Oracle® Flash Accelerator F640 PCIe Card v2 Product Notes

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Contents

Using This Documentation

- **Overview** – Provides late-breaking information about Oracle Flash Accelerator F640 PCIe Card v2
- **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/oracleflashf640/docs

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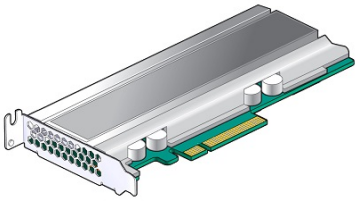
Oracle Flash Accelerator F640 PCIe Card v2 Product Notes

This section contains late-breaking information about Oracle Flash Accelerator F640 PCIe Card v2s. Read this section before reading other Oracle Flash Accelerator F640 PCIe Card v2 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 Flash Accelerator F640 PCIe Card v2s with your server, supported firmware and operating systems, important operating notes, and known issues, refer to the latest platform product notes document.



These topics are included in this section.

Description	Links
Review the software and firmware supported for Oracle Flash Accelerator F640 PCIe Card v2s.	“Supported Hardware and Software” on page 10
Review important information for configuring Oracle Flash Accelerator F640 PCIe Card v2s.	“Implementation Considerations” on page 16
Check known issues.	“Known Issues” on page 34

Supported Hardware and Software

The following sections describe the software and firmware supported for Oracle Flash Accelerator F640 PCIe Card v2s:

Supported Servers and Operating Systems

This section lists the servers that support Oracle Flash Accelerator F640 PCIe Card v2s. For detailed information about using this card with your server, see the product notes for your server, available at `https://docs.oracle.com`.

The following servers are supported for the Oracle Flash Accelerator F640 PCIe Card v2.

x86 Servers	Number of Cards	Slots Supported for Installing Cards	Minimum Supported Operating Systems
Oracle Server X8-2L	1 to 4 for HC (High Capacity) 1 to 8 for EF (Extreme Flash) 3 when installed with PCIe Switch Cards	For HC (High Capacity): Slots 4,5,6,10 For EF (Extreme Flash): Slots 2,3,4,5,6,8,9,10	■ Oracle Linux 7.6 with Unbreakable Enterprise Kernel Release 5 Update 1 (UEK R5u1) or the Red Hat Compatible Kernel ■ Oracle VM Server 3.4.6 ■ Oracle Solaris 11.4 ■ Windows Server 2016 ■ VMware ESXi 6.7 Update 1
Oracle Server X8-8	1 to 4 in 4-CPU System 1 to 8 in 8-CPU System	4-CPU System System A: Slots 8,6,4,2 4-CPU System System B: Slots 16,14,12,10 8-CPU System Slots 16,8,14,6,12,4,10,2	■ Oracle Linux 7.6 with Unbreakable Enterprise Kernel Release 5 Update 1 (UEK R5u1) or the Red Hat Compatible Kernel ■ Oracle VM Server 3.4.6 ■ Oracle Solaris 11.4 ■ Windows Server 2019 Windows Server 2016 ■ VMware ESXi 6.7 Update 1
Oracle Server X7-2L	1 to 4 for HC (High Capacity) 1 to 8 for EF (Extreme Flash)	For HC (High Capacity): Slots 4,5,6,10	■ Oracle Linux 7.3

x86 Servers	Number of Cards	Slots Supported for Installing Cards	Minimum Supported Operating Systems
	3 when installed with PCIe Switch Cards	For EF (Extreme Flash): Slots 2,3,4,5,6,8,9,10	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 Server 3.4.4 ■ Oracle Solaris 11.3 SRU 23 Oracle Solaris 11.4 ■ Windows Server 2016 Windows Server 2012 R2 ■ VMware ESXi 6.5 Update 1
Oracle Server X7-8	1 to 4 in 4-CPU System 1 to 8 in 8-CPU System	4-CPU System System A: Slots 8,6,4,2 4-CPU System System B: Slots 16,14,12,10 8-CPU System Slots 16,8,14,6,12,4,10,2	■ 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

SPARC Servers	Number of Cards	Slots Supported for Installing Cards	Minimum Supported Operating Systems
SPARC S7-2L Server	8 drive: 1 to 6 24 drive: 1 to 6	8 drive: 1 to 6 24 drive: 1 to 6	Oracle Solaris 11.4
SPARC T7-1 Server	1 to 4	1 to 6	Oracle Solaris 11.4
SPARC T7-2 Server	1 to 4	1 to 8 (All)	Oracle Solaris 11.4
SPARC T8-1 Server	1 to 4	1 to 6 (All)	Oracle Solaris 11.4
SPARC T8-2 Server	1 to 4	1 to 8	Oracle Solaris 11.4
SPARC T8-4 Server	1 to 8	3, 16, 4, 15, 7, 12, 8, 11, 1, 14, 5, 10, 2, 13, 6, 9	Oracle Solaris 11.4

SPARC Servers	Number of Cards	Slots Supported for Installing Cards	Minimum Supported Operating Systems
SPARC M8-8 Server with one PDomain	1 to 8 Up to 8 per system	1 to 24 (All)	Oracle Solaris 11.4
SPARC M8-8 Server with two PDomains	1 to 16 Up to 8 per PDomain Up to 16 per system	1 to 24 (All)	Oracle Solaris 11.4
SPARC M7-8 Server with one PDomain	1 to 8 Up to 8 per system	1 to 24 (All)	Oracle Solaris 11.4
SPARC M7-8 Server with two PDomains	1 to 16 Up to 8 per PDomain. Up to 16 per system	1 to 24 (All)	Oracle Solaris 11.4
SPARC M7-16 Server	1 to 32 Up to 8 per PDomain Up to 32 per system	1 to 48 (All)	Oracle Solaris 11.4

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

Minimum Supported Card Firmware Version

Oracle Flash Accelerator F640 PCIe Card v2s run with the minimum required firmware package listed in the following table.

