

Oracle® 6.4 TB NVMe SSD v1 Product Notes

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Using This Documentation

- **Overview** – Provides late-breaking information about Oracle 6.4 TB NVMe SSD v1
- **Audience** – System administrators, network administrators, and service technicians
- **Required knowledge** – Advanced understanding of server systems

Product Documentation Library

Documentation and resources for this product and related products are available at: <https://www.oracle.com/goto/oracletflashf640/docs>

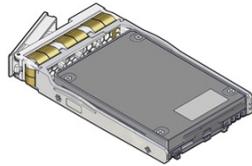
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Oracle 6.4 TB NVMe SSD v1 Product Notes

This section contains late-breaking information about Oracle 6.4 TB NVMe SSD v1s (solid state devices). Read this section before reading other Oracle 6.4 TB NVMe SSD v1 documentation. Always refer to the latest version of the product notes.

For specific installation instructions, late-breaking information about the installation and use of Oracle 6.4 TB NVMe SSD v1s with your server, supported firmware and operating systems, important operating notes, and known issues, refer to the latest platform product notes document. For detailed information about using this storage drive with your server, see the product notes for your server, available at <https://docs.oracle.com>.



These topics are included in this section.

Description	Links
Review the software and firmware supported for Oracle 6.4 TB NVMe SSD v1s.	“Supported Hardware and Software” on page 10
Review important information for configuring Oracle 6.4 TB NVMe SSD v1s.	“Implementation Considerations” on page 17
Check known issues.	“Known Issues” on page 36

Supported Hardware and Software

The following sections describe the software and firmware supported for Oracle 6.4 TB NVMe SSD v1s:

- “Supported Servers and Operating Systems” on page 10
- “Minimum Supported Oracle 6.4 TB NVMe SSD v1 Firmware Version” on page 12
- “Required Host Firmware” on page 15
- “Keep Drivers and Firmware Up to Date” on page 16

Supported Servers and Operating Systems

This section lists the servers that support Oracle 6.4 TB NVMe SSD v1s. For detailed information about using this storage drive with your server, see the product notes for your server, available at <https://docs.oracle.com>.

The following servers are supported for the Oracle 6.4 TB NVMe SSD v1.

x86 Servers	Number of 6.4 TB NVMe SSDs	Slots Supported for Installing 6.4 TB NVMe SSDs	Minimum Supported Operating Systems
Oracle Server X7-2	1 to 8	0-7 slots labeled NVMe0-NVMe7 NVMe0, NVMe1, NVMe2, NVMe3 NVMe4, NVMe5, NVMe6, NVMe7	<ul style="list-style-type: none"> ■ Oracle Linux 7.3 with Unbreakable Enterprise Kernel Release 4 Update 4 (UEK R4u4) or the Red Hat Compatible Kernel ■ Oracle Linux 6.9 with Unbreakable Enterprise Kernel Release 4 Update 4 (UEK R4u4) or the Red Hat Compatible Kernel ■ Oracle VM 3.4.4 ■ Oracle Solaris 11.3 SRU 23 ■ Windows Server 2016 ■ Windows Server 2012 R2 ■ VMware ESXi 6.5 Update 1
Oracle Server X7-2L	1 to 12	0-11 slots labeled NVMe0-NVMe11 NVMe0, NVMe1, NVMe2, NVMe3 NVMe4, NVMe5, NVMe6, NVMe7, NVMe8, NVMe9, NVMe10, NVMe11	<ul style="list-style-type: none"> ■ Oracle Linux 7.3 with Unbreakable Enterprise Kernel Release 4 Update 4 (UEK R4u4) or the Red Hat Compatible Kernel ■ Oracle Linux 6.9 with Unbreakable Enterprise Kernel Release 4 Update 4 (UEK R4u4) or the Red Hat Compatible Kernel ■ Oracle VM 3.4.4

x86 Servers	Number of 6.4 TB NVMe SSDs	Slots Supported for Installing 6.4 TB NVMe SSDs	Minimum Supported Operating Systems
			<ul style="list-style-type: none"> ■ Oracle Solaris 11.3 SRU 23 ■ Windows Server 2016 ■ Windows Server 2012 R2 ■ VMware ESXi 6.5 Update 1
SPARC Servers	Number of 6.4 TB NVMe SSDs	Slots Supported for Installing 6.4 TB NVMe SSDs	Minimum Supported Operating Systems
SPARC S7-2 Server	1 to 4	2, 3, 4, 5 Slots labeled NVMe0, NVMe1, NVMe2, NVMe3	Oracle Solaris 11.3 (SRU 23)
SPARC S7-2L Server 8 drive:	1 to 4	2, 3, 4, 5 Slots labeled NVMe0, NVMe1, NVMe2, NVMe3	Oracle Solaris 11.3 (SRU 23) Note - SPARC S7-2L with 3.5-inch 12 drive configuration does not support Oracle 6.4 TB NVMe SSD v1 operation.
SPARC S7-2L Server 12 drive:	1 to 12	1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23 Slots labeled NVMe0, NVMe1, NVMe2, NVMe3 NVMe4, NVMe5, NVMe6, NVMe7, NVMe8, NVMe9, NVMe10, NVMe11	
SPARC S7-2L Server 24 drive:	1 to 4	3, 4, 19, 20 Slots labeled NVMe0, NVMe1, NVMe2, NVMe3	
SPARC T7-1 Server	1 to 4	2, 3, 4, 5 Slots labeled NVMe0, NVMe1, NVMe2, NVMe3	Oracle Solaris 11.3 (SRU 23)
SPARC T7-2 Server	1 to 4	2, 3, 4, 5 Slots labeled NVMe0, NVMe1, NVMe2, NVMe3	Oracle Solaris 11.3 (SRU 23)
SPARC T7-4 Server	1 to 8 2 Oracle PCIe Switch Cards	0, 1, 2, 3, 4, 5, 6, 7 Slots labeled NVMe0, NVMe1, NVMe2, NVMe3 NVMe4, NVMe5, NVMe6, NVMe7	Oracle Solaris 11.3 (SRU 23)
SPARC T8-1 Server	1 to 4	2, 3, 4, 5 Slots labeled NVMe0, NVMe1, NVMe2, NVMe3	Oracle Solaris 11.3 (SRU 23)
SPARC T8-2 Server	1 to 4	2, 3, 4, 5 Slots labeled NVMe0, NVMe1, NVMe2, NVMe3	Oracle Solaris 11.3 (SRU 23)

SPARC Servers	Number of 6.4 TB NVMe SSDs	Slots Supported for Installing 6.4 TB NVMe SSDs	Minimum Supported Operating Systems
SPARC T8-4 Server	1 to 8 2 Oracle PCIe Switch Cards	0, 1, 2, 3, 4, 5, 6, 7 Slots labeled NVMe0, NVMe1, NVMe2, NVMe3 NVMe4, NVMe5, NVMe6, NVMe7	Oracle Solaris 11.3 (SRU 23)

Other servers and processors might be added to this list in the future, if they qualify. Check your server product notes for confirmation that your server has subsequently been qualified for device support.



Caution - Any unsupported configuration causes the host to power off as soon as it is powered on. A fault is generated on the service processor when an unsupported configuration is detected. The fault clears after the unsupported configuration is fixed and the host is powered on.

Note - Slots that can contain either SAS HDD or NVMe storage drives have labels with both HDD and NVMe identification marks on the server panel.

Note - Refer to your server product notes for up-to date information on supported servers, operating systems, and required patchsets.

Minimum Supported Oracle 6.4 TB NVMe SSD v1 Firmware Version

Oracle 6.4 TB NVMe SSD v1s run with the minimum required firmware package listed in the following table.

