Ultimate Business Protection

The foundation of secure business

What will this guide do for you?

Data protection is one of the most important issues facing organisations today. To ensure continuity of your data in the event of any threat – it's vital that you have an appropriate data protection strategy in place.

In the past, data archives were maintained in libraries of paper documents, usually filed in secure storage areas such as vaults or file rooms. Today, even though data has moved from paper to an electronic format, the risks for long-term, up-to-date storage remain. As well as having to maintain data availability and minimise data corruption and loss, modern IT managers must also ensure continuous access to business applications – of which even a short interruption can impact your business's ability to perform its core function. As will be illustrated later in this guide, such events can have a devastating impact and, in many instances, can lead to the loss of significant revenue, loss of customers or even bankruptcy.

Today's advances in storage technologies offer many different choices for data protection and business continuity – from tape and disk drives to RAID and data mirroring, in combination with storage software to manage it. It is important to understand that these technologies are not standalone, and the greatest level of data protection may come from a combination of many different technologies working as one. Each approach has benefits and limitations, and the solution that's right for you will depend on a number of factors.

This guide will help you to determine which HP data protection solution is right for your environment – focusing specifically on direct-attach storage (DAS), network attached storage (NAS) and local area network (LAN) backup strategies.

If your organisation is looking for more of an enterprise-level solution, then please ask your local HP representative for a copy of our Ultimate Business Protection Enterprise Edition guide, in which we explore storage area network (SAN), network attached storage (NAS) and multi-level strategies using a combination of technologies. Please also refer to the HP Easy as NAS and My First SAN programmes – ask your local HP representative – which offer valuable information and insight into NAS- and SAN-based storage solutions.

Don't gamble with data protection – make the right choice.

Why is data protection important?

In the modern business world, data is everywhere – it's created and stored in huge volumes every day. Analysts at IDC estimate data growth at approximately 80% per year across all companies, both large and small. With reliance on data-rich application software, information and communications to generate revenue and optimise costs, businesses need to know that they can recover from any temporary loss of data, whatever the cause. So data protection becomes an essential part of an overall IT strategy, and not just a desirable feature.
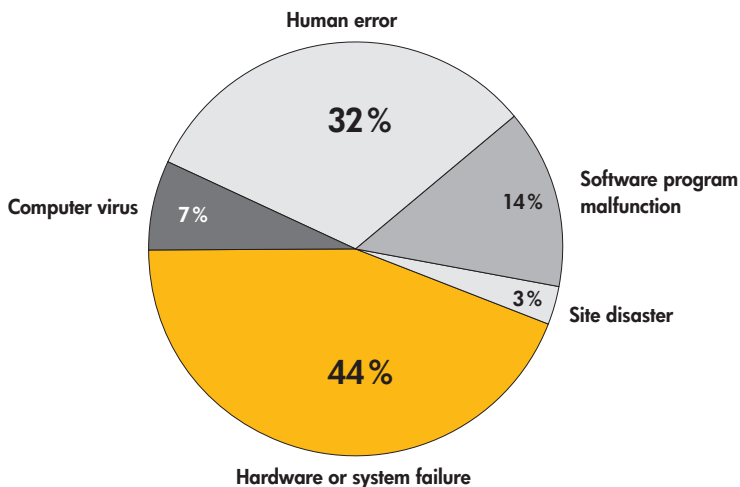
Most businesses have considered the impact of data loss at some point, but the majority still have no explicit strategy in place to deal with such an occurrence. Although implementing a data protection strategy does not remove the risks themselves, it does improve your ability to survive and recover. Later in this guide, different scenarios will be described that outline how the risks of data loss can be negated.

Research shows that the most prevalent cause of data loss and downtime is computer and system failure, but human error also accounts for a large percentage of problems.

The causes of system downtime can be numerous and are illustrated below:

Causes of downtime and data loss
Source: ZDNet by ADIC, October 2002

Human error 32%
Software program malfunction 14%
Site disaster 3%
Hardware or system failure 44%
Computer virus 7%

What happens when data isn't protected?

Downtime due to data loss or unavailability will have a significant impact on business operations and, in turn, on business profitability – whatever the size of your business:

- 93% of companies that lost their data centre for 10 days or more due to a disaster filed for bankruptcy within one year of the disaster.

Source: National Archives & Records Administration in Washington

- 70% of businesses that suffered catastrophic data loss were closed within 18 months.

Source: The U.K. Department of Trade and Industry

- The average large company spends between $100,000 and $1,000,000 in total ramifications per year for desktop-oriented disasters (both hard and soft costs).

Source: 7th Annual ICSA Lab's Virus Prevalence Survey, March 2002

Although less profound than complete data loss, even short interruptions to a business operation can have a major impact. A recent survey asked companies of all sizes to assess the likely cost of an hour's downtime:
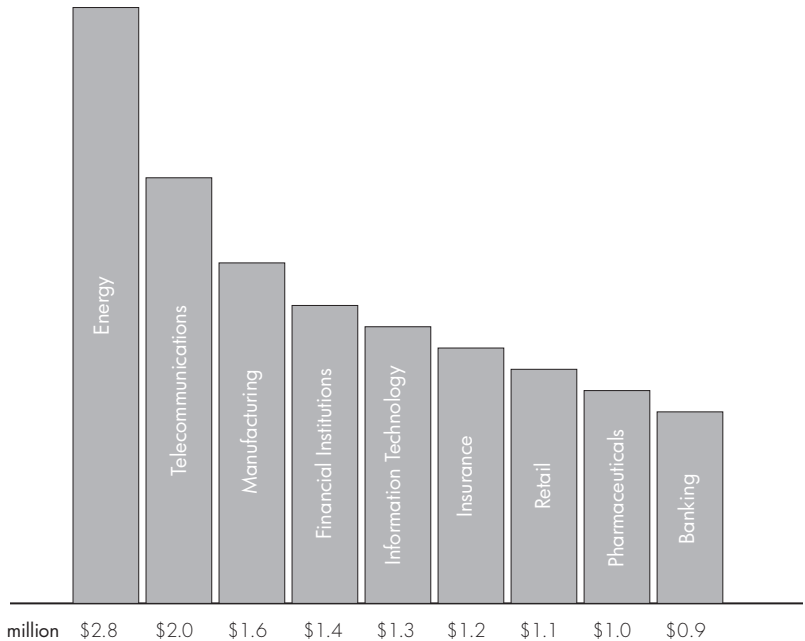
- 46% said it would cost them up to $50,000 per hour

- 28% said it would cost between $51,000 and $250,000 per hour

- 18% said it would cost between $251,000 and $1 million per hour

- 8% said it would cost them more than $1 million per hour

Source: 2001 Cost of Downtime Survey Results, 2001

Nearly 40% of SMBs do not back up their end users' PCs at all.

