DELL™ POWEREDGE™ RAID CONTROLLER

PERC H700
PERC H800

TRANSITION GUIDE

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1 Introduction

Dell introduced the next generation PowerEdge™ RAID Controllers (PERC**)** worldwide in December 2009. This document provides guidance for product transitions from Dell's PERC 6/I and PERC 6/E products to the new generation PERC H700 and PERC H800 solutions.

Dell PERC H700 and PERC H800 products add 6Gb/s SAS (SAS 2.0) performance capability and increased flexibility and scalability to the Dell 11th Generation PowerEdge Servers and the new PowerVault™ MD1200 and MD1220 expansion arrays. The PERC H700 and PERC H800 offer the following new features:

- Increased Performance
    o 6Gb/s SAS (SAS 2.0) doubles the throughput performance
    o New ROC (RAID-on-chip) processor offers up to 35% increased IOPs performance capability
- Increased Security: Supports Self Encrypting Drive (SED)
- Increased expansion array features with PERC H800
    o Increased Density of the 3.5" (MD1200) enclosure (12 drive 2U)
    o Increased Capacity and Scalability – Daisy chain up to 8 enclosures (up to 192 drives) behind a PERC H800
    o Increased Flexibility
        o Mix 2.5" (MD1220) and 3.5" (MD1200) enclosures behind a PERC H800
        o Mix 2.5" and 3.5" drives in the MD1200**
    o Supports SAS Drives only: HDDs at 7.2K, 10K, and 15K rpm and SSD**

