Compaq StorageWorks™

Data Protection Guide

Volume 4

COMPAQ
Inspiration Technology

Contents

Your first step toward smarter data protection

Enterprise Storage is becoming one of the most critical IT issues any business faces. New applications are more data-intensive than ever. Consumption of disk storage is rising exponentially. And – like never before – your data is absolutely vital to the day-to-day operation of your business. You may be protecting that data against drive failures with RAID or other fault-tolerant systems, but that won't protect you against deleted files, natural disasters or theft the way a rock-solid backup system can. But where do you get started? And how do you choose the right backup technology? By picking up this guide, you've taken the first step.

Compaq created this guide to give you a sensible, manageable approach to creating a backup strategy for your enterprise. Because once you understand your business needs, we're quite confident you'll make the smart choice when it comes to backup solutions: Compaq.

Six reasons why there's only one brand to choose

1. Compaq knows storage –

As the largest provider of multi-user storage* across all markets, including Microsoft® Windows® NT,® Microsoft Windows 2000, UNIX and Novell NetWare, Compaq understands that backup is a vital part of your storage strategy. So you can count on us to deliver the right solutions for all your enterprise backup needs.

2. Compaq backup solutions are optimized specifically for your servers –

Compaq backup solutions integrate and perform with your Compaq servers and NAS appliances better than any other brand. Selected, tested and tuned by Compaq engineers specifically for optimal performance with Compaq servers, our backup solutions give you the maximum reliability and performance you need.

3. Compaq backup solutions are proven with software you already rely on –

Our industry-leading partnerships with backup software vendors like Computer Associates, VERITAS Software, Tivoli and Legato are some of the strongest in the business. So you're assured seamless integration and ultimate reliability with your backup software. You're also assured compatibility with your operating systems – whether you run Microsoft Windows NT, Microsoft Windows 2000, Novell NetWare, Compaq *Tru64*™ UNIX, *Open VMS*, Linux, HP-UX, AIX or Sun Solaris, so implementation is quick, easy and nondisruptive to your users.

4. Compaq backup solutions provide choices for all your needs –

From cost-effective backup and restore for individual workstations, to massive, enterprise-level automated solutions, to customized consulting services, Compaq gives you options from end to end. With new technologies such as Fibre Channel, distance and speed limitations are no longer an issue. Compaq will provide you with an optimized data protection solution for direct- or fibre-attached environments. A total Compaq backup solution means protection, performance and smooth integration across your entire business – plus one-stop shopping for products, service and support.

5. Compaq backup solutions come with great Compaq quality –

Although it's unlikely you'll ever need it, Compaq backup solutions come with a warranty you can count on. All Compaq tape libraries carry a three-year limited warranty. All other Compaq backup products are warranted for three years for parts. Once installed into a Compaq system, the product carries the remainder of the warranty period for the Compaq product in which it is installed.

6. Compaq backup solutions provide a complete, end-to-end non-disruptive solution for departments and data centers.

The Non-Disruptive Backup Solution provides a fully tested, characterized backup infrastructure for Windows NT/2000 that enhances the application availability of business-critical systems. Today's business model increasingly requires 24x7 data and application availability, with little time for a backup window. The Non-Disruptive Backup Solution provides a complete backup infrastructure that offloads backup responsibility from the application server, increases time for profit-generating activities, simplifies backup implementation and management, ensures data integrity, and improves the availability of Oracle and Microsoft Exchange.

*Based on combined 1998 revenue.
IDC Flash #17812 – January 1999.

Designing your backup solution

Investing in a particular backup and restore technology without closely analyzing your needs can end up costing you a lot – either in wasted resources or insufficient solutions. Taking a methodical approach to planning will pay off in the end, and make choosing the right technology simple. Here are the basics.

1. **First, you'll want to conduct a backup needs analysis for your environment.** Determine what information needs to be protected and where it resides. A few questions to ask yourself include:
   - Is there any storage to which you may not have rights, but which is part of the network to be protected?
   - Is the environment growing and likely to need more capacity soon?
   - How critical is the information to your business? Mission-critical data will require a higher level of protection and accessibility than less critical databases.
   - How many generations of backup do you want to keep? If you're comfortable overwriting your only current backup, you may be able to save money on media.
   - Is it convenient for your users to have the system shut down for backup? Do you need to address the needs of international users?
   - If the environment is 24x7, when will a performance slowdown cause the least disruption?
   - Are there special considerations such as storage consolidation, distance requirements between data centers or shrinking backup windows?

2. **Next, you'll create backup "domains,"** manageable sub-segments of the production server networks, each with a dedicated backup server with one or more tape drives or tape libraries.
   - Identify the acceptable backup window for your application network.
   - Identify the level of bandwidth available in your backup environment (i.e., local or over the network at 10 or 100 MB/s Ethernet or over Fibre Channel).
   - Select the maximum size of backup domains to enable you to reach your desired backup window.

   [Quantity of data ÷ network performance ÷ backup window = number of domains]

3. **Now you can choose a backup solution for each backup domain.** With your backup window and capacity in mind, the charts on the next two pages will help you determine the type of technology you'll need to achieve your goals.

Example

You need to back up a 1 TB accounting network in less than eight hours. Network bandwidth performance is about 15 GB/hr. As a single domain, the network would require 67 hours of backup time. So to achieve the eight-hour window, you will need to divide the network into ten domains of 100 GB each, which equates to 150 GB/hr. Those domains can now be backed up simultaneously – all in under seven hours.

For detailed sizing information for your SAN-based Environment, access the EBS Sizer Utility at compaq.com

Choosing the tape storage device

Backup window

Backup capacity

GB/hr	1 Hour		2 Hour		4 Hour		8 Hour		16 Hour		24 Hour	
0 - 4 GB	One 12/24 DAT Drive	One 20/40 DAT Drive	One 12/24 DAT Drive	One 4/8 DAT Drive	One 4/8 DAT Drive	One 4/8 SLR Drive			One 4/8 SLR Drive			
5 - 8 GB	Two 12/24 DAT Drives	One 20/40 SLR Drive	Two 12/24 DAT Drives	Two 4/8 DAT Drives	One 4/8 DAT Drive	One 4/8 SLR Drive			One 4/8 SLR Drive			
9 - 16 GB	One AIT 35 Drive	Three 20/40 DAT Drives	Two 12/24 DAT Drives	One 20/40 DAT Drive	Two 4/8 DAT Drives	One 12/24 DAT Drive			One 4/8 SLR Drive			
17 - 48 GB	One or Two 35/70 DLT Drives	One or Two AIT 50 Drives	Three 20/40 DAT Drives	One AIT 50 Drive	Two 20/40 DLT Drives	Two 20/40 DAT Drives	One AIT 35 Drive	One 20/40 DLT Drive	One 20/40 DAT Drive		One 20/40 DLT Drive	One 12/24 DAT Drive	One 20/40 DLT Drive	One 12/24 DAT Drive
49 - 90 GB	Three 35/70 DLT Drives	Three AIT 50 Drives	Eight 20/40 DLT Drives	Two 35/70 DLT Drives	Two AIT 50 Drives	Four 20/40 DLT Drives	One 35/70 DLT Drive	One AIT 50 Drive	Two 20/40 DLT Drives	One AIT 35 Drive	One 20/40 DLT Drive		One 20/40 DLT Drive	
91 - 180 GB	One DLT Tape Array II			Three AIT 50 Drives	Three 35/70 AIT Drives	Eight 20/40 DLT Drives	Two 35/70 DLT Drives	Two AIT 50 Drives	Four 20/40 DLT Drives	One 35/70 DLT Drive	One AIT 50 Drive	Two 20/40 DLT Drives	One AIT 35 Drive	One 20/40 DLT Drive	One 20/40 DLT Drive	
181 - 360 GB	Two DLT Tape Array II			One DLT Tape Array II			Three 35/70 DLT Drives	Three AIT 50 Drives	Eight 20/40 DLT Drives	Two 35/70 DLT Drives	Two AIT 50 Drives	Four 20/40 DLT Drives	One 35/70 DLT Drive	One AIT 50 Drive	One 20/40 DLT Drive	One 35/70 AIT Drive	One 20/40 DLT Drive
361 - 720 GB				Two DLT Tape Array II			One DLT Tape Array II			Three 35/70 DLT Drives	Three AIT 50 Drives	Eight 20/40 DLT Drives	Two 35/70 DLT Drives	Two AIT 50 Drives	Four 20/40 DLT Drives	One 35/70 DLT Drive	Two AIT 35 Drives	Four 20/40 DLT Drives
721 - 1000 GB							Two DLT Tape Array II			One DLT Tape Array II			Three 35/70 DLT Drives	Three AIT 50 Drives	Eight 20/40 DLT Drives	Two 35/70 DLT Drives	Two AIT 50 Drives	Four 20/40 DLT Drives
1001 - 2000 GB										Two DLT Tape Array II			One DLT Tape Array II			Three 35/70 DLT Drives	Three AIT 50 Drives	Eight 20/40 DLT Drives
2001 - 3000 GB													Two DLT Tape Array II					

