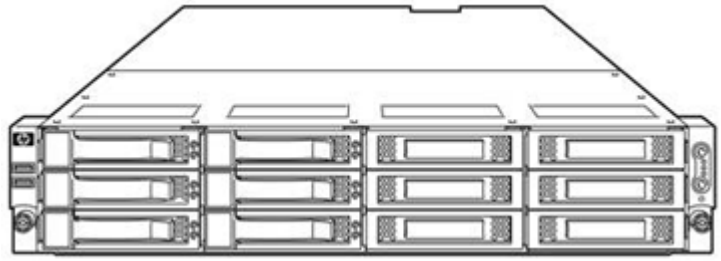
This QS has been merged into a new QS: 13218 - HP StorageWorks D2D Backup System

HP StorageWorks D2D4000 Backup System provides consolidated, disk-based data protection for small and medium size data centers in an intelligent self-managing 2U rack-mountable solution. Dynamic deduplication removes redundant backup data to retain up to 50x more data on the same raw 4.5 TB or 9 TB disk and allowing low bandwidth replication for cost-effective offsite backup and recovery. The D2D4000 Backup System integrates seamlessly into your existing environment and works with your backup software applications to automate the simultaneous daily backup of up to 16 servers onto a single network-connected device. With speeds of more than 325 GB/hour over iSCSI or 4 Gb Fibre Channel interface you can significantly reduce your backup window. The D2D4000 Backup System removes the need to manage multiple devices and reduces errors caused by media handling; proven RAID 6 further reduces the risk of data loss for worry-free data protection.



HP StorageWorks D2D4000 Backup System

What's New

- Low bandwidth replication option for cost-effective backup of remote offices and offsite disaster recovery. License by target device required.
- Direct attach to tape autoloaders and libraries enables easy offload to physical tape for an additional level of data security and disaster recovery.

Features and Benefits

Retain up to 50 times more data on disk	Dynamic deduplication reduces the disk space required to store backup data sets by up to 50x without impacting backup performance. Retaining more backup data on disk for longer periods of time results in greater data accessibility for rapid restore of lost or corrupt files and reduces the impact on business productivity.
Low bandwidth replication	HP's Dynamic deduplication technology makes replication of backup data a cost-effective solution by significantly reducing the bandwidth required. Using low bandwidth links, backup datasets can be inexpensively transmitted from remote offices to a central location or from the data center to an offsite location for disaster recovery purposes.
"Hands-free" backup	Automating the backup process simplifies and reduces the time spent managing your data protection processes. Implementing unattended daily backup is especially powerful for environments with limited IT resources.
More affordable data protection	At less than the cost of comparable solution deduplication products, the HP D2D4000 Backup System delivers more affordable data protection by storing more data in the same raw 4.5 TB or 9 TB disk supporting savings in IT resources, physical space and power requirements.
Backup multiple servers faster	Backing up 16 servers simultaneously to a disk-based solution at speeds of more than 325 GB per hour instead of sequentially to a tape drive or autoloader means that you can substantially reduce your backup window.
Make your backups more reliable	Improve the overall reliability of your backup infrastructure by automating and consolidating the backup of multiple servers to the D2D4000 Backup System. This reduces the incidence of human error related to backup processes such as tape media rotation and management. Integrated hardware-based RAID 6 controller helps to reduce the incidence of disk failure to virtually zero.
Seamlessly integrate into your existing environment	The D2D4000 Backup System 2U form factor is easily rack-mounted in standard racks for efficient use of space in the data center. It supports all leading backup applications allowing the device to be installed and used without additional investment in systems, software or staff training.
Choice of interface FC and iSCSI	Choose either dual 1Gb iSCSI or dual 4 Gb Fibre Channel interfaces delivering even greater performance to meet the needs of shrinking backup windows
Manage backup more easily	A web-based browser interface lets you monitor your D2D4000 Backup System from anywhere, locally or remotely, to check on available capacity, view progress or to make a change to device setup.
Reduced maintenance	With HP D2D4000 Backup System you can also reduce the time spent on routine maintenance; this self-managing device does not require you to create RAID sets, conduct disk defragmentation, apply security patches or run virus protection.

Features and Benefits

Offload to tape for longer term archival

Use your HP D2D4000 as part of a comprehensive disk-to-disk-to-tape (D2D2T) solution to combine the data availability of disk with the cost-effective offsite storage and archival capabilities of tape. Copying or deduplication or Mirror to tape capability allows for cost effective archival and offsite vaulting. Use your backup application to copy data from the D2D4000 Backup System to HP LTO Ultrium tape drives, autoloaders and libraries, or use the appliance's direct copy facility at any time of day without slowing down the network.

