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# Enterprise Backup Solution for Computer Associates ARCserve *IT*

*Abstract:* The Compaq StorageWorks Enterprise Backup Solution is an integration of backup and restore application software and industry-standard hardware providing a complete enterprise-class solution. Compaq has partnered with Computer Associates (CA) to provide a solution that supports the backup and restore of homogeneous operating systems using CA ARCserve *IT* software.

This document provides an overview of the Enterprise Backup Solution for CA ARCserve *IT*.

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## Introduction

**Note:** This paper includes the terms *fibre* and *fiber*. Fibre is the international spelling that refers to the Fibre Channel Standards that include optical and copper media. Fiber refers to the optical media used to implement Fibre Channel.

ARCserveIT from Computer Associates (CA) is a Microsoft Windows NT and Novell NetWare data protection solution for growing networks. ARCserveIT incorporates database protection and storage management options for storage area network (SAN) environments.

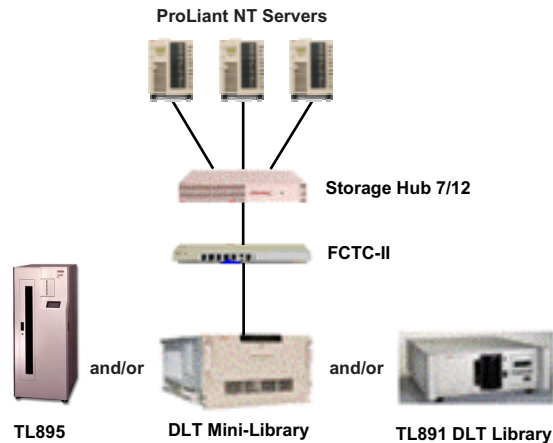
Compaq has partnered with CA to provide an enterprise backup solution using the speed and scalability of Fibre Channel technology. Compaq supports the backup and restore of homogeneous operating systems using ARCserveIT software. This enterprise backup solution (EBS) with ARCserveIT uses a SAN that provides dedicated bandwidth that is independent of the local area network (LAN). This independence allows single or multiple backup or restore jobs to run without the network traffic that is caused by traditional data protection environments.

This white paper explains how data backup and restore is provided with ARCserveIT using an automated digital linear tape (DLT) library and Fibre Channel technology. ARCserveIT incorporates database protection and storage management agents and options for SAN environments. These agents are specifically designed for:

- Complex messaging
- Transaction-intensive databases
- Storage system management and server recovery options that can be installed from any centralized backup server

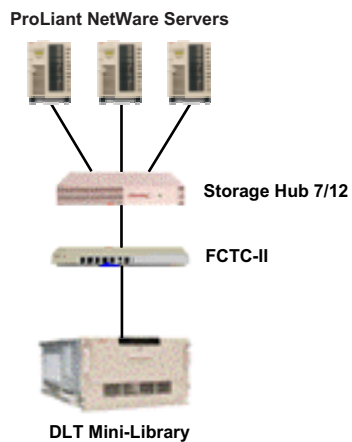
This solution includes Compaq ProLiant servers sharing DLT libraries interconnected through a StorageWorks Fibre Channel Storage Hub 7 or StorageWorks Fibre Channel Storage Hub 12 and Fibre Channel tape controllers. The servers can be running either Microsoft Windows NT 4.0 or Novell NetWare homogeneously.

Figure 1 shows a configuration using ProLiant servers that are running Windows NT.



**Figure 1: Enterprise Backup Solution for Computer Associates ARCserveIT in a ProLiant NT environment**

Figure 2 shows a configuration using ProLiant servers that are running NetWare.



**Figure 2: Enterprise Backup Solution for Computer Associates ARCserve/IT in a ProLiant NetWare environment**

The ARCserve/IT application manages backup operations across the enterprise from any location.

## Servers and Operating Systems

The following ProLiant servers can be used in this solution and must be running Microsoft Windows NT 4.0 with SP 4 (or later) or Novell NetWare 4.11 (or later):

- ProLiant 800
- ProLiant 1500
- ProLiant 1600
- ProLiant 1850
- ProLiant 2500
- ProLiant 3000
- ProLiant 4500
- ProLiant 5000
- ProLiant 5500
- ProLiant 6000
- ProLiant 6400
- ProLiant 6500
- ProLiant 7000
- ProLiant 8000
- ProLiant 8500

## Enterprise Backup Solution Components

The components described in this solution consist of the following libraries, ProLiant servers, Fibre Channel tape controllers, Fibre Channel hubs, and a Fibre Channel Host Bus Adapter.

