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Compaq Computer Corporation

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Compaq StorageWorks RA4100 SAN Solutions Configuration and Setup Procedures

Abstract: The purpose of this documentation is to demonstrate the configuration steps for an entry level SAN environment. In this paper the Fibre Channel Arbitrated Loop (FC-AL) Switch 8 is used to connect different clusters and stand-alone servers from various operating systems including the following: Windows NT Server Enterprise Edition, Windows 2000 Advanced Server, NetWare 5.1 and Red Hat Linux 7.0.

There are three-configuration scenarios in this paper:

- 1. Multi-Cluster Non-Redundant Configuration
 - Windows 2000 Advanced Server Cluster Service (MSCS)
 - Windows NT Server Enterprise Edition Cluster Server (MSCS)
 - NetWare 5.1 Cluster Services (NCS)
- 2. Cluster and Stand-alone Non-Redundant Configuration
 - Windows 2000 Advanced Server Cluster Service (MSCS)
 - Windows NT Server Enterprise Edition Cluster Server (MSCS)
 - Stand-alone Servers
 - o Windows 2000 Advanced Server
 - NetWare 5.1 Server
 - o Red Hat Linux 7.0 Server
- 3. Redundant Configuration
 - Windows NT Server Enterprise Edition Cluster Service (MSCS)
 - NetWare 5.1 Cluster Services (NCS)
 - Standalone Windows NT Server 4.0

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Compaq StorageWorks RA4100 SAN Solutions Configuration and Setup Procedures White Paper prepared by High Availability

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Introduction

A Storage Area Network (SAN) is designed for multiple host servers to have access to a network of storage devices. It allows servers to share storage without impacting system performance on the primary communication network. The Compaq StorageWorks RAID Array 4000/4100 based SAN Solution configuration supports multiple servers and/or clusters running different operating systems.

The RA4100 SAN Solutions is an affordable SAN that simplifies storage management, manages explosive data growth, and reduces system downtime. This solution consolidates storage for multiple servers to one centralized SAN. By integrating primary and secondary storage on the same SAN, the RA4100 SAN Solutions increases availability, scalability, and system performance. The RA4100 SAN Solutions makes configuring, managing, and maintaining storage resources efficient and easy to use.

The RA4100 SAN Solutions configuration can include Compaq and multi-platform x86 servers running different operating systems such as Windows, NetWare, Linux, and UnixWare. Components are interconnected through the Compaq StorageWorks FC-AL Switch 8 with an optional 3-port expansion module.

This configuration and setup white paper describe some of the configurations that are supported in the RA4100 SAN Solutions. This paper is served as a guide to set up your configurations.

Compaq SAN Solutions

SAN Solutions

• Non-Redundant Configuration

The RA4100 SAN Solutions non-redundant configuration supports stand-alone servers, clusters, and a combination of the two. This solution supports different operating systems mixed on the same Compaq StorageWorks FC-AL Switch 8. All servers in the SAN environment have only one Fibre Channel Host Bus Adapter (HBA) connected through one Compaq StorageWorks FC-AL Switch 8. This is a single loop environment.

• Redundant Configurations

The RA4100 SAN Solutions Redundant configuration is a dual loop environment. This solution also supports different operating systems mixed on the same Compaq StorageWorks FC-AL Switch 8. All servers in the SAN have two Fibre Channel Host Bus Adapters (HBA) connected through two Compaq StorageWorks FC-AL Switch 8. These two loops are independent, if one of the loops fails, the other loop will perform the tasks.

Mixed Redundant and Non-Redundant Configuration

The RA4100 SAN Solutions mixed configuration supports stand-alone servers, clusters, and a combination of the two with non-redundant and redundant paths. This solution also supports different operating systems mixed on the same Compaq StorageWorks FC-AL Switch 8.

Tools used to configure SAN

Compaq StorageWorks FC-AL Switch 8 Management Utility

The Compaq StorageWorks FC-AL Switch 8 Management Utility uses a web browser to monitor and manage the status and port policy of the Compaq StorageWorks FC-AL Switch 8.

Port policies are used to control the access and broadcasting method of the Compaq StorageWorks FC-AL Switch 8. It is managed by Intelligent LIP (Loop Initialization Primitive) Control (ILC).

ILC is an advanced method of managing loop initialization events. A Loop Initialization Primitive (LIP) being issued by a device on the arbitrated loop prompts Loop initialization. The LIP can be issued at any time and is potentially disruptive if issued during frame transfer. If such a disruption occurs, error-handling code at the driver or application layer is triggered by a timeout to prevent I/O errors or data corruption. ILC avoids the disruption in the first place by holding the LIP, up to a certain maximum period, until a minimum gap in frame transfer occurs.

A LIP may be triggered for several reasons, such as adding a new device. The new device can be a former participant that has been powered on or an active device that has been

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moved from one switch port to another. A LIP occurrence can cause an undesirable disruption of an ongoing process on the SAN.

LIP Propagation Policy (Port Policy) allows administrators to prevent LIPs generated by initiators to propagate to other ports, thus eliminating the impact of unnecessary LIPs in the data flow. When LIP Propagation is prevented the Compaq StorageWorks FC-AL Switch 8 will provide discovery information needed by the initiator, and targets are not disrupted. This policy is implemented on a per port basis.

Note: Refer to "Compaq StorageWorks Fibre Channel Arbitrated Loop Switch 8 (FC-AL Switch 8) User Guide" for further information.

Selective Storage Presentation (SSP)

Selective Storage Presentation (SSP) is an RA4000 controller firmware feature. RA4000 controller is the controller used in the Compaq StorageWorks RA4000/4100. It is a new access control feature that allows multiple hosts running multiple applications on the SAN to have controlled access to the Compaq StorageWorks RA4000/4100 storage system on the SAN. This selective access allows policies to be set as to which application can access which storage enclosure. The access can be controlled down to a logical volume level.

The RA4100 SAN Solutions integrates SSP functionality, which allows customers to allocate and restrict data access at the logical drive level and permits the sharing of storage devices between servers, including servers running different operating systems. SSP guarantees that the volumes created on a single storage subsystem can only be accessed by designated servers, allowing non-cooperating heterogeneous and homogeneous servers to share a storage subsystem without one server corrupting data from another. SSP partitions storage but, at the same time, prevents non-cooperating servers running different operating systems from sharing the same logical drives.

Note: Configuration restrictions of Compaq StorageWorks RA4000/4100 are listed at the end of this section. Storage systems allocated to a cluster cannot be shared with any other cluster or standalone server. For more information check on <u>http://www.compaq.com/storage</u>

Compaq Array Configuration Utility (ACU) v2.50 or higher

The ACU uses a graphical user interface (GUI) to help configure an RA4100 SAN Solutions. This GUI is used to configure the RA4000/4100 controller, add additional disk drives to an existing configuration, and reconfigure an array controller.

The SSP functionality is implemented in the array controller firmware, operating system drivers, and the ACU. In addition to making it easy to configure and expand the number of disk drive arrays, the ACU provides a means of mapping the worldwide names of server HBAs to connection names and setting up access control lists for logical drives based on worldwide or connection names.

Compaq Redundancy Manager (CRM)

The CRM software is a redundancy management solution, which provides a range of functionality for Windows NT 4.0 servers using the Compaq StorageWorks RA4000/4100 storage system. The CRM software provides the ability to configure the environment using redundant Compaq StorageWorks Fibre Channel Host Bus Adapters (HBA) and redundant Compaq StorageWorks RA4000/4100 Controllers.

The CRM can automatically configure multiple paths, with the first available path being set as active and the next path as standby. Once the environment is configured, the CRM provides redundancy and path management for the configuration.

The CRM software operates on Compaq ProLiant Servers and supports the following operating systems:

- Microsoft Windows NT Server 4.0 (stand-alone configurations)
- Microsoft Windows NT Server Enterprise Edition (cluster configurations)

The CRM (Fibre Channel) features include:

- Active/Standby paths enables two or more HBAs to have active and standby paths on a Fibre Channel Arbitrated Loop.
- Active/Active paths enables two or more host bus adapters to have active paths on a Fibre Channel Arbitrated Loop. (Required at lease two RA4000/4100's).
- I/O load balancing allows online load balancing using two or more host bus adapters and Compaq StorageWorks RA4000/4100s.
- HBA failover allows host bus adapters to failover all I/O between the adapters, either manually for maintenance or automatically due to failure.
- Event logging provides descriptive event logging of informational, warning, and error messages.
- Graphical User Interface (GUI) provides an easy-to-use GUI for configuring and viewing of the current configuration.

Compaq SANworks Secure Path for NetWare

Compaq SANworks Secure Path for NetWare is a high-availability software product that manages and maintains continuous data access to the Compaq StorageWorks RA4000/4100 storage system.

Secure Path eliminates the array controllers, HBAs, and interconnect hardware (cables, hubs or switches, and connectivity devices) as single points of failure in the storage system. Through the deployment of redundant hardware and advanced RAID technology, Secure Path enhances fault tolerance and storage system availability by providing automated failover capability.

Redundant physical connections define separate physical "paths" in a Secure Path configuration. Each path originates at a unique HBA port on the server, and ends at a unique controller port in the storage system.

Features

Secure Path provides the following features:

- Allows a single instance of Secure Path Manager (SPM) to control NetWare and Windows hosts simultaneously.
- Allows StorageWorks dual-controller systems and host servers equipped with multiple HBAs to have redundant physical connectivity along a FC-AL.
- Monitors each path and automatically re-routes I/O to a functioning alternate path if an HBA, cable, hub, switch, or controller failure occurs.
- Determines the "health" of available storage units and physical paths through the implementation of path verification diagnostics.
- Monitors and identifies failed paths and failed-over storage units.
- Automatically restores failed-over storage units and repairs paths with auto-failback capability enabled.
- Implements anti-thrash filters to prevent failover/failback effects caused by marginal or intermittent conditions.
- Detects failures reliably without inducing false or unnecessary failovers.
- Implements failover/failback actions transparently without disrupting applications.
- Provides client/server remote management capability and multiple storage system support.

Configuration Restrictions

- 1. Clustered Compaq StorageWorks RA4000/4100 storage systems cannot be shared or owned by more than one Windows NT 4.0 or Windows 2000 cluster. This means that each RA4100 storage cabinet used by a Windows NT 4.0 or Windows 2000 cluster must be dedicated for use exclusively by that cluster. That storage cabinet cannot be accessed by any other servers outside of the cluster.
- 2. RA4000/4100 storage systems owned by a Windows NT or Windows 2000 cluster cannot be shared with stand-alone servers.
- 3. Redundant RA4000/4100 storage systems cannot be shared with non-redundant servers. This means that a redundant storage system can only be accessed by servers that contain dual Host Bus Adapters (HBAs) connected to separate FC-AL Switch 8 connections. The servers may be clustered or stand-alone, but they must have dual HBAs.
- 4. A server supports only a single or redundant path to the SAN (that is, a server cannot attach to multiple SANs). If a server contains dual HBAs, both of them must be connected to the same dual path infrastructure.

Note: For the most current configuration restrictions, visit the Compaq website at http://www.compaq.com/storage

Compaq SAN Solutions Configuration

The RA4100 SAN Solution is ideal for workgroups or departments that want to deploy primary and secondary storage solutions across servers on the same SAN. This solution allows workgroups and departments to share their departmental applications while avoiding the cost of an enterprise-level SAN. The RA4100 SAN Solution features include the following:

- 1. Support for heterogeneous operating systems, such as Windows, NetWare, Linux, and UnixWare, that access storage through the Compaq StorageWorks FC-AL Switch 8.
- 2. Support for redundant and non-redundant stand-alone servers, clusters, or a combination of the two.
- 3. Eight ports for high-performance switch connection of components using the Compaq StorageWorks FC-AL Switch 8 with the option to expand to eleven ports using the StorageWorks 3-Port Expansion Module (PEM).
- 4. Shared consolidated storage enabling business applications to be decentralized and specialized.

To demonstrate the features of SAN Solutions, three configurations are presented in this paper.

Configuration Scenario

Multi-Cluster Non-Redundant Configuration

There are six systems (Server A, B, C, D, E, F) and four Compaq StorageWorks RA4000/4100 in this configuration. Each of the servers has only one HBA connected to one FC-AL Switch 8 with PEM. Each of the storage subsystems will have one to three logical drives (LD) according to the following configuration:

Hardware Configuration:

System:

Server Name	Operating System	
MW360W21	Windows 2000 Advanced Server	
MW360W22	Windows 2000 Advanced Server	
MW360NT1	Windows NT Enterprise Edition Server	
MW360NT2	Windows NT Enterprise Edition Server	
MW360NW1	NetWare 5.1	
MW360NW2	NetWare 5.1	

Storage Subsystem:

Worldwide ID	Logical drives created	Can be accessed by server
D952DBX10030	Logical Drive 1	MW360W21, MW360W22
	Logical Drive 2	MW360W21, MW360W22
	Logical Drive 3	MW360W21, MW360W22
D952DBX10056	Logical Drive 1	MW360W21, MW360W22
D952DBX10063	Logical Drive 1	MW306NT1, MW360NT2
	Logical Drive 2	MW306NT1, MW360NT2
	Logical Drive 3	MW306NT1, MW360NT2
D931DBX10140	Logical Drive 1	MW360NW1, MW360NW2
	Logical Drive 2	MW360NW1, MW360NW2
	Logical Drive 3	MW360NW1, MW360NW2

In this configuration, there are three clusters.

- 1. Windows 2000 Advanced Server cluster formed by two servers and two external shared storage subsystems.
 - a. Server MW360W21
 - b. Server MW360W22
 - c. RA4000 controller ID D952DBX10030 (three 9.1GB drives attached).
 - d. RA4000 controller ID D952DBX10056 (three 9.1GB drives attached).
- 2. Windows NT Server Enterprise Edition cluster formed by two servers and one external shared storage subsystem.
 - a. Server MW360NT1
 - b. Server MW360NT2
 - c. RA4000 controller ID D952DBX10063 (three 9.1GB drives attached).
- 3. NetWare 5.1 cluster formed by two servers and one external shared storage subsystem.
 - a. Server MW360NW1
 - b. Server MW360NW2
 - c. RA4000 controller ID D931DBX10140 (three 18.1GB drives attached).

