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Contents

Business Benefits of Non-Disruptive Backup Solution for Windows NT

Abstract: This paper examines the business issues associated with backup and recovery, and explores the strategic and tactical advantages of the Non-Disruptive Backup Solution for Windows NT- a complete, characterized, and integrated backup infrastructure that enhances the application availability of business-critical systems. Today's business model increasingly requires 24*7 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. The document includes both customer and analyst endorsements.

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Business Benefits of Non-Disruptive Backup Solution for Windows NT
White Paper prepared by Storage Products Division

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I. Executive Overview

In the Internet age, backup windows are a thing of the past. As companies move from a conventional to an e-business model, their data and applications must be available 24 hours a day, 7 days a week. As a result, businesses need a backup infrastructure that does not interfere with the availability and performance of their primary storage systems. In addition, setting up a backup strategy has become increasingly complex.

The *Non-Disruptive Backup Solution* is a *Compaq NonStop*™ eBusiness solution designed for businesses that need to run 24x7—especially those that rely on e-commerce, Oracle databases, and Microsoft® Exchange. This integrated storage solution solves the two major business problems associated with backup and recovery today:

- **Shrinking backup window**

- **Complexity of backup**

The *Non-Disruptive Backup Solution* is a combination of products and services that provides a complete backup infrastructure for both Storage Area Networks (SAN) and SCSI direct-attached secondary storage environments. Intended for users of *Compaq StorageWorks RAID Array* RA8000 and *Enterprise Storage Array* ESA12000 systems, it provides a qualified, characterized backup solution. 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. This solution initially supports Windows NT®, and will also support Sun Solaris and *Compaq Tru64 UNIX®* later in the year 2000.

Because it minimizes backup downtime and simplifies backup management, the *Non-Disruptive Backup Solution* delivers quantifiable business benefits. It eliminates dependency on a backup window—while providing the consolidation, redundancy, and manageability benefits of tape automation.

> *"By using Compaq's Non-Disruptive Backup Solution in our data warehouse applications, we reduced planned downtime from over 6 hours to just 15 minutes, giving us a full day of system uptime and application availability each week as we manage a 24X7 operation."*
> —Tim Donar, System Architect, Acxiom Corporation

> *"NT Server is now taking a place alongside mainframe and UNIX operating systems as a major platform for business critical applications. Compaq's* **Non-Disruptive Backup Solution** *helps ensure 24x7 availability of NT applications by eliminating the backup window and makes network bandwidth more available by moving high volume data transfer traffic from disk to tape off the LAN. A centralized backup strategy for NT storage can also be implemented to ensure backup consistency and restoration reliability"*
> —John Webster, Illuminata

II. Solution Description

The *Non-Disruptive Backup Solution for Windows NT* is a qualified, fully integrated configuration of hardware, applications, backup software, and services that allows businesses to perform backup with minimal disruption of production systems.
It provides a backup infrastructure for both SAN (dual loop or switched fabric) and SCSI (direct-attached) secondary storage environments—resulting in an end-to-end data protection environment for both primary and secondary storage.

The solution provides the ultimate integrated storage and backup solution for medium to large companies that depend on e-commerce, finance, online transaction processing, mail and messaging, and business-critical Windows NT applications.

In addition to being compatible with popular third-party backup software, the solution has been characterized with Oracle and Microsoft Exchange on *Compaq ProLiant* servers. The solution includes configuration and performance 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.

The *Non-Disruptive Backup Solution* uses the snapshot and cloning capabilities of the *StorageWorks* HSG80 RAID controller, using the *SANworks Enterprise Volume Manager (EVM)* coupled with various primary and secondary storage strategies. A key part of the *Non-Disruptive Backup Solution*, *Enterprise Volume Manager* is web-based software that manages controller-based clone and snapshot operations.