Firmware	Minimum Required Drive Firmware Version	Recommended Drive Firmware Version
Oracle 6.4 TB NVMe SSD v1 Package	Patch 27541044: 6.4TB NVME PCIE SSD - RE14 FIRMWARE 8DV1RE14 Support for: <ul style="list-style-type: none"> ■ Oracle X7 series servers ■ SPARC S7 series servers ■ SPARC T7 series servers ■ SPARC T8 series servers 	Patch 33518695: 6.4TB NVME PCIE SSD FW RF35 QDV1RF35 ICDPC2DD2.RF35.fw Support for: <ul style="list-style-type: none"> ■ Oracle X7 series servers ■ SPARC S7 series servers ■ SPARC T7 series servers ■ SPARC T8 series servers

Note - For best practice, install the latest device firmware versions.

Summary of Changes in Firmware RF35 Release

The following improvements or changes were included in firmware QDV1RF35 release of Oracle 6.4 TB NVMe SSD v1:

- Merged firmware for Oracle Flash Accelerator F640 PCIe Card and Oracle 6.4 TB NVMe SSD v1. Recommended firmware update improves quality of product and merges into one binary for both Oracle Flash Accelerator F640 PCIe Card and Oracle 6.4 TB NVMe SSD v1.
- The Oracle 6.4 TB NVMe SSD v1 Firmware RF35 package includes the firmware files and associated metadata.xml files that automate the Oracle 6.4 TB NVMe SSD v1 update process.
- If you install Oracle 6.4 TB NVMe SSD v1s as an option, you must update the firmware from release 8DV1RF30 or a lower release to release QDV1RF35.

Summary of Changes in Firmware RF30 Release

The following improvements or changes were included in firmware 8DV1RF30 release of Oracle Flash Accelerator F640 PCIe Card and Oracle 6.4 TB NVMe SSD v1:

- Merged firmware for Oracle Flash Accelerator F640 PCIe Card and Oracle 6.4 TB NVMe SSD v1. Recommended firmware update improves quality of product and merges into one binary for both Oracle Flash Accelerator F640 PCIe Card and Oracle 6.4 TB NVMe SSD v1.
- The Oracle 6.4 TB NVMe SSD v1 Firmware RF30 package includes the firmware files and associated metadata.xml files that automate the Oracle 6.4 TB NVMe SSD v1 update process.
- If you install Oracle 6.4 TB NVMe SSD v1s as an option, you must update the firmware from release 8DV1RE14 or a lower release to release 8DV1RF30.
- Key Fixes include:
 - Bug ID 28244670 – Oracle ILOM incorrectly faults the device with message "Fault fault.io.scsi.cmd.disk.dev.rqs.baddrv on FRU /SYS"
Oracle Server X7-2L and Oracle Server X7-2L Software 1.3.2 or later with Oracle ILOM Software Release 4.0.4.21.a is required on x86 platforms using firmware release 8DV1RF30 to reduce device read failures. The SMBus can take up to 30 seconds to respond after a firmware update (Bug ID: 28708331 - Device Monitor: Extend jitter check to cover device read failures).
 - Bug ID 27759886 – Oracle 6.4 TB NVMe SSD v1 SFF Asserting on RE14 – when device sits unpowered for several weeks, device may report UE errors or assert

To immediately ensure the fix is implemented, perform the *Secure Erase Drives Before Use* erase sequence, otherwise after two weeks of device power-on the issue will be fully resolved.

- Assert codes HI149 and DE003 (DRAM Memory Access Error), and NDA (no device attached) due to NAND channel timeout and sidetrace corruption

Summary of Changes in Firmware RE14 Release

The following improvements or changes were included in firmware 8DV1RE14 release of Oracle 6.4 TB NVMe SSD v1s:

- Support for Oracle X7 series servers.
- Support for SPARC S7 series servers.
- Support for SPARC T7 series servers.
- Support for SPARC T8 series servers.
- If you install Oracle 6.4 TB NVMe SSD v1s as an add-on option, you must update the firmware if the release number is lower than 8DV1RE14. Update to 8DV1RE14 or a subsequent release if available.
- If you install Oracle 6.4 TB NVMe SSD v1s as an option, and you must update the firmware from release 8DV1RE12 or a lower release to release 8DV1RE14. You must update Oracle 6.4 TB NVMe SSD v1s to release 8DV1RE13 before they can be upgraded to release 8DV1RE14.

If the firmware release is lower than 8DV1RE13, for example release 8DV1RE12, 8DV1RE10, or 8DV1RE0F, do the following:

1. Run the `fwupdate` command once to update the device firmware to 8DV1RE13.
See [“Accessing Software Updates and Firmware Downloads” on page 20](#).
The metadata file ensures that the first time the `fwupdate` command is run, the device only moves to 8DV1RE13.
The device NVMe Resets from metadata file sequence. The device requires a power cycle after the update for any bootloader changes to take effect.
2. Verify that the device firmware release is 8DV1RE13.
See [“Verify Oracle 6.4 TB NVMe SSD v1 Operation” on page 27](#).
3. Run the `fwupdate` command again to update the firmware to 8DV1RE14, or a subsequent release if available.
Delay at least 30 seconds between running the two `fwupdate` commands.
The device NVMe Resets from metadata file sequence.
4. Verify that the device firmware release is 8DV1RE14.

See [“Verify Oracle 6.4 TB NVMe SSD v1 Operation”](#) on page 27.

Required Host Firmware

Oracle 6.4 TB NVMe SSD v1s run with the minimum required host firmware listed in the following table.

x86 Driver	Minimum Required System Firmware Version (Patch No.)	Recommended System Firmware Version (Patch No.)
Oracle Server X7-2	27468399 Oracle Server X7-2 SW 1.1.1 - FIRMWARE PACK (Patch)	Patch 33193097: Oracle Server X7-2 SW 3.2.2 - FIRMWARE PACK or later
Oracle Server X7-2L	27468368 Oracle Server X7-2L SW 1.1.1 - FIRMWARE PACK (Patch)	Patch 33194331: Oracle Server X7-2L SW 3.2.2 - FIRMWARE PACK or later
SPARC Driver		
SPARC Driver	Minimum Required System Firmware Version (Patch No.)	Recommended System Firmware Version (Patch No.)
SPARC S7-2 Server	S7-2 Sun System Firmware 9.8.3 - Patch number 27043768 With Hardware_Programmables-1.0.14-SPARC_T7-1+T7-2+T7-4+S7-2+S7-2L.pkg file also installed.	Patch 33270228: FIRMWARE: SPARC S7-2 SUN SYSTEM FIRMWARE 9.10.3 or later
SPARC S7-2L Server	S7-2 Sun System Firmware 9.8.3 - Patch number 27043769 With Hardware_Programmables-1.0.14-SPARC_T7-1+T7-2+T7-4+S7-2+S7-2L.pkg file also installed.	Patch 33270230: FIRMWARE: SPARC S7-2L SUN SYSTEM FIRMWARE 9.10.3 or later
SPARC T7-1 Server	SPARC T7-1 Sun System Firmware 9.8.3 - Patch number 27043765 With Hardware_Programmables-1.0.17-SPARC_T7-1.pkg file also installed.	Patch 33270223: FIRMWARE: SPARC T7-1 SUN SYSTEM FIRMWARE 9.10.3 or later
SPARC T7-2 Server	SPARC T7-2 Sun System Firmware 9.8.3 - Patch number 27043766 With Hardware_Programmables-1.0.15-SPARC_T7-1+T7-2+T7-4+S7-2+S7-2L.pkg file also installed.	Patch 33270225: FIRMWARE: SPARC T7-2 SUN SYSTEM FIRMWARE 9.10.3 or later
SPARC T7-4 Server	SPARC T7-4 Sun System Firmware 9.8.3 - Patch number 27043767 With Hardware_Programmables-1.0.14-SPARC_T7-1+T7-2+T7-4+S7-2+S7-2L.pkg file also installed.	Patch 33270226: FIRMWARE: SPARC T7-4 SUN SYSTEM FIRMWARE 9.10.3 or later

