Dell Technologies Boot Optimized Storage Solution-S2

User's Guide

DELLEMC

Notes, cautions, and warnings

NOTE: A NOTE indicates important information that helps you make better use of your product.

CAUTION: A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.

WARNING: A WARNING indicates a potential for property damage, personal injury, or death.

Contents

Dell Technologies Boot Optimized Storage Solution-S2

Dell Technologies Boot Optimized Storage Solution-S2 (BOSS-S2) is a RAID solution card that is designed for booting a server's operating system that supports:

- 80 mm M.2 SATA Solid-State Devices (SSDs)
- PCIe card with PCIe Gen 2 x 4 Host Interface
- Dual SATA Gen 3 Device Interfaces

(i) **NOTE:** For the safety, regulatory, and ergonomic information associated with these devices, and for more information about the Integrated Dell Remote Access Controller (iDRAC) or Lifecycle Controller (LC) remote management, see your platform documentation.

Topics:

Features of BOSS-S2 card

Figure 1. Features of BOSS-S2 card

1. M.2 blank
3. BOSS-S2 module bracket
5. M.2 card
7. Signal cable
9. Power cable connector

2. M.2 carrier
4. BOSS-S2 module
6. BOSS-S2 card
8. Power cable
10. Signal cable connector

Technical specifications of BOSS-S2 card

The following table lists the BOSS-S2 card technical specifications:

Table 1. Technical specifications of BOSS-S2 card

Function or feature	BOSS-S2 card
Hot−plug of M.2 drives	Yes
LED activity of M.2 drives	Yes
Controlled firmware update	Yes
RAID levels	RAID 1 and Non−RAID
Stripe size	Supports default 64 K stripe size only
Battery backup unit	No
Non−volatile cache	No
Virtual disk cache function	Write through
Maximum number of virtual disks	1
Maximum number of drives supported	2
Support for non−RAID disks	Yes (supports up to two disks)
Drive types	6 Gbps M.2 SATA SSDs x 2
PCIe support	Gen 2
Disk cache policy	Drive default
TRIM	Non−RAID mode
Stripe size supported	64 K
Configuration (HII)	Yes
Full initialization	No
Fast initialization	Yes ⓘ **NOTE:** By default, fast initialization is performed when you create a virtual disk.
Background initialization	No
RAID 0	No
RAID 1	Yes
Single non−RAID	Yes
Dual non−RAID	Yes
Degraded RAID 1 and non−RAID	No
Foreign import	Yes
Consistency check	No
Patrol read	No

Table 1. Technical specifications of BOSS-S2 card (continued)

Function or feature	BOSS-S2 card
Load balance	N/A
Rebuild	Yes (Only Auto–rebuild)
Hot spare	No
Change rebuild priority/rate	No
Virtual disk write back/read ahead cache	No ⓘ **NOTE:** BOSS-S2 controller does not support controller cache.
Battery support	N/A ⓘ **NOTE:** BOSS-S2 controller does not support a battery.
Non–RAID disk cache policy	Yes ⓘ **NOTE:** OS controlled or device defaults.
SMART Info	Yes ⓘ **NOTE:** Use the BOSS-S2 CLI to retrieve the SMART information from the drives.
Physical disk hot–plug	Yes
Virtual disk expansion	No
Virtual disk slicing	No
Virtual disk migration	Yes ⓘ **NOTE:** On new controller, virtual disk must be imported from HII before presented to OS.
Split mirror	No ⓘ **NOTE:** System required to shutdown and migrate one physical disk to another system and continue rebuild.
Non–RAID migration	Yes
BIOS configuration utility (Ctrl-M)	Yes
Add on driver for data path (OS device driver)	No ⓘ **NOTE:** Console Windows driver or Linux library is required for management purposes only.
4 K native drive support	No
TRIM and UNMAP virtual disk	No
TRIM and UNMAP non–RAID physical disk	Yes
Self-encrypting drives (SED) support	No
Cryptographic erase (sanitize)	Yes ⓘ **NOTE:** If drive supports SANITIZE Crypto Erase. No other encryption support from controller or drive.

Supported M.2 drives of BOSS-S2 card

The BOSS-S2 card supports the following M.2 drives:

⚠️ **CAUTION: The BOSS-S2 card is tested and supported only with the M.2 drives that are shipped with the controller.**

Table 2. Supported M.2 drives of BOSS-S2 card

Drive Model	Capacity
Intel M.2 S4510	240 GB, 480 GB
Micron M.2 5300	240 GB, 480 GB

(i) **NOTE:** Dell Technologies recommends that you use the BOSS-S2 card only as an operating system boot device.

(i) **NOTE:** Ensure that M.2 drives have the latest firmware. You can download the latest firmware from www.dell.com/support/home.

PowerEdge systems supported by BOSS-S2

The following PowerEdge systems support the BOSS-S2 card:

- PowerEdge R6525
- PowerEdge R7525

Operating systems supported by BOSS-S2

See Dell Technologies Enterprise operating systems support for a list of supported operating systems by a specific server for the BOSS-S2 card.

(i) **NOTE:** For the latest list of supported operating systems and driver installation instructions, see the operating system documentation at www.dell.com/operatingsystemmanuals. For specific operating system service pack requirements, see the Drivers and Downloads section at www.dell.com/manuals.

Applications supported by BOSS-S2

BOSS-S2 card management applications include the UEFI RAID Configuration Utility, Dell OpenManage Storage Management, BOSS-S2 Command Line Interface (CLI) Utility, The Integrated Dell Remote Access Controller (iDRAC), and Lifecycle Controller (LC). They enable you to manage and configure the RAID system, create and manage a disk group, and provide online maintenance.

Topics:

Unified Extensible Firmware Interface RAID Configuration Utility

Unified Extensible Firmware Interface (UEFI) RAID Configuration Utility is integrated into the system BIOS (F2). See UEFI/HII RAID configuration utility.

Dell OpenManage Storage Management

Dell OpenManage Storage Management enables you to perform controller and enclosure functions for all supported RAID controllers and enclosures from a single graphical or command line interface. For more information, see the Dell OpenManage Storage Management User's Guide at www.dell.com/openmanagemanuals.

BOSS-S2 Command Line Interface Utility

The BOSS-S2 Command Line Interface (CLI) Utility enables you to check controller, physical disk, and virtual disk status while booted to an operating system. The application is also used to check physical disks and display controller SMART information. For more information about CLI commands, see Manage BOSS-S2 using CLI commands on page 33.

Table 3. BOSS-S2 CLI utility for supported operating systems

Operating system	Utility name
Windows	mvsetup
Linux	mvcli
ESXi	mvcli

ⓘ **NOTE:** To use the mvsetup Windows utility, the BOSS-S2 management driver must be installed first. You can download the latest Windows unified console driver from www.dell.com/support/home. Linux or ESXi mvcli does not require a driver.

ⓘ **NOTE:** To remove mvcli from the operating systems, uninstall BOSS-S2 drivers from the operating systems or remove the libraries and the executable files.

Table 4. Instructions to remove mvcli from the operating systems

Operating system	Instructions to remove mvcli from the operating systems
Windows	Locate and remove the library and executable files

Table 4. Instructions to remove mvcli from the operating systems (continued)

Operating system	Instructions to remove mvcli from the operating systems
Linux	Locate and remove the library and executable files
ESXi	Remove using `vib remove` command

The Integrated Dell Remote Access Controller and Lifecycle Controller

The Integrated Dell Remote Access Controller (iDRAC) and Lifecycle Controller (LC) application enables you to effectively monitor the RAID and network controllers installed on the system using iDRAC and LC without an operating system installed on the system. For more information, see the Integrated Dell Remote Access Controller 9 User's Guide at www.dell.com/idracmanuals.

Update the BOSS-S2 firmware version

BOSS-S2 card firmware updates can be done using the following methods:

● Operating system Dell Update Packages

    ○ Windows
    ○ Linux
● The Integrated Dell Remote Access Controller (iDRAC)
● Lifecycle Controller (LC)

Topics:

Update BOSS-S2 using Windows update packages

Prerequisites

Download the latest operating system Dell Update Package (DUP) from **SAS-RAID_Firmware_xxxxx_xxxx_xxx.exe** for Windows from www.dell.com/support/home and install it for monolithic servers.

About this task

Perform the following steps to update using Windows:

ⓘ **NOTE:** Ensure that you have Administrator privileges for Windows.

Steps

1. Download the latest Dell Update Package (DUP) for Windows from the www.dell.com/support/home.
2. Double-click the EXE file and click **Install**.
   After the inventory collection and firmware validation processes are complete, the installed version and package version are displayed.
   ⓘ **NOTE:** Installed version refers to the current firmware version of the controller, and package version refers to the DUP version.
3. Click **Yes** to continue.
4. Click **Yes** to reboot the system.
   System reboot is required for a successful update as the firmware updates are staged.
5. Verify the installed firmware version in HII, iDRAC, or MVCLI utility.