Cluster and Stand-alone Non-Redundant Configuration

Hardware Configuration:

Server Name	Operating System	
MW360W21	Windows 2000 Advanced Server	
MW360W22	Windows 2000 Advanced Server	
MW360W23	Windows 2000 Advanced Server	
MW360NW1	NetWare 5.1	
MW360LX1	Red Hat Linux 7.0	
MW360NT1	Windows NT Enterprise Edition Server	
MW360NT2	Windows NT Enterprise Edition Server	

Storage subsystem:

Worldwide ID	Logical drives created	Can be accessed by server	
D952DBX10030	Logical Drive 1	MW360W21, MW360W22	
	Logical Drive 2 MW360W21, MW360W22		
	Logical Drive 3	MW360W21, MW360W22	
D952DBX10041	Logical Drive 1	MW360W23	
	Logical Drive 2	MW360NW1	
	Logical Drive 3	MW360LX1	
D952DBX10163	Logical Drive 1	MW360NT1, MW360NT2	
	Logical Drive 2	MW360NT1, MW360NT2	
	Logical Drive 3	MW360NT1, MW360NT2	

Each server in this configuration has one HBA and is connected through one Compaq StorageWorks FC-AL Switch 8 with PEM.

In this configuration, there are two clusters and three stand-alone servers.

- 1. Windows 2000 Advanced Server cluster formed by two servers and one storage subsystem.
 - a. Server MW360W21
 - b. Server MW360W22
 - c. RA4000 controller ID D952DBX10030 (three 9.1GB drives attached).
- 2. One stand-alone NetWare 5.1, one standalone Linux Red Hat 7.0 and one stand-alone Windows 2000 Advanced Server sharing one storage subsystem.
 - a. Server MW360W23 (Windows 2000 Advanced Server)
 - b. Server MW360NW1 (NetWare 5.1)
 - c. Server MW360LX1 (Linux 7.0 Red Hat Server)
 - d. RA4000 controller ID D952DBX10041 (Six 9.1GB drives attached).
- 3. NT 4.0 Enterprise Edition Server cluster formed by two servers and one storage subsystem.
 - a. Server MW360NT1
 - b. Server MW360NT2
 - c. RA4000 controller ID D952DBX10063 (three 9.1GB drives attached).

Note: Before adding an HBA to the Linux Server, the administrator needs to write down the Worldwide ID of the HBA. The Worldwide ID is the serial number labeled on the HBA. In the Linux environment, there is not a location record that indicates which HBA is local to the Linux server.

Not all HBAs can be accessed by Linux. Compaq suggests a Compaq 64-Bit/66-MHz PCI-to-Fibre Channel Host Bus Adapter to be used in this configuration.

Redundant Configuration

In the redundant configuration, there are two data flow loops to provide high availability to the SAN environment. In order to achieve the dual-loop environment, two Compaq StorageWorks FC-AL Switch 8 are required. All servers will have two HBAs. All Compaq StorageWorks RA4000/4100 will have two controllers.

Hardware Configuration:

System:

Server Name	Operating System	
MW360NT1	Windows NT Enterprise Edition Server	
MW360NT2	Windows NT Enterprise Edition Server	
MW360NW1	NetWare 5.1	
MW360NW2	NetWare5.1	
MW360NT3	Windows NT Enterprise Edition Server	

Storage subsystem:

Worldwide ID	Logical drives created	Can be accessed by server
D952DBX10041	Logical Drive 1	MW360NT1, MW360NT2
	Logical Drive 2	MW360NT1, MW360NT2
D952DBX10063	Logical Drive 1	MW360NT1, MW360NT2
D952DBX10056	Logical Drive 1	MW360NT1, MW360NT2
D952DBX10040	Logical Drive 1	MW360NW1, MW360NW2
	Logical Drive 2	MW360NW1, MW360NW2
D952DBX10130	Logical Drive 1	MW360NT3

In this configuration, there are two clusters and one stand-alone server.

- 1. Windows NT Server Enterprise Edition cluster formed by two servers and three storage subsystems.
 - a. Server MW360NT1
 - b. Server MW360NT2
 - c. RA4000 controller ID D952DBX10041 (three 9.1GB drives attached).
 - d. RA4000 controller ID D952DBX10063 (three 9.1GB drives attached).
 - e. RA4000 controller ID D952DBX10056 (three 9.1GB drives attached).
- 2. NetWare 5.1 cluster formed by two servers and one storage subsystem.
 - a. Server MW360NW1
 - b. Server MW360NW2
 - c. RA4000 controller ID D931DBX10140 (three 18.1GB drives attached).
- 3. One Window NT 4.0 standalone server with one storage subsystem.
 - a. Server MW360NT3
 - b. RA4000 controller ID D952DBX10030 (three 9.1GB drives attached).

Multi-Cluster Non-Redundant Configuration

Multi-Cluster Non-Redundant Configuration

- Windows 2000 Advanced Server MSCS
- Windows NT Server Enterprise Edition MSCS
- NetWare 5.1 NCS

Pre-configuration assumptions:

- 1. Before installing the OS on the servers, all of the Compaq StorageWorks RA4000/4100 that belong to this configuration should be powered up. Then power on each system to install the OS.
- 2. Windows NT Server Enterprise Edition is properly installed, NTSSD and Service Pack 6a have been applied to both servers (MW360NT1, MW360NT2).
- 3. Windows 2000 Advanced Server is properly installed, the Compaq Support Paq (CSP) and Windows 2000 Service Pack 1 have been applied to both servers (MW360W21, MW360W22).
- 4. NetWare 5.1 is properly installed, the Compaq Novell NetWare SSD and Service Pack 1 have been applied to both servers (MW360NW1, MW360NW2).
- 5. The six servers are attached to port 1 through 6 of the Compaq StorageWorks FC-AL Switch 8.
- 6. All the StorageWorks RA4000/4100s and the Compaq StorageWorks FC-AL Switch 8 w/PEM should be flashed with the latest firmware. If any previous configurations exist, use the Compaq ACU to delete any configuration on the array controllers.
- 7. No cluster software is installed on any of the servers.

Port Policy Configuration

As described in the previous section, the LIP Propagation Policy allows administrators to prevent LIPs generated by initiators to propagate to other ports, thus eliminating the impact of unnecessary LIPs in the data flow. The administrator can either block a device to prevent interrupt or non-block a device to enhance the performance.

In the FC-AL environment, the administrator should enable LIP on the storage subsystems and disable LIP on the servers.

The Compaq FC-AL Management Utility is used to configure the Compaq StorageWorks FC-AL Switch 8. An internet browser is used to access the management tool. SNMP is used to communicate with the Compaq StorageWorks FC-AL Switch 8.

The configuration steps are as follows:

1. Use an Ethernet RJ-45 cable to connect the Compaq StorageWorks FC-AL Switch 8 to the network. This connection is used to provide management functionality through SNMP. By default, the Compaq StorageWorks FC-AL Switch 8 is configured to use an IP address of 127.0.0.1. To change the IP address, use a terminal emulator that is connected to the serial

port on the switch. The Compaq StorageWorks FC-AL Switch 8 runs at 10mb/sec. Make sure the network hub that the Compaq StorageWorks FC-AL Switch 8 is attached to supports 10mb/sec.

Note: Refer to the "Compaq StorageWorks Fibre Channel Arbitrated Loop Switch (FC-AL Switch 8) User Guide" for additional information.

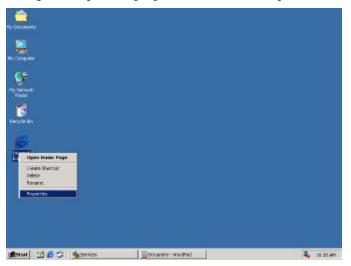
2. To enable the SNMP service on the Windows 2000 Advanced Server, open the property sheet of the SNMP service. Select the "Traps" tab. Use "public" for the community name.

SNMP Service Properties (Local Computer)	?	×
General Log On Recovery Dependencies	Agent Traps Security	
The SNMP Service provides network manager and IPX/SPX protocols. If traps are required, or community names must be specified. Trap dest host names, IP addresses or IPX addresses.	ne or more	
_ <u>C</u> ommunity name		
public	Add to jist	
	<u>R</u> emove from list	
<u>T</u> rap destinations:		
20.20.100.45		
Add <u>E</u> dit	Remove	
ОК	Cancel Apply	

3. Select the "Security" tab and add the "private" community with "Read Create" rights.

P Service Propertie	e <mark>s (Local Compu</mark>	iter)	
eneral Log On Rec マ Send authentication		icies Agent Traps	Security
- Accepted community Community	/ <u>n</u> ames	Rights	
public private		READ ONLY READ CREATE	
Add			
Add <u>.</u>	Edjt	Remove	

4. Microsoft Internet Explorer 5.0 or higher is required to access the management utility. Before the browser can access the Compaq StorageWorks FC-AL Switch 8, it needs to be configured. Open the properties of Internet Explorer.



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5. In the properties of Internet Explorer, select the "Advanced" tab.

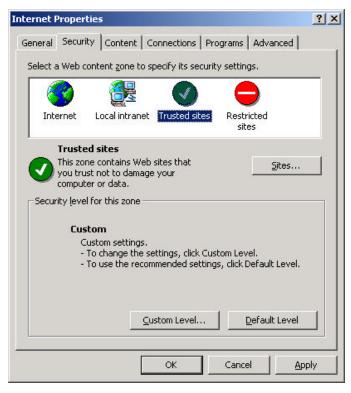
iternet F	Proper	ies		?
General	Securi	V Content Connection	ns Programs A	dvanced
Select a	a Web c	ontent zone to specify its	security settings.	
6	B	🚼 📢)
Inte	ernet	Local intranet Trusted	sites Restrict sites	ed
1000	1.000	d sites		
	you tru	ie contains Web sites that st not to damage your er or data.	Ľ	Sites
Secur	ity leve	for this zone		
		tom ustom settings. To change the settings, cl To use the recommended		
		<u>C</u> ustom Lev	el <u>D</u> el	fault Level
		OK	Cancel	

6. In the "Settings:" window of the "Advanced" tab, scroll down to find the Microsoft VM section. Enable all of the Microsoft VM options.

ternet Properties	?
General Security Content Connections Programs Advanced	
Settings:	
O Always	
O Hover	_
O Never	
Use inline AutoComplete	
Use smooth scrolling	
#TTP 1.1 settings	
Use HTTP 1.1	
Use HTTP 1.1 through proxy connections	
📑 Microsoft VM	
🖉 🔽 Java console enabled (requires restart)	
Java logging enabled	
JIT compiler for virtual machine enabled (requires restart)	
🅰 Multimedia	
Always show Internet Explorer (5.0 or later) Radio toolbar	
Play animations	
✓ Play sounds	-
•	•
<u>R</u> estore Defau	ts
OK Cancel A	ply.
	ienz.

Note: A bug in an older version of the Microsoft Internet Explorer JVMs will prevent the applet from working unless the switch's IP address maps to a valid FQDN in the DNS server used by the browser host.

7. Open the "Internet Explorer" property sheet and click on the "Security" tab. Select the "Trusted" sites icon. Click on the "Sites" button to add the Compaq StorageWorks FC-AL Switch 8 IP address/Host name to the trusted sites.



8. Add the hostname or the IP address of the Compaq StorageWorks FC-AL Switch 8 to the "Add this Web site to the zone:" field. The default IP address for the Compaq StorageWorks FC-AL Switch 8 is 127.0.0.1. To fit into the IP address schema of this test configuration, we have changed the Compaq StorageWorks FC-AL Switch 8 to 20.20.100.80. Uncheck "Require Server verification (https:) for all sites in this zone" in the check box. Click "OK" to leave this page.

Trusted sites		<u>? ×</u>
	ove Web sites from this z e zone's security setting:	
Add this Web site to the zone:	8	
http://20.20.100.80		Add
<u>W</u> eb sites:		
		<u>R</u> emove
Require <u>s</u> erver verification	(https:) for all sites in th	is 700e
12 Require gerrer vernieddorr	(https://for diraces infer	13 20110
	ок	Cancel
	12	

9. Once the "Internet Properties" page comes back, select the "Security" tab and click on the "Custom Level" button at the end of the page.

Internet Properties	? ×
General Security Content Connections Programs Advanced	
Select a Web content zone to specify its security settings.	
	_
Internet Local intranet Trusted sites Restricted sites	
Trusted sites This zone contains Web sites that you trust not to damage your computer or data.	
Security level for this zone	
Custom Custom settings. - To change the settings, click Custom Level. - To use the recommended settings, click Default Level.	
Custom Level Default Level	
OK Cancel Ar	oply

10. At the "Security Settings" page, scroll down to the "Microsoft VM" section. Set the "Java permissions" to "Custom". Then click the "Java Custom Settings" button at the bottom of the page.

ecurity Settings	<u>?</u> ×
Settings:	
O Prompt	
📑 Microsoft VM	
📑 📑 Java permissions	
O Custom	
O Disable Java	
O High safety	
O Low safety	
O Medium safety	
Miscellaneous	
🖉 🖉 Access data sources across dom	ains
O Disable	
• Enable	
O Prompt	_
B Desa and dean as cance and marks	s Filos
Reset custom settings	
Reset to: Low	▼ R <u>e</u> set
1	
Java Custom Settings	OK Cancel

11. Click the "Edit Permissions" tab in the "Trusted sites" page. Set the Unsigned Content to "Run in sandbox", and "Enable" access to all network addresses.

isted sites			?
View Permissions	Edit Permissions		
P Unsigned Co			•
	igned Content		
O Bun O Disa	in sandbox		
		_	
	tional Unsigned Permissions		
	Access to all Files		
	Disable		
100	🕽 Enable		
	Access to all Network Address	es	
	Disable		
	Enable		
	Execute O Disable		
	D Enable		
	Dialogs		-
Reset Java Per	nissions		
Reset to: Sa	ved permissions	▼ R <u>e</u> set	
1		29.7	_
	[[[[[DK Cance	I

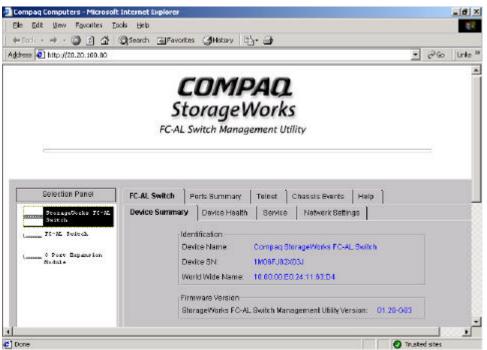
- 12. Click "OK" and exit the property sheet of Internet Explorer. If Internet Explorer is running, you must restart it for the changes to go into effect.
- 13. Start Internet Explorer. In the address bar, type FQDN if DNS is properly setup or enter the IP address of the Compaq StorageWorks FC-AL Switch 8. In this scenario, http://20.20.100.80 was typed in the location bar.
- 14. The login box of the Compaq StorageWorks FC-AL Switch 8 will show up. The default login is "user" with the password "ADMIN".

