VMware vSphere 6.5.x on Dell EMC PowerEdge Systems

Release Notes

April 2022
Rev. A18

DELL Technologies

Notes, cautions, and warnings

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

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

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

Contents

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Release summary

VMware vSphere 6.5.x includes the ESXi 6.5.x hypervisor and is managed by vCenter Server 6.5.x. The current release of VMware vSphere incorporates feature upgrades, new hardware, feature support, and bug fixes that enhance the virtualization experience in VMware environments.

NOTE: The issues that are listed in this document are applicable to Dell EMC servers with VMware vSphere 6.5.x installed.

Topics:

Version

6.5.x

Release date

September 2020

Priority and recommendations

RECOMMENDED: Dell EMC recommends applying this update during your next scheduled update cycle. The update contains feature enhancements or changes that will help keep your system software current and compatible with other system modules, including firmware, BIOS, drivers, and software.

Installation and upgrade instructions

For information about installing ESXi 6.5.x or upgrading from a previous version of ESXi, see the version specific *VMware vSphere ESXi 6.5.x on Dell EMC PowerEdge Servers Installation Instructions and Important Information Guide* at www.dell.com/virtualizationsolutions.

For the list of enhancements and bug fixes, see the version-specific VMware vSphere release notes at support.vmware.com.

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Compatibility

Topics:

- System configuration requirements

System configuration requirements

Memory

The following table lists the system memory requirements for VMware vSphere 6.5.x on Dell EMC PowerEdge servers.

Table 1. Memory requirements for VMware vSphere 6.5.x

Memory	Size
Minimum recommended system memory	1.5 GB per logical CPU
Maximum certified system memory	16 TB

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Known issues

Topics:

- Hostd log may display warning message
- VMkernel logs may display a warning message related to jumpstart plugin
- SAS address of the Dell EMC PERC controller is displayed incorrectly
- SATA SSD disks may report disk protocol incorrectly
- Some Emulex controller models are displayed incorrectly
- Host platform fails due to unsupported sector sizes on the NVMe devices
- Intel Ethernet 10G 2P X520 adapter controller is displayed incorrectly
- vmnic enumeration for the Mellanox controller may display as vmnic 1000202
- Dell PERC H310 model name is displayed incorrectly
- System physical memory reported in DCUI varies
- vSphere web client displays incorrect Service Tag for Dell EMC PowerEdge blade servers
- Configuring NVMe devices as passthrough device to the guest operating system, ESXi host stops responding and results in PSOD
- Power supply unit status and details are displayed incorrectly in vSphere Web Client or vCenter Server
- Temperature status of the processor may display incorrectly in vSphere Web Client or vCenter Server
- Storage-related sensor details are not available in vSphere Web Client or vCenter Server
- Dell EMC PowerEdge Express Flash NVMe PCIe SSD device is not detected during hot-plug
- The status of LUN or disks is displayed as degraded
- Dual port Mellanox card displays incorrect vmnic number
- Incorrect name for Dell PowerEdge FD332 storage controller
- Software RAID is not supported for VMware ESXi
- Status of some of the PCI devices is listed as Unknown on vCenter server
- PSU wattage is not displayed for a ESXi host on the vCenter Server
- ESXi Direct Console User Interface displays the hardware label as N/A
- ESXi installation may fail while deploying from virtual media
- Unable to turn on Windows virtual machine when Dell PowerEdge Express Flash NVMe PCIe SSD is directly connected as a passthrough device
- VMware ESXi host periodically disconnect and reconnect from vCenter Server during heavy load on storage subsystem
- The PCI passthrough section on vSphere client or vCenter server does not display Dell PowerEdge Express Flash NVMe PCIe SSD
- esxcli command is unable to fetch hardware FRU list information in ESXi 6.5
- Unsafe shutdowns counter of a NVMe device is incremented for both soft and abrupt shutdowns
- Dell EMC PowerEdge servers running specific versions of ESXi 6.0 U3 fails to upgrade to ESXi 6.5.x or ESXi 6.7

Downgrade i40en and Marvell E3 drivers on the systems with ESXi 6.5 U3 A08 image

Description	As there are unsupported drivers in the A08 image, you must downgrade i40en and Marvell E3 drivers when you have ESXi 6.5 U3 A08 image installed on your system.
Applies to	Dell EMC customized VMware ESXi 6.5 U3 image customers that have upgraded from A08 or later.
Solution	To uninstall the drivers, follow the steps: 1. To uninstall the below driver VIBs, see Downgrading device drivers in VMware ESXi (2079279). • i40en - v1.13.1.0 • qfle3 - 1.1.12.0 • qfle3f - 1.1.15.0 • qfle3i - 1.1.5.0 • qcnic - 1.1.57.0 Install the below driver version listed in Step 2 & Step 3. 2. To install the i40en drivers form VMware HCL, see VMware ESXi 6.5 native i40en 1.9.5 NIC Driver for Intel Ethernet Controllers X710, XL710, XXV710, and X722 family. 3. To install the Marvel E3 driver set version **MRVL-E3-Ethernet-iSCSI-FCoE-v1.0.119.2-16969975.zip** which includes qfle3 - v1.1.6.1, qfle3f - 1.1.9.0, qfle3i - 1.1.2.0, qcnic -

1.0.51.0 from VMware HCL, see VMware ESXi 6.5 Driver CD for QLogic Network/iSCSI/FCoE Driver Set.

The UID information for the Dell PowerEdge RAID Controller H310 is displayed incorrectly

Description: The UID information for the Dell PowerEdge RAID Controller H310 is displayed incorrectly as `unknown.vmhba3` when the command `localcli storage core adapter list` is queried. This issue is a cosmetic issue and can be ignored.

Applies to: ESXi 6.x

Systems affected: All Dell EMC PowerEdge servers that support PERC H310 controller.

Tracking number: 117210

The health status of the SD cards are not updated under the Hardware Health tab

Description: The health status of the SD card from the Dell Internal Dual SD Module (IDSDM) is displayed as **Unknown** on the respective **Hardware Health** tabs of the VMware ESXi web client and the vCenter web client.

Applies to: ESXi 6.5.x

Workaround: The iDRAC page displays the status of the IDSDM SD cards correctly.

Systems affected: All Dell EMC PowerEdge servers.

Tracking number: 101450

Network connectivity is lost when virtual machines configured with Virtual Guest Tagging (VGT) are migrated to another ESXi host

Description: When virtual machines that are configured with 802.1q VLAN tagging are migrated to another ESXi host, the network connectivity is lost. The network connectivity is reestablished within a few minutes without any user intervention.