    **Available March 2010
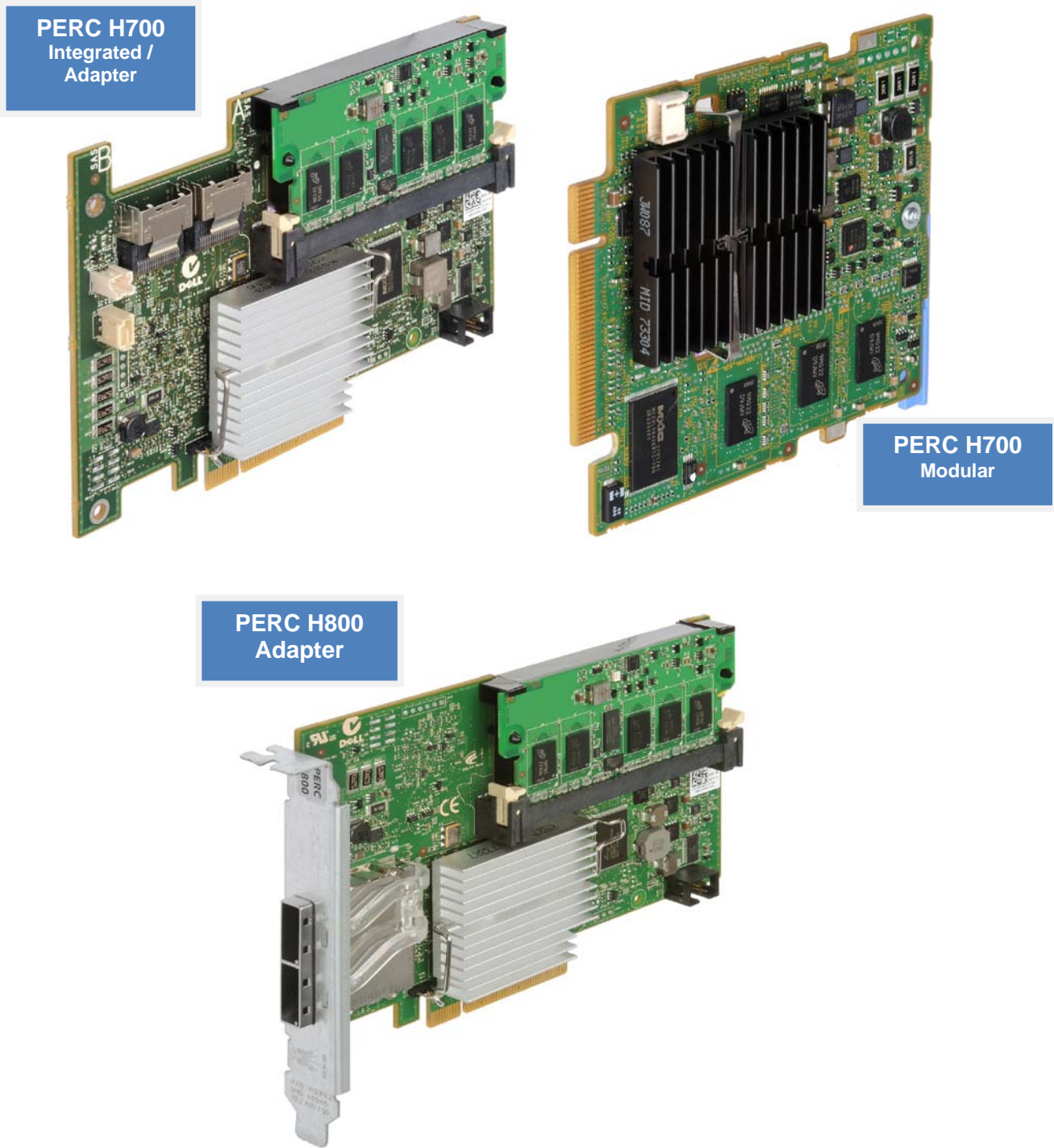
Figure 1 presents views of the H700 and H800 products.

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Figure 1.   PERC H700 and H800 Views

2 Product Comparison

PERC H700 and H800 will be supported in PowerEdge 11th Generation servers. The PERC H700 is a follow-on to the PERC 6/I, and the PERC H800 is the follow-on to the PERC 6/E.

Table 1.   Comparison of PERC H700 and PERC H800 to PERC 6/I and PERC 6/E

Feature/Spec	NEW PERC H700	PERC 6/I	NEW PERC H800	PERC 6/E
Interface	6Gb (SAS 2.0)	3Gb (SAS 1.1)	6Gb (SAS 2.0)	3Gb (SAS 1.1)
Bus support	x8 PCIe 2.0	x8 PCIe 1.0	x8 PCIe 2.0	x8 PCIe 1.0
Ports / Channels	8 (2 x4)	8 (2 x4)	8 (2 x4)	8 (2 x4)
Int/Ext Connectors	2 internal	2 internal	2 external	2 external
Cache Memory	512MB (800 MHz DDR2)	256MB (667 MHz DDR2)	512MB (800 MHz DDR2)	256MB / 512MB (667 MHz DDR2)
Battery-Backed Cache	Yes	Yes	Yes Transportable	Yes Transportable
RAID Levels	0, 1, 5, 6, 10, 50, 60	0, 1, 5, 6, 10, 50, 60	0, 1, 5, 6, 10, 50, 60	0, 1, 5, 6, 10, 50, 60
Max physical drives in Large RAID volume	16	10	192 (8x MD1220)	144 (6x MD1120)
HDD Support	SAS & SATA	SAS & SATA	SAS only	SAS & SATA
SSD Support	SAS** & SATA	SATA	SAS only**	Not Supported
SED Support	Yes (Local Key Mgmt)	Not Supported	Yes (Local Key Mgmt)	Not Supported
Controller Firmware (latest rev)	7.0	6.2	7.0	6.2
Redundant Path	No	No	Yes	Yes
I/O Load Balancing	No	No	Yes	Yes
Cluster Support	No	No	No	No
Storage Management	OpenManage 6.2 (minimum version)	OpenManage 5.4 (minimum version)	OpenManage 6.2 (minimum version)	OpenManage 5.4 (minimum version)

3 PERC H700 Model Overview

The PERC H700 internal host-RAID product offers three different models to support Dell 11th Generation PowerEdge Servers.