Enter Netv	work Passwo	rd	<u>? ×</u>
? >	Please type y	our user name and password.	
₿ [°]	Site:	20.20.100.80	
	Realm	Compaq StorageWorks FC-AL Switch	
	<u>U</u> ser Name	user	
	<u>P</u> assword	×××××	
	🔲 <u>S</u> ave this	password in your password list	
		OK Can	cel
			11

15. In the SNMP community settings, enter the proper community that was created during the set up of the SNMP Service properties. In this case, the Read Community is "public" and the Write Community is "private". The properties are *case sensitive*. Make sure the case matches the communities that were previous defined.

Enter Passwords	<u>_ ×</u>
Please Enter the	SNMP community strings
Read Community	public
Write Community	private
, in the second s	OK Clear
Varning: Applet Window	£

16. The Compaq StorageWorks FC-AL Switch 8 Management Utility main page will display. In the left side, the Compaq StorageWorks FC-AL Switch 8 with the IP address 20.20.100.80 and the 3 ports expansion module (PEM) is listed. There are several tabs that provide management information for the administrator. Please refer to the "Compaq StorageWorks User Guide - Fibre Channel Arbitrated Loop Switch (FC-AL Switch 8)" for more information. In this configuration, we want to define the port policy for the Compaq StorageWorks FC-AL Switch 8. Click on the Compaq StorageWorks FC-AL Switch 8 icon in the left panel.



- 17. There are four tabs in the FC-AL Switch 8 page.
 - The "FC-AL Switch information" provides descriptions, model numbers and serial number for the selected Compaq StorageWorks FC-AL Switch 8.
 - The "FC-AL Switch Ports Summary" gives summary information for all ports.
 - The "FC-AL Switch Port Detail" provides the configuration information for a specific port.
 - The "FC-AL Switch Events" reports the descriptions and the severity of events detected by the Compaq StorageWorks FC-AL Switch 8.

In the first scenario there are six servers and four Compaq StorageWorks RA4000/4100s. To configure the port policy click on the Compaq StorageWorks FC-AL Switch 8 Port Detail tab.

eis 💨 http://20.30.100.80	-	* 2 Go Links *
Sensition Famil Sensition Famil Decaystants Tr-14 Merrorition FC-ALSensition N=46-Sensition Tress Departure Bookts		

- 18. In the middle panel, there are 8 ports listed. Check the Configuration tab. The information in the right panel is for the port that is highlighted. There are four groups in the Configuration panel: Port Number, Operation Mode, LIP Generation and LIP Propagation.
 - Port Number Shows the number that identifies the selected port.
 Operating Mode
 - Operating Mode When "forced bypassed" is checked, a device can be connected to the port but it is not allowed into the loop. If "forced bypassed" is unchecked, a device which attached to that port is allowed to enter the loop.
 - LIP Generation The Compaq StorageWorks FC-AL Switch 8 can generate forced the LIPs when it is detects a change in a port state.
 - LIP Propagation

This specifies whether LIPs generated by devices attached to this port should be propagated to the other ports. Switch ports populated with hosts are candidates for disabling LIP propagation. LIP propagation should not be disabled for ports populated with target I/O devices.

The six servers in this scenario should have LIP disabled, and the four Compaq StorageWorks RA4000/4100 should have LIP enabled. The servers are connected to ports one through six of the FC-AL Switch 8 and the Compaq StorageWorks RA4000/4100s are connected to port seven, port eight, and two ports on the PEM. Disable the LIP Propagation for the first six ports by selecting each port in the middle panel and clicking the disable option in the LIP Propagation section.

2						■ Pilo Links
	magnifiction TC-IC. 18-05 20 College Part Espansion 70 4	Narmalien Der Australien Park I Park	FC-AL Switch Polo Bunmary Information	LP Ges S U LP Proc	1 ng Wade De Bayansed: (" Bet Ise F7 C Use F8 Bet	

19. To check the status of each connection for all of the ports on the Compaq StorageWorks FC-AL Switch 8. Click on the "FC-AL Switch Port Detail" tab. The "Status" section will indicate which ports are active and which do not have a successful connection. In the "LIP Propagation section" it displays a summary of the LIPs setting. Make sure all connections are marked as "Active" and the LIP setting is correct ports 1 to 6 should be marked as "Disabled" and ports 7 and 8 should be marked as "Enabled".

Selection Panel		CAL BWEEN FC-AL BWEE DE DATAT	n		
more Descapellantes TC-M. Destach	Port Batus	Media Type	AL PALIST	LIP Propagation	
PC+AL Switch	1 Enabled-Active	0BIC ShortMave - 1.05Gb	10	Disabled	
	2 Enabled - Active	OBIC Bhort/Nave - 1.060b		Disabled	
1. 2 Forth Department	2 Dynamic No incoming sign	al GBIC ShortMare - 1.05Gb		Disabled	
10000.0	4 Enabled - Artive	OBIC BhortMave - 1.0608	18	Disablad	
	5 Enabled - Active	OBIO ShortWave - 1.050b		Disabled	
	 Enabled - Active 	GBIC ShortMake - 1.0000		Disabled	
	7 Enabled-Aztive	OBIC ShortWave - 1.0908		Enabled	
	8 Enabled - Antive	6BIC ShortMave - 1.05Gb	OF	Enabled	
• •					

20. There are two Compaq StorageWorks RA4000/4100 attached to the PEM. In this scenario, the LIP setting of the two ports should be enabled. Click on the "3 Port Extension Module" in the left panel. Click on the "PEM Port Summary" tab. All three ports should have LIP enabled.

	Faverbas 🕑 History 🔄 - 😏		
Address 🛃 http://20.20.100.60		* ?	Go Links *
Selector (E) Trip, (Local Hards Selector (Farmel) Denote the selector (F-H) Denote the selector (F-H) I PC-H, Selector (F-H)	FEN Information FEM Ports Summary FEM Port Datail FEM Events Port Status Media Type AL_PAUXI Lift Propagation 1 Enabled -Active OEIC ShortName -1.000b 00 Enabled 2 Enabled-Active OEIC ShortName -1.000b 02 Enabled 3 Enabled-Active OEIC ShortName -1.000b 02 Enabled		*
Fine Transistan @ Pr			

21. If any of the ports on the PEM are not LIP enabled, click on the "PEM Port Detail" tab and enable the LIP on each port. Close the browser when finished with the port configuration.

Address 💨 http	Selector Panel		L sevenin surviv	PER Part Detail FEW Events	ind and a set of the
	International Sources	FEM Information	PEW Ports Burnmary		
Applet started	Fano G Tempessium G Pou	ver 🧿 Otter 🧿		Clear Cancel Refer	m Trusted stee

At this point, the configuration for the Port Policies is finished. We can start to configure each server in this scenario.

ACU and SSP in Windows 2000 Advanced Server

Windows 2000 Advanced Server Cluster Service is formed by two servers and two storage subsystems.

- a. Server MW360W21
- b. Server MW360W22
- c. RA4000 controller ID D952DBX10030 (three 9.1GB drives attached) has three logical drives
 - 1. 100MB logical drive for the quorum
 - 2. 10000MB logical drive
 - 3. 7251MB logical drive
- d. RA4000 controller ID D952DBX10056 (three 9.1GB drives attached) has one logical drive
 - 1. 26033MB logical drive

Configure the ACU

1. The Compaq ACU is GUI software for the Smart Array products and the StorageWorks RA 4000/4100. This utility is located on the SmartStart and the Support Software CD. If a server is properly installed through the Compaq SmartStart and the Compaq Support Paq was applied, The ACU can be accessed through workspace as shown below.

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Compute	at .					
Network						
Macaa						
cycle Bin						
*	Windows Update					
-	Programs	G	Accessories			
100		6				
0	Decursente		Company System Tools	_	Company Array Configuration Utility	
1	Settings	• 🖉	Startup Internet Explorer		Conglocation: C:(Program Ples(Compag(Cpgacu) Compag Integrated Management Log Vewer	
01	Search	۰ŏ	Outlook Express	1	Compag Power Down Manager	
100				3	Compag Power Supply Viewer	
-	Help					
2	Run					
چ	KUN					
)	KUN.					

 In this configuration, the ACU was accessed by server MW360W22. In the Controller Selection drop down box, RA4000 controllers are listed with specific worldwide ID and one embedded Smart Array Controller. These IDs will match the number in the upper right corner of the physical StorageWorks RA4000/4100 box.

The controller name can be changed through the ACU. Click on the "Settings" button in the "Controller" section of the right panel.

Smart Array Controller, B	imbedded Slat	* Controller
and the second	Amty/ID D931DEX10104	Sottings
RA4000 Controller, RAID	Array ID D952DEX10030	Create Array.
	Array ID D952D6X10041	- Array
	Army ID D952D6X10056	savag
AANOO CONFIDER. FAID	Array ID D952DEX10063	Modily
		Eupord
		Ciunte Logical D
		Logical Drive
		Modify
		Migrate
		Edenci
rive View		
C Logical	C Physical	More Informatic

3. In this configuration the Worldwide ID will be the name of the array. In order for NetWare 5.1 to recognize the Worldwide ID name, it is suggested to retype the Worldwide ID in this section. Otherwise, NetWare will not pick up the ID in the NetWare ACU, it will all be labeled as "Unknown", which will create some difficulties identifying the controllers. The administrator can change the name of the controllers according to practical needs.

Total Available Memory: Available for Read Cache.	65535 KB
manaple for Read Galerie.	100 %
Available for Write Cache:	76 %
0% Read / 75% Write 25% Read / 75% Write 30% Read / 75% Write 40% Read / 70% Write 60% Read / 60% Write 60% Read / 40% Write 60% Read / 40% Write 80% Read / 40% Write 90% Read / 20% Write 90% Read / 10% Write 100% Read / 0% Write	2
	0% Read / 75% Write 25% Read / 75% Write 30% Read / 75% Write 40% Read / 70% Write 50% Read / 50% Write 50% Read / 40% Write 50% Read / 40% Write 50% Read / 20% Write 50% Read / 20% Write 50% Read / 20% Write

4. According to the configuration plan, server MW360W22 should be able to access two RA4000 controllers, which are

D952DBX10030	Windows 2000 Advanced Server
D952DBX10056	Windows 2000 Advanced Server

In the Controller Selection drop down menu both controllers are listed. Start the configuration process by select the first controller that belongs to this configuration, which is the controller with ID D952DBX10030.

Smart Array Controller, Embedded Slat		Controller
RA4000 Controller, RAID Army/ID D931DEX10104	-	Settings
RA4000 Controller, RAID Array ID D952DBX10030		Create Array
BA4000 Controller, RAID Army/ID 0552DBX10041 RA4000 Controller, RAID Army/ID 0552DBX10055		Artay
RA4000 Controller. RAID Antaylo Diss208X10056 RA4000 Controller. RAID Antaylo Diss208X10063		Wedle
	-	-
		Emand
		Counte Logical Dove
		Logical Drive
		Modify
		Migrate
		Edenci
Drive View	-	
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5. This controller has three 9GB drives attached. This RA4000 controller will host three logical drives for two servers, MW360W21 and MW360W22. In this scenario, create one RAID 5 array using three 9.1GB drives. Then create three logical drives in this array. Click on

stroller Selection	Controller
RA4000 Controller, RAID Arrey D D952DBK10030	Sattings
gical Configuration View	Create Anay
RA4000 Controller, RAD Ansy ID 065208X10030 - (1) 9.1 GB, Port 1, ID 0 - (1) 9.1 GB, Port 1, ID 1 - (1) 9.1 GB, Port 1, ID 2	-Array Identic Expend
	Dicate Logical Drive
	Monty
	Mgote
	Extend .
ive View	
G Logical 🗍 C Bhysical	More Information

"Create Array" button to start the process.

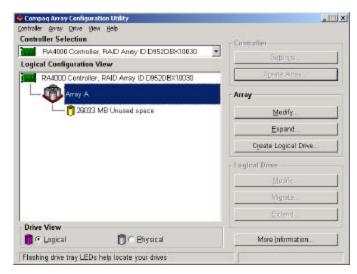
6. Select all three drives. Then click on the top icon to add drives to Array A.

eate Drive Array	×
Egisting Drives R44000 Controller, RAID Array D D Port 1 P 0 9.1 GB, D 1 0 9.1 GB, D 2 P 01 2	Anay Array A
Done Cancel	Вер

7. As shown below, all three drives have been moved to Array A. Click "Done" at the bottom of the dialogue box to return to the Main Configuration menu.

Existing Drives A4000 Controller, RAID Array D D Port 1 	Array A - C 9 1 GB, Port 1, ID 0 - M 9 9.1 GB, Port 1, ID 1 - M 9 9.1 GB, Port 1, ID 1 - M 9 9.1 GB, Port 1, ID 1	_
	4	
۹	84	
Done Cancel	Help	

8. The "Logical Configuration View" indicates that Array A has been created. Click on the unused space and click the "Create Logical Drive" button.