Applies to: ESXi 6.5.x

Cause: VMware VMotion is unable to send a Reverse Address Resolution Protocol (RARP) for the tagged guest virtual machine. For more information VMware Knowledge Base article 2113783.

Workaround: Force an Address Resolution Protocol (ARP) lookup request on the tagged network which generates an egress traffic that is started from the new switch port and update the switch of the new location. Forcing an ARP lookup request can be accomplished by performing a ping to another destination on the network from inside the guest operating system running in the virtual machine.

Systems affected: All Dell EMC PowerEdge servers.

Tracking number: 173609

The Hardware Health tab of the vCenter Web Client does not display any information when a drive is removed

Description: The **Hardware Health** tab does not generate alerts in the vCenter Web Client when a drive is removed from the ESXi host or when a RAID storage array is modified.

Applies to: ESXi 6.5.x

Workaround: The drive status of the ESXi host is marked as **Deassert** under the **Hardware Health** tab when it is removed. The status of the drive removal can also be obtained using the perccli storelib library in the ESXi host shell.

Systems affected: All Dell EMC PowerEdge servers.

Tracking number: 81455

Status of the NVMe devices configured as a host cache device is not updated after surprise removal

Description: When surprise removal is performed on NVMe devices, the status of the drives that are configured as a host cache device is not updated and listed as `Available` when the following esxcli or localcli commands are queried:

```
esxcli storage core device list
esxcli storage nmp path list
```

Applies to: ESXi 6.5.x

Cause: This issue is an expected behavior as the surprise removal of devices that are configured as a host cache device is unsupported.

Systems affected: All Dell EMC PowerEdge servers.

Tracking number: 171186

The NIC description is incorrect

Description: In Dell EMC PowerEdge systems with ESXi 6.5.x, the installed Broadcom 57416 device is displayed as **Broadcom BCM57416 NetXtreme-E 10GBASE-T RDMA Ethernet Controller** instead of **Broadcom BCM57416 NetXtreme-E Dual-Media 10G RDMA Ethernet Controller**. This is a cosmetic issue and there is no functionality loss.

Applies to: ESXi 6.5.x

Workaround: Not applicable

Systems affected: All Dell EMC PowerEdge servers

Tracking number: 154618

FCoE adapter speed is displayed as 0

Description: Dell EMC PowerEdge systems MX740c and MX840c with ESXi 6.5.x and FC adapter configuration displays the FCoE adapter speed as 0 when you run one of the following commands:

- `esxcli storage san fc list`
- `localcli storage san fc list`

When you run the same command on the same system that is configured with an FC device and a lun that is associated with an FC device, the FC adapter speed is not displayed as 0.

Applies to: ESXi 6.5.x

Workaround: Not applicable

Systems affected: Dell EMC PowerEdge MX740c servers and Dell EMC PowerEdge MX840c servers

Tracking number: 157316

The specific NVMe storage device model name is not displayed

Description: On PowerEdge systems with ESXi 6.5.x, the hot-swappable NVMe device model name is displayed as `Non-Volatile memory controller` instead of the actual model name, after the hot-inseration of the drive.

Applies to: ESXi 6.5.x U3

Workaround: Not applicable

Systems affected: All PowerEdge servers

Tracking number: 150315

The vmkernel log displays a warning

Description: On the PowerEdge AMD EPYC servers, the vmkernel log displays a following warning message:

```
WARNING: AMDIOMMU: 222: completion wait bit is not set after a while!
```

These messages are displayed on vSAN Cluster nodes.

Applies to: ESXi 6.5.x

Workaround: These messages can be ignored because there is no functionality loss with these error messages logged in vmkernel.log file.

Systems affected: yx5x AMD PowerEdge servers

Tracking number: 142440

The vmkernel log displays an invalid support message on multiple PCIe devices

Description: On PowerEdge AMD Rome servers with multiple PCIe devices, the vmkernel log displays the following message for all the PCIe devices:

```
invalid supported max link speed
```

These messages are displayed only when Dell iSM or Dell OMSA is installed on the system, or when wbem is enabled.

Applies to: ESXi 6.5.x

Workaround: Enable the wbem, and then disable the provider vmw_pci to prevent these repeated error messages logging in vmkernel.log file. For more information about enable/disable wbem, see the VMware KB 1025757. For more information about disabling provider vwm_pci, see the VMware KB 2053715.

Systems affected: yx5x PowerEdge servers with AMD processors

Tracking number: 114799

PSOD is not seen in the host when the NMI option is selected in the iDRAC UI

Description: In the iDRAC UI of Dell EMC PowerEdge servers with AMD EPYC processors, below the **Configuration** tab, select the **Power Control** option, and then select **NMI(Non-Masing Interrupt)**. On selecting the option NMI on the idrac page, the server crashes the PSOD. However, the PSOD is not seen in the yx5x PowerEdge servers with AMD EPYC processors due to a bug in AMD IOMMU.

Applies to: ESXi 6.5.x

Workaround: Disable IOMMU in the BIOS.

Systems affected: yx5x PowerEdge servers with AMD processors

Tracking number: 132871

scsi-qla4xxx driver update fails with ESXi 6.0 U3 and ESXi 6.5.x Dell EMC customized images

Description: Due to the discrepancy in the driver naming convention for different ESXi releases (for example, 5.x and 6.x), upgrades from ESXi 6.0.x or ESXi 6.5 to ESXi 6.5 U1 A00 retain the older driver for scsi-qla4xxx.

Applies to: ESXi 6.0 U3 and ESXi 6.5.x

Solution: To upgrade to the latest version of scsi-qla4xxx, uninstall the existing driver version using the **`esxcli`** command and install the new driver.

NOTE: If ESXi is booted from SAN network using scsi-qla4xx, the driver cannot be updated.

Virtual machines report guest data consistency errors after disk extend operation

Description: Virtual machines running on VMware vSAN 6.6 and later report guest data consistency errors following a disk extend operation. This is a rare occurrence, requiring specific conditions to be met.

Applies to: ESXi 6.5.x

Workaround: VMware recommends the following workaround:

1. Log in to the ESXi host through SSH with username as root.
2. To set the Inplace Expansion value to 0, run the following command:

```
# esxcfg-advcfg -s 0 /VSAN/ClomEnableInplaceExpansion
```

3. To confirm that the value is set to 0, run the following command:

```
# esxcfg-advcfg -g /VSAN/ClomEnableInplaceExpansion
```

4. Repeat this process on all ESXi hosts in the vSAN cluster.

For more information, see the VMware KB article 58715.