EVM lets you create, in background mode, independently addressable volumes for open system information storage. The volumes are virtual copies of active production volumes. This parallel processing enables you to redirect workloads and perform non-disruptive backups—while maintaining normal business operations. *EVM* can be used to meet business continuance requirements by minimizing application downtime. Because all backup operations are done on the clone or snapshot—rather than on the live data—the performance impact on the production system is minimized during the backup process, and application availability is enhanced.

Solution Components

- *Compaq SANworks Enterprise Volume Manager (EVM)* with scripts for third-party backup software and primary data applications
    - Third-party backup software: Legato NetWorker, VERITAS Backup Exec, and Computer Associates ARCserve*IT* (others to follow)
    - Applications: Oracle8 and Microsoft Exchange 5.5
- *Compaq StorageWorks* RA8000 o*r* ESA12000 with HSG80 and ACS 8.5 (F or S) controller firmware
- Choice of Compaq backup device:
    - Tape Library: TL891, TL895, ESL9326D
    - *Compaq Enterprise Backup Solution (EBS)*: *EBS* for Departments, *EBS* for Data Centers
- SCSI or Fibre Channel (dual loop or switched fabric) interconnect to secondary storage
- *Compaq Batch Scheduler*
- Usability information: configuration, performance, and characterization data
- Windows NT backup server with Legato NetWorker, VERITAS Backup Exec, or Computer Associates ARCserve*IT*
- Tested on Oracle and Microsoft Exchange
- Standard Compaq 3-year warranty

- Single bundled part number for pre-configured entry-level, mainstream, or enterprise-class solutions, or customized package to met specific requirements
- Optional services, including 24x7 warranty uplift, installation and startup services, and more

Backup Evolution

When considering a backup methodology, it is helpful to understand the evolution of backup. On-Line Local Backup, described in figure 1, shows how data is backed-up when each server has dedicated primary and secondary storage. While this is an effective way to backup data, some major disadvantages are: there is no central administration of backup, there is no sharing of data resources, and the application is unavailable to the business during backup.

Figure 2 shows the next step in backup evolution, On-Line Backup on a Local Area Network (LAN), developed as a result of the limitations of local backup. The LAN allows central management and sharing of backup resources, but primary storage is still dedicated to the server. The key disadvantage of this technique is performance. Performance on a LAN is degraded, as compared to local backup because backup jobs and application data contend for bandwidth. As with local backup, the application is unavailable to the business during backup.

On-Line Backup on a Storage Area Network (SAN) is described in figure 3. The SAN permits the sharing of both primary and secondary storage, allowing for consolidation of storage resources as well as shared primary and secondary storage. The SAN has a performance advantage over LAN-based backup in that its fibre channel infrastructure offers the speed of fibre interconnects. However, the SAN still has the problem depicted in the previous 2 scenarios: the application is unavailable to the business during the backup process.

The most recent phase in the evolution of backup is Non-Disruptive Backup, shown in figure 4. Non-Disruptive Backup incorporates the benefits of SAN-based storage with off-line backup using Enterprise Volume Manager software, solving the problem of application availability. It also provides the benefits of a SAN: centralized management, storage consolidation, and shared storage resources. Figures 5 and 6 further describe non-disruptive backup by demonstrating the cloning and snapshot capabilities of the Non-Disruptive Backup Solution.
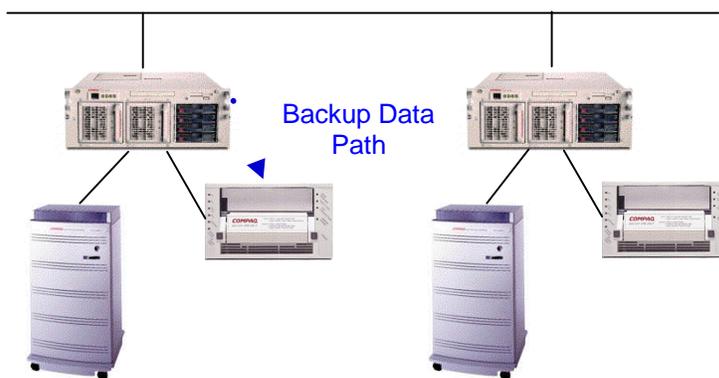
Backup Data Path