9. In the "Create Logical Drive" dialogue box, select "RAID 5-Distributed Data Guarding" then specify the size of the logical drive. All of the unused space is listed in the logical drive size box.

ault Tolerance	Array Accelerator
RAD 0 - No Fault Tolerance RAD 4 - Data Guarding	C Disable
RAID 5 - Distributed Data Guarding	- Stripe Size
	16 KB
	-Access Control
	Host Access
ogical Drive Size	15815 20820 26027 MB RAID Overhead
Usable Capacity	RAID Overhead

10. Create a 100MB logical drive for the quorum drive. Type 100 in the "Logical Drive Size" box to create the 100MB logical drive. Then click the "Done" button at the bottom of the dialog box.

ault Tolerance RAID 0 - No Fault Tolerance RAID 4 - Data Guarding	Array Accelerator © Enable © Disable
RAID 5 - Distributed Data Guarding	-Stripe Size
	-Access Control Host Access
ogical Drive Size	
MB 0 5205 10410	1 15515 20820 26027 MB

11. The ACU will confirm that a logical drive has been created. Click OK to return to the main screen.

Q	In order to optimize performance, the logical drive size has automatic been changed.				
	Requested Size: Difference: Adjusted Size:	100 MB 1 MB 99 MB			
(338)					

12. In the logical configuration view box there is one RAID 5 drive created. 25884MB unused space is still available.



13. Repeat steps 8 through 11 until all three logical drives have been created and no unused disk space remains.

ntroller Arov Orive View Help antroller Selection	Controller
RA4000 Controller, RAID Arrey ID D952DBK10030	Battings
ogical Configuration View	Create Array
RA4000 Controller, RAID Array ID 09520 BX10030	farsy
- 👩 99 MB, RAID 5, Logical Drive 1	Main's
10000 MB, RAID 5, Logical Drive 2 2251 MB, RAID 5, Logical Drive 3	Expand
• 125 mb, 1940 0, 23304 bire 0	Create Logical Drive
	Logical Drive
	Metify
	Mignite
	Extend .
Drive View	
📫 🤆 Logical 👘 🤆 Ehysical	More Information

In this paper we will define the access rules. The SSP is used to regulate the host access of each logical drive.

Configure Select Storage Presentation (SSP)

A. Grant access for server MW360W22 to access the shared drives.

The SSP is integrated into the ACU. It is a firmware level utility, which allows the administrator to allocate and restrict data access at the logical drive level. In this configuration, server MW360W22 needs to access two Compaq StorageWorks RA4000/4100 through the ACU.

1. Three logical drives were created in the RA4000 controller with ID D952DBX10030 in the previous section. Since the SSP works at the logical drive level, the configuration needs to be done for each logical drive. Click on the first logical drive. The "Logical Drive" section in the left panel becomes available. To modify the access control for this logical drive, click "Modify".



2. On the "Modify Logical Drive" screen Array Accelerator is enabled by default. Click on the "Host Access" button to bring up the SSP configuration screen.

and the second sec	
@ Enable	
C Digable	
Access Control	
Host Access.	

3. Each connection represents the HBA in the server. The Adapter ID is the worldwide ID for the HBA, which is labeled on the HBA.

The "Location" section indicates where the HBA is. In this scenario, the SSP is running on server MW360W22, which indicates the Adapter ID 500805F1FADB05B1 is sitting in the server MW360W22. As shown in the box, the location of the adapter is "Local".

Once the adapter is identified, access should be granted accordingly. By default, this logical drive grants access to all of the HBAs in the environment. In this configuration, the first logical drive in the RA4000 controller ID D952DBX10030 should only be accessed by server MW360W21 and MW360W22. Therefore, change "Grant access to all Connections" to "Grant access only to the selected connections below".

Connection Name	Adapter ID	Location	Status
🗹 [🔄 Unknown	500805F1FAD6DD48	Remote	Online
🗹 🛄 Unknavin	500805F1FADB8129	Remote	Online
🗹 [🔄 Unknown	500805F1FADB2A0E	Remote	Online
🗹 🛄 Unknown	500805F1FADB20C1	Remote	Online
🗹 🛄 Unknown	500805F1FADB1F7B	Remote	Online
🗹 🚉 Unknown	500806F1FADB05B1	Local	Online

 The names in the "Connection Name" column can be renamed. Check the "Connection Name" of the adapter that belongs to server MW360W22, with adapter ID 500805F1FADB05B1.

Compaq strongly suggests you rename each connection to names that are meaningful. From a management perspective, it makes it easy for an administrator to identify connections for repair or maintenance.

This logical drive should be accessed by server MW360W22 and MW360W21. Unless the administrator collected the HBA Worldwide IDs before the HBA was added to server, there

is no indication of which adapter belongs to which server in the "Logical Drive Host Access" page.

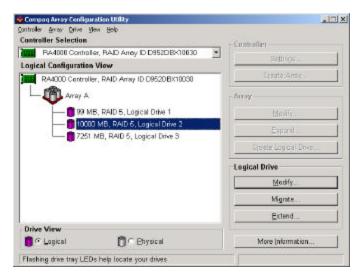
NOTE: It is highly recommended that the administrator record all the hardware information before configuring the SAN environment.

Connection Name	the selected connections be Adapter ID	Location	Status
D Interation	500805F1FAD8D048	Remote	Online
🗆 🗽 Unknown	500805F1FAD68129	Remote	Online
🗆 🐚 Unknown	500805F1FADB2ADE	Remote	Online
🗆 📴 Unknown	500805F1FAD820C1	Remote	Online
🗆 🗽 Unknown	500805F1FADB1F7B	Remote	Online
🗹 📜 Unknown	500805F1FAD805B1	Local	Online

5. To rename a connection, click on the name of the connection and click the "Rename" button at the bottom of the page. Once the name space becomes available, type the desired name. In this configuration, the server name "MW360W22" is used to show the connection.

onnection Name	Adapter ID	Location	Status
3 🐚 Unknown	500805F1FAD8D048	Remote	Online
] 🗽 Unknawn	500805F1FADB8129	Remote	Online
1 🐚 Unknown	500805F1FADB2A0E	Remote	Online
3 🛄 Unknown	500805F1FADB20C1	Remote	Online
🛾 🛄 Unknown	500805F1FADB1F7B	Remote	Online
1 KMA/380W/22	500805F1FAD805B1	Local	Online
			1000

6. The SSP is performed at the logical drive level; the administrator should go through these processes for each logical drive in the array that was created. In this scenario, there is one Array and three logical drives created, so the same procedures will apply to all three logical drives. If there is more than one array created on the controller, use SSP to configure all the logical drives in the other array. Select the second logical drive in the array and click "Modify".



7. Since the connection name of the local adapter ID has been changed, the "Logical Drive Host Access " page of the second logical drive keep the connection name. By default, the second logical drive grants access to all HBAs.

Connection Name	Adapter ID	Location	Status
🗹 🗽 Unknown	500805F1FAD6D048	Remote	Online
🗹 🗽 Unknown	500805F1FADB8129	Remote	Online
🗹 [🚉 Unknown	500805F1FADB2ADE	Remote	Online
🗹 🛄 Unknown	500805F1FADB20C1	Remote	Online
🗹 🗽 Unknown	500805F1FAD61F7B	Remote	Online
MNV380VV22	500806F1FADB05B1	Local	Online

8. The second logical drive will be set to grant access to server MW360W22 using "Logical Drive Host Access". Change the access condition for this logical drive. Grant access only to server MW360W22. Click "Done" and return to the main configuration screen of the ACU.

Connection Name		1	
and the second se	Adapter ID	Location	Status
🗆 🌆 Unknown	500805F1FAD6D048	Remote	Online
🗆 🗽 Unknawn	500805F1FADB8129	Remote	Online
🗆 🛄 Unknown	500805F1FADB2ADE	Remote	Online
🗆 🗽 Unknown	500805F1FADB20C1	Remote	Online
🗆 🛄 Unknown	500805F1FADB1F7B	Remote	Online
🗹 🗽 MAY360VA/22	500805F1FAD805B1	Local	Online

9. Repeat steps 6 through 8 for the third logical drive. After all three logical drives on the first array controller have been configured, exit to the main configuration screen of the ACU. In this scenario, there are two RA4000 controllers that need to be configured. Select the second controller D952DBX10056 from the ACU controller drop down menu.

ntroller groy Drive ! Controller Selection	ilen Holp	Controller
RA4000 Contra	ler, RAD Arrey ID D952DBK10056	Eatings
Logical Configuratio	n View	
RA4000 Control	ler, RAID Array ID 09520 BX10058	Create Array
9.1 GB, Por		harsy
- 🛱 9.1 GB, Par	11, ID 2	Monts
		Expand
		Create Lopical Drive
		-Logical Drive
		Monify
		Mignie
		Extend .
Drive View		
C Logical	C Bhysical	More Information

10. Create one RAID 5 Array using all three 9.1GB drives. Then create one logical drive in this new array. Modify the access control page to let server MW360W22 have access to this new logical drive. Grant access to the Local HBA. The "Logical Drive Host Access" page should look like this.

Colare access drip to	the <u>s</u> elected connections be	alowi	
Connection Name	Adapter ID	Location	Statue
🗆 🔚 Unknown	500805F1FADBD048	Remote	Online
🗆 🗽 Unknown	500805F1FAD68129	Remote	Online
🗆 🛄 Unknown	500805F1FADB2A0E	Remote	Online
🗆 🗽 Unknown	500805F1FADB20C1	Remote	Online
🗆 🐚 Unknown	500805F1FADB1F7B	Remote	Online
MW380W22	500806F1FAD805B1	Local	Online
	Rename	C	

11. Save the configuration and exit the ACU.

The configuration of ACU and SSP on server MW360W22 is finished. It is now the only system that can access all the logical drives in both RA4000 controllers.

Since server MW360W22 and server MW360W21 will form a Windows 2000 Advanced Server cluster, you must now grant access for server MW360W21 to access the shared drives.

B. Grant access for server MW360W21 to access the shared drives.

In order to grant access to the HBA in the server MW360W21, the administrator should access the ACU and the SSP on server MW360W21 to identify the HBA that belongs to server MW360W21.

 Open the ACU from MW360W21. Since two controllers in this configuration have just been configured through server MW360W22, several confirmation pages indicated controllers D952DBX10030 and D952DBX10056 have not finished the initialization process yet. Click OK to continue.

V	The Compaq RA4000 Controller in RAID Array D952DBX10030 is currently performing background parity initialization on the following logical drives:	-
	Logical Drive 1 Logical Drive 2 Logical Drive 3	
15645)	This is a normal operation that is necessary to initialize logical drives that have a fault tolerance with parity. Once this operation completes,	

2. To grant server MW360W21 access to all the logical drives in the two RA4000 controllers, select the correct controller that hosts the shared logical drives through the ACU. At the drop down menu of controllers, select the controller that will be accessed by server MW360W21. In this case, select D952DBX10030.

Controller Selection Smart.Anay.Controller, Embedded	Slat
Smart Array Controller, Embedded	Settings.
RA4000 Controller, RAID Array ID D	
RA4000 Controller, RAID Array ID D	
RA4000 Controller, RAID Array ID D	
RA4000 Controller, PAID Array ID D RA4000 Controller, PAID Array ID D	Martic
	Expand
	Djoste Jugi ca Lbixo.
	Logical Drive
	Monty
	Migrate
	Extend .
Drive View	
👩 🤆 Logical 🛛 👘 C Bhy	ical More Information

3. This controller has already been configured with three logical drives in the configuration of server MW360W22. The next step is to grant the HBA in server MW360W21 access to each logical drive on this controller. Click on the first logical drive then click "Modify" in the "Logical Drive" panel.

Compag Array Configur	ation Utility	2
Controller Greav Crive 19 Controller Selection	aw Hab	- Controller
RA4000 Controlle	er, RAID Arrey ID D952DBK10030	Septros.
Logical Configuration	View	
RA4000 Controlle	r, RAID Array ID D952DBX18038	Cleans guns.
- 👘 Array A		-Array
— 🎁 99 Mi	B, RAID 5, Logical Drive 1	Monife
	1 MB, RAID 5, Logical Drive 2	Exaprid
- 7251	MB, RAID 5, Logical Drive 3	
		Djeate Logical Linke,
		Legical Drive
		Modify
		Migrate
		Extend
Drive View		
C Logical	C Physical	More Information

4. Click the "Host Access" button on the "Modify Logical Drive" page.

© <u>E</u> nable © Di <u>s</u> able	
C Di <u>s</u> able	
Access Control	

5. This will bring up the "Logical Drive Host Access" screen. In the configuration process of server MW360W22, this logical drive was granted access only to the HBA that is in server MW360W22. The connection that was made previously should be already checked.

To locate the HBA in server MW360W21, use the following screen. Adapter ID 500805F1FADB2A0E is indicated as local, which means that the HBA is in server MW360W21. Grant server MW360W21 access to this logical drive by selecting the adapter that is marked as local.

Lurknown 500305F1FAD63129 Remote 0 Lurknown 500305F1FAD62A0E Local 0 Lurknown 500305F1FAD620C1 Remote 0 Lurknown 500305F1FAD620C1 Remote 0 Lurknown 500305F1FAD61F7B Remote 0	the second s	Location	Adapter ID	Connection Name
KUnknown 500305F1FAD82A0E Local () KUnknown 500305F1FAD820C1 Remote () KUnknown 500305F1FAD81F78 Remote ()	e Online	Remote	500805F1FAD8D048	🗆 🔚 Unknown
KUrknown 500305F1FAD820C1 Remote 0 Multi-Remote 0 Multi-Remote 0	e Online	Remote	500805F1FAD88129	🗆 🗽 Unknown
🗆 📴 Unknown 500805F1FADB1F7B Remote (Online	Local	500805F1FADB2A0E	🗆 🛄 Unknown
	e Online	Remote	500805F1FADB20C1	🗆 🗽 Unknown
■ MW360W22 500305F1FADB05B1 Remote ()	e Online	Remote	500805F1FADB1F7B	🗆 🛄 Unknown
	e Online	Remote	500805F1FADB05B1	2 🗽 MAY360V/22

6. Rename this connection to MW360W21. Click "Done" to finish the access control setting. At this point, this logical drive can only be accessed by two of the servers, which are servers MW360W21 and MW360W22.

	the selected connections be		
Connection Name	Adapter ID	Location	Status
🗆 🌆 Unknown	500805F1FAD6D048	Remote	Online
🗆 🗽 Unknown	500805F1FAD68129	Remote	Online
A MAAGOW21	500805F1FADB2ADE	Local	Online
🗆 🗽 Unknown	500805F1FADB20C1	Remote	Online
🗆 🐚 Unknown	500805F1FADB1F7B	Remote	Online
21 🗽 MNV360VV22	500806F1FAD805B1	Remote	Online

7. Repeat steps 3 through 5 to grant server MW360W21 access to the other two logical drives that reside on controller D950DBX10030.

