

QuickSpecs

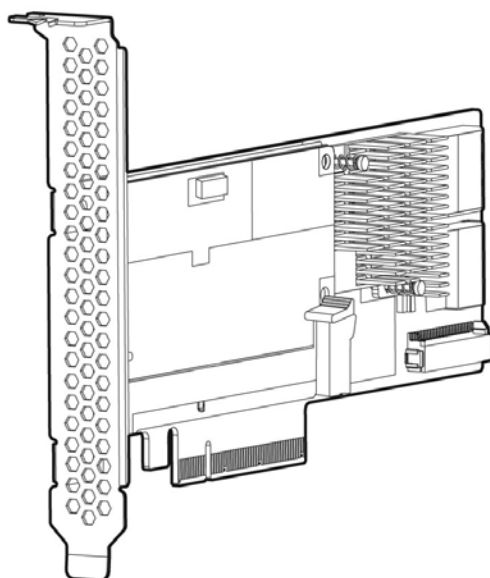
HPE Smart Array P420 Controller

Overview

HPE Smart Array P420 Controller HPE Smart Array P420i Controller

The HPE Smart Array P420 Controller is a low profile, 6 Gb/s, PCIe 3.0, Serial Attached SCSI (SAS) RAID controller that provides enterprise class, storage performance and data protection for select HPE ProLiant Gen8 rack servers and tower servers.

It features eight internal SAS ports and delivers increased server uptime by providing advanced storage functionality, including online RAID level migration (between any RAID levels) with flash back write cache, global online spare, and pre-failure warning. Data Compatibility among all models of Smart Array controllers allows simple and easy migration at any time when needs for higher performance, capacity, and availability increase. Even new generations of Smart Array controllers can understand the data format of previous generations of Smart Array controllers.



Models

HPE Smart Array P420 Controller	HPE Smart Array P420/1GB FBWC 6Gb 2-ports Int SAS Controller	631670-B21
	HPE Smart Array P420/2GB FBWC 6Gb 2-ports Int SAS Controller	631671-B21

Standard Features

The Smart Array Advantage

HPE's innovative design and integration work of the Smart Array family of products creates customer value that is unmatched in the industry. Use of Smart Array products across multiple applications results in a much lower Total Cost of Ownership (TCO) than any other server storage RAID product. The HPE Smart Array family brings an unparalleled return on investment through:

Data Compatibility among most current shipping Smart Array controllers allows simple and easy upgrades any time needs for higher performance, capacity, and availability increase. Even successive generations of Smart Array controllers understand the data format of other Smart Array Controllers.

Consistent Configuration and Management Tools. Most current shipping Smart Array products utilize a standard set of management and utility software. These tools minimize Total Cost of Ownership (TCO) by reducing training requirements and technical expertise necessary to install and maintain the HPE server storage.

SmartDrive Carrier form factor is for use across multiple Hewlett Packard Enterprise servers, Universal Hard Drive form factor is for disk enclosures and storage systems. With compatibility across many enterprise platforms, you are free to deploy and re-deploy these drives to quickly deliver increased storage capacity, migrate data between systems, and easily manage spare drives.

Pre-Failure Warranty means HPE Insight Manager not only reports when a drive is going to fail but allows replacement of failing drives prior to actual failure. For complete details, consult the HPE Support Center or refer to your HPE Server documentation.

Key Features

- The P420 Controller supports up to 60 drives depending on the server implementation.
- Seamless upgrades from past generations and upgrades to next generation HPE high performance and high capacity Serial Attached SCSI Smart Array controllers.
- 6Gb/s SAS technology delivers high performance and data bandwidth and contains full compatibility with 6Gb/s SATA technology.
- x8 PCIe 3.0 host interface technology delivers high performance and data bandwidth up to 8 GB/s maximum bandwidth.
- Modular, easy-to-upgrade design lets you optimize performance by upgrading from 40-bit 512MB cache to 72-bit 1GB Flash Backed Write Cache or 72-bit 2GB Flash Backed Write Cache (FBWC).
- Addition of the flash backed cache upgrade enables array expansion, logical drive extension, RAID migration, and stripe size migration.
- Standard on the P420 are RAID 6 ADG, RAID 60 ADG, RAID 1 ADM, Capacity Expansion, mirror split, recombine, and rollback in Online Mode, Drive Erase, Performance Optimization-Degraded Reads and Read Coalescing, Move/Delete any individual LUNS and Online Split Mirror
- The HPE SSD Smart Path feature included in the Smart Array software stack improves SSD read for all RAID levels and RAID 0 write operations by optimizing the path to each SSD attached to the controller
- The HPE SmartCache licensed feature (available as an additional option) is a controller-based read caching solution in a DAS environment that caches the most frequently accessed data ("hot" data) onto lower latency SSDs to dynamically accelerate application workloads.
- Mix-and-match SAS and SATA hard drives, lets you deploy drive technology as needed to fit your computing environment.
- Software consistency on most current shipping Smart Array products: HPE Smart Storage Administrator, HPE Systems Insight Manager (SIM), and Intelligent Provisioning.
- Low-profile PCI Express form factor - ships with a full size bracket for deployment in either a low-profile or full sized slot.

