



Simply Business Protection solution guide

Your guide to choosing the right data protection strategy
for your business

Spring 2008

Simply StorageWorks

Lose your data and you could lose your business. That is why reliable data protection is one of the most important challenges your business faces today. In the event of any threat to your data – including a ‘worst-case scenario’, when multiple system failures occur at the same time – it is essential that you have the appropriate data protection and recovery strategy in place.

How can this guide help you?

As part of the HP Simply Business Protection programme, this guide is designed specifically to help small and mid-sized businesses choose the data protection strategy that is right for them. It is divided into four parts to make it easier for you to find the information you need.

Part 1: The importance of data protection (pages 3–7)

- Why data protection is one of the key business concerns today
- What happens when data is not protected
- Start planning your data protection solution
- What is HP’s approach to data protection?
- Identifying your data protection needs
- HP’s data protection technologies

Part 2: How to choose the HP solutions you need (pages 8–19)

- A typical small office environment
- A typical small business environment with multiple servers
- A typical networked environment with two offices
- A typical environment for tape backup consolidation
- A typical environment for both online storage and backup consolidation – all in one
- A typical environment for high availability and performance

Part 3: Choosing your products and services (pages 20–28)

- How to select the HP tape drives, autoloaders, tape libraries, or disk-based backup solutions that are right for you
- An outline of the benefits of HP software and media
- How HP Services can help support your solution

Part 4: Complete your knowledge (pages 29–31)

- Quick answers to commonly asked questions
- Jargon buster – simple definitions of key technology terms used in this guide

Can we help you further?

This guide is part of the HP Simply StorageWorks framework, which provides comprehensive information about the complete line of HP storage for small and mid-sized businesses. If you require information on network-attached storage (NAS) and storage area network (SAN) solutions, please refer to the Simply File Services and Simply Consolidation solution guides.

Part 1: The importance of data protection



Why is data protection important?

Data is the backbone of every organisation. Whatever business you are in, enormous amounts of data are needed every day to keep it running.

Furthermore, large businesses are no longer the only organisations that need sophisticated data protection strategies. Recent surveys indicate that backup and recovery is the top IT priority among small and mid-sized businesses. As a result, smaller companies are also looking for advanced data protection features with high levels of availability and recovery.

For example, what would happen if the data on your systems were wiped out by a power surge or system failure? What if a fire or flood destroyed your electronic or paper-based records? Would you be able to recover all of your information?

What if a crucial manual backup had been forgotten? Would you know which customers to invoice – and for how much? Could you pay your bills? Could your business continue to run?

Fifty per cent of companies that lose their data go out of business immediately, and 90 per cent do not survive for more than two years after such a loss.¹ Given the importance of information and the potential high cost associated with data loss, reliable data protection is no longer an option – it is an obligation. Whether you need to capture, distribute and protect data automatically, or you need a fast and affordable backup and recovery system, data protection must be performed in a systematic way.

HP's role is to help you find a solution that fits your specific needs – no matter what size your business happens to be.

¹ Based on research from Baroudi Bloor International; *Sarbanes-Oxley Compliance Journal*, December 2005.

Start planning your data protection solution

Now that you have learned what risks are associated with data loss, it is vital that you choose a data protection solution that fits your needs and addresses your current concerns. Among the considerations to keep in mind:

- Affordability and cost control are primary considerations in every business, but even in very small companies the value of the business data will far outweigh the costs of a simple tape-based data protection regime. However, in larger businesses, attaching a separate tape drive to each server duplicates resources and adds to your IT management overhead as the number of servers grows.
- Distributed backup can complicate management and disaster recovery planning.
- Is your LAN fast enough to handle the volume of traffic produced when it runs your backups? Can you manage your backup windows to keep the network free during working hours?
- How quickly is your data multiplying? Do you have enough storage capacity available to meet both your primary storage and data protection needs?
- Do your backup window requirements and value of data require a dedicated backup server? Can your infrastructure scale to meet your growing needs over time?

The first step in planning your data protection solution is to understand what type of IT environment you are running.

DAS environments

Direct-attached storage (DAS) is the simplest backup and restore environment, usually consisting of a stand-alone tape drive or an autoloader attached directly to the server it is protecting. Businesses that operate DAS usually

- Require only daily and/or weekly backups
- Maintain only a few (one to two) networked servers on each network
- Require only a single operating system
- Do not employ online business-critical operations

LAN environments

Local area network (LAN)-based backup has storage backup devices that are connected to the LAN and managed centrally from a single console through a single backup server, reducing hardware costs and management time. Businesses that operate LAN-based backup usually

- Require continuous, business-critical operations
- Require hourly or daily backups
- Have three or more networked servers
- Run multiple operating systems

SAN environments

Businesses that run storage area networks (SANs) have characteristics similar to those that operate LANs and usually

- Have a large and possibly complex network
- Have dedicated IT staff, exponential data growth and a need for instant recovery

What is HP's approach to data protection?

HP provides solutions that range from the simplest IT environments to the most complex ones running multiple operating systems and business applications – as well as support for heterogeneous environments. HP's range includes a rich array of reliable, simple and affordable solutions that capture, distribute, consolidate, restore and protect your data. Each is designed to make sure your data is there when you need it.

How do you choose the right business protection strategy for you?

First, you need to consider and understand the value that your IT brings to the business. For example, can an application be down for 24 hours without significantly affecting your business, or would an outage lasting just minutes be catastrophic?

Two key measures can help you assess the needs of your business. The first is the Recovery Time Objective (RTO), which is the amount of time a business process can be down. The second, the Recovery Point Objective (RPO), is the amount of data you can afford to lose. For 24x7 applications, the RPO could be the most recent transaction; for file servers, it could be last night's backup.

Once you have established the RTO and the RPO for your business, you can consider the hardware, software and services available that will provide you with the right level of protection against specific causes of data loss. Three examples illustrate how this might work:

- In a typical small business a daily or weekly backup stored off site may be sufficient to allow the business to keep running in the event of data loss. In these circumstances traditional tape backup provides a reliable and cost-effective solution.
- Tape backup effectively protects your systems against virus attacks because data can be restored from the most recent healthy backup. However, recovery time may be longer than your business can tolerate, in which case a multi-tier backup that includes both disk and tape may be appropriate.
- Remote replication of data between sites will provide much faster recovery of a site disruption compared to tape. However, it will not supply the same level of protection against accidental deletion or virus attacks.

These are just three ways to look at the problem. Because HP has such a wide array of storage technologies available, you can find and implement the solution that best meets the specific needs of your business.

Recovery Time Objective:

How long can your business tolerate downtime?

Recovery Point Objective:

What point in time do you need to recover:

- 24 hours ago?
- 1 hour ago?
- 5 seconds ago?

Identifying your data protection needs

The diagram below shows the spectrum of business continuity solutions available from HP. It also allows you to see where your business protection needs are today.

Some organisations will need solutions only at the traditional tape end of the spectrum, where lower cost is key and restore speed is not an imperative. Some will need to implement several different solutions to cover different service-level agreements (SLAs) for restore time and uptime objectives.

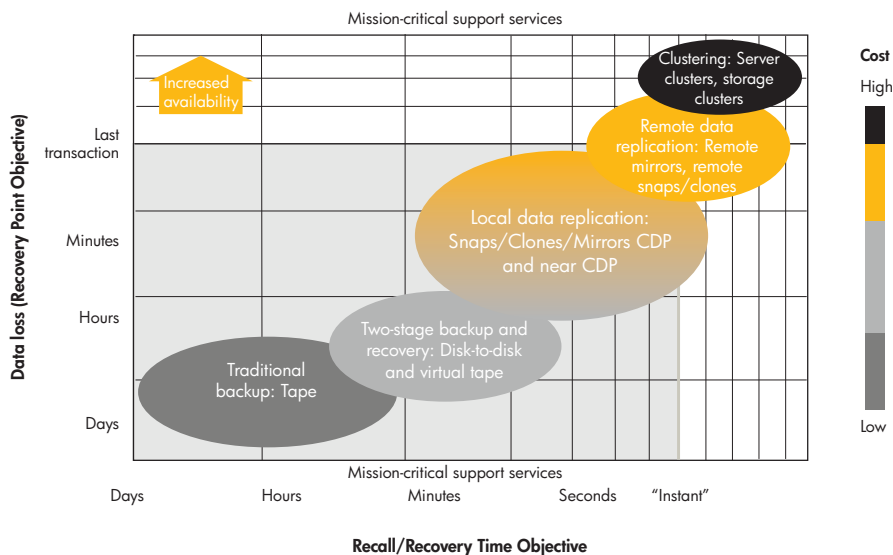
From data protection to business protection

When does ordinary data protection become business protection? When you match the value of your data to the storage solution you use.

