

Overview

HPE D8000 Disk Enclosure

Need an ultra-dense, cost-effective high capacity direct attach storage (DAS) option? Reduce enclosure costs and minimize rack footprint for your HPE ProLiant server storage expansion needs with the HPE D8000 Disk Enclosure.

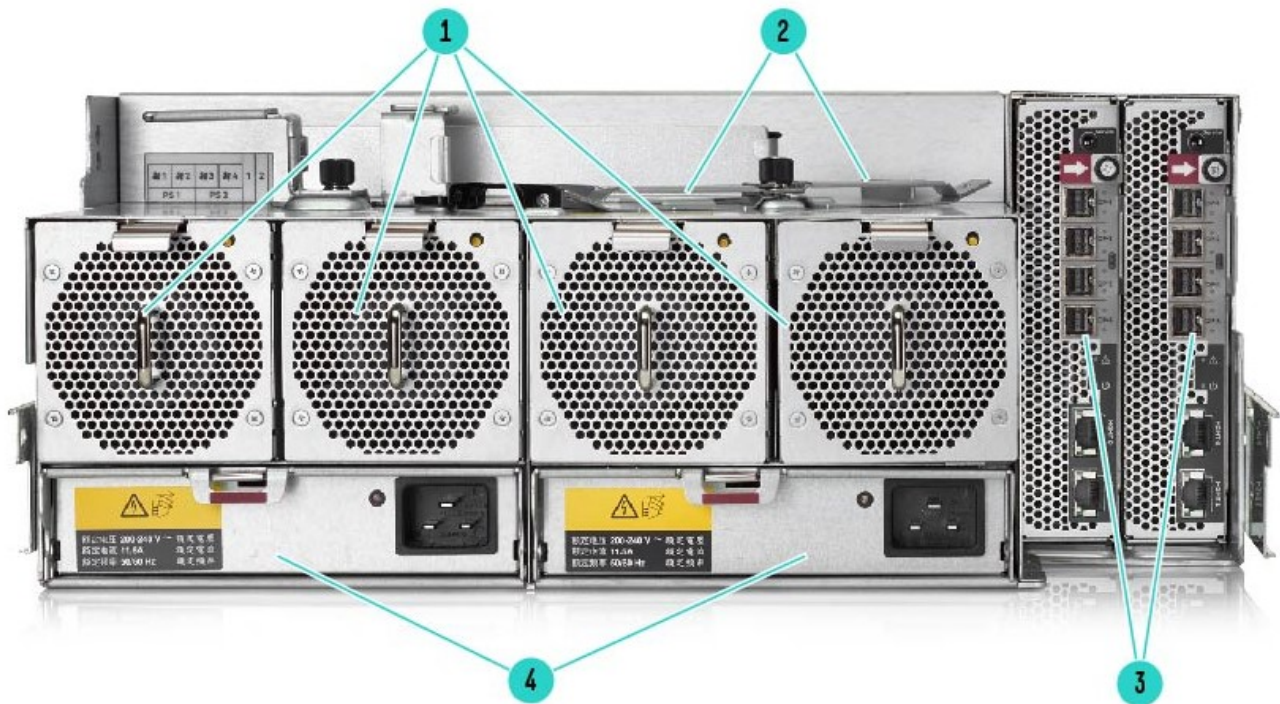
With the 12 Gb/s SAS HPE D8000 Disk Enclosure, Hewlett Packard Enterprise extends and redefines direct-attached storage for ProLiant servers, combining the simplicity and cost effectiveness of direct-attached storage without sacrificing flexibility or performance. The HPE D8000 Disk Enclosure, designed for data-intensive environments, is a storage enclosure for dense, cost-effective external storage expansion for massive data capacity applications. The HPE D8000 can be used not only as a standalone Direct Attach Enclosure, but can also be used for dense, high capacity expansion in storage applications like Cloud Backup, Data Protection or Big Data environments (Unstructured and Structured).