Systems affected: All Dell EMC PowerEdge servers

Tracking number: NA

iDRAC web interface shows incorrect status with ESXi inbox native driver

Description: If the ESXi inbox native driver is installed, iDRAC web interface displays incorrect status for network card details such as **OS Driver State** and **Family Driver version**.

Applies to: ESXi 6.5.x

Workaround: This issue can be ignored because there is no functionality loss.

For more information about the port link status, use vCenter Server or the esxcli command: esxcfg-nics -l.

Systems affected: All Dell EMC PowerEdge servers

Tracking number: 86600

ESXi OS installed on IDSDM fails to boot when USB 3.0 is enabled

Description: On rebooting the Dell EMC PowerEdge R530, R430, and T430 servers, the ESXi OS installed on IDSDM does not boot when the USB 3.0 controller is enabled on the server BIOS.

Applies to: ESXi 6.5.x

Workaround: Disable the **vmkusb** module on the affected servers by running the command:

```
#esxcli system module set -m=vmkusb  -e=FALSE
```

For more information, see VMware KB 2147650.

Systems affected: Dell EMC PowerEdge R530, R430, and T430 servers

Tracking number: 93275

Data integrity issue occurs when deleting virtual disks on ESXi system with PERC9 controller in RAID mode

Description: On the Dell EMC PowerEdge systems running ESXi 6.5.x, data integrity issue occurs on PERC9 controller in RAID mode in the following conditions:

- PERC H730, H730P, H830, FD332xS, FD332xD
- ESXi OS running PERC driver 7.x
- Minimum three virtual disks or more RAID arrays are configured
- A virtual disk is removed, using a delete command, or manually removing all physical disks from an array resulting in an array (VD) failure or removal

Applies to: ESXi 6.5.x

Solution: Download and install the ESXi 6.5.x image with PERC driver v7.703.18.00.

qedf driver data integrity may fail at 256 KB block size

Description: On the Dell EMC PowerEdge systems running ESXi 6.5.x with QLogic FCoE driver (qedf), the I/O workload executed from a Linux VM data integrity may fail at 256 KB block size.

Applies to: ESXi 6.5.x

Solution: Update to Dell EMC customized VMware ESXi 6.5 U1 A11 image.

ESXi 6.5 U1 does not display the complete description of USB controller

Description: On Dell EMC's 14th generation of PowerEdge servers with AMD EPYC and ESXi 6.5 U1 operating system, `lspci` output does not show the complete description of the USB 3.0 controller. The incomplete output may be similar to:

```
0000:04:00.3 Serial bus controller:[vmhba33]
```

whereas the output should be:

```
0000:04:00.3 Serial bus controller: Advanced Micro Devices, Inc. [AMD]
USB 3.0 Host controller [vmhba33]
```

Applies to: ESXi 6.5.x

Workaround: This issue can be ignored because there is no functionality loss.

Critical issue observed on Dell EMC PowerEdge 14th generation servers with AMD processor and HBA330/12Gbps controller

Description: On Dell EMC PowerEdge 14th generation servers with AMD processors and HBA330/12Gbps controller with ESXi 6.5 U1 operating system, the VMkernel log displays the following error message:

```
lsi_msgpt3:msgpt_base_fault_info:236: lsi_msgpt3_0:fault_state(0x2100)!
```

This is a known issue with lsi_msgpt3 driver v14.15.00. The issue is resolved in v14.15.01.

Applies to: ESXi 6.5.x on Dell EMC PowerEdge 14th generation servers such as R7425, R7415, and R6415

Solution: Perform one of the following:

- Install or upgrade the `lsi_msgpt3` driver to v14.15.01.
- Install or upgrade to the latest Dell EMC customized image that has this driver included.

VMkernel logs may display a warning message in VSAN cluster configuration

Description: On PowerEdge servers with HBA330 running ESXi 6.5 U1, if the server is in VSAN cluster configuration, the following warning message is displayed in the VMkernel log. `WARNING: VmkMgmtSyncEventIoctl - unable to validate header`

Applies to: ESXi 6.5.x

Solution: This issue can be ignored because there is no functionality loss.

Uninstallation of Dell EMC OpenManage VIB fails to delete certain files

Description: Specific Dell EMC OpenManage files and directories are not deleted after uninstalling the Dell OpenManage VIB.

Applies to: ESXi 6.5.x

Solution: This issue can be ignored because there is no functionality loss. Reboot the system for complete cleanup.

Dell EMC PowerEdge servers with VSAN All-Flash configuration and deduplication enabled reports unrecoverable medium or checksum error

Description: Dell EMC PowerEdge servers with VSAN All-Flash configuration and deduplication that is enabled reports the following vSphere observations in the **Events** tab:

- VSAN detected an unrecoverable medium or checksum error for component uuid on disk group uuid
- VSAN detected and fixed a medium or checksum error for component uuid on disk group uuid

Under specific operations and IO patterns, you encounter IO read errors and sometimes severe symptoms such as inaccessible VMs, host failures, or stuck resynchronizations.

Applies to: ESXi 6.5.x

Solution: Perform one of the following steps:

- Install the Patch as mentioned in the *VMware Knowledge Base article 2151081*.
- Install or upgrade to the latest Dell EMC customized image, that has this patch included. For more information about Dell EMC customized image, see Image Customization Information.

ESXi 6.5 with dell-shared-perc8 driver fails to clone VMs simultaneously on a shared datastore

Description: Due to open critical issues around dell-shared-perc8 driver (v06.806.89.00), Dell EMC has revoked VMware ESXi 6.5 support on Dell EMC PowerEdge VRTX. Some of the use cases which fail on VRTX are clone, snapshots and so on. The failure occurs when there are storage intensive I/O operations involving Shared PERC8 VMFS datastore. During the failure, vmkernel log file reports:

```
Writing lock failed: I/O error
```

Applies to: ESXi 6.5.x

Solution: Dell EMC recommends that you install ESXi 6.5 U1 A04 image which has latest dell-shared-perc8 driver (v6.806.90.00).

qlnativefc driver does not load for QLE8262

Description: The Dell EMC PowerEdge server with QLE8262 running ESXi 6.5 U1 does not load the qlnativefc driver.

