Overview

Broadcom MegaRAID MR Storage Controllers

A versatile, simplified and flexible choice for data centers
HPE introduces an expansive and agile PCIe Gen 4.0 server portfolio based on Broadcom MegaRAID technology delivering quality, performance and security for mission-critical applications.
Accelerate performance of nvme and sas ssd's while minimizing power consumption

- HPE MR416i-a / MR416i-p and MR216i-a / MR216i-p controllers offer up to 13,700 MBs of Bandwidth, 3M Random Read IOPs, and 240K RAID5 Random Write IOPs; more than double previous Broadcom MegaRAID generations.
- Support for PCIe Gen 4.0 enables these adapters for high bandwidth by delivering twice the bandwidth and 75% more IOPs.
- Support up to 16 internal ports providing unmatched IOPS performance and data protection.
- Provide the lowest power consumption in their class equating to power savings for any data center environment.

Hardware root of trust and secure encryption and decryption of critical drive data

- The Broadcom MegRAID portfolio provides confidence in the security and data protection offered with hardware secure boot, as well as self-encrypting drives support.
- Broadcom MR416i-a / MR416i-p and MR216i-a / MR216i-p controllers manage SEDs attached to the RAID controller for higher levels of security of Data at Rest (DAR).
- SEDs constantly perform encryption and decryption of all drive contents, and the ability to lock a drive so that its contents remain safely beyond the reach of hackers and thieves is crucial.

Jobs to be done

- HPE MR416i-a / MR416i-p are ideal for all data center environments where RAID is applicable offering reduced rebuild times, high-bandwidth and 240K RAID5 Random Write IOPs
- HPE MR216i-a / MR216i-p are ideal for all virtualized environments where HBA / Pass-through mode is applicable offering high-bandwidth and 3M Random Write IOPs

HPE has enabled customers to go further, faster this latest generation of Broadcom Tri-Mode Controllers supporting PCIe Gen 4.0 Tri-Mode and SED while enhancing SAS and NVMe RAID performance. The MR Controllers use a new, user-friendly web-based interface called HPE MR Storage Administrator (MRSA) that makes it easy to configure, monitor, maintain, and troubleshoot drives.

For those customers familiar with MegaRAID technology the MR Controllers use CLI Management Tool called StorCLI.
Note: MegaRAID Storage Administrator and StorCLI can only be used on MegaRAID MR controllers.

For more information on MR Storage Administrator see the MR Storage Administrator section below.
For more information on StorCLI see the Store CLI section below.

Models

Broadcom MegaRAID MR416i-a Gen10 Plus Controller	P26279-B21
Broadcom MegaRAID MR416i-p Gen10 Plus Controller	P06367-B21
Broadcom MegaRAID MR216i-a Gen10 Plus Controller	P26325-B21
Broadcom MegaRAID MR216i-p Gen10 Plus Controller	P26324-B21

Notes: An HPE Smart Storage energy pack (available in both battery and hybrid capacitor options) is required with the MR RAID controller. See below for energy pack options.

Compatibility

SKU	P26279-B21	P06367-B21	P26325-B21	P26324-B21
Description	Broadcom MegaRAID MR416i-a Gen10 Plus Controller	Broadcom MegaRAID MR416i-p Gen10 Plus Controller	Broadcom MegaRAID MR216i-a Gen10 Plus Controller	Broadcom MegaRAID MR216i-p Gen10 Plus Controller
ProLiant DL360 Gen10 Plus	✔	✔	✔	✔
ProLiant DL380 Gen10 Plus	✔	✔	✔	✔
ProLiant DL325 Gen10 Plus v2	✔	✔	✔	✔
ProLiant DL345 Gen10 Plus	✔	✔	✔	✔
ProLiant DL365 Gen10 Plus	✔	✔	✔	✔
ProLiant DL385 Gen10 Plus v2	✔	✔	✔	✔

Operating System Support

- **Microsoft Windows Server**
- **Red Hat Enterprise Linux (RHEL)**
- **SUSE Linux Enterprise Server (SLES)**
- **VMware ESXi**
- **Canonical Ubuntu**
- **CentOS**

Notes: HPE MegaRAID controllers are supported by the server operating system. For more information on HPE's server operating systems and virtualization software, please visit:
http://www.hpe.com/info/ossupport