- DLT 35/70 Mini-Library
- TL891 MiniLibrary
- TL895 DLT Library
- Compaq ProLiant server running Windows NT with SP 4 (or later)
- Compaq ProLiant server running Novell NetWare 4.11 (or later)
- Fibre Channel Tape Controller
- Fibre Channel Tape Controller-II
- Compaq StorageWorks Fibre Channel Storage Hub 7
- Compaq StorageWorks Fibre Channel Storage Hub 12
- Compaq StorageWorks Fibre Channel Host Bus Adapter

Each server in the EBS needs to have a Fibre Channel Host Bus Adapter installed in a PCI slot. The Host Bus Adapter is a bus master device that takes advantage of the PCI architecture by performing high-speed data transfers.

The most important components of the EBS are the tape libraries. The DLT libraries automate the tape handling process which frees valuable administrative resources. The automated tape libraries provide dedicated service 24 hours a day, 7 days a week.

EBS can support more than one library for scaling and performance needs. CA ARCserveIT for Windows NT can support any mix of the DLT 35/70 Mini-Library, the TL 891 MiniLibrary, and the TL 895 DLT Library.

## Libraries

### DLT 35/70 Mini-Library

Tape library automation is an important element of the Compaq StorageWorks Enterprise Backup Solution. The DLT 35/70 Mini-Library:

- Contains up to two DLT 35/70 tape drives
- Stores up to 1 TB of data on 15 tapes (using 2:1 compression)

### TL891 MiniLibrary

The TL891 MiniLibrary:

- Comes in a single rack (4U height) or workbench configuration
- Supports up to two DLT 35/70 drives, offering up to 10 MB/s of native performance
- Provides up to 700 GB (using 2:1 compression) of storage

## TL895 DLT Library

The TL895 is a high-performance, free-standing DLT library that:

- Contains a 96-slot automated library unit
- Provides up to 6.7 TB of mass storage capacity (using 2:1 compression)
- Supports from two to seven DLT 35/70 drives
- Contains a four-cartridge pass-through load port for adding or maintaining DLT cartridges
- Supports the ProLiant series servers

Adding the TL895 to the EBS product mix provides:

- **Increased performance**—The TL895 offers up to seven DLT 35/70 drives for transfer rates up to 180 GB/h (using 2:1 compression).
- **Increased scalability**—The TL895 is available in two- to seven-drive configurations to match performance and retention needs, allowing lights-out operations.

## Fibre Channel Tape Controllers

### Fibre Channel Tape Controller

The Fibre Channel Tape Controller (FCTC) translates the Fibre Channel protocol to a SCSI protocol between the Fibre Channel Network and the Differential SCSI devices. This translation of protocols allows the sharing of the tape libraries. The FCTC controller handles single-channel in/single-channel out SCSI. The FCTC comes in a rack mountable, 1U form factor.

For maximum throughput, Compaq recommends attaching up to two DLT drives per FCTC.

### Fibre Channel Tape Controller-II

The FCTC-II provides the capability to attach SCSI DLT Libraries to the Fibre Channel SAN. Each FCTC-II has a single Fibre Channel connection and dual 20 MB/s SCSI buses, each of which can be connected to a maximum of two tape drives per bus for a total of four DLT 35/70 drives.

Gigabit Interface Converters (GBICs) are used for media interface. The FCTC-II supports either short-wave<sup>1</sup> (GBIC-SW) or long-wave (GBIC-LW) GBICs. Although GBIC-LWs support up to 10 Km (6.2 miles) between components, Compaq recommends that the sum of the lengths of all of the segments in the Fibre Channel arbitrated loop (FC-AL) for this solution be limited to 2.8 Km (1.7 miles).

The FCTC-II is rack-mountable and has a 1U form factor.

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<sup>1</sup> The FCTC-II ships with one short-wave GBIC.

## Fibre Channel Storage Hubs

### Compaq StorageWorks Fibre Channel Storage Hub 7

The Storage Hub 7 is a seven-port hub that creates a 100 MB/s Fibre Channel arbitrated loop (FC-AL). The Storage Hub 7 connects up to seven Fibre Channel components, which enables multiple servers and tape devices to be connected to an FC-AL for a centralized backup solution. A 1U rack-mounting kit is available for the Storage Hub 7.