HP Dynamic deduplication - keep more data on disk for longer

Why data deduplication?

Data deduplication is a method of reducing storage needs by eliminating redundant data so that over time only one unique instance of the data is actually retained on disk. As a result, up to 50x more backup data can be retained in the same disk footprint.

Adding data deduplication to disk-based backup delivers a number of benefits:

- A cost effective way of keeping your backup data on disk for a number of weeks or even months. More efficient use of disk space effectively reduces the cost-per-gigabyte of storage and the need to purchase more disk capacity.
- Making file restores fast and easy from multiple available recovery points. By extending data retention periods on disk, your backup data is more accessible for longer periods of time, before archiving to tape. In this way lost or corrupt files can be quickly and easily restored from backups taken over a longer time span.
- Ultimately, data deduplication makes the replication of backup data over low bandwidth WAN links viable (providing offsite protection for backup data) as only changed data is sent across the connection to a second device (either a second identical device or one that comes from this product family).

How it works

Deduplication works by examining the data stream as it arrives at the storage appliance, checking for blocks of data that are identical and eliminating redundant copies. If duplicate data is found, a pointer is established to the original set of data as opposed to actually storing the duplicate blocks-removing or "deduplicating" the redundant blocks from the volume. The key here is that the data deduplication is being done at the block level to remove far more redundant data than deduplication done at the file level where only duplicate files are removed.

Data deduplication is especially powerful when it is applied to backup, since most backup data sets have a great deal of redundancy. The amount of redundancy will depend on the type of data being backed up, the backup methodology and the length of time the data is retained.

Example. Backing up a large customer database that gets updated with new orders throughout the day. With the typical backup application you would normally have to back up, and more importantly store, the entire database with each backup, (and even incremental backups will store the full database again). With block-level deduplication, you can backup the same database to the device on two successive nights and, due to its ability to identify redundant blocks, only the blocks that have changed will be stored. All the redundant data will have pointers established.

The HP approach to deduplication - D2D and VLS

Recognizing the differing needs of the small and medium businesses versus large and enterprise data centers, HP has selected two different deduplication technologies to match each requirement.

HP Dynamic deduplication for HP StorageWorks D2D Backup Systems - meeting the needs of smaller IT environments with requirements for low cost solutions, smaller storage capacities, ease of use and broad

compatibility.

HP Accelerated deduplication for HP StorageWorks Virtual Library Systems (VLS) - delivering maximum performance.

HP Dynamic deduplication
The HP patented Dynamic deduplication algorithm has been designed specifically for smaller IT environments, such as remote and branch offices, to provide for low cost solutions with a small footprint. It uses inline deduplication based on hash algorithms with additional levels of error prevention and correction to verify the integrity of data backup and restore. Importantly and unlike some other forms of data deduplication technology the HP Dynamic deduplication is independent of the data format recorded and so works with all the leading backup application packages.

What deduplication ratio can I expect?
The actual data deduplication ratio you can expect will depend on a number of factors including; the type of data, the backup methodology used, the length of time you retain your data. However, assuming standard business data mix and extended on disk retention (periods of more than 12 weeks) you could expect to see:
20:1 capacity ratio assuming a weekly full and daily incremental backup model
50:1 capacity ratio assuming daily full backups

For more information on achieving deduplication ratios go to: www.hp.com/go/deduplication

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Low bandwidth replication - cost-effective data protection and disaster recovery

Data replication is the process of making a replica copy of a data set across a network to a "target site". It is generally used to provide disaster recovery (DR) protection in the event of catastrophic data loss at the "source site"

In the past, only the largest companies could afford to implement data replication as replicating large volumes of data backup over a typical WAN is expensive. However, today's D2D products with data deduplication have made replication a practical disaster recovery solution for most sizes of business, in addition to an ideal solution for centralizing the backup of remote offices.

Data deduplication shrinks the amount of backup data that needs to be replicated from the source HP D2D appliance, and as a result significantly reduces replication bandwidth requirements. Once a replica of the data backup set has been created on a remote HP D2D target appliance, all that is required to keep the replica identical to the source is the automatic, periodic copying and movement of the new data segments which are created during each backup. With such small amounts of data being transmitted asynchronously, low bandwidth networks offer sufficient performance and a much lower cost solution.

