

Oracle® Database Appliance X9-2

Service Manual



F59494-02
August 2022



Oracle Database Appliance X9-2 Service Manual,

F59494-02

Copyright © 2022, Oracle and/or its affiliates.

Primary Author: Ralph Woodley

This software and related documentation are provided under a license agreement containing restrictions on use and disclosure and are protected by intellectual property laws. Except as expressly permitted in your license agreement or allowed by law, you may not use, copy, reproduce, translate, broadcast, modify, license, transmit, distribute, exhibit, perform, publish, or display any part, in any form, or by any means. Reverse engineering, disassembly, or decompilation of this software, unless required by law for interoperability, is prohibited.

The information contained herein is subject to change without notice and is not warranted to be error-free. If you find any errors, please report them to us in writing.

If this is software or related documentation that is delivered to the U.S. Government or anyone licensing it on behalf of the U.S. Government, then the following notice is applicable:

U.S. GOVERNMENT END USERS: Oracle programs (including any operating system, integrated software, any programs embedded, installed or activated on delivered hardware, and modifications of such programs) and Oracle computer documentation or other Oracle data delivered to or accessed by U.S. Government end users are "commercial computer software" or "commercial computer software documentation" pursuant to the applicable Federal Acquisition Regulation and agency-specific supplemental regulations. As such, the use, reproduction, duplication, release, display, disclosure, modification, preparation of derivative works, and/or adaptation of i) Oracle programs (including any operating system, integrated software, any programs embedded, installed or activated on delivered hardware, and modifications of such programs), ii) Oracle computer documentation and/or iii) other Oracle data, is subject to the rights and limitations specified in the license contained in the applicable contract. The terms governing the U.S. Government's use of Oracle cloud services are defined by the applicable contract for such services. No other rights are granted to the U.S. Government.

This software or hardware is developed for general use in a variety of information management applications. It is not developed or intended for use in any inherently dangerous applications, including applications that may create a risk of personal injury. If you use this software or hardware in dangerous applications, then you shall be responsible to take all appropriate fail-safe, backup, redundancy, and other measures to ensure its safe use. Oracle Corporation and its affiliates disclaim any liability for any damages caused by use of this software or hardware in dangerous applications.

Oracle, Java, and MySQL are registered trademarks of Oracle and/or its affiliates. Other names may be trademarks of their respective owners.

Intel and Intel Inside are trademarks or registered trademarks of Intel Corporation. All SPARC trademarks are used under license and are trademarks or registered trademarks of SPARC International, Inc. AMD, Epyc, and the AMD logo are trademarks or registered trademarks of Advanced Micro Devices. UNIX is a registered trademark of The Open Group.

This software or hardware and documentation may provide access to or information about content, products, and services from third parties. Oracle Corporation and its affiliates are not responsible for and expressly disclaim all warranties of any kind with respect to third-party content, products, and services unless otherwise set forth in an applicable agreement between you and Oracle. Oracle Corporation and its affiliates will not be responsible for any loss, costs, or damages incurred due to your access to or use of third-party content, products, or services, except as set forth in an applicable agreement between you and Oracle.

Contents

Preface

Audience	v
Documentation Accessibility	v
Related Documents	v
Conventions	vi

1 Overview of System Status Indicators and LEDs

Oracle Database Appliance X9-2S/X9-2L Status Indicators	1-1
Oracle Database Appliance X9-2S/X9-2L Server Status Indicators	1-1
Server Front Panel Status Indicators	1-1
Server Back Panel Status Indicators	1-5
Oracle Database Appliance X9-2-HA Status Indicators	1-7
Oracle Database Appliance X9-2-HA Server Node Status Indicators	1-7
Server Node Front Panel Status Indicators	1-7
Server Node Back Panel Status Indicators	1-9
Oracle Database Appliance X9-2-HA Storage Shelf Indicators	1-12
Storage Shelf Front Panel Status Indicators	1-13
Storage Shelf Back Panel Status Indicators	1-14

2 Preparing Oracle Database Appliance for Service

Preparing Oracle Database Appliance X9-2 Series for Service	2-1
---	-----

3 Servicing CRUs That Do Not Require System Power Off

Oracle Database Appliance X9-2 Server Hot-Pluggable Components	3-1
Servicing NVMe Storage Drives (CRU)	3-2
Replacing an NVMe Storage Drive	3-3
Adding NVMe Expansion Storage	3-5
Oracle Database Appliance X9-2-HA Storage Shelf Hot Pluggable Components	3-6
Adding Optional Storage Shelf Drives (CRU)	3-6
Replace a Storage Shelf HDD or SSD (CRU)	3-10

Replace a Storage Shelf Power Supply (CRU)	3-12
Replace a Storage Shelf I/O Module (CRU)	3-14

4 Servicing CRUs That Require System Power Off

Servicing Oracle Database Appliance X9-2 Series CRUs	4-1
Adding Optional Public Network PCIe Cards (CRU)	4-2

5 Servicing FRUs

Servicing Oracle Database Appliance X9-2 Series FRUs	5-1
Component Fault Management	5-2

6 Returning Oracle Database Appliance to Operation

Returning Oracle Database Appliance X9-2 Series to Operation	6-1
Powering On Oracle Database Appliance X9-2-HA	6-2

7 Server Node Diagnostic Tools and Resetting the Service Processor

Server Node Diagnostic Tools	7-1
Resetting the Service Processor	7-2

8 Server Basic Input/Output System (BIOS)

Oracle Database Appliance X9-2 Series BIOS Utility	8-1
Setting Up BIOS Configuration Parameters	8-2
BIOS Setup Utility Menu Options	8-2

Index

Preface

This guide provides instructions for servicing the Oracle Database Appliance.

- [Audience](#)
- [Documentation Accessibility](#)
- [Related Documents](#)
- [Conventions](#)

Audience

This document is intended for technicians, system administrators, and authorized service providers responsible for installing the Oracle Database Appliance.

Documentation Accessibility

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

Access to Oracle Support

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

Related Documents

For more information about Oracle Database Appliance, go to <http://www.oracle.com/goto/oda/docs> and click the appropriate release. The following documents are published in the Oracle Database Appliance online documentation library:

- *Oracle Database Appliance Release Notes*
- *Oracle Database Appliance Licensing Information User Manual*
- *Oracle Database Appliance Security Guide*
- *Oracle Database Appliance Accessibility Guide*
- *Oracle Database Appliance Deployment and User's Guide (model-specific)*
- *Oracle Database Appliance Owner's Guide*
- *Oracle Database Appliance Service Manual*

Conventions

The following text conventions are used in this document:

Convention	Meaning
boldface	Boldface type indicates graphical user interface elements associated with an action or terms defined in the text.
<i>italic</i>	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.
monospace	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.
# prompt	The pound (#) prompt indicates a command that is run as the root user.

1

Overview of System Status Indicators and LEDs

Learn about various Oracle Database Appliance model indicators and LEDs.



Note:

For information about system features and racking, refer to the *Oracle Database Appliance Owner's Guide*. For information about cabling, Oracle ILOM initial setup, and appliance software setup, refer to the *Oracle Database Appliance Deployment and User's Guide* for your model.

- [Oracle Database Appliance X9-2S/X9-2L Status Indicators](#)
Learn about Oracle Database Appliance X9-2S/X9-2L status indicators.
- [Oracle Database Appliance X9-2-HA Status Indicators](#)
Learn about Oracle Database Appliance X9-2-HA status indicators.

Oracle Database Appliance X9-2S/X9-2L Status Indicators

Learn about Oracle Database Appliance X9-2S/X9-2L status indicators.

- [Oracle Database Appliance X9-2S/X9-2L Server Status Indicators](#)
See a description of the front and back status indicators for the Oracle Database Appliance X9-2S/X9-2L.

Oracle Database Appliance X9-2S/X9-2L Server Status Indicators

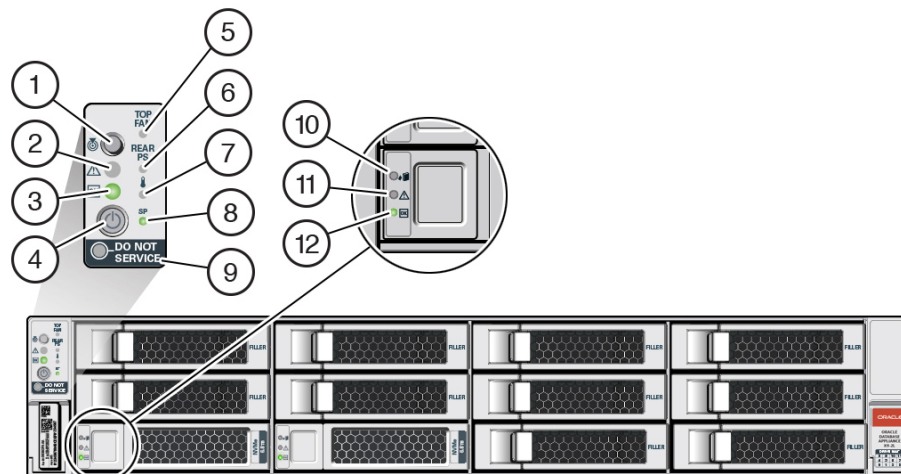
See a description of the front and back status indicators for the Oracle Database Appliance X9-2S/X9-2L.

- [Server Front Panel Status Indicators](#)
See a listing of the various front panel status indicators for the Oracle Database Appliance X9-2S/X9-2L.
- [Server Back Panel Status Indicators](#)
See a listing of the various back panel status indicators for the Oracle Database Appliance X9-2S/X9-2L.

Server Front Panel Status Indicators

See a listing of the various front panel status indicators for the Oracle Database Appliance X9-2S/X9-2L.

The following figure shows the Oracle Database Appliance X9-2S/X9-2L server front panel includes indicators for the system and storage drives.



Callout	Indicator/LED: Color	State Meaning
1	Locate: white	<ul style="list-style-type: none"> Off - Normal operation. Fast blink - This LED blinks to help locate the system. Operators can turn this indicator on and off remotely using Oracle ILOM. Pressing this button toggles the fast blink on or off.
2	Service Required: amber	<ul style="list-style-type: none"> Off - Normal operation. On - A fault is present in the server node. <p>The lighting of this indicator is always accompanied by a system console message that includes a recommended service action.</p>

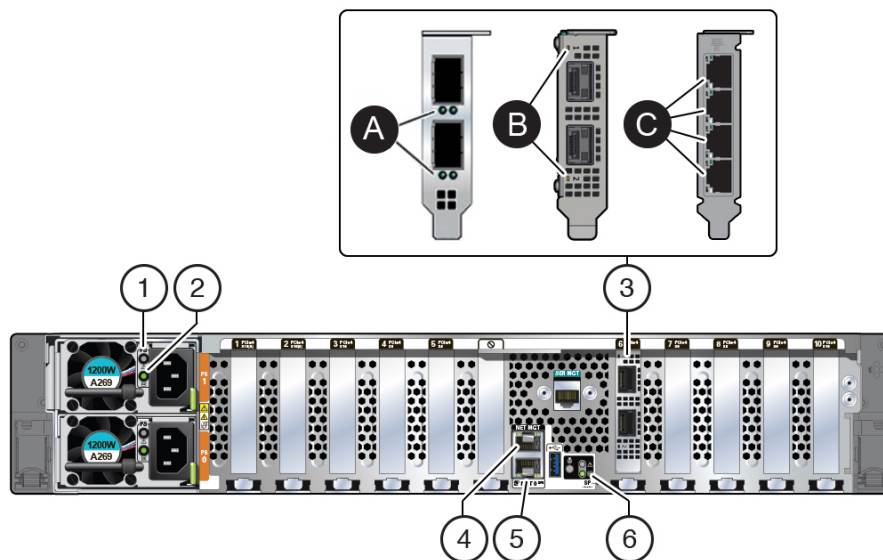
Callout	Indicator/LED: Color	State Meaning
3	OK: green	<p>Indicates the operational state of the server node:</p> <ul style="list-style-type: none"> • Off - AC power is either not present or the Oracle ILOM service processor (SP) boot process is not complete. • Steady blink - Standby power is on and the Oracle ILOM SP is running, but the server host power is off. • Slow blink - Startup/shutdown sequence has been initiated on the server host. During startup, the power-on self tests are running on the system. During shutdown, the server host is shutting down and transitioning from full power to standby power. • On - The server host is powered on and is in the process of booting or is running the operating system.
4	Power button	<p>Press to apply full power and start the server host. Press again to transition from full power to standby power where only the Oracle ILOM SP is running.</p>
5	Top fan: amber	<p>Indicates that one (or more) of the internal fan modules has failed.</p> <ul style="list-style-type: none"> • Off - Indicates steady state; no service is required. • On - Indicates service required; service the failed fan module.
6	Rear PS: amber	<p>Indicates that one (or more) of the power supplies has failed.</p> <ul style="list-style-type: none"> • Off - Indicates steady state; no service is required. • On - Indicates service required; service the failed power supply.

Callout	Indicator/LED: Color	State Meaning
7	Over temperature warning: amber	<ul style="list-style-type: none"> Off - Normal operation; no service is required. On - The system is experiencing an over temperature warning condition. <p>This is a warning indication, not a fatal over temperature. Failure to correct this condition might result in the system overheating and shutting down unexpectedly.</p>
8	Service processor (SP): green	<ul style="list-style-type: none"> Off - The service processor (SP) is not running. On - The SP is fully operational. Slow blink - SP is booting.
9	DO NOT SERVICE: white	<p>Indicates that the system is not ready to service.</p> <ul style="list-style-type: none"> Off - Normal operation. On - The system is not ready for service. <p>The DO NOT SERVICE indicator is application specific. This indicator is only illuminated on demand by the Host application.</p>
10	Drive Ready-to-Remove: blue	<ul style="list-style-type: none"> Off - The storage drive has not been prepared for removal. On - The storage drive can be removed safely during a hot-plug operation.
11	Drive Service Required: amber	<ul style="list-style-type: none"> Off - The storage drive is operating normally. On - The system has detected a fault with the storage drive.
12	Drive OK: green	<ul style="list-style-type: none"> Off - Power is off or the installed drive is not recognized by the system. On - The drive is engaged and is receiving power. Random blink - There is disk activity. The indicator blinks on and off to indicate activity.