The D8000 Disk Enclosure can be connected to ProLiant Gen10 servers using the HPE Smart Array E208e-p SR Gen10 Controller or the P408e-p SR Gen10 Controller. Two enclosures can be daisy-chained together to provide support for up to 211 drives.



HPE D8000 Disk Enclosure Front View

Overview



HPE D8000 Disk Enclosure Rear View

- | | |
|--|-------------------------------------|
| 1. System Fan Module (Quantity - 4) | 3. I/O Module (Quantity - 2) |
| 2. Cable Shelf and CMA bracket for coiled cables | 4. Power Supply Unit (Quantity - 2) |

NOTE: CMA stands for Cable Management Arm

What's New

- Introduction of new modern 12Gb SAS High Density Enclosure with supported HDD/SSD media
- Introduce 10 pack HDD bundles to simplify ordering

At A Glance

- 4U rackmount form factor
- Supports one hundred and six (106) 3.5" LFF hot pluggable SATA, SAS (Midline) MDL or Solid State drives
- 1+1 daisy-chaining allows support for up to 211 drives
- Innovative design supports top loading of hot pluggable large form factor low profile carrier dual-ported SATA, SAS MDL and Solid State drives
- End-to-End 12 Gb/s direct connect to ProLiant Gen10 servers using the HPE Smart Array E208e-p SR Gen10 Controller and/or the HPE Smart Array P408e-p SR Gen10 Controller
- Additional option kit with second dual port I/O module is added for SAS drives, creating a dual domain environment.
- 3-0-0 warranty

Standard Features

Deployment Guide

For detailed deployment information, see the HPE direct connect external SAS storage for HPE BladeSystem deployment guide. Select Manuals under Resources for HPE D8000 Disk Enclosure:

<https://www.hpe.com/us/en/product-catalog/storage/disk-enclosures/pip.hpe-D8000-disk-enclosure.1009024698.html>

Key Features

High density, low cost storage for ProLiant DL/ML servers

- 106 LFF SAS MDL, SATA or Solid State drives in 4U form factor.
 - Design supports top loading of hot pluggable large form factor (LFF) low profile dual-ported SATA, SAS MDL or Solid State drives
 - 1+1 expansion allows up to two (2) D8000 enclosures which can be cascaded for a maximum of 211 drives.
 - Support for end-to-end 12 Gb/s direct connect to ProLiant Gen10 servers using the HPE Smart Array E208e-p SR Gen10 Controller and/or the HPE Smart Array P408e-p SR Gen10 Controller.
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HPE reliability

Familiar Smart Array technology of the Smart Array Controllers enables support for RAID levels

- Keeps data available and server running while a failed drive is being replaced; two fault tolerance configurations are supported for the internal connections including:
 - RAID 0 (striping) provides no extra data protection.
 - RAID 1 (mirroring) protects against failure of one drive.
 - RAID 1+0 (mirroring and striping) protects against failure of one drive (and failure of particular multiple drives).
 - RAID 5 (distributed data guarding) protects against failure of one drive.
 - RAID 6 with ADG (Advanced Data Guarding): This is the highest level of fault tolerance.
 - RAID 50 (RAID 5+0) protects against failure of one drive (and failure of particular multiple drives).
 - RAID 60 (RAID 6+0) allows administrators to split the RAID 6 storage across multiple external boxes.
 - RAID 1 ADM (Advanced Data Mirroring) allows customers to create mirrored RAID set using 3 identical hard drives.
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Product Technology

SAS (internal protocol)

12 Gb/s SAS

Modular Chassis

4U, 106 Large Form Factor drive bays

Drives available

3.5" Large Form Factor Low Profile Carrier Serial Attached SCSI (SAS) Midline, SATA and Solid State Drive (SSD). The D8000 can accommodate SAS MDL and Solid State drives within the same enclosure but SAS and SATA drives cannot mixed in the same enclosure. Complete list of supported drives in the configuration information below.