Gartner, SMB Server Storage Preferences and Investment Plans, August 2003

The graph below illustrates the average hourly cost of downtime for a range of larger companies across a range of industry sectors:

Industry	Cost (million)
Energy	$2.8
Telecommunications	$2.0
Manufacturing	$1.6
Financial Institutions	$1.4
Information Technology	$1.3
Insurance	$1.2
Retail	$1.1
Pharmaceuticals	$1.0
Banking	$0.9

Source: IT Performance Engineering & Measurement Strategies: Quantifying Performance Loss, Meta Group, October 2000

These averages indicate the scale of the problem facing large businesses. Smaller business can be even more vulnerable to such disasters as they have less access to IT and financial resources. And with perhaps fewer customers and less ability to withstand a short revenue interruption, your survival may be even more threatened.

You must assess your own vulnerability to data loss, and decide which solution offers the most effective and appropriate data protection for your business. This calls for the assessment of many areas, including:

• Identification of your critical business processes

• Optimum recovery point and time

• Loss of revenue due to unavailable data

• Loss of productivity due to unavailable systems

• Cost of restoring data

• Loss of customer and supplier database

• Loss of inventory data

• Loss of customers to your competition

From this assessment, the risks and impacts can be determined, leading you to a range of options to consider for your data protection solution.

What is HP's approach?

With such a high cost of downtime and data loss, it is vital that businesses invest in suitable data protection. HP takes a solution approach that focuses on three key customer objectives:

- **Recovery time** – how fast do you have to recover data if an outage occurs?

- **Recovery point** – how recent does the recovered data have to be?

- **Data capacity** – how much data has to be restored?

From this information, HP and its partners can work with you to determine which solution from our comprehensive data protection portfolio is most suitable.

We can implement solutions for the simplest to the most complex environments, running different operating systems and business applications, as well as those with multi-vendor hardware and software. And because we offer a wide range of industry-leading technologies, our solutions enable you to back up and recover virtually any type of data.

To manage the backup and restore process, HP provides HP OpenView Data Protector software that allows you to back up data while your applications are still running. You can restore anything from a single file to a whole server via a simple easy-to-manage graphical user interface (GUI). For more information on HP OpenView Data Protector, see page 24.

Choose the technology that fits

Data protection solutions are usually disk- or tape-based, dependent on how quickly and frequently you need to access and restore your data. HP has solutions for both, enabling you to choose the technology that fits your individual requirements.

Disk-based solutions

Disk-based backup is ideal for businesses that run 24 x 7 applications and require fast, random access to data and instant recovery from a disaster. HP provides leading disk-based technologies and features such as RAID, remote data replication and snapshots.

Tape-based solutions

Small to medium-sized businesses will more commonly choose tape-based backup. This offers the following benefits:

- Lower cost of ownership compared to disk-based backup

- Durable media that can be re-used and readily located off-site

- Easy data recovery

- Very reliable – back up and restore first time, every time

- Scalable to suit a wide range of environments

HP provides leading tape-based technologies – covering DAT, DLT VS, SDLT and LTO – in a leading range of products, such as standalone tape drives, integrated autoloaders and tape libraries. In this guide, we will focus particularly on tape-based technology and examine the choice of solutions available to meet today's varying business demands.

Guidelines for success

Whatever solution is best for you, following these simple guidelines will increase your level of protection.

• First, classify your data according to business relevance. Understand what data is business critical, requiring the highest level of data protection, and what data you can afford to restore at a later point in time.

• Perform a full backup to tape and remove tapes to an off-site storage location daily or weekly to reduce the risk of data loss.

• Test the solution's restore capabilities frequently to ensure backup integrity.

• Buy technologies with proven track records and clear product roadmaps – this will ensure backward-read compatibility in the future.
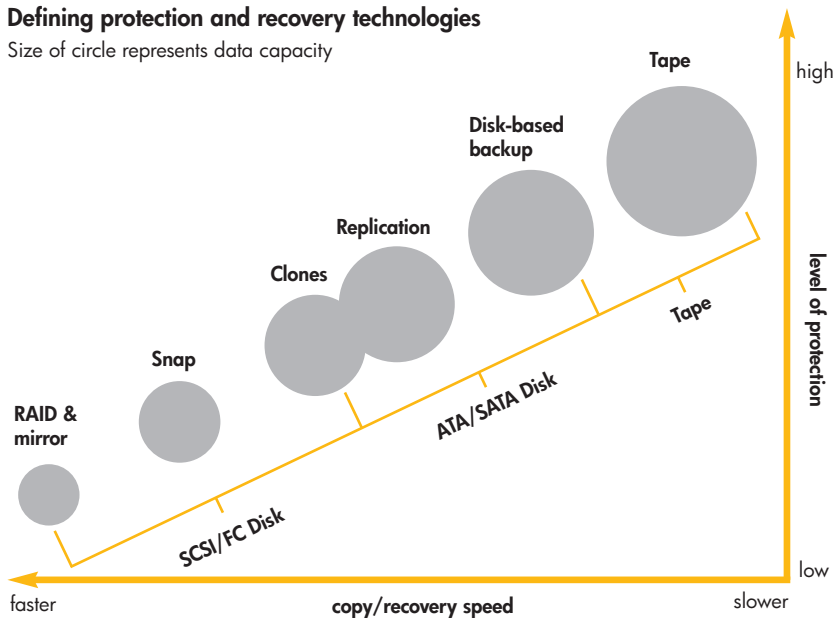
• Consider a multi-level data protection strategy consisting of disk-mirroring, snapshots and tape backup.

• Adopt archival practices for data that can be moved off-site for later retrieval. This increases efficiency by freeing up more costly primary disk storage space.

Data protection technology capabilities

The picture below illustrates the broad coverage of HP StorageWorks disk and tape products and shows the high-level attributes of each. The purpose of this picture is to indicate that there are three dimensions to selecting the optimum storage solution, depending on your needs for recovery speed, data capacity and level of protection. The decision tree (page 8) will help you position your requirement more precisely.