Server Back Panel Status Indicators

See a listing of the various back panel status indicators for the Oracle Database Appliance X9-2S/X9-2L.

The following figure shows the Oracle Database Appliance X9-2S/X9-2L server back panel and includes indicators for the system, power supplies and network ports.



Callout	Indicator/LED: Color	State Meaning
1	PS Service Required: amber	<ul style="list-style-type: none"> Off - Normal operation. On - The power supply (PS) has detected a PS fan failure, PS overtemperature, PS over current, or PS over or under voltage.
2	PS OK: green	<ul style="list-style-type: none"> Off - No AC power is present. On - Normal operation. Input AC power and DC output voltage are within specification. Slow blink - Normal operation. Input power is within specification. DC output voltage is not enabled.

Callout	Indicator/LED: Color	State Meaning
3	<ul style="list-style-type: none"> 3a. Oracle Dual Port 25 Gb Ethernet Adapter, Broadcom, SFP28 ports: green/yellow --or-- 3b. Oracle Dual Port 25 Gb Ethernet Adapter, Mellanox, SFP28 ports: green/amber --or-- 3c. Oracle Quad Port 10GBase-T Adapter RJ-45 ports: green/yellow 	<p>Oracle Dual Port 25 Gb Ethernet Adapter, Broadcom. Each of the two ports has:</p> <ul style="list-style-type: none"> Left activity indicator: <ul style="list-style-type: none"> Off - No activity. Flashing - Packet activity. Right link indicator: <ul style="list-style-type: none"> Off - No function. Green On - 25GbE link. Yellow On - 10GbE link. <p>Oracle Dual Port 25 Gb Ethernet Adapter, Mellanox. Each port has one bi-colored status LED:</p> <ul style="list-style-type: none"> Off - No link. Solid green - Valid link. Flashing green - Link with packet activity. Blinking amber (4Hz) - Problem with the link. <p>Oracle Quad Port 10GBase-T Adapter. Each of the four ports has:</p> <ul style="list-style-type: none"> Top activity indicator: <ul style="list-style-type: none"> Off - No activity. Flashing - Packet activity. Bottom link indicator: <ul style="list-style-type: none"> Off - 100 Mb link. Green On - 10GbE link. Yellow On - 1GbE link.
4	NET MGT port: green	<p>10/100/1000 BASE-T Ethernet management interface.</p> <p>Top left speed indicator:</p> <ul style="list-style-type: none"> Off - 10/100BASE-T link. On - Green for 1000Base-T link. <p>Top right activity indicator:</p> <ul style="list-style-type: none"> Off - No link or link down. On - Link up. Blinking - Packet activity.
5	NET 0 port: green	<p>10/100/1000 BASE-T Ethernet interface.</p> <p>Bottom left activity indicator:</p> <ul style="list-style-type: none"> Off - No link or link down. On - Link up. Blinking - Packet activity. <p>Bottom right link indicator:</p> <ul style="list-style-type: none"> Off - 10/100BASE-T link. On - 1000Base-T link.

Callout	Indicator/LED: Color	State Meaning
6	System locate, service required and OK: various	These operate in the same way as on the front panel.

Oracle Database Appliance X9-2-HA Status Indicators

Learn about Oracle Database Appliance X9-2-HA status indicators.

- [Oracle Database Appliance X9-2-HA Server Node Status Indicators](#)
See a description of the Oracle Database Appliance X9-2-HA server node front and back status indicators.
- [Oracle Database Appliance X9-2-HA Storage Shelf Indicators](#)
See a description of the front and back Oracle Database Appliance X9-2-HA storage shelf status indicators.

Oracle Database Appliance X9-2-HA Server Node Status Indicators

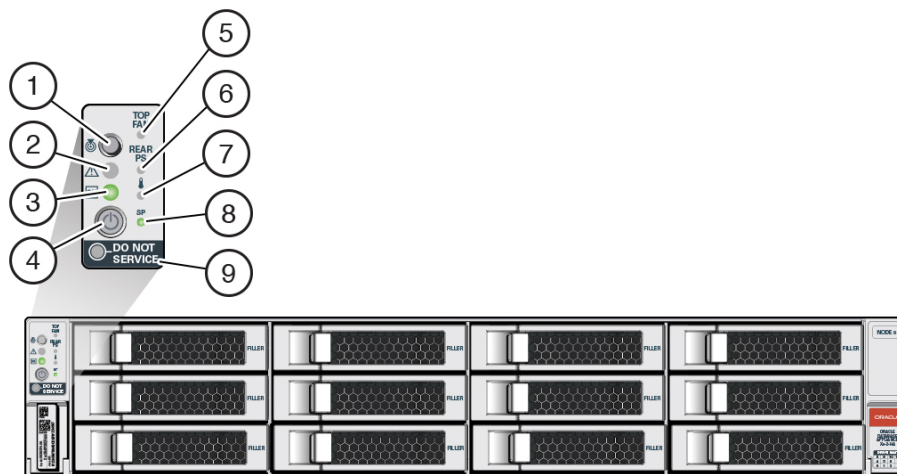
See a description of the Oracle Database Appliance X9-2-HA server node front and back status indicators.

- [Server Node Front Panel Status Indicators](#)
See a listing of the various front panel status indicators for the Oracle Database Appliance X9-2-HA server node.
- [Server Node Back Panel Status Indicators](#)
See a listing of the various back panel status indicators for the Oracle Database Appliance X9-2-HA server node.

Server Node Front Panel Status Indicators

See a listing of the various front panel status indicators for the Oracle Database Appliance X9-2-HA server node.

The following figure shows the Oracle Database Appliance X9-2-HA server node front panel and includes indicators for the system.



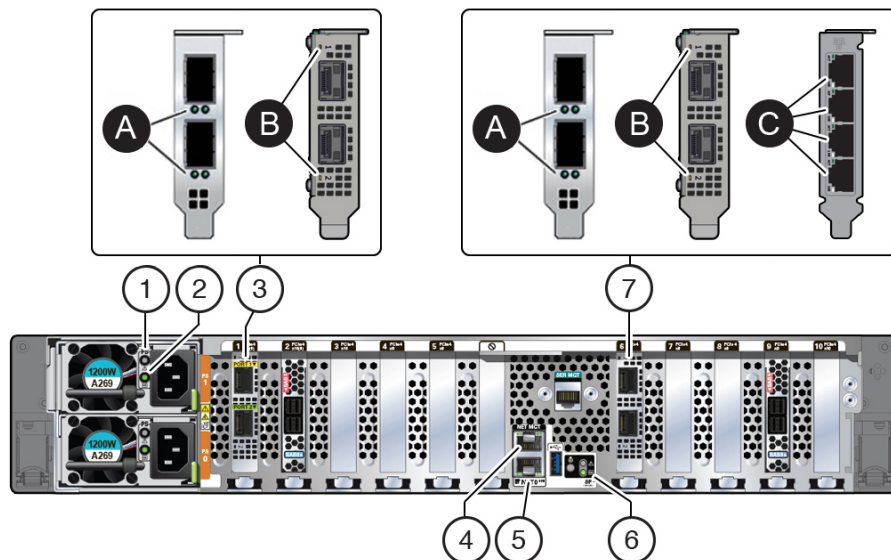
Callout	Indicator/LED: Color	State Meaning
1	Locate: white	<ul style="list-style-type: none"> Off - Normal operation. Fast blink - This LED blinks to help locate the system. Operators can turn this indicator on and off remotely using Oracle ILOM. Pressing this button toggles the fast blink on or off.
2	Service Required: amber	<ul style="list-style-type: none"> Off - Normal operation. On - A fault is present in the server node. <p>The lighting of this indicator is always accompanied by a system console message that includes a recommended service action.</p>
3	OK: green	<p>Indicates the operational state of the server node:</p> <ul style="list-style-type: none"> Off - AC power is either not present or the Oracle ILOM service processor (SP) boot process is not complete. Steady blink - Standby power is on and the Oracle ILOM SP is running, but the server host power is off. Slow blink - Startup/shutdown sequence has been initiated on the server host. During startup, the power-on self tests are running on the system. During shutdown, the server host is shutting down and transitioning from full power to standby power. On - The server host is powered on and is in the process of booting or is running the operating system.
4	Power button	<p>Press to apply full power and start the server host. Press again to transition from full power to standby power where only the Oracle ILOM SP is running.</p>

Callout	Indicator/LED: Color	State Meaning
5	Top fan: amber	<p>Indicates that one (or more) of the internal fan modules has failed.</p> <ul style="list-style-type: none"> Off - Indicates steady state; no service is required. On - Indicates service required; service the failed fan module.
6	Rear PS: amber	<p>Indicates that one (or more) of the power supplies has failed.</p> <ul style="list-style-type: none"> Off - Indicates steady state; no service is required. On - Indicates service required; service the failed power supply.
7	Over temperature warning: amber	<ul style="list-style-type: none"> Off - Normal operation; no service is required. On - The system is experiencing an over temperature warning condition. <p>This is a warning indication, not a fatal over temperature. Failure to correct this condition might result in the system overheating and shutting down unexpectedly.</p>
8	Service processor (SP): green	<ul style="list-style-type: none"> Off - The service processor (SP) is not running. On - The SP is fully operational. Slow blink - SP is booting.
9	DO NOT SERVICE: white	<p>Indicates that the system is not ready to service.</p> <ul style="list-style-type: none"> Off - Normal operation. On - The system is not ready for service. <p>The DO NOT SERVICE indicator is application specific. This indicator is only illuminated on demand by the Host application.</p>

Server Node Back Panel Status Indicators

See a listing of the various back panel status indicators for the Oracle Database Appliance X9-2-HA server node.

The following figure shows the Oracle Database Appliance X9-2-HA server node back panel and includes indicators for the system, power supplies and network ports.



Callout	Indicator/LED: Color	State Meaning
1	PS Service Required: amber	<ul style="list-style-type: none"> Off - Normal operation. On - The power supply (PS) has detected a PS fan failure, PS overtemperature, PS over current, or PS over or under voltage.
2	PS OK: green	<ul style="list-style-type: none"> Off - No AC power is present. On - Normal operation. Input AC power and DC output voltage are within specification. Slow blink - Normal operation. Input power is within specification. DC output voltage is not enabled.

Callout	Indicator/LED: Color	State Meaning
3	<ul style="list-style-type: none"> 3a. Oracle Dual Port 25 Gb Ethernet Adapter, Broadcom. Private cluster interconnect SFP28 PORT 1 and 2: green/yellow --or-- 3b. Oracle Dual Port 25 Gb Ethernet Adapter, Mellanox. Private cluster interconnect SFP28 PORT 1 and 2: green/amber 	<p>Oracle Dual Port 25 Gb Ethernet Adapter, Broadcom. Each of the two ports has:</p> <ul style="list-style-type: none"> Left activity indicator: <ul style="list-style-type: none"> Off - No activity. Flashing - Packet activity. Right link indicator: <ul style="list-style-type: none"> Off - No function. Green On - 25GbE link. Yellow On - 10GbE link. <p>Oracle Dual Port 25 Gb Ethernet Adapter, Mellanox. Each port has one bi-colored status LED:</p> <ul style="list-style-type: none"> Off - No link. Solid green - Valid link. Flashing green - Link with packet activity. Blinking amber (4Hz) - Problem with the link.
4	NET MGT port: green	<p>10/100/1000 BASE-T Ethernet management interface.</p> <p>Top left speed indicator:</p> <ul style="list-style-type: none"> Off - 10/100BASE-T link. On - Green for 1000Base-T link. <p>Top right activity indicator:</p> <ul style="list-style-type: none"> Off - No link or link down. On - Link up. Blinking - Packet activity.
5	NET 0 port: green	<p>10/100/1000 BASE-T Ethernet interface.</p> <p>Top right speed indicator:</p> <ul style="list-style-type: none"> Off - 10/100BASE-T link. On - Green for 1000Base-T link. <p>Top left link indicator:</p> <ul style="list-style-type: none"> Off - No link or link down. On - Link up. Blinking - Packet activity.
6	System locate, service required and OK: various	These operate in the same way as on the front panel.

Callout	Indicator/LED: Color	State Meaning
7	<ul style="list-style-type: none"> 3a. Oracle Dual Port 25 Gb Ethernet Adapter, Broadcom, SFP28 ports: green/yellow --or-- 3b. Oracle Dual Port 25 Gb Ethernet Adapter, Mellanox, SFP28 ports: green/amber --or-- 3c. Oracle Quad Port 10GBase-T Adapter RJ-45 ports: green/yellow 	<p>Oracle Dual Port 25 Gb Ethernet Adapter, Broadcom. Each of the two ports has:</p> <ul style="list-style-type: none"> Left activity indicator: <ul style="list-style-type: none"> Off - No activity. Flashing - Packet activity. Right link indicator: <ul style="list-style-type: none"> Off - No function. Green On - 25GbE link. Yellow On - 10GbE link. <p>Oracle Dual Port 25 Gb Ethernet Adapter, Mellanox. Each port has one bi-colored status LED:</p> <ul style="list-style-type: none"> Off - No link. Solid green - Valid link. Flashing green - Link with packet activity. Blinking amber (4Hz) - Problem with the link. <p>Oracle Quad Port 10GBase-T Adapter. Each of the four ports has:</p> <ul style="list-style-type: none"> Top activity indicator: <ul style="list-style-type: none"> Off - No activity. Flashing - Packet activity. Bottom link indicator: <ul style="list-style-type: none"> Off - 100 Mb link. Green On - 10GbE link. Yellow On - 1GbE link.