<u>PERC H700 Integrated card</u> with two x4 internal mini-SAS ports and battery backup unit that supports PCIe 2.0 x8 host interface. The PERC H700 Integrated card is installed in the dedicated internal storage slot of the server.

<u>PERC H700 Adapter</u> with two x4 internal mini-SAS ports and battery backup unit that supports PCIe 2.0 x8 host interface. The PERC H700 Adapter is installed in a PCIe slot of the server. See Figure 1 for an angled view of the PERC H700 Integrated card (Adapter version is the same with the addition of a sled for adhering to the PCIe slot connection).

<u>PERC H700 Modular card</u> with one x4 internal SAS port and battery backup unit that supports PCIe 2.0 x4 host interface. The PERC H700 Modular is installed in the integrated slot in the Blade server platforms. See Figure 1 for an angled view of the PERC H700 Modular.

Table 2.   Comparison of PERC H700 Modular to PERC 6/I Modular and CERC 6/I

Feature/Spec	NEW PERC H700 Modular	PERC 6/I Modular	CERC 6/I
Interface	6Gb (SAS 2.0)	3Gb (SAS 1.1)	3Gb (SAS 1.1)
Bus support	x8 PCIe 2.0	x8 PCIe 1.0	x8 PCIe 2.0
Ports / Channels	4 (1 x4)	4 (1 x4)	4 (1 x4)
Int/Ext Connectors	1 internal	1 internal	1 internal
Cache Memory	512MB (800 MHz DDR2)	256MB (667 MHz DDR2)	128MB (667 MHz DDR2)
Battery-Backed Cache	Yes	Yes	No
RAID Levels	0, 1, 5, 6, 10	0, 1, 5, 6, 10	0, 1, 5, 6, 10
Max physical drives supported	4 Server max	4 Server max	4 Server max
HDD Support	SAS & SATA	SAS & SATA	SAS & SATA
SSD Support	SAS** & SATA	SATA	SATA
SED Support	Yes (Local Key Mgmt)	Not Supported	Not Supported
Controller Firmware (latest rev)	7.0	6.2	7.0
Storage Management	OpenManage 6.2 (minimum version)	OpenManage 6.1 (minimum version)	OpenManage 6.0 (minimum version)

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4 PERC H800 Model Overview

The PERC H800 external host RAID product is supported with Dell 11th Generation PowerEdge Servers for expanding storage to the Dell PowerVault MD1200 and MD1220 6Gb/s SAS enclosures.

The PERC H800 Adapter with two x4 external mini-SAS ports and transportable battery backup unit that supports PCIe 2.0 x8 host interface is installed in a PCIe slot of the server.

5 6Gb/s SAS (SAS 2.0) Overview

The 6 Gb/s SAS 2.0 specification doubles the current 3Gb/s SAS data transfer rate. 6Gb/s SAS is designed for backward compatibility with 3Gb/s SAS and 3Gb/s SATA hard drives. Regardless of the drive speed, 6Gb/s controllers will deliver significant performance improvements in both read and write applications as compared to their 3Gb/s predecessors.

Other new features of the 6Gb/s SAS controllers will offer improved signal integrity and additional safeguards to enhance data protection with support for SED (Self-Encrypting Drive) technology.

Table 3.   6Gb/s SAS (SAS 2.0) Features

Serial Attached SCSI 6Gb/s	DAS-based Server Storage
6Gb/s Throughput	★
3Gb/s Compatible	★
Standard Mini-SAS Connectors (SFF-8087 and SFF-8088)	★
DFE (Decision Feedback Equalization) improved signaling	★
SSC (Spread Spectrum Clocking) reduced radiated emissions	★
Enhanced Security with SED (Self-Encrypting Drive) support	★
Improved Scalability	★

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5.1 6Gb/s SAS performance benefit over 3Gb/s SAS

In small disk drive configurations, one to eight drives, the aggregate media rate of the disks (the speed at which the disk heads can read and write data) become the bottleneck for storage throughput. As business storage needs grow, IT centers can add more disk drives to their storage infrastructure, and the latest generation of SAS allows server performance to scale past the 3Gb SAS performance limitations: from 2.4 GB/s to 4.8 GB/s unidirectional.

