

Dell EMC PowerEdge Servers

Troubleshooting Guide



View our **PowerEdge R940**
inventory [here](#)

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.

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Introduction

Use this guide to learn how to identify and troubleshoot the Dell PowerEdge server issues.

In particular, this guide:

- Provides troubleshooting procedures for issues related to Server Operating System, Server Hardware, and Server Management Software.
- Provides an overview of diagnostic indicators and describes how to use the indicator codes to facilitate troubleshooting.
- Lists Dell PowerEdge server error messages and their probable causes, and provides the actions recommended to correct them.

NOTE: This guide does not cover every possible issue that might occur on Dell PowerEdge servers, however focuses on issues that are frequently encountered or are frequently asked questions.

Topics:

- [Audience](#)
- [Recommended tools](#)
- [Documentation resources](#)
- [Safety instructions](#)

Audience

The information in this troubleshooting guide is intended primarily for administrators, who are responsible for managing the Dell PowerEdge servers, however might be useful for all users of Dell servers.

Recommended tools

Lists the basic tools and equipment necessary to perform troubleshooting tasks on the Dell PowerEdge servers.

- Key to the bezel lock
The key is needed only if your system includes a bezel.
- Phillips #1 screwdriver
- Phillips #2 screwdriver
- Torx #T30 screwdriver
- 1/4 inch flat head screwdriver
- #4 nut driver
- Plastic scribe
- Wrist grounding strap
- ESD mat

You need the following tools to assemble the cables for a DC power supply unit:

- AMP 90871-1 hand-crimping tool or equivalent
- Tyco Electronics 58433-3 or equivalent
- Wire-stripper pliers to remove insulation from size 10 AWG solid or stranded, insulated copper wire

NOTE: Use alpha wire part number 3080 or equivalent (65/30 stranding).

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.



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:

- o Type the name and version of the document in the search box.

Table 1. 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 rack solution. For information about setting up your system, see the <i>Getting Started Guide</i> document that is shipped with your system.	www.dell.com/poweredgemanuals
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. 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.	www.dell.com/poweredgemanuals
	For information about earlier versions of the iDRAC documents. To identify the version of iDRAC available on your system, on the iDRAC web interface, click ? > About .	www.dell.com/idracmanuals
	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 Essentials, see the Dell OpenManage Essentials User's Guide.	www.dell.com/openmanagemanuals > OpenManage Essentials
	For information about installing and using Dell SupportAssist, see the Dell EMC SupportAssist Enterprise User's Guide.	www.dell.com/serviceabilitytools

Table 1. Additional documentation resources for your system (continued)

Task	Document	Location
	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, see the Error Code Lookup.	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

Safety instructions

-  **NOTE:** Whenever you need to lift the system, get others to assist you. To avoid injury, do not attempt to lift the system by yourself.
-  **WARNING:** Opening or removing the system cover while the system is powered on may expose you to a risk of electric shock.
-  **CAUTION:** Do not operate the system without the cover for a duration exceeding five minutes.
-  **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:** Operating the system without the system cover can result in component damage.
-  **NOTE:** It is recommended that you always use an antistatic mat and antistatic strap while working on components inside the system.
-  **NOTE:** To ensure proper operation and cooling, all bays in the system and system fans must be populated always with a component or with a blank.

Diagnostic indicators

The diagnostic indicators on the system indicates operation and error status.

Topics:

- Status LED indicators
- System health and system ID indicator codes
- iDRAC Quick Sync 2 indicator codes
- iDRAC Direct LED indicator codes
- NIC indicator codes
- Power supply unit indicator codes
- Non-redundant power supply unit indicator codes
- Hard drive indicator codes
- uSATA SSD indicator codes
- Internal dual SD module indicator codes

Status LED indicators

The status LED indicators on the system front panel display error status during system startup.

NOTE: No status LED indicators are illuminated when the system is turned off. To start the system, plug it into a working power source and press the power button.

NOTE: Status LED indicators are always off and only turn solid amber if any error occurs.

Table 2. Status LED indicators

Icon	Description	Condition	Corrective action
	Hard drive indicator	The indicator turns solid amber if there is a hard drive error.	Check the System Event Log to determine if the hard drive has an error. Run the appropriate Online Diagnostics test. Restart the system and run embedded diagnostics (ePSA). If the hard drives are configured in a RAID array, restart the system and enter the host adapter configuration utility program.
	Temperature indicator	The indicator turns solid amber if the system experiences a thermal error (for example, the ambient temperature is out of range or fan failure).	Ensure that none of the following conditions exist: • A cooling fan has been removed or has failed. • System cover, air shroud, EMI filler panel, memory module blank, or back filler bracket is removed. • Ambient temperature is too high. • External airflow is obstructed. If the problem persists, see the Getting help section.
	Electrical indicator	The indicator turns solid amber if the system experiences an electrical error (for example, voltage out of range, or a failed power supply unit (PSU) or voltage regulator).	Check the System Event Log or system messages for the specific issue. If it is due to a problem with the PSU, check the LED on the PSU. Reseat the PSU. If the problem persists, see the Getting help section.
	Memory indicator	The indicator turns solid amber if a memory error occurs.	Check the System Event Log or system messages for the location of the failed memory. Reseat the memory module. If the problem persists, see the Getting help section.

Table 2. Status LED indicators (continued)

Icon	Description	Condition	Corrective action
	PCIe indicator	The indicator turns solid amber if a PCIe card experiences an error.	Restart the system. Update any required drivers for the PCIe card. Reinstall the card. If the problem persists, see the Getting help section. NOTE: For more information about the supported PCIe cards, see the Expansion card installation guidelines section.

System health and system ID indicator codes



Figure 1. System health and system ID indicators

Table 3. System health and system ID indicator codes

System health and system ID indicator code	Condition
Blue solid	Indicates that the system is turned on, system is healthy and system ID mode is not active. Press the system health and system ID button to switch to system ID mode.
Blinking blue	Indicates that the system ID mode is active. Press the system health and system ID button to switch to system health mode.
Amber solid	Indicates that the system is in fail-safe mode. If the problem persists, see the Getting help section.
Blinking amber	Indicates that the system is experiencing a fault. Check the System Event Log or the LCD panel, if available on the bezel, for specific error message. For information about the event and error messages generated by the system firmware and agents that monitor system components, see the Error Code Lookup page at qrl.dell.com

iDRAC Quick Sync 2 indicator codes

NOTE: iDRAC Quick Sync 2 module (optional) is located on the left control panel of your system.



Figure 2. iDRAC Quick Sync 2 indicators

Table 4. iDRAC Quick Sync 2 indicators

Wireless indicator code	Condition	Corrective action
Off (default state)	Indicates that the iDRAC Quick Sync 2 feature is turned off. Press the iDRAC Quick Sync 2 button to turn on the iDRAC Quick Sync 2 feature.	If the LED fails to turn on, reseal the left control panel flex cable and check again. If the problem persists, see the Getting help section.
White solid	Indicates that iDRAC Quick Sync 2 is ready to communicate. Press the iDRAC Quick Sync 2 button to turn off.	If the LED fails to turn off, restart the system. If the problem persists, see the Getting help section.

Table 4. iDRAC Quick Sync 2 indicators (continued)

Wireless indicator code	Condition	Corrective action
Blinks white rapidly	Indicates data transfer activity.	If the indicator continues to blink indefinitely, see the Getting help section.
Blinks white slowly	Indicates that firmware update is in progress.	If the indicator continues to blink indefinitely, see the Getting help section.
Blinks white five times rapidly and then turns off	Indicates that the iDRAC Quick Sync 2 feature is disabled.	Check if iDRAC Quick Sync 2 feature is configured to be disabled by iDRAC. If the problem persists, see the Getting help section. For more information, see <i>Integrated Dell Remote Access Controller User's Guide</i> at www.dell.com/poweredgemanuals or <i>Dell OpenManage Server Administrator User's Guide</i> at www.dell.com/openmanagemanuals
Amber solid	Indicates that the system is in fail-safe mode.	Restart the system. If the problem persists, see the Getting help section.
Blinking amber	Indicates that the iDRAC Quick Sync 2 hardware is not responding properly.	Restart the system. If the problem persists, see the Getting help section.

iDRAC Direct LED indicator codes

The iDRAC Direct LED indicator lights up to indicate that the port is connected and is being used as a part of the iDRAC subsystem. iDRAC Direct LED indicator is located below the iDRAC Direct port on the front panel.

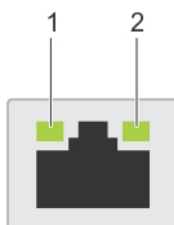
The following table describes iDRAC Direct activity when configuring iDRAC Direct by using your laptop or tablet and USB to micro USB (type AB) cable:

Table 5. iDRAC Direct LED indicator codes

iDRAC Direct LED indicator pattern	Condition
Solid green for two seconds	Indicates that the laptop or tablet is connected.
Flashing green (on for two seconds and off for two seconds)	Indicates that the laptop or tablet connected is recognized.
Turns off	Indicates that the laptop or tablet is unplugged.

NIC indicator codes

Each NIC on the back panel has indicators that provide information about the activity and link status. The activity LED indicator indicates if data is flowing through NIC, and the link LED indicator indicates the speed of the connected network.

**Figure 3. NIC indicators**

1. Link LED indicator
2. Activity LED indicator

Table 6. NIC indicators

Status	Condition
Link and activity indicators are off	The NIC is not connected to the network.

Table 6. NIC indicators (continued)

Status	Condition
Link indicator is green and activity indicator is blinking green	The NIC is connected to a valid network at its maximum port speed and data is being sent or received.
Link indicator is amber and activity indicator is blinking green	The NIC is connected to a valid network at less than its maximum port speed and data is being sent or received.
Link indicator is green and activity indicator is off	The NIC is connected to a valid network at its maximum port speed and data is not being sent or received.
Link indicator is amber and activity indicator is off	The NIC is connected to a valid network at less than its maximum port speed and data is not being sent or received.
Link indicator is blinking green and activity is off	NIC identify is enabled through the NIC configuration utility.

Power supply unit indicator codes

AC power supply units (PSUs) have an illuminated translucent handle that serves as an indicator and DC PSUs have an LED that serves as an indicator. The indicator shows whether power is present or a power fault has occurred.

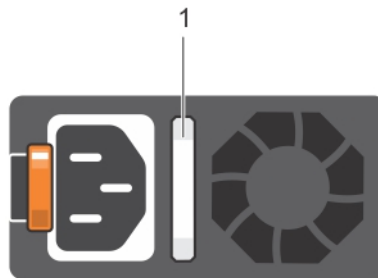


Figure 4. AC PSU status indicator

1. AC PSU status indicator or handle

Table 7. AC PSU status indicator

Power indicator codes	Condition
Green	A valid power source is connected to the PSU and the PSU is operational.
Blinking amber	Indicates a problem with the PSU.
Not illuminated	Power is not connected.
Blinking green	When the firmware of the PSU is being updated, the PSU handle blinks green. ⚠ CAUTION: Do not disconnect the power cord or unplug the PSU when updating firmware. If firmware update is interrupted, the PSUs do not function.
Blinking green and turns off	When hot-plugging a PSU, the PSU handle blinks green five times at a rate of 4 Hz and turns off. This indicates a PSU mismatch with respect to efficiency, feature set, health status, or supported voltage. ⚠ CAUTION: If two PSUs are installed, both the PSUs must have the same type of label. For example, Extended Power Performance (EPP) label. Mixing PSUs from previous generations of PowerEdge servers is not supported, even if the PSUs have the same power rating. This results in a PSU mismatch condition or failure to turn the system on. ⚠ CAUTION: When correcting a PSU mismatch, replace only the PSU with the blinking indicator. Swapping the PSU to make a matched pair can result in an error condition and unexpected system shutdown. To change from a high output configuration to a low output configuration or vice versa, you must turn off the system. ⚠ CAUTION: AC PSUs support both 240 V and 120 V input voltages with the exception of Titanium PSUs, which support only 240 V. When two identical PSUs receive different input voltages, they can output different wattages, and trigger a mismatch.

Table 7. AC PSU status indicator (continued)

Power indicator codes	Condition
	CAUTION: If two PSUs are used, they must be of the same type and have the same maximum output power.
	CAUTION: Combining AC and DC PSUs is not supported and triggers a mismatch.

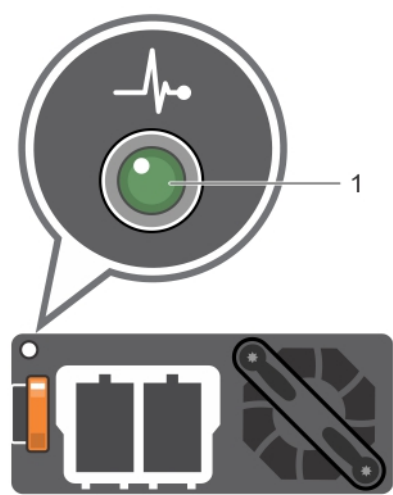


Figure 5. DC PSU status indicator

1. DC PSU status indicator

Table 8. DC PSU status indicator codes

Power indicator codes	Condition
Green	A valid power source is connected to the PSU and the PSU is operational.
Blinking amber	Indicates a problem with the PSU.
Not illuminated	Power is not connected.
Blinking green	When hot-plugging a PSU, the PSU indicator blinks green. This indicates that there is a PSU mismatch with respect to efficiency, feature set, health status, or supported voltage. CAUTION: When correcting a PSU mismatch, replace only the PSU with the blinking indicator. Swapping the PSU to make a matched pair can result in an error condition and unexpected system shutdown. To change from a High Output configuration to a Low Output configuration or vice versa, you must turn off the system. CAUTION: If two PSUs are used, they must be of the same type and have the same maximum output power. CAUTION: Combining AC and DC PSUs is not supported and triggers a mismatch.

Non-redundant power supply unit indicator codes

Press the self-diagnostic button to perform a quick health check on the non-redundant power supply unit (PSU) of the system.

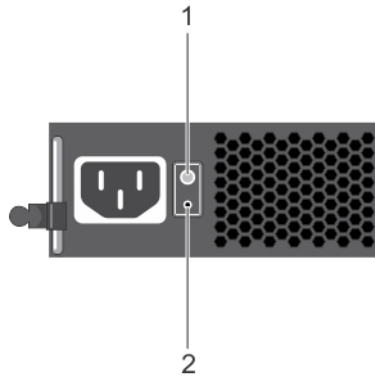


Figure 6. Non-redundant AC PSU status indicator and self-diagnostic button

1. Self-diagnostic button
2. AC PSU status indicator

Table 9. Non-redundant AC PSU status indicator

Power Indicator Pattern	Condition
Not lit	Power is not connected or PSU is faulty.
Green	A valid power source is connected to the PSU and the PSU is operational.

Hard drive indicator codes

Each hard drive carrier has an activity LED indicator and a status LED indicator. The indicators provide information about the current status of the hard drive. The activity LED indicator indicates whether the hard drive is currently in use or not. The status LED indicator indicates the power condition of the hard drive.

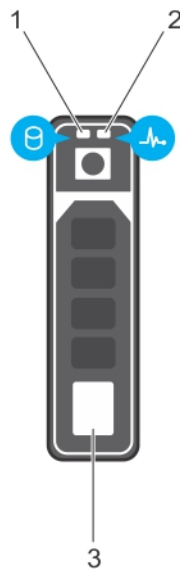


Figure 7. Hard drive indicators

1. Hard drive activity indicator
2. Hard drive status LED indicator
3. Hard drive

NOTE: If the hard drive is in the Advanced Host Controller Interface (AHCI) mode, the status LED indicator does not turn on.

Table 10. Hard drive indicator codes

Drive-status indicator pattern	Condition
Flashes green twice per second	Identifying drive or preparing for removal.
Off	Drive ready for insertion or removal. i NOTE: The drive status indicator remains off until all hard drives are initialized after the system is turned on. Drives are not ready for removal during this time.
Flashes green, amber, and then turns off	Predicted drive failure.
Flashes amber four times per second	Drive failed.
Flashes green slowly	Drive rebuilding.
Steady green	Drive online.
Flashes green for three seconds, amber for three seconds, and then turns off after six seconds	Rebuild stopped.

uSATA SSD indicator codes



Figure 8. uSATA SSD indicators

- 1. uSATA SSD activity indicator
- 2. uSATA SSD status indicator
- 3. uSATA SSD

i **NOTE:** If the SSD is in the Advanced Host Controller Interface (AHCI) mode, the status indicator (on the right side) does not function and remains off.

Table 11. Drive status indicator codes

Drive-status indicator pattern	Condition
Flashes green twice per second	Identifying drive or preparing for removal.
Off	Drive ready for insertion or removal. i NOTE: The drive status indicator remains off until all hard drives are initialized after the system is turned on. Drives are not ready for insertion or removal during this time.
Flashes green, amber, and turns off	Predicted drive failure.
Flashes amber four times per second	Drive failed.
Steady green	Drive online.
Flashes green for three seconds, amber for three seconds, and turns off after six seconds	Rebuild stopped.

Internal dual SD module indicator codes

The Internal Dual SD module (IDSDM) provides you with a redundant SD card solution. You can configure the IDSDM for storage or as the OS boot partition. The IDSDM card offers the following features:

- Dual card operation — maintains a mirrored configuration by using SD cards in both the slots and provides redundancy.



NOTE: When the Redundancy option is set to Mirror Mode in the Integrated Devices screen of System Setup, the information is replicated from one SD card to another.
- Single card operation — single card operation is supported, but without redundancy.

The following table describes the IDSDM indicator codes:

Table 12. IDSDM indicator codes

Convention	IDSDM indicator code	Description
A	Green	Indicates that the card is online.
B	Flashing green	Indicates rebuild or activity.
C	Flashing amber	Indicates card mismatch or that the card has failed.
D	Amber	Indicates that the card is offline, has failed, or is write-protected.
E	Not lit	Indicates that the card is missing or is booting.

Running diagnostics

Running diagnostics help you to identify the cause for a system issue. The diagnostics test your system hardware without requiring additional equipment or risking data loss.

Topics:

- [Receiving automated support with SupportAssist](#)
- [PSA/ePSA Diagnostics](#)
- [Debugging mini crash dump files using by WinDbg in Windows operating system](#)

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.

PSA/ePSA Diagnostics

Run the Embedded System Diagnostics (ePSA) if your system does not boot.

Running the PSA Diagnostics

Steps

1. While the system is booting, press <F11> to enter **Boot Manager**. Alternatively, press <F10> to enter Lifecycle Controller.
2. Use the up and down arrow keys to select **System Utilities** → **Hardware Diagnostics**.
 **NOTE:** For systems that do not have Lifecycle Controller, press <F10> to launch the Utility Mode (diags) option.
3. Note down the error code.
 The following table describes the PSA/ePSA diagnostics error messages.

PSA and ePSA Diagnostics error codes

-  **NOTE:** For information about the event and error messages generated by the system firmware and agents that monitor system components, see the Error Code Lookup page at qrl.dell.com

Table 13. PSA/ePSA error codes

Error number (PSA and ePSA)	Error message	Description	Steps
PSA NA ePSA 2000-0111	CPU - exception occurred	An error occurred during the tests that may involve the system board.	1. Update to the latest BIOS version. 2. Repeat the PSA diagnostics. 3. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-0112	CPU - machine check exception detected	An error occurred during the tests that may involve the system board.	1. Update to the latest BIOS version. 2. Repeat the PSA diagnostics. 3. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-0114	CPU - Cache integrity test discrepancy	An error occurred during the tests that may involve the system board.	1. Update to the latest BIOS version. 2. Repeat the PSA diagnostics. 3. Check temperatures in system health and check that no airflow obstructed. 4. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-0115	CPU - Stress Thermal condition. Limit (d)C. Actual (d)C	An error occurred during the tests that may involve the system board.	1. Update to the latest BIOS version. 2. Repeat the PSA diagnostics. 3. Check temperatures in system health and check that no airflow obstructed. 4. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-0121	Memory - memory errors were detected and repaired	An error occurred during the tests that may involve the system board or memory of the system. However, the system has self repaired.	1. Turn off the system and reseal the memory modules. 2. Update to the latest BIOS version. 3. Repeat the PSA diagnostics. 4. If failure continues, contact Dell Technical Support
PSA 1000-0122 ePSA 2000-0122	PSA Memory - test initialization failure ePSA Memory - memory errors were detected and excessive errors were detected	An error occurred during the tests that may involve the system board or memory of the system. However, the system has self repaired.	1. Turn off the system and reseal the memory modules. 2. Update to the latest BIOS version. 3. Repeat the PSA diagnostics. 4. If failure continues, contact Dell Technical Support
PSA 1000-0123 ePSA 2000-0123	Memory - integrity test failed	An error occurred during the tests that may involve the system board or memory of the system. However, the system has self repaired.	1. Turn off the system and reseal the memory modules. 2. Repeat the PSA diagnostics.
PSA NA ePSA 2000-0124	System Log - <Timestamp>, <Log message>	This is information in the system log to show time and messages related to system events.	1. Clear the system log. 2. Repeat the PSA diagnostics.

Table 13. PSA/ePSA error codes (continued)

Error number (PSA and ePSA)	Error message	Description	Steps
PSA NA ePSA 2000-0125	Event Log	The IPMI system event log is full for various reasons or logging has stopped because too many ECC errors have occurred.	1. Clear the IPMI system event log. 2. Repeat the PSA diagnostics.
PSA NA ePSA 2000-0126	Event Log	The event log(s) must be cleared before testing can continue.	1. Clear the system event log. 2. Repeat the PSA diagnostics.
PSA NA ePSA 2000-0131	Battery - the battery is not installed	An error occurred during the tests that may involve the main system board or battery of the system.	1. Turn off the system and reseal the system battery. 2. Update to the latest BIOS version. 3. Repeat the PSA diagnostics. 4. If failure continues, contact Dell Technical Support.
PSA NA ePSA 2000-0132	Battery - the battery is reaching the end of its usable life	An error occurred during the tests that may involve the main system board or battery of the system.	1. Turn off the system and reseal the system battery. 2. Update to the latest BIOS version. 3. Repeat the PSA diagnostics. 4. If failure continues, contact Dell Technical Support.
PSA NA ePSA 2000-0133	Battery - the battery cannot supply sufficient power	An error occurred during the tests that may involve the main system board or battery of the system.	1. Turn off the system and reseal battery. 2. Update to the latest BIOS version. 3. Repeat the PSA diagnostics. 4. If failure continues, contact Dell Technical Support.
PSA 2000-0141 ePSA 2000-0141	Hard Drive - no drive detected	Your system BIOS is reporting that no Hard Disk Drive is being reported. If a Portable, reseal the hard drive, if a Desktop, reseal both ends of the data cable and reseal the power cable to the drive. Repeat the PSA diagnostics. If a known good hard drive is available, see if the good drive can be detected in the system or try the suspect drive in a working system.	1. If you don't have a hard disk drive (HDD), this may be an automatic message and requires no action. 2. If you have an HDD, reconnect your HDD to the system board. 3. Update to the latest BIOS. 4. Repeat the PSA diagnostics. 5. If failure continues, contact Technical Support
PSA 1000-0142 ePSA 2000-0142	PSA Hard Drive - drive self test failed ePSA Hard Drive - self test unsuccessful	Your hard disk drive has indicated a failure.	1. Update to the latest BIOS. 2. Turn off your computer and reconnect your hard disk drive (HDD) to the system board for instructions.) 3. Repeat the PSA diagnostics.
PSA 1000-0143 ePSA 2000-0143	Hard Drive - SMART read command unsuccessful	Your hard disk drive has indicated a failure.	
PSA 1000-0144	Hard Drive - no support for drive self test	Your hard disk drive has indicated a failure.	

Table 13. PSA/ePSA error codes (continued)

Error number (PSA and ePSA)	Error message	Description	Steps
ePSA 2000-0144			
PSA 1000-0145 ePSA 2000-0145	PSA Hard Drive - timeout waiting for Drive Self Test to complete ePSA Hard Drive - self test did not complete	The hard drive test did not complete the last test attempted.	1. Check www.dell.com/support for a firmware update for your hard drive. Update the firmware if one is available. 2. Reseat the drive, reseat the data cable and power connection at both ends if it is desktop. 3. Turn off your computer and reconnect your hard disk drive (HDD) to the system board. For more information, see your systems <i>Owners Manual</i> at www.dell.com/poweredgemanuals. 4. Update to the latest BIOS. 5. Repeat the PSA diagnostics. 6. If failure continues, contact Dell Technical Support
PSA 1000-0146 ePSA 2000-0146	Hard Drive - self test log contains previous errors	Your hard drive has indicated a failure.	1. Update to the latest BIOS version. 2. Run a Chkdsk /r or format your hard drive and reinstall your operating system. 3. Repeat the PSA diagnostics. 4. If failure continues, contact Dell Technical Support
PSA 1000-0147 ePSA 2000-0147	PSA Optical Drive - IDE status failed. ePSA Optical Drive - self test --(s)	Your CD or DVD drive has indicated a failure.	1. Update to the latest BIOS version. 2. Turn off your computer and reconnect your optical drive to the system board. 3. Repeat the PSA diagnostics.
PSA 1000-0148 ePSA 2000-0148 replaced by 2000-0151, 2000-0152	PSA Optical Drive - BIST --(s) ePSA Optical Drive - incorrect status	Your CD or DVD drive has indicated a failure.	1. Update to the latest BIOS version. 2. Turn off your computer and reconnect your optical drive to the system board. 3. Repeat the PSA diagnostics.
PSA NA ePSA 2000-0149	Optical Drive - no drive detected	Your CD or DVD drive has indicated a failure.	1. Update to the latest BIOS version. 2. Turn off your computer and reconnect your optical drive to the system board. 3. Repeat the PSA diagnostics.
PSA NA ePSA 2000-0150 replaced 2000-0141	Hard Drive - No drive detected.	Your system BIOS is reporting that no Hard Disk Drive is being reported. If a Portable, reseat the hard drive, if a Desktop, reseat both ends of the data	1. If you don't have a hard disk drive (HDD), this may be an automatic message and requires no action.

Table 13. PSA/ePSA error codes (continued)

Error number (PSA and ePSA)	Error message	Description	Steps
		cable and reseal the power cable to the drive. Repeat the PSA diagnostics. If a replacement working hard drive is available, see if the working hard drive is detected by the system or try the suspect drive in a working system.	2. If you have an HDD, reconnect your hard disk drive (HDD) to the system board. 3. Update to the latest BIOS version. 4. Repeat the PSA diagnostics. 5. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-0151	Hard Drive - BIST --(s)	The hard drive is showing an incorrect status in the diagnostic. Check for a firmware update for your hard drive.	1. If you have a replacement hard drive, install it. 2. Update to the latest BIOS version. 3. Repeat the PSA diagnostics. 4. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-0152	Optical Drive - BIST --(s)	The CD or DVD Drive is showing an incorrect status in the diagnostic.	1. Update to the latest BIOS. 2. Remove and reinstall your optical drive. 3. Repeat the PSA diagnostics. 4. If failure continues, contact Technical Support
PSA NA ePSA 2000-0153	Hard Drive - Removable Hard Drive [d] - Incorrect status = [x] [s]	Check the installation of the removable drive, cables, and connections.	1. If you have an HDD, reconnect your hard disk drive (HDD) to the system board. 2. Update to the latest BIOS version. 3. Repeat the PSA diagnostics. 4. If failure continues, contact Technical Support
PSA NA ePSA 2000-0154	Tape Drive - Tape Drive [s] - S/N [d], incorrect status = [d] [d]	Check installation of the tape drive, cables and connections. If the error persists, ensure that the drive firmware is current.	1. Update to the latest BIOS. 2. Remove and reinstall your tape drive. 3. Repeat the PSA diagnostics. 4. If failure continues, contact Technical Support
PSA NA ePSA 2000-0155	Hard Drive - Not Installed	This is an error displayed when HDD is not inserted in the notebooks.	1. Update to the latest BIOS version. 2. Remove and reinstall your Hard drive. 3. Repeat the PSA diagnostics. 4. If failure continues, contact Dell Technical Support
PSA 1000-0212 ePSA 2000-0212 (Not used with UEFI BIOS)	System board - CMOS, Location = (x), Expected = (x), Found = (x)	An error occurred during the tests that may involve the main system board of the system.	1. Update to the latest BIOS version. 2. Repeat the PSA diagnostics. 3. If failure continues, contact Dell Technical Support.

Table 13. PSA/ePSA error codes (continued)

Error number (PSA and ePSA)	Error message	Description	Steps
PSA 1000-0213 ePSA 2000-0213 (Not used with UEFI BIOS)	System board - CMOS battery failure detected	An error occurred during the tests involving the CMOS battery (This maintains all the settings in the BIOS when there is no power to the system) On desktop systems this is a easily replaceable watch size battery, some portable systems may have a replaceable battery too.	1. Update to the latest BIOS version. 2. Repeat the PSA diagnostics. 3. Remove and replace your CMOS battery. 4. If failure continues, contact Dell Technical Support
PSA 1000-0221 ePSA 2000-0221 (Not used with UEFI BIOS)	PSA System board - Interval timer Channel 0 (mode 0) is not generating interrupts ePSA Timer - Interval timer not functional	An error occurred during the tests that may involve the main system board of the system. If a memory error is detected, try memory modules individually. If no 2000-0123 memory error & If diagnostics fail again after the BIOS is current, contact Technical Support to resolve the problem.	1. Update to the latest BIOS version. 2. Reseat the CMOS battery. 3. Repeat the PSA diagnostics 4. If failure continues, contact Dell Technical Support
PSA 1000-0222 ePSA 2000-0222 (Not used with UEFI BIOS)	PSA System board - Interval timer Channel 0 (mode 0) is not generating interrupts ePSA Timer - Interval timer not functional	An error occurred during the tests that may involve the main system board of the system. If a memory error is detected, try memory modules individually. If no 2000-0123 memory error & If diagnostics fail again after the BIOS is current, contact Technical Support to resolve the problem.	1. Update to the latest BIOS version. 2. Repeat the PSA diagnostics 3. If failure continues, contact Dell Technical Support
PSA 1000-0223 ePSA 2000-0223 (Not used with UEFI BIOS)	System board - Timer - Interval timer initial clock output level incorrect	An error occurred during the tests that may involve the main system board of the system. If a memory error is detected, try memory modules individually. If no 2000-0123 memory error & If diagnostics fail again after the BIOS is current, contact Technical Support to resolve the problem.	1. Update to the latest BIOS version. 2. Repeat the PSA diagnostics 3. If failure continues, contact Dell Technical Support
PSA 1000-0224 ePSA 2000-0224 (Not used with UEFI BIOS)	System board - Interval timer had wrong time period in mode	An error occurred during the tests that may involve the main system board of the system. If a memory error is detected, try memory modules individually. If no 2000-0123 memory error & If diagnostics fail again after the BIOS is current, contact Technical Support to resolve the problem.	1. Update to the latest BIOS version. 2. Repeat the PSA diagnostics 3. If failure continues, contact Dell Technical Support
PSA 1000-0231 ePSA 2000-0231 (Not used with UEFI BIOS)	System board - Failure in Interval timer in mode	An error occurred during the tests that may involve the main system board of the system. If a memory error is detected, try memory modules individually. If no 2000-0123 memory error & If diagnostics fail again after the BIOS is current, contact	1. Update to the latest BIOS version. 2. Repeat the PSA diagnostics 3. If failure continues, contact Dell Technical Support

Table 13. PSA/ePSA error codes (continued)

Error number (PSA and ePSA)	Error message	Description	Steps
		Technical Support to resolve the problem.	
PSA 2000-0232 ePSA 2000-0232 (Not used with UEFI BIOS)	System board - the RTC did not generate periodic ticks	An error occurred during the tests that may involve the main system board of the system. If a memory error is detected, try memory modules individually. If no 2000-0123 memory error & If diagnostics fail again after the BIOS is current, contact Technical Support to resolve the problem.	1. Update to the latest BIOS version. 2. Repeat the PSA diagnostics 3. If failure continues, contact Dell Technical Support
PSA 2000-0233 ePSA 2000-0233 (Not used with UEFI BIOS)	PSA System board - RTC 'seconds' count is not updating ePSA RTC - 'seconds' count is not updating	An error occurred during the tests that involve the Real Time Clock (RTC) of the main system board in the system. If a memory error is detected, try memory modules individually. If no 2000-0123 memory error & If diagnostics fail again after the BIOS is current, contact Technical Support to resolve the problem.	1. Update to the latest BIOS version. 2. Repeat the PSA diagnostics 3. If failure continues, contact Dell Technical Support
PSA 1000-0234 ePSA 2000-0234 (Not used with UEFI BIOS)	PSA System board - timeout waiting for RTC update flag to set ePSA System board - HPET incorrect time period.	An error occurred during the tests that may involve the main system board of the system. If a memory error is detected, try memory modules individually. If no 2000-0123 memory error & If diagnostics fail again after the BIOS is current, contact Technical Support to resolve the problem.	1. Update to the latest version. 2. Repeat the PSA diagnostics 3. If failure continues, contact Dell Technical Support
PSA 1000-0235 ePSA NA	System board - PM timer 1 had wrong time period.	An error occurred during the tests that may involve the main system board of the system. If a memory error is detected, try memory modules individually. If no 2000-0123 memory error & If diagnostics fail again after the BIOS is current, contact Technical Support to resolve the problem.	1. Update to the latest BIOS version. 2. Repeat the PSA diagnostics 3. If failure continues, contact Dell Technical Support
PSA 1000-0241 ePSA 2000-0241 (Not used with UEFI BIOS)	BIOS - A20 gate not enabled	An error occurred during the tests that may involve the main system board of the system. If a memory error is detected, try memory modules individually. If no 2000-0123 memory error & If diagnostics fail again after the BIOS is current, contact Technical Support to resolve the problem.	1. Update to the latest BIOS version. 2. Repeat the PSA diagnostics. 3. If failure continues, contact Dell Technical Support
PSA 1000-0242	PSA System board - no interrupt detected for IRQ.	An error occurred during the tests that may involve the main system board of the system. If a	1. Update to the latest BIOS version.