- Each application server is attached to the LAN
- Each server has local disks for primary storage
- Tape drives are either embedded in the server or locally attached for server backup
- Advantages:
  - Performance
- Disadvantages:
  - No central administration of backup
  - No sharing of resources
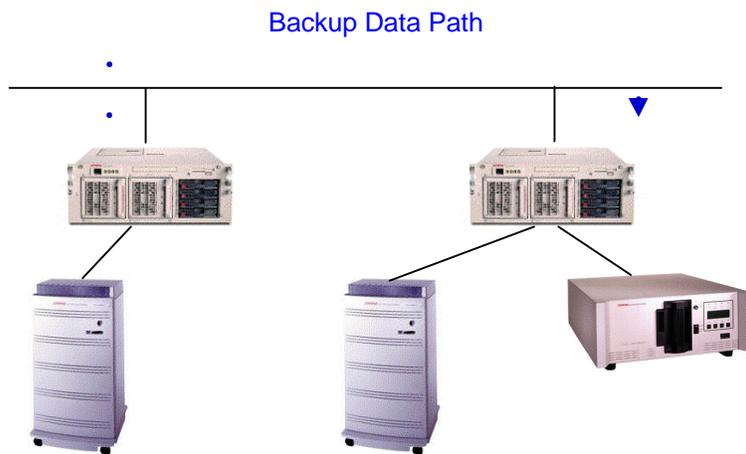 - Application unavailable during backup

Figure 1: On-line local backup

Backup Data Path

- Each application server is attached to the LAN.
- Each server has local disks for primary storage.
- One server is designated as a backup server and is responsible for tape automation device.
- Advantage:
  - Shared backup resources via LAN
  - Central management
- Disadvantages:
  - Performance during backup
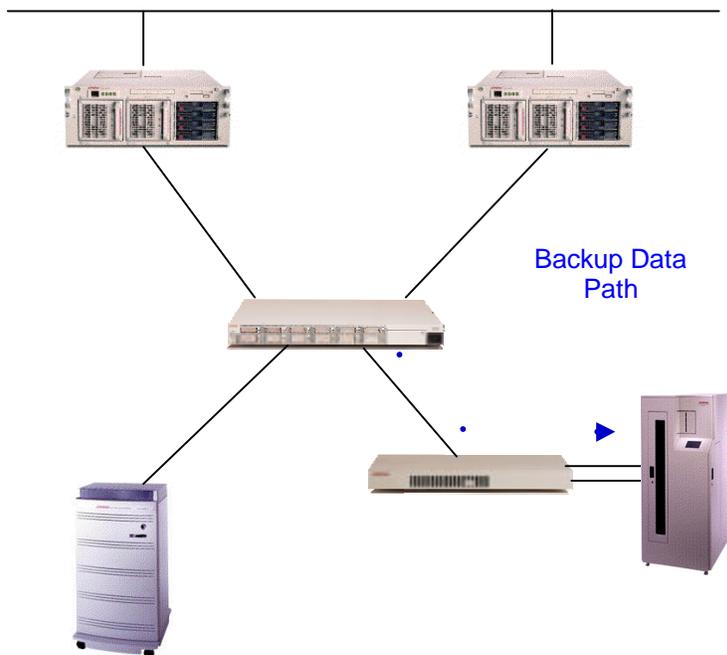 - Application unavailable during backup

Figure 2: On-line backup on a local-area-network (LAN)