Management Features

- Online array expansion (with FBWC)
- Online Advanced Capacity Expansion (with FBWC)
- Online logical drive extension (with FBWC)
- Online RAID level migration (with FBWC)

Standard Features

- Online stripe size migration (with FBWC)
- Online mirror split, recombine and rollback (with FBWC)
- Unlimited global online spare assignment
- User selectable expand and rebuild priority
- User selectable RAID level and stripe size
- User selectable read and write cache sizes
- Supports Predictive Spare Activation

Ports • Eight (8) SAS physical links distributed across 2 internal x4 wide port connectors.

Performance

- 6Gb/s SAS [(600MB/s bandwidth per physical link)]
- x8 6Gb/s SAS physical links (compatible with 3Gb/s SATA)
- 512 MB 72-bit wide DDR3-800MHz Flash Backed Write Cache, 1 GB 72-bit wide DDR3-1333MHz Flash Backed Write Cache or 2GB 72-bit wide DDR3-1333MHz Flash Back Write Cache provides up to 10.6 GB/s maximum bandwidth (on the DDR3-1333MHz cache)
- x8 PCIe 3.0 host interface provides maximum bandwidth
- Read ahead caching
- Write-back caching (with FBWC)

Native Command Queuing

Native Command Queuing (NCQ) is a technology designed to increase performance of SATA hard disk drives by allowing the individual hard disk to internally optimize the order in which received read and write commands are executed. This can reduce the amount of unnecessary going back-and-forth on the drive's heads, resulting in increased performance for workloads where multiple simultaneous read/write requests are outstanding, most often occurring in server or storage-type applications. Without NCQ the drive has to process and complete one command at a time. For NCQ to be enabled, it must be supported and turned on in the controller and in the hard drive itself.

NOTE: Please see the [SATA Hard Drive QuickSpecs for specific SATA hard drive capacities that support NCQ](https://www.hpe.com/h20195/v2/gethtml.aspx?docname=c04111725): <https://www.hpe.com/h20195/v2/gethtml.aspx?docname=c04111725>

Capacity Given the increasing need for high performance and rapid capacity expansion, the SA-P420 Controller offers:

- Up to 240TB of total internal storage with 60 x 4TB LFF SATA hard drives
- Up to 24TB of total internal storage with 27 x 900GB SFF SAS hard drives

Above stated total internal storage LFF is based on the HPE SL4540 Gen8 server. Maximum internal storage is dependent on the server.

Availability

Provides increased server uptime by providing advanced storage functionality:

- Online RAID level migration between any RAID levels (with FBWC)
- Online stripe size migration
- Online capacity expansion
- Online logical drive extension
- Online active drive replacement
- Online drive firmware upgrade
- Unlimited global online spare
- Pre-Failure Warranty

Fault Prevention

The following features offer detection of possible failures before they occur, allowing preventive action

Standard Features

to be taken:

- S.M.A.R.T.: Self Monitoring Analysis and Reporting Technology first developed at HPE detects possible hard disk failure before it occurs, allowing replacement of the hard drive before a real failure occurs.
- Drive Parameter Tracking monitors drive operational parameters, predicting failure and notifying the administrator.
- Dynamic Sector Repairing continually performs background surface scans on the hard disk drives during inactive periods and automatically remaps bad sectors, ensuring data integrity.
- Smart Array Cache Tracking monitors integrity of controller cache, allowing pre-failure preventative maintenance.

