifies the cluster number in the es.xml, starting at 1
- **CLUSTERNAME**: Specifies the name of the cluster
- **CLUSTERID**: Specifies the es.xml ID of the cluster
Usage Notes

If you do not specify a WHERE clause, then this command lists all the machines defined in the es.xml file.

3.3.3.12 NETWORK

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

- **ADD NETWORK** (page 3-62)
- **ALTER NETWORK** (page 3-63)
- **DELETE NETWORK** (page 3-65)
- **LIST NETWORKS** (page 3-65)

3.3.3.12.1 ADD NETWORK

This command adds a network record to a machine in the existing configuration.

Syntax

```
ADD NETWORK
   NETWORKTYPE=network_type  HOSTNAME=hostname  IP=ip_addr
   NETMASK=netmask  DOMAINNAME=domain_name  MASTER=master
   [  GATEWAY=gateway  |  SSHENABLED=ssh_enabled  ]  [  MAC=mac_addr ]
   [  NIC=nic_speed  |  SLAVE='slave' ]  [  PEER=pkey ]
   [  PKEYNAME=pkey_name  |  STATUS=status  ]  [  LACP=lacp ]
   [  VLAND=vlan_id  |  NATHOSTNAME=nat_host_name  ]  [  NATIP=nat_ip_addr ]
   [  NATDOMAINNAME=nat_domain_name  ]  [  NATNETMASK=nat_mask ]
   WHERE {  HOSTNAME = hostname  |  CLUSTERNUMBER = cluster_num COMPUTENUMBER=compute_num  |  CLUSTERNUMBER = cluster_num STORAGENUMBER=storage_num  |  CLUSTERNUMBER = cluster_num COMPUTENUMBER=compute_num  |  CLUSTERNUMBER = cluster_num STORAGENUMBER=storage_num  |
```

Arguments

You can specify the following attributes when adding a network:

- **NETWORKTYPE**: (Mandatory) Specifies the type of network, which can be **ADMIN**, **CLIENT**, **BACKUP**, **PRIVATE**, **OTHER**, **INGESTVIP**, **REPLICATIONVIP**, or **ILOM**.
- **HOSTNAME**: (Mandatory) Specifies the short host name for the network
- **IP**: (Mandatory) Specifies the IP address of the network
- **NETMASK**: (Mandatory) Specifies the netmask of the network
- **DOMAINNAME**: (Mandatory) Specifies the domain name of the network
- **MASTER**: (Mandatory) Specifies the master adapter name
- **GATEWAY**: Specifies the network subnet gateway
- **SSHENABLED**: A Boolean variable where **TRUE** indicates SSH should be enabled for this adapter
- **MAC**: Specifies the MAC address
- **NIC=nic_speed**: (Only for X7 2 socket compute nodes), either 10000 or 25000
• **SLAVE**: Specifies a space-separated list of slave devices for a bonded network, enclosed in single quotes

• **PKEY**: (For Private networks only) Specifies the pkey

• **PKEYNAME**: (For Private networks only) Specifies the pkey name

• **STATUS**: Specifies the status of the network

• **LACP**: A Boolean variable where **TRUE** indicates that LACP should be enabled

• **VLANID**: Specifies the VLAN Id if network is a VLAN network and not private

• **NATHOSTNAME**: Specifies the NAT host name

• **NATIP**: Specifies the NAT IP address

• **NATDOMAINNAME**: Specifies the NAT domain name

• **NATNETMASK**: Specifies the NAT netmask

The following arguments are available in the **WHERE** clause:

• **HOSTNAME**: Specifies the host name for an existing compute node

• **CLUSTERNUMBER**: Specifies the cluster number in the es.xml, starting at 1

• **CLUSTERNAME**: Specifies the name of an existing cluster

• **COMPUTENUMBER**: Specifies the number of an existing compute node in the cluster, starting at 1

• **STORAGENUMBER**: Specifies the number of an existing storage cell in the cluster, starting at 1

### 3.3.3.12.2 ALTER NETWORK

This command modifies a network record for a machine in the existing configuration.

#### Syntax

```
ALTER NETWORK {
    [ HOSTNAME=hostname ] [ IP=ip_addr ] [ NETMASK=netmask ]
    [ DOMAINNAME=domain_name ] [ MASTER=master ] [ GATEWAY=gateway ]
    [ SSHENABLED=ssh_enabled ] [ MAC=mac_addr ] [ NIC_SPEED=nic_speed ]
    [ SLAVE='slave' ] [ PKEY=pkey ] [ PKEYNAME=pkey_name ]
    [ STATUS=status ] [ LACP=laclp ] [ VLANID=vlan_id ]
    [ NATHOSTNAME=nat_host_name ] [ NATIP=nat_ip_addr ]
    [ NATDOMAINNAME=nat_domain_name ] [ NATNETMASK=nat_mask ]
}
```

**WHERE**

```
WHERE {
    ID = network_id |
    NETWORKHOSTNAME = network_hostname |
    NATHOSTNAME = nat_hostname |
    HOSTNAME = hostname NETWORKTYPE = network_type [PRIVATEID=private_id] |
    CLUSTERNAME = cluster_name [ COMPUTENUMBER=compute_number |
    STORAGENUMBER=storage_number ]
    NETWORKTYPE = network_type [PRIVATEID=private_id] |
    CLUSTERNUMBER = cluster_number [ COMPUTENUMBER=compute_number |
    STORAGENUMBER=storage_number ]
    NETWORKTYPE = network_type [PRIVATEID=private_id] }
```

#### Arguments

You can specify the following attributes when altering a network:
• **HOSTNAME**: Specifies the short host name for the network
• **IP**: Specifies the IP address of the network
• **NETMASK**: Specifies the netmask of the network
• **DOMAINNAME**: Specifies the domain name of the network
• **MASTER**: Specifies the master adapter name
• **GATEWAY**: Specifies the network subnet gateway
• **SSHENABLED**: A Boolean variable where `TRUE` indicates SSH should be enabled for this adapter
• **MAC**: Specifies the MAC address
• **NICSPEED**: (Only for X7 2 socket compute nodes), either 10000 or 25000
• **SLAVE**: Specifies a space-separated list of slave devices for a bonded network, enclosed in single quotes
• **PKEY**: (For Private networks only) Specifies the pkey
• **PKEYNAME**: (For Private networks only) Specifies the pkey name
• **STATUS**: Specifies the status of the network
• **LACP**: A Boolean variable where `TRUE` indicates that LACP should be enabled
• **VLANID**: Specifies the VLAN Id if network is a VLAN network and not private
• **NATHOSTNAME**: Specifies the NAT host name
• **NATIP**: Specifies the NAT IP address
• **NATDOMAINNAME**: Specifies the NAT domain name
• **NATNETMASK**: Specifies the NAT netmask

The following arguments are available in the **WHERE** clause:
• **ID**: Specifies the ID for the target network in the XML configuration file.
• **NETWORKHOSTNAME**: Specifies the host name for an network object, not the machine host name
• **NATHOSTNAME**: Specifies the NAT host name for an existing compute node
• **HOSTNAME**: Specifies the host name for an existing compute node
• **NETWORKTYPE**: Specifies the type of network, which can be `ADMIN`, `CLIENT`, `BACKUP`, `PRIVATE`, `OTHER`, `INGESTVIP`, `REPLICATIONVIP`, or `ILOM`.
• **PRIVATEID**: Specifies the ID of the private network
• **CLUSTERNUMBER**: Specifies the cluster number in the XML configuration file, starting at 1
• **CLUSTERNAME**: Specifies the name of an existing cluster
• **COMPUTENUMBER**: Specifies the number of an existing compute node in the cluster, starting at 1
• **STORAGENUMBER**: Specifies the number of an existing storage cell in the cluster, starting at 1
3.3.3.12.3 DELETE NETWORK

This command removes a network record for a machine.

Syntax

DELETE NETWORK
WHERE {
    ID = network_id |
    HOSTNAME = network_hostname NETWORKTYPE = network_type |
    CLUSTERNAME = cluster_name { COMPUTENUMBER=compute_number |
        STORAGENUMBER=storage_number } NETWORKTYPE = network_type |
    CLUSTERNUMBER = cluster_number { COMPUTENUMBER=compute_number |
        STORAGENUMBER=storage_number } NETWORKTYPE = network_type |
    CLUSTERID = cluster_id { COMPUTENUMBER=compute_number |
        STORAGENUMBER=storage_number } NETWORKTYPE = network_type |
    CLUSTERNUMBER = cluster_number { COMPUTENUMBER=compute_number |
        STORAGENUMBER=storage_number } NETWORKTYPE = network_type |
    CLUSTERID = cluster_id { COMPUTENUMBER=compute_number |
        STORAGENUMBER=storage_number } NETWORKTYPE = network_type |
}

Arguments

The following arguments are available in the WHERE clause:

• **ID**: Specifies the ID for the network object in the XML configuration file.
• **HOSTNAME**: Specifies the host name for an existing compute node
• **NETWORKTYPE**: Specifies the type of network, which can be ADMIN, CLIENT, BACKUP, PRIVATE, OTHER, INGESTVIP, REPLICATIONVIP, or ILOM.
• **CLUSTERNAME**: Specifies the name of an existing cluster
• **CLUSTERNUMBER**: Specifies the cluster number in the XML configuration file, starting at 1
• **CLUSTERID**: Specifies the cluster ID in the XML configuration file
• **COMPUTENUMBER**: Specifies the number of an existing compute node in the cluster, starting at 1
• **STORAGENUMBER**: Specifies the number of an existing storage cell in the cluster, starting at 1

3.3.3.12.4 LIST NETWORKS

This command lists the network details.

Syntax

LIST NETWORKS
[ WHERE {
    ID = network_id |
    HOSTNAME = network_hostname [ NETWORKTYPE = network_type ] |
    CLUSTERNAME = cluster_name { COMPUTENUMBER=compute_number |
        STORAGENUMBER=storage_number } [ NETWORKTYPE = network_type ] |
    CLUSTERNUMBER = cluster_number { COMPUTENUMBER=compute_number |
        STORAGENUMBER=storage_number } [ NETWORKTYPE = network_type ] |
    CLUSTERID = cluster_id { COMPUTENUMBER=compute_number |
        STORAGENUMBER=storage_number } [ NETWORKTYPE = network_type ] }
    CLUSTERNUMBER = cluster_number { COMPUTENUMBER=compute_number |
        STORAGENUMBER=storage_number } [ NETWORKTYPE = network_type ] }
    CLUSTERID = cluster_id { COMPUTENUMBER=compute_number |
        STORAGENUMBER=storage_number } [ NETWORKTYPE = network_type ] }
]}

Arguments

The following arguments are available in the WHERE clause:
• **ID**: Specifies the ID for the network object in the XML configuration file.
• **HOSTNAME**: Specifies the host name for an existing compute node.
• **NETWORKTYPE**: Specifies the type of network, which can be **ADMIN**, **CLIENT**, **BACKUP**, **PRIVATE**, or **ILOM**.
• **CLUSTERNAME**: Specifies the name of an existing cluster.
• **CLUSTERNUMBER**: Specifies the cluster number in the XML configuration file, starting at 1.
• **CLUSTERID**: Specifies the cluster ID in the XML configuration file.
• **COMPUTENUMBER**: Specifies the number of an existing compute node in the cluster, starting at 1.
• **STORAGENUMBER**: Specifies the number of an existing storage cell in the cluster, starting at 1.

3.3.3.13 SCAN

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

- **ADD SCAN** (page 3-66)
- **ALTER SCAN** (page 3-67)
- **DELETE SCAN** (page 3-67)
- **LIST SCANS** (page 3-67)

3.3.3.13.1 ADD SCAN

This command adds a SCAN to the an individual cluster.

**Syntax**

ADD SCAN SCANNAMES=scan_name [ SCANPORT=scan_port ] SCANIPS='scan_ip_addrs'
WHERE

{   CLUSTERNAME = cluster_name |
    CLUSTERNUMBER = cluster_number |
    CLUSTERID = cluster_id }

**Arguments**

You can specify the following attributes for the new SCAN:

- **SCANNAMES**: Specifies the DNS name for the SCAN
- **SCANPORT**: Specifies the port for the SCAN. The default value is 1521.
- **SCANIPS**: A comma-separated list of IP addresses for the SCAN, enclosed in single quotes.

The following arguments are available in the **WHERE** clause:

- **CLUSTERNAME**: Specifies the name of the cluster
- **CLUSTERNUMBER**: Specifies the cluster number in the XML configuration file, starting at 1.
- **CLUSTERID**: Specifies the ID of the cluster in the XML configuration file.
3.3.3.13.2 ALTER SCAN

This command modifies the attributes of a SCAN for an individual cluster.

Syntax

ALTER SCAN { SCANNAME=scan_name | SCANPORT=scan_port | SCANIPS='scan_ip_addrs' } WHERE { CLUSTERNAME = cluster_name | CLUSTERNUMBER = cluster_number | CLUSTERID = cluster_id }

Arguments

You can modify the following attributes for the SCAN:

- **SCANNAME**: Specifies the DNS name for the SCAN
- **SCANPORT**: Specifies the port for the SCAN.
- **SCANIPS**: A comma-separated list of IP addresses for the SCAN, enclosed in single quotes.

The following arguments are available in the WHERE clause:

- **CLUSTERNAME**: Specifies the name of the cluster
- **CLUSTERNUMBER**: Specifies the cluster number in the XML configuration file, starting at 1
- **CLUSTERID**: Specifies the ID of the cluster in the XML configuration file

3.3.3.13.3 DELETE SCAN

This command removes a SCAN for an individual cluster.

Syntax

DELETE SCAN WHERE { CLUSTERNAME = cluster_name | CLUSTERNUMBER = cluster_number | CLUSTERID = cluster_id }

Arguments

The following arguments are available in the WHERE clause:

- **CLUSTERNAME**: Specifies the name of the cluster
- **CLUSTERNUMBER**: Specifies the cluster number in the XML configuration file, starting at 1
- **CLUSTERID**: Specifies the ID of the cluster in the XML configuration file

3.3.3.13.4 LIST SCANS

This command lists the SCAN details for all clusters or for an individual cluster.
Syntax

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

Arguments

The following arguments are available in the WHERE clause:

• SCANID: Specifies the ID of the SCAN object in the XML configuration file
• CLUSTERNAME: Specifies the name of the cluster
• CLUSTERNUMBER: Specifies the cluster number in the XML configuration file, starting at 1
• CLUSTERID: Specifies the ID of the cluster in the XML configuration file

Usage Notes

If you do not specify a WHERE clause, then this command lists details about all the SCANS for all the clusters in the XML configuration file.

3.3.3.14 SWITCH

You can alter or list the switches.

• ALTER SWITCH (page 3-68)
• LIST SWITCHES (page 3-69)

3.3.3.14.1 ALTER SWITCH

This command alters attributes of an individual switch.

Syntax

ALTER SWITCH { DNSSERVERS= 'dns_servers' | NTPSERVERS= 'ntp_servers' | TIMEZONE = timezone } WHERE {
  ID = switch_id | 
  HOSTNAME = switch_name }

Arguments

You can modify the following attributes for a switch:

• DNSSERVERS: Specifies a comma-separated list of DNS servers that is enclosed in single quotes.
• NTPSERVERS: Specifies a comma-separated list of NTP servers that is enclosed in single quotes.
• TIMEZONE: Specifies a valid time zone for the switch.

The following arguments are available in the WHERE clause:

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

3.3.3.14.2 LIST SWITCHES

This command lists the switch details for all switches or for an individual switch.

Syntax

LIST SWITCHES
[ WHERE {
    ID = switch_id |
    HOSTNAME = switch_name |
} ]

Arguments

The following arguments are available in the WHERE clause:

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

Usage Notes

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

3.3.3.15 VIP

You can add, alter, delete, or list the VIPs for the clusters.

• ADD VIP (page 3-69)
• ALTER VIP (page 3-70)
• DELETE VIP (page 3-70)
• LIST VIPS (page 3-71)

3.3.3.15.1 ADD VIP

This command adds a VIP for an individual node in a cluster.

Purpose

This command does not add additional VIPs. You should only use this command after previously issuing a DELETE VIP command.

Syntax

ADD VIP NAME=vip_name DOMAINNAME=domain_name IP=vip_ip_addr
WHERE {
    HOSTNAME = hostname |
    CLUSTERNAME = cluster_name COMPUTENUMBER = compute_number |
    CLUSTERNUMBER = cluster_number COMPUTENUMBER = compute_number |
    CLUSTERID = cluster_id COMPUTENUMBER = compute_number |
}

Arguments

You can specify the following attributes when adding a VIP:

• NAME: Specifies the short DNS name for the VIP
• **DOMAINNAME**: Specifies the domain name for the VIP
• **IP**: Specifies the IP address for the VIP

The following arguments are available in the **WHERE** clause:

• **HOSTNAME**: Specifies the host name for the compute node in the cluster
• **CLUSTERNUMBER**: Specifies the cluster number in the es.xml, starting at 1
• **CLUSTERNAME**: Specifies the name of the cluster
• **CLUSTERID**: Specifies the es.xml ID of the cluster
• **COMPUTENUMBER**: Specifies the compute node number in the cluster, starting at 1

**Usage Notes**

When adding a VIP to a compute node, the node must not already have a VIP defined.

### 3.3.3.15.2 ALTER VIP

This command alters the attributes of a VIP for an individual node in a cluster.

**Syntax**

```
ALTER VIP { NAME= vip_name | DOMAINNAME= domain_name | IP= vip_ip_addr }
WHERE {
    HOSTNAME = hostname |
    CLUSTERNUMBER = cluster_number COMPUTENUMBER = compute_number |
    CLUSTERNAME = cluster_name COMPUTENUMBER = compute_number |
    CLUSTERID = cluster_id COMPUTENUMBER = compute_number }
```

**Arguments**

You can modify the following attributes for the VIP:

• **NAME**: Specifies the short DNS name for the VIP
• **DOMAINNAME**: Specifies the domain name for the VIP
• **IP**: Specifies the IP address for the VIP

The following arguments are available in the **WHERE** clause:

• **HOSTNAME**: Specifies the host name for the compute node in the cluster
• **CLUSTERNUMBER**: Specifies the cluster number in the es.xml, starting at 1
• **CLUSTERNAME**: Specifies the name of the cluster
• **CLUSTERID**: Specifies the es.xml ID of the cluster
• **COMPUTENUMBER**: Specifies the compute node number in the cluster, starting at 1

### 3.3.15.3 DELETE VIP

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

**Syntax**

```
DELETE VIP
WHERE { 
    ID = vip_id | 
```
Arguments

The following arguments are available in the WHERE clause:

- **ID**: Specifies the ID for the VIP in the XML configuration file
- **HOSTNAME**: Specifies the host name for the compute node in the cluster
- **CLUSTERNUMBER**: Specifies the cluster number in the XML configuration file, starting at 1
- **CLUSTERNAME**: Specifies the name of the cluster
- **CLUSTERID**: Specifies the ID of the cluster in the XML configuration file
- **COMPUTENUMBER**: Specifies the compute node number in the cluster, starting at 1

3.3.3.15.4 LIST VIPS

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

Syntax

```bash
LIST VIPS
[ WHERE {
   HOSTNAME = hostname |
   CLUSTERNAME = cluster_name [ COMPUTENUMBER = compute_number ] |
   CLUSTERNUMBER = cluster_number [ COMPUTENUMBER = compute_number ] |
   CLUSTERID = cluster_id [ COMPUTENUMBER = compute_number ] }
```

Arguments

The following arguments are available in the WHERE clause:

- **ID**: Specifies the ID for the VIP in the XML configuration file
- **HOSTNAME**: Specifies the host name for the compute node in the cluster
- **CLUSTERNUMBER**: Specifies the cluster number in the XML configuration file, starting at 1
- **CLUSTERNAME**: Specifies the name of the cluster
- **CLUSTERID**: Specifies the ID of the cluster in the XML configuration file
- **COMPUTENUMBER**: Specifies the compute node number in the cluster, starting at 1

Usage Notes

If you do not specify a WHERE clause, then this command lists the VIPs for all clusters.
This chapter describes how to move, install and configure the hardware through to powering on the system.

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

### 4.1 Reviewing Safety Guidelines

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

Failing to observe these precautions can result in injury, equipment damage, or malfunction.

- Do not block ventilation openings.
- Do not install Oracle Exadata Rack in a location that is exposed to direct sunlight or near a device that may become hot.
- Do not install Oracle Exadata Rack in a location that is exposed to excessive dust, corrosive gases, or air with high salt concentrations.
- Do not install Oracle Exadata Rack in a location that is exposed to frequent vibrations. Install Oracle Exadata Rack on a flat, level surface.
- Use a power outlet that uses proper grounding. When using shared grounding, the grounding resistance must not be greater than 10 ohms. Ensure that your facility administrator or a qualified electrical engineer verifies the grounding method for the building, and performs the grounding work.
- Be sure that each grounding wire used for Oracle Exadata Rack is used exclusively for Oracle Exadata Rack. Also be sure to observe the precautions, warnings, and notes about handling that appear on labels on the equipment.
- Do not place cables under the equipment or stretch the cables too tightly.
- Do not disconnect power cords from the equipment while its power is on.
- If you cannot reach the connector lock when disconnecting LAN cables, then press the connector lock with a flathead screwdriver to disconnect the cable. You could damage the system board if you force your fingers into the gap rather than using a flathead screwdriver.
• Do not place anything on top of Oracle Exadata Rack or perform any work directly above the rack.

• Do not let the room temperature rise sharply, especially in winter. Sudden temperature changes can cause condensation to form inside Oracle Exadata Rack. Allow for a sufficient warm-up period prior to server operation.

• Do not install Oracle Exadata Rack near a photocopy machine, air conditioner, welding machine, or any other equipment that generates loud, electronic noises.

• Avoid static electricity at the installation location. Static electricity transferred to Oracle Exadata Rack can cause malfunctions. Static electricity is often generated on carpets.

• Confirm the supply voltage and frequency match the electrical ratings indicated for Oracle Exadata Rack.

• Do not insert anything into any Oracle Exadata Rack opening, unless doing so is part of a documented procedure. Oracle Exadata Rack contains high-voltage parts. If a metal object or other electrically-conductive object enters an opening in Oracle Exadata Rack, then it could cause a short circuit. This could result in personal injury, fire, electric shock, and equipment damage.

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

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

See Also:

• *Important Safety Information for Sun Hardware Systems* (816-7190) included with the rack

• *Oracle Engineered System Safety and Compliance Guide, Compliance Model No.: ESY27*

4.2 Unpacking Oracle Exadata Rack

The unpacking location should be determined during the site planning process. The following image shows the Oracle Exadata Rack shipping crate.
The shipping kit contains the following tools and equipment to install and service Oracle Exadata Rack:

- 16 mm long No. 2 Phillips screw
- T30 Torx cranked wrench key
- T25 Torx cranked wrench key
- 6 mm hexagon Allen wrench key
- SW 12 mm single-headed wrench
- 2 square jumper brackets with 4 M5 Torx screws
- 2 cable management hooks with 4 spring nuts
- Side panel removal tool
- Keys to the front door, rear door, and side panel locks
- 32 M6 cage nuts
- 32 M6 screws
- Cage nut mounting tool
• SW 17 mm single-headed wrench is included on the shipping pallet

**Note:**
The following items are not included in the shipping kit:
- No. 2 Phillips screwdriver
- Antistatic wrist strap

The following procedure describes how to unpack Oracle Exadata Rack:

**WARNING:**
Oracle strongly recommends that you use professional movers when unpacking and installing Oracle Exadata Rack.

1. Unpack Oracle Exadata Rack carefully from the packaging and shipping pallet as follows:

**Note:**
Before unpacking the rack from the shipping carton, refer to the labels on the carton and to the instructions that they provide.

a. Remove the shipping carton bands.
b. Remove the yellow fasteners and carton top.
c. Remove the carton sides and inner top.

**WARNING:**
Rocking or tilting the rack can cause the rack to fall over and cause serious injury or death.

2. Remove the shipping kit.

3. Attach the ramps to the shipping pallet as follows:
   a. Remove the ramps from the pallet sides.
   b. Obtain the parts bag from inside the cabinet.
   c. Adjust the leveling bolts on the ramps and connect the ramps to the pallet wheel track.

4. Carefully roll Oracle Exadata Rack off the shipping pallet as follows:
   a. Unfasten the exterior mounting brackets from the pallet.
b. Unfasten the interior mounting brackets from the pallet.

Note:

Use care when removing the mounting brackets from underneath Oracle Exadata Rack. Access to the inside mounting brackets might be limited.

c. Roll the cabinet down the ramps to the level floor. Oracle recommends having three people available to move the rack down the ramp: two people on both sides to help guide the rack and one person in back.

5. Save the mounting brackets used to secure the rack to the shipping pallet. Do not dispose of these brackets, because you cannot order replacement brackets.