HP's replication feature includes replication bandwidth limitation, limiting the amount of bandwidth being used when replicating data. Without replication bandwidth limitation, a replication job could use as much bandwidth as is available to it. It is possible that this could, make other network activities unresponsive. Replication bandwidth limitation is customer configurable at the appliance level via the graphical user interface and is set as a percentage of the available network bandwidth.

The HP StorageWorks D2D4000 Backup System is available with replication purchased as a license by target. It delivers the most affordable replication solution on the market for the following environments:

- For remote offices, low bandwidth replication provides an affordable means to centralize backup at the data center, reducing operator costs and also decreasing the usage of removable media.
- For data centers, low bandwidth replication gives IT departments a new disaster recovery option

by making inter-site replication over WANs a practical alternative.

The HP StorageWorks D2D4000 Backup System is available with replication which may be licensed by target. A total of 16 source appliances can replicate into a single D2D4000 target appliance, see the "configuring" section of this document for ordering information. Once a license has been obtained, configuring and using replication is then made straightforward by the graphical user interface and configuration wizard on the HP D2D4000 appliance.

HP D2D4000 products purchased prior to January 2009 may also use the replication feature, but will require a free firmware upgrade by web download before purchasing a replication license This upgrade is available from the "support for your product" link on http://www.hp.com/go/d2d4000 or by following the "software drivers and downloads" link from http://www.hp.com

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Automation - making backup easier

Using your backup software application, create "hands-free" daily backup with the following benefits:

- Reduce your backup window - backing up 16 servers simultaneously at disk speeds of more than 325 GB per hour instead of one after the other to a tape drive or autoloader means that you can dramatically reduce your backup window.
- Takes the manual labor out of daily backup - no one has to remember to change the backup tapes each day. Use HP Data Protector Express Software or other compatible backup software to set your backup schedule and then forget it. Unlike over-the-network backup to a tape drive or autoloader, where every backup job happens sequentially, the HP D2D4000 Backup System can back up 16 servers simultaneously. This means that you don't have to worry about backup jobs not finishing within the backup window, leaving data unprotected or having an adverse impact on user productivity at the beginning of the workday.
- Reduced media handling - using the D2D4000 Backup System for daily backup means fewer tape cartridges to store and track and lower IT costs. You may be able to reduce backup to tape to a weekly event, creating a weekly full backup to tape to meet offsite, disaster recovery and archiving requirements.

Disk-to-Disk-to-Tape - complete data protection

Although Disk-to-disk (D2D) based backup meets the need for greater speed and data accessibility, it remains prone to many of the same risks as your server - fire, flood, and theft. Tape storage retains its place as the foundation of a good data protection strategy because of its portability, long shelf-life and low cost per gigabyte which make it ideal for longer term archival of data and offsite storage for disaster recovery. Storing backup data offline and offsite provides protection from virtually all risks to data, and removable tape media allows this to be done easily and cost effectively.

Disk-based deduplication and replication can reduce the amount of tape you use, but most IT departments combine the technologies, using tape for longer term retention. This approach makes sense to most users. If you want to keep data for six months or three years or seven years, tape provides the right economics and portability.

With a directly attached tape drive, the HP D2D4000 Backup System can offload data to physical tape cartridge providing a full disk-to-disk-to-tape (D2D2T) solution without involving the backup server or impacting network performance. It supports LTO Ultrium tape drives for direct attach physical backup using either a manual or scheduled cartridge copy operation.

You can use the HP D2D4000 Backup System for daily backup, while utilizing direct attach HP LTO tape drives, or using HP LTO tape drives and autoloaders attached to your network servers, for regular full backups to tape. Tape backup can be done using a tape-to-tape copy from the "virtual tapes" in the D2D4000 to physical tape, or a direct backup from the server to physical tape. Such backup regimes

combine the advantages of disk-to-disk backup with the disaster recovery protection of tape, providing you with the best of both worlds.

Reliable and dependable

The D2D4000 Backup System makes your data protection more reliable in a number of ways.

- Automated backup - makes sure that backups happen when they should, day in and day out and also removes the risk of human errors from handling tape media, a common cause of failed backups.
- The D2D4000 Backup System employs hardware-based RAID 6 support to protect your data in the event of a hardware problem. In the event of a single disk failure, the D2D4000 can completely recover your data while rebuilding your original data RAID set when the new disk drive is added.
- Unlike other disk-based backup solutions, the D2D4000 Backup System uses integrated flash memory to store device software so that in the event of a system failure it can be quickly reconfigured without the need to reinstall device software.
- The D2D4000 Backup System has enhanced security over NAS-based storage systems because it is a dedicated backup device. It is accessible as a tape device, making it virtually invulnerable to accidental file deletion and virus or hacker attacks.
- Built on HP ProLiant Server technology, the HP D2D4000 Backup System delivers high reliability using proven hardware from the industry leader in server solutions.