Choosing the automated tape storage device

Backup window

Backup capacity

GB/hr	1 Hour		2 Hour		4 Hour		8 Hour		16 Hour	24 Hour
0 - 4 GB	One 1-Drive TL881 MiniLibrary	One 12/24 DAT Autoloader	One 2-Drive TL881 MiniLibrary				One 12/24 DAT Autoloader			
5 - 8 GB	One 2-Drive TL881 MiniLibrary	One 20/40 DAT Autoloader	One 2-Drive TL881 MiniLibrary				One 12/24 DAT Autoloader			
9 - 16 GB	One 2-Drive TL881 MiniLibrary		One 2-Drive TL881 MiniLibrary	Two 20/40 DAT Autoloaders	One 1-Drive TL881 MiniLibrary	One 20/40 DAT Autoloader	One 1-Drive TL881 MiniLibrary	One 12/24 DAT Autoloader		
17 - 48 GB	One 2-Drive SSL2020 MiniLibrary	One 2-Drive TL891 MiniLibrary	One 2-Drive TL891 MiniLibrary	One 1-Drive SSL2020 MiniLibrary	One 1-Drive TL891 MiniLibrary		One 1-Drive TL881 MiniLibrary			
49 - 90 GB	One 5-Drive TL895 Library	One 2-Drive & One 1-Drive SSL2020 MiniLibrary	One 2-Drive SSL2020 MiniLibrary		One 1-Drive TL891 MiniLibrary	One 2-Drive TL881 MiniLibrary	One 1-Drive TL881 MiniLibrary			
91 - 180 GB	One 7-Drive TL895 Library	One 10-Drive ESL9326D Ent. Library	One 5-Drive TL895 Library	Two 2-Drive SSL2020 MiniLibraries	One 2-Drive SSL2020 MiniLibrary	One 2-Drive TL895 MiniLibrary	One 2-Drive TL881 MiniLibrary		One 1-Drive TL881 MiniLibrary	
181 - 360 GB	One 12-Drive ESL9326D Ent. Library	One 8-Drive ESL9198DX Ent. Library	One 7-Drive TL895 Library	Two 2-Drive SSL2020 MiniLibraries	One 5-Drive TL895 Library	One 2-Drive SSL2020 MiniLibrary	One 1-Drive SSL2020 MiniLibrary	One 2-Drive TL881 MiniLibrary	One 1-Drive TL881 MiniLibrary	
361 - 720 GB	One 16-Drive ESL9326DX Enterprise Library		One 12-Drive ESL9326D Enterprise Library		One 5-Drive TL895 Library	One 6-Drive ESL9326D Enterprise Library	Two 2-Drive TL891 MiniLibraries		One 1-Drive SSL2020 MiniLibrary	One 1-Drive TL881 MiniLibrary
721 - 1000 GB	Two 12-Drive ESL9326DX Enterprise Libraries		One 16-Drive ESL9326D Ent. Library	One 12-Drive ESL9326DX Ent. Library	One 6-Drive ESL9326D Ent. Library	One 6-Drive ESL9198DX Ent. Library	Two 2-Drive TL891 MiniLibrary		One 2-Drive SSL2020 MiniLibrary	One 1-Drive SSL2020 MiniLibrary
1001 - 2000 GB	Three 16-Drive ESL9326DX Enterprise Libraries		Two 16-Drive ESL9326D Enterprise Libraries		One 16-Drive ESL9326D Ent. Library	One 12-Drive ESL9326DX Ent. Library	One 6-Drive ESL9326DX Ent. Library	One 8-Drive ESL9326D Ent. Library	Two 2-Drive SSL2020 MiniLibraries	One 2-Drive SSL2020 MiniLibrary
2001 - 3000 GB	Five 16-Drive ESL9326DX Enterprise Libraries (3456)		Three 16-Drive ESL9326D Enterprise Libraries		Two 16-Drive ESL9326D Enterprise Libraries		One 12-Drive ESL9326D Enterprise Library		One 6-Drive ESL9326D Enterprise Library	One 2-Drive SSL2020 MiniLibrary
3001 - 4000 GB			Three 16-Drive ESL9326DX Enterprise Libraries (3456)		Two 16-Drive ESL9326D Enterprise Libraries		One 16-Drive ESL9326D Enterprise Library		One 6-Drive ESL9198DX Enterprise Library	One 5-Drive TL895 Library

Choosing the right connection

Customers have more technology options for backup and restore today than ever before. Traditionally, customers were limited to direct-attached data protection solutions – a tape drive or library with a direct SCSI attachment to the server. Backup and restore traffic was sent across the core communications network (LAN, WAN, etc.) to the server that had the physical connection to the backup and restore device.

Direct-attached backup and restore is still effective for many customers, but the development of Fibre Channel technology has provided a way to offload data traffic from the core communications network to a dedicated network where storage information is the only traffic. This alternative is known as a Storage Area Network (SAN).

Fibre Channel is a two-way communication channel that is used to interconnect computers and storage devices. Fibre Channel is used today as an enabling technology for SANs, where primary storage and secondary storage can be shared by multiple servers. The SAN runs parallel to the existing communications network and provides a dedicated data path. By offloading data traffic to a SAN, the primary network enjoys better performance, and storage can be more efficiently allocated among multiple servers.

Fibre Channel technology also eliminates the current constraints of SCSI-attached solutions – distance and speed. Fibre Channel can connect devices up to 10 Km apart and provide a high-speed transport mechanism at 100 MB/s. This added flexibility and speed has created new solutions and architecture options for data protection solutions.

When choosing an automated storage product, customers must ask the question – what is the best option today, and will my investment be protected tomorrow? Compaq can provide you the best direct-attached (SCSI) solution today, with an easy upgrade path when you are ready to move to a SAN-based data protection solution. Indeed, many of our customers already own Compaq library products – and we have helped them transition from a SCSI environment to a Fibre Channel environment with simple enhancements to their current investment.

Whether you are considering a direct-attached tape product to deploy in a small server farm or are trying to protect terabytes of information in an enterprise data center, Compaq has the right architecture for you. In the pages that follow, we will clearly identify what connection options you have by product, so you can choose the right solution or flexible architecture for your business today and tomorrow.

Important choices

When choosing a data protection solution, customers have many important choices, including connection type. Compaq provides customers two options for connecting larger storage devices to their computing environment – direct-attached SCSI-based solutions and SAN-attached solutions based on Fibre Channel technology.

Entry-level solutions & environments

For entry-level backup, you'll want solutions that are simple, cost-effective and easy to integrate, but still provide investment protection as you grow. For those needs, the Compaq 4/8 GB and 12/24 GB DAT drives are great alternatives.

For smaller local backups of individual workstations or small business servers with broader backup windows, Compaq offers a range of affordable entry-level solutions.

Compaq 12/24 GB DAT drive

Backward-read compatible (with both DDS-1 and DDS-2 drives) to protect your current DAT media investments, this device allows you to achieve the highest backup capacities possible while maintaining your current DAT standard.

- 12 GB native capacity, up to 24 GB with 2:1 compression
- DDS-3 helical scan technology delivers 4.2 to 8.4 GB/hr
- Internal automated head cleaner reduces failure rates and dramatically reduces user maintenance
- 12/24 GB DAT DDS-3 data cassette, cleaning cassette and live trial software included*
- Fits in Compaq workstation and server bays or in an External SCSI Storage Expander II Cabinet for a rackmounted solution

* Purchase may be necessary for software use beyond the trial period.

Compaq 20/40 GB DAT drive

The 20/40 GB DAT DDS-4 tape drive is a high-performance, low-cost tape backup solution and the next generation in a long line of reliable DAT products from Compaq.

- 20 GB native capacity, up to 40 GB with 2:1 compression
- 2.4 MB/s data transfer rate, up to 4.8 MB/s with 2:1 compression
- Backward read/write compatible with DDS-1, DDS-2 and DDS-3 media
- Internal 3.25", external tabletop and hot plug configurations available
- Disaster Recovery Functionality
- 20/40 GB DAT data cassette, cleaning cassette and live trial software included*

* Purchase may be necessary for software use beyond the trial period.

Workgroup & departmental environments

For larger workgroups and departments with higher backup loads and smaller backup windows, Compaq offers higher performing, more manageable backup solutions.

These domains may not only need higher capacity and performance, but more manageability and automation as well – so you can automate reliable backups and focus energy resources on other things.

Compaq 20/40 GB DAT 8 cassette auto loader

A high-capacity automated solution with increased reliability, performance and backward-read compatibility with DDS-2, DDS-3 and DDS-4 media.

- 320 GB* of total capacity based on using a "random accessed" 8-cassette magazine
- Up to 16.8 GB/hr transfer rate
- Fast cartridge load time – 58 seconds average from any position in the magazine
- Read-after-write data verification
- Compaq Insight Manager support for better fault detection
- Internal and external model configurations available
- Ideal for automated data protection in remote office environments
- 20/40 GB DAT 8 cassette auto loader data cassette, cleaning cassette and live trial software included**

* Based on 2:1 data compression
** Purchase may be necessary for software use beyond the trial period.

Compaq 20/40 GB DLT tape drive

A flexible, reliable internal or external solution with generous capacity for a wide range of environments.

- 20 GB native capacity, up to 40 GB with 2:1 compression – plenty for even a mid-sized business
- Backup speeds of up to 10.6 GB/hr
- Easily backward-read compatible with existing DLT 10/20 and 15/30 GB media
- Internal 5.25" or external tabletop form factor
- 20/40 GB data cassette, cleaning cassette and live trial software included*

* Purchase may be necessary for software use beyond the trial period.

