COMPAQ
White Paper

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Contents

Business Benefits of the Compaq Cluster Backup Solution

Abstract: Companies need to meet the growing demand for data access and application availability 24 hours a day, 7 days a week. One way that a company can achieve increased availability is with a complete backup infrastructure.

The Compaq Cluster Backup Solution provides a complete backup infrastructure that decreases downtime, increases time for profit-generating activities, simplifies backup implementation and management, ensures data integrity, and is priced to meet different customer requirements.

Notice

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Business Benefits of the Compaq Cluster Backup Solution
White Paper prepared by Tape and Optical Group

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Introduction

An increase in users and server systems within a business exponentially increases the amount of data and creates a growing demand for reliable data storage. It is critical for businesses to meet the users' need for continuous data access and application availability 24 hours a day, 7 days a week. Nothing is more critical to the success of a business than the data it runs on—data that is often irreplaceable. Companies also need a backup solution that does not interfere with production systems and the data and applications availability.

Increased data and application availability allows businesses to service a greater number of customers, optimize opportunities for revenue-producing activities, and generate more business. The Compaq Cluster Backup Solution is a low-cost, high-performance automated backup infrastructure that increases time for profit-generating activities, simplifies backup implementation and management, ensures data integrity, and is priced to meet different customer requirements.

Availability: Key to Business Success

The adage "time is money" accurately describes the business environment in which companies must achieve the highest levels of data and application availability to compete. Computer downtime resulting in an interruption of data and application availability can be devastating, resulting in lost revenues, lost opportunities, failure-to-perform fees, and non-compliance penalties. Most important is the loss of customer satisfaction in a company, and this loss is incalculable. The success of any company lies in its ability to build and retain strong customer relations, and in an era of e-business and e-commerce, availability is critical to maintain customer loyalty and business success.

Availability is the ability to continuously deliver business services as measured by the user of these services and is characterized by the perception of the users interacting with a system as part of the business process. A company is losing an exponential amount of money if data and applications are not available to the users.

Business environments require continuous, rapid processing of transactions and the assurance of data integrity. For example, an online business must be open to its customers 24 hours a day, 7 days a week, have accurate data about its services and its customers, and it must have the capability to process customer inquiries and purchases without interruption.

The Cluster Backup Solution is designed to run 24 hours a day, 7 days a week because it solves two major business problems associated with data backup and recovery: a shrinking backup window and the complexity of backing up a server system. The Cluster Backup Solution delivers quantifiable business benefits because it does the following:

- Eliminates the dependency on a backup window while providing data consolidation, redundancy, and manageability.
- Minimizes backup downtime and simplifies backup management.

Clustering Overview

Defining Clusters

Clusters provide high availability of applications and data for users. In a cluster, two or more servers (called nodes) are linked in a network and run cluster software that allows each node access to the shared SCSI bus that connects any number of disks or storage devices. Clusters improve availability by transferring applications and services to another node if a failure occurs on the primary node. This process of transferring applications and services from the primary node to a secondary node in the event of a failure is called failover. As a cluster, the group of servers offers a level of availability and scalability that exceeds the level obtained if each server node operated as a stand-alone server. Clustering translates into increased performance and availability of data and applications. Figure 1 shows a diagram of a cluster configuration.