If a cascaded configuration or hub management is needed in a Windows NT environment to further optimize this solution, replace the Storage Hub 7 with the Compaq StorageWorks Fibre Channel Storage Hub 12.

### Compaq StorageWorks Fibre Channel Storage Hub 12

A single Fibre Channel Storage Hub 12 is a 12-port hub that creates a 100 MB/s FC-AL. The Storage Hub 12 connects up to 12 Fibre Channel components, which enables multiple servers and tape devices to be connected to a FC-AL for a centralized backup solution.

For example, nine servers can be connected to the storage hub, leaving three available ports for connection to Fibre Channel Tape Controllers. Every Storage Hub 12 includes both a rack-mounting kit and rubber feet for desktop use. The rack-mountable Storage Hub 12 has a 1U form factor.

The Storage Hub 12 offers an optional module which provides management for the Storage Hub 12. Features include the following:

- Topology Mapping of devices and nodes
- Hub status
- Port and Interconnect diagnostics
- Node status monitoring

Additionally, two Storage Hub 12s can be cascaded together to provide connections for up to 22 devices. Compaq currently supports a maximum of 20 servers on one loop. This allows up to eight DLT drives to be connected into a one-hop, cascaded solution. For additional server counts, more than one EBS solution may be implemented.



# Enterprise Backup Solution Architecture Configurations

## Typical Windows NT Configuration

The typical EBS configuration for Windows NT consists of multiple ProLiant servers running Windows NT 4.0 and an EBS tape library.

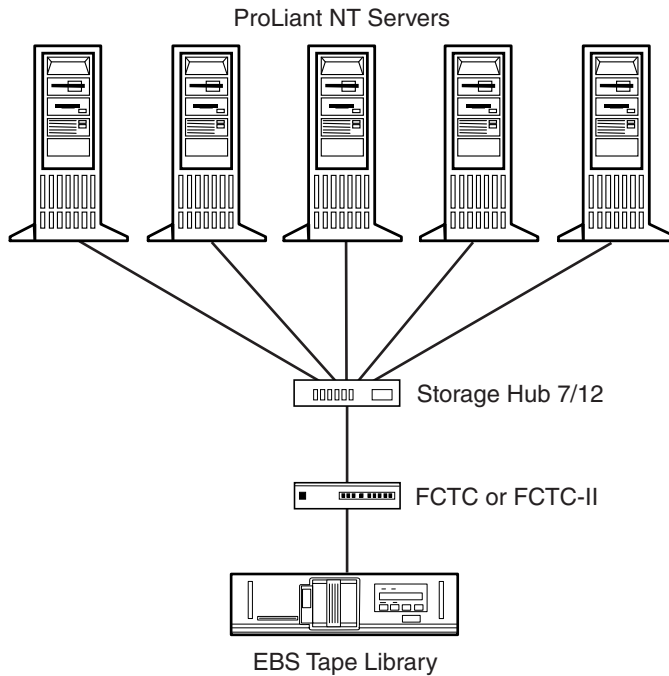


Figure 3: Typical Windows NT configuration

## Maximum Windows NT Server Configuration

The current EBS for ARCserveIT supports a maximum of 20 servers in a cascaded 12 port hub environment as shown in Figure 4. This configuration supports up to eight DLT drives and can be changed to increase backup speeds and for shorter backup windows. For every server that is eliminated, up to four drives can be added with the FCTC-II to increase the aggregate throughput of the EBS. See the “Sizer Utility” section to determine performance of the EBS.