Table 13. PSA/ePSA error codes (continued)

Error number (PSA and ePSA)	Error message	Description	Steps
ePSA 2000-0242 (Not used with UEFI BIOS)	ePSA- System board - Interrupt controller - IRQ (d) - %s not detected	memory error is detected, try memory modules individually. If no 2000-0123 memory error & If diagnostics fail again after the BIOS is current, contact Technical Support to resolve the problem.	2. Repeat the PSA diagnostics 3. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-0243	System board - USB device, IO board, Daughter Card	An error occurred during the tests that may involve the USB controller or ports of the main system board of the system. Disconnect any USB devices and run the diagnostic again. Test USB devices in a different port. Try a known good USB device.	1. Update to the latest BIOS version. 2. Repeat the PSA diagnostics 3. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-0244	System board - USB device	An error occurred during the tests that may involve the USB controller or ports of the main system board of the system. Disconnect any USB devices and run the diagnostic again. Test USB devices in a different port. Try a known good USB device.	1. Update to the latest BIOS version 2. Repeat the PSA diagnostics 3. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-0245	System board - USB device	An error occurred during the tests that may involve the USB controller or ports of the main system board of the system. Disconnect any USB devices and run the diagnostic again. Test USB devices in a different port. Try a known good USB device.	1. Update to the latest BIOS version. 2. Repeat the PSA diagnostics. 3. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-0251	Event Log - the log contains failing records.	This relates to BIOS events in servers only.	1. Update to the latest BIOS version. 2. Repeat the PSA diagnostics.
PSA NA ePSA 2000-0261	System board - Data errors.	Multiple memory DIMMs failed, presumed to be caused by motherboard issues.	1. Update to the latest BIOS version. 2. Repeat the PSA diagnostics. 3. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-0313	Touchpad - pointing stick/ touchpad not detected	The mouse, touchpad, or trackstick is not being detected by the diagnostic tools. Power the system off, reseal any cable connection and check the BIOS to ensure that the touchpad or mouse has not been disabled.	1. Update to the latest BIOS version. 2. If your mouse, touchpad, or pointing stick is disconnected, reconnect it. 3. For laptops, make sure that your touchpad is active. 4. If failure continues, contact Dell Technical Support

Table 13. PSA/ePSA error codes (continued)

Error number (PSA and ePSA)	Error message	Description	Steps
PSA NA ePSA 2000-0314	Thermal - the (s) reading (dc) exceeds the thermal limit.	The system board, heat sink, fan, or processor are failing the diagnostic tools.	1. Update to the latest BIOS version. 2. Check the logs, the fan and for any other signs of overheating. 3. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-0315	Sensor - the (s) reading (dc) is lower than expected	The system board or sensor is failing the diagnostic tools.	1. Update to the latest BIOS version 2. Check the system logs. 3. If failure continues, contact Technical Support
PSA 1000-0321 ePSA 2000-0321	PSA LCD EDID - unable to access EDID EEPROM ePSA Unable to detect LCD	LCD Extended Display Identification Data (EDID) - unable to access the EDID Electrically Erasable Programmable Read-Only Memory (EEPROM) in the LCD display is indicating a data failure. If there is video on the LCD, then the Display does not need replacement.	1. Update to the latest BIOS version. 2. Turn off your computer and reconnect your LCD cable. 3. Repeat the PSA diagnostics.. 4. If failure continues, contact Dell Technical Support
PSA 1000-0322 ePSA 2000-0322	PSA LCD Panel - Error accessing the LCD inverter ePSA LCD panel - unable to modify brightness	LCD panel - unable to modify brightness. Try to adjust the brightness in Windows using the hotkeys. Boot to the BIOS and see if brightness can be adjusted at that point outside of Windows	1. Update to the latest BIOS version. 2. Turn off your computer and reconnect your LCD cable. 3. Repeat the PSA diagnostics. 4. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-0323	LCD panel - Unable to detect inverter lamp status.	Check LCD connector and cables.	1. Update to the latest BIOS version. 2. Repeat the PSA diagnostics. 3. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-0324	LCD panel - user reported LCD BIST colors were not displayed	You may get this error if you answered No to the LCD BIST test instead of Yes. If you were able to clearly see red, blue, green white and white screen with text without distortion, lines, or color problems, re-run the diagnostic and if the screens appear normal, click Yes	1. Update to the latest BIOS version. 2. Turn off your computer and reconnect your LCD cable. 3. Repeat the LCD BIST diagnostics. 4. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-0325	LCD panel - user provided no input for LCD BIST	You may get this error if you answered No to the LCD BIST test instead of Yes. If you were able to clearly see red, blue, green white and white screen with text without distortion, lines, or color problems, re-run the diagnostic	1. Update to the latest BIOS version. 2. Turn off your computer and reconnect your LCD cable. 3. Repeat the PSA diagnostics. 4. If failure continues, contact Technical Support

Table 13. PSA/ePSA error codes (continued)

Error number (PSA and ePSA)	Error message	Description	Steps
		and if the screens appear normal, click Yes	
PSA 1000-0326 ePSA 2000-0326	LCD panel - unable to turn lamp on or off	The backlight lamp was not able to be turned on or off during the diagnostic testing	1. Update to the latest BIOS. 2. Turn off your computer and reconnect your LCD cable. 3. Repeat the PSA diagnostics. 4. If failure continues, contact Technical Support
PSA NA ePSA 2000-0327	LCD panel - unable to use BIOS interface	The Liquid Crystal Display (LCD) panel does not display the BIOS screen correctly and the BIOS screen is not visible on the LCD.	1. Update to the latest BIOS. 2. Turn off your computer and reconnect your LCD cable. 3. Repeat the PSA diagnostics. 4. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-0328	LCD panel - unable to detect variance in ambient light sensor	The Ambient light sensor that automatically dims the LCD in low light did not respond during the diagnostics.	1. Update to the latest BIOS version. 2. Turn off your computer and reconnect your LCD cable. 3. Repeat the PSA diagnostics. 4. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-0331	Video controller - no video controller detected	The system is not detecting the graphics adapter. If you are using a desktop system and if a PCIe expansion card is installed, reseal the card and reconnect any internal power connections to the card. Then reconnect the video cable and repeat the PSA diagnostic.	1. Update to the latest BIOS version. 2. Desktop: Turn off your computer and if equipped with PCIe expansion card, reseal the card. 3. Reconnect your LCD cable. 4. Repeat the PSA diagnostics.. 5. If failure continues,, contact Dell Technical Support
PSA NA ePSA 2000-0332	Video memory - Video memory integrity test discrepancy	PSA diagnostics detected a video memory failure. Please reset the system memory and update the BIOS to most current version.	1. Update to the latest BIOS version. 2. Reseat the system memory 3. Turn off your computer and reconnect your LCD cable. 4. Repeat the PSA diagnostics. 5. If failure continues,, contact Dell Technical Support
PSA 1000-0333 ePSA 2000-0333	PSA Video - Graphics test timed out waiting for keyboard response ePSA Video - User provided no input for graphics test	PSA diagnostics did not record the user input (Y or N) after the video test. Ensure that you accurately answer queries that are prompted during the diagnostic.	1. Error occurs when a graphics test times out while waiting for you to enter a response. 2. Update to the latest BIOS version. 3. Turn off your computer and reconnect your LCD cable. 4. Repeat the PSA diagnostics. 5. If failure continues, contact Dell Technical Support

Table 13. PSA/ePSA error codes (continued)

Error number (PSA and ePSA)	Error message	Description	Steps
PSA 1000-0334 ePSA 2000-0334	Video - user reported the patterns were not displayed correctly	You may get this error if you answered No to the color test instead of Yes. If you were able to clearly see both the vertical and horizontal color bars without distortion, lines, or color problems, re-run the diagnostic and if the bar appears normal, click Yes.	1. You may get this error if you answered No to the color test instead of Yes. 2. Update to the latest BIOS version. 3. Turn off your computer and reconnect your LCD cable. 4. Repeat the PSA diagnostics.. 5. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-0411	Cables - not detected	Normally, the cable involved in the error (LCD LVDS CABLE for example) is indicated in the error message. Reseat the cable connection and inspect the cable and connections for damage.	1. Update to the latest BIOS. 2. Turn off your system and reconnect the cable, jumper, or connection indicated in the error message. 3. Replace damaged cables or devices. 4. Repeat the PSA diagnostics. 5. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-0412	Cables - auxiliary cable not detected	Normally, the cable involved in the error (LCD LVDS CABLE for example) is indicated in the error message. Reseat the cable connection and inspect the cable and connections for damage.	1. Update to the latest BIOS version. 2. Turn off your system and reconnect the cable, jumper, or connection indicated in the error message. 3. Replace damaged cables or devices. 4. Repeat the PSA diagnostics. 5. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-0413	Cables - LCD cable not detected	Normally, the cable involved in the error (LCD LVDS CABLE for example) is indicated in the error message. Reseat the cable connection and inspect the cable and connections for damage.	1. Update to the latest BIOS version. 2. Turn off your system and reconnect the cable, jumper, or connection indicated in the error message. 3. Replace damaged cables or devices. 4. Repeat the PSA diagnostics. 5. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-0414	Cables - Invertor cable not detected	Normally, the cable involved in the error (LCD LVDS CABLE for example) is indicated in the error message. Reseat the cable connection and inspect the cable and connections for damage.	1. Update to the latest BIOS version. 2. Turn off your system and reconnect the cable, jumper, or connection indicated in the error message. 3. Replace damaged cables or devices. 4. Repeat the PSA diagnostics.

Table 13. PSA/ePSA error codes (continued)

Error number (PSA and ePSA)	Error message	Description	Steps
			5. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-0415	Cables - Check the following cables, jumper, connection, or sensors: [s]	Normally, the cable involved in the error (LCD LVDS CABLE for example) is indicated in the error message. Reseat the cable connection and inspect the cable and connections for damage.	1. Update to the latest BIOS version. 2. Turn off your system and reconnect the cable, jumper, or connection indicated in the error message. 3. Replace damaged cables or devices. 4. Repeat the PSA diagnostics. 5. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-0511	Fan - the (s) fan failed to respond correctly	The cooling fan is not responding to the diagnostics tool. Please check nothing is obstructing the fan.	1. Update to the latest BIOS version. 2. Check your system for any obstructions to the air vents or cooling fan. 3. Repeat the PSA diagnostics. 4. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-0512	Fan - the (s) fan is running faster than expected.	This could be an issue with the system board, temperature sensor, or cooling fan. Please check everything is firmly seated.	1. Update to the latest BIOS version. 2. Check for any loose connections, any obstructed air vents, and for any other signs of overheating. 3. Repeat the PSA diagnostics. 4. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-0620	Network - Network [d] - {Vendor supplied error}	The Network (Ethernet) device may be faulty. Depending on the system, this may be on the motherboard, an adapter, or a daughter card. Errors include Register test failed or Packet loopback test failed.	1. Update to the latest BIOS/ Firmware versions. 2. Check for any loose connections or any bent pins in the connectors. 3. Repeat the PSA diagnostics. 4. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-0621	Network - Network [d] - Driver version [x] outdated. Version [x] or newer required for "[s]"	The Network (Ethernet) device Firmware may be out of date.	1. Update to the latest BIOS/ Firmware versions. 2. Repeat the PSA diagnostics. 3. If failure continues, contact Technical Support
PSA NA ePSA 2000-8001	BIOS - No BIOS support for software interrupt [x] function[x] [x]	The motherboard BIOS revision may not be current. Update the BIOS to the most current version and the issue should resolve.	1. Update to the latest BIOS version. 2. Repeat the PSA diagnostics. 3. If failure continues, contact Dell Technical Support

Table 13. PSA/ePSA error codes (continued)

Error number (PSA and ePSA)	Error message	Description	Steps
PSA NA ePSA 2000-8002	BIOS - No BIOS support for SMI interface function(x) or Sensor [x] exceeded thermal zone [d]. Peak zone was [d].	The motherboard BIOS revision may not be current. Update the BIOS to the most current version and the issue should resolve.	1. Update to the latest BIOS version. 2. Repeat the PSA diagnostics. 3. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-8003	BIOS - Fan - Unable to set Manufacturing Mode	The motherboard BIOS revision may not be current. Update the BIOS to the most current version and the issue should resolve.	1. Update to the latest BIOS version. 2. Repeat the PSA diagnostics. 3. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-8004	BIOS - Fan - Unable to determine fan speeds	The motherboard BIOS revision may not be current. Update the BIOS to the most current version and the issue should resolve.	1. Update to the latest BIOS version. 2. Repeat the PSA diagnostics. 3. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-8005	LCD - LCD BIST not supported	The LCD BIST may not exist on all systems.	1. Update to the latest BIOS version. 2. Repeat the PSA diagnostics. 3. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-8006	BIOS - Fan - Unable to set fans to ([d], [d], or [d]) speed or No chipset event timer.	The motherboard BIOS revision may not be current. Update the BIOS to the most current version and the issue should resolve.	1. Update to the latest BIOS version. 2. Repeat the PSA diagnostics. 3. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-8007	BIOS - Log contains Fan events or Timer expected [d] observed [d]	This message is informational only - it provides a record of fan events.	1. Clear Log. 2. Repeat the PSA diagnostics. 3. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-8008	Diagnostics - A. Out of memory! fMalloc() Failed! B. Unable to allocate memory for object data. Unable to [s] testable memory C. Unable to start application processors D. Unable to stop all APs	The system may be unstable and should be rebooted.	1. Update to the latest BIOS version. 2. Repeat the PSA diagnostics. 3. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-8009	Diagnostics - Software Error	The System may be unstable and should be rebooted.	1. Update to the latest BIOS version. 2. Repeat the PSA diagnostics. 3. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-800B	BIOS - Retrieve vendor ID function error	The system may be unstable.	1. Update to the latest BIOS version. 2. Repeat the PSA diagnostics. 3. If failure continues, contact Dell Technical Support

Table 13. PSA/ePSA error codes (continued)

Error number (PSA and ePSA)	Error message	Description	Steps
PSA NA ePSA 2000-800C	BIOS - Get/Set inverter mode function error. Vendor: [s] Revision: [d]	The motherboard BIOS revision may not be current. Update the BIOS to the most current version and the issue should resolve.	1. Update to the latest BIOS version. 2. Repeat the PSA diagnostics. 3. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-800D	BIOS - Set lamp off function error. Vendor: [s] Revision: [d]	The motherboard BIOS revision may not be current. Update the BIOS to the most current version and the issue should resolve.	1. Update to the latest BIOS version. 2. Repeat the PSA diagnostics. 3. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-800E	BIOS - Set lamp on function error. Vendor: [s] Revision: [d]	The motherboard BIOS revision may not be current.	1. Update to the latest BIOS version. 2. Repeat the PSA diagnostics. 3. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-800F	BIOS - Restore function error. Vendor: [s] Revision: [d].	The motherboard BIOS revision may not be current.	1. Update to the latest BIOS version. 2. Repeat the PSA diagnostics. 3. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-8010	System Board	High-Precision event timer not found.	1. Update to the latest BIOS version. 2. Repeat the PSA diagnostics. 3. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-8011	USB Device Diagnostics - Invalid status returned from the device	The attached USB device is returning an invalid status to the BIOS.	1. Reseat the USB Device. 2. Repeat the PSA diagnostics. 3. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-8012	Diagnostics - Invalid parameter passed to the device. Unknown test [d] selected	An unexpected parameter was passed to a device under test.	1. Update to the latest BIOS version. 2. Repeat the PSA diagnostics. 3. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-8013	Diagnostics - LCD [s] doesn't support test commands	Update the BIOS to the most current version and the issue should resolve.	1. Update to the latest BIOS version. 2. Repeat the PSA diagnostics. 3. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-8014	Diagnostics - ADDF module ([s]) device ([s]) failed with error code [x], number [x]. No EPSA beep code mapped!	The diagnostics program has run an external module, which has reported an unusual error.	1. Update to the latest BIOS. 2. Repeat the PSA diagnostics. 3. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-8016	Diagnostics - Battery - unable to retrieve battery health	The motherboard BIOS revision may not be current.	1. Reseat the Battery 2. Update to the latest BIOS version. 3. Repeat the PSA diagnostics.

Table 13. PSA/ePSA error codes (continued)

Error number (PSA and ePSA)	Error message	Description	Steps
			4. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-8017	BIOS - Battery - BIOS has no support for battery health	This optional feature may not be supported.	1. Update to the latest BIOS version. 2. Repeat the PSA diagnostics. 3. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-8018	Diagnostics - Fatal: The module reported multiple test results!!	The system may be unstable.	1. Update to the latest BIOS version. 2. Repeat the PSA diagnostics. 3. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-8019	Diagnostics - Unable to log to NVRAM	The system may be unstable.	1. Update to the latest BIOS version. 2. Repeat the PSA diagnostics. 3. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-8020	Diagnostics - Low memory. [d]k bytes free!	The system may be unstable.	1. Update to the latest BIOS version. 2. Repeat the PSA diagnostics. 3. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-8115	Diagnostics - Unable to stop all APs	The system may be unstable.	1. Update to the latest BIOS version. 2. Repeat the PSA diagnostics. 3. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-8154	Tape Drive - Tape Drive [d] - S/N [s], ULTRIUM [d] media found but drive. Requires ULTRIUM [s] for [s]	Install the correct tape drive media.	1. Use correct tape drive media. 2. Repeat the PSA diagnostics. 3. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-8155	Tape Drive - Tape Drive [d] - S/N [s], data read does not match data written	Try different tape drive media.	1. Use different tape drive media. 2. Repeat the PSA diagnostics. 3. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-8156	Tape Drive - Tape Drive [d] - S/N [s], no media cannot test drive	Insert writable tape drive media.	1. Insert writable media. 2. Repeat the PSA diagnostics. 3. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-8157	Tape Drive - Tape Drive [d] - S/N [s], drive is not a supported drive	Tape drive model is unknown and not supported by diagnostics.	1. Reseat the Drive. 2. Test with a known good drive if possible. 3. Repeat the PSA diagnostics. 4. If failure continues, contact Dell Technical Support

Table 13. PSA/ePSA error codes (continued)

Error number (PSA and ePSA)	Error message	Description	Steps
PSA NA ePSA 2000-8158	Backplane - [DRIVE] Drive [d] - incorrect status = [x], [s]	The string indicates the backplane, expander, or removable hard drive is reporting an incorrect status.	1. Reseat the drives/cables/connections. 2. Repeat the PSA diagnostics. 3. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-8160	PERC - PERC Battery [d] - incorrect status = [x], [s]	The [s] string may be one of the following messages: • Battery missing or disconnected • Replace battery pack • Remaining capacity low	1. Reseat parts. 2. Repeat the PSA diagnostics. 3. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-8165	OS - MBR code is unknown, possibly infected by a virus	The Master Boot Record on the Hard Disk Drive has unrecognized code present which is an indication of a virus infecting the system. It is recommended that you scan your system with an up-to-date antivirus application.	1. Update and run your anti-virus software. 2. Update or reinstall your OS.
PSA NA ePSA 2000-8166	OS - Detected virus (s)	A virus appears to be infecting the system. It is recommended that you scan your system with an up-to-date antivirus application.	1. Update and run your anti-virus software.
PSA NA ePSA 2000-8170	PCIe - Training error on device PciTag [s] VendorID [x] DeviceID [x] SVID [x] SDID [x] Link Degraded, maxLinkWidth = x[d], negotiatedLinkWidth = x[d]	The system is reporting an error on a PCIe adapter.	1. Reseat the PCIe adapter. 2. Repeat the PSA diagnostics. 3. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-8415	Cables - BIOS reports no testable cable/jumper/connector/sensor	An internal failure of the diagnostic tool, not a hardware failure.	1. Update to the latest BIOS version. 2. Repeat the PSA diagnostics. 3. If failure continues, contact Dell Technical Support
PSA NA ePSA 2000-8611	Audio - User reported not hearing speaker tones	If the beep was not heard, verify that the internal speakers are connected properly. On some systems, internal speakers are a purchased option. For a given system, if the speaker is optional, it might not exist on that system. If audio is not heard, make sure to unplug anything plugged into an external headphone jack and re-run the test. External HP jacks can mute the internal speakers at the hardware level.	1. Unplug all external Audio Jacks. 2. Reseat the internal speaker connector. 3. Repeat the PSA diagnostics. 4. If failure continues, contact Dell Technical Support

Debugging mini crash dump files using by WinDbg in Windows operating system

Prerequisites

1. Click **Start > Control Panel > System**.

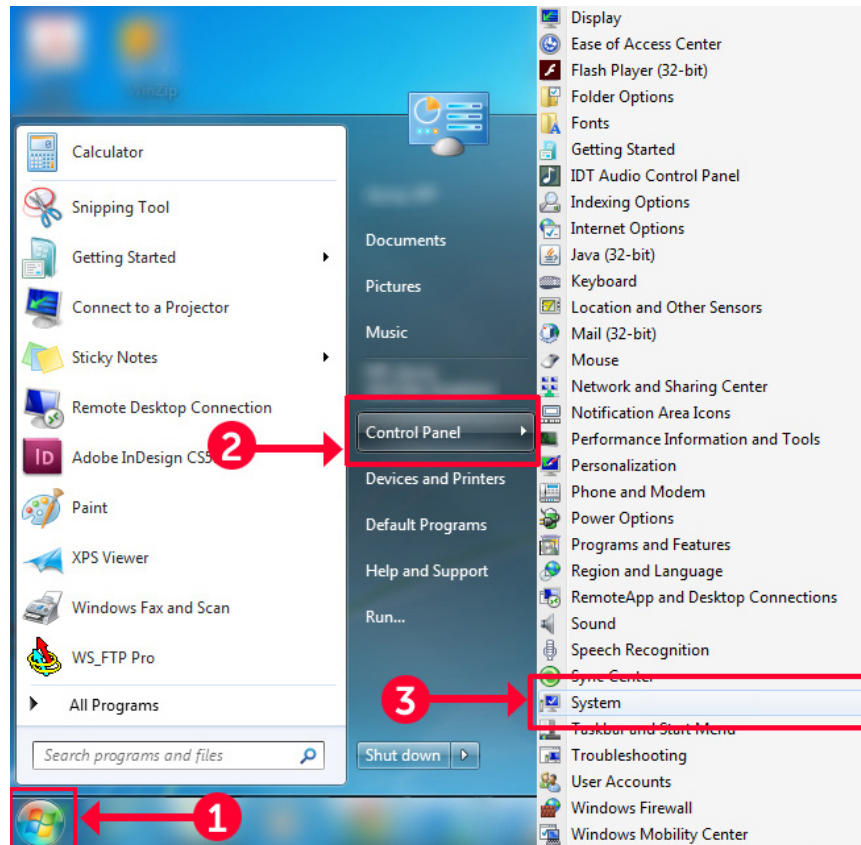


Figure 9. Opening the Systems page

2. In the **System** page, click **Advanced system settings** in the left pane.

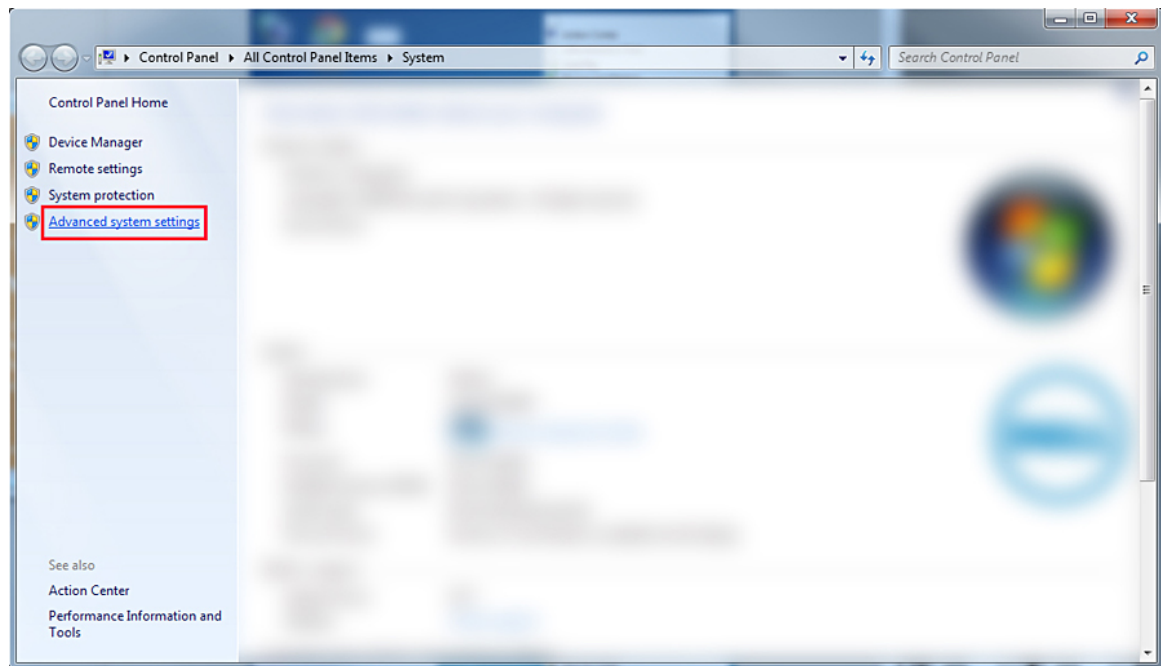


Figure 10. Advanced system settings page

3. In the **System Properties** window, click **Settings** under the **Startup and Recovery** section.

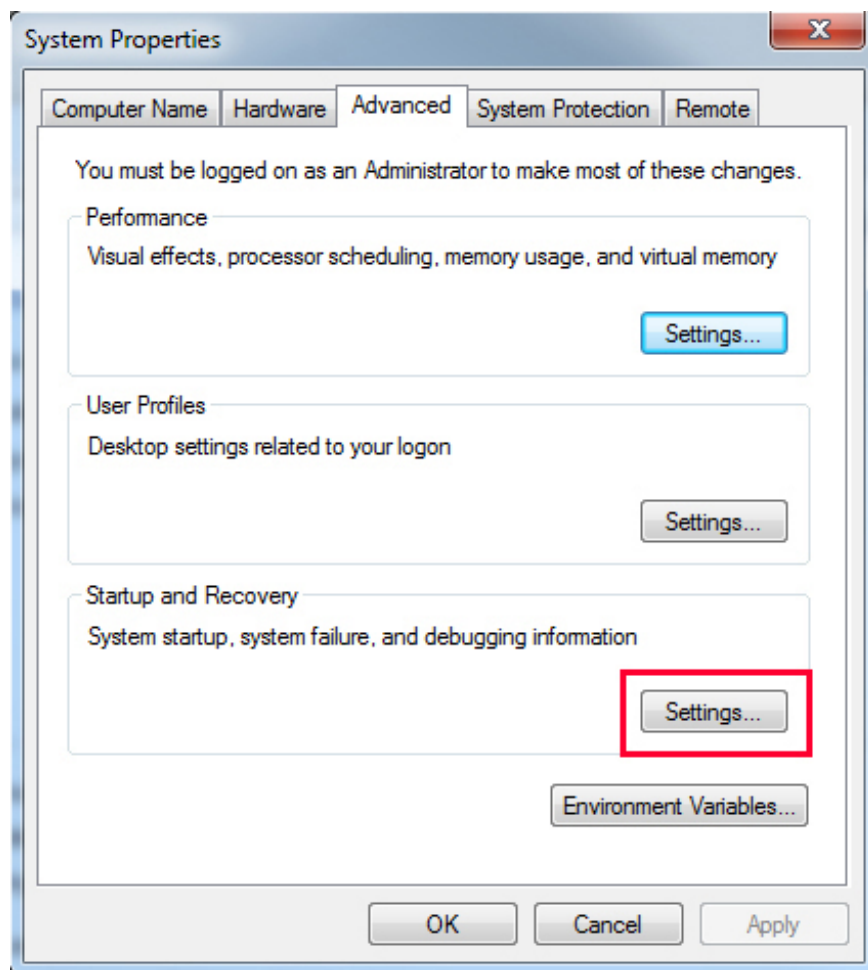


Figure 11. System Properties window

4. In the **Startup and Recovery** window, **System failure** section, do the following:
 - a. Select **Write an event to the system log** to ensure that the minidump file is created in the event of a system failure.

- b. Select **Automatically restart** to restart the system after a blue screen of death (BSOD) occurs.

NOTE: For servers, it is recommended that you select the **Automatically restart** option so that the server can function if the error is not critical.

- c. Verify that the **Overwrite any existing file** option is not selected. This ensures that a record of failures is maintained if there are repeated occurrences of system failures.

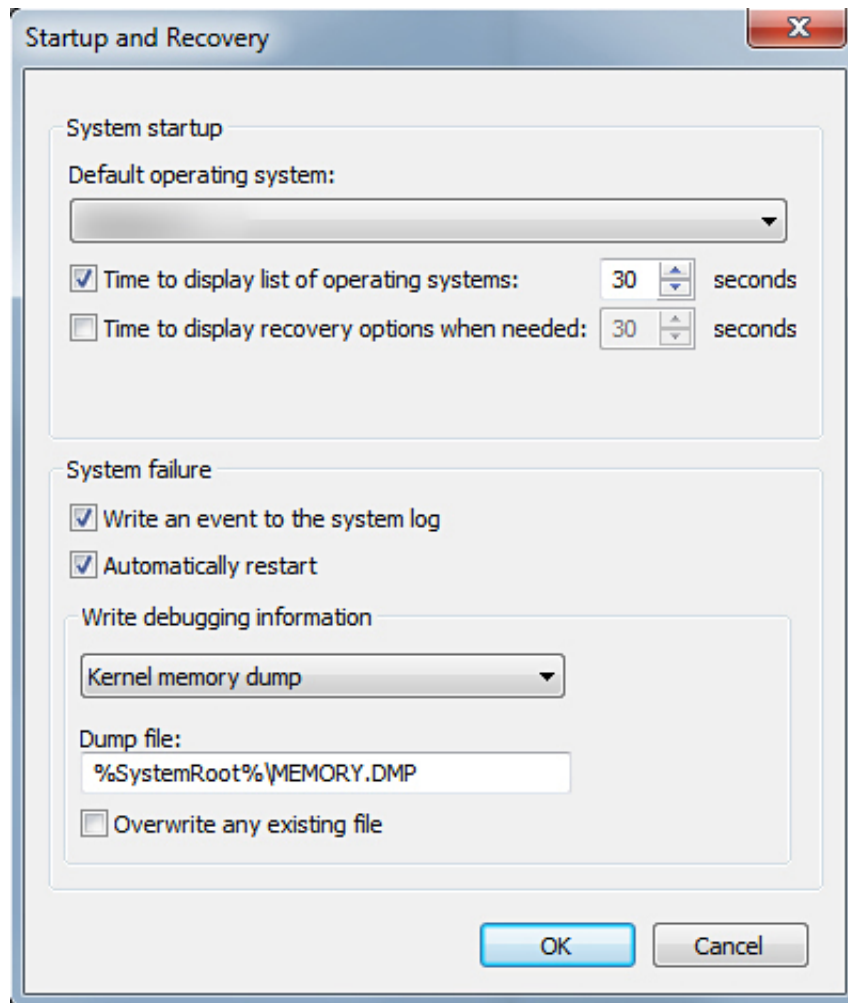


Figure 12. Startup and Recovery window

5. When a BSOD occurs, collect the minidump files by navigating to `C:\windows\minidump`.
6. Download and install the Windows Debugger (WinDbg) tool from <https://msdn.microsoft.com/en-us/windows/hardware/hh852365.aspx>.

Steps

1. Open WinDbg.
2. Click **File** → **Symbol File Path** or press **Ctrl + S** on the keyboard.
3. In the **Symbol Path** field, enter `SRV*<local path>*http://msdl.microsoft.com/download/symbols` where, <local path> is the path where you want to download the symbol files.
4. Click **OK**.
5. Click **File** → **Open Crash Dump** or press **Ctrl + D**.
6. Navigate to the folder where the mini dump file is saved.
7. Select the mini dump file and click **OK**.
8. Click **No** when the system prompts to save information for workspace.
Debugging starts.
9. Click **!analyze -v** to get detailed debugging information.
10. Note down the values for the following parameters:
 - a. **DEFAULT_BUCKET_ID**

b. **MODULE_NAME**

c. **IMAGE_NAME**

11. Call Dell Technical Support for further assistance.

Troubleshooting hardware issues

This section helps you troubleshoot hardware issues in your system.