6. Recycle the packaging properly. Follow local laws and guidelines to dispose of the material.

See Also:


4.3 Placing Oracle Exadata Rack in Its Allocated Space

This section describes how to position, stabilize, and ground Oracle Exadata Rack.

4.3.1 Moving Oracle Exadata Rack

The following procedure describes how to move Oracle Exadata Rack:

1. Ensure the doors are closed and secured.
2. Ensure the leveling and stabilizing feet on the rack are raised and out of the way.
3. Push Oracle Exadata Rack from behind to the installation site.

When moving Oracle Exadata Rack to the installation site, the front casters do not turn; you must steer the unit by moving the rear casters. You can safely maneuver Oracle Exadata Rack by carefully pushing it. Figure 4-2 (page 4-6) shows the correct way to push the rack.
Oracle recommends having two people to move the rack: one person in front and one person in back to help guide the rack. When transporting configured racks from one location to another, take care to move them slowly, 0.65 meters per second (2.13 feet per second) or slower.

Carefully examine the transportation path. Avoid obstacles such as doorways or elevator thresholds that can cause abrupt stops or shocks. Go around obstacles by using ramps or lifts to enable smooth transport.

**WARNING:**

- Never attempt to move Oracle Exadata Rack by pushing on the side panels. Pushing on the side panels can tip the rack over. This can cause serious personal injury or death as well as damage to the equipment.
- Never tip or rock Oracle Exadata Rack because the rack can fall over.

### 4.3.2 Stabilizing Oracle Exadata Rack

After moving Oracle Exadata Rack to the installation site, stabilize the rack to ensure that it does not move or tip over.

You can stabilize the rack permanently by extending the rack leveling feet.

- [Stabilize Oracle Exadata Rack with Leveling Feet](#) (page 4-7)
- [Stabilize Oracle Exadata Rack X7 with Leveling Feet](#) (page 4-8)
4.3.2.1 Stabilize Oracle Exadata Rack with Leveling Feet

The rack contains four leveling feet that can be lowered to stabilize the rack. The leveling feet can be used even when the rack is permanently secured to the floor. The four leveling feet should share the rack load with at least one other support. The following is an acceptable method to share the rack load:

- Casters and leveling feet

To adjust the leveling feet, do the following:

1. Locate the four leveling feet located at the bottom corners of Oracle Exadata Rack. Figure 4-3 (page 4-7) shows the location of the leveling feet on the bottom of Oracle Exadata Rack.

![Figure 4-3 Location of Leveling Feet on Oracle Exadata Rack](image)

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

2. Lower the leveling feet to the floor to share the load with the casters, as shown in Figure 4-4 (page 4-8) using the SW 12 mm wrench.

Figure 4-4  Securing Oracle Exadata Rack Using the Leveling Feet

4.3.2.2 Stabilize Oracle Exadata Rack X7 with Leveling Feet

The rack contains four leveling feet that can be lowered to stabilize the rack.

The leveling feet can be used even when the rack is permanently secured to the floor. The four leveling feet share the load with the casters. This increases the footprint of the rack which improves stability and helps prevent rack movement.

To adjust the leveling feet, do the following:

1. Locate the four leveling feet located at the bottom corners of Oracle Exadata Rack. The following figure shows the location of the leveling feet on the bottom of Oracle Exadata Rack. The image dimensions include the doors attached to the rack.
Figure 4-5  Location of Leveling Feet on Oracle Exadata Rack X7

- 1: Distance from the edge of the feet to the Front door surface is 58 mm (2.3 inches)
- 2: Depth of the outside edges of the leveling feet is 1113 mm (43.8 inches)
- 3: Distance from the edge of the leveling feet to the rear door surface is 26 mm (1.0 inches)
- 4: Distance from the center of rear casters to the side of the rack is 96.5 mm (3.8 inches)
- 5: Width between the center of the rear casters is 407 mm (16.0 inches)
- 6: Distance from the center of the rear casters to the rear door surface is 142 mm (5.6 inches)
- 7: Depth between the front and rear casters is 889 mm (35.0 inches)
- 8: Distance between the center of the front casters and the Front door surface is 166 mm (6.5 inches)
- 9: Width from the outside edges of the leveling feet is 583 mm (23.0 inches)
- 10: Width from the inside edges of the leveling feet is 513 mm (20.2 inches)
- 11: Distance from the edge of the mounting feet to the side of the rack is 8.5 mm (0.3 inches)
- 12: Width between the center of the front casters is 410 mm (16.1 inches)
- 13: Distance from the center of front casters to the side of the rack is 95 mm (3.7 inches)

2. Stabilize the rack by lowering the four leveling feet to the floor, using a 6-mm hex wrench or your fingers, as shown in the following image.
4.3.3 Attaching a Ground Cable (Optional)

The Oracle Exadata Rack power distribution units (PDUs) achieve earth ground through their power cords. Final chassis ground is achieved by way of the ground prong when you connect the power cord to a socket. For additional grounding, attach a chassis earth ground cable to Oracle Exadata Rack. The additional ground point enables electrical current leakage to dissipate more efficiently.

⚠️ WARNING:

The PDU power input lead cords and the ground cable must reference a common earth ground. If they do not, then a difference in ground potential can be introduced. If you are unsure of your facility's PDU receptacle grounding, then do not install a ground cable until you confirm that there is a proper PDU receptacle grounding. If a difference in ground potential is apparent, then you must take corrective action.

🔍 Note:

A grounding cable is not shipped with the system.

1. Ensure the installation site has properly grounded the power source in the data center. The facility PDU must have earth ground.
2. Ensure all grounding points, such as raised floors and power receptacles, reference the facility ground.
3. Ensure that direct, metal-to-metal contact is made for this installation. During manufacturing, the ground cable attachment area might have been painted or coated.

4. Attach the ground cable to one of the attachment points located at the bottom rear of the system frame as shown in Figure 4-7 (page 4-11). The attachment point is an adjustable bolt that is inside the rear of the Oracle Exadata Rack cabinet on the right side.

![Figure 4-7 Earth Ground Attachment Bolt Location](image)

See Also:

Oracle Exadata Database Machine Extending and Multi-Rack Cabling Guide if Oracle Exadata Rack will be connected to another Oracle Exadata Rack

4.4 Acclimating Oracle Exadata Database Machine

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

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

4.5 Powering on the System the First Time

Before powering on the system for the first time, it is necessary to inspect the machine, and connect the power cords.

4.5.1 Inspecting the Machine After it is in Place

This procedure describes how to visually examine the Oracle Exadata Rack physical system after it is in place, but before power is supplied.
1. Check the rack for damage.
2. Check the rack for loose or missing screws.
3. Check Oracle Exadata Rack for the ordered configuration. Refer to the Customer Information Sheet (CIS) on the side of the packaging.
4. Check that all cable connections are secure and firmly in place as follows:
   a. Check the power cables. Ensure that the correct connectors have been supplied for the data center facility power source.
   b. Check the network data cables.
5. Check the site location tile arrangement for cable access and airflow.
6. Check the data center airflow that leads in to the front of Oracle Exadata Rack.

Related Topics:

- Ventilation and Cooling Requirements (page 1-45)
  Always provide adequate space in front and behind the rack to allow for proper ventilation.

4.5.2 Connecting Power Cords

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

1. Open the rear cabinet door.
2. Ensure that the correct power connectors have been supplied.
3. Unfasten the power cord cable ties. The ties are for shipping only and are no longer needed.
4. Route the power cords to the facility receptacles as shown in Figure 4-8 (page 4-13).
5. Secure the power cords in bundles as shown in Figure 4-8 (page 4-13).
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.
4.5.3 Powering on Oracle Exadata Rack

The following procedure describes how to power on Oracle Exadata Rack:

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

1. Switch on the PDU B circuit breakers, one at a time. PDU B is on the right side of the rack when viewed from the rear. The circuit breakers are on the rear of the Oracle Exadata Rack cabinet as shown in the following figure. Press the ON (I) side of the toggle switch. When the breaker is in the ON position, the breakers are flush with the side of the PDU.
2. Verify the expected power LEDs are on. The LEDs are located as follows:
   • Database servers: Right-hand LED
   • Exadata Storage Servers: Top LED
   • Cisco switch: Left LED (viewed from front) is green, and the other LEDs are red
   • InfiniBand switches: Left LED (viewed from front) labeled PS0, or right LED (viewed from front) labeled PS1
   • KVM switch on Oracle Exadata Database Machine X2-2: Lower LED B
   • KMM switch on Oracle Exadata Database Machine X2-2: Only supplied by PDU B

3. Connect power to PDU A. Ensure the breaker switches are in the OFF position before connecting the power cables.

4. Switch on the PDU A circuit breakers, one at a time.

5. Verify the expected LEDs are on.

6. Perform a visual check of all cable connections in the rack. Do not press every connector to verify connection.

7. Verify the OK LED is blinking standby for all systems. The OK LED blinks on for 0.1 seconds, once every 3 seconds when in standby mode. The OK LED does not blink when the ILOM is starting. The LED remains dark until it goes to standby mode after 2 to 3 minutes.

Related Topics:
- Reviewing Safety Guidelines (page 4-1)
5

Configuring Oracle Exadata Database Machine

This chapter describes how to configure the system, accounts, and software for Oracle Exadata Database Machine.

Note:

• For ease of reading, the name “Oracle Exadata Rack” is used when information refers to both Oracle Exadata Database Machine and Oracle Exadata Storage Expansion Rack.

• The procedures in this chapter are applicable to Oracle Exadata Storage Expansion Rack as well as Oracle Exadata Database Machine.

• The procedures in this chapter use the information from Oracle Exadata Database Machine Deployment Assistant (OEDA). Be sure to run OEDA before starting the procedures in this chapter.

Related Topics:

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

5.1 Configuring Sun Datacenter InfiniBand Switch 36 Switch

The following procedure describes how to configure the Sun Datacenter InfiniBand Switch 36 switches.

1. Log in to the first database server as the root user. The first database server is the lowest database server in the rack, which is rack position U16.

Note:

If you do not have the password for the root user, then contact Oracle Support Services.

2. Use SSH to log in to the Sun Datacenter InfiniBand Switch 36 switch as the ilom-admin user. Find the default IP address for the Sun Datacenter InfiniBand Switch 36 switch for your system in "Default IP Addresses (page 2-20)". 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 \npendingipgateway=pending_gw pendingipnetmask=pending_nm
```

```
set /SP/network commitpending=true
```

In the preceding commands, `pending_ip`, `pending_gw`, and `pending_nm` are IP addresses defined by the network administrator.

5. Use the `exit` command to exit the interface.

6. Edit the `/etc/hosts` file to set the IP address and host name using an editor such as `vi`. The following is an example of the updated file:

```
#Do not remove the following link, or various programs
#that require network functionality will fail.
127.0.0.1 localhost.localdomain localhost
10.7.7.32 dm01sw-ib1-ib2.example.com trnasw-ib2
```

It is required that the second line has both fully-qualified and non-fully-qualified names.

7. Use the ILOM interface to configure the IP address, host name, NTP servers, and DNS servers.

8. Restart the switch.

9. Examine the firmware version using the following command:

```
# version
```

Refer to My Oracle Support Note 888828.1 for the current firmware version.

10. Check the health of the switch using the following command:

```
# showunhealthy
```

OK - No unhealthy sensors

11. Run the environment test using the following command:

```
# env_test
```

**NM2 Environment test started:**
Starting Voltage test:
Voltage ECB OK
Measured 3.3V Main = 3.28 V
Measured 3.3V Standby = 3.42 V
Measured 12V =12.06 V
Measured 5V =5.03 V
Measured VBAT =3.06 V
Measured 2.5V =2.53 V
Measured 1.8V =1.79 V
Measured I4 1.2V =1.22 V
Voltage test returned OK
Starting PSU test:
PSU 0 present
PSU 1 present
PSU test returned OK
Starting Temperature test:
Back temperature 30.50
Front temperature 33.88
ComEx temperature 34.12
12. Enable the InfiniBand Subnet Manager using the following command:
   
   ```
   # enablesm
   ```

   **Note:**
   
   If you get an error indicating the InfiniBand Subnet Manager is already running, then restart it as follows:
   
   ```
   # disablesm
   # enablesm
   ```

13. Verify the IP address is correct using the following command:
   
   ```
   # ifconfig eth0
   ```

   ```
   eth0  Link encap:Ethernet HWaddr 00:E0:4B:2A:07:2B
   inet addr:172.16.10.32 Bcast:172.16.10.255
   Mask:255.255.255.0
   inet6 addr:fe80::2e0:3a00:fe2a:61e/64 Scope:Link
   UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
   RX packets:11927 errors:0 dropped:0 overruns:0 frame:0
   TX packets:89 errors:0 dropped:0 overruns:0 carrier:0
   collisions:0 txqueuelen:1000
   RX bytes:720262 (703.3 KiB) TX bytes:11402 (11.1 KiB)
   ```

14. Verify the host name is correct using the following command:
   
   ```
   # hostname
   ```

   ```
   dm01sw-ib2.example.com
   ```

15. Set the Subnet Manager Master as described in "Setting the Subnet Manager Master on Oracle Exadata Database Machine Full Rack and Oracle Exadata Database Machine Half Rack (page 5-4)". This step is needed for Oracle Exadata Database Machine Half Rack and Oracle Exadata Database Machine Full Rack.

16. Log out from the InfiniBand switch using the following command:

   ```
   # exit
   ```
Note:
If the network settings did not appear after restart, then power cycle the switch by removing both power cords for one minute.

Related Topics:
• Exadata Database Machine and Exadata Storage Server Supported Versions (My Oracle Support Doc ID 888828.1)

5.1.1 Setting the Subnet Manager Master on Oracle Exadata Database Machine Full Rack and Oracle Exadata Database Machine Half Rack

Oracle Exadata Database Machine X3-2 systems and Oracle Exadata Database Machine X2-2 systems have three Sun Datacenter InfiniBand Switch 36 switches. Starting with Oracle Exadata Database Machine X4-2, Oracle Exadata Database Machine Two-Socket Systems have two Sun Datacenter InfiniBand Switch 36 switches.

The switch located in rack unit 1 (U1) is referred to as the spine switch. The other two switches are referred to as the leaf switches. The location of the leaf switches is as follows:

• Oracle Exadata Database Machine Two-Socket Systems (X3-2 and later): rack unit 20 (U20) and rack unit 22 (U22)
• Oracle Exadata Database Machine X2-2 racks: rack unit 20 (U20) and rack unit 24 (U24)
• Oracle Exadata Database Machine Eight-Socket Systems (X2-8 and later) Full Racks: Rack unit 21 (U21) and rack unit 23 (U23)

The spine switch is the Subnet Manager Master for the InfiniBand subnet. The Subnet Manager Master has priority 8, and can be verified using the following procedure:

1. Log in to the spine switch as the root user.
2. Run the `setsmpriority list` command.
   The command should show that `smpriority` has a value of 8. If `smpriority` has a different value, then do the following:
   a. Use the `disablesm` command to stop the Subnet Manager.
   b. Use the `setsmpriority 8` command to set the priority to 8.
   c. Use the `enablesm` command to restart the Subnet Manager.

The leaf switches are the Standby Subnet Managers with a priority of 5. This can be verified using the preceding procedure, substituting a value of 5 in the `setsmpriority` command above.
Note:

Oracle Exadata Database Machine Half Rack with Sun Fire X4170 Oracle Database Servers include two Sun Datacenter InfiniBand Switch 36 switches, which are set to priority 5.

To determine the Subnet Manager Master, log in as the root user on any InfiniBand switch, and run the `getmaster` command. The location of the Subnet Manager Master is displayed. The following is an example of the output from the `getmaster` command:

```
# getmaster
20100701 11:46:38 OpenSM Master on Switch : 0x0021283a8516a0a0 ports 36 Sun DCS 36 QDR switch dm01sw-ib1.example.com enhanced port 0 lid 1 lmc 0
```

The preceding output shows the proper configuration. The Subnet Master Manager is running on spine switch `dm01sw-ib1.example.com`.

If the spine switch is not the Subnet Manager Master, then do the following procedure to set the Subnet Manager Master:

1. Use the `getmaster` command to identify the current location of the Subnet Manager Master.
2. Log in as the root user on the leaf switch that is the Subnet Manager Master.
3. Disable Subnet Manager on the switch. The Subnet Manager Master relocates to another switch.
4. Use the `getmaster` command to identify the current location of the Subnet Manager Master. If the spine switch is not Subnet Manager Master, then repeat steps 2 (page 5-5) and 3 (page 5-5) until the spine switch is the Subnet Manager Master.
5. Enable Subnet Manager on the leaf switches that were disabled during this procedure.

Note:

- If the InfiniBand network consists of four or more racks cabled together, then only the spine switches should run Subnet Manager. The leaf switches should have Subnet Manager disabled on them.
- Oracle Exadata Database Machine Half Racks with Sun Fire X4170 Oracle Database Servers, and Oracle Exadata Database Machine Quarter Racks have two Sun Datacenter InfiniBand Switch 36 switches, and both are set to priority 5. The master is the one with the lowest GUID.
5.2 Configuring the Cisco Ethernet Switch

You must perform an initial configuration of the Cisco Ethernet switch.

- Configuring the Cisco Catalyst 4948 Ethernet Switch (page 5-6)
- Performing the Initial Switch Configuration for the Cisco Nexus 93108-1G Ethernet Switch (page 5-14)

5.2.1 Configuring the Cisco Catalyst 4948 Ethernet Switch

The Cisco Catalyst 4948 Ethernet switch supplied with Oracle Exadata Rack is minimally configured during installation.

The minimal configuration disables IP routing, and sets the following:

- Host name
- IP address setup
- Subnet mask
- Default gateway
- Domain name
- Name server
- NTP server
- Time
- Time zone

Before configuring the switch, note the following:

- The Cisco Ethernet switch should not be connected until the running configuration has been verified, and any necessary changes have been made by the network administrator.
- The Cisco Ethernet switch should not be connected to the customer network until the IP addresses on all components have been configured in Oracle Exadata Rack. This is to prevent any duplicate IP address conflicts which are possible due to the default addresses set in the components when shipped.
Note that the Cisco 4948E-F switch supports multiple uplinks to the customer network by utilizing ports 49 - 52. This is a more complicated switch setup due to the redundant connectivity, and should be performed by the customer's network administrator.

The following procedure describes how to configure the Cisco Ethernet switch. Configuration should be done with the network administrator.

1. Connect a serial cable from the Cisco switch console to a laptop or similar device. An Oracle supplied rollover cable is pre-installed on the Cisco serial console port. Obtain the appropriate adapter and connect it at the end of the rollover cable. An Oracle P/N 530-3100 RJ45-DB9 adapter as used on ILOM ports will also work, connected at the end of the network cable.

2. Ensure the terminal session is recorded on the laptop by logging the output. The output can be used as a reference that the switch has been configured correctly. The default serial port speed is 9600 baud, 8 bits, no parity, 1 stop bit, and no handshake.

   Switch con0 is now available
   Press RETURN to get started.

3. Change to the enable mode.

   Switch> enable
   Password: ******
   Switch#

   **Note:**
   If you do not have the password, then contact Oracle Support Services.

4. Check the current version on the 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
   zdrlawip uptime is 1 minute
   System returned to ROM by reload
   System image file is "bootflash:cat4500e-ipbasek9-mz.152-3.E2.bin"
   Hobgoblin Revision 22, Fortooine Revision 1.40
   ...
   
   Configuration register is 0x2102
   Switch#

   The version of the Cisco 4948E-F switch firmware purchased and shipped by Oracle with Exadata Database Machine X6 is IPBASEK9-MZ, which includes telnet and ssh support. Currently the full release version string is cat4500e-ipbasek9-mz.152-3.E2.bin.

5. Configure the network for a single VLAN. The following example assumes you are using IPv4 addressing.
Switch# `configure terminal`
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# `interface vlan 1`
Switch(config-if)# `ip address` 10.7.7.34 255.255.255.0
Switch(config-if)# `end`
Switch# *Sep 15 14:12:06.309:%SYS-5-CONFIG_I: Configured from console by console
Switch# `write memory`
Building configuration...
Compressed configuration from 2474 bytes to 1066 bytes [OK ]

6. **(Optional) Disable the default IP routing setting, and configure the default gateway.**
   This step is required if IP routing is not used on the switch.

   Switch# `configure terminal`
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# `no ip routing`
Switch(config)# `ip default-gateway` 10.7.7.1
Switch(config)# `end`
*Sep 15 14:12:46.309:%SYS-5-CONFIG_I: Configured from console by console
Switch# `write memory`
Building configuration...
Compressed configuration from 2492 bytes to 1070 bytes [OK ]

**Note:**

If IP routing is required on the switch, then leave the IP routing setting as the default, and configure the default gateway.

Switch# `configure terminal`
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# `ip route` 0.0.0.0 0.0.0.0 10.7.7.1
Switch(config)# `end`
*Sep 15 14:13:26.013:%SYS-5-CONFIG_I: Configured from console by console
Switch# `write memory`
Building configuration...
Compressed configuration from 2502 bytes to 1085 bytes [OK ]

7. Set the host name of the switch.

   Switch# `configure terminal`
Enter configuration commands, one per line. End with CNTL/Z.
exalsw-ip(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.

8. Configure up to three DNS servers.

   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 for the SSH keys to be configurable.

9. (Optional) Set the password.

   exa1sw-ip #configure terminal
   Enter configuration commands, one per line. End with CNTL/Z.
   exa1sw-ip(config)#enable password welcome1
   exa1sw-ip(config)#enable secret welcome1
   The enable secret you have chosen is the same as your enable password. This is not recommended. Re-enter the enable secret.
   exa1sw-ip(config)#end
   exa1sw-ip#write memory
   *Sep 15 14:25:05.893:%SYS-5-CONFIG_I:Configured from console by console
   Building configuration...
   Compressed configuration from 2502 bytes to 1085 bytes [OK ]

10. Verify telnet access is disabled.

    exa1sw-ip#configure terminal
    Enter configuration commands, one per line. End with CNTL/Z.
    exa1sw-ip(config)#line vty 0 15
    exa1sw-ip(config)#login
    % Login disabled on line 1, until 'password' is set
    % Login disabled on line 2, until 'password' is set
    ...
    % Login disabled on line 16, until 'password' is set
    exa1sw-ip(config)#end

    If the login command returns output as shown above, then telnet access has been disabled. If instead you get a prompt, then disable telnet access.

    exa1sw-ip(config-line)#no password
    exa1sw-ip(config-line)#end
    exa1sw-ip#write memory
    Building configuration...
    Compressed configuration from 3786 bytes to 1468 bytes [OK ]

11. (Optional) Configure SSH access on the Cisco switch.

    exa1sw-ip#configure terminal
    Enter configuration commands, one per line. End with CNTL/Z.
    exa1sw-ip(config)#crypto key generate rsa
    % You already have RSA keys defined named exa1sw-ip.example.com.
    % Do you really want to replace them? [yes/no]: yes
    Choose the size of the key modulus in the range of 360 to 2048 for your General Purpose Keys. Choosing a key modulus greater than 512 may take a few minutes.

    How many bits in the modulus [512]: 768
    % Generating 768 bit RSA keys, keys will be non-exportable...[OK]

    exa1sw-ip(config)#
    exa1sw-ip(config)#username admin password 0 welcome1
    exa1sw-ip(config)#line vty 0 15
    exa1sw-ip(config)#transport input ssh
    exa1sw-ip(config-line)#exit
    exa1sw-ip(config)#aaa new-model
    exa1sw-ip(config)#
    exa1sw-ip(config)#ip ssh time-out 60
If the login command returns output as shown above, then telnet access has been disabled. If instead you get a prompt, then disable telnet access.

12. Set the clock and time zone. The switch keeps internal time in Coordinated Universal Time (UTC) format.

- To use UTC, use the following command:
  
  ```
  exa1sw-ip(config-line)#no password
  exa1sw-ip(config-line)#end
  exa1sw-ipwrite memory
  Building configuration...
  Compressed configuration from 3786 bytes to 1468 bytes [OK]
  ```

- 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 month hh:mm week day month hh:mm [offset ]]
  ```
  
  In the preceding command, `zone` is the time zone to be displayed when summer time is in effect (EDT, for example), `week` is the week of the month (1 to 5 or last), `day` is the day of the week (Sunday, Monday, ...), `month` is the month (January, February, ...), `hh:mm` is the hours and minutes in 24-hour format, and `offset` is the number of minutes to add during summer time. The default offset is 60 minutes.

- To manually set the clock to any time use the following command, where the time specified is relative to the configured time zone:
  
  ```
  clock set hh:mm:ss month day year
  ```
  
  In the preceding command, `hh:mm:ss` is the time in 24-hour format, `day` is the day by date in the month, `month` is the name of the month, and `year` is the 4-digit year.