Oracle Database Appliance X9-2-HA Storage Shelf Indicators

See a description of the front and back Oracle Database Appliance X9-2-HA storage shelf status indicators.

- [Storage Shelf Front Panel Status Indicators](#)
See a listing of the various front panel status indicators for the Oracle Database Appliance X9-2-HA storage shelf.
- [Storage Shelf Back Panel Status Indicators](#)
See a listing of the various back panel status indicators for the Oracle Database Appliance X9-2-HA storage shelf.

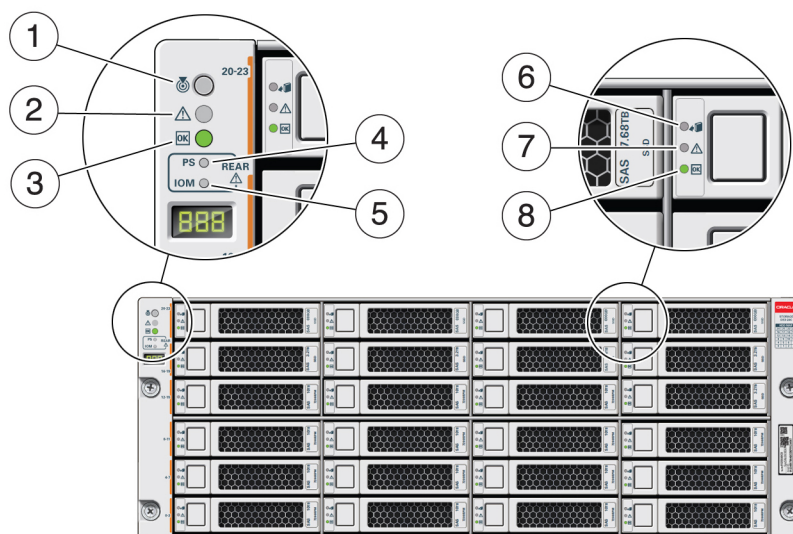
Storage Shelf Front Panel Status Indicators

See a listing of the various front panel status indicators for the Oracle Database Appliance X9-2-HA storage shelf.

The following figure shows the controls and indicators on the for the Oracle Database Appliance X9-2-HA storage shelf (DE3-24C) front panel and drives.

 **Note:**

The 2 or 3 character LED enclosure ID display panel on the front of the storage shelf is not used with the Oracle Database Appliance product. Any numbers or letters displayed in this panel other than zeros could indicate a fault with either the panel, its cabling (neither of which are customer replaceable), or some other storage shelf component.



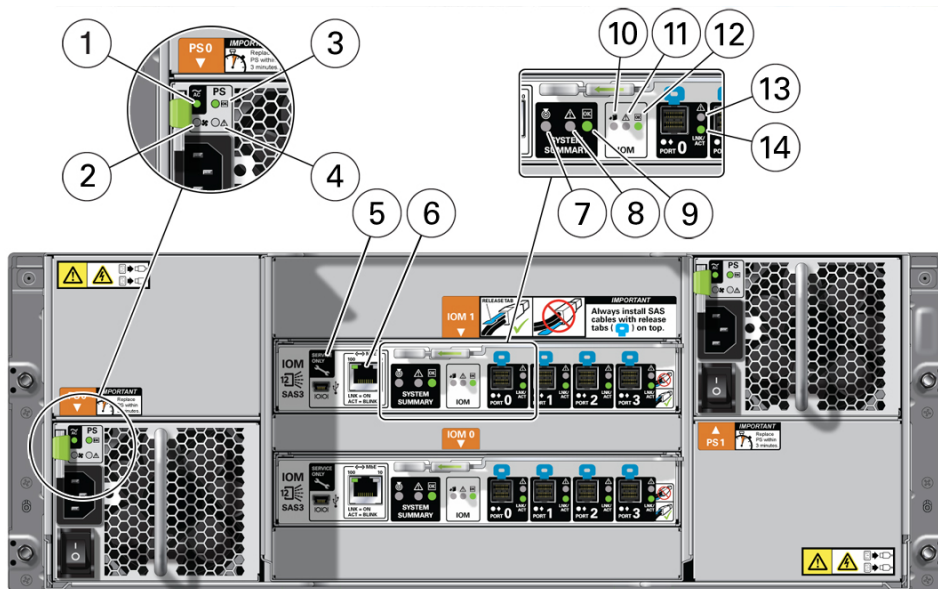
Callout	Indicator/LED: Color	State Meaning
1	Locate: white	<ul style="list-style-type: none"> Off - Normal operation. Fast blink - This LED blinks to help locate the system. Operators can turn this indicator on and off remotely using Oracle ILOM. Pressing this button toggles the fast blink on or off.
2	Service Required: amber	<ul style="list-style-type: none"> Off - Normal operation. Steady on - A fault is present in the storage shelf.

Callout	Indicator/LED: Color	State Meaning
3	OK: green	<ul style="list-style-type: none"> Off - The storage shelf is unplugged or turned off. On - The storage shelf is powered on and operating normally.
4	Power Supply fault indicator: amber	<ul style="list-style-type: none"> Off - Normal operation. On - Indicates a fault with a power supply. View the LEDs at the back of the storage shelf to determine which power supply has the fault.
5	SAS I/O Module fault indicator: amber	<ul style="list-style-type: none"> Off - Normal operation. On - Indicates a fault with a SAS I/O module. View the LEDs at the back of the storage shelf to determine which module has the fault.
6	Ready-to-Remove: blue	<ul style="list-style-type: none"> Off - The storage drive has not been prepared for removal. On - The storage drive can be safely removed during a hot-plug operation.
7	Drive Service Required: amber	<ul style="list-style-type: none"> Off - Normal operation. Steady on - A fault is present in the disk drive.
8	Power/Activity: green	<ul style="list-style-type: none"> Off - The drive is powered off or the installed drive is not recognized by the system. On - The drive is installed and recognized by the system but there is no drive activity. Blink - The LED blinks randomly in response to data being written to or read from the drive.

Storage Shelf Back Panel Status Indicators

See a listing of the various back panel status indicators for the Oracle Database Appliance X9-2-HA storage shelf.

The following figure shows the controls and indicators on the Oracle Database Appliance X9-2-HA storage shelf (DE3-24C) back panel.



Callout	Indicator/LED: Color	State Meaning
1	AC power fault indicator: amber	<ul style="list-style-type: none"> Off - Normal operation. On - Indicates an AC power fault.
2	Fan fail indicator: amber	<ul style="list-style-type: none"> Off - Normal operation. On - The fan is faulty.
3	Power supply status indicator: green	<ul style="list-style-type: none"> Off - The power supply is unplugged or turned off. On - The power supply is operating normally.
4	DC power fail indicator: amber	<ul style="list-style-type: none"> Off - Normal operation. On - The power supply is faulty.
5	Reserved	This port is reserved for Oracle Service.
6	Network port (reserved)	This port is reserved for Oracle Service.
7	Locate: white	<ul style="list-style-type: none"> Off - Normal operation. Fast blink - This LED blinks to help locate the system. Operators can turn this indicator on and off remotely using Oracle ILOM. Pressing this button toggles the fast blink on or off.
8	Service Required: amber	<ul style="list-style-type: none"> Off - Normal operation. Steady on - A fault is present in the storage shelf.
9	OK: green	<ul style="list-style-type: none"> Off - The storage shelf is unplugged or turned off. On - The storage shelf is powered on and operating normally.

Callout	Indicator/LED: Color	State Meaning
10	SAS I/O Module Ready-to-Remove: blue	<ul style="list-style-type: none"> Off - The I/O module has not been prepared for removal. On - The I/O module can be safely removed during a hot-plug operation.
11	SAS I/O Module Service Required indicator: amber	<ul style="list-style-type: none"> Off - Normal operation. Steady on - A fault is present in the SAS I/O module.
12	SAS I/O Module OK: green	<ul style="list-style-type: none"> Off - The I/O module is unplugged or turned off. On - The I/O module is powered on and operating normally.
13	Host SAS port Service Required indicator: amber	<ul style="list-style-type: none"> Off - Normal operation. Steady on - A fault is present with the port or connection.
14	Host SAS port activity indicator: green	<ul style="list-style-type: none"> Off - No link activity. Random blinking - Indicates host SAS link activity.

2

Preparing Oracle Database Appliance for Service

How to prepare the Oracle Database Appliance for servicing.

- [Preparing Oracle Database Appliance X9-2 Series for Service](#)
Learn how to prepare an Oracle Database Appliance X9 series system for service.

Preparing Oracle Database Appliance X9-2 Series for Service

Learn how to prepare an Oracle Database Appliance X9 series system for service.

Most service procedures are performed on a single appliance component. For an Oracle Database Appliance X9-2-HA, service procedures that require a single server node to be powered off can be performed without shutting down the entire appliance. Before powering off any component for service, refer to the *Deployment and User's Guide* for the Oracle Database Appliance X9 series for any special instructions or commands that must be performed on the appliance to prepare it for service.



Note:

The links in the following table take you to instructions **outside** of the Oracle Database Appliance library to the Oracle Server X9-2L documentation library. Use your browser's Back button to return to the Oracle Database Appliance library.

Oracle Database Appliance X9-2S/X9-2L	Oracle Database Appliance X9-2-HA
Safety Precautions	Safety Precautions
Safety Symbols	Safety Symbols
Electrostatic Discharge Safety	Electrostatic Discharge Safety
Required Tools	Required Tools
Powering Down the Server (only required when replacing non-hot plug components)	Powering Down a Server Node (only required when replacing non-hot plug components)
Disconnect Cables From the Server	Disconnect Cables From the Server
Extend the Server to the Maintenance Position	Extend the Server to the Maintenance Position
Remove the Server From the Rack (if required)	Remove the Server From the Rack (if required)
Take Antistatic Measures	Take Antistatic Measures
Remove the Server Top Cover	Remove the Server Top Cover

3

Servicing CRUs That Do Not Require System Power Off

Perform tasks for servicing hot plug components in the Oracle Database Appliance.

Hot-pluggable components can be replaced with the system powered on.

Note:

Hot-pluggable components can also be replaced with the system powered off. If you choose this method, first power off the system as described in [Preparing Oracle Database Appliance for Service](#).

- [Oracle Database Appliance X9-2 Server Hot-Pluggable Components](#)
Provides instructions on how to perform hot plug tasks on an Oracle Database Appliance server.
- [Oracle Database Appliance X9-2-HA Storage Shelf Hot Pluggable Components](#)
Perform hot plug tasks on an Oracle Database Appliance storage shelf.

Oracle Database Appliance X9-2 Server Hot-Pluggable Components

Provides instructions on how to perform hot plug tasks on an Oracle Database Appliance server.

This section describes how to service customer-replaceable components that do not require server power off for an Oracle Database Appliance X9-2S/X9-2L server or X9-2-HA server node.

Note:

In certain storage expansion scenarios (explained in the following procedures), adding optional storage might require that the appliance be powered off.

If you are servicing storage shelf hot plug components, see [Oracle Database Appliance Storage Shelf Hot-Pluggable Components](#).

Hot-pluggable components are those that can be removed and installed while the system is running. These are designated as Customer Replaceable Units (CRUs).

 **Note:**

After a physical insertion or removal action of a storage component (such as a disk or SAS cable), you should wait before performing the next action to allow the system software to fully process the event. This could take up to 3 minutes to complete.

For instructions on servicing NVMe front-mounted storage devices, see [Servicing NVMe Storage Drives \(CRU\)](#). Note that front mounted storage drives are **not** supported in the Oracle Database Appliance X9-2-HA server nodes.

Caution: An NVMe drive must first be powered off before removal. If you do not power off the NVMe drive before removal you can crash the operating system. Oracle Database Appliance uses special commands to remove or add NVMe storage.

Refer to the following table for hot-plug component instructions for your appliance.

 **Note:**

Some of the links in the following table take you to instructions *outside* of the Oracle Database Appliance library to the Oracle Server X9-2L documentation library. Use your browser's Back button to return to the Oracle Database Appliance library.

Oracle Database Appliance X9-2S/X9-2L	Oracle Database Appliance X9-2-HA
Servicing NVMe Storage Drives (CRU) Caution: An NVMe drive must first be powered off before removal. If you do not power off the NVMe drive before removal you can crash the operating system. Oracle Database Appliance uses special commands to remove or add NVMe storage.	Front mounted storage drives are not supported in the server nodes for this product.
Servicing Internal M.2 Flash SSDs (CRU)	Servicing Internal M.2 Flash SSDs (CRU)
Servicing Fan Modules (CRU)	Servicing Fan Modules (CRU)
Servicing Power Supplies (CRU)	Servicing Power Supplies (CRU)

- [Servicing NVMe Storage Drives \(CRU\)](#)
Perform tasks for servicing front-mounted NVMe drives in an Oracle Database Appliance X9-2S/X9-2L system. The Oracle Database Appliance X9-2-HA does not support front-mounted drives in server nodes.

Servicing NVMe Storage Drives (CRU)

Perform tasks for servicing front-mounted NVMe drives in an Oracle Database Appliance X9-2S/X9-2L system. The Oracle Database Appliance X9-2-HA does not support front-mounted drives in server nodes.

- [Replacing an NVMe Storage Drive](#)
Replace a front-mounted NVMe drive in an Oracle Database Appliance X9-2S/X9-2L system.
- [Adding NVMe Expansion Storage](#)
Add NVMe storage to an Oracle Database Appliance X9-2L. Note that the Oracle Database Appliance X9-2S does not support additional storage.

Replacing an NVMe Storage Drive

Replace a front-mounted NVMe drive in an Oracle Database Appliance X9-2S/X9-2L system.

Before removing an NVMe drive it must be powered off. After installing an NVMe drive it must be powered on. Failed drives are automatically powered off after 5 minutes.

▲ Caution:

If you remove an NVMe drive without first powering it off, you can crash the operating system. Oracle Database Appliance uses special commands to add or remove NVMe storage.