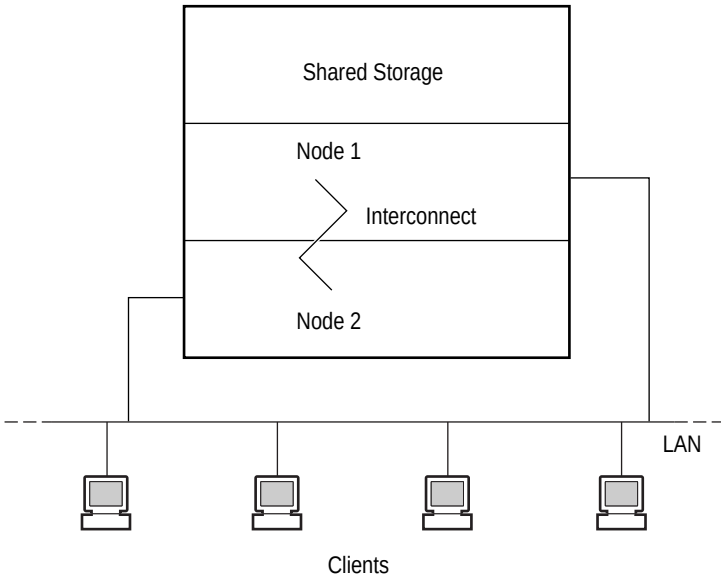

Figure 1: Cluster configuration diagram

Causes of System Downtime

System downtime is the period of time during which a computer system cannot meet the requests of its users. System downtime is inversely related to availability, which characterizes the amount of time during which a computer system can meet the needs of its users. The following are some of the leading causes of downtime:

- Software failures
- Hardware failures
- Planned maintenance
- Environmental causes

Clustering transfers applications and services in the event of a failure, and the Cluster Backup Solution ensures that a complete and automated backup is performed to protect against the loss of data and applications during a failover. The Cluster Backup Solution does not interfere with data and application availability and system performance, so the amount of system downtime is reduced and reliability is increased.

Cost of System Downtime

After considering the causes of system downtime, the next questions to consider are: "How is the computer system affected by these causes?" and "What is the cost of system downtime?"

The factors that determine the cost of system downtime are weighted differently, depending on how they affect the business and the specific applications. For example, downtime during peak hours of a point-of-sale operation will have a much greater impact on user satisfaction than downtime during an end-of-day email server backup operation.

Several factors must be included in the cost of downtime formula. To understand the true cost of computer downtime in a business environment, examine the following factors:

- Productivity loss
- Cost of servicing the failed system
- Lost transactions
- User dissatisfaction

Productivity Loss

Productivity loss measures the cost of having idle employees. Use the following steps to calculate costs associated with the loss of productivity during system downtime:

1. Determine the average hourly rate of the employees using the system.
2. Multiply the average hourly rate by the number of employees who are unable to perform their work during downtime.
3. Multiply again by the number of hours the system is not working.

Cost of Servicing a Failed System

Service technicians and system administrators are usually required to repair a failed system. This cost only measures the cost of the repair and not the lost time from other duties. Use the following steps to calculate the cost of servicing a failed system:

1. Determine, on average, how much it costs per hour to pay staff to repair the system.
2. Multiply the average hourly rate by the number of technicians and system administrators working to solve the problem.
3. Multiply again by the number of hours the system is not working.

Clustering does not prevent failures, but incorporating the Cluster Backup Solution into a cluster reduces the cost of a failed system by allowing for planned service events and avoiding costly emergency repairs. The Cluster Backup Solution minimizes downtime by automatically backing up the failed system without user intervention.

Lost Transactions

A system is performing transactions while it is up and running. These transactions may include payroll calculations for the human resource department, sales transactions at a video rental store, or ATM requests from bank customers. No transactions are being performed if the system is down. Use the following steps to calculate the cost of lost transactions:

1. Determine the type of business transactions that are performed by this computer system.
2. Estimate the revenue lost each hour when these transactions cannot be completed.
3. Multiply the estimate of lost revenue by the number of hours the system is not working.

User Dissatisfaction

System downtime causes varying levels of user dissatisfaction. Dissatisfaction can be difficult to express in specific dollar amounts, such as the cost of lost repeat sales. It may be unreasonable in a business environment to assign a specific cost to user dissatisfaction as a result of system downtime, but be aware that these hidden costs exist.

Compaq Cluster Backup Solution

The Compaq Cluster Backup Solution provides low-cost, high-performance backup solutions for the Compaq *ProLiant*™ Cluster Servers CL1850/R and CL380. The Cluster Backup Solution provides a complete backup infrastructure that increases time for profit-generating activities, simplifies backup implementation and management, ensures data integrity, and is priced to meet different customer requirements. Figure 2 shows a diagram of a Cluster Backup Solution.