Fault Tolerance

Keeps data available and server running while a failed drive is being replaced; several fault tolerance configurations are supported including:

- **RAID 6** (Advanced Data Guarding): Supported with a minimum of 4 drives. This allocates two sets of parity data across drives. This level of fault tolerance can withstand a double drive failure without downtime or data loss.
- **RAID 60**: Supported with a minimum of 8 drives. This volume is composed of two or more RAID 6 sub-volumes (parity groups) where data is striped across each parity group as if it were a single physical drive. Each RAID 6 parity group can sustain up to two drive failures without incurring data loss.
- **RAID 5** (Distributed Data Guarding): Supported with a minimum of 3 drives. This allocates one set of parity data across drives. This level of fault tolerance can withstand a single drive failure without downtime or data loss.
- **RAID 50**: Supported with a minimum of 6 drives. This volume is composed of two or more RAID 5 sub-volumes (parity groups) where data is striped across each parity group as if it were a single physical drive. Each RAID 5 parity group can sustain a single drive failure without incurring data loss.
- **RAID 1 & 10** (Drive Mirroring): Supported with a minimum of 2 drives. This allocates half of the drive array to the data and the other half to the mirrored data, providing two copies of the data.
- **RAID 1 ADM & 10 ADM** (Advanced Data Mirroring): Supported with a minimum of 3 drives. RAID 1 ADM creates redundant copies of the data using 3 drives. RAID 10 ADM stripes data across two or more sets of RAID 1 ADM volumes. This level of fault tolerance can withstand a double drive failure within a RAID 1 ADM volume without downtime or data loss.

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.
- Battery-backed write cache upgrade provides for up to two days of battery power for data cache retention. The data backup duration could be extended anytime the server's auxiliary power is available during system power down.

Ease of Use

Consistency and upgradeability on most current shipping Smart Array products make them unique in

Standard Features

the industry:

- GUI based configuration, management and diagnostic software tools with the HPE Smart Storage Administrator
- Common data format between generations of products
- Data migration between servers and external Modular Smart Array enclosures

HPE SSD Smart Path

The HPE SSD Smart Path feature included in the Smart Array software stack improves Solid State Disk (SSD) read performance. With up to 4x better SSD read performance, HPE SSD Smart path chooses the optimum path to the SSD and accelerates reads for all RAID levels and RAID 0 writes. HPE SSD Smart Path Requires updated firmware, drivers, and configuration utility available at <http://www.hp.com/go/ssdsmartpath>. HPE SSD Smart Path is ideal for read intensive workloads and is included as a base feature on HPE Smart Array P-series controllers. The following operating systems are supported by the HPE SSD Smart Path feature:

- Microsoft Windows Server 2008
- Microsoft Windows Server 2008 R2
- Microsoft Windows Server 2012
- Microsoft Windows Server 2012 R2
- Red Hat Enterprise Linux 6.1, 6.2, 6.3, 6.4, and 6.5
- SUSE Linux Enterprise Server 11 (SP1, SP2, SPA)
- VMware ESXi 5.0 U3
- VMware vSphere 5.1 U2 and vSphere 5.5

HPE SmartCache

The HPE SmartCache licensed feature is a controller-based read caching solution in a DAS environment that caches the most frequently accessed data ("hot" data) onto lower latency SSDs to dynamically accelerate application workloads. The HPE SmartCache architecture is flexible and supports any HPE ProLiant Gen8 supported HDD for bulk storage and any HPE ProLiant Gen8 supported SSD as an accelerator.

HPE SmartCache is deployed and managed using the HPE Smart Storage Administrator (HPE SSA) and HPE Array Configuration Utility (HPE ACU).

The basic HPE SmartCache architecture is comprised of the following three elements:

- **Bulk storage:** The first element is the bulk storage device, which is any supported HDD attached to the HPE Smart Array controller.
- **Accelerator:** The second element, the accelerator, is a faster/lower latency SSD device that caches data.
- **Metadata:** The final element is metadata, information held in a relatively small storage area that maps the location of information residing on the accelerator and bulk storage devices.

For more information please visit <http://www.hpe.com/servers/smartcache>

Warranty

The warranty for this device is 3-years parts only.

Pre-Failure Warranty: Drives attached to the Smart Array Controller and monitored under Insight Manager are supported by a Pre-Failure (replacement) Warranty. For complete details, consult the HPE Support Center or refer to your HPE Server Documentation.