Compaq AIT 35 GB tape drive

Bringing the advantages of Advanced Intelligent Tape (AIT) to Compaq customers, the AIT 35 GB tape drive offers higher capacity and performance at a DDS price.

- A new standard for Departmental Backup from a company you can trust – Compaq
- Extreme reliability with increased backup capacity designed for strenuous, high duty-cycle applications
- Achieves outstanding capacity and reliability in a 3.5" form factor
- Internal, external tabletop and hot plug configurations available
- Disaster Recovery Functionality
- AIT 35 GB tape drive data cassette, cleaning cassette and live trial software included*

* Purchase may be necessary for software use beyond the trial period.

Compaq AIT 50 GB tape drive

For businesses with growing needs for departmental and workgroup backup, the Compaq AIT (Advanced Intelligent Tape) 50 GB drive is the "just right" solution.

- 50 GB native capacity, up to 100 GB with 2:1 compression
- 6 MB/s data transfer rate, up to 12 MB/s with 2:1 compression
- Backward read/write compatible with AIT-1 25 GB, 35 GB or TZS 20 media
- Available in 3.25" internal, external tabletop and hot plug configurations
- Disaster Recovery Functionality
- AIT 50 GB data cassette, cleaning cassette and live trial software included*

* Purchase may be necessary for software use beyond the trial period.

Compaq SCSI Storage Expander II

A low-cost external storage enclosure that enables existing tape drives to be moved from inside the server to an external enclosure, while providing support for up to four SCSI tape devices.

- Options for either tower or rackmount (4U) model
- Supports up to 2 full-height or 4 half-height tape devices
- Tape devices supported: 35/70 DLT, 20/40 DLT, 15/30 DLT, 4/8 DAT, 4/8 DAT Autoloader, 12/24 DAT and 12/24 DAT Autoloader
- 140 GB of storage capacity (with 35/70 DLT drives installed at 2:1 compression)
- Up to three SCSI Storage Expander II can be daisy chained together from a single SCSI controller

Compaq TA1000 AIT tape array

High-availability is becoming an important factor in today's IT departments, so we designed the TA1000 to offer hot-pluggable technology. This means the customer does not have to take the server down because of a component failure.

- Up to 196 GB/hr data transfer rate
- 1 TB of storage capacity (with 2:1 compression)
- Uses 10 AIT 50 GB tape drives for simultaneous backup jobs
- Hot-pluggable capability
- Available in a 5 or 10 drive rackmount configuration
- Uses in-house Compaq technology
- LVD Interface
- Qualified behind Windows NT 4.0, Windows 2000, and NetWare
- Supported with VERITAS Backup Exec™ and Computer Associates ARCserve®
- Compatible with Computer Associates RAID Option and VERITAS RAIDirector software

Compaq SSL2020 AIT Library

Cost-effective entry into SCSI-attached consolidated backup and restore with a high performance and high capacity within a small form factor. The SSL2020 adds a new standard for Automated Entry-Level and Departmental Backup.

- Each unit supports one or two AIT-2 GB tape drives and 20 cartridges
- Native transfer rates up to 40 GB/hr in a single module
- Compatible with a wide variety of operating systems, software applications and server platforms
- Compress form factor takes only 4U of rack space with a single module
- Tabletop and rackmount configurations available
- Removable magazine for off-site backup storage
- Qualified for cluster backup solution
- Qualified for Compaq *StorageWorks* SAN based EBS solution
- Backs up to 1 TB of data (native) in a single unit (2 TB with compression)
- Scales up to 5 modules for native backup capacity of 5 TB (10 TB with compression)

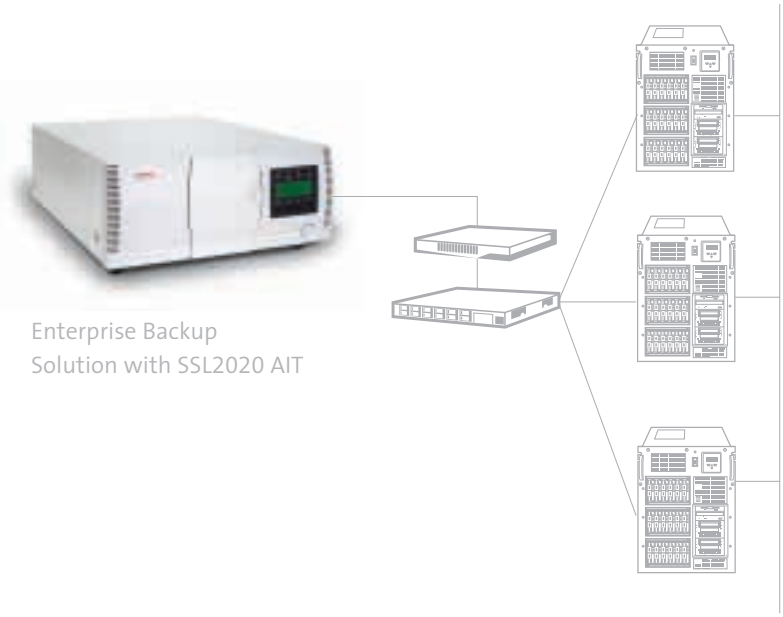
StorageWorks Enterprise Backup Solution (EBS) for Workgroups

EBS BackPaq and EBS ARCPaq

EBS for Workgroups is a Fibre Channel (FC) backup and restore solution that is simple, bundled, and easy to integrate. It consolidates backup tasks and reduces costs for entry-level enterprise environments. It delivers high-performance Fibre Channel SAN backup for about the same price as backing up individual servers or network-attached storage systems via tape drive. These solutions complement Compaq and/or x86 servers in Windows NT/2000 and Novell NetWare environments.

EBS offers two bundles that are ideal for customers who want to enjoy the benefit of centralized and automated data protection at an aggressive price per server.

- EBS BackPaq and EBS ARCPaq provide a simple, bundled, and affordable solution for a workgroup environment
- Backup and restore management software takes advantage of the added bandwidth of Fibre Channel to maximize performance and allows multiple servers to access one or more tape libraries simultaneously
- One Fibre Channel Storage Hub 7 connects servers and a Modular Data Router to the Fibre Channel Loop
- The Modular Data Router allows the tape library to be shared by all the servers on the Fibre Channel loop
- Creates an independent 100 MB/s Fibre Channel storage network
- Consolidates backup for up to five servers
- EBS components are sold separately



Enterprise Backup
Solution with SSL2020 AIT

Architecture Options

- *Ideal for five ProLiant or x86 servers*
- *EBS BackPaq comes with VERITAS Backup Exec software*
- *EBS ARCPaq comes with Computer Associates ARCserve software*
- *Both solutions are based on a Fibre Channel architecture*
- *Supports either SSL2020 or TL891DLX*

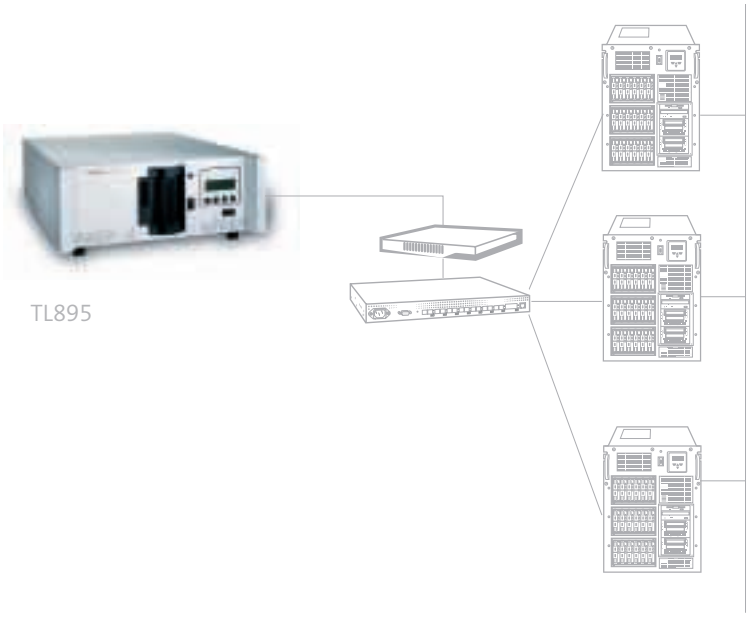
StorageWorks Enterprise Backup Solution (EBS) for Departments

EBS SANPaq

EBS for Departments offers large-volume data customers the ability to leverage the FC fabric to support disk ***and*** tape on the same SAN improving overall price, performance and reducing complexity. It provides consolidated backup for multiple heterogeneous platforms running Windows NT/2000 or Novell NetWare, in a switched environment.

EBS SANPaq is a cost-effective bundle, allowing for consolidation and sharing disk and tape resources for a Departmental environment.