Applies to: ESXi 6.5.x

Solution: Perform any one of the following tasks that is appropriate:

- Install Dell Customized 6.5 U1 image that has the async qlnativefc driver for QLE8262.

  or

- If the ESXi image is downloaded from the VMware download page, use the latest async driver from VMware HCL.

snmpd failure message is displayed in the vRealize log insight with snmp enabled

Description: With snmp enabled on ESXi 6.5 U1 OS, the following snmpd failure message is displayed in the vRealize log insight. `snmpd: process_compact_sensor: load current state for sensor 0x3c failed completion code 0xcb`

Applies to: ESXi 6.5.x

Solution: This issue can be ignored because there is no functionality loss.

ESXi OS with Secure boot enabled, the executables does not work on `/scratch partition`

Description: ESXi OS, with Secure boot enabled, does not allow any executables to run on `/scratch partition` or non-visorfs.

Applies to: ESXi 6.5.x

Solution: There is no workaround.

PowerEdge 14th generations servers installed with ESXi are configured with default login credentials

Description: The Dell EMC 14th generation PowerEdge Servers installed with ESXi have been configured with username as `root` and the password is the service tag of your system. This is different compared to the Dell EMC 13th generation PowerEdge Servers because password was not set for username `root`.

Applies to: ESXi 6.5.x and later, and 14th generation PowerEdge servers

Solution: This is not an issue. This is a change introduced from Dell EMC factories shipping VMware ESXi. To locate the service tag of your system, see the **Locating Service Tag of your system** section in *VMware vSphere 6.5.x on Dell EMC PowerEdge Systems Getting Started Guide* at www.dell.com/virtualizationsolutions.

By default, VMFS datastore is disabled on Dell EMC 14th generation PowerEdge Servers with factory-installed VMware ESXi on BOSS-S1

Description: The Dell EMC 14th generation servers installed with ESXi on the BOSS-S1 device do not have VMFS datastore enabled by default.

Applies to: ESXi 6.5.x and later, 14th generation PowerEdge Servers, and BOSS-S1

Workaround: Dell EMC recommends using the BOSS-S1 device as a boot device only for VMware ESXi. For more information, see the *VMware Knowledge Base article 2145210*.

Scratch partition stops working after hardware or software iSCSI is enabled on ESXi with elxiscsi Emulex driver

Description: When specific versions of elxiscsi Emulex driver are installed or is part of ESXi, then, enabling the hardware or software iSCSI stops the scratch partition to work. This prevents the redirection of logging to a persistent data store causing loss of log data across reboots.

Applies to: ESXi 6.5.x

Solution: Dell EMC recommends that you install ESXi 6.5U1-A05 customized image which has latest Emulex elxiscsi-11.2.1197.17 driver to resolve this issue.

Perform one of the following steps:

- Use `syslog` for logging on hardware or software iSCSI configurations with Emulex driver version `elxiscsi-11.2.1152.0` and later. For more information about configuring syslog, see *VMware Knowledge Base article 2003322*.
- Uninstall the elxiscsi driver and the associated shared library `elx-esx-libelxima.so`, if Emulex is not part of the configuration. To uninstall the elxiscsi driver, run the following commands:
  1. `/etc/init.d/hostd stop`
  2. `localcli software vib remove -n elxiscsi -n elx-esx-libelxima.so`
  3. `reboot`

Virtual machines fail to power on, when system BIOS has MMIO set to 56 TB with supported GPU configured as pass-through device

Description: When system BIOS has **Memory Mapped I/O Base** set to 56 TB and if the server has GPU cards such as Nvidia M60 as the PCIe pass-through device, the virtual machines fails to power on.

Applies to: ESXi 6.5.x and Dell EMC's 14th generation PowerEdge Servers

Workaround: In **System BIOS Settings** > **Integrated Devices**, set **Memory Mapped I/O Base** to 12 TB. For more information, see the *VMware Knowledge Base article 2142307*.

In ESXi host client, physical NICs reports duplicate entries of the speed supported

Description: When you try to edit settings for physical NICs, you will find multiple duplicated entries of the network speed supported which is displayed multiple times. For example, 10,000 Mbps, full duplex.

Applies to: ESXi 6.5.x

Solution: This issue can be ignored because there is no functionality loss.

Embedded Host Client or vCenter Server reports an error when configuring SR-IOV

Description: When configuring SR-IOV with Embedded Host Client or vCenter Server, a warning message is displayed, `Failed to configure SR-IOV`.

Applies to: ESXi 6.5.x

Solution: By default, SR-IOV is disabled. Enable SR-IOV by running the following command:

```
esxcli system module parameters set -m NIC_Driver_Module -p "max_vfs=n"
```

For more information, see *VMware Knowledge Base article 2142307*.

Virtual machines fail to power on, when System BIOS has MMIO set to 56 TB with Network Controllers enabled with NPAR or NPAREP and SR-IOV

Description: When system BIOS has **Memory Mapped I/O Base** set to 56 TB and if the server has network controllers with NPAR and SR-IOV enabled, virtual machines fail to power on.

Applies to: ESXi 6.5.x and 14th generation PowerEdge servers

Solution: In **System BIOS Settings** > **Integrated Devices**, set **Memory Mapped I/O Base** to 12 TB. For more information, see*VMware Knowledge Base article 2142307*.

In ESXi 6.5, xHCI related platform erratum is reported in VMkernel logs

Description: After ESXi Installation, VMkernel logs displays the following warning message:

```
Platform erratum: xHCI Host Controller USB 2.0 Control Transfer may cause
IN Data to be dropped. BIOS firmware update may be required.
```

```
WARNING: xhci_pci_attach:340: Platform erratum: xHCI controller Parity
Error response bit set to avoid parity error on poison packet.
```

Applies to: ESXi 6.5.x and 14th generation PowerEdge Servers

Workaround: This issue can be ignored because there is no functionality loss.

Hardware Health status reports the raw reading instead of the computed reading of IPMI Sensors

Description: In ESXi vCenter Server or Webclient, the Host Hardware status information reports the raw reading of the sensors rather than the computed reading.

Applies to: ESXi 6.5.x and 14th generation PowerEdge servers

Solution: Use Open Manage Server Administrator or iDRAC to monitor system health status.

iDRAC does not report the operating system information

Description: PowerEdge server installed with VMware ESXi 6.5 does not report the installed operating system information in iDRAC.