Now controller D952DBX10056 needs to be configured. At the main ACU page select controller ID D952DBX10056. There is one logical drive that has already been created though the configuration of server MW360W22. Repeat step 3 to 6 to grant server MW360W21 the access to that logical drive. The "Logical Drive Host Access" page should look exactly the same as the previous screen. Click on "Done" to exit this page.

8. Save the configuration and exit the ACU.

Install MSCS

After all of the controllers have been configured, the system is ready to have MSCS installed. Use disk manager to create partitions and format the logical drives that where created through the ACU. In the Windows 2000 Disk Management Utility screen, there should be four logical drives. The first logical drive, which has a 100MB capacity, is the quorum drive for the cluster and the other three drives should be shared drives within the cluster. After MSCS is installed, reapply the Windows 2000 Service Pack 1.

ACU and SSP in Windows NT Server Enterprise Edition

The Windows NT Server Enterprise Edition cluster is formed by two servers and one storage subsystem.

- a. Server MW360NT1
- b. Server MW360NT2
- c. RA4000 controller ID D952DBX10063 (three 9.1GB drives attached) with three logical drives
 - 1. 100MB logical drive for the quorum
 - 2. 1000MB logical drive
 - 3. 7251MB logical drive

Use ACU to create three logical drives on the RA4000 Controller ID D952DBX10063. Then use the SSP to configure the host access. The SSP procedure will apply on both servers.

The configuration procedure summary:

 Access the ACU through server MW360NT2. Select the RA4000 Controller ID 952DBX10063 from the "Controller Selection" drop down menu. Create three logical drives. The creation process for the array and logical drives is the same as in Windows 2000 Advanced Server.

In the following screen shot, three logical drives have been created on the controller D952DBX10063.

RA4000 Controller, RAID Arrey ID D952DEX10053	- Contoniler.
ogical Configuration View	Selection -
RA4000 Controller, RAID Array ID D9520 BX18063	1996 6 200
- T Array A	-haray-
99 MB, RAID 5, Logical Drive 1	Idenia
10000 MB, RAID 5, Logical Drive 2 7251 MB, RAID 5, Logical Drive 3	$= (r_{1}, r_{2})$
251 WB, WHD S, LOGIST DIVES	action and the second
	Logical Drive
	Modify
	Mignite
	Extend
Drive View	
C Edgical C Ehysical	More information

- 2. The "Logical Drive Host Access" indicates the connections for each logical drive. Identify the HBA in server MW360NT2 from the "Logical Drive Host Access" screen. By default each logical drive is granted access to all the connections. Chang the option to "Grant access only to the selected connections below". Grant access to the connection that is local to server MW360NT2. Repeat the same processes for all three logical drives and grant access only to server MW360NT2.
- 3. The next step is to grant logical drives access to the second server MW360NT1. Access the ACU from server MW360NT1. Select the RA4000 Controller with ID D952DBX10063. There is one array with three logical drives listed. Access the SSP for each logical drive listed under the array.

For each logical drive, identify the HBA through the "Logical Drive Host Access" page and grant access only to local connection. As shown in the following screen shot, adapter ID 500805F1FADB20C1 is local to server MW360NT1. Grant access to that connection and rename the connection to "MW360NT1".

 Grant access to all co Deny access to all co 			
 Grant access only to 	the <u>s</u> elected connections b	elow	
Connection Name	Adapter ID	Location	Status
🗆 🛄 Unknown	500805F1FADBD04B	Remote	Online
🗹 📗 MW360NT2	500805F1FADB8129	Remote	Online
🗆 🛄 Unknown	500805F1FADB2A0E	Remote	Online
🗹 🗽 MW360NT1	500805F1FADB20C1	Local	Online
🗆 🐚 Unknown	500805F1FADB1F7B	Remote	Online
🗆 🗽 Unknown	500805F1FADB05B1	Remote	Online
	Danama	1	
	<u>R</u> ename		

4. This process should apply to all three logical drives on the controller ID D952DBX10063. Click the "Done" button to leave this screen. Save the configuration of the ACU and exit. Once the information has been saved through ACU, the configuration of the ACU and the SSP for Windows NT Server Enterprise Edition is finished.

Install MSCS

Open Disk Manager in Windows NT Server Enterprise Edition. There should be three unpartitioned drives listed. Partition and format each drive accordingly. Then install MSCS. Use the first logical drive, which has a 100MB capacity, as the quorum drive. This cluster should own two logical drives. After MSCS is successfully installed, reapply Windows NT Service Pack 6a.

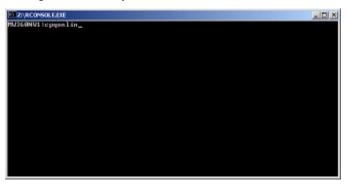
ACU and SSP in NetWare

NetWare 5.1 Server cluster formed by two servers and one shared storage subsystem.

- 1. MW360NW1
- 2. MW360NW2
- 3. RA4000 controller ID D931DBX10104 (three 18.1GB drive attached). Two logical drives will be created.
 - 1. 100MB logical drive
 - 2. 34630MB logical drive

The following are the configuration steps for NetWare:

1. NetWare Online Array Configuration Utility, also called CPQONLIN, is a NetWare Loadable Module (NLM) for configuring drive arrays. It also provides information about the status of drives attached to the RA4000 controller. To access the CPQONLIN utility, at the NetWare console on server MW360NW1 type "CPQONLIN" to start the "Compaq Online Array Configuration Utility" on NetWare Server.



2. Select "Array Configuration Utility" in the "Available Options" list.

Compay Online Conf	igaration v2.46	HetHave Loadable Module
	Svailable Options	
	2. Advanced Notwork Control US 3. Ulew Readme File	illity
	4. Ecit	

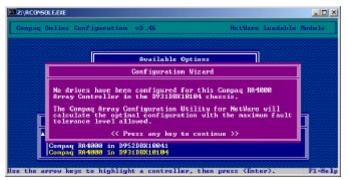
3. Then the "Select Active Controller" dialogue box will appear. On server NW360NW1, there are two controllers. One is the Embedded Compaq Smart Array controller the other is the fibre channel HBA. Select the fibre channel HBA which is listed as "Compaq FCHC/P Adapter in PCI Slot 1"

Available Options	
1. Array Configuration Utility 2. Advanced Network Control Utility 3. View Readme File	
4. Exit	
 Salart Antin Contaillan	
Select Active Controller t Array controller in PCI zlot 8 24 Mapter in PCI zlot 1	

4. Since this controller is connected to the Compaq StorageWorks FC-AL Switch 8, all of the RA4000 Controllers will show up in the "Select Active Controller" section. Select the controller that is designated to this configuration, which in this case is controller ID D931DBX10104.

	igaratian v2.46	brtHars Loadable Mode
	Available Options	
	1. Array Configuration Utility 2. Advanced Network Control Util 3. View Readme File	Lity
	4. Exit	
	Select Active Controller	
A Compaq BR4 Compaq BR4 Compaq BR4	999 in D952DBX19956 999 in D952DBX19963 999 in D952DBX19841 998 in D952DBX19844	

5. This controller has not been configured yet. The Compaq CPQONLIN utility will try to suggest the optimal configuration for this controller. Press any key to continue.



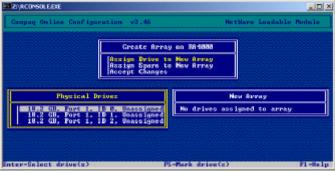
6. In the "Logical Configuration View", it lists one array that combines all of the available drives attached to this controller. Since the CPQONLIN utility will try to optimize the configuration for the system, it provides all the possible options for this array. It can be set as RAID 5, RAID 1 or RAID 0. To enable the SSP functions at the logical drive level, the administrator must select the "Custom Configuration" option in the "Select Fault Tolerance" box.

Proposed Logical G	onfiguration	Select Fault	Telerance
RA4880 Centroller - 99	BIDERIGIES D 5 Log Drive 1	niidisteri niid i Chrim Baild i Chrim Baild 8 Chu F Custem Confi	Onion Constitution 8 Mirroring) Mult2 Suration

7. Three unassigned drives will be listed under the "RA4000 Controller D931DBX100104". Press enter to move to the "Create New Array" option in the "Controller Options" window. Then press enter again to open the "Create New Array" menu.

MIS//RCONSOLE/EX	E.					
Compag Onlis	a Configuration	w2.46		Hictory	re Loadable	Medicle
La la	gical Configurat	ion View		Ge	stroller Opt	ions
	2 GB, Port 1, I 2 GB, Port 1, I 2 GB, Port 1, I 2 GB, Port 1, I		signed	18:	eate New Are stroller Set	ay tings
Inter-Select	Esc -Provinus	Nenu	Tab-Physical	Ulew	Pillete	Plefelp

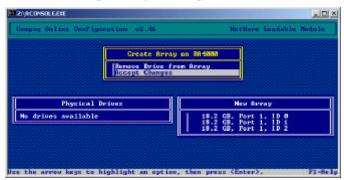
8. Select the "Assign Drive to New Array". Every time you press "Enter", a drive will be selected and shown in a different box, which means that the drive is part of the new array.



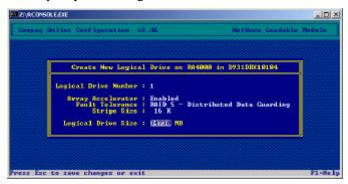
9. In this configuration, all three drives will be added to the new array. Press "Enter" to add the first physical drive to the array.

Compaq Online Config.	ination v2.46	MetWare Loadable Module
	Greate Array on BA1000	
	Assign Drive to New Array Assign Spare to New Array Renove Brive From Array Accept Changes	
Physical I	brivez	New Revey
18.2 GB. Fort 1. 18.2 GB. Fort 1.	ID 1. Unassigned 18.2 ID 2. Unassigned	GB, Port 1, 10 8

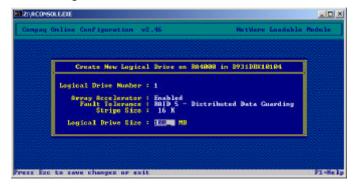
10. The curser will move to the second physical drive. Press "Enter" to add the second physical drive to the array. The curser will then move to the third physical drive. Press "Enter" to add the third physical drive to the array. When all three drives are added to the array, move the cursor to "Accept Changes" and press "Enter".



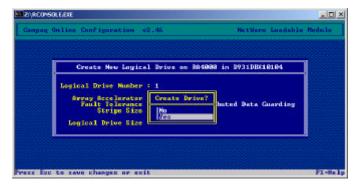
11. Then the "Create New Logical Drive on RA4000 in D931DBX10104" dialogue box appears. The capacity of this logical drive is 34738MB.



12. In this configuration, there are two logical drives that need to be created. Enter the desired size of the first logical drive. According to the configuration plan for this scenario, the size of the first logical drive should be 100MB. Enter 100 in the "Logical Drive Size" space.



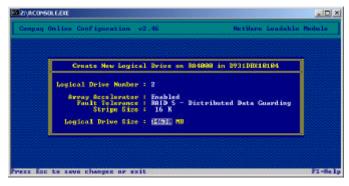
13. Confirm the creation of the first logical drive, by selecting "Yes" then press Enter.



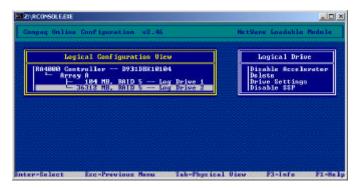
14. Once the logical drive has been created, the ACU will give you the option of running the SSP for this controller. Make sure the cursor is on "Yes" and press "ESC" to allow the SSP to run on this controller.

***** WARNING *	
Selective Storage Presentation (SSP controller.) is supported on this
Would you like to enable SSP and ad server to the access control list F	d all connections in this or this logical drive?
<u>488</u>	NO

15. You will still have unused space in the array that was created on D931DBX10104. The CPQONLIN utility will bring you back to the "Create New Logical Drive on RA4000 in D931DBX10104" page.



16. Create a new logical drive with all the space available and enable SSP for the new logical drive. After the SSP is enabled on all logical drives, press "Esc" to exit to the NetWare Console.



17. After enabling the SSP for server MW360NW1, the configuration is finished. Next, the SSP for the second NetWare Server MW360NW2 should be enabled. At the console of server MW360NW2, type CPQONLINE.

Server MW360NW2 is accessing the same Compaq StorageWorks RA4000/4100 as server MW360NW1. Two logical drives have already been created in Array A. Enable the SSP on each of the logical drives. Once the SSP is enabled, the configuration of the second server MW360NW2, is finished. There are two logical drives owned by the two NetWare Servers.

Logica	1 Genfiguration View	Logical Drive
Erney B	ller 093108x10104 04 HB, RAID 5 Log Drive 124 HD, RAIDS Log Drive	Dizable Accelerate Delets Drive Settings Disable SSP
5363	84 MB, BHID 5 Log Drive 12 MB, BHIDE Cor Drive	Drive Settings Disable SSP

Install NCS

Use the "NWCONFIG" utility to create the NetWare Volumes. Then install the NCS. After NCS is successfully installed, reapply NetWare Service Pack 1.

Cluster and Stand-alone Non-Redundant Configuration

Red Hat Linux 7.0, Windows 2000 Advanced Server and NetWare 5.1 will be installed as standalone servers that will share one Compaq StorageWorks RA4000/4100. Two clusters will be installed which are Windows 2000 Advanced Server and Windows NT Server Enterprise Edition.

NOTE: The servers that will share a storage box cannot be clustered. Refer to "Configuration Restriction" section in the beginning of the white paper.