 **NOTE:** If the issue still persists, contact Dell Technical Support for assistance.

Topics:

- [Troubleshooting system startup failure](#)
- [Troubleshooting external connections](#)
- [Troubleshooting the video subsystem](#)
- [Troubleshooting a USB device](#)
- [Troubleshooting a serial Input Output device](#)
- [Troubleshooting a NIC](#)
- [Troubleshooting a wet system](#)
- [Troubleshooting a damaged system](#)
- [Troubleshooting the system battery](#)
- [Troubleshooting cooling problems](#)
- [Troubleshooting cooling fans](#)
- [Troubleshooting an internal USB key](#)
- [Troubleshooting a micro SD card](#)
- [Troubleshooting expansion cards](#)
- [Troubleshooting processors](#)
- [Troubleshooting a storage controller](#)
- [Troubleshooting hard drives](#)
- [Troubleshooting an optical drive](#)
- [Troubleshooting a tape backup unit](#)
- [Troubleshooting no power issues](#)
- [Troubleshooting power supply units](#)
- [Troubleshooting RAID](#)
- [Troubleshooting thermal issue](#)
- [Input/Output errors while reseating SAS IOM storage sled on hardware configurations](#)

Troubleshooting system startup failure

If you boot the system to the BIOS boot mode after installing an operating system from the UEFI Boot Manager, the system stops responding. To avoid this issue, you must boot to the same boot mode in which you installed the operating system.

For all other startup issues, note the system messages that appear on the screen.

No bootable device found

Troubleshooting a no bootable device found issue.

Resolution: To resolve the issue, follow these steps:

1. Switch off the system.
2. Disconnect all power cables to the server's power supply units.
3. Remove the system cover.
4. Reseat all the cables of hard drive backplane at both ends.
5. Reseat all the drives.
6. Replace the system cover.
7. Connect the power cables to the server's power supply units.
8. Power on the system

9. To enter UEFI, Press F2.
10. Verify that all installed drives are detected in controller BIOS, if not detected refer to the Troubleshooting Hard drive issues section.
11. Ensure that in BIOS the RAID setting is set to RAID mode for SATA drives.
12. Save the setting, and reboot the server.
13. If the issue persists, contact Dell Technical Support for assistance.

Troubleshooting external connections

Before troubleshooting any external devices, ensure that all external cables are securely attached to the external connectors on your system.

- Compare the technical specification of the system with the external device to check the compatibility.
- Check the external device functionality with some other similar system so that we are sure that the device is working fine.
- Check any other similar external device with this system so that we are sure that the system port is working fine.

For any further queries contact, [Global Technical Support](#).

Troubleshooting the video subsystem

Prerequisites

 **NOTE:** Ensure that the **Local Server Video Enabled** option is selected in the iDRAC Graphical User Interface (GUI), under **Virtual Console**. If this option is not selected, local video is disabled.

 **NOTE:** The VGA ports are not hot-pluggable.

Steps

1. Check the cable connections (power and display) to the monitor.
2. Check the video interface cabling from the system to the monitor.

Results

If the tests run successfully, the problem is not related to video hardware.

Next steps

If the tests fail, see the Getting help section.

Troubleshooting a USB device

Prerequisites

 **NOTE:** Follow steps 1 to 5 to troubleshoot a USB keyboard or mouse. For other USB devices, go to step 6.

Steps

1. Disconnect the keyboard and/or mouse cables from the system and reconnect them.
2. If the problem persists, connect the keyboard and/or mouse to another USB port on the system.
3. If the problem is resolved, restart the system, enter System Setup, and check if the non-functioning USB ports are enabled.
4. In **iDRAC Settings Utility**, ensure that **USB Management Port Mode** is configured as **Automatic** or **Standard OS Use**.
5. If the problem is not resolved, replace the keyboard and/or mouse with a known working keyboard or mouse.
If the problem is not resolved, proceed to step 6 to troubleshoot other USB devices attached to the system.
If the problem is not resolved, proceed to troubleshoot other USB devices attached to the system.
6. Turn off all attached USB devices, and disconnect them from the system.
7. Restart the system.

8. If your keyboard is functioning, enter System Setup, verify that all USB ports are enabled on the **Integrated Devices** screen. If your keyboard is not functioning, use remote access to enable or disable the USB options.
9. If the system is not accessible, reset the NVRAM_CLR jumper inside your system and restore the BIOS to the default settings. See the System board jumper setting section
10. In the **iDRAC Settings Utility**, ensure that **USB Management Port Mode** is configured as **Automatic** or **Standard OS Use**.
11. Reconnect and turn on each USB device one at a time.
12. If a USB device causes the same problem, turn off the device, replace the USB cable with a known good cable, and turn on the device.

Next steps

If all troubleshooting fails, see the Getting help section.

Troubleshooting iDRAC Direct - USB XML configuration

For information about USB storage device and system configuration, see *Integrated Dell Remote Access Controller User's Guide* at www.dell.com/poweredgemanuals

Steps

1. Ensure that your USB storage device is connected to the front USB Management Port, identified by  icon.
2. Ensure that your USB storage device is configured with an NTFS or an FAT32 file system with only one partition.
3. Verify that the USB storage device is configured correctly. For more information about configuring the USB storage device, see *Integrated Dell Remote Access Controller User's Guide* at www.dell.com/poweredgemanuals
4. In the **iDRAC Settings Utility**, ensure that **USB Management Port Mode** is configured as **Automatic** or **iDRAC Direct Only**.
5. Ensure that the **iDRAC Managed: USB XML Configuration** option is either **Enabled** or **Enabled only when the server has default credential settings**.
6. Remove and reinsert the USB storage device.
7. If import operation does not work, try with a different USB storage device.

Next steps

If all troubleshooting fails, see the Getting help section.

Troubleshooting iDRAC Direct - Laptop connection

For information about USB laptop connection and system configuration, see the *Integrated Dell Remote Access Controller User's Guide* at www.dell.com/poweredgemanuals.

Steps

1. Ensure that your laptop is connected to the front USB Management Port, identified by  icon with a USB Type A/A cable.
2. On the **iDRAC Settings Utility** screen, ensure that **USB Management Port Mode** is configured as **Automatic** or **iDRAC Direct Only**.
3. If the laptop is running Windows operating system, ensure that the iDRAC Virtual USB NIC device driver is installed.
4. If the driver is installed, ensure that you are not connected to any network through WiFi or cabled ethernet, as iDRAC Direct uses a non-routable address.

Next steps

If all troubleshooting fails, see the Getting help section.

Troubleshooting a serial Input Output device

Prerequisites

 **NOTE:** The Serial port is not hot-pluggable.

Steps

1. Turn off the system and any peripheral devices that are connected to the serial port.
2. Swap the serial interface cable with a known working cable, and turn on the system and the serial device.
If the problem is resolved, replace the interface cable with a known working cable.
3. Turn off the system and the serial device, and swap the serial device with a compatible device.
4. Turn on the system and the serial device.

Next steps

If the problem persists, see the Getting help section.

Troubleshooting a NIC

Prerequisites

 **NOTE:** Network Daughter Card (NDC) slot is not hot-pluggable.

Steps

1. Run the appropriate diagnostic test. For more information, see the Using system diagnostics section for the available diagnostic tests.
2. Restart the system and check for any system messages pertaining to the NIC controller.
3. Check the appropriate indicator on the NIC connector:
 - If the link indicator does not glow, the cable connected might be disengaged.
 - If the activity indicator does not glow, the network driver files might be damaged or missing.
Install or replace the drivers as necessary. For more information, see the NIC documentation.
 - Try another known good network cable.
 - If the problem persists, use another connector on the switch or hub.
4. Ensure that the appropriate drivers are installed and the protocols are bound. For more information, see the NIC documentation.
5. Enter System Setup and confirm that the NIC ports are enabled on the **Integrated Devices** screen.
6. Ensure that all the NICs, hubs, and switches on the network are set to the same data transmission speed and duplex. For more information, see the documentation for each network device.
7. Ensure that all the NICs and switches on the network are set to the same data transmission speed and duplex. For more information, see the documentation for each network device.
8. Ensure that all network cables are of the proper type and do not exceed the maximum length.

Next steps

If the problem persists, see the Getting help section.

NIC teaming on a PowerEdge Server

Network Interface Card (NIC) teaming is a method of logically connecting two or more network adapters to form one network adapter. For information about how to configure NIC teaming on a PowerEdge Server and common issues, see www.dell.com/support/article/us/en/04/sln129960/nic-teaming-on-a-poweredge-server-whitepapers-setup-articles-and-common-issues.

Troubleshooting a wet system

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 are shipped with your product.

Steps

1. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
2. Remove the system cover.
3. Remove the following components (if installed) from the system:
 - Power supply unit(s)
 - Optical drive
 - Hard drives
 - Hard drive backplane
 - USB memory key
 - Hard drive tray
 - Cooling shroud
 - Expansion card risers (if installed)
 - Expansion cards
 - Cooling fan assembly (if installed)
 - Cooling fan(s)
 - Memory modules
 - Processor(s) and heat sink(s)
 - System board
4. Let the system dry thoroughly for at least 24 hours.
5. Reinstall the components you removed in step 3 except the expansion cards.
6. Install the system cover.
7. Turn on the system and attached peripherals.

If the problem persists, see the Getting help section.

8. If the system starts properly, turn off the system, and reinstall all the expansion cards that you removed.
9. Run the appropriate diagnostic test. For more information, see the Using system diagnostics section.

Next steps

If the tests fail, see the Getting help section.

Troubleshooting a damaged system

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 are shipped with your product.

Steps

1. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
2. Remove the system cover.
3. Ensure that the following components are properly installed:
 - cooling shroud
 - expansion card risers (if installed)
 - expansion cards
 - power supply unit(s)
 - cooling fan assembly (if installed)
 - cooling fan(s)

- processor(s) and heat sink(s)
 - memory modules
 - drive carriers or cage
4. Ensure that all cables are properly connected.
 5. Install the system cover.
 6. Run the appropriate diagnostic test. For more information, see the Using system diagnostics section.

Next steps

If the problem persists, see the Getting help section.

Troubleshooting the system battery

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 are shipped with your product.

 **NOTE:** If the system is turned off for long periods of time (for weeks or months), the NVRAM may lose the system configuration information. This situation is caused by a defective battery.

 **NOTE:** Some software may cause the system time to speed up or slow down. If the system seems to operate normally except for the time set in System Setup, the problem may be caused by a software, rather than by a defective battery.

Steps

1. Re-enter the time and date in System Setup.
2. Turn off the system, and disconnect it from the electrical outlet for at least an hour.
3. Reconnect the system to the electrical outlet, and turn on the system.
4. Enter System Setup.

If the date and time displayed in System Setup are not correct, check the System Error Log (SEL) for system battery messages.

Next steps

If the problem persists, see the Getting help section.

Troubleshooting cooling problems

 **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.

Ensure that the following conditions exist:

- System cover, cooling shroud, EMI filler panel, or back filler bracket is not removed.
- Ambient temperature is not higher than the system specific ambient temperature.
- External airflow is not obstructed.
- A cooling fan is not removed or has not failed.
- The expansion card installation guidelines have been followed.

Additional cooling can be added by one of the following methods:

From the iDRAC web GUI:

1. Click **Hardware > Fans > Setup**.
2. From the **Fan Speed Offset** drop-down list, select the cooling level that is required or set the minimum fan speed to a custom value.

From F2 System Setup:

1. Select **iDRAC Settings > Thermal**, and set a higher fan speed from the fan speed offset or minimum fan speed.

From RACADM commands:

1. Run the command `racadm help system.thermalsettings`

For more information, see *Integrated Dell Remote Access User's Guide* at www.dell.com/poweredgemanuals

Troubleshooting cooling fans

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 are shipped with your product.

 **NOTE:** The fan number is referenced by the management software of the system. In the event of a problem with a particular fan, you can easily identify and replace it by noting down the fan numbers on the cooling fan assembly.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.

Steps

1. Reseat the fan or the fan's power cable.
2. Restart the system.

Next steps

1. Follow the procedure listed in the After working inside your system section.
2. If the problem persists, see the Getting help section.

Troubleshooting an internal USB key

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 are shipped with your product.

Steps

1. Enter System Setup and ensure that the **USB key port** is enabled on the **Integrated Devices** screen.
2. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
3. Remove the system cover.
4. Locate the USB key and reseat it.
5. Install the system cover.
6. Turn on the system and attached peripherals, and check if the USB key is functioning.
7. If the problem is not resolved, repeat step 2 and step 3.
8. Insert a known working USB key.
9. Install the system cover.

Next steps

If the problem persists, see the Getting help section.

Troubleshooting a micro SD card

Prerequisites

 **NOTE:** Certain micro SD cards have a physical write-protect power on the card. If the write-protect switch is turned on, the micro SD card is not writable.

 **NOTE:** IDSDM and vFlash slots are not hot-pluggable.

Steps

1. Enter System Setup, and ensure that the **Internal SD Card Port** is enabled.
2. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.
3. Remove the system cover.

 **NOTE:** When an SD card failure occurs, the internal dual SD module controller notifies the system. On the next restart, the system displayed a message indicating the failure. If redundancy is enabled at the time of SD card failure, a critical alert is logged and chassis health will degrade.
4. Replace the failed micro SD card with a new micro SD card.
5. Install the system cover.
6. Reconnect the system to its electrical outlet and turn on the system, including any attached peripherals.
7. Enter System Setup, and ensure that the **Internal SD Card Port** and **Internal SD Card Redundancy** modes are set to the needed modes.

Verify that the correct SD slot is set as **Primary SD Card**.
8. Check if the micro SD card is functioning properly.
9. If the **Internal SD Card Redundancy** option is set to **Enabled** at the time of the SD card failure, the system prompts you to perform a rebuild.

 **NOTE:** The rebuild is always sourced from the primary SD card to the secondary SD card.

Troubleshooting expansion cards

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 are shipped with your product.

 **NOTE:** When troubleshooting an expansion card, you also have to see the documentation for your operating system and the expansion card.

 **NOTE:** Riser slots are not hot-pluggable.

Steps

1. Run the appropriate diagnostic test. See the Using system diagnostics section.
2. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
3. Remove the system cover.
4. Ensure that each expansion card is firmly seated in its connector.
5. Install the system cover.
6. Turn on the system and attached peripherals.
7. If the problem is not resolved, turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
8. Remove the system cover.

9. Remove all expansion cards installed in the system.
10. Install the system cover.
11. Run the appropriate diagnostic test. See the Using system diagnostics section.
If the tests fail, see the Getting help section.
12. For each expansion card you removed in step 8, perform the following steps:
 - a. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
 - b. Remove the system cover.
 - c. Reinstall one of the expansion cards.
 - d. Install the system cover.
 - e. Run the appropriate diagnostic test. See the Using system diagnostics section.

Next steps

If the problem persists, see the Getting help section.

Troubleshooting processors

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 are shipped with your product.

 **NOTE:** Processor sockets are not hot-pluggable.

Steps

1. Run the appropriate diagnostics test. See the Using system diagnostics section.
2. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
3. Remove the system cover.
4. Ensure that the processor and heat sink are properly installed.
5. Install the system cover.
6. Run the appropriate diagnostic test. See the Using system diagnostics section.
7. If the problem persists, see the Getting help section.

Troubleshooting a CPU Machine Check error

Issue: System encountered a "CPU Machine Check" error.

Solution:

 **CAUTION:** Ensure that all configurations and data is backed up prior to updating BIOS or Firmware.

1. Ensure there are no other system failures, check the System Event log for more information.
2. Test the system memory using the MP Memory test to ensure that there are no DIMM failures.
3. Test the system using the ePSA to test the general hardware to ensure system health.
4. Complete a full power and minimum to POST, while testing the system at each stage.
5. Check if there are any available updates on firmware (BIOS and iDRAC firmware).
6. Clear the system event logs
7. If the issue persists, contact Dell Tech Support team.

Troubleshooting a storage controller

 **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.

 **NOTE:** When troubleshooting a controller, see the documentation for your operating system and the controller.

 **NOTE:** Mini-PERC socket is not hot-pluggable.

1. Run the appropriate diagnostic test. See the Using system diagnostics section.
2. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
3. Remove the system cover.
4. Verify that the installed expansion cards are compliant with the expansion card installation guidelines.
5. Ensure that each expansion card is firmly seated in its connector.
6. Install the system cover.
7. Reconnect the system to the electrical outlet, and turn on the system and attached peripherals.
8. If the problem is not resolved, turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
9. Remove the system cover.
10. Remove all expansion cards installed in the system.
11. Install the system cover.
12. Reconnect the system to the electrical outlet, and turn on the system and attached peripherals.
13. Run the appropriate diagnostic test. See the Using system diagnostics section.

If the tests fail, see the Getting help section.

14. For each expansion card you removed in step 10, perform the following steps:
 - a. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
 - b. Remove the system cover.
 - c. Reinstall one of the expansion cards.
 - d. Install the system cover.
 - e. Run the appropriate diagnostic test. See the Using system diagnostics section.

If the problem persists, see the Getting help section.

OMSA flagging PERC driver

Issue: OpenManage Server Administrator (OMSA) flagging the PERC driver.

Solution: Dell EMC recommends that you download and install the latest BIOS, drivers, and systems management firmware on your system. For more information, see the Downloading the drivers and firmware topic.

Importing or clearing foreign configurations using the foreign configuration view screen

Prerequisites

About this task

If one or more physical disks are removed from a configuration, the configuration on those disks is considered a foreign configuration by the RAID controller.

You can use the **Foreign Config** screen to view information about the foreign configuration, such as disk groups, virtual disks, physical disks, space allocation, and hot spares. The foreign configuration data is displayed in the same format as configurations on the **VD Mgmt** screen. You can use the **VD Mgmt** screen to view the foreign configuration before importing. After you view the foreign configuration, you can either clear or import to the RAID controller.

 **NOTE:** Before you import the foreign configuration, review the configuration on the screen to ensure that it is the end result that you require.

You can use the **Foreign Config** screen to manage foreign configurations in the following cases:

- All the physical disks in a configuration are removed and re-inserted.
- Some of the physical disks in a configuration are removed and re-inserted.
- All the physical disks in a virtual disk are removed, but at different times, and then re-inserted.
- The physical disks in a non-redundant virtual disk are removed.

The following constraints apply to the physical disks that are considered for import:

- The disk state of a physical disk can change from the time the foreign configuration is scanned to when the actual import occurs. The foreign import occurs only on disks that are in the **Unconfigured Good** state.
- Disks in the failed or offline state cannot be imported.
- The firmware does not allow you to import more than eight foreign configurations.

To manage foreign configurations:

Steps

1. If all or some of the physical disks in a configuration are removed and reinserted, the controller considers the disks to have foreign configurations. Perform the following steps:

- a. Select **Foreign Config** to display the foreign configuration information on the **Foreign Config** screen.
- b. Press <F2> to display the options (**Import**, **Clear**).

 **NOTE:** You must have all the disks in the system before you perform the import operation.

- c. Select **Import** to import the foreign configuration to the controller or select **Clear** to delete the foreign configuration(s) from the re-inserted disk(s).

In the **Preview Configuration Data** window, the status of a physical disk that needs to be rebuilt is displayed as **Rebuild**.

 **NOTE:** When you import a foreign configuration, the dedicated hot spares in the configuration are imported as dedicated hot spares on two conditions — the associated virtual disk is already present or the associated virtual disk is also imported along with the configuration.

 **NOTE:** Start a consistency check immediately after the rebuild is complete to ensure data integrity for the virtual disks. For more information about checking data consistency, see the **Checking Data Consistency**.

2. If all the physical disks in a virtual disk are removed at different times and re-inserted, the controller considers the disks to have foreign configurations. Perform the following steps:

- a. Select **Foreign Configuration View** to display the complete virtual disk, across different foreign configurations and allow foreign configurations to be imported.
- b. Press <F2> to display the options **Import** and **Clear**.

 **NOTE:** You must have all the drives in the system before you perform the import operation.

- c. Select **Import** to merge the foreign configurations with the existing configuration on the controller or **Clear** to delete the foreign configuration(s) from the re-inserted disk(s).

If you select **Import**, all drives that were removed before the virtual disk became offline are imported, and then automatically rebuilt.

 **NOTE:** Start a consistency check immediately after the rebuild is complete to ensure data integrity for the virtual disks. For more information about checking data consistency, see the **Checking Data Consistency** section.

3. If the physical disks in a non-redundant virtual disk are removed, the controller considers the disks to have foreign configurations. Perform the following steps:

- a. Select **Foreign Configuration View** to display the complete foreign configuration information.
- b. Press <F2> to display the options **Import** and **Clear**.
- c. Select **Import** to import the foreign configurations to the virtual disk or **Clear** to delete the foreign configuration(s) from the re-inserted disk(s).

No rebuilds occur after the import operation because there is no redundant data to rebuild the disks with.

Importing or clearing foreign configurations using the VD mgmt menu

When a foreign configuration exists, the BIOS screen displays the message `Foreign configuration(s) found on adapter`. In addition, a foreign configuration is displayed on the right side of the **Ctrl Mgmt** screen.

About this task

You can use the **VD Mgmt** menu to import the existing configuration to the RAID controller or clear the existing configuration. In addition, you can view the foreign configuration from the **Foreign View** tab without importing the configuration.

 **NOTE:** The controller does not allow import of configurations that results in more than 64 virtual disks.

Perform the following steps to import or clear foreign configurations:

Steps

1. During bootup, press <Ctrl> <R> when prompted by the BIOS screen.
The **VD Mgmt** screen is displayed by default.
2. On the **VD Mgmt** screen, highlight the **Controller #**.
3. Press <F2> to display the available actions.
4. Navigate to the **Foreign Config** option and press the right arrow key to display the available actions:
 - a. **Import**
 - b. **Clear**

 **NOTE:** Ensure that your virtual disk has all the physical disks by verifying that there are no physical disks marked as **Missing in the foreign view page** and that all the disks appear as expected before importing them.

5. Select **Import** to import the foreign configuration or **Clear** to delete the foreign configuration and then press <Enter>.
If you import the configuration, the **VD Mgmt** screen displays detailed configuration information. It includes information about the disk groups, virtual disks, physical disks, space allocation, and hot spares.

RAID controller L1, L2 and L3 cache error

Issue: The RAID controller is generating L1, L2 and L3 errors.

Solution: To fix the issue, perform the following:

1. Update the system BIOS to the latest version
2. Clear the iDRAC logs from the iDRAC web interface
3. Update the iDRAC firmware
4. Update the RAID controller drivers and firmware
5. Clear the system event logs

PERC controllers do not support NVME PCIe drives

Issue: NVME PCIe connected drives are not supported by PERC RAID controllers.

Solution: The controller is working as designed.

- For more information about installation and removal of NVMe PCIe SSD in the system, see Replacing and configuring hardware.
- For configuring and managing the PCIe SSD adapter, see Configuring And Managing Your NVMe PCIe SSD Adapter.

12 Gbps hard drive does not support in SAS 6ir RAID controllers

Issue: 12 Gbps drive does not support in SAS 6ir RAID controllers.

Resolution:

- The controller is working as designed.

- SAS 6ir controllers support speeds of up to 3 Gbps.

For more information, refer to the SAS 6ir product documentation.

Hard drives cannot be added to the existing RAID 10 Array

Create a new RAID 1 array or RAID 50 array, and ensure that the virtual disk has the maximum partition space. For information about how to configure a RAID array, see [RAID configuration using OpenManage Server Administrator](#), [RAID configuration using Unified Server Configurator](#), or [Configuring RAID by using Lifecycle Controller](#).

For information about RAID configuration by using PERC, see [RAID configuration using PERC](#).

PERC battery discharging

Issue: PERC battery discharging

Solution: To fix this issue, update the BIOS and PERC firmware. The following steps show how to update the BIOS and PERC firmware:

There are four methods to update the BIOS, below are the steps for the four methods:

Method 1: Dell update package instructions for UEFI.

1. Download the BIOS update package at: Dell.com/support.
2. When the Export Compliance Disclaimer window appears, read the agreement and if you agree, click **I agree**.
3. The File Download window appears, click **Save** to save the file to your hard drive.
4. You can update the BIOS using a UEFI shell bootable media, such as a USB key. Copy the file to the bootable device with UEFI shell.
5. Boot the system to UEFI shell by using the bootable device.
6. Run the executable .efi file under the UEFI shell. Follow the instructions provided by the flash utility.

You can also load this executable file directly from BIOS Boot Manager without a UEFI shell bootable media:

1. Copy the file to a USB device.
2. Plug in the USB device to the system and then press F11 during POST to enter BIOS Boot Manager.
3. Navigate to the System Utilities menu and select BIOS Update File Explorer.
4. Select the USB device and navigate through the directory contents to find the executable (.efi).
5. Launch the executable and follow the instructions provided by the flash utility.

Method 2: Dell update package instructions for Linux DUP.

1. Download the BIOS update package at: Dell.com/support.
2. When the File Download window appears, click **Save** to save the file to your hard drive.
3. Read the release information by running the command `./[model]_BIOS_LX[revision].BIN--version` command from the shell.
4. Download and perform the prerequisites identified in the above steps before proceeding.
5. Install any necessary Embedded Systems Management firmware prior to this BIOS update.
6. Run the update `./[model]_BIOS_LX[revision].BIN--version`.
7. Follow the remaining prompts to perform the update.

Method 3: Dell update package instructions for Windows DUP.

1. Download the BIOS update package at: Dell.com/support.
2. When the File Download window appears, click **Save** to save the file to your hard drive.
3. Browse the location where you downloaded the file and double-click the file.
4. Read over the release information presented in the dialog window.
5. Download and install any prerequisites identified in the dialog window before proceeding.
6. Install any necessary Embedded Systems Management firmware prior to this BIOS update.
7. Click the Install button.
8. Follow the remaining prompts to perform the update.

Method 4: GnuPG signature of Dell update package instructions.

1. Download the BIOS update package at: Dell.com/support.
2. When the File Download window appears, click **Save** to save the file to your hard drive.
3. Import the Dell public key.

 **NOTE:** You only need to do once on your system.

4. Verify the Dell Update Package by using its signature file, [model]_BIOS_LX_[version].BIN.sign.

There are two methods to update the PERC firmware. Below are the steps for the two methods:

Method 1: Windows update package.

1. Download the BIOS update package at: [Dell.com/support](https://dell.com/support).
2. When the File Download window appears, click **Save** to save the file to your hard drive.
3. Browse to the location where you downloaded the file and double-click the new file.
4. Read over the release information presented in the dialog window.
5. Download and perform any prerequisites identified in the dialog window before proceeding.
6. Click the Install button.
7. Follow the remaining prompts to perform the update.

Method 2: Linux update package.

1. Download the BIOS update package at: [Dell.com/support](https://dell.com/support).
2. When the File Download window appears, click **Save** to save the file to your hard drive.
3. Read over the release information presented by executing the ". /SAS-RAID_Firmware_XXXXX_LN_XXXXX.BIN--version" command from the shell.
4. Download and perform any prerequisites identified in the above step before proceeding.
5. Run the update by executing ". /SAS-RAID_Firmware_XXXXX_LN_XXXXX.BIN" from the shell.
6. Follow the remaining prompts to perform the update.

There are two methods to update the PERC firmware:

Method 1: Windows update package:

1. Download the BIOS update package at: [Dell.com/support](https://dell.com/support).
2. When the File Download window appears, click **Save** to save the file to your hard drive.
3. Browse to the location where you downloaded the file and double-click the new file.
4. Read over the release information presented in the dialog window.
5. Download and install any prerequisites identified in the dialog box before proceeding.
6. Click the Install button.
7. Follow the remaining prompts to perform the update.

Method 2: Linux update package:

1. Download the BIOS update package at: [Dell.com/support](https://dell.com/support).
2. When the File Download window appears, click **Save** to save the file to your hard drive.
3. Read over the release information presented by executing the ". /SAS-RAID_Firmware_XXXXX_LN_XXXXX.BIN--version" command from the shell.
4. Download and install any prerequisites identified in the above step before proceeding.
5. Run the update by executing ". /SAS-RAID_Firmware_XXXXX_LN_XXXXX.BIN" from the shell.
6. Follow the remaining prompts to perform the update.

PERC battery failure message is displayed in ESM log

About this task

If the PERC battery is displayed as failed in the ESM log, and there is no hardware failure, perform the following steps:

Steps

1. Turn off the system, and remove the power cable (s) from the system.
2. Let the system sit for 30 seconds to allow any remaining flea power to drain.
3. Boot to the operating system, and clear logs.
4. Update the iDRAC firmware to the latest version.

 **NOTE:** If the issue persists, Dell recommends that you replace PERC and the PERC battery.

For more information about troubleshooting the PERC battery, see [Additional Information for troubleshooting memory or battery errors on the PERC controller section](#).

Creating non-raid disks for storage purpose

About this task

By default, all the disks are in RAID capable unconfigured state. The user can convert the RAID capable disks to non-RAID disks using either the BIOS configuration utility or the UEFI/HII RAID configuration utility.

To create a non-RAID disk, perform the following steps in the **BIOS Configuration Utility** (<Ctrl> <R>):

Steps

1. On the **Virtual Disk Mgmnt** screen, use the arrow keys to highlight the PERC 9 adapter or **Disk Group #**.
2. Press <F2>.
The list of available action is displayed.
3. Click **Convert to Non-RAID**.
The **Convert RAID Capable Disks to Non-RAID** window is displayed.
4. Press the down-arrow key to highlight an available physical disk.
5. Press the spacebar to select the disk.
An **X** is displayed beside the selected physical disk(s).
6. Select **OK**.

Firmware or Physical disks out-of-date

Issue:The Firmware or Drives out of date adn results in unknown disk errors.

Solution:

- Update the Firmware/ PERC Controller.

Cannot boot to Windows due to foreign configuration

About this task

When a foreign configuration exists in the controller, and you cannot boot to Windows, do the following:

Steps

1. Import the foreign configuration to the RAID controller. See, [Importing foreign configuration using PERC](#).
2. Rebuild the failed hard drives. See, [Rebuild](#).
3. Upgrade the iDRAC firmware/PERC. See, [Downloading drivers and firmware](#).

Offline or missing virtual drives with preserved cache error message

Error Message:

There are offline or missing virtual drives with preserved cache. Please check the cables and ensure that all drives are present. Press any key to enter the configuration utility.

Probable Cause:

The controller preserves the dirty cache from a virtual disk if the disk becomes offline or is deleted because of missing physical disks. This preserved dirty cache is called pinned cache, and is preserved until you import the virtual disk, or discard the cache.

Corrective Action:

Use the <Ctrl> <R> utility to import the virtual disk or discard the preserved cache. For the steps used to manage preserved cache, see [Managing preserved cache](#).

 **NOTE:** Ctrl R is not available for systems set to UEFI boot mode. Use the HII menu to manage preserved cache in these cases.

Managing preserved cache

About this task

If a virtual disk goes offline or is deleted because of missing physical disks, the controller preserves the dirty cache from the virtual disk. The preserved dirty cache, known as pinned cache, is preserved until you import the virtual disk or discard the cache.

 **NOTE:** Certain operations, such as creating a new virtual disk, cannot be performed if preserved cache exists. You have to enter the BIOS Configuration Utility (<Ctrl> <R>) to resolve the situation before you boot to the operating system. Messages are displayed notifying you that you must enter the BIOS Configuration Utility (<Ctrl> <R>) to discard the preserved cache or import the virtual disks with the preserved cache.

 **CAUTION:** If there are any foreign configurations, it is strongly advised that you import the foreign configuration before you discard the preserved cache. Otherwise, you might lose data that belongs with the foreign configuration.

To manage the preserved cache:

Steps

1. On the **VD Mgmt** screen, click on a controller icon.
2. Press <F2> to display the available actions.
3. Select **Manage Preserved Cache**.
A message is displayed advising you to import the foreign configuration before you discard the preserved cache to avoid losing data belonging to the foreign configuration. Confirm whether you want to continue. The **Manage Preserved Cache** screen displays the affected virtual disks.
4. You can choose to discard the cache on the **Manage Preserved Cache** screen. If you press **Cancel**, the process is cancelled and the **Preserved Cache Retained** dialog box is displayed. If you choose to discard the cache, you are prompted to confirm your choice. If you choose to retain the cache, a message is displayed to notify you that you cannot perform certain operations while the cache exists. Click **OK** to continue.

Expanding RAID array

Reconfigure or migrate a virtual disk (VDs) to increase the capacity or change the RAID level of the virtual disk. For more information about reconfiguration of virtual disks, see [Starting and target RAID levels for virtual disk reconfiguration and capacity expansion](#), and [Reconfiguring or migrating virtual disks](#).

LTO-4 Tape drives are not supported on PERC

Tape drives are not supported on PERC. Use a 6Gbps SAS HBA or an equivalent SAS HBA that is not designed with RAID.