SPARC Driver	Minimum Required System Firmware Version (Patch No.)	Recommended System Firmware Version (Patch No.)
SPARC T8-1 Server	T8-1 Sun System Firmware 9.8.1a - Patch number 26585181 With Hardware_Programmables-1.0.17-SPARC_T8-1.pkg file also installed.	Patch 33270219: FIRMWARE: SPARC T8-1 SUN SYSTEM FIRMWARE 9.10.3 or later
SPARC T8-2 Server	T8-2 Sun System Firmware 9.8.1 - Patch number 26585182	Patch 33270220: FIRMWARE: SPARC T8-2 SUN SYSTEM FIRMWARE 9.10.3 or later
SPARC T8-4 Server	T8-4 Sun System Firmware 9.8.1 - Patch number 26585183	Patch 33270221: FIRMWARE: SPARC T8-4 SUN SYSTEM FIRMWARE 9.10.3 or later

Note - Refer to [Firmware Downloads and Release History for Oracle Systems \(https://www.oracle.com/servers/technologies/firmware/release-history-jsp.html\)](https://www.oracle.com/servers/technologies/firmware/release-history-jsp.html).

Keep Drivers and Firmware Up to Date

Refer to the server documentation to check for updates to the device firmware. For information on updating drivers and firmware for Oracle 6.4 TB NVMe SSD v1s, see “[Accessing Software Updates and Firmware Downloads](#)” on page 20 and refer to “[Update Your System to the Latest Software Release](#)” in *Oracle 6.4 TB NVMe SSD User Guide*.

Server Management Tools

The following single system management tools are available for the server:

- **Oracle Integrated Lights Out Management (ILOM)**. For information, refer to the product information page at: <https://www.oracle.com/servers/technologies/integrated-lights-out-manager.html>. For documentation, refer to the Oracle Integrated Lights Out Manager (ILOM) 5.0 Documentation Library at: <https://www.oracle.com/goto/ilom/docs>

You can find descriptions of new Oracle ILOM 5.0 features in the *Oracle ILOM Feature Updates and Release Notes*.
- **Oracle Hardware Management Pack**, available with the Oracle Solaris OS or as a standalone product with other OS. For information, refer to the product information page at: <https://www.oracle.com/servers/technologies/hardware-management-pack.html>. For documentation and OS support matrix, refer to the Oracle Hardware Management Pack 2.4 Documentation Library at: <https://www.oracle.com/goto/ohmp/docs>

Oracle Hardware Management Pack for Oracle Solaris 11.4 Documentation Library at https://docs.oracle.com/cd/E79568_01/index.html

In addition, the following software is available to manage multiple systems in a data center:

Oracle Enterprise Manager Ops Center, available software to manage multiple systems in a data center. For information, refer to the product information page at: <https://www.oracle.com/enterprise-manager/technologies/>. For documentation, refer to the Oracle Enterprise Manager Cloud Control Documentation Library at: <https://docs.oracle.com/en/enterprise-manager/related-products.html>

Implementation Considerations

The following sections provide important information about configuring Oracle 6.4 TB NVMe SSD v1s in supported servers:

- “Oracle Server X7-2 Configuration” on page 17
- “Oracle Server X7-2L Configuration” on page 18
- “SPARC S7-2 Server Configuration” on page 18
- “SPARC S7-2L Server Configuration” on page 18
- “SPARC T7-1 Server Configuration” on page 18
- “SPARC T7-2 Server Configuration” on page 19
- “SPARC T7-4 Server Configuration” on page 19
- “SPARC T8-1 Server Configuration” on page 19
- “SPARC T8-2 Server Configuration” on page 19
- “SPARC T8-4 Server Configuration” on page 19
- “SSD Volume Management” on page 20
- “Accessing Software Updates and Firmware Downloads” on page 20

Oracle Server X7-2 Configuration

For more information about server configuration, refer to the server documentation at <https://www.oracle.com/goto/x7-2/docs>.

Oracle Server X7-2L Configuration

For more information about server configuration, refer to the server documentation at <https://www.oracle.com/goto/x7-2l/docs>.

SPARC S7-2 Server Configuration

SPARC S7-2 servers support the Oracle 6.4 TB NVMe SSD v1 as a boot device.

An Oracle PCIe Switch Card is not required in a four NVMe drive configuration. The switch function is included in the motherboard.

For more information about server configuration, refer to the server documentation at <https://www.oracle.com/goto/s7-2/docs>.

SPARC S7-2L Server Configuration

SPARC S7-2L servers support the Oracle 6.4 TB NVMe SSD v1 as a boot device.

An Oracle PCIe Switch Card is not required in a four NVMe drive configuration. The switch function is included in the motherboard. The SPARC S7-2L Server can support three Oracle PCIe Switch Cards. Additional Oracle PCIe Switch Cards are required to support backplane configurations with more than four NVMe drives.

For more information about server configuration, refer to the server documentation at <https://www.oracle.com/goto/s7-2l/docs>.

SPARC T7-1 Server Configuration

SPARC T7 series servers support the Oracle 6.4 TB NVMe SSD v1 as a boot device. The SPARC T7-1 Server supports only one Oracle PCIe Switch Card in PCIe slot 3.

For more information about server configuration, refer to the server documentation at <https://www.oracle.com/goto/t7-1/docs>.

SPARC T7-2 Server Configuration

SPARC T7 series servers support the Oracle 6.4 TB NVMe SSD v1 as a boot device. The SPARC T7-2 Server supports one or two Oracle PCIe Switch Cards in PCIe slots 1 and 2.

For more information about server configuration, refer to the server documentation at <https://www.oracle.com/goto/t7-2/docs>.

SPARC T7-4 Server Configuration

SPARC T7 series servers support the Oracle 6.4 TB NVMe SSD v1 as a boot device. The SPARC T7-4 Server can support zero or two Oracle PCIe Switch Cards.

For more information about server configuration, refer to the server documentation at <https://www.oracle.com/goto/t7-4/docs>.

SPARC T8-1 Server Configuration

SPARC T8 series servers support the Oracle 6.4 TB NVMe SSD v1 as a boot device. The SPARC T8-1 Server supports only one Oracle PCIe Switch Card in PCIe slot 3.

For more information about the servers, refer to the server documentation at <https://www.oracle.com/goto/t8-1/docs>.

SPARC T8-2 Server Configuration

SPARC T8 series servers support the Oracle 6.4 TB NVMe SSD v1 as a boot device. The SPARC T8-2 Server supports two Oracle PCIe Switch Cards in PCIe slots 1 and 2.

For more information about the server, refer to the server documentation at <https://www.oracle.com/goto/t8-2/docs>.

SPARC T8-4 Server Configuration

SPARC T8 series servers support the Oracle 6.4 TB NVMe SSD v1 as a boot device. The SPARC T8-4 Server can support zero or two Oracle PCIe Switch Cards.

For more information about the servers, refer to the server documentation at <https://www.oracle.com/goto/t8-4/docs>.

SSD Volume Management

A volume manager can present multiple SSD devices as one larger volume. Use the Automatic Storage Management (ASM) volume manager or other volume manager to concatenate multiple flash memory domains. For example, a volume manager can be used to concatenate four 6.4 TB domains into a single 25.6 TB volume.

