

# Dell EMC PowerEdge Systems running Red Hat Enterprise Linux 6 (x86\_64, x86)

Installation Instructions and Important Information

## 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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# Installation instructions and important information

## Overview

This document provides the following information:

- Instructions for installing and reinstalling the operating system on your Dell EMC system.
- Sources of additional information.

## Latest available operating system

The latest update to Red Hat Enterprise Linux is 6.10. This update provides fixes for certain issues that are found in the previous releases.

## System configuration requirements

### Operating system architecture

Dell EMC supports the x86\_64 version of Red Hat Enterprise Linux 6 on all Dell EMC PowerEdge systems. To check if your PowerEdge system supports Red Hat Enterprise Linux 6, see the operating systems support matrix at [Dell.com/ossupport](http://Dell.com/ossupport).

**NOTE:** If you require the x86 version of the operating system, Dell EMC recommends that you run it as a VM on Red Hat Enterprise Linux 6 x86\_64 or an equivalent host. For information about installing a Red Hat Enterprise Linux 6 virtualized guest, go to [www.access.redhat.com/documentation](http://www.access.redhat.com/documentation).

## Memory

The following table lists the system memory requirements on the x86\_64 architecture of Red Hat Enterprise Linux 6, as recommended by Red Hat.

**Table 1. Memory Requirements on x86\_64 Architecture**

Memory	Size
Minimum	1 GB
Recommended	2 GB
Maximum certified system memory	6 TB
Maximum certified system memory on an x86 virtual machine	6 GB

**NOTE:** The maximum system memory that kernel supports may be greater than the value listed in this table. For more information, see [www.redhat.com/rhel/compare](http://www.redhat.com/rhel/compare).

**NOTE:** PowerEdge R910 systems support up to 2 TB of memory.

# Bootable disk size

By default, Red Hat Enterprise Linux 6 configures partitions in the MS-DOS master boot record (MBR) format. The MBR scheme limits the size of the boot disk (physical or virtual) to 2.2 TB. Use the GUID partition table (GPT) on the boot disk while installing Red Hat Enterprise Linux 6 for disks larger than 2.2 TB. For more information on setting up GPT during installation, see [Installing In The UEFI Mode](#).

**Table 2. Bootable Disk Size**

Interface	Disk/LUN
Conventional BIOS	Less than 2 TB
UEFI or GPT	Greater than 2 TB

# Reviewing preconfiguration options

This section describes packages and options that are installed or preconfigured by Dell EMC.

# Operating system packages preinstalled by Dell EMC

Dell EMC has preinstalled on your system a set of operating system packages that provides the features required by system users. If you require functionality not provided by the packages, install additional packages from the Red Hat installation media or through Red Hat Network.

# Languages

Your system is pre-installed with the Red Hat operating system for the following languages:

- English
- French
- German
- Korean
- Spanish
- Japanese
- Simplified Chinese

# Storage partitions

The following table lists the partition scheme for a pre-installed Red Hat Enterprise Linux 6 operating system.

**Table 3. Pre-Installed Red Hat Enterprise Linux Partitions and Mount Points for the Primary Hard Drive**

Mount Point	Size (MB)	Partition Type	Volume Group
Utility Partition	32–326	FAT 32	N/A
/	4096	ext4	LogVol00
/boot	200	ext4	N/A

Mount Point	Size (MB)	Partition Type	Volume Group
Swap	automatic	Linux swap	LogVol01
/usr	6144	ext4	LogVol02
/tmp	3072	ext4	LogVol03
/var	8192	ext4	LogVol04
/home	4096	ext4	LogVol05

**NOTE:** The size of the default Logical Volume Management (LVM) partitions (such as, /usr, /tmp) is based on a single 36 GB hard drive. If you have a larger hard drive or multiple hard drives, use the various native LVM tools to resize the existing partitions and create new partitions, per your custom requirements.

**NOTE:** The minimum swap size is 250 MB. For memory up to 4 GB, it is recommended that the minimum swap size be at least 2 GB. For the recommended swap size, see [www.access.redhat.com/documentation](http://www.access.redhat.com/documentation).

## Installing and reinstalling Red Hat Enterprise Linux 6

**CAUTION:** Back up all the data from the system before installing or upgrading the Red Hat Enterprise Linux 6 operating system.

To install or reinstall Red Hat Enterprise Linux 6, use one of the following media or methods:

- Installing using the *Dell EMC Systems Management Tools and Documentation* media
- Installing using the *Dell EMC Systems Build and Update Utility* media
- Installing using the Unified Server Configurator (Dell EMC USC)
- Installing on systems with a Dell EMC Utility Partition
- Installing in the conventional (BIOS) mode
- Installing in the Unified Extensible Firmware Interface (UEFI) mode
- Installing on devices that support multipathing
- Installing on iSCSI storage
- Installing on Fibre Channel over Ethernet (FCoE) enabled storage

## Installing Red Hat Enterprise Linux 6 using the Dell EMC Systems Management Tools and Documentation media

**CAUTION:** Back up all the data from the system before installing or upgrading the Red Hat Enterprise Linux 6 operating system.

It is recommended that you use the *Dell EMC Systems Management Tools and Documentation* media to install and re-install Red Hat Enterprise Linux 6.

The *Dell EMC Systems Management Tools and Documentation* media provides the following benefits:

- Automates the installation process.
- Restores the preinstalled settings for the RPM modules and the partition scheme.
- Installs additional software and drivers specific to Dell EMC PowerEdge systems that are not included in the Red Hat media.

**NOTE:** Before you install the operating system using the *Dell EMC Systems Management Tools and Documentation* media, disconnect all the USB storage devices that are connected to your system.

Insert the *Dell EMC Systems Management Tools and Documentation* media into your optical drive and reboot your system. Follow the directions on the screen and the instructions in the documentation that shipped with your media.

- ① **NOTE:** The *Dell EMC Systems Management Tools and Documentation* media simplifies operating system installation and contains the latest drivers at the time you purchased your system. The media automatically installs drivers and any Dell EMC-specific updates not included with the Red Hat media. Save your *Dell EMC Systems Management Tools and Documentation* media in case you need to reinstall the Red Hat Enterprise Linux operating system.

## Installing using the Red Hat Enterprise Linux 6 installation media

To perform a custom installation using the Red Hat Enterprise Linux 6 installation media:

- 1 Insert the Red Hat Enterprise Linux 6 installation media into your optical drive and boot the system.
- 2 Ensure that the optical drive is the first boot device:
  - If your system has a conventional BIOS, press F2 during boot to enter the BIOS and set the optical drive as the first boot device.
  - If your system supports UEFI, press F11 during boot to initiate the UEFI boot manager and set the boot mode to **Boot from CD option**.

For more information on UEFI based installation, see [Installing In The UEFI Mode](#).

The system boots through the *Dell EMC Systems Build and Update Utility* media and a welcome page is displayed.

- 3 Choose **Install** from the Boot menu.  
The installer loads Red Hat Enterprise Linux Anaconda.
- 4 Follow the instructions on your screen and complete the installation.

## Installing Red Hat Enterprise Linux 6 with Dell EMC Unified Server Configurator

- △ **CAUTION:** Back up all the data from the system before installing or upgrading the Red Hat Enterprise Linux 6 operating system.

Dell EMC USC provides an **OS Deployment wizard** that assists you with the installation of Red Hat Enterprise Linux 6.

- ① **NOTE:** Dell EMC USC may not provide the latest drivers that are required to complete the installation of the operating system. Download the drivers from Dell EMC <https://downloads.dell.com>, or use the *Dell EMC Systems Management Tools and Documentation* media.
- ① **NOTE:** Dell EMC Unified Server Configurator-Lifecycle Controller Enabled (USC-LCE) comes with embedded drivers that are factory that is installed. It is recommended that you run the Platform Update wizard to ensure that you have the latest drivers before you begin installing the operating system. For more information, see the *Dell EMC Lifecycle Controller User's Guide* available at [www.dell.com/idracmanuals](http://www.dell.com/idracmanuals).

To begin installation using the **OS Deployment wizard**:

- 1 Boot the system and press F10 within seconds of the Dell EMC logo being displayed.
- 2 In the left pane, click **OS Deployment**.
- 3 In the right pane, click **Deploy OS**.

- ① **NOTE:** If your system has a RAID controller, you must configure RAID before you continue with the installation of drivers. For more information, see the *Dell EMC Lifecycle Controller User's Guide* available at [www.dell.com/idracmanuals](http://www.dell.com/idracmanuals).

- 4 From the list of operating systems, select **Red Hat Enterprise Linux 6 x86\_64 bit**.  
Dell EMC USC or USC-LCE extracts the driver update disk to an internal USB drive labeled **OEMDRV**.

After the drivers are extracted, Dell EMC USC or USC-LCE prompts you to insert the operating system installation media.

- 5 Click **Next**.
- 6 Select **BIOS** or **UEFI** when prompted, and click **Next**.
- 7 Insert the Red Hat Enterprise Linux 6 installation media and click **Next**.
- 8 Click **Finish** to reboot the system and continue with the operating system installation by booting to the operating system media.