To set the local time and time zone, ordering is important. For example, to set the local time to US Eastern time:

```
exa1sw-ip(config-line)#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
exa1sw-ip(config)#clock timezone EST -5
exa1sw-ip(config)#clock summer-time EDT recurring
exa1sw-ip(config)#end
exa1sw-ip#clock set 21:00:00 August 09 2017
```
13. After setting the local time zone, you can configure up to two NTP servers.

```
exalsw-ip(config)# ntp server 10.7.7.32 prefer
exalsw-ip(config)# ntp server 198.51.100.19
exalsw-ip(config)# end
```

The preceding should show the NTP server synchronized to local time if the Cisco switch is connected to the network that has access to the NTP server.

14. Verify the configuration using the following command:

```
exalsw-ip# show running-config
```

```
Current configuration : 3923 bytes

! Last configuration change at 02:40:49 GMT Wed Nov 12 2014
!
version 15.2
no service pad
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
service compress-config
!
hostname exalsw-ip
!
boot-start-marker
boot system bootflash:cat4500e-ipbasek9-mz.152-3.E2.bin
boot-end-marker
!
enable secret 5 $1$mS8h$EaJr1ECUXavfGH6vLZgL.
enable password welcome1
!
username admin password 0 welcome1
!
aaa new-model
!
!
aaa session-id common
ip subnet-zero
ip domain-name example.com
ip name-server 10.7.7.3
ip name-server 198.51.100.5
```
ip name-server 10.8.160.1
!
ip vrf mgmtVrf
!
vtp mode transparent
!
power redundancy-mode redundant
!
spanning-tree mode pvst
spanning-tree extend system-id
!
vlan internal allocation policy ascending
!
interface FastEthernet1
  ip vrf forwarding mgmtVrf
  no ip address
  speed auto
duplex auto
!
interface GigabitEthernet1/1
  spanning-tree portfast
!
interface GigabitEthernet1/2
  spanning-tree portfast
!
...
!
interface GigabitEthernet1/48
  media-type rj45
!
interface Vlan1
  ip address 10.7.7.34 255.255.255.0
!
interface Vlan48
  no ip address
  shutdown
!
ip default-gateway 10.7.7.1
ip http server
!
control-plane
!
line con 0
  stopbits 1
line vty 0 4
  password welcome1
  transport input ssh
line vty 5 15
  password welcome1
  transport input ssh
!
ntp server 10.7.7.32 prefer
ntp server 198.51.100.19
end
**Note:**

If any setting is incorrect, the repeat the appropriate step. To erase a setting, enter no in front of the same command. For example, to erase the default gateway, use the following commands:

```
exa1sw-ip#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
exa1sw-ip(config)#no ip default-gateway 10.7.7.1
exa1sw-ip(config)#end
exa1sw-ip#
```

```
*Sep 15 14:13:26.013: %SYS-5-CONFIG_I: Configured from console by console
exa1sw-ip#write memory
Building configuration...
Compressed configuration from 2502 bytes to 1085 bytes[OK]
```

15. Save the current configuration.

```
exa1sw-ip#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
Compressed configuration from 2654 bytes to 1189 bytes[OK]
```

16. Exit from the session using the following command:

```
exa1sw-ip#exit
```

```
exa1sw-ip con0 is now available
Press RETURN to get started.
```

17. Disconnect the cable from the Cisco console.

The Cisco switch must not be connected to the management network at this stage. The switch will be connected later after Oracle has configured the systems with the necessary IP addresses and you have worked with the field service engineer to make any additional changes necessary for connecting to the network.

18. To check the Cisco switch, attach a laptop computer to port 48, and ping the IP address of the Exadata internal management network to check the configuration.

**Related Topics:**

- Network Connection and IP Address Requirements for Oracle Exadata Database Machine (page 1-47)
- Network Configuration Checklist (page A-15)

Use this checklist to ensure that the network configuration requirements have been addressed.

### 5.2.2 Configuring the Cisco Nexus 93108-1G Ethernet Switch

The Cisco Nexus 93108-1G Ethernet switch supplied with Oracle Exadata Rack is minimally configured during installation.

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 Ethernet Switch (page 5-14)
5.2.2.1 Performing the Initial Switch Configuration for the Cisco Nexus 93108-1G 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. Login as the admin user.
   
   User Access Verification
   exadata7-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.

   exadata7-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.

   exadata7-adm0# reload

   This command will reboot the system. (y/n)? [n] y

2017 Aug 31 01:09:00 exadata7-adm0 %% VDC-1 %% PLATFORM-2-PFM_SYSTEM_RESET:
Manual system restart from Command Line Interface
7. Switch to normal setup and, when asked if you want to enforce secure password standard, enter no, then enter a new password for the admin user.

Running S93thirdparty-script...

Populating conf files for hybrid sysmgr ...
Starting hybrid sysmgr ...
inserting /isan/lib/modules/klm_cisco_nb.o ... done

Abort Auto Provisioning and continue with normal setup? (yes/no) [n]: yes

---- System Admin Account Setup ----

Do you want to enforce secure password standard (yes/no) [y]: no

Enter the password for "admin":
Confirm the password for "admin":

8. When the Basic System Configuration Dialog appears, choose to enter the basic configuration dialog.

---- Basic System Configuration Dialog VDC: 1 ----

This setup utility will guide you through the basic configuration of the system. Setup configures only enough connectivity for management of the system.

Please register Cisco Nexus9000 Family devices promptly with your supplier. Failure to register may affect response times for initial service calls. Nexus9000 devices must be registered to receive entitled support services.

Press Enter at anytime to skip a dialog. Use ctrl-c at anytime to skip the remaining dialogs.

Would you like to enter the basic configuration dialog (yes/no): yes

9. In the basic configuration, you can use the default inputs until asked to enter the switch name.

In this example, the switch has a name of test123sw-adm0.

Create another login account (yes/no) [n]:
Configure read-only SNMP community string (yes/no) [n]:
Configure read-write SNMP community string (yes/no) [n]:
Enter the switch name: test123sw-adm0

10. Respond no when asked to configure Out-of-band management configuration.

Continue with Out-of-band (mgmt0) management configuration? (yes/no) [y]: no

11. Respond yes when asked to configure advanced IP options.

Configure advanced IP options? (yes/no) [n]: yes

12. Respond no when asked to configure static route (this will be configured later).

Configure static route? (yes/no) [n]: no
13. Enter the destination prefix and mask, and other values as prompted.
   Destination prefix : 10.100.100.0
   Destination prefix mask : 255.255.255.0
   Next hop IPv4 address : 10.100.100.1

14. Skip configuring the DNS IPv4 addresses (this will be configured later).
    Configure the DNS IPv4 address? (yes/no) [n]: no

15. Skip configuring the default domain name (this will be configured later).
    Configure the default domain name? (yes/no) [n]: no

16. Accept the default responses until asked to configure SSH and the NTP server.
    Enable the telnet service? (yes/no) [n]: no
    Enable the ssh service? (yes/no) [y]: yes
    Type of ssh key you would like to generate (dsa/rsa) [rsa]: rsa
    Number of rsa key bits <1024-2048> [1024]: 1024
    Configure the ntp server? (yes/no) [n]: yes
    NTP server IPv4 address : 10.100.100.3

17. Accept the default responses until asked to specify the CoPP system profile. Enter lenient.
    Configure default interface layer (L3/L2) [L2]:
    Configure default switchport interface state (shut/noshut) [noshut]:
    Configure CoPP system profile (strict/moderate/lenient/dense) [strict]: lenient

18. After reviewing the configuration, save the configuration.
    The following configuration will be applied:
    no password strength-check
    switchname test123sw-adm0
    ...

    Would you like to edit the configuration? (yes/no) [n]:

    Use this configuration and save it? (yes/no) [y]: yes

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

22. Configure the DNS information.

test123sw-adm0(config)# ip domain-name example.com
test123sw-adm0(config)# ip name-server 10.100.100.2
test123sw-adm0(config)# exit

23. Save the current configuration.

test123sw-adm0# copy running-config startup-config
[########################################] 100%
Copy complete.

24. Optional: Set the clock, as described in the next topic.

5.2.2.2 Setting the Clock on the Cisco 93108-1G Ethernet Switch

After you have performed the initial configuration, you can adjust the time used by the switch.

1. Login in as the admin user.

2. View the current time.

test123sw-adm0(config)# show clock
20:44:52.986 UTC Thu Aug 31 2017
Time source is NTP

3. Set the timezone appropriately.

test123sw-adm0(config)# clock timezone PST -8 0

4. View the modified time.

test123sw-adm0(config)# show clock
12:46:22.692 PST Thu Aug 31 2017
Time source is NTP

5. Save the configuration.

test123sw-adm0# copy running-config startup-config
[########################################] 100%
Copy complete.

5.3 Configuring the Power Distribution Units

The power distribution units (PDUs) are configured with a static IP address to connect to the network for monitoring. Ensure you have the following before connecting the PDU to the network:

- Static IP address
- Subnet mask
- Default gateway
- Ethernet cables
- Laptop computer with either Oracle Solaris or Microsoft Windows
For systems less than full racks, the PDU Ethernet connections may use available ports in the Cisco 4948E-F switch. Note that for full rack systems, you cannot connect PDUs to the Cisco 4948E-F because all the ports on the switch are already reserved for other components.

The following procedure describes how to configure and connect the PDU to the network:

1. Power off the PDU.
2. Disconnect the power leads from the power source.
3. Select an unused LAN network connection from the available network connections on the laptop as follows:

   • For Oracle Solaris:
     a. Log in as a super user.
     b. Use the `dladm show-link` command to find an unused Ethernet interface.
     c. Use the `ifconfig -a` command to determine which interface is being used.
     d. Use the following command to plumb the unused interface:

```
# ifconfig interface plum up
```

In the preceding command, `interface` is the network interface determined in step 3.c (page 5-18).

   e. Using the following command to assign an IPv4 address and netmask to the interface:

```
# ifconfig interface IPv4_address netmask + netmask \
   broadcast broadcast up
```

In the preceding command, `interface` is the network interface, `IPv4_address` is the IP address, `netmask` is the netmask address, and `broadcast` is the broadcast address.

---

**Note:**

The network interfaces configured with the `ifconfig` command do not persist across system restarts.

---

   • For Microsoft Windows:
     a. Select **Settings** from the Start menu.
     b. Select **Network Connections** from the Settings menu.
     c. Select an unused local area connection from the Network Connections menu.
     d. Double-click **Internet Protocol (TCP/IP)** in the Local Area Connection Properties window. The Internet Protocol (TCP/IP) window appears.
     e. Select **Use the following IP address**.
     f. Enter the IP address in the IP address field. Do not use 192.168.0.1 because that is the default PDU metering unit address.
g. Enter the IP address in the Subnet mask field.

h. Leave the Default gateway field blank.

i. Click **OK**.

4. Connect the PDU and the laptop to two ports on the Cisco switch. The equipment currently using the Cisco switch must be disconnected temporarily.

5. Connect the PDU power input lead to the power source. Only one PDU power input lead needs to be connected, as follows:
   • On PDUs with one power input lead, connect the one lead to the power source.
   • On PDUs with two power leads, connect the first power lead to the power source. The first power lead is labelled 0.
   • On PDUs with three power input leads, connect the middle power lead to the power source. The middle power lead is labelled 1.

6. Use a Web browser to access the PDU metering unit by entering the factory default IP address for the unit, *192.168.0.1*, in the address line of the browser. The Current Measurement page should appear.

7. Click **Network Configuration** in the upper left of the page.

8. Log in as the **admin** user on the PDU metering unit. Change the password after configuring the network.

9. Confirm the DHCP Enable check box is not selected.

10. Enter the following network settings for the PDU metering unit:
    • IP address
    • Subnet mask address
    • Default gateway

11. Click **Submit** to set the network settings, and reset the PDU metering unit.

12. Disconnect the PDU and laptop from the Cisco switch.

13. Reconnect the two cables that were originally connected to the Cisco switch.

14. Connect an Ethernet cable to the PDU metering unit RJ-45 Ethernet port and to the network.

15. Log in to the PDU metering unit using a Web browser. Use the PDU metering unit's static IP address in the browser's address line. If the configuration was successful, then the Current Measurement page is displayed.

16. Connect the remaining PDU power input leads to the power source.

### 5.3.1 Configuring the Threshold Settings for the Power Distribution Units

The PDU current can be monitored directly or with Oracle Enterprise Manager Grid Control. Configure the threshold settings to monitor the PDUs. The threshold settings depend on the size of Oracle Exadata Rack and type PDU. The configurable threshold values for each metering unit module and phase are **Info low**, **Pre Warning**, and **Alarm**.
5.3.1.1 PDU Thresholds for Oracle Exadata Database Machine X5-2 and Later

Starting with Oracle Exadata Database Machine X5-2, Oracle Exadata Configuration Assistant (OECA) is the only source for PDU thresholds. OECA is available on Oracle Technology Network at http://www.oracle.com/technetwork/database/exadata/oeca-download-2817713.html

If for some reason you are unable to utilize OECA, contact Oracle Support.

5.3.1.2 PDU Thresholds for Oracle Exadata Database Machine X4-2

This section contains the PDU thresholds for Oracle Exadata Database Machine X4-2.

5.3.1.2.1 PDU Thresholds for Oracle Exadata Database Machine X4-2 Full Rack

The following tables list the threshold values for Oracle Exadata Database Machine X4-2 Full Rack:
Table 5-1 (page 5-21) Threshold Values for Oracle Exadata Database Machine X4-2 Full Rack with Single-phase, Low-voltage PDU

Table 5-2 (page 5-21) Threshold Values for Oracle Exadata Database Machine X4-2 Full Rack with Three-phase, Low-voltage PDU

Table 5-3 (page 5-22) Threshold Values for Oracle Exadata Database Machine X4-2 Full Rack with Single-phase, High-voltage PDU

Table 5-4 (page 5-22) Threshold Values for Oracle Exadata Database Machine X4-2 Full Rack with Three-phase, High-voltage PDU

Table 5-1 lists the threshold values for Oracle Exadata Database Machine X4-2 Full Rack using a single-phase, low-voltage PDU.

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>20</td>
<td>24</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>17</td>
<td>22</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>19</td>
<td>24</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>19</td>
<td>24</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>17</td>
<td>22</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>20</td>
<td>24</td>
</tr>
</tbody>
</table>

Table 5-2 lists the threshold values for Oracle Exadata Database Machine X4-2 Full Rack using a three-phase, low-voltage PDU.

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A and B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>32</td>
<td>40</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>34</td>
<td>42</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>32</td>
<td>40</td>
</tr>
</tbody>
</table>

Table 5-3 (page 5-22) lists the threshold values for Oracle Exadata Database Machine X4-2 Full Rack using a single-phase, high-voltage PDU.
Table 5-3  Threshold Values for Oracle Exadata Database Machine X4-2 Full Rack with Single-phase, High-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>18</td>
<td>23</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>16</td>
<td>20</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>18</td>
<td>23</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>18</td>
<td>23</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>16</td>
<td>20</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>18</td>
<td>23</td>
</tr>
</tbody>
</table>

Table 5-4 (page 5-22) lists the threshold values for Oracle Exadata Database Machine X4-2 Full Rack using a three-phase, high-voltage PDU.

Table 5-4  Threshold Values for Oracle Exadata Database Machine X4-2 Full Rack with Three-phase, High-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A and B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>18</td>
<td>21</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>18</td>
<td>21</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>16</td>
<td>21</td>
</tr>
</tbody>
</table>

5.3.1.2.2 PDU Thresholds for Oracle Exadata Database Machine X4-2 Half Rack

The following tables list the threshold values for Oracle Exadata Database Machine X4-2 Half Rack:

- Table 5-5 (page 5-23) Threshold Values for Oracle Exadata Database Machine X4-2 Half Rack with Single-phase, Low-voltage PDU
- Table 5-6 (page 5-23) Threshold Values for Oracle Exadata Database Machine X4-2 Half Rack with Three-phase, Low-voltage PDU
- Table 5-7 (page 5-23) Threshold Values for Oracle Exadata Database Machine X4-2 Half Rack with Single-phase, High-voltage PDU
- Table 5-8 (page 5-24) Threshold Values for Oracle Exadata Database Machine X4-2 Half Rack with Three-phase, High-voltage PDU

Table 5-5 (page 5-23) lists the threshold values for Oracle Exadata Database Machine X4-2 Half Rack using a single-phase, low-voltage PDU.
Table 5-5  Threshold Values for Oracle Exadata Database Machine X4-2 Half Rack with Single-phase, Low-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>20</td>
<td>24</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>10</td>
<td>13</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>0.1</td>
<td>0.2</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>0.1</td>
<td>0.2</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>10</td>
<td>13</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>20</td>
<td>24</td>
</tr>
</tbody>
</table>

Table 5-6 (page 5-23) lists the threshold values for Oracle Exadata Database Machine X4-2 Half Rack using a three-phase, low-voltage PDU.

Table 5-6  Threshold Values for Oracle Exadata Database Machine X4-2 Half Rack with Three-phase, Low-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A and B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>17</td>
<td>22</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>19</td>
<td>24</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>15</td>
<td>20</td>
</tr>
</tbody>
</table>

Table 5-7 (page 5-23) lists the threshold values for Oracle Exadata Database Machine X4-2 Half Rack using a single-phase, high-voltage PDU.

Table 5-7  Threshold Values for Oracle Exadata Database Machine X4-2 Half Rack with Single-phase, High-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>18</td>
<td>23</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>0.1</td>
<td>0.2</td>
</tr>
</tbody>
</table>
Table 5-7  (Cont.) Threshold Values for Oracle Exadata Database Machine X4-2 Half Rack with Single-phase, High-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>0.1</td>
<td>0.2</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>18</td>
<td>23</td>
</tr>
</tbody>
</table>

Table 5-8 (page 5-24) lists the threshold values for Oracle Exadata Database Machine X4-2 Half Rack using a three-phase, high-voltage PDU.

Table 5-8  Threshold Values for Oracle Exadata Database Machine X4-2 Half Rack with Three-phase, High-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A and B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>11</td>
<td>15</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>7</td>
<td>10</td>
</tr>
</tbody>
</table>

5.3.1.2.3 PDU Thresholds for Oracle Exadata Database Machine X4-2 Quarter Rack

The following tables list the threshold values for Oracle Exadata Database Machine X4-2 Quarter Rack:

- **Table 5-9** (page 5-25) Threshold Values for Oracle Exadata Database Machine X4-2 Quarter Rack with Single-phase, Low-voltage PDU
- **Table 5-10** (page 5-25) Threshold Values for Oracle Exadata Database Machine X4-2 Quarter Rack with Three-phase, Low-voltage PDU
- **Table 5-11** (page 5-25) Threshold Values for Oracle Exadata Database Machine X4-2 Quarter Rack with Single-phase, High-voltage PDU
- **Table 5-12** (page 5-26) Threshold Values for Oracle Exadata Database Machine X4-2 Quarter Rack with Three-phase, High-voltage PDU

**Table 5-9** (page 5-25) lists the threshold values for Oracle Exadata Database Machine X4-2 Quarter Rack using a single-phase, low-voltage PDU.
Table 5-9  Threshold Values for Oracle Exadata Database Machine X4-2 Quarter Rack with Single-phase, Low-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>10</td>
<td>13</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>0.1</td>
<td>0.2</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>0.1</td>
<td>0.2</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>10</td>
<td>13</td>
</tr>
</tbody>
</table>

Table 5-10 (page 5-25) lists the threshold values for Oracle Exadata Database Machine X4-2 Quarter Rack using a three-phase, low-voltage PDU.

Table 5-10  Threshold Values for Oracle Exadata Database Machine X4-2 Quarter Rack with Three-phase, Low-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A and B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>11</td>
<td>14</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>10</td>
<td>13</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>5</td>
<td>7</td>
</tr>
</tbody>
</table>

Table 5-11 (page 5-25) lists the threshold values for Oracle Exadata Database Machine X4-2 Quarter Rack using a single-phase, high-voltage PDU.

Table 5-11  Threshold Values for Oracle Exadata Database Machine X4-2 Quarter Rack with Single-phase, High-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>0.1</td>
<td>0.2</td>
</tr>
</tbody>
</table>
### Table 5-11 (Cont.) Threshold Values for Oracle Exadata Database Machine X4-2 Quarter Rack with Single-phase, High-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>0.1</td>
<td>0.2</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>9</td>
<td>12</td>
</tr>
</tbody>
</table>

Table 5-12 (page 5-26) lists the threshold values for Oracle Exadata Database Machine X4-2 Quarter Rack using a three-phase, high-voltage PDU.

### Table 5-12 Threshold Values for Oracle Exadata Database Machine X4-2 Quarter Rack with Three-phase, High-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A and B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>9</td>
<td>11</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

5.3.1.3 PDU Thresholds for Oracle Exadata Database Machine X3-2

This section contains the PDU thresholds for Oracle Exadata Database Machine X3-2.

#### Note:

The values listed here are reliable for use on systems in the configuration received upon deployment and delivery from the Oracle Factory. Any changes to this configuration should be modeled in Oracle Exadata Configuration Assistant (OECA), and the PDU thresholds listed in OECA should then be used. OECA is available on Oracle Technology Network.

5.3.1.3.1 PDU Thresholds for Oracle Exadata Database Machine X3-2 Full Rack

The following tables list the threshold values for Oracle Exadata Database Machine X3-2 Full Rack:

- **Table 5-13** (page 5-27) Threshold Values for Oracle Exadata Database Machine X3-2 Full Rack with Single-phase, Low-voltage PDU
- **Table 5-14** (page 5-27) Threshold Values for Oracle Exadata Database Machine X3-2 Full Rack with Three-phase, Low-voltage PDU
• Table 5-15 (page 5-28) Threshold Values for Oracle Exadata Database Machine X3-2 Full Rack with Single-phase, High-voltage PDU

• Table 5-16 (page 5-28)
  Threshold Values for Oracle Exadata Database Machine X3-2 Full Rack with Three-phase, High-voltage PDU

Table 5-13 (page 5-27) lists the threshold values for Oracle Exadata Database Machine X3-2 Full Rack using a single-phase, low-voltage PDU.

Table 5-13  Threshold Values for Oracle Exadata Database Machine X3-2 Full Rack with Single-phase, Low-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>20</td>
<td>24</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>14</td>
<td>18</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>19</td>
<td>24</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>19</td>
<td>24</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>14</td>
<td>18</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>20</td>
<td>24</td>
</tr>
</tbody>
</table>

Table 5-14 (page 5-27) lists the threshold values for Oracle Exadata Database Machine X3-2 Full Rack using a three-phase, low-voltage PDU.

Table 5-14  Threshold Values for Oracle Exadata Database Machine X3-2 Full Rack with Three-phase, Low-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A and B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>30</td>
<td>38</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>32</td>
<td>40</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>30</td>
<td>38</td>
</tr>
</tbody>
</table>

Table 5-15 (page 5-28) lists the threshold values for Oracle Exadata Database Machine X3-2 Full Rack using a single-phase, high-voltage PDU.
Table 5-15  Threshold Values for Oracle Exadata Database Machine X3-2 Full Rack with Single-phase, High-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>18</td>
<td>23</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>13</td>
<td>17</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>18</td>
<td>22</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>18</td>
<td>22</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>13</td>
<td>17</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>18</td>
<td>23</td>
</tr>
</tbody>
</table>

Table 5-16 (page 5-28) lists the threshold values for Oracle Exadata Database Machine X3-2 Full Rack using a three-phase, high-voltage PDU.

Table 5-16  Threshold Values for Oracle Exadata Database Machine X3-2 Full Rack with Three-phase, High-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A and B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>17</td>
<td>21</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>17</td>
<td>21</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>15</td>
<td>19</td>
</tr>
</tbody>
</table>

5.3.1.3.2 PDU Thresholds for Oracle Exadata Database Machine X3-2 Half Rack

The following tables list the threshold values for Oracle Exadata Database Machine X3-2 Half Rack:

- Table 5-17 (page 5-29) Threshold Values for Oracle Exadata Database Machine X3-2 Half Rack with Single-phase, Low-voltage PDU
- Table 5-18 (page 5-29) Threshold Values for Oracle Exadata Database Machine X3-2 Half Rack with Three-phase, Low-voltage PDU
- Table 5-19 (page 5-29) Threshold Values for Oracle Exadata Database Machine X3-2 Half Rack with Single-phase, High-voltage PDU
- Table 5-20 (page 5-30) Threshold Values for Oracle Exadata Database Machine X3-2 Half Rack with Three-phase, High-voltage PDU

Table 5-17 (page 5-29) lists the threshold values for Oracle Exadata Database Machine X3-2 Half Rack using a single-phase, low-voltage PDU.
### Table 5-17  Threshold Values for Oracle Exadata Database Machine X3-2 Half Rack with Single-phase, Low-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>20</td>
<td>24</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>9</td>
<td>11</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>9</td>
<td>11</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>20</td>
<td>24</td>
</tr>
</tbody>
</table>

### Table 5-18  Threshold Values for Oracle Exadata Database Machine X3-2 Half Rack with Three-phase, Low-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A and B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>16</td>
<td>21</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>19</td>
<td>24</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>14</td>
<td>18</td>
</tr>
</tbody>
</table>

### Table 5-19  Threshold Values for Oracle Exadata Database Machine X3-2 Half Rack with Single-phase, High-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>18</td>
<td>23</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Table 5-19 (Cont.) Threshold Values for Oracle Exadata Database Machine X3-2 Half Rack with Single-phase, High-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>18</td>
<td>23</td>
</tr>
</tbody>
</table>

Table 5-20 (page 5-30) lists the threshold values for Oracle Exadata Database Machine X3-2 Half Rack using a three-phase, high-voltage PDU.