Refer to the Automatic Storage Management documentation at <https://docs.oracle.com/en/database/oracle/oracle-database/19/ostmg/index.html>.

Accessing Software Updates and Firmware Downloads

Product patches, updates and firmware are available on My Oracle Support at <https://support.oracle.com> from the Patches and Updates tab.

See:

- [“Download the Device Software Package” on page 20](#)
- [“Update the NVMe Storage Drive Firmware” on page 21](#)
- [“Verify Oracle 6.4 TB NVMe SSD v1 Operation” on page 27](#)

▼ Download the Device Software Package

To find the device software package, access My Oracle Support and download the latest software package for Oracle 6.4 TB NVMe SSD v1s.

1. **Go to the My Oracle Support web site:** <https://support.oracle.com>.
2. **Sign in to My Oracle Support.**
3. **At the top of the page, click the Patches & Updates tab.**
The Patch Search pane appears at the right of the screen.
4. **Within the Search tab area, click Number/Name OR Bug Number (Simple).**
The Search tab area appears with search fields.

5. **In the Product field, enter the patch number for 6.4TB NVMe PCIe SSD.**
See “[Minimum Supported Oracle 6.4 TB NVMe SSD v1 Firmware Version](#)” on page 12.
6. **Click Search.**
The Patch Search Results screen appears, listing the patch for the software release.
7. **To review the ReadMe file for this patch, click ReadMe.**
8. **To download the patch for the software release, click Download.**
9. **In the File Download dialog box, click the patch zip file name.**
The patch for the software release downloads. The download is an archive zip file, which you must extract to find the directory containing the image.pkg file.

▼ Update the NVMe Storage Drive Firmware

This procedure provides instructions to update Oracle 6.4 TB NVMe SSD v1 NAND flash controller firmware for the host on supported Oracle Solaris and Oracle Linux operating systems. Oracle 6.4 TB NVMe SSD v1 firmware is updated as a single package using Oracle Hardware Management Pack utility command-line interface (CLI) tools.

Note - Refer to the server documentation product notes for detailed instructions on system software updates.

- Before You Begin**
- Update your system to the latest software release.
 - Verify that the latest supported software release of Oracle Hardware Management Pack is installed on the host.
For CLI command instructions, refer to Oracle Hardware Management Pack documentation at <https://www.oracle.com/goto/ohmp/docs>.
1. **Check Oracle 6.4 TB NVMe SSD v1 Product Notes for the latest firmware requirements.**
See “[Minimum Supported Oracle 6.4 TB NVMe SSD v1 Firmware Version](#)” on page 12.
 2. **Log in to the target system.**
For detailed instructions, refer to the server installation guide. For example, to log in to the target system through SSH or through Oracle ILOM Remote System Console Plus, do one of the following:
 - **If you are using an SSH client connection.**

- a. **From a shell command line in a terminal window, establish an SSH connection to the server host.**

Type: `ssh root@hostname`, where *hostname* can be the DNS name or the IP address for the server host.

- b. **Log in to the system using an account with root access.**

- c. **Proceed to Step 3.**

- **If you are using a remote system console, first refer to the server administration guide and then perform these steps.**

To launch an Oracle ILOM Remote System Console Plus session, refer to Launching Remote KVMS Redirection Sessions in the server administration guide.

- a. **Access the host console. Establish a remote connection to the host console.**

Start an Oracle ILOM serial console session, type:

```
-->start /HOST/console
```

```
Are you sure you want to start /HOST/console (y/n)? y
```

- b. **Ensure that the server is powered on and booted.**

- c. **Access the operating system command-line interface.**

You issue Oracle Hardware Management Pack commands from the operating system command-line interface.

3. **Download and store any firmware image file updates on the server that are required to support Oracle 6.4 TB NVMe SSD v1s.**

- a. **Download firmware image files from this location:**

<https://support.oracle.com>

See “Download the Device Software Package” on page 20.

- b. **Copy the downloaded firmware image files to the target system root directory.**

4. **Identify all Oracle 6.4 TB NVMe SSD v1s and controller firmware versions in the server.**

a. Type: # fwupdate list controller

In the following examples, 6.4 TB NVMe SSD controllers c0-6 are enumerated in the output returned by the above command.

```
# fwupdate list controller
=====
CONTROLLER
=====
ID      Type  Manufacturer  Model  Product Name  FW Version
-----
c0      NVMe  Intel         0x0a54 7335940:ICDPC2DD20RA6.4T 8DV1RF30
c1      NVMe  Intel         0x0a54 7335940:ICDPC2DD20RA6.4T QDV1RF35
c2      NVMe  Intel         0x0a54 7335940:ICDPC2DD20RA6.4T QDV1RF35
c3      NVMe  Intel         0x0a54 7335940:ICDPC2DD20RA6.4T QDV1RF35
c4      NVMe  Intel         0x0a54 7335940:ICDPC2DD20RA6.4T QDV1RF35
c5      NVMe  Intel         0x0a54 7335940:ICDPC2DD20RA6.4T QDV1RF35
c6      NVMe  Intel         0x0a54 7335940:ICDPC2DD20RA6.4T QDV1RE14
c7      SAS   LSI Logic    0x00ce  Avago MegaRAID SAS 9361-1 4.710.00
c9      NET   Intel        0x1533  Intel(R) I210 Gigabit Net -
```

b. Verify that the firmware package files that are installed in Oracle 6.4 TB NVMe SSD v1s require updating.

To identify NVMe controllers that need updated firmware image files, view the FW Version column in the output from the `fwupdate list controller` command.

In the following example, 6.4 TB NVMe SSD controller c6 shows firmware version 8DV1RE14, while all of the other NVMe controllers show firmware version 8DV1RF30. All 6.4 TB NVMe SSD controllers c0 through c6 are enumerated in the output returned by the above command.

```
# fwupdate list controller
=====
CONTROLLER
=====
ID      Type  Manufacturer  Model  Product Name  FW Version
-----
c0      NVMe  Intel         0x0a54 7335940:ICDPC2DD20RA6.4T QDV1RF35
c1      NVMe  Intel         0x0a54 7335940:ICDPC2DD20RA6.4T QDV1RF35
c2      NVMe  Intel         0x0a54 7335940:ICDPC2DD20RA6.4T QDV1RF35
c3      NVMe  Intel         0x0a54 7335940:ICDPC2DD20RA6.4T QDV1RF35
c4      NVMe  Intel         0x0a54 7335940:ICDPC2DD20RA6.4T QDV1RF35
c5      NVMe  Intel         0x0a54 7335940:ICDPC2DD20RA6.4T QDV1RF35
c6      NVMe  Intel         0x0a54 7335940:ICDPC2DD20RA6.4T QDV1RE14
c7      SAS   LSI Logic    0x00ce  Avago MegaRAID SAS 9361-1 4.710.00
c9      NET   Intel        0x1533  Intel(R) I210 Gigabit Net -
```

c. View the Firmware Revision in the output from the `nvmeadm list -v` command.

To identify NVMe controllers and current firmware versions type:

```
# nvmeadm list -v
```

In the following example, controller SUNW-NVME-1 shows firmware version QDV1RF35 in the output returned by the above command.

```
# nvmeadm list -v
SUNW-NVME-1
      PCI Vendor ID:          0x8086
      Serial Number:         PHLE7464009U6P40GN
      Model Number:         7335940:ICDPC2DD2ORA6.4T
      Firmware Revision:     QDV1RF35
      Number of Namespaces:  1
root:~#
```

5. Quiesce Oracle 6.4 TB NVMe SSD v1 devices.

Before removing a drive, manually quiesce I/O and device usage.