Backup Data Path

- Each application server is attached to the SAN
- SAN attached disks for primary storage
- SAN attached tape automation for secondary storage
- Advantages:
  - Shared backup resources via SAN
  - Storage consolidation
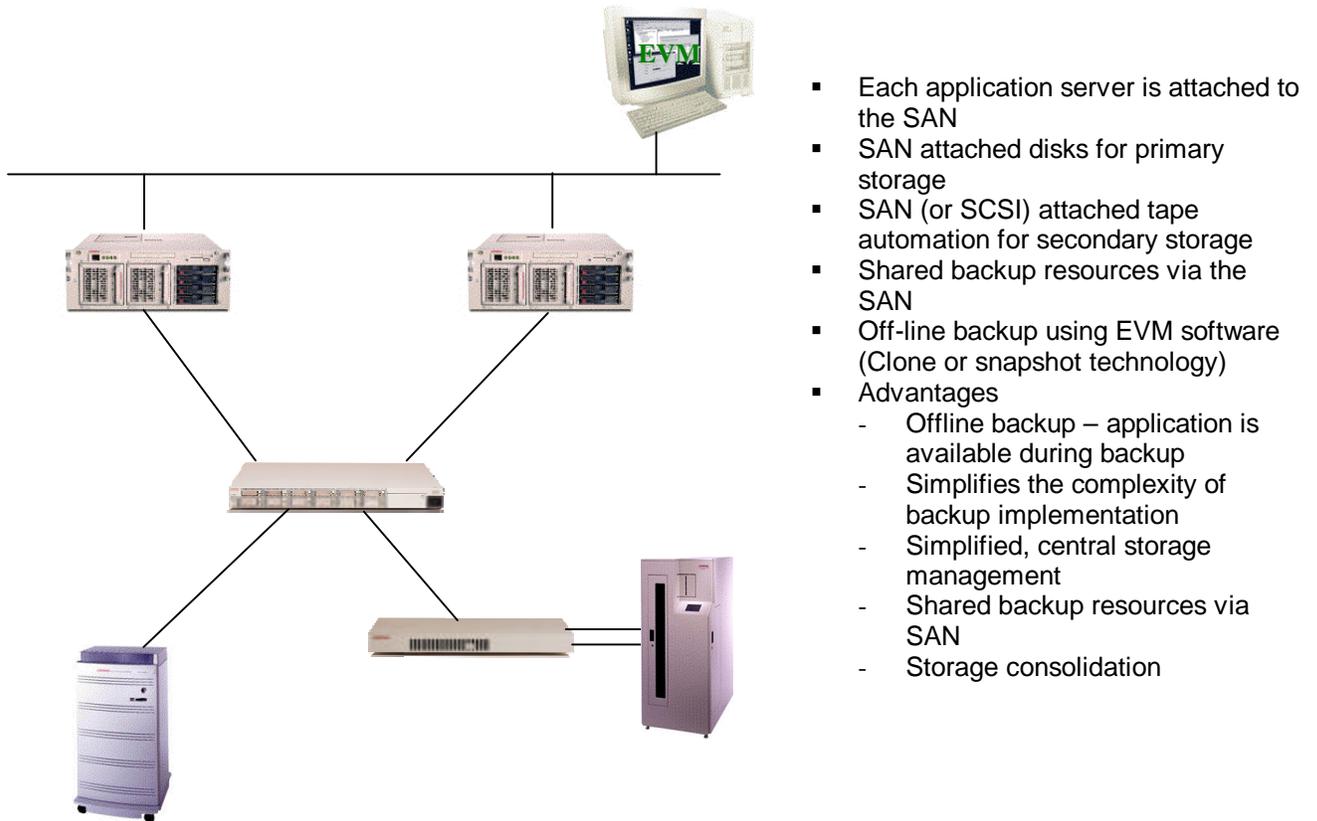- Disadvantage: Application unavailable during backup

Figure 3: On-line backup on a storage area network (SAN)

- Each application server is attached to the SAN
- SAN attached disks for primary storage
- SAN (or SCSI) attached tape automation for secondary storage
- Shared backup resources via the SAN
- Off-line backup using EVM software (Clone or snapshot technology)
- Advantages
  - Offline backup – application is available during backup
  - Simplifies the complexity of backup implementation
  - Simplified, central storage management
  - Shared backup resources via SAN
  - Storage consolidation