Limitations of HDD size on H310

The PowerEdge RAID Controller H310 does not support HDD size more than 2 TB. HDD size has this limitation.

System logs show failure entry for a storage controller even though it is working correctly

The PowerEdge RAID Controller (PERC) family of enterprise-class controllers is designed for enhanced performance, increased reliability, fault tolerance, and simplified management. These controllers provide a powerful, easy-to-manage way to create a robust infrastructure and help maximize server uptime. The battery installed on these controllers help in ensuring data integrity in case of power outages.

About this task

When the controller battery is discharged, the system recharges the battery and reconditions it. During this reconditioning, you may see a failure in the system logs. To confirm that the battery is working correctly, check the hardware details on any of the Dell EMC systems management solutions. This error can also be resolved by clearing the static build-up in the system. To clear the static build-up, perform the following steps:

Steps

1. Shut down the system.
2. Disconnect all the power cables.
3. Press and hold power button for 15 seconds.
4. Reconnect all the cables and turn the system on.

Results

Check the hardware details to ensure that the controller is working correctly.

Troubleshooting hard drives

Prerequisites

 **CAUTION:** This troubleshooting procedure can erase data stored on the hard drive. Before you proceed, back up all files on the hard drive.

 **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.

 **NOTE:** Ensure that the sleds internal SATA cables are connected correctly.

Steps

1. Run the appropriate diagnostic test. See the Using system diagnostics section.
Depending on the results of the diagnostics test, proceed as required through the following steps.
2. If your system has a RAID controller and your hard drives are configured in a RAID array, perform the following steps:
 - a. Restart the system and press F10 during system startup to run the Dell Lifecycle Controller, and then run the Hardware Configuration wizard to check the RAID configuration.
See the Dell Lifecycle Controller documentation or online help for information about RAID configuration.
 - b. Ensure that the hard drives are configured correctly for the RAID array.
 - c. Take the hard drive offline and reseal the drive.
 - d. Exit the configuration utility and allow the system to boot to the operating system.
3. Ensure that the needed device drivers for your controller card are installed and are configured correctly. For more information, see the operating system documentation.
4. Restart the system and enter the System Setup.
5. Verify that the controller is enabled and the drives are displayed in the System Setup.

Next steps

If the problem persists, see the Getting help section.

Troubleshooting multiple Drive failure

Multiple physical disk errors in a single array typically indicate a failure in cabling or connection and could involve the loss of data. You can recover the virtual disk after multiple physical disks become simultaneously inaccessible. Perform the following steps to recover the virtual disk.

Prerequisites

Follow the safety precautions to prevent electrostatic discharge.

Steps

1. Turn Off the System.

2. Reseat the cable at both the ends.
3. Reseat the controller card.
4. Reseat the Drives and ensure that all the drives are present in the system.
5. Turn on the system and enter the CTRL+R utility, or and either import or clear the foreign configuration.
6. Press <"F"> at the prompt to import the foreign configuration.
7. press <"C"> to enter the BIOS configuration utility.
If the virtual disk is redundant and transitioned to **degraded** state before going **Offline**, a rebuild operation starts automatically after the configuration is imported. If the virtual disk has gone directly to the **Offline** state due to a cable pull or power loss situation, the virtual disk is imported in its **Optimal** state without a rebuild occurring. You can also use the BIOS Configuration Utility or Dell OpenManage storage management application to perform a manual rebuild of multiple physical disks.
8. If the problem is not resolved, refer to [Troubleshooting Hard drives section](#) in the Dell EMC PowerEdge Servers Troubleshooting Guide.

Checking hard drive status in the PERC BIOS

Steps

1. Press **Ctrl + R** during the POST process to open **PERC BIOS Configuration Utility**.

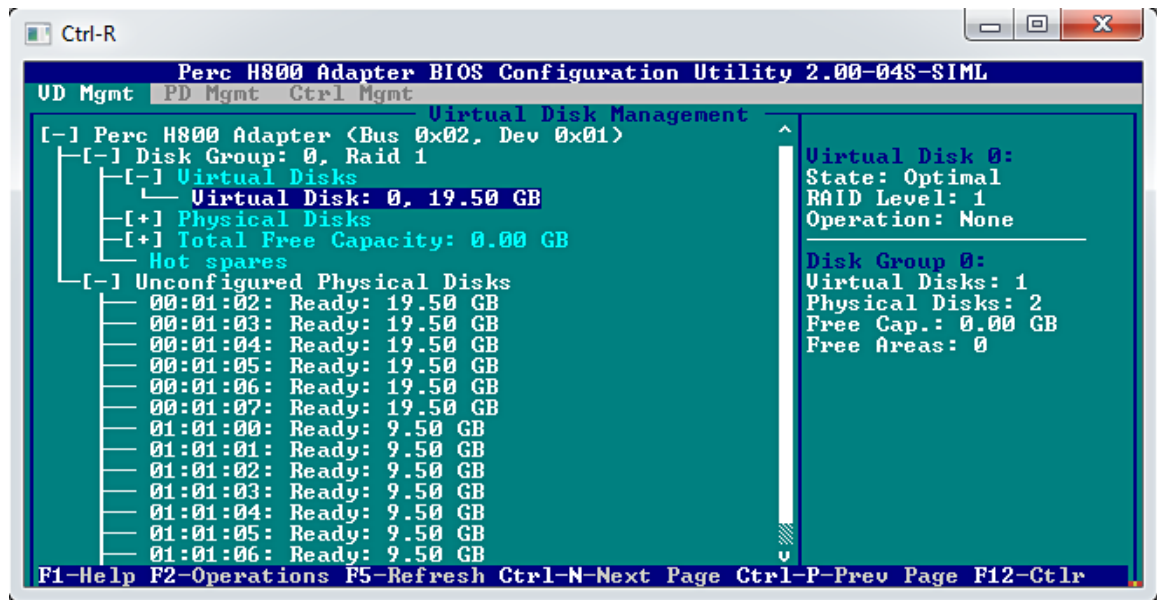


Figure 13. PERC Configuration Utility VD Mgmt screen

2. To check if the hard drive is participating in the RAID array, perform the following steps:
 - a. Press **Ctrl + N** to go to the **PD Mgmt (Physical Disk Management)** screen and check if any hard drives are offline or missing.

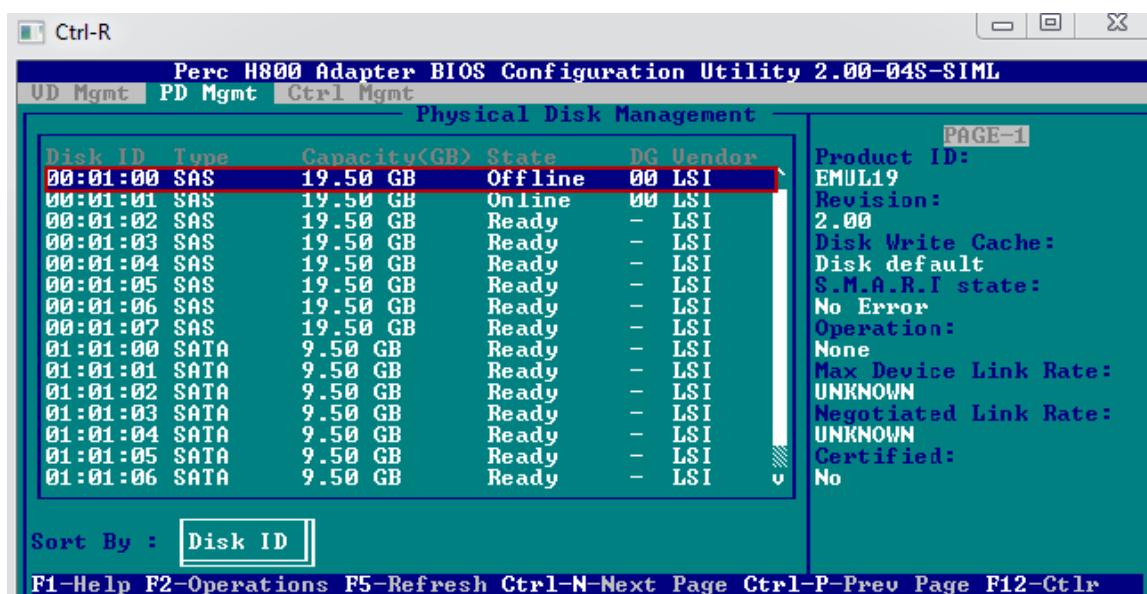


Figure 14. PERC Configuration Utility PD Mgmt screen

The table shows Hard drive status

Table 14. Hard drive status

Hard drive status	Description
Offline	Hard drive is not part of the RAID array.
Online	Hard drive is part of the RAID array.
Ready	Hard drive is ready to be a part of the RAID array.

FAQs

How to identify a hard drive failure?

Hard drive failures may occur because of logical, head, or mechanical failures. The following table describes the symptoms of failing hard drives:

Table 15. Symptoms of a failing hard drive

Symptom	Description
Noisy hard drives	Noisy hard drives indicate head crash, noisy bearings, or a failed motor.
Data and disk errors	Files may not get saved or programs may stop responding.
Hard drive not detected	Operating system does not detect the hard drive.
System crash	Blue screen errors.
Slow read-write process	Delay in reading or writing data on the hard drive.

Perform the following steps if any of these symptoms occur:

1. Check if the hard drives are installed correctly.
2. Check the hard drive indicators. For more information, see Hard drive indicator codes section.
3. For systems with LED indicators, check the diagnostic LEDs. For more information, see Status LED indicators section.

NOTE: The diagnostic LED indicators might be different for different systems.

- For systems with LCD panel, check for the following error codes:

Table 16. Hard drive error codes

Error Code	Error Message	Description
E1810	Hard drive <number> fault.	Hard drive <number> has had a fault as determined by the SAS subsystem.
E1811	Hard drive <number> rebuild aborted.	Drive <number> has had its rebuild aborted.
E1812	Hard drive <number> removed.	Drive <number> has been removed from the system.

- Check the hard drive status in SupportAssist.
- Check the hard drive status in the RAID BIOS. For more information, see Checking hard drive status in the PERC BIOS section.

If you have any of the above error conditions, contact Dell Technical Support. When you call, keep the SupportAssist report and the troubleshooting logs ready.

How do I extract RAID-Controller Logs using MegaCLI for Windows and Linux?

NOTE: To export information about the status of the RAID controller and the connected hard drives, use the MegaCLI tool by LSI (Avagotech).

To create the appropriate diagnostic files, perform the following steps:

- Download the appropriate version of the MegaCli tool for Windows Operating systems from the [Avagotech support site](#).
- Unzip the downloaded files and copy them in any directory on the server or host system according your installed operating system. For example, on Windows the path can be `C:\temp\megaccli`, and on Linux the path can be `/tmp/megaccli`.
- Open a terminal in Linux or a command prompt in Windows operating systems and navigate to the newly created directory.
- Now, run the following commands:
 - To create the RAID controller logs in Windows, use the command `MegaCli.exe -FwTermLog -Dsply -aALL > ttylog.txt`.
 - To create the Event Log in Windows, use the command `MegaCli.exe -AdpEventLog -IncludeDeleted -f deleted.txt -aALL`.
 - To create the RAID controller logs in Linux, use the command `./MegaCli64 -FwTermLog -Dsply -aALL > /tmp/ttylog.txt`.
 - To create the Event Log in Linux, use the command `./MegaCli64 -AdpEventLog -IncludeDeleted -f deleted.txt -aALL`.

NOTE: For the most popular Linux operating systems, you also need the following file to ensure a smooth execution: - `Lib_Utills-1.00-09.noarch.rpm`

NOTE: The `deleted.txt` file is always stored in the MegaCli folder.

Symptoms

Hard disk drive making noise

Description

Clicking or other loud noise is heard from the hard drive. The noise can be intermittent and may or may not coincide with read or write operations.

Resolution

- Run the custom ePSA diagnostics and obtain the error code. For more information on ePSA diagnostics, see [PSA/ePSA Diagnostics](#) on page 18.
- If the diagnostics fail, call Dell Technical Support for further assistance.
- If the diagnostics pass, reseal the hard drive.
- If the problem persists, call Dell Technical Support for further assistance.

Drive timeout error

Issue—Drive times out and the RAID controller displays the drive as failed.

Corrective action—Update the hard drive firmware/PERC controller. For information about driver installation, see the driver installation section. For information about firmware installation, see the Firmware section.

Drives not accessible

Multiple physical disk errors in a single array typically indicate a failure in cabling or connection and could involve the loss of data. You can recover the virtual disk after multiple physical disks become simultaneously inaccessible. Perform the following steps to recover the virtual disk.

Prerequisites

Follow the safety precautions to prevent electrostatic discharge.

Steps

1. Turn Off the System.
2. Reseat the cable at both the ends.
3. Reseat the controller card.
4. Reseat the Drives and ensure that all the drives are present in the system.
5. Turn on the system and enter the CTRL+R utility. or and either import or clear the foreign configuration.
6. Press <"F"> at the prompt to import the foreign configuration.
7. press <"C"> to enter the BIOS configuration utility.

If the virtual disk is redundant and transitioned to **degraded** state before going **Offline**, a rebuild operation starts automatically after the configuration is imported. If the virtual disk has gone directly to the **Offline** state due to a cable pull or power loss situation, the virtual disk is imported in its **Optimal** state without a rebuild occurring. You can also use the BIOS Configuration Utility or Dell OpenManage storage management application to perform a manual rebuild of multiple physical disks.

Troubleshooting an optical drive

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 are shipped with your product.

Steps

1. Try using a different CD or DVD.
2. If the problem is not resolved, enter System Setup and ensure that the integrated SATA controller and the drive's SATA port are enabled.
3. Run the appropriate diagnostic test.
4. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
5. If installed, remove the bezel.
6. Remove the system cover.
7. Ensure that the interface cable is securely connected to the optical drive and to the controller.
8. Ensure that a power cable is properly connected to the drive.
9. Install the system cover.

Next steps

If the problem persists, see the Getting help section.

Troubleshooting a tape backup unit

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 are shipped with your product.

Steps

1. Use a different tape cartridge.
2. Ensure that the device drivers for the tape backup unit are installed and are configured correctly. See your tape drive documentation for more information about device drivers.
3. Reinstall the tape-backup software as instructed in the tape-backup software documentation.
4. Ensure that the interface cable of the tape drive is connected to the external port on the controller card.
5. Perform the following steps to ensure that the controller card is properly installed:
 - a. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
 - b. Remove the system cover.
 - c. Reseat the controller card in the expansion card slot.
 - d. Install the system cover.
 - e. Turn on the system and attached peripherals.
6. Run the appropriate diagnostic test. For more information, see the Using system diagnostics.

Next steps

If you cannot resolve the problem, see the Getting help section.

Troubleshooting no power issues

Prerequisites

Ensure all power supplies are firmly seated, power cables are connected, and both power supplies are operating.

Steps

1. Swap the AC power cable with a known-good power cable.
If the system works with a known-good AC power cable, replace the power cable.
2. Check the status of the power indicator on the power supply unit (PSU).
 - If the power indicator is lit Green, reseal the PSU. If this does not fix the issue, test the system with a good PSU.
 - If the power indicator is lit Amber, this indicates a PSU fault condition. Replace the PSU with a good PSU and check the indicator status.
 - If the issue is resolved, consider replacing the PSU.

Troubleshooting power supply units

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 are shipped with your product.

The following sections provide information on troubleshooting power source and power supply units problems.

Troubleshooting power source problems

Steps

1. Press the power button to ensure that your system is turned on. If the power indicator does not glow when the power button is pressed, press the power button firmly.
2. Plug in another working power supply unit to ensure that the system board is not faulty.
3. Ensure that no loose connections exist.
For example, loose power cables.
4. Ensure that the power source meets applicable standards.
5. Ensure that there are no short circuits.
6. Have a qualified electrician check the line voltage to ensure that it meets the needed specifications.

Results

 **NOTE:** Some power supply units require 200-240V AC to deliver their rated capacity. For more information, see the **system Technical Specifications** section in the Installation and Service Manual available at www.dell.com/poweredgemanuals.

Troubleshooting power supply unit problems

Steps

1. Ensure that no loose connections exist.
For example, loose power cables.
 2. Ensure that the power supply handle LED indicates that the power supply is working properly.
 3. If you have recently upgraded your system, ensure that the power supply unit has enough power to support the new system.
 4. If you have a redundant power supply configuration, ensure that both the power supply units are of the same type and wattage.
If the LED You may have to upgrade to a higher wattage power supply unit.
 5. Ensure that you use only power supply units with the Extended Power Performance (EPP) label on the back.
 6. Reseat the power supply unit.
-  **NOTE:** After installing a power supply unit, allow several seconds for the system to recognize the power supply unit and determine if it is working properly.

If the problem persists, see the Getting help section.

Troubleshooting RAID

RAID configuration using PERC

How to create RAID volumes

If your system has one or more supported **PERC** RAID controllers with **PERC 8** firmware or later versions, or software RAID controllers, use the RAID Configuration wizard to configure a virtual disk as the boot device. RAID volumes can be created using several interfaces. Here we are creating a RAID volume using Lifecycle controller.

To configure RAID using LC, complete the following steps:

1. Start Lifecycle Controller. For more information, see *Lifecycle Controller User's Guide* available at www.dell.com/idracmanuals.
2. In the left pane, click **Hardware Configuration**.
3. In the right pane, click **Configuration wizards**.
4. Under **Storage configuration wizard**, click **RAID configuration** to launch the wizard.

The **View Current RAID Configuration and Select Controller** page is displayed.

 **NOTE:** BOSS-S1 controller is supported at RAID 1 level only.

5. Select the controller which you want to use and click **Next**.

The **Select RAID Level** page is displayed.

6. Select the RAID level and click **Next**.

The **Select Physical Disks** page is displayed.

7. Select the physical disk and click **Next**.

The **Virtual Disk Attributes** page is displayed.

8. Select the virtual disk parameters and click **Next**.

The **Summary** page is displayed.

9. To apply the RAID configuration, click **Finish**.

For more information about creating a RAID using other interfaces, see *Lifecycle Controller User's Guide* available at www.dell.com/idracmanuals

Creating a secured virtual disk

A virtual disk can be either secured or unsecured depending on how it was configured when created. The Dell PowerEdge RAID Controller (PERC) cards support Self-Encrypting Disks (SED) for protection of data against loss or theft of SEDs.

Prerequisites

The controller must have a security key present and must contain SEDs only.

About this task

To create a secured virtual disk, do the following:

Steps

1. During host system bootup, press Ctrl + R after the BIOS screen is displayed.
The **Virtual Disk Management** screen is displayed. If there is more than one controller, the main menu screen is displayed. Select a controller, and press Enter. The **Virtual Disk Management screen** is displayed for the selected controller.
2. Use the arrow keys to highlight the PERC series of adapters.
For example, PERC H730P Adapter or Disk Group #.
3. Press F2.
A list of available actions is displayed.
4. Select **Create New VD**, and set the **Secure VD** option as **Yes**.

Next steps

 **NOTE:**

To select or configure a non-SED, you must create an unsecured virtual disk. You can create an unsecured virtual disk even if there is a security key. From the Create New VD menu, select the Secure VD option as No.

For more information about creating a virtual disk, see the *Dell PowerEdge RAID Controller (PERC) User's Guide* at www.dell.com/storagecontrollermanuals.

Rebuild

Select Rebuild to rebuild one or more failed physical disks.

Several of the controller configuration settings and the virtual disk settings affect the actual rate of rebuild. The factors include the rebuild rate setting, virtual disk stripe size, virtual disk read policy, virtual disk write policy, and the amount of workload placed on the storage subsystem. For information on getting the best rebuild performance from your RAID controller, see the documentation at www.dell.com/storagecontrollermanuals.

The listed rates in the following table were taken during single disk failure with no I/O. Rates vary depending on type, speed and number of hard drives present in array; as well as which controller model and enclosure configuration are being used.

Table 17. Estimated rebuild rates

RAID level	Number of Hard Drives	7.2 K rpm 12 Gbps SAS Hard Drive	15 K rpm 6 Gbps SAS Hard Drive
RAID 1	2	320 GB/hour	500 GB/hour
RAID 5	6	310 GB/hour	480 GB/hour
RAID 10	6	320 GB/hour	500 GB/hour
RAID 5	24	160 GB/hour	240 GB/hour
RAID 10	24	380 GB/hour	500 GB/hour

Rebuilding the physical disks after multiple disks become simultaneously inaccessible

About this task

Multiple physical disk errors in a single array typically indicate a failure in cabling or connection and could involve the loss of data. You can recover the virtual disk after multiple physical disks become simultaneously inaccessible.

Perform the following steps to recover the virtual disk:

Steps

1. Turn off the system, check cable connections, and reseal physical disks.
2. Ensure that all the drives are present in the enclosure.
3. Turn on the system and enter the **CTRL+R** utility and import the foreign configuration. Press **<"F">** at the prompt to import the configuration, or press **<"C">** to enter the BIOS configuration utility and either import or clear the foreign configuration.
4. If the virtual disk is redundant and transitioned to Degraded state before going Offline, a rebuild operation starts automatically after the configuration is imported.
5. If the virtual disk has gone directly to the Offline state due to a cable pull or power loss situation, the virtual disk is imported in its Optimal state without a rebuild occurring.
6. You can use the BIOS Configuration Utility or Dell OpenManage storage management application to perform a manual rebuild of multiple physical disks.

Importing a foreign configuration using PERC

About this task

Some controllers enable you to import a foreign configuration so that virtual disks are not lost after moving the physical disks. You can import a foreign configuration only if it contains a virtual disk that is either in a **Ready** or **Degraded** state. In other words, all of the virtual disk data must be present, but if the virtual disk is using a redundant RAID level, the additional redundant data is not required. For example, if the foreign configuration contains only one side of a mirror in a RAID 1 virtual disk, then the virtual disk is in a **Degraded** state and can be imported. On the other hand, if the foreign configuration contains only one physical disk that was originally configured as a RAID 5 using three physical disks, then the RAID 5 virtual disk is in a **Failed** state and cannot be imported. In addition to virtual disks, a foreign configuration may consist of a physical disk that was assigned as a hot spare on one controller and then moved to another controller. The **Import Foreign Configuration** task imports the new physical disk as a hot spare. If the physical disk was set as a dedicated hot spare on the previous controller, but the virtual disk to which the hot spare was assigned is no longer present in the foreign configuration, then the physical disk is imported as a global hot spare. The **Import Foreign Configuration** task is only displayed when the controller has detected a foreign configuration. You can also identify whether a physical disk contains a foreign configuration (virtual disk or hot spare) by checking the physical disk state. If the physical disk state is **Foreign**, then the physical disk contains all or some portion of a virtual disk or has a hot spare assignment. If you have an incomplete foreign configuration which cannot be imported, you can use the **Clearing Foreign Configuration** option to erase the foreign data on the physical disks.

NOTE: The task of importing foreign configuration imports all virtual disks residing on physical disks that have been added to the controller. If more than one foreign virtual disk is present, all the configurations are imported.

When a foreign configuration exists, the BIOS screen displays the message **Foreign configuration(s) found on adapter**. In addition, a foreign configuration is displayed on the right side of the **Ctrl Mgmt** screen. To import or clear a foreign configuration, do the following:

Steps

1. During bootup, press Ctrl + R when prompted by the BIOS screen.
The **VD Mgmt** screen is displayed by default.

2. On the **VD Mgmt** screen, highlight the **Controller #**.
3. Press F2 to display the available actions.
4. Navigate to the **Foreign Config** option and press the right arrow key to display the available actions:
 - **Import**
 - **Clear**

NOTE: Ensure that your virtual disk has all the hard drives by verifying that there are no hard drives marked as Missing in the foreign view page and that all the disks are displayed as expected before importing them.

5. Select **Import** to import the foreign configuration or **Clear** to delete the foreign configuration and then press Enter.
If you import the configuration, the **VD Mgmt** screen displays detailed configuration information. It includes information about the disk groups, virtual disks, hard drives, space allocation, and hot spares.

Next steps

You can export the TTY PERC Controller Log using OpenManage Server Administrator to analyze the cause for the issue.

If you have replaced the failed drive with a working drive, then the automated rebuild does not work. You must configure a hot spare to rebuild your RAID volume.

If the firmware of controller is out of date, update the firmware/PERC controller.

Configuring hot spare

Steps

1. Enter the **Dell PERC 10 Configuration Utility**. See the Navigating to Dell PERC 10 configuration utility section.
2. Click **Main Menu > Controller Management > Advanced Controller Properties**.
3. Click **Spare**.
The following list of options are displayed:

NOTE: If there are Pending jobs in the queue, you can delete the pending jobs and assign the physical disk as hot spare. This allows the replaced physical disk to start the rebuilding process

 - Persistent Hot Spare — allows you to enable or disable the ability to have same system backplane or storage enclosure disk slots dedicated as hot spare slots.
 - Allow Replace Member with Revertible Hot Spare — allows you to enable or disable the option to copy the data form a hot spare disk to physical disk.
 - Auto Replace Member on Predictive Failure — allows you to enable or disable the option to start a Replace Member operation if a predictive failure error is detected on a physical disk.
4. Select the applicable option and click **Apply Changes**.
The changes made are saved successfully.

RAID configuration using OpenManage Server Administrator

For more information about the OpenManage Server Administrator RAID Configuration video, go to <https://www.youtube.com/playlist?list=PLe5xhhyFjDPfL6NsJ29FXLVsP9uE-AFO0>.

Create Virtual Disk Express Wizard

The **Create Virtual Disk Wizard** allows you to select the wizard type and the RAID level. The **Create Virtual Disk Express Wizard** calculates the appropriate virtual disk configuration based on the available space and controller requirements. To make your own selections for the virtual disk configuration, select the **Advanced Wizard** option.

About this task

This task is not supported on PERC hardware controllers running in **HBA** mode. To create a virtual disk by using the **Create Virtual Disk Express Wizard**, perform the following steps:

Steps

1. On the upper-left corner of the **Server Administrator** page, expand **Storage**.
2. Click **PERC Controller**.
3. Click **Virtual Disks**.
The **Virtual Disk(s) on Controller <Controller Name>** page is displayed.
4. Click **Go to the Create Virtual Disk Wizard**.
The **Create Virtual Disk Wizard <Controller Name>** page is displayed.
5. Select the **Express Wizard** option and the **RAID level** from the drop-down menu.
6. Click **Continue**.
The **Create Virtual Disk Express Wizard - <Controller Name>** page displays the summary of attributes of the selected RAID level. The attributes include **Bus Protocol**, **Stripe Element Size**, **Read Policy**, and the selected physical disk. The default values of the virtual disk attributes excluding the RAID level are recommended for the selected RAID level.
7. In the **Name** field, type a name for the virtual disk.
The virtual disk name can contain only alphanumeric characters, spaces, dashes, and underscores. The maximum length of the virtual disk name depends on the controller. In most cases, the maximum length is 15 characters. The name cannot start with a space or end with a space.
 **NOTE:** Dell recommends that you specify a unique name for each virtual disk. If you have virtual disks with the same name, it is difficult to differentiate the generated alerts.
8. In the **Size** field, type the size of the virtual disk.
The virtual disk size must be within the minimum and maximum values displayed against the **Size** field.
In some cases, the virtual disk is slightly larger than the size you specify. The **Create Virtual Disk Wizard** adjusts the size of the virtual disk to avoid rendering a portion of the physical disk space unusable.
9. If you want to change your selections, click **Go Back To Previous Page** to return to **Create Virtual Disk Express Wizard** page.
10. Click **Finish** to complete the virtual disk creation or click **Exit Wizard** to cancel the virtual disk creation.
For PERC H700 and PERC H800 controllers, if any of the drives you selected is in the spun down state, the following message is displayed:

The below listed physical drive(s) are in the **Spun Down** state. Executing this task on these drive(s) takes additional time, because the drive(s) need to spun up.

The message displays the ID(s) of the spun down drive(s).

 **NOTE:** When the hard drive is in the spun down state, the drive is not in active use.

The virtual disk is displayed on the **Virtual Disk(s) on Controller <Controller Name>** page.

Create virtual disk Advanced Wizard

The **Create Virtual Disk Advanced Wizard** allows you to specify the read, write, cache policy, and parameters such as RAID level, bus protocol, media type, and encrypted disk for the virtual disk. You can also select the physical disks and the controller connector. You must have a good knowledge of RAID levels and hardware to use the Advanced Wizard. If you want the wizard to recommend a virtual disk configuration for you, select the **Express Wizard** option.

About this task

 **NOTE:** This task is not supported on PERC hardware controllers running in HBA mode.

To create a virtual disk using the **Create Virtual Disk Advanced Wizard**:

Steps

1. On the upper-right corner of the **Server Administrator** page, click **Storage**.
2. Click **<PERC Controller>**.
3. Click **Virtual Disks**.
The **Virtual Disk(s) on Controller <Controller Name>** page is displayed.
4. Click **Go to the Create Virtual Disk Wizard**.
The **Create Virtual Disk Wizard <Controller Name>** page is displayed.

5. Select the **Advanced Wizard** option.
6. To make sure that only encrypted physical disks are used to create the virtual disk, select **Yes** from the **Create Encrypted Virtual Disk** drop-down list.

The RAID levels are available for selection based on the number of encrypted physical disks.

If you select **No**, the RAID levels are available based on the total number of physical disks present on the system.

7. Select the required RAID level from the drop-down menu.
8. Select **Bus Protocol**.

The options are:

- SAS
- SATA

9. Select **Media Type**.

The available options are:

- HDD
- SSD

10. Click **Continue**.



NOTE: If you are creating an encrypted virtual disk, only the encrypted physical disks are displayed. Else, both encrypted and unencrypted physical disks are displayed.

Example:

Connector 0

The **Connector** section of the page displays the connectors on the controller and the disks attached to each connector. Select the disks you want to include in the virtual disk. In this example, the controller has a single connector with five disks.

- Physical disk 0:0
- Physical disk 0:1
- Physical disk 0:2
- Physical disk 0:3
- Physical disk 0:4

Physical Disks Selected

The **Physical Disks Selected** section of the page displays the disks you have chosen. In this example, two disks are selected.

- Physical disk 0:0
- Physical disk 0:1

Each RAID level has specific requirements for the number of disks that must be selected. RAID 10, RAID 50, and RAID 60 also have requirements for the number of disks that must be included in each stripe or span.

If the controller is a SAS controller with firmware version 6.1 and later, and you selected RAID 10, RAID 50, and RAID 60, the user interface displays the following:

- **All Disks**—Enables you to select all the physical disks in all the enclosures.
- **Enclosure**—Enables you to select all physical disks in the enclosure.



NOTE: The **All Disks** and **Enclosure** options enable you to edit spans after selecting the physical disks that comprise them. You can remove a span and specify a span again with different physical disks before proceeding.

- **Number of Disks per Span** — Enables you to select the number of disks in each span (default = 2). This option is available only on SAS controllers with firmware version 6.1 and later.



NOTE: This option is available only if **Intelligent Mirroring** is selected on the **Create Virtual Disk Advanced Wizard** page.



NOTE: On a SAS controller with firmware version 6.1 and later, RAID 10 supports only even number of disks per span and a maximum of 8 spans with 32 disks in each span.

Let us consider that the controller has three enclosures with six physical disks each (total number of available disks = $3 \times 6 = 18$ disks). If you select four disks per span, the controller creates four spans (18 disks/4 disks per span = 4 spans). The last two disks of the last enclosure are not part of RAID 10.

- Select the **number of disks to create a single spanned virtual disk** list box — Enables you to create a single span virtual disk with 22 or 26 physical drives for PERC controllers. This list box option is displayed only if you have selected RAID 10 in step 1 and the system has 22 or more physical drives.

NOTE: Only physical disks that comply with the virtual disk parameters, selected in the Create Virtual Disk Wizard page are displayed.

11. Select the required connector and the corresponding physical disk, and click **Continue**.
12. In the **Name** field, type a name for the virtual disk.

The virtual disk name can contain only alphanumeric characters, spaces, dashes, and underscores. The maximum length depends on the controller. In most cases, the maximum length is 15 characters.

The name cannot start with a space or end with a space. If you have virtual disks with the same name, it is hard to differentiate the generated alerts, Dell recommends that you specify a unique name for each virtual disk.

13. In the **Size** field, type the size of the virtual disk.

The virtual disk size must be within the minimum and maximum values displayed near the **Size** field.

In some cases, the virtual disk is slightly larger than the size you specify. The **Create Virtual Disk Wizard** adjusts the size of the virtual disk to avoid rendering a portion of the physical disk space unusable.

NOTE:

- If a physical disk is receiving a SMART alert, it cannot be used in a virtual disk.
- For a controller that has more than one channel, it may be possible to configure a virtual disk that is channel-redundant.

Depending on the RAID level you selected and the virtual disk size, this page displays the disks and connectors (channels or ports) available for configuring the virtual disk.

NOTE:

The **Size** field displays the default size of the virtual disk depending upon the RAID configuration you selected. However, you can also specify a different size based on your requirement. The virtual disk size must be within the minimum and maximum values displayed against the **Size** field. In some cases, the virtual disk is slightly larger than the size you specify. The **Create Virtual Disk Wizard** adjusts the size of the virtual disk to avoid rendering a portion of the physical disk space unusable.