Caution - System hang or data loss. Before updating device firmware, ensure that the device is quiesced and the following events are not occurring:

- The operating system is not accessing the disk (for example, the system boot disk).
 - An application is not accessing the disk (for example, a database application).
-

6. Update the selected 6.4 TB NVMe SSDs with the specified firmware package.

The `fwupdate` command can update firmware for all similar devices in the system utilizing an XML metadata file. This method is called Automatic Mode and is the recommended method for upgrades.

Note - Alternately, if you determine that each device must be updated with a separate `fwupdate` command, perform the `fwupdate Automatic Single Drive` method, or the `fwupdate Manual` method (if an XML metadata file is not available). For CLI command instructions, refer to Oracle Hardware Management Pack documentation at: <https://www.oracle.com/goto/ohmp/docs>.

a. Verify that an XML metadata file is available for the server.

An XML metadata file must be included with the firmware update package to use Automatic Mode. Refer to the update package Release Notes for more information.

- b. To update device firmware on Oracle 6.4 TB NVMe SSD v1s, type `fwupdate update controller -x metadata.xml`.**

```
# fwupdate update controller -x metadata.xml
```

The following components will be upgraded as shown:

```
=====
ID          Priority Action      Status   Old Firmware Ver.  Proposed Ver.  New
Firmware Ver. System Reboot
-----
c1          1          Check FW  Success   8DV1RE13         QDV1RF35       N/A
          System Reset
c2          1          Check FW  Success   8DV1RE13         QDV1RF35       N/A
          System Reset
```

Do you wish to process all of the above component upgrades? [y/n]?

If the current firmware package version on the selected drive is higher than the specified firmware package version, the command returns an error. For error codes, refer to Oracle Hardware Management Pack documentation at <https://www.oracle.com/goto/ohmp/docs>.

- c. To upgrade the firmware packages and process all of the above component upgrades, type `y`.**

```
Updating c1: Success
```

```
Updating c2: Success
```

```
Verifying all priority 1 updates
```

```
Execution Summary
```

```
=====
ID          Priority Action      Status   Old Firmware Ver.  Proposed Ver.  New
Firmware Ver. System Reboot
-----
c1          1          Post Power Pending  8DV1RF30         QDV1RF35       N/A
          System Reset
c2          1          Post Power Pending  8DV1RF30         QDV1RF35       N/A
          System Reset
```

```
System Reboot required for some applied firmware
```

```
Do you wish to automatically reboot now? [y/n]?
```

- d. Type `y` to reboot the host server to initialize the firmware update.**

7. Re-access the console. See step 2.

For more instructions, refer to the server Installation Guide.

8. Verify that the updated firmware package is installed in Oracle 6.4 TB NVMe SSD v1s.

a. Type the following from a terminal:

```
# fwupdate list controller
```

In the following example, Oracle 6.4 TB NVMe SSD v1s are displayed.

```
# fwupdate list controller
```

```
=====
CONTROLLER
=====
ID      Type   Manufacturer  Model   Product Name          FW Version
-----
c0      NVMe   Intel         0x0a54  7335940:ICDPC2DD2ORA6.4T  QDV1RF35
c1      NVMe   Intel         0x0a54  7335940:ICDPC2DD2ORA6.4T  QDV1RF35
c2      NVMe   Intel         0x0a54  7335940:ICDPC2DD2ORA6.4T  QDV1RF35
c3      NVMe   Intel         0x0a54  7335940:ICDPC2DD2ORA6.4T  QDV1RF35
c4      NVMe   Intel         0x0a54  7335940:ICDPC2DD2ORA6.4T  QDV1RF35
c5      NVMe   Intel         0x0a54  7335940:ICDPC2DD2ORA6.4T  QDV1RF35
c6      NVMe   Intel         0x0a54  7335940:ICDPC2DD2ORA6.4T  QDV1RF35
c7      SAS    LSI Logic     0x00ce  Avago MegaRAID SAS 9361-1 4.710.00
c9      NET    Intel         0x1533  Intel(R) I210 Gigabit Net -
```

b. Verify host recognition of all 6.4 TB NVMe SSDs by checking ID enumeration.

In the above example, 6.4 TB NVMe SSD controller IDs c0 to c6 are enumerated in the output returned by the above command.

c. Ensure that the 6.4 TB NVMe SSD firmware was updated in the output returned by the above command.

9. Verify Oracle 6.4 TB NVMe SSD v1 operation.

See “[Verify Oracle 6.4 TB NVMe SSD v1 Operation](#)” on page 27.

10. Repeat the firmware upgrade process until Oracle 6.4 TB NVMe SSD v1s have the most up to date firmware release.

See “[Minimum Supported Oracle 6.4 TB NVMe SSD v1 Firmware Version](#)” on page 12.

For example, upgrade firmware revision from 8DV1RE13 to 8DV1RE14, and then to 8DV1RF35.

Related Information

- *Oracle Server CLI Tools User's Guide* at: <https://www.oracle.com/goto/ohmp/docs>

- [“Minimum Supported Oracle 6.4 TB NVMe SSD v1 Firmware Version” on page 12](#)

▼ Verify Oracle 6.4 TB NVMe SSD v1 Operation

This procedure provides instructions to verify Oracle 6.4 TB NVMe SSD v1 operation on the host for supported Oracle Solaris and Oracle Linux operating systems. Verify Oracle 6.4 TB NVMe SSD v1 operation using Oracle Hardware Management Pack utility CLI tools.

- Before You Begin**
- Verify that Oracle Hardware Management Pack is installed on the host.
For CLI command instructions, refer to Oracle Hardware Management Pack documentation at <https://www.oracle.com/goto/ohmp/docs>.
 - Ensure that you have access to the server (either directly or over the network).

1. Observe Oracle 6.4 TB NVMe SSD v1 status indicator LEDs.

Verify that the Fault-Service Required 6.4 TB NVMe SSD status indicator is not lit and that the green Power status indicator is lit on the 6.4 TB NVMe SSDs that you updated. LED status indicators are: Green (operational), Amber (faulty disk), Blue (SSD has been prepared for removal).

Refer to [“Status Indicators” in Oracle 6.4 TB NVMe SSD User Guide](#).

2. Log in to the target system.

For detailed instructions, refer to the server installation guide. For example, to log in to the target system through SSH or through Oracle ILOM Remote System Console Plus, do one of the following:

- **If you are using an SSH client connection.**
 - a. From a shell command line in a terminal window, establish an SSH connection to the server host.**

Type: `ssh root@hostname`, where *hostname* can be the DNS name or the IP address for the server host.
 - b. Log in to the system using an account with root access.**
 - c. Proceed to Step 3.**
- **If you are using a remote system console, first refer to the server administration guide and then perform these steps.**

To launch an Oracle ILOM Remote System Console Plus session, refer to Launching Remote KVMS Redirection Sessions in the server administration guide.

a. Access the host console. Establish a remote connection to the host console.

Start an Oracle ILOM serial console session, type:

```
-->start /HOST/console
```

```
Are you sure you want to start /HOST/console (y/n)? y
```

b. Ensure that the server is powered on and booted.

c. Access the operating system command-line interface.

You issue Oracle Hardware Management Pack commands from the operating system command-line interface.