The instructions describe how to replace an NVMe drive using the `odaadmcli` power on/off commands for an Oracle Database Appliance server.

The `odaadmcli` commands listed here must be run as the root user.

1. Identify the NVMe drive to be replaced. Type the following command at the host:

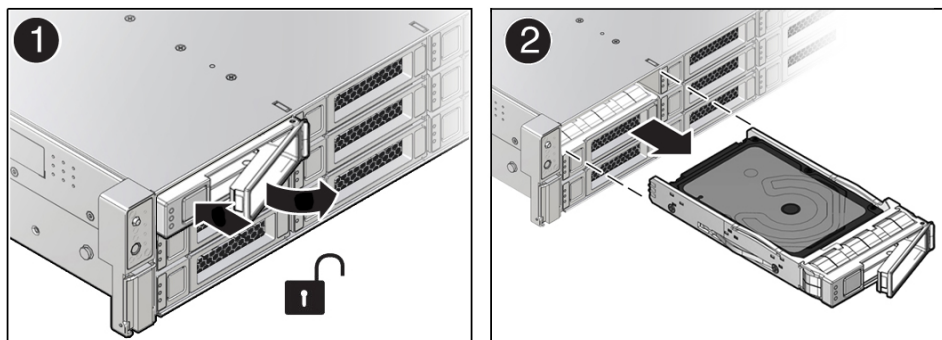
```
# odaadmcli show disk
```

For example, the drive names `pd_00` and `pd_01` are seen by the host as NVMe0 and NVMe1 and correspond to front drive slots 0 and 1, respectively.

2. Unmount and power off the drive to be replaced. Do one of the following:
 - a. If you are replacing a failed drive, check to see if its blue ready-to-remove light is lit.
If a drive has failed, it should power off automatically and light its blue ready-to-remove indicator after 5 minutes.
 - b. If the drive being replaced doesn't already have its blue ready-to-remove indicator lit, type the following command from the host to unmount and turn off power to the drive:

```
# odaadmcli power disk off pd_xx
```

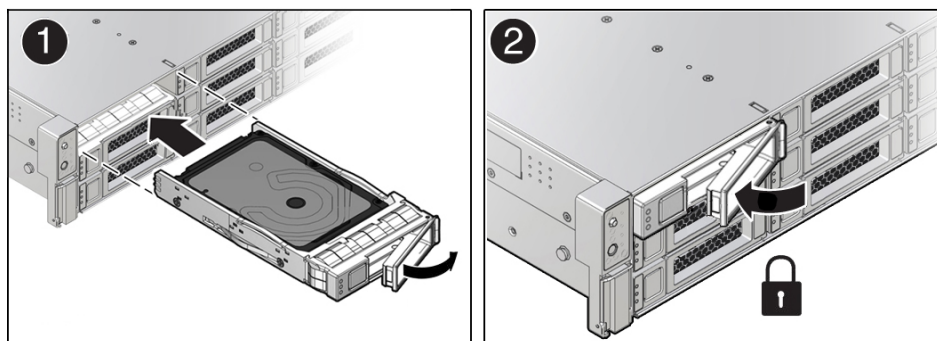
Where `pd_xx` is the name of the disk to be replaced as described in step 1.
Before proceeding to the next step confirm that the blue ready-to-remove indicator on the drive is lit.
3. Push the latch release button on the front of the drive to open the drive latch [1], grasp the latch, and pull the drive out of the drive slot [2] as shown in the following figure.



4. Align the replacement drive with the drive slot.

The drive is physically addressed according to the slot in which it is installed. It is important to install a replacement drive in the same slot as the drive that was removed.

5. With the drive latch in the open position, slide the drive into the slot until the drive is fully seated [1] and then close the drive latch to lock the drive in place [2] as shown in the following figure.



6. Power on and remount the replacement drive. Type the following command from the host:

```
# odaadmcli power disk on pd_xx
```

Where `pd_xx` is the name of the disk being replaced as described in step 1.

It can take a few minutes for the power-on operation to complete. Once complete, the drive's green OK indicator will light.

7. To check the status of the replacement disk, type the following command from the host:

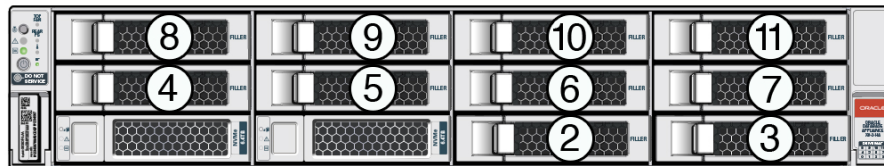
```
# odaadmcli show disk
```

For additional information, refer to the Oracle Database Appliance *Deployment and User's Guide*.

Adding NVMe Expansion Storage

Add NVMe storage to an Oracle Database Appliance X9-2L. Note that the Oracle Database Appliance X9-2S does not support additional storage.

- The **Oracle Database Appliance X9-2L** supports ten expansion slots for NVMe drives. These are slots labeled 2 through 11 as seen from the front of the system (callouts 2 through 11 in the following illustration). Storage drives can be added in sets of two. For information about supported optional storage drives, refer to the *Owner's Guide*.



- When expanding storage, populate slots starting with the lowest numbered available slot (for example, slot 2 as seen on the front panel).
 - The drive power-up and storage expansion `odaadmcli` commands listed here should only be run after all new disk drives have been physically installed. Once you expand storage, you cannot revert to a previous storage configuration (for example, the default installation with only two NVMe drives).
1. Remove the drive filler panel of an unpopulated slot by using your finger to pry open the panel release latch and pulling the filler out of the drive slot.

 **Note:**

Replace filler panels with drives one at a time to ensure proper system cooling.

2. Open the latch of the new drive by pressing the release button on the drive.

 **Caution:**

Do not over-rotate the latch outwards when opening. Doing so can damage it.

3. Insert the new drive by sliding the drive into the slot until the drive is fully seated. Then close the drive latch to lock the drive in place.
4. Repeat steps 1 - 3 for each new drive.

For the **Oracle Database Appliance X9-2L**, the name for these drives to the host will be `pd_02`, `pd_03`, `pd_04`, etc., matching the numbering of their respective drive slots up to `pd_11`.

- Power on each of the new drives by entering the appropriate commands from the host using the following command format:

```
# odaadmcli power disk on pd_##
```

Where ## is the number of the drive being powered on (02 through 11).

It can take a few minutes for the power-on operation to complete. Once complete, the green OK indicators will light for the newly installed drives.

 **Note:**

Do not attempt to power on and expand storage on one new disk and then power on and expand storage on the next new disk. Before you can expand storage, all the new disks must be powered on with their green OK indicators lit.

- Expand the system storage to include the new drives. Type the following command from the host:

```
# odaadmcli expand storage -ndisk number_of_disks
```

Where *number_of_disks* is the number of disks being added. The system will then detect and use the new storage.

For additional information, refer to the Oracle Database Appliance *Deployment and User's Guide*.

Oracle Database Appliance X9-2-HA Storage Shelf Hot Pluggable Components

Perform hot plug tasks on an Oracle Database Appliance storage shelf.

Under most circumstances, Oracle Database Appliance X9-2-HA storage shelf components can all be replaced while the storage shelf is powered-on and running. Any exceptions will be described in the following procedures.

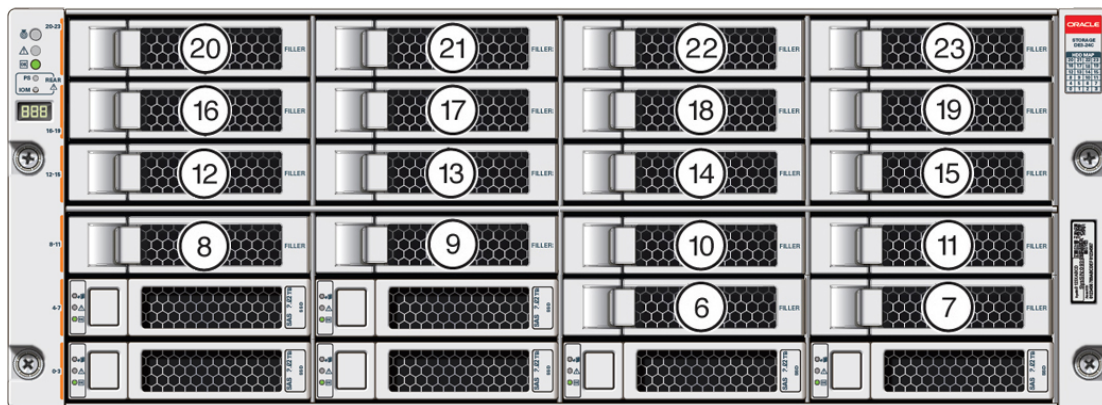
- [Adding Optional Storage Shelf Drives \(CRU\)](#)
Add disk storage in an Oracle Database Appliance X9-2-HA storage shelf.
- [Replace a Storage Shelf HDD or SSD \(CRU\)](#)
Replace a storage disk in an Oracle Database Appliance storage shelf.
- [Replace a Storage Shelf Power Supply \(CRU\)](#)
Replace a power supply in an Oracle Database Appliance storage shelf.
- [Replace a Storage Shelf I/O Module \(CRU\)](#)
Replace an IO module in an Oracle Database Appliance storage shelf.

Adding Optional Storage Shelf Drives (CRU)

Add disk storage in an Oracle Database Appliance X9-2-HA storage shelf.

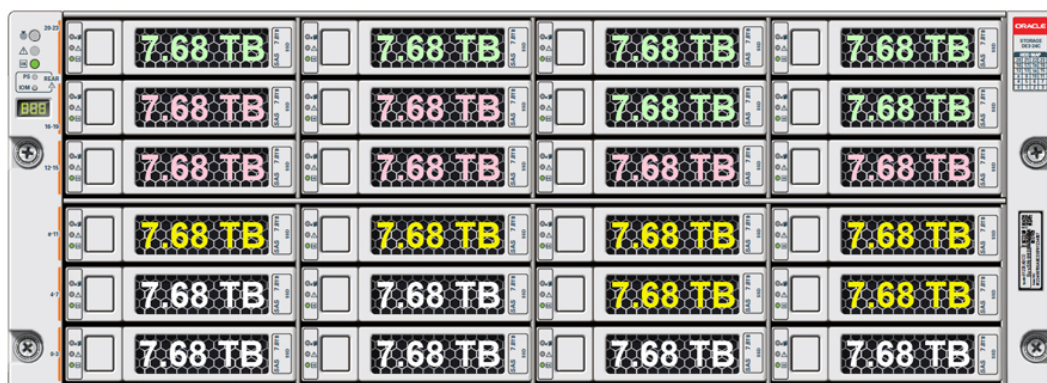
The **Oracle Database Appliance X9-2-HA storage shelf** partially-populated base configuration supports storage expansion with either 7.68 TB SSDs (available in six-packs) or 18 TB HDDs (available in an eighteen-pack). Depending on your initial base

storage shelf configuration, there can be up to eighteen expansion slots. These slots are labeled 6-23 as seen from the front of the system (callouts 6 through 23 in the following illustration).



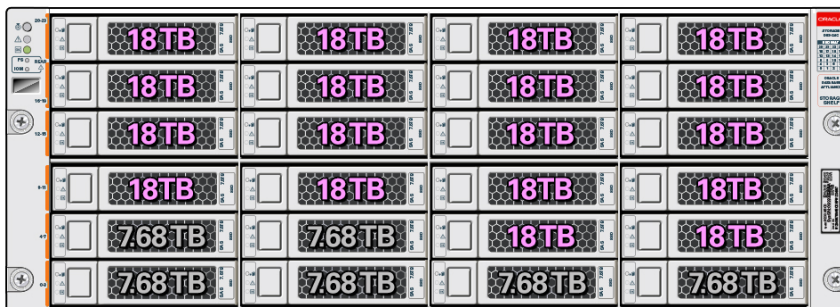
- Upgrade options:
 - **For a high performance shelf**, you can add up to eighteen 7.68 TB SSDs (available in six-packs). You can add storage with the system running and use the appliance CLI software commands to expand the storage configuration.
 - **For a high capacity shelf**, you can add eighteen 18 TB HDDs (available in an eighteen-pack). You must power off the appliance, add storage, then re-image and redeploy the appliance software. This is required to reconfigure the appliance from the default high performance mode to high capacity mode.
- **Expanding the base configuration storage shelf with 7.68 TB SSDs for high performance.** The base configuration has slots 0-5 with 7.68 TB drives for DATA/RECO. Expansion SSDs are available in six-packs and are populated in shelf storage slots from the bottom up to also be used for DATA/RECO, as follows:
 - The first six expansion drives go into slots 6-11.
 - The second six expansion drives go into slots 12-17.
 - The third six expansion drives go into slots 18-23.

The following illustration shows the expanded drive configuration for 7.68 TB SSDs.



- **Expanding the base configuration storage shelf with 18 TB HDDs for high capacity.** When expanding the storage shelf with HDDs, the base configurations SSDs will be used for FLASH and the HDDs will be used for DATA/RECO. Expansion HDDs are available in an eighteen-pack and populate the empty shelf storage slots (slots 6-23).