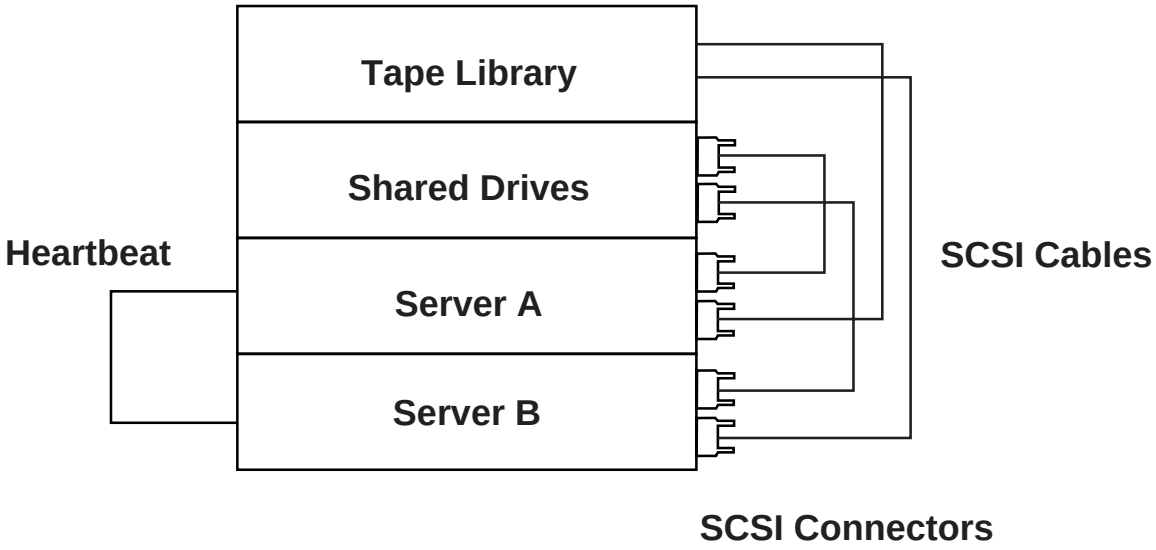

Figure 2: Cluster Backup Solution diagram

The Cluster Backup Solution enhances the cluster's ability to manage failures by providing failover support during backups. The ability to support a cluster backup comes from the backup application's ability to handle the failover and from firmware modifications on the server and tape devices. For example, if server A fails in the middle of a backup job, server B will automatically re-sync, determine that a backup was being executed, and restart the backup job without user intervention.

Key features of the Cluster Backup Solution include:

- VERITAS Backup Exec™ 8.0 and all the necessary options that provide cluster failover protection
- High availability
- Continuous failover during backup process
- High-capacity, high-performance data protection
- Priced to meet all business requirements

Cluster Backup Connectivity Kits

The Cluster Backup Connectivity kits provide security in the event of a server failure during a backup. The kits offer a complete backup solution, not just component parts. However, the Cluster Backup Connectivity kits do not include tape drive or libraries, and they must be ordered separately. The two kits available are:

- Cluster Backup Connectivity Kit – LVD (Part number 202165-B22)
- Cluster Backup Connectivity Kit – HVD (Part number 202166-B22)

Cluster Backup Connectivity Kit – LVD

This kit provides customers with all the parts and software needed to connect an LVD tape drive or library to the Compaq ProLiant Cluster Server CL1850/R and CL380. Kit features include:

- Support for Compaq *StorageWorks*™ SSL2020 AIT Library (SSL2020 AIT Library)
- Support for Compaq AIT 50 GB Tape Drive (AIT 50 GB Tape Drive)
- Support for Compaq 35/70 GB DLT Drive (35/70 GB DLT Drive)
- Support for the Compaq 64-Bit Dual Channel Wide-Ultra2 SCSI interface
- SCSI cables for connectivity
- VERITAS Backup Exec™ 8.0 for Windows 2000 and Windows NT
- VERITAS Backup Exec™ 8.0 Agent Accelerator for Windows 2000 and Windows NT
- VERITAS Backup Exec™ 8.0 Library Expansion Option for Windows 2000 and Windows NT
- Documentation for installation and setup

Figure 3 shows components of a Cluster Backup Solution – LVD.