Update BOSS-S2 using Linux

Prerequisites

Download the latest operating system Dell Update Package (DUP) from **SAS-RAID_Firmware_xxxxx _xxxx_xxx.bin** for Linux from www.dell.com/support/home and install it for monolithic servers.

About this task

Perform the following steps to update using Linux:

(i) **NOTE:** Ensure that you have Root or Sudo privileges for Linux or ESXi.

Steps

1. Download the latest Dell Update Package (DUP) for Linux from the www.dell.com/support/home.
2. Go to the downloaded file path and provide the permissions to execute the DUP file.
3. Execute the BIN file **./SAS-RAID_Firmware_xxxxx_xxxx_xxx.bin**.
4. When prompted, press **Q** to proceed.
   After the inventory collection and firmware validation processes are complete, the installed version and package version are displayed.
5. To continue press **Y+Enter** or **N+Enter** to cancel.
6. When prompted to reboot the server, press **Y+Enter**.
   System reboot is required for a successful update as the firmware updates are staged.
7. Verify the installed firmware version in HII, iDRAC, or BOSS-S2 CLI.

Update BOSS-S2 using iDRAC

Prerequisites

You can update controller firmware using iDRAC. The controller firmware can be updated using the Dell Update Package (DUP) when booted to an operating system. Ensure that you have installed the latest firmware version available at www.dell.com/support/home.

About this task

To update the firmware using the iDRAC web interface:

Steps

1. Download the latest DUP **SAS- RAID_Firmware_xxxxx_xxxx_xxx.exe** from the www.dell.com/support/home.
2. Click **Maintenance** > **System Update** > **Manual Update**.
3. Click **Choose file**. Select the **DUP firmware image**.
4. Click **Upload**.
   The update section displays the firmware DUP details.
5. Select the EXE Dell Update Package (DUP).
6. Upload the file, and then click **Install** > **Reboot**.
   System boots into Lifecycle Controller automatically to perform update operation. Launch **Job Queue** and **Lifecycle Log** page to view and monitor the staged firmware updates.
7. Log in and verify the installed firmware version in HII, iDRAC, or BOSS-S2 CLI.

Update BOSS-S2 using Lifecycle Controller

Prerequisites

You can update controller firmware using Lifecycle Controller (LC). The controller firmware can be updated using the Dell Update Package (DUP) when booted to an operating system. Ensure that you have installed the latest firmware version available at www.dell.com/support/home.

About this task

To update the firmware using the Lifecycle Controller:

Steps

1. Download the DUP file from the www.dell.com/support/home and copy the .exe DUP file to a local drive.
   Example of the file name: SAS- RAID_Firmware_xxxxx_xxxx_xxx.exe.
2. Open Virtual Console and boot into Lifecycle Controller by pressing F10 at boot time.

3. Click **Firmware Update** on the dashboard window and click **Launch Firmware Update**.
4. Select any one of these repositories **FTP Server**, **Local Drive (CD/DVD/USB)**, or **Netowrk Share (CIFS, NFS, HTTP, or HTTPS)**. Click **Next**.
5. Select the EXE file and click **Next**.
6. Select the EXE Dell Update Package (DUP) and click **Apply**.
7. After successful installation, reboot and verify the installed firmware version in the HII, iDRAC, or BOSS-S2 CLI.

ⓘ **NOTE:** For Information on how to update using the CLI, see Manage BOSS-S2 using CLI commands on page 33.

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Features of BOSS-S2

Topics:

- Hot–plugging M.2 drives in PowerEdge systems
- Identify M.2 drives by using LEDs
- Controlled firmware update
- Foreign import of VDs
- Detect a drive failure using SMART feature
- Auto–rebuild a degraded drive
- Support of non–RAID drives
- TRIM feature on SSDs
- Erase physical disk data

Hot–plugging M.2 drives in PowerEdge systems

The unique controller design of the BOSS-S2 card carrier card allows you to hot plug M.2 drives. This feature reduces the possibility of downtime during M.2 replacement. Automatic rebuild replaces the M.2 configured drives that are identified as degraded and then starts an automatic rebuild.

(i) **NOTE:** The Integrated Dell Remote Access Controller (iDRAC) and Lifecycle Controller (LC) logs for the hot–plug events of M.2 drives are not updated on a real time basis.

Drive removal and absence status information are available in the hard drive queried by the iDRAC. The event logs return information about the removal, failure, and rebuild status of an M.2 module. The iDRAC and OMSA provides the status of the virtual drive and also the hard drive status such as SMART and Remaining Rated Write Endurance (RRWE).

Identify M.2 drives by using LEDs

BOSS-S2 card supports Activity and Status LEDs.

- Activity LED—The activity LED is triggered when an activity is initiated in M.2 drives.
- Status LED—The status LED is driven based on the drive status as mentioned below:

Table 5. Status LED state

Status LED state	Description
Green	Drive is online or rebuild
BLINK - Amber	Drive is failed
BLINK - Green	Locate or identify (i) **NOTE:** The locate or identify functionality is triggered using iDRAC and OpenManage Server Administrator (OMSA).
OFF	Drive is not present

Controlled firmware update

Use the Dell update Package with out-of-band support and iDRAC to update the BOSS-S2 firmware. The firmware payload is verified using a cryptographic digital signature, offering a secure update. By default, the BOSS-S2 controller state is secure and locked, and is unlocked only during the firmware update process. Following the update, the controller automatically returns to the default, locked state to prevent any unauthorized updates to the firmware.

(i) **NOTE:** Firmware update using DUP within an operating system (in-band) enters through the iDRAC as a staged operation.

Foreign import of VDs

A virtual disk is considered foreign if it is not native to the adapter.

- A virtual disk is considered native to the adapter if:
  - The virtual disk was created or imported on the adapter.
- A physical disk is considered native to the adapter if:
  - There is no previous virtual disk metadata on the adapter and the physical disk are unconfigured.
  - When the virtual disk corresponding to the physical disks is deleted

The system must be rebooted after performing foreign import.

To check for previous virtual disk metadata, see Controller Information. Only a virtual disk or physical disk native to the adapter will be presented to the operating system.

Upon migrating two foreign drives to a controller, you must do either of the following:

- Clear the controller configuration if using unconfigured drives—Clear Controller Configuration.
- Import the virtual disk if using configured drives—Virtual Disk Import.

Detect a drive failure using SMART feature

SMART monitors certain physical aspects of the disk electronics to help detect predictable disk failures. Data on SMART-compliant physical disks can be monitored to identify changes in values and determine whether the values are within the threshold limits. Any electrical failures in the disk can cause degradation in the performance before failure.

A SMART failure is also referred to as a predicted failure. There are numerous factors that predict physical disk failures, such as a read error rate, throughput performance, and changes in spin-up time. In addition, there are factors related to read/write surface failure, such as seek error rate and excessive bad blocks.

(i) **NOTE:** The BOSS-S2 CLI displays error messages with the status **OK** and **NOT OK** along with smart attributes.

Auto−rebuild a degraded drive

Auto−rebuild is enabled by default, and the rebuild can start automatically if the native virtual disk is degraded and a valid rebuild target is present. A valid rebuild target is any functional drive attached to the BOSS-S2 device which is not part of the native virtual disk and is of equal or greater storage capacity. An auto−rebuild occurs without prompting the user, and any data on the rebuild target is overwritten.

(i) **NOTE:** Auto−rebuild is applicable during drive replacement (hot−plug event).

Support of non−RAID drives

By default, all the drives are in an unconfigured state.

(i) **NOTE:**

- For the BOSS-S2 card, unconfigured drives are automatically non−RAID drives. To convert RAID drives to non−RAID drives, delete the virtual disk.
- The BOSS-S2 only supports one configured (RAID) and two unconfigured states. The BOSS-S2 card does not break `unconfigured` drives into RAID and non−RAID states.

TRIM feature on SSDs

TRIM (Non−RAID physical disk) allows an operating system to delete a block of data that is no longer considered in use by SSDs. For supported operating systems, the TRIM command resolves the write amplification issue. When an operating system deletes a file, the file is marked for deletion in the file system, but the contents on the disk are not actually erased. As a result, the SSDs do not know the Logical Block Addressing (LBA) previously occupied can be erased. With the introduction of TRIM, when a file is deleted, the operating system sends a TRIM command along with the LBAs that do not contain valid data to the physical disk.

Erase physical disk data

The erase physical disk feature deletes metadata from the physical disk. This feature can be enabled only when the physical disk is not part of any virtual disk.