Scalability

Up to 106 SAS, SAS MDL or Solid State 3.5" hot plug hard drives can be supported per D8000. For power and cooling reasons, D8000 must be populated with 20 drives as a minimum requirement or up to 211 drives when two D8000's are daisy-chained together.

Power supplies

Hot-pluggable redundant AC power supply unit (PSU)

Fans

Four redundant hot plug fans

Configuration and Management Tools

Smart Array Controller: Array Configuration Utility (ACU) provides configuration and management of hard drives, and supports online array capacity expansion, logical drive extension, assignment of online spares and RAID or stripe size migration.

Management/Health Utilities

Active hardware management using HPE SIM: Manage the array with the highly refined HPE Systems Insight Manager. Smart Components are available to easily update firmware. A convenient Integrated Management Log records hundreds of events and stores them in an easy-to-view format.

Standard Features

Supported HPE Smart Array Controllers

HPE Smart Array E208e-p SR Gen10 Controller

- Storage interface (SAS/SATA)
- 8 SAS lanes across 2 x4 external Mini-SAS HD ports
- 12Gb/s SAS, 6Gb/s SATA technology
- Support for SAS tape drives
- PCI Express 3.0 x8 link
- RAID 0, 1, 5, 10
- Mixed Mode (RAID logic drives and HBA physical drives simultaneously)
- Legacy and UEFI boot operation
- UEFI System Utilities (storage configuration)
- Up to 238 physical drives
- Up to 64 logical drives
- HPE Smart Array SR Secure Encryption (optional license)
- HPE SSD Smart Path
- Rapid Parity Initialization (RPI)
- Rapid rebuild
- Drive Sanitize
- Performance Optimization-Degraded Reads and Read Coalescing
- Power efficiency
- Seamless upgrades from HPE Smart Array Software RAID
- Seamless upgrades to HPE Smart Array P-class Controllers

HPE Smart Array P408e-p SR Gen10 Controller

- Storage interface (SAS/SATA)
 - 8 SAS lanes across 2 x4 external Mini-SAS HD ports
 - 12Gb/s SAS, 6Gb/s SATA technology
 - Support for SAS tape drives, SAS tape autoloaders and SAS tape libraries
 - 4 GB Flash-Backed Write Cache (FBWC)
 - PCI Express 3.0 x8 link
 - RAID 0, 1, 5, 6, 10, 50, 60, 1 ADM, 10 ADM (Advanced Data Mirroring)
 - Mixed Mode (RAID logic drives and HBA physical drives simultaneously)
 - Legacy and UEFI boot operation
 - UEFI System Utilities (storage configuration)
 - Up to 238 physical drives
 - Up to 64 logical drives
 - HPE Smart Array SR SmartCache (optional license)
 - HPE Smart Array SR Secure Encryption (optional license)
 - HPE SSD Smart Path
 - Rapid Parity Initialization (RPI)
 - Rapid rebuild
 - Drive Sanitize
 - Performance Optimization-Degraded Reads and Read Coalescing
 - Power efficiency
 - Seamless upgrades from HPE Smart Array S-class and E-class controllers
 - FIPS 140-2 Level 1 Implementation Under Test (expected validation complete in 2018)
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Standard Features

HPE Smart Array

For latest information on E208i-a,E208i-p,E208e-p,P408i-a,P408i-p,P408e-p,P816i-a, please refer to their QuickSpecs: [HPE Smart Array Gen10 Controllers](#) for HPE ProLiant DL, ML and Apollo Servers.

Supported OS

HPE ProLiant Gen10 Servers

Power Supply

The HPE D8000 Enclosure uses the 20 Power Supply Unit (PSU). PSU operates in the voltage range of 200-240 VAC.

HPE D8000 PSU meet the following harmonics:

EN61000-3-2 (EU), EN 31000-3-3 (EU), EN 55024 (EU), KN 24/KN 35 (S. Korea)

Service and Support

Warranty

3-0-0 warranty

Three-year parts exchange, next business day delivery

NOTE: The warranties of the various media options purchased for the D8000 are different for SAS Midline (MDL), SATA hard drives and Solid State drives.