- EBS SANPaq comes with Computer Associates or VERITAS Backup Exec software, Modular Data Router, FC SAN Switch 8-EL
- Eight Fibre Channel ports on a fabric switch offer 800 MB/s throughput. Cascade a second switch for support of up to seven additional servers
- Modular Data Router allows the DLT or AIT tape library to be shared by all servers attached to the switch
- Consolidates disk and tape into a SAN
- Reduces complexity and minimizes hardware
- An affordable fabric solution for Departmental environments
- EBS components are sold separately



TL895

Architecture Options

- *SANPaq includes licenses for five ProLiant or x86 servers*
- *EBS SANPaq comes with Computer Associates software or VERITAS Backup Exec*
- *Supports either TL891DLX or TL895*

High-end to Data Center backup/restore environments

- *Compaq 40/80 GB DLT Drive*
- *Compaq DLT Array*
- *Compaq TL891DLX MiniLibrary, a 40/80 DLT-based scalable library*
- *Compaq TL895, 96-slot 35/70 DLT-based library*
- *Compaq ESL9198DLX, 198 slot 40/80 DLT-based Enterprise Library*
- *Compaq ESL9326DX, 326 slots 40/80 DLT-based Enterprise Library*
- *Fibre Channel and Direct-Attached Solutions*

In critical environments with massive backup requirements and virtually no time for down-time, Compaq offers highly automated and manageable backup solutions. These demanding environments need more than just high capacity and transfer rates.

They need intelligent, high-availability solutions that provide maximum control over backup while keeping administration costs low. Often, you'll need 24x7, mission-critical protection within minimal backup windows. Once again, Compaq offers a range of alternatives from fast, dense, yet basic DLT drives to fully automated intelligent tape arrays and libraries with advanced media management, RAIT (Redundant Array of Independent Tapes) fault-tolerance (when combined with Computer Associates ARCserve) and full lights-out automation.

Compaq 40/80 GB DLT tape drive

The 40/80 GB DLT tape drive is used in backup solutions for mid to high-end servers as a stand-alone product. The 40/80 GB DLT drive is part of a total Compaq solution using Compaq branded servers, primary storage and media.

- Offers 40 GB native capacity at 6 MB/s data transfer
- Internal 5.25" full height and external tabletop configurations availability
- Backwards compatibility with existing DLT 20/40 GB media (DLT IV)
- 40/80 GB data cartridge, cleaning cartridge and live trial software included

Compaq DLT Tape Array III

A cost-effective array solution for your high-end, high-availability requirements, the DLT Tape Array III provides the fault protection of RAIT plus the protection of locating the array off-site from your production servers.

- 160 GB native capacity, up to 320 GB with 2:1 compression
- 216 GB/hr maximum transfer rate
- Reads and writes 20/40 GB DLT, 35/70 GB DLT and 40/80 GB DLT media
- 5U rackmount enclosure for protection and manageability in data-center environments
- Compatible with Computer Associates RAID Option and VERITAS RAIDirector software

Compaq SDLT 110/220 tape drive

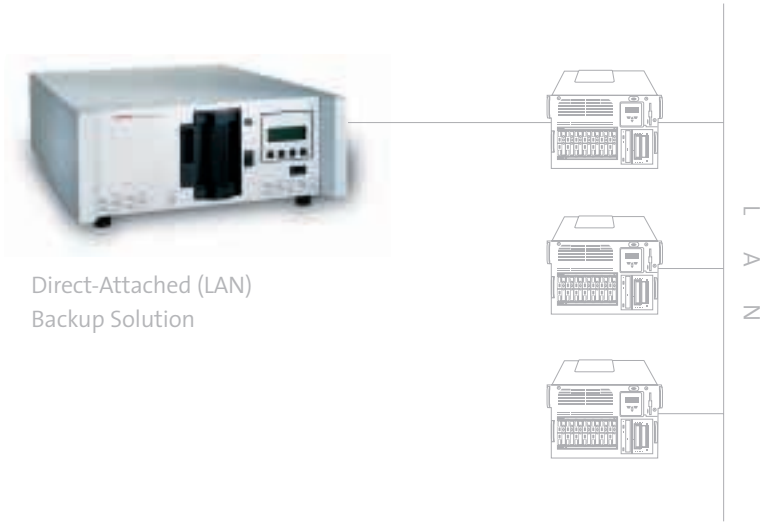
Compaq SDLT 110/200 GB tape drive is the first product in the SDLT family, offering increased capacity and performance over DLT, and with backwards read compatibility with DLT IV media, allowing customers to operate within smaller backup windows and to store more data on a single piece of media.

- Offering 110 GB native capacity and 11 MB/s native performance
- Fast-wide LVD SCSI interface
- Backward read/write compatibility to DLT Type IV media
- SDLT tape cartridge, cleaning cartridge and live trial software included
- Supported with Tape Storage Management Console (TSMC)

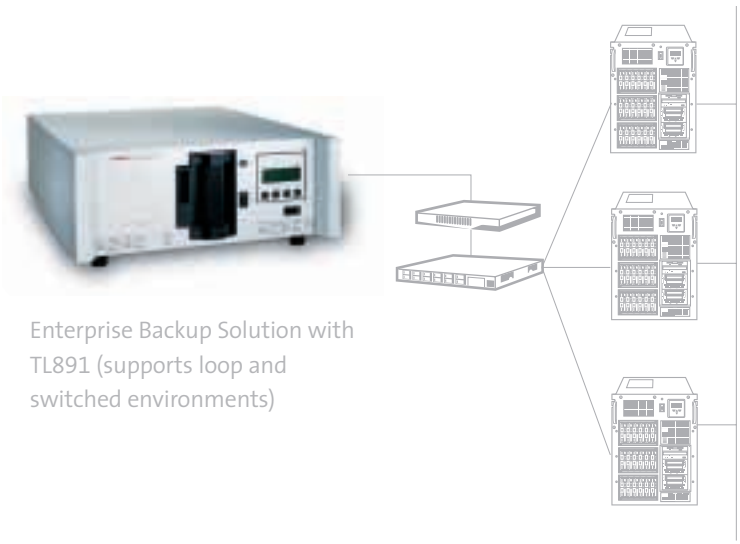
Architecture Options

The TL891DLX can be deployed in two configurations:

- *Directly attached to a server using the communications network backbone (LAN, WAN, etc.)*
- *SAN-attached to multiple servers using a dedicated Fibre Channel backbone for storage communications, providing LAN-free data protection (supports switched fabric and Fibre Channel arbitrated loop)*



Direct-Attached (LAN) Backup Solution



Enterprise Backup Solution with TL891 (supports loop and switched environments)

Compaq TL891DLX scalable DLT MiniLibrary

- Each unit supports one or two Compaq 40/80 GB DLT drives and 10 cartridges
- Back up as much as 7.2 TB (2:1 compression) of data within a multi-unit library configuration or start with just a single module 800 GB (2:1 compression) solution
- From 43.2 GB/hr to 216 GB/hr (native) performance, providing transfer of up to one TB in less than five hours (using 10 drives in a multi-unit library configuration)
- Software RAIT-capable for added performance and fault protection (with third-party software)
- A rackmountable solution supporting up to six modules in a single rack
- DLT Base Units and Data Units for a fully scalable and custom configurable solution
- Qualified for the Compaq *StorageWorks* SAN-based Enterprise Backup Solution
- Qualified for clustered backup solution

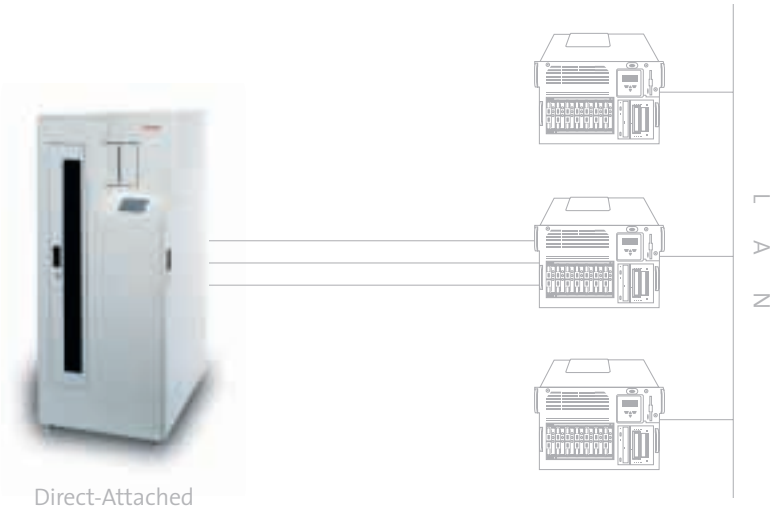
Qualified for Compaq *ProLiant™* and x86 servers running Windows NT, Windows 2000 and Novell NetWare and Compaq *AlphaServer™* systems running *Tru64* UNIX and *OpenVMS*

Compaq TL895 DLT Tape Library

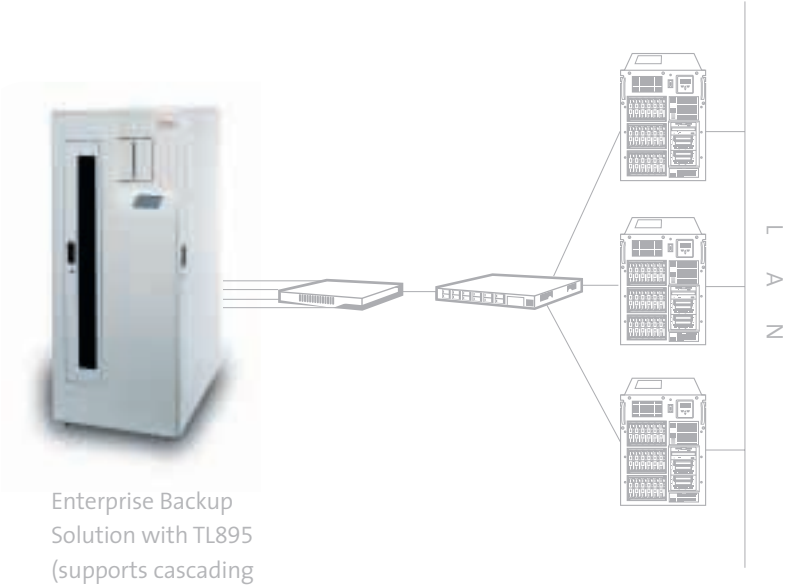
Back up as much as 6.7 TB of data within a single stand-alone library.