**NOTE:** Upon reboot, the system prompts you to press a key to boot to the operating system media. If you do not press a key, the system boots to the hard drive.

**NOTE:** All the copied drivers are removed after 18 hours. You must complete the operating system installation within 18 hours. To remove the drivers before 18 hours, reboot the system, press F10, and re-enter Dell EMC USC.

## Installing Red Hat Enterprise Linux 6 on systems with a Dell EMC Utility Partition

**CAUTION:** Back up all the data from the system before installing or upgrading the Red Hat Enterprise Linux 6 operating system.

The Dell EMC Utility Partition contains diagnostics and other utilities that can be initiated during system boot. If you are installing or reinstalling Red Hat Enterprise Linux 6 on a system with a Dell EMC Utility Partition, install the boot loader on the first sector of the boot partition. This retains the option of booting from the Dell EMC Utility Partition as the system does not overwrite the MBR.

To install Red Hat Enterprise Linux 6:

- 1 Select the appropriate option in **Which type of installation would you like?**, such that the existing Dell EMC Utility Partition is not deleted.
- 2 Select **Review and Modify partitioning layout** and click **Next**.
- 3 Review the partition setup and click **Next**.
- 4 Confirm to **Write changes to disk**.
- 5 When prompted to install the boot loader, click **Change Device**.
- 6 Select **First sector of boot partition** and click **OK**.
- 7 Follow the instructions on your screen and complete the installation.

**NOTE:** By default, the installer does not overwrite the utility partition.

## Installing Red Hat Enterprise Linux 6 in the Conventional (BIOS) Mode

**CAUTION:** Back up all the data from the system before installing or upgrading the Red Hat Enterprise Linux 6 operating system.

- 1 Insert the Red Hat Enterprise Linux 6 media into your optical drive and boot the system.

**NOTE:** If your system has a conventional BIOS, press F2 during boot to enter the BIOS and set the optical drive as the first boot device.

- 2 Select **Install or upgrade an existing system** in the **Boot** menu.  
The **Red Hat Enterprise Linux** installer loads.
- 3 Follow the instructions on the screen and complete the installation.

For more information, see the operating system documentation at [www.access.redhat.com/documentation](http://www.access.redhat.com/documentation).

# Installing Red Hat Enterprise Linux 6 in the UEFI mode

**⚠ CAUTION:** Back up all the data from the system before installing or upgrading the Red Hat Enterprise Linux 6 operating system.

- 1 Ensure that your system is configured to boot in the UEFI mode.  
For more information on how to enable the UEFI mode, see your systems documentation at [www.dell.com/manuals](http://www.dell.com/manuals).
- 2 Insert the Red Hat Enterprise Linux 6 media in the optical drive.  
**① NOTE:** Ensure that the first boot device is your optical drive. If the first boot device is not your optical drive, go to UEFI Boot Sequence and change the boot order.
- 3 Select **Continue** from the **UEFI boot** menu to boot from the Red Hat Enterprise Linux 6 media.  
The system boots from the Red Hat Enterprise Linux 6 media and the **Welcome to the Red Hat Enterprise Linux for x86\_64** screen is displayed.
- 4 Proceed with the installation until the **Which type of installation would you like?** screen is displayed.
- 5 Leave the default **Use All Space** option and select **Review and modify partitioning layout**.
- 6 Click **Next**.
- 7 Check if the partitioning scheme is as per your requirement, and click **Next**.  
The **Format Warnings** screen displays a message that your boot disk will be formatted with a GUID partition table.
- 8 Click **Format**.
- 9 In the **Write Storage Configuration to Disk** screen, click **Write changes to disk**.
- 10 Install boot loader on `/dev/sda1`.
- 11 Continue with the installation.  
After the installation is complete, check that the entry for Red Hat Enterprise Linux 6 is added in UEFI Boot Manager, and use it to boot the system. UEFI must be the default boot option and the system must boot into the new Red Hat Enterprise Linux 6 installation.

# Installing Red Hat Enterprise Linux 6 on devices that support multipathing

**⚠ CAUTION:** Back up all the data from the system before installing or upgrading the operating system.

- 1 Configure the storage array to enable multipathing.  
To configure the storage array for your system, see the specific PowerVault system documentation at [Dell.com/powervaultmanuals](http://Dell.com/powervaultmanuals).
- 2 After the storage array is set up, follow the "Prerequisite Steps" for using multipath devices from the *Dell EMC PowerVault MD3200 and MD3220 Storage Arrays Owner's Manual* at [Dell.com/powervaultmanuals](http://Dell.com/powervaultmanuals).
- 3 During the operating system installation, select **Specialized Storage Devices** in the **Storage Devices** page.
- 4 Click **Next**.
- 5 In the **Storage Device Selection** page, click the **Multipath Devices** tab.
- 6 Select the multipath device that is displayed on this screen and continue with the installation.

# Installing Red Hat Enterprise Linux 6 on iSCSI storage

**⚠ CAUTION:** Back up all the data from the system before installing or upgrading the Red Hat Enterprise Linux 6 operating system.

Red Hat Enterprise Linux 6-based systems can connect to an iSCSI storage array either through the iSCSI software stack, an iSCSI Host Bus Adapter (HBA), or an iSCSI offload hardware.

Now, you cannot install Red Hat Enterprise Linux 6 through an iSCSI offload hardware. You can install Red Hat Enterprise Linux 6 either through the iSCSI software stack (referred to as software initiator) or the iSCSI HBA (referred to as hardware initiator).

## Installing Red Hat Enterprise Linux 6 using the software iSCSI initiator

**⚠ CAUTION:** Back up all the data from the system before installing or upgrading the Red Hat Enterprise Linux 6 operating system.

- 1 Configure the network interface controllers to access the iSCSI storage.
- 2 During the operating system installation, select **Specialized Storage Devices** in the **Storage Devices** page and click **Next**.
- 3 In the **Storage Device Selection** page, click **Advanced Storage Options** to connect to the iSCSI target or FCoE SAN.
- 4 Select **Add iSCSI Target** and click **Add Drive**.
- 5 In the **Configure iSCSI Parameters** page, provide the required information, and click **Add Target** to connect to the iSCSI target.

## Installing Red Hat Enterprise Linux 6 using the hardware iSCSI initiator

**⚠ CAUTION:** Back up all the data from the system before installing or upgrading the Red Hat Enterprise Linux 6 operating system.

- 1 Configure the network interface controllers to access the iSCSI storage.
- 2 During the operating system installation, select **Specialized Storage Devices** in the **Storage Devices** page and click **Next**.
- 3 In the **Storage Device Selection** page, click the **Other SAN Devices** tab.
- 4 Select the SAN device that is displayed on this screen and continue with the installation.

## Installing Red Hat Enterprise Linux on FCoE-Enabled storage

**⚠ CAUTION:** Back up all the data from the system before installing or upgrading the Red Hat Enterprise Linux 6 operating system.

- 1 During the Red Hat Enterprise Linux 6 operating system installation, select **Specialized Storage Devices** in the **Storage Devices** page and click **Next**.
- 2 In the **Storage Device Selection** page, click **Add Advanced Target**.  
The **Advanced Storage Options** page is displayed. You can connect to the iSCSI target or the FCoE SAN through this screen.
- 3 To configure FCoE SAN, select **Add FCoE SAN** and click **Add Drive**.  
The **Configure FCoE Parameters** page is displayed.
- 4 Select the network interface that is connected to your FCoE switch and click **Add FCoE Disk(s)**.

## Add-on device drivers

All Dell EMC add-on device driver packages that are not on the Red Hat Enterprise Linux 6 media are packaged as kernel module packages (kmods). For devices that require updated drivers other than those present on the Red Hat Enterprise Linux 6 media, see [www.dell.com/support](http://www.dell.com/support).

**ⓘ NOTE:** Your system does not require a driver update if there are no driver packages available on [www.dell.com/support](http://www.dell.com/support).

For a list of add-on device drivers that are installed on your system, type the following command at the command prompt: `rpm -qa |grep kmod`

① **NOTE:** For more information on add-on drivers, see the Red Hat Enterprise Linux driver update program at [www.access.redhat.com](http://www.access.redhat.com).

# Updating your system packages using the Red Hat Network

① **NOTE:** To update your system with the latest operating system packages using RHN (Red Hat Network) service, see [www.rhn.redhat.com](http://www.rhn.redhat.com).

Red Hat periodically releases software updates to fix issues, address security issues, and add new features and hardware support. You can download updated operating system packages and the latest kernel releases and updates:

- By performing a manual download from the RHN service at [www.rhn.redhat.com](http://www.rhn.redhat.com).
- By using the **yum utility**.

It is recommended that you use the RHN service to update your system software to the latest revisions before you deploy your system.

## Important information

### biosdevname utility

In the earlier versions of Red Hat Enterprise Linux, the interface names that are assigned by the operating system did not map to the corresponding ports on the system board or on the add-in network adapters. For example, **eth0** need not necessarily be associated with **port0** on the system board.