Firmware	Minimum Required Card Firmware Version	Recommended Card Firmware Version
Oracle 6.4 TB NVMe SSD v2 Package	VDV1RZ06 F640 1.0.0 - FIRMWARE	33528265 - F640 V2 ORACLE FLASH ACCELERATOR (AIC) FW RZ09 VDV1RZ09

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

Summary of Changes in Firmware VDV1RZ09 Release

The following improvements or changes were included in firmware VDV1RZ09 release of Oracle F640 Flash Card v2:

- SPARC T8-4 Server support.
- If you install Oracle Flash Accelerator F640 PCIe Card v2s as an option, you must update firmware to VDV1RZ06, and then to VDV1RZ09, or a subsequent firmware release if available.

Summary of Changes in Firmware VDV1RZ06 Release

The following improvements or changes were included in firmware VDV1RZ06 release of Oracle F640 Flash Card v2:

- If you install Oracle Flash Accelerator F640 PCIe Card v2s as an option, you must update firmware to 8DV1RZ03, and then to VDV1RZ06, or a subsequent firmware release if available.

Required Host Firmware

Oracle Flash Accelerator F640 PCIe Card v2s run with the minimum required host firmware listed in the following table.

x86 Driver	Minimum Required Host Firmware Version (Patch No.)	Recommended System Firmware Version (Patch No.)
Oracle Server X8-2L	Patch 29811557: Oracle Server X8-2L SW 1.1.0 - FIRMWARE PACK	Patch 33193066: Oracle Server X8-2L SW 3.2.2 - FIRMWARE PACK or later
Oracle Server X8-8	Patch 29913855 Oracle Server X8-8 SW 1.1.0 - FIRMWARE PACK	Patch 33188287: Oracle Server X8-8 SW 3.2.2 - FIRMWARE PACK or later
Oracle Server X7-2L	Patch 29928400: Oracle Server X7-2L SW 1.6.0 - FIRMWARE PACK	Patch 33194331: Oracle Server X7-2L SW 3.2.2 - FIRMWARE PACK or later
Oracle Server X7-8	Patch 29913849: Oracle Server X7-8 SW 1.6.0 - FIRMWARE PACK	Patch 33187298: Oracle Server X7-8 SW 3.2.2 - FIRMWARE PACK or later

SPARC Driver	Minimum Required Host Firmware Version (Patch No.)	Recommended System Software Version (Patch No.)
SPARC S7-2L Server	Patch 29443731: FIRMWARE: SPARC S7-2L SUN SYSTEM FIRMWARE 9.9.2.A 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	Patch 26963946: FIRMWARE: SPARC T7-1 SUN SYSTEM FIRMWARE 9.9.2.A With Hardware_Programmables-1.0.14-SPARC_T7-1+T7-2+T7-4+S7-2+S7-2L.pkg file also installed.	Patch 33270223: FIRMWARE: SPARC T7-1 SUN SYSTEM FIRMWARE 9.10.3 or later
SPARC T7-2 Server	Patch 27353106: FIRMWARE: SPARC T7-2 SUN SYSTEM FIRMWARE 9.9.2.A With Hardware_Programmables 1.0.15 file also installed.	Patch 33270225: FIRMWARE: SPARC T7-2 SUN SYSTEM FIRMWARE 9.10.3 or later
SPARC T8-1 Server	Patch 29443721: FIRMWARE: SPARC T8-1 SUN SYSTEM FIRMWARE 9.9.2.A	Patch 33270219: FIRMWARE: SPARC T8-1 SUN SYSTEM FIRMWARE 9.10.3 or later
SPARC T8-2 Server	Patch 29443723: FIRMWARE: SPARC T8-2 SUN SYSTEM FIRMWARE 9.9.2.A	Patch 33270220: FIRMWARE: SPARC T8-2 SUN SYSTEM FIRMWARE 9.10.3 or later
SPARC T8-4 Server	FIRMWARE: SPARC T8-4 SUN SYSTEM FIRMWARE 9.9.2.A Patch 28902031: FIRMWARE: SPARC T8-4 SUN SYSTEM FIRMWARE 9.9.1.F	Patch 33270221: FIRMWARE: SPARC T8-4 SUN SYSTEM FIRMWARE 9.10.3 or later
SPARC M8-8 Server with one PDomain	FIRMWARE: SPARC M8-8 SUN SYSTEM FIRMWARE 9.9.2.A Patch 29443726: FIRMWARE: SPARC M8-8+M7-16+M7-8 SYSTEMS SUN SYSTEM FIRMWARE 9.9.2	Patch 33270227: FIRMWARE: SPARC M8-8+M7-16+M7-8 SYSTEMS SUN SYSTEM FIRMWARE 9.10.3 or later
SPARC M8-8 Server with two PDomains	FIRMWARE: SPARC M8-8 SUN SYSTEM FIRMWARE 9.9.2.A Patch 29443726: FIRMWARE: SPARC M8-8+M7-16+M7-8 SYSTEMS SUN SYSTEM FIRMWARE 9.9.2	Patch 33270227: FIRMWARE: SPARC M8-8+M7-16+M7-8 SYSTEMS SUN SYSTEM FIRMWARE 9.10.3 or later
SPARC M7-8 Server with two PDomains SPARC M7-8 Server with one PDomain	FIRMWARE: SPARC M7-8 SUN SYSTEM FIRMWARE 9.9.2.A Patch 29443726: FIRMWARE: SPARC M8-8+M7-16+M7-8 SYSTEMS SUN SYSTEM FIRMWARE 9.9.2	Patch 33270227: FIRMWARE: SPARC M8-8+M7-16+M7-8 SYSTEMS SUN SYSTEM FIRMWARE 9.10.3 or later
SPARC M7-16 Server	FIRMWARE: SPARC M7-16 SUN SYSTEM FIRMWARE 9.9.2.A Patch 29443726: FIRMWARE: SPARC M8-8+M7-16+M7-8 SYSTEMS SUN SYSTEM FIRMWARE 9.9.2	Patch 33270227: FIRMWARE: SPARC M8-8+M7-16+M7-8 SYSTEMS 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).

