MODELS

Compaq StorageWorks High Availability Storage Solution for ProLiant

StorageWorks RAID Array 4000
223100-001

Fibre Channel Storage Hub 7
234453-001

Fibre Channel Host Adapter Kit / PCI
223180-B21

Rack 9000 22U
120665-B21

18.2-GB Pluggable Wide-Ultra SCSI-3 10K-II Drive (1.0 in (2.54 cm))
128417-B21

OVERVIEW

The Compaq *StorageWorks* High Availability Storage Solution for *ProLiant*

The High Availability Storage Solution for *ProLiant* is a pre-tested configuration of hardware, software, installation, and customer training that is targeted at moving large Microsoft Exchange servers into a SAN-compatible environment.

It provides a first step toward simplifying rapidly growing storage deployment by combining appropriate Compaq products with services and customer training to meet the requirements of a typical medium-sized storage configuration attached to *ProLiant* servers. All the components of the High Availability Storage Solution for *ProLiant* are "SAN-ready", and can become part of a future Compaq Storage Area Network installation.

Microsoft Exchange Solution

In today's information age, collaboration via electronic communication is an essential part of every business. Microsoft Exchange Server contains collaboration tools that help develop a wide range of collaborative solutions.

The High Availability Storage Solution for *ProLiant* easily satisfies the storage capacity and performance needs of a dual server Microsoft Exchange configuration. Migration from existing server based Exchange Server configurations to the High Availability Storage Solution for *ProLiant* is a straightforward. Compaq provides a fully documented migration process. The High Availability Storage Solution for *ProLiant* supports smooth future migration to a full SAN configuration.

Hardware and Software Components

The High Availability Storage Solution for *ProLiant* consists of the following components:

- Two independent Fibre Channel loops, each capable of transferring data at 100 megabytes per second.
- Four Fibre Channel Host Adapters and two Fibre Channel Storage Hub 7 to link the servers to the Fibre Channel loops. The two loops insure that if one loop fails, all the data in the storage system is still available.
- Two dual controller RAID Array 4000 systems. Each system holds up to twelve 18.2 gigabyte disks or eight 36.4 gigabyte disks.
- One 22U Rack 9000 with 13U available to mount existing *ProLiant* Microsoft Exchange servers. (1U is 1.75 inches (4.45 cm) of vertical height in the rack.)
- Software for configuration and data management in the RAID environment.
- *StorageWorks* Virtual Replicator software simplifying the overall management of the storage solution. *StorageWorks* Replicator can also create snapshots that can be used for backup, restore, and other purposes.

These components are integrated to provide the Compaq *StorageWorks* High Availability Storage Solution for *ProLiant* Solution. Compaq decided to integrate these specific "best-in-class" components because each one offers the very best technology to solve the problems of migrating an existing Microsoft Exchange Server system to a SAN-ready storage environment.

COMPAQ

OVERVIEW *(continued)*

Installation

The High Availability Storage Solution for *ProLiant* is a pre-tested configuration of hardware, software, installation, and customer training that is targeted at moving large Microsoft Exchange servers into a SAN-compatible environment. Installation is available from Compaq Customer Services, and includes:

- Assembly of hardware components.
- Installation of Fibre Channel host adapters into customer's Exchange servers.
- Configuration of RAID Array 4000 and Fibre Channel hubs into a High Availability storage subsystem.
- Installation of management software.
- Migration of customer's Exchange data from existing disks to the RA4000 disks.
- System Verification Test.

Fibre Channel Arbitrated Loop

The Compaq High Availability Storage Solution for *ProLiant* Solution uses Fibre Channel Arbitrated Loop technology to transfer data between the servers and the external storage subsystems. Fibre Channel Arbitrated Loop delivers the advantages of 100 MB/s bandwidth, up to 126 addressable connections, easy cabling, 500 meters (546.8 yards) to 10 kilometer (6.21 miles) distances between nodes, hot pluggable and node-bypass capabilities.

The High Availability Storage Solution for *ProLiant* configuration uses two independent Fibre Channel Arbitrated Loops to provide full no-single-point-of-failure redundancy. Each loop implements an independent Fibre Channel Fabric. Any failure on one Fabric causes the system to use the other Fabric for communication between the servers and the external storage. For the purposes of this Solution, one loop is called "Fabric A", and the other is called "Fabric B".

StorageWorks RAID Array 4000

The Compaq High Availability Storage Solution for *ProLiant* Solution uses two dual-redundant RA4000 RAID subsystems. These include a total of four RAID controllers in two separate rack mounted enclosures. Each RA4000 subsystem operates completely independently, and the redundant controller in each subsystem protects against controller failures.

RAID levels 0 (striping), 1 (mirroring), 4 (block parity) and 5 (distributed block parity) are supported by the RA4000. For maximum data availability in case of disk failure, and to maximize I/O request performance, RAID 1 (mirroring) is the preferred option for the High Availability Storage Solution for *ProLiant*. In mirrored data subsystems, two complete copies of all of the user's data are maintained, and READ requests from the server can be handled from either copy--which maximizes READ performance.

Each RA4000 supports up to 64 megabytes of cache memory. This is used to optimize the performance of Microsoft Exchange Server application.

Fibre Channel Storage Hub 7

The Fibre Channel Storage Hub 7 is a 7 port Fibre Channel Hub. The two Hub 7s in this solution provide the Fibre Channel interconnection fabric for the High Availability Storage Solution for *ProLiant* Solution. Each hub provides two ports for host connections and two ports for storage connections, with additional ports for later expansion. The Hub 7s are mounted in the Rack 9000 in a 1U form factor.