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

Standard Features

- Duration - Select duration of coverage for a period of 1, 3, or 5 years
- Warranty upgrade options can come in the form of Care Packs, which are sold at the HPE System level to which this product attaches

Compatibility

Server Compatibility For up to date compatibility, please see the following URL for complete Smart Array Controller compatibility and support information: <http://www.hp.com/go/smartarray>

Operating Systems

- Microsoft Windows Server 2008
- Microsoft Windows Server 2008
- Microsoft Windows Server 2012
- Red Hat Enterprise Linux 5 (x64 & x86)
- Red Hat Enterprise Linux 6 (x64 & x86)
- SUSE Linux Enterprise Server 10 (x64 & x86)
- SUSE Linux Enterprise Server 11 (x64 & x86)
- VMware ESX 4.1
- VMware ESXi 4.1, 5.0, 5.1

NOTE: : For more information on HPE's Certified and Supported ProLiant Servers for OS and Virtualization Software and the latest listing of software drivers available for your server and Smart Array RAID controller, please visit our Support Matrix at:

<http://www.hp.com/go/ossupport>

NOTE: For more Linux OS support & certification information, please visit our the ProLiant & BladeSystem Server Linux matrix:

<http://h18004.www1.hp.com/products/servers/linux/hplinuxcert.html>

Software Suite

Most current shipping Smart Array products share a common set of configuration, management and diagnostic tools, including HPE Smart Storage Administrator, and HPE Systems Insight Manager. This software consistency of tools reduces the cost of training for each successive generation of product and takes much of the guesswork out of troubleshooting field problems. These tools lower the total cost of ownership by reducing training and technical expertise necessary to install and maintain HPE server storage.

HPE Systems Insight Manager

- Powerful server and server options/storage manager tool
- Monitors over 1200 system wide parameters
- Configuration/Diagnostic Utilities

HPE Smart Storage Administrator

- Comprehensive management for HPE Smart Storage products
- Simplified and intuitive interface and functionality
- Advanced scripting and diagnostic features

For more information please visit <http://www.hp.com/go/hpssa>

Service and Support

Service and Support

HPE Technology Services

Capitalizing on HPE ProLiant server and HPE BladeSystem capabilities requires a service partner who understands your increasingly complex business technology environment. That's why it makes sense to team up with the people who know Hewlett Packard Enterprise infrastructure hardware and software best - the experienced professionals at HPE Services.

Protect your business beyond warranty with HPE Pointnext operational services

When you buy HPE Options, it's also a good time to think about what level of service you may need. HPE Pointnext operational services provide total care and support expertise with committed response choices designed to meet your IT and business need

HPE Foundation Care services offer scalable reactive support-packages for Hewlett Packard Enterprise servers and software. You can choose the type and level of service that is most suitable for your IT and business needs. HPE Proactive Care delivers high levels of system availability through proactive service management and advanced technical response.

Recommended HPE Pointnext operational services for optimal satisfaction with your HPE product

Optimized Care

3-Year HPE 6 hour Call to Repair Response, Proactive Care

Combined reactive and proactive support for hardware and software helping optimize your systems and delivering high levels of availability through proactive service management and advanced technical response. Hardware problem resolution to return the hardware in operating condition within 6 hours of the initial service request. A Technical Account Manager, as your single point of contact, will own your call or issue end to end until resolved.

<https://www.hpe.com/h20195/v2/GetPDF.aspx/4AA3-8855EEE.pdf>

HPE Installation of ProLiant Add On Options Service

This easy-to-buy, easy-to-use HPE Care Pack service helps ensure that your new Hewlett Packard Enterprise hardware or software is installed smoothly, efficiently, and with minimal disruption of your IT and business operations.

Standard Care

3-Year HPE 24x7 4 hour response, Proactive Care Service

This service gives you combined reactive and proactive support including rapid access to our Advanced Solution Center to manage and prevent problems and a Technical Support Specialist with a broad level of technical knowledge that will engage with additional technical expertise as needed from HPE's vast global resources.

<https://www.hpe.com/h20195/v2/GetPDF.aspx/4AA3-8855EEE.pdf>

HPE Installation of ProLiant Add On Options Service

This easy-to-buy, easy-to-use HPE Care Pack service helps ensure that your new Hewlett Packard Enterprise hardware or software is installed smoothly, efficiently, and with minimal disruption of your IT and business operations.