- Supports two to seven Compaq 35/70 DLT drives and 96 cartridges
- From 36 GB/hr to 126 GB/hr (native) performance
- Software RAIT-capable for added performance and fault protection (with third-party software)
- Highest reliability of any DLT automation device with 2 million mean swaps (MSBF)
- Qualified for the Compaq *StorageWorks* SAN-based Enterprise Backup Solution

Qualified for Compaq *ProLiant™* and x86 servers running Windows NT, Windows 2000 and Novell NetWare and Compaq *AlphaServer™* systems running *Tru64* UNIX, *OpenVMS* and Sun servers running Solaris



Direct-Attached (LAN) Backup Solution



Enterprise Backup Solution with TL895 (supports cascading hub and switched environments)

Architecture Options

The TL895 can be deployed in two configurations:

- *Directly attached to a server using the communications network backbone (LAN, WAN, etc.)*
- *SAN-attached to multiple servers using a dedicated Fibre Channel backbone for storage communications, providing LAN-free data protection (supports cascading hub or switch connection for SAN-based solutions)*

Architecture Options

The ESL9198DLX has three deployment configurations

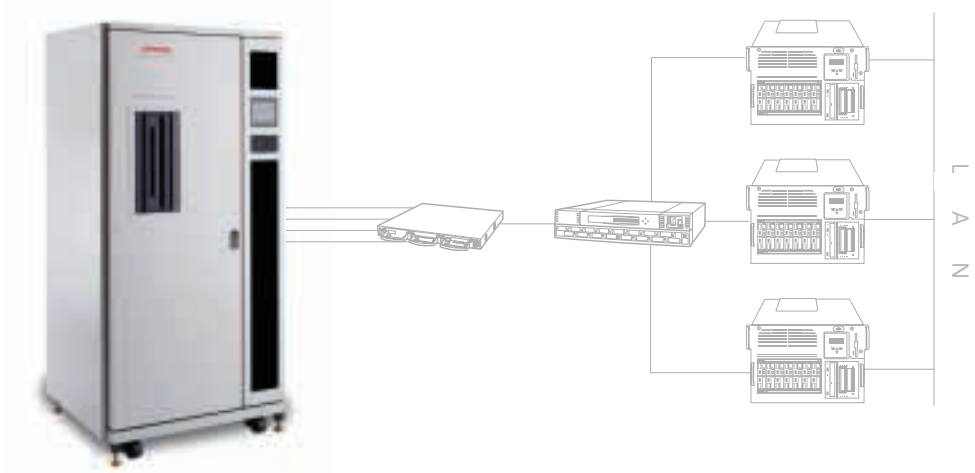
- *Directly attached to a server using the communications network backbone (LAN, WAN, etc.)*
- *SAN-attached to multiple servers using a dedicated Fibre Channel backbone for storage communications, providing LAN-free data protection in a switched environment*
- *Multi host offers the flexibility of deploying multiple servers directly attached to specific drives in an ESL library. Multi host also provides dedicated partitioning without the use of Fibre Channel*

StorageWorks ESL9198DLX Enterprise Storage Library

Delivers unprecedented flexibility, capacity, high availability and investment protection in most demanding enterprise environments in a compact form factor.

- Support two to eight Compaq 40/80 GB DLT drives and 198 cartridges for storage up to 7.92 TB of data (native) and delivers transfer speeds up to 172.8 GB/hr (native)
- Pass-through kit provides scalability up to five libraries and 40 drives providing up to 34.8 TB storage (native) and up to 864 GB/hr (native) transfer rate
- Continuous uptime via hot plug drives, hot swap power supplies and cooling fans
- Mission-critical availability with redundant power, power supplies and fans
- GUI browser based touch screen control panel for easy operation and diagnostics
- Compaq Insight Manager and Compaq TSMC (Tape Storage Management Console) for library status reports and diagnostics
- Space-saving design with service access doors at front and rear eliminates the need for providing service space at sides — saving valuable data-center space
- Qualified for the Compaq *StorageWorks* SAN-based EBS

Direct-Attached (LAN) Backup Solution



Enterprise Backup Solution with ESL9198DLX

Multi Host Backup Solution

Architecture Options

The ESL9326DX has three deployment configurations

- *Directly attached to a server using the communications network backbone (LAN, WAN, etc.)*
- *SAN-attached to multiple servers using a dedicated Fibre Channel backbone for storage communications, providing LAN-free data protection in a switched environment*
- *Multi host offers the flexibility of deploying multiple servers directly attached to specific drives in an ESL library. Multi host also provides dedicated partitioning without the use of Fibre Channel*

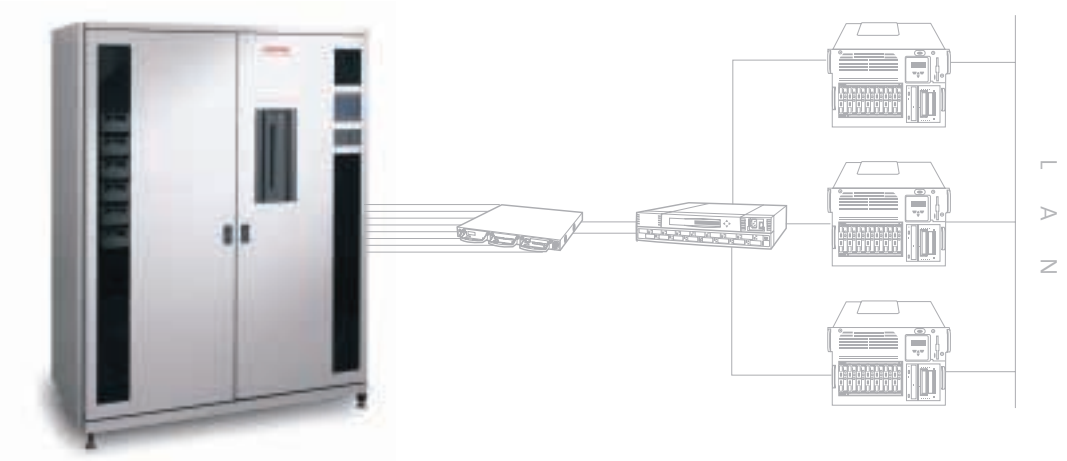
StorageWorks ESL9326DX Enterprise Storage Library

Delivers unprecedented flexibility, capacity, high availability and investment protection in the most demanding enterprise environments.

- Supports six to 16 Compaq 40/80 GB DLT drives and 326 cartridges for storage up to 13.04 TB of data (native) and delivers transfer rates up to 345.6 GB/hr (native)
- Pass-through kit provides scalability up to five libraries and 80 drives providing up to 65.2 TB storage (native) and up to 1.73 TB/hr (native) transfer rate
- Continuous uptime via hot-swappable drives, power supplies and cooling fans
- Mission-critical availability with redundant power, power supplies and fans
- GUI browser based touch screen control panel for easy operation and diagnostics
- Compaq Insight Manager and Compaq Tape Storage Management Console (TSMC) for library status reports and diagnostics
- Space-saving design with service access doors at front and rear eliminates the need for providing service space at sides – saving valuable data-center space
- Qualified for the Compaq *StorageWorks* SAN-based Enterprise Backup Solution

Qualified for Compaq *Alpha* and Compaq *ProLiant* servers running Compaq *Tru64* UNIX, *OpenVMS*, NetWare, Microsoft Windows NT or Windows 2000

Direct-Attached (LAN) Backup Solution



Enterprise Backup Solution with ESL9326DX

Multi Host Backup Solution

The Compaq *StorageWorks* Enterprise Backup Solution for SANs

The Compaq *StorageWorks* Enterprise Backup Solution EBS is a complete backup and restore solution for consolidated backup at local server speeds. It combines SCSI-based backup technology with Fibre Channel technology to link multiple heterogeneous servers, running multiple operating systems, to a single backup device, creating an independent, high-speed network just for backup and restore.

Consolidating your backup systems to a designated enterprise storage network reduces the time, effort and staff devoted to monitoring and management, which reduces your total cost of ownership. Data backups won't slow down user productivity, and Fibre Channel technology provides transfer rates up to five times faster than SCSI for reliable backup in less time.

1. When it's time for a scheduled backup, a quick message is sent across your network signaling each server to begin backup.
2. Data is converted to Fibre Channel format via the host bus adapter in each server and transmitted directly from multiple servers to the Fibre Channel SAN Switch, FC-AL Switch or Hub 7.
3. From the Switch or Hub, data passes to a Modular Data Router tape controller (one for up to 16 tape drives) where it is reconverted to SCSI for storage on your tape backup device.
4. The entire process bypasses your corporate network and takes advantage of the high speeds and longer distances of Fibre Channel technology.