An affordable way to improve your backup

The HP D2D4000 Backup System makes disk-based backup even more affordable.

- Data deduplication allows you to store up to 50x more data on the same disk, effectively reducing the cost per gigabyte of storage and the need to purchase more disk space.
- Using the D2D4000 dramatically reduces the amount of time it takes to restore lost or corrupted data, especially used in conjunction with data deduplication which retains backup data on disk for longer. This improves productivity by allowing employees get back to work faster, saving the organization both time and money and protecting against other associated issues with business downtime.
- There's no need to purchase or allocate server hardware to manage this device, nor is there a need to purchase additional cables and host bus adapters for connectivity to your network.
- Consolidating your daily backup onto a single, automated, disk-based device reduces your IT operational costs. Doing away with daily backup to tape also decreases media costs, however for a robust data protection strategy HP recommends regular backup to tape. At a minimum offload weekly full backups to tape for vaulting and protection against all types of site-wide disasters.

Features and Benefits

Seamlessly integrates into your current environment

The D2D4000 Backup System's iSCSI interface plugs right into your existing Ethernet network, and the FC interface plugs into your Fibre Channel. HP's extensive compatibility testing program assures that your HP StorageWorks D2D4000 Backup System works with leading servers, operating systems, and backup applications, including those not manufactured by HP.

The HP StorageWorks D2D4000 Backup System works with leading backup applications to deliver a total solution for protecting data. This includes HP Data Protector Express Software which provides simple, reliable and efficient data protection. Designed for organizations without dedicated disaster recovery staff, it is easy to install, operate and manage. In addition to the HP D2D4000 Backup System, Data Protector Express also supports other storage solutions such as tape, disk and optical devices as backup media. Agents provide online protection for networked file servers, application servers and Windows-based desktop machines. Data Protector Express delivers high performance that minimizes the impact of backup and recovery operations.

HP StorageWorks D2D Backup System Family

The family of HP StorageWorks D2D Backup Systems has been specifically designed to deliver affordable disk-based backup for small and medium size data centers and remote or branch offices. The family includes:

D2D120 and D2D130 Backup Systems
Entry level tower products with up to 3 TB raw capacity and speeds of up to 50 MB/sec. These products feature an optional integrated HP LTO Ultrium Tape Drive.

D2D2500 Backup System
Entry level 1U rack-mount product with up to 3 TB raw capacity and speeds of up to 75 MB/sec. This product includes HP Dynamic deduplication technology.

D2D4000 Backup System
For highest capacity and performance in a 2U rack-mount form factor and a choice of two raw capacity points of either 4.5 TB or 9 TB with speeds of more than 90 MB/sec. These products include HP Dynamic deduplication technology and offer a choice of dual iSCSI or Fibre Channel interfaces.

HP also offers the HP StorageWorks Virtual Library Systems (VLS) products for dedicated disk-based backup. These products, including the VLS6000, VLS9000 and VLS12000, are designed for large and enterprise data centers requiring the highest capacity and performance. For more information visit: www.hp.com/go/vls.

Compatibility

Server Compatibility

HP extensive compatibility testing program assures that your HP StorageWorks D2D4000 Backup System works with leading servers, operating systems, and backup applications, including those not manufactured by HP.

The HP D2D4000 Backup System is supported on servers that use Microsoft Windows or Linux operating systems, including HP ProLiant, HP Integrity Servers and a variety of third-party servers. For compatibility details on specific servers, refer to our website for the latest hardware compatibility information: http://www.hp.com/go/connect

OS Support

The HP D2D4000 Backup System is supported with Microsoft Windows, Linux, HP-UX and Solaris operating systems.

For more details, refer to our website for the latest information: http://www.hp.com/go/connect.