Figure 3: Components of a Cluster Backup Solution – LVD

StorageWorks SSL2020 AIT Library Configuration

Figure 4 shows a Cluster Backup Connectivity Kit – LVD configuration using an SSL2020 AIT Library.

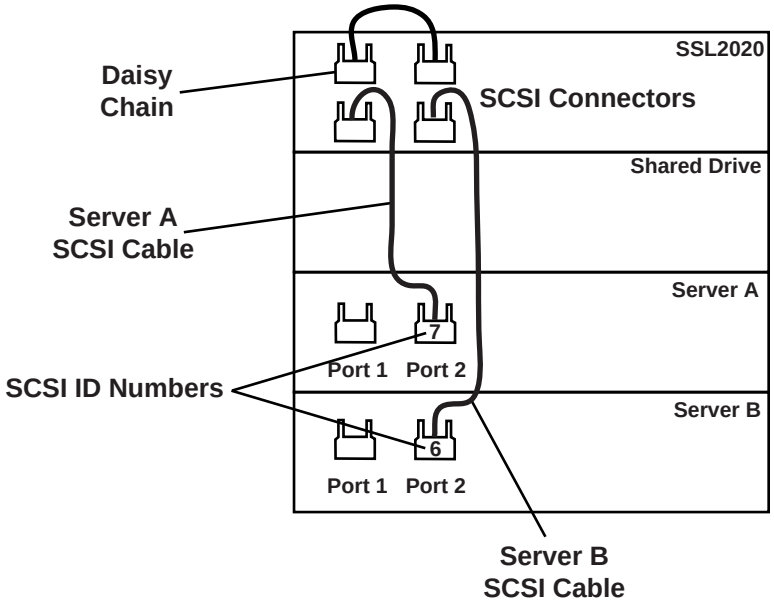

Figure 4: SSL2020 AIT Library configuration

Compaq 35/70 GB DLT Drive or Compaq AIT 50 GB Tape Drive Configuration

The Cluster Backup Connectivity Kit – LVD also provides the option of using either 35/70 GB DLT Drives or AIT 50 GB Tape Drives in the backup configuration.

IMPORTANT: Do not mix the 35/70 GB DLT Drive or the AIT 50 GB Tape Drive in the same backup configuration.

Figure 5 shows a Cluster Backup Connectivity Kit – LVD configuration using either two 35/70 GB DLT Drives or two AIT 50 GB Tape Drives.

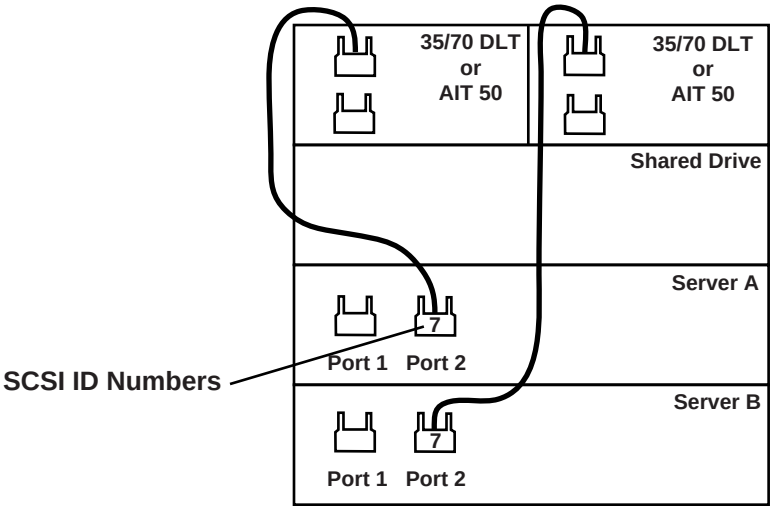

Figure 5: Dual Compaq 35/70 GB DLT Drive or Dual Compaq AIT 50 GB Tape Drive configuration

Note: In case of a server failure, the system restarts the automatic backup process on the second tape drive.