Applies to: ESXi 6.5.x, 13th, and 12th generation PowerEdge servers

Solution: By default, WBEM is disabled. The workaround is to enable WBEM by running the command:

```
esxcli system wbem set -e 1
```

iDRAC does not report the operating system information

Description: PowerEdge server installed with VMware ESXi 6.0.x does not report the installed operating system information in iDRAC.

Applies to: ESXi 6.5.x and 14th generation PowerEdge servers.

Solution: Install OpenManage Server Administrator on ESXi.

Operating system reinstallation on top of an existing ESXi installation on a BOSS device fails

Description: Dell EMC 14th generation PowerEdge Server configurations include a Boot Optimized Server Storage (BOSS) device for OS boot. BOSS device supports two Intel M.2 devices that are configured as separate non-RAID drives (PD1, PD2) or RAID 1 (VD). This configuration provides an option to have two physical disk (PD1, PD2) or RAID 1(VD) options, utilizing the two physical disks which are Intel M.2 devices.

On the first installation of ESXi 6.0.x to a BOSS PD 1, OS initializes or formats the disk layout and works as expected.

After ESXi 6.0.x is installed on a BOSS device, with ESXi 6.0.x installed on PD1, if a customer creates a VD on top of two physical disks (PD1, PD2), a subsequent reinstall (overwrite) of ESXi fails to reformat the disk layout. Upgrades of the existing installation (using original non-RAID drive) works.

Applies to: ESXi 6.5 and 14th generation PowerEdge Servers

Workaround: Delete the virtual disk (VD) and erase the physical disks manually from HII (**System BIOS** > **Device Settings** > **BOSS AHCI Configuration Utility** > **Erase Physical disks**), and then recreate the VD again. This removes existing partition table and results in successful installation.

NUMA related warning message is reported in VMkernel logs when Dell Fault Resilient Memory is enabled

Description: When accessing the console of the ESX/ESXi host or VMkernel logs, a warning message is displayed similar to: `Significant imbalance between NUMA nodes detected`. This issue occurs when the Dell Fault Resilient feature is enabled in the System BIOS.

Applies to: ESXi

Workaround: There is no functionality impact and can be safely ignored. For more information, see VMware KB 1018754.

Hardware Health Status tab does not display sensor details

Description: In vCenter, the **Hardware Health Status** tab does not display all sensor details.

Applies to: ESXi 6.5.x

Workaround: Enable `WBEM` by using the command `esxcli system wbem set -e 1`. Wait for a couple of minutes, and then update the **Hardware Health Status** tab.

VMKernel logs may display a warning message

Description: On Dell EMC PowerEdge servers, when ESXi 6.5 is deployed, the system may display a warning message: `Failed to get irq routing info for seg/bus 0000:3f`.

Applies to: ESXi 6.5.x.

Workaround: This issue is fixed in Dell EMC ESXi 6.5.x build A10.

Hostd log may display warning message

Description: Hostd log may display a warning message as `Default Estimated fds limit 5120 > 4096 max supported by setrlimit. Setting fds limit to 4096.`

Applies to: ESXi 6.5.x

Solution: This issue can be ignored because there is no functionality loss.

VMkernel logs may display a warning message related to jumpstart plugin

Description: VMkernel logs may display a warning message: `Jumpstart plugin restore-networking activation failed.`

Applies to: ESXi 6.5.x

Solution: This issue can be ignored because there is no functionality loss.

SAS address of the Dell EMC PERC controller is displayed incorrectly

Description: In ESXi 6.5, the SAS address of the Dell EMC PERC controller is displayed as `WWNN` under the **Storage Adapter** section, in vSphere Webclient.

Applies to: ESXi 6.5.x

Solution: This issue can be ignored because there is no functionality loss.

SATA SSD disks may report disk protocol incorrectly

Description: In ESXi 6.5, vSphere WebClient may report the SATA SSD disks as SAS protocol.

Applies to: ESXi 6.5.x

Solution: This issue can be ignored because there is no functionality loss.

Some Emulex controller models are displayed incorrectly

Description: In ESXi, Emulex OCe14102-UX-D, Emulex OCm14104-UX-D, and Emulex OneConnect OCm14102B controller models are displayed as Emulex Corporation Emulex OneConnect OCe14000 NIC.

Applies to: ESXi 6.5.x

Solution: This issue can be ignored because there is no functionality loss.

Host platform fails due to unsupported sector sizes on the NVMe devices

Description: The PowerEdge UEFI partition manager supports sector sizes 512B or 4 KB for the NVMe devices. When you reformat the NVMe device to a new sector size other than 512B or 4 KB, the host platform fails to boot.

Applies to: ESXi 6.5.x

Solution: Use only 512B (default) or 4 KB sector sizes. To recover 2.5-inch NVMe devices, which have been formatted to an unsupported sector size:

1. Remove the devices from the host platform before booting.
2. Hot insert once the operating system is up and running.
3. Reformat to one of the supported sector sizes—512B or 4 KB.

Intel Ethernet 10G 2P X520 adapter controller is displayed incorrectly

Description: In ESXi, the Intel Ethernet 10G 2P X520 Adapter model is displayed incorrectly as Intel Corporation 82599 EB 10-Gigabit SFP+ Network Connection.

Applies to: ESXi 6.5.x

Solution: This issue can be ignored because there is no functionality loss.

vmnic enumeration for the Mellanox controller may display as vmnic 1000202

Description: On the Dell EMC PowerEdge servers with ESXi 6.5, vmnic Enumeration for the Mellanox controllers may display values such as `vmnic 1000202`. The enumeration occurs as the VMware ESXi device naming mechanism is based on the PCIe Index and Mellanox has single function for both ports.

Applies to: ESXi 6.5.x

Workaround: This issue can be ignored because there is no functionality loss.

Dell PERC H310 model name is displayed incorrectly

Description: In ESXi 6.5, Dell H310 mini controller name is displayed as **MegaRAID SAS SKINNY Controller**.

Applies to: ESXi 6.5.x

Solution: This issue can be ignored because there is no functionality loss.

System physical memory reported in DCUI varies

Description: System memory reported in DCUI is slightly different when compared to the memory displayed in the system BIOS. For example, memory present is 128 GB but ESXi may report the memory as 127.9 GB.