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 Flash Accelerator F640 PCIe Card v2s, see "Accessing Software Updates and Firmware Downloads" on page 24 and refer to "Update Your System to the Latest Software Release" in *Oracle Flash Accelerator F640 PCIe Card v2 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

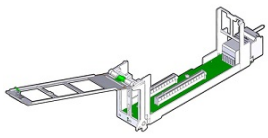
These topics provide important information for configuring Oracle Flash Accelerator F640 PCIe Card v2s in supported servers:

Oracle Server X8-8 Configuration

Minimum required software for Oracle Server X8-8 is SW1.1.0 or later.

Oracle Server X8-8 requires a doublewide PCIe hot-plug carrier extension for each installed Oracle Flash Accelerator F640 PCIe Card v2 to facilitate airflow. Dual PCIe Card Carriers (DPCCs) do not allow the use of one adjacent PCIe slot. PCIe hot-plug carrier extensions (PN **710710**) are installed in odd numbered PCIe slots.

The following figure shows an example of a hot-swappable Dual PCIe Card Carrier that populates two PCIe slots for each Oracle Flash Accelerator F640 PCIe Card v2.



For more information about server configuration, refer to the server documentation at https://www.oracle.com/goto/x8-8/docs.

Oracle Server X8-2L Configuration

Minimum required software for Oracle Server X8-2L is SW1.1.1 or later.

Oracle Flash Accelerator F640 PCIe Card v2 population rules for Oracle Server X8-2L:

- If Oracle F640 Flash Card v2 quantity is less than three, then Oracle F640 Flash Card v2 installation order is: NVMe0, NVMe1, NVMe2, NVMe3 NVMe4, NVMe5, NVMe6, NVMe7, NVMe8, NVMe9, NVMe10, NVMe11
- If Oracle F640 Flash Card v2 quantity is four, then Oracle F640 Flash Card v2 installation order is: NVMe4, NVMe5, NVMe6, NVMe10
- If Oracle F640 Flash Card v2 quantity is more than four, then Oracle F640 Flash Card installation v2 order is: NVMe0, NVMe1, NVMe2, NVMe3 NVMe4, NVMe5, NVMe6, NVMe7, NVMe8, NVMe9, NVMe10, NVMe11.

  Note the following restrictions for installing more than four Oracle F640 Flash Card v2s:

  - Do not install Oracle Storage 12 Gb SAS PCIe RAID HBA, Internal: 16 port card.
  - Do not install HBA-connected storage drives in the server front bays.

Refer to the server documentation for more information at https://www.oracle.com/goto/x8-2l/docs.

Oracle Server X7-2L Configuration

Minimum required software for Oracle Server X7-2L is SW1.4.2 or later.

Oracle Flash Accelerator F640 PCIe Card v2 population rules for Oracle Server X7-2L:

- If Oracle F640 Flash Card v2 quantity is less than three, then Oracle F640 Flash Card v2 installation order is: NVMe0, NVMe1, NVMe2, NVMe3 NVMe4, NVMe5, NVMe6, NVMe7, NVMe8, NVMe9, NVMe10, NVMe11
- If Oracle F640 Flash Card v2 quantity is four, then Oracle F640 Flash Card v2 installation order is: NVMe4, NVMe5, NVMe6, NVMe10
- If Oracle F640 Flash Card v2 quantity is more than four, then Oracle F640 Flash Card v2 installation order is: NVMe0, NVMe1, NVMe2, NVMe3 NVMe4, NVMe5, NVMe6, NVMe7, NVMe8, NVMe9, NVMe10, NVMe11.

Note the following restrictions for installing more than four Oracle F640 Flash Card v2s:

- Do not install Oracle Storage 12 Gb SAS PCIe RAID HBA, Internal: 16 port card.
- Do not install HBA-connected storage drives in the server front bays.

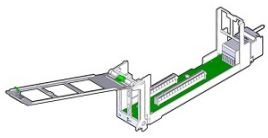
Refer to the server documentation for more information at https://www.oracle.com/goto/x7-2l/docs.

Oracle Server X7-8 Configuration

Minimum required software for Oracle Server X7-8 is SW1.5.0 or later.