Red Hat Enterprise Linux 6.1 supports the **biosdevname utility**. The **biosdevname utility** enables the operating system to logically assign and map Ethernet interface names with the respective physical ports on the system board or the add-in network adapters.

The new naming convention is as follows:

Lan-On-Motherboard interfaces      *em <port number>*  
(ethernet-on-motherboard <1,2,...>)

PCI add-in interfaces      *p<slot number>p<port number>\_<virtual function instance>*

For more information on the **biosdevname utility** and the new naming scheme, see [www.linux.dell.com/files/whitepapers](http://www.linux.dell.com/files/whitepapers).

① **NOTE:** Npar capability has been provided in Red Hat Enterprise Linux 6.2.

① **NOTE:** If you do not wish to use the new naming scheme, you can turn it off during installation or post installation by passing the kernel command line parameter `biosdevname=0`. The new naming scheme is enforced by default at the time of installation and run time on supported Dell EMC systems.

## Networking on Red Hat Enterprise Linux

Networking on Red Hat Enterprise Linux can be managed using either traditional network scripts or NetworkManager. For systems, deselect NetworkManager and NetworkManager-gnome packages during installation. For kickstart installations, add the following to the kickstart file **ks.cfg**:

```
%packages
```

```
–NetworkManager
```

```
–NetworkManager-gnome
```

# Red Hat Enterprise Linux supports FCoE functionality in Broadcom 57810

Broadcom 57810 is the Converged Network Controller, which supports FCoE functionality.

**NOTE: Support for 10 GB Ethernet and iSCSI functionalities is available in Broadcom 57810.**

To enable FCoE on Broadcom 57810, ensure that the firmware version is 7.2.11 or greater. You can download the latest firmware from [www.dell.com/support](http://www.dell.com/support).

Broadcom 57810 requires **bnx2fc.ko** driver version 1.0.10 or greater to enable FCoE. This version of the driver is not native in Red Hat Enterprise Linux 6.2. You can install the add-on driver from Red Hat Network, at [www.rhn.redhat.com](http://www.rhn.redhat.com). The driver is packed with the upcoming updates for Red Hat Enterprise Linux 6.

## Known issues in Red Hat Enterprise Linux 6.10

### IPMI device node is not created automatically

**Description** After booting into OS, the device node (`/dev/ipmi*`) is not created for IPMI device. Therefore, the following error message is displayed when you run the user space applications such as `ipmitool`:

```
Could not open device at /dev/ipmi0: No such file or directory
```

**Cause** The driver that is required to create the device node is not loaded into kernel.

**Workaround** Manually load the IPMI driver using the command `modprobe ipmi_devintf`.

## Known issues in Red Hat Enterprise Linux 6.9

### IPMI device node is not created automatically

**Description** After booting into OS, the device node (`/dev/ipmi*`) is not created for IPMI device. Therefore, the following error message is displayed when you run the user space applications such as `ipmitool`:

```
Could not open device at /dev/ipmi0: No such file or directory
```

**Cause** The driver that is required to create the device node is not loaded into kernel.

**Workaround** Manually load the IPMI driver using the command `modprobe ipmi_devintf`.

## Red Hat Enterprise Linux 6.9 does not recognize the QLogic QL41162 10 GbE and QL45212-DE 25 GbE devices

**Description** Red Hat Enterprise Linux (RHEL) 6.9 operating system does not recognize the QLogic QL41162 10 Gigabit Ethernet (GbE) and QL45212-DE 25 GbE devices.

**Cause** RHEL 6.9 does not have the inbox driver for QLogic QL41162 10 GbE and QL45212-DE 25 GbE devices.

## Log in to iSCSI LUN fails on the QLogic QL41162 10 GbE, QL41112 10 GbE and QL41262 25 GbE devices

**Description** RHEL 6.9 does not log in to iSCSI LUN for QL41162 10 GbE, QL41112 10 GbE, and QL41262 25 GbE devices. iSCSI boot fails for these devices.

**Cause** Log in to iSCSI LUN fails because of few upstream patches are missing in RHEL 6.9 iSCSI package.

## Known issues in Red Hat Enterprise Linux 6.8

### Red Hat Enterprise Linux 6.8 does not recognize the QLogic QL45212-DE 25 GbE device

**Description** Red Hat Enterprise Linux (RHEL) 6.8 operating system does not recognize the QLogic QL45212-DE 25 Gigabit Ethernet (GbE) device.

**Cause** RHEL 6.8 does not have the inbox driver for QLogic QL45212-DE 25 GbE device.

### Unable to boot Red Hat Enterprise Linux 6.7 and later from FCoE using Intel X520 based NIC

**Description** Booting Red Hat Enterprise Linux 6.7 and later from Fibre Channel over Ethernet (FCoE) using Intel X520 based NIC, fails intermittently when using Dell EMC Networking S5000 switch.

**Cause** The operating system is unable to select Fiber Channel Forwarder (FCF) when unsolicited multicast FCoE Initialization Protocol (FIP) advertisements arrive in less than two second time interval.

**Workaround** Set `FKA-adv-period` to 45 seconds on switch.

### NVMe devices are not identified during Red Hat Enterprise Linux 6.5 installation and later

**Description** While installing Red Hat Enterprise Linux 6.5 and later, the NVMe express devices are listed as `Unknown`.

**Cause** The installer does not identify the vendor and model name for the NVMe devices.

**Workaround** This error message can be ignored because there is no functionality loss.

## Ethtool reports 10 GbE port speed instead of 25 GbE when using Mellanox mlx5\_core driver

<b>Description</b>	On Dell EMC PowerEdge servers installed with Red Hat Enterprise Linux 6.8, the Mellanox ConnectX-4 Lx 25 GbE Ethernet adapter link speed is reported as 10 GbE instead of 25 GbE.
<b>Cause</b>	The Ethtool utility does not have required patches to identify 25 GbE speed.
<b>Workaround</b>	This error message can be ignored because there is no functionality loss.

## Resolved issues in Red Hat Enterprise Linux 6.7

### Invalid IRQ (255) is assigned to Emulex card when NPAR-EP is enabled

<b>Description</b>	On Dell EMC PowerEdge systems installed with Red Hat Enterprise Linux 6.7 and Emulex OCe14102B-U1-D PCIe dual port NIC, invalid IRQ (Interrupt Request Line 255) is assigned to some of the extended NIC partitions. The IRQ 255 is assigned only for six of the eight extended partitions. The first eight partitions and two partitions from the extended partitions have the correct IRQ assigned.
<b>Cause</b>	This happens due to an issue in kernel, in handling ARI capable devices. As an example, for partitions from 03:01.0 to 03:01.7, the device (of PCI bus/device/function) is incorrectly interpreted as 1 instead of device 0.
<b>Workaround</b>	By default functionality is not impacted as the driver enables MSIX interrupts. Avoid direct assignment of partitions with IRQ 255 to guest OS.

## Known issues in Red Hat Enterprise Linux 6.7

### ACPI displays warning message when system IO range conflicts

<b>Description</b>	The Advanced Configuration and Power Interface (ACPI) displays a warning message, if there is a conflict between the system input/output (IO) and operation address range (OpRange).
<b>Cause</b>	The latest kernel in Red Hat Enterprise Linux 6.7 with <code>acpi_check_resource_conflict()</code> checks for entire address range for particular device. In the watchdog timer and General-purpose input/output (GPIO), the memory address that is mapped by system IO and OpRange is accessed by both ACPI and operating system.
<b>Workaround</b>	This error message can be ignored because there is no functionality loss.

### Kernel fails to get CPU APIC ID

<b>Description</b>	The <code>Kernel fails to get CPU APIC ID</code> error message is displayed, when the BIOS Advanced Programmable Interrupt Controller (APIC) table has static entries for all the APIC IDs for highest configuration core processors.
--------------------	---

<b>Cause</b>	The BIOS APIC table has static entries for the highest configuration of the processor supported on the system. For example, a system supports 16 core processor, however if the system has a 14 core processor populated, then APIC IDs 15 and 16 are available in the BIOS APIC table, and the kernel tries to enable the core processor. But, physically a 14 core processor is available, and APIC IDs 15 and 16 are not initialized, and hence the error occurs.
<b>Work around</b>	This error message can be ignored because there is no functionality loss.

## Known issues in Red Hat Enterprise Linux 6.6

### Biosdevname does not rename port2 of Mellanox device

<b>Description</b>	The <code>dev_id</code> of port1 and port2 of Mellanox device are same because of which biosdevname fails to rename.
<b>Cause</b>	The <code>dev_id</code> support is replaced with <code>dev_port</code> which need to be incorporated in <code>m1x_en</code> driver and biosdevname.
<b>Work around</b>	Add kernel boot parameter " <code>biosdevname=0</code> ", this returns back to ethN naming.

### Unable to boot Red Hat Enterprise Linux 6.6 with NVMe devices

<b>Description</b>	Unable to boot Red Hat Enterprise Linux 6.6 with NVMe devices, because there is a limitation in the boot loader.
<b>Cause</b>	Limitation in the boot loader.
<b>Work around</b>	Use NVMe device as data storage, and not as a boot volume.