Applies to: ESXi 6.5.x

Solution: This issue can be ignored because there is no functionality loss.

vSphere web client displays incorrect Service Tag for Dell EMC PowerEdge blade servers

Description: The vCenter server connected using a web client displays incorrect service tag for Dell EMC PowerEdge blade servers. The Service Tag displayed is a combination of chassis service tag and blade server Service Tag.

Applies to: ESXi 6.5.x

Solution: This issue can be ignored because there is no functionality loss. Run the `smbiosDump` command in ESXi to know the correct Service Tag for the blade and also for the chassis.

Configuring NVMe devices as passthrough device to the guest operating system, ESXi host stops responding and results in PSOD

Description: When the NVMe devices are configured as passthrough device to the guest operating system, the host system stops functioning and can result in data corruption.

Applies to: ESXi 6.5.x

Solution: You must manually set the Virtual Machine (VM) Memory Mapped Input Output (MMIO) space to 2 GB in the *.vmx* file by using the following steps:

NOTE: Do not replace any hardware components while performing these steps.

1. All the VMs configured memory must be reserved. If each VM has 2 GB of memory allocated, you should reserve all 2 GB. To do this by using the vSphere Client, select the **Reserve all guest memory** option from the **Memory** drop-down menu under the **Resources** tab in a **Virtual Machine's Settings** window. For more information, see the *VMware Knowledge Base article 1010789*.
2. For VMs that have more than 2 GB of configured memory, add this parameter to the *.vmx* file of the VM: *pciHole.start = "2048"*.

   NOTE: The guest OS should be turned off before editing the *.vmx* file.
3. By using the vSphere Client, connect NVMe PCIe SSD installer that is configured as passthrough devices directly to the ESXi host, or select the host in vCenter.
4. Right-click the VM and select **Edit Settings**.
5. Add a new device by selecting PCI Device from the list, and then click **Next**.
6. Select the **NVMe PCIe SSD** as the passthrough device to connect to the VM from the drop-down list, and then click **Next**.
7. Click **Finish**.
8. Download and install the supported drivers for the VM's OS.
9. Reboot the VM.

Power supply unit status and details are displayed incorrectly in vSphere Web Client or vCenter Server

Description: On the Dell PowerEdge C6320 servers, the status and details of power supply unit (PSU) are displayed incorrectly. The PSU report is displayed as Not Installed on the **Hardware Health Status** tab, in vCenter Server. The PSU report is displayed as **Normal** on the **Hardware Health Status** tab, in vSphere Web Client.

Applies to: ESXi 6.5.x

Solution:	Use Dell EMC OpenManage for monitoring or managing the servers with ESXi.

Temperature status of the processor may display incorrectly in vSphere Web Client or vCenter Server

Description:	On the Dell PowerEdge C6320 servers, when the temperature of the processor crosses critical thresholds, the temperature status of the processor may display incorrectly on the **Hardware Health Status** tab of the vCenter Server or vSphere Web Client.
Applies to:	ESXi 6.5.x
Solution:	Use Dell EMC OpenManage or iDRAC for monitoring or managing the servers with ESXi.

Storage-related sensor details are not available in vSphere Web Client or vCenter Server

Description:	On the Dell PowerEdge C6320 servers, the vSphere Web Client does not display hard drive, system board riser, and driver cable information under the **Storage and Cable/Interconnect sensor** section.
Applies to:	ESXi 6.5.x
Solution:	Use Dell EMC OpenManage or iDRAC for monitoring or management the servers with ESXi.

Dell EMC PowerEdge Express Flash NVMe PCIe SSD device is not detected during hot-plug

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.
Applies to:	ESXi 6.5.x
Solution:	Perform one of the following: ● Reconnect the drive to a different drive slot, if available. ● Restart the `sfcbd-watchdog` service, and reinsert the drive.

The status of LUN or disks is displayed as degraded

Description:	The command line interface (CLI) utility esxcfg-scsidevs lists the status of the LUN or disks attached to FD332 as degraded.
Applies to:	ESXi 6.5.x
Solution:	For the actual LUN or VD status, see the Storage section of iDRAC or vCenter Server.

Dual port Mellanox card displays incorrect vmnic number

Description:	The dual port Mellanox card displays an incorrect vmnic number for the second port.
Applies to:	ESXi 6.5.x

Solution: There is no workaround.

Incorrect name for Dell PowerEdge FD332 storage controller

Description: The storage controller for Dell PowerEdge FD332 is named as FS332 instead of FD332.

Applies to: ESXi 6.5.x

Solution: This issue can be ignored because there is no functionality loss.

Software RAID is not supported for VMware ESXi

Description: On-board SATA controller for Dell EMC PowerEdge servers provides an option to create RAID. The software RAID LUNs are not supported because VMware ESXi does not carry supported drivers. Select AHCI or ATA mode for SATA Controller on the **BIOS Setup** page and clear RAID mode.

Applies to: ESXi 6.5.x

Solution: There is no workaround.

Status of some of the PCI devices is listed as Unknown on vCenter server

Description: On vCenter Server some of the entries status in the PCI device section of the **Hardware Status** tab on the ESXi host are listed as `Unknown`.

Applies to: ESXi 6.5.x

Solution: This issue can be ignored because there is no functionality loss.

PSU wattage is not displayed for a ESXi host on the vCenter Server

Description: For Dell's 13th generation of PowerEdge servers with ESXi the power (Watt) of a Power Supply Unit (PSU) is not displayed in the Power section on the Hardware Status tab on vCenter Server.

Applies to: ESXi 6.5.x

Solution: This issue can be ignored because there is no functionality loss.

ESXi Direct Console User Interface displays the hardware label as N/A

Description: For some network cards the Hardware Label field on the DCUI of ESXi displays N/A instead of a valid device description. This issue occurs because of the method in which ESXi maps the device to the user interface by checking the output of the lspci and smbios commands from the server.

Applies to: ESXi 6.5.x

Solution: This issue can be ignored because there is no functionality loss.

ESXi installation may fail while deploying from virtual media

Description:	For some PowerEdge systems while installing VMware ESXi from virtual media with iDRAC virtual console installation the installation stops responding if Spanning Tree Protocol is enabled and the iDRAC NIC is set as Shared.
Applies to:	ESXi 6.5.x
Solution:	Disable STP or do not connect iDRAC NIC to Shared.