Defining protection and recovery technologies

Size of circle represents data capacity

RAID & mirror · Snap · Clones · Replication · Disk-based backup · Tape

SCSI/FC Disk · ATA/SATA Disk · Tape

level of protection — high / low

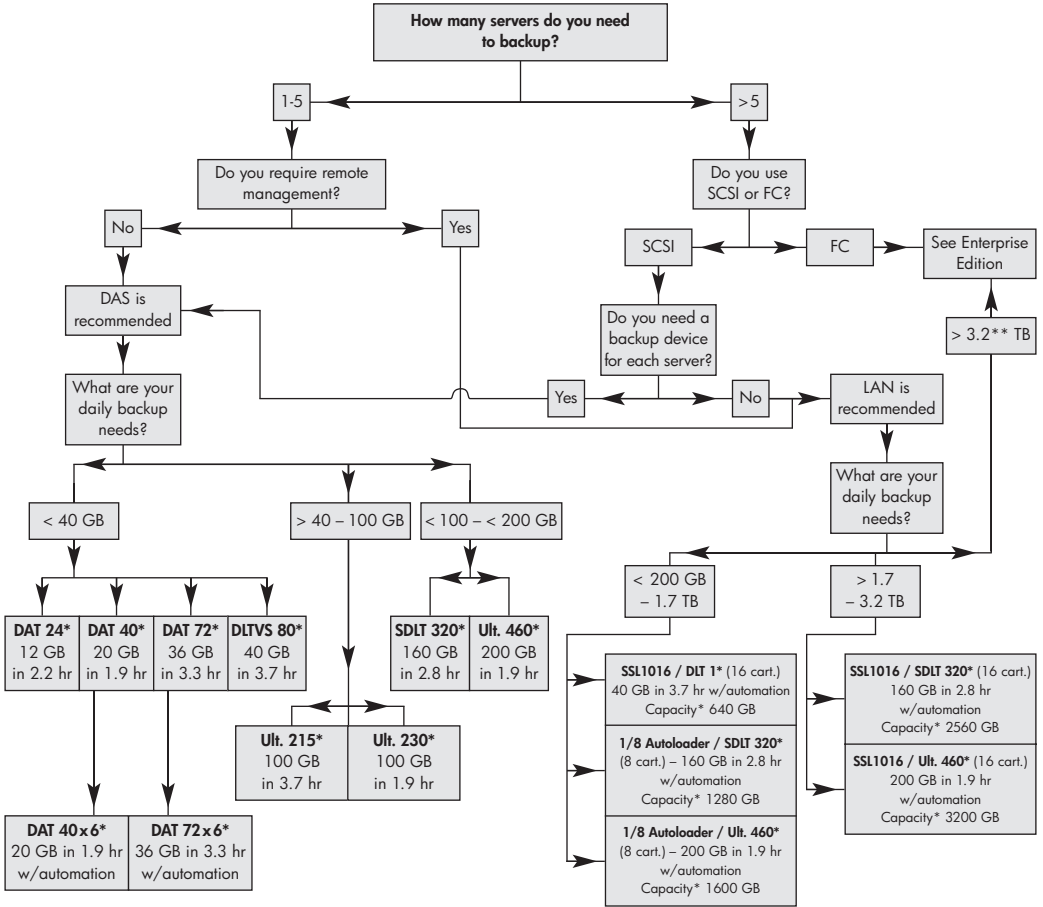copy/recovery speed — faster / slower

Which HP data protection solution is right for you?

This decision tree gives you a quick way of determining the best data protection solution for your specific business requirements.

If you are pointed to a DAS- or LAN-based solution then read on; we will explore these in more detail over the following pages.

If a SAN is recommended, then please refer to our Ultimate Business Protection Enterprise Edition guide, in which we look at three different SAN-based backup solutions for different needs.

How many servers do you need to backup?

- 1-5
  - Do you require remote management?
    - No → DAS is recommended
      - What are your daily backup needs?
        - < 40 GB
          - **DAT 24*** 12 GB in 2.2 hr
          - **DAT 40*** 20 GB in 1.9 hr
          - **DAT 72*** 36 GB in 3.3 hr
          - **DLTVS 80*** 40 GB in 3.7 hr
            - **DAT 40x6*** 20 GB in 1.9 hr w/automation
            - **DAT 72x6*** 36 GB in 3.3 hr w/automation
        - > 40 – 100 GB
          - **Ult. 215*** 100 GB in 3.7 hr
          - **Ult. 230*** 100 GB in 1.9 hr
        - < 100 – < 200 GB
          - **SDLT 320*** 160 GB in 2.8 hr
          - **Ult. 460*** 200 GB in 1.9 hr
    - Yes
- >5
  - Do you use SCSI or FC?
    - SCSI
      - Do you need a backup device for each server?
        - Yes
        - No → LAN is recommended
    - FC → See Enterprise Edition
      - > 3.2** TB
    - LAN is recommended
      - What are your daily backup needs?
        - < 200 GB – 1.7 TB
          - **SSL1016 / DLT 1*** (16 cart.) 40 GB in 3.7 hr w/automation Capacity* 640 GB
          - **1/8 Autoloader / SDLT 320*** (8 cart.) – 160 GB in 2.8 hr w/automation Capacity* 1280 GB
          - **1/8 Autoloader / Ult. 460*** (8 cart.) – 200 GB in 1.9 hr w/automation Capacity* 1600 GB
        - > 1.7 – 3.2 TB
          - **SSL1016 / SDLT 320*** (16 cart.) 160 GB in 2.8 hr w/automation Capacity* 2560 GB
          - **SSL1016 / Ult. 460*** (16 cart.) 200 GB in 1.9 hr w/automation Capacity* 3200 GB

This chart is only to be used as a quick reference guide. For an accurate assessment of drive selection, please refer to the HP StorageWorks Backup Sizing Tool (see page 26) or your local HP reseller.

*Full backup based on native capacity and transfer rates of drive.
**Multiple autoloaders can also accommodate capacities above 3200 GB. Please refer to product guides and HP StorageWorks Backup Sizing Tool for specific configuration information.

Choosing the right solution

We identified earlier that the fundamental questions that need to be addressed prior to choosing a data protection strategy are:

1) How quickly does your system need to be back online (recovery time)?

2) How recent does the data have to be (recovery point)?

3) How much data has to be backed up for a full recovery?

The decision tree (see page 8) takes these and other factors into account, and leads you to either a DAS- or LAN-based backup solution.

Over the following pages, these two categories are summarised in a simple-to-follow structure that should make it easy for you to decide if they meet your requirements. See how you match our customer profiles, or read the sample scenarios we've summarised and compare against your own infrastructure.

You may find that your business is suited to both a DAS and a LAN solution. In this case, think about whether your business is likely to grow in the near future and need more data capacity – if so, a LAN may be better. Or take a look at the considerations we've provided; they may help you decide.