Mix Non-Redundant Configuration

- Windows 2000 Advanced Server MSCS
- Windows NT Server Enterprise Edition MSCS
- Stand-alone Servers
 - o Windows 2000 Advanced Server
 - o NetWare 5.1
 - Red Hat Linux 7.0

Pre-configuration assumptions:

- 1. Before installing the OS on the servers, all of the Compaq StorageWorks RA4000/4100 that belongs to this configuration should be powered up. Then power on each system to install the OS
- Windows 2000 Advanced Server is properly installed and the CSP and Windows 2000 Service Pack 1 are correctly installed on all three servers (MW360W21, MW360W22, MW360W23).
- 3. Windows NT Server 4.0 Enterprise Edition is properly installed, NTSSD and Service Pack 6a have been applied. (MW360NT1, MW360NT2).
- 4. NetWare 5.1 is properly installed and the Compaq Novell NetWare SSD and Service Pack 1 are properly installed. (MW360NW1).
- 5. Red Hat Linux 7.0 is properly installed (MW360LX1).
- 6. Seven servers are properly attached to port 1-7 in the Compaq StorageWorks FC-AL Switch 8.
- 7. All the StorageWorks RA4000/4100s and the Compaq StorageWorks FC-AL Switch 8 w/PEM should be flashed with the latest firmware. If any previous configurations exist, use Compaq ACU to delete any configuration on the array controllers.
- 8. No cluster software is installed on any of the servers.

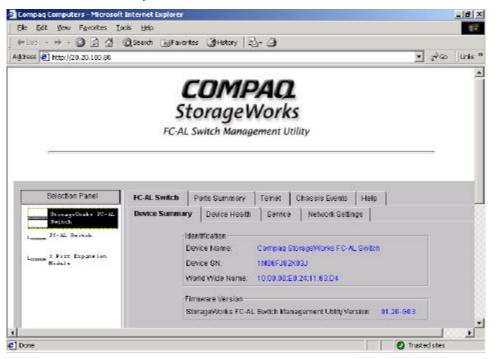
Redefine Port Policy

In this scenario there are seven servers and three StorageWorks RA4000/4100s. The port policy should be changed accordingly. All of the ports that the seven servers are attached to should be set to "Lip Disabled" and the ports that the three StorageWorks RA4000/4100 should be set to "LIP Enabled".

Access the "Compaq StorageWorks FC-AL Switch 8 Management Utility" through Internet Explorer (v5.0 or higher). Make sure the browser is properly set up.

Note: Please refer to the settings procedure for the browser in the **"Multi-Cluster Non-Redundant Configuration"** section.

In the address bar type the IP address of the Compaq StorageWorks FC-AL Switch 8. Login as "user" and use "ADMIN" as the password. Enter "public" for the read community and "private" for the write community.



Click on the Compaq StorageWorks FC-AL Switch 8 icon in the left panel and select the "FC-AL Switch Port Detail" tab. Select ports 1 to 7 respectively, and set of LIP Propagation section to "Disable". "Enable" the LIP for port 8 and the three expansion ports, which are connected to the Compaq StorageWorks RA4000/4100.

Addman (1) http://20.20.106.60				- 19 B	Lolu 30
Fare G Temperature G P	FC-AL Switch Information FC-AL Switch Ports Starmary FC-AL Switch Ports Starmary Formation F	Fa LIP 00 Fi LIP Phi		and a second	2
() Done			1201	🕑 Triated sites	

ACU and SSP in Windows 2000 Advanced Server

The Windows 2000 Advanced Server cluster is formed by two servers and one storage subsystem.

- a. Server MW360W21
- b. Server MW360W22
- c. RA4000 controller with ID D952DBX10030 (three 9.1GB drives attached). Three logical drives will be created.
 - a. 100MB logical drive for the quorum
 - b. 1000MB logical drive
 - c. 7251MB logical drive

Configuration steps will be the same as in the first scenario. Please refer to the screen shots for Windows 2000 Advanced Server in the first scenario.

- 1. Access the ACU through server MW360W22.
- 2. Select the RA4000 Controller with ID D952DBX10030 from the drop down menu of the ACU.
- 3. Create one Array using all three 9.1GB drives.
- 4. Create three logical drives within the array
 - a. 100MB logical drive for the quorum
 - b. 1000MB logical drive
 - c. 7251MB logical drive

- 5. Select the first logical drive and modify the logical drive to grant access only to the connection local to server MW360W22.
- 6. Rename the connection to MW360W22.

D IFADBDD4B IFADB8129 IFADB2ADE	Location Remote Remote	Online Online
FADB8129	Remote	
		Oplina
FADBOADE		00000
TT Partition in the	Remote	Online
IFADB20C1	Remote	Online
FADB1F7B	Remote	Online
IFADB05B1	Local	Online
	-1	
		FAD80581 Local

- 7. Repeat steps 5 and 6 for the other two logical drives.
- 8. Save the configurations and exit the ACU on server MW360W22.
- 9. Access the ACU on the server MW360W21.
- 10. Select the RA4000 Controller with ID D952DBX10030
- 11. There should be three logical drives listed under the array. Modify the host access of the first logical drive to grant access only to the connection local to server MW360W21.
- 12. Rename the connection to MW360W21.
- 13. Repeat step 11 and 12 for the other two logical drives.
- 14. Save the configuration and exit the ACU in server MW360W21.

Install MSCS

Use disk manager to create partitions and format the logical drives that where created through the ACU. In the Windows 2000 Disk Management Utility screen, there should be three logical drives. The first logical drive, which has a 100MB capacity, is the quorum drive for the cluster and the other two drives should be shared drives within the cluster. After MSCS is installed, reapply the Windows 2000 Service Pack 1.

ACU and SSP for Stand-alone Servers

In this configuration, there are three stand-alone severs and one StorageWorks RA4000/4100.

- 1. Windows 2000 Advanced Server (MW360W23).
- 2. Red Hat Linux 7.0 (MW360LX1) with HBA ID 500805FFABD8129.
- 3. NetWare 5.1 (MW360NW1).
- 4. Compaq StorageWorks RA4000/4100 (IDD952DBX10041). There are six 9.1GB drives attached to this controller.

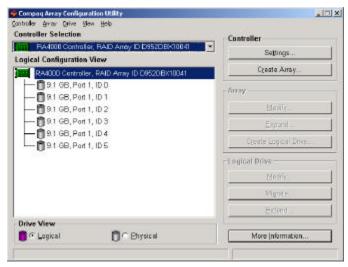
Configuration steps for each standalone server are described below.

Windows 2000 Advanced Server

1. Access the ACU from Windows 2000 Advanced Server (MW360W23). Select the controller with ID D952DBX10041.

Compag Array Configu antroler gray Drive S		
Controller Selection		Controller
	ntroller, Embedded Slat	Bettings
RA4000 Cantroll	boller. Embedded Slot er, RAID Array ID D931DBX10104	Create Array
THE OWNER AND ADDRESS OF TAXABLE PARTY.	er, RAID Array ID D952DEX10030 er, RAID Array ID D952DEX10041	- haray
RA4000 Controll	er, RAID Array ID D952DBX10056 er, RAID Array ID D952DBX10053	Boilty.
		Expand
		Greate Log cal Drive
		Logical Drive
		Monifs
		Mignue
		Eclend .
Drive View		
📋 🤄 Logical	🗂 🦳 Bhysical	More Information

2. There are six 9.1GB drives attached to this RA4000 controller. In this configuration, three operating systems will share this storage subsystem. Each OS will have access to two of the drives.



3. Select the first two 9.1GB drives to create an array (Array A) for Windows 2000 Advanced Server.

Egisting Drives	Array
RA4000 Controller, RAID Array ID D.	👜 Array A
📼 🗐 Port 1	- 🗹 🗍 9.1 GB, Port 1, ID 0
	🖬 🚺 9.1 GB, Port 1, ID 1
- 🗆 🚱 9.1 GB, IO 1	(h-6)
- D 🗍 9.1 68, D 2	10 T
- D 0 9.1 GB, D 3	
- 🗆 👩 9.1 GB, ID 4	4 L
- CI 🚺 9.1 GB, ID 5	
- E Port 2	
4 1 1	8.4
<u> </u>	interarrated (
Dona Cancel	Help

4. Use the next two drives to create another array (Array B) for the Linux server and leave the other two drives for the NetWare 5.1 server.

Compag Array Configuration Utility	
antroller Array Orive View Help Controller Selection	- Controller
RA4000 Controller, RAID Array ID D952DBK10041	Estucos.
Logical Configuration View	
RA4000 Controller, RAID Array ID D9520BX10041	Steate Antry
9.1 GB, Port 1, ID 4	Array
- Array A	Manife
B673 MB, RAID 1, Logical Drive 1	Expand
- 🕅 Алау В	Greate Logical Drive
9673 MB, RAID 1, Logical Drive 2	Logical Drive
	Madify
	Mignite
	Extend
Drive View	
🟮 🤆 Logical 🛛 🗍 C Bhysical	More Information
Flashing drive tray LEDs help locate your drives	

5. Move the cursor to "Array A", then click the "Create Logical Drive" button. In the "Create Logical Drive" page, there are two fault tolerance levels to choose from. In this configuration, create a RAID 1 array. Click the "Done" button to exit this screen.

RAID 1 - Drive Mirroring	C Di <u>s</u> able
	-Stripe Size-
	128 KB 💌
	-Access Control
	Host Access
B673 MB D 3469 6938 104	07 13876 17347 MB

6. After the logical drive has been created for Array A, click on the "Modify" button in the "Logical Drive" section, this will bring up the access control screen for that logical drive. Click on the "Host Access" button to access the SSP.

Enable		
C Di <u>s</u> able		
ccess Control	st <u>A</u> ccess	

 By default, Array A will grant access to all of the HBAs in this environment. In this configuration, access to Array A only needs to be granted to the HBA in server MW360W23. The HBA ID 500805F1FADB2A0E is local to server MW360W23.

C Grant access only to Connection Name	the selected connections be	low Location	Status
≪ In Unknown ■ Unknown ■ Unknown ■ Unknown ■ Unknown ■ Unknown	Adapter ID 500305F1FAD8D048 500305F1FAD8129 500305F1FAD81A0E 500305F1FAD81F7E 500305F1FAD80561	Remote Remote Local Remote Remote	Online Online Online Online Online

8. Change the access method from "Grant access to all connections" to "Grant access only to the selected connections below". Check the HBA that is local to server MW360W23 and change the connection name to MW360W23. Then click "Done" to leave this page.

	the selected connections be		
Connection Name	Adapter ID	Location	Status
🗆 🌆 Unknown	500805F1FAD6D048	Remote	Online
🗆 📃 Unknown	500805F1FADB8129	Remote	Online
MW36DW23	500805F1FADB2ADE	Local	Online
🗆 🗽 Unknown	500805F1FADB1F7B	Remote	Online
🗆 🗽 Unknown	500805F1FADB05B1	Remote	Online

9. Save the configuration and exit the ACU.

The access control for Windows 2000 Advanced Server is set to access the first two drives in the RA4000 controller with worldwide ID D952DBX10041. Use Disk Management Utility in Windows 2000 Advanced Server to partition and format the drive as an NTSF partition. Now server MW360W23 can access the logical drive.

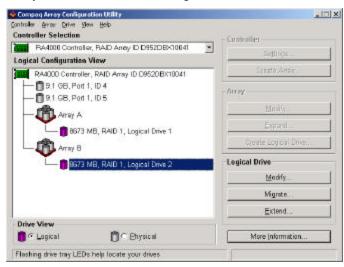
Red Hat Linux 7.0

Linux does not have an ACU or an SSP to configure the array and access control. A Windows NT Server or Windows 2000 Server is needed to configure the ACU and SSP. In this configuration procedure, Windows 2000 Advanced Server ACU utility will be used to create the drive array for the Linux server and the Linux server command line will be used to assign the drives to Linux server. The configuration of Linux will be described in two parts.

- 1. Before adding the HBA to the Linux server, the administrator needs to write down the worldwide ID that is on the HBA. In the Linux environment, there is no location record that indicates which HBA is local to the Linux Server. In our configuration, HBA with ID 500805FFABD8129 is installed in the Linux Server.
- Linux server MW360LX1 will share the Compaq StorageWorks RA4000/4100 with the previous Windows 2000 Advanced Server. In the previous configuration of the RA4000 Controller with ID D952DBX10041, two arrays were created. One for the access of Windows 2000 Advanced Server and the other is for Red Hat Linux 7.0 r.

Open the ACU on server MW360W23. Select the RA4000 Controller with ID D952DBX10041. There are two arrays. Array A is assigned access to server WM360W23. Array B will be assigned access to MW360LX1.

In this configuration, one logical drive will be created in Array B. Use all of the space in Array B to create a RAID 1 logical drive.



3. Click on the logical drive in Array B and modify the access control property.

In this scenario the Worldwide ID for the HBA in the Linux server is 500805FFABD8129, which was written down before the HBA was installed. In the Logic Drive Host Access menu, grant access to the adapter with ID 500805FFABD8129 and change the connection name to MW360LX1.

Connection Name	the <u>selected</u> connections be Adapter ID	Location	Status
🗆 🐚 Unknown	500805F1FAD8D048	Remote	Online
MVAG60LX1	500805F1FAD68129	Remote	Online
1 NW360W23	500805F1FADB2ADE	Local	Online
🗆 🗽 Unknown	500805F1FADB1F7B	Remote	Online
🛛 🐚 Unknown	500805F1FAD805B1	Remote	Online

4. After successfully installing Red Hat Linux 7.0, apply Compaq Fibre Channel Driver *cpqfc.o* which is located at

/lib/modules/2.2.16-22/scsi (Linux is case sensitive, please type with lower case)

- 5. After changing to the correct folder, apply the Compaq Fibre Channel Driver by typing *insmod cpqfc.o* At the Linux command prompt and pressing enter to execute.
- 6. During the installation of the Compaq Fibre Channel Driver for Linux, it will detect that there are one logical drive that the Linux server can access. Linux will automatically assign a name to the logical drive. In this scenario it was *sdb*.
- 7. For the Linux server to be able to access the drive, the administrator needs to map the drive and mount it on the Linux server. Use the following Linux commands to mount the logical drive to the Linux server. There are three steps to mount the drive.
 - a. *me2fs /dev/sdb* (Creates a file system on drive *sdb*)
 - b. *mdir* /*disk1* (creates a directory in Linux called *disk1*)
 - c. *mount /dev/sdb /disk1* (mounts the drive *sdb* to the directory *disk1*)

NetWare 5.1

In the NetWare 5.1 environment, CPQONLIN is used to configure the drive array. The procedure is the same as described in the first configuration scenario.

- 1. At the NetWare 5.1 Console, type "CPQONLIN".
- 2. Select the correct Compaq RA4000 controller. In this configuration it is D952DBX10041.