Business protection solutions may be disk based or tape based, depending on how quickly and how often you need to gain access to and restore lost or corrupted data. For example, it might not be cost-effective to store general e-mail archives on an expensive, always-available disk array. In that case, it might be better to deploy a more affordable, tape-based technology.

The chief characteristics of both disk- and tape-based technologies are described in the text that follows, and details of the HP range of disk and tape solutions are outlined in Part 3: Choosing your products and services.

HP StorageWorks continuum for business continuity and availability



Tape-based data protection

Magnetic tape has provided data protection for more than 50 years. It is still the most cost-effective technology for high-capacity and long-term data protection. Tape has a number of advantages that have yet to be eclipsed by other technologies:

- Tape media is small as well as transportable and can be stored off site easily.
- Its long shelf life of up to 30 years makes it a dependable medium for archiving.
- Because tape is removable, its capacity is effectively infinitely scalable.
- Library solutions can be integrated easily into many environments to provide automated, multiple-cartridge backup.

HP provides a choice of leading tape technologies – Digital Audio Tape (DAT) and Linear Tape-Open (LTO) – in a wide range of products.

Disk-based data protection

Employing disk-based backup as part of an overall business protection solution can provide users with several advantages over systems based solely on tape devices. First, in situations where tape devices are attached to each host server, disk-based backup can consolidate multiple backup jobs onto a single network-connected storage device. Second, data or files can be recovered easily and quickly from disk in minutes.

And last, the inability to automate backup jobs can lead to problems with backup reliability. Disk-based data protection solutions can provide these customers with affordable solutions that automate the backup for multiple servers.

Disk-to-disk (D2D) backup

In most disk-to-disk (D2D) solutions, backup software streams backup data to a disk array that is divided into backup targets for each host server being backed up. In some cases, once a host has written to the disk, the migration to physical tape occurs through that host. However, some technologies allow the auto-migration of disk-based backup files directly to tape.

Virtual tape

Virtual tape is a disk-based storage device that appears to the LAN or SAN as a tape drive, tape autoloader, or tape library. By presenting a virtual tape device to the LAN or SAN, the pool of storage within it may be shared dynamically among multiple hosts. Virtual tape can improve backup and restore performance dramatically because virtual tapes are easy to provision.

Replication (snapshots, clones and mirrors)

Snapshots, clones and mirrors allow backups to be performed with no interruption to your applications. They also allow data to be restored instantly from saved images on the disk array. Replication is often used to move data across a WAN because data is replicated as it is changed, resulting in efficient use of network bandwidth.

Clustering

Clustering provides protection against basic hardware failure. A cluster of servers provides fault tolerance with one or more additional servers available to take over operations if a server fails. In conjunction with server clustering, HP StorageWorks solutions provide protection so that the disk storage itself automatically fails over to another site without any interruption to business applications.

Part 2: How to choose the HP solutions you need

The following scenarios were created using hypothetical businesses to illustrate the range of data protection needs faced by small and mid-sized businesses, as well as the strategies HP recommends for each. One or more of these business situations is likely to be similar to your own. These examples will help you to identify the right data protection method for you.

A typical small office environment

A small architectural practice with five employees is called Simply Ltd. The company's chief architect uses a notebook computer, the junior architects and the technician have workstations, and the administrator has a desktop computer – all of which run on Microsoft® Windows®. An HP ProLiant ML310 Server acts as a shared file server for all the firm's computer-aided design (CAD) drawings.

Recovery Time Objective:

If an outage occurs, Simply Ltd needs to recover data within 24 hours.

Recovery Point Objective:

If an outage occurs, Simply Ltd needs to recover data from the previous day.

Other considerations:

Simply Ltd is a small practice with a limited IT budget; therefore, they need the lowest-cost solution they can find.



Single-server, entry-level backup solution

To meet their data protection needs, Simply Ltd chose an HP StorageWorks DAT 160 USB Tape Drive. Using USB to connect to a file server, backups are performed easily using the HP Data Protector Express Single Server Edition software included with the tape drive.

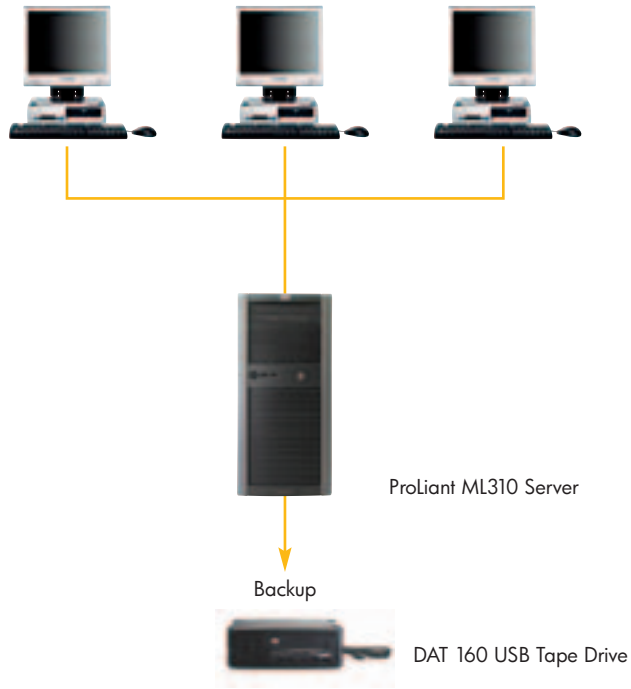
Data Protector Express Single Server Edition software is used to schedule incremental server backups of 3 to 5 GB each night, as well as a full 50 GB backup at the weekend. The system administrator takes the incremental backup tapes home to make sure the data will still be available if a disaster occurs.

All HP tape drives also include the Data Protector Express Bare Metal Disaster Recovery option. This is used in conjunction with the tape drive's One-Button Disaster Recovery (OBDR) feature, which provides fast and automated recovery of the entire system.

Furthermore, the low cost of DAT media and the inclusion of Data Protector Express Single Server Edition software and the Data Protector Express Bare Metal Disaster Recovery (BMDR) option add to the cost-effectiveness of the company's data protection solution.

'Knowing that HP's One-Button Disaster Recovery will help me get the system up and running quickly if the worst happens gives me peace of mind.'

Single-server, entry-level backup solution



Typical configuration

Description	Part number	Qty.
HP StorageWorks DAT 160 USB External Tape Drive	Q1581A	1
HP DAT 160 cartridge, 160 GB	C8011A	8
HP Data Protector Express Single Server Edition software (included with HP StorageWorks tape drive)	—	1
HP Data Protector Express Bare Metal Disaster Recovery option software (included with HP StorageWorks tape drive)	—	1

A typical small business environment with multiple servers

A small accounting and financial services company called Kalm Associates has a staff of 35, all of whom operate from a single office. The office manager has responsibility for the firm's IT systems, which are supported by a local reseller. The firm's infrastructure includes a file server, an HP ProLiant ML350 G5 Storage Server, to hold customer records. An additional server, an HP ProLiant ML370 Server, is used for e-mail and print jobs.

Recovery Time Objective:

If an outage occurs, Kalm Associates needs to recover data within 12 hours.

Recovery Point Objective:

If an outage occurs, Kalm Associates needs to recover data from the previous day.