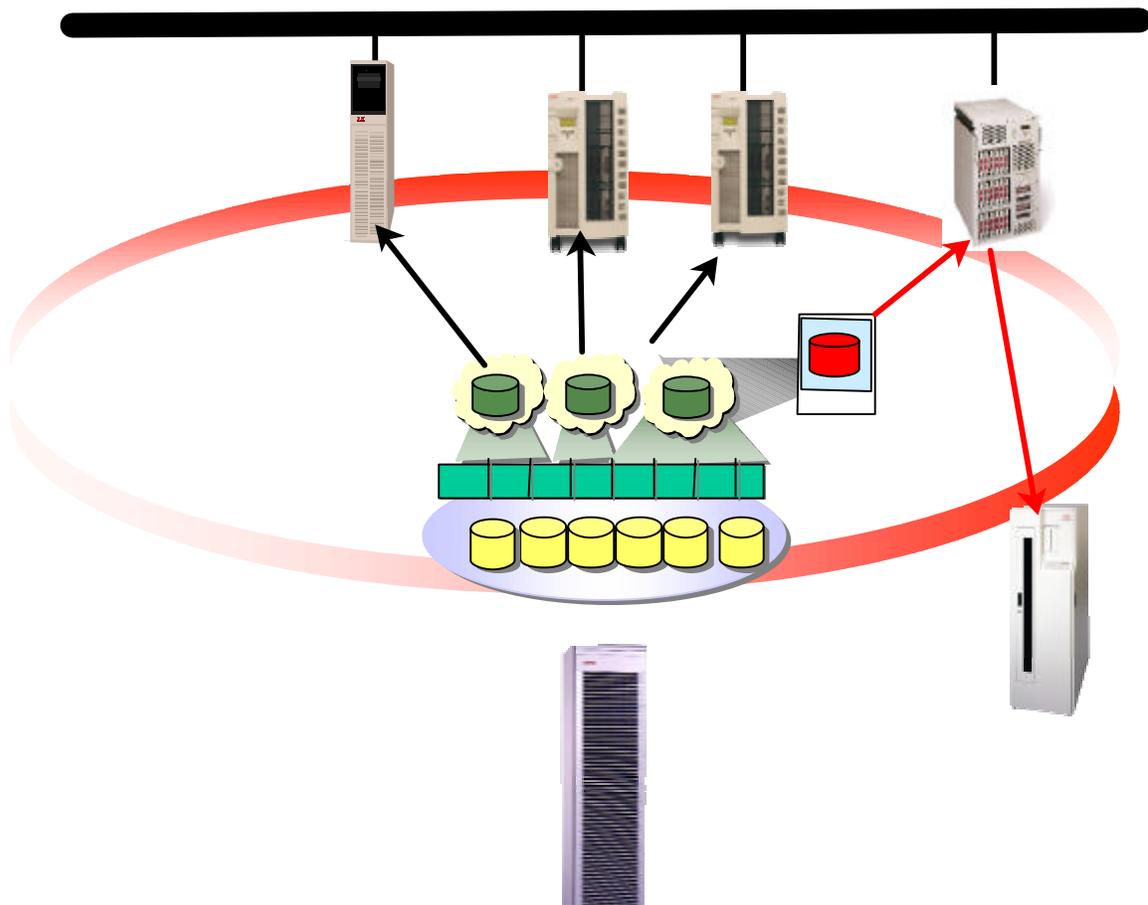**Figure 4: Non-Disruptive Backup**

Cloning with the Non-Disruptive Backup Solution
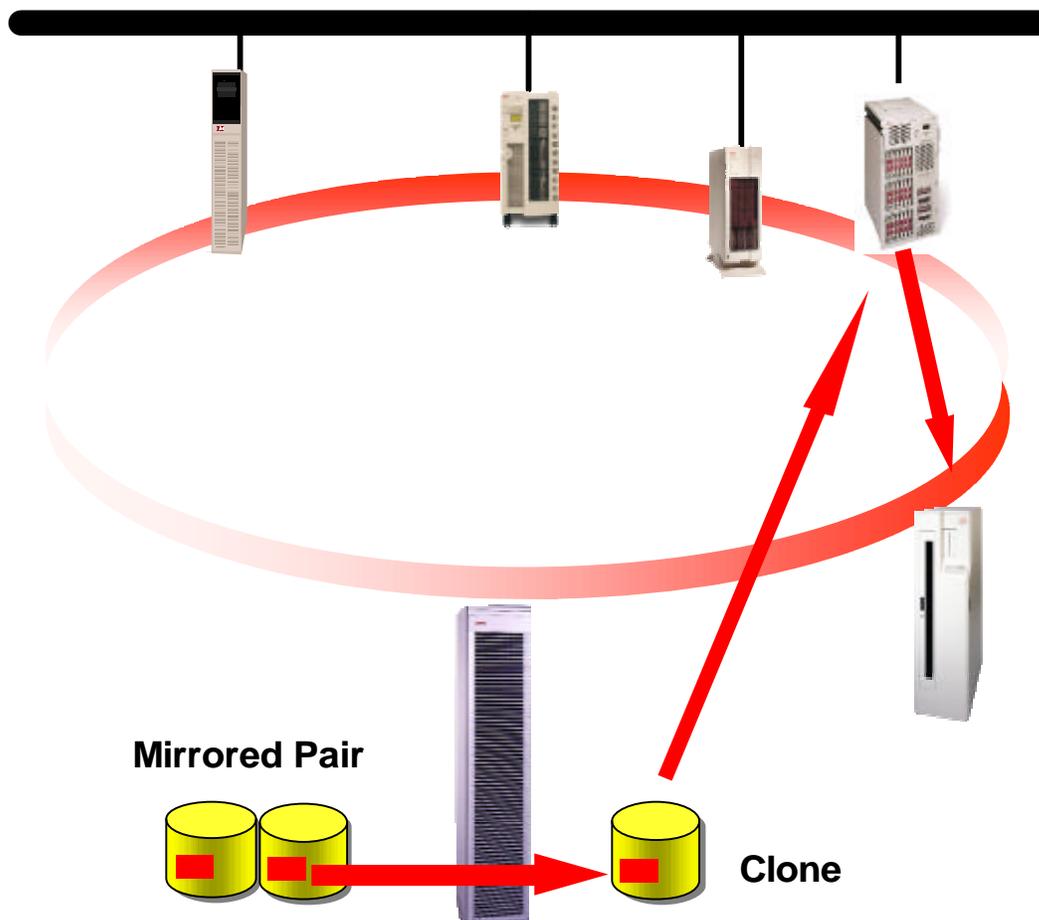
- Create a clone of the data (mirror)
- Quiesce the Exchange or Oracle database
- Split off the clone (a separate physical copy)
- Restart the database
- Mount the clone on the backup server
- Backup the clone to tape

Figure 5: Cloning with the Non-Disruptive Backup Solution

Snapshot with the Non-Disruptive Backup Solution

- Quiesce Exchange or Oracle
- Create a point in time snapshot (a virtual copy) of the data
- Restart the application
- Mount the snapshot on the backup server
- Backup the snapshot to tape

Figure 6: Snapshot with the Non-Disruptive Backup Solution

III. Business Benefits

Benefits at a Glance				
Feature	**Traditional Method**	**Compaq Non-Disruptive Backup Solution**	**Business Benefits**	**Operational Benefits**
Backup	Backup to tape	Backup to snapshot, clone, or tape— tested on Oracle and Exchange	Minimum disruption to business operations Ability to backup without impact to production systems	Increased application availability and production system uptime
Storage Manage-ment	Manual, complex, labor-intensive	Scripted, automated characterized configurations using industry-standard components	Time and cost savings Improves utilization of personnel resources	Improves reliability and productivity

Provides a complete backup infrastructure

The *Non-Disruptive Backup Solution* is a modular, end-to-end data protection environment for both primary and secondary storage. The solution can be tailored to the specific needs of the business. For example, it can be implemented immediately in a direct-attached, SCSI environment and later added to a Compaq SAN. This simplifies the deployment of backup—while accommodating future needs.