Storage Management Software Suite

- HPE MR Storage Administrator
- HPE StorCLI
- UEFI System Utilities (storage configuration)

Notes: For additional information see the HPE MR Storage Administrator User Guide at:
http://www.hpe.com/info/MRdocs

Additional Information
Broadcom MegaRAID MR Gen10 Plus Controllers
For additional information on the features for HPE MegaRAID MR Gen10 Plus Controllers, please see the HPE MegaRAID MR Gen10 Plus User Guide, HPE MegaRAID MR Gen10 Plus Configuration Guide at:
http://www.hpe.com/info/MegaRAIDGen10PLUS-docs

Standard Features

GUI Management Tool
MR Storage Administrator
The MR Storage Administrator is a web-based application that enables you to monitor, maintain, troubleshoot, and configure MegaRAID (MR) storage controllers. The MR Storage Administrator graphical user interface (GUI) helps you to view, create, and manage storage configurations.

- **Monitoring and Configuring:** MR Storage Administrator enables you to monitor the controllers and configure the drives on the controller. It displays the status of the controller cards, logical drives, and drives on the controller. The device status icons are displayed on their respective pages to notify you in case of drive failures and other events that require your immediate attention. Real-time email notifications on the status of the server are sent based on your alert settings. The system errors and events are recorded and displayed in an event log file. Additionally, you can also import or clear foreign configurations.

    Notes: Limited alerting and monitoring is available via iLO when HPE Agentless Management Service is installed

- **Maintaining:** Using MR Storage Administrator, you can perform system maintenance tasks, such as updating the controller firmware
- **Troubleshooting:** MR Storage Administrator displays information related to drive failures, device failures, and so on. It also provides recommendations and displays contextual links, helping you to easily locate the drives/devices that have issues and troubleshoot them. You can also download a complete report of the all the devices and their configurations, properties, and settings and send it to the Support Teams for further troubleshooting.

Please refer to the **MR Storage Administrator User Guide** for more detailed information.
Notes: The HPE MR storage controller is managed through the HPE MegaRAID Storage Administrator only.

CLI Management Tool
The Storage Command Line Interface (StorCLI) tool is the command line management software designed for the MegaRAID product line. The StorCLI tool is a command line interface that is designed to be easy to use, consistent, and easy to script. This chapter provides information on how to install and use the StorCLI tool and explains the various features of the StorCLI tool.
Please refer to the **StorCLI User Guide** for more detailed information.
https://support.hpe.com/hpesc/public/docDisplay?docLocale=en_US&docId=a00048288en_us

Know your choices when it comes to HPE ProLiant and data storage

	MR Gen10 Plus Controllers	SR Gen10 and Gen10 Plus Controllers
Type	MegaRAID	SmartRAID
GUI Management Tool	**?** HPE MR Storage Administrator	**?** HPE Smart Storage Administrator
CLI Management Tool	**?** StorCLI	**?** SSACLI

Notes: You will not be able to see any SR based controllers in your environment through this management tool. HPE recommends choosing either MR controllers or SR controllers to meet your storage controller needs.

Key Features
- MR416i and MR216i Controllers boast best in class performance including up to 13,700 MB's of bandwidth, 3M Random Read IOPs, and 240K RAID5 Random Write IOPs
- Best in class SerDes with exceptional margin that supports NVMe4/SAS3/SATA

Standard Features

      x8 SFF-8654
      12Gb/s SAS, 6Gb/s SATA technology
      Mix-and-match SAS, SATA, and NVMe drives to the same controller

- HW based Root of Trust for Firmware Authentication and support for Self-Encrypting Drives to ensure protection for data at rest and the prevention of malware.
- Support for all major OS's including but not limited to Windows, Linux, and VMWare. Full tool suite including Command Line Interface, Web Based Management, and Out of Band Management support.
- Mixed Mode (RAID logic drives and HBA physical drives simultaneously)
- UEFI System Utilities (storage configuration)
- Up to 240 physical drives
- Up to 32 NVMe devices
- MegaRAID FastPath (SSD acceleration)
- Online firmware updates

Notes: MegaRAID Storage Controllers does not support the same tools or features as the SmartRAID SR Gen10 Plus Controllers such as HPE SSA and SR Secure Encryption.