Other considerations:

Kalm Associates has no online business-critical operations and requires only a daily data backup. A solution that is simple to operate is key.

The print and e-mail server, which holds almost 500 GB of data, is backed up to an HP StorageWorks Ultrium 920 SAS Tape Drive featuring Data Protector Express software. Data Protector Express Single Server Edition software is used to schedule a full backup every Friday night as well as incremental backups every other night. The office manager stores the weekly full backup media off site for four weeks, so that data can be restored to any point up to a month before.

For additional protection from more catastrophic disasters, Kalm Associates uses the Data Protector Express BMDR option in conjunction with the Ultrium 920 Tape Drive's OBDR feature, which works with HP ProLiant servers. Each time a full backup is written to tape, a disaster recovery image is created automatically and written to tape and the Data Protector Express catalogue. If the worst happens, the repaired ProLiant server or replacement hardware can be booted from the Ultrium tape, and the Data Protector Express BMDR option will restore the operating system, applications and data automatically using only the backup tape.

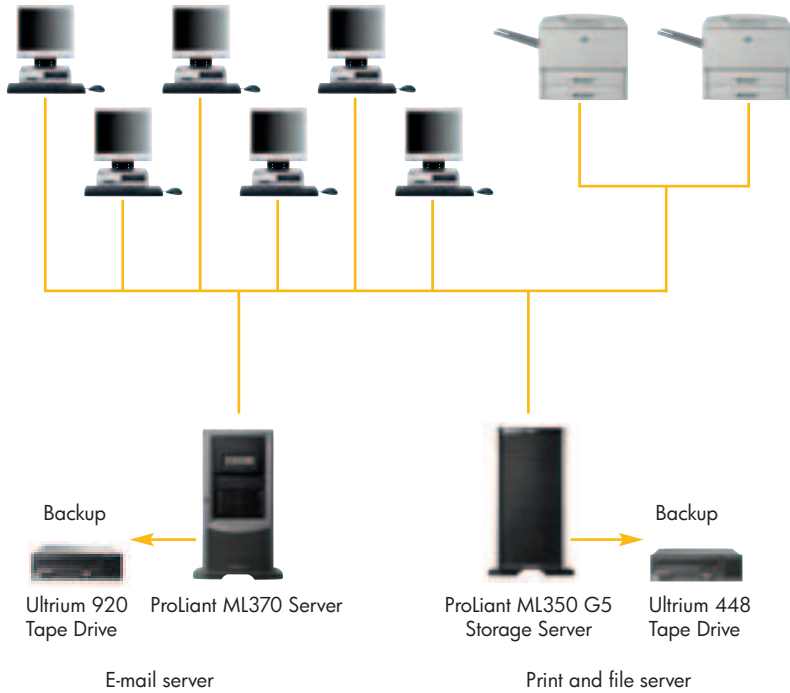
This simple DAS solution makes life very easy for Kalm's office manager, who occasionally must restore lost or corrupted files but has never needed to perform a complete disaster recovery. However, on the advice of her reseller, she does a periodic test restore at weekends, just to make sure the process will work flawlessly should she ever need it.

DAS-based backup solution

The company selected an HP StorageWorks Ultrium 448 SAS Tape Drive and HP Data Protector Express Single Server Edition software (included with the drive) to back up the 240 GB of data stored on the file server. The office manager takes the backup tapes home with her each day to protect the data from an on-site disaster.

'We needed a simple and reliable backup solution, and our reseller told us that you can't get any easier than HP StorageWorks Ultrium products.'

DAS-based backup solution



Typical configuration

Description	Part number	Qty.
HP StorageWorks Ultrium 448 SAS Internal Tape Drive	DW085A	1
HP Ultrium data cartridge for Ultrium 448 (LTO-2)	C7972A	10
HP StorageWorks Ultrium 920 SAS Tape Drive	EH847A	1
HP Ultrium 800 GB RW Data Cartridge for Ultrium 920 (LTO-3)	C7973A	10
HP SC44Ge Host Bus Adaptor	416096-B21	2
2 x HP Data Protector Express Bare Metal Disaster Recovery option software (one copy included with HP StorageWorks tape drive)	—	2

A typical networked environment with two offices

ExeMed is a small firm that designs and manufactures specialised medical equipment. It has 100 employees, two offices and a dedicated three-person IT team that looks after a network of seven servers: five in the suburban head office, and two in the second office located in the city's financial sector. These are mainly Intel® processor-based servers, including an HP ProLiant DL360 Server, several non-HP servers, and an HP Integrity rx4640 Server running the HP-UX 11i v1 operating system.

Recovery Time Objective:

If an outage occurs, ExeMed needs to recover data within eight hours.

Recovery Point Objective:

If an outage occurs, ExeMed needs to recover data from the previous day.

Other considerations:

Because ExeMed runs continuous business processes, backups must be performed frequently during the day, as well as nightly on specific servers at scheduled times.

LAN-based backup solution

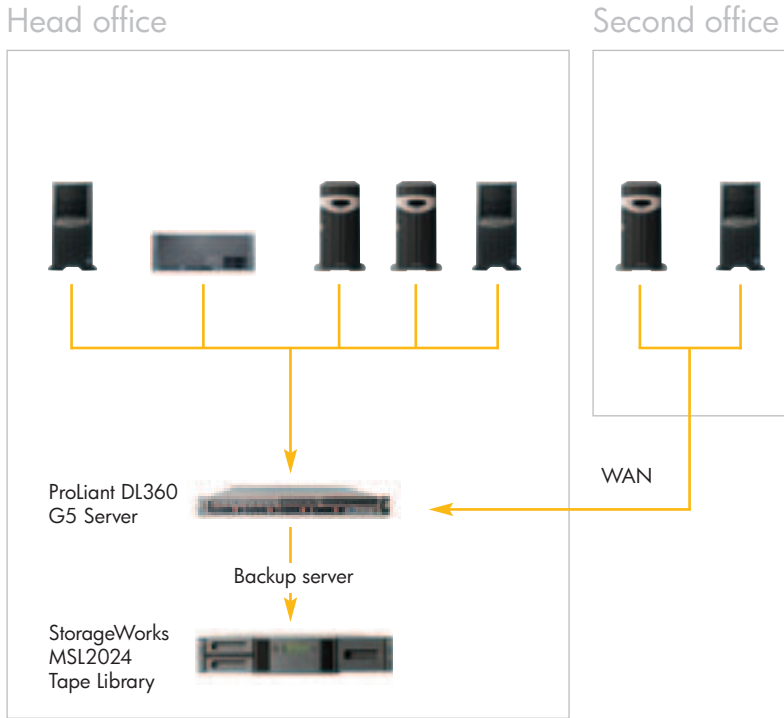
The company's data protection strategy is straightforward: incremental backups of 20 to 30 GB are performed each night over the LAN to an HP StorageWorks MSL2024 Tape Library with an HP StorageWorks Ultrium 1840 Tape Drive. Thanks to superdrive tape technology, each backup fits onto a single data cartridge that the IT manager can take home for off-site storage. A full backup (totaling more than 600 GB) is performed at weekends, with the tape library changing the cartridges automatically as required.

With its main supplier located on a different continent, the company's network must be available 18 hours a day so that the systems can be updated by the supplier during local business hours. That leaves only a six-hour window to complete the backup each night. The Ultrium 1840 Tape Drive is up to the challenge, backing up all the LAN's local office servers. By using LTO-4 Ultrium 1840 encryption, not only is data fully capable of being compressed and therefore maximising capacity, but encrypted backups can also be completed without a loss in performance. The two servers in the remote office are staged to a disk in the main office over the WAN using Data Protector Advanced Backup to Disk software, then copied to tape over the LAN along with data from the local servers.

Overall, the LAN-based solution has simplified IT management processes, allowing ExeMed to consolidate the backup from multiple servers onto a single device. For added simplicity, the MSL2024 tape library is housed in the same rack as the ProLiant DL360 Server, which manages the backup process in combination with HP Data Protector software.