> ⚠ **CAUTION: Performing erase physical disk removes all the data from the physical disk.**

Install and remove a BOSS-S2 card

Topics:

Safety instructions

ⓘ **NOTE:** To avoid injury, do not lift the system on your own. Get others to assist you.

⚠ **WARNING: Opening or removing the system cover while the system is turned on may expose you to a risk of electric shock.**

⚠ **CAUTION: Do not operate the system without the cover in place for a duration exceeding five minutes. Operating the system without the system cover in place can result in component damage.**

⚠ **CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that are shipped with your product.**

⚠ **CAUTION: To ensure proper operation and cooling, all system bays and fans must be always populated with a component or a blank.**

ⓘ **NOTE:** It is recommended that you always use an antistatic mat and antistatic strap while working on components inside the system.

ⓘ **NOTE:** While replacing the hot swappable PSU, after next server boot; the new PSU automatically updates to the same firmware and configuration of the replaced one. For more information about the Part replacement configuration, see the *Lifecycle Controller User's Guide* at https://www.dell.com/idracmanuals

ⓘ **NOTE:** While replacing faulty storage controller/FC/NIC card with the same type of card, after you power on the system; the new card automatically updates to the same firmware and configuration of the faulty one. For more information about the Part replacement configuration, see the *Lifecycle Controller User's Guide* at https://www.dell.com/idracmanuals

Before working inside your system

Steps

1. Power off the system and all attached peripherals.
2. Disconnect the system from the electrical outlet, and disconnect the peripherals.
3. If applicable, remove the system from the rack.
   For more information, see the *Rail Installation Guide* relevant to your rail solutions at www.dell.com/poweredgemanuals.
4. Remove the system cover.

After working inside your system

Steps

1. Replace the system cover.
2. If applicable, install the system into the rack.
   For more information, see the *Rail Installation Guide* relevant to your rail solutions at www.dell.com/poweredgemanuals.
3. Reconnect the peripherals and connect the system to the electrical outlet, and then power on the system.

Remove the BOSS-S2 module

Prerequisites

⚠️ **CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the system.**

1. **Follow the safety guidelines listed in the Safety instructions on page 17.**
2. **Follow the procedure listed in the Before working inside your system on page 17.**

ⓘ **NOTE:** The below procedure is applicable to 1U systems. For more information on 2U systems, see the system-specific *Installation and Service Manual* available at www.dell.com/poweredgemanuals.

Steps

1. Disconnect the BOSS-S2 module power cable and signal cable from the system board.

2. Slide the M.2 carrier from the BOSS-S2 module bay.

Figure 2. Slide the M.2 carrier from the BOSS-S2 module bay

3. If installed, pull the M.2 blank out from the BOSS-S2 module bay.

ⓘ **NOTE:** An M.2 module blank is installed only if the controller has one M.2 carrier.
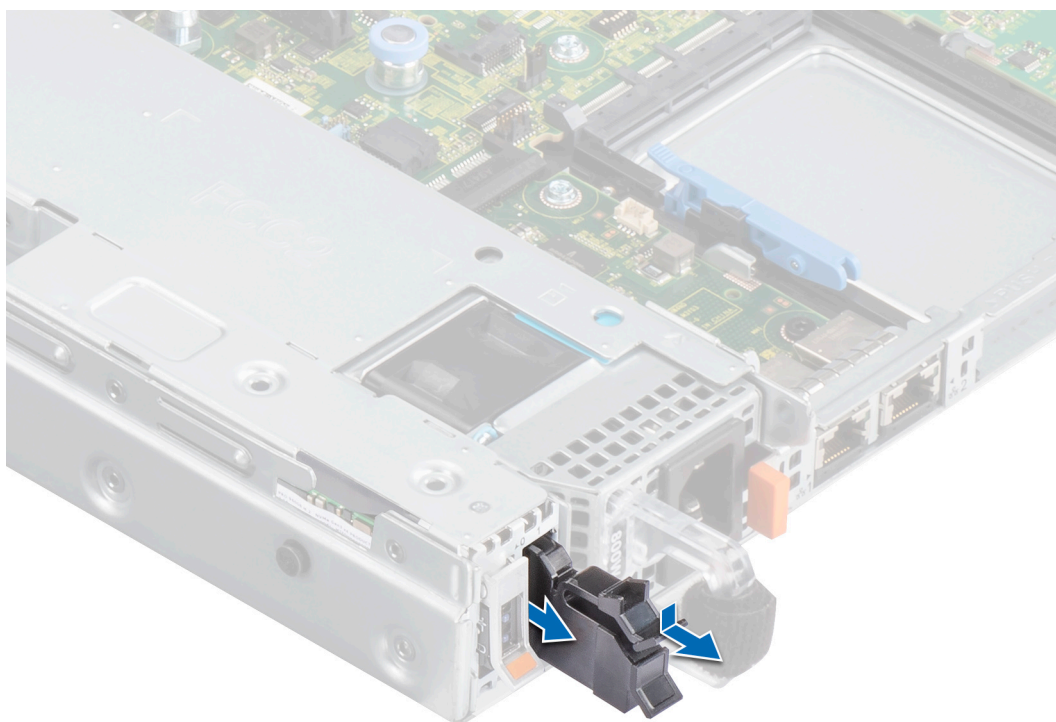
Figure 3. Pull the M.2 blank out from the BOSS-S2 module bay

4. Using a Phillips #1 screwdriver, remove the two screws that secure the BOSS-S2 module bay. Slide the BOSS-S2 module out of the BOSS-S2 module bay.
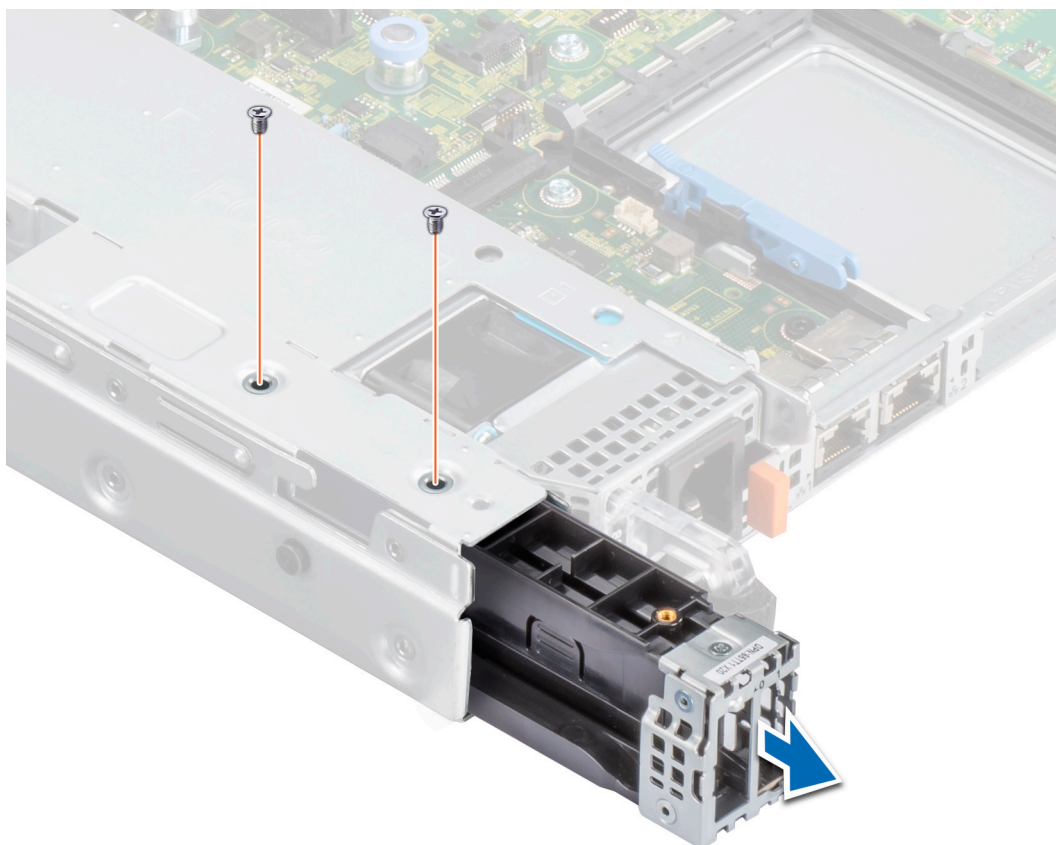
Figure 4. Remove the screws that secure the BOSS-S2 module bay

