Compaq StorageWorks™

Configuring backup & restore solutions for the enterprise.

COMPAQ NonStop™

A step-by-step approach to data protection.

Compaq Backup Advantage #1

Establishing the right backup strategy requires trade-offs. Performance vs. cost. Attached vs. network-based backup. The speed of multiple servers vs. the simplicity of a single server.

A trusted, experienced leader in backup solutions, Compaq can help you find the ideal balance for your business.

Data is one of your business's most valuable assets, and protecting that data from loss is a high IT priority. Protection from physical destruction, mechanical failure and human error — or simply meeting regulatory requirements — requires an integrated data protection strategy.

The most important component of that strategy? A sound approach to backup and restore.

This guide is designed to give you a sound methodology for planning and configuring an appropriate data backup and restore plan for your enterprise — with the right combination of hardware, software and services and the right balance of data protection, performance and cost.

You needn't complete these steps in any particular order. And you needn't complete them alone, because Compaq is there to help you — every step of the way.

Consider

1. **How much data do you need to move?**
Your first step should be to inventory how much data you need to back up, taking into account full and incremental backups. You should also develop a forecasted data growth path that encompasses future data capacity needs. Assessing the quantity of data you're dealing with will help you define factors like how many libraries and tape drives you need, how much capacity the libraries must hold and how your network might best be structured.

2. **Where is your data?**
You'll want to inventory your data by host, by operating system and by physical location (again keeping future growth in mind) in order to organize your backup strategy. Is your data local? Is it distributed or located at remote field offices or international locations? How is it connected (ATM, fibre, etc.)? This will help you identify the backup applications most appropriate for your backup servers and sensibly design your network infrastructure. You'll also be able to identify which clients would benefit from attached backup devices.

3. **What's your real backup window?**
Many IT managers think of their backup window as a single period of time during which their users must do without applications.

But taking a "shift" approach can help you conserve productivity, save money and have more flexibility in designing your hardware infrastructure

By looking at your backup needs on an application-by-application basis, you may be able to break your backup window into manageable pieces — or shifts — throughout the day, determining when it's least disruptive for users to be without a particular application or system. For example, you may be able to back up some applications during the evening and others overnight. That way, even though any one application can be backed up in six hours, the total backup window available to you is much longer.

Another key step in determining your backup windows is to carefully consider the level of data protection needed in various segments of your system. (It's often useful to think in terms of data protection instead of limiting the analysis to backup.) Identifying areas where you can afford moderate data protection (such as data snapshots or clones) will help you reduce backup and restore time. Identifying areas where you need remote backup for absolute disaster recovery capabilities will help you focus resources where they are most critical.

Both of these steps will help you maximize data protection without oversizing your solution.

Compaq Backup Advantage #2

Our vast experience and expertise in enterprise backup and restore will save you time and headaches — and help you meet the needs of your business precisely — now and in the future.

4. **What level of restore service can you afford?**
Many businesses look only at backup service levels (the backup window or the amount of time required to protect data by moving it to tape) when determining their system requirements and neglect a simple fact: data restore can take significantly longer than backup — sometimes by a factor of two or more.

Sizing a system properly and choosing the best data retention strategy require careful consideration of both backup and restore service requirements. How quickly must you restore (single files vs. complete databases)? How often do you require restores? For example, snapshots and clones can offer the fastest, simplest restore, and onsite libraries are faster than offsite libraries. You'll want to consider factors like these and weigh them against your other priorities.

5. **What's the best backup policy for my business?**
What business and data protection needs must be satisfied by your backup solution? How long must data be retained, and how many copies and generations are required? Should retained data remain online, "nearline" or offline? Onsite or off? These considerations will help you calculate library capacity and establish proper backup, archive and data retention policies.

Plan

6. Select your backup server.
Choosing the right backup server platforms (hardware and operating system) will help ensure that your system provides the bandwidth you need for both backup and restore.

→ First, examine the operating environments in which your data reside. It is desirable to back up to a server that runs the same operating system as the application for which data is to be backed up. This can facilitate restores and ensures that the backup server is at least as reliable as the data it is backing up. Once you have decided on a backup platform, you can choose a backup application that best satisfies your business needs.

→ Second, you'll need to ensure you have adequate connectivity (PCI slots or other connections to the backup server) for the tape drives and network connections you anticipate — based on capacity and architecture needs. While fast processors, adequate memory and high-bandwidth I/O are important considerations in choosing the right server platform, connectivity is key to facilitating backup and restore performance.

7. Select your backup application.
Once you've evaluated your platform needs, you can choose from a number of backup applications, agents and software utilities.