'My backups need to be completed by 6 a.m., when the first employees arrive at the office. Moving up to the tape library means the whole cycle can be completed without human intervention, day in and day out.'

LAN-based backup solution



Typical configuration

Description	Part number	Qty.
HP StorageWorks MSL2024 1 LTO-4 Ultrium 1840 SCSI Tape Library	AJ033A	1
HP LTO-4 Ultrium 1.6 TB data cartridge	C7974A	24
HP Data Protector software	B6961AA	1
HP Data Protector Advanced Backup to Disk software	B7038AA	1

A typical environment for multi-tiered (D2D2T) data protection

Sabrestar is a mid-sized advertising agency that has four servers, each of which backs up to a stand-alone LTO Ultrium tape drive. This presents daily problems related to backup scheduling, backup completion within the window and tape media management (primarily tape rotation).

As more and more media are needed for each tape drive, costs continue to escalate. Furthermore, managing four individual backups puts undue strain on the company's limited IT staff. When backups fail, the staff must either rerun the previous night's backup (which affects server bandwidth and IT resources) or risk using an older backup copy.

Sabrestar need a solution that will enable them to consolidate their tape drives, yet still migrate much of their data to tape for off-site storage and compliance with regulatory requirements.

Recovery Time Objective:

If an outage occurs, Sabrestar needs to recover data within three hours.

Recovery Point Objective:

If an outage occurs, Sabrestar needs to recover data from the previous day.

Other considerations:

Sabrestar performs a full backup once a week, plus daily incremental backups during an eight-hour backup window at night. To reduce the strain on its IT resources, Sabrestar needs a better solution for restoring lost files quickly without having to retrieve tapes.

Disk-based backup solution

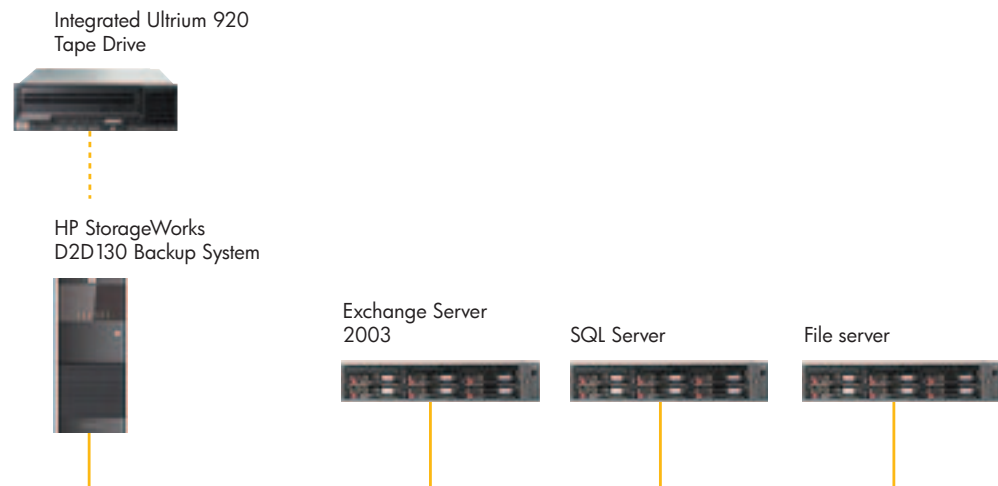
The traditional solution would be to transition the stand-alone tape drives to an automated solution, such as a tape autoloader. However, this could create further problems, such as trying to back up four servers to one autoloader in a given backup window. Additionally, restores would still be slow and tape media investments would continue to increase.

Adding a disk-based backup device such as the HP StorageWorks D2D130 Backup System to the environment will both automate and centralise the backup process – reducing the strain on IT resources – and will make it possible to restore files much more quickly. By accessing backup data from a centrally managed disk-based device, restore times can be reduced dramatically. Because data is readily available online, access can be gained much more quickly than with direct backup to tape. The backup window can be met because multiple backups occur in parallel, at the same time.

Because the D2D130 Backup System uses disk rather than tape media, Sabrestar would also see a decrease in their ongoing data protection costs, as well as fewer tape media management problems. Furthermore, the company could protect its existing investment in stand-alone tape drives by continuing to use them for off-site storage, disaster recovery and long-term storage. Finally, Sabrestar decided to use the D2D Backup System with the integrated Ultrium 920 Tape Drive; however, an existing external drive could also be used. This would allow them to copy or export backups directly to the LTO tape drive, reducing traffic on their LAN when moving data to tape for long-term storage and disaster recovery purposes.

'I have so much more time to focus on strategic projects now. The backups really take care of themselves with the D2D Backup System.'

Backup consolidation using a disk-based solution



Typical configuration

Description	Part number	Qty.
HP StorageWorks D2D130 Backup System with integrated Ultrium 920 Tape Drive	EH952A	1
HP Data Protector Express Backup Server Upgrade from Data Protector Express Single Server Edition Media and LTU	BB117ET	1
HP Data Protector Express Network Server Backup Agent LTU	BB121AA	2
HP Data Protector Express Agent for Microsoft Exchange Online Backup LTU	BB123AA	1
HP Data Protector Express Agent for Microsoft SQL Server Online Backup LTU	BB124AA	1
HP Ultrium RW data cartridge, 800 GB	C7973A	12

A typical environment for both online storage and backup consolidation – all in one

Salem Law is a company that has six servers, each of which uses its own direct-attached storage (DAS) for file and application data. Each server is backed up individually to a stand-alone tape drive. This situation results in inefficient capacity utilisation for the online production data and creates data protection challenges with backup scheduling and media management.

To help address the need for a scalable online storage solution while also simplifying their backup procedure, Salem is consolidating storage into an HP All-in-One Storage System and is using HP StorageWorks Tape and Storage Mirroring software to deliver a complete solution.

Recovery Time Objective:

If an application error occurs, Salem needs to recover data in minutes; in the event of a major outage, the company requires two-hour data recovery.

Recovery Point Objective:

Salem needs to recover data from the past hour. A major outage would require recovery of data from the previous day.

Other considerations:

Salem required a solution that could be implemented easily and managed by existing IT staff.

Simple online storage consolidation with integrated data protection

The HP All-in-One (AiO) Storage System combines the functions of a Windows file server (NAS) with an entry-level iSCSI storage array (SAN) while including integrated data protection software and a radically simple management interface designed for IT generalists who have no storage expertise.

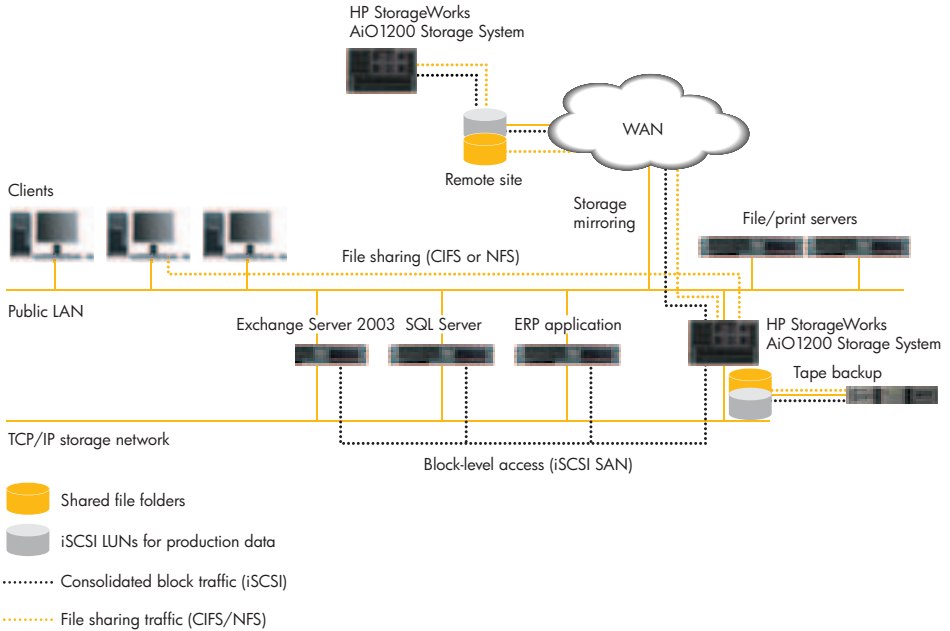
Using the AiO Storage System, Salem can serve files to client computers while also sharing capacity across multiple application servers. The system comes with a factory-installed copy of HP Data Protector Express software to protect online data and to manage the disk and tape backup domain for the other systems on the network. The AiO also uses the Microsoft Volume Shadow Copy Service (VSS) framework to capture disk-based snapshots for quick and easy restore to a previous point in time. When it is time to back up the data to disk or tape, the backup is initiated directly from a snapshot on the AiO array, so there is no backup window to contend with.