5. Using a Phillips #1 screwdriver, remove the screw that secures the bracket on the BOSS-S2 module. Slide the bracket from the BOSS-S2 module to remove the bracket.
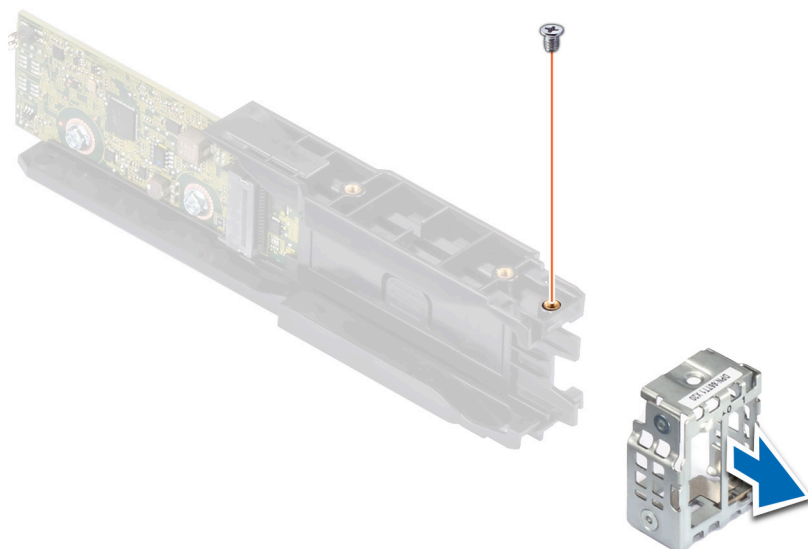
Figure 5. Remove the screw of the bracket on the BOSS-S2 module

6. Using a Phillips #1 screwdriver, remove the screw that secures the M.2 card to the M.2 card carrier.
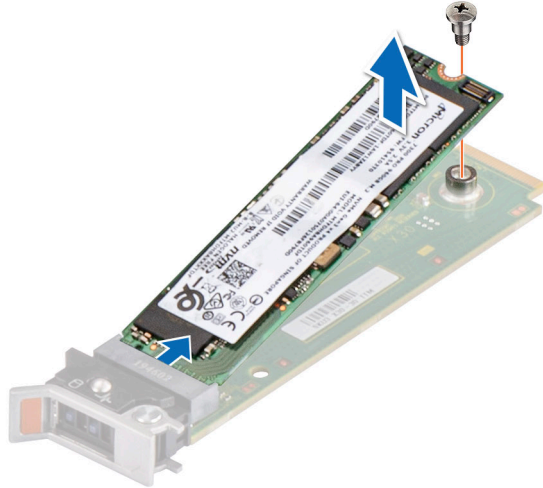
Figure 6. Remove the screw that secures the M.2 card to the M.2 card carrier

7. Slide the M.2 card from the M.2 card carrier.

Install the BOSS-S2 module

Prerequisites

⚠ **CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the system.**

1. Follow the safety guidelines listed in the **Safety instructions** on page 17.
2. Follow the procedure listed in the **Before working inside your system** on page 17.

ⓘ **NOTE:** The below procedure is applicable to 1U systems. For more information on 2U systems, see the system-specific *Installation and Service Manual* available at www.dell.com/poweredgemanuals.

Steps

1. Align the M.2 card at an angle with the M.2 card carrier.
2. Insert the M.2 card until it is firmly seated in the M.2 card carrier.

3. Using a Phillips #1 screwdriver, secure the M.2 card to the M.2 card carrier with the screw.

⚠️ **CAUTION: Ensure that the screws are tightened by using a torque of 1.7 in-lb (0.19 N-m).**
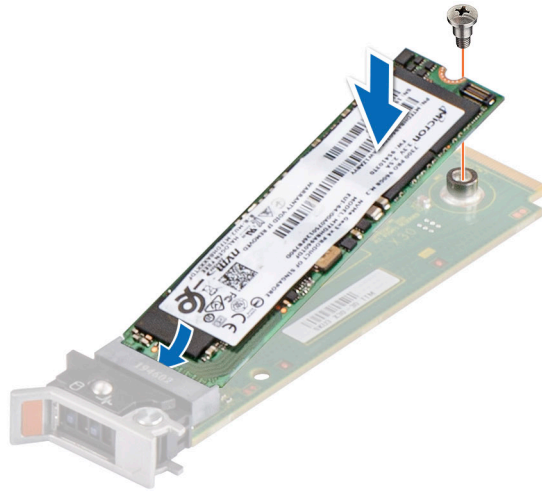
Figure 7. Install the screw that secures the M.2 card to the M.2 card carrier

4. Slide the bracket on the BOSS-S2 module. Using a Phillips #1 screwdriver, secure the bracket on the BOSS-S2 module with the screw.
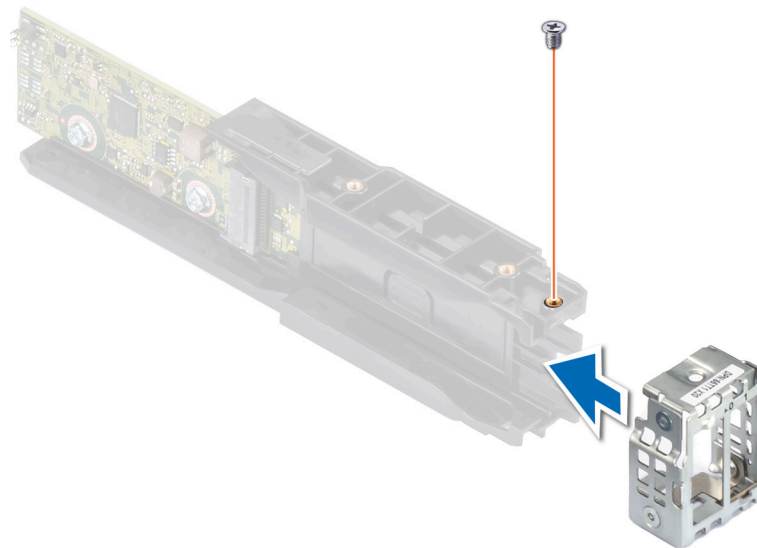
Figure 8. Install the screw of the bracket on the BOSS-S2 module

5. Slide the BOSS-S2 module into the BOSS-S2 module bay until it is firmly seated.

6. Using a Phillips #1 screwdriver, secure the BOSS-S2 module with the two screws.

   ⚠ **CAUTION: Ensure that the screws are tightened by using a torque of 4 in-lb (0.45 N-m).**
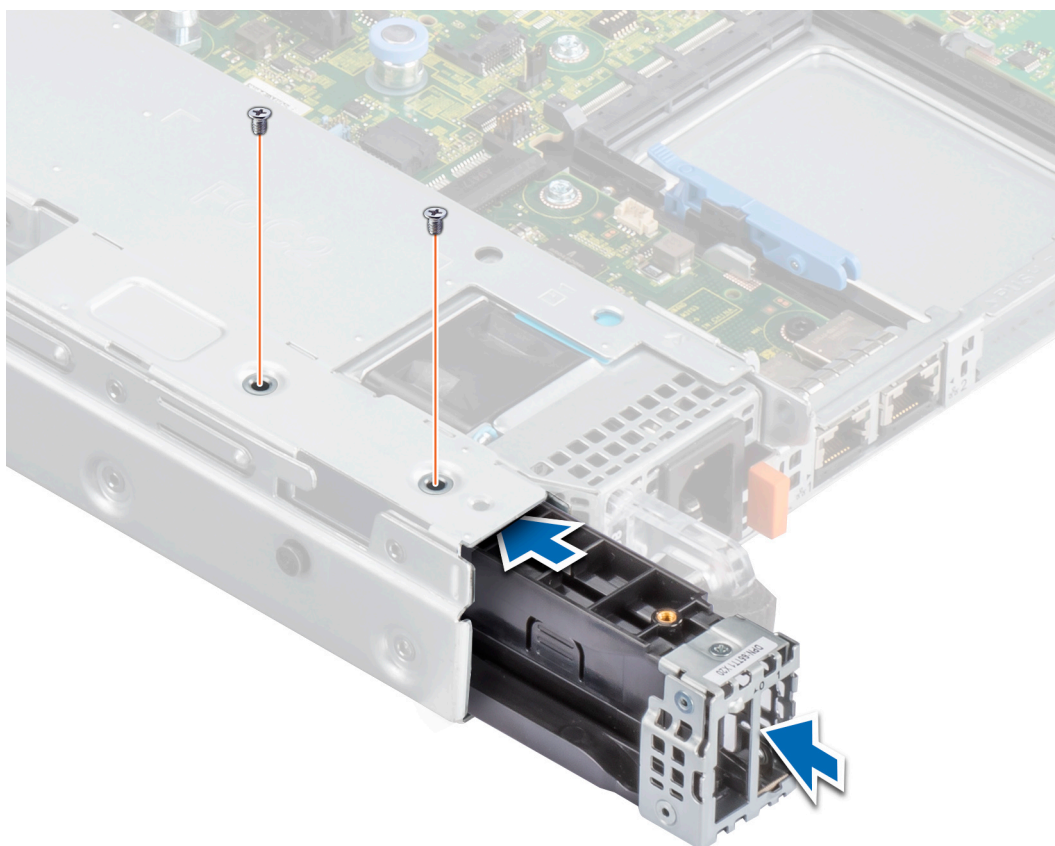
Figure 9. Install the screws that secure the BOSS-S2 module