Note: A single LVD backup storage device can be configured, but it is not supported in this configuration.

Cluster Backup Connectivity Kit – HVD

This kit provides customers with all the parts and software needed to connect a HVD library to the ProLiant Cluster Server CL1850/R and CL380. Kit features include:

- Support for StorageWorks TL891 DLT Mini-Library (TL891 Mini-Library)
- Two Compaq Dual Channel Wide-Ultra SCSI-3 Controllers
- SCSI cables for connectivity
- VERITAS Backup Exec™ 8.0 for Windows 2000 and Windows NT
- VERITAS Backup Exec™ 8.0 Agent Accelerator for Windows 2000 and Windows NT
- VERITAS Backup Exec™ 8.0 Library Expansion Option for Windows 2000 and Windows NT
- Documentation for installation and setup

Figure 6 shows components of a Cluster Backup Solution – HVD.

Figure 6: Components of a Cluster Backup Solution – HVD

StorageWorks TL891 Mini-Library Configuration

Figure 7 shows a Cluster Backup Connectivity Kit – HVD configuration using a TL891 Mini-Library.

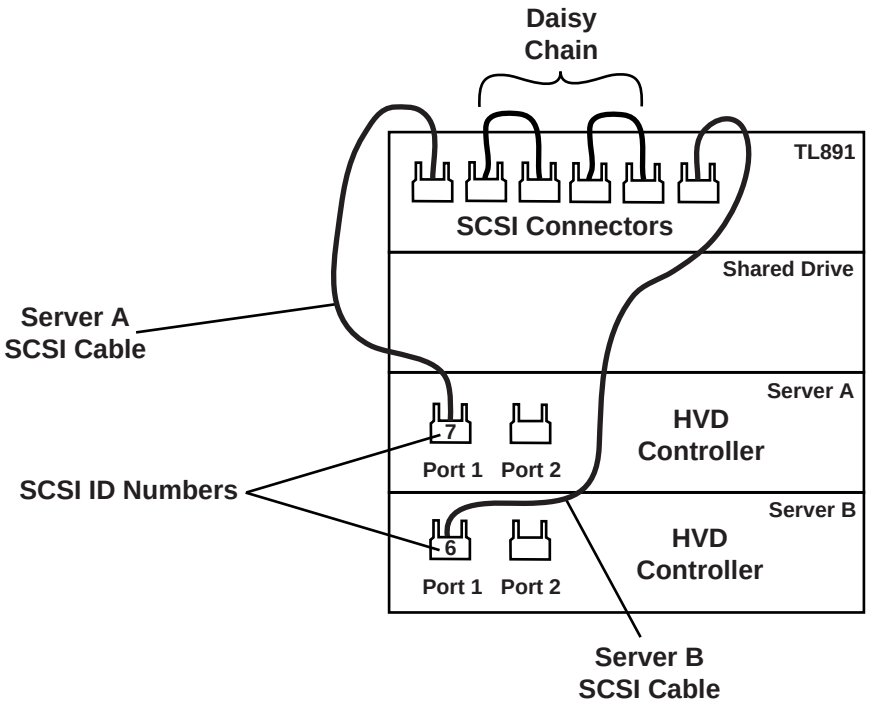

Figure 7: TL891 Mini-Library configuration

Storage Devices

As new applications become more data-intensive and data consumption rises, data storage becomes one of the most critical IT issues that a company faces. The Cluster Backup Solution provides an option for employing three different storage systems and is designed to meet the needs of a variety of users—from small businesses to data centers. A storage backup device is shared between different servers in a system. The storage systems supported by the Cluster Backup Solution include:

- StorageWorks TL891 DLT Mini-Library
- StorageWorks SSL2020 AIT Library
- Compaq external tape drives
    - Compaq AIT 50 GB Tape Drive
    - Compaq 35/70 GB DLT Drive

Storage Works TL891 DLT Mini-Library

The TL891 Mini-Library provides automated backup and restore capabilities and is targeted at large database servers running mission-critical consolidated databases. The TL891 Mini-Library provides the highest level of reliability which equates to less system downtime, shorter backup windows with high throughput capability, and redundancy for manual failover capabilities. The TL891 Mini-Library is a DLT solution that provides high levels of manageability, performance, and capacity. The TL891 Mini-Library stores up to 700 GB (2:1 compression) of data in a single unit. Figure 5 shows a TL891 Mini-Library.