Oracle Server X7-8 requires a doublewide PCIe hot-plug carrier extension for each installed Oracle Flash Accelerator F640 PCIe Card v2 to facilitate airflow. Dual PCIe Card Carriers (DPCCs) do not allow the use of one adjacent PCIe slot. PCIe hot-plug carrier extensions (PN 710710) are installed in odd numbered PCIe slots.

The following figure shows an example of a hot-swappable Dual PCIe Card Carrier that populates two PCIe slots for each Oracle Flash Accelerator F640 PCIe Card v2.



For more information about server configuration, refer to the server documentation at https://www.oracle.com/goto/x7-8/docs.

SPARC S7-2L Server Configuration

Minimum required software for SPARC S7-2L Server is SPARC S7-2L SUN SYSTEM FIRMWARE 9.9.3 or later.

SPARC S7-2 series servers support the Oracle Flash Accelerator F640 PCIe Card v2 as a boot device.

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

SPARC T7-1 Server Configuration

Minimum required software for SPARC T7-1 Server is SPARC T7-1 SUN SYSTEM FIRMWARE 9.9.3 or later.

SPARC T7 series servers support the Oracle Flash Accelerator F640 PCIe Card v2 as a boot device.

In SPARC T7-1 servers that have Oracle Flash Accelerator F640 PCIe Card v2s installed, you can populate no more than four slots, which are two fewer than systems that use Oracle Flash Accelerator F320 PCIe Cards.

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

SPARC T7-2 Server Configuration

Minimum required software for SPARC T7-2 Server is SPARC T7-2 SUN SYSTEM FIRMWARE 9.9.3 or later.

SPARC T7 series servers support the Oracle Flash Accelerator F640 PCIe Card v2 as a boot device.

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

SPARC T8-1 Server Configuration

Minimum required software for SPARC T8-1 Server is SPARC T8-1 SUN SYSTEM FIRMWARE 9.9.2.A or later.

SPARC T8 series servers support the Oracle Flash Accelerator F640 PCIe Card v2 as a boot device.

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

Minimum required software for SPARC T8-2 Server is SPARC T8-2 SUN SYSTEM FIRMWARE 9.9.2.A or later.

SPARC T8 series servers support the Oracle Flash Accelerator F640 PCIe Card v2 as a boot device.

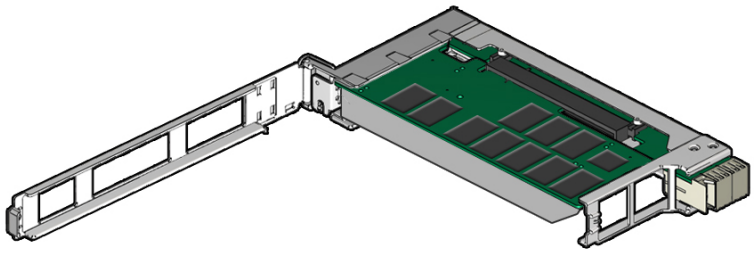
For more information about the server, refer to the server documentation at https://www.oracle.com/goto/t8-2/docs.

SPARC T8-4 Server Configuration

Minimum required software for SPARC T8-4 Server is SPARC T8-4 SUN SYSTEM FIRMWARE 9.9.2.A or later.

SPARC T8 series servers support the Oracle Flash Accelerator F640 PCIe Card v2 as a boot device.

SPARC T8-4 Servers require a singlewide PCIe hot-plug carrier extension for each installed Oracle Flash Accelerator F640 PCIe Card v2 to facilitate airflow.



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

SPARC M8 Series Servers Configuration

SPARC M8 series servers support the use of only PCIe x16 hot-plug card carriers, which are physically labeled with "x16 CAR" on the faceplate. PCIe x8 card carriers from earlier generations of Oracle servers, which are labeled with "CAR" on the faceplate, are not supported for use in M8 series servers. PCIe x8 and PCIe x16 cards are supported for use in these servers.

SPARC M8 series servers support the Oracle Flash Accelerator F640 PCIe Card v2 as a boot device. SPARC M8 series servers support up to two Oracle F640 Flash Card v2s per CMIOU. Use slot 3 for the NIC and boot device. Treat SPARC M8 series server slots 1 and 3 in CMIOUs 0-2 and 4-6 the same. Oracle F640 Flash Card v2s should be in the lowest number CMIOU slots available.

Hot-plugging cannot be used if the Oracle F640 Flash Card v2 contains the operating system boot image for the physical domain (PDomain). In that case power down the physical domain to the Oracle ILOM prompt. Refer to: *Removing Power From the Server or Domain* at https://docs.oracle.com/cd/E55211_01/html/E55215/gojoq.html#scrolltoc

For more information about the servers, refer to the server documentation at https://www.oracle.com/goto/m8/docs.

SPARC M7 Series Servers Configuration

SPARC M7 series servers support the use of only PCIe x16 hot-plug card carriers, which are physically labeled with "x16 CAR" on the faceplate. PCIe x8 card carriers from earlier generations of Oracle servers, which are labeled with "CAR" on the faceplate, are not supported for use in M7 series servers. PCIe x8 and PCIe x16 cards are supported for use in these servers.

SPARC M7 series servers support the Oracle Flash Accelerator F640 PCIe Card v2 as a boot device. Use slot 3 for the NIC and boot device. Treat SPARC M7 series server slots 1 and 3 in CMIOUs 0-2 and 4-6 the same. Oracle F640 Flash Card v2s should be in the lowest number slots available. If the Oracle F640 Flash Card v2 contains the operating system for the physical domain, then bring the physical domain down to the Oracle ILOM prompt (power down the PDomain).