For detailed information, go to compaq.com/ebs

Fibre Channel Host Bus Adapter (HBA)

The HBA occupies one server slot and links your server to the Fibre Channel SAN Switch 8/16/8-EL/16-EL, Fibre Channel Storage Hub or FC-AL Switch 8.

Fibre Channel Storage Hub 7

- Enables you to connect multiple servers and tape devices onto a single Fibre Channel Storage Network
- Provides 7 direct Fibre Channel connections for centralized backup to up to six devices (single hub connections to servers and DLT or AIT tape libraries)
- Rackmountable, utilizing just 1U of rack space
- Supports a minimum of three DLT or AIT tape libraries

Fibre Channel Loop Switch

- FC-Arbitrated Loop Switch based unit
- 8 FC ports, expandable to 11
- 100 MB/s bandwidth per port
- Affordable alternative to loop hub

Fibre Channel Fabric Switches

- Four models to choose from
- Full FC Fabric based units
- High scalability for future expansion
- 100 MB/s bandwidth per switch port
- Web-Based Management tools

Fibre Channel SAN Switch series

- 8-port and 16-port models
- Hot-pluggable fans
- Optional hot-pluggable redundant power supplies

Fibre Channel SAN Switch -EL series

- Same performance as SAN Switch /8 and /16
- Lower cost, sealed units
- 8-port and 16-port models

Modular Data Router (MDR)

- Provides network connectivity and sharing for Compaq DLT or AIT tape libraries over a Fibre Channel network
- Each MDR connects to 16 DLT or AIT tape drives
- Rackmountable, utilizing just 1U of rack space

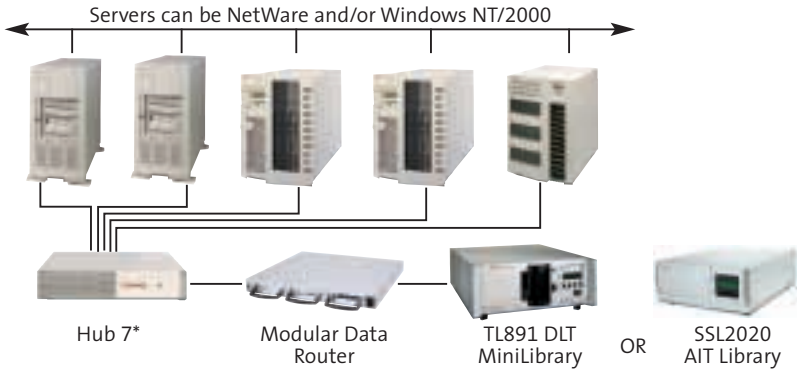
- *Backup speeds of up to 100 MB/s dramatically reduce backup time*
- *Cable lengths up to 500m allow greater flexibility without compromising performance*
- *Fewer tape devices per server lower your hardware costs*
- *Compatibility with the new DLT 40/80 drives (HVD and LVD models), SSL2020 AIT, ESL9198DLX, TL891, TL891DLX and ESL9326DX libraries protect your investment*

Enterprise Backup Solutions for Workgroups

Workgroups benefit from an entry-level price, for superior performance and scalability in an affordable Fibre Channel Arbitrated Loop based SAN.

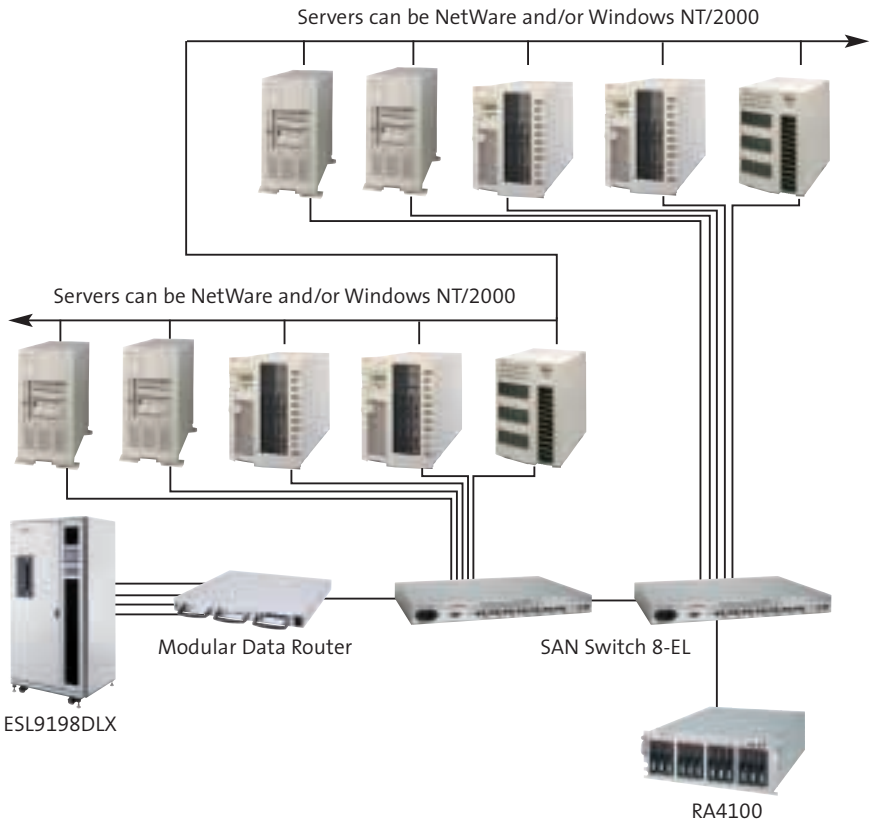
Benefits

- Centralization
- Automation
- Distance
- Better asset utilization
- Channel focus



*Available only in EBS BackPaq and EBS ARCPaq.

Enterprise Backup Solutions for Departments



Departmental environments can now leverage the Fibre Channel fabric to support disk and tape on the same SAN improving overall price, performance and reducing complexity.

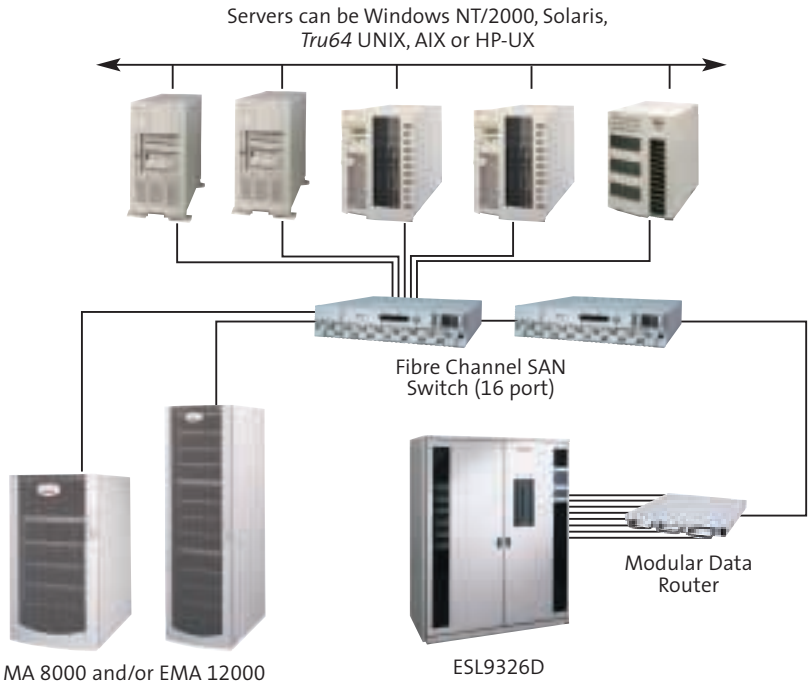
Benefits

- Centralization
- Flexibility
- Performance
- Scalability
- Consolidation

Enterprise Backup Solutions for Data Centers

EBS for Data Centers provides unique integration of application software and industry-standard hardware to complete an enterprise-class solution dedicated to backup and restore of data in a heterogeneous environment. Their demanding environments have massive backup requirements with virtually no time for downtime.

EBS for Data Centers offers storage consolidation through heterogeneous operating system and platform support.



Benefits

- Leverages current DLT and AIT library technology and shares tape device to all servers on a Fabric switch
- Centralized automated backup for Compaq *ProLiant*, *AlphaServer* systems, *TaskSmart* N-Series (NAS), other vendor x86 servers, HP-UX, IBM AIX and Sun Solaris servers
- High bandwidth and scalability to handle surging volumes
- Substantial management savings and tape standardization for all servers
- Storage consolidation through heterogeneous operating system and platform support

Why Compaq tape media?

When you're helping customers choose the right Compaq storage solution, some of the best guidance you can give them is to choose Compaq-branded storage media.

Only Compaq-branded tape media are thoroughly tested and qualified for Compaq servers and storage devices. That assures your customer a level of reliability, performance, and confidence they can only get from Compaq.

Critical reliability

Stored data is a business-critical asset and the most important asset to a company right behind its people. Putting that data at risk with inferior media can be a disastrous short-sighted decision. Compaq qualifies only the highest-quality media for Compaq storage products, for the most reliable storage and data protection possible. We hold media with our name to the highest standards of quality assurance. In fact, only the best of breed pass Compaq stringent qualification requirements.