DAS backup solution

A typical environment

Here we consider a scenario in which storage backup devices are connected directly to the server – a direct-attach storage (DAS) environment. This category represents the simplest environment in which to consider data protection solutions. If you fit into this category, you may have some or all of the following characteristics:

- No online business-critical operations

- Daily to weekly backup is acceptable

- Small number of networked servers (<5)

- Single operating system

- Want 'plug and play' compatibility

- Need simple and effective manageability

- Acquisition cost conscious

- Influenced by: storage capacity, performance, reliability, durability

An example of DAS-based backup

DAS-based solutions offer very cost-effective data protection for small multi-server environments using standalone tape drives. The choice of tape technology depends on the required native storage capacity (without data compression):

- DAT offers up to 36 GB

- DLT VS offers up to 40 GB

- SDLT offers up to 160 GB

- LTO offers up to 200 GB

Whichever is selected, all technologies are well established and ensure data is backed up and restored reliably. Media is readily available, durable and cost-effective.

In a typical implementation, the tape drive connects directly to the server or workstation being protected, with the backup management software residing on the server itself. If you have a larger system, you can choose to deploy an autoloader or library to automate the backup process. This brings significant resource savings and reliability improvements; backups can be managed from a single management console and all the media is contained within a single device, simplifying the whole process.

Considerations

There are a number of considerations in the DAS scenario:

- A standalone tape drive relies on a manual process for insertion of the tape media on a daily basis or at whatever frequency the business demands.

- An autoloader is recommended for environments that require higher capacity and automated backup.

- As the number of servers grows to meet new business demands, the complexity and cost of administration also grows, along with storage capacity requirements. Hence, a careful assessment of the selection of DAT, DLT VS, SDLT or LTO tape drives is needed.

- Because data is only backed up daily or less frequently, it is less suitable for businesses that have a critical need to restore operations from the point of loss.

The HP advantage

Choosing HP for your DAS backup solution offers many advantages, which are outlined below. Further information can be obtained from the online resources detailed on page 31.

- HP provides a full range of standalone tape drive products and media to meet your specific requirements. These include:

  - HP DAT tape drives and media (options from 12 to 36 GB native capacity)

  - HP DLT VS tape drives and media (40 GB native capacity)

  - HP SDLT tape drive and media (160 GB native capacity)

  - HP Ultrium tape drives and media (options from 100 to 200 GB native capacity)

  - Internal, external, hot-plug and rack-mount options are available on selected drives

- For larger environments within this category, HP has a range of autoloaders. These include:

  - DAT 6-slot Autoloader for entry-level requirements (up to 36 GB native capacity per tape media)

  - 1/8 Autoloaders for fast backup of additional capacity (up to 1.6 TB native capacity)

- HP tape drives and autoloaders incorporate two unique features that increase their operational advantages:

  - **One-Button Disaster Recovery (OBDR)** enables full and rapid restoration or replication of the server's operating system, software applications and data. It allows users to utilise their latest backup tape to recover from a server failure. (Available only on HP DAT and Ultrium tape drives and autoloaders).

  - **Hot-plug technology** allows users to add or remove tape drives from a server, without interrupting the operation of the server. This allows a user to rotate a single drive among many servers and thereby eliminate the need for one tape per server. (Available only on HP DAT drives).

With the addition of **HP OpenView Data Protector** software, you can automate your backup process and perform quick search and restore of the data that has been backed up (see page 24).

An HP DAS solution

HP StorageWorks	
Tape drives	**Autoloaders**
DAT 24	DAT 40x6
DAT 40	DAT 72x6
DAT 72	(available March 2004)
DLT VS80	
SDLT 320	1/8 Autoloaders
Ultrium 215	SSL1016 Autoloader
Ultrium 230	
Ultrium 460	

HP workstations and servers*
HP Workstations
HP ProLiant servers
HP 9000 servers
HP AlphaServers
HP Integrity servers

* For third-party server connect, visit:
 www.hp.com/go/connect

LAN-based backup solution

A typical environment

Here we consider a scenario in which storage backup devices are connected to a Local Area Network (LAN). This solution is targeted at a business, or specific department, that runs continuous business processes and has multiple LAN-connected servers and workstations. If you fit into this category, you may have some or all of the following characteristics:

• Online, continuous business-critical operations

• Unpredictable data growth

• Hourly to daily backup required

• Large number of networked servers (> 5)

• Multiple operating systems

• Legacy infrastructure

• Existing backup system deployed

• Looking for a scalable, cost-effective solution

• Need automation of backup

• Aware of technology and TCO issues

• Influenced by: storage capacity, performance, reliability, durability and availability

An example of LAN-based backup

The backup management server for this scenario can be connected to either the main LAN or a dedicated backup LAN. The latter is recommended for situations when performance degradation in the main LAN due to backup volume is unacceptable. Disk agents placed on the servers or workstations to be backed up push data over the LAN to the backup server, which then writes the data to tape.

This solution is perfect if you want to automate your backup process and schedule backups on certain servers at certain times without manual intervention. For a smaller network, you could use an autoloader containing a single tape drive or, for a larger network with a greater capacity requirement, you could choose a tape library. Compared with standalone tape drives, these offer significant resource savings and reliability improvements to the backup process.

Careful capacity and performance planning is required to determine the correct backup device. The first step is to calculate the daily backup volume from each server/workstation. In terms of performance, a dedicated gigabit backup LAN will transfer data at about 80 MB/sec (288 GB/hr), as long as the media server has the sufficient processing power.

Considerations

There are a number of considerations in the LAN-based scenario:

- A second, dedicated backup LAN is recommended for best overall performance and least impact on the main system LAN.

- This LAN-based data protection solution is limited to a maximum, practical data rate of 288 GB/hr.

- If a higher capacity, faster backup is required, a tape library featuring multiple drives is recommended. For details on a suitable tape library configuration, please refer to the Ultimate Business Protection Enterprise Edition.

The HP advantage

Choosing HP for your LAN-based backup solution offers many advantages, which are outlined below. Further information can be obtained from the online resources detailed on page 31.

- HP has a full range of autoloader products and media to meet your specific needs. These include:

  - HP SSL1016 Autoloaders with Ultrium 460, SDLT 320 or DLT1 drive and 16 media slots (maximum 3.2 TB native capacity with Ultrium 460)

  - HP 1/8 Autoloaders with one Ultrium 460/230 or DLT VS80 drive and eight media slots (maximum 1.6 TB native capacity with Ultrium 460)

  - HP DAT 6-slot Autoloader (maximum 36 GB native capacity per cartridge)

- HP StorageWorks MSL tape libraries – in combination with Ultrium or SDLT tape drives – offer unparalleled performance, investment protection and flexibility. They can be scaled with each other to provide 16 drives and 240 slots, allowing you to grow with changing needs. Plus, they're easy to manage via an intuitive GUI control panel and integrated remote web management.