Table 5-20 Threshold Values for Oracle Exadata Database Machine X3-2 Half Rack with Three-phase, High-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A and B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>11</td>
<td>15</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>9</td>
<td>11</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>6</td>
<td>8</td>
</tr>
</tbody>
</table>

5.3.1.3.3 PDU Thresholds for Oracle Exadata Database Machine X3-2 Quarter Rack

The following tables list the threshold values for Oracle Exadata Database Machine X3-2 Quarter Rack:

- Table 5-21 (page 5-31) Threshold Values for Oracle Exadata Database Machine X3-2 Quarter Rack with Single-phase, Low-voltage PDU
- Table 5-22 (page 5-31) Threshold Values for Oracle Exadata Database Machine X3-2 Quarter Rack with Three-phase, Low-voltage PDU
- Table 5-23 (page 5-31) Threshold Values for Oracle Exadata Database Machine X3-2 Quarter Rack with Single-phase, High-voltage PDU
- Table 5-24 (page 5-32) Threshold Values for Oracle Exadata Database Machine X3-2 Quarter Rack with Three-phase, High-voltage PDU

Table 5-21 (page 5-31) lists the threshold values for Oracle Exadata Database Machine X3-2 Quarter Rack using a single-phase, low-voltage PDU.
Table 5-21  Threshold Values for Oracle Exadata Database Machine X3-2 Quarter Rack with Single-phase, Low-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>10</td>
<td>13</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>10</td>
<td>13</td>
</tr>
</tbody>
</table>

Table 5-22 (page 5-31) lists the threshold values for Oracle Exadata Database Machine X3-2 Quarter Rack using a three-phase, low-voltage PDU.

Table 5-22  Threshold Values for Oracle Exadata Database Machine X3-2 Quarter Rack with Three-phase, Low-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A and B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>11</td>
<td>14</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>10</td>
<td>13</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>4</td>
<td>6</td>
</tr>
</tbody>
</table>

Table 5-23 (page 5-31) lists the threshold values for Oracle Exadata Database Machine X3-2 Quarter Rack using a single-phase, high-voltage PDU.

Table 5-23  Threshold Values for Oracle Exadata Database Machine X3-2 Quarter Rack with Single-phase, High-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>9</td>
<td>11</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Table 5-23  (Cont.) Threshold Values for Oracle Exadata Database Machine X3-2 Quarter Rack with Single-phase, High-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>9</td>
<td>11</td>
</tr>
</tbody>
</table>

Table 5-24 (page 5-32) lists the threshold values for Oracle Exadata Database Machine X3-2 Quarter Rack using a three-phase, high-voltage PDU.

Table 5-24  Threshold Values for Oracle Exadata Database Machine X3-2 Quarter Rack with Three-phase, High-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A and B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

5.3.1.4 PDU Thresholds for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers)

This section contains the PDU thresholds for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers).

Note:
The values listed here are reliable for use on systems in the configuration received upon deployment and delivery from the Oracle Factory. Any changes to this configuration should be modeled in Oracle Exadata Configuration Assistant (OECA), and the PDU thresholds listed in OECA should then be used. OECA is available on Oracle Technology Network.

5.3.1.4.1 PDU Thresholds for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Full Rack

The following tables list the threshold values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Full Rack:
• **Table 5-25** (page 5-33) Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Full Rack with Single-phase, Low-voltage PDU

• **Table 5-26** (page 5-33) Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Full Rack with Three-phase, Low-voltage PDU

• **Table 5-27** (page 5-34) Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Full Rack with Single-phase, High-voltage PDU

• **Table 5-28** (page 5-34) Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Full Rack with Three-phase, High-voltage PDU

**Table 5-25** (page 5-33) lists the threshold values for Oracle Exadata Database Machine Full Rack using a single-phase, low-voltage PDU.

**Table 5-25**  
Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Full Rack with Single-phase, Low-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>18</td>
<td>23</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>22</td>
<td>24</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>18</td>
<td>23</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>18</td>
<td>23</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>22</td>
<td>24</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>18</td>
<td>23</td>
</tr>
</tbody>
</table>

**Table 5-26** (page 5-33) lists the threshold values for Oracle Exadata Database Machine Full Rack using a three-phase, low-voltage PDU.

**Table 5-26**  
Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Full Rack with Three-phase, Low-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A and B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>32</td>
<td>40</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>34</td>
<td>43</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>33</td>
<td>42</td>
</tr>
</tbody>
</table>
Table 5-27 (page 5-34) lists the threshold values for Oracle Exadata Database Machine Full Rack using a single-phase, high-voltage PDU.

### Table 5-27  Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Full Rack with Single-phase, High-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>16</td>
<td>20</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>20</td>
<td>21</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>16</td>
<td>20</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>16</td>
<td>20</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>20</td>
<td>21</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>16</td>
<td>20</td>
</tr>
</tbody>
</table>

Table 5-28 (page 5-34) lists the threshold values for Oracle Exadata Database Machine Full Rack using a three-phase, high-voltage PDU.

### Table 5-28  Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Full Rack with Three-phase, High-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A and B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>18</td>
<td>21</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>18</td>
<td>21</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>17</td>
<td>21</td>
</tr>
</tbody>
</table>

5.3.1.4.2 PDU Thresholds for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Half Rack

The following tables list the threshold values for Oracle Exadata Database Machine Half Rack:

- Table 5-29 (page 5-35) Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Half Rack with Single-phase, Low-voltage PDU
- Table 5-30 (page 5-35) Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Half Rack with Three-phase, Low-voltage PDU
• Table 5-31 (page 5-36) Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Half Rack with Single-phase, High-voltage PDU

• Table 5-32 (page 5-36) Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Half Rack with Three-phase, High-voltage PDU

Table 5-29 (page 5-35) lists the threshold values for Oracle Exadata Database Machine Half Rack using a single-phase, low-voltage PDU.

Table 5-29  Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Half Rack with Single-phase, Low-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>18</td>
<td>23</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>13</td>
<td>17</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>13</td>
<td>17</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>18</td>
<td>23</td>
</tr>
</tbody>
</table>

Table 5-30 (page 5-35) lists the threshold values for Oracle Exadata Database Machine Half Rack using a three-phase, low-voltage PDU.

Table 5-30  Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Half Rack with Three-phase, Low-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A and B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>18</td>
<td>23</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>17</td>
<td>22</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>18</td>
<td>23</td>
</tr>
</tbody>
</table>

Table 5-31 (page 5-36) lists the threshold values for Oracle Exadata Database Machine Half Rack using a single-phase, high-voltage PDU.
Table 5-31  Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Half Rack with Single-phase, High-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>16</td>
<td>20</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>16</td>
<td>20</td>
</tr>
</tbody>
</table>

Table 5-32 (page 5-36) lists the threshold values for Oracle Exadata Database Machine Half Rack using a three-phase, high-voltage PDU.

Table 5-32  Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Half Rack with Three-phase, High-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A and B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>10</td>
<td>13</td>
</tr>
</tbody>
</table>

5.3.1.4.3 PDU Thresholds for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Quarter Rack

The following tables list the threshold values for Oracle Exadata Database Machine Quarter Rack:

- Table 5-33 (page 5-37) Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Quarter Rack with Single-phase, Low-voltage PDU
- Table 5-34 (page 5-37) Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Quarter Rack with Three-phase, Low-voltage PDU
- Table 5-35 (page 5-38) Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Quarter Rack with Single-phase, High-voltage PDU
- **Table 5-36** (page 5-38) Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Quarter Rack with Three-phase, High-voltage PDU

**Table 5-33** (page 5-37) lists the threshold values for Oracle Exadata Database Machine Quarter Rack using a single-phase, low-voltage PDU.

**Table 5-33**  Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Quarter Rack with Single-phase, Low-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>10</td>
<td>13</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>10</td>
<td>13</td>
</tr>
</tbody>
</table>

**Table 5-34** (page 5-37) lists the threshold values for Oracle Exadata Database Machine Quarter Rack using a three-phase, low-voltage PDU.

**Table 5-34**  Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Quarter Rack with Three-phase, Low-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A and B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>11</td>
<td>14</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>5</td>
<td>7</td>
</tr>
</tbody>
</table>

**Table 5-35** (page 5-38) lists the threshold values for Oracle Exadata Database Machine Quarter Rack using a single-phase, high-voltage PDU.
Table 5-35  Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 M2 and X4270 M2 servers) Quarter Rack with Single-phase, High-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>9</td>
<td>12</td>
</tr>
</tbody>
</table>

Table 5-36 (page 5-38) lists the threshold values for Oracle Exadata Database Machine Quarter Rack using a three-phase, high-voltage PDU.

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A and B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

5.3.1.5 PDU Thresholds for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers)

This section contains the PDU thresholds for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers).
Note:
The values listed here are reliable for use on systems in the configuration received upon deployment and delivery from the Oracle Factory. Any changes to this configuration should be modeled in Oracle Exadata Configuration Assistant (OECA), and the PDU thresholds listed in OECA should then be used. OECA can be downloaded from Oracle Technology Network.

5.3.1.5.1 PDU Thresholds for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Full Rack

The following tables list the threshold values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Full Rack:

- **Table 5-37** (page 5-39) Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Full Rack with Single-phase, Low-voltage PDU
- **Table 5-38** (page 5-40) Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Full Rack with Three-phase, Low-voltage PDU
- **Table 5-39** (page 5-40) Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Full Rack with Single-phase, High-voltage PDU
- **Table 5-40** (page 5-40) Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Full Rack with Three-phase, High-voltage PDU

**Table 5-37** (page 5-39) lists the threshold values for Oracle Exadata Database Machine Full Rack using a single-phase, low-voltage PDU.

**Table 5-37**  Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Full Rack with Single-phase, Low-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>22</td>
<td>24</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>22</td>
<td>24</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>21</td>
<td>24</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>21</td>
<td>24</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>22</td>
<td>24</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>22</td>
<td>24</td>
</tr>
</tbody>
</table>
Table 5-38 (page 5-40) lists the threshold values for Oracle Exadata Database Machine Full Rack using a three-phase, low-voltage PDU.

**Table 5-38** Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Full Rack with Three-phase, Low-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A and B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>36</td>
<td>45</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>39</td>
<td>44</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>38</td>
<td>45</td>
</tr>
</tbody>
</table>

Table 5-39 (page 5-40) lists the threshold values for Oracle Exadata Database Machine Full Rack using a single-phase, high-voltage PDU.

**Table 5-39** Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Full Rack with Single-phase, High-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>20</td>
<td>21</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>20</td>
<td>21</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>19</td>
<td>21</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>19</td>
<td>21</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>20</td>
<td>21</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>20</td>
<td>21</td>
</tr>
</tbody>
</table>

Table 5-40 (page 5-40) lists the threshold values for Oracle Exadata Database Machine Full Rack using a three-phase, high-voltage PDU.

**Table 5-40** Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Full Rack with Three-phase, High-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A and B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>20</td>
<td>21</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>21</td>
<td>21</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>18</td>
<td>21</td>
</tr>
</tbody>
</table>
5.3.1.5.2 PDU Thresholds for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Half Rack

The following tables list the threshold values for Oracle Exadata Database Machine Half Rack:

- **Table 5-41** (page 5-41) Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Half Rack with Single-phase, Low-voltage PDU
- **Table 5-42** (page 5-41) Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Half Rack with Three-phase, Low-voltage PDU
- **Table 5-43** (page 5-42) Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Half Rack with Single-phase, High-voltage PDU
- **Table 5-44** (page 5-42) Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Half Rack with Three-phase, High-voltage PDU

**Table 5-41** (page 5-41) lists the threshold values for Oracle Exadata Database Machine Half Rack using a single-phase, low-voltage PDU.

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>21</td>
<td>24</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>13</td>
<td>17</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>13</td>
<td>17</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>21</td>
<td>24</td>
</tr>
</tbody>
</table>

**Table 5-42** (page 5-41) lists the threshold values for Oracle Exadata Database Machine Half Rack using a three-phase, low-voltage PDU.

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A and B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>19</td>
<td>24</td>
</tr>
</tbody>
</table>
Table 5-42  (Cont.) Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Half Rack with Three-phase, Low-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A and B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>20</td>
<td>25</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>19</td>
<td>24</td>
</tr>
</tbody>
</table>

Table 5-43 (page 5-42) lists the threshold values for Oracle Exadata Database Machine Half Rack using a single-phase, high-voltage PDU.

Table 5-43  Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Half Rack with Single-phase, High-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>19</td>
<td>21</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>19</td>
<td>21</td>
</tr>
</tbody>
</table>

Table 5-44 (page 5-42) lists the threshold values for Oracle Exadata Database Machine Half Rack using a three-phase, high-voltage PDU.

Table 5-44  Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Half Rack with Three-phase, High-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A and B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>11</td>
<td>14</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>11</td>
<td>14</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>10</td>
<td>13</td>
</tr>
</tbody>
</table>
5.3.1.5.3 PDU Thresholds for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Quarter Rack

The following tables list the threshold values for Oracle Exadata Database Machine Quarter Rack:

- **Table 5-45** (page 5-43)
  Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Quarter Rack with Single-phase, Low-voltage PDU

- **Table 5-46** (page 5-44)
  Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Quarter Rack with Three-phase, Low-voltage PDU

- **Table 5-47** (page 5-44)
  Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Quarter Rack with Single-phase, High-voltage PDU

- **Table 5-48** (page 5-44)
  Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Quarter Rack with Three-phase, High-voltage PDU

**Table 5-45** (page 5-43) lists the threshold values for Oracle Exadata Database Machine Quarter Rack using a single-phase, low-voltage PDU.

**Table 5-46** (page 5-44) lists the threshold values for Oracle Exadata Database Machine Quarter Rack using a three-phase, low-voltage PDU.

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>12</td>
<td>15</td>
</tr>
</tbody>
</table>

**Table 5-46** (page 5-44) lists the threshold values for Oracle Exadata Database Machine Quarter Rack using a three-phase, low-voltage PDU.
Table 5-46  Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Quarter Rack with Three-phase, Low-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A and B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>13</td>
<td>17</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>5</td>
<td>7</td>
</tr>
</tbody>
</table>

Table 5-47 (page 5-44) lists the threshold values for Oracle Exadata Database Machine Quarter Rack using a single-phase, high-voltage PDU.

Table 5-47  Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Quarter Rack with Single-phase, High-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>11</td>
<td>14</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>11</td>
<td>14</td>
</tr>
</tbody>
</table>

Table 5-48 (page 5-44) lists the threshold values for Oracle Exadata Database Machine Quarter Rack using a three-phase, high-voltage PDU.

Table 5-48  Threshold Values for Oracle Exadata Database Machine X2-2 (with X4170 and X4275 servers) Quarter Rack with Three-phase, High-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A and B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>11</td>
<td>14</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
5.3.1.6 PDU Thresholds for Oracle Exadata Database Machine X4-8 and Later

This section contains the PDU thresholds for Oracle Exadata Database Machine Eight-Socket systems for X4-8 and later.

Oracle Exadata Configuration Assistant (OECA) is the only source for PDU thresholds for Oracle Exadata Database Machine X4-8 and later systems. OECA is available on Oracle Technology Network at http://www.oracle.com/technetwork/database/exadata/oeca-download-2817713.html

If for some reason you are unable to utilize OECA, contact Oracle Support.

5.3.1.7 PDU Thresholds for Oracle Exadata Database Machine X3-8 Full Rack

This section contains the PDU thresholds for Oracle Exadata Database Machine X3-8 Full Rack.

- Table 5-49 (page 5-45) Threshold Values for Oracle Exadata Database Machine X3-8 Full Rack with Single-phase, Low-voltage 22 kVA PDU
- Table 5-50 (page 5-46) Threshold Values for Oracle Exadata Database Machine X3-8 Full Rack with Three-phase, Low-voltage 24 kVA PDU
- Table 5-51 (page 5-46) Threshold Values for Oracle Exadata Database Machine X3-8 Full Rack with Single-phase, High-voltage 22 kVA PDU
- Table 5-52 (page 5-47) Threshold Values for Oracle Exadata Database Machine X3-8 Full Rack with Three-phase, High-voltage 24 kVA PDU

Table 5-49 (page 5-45) lists the threshold values for Oracle Exadata Database Machine X3-8 Full Rack using a single-phase, low-voltage 22 kVA PDU.

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>25</td>
<td>31</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>26</td>
<td>33</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>24</td>
<td>30</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>24</td>
<td>30</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>26</td>
<td>33</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>25</td>
<td>31</td>
</tr>
</tbody>
</table>

Table 5-50 (page 5-46) lists the threshold values for Oracle Exadata Database Machine X3-8 Full Rack using a three-phase, low-voltage 24 kVA PDU.
Table 5-50  Threshold Values for Oracle Exadata Database Machine X3-8 Full Rack with Three-phase, Low-voltage 24 kVA PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>21</td>
<td>27</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>23</td>
<td>30</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>22</td>
<td>28</td>
</tr>
<tr>
<td>A</td>
<td>Module 2, phase 1</td>
<td>0</td>
<td>20</td>
<td>25</td>
</tr>
<tr>
<td>A</td>
<td>Module 2, phase 2</td>
<td>0</td>
<td>21</td>
<td>27</td>
</tr>
<tr>
<td>A</td>
<td>Module 2, phase 3</td>
<td>0</td>
<td>23</td>
<td>29</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>20</td>
<td>25</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>21</td>
<td>27</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>23</td>
<td>29</td>
</tr>
<tr>
<td>B</td>
<td>Module 2, phase 1</td>
<td>0</td>
<td>21</td>
<td>27</td>
</tr>
<tr>
<td>B</td>
<td>Module 2, phase 2</td>
<td>0</td>
<td>23</td>
<td>30</td>
</tr>
<tr>
<td>B</td>
<td>Module 2, phase 3</td>
<td>0</td>
<td>22</td>
<td>28</td>
</tr>
</tbody>
</table>

Table 5-51 (page 5-46) lists the threshold values for Oracle Exadata Database Machine X3-8 Full Rack using a single-phase, high-voltage 22 kVA PDU.

Table 5-51  Threshold Values for Oracle Exadata Database Machine X3-8 Full Rack with Single-phase, High-voltage 22 kVA PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A and B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>22</td>
<td>28</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>24</td>
<td>30</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>22</td>
<td>28</td>
</tr>
</tbody>
</table>

Table 5-52 (page 5-47) lists the threshold values for Oracle Exadata Database Machine X3-8 Full Rack using a three-phase, high-voltage 24 kVA PDU.
Table 5-52  Threshold Values for Oracle Exadata Database Machine X3-8 Full Rack with Three-phase, High-voltage 24 kVA PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>12</td>
<td>16</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>13</td>
<td>17</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>10</td>
<td>13</td>
</tr>
<tr>
<td>A</td>
<td>Module 2, phase 1</td>
<td>0</td>
<td>10</td>
<td>13</td>
</tr>
<tr>
<td>A</td>
<td>Module 2, phase 2</td>
<td>0</td>
<td>13</td>
<td>17</td>
</tr>
<tr>
<td>A</td>
<td>Module 2, phase 3</td>
<td>0</td>
<td>11</td>
<td>15</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>10</td>
<td>13</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>13</td>
<td>17</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>11</td>
<td>15</td>
</tr>
<tr>
<td>B</td>
<td>Module 2, phase 1</td>
<td>0</td>
<td>12</td>
<td>16</td>
</tr>
<tr>
<td>B</td>
<td>Module 2, phase 2</td>
<td>0</td>
<td>13</td>
<td>17</td>
</tr>
<tr>
<td>B</td>
<td>Module 2, phase 3</td>
<td>0</td>
<td>10</td>
<td>13</td>
</tr>
</tbody>
</table>

5.3.1.8 PDU Thresholds for Oracle Exadata Database Machine X2-8 Full Rack

This section contains the PDU thresholds for Oracle Exadata Database Machine X2-8 Full Rack.

- **Table 5-53** (page 5-48) Threshold Values for Oracle Exadata Database Machine X2-8 Full Rack with Single-phase, Low-voltage 22 kVA PDU

- **Table 5-54** (page 5-48) Threshold Values for Oracle Exadata Database Machine X2-8 Full Rack with Three-phase, Low-voltage 24 kVA PDU

- **Table 5-55** (page 5-48) Threshold Values for Oracle Exadata Database Machine X2-8 Full Rack with Single-phase, High-voltage 22 kVA PDU

- **Table 5-56** (page 5-49) Threshold Values for Oracle Exadata Database Machine X2-8 Full Rack with Three-phase, High-voltage 24 kVA PDU

**Table 5-53** (page 5-48) lists the threshold values for Oracle Exadata Database Machine X2-8 Full Rack using a single-phase, low-voltage 22 kVA PDU.
### Table 5-53  Threshold Values for Oracle Exadata Database Machine X2-8 Full Rack with Single-phase, Low-voltage 22 kVA PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>36</td>
<td>37</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>35</td>
<td>37</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>35</td>
<td>37</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>35</td>
<td>37</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>35</td>
<td>37</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>36</td>
<td>37</td>
</tr>
</tbody>
</table>

*Table 5-54 (page 5-48) lists the threshold values for Oracle Exadata Database Machine X2-8 Full Rack using a three-phase, low-voltage 24 kVA PDU.*

### Table 5-54  Threshold Values for Oracle Exadata Database Machine X2-8 Full Rack with Three-phase, Low-voltage 24 kVA PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A and B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>32</td>
<td>40</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>34</td>
<td>43</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>33</td>
<td>42</td>
</tr>
</tbody>
</table>

*Table 5-55 (page 5-48) lists the threshold values for Oracle Exadata Database Machine X2-8 Full Rack using a single-phase, high-voltage 22 kVA PDU.*

### Table 5-55  Threshold Values for Oracle Exadata Database Machine X2-8 Full Rack with Single-phase, High-voltage 22 kVA PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A and B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>26</td>
<td>32</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>25</td>
<td>32</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>26</td>
<td>32</td>
</tr>
</tbody>
</table>
Table 5-56 (page 5-49) lists the threshold values for Oracle Exadata Database Machine X2-8 Full Rack using a three-phase, high-voltage 24 kVA PDU.

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A and B Module 1, phase 1</td>
<td>0</td>
<td>18</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>A and B Module 1, phase 2</td>
<td>0</td>
<td>18</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>A and B Module 1, phase 3</td>
<td>0</td>
<td>17</td>
<td>21</td>
<td></td>
</tr>
</tbody>
</table>

5.3.1.9 PDU Thresholds for Oracle Exadata Storage Expansion Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers

This section contains the PDU thresholds for Oracle Exadata Storage Expansion Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers.

5.3.1.9.1 PDU Thresholds for Oracle Exadata Storage Expansion Full Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers

The following tables list the threshold values for Oracle Exadata Storage Expansion Full Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers Full Rack:

- Table 5-57 (page 5-50) Threshold Values for Oracle Exadata Storage Expansion Full Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Single-phase, Low-voltage PDU
- Table 5-58 (page 5-50) Threshold Values for Oracle Exadata Storage Expansion Full Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Three-phase, Low-voltage PDU
- Table 5-59 (page 5-50) Threshold Values for Oracle Exadata Storage Expansion Full Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Single-phase, High-voltage PDU
- Table 5-60 (page 5-51) Threshold Values for Oracle Exadata Storage Expansion Full Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Three-phase, High-voltage PDU

Table 5-57 (page 5-50) lists the threshold values for Oracle Exadata Storage Expansion Full Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers using a single-phase, low-voltage PDU.
### Table 5-57  Threshold Values for Oracle Exadata Storage Expansion Full Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Single-phase, Low-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>18</td>
<td>23</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>22</td>
<td>24</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>18</td>
<td>23</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>18</td>
<td>23</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>22</td>
<td>24</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>18</td>
<td>23</td>
</tr>
</tbody>
</table>

*Table 5-58 (page 5-50) lists the threshold values for Oracle Exadata Storage Expansion Full Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers using a three-phase, low-voltage PDU.*

### Table 5-58  Threshold Values for Oracle Exadata Storage Expansion Full Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Three-phase, Low-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A and B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>32</td>
<td>40</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>34</td>
<td>43</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>33</td>
<td>42</td>
</tr>
</tbody>
</table>

*Table 5-59 (page 5-50) lists the threshold values for Oracle Exadata Storage Expansion Full Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers using a single-phase, high-voltage PDU.*

### Table 5-59  Threshold Values for Oracle Exadata Storage Expansion Full Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Single-phase, High-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>16</td>
<td>20</td>
</tr>
</tbody>
</table>
Table 5-59  (Cont.) Threshold Values for Oracle Exadata Storage Expansion Full Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Single-phase, High-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>20</td>
<td>21</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>16</td>
<td>20</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>16</td>
<td>20</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>20</td>
<td>21</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>16</td>
<td>20</td>
</tr>
</tbody>
</table>

Table 5-60  (page 5-51) lists the threshold values for Oracle Exadata Storage Expansion Full Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers using a three-phase, high-voltage PDU.