7. Connect the BOSS-S2 module power cable and signal cable to the system board.
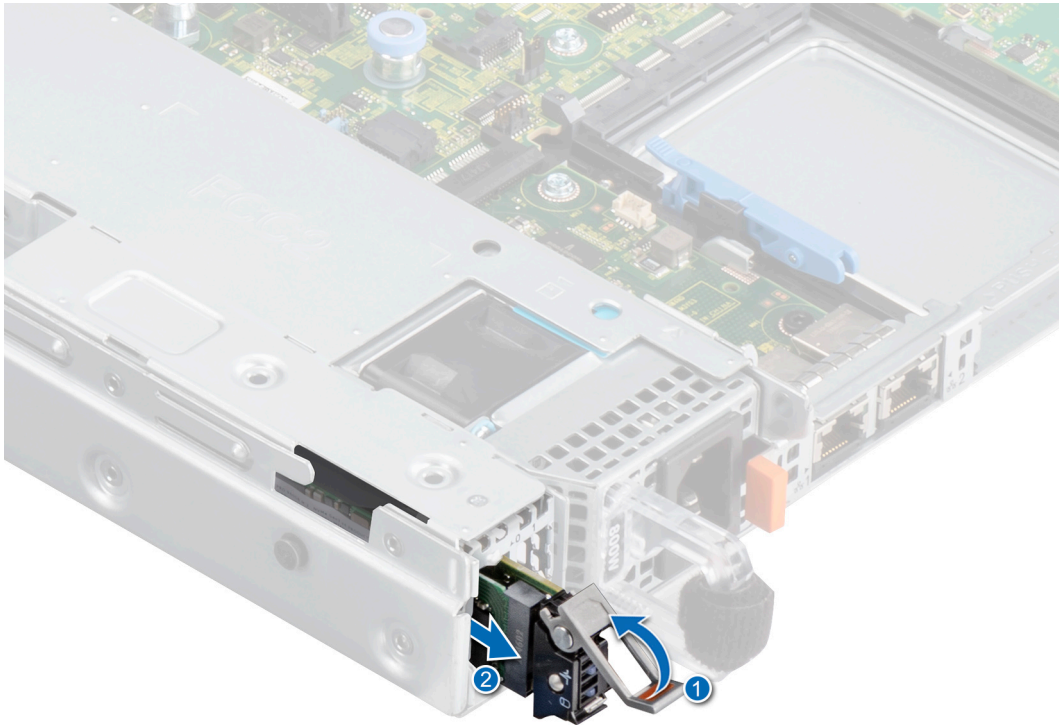
8. Slide the M.2 card carrier into the BOSS-S2 module bay.
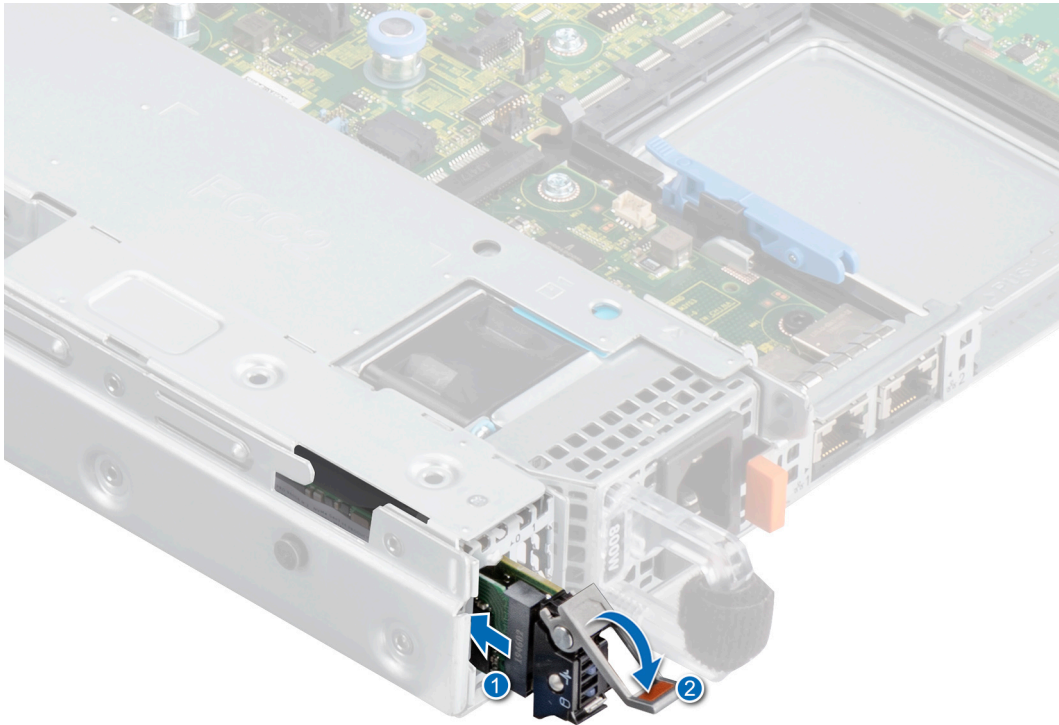
Figure 10. Slide the M.2 carrier into the BOSS-S2 module bay

9. Slide the M.2 blank into the BOSS-S2 module bay to lock the carrier in place.

   (i) **NOTE:** An M.2 blank is installed only if the controller has one M.2 carrier.
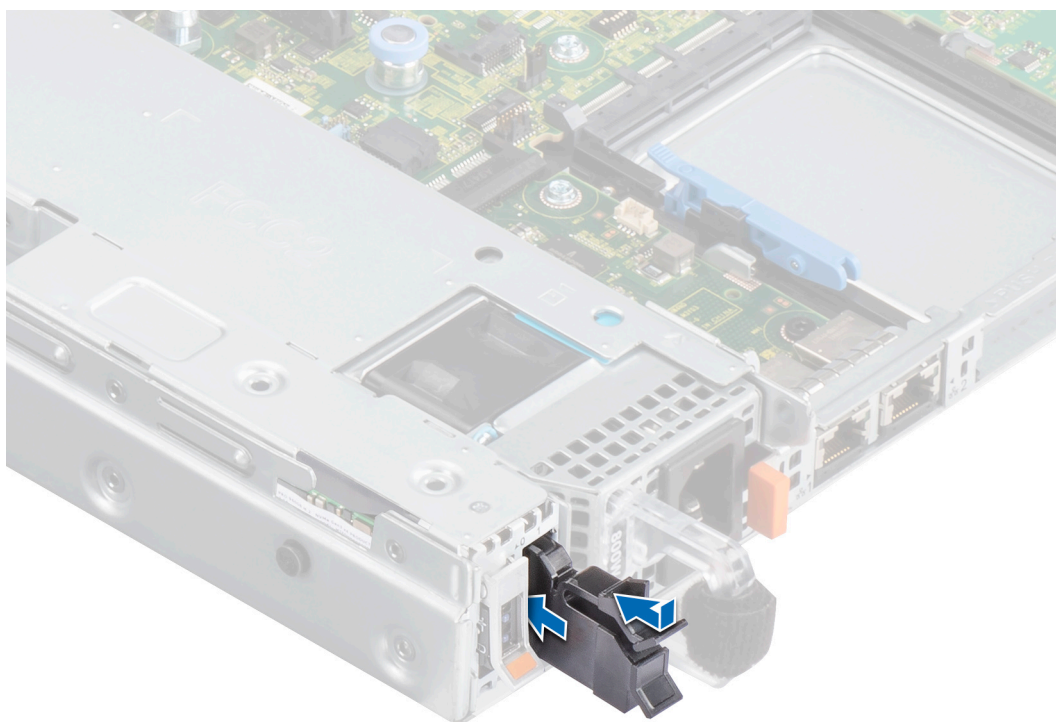
Figure 11. Slide the M.2 blank into the BOSS-S2 module bay

Next steps

1. Follow the procedure listed in After working inside your system on page 18.

Driver support for BOSS-S2

The BOSS-S2 card leverages the inbox AHCI driver with all the supported operating systems.

Windows driver installation—By default, native AHCI driver is the inbox for installation.

(i) **NOTE:** The Management console driver is required to support the command line interface for BOSS-S2 card in Windows driver installation.