- For the best performance and shortest backup window, use HP OpenView Data Protector to back up multiple servers in parallel to one or more tape drives.

An HP LAN solution

The arrows in this diagram represent the flow of data

Local Area Network*

HP StorageWorks NAS 1200s

SCSI

HP StorageWorks autoloaders and tape libraries:
DAT 6-slot Autoloader
1/8 Autoloader
SSL1016 Autoloader
MSL Series Tape Libraries

*This can either be a single LAN connection shared with servers and PC's or a dedicated LAN for backup.

Data protection for remote offices

A typical environment

Many companies struggle to protect their data efficiently in a geographically dispersed environment. While focusing data protection efforts on the central office, remote locations are often being neglected – made worse by a lack of local skilled IT personnel to manage the backup and restore process. The end result is critical data being left unprotected.

Centralising backup for remote offices

Centralising your backup is the obvious solution to save on management costs while gaining the advantages of consolidated backup in your central office. But with limited bandwidth between the remote and the central office, traditional LAN-based backup is not an efficient solution. Backup windows would have to be extensive to enable all data to be pulled through on a comparably slow link.

The ideal solution to this problem is mirroring the relevant data to a NAS file server in your central office using intelligent software designed specifically to work over slow links. Data from multiple remote sites can be replicated over an IP network to your central NAS server, which can then back up all data to a direct-attached autoloader or tape drive at full speed. And because data is constantly replicated to the NAS system, it can be almost instantly recovered following a system failure or disaster.

Considerations

• Capacity planning needs to be taken seriously to ensure all changed data can be replicated in time over the remote link.

• Clustering multiple NAS servers in the central office will provide higher availability.

• Consider the speed of the link between the central office and the remote site.

• The capacity of your autoloader needs to match your backup requirements.
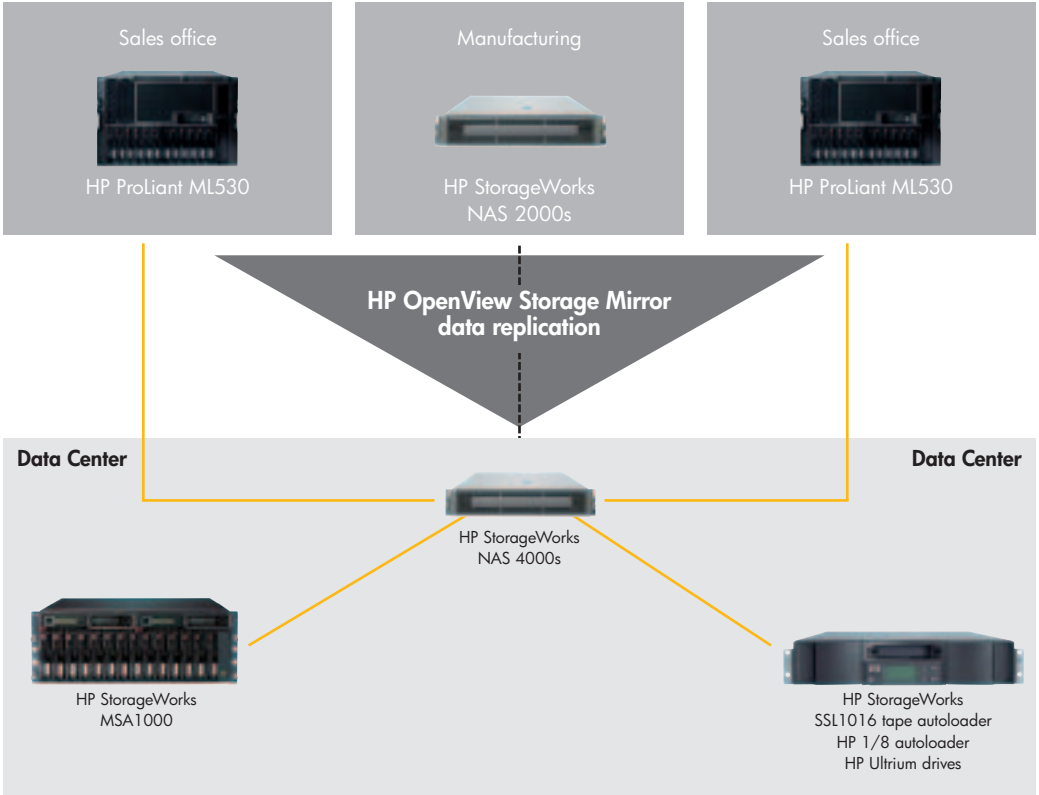
The HP advantage

HP StorageWorks NAS servers with HP OpenView Storage Mirror make optimal use of limited network bandwidth by copying only blocks of data that have changed at the remote site. Replication can be configured to use only a percentage of the available bandwidth – or to only run at off-peak times – enabling large amounts of data to be synchronised over slow links, while the faster connection is retained for day-to-day business activities.
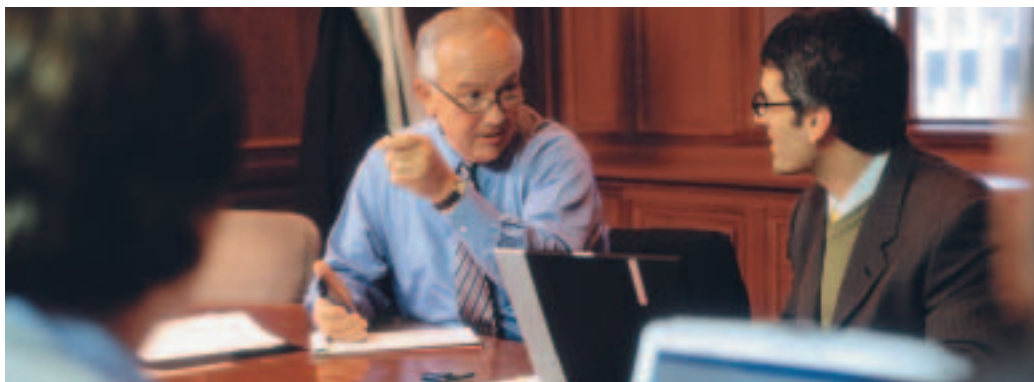
Recommended HP solutions:

• HP SSL1016 Autoloaders with one Ultrium 460, SDLT 320 or DLT1 drive and 16 media slots (maximum 3.2 TB native capacity with Ultrium 460)

• HP 1/8 Autoloaders with one Ultrium 460/230 or VS80 drive and eight media slots (maximum 1.6 TB native capacity with Ultrium 460)

• HP Ultrium drives (options from 100 to 200 GB native capacity)

For recommended HP NAS solutions, please visit: **www.hp.com/eur/easyasnas**

An HP remote office backup solution

Sales office	Manufacturing	Sales office
HP ProLiant ML530	HP StorageWorks NAS 2000s	HP ProLiant ML530

HP OpenView Storage Mirror data replication

Data Center   **Data Center**

HP StorageWorks
NAS 4000s

HP StorageWorks
MSA1000

HP StorageWorks
SSL1016 tape autoloader
HP 1/8 autoloader
HP Ultrium drives

Backup for mobile users

A typical environment

While servers are often protected very well, desktops and notebooks are often not. It is usually left to users to back up their own PCs, which frequently means no backup is performed at all – especially by mobile users who spend less time connected to the network.