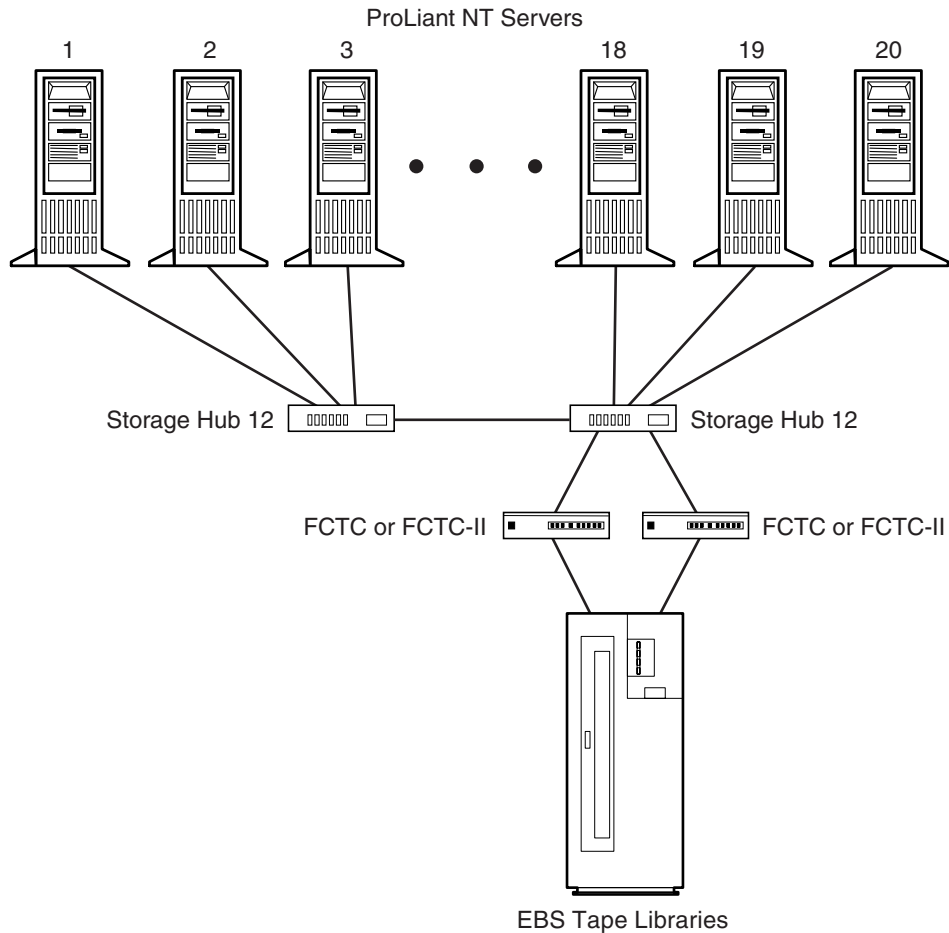
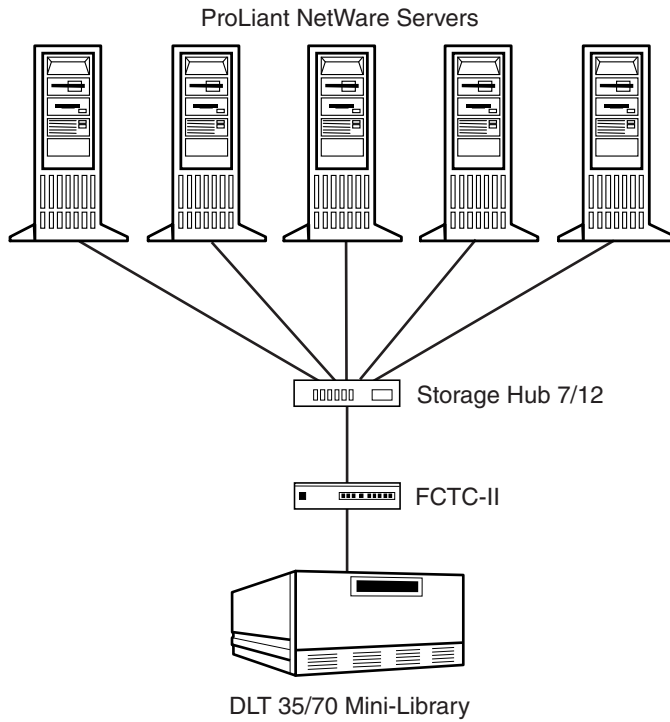


Figure 4: Maximum Windows NT server configuration

## Typical NetWare Configuration

EBS for ARCserveIT also supports a NetWare environment. NetWare servers connect to the DLT 35/70 library through the SAN.