Linux driver installation—By default, native AHCI driver is the inbox for installation.

ESXi driver installation—By default, native AHCI driver is the inbox for installation.

BOSS-S2 UEFI configuration utility

The Unified Extensible Firmware Interface (UEFI) RAID configuration utility is a storage management application integrated into the system BIOS <F2>. It is used to configure and manage RAID disk groups, virtual disks, and physical disks. This utility is independent of the operating system.

The following topics provide information about using the UEFI RAID configuration utility. For more information, see the online help option in the UEFI RAID configuration utility.

(i) **NOTE:** Use the UEFI RAID configuration utility for initial setup and disaster recovery. Certain advanced features are also offered in the utility.

Topics:

- Enter the BOSS-S2 UEFI configuration utility
- Exit the BOSS-S2 UEFI configuration utility
- Navigate to BOSS-S2 configuration utility
- Physical or virtual disk information
- Create a virtual disk
- Delete a virtual disk
- Recover or rebuild a degraded virtual drive
- Erase physical disk data
- View RAID controller information

Enter the BOSS-S2 UEFI configuration utility

About this task

Perform the following steps to boot to the UEFI configuration utility:

Steps

1. Turn on the system.
2. While the system is booting, press <F2> to enter **System Setup**.
3. Click **Device Settings**.
   Device Settings lists all the RAID controllers in the system.

   To access the management menu for the controller, use the arrow keys or the mouse.

   (i) **NOTE:** For more information in all the options, click **Help,** available on the top right-hand corner of the browser screen. Help information for individual option menus can also be viewed by scrolling down on each option.

   (i) **NOTE:** Some of the options within the UEFI RAID configuration utility are not present if the controller does not support the corresponding feature. Options may also be disabled if the feature is not supported in the existing configuration.

Exit the BOSS-S2 UEFI configuration utility

About this task

To exit the UEFI configuration utility, perform the following steps:

Steps

1. Click **Finish** at the bottom-right corner on the **System Setup Main Menu** screen.
   A warning message confirming your choice appears.

2. Click **Yes** to exit the configuration utility.

> (i) **NOTE:** Depending on the device configuration changes, exiting the UEFI configuration utility may prompt for a system reboot.

Navigate to BOSS-S2 configuration utility

About this task

To navigate to UEFI configuration utility, perform the following steps:

Steps

1. Enter the UEFI configuration utility. See Enter the UEFI RAID configuration utility
   The **Device Settings** screen displays a list of NIC ports and the BOSS-S2 configuration utility.
2. To enter BOSS-S2 configuration utility, click **BOSS-S2 Configuration Utility**.
   The list of **Configuration Options** appears:

   - **Physical/Virtual Disk Information** — view the properties of physical disks and virtual disks
   - **Create RAID Configuration** — configure a virtual disk
   - **Delete RAID Configuration** — delete a virtual disk
   - **RAID Rebuild** — rebuild a degraded RAID volume, if a suitable peer drive is available
   - **Erase Physical Disk** — clear data on a physical disk
   - **Controller Information** — view BOSS-S2 adapter information

Physical or virtual disk information

The **Physical/virtual disk information** menu allows you to view physical disk properties and virtual disk properties.

View physical disk information

About this task

To view the physical disk information, perform the following steps:

Steps

1. Enter the **BOSS-S2 Configuration utility**. See Enter the BOSS-S2 Configuration Utility.
2. Click **Physical/Virtual disk information**.
   All available physical disks are displayed.
3. Select a physical disk to view its information.

View virtual disk information

About this task

To view the virtual disk information, perform the following steps:

Steps

1. Enter the **BOSS-S2 Configuration utility**. See Enter the BOSS-S2 Configuration Utility.
2. Click **Physical/Virtual disk information**.
3. Select **Virtual disk info**.
   All available virtual disks are displayed.
4. Select a virtual disk to view its information.
5. Observe quick initialization information in the virtual disk information.

Import and set a foreign virtual disk as BOSS-S2 native

About this task

The Import operation sets a foreign virtual disk as native to the configuration.

Steps

1. Enter the **BOSS-S2 Configuration utility**. See Enter the BOSS-S2 Configuration Utility.
2. Click **Physical/Virtual disk information**.
3. Click **Virtual disk information**.
4. Select the virtual disk.
5. Select **Yes** for the option **Would you like to import this virtual disk?**.

   (i) **NOTE:** This option is only available when the controller detects a foreign disk.

6. Click **OK**, and then click **Import**.
7. Click **Back** untill you return to the screen.
8. Click **Finish**, and then click **Yes** to save the settings.

Create a virtual disk

About this task

To create a virtual disk, perform the following steps:

Steps

1. Enter the **BOSS-S2 Configuration Utility**. See Enter the BOSS-S2 Configuration Utility.
2. Click **Create RAID Configuration**.
3. Select the physical disks.
4. Click **Next**.
5. Type a name for the virtual disk in the **Name** field.

   (i) **NOTE:** Adding special characters in the virtual disk name is not supported.

6. Select **Yes** for the option **Would you like to create this virtual disk?** and click **OK**.
7. Click **Next**, and then click **OK**.
   A virtual disk is created with quick initialization by default.

Delete a virtual disk

About this task

To delete a virtual disk, perform the following steps:

Steps

1. Enter the **BOSS-S2 configuration utility**. See Enter the BOSS-S2 Configuration Utility.
2. Click **Delete RAID configuration**.
3. Select the virtual disk.
4. Select **Yes** for the option **Are you sure you want to delete the selected Virtual Disk?**.
5. Click **OK**, and then click **Next** to delete the selected virtual disk.

Recover or rebuild a degraded virtual drive

You can manually rebuild a degraded virtual disk. RAID rebuild is available only when a degraded RAID volume is present and there is an available target device. If a foreign virtual disk is in rebuild state, rebuild starts automatically after you import the virtual disk and reboot the server. Clear configuration operation does not affect any background activity, like rebuild.

Erase physical disk data

About this task

ⓘ **NOTE:** Erase physical disk is not supported when the physical disk is a part of virtual disk.

Steps

1. Enter the **BOSS-S2 Configuration Utility**. See Enter the BOSS-S2 Configuration Utility.
2. Click **Erase Physical Disk**.
3. Select the devices by selecting the check box next to the available physical disk configuration.
4. Select **Yes** for the option **Would you like to erase this Physical Disk?**.
5. Click **Next**.

   After the physical disk is successfully erased, the **Physical Disk** information tab shows the physical disk status as **unconfigured**.

View RAID controller information

About this task

The Controller information menu allows you to view the properties of the RAID Controller.

Steps

1. Enter the **BOSS-S2 configuration utility**. See Enter the BOSS-S2 Configuration Utility.
2. Click **Controller information**.

   The RAID adapter information is displayed.

Clear RAID controller configuration data

About this task

The clear configuration operation is used to clear RAID metadata from the adapter.

ⓘ **NOTE:** The clear configuration operation does not delete any data on the virtual disk.

Steps

1. Click **Controller information**.
2. Select **Clear Config**.
3. Click **OK**.

Manage BOSS-S2 using CLI commands

This section provides information about the methods to use the BOSS-S2 Command Line Interface (CLI) for performing a variety of controller and enclosure specific operations.

The BOSS-S2 CLI utility is supported on the following operating systems:

- Windows
- Linux
- ESXi

Topics:

BOSS-S2 CLI commands supported on PowerEdge servers

The following table lists the supported BOSS-S2 command line interface (CLI) commands. For more information about the commands, type **> help**.

(i) **NOTE:** The BOSS-S2 CLI utility only supports the following commands:

Table 6. Supported CLI commands

CLI commands	Description	Windows usage	Linux/VMware usage
info -o hba	Display BOSS-S2 controller information.	mvsetup info -o hba	./mvcli info -o hba
info -o vd	Display virtual drive information.	mvsetup info -o vd	./mvcli info -o vd
info -o pd	Display physical drive information.	mvsetup info -o pd	./mvcli info -o pd
smart -p <PD_ID>	Display SMART information of physical drive.	mvsetup smart -p 0	./mvcli smart -p 0
event	Display controller events.	mvsetup event	./mvcli event
help	Details help for all commands or for only one command.	mvsetup help info	./mvcli help

(i) **NOTE:** SMART reports the health status of the M.2 disks. See the SMART status return after the command is executed.

(i) **NOTE:** There might be inconsistency in the events that are listed in BOSS CLI and other management interfaces that include Dell EMC Open Manage Storage Services.