- SAS MDL hard drive options have a one year warranty
- SATA hard drives have a one year warranty
- Solid State Drives have a three year warranty

Solid State Drives (SSD) have 3/0/0 warranty; Customer Self Repair (CSR) subject to maximum usage and or maximum supported lifetime limitations, whichever occurs first. Maximum Supported Lifetime is the period in years set to equal the warranty for the device. Maximum usage limit is the maximum amount of data that can be written to the device before reaching the device's write endurance limit

Warranty Upgrade Options

- Response - Upgrade on-site response from next business day to same day 4-hour response or 6 Hour Call To Repair
- Coverage - Extend hours of coverage from next business day to 9 hours x 5 days to 24 hours x 7 days
- Duration Select duration of coverage for a period of 1, 3, 4 or 5 years

Service and Support

Protect your business beyond warranty with HPE Support Services

HPE Technology Services delivers confidence, reduces risk and helps customers realize agility and stability. Our integrated portfolio of Services for storage help customers reduce costs, optimize data, streamline storage management, and improve backup and recovery. HPE Support Services enable you to choose the right service level, length of coverage and response time as you purchase your new storage solution, giving you full entitlement for the support for need for your IT and business.

Connect your devices

Unlock all of the benefits of your technology investment by connecting your products to Hewlett Packard Enterprise. Achieve up to 77%¹ reduction in down time, near 100%² diagnostic accuracy and a single consolidated view of your environment. By connecting, you will receive 24x7 monitoring, pre-failure alerts, automatic call logging, and automatic parts dispatch. HPE Proactive Care Service and HPE Datacenter Care Service customers will also benefit from proactive activities to help prevent issues and increase optimization. All of these benefits are already available to you with your server storage and networking products, securely connected to Hewlett Packard Enterprise support.

1 – IDC

2 – HP CSC reports 2014 – 2015

Recommended Support Services

Optimized Care

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

HPE Proactive Care gives customers an enhanced call experience plus helps prevent problems and maintains IT stability by utilizing tailored, proactive reports with recommendations and advice when your products are connected to Hewlett Packard Enterprise. This Service combines three years' proactive reporting and advice with our highest level of hardware support - The Hewlett Packard Enterprise 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 storage systems.

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

Service and Support

Standard Care

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

HPE Proactive Care gives customers an enhanced call experience plus helps preventing problems and maintains IT stability by utilizing personalized proactive reports with recommendations and advice when your products are connected to Hewlett Packard Enterprise. This Service combines three years' proactive reporting and advice with our 24x7 coverage, four hour hardware response time when there is a problem. <https://www.hpe.com/h20195/v2/GetPDF.aspx/4AA3-8855ENW.pdf>

*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.

Basic Care

HPE Foundation Care 24x7, three-year Support Service

HPE Foundation Care 24x7 gives you access to Hewlett Packard Enterprise 24 hours a day, seven days a week for assistance on resolving issues. This service includes need based Hardware onsite response within four hours. Simplify your support experience and make Hewlett Packard Enterprise your first call to help resolve hardware or software problems.

<http://www.hpe.com/h20195/V2/GetDocument.aspx?docname=4AA4-8876ENW&cc=us&lc=en>

Additional Service Offers

HPE Proactive Care Advanced

HPE Proactive Care Advanced builds on HPE Proactive Care, providing additional benefits such as the assignment of a dedicated, local account support manager (ASM) for collaboration and best practices and critical event management that provides 24x7 fast response and IT service restoration with incident follow-up to prevent a repeat. All of this is designed to give you an incredibly personalized, high-touch support experience that keeps your system fully available and running at peak performance.