Description	MR416i-a Gen10+ Controller	MR416i-p Gen10+ Controller	MR216i-a Gen10+ Controller	MR216i-p Gen10+ Controller
SKU	**P26279-B21**	**P06367-B21**	**P26325-B21**	**P26324-B21**
Ports	x8 host / x16 internal tri-mode	x8 host / x16 internal tri-mode	x8 host / x16 internal tri-mode	x8 host / x16 internal tri-mode
Internal SAS lanes	x16			
RAID on Chip Controller	SAS3916			
Form Factor				
Type-a Modular Controller	✔		✔	
PCIe plug-in Controller		✔		✔
Host Interface	PCIe Gen4 x8 host / Gen4 NVMe / Gen 3 SAS/SATA			
Performance				
Cache Size (FBWC)	4GB	4GB	N/A	N/A
Notes: An HPE Smart Storage energy pack is required when using Cache based storage controllers. See below for energy pack options.				
Read Ahead Caching	✔	✔	✔	✔
Write-back Caching	✔	✔	✔	✔
Storage Protocol	12Gbps SAS, 6GB/SATA, 16Gb/s PCIe			
I/O slot	x8 PCI Express 4.0			
Key Features				
Maximum Physical Drives (up to)	240	240	240	240
Maximum Logical Drives (up to)	64	64	64	64
RAID:	0, 1, 5, 6, 10, 50, 60	0, 1, 5, 6, 10, 50, 60	0, 1, 10	0, 1, 10
Mixed Mode: (RAID & HBA)	✔	✔	✔	✔
Boot Mode: Legacy and UEFI	✔	✔	✔	✔
SSD Accelerator	MegaRAID FastPath			
Other features:	• Online Capacity Expansion (OCE) • Auto resume after loss of system power during array			

Standard Features

	- rebuild or OCE - Single controller multipathing - Load balancing - Configurable stripe size up to 1 MB - Fast initialization for quick array setup - Check consistency for background data integrity - SSD support with SSD Guard™ technology - Patrol read for media scanning and repairing - DDF compliant Configuration on Disk (COD) - S.M.A.R.T. support - Global and dedicated Hot Spare with Revertible Hot - Spare support: Automatic rebuild Enclosure affinity Emergency SATA hot spare for SAS arrays - Enclosure management: SES (inband) SGPIO (sideband) Universal Backplane Management (UBM) ready - DataBolt bandwidth optimizer technology support for - compatible expander-based enclosures - Shield state drive diagnostic technology - MegaRAID SafeStore Software for SED Key Management

Array Configuration Features	- Expand Array - Heal Array - Move Drives - Re-Mirror Array - Shrink Array - Spare Management - Split Mirrored Array
Logical Drive Configuration Features	- Extend Logical Drive - Instant Secure Erase - Migrate RAID/Stripe Size - Modifying Cache Write Policy - Move Logical Drive - Re-enable Failed Logical Drive

HPE OneView Support	Not supported	Not supported	Not supported	Not supported
Kit contents	Includes controller, documentation information card, warranty statement, and battery required card.			

Standard Features

Warranty
The warranty for this device is 3 years parts only.
Warranty Upgrade Options

- Response - Upgrade on-site response from next business day to same day 4 hours.
- Coverage - Extend hours of coverage from 9 hours x 5 days to 24 hours x 7 days.
- Duration - Select duration of coverage for a period of 1, 3, or 5 years.

Warranty upgrade options can come in the form of HPE Pointnext operational, which are sold at the HPE System level to which this product attaches.

Fault Recovery
Minimizes downtime, reconstructs data, and facilitates a quick recovery from drive failure
Recovery ROM: This feature protects the user from a firmware image corruption by storing a redundant copy of the firmware image. If the active firmware image becomes corrupt, the controller will use the redundant firmware image and continue operating.
On-Line Spares: There is no limit to the number of spare drives that can be installed prior to drive failure. If a failure occurs, recovery begins with an On-Line Spare and data is reconstructed automatically.
DRAM ECC detects and corrects data bit errors.