Table 5-60  Threshold Values for Oracle Exadata Storage Expansion Full Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Three-phase, High-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A and B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>18</td>
<td>21</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>18</td>
<td>21</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>17</td>
<td>21</td>
</tr>
</tbody>
</table>

5.3.1.9.2 PDU Thresholds for Oracle Exadata Storage Expansion Half Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers

The following tables list the threshold values for Oracle Exadata Storage Expansion Half Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers:

- **Table 5-61** (page 5-52) Threshold Values for Oracle Exadata Storage Expansion Half Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Single-phase, Low-voltage PDU
- **Table 5-62** (page 5-52) Threshold Values for Oracle Exadata Storage Expansion Half Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Three-phase, Low-voltage PDU
- **Table 5-63** (page 5-53) Threshold Values for Oracle Exadata Storage Expansion Half Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Single-phase, High-voltage PDU
Table 5-64 (page 5-53) Threshold Values for Oracle Exadata Storage Expansion Half Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Three-phase, High-voltage PDU

Table 5-61 (page 5-52) lists the threshold values for Oracle Exadata Storage Expansion Half Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers using a single-phase, low-voltage PDU.

Table 5-61  Threshold Values for Oracle Exadata Storage Expansion Half Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Single-phase, Low-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>18</td>
<td>23</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>13</td>
<td>17</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>13</td>
<td>17</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>18</td>
<td>23</td>
</tr>
</tbody>
</table>

Table 5-62 (page 5-52) lists the threshold values for Oracle Exadata Storage Expansion Half Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers using a three-phase, low-voltage PDU.

Table 5-62  Threshold Values for Oracle Exadata Storage Expansion Half Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Three-phase, Low-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A and B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>18</td>
<td>23</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>17</td>
<td>22</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>18</td>
<td>23</td>
</tr>
</tbody>
</table>

Table 5-63 (page 5-53) lists the threshold values for Oracle Exadata Storage Expansion Half Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers using a single-phase, high-voltage PDU.
### Table 5-63  Threshold Values for Oracle Exadata Storage Expansion Half Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Single-phase, High-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>16</td>
<td>20</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>16</td>
<td>20</td>
</tr>
</tbody>
</table>

Table 5-64 (page 5-53) lists the threshold values for Oracle Exadata Storage Expansion Half Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers using a three-phase, high-voltage PDU.

### Table 5-64  Threshold Values for Oracle Exadata Storage Expansion Half Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Three-phase, High-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A and B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>10</td>
<td>13</td>
</tr>
</tbody>
</table>

5.3.1.9.3 PDU Thresholds for Oracle Exadata Storage Expansion Quarter Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers

The following tables list the threshold values for Oracle Exadata Storage Expansion Quarter Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers:

- **Table 5-65** (page 5-54) Threshold Values for Oracle Exadata Storage Expansion Quarter Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Single-phase, Low-voltage PDU
- **Table 5-66** (page 5-54) 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 5-67** (page 5-55) Threshold Values for Oracle Exadata Storage Expansion Quarter Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Single-phase, High-voltage PDU

- **Table 5-68** (page 5-55) Threshold Values for Oracle Exadata Storage Expansion Quarter Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Three-phase, High-voltage PDU

**Table 5-65** (page 5-54) lists the threshold values for Oracle Exadata Storage Expansion Quarter Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers using a single-phase, low-voltage PDU.

**Table 5-65  Threshold Values for Oracle Exadata Storage Expansion Quarter Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Single-phase, Low-voltage PDU**

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>10</td>
<td>13</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>10</td>
<td>13</td>
</tr>
</tbody>
</table>

**Table 5-66** (page 5-54) lists the threshold values for Oracle Exadata Storage Expansion Quarter Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers using a three-phase, low-voltage PDU.

**Table 5-66  Threshold Values for Oracle Exadata Storage Expansion Quarter Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Three-phase, Low-voltage PDU**

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A and B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>11</td>
<td>14</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>5</td>
<td>7</td>
</tr>
</tbody>
</table>

**Table 5-67** (page 5-55) lists the threshold values for Oracle Exadata Storage Expansion Quarter Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers using a single-phase, high-voltage PDU.
Table 5-67  Threshold Values for Oracle Exadata Storage Expansion Quarter Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Single-phase, High-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>A</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>9</td>
<td>12</td>
</tr>
</tbody>
</table>

Table 5-68 (page 5-55) lists the threshold values for Oracle Exadata Storage Expansion Quarter Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers using a three-phase, high-voltage PDU.

Table 5-68  Threshold Values for Oracle Exadata Storage Expansion Quarter Rack with Exadata Storage Server with Sun Fire X4270 M2 Servers with Three-phase, High-voltage PDU

<table>
<thead>
<tr>
<th>PDU</th>
<th>Module/Phase</th>
<th>Info Low Threshold</th>
<th>Pre Warning Threshold</th>
<th>Alarm Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A and B</td>
<td>Module 1, phase 1</td>
<td>0</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 2</td>
<td>0</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>A and B</td>
<td>Module 1, phase 3</td>
<td>0</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

5.4 Checking Exadata Storage Servers

The following procedure describes how to check Exadata Storage Servers:
When using the KVM switch, and pressing the ESC key, the BIOS may receive two ESC characters, and prompt to exit. Select **CANCEL**.

If you need to connect to the ILOM serial management port, then the baud rate setting on Exadata Storage Servers is changed from the default ILOM setting 9600 to 115200 baud, 8 bits, no parity, and 1 stop bit.

1. Log in as the **root** user to the first Exadata Storage Server.

2. Verify the SysSN label for the cell matches the **product_serial_number** value using the following command:

   ```bash
   # ipmitool sunoem cli "show /SYS product_serial_number"
   Connected.Use ^ D to exit.
   ->show /SYS product_serial_number
   /SYS
   Properties:
   product_serial_number =0937XFG03B
   ->Session closed
   Disconnected
   ```

3. Check the hardware and firmware using the following command:

   ```bash
   # /opt/oracle.SupportTools/CheckHWnFWProfile
   
   If output does not show success, then examine the output for mismatched hardware or firmware and take steps to correct those as explained in next steps in this section.
   
   4. Verify the disks on the server are visible and online using the following command. The disks are numbered slot 0 to slot 11.

   ```bash
   #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
   ```
5. Verify the flash modules are visible using the following command. There are four cards, and four modules per card.

```
# lsscsi |grep -i marvel
# cellcli -e list lun where disktype=flashdisk
```

The numbering shows the PCI slot number and FMOD number, such as 1_0 is PCI slot 1, FMOD 0 on the card. To confirm the flash disks are mapped that way, use the following command:

```
# cellcli -e list physicaldisk attributes name, id, slotnumber where \
disktype="flashdisk" and 'status!="not present"
```

If any FMODs are missing, then power cycle the system, and wait 10 minutes after starting to check. If this does not resolve the problem, then reseat the module and flash card. If the problem continues, then replace the card with the on-site spare.

6. Check the rear of the rack to ensure the flash card LEDs are green all the way across. These LEDs are FMOD, 0, 1, 2, 3, and SuperCAP. If any LED is amber, then check again after the next step. If the LED is still amber after restart, then reseat the card and ESM or FMOD. If the problem continues, then replace the card with the on-site spare.

**Note:**

This step can be done when all systems are on. It does not have to be done on a per-server basis.

7. Log out of the system using the following command:

```
# logout
```

8. Return to the User Interface on the KVM switch by pressing the Ctrl key on the left to return to the KVM switch, and select **Disconnect Session**, if using the KVM switch to access the server.

9. Select **Target Devices** from Unit View, if using the KVM switch to access the server.

10. Proceed to the next Exadata Storage Server.

### 5.5 Checking Oracle Database Servers

The following procedure describes how to check the Oracle Database servers. At this point, the operating system is Linux.

1. Log in as the root user to the first database server.
Note:

If you do not have the password for the root user, then contact Oracle Support Services.

2. Verify the SysSN label for the server matches the `product_serial_number` value using the following command:

   ```bash
   # ipmitool sunoem cli "show /SYS product_serial_number"
   Connected.Use ^ D to exit.
   ->show /SYS product_serial_number
   /SYS
   Properties:
   product_serial_number =093ABCD5001
   ->Session closed
   Disconnected
   ```

3. Change to the `/opt/oracle.SupportTools/firstconf` directory using the following command:

   ```bash
   cd /opt/oracle.SupportTools/firstconf
   ```

4. Create a group file with the list of server IP addresses to use in the dcli utility commands, if required, using the following command:

   ```bash
   # ibhosts | awk '{print $8}' | cut -c1-14 > group_file
   ```

   In the preceding command, `group_file` is the file with the server IP addresses.

5. Verify the hardware profile is correct using the following command. The command checks CPU type and count, component firmware, and so on.

   ```bash
   # 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:

   ```plaintext
   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.

   ```bash
   # /opt/oracle.SupportTools/CheckHWnFWProfile -U /opt/oracle.cellos/iso/cellbits
   Now updating the ILOM and the BIOS ... 
   ```

   The command must be entered on a single line. After running the command, power off the system, reset the ILOM, and wait 10 minutes before powering on the system.

6. Verify the disks on the server are visible and online using the following command.
# cd /opt/MegaRAID/MegaCli
# ./MegaCli64 -Pdlist -aAll |grep "Slot \|Firmware"

Slot Number: 0
Firmware state:Online, Spun Up
Device Firmware Level: 0868
Slot Number: 1
Firmware state:Online, Spun Up
Device Firmware Level: 0868
Slot Number: 2
Firmware state:Online, Spun Up
Device Firmware Level: A2A8
Slot Number: 3
...

7. Examine the output of the following command:

```
/opt/MegaRAID/MegaCli/MegaCli64 -LdInfo -LAll -aAll
```

8. (Oracle Exadata Database Machine based on Sun Fire X4170 Oracle DatabaseServers only) Check that the ILOM is configured for the proper fan cooling on each database server using the following command:

```
# ipmitool sunoem cli "show /SP/policy"
```

- If the policy is present and enabled, then no additional steps are needed.
- If the policy is present and disabled, then enable the policy using the following command:

```
# ipmitool sunoem cli "set /SP/policy FLASH_ACCELERATOR_CARD_ 
INSTALLED=enabled"
```

The command must be entered as a single line.

9. Log out of the system using the following command:

```
# logout
```

10. Return to the User Interface on the KVM switch by pressing the Ctrl key on the left to return to the KVM switch, and select Disconnect Session, if using the KVM switch to access the server.

11. Select Target Devices from Unit View, and proceed to the next database server, if using the KVM switch to access the server.

12. Verify that NTP servers are configured the same for all servers using the following command. The command is run on each database server individually.

```
ntpq -p
```

5.6 Performing Additional Checks and Configuration

The following procedure describes additional checks and configuration steps for Oracle Exadata Rack:

1. (Oracle Exadata Database Machine only) Log in to the first database server as the root user.

2. Change to the firstconf directory using the following command:

```
# cd /opt/oracle.SupportTools/firstconf
```

3. Create a group file with the list of IP addresses to use in the dcli utility commands, if needed
4. Verify the rack master serial number is set correctly using the following command:

   # dcli -l root -g group_file "ipmitool sunoem cli 'show /SP system_identifier'" > /tmp/show-rack-csn.out
   # more /tmp/show-rack-csn.out

   If none of the serial numbers are set, then contact Oracle Support Services. If one
   serial number is not set correctly, then run the following command to correct it:

   ipmitool sunoem cli 'set /SP system_identifier= "Exadata Database Machine rack_type xxxxAKyyyy"'

   In the preceding command, rack_type is X2-2 or X2-8, depending on the rack.

5. Ensure disk cache policy is set to Disabled using the following command as the root
   user on the first database server in the cluster:

   dcli -g /opt/oracle.SupportTools/onecommand/all_group -l root /
   /opt/MegaRAID/MegaCli/MegaCli64 -LdPdInfo -aALL | grep -i 'Disk Cache Policy'

   The following is an example of the output from the command:

   dm01db01: Disk Cache Policy : Disabled
dm01db02: Disk Cache Policy : Disabled
dm01db03: Disk Cache Policy : Disabled
   ...
dm01cel01: Disk Cache Policy : Disabled
dm01cel02: Disk Cache Policy : Disabled
   ...

   If any server shows different output, then identify the LUN and use the following
   command to reset the policy to Disabled:

   MegaCli64 -LDSetProp -DisDskCache -LUNn -a0

   In the preceding command, LUNn is the LUN number, such as L2.

5.7 Verifying the InfiniBand Network

   The following procedure describes how to verify the InfiniBand network:

1. Visually check all the InfiniBand cable connections within the rack. The port lights
   should be on, and the LEDs should be on. Do not press each connector to verify
   connectivity.

2. Log in as the root user on any component in the rack.

3. Verify the InfiniBand topology using the following commands:

   # cd /opt/oracle.SupportTools/ibdiagtools
   # ./verify-topology [-t rack_size]

   The following example shows the output when the network components are
   correct.

   [DB Machine Infiniband Cabling Topology Verification Tool ]
   Is every external switch connected to every internal switch.......[SUCCESS ]
   Are any external switches connected to each other.................[SUCCESS ]
   Are any hosts connected to spine switch.........................[SUCCESS ]
   Check if all hosts have 2 CaS to different switches...............[SUCCESS ]
   Leaf switch check:cardinality and even distribution............[SUCCESS ]
Check if each rack has a valid internal ring..................[SUCCESS]

In the preceding command, \texttt{rack\_size} is the size of the rack. The \texttt{-t \textit{rack\_size}} option is needed if the rack is Oracle Exadata Database Machine Half Rack or Oracle Exadata Database Machine Quarter Rack. Use \texttt{halfrack} for Oracle Exadata Database Machine Half Rack, and \texttt{quarrerack} for Oracle Exadata Database Machine Quarter Rack.

The following example shows the output when there is a bad InfiniBand switch to InfiniBand cable connection:

```
#./verify-topology
[DB Machine Infiniband Cabling Topology Verification Tool ]
Is every external switch connected to every internal switch......[SUCCESS]
Are any external switches connected to each other...............[SUCCESS]
Are any hosts connected to spine switch.........................[SUCCESS]
Check if all hosts have 2 CAs to different switches.............[SUCCESS]
Leaf switch check:cardinality and even distribution............[SUCCESS]
Check if each rack has an valid internal ring...................[ERROR]

Switches 0x21283a87cba0a0 0x21283a87b8a0a0 have 6 connections between them. They should have at least 7 links between them
```

The following example shows the output when there is a bad InfiniBand cable on a database server:

```
#./verify-topology
[DB Machine Infiniband Cabling Topology Verification Tool ]
Is every external switch connected to every internal switch......[SUCCESS]
Are any external switches connected to each other...............[SUCCESS]
Are any hosts connected to spine switch.........................[SUCCESS]
Check if all hosts have 2 CAs to different switches.............[ERROR]
Node db01 has 1 endpoints.(Should be 2)
Port 2 of this node is not connected to any switch
--------fattree End Point Cabling verification failed-----
Leaf switch check:cardinality and even distribution............[ERROR]
Internal QDR Switch 0x21283a87b8a0a0 has fewer than 4 compute nodes It has only 3 links belonging to compute nodes[ SUCCESS ]
Check if each rack has an valid internal ring...................[SUCCESS]
```

The following example shows the output when there is a bad connection on the switch and the system:

```
#./verify-topology
[DB Machine Infiniband Cabling Topology Verification Tool ]
Is every external switch connected to every internal switch......[SUCCESS]
Are any external switches connected to each other...............[SUCCESS]
Are any hosts connected to spine switch.........................[SUCCESS]
Check if all hosts have 2 CAs to different switches.............[ERROR]

Node burxdb01 has 1 endpoints.(Should be 2)
Port 2 of this node is not connected to any switch
--------fattree End Point Cabling 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...................[ERROR]
```

Switches 0x21283a87cba0a0 0x21283a87b8a0a0 have 6 connections between them They should have at least 7 links between them
5.8 Imaging a New System

You have different options for preparing an Oracle Exadata system for deployment.

- Using ISO Images to Image a New System (page 5-62)
- Using Elastic Configuration to Image a New System (page 5-65)
- Using ISO to Image a New System (page 5-68)
- Using PXE to Image a New System (page 5-74)
- Using USB to Image a New System (page 5-79)
- Updates to Imaging Parameters (page 5-84)

Using a preconf.csv file with the PXE, USB and ISO options enables an unattended first boot configuration and greatly simplifies the installation but is not mandatory. It is possible to boot from the installation media and follow the prompts to configure the system.

In release 12.1.2.2.0 and above, the installation media has been simplified, and it is no longer necessary to build files using the ImageMaker process.

Refer to My Oracle Support note 2038073.1 for additional details on valid options for imaging 12.1.2.1.0 and above.

Related Topics:
- Exadata 12.1.2.2.0 release and patch (20131726) (My Oracle Support Doc ID 2038073.1)

5.8.1 Using ISO Images to Image a New System

In versions prior to 12.1.2.2.0, ISO images are available as patches that you can download for bare metal imaging an Exadata system. This is now the default method in 12.1.2.2.0 and above. You are no longer required to build the ISO files using imagemaker. Patches are available for both database nodes and cells. You can use the ISO images to boot the server using a virtual media device on the ILOM (from the Devices menu of the ILOM console). For example, the two ISO images available for 12.1.2.1.1 are listed in the following table.

Table 5-69    ISO Images for 12.1.2.1.1

<table>
<thead>
<tr>
<th>Version</th>
<th>Type</th>
<th>Edelivery Part / Notes</th>
<th>ARU Bug #/ULN Channel</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.1.2.1.1</td>
<td>Cell ISO image and md5sum: 90305b9e2c7e050d7 588b8a7d5c731e7 cell_12.1.2.1.1_LINUX_X64_150316.2-1.x86_64.iso</td>
<td>Refer to 12.1.2.1.1 Readme (Doc ID 1959143.1) as well as the readme provided with the download.</td>
<td>20757971</td>
<td>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</td>
</tr>
</tbody>
</table>
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 (page 5-68) to mount the image on an NFS repository. You need to place the `preconf.csv` file in the same NFS directory.
5. If you are using Oracle VM, run `switch_to_ovm.sh` on each database server. The database servers will reboot.

For example:

```
#!/opt/oracle.SupportTools/switch_to_ovm.sh
2014-12-07 11:58:36 -0800 [INFO] Switch to DOM0 system partition /dev/VGExaDb/LVDbSys3 (/dev/mapper/VGExaDb-LVDbSys3)
2014-12-07 11:58:36 -0800 [INFO] Active system device: /dev/mapper/VGExaDb-LVDbSys1
2014-12-07 11:58:36 -0800 [INFO] Active system device in boot area: /dev/mapper/VGExaDb-LVDbSys1
2014-12-07 11:58:36 -0800 [INFO] Active system device in boot area: /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] Active system device in boot area: /dev/mapper/VGExaDb-LVDbSys1
2014-12-07 11:58:36 -0800 [INFO] Set active system device /boot/I_am_hd_boot
2014-12-07 11:58:36 -0800 [INFO] Reboot has been initiated to switch to the DOM0 system partition
```
6. Run `reclaimdisks.sh` on each database server.

The `/opt/oracle.SupportTools/reclaimdisks.sh` command reclaim disk space reserved for the deployment type not selected. The command takes less than 5 minutes, approximately. Systems are imaged with disks configured with RAID5; a RAID rebuild is no longer part of the `reclaimdisks.sh` process.
Do not skip this step. Skipping this step results in unused space that can no longer be reclaimed by `reclaimdisk.sh`.

For example:

```bash
# /opt/oracle.SupportTools/reclaimdisk.sh -free -reclaim
Model is ORACLE SERVER X5-2
Number of LSI controllers: 1
Physical disks found: 4 (252:0 252:1 252:2 252:3)
Logical drives found: 1
Linux logical drive: 0
RAID Level for the Linux logical drive: 5
Physical disks in the Linux logical drive: 4 (252:0 252:1 252:2 252:3)
Dedicated Hot Spares for the Linux logical drive: 0
Global Hot Spares: 0
[INFO     ] Check for DOM0 system disk
[INFO     ] Check for DOM0 with inactive Linux system disk
[INFO     ] Valid DOM0 with inactive Linux system disk is detected
[INFO     ] Number of partitions on the system device /dev/sda: 4
[INFO     ] Higher partition number on the system device /dev/sda: 4
[INFO     ] End sector of the last partition on the system device /dev/sda:
330035608
[INFO     ] Unmount /EXAVMIMAGES from ocf2s partition on /dev/sda3
[INFO     ] Mount ocf2s partition /dev/sda3 to /EXAVMIMAGES
[INFO     ] Remove inactive system logical volume /dev/VGExaDb/LVDbSys1
[INFO     ] Remove logical volume /dev/VGExaDbOra/LVDbOra1
[INFO     ] Remove volume group VGExaDbOra
[INFO     ] Remove physical volume /dev/sda4
[INFO     ] Remove partition /dev/sda4
[INFO     ] Re-calculate end sector of the last partition after removing of /dev/
sda4 partition
[INFO     ] End sector of the last partition on the system device /dev/sda:
330035608
[INFO     ] Check for existing first boot system image /EXAVMIMAGES/
System.first.boot.12.1.2.1.0.141205.2.img
[INFO     ] Saving /EXAVMIMAGES/System.first.boot.12.1.2.1.0.141205.2.img
in /var/log/exadatatmp ...
[INFO     ] First boot system image saved in /var/log/exadatatmp/
System.first.boot.12.1.2.1.0.141205.2.img
[INFO     ] Unmount /EXAVMIMAGES from /dev/sda3
[INFO     ] Remove partition /dev/sda3
[INFO     ] Re-calculate end sector of the last partition after removing of /dev/
sda3 partition
[INFO     ] End sector of the last partition on the system device /dev/sda:
240132159
[INFO     ] Create primary ocf2s partition 3 using 240132160 3509758999
[INFO     ] Create ocf2s partition on /dev/sda3
[INFO     ] Mount ocf2s partition on /dev/sda3 to /EXAVMIMAGES
[INFO     ] Restoring /var/log/exadatatmp/System.first.boot.12.1.2.1.0.141205.2.img into /EXAVMIMAGES ...
[INFO     ] Logical volume LVDbSys2 exists in volume group VGExaDb
[INFO     ] Grub version in /boot/grub/grub.stage.version: 0.97-81.0.1.el6
[INFO     ] Grub rpm version: 0.97-13.10.0.1.el5
[INFO     ] Copying /usr/share/grub/x86_64-redhat/* to /boot/grub ...
[INFO     ] Create filesystem on device /dev/sda1
[INFO     ] Tune filesystem on device /dev/sda1

GNU GRUB  version 0.97  (640K lower / 3072K upper memory)
```

[ Minimal BASH-like line editing is supported. For the first word, TAB
lists possible command completions. Anywhere else TAB lists the possible]
completions of a device/filename.)
grub> root (hd0,0)
 Filesystem type is ext2fs, partition type 0x83
grub> setup (hd0)
 Checking if "/boot/grub/stage1" exists... no
 Checking if "/grub/stage1" exists... yes
 Checking if "/grub/stage2" exists... yes
 Checking if "/grub/e2fs_stage1_5" exists... yes
 Running "embed /grub/e2fs_stage1_5 (hd0)"
... failed (this is not fatal)
 Running "embed /grub/e2fs_stage1_5 (hd0,0)"
... failed (this is not fatal)
 Running "install /grub/stage1 (hd0) /grub/stage2 p /grub/grub.conf ".
 succeeded
 Done.
grub> quit

7. Run `ibhosts` and verify that all nodes show the correct IP addresses and host names. There should be no nodes with `elasticNode` in the description.

8. Run the OEDA tool to deploy.