2012//RCOMSOLE/EXE			
Compaq Online Confi	garation v2.46	HetWare Loodable	Mode le
	Available Option	12	
	1. Array Configuration Ut 2. Advanced Network Contr 3. View Readme File	el Utility	
	4. Exit		
	Select Active Contro	ller	
	88 in 593108X19104 88 in 595208X18941		
Compag RA48	08 in D952DBX10063		
Use the arrow keys to	highlight a controllar, th	un prezz (Enter).	Findely

3. In the "Logical Configuration View", there should be two arrays that have already been created and two remaining 9.1 GB drives. The two existing arrays belong to the Red Hat Linux 7.0 server and the Windows 2000 Advanced Server.

20	IV/RCOMSOLE/EXE	
0	seepaq Online Configuration = v2.46	HetHars Loadable Models
		and the second
	Logical Configuration View	Gentroller Options
	Physics Control for - 595210511041 - 7.1 CB. Part 1. 10 4. Unassigned - 7.1 CB. Part 1. 10 5. Unassigned - Rrray M. - 9295 MB. BNID 1 - Log Drive 1	Create New Avray Controller Settings
l	Array B 9895 MB, BhlD 1 Log Drive 2	
PERSONAL PROPERTY AND INCOME.	er-Select Esc-Previous Menu Tab-Physics	it often an-ture al-merb

4. Press "Enter" to move the cursor to the "Controller Options" page and select "Create New Array". Use all the available drives to create a RAID 1 array.



SERVACONSOLECE

Compaq Online Configuration v2.46

Notilare Loadable Hodule

Create New Logical Brive as RA4000 in D952DBE10041

Logical Drive Number : 3

Rryay Scelerators : Endled
Foile Hirvoring
Foilige Size : 128 K

Logical Drive Size : 35228 MB

Freat End to save charges or estt

5. Confirm the creation of the RAID 1 array and press "Esc" to save the changes.

6. Once the logical drive has been created, the ACU will give you the option of running the SSP for this controller. Make sure the cursor is on "Yes" and press "ESC" to allow the SSP to run on this controller.

VICOMBOLEJER		
empaq Onlis	w Configuration v2.46	HetHars Louisble Model
ſ	WARH	ING
St	elective Storage Presentation Introller.	(SSP) is supported on this
No.	uld you like to enable SSP as erver to the access control 1.	nd add all connections in this ist for this logical drive?
	<u>000</u>	ND
ar fac to a	reve changes or exit	715

7. In the CPQONLIN main configuration page, the newly created array "Array C" is 9095MB.



8. Once the array is created, use "NWCONFIG" to create NetWare Volume.

Now the configuration of the three stand-alone servers is finished. Each operating system can only access the array that is assigned to it. The SSP will manage the access rules behind the scenes.

ACU and SSP in Windows NT Server Enterprise Edition

Windows NT Server Enterprise Edition cluster is formed by two servers and one storage subsystem.

- 1. MW360NT1
- 2. MW360NT2
- 3. RA4000 controller ID D952DBX10063 (three 9.1GB drives attached)
 - a. 100MB logical drive for the quorum
 - b. 10000MB logical drive
 - c. 7251MB logical drive

The configuration procedures of the ACU and the SSP in this scenario are exactly the same as the Windows 2000 Advanced Server procedures.

Note: Refer to the "ACU and SSP in Windows 2000 Advanced Server" section.

Here are the steps for this configuration:

- 1. Access the ACU through server MW360NT1.
- 2. Select the RA4000 controller with ID D952DBX10063 from the Controller Selection Menu.
- 3. Create one array using all three 9.1GB drives.
- 4. Create three logical drives under the array you have just created.
- 5. Select the first logical drive and modify the logical drive to grant access only to the connection local to server MW360NT1.
- 6. Rename the connection to MW360NT1.
- 7. Repeat steps 5 and 6 for the remaining two logical drives.
- 8. Save the configuration and exit the ACU.
- 9. Access the ACU the through server MW360NT2.
- 10. Select the RA4000 Controller with ID D952DBX10063.
- 11. There should be three logical drives listed on this controller. Modify the Host Access of the first logical drive to grant access only to the connection local to server MW360NT2.
- 12. Rename the connection to MW360NT2.
- 13. Repeat steps 11 and 12 for the remaining two logical drives.
- 14. Save the configuration and exit the ACU.

Install MSCS

Open Disk Manager in Windows NT Server Enterprise Edition. There should be three unpartitioned drives listed. Partition and format each drive accordingly. Then install MSCS. Use the first logical drive, which has a 100MB capacity, as the quorum drive. This cluster should own two logical drives. After MSCS is successfully installed, reapply Windows NT Service Pack 6a.

Redundant Configuration

The redundant configuration, as describe in the previous section, consists of two FC-AL Switch 8s and two HBAs in each server. The ACU configuration procedures are the same as the previous section. Since there are two HBAs in each system, the location section of SSP should detect 2 HBAs as local.

Redundant Configuration

- Windows NT Server Enterprise Edition MSCS
- ✤ NetWare 5.1 NCS
- Stand-alone Windows NT 4.0 Server

Pre-configuration assumptions:

- 1. Before installing the OS on the servers, all of the Compaq StorageWorks RA4000/4100 that belong to this configuration should be powered up. Then power on each system to install the OS.
- 2. Each server has two HBAs and two Compaq StorageWorks FC-AL Switch 8 connected correctly.
- Windows NT Server Enterprise Edition is properly installed, NTSSD, Compaq Redundancy Manager, and Service Pack 6a have been applied to three servers (MW360NT1, MW360NT2, MW360NT3).
- 4. NetWare 5.1 is properly installed, the Compaq Novell NetWare SSD and Service Pack 1 have been applied to both servers (MW360NW1, MW360NW2).
- 5. The five servers are attached to port 1 through 5 of the Compaq StorageWorks FC-AL Switch 8.
- 6. All the StorageWorks RA4000/4100s and the Compaq StorageWorks FC-AL Switch 8 w/PEM should be flashed with the latest firmware. If any previous configurations exist, use the Compaq ACU to delete any configuration on the array controllers.
- 7. No cluster software is installed on any of the servers.

Note: For more information about Compaq Redundancy Manger, refer to the online documentation CPQDXCFG.HLP included in the CD or the "*Compaq ProLiant Cluster HA/F100 and HA/F200 Administrator Guide*"

Redefine Port Policy

In this configuration, there are a total of five servers and five StorageWorks RA4000/4100s. Access the "Compaq StorageWorks FC-AL Switch 8 Management Utility" through Internet Explorer 5.0 or later. Make sure the browser is properly set up.

Note: Please refer to the settings procedure for the browser in the **"Multi-Cluster Non-Redundant Configuration"** section.

At the address bar, type the IP address of the FC-AL Switch 8. Login as "user" and use "ADMIN" as password. Enter "public" for the read community and "private" for the write community.

Click on the "FC-AL Switch" icon at the left panel. Select the "FC-AL Switch Port Detail" tab. Set the LIP propagation of port 1 to 5 to "Disabled" and port 6 to 8 to "Enabled". In the PEM (3 Port Expansion Module), "Enabled" LIP propagation for all three ports.

In the redundant configuration, there are two Compaq StorageWorks FC-AL Switch 8. Configure the second switch using Internet Explorer 5.0 or later. Set the LIP propagation of port 1 to 5 to "Disabled" and port 6 to 8 to "Enablde". In the PEM (3 Port Expansion Module), "Enabled" the LIP propagation for all three ports.

ACU and SSP in Windows NT Server Enterprise Edition

The Windows NT Server Enterprise Edition cluster is formed by two servers and three storage subsystems.

- a. Server MW360NT1
- b. Server MW360NT2
- c. Three Compaq StorageWorks RA4000/4100 with ID

D952DBX10041 (three 9.1GB drives attached)

- 1. 100MB logical drive for the quorum
- 2. One logical drive

D952DBX10063 (three 9.1GB drives attached)

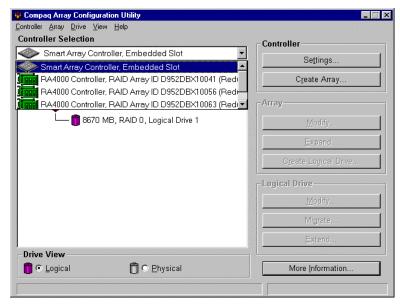
1. One logic al drive

D952DBX10056 (three 9.1GB drives attached)

1. One logical drive

In this scenario two HBAs in each of the servers. The redundant configuration steps are the same with all the Windows NT Server Enterprise Edition systems. The only difference is in the "Logical Drive Host Access" page in the SSP, which will show two Adapter IDs as Local. The following steps are used to configure the ACU and SSP in the Windows NT Server Enterprise Edition configuration:

1. Access the ACU through server MW360NT1. Three RA4000 Controllers are listed. As shown in the "Controller Selection" section, all three controllers are marked as "Redundant".



2. Select RA4000 Array ID D952DBX10041.

- 3. Create one RAID 5 array using all three 9.1GB drives.
- 4. Create two logical drives under the Array A.
 - a. 100 MB logical drive for quorum
 - b. One additional logical drive

🎁 Compaq Array Configuration Utility	
<u>C</u> ontroller <u>A</u> rray <u>D</u> rive <u>V</u> iew <u>H</u> elp	
Controller Selection	- Controller
RA4000 Controller, RAID Array ID D952DBX10041 (Rec	
Logical Configuration View	Se <u>t</u> tings
RA4000 Controller, RAID Array ID D952DBX10041 (Redund	Create Array
Array A	Array
— 🎁 99 MB, RAID 5, Logical Drive 1	Modify
🔲 17252 MB, RAID 5, Logical Drive 2	
	Expand
	Create Logical Drive
	Logical Drive
	<u>M</u> odify
	Migrate
	Extend
Drive View	
🞁 👁 Logical 🍈 🔿 Physical	More Information
Flashing drive tray LEDs help locate your drives	

- 5. Select the first logical drive and modify the logical drive to grant access only to the connections that are local to server MW360NT1.
- 6. In the "Logical Drive Host Access" page there are two local adapters listed in the "Location" section of the page. That is because there are two HBAs in MW360NT1. In a redundant configuration one HBA is active and the other HBA is standby. In the "Status" section of the following screen, the active HBA will be listed as "Online" the Standby HBA will be listed as "Offline". There should be two HBAs marked as "Local" in the "Logical Drive Host Access" page. Grant access only to those two HBAs and change the connection names to MW360NT1-1, MW360NT1-2. Save the setting and exit to the main configuration page of the ACU.

 Deny access to all cont Grant access only to th 		elow	
Connection Name	 Adapter ID	Location	Status
🗹 🖹 MW360NT1-1	500805F1FADB8129	Local	Offline
🗆 🛄 Unknown	500805F1FADB20C1	Unknown	Offline
🗆 🛄 Unknown	500805F1FADB20AD	Remote	Online
MW360NT1-2	500805F1FADB1FD9	Local	Online
🗆 📘 Unknown	500805F1FADB1F92	Remote	Online
🗆 🛄 Unknown	500805F1FADB18CF	Remote	Online

- 7. Repeat steps 5 and 6 for the second logical drive in this array.
- 8. At the main ACU screen, select the second RA4000 Controller ID D952DBX10063. Create one RAID 5 array using all three physical drives. Then created one logical drive.

🎁 Compaq Array Configuration Utility	
<u>C</u> ontroller <u>Array</u> <u>Drive</u> <u>View</u> <u>H</u> elp	
Controller Selection	- Controller
RA4000 Controller, RAID Array ID D952DBX10063 (Rec	Settings
Logical Configuration View	
RA4000 Controller, RAID Array ID D952DBX10063 (Redund	Create Array
Array A	Аггау
17351 MB, RAID 5, Logical Drive 1	Modify
	Expand
	Create Logical Drive
	Logical Drive
	Modify
	Migrate
× •	<u>E</u> xtend
Drive View	More Information
Flashing drive tray LEDs help locate your drives	

9. Open the "Logical Drive Host Access" of the logical drive that was created on the RA4000 Controller with ID D952DBX10063. There should be two HBAs marked as "Local" in the "Logical Drive Host Access" page. Grant access only to those two HBAs and change the connection names to MW360NT1-1, MW360NT1-2. Save the setting and exit to the main configuration page of the ACU.

 Grant access to all conr Deny access to all conn Grant access only to the 	ections	elow	
Connection Name	Adapter ID	Location	Status
🗹 🗽 MW360NT1-1	500805F1FADB8129	Local	Offline
🗆 🗽 Unknown	500805F1FADB20C1	Unknown	Offline
🗆 🗽 Unknown	500805F1FADB20AD	Remote	Online
MW360NT1-2	500805F1FADB1FD9	Local	Online
🗆 🗽 Unknown	500805F1FADB1F92	Remote	Online
🗆 🛄 Unknown	500805F1FADB18CF	Remote	Online
	<u>R</u> ename		

10. Select the third RA4000 Controller with ID D952DBX10056. Create one RAID 5 array using all three drives. Then create one logical drive.



- 11. Grant access to server MW360NT1 with the new connection names MW360NT1-1, MW360NT1-2.
- 12. Save the configuration and exit the ACU in server MW360NT1.
- 13. Access the ACU through server MW360NT2.
- 14. Select the RA4000 Controller with ID D952DBX10041
- 15. There are two logical drives, which have been created through the ACU on server MW360NT1. In the "Logical Drive Host Access" page, grant access to server MW360NT2. There are two HBAs listed as "Local". These are the HBAs in server MW360NT2.
- 16. Rename the connections to MW360NT2-1, WM360NT2-2. Save the configuration.

Logical Drive Host Access			×
C Gr <u>a</u> nt access to all conne	ections		
Deny access to all conne	ctions		
Grant access only to the	<u>s</u> elected connections be	low	
Connection Name	Adapter ID	Location	Status
🗹 🐚 MW360NT2-1	500805F1FADB8129	Local	Offline
MVV360NT1-1	500805F1FADB20C1	Unknown	Offline
🗹 🗽 MW360NT2-2	500805F1FADB1FD9	Local	Online
☑ 1 MW360NT1-2	500805F1FADB1F92	Remote	Online
	Rename	1	
<u>D</u> one Cancel			<u>H</u> elp

17. Select the controller ID D952DBX10063 from the ACU, grant access only to server MW360NT2. Rename the connections to MW360NT2-1 and MW360NT2-2.