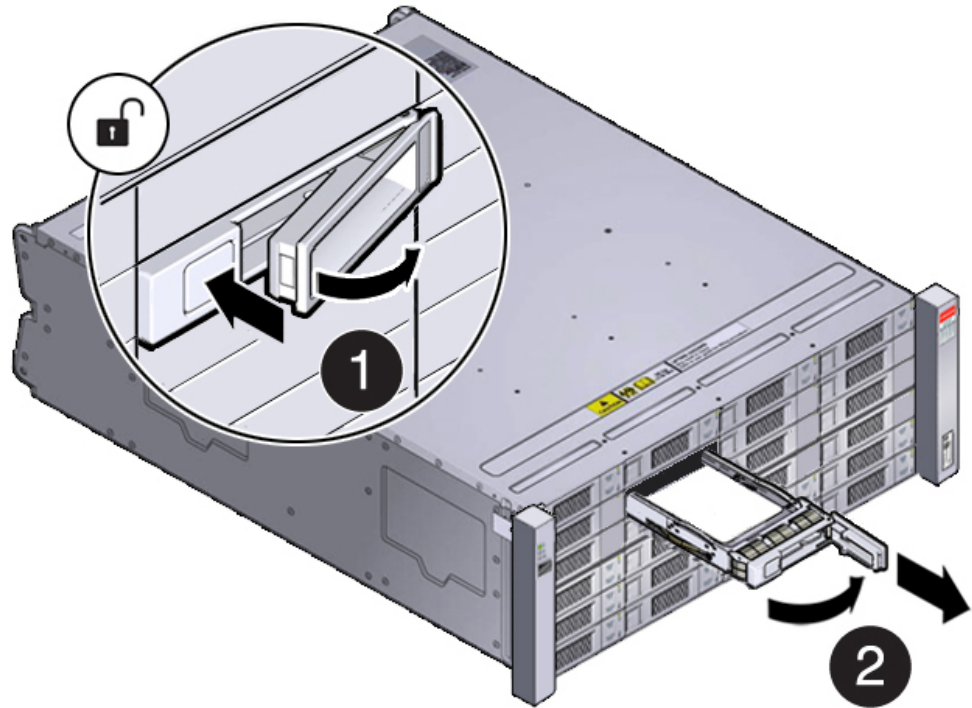
The following illustration shows the expanded drive configuration for 18 TB HDDs.



- Once you expand storage to support additional disks, you cannot revert to the base configuration (no drives in slots 6-23).
 - If you plan on adding another storage shelf, it must be populated identically to your first storage shelf.
 - The `odaadmcli` commands listed here must be run as the root user.
1. Do one of the following:
 - If you are adding 7.68 TB SSDs to the storage shelf, leave the appliance powered on and proceed to the next step.
 - If you are adding 18 TB HDDs to the storage shelf, power off the appliance and proceed to the next step.
 2. To install the new drives into the storage shelf, do the following:
 - a. Remove one of the empty slot drive filler panels by pressing its release button [1] and removing it from the drive slot [2] as shown in the following figure.

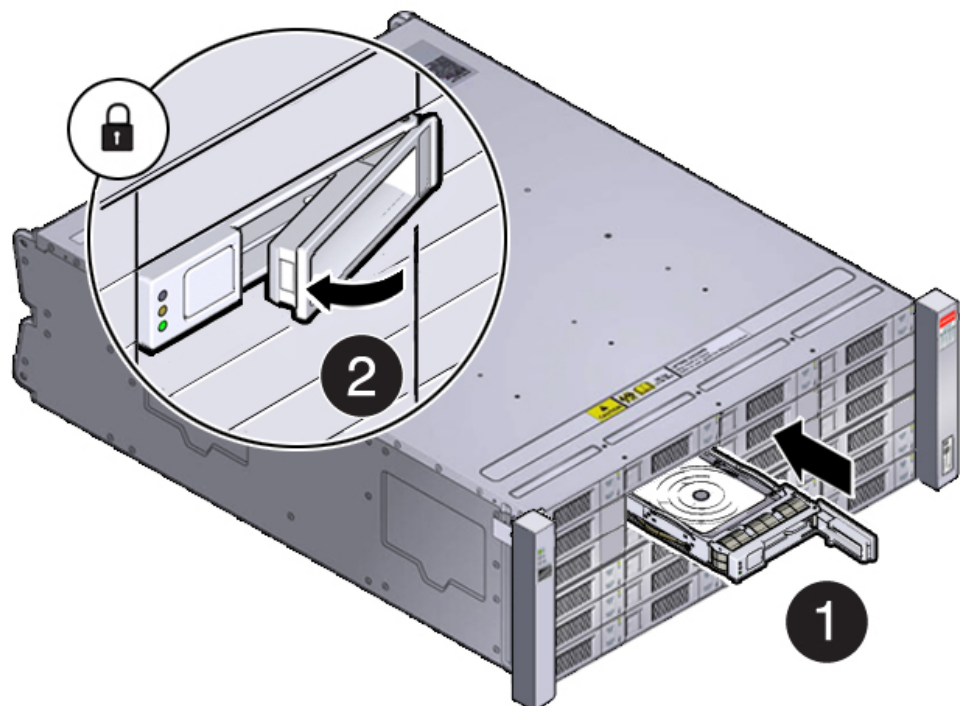
 **Note:**

Replace filler panels with drives one at a time to ensure proper storage shelf chassis cooling.



- b. Open the drive lever of the new drive by pressing the release button on the drive.
- c. Slide the new drive into the drive slot [1] until it engages with the backplane connector and then close the lever to fully seat the drive and lock it into place [2] as shown in the following figure.

Check that the drive is locked in place and flush with the other drives.



- d. Repeat steps a through c until all of the new drives are installed in the storage shelf.
3. Do one of the following:
 - If you added 7.68 TB SSDs to the storage shelf, check that the OK indicator on each new drive is steady green to indicate that it is ready. Then expand the system storage to include the new drives by typing the following command from the primary server node (node 0):

```
# odaadmcli expand storage -ndisk number_of_disks -
enclosure 0
```

Where *number_of_disks* is the number of disks being added. The system will then detect and use the new storage. It can take up to 12 minutes to update the configuration. For additional storage commands, refer to the *Deployment and User's Guide*.

- If you added 18 TB HDDs to the storage shelf, power on the appliance, then re-image and redeploy the appliance software as described in the *Deployment and User's Guide*.
4. If you are also adding a storage expansion shelf (can only be added to a system with an identically and fully populated storage shelf), you can do so after successfully completing the previous step.

Refer to the Oracle Database Appliance *Owner's Guide* for information on installing a storage expansion shelf into a rack.

Refer to the Oracle Database Appliance *Deployment and User's Guide* for information on cabling and storage expansion commands for a storage expansion shelf.

Replace a Storage Shelf HDD or SSD (CRU)

Replace a storage disk in an Oracle Database Appliance storage shelf.

Note:

After a physical insertion or removal action of a storage component (such as a disk or SAS cable), you should wait before performing the next action to allow the system software to fully process the event. This could take several minutes to complete.

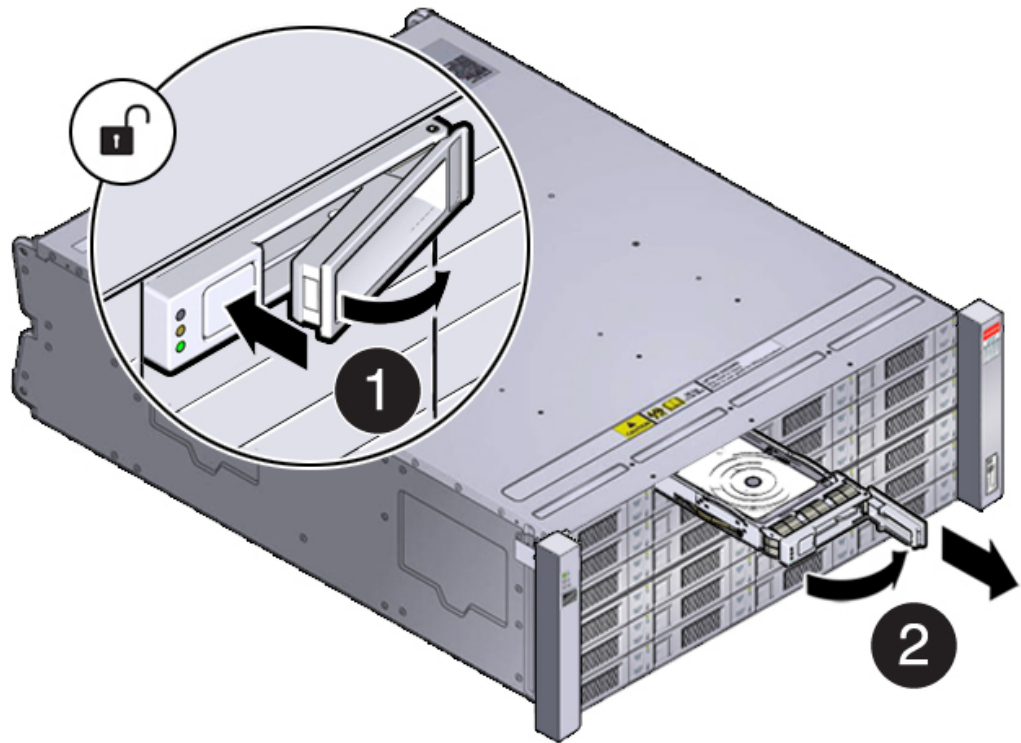
1. Locate the failed drive on the front of the storage shelf.

Look for the drive with its Service Required indicator and/or Ready-to-Remove indicator lit.

Caution:

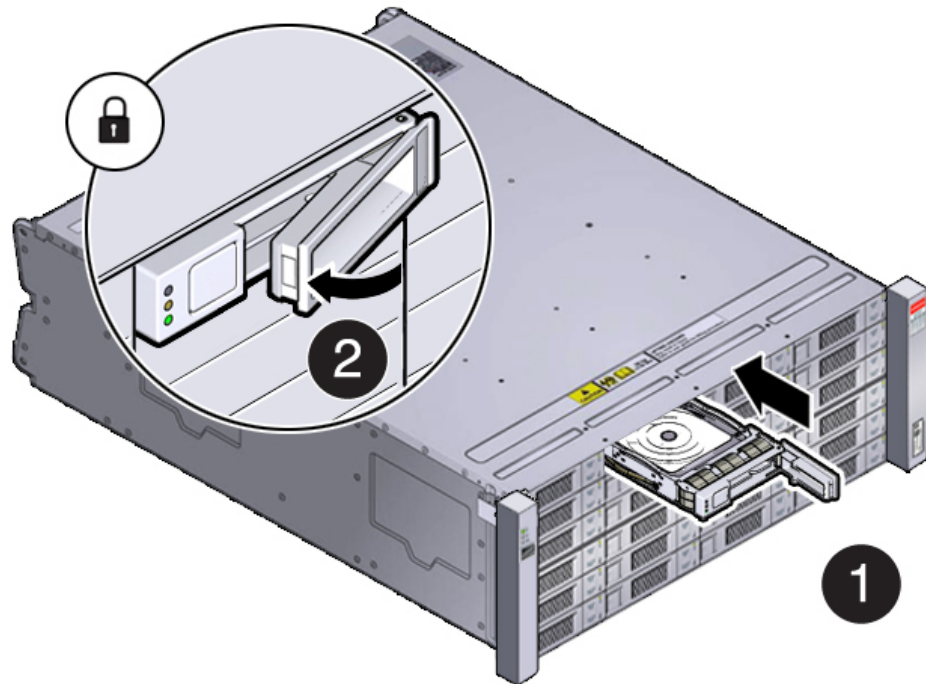
Equipment damage. Do not remove a drive unless you have an immediate replacement.

2. Remove the drive by pressing the release button [1] to release the drive lever and then, rotate the lever open and, grasping the drive body, slide the drive out of the storage shelf [2] as shown in the following figure.



3. Install the replacement drive by opening the drive lever on the replacement drive. Slide the new drive into the drive slot [1] until it engages with the backplane connector and then close the lever to fully seat the drive and lock it into place [2] as shown in the following figure.

Check that the drive is locked in place and flush with the other drives.



4. Once installed, the system should automatically detect and use the replacement drive. Ensure that the green OK indicator for the replacement drive lights to show that the drive is ready.

This can take a few minutes to complete.

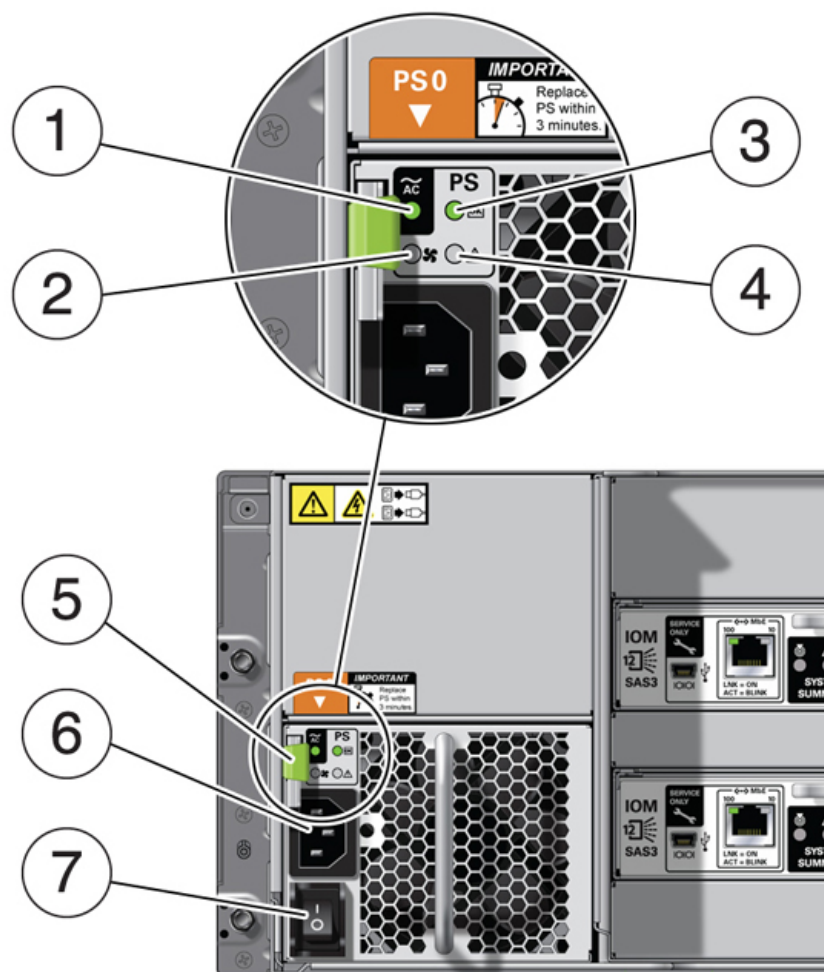
Replace a Storage Shelf Power Supply (CRU)

Replace a power supply in an Oracle Database Appliance storage shelf.