Run BOSS-S2 CLI commands on PowerEdge servers running the Windows operating system

About this task

Follow these procedures to run CLI commands using the Windows operating system:

Steps

1. Download the latest **MVSETUP BOSS-S2 utility for Windows** from www.dell.com/support/home.
2. Extract the content of the **mvsetup_xxxx_Axx.zip** file on the system.
3. Browse the directory where you have extracted the content of the **mvsetup_xxxx_Axx.zip** file and run the **mvsetup.exe** file.
   The CLI window, within which you can run BOSS-S2 CLI commands, is displayed. Run BOSS-S2 CLI commands from this window.

Run BOSS-S2 CLI commands on PowerEdge servers running the Linux operating system

About this task

Follow these procedures to run CLI commands using the Linux operating system:

Steps

1. Download the latest **MVCLI BOSS-S2 utility for Linux** from www.dell.com/support/home.
2. Extract the content of the **mvcli.xxxx_Axx.zip** file on the system.
3. Browse the directory to which you have extracted the content of the **mvcli.xxxx_Axx.zip** file and run the **./install** and **./mvcli** files.
   The CLI window, within which you can run BOSS-S2 CLI commands appears.

Run BOSS-S2 CLI commands on PowerEdge servers running the ESXi operating system

About this task

Follow these procedures to run CLI commands using the ESXi operating system:

Steps

1. Install ESXi on a host machine.
2. Use **WinSCP** or **SCP** and copy the attached files into the **/tmp/ directory**.
3. Log in to an **ESXi shell** using putty.
4. Change the directory to **cd /tmp**.
5. Run the command, – `esxcli software vib install -d /tmp/SAS-RAID_BOSS-S2_CLI_Axx.zip` to install the offline bundle.
   Successful commands are reported at the command line.
6. Enter the directory **cd /opt/dell/boss/** and run the mvcli (BOSS CLI) utility.

   (i) **NOTE:** ESXi 7.0 or ESXi 6.7 U3 is the minimum requirement to install the BOSS-S2 CLI utility.

Troubleshooting

To get help with your Dell BOSS-S2 card, you can contact your Dell Technical Service representative or see https://www.dell.com/support.

Topics:

- Importing the BOSS ESXi CLI offline bundle may fail in VSphere Lifecycle Manager
- BOSS ESXi CLI package fails when upgrading from Dell EMC customized versions of 6.7.x to version 7.0
- M.2 drive firmware update from iDRAC fails on unconfigured drives with an existing adapter key on the BOSS-S2 controller
- Unconfigured drives in the BOSS-S2 controller is unavailable for operating system installation with an existing adapter key
- The ROM version for BOSS is reported as firmware version in IDRAC interface
- Unable to update the M.2 drive firmware by using iDRAC or Lifecycle Controller
- BOSS-S2 CLI displays No Adapter Found error in Linux
- LC log displays fan unavailability error
- Physical disk size is not updated on iDRAC when CSIOR is disabled
- Physical disk or virtual disk is indicated as missing on iDRAC when CSIOR is disabled
- The Back Ground Activity (BGA) task process in HII does not report real-time status
- Virtual disk related events are repeatedly generated in BOSS-S2 and OMSS
- Characters are limited when entering a virtual drive name
- VMFS datastore is disabled from YX5X of PowerEdge systems that are shipped with VMware ESXi installed on BOSS-S2
- One or more physical disks are not detected by the operating system
- Virtual disk is not detected by the operating system
- An installed drive is not listed in the BOSS-S2 Configuration Utility
- The BOSS-S2 card is not presented to the PowerEdge server
- Unable to boot to M.2 drive installed in slot 1
- Unsupported commands, options, and features are displayed by BOSS-S2 CLI with VMware CLI utility
- Unable to deploy ESXi on RAID 1 of BOSS-S2

Importing the BOSS ESXi CLI offline bundle may fail in VSphere Lifecycle Manager

Issue:	Importing the BOSS ESXi CLI offline bundle into vSphere Lifecycle Manager fails through the vSphere Web Client. For more information, see https://kb.vmware.com/s/article/78688.
Corrective Action:	This issue is resolved. For more information, see https://kb.vmware.com/s/article/2147284 published by VMware for this behavior.

BOSS ESXi CLI package fails when upgrading from Dell EMC customized versions of 6.7.x to version 7.0

Issue:	When upgrading vSphere versions from 6.7.x to version 7.0, the package update fails if the previous version of BOSS CLI exists.
Corrective Action:	Remove the driver packages before attempting an upgrade using the command `esxcli software vib remove -n <vib name>`. ⓘ **NOTE:** The ESXi must be gracefully rebooted to complete the driver packages removal before upgrading. For more information, see https://kb.vmware.com/s/article/78389.

M.2 drive firmware update from iDRAC fails on unconfigured drives with an existing adapter key on the BOSS-S2 controller

Issue: M.2 drive firmware update from iDRAC fails on unconfigured drives in systems containing a controller with an existing adapter key.

Corrective Action: Clear the controller configuration in HII under **Controller Information** > **Clear Configuration** and update the drive firmware.

Unconfigured drives in the BOSS-S2 controller is unavailable for operating system installation with an existing adapter key

Issue: Unconfigured drives in systems containing a controller with an existing adapter key is not exposed for installing an operating system.

Corrective Action: Clear the controller configuration in HII under **Controller Information** > **Clear Configuration** and initiate the operating system installation.

The ROM version for BOSS is reported as firmware version in IDRAC interface

Issue: Starting with BOSS-S2 A00 release, BOSS-S2 versions are tracked using the ROM version. Therefore, iDRAC may report the ROM version as firmware version. For example, 2. 5.13. 4008 for A00.

Corrective Action: This is an expected behavior and no action is required.

Unable to update the M.2 drive firmware by using iDRAC or Lifecycle Controller

Issue: Firmware update of M.2 drives using the iDRAC web interface fails when the drive is in foreign state.

Corrective Action: Import the foreign configuration before updating the firmware of the drives.

BOSS-S2 CLI displays No Adapter Found error in Linux

Issue: BOSS-S2 CLI displays `No Adapter Found` error message in the Linux operating system.

Probable Cause: Using the BOSS-S2 CLI, when you run the CLI commands using non-administrative user privileges, the error No Adapter found is displayed.

Corrective Action: Use root/sudo administrator privilege while you run the CLI commands.

LC log displays fan unavailability error

Issue: LC log displays `The BOSS-S2 device does not have a fan installed in it` error message.

Probable Cause: Currently there is no fan requirement for BOSS-S2, which might be required in future based on M.2 thermal requirement.

Corrective Action: No action required. This error message can be ignored.

Physical disk size is not updated on iDRAC when CSIOR is disabled

Probable Cause: When Collect System Inventory on Reboot (CSIOR) is disabled, iDRAC displays partial information about BOSS-S2 components.

Corrective Action: Ensure that CSIOR is enabled in iDRAC for the server to collect the system inventory on reboot.
(i) **NOTE:** Ensure that the BOSS-S2 controller firmware and iDRAC firmware are updated to the latest version.

Physical disk or virtual disk is indicated as missing on iDRAC when CSIOR is disabled

Probable Cause: When Collect System Inventory on Reboot (CSIOR) is disabled, iDRAC displays partial information about BOSS-S2 components.

Corrective Action: Ensure that CSIOR is enabled in iDRAC for the server to collect the system inventory on reboot.
(i) **NOTE:** Ensure that the BOSS-S2 controller firmware and iDRAC firmware are updated to the latest version.

The Back Ground Activity (BGA) task process in HII does not report real-time status

Issue: Back Ground Activity (BGA) task progress in HII does not report the real-time status of running tasks.

Probable Cause: This is an expected firmware behavior, and there is no functionality loss.

Corrective Action: It is recommended that you check the BOSS-S2 CLI for status.

(i) **NOTE:** BOSS-S2 Command Line Interface (CLI) and Dell EMC Open Manage Storage Services only report events for the tasks that are completed.

Virtual disk related events are repeatedly generated in BOSS-S2 and OMSS

Issue: Events related to virtual disk state will be generated twice in BOSS-S2 CLI and Open Manage Storage Services (OMSS).

| **Probable Cause:** | This occurs when Dell EMC PowerEdge Servers perform a cold reboot. |
| **Corrective Action:** | These events can be safely ignored as there is no functionality loss. |

Characters are limited when entering a virtual drive name

| **Issue:** | Limitation in the number of characters while creating a virtual disk name |
| **Corrective Action:** | It is recommended that you use maximum of 10 characters while naming the virtual disk. |

VMFS datastore is disabled from YX5X of PowerEdge systems that are shipped with VMware ESXi installed on BOSS-S2

Issue:	Installation of ESXi on a BOSS-S2 device does not have VMFS datastore enabled by default, and disables VMFS if you use a custom image for installation. This issue occurs when using ESXi version 6.5.x or later on the BOSS-S2 card.
Corrective Action:	When you have VMware ESXi installed on BOSS-S2, it is recommended that you use the BOSS-S2 device only as a boot device and disable VMFS if you are installing a custom image. For more information, see https://kb.vmware.com/s/article/2004582 and https://kb.vmware.com/s/article/2145210.
	(i) **NOTE:** The scratch partition is created and configured during VMware ESXi installation in addition to boot support on BOSS-S2.