**Figure 5: Typical NetWare configuration**

## Maximum NetWare Server Configuration

The EBS ARCserveIT NetWare configuration supports any one of the following configurations:

- Nine servers and one DLT 35/70 Mini-Library
- Eight servers and two DLT 35/70 Mini-Libraries
- Seven servers and three DLT 35/70 Mini-Libraries

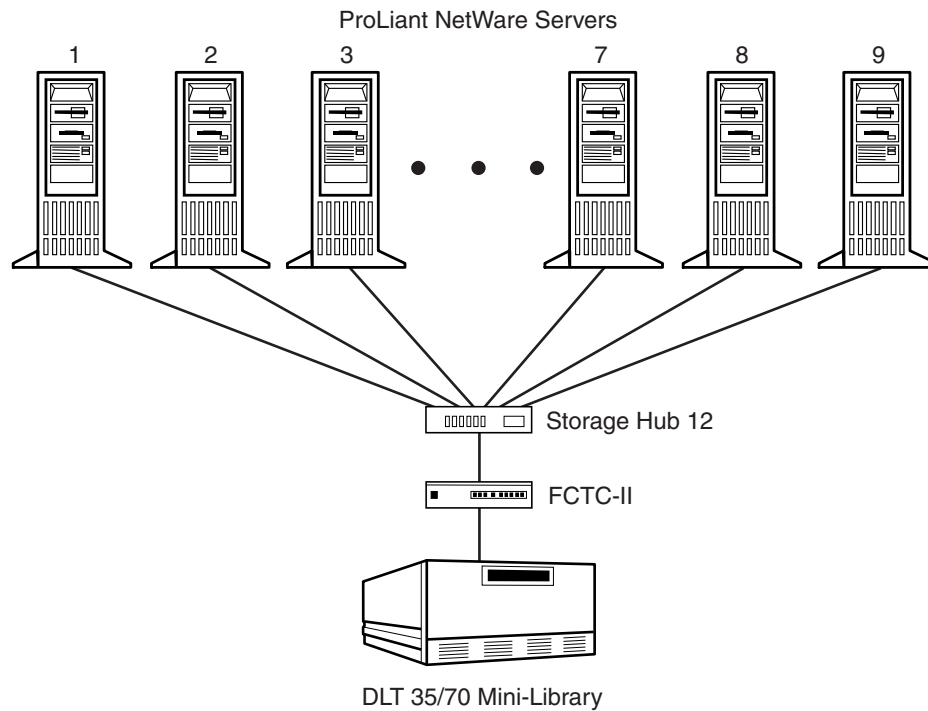


Figure 6: Maximum NetWare server configuration

## Enterprise Backup Solution Management Software

The software for this solution includes:

- Computer Associates ARCserveIT
- Compaq StorageWorks Command Console<sup>2</sup>
- Compaq User Diagnostics
- Compaq Insight Manager
- Compaq Insight Manager XE

<sup>2</sup> Not supported in a NetWare environment.

## Computer Associates ARCserveIT

ARCserveIT is a complete suite of solutions that provides:

- High performance
- Ease of administration
- Reliable data protection
- Policy-based data management
- Online backup of applications
- Fast disaster recovery
- Advanced media management
- Support for Fibre Channel storage networks

## Advantages

ARCserveIT provides the following advantages:

- Integrated client support
- Integrated autoloader support
- Extensive device support
- Microsoft Tape Format (MTF) compatible
- Proactive backup
- Data verification
- Advanced scheduling
- Media management
- Extensive reporting
- Pre- and Post-Scripting
- Centralized database
- Centralized and remote management

## **Benefits and Features**

Deployed in an EBS environment, ARCserveIT configured with the Enterprise Library Option uses a dedicated FC-AL to perform backup and restore operations. Backup traffic is separated from the LAN eliminating network bandwidth bottlenecks that reduce productivity for the network users.

The Enterprise Library Option allows all servers configured in the SAN to dynamically share a common set of tape devices.

Additionally, due to the manner in which devices are mapped by the Fibre Channel tape controller, tape libraries are always presented to the application in a consistent order. This consistent presentation of tape libraries eliminates the need to reconfigure the application in case a tape drive or a library fails.

## **ARCserveIT Enterprise Edition for Novell NetWare**

The ARCserveIT Enterprise Edition for Novell NetWare is designed to meet the needs of most small to midsize multiserver organizations and provides advanced features and scalability. ARCserveIT Enterprise Edition for Novell NetWare provides centralized management of all storage servers throughout the network and advanced solutions that provide enhanced functionality and scalability. The Enterprise Edition offers support for Enterprise Backup Solution Fibre Channel SANs.