### Logical Processor Idling feature is not working

<b>Description</b>	When BIOS option is selected, Logical Processor Idling feature is enabled, it allows the operating system to fall into a low power consumption mode during low work load conditions.
<b>Cause</b>	Red Hat Enterprise Linux 6.6 does not have support for ACPI processor aggregator device, which never allows the system to enter in to power saving state.
<b>Work around</b>	This error can be ignored because there is no functionality loss.

## Resolved issues in Red Hat Enterprise Linux 6.6

### Kernel panic occurs when OMSA services are started on Red Hat Enterprise Linux 6.5

<b>Description:</b>	Kernel panic occurs when OpenManage Server Administrator (OMSA) services are started on Red Hat Enterprise Linux 6.5.
<b>Cause:</b>	The Kernel might spend more time in servicing the kernel timer functions and set a flag to prevent the other code from resetting the timer hardware (APIC timer). The kernel then programs the timer hardware for a timeout up to 100 ms to run the kernel timer functions. At the next timer hardware interrupt, this flag is cleared, where the flag

can be ignored for the specific code path. When the flag is ignored, the timer hardware might be set to an incorrect timeout value. This incorrect timeout value might be over 10 seconds and during this time no kernel timer functions can be run.

**Workaround:** Upgrade from Red Hat Enterprise Linux 6.5 to Red Hat Enterprise Linux 6.6.

## Unable to Install Red Hat Enterprise Linux 6.5 with an existing brtfs partition

**Description:** Red Hat Enterprise Linux 6.5 kernel does not function, when installing on Red Hat Enterprise Linux 7 /SUSE Linux Enterprise Server 12 with an existing brtfs partition.

**Cause:** The `brtfs` file systems is not fully supported.

**Workaround:** Ensure that there are no existing brtfs partitions on the drive before installation.

## Underscore is missing for the interface name of Vindicator 2 Emulex card on network page

**Description:** Underscore is missing for the interface name of Vindicator 2 Emulex card, instead of `em1_1` it is showing as `em11` on network page.

**Cause:** Network manager does not update the interface name with an underscore.

**Workaround:** This error can be ignored as there is no functionality loss.

## Unable to boot Red Hat Enterprise Linux 6.5, after successful installation in UEFI mode

**Description:** Unable to boot Red Hat Enterprise Linux 6.5, after successful installation because there is no boot entry in UEFI boot menu.

**Cause:** `EFIbootmgr` is unable to create a UEFI boot entry, when boot variables of Hard drive C: (under BIOS) is greater than 1024bytes. This is a known limitation.

**Workaround:**

- 1 Remove all the bootable devices shown under `Hard Drive C:` (listed in BIOS under F11 option).
- 2 Boot into legacy BIOS, and change the boot setting to UEFI mode.
- 3 Reboot the server, re insert the devices that we removed under `Hard Drive C:` and reinstall.

**Or** Create the boot entry manually by choosing `redhat.efi` file which is listed in "Boot from File" option.

## DDR DMA testing fails in ethtool on Red Hat Enterprise Linux 6.5 Hypervisor

**Description** On a Red Hat Enterprise Linux 6.5 Hypervisor using the Emulex OCM14104 adapter, the Double Data Rate (DDR) Direct Memory Access (DMA) testing on the ethtool fails, when the cable is unplugged.

**Cause** The DDR DMA test is executed after the external loopback test. On certain physical layers the loopback test might take up to 15 seconds. The driver polls for the completion of the test for 12 seconds only and the DDR DMA fails in cases where the loopback takes up to 15 seconds.

## Using IPv6 with Mozilla Firefox displays certification error

**Description** A certification error is displayed when using the Mozilla Firefox browser with IPv6, on Red Hat Enterprise Linux 6.x, to access a HTTPs server. The user cannot continue to access the HTTPs server.

**Cause** The certificate error occurs due to a known limitation in Mozilla Firefox.

## Data unavailability occurs on Dell EMC EqualLogic arrays due to Linux multipathing

**Description** Multipathing in Linux using the path\_checker, results in data being unavailable on EqualLogic arrays, with firmware versions 7 or later.

**Workaround** Do not select the path\_checker option while configuring multipathing.

**Cause** If the patch\_checker is used, the array reports a protocol error and sends a request to disconnect the initiator. This results in a loop where the initiator connects and disconnects the drive. The drive becomes unavailable for any input or output operations.

## Red Hat Enterprise Linux 6.5 displays the error message

**Description** When the Serial ATA (SATA) is set to Advanced Technology Attachment (ATA) mode in Red Hat Enterprise Linux 6.5 the operating system displays the following error message:

```
ata1.01: failed to resume link (Scontrol 0)
```

This error can be ignored as there is no functionality loss.

## Red Hat Enterprise Linux 6.5 fails to boot from iSCSI LUNs

**Description** The Red Hat Enterprise Linux 6.5 fails to boot from the iSCSI LUNs, when the tboot package is selected.

**Workaround** Do not select the tboot package.

**Cause** The tboot package truncates the kernel command line to 255 bytes. The kernel command line requires more than 300 bytes, when Red Hat Enterprise Linux 6.5 boots from iSCSI. The system fails to boot successfully due to the truncated command line.

## Known issues in Red Hat Enterprise Linux 6.5

### Booting with kernel parameters results in DMAR errors

**Description:** Booting Red Hat Enterprise Linux 6.5 with "intel\_iommu=on" kernel parameter results in DMAR errors.

**Cause:** DMAR on g4x/gm45 graphic processing unit is not fully supported.  
**Workaround:** Use "intel\_iommu=igfx\_off" kernel parameter to avoid errors.

## Xserver crashes, while booting Red Hat Enterprise Linux 6.5 after installation

**Description:** During the first boot of Red Hat Enterprise Linux 6.5 on Windows 2012 R2 Virtual Machine, the Xserver crashes.  
**Cause:** The vesa driver is used instead of hyperv\_fb driver during the installation.  
**Workaround:** Remove the string "xdriver=vesa " from kernel boot parameters during installation.

## Invalid naming conventions for the ports of Vindicator 2 Emulex card when NPAR-EP is enabled

**Description:** Red Hat Enterprise Linux 6.5 with Emulex card naming conventions by biosdevname may not be accurate for all the networking devices. As a result partitions 3 and 4 of all the four ports of Emulex is not named as expected.  
**Cause:** Biosdevname has the Limitation, which cannot handle more than 7 PCI functions.  
**Workaround:** Add kernel boot parameter "biosdevname=0" this return back to ethN naming.

## NVMe Devices Are Not Identified During Operating System Installation

**Description** When installing Red Hat Enterprise Linux 6.5, the NVMe express devices are listed as unknown data storage devices in the installer.  
**Cause** The vendor and model name for the NVMe devices are not identified by the installer.

## Red Hat Enterprise Linux 6 fails when the DSDT in the BIOS has IPMI Opreion enabled

**Description** dmesg displays the following ACPI-IPMI related error messages on system startup:

```
[ 4.724118] ACPI Error: No handler for Region [IPMI] (ffff880c04d8c240) [IPMI]
(20110623/evregion-373)
[ 4.724122] ACPI Error: Region IPMI (ID=7) has no handler (20110623/
exfldio-292)
```

**Workaround** There is no functionality loss.  
**Cause** The DSDT feature is enabled in BIOS as per ACPI 4.0 specifications. Platforms that require IPMI Opreion enabled in BIOS for Power Meter usage display the ACPI error messages. The kernel does not have handlers to support the methods in IPMI Opreion.

# Lifecycle Controller (USC based installation) deployment fails when installing Red Hat Enterprise Linux 6.x

- Description** Lifecycle Controller **OS Deployment** fails with the error message `install exited abnormally` when installing RHEL 6.x. The deployment fails when the number of RPMs in the disk drive is greater than 25.
- Cause** The installation fails when the number of RPMs in the disk drive is greater than 25. The `explodeRPM()` function call in the anaconda code fails to free the resources. When the `explodeRPM()` function is called repeatedly (more than 25 RPMs) without freeing the claimed resources, the anaconda loader stops functioning.

# ethtool does not report 40 GB for Mellanox ConnectX-3 40 GB adapter

- Description** On a Dell EMC PowerEdge Server with Mellanox ConnectX-3 40 GB adapter, ethtool does not report 40 GB in Supported and Advertised link modes.

```
#ethtool p4p1
Settings for p4p1:
Supported ports: [ TP ]
Supported link modes: 10000baseT/Full
Supported pause frame use: No
Supports auto-negotiation: No
Advertised link modes: 10000baseT/Full
```

- Cause** The ethtool utility in Red Hat Enterprise Linux 6 does not recognise 40 GB link modes.