14. Select a stripe size from the **Stripe Element Size** drop-down list box. The stripe size refers to the amount of space that each stripe consumes on a single disk.
15. Select the required read, write, and disk cache policy from the respective drop-down list box. These selections can vary depending on the controller.

NOTE:

- There is limited support for write policy on controllers that do not have a battery. The cache policy is not supported on controllers that do not have a battery.
- If you have selected the **Create Encrypted Virtual Disk** option in **Create Virtual Disk Advanced Wizard**, then in the **Summary of Virtual Disk Attributes**, an **Encrypted Virtual Disk** attribute is displayed with a value **Yes**.

16. Click **Span Edit** to edit the spans created in **Create Virtual Disk Advanced Wizard**.

CAUTION: If you click **Span Edit**, Intelligent Mirroring that has already been applied becomes invalid.

NOTE:

The **Span Edit** option is available in the following two cases:

- Only if the controller is a SAS controller with firmware 6.1 and later.
- If you selected RAID 10 while using **Create virtual disk Advanced Wizard** on page 64.

17. If you want to change your selections, click **Go Back To Previous Page** to return to **Create Virtual Disk Advanced Wizard** page.
18. Click **Finish** to complete the virtual disk creation or click **Exit Wizard** to cancel the virtual disk creation.
The virtual disk is displayed in the **Virtual Disk(s) on Controller <Controller Name>** page.

For PERC H700 and PERC H800 controllers, if any of the drives you selected is in the spun down state, the following message is displayed:

The below listed physical drive(s) are in the spun down state. Executing this task on these drive(s) takes additional time, because the drive(s) need to spun up.

The message displays the ID(s) of the spun down drive(s).

The **Create Virtual Disk Advanced Wizard - <Controller Name>** page displays a checkbox next to each physical disk that is suitable as a dedicated hot spare. Select a **Physical Disk** checkbox if you want to assign a dedicated hot spare.

The **Physical Disk** checkbox is not available if the controller does not have a physical disk that is a suitable hot spare for the virtual disk you are creating. For example, the available physical disks may not be sufficient to protect the virtual disk. If the **Physical Disk** checkbox is not available, specify a smaller virtual disk, use a different RAID level, or change the disk selection.

 **NOTE:** If you are creating an encrypted virtual disk, then encrypted physical disks are listed as candidates for hot spare.

RAID configuration by using Unified Server Configurator

The Unified Server Configurators (USC)'s main features include operating system deployment, firmware updates, hardware configuration, and diagnostics. The UEFI specification creates framework for many powerful applications that run without an operating system. The UEFI specification includes the Trusted Computing Group (TCG) protocol that allows for Trusted Platform Module (TPM) measurements and secure updates which USC leverages to its fullest extent.

Steps

1. Select the **RAID configuration** tab to create the virtual disk as the boot device.
2. On the **View Current Configuration** screen, you can view a list of current controllers and virtual disks installed in the system.
 - a. If the virtual disk or disks exist in the system, click **Exit** to exit the screen and continue with operating system installation. if the virtual disk or disks do not exist in the system, continue with the new virtual disk creation process.
3. On the **Select RAID Controller** screen, select the controller on which to configure a virtual disk.
 - If the selected controller contains a foreign configuration, the **Foreign Configuration Detected** screen is displayed.
 - Depending on the foreign configuration, you have the option to either **Clear**, **Import** or **Ignore** the foreign configuration.
 - If you select the **Clear Foreign Configuration** option, all the data gets deleted on the drives containing the foreign configuration, thereby allowing the drives to be used in a new configuration.
 - Selecting **Import Foreign Configuration** attempts to import the foreign configuration.
 - Selecting **Ignore Foreign Configuration** leaves the drives in their current state and uses free drives to create a new configuration.

 **NOTE:** Selecting the Ignore Foreign Configuration causes the system to generate alerts and error messages every time the system is started.

4. Select either the **Express Wizard** or **Advanced Wizard** window on the **Select a Configuration Option** screen.

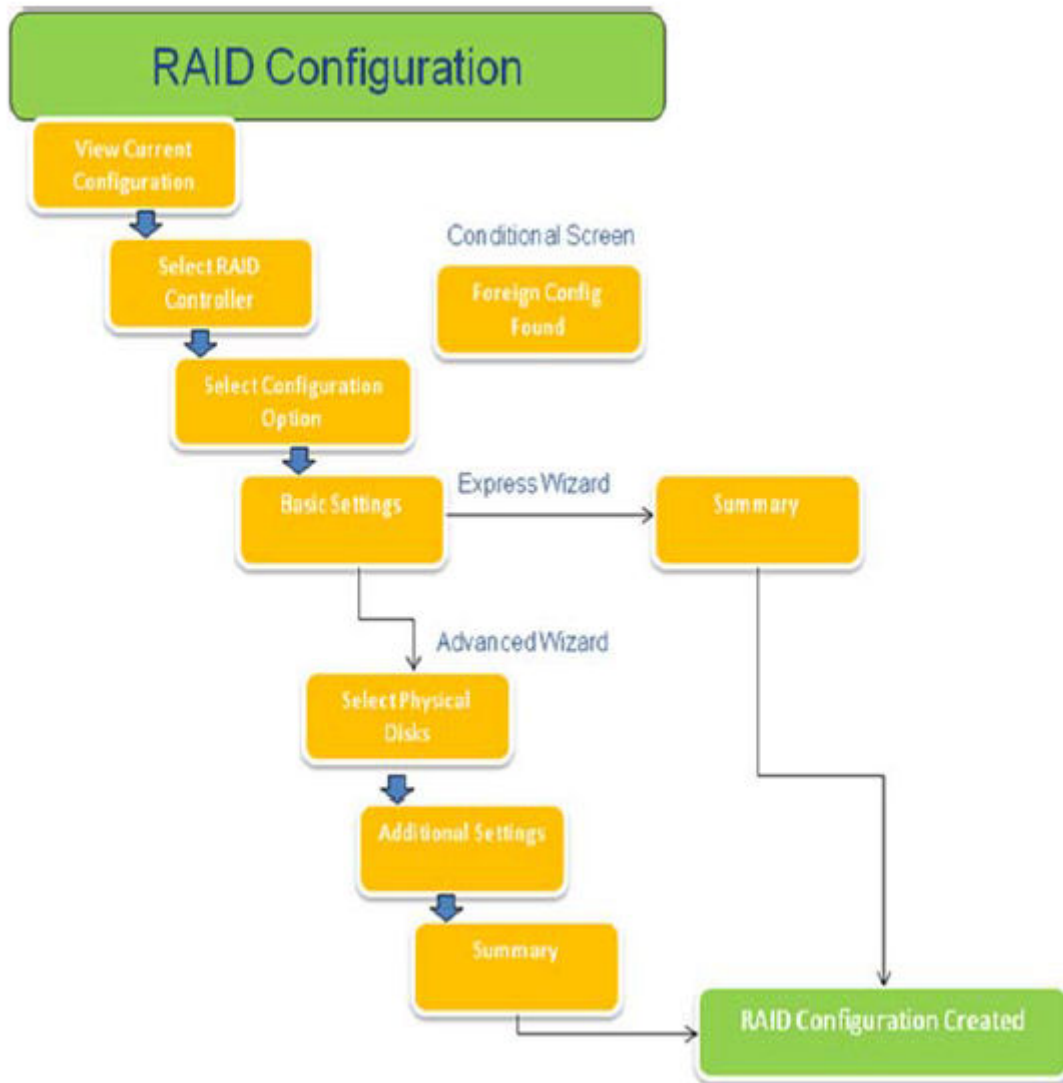


Figure 15. Flowchart of Unified Server Configurator's RAID configuration process

5. The Express option selects the appropriate disks depending upon the RAID type selected for virtual disk creation. The **Summary** screen is displayed. You can review the choices selected during the Express wizard.
6. Click **Finish** to create the virtual disk to be used for operating system installation.
7. The **Advanced** option takes you to a series of more screens. Select the RAID type on the **Basic Settings** screen. On the **Select Physical Disks** screen, select the physical disks that are the part of the virtual disk. The **Additional Settings** screen is displayed to define additional parameters for the virtual disk, such as stripe element size, read and write policy, and whether or not to assign a hot spare disk. The **Summary** of virtual disk attributes is displayed.
8. Click **Finish** to create virtual disk to be used for operating system installation.

Downloading and installing the RAID controller log export by using PERCCLI tool on ESXi hosts on Dell's 13th generation of PowerEdge servers

To export information about the status of the RAID controller and its attached hard drives, you can use the PERCCLI tool. To download and install the RAID controller log export by using PERCCLI tool on ESXi hosts on Dell's 13th generation of PowerEdge servers, perform the following steps:

Steps

1. Download the latest version of PERCCLI for ESX tool from www.dell.com/support.
2. To upload the PERCCLI tool to Datastore:
 - a. Select the **host** (1), and then click on the **Configuration** tab (2).
 - b. In the **Hardware** panel, select **Storage** (3) and right-click **datastore1**.

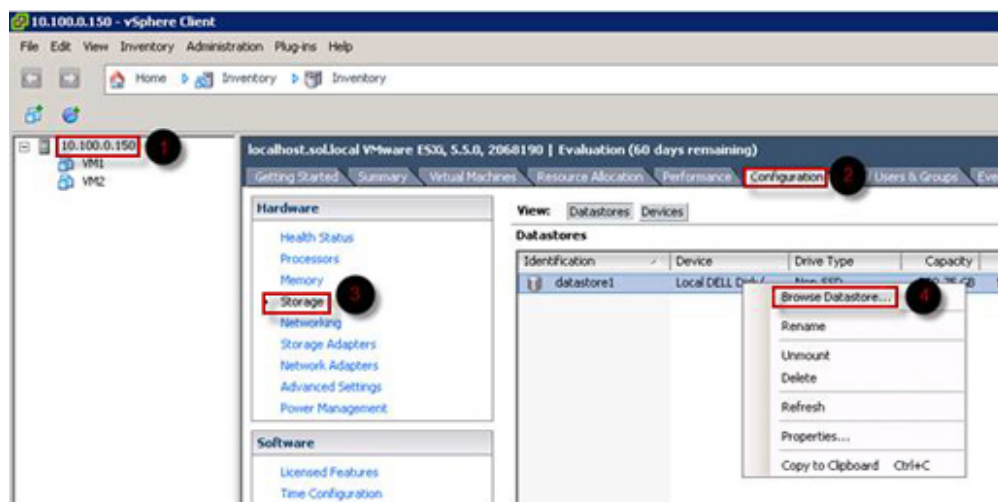


Figure 16. vSphere Client

- a. In **Datastore Browser**, click **Upload**, and then click **Upload File**.



Figure 17. Datastore Browser

3. To enable Secure Socket Shell (SSH) select **host** (1), and then click on the **Configuration** tab (2). In the **Software** panel, select **Security Profile** (3). In **Services**, click **Properties** (4) at the upper-right corner of the screen.

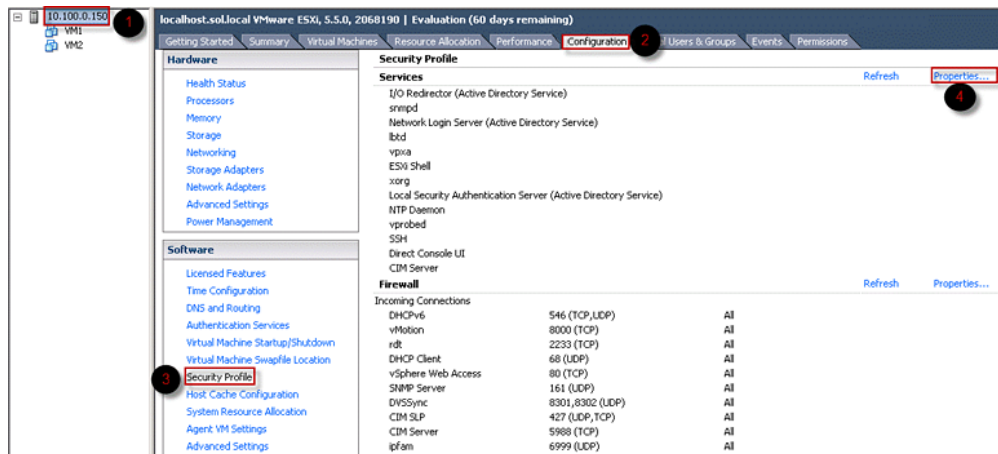


Figure 18. Configuration tab

- a. In the **Services properties** window, select **SSH** (1), and then click **Options...** (2)

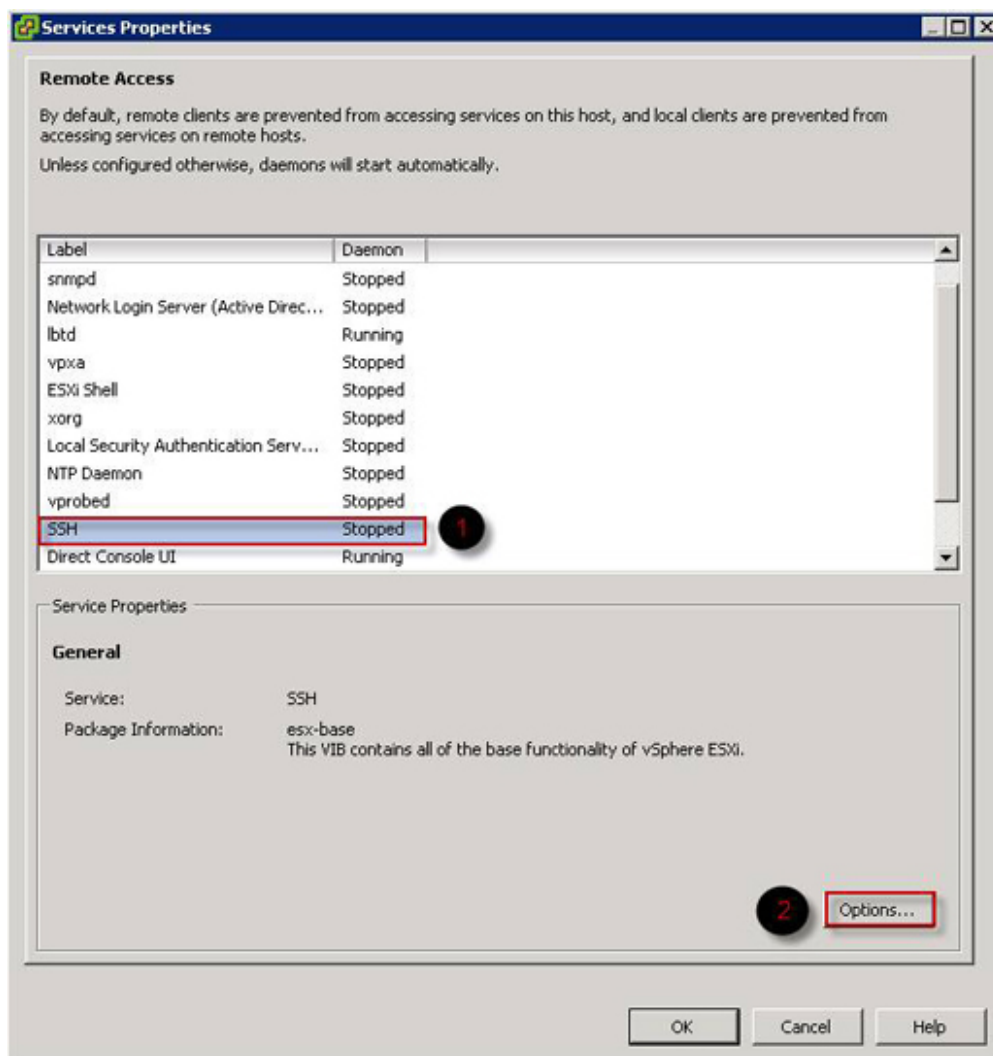


Figure 19. Open SSH Options

- b. In the **SSH Options** window, click **Start** (1), and then click **OK** (2) to activate the service.

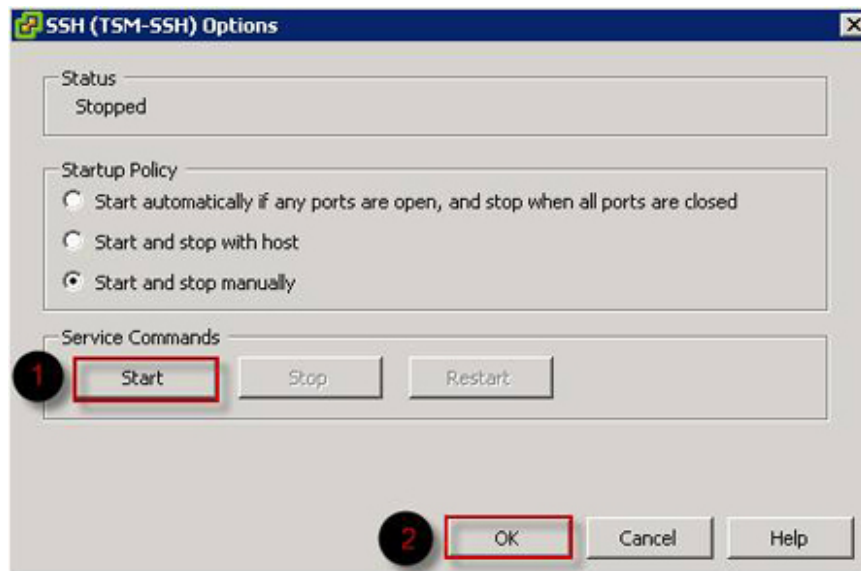


Figure 20. Start SSH Service

4. To unzip vmware-esx-perccli, open an SSH connection via PUTTY and run the command: `unzip /vmfs/volumes/datastore1/vmware-esx-perccli-1.05.08.zip`

PUTTY is a free and open-source terminal emulator, serial console and network file transfer application. It supports several network protocols, including SCP, SSH, Telnet, rlogin, and raw socket connection. You can download it from Google. The files vmware-esx-perccli-1.05.08.vib and Readme.txt are now extracted to: /vmfs/volumes/datastore1/

WARNING: Please check the correct path (e.g. datastore1) according to your installation package

5. Install PERCCLI by using command: `esxcli software vib install -v /vmfs/volumes/datastore1/vmware-esx-perccli-1.05.08.vib --no-sig-check`

```
10.100.5.101 - PuTTY
~ # vmware -v1
VMware ESXi 5.5.0 build-2068190
VMware ESXi 5.5.0 Update 2
~ # esxcli hardware platform get
Platform Information
  UUID: 0x4c 0x4c 0x45 0x44 0x0 0x4a 0x50 0x10 0x80 0x4a 0xc3 0xc0 0x4f 0x33 0x
34 0x32
  Product Name: PowerEdge R430
  Vendor Name: Dell Inc.
  Serial Number: CJPJ342
  IPMI Supported: true
~ # esxcli software vib install -v /vmfs/volumes/datastore1/vmware-esx-perccli-1
.05.08.vib --no-sig-check
Installation Result
  Message: Operation finished successfully.
  Reboot Required: false
  VIBs Installed: LSI_bootbank_vmware-esx-perccli-1.05.08_1.05.08-01
  VIBs Removed:
  VIBs Skipped:
~ #
```

Figure 21. Install PERCCLI

6. Go to directory /opt/lsi/perccli by using command: `cd /opt/lsi/perccli`

7. Collect the logs by using command: `./perccli /c0 show termlog`

The log is created with the name: **#### MegaSAS.log**

```

10.100.5.101 - PuTTY
000000 00000000 c20d0800
06/15/15 16:43:08: CO:C0330BCC: c0081800 00000001 ffffffff ffffffff 00000000 000
000000
06/15/15 16:43:08: C1:initFreeDBs=xorPool c0078000-c0081800 genPool c0041c00-c0
051c00 runTime 1 numXorDdb 40 numCipherDdb =200
06/15/15 16:43:08: C1:initBladeSGL c0051c00-c0078000 runTime 1 numSglFrame 4c8
06/15/15 16:43:08: C1:initBladeSgl: FreeHead:c0051c00 FreeTail:c0077f80
06/15/15 16:43:08: CO:Completing FW_RAID_MAP cmd
06/15/15 16:43:08: CO:ldIsFPCapable: LD 00 disabled reason LD properties
06/15/15 16:43:08: CO:ld sync: all LDs sync'd
06/15/15 16:43:08: CO:Completing FW_RAID_MAP cmd
06/15/15 16:43:08: CO:ldIsFPCapable: LD 00 disabled reason LD properties
06/15/15 16:47:40: CO:I2C 4 TXFifo has data on entry
06/15/15 17:18:16: CO:I2C 4 TXFifo has data on entry
06/15/15 17:18:17: CO:I2C 4 reset!
06/15/15 17:18:17: CO:I2C 4 cannot find idle bus!
06/15/15 17:18:17: CO:I2C 4 ILLEGAL CMD! intStatus 00000108
Controller = 0
Status = Success
Description = None

/opt/lsi/perccli # wc -l MegaSAS.log
14262 MegaSAS.log
/opt/lsi/perccli #

```

Figure 22. Log creation

8. Copy MegaSAS.log to datastore by using command: `cp /opt/lsi/perccli/MegaSAS.log /vmfs/volumes/datastore1/`
9. Copy the file to desktop with **Datastore Browser**.

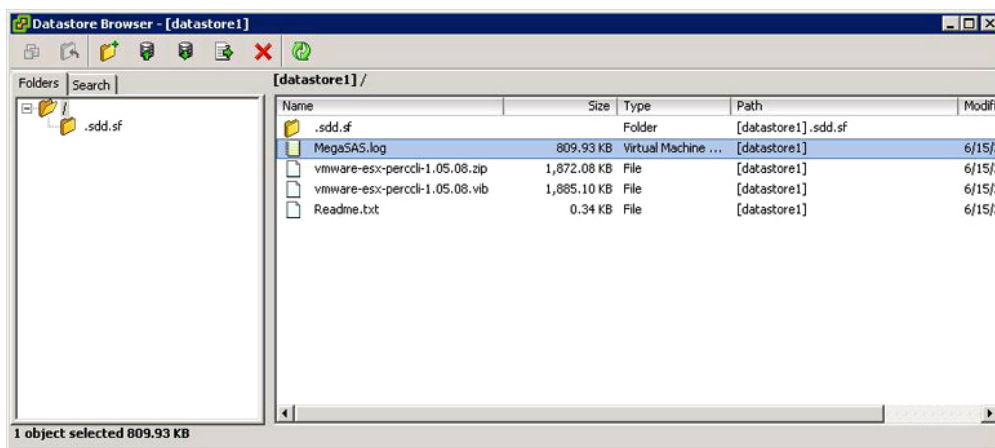


Figure 23. Log file in Datastore Browser

Now the logs are exported on ESXi hosts on the Dell 13th generation PowerEdge servers.

Configuring RAID by using Lifecycle Controller

Prerequisites

If your system has one or more supported PERC RAID controllers with PERC 8 firmware or later, or software RAID controllers, use the RAID Configuration wizard to configure a virtual disk as the boot device.

NOTE: Create boot virtual disk only from a disk drive populated across slots 0–3 of the system. For slot information, see the server Owner's Manual at www.dell.com/poweredgemanuals.

Steps

1. Launch the **Lifecycle Controller** home page, click **Hardware Configuration**, and then click **Configuration Wizards**. The **Configuration Wizards** window is displayed.
2. In **Storage Configuration Wizards**, click **RAID Configuration**.

3. Select the RAID controller to view its current virtual disk configuration and disk attributes. Click **Next**.
4. Select the RAID level for the virtual disk that you want to create and click **Next**.
5. On the **Select Physical Disks** screen, the default values for **Protocol**, **Media Type**, and **Encryption capability** are displayed.
6. Select the required physical disks that you want to include in the virtual disk, and then click **Next**.
7. On the **Virtual Disk Attributes** screen, type the virtual disk name.
 **NOTE:** The virtual disk name should not contain any space or special characters.
8. Type the size of the physical disk.
The values for **Stripe Element Size**, **Read Policy**, and **Write Policy** are displayed by default.
9. If you want to change the values for **Stripe Element**, **Read Policy** and **Write Policy**, select the required values from the respective drop-down lists.
The **Summary** of virtual disk attributes is displayed.
10. Click **Finish**.
11. On the **RAID Configuration Warning** window, click **Yes** if you wish to continue with the creation of virtual disk.
The **RAID Configuration window** is displayed. Note that this operation might take approximately one minute to complete.
12. When the virtual disk is created successfully, the **RAID Configuration Success** window is displayed. Click **OK**.
You are taken to the **Hardware configuration** window. Click **Back** to go to the home page.
13. You can verify, if the RAID operation was successful by checking the events in the **Lifecycle Log**.
 - a. Click **View Lifecycle Log History**. The **View Lifecycle Log** window is displayed. Note that this operation might take few minutes.
 - b. On the **View Log History** page, you can verify if the RAID operation is successful. For more information about Dell Lifecycle controller, go to Dell.com/techcenter/LC.

For more information about the Dell Lifecycle Controller RAID Configuration video, go to <https://www.youtube.com/watch?v=JFPmeHNENV4>

Starting and target RAID levels for virtual disk reconfiguration and capacity expansion

Table 18. Possible scenarios for reconfiguring a virtual disk

Table 18. Possible scenarios for reconfiguring a virtual disk (continued)

Controller	Starting RAID Level	Target RAID Level	Comments
Adapter, PERC FD33xD/ FD33xS			RAID 6 requires a minimum of 4 disks.
	RAID 6	RAID 0, RAID 5	With or without adding additional disks
	RAID 6	RAID 6	Add at least one additional disk
	RAID 10	RAID 10	Without adding additional disks
SAS 6/iR	N/A	N/A	N/A
PERC S100, S110, S130, and S300	RAID 0	RAID 0	With or without additional disks
	RAID 1	RAID 1	Without additional disks
	RAID 5	RAID 5	With or without additional disks
	RAID 10	RAID 10	Without additional disks

- NOTE:** The order of the controllers displayed on Storage Management may differ from the order of the controllers displayed in the Human Interface (HII) and PERC Option ROM. The order of the controllers does not cause any limitation.
- NOTE:** When creating virtual disks using software RAID controllers, the information related to the physical disks linked to the virtual disk is enumerated or displayed on Storage Management after a short delay. This delay in displaying the information does not cause any functional limitation. If you are creating partial virtual disks, Dell recommends that you provide Storage Management adequate time between each partial virtual disk creation process.
- NOTE:** RAID 10 virtual disk reconfiguration operation is not supported with Intelligent Mirroring.

Replacing physical disks in RAID1 configuration

About this task

Perform the following steps to replace physical disks in RAID1 configuration:

Steps

1. In the **Virtual Disk Management** window, select **Virtual Disk #** and press the down-arrow key until Physical Disks are highlighted.
2. Press the right-arrow key to expand the list of physical disks that are members of the virtual disk.
3. Press the down-arrow key and highlight the desired physical disk you want to replace. Press **<F2>** to expand the list of allowed operations on the disk.
4. Select **Replace**.
5. Select **Start**.
6. Press the down-arrow to highlight a replacement disk and then press the spacebar to select the disk.
7. Select **OK** to start the replacement.

NOTE: The replacement disk must be a hot spare or an unconfigured disk without a foreign configuration. It must have the same or greater capacity and should be of the same type as the disk it is replacing.

NOTE: Each physical disk in the RAID1 configuration should be replaced one by one.

Thumb rules for RAID configuration

The following are the thumb rules for RAID configuration:

- Both drives should be of same size.

- Both drives should be of same type.
- Both drives should run at same speed.

Reconfiguring or migrating virtual disks

About this task

Reconfiguring or migrating a virtual disk (VDs) enables you to increase the capacity or change the RAID level of the virtual disk.

NOTE: In the PERC BIOS Configuration Utility window, with software RAID S110 and S130 controllers, if a physical disk (supports SATA SSD or HDD and does not support SAS drives) is removed from a virtual disk and the same physical disk is reinserted (hot plug) into the virtual disk instantly, then the virtual disk state is displayed as Ready or Non RAID (for the PERC S110 and S100) and the physical disk state is displayed as Online. However, if the same physical disk is reinserted after a short delay, then the virtual disk state is displayed as Degraded and the physical disk state is displayed as Ready.

To reconfigure a virtual disk:

Steps

1. Review the information in the Starting and Target RAID Levels for Virtual Disk Reconfiguration and Capacity Expansion section in this document.
2. In the tree view, locate the controller on which the virtual disk resides. Expand the controller object until the **Virtual Disks** object is displayed.
3. Select the **Reconfigure** task from the virtual disk's **Tasks** drop-down list box and click **Execute**.
4. Complete the **Reconfigure** task using the Reconfigure wizard.

Starting and target RAID levels for virtual disk reconfiguration and capacity expansion

After you have created a virtual disk, the possibilities for reconfiguring the virtual disk depend on the controller, RAID level, and available physical disks.

Table 19. Possible scenarios for reconfiguring a virtual disk

Controller	Starting RAID Level	Target RAID Level	Comments
PERC 6/E, PERC 6/I, PERC H800 Adapter, PERC H700 Adapter, PERC H700 Integrated, and PERC H700 Modular, PERC H310 Adapter, PERC H310 Mini Monolithic, PERC H310 Mini Blades, PERC H710 Adapter, PERC H710 Mini Blades, PERC H710 Mini Monolithic, PERC H710P Adapter, PERC H710P Mini Blades, PERC H710P Mini Monolithic, PERC H810 Adapter, PERC H330 Adapter, PERC H330 Mini Monolithic, PERC H330 Mini Blades, PERC H330 Embedded, PERC H730 Adapter, PERC H730 Mini Monolithic, PERC H730 Mini Blades, PERC H730P Adapter, PERC H730P Mini Monolithic, PERC H730P Mini Blades, PERC H730P Slim, PERC H830 Adapter, PERC FD33xD/ FD33xS	RAID 0	RAID 1	Add a single disk
	RAID 0	RAID 0, RAID 5	Add at least one additional disk.
	RAID 0	RAID 6	RAID 6 requires a minimum of 4 disks. Reconfiguration from RAID 0 to RAID 6 requires at least 2 additional disks even when this exceeds the 4-disk minimum required by RAID 6
	RAID 1	RAID 0	With or without adding additional disks
	RAID 1	RAID 5, RAID 6	Add at least one additional disk. RAID 6 requires a minimum of 4 disks.
	RAID 5	RAID 0	With or without adding additional disks
	RAID 5	RAID 5, RAID 6	Add at least one additional disk. RAID 6 requires a minimum of 4 disks.

Table 19. Possible scenarios for reconfiguring a virtual disk (continued)

Controller	Starting RAID Level	Target RAID Level	Comments
	RAID 6	RAID 0, RAID 5	With or without adding additional disks
	RAID 6	RAID 6	Add at least one additional disk
	RAID 10	RAID 10	Without adding additional disks
SAS 6/iR	N/A	N/A	N/A
PERC S100, S110, S130, and S300	RAID 0	RAID 0	With or without additional disks
	RAID 1	RAID 1	Without additional disks
	RAID 5	RAID 5	With or without additional disks
	RAID 10	RAID 10	Without additional disks

-  **NOTE:** The order of the controllers displayed on Storage Management may differ from the order of the controllers displayed in the Human Interface (HII) and PERC Option ROM. The order of the controllers does not cause any limitation.
-  **NOTE:** When creating virtual disks using software RAID controllers, the information related to the physical disks linked to the virtual disk is enumerated or displayed on Storage Management after a short delay. This delay in displaying the information does not cause any functional limitation. If you are creating partial virtual disks, Dell recommends that you provide Storage Management adequate time between each partial virtual disk creation process.
-  **NOTE:** RAID 10 virtual disk reconfiguration operation is not supported with Intelligent Mirroring.

Foreign Configuration Operations

Foreign configuration is virtual disk data residing on physical disks that have been moved from one controller to another.

The **Foreign Configuration Operations** task provides a preview of the foreign configurations that you can import.

-  **NOTE:** On the PERC BIOS Configuration Utility screen, foreign configuration operations are not supported on PERC hardware controllers running in HBA mode.
-  **NOTE:** Foreign Configuration Operations task is available only on PERC 6 and SAS controllers with firmware versions 6.1 and later.
-  **NOTE:** It is not recommended to remove an external enclosure cable while the operating system is running on the system. Removing the cable could result in a foreign configuration when the connection is re-established.

The **Foreign Configuration Operations** task is displayed only when a controller detects a foreign configuration. Select this option and click **Execute** to display the **Foreign Configuration Preview** page.

The **Foreign Configuration Preview** page provides a preview of the foreign disks and enables you to perform operations such as, importing, recovering, or clearing the foreign disks. You can also import or clear a locked foreign configuration.

If any foreign configurations that are locked by using **Local Key manager (LKM)** are detected, the associated **Encryption Key Identifier** is displayed prompting you to provide the corresponding passphrase to unlock the drives.

To avoid unlocking foreign configurations and to proceed to preview, import, or clear a foreign configuration that has not been locked, on the **PERC BIOS Configuration Utility Foreign Configuration** screen, click **Skip** or **Continue**.