## **ARCserveIT Enterprise Edition for Windows NT**

The ARCserveIT Enterprise Edition for Windows NT is an extensive, enterprise-class storage management platform. The Enterprise Edition for Windows NT offers all of the features of the Workgroup and Advanced Editions with the added functionality that large environments demand, including cross-platform centralized management from Windows NT for remote administration. Other exclusives include integrated tape RAID and support for large tape silos.

## **ARCserveIT Advanced Edition for Windows NT**

The ARCserveIT Advanced Edition for Windows NT is an extensive, enterprise-class storage management platform. The Advanced Edition for Windows NT offers added functionality that large environments demand, including cross-platform centralized management from Windows NT for remote administration. Other exclusives include integrated tape RAID support.

## Options and Agents

Refer to the CA website to determine which edition of ARCserveIT supports the following options and agents.

### **ARCserveIT Client Agents**

ARCserveIT Client Agents extend backup and support to a wide variety of networked machines. To improve performance, these agents use push technology, where all filtering of files and directories is done on the remote client prior to pushing the data to the host storage server for processing.

### **ARCserveIT Disaster Recovery Option**

ARCserveIT Disaster Recovery Option restores a downed server without reinstalling the operating system or ARCserveIT. The ARCserveIT Disaster Recovery Option regenerates an entire Windows NT system or NetWare server using just a few diskettes.

### **ARCserveIT Backup Agent for Open Files**

ARCserveIT Backup Agent for Open Files enables the performance of routine backups while the users continue to work normally. File availability and integrity are maintained upon recovery.

### **ARCserveIT Tape Library Option**

The ARCserveIT Tape Library Option provides flexible, unattended operations by optimizing the capabilities of higher capacity tape libraries or autoloaders. This option supports multiple drive libraries. The number of libraries that can be installed on one computer is limited only by available resources and system performance.

The Tape Library Option provides device management functions including:

- Bar code support
- Formatting and erasing slot ranges
- Maintaining inventory on slots
- Mounting magazines
- Cleaning of the changer drive

### **ARCserveIT Database Agents**

The ARCserveIT Database Agents deliver 24 hours a day, 7 days a week (24 x 7), hot, online backup and restoration of popular databases. These backup agents provide additional security with maximum data integrity, even if users are currently accessing data. Backup agents protect individual tablespaces and the complete database.

## **ARCserve/IT Messaging Agents**

The ARCserve/IT Messaging Agents deliver 24 x 7, hot, online backup and restore of messaging/GroupWare systems. These agents provide data integrity and enable back up and restoration of individual, critical Microsoft Exchange mailboxes with To:, cc:, and bcc: information. The backup agent also saves messaging rich-text format meta-data and email enclosure information.

## **ARCserve/IT Enterprise Library Option**

The ARCserve/IT Enterprise Library Option uses a SAN as the dedicated communication path between the servers and the storage devices. This path facilitates data speeds up to 100 MB/s or faster depending on the system configuration. This option also supports multiple servers and enables device sharing from any server on the loop or switched environment.

## **ARCserve/IT RAID Option**

The ARCserve/IT RAID Option provides fault tolerance that enables data restoration even if a tape is lost or damaged. This option is also integrated into the ARCserve/IT Image, Disaster Recovery, and Enterprise Library SAN technology.

This option supports

- RAID levels 0, 1, and 5
- Individual tape drives (RAIT)

## **Compaq StorageWorks Command Console**

StorageWorks Command Console (SWCC) is a feature-rich, year 2000 compliant GUI that provides local and remote management of StorageWorks controllers. The SWCC is a user-friendly tool used to monitor, configure, and troubleshoot storage subsystems and launch management tools for the Fibre Channel tape controllers and storage hubs.

The SWCC can be connected to your StorageWorks controller in several ways. Once connected, the SWCC issues commands and interprets the responses sent by the controller. The GUIs display the logical and physical layout, as well as the status of a selected subsystem.

SWCC consists of two major components, the Client and the Agent.