Naming Framework
The Gen10 Plus controller naming framework has been updated to simplify identification.
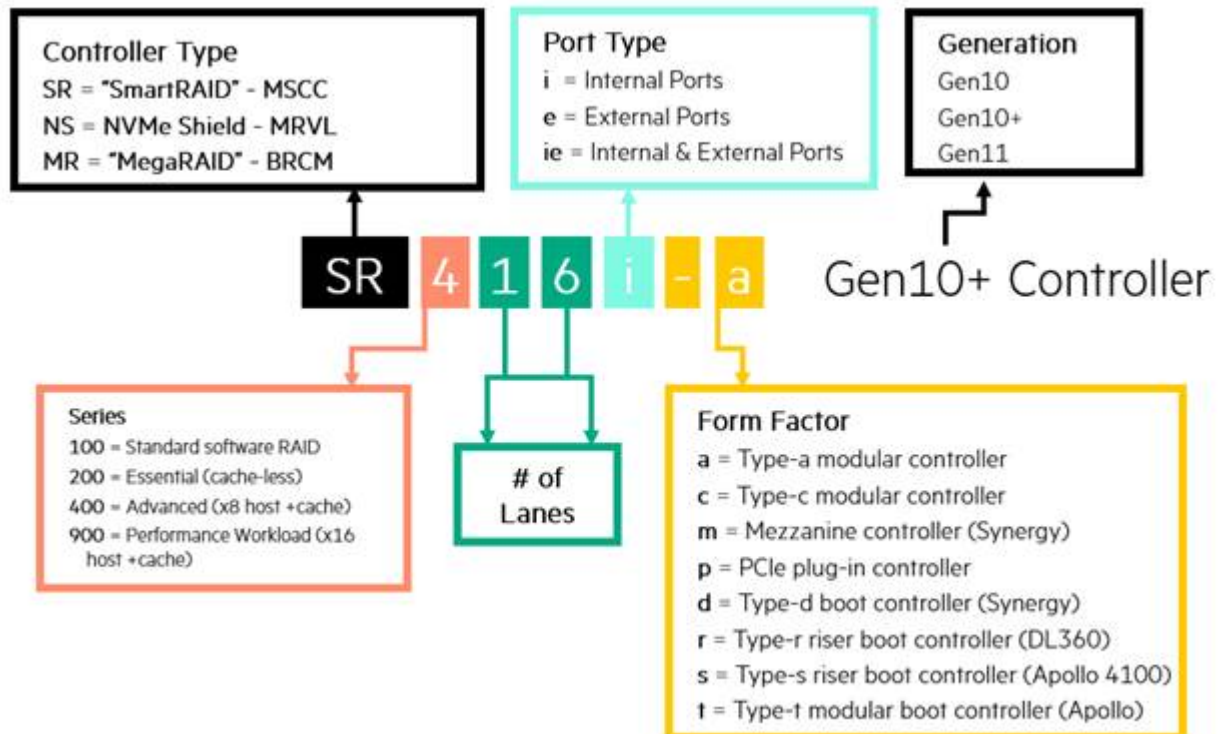
Related Options

Required Accessories for MR 400 Series Storage Controllers

Energy pack Options Sold Separately

HPE 96W Smart Storage Lithium-ion Battery with 145mm Cable Kit	P01366-B21
HPE 96W Smart Storage Lithium-ion Battery with 260mm Cable Kit	P01367-B21
HPE Smart Storage Hybrid Capacitor with 145mm Cable Kit	P02377-B21
HPE Smart Storage Hybrid Capacitor with 260mm Cable Kit	P02381-B21

Notes:

An HPE Smart Storage energy pack is required when using Cache based storage controllers.

The Smart Storage 96W Battery supports multiple devices. See server QuickSpecs for compatibility.

The HPE Smart Storage Hybrid Capacitor is only supported on Gen10 servers or later. Before installing the HPE Smart Storage Hybrid Capacitor verify that the system BIOS meets the minimum firmware requirements to support the hybrid capacitor module.

Service and Support

HPE Support Services

Protect your business beyond warranty with HPE Support Services

HPE Pointnext provides a comprehensive portfolio including Advisory and Transformational, Professional, and Operational Services to help accelerate your digital transformation. From the onset of your transformation journey, Advisory and Transformational Services focus on designing the transformation and creating a solution roadmap. Professional Services specializes in creative configurations with flawless and on-time implementation, and on-budget execution. Finally, operational services provides innovative new approaches like Flexible Capacity and Datacenter Care, to keep your business at peak performance. Hewlett Packard Enterprise is ready to bring together all the pieces of the puzzle for you, with an eye on the future, and make the complex simple.