If you do not want to import or clear the foreign configurations, or in case of loss of the associated passphrase of the corresponding **Encryption Key Identifier**, execute the **Instant Encrypt Erase** task for the physical disks.

 **CAUTION:** Executing the Instant Encrypt Erase task erases all data on the physical disk.

Some conditions, such as an unsupported RAID level or an incomplete disk group, can prevent the import or recovery of foreign virtual disks.

Foreign Configuration properties

The following table describes the properties that are displayed on the **PERC BIOS Configuration Utility Foreign Configuration** screen for the Foreign Disks and Global Hot Spares.

Table 20. Memory channels

Property	Definition
Status	These icons represent the severity or health of the storage component.  — Normal/OK  — Warning/Non-critical  — Critical/Failure/Error
Name	Displays the name of the foreign configuration and is available as a link. This link enables you to access the physical disks that constitute the foreign disk.
State	Displays the current state of the foreign configuration. Possible values are: Ready — The foreign disk can be imported and functions normally after import. Degraded — The foreign disk is in degraded state and rebuilds after import. Failed — The foreign disk has encountered a failure and is no longer functioning. You cannot import the foreign configuration. The foreign configuration may be in degraded or failed state due to any of the following reasons: - Missing physical disk — One of the physical disk(s) in the potential virtual disk is missing or not available. - Missing span — One or more spans of a hybrid virtual disk is missing. - Stale physical disks — One or more physical disks in the configuration may contain out-of-date data relating to other disks of that virtual disk. Hence, the data integrity of the imported virtual disk is not intact. - Unsupported configuration of the virtual disk — The virtual disk has an unsupported RAID level. - Import and Export — The virtual disks available for import exceed the number of virtual disks available for export. - Incompatible physical disks — Configuration on the physical disks is not recognized by the RAID firmware. - Orphan drive — A physical disk in the foreign configuration has configuration information that matches another physical disk that is already a part of an array (either a foreign or a native array).
Layout	Displays the RAID level of the foreign configuration.
Remarks	Provides information about the foreign virtual disk. If the virtual disk cannot be imported, the reason for failure is displayed. - Exceeded maximum — The number of virtual disks selected for import has exceeded the maximum number of supported disks. - Missing physical disk or Missing span — One or more physical disk(s) or span(s) in the virtual disk to be imported is missing. - Unsupported — The selected RAID level is not supported on this controller. - Orphan drive — The physical disk has been replaced and is no longer a part of the RAID volume. The configuration should be cleared. - Stale physical disk — The physical disk to be imported in the virtual disk has outdated data. - Partially foreign — The virtual disk is part of an already existing configuration. Some physical disks in this virtual disk are foreign.

Table 20. Memory channels (continued)

Property	Definition
Dedicated Hot Spare	Displays whether the foreign disk is a dedicated hot spare.

Based on the properties information, you can decide whether you want to import, recover, or clear the foreign configuration.

Viewing Patrol Read report

The patrol read report provides information on all the patrol reads performed on the controller in the chronological order. It provides information such as last run time and result. If a patrol read fails, the reason for the failure is displayed.

Setting Patrol Read mode

 **NOTE:** This task is not supported on PERC hardware controllers running in HBA mode.

Patrol read identifies disk errors in order to avoid disk failures and data loss or corruption. The **Set Patrol Read** task is applicable only for disks used as virtual disks or hot spares.

The **Set Patrol Read** task runs in the background and corrects the disk errors, when possible. When the **Set Patrol Read mode** is set to **Auto**, patrol read is initiated when the controller is idle for a specific period of time and when no other background tasks are active. In this scenario, the patrol read enhances the system performance as disk errors can be identified and corrected when there is no input/output activity on the disk.

The controller adjusts the amount of system resources dedicated for patrol read based on the amount of controller activity that is competing with the Patrol Read task. When the controller activity is high, fewer system resources are dedicated to the patrol read task.

Patrol Read does not run on a physical disk in the following circumstances:

- The physical disk is not included in a virtual disk or is assigned as a hot spare.
- The physical disk is included in a virtual disk that is currently undergoing one of the following:
 - Rebuild
 - Reconfiguration or reconstruction
 - Background initialization
 - Check consistency

In addition, the Patrol Read is suspended during heavy I/O activity and resumes when the I/O is finished.

To set Patrol Read mode, select the desired Patrol Read Mode option. The options available are:

- **Auto** — Initiates the Patrol Read task. After the task is complete, it automatically runs again within a specified period. For example, on some controllers the Patrol Read runs every four hours and on other controllers, the Patrol Read runs every seven days. The Patrol Read task runs continuously on the system starting again within the specified period after each iteration of the task completes. If the system reboots while the Patrol Read task is running in **Auto** mode, the Patrol Read restarts at zero percent (0%). When the Patrol Read task is set to **Auto** mode, you cannot start or stop the task. **Auto** mode is the default setting.

 **NOTE:** For more information on how often the Patrol Read task runs when in Auto mode, see your controller documentation.

- **Manual** — Enables you to start and stop the Patrol Read task using **Start and Stop Patrol Read**. Setting the mode to **Manual** does not initiate the Patrol Read task. If the system reboots while Patrol Read is running in **Manual** mode, Patrol Read does not restart.
- **Disabled** — Prevents the Patrol Read task from running on the system.

To set Patrol Read mode

Select the desired Patrol Read Mode option. The options available are:

- **Auto** — Initiates the Patrol Read task. After the task is complete, it automatically runs again within a specified period. For example, on some controllers the Patrol Read runs every four hours and on other controllers, the Patrol Read runs every seven days. The Patrol Read task runs continuously on the system starting again within the specified period after each iteration of the task completes. If the system reboots while the Patrol Read task is running in **Auto** mode, the Patrol Read restarts at zero percent (0%). When the Patrol Read task is set to **Auto** mode, you cannot start or stop the task. **Auto** mode is the default setting.

 **NOTE:** For more information on how often the Patrol Read task runs when in Auto mode, see your controller documentation.

- **Manual** — Enables you to start and stop the Patrol Read task using **Start and Stop Patrol Read**. Setting the mode to **Manual** does not initiate the Patrol Read task. If the system reboots while Patrol Read is running in **Manual** mode, Patrol Read does not restart.

- **Disabled** — Prevents the Patrol Read task from running on the system.

Check Consistency report

The check consistency report provides information on all the consistency checks performed on the controller in a chronological order. It provides information such as last run time and result. If the consistency check fails, it provides the reason for the failure.

Performing a Check Consistency

The **Check Consistency** task verifies the accuracy of the redundant (parity) information. This task only applies to redundant virtual disks. When necessary, the **Check Consistency** task rebuilds the redundant data. If the virtual disk is in a Failed Redundancy state, running a check consistency may return the virtual disk to a Ready state.

Performing Check Consistency using OMSA

The link below provides information on how to perform Check Consistency using OpenManage Server Administrator (OMSA):

<http://www.dell.com/support/article/us/en/04/sln156918/perc-how-to-perform-a-check-consistency-using-openmanage-server-administrator?lang=en>

Canceling a Check Consistency

The Cancel Check Consistency task stops a check consistency operation while it is in progress.

Pausing a Check Consistency

The Pause Check Consistency task pauses a check consistency while it is in progress.

 **NOTE:** The Pause Check Consistency task updates the virtual disk State property to Resyncing Paused immediately. The Progress property may continue to increment for up to three seconds. This time delay occurs because the polling task may take up to three seconds to query the task information and update the display.

Resuming a Check Consistency

The Resume Check Consistency task resumes check consistency after it has been paused.

To locate view Check Consistency report in Storage Management:

1. In the **Server Administrator** window, under the system tree, click **Storage**.
2. Select **View Check Consistency Report** from the **Select Report** drop-down menu.
3. Click **Execute**.

To locate view Check Consistency report in Storage Management

Steps

1. In the **Server Administrator** window, under the system tree, click **Storage**.
2. Select **View Check Consistency Report** from the **Select Report** drop-down menu.
3. Click **Execute**.

Virtual disk troubleshooting

Rebuilding of virtual disk does not work

Rebuilding of virtual disk does not work in the following situations:

- The virtual disk is non redundant — For example, a RAID 0 virtual disk cannot be rebuilt because RAID 0 does not provide data redundancy.
- There is no hot spare assigned to the virtual disk — As long as the virtual disk is redundant, to rebuild it:
 - Remove the failed physical disk and replace it. A rebuild automatically starts on the new disk.
 - Assign a hot spare to the virtual disk and then perform a rebuild.
- You are attempting to rebuild onto a hot spare that is too small — Different controllers have different size requirements for hot spares.

- The hot spare is unassigned from the virtual disk — This occurs on some controllers if the hot spare is assigned to more than one virtual disk and is being used to rebuild a failed physical disk for another virtual disk.
- The virtual disk includes failed or corrupt physical disks — This situation may generate alert 2083. For information on alert messages, see the *Server Administrator Messages Reference Guide* at **Dell.com/support/home**.
- The rebuild rate setting is too low — If the rebuild rate setting is quite low and the system is processing a number of operations, then the rebuild may take an unusual amount of time to complete.
- The rebuild is canceled — Another user can cancel a rebuild that you have initiated.

Rebuilding of virtual disk completes with errors

About this task

A rebuild completes with errors when a portion of the disk containing redundant (parity) information is damaged. The rebuild process can restore data from the healthy portions of the disk but not from the damaged portion.

When a rebuild is able to restore all data except data from damaged portions of the disk, it indicates successful completion while also generating alert 2163. For information about the event and error messages generated by the system firmware and agents that monitor system components, see the Error Code Lookup page at qrl.dell.com

The rebuild may also report sense key errors. In this situation, take the following actions to restore the maximum data possible:

Steps

1. Back up the degraded virtual disk onto a fresh (unused) tape drive.
 - If the backup is successful — If the backup completes successfully, then the user data on the virtual disk has not been damaged. In this case, you can continue with step 2.
 - If the backup encounters errors — If the backup encounters errors then the user data has been damaged and cannot be recovered from the virtual disk. In this case, the only possibility for recovery is to restore from a previous backup of the virtual disk.
2. Perform Check Consistency on the virtual disk that you have backed up onto a tape drive.
3. Restore the virtual disk from the tape drive onto healthy physical disks.

Cannot create a virtual disk

You may be attempting a RAID configuration that is not supported by the controller. Check the following:

- How many virtual disks already exist on the controller? Each controller supports a maximum number of virtual disks.
- Is there adequate available space on the disk? The physical disks that you have selected for creating the virtual disk must have an adequate amount of free space available.
- The controller may be performing other tasks, such as rebuilding a physical disk, that must run to completion before the controller can create the new virtual disk.

A virtual disk of minimum size is not visible to Windows Disk Management

If you create a virtual disk using the minimum allowable size in Storage Management, the virtual disk may not be visible to Windows Disk Management even after initialization. This occurs because Windows Disk Management is only able to recognize extremely small virtual disks if they are dynamic. It is advisable to create virtual disks of larger size when using Storage Management.

Virtual disk errors on systems running Linux

About this task

On some versions of the Linux operating system, the virtual disk size is limited to 1TB. If you create a virtual disk that exceeds the 1TB limitation, your system may experience the following behavior:

- I/O errors to the virtual disk or logical drive.
- Inaccessible virtual disk or logical drive.
- Virtual disk or logical drive size is smaller than expected.

If you have created a virtual disk that exceeds the 1TB limitation, you must:

Steps

1. Back up your data.
2. Delete the virtual disk.
3. Create one or more virtual disks that are smaller than 1TB.
4. Restore your data from backup.

Irrespective of whether your Linux operating system limits the virtual disk size to 1TB, the virtual disk size depends on the version of the operating system and any updates or modifications that you have implemented. For more information on operating system, see your operating system documentation.

Problems associated with using the same physical disks for both redundant and nonredundant virtual disks

When creating virtual disks, you should avoid using the same physical disks for both redundant and nonredundant virtual disks. This applies to all controllers. Using the same physical disks for both redundant and nonredundant virtual disks can result in unexpected behavior including data loss.

 **NOTE: SAS controllers do not allow you to create redundant and nonredundant virtual disks on the same set of physical disks.**

Enable the alarm on PERC 5/E adapter to alert in case of physical disk failures

The PERC 5/E adapter uses an audible alarm to alert you to key critical and warning events involving the virtual disks or physical disks. You can use the BIOS Configuration Utility to enable or disable the on-board alarm tone.

About this task

To enable the alarm in the BIOS Configuration Utility, do the following:

Steps

1. Press Ctrl+N to access the **Ctrl Mgmt** menu screen.
2. Press Tab in the **Settings** box to move the cursor to **Enable Alarm**.
3. Press the spacebar to select **Enable Alarm**.
An **X** displays next to **Enable Alarm**.
4. Press Tab to move the cursor to the **Apply** button, and then press Enter to apply the selection.

The alarm is enabled.

To disable the alarm, use the spacebar to deselect the **Enable Alarm** control, and then select **Apply**.

RAID controller displays multibit ECC errors

About this task

Description: RAID controller displays multibit ECC errors on Dell's 13th generation of PowerEdge servers

Workaround:

Steps

1. Update the controller driver version.
2. Clear the ESM logs.
3. Restart the system.

PERC goes offline with an error message

Issue: PERC goes offline with the following error: Communication with chassis Integrated Controller has been lost.

Corrective action: To resolve the issue, upgrade the following firmware to the latest version. Installation instructions are provided in the link:

CMC firmware:

<http://www.dell.com/support/home/drivers/DriversDetails?productCode=poweredge-vrtx&driverId=6W6P1>

Chassis infrastructure firmware:

<http://www.dell.com/support/home/drivers/DriversDetails?productCode=poweredge-vrtx&driverId=CPMVM>

SPERC firmware:

<http://www.dell.com/support/home/drivers/DriversDetails?productCode=poweredge-vrtx&driverId=THVJ9>

SPERC driver:

<http://www.dell.com/support/home/drivers/DriversDetails?productCode=poweredge-vrtx&driverId=120MK>

Reconfiguring the RAID level and virtual disks

An online virtual disk can be reconfigured in ways that expand its capacity and/or changes its RAID level. For more information, go to [Changing the RAID level on PowerEdge server](#).

Lost shared storage access

Issue: Lost shared storage access.

Corrective action: Update the system's driver and firmware to the latest version. Order of updates should be:

- CMC
- iDRAC/LCC
- BIOS
- PERC
- SPERC
- VRTX mainboard
- NIC driver
- NIC firmware
- Switch firmware

The following links contain the system drivers and firmware for VRTX:

VRTX chassis infrastructure firmware bundle: <http://www.dell.com/support/home/us/en/19/drivers/driversdetails?driverId=CPMVM>

VRTX drivers and downloads website: <http://www.dell.com/support/home/us/en/19/product-support/product/poweredge-vrtx/drivers>

Troubleshooting memory or battery errors on the PERC controller on Dell PowerEdge servers

Interpreting LCD and Embedded Diagnostic event messages

Issue: The server LCD presents a error message, or an error message is generated when running the Enhanced Pre-Boot System Assessment (ePSA).

Solution: For information about the event and error messages generated by the system firmware and agents that monitor system components, see the Error Code Lookup page at qrl.dell.com.
The Event Message Reference contains the error and event information generated by firmware and other agents that monitor system components. These events might be logged and displayed on one of the system management consoles, or both logged and displayed.

 **NOTE:** To run the Embedded System Diagnostics (also known as Enhanced Pre-Boot System Assessment):

1. As the system boots, press F11.
2. Use the up-and-down arrows keys to select System Utilities > Launch Dell Diagnostics.

Troubleshooting conditions that lead to error message

NOTE: Troubleshooting the associated events may also prevent the error message from occurring. Error message can occur normally when one of the following conditions occur.

- OS indicates abnormal shutdown.
- OS indicates error occurred (blue screen occurred in Windows).
- Spontaneous power loss condition.

Try the following troubleshooting steps:

- Reboot to OS

If the OS boot is successful, rebooting again should result in no message being displayed.
- Clear Controller Cache
 - Ctrl + M for SCSI controllers (PERC 3, PERC 4).
 - Ctrl + R for SAS/SATA controllers (PERC 5, PERC 6 and newer controllers).
 - Wait for five minutes to allow contents of cache to purge.
 - Reboot back to controller BIOS.
 - If error is eliminated, boot to OS.
 - If OS boot is still not successful and/or the error persists, this may indicate a problem with the OS. Contact Technical Support for further troubleshooting steps.
- Check the Physical PERC Controller.
 1. Inspect the DIMM and DIMM Socket for Damage.
 - a. Turn off the system and remove the power cable(s) from the system.
 - b. Let the system sit for 30 seconds to allow any remaining flea power to drain.
 - c. Remove the PERC controller. For information about removing and replacing parts in this system, refer to the user guide located at www.dell.com/poweredge manuals.
 - d. Remove the RAID memory battery. Ensure to reinstall the memory battery after inserting the DIMM.
 - e. Remove the memory DIMM from the controller, if applicable.
 - f. Check DIMM socket for any bent pins or other damage. Check the edge connector of the memory DIMM for any damage.
 2. If the controller has embedded memory or the memory socket is damaged, contact Dell Technical Support.
 3. If the memory is damaged, the controller memory may need to be replaced, contact Dell Technical Support.
 4. If there is no damage, replace the memory DIMM and reinstall the controller.
 5. Swap the controller memory a with known good memory, if possible.
 - a. If there is no known good memory available, contact Dell Technical Support.
 - b. If the error does not occur with the known good memory, contact Dell Technical Support.
 - c. If the error remains with a known good memory, contact Dell Technical Support.

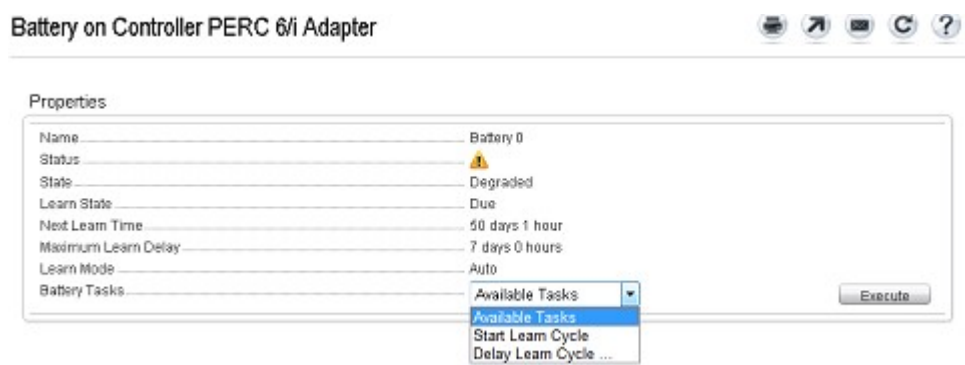
NOTE: If error persists, the likelihood of a hardware error is increased. Contact Dell Technical Support for further troubleshooting steps.

Additional information for troubleshooting memory or battery errors on the PERC controller

A RAID Controller error message is displayed during POST to indicate that the controller's cache does not contain all of the expected information, or it contains data destined for a hard drive that cannot be or has not been written to the drive. The most common reasons why this error may occur are:

- Server did not perform a normal shutdown process – Power loss and/or spontaneous restarts can result in incomplete or corrupted data to remain in cache that cannot be written to a drive.
- Cache memory is defective – Bad cache memory can cause data to become corrupted. This can cause OS-related issues and spontaneous reboots.
- Loss of battery power while server is shutdown – Controllers that do not use NVCACHE (Non-Volatile Cache) memory utilize batteries that can retain the contents of cache for a limited time (24-72 hours) while the server is not powered on. Once the battery drains, the entire contents of cache is lost and the controller recognizes that the cache memory does not contain all of the information expected. Controllers that do utilize NVCache (some H700/H800 controllers and newer controllers such as H710, H710P, H810) are very unlikely to encounter this issue since the battery only needs to maintain power for 30 seconds or less in most cases.
- PERC Battery Maintenance

A PERC battery that is suspected to have failed or has a warning symbol displayed in OpenManage Server Administrator should have a manual Learn Cycle performed. A Learn Cycle causes the battery to discharge and recharge, and restores the battery to a fully functional condition. In some cases, multiple Learn Cycle procedures may be required to restore the battery to an effectively charged state. To perform a manual Learn Cycle, select **Start Learn Cycle** from the **Battery Tasks** drop-down menu in Open Manage Server Administrator (OMSA).



- Cache Use

Hardware RAID controllers utilize cache (a temporary repository of information) for their normal operation. The normal operation cache comprises DRAM memory, which, like system memory, retains data only when powered on.

Newer controllers utilize NVCache, which is utilized when the server is powered off. NVCache memory contains both DRAM memory (for normal operation) and flash memory (non-volatile). The controllers battery (if operational) powers the DRAM memory during a power loss so that the contents can be copied into the flash memory for indefinite storage.

The contents of cache can essentially be broken into three parts:

- RAID configuration and metadata - Information about the RAID arrays including configuration information, disk members, role of disks, etc.
- Controller logs - RAID controllers maintain several log files. Dell technicians rely on the TTY log as the primary log for troubleshooting various RAID and hard drive issues.
- RAID data - This is the actual data destined to be written to the individual hard drives. Data is written into the cache of the controller in both Write Through and Write Back cache policy modes.

Slicing

Configuring multiple RAID arrays across the same set of disks is called Slicing.

RAID puncture

A RAID puncture is a feature of Dell PowerEdge RAID Controller (PERC) designed to allow the controller to restore the redundancy of the array despite the loss of data caused by a double fault condition. Another name for a RAID puncture is rebuild with errors. When the RAID controller detects a double fault and there is insufficient redundancy to recover the data in the impacted stripe, the controller creates a puncture in that stripe and enables the rebuild to continue.

- Any condition that causes data to be inaccessible in the same stripe on more than one drive is a double fault.
- Double faults cause the loss of all data within the impacted stripe.
- All RAID punctures are double faults but all double faults are NOT RAID punctures.

Causes of RAID puncture

Without the RAID puncture feature, the array rebuild would fail, and leave the array in a degraded state. In some cases, the failures may cause additional drives to fail, and cause the array to be in a non-functioning offline state. Puncturing an array has no impact on the ability to boot to or access any data on the array.

RAID punctures can occur in one of two situations:

- Double Fault already exists (Data already lost).
 - Data error on an online drive is propagated (copied) to a rebuilding drive.
- Double Fault does not exist (Data is lost when second error occurs).

While in a degraded state, if a bad block occurs on an online drive, that LBA is RAID punctured.

This advantage of puncturing an array is keeping the system available in production till the redundancy of the array is restored. The data in the affected stripe is lost whether the RAID puncture occurs or not. The primary disadvantage of this method is that while the array has a RAID puncture in it, uncorrectable errors will continue to be encountered whenever the impacted data (if any) is accessed.

A RAID puncture can occur in the following three locations:

- In blank space that contains no data. That stripe will be inaccessible, but since there is no data in that location, it will have no significant impact. Any attempts to write to a RAID punctured stripe by an OS will fail and data will be written to a different location.
- In a stripe that contains data that isn't critical such as a README.TXT file. If the impacted data is not accessed, no errors are generated during normal I/O. Attempts to perform a file system backup will fail to backup any files impacted by a RAID puncture. Performing a Check Consistency or Patrol Read operations will generate Sense code: 3/11/00 for the applicable LBA and/or stripes.
- In data space that is accessed. In such a case, the lost data can cause a variety of errors. The errors can be minor errors that do not adversely impact a production environment. The errors can also be more severe and can prevent the system from booting to an operating system, or cause applications to fail.

An array that is RAID punctured will eventually have to be deleted and recreated to eliminate the RAID puncture. This procedure causes all data to be erased. The data would then need to be recreated or restored from backup after the RAID puncture is eliminated. The resolution for a RAID puncture can be scheduled for a time that is more advantageous to needs of the business.

If the data within a RAID punctured stripe is accessed, errors will continue to be reported against the affected bad LBAs with no possible correction available. Eventually (this could be minutes, days, weeks, months, and so on), the Bad Block Management (BBM) Table will fill up causing one or more drives to become flagged as predictive failure. As seen in the figure, drive 0 will typically be the drive that gets flagged as predictive failure due to the errors on drive 1 and drive 2 being propagated to it. Drive 0 may actually be working normally, and replacing drive 0 will only cause that replacement to eventually be flagged predictive failure as well.

A Check Consistency performed after a RAID puncture is induced will not resolve the issue. This is why it is very important to perform a Check Consistency on a regular basis. It becomes especially important prior to replacing drives, when possible. The array must be in an optimal state to perform the Check Consistency.

A RAID array that contains a single data error in conjunction with an additional error event such as a hard drive failure causes a RAID puncture when the failed or replacement drive is rebuilt into the array. As an example, an optimal RAID 5 array includes three members: drive 0, drive 1 and drive 2. If drive 0 fails and is replaced, the data and parity remaining on drives 1 and 2 are used to rebuild the missing information on to the replacement drive 0. However, if a data error exists on drive 1 when the rebuild operation reaches that error, there is insufficient information within the stripe to rebuild the missing data in that stripe. Drive 0 has no data, drive 1 has bad data and drive 2 has good data as it is being rebuilt. There are multiple errors within that stripe. Drive 0 and drive 1 do not contain valid data, so any data in that stripe cannot be recovered and is therefore lost. The result as shown in Figure 3 is that RAID punctures (in stripes 1 and 2) are created during the rebuild. The errors are propagated to drive 0.

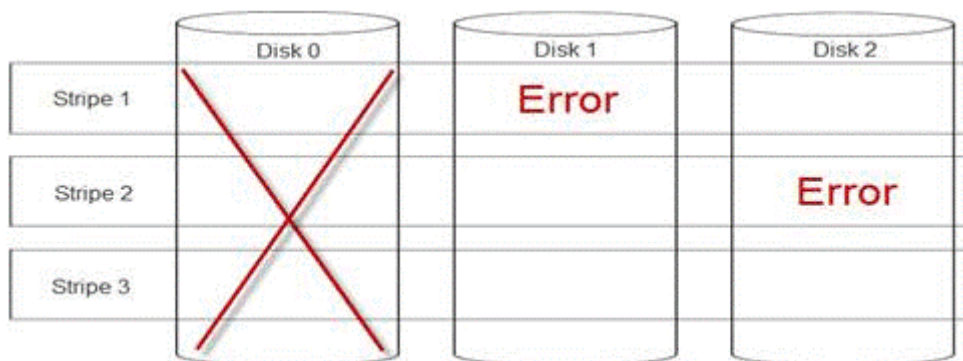


Figure 24. RAID punctures

Puncturing the array restores the redundancy and returns the array to an optimal state. This provides for the array to be protected from additional data loss in the event of additional errors or drive failures.

How to fix a RAID puncture

Issue: How to fix RAID arrays that have been subjected to a puncture?

Solution: Complete the following steps to resolve the issue:

⚠ WARNING: Following these steps will result in the loss of all data on the array. Ensure that you are prepared to restore from backup or other means prior to following these steps. Use caution so that following these steps does not impact any other arrays.

1. Discard Preserved Cache, if it exists.
2. Clear foreign configurations, if any.
3. Delete the array.
4. Shift the position of the drives by one.

Move Disk 0 to slot 1, Disk 1 to slot 2, and Disk 2 to slot 0.
5. Recreate the array as desired.
6. Perform a Full Initialization of the array (not a Fast Initialization).
7. Perform a Check Consistency on the array.

If the Check Consistency completes without errors, you can safely assume that the array is now healthy and the puncture is removed. Data can now be restored to the healthy array.

Preventing problems before they happen and solving punctures after they occur

Dell's RAID controllers contain a number of features to prevent many types of problems and to handle a variety of errors that do occur. The primary job of a RAID controller is to preserve the integrity of the data contained on its array(s). Even in the more extreme cases of damage (such as punctures), the array's data is often available and the server can remain in production. Part of any maintenance plan should be the proactive maintenance of the RAID arrays. Dell's RAID controllers are highly reliable and very good at managing its arrays without user intervention. Disregarding proper maintenance can cause even the most sophisticated technologies to experience problems over time. There are a number of things that can help maintain the health of arrays, and prevent the majority of data errors, double faults and punctures.

It is highly recommended to perform routine and regular maintenance. Proactive maintenance can correct existing errors, and prevent some errors from occurring. It is not possible to prevent all errors from occurring, but most serious errors can be mitigated significantly with proactive maintenance. For storage and RAID subsystems these steps are:

- Update drivers and firmware on controllers, hard drives, backplanes and other devices.
- Perform routine Check Consistency operations (Dell recommends every 30 days).
- Inspect cabling for signs of wear and damage and ensure good connections.
- Review logs for indications of problems.

This doesn't have to be a high level technical review, but could simply be a cursory view of the logs looking for extremely obvious indications of potential problems. Contact Dell Technical Support with any questions or concerns.

Troubleshooting thermal issue

Thermal issues can occur due to malfunctioning ambient temperature sensors, malfunctioning fans, dusty heat sinks, and malfunctioning thermal sensors and so on.

To resolve the thermal issues:

1. Check the LCD and Embedded System Management (ESM) logs for any additional error messages to identify the faulty component.
2. Ensure that airflow to the machine is not blocked. Placing it in an enclosed area or blocking the air vent, can cause it to overheat. If installed in a rack, ensure that the rack cooling system is working normally.
3. Check for the ambient temperature is within acceptable levels.
4. Check the internal system fans for obstructions and ensure that all fans are spinning properly. Swap any failing fans with a known-good fan for testing.
5. Ensure that all the required shrouds and blanks are installed.
6. Check if all the fans are functioning properly, the heat sink is installed correctly, and thermal grease is applied.

Input/Output errors while reseating SAS IOM storage sled on hardware configurations

Reseating SAS IOM/ storage sled on the following hardware configurations, setup as Failover clusters with shared storage and multi path enabled, results in IO errors. MX7000 chassis with compute nodes as cluster nodes and MX5016s sled for

shared storage 14G servers as cluster nodes with external Storage enclosures attached for shared storage

Prerequisites



CAUTION:

1. Take the back up of existing registry , refer <https://support.microsoft.com/en-in/help/322756/how-to-back-up-and-restore-the-registry-in-windows> MS link on how to take the registry back-up.
2. Failing to Enable these settings on Dell Servers which are configured for Failover Cluster with Shared Storage may lead to Cluster Shared Volume to go to failed state.

About this task

Recommended action for Windows Server 2016

Steps

1. Install Windows Update with KB4457127 or a latest Update package on all the nodes that are part of the cluster. Restart them to have the update enabled on the systems.
2. Create a registry key (Reg_DWORD) with the value "0x1" in the registry path "HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\StorPort\QoSFlags" on all the cluster nodes. Restart the cluster nodes to enable the registry key.

Recommended action for Windows Server 2019

3. Create a registry key (Reg_DWORD) with the value "0x1" in the registry path "HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\StorPort\QoSFlags" on all the cluster nodes. Restart all the cluster nodes to enable the setting.

Next steps

Proceed with the setup as planned post the above enablement. If the issue persists, contact Dell EMC [Global Technical Support](#) for further assistance.

Server management software issues

This section helps to manage software issues related to the server management.

Topics:

- What are the different types of iDRAC licenses
- How to activate license on iDRAC
- Can I upgrade the iDRAC license from express to enterprise and BMC to express
- How to find out missing licenses
- How to export license using iDRAC web interface
- How to set up e-mail alerts
- System time zone is not synchronized
- How to set up Auto Dedicated NIC feature
- How to configure network settings using Lifecycle Controller
- Assigning hot spare with OMSA
- Storage Health
- How do I configure RAID using operating system deployment wizard
- Foreign drivers on physical disk
- Physical disk reported as Foreign
- How to update BIOS on 13th generation PowerEdge servers
- Why am I unable to update firmware
- Which are the operating systems supported on Dell EMC PowerEdge servers
- Unable to create a partition or locate the partition and unable to install Microsoft Windows Server 2012
- JAVA support in iDRAC
- How to specify language and keyboard type
- Message Event ID - 2405
- Installing Managed System Software On Microsoft Windows Operating Systems
- Installing Managed System Software On Microsoft Windows Server and Microsoft Hyper-V Server
- Installing Systems Management Software On VMware ESXi
- Processor TEMP error
- PowerEdge T130, R230, R330, and T330 servers may report a critical error during scheduled warm reboots
- SSD is not detected
- OpenManage Essentials does not recognize the server
- Unable to connect to iDRAC port through a switch
- Lifecycle Controller is not recognizing USB in UEFI mode
- Guidance on remote desktop services

What are the different types of iDRAC licenses

There are three types of the iDRAC licenses:

- Basic Management — Basic Management which was earlier known as BMC, was the default iDRAC version for the 11th generation of the servers ranging between 200– 500 series.
- Express — iDRAC Express is the standard, default offering that is part of the base configuration for 600 series and above. It does not require license installation, back up, or license management. Express offers embedded tools, console integration, and simplified remote access.
 - Express for Blades — For the 12th and 13th generation blade servers, there is a new **Express for Blades** iDRAC version. It offers a single-user virtual console session and virtual media in addition to the standard Express offerings.
- Enterprise — There are two types of Enterprise licenses, based on the type and the duration.
 - Evaluation - This license is for a 30-day trial of certain features. It can be used on any system.