Table 4.   SAS Configurations

SAS Generation	PCI-Express Interface	Approximate number of SAS HDDs required to saturate bandwidth (RAID 0)
1.0 (3Gb)	1.0	8 to10
2.0 (6Gb)	2.0	16 to 20

In addition to the improvements in the SAS bandwidth, PCI Express 2.0 provides double the system-to-storage controller interconnect speed. The x8 PCI Express 1.0 interface linking the controller to the host platform limited throughput even further to a theoretical 2GB/s maximum; that limitation has been raised to 4GB/s (unidirectional).

5.2 6Gb/s SAS Expectation

RAID controllers employing 6Gb/s SAS technology excel in both high-IOP and high-bandwidth applications. Applications and environments that benefit most range from traditional data center applications, such as random IOPs intensive email, web, and database servers to streaming and archival applications that will benefit from improved sequential read and write throughput. What does this mean? More users, more video streams, more email accounts, and faster backups are now possible.

6 Product Support

6.1 PowerEdge Server Support

The Dell PERC H700 and PERC H800 are supported with Dell 11th Generation PowerEdge Servers. For the latest Dell PERC support matrix with Dell PowerEdge Servers, visit the PERC web page at www.dell.com/PERC.

Table 5.   PowerEdge Server Support with PERC H700 and PERC H800

PERC H700 Internal Integrated	PERC H700 Internal Adapter	PERC H700 Internal Modular	PERC H800 External Adapter
PE R510	PE T310	PE M610	PE R410
PE R610	PE R410	PE M710	PE T310
PE T610	PE T410		PE T410
PE R710			PE R510
PE T710			PE R610
			PE T610
			PE R710
			PE T710

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6.2 Management Software Support

The Dell PERC H700 and H800 are supported with Dell 11th Generation PowerEdge Servers and managed through common OpenManage Storage Management software (minimum version 6.2). For pre-OS configuration, the PERC BIOS utility can also be used to configure and troubleshoot the PERC H700 and PERC H800 products.

6.3 Operating System Support

The Dell PERC H700 and PERC H800 provide operating system support based on Dell 11th Generation PowerEdge support requirements. For the latest list of supported operating systems and driver installation instructions, see the system documentation on the Dell Support website at support.dell.com/manuals. For specific operating system service pack requirements, see the Drivers and Downloads section on the Dell Support website at support.dell.com.

Table 6.   Operating System Support with PERC H700 and PERC H800

Supported Operating Systems
Microsoft® Windows Server® 2003 Family
Microsoft Windows Server 2008 Family
Microsoft Windows Server 2008 R2
Red Hat® Enterprise Linux™ Version 4 and Version 5
RHEL 4.7 and later (32 and 64 bit)
RHEL 5.3 and later (32 and 64 bit)
Sun® Solaris™10 (64-bit)
SUSE® Linux Enterprise Server Version 10 (64-bit) and Version 11 (64-bit)
SLES10 SP2 and later
SLES11 GM and later
VMware® ESX 4.0 Update 1 and later
Citrix® XenServer™ 6.0 and later

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6.4 Drive Support

Dell PERC H700 supports SAS and SATA interface drives, both HDD (hard-disk drive) and SSD (solid-state drive). The Dell PERC H800 supports SAS interface drives, both HDDs and SSDs. For specific form-factor and capacity support, refer to the platform-specific support matrix at dell.com.

Table 7.   Drive Support

Drive Type	Interface	PERC H700	PERC H800
HDD	6Gb/s SAS	Yes	Yes
	3Gb/s SAS	Yes (field support)	Yes (field support)
	3Gb/s SATA	Yes	No
SSD	3Gb/s SAS (available within 90 days of RTS)	Yes	Yes
	3Gb/s SATA	Yes	No

SATA interface drives are not supported with PERC H800 and the Dell PowerVault MD1200 and MD1220 enclosures.