_

- 18. Select the controller ID D952DBX10056 from the ACU, grant access only to MW360NT2. Rename the connections to MW360NT2-1 and MW360NT2-2.
- 19. Save the configuration and exit the ACU in server MW360NT2.

Install MSCS

Open Disk Manager in Windows NT Server Enterprise Edition. There should be four unpartitioned drives listed. Partition and format each drive accordingly. Then install MSCS. Use the first logical drive, which has a 100MB capacity, as the quorum drive. This cluster should own three logical drives. After MSCS is successfully installed, reapply Windows NT Service Pack 6a.

ACU and SSP in NetWare 5.1

The NetWare 5.1 NCS is formed by two servers and one storage subsystem.

- a. Server MW360NW1
- b. Server MW360NW2
- c. Compaq StorageWorks RA4000/4100 ID D931DBX10140 (three 18.1GB drives attached)
 - 1. One logical drive

Compaq SANworks Secure Path is used to manage the redundant configuration in NetWare. The Secure Path Client will be installed on a Windows 2000 client to monitor and manage the paths. Secure Path Agent will be installed on both NetWare Servers. A summary of the installation and configuration process is as follows:

- 1. Logon on to NetWare 5.1 from a Window 2000 client that has NetWare Client installed.
- 2. Install the Secure Path Client by inserting the Secure Path CD. The "Secure Path Manager for NetWare on Windows 2000" program will start automatically. Click "Yes" to continue.

Question	×
٩	To install Secure Path for Netware: Click the 'NO' button and place CD into Netware CD-ROM drive and follow the Netware Install directions located in the Readme file in the Docs directory.
	To install Secure Path v3.0 for Netware on Windows: Click the 'YES' button and follow Setup's directions.
	Do you wish to proceed with Secure Path for Windows Install?
	<u>1 295 0</u> 0

3. Following the setup instructions. Accept the license agreement. Make sure you only install the "Secure Path Client". Click "Next" to continue.

hoose Component to install		1
Server must be connected to storage. Clien Server Path Client	nt can be installed on any comp Description	oter with TCP/IP)
n Stield	0	
al al resta		

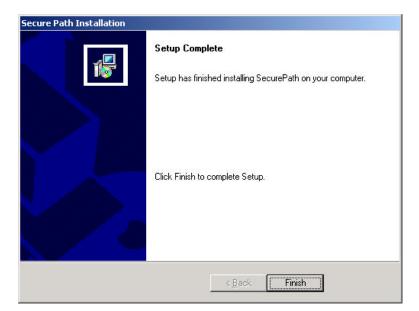
4. Accept the default program folder. Click on "Next" to continue.

Secure Path Installation			×
Select Program Folder Please select a program folder.			
Setup will add program icons to the Progra name, or select one from the existing folder			a new folder
Program Folders:			
SecurePath			
Existing Folders:			
Accessories Administrative Tools Compaq System Tools Novell (Common) Startup			
InstallShield			
	< <u>B</u> ack	<u>N</u> ext >	Cancel

5. Secure Path summarizes the settings before it starts to copy files. Click "Next" to start the process.

Secure Path Installation
Start Copying Files Review settings before copying files.
Setup has enough information to start copying the program files. If you want to review or change any settings, click Back. If you are satisfied with the settings, click Next to begin copying files.
Current Settings:
SELECTION SUMMARY Installation Location: - C:\Program Files\Compaq\SecurePath Components to be installed: - SecurePath Client Start Up Location: - SecurePath
nstallShield

6. Once files have been successfully copied, click "Finish" to complete the Secure Path Client setup.



7. The Secure Path Manager (SPM) will appear on the Programs Menu.

3 2								
latera Alerra Al								
yde Ba		-						
*	Windows Lipdate							
6	Program	- 6	Accessories Administrative Tools					
Ċ)	Documents	• 6	Intervet Explorer					
10	Settings	18	Cutlook Express SecurePath	•	C24			
2	Search		5000000		Lacation : CI/Program Riesl CompadySecure	PathUllent		
	Help							
P	Runia							
	Shat Down							
Itart	3 6 3	Start Me	nu -	mark	nk - WorlPad		N	5:07 PP

8. Before the administrator installs Secure Path Agent to the NetWare 5.1, edit the hosts file on the Secure Path Client system and both NetWare 5.1 systems. Open the hosts file on the Windows 2000 client and add MW360W22, MW360NW1 and MW360NW2 into the hosts file. Save the file and exit.

Fie E	dit Format Help		
		993–1999 Microsoft corp	u
Th	is is a sample	e HOSTS file used by Mi	crosoft TCP/IP for windows.
be the	is file conta try should be placed in th e IP address ace.	ins the mappings of IP kept on an individual e first column followed and the host name shoul	addresses to host names. Each line. The IP address should by the corresponding host name d be separated by at least one
i lii	ditionally, c nes or follow r example:	omments (such as these) ing the machine name de	may be inserted on individual noted by a '#' symbol.
-	102.54.94. 38.25.63.3		¢ source server ♦ x client host
20.2	0.0.1 1 0.100.41 M 0.100.42 M 0.100.46 M	W360NW1	

9. On both NetWare 5.1 systems, edit the host file using the "edit" command. At the NetWare Server Console type "edit sys:\etc\hosts" to edit the host file. NetWare is case sensitive; the server names must be exactly the same as shown in the NetWare Server Console. Add IP resolution for MW360NW1, MW360NW2 and client system MW360W22 to the hosts file.

IN 25/R CONSOLE.EXE	
NetWare Text Editor 4.15	NetWare Loadable Module
Current File "SYS=\EIC\HOSI	S "
# 127.0.0.1 loopback lb localhest # normal	loophack address
# examples from Novell network	
#138.57.4.2 ta tahiti ta.novsll.com loghost #138.57.6.98 osd-frog frog #138.57.6.144 sj-in5 in5 #192.67.172.71 sj-in1 in1	
interesting addresses on the Internet	
192.67.67.28 sri-mic.arpa mic.ddm.mil mic 426.2.8.74 usmm-simtel20.army.mil sintel20 28.28.100.11 H/36DWH 28.28.100.12 H/36DWH 28.28.100.14 H/36DWH2 20.20.100.46 H/36DWH2	
Alt+Fig-Exit	Pi-fielp

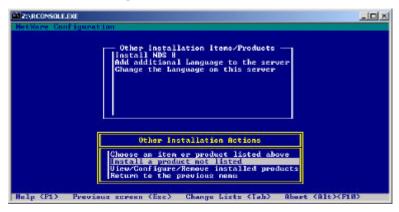
10. Use the "ping" command at NetWare Server console to verify that name/IP resolution works. At the NetWare Server Console, type, "ping MW360W22". NetWare is case sensitive. Type exactly the same names that the administrator added in the NetWare Server hosts file.



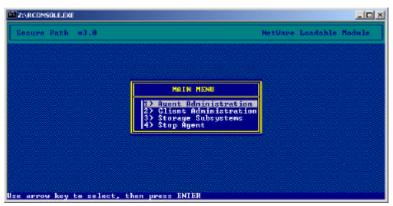
11. After the name/IP resolution has been established, the installation of the Secure Path Agent can start. Insert the Secure Path CD into server MW360NW1. Mount the CDROM for server MW360NW1. Once the CDROM is successfully mounted, type "NWCONFIG" at NetWare Console and select "Product Option".

Con	figuration Options	
briver Options Standard Disk Options SS Disk Options License Options Japy Files Options Directory Options GF files Options Multi CFU Options Tedat Options	(lead/unlead disk and network drivers) (configure NETWARE partitions/volumes) (configure NES stowage and volumes) (install or renove licenses) (install NetWare system files) (install NEB) (create/edit server stortup files) (install/veninstall SMP) (install/veninstall SMP)	
×it	a a construction of the second se	

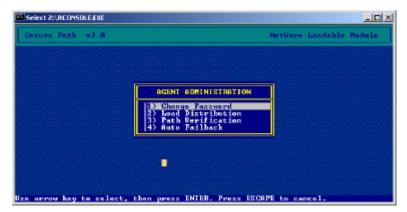
12. Select the "Install a product not listed" from "Other Installation Action".



13. Use the F3 key to specify the path to the Secure Path Agent installation files and press "Enter". The Secure Path Agent installation process will start. After the installation, the Secure Path configuration page will come up. Select the "Agent Administration".



14. To set the password for Secure Path Client access; select "Change Password". A dialogue box will appear. Enter the password. The system will prompt you to re-enter the password. The password is case sensitive. Use the "Esc" key to leave the agent administration.



15. From the "Main Menu" of Secure Path select "Client Administration" to configure the Secure Path Client. Select "Add a Client".

21-YRCONSOLE.EXE	
Secure Path #3.8	NetUare Loadable Module
CLIENT ADMINISTRATION	
1) Ujow Glients 3) Fide a Start 3) Renove a client	
3) Renove a client	
Use arrow key to select, then press ENTER. Press ESC	PE to cancel.

16. Enter the client name that has the Secure Path Client installed. In this configuration the client name is MW360W22. This process will let server MW360W22 have access to NetWare to manage and monitor the activities of Secure Path.

23 25/RCONSOLE.EXE	
Secure Path #3.8 NetVare	Loadable Module
ADD CLIENT	
Client Name:MV368V22	
	J
Type the client name, then press ENTER. Press ESCAPE to cance	1.

- 17. Restart the NetWare 5.1 server, MW360NW1, after installing and configuring the Secure Path Agent.
- 18. Repeat steps 9 through 17 for NetWare 5.1 server MW360NW2.
- 19. After both NetWare Servers reboot, from the NetWare Server Console of MW360NW1, start the CPQONLIN utility to enable the SSP.

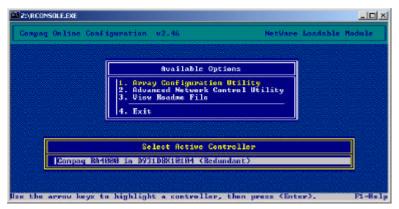


20. There are two HBAs in each of the NetWare 5.1 servers. The CPQONLIN utility detects two Compaq HBAs and the local smart array controller. By default, Secure Path Agent sets one of the HBAs to "Active" and the other is set to "Standby".

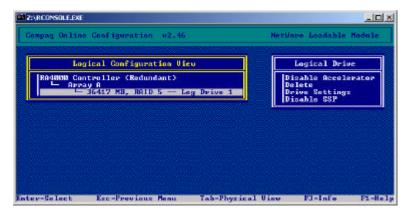
Select the first HBA in the box. If following message appears this HBA is in the "Standby" mode. Press any key to exit.

vg Online Configuration v2.46	NetVare Loadable Modu
Available Opti	ions
1. Array Configuration 2. Advanced Network Con	Utility step1 Utility
NAMEN NAMING NAMEN	
There are no configurable (active) con attached to this PCHC/P.	trollers
There is(are) 1 controller(s) in stand attached to this FCHC/P.	lby mode
C Press any key to continue 2	×

 Select the other Compaq HBA, which will be in "Active" mode. In the "Select Active Controller" section, the controller with ID D931DBX10104 is listed and is marked as "Redundant". Select this controller and create a RAID 5 Array using all three drives that are attached to the controller.



22. Enable the SSP for the logical drive. Exit the CPQONLIN utility and reboot the server.

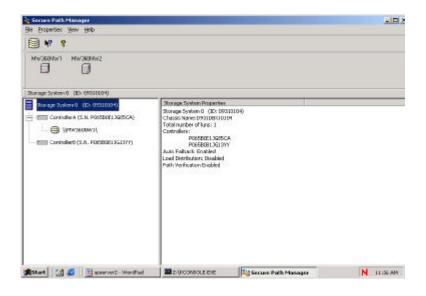


23. To enable the SSP in MW360NW2, type CPQONLIN in the NetWare 5.1 Server Console. In the "Available Options" select the HBA that is marked as "Active". Enable the SSP. Exit the CPQONLIN and reboot the server.

Secure Path for NetWare has been successfully installed. From the Secure Path Client open the Secure Path Manager from the Program menu. Type the names of two NetWare Servers and the password that was set in the configuration process of the Secure Path Agent. Give a profile name for this setting and save the profile. Then click "Login".

Nodes: Enter Hostname and Clustername (if any) separated by '-' (Hyphen)	Profile(s)
Host-Cluster names MW360NW1 MW360NW2	Save Profile New
	Password (case sensitive)
<u> </u>	Save Password

As shown in the following screen, there are two Array Controllers in one Compaq StorageWorks RA4000/4100. There is one logical drive. Detailed information about the hardware settings are listed in the right panel.



NOTE: For more information regarding Compaq SANworks Secure Path for NetWare, please refer to the documentation AA-RN72A-TE in Secure Path CD NWSPV30.

Install NCS

Use the "NWCONFIG" utility to create NetWare Volumes before installing NCS. After successfully installing NCS, reapply the latest Support Pack for NetWare 5.1.

Standalone Windows 4.0 NT Server

The Window NT 4.0 stand-alone server with one StorageWorks RA4000/4100 storage subsystem.

- a. Server MW360NT3
- b. RA4000 controller with ID D952DBX10030 (three 9.1GB drives attached)

The configuration steps are the same as non-redundant configuration step except in the SSP.

A summary for this scenario follows:

- 1. Access the ACU through server MW360NT3
- 2. Select the RA4000 controller ID D952DBX10030 from the Controller Selection Menu.
- 3. Create one array using all three 9.1GB drives.
- 4. Create one logical drive under the array just created.
- 5. Select the logical drive and modify the logical drive to grant access only to the connection local to server MW360NT3.
- 6. Rename the connection to MW360NT3.
- 7. Save the configuration and exit ACU in server MW360NT1.

Conclusion

The StorageWorks RA4100 SAN delivers a uniquely affordable SAN that simplifies storage management, tames explosive data growth and reduces business down time. It's scalable architecture and broad range of OS, ProLiant and industry standard x86 platform support allows for re-deployment or reconfiguration of storage as computing environments change. With centralized management, storage consolidation and dynamic storage allocation and access control, the RA4100 SAN truly delivers business flexibility, increased service levels and operational efficiencies at a price point unmatched in the industry today.