HPE Foundation Care Call-to-Repair Service

Offers 24x7 service, including on Hewlett Packard Enterprise holidays, with a six-hour call-to- repair time, where our commitment is to have the hardware operational within six hours after your call is opened. Software support is 24x7 with a 2-hour response time

More Information

<https://www.hpe.com/us/en/services.html>

To learn more on HPE Services, please contact your Hewlett Packard Enterprise Sales representative or Hewlett Packard Enterprise Authorized Channel Partner. HPE Proactive Care Services are sold by Hewlett Packard Enterprise and Hewlett Packard Enterprise Authorized Service Partners:

- Services for customers purchasing from Hewlett Packard Enterprise or an enterprise reseller are quoted using Hewlett Packard Enterprise order configuration tools.
- Customers purchasing from a commercial reseller can find HPE Support Services at <http://www.hpe.com/services/storage>

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.

Configuration Information

Step 1: HPE D8000 Disk Enclosure

Model Description

Part Number

HPE D8000 Single I/O Module LFF (3.5in) Density Disk Enclosure

Q2R34A

NOTE: Base model for SAS, SAS Midline (MDL) and Solid State drives. Add Q2R35A when using dual-ported SAS drives to create a dual domain environment.

NOTE: Includes two hot plug power supplies for redundancy and four hot plug fans for n+1 redundancy.

HPE D8000 Dual I/O Module Option Kit

Q2R35A

NOTE: Add Q2R35A option kit to Q2R34A when using dual-ported SAS drives to create a dual domain environment

Step 2: Choose Supported Options

HPE D8000 Lift Handle

RON98A

NOTE: Lift handle helps in easier unboxing and rack mounting the HPE D8000 Enclosure

HPE ProLiant Gen10 Smart Array Controllers

HPE Smart Array E208e-p SR Gen10 (8 External Lanes/No Cache) 12G SAS PCIe Plug-in Controller

804398-B21

HPE Smart Array P408e-p SR Gen10 (8 External Lanes/4GB Cache) 12G SAS PCIe Plug-in Controller

804405-B21

Step 2b - SAS Cable

Model Description

Cables to be used for connecting D8000 with the HPE Smart Array P441, P841, P721m and H241 HBA (HD connector)

HPE External 4.0m (13ft) Mini-SAS HD 4x to Mini-SAS HD 4x Cable

716199-B21

Step 3 - D8000 Drive Options

10-Pack SAS Hard Disk Drive Bundles

HPE D8000 6TB SAS 12G Midline 7.2K LFF (3.5in) LP 1yr Wty 512e 10-pack HDD Bundle

Q2S27A

NOTE: Includes ten 6TB LFF Midline SAS drives

HPE D8000 10TB SAS 12G Midline 7.2K LFF (3.5in) LP 1yr Wty 512e 10-pack HDD Bundle

Q2S29A

NOTE: Includes ten 10TB LFF Midline SAS drives

HPE D8000 12TB SAS 12G Midline 7.2K LFF (3.5in) LP 1yr Wty 512e 10-pack HDD Bundle

Q2S30A

NOTE: Includes ten 12TB LFF Midline SAS drives

12G 3.5" SAS Midline (MDL) Hard Disk Drives

HPE 12TB SAS 12G Midline 7.2K LFF (3.5in) LP 1yr Wty Helium 512e Digitally Signed Firmware HDD

881781-B21

HPE 10TB SAS 12G Midline 7.2K LFF (3.5in) LP 1yr Wty Helium 512e Digitally Signed Firmware HDD

P09149-B21

HPE 6TB SAS 12G Midline 7.2K LFF (3.5in) LP 1yr Wty 512e HDD

861746-B21

6G 3.5" SATA Hard Disk Drives

HPE 12TB SATA 6G Midline 7.2K LFF (3.5in) LP 1yr Wty Helium 512e Digitally Signed Firmware HDD

881787-B21

HPE 10TB SATA 6G Midline 7.2K LFF (3.5in) LP 1yr Wty Helium 512e Digitally Signed Firmware HDD

P09161-B21

HPE 8TB SATA 6G Midline 7.2K LFF (3.5in) LP 1yr Wty 512e Digitally Signed Firmware HDD

834028-B21

HPE 6TB SATA 6G Midline 7.2K LFF (3.5in) LP 1yr Wty 512e HDD

861742-B21

Configuration Information

12G 3.5" SAS Solid State Drives (SSD) in Converter carriers

HPE 800GB SAS 12G Mixed Use LFF (3.5in) LPC 3yr Wty Digitally Signed Firmware SSD

P04531-B21

NOTE: Mix of SAS and SATA drives in the same enclosure is not supported.