For more information about the servers, refer to the server documentation at https://www.oracle.com/goto/m7/docs.

Upgrading Oracle Flash Accelerator F320 PCIe Card to Oracle Flash Accelerator F640 PCIe Card v2

Replace Oracle Flash Accelerator F320 PCIe Card with Oracle Flash Accelerator F640 PCIe Card v2. Oracle Flash Accelerator F320 PCIe Card and Oracle F640 Flash Card are CRUs (customer-replaceable units).

1. **List server devices.**

   "Verify Oracle Flash Accelerator F640 PCIe Card v2 Operation" on page 31

2. **Download the Device Software Package.**

   To find the device software package, access My Oracle Support and download the latest software package for Oracle Flash Accelerator F640 PCIe Card v2s.

   "Download the Device Software Package" on page 24

3. **Install Oracle Flash Accelerator F640 PCIe Card v2 firmware.**

   Update the NVMe Storage Drive Firmware. Oracle F640 Flash Card firmware is updated as a single package using Oracle Hardware Management Pack utility command-line interface (CLI) tools. For detailed instructions on system software updates, refer to the server documentation.

   - "Update the NVMe Storage Drive Firmware" on page 25
   - x86 series servers - `https://docs.oracle.com/en/servers/index.html` and `https://docs.oracle.com/cd/E23161_01/`
   - SPARC series servers - `https://docs.oracle.com/en/servers/sparc.html`
   - Links to supported server documentation: "Implementation Considerations" on page 16

4. **Remove Oracle Flash Accelerator F320 PCIe Card.**

   Your server chassis might contain a card carrier or other configuration. Refer to the server service manual for PCIe card removal and replacement instructions.

   - Replace Oracle F320 Flash Card (Server Power-Off) (`https://docs.oracle.com/cd/E65386_01/html/E65387/gpaqj.html#scrolltoc`)
   - Replace Oracle F320 Flash Card (Server Power-On) (`https://docs.oracle.com/cd/E65386_01/html/E65387/gpjbc.html#scrolltoc`)
   - Links to supported server documentation: "Implementation Considerations" on page 16

5. **Install Oracle Flash Accelerator F640 PCIe Card v2.**

Your server chassis might contain a card carrier or other configuration. Refer to the server service manual for PCIe card removal and replacement instructions.

- Replace Oracle F640 Flash Card (Server Power-Off) (`https://docs.oracle.com/cd/E87231_01/html/E99807/gpaqj.html#scrolltoc`)
- Replace Oracle F640 Flash Card (Server Power-On) (`https://docs.oracle.com/cd/E87231_01/html/E99807/gpjbc.html#scrolltoc`)
- Links to supported server documentation - "Implementation Considerations" on page 16

6. **Verify Oracle Oracle Flash Accelerator F640 PCIe Card v2.**

   Two 3.2 TB controllers are listed. Check that firmware VDV1RZ09 or later is installed.

   "Verify Oracle Flash Accelerator F640 PCIe Card v2 Operation" on page 31

7. **Change the server boot drive order.**

   Refer to the server Administration Guide.

   - x86 series servers - `https://docs.oracle.com/cd/E23161_01/`
   - SPARC series servers - `https://docs.oracle.com/en/servers/sparc.html`
   - Links to supported server documentation - "Implementation Considerations" on page 16

8. **Manage the SSD volumes.**

   A volume manager can present multiple SSD devices as one larger volume.

   "SSD Volume Management" on page 23

9. **Manage the server domains. Configure RAID.**

   You can use the **`nvmeadm`** command that is provided in Oracle Hardware Management Pack.

   - "Server Management Tools" on page 15
   - `https://docs.oracle.com/en/servers/management.html`

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 24
- “Update the NVMe Storage Drive Firmware” on page 25
- “Verify Oracle Flash Accelerator F640 PCIe Card v2 Operation” on page 31

▼ Download the Device Software Package

To find the device software package, access My Oracle Support and download the latest software package for Oracle Flash Accelerator F640 PCIe Card v2s.

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 Oracle Flash Accelerator F640 PCIe Card v2s.**

   See “Minimum Supported Card Firmware Version” on page 12.
6. **In the Release field, select a software release from the drop-down list.**

   Expand the list to see all available software releases.
7. **Click Search.**

   The Patch Advanced Search Results screen appears, listing the patches for the software release.
8. **To select a patch for a software release, click the patch number next to the software release version.**

You can use the Shift key to select more than one patch.

A pop-up action panel appears. The panel contains several action options, including the ReadMe, Download, and Add to Plan options. For information about the Add to Plan option, click the associated button and select “Why use a plan?”.

9. **To review the ReadMe file for this patch, click `ReadMe`.**

10. **To download the patch for the software release, click `Download`.**

11. **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 F640 Flash Card NAND flash controller firmware on the host for supported Oracle Solaris and Linux operating systems. Oracle F640 Flash Card firmware is updated as a single package using Oracle Hardware Management Pack utility command-line interface (CLI) tools.

Note - For detailed instructions on system software updates, refer to the server documentation.

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 Flash Accelerator F640 PCIe Card v2 Product Notes for the latest firmware requirements.**

   See “Minimum Supported Card 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. **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 Flash Accelerator F640 PCIe Card v2s.**

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

      https://support.oracle.com

      See “Download the Device Software Package” on page 24.

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

4. **Identify all Oracle Flash Accelerator F640 PCIe Card v2 controller firmware versions in the server.**

a. Type `# fwupdate list controller`.