Related Services

3 HPE Proactive Care Personalized Support - Environmental Option

The Personalized Support option provides an assigned Account Support Manager who can bring best practices from across the industry plus extra technical skills to your IT team. This option is only available as an add-on to HPE Proactive Care Support

HPE Proactive Select Service

Provides a flexible way to purchase HPE best-in-class consultancy and technical services. You can buy Proactive Select Service Credits when you purchase your hardware and then use the credits over the next 12 months. <https://www.hpe.com/h20195/V2/GetPDF.aspx/4AA2-3842ENN.pdf>

Service and Support

NOTE: Additional HPE Pointnext operational services can be found at: <http://hp.com/go/cpc>

Insight Online/Insight Remote Support

HPE Insight Remote Support provides 24 X 7 remote monitoring, proactive notifications, and problem resolution. This comes at no additional cost with your HPE solution. Learn more about Insight Remote Support <http://www.hp.com/go/insightremotesupport> and Insight Online <http://h18013.www1.hp.com/products/servers/management/insight-online/index.html>

HPE Support Center

Personalized online support portal with access to information, tools and experts to support Hewlett Packard Enterprise business products. Submit support cases online, chat with HPE experts, access support resources or collaborate with peers. Learn more <http://www.hp.com/go/hpsc>

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 Care Pack or Hewlett Packard Enterprise contractual support agreement.

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

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 QuickSpecs, 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 HPE due to malfunction.

For more information

To learn more on services for HPE ProLiant Servers, please contact your Hewlett Packard Enterprise sales representative or Hewlett Packard Enterprise Authorized Channel Partner. Or visit: <http://www.hp.com/services/proliant>.

Related Options

HPE Optional Upgrades	HPE 512MB P-series Smart Array Flash Backed Write Cache	661069-B21
	HPE 1GB P-series Smart Array Flash Backed Write Cache	631679-B21
	HPE 2GB P-series Smart Array Flash Backed Write Cache	631681-B21

HPE Cable Options	Mini SAS Cables	
	HP Mini SAS Straight to Left 33in Cable Assembly	662899-B21
	HPE Mini SAS Straight to Straight 37in Cable Assembly	662897-B21
	HPE Double Mini SAS Y 36in Cable Assembly	662901-B21

HPE SmartCache	HPE Smart Array SR SmartCache (Single Key/Single Server) LTU	D7S26A
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NOTE: This part number can be used to purchase a single license or to order multiple licenses with a unique activation key per server. Customer will receive a printed license entitlement certificate via physical shipment. The license entitlement certificate must be redeemed online or via fax in order to obtain the license activation key(s). Include one year of 24x7 HPE Software Technical Support Services.

	HPE Smart Array SR SmartCache (Single Key/Multiple Servers) E-LTU	D7S27AAE
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NOTE: This part number can be used to purchase multiple licenses with a single activation key. Customer will receive a printed license entitlement certificate via physical shipment. The license entitlement certificate must be redeemed online or via fax in order to obtain the license activation key(s). Includes one year of 24x7 HPE Software Technical Support Services.

	HPE Smart Array SR SmartCache (Single Key/Multiple Servers) LTU	D7S27A
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NOTE: This part number can be used to purchase a single license or to order multiple licenses with a single activation key. Customers will receive a license entitlement certificate via e-mail. The license entitlement certificate must be redeemed online or via fax in order to obtain the license activation key(s). Include one year of 24x7 HPE Software Technical Support Services.

NOTE: HPE SmartCache requires the following: Min 1 or 2 GB FBWC module along with HPE ProLiant Gen8 supported HDD(s) and SSD(s) for more information visit: <http://www.hpe.com/servers/smartcache>