# Blurred display when changing resolution in Red Hat Enterprise Linux 6.5

- Description** On changing the display properties from a lower resolution to a higher resolution, the display becomes blurred (example: 800 x 600 to 1024 x 768 or 1152 x 864). The issue occurs if the display is plugged either at the rear or front VGA port.
- Cause** The resolution set by the user using the Display option is not compatible with the MGA driver resolution. Due to the resolution mismatch, the Xorg crashes and the display screen appears blurred.

# Resolved issues in Red Hat Enterprise Linux 6.5

## Teamed NICs have no network connectivity

- Description** When NICs are configured to bond, the teamed NICs do not connect to other devices on the network.
- Workaround** Configure the network without using Network Manager, and follow the Red Hat documentation for bonding NICs. In the configuration files, specify the following command:
- ```
nm_controlled=no
```

For more information, see the Deployment Guide at [www.access.redhat.com/documentation](http://www.access.redhat.com/documentation). This issue is fixed in Red Hat Enterprise Linux 6.5.

**Cause** This issue occurs because the Network Manager is used to configure the network.

## Red Hat Enterprise Linux 6.4 installation on 10 GB iSCSI LUN from an EQL array hangs while creating a file system

**Description** Installing Red Hat Enterprise Linux 6.4 on 10 GB iSCSI LUN from an EQL array hangs while creating a file system. This issue also occurs on data LUN.

**Workaround** This issue is fixed in Red Hat Enterprise Linux 6.5.

**Cause** EQL firmware reports **discard\_granularity** as a non power of 2. Red Hat Enterprise Linux 6 **blkdev\_issue\_discard** has never supported a non power of 2 **discard\_granularity**. Therefore the file system creation hangs at the time of installation.

📌 **NOTE:** For more information, see the Kbase article [354883](https://access.redhat.com/solutions/354883) at [www.access.redhat.com](http://www.access.redhat.com).

## Ethtool reports 10GbE port speed instead of 40GbE when using Mellanox MLX4\_EN driver

**Description** On Dell PowerEdge servers installed with Red Hat Enterprise Linux 6.3/6.4, the Mellanox ConnectX-3 40GbE ethernet adapter links at 40GbE when connecting two ports on the adapter consecutively, but the Ethtool reports the link speed as 10GbE.

**Workaround** This issue is fixed in Red Hat Enterprise Linux 6.5.

**Cause** The Ethtool utility tool reports the incorrect link speed.

## Packet loss occurs when bonding device is configured in balanced-alb mode

**Description** In Red Hat Enterprise Linux 6.4, when bonding is configured in **balance-alb** mode, packet losses may occur when you ping to one or multiple remote hosts.

**Workaround** This issue is fixed in Red Hat Enterprise Linux 6.5

**Cause** The packet loss occurs due to the bonding device setup. The slave devices are enslaved before **bond0** is brought up. As a result, during setup, the **bond\_enslave** function is called before the **bond\_open** function. Hence, all slaves do not have a unique MAC id as required by **balance-alb** mode. The MAC address is copied only to netdev and not set on the hardware because the variable `bond >alb_info.rlb_enabled` is set only in **bond\_open**. Any reply packet having the MAC address, which does not match the **bond0's** MAC address is dropped. For example, slave device 2's MAC address, is dropped.

📌 **NOTE:** For more information, see the Kbase article [390603](https://access.redhat.com/solutions/390603) at [www.access.redhat.com](http://www.access.redhat.com).

# Known issues in Red Hat Enterprise Linux 6.4

## System monitor displays incomplete processor information

|                    |                                                                                                                                                                                                  |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Description</b> | The System Monitor does not display information for systems with processor cores greater than 20 (approximately).                                                                                |
| <b>Workaround</b>  | For complete processor information in the <code>/proc</code> file system, run the following command:<br><pre>Cat /proc/cpuinfo</pre><br>This issue is also seen in Red Hat Enterprise Linux 6.3. |
| <b>Cause</b>       | <b>lib gtop2</b> , which is used by the System Monitor, has a limited buffer size which results in incomplete processor information being displayed.                                             |

## Resolved issues in Red Hat Enterprise Linux 6.4

### Power saving threads created by the acpi driver consumes excess power

|                    |                                                                                                                                                                                                                                            |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Description</b> | The BIOS requests the <b>acpi_pad</b> driver for a specific number of processors to be moved into a <b>High C</b> state to reduce power. The <b>acpi pad</b> driver creates a power saving thread on each processor to be idled.           |
| <b>Workaround</b>  | Disable the acpi driver by appending <b>acpi=off</b> to the kernel boot command line of the <code>/boot/grub/grub.conf</code> file and reboot the system.<br><br>This issue will be fixed in a future release of Red Hat Enterprise Linux. |
| <b>Cause</b>       | The power saving thread loops very quickly consuming more power than it did before it was in an idle state.                                                                                                                                |

### Error message displayed on Dell EMC PowerEdge Servers with AMD Opteron processors

|                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Description</b> | On installing and rebooting Red Hat Enterprise Linux 6.3 with AMD Opteron 43xx and 63xx processors, the <code>dmesg</code> displays the following error message:<br><pre>[Firmware Bug]: cpu 0, try to use APIC500 (LVT offset 0) for vector 0x10400, but the register is already in use for vector 0xf9 on another cpu<br/><br/>[Firmware Bug]: cpu 0, IBS interrupt offset 0 not available (MSRC001103A=0x0000000000000100)<br/>Failed to setup IBS, -22</pre> |
| <b>Workaround</b>  | This issue is fixed in Red Hat Enterprise Linux 6.4.                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Cause</b>       | The Local Vector Table (LVT) offsets are not set up correctly. For Machine Check Exception (MCE) thresholds, offset 0 is selected (indicated by banks 0-3) instead of 1 (bank 4). Instruction Based Sampling (IBS, IBSCTL                                                                                                                                                                                                                                        |

register) is also configured with offset 0. On upstream, kernels are available with the IBS support, but without the fixes. This leads to a conflict. IBS initialization fails if configured later.

**NOTE:** Currently, Red Hat Enterprise Linux 6 does not support IBS. For more information, see the Kbase article [234583](https://www.access.redhat.com/articles/234583) at: [www.access.redhat.com](https://www.access.redhat.com).

## Known issues in Red Hat Enterprise Linux 6.3

### Error message displayed on Dell EMC PowerEdge Servers with AMD Opteron 63xx processors

**Description** On installing and rebooting Red Hat Enterprise Linux 6.3 with AMD Opteron 63xx processors, the dmesg displays the following error message:

```
[Firmware Bug]: cpu 0, try to use APIC500 (LVT offset 0) for vector 0x10400, but the register is already in use for vector 0xf9 on another cpu

[Firmware Bug]: cpu 0, IBS interrupt offset 0 not available (MSRC001103A=0x00000000000000100)

Failed to setup IBS, -22
```

**Workaround** This issue is fixed in Red Hat Enterprise Linux 6.4.

**Cause** The Local Vector Table (LVT) offsets are not set up correctly. For MCE thresholds, offset 0 is selected (indicated by banks 0-3) instead of 1 (bank 4). IBS (Instruction Based Sampling, IBSCTL register) is also configured with offset 0. On upstream, kernels are available with the IBS support, but without the fixes. This leads to a conflict. IBS initialization fails if configured later.

**NOTE:** Currently, Red Hat Enterprise Linux 6 does not support IBS. For more information, see the Kbase article [234583](https://www.access.redhat.com/articles/234583) at [www.access.redhat.com](https://www.access.redhat.com).

### Biosdevname names SR-IOV Virtual Functions from Intel Sarek NDC as ethN

**Description** On servers that are installed with Red Hat Enterprise Linux 6.2/6.3 and Intel Ethernet NDC controller, the **biosdevname 0.3.11 utility** names the SR-IOV Virtual Functions (VFs) from 10GbE port of Intel Sarek rNDC as ethN. The VFs are named ethN instead of the following format:

```
em<port number>_<virtual function instance>
```

This issue affects platforms with on-board network adapters NDC which support SR-IOV when SR-IOV is enabled for the adapters.

**Workaround** To turn off the new naming convention, enter the kernel command-line parameter, `biosdevname=0` in the boot command line during and after installation. This issue is fixed in biosdevname-0.4.0. For more information, see [www.linux.dell.com/biosdevname/biosdevname-0.4.1](http://www.linux.dell.com/biosdevname/biosdevname-0.4.1).

**NOTE:** This issue is fixed in Red Hat Enterprise Linux 6.4.

**Cause** SR-IOV virtual functions from onboard network adapters do not have SMBIOS type 41 records. To retrieve the port number, use the SMBIOS device type instance from the physical function to which the virtual functions belong.