Software Support

The HP D2D4000 Backup System is supported by a range of popular backup applications, including HP Data Protector. For details of specific backup application compatibility, refer to our website for the latest information: http://www.hp.com/go/connect

Tape drive compatibility

The HP D2D4000 Backup System supports direct connection of the following HP LTO Ultrium tape drives autoloaders and libraries using an appropriate host bus adapter:

- HP External LTO-2, LTO-3, and LTO-4 Ultrium tape drives
- HP Internal LTO-2, LTO-3, and LTO-4 Ultrium tape drives in either an HP 1U or 3U Rack-mount Kit
- HP External 1/8 G2 Autoloader with LTO-2, LTO-3, and LTO-4 Ultrium tape drives
- HP External MSL2024 Tape Library with LTO-2, LTO-3 and LTO-4 Ultrium tape drives
- HP External MSL4048 Tape Library with LTO-2, LTO-3 and LTO-4 Ultrium tape drives

Backup to tape autoloaders and tape libraries is also available across the network, using the tape-to-tape (or media copy) feature in your backup.

For further information about these products, visit the HP Web site at: www.hp.com/go/tape

Network Compatibility

For the best performance, the HP D2D4000 Backup System should be connected to the servers it protects via a 1Gb (gigabit) Ethernet network. It is supported on all 1Gb Ethernet network interface cards (NICs) and switches. The device will run on either IPv4 or IPv6 networks.

The HP D2D4000 Backup System is also supported on 100 base-T Ethernet networks, but performance will be severely restricted. This product is not supported on networks using slower Ethernet technology. The D2D4000 Backup System communicates data over your Ethernet network using iSCSI technology:

- For Windows systems, this requires installation of the Microsoft iSCSI Initiator 2.02 (or above) software driver on each server that will be backed up to the HP D2D4000 Backup System. This initiator is downloaded and installed from Microsoft automatically by the installation wizard and is also available via free download from the Microsoft website at: http://www.microsoft.com
- For supported Linux operating systems, a software iSCSI initiator is provided with the operating system but may need to be installed separately if not included in the initial operating system installation.

Compatibility

SAN Compatibility

The HP D2D4000 Backup System supports a variety of Fibre Channel switches and HBA.

For more details of SAN compatibility, refer to our website for the latest information:
http://www.hp.com/go/ebs

Warranty and Services Included with the Product

Hewlett-Packard provides a 1 year parts exchange, 1 year labor, 1 year on site, normal business hours, next business day response for StorageWorks D2D4000 Backup System, plus 9x5 phone support for the duration of the warranty.

Where a Tape Drive is attached to a D2D4000 Backup System, the tape drive carries its own separate warranty. Hewlett-Packard provides a 3-year, next-day, parts exchange, limited warranty for the StorageWorks Ultrium tape drive, plus 9x5 phone support for the duration of the warranty.

HP warrants only that the StorageWorks Data Protector Express software media will be free of physical defects for a period of ninety (90) days from delivery.

For more information about HP's Global Limited Warranty and Technical Support, visit:
ftp://ftp.compaq.com/pub/products/storageworks/warranty/en_321708-008.pdf

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HP Care Pack Services

HP Care Pack Services offer upgraded service levels to extend and expand your standard product warranty with easy-to-buy, easy-to-use support packages that help you make the most of your hardware and software investments. They let you choose the support levels that meet your business requirements, from basic to mission-critical. They help you contain total cost of ownership.

HP Care Pack warranty extensions can be purchased along with HP products to cost-effectively upgrade or extend your warranty. For many products, post-warranty HP Care Pack Services are available when your original warranty has expired.

Why purchase an HP Care Pack Service?

Your standard warranty protects against product defects. HP Care Pack Services help you guard against unplanned downtime, which can reduce your productivity and profitability. These convenient service packages:

- Protect your investment in HP products
- Provide consistent, predictable levels of support across your entire department or business
- Ease budget planning with fixed-cost support that includes parts and labor
- Give you direct access to proven technical and problem-solving expertise
- Offer a choice of response-time and repair-time commitments
- Deliver prompt, measurable results
- Are available whenever and wherever you do business
- Also available to provide consistent, predicable levels of software support for replication

HP Care Pack availability may vary by country and product.

HP Care Pack Services are sold by HP and HP authorized enterprise and commercial resellers. Services for customers purchasing via direct and enterprise resellers are quoted using HP order configuration tools. Additional information about HP Care Pack Service features and benefits is available at:
http://www.hp.com/hps/carepack/services/.

To find HP Care Pack Services available via HP authorized commercial resellers, visit:
http://h30125.www3.hp.com/csn/salesmktg/elfpack/elf_nonlkup_ctrylang.asp?code=elnl

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Service and Support, HP Care Pack, and Warranty Information

eSupport

HP eSupport is a portfolio of technology-based services that assist you with managing your business environment - from the desktop to the data center.

Support Portal
The HP support portal provides one-stop access to the information, tools and services you need to manage the daily operations of your IT environment.