Protection for mobile users

Mobile users often connect to their office network only for very short times – or via DSL from their home office – meaning a full backup of all data is usually not possible. To overcome this, the best strategy is to synchronise data directories automatically upon connection to the network. Only the changed data has to be synchronised, so the volume of data transfer is minimal.

Data is sent to a central NAS system optimised for file serving, which can handle synchronisation for hundreds of mobile users. Some NAS servers also offer snapshot technology, enabling users to keep several copies of each file during the day – and with Microsoft® Windows® XP, they can restore files themselves without help from the IT department, significantly reducing costs. Once data has reached the NAS server, it can be backed up to an autoloader or tape drive connected directly to it. In this instance, the NAS server is also the backup server.

The HP advantage

HP StorageWorks NAS servers are the ideal consolidation platform. They offer inexpensive disk capacity for backup staging purposes and act as the backup server at the same time. Virus scanning can also be integrated, keeping backup data clean. All HP NAS servers offer snapshot technology built into Windows Storage Server 2003.

Recommended HP solutions:

• HP SSL1016 Autoloaders with one Ultrium 460, SDLT 320 or DLT1 drive and 16 media slots (maximum 3.2 TB native capacity with Ultrium 460)

• HP 1/8 Autoloaders with one Ultrium 460/230 or VS80 drive and eight media slots (maximum 1.6 TB native capacity with Ultrium 460)

• HP Ultrium drives and media (options from 100 to 200 GB native capacity)

For recommended HP NAS solutions, please visit: **www.hp.com/eur/easyasnas**

An HP backup solution for notebooks and mobile users

LAN

HP StorageWorks NAS 2000s

WLAN

SSL 1016 Autoloader
1/8 Autoloader
DAT 6-slot Autoloader
SDLT tape drives
Ultrium tape drives

Technology overview

Ultrium – the highest standards in the industry

HP StorageWorks Ultrium tape drives are HP's premier family of backup devices. Based on the LTO Ultrium format – an open standard with a well-defined four-generation roadmap – HP Ultrium tape drives offer the best choice for investment protection. With ultimate reliability and ease of use in mind, even at 100% duty cycles, their rugged design builds on superior LTO technology and adds advanced features to create a new level of data protection.

HP's ultra-durable soft-load feature automatically positions the data cartridge, and the highly reliable HP leader-capture mechanism virtually eliminates lost leaders, increasing the success of your backup and restore operations. Plus, HP One-Button Disaster Recovery provides the easiest iway to restore data in the event of a disaster.

An exclusive feature of HP Ultrium tape drives, data rate matching allows the tape drive to adjust its transfer rate to the speed of its host dynamically and continuously. Data rate matching keeps the data to the drive "streaming" – reducing the need to rewind the tape back and forth to wait for the host (the "shoeshining" effect). This feature brings two big advantages: it optimises performance, getting the best performance possible for the environment, regardless of the speed of the host or the network, and it reduces wear and tear on both the drive and media, thus increasing reliability.

Support for a broad range of operating systems, backup software and servers makes HP Ultrium drives ideal for many direct-attach, over-the-network backup and SAN applications, especially in heterogeneous environments.

HP StorageWorks Ultrium 460 tape drive

The HP StorageWorks Ultrium 460 tape drive delivers a capacity of 400 GB of compressed data on a single cartridge. With a transfer rate of 60 MB/sec, the Ultrium 460 is the ideal choice for enterprise-class data protection needs.

HP StorageWorks Ultrium 230 tape drive

The HP StorageWorks Ultrium 230 tape drive is the high-performance, first-generation superdrive in the HP Ultrium family, capable of storing 200 GB of compressed data on a single tape at speeds of up to 108 GB per hour.

HP StorageWorks Ultrium 215 tape drive

As the entry point for HP's Ultrium family, the HP StorageWorks Ultrium 215 tape drive offers superdrive capacity in a compact half-height form factor, and can store 200 GB of compressed data on a single tape at up to 54 GB per hour.

HP StorageWorks DDS/DAT technology – meeting stringent demands

HP StorageWorks DAT drives are based on Digital Data Storage (DDS) format, the most successful tape backup format of all time, with an installed based of over 9 million drives. DDS leads the market in shipments because its balance of capacity, reliability and low cost meets the needs of so many users.

The affordability of DDS media helps keep the cost of DAT drive ownership low. And its small form factor means HP can offer a range of internal, external, hot-plug and rack-mount DAT drive models to fit almost any system. They come with HP One-Button Disaster Recovery, to restore systems quickly and effortlessly with the touch of a single button; a single-server copy of TapeWare XE, an easy-to-use backup and disaster recovery package for small businesses; and HP StorageWorks Library and Tape Tools, our comprehensive suite of tape-drive management utilities. Plus, HP's extensive testing programmes ensure that HP DAT drives are compatible with a wide range of servers, operating systems and backup software.

HP StorageWorks DAT 72 tape drive

The HP StorageWorks DAT 72 tape drive provides unprecedented levels of capacity, reliability and low cost of ownership in a DDS drive. The DAT 72 delivers a capacity of 72 GB on a single data cartridge and a transfer rate of 21.6 GB/hr (assuming a 2:1 compression ratio).

HP StorageWorks DAT 40 tape drive

The HP StorageWorks DAT 40 tape drive is a fast, dependable backup solution for smaller servers. This DDS-4 tape drive stores 40 GB of compressed data on a single cartridge at a rate of 21.6 GB/hr (assuming 2:1 data compression).

HP StorageWorks DAT 24 tape drive

The HP StorageWorks DAT 24 tape drive provides a dependable, entry-level solution for data protection in small servers and workstations. This DDS-3 drive has a compressed capacity of 24 GB and a transfer speed of 7.2 GB/hr (compressed).