One or more physical disks are not detected by the operating system

Issue:	One or more physical disks are not detected by the operating system.
Probable Cause:	A physical disk will not be presented to the operating system in the following scenarios:
	● There is RAID metadata on the physical disk and no RAID metadata on the controller.
	● The BOSS-S2 controller has RAID metadata on it and the physical disk does not have the RAID metadata on it.
Corrective Action:	If the RAID metadata is on the controller, follow the steps listed in Clear Controller Configuration.
	If the RAID metadata is on the physical disk, follow the steps specified in Erase physical disk.
	Alternatively, if you want to keep the RAID drive, refer to Virtual Disk Not visible to Operating System

Virtual disk is not detected by the operating system

Issue:	In RAID mode a virtual disk is not appearing for use by an operating system.
Probable Cause:	Virtual disks will not be presented to the system if they are not native to the controller.
Corrective Action:	Import the virtual disk via HII as specified in section Virtual Disk Import.

An installed drive is not listed in the BOSS-S2 Configuration Utility

Issue:	An installed drive is not listed in the BOSS-S2 configuration utility.
	OpenManage reports **Physical disk offline** state.
Probable Cause:	Drive is either in failure state or has corrupted firmware.
Corrective Action:	Reseat drive to ensure drive is inserted correctly. If error persists, attempt to update drive firmware using DUP. If error is still present, replace erroneous drive.

The BOSS-S2 card is not presented to the PowerEdge server

Issue:	The BOSS-S2 card is not presented to the PowerEdge server.
Probable Cause:	Hardware fault on the card.
Corrective Action:	Replace the BOSS-S2 adapter.

Unable to boot to M.2 drive installed in slot 1

Issue:	When two unconfigured bootable M.2 drives are inserted into the BOSS-S2 device, only the slot 0 drive may be used as a boot drive.
Probable Cause:	Working as designed, BIOS only allows booting from the first listed boot device, in this case, slot 0 per peripheral controller. This only occurs in legacy BIOS boot mode.
Corrective Action:	Remove the drive from slot 1 and install it in slot 0.

Unsupported commands, options, and features are displayed by BOSS-S2 CLI with VMware CLI utility

Issue:	Several commands, options, or other features listed by the VMware CLI utility state that they are unsupported when run.
Probable Cause:	CLI shows the same information on all Marvell products, but only implements the functions which are pertinent to that platform or system.
Corrective Action:	Use the supported features. See Manage BOSS-S2 using CLI commands on page 33.

Unable to deploy ESXi on RAID 1 of BOSS-S2

Issue:	Attempting to install ESXi on a RAID 1 results in an invalid partition table error.
Probable Cause:	If an unconfigured physical disk containing an ESXi partition is used in a virtual disk, any attempts to install a partition of ESXi on this virtual disk will raise an error due to failure to clear out the previous partition.

Corrective Action: Delete the existing RAID 1, run `erase physical disk` on both drives, re-create the RAID 1 with quick initialization ON, then attempt to reinstall ESXi on the virtual disk.

Getting help

Topics:

- Recycling or End-of-Life service information
- Contacting Dell
- Receiving automated support with SupportAssist

Recycling or End-of-Life service information

Take back and recycling services are offered for this product in certain countries. If you want to dispose of system components, visit www.dell.com/recyclingworldwide and select the relevant country.

Contacting Dell

Dell provides online and telephone based support and service options. If you do not have an active internet connection, you can find Dell contact information on your purchase invoice, packing slip, bill or Dell product catalog. The availability of services varies depending on the country and product, and some services may not be available in your area. To contact Dell for sales, technical assistance, or customer service issues:

Steps

1. Go to www.dell.com/support/home.
2. Select your country from the drop-down menu on the lower right corner of the page.
3. For customized support:
   a. Enter the system Service Tag in the **Enter a Service Tag, Serial Number, Service Request, Model, or Keyword** field.
   b. Click **Submit**.
      The support page that lists the various support categories is displayed.
4. For general support:
   a. Select your product category.
   b. Select your product segment.
   c. Select your product.
      The support page that lists the various support categories is displayed.
5. For contact details of Dell Global Technical Support:
   a. Click Global Technical Support.
   b. The **Contact Technical Support** page is displayed with details to call, chat, or e-mail the Dell Global Technical Support team.

Receiving automated support with SupportAssist

Dell EMC SupportAssist is an optional Dell EMC Services offering that automates technical support for your Dell EMC server, storage, and networking devices. By installing and setting up a SupportAssist application in your IT environment, you can receive the following benefits:

- Automated issue detection — SupportAssist monitors your Dell EMC devices and automatically detects hardware issues, both proactively and predictively.
- Automated case creation — When an issue is detected, SupportAssist automatically opens a support case with Dell EMC Technical Support.

- Automated diagnostic collection — SupportAssist automatically collects system state information from your devices and uploads it securely to Dell EMC. This information is used by Dell EMC Technical Support to troubleshoot the issue.
- Proactive contact — A Dell EMC Technical Support agent contacts you about the support case and helps you resolve the issue.

The available benefits vary depending on the Dell EMC Service entitlement purchased for your device. For more information about SupportAssist, go to www.dell.com/supportassist.

Documentation resources

This section provides information about the documentation resources for your system.

To view the document that is listed in the documentation resources table:

- From the Dell EMC support site:
  1. Click the documentation link that is provided in the Location column in the table.
  2. Click the required product or product version.

     (i) **NOTE:** To locate the product name and model, see the front of your system.
  3. On the Product Support page, click **Manuals & documents**.
- Using search engines:
  - Type the name and version of the document in the search box.

Table 7. Additional documentation resources for your system

Task	Document	Location
Setting up your system	For more information about installing and securing the system into a rack, see the Rail Installation Guide included with your rail solution.	www.dell.com/poweredgemanuals
	For information about setting up your system, see the *Getting Started Guide* document that is shipped with your system.	
Configuring your system	For information about the iDRAC features, configuring and logging in to iDRAC, and managing your system remotely, see the Integrated Dell Remote Access Controller User's Guide.	www.dell.com/poweredgemanuals
	For information about understanding Remote Access Controller Admin (RACADM) subcommands and supported RACADM interfaces, see the RACADM CLI Guide for iDRAC.	
	For information about Redfish and its protocol, supported schema, and Redfish Eventing implemented in iDRAC, see the Redfish API Guide.	
	For information about iDRAC property database group and object descriptions, see the Attribute Registry Guide.	
	For information about Intel QuickAssist Technology, see the Integrated Dell Remote Access Controller User's Guide.	
	For information about earlier versions of the iDRAC documents.	www.dell.com/idracmanuals
	To identify the version of iDRAC available on your system, on the iDRAC web interface, click **?** > **About**.	

Table 7. Additional documentation resources for your system (continued)

Task	Document	Location
	For information about installing the operating system, see the operating system documentation.	www.dell.com/operatingsystemmanuals
	For information about updating drivers and firmware, see the Methods to download firmware and drivers section in this document.	www.dell.com/support/drivers
Managing your system	For information about systems management software offered by Dell, see the Dell OpenManage Systems Management Overview Guide.	www.dell.com/poweredgemanuals
	For information about setting up, using, and troubleshooting OpenManage, see the Dell OpenManage Server Administrator User's Guide.	www.dell.com/openmanagemanuals > OpenManage Server Administrator
	For information about installing, using, and troubleshooting Dell OpenManage Enterprise, see the Dell OpenManage Enterprise User's Guide.	https://www.dell.com/openmanagemanuals
	For information about installing and using Dell SupportAssist, see the Dell EMC SupportAssist Enterprise User's Guide.	https://www.dell.com/serviceabilitytools
	For information about partner programs enterprise systems management, see the OpenManage Connections Enterprise Systems Management documents.	www.dell.com/openmanagemanuals
Working with the Dell PowerEdge RAID controllers	For information about understanding the features of the Dell PowerEdge RAID controllers (PERC), Software RAID controllers, or BOSS card and deploying the cards, see the Storage controller documentation.	www.dell.com/storagecontrollermanuals
Understanding event and error messages	For information about the event and error messages generated by the system firmware and agents that monitor system components, go to qrl.dell.com > **Look Up** > **Error Code**, type the error code, and then click **Look it up**.	www.dell.com/qrl
Troubleshooting your system	For information about identifying and troubleshooting the PowerEdge server issues, see the Server Troubleshooting Guide.	www.dell.com/poweredgemanuals