Figure 8: StorageWorks TL891 DLT Mini-Library

StorageWorks SSL2020 AIT Library

The SSL2020 AIT Library provides high levels of performance and capacity. The SSL2020 AIT Library is a low-cost backup and restore solution that offers scalability and flexibility for a company's growing storage needs. The SSL2020 AIT Library can back up large amounts of data in a small backup window, and its reliability reduces downtime. The SSL2020 AIT Library supports two AIT 50-GB Tape Drives and stores up to 2 TB of data (using 2:1 compression) in a single module. Figure 6 shows an SSL2020 AIT Library.

Figure 9: StorageWorks SSL2020 AIT Library

Compaq AIT 50 GB Tape Drive

The AIT 50 GB Tape Drive provides a reliable solution for backup and storage needs. AIT 50 GB Tape Drive is a low-cost, high-performance, large-capacity tape storage device that can back up large-scale network servers and large amounts of data. The AIT 50 GB Tape Drive meets a small to medium company's growing data storage needs and is cost-effective. The AIT 50 GB Tape Drive stores up to 50 GB and 100 GB using 2:1 compression of data. Figure 10 shows an AIT 50 GB Tape Drive.

Figure 10: Compaq AIT 50 GB Tape Drive

Compaq 35/70 GB DLT Drive

The 35/70 GB DLT Drive provides an upward migration path to higher performance and greater storage capacity for backup. The 35/70 GB DLT Drive meets the growing backup demands and is four times faster with over twice the capacity of the Compaq 15/30 GB DLT Drive. The 35/70 GB DLT Drive provides 8 MB of built-in cache optimal for high levels of performance. The 35/70 GB DLT Drive stores up to 35 GB (native) and 70 GB using 2:1 compression of data. Figure 12 shows a Compaq 35/70 GB DLT Drive.

Figure 11: Compaq 35/70 GB DLT Drive

Business Benefits

The Cluster Backup Solution is a modular, end-to-end protection environment for both primary and secondary storage. The solution is tailored to the specific needs of a company and provides a complete backup infrastructure.

Table 1. Business Benefits at a Glance

Feature	Business Benefits	Operational Benefits
Backup	Minimum disruption to business operations	Increased data and application availability
	Ability to back up without impact to production systems	Increased system uptime
Storage management	Time and cost savings	Improves reliability and productivity
	Improves utilization of personnel	Ensures data integrity

Automated Backup for Primary Server

The Cluster Backup Solution frees businesses from backup window restrictions because its backup procedures do not interfere with data availability and application. This means that there is minimal or no disruption to business. Increased availability of data and applications results in greater revenues and increased customer satisfaction.

Increased Time for Profit-Generating Activities

The Cluster Backup Solution provides significant financial benefits for businesses. By eliminating system downtime, the solution allows companies to optimize their revenue-generating activities, generate more business, and service and satisfy a greater number of customers.

This backup solution includes all the necessary components for a complete backup infrastructure, such as applications, hardware, backup software, and services. With the Cluster Backup Solution, personnel costs and efforts are reduced. This results in significant time and cost savings for any business.

Total Compaq Solution

Some of the most important needs in the industry are maintaining server integrity, providing 100 percent uptime, and increasing storage capacities. The Compaq Cluster Backup Solution kit provides complete failover protection during backup. The kit provides a complete solution that does the following:

- Increases time for profit-generating activities
- Simplifies backup implementation and management
- Ensures data integrity
- Priced to meet different customer requirements

An extended warranty and installation and startup services are available with the Compaq Cluster Backup Solution kits. Installation and startup services provide quick deployment when short installation times and dependable results immediately translate into increased profits.