For additional protection, Salem chose to add StorageWorks Storage Mirroring software, which enables replication and failover if configured to another system at another location.

This new infrastructure is much more efficient than Salem's previous environment. The company is now able to add online capacity quickly for growing applications while also keeping data safe and secure.

'We looked at competing products, but found that the HP StorageWorks AiO system was the most affordable solution. It provides us with flexible storage that includes data protection, but it is still easy to manage.'

Storage consolidation using HP StorageWorks All-in-One Storage Systems



Typical configuration

Description	Part number	Qty.
HP StorageWorks All-in-One 1200 Storage System, which includes factory-installed HP Data Protector Express software	AG655A	2
HP Data Protector Express D2D2Any option software	BB130AA	1
HP Data Protector Express Drive Expansion software (1 incremental drive)	BB133AA	1
HP StorageWorks MSL2024 2 Ultrium 920 Tape Library	AH170A	1
HP Ultrium RW data cartridge, 800 GB	C7973A	24
HP StorageWorks Storage Mirroring AiO Edition software	T5446A	2

A typical environment for high availability and performance

A growing number of businesses place round-the-clock demands on their core data; one might be the IT manager at a company called Delvin Market Research. He wants to increase the availability and performance of the company's Microsoft SQL Server database while reducing backup cycles. To do this, he has decided to replace the existing direct-attached storage environment with a cost-effective, high-capacity SAN.

Recovery Time Objective:

If an outage occurs, Delvin Market Research needs to recover data instantly.

Recovery Point Objective:

Delvin Market Research needs to recover all data created prior to any outage.

Other considerations:

The SAN environment offers high scalability, availability and utilisation of disk resources, plus simple and centralised management. Delvin needs a backup and recovery solution to match.

Entry-level SAN backup solution

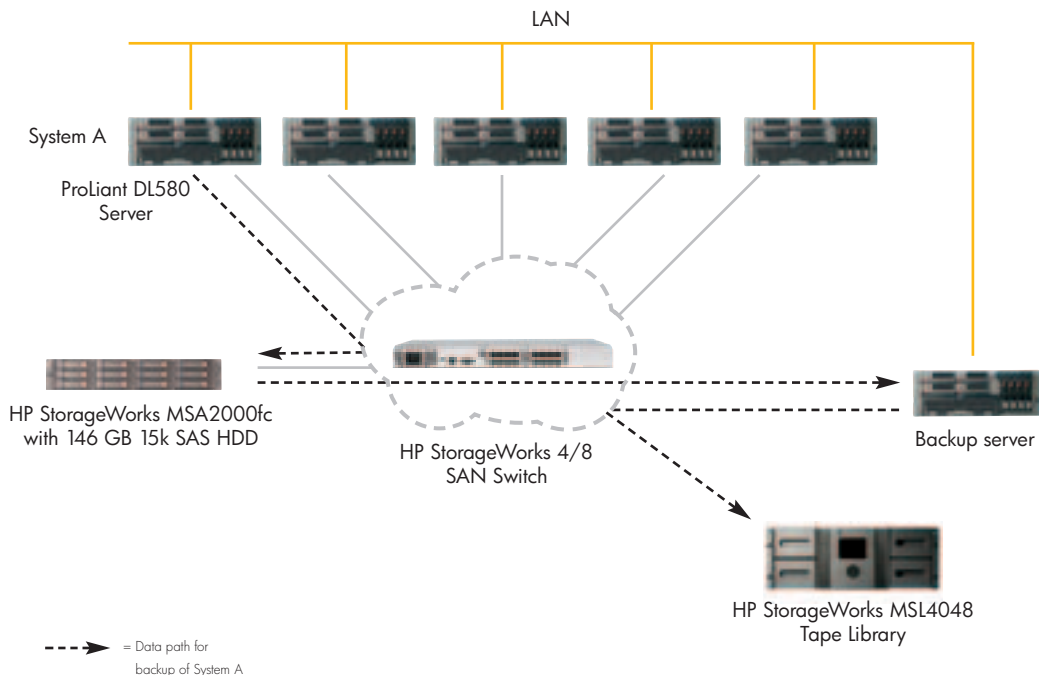
Taking advice and support from the experts at HP Services, Delvin based its solution on an HP StorageWorks 2000fc Modular Smart Array (MSA2000fc), five HP ProLiant DL580 Servers, an HP StorageWorks MSL4048 Tape Library with HP StorageWorks LTO-4 Ultrium 1840 Fibre Channel Tape Drives and selected HP storage software products. HP Data Protector software works as the core manager of the solution to monitor backup and restore operations quickly and easily, so system performance and staff productivity are increased significantly.

The LTO-4 Ultrium 1840 Fibre Channel Tape Drives deployed within the MSL4048 tape library provide more than enough performance for the daily backup operations, while the MSA2000fc array works seamlessly with HP StorageWorks Storage Mirroring software. This enables IT staff to replicate critical data for near-instant recovery following disaster.

With this solution, Delvin Market Research now has the technology in place to back up data more efficiently than ever – and to serve increasing customer demands by keeping more data online. Delvin also has the tools and utilities to recover any corrupted or lost data in minutes.

'Deploying this SAN solution has helped increase the availability and performance of our database fundamentally. We have managed to reduce our backup cycles significantly and are now able to recover our data in minutes if needed.'

Entry-level SAN backup solution



Typical configuration

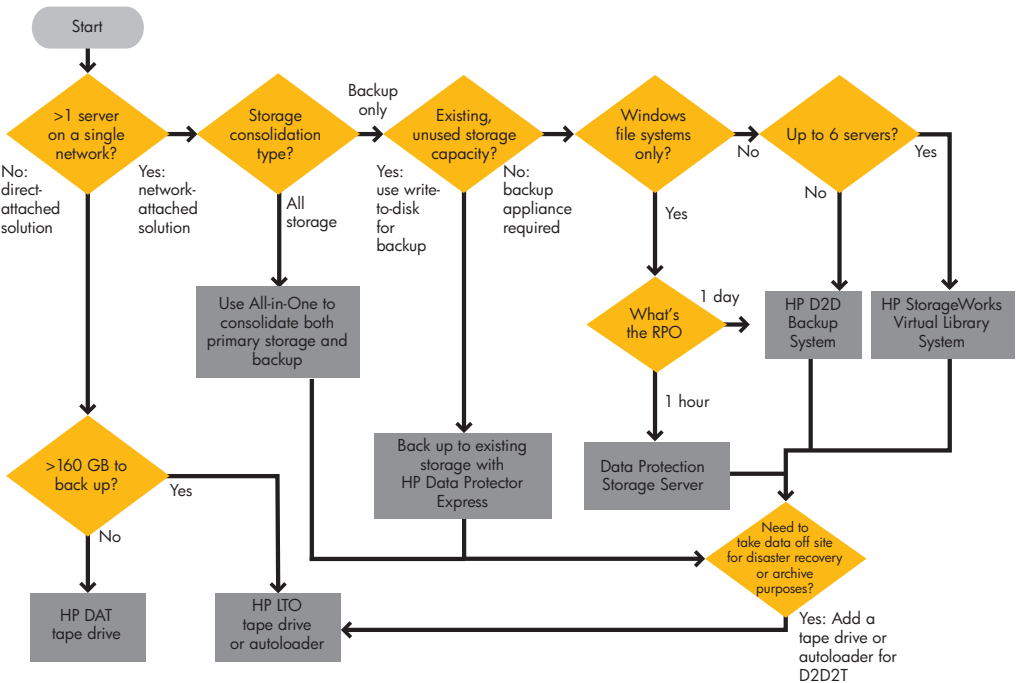
Description	Part number	Qty.
HP StorageWorks MSA2000fc	AJ743A	1
146 GB 15K universal SAS disk drive	AJ735A	8
HP StorageWorks 4/8 SAN Switch	A8000A	1
HP StorageWorks FCA2242SR 4 GB Fibre Channel, HBA	A8002A	6
HP 4 GB short-wave SFP transceivers	A7466A	8
HP 5 m LC/SC Fibre Channel cable	221691-B22	8
HP StorageWorks MSL4048 2 LTO-4 Ultrium 1840 4 Gb Fibre Channel Tape Library	AJ038A	1
HP Ultrium RW data cartridge, 1.6 TB	C7974A	48
HP Data Protector software	B6961AA	1
HP Data Protector SAN Drive Extension software	B6953AA	1
HP StorageWorks Storage Mirroring software	T5440A	5