Fibre Channel Host Adapter Kit / PCI

The Fibre Channel Host Adapter Kit / PCI provides the capability to attach Compaq *ProLiant* servers to the Fibre Channel interconnection fabric. Each Fibre Channel Tape Host Adapter has a single Fibre Channel port that provides a fiber optic connection to the Storage Hub 7. Each Host Adapter Kit uses one PCI slot in a *ProLiant* server. To achieve data path redundancy, each server has two Host Adapter Kits. Each server has one connection to Fabric A and a separate connection to Fabric B.

Rack 9000 22U

Compaq sets the standard for performance and value in the enterprise with the Compaq Rack 9000 Series family of rack cabinets and rack options. This enterprise-class rack cabinet system combines next-generation structural integrity and ease of use capabilities to deliver industry-leading performance.

Ideal for onsite assembly of rack mounted Compaq *ProLiant* servers and *StorageWorks* products, the Compaq Rack 9000 Series of rack cabinets complement and protect your customer's investment in technology. Specifically designed to ensure outstanding performance and seamless integration throughout the entire enterprise, the Compaq Rack 9000 could easily be the last family of racks that your customers ever have to think about purchasing. Key features include:

- Unique frame and rail design
- Thermal integrity
- Security provisions
- Flexibility
- Custom expandability
- Warranty

OVERVIEW *(continued)*

Hardware Support, Configuration, and Diagnostic Software

The High Availability Storage Solution for *ProLiant* uses standard, fully supported Compaq hardware and software products. All supporting material, including support, configuration, and diagnostic functions are exactly the same as those used in the individual products. All support, configuration, and diagnostic software is included in the solution.

Integrated Software Solutions

A key component of the Compaq *StorageWorks* High Availability Storage Solution for *ProLiant* is storage management application software. *StorageWorks* Virtual Replicator is a Windows NT driver-level application that supports two important management features. *StorageWorks* Virtual Replicator can be used to simplify overall storage management by creating "pools" of storage capacity from disks in the RA4000 systems, and from other disks connected to the host servers. Virtual disks may be created from the storage capacity in a pool, and these virtual disks may be used like any other disk available to Windows NT. *StorageWorks* Virtual Replicator can also be used to create snapshots of any disk. A snapshot is a copy of a disk that is created almost instantaneously and can be used as a quick source for data recovery, and other purposes.

In the Compaq *StorageWorks* High Availability Storage Solution for *ProLiant* the *StorageWorks* Virtual Replicator application is used in several ways. For the Microsoft Exchange Server data stored in the High Availability Storage Solution for *ProLiant* subsystem, the snapshot allows fast data restore operations. For other data stored in the High Availability Storage Solution for *ProLiant*, the snapshot can also be used for data backup, restore, and management activity needed in routine operations. In addition, the virtual pool capability of Virtual Replicator can be used to provide virtual disks that meet the particular requirements of a specific user application.

Scalability

The solution capacity can be increased to as much as 436 GB using 18 GB disk drives (total capacity is 24 disks). In addition, both performance and capacity can be scaled with the addition of RA4000 units, and each RA4000 holds 12 disks of up to 36 GB each.

The High Availability Storage Solution for *ProLiant* is compatible with Compaq *StorageWorks* Storage Area Network products. As your installation evolves toward larger SAN deployment, all the hardware and software in the High Availability Storage Solution for *ProLiant* can remain part of the installation. This means that the solution can be scaled in the context of a larger Storage Area Network.

Smooth Integration/Installation

The Compaq High Availability Storage Solution for *ProLiant* integrates smoothly into an existing Microsoft Exchange environment. All the components are customer installable. Installation is also available from Compaq.

Prerequisites

The Compaq High Availability Storage Solution for *ProLiant* is designed to work with an existing customer environment that includes the following components.

- Two *ProLiant* servers (See the Compatibility Matrix for supported servers located in the Sizing and Configuration Guide) Configured in a MSCS cluster
- One *ProLiant* server running Exchange Server with failover selected for second *ProLiant* server
- The second (failover) server can be used for other applications.

Warranty

The Compaq High Availability Storage Solution for *ProLiant* is covered by a three-year parts warranty, one-year on-site warranty and a one-year labor warranty.

Note: Certain restrictions and exclusions apply. Consult the Compaq Customer Support Center for details. In Canada, consult the Product Information Centre at 1-888-88-COMPAQ.

SPECIFICATIONS

High Availability Storage Solution for *ProLiant*

The High Availability Storage Solution for *ProLiant* is a pre-tested installation that includes the following Compaq products. Refer to the QuickSpecs or Detailed Descriptions for the individual product specifications.

Hardware Configuration

Rack 9000 22U
18.2-GB Pluggable Wide-Ultra SCSI-3 10K-II Drives (1.0 in (2.54 cm))
Fibre Channel Host Adapter Kits / PCI

SPECIFICATIONS *(continued)*

Hardware Configuration *(continued)*

Fibre Channel Storage Hub 7s
StorageWorks RAID Array 4000s (Rack)
StorageWorks RAID Array 4000 Redundant Controllers
ProLiant Storage System/RA 4000 Power Supplies
Fibre Channel Storage Hub 7 Tower-to-Rack Conversion Kit

Software Configuration

StorageWorks Virtual Replicator
Compaq Redundancy Manager
Compaq Insight Manager
Compaq Array Configuration Utility
Compaq User Diagnostic Utility
Compaq Array Diagnostics Utility
Compaq Fault Isolation Utility

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