Features include:

- Access to self-solve tools (including search technical knowledge base)
- Efficient logging and tracking of support cases
- Collaboration with other business and IT professionals
- Download of patches and drivers
- Access to diagnostic tools
- Proactive notification of relevant information

Access to certain features of the support portal requires an HP service agreement. To access the support portal, visit: http://www.hp.com/support

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HP Education Services

For more information about HP Education Services for Storage and SAN, visit http://h10076.www1.hp.com/education/curr-storsan.htm

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Additional Services Information

For more information about Deployment, Per Event, Consulting and Education services for HP Storage, visit: http://www.hp.com/hps/storage/

For more information about HP Care Pack services for storage products, visit: http://www.hp.com/hps/carepack/storage/cp_networked.html

For more information about HP storage software, services and updates, visit: http://h18006.www1.hp.com/storage/software.html

If you have specific questions, contact your local HP representative. Contact information for a representative in your area can be found at "Contact HP" http://www.hp.com/

Step 1 - Select a Configuration

Select one:

Model Name	Model Description	Part Number
HP StorageWorks D2D4004i Backup System	D2D4004i Backup System with 4.5 TB of disk storage Kit Contents: D2D4004i Backup System (6 x 750 GB disks) Ethernet cable(Cat 5e) 3m (x2) 2 x Power cords (with IEC 320 C13 plug for Rack PDU) Installation poster HP StorageWorks D2D4000 Backup System CD(contains installation wizard, device drivers, and documentation, all localized in multiple languages) NOTE: 0D1 will appear after this part number on your sales order if factory integration is indicated.	EH938A
HP StorageWorks D2D4009i Backup System	D2D4009i Backup System with 9 TB of disk storage Kit Contents: D2D4009i Backup System (12 x 750 GB disks) Ethernet cable(Cat 5e) 3m (x2) 2 x Power cords (with IEC 320 C13 plug for Rack PDU) Installation poster HP StorageWorks D2D4000 Backup System CD(contains installation wizard, device drivers, and documentation, all localized in multiple languages) NOTE: 0D1 will appear after this part number on your sales order if factory integration is indicated.	EH939A
HP StorageWorks D2D4004fc Backup System	D2D4004fc Backup System with 4.5 TB of disk storage Kit Contents: D2D4004fc Backup System (6 x 750 GB disks) Ethernet cable(Cat 5e) 3m (x2) 2 x Power cords (with IEC 320 C13 plug for Rack PDU) Installation poster HP StorageWorks D2D4000 Backup System CD(contains installation wizard, device drivers, and documentation, all localized in multiple languages) NOTE: 0D1 will appear after this part number on your sales order if factory integration is indicated.	EH941A
HP StorageWorks D2D4009fc Backup System	D2D4009fc Backup System with 9 TB of disk storage Kit Contents: D2D4009fcBackup System (12 x 750 GB disks) Ethernet cable(Cat 5e) 3m (x2) 2 x Power cords (with IEC 320 C13 plug for Rack PDU) Installation poster HP StorageWorks D2D4000 Backup System CD(contains installation wizard, device drivers, and documentation, all localized in multiple languages) NOTE: 0D1 will appear after this part number on your sales order if factory integration is indicated.	EH942A

Configuration Information

HP StorageWorks D2D4904 Capacity Upgrade	D2D4904 Capacity Upgrade, enables the D2D4004 products to be upgraded to D2D4009 capacity products Kit Contents: 6 x 750 GB discs Entitlement certificate Installation booklet	EH944A

Step 2- Related Options

Replication License	HP StorageWorks D2D4000 Replication License	EH991A

- This license enables an appliance to host replication target libraries. (No license is required for appliances which only act as replication sources)
- Licensing is "per appliance" i.e. A single license is required to enable an appliance to host as many replication target libraries as it is capable of (e.g. D2D4000 may host up to 16 replication target libraries).
- Licenses are delivered via http://www.webware.hp.com and are node-locked by appliance serial number (and are not transferable)
- A total of 16 source appliances can replicate into a single D2D4000 target appliances