 **NOTE: This is not recommended for the production environment.**

- Perpetual - This license is valid for the life of the product. It does not expire and never needs to be renewed. It must be bound to only one service tag at a time.

For more information on the iDRAC licensing feature, see [En.community.dell.com/techcenter/extras/m/white_papers/20067892](https://en.community.dell.com/techcenter/extras/m/white_papers/20067892)

How to activate license on iDRAC

You can manage your licenses by creating your account and access **License Management** portal. It enables you to view your digital licenses, obtain a replacement license, or reassign licenses to different hardware.

To create an account:

- Go to www.dell.com/support/retail/lkm.
- Click **Create an Account**
- Enter the required information and click **Create Account**.
- Click **Sign In**, the end user license agreement is displayed.
- Review the **Dell Software License Agreement**, and click **Yes, I Agree** button. You are redirected to the License Management portal.

To activate the license:

- Log in to the License Management portal.
- Click **Activate Licenses** tab.
- To activate license, navigate to the license and click **Assign License**.

 **NOTE:** All the licenses must be associated with the asset. The **Activate Licenses** tab lists the licenses that must be bound to an asset.

For more information on the iDRAC licensing feature, see [En.community.dell.com/techcenter/extras/m/white_papers/20067892](https://en.community.dell.com/techcenter/extras/m/white_papers/20067892)

Can I upgrade the iDRAC license from express to enterprise and BMC to express

You can upgrade the iDRAC license from Express to Enterprise or BMC to either Express or Enterprise without having to open the box or install any hardware.

Request for the type of the iDRAC license you require by providing the service tag number of your server. Once you receive the license file in the .xml format, save it in your local drive to replace the license with the existing one.

To upgrade/ replace the existing license:

- Log in to the iDRAC web interface
- On the left navigation pane, click **Overview**, click **Server**, and then click **Licenses**.
- From the **License Options** drop-down list, select **Replace**. Click **Browse** to navigate to the local folder where the license file is saved.
- Select the license file and click **Open**.
- Click **Apply** to upgrade/ replace the new license file.

The purchase of a new PowerEdge server with iDRAC8 is the same as it was with iDRAC7. For the 600 series servers and above, all the hardware required for iDRAC Enterprise is on the motherboard. Not only does this eliminate the possibility of a card unseating during shipping, but it also allows for an upgrade if available. If Enterprise is ordered from Dell at point of sale on 200-500 series servers, the necessary hardware is installed in the factory. This piece of hardware is the Dell Ports card, which sits in a PCIe slot and has the RJ-45 connector for the Dedicated NIC and the slot for the vFlash SD card.

For more information on the iDRAC licensing feature, see [En.community.dell.com/techcenter/extras/m/white_papers/20067892](https://en.community.dell.com/techcenter/extras/m/white_papers/20067892)

How to find out missing licenses

If you misplace your original license and need to retrieve the original license, follow the steps to find out missing license:

- Log in to the License Management portal.
- Click **Manage Licenses** tab.

 **NOTE:** All the licenses must be associated with the asset. The **Manage Licenses** tab lists the licenses that are associated with an asset.

- To download license, navigate to the license and click **Get Key**. **Deliver My License Key** window is displayed.
- To download the license directly to your computer, select **Download** and then click **Submit**. Select **Email** if you want the license key on an email.

For more information on the iDRAC licensing feature, see [En.community.dell.com/techcenter/extras/m/white_papers/20067892](https://en.community.dell.com/techcenter/extras/m/white_papers/20067892).

How to export license using iDRAC web interface

To export the license using iDRAC web interface:

- Log in to the iDRAC web interface.
- On the left navigation pane of the **System Summary** screen, click **Licenses**.
- If you have a single license, you can initiate the license export process by directly navigating to the **License Options** drop-down list. If you have multiple licenses, expand the **Licenses** table and navigate to the particular license, and select **Export** from the **License Options** drop-down list.
- Save and click **OK**.

The license is exported successfully. Check your download folder to verify if the export license process is successful.

For more information on the iDRAC licensing feature, see [En.community.dell.com/techcenter/extras/m/white_papers/20067892](https://en.community.dell.com/techcenter/extras/m/white_papers/20067892)

How to set up e-mail alerts

You can set up an e-mail alert message which can be sent to one or more e-mail addresses. When iDRAC senses a platform event, such as an environmental warning or a component failure, an alert message is sent to a designated e-mail address.

To configure e-mail alerts:

- Log in to the iDRAC web interface.
- On the left pane, click **Alerts**.
- Click **SNMP and Email Settings** tab.
- Navigate to the **Destination the Email Addresses** section.
- Select the **State** field, enter the **Destination Email Addresses**, and click **Apply**.

 **NOTE:** Ensure that the platform event filters are configured before configuring the e-mail alert settings.

 **NOTE:** If the mail server is Microsoft Exchange 2007, you must configure the iDRAC domain name to receive alerts from the iDRAC.

System time zone is not synchronized

You can configure the time zone on iDRAC and synchronize the iDRAC time using Network Time Protocol (NTP) instead of BIOS or host system times. You must have Configure privilege to configure time zone or NTP settings.

About this task

To configure time zone and NTP using iDRAC web interface:

Steps

1. Go to **Overview > iDRAC Settings > Properties > Settings**.
The **Time zone and NTP** page is displayed.
2. To configure the time zone, from the **Time Zone** drop-down list, select the required time zone, and then click **Apply**.
3. To configure NTP, enable NTP, enter the NTP server addresses, and then click **Apply**.
For information about the fields, see *iDRAC Online Help*.

Next steps

To configure time zone and NTP, use the set command with the objects in the **iDRAC.Time** and **iDRAC.NTPConfigGroup** group.

For more information, see the *iDRAC 9 RACADM Command Line Interface Reference Guide* available at Dell.com/idracmanuals.

How to set up Auto Dedicated NIC feature

The **Auto Dedicated NIC** feature provides the option to automatically reroute the iDRAC management traffic for the scenarios such as connecting a crash cart or reconfiguring network cables. When this feature is enabled, iDRAC automatically and dynamically detects a system's network mode. It senses the system's network cable configuration and checks if a cable is connected to the system's dedicated NIC port.

This feature was made available with iDRAC7 starting with the firmware version 1.30.30 with an Enterprise license. For the Dell PowerEdge rack and tower servers of 600 series and above, the dedicated NIC port is standard on the system, but requires an iDRAC7 Enterprise license to enable the port. Dell PowerEdge rack and tower servers of series 500 and below comes with an add-in card if ordered with an Enterprise license at the point-of-sale. If an Enterprise license is purchased later than point-of-sale, the add-in card must also be purchased to have the dedicated NIC port.

 **NOTE:** This feature is not available on blade servers.

Enable the Auto Dedicated NIC feature using iDRAC web interface:

- Log on to the iDRAC7 web interface.
 -  **NOTE:** The system must have a valid Enterprise license.
- Click **Overview**, select **iDRAC Setting**, and then select **Network**.
- In the **Network Settings** section, select the **Auto Dedicated NIC**.

 **NOTE:** Auto Dedicated NIC is disabled by default, this check box is no selected when you first log in to iDRAC7.

 **NOTE:** For the Dell PowerEdge blade servers, the NIC Selection field is always set at Dedicated which means that Auto Dedicated NIC is always disabled and not supported. Auto Dedicated NIC is supported on the Dell PowerEdge tower and rack servers only. A new read-only field Active NIC Interface displays the currently active network interface on the iDRAC7 web interface.

For more information about Auto dedicated NIC feature, see [En.community.dell.com/techcenter/extras/m/white_papers/20275980](https://en.community.dell.com/techcenter/extras/m/white_papers/20275980)

How to configure network settings using Lifecycle Controller

About this task

To configure network settings using Lifecycle Controller:

Steps

1. Launch the Lifecycle Controller.
2. On the left pane, click **Settings**.
3. On the **Settings** pane, click **Network Settings**.
4. From the **NIC Card** drop-down menu, select the NIC port that you want to configure.
 -  **NOTE:** You can use only one NIC at a time to communicate with the network.
5. From the **IPv4 Network Settings**→ **IP Address Source** drop-down menu, select one of the following options:
 - **No Configuration**—indicates that the NIC must not be configured.
 - **DHCP**—indicates that the NIC must be configured using an IP address from a DHCP server. If DHCP is selected, a DHCP IP address is displayed on the **Network Settings** page.
 - **Static IP**—indicates that the NIC must be configured using a static IP. Type the **IP Address Properties**—**IP Address**, **Subnet Mask**, **Default Gateway**, and **DNS Address**. If you do not have this information, contact your network administrator.
6. From the **IPv6 Network Settings**→ **IP Address Source** drop-down menu, select one of the following options:
 - **No Configuration**—indicates that the NIC must not be configured.
 - **DHCPv6**—indicates that the NIC must be configured using an IP address from a DHCPv6 server. If DHCPv6 is selected, a DHCPv6 IP address is displayed on the **Network Settings** page.

NOTE: While configuring DHCP server with IPv6, the configuration fails if you disable forwarding or advertising options.

- **Static IP**—indicates that the NIC must be configured using a static IP. Type the **IP Address Properties—IP Address, Subnet Mask, Default Gateway, and DNS Address**. If you do not have this information, contact your network administrator.

7. Click **Enabled**, and type the **VLAN ID** and **Priority** under **Lifecycle Controller VLAN Settings**.

You cannot configure the VLAN settings of the following NICs:

- Emulex SeaHawk-2 (FH) PCIe Adapter
- Emulex SeaHawk-2 (LP) PCIe Adapter
- Emulex Vindicator-2 rNDC
- Emulex Sea Stallion-2 Mezzanine Card
- Emulex Pave Low-2 bNDC
- Emulex SeaHawk-2 (FH) NIC Only PCIe Adapter
- Emulex SeaHawk-2 (LP) NIC Only PCIe Adapter
- Emulex Vindicator-2 NIC Only rNDC
- Emulex Sea Stallion-2 NIC Only Mezzanine Card
- Emulex Pave Low-2 NIC Only bNDC

8. Click **Next**.

NOTE: If the Lifecycle Controller settings are not correctly configured, an error message is displayed.

NOTE: If you are unable to connect to a network, verify the settings. For information about correct network settings, contact your network administrator.

Assigning hot spare with OMSA

Assigning And Unassigning Global Hot Spare

NOTE: To assign global hot-spare drives, ensure that you have installed the latest version of Server Administrator. For more information, see the *Dell EMC OpenManage Software Support Matrix* available on the support site.

A global hot spare is an unused backup disk that is part of the disk group. Hot spares remain in standby mode. When a physical disk that is used in a virtual disk fails, the assigned hot spare is activated to replace the failed physical disk without interrupting the system or requiring your intervention. When a hot spare is activated, it rebuilds the data for all redundant virtual disks that were using the failed physical disk.

You can change the hot spare assignment by unassigning a disk and choosing another disk as needed. You can also assign more than one physical disk as a global hot spare.

NOTE: On PERC S100 and S300 controllers, if there is free space available on the global hot spare, it continues to function as a spare even after replacing a failed physical disk.

Global hot spares must be assigned and unassigned manually. They are not assigned to specific virtual disks. If you want to assign a hot spare to a virtual disk (it replaces any physical disk that fails in the virtual disk), then use the Assign and Unassign Dedicated Hot Spare.

NOTE: When deleting virtual disks, all assigned global hot spares may be automatically unassigned when the last virtual disk associated with the controller is deleted. When the last virtual disk of a disk group is deleted, all assigned dedicated hot spares automatically become global hot spares.

NOTE: For PERC H310, H700, H710, H710P, H800, H810, H330, H730, H730P, H730P MX, H740P, H745P MX, H830, H840 and PERC FD33xD/FD33xS controllers, if any of the drives you selected are in the Spun Down state, the following message is displayed: The current physical drive is in the spun down state. Executing this task on this drive takes additional time, because the drive needs to spun up.

You should be familiar with the size requirements and other considerations associated with hot spares.

Storage Health

The **Storage Dashboard** displays the combined status for each controller and lower-level storage components. For example, if the health of the storage system has been compromised due to a degraded enclosure, both the enclosure **Health** and the controller severity on the **Storage Dashboard** display a yellow exclamation mark to indicate a Warning severity. If a controller on the **Storage Dashboard** displays a Warning or Critical status, perform the following actions to investigate the cause:

- Click **Check Alert Log** to display the **Alerts Log**. Review the Alert Log for alerts relating to the status of the controller and its lower-level components. The **Check Alert Log** link is only displayed when the controller displays a Warning or Critical status.
- Select the controller and investigate the status of the lower-level components. For more information, see the Storage Component Severity section.
- Click the virtual disk that is in degraded state to display the **Physical Disk Properties** page.

 **NOTE:** The virtual disk link is displayed only if the physical disks that are part of the virtual disk, are in a Warning or Critical state.

For more information on how the status of lower-level components is *rolled up* into the status displayed for the controller, see the Determining The Health Status For Storage Components section.

How do I configure RAID using operating system deployment wizard

You can configure RAID using an operating System deployment wizard on the Dell Lifecycle controller. To configure RAID:

- Launch the Lifecycle Controller.
- In the left pane, click **OS Deployment**.
- On the **OS Deployment** page, click **Deploy OS**.
- On the **Deploy OS** page, click **Configure RAID First**, and then click **Next**.
- The storage controllers available for configuration are displayed in the **RAID Configuration** page.

 **NOTE:** Make sure that the selected controller is not in a non-RAID mode.

- Select a storage controller. The RAID configuration options are displayed.
- Follow the instruction on the screen, complete the RAID setting tasks, and then click **Finish**.

The RAID configuration is applied to the virtual disks.

To create virtual disks using RAID configuration at the preferred RAID level, watch the Dell Lifecycle Controller RAID configuration video on YouTube <https://www.youtube.com/watch?v=JFPmeHNEV4>

Foreign drivers on physical disk

Importing Foreign Configurations

 **NOTE:** To make the foreign configuration effective, ensure that you have installed the latest version of **Server Administrator**. For more information, see the *Dell EMC OpenManage Software Support Matrix* available on the support site.

You can import a foreign configuration only if it contains a virtual disk that is either in a Ready or Degraded state. In other words, all of the virtual disk data must be present, but if the virtual disk is using a redundant RAID level, the additional redundant data is not required.

For example, if the foreign configuration contains only one side of a mirror in a RAID 1 virtual disk, then the virtual disk is in a Degraded state and can be imported. On the other hand, if the foreign configuration contains only one physical disk that was originally configured as a RAID 5 using three physical disks, then the RAID 5 virtual disk is in a Failed state and cannot be imported.

In addition to virtual disks, a foreign configuration may consist of a physical disk that was assigned as a hot spare on one controller and then moved to another controller. The Import Foreign Configuration task imports the new physical disk as a hot spare. If the physical disk was set as a dedicated hot spare on the previous controller, but the virtual disk to which the hot spare was assigned is no longer present in the foreign configuration, then the physical disk is imported as a global hot spare.

The Import Foreign Configuration task is only displayed when the controller has detected a foreign configuration. You can also identify whether a physical disk contains a foreign configuration (virtual disk or hot spare) by checking the physical disk state. If the physical disk state is Foreign, then the physical disk contains all or some portion of a virtual disk or has a hot-spare assignment.

Setting the check consistency rate

The Set Check Consistency Rate task changes the amount of system resources dedicated to the check the consistency rate.

The check consistency rate, configurable between 0% and 100%, represents the percentage of the system resources dedicated for running the check consistency task. At 0%, the check consistency has the lowest priority for the controller, takes maximum time to complete, and has least impact to system performance. A check consistency rate of 0% does not mean that the check consistency is stopped or paused.

At 100%, the check consistency is the highest priority for the controller. The check consistency time is minimized and has most impact to system performance.

Performing a Consistency Check

The Check Consistency task verifies the accuracy of the redundant (parity) information. This task only applies to redundant virtual disks. When necessary, the Check Consistency task rebuilds the redundant data. If the virtual disk is in a Failed Redundancy state, running a check consistency may be able to return the virtual disk to a Ready state.

Physical disk reported as Foreign

This topic describes the scenarios when a disk that is part of a RAID array may be reported as Foreign.

A physical disk state may be displayed as **Foreign** if

- The disk is located out of the array for an extended period of time
- The disk is removed out of the array and reseated

To include a **Foreign** disk in the volume, you can clear the foreign configuration and reset the controller configuration.

Clearing the foreign configuration

Steps

1. On the iDRAC9 web interface, go to **Configuration > Storage Configuration > Controller Configuration**. The **Controller Configuration** page is displayed.
2. In the **Foreign Configuration** section, from the **Controller** drop-down menu, select the controller for which you want to clear the foreign configuration.
3. From the **Apply Operation Mode** drop-down menu, select when you want to clear the configuration.

Resetting storage-controller configuration

Steps

1. On the iDRAC9 web interface, go to **Configuration > Storage Configuration > Controller Configuration**. The **Controller Configuration** page is displayed.
2. From the **Actions** menu, select **Reset Configuration** for the desired controller.
3. From the **Apply Operation Mode** menu, select when you want to clear the configuration.
4. Click **Clear**.

How to update BIOS on 13th generation PowerEdge servers

The 13th generation of Dell PowerEdge servers offers various methods namely local or remote, with or without an operating system, to update the system BIOS. The different methods are listed below. You can choose the method that best suits your need and environment.

- Executing the BIOS Dell Update Package (DUP) from within the operating system.
- Using the UEFI-based BIOS flash utility in a preboot environment.

- Using the Lifecycle Controller Platform Update option—F10.
- Using the Update and Rollback feature in the iDRAC web GUI.
- Using the WS-MAN based one to many Remote Update method—Remote Enablement

 **NOTE:** Legacy DOS-based BIOS update utility is no longer supported.

For detailed information about different methods of updating BIOS see [En.community.dell.com/techcenter/extras/m/white_papers/20440526](https://en.community.dell.com/techcenter/extras/m/white_papers/20440526)

Why am I unable to update firmware

This topic describes some of the reasons why a firmware update may not be successful.

 **NOTE:** It is generally recommended that you install the latest firmware for your system and components. Firmware updates improve the performance, reliability, and security of the system.

If you are unable to update the firmware for a component or are unable to update iDRAC itself, try the following:

- Ensure that you follow the instructions provided in the user's guide for the product.
- Update the firmware from another interface. Some of the interfaces that support firmware updates are iDRAC web interface, LC GUI, RACADM, and Redfish.
- Ensure that the firmware is compatible with the system or component that you are trying to update.
- Read the Release Notes for the firmware, if available, to check for any special instructions or compatibility information.
- Reboot the system and retry the update.

Which are the operating systems supported on Dell EMC PowerEdge servers

Dell EMC PowerEdge servers are designed to work with many operating systems and virtualization which may include but not limited to:

1. Canonical Ubuntu LTS
2. Citrix XenServer
3. Microsoft Windows Server with Hyper-V
4. Red Hat Enterprise Linux
5. SUSE Linux Enterprise Server
6. VMware ESXi

For information about supported operating systems on specific PowerEdge servers, see www.dell.com/ossupport

Unable to create a partition or locate the partition and unable to install Microsoft Windows Server 2012

Issue: Unable to create a partition or locate the partition and unable to install Microsoft Windows Server 2012 with an USB, or DVD or from network.

Solution:

Ensure that the correct virtual drive (VD) partition is set as the first boot device. Install Microsoft Windows Server 2012 by using a USB 2.0 bootable drive.

 **NOTE:** USB 3.0 is not natively supported during the Windows 2012 installation.

JAVA support in iDRAC

About this task

For accessing iDRAC and some of its features, you need to install and configure the supported version of Java. The following are some of the key considerations:

- Oracle version of Java is supported.
- Java version 8 or later is required.
- If you are using Firefox or Internet Explorer, and want to use the Java viewer to access iDRAC, configure the browser to use Java plug-in.
- **NOTE: On a 64-bit operating system, both 32-bit and 64-bit JRE versions are supported. On a 32-bit operating system, only 32-bit JRE version is supported.**
- On Linux, Java is the default plug-in type for accessing the Virtual Console.
- When the iDRAC firmware is updated, launching Virtual Console with Java plug-in may fail. Delete the Java cache and then launch the Virtual Console.
- When using the Virtual Console, if you face issues such as out-of-range errors, synchronization issues, and so on, clear the browser's cache to remove or delete any old versions of the viewer that may be stored on the system, and then try again.

NOTE: You must have administrator privilege to clear the browser's cache.

To clear older versions of Java viewer in Windows or Linux:

- Using the command prompt, run `javaws-viewer` or `javaws-uninstall`. The Java Cache viewer is displayed.
- Delete the items titled *iDRAC Virtual Console Client*.
- If SSL encryption is set to 256-bit or higher and 168-bit or higher, the cryptography settings for your virtual machine environment (JVM, IcedTea) may require installing the **Unlimited Strength Java Cryptography Extension Policy Files** to permit usage of iDRAC plugins such as Virtual Console with this level of encryption. For information about installing the policy files, see the documentation for Java.
- While launching the Virtual Console using Java plug-in, you may occasionally see a Java compilation error. To resolve this, go to **Java control panel > General > Network Settings** and select **Direct Connection**.

How to specify language and keyboard type

To specify the language and keyboard type using Lifecycle Controller:

- Launch the Lifecycle Controller.
- On the left pane, click **Settings**.
- On the **Settings** pane, click **Language and Keyboard**.
- From the **Language** drop-down menu, select the language.
- From the **Keyboard Type** drop-down menu, select the keyboard type.
- Click **Finish** to save the new settings.

Message Event ID - 2405

Description

Command timeout on physical disk.

Severity: Warning.

Cause: The spindown physical disks take more time than the timeout period and the configuration commands are timed out.

Action: Check if the disk driver is present or needs to be replaced. If the controller is causing timeouts, the drive may not have failed because of a hardware fault in itself, but instead may have been caused by a communication failure. Update the server and then successfully rebuild the drive to conclude that the drive itself is not the issue.

Installing Managed System Software On Microsoft Windows Operating Systems

On Microsoft Windows, an autorun utility is displayed when you insert the *Dell EMC OpenManage Systems Management Tools and Documentation* software. This utility allows you to choose the systems management software you want to install on the system.

If the autorun program does not start automatically, use the autorun program from the DVD root or the setup program in the `SYSMGMT\sradmin\windows` directory on the *Dell EMC OpenManage Systems Management Tools and Documentation* software. See the *Dell EMC OpenManage Systems Software Support Matrix* for a list of operating systems currently supported.

NOTE: Use the *Dell EMC OpenManage Systems Management Tools and Documentation* software to perform an unattended and scripted silent installation of the managed system software. Install and uninstall the features from the command line.

Installing Managed System Software On Microsoft Windows Server and Microsoft Hyper-V Server

The Server Core installation option of the Microsoft Windows Server and Hyper-V Server operating system provides a minimal environment for running specific server roles that reduce the maintenance and management requirements and the attack surface for those server roles. A Windows Server or Hyper-V Server installation installs only a subset of the binaries that are required by the supported server roles. For example, the Explorer shell is not installed as part of a Windows Server or Hyper-V Server installation. Instead, the default user interface for a Windows Server or Hyper-V Server installation is the command prompt.

NOTE: On Windows client operating systems, to install the systems management software successfully, log in using an account which belongs to the Administrators group and must run the `setup.exe` using the option Run as administrator from the right-click menu.

NOTE: Log in as a built-in Administrator, Domain Administrator, or user who is a part of Domain Admins and Domain Users group, to install the systems management software on supported Microsoft Windows operating system. For more information about user privileges, see the corresponding Microsoft Windows operating system Help.

Installing Systems Management Software On VMware ESXi

VMware ESXi is factory-installed on some systems. For a list of these systems, see the latest *Systems Software Support Matrix*.

Server Administrator is available as a .zip file for installing on systems running VMware ESXi. The **zip** file, `OM-SrvAdmin-Dell-Web-<version>-<bldno>.VIB-ESX<version>i_<bld-revno>.zip`, where `<version>` is the supported ESXi version.

Download VMware vSphere Command Line Interface (vSphere CLI) from **vmware.com** and install on the Microsoft Windows or Linux system. Alternately, you can import VMware vSphere Management Assistant (vMA) to the ESXi host.

Processor TEMP error

Issue: Processor TEMP errors displayed in event viewer.

Corrective action: Dell EMC recommends that you download and install the latest BIOS, drivers, and systems management firmware on your system. For more information, see the [Downloading the drivers and firmware](#) topic.

PowerEdge T130, R230, R330, and T330 servers may report a critical error during scheduled warm reboots

PowerEdge T130, R230, R330, and T330 servers may report a critical error during scheduled warm reboots and displays an error messages in the Hardware System event logs, the Lifecycle Controller logs. Dell EMC recommends that you download and install the latest BIOS, drivers, and systems management firmware on your system. For more information, see the **Downloading the drivers and firmware** topic. <https://www.dell.com/support/home/us/en/04/product-support/product/poweredge-t130/drivers>

SSD is not detected

About this task

If Solid-state drive (SSD) is not detected by server operating system, you must update all firmware versions including OpenManage Server Administrator. To update firmware version, do the following:

Steps

1. Download the latest versions of the supported firmware and drivers. For more information downloading the latest firmware, see the Downloading firmware and drivers section.
2. Double-click the downloaded file, and follow the on-screen instructions to install the latest firmware or drivers.

TRIM/UNMAP and Dell Enterprise SSD Drives Support

Certain operating systems support the TRIM function, which translates deleted files to the associated LBA (logical block address) on the storage device (SSD). For SATA, the command is referred to as TRIM, for SAS, the command is called UNMAP. The TRIM/UNMAP command notifies the drive that it no longer needs data in certain Logical Block Addresses (LBA) which then free up several NAND pages.

The TRIM/UNMAP command must be supported by the operating system, the drive, and the controller in order to work. The TRIM/UNMAP command could result in higher SSD performance from both the reduced data needed to be rewritten during garbage collection and the higher free space resulting on the drive. Dell enterprise drives which are currently shipped have high performance and endurance so they do not yet support these commands even if the OS supports them. These features are being investigated for subsequent Dell SSD offerings.

OpenManage Essentials does not recognize the server

About this task

OpenManage Essentials does not recognize the server. To setup the a new discovery range and inventory and enable WMI protocol.

Steps

1. Launch OpenManage Essentials.
2. Navigate to **Manage --> Discovery and Inventory**.
3. In the left panel, click **Add Discovery Range**.
4. Enter the IP address of the specific client device or the IP range having all the client devices with the subnet mask details.
5. Click **Next**.
6. In the ICMP Configuration page, click **Next**.
7. Protocol Selection

From Dell Command | Monitor 9.0 onwards, both SNMP and WMI protocols are supported for discovery and inventory. Select the required protocols (only SNMP or only WMI or both SNMP and WMI) and enter the required information.

It is recommended to use WMI protocol for discovery and inventory. The difference of inventory information fetched using WMI versus SNMP protocol is specified. Fetching of hardware logs is possible only using WMI protocol.

- For discovery and inventory through SNMP protocol, set the community strings in SNMP Configuration page.
- To disable SNMP discovery uncheck the Enable SNMP discovery
- For discovery and inventory through WMI protocol, click Next, otherwise click Finish.
- In the WMI configuration page, select Enable WMI discovery. Provide the WMI credentials of remote device.
- Click Finish.

Unable to connect to iDRAC port through a switch

You can use iDRAC through various interfaces and methods. The interfaces include web interface, RACADM, Redfish, and so on. You can connect to iDRAC either locally or remotely.

If you try to connect to iDRAC using the iDRAC port through a switch, you may need to perform additional configuration on the switch to allow the connection to be successful. Alternatively, bypass the switch and connect the system directly to the iDRAC port.

 **NOTE:** For more information on connecting to iDRAC, see the iDRAC manuals at www.dell.com/idracmanuals

Lifecycle Controller is not recognizing USB in UEFI mode

When there are combinations of servers connected, you need to use the same mode for all servers. USB driver is not recognized on Lifecycle controller. You can install on BIOS mode and not on UEFI mode.

Guidance on remote desktop services

A Remote Desktop Services deployment is the infrastructure used to share applications and resources with users. Depending on the experience you want to provide, you can make it as small or complex as you need. Remote Desktop deployments are easily scaled. You can increase and decrease Remote Desktop Web Access, Gateway, Connection Broker and Session Host servers at will. You can use Remote Desktop Connection Broker to distribute workloads. Active Directory based authentication provides a highly secure environment. For more information, see [Build and Deploy Remote Desktop Services](#)

 **NOTE:** Provide the correct Microsoft Windows version while purchasing the license.

Troubleshooting operating system issues

This section helps you troubleshoot operating system issues in your system.

 **NOTE:** If the problem persists, contact Dell Technical Support for further assistance.

Topics:

- [How to install the operating system on a Dell PowerEdge Server](#)
- [Locating the VMware and Windows licensing](#)
- [Troubleshooting blue screen errors or BSODs](#)
- [Troubleshooting a Purple Screen of Death or PSOD](#)
- [Troubleshooting no boot issues for Windows operating systems](#)
- [No POST issues in iDRAC](#)
- [Troubleshooting a No POST situation](#)
- [Migrating to OneDrive for Business using Dell Migration Suite for SharePoint](#)
- [Windows](#)
- [VMware](#)
- [Linux](#)
- [Installing operating system through various methods](#)

How to install the operating system on a Dell PowerEdge Server

Issue: Installing the operating system using Lifecycle Controller on a Dell PowerEdge server.

Solution: The following link provides detailed guidelines about installing the operating system using Lifecycle Controller: <http://www.dell.com/support/article/us/en/04/sln129177/how-to-install-the-operating-system-on-a-dell-powerededge-server-os-deployment?lang=en#LCC>

 **NOTE:** Update all the driver version to the latest.

Locating the VMware and Windows licensing

Issue: Location of the VMware and Windows licensing on Dell EMC PowerEdge servers.

Corrective action:

The link below describes the location of the licenses on Dell EMC PowerEdge servers: <http://en.community.dell.com/techcenter/b/techcenter/archive/2015/04/01/where-is-the-microsoft-oem-server-os-certificate-of-authenticity-coa-label-located-on-dell-powerededge-servers>.

Troubleshooting blue screen errors or BSODs

Steps

1. Identify the stop code or the stop message when the system displays the blue screen of death.

```
A problem has been detected and windows has been shutdown to prevent damage to your computer.
DRIVER_IRQL_NOT_LESS_OR_EQUAL

If this is the first time you've seen this stop error screen, restart your computer. If this screen appears again, follow
these steps:

Check to make sure any new hardware or software is properly installed. If this is a new installation, ask your hardware or
software manufacturer for any windows updates you might need.

If problems continue, disable or remove any newly installed hardware or software. Disable BIOS memory options such as
caching or shadowing. If you need to use Safe Mode to remove or disable components, restart your computer, press F8 to
select Advanced Startup Options, and then select Safe Mode.

Technical information:
*** STOP: 0x000000D1 (0x0000000C,0x00000002,0x00000000,0xF86B5A89)
*** gv3.sys - Address F86B5A89 base at F86B5000, DateStamp 3dd9919eb
Beginning dump of physical memory
Physical memory dump complete.
Contact your system administrator or technical support group for further assistance.
```

Figure 25. Blue screen of death

2. Run the PSA/ePSA diagnostics. For more information, see [PSA/ePSA Diagnostics](#) on page 18.
3. If the diagnostics pass and the issue persists, identify the stage in which the blue screen error occurs.
4. If the BSOD occurs during the boot process, check for minimum to POST components. For more information, see [Troubleshooting a No POST situation](#) on page 103.
If the issue persists, call Dell Technical Support.
5. If the BSOD occurs during pre-logon, boot into Safe Mode and disable all startup entries. Isolate one startup entry at a time until you find the causing agent.
i | NOTE: If you are unable to boot into Safe Mode, call Dell Technical Support.
6. If the issue persists, check for minimum to POST components. For more information, see No POST .
If the issue persists, call Dell Technical Support.
7. If the BSOD occurs intermittently or during post-logon, debug mini crash dump files using WinDbg. For more information, see [Debugging mini crash dump files using by WinDbg in Windows operating system](#) on page 34.
After debugging, call Dell Technical Support with the minidump file.

Troubleshooting a Purple Screen of Death or PSOD

For information on Troubleshooting a PSOD, see [Troubleshooting a Purple Screen of Death](#) and [Interpreting a purple screen of death](#).

Troubleshooting no boot issues for Windows operating systems

Steps

1. Check the hard drive status in the PERC BIOS. For more information, see [Checking hard drive status in the PERC BIOS](#) on page 55.
2. Boot the server in the safe mode.

i | NOTE: If the server is a domain controller, boot the server in Directory Services Repair Mode (DSRM).

If the server boots successfully, the issue is with an installed driver, application, or service. Proceed to Step 4.