HP StorageWorks SDLT and DLT VS technology – store and restore data with confidence

HP StorageWorks SDLT and DLT VS technology, recognised for its large capacities and fast retrieval rates, is ideal for customers who have standardised their data centre with HP StorageWorks DLTtape IV media. Now you can store and restore data with confidence.

HP StorageWorks SDLT 320 tape drive

HP StorageWorks SDLT tape drives are ideally suited for data centre and departmental backups where capacity and performance are critical. The SDLT 320 tape drive offers up to 320 GB (compressed) of storage capacity and 32 MB/sec sustained data transfer rate (assuming 2:1 compression). It gives you backward read/write compatibility to the SDLT 220 tape drive, and backward read compatibility to DLT tape drives.

HP StorageWorks DLT VS80 tape drive

The HP StorageWorks DLT VS80 tape drive is a mid-range backup solution. With an 80-GB capacity and 6-MB/s (compressed) transfer rate, this tape drive is the ideal solution for customers who are price sensitive and moving up from DLT 4000 with a need for backward read compatibility or for customers who will want to move up to SDLT in the future.

HP StorageWorks autoloaders – where versatility and flexibility meet

HP StorageWorks high-capacity, high-performance tape storage technology offers "future-now" functionality. And, as part of the HP total solution commitment, our autoloader technology combines versatility and flexibility for the most dynamic storage and backup solution available in the industry.

HP StorageWorks 1/8 Autoloader

HP StorageWorks 1/8 Autoloader provides cost-effective, easy-to-install unattended backup. Equally at home in a data-centre rack or on a desktop, the 1/8 Autoloader is equipped with either an Ultrium 460, Ultrium 230, SDLT 320 or DLT VS80 drive and can house up to eight cartridges. The Ultrium versions are ideal for consolidated backup on multiple servers where high throughput and capacity are required. For less stringent capacity and throughput requirements, the DLT VS80 version is recommended. All models come with HP OpenView Storage Data Protector, Single Server Edition for Windows 2000/NT/2003/XP.

HP StorageWorks SSL1016 tape Autoloader

Combining library features and capacity in a compact form factor, the HP StorageWorks SSL1016 Autoloader is in a class of its own. Ideal for replicated systems, the web-based management feature reduces dependence on local IT resources allowing central support of multiple sites. This increases manageability by enabling administrators to monitor and control the unit from across the room or across the globe.

With a native capacity of up to 3.2 TB, the SSL1016 tackles many jobs previously in the domain of entry-level libraries. Its 2U form factor saves valuable rack space, and provides a choice of storage capacity with support for Ultrium 460, SDLT 320 and DLT1 drives. Plus, it incorporates many tape library features such as bar-code reading – enabling short inventory times and simple media management – and bulk handling of media through two 8-slot magazines.

HP StorageWorks DAT 40x6 and DAT 72x6 Autoloaders

HP StorageWorks DAT Autoloaders offer a cost-effective entry-level backup solution for small to mid-range servers. They provide easy unattended scheduled backup with a media management tape rotation scheme based around six slots – allowing one tape backup per day, plus a weekly cleaning cycle. If a tape is full, the backup will continue on the next tape, offering scalability and backup assurance. Available as internal models for standard, full-height bays, or external models sitting on a desk, the DAT 40x6 and DAT 72x6 Autoloaders offer plug-and-play compatibility with top servers, operating systems and backup software.

HP OpenView Data Protector

Do you need to reduce costs? Do you want to maximise the effectiveness of your IT staff? HP OpenView Data Protector can do this easily by automating routine backup tasks and improving your disaster recovery strategy. And you can have all this enterprise data protection at an entry-level price!

A key benefit of OpenView Data Protector is that it can scale from a single server to a distributed enterprise environment with the same user-interface look and feel, and without major re-investment on training and software. It covers an extensive range of applications, operating systems and storage configurations – all in a single solution.

Ease of Use

Automatically initiates scheduled backup of your applications and files. It also simplifies the management of your backup devices and procedures – even multi-level backup and snapshots – via a simple graphical user interface.

Performance

Can run multiple backup jobs in parallel and make use of all available backup devices simultaneously to provide the best performance. In a SAN environment, it improves performance by sharing devices among all servers.

Open

Supports a broad range of hosts, applications, storage technologies and protection strategies, allowing your organisation to expand as your needs grow.

Flexible

Offers a simple and modular structure, and broad compatibility with platforms, operating systems, libraries, disks and topologies.

Scalable

The Single Server Edition provides a single solution that can scale from small to large enterprises in affordable steps.

First-class support

As with all HP backup and restore solutions, OpenView Data Protector is fully supported by HP, so you can rest assured that if anything happens, we're there to help.

Why HP data protection?

We have seen through the practical examples shown in this guide that small-to medium-sized businesses like yours can get Ultimate Business Protection from a variety of HP solutions – all designed to meet your individual requirements and budget. Plus, we offer free tools that help you choose the right configuration from the start and maintain your system once its up and running.

In addition, HP assures you of peace of mind with reliable solutions and comprehensive support. For example:

• At HP, we continually test our tape products with leading workstations, servers, operating systems and software to ensure full compatibility and reliable, trouble-free performance.

• We provide a single source for all your tape products, regardless of who provides your network hardware or your preference for operating systems or application software.

• You get a total solution. Our storage products support industry-leading backup applications, including HP OpenView Data Protector, that help eliminate unplanned downtime and recover systems in minutes.

• HP Services is always on hand to help you cut the cost and complexity of maintaining, managing and protecting your storage investments.

For more details on getting Ultimate Business Protection from HP, please visit: **www.hp.com/eur/ubp**

HP One-Button Disaster Recovery (OBDR)

Restore your entire system quickly and reliably from a disaster with HP One-Button Disaster Recovery. Simply insert your most recent backup tape to your tape drive and push one button to recover your operating system, applications, drivers and data.

Built into HP StorageWorks DAT and Ultrium tape drives, OBDR is the ultimate disaster-recovery product for small to medium servers. For more information, visit: **www.hp.com/go/obdr**

Configure your ideal solution

HP StorageWorks Backup Sizing Tool

Designing your backup solution is not a simple process, so HP makes it easier with the StorageWorks Backup Sizing Tool (SWBST). This web-based tool allows you to size and configure an ideal solution using specified information, regardless of the type and size of your environment. It can also periodically check that your solution is fulfilling the changing needs of your business. SWBST uses data from two sources:

• HP Enterprise Backup Solution Compatibility Matrix (tape library/autoloader certifications: **www.hp.com/go/ebs)**

• HP Direct Attach Tape Solutions Compatibility Matrix (tape drive certifications: **www.hp.com/go/connect)**

Download it today for free at Active Answers or at: **www.hp.com/go/swbst**

HP StorageWorks Library and Tape Tools (L&TT)

HP knows that you rely on your system to function at full capacity, and if downtime should occur, you need immediate corrective actions. We answer this challenge with a free diagnostic tool that's easy to install and operate. L&TT is a single, convenient program for proactive preventative maintenance and downtime analysis that sets industry standards in reliability and convenience.