```
[root] # ./install.sh -cf ../MAA-dm01.xml -l
1. Validate Configuration File
2. Setup Capacity-on-Demand
3. Create Virtual Machine
4. Create Users
5. Setup Cell Connectivity
6. Create Cell Disks
7. Create Grid Disks
8. Configure Alerting
9. Install Cluster Software
10. Initialize Cluster Software
11. Install Database Software
12. Relink Database with RDS
13. Create ASM Diskgroups
14. Create Databases
15. Apply Security Fixes
16. Install Exachk
17. Setup ASR Alerting
18. Create Installation Summary
19. Resecure Machine
```

Related Topics:

- **Exadata 12.1.2.1.1 release and patch (20240049) (My Oracle Support Doc ID 1959143.1)**

### 5.8.2 Using Elastic Configuration to Image a New System

Elastic configuration is now the standard methodology for all new deployments, and applies to Oracle Exadata X5, X5-2L, and X4-8b (with X5 storage cells) servers. You can also use the same process to add additional database servers or cells to an existing configuration. The process allows initial IP addresses to be assigned to database servers and cells, regardless of the exact customer configuration ordered.

Elastic configuration is only applicable to machines shipped from the factory (or to machines imaged exactly to mimic that) and only for X5 and X4-8b systems or later generations. You can run Elastic configuration at the first time of deployment, and when adding new X5 factory-built components to a rack. You cannot use Elastic configuration to configure or reconfigure systems. It is recommended that you use Elastic configuration only with machines shipped from the factory for first-time deployment.
When a server is shipped from the factory, the elastic configuration code is executed when the server is first powered on. At that time, the machine will be assigned an IP address in the 172 range.

To prepare a new Exadata system for deployment using the elastic configuration method, perform the following steps:

1. Obtain the latest Oracle Exadata Deployment Assistant (OEDA).
2. Run the OEDA configuration tool to generate the configuration files.
3. Power on all the servers.
   a. Database nodes and cells will automatically assign to themselves unused IP addresses on eth0 in the 172.16 range.
   b. Host names of the nodes will be of the format “nodeN”, where N is a number.
4. If you are using Oracle VM, run `switch_to_ovm.sh` on each database server. The database servers will reboot. If you are using physical deployment and not virtualized deployment, then you can skip this step.
   
   For example:
   
   ```
   # /opt/oracle.SupportTools/switch_to_ovm.sh
   2014-12-07 11:58:36 -0800 [INFO] Switch to DOM0 system partition /dev/VGExaDb/LVDbSys3 (/dev/mapper/VGExaDb-LVDbSys3)
   2014-12-07 11:58:36 -0800 [INFO] Active system device: /dev/mapper/VGExaDb-LVDbSys1
   2014-12-07 11:58:36 -0800 [INFO] Active system device in boot area: /dev/mapper/VGExaDb-LVDbSys1
   2014-12-07 11:58:36 -0800 [INFO] Set active 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
   ```
5. Run `reclaimdisks.sh` on each database server.
   
   The `/opt/oracle.SupportTools/reclaimdisks.sh -free -reclaim` command reclaims disk space reserved for the deployment type not selected. The command takes less than 5 minutes, approximately. Systems are imaged with disks configured with RAID5; a RAID rebuild is no longer part of the `reclaimdisks.sh` process.

   Do not skip this step. Skipping this step results in unused space that can no longer be reclaimed by `reclaimdisks.sh`.

   For example:
   
   ```
   # /opt/oracle.SupportTools/reclaimdisks.sh -free -reclaim
   Model is ORACLE SERVER X5-2
   Number of LSI controllers: 1
   Physical disks found: 4 (252:0 252:1 252:2 252:3)
   Logical drives found: 1
   Linux logical drive: 0
   RAID Level for the Linux logical drive: 5
   Physical disks in the Linux logical drive: 4 (252:0 252:1 252:2 252:3)
   Dedicated Hot Spares for the Linux logical drive: 0
   Global Hot Spares: 0
   [INFO] Check for DOM0 system disk
   [INFO] Check for DOM0 with inactive Linux system disk
   [INFO] Valid DOM0 with inactive Linux system disk is detected
   [INFO] Number of partitions on the system device /dev/sda: 4
   [INFO] Higher partition number on the system device /dev/sda: 4
   [INFO] Last sector on the system device /dev/sda: 3509759999
[INFO] End sector of the last partition on the system device /dev/sda: 3509759000
[INFO] Unmount /EXAVMIMAGES from ocfs2 partition on /dev/sda3
[INFO] Mount ocfs2 partition /dev/sda3 to /EXAVMIMAGES
[INFO] Remove inactive system logical volume /dev/VGExaDb/LVDbSys1
[INFO] Remove logical volume /dev/VGExaDbOra/LVDbOra1
[INFO] Remove volume group VGExaDbOra
[INFO] Remove physical volume /dev/sda4
[INFO] Remove partition /dev/sda4
[INFO] Re-calculate end sector of the last partition after removing of /dev/sda4 partition
[INFO] End sector of the last partition on the system device /dev/sda: 3300035608
[INFO] Check for existing first boot system image /EXAVMIMAGES/
System.first.boot.12.1.2.1.0.141205.2.img
[INFO] Saving /EXAVMIMAGES/System.first.boot.12.1.2.1.0.141205.2.img
in /var/log/exadatatmp ...
[INFO] First boot system image saved in /var/log/exadatatmp/
System.first.boot.12.1.2.1.0.141205.2.img
[INFO] Unmount /EXAVMIMAGES from /dev/sda3
[INFO] Remove partition /dev/sda3
[INFO] Re-calculate end sector of the last partition after removing of /dev/sda3 partition
[INFO] End sector of the last partition on the system device /dev/sda: 240132159
[INFO] Create primary ocfs2 partition 3 using 240132160 3509758999
[INFO] Create ocfs2 partition on /dev/sda3
[INFO] Mount ocfs2 partition on /dev/sda3 to /EXAVMIMAGES
[INFO] Restoring /var/log/exadatatmp/System.first.boot.12.1.2.1.0.141205.2.img
[INFO] Logical volume LVDbSys2 exists in volume group VGExaDb
[INFO] Grub version in /boot/grub/grub.stage.version: 0.97-81.0.1.el6
[INFO] Grub rpm version: 0.97-13.10.0.1.el5
[INFO] Copying /usr/share/grub/x86_64-redhat/* to /boot/grub ...
[INFO] Create filesystem on device /dev/sda1
[INFO] Tune filesystem on device /dev/sda1

GNU GRUB version 0.97 (640K lower / 3072K upper memory)

[ Minimal BASH-like line editing is supported. For the first word, TAB
lists possible command completions. Anywhere else TAB lists the possible
completions of a device/filename.]

grub> root (hd0,0)
Filesystem type is ext2fs, partition type 0x83
grub> setup (hd0)
Running "install /boot/grub/stage1 (hd0) /boot/grub/stage2 p /boot/grub/grub.conf "...
succeeded
Done.

grub> quit

6. **Apply your specific configuration to the nodes by running the applyElasticConfig.sh script that is supplied with OEDA.**
See My Oracle Support note 1953915.1 for further details on how the elastic configuration process works, and specific examples of how to apply customer IP addresses to the rack.

7. Run `ibhosts` and verify that all nodes show the correct IP addresses and host names. There should be no nodes with "elasticNode" in the description.

8. Run the OEDA tool to deploy.

   ```bash
   [root] # ./install.sh -cf ../MAA-dm01.xml -l
   1. Validate Configuration File
   2. Setup Capacity-on-Demand
   3. Create Virtual Machine
   4. Create Users
   5. Setup Cell Connectivity
   6. Create Cell Disks
   7. Create Grid Disks
   8. Configure Alerting
   9. Install Cluster Software
   10. Initialize Cluster Software
   11. Install Database Software
   12. Relink Database with RDS
   13. Create ASM Diskgroups
   14. Create Databases
   15. Apply Security Fixes
   16. Install Exachk
   17. Setup ASR Alerting
   18. Create Installation Summary
   19. Resecure Machine
   ```

**Related Topics:**
- Elastic Configuration on Exadata (My Oracle Support Doc ID 1953915.1)

### 5.8.3 Using ISO to Image a New System

To prepare a new Exadata system for deployment using ISO, perform the following steps:

1. Obtain the latest Oracle Exadata Deployment Assistant (OEDA).
2. Run the OEDA configuration tool to generate the configuration files.
3. Power on all the servers.
   a. Database nodes and cells will automatically assign to themselves unused IP addresses on eth0 in the 172.16 range.
   b. Host names of the nodes will be of the format `nodeN`, where `N` is a number.
4. Run OEDA to generate the `preconf.csv` file that can be used to image the system.
5. Connect to the first database node. You can do this by connecting a laptop to the iLOM serial management port (9600, 8, N, 1), and then connecting to the console and log in to the database node.
6. Obtain the eth0 MAC address for each database node. This is the `fru_macaddress` field from `/SYS/MB/NET0` in the iLOM (or through `ip addr` if logged into the console).
   a. Connect to the other database nodes using ssh from the console.
   b. Run `ibhosts` to get a list of node names and IP addresses.
7. Insert the MAC addresses using uppercase characters in the seventh field of the `preconf.csv` file for each node. This field should be empty, that is, you should see two consecutive comma characters (,,). For example:

```
orhb42-b08-01,us.oracle.com,db,eth0,eth0,Management,00:10:E0:69:34:52,  
10.196.3.106,255.255.224.0,10.196.31.250,orhb42-b08-01-priv,Private:active-bond-ib,  
192.168.10.15,255.255.255.0,,America/Los_Angeles  
```

8. Run `ipconf` to verify the generated `preconf.csv` file. This can be done on any Exadata server, and although not required, it is useful to ensure the `preconf.csv` is valid before proceeding.

```
# ipconf -verify -preconf /tmp/preconf.csv
[Info]: ipconf command line: /opt/oracle.cellos/ipconf.pl -verify -preconf /tmp/preconf -nocodes
[Done]: Pre config verification OK
```

9. If you are using versions prior to 12.1.2.2.0, proceed to step 11 (page 5-70) to use ImageMaker to create the image files.

If you are using version 12.1.2.2.0 or later, it is no longer necessary to use `imagemaker` to create the image files. The relevant PXE, ISO, and USB image files have already been created in the patches themselves. Simply download the patch containing the prebuilt image file from Oracle Software Delivery Cloud and place the downloaded ISO .iso image file in the appropriate location. For 12.1.2.2.0 the patch numbers can be obtained from My Oracle Support note 2038073.1. There are separate ImageMaker files for database nodes and cells.

**Note:** For image version 12.1.2.2.0 the format of the downloadable image files has changed.

There will be an image file in the downloaded zip file. For example, the database node zip file will contain:

```
compute_12.1.2.2.0_LINUX.X64_150917-1.x86_64.iso
```

For cell image, the file will be similar to:

```
cell_12.1.2.2.0_LINUX.X64_150917-1.x86_64.iso
```

10. (For 12.1.2.2.0 and above) Follow the steps in the patch `README.txt` to copy the ISO file and optional `preconf.csv` file into place.

   a. After download, unzip the file as root user for the following ISO image.

```
b2d6d9ac61e2e673d05fb11ec65107d  
compute_12.1.2.2.0_LINUX.X64_150917-1.x86_64.iso
```
**Note:**

- ISO + preconf.csv is supported only if the ISO image is mounted on an NFS repository in ILOM and the preconf.csv file is located in the same NFS directory. All other methods of mounting the ISO image in ILOM (SAMBA URI and Java Remote Console) and burning ISO image to DVD will not work with the preconf.csv file. For instructions on how to mount the ISO image from a NFS central repository, see "Configure a Host Storage Device Redirection Session" in the Oracle X5 Series Servers Administration Guide.

- Because of possible late echos of text to the console, be aware that the boot process will be waiting for input to complete the interactive ipconf by prompting for Nameserver:

- Due to a bug, ipconf will prompt you twice to enter the network settings.

b. Proceed to step 15 (page 5-72), and boot the system with the ISO image and follow installation prompts. The ISO can be made available with a preconf.csv following the steps in the Note box above, or as virtual media on the ILOM of the node to be reimaged when a preconf.csv is not used.

Steps 11 (page 5-70) to 14 (page 5-72), which create the image files, can be skipped.

11. Download the imagemaker kit to prepare and create the files for the USB drive.

   This kit is available publicly on the Oracle Software Delivery Cloud (edelivery.oracle.com) site under "Oracle Database Products -> Linux x86-64". There are separate ImageMaker files for database nodes and cells.

12. After download, unzip the first file, called something similar to V75080-01.zip, and then unzip the subsequent file as well. Perform the unzips as the root user. Then untar the file.

   ```
   # unzip V75080-01.zip
   # unzip cellImageMaker_12.1.2.1.1_LINUX.X64_150316.2-1.x86_64.zip
   # tar -pxvf cellImageMaker_12.1.2.1.1_LINUX.X64_150316.2-1.x86_64.tar
   ```

   View the README_FOR_FACTORY.txt file in the resulting directory for additional details.

13. Run makeImageMedia.sh to build the ISO file for imaging.

   For building images for 12.1.2.1.0 and above, the recommended makeImageMedia.sh options for building ISO images are:

   a. (12.1.2.1.0 up to 12.2.1.1.0) Change directory to the dl180 or dl360 directory.

   b. (12.2.1.1.0 and above) Change directory to the cell or compute directory.

   c. Make the ISO file.

   ```bash
   ./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 compute-node.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 commons.tbz ...
Calculating md5 checksum for debugos.tbz ...
Calculating md5 checksum for dbrpbs.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 commonsovs.tbz ...
Calculating md5 checksum for debugosovs.tbz ...
Calculating md5 checksum for dbovsrpms.tbz ...
Calculating md5 checksum for sunovsutils.tbz ...
Calculating md5 checksum for dbvmsboot.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
4.52% 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

Total translation table size: 2048
Total rockridge attributes bytes: 0
Total directory bytes: 2048
14. Attach the ISO as virtual media to the ILOM of the database server to be reimaged, and select CDROM as the next boot device.

15. Reboot the database node or cell to start the imaging process from the ISO.

16. If you are using Oracle VM, run `switch_to_ovm.sh` on each database server. The database servers will reboot.

   For example:

   ```
   # /opt/oracle.SupportTools/switch_to_ovm.sh
   2014-12-07 11:58:36 -0800 [INFO] Switch to DOM0 system partition /dev/VGExaDb/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
   ```

17. Run `reclaimdisks.sh` on each database server.

   The `reclaimdisks.sh -free -reclaim` command reclaims disk space reserved for the deployment type not selected. The command takes less than 5 minutes, approximately. Systems are imaged with disks configured with RAID5; a RAID rebuild is no longer part of the `reclaimdisks.sh` process.

   Do not skip this step. Skipping this step results in unused space that can no longer be reclaimed by `reclaimdisks.sh`.

   For example:

   ```
   # /opt/oracle.SupportTools/reclaimdisks.sh -free -reclaim
   Model is ORACLE SERVER X5-2
   Number of LSI controllers: 1
   Physical disks found: 4 (252:0 252:1 252:2 252:3) Logical drives found: 1
   Linux logical drive: 0
   RAID Level for the Linux logical drive: 5
   Physical disks in the Linux logical drive: 4 (252:0 252:1 252:2 252:3) Dedicated Hot Spares for the Linux logical drive: 0
   Global Hot Spares: 0
   [INFO] Check for DOM0 system disk
   [INFO] Check for DOM0 with inactive Linux system disk
   [INFO] Valid DOM0 with inactive Linux system disk is detected
   [INFO] Number of partitions on the system device /dev/sda: 4
   [INFO] Higher partition number on the system device /dev/sda: 4
   [INFO] Last sector on the system device /dev/sda: 3509759999
   [INFO] End sector of the last partition on the system device /dev/sda: 3509759999
   [INFO] Unmount /EXAVMIMAGES from ocfs2 partition on /dev/sda3
   [INFO] Mount ocfs2 partition /dev/sda3 to /EXAVMIMAGES
   [INFO] Remove inactive system logical volume /dev/VGExaDb/LVDbSys1
   [INFO] Remove logical volume /dev/VGExaDbOra/LVDbOra1
   [INFO] Remove volume group VGExaDbOra
   [INFO] Remove physical volume /dev/sda4
   ```
18. Run `ibhosts` and verify that all nodes show the correct IP addresses and host names. There should be no nodes with `elasticNode` in the description.

19. Run the OEDA tool to deploy.

    [root] # ./install.sh -cf ../MAA-dm01.xml -l
1. Validate Configuration File
2. Setup Capacity-on-Demand
3. Create Virtual Machine
4. Create Users
5. Setup Cell Connectivity
6. Create Cell Disks
7. Create Grid Disks
8. Configure Alerting
9. Install Cluster Software  
10. Initialize Cluster Software  
11. Install Database Software  
12. Relink Database with ROS  
13. Create ASM Diskgroups  
14. Create Databases  
15. Apply Security Fixes  
16. Install Exachk  
17. Setup ASR Alerting  
18. Create Installation Summary  
19. Resecure Machine

Related Topics:  
- Oracle Software Delivery Cloud  
- Exadata 12.1.2.0 release and patch (20131726) (My Oracle Support Doc ID 2038073.1)  
- Exadata Database Machine and Exadata Storage Server Supported Versions (My Oracle Support Doc ID 888828.1)

5.8.4 Using PXE to Image a New System

To prepare a new Exadata system for deployment using PXE, perform the following steps:

1. Obtain the latest Oracle Exadata Deployment Assistant (OEDA).
2. Run the OEDA configuration tool to generate the configuration files.
3. Apply power to all the servers.  
   a. Database nodes and cells will automatically assign to themselves unused IP addresses on eth0 in the 172.16 range.
   b. Host names of the nodes will be of the format nodeN, where N is a number.
4. Run OEDA to generate the preconf.csv file that you will use to image the system.
5. Connect to the first database node. You can do this by connecting a laptop to the ILOM serial management port (9600, 8, N, 1), and then connecting to the console and log in to the database node.
6. Obtain the eth0 MAC address for each database node. This is the fru_macaddress field from /SYS/MB/NET0 in the ILOM (or from ip addr if logged into the console).  
   a. Connect to the other database nodes through SSH from the console.
   b. Run ibhosts to get a list of node names and IP addresses.
7. Insert the MAC addresses using uppercase characters in the seventh field of the preconf.csv file for each node. This field should be empty, that is, you should see two consecutive comma characters (,,). For example:

   orhb42-b08-01,us.oracle.com,db,eth0,eth0,Management, 00:10:E0:69:34:52,  
   10.196.3.106,255.255.224.0,10.196.31.250,orhb42-b08-01-priv,Private:active-bond-ib,  
   192.168.10.15,255.255.255.0,,America/Los_Angeles

8. Create a PXE configuration file for each node.

   Below are the recommended options for PXE imaging of versions 12.1.2.1.0 and above
append initrd=img_file pxe factory stit reboot-on-success notests=diskgroup
dhcp preconf=n.n.n.n:/directory/preconf.csv sk=n.n.n.n:/directory
console=ttys0,115200n8

The line above should appear as one line with no line breaks.

9. For versions prior to 12.1.2.2.0 proceed to step 10 (page 5-75) to use ImageMaker to create the image files.

If you are using version 12.1.2.2.0 or later, it is no longer necessary to use ImageMaker to create the image files. The relevant PXE, ISO, and USB image files have already been created in the patches themselves. Simply download the patch containing the prebuilt PXE image files from Oracle Software Delivery Cloud and place them into the appropriate directories on the PXE server. For 12.1.2.2.0 the patch numbers can be obtained from My Oracle Support note 2038073.1. There are separate ImageMaker files for database nodes and cells.

**Note:** For image version 12.1.2.2.0 the format of the downloadable image files has changed.

The downloaded zip file contains four image files:

- **For 12.1.2.2.0 up to 12.2.1.1.0:**
  
  kernel: vmlinux-version-ImageName-{DL180|DL360}
  initrd: initrd-version-ImageName-{DL180|DL360}.img
  image: nfsimg-version-ImageName-{DL180|DL360}.tar
  image: nfsimg-version-ImageName-{DL180|DL360}.tar.md5

- **For 12.2.1.1.0 and above:**
  
  kernel: vmlinux-version-ImageName-{cell|compute}
  initrd: initrd-version-ImageName-{cell|compute}.img
  image: nfsimg-version-ImageName-{cell|compute}.tar
  image: nfsimg-version-ImageName-{cell|compute}.tar.md5

If you are imaging version 12.1.2.2.0 and later, proceed to step 13 (page 5-76). For versions earlier than 12.1.2.2.0, go to step 10 (page 5-75) to create the image files using ImageMaker.

10. Download the ImageMaker kit to prepare and create the files for the PXE server. The kit is available publicly on the Oracle Software Delivery Cloud (edelivery) site under “Oracle Database Products -> Linux x86-64”. There are separate ImageMaker files for database nodes and cells.

11. After downloading the kit, unzip the first file, called something similar to V75080-01.zip, and then unzip the subsequent file as well. Perform the unzip as the root user. Then untar the file.

    # unzip V75080-01.zip
    # unzip cellImageMaker_12.1.2.1.1_LINUX.X64_150316.2-1.x86_64.zip
    # tar -pxvf cellImageMaker_12.1.2.1.1_LINUX.X64_150316.2-1.x86_64.tar

    View the README_FOR_FACTORY.txt file in the resulting directory for additional details.

12. Run makeImageMedia.sh to build the kernel, initrd, and image files if necessary. Place these in the relevant directories on the PXE server. These files will be sent at boot time to the node being imaged.

   a. **(For 12.1.2.2.0 up to 12.2.1.1.0)** Change directory to the dl180 or dl360 directory.
b. (For 12.2.1.1.0 and above) Change directory to the cell or compute directory.

c. Make PXE build using:

```
./makeImageMedia.sh -pxe -pxeout ImageName
```

This creates four files in the ./PXE subdirectory:

- **For 12.1.2.2.0 up to 12.2.1.1.0:**
  - kernel: vmlinux-version-ImageName-{DL180|DL360}
  - initrd: initrd-version-ImageName-{DL180|DL360}.img
  - image: nfsimg-version-ImageName-{DL180|DL360}.tar
  - image: nfsimg-version-ImageName-{DL180|DL360}.tar.md5

- **For 12.2.1.1.0 and above:**
  - kernel: vmlinux-version-ImageName-{cell|compute}
  - initrd: initrd-version-ImageName-{cell|compute}.img
  - image: nfsimg-version-ImageName-{cell|compute}.tar
  - image: nfsimg-version-ImageName-{cell|compute}.tar.md5

For example:

```
# ./makeImageMedia.sh -pxe -pxeout test
```

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 dbvm.boot.tbz ...
Calculating md5 checksum for ofedvm.tbz ...
Calculating md5 checksum for sunvmutils.tbz ...
Store filename of nfsimg tarball nfsimg-12.1.2.1.1-test-DL360.tar inside initrd
Please wait. Making initrd ...
395853 blocks
Please wait. Calculating md5 checksums for boot ...
PXE NFS image: /root/imagemaker/dl360./PXE/nfsimg-12.1.2.1.1-test-DL360.tar
PXE NFS md5 sum: /root/imagemaker/dl360./PXE/nfsimg-12.1.2.1.1-test-DL360.tar.md5
PXE initrd: /root/imagemaker/dl360./PXE/initrd-12.1.2.1.1-test-DL360.img
PXE kernel: /root/imagemaker/dl360./PXE/vmlinux-12.1.2.1.1-test-DL360

13. Change the boot order using the ILOM to boot from PXE and then reboot to start the imaging process.

For example, from the Unix prompt on the host:
# ipmitool chassis bootdev pxe

# reboot

14. If you are using Oracle VM, run `switch_to_ovm.sh` on each database server. The database servers will reboot.

For example:

```
# /opt/oracle.SupportTools/switch_to_ovm.sh
2014-12-07 11:58:36 -0800 [INFO] Switch to DOM0 system partition /dev/VGExaDb/LVDbSys3 (/dev/mapper/VGExaDb-LVDbSys3)
2014-12-07 11:58:36 -0800 [INFO] Active system device: /dev/mapper/VGExaDb-LVDbSys1
2014-12-07 11:58:36 -0800 [INFO] Active system device in boot area: /dev/mapper/VGExaDb-LVDbSys1
2014-12-07 11:58:36 -0800 [INFO] Set active system device to /dev/VGExaDb/LVDbSys1 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
```

15. Run `reclaimdisks.sh` on each database server.

The `/opt/oracle.SupportTools/reclaimdisks.sh -free -reclaim` command reclaims disk space reserved for the deployment type not selected. The command takes less than 5 minutes, approximately. Systems are imaged with disks configured with RAID5; a RAID rebuild is no longer part of the `reclaimdisks.sh` process.

Do not skip this step. Skipping this step results in unused space that can no longer be reclaimed by `reclaimdisks.sh`.

For example:

```
# /opt/oracle.SupportTools/reclaimdisks.sh -free -reclaim
Model is ORACLE SERVER X5-2
Number of LSI controllers: 1
Physical disks found: 4 (252:0 252:1 252:2 252:3)
Logical drives found: 1
Linux logical drive: 0
RAID Level for the Linux logical drive: 5
Physical disks in the Linux logical drive: 4 (252:0 252:1 252:2 252:3)
Dedicated Hot Spares for the Linux logical drive: 0
Global Hot Spares: 0
[INFO] ] Check for DOM0 system disk
[INFO] ] Check for DOM0 with inactive Linux system disk
[INFO] ] Valid DOM0 with inactive Linux system disk is detected
[INFO] ] Number of partitions on the system device /dev/sda: 4
[INFO] ] Higher partition number on the system device /dev/sda: 4
[INFO] ] Last sector on the system device /dev/sda: 3509759999
[INFO] ] End sector of the last partition on the system device /dev/sda: 3509759000
[INFO] ] Unmount /EXAVMIMAGES from ocfs2 partition on /dev/sda3
[INFO] ] Mount ocfs2 partition /dev/sda3 to /EXAVMIMAGES
[INFO] ] Remove inactive system logical volume /dev/VGExaDb/LVDbSys1
[INFO] ] Remove logical volume /dev/VGExaDbOra/LVDbOra1
[INFO] ] Remove volume group VGExaDbOra
[INFO] ] Remove physical volume /dev/sda4
[INFO] ] Remove partition /dev/sda4
[INFO] ] Re-calculate end sector of the last partition after removing of /dev/sda4 partition
[INFO] ] End sector of the last partition on the system device /dev/sda: 3300035608
```
16. Run `ibhosts` and verify that all nodes show the correct IP addresses and host names. There should be no nodes with `elasticNode` in the description.

17. Run the OEDA tool to deploy.