3. Identify all 6.4 TB NVMe SSDs and verify that the latest firmware packages are installed.

a. Type the following command:

```
# fwupdate list controller
```

In the following example, devices are enumerated in the output returned by the above command.

```
# fwupdate list controller
=====
CONTROLLER
=====
ID      Type   Manufacturer  Model    Product Name                FW Version
-----
c0      NVMe   Intel         0x0a54   7335940:ICDPC2DD20RA6.4T    QDV1RF35
c1      NVMe   Intel         0x0a54   7335940:ICDPC2DD20RA6.4T    QDV1RF35
c2      NVMe   Intel         0x0a54   7335940:ICDPC2DD20RA6.4T    QDV1RF35
c3      NVMe   Intel         0x0a54   7335940:ICDPC2DD20RA6.4T    QDV1RF35
c4      NVMe   Intel         0x0a54   7335940:ICDPC2DD20RA6.4T    QDV1RF35
c5      NVMe   Intel         0x0a54   7335940:ICDPC2DD20RA6.4T    QDV1RF35
c6      NVMe   Intel         0x0a54   7335940:ICDPC2DD20RA6.4T    QDV1RF35
c7      SAS    LSI Logic     0x00ce   Avago MegaRAID SAS 9361-1  4.710.00
c9      NET    Intel         0x1533   Intel(R) I210 Gigabit Net -
```

b. Verify host recognition of all 6.4 TB NVMe SSDs by checking controller ID enumeration.

In the above example, 6.4 TB NVMe SSD controllers c0 to c6 are enumerated in the output returned by the above command.

- c. **Ensure that all 6.4 TB NVMe SSDs firmware revisions are current in the output returned by the above command.**

See [“Minimum Supported Oracle 6.4 TB NVMe SSD v1 Firmware Version”](#) on page 12.

4. Check NVMe device status.

To identify NVMe controllers and current firmware versions, type:

```
# nvmeadm list -v
```

To identify NVMe controllers that have updated firmware, view the **Firmware Revision** row in the output from the `nvmeadm list -v` command.

In the following example, controller SUNW-NVME-1 shows firmware version 8DV1RF30 in the output returned by the above command.

```
# nvmeadm list -v
SUNW-NVME-1
    PCI Vendor ID:          0x8086
    Serial Number:         PHLE7464009U6P40GN
    Model Number:         7335940:ICDPC2DD20RA6.4T
    Firmware Revision:     QDV1RF35
    Number of Namespaces:  1
root:~#
```

5. Check the health of Oracle 6.4 TB NVMe SSD v1s.

To check the selected 6.4 TB NVMe SSD health and SMART (Self-Monitoring, Analysis, and Reporting Technology) information, type:

```
# nvmeadm getlog -h
```

Ensure that the 6.4 TB NVMe SSDs have remaining drive life (Percentage Used) in the output returned by the above command.

```
# nvmeadm getlog -h
F640-NVME-1
SMART/Health Information:
    Critical Warning: 0
    Temperature: 312 Kelvin
    Available Spare: 100 percent
    Available Spare Threshold: 10 percent
    Percentage Used: 0 percent
    Data Unit Read: 0x1 of 512k bytes.
    Data Unit Written: 0x0 of 512k bytes.
```

```

Number of Host Read Commands: 0x30313b3
Number of Host Write Commands: 0x302f25d
Controller Busy Time in Minutes: 0x0
Number of Power Cycle: 0xf
Number of Power On Hours: 0x1c
Number of Unsafe Shutdown: 0xf
Number of Media Errors: 0x0
Number of Error Info Log Entries: 0x0
    
```

F640-NVME-2
 SMART/Health Information:....

Related Information

- [“Minimum Supported Oracle 6.4 TB NVMe SSD v1 Firmware Version” on page 12](#)
- Oracle Hardware Management Pack documentation at: <https://www.oracle.com/goto/ohmp/docs>

Issues Fixed in This Firmware Release

This section lists Oracle 6.4 TB NVMe SSD v1 issues fixed in Firmware Release QDV1RF35 or previously. Consult the Readme.

Fixed Issues

The following Oracle 6.4 TB NVMe SSD v1 issues are fixed in Firmware Release QDV1RF30.

Bug ID	Issue
28244670	Oracle ILOM Reports a Fault <code>fault.io.scsi.cmd.disk.dev.rqs.baddrv</code>
27759886	Oracle 6.4 TB NVMe SSD v1 Asserting on RE14 To immediately ensure the fix is implemented, perform the <i>Secure Erase Drives Before Use</i> erase sequence, otherwise after two weeks of device power-on the issue will be fully resolved. See “Secure Erase Drives Before Use” on page 31 .
28708331	Device Monitor: Extend jitter check to cover device read failures Oracle ILOM Software Release 4.0.4.21.a is required on x86 platforms using firmware release 8DV1RF30 to reduce device read failures. The SMBus can take up to 30 seconds to respond after a firmware update (Bug ID: 28708331 – Device Monitor: Extend jitter check to cover device read failures).

The following issues are fixed in Firmware Release 8DV1RE14.

Bug ID	Issue
27410962	Oracle 6.4 TB NVMe SSD v1 loses namespace, IPS 00214730
27036497	MI data returns Drive not ready: TRUE when drive is healthy and functional in-band
27002878	Oracle 6.4 TB NVMe SSD v1 failed on the first boot to Solaris when VTS was started
27002555	Oracle 6.4 TB NVMe SSD v1 does not come ready beyond 20 seconds
26942617	ATS hwdiag pci info all fails for NVMe Oracle 6.4 TB NVMe SSD v1
26910610	Oracle 6.4 TB NVMe SSD v1 disappears when binding to VFIO
26865237	Oracle 6.4 TB NVMe SSD v1 has Queue fail and device no response during SPARC system reboot test
26830704	Oracle 6.4 TB NVMe SSD v1 hwdiag reports invalid field length of vendor specific block This output can be viewed only from the restricted access Sun Service hwdiag shell.
26789934	Oracle 6.4 TB NVMe SSD v1 Invalid field length of vendor specific block for DSN length with REOD
26726770	Oracle 6.4 TB NVMe SSD v1 fault.io.intel.iio.pcie-data-link-layer-inactive
26693990	Oracle 6.4 TB NVMe SSD v1 drives experiencing pcie-link-degraded-width fault on X7-2L
26630304	Oracle 6.4 TB NVMe SSD v1 devices lost during and after testing
26566040	Determine the correct NVMe Shutdown timeout period for RTD3 (RunTime D3) power state Oracle 6.4 TB NVMe SSD v1s support NVMe specifications for RTD3 Resume Latency and RTD3 Entry Latency. RTD3R Resume latency allows 12 seconds of margin for devices to safely start before main power is applied to the device controller. RTD3E Entry latency allows 10 seconds of margin for active devices to safely shutdown before main power is removed from the device controller. Note - Shutdown not complete messages may appear for OSES that do not support RTD3 Resume Latency and RTD3 Entry Latency.

Secure Erase Drives Before Use

Bug ID: 27759886 *Fixed in Firmware Release RF30*

Oracle 6.4 TB NVMe SSD v1 may report uncorrectable errors or assert after not being powered for three or more months. For best practice, secure erase Oracle 6.4 TB NVMe SSD v1s before use (especially if use is reading from the drive as a test) and especially if the drive has been unpowered for more than three months. If the NAND media is not refreshed for approximately three months, the drive may experience media errors.

Over time, the drive firmware policy refreshes the media in the background while it remains powered-on. If the drive has been powered on long enough for the background refresh policy to be applied to all bits, the drive is not at risk for this issue. The time required to refresh all the bits is approximately 14 days and varies by product.

If the number of bits experiencing this issue exceeds the error-correction code (ECC) capability, it may result in an uncorrectable read error. If the uncorrectable read errors occur during normal drive operation, the drive will report an increased number of SMART media errors to the host. If the uncorrectable read errors occur during drive power-on, the drive will report either an ASSERT or BAD_CONTEXT error code to the host.