Download it today at: **www.hp.com/support/tapetools**

Trust HP storage media for every backup need

Not all tapes are equal, nor will a single brand of tape always perform in the same way. The manufacture of storage media is complex, and the quality between different samples can vary greatly – even if made by the same company. Only a media-testing programme as deep and as wide as HP's gives you the best-quality media every time.

We test every batch of product that is destined to carry the HP brand. And we can, and do, suspend supply from our media manufacturers when their samples fail to meet HP quality standards – which are typically much higher than industry-standard logos. Unlike logo tests, HP brand specifications focus on multiple batches in multiple drives covering an array of environmental conditions.

Yet backup is only half the solution. What really matters is being 100% certain that you can recover data from HP media in an emergency. Therefore, we have 20 custom-built test chambers in use – running over 70,000 real-world tests for 1.3 million test hours a year to make sure that, whatever happens, data can be restored.

With pre-labelled DLT and Ultrium data cartridges, you can save the time and money of labelling up cartridges by hand. More important, our labelling systems are precision engineered to make sure the automation device retrieves the right tape, every time.

When you combine HP media with HP tape drives and tape automation products, world-class support is just a phone call away. So if the unthinkable happens, you can depend on HP-branded media to get things up and running again. Fast.

Q&A

1) Are HP storage backup products compatible with other manufacturers' servers?

All our DDS, DLT and Ultrium products are tested on leading third-party servers. This means you're 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**

2) How do I calculate the best backup storage solution for my business?

If you are you a small to medium-sized business, then consider the DAS- and LAN-based backup solutions presented in this guide. If you are an enterprise business that wants a SAN, then ask your local HP representative for our guide to Ultimate Business Protection for the enterprise. Once you've decided on the technology, use the StorageWorks Backup Sizing Tool at **www.hp.com/go/swbst** to configure and size your ideal solution.

3) Can DAT, DLT VS, SDLT and Ultrium tape drives back up multiple servers?

HP tape drives and autoloaders can back up multiple servers through the network. The most common configuration is to attach the tape drive or autoloader to a backup server, and through the backup software, schedule the backup of servers connected to the LAN (see LAN configuration example on page 15).

4) When should an autoloader be considered?

When you want to automate your backup process and schedule backups on certain servers at certain times to reduce human intervention, an autoloader is ideal. An autoloader with a single tape drive will provide efficient, unattended backup and – compared to using standalone tape drives – will save you resources and improve backup reliability.

5) Are the backup purchases made today future-proof if I need to upgrade due to data growth or critical operations?

HP continues to invest in key tape technologies, and work to provide our customers with a clear roadmap for the future. HP provides regular updates to our roadmaps and a continued commitment to supplying customers with the best-quality products in tape technology. Today, HP has a range of models that cover the needs of every business, from those with less than 40 GB of data to those that need scalability up to multiple TBs, which allows you to continuously consider alternative capacities and technologies to meet your requirements.

6) What backup applications does HP support?

HP supports a wide range of backup applications and solutions. Included with most tape drives and autoloader is a copy of either TapeWare or HP OpenView Data Protector, which allows you to install and work with your backup device right out of the box. For HP OpenView Data Protector, there are several upgrade options available that can assist you with making the backup process more robust and secure. For a complete list of supported backup applications please refer to: **www.hp.com/go/connect**

7) Why should I use HP OpenView Data Protector?

OpenView Data Protector enables you to reduce costs by automating routine tasks, thereby maximising the effectiveness of your IT staff. For the price of an entry-level product, it provides you with enterprise functionality. It's suitable for all environments, from a single-server business to a distributed enterprise, and it covers an extensive range of heterogeneous applications, operating environments and storage configurations.

Glossary

ATA/SATA (Serial) Advanced Technology Attachment
A new low-cost standard for connecting storage devices into computer systems. SATA is based on serial signalling technology, unlike the current IDE (Integrated Drive Electronics) interface that uses parallel signalling, and offers thinner, longer and more flexible cables.

Compressed capacity
The amount of data a storage device can store using a compression procedure in which redundant information is removed from the data in order to reduce the number of bits required to represent it. Typical compression ratio for tape drives is 2:1, meaning the storage device can hold twice its native capacity. However, actual compression is highly dependent upon the type of data, and can be more or less than 2:1.

DAT – Digital Audio Tape
A term used interchangeably with DDS. Refers to the technology originally used for audio recording, which has since been adapted for data storage.

DDS – Digital Data Storage
The prevalent tape-drive technology for small and medium business environments.

DLT – Digital Linear Tape
A proprietary tape technology now superseded by SDLT.

L&TT – Library and Tape Tools
An HP tool that aids the troubleshooting and configuration of tape drives.

Native capacity
The total usable volume of bits and bytes that a storage device can hold.

SCSI – Small Computer System Interface
A popular server interface standard for fast and flexible connection of a variety of devices to a host computer. SCSI standards define both the physical connections (cables and connectors) between the devices and the protocols they use to communicate with each other.

SDLT – Super Digital Linear Tape
A new proprietary tape technology that extends the life of DLT.

Ultrium
A tape format based on LTO technology. Ultrium is the fastest-growing tape format for mid-range and high-end backup.

For more information

Ultimate Business Protection from HP.
Find out more at: **www.hp.com/eur/ubp**

To configure the ideal data protection solution
with the HP StorageWorks Backup Sizing Tool,
visit: **www.hp.com/go/swbst**

For information on HP One-Button Disaster
Recovery, visit: **www.hp.com/go/obdr**

A current list of supported products and
compatible tape drives is available at:
www.hp.com/go/connect

Download HP StorageWorks Library and Tape
Tools at: **www.hp.com/support/tapetools**

For more information on HP tape automation
products go to: **www.hp.com/go/automation**

For more information on HP tape drives, go to:
www.hp.com/go/tape

Interested in NAS? Visit the Easy as NAS
programme at: **www.hp.com/eur/easyasnas**

Thinking about a SAN?
Ask your local reseller for a copy of the
My First SAN solution guide

Find out more about
Ultimate Business Protection from HP at
www.hp.com/eur/ubp