Part 3: Choosing your products and services



HP provides a wide range of data protection solutions, from tape and disk drives to RAID and data mirroring, in combination with storage software to manage it. The decision tree shown below will help guide you to the right solution for your specific needs.

Choose a solution that fits your needs



HP StorageWorks tape-based technology solutions

The unique characteristics of tape-based storage make it the foundation of a solid data protection strategy. Because it is small and portable, tape storage allows you to take data off site, giving you protection against site-wide disasters, virus attacks, or equipment failures. Tape's low cost and long media life also make it an effective means for long-term data archiving. HP offers a full range of tape-based solutions, including tape drives, autoloaders and libraries.

HP StorageWorks tape drives

All HP StorageWorks DAT and Ultrium tape drives provide a complete backup solution that includes the following:

- **One-Button Disaster Recovery (OBDR)** – a unique HP feature that allows you to restore systems quickly and effortlessly with the touch of a single button
- **HP Data Protector Express Single Server Edition software** – an easy-to-use backup application to protect a single server
- **HP Data Protector Express Bare Metal Disaster Recovery software** – an option of Data Protector Express that creates bootable optical or tape media (with HP tape drives) from a full backup to automate recovery of a repaired ProLiant server after a disaster or serious failure
- **HP Library and Tape Tools (L&TT)** – a comprehensive suite of tape drive management utilities

HP StorageWorks DAT drives

DAT drives are ideal for entry-level business protection needs. They combine proven reliability with a low cost of ownership, helped by affordable DAT media. The range consists of 40 GB, 72 GB and 160 GB drives, available as internal, external and rack-mounted models.

HP StorageWorks Ultrium half-height drives

Half-height LTO Ultrium drives provide simple integration with workstations and servers while retaining the capacity of traditional full-height drives. Available in 200 GB, 400 GB, 800 GB and 1.6 TB capacities, they provide unique HP features such as dynamic data rate matching (DDRM) and a choice of SCSI or SAS interfaces.

HP StorageWorks Ultrium full-height drives

Full-height Ultrium drives combine a rugged design made for demanding 100 per cent duty cycles with outstanding performance. The HP StorageWorks Ultrium 1840 Tape Drive backs up 1.6 TB of data in less than two hours. Our full height Ultrium drives include DDRM, Write-Once, Read-Many (WORM) capabilities, data encryption for greater levels of information security (on LTO-4) and low power consumption. They are available in 200 GB, 400 GB, 800 GB and 1.6 TB capacities.

HP StorageWorks tape blades

Exclusive to HP BladeSystem c-Class enclosures, HP StorageWorks tape blades provide an integrated data protection solution for enclosures not connected to a storage area network (SAN). These tape blades provide direct backup of the adjacent server blade with network backup capability for all other storage residing within the enclosure.



DAT 160 USB tape drive



Ultrium 448 tape drive



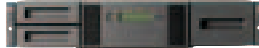
Ultrium 1760 tape drive



Ultrium 1840 tape drive



1/8 G2 autoloader



MSL2024 tape library



SB920c tape blade



MSL4048 tape library



MSL8096 tape library

HP StorageWorks tape autoloaders

Designed to automate media management and the backup process, autoloaders are ideal for environments that have outgrown stand-alone tape drives and have RTOs of hours to days. All models come with HP Data Protector Express Single Server Edition software and the HP Data Protector Express Bare Metal Disaster Recovery option.

HP StorageWorks DAT 72x10 Autoloader

For environments using DAT technology that have longer backup windows, the most cost-effective automated solution is the ten-slot DAT 72x10 autoloader, which provides more than a week of unattended backup for a single server, with room for a cleaning cartridge, too.

HP StorageWorks 1/8 G2 Tape Autoloader

HP 1/8 tape autoloaders are equally at home in a data centre rack or on a desk next to the office server. They are equipped with a choice of tape drives and house up to eight cartridges. Ideal for LAN environments, the 1/8 tape autoloaders have a high duty cycle that makes them suitable for backing up multiple servers.

HP StorageWorks tape libraries

For consistent, automated backup of large volumes of data – without the need for specialised resources or time-consuming processes – HP StorageWorks tape libraries provide a perfect solution. They are simple to manage, fit into multi-vendor environments easily, work well in LANs or SANs and come complete with intelligent tools to streamline backups and simplify management.

HP StorageWorks MSL2024, MSL4048 and MSL8096 Tape Libraries

These tape libraries provide dense, high-capacity storage without requiring much valuable rack space. The MSL4048 and MSL8096 tape libraries can handle the sort of backup and recovery jobs typically managed by larger tape libraries, thanks to a maximum compressed capacity of up to 153.6 TB when using HP StorageWorks Ultrium 1840 Tape Drives.² The libraries are perfect for businesses with remote offices because of their integrated Web-based management that allow them to be managed centrally.

² Assumes 2:1 data compression.

HP StorageWorks disk-based technology solutions

Disk-based backup has generated a lot of interest in the last few years because it can deliver real benefits to a business. Disk-to-disk (D2D) backup automates the backup process and makes it practical to perform more frequent backups – or even continuous data protection – thus meeting a more demanding RPO. Storing backup data online can provide quicker access in the event of data loss, and these fast restores improve the ability to meet a challenging RTO. To meet diverse business requirements, HP provides a number of different solutions for disk-based data protection.

While disk-based data protection can remove some of the human error and hardware problems that can affect a tape-based backup process, most environments require the additional protection of tape to protect against all types of risk. Two-stage backups, often called disk-to-disk-to-tape (D2D2T), combine the benefits of disk *and* the benefits of tape. HP's range of disk-based data protection solutions can all be combined with tape to provide the best of both worlds.

HP StorageWorks 1000i Virtual Library System

The HP StorageWorks 1000i Virtual Library System (VLS 1000i) is a disk-based storage solution that delivers disk-to-disk (D2D) backup through tape virtualisation, providing unattended backup and improved restore performance for all types of businesses. It meets the needs of growing businesses that need to protect their data (where off-site tape storage is not required), as well as those that need to enhance their current tape backup solutions.

The VLS 1000i solution supports up to 12 servers and is easy to set up, integrating seamlessly with existing Ethernet networked environments through the use of iSCSI connecting directly to a LAN. It also enables you to restore files in minutes rather than hours. To reduce the need for on-site IT resources in remote or branch offices, the VLS 1000i solution provides remote Web-based control, troubleshooting and management through a browser-based user interface.

HP StorageWorks D2D Backup System

The HP StorageWorks D2D Backup System provides reliable data protection for up to six servers in a single, self-managing device. Designed expressly for smaller businesses with limited IT budgets, the D2D Backup System automates daily backups, minimising the tasks associated with data protection management – an ideal solution if you have limited IT resources.