Technical Specifications

Dimensions (not including bracket)	Low Profile PCIe Form Factor 7.5 in x 9.5 in x 2.25 in (19.05 cm x 24.13 cm x 5.72 cm)
Disk Drive and Enclosure Interface - Transfer rate	6Gb/s SAS (Serial Attached SCSI) Up to 6Gb/s SATA (Serial ATA)
SAS Connectors	2 internal (Mini-SAS) x8 wide port connectors
Cache Memory Speed	DDR3-800MHz with 40-bit for 512MB FBWC or DDR3-1333MHz with 72-bit wide bus provides up to 10.6 GB/s maximum bandwidth.
Server Interface	x8 PCIe 3.0 provides 8GB/s maximum bandwidth
SAS Speed	x8 6Gb/s SAS provides 4.8GB/s maximum bandwidth
Cache Memory	40-bit 512MB ECC protected cache, 72-bit 1GB FBWC or 72-bit 2GB FBWC module upgrades available; transportable with flash upgrade
Logical Drives Supported	Zero Memory for embedded controller supports up to 2 logical volumes 512MB cache and greater, Up to 64 logical volumes
Host Memory Addressing	64-bit, supporting greater than 4GB server memory space
RAID Support	RAID 6, 60 (Advanced Data Guarding) NOTE: RAID 6, 60 can be enabled with a minimum of 512 MB FBWC RAID 5, 50 (Distributed Data Guarding) NOTE: A minimum of 512 MB cache is required to enable RAID 5, 50 support of the Smart Array P420i RAID 1, 10 (Drive Mirroring) RAID 1 ADM, 10 ADM (Advanced Data Mirroring) RAID 0 (Striping)
Upgradeable Firmware	Upgradeable Firmware with recovery ROM feature

Environment-friendly Products and Approach	End-of-life Management and Recycling	Hewlett Packard Enterprise offers end-of-life Hewlett Packard Enterprise product return, trade-in, and recycling programs in many geographic areas. For trade-in information, please go to: http://www.hp.com/go/green . To recycle your product, please go to: http://www.hp.com/go/green or contact your nearest Hewlett Packard Enterprise sales office. Products returned to Hewlett Packard Enterprise will be recycled, recovered or disposed of in a responsible manner.
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The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard Enterprise web site at: <http://www.hp.com/go/green>. These instructions may be used by recyclers and other WEEE treatment facilities as well as Hewlett Packard Enterprise OEM customers who integrate and re-sell Hewlett Packard Enterprise equipment.

Summary of Changes

Date	Version History	Action	Description of Change
23-Oct-2017	From Version 15 to 16	Changed	Care Pack naming and Service and Support- Parts and Materials updated.
19-Aug-2016	From Version 14 to 15	Changed	Standard Features and Related Options were revised.
10-Jun-2013	From Version 13 to 14	Added	Related Options – Added 12G SAS Enterprise Performance Solid State Drives and 12G SAS Enterprise Mainstream Solid State Drives to Hard Drives.
		Changed	Standard Features, Compatibility and Related Options were revised.
		Removed	Related Options – Removed 6G SAS SLC Hot Plug SFF (2.5-inch) Enterprise Performance Solid State Drives, 3G SATA MLC Hot Plug SFF (2.5-inch) Enterprise Mainstream Solid State Drives and 3G SATA MLC Hot Plug LFF (3.5-inch) Enterprise Mainstream Solid State Drives from Hard Drives.
13-Sep-2013	From Version 12 to 13	Changed	Changes made to the following Sections Overview Standard Features Compatibility Service and Support
10-Sep-2013	From Version 11 to 12	Changed	Operating Systems, Hard Drives, and HPE Tape Backup were revised.
10-Jun-2013	From Version 10 to 11	Added	Compatibility: Added HPE SSD SmartPath and HPE SmartCache sections.
		Changed	Overview: Updated What's New with Up to 4x better Solid State Disk (SSD) read performance with the SSD Smart Path firmware and driver based feature for Smart Array controllers Standard Features: Updated Key Features section.
27-Mar-2013	From Version 9 to 10	Changed	Changes were made to the Operating Systems section within Compatibility.
19-Feb-2013	From Version 8 to 9	Changed	Changes were made to the Overview Section, What's New Section, Key Features and Performance Sections.
04-Dec-2012	From Version 7 to 8	Added	Added new Hard Drivers to Related Options section.
26-Nov-2012	From Version 6 to 7	Added	Added missing sub-header in Related Options section.
06-Jun-2012	From Version 5 to 6	Changed	Changes made in the Standard Features, Related Options and Technical Specifications sections.
25-May-2012	From Version 4 to 5	Changed	Changes made in the Standard Features, Related Options and Technical Specifications sections.
14-May-2012	From Version 3 to 4	Changed	Hard Drives were completely revised and What's New was added.
15-Mar-2012	From Version 2 to 3	Changed	Changes made in the Hard Drives section of Related Options.
07-Mar-2012	From Version 1 to 2	Changed	Changes made in the Hard Drives section of Related Options.

Summary of Changes



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For hard drives, 1GB = 1 billion bytes. Actual formatted capacity is less.

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