# Resolved issues in Red Hat Enterprise Linux 6.3

## Red Hat Enterprise Linux 6.2 kickstart installation may fail

|                    |                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Description</b> | Red Hat Enterprise Linux 6.2 fails to install using the kickstart method. After rebooting, it displays the following error:<br><pre>Specified BIOS disk 80 cannot be determined.</pre><br>Kickstart fails when <b>onbiosdisk=80</b> is used in kickstart file. The onbiosdisk forces the partition to be created on a particular disk as discovered by the BIOS. |
| <b>Cause</b>       | There is a bug in the Anaconda code where it wrongly decodes hexadecimal 0x80 as 0x128.                                                                                                                                                                                                                                                                          |

## Network connections display the last used status as never in Red Hat Enterprise Linux 6

|                    |                                                                                                                                        |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| <b>Description</b> | Even though the network connections are functioning, Red Hat Enterprise Linux 6.2 /6.1 displays the last used status as <b>Never</b> . |
| <b>Workaround</b>  | Disable or uninstall NetworkManager. For network usage statistics, use the command <code>ifconfig</code> .                             |

 **NOTE:** Red Hat does not recommend using NetworkManager on Red Hat Enterprise Linux server operating systems.

## Red Hat Enterprise Linux 6.2 displays a dbus netlink poll error after installation

|                    |                                                                                                                                                                                                               |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Description</b> | After a clean install of Red Hat Enterprise Linux 6.2, the event log displays the following error:<br><pre>dbus: avc: netlink poll: error 4</pre><br>This issue is also seen in Red Hat Enterprise Linux 6.1. |
| <b>Workaround</b>  | Turn off SELinux.                                                                                                                                                                                             |
| <b>Cause</b>       | The dbus is not compatible with the policies of SELinux.                                                                                                                                                      |

## Network manager error in Red Hat Enterprise Linux 6.1 operating system log

|                    |                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Description</b> | After a clean installation of Red Hat Enterprise Linux 6.1, the Operating System event log ( <code>/var/log/messages</code> ) contains the following errors:<br><pre>GRST04 NetworkManager[6257]: [1324512946.32629] [nm-manager.c:1313] user_proxy_init(): could not init user settings proxy: (3) Could not get owner of name 'org.freedesktop.NetworkManagerUserSettings': no such name</pre> |
| <b>Cause</b>       | Network Manager tries to initialize user proxy settings even when it is not active.                                                                                                                                                                                                                                                                                                              |

 **NOTE:** There is no loss in functionality.

## Red Hat Enterprise Linux 6.1 stops responding when iDRAC6 is reset

**Description** Red Hat Enterprise Linux 6.1 stops responding when iDRAC6 is reset on PowerEdge systems.  
**Cause** This issue occurs due to the USB error handling code.

## Known issues in Red Hat Enterprise Linux 6.2

### Red Hat Enterprise Linux 6.2 displays a no DIMM labels error message in the `/var/log/messages` log file

**Description** After Red Hat Enterprise Linux 6.2 installation, the OS event log (`/var/log/messages`) contains the following errors:

```
edac: edac-ctl: Error: No dimm labels for Dell Inc.
```

 **NOTE:** This does not have any impact on functionality.

**Cause** The admin utility `edac-ctl` displays the error message when the model numbers of the systems are not populated in the `/etc/edac/labels.db` file.

### Red Hat Enterprise Linux 6.2 displays MCE error message in `/var/log/messages` and `dmesg` log files

**Description** Red Hat Enterprise Linux 6.2 64-bit systems may display Machine Check Exception (MCE) errors during a thermal event when the power budget is set in iDRAC.

The following error message is displayed in the `/var/log/messages` log file and the `dmesg` log file:

```
[Hardware Error]: Machine check events logged.
```

This issue is also seen in Red Hat Enterprise Linux 6.1.

**Workaround** A fix will be available in a later Red Hat Enterprise Linux update.

**Cause** The thermal interrupt handler triggers the error messages.

### Add-on cards display biosdevname names instead of eth names

**Description** For systems with SMBIOS version 2.5, the add-on cards display the `biosdevname` names instead of the eth names.

**Workaround** Disable the `biosdevname` utility by typing the following command to the kernel command line parameter:  
`biosdevname=0.`

 **NOTE:** This issue is fixed in Red Hat Enterprise Linux 6.4.

## Resolved issues in Red Hat Enterprise Linux 6.2

### Errors found in command `cat/proc/interrupts` in Red Hat Enterprise Linux 6


|                    |                                                                                                                                                                                           |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Description</b> | An error is displayed while running the command <code>cat/proc/interrupts</code> in Red Hat Enterprise Linux 6.                                                                           |
| <b>Cause</b>       | The ERR interrupt occurs when the machine check code loads and initializes the thermal monitoring interrupt on each core APIC. The BIOS generates a spurious interrupt on initialization. |

### `biosdevname` utility fails on NPAR capable network adapters

|                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Description</b> | <p>The Red Hat Enterprise Linux 6.1 <b>biosdevname utility</b> incorrectly names the NIC partitions.</p> <p>The <b>biosdevname utility</b> naming convention for NPAR capable network adapters is <code>em &lt;port number&gt;_&lt;NPAR index&gt;</code>.</p> <p>For example, the fourth NIC partition from the first port of BCM 57712 dual port Network Daughter Card is <code>em1_4</code>.</p> <p>The Red Hat Enterprise Linux 6.1 <b>biosdevname utility</b> incorrectly names the NIC partition as <code>em5</code>.</p> <p>This will be fixed in a future release of Red Hat Enterprise Linux.</p> |
| <b>Cause</b>       | <p>The Red Hat Enterprise Linux 6.1 <b>biosdevname utility</b> incorrectly names the NIC partition because:</p> <ul style="list-style-type: none"><li>• The port number of the NIC partition does not match the actual number of physical ports present on the system due to an issue in the NPAR partition naming logic in the <b>biosdevname utility</b>.</li><li>• The NPAR index is not suffixed and there is an issue retrieving the NPAR index.</li></ul>                                                                                                                                           |

## Known issues in Red Hat Enterprise Linux 6.1

### Red Hat Enterprise Linux 6.1 displays a bluez network manager error after installation

|                    |                                                                                                                                                                                                                                                                                        |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Description</b> | <p>After a clean install of Red Hat Enterprise Linux 6.1, the event log displays the following bluez error:</p> <pre>NetworkManager[9113]: &lt;warn&gt; bluez error getting default adapter: The name org.bluez was not provided by any .service files</pre>                           |
| <b>Workaround</b>  | <p>To prevent the message from reoccurring, run the following command: <code>yum remove gnome-bluetooth bluez</code>.</p> <p> <b>NOTE:</b> This issue is fixed in Red Hat Enterprise Linux 6.4.</p> |

**Cause** gnome-bluetooth module was installed during a standard installation. Network Manager triggers the warning events through gnome-bluetooth module.

## Error message on starting IPMI drivers while installing OMSA

**Description** On starting the IPMI service on PowerEdge R620, T620, M620, R720, and R720xd systems, the system log displays the message: `Could not enable interrupts, failed set, using polled mode.`

**Workaround** This is working as designed. This is addressed in a later version of the iDRAC firmware.

**Cause** Although the message indicates that the operating system is in polling mode, the Linux driver continues to work in the interrupt mode.

## Assigning iSCSI LUN target to Intel 10G network controller stops the operating system from booting

**Description** When attempting to install the operating system on iSCSI Logical Unit Numbers (LUN) with the Intel 10G network controller (Intel card X520 and Intel Ethernet X520-DA2 Server Adapter), the system stops responding at the boot screen (after POST).

**Workaround** Disable the local storage controller from the **BIOS** menu, and then proceed with the iSCSI based installation.

**Cause** This error occurs because the BIOS 0xE820 code does not return the first 0xe820 entry to match int 12 interface and hence does not comply with ACPI specification.

## Systems with Intel multiport i350 rNDC and PCI add-in adapters report incorrect or duplicate Mac address

**Description** Native **igb** driver reports incorrect MAC ids for interfaces of multiport i350 rNDC and PCI add-in adapters. This results in interface configurations files **ifcfg-ethN** having incorrect HWADDR fields.

This issue is addressed in the latest version of the Dell EMC **igb** driver. Use the latest driver disk from [www.dell.com/support](http://www.dell.com/support) during installation, to address this issue. This ensures that interface configurations files will have correct MAC ids.

**Workaround** During Installation, load the Dell EMC DKMS drivers on to a USB drive in the form of a driver disk. The Anaconda installer uses these drivers and updates the original drivers.

To install the drivers:

- During installation: Load the Dell EMC DKMS drivers on to a USB drive in the form of a driver disk. The Anaconda installer uses these drivers and updates the original drivers.
- During upgrade: Network configuration files are created using the original drivers during installation. Due to this, the configuration files retain the faulty MAC address. Delete all the configuration files present in the scripts directory `/etc/sysconfig/network-scripts/ifcfg-*`, and restart the server.