3. For Windows Server, you can perform the following recovery options:
 - Use the `bootrec` command to troubleshoot startup issues. For more information, see <https://support.microsoft.com/en-in/kb/927392>.
 - Use the `chkdsk` tool to determine whether there is a disk problem. For more information, see <https://technet.microsoft.com/en-us/library/cc730714.aspx>

- Use **DiskPart** to verify the status of disk partitions. For more information, see <https://technet.microsoft.com/en-in/library/bb490893.aspx>.
- Use the **bcdedit** utility to view or modify the boot configuration database (BCD). For more information, see <https://technet.microsoft.com/en-us/library/cc731662.aspx>.

NOTE: For additional recovery console commands, see <https://support.microsoft.com/en-us/kb/326215>.

NOTE: For more troubleshooting steps, see <https://support.microsoft.com/en-us/kb/325375>.

4. From within the safe mode or DSRM, use the **msconfig** utility to disable startup applications and non-Microsoft services on the server.
5. Reboot the server in the normal mode.
6. If the server boots, use the **msconfig** utility to identify the disrupting service or application by enabling services and startup applications one at a time and rebooting the server until the server fails to boot.
7. If the issue persists, use Dell's Linux-based OMSA LiveCD to boot the system and run diagnostic tests to determine whether any hardware is malfunctioning.

OMSA LiveCD can also be used to recover data from a server whose operating system does not start.

No boot device found error message is displayed

Description—After the server completes the Power On Self-Test (POST) phase, the server is unable to boot a bootable device. This condition is called **No Boot**. Files available in a bootable device—RAID, USB key, DVD, or ISO file—contain instructions to start the operating system. When these files cannot be located, an error message—**No boot device found**—is displayed. You may observe this issue if the virtual disks are not online, due to a hard drive or PowerEdge RAID Controller (PERC) issue.

About this task

Workaround—Perform the following steps:

Steps

1. Check the hard drive status in the PERC BIOS.
An error message—**No boot device found**—is displayed.
2. Press Ctrl + R during the POST process to open the PERC BIOS Configuration Utility.
3. To check if the hard drive is part of the RAID array, do the following:
 - a. Press Ctrl + N to navigate to the **PD Mgmt** (Physical Disk Management) screen.
 - b. Check if any hard drives are offline or missing.

Table 21. Hard drive status

Hard drive status	Description
Offline	Hard drive is not part of the RAID array.
Online	Hard drive is part of the RAID array
Ready	Hard dive is ready to be a part of the RAID array

- c. Check that the Virtual Disk is online in an optimal state.
4. Click the **CTRL Mgmt** tab, and select the Virtual Drive where the operating system is installed.
When the RAID is managing multiple Virtual Drive, it is important to select which Virtual Drive has to be presented when the server tries to boot on the raid controller.
 5. If the problem persists, call Dell Technical Support for further assistance.

No POST issues in iDRAC

This section provides details on troubleshooting iDRAC issues.

“First Boot Device cannot be set” error message is displayed when configuring a boot device during POST.

Description

The error message “First Boot Device cannot be set. Either the system BIOS is out-of-date, or the server needs a reboot for the settings to take effect” displays in the POST mode.

Resolution

Allow the server to completely boot to the OS or turn off the server before setting a vFlash partition to the first boot device. This allows the server to boot to the vFlash partition and the error will no longer be seen.

“Alert! iDRAC6 not responding.. Power required may exceed PSU wattage...” error message is displayed at POST during a reboot.

Description

An error message “Alert! iDRAC6 not responding.. Power required may exceed PSU wattage. Alert! Continuing system boot accepts risk that system may power without warning. Strike the F1 key to continue, F2 to run the system setup program” is displayed at POST during a reboot.

Resolution

Perform the following steps:

1. Reboot the server to resolve the issue.
2. Remove the AC power for 30 seconds. Once AC power is re-applied, allow two minutes for the iDRAC to complete POST or initialize.
3. Check if the Network Adapter is updated to the latest firmware.

Troubleshooting a No POST situation

Power On Self Test (POST) is a series of diagnostic tests that run automatically when you turn on your system. POST tests the memory, the keyboard and the disk drivers. If the test is successful, the computer boots itself, else the system displays an LED error or an error message in the LCD panel. This situation is called No POST.

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 are shipped with your product.

 **NOTE:** When removing or replacing parts, always turn off the server, remove the power cord, and wait for ten seconds for the static flea power to drain. Reconnect the power cord, wait for a minute and turn on the server. This allows time for the Baseboard Management Controller (BMC) to power up. Error messages may not be reported correctly if the static flea power is not fully drained. For more information on removing and installing hardware components, see your system’s *Owner’s Manual* at www.dell.com/poweredge manuals.

 **NOTE:** Ensure that you give enough time for the server to POST. Newer systems may take up to three minutes before any video appears during the POST. During this period, a message on the LCD screen is displayed, which indicates that the server is booting.

Steps

1. Check the LCD screen or LED indicators for any error messages.
For information about the event and error messages generated by the system firmware and agents that monitor system components, see the Error Code Lookup page at url.dell.com.
2. Ensure that the server is turned on by verifying that the power supply LED glows green.
If the power LED is lit amber, see [Power supply unit indicator codes](#) on page 13.
3. Remove all the Electrostatic Discharge (ESD) from the server.
 - a. Turn off the server.
 - b. Disconnect all cables from the server including the power cable.
 - c. Press and hold the power button for 60 seconds to discharge.
 - d. Reconnect the power and video cable only.
 - e. Turn on the server.
If the server fails to POST, proceed to the next step.
4. Disconnect all cables from the server including the power cable.
5. Bring the server to the minimum configuration for the POST.

 **NOTE: Minimum to POST configuration is the config that has the minimum components required to complete POST. Typically, the minimum to POST configuration for rack servers is PSU1, CPU1, memory module in A1 slot, and the default riser without expansion cards. For tower servers, the minimum to POST configuration is PSU1, CPU1, and memory module in A1 slot. For modular servers, the minimum to POST configuration is CPU1 and memory module in A1 slot.**
6. Reconnect the power and video cable only.
7. Attempt to POST the server.
 - a. If the server completes the POST, turn off the server and plug the components one at a time until the defective part is found.
If you identify the defective part, contact Dell Technical Support with information about the defective part.
 - b. If you are unable to identify the defective part, go to the next step.
8. Disconnect the hard drives, optical drives, and tape drives from the server and attempt to POST the server.
 - a. If the server completes the POST, plug the hard drives back one at a time until the defective hard drives are found.
If you identify the defective part, contact Dell Technical Support with information about the defective part.
 - b. If you are unable to identify the defective part, go to the next step.
9. Reseat the control panel connector.
10. Ensure that the processors and heat sinks are seated correctly.
11. If the server does not complete the POST, clear the NVRAM using the jumper.
For more information, see your system's *Owner's manual* at www.dell.com/poweredge manuals.

Next steps

If the issue still persists, contact Dell Technical Support for assistance.

Migrating to OneDrive for Business using Dell Migration Suite for SharePoint

About this task

To connect to OneDrive for Business:

Steps

1. Login to a SharePoint Online site in the browser.
2. Click on the OneDrive link in the header at the top of an Office 365 page.
3. Copy the site URL from the browser's address line.
4. Open the application and specify the OneDrive URL in the Connect to SharePoint wizard.

NOTE: Before connecting the OneDrive site of another user, make sure the OneDrive has been provisioned (i.e. the OneDrive site owner has visited it at least once) and you have administrator permissions granted either by the OneDrive site owner or using the Set-SPOUser commandlet ([http://technet.microsoft.com/en-us/library/fp161375\(v=office.15\).aspx](http://technet.microsoft.com/en-us/library/fp161375(v=office.15).aspx)).

Windows

Installing and reinstalling Microsoft Windows Server 2016

You can use one of the following methods to install the Microsoft Windows Server 2016 operating system, if you do not have it installed on your server or if you wish to reinstall it:

- Install Windows Server 2016 by using the Dell LifeCycle Controller
- Installing the Operating System using the Windows Server 2016 Media

NOTE: Dell EMC highly recommends that you install the latest hotfixes and security updates from Microsoft on your system by using Windows updates or by downloading the latest updates after installing the operating system.

Install Windows Server by using Dell LifeCycle Controller

About this task

To install Microsoft Windows Server for Standard, Datacenter, and the Essentials edition by using the LifeCycle Controller:

Steps

1. Connect the keyboard, monitor, mouse, and any additional peripherals to your system.
2. Turn on the system and attached peripherals.
3. In the **LifeCycle Controller** window, click the appropriate option if you want to configure hardware, diagnostics, or set changes. If no changes are required, select **OS Deployment**.
4. In the **Operating System Deployment** window, click **Deploy OS**. The **Configure or Skip RAID** window is displayed. If Redundant Array of Independent Disks (RAID) is configured, the window displays the existing RAID configuration details.
5. Select **Go Directly to OS Deployment**. If RAID is not yet configured, configure .
6. Click **Next**. The **Select Operating System** window is displayed with a list of compatible operating systems.
7. Select , and then click **Next**.

NOTE: If is not listed,

8. Select whether you want to deploy the operating system in UEFI or BIOS mode, and click **Next**.
9. In the **Insert OS Media** window, insert the media, and then click **Next**.
10. On the **Reboot the System** screen, follow the instructions on the screen, and then click **Finish**. If a Windows operating system is installed on your system, the following message is displayed:

Press any key to boot from the CD/DVD...Press any key to begin the installation

11. On the **Windows Setup** screen, select the appropriate option for **Language, Time and Currency Format**, and **Keyboard or Input Method**.
12. Click **Next** to continue.
13. On the screen, click **Install Now**. The **Operating System Install** screen is displayed.
14. On the **Operating System Install** screen, select the operating system, and then click **Next**. The **License terms** window is displayed.
15. Read the license agreement information. If you agree with all the information, select **I accept the license terms** and click **Next**.

16. On the **Which Type of Installation Do You Want** screen, select **Custom: Install Windows only (advanced)**, if it is not selected already.
17. On the **Where do you want to install Windows** screen, specify the partition on which you want to install the operating system. To create a partition and begin installation:
 - a. Click **New**.
 - b. Specify the size of the partition in MB, and click **Apply**.

The following message is displayed:

```
Windows might create additional partition for system files
```

- c. Click **OK**.

 **NOTE:** The recommended minimum partition size for the primary partition is 40 GB and for the Essentials Edition is 60 GB. If you are installing extra memory on your system, you may require more primary partition space to accommodate page file and hibernation. During installation, a recommended partition size is displayed on the screen based on the memory size of your system. Follow the instructions on the screen. If you select Core installation, you require less hard drive space for the primary partition.
- d. Select the newly created operating system partition, and click **Next**. The **Installing Windows** screen is displayed, and the installation process begins.

After the operating system is installed, the system reboots. Set the administrator password before you can log in for the first time.

18. On the **Settings** screen, enter the password, confirm the password, and then click **Finish**.
19. Type the administrator password, and then press Enter to log in to the system.

Results

The operating system installation is complete.

Install Windows Server by using operating system media

About this task

To install the Microsoft Windows Server operating system for Standard, Datacenter, and the Essentials edition:

Steps

1. Connect a keyboard, monitor, mouse, and any additional peripherals to your system.
2. Turn on your system and any attached peripherals.

Several BIOS screens are displayed during startup, but do not require any user intervention.

 **NOTE:** This method of installation is supported in the BIOS and UEFI modes.

3. Insert the *Microsoft Windows Server* media into the DVD drive. The following message is displayed:

```
Loading Files
```

 **NOTE:** If a Windows operating system is installed on your system, the following message is displayed:

```
Press any key to boot from the CD/DVD ... Press any key to begin the installation
```

4. After the files are loaded, click the appropriate language that you want to deploy.

 **NOTE:** This screen is not displayed for the Simplified or Traditional Chinese operating system.
5. On the **Windows Setup** screen, select the appropriate **Language**, **Time & Currency**, and the **Keyboard or Input** values, and then click **Next**.
6. On the screen, click **Install Now**.

The **Operating System Install** screen is displayed.

 **NOTE:** In Windows Server Essentials edition, on clicking Install Now, the License terms window is displayed.

7. On the **Select the operating system you want to install** screen, select the operating system from the available list, and click **Next**. The **license terms** window is displayed.
8. Read through the license agreement information. If you agree with all the information, select **I accept the license terms**, and then click **Next**.
9. On the **Which type of installation do you want** screen, select **Custom: Install Windows only (advanced)** if it is not selected already.
10. On the **Where do you want to install Windows** screen, specify the partition on which you want to install the operating system. To create a partition and begin installation:
 - a. Click **Drive options (advanced)** > **New**.
 - b. Specify the size of the partition in MB, and click **Apply**. The following message is displayed:

To ensure that all Windows features work correctly, Windows might create additional partition for system files
 - c. Click **OK**.

NOTE: The recommended minimum partition size for the Primary partition Standard, Datacenter, Edition is 40 GB and for the Essentials Edition is 60 GB. If you are installing extra memory on your system, you may require more primary partition space to accommodate page file and hibernation. During installation, a recommended partition size is displayed on the screen based on the memory size of your system. Follow the instructions on the screen. If you select Core installation, you may require less hard drive space for the Primary partition. For information on drive partitioning see the Partitioning a drive section.
11. Select the newly-created operating system partition, and click **Next**. After the operating system is installed, the system reboots. Set the administrator password before you can log in for the first time.

NOTE: For Windows Server Essentials edition, after the installation is complete you must configure the system before setting the administrator password.
12. Type the administrator password, and then press Enter to log in to the system.

Next steps

The operating system installation is complete.

- NOTE:** After you log in to the system, you can use the Server Manager Dashboard to configure and manage different roles and features in the operating system.

FAQs

How to resolve the yellow bangs in device manager for Dell 12th Generation Servers?

Description

After installing Windows Server 2012 R2 on Dell PowerEdge 12th Generation Servers, two yellow bangs appear in the Device Manager under Hidden Devices: PCI SIMPLE COMMUNICATIONS CONTROLLER. These devices do not impact the server.

Resolution

Download and install chipset drivers from www.dell.com/support for the respective servers.

Why are the USB keyboard and mouse not detected during the Windows Server 2008 R2 SP1 installation

Cause

This issue occurs because Windows Server 2008 R2 SP1 does not have native USB 3.0 driver support.

Resolution

1. In **System Setup**, ensure that the USB 3.0 option on the **Integrated Device Settings** screen is set to **Disable**.

NOTE: By default, the USB 3.0 option is disabled. If enabled, the operating system fails to detect the USB devices such as keyboard, mouse, and USB DVD. Windows Server 2008 R2 SP1 supports out-of-box drivers for USB 3.0, and are available at www.dell.com/support.

2. Install the drivers after installing the OS
3. Restart the system.
4. In **System Setup**, ensure that the USB 3.0 option on the **Integrated Device Settings** screen is set to **Enable**.

NOTE: Ensure that you first install the drivers, and then restart the system to enter System Setup.

Why does the installation wizard stop responding during the Windows OS installation

Cause

This issue occurs because the Windows 2008 R2 SP1 does not support Secure Boot.

Resolution:

Before installing Windows 2008 R2 SP1, ensure that the **Secure Boot** option in **System Setup** is set to **Disable**.

NOTE: Secure Boot is supported only on Windows 2012, Windows 2012 R2 and Windows 2016 with native storage controller and out-of-box drivers. Secure Boot is supported only in the UEFI mode.

Why does Windows OS installation using Lifecycle Controller, on PowerEdge Servers fail at times with an error message

Cause

This issue occurs when the size of the drivers exceed the temporary storage space provided by the OS.

Resolution:

Before installing the OS, ensure that there are no add-on devices installed on the system. To avoid removing the hardware manually, you can also disable the PCIe slots in the BIOS configuration utility.

Why does Windows Server 2008 R2 SP1 display a blank screen in UEFI mode after installation

After installing Windows Server 2008 R2 SP1 in the UEFI mode, either using Lifecycle Controller (LC) or manually, may display a blank screen while booting to the OS.

Cause

This issue occurs because the Windows Server 2008 R2 does not support Graphics Output Protocol (GOP).

Resolution

In the BIOS configuration utility, ensure that Load Legacy Option Rom on the Miscellaneous Settings screen is set to Enable.

Restart your system and boot to the operating system again.

Symptoms

Booting to iSCSI or FCoE fails

Description

When trying to install Windows Server 2012 R2 operating system on an iSCSI or FCOE LUN, you may see a failure either during the operating system installation or at first boot.

Resolution

This is a known issue. This issue has been fixed in operating systems pre-installed by Dell and in the recovery media shipped with your system. For more information, see the knowledge base article **KB2894179** at support.microsoft.com.

Troubleshooting system crash at cng.sys with watchdog Error violation

Issue: System encountered Blue Screen of Death at cng.sys with "Watchdog Error violation" error.

Cng.sys blue screen errors can be caused by a variety of hardware, firmware, driver, or software issues. These could be related to either Microsoft Windows software or hardware issue. "cng.sys" errors can be caused by:

1. Incorrectly configured, old, or corrupted Microsoft Windows device drivers.
2. Corruption in Microsoft Windows registry from a recent cng.sys-related software change
3. Virus or malware infection that has corrupted the cng.sys file
4. Hardware conflict after installing new hardware, or hardware related to cng.sys
5. Damaged or removed system files after you've installed software or drivers related to Microsoft Windows.
6. cng.sys blue screen caused by a damaged hard disk.
7. cng.sys STOP error due to memory (RAM) corruption.

To fix the issue:

1. Ensure system is updated with latest version of the cng.sys .
2. Ensure that all configurations and data is backed up prior to updating BIOS or Firmware.
3. Update latest BIOS, firmware and related drivers.
4. Perform general hardware diagnostic to ensure system health.
5. If the issue persists, call Dell Technical Support for assistance.

Host bus adapter mini is missing physical disks and backplane in Windows

Issue—On a server platform that supports HBA330 mini card, if you make any of the following changes:

- Move the rear backplane of R730XD to an onboard controller.
- Move an HBA330 mini from one server with one backplane configuration to another server with a different backplane configuration.

after Windows is installed, then the operating system does not detect a physical disk. However, the iDRAC and HBA330 BIOS displays all the physical disks as working fine.

NOTE: This issue affects the Windows operating system. However, iDRAC and HBA330 BIOS displays all disks and backplanes as working fine. The presence of a Generic SCSI Enclosure device in Device Manager is required for Storage Spaces Direct. If this device is not available, no enclosure is presented in Cluster Manager that is required for Storage Spaces Direct.

Workaround—Do not replace hardware. The HBA330 mini Windows driver writes a Driver Mapping Page to the HBA330 mini firmware. If the backplane configuration is changed after the Operating System is installed, the information displayed on the Driver Mapping page is incorrect and you need to reset the page. To reset the Driver Mapping page, use a boot image. If you observe this issue again, contact the Dell Technical Support.

Converting evaluation OS version to retail OS version

Issue:Customer is attempting to install Windows 2012 R2 using the license key provided by Dell EMC but do not have the media at hand. Customer then proceed to use the evaluation version to upgrade but the version did not match. Errors occurred when inserting the license key.

Corrective actions:

To fix the issue, follow the guidelines from the link below. <https://docs.microsoft.com/en-us/windows-server/get-started/supported-upgrade-paths>

Partitions on disk selected for installation of Hyper-V server 2012

Error occurred during installation of Hyper-V server 2012 as the partitions on disk selected for installation are not in recommended order.

The recommended configuration order includes a Windows RE Tools partition, a system partition, an Microsoft® Reserved partition (MSR), a Windows partition, and a recovery image partition.

The Microsoft Windows RE Tools partition and system partition before you add the Windows partition. Add the partition that contains the recovery image at the end. This partition order helps keep the system and the Windows RE Tools partition safe, during actions such as removing the recovery image partition or changing the size of the Windows partition.

Install Microsoft Hyper-V Server 2012 R2 with the Internal Dual SD module

Prerequisites

- Dell EMC 13th generation of PowerEdge servers with Dual 8GB or 16GB SD cards in Mirror mode installed in the Internal Dual SD module (IDSDM).
- Set the Boot Mode to Bios and not UEFI.
- Download the Hyper-V Server 2012 R2 ISO from Microsoft.

About this task

To install Microsoft Hyper-V server 2012 R2 using IDSM.

Steps

1. Boot to the F2 System Setup to verify USB Mode is set to USB 3.0 and IDSDM Cards are in Mirror Mode.
2. Choose the **System Bios** option, then choose **Integrated Devices**.
3. Go back to **System Bios Menu** and choose **Boot Settings**.
4. Make sure **Boot mode** is in **Bios mode**, then click on **BIOS Boot Settings**.
5. On the **BIOS Boot Settings** Choose **Boot Sequence** and make sure that **Hard Drive C:** is at the top.
6. Under **Hard-Disk Drive Sequence** move **Internal SD:IDSDM** is above Integrated RAID Controller.
7. Boot to the Hyper-V Server 2012 R2 ISO, and Click on **Install Now**.
8. Check the box to accept the license terms and click next.
9. Choose "Custom: Install the newer version of Hyper-V Server only (advanced)".
10. Make sure to choose the right disk to install to and click **next**. If there is a partition on the SD card, select it, and click **Delete**, then click **next**.
Your drive size will vary based on the size of your SD cards.
If you get the warning message you can ignore it and click **next**.
11. After the install is complete, let the server reboot, but make sure to enter the **F2 System Bios** again.
12. Select **System Bios** again, and **Integrated Devices**. Disable USB 3.0, click **back**, then **finish**. Click on **yes** to save settings. Click **OK** to acknowledge the change, and click **finish**. Lastly click **yes** to confirm exit.
13. The server will reboot to the OS.
14. The first time you login, you'll have to set a local admin password.

Next steps

Configure to your requirements.

VMware

FAQs

Why are VMs configured with Fault Tolerance not in a protected state in ESXi 6.0?

For some PowerEdge systems with AMD 6300 series processor, VMs configured with Fault Tolerance (FT) might not be in a protected state. Sometimes, secondary VM takes more time to attain the protected state. This is a known issue. Affected systems include PowerEdge systems R815, R715 and M915.

Rebooting an ESXi host

About this task

Before shutting down or rebooting the ESXi hosts, ensure that the hosts are in the Maintenance mode. Powering off a managed host, disconnects it from vCenter Server, but does not remove it from the inventory. To Reboot, perform the following steps.

Steps

1. Shut down all virtual machines running on the ESXi host.
2. Select the ESXi host you want to shut down.
3. From the main menu or right-click the main menu, select **Reboot** or **Shut Down**.
 - If you select **Reboot**, the ESXi host shuts down and reboots.
 - If you select **Shut Down**, the ESXi host shuts down. You must manually power on the system.
4. Provide a reason for the shut down.
This information is added to the log.

Unable to allocate storage space to a VM

One of the advantages of using a VM is that you can dynamically allocate drive space to VMs to meet storage requirements. It helps optimize the space utilization.

You may be unable to allocate space to a VM if the hard drives associated with VM do not have enough free space. Before you try to allocate space to a VM, ensure that the hard drives have enough free space.

Configuration backup and restore procedures

Dell EMC recommends that you back up your VMware ESXi configuration after you complete the initial setup on a routine schedule that fits your datacenter environment. Backing up your configuration captures the license code (host serial number).

To back up or restore the configuration information, use the VMware vSphere CLI. The vSphere CLI is available in:

- vSphere CLI package — vSphere CLI package can be installed on either Linux or on Microsoft Windows operating systems.
- vSphere Management Assistant (vMA) — vMA can be deployed on an ESXi host.

Both of this software are available for download from vmware.com. For more information on setting up and running the vSphere CLI, see the VMware vSphere Command-Line Interface Installation and Reference Guide and VMware ESXi Embedded and vCenter Server Setup Guide at vmware.com/support/pubs.

The backup and restore steps are given in this section considering that:

- You have already imported the vSphere CLI to a system other than the one you want to back up or restore.
- You have installed the Windows or Linux management Application Programming Interfaces (APIs).

Backing up the configuration of your ESXi host

About this task

To back up configuration data of a host:

Steps

1. Start the vSphere CLI.
2. Run the `vicfg-cfgbackup` command with the **-s** flag to save the host configuration to the specified backup filename:

```
vicfg-cfgbackup --server< ESXi-host-ip> -- portnumber <port_number> --protocol  
<protocol_type> --username root --password root_password [-s <backup-filename>
```

The `-portnumber` and `-protocol` options are optional. If you exclude them, the defaults are port **443** and protocol **HTTPS**.

- NOTE:** If you do not specify a password in the command line, you are prompted for one when the command executes. For example: `vicfgcfgbackup --server 172.17.13.211 --username root -s backupdate.dat`
- NOTE:** If your administrative password includes special characters, such as \$ or &, you must include a backslash escape character (\) before each special character.

Restoring configuration of your ESXi host

About this task

To restore the configuration data of a host:

- NOTE:** The backup process does not support restoring to later builds. This requirement can be overridden by using the **-f** option.

Steps

1. Turn off any VM that is running on the host you want to restore.
2. Optionally, restore the host to the ESXi build number used when the backup file was created.
3. Start the vSphere CLI on a host other than the host you want to restore and log in.
4. Run the `vicfg-cfgbackup` command with the **-l** flag to load and restore the backup file to the host.

```
vicfg-cfgbackup --server <ESXi-host-IP> -- portnumber <port_number> --protocol  
<protocol_type>-- username <username> --password <password> -l <backup_filename>
```

The **-portnumber** and **-protocol** options are optional. If you exclude them, the defaults are **port 443** and protocol **HTTPS**.

- NOTE:** If you do not specify a password in the command line, you are prompted for one when the command executes. For example: `vicfgcfgbackup --server 172.17.13.211 --username root -l backupdate.dat`

After a successful restore, the system reboots using the new configuration. For complete instructions on backup and restore commands, see *VMware ESXi Embedded and vCenter Server Setup Guide* at vmware.com/support/pubs.

Can we back up 2012 r2 as a VM

You can back up a host OS but not to a VM. You can use two non-raid disks to backup the data.

Install, update and manage Fusion-IO drives in Windows OS

Issue: Customer is trying to install ioSphere and are having problems with password credentials.

Corrective action:

To fix the issue, ioSphere needs to be reinstalled. The link below contains information about installing, updating and managing Fusion-IO, which contains information about installing ioSphere:

<http://www.dell.com/support/article/au/en/audhs1/sln156793/how-to-install-update-and-manage-fusion-io-drives-in-windows-os-on-dell-powerededge-servers?lang=en>

Symptoms

Dell PowerEdge Express Flash NVMe PCIe SSD device is not detected during hot-plug in ESXi 6.0

Description

When the Express Flash NVMe PCIe SSD namespace is set as Offline and hot-plug operation is performed in the same slot, the SSD does not initialize and is not detected.

This is a known issue. Perform one of the following steps:

1. Reconnect the drive to a different drive slot, if available.
2. Restart the sfcdb-watchdog service and reinsert the drive.

Linux

FAQs

Why are network ports displayed as unknown in YaST2 network configuration in SUSE Linux Enterprise?

While configuring a bonding interface, the configured bond-slaves are listed as Unknown Network Device. The YaST installer is unable to write the device name in to the ifcfg files. Delete the existing configuration of previously configured network interfaces.

Symptoms

Unable to boot from iSCSI when static IPv6 address is assigned to the initiator

Description

The SUSE Linux Enterprise Server 12 does not boot from iSCSI over IPv6 address after successful installation, when static IPv6 address is assigned to the initiator.

Resolution

Use Dynamic Host Configuration Protocol (DHCP) address for the initiator.

Installing operating system through various methods

Install and deploy operating system through Dell Lifecycle Controller and various methods, watch the following videos listed below:

Table 22. Installation of OS through LC and various methods

Slno	Video Description	Location
1.	Launching Lifecycle Controller	Launching LC
2.	Dell Lifecycle Controller - Firmware Rollback	LC Firmware Rollback

Table 22. Installation of OS through LC and various methods (continued)

Slno	Video Description	Location
3.	Dell Lifecycle Controller - Firmware Update Using FTP Server	LC Firmware Update Using FTP Server
4.	Dell Lifecycle Controller - Firmware Update Using Network Share: CIFS (Common Internet File System)	LC - Firmware Update Using CIFS
5.	Dell Lifecycle Controller - Firmware Update Using Network Share: NFS (Network File System)	LC - Firmware Update Using NFS
6.	Dell Lifecycle Controller - Export Server Profile Using USB Drive	LC - Export Server Profile Using USB Drive
7.	Dell Lifecycle Controller - Export Server Profile Using Network Share: Network File System (NFS)	LC - Export Server Profile Using NFS
8.	Dell LifecC - Export Server Profile Using Network Share: Common Internet File System (CIFS)	LC - Export Server Profile Using CIFS
9.	Dell Lifecycle Controller - Backup Server Profile	LC - Backup Server Profile
10.	Dell Lifecycle Controller - Firmware Update Using Local Drive (CD or DVD or USB)	LC - Firmware Update Using Local Drive CD or DVD or USB
11.	Dell Lifecycle Controller - Network Settings	LC - Network Settings
12.	Dell Lifecycle Controller - RAID Configuration - Break Mirror	LC - RAID Configuration - Break Mirror
13.	Dell Lifecycle Controller - RAID Configuration - Key Encryption	LC - RAID Configuration - Key Encryption
14.	Dell Lifecycle Controller RAID Configuration	LC RAID Configuration
15.	Dell Lifecycle Controller - Import Server Profile Using USB Drive	LC - Import Server Profile Using USB Drive
16.	OS Deployment Manual Installation	OS Deployment Manual Installation
17.	OS Deployment - Unattended Install Using NFS - Network File System	OS Deployment - Unattended Install Using NFS
18.	OS Deployment - Unattended Install Using - CIFS - Common Internet File System	OS Deployment - Unattended Install Using - CIFS
19.	OS Deployment - Unattended Installation Using USB Drive	OS Deployment - Unattended Installation Using USB Drive
20.	Install Operating System with Secure Boot through Lifecycle Controller	Install OS with Secure Boot through LC
21.	Unattended OS Installation, UEFI Mode	Unattended OS Installation UEFI Mode
22.	Unattended OS Installation, BIOS Mode	Unattended OS Installation BIOS Mode
23.	Repurpose or Retire System	Repurpose or Retire System
24.	Collecting Tech Support Report and Exporting in USB Drive	Collecting Tech Support Report and Exporting in USB Drive
25.	Deploying an Operating System using Lifecycle Controller – Manual Install method	Deploying an OS using LC – Manual Install method
26.	Deploying an Operating System using Lifecycle Controller - Unattended Install method	Deploying an OS using LC - Unattended Install method

Getting help

Topics:

- [Contacting Dell EMC](#)
- [Download the drivers and firmware](#)
- [Locating Service Tag of your system](#)

Contacting Dell EMC

Dell EMC provides several online and telephone based support and service options. If you do not have an active internet connection, you can find contact information about your purchase invoice, packing slip, bill, or Dell EMC product catalog. Availability varies by country and product, and some services may not be available in your area. To contact Dell EMC 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 your system Service Tag in the **Enter your Service Tag** 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 EMC 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 EMC Global Technical Support team.

Download the drivers and firmware

It is recommended that you download and install the latest BIOS, drivers, and systems management firmware on your system.

Prerequisites

Ensure that you clear the web browser cache before downloading the drivers and firmware.

Steps

1. Go to Dell.com/support/drivers.
2. In the **Drivers & Downloads** section, enter the Service Tag of your system in the **Enter a Dell Service Tag, Dell EMC Product ID, or Model** field, and then click **Submit**.
 **NOTE:** If you do not have the Service Tag, click **Detect PC** to allow the system to automatically detect your Service Tag.
3. Click **Drivers & Downloads**.
A list of applicable downloads is displayed.
4. Download the drivers or firmware to a USB drive, CD, or DVD.

Locating Service Tag of your system

Your system is identified by a unique Express Service Code and Service Tag number. The Express Service Code and Service Tag are found on the front of the system by pulling out the information tag. Alternatively, the information may be on a sticker on the chassis of the system. The mini Enterprise Service Tag (EST) is found on the back of the system. This information is used by Dell to route support calls to the appropriate personnel.

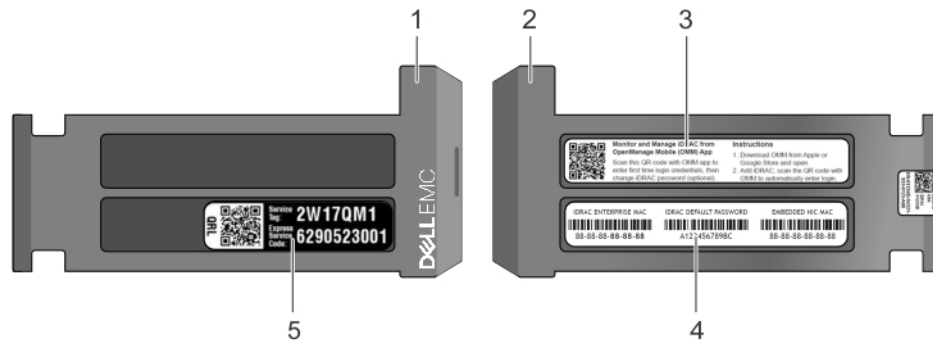


Figure 26. Locating Service Tag of your system

1. Information tag (top view)
2. Information tag (back view)
3. Open Manage Mobile (OMM) label
4. MAC address and secure password label
5. Service tag label