The storage shelf and the storage expansion shelf each have two power supplies. Indicators (LEDs) on the power supplies indicate their operation state.

The power supplies are redundant and one can be replaced while the appliance is running.

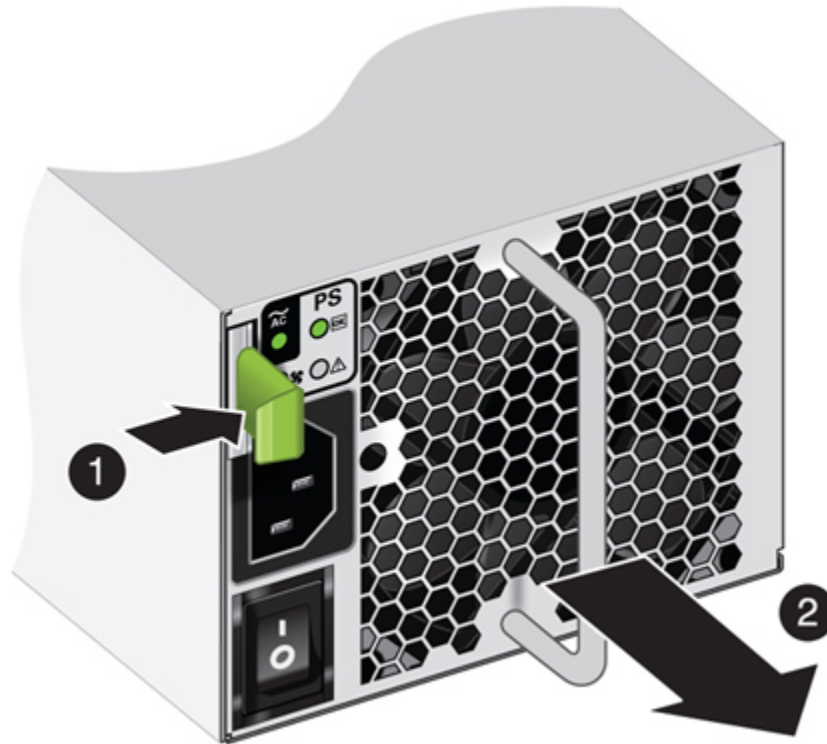
Example figure showing a DE3-24C power supply:



Callout	Description
1	AC power fail indicator
2	Fan fail indicator
3	Power supply status indicator
4	DC power fail indicator
5	Release lever
6	AC connector
7	On/Off switch

If any of the indicators are amber, or if the power supply status indicator does not light, replace the power supply.

1. Ensure the power supply on/off switch is in the "O" off position.
2. Disconnect the power cord tie strap from the power cord, and unplug the power cord from the power supply.
3. Remove the power supply unit by grasping the power supply handle, push the release button [1], and slide the power supply out of the chassis [2] as shown in the following figure.



4. Slide the replacement power supply module into the chassis.
When fully installed, you should hear a click of the release lever returning to the locked position.
5. Plug the power cord into the new power supply and attach the power cord tie strap to the power cord.
6. Place the power supply on/off switch to the "I" on position.
The Power/OK status LED should be a steady green, and all other indicators should be off.

Replace a Storage Shelf I/O Module (CRU)

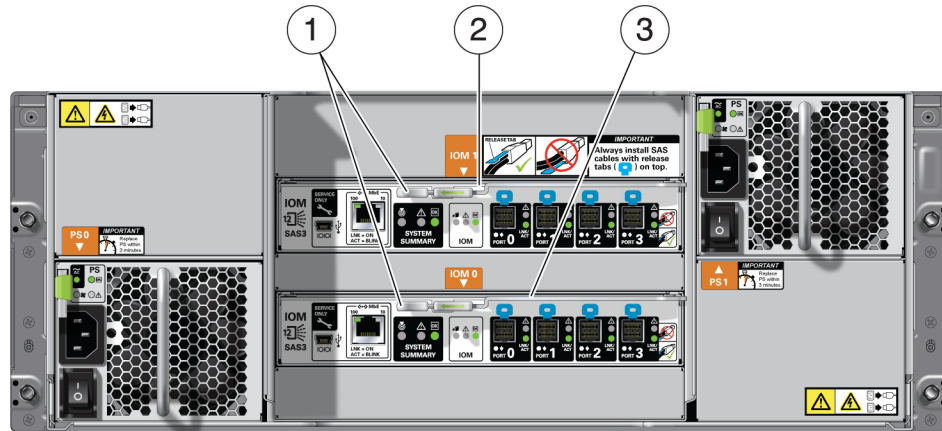
Replace an IO module in an Oracle Database Appliance storage shelf.

Storage Shelf SAS I/O modules are fully redundant and can be replaced while the appliance is running.

 **Note:**

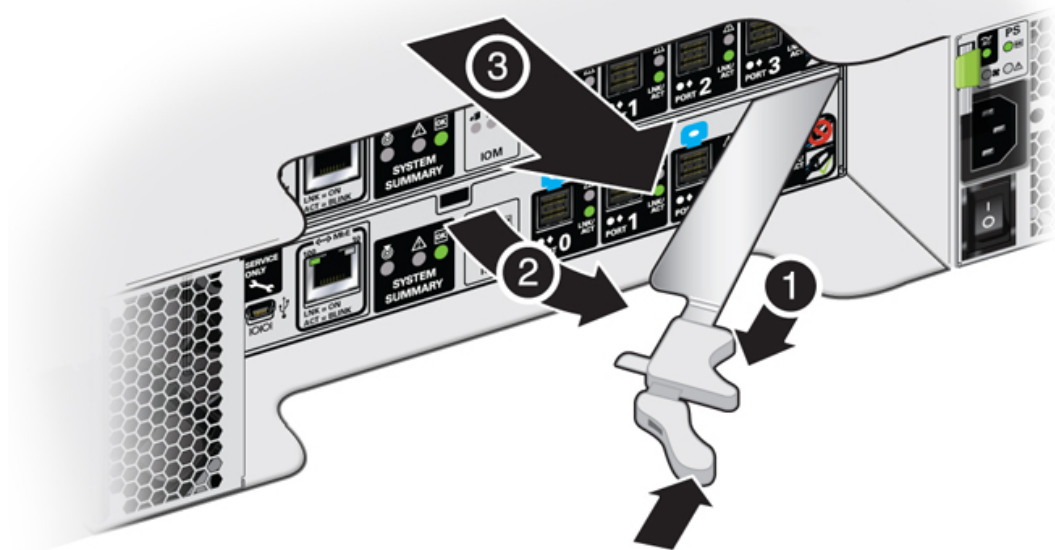
After a physical insertion or removal action of a storage component (such as a disk or SAS cable), you should wait before performing the next action to allow the system software to fully process the event. This could take up to 3 minutes to complete.

Example figure showing the DE3-24C:



Callout	Description
1	I/O module locking levers
2	I/O module 1 (top)
3	I/O module 0 (bottom)

1. Disconnect the cables from the I/O module. Be sure to mark the cables so you can return them to their proper connectors.
2. Remove the I/O module using your thumb and forefinger, pinch the release buttons [1] together to release the locking lever [2] as shown in the following figure. Grasp the lever and remove the I/O module from the chassis [3] as shown in the following figure.



3. Open the lever in the new I/O module if it is not already open.

4. Slide the new I/O module into the disk shelf and close the locking lever.

 **Caution:**

Equipment damage. Be careful not to damage the connector pins at the back of the I/O module.

5. Reconnect the cables.
6. Verify that the new I/O module is working correctly.
 - After approximately 60 seconds, the power LED should be solid green and the Fault/Locate LED should be off.
 - For each port that has a cable connected, all four activity LEDs should be solid green.

4

Servicing CRUs That Require System Power Off

Perform tasks for servicing customer-replaceable units (CRUs) for the Oracle Database Appliance that require you to power off system components.



Note:

The servicing of hot-plug components such as the HDDs, SSDs, power supplies, and fans is described in [Servicing CRUs That Do Not Require System Power Off](#).

- [Servicing Oracle Database Appliance X9-2 Series CRUs](#)
Provides instructions on how to perform CRU service tasks requiring system power off.

Servicing Oracle Database Appliance X9-2 Series CRUs

Provides instructions on how to perform CRU service tasks requiring system power off.

This section describes how to service customer-replaceable components that require server power off for an Oracle Database Appliance X9-2 series system.



Note:

For the Oracle Database Appliance X9-2-HA, all of the CRUs on the storage shelf and the storage expansion shelf can be replaced while the power is on. See [Oracle Database Appliance Storage Shelf Hot-Pluggable Components](#) for storage shelf component replacement procedures.



Note:

When adding DIMMs to the system, refer to the "Optional Component Installation" section in the *Owner's Guide* for supported configurations.



Note:

The links in the following table take you to instructions **outside** of the Oracle Database Appliance library to the Oracle Server X9-2L documentation library. Use your browser's Back button to return to the Oracle Database Appliance library.

Oracle Database Appliance X9-2S/X9-2L	Oracle Database Appliance X9-2-HA
CRU List	CRU List
Servicing DIMMs (CRU)	Servicing DIMMs (CRU)
Adding Optional Public Network PCIe Cards (CRU)	Adding Optional Public Network PCIe Cards (CRU)
Servicing PCIe Cards (CRU)	Servicing PCIe Cards (CRU)
	Note: These instructions also apply the factory installed the server node external SAS HBAs.
Servicing the Battery (CRU)	Servicing the Battery (CRU)

- [Adding Optional Public Network PCIe Cards \(CRU\)](#)
 Describes installation sequence for adding optional public network PCIe cards to an Oracle Database Appliance.

Adding Optional Public Network PCIe Cards (CRU)

Describes installation sequence for adding optional public network PCIe cards to an Oracle Database Appliance.

The Oracle Database Appliance X9-2 series systems support up to three optional public network cards (or three network cards per node if you have an X9-2-HA).

- If possible, order any optional public network cards when you initially buy the system and have the cards factory installed.
- If you want to add or replace public network cards after your appliance has been delivered from the factory, the following rules apply:
 - You can install any of the supported network cards listed in the table below.
 - You must install optional network cards in the proper order and slots (refer to the table below).
 - If you want to replace an existing network card, you must first delete the network card and its network interface using the appliance software. Then replace the physical network card with the new one. When the appliance is restarted the new network card will be used. For specific instructions on software removal or configuration of a public network card, refer to the *Deployment and User's Guide*.

 **Note:**

You **cannot** replace the factory installed public network card installed in PCIe slot 6. In addition, for the Oracle Database Appliance X9-2-HA, you **cannot** replace the factory installed cluster interconnect network card installed in PCIe slot 1.

The following table describes the supported network cards and the order in which they can be installed in the system.

Description	Oracle Database Appliance X9-2S	Oracle Database Appliance X9-2L	Oracle Database Appliance X9-2-HA (per node)
Supported public network PCIe cards:	<ul style="list-style-type: none"> • Oracle Dual Port 25 Gb Ethernet Adapter • Oracle Dual Port 100 Gb Ethernet Adapter • Oracle Quad Port 10GBase-T Adapter 	<ul style="list-style-type: none"> • Oracle Dual Port 25 Gb Ethernet Adapter • Oracle Dual Port 100 Gb Ethernet Adapter • Oracle Quad Port 10GBase-T Adapter 	<ul style="list-style-type: none"> • Oracle Dual Port 25 Gb Ethernet Adapter • Oracle Dual Port 100 Gb Ethernet Adapter • Oracle Quad Port 10GBase-T Adapter
Installation order:	<ol style="list-style-type: none"> 1. By default, the server comes with a public network card installed in PCIe slot 6. 2. A second public network card can be installed in PCIe slot 7. 3. A third public network card can be installed in PCIe slot 8. 	<ol style="list-style-type: none"> 1. By default, the server comes with a public network card installed in PCIe slot 6. 2. A second public network card can be installed in PCIe slot 4. 3. A third public network card can be installed in PCIe slot 8. 	<ol style="list-style-type: none"> 1. By default, each server node comes with a public network card installed in PCIe slot 6. 2. A second public network card can be installed in PCIe slot 4. 3. A third public network card can be installed in PCIe slot 8.
Installation intructions:	Servicing PCIe Cards (CRU)	Servicing PCIe Cards (CRU)	Servicing PCIe Cards (CRU)

5

Servicing FRUs

Perform tasks for servicing field-replaceable units (FRUs) for the Oracle Database Appliance that require you to power off the system and/or server node.

When servicing FRU components, the server node and/or system must be powered down and the AC power cords disconnected.



Note:

Only authorized Oracle Service personnel can service FRU components.

- [Servicing Oracle Database Appliance X9-2 Series FRUs](#)
Provides instructions on how to perform FRU service tasks on an Oracle Database Appliance X9 series system.
- [Component Fault Management](#)
Perform component fault management on Oracle Database Appliance systems.

Servicing Oracle Database Appliance X9-2 Series FRUs

Provides instructions on how to perform FRU service tasks on an Oracle Database Appliance X9 series system.

This section describes how to service field-replaceable components that require server power off for an Oracle Database Appliance X9-2 series system.

Only authorized Oracle Service personnel can service FRU components.



Note:

Most of the links in the following table take you to instructions **outside** of the Oracle Database Appliance library to the Oracle Server X9-2L documentation library. Use your browser's Back button to return to the Oracle Database Appliance library.