Unable to turn on Windows virtual machine when Dell PowerEdge Express Flash NVMe PCIe SSD is directly connected as a passthrough device

Description:	Unable to turn on Microsoft Windows VMs such as Microsoft Windows 2008 R2 SP1, Microsoft Windows 2012, or Microsoft Windows 2012 R2 when PCIe SSDs such as Express Flash NVMe PCIe SSD is directly connected as a passthrough device.
Applies to:	ESXi 6.5.x
Solution:	The maximum number of VMs that Windows can support is 31. You can manually set the MSI-X vectors to 31. For more information, see the *VMware Knowledge Base article 2032981*.

VMware ESXi host periodically disconnect and reconnect from vCenter Server during heavy load on storage subsystem

Description:	ESXi host gets disconnected periodically from vCenter Server during heavy load on storage subsystem. However, the host gets reconnected automatically after some time.
Applies to:	ESXi 6.5.x
Solution:	This issue can be ignored because there is no functionality loss.

The PCI passthrough section on vSphere client or vCenter server does not display Dell PowerEdge Express Flash NVMe PCIe SSD

Description:	After a hot plug of Express Flash NVMe PCIe SSD, the device is not available for PCI passthrough. The device itself is not displayed in the PCI passthrough page.
Applies to:	ESXi 6.5.x
Solution:	Restart hosted service (`/etc/init.d/hostd restart`) to make the device available for passthrough

esxcli command is unable to fetch hardware FRU list information in ESXi 6.5

Description: In ESXi 6.5, the following `esxcli` command is unable to fetch the `hardware FRU list` information.

```
# esxcli hardware ipmi fru list
```

```
not well-formed (invalid token): line 7, column 176.
```

Applies to: 6.5.x

Solution: This is a known issue in ESXi 6.5.x which is fixed in ESXi 6.7.

In ESXi 6.5.x, use the `localcli` command instead of `esxcli`.

```
# localcli hardware ipmi fru list
```

Unsafe shutdowns counter of a NVMe device is incremented for both soft and abrupt shutdowns

Description: In ESXi 6.5, Unsafe shutdowns counter of a NVMe device is incremented for both soft, and abrupt shutdowns.

Applies to: 6.5.x.

Workaround: This is a known issue and does not cause data loss or corruption.

Dell EMC PowerEdge servers running specific versions of ESXi 6.0 U3 fails to upgrade to ESXi 6.5.x or ESXi 6.7

Description: When an upgrade is attempted to either ESXi 6.0 U3 v A11 or ESXi 6.5, ESXi 6.5 U1, ESXi 6.5 U2, or ESXi 6.7, on Dell EMC PowerEdge servers running ESXi 6.0 U3 (vA06/A07/A08/A08/A10), it may result in a failure with the following error message:

```
esxupdate: ERROR: ValueError: Cannot merge
VIBs MEL_bootbank_nmlx5-core_4.15.10.3-1OEM.600.0.0.2768847,
MEL_bootbank_nmlx5-core_4.15.10.3-1OEM.600.0.0.2768847 with unequal
acceptancelevel attributes: (certified, partner)
```

Applies to: 6.0.x, 6.5.x, 6.7.x

Solution: Following are the steps for a successful upgrade from ESXi 6.0 U3 without Mellanox devices in the configuration:

1. Download `nmlx5-core driver vib` from VMware HCL at https://my.vmware.com/web/vmware/details?downloadGroup=DT-ESXI60-MELLANOX-NMLX5-CORE-415103&productId=491.

   Skip this step if the Mellanox driver is not required for future use.

2. Copy the `nmlx5-core driver vib` to ESXi host. Ensure that you copy the driver `vib` to datastore.

   Skip this step if the Mellanox driver is not required for future use.

3. Log in to ESXi host, and uninstall the `nmlx5-core` driver using `esxcli or localcli`.

4. Perform **Graceful Reboot**.
5. Install the new driver using the `esxcli or localcli`.

   Skip this step if the Mellanox driver is not required for future use.
6. Start the upgrade process.

Dell EMC recommends a fresh installation to the latest available with Mellanox devices in the configuration.

4

Resources and support

Not applicable.

Topics:

Related information for virtualization solutions

Table 2. Related information for virtualization solutions

If you need information about	See
Dell EMC VMware documentation	www.dell.com/virtualizationsolutions
OpenManage documentation	www.dell.com/openmanagemanuals
PowerEdge documentation	www.dell.com/poweredgemanuals
Basic configuration information for running ESXi on a Dell EMC PowerEdge server	Getting Started Guide at www.dell.com/virtualizationsolutions
• Information about downloading, installing, and configuring ESXi • Supported hardware configurations for running ESXi on a Dell EMC PowerEdge server	Installation Instructions and Important Information Guide at www.dell.com/virtualizationsolutions
PowerEdge servers and compatibility with vMotion	*VMware ESXi vMotion Support on Dell EMC PowerEdge Servers Compatibility Matrix* at www.dell.com/virtualizationsolutions
PowerEdge and PowerVault compatibility information for running ESXi	*VMware vSphere on Dell EMC PowerEdge Servers Compatibility Matrix* at www.dell.com/virtualizationsolutions
Known issues and resolutions	*VMware vSphere 6.5.x on Dell EMC PowerEdge Server Release Notes* at www.dell.com/virtualizationsolutions
ESXi ISO image customization information	*VMware ESXi on Dell EMC PowerEdge Systems Image Customization Information* at www.dell.com/virtualizationsolutions

Technical support resources

- vmware.com/support
- www.dell.com/support/home
- Dell.com/services

Discussion forums

- Communities.vmware.com/community/vmtn
- Dell Virtualization
- Wikis, Forums, Blogs, and Videos
- Dell Community

Knowledge base

- kb.vmware.com/kb

NOTE: For more information that is related to the VMware ESXi installation on Dell EMC PowerEdge servers, go to Dell Virtualization.

Virtualization videos for Dell EMC PowerEdge servers

All the supported virtualization videos for Dell EMC PowerEdge servers are available in the Supported Operating Systems for Dell PowerEdge servers playlist.