The following screen shows an ASSERT or BAD_CONTEXT event at power-on after the media has not been refreshed for a time.

```
Firmware QDV1RD28: ASSERT_100452A0, BAD_CONTEXT_1042, or BAD_CONTEXT_1043
```

Workaround:

Select one of the following methods before use of the drive for operation or test. An off-line server can be used.

- Download and use RF30 mitigation firmware to secure erase the drive, using the nvmeadmin utility. See *Secure Erase Oracle 6.4 TB NVMe SSD v1*.
- Wait two weeks for a media refresh while the drive is powered-on before using the drive.



Caution - All device data will be destroyed after an erase.

Secure Erase Oracle 6.4 TB NVMe SSD v1

If immediate refresh of all bits is desired, secure erase the drive, using the Oracle Hardware Management Pack NVMe admin utility.

For more information on CLI commands, refer to *Oracle Hardware Management Pack 2.4 Server CLI Tools User's Guide*: <https://www.oracle.com/goto/ohmp/docs>. See “Server Management Tools” on page 16.

1. Stop all IO to the NVMe device before attempting this action. Manually quiesce I/O and device usage.
2. List all server devices. Type: `# fwupdate list controller`. For example:

```
# fwupdate list controller

=====
CONTROLLER
=====
ID      Type  Manufacturer  Model    Product Name          FW Version
-----
c0     SAS   LSI Logic     0x0097   ORACLE-T7             05.00.00.00
```

c1	SAS	LSI Logic	0x0097	SAS9300-8e	13.00.00.00
c2	SAS	LSI Logic	0x0097	ORACLE-T7	05.00.00.00
c3	NVMe	Intel	0x0a54	7335943:ICDPC5ED20RA6.4T	8DV1RF35
c4	NVMe	Intel	0x0a54	7335943:ICDPC5ED20RA6.4T	8DV1RF35
c5	NVMe	Intel	0x0a54	7335940:ICDPC2DD20RA6.4T	8DV1RF35
c6	NVMe	Intel	0x0a54	7335940:ICDPC2DD20RA6.4T	8DV1RF35
c7	NVMe	Intel	0x0a54	7335943:ICDPC5ED20RA6.4T	8DV1RF35
c8	NVMe	Intel	0x0a54	7335943:ICDPC5ED20RA6.4T	8DV1RF35
c9	NVMe	Intel	0x0a54	7335943:ICDPC5ED20RA6.4T	8DV1RF35
c10	NVMe	Intel	0x0a54	7335943:ICDPC5ED20RA6.4T	8DV1RF35
c11	NVMe	Intel	0x0a54	7335943:ICDPC5ED20RA6.4T	8DV1RF35
c12	NVMe	Intel	0x0a54	7335943:ICDPC5ED20RA6.4T	8DV1RF35
c13	NVMe	Intel	0x0a54	7335943:ICDPC5ED20RA6.4T	8DV1RF35
c14	NVMe	Intel	0x0a54	7335943:ICDPC5ED20RA6.4T	8DV1RF35

3. Back up drive user data, if necessary.
4. Download the RF30 mitigation firmware image, if necessary.
See [“Download the Device Software Package” on page 20](#) at [“Accessing Software Updates and Firmware Downloads” on page 20](#).
5. Update the affected drive with the RF30 mitigation firmware, if necessary. See [“Update the NVMe Storage Drive Firmware” on page 21](#).

Type: # **fwupdate update nvme-controller-firmware -f <FW file> -n <controller ID>** . For example:

```
# fwupdate update nvme-controller-firmware -f ICDPC2DD2.RF30.fw -n c3
```

The following components will be upgraded as shown:

```
=====
```

ID	Priority	Action	Status	Old Firmware Ver.	Proposed Ver.	New
		System Reboot				
c3	1	Check FW	Success	QDV1RF30	Not Provided	N/A
		N/A				

Do you wish to process all of the above component upgrades? [y/n]? y
Updating c3: Success

Verifying all priority 1 updates

No metadata provided, so version verification can not be completed

Execution Summary

```
=====
```

ID	Priority	Action	Status	Old Firmware Ver.	Proposed Ver.	New
		System Reboot				

```
-----
c3      1      Validate  Pending  QDV1RF30      Not Provided
8DV1RF35      N/A
```

Note - After performing updates from below Firmware Release RE14, perform a drive full power cycle.

Power down the host using Oracle ILOM. Type: `# fwupdate reset controller -n <controller ID>`. Alternately, hotplug disable and remove the devices and re-insert them.

6. Reset the affected drive. Type: `# fwupdate reset controller -n <controller ID>`.
7. Check NVMe device status to identify NVMe controllers and current firmware versions. Type `#nvmeadm list -v`. For example:

```
# nvmeadm list -v
SUNW-NVME-1
    PCI Vendor ID:          0x8086
    Serial Number:          PHLE713400T56P4BGN-1
    Model Number:           7335943:ICDPC5ED20RA6.4T
    Firmware Revision:      8DV1RF35
    Number of Namespaces:   1
SUNW-NVME-2
    PCI Vendor ID:          0x8086
    Serial Number:          PHLE713400T56P4BGN-2
    Model Number:           7335943:ICDPC5ED20RA6.4T
    Firmware Revision:      8DV1RF35
    Number of Namespaces:   1
SUNW-NVME-3
    PCI Vendor ID:          0x8086
    Serial Number:          PHLE7464009N6P40GN
    Model Number:           7335940:ICDPC2DD20RA6.4T
    Firmware Revision:      8DV1RF35
    Number of Namespaces:   1
SUNW-NVME-4
    PCI Vendor ID:          0x8086
    Serial Number:          PHLE7464009L6P40GN
    Model Number:           7335940:ICDPC2DD20RA6.4T
    Firmware Revision:      8DV1RF35
    Number of Namespaces:   1
```

8. Take the drive offline. Type: `# nvmeadm offline -n <namespace> <controller name> namespacecontroller_name`. The namespace is 1 in the following example:

```
# nvmeadm offline -n 1 SUNW-NVME-3
```

9. Securely erase the affected drive three times.

To securely erase all namespaces (SES=1), type: `# nvmeadm erase -a controller_name`. For example:

```
# nvmeadm erase -a SUNW-NVME-3
SUNW-NVME-3
Erase data on all namespaces (Y/N)?y
Erase device SUNW-NVME-3 successfully.
```

Repeat this command two more times to securely erase all namespaces. For example:

```
# nvmeadm erase -a SUNW-NVME-3
SUNW-NVME-3
Erase data on all namespaces (Y/N)?y
Erase device SUNW-NVME-3 successfully.
# nvmeadm erase -a SUNW-NVME-3
SUNW-NVME-3
Erase data on all namespaces (Y/N)?y
Erase device SUNW-NVME-3 successfully.
```

10. Place the drive online. Type: `# nvmeadm online -n <namespace> <controller name> namespacecontroller_name`. The namespace is 1 in the following example:

```
# nvmeadm online -n 1 SUNW-NVME-3
```

11. Identify the affected drive block device name of SUNW-NVME-3 using the `nvmeadm namespace` command. The Block Device Name is `/dev/rdisk/c28t1d0s2` in the following example:

```
# nvmeadm namespace -v SUNW-NVME-3
SUNW-NVME-3
  Namespace: 1
    Block Size:          512
    Capacity:            6401252745216
    Metadata Size:       0
    Block Device Name:    /dev/rdisk/c28t1d0s2
    Status:               online
```

Verify that the device status is online.