Oracle Database Appliance X9-2S/X9-2L	Oracle Database Appliance X9-2-HA
FRU List	FRU List
Servicing Processors (FRU)	Servicing Processors (FRU)
Servicing the Disk Backplane (FRU)	Servicing the Disk Backplane (FRU)
Servicing the Front Indicator Module (FRU)	Servicing the Front Indicator Module (FRU)
Servicing the Temperature Sensor (FRU)	Servicing the Temperature Sensor (FRU)
Servicing the Motherboard (FRU)	Servicing the Motherboard (FRU)

Oracle Database Appliance X9-2S/X9-2L	Oracle Database Appliance X9-2-HA
Servicing the NVMe Cables (FRU)	The server nodes for this product do not have NVMe devices.
Component Fault Management	Component Fault Management

Component Fault Management

Perform component fault management on Oracle Database Appliance systems.

Typically, when a faulty component is replaced and the server is returned to service, the fault state of the component in Oracle ILOM is automatically cleared and the component Service Required indicator will turn off. This is the default behavior for all components that have an embedded FRU serial number in the component firmware.

For replaced components that do not have an embedded FRU serial number, or do not automatically clear their fault state after the component has been repaired and the server is returned to service, you can use Oracle ILOM command line interface to manually clear the fault state. Use the following syntax:

```
set /path_to_target clear_fault_action=true
```

Where *path_to_target* is the path to the component (such as a DIMM) that had the fault.

In addition, the Fault Management shell can also be used. Use of the Fault Management shell is reserved for Oracle Service. For more information on component fault management:

For systems with Oracle ILOM 5.0, see [Using fmadm to Administer Active Hardware Faults](#) in the Oracle Integrated Lights Out Manager Documentation Library.

6

Returning Oracle Database Appliance to Operation

Perform tasks to return the Oracle Database Appliance to operation after service.

- [Returning Oracle Database Appliance X9-2 Series to Operation](#)
Provides instructions on how to return an Oracle Database Appliance X9 series system to operation after service.
- [Powering On Oracle Database Appliance X9-2-HA](#)
Perform tasks required to power on Oracle Database Appliance X9-2-HA.

Returning Oracle Database Appliance X9-2 Series to Operation

Provides instructions on how to return an Oracle Database Appliance X9 series system to operation after service.

This section describes how to return the system to operation after servicing an Oracle Database Appliance X9-2 series system.



Note:

Most of the links in the following table take you to instructions **outside** of the Oracle Database Appliance library to the Oracle Server X9-2L documentation library. Use your browser's Back button to return to the Oracle Database Appliance library.

Oracle Database Appliance X9-2S/X9-2L	Oracle Database Appliance X9-2-HA
Install the Top Cover	Install the Top Cover
Remove Antistatic Measures	Remove Antistatic Measures
Reinstall the Server Chassis Into the Rack (if required)	Reinstall the Server Chassis Into the Rack (if required)
Return the Server to the Normal Rack Position	Return the Server to the Normal Rack Position
Reconnect Data Cables and Power Cords	Reconnect Data Cables and Power Cords
Powering On Oracle Database Appliance X9-2S/X9-2L	Powering On Oracle Database Appliance X9-2-HA

Powering On Oracle Database Appliance X9-2-HA

Perform tasks required to power on Oracle Database Appliance X9-2-HA.

 **Note:**

If you have an Oracle Database Appliance X9-2S/X9-2L, your system does not support a storage shelf and you should skip this section.

When powering on the system, each server node is powered on separately.

1. If you powered off and disconnected the power cords from a storage shelf (and storage expansion shelf if one is present), reconnect the power cords now.
2. Power on the storage shelf (and storage expansion shelf if one is present) by switching the power supply On/Off button on each power supply to the On position.

The disks begin to initialize and the power supply LEDs light green. This can take several minutes.

 **Note:**

Do not power on the server nodes until the disks on the storage shelf and storage expansion shelf have initialized.

3. If you powered off a server node, reconnect any unplugged power cords.
4. Power on a server node on using one of the following methods:
 - Press the recessed Power button on the server node front panel.
 - Log in to the Oracle ILOM web interface, click Host Management > Power Control, and select **Power On** from the Select Action list box.
 - Log in to the Oracle ILOM command-line interface (CLI), and type the following command at the Oracle ILOM CLI prompt.

```
-> start /SYS
```

When the server is powered on and the power-on self-test (POST) code checkpoint tests have completed, the green Power/OK status indicator on the server node front panel lights and remains lit.

 **Note:**

If you powered off both server nodes prior to servicing, repeat steps 3 and 4 to power on the second server node.

5. Refer to the appropriate *Deployment and User's Guide* for any additional instructions or commands required to return the appliance to service.

7

Server Node Diagnostic Tools and Resetting the Service Processor

Learn about server node diagnostic tools and how to reset the SP.

Diagnostic tools are used to troubleshoot or monitor the performance of your system. Data gathered by the service processor (SP) of each server node helps in monitoring and identifying problems with server node hardware. If the SP hangs or becomes inaccessible, it might need to be reset.

Note:

Most of the tools and procedures described in this chapter are reserved for Oracle Service personnel and should not be run on the appliance unless directed to do so by Oracle Service.

- [Server Node Diagnostic Tools](#)
See a listing of the various Oracle Database Appliance diagnostic tools and where to obtain more information about them.
- [Resetting the Service Processor](#)
How to reset the service processor (SP) of a server node of an Oracle Database Appliance.

Server Node Diagnostic Tools

See a listing of the various Oracle Database Appliance diagnostic tools and where to obtain more information about them.

Oracle provides a wide selection of diagnostic tools for use with your server node. These tools include lights out management of the system, service processor recovery, power-on self-test (POST), UEFI or Pc-Check diagnostics, as well as hardware LEDs that indicate the status of system components.

Note:

The links in the following table take you to instructions **outside** of the Oracle Database Appliance library. Use your browser's Back button to return to the Oracle Database Appliance library.

Diagnostic Tool	What It Does	Where to Find Information
Oracle Integrated Lights Out Manager (ILOM)	Monitors server status, environmental conditions, generates alerts (SNMP traps, IPMI PEs, remote syslog), performs fault isolation, provides remote console access. Note that all patching/updating of Oracle Database Appliance is done with the regular Oracle Database Appliance Patch Set Bundle. This includes BIOS and SP firmware. This ensures that all software and firmware component versions are supported to work together. Patches are available through My Oracle Support.	Refer to the appropriate Oracle Integrated Lights Out Manager (ILOM) Documentation Library based on your appliance's supported version of Oracle ILOM. Oracle Integrated Lights Out (ILOM) Documentation Library
System indicators and LEDs	Provides at-a-glance status of the system and its components.	<ul style="list-style-type: none"> • Overview of System Status Indicators and LEDs • You can also use Oracle ILOM to check server node indicator status. Refer to the appropriate Oracle Integrated Lights Out Manager (ILOM) Documentation Library based on your appliance's supported version of Oracle ILOM. Oracle Integrated Lights Out (ILOM) Documentation Library
Power-On Self-Test (POST)	Tests core components of system: CPUs, memory, and motherboard I/O board integrated circuits.	For Oracle Database Appliance X9-2 series, refer to the appropriate <i>Oracle x86 Servers Diagnostics Guide</i> based on your appliance's supported version of Oracle ILOM. Oracle x86 Servers Administration, Diagnostics, and Applications Library
UEFI Diagnostics	UEFI-based utility that tests and detect problems on all processor, memory, disk drives, and network ports. It is used on newer Oracle systems.	Refer to the appropriate <i>Oracle x86 Servers Diagnostics Guide</i> based on your appliance's supported version of Oracle ILOM. Oracle x86 Servers Administration, Diagnostics, and Applications Library

Resetting the Service Processor

How to reset the service processor (SP) of a server node of an Oracle Database Appliance.

There are times when you might need to reset the service processor (such as after a firmware update). You can reset the server node SP using Oracle ILOM without affecting the host OS. However, this action disconnects your current Oracle ILOM session and will not allow any new sessions to be initiated until the reset has completed.

To reset the SP using the Oracle ILOM web interface or the CLI, see *Oracle Integrated Lights Out Manager (ILOM) Documentation Library*:

<https://www.oracle.com/goto/ilom/docs>

 **Note:**

Be sure to refer to the documentation that applies to the version of Oracle ILOM supported with your appliance. See the "Supported Components and Capabilities" section in the *Oracle Database Appliance Owner's Guide*.

If you are unable to reset the SP using the Oracle ILOM web interface or the CLI (for example, if the SP hangs), then use the SP reset button as described in the following tables.

 **Note:**

The links in the following tables take you to instructions **outside** of the Oracle Database Appliance library. Use your browser's Back button to return to the Oracle Database Appliance library.

For Oracle Database Appliance X9-2 series:

Oracle Database Appliance X9-2S/X9-2L	Oracle Database Appliance X9-2-HA
Reset the Service Processor From the Server Back Panel	Reset the Service Processor From the Server Back Panel

8

Server Basic Input/Output System (BIOS)

Learn about the server node BIOS Setup Utility.

The Basic Input/Output System (BIOS) has a Setup Utility stored in the BIOS flash memory. The Setup Utility reports system information and can be used to configure the BIOS settings. The configurable data is provided with context-sensitive help and is stored in the system's battery-backed CMOS RAM. If the configuration stored in the CMOS RAM is invalid, the BIOS settings return to their default optimal values.

Note:

The BIOS menus shown in this chapter are examples. The BIOS version numbers, menu information, and menu selections are subject to change over the life of the product. You should not change the factory settings unless prompted to do so by Oracle Service personnel.

- [Oracle Database Appliance X9-2 Series BIOS Utility](#)
Learn about the BIOS Setup Utility for an Oracle Database Appliance server.

Oracle Database Appliance X9-2 Series BIOS Utility

Learn about the BIOS Setup Utility for an Oracle Database Appliance server.

This section describes the BIOS Setup Utility of an Oracle Database Appliance X9-2 series system.

All settings are set to the optimal defaults at startup.

Caution:

You should not configure system BIOS settings. Oracle Database Appliance patch software will do this for you. The only time you might need to configure BIOS settings would be if requested to do so by Oracle Service.

- [Setting Up BIOS Configuration Parameters](#)
Learn about the BIOS configuration parameters for Oracle Database Appliance X9-2 series.
- [BIOS Setup Utility Menu Options](#)
Learn about the BIOS utility menu options for Oracle Database Appliance X9-2 series.

Setting Up BIOS Configuration Parameters

Learn about the BIOS configuration parameters for Oracle Database Appliance X9-2 series.



Note:

The links in the following table take you to instructions **outside** of the Oracle Database Appliance library to the Oracle Server X9-2L documentation library. Use your browser's Back button to return to the Oracle Database Appliance library.

Oracle Database Appliance X9-2S/X9-2L	Oracle Database Appliance X9-2-HA
Managing the BIOS Configuration	Managing the BIOS Configuration
Accessing the BIOS Setup Utility	Accessing the BIOS Setup Utility
Using UEFI BIOS	Using UEFI BIOS
Common BIOS Setup Utility Tasks	Common BIOS Setup Utility Tasks

BIOS Setup Utility Menu Options

Learn about the BIOS utility menu options for Oracle Database Appliance X9-2 series.



Note:

The links in the following table take you to instructions **outside** of the Oracle Database Appliance library to the Oracle Server X9-2L documentation library. Use your browser's Back button to return to the Oracle Database Appliance library.

Oracle Database Appliance X9-2S/X9-2L	Oracle Database Appliance X9-2-HA
BIOS Main Menu Selections	BIOS Main Menu Selections
BIOS Advanced Menu Selections	BIOS Advanced Menu Selections
BIOS IO Menu Selections	BIOS IO Menu Selections
Security Menu Selections	Security Menu Selections
BIOS Boot Menu Selections	BIOS Boot Menu Selections
BIOS Save and Exit Menu Selections	BIOS Save and Exit Menu Selections

Index

A

antistatic wrist strap
described, [2-1](#)

B

battery
installing, [4-1](#)
removing, [4-1](#)

BIOS
accessing the setup utility, [8-2](#)
advanced menu options, [8-2](#)
boot menu options, [8-2](#)
common tasks, [8-2](#)
I/O menu options, [8-2](#)
legacy and UEFI modes, [8-2](#)
main menu options, [8-2](#)
managing configurations, [8-2](#)
memory testing, [7-1](#)
overview, [8-1](#)
POST errors, [7-1](#)
save and exit options, [8-2](#)
setup screens summary, [8-2](#)
setup utility hot keys, [8-2](#)
UEFI driver control options, [8-2](#)
using for resource allocation, [8-2](#)

BIOS Setup Utility
accessing, [8-2](#)

C

cables
reconnecting power and data cables after
servicing, [6-1](#)

cold service components, [4-1](#)
FRUs, [5-1](#)

CPUs
clearing faults, [5-2](#)
installing, [5-1](#)
population rules, [5-1](#)
removing, [5-1](#)
servicing, [5-1](#)

CRUs
component locations, [4-1](#)

CRUs (continued)

removal that does not require system power
off, [3-1](#)
servicing non-hotplug components, [4-1](#)

D

date and time
resetting after battery replacement, [4-1](#)

diagnostic tools
summary of, [7-1](#)

diagnostics
available tools, [7-1](#)

DIMMs
clearing faults, [5-2](#)
installing, [4-1](#)
population rules, [4-1](#)
removing, [4-1](#)
servicing, [4-1](#)

disk backplane, [5-1](#)

disk drives
adding NVMe storage to the server
Oracle Database Appliance X9-2L, [3-5](#)
adding optional drives to the storage shelf
Oracle Database Appliance X9-2-HA, [3-6](#)
replacing in server, [3-1](#)
replacing in storage shelf, [3-10](#)
replacing NVMe storage
Oracle Database Appliance X9-2S/
X9-2L, [3-3](#)

E

electrostatic discharge (ESD)
precautions, [2-1](#)

emergency shutdown
server node, [2-1](#)