In the following examples, Oracle Flash Accelerator F640 PCIe Card v2 controllers `c0` and `c1` 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    7335943:ICDPC5ED2ORA6.4T  VDV1RZ09
c1    NVMe   Intel          0x0a54    7335943:ICDPC5ED2ORA6.4T  VDV1RZ09
c10   SAS    LSI Logic      0x00ce    Avago MegaRAID SAS 9361-1 4.710.00-
c12   NET    Intel          0x1533    Intel(R) I210 Gigabit Net -
```

b. Verify that the firmware package files that are installed in Oracle Flash Accelerator F640 PCIe Card v2s require updating.

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

In the following example, Oracle Flash Accelerator F640 PCIe Card v2 controller `c0` shows firmware version `VDV1RZ06`, while the other NVMe controllers show firmware version `VDV1RZ09`.

```
# fwupdate list controller
================================================
CONTROLLER
================================================
ID    Type   Manufacturer   Model     Product Name              FW Version
------------------------------------------------------------------------------
c0    NVMe   Intel          0x0a54    7335943:ICDPC5ED2ORA6.4T  QDV1RL06
c1    NVMe   Intel          0x0a54    7335943:ICDPC5ED2ORA6.4T  VDV1RZ09
c10   SAS    LSI Logic      0x00ce    Avago MegaRAID SAS 9361-1 4.710.00-
c12   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, controllers `SUNW-NVME-1` and `SUNW-NVME-2` show firmware version `VDV1RZ09` in the output returned by the above command.

```
# nvmeadm list -v
SUNW-NVME-1
```

```
        PCI Vendor ID:                  0x8086
        Serial Number:                  PHLE713401RZ6P4BGN-1
        Model Number:                   7335943:ICDPC5ED2ORA6.4T
        Firmware Revision:              VDV1RZ09
        Number of Namespaces:           1
SUNW-NVME-2
        PCI Vendor ID:                  0x8086
        Serial Number:                  PHLE713401RZ6P4BGN-2
        Model Number:                   7335943:ICDPC5ED2ORA6.4T
        Firmware Revision:              VDV1RZ09
        Number of Namespaces:           1
root:~#
```

5. **Quiesce Oracle Flash Accelerator F640 PCIe Card v2 devices.**

   Before removing the card, 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 Oracle Flash Accelerator F640 PCIe Card v2s 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 Flash Accelerator F640 PCIe Card v2s, type `#fwupdate update controller -x metadata.xml`**

In the following example, controllers `c1` and `c2` will be upgraded to firmware version `VDV1RZ09`.

```
# fwupdate update controller -x metadata.xml
 The following components will be upgraded as shown:
=============================================================
ID        Priority Action     Status      Old Firmware Ver.   Proposed Ver.
------------------------------------------------------------------------------
c1        1        Check FW   Success     VDV1RZ09            VDV1RZ09
c2        1        Check FW   Success     VDV1RZ09            VDV1RZ09
Do you wish to process all of the above component upgrades? [y/n]?
```

If the current firmware package version on the selected controller 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    VDV1RZ06          VDV1RZ09    N/A     System Reset
c2  1      Post Power Pending    VDV1RZ06          VDV1RZ09    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 updated firmware packages are installed in Oracle Flash Accelerator F640 PCIe Card v2s.

a. Type the following from a terminal:

```
# fwupdate list controller
```

In the following example, Oracle Flash Accelerator F640 PCIe Card v2s are displayed.

```
# fwupdate list controller
================================================
CONTROLLER
================================================
ID    Type   Manufacturer   Model     Product Name              FW Version
------------------------------------------------------------------------------
c0    NVMe   Intel          0x0a54    7335943:ICDPC5ED2ORA6.4T  VDV1RZ09
c1    NVMe   Intel          0x0a54    7335943:ICDPC5ED2ORA6.4T  VDV1RZ09
c10   SAS    LSI Logic      0x00ce    Avago MegaRAID SAS 9361-1 4.710.00-
c12   NET    Intel          0x1533    Intel(R) I210 Gigabit Net -
```

b. Verify host recognition of all Oracle Flash Accelerator F640 PCIe Card v2s by checking PCIe ID enumeration.

In the above example, Oracle Flash Accelerator F640 PCIe Card v2 controllers `c0` and `c1` are enumerated in the output returned by the above command.

c. Ensure that Oracle Flash Accelerator F640 PCIe Card v2 firmware was updated in the output returned by the above command.

In the above example, Oracle Flash Accelerator F640 PCIe Card v2 controllers `c0` and `c1` show firmware version `VDV1RZ09`.

9. Verify Oracle Flash Accelerator F640 PCIe Card v2 operation.

See "Verify Oracle Flash Accelerator F640 PCIe Card v2 Operation" on page 31.

10. Repeat the firmware upgrade process until Oracle Flash Accelerator F640 PCIe Card v2s have the most up to date firmware release.

See "Minimum Supported Card Firmware Version" on page 12.

For example, upgrade firmware revision from 8DV1RL01 to 8DV1RZ03, and then to VDV1RZ06.

Related Information

- "Minimum Supported Card Firmware Version" on page 12
- For CLI command instructions, refer to Oracle Hardware Management Pack documentation at `https://www.oracle.com/goto/ohmp/docs`.