Compaq media is carefully screened to ensure that defective media products never get to the market. If a single screened unit fails, the entire lot never reaches our customers. Our media testing programs are as rigorous as the testing our drives undergo. Street and functionality testing includes thousands of inserts, loads, and unloads and tape passes from beginning to end – more abuse than your media will receive in even the most demanding business environment.

One-stop storage shopping

Compaq offers complete storage solutions – drives, media, servers, and tape libraries. So customers can look to one company for all their storage needs, from storage products to services. When you choose Compaq media, you can count on the full support from Compaq if you should ever encounter a media defect.

Enhanced sales opportunities for you

For our reseller partners, selling Compaq tape media not only generates satisfied customers, it also provides great opportunities for incremental and add-on sales – as well as lucrative promotional opportunities built around complete drive, library and media solutions.

Your customers can choose the right media from you when they purchase their storage solutions, and they can look to you for additional media down the road – knowing they're getting a tested, qualified and reliable solution fully supported by you and Compaq.

Key benefits of Compaq-branded media:

- *Reliable, high-performance media fully qualified for Compaq storage devices*
- *The highest standards for testing, qualification and quality assurance*
- *A single source for customer storage needs*
- *Compaq support for both media and hardware*
- *Additional sales opportunities, satisfied customers and higher revenues*

For detailed information, go to compaq.com/products/storageworks/mediafamily

Software

With the availability of both Fibre Channel connectivity and traditional SCSI-based attached backup solutions, customers have a choice when it comes to backup software. Today, you can choose from VERITAS Backup Exec, VERITAS NetBackup, Computer Associates ARCserve/2000 or Legato NetWorker to run your SCSI-attached backup. VERITAS, Computer Associates, Legato and Tivoli Storage Manager also support Fibre Channel-based backup with support modules such as the Legato Smart Media, VERITAS Shared Storage Option and the Computer Associates SAN Option.

Choose your backup software

Hardware is just part of your backup picture. You also need robust, reliable software to make it all happen how and when you need it to. Compaq has partnered with industry-leading backup software suppliers VERITAS, Tivoli, Computer Associates and Legato to bring you a choice of software in designing the solutions that best meet your needs. We've worked closely with these leading vendors to engineer, test and tune your backup solution for optimal integration and performance.

All Compaq backup products and the Compaq *StorageWorks* Enterprise Backup Solution are fully compatible and optimized for:

- **VERITAS Backup Exec for Windows NT, Windows 2000 and/or NetWare.** VERITAS Backup Exec provides automated, scalable protection of your data enterprise-wide. As a client-server-based network storage solution, Backup Exec protects mission-critical data from the desktop to multiple distributed heterogeneous servers. VERITAS NetBackup fully supports Compaq *Tru64* UNIX, Windows NT/2000, AIX, HP-UX and Sun Solaris environments.

- **Computer Associates ARCserve/2000 for Windows NT, Windows 2000 or ARCserve for NetWare** – Computer Associates ARCserve/2000 offers a 32-bit, multi-threaded modular architecture optimized for high-performance in PC LAN multi-server environments. Performance features include parallel streaming, optimized device support, data compression and client push agents.

- **Legato NetWorker™** helps automatic integration with the popular storage management frameworks. Legato NetWorker backup software allows for multiple heterogeneous servers and operating systems to utilize the same backup device while leveraging FC speed to deliver the highest backup throughput in the industry. Legato NetWorker fully supports Compaq *Tru64* UNIX, Windows NT/2000 and Sun Solaris environments.

- **Tivoli Storage Manager** – Tivoli Storage Manager provides centralized management of mission-critical business information in SAN environments, spanning platforms from Windows NT and Windows 2000 to Solaris and AIX. Features such as LAN-free backup and tape sharing are ideal for SANs. And automated network file backup, archive and retrieval plus the industry's fastest high-speed recovery reduce disruption for backup and recovery. The solution provides data protection for most popular groupware, e-mail, database and other business applications.

How do you get the software you need?

Compaq even makes it easy and convenient to obtain, install and support backup software. A live 60-day trial copy of your backup software is included with your solution kit. It's easy to install and use, and you're ready to go right out of the box; but you've still got time to evaluate software before you buy. Then when you're ready, you can purchase software quickly and easily through our software partners' global distribution networks. After that, just one call to Compaq provides installation and configuration support for both your hardware and software. Now that's making partnership work for you.

For more information on available software features, visit our partners' Web sites through www.compaq.com, or at www.legato.com, www.tivoli.com, www.VERITAS.com and www.cai.com (for Computer Associates).

Non-Disruptive Backup Solutions

- Support Microsoft Windows NT, Sun Solaris and Compaq *Tru64* environments with a single integrated backup solution
- Create uncompromised availability for your business-critical applications
- Eliminate the restrictions of a shrinking backup window
- Simplify your backup planning and management
- Benefit from tested integration with third-party application and backup software
- Ensure end-to-end data protection at both the enterprise and departmental levels
- Protect your IT investment with a scalable and upgradable backup infrastructure
- Based on the award-winning *StorageWorks* Enterprise Backup Solution

A complete and qualified infrastructure for non-disruptive backups. Gain the competitive edge with 24x7 application availability

Replace downtime with production time

Today's enterprise generates a rapidly growing mountain of information. At the same time the amount of data increases, the job of ensuring its integrity becomes more complex. Not only must you plan and manage software and hardware from different vendors, but the available window for running a conventional backup is rapidly shrinking – any downtime at all is increasingly unacceptable.

The Non-Disruptive Backup Solution offers end-to-end data protection while it optimizes the availability of your business production systems, around the clock and around the world.

This is a complete backup infrastructure – a fully qualified, characterized installation of hardware and software – which allows you to perform backups with minimal impact on the availability of your business production systems. At the same time, you will simplify the complex tasks of backup planning and administration.

With this Compaq eBusiness solution your enterprise will enjoy improved customer service and operational efficiency – competitive advantages which translate directly into increased profits.

Ensure 24x7 application availability, even during backup

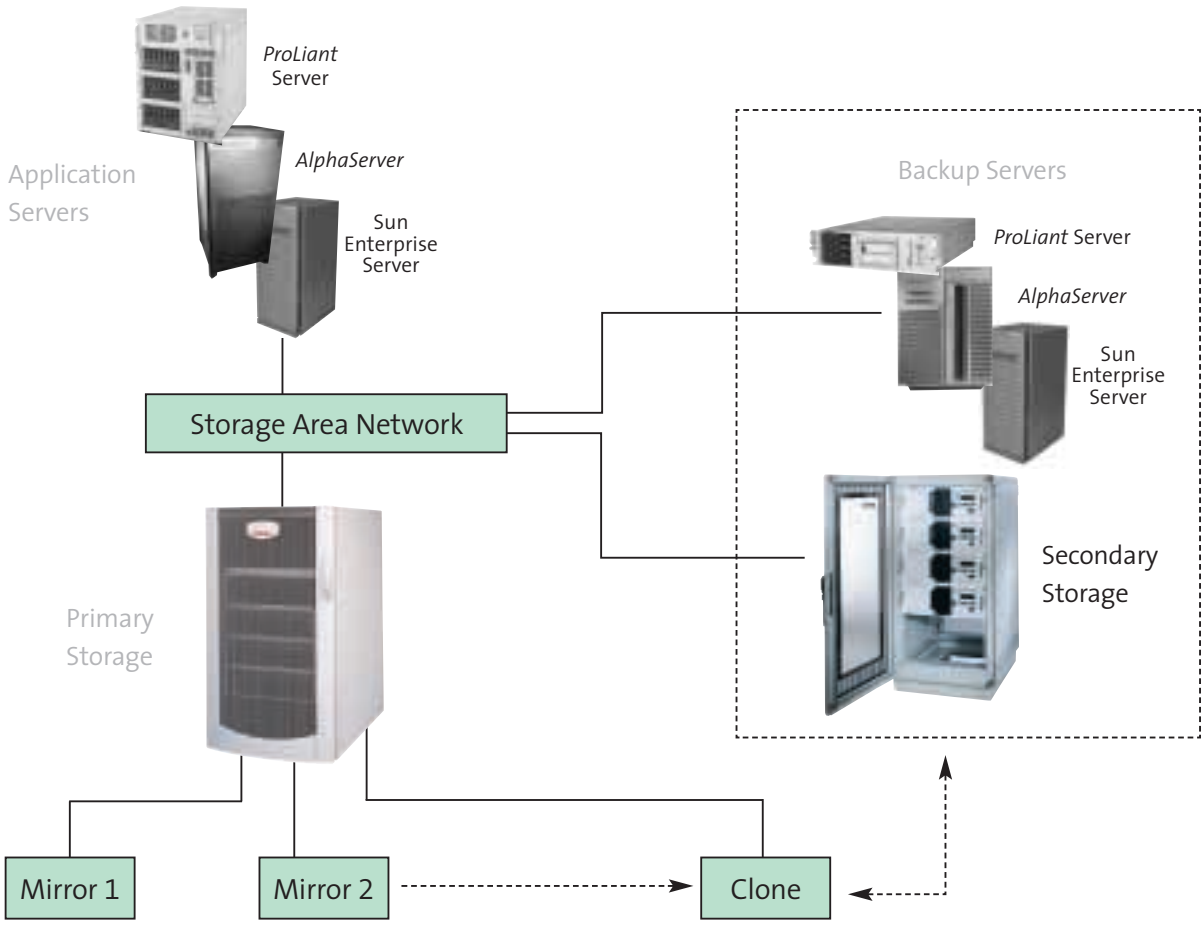
The enterprise that can maintain data integrity without impacting the robustness of their production systems has the competitive edge. And that edge is exactly what the Non-Disruptive Backup Solution gives you.