```
[root] # ./install.sh -cf ../MAA-dm01.xml -l
1. Validate Configuration File
2. Setup Capacity-on-Demand
3. Create Virtual Machine
4. Create Users
5. Setup Cell Connectivity
6. Create Cell Disks
7. Create Grid Disks
8. Configure Alerting
9. Install Cluster Software
10. Initialize Cluster Software
11. Install Database Software
12. Relink Database with RDS
13. Create ASM Diskgroups
```
5.8.5 Using USB to Image a New System

To prepare a new Exadata system for deployment using USB, perform the following steps:

1. Obtain the latest Oracle Exadata Deployment Assistant (OEDA).
2. Run OEDA to generate the `preconf.csv` file that you can use to image the system.
3. Power on all the servers.
   a. Database nodes and cells will automatically assign to themselves unused IP addresses on eth0 in the 172.16 range.
   b. Host names of the nodes will be of the format `nodeN`, where `N` is a number.
4. Connect to the first database node. You can do this by connecting a laptop to the ILOM serial management port (9600, 8, N, 1), and then connecting to the console and logging in to the database node.
5. Obtain the eth0 MAC address for each database node. This is the `fru_macaddress` field from `/SYS/MB/NET0` in the ILOM, or use the command `ip addr` if logged into the console.
   a. Connect to the other database nodes using SSH from the console.
   b. Run `ibhosts` to get a list of node names and IP addresses.
6. Insert the MAC addresses using uppercase characters in the seventh field of the `preconf.csv` file for each node. This field should be empty, that is, you should see two consecutive comma characters (,,). For example, if the MAC address is `00:10:E0:69:34:52`:

   `orhb42-b08-01,us.oracle.com,db,eth0,eth0,Management,00:10:E0:69:34:52,10.196.3.106,255.255.224.0,10.196.31.250,orhb42-b08-01-priv,Private:active-bond-ib,192.168.10.15,255.255.255.0,,America/Los_Angeles`

7. Run `ipconf` to verify the generated `preconf.csv` file. This can be done on any Oracle Exadata server, and although not required, it is useful to ensure the `preconf.csv` file is valid before proceeding.
# ipconf -verify -preconf /tmp/preconf.csv
[Info]: ipconf command line: /opt/oracle.cellos/ipconf.pl -verify -preconf /tmp/preconf -nocodes
[Done]: Pre config verification OK

8. For versions prior to 12.1.2.2.0 proceed to step 11 (page 5-81) to use ImageMaker to create the image files.

If you are using version 12.1.2.2.0 or later, it is no longer necessary to use ImageMaker to create the image files in version 12.1.2.2.0. The relevant PXE, ISO, and USB image files have already been created in the patches themselves. Simply download the patch containing the prebuilt image file from Oracle Software Delivery Cloud (edelivery) and place the downloaded USB .img image file onto the USB drive. For 12.1.2.2.0 the patch numbers can be obtained from My Oracle Support note 2038073.1. There are separate ImageMaker files for database nodes and cells.

Note: For image version 12.1.2.2.0 the format of the downloadable image files has changed.

There will be an image file in the downloaded zip file. For example, the database node zip file will contain computeImageMaker_12.1.2.2.0_LINUX.X64_150917.x86_64.img. For cell images, the file will be similar to cellImageMaker_12.1.2.2.0_LINUX.X64_150917.x86_64.img.

9. (For 12.1.2.2.0 and above) Follow the steps in the patch README.txt file to copy the file and optional preconf.csv file onto the USB drive.

a. Place the computeImageMaker_12.1.2.2.0_LINUX.X64_150917.x86_64.img file in a directory on a Linux server.

b. Verify that the md5sums match: f3daae6a9757d4feb4a0f4262e610945 computeImageMaker_12.1.2.2.0_LINUX.X64_150917.x86_64.img

c. Prepare the USB drive using a command similar to the following, where /dev/sdd is the name of the inserted USB drive:

   # dd if=/dev/zero of=/dev/sdd bs=1M count=100 oflag=direct

   You can determine the exact name of the USB drive by looking in /var/log/messages after inserting the USB drive.

d. Write the .img file to the USB drive. This may take 15 minutes or more and no output is shown during the operation.

   # dd if=filename.img of=/dev/sdd bs=1M oflag=direct

e. Rescan the partition table on Linux to recognize the new partition:

   # partprobe

f. Verify that the USB is mountable as long as the system supports ext4 file system. This must be an Oracle Linux 6 system for this step even if the previous dd command was run on an Oracle Linux 5 system.

   mount /dev/sdd1 /mnt

g. (Optional) Prepare and place the preconf.csv file on the USB drive. The file name must be preconf.csv on the USB drive. The preconf.csv file must contain MAC addresses for each node in the order to be used during the image. If no preconf.csv file is used during imaging, the node will prompt for its network configuration the first time it boots up.
# cp /path/preconf.csv /mnt/preconf.csv

# umount /mnt

The `umount` command above ensures that the file system is synchronized.

**h.** Proceed to step **15** (page 5-81). Steps **11** (page 5-81) to **14** (page 5-81), which create the image files, can be skipped.

**10.** Download the ImageMaker kit to prepare and create the files for the USB drive. This kit is available publicly on the Oracle Software Delivery Cloud (edelivery) site under “Oracle Database Products -> Linux x86-64”. There are separate ImageMaker files for database nodes and cells.

**11.** After downloading ImageMaker, unzip the first file, which is named similar to `V75080-01.zip`, and then also unzip the subsequent file. Perform the unzip as the root user. Then untar the file.

```
# unzip V75080-01.zip

# unzip cellImageMaker_12.1.2.1.1_LINUX.X64_150316.2-1.x86_64.zip

# tar -pxvf cellImageMaker_12.1.2.1.1_LINUX.X64_150316.2-1.x86_64.tar
```

View the `README_FOR_FACTORY.txt` file in the resulting directory for additional details.

**12.** Insert a blank USB device in the slot of the server where ImageMaker was unpacked.

**13.** Run `makeImageMedia.sh` to build the kernel, initrd, and image files for the USB device. `makeImageMedia.sh` will prompt to confirm creation of the image on the USB device. For building 12.1.2.1.0 and above images, the recommended `makeImageMedia.sh` options for building USB bootable media are:

a. *(For 12.1.2.1.0 up to 12.2.1.1.0)* Change directory to the `dl180` or `dl360` directory.

b. *(For 12.2.1.1.0 and above)* Change directory to the `cell` or `compute` directory.

c. Make files for the USB.

```
./makeImageMedia.sh -factory -stit -reboot-on-success -nodisktests [-preconf path_to_preconf_file]
```

For USB imaging, note the following:

- `makeImageMedia.sh` must be run from an Oracle Exadata database server if using the `-preconf` option.

- Storage servers and database servers can hang during boot when attempting a reimage using a bootable USB created with the `makeImageMedia.sh` script provided with storage cell and Linux database host images available on the Oracle Software Delivery Cloud (edelivery). To work around the issue, see My Oracle Support note 1919001.1

**14.** After the USB drive has been prepared, place it into the slot of the server to be imaged. Ensure the image type matches the server type (database node or cell).

**15.** Reboot the database node or cell to start the imaging process from USB.

**16.** If you are using Oracle VM, run `switch_to_ovm.sh` on each database server. The database servers will reboot.

For example:
17. Run `reclaimdisks.sh` on each database server.

The `reclaimdisks.sh -free -reclaim` command reclaims disk space reserved for the deployment type not selected. The command takes less than 5 minutes, approximately. Systems are imaged with disks configured with RAID5; a RAID rebuild is no longer part of the `reclaimdisks.sh` process.

Do not skip this step. Skipping this step results in unused space that can no longer be reclaimed by `reclaimdisks.sh`.

For example:

```
# /opt/oracle.SupportTools/reclaimdisks.sh -free -reclaim
Model is ORACLE SERVER X5-2
Number of LSI controllers: 1
Physical disks found: 4 (252:0 252:1 252:2 252:3)
Logical drives found: 1
Linux logical drive: 0
RAID Level for the Linux logical drive: 5
Physical disks in the Linux logical drive: 4 (252:0 252:1 252:2 252:3)
Dedicated Hot Spares for the Linux logical drive: 0
Global Hot Spares: 0
[INFO] Check for DOM0 system disk
[INFO] Check for DOM0 with inactive Linux system disk
[INFO] Valid DOM0 with inactive Linux system disk is detected
[INFO] Number of partitions on the system device /dev/sda: 4
[INFO] Higher partition number on the system device /dev/sda: 4
[INFO] Last sector on the system device /dev/sda: 350959999
[INFO] End sector of the last partition on the system device /dev/sda: 3509759000
[INFO] Unmount /EXAVIMAGES from ocfs2 partition on /dev/sda3
[INFO] Mount ocfs2 partition /dev/sda3 to /EXAVIMAGES
[INFO] Remove inactive system logical volume /dev/VGExaDb/LVDbSys1
[INFO] Remove physical volume /dev/VGExaDbOra/LVDbOra1
[INFO] Remove volume group VGExaDbOra
[INFO] Remove partition /dev/sda4
[INFO] Remove partition /dev/sda4
[INFO] Re-calculate end sector of the last partition after removing of /dev/sda4 partition
[INFO] End sector of the last partition on the system device /dev/sda: 3300035608
[INFO] Check for existing first boot system image /EXAVIMAGES/
System.first.boot.12.1.2.1.0.141205.2.img
[INFO] Saving /EXAVIMAGES/System.first.boot.12.1.2.1.0.141205.2.img in /var/log/exadatatmp ...
[INFO] First boot system image saved in /var/log/exadatatmp/
System.first.boot.12.1.2.1.0.141205.2.img
[INFO] Unmount /EXAVIMAGES from /dev/sda3
[INFO] Remove partition /dev/sda3
[INFO] Re-calculate end sector of the last partition after removing of /dev/
```
sda3 partition
[INFO     ] End sector of the last partition on the system device /dev/sda:
240132159
[INFO     ] Create primary ocfs2 partition 3 using 240132160 3509758999
[INFO     ] Create ocfs2 partition on /dev/sda3
[INFO     ] Mount ocfs2 partition on /dev/sda3 to /EXAVMIMAGES
12.1.2.1.0.141205.2.img into /EXAVMIMAGES ...
[INFO     ] Logical volume LVDbSys2 exists in volume group VGExaDb
[INFO     ] Grub version in /boot/grub/grub.stage.version: 0.97-81.0.1.el6
[INFO     ] Grub rpm version: 0.97-13.10.0.1.el5
[INFO     ] Copying /usr/share/grub/x86_64-redhat/* to /boot/grub ...
[INFO     ] Create filesystem on device /dev/sda
[INFO     ] Tune filesystem on device /dev/sda

GNU GRUB  version 0.97  (640K lower / 3072K upper memory)

[ Minimal BASH-like line editing is supported. For the first word, TAB
lists possible command completions. Anywhere else TAB lists the possible
completions of a device/filename.]
grub> root (hd0,0)
  Filesystem type is ext2fs, partition type 0x83
grub> setup (hd0)
  Checking if "/boot/grub/stage1" exists... no
  Checking if "/grub/stage1" exists... yes
  Checking if "/grub/stage2" exists... yes
  Checking if "/grub/e2fs_stage1_5" exists... yes
  Running "embed /grub/e2fs_stage1_5 (hd0)"... failed (this is not fatal)
  Running "embed /grub/e2fs_stage1_5 (hd0,0)"... failed (this is not fatal)
  Running "install /grub/stage1 (hd0) /grub/stage2 p /grub/grub.conf "...
succeeded
Done.
grub> quit

18. Run `ibhosts` and verify that all nodes show the correct IP addresses and host
names. There should be no nodes with "elasticNode" in the description.

19. Run the OEDA tool to deploy.

  [root] # ./install.sh -cf ../MAA-dm01.xml -l
  1. Validate Configuration File
  2. Setup Capacity-on-Demand
  3. Create Virtual Machine
  4. Create Users
  5. Setup Cell Connectivity
  6. Create Cell Disks
  7. Create Grid Disks
  8. Configure Alerting
  9. Install Cluster Software
 10. Initialize Cluster Software
 11. Install Database Software
 12. Relink Database with RDS
 13. Create ASM Diskgroups
 14. Create Databases
 15. Apply Security Fixes
 16. Install Exachk
 17. Setup ASR Alerting
 18. Create Installation Summary
 19. Resecure Machine

Related Topics:
  • Oracle Software Delivery Cloud
5.8.6 Updates to Imaging Parameters

Some of the command line options for imaging have changed with 12.1.2.1.0 and above.

The changes are:

- **updfrm**
  Do NOT use the `updfrm` option in any form. It will be removed from the imaging options in the future. Allow the firmware to be updated automatically upon initial boot instead.

- **dualboot**
  `dualboot` is no longer required with 12.1.2.1.0 as there is no support for Solaris. It has no meaning in releases 12.1.2.1.0 and above.

- **factory**
  The meaning of the `factory` keyword has changed as of 12.1.2.1.0. The use of “factory” now enforces additional options such as “ovs=yes”. This should be used for all imaging, regardless of the ultimate system configuration (Oracle VM, Physical etc.)

- **OVS=yes|no**
  This option defaults to “no”. However it is not recommended to use this at all because it may change in the future. In its place, use the “factory” option which will override some default options.

There are some additional command line options which may be useful:

- To create a hot spare on dbnodes, use the `enable_hot_spare` option.
  - `makemImageMedia.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.
  - `makemImageMedia.sh` option: `--active-bond-ib <yes|no>`
  - PXE option: `active-bond-ib=<yes|no>`

The `README_FOR_FACTORY.txt` file shipped with the imagemaker software explains each option in more detail.

Related Topics:

- **Exadata 12.1.2.2.0 release and patch (20131726) (My Oracle Support Doc ID 2038073.1)**
- **Reimaging Exadata Cell Node Guidance (My Oracle Support Doc ID 2151671.1)**
5.9 Performing Initial Elastic Configuration of Oracle Exadata Database Machine

This topic provides background information on elastic configuration and describes how to perform the initial configuration of Oracle Exadata Database Machine.

You need the configuration file generated by Oracle Exadata Database Machine Deployment Assistant.

Elastic configuration is new in Exadata version 12.1.2.1.0. It applies to all rack configurations, such as the following:

- Racks ordered with a standard number of database nodes and cells, for example, quarter or half racks
- Rack configurations that feature additional database nodes and cells
- Oracle Exadata Database Machine Two-Socket X5 generation and later Storage Servers

Starting with the Oracle Exadata Database Machine Two-Socket X5 generation of Storage Servers, the same process can also be used to add additional database servers or cells to an existing configuration.

The process allows initial IP addresses to be assigned to database servers and cells, regardless of the exact customer configuration ordered. The customer specific configuration can then be applied to the nodes. The procedure can be run from any database node (usually the first node,) and also from a cell in cases where expansion involves adding only cell nodes.

Every Exadata system has a pre-defined method for the cabling of nodes to the InfiniBand switch ports. Therefore, there is a fixed mapping from each node's location in the rack to the ports of the InfiniBand switches. Assuming the rack is always populated following this map, a node's rack unit location can be identified by querying the InfiniBand fabric to determine the InfiniBand switch port the node is connected to. Once found, that information is used to determine the rack unit location of the node. With this information, nodes can be allocated initial IP addresses based on their rack unit location, with nodes lower in the rack getting lower IP addresses.

Note:

- If a RAID rebuild/reconstruction (that is, a disk replacement or expansion) is in progress, wait until it is finished before performing the steps in this section. The reason is that the reclaimdisks.sh script is blocked from running until the RAID rebuild/reconstruction is complete.
- Disk space for unused system partitions must be reclaimed before installing software. Use the following script to reclaim the disk space:
  
  /opt/oracle.SupportTools/reclaimdisks.sh -free -reclaim
- My Oracle Support note 1953915.1 for detailed information about the configuration process.
1. Open a console session to the first database server. The first database server is
the lowest database server in the rack, which is rack position U16. In the case of
an expansion involving only cells, the procedure should be run from a cell instead
of a database node.

Note:

The network connection and configuration for Oracle Exadata Database
Machine has not occurred yet.

2. Log in as the root user on the first database server.

Note:

If you do not have the password for the root user, then contact Oracle Support
Services.

3. Verify all servers are configured with the 172.16 IP address for the ETH0 interface
using the following command:

```bash
# ibhosts
```

Each server description should be hostname elasticNode. ipaddress ETH0.

4. (Optional on database servers) Switch to the Oracle VM when using virtualization
on the rack using the following command:

Note that database servers will reboot during this step.

Note:

It is not possible or supported to switch between physical and Oracle VM
configuration.

```bash
#/opt/oracle.SupportTools/switch_to_ovm.sh
```

On database servers, run reclaimdisks.sh. This is necessary in all deployment
scenarios.

```bash
#/opt/oracle.SupportTools/reclaimdisks.sh -free -reclaim
```

If Oracle VM was chosen, this step locks in the image as Oracle VM. Going back
and forth will not be possible.

reclaimdisks.sh performs partition reconfiguration and a few other necessary
configuration changes that take typically less than a minute to complete.

5. On database servers, verify disk configuration.

```bash
#/opt/oracle.SupportTools/reclaimdisks.sh -check
```

If the system is a physical (bare metal) deployment, the last line of output will be
the following:

If the system is an Oracle VM deployment, the last line of output will be the following:
Valid. Booted: DOM0. Layout: DOM0.

6. Copy Oracle Exadata Database Machine Deployment Assistant to the database server using one of the following methods. If adding only cell servers, the steps can be run from a cell.

- Using a USB flash drive on Linux:
  a. Copy the configuration file to a USB flash drive.
  b. Connect the USB drive to the database server or cell.
  c. Locate the USB drive using the following command:

```
for x in `ls -1 /sys/block`; do udevadm info --attribute-walk --path=/sys/block/$x | grep -iq 'DRIVERS=="usb-storage"'; if [ $? -eq 0 ] ; then echo /dev/${x}1; fi ; done
```

The expected output is similar to:

```
/dev/sdb1
```

**Note:**

If an X6 or X5 EF cell is used, the command will also return the two internal USB drives, usually /dev/sda1 and /dev/sdb1. The newly inserted USB drive will be the additional device, usually /dev/sdc1.

The expected output is similar to:

```
/dev/sda1
/dev/sdb1
/dev/sdc1
```

The internal USBs can be identified by viewing `mdstat`:

```
# grep md4 /proc/mdstat | awk '{print $5,$6;}'
```

d. Create a directory on the database server or cell using the following command:

```
# mkdir /mnt/usb
```

e. Create a directory for the installation using the following command:

```
# mkdir /opt/oracle.SupportTools/onecommand
```

If the directory already exists, then rename the existing one to `onecommand.old`, and then re-create the empty directory.

**Note:** Do not use a directory under /u01 or /EXAVMIMAGES because `reclaimdidsks.sh` will fail if there is content in those directories.

f. Mount the device. Use the device name given in step 6.c (page 5-87). The following is an example of the command.

```
```
g. Copy Oracle Exadata Deployment Assistant and the configuration files from the USB flash drive to the onecommand directory on the database server or cell using the following command:

```
# cp /mnt/usb/path_to_file/*.* /opt/oracle.SupportTools/onecommand
```

In the preceding command, `path_to_file` is the directory path to the configuration file on the USB flash drive.

h. Unmount the USB flash drive using the following command:

```
# umount /mnt/usb
```

i. Remove the USB flash drive from the database server or cell.

• Using a temporary network connection:

This option is only needed if there were IP address conflicts, and Oracle Exadata Database Machine is not already connected to the network.

a. Connect a network cable to the Ethernet port labeled NET0 on the back of the first database server.

b. Bring up the eth0:1 interface as follows:

```
# ifconfig eth0:1 real_ip netmask real_netmask up
```

In the preceding command, `real_ip` is the IP address to assign to the database server, and `real_netmask` is the subnet mask to assign to the database server.

c. Add the default route as follows:

```
# route add -net 0.0.0.0 netmask 0.0.0.0 gw real_gateway
```

In the preceding command, `real_gateway` is the default gateway to use for the database server.

d. Copy the configuration files to the `/opt/oracle.SupportTools/onecommand` directory on the database server or cell using a file transfer utility such as `scp`.

e. Disconnect the network cable from Ethernet port NET0.

**Note:**

It is not necessary to reconfigure the network because the network is reconfigured automatically during the restart step.

7. Verify all servers are configured with the 172.16 IP address for the ETH0 interface using the following command:

```
# ibhosts
```

No server description should include `elasticNode` in its description.

8. Run the `applyElasticConfig.sh` script using the following command:

```
# cd /opt/oracle.SupportTools/onecommand/linux-x64
# ./applyElasticConfig.sh -cf customer_name-configFile.xml
```
The `applyElasticConfig.sh` script performs network configuration for all database servers and Exadata Storage Servers. All servers restart at the end of the process.

9. Connect the corporate network cable for the management network to the Cisco Ethernet switch.

10. Connect the corporate network cables for the client access network to the database servers.

11. Restart all database servers and Exadata Storage Servers.

12. Log in to the first database server (or cell, if only cells were added for expansion) to verify network connectivity using the following commands:

```bash
# cd /opt/oracle.SupportTools/onecommand/linux-x64
#.checkip.sh -cf configuration_file
```

In the preceding command, `configuration_file` is the name of the configuration file from Oracle Exadata Deployment Assistant, and includes the full path.

**Note:**

- The `checkip.sh` script can be run on a server outside of Oracle Exadata Database Machine to verify network connectivity to Oracle Exadata Database Machine. Copy the `checkip.sh` file to the external system, and run the command as shown in this step.
- If the command is run from a Microsoft Windows machine, then the command is `checkip.cmd`.
- Download the version of Oracle Exadata Deployment Assistant for the relevant platform.

13. Use Oracle Exadata Deployment Assistant to install and configure the software for Oracle Exadata Database Machine.

**See Also:**

- *Oracle Exadata Database Machine System Overview* for rack layout information
- *Oracle Exadata Database Machine Maintenance Guide* for information about restarting the servers

**Related Topics:**

- *Adding Additional Elastic Nodes to an Existing Rack* (page 5-90)
  You can add nodes to an existing rack using elastic configuration.
- *Elastic Configuration on Exadata* (My Oracle Support Doc ID 1953915.1)
5.10 Adding Additional Elastic Nodes to an Existing Rack

You can add nodes to an existing rack using elastic configuration.

The elastic configuration procedure described in "Performing Initial Elastic Configuration of Oracle Exadata Database Machine (page 5-85)" can also be used to add new servers to an existing rack. The new servers and existing servers must be at least X5. The procedure assigns IP addresses to the new database servers and cells, in preparation for adding them into existing setups. The addition of X5, X6, or X7 servers into previous generation racks using this methodology is not supported.

The XML configuration file generated by the Oracle Exadata Deployment Assistant must contain the existing nodes, plus the new nodes to be added. The same elastic configuration procedures described in the previous section should be followed, and the applyElasticConfig.sh script that runs as part of step 8 (page 5-88) determines which nodes are new, and assigns IP addresses accordingly.

When adding only storage cells, you can run the applyElasticConfig.sh script from a cell server rather than a database server.

5.11 Loading the Configuration Information and Installing the Software

Oracle Exadata Deployment Assistant loads the network settings, creates the user accounts, installs Oracle Database software, and secures the system based on the information the configuration files. You can also choose to do the process manually.

Note:

- To enable a supported, non-English language, set the following environment variables before starting the configuration:

  ```
  export LANG=preferred_language
  export LC_ALL=preferred_language
  ```

- To copy the database image to a USB drive, use the procedure in the database maintenance chapter of Oracle Exadata Database Machine Maintenance Guide. For releases 12.1.2.1.0 and later, the system used to create the image must be running Oracle Linux 6.
5.11.1 Configuring Oracle Exadata Database Machine Using Oracle Exadata Deployment Assistant

Oracle Exadata Deployment Assistant (OEDA) is used to configure Oracle Exadata Database Machine.

The deployment assistant works with the information provided in Oracle Exadata Database Machine Deployment Assistant.

The following procedure describes how to configure Oracle Exadata Database Machine using Oracle Exadata Deployment Assistant:

1. Go to My Oracle Support.
2. Download the latest Oracle Exadata Deployment Assistant, and follow the steps in the associated README file.
3. Download all necessary Oracle Exadata Storage Server Software and Oracle Database patches. See My Oracle Support note 888828.1 for details.
4. Log in as the root user on the first database server.

Note:

If you do not have the password for the root user, then contact Oracle Support Services.

5. Copy the configuration file from the machine that was used to run Oracle Exadata Deployment Assistant to the /opt/oracle.SupportTools/onecommand directory on the first database server of the Oracle Exadata Rack.
6. Create a directory named WorkDir on the first database server.
7. Put the downloaded software and patches in the WorkDir directory.
8. Apply Oracle Exadata Deployment Assistant update according to the instructions included in the README file.
9. Change to the following directory:

   # cd /opt/oracle.SupportTools/onecommand

10. Run the following command to configure Oracle Exadata Rack:

    # ./install.sh -cf configuration_file [-s step_number | \ 
        -r step_numberA stepnumberB]
Note:
If the configuration is run from a Microsoft Windows machine, then the command is `install.cmd`.

In the preceding command, `configuration_file` is the name of the configuration file, and includes the full path. The options for the script are:

- `-cf file`: Use configuration file. The full path must be included with the file name.
- `-h`: Describe options for the script.
- `-l`: List the steps of Oracle Exadata Deployment Assistant.
- `-r {n-N | n}`: Run steps `n` through `N` of Oracle Exadata Deployment Assistant, or one step.
- `-s n`: Run step `n` of Oracle Exadata Deployment Assistant.
- `-u {n-N | n}`: Undo steps `n` through `N`, or one step.

The following steps are performed by the utility. However, the actual steps for a specific deployment may differ depending on the deployment options chosen. For example, the “Update Nodes for Eighth Rack” step is performed only if you are doing an eighth rack deployment.

1. Validate Configuration File
2. Update Nodes for Eighth Rack
3. Create Virtual Machine
4. Create Users
5. Setup Cell Connectivity
6. Create Cell Disks
7. Create Grid Disks
8. Configure Alerting
9. Install Cluster Software
10. Initialize Cluster Software
11. Install Database Software
12. Relink Database with RDS
13. Create ASM Diskgroups
14. Create Databases
15. Apply Security Fixes
16. Install Exachk
17. Setup ASR Alerting
18. Create Installation Summary
19. Resecure Machine

Note:
The preceding steps are correct for the current release. However, the steps may differ for other releases. Always use the latest Oracle Exadata Deployment Assistant patch listed in My Oracle Support note 888828.1. Refer to the README in the patch for the latest steps.
5.11.2 Configuring Oracle Database and Oracle ASM Instances for Oracle Exadata Database Machine Manually

Oracle Database and Oracle Automatic Storage Management (Oracle ASM) 11g Release 2 (11.2) must be installed on the database server. Follow the instructions for installing Oracle Database and Oracle ASM provided in the Oracle Database Installation Guide for your platform.

**Note:**

- During Oracle Database installation, Database Configuration Assistant (DBCA) release 11.2.0.1.0 does not set the COMPATIBLE parameter equal to '11.2.0.2'. You must set the value on the Initialization Parameters page.

- To fully utilize the Hardware Assisted Resilient Data (HARD) features, ensure the DB_BLOCK_CHECKSUM initialization parameter is set to TYPICAL (default) or FULL.

When installing Oracle Database, you must select the Oracle ASM storage option. If you are installing Oracle Real Application Clusters (Oracle RAC), then refer to the platform-specific Oracle Clusterware and Oracle RAC installation guides, such as Oracle Grid Infrastructure Installation and Upgrade Guide and Oracle Real Application Clusters Installation Guide.
For Oracle RAC, you must shut down the entire cluster, and then restart the cluster after the database and cell software have been installed, and the cell configuration files are in place.

The recommended procedure is to install Oracle software on Oracle Exadata Database Machine using Oracle Exadata Deployment Assistant. If you choose to install the software manually, then do the following:

1. Install Oracle Grid Infrastructure for a cluster as described in Oracle Grid Infrastructure Installation and Upgrade Guide for Linux.
2. Install Oracle Database as described in Oracle Real Application Clusters Installation Guide for Linux and UNIX.
3. Apply the latest patches for Oracle Database and Oracle Exadata Storage Server Software.

After the cells are configured as described in Oracle Exadata System Software User’s Guide, and the database and Oracle ASM instances are installed, the instances must be configured to use the cells as part of an Oracle ASM disk group. The required configuration involves updating the initialization parameter file of both the database and Oracle ASM instances. Additionally, Oracle ASM disk groups must be created to access storage cells.

You can update the initialization parameter file of the Oracle ASM or the database instance while the instance is running, but the instance must be restarted if you manually update the initialization parameter file. If you update an initialization parameter dynamically using the SQL ALTER SYSTEM or ALTER SESSION commands, then there is no need to restart the instance.

In addition, for the database, you can configure a new Database Resource Manager (DBRM) plan, rather than using the default plans.

Related Topics:
- Exadata Database Machine and Exadata Storage Server Supported Versions (My Oracle Support Doc ID 888828.1)
5.11.2.1 Configuring the Compatible Parameter for a Database Instance

To configure a database instance to access cell storage, ensure that the COMPATIBLE parameter is set to 11.2.0.2 or later in the database initialization file. Oracle recommends using the best practices for Oracle Exadata Storage Server Software available at My Oracle Support.

You can view the initialization parameter file from the operating system or use the SQL*Plus administration command `SHOW PARAMETER` if the database is running. For example:

```
SQL> SHOW PARAMETER
SQL> SHOW PARAMETER compatible
```

If necessary, set the COMPATIBLE initialization parameter in the initialization parameter file to 11.2.0.2 or later. For example:

```
COMPATIBLE='11.2.0.2'
```

The COMPATIBLE parameter cannot be changed dynamically. If you change the value in the initialization parameter file, then the database must be shut down and restarted for the change to take effect.

5.11.2.2 Configuring Initialization Parameters for an Oracle ASM Instance

To enable an Oracle ASM instance to discover and access Exadata Storage Server grid disks, you must configure the ASM_DISKSTRING initialization parameter as follows:

- Set the ASM_DISKSTRING initialization parameter to the empty string ("") to discover all grid disks on the cells listed in the `cellip.ora` file. This causes Oracle ASM discovery for `/dev/raw/*` and any ASMLIB disks on any non-Exadata Storage Servers.
- Set the ASM_DISKSTRING initialization parameter to restrict the discovery by Oracle ASM to only specific sets of disks, as shown in the examples.
To discover only a subset of cells, use a pattern for the ASM_DISKSTRING value such as the following:

```
o/*cell-connect-info-pattern/griddisk-name-pattern.
```

For example:

```
ASM_DISKSTRING = 'o/*/*/
```

To discover non-Exadata Storage Server disks and all grid disks on all the cells specified in the cellip.ora file, use a wildcard pattern for Exadata Storage Server grid disks. For example:

```
ASM_DISKSTRING = '/dev/rdsk/*/*', 'o/*/*'
```

You can change the ASM_DISKSTRING initialization parameter when the Oracle ASM instance is running with the SQL `ALTER SYSTEM` command. If you edit the ASM_DISKSTRING initialization parameter in the initialization parameter file when the Oracle ASM instance is running, then the Oracle ASM instance must be shut down and restarted for the change to take effect.

See Also:

- *Oracle Automatic Storage Management Administrator’s Guide* for additional information about the following:
  - Oracle ASM discovery strings
  - starting up and connecting to an Oracle ASM instance
- *Oracle Database Reference* for additional information about the ASM_DISKSTRING initialization parameter
- *Oracle Database SQL Language Reference* for additional information about the `ALTER SYSTEM` command

## 5.12 Installing Oracle Enterprise Manager Cloud Control

Oracle Exadata Database Machine should be monitored using Oracle Enterprise Manager Cloud Control. Ensure that the Enterprise Manager environment is configured for high availability and disaster recovery to ensure sufficient monitoring of the Exadata environments.

Related Topics:

- *Oracle Enterprise Manager Cloud Control Basic Installation Guide*
- Installation and Deployment in *Oracle Enterprise Manager Exadata Management Getting Started Guide*
- Configuring Enterprise Manager for High Availability in *Oracle Enterprise Manager Cloud Control Advanced Installation and Configuration Guide*
- *Oracle Enterprise Manager Cloud Control Advanced Installation and Configuration Guide*
- Discovery in *Oracle Enterprise Manager Cloud Control Administrator’s Guide*
• How to Configure Oracle Configuration Manager for Oracle Exadata Database Machine (My Oracle Support Doc ID 1319476.1)
• MAA Best Practices website
Site Checklists

Complete the checklists in this appendix to ensure the site is prepared for Oracle Exadata Database Machine or Oracle Exadata Cloud Machine.

**Note:**

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

### A.1 System Components Checklist

Use this checklist to ensure that the system component considerations have been addressed.

<table>
<thead>
<tr>
<th>System Components Checklist Items</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is it an Oracle Exadata Database Machine, Oracle Exadata Cloud Machine, or Oracle Exadata Storage Expansion Rack?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>How many racks will be installed?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is the system going to be connected to other Oracle racks using the InfiniBand network?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Note:</strong> Not applicable for Exadata Cloud Machine.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>System Components Checklist Items</td>
<td>Yes</td>
<td>No</td>
<td>N/A</td>
<td>Comment</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------------------------------</td>
<td>-----</td>
<td>----</td>
<td>-----</td>
<td>---------</td>
</tr>
<tr>
<td>If an Oracle Exadata Database Machine will be connected to other Oracle racks using the InfiniBand network, then have a Sun Datacenter InfiniBand Switch 36 (spine switch) and cables been ordered?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is the rack installation an addition to an existing system? If yes, refer to the Oracle Exadata Database Machine Extending and Multi-Rack Cabling Guide for cabling information.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Has the multi-rack cabling service been purchased and the correct networking components been ordered?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are all Oracle Exadata Database Machine racks adjacent to each other?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>System Components Checklist Items</td>
<td>Yes</td>
<td>No</td>
<td>N/A</td>
<td>Comment</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------------------------------</td>
<td>-----</td>
<td>----</td>
<td>-----</td>
<td>---------</td>
</tr>
<tr>
<td>If the connecting racks are not within the specified proximity, then have the following been done:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Purchased approved longer InfiniBand cables from an approved third-party provider?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Asked Oracle Support Services to provide and schedule the custom multi-rack cabling service with the installation?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Will the Ethernet switch be replaced? If yes, has the customer arranged for the replacement switch installation?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Will additional equipment be attached to or installed in the rack? If so, ensure that the additional equipment falls within Oracle guidelines and sufficient power and cooling exist for it.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# A.2 Data Center Room Checklist

Use this checklist to ensure that the data center room requirements have been addressed.

<table>
<thead>
<tr>
<th>Data Center Room Checklist Items</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Has the rack location been allocated and is vacant?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the floor layout meet the equipment maintenance access requirements?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Will the rack be positioned so that the exhaust air of one rack does not enter the air inlet of another rack?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have cabinet stabilization measures been considered?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>If the data center has a raised floor:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Does the raised floor satisfy the weight requirements for the new hardware?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Is permission required to remove floor tiles for cabling and servicing below the floor?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Data Center Environment Checklist

Use this checklist to ensure that the data center environment requirements have been addressed.

<table>
<thead>
<tr>
<th>Data Center Environment Considerations</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does the computer room air conditioning meet temperature and humidity requirements?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the installation floor layout satisfy the ventilation requirements?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Related Topics:
- [Space Requirements](#) (page 1-28)
- [Flooring Requirements](#) (page 1-34)
- [Stabilize Oracle Exadata Rack with Leveling Feet](#) (page 4-7)
## Data Center Environment Considerations

<table>
<thead>
<tr>
<th>If the room cooling is from a raised floor, then:</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Are the perforated floor tiles each rated at 400 CFM or greater?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Can additional perforated floor tiles be obtained if required for additional cooling?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the data center air conditioning provide sufficient front-to-back airflow?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is airflow adequate to prevent hot spots?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can the data center continuously satisfy the environmental requirements?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Related Topics:**

- [Temperature and Humidity Requirements](#) (page 1-44)
- [Ventilation and Cooling Requirements](#) (page 1-45)
  Always provide adequate space in front and behind the rack to allow for proper ventilation.
- [General Environmental Requirements](#) (page 1-1)

### A.4 Access Route Checklist

Use this checklist to ensure that the access route requirements are addressed.
<table>
<thead>
<tr>
<th>Access Route Considerations</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>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?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimensions of the packaged rack:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Height: 2159 mm (85 inches)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Width: 1219 mm (48 inches)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Depth: 1575 mm (62 inches)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimensions of the unpackaged rack:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Height: 1998 mm (78.66 inches)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Width: 600 mm with side panels (23.62 inches)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Depth 1200 mm (47.24 inches)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are there any stairs, ramps, or thresholds that are of concern? If yes, then provide details.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are all access route incline angles within the permitted range (6 degrees)?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is the access route free of any obstacles that would expose the equipment to shock?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Access Route Considerations</td>
<td>Yes</td>
<td>No</td>
<td>N/A</td>
<td>Comment</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------------------------</td>
<td>-----</td>
<td>----</td>
<td>-----</td>
<td>---------</td>
</tr>
<tr>
<td>Are all the surfaces acceptable for rolling the new unpacked and packed equipment?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>If a pallet jack is to be used:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Can the pallet jack support the weight of the rack?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Are the pallet jack tines compatible with the shipping pallet?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>If there are stairs, is a loading elevator available for the equipment?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>If an elevator is to be used:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Is the elevator car wide enough for the device to be carried into it?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Is the elevator car high enough for the device to be carried into it?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Does the elevator door meet the height requirement?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Can the elevator car handle the weight of a fully-loaded rack?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Access Route Considerations

<table>
<thead>
<tr>
<th>Access Route Considerations</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Can the access route support the weight of the unpacked rack?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is the access route onto the raised floor rated for dynamic loading of the rack?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Related Topics:**
- [Table: Access Route Requirements](page 1-33)
- [Table: Rack Weights for Oracle Exadata Database Machine](page 1-29)
- [Table: Rack Weights for Oracle Exadata Storage Expansion Rack](page 1-31)
- [Flooring Requirements](page 1-34)

### A.5 Facility Power Checklist

Use this checklist to ensure that the facility power requirements have been addressed.

<table>
<thead>
<tr>
<th>Facility Power Considerations</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have the operating voltage and electric current requirements listed in &quot;Electrical Power Requirements (page 1-34)&quot; been reviewed?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Will single-phase (low-voltage or high-voltage) or 3-phase (low-voltage or high-voltage) power be used?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are enough power outlets provided within 2 meters for each rack?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Facility Power Considerations</td>
<td>Yes</td>
<td>No</td>
<td>N/A</td>
<td>Comment</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-----</td>
<td>----</td>
<td>-----</td>
<td>---------</td>
</tr>
<tr>
<td>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.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Will optional ground cables be attached to the rack?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are the circuit breakers for the equipment suitable in terms of voltage and current-carrying capacities?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the power frequency meet the equipment specifications?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are power outlets available for the new equipment at the designated location?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Will system power be delivered from two separate grids?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is there a UPS to power the equipment?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>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.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
A.6 Safety Checklist

Use this checklist to ensure that the safety requirements have been addressed.

<table>
<thead>
<tr>
<th>Safety Checklist Considerations</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is there an emergency power shut off?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is there a fire protection system in the data center room?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is the computer room adequately equipped to extinguish a fire?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is antistatic flooring installed?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is the area below the raised floor free of obstacles and blockages?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Related Topics:
- Temperature and Humidity Requirements (page 1-44)

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.

<table>
<thead>
<tr>
<th>Logistics Checklist Considerations</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is contact information for the data center personnel available?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Logistics Checklist Considerations</td>
<td>Yes</td>
<td>No</td>
<td>N/A</td>
<td>Comment</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------------------------------</td>
<td>-----</td>
<td>----</td>
<td>-----</td>
<td>---------</td>
</tr>
<tr>
<td>Is there security or access control for the data center?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>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.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>How many days in advance must background checks be completed?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are there any additional security access issues?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is computer room access available for installation personnel?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are laptops allowed in the data center?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are cell phones allowed in the data center?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are cameras allowed in the data center?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the building have a delivery dock?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is there a delivery/unpacking/staging area?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Logistics Checklist Considerations</td>
<td>Yes</td>
<td>No</td>
<td>N/A</td>
<td>Comment</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>-----</td>
<td>----</td>
<td>-----</td>
<td>---------</td>
</tr>
<tr>
<td>Is inside delivery planned (direct to the final rack location in the data center room)?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>If the delivery is not inside, then is the site prepared for uncrating?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is the delivery/unpacking/staging area protected from the elements?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the building have adequate receiving space?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is the unpacking area air-conditioned to avoid thermal shock for various hardware components?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Will sufficient moving personnel be available to transport the rack?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(If applicable to your country) Is union labor required for any part of the delivery or installation?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is the site prepared for uncrating and packaging removal? Package removal should take place outside the data center room.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Logistics Checklist Considerations</td>
<td>Yes</td>
<td>No</td>
<td>N/A</td>
<td>Comment</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>-----</td>
<td>----</td>
<td>-----</td>
<td>---------</td>
</tr>
<tr>
<td>Is uncrating of cabinet and cabinet packaging removal required?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are there any restrictions on delivery truck length, width or height?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>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?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is there a time constraint on dock access? If yes, please provide time constraints.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is a tail or side lift required on the delivery carrier to unload the equipment at the delivery dock?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Will any special equipment be required to place the rack in the data center room? Examples:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Stair walkers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Lifters</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Ramps</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Steel plates</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Floor covers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Logistics Checklist

<table>
<thead>
<tr>
<th>Considerations</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does the delivery carrier require any special equipment, such as non-floor damaging rollers, transport dollies, pallet jacks or fork lifts?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Related Topics:**
- **Space Requirements** (page 1-28)

## A.8 Network Configuration Checklist

Use this checklist to ensure that the network configuration requirements have been addressed.

<table>
<thead>
<tr>
<th>Considerations</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Were any conflicts found while running the <code>checkip.sh</code> script before connecting the network? See &quot;Default IP Addresses (page 2-20)&quot; for information on the script.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Will the required network cables be laid from the network equipment to the location where the Oracle Exadata Rack will be installed?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Will the network cables that will connect to the Oracle Exadata Rack be labeled?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Network Configuration Considerations

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Will the 10 GbE or 25 GbE interfaces be used for the client access network?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have the optional 10 GbE or 25 GbE SFP+ transceivers and appropriate fiber cables been ordered?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Will the Cisco Ethernet switch have IP routing disabled (recommended)?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Related Topics:**
- Understanding the Network Requirements for Oracle Exadata Database Machine (page 2-1)

## A.9 Auto Service Request Checklist

Use this checklist if you are planning to use Auto Service Request with the Oracle Exadata Database Machine.

<table>
<thead>
<tr>
<th>Auto Service Request Considerations</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does the customer have a My Oracle Support account to register Auto Service Request?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is the Oracle Support Customer Support Identifier (CSI) number available?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Auto Service Request Considerations

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are the host name and IP address for the server where ASR Manager will be installed available?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Will the system need a proxy server? If so, what is the host name and IP address for the proxy server?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>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.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**See Also:**

"Understanding Auto Service Request" in the *Oracle Exadata Database Machine Maintenance Guide*

---

### A.10 Reracking Checklists

Reracking of Oracle Exadata Database Machine Half Rack or Oracle Exadata Database Machine Quarter Rack is allowed when the customer site requires a specialized infrastructure.

Use these checklists prior to reracking Oracle Exadata Database Machine configurations approved for rerack by Oracle Exadata Configuration Assistant (OECA).
**Note:**

- Customer must purchase both the Oracle Reracking Service and Oracle Installation Service.
- Oracle does not provide support for customer-supplied equipment.

<table>
<thead>
<tr>
<th>Reracking Considerations</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Has the customer purchased the Oracle Reracking Service?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>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?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is the target rack empty?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Please attach pictures of the target rack (inside and outside).</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reracking Considerations</td>
<td>Yes</td>
<td>No</td>
<td>N/A</td>
<td>Comment</td>
</tr>
<tr>
<td>----------------------------------------------------------------------------------------</td>
<td>-----</td>
<td>----</td>
<td>-----</td>
<td>---------</td>
</tr>
<tr>
<td>Do the target rack dimensions meet the following requirements?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Height: 42 RU</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Width: 600 mm (23.62 inches)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Depth: 1112 mm (43.78 inches) without front and rear doors</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>If the rack is less than 42 RU, then the rack must be at least 30 RU tall and the customer must provide compatible PDUs to install in the target rack.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>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)?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>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)?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reracking Considerations</td>
<td>Yes</td>
<td>No</td>
<td>N/A</td>
<td>Comment</td>
</tr>
<tr>
<td>--------------------------</td>
<td>-----</td>
<td>----</td>
<td>-----</td>
<td>---------</td>
</tr>
<tr>
<td>Does the target rack meet the following minimum load capacity?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 19 kg (41.89 lb) / RU</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 785 kg (1730.63 lb) total</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is the rack a four-post rack (mounting at both front and rear)?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Note:</strong> Two-post racks are not compatible.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the target rack’s horizontal opening and unit vertical pitch conform to ANSI/EIA 310-D-1992 or IEC 60297 standards?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the target rack have RETMA rail support?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Note:</strong> Oracle Exadata Rack requires 19 inches (483 mm) for RETMA rail spacing width. The minimum rack width of 600 mm (23.63 inches) is recommended to accommodate the PDU and cable harnesses on the side. If the rack is less than 600 mm wide, then it must have additional depth to accommodate mounting behind the server CMAs.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reracking Considerations</td>
<td>Yes</td>
<td>No</td>
<td>N/A</td>
<td>Comment</td>
</tr>
<tr>
<td>-----------------------------------------------------------------------------------------</td>
<td>-----</td>
<td>----</td>
<td>-----</td>
<td>---------</td>
</tr>
<tr>
<td>Does the target rack support Oracle cable management arms (CMAs)?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the target rack support installation of Oracle vented and solid filler panels?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can the target rack provide tie-downs along the left rear side of the rack to support the InfiniBand cables? The side is left rear side when viewed from the front of the rack.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can the target rack provide tie-downs for the Ethernet wiring harness?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is there sufficient space for the cable harnesses and the PDUs in the target rack?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can a label with the Oracle Exadata Rack serial number be printed and attached to the target rack?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The following checklist is specific to the power distribution units (PDUs) when using the reracking service.
<table>
<thead>
<tr>
<th>PDU Reracking Considerations</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does the target rack support installation of standard Oracle PDUs? If not, then complete this checklist.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can the customer provide an equivalent pair of PDUs?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can the customer provide two PDUs with capacity of 10 kVA per PDU?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can the customer provide at least 17 x 10A C13 plugs per PDU?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can the customer provide a single PDU and its circuits to support the Oracle Exadata Rack power requirements in case one PDU fails?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can the customer ensure power loads are evenly distributed across all circuits of a single PDU?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can the customer provide appropriate power drops for the PDUs?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**A.10.1 Recycling the Racks**

Use this checklist when recycling the rack.
<table>
<thead>
<tr>
<th>Recycling Considerations</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does the customer want Oracle to take back and recycle the empty rack?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>If yes, then the Oracle service engineer can pack the empty rack for recycling.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>If Oracle is recycling the rack, then has the customer completed the appropriate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>application at the Oracle Hardware Take Back Program website?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Related Topics:**

- Product Take Back and Recycling website
Database High Availability Checklist

Use this checklist to ensure the requirements for high availability are met for Oracle Exadata Database Machine.

<table>
<thead>
<tr>
<th>Database High Availability Considerations</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have high redundancy disk groups been configured for best protection against different storage failures and corruptions?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you have a bonded network for client access?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Will the pre-optimized and configured database be used after deployment?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have you reviewed the Oracle Exadata Storage Server Software patching overview and patch testing guidelines in My Oracle Support note 1262380.1?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have you reviewed the Oracle Exadata Storage Server Software Maximum Availability Architecture (MAA) Web site for post-deployment steps to achieve MAA?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Database High Availability Considerations

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Will you use Oracle Exadata Database Machine health check after deployment? The health check is available from My Oracle Support note 1070954.1.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Will you follow Oracle Exadata Database Machine monitoring best practices available in My Oracle Support note 1920255.1?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have you reviewed the recommended software for Oracle Exadata Database Machine in My Oracle Support note 888828.1?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have you reviewed Oracle Exadata Database Machine best practices in My Oracle Support note 757552.1?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Related Topics:

- *Oracle Database High Availability Overview*
- Exadata Patching Overview and Patch Testing Guidelines (My Oracle Support Doc ID 1262380.1)
- Oracle Maximum Availability Architecture website
- Oracle Exadata Database Machine exachk or HealthCheck (My Oracle Support Doc ID 1070954.1)
- Exadata Health and Resource Usage Monitoring White Paper (My Oracle Support Doc ID 1920255.1)
- Exadata Database Machine and Exadata Storage Server Supported Versions (My Oracle Support Doc ID 888828.1)
- Oracle Exadata Best Practices (My Oracle Support Doc ID 757552.1)
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