## tg3 driver fails post Red Hat Network update

|                    |                                                                                                                                                                                   |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Description</b> | When you already have a KMOD driver, and you update Red Hat Enterprise Linux 6.1 to a newer kernel from Red Hat Network (RHN), the <b>tg3</b> driver reverts to a native version. |
| <b>Workaround</b>  | A fix will be available in a later Red Hat Enterprise Linux update.                                                                                                               |
| <b>Cause</b>       | The <b>tg3</b> driver does not follow the SPEC file format recommended by Red Hat.                                                                                                |

## Kernel panic occurs when GPGPU C2075 is installed on Red Hat Enterprise Linux 6.1

|                    |                                                                                              |
|--------------------|----------------------------------------------------------------------------------------------|
| <b>Description</b> | Kernel panic occurs when NVIDIA GPGPU controller is installed on Red Hat Enterprise Linux 6. |
|--------------------|----------------------------------------------------------------------------------------------|

 **NOTE: Kernel panic does not occur when a basic video driver is installed.**


|                   |                                                                                                                                                                                                                                                                                                                                                           |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Workaround</b> | To resolve the issue: <ol style="list-style-type: none"><li>1 Install the operating system with kernel parameter <b>nomodeset</b> to enforce basic video drivers.</li><li>2 Once the installation is complete, install the video drivers.</li><li>3 Install the NVIDIA driver from <a href="https://downloads.dell.com">downloads.dell.com</a>.</li></ol> |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|              |                                                                                                             |
|--------------|-------------------------------------------------------------------------------------------------------------|
| <b>Cause</b> | The NVIDIA <b>nouveau</b> open source driver does not support the GPGPU card on Red Hat Enterprise Linux 6. |
|--------------|-------------------------------------------------------------------------------------------------------------|

## Red Hat Enterprise Linux 6.1 installation fails

 **NOTE: This issue affects USC-based installations.**

|                    |                                                                                                                                                                                   |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Description</b> | When you deploy Red Hat Enterprise Linux 6.1 operating system in UEFI mode, although the operating system is installed, the drivers in the <b>OEMDRV</b> drive are not installed. |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Workaround</b> | <ol style="list-style-type: none"><li>1 Start the operating system installation through Lifecycle Controller.</li><li>2 After the operating system media boots, press Tab.</li><li>3 For installation in:<ul style="list-style-type: none"><li>• BIOS mode: Type the command-line argument space followed by the string <b>dd updates</b>.</li><li>• UEFI mode: Press A and type the string <b>dd updates</b>.</li></ul></li><li>4 Press Enter to start the installation.</li><li>5 During installation, a <b>Driver Disk</b> pop-up is displayed with the message — <code>Do you have a driver disk?</code>.</li><li>6 Select <b>Yes</b> and provide the location of the driver disk.<p> <b>NOTE: Sometimes, the driver disk is automatically detected. If the disk is detected, skip step 6, select No, and follow the on-screen instructions to complete the installation.</b></p></li><li>7 Select the driver disk drive <b>OEMDRV</b>.</li><li>8 Select the file <b>driver_disk.iso</b> to load the drivers.<p>An <b>Update Disk Source</b> pop-up is displayed, with the message to select the location of the update source.</p></li><li>9 Select the <b>OEMDRV</b> partition and press <b>OK</b>.</li></ol> |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

The **Updates Disk** pop-up is displayed.

- 10 Press **OK** and follow the on-screen instructions to complete the installation.

**NOTE:** This issue has been resolved in Red Hat Enterprise Linux 6.2.

#### Cause

During Red Hat Enterprise Linux 6.1 installation, the installer tries to create a mount point (`\boot\efi`) on any exposed vFAT partition.

## Driver installation fails during Red Hat Enterprise Linux 6.1 installation

**NOTE:** This issue affects USC-based installations.

#### Description

During the Red Hat Enterprise Linux 6.1 installation, the installer tries to create a mount point (`\boot\efi`) on any exposed vFAT partition. However, since the exposed vFAT partitions on Lifecycle Controller are read-only, the installation fails.

#### Workaround

When you deploy Red Hat Enterprise Linux 6.1 operating system in UEFI mode, although the operating system is installed, the drivers in the **OEMDRV** drive are not installed.

- 1 Start the operating system installation through Lifecycle Controller.
- 2 After the operating system media boots, press Tab.
- 3 For installation in:
  - BIOS mode: Type the command-line argument `space` followed by the string `dd updates`.
  - UEFI mode: Press A and type the string `dd updates`.
- 4 Press Enter to start the installation.
- 5 During installation, a **Driver Disk** pop-up is displayed with the message — `Do you have a driver disk?`.
- 6 Select **Yes** and provide the location of the driver disk.

**NOTE:** Sometimes, the driver disk is automatically detected. If the disk is detected, skip step 6, select No, and follow the on-screen instructions to complete the installation.

- 7 Select the driver disk drive **OEMDRV**.
- 8 Select the file **driver\_disk.iso** to load the drivers.  
An **Update Disk Source** pop-up is displayed, with the message to select the location of the update source.
- 9 Select the **OEMDRV** partition and press **OK**.  
The **Updates Disk** pop-up is displayed.
- 10 Press **OK** and follow the on-screen instructions to complete the installation.

**NOTE:** This issue has been resolved in Red Hat Enterprise Linux 6.2.

#### Cause

The installer code intermittently fails to detect the **OEMDRV** driver disk partition.

## dmesg error log displays a generic hardware error

#### Description

These messages are for information only, and can be ignored:

```
GHES: Generic hardware error source: 32992 notified via NMI is not supported!  
GHES: Generic hardware error source: 32993 notified via NMI is not supported!
```

```
GHES: Generic hardware error source: 32994 notified via NMI is not supported!
GHES: Generic hardware error source: 227 notified via NMI is not supported!
```

**Workaround** This will be fixed in a future release of Red Hat Enterprise Linux.

**Cause** This issue occurs because Non Maskable Interrupt (NMI) is not supported.

## Resolved issues in Red Hat Enterprise Linux 6.1

### Graphical boot splash screen in the UEFI mode is in low resolution

**Description** On systems that boot through UEFI, the bootsplash (Plymouth) screen may be displayed in a lower resolution after successful installation of the operating system.

**Workaround** This issue is seen only during bootup and does not affect X-Windows startup or GNOME/KDE.

**Cause** This issue occurs due to the way the console is initialized in the UEFI mode by the operating system.

### PERC H700 DIMM failure messages with the debug kernel

**Description** While booting with the debug kernel (**kernel-debug-2.6.32-71.el6**) on a system with PowerEdge RAID Controller (PERC) H700, the controller initialization displays the following DIMM-related error messages on the console:

```
Multibit ECC errors were detected on the RAID controller. The DIMM on the
controller needs replacement. Please contact technical support to resolve this
issue.
```

**Workaround** To continue booting to the debug kernel, press <X>.

This issue does not affect the booting of the default Red Hat Enterprise Linux 6 kernel (**kernel-2.6.32-71.el6**).

**Cause** The **megaraid\_sas** driver resets the PERC H700 controller leaving the controller in an unknown state.

### Network devices enumerated in an incorrect order

**Description** On certain PowerEdge systems, such as PowerEdge 2950, R905, R805, R900, and R300 that have an add-in network adapter plugged in a PCIe slot, eth0 in the operating system does not always map to the Gb1 port as labeled on the chassis. The add-in network adapter may map to eth0.

**Workaround** Pass the `driverload=<module name of the network driver for the LOM>` command line option to the installer while booting from the Red Hat Enterprise Linux 6 media. Passing this command option ensures that the driver for the onboard network adapters loads before other network driver modules.

For example, on PowerEdge systems, the **driverload** is **bnx2**.

 **NOTE:** Do not use the **driverload** option if you do not use your onboard network adapters.

**Cause** This issue is caused due to a race condition during the parallel loading of modules by **udev**.

# OpenManage installation does not respond on Red Hat Enterprise Linux 6

|                    |                                                                                                                                                                                                |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Description</b> | Dell EMC OpenManage installation does not respond on PowerEdge R905, 2970, 6950, and T605 systems.                                                                                             |
| <b>Workaround</b>  | <b>dcdbas</b> is a native driver in Red Hat Enterprise Linux 6.1. To resolve this issue, download the <b>dcdbas</b> driver at <a href="http://www.dell.com/support">www.dell.com/support</a> . |
| <b>Cause</b>       | This issue is caused due to a defect in the <b>dcdbas</b> driver.                                                                                                                              |

# Red Hat Enterprise Linux 6 installation fails with virtual media

|                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Description</b> | Red Hat Enterprise Linux 6 installation fails while accessing the iDRAC virtual media.                                                                                                                                                                                                                                                                                                                                                                |
| <b>Workaround</b>  | <ol style="list-style-type: none"><li>1 Go to <a href="http://www.dell.com/support">www.dell.com/support</a>.</li><li>2 Click <b>Drivers &amp; Downloads</b>.</li><li>3 Enter your system Service Tag or select your product.</li><li>4 From the <b>Operating System</b> drop-down menu, select <b>Red Hat Enterprise Linux 6</b>.</li><li>5 From the <b>All PowerEdge XXX files</b>, click <b>Operating System</b> and download the patch.</li></ol> |
| <b>Cause</b>       | <b>Udev</b> uses <b>cdrom_id</b> binary internally to populate environment variables that are related to the CDROM. During installation, certain variables may not be available and the installation is forced to terminate.                                                                                                                                                                                                                          |