- The Client:
  - Includes the user interface
  - Includes additional services
  - Provides a window into your storage subsystems
- The Agent:
  - Is a host-resident program
  - Is an interface that interprets and transfers data between the Client and the host storage controller



## Compaq User Diagnostics

User Diagnostics provide several management functions for the EBS components:

**Detailed device information**—This device information allows you to view the library ID, serial number, and firmware revision. Additionally you can see the FCTC world wide name as well as the devices that are attached.

**Firmware upgrades**—User Diagnostics allow you to upgrade both the FCTC firmware and the DLT drive firmware through your Fibre Channel SAN.

**Functional tests**—Functional tests, such as DLT buffer read/write, move media, and test unit ready, can be remotely administered offline from the server or remote client.

## Compaq Insight Manager

Compaq Insight Manager is a comprehensive management tool used to monitor and control the operation of Compaq servers and clients. This control includes the ability to monitor the health and status of the:

- Fibre Channel tape controllers
- Tape libraries
- Individual tape drives
- Firmware level
- World Wide Name
- Serial numbers
- Error counts and whether maintenance is needed

Compaq Insight Manager consists of two components:

- A Windows-based console application
- Server- or client-based management data collection agents

Working in conjunction with the system hardware and firmware, the Compaq Insight Management Agents monitor over 1,000 management parameters. Key subsystems are checked to make health, configuration, and performance data available to the agent software.

The agents act upon the applicable data by initiating alarms in the event of faults, and by providing updated management information, such as network interface or storage subsystem performance statistics. Compaq Insight Manager provides control over systems through monitoring and alerting capabilities for the critical systems in your distributed enterprise.

## Compaq Insight Manager XE

Compaq Insight Manager XE is a Web-based enterprise management (WBEM) application that enables browser access to both managed devices and the management application. Compaq Insight Manager XE works with industry-standard management agents and provides easy access at anytime from anywhere.

Compaq Insight Manager XE can browse:

- Directly to the systems with the Web-enabled Management Agent
- Web-Enabled Compaq Management Agents (4.0 and later)
- SNMP or DMI management agents
- Compaq Server Management Agents (3.1 or later)
- Compaq Client Management Agents (3.51 or later)
- Third-party devices with SNMP MIB-2 or DMI V2 agents
- Compaq Insight Manager LC (for clients)
- Compaq Intelligent Cluster Administrator
- Non-Compaq Web services running on a device

## Sizer Utility

The StorageWorks Enterprise Backup Solution Sizing Tool 1.3 is a Windows-based tool used to determine a backup solution based on the information supplied by the user. Before beginning the sizing process, the user must have a thorough understanding of the network, the type of data to be backed up, and the back-up window parameters.

The StorageWorks Enterprise Backup Solution Sizing Tool 1.3:

- Accepts user input
- Allows the user to select the options and agents that are offered by the ISV
- Performs calculations for realistic performance
- Performs the calculations necessary for backup and tape retention
- Configures a solution for a single data zone or a larger solution or domain
- Generates both a report and a proposal for a solution

Download, install, and run the StorageWorks Enterprise Backup Solution Sizing Tool 1.3 to configure a solution for Computer Associates ARCserveIT. The Sizer can be found on the Compaq website at:

[www.compaq.com](http://www.compaq.com)

## Appendix A: References

### Compaq

For comprehensive online support, refer to:

[www.compaq.com](http://www.compaq.com)

For international information, refer to:

[www.compaq.com/corporate/overview/world\\_offices.html](http://www.compaq.com/corporate/overview/world_offices.html)

**Table 1. Departments and Telephone Numbers for Canada and the United States**

Department	Telephone Number(s)
Consumer Direct	1-800-888-0220
Compaq DirectPlus	1-800-888-5858 (U.S.)
Compaq Partner Direct	1-800-888-5874
Compaq Reseller Locator	1-800-345-1518 (Option 3)
Compaq Canadian Reseller Locator & Product Literature	1-800-567-1616
Diskette Fulfillment (backup diskettes for preinstalled software)	1-800-952-7689 (U.S.) 1-800-349-8498 (Canada)
Compaq Product Information	1-800-345-1518 (U.S.) 1-800-567-1616 (Canada)
Compaq Technical Support	1-800-OK-COMPAQ (U.S. and Canada) 1-800-652-6672

### Computer Associates

For comprehensive online support, refer to:

[support.cai.com/](http://support.cai.com/)

For more detailed information on Computer Associates ARCserveIT, refer to:

[www.cai.com/](http://www.cai.com/)