Rack-mount Options (Connecting a tape drive option to the D2D4000 requires installation of the appropriate host bus adapter. Please select an option from the list provided below)	Rack-mount Tape Drive Kits	
	HP StorageWorks 1U SCSI Rack-mount Kit	A7445B
	HP Storage Works 1U SAS Rack-mount Kit	AE459A
	HP StorageWorks 3U SCSI Rack-mount Kit	274338-B22
	HP StorageWorks 3U SAS Rack-mount Kit	AG576A
	Pre-Configured Rack-mount Tape Options	
	HP StorageWorks 1U Rack-mount Kit with one LTO-2 Ultrium 448 drive	DW028B
	HP StorageWorks 1U Rack-mount Kit with one LTO-3 Ultrium 920 drive	EH903A
	HP StorageWorks 3U Rack-mount Kit with one LTO-3 Ultrium 960 drive	Q1595B
	HP StorageWorks 3U Rack-mount Kit with one LTO-4 Ultrium 1760 drive	EH946A
	HP StorageWorks 3U Rack-mount Kit with one LTO-4 Ultrium 1840 drive	EH926A
	Internal Tape Drive Options for Rack-mount Kits	
	HP StorageWorks LTO-2 Ultrium 448 SCSI Internal Tape Drive	DW016A
	HP StorageWorks LTO-2 Ultrium 448 SAS Internal Tape Drive	DW085A
	HP StorageWorks LTO-3 Ultrium 920 SCSI Internal Tape Drive	EH903A
	HP StorageWorks LTO-3 Ultrium 920 SAS Internal Tape Drive	EH847A
	HP StorageWorks LTO-3 Ultrium 960 SCSI Internal Tape Drive	Q1538A
	HP StorageWorks LTO-4 Ultrium 1760 SAS Internal Tape Drive	EH919A
	HP StorageWorks LTO-4 Ultrium 1840 SCSI Internal Tape Drive	EH853A
	HP StorageWorks LTO-4 Ultrium 1840 SAS Internal Tape Drive	EH860A

NOTE: HP Rack-mount kits can support a maximum of either 2 (1U) or 4 (3U) tape drives. While the HP D2D4000 can only attach to a single tape drive, you may add additional tape drives to the kit to allow for connection to other devices in your rack.

Configuration Information

Tape Drive Options (Connecting a tape drive option to the D2D4000 requires installation of the appropriate host bus adapter. Please select an option from the list provided below)	**Direct attach**	
	HP StorageWorks Ultrium 1840 SCSI External Tape Drive	EH854A
	HP StorageWorks Ultrium 1840 SAS External Tape Drive	EG861A
	HP StorageWorks Ultrium 1760 SAS External Tape Drive	EH920A
	HP StorageWorks Ultrium 960 SCSI External Tape Drive	Q1539B
	HP StorageWorks Ultrium 920 SCSI External Tape Drive	EH842A
	HP StorageWorks Ultrium 920 SAS External Tape Drive	EH848A
	HP StorageWorks Ultrium 448 SCSI External Tape Drive	DW017B
	HP StorageWorks Ultrium 448 SAS External Tape Drive	DW086A
	HP StorageWorks 1/8 G2 Tape Autoloader http://h18000.www1.hp.com/products/quickspecs/12630_div/12630_div.html	
	HP StorageWorks MSL2024 Tape Library http://h18000.www1.hp.com/products/quickspecs/12383_div/12383_div.html	
	HP StorageWorks MSL4048 Tape Library http://h18000.www1.hp.com/products/quickspecs/12422_div/12422_div.html	
	NOTE: HP StorageWorks Tape Autoloaders and Tape Libraries listed above are available with a wide range of LTO Ultrium tape drive and interface options. Please refer to the product Quickspecs for detailed ordering information. www.hp.com/go/tape	
Host Bus Adapter (HBA) Options	HP SC11Xe Host Bus Adapter (SCSI)	412911-B21
	HP SC44Ge Host Bus Adapter (SAS)	416096-B21