Table 3. Virtualization videos for Dell EMC PowerEdge servers

Video title	Links
Downloading the Dell EMC customized ESXi image from support site	www.youtube.com/watch?v=YnVxtkAkYTI
Downloading Dell EMC customized ESXi image from VMware website	www.youtube.com/watch?v=TnWyuyxuk5k
OS Deployment (VMware ESXi)—Installing Using CD/DVD	www.youtube.com/watch?v=-EbufUS86zA
Enabling and Configuring Fault Resilient Memory on Dell EMC PowerEdge servers	www.youtube.com/watch?v=retSh-XlsK0
OS Deployment (VMware ESXi)—Installing on BOSS S1 device	www.youtube.com/watch?v=TB1loXpFFME
OS Deployment (VMware ESXi)—Installing on IDSDM	www.youtube.com/watch?v=EC-Xntg5mgw
To enable UEFI Secure Boot on VMware ESXi for Dell EMC's yx3x PowerEdge servers **NOTE:** This video is applicable to VMware ESXi 6.5.x.	www.youtube.com/watch?v=Ll9qlF9qV9I
To enable UEFI Secure Boot on VMware ESXi for Dell EMC's yx4x PowerEdge servers **NOTE:** This video is applicable to VMware ESXi 6.5.x.	www.youtube.com/watch?v=ZZB_XyV0enY

Documentation resources

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

Table 4. Additional documentation resources for your server

Task	Document	Location
Setting up your server	For information about installing the server into a rack, see the rack documentation included with your rack solution or the *Getting Started Guide* that is shipped with your server.	www.dell.com/poweredgemanuals

Table 4. Additional documentation resources for your server (continued)

Task	Document	Location
	For information about turning on the server and the technical specifications of your server, see the *Getting Started Guide* that is shipped with your server.	www.dell.com/poweredgemanuals
Configuring your server	For information about the iDRAC features, configuring and logging in to iDRAC, and managing your server remotely, see the *Integrated Dell Remote Access Configuration Tool User's Guide.*	www.dell.com/idracmanuals
	For information about installing the operating system, see operating system documentation.	www.dell.com/operatingsystemmanuals
	For information about understanding Remote Access Controller Admin (RACADM) subcommands and supported RACADM interfaces, see the *iDRAC RACADM CLI Guide*.	www.dell.com/idracmanuals
	For information about updating drivers and firmware, see Download drivers and firmware topic in this document.	www.dell.com/support/drivers
Managing your server	For information about server management software offered by Dell EMC, see the Dell EMC *Systems Management Overview Guide*.	www.dell.com/openmanagemanuals
	For information about setting up, using, and troubleshooting OpenManage, see the Dell EMC *OpenManage Server Administrator User's Guide*.	www.dell.com/openmanagemanuals
	For information about installing, using, and troubleshooting Dell EMC OpenManage Essentials, go to *www.dell.com/openmanagemanuals* > *OpenManage Essentials User's Guide*.	www.dell.com/openmanagemanuals
	For information about installing and using Dell SupportAssist, see the Dell EMC *SupportAssist Enterprise User's Guide*.	www.dell.com/serviceabilitytools
	For understanding the features of Dell EMC Lifecycle Controller (LC), see the *Lifecycle Controller User's Guide*.	www.dell.com/idracmanuals
	For information about partner programs enterprise systems management, see the *OpenManage*	www.dell.com/esmmanuals

Table 4. Additional documentation resources for your server (continued)

Task	Document	Location
	Connections Enterprise Systems Management documents.	
	For information about viewing inventory, performing configuration, and monitoring tasks, remotely turning on or off servers, and enabling alerts for events on servers and components using the Dell EMC Chassis Management Controller (CMC), see the *Chassis Management Controller User's Guide* .	www.dell.com/esmmanuals
Working with the Dell EMC PowerEdge RAID controllers	For information about understanding the features of the Dell EMC PowerEdge RAID controllers (PERC) and deploying the PERC cards, see the Storage controller documentation.	www.dell.com/storagecontrollermanuals
Understanding event and error messages	For information about checking the event and error messages generated by the system firmware and agents that monitor server components, see the Dell EMC Event and Error Messages Reference Guide.	www.dell.com/openmanagemanuals
Troubleshooting your system	For information about identifying and troubleshooting the PowerEdge server issues, see the *PowerEdge Servers Troubleshooting Guide*.	www.dell.com/poweredgemanuals
Configuring Dell PowerEdge VRTX shared storage for VMware vSphere environment	For information on configuring Dell PowerEdge VRTX shared storage for VMware vSphere environment, see Dell EMC White papers.	Configuring Dell PowerEdge VRTX shared storage for VMware vSphere Environment

Identifying the series of your Dell EMC PowerEdge servers

The PowerEdge series of servers form Dell EMC are divided into different categories on the basis of their configuration. For easier reference, they are referred to as YX2X, YX3X, YX4X, YX4XX, or YX5XX series of servers. The structure of the naming convention is described below:

The letter Y denotes the alphabets in the server model number. The alphabets denote the form factor of the server. The form factors are described below:

- Cloud (C)
- Flexible(F)
- Modular (M or MX)
- Rack(R)
- Tower(T)

The letter X denotes the numbers in the server model number. The numbers denote multiple items about the server.

- The first digit (denoted by X) denotes the value stream or class of the server.

- 1-5—iDRAC basic
- 6-9—iDRAC Express

- The second digit denotes the series of the server. It is retained in the server naming convention and not replaced by the letter X.
  - 0—series 10
  - 1—series 11
  - 2—series 12
  - 3—series 13
  - 4—series 14
  - 5—series 15
- The third digit (denoted by X) denotes the number of processor sockets a series of server supports. This is applicable only from series 14 of PowerEdge servers.
  - 1–one socket server
  - 2–two socket server
- The last digit (denoted by X) always denotes the make of the processor as described below:
  - 0—Intel
  - 5—AMD

Table 5. PowerEdge servers naming convention and examples

YX3X servers	YX4X systems	YX4XX systems	YX5XX
PowerEdge M630	PowerEdge M640	PowerEdge R6415	PowerEdge R6515
PowerEdge M830	PowerEdge R440	PowerEdge R7415	PowerEdge R7515
PowerEdge T130	PowerEdge R540	PowerEdge R7425	PowerEdge R6525

Download drivers and firmware

It is recommended that you download and install the latest BIOS, drivers, and systems management firmware on your system.

Ensure that you clear the web browser cache before downloading the drivers and firmware.

1. Go to www.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 the right arrow button.

   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.

Documentation feedback

You can rate the documentation or write your feedback on any of our Dell EMC documentation pages and click **Send Feedback** to send your feedback.

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Contacting Dell EMC

Dell EMC provides several online and telephone-based support and service options. Availability varies by country, region, and product, and some services may not be available in your area.

To contact Dell EMC for sales, technical assistance, or customer service issues, see www.dell.com/contactdell.

If you do not have an active Internet connection, you can find contact information on your purchase invoice, packing slip, bill, or the product catalog.