The Non-Disruptive Backup Solution is a fully integrated configuration of hardware, applications, backup software, and services that provide a complete backup infrastructure for both Storage Area Networks (SAN) and SCSI direct-attached secondary storage environments. Intended for users of Compaq *StorageWorks* MA 8000 and EMA 12000 subsystems, it provides a qualified, characterized backup solution resulting in an end-to-end data protection environment for both primary and secondary storage. The solution manages the snapshot and cloning features of the *StorageWorks* RAID array using the Compaq *SANworks* Enterprise Volume Manager, and includes customizable application and backup scripts for quick success.

In addition to being compatible with popular third-party backup software, the solution has been characterized with Oracle on Compaq *ProLiant* servers. Additionally, on Windows NT, it has been characterized with Microsoft Exchange. It includes performance information and configuration recommendations, so it can be deployed in a working environment quickly and easily. This gives businesses a reliable way to estimate the solution's behavior under actual conditions – which relieves much of the uncertainty about deploying and configuring a new storage infrastructure.

Primary Storage	Compaq MA 8000 or Compaq EMA 12000
Secondary Storage	Compaq tape libraries: TL891, TL895, ESL9198, ESL9326D OR Compaq Enterprise Backup Solution (EBS): EBS for Workgroups, EBS for Departments, EBS for Data Centers
Interconnects	Primary Storage: Fibre Channel (dual loop or switched fabric) Secondary Storage: Direct-attached SCSI OR Fibre Channel (Dual loop or switched fabric)
Management Software	Compaq *SANworks* Enterprise Volume Manager Compaq Batch Scheduler
Scripts	Application Software: Oracle and Microsoft Exchange; Backup software: Windows NT, Legato NetWorker, VERITAS Backup Exec, VERITAS NetBackup, Computer Associates ArcServe/2000, Sun Solaris and Compaq *Tru64* UNIX: Legato NetWorker and VERITAS NetBackup
Usability Information	Best practices data including characterization, performance, and configuration information

Sample Configuration



A four-step approach to eBusiness Needs

When asked, "What are your chances of buying a proprietary storage solution if it meets your business needs?" less than 30% of businesses said it was likely (ITcentrix, 12/99, Storage Network Survey). In other words, 70% of today's businesses are looking for an Open SAN.

Step One: The ENSA Backbone

When, in 1999, Compaq introduced its vision of storage as a shared utility – via the Compaq Enterprise Network Storage Architecture (ENSA) – the concept seemed radical and futuristic.

However, Compaq is proving this is possible given time to develop the underlying storage technologies, network topologies and storage management software. Since then, Compaq delivered products against the ENSA vision – both customers and industry watchers also began to see ENSA as the ideal backbone for development of the storage utility.

Step Two: Getting Past the SAN Dilemma

Fibre Channel technology can provide the speed and flexibility to improve data access over increasing distances. Multi-vendor storage systems – like *StorageWorks* – can support a myriad of server hosts and operating system environments. And a wide selection of interconnect devices and other components already exist to complete the SAN topology – the foundation of ENSA.

There's just one problem: There are no broad inter-operability standards in place to ensure that Fibre Channel storage systems from different vendors can be managed on the same SAN. Customers are left with a "SAN per vendor" approach, which, clearly, the majority of users do not want.

Step Three: The Promise of the Open SAN

The industry is looking forward to the day when an Open SAN will exist. That Open SAN will support any application, file and operating system, server platform, storage system, tape library, or SAN interconnect device – using published, open industry standards.

Step Four: Storage as a Utility

An Open SAN will allow for highly intelligent, centralized information management functionality – the very functionality that will enable the Enterprise Storage Utility, first envisioned by Compaq ENSA. Ultimately, the Storage Utility will present storage as an enterprise-wide, flexible, shared resource, analogous to a telephone service utility. This storage "pool" can be deployed anywhere in the enterprise, yet remain centrally managed and independent of computing systems and applications.

The industry is on its way to the "storage as a utility" concept; the first step is delivery of the Open SAN. With the Compaq *SANworks* family of unifying technologies and management tools, the Open SAN is that much closer to being a reality.

The *SANworks* business value

Increased Customer Service Levels mean ensuring data is available whenever needed, and that every application will receive data as quickly as required, even under adverse conditions.

Business velocity for higher profitability

The very promise of an Open SAN – one that will support "any to any" and "many to many" connectivity – makes multi-vendor, open *StorageWorks* the ideal product line for the Open SAN solution. That is why Compaq is planning support for the Open SAN with both product lines, *StorageWorks* and *SANworks*, creating together the concept of Business Velocity.

SANworks Enterprise Storage Management Software

SANworks is a new breed of management software designed to maximize business velocity and SAN accessibility. Businesses have long looked to industry-leading Compaq *StorageWorks* products to build more flexible storage environments. Now, *StorageWorks* and *SANworks* solutions work together to deliver unprecedented storage agility for open SANs in the Internet age.

***SANworks* Enterprise Volume Manager**
This controller-based management tool with snapshot and clone-copy functions minimizes downtime during system backups and data migration. Parallel processing means that you can continue using your data while running a variety of background tasks (such as data mining or migration, backups, upgrades, testing or work distribution). So you needn't interrupt business to protect against data loss.

***SANworks* Secure Path**
SANworks Secure Path delivers high-availability in mission-critical environments by maintaining connectivity between the server and storage. Secure Path monitors I/O paths, generates alerts on significant events and moves storage sets between paths to allow continuous access to data and provide maximum I/O efficiency.

***SANworks* Storage Resource Manager**
SANworks Storage Resource Manager is a Web-based event management and reporting application that enables IT managers to detect trends, predict problems and balance resources via automated reports and alerts on the capacity, consumption and availability of network-based storage.

The backup lineup

Take a look at our entire product spectrum, with solutions for all your environments and all your backup priorities.

Backup glossary

Types of backup
Backups are classified by the status of the network server (online or offline), when the backup takes place and by the amount of information that is backed up (full or partial, also referred to as differential, incremental or user-defined). Full, differential, incremental and partial backups can be used in either online or offline mode.

Online backup
An online backup takes place with the server online and available to users. A file may thus be open and not available for backup by some backup applications. There are applications that can protect open files, but if the file is changed while it is being backed up, then the file on tape may be different from the file on disk. The only sure way to protect open files is to use an open file manager available with Computer Associates ARCserve, VERITAS Backup Exec, VERITAS NetBackup, Tivoli Storage Manager and Legato NetWorker.

Offline backup
For an offline backup, the system administrator's first step is to take the server offline, making it unavailable to users for the duration of the backup operation. The typical offline backup takes place when user demand is at its lowest.

Full backup
A complete backup. All files are copied.

Differential backup
Backs up only files changed since the last full backup. This type of backup is useful when it's important to have the latest version of each file. If the same tapes are used for consecutive differential backups, the newer versions of backed-up files are often allowed to overwrite older versions of the same file on the tape.

Incremental backup
Backs up all files changed since the last backup, regardless of what kind of backup it was. This type of backup is used when each revision of a file must be maintained. If the same tapes are used for consecutive incremental backups, the newer versions of backed-up files are not allowed to overwrite earlier versions. Rather, the newer files are usually appended to the backup medium.

User-defined backup
Copies a user-defined set of files.

Partial backup
There are three types of partial backup:

- All applications – Saves all files in the area defined by the user, including settings, customizations, passwords, etc. Application backups are particularly useful after a major change or upgrade in software.
- Applications and data – Creates a stand-alone copy of the user's information base. Application and data backups allow easy restoration of the user's organization's records. These backups can also be used to migrate information to another server.
- Data only – May be segregated by project or department, or may include all information created within a certain time frame, or both. Clearly, the amount of backed-up information varies with the type of backup selected. This, in turn, directly affects the overall strategy in terms of capacity and transfer rate.

Push agent
A Push Agent is defined as a software function that uses the remote server to process the file and directories to be backed up. This drastically reduces the processing required of the backup server and thus improves performance. If the database manager, such as SAP or Oracle, compresses the data as it is extracted and presented to the backup application push agent, even greater performance can be achieved for LAN backups.

The backup lineup

	ProLiant DL320	*ProLiant ML330*	*ProLiant ML350*	*ProLiant ML370*	*ProLiant DL360*	*ProLiant DL380*	*ProLiant ML530*
							
12/24 DAT							
20/40 DAT							
12/24 DAT Auto loader							
AIT 35							
AIT 50							
SCSI Storage Expander II							
20/40 DLT							
40/80 DLT							
Tape Array III							
SSL2020							
TA1000							
TL891							
TL895							
ESL9326D							
ESL9198DLX							
EBS for Workgroups							
EBS for Departments							
EBS for Data Centers							

ProLiant **ML570**	*ProLiant* *DL580*	*ProLiant* **8000**	*AlphaServer* **1200**	*AlphaServer* **4100/ES40**	*AlphaServer* **DS10/DS20**	*AlphaServer* **GS60/GS140**
						

For more information contact your Compaq Authorized Reseller
web site: compaq.com/storage

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Inspiration Technology

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