Technical Specifications

	D2D4004i Backup System	D2D4004fc Backup System	D2D4009i Backup System	D2D4009fc Backup System
Form Factor	2U Rack	2U Rack	2U Rack	2U Rack
Total Capacity (Raw)	4.5 TB	4.5 TB	9 TB	9 TB
Total Capacity (Useable)	3 TB	3 TB	7.5 TB	7.5 TB
Data Deduplication Usable capacity using data deduplication at 20:1*	60 TB	60 TB	150 TB	150 TB
Usable capacity using data deduplication at 50:1*	150 TB	150 TB	375 TB	375 TB
Replication	Supports low bandwidth replication of libraries between D2D appliances. Replication is automatic and up to 16 source appliances may replicate into a single D2D4000 target appliance. Appliances may function as both replication targets and sources simultaneously with a license only being required for any appliance acting as a target.			
Maximum number of source appliances per target appliance (fan in)	16	16	16	16
Disk Drive Capacity, Type	750 GB, SATA 7200rpm, 3.5- inch	750 GB, SATA 7200rpm, 3.5-inch	750 GB, SATA 7200rpm, 3.5-inch	750 GB, SATA 7200rpm, 3.5-inch
Number of Disk Drives	6	6	12	12
RAID Support	Hardware RAID 6	Hardware RAID 6	Hardware RAID 6	Hardware RAID 6
Performance* (maximum aggregated data transfer rate)	> 90 MB/s	> 90 MB/s	> 90 MB/s	> 90 MB/s
Device Interface	2 x 1 Gb iSCSI (Ethernet) (also supports 100 base-T)	2 x 4 Gb Fibre Channel 2 x 1 Gb iSCSI (Ethernet) (also supports 100 base-T)	2 x 1 Gb iSCSI (Ethernet) (also supports 100 base-T)	2x 4 Gb Fibre Channel 2 x 1 Gb iSCSI (Ethernet) (also supports 100 base-T)
Tape Devices Emulated	HP LTO- 2 Ultrium /LTO-3 Ultrium/LTO-4 Ultrium Tape Drives in HP 1/8 G2 Tape Autoloader, MSL2024 Tape Library, MSL4048 Tape Library, HP VLS generic library			
Maximum Number of Tape Autoloader/Libraries Emulated	16	16	16	16
Maximum Number of Cartridges Emulated (Assumes 16 generic 4 drive libraries with 96 slots)	1536	1536	1536	1536
Direct-attach Tape Drives Supported (maximum of one external tape drive - requires HBA	HP LTO-4 (Ultrium 1840 and Ultrium 1760) tape drives LTO-3 (Ultrium 920 and Ultrium 960) tape drives and LTO-2 (Ultrium 448 and Ultrium 460) tape drives			

* Actual results of data deduplication will vary with data type, change rates over time and backup methodologies used. Assuming standard business data mix and extended on-disk retention, a 20:1 data deduplication ratio could be assumed with a weekly full and daily incremental backup model. A 50:1 capacity ratio could be assumed for daily full backups.

Dimensions (HxWxD)	**Shipping**	11.3 x 23.0 x 38.9 in (28.7 x 58.4 x 98.8 cm)
	Out of box	3.44 x 17.64 x 27.50 in (8.75 x 44.80 x 69.88 cm)
Weight (Max)	**Shipping (D2D4004)**	61.5 lbs
	Shipping (D2D4009)	71.5 lbs
	Out of box (D2D2004)	47 lbs
	Out of box (D2D4009)	57 lbs
Power Requirements (per power supply)	**Range Input Voltage**	100 - 240 VAC
	Rated Input Frequency	50 to 60 Hz
	Rated Input Current	9.10 A (at 100 VAC), 4.5 A (at 200 VAC)
	BTU Rating	Maximum 3107.82 BTU/hr (at 100 VAC), 3073.67 BTU/hr (at 200 VAC)
	Rated Steady-State Power	750 W (at 100 VAC), 750 W (at 200 VAC)
	Maximum Peak Power	750 W (at 100 VAC), 750 W (at 200 VAC)
Relative Humidity (non-condensing)	**Operating**	10 to 90% relative humidity (Rh), 82.4° F (28° C) maximum wet bulb temperature, non-condensing.
	Non Operating	5 to 95% relative humidity (Rh), 101.7° F (38.7° C) maximum wet bulb temperature, non-condensing.
Temperature Range	**Operating**	50° to 95°F (10° to 35°C) at sea level with an altitude derating of 1.8°F per every 1000 ft (1.0°C per every 305 m) above sea level to a maximum of 10,000 ft (3050 m), no direct sustained sunlight. Maximum rate of change is 18°F/hr (10°C/hr). The upper limit may be limited by the type and number of options installed. System performance may be reduced if operating with a fan fault or above 86°F (30°C)
	Non Operating	22° to 140° F (-30° to 60° C). Maximum rate of change is 36° F/hr (20° C/hr).
Acoustic Noise.	**Idle** (disks spinning)	Listed are the declared A-Weighted sound power levels (LWAd) and declared average bystander position A-Weighted sound pressure levels (LpAm) when the product is operating in a 23°C ambient environment LWad 6.7 B LpAm 51 dBA
	Operating (random seeks to disks)	Listed are the declared A-Weighted sound power levels (LWAd) and declared average bystander position A-Weighted sound pressure levels (LpAm) when the product is operating in a 23°C ambient environment LWad 6.7 B LpAm 51 dBA

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