Offloads backup responsibility from application server

This solution frees businesses from backup window restrictions because its backup procedures do not interfere with the availability and performance of primary application data. This means minimal or no disruption to business operations. In fact, the solution significantly reduces downtime of production systems due to backup. Increased uptime can result in greater revenues and increased customer satisfaction—which is critical for 24x7 operations and e-commerce applications that require 100% availability of production systems.

Increases time for profit-generating activities

The *Non-Disruptive Backup Solution* can provide significant financial benefits for businesses. By eliminating planned downtime, companies can generate more business, service a greater number of customers, and optimize their revenue-producing activities.

Simplifies backup implementation and management

The backup and restore process is the most difficult challenge in the storage arena today. Backup technologies have become increasingly complex, third party software products add to the complexity, and databases impose unique formats—resulting in difficulty designing and operating backup systems. More importantly, the complexity of the implementation leaves many businesses uncomfortable with the integrity of the backup data.

The *Non-Disruptive Backup Solution* provides easy implementation of backup strategies, including customizable scripts, and the integration of all necessary components— applications, hardware, backup software, services, and real usability information. It also includes extensive performance, sizing and configuration data. As a result, personnel costs and efforts are reduced—resulting in significant time and cost savings to businesses. Additionally, integrity of the backup data is ensured.

Improves the availability of Oracle and Exchange

Today, most business-critical applications for Windows NT involve either Oracle or Microsoft Exchange. The *Non-Disruptive Backup Solution* significantly improves Exchange and Oracle availability because it delivers immediate backup for Exchange and Oracle.

Ensures data integrity

The *Non-Disruptive Backup Solution* uses *EVM* software to transfer point-in-time consistent data to the production volume copy, which ensures that data is accurate and current.

Provides investment protection

The *Non-Disruptive Backup Solution* leverages existing hardware/software and uses standard Compaq components—thus protecting past investments. And because it supports a wide variety of configurations and is compatible with future ENSA products, future investment protection is ensured as well.

Supports popular third-party backup software

Not only can businesses use their favorite third-party backup software, they can use it with complete confidence because the solution is pre-tested. Legato NetWorker, VERITAS Backup Exec, and Computer Associates ARCserve*IT* are qualified and characterized on the *Non-Disruptive Backup Solution*—ensuring compatibility with the company's existing environments and operations.

Offers non-stop warranty protection

Companies can choose from a many optional extended warranty and/or installation and startup services—as needed to support the business. The extended, 24x7 warranty offers non-stop warranty protection. Installation and startup services ensure that the solution is up and running quickly and ready for use with the required application. The resulting quick deployment and solution health check is a benefit to business applications where short installation times and dependable results immediately translate into increased profits.

Learn more

For more information on the Non-Disruptive Backup Solution, please contact your Compaq representative, or visit the following websites:

Compaq StorageWorks Non-Disruptive Backup Solution:
http://www.compaq.com/products/storageworks/solutions/non-disruptive/wntindex.html

Compaq Storage Solutions:
http://www.compaq.com/products/storageworks/menu_solutions.html

Compaq SANworks Enterprise Volume Manager (EVM):
http://www.compaq.com/products/storageworks/Storage-Management-Software/evmindex.html

Compaq Tape Storage Systems:
http://www.compaq.com/products/storageworks/tape_optical_storage.html

Compaq StorageWorks RAID Arrays:
http://www.compaq.com/products/storageworks/raidstoragesystems.html

Compaq NonStop eBusiness Solutions:
http://www.compaq.com/strategy/