Because backup data is held online, this disk-based solution makes restoring lost or corrupted files a quick and easy process. Consolidating the backup of multiple servers means that there are fewer devices to manage, and the browser-based interface allows you to manage the device remotely from anywhere on your network.

This simple solution fits right into existing Windows and Linux environments, in many cases working with your current backup hardware and software. For disaster recovery purposes, existing tape drives can still be used to provide tape backups for off-site copies and disaster recovery, connecting to either the host or backup server, or by connecting the tape drive directly to the D2D Backup System. Existing backup software may be used because the D2D Backup System is managed as a tape device. For new installations, the D2D Backup System is available in a package that includes a Data Protector Express Software Kit with all the software needed to protect up to four servers.

For small businesses that require a better way to protect their data, the D2D Backup System provides reliable, automated backup of multiple servers.

HP All-in-One Storage Systems

Imagine a single solution that can provide shared storage for application servers, file serving for end-user clients and comprehensive data protection. These are the key functions of HP All-in-One (AiO) Storage Systems, and, together, they allow businesses to lower costs, increase efficiencies and respond to rapid data growth.

In addition to providing primary storage consolidation, an HP AiO Storage System can be used as a D2D backup target for other devices on the LAN. Each AiO Storage System includes a factory-installed copy of Data Protector Express software, making it a simple, affordable and reliable solution for businesses that need to simplify their total storage environment.

HP StorageWorks tape devices can be connected directly to the AiO Storage System to provide off-site, long-term archival and disaster recovery storage. HP StorageWorks Storage Mirroring software can also be installed on the AiO Storage System to enable replication and advanced disaster recovery between systems or across sites.

For more information about HP All-in-One Storage Systems, visit:

www.hp.com/go/aiostorage

HP data protection software products

HP provides backup and storage management software suites to suit all environments. For example, HP Data Protector Express software is designed for protecting the systems and data of single machines and small networks. For larger and more complex environments, there is HP Data Protector software.

The HP StorageWorks Storage Mirroring software prevents data loss due to failure, error, or disaster by providing replication of your Windows, Exchange and SQL data to another Windows server.

HP Data Protector software

HP Data Protector software enables rapid, automated and efficient backup and recovery over unlimited distances, from either disk or tape. It fully integrates with HP SAN solutions for a high level of business continuity and availability. Furthermore, Data Protector software allows you to reduce backup windows and secures high availability of data and systems by providing fully integrated Zero Downtime Backup and Instant Recovery.

Data Protector software delivers a superior price/feature ratio, with mid-to-large configurations costing 50 to 70 per cent less than its competitors. It also has a simpler licensing model, which reduces the number of part numbers you need.

With Data Protector 6.0 software, HP has introduced several innovative and unique new capabilities:

- **Virtual full capability:** This reduces the time and resources needed to perform full backups. Data Protector software also improves tape utilisation by using 'pointers' instead of duplicating data.



- **Instant, automated e-mail recovery:** Combining Microsoft VSS and replication technologies permits mail services to continue during backup. It also allows extremely fast recovery of terabytes of e-mail data to be performed.

- **Data encryption:** Data encryption is performed using 256-bit Advanced Encryption Standard (AES).

AES helps to protect data from unauthorised access and allows backups to meet all compliance and regulatory requirements for government agencies and financial institutions. Ideal for businesses where network backup is not secure or the cost of a dedicated encryption appliance is too high, Data Protector software reduces complexity and completes backup encryption on the client level, so that data is secure during transmission and while at rest. Key management is simple to use, secure and flexible.

For more information, visit the Data Protector software Web site at:

www.hp.com/go/dataprotector

HP Data Protector Express software

For smaller and less complex environments, Data Protector Express software is both powerful and easy to use. Both the Data Protector Express Single Server Edition software, which is based on Data Protector Express software, and the Data Protector Express Bare Metal Disaster Recovery option are included with all HP StorageWorks tape drives and autoloaders.

Simple and powerful

Data Protector Express software provides simple, affordable and reliable backup and recovery for file servers, application servers and Windows-based desktop systems. It runs in Windows, Linux and NetWare environments, and supports tape, disk, optical and removable devices as backup targets. Highlights include

- **Easy:** The Windows-like interface and wizards make creating, running and managing jobs easy and fast.
- **Reliable disk backup and restore:** D2D and D2D2Any backup use disk volumes as the backup target, providing fast single file restore performance, reliability and easy scalability.
- **Assured:** HP Data Protector Express software includes one year of HP support.
- **Secure:** Backup data can be encrypted easily and securely. If you lose a backup tape, the protected data is not compromised.

For more information on Data Protector Express software, visit:

www.hp.com/go/dataprotectorexpress

For more information on Data Protector Express Single Server Edition software (included with HP tape products), visit:

www.hp.com/go/dataprotectorexpress/sse

HP StorageWorks Storage Mirroring software

To prevent data loss from failure, error, or disaster, HP StorageWorks Storage Mirroring software provides replication and failover of your valuable Windows, Exchange and SQL data to another Windows server. Proactive replication is a key strategy that can be coupled with tape backup and/or snapshot technology for continuous data protection and point-in-time copies. Keeping data located at two sites with the StorageWorks Storage Mirroring server failover function means that your business can recover static and transactional data in seconds, without losing productivity.

HP StorageWorks Storage Mirroring software provides host-based, continuous replication for small to midsized businesses seeking an alternative to fabric or array-based replication. Patented replication and failover technology capture byte-level data changes continuously as they happen and replicate those changes to one or more target servers to any location – with no geographic limitations. StorageWorks Storage Mirroring software's flexibility, resource optimisation and application-specific protection enable you to solidify your data and disaster protection strategies.

For more information about StorageWorks Storage Mirroring software, visit:

www.hp.com/go/storageworks/storagemirroring

The value of HP media

HP data cartridges endure a continuous testing programme to guarantee the high levels of quality specified by HP. Data cartridges are ideally suited for backup and restore operations that have critical requirements for capacity, performance and cost.

The price of storage media is small compared to your need to save and store critical information reliably. That is why HP has a quality control programme that tests HP media, pushing them to extremes. Furthermore, each batch of media must pass these tests before it is shipped. HP also has 20 custom-built test chambers, in use around the clock, that emulate real-world environmental conditions in 70,000 tests and 1.3 million test hours a year. The goal is to make sure that every tape works reliably the first time and every time it is loaded into a drive.

HP's 20-year track record of saving and restoring more than one billion TB of data means that you can feel secure with HP storage supplies. In fact, HP is so confident of media quality that we guarantee the products for the lifetime of their use – up to 100 years of archival life.

If you measure the cost of your media in terms of the cost of lost data – not in the price per tape – you will need to ask yourself some different questions. How important is your business? Measure the value of successful backup and restore processes against the cost of a short-term disruption – or even a complete interruption – of your business. That is the true value of your media. Protect your investment with HP storage media. HP's media testing exceeds ANSI and ISO/IEC requirements, and maintains a defect level among the lowest in the industry.



Tested thoroughly on HP drives

HP is committed to providing a whole solution for our customers. That is why HP drives ship with everything you need – including the media. That is also why HP media are tested on HP drives more than on any other. From the moment you open the drive box through set-up, backup and the inevitable restore process – every element must meet HP's stringent requirements. When you purchase additional HP media to support your ongoing business needs, you know the product has met rigorous testing standards. You are also assured of compatibility. No matter which hardware you use, HP's exacting tests mean you will be able to back up your data successfully, so that the next time you restore them, your data will be there.

HP Services

HP Services provides support for each element of your IT environment, at every point of the IT life-cycle.