NOTE: For power and cooling reasons, HPE D8000 needs to be filled with 20 drives as a minimum requirement.

Step 4: Choose Rack Options

Choose HPE G2 Advanced or Enterprise series 1200mm depth Racks for the D8000.

HPE G2 Enterprise Series Racks or **HPE G2 Advanced Series Racks** QuickSpecs.

NOTE: A D8000 fully loaded with drives weighs 321lbs.

NOTE: Hewlett Packard Enterprise has not tested or validated the D8000 with any third-party racks. Before installing the D8000 in a third-party rack, be sure to properly scope the limitations of the rack. Before proceeding with the installation, consider the following:

- You must fully understand the static and dynamic load carrying capacity of the rack and be sure that it can accommodate the weight of the D8000.
 - Be sure sufficient clearance exists for cabling, installation and removal of the enclosure, actuation of the rack doors, and full articulation of the drive drawers
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Technical Specifications

Input Power (per power supply)	Rated Line Voltage	200 to 240 VAC
	Rated Input Frequency	50 to 60 Hz
Temperature and humidity ranges	Operating Temperature	41° to 95° F (5° to 35° C) NOTE: Maximum Rated 10°C per/hr (50°F/hr)
	Storage Temperature	-40° to 158° F (-40° to 70° C) NOTE: Maximum Rated 20°C/hr (68°F/hr)
	Operating Humidity	-12° DP/10 to 80% (Max) relative humidity (Rh), non-condensing
	Non-Operating Humidity	-12° DP/5 to 100% (Max) relative humidity (Rh), non-condensing
Physical	Depth (including handles, excluding cables)	113.9 cm (44.84 in)
	Width (excluding ears and rails)	44.1 cm (17.36 in)
	Height (including top cover)	17.64 cm (6.94 in)
	Chassis Weight	43.10 kg (95 lb) with no hard drives installed
	Weight	127 kg (280 lb) with hard drives installed

Power Consumption (maximum)	Power consumption at 208VAC		
	Drive Type	Typical	Service Position Maximum (drawers being pulled out causing all fans to go to full speed)
	7200 RPM SAS MDL	1035W (3532 Btu/hr)	1470W (5021 Btu/hr)
NOTE: Input Power and Heat Dissipation specifications are maximum values and apply to worst-case conditions at full rated power supply load. The power/heat dissipation for your installation will vary depending on the equipment configuration.			
NOTE: Temperature ratings shown are for sea level. An altitude derating of 1°C per 300 m (1.8°F per 1,000 ft.) to 3048 m (10,000 ft.) above 900m is applicable. No direct sunlight allowed. The upper limit may be limited by the type and number of options installed.			
NOTE: Storage maximum humidity of 95% is based on a maximum temperature of 45°C (113°F). Altitude maximum for storage corresponds to a pressure minimum of 70 KPa.			
NOTE: The "service position maximum" column is the test result with the drawers open.			
	Upgradeable Firmware	Offline	
	Disk Drives and Enclosure Protocol Support	HPE 3.5" SAS and SAS MDL 6 Gb/s	

I/O Module	Host Connector Type	External mini-HD SAS connector
	Host Number of Ports	Two (each with 4 lanes of 6Gb/sec SAS)

Summary of Changes

Date	Version History	Action	Description of Change
06-May-2019	Version 3	Changed	Added support for Daisy Chaining
02-Apr-2019	Version 2	Changed	Standard Features and Configuration Information sections were updated.
04-Mar-2019	Version 1	New	New QuickSpecs



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

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