Your backup application is one of the most important choices you will make, and the chart below is a good guide. Choosing your application will also determine which additional client or optional software you may need to deploy.

8. Design your backup topology
Now you're ready to begin designing your system topology. You'll divide backup bandwidth requirements among your backup network and direct-attached tapes to provide the ideal cost-performance balance for your environment.

First, consider local (client-attached) tapes where practical to reduce network traffic and enhance throughput.

Compaq Backup Advantage #3

Thanks to our close partnerships with software vendors, Compaq can help you keep future technologies and opportunities in mind as you design your topology — so you can make wise investments today and take advantage of innovation tomorrow.

Be sure to keep your restore service level agreements in mind. You may want to add tape drives or network interface cards to ensure your restore capabilities meet your business needs.

Selecting the right technologies will help you minimize cost and reduce network problems during backup and restore. Most important, carefully choosing the right data movement technologies will help you stay within your required backup windows.

Choosing the automated backup device

BACKUP WINDOW

BACKUP CAPACITY

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

* Requires expansion unit and pass through

** Suggest multihost backup configuration with *Compaq StorageWorks* Enterprise Backup Solution

*** Requires expansion unit if storage exceeds 700 GB

Configure

9. Build your configuration.
Once you've carefully assessed your needs and planned your strategy, it's time to start building.

If you haven't done so by now, this is a good time to consider consulting with a backup professional. Compaq can help you configure your system to maximize application performance and reliability and optimize your network design for efficient backup and restore.

Compaq can help you:

- Optimally configure tapes and libraries to your servers
- Optimally configure your network infrastructure, keeping client volumes, application performance, future growth and your budget in mind

10. You're ready to buy.

1. Order your backup software, including the appropriate auxiliary licenses

2. Order your tape drives and libraries:
   - Choose tape drives with performance that accommodates your restore service level agreements and backup capacity
   - Choose libraries with enough capacity to satisfy your online storage needs
   - Choose attached drives consistent with needs of the host server or client

3. Order your backup server
   - Choose a server with enough slot connectivity to support your backup plan
   - Choose a server that can accommodate not only your backup software, but any other applications required

4. Order your host and network adapters

Sample Configurations

Here are a few examples of Compaq backup solutions for different enterprise environments.

Whatever your environment, Compaq can help you configure the ideal data protection system for your business.

Large UNIX or Windows NT Environment	
Backup Server	*AlphaServer* running *Tru64* UNIX or *AlphaServer* [ES or GS]-class system
Disk Storage	ESA 12000 Fibre Channel
Tape Libraries	ESL9000 TL895 TL891 for local tapes as needed Enterprise Backup Solution with TL895
Optional Software	Data Replication Manager
Backup Software	NetWorker or NetBackup for Windows NT (Intel) or *Tru64* UNIX
Other Software	Legato BusinesSuite (for NetWorker; equivalent software for other applications) application-specific modules Archiving, Media Management Hierarchical Storage Management
Services	Compaq Customer Services for planning, design, implementation or management services
NetWorker or NetBackup (or appropriate) clients	
Regular client for most networked systems	
Attached devices for clients with >50 GB of data to be backed up	

Medium UNIX or Windows NT Environment	
Backup Server	*ProLiant* or *AlphaServer* running Windows NT or *Tru64* UNIX
Disk Storage	RAID Array 8000FC or ESA 12000FC
Tape Libraries	TL895 or TL891 if local tapes are needed Enterprise Backup Solution with TL895
Backup Software	NetWorker Server for Windows NT (Alpha) or *Tru64* UNIX Alternatives: VERITAS NetBackup For Windows only, consider CA ARCserve*IT*, VERITAS Backup Exec
Other Software	Archiving, Media Management Hierarchical Storage Management Enterprise Volume Manager
Services	Compaq Customer Services for planning, design, implementation or management services
NetWorker (or appropriate) Clients	
Regular client for most networked systems	
Attached devices for clients with >50 GB of data to be backed up	

Windows NT Environment	
Backup Server	*ProLiant* server running Windows NT Server
Disk Storage	RAID Array 4000 or 4100
Tape Libraries	Enterprise Backup Solution with TL895
Backup Software	VERITAS Backup Exec Alternatives: Legato NetWorker, VERITAS NetBackup, CA ARCserve*IT*
Enhancement Software	*StorageWorks* Virtual Replicator
Appropriate Client Services	Compaq Customer Services for planning, design, implementation or management services

For more information on Compaq Backup and Restore solutions, contact your authorized Compaq reseller or visit www.compaq.com

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