12. Execute more than 490 GB of sequential write to the affected drive. For example:

```
# dd if=/dev/zero of=/dev/rdisk/c28t1d0p0 bs=131072 count=3814698
3814698+0 records in
3814698+0 records out
```

The drive Block Device Name is `/dev/rdsk/c28t1d0s2`. Use the Block Device Name that represents the entire drive to utilize the raw device as shown in the above example.

Note - 3814698 (count) x 131072 (bs) = 500,000,096,256 bytes

13. Verify drive health. See [“Verify Oracle 6.4 TB NVMe SSD v1 Operation”](#) on page 27.
14. Restore user data, if necessary.

Known Issues

This section describes important operating issues and known hardware and software issues for Oracle 6.4 TB NVMe SSD v1s.

Supplementary and workaround information for Oracle 6.4 TB NVMe SSD v1s. Specific Bug ID identification numbers are provided for service personnel.

Oracle Linux 8 Update 3, Update 4 Install Fails on Oracle 6.4 TB NVMe SSD Devices

Bug ID: 32230475, 32823840, 32352405

Issue: Installation of Oracle Linux 8 Update 3 or Oracle Linux 8.4 on Oracle 6.4 TB NVMe SSD devices generates errors and stops.

Installation on Oracle 6.4 TB NVMe SSD device fails because `mkfs.xfs` cannot mount file system. Attempting to perform a fresh installation of Oracle Linux 8.3 or Oracle Linux 8.4 on an Oracle 6.4 TB NVMe SSD device will fail. This issue occurs because the `mkfs.xfs` command cannot mount the file system. This failure is related to a problem with the `xfsprogs` package version that is in RHCK, with the root cause of the issue being an NVMe SSD firmware bug.

The following screen shows an incomplete Oracle Linux 8 Update 3 installation for Oracle 6.4 TB NVMe SSD v1.

```
An unknown error has occurred
```

Affected Software: Oracle Linux 8 Update 3, Oracle Linux 8 Update 4

Affected Hardware: Oracle 6.4 TB NVMe SSD v1 and v2 storage drives on supported X7 and X8 series servers. See [“Supported Servers and Operating Systems”](#) on page 10.

Workaround: Do not use the Oracle 6.4 TB NVMe SSD as a boot disk. Alternatively, you can install Oracle Linux 8.2, and then upgrade to Oracle Linux 8.4. Use the Ext4 file system to install Oracle Linux 8 Update 3 to Oracle 6.4 TB NVMe SSD storage drives. Disable the **DSM** deallocate bit on X7-2, X7-2L, X8-2, X8-2L servers.

Fix: None

Oracle 6.4 TB NVMe SSD v1 Subsystem Vendor ID Misnamed

Important Operating Note

Summary: Oracle 6.4 TB NVMe SSD v1 (P4600 Series) Subsystem Vendor ID (SSID) should be 0x4871. However, some Oracle 6.4 TB NVMe SSD v1s were programmed with Subsystem Vendor ID 0x4870. Both Subsystem Vendor IDs are supported as the hardware and firmware are identical.

Issue: Oracle 6.4 TB NVMe SSD v1 (P4600 Series) Subsystem Vendor IDs should be 0x4871. However, some Oracle 6.4 TB NVMe SSD v1s were programmed with Subsystem Vendor ID 0x4870. Both Subsystem Vendor IDs are supported, as the hardware and firmware are identical. With devices using QD1VRF30 firmware, the SSID may be reported as 0x4870. There is no functional difference between the two drives and this report can be safely ignored.

However, note that when the Oracle 6.4 TB NVMe SSD v1 (P4600 Series) is queried in VMware ESXi, for example using the command `esxcfg-scsidevs -a`, the SSID is matched to a text file string stored in a file called `pciids` (<https://github.com/pciutils/pciids>). A correctly programmed Oracle 6.4 TB NVMe SSD v1 with SSID 0x4871 is matched to the text string `108e 4871 NVMe PCIe 3.0 SSD 6.4TB 2.5-inch (P4600)`. When an Oracle 6.4 TB NVMe SSD v1 with SSID 0x4870 is queried, the device is matched to `108e 4870 NVMe PCIe 3.0 SSD 6.4TB AIC (P4608)`. This can cause some confusion when requesting VMware support, as the P4608 device is not supported, nor is it part of the Oracle vSAN offering. Only the P4600 and P4610 series devices are supported and included in the Oracle vSAN offering. Refer to the VMware Compatibility Guide:

https://www.vmware.com/resources/compatibility/search.php?deviceCategory=ssd&details=1&vsan_type=vsanssd&ssd_partner=276&ssd_devicetype=22&vsanrncomp=true&

Affected Hardware: Oracle 6.4 TB NVMe SSD v1s (P4600 Series) with SSID 0x4870

Affected Software: VMware ESXi

Resolution: Oracle 6.4 TB NVMe SSD v1 (P4600 Series) with SSID 0x4870 and 0x4871 are identical devices and both are supported under the vSAN certification. This is just a notification

that either device SSID is acceptable. Long term, Oracle may release a fix that may require another vSAN certification, but would update the correct device SSID to 0x4871.

Oracle ILOM Reports a Fault for NVMe Devices When Performing a Reboot, Firmware Update, or Hot-Plug Operation

Bug ID: 28654297

Issue: Oracle ILOM might report a `fault.chassis.device.fail` error for NVMe devices when performing a reboot, a firmware update, or hot-plug operation.

Affected Hardware and Software: NVMe storage devices on all supported operating systems

Workaround: Disable the `device_monitor` feature in Oracle ILOM using the following command:

```
set /SP/services/device_monitor servicestate=disabled
```

Additional File in Oracle 6.4 TB NVMe SSD v1 RE14 Firmware Upgrade Package

The file `FORCEMTR.1111.fw` contained in FW release RE14 for Oracle 6.4 TB NVMe SSD v1s has no function and can be safely ignored.

Utility `nvmeadm 2.4.3.0` Cannot Reformat Oracle 6.4 TB NVMe SSD v1 to 4096 Bytes LBA Size (27370903, 27367486)

The Oracle Hardware Management Pack utility `nvmeadm 2.4.3.0` cannot reformat an NVMe drive to 4096 bytes LBA (logical block address) size. When using `nvmeadm format` command, the Oracle 6.4 TB NVMe SSD v1 is unable to format with a "4k" logical block address size as shown in the following example.

```
# nvmeadm -V
```

```

nvmeadm version 2.4.3.0 r20704

# nvmeadm format -a -b 4096 -f SUNW-NVME-2
SUNW-NVME-2
Invalid blocksize and/or metadata size.
ERROR: Command failed on one or more device(s)

# nvme id-ns /dev/nvme1n1
NVME Identify Namespace 1:
nsze   : 0x2e93432b0
ncap   : 0x2e93432b0
nuse   : 0x2e93432b0
nsfeat : 0
nlbaf  : 1
flbas  : 0
mc     : 0
dpc    : 0
dps    : 0
nmic   : 0
rescap : 0
fpi    : 0
nawun  : 0
nawupf : 0
nacwu  : 0
nabsn  : 0
nabo   : 0
nabspf : 0
nvmcap : 6401252745216
nguid  : 01000000010000005cd2e445073d4e51
eui64  : 5cd2e445073d0100
lbaf 0 : ms:0 ds:9 rp:0x2 (in use)
lbaf 1 : ms:0 ds:12 rp:0

# nvmeadm format -l SUNW-NVME-1
SUNW-NVME-1
  LBA Format: 1
    Block Size:          512 <-----
    Metadata Size:      0 <-----
  LBA Format: 2
    Block Size:          512 <-----
    Metadata Size:      8 <-----

```

Workaround:

None. Use a supported block size other than a "4k" block size when formatting. Use a different supported format utility if available.

Diversity and Inclusion

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