  Oracle Server CLI Tools User's Guide

▼ Verify Oracle Flash Accelerator F640 PCIe Card v2 Operation

This procedure provides instructions to verify Oracle Flash Accelerator F640 PCIe Card v2 operation on the host for supported Oracle Solaris and Oracle Linux operating systems. Verify Oracle Flash Accelerator F640 PCIe Card v2 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 Flash Accelerator F640 PCIe Card v2 status indicator LEDs.

Verify that the Fault-Service Action Required Oracle Flash Accelerator F640 PCIe Card v2 status indicator is not lit and that the green Power status indicator is lit on Oracle Flash Accelerator F640 PCIe Card v2s that you updated.

Refer to "Status Indicators" in *Oracle Flash Accelerator F640 PCIe Card v2 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, refer to the server administration guide and perform these steps.**

  a. 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
```

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

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 Oracle F640 Flash Cards and verify that the latest firmware packages are installed.

a. Type the following command: `# fwupdate list controller`.

```
# fwupdate list controller
================================================
CONTROLLER
================================================
ID    Type   Manufacturer   Model     Product Name              FW Version
------------------------------------------------------------------------------
c0    NVMe   Intel          0x0a54    7335943:ICDPC5ED2ORA6.4T  VDV1RZ09
c1    NVMe   Intel          0x0a54    7335943:ICDPC5ED2ORA6.4T  VDV1RZ09
c10   SAS    LSI Logic      0x00ce    Avago MegaRAID SAS 9361-1 4.710.00-
c12   NET    Intel          0x1533    Intel(R) I210 Gigabit Net -
```

b. Verify host recognition of all Oracle F640 Flash Cards by checking controller ID enumeration.

In the above example, Oracle F640 Flash Card controllers `c0` and `c1` are enumerated in the output returned by the above command.

c. Ensure that all Oracle F640 Flash Card firmware revisions are current in the FW Version output returned by the above command.

See “Minimum Supported Card 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, controllers `SUNW-NVME-1` and `SUNW-NVME-1` show firmware version `VDV1RZ09` in the output returned by the above command.

```
# nvmeadm list -v
SUNW-NVME-1
        PCI Vendor ID:                  0x8086
        Serial Number:                  PHLE713401RZ6P4BGN-1
        Model Number:                   7335943:ICDPC5ED2ORA6.4T
        Firmware Revision:              VDV1RZ09
        Number of Namespaces:           1
SUNW-NVME-2
        PCI Vendor ID:                  0x8086
        Serial Number:                  PHLE713401RZ6P4BGN-2
        Model Number:                   7335943:ICDPC5ED2ORA6.4T
        Firmware Revision:              VDV1RZ09
        Number of Namespaces:           1
root:~#
```

5. Check Oracle Flash Accelerator F640 PCIe Card v2 health and SMART information.

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 Oracle F640 Flash Cards 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 Card 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 the cumulative issues fixed in Firmware Release VDV1RZ06 or previously. Consult the Readme.

Fixed Issues

The following issues are fixed in Firmware Release VDV1RZ06.

Bug ID	Issue
Bug 26566040	Determine the correct NVMe Shutdown timeout period for RTD3 (RunTime D3) power state Oracle Flash Accelerator F640 PCIe Card v2s support NVMe specifications for RTD3 Resume Latency and RTD3 Entry Latency. RTD3R Resume latency allows 7.5 seconds of margin for devices to safely start before main power is applied to the device controller. RTD3E Entry latency allows 6 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.

Known Issues

This section describes important operating issues and known hardware and software issues for Oracle Flash Accelerator F640 PCIe Card v2s.

Supplementary and workaround information for Oracle Flash Accelerator F640 PCIe Card v2s. Specific Bug ID identification numbers are provided for service personnel.

Oracle ILOM Incorrectly Faults the Device with Message `fault.io.scsi.cmd.disk.dev.rqs.baddrv`

Bug ID: 28244670

Issue: Oracle ILOM might report a `fault.io.scsi.cmd.disk.dev.rqs.baddrv` error for NVMe devices. Oracle ILOM incorrectly faults the device with message Fault `fault.io.scsi.cmd.disk.dev.rqs.baddrv on` *FRU /SYS*.

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

Workaround: None

Recovery:

If a system encounters this issue, do the following steps.

1. Look for the NVMe ILOM fault code: `fault.io.scsi.cmd.disk.dev.rqs.baddrv`

   The following screen shows a fault.io.scsi.cmd.disk.dev.rqs.baddrv error for Oracle Flash Accelerator F640 PCIe Card v2.

   ```
   ereport.io.scsi.cmd.disk.dev.rqs.baddrv@/SYS/MB/PCIE5
                           status_flags  = 0xc3
                           smart_warning = 0xff
                           reason        = Drive is not functional
   ```

   You can also use the Oracle ILOM **`show faulty`** command at the Oracle ILOM command-line prompt (->) to identify a drive failure.

   To list all known faults in the server, log in to the Oracle ILOM service processor from the Oracle ILOM Fault Management Shell and issue the **`fmadm faulty`** command. For more information about how to use the Oracle ILOM Fault Management Shell and supported commands, refer to the *Oracle ILOM User's Guide for System Monitoring and Diagnostics* in the Oracle Integrated Lights Out Manager (ILOM) 5.0 Documentation Library at `https://www.oracle.com/goto/ilom/docs`.
2. Upgrade drive firmware if not current.

   See Oracle Flash Accelerator F640 PCIe Card v2 “Supported Hardware and Software” on page 10.
3. Do one of the following:

   If SMbus `status_flags = 0xbb` displays, then clear the fault. No power cycling is required. To clear the fault code in Oracle ILOM, go to step 4.

   If SMbus `status_flags = 0xc3` displays, complete a server power cycle, then clear the fault. Do the following to recover, then go to step 4.

a. To identify the drive slot, type:

```
# lspci -vv -s 1b:00.0
  1b:00.0 Non-Volatile memory controller: [NVM Express])
      Subsystem: Oracle/SUN Device
      Physical Slot: 900
      Control: I/O- The PCIe address of /dev/nvme10n1 is 0000:e7:00.0
```

b. Take the affected drive off-line.

Disconnect all users of the NVMe drive and back up the NVMe drive data as needed. Use the **umount** command to unmount any file systems that are mounted on the device. Remove the device from any multiple device (md) and Logical Volume Manager (LVM) volume using it.

If the device is a member of an LVM Volume group, then it might be necessary to move data off the device using the pvmove command, then use the **vgreduce** command to remove the physical volume, and (optionally) **pvremove** to remove the LVM metadata from the disk. If the device uses multipathing, run **multipath -l** and note all the paths to the device. Then, remove the multipathed device using the **multipath -f device** command. Run the **blockdev --flushbufs device** command to flush any outstanding I/O to all paths to the device.

c. To prepare the NVMe drive for removal, that is, to detach the NVMe device driver and power off the NVMe drive slot, type: **# echo 0 >/sys/bus/pci/slots/900/power**

d. To power on the drive, type: **# echo 1 >/sys/bus/pci/slots/900/power**

4. To clear the fault code in Oracle ILOM, type:

```
-> set /SYS/DBP/HDD0 clear_fault_action=true
   Are you sure you want to clear /SYS/MB/PCIE5 (y/n)? y
   Set 'clear_fault_action' to 'true'
->
```

5. Enable the drive.

Rescan the PCI bus to rediscover the NVMe drive.

 # echo 1 > /sys/bus/pci/rescan.

If the same failure occurs again, use the same recovery process noted above. The drive has failed if the failure occurs again within minutes. If problem persists, then replace the faulty card identified in the **fmadm faulty** output.

Refer to the following document for the latest procedures for displaying event content in preparation for submitting a service request and applying any post-repair actions that may be required. *PSH Procedural Article for ILOM-Based Diagnosis* (Doc ID 1155200.1)

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
```

Oracle ILOM Reports Faults for Correctable Errors on Oracle Flash Accelerator F640 PCIe Card v2

Bug ID: 28601316

Issue: The PCIe link retrains, a PCIe PHY reset event occurs on PCIe channels, and Oracle ILOM reports three different types of correctable errors. OS logs contain errors.

- Bad DLLP
- Bad TLP
- RTTO

Workaround: None

The TCRH (Train Cold – Run Hot) Compensation Feature is an expected behavior on Oracle Server X7 and Oracle Server X8 series servers.

Secure Erase Cards Before Use

Oracle Flash Accelerator F640 PCIe Card v2 may report uncorrectable errors or assert after not being powered for three or more months. For best practice, secure erase Oracle Flash Accelerator F640 PCIe Card v2s before use (especially if use is reading from the card as a test) and especially if the card 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.

Choose one of the erase options:

- Secure erase the drive, using the `nvmeadmin` utility.
- Download and use third party utilities to secure erase the drive.
- Wait two weeks for a media refresh while the drive is powered-on before using the drive.

Caution - All data will be destroyed after an erase.

Secure Erase Drive Using `nvmeadmin` Utility

To secure erase the drive, using the Oracle Hardware Management Pack NVMe admin utility:

1. Stop all IO to the NVMe device before attempting this action.
2. To securely erase all namespaces, type: **`# nvmeadm erase -s -a`** *controller_name*. For example:

   ```
   # nvmeadm erase -s -a SUNW-NVME-1
   ```
3. List all server devices.
4. Verify drive health.

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 15.

Secure Erase Drive Using Third-party Utilities

To secure erase the drive before use, using the Intel Solid-State Drive Configuration Manager utility, if available:

1. Install the Intel Solid-State Drive Configuration Manager.
2. Stop all IO to the NVMe device before attempting this action.
3. Use the **–secure_erase** option to erase all the data on the drive.

   ```
   issdcm –drive_index 1 –secure_erase
   ```
4. The user is prompted unless the **–force** option is used:

   ```
   WARNING: You have selected to secure erase the drive!
   Proceed with the secure erase? (Y/N)
   ```
5. If the drive contains a partition, the prompt contains a second warning message:

   ```
   WARNING: You have selected to secure erase the drive!
   WARNING: Tool has detected as partition on the drive!
   Proceed with the secure erase? (Y/N)
   ```
6. To bypass the warning prompts, use the **–force** option:

   ```
   issdcm –drive_index 1 –secure_erase -force
   ```
7. List all server devices.
8. Verify drive health.

Oracle Flash Accelerator F640 PCIe Card v2 Product Accessibility

Oracle strives to make its products, services, and supporting documentation usable and accessible to the disabled community. To that end, products, services, and documentation include features that make the product accessible to users of assistive technology.

For more information about Oracle's commitment to accessibility, go to http://www.oracle.com/pls/topic/lookup?ctx=acc&id=docacc.

Documentation Accessibility

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Note that screen readers might not always correctly read the code examples in the documentation. The conventions for writing code require that closing braces should appear on an otherwise empty line. However, some screen readers might not always read a line of text that consists solely of a bracket or brace.

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