HP Care Pack Services: We care about IT

When it comes to keeping your business competitive, it is good to know that you are not alone. HP Care Pack Services mean expert advice and personalised, reliable IT support that suits you – at a price you can afford. Select from an easy-to-buy, easy-to-use line of packaged services that complement your staff and skills with HP-certified expertise. Our experience and insights help you focus your IT resources to optimise your business results. Choose from the following range of services:

- **Deployment Services** make sure your products are operational with minimal disruption to your business.
- **Hardware Support Services** deliver high-quality on-site and off-site support.
- **Software Support Services** provide direct access to HP Response Centres for rapid problem diagnosis and resolution, plus substantial savings on software updates.
- **Support Plus/Support Plus 24** provide an integrated set of hardware and software problem resolution features at predictable packaged prices.
- **Proactive 24 Service** is an integrated hardware and software support solution that combines proactive problem preventive measures with responsive technical assistance.
- **Critical Service** provides expert proactive services to keep your mission-critical hardware and software highly available, as well as rapid reactive support for seamless problem resolution.

Why buy an HP Care Pack?

These convenient service packages

- Reduce time to implementation and time to revenue return through installation and integration with your existing IT environment
- Give you direct access to HP-certified storage support teams, complemented by solution partnerships with leading storage suppliers for technical and problem-solving expertise
- Provide committed response times for SAN and NAS environments to improve performance and reduce the downtime risks of your data protection solution
- Ease budget planning and reduce your management costs with fixed-cost support that includes parts and labour

For more information about HP Care Pack services, visit:

www.hp.com/services/storage_carepacks

Further support

Education services

HP provides a range of training methods to fit your needs, including traditional instructor-led courses at one of our 120 training centres worldwide, on-site training customised to your needs, training at your facility, or even Remotely Assisted Instruction Learning that combines the best of traditional classroom training (including live instructors and labs) with the best of online training (no traveling required). Further, if you like learning on your own schedule, at your own pace, you can make use of e-learning opportunities on the award-winning HP IT Resource Centre, a 'learning community' with extensive on-demand resources that can be accessed 24x7.

For more information about these services, contact your HP sales representative, authorised HP business partner, or visit:

www.hp.com/learn/storage

Part 4: Complete your knowledge



Questions and answers

Q: Are HP storage backup products compatible with other manufacturers' servers?

A: All HP DAT and Ultrium tape drives, autoloaders and tape libraries, as well as disk-based solutions such as the D2D Backup System and VLS1000i are tested on leading third-party servers. This means that you are not tied to any particular vendor, and you can integrate multi-vendor products to your system as required. For specific information, visit: www.hp.com/go/connect

Q: Can tape drives back up multiple servers?

A: HP tape drives and autoloaders can back up multiple servers. The most common configuration is to attach the tape drive or autoloader to a backup server, and then use the backup software to schedule the backup of servers connected to the LAN.

Q: When should an autoloader or a tape library be considered?

A: When you want to automate your backup process and schedule backups on certain servers at specific times to reduce human intervention, an autoloader is ideal. An autoloader with a single tape drive will provide efficient, unattended backup.

For businesses with uncertain data growth or that require a high storage capacity, HP StorageWorks MSL tape libraries provide centralised backup to a single automated device. This frees up valuable IT resources and provides a complete backup and restore solution for small to mid-range environments – with or without a storage area network (SAN).

Q: What benefits can disk-based backup add to my data protection strategy?

A: HP disk-based backup devices provide the advantages of both tape and disk backup, making them ideal if you want a D2D or D2D2T solution. In short, they are backup storage products that integrate easily into current IT infrastructures. They can automate backups, improve backup and restore performance, and reduce media management problems (rotation, cataloguing, storage and replacement). By allowing you to consolidate multiple backups on a single network-attached device, they also provide a solution for distributed environments in which backups must be managed physically. This will give you better control, efficiency and reliability.

Q: Are the backup purchases made today adaptable for the future if I need to upgrade due to data growth or critical operations?

A: At HP, we continue to invest in key tape and disk technologies that provide our customers with a clear strategy for the future. HP's wide range of backup products allows you to consider alternative capacities and technologies as your needs change.

Q: How does the HP StorageWorks All-in-One Storage System compare to a dedicated disk-based backup device such as the D2D Backup System?

A: The All-in-One storage products are designed to provide online access to files using their NAS capabilities and structured databases using their iSCSI SAN capabilities. HP All-in-One Storage Systems provide integrated data protection for such online data, but they are not dedicated disk-based backup solutions. If you are looking for a dedicated disk-based backup solution for servers on your network, then a solution such as the D2D Backup System or the VLS1000i would be a good match for your needs.

Q: What backup applications do HP StorageWorks products support?

A: HP data protection hardware supports a wide range of backup applications and solutions. Included with all HP tape drives and autoloaders is a copy of HP Data Protector Express Single Server Edition software, which allows you to install and work with your backup device from initial set-up. For larger and more complex environments, HP recommends HP Data Protector software. HP also supports various third-party backup and recovery software products on its tape drives, autoloaders and libraries.

For a complete list of supported backup applications and tape drive compatibility, refer to: www.hp.com/go/connect

For more information about automated tape solutions and virtual libraries, visit:

www.hp.com/go/ebs

Q: Why should I use HP Data Protector Express software?

A: HP Data Protector Express software is an ideal solution for companies needing an easy-to-manage application for data protection and recovery. Its Windows-like interface makes backup and recovery as easy as selecting a file in Microsoft Internet Explorer. The software provides backup and recovery for file servers, application servers and desktops.

Q: Is the tape blade my only option for backing up data on my blade enclosure?

A: HP provides a wide range of data protection solutions for the HP BladeSystem c-Class enclosures. The tape blade is ideal for the remote office/branch office environment or for blade enclosures that are not connected into a SAN. For customers looking for external data protection solutions, HP provides both tape automation and virtual library systems.

For more information about tape blade compatibility, visit

www.hp.com/go/connect

Q: What are the benefits of data encryption in the Ultrium 1840 tape drive?

A: Backup data is compressed before encryption, maximising the use of tape media. The encrypted backups are completed without a loss in server performance because the processing is done by the tape drive.

Jargon buster

Disk-to-disk-to-tape (D2D2T)

D2D2T is a two-stage backup process that combines disk-based and tape-based data protection to achieve the benefits of both. Typically, a D2D backup is run during the backup window. The backup data will then be copied to tape in a separate operation during normal hours without affecting server operations.

Dynamic data rate matching (DDRM)

Dynamic data rate matching is a unique feature of HP Ultrium tape drives that allows the tape drives to adjust their speed continuously and dynamically to match the speed of the host and network. This prevents the stopping and starting that reduce overall performance and create wear and tear on both the drive and the media.

iSCSI protocol

iSCSI is a new networking protocol. It is similar to the Fibre Channel protocol, but it uses standard Ethernet-based IP (Internet Protocol) networks. iSCSI is especially useful for small environments with lower performance requirements.

Redundant Array of Independent Disks (RAID)

RAID is a method of writing data simultaneously over multiple disk drives. It is used in disk arrays for increased data protection and/or increased performance.

Snapshots, clones and mirrors

Usually deployed in 24x7 mission-critical environments, these are disk-based copies of data that reduce backup and restore time to just seconds. Because a 'snapshot' replicates pointers to data – not the actual data itself – it is virtually capacity free. When a snapshot is created, the array controller begins copying data to a clone – a full, identical copy of the data. A mirror is the same as a clone, but is located at a remote, second site for disaster recovery purposes.

Ultrium

Ultrium is a high-capacity tape format based on LTO technology. It is an open format used by multiple manufacturers that provides enhanced performance and reliability over earlier tape formats.

Virtual tape

Virtual tape is a disk-based technology that emulates one or more tape drives, autoloaders, or libraries. A virtual tape device appears to the backup software and other devices on the network as a physical tape device, making it easy to deploy in a traditional backup environment.

Write-Once, Read-Many (WORM)

WORM is a data storage technology that allows information to be written to storage media only once. It is used to prevent data from being altered or erased, and it helps organisations meet regulatory requirements for retaining data securely in an unalterable format. Data can be appended but not changed or overwritten.

Simply StorageWorks

Storage is easy when you choose HP.

For information about Simply Business Protection and Simply StorageWorks solutions, visit:

www.hp.com/eur/simply (Europe, the Middle East and Africa)

www.hp.com/apac/simply (Asia, Australia and New Zealand)

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