Recommended Support

HPE Proactive Care* with 24x7 coverage, three year Support Service

HPE Proactive Care gives customers an enhanced call experience. When your products are connected to Hewlett Packard Enterprise, Proactive Care helps prevent problems and maintains IT stability by utilizing personalized proactive reports with recommendations and advice. This Service combines three years proactive reporting and advice with our 24x7 coverage, four hour hardware response time when there is a problem. This service also includes collaborative software support for Independent Software Vendors (ISVs), (Red Hat, VMWare, Microsoft, etc.) running on your HPE servers.
https://www.hpe.com/h20195/v2/GetPDF.aspx/4AA3-8855ENW.pdf

HPE Proactive Care* with 6 hour call-to-repair commitment, three year Support Service

HPE Proactive Care gives customers an enhanced call experience. When your products are connected to Hewlett Packard Enterprise, Proactive Care helps prevent problems and maintains IT stability by utilizing personalized proactive reports with recommendations and advice. This Service combines three years' proactive reporting and advice with our highest level of hardware support – the HPE 24x7, six hour hardware call-to-repair. Hewlett Packard Enterprise is the only leading manufacturer who makes this level of coverage available as a standard service offering for your most valuable servers. This service also includes collaborative software support for Independent Software Vendors (ISVs), (Red Hat, VMWare, Microsoft, etc.) running on your HPE servers.
https://www.hpe.com/h20195/v2/GetPDF.aspx/4AA3-8855ENW.pdf

Notes: *HPE Proactive Care and HPE Proactive Care Advanced require that the customer connect their devices to make the most of these services and receive all the deliverables.

HPE Education Services

Keep your IT staff trained making sure they have the right skills to deliver on your business outcomes. Book on a class today and learn how to get the most from your technology investment.
http://www.hpe.com/ww/learn

HPE Support Center

The HPE Support Center is a personalized online support portal with access to information, tools and experts to support HPE business products. Submit support cases online, chat with Hewlett Packard Enterprise experts, access support resources or collaborate with peers.
Learn more **http://www.hpe.com/support/hpesc**

The HPE Support Center Mobile App* allows you to resolve issues yourself or quickly connect to an agent for live support. Now, you can get access to personalized IT support anywhere, anytime.

HPE Insight Remote Support and HPE Support Center are available at no additional cost with a HPE warranty, HPE Support Service or HPE contractual support agreement.

Service and Support

Notes: *HPE Support Center Mobile App is subject to local availability

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Parts and materials
Hewlett Packard Enterprise will provide HPE-supported replacement parts and materials necessary to maintain the covered hardware product in operating condition, including parts and materials for available and recommended engineering improvements.

Parts and components that have reached their maximum supported lifetime and/or the maximum usage limitations as set forth in the manufacturer's operating manual, product quick-specs, or the technical product data sheet will not be provided, repaired, or replaced as part of these services.

The defective media retention service feature option applies only to Disk or eligible SSD/Flash Drives replaced by Hewlett Packard Enterprise due to malfunction.

Related Services

HPE Server Hardware Installation
Provides for the basic hardware installation of HPE branded servers, storage devices and networking options to assist you in bringing your new hardware into operation in a timely and professional manner
https://www.hpe.com/h20195/V2/GetPDF.aspx/5981-9356EN.pdf
HPE Installation and Startup Service provides for the installation and startup of HPE technology including BladeSystems, C-Class enclosure, HPE ProLiant c-Class and Integrity server blades, storage blades, SAN switch blades, HPE Virtual Connect modules (Ethernet and Fibre Channel), Ethernet network interconnects, and InfiniBand, as well as the installation of one supported operating system type (Windows® or Linux). Warranty and Support Services will extend to include HPE options configured with your server or storage device. The price of support service is not impacted by configuration details. HPE sourced options that are compatible with your product will be covered under your server support at the same level of coverage allowing you to upgrade freely. Installation for HPE options is available as needed. To keep support costs low for everyone, some high value options will require additional support. Additional support is only required on select high value workload accelerators, fibre switches, InfiniBand and UPS batteries over 12KVA. See the specific high value options that require additional support **HERE.**

For more information
Visit the Hewlett Packard Enterprise Service and Support **website**.

Summary of Changes

Date	Version History	Action	Description of Change
06-Apr-2021	Version 1	New	New QuickSpecs

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