Ethernet ports
LEDs
Oracle Database Appliance X9-2-HA, [1-9](#)
Oracle Database Appliance X9-2S/
X9-2L, [1-5](#)
naming and boot priority, [8-2](#)

F

fans

- detecting faults using LEDs
 - Oracle Database Appliance X9-2-HA, [1-7](#)
 - Oracle Database Appliance X9-2S/X9-2L, [1-1](#)
- replacing in server, [3-1](#)

faults

- clearing CPU faults, [5-2](#)
- clearing DIMM faults, [5-2](#)
- clearing PCIe card faults, [5-2](#)
- clearing PCIe riser faults, [5-2](#)
- clearing the primary HBA card faults, [5-2](#)
- managing, [5-2](#)

front indicator panels

- servicing, [5-1](#)

FRUs

- component locations, [5-1](#)
- servicing non-hotplug FRU components, [5-1](#)

G

graceful shutdown

- server node, [2-1](#)

H

HBA cards

- servicing, [4-1](#)

hot-plug components

- server, [3-1](#)

hot-pluggable components, [3-1](#)

I

I/O module

- replacing in storage shelf, [3-14](#)

ILOM

- used as diagnostic tool, [7-1](#)

L

LEDs

- AC OK
 - Oracle Database Appliance X9-2-HA, [1-9](#)
 - Oracle Database Appliance X9-2S/X9-2L, [1-5](#)
- Activity
 - Oracle Database Appliance X9-2-HA, [1-7](#)
 - Oracle Database Appliance X9-2S/X9-2L, [1-1](#)

LEDs (*continued*)

- component failure
 - Oracle Database Appliance X9-2S/X9-2L, [1-1](#)
- DC OK
 - Oracle Database Appliance X9-2-HA, [1-9](#)
 - Oracle Database Appliance X9-2S/X9-2L, [1-5](#)
- Ethernet ports
 - Oracle Database Appliance X9-2-HA, [1-9](#)
 - Oracle Database Appliance X9-2S/X9-2L, [1-5](#)
- fans
 - Oracle Database Appliance X9-2-HA, [1-7](#)
 - Oracle Database Appliance X9-2S/X9-2L, [1-1](#)
- general status
 - Oracle Database Appliance X9-2-HA, [1-7](#)
 - Oracle Database Appliance X9-2S/X9-2L, [1-1](#)
- Locate
 - Oracle Database Appliance X9-2-HA, [1-7](#)
 - Oracle Database Appliance X9-2S/X9-2L, [1-1](#)
- OK
 - Oracle Database Appliance X9-2-HA, [1-7](#)
 - Oracle Database Appliance X9-2S/X9-2L, [1-1](#)
- Oracle Database Appliance X9-2-HA, [1-7](#)
- Oracle Database Appliance X9-2S/X9-2L, [1-1](#)
- Over Temperature
 - Oracle Database Appliance X9-2-HA, [1-7](#)
 - Oracle Database Appliance X9-2S/X9-2L, [1-1](#)
- power supplies
 - Oracle Database Appliance X9-2-HA, [1-7](#)
 - Oracle Database Appliance X9-2S/X9-2L, [1-1](#)
- Power/OK
 - Oracle Database Appliance X9-2-HA, [1-7](#)
 - Oracle Database Appliance X9-2S/X9-2L, [1-1](#)
- Ready to Remove
 - Oracle Database Appliance X9-2-HA, [1-7](#)
 - Oracle Database Appliance X9-2S/X9-2L, [1-1](#)
- rear component failure
 - Oracle Database Appliance X9-2-HA, [1-7](#)
 - Oracle Database Appliance X9-2S/X9-2L, [1-5](#)
- server front Locate
 - Oracle Database Appliance X9-2S/X9-2L, [1-1](#)

LEDs (*continued*)

- server node rear Locate
 - Oracle Database Appliance X9-2-HA, [1-9](#)
- server node rear Power/OK
 - Oracle Database Appliance X9-2-HA, [1-7](#)
- server node rear Service Required
 - Oracle Database Appliance X9-2-HA, [1-9](#)
- server node Service Required
 - Oracle Database Appliance X9-2-HA, [1-7](#)
- server rear Locate
 - Oracle Database Appliance X9-2S/
X9-2L, [1-5](#)
- server rear Power/OK
 - Oracle Database Appliance X9-2S/
X9-2L, [1-5](#)
- server Service Required
 - Oracle Database Appliance X9-2S/
X9-2L, [1-1](#)
- SP OK/Fault
 - Oracle Database Appliance X9-2-HA, [1-7](#)
 - Oracle Database Appliance X9-2S/
X9-2L, [1-1](#)
- storage devices
 - Oracle Database Appliance X9-2-HA, [1-7](#)
 - Oracle Database Appliance X9-2S/
X9-2L, [1-1](#)
- storage shelf back panel
 - Oracle Database Appliance X9-2-HA, [1-14](#)
- storage shelf front panel
 - Oracle Database Appliance X9-2-HA, [1-13](#)

M

- motherboard assembly
 - servicing, [5-1](#)

N

- network cards
 - adding, [4-2](#)
- network ports
 - naming and boot order, [8-2](#)
- NVMe drives
 - adding to server
 - Oracle Database Appliance X9-2S/
X9-2L, [3-2](#)
 - replacing in server
 - Oracle Database Appliance X9-2S/
X9-2L, [3-2](#)

O

- option ROM settings
 - configuring, [8-2](#)
- Oracle Integrated Lights Out Manager (Oracle ILOM)
 - server node power off procedures, [2-1](#)
 - server node power on procedures
 - Oracle Database Appliance X9-2-HA, [6-2](#)
 - SP reset, [7-2](#)
 - used as diagnostic tool, [7-1](#)

P

- Pc-Check, [7-1](#)
- PCIe cards
 - adding, [4-2](#)
 - clearing faults, [5-2](#)
 - servicing, [4-1](#), [5-1](#)
- PCIe riser
 - clearing faults, [5-2](#)
- power on
 - returning the system to operation, [6-1](#)
- power supplies
 - replacing in server, [3-1](#)
 - replacing in storage shelf, [3-12](#)
 - server, [3-1](#)
 - status indicators
 - Oracle Database Appliance X9-2-HA, [1-7](#), [1-9](#)
 - Oracle Database Appliance X9-2S/
X9-2L, [1-1](#), [1-5](#)
- power-on self-test (POST), [7-1](#)
- power-on self-test (POST) events, [7-1](#)
- powering off
 - emergency shutdown, [2-1](#)
 - graceful shutdown, [2-1](#)
- powering on, [6-1](#)
 - Oracle Database Appliance X9-2-HA, [6-2](#)

R

- replaceable components
 - cold service components, [4-1](#)
 - hot service components, [3-1](#)
- replacing
 - hot and cold service components, [2-1](#)
- required tools
 - servicing components, [2-1](#)
- reset Oracle ILOM SP, [7-2](#)
- Retimer card
 - servicing, [5-1](#)

S

- safety information
 - servicing, [2-1](#)
- SAS HBA cards
 - servicing, [4-1](#)
- server
 - back panel indicators
 - Oracle Database Appliance X9-2S/X9-2L, [1-5](#)
 - front panel indicators
 - Oracle Database Appliance X9-2S/X9-2L, [1-1](#)
 - powering off, [2-1](#)
 - reconnecting power and data cables, [6-1](#)
 - reinstalling in rack, [6-1](#)
 - removing from rack, [2-1](#)
 - removing the top cover, [2-1](#)
 - slide into rack from maintenance position, [6-1](#)
 - slide out from rack to maintenance position, [2-1](#)
- server locate
 - Oracle Database Appliance X9-2S/X9-2L, [1-1](#)
- server node
 - back panel indicators
 - Oracle Database Appliance X9-2-HA, [1-9](#)
 - front panel indicators
 - Oracle Database Appliance X9-2-HA, [1-7](#)
- server node rear Locate
 - Oracle Database Appliance X9-2-HA, [1-9](#)
- server rear Locate
 - Oracle Database Appliance X9-2S/X9-2L, [1-5](#)
- service processor reset, [7-2](#)
- servicing
 - CPUs, [5-1](#)
 - DIMMs, [4-1](#)
 - disk backplane, [5-1](#)
 - front indicator panels, [5-1](#)
 - hot-plug components, [3-1](#)
 - motherboard assembly, [5-1](#)
 - non-hotplug customer replaceable components, [4-1](#)
 - non-hotplug field replaceable components, [5-1](#)
 - NVMe cables, [5-1](#)
 - PCIe cards, [4-1](#)
 - preparing for service, [2-1](#)
 - preparing the system, [2-1](#)
 - removing a server node from chassis, [2-1](#)
 - removing the top cover, [2-1](#)
 - replacing a power supply in storage shelf, [3-12](#)
 - replacing disk drives in a storage shelf, [3-10](#)
 - replacing fans in server, [3-1](#)
 - servicing (*continued*)
 - replacing hard disk drives in server, [3-1](#)
 - replacing I/O module in storage shelf, [3-14](#)
 - replacing power supplies in server, [3-1](#)
 - resetting the SP, [7-1](#)
 - Retimer card, [5-1](#)
 - returning the appliance to operation, [6-1](#)
 - returning the system to operation, [6-1](#)
 - SAS HBA cards, [4-1](#)
 - server node battery, [4-1](#)
 - troubleshooting and diagnostics, [7-1](#)
- Setup
 - BIOS Setup Utility overview, [8-1](#)
- shutdown procedures
 - emergency shutdown, [2-1](#)
 - graceful shutdown, [2-1](#)
- shutting down, [2-1](#)
 - preparing the system for servicing, [2-1](#)
- standby power state, [6-1](#)
 - Oracle Database Appliance X9-2-HA server node, [6-2](#)
- status indicators , [1-1](#), [1-7](#)
 - AC OK
 - Oracle Database Appliance X9-2-HA, [1-9](#)
 - Oracle Database Appliance X9-2S/X9-2L, [1-5](#)
 - Activity
 - Oracle Database Appliance X9-2-HA, [1-9](#)
 - Oracle Database Appliance X9-2S/X9-2L, [1-5](#)
 - DC OK
 - Oracle Database Appliance X9-2-HA, [1-9](#)
 - Oracle Database Appliance X9-2S/X9-2L, [1-5](#)
 - Ethernet ports
 - Oracle Database Appliance X9-2-HA, [1-9](#)
 - Oracle Database Appliance X9-2S/X9-2L, [1-5](#)
 - fans
 - Oracle Database Appliance X9-2-HA, [1-7](#)
 - Oracle Database Appliance X9-2S/X9-2L, [1-1](#)
 - general status
 - Oracle Database Appliance X9-2-HA, [1-7](#)
 - Oracle Database Appliance X9-2S/X9-2L, [1-1](#)
 - Locate
 - Oracle Database Appliance X9-2-HA, [1-7](#)
 - Oracle Database Appliance X9-2S/X9-2L, [1-1](#)
 - Oracle Database Appliance X9-2-HA, [1-7](#)
 - Oracle Database Appliance X9-2S/X9-2L, [1-1](#)
- Over Temperature
 - Oracle Database Appliance X9-2-HA, [1-7](#)

- status indicators (*continued*)
 - Over Temperature (*continued*)
 - Oracle Database Appliance X9-2S/
X9-2L, [1-1](#)
- power supplies
 - Oracle Database Appliance X9-2-HA, [1-7](#)
 - Oracle Database Appliance X9-2S/
X9-2L, [1-1](#)
- Power/OK
 - Oracle Database Appliance X9-2-HA, [1-7](#)
 - Oracle Database Appliance X9-2S/
X9-2L, [1-1](#)
- Ready to Remove
 - Oracle Database Appliance X9-2-HA, [1-7](#)
 - Oracle Database Appliance X9-2S/
X9-2L, [1-1](#)
- rear component failure
 - Oracle Database Appliance X9-2-HA, [1-7](#)
 - Oracle Database Appliance X9-2S/
X9-2L, [1-5](#)
- server node rear Power/OK
 - Oracle Database Appliance X9-2-HA, [1-7](#)
- server node rear Service Required
 - Oracle Database Appliance X9-2-HA, [1-9](#)
- server node SP OK/Fault
 - Oracle Database Appliance X9-2-HA, [1-7](#)
 - Oracle Database Appliance X9-2S/
X9-2L, [1-1](#)
- server rear Power/OK
 - Oracle Database Appliance X9-2S/
X9-2L, [1-1](#)
- server rear Service Required
 - Oracle Database Appliance X9-2S/
X9-2L, [1-5](#)
- server Service Required
 - Oracle Database Appliance X9-2S/
X9-2L, [1-1](#)
- Service Required
 - Oracle Database Appliance X9-2-HA, [1-7](#)
 - Oracle Database Appliance X9-2S/
X9-2L, [1-1](#)
- status indicators (*continued*)
 - Service Required (*continued*)
- storage devices
 - Oracle Database Appliance X9-2-HA, [1-7](#)
 - Oracle Database Appliance X9-2S/
X9-2L, [1-1](#)
- storage
 - adding NVMe storage to the server
 - Oracle Database Appliance X9-2L, [3-5](#)
 - replacing NVMe storage
 - Oracle Database Appliance X9-2S/
X9-2L, [3-3](#)
- storage shelf
 - adding optional drives to the ODA X9-2-HA
storage shelf, [3-6](#)
 - replacing a power supply, [3-6](#)
 - replacing a SAS I/O module, [3-6](#)
 - replacing a storage drive, [3-6](#)
 - replacing storage drives, [3-10](#)
- storage shelf indicators
 - back panel
 - Oracle Database Appliance X9-2-HA,
[1-14](#)
 - front panel
 - Oracle Database Appliance X9-2-HA,
[1-13](#)

T

- tools
 - required for service, [2-1](#)
- top cover
 - install, [6-1](#)
 - remove, [2-1](#)
 - server, [2-1](#)
- troubleshooting
 - diagnostics and resetting the SP, [7-1](#)
- Trusted Platform Module (TPM)
 - support for, [8-2](#)