# Known issues in Red Hat Enterprise Linux 6

## Kernel panic on PowerEdge R905 systems

|                    |                                                                                                                                                                                                                               |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Description</b> | Kernel panic may occur on PowerEdge R905 systems when HPET is enabled in the BIOS.                                                                                                                                            |
| <b>Workaround</b>  | This issue does not occur when the HPET setting is disabled (Dell EMC factory default setting).<br><br>If the HPET setting is enabled in the BIOS, pass the <code>no_timer_check</code> parameter in the kernel command line. |
| <b>Cause</b>       | This issue occurs due to the way the APIC of the system is initialized by the operating system.                                                                                                                               |

## Login to iSCSI LUN may fail through multiple interfaces

|                    |                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Description</b> | If there are multiple interfaces on the same subnet and if iSCSI LUN discovery is done using the second interface, the discovery fails. This issue affects iSCSI iface binding when multiple interfaces are on the same subnet.<br><br>Login using the following command succeeds:<br><pre>#iscsiadm -m discovery -t st -p &lt;IP&gt; -I iface0#iscsiadm -m discovery -t st -p -I iface0 -l</pre> |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Login using the following command fails:

```
#iscsiadm -m discovery -t st -p <IP> -I iface1 -o new#iscsiadm -m discovery -t st -p <IP> -I iface1 -l
```

**Workaround** Set `net.ipv4.conf.default.rp_filter` to **0** or **2** in `/etc/sysctl.conf`, and reboot the system.

**Cause** In the **2.6.31 kernel**, the `net.ipv4.conf.default.rp_filter = 1` behavior has changed to be more strict in the I/O.

## IPMI commands may result in high processor utilization

**Description** On PowerEdge systems that are managed through IPMI, the `kipmid` thread may consume high processor resources when you issue IPMI commands to the BMC.

**Workaround** Set the option `kipmid_max_busy_us` to the `ipmi_si` driver module.

This option can be set by creating a file, `/etc/modprobe.d/ipmi.conf` with the following line and reloading the `ipmi_si` module:

```
options ipmi_si kipmid_max_busy_us=300
```

## Updating firmware through Dell EMC Utility Partition may fail in the UEFI mode

**Description** When you boot to Red Hat Enterprise Linux 6 in the UEFI mode, updating the firmware through the DUP may fail after DUP reboots the system.

**Workaround** Boot the system with the `reboot=k` kernel command line option before flashing the firmware. Add this option to `/etc/grub.conf` to be persistent across reboots.

**Cause** DUP relies on a warm system reset to enable firmware flashing. By default, the kernel performs a cold reset in the UEFI mode.

A resolution for this issue will be available in a future update of the operating system.

For more information on DUP, see the *Dell EMC Update Packages User's Guide* at [www.dell.com/manuals](http://www.dell.com/manuals).

## Finding more information

- See [www.dell.com/support](http://www.dell.com/support) for:
  - The latest BIOS and firmware versions.
  - Files that are specific to your Dell EMC hardware running the Red Hat Enterprise Linux operating system.
  - Information about Dell EMC hardware that is running the Red Hat Enterprise Linux operating system.
- Additional information can be found at [www.redhat.com/en/technologies/linux-platforms/enterprise-linux](http://www.redhat.com/en/technologies/linux-platforms/enterprise-linux).
- Sign up for mailing lists at [www.lists.us.dell.com](http://www.lists.us.dell.com).
- Search for previously posted information that addresses issues that you may encounter at [www.lists.us.dell.com/pipermail/linux-poweredge](http://www.lists.us.dell.com/pipermail/linux-poweredge).
- For additional information, also see [www.dell.com/community](http://www.dell.com/community).

# Getting help

Topics:

- [Contacting Dell EMC](#)
- [Related documentation](#)
- [Documentation resources](#)
- [Download the drivers and firmware](#)
- [Documentation feedback](#)

## 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](http://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.

## Related documentation

**NOTE:** For all PowerEdge and PowerVault documentation, go to [www.dell.com/poweredgemanuals](http://www.dell.com/poweredgemanuals) and [Dell.com/powervaultmanuals](http://Dell.com/powervaultmanuals) type the system Service Tag to get your system documentation.

**NOTE:** For all Virtualization documents, go to [Dell.com/virtualizationsolutions](http://Dell.com/virtualizationsolutions).

**NOTE:** For all operating system documents, go to [www.dell.com/operatingsystemmanuals](http://www.dell.com/operatingsystemmanuals).

**NOTE:** For information on deploying Red Hat Enterprise Virtualization, see the product documentation available on [www.access.redhat.com/documentation](http://www.access.redhat.com/documentation).

Your product documentation includes:

### Troubleshooting Guide

Provides information about troubleshooting the software and the system.

### OpenManage Server Administrator User's Guide

Provides information about using Dell EMC OpenManage Server Administrator to manage your system.

**NOTE:** For more information about Dell EMC OpenManage Server Administrator, go to [www.dell.com/support/article/sln312492](http://www.dell.com/support/article/sln312492).

# 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 <i>Getting Started Guide</i> that is shipped with your server.     | <a href="http://www.dell.com/poweredgemanuals">www.dell.com/poweredgemanuals</a>             |
|                         | For information about turning on the server and the technical specifications of your server, see the <i>Getting Started Guide</i> that is shipped with your server.                            | <a href="http://www.dell.com/poweredgemanuals">www.dell.com/poweredgemanuals</a>             |
| Configuring your server | For information about the iDRAC features, configuring and logging in to iDRAC, and managing your server remotely, see the <i>Integrated Dell Remote Access Configuration Tool User's Guide</i> | <a href="http://www.dell.com/idracmanuals">www.dell.com/idracmanuals</a>                     |
|                         | For information about installing the operating system, see operating system documentation.                                                                                                     | <a href="http://www.dell.com/operatingsystemmanuals">www.dell.com/operatingsystemmanuals</a> |
|                         | For information about understanding Remote Access Controller Admin (RACADM) subcommands and supported RACADM interfaces, see the <i>iDRAC RACADM CLI Guide</i> .                               | <a href="http://www.dell.com/idracmanuals">www.dell.com/idracmanuals</a>                     |
|                         | For information about updating drivers and firmware, see <a href="#">Downloading the drivers and firmware</a> topic in this document.                                                          | <a href="http://Dell.com/support/drivers">Dell.com/support/drivers</a>                       |
| Managing your server    | For information about server management software offered by Dell EMC, see the Dell EMC <i>Systems Management Overview Guide</i> .                                                              | <a href="http://www.dell.com/openmanagemanuals">www.dell.com/openmanagemanuals</a>           |
|                         | For information about setting up, using, and troubleshooting OpenManage, see the Dell EMC <i>OpenManage Server Administrator User's Guide</i> .                                                | <a href="http://www.dell.com/openmanagemanuals">www.dell.com/openmanagemanuals</a>           |
|                         | For information about installing, using, and troubleshooting Dell                                                                                                                              | <a href="http://www.dell.com/openmanagemanuals">www.dell.com/openmanagemanuals</a>           |

| Task                                                 | Document                                                                                                                                                                                                                                                                                                  | Location                                                                                 |
|------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
|                                                      | EMC OpenManage Essentials, see the Dell EMC <a href="http://Dell.com/openmanagemanuals">Dell.com/openmanagemanuals</a> > <i>OpenManage Essentials User's Guide</i> .                                                                                                                                      |                                                                                          |
|                                                      | For information about installing and using Dell SupportAssist, see the Dell EMC <i>SupportAssist Enterprise User's Guide</i> .                                                                                                                                                                            | <a href="http://www.dell.com/serviceabilitytools">www.dell.com/serviceabilitytools</a>   |
|                                                      | For understanding the features of Dell EMC Lifecycle Controller (LC), see the <i>Lifecycle Controller User's Guide</i> .                                                                                                                                                                                  | <a href="http://www.dell.com/idracmanuals">www.dell.com/idracmanuals</a>                 |
|                                                      | For information about partner programs enterprise systems management, see the <i>OpenManage Connections Enterprise Systems Management</i> documents.                                                                                                                                                      | <a href="http://www.dell.com/esmmanuals">www.dell.com/esmmanuals</a>                     |
|                                                      | 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 <i>Chassis Management Controller User's Guide</i> . | <a href="http://www.dell.com/esmmanuals">www.dell.com/esmmanuals</a>                     |
| 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.                                                                                                                                | <a href="http://Dell.com/storagecontrollermanuals">Dell.com/storagecontrollermanuals</a> |
| 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 <i>Event and Error Message Reference Guide for 14th Generation Dell EMC PowerEdge Servers</i> .                                                  | <a href="http://Dell.com/openmanagemanuals">Dell.com/openmanagemanuals</a>               |
| Troubleshooting your system                          | For information about identifying and troubleshooting the PowerEdge server issues, see the <i>PowerEdge Servers Troubleshooting Guide</i> .                                                                                                                                                               | <a href="http://www.dell.com/poweredgemanuals">www.dell.com/poweredgemanuals</a>         |

# Download the 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 [Dell.com/support/drivers](https://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.

# 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.