Network Attached Storage

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This chapter covers the following major topics:

- NAS / SAN Integration Overview
- StorageWorks NAS Features
- StorageWorks NAS 8000 Features
- StorageWorks NAS SAN Configuration and Zoning Rules
- StorageWorks NAS SAN Fabric Rules
- StorageWorks NAS SAN Storage Rules

NAS / SAN Integration Overview

Customers typically base their decisions on SAN or NAS implementations by selecting file or block formats and by determining the hardware and software components they need. But with NAS integration in a heterogeneous SAN environment using the StorageWorks NAS b3000v2, the StorageWorks NAS e7000v2, or the StorageWorks NAS 8000, the decision to use either NAS or SAN systems becomes irrelevant.

With NAS/SAN integration, the customer benefits are significant and include the following:

Table 37: NAS/SAN Integration Features and Benefits

Feature	Impact	Benefit
The decision to use NAS or SAN systems is irrelevant because customer should use both.	Fully integrated, converged storage architectures.	Ease of choice. Eliminates technical trade-offs. Easy to implement and grow.
Supports multiple operating systems.	Allows centralized data and increases flexible storage capacity and efficiency. Data can be shared across multiple operating systems regardless of the device or operating system.	Provides strategic power in the marketplace and consolidates data. Saves money by providing better disk utilization.
Storage networks integrate with existing hardware	Less interruption to production systems and easier to manage.	Reduces Total Cost of Ownership (TCO).
Enterprise-wide file sharing reduces file duplication.	The right information to the right person at the right time in the right format.	Data sharing, which reduces storage capacity requirements.
Reliable and efficient access to data and application information 24x7.	Improves both local and wide- area data retrieval.	Improved data availability across the enterprise.
Seamless integration of storage devices and architecture.	New applications integrate reliably to ensure new data does not overload your system.	Faster time to market. Lower maintenance costs.
Data storage in centrally managed locations rather than across multiple application servers.	Facilitates administration, backup, and security.	Centralized deployment of specialized resources and skill sets.
Storage resources shared among a much larger number of processing systems and users.	Improved efficiency and simplified management.	Better asset allocation.
Data is highly accessible.	Business continues without interruption.	Provides strategic power in the marketplace.

StorageWorks NAS Features

StorageWorks NAS B3000v2 Features

The StorageWorks NAS b3000v2 is the entry-point into NAS/SAN fusion solutions with enterprise-level availability, scalability and performance in a turnkey package that includes:

- RAID ADG
- Multi-protocol File Serving (Windows, UNIX/Linux, NetWare, AppleTalk)
- Users, groups share creation/management
- Quotas
- Manageability
- Backup support
- Anti-virus support
- Storage virtualization
- Snapshot capabilities
- Availability
- Cluster support
- Redundant hardware components
- Data replication
- Integrated Lights Out (iLO)
- Fibre Channel storage connectivity with MSA1000, EVA3000, EVA5000, and VA storage
- 1Gb and/or 2Gb HP SAN connectivity
- 10/100 Ethernet (TCP Offload Engine - TOE, Optional)
- Gigabit Ethernet (TCP Offload Engine - TOE, Optional)
- 1Gb or 2Gb Fibre Channel storage connectivity using the StorageWorks MSA1000
- Services; warranty uplifts
- Installation and configuration service

StorageWorks NAS B3000v2 Hardware

The StorageWorks NAS b3000v2 is qualified in a heterogeneous open SAN as both a stand-alone or clustered server and follows the same Windows 2000 SAN hardware rules found in this guide.

Note: Refer to the StorageWorks NAS B3000v2 QuickSpec document for additional information, including the latest IP network controller hardware support:

http://h18006.www1.hp.com/products/quickspecs/11339_div/11339_div.html

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StorageWorks NAS E7000v2 Features

The new StorageWorks Network Attached Storage (NAS) e7000v2 fuses NAS and SAN, offering customers the greatest scalability and flexibility, providing cost effective management for their storage resources. This latest innovation from HP provides enhanced performance along with simplified, centralized storage and system management, ultimately saving customers resources, time and money, lowering their Total Cost of Ownership (TCO). The

StorageWorks NAS e7000v2 delivers the fusion of NAS and SAN in a common, networked storage pool that provides customers with the flexibility to choose file (NAS) or block (SAN)-level access to best suit the needs of their applications.

- Multi-protocol File Serving (Windows, UNIX/Linux, NetWare, AppleTalk)
- Users, groups share creation/management
- Quotas
- Manageability
- Backup support
- Anti-virus support
- Storage virtualization
- Snapshot capabilities
- High Availability
- Cluster support
- Redundant hardware components
- Data replication
- Integrated Lights Out (iLO) connectivity
- Featuring HP SAN connectivity
- 10/100 Ethernet (TCP Offload Engine - TOE, Optional)
- Gigabit Ethernet (TCP Offload Engine - TOE, Optional)
- Fibre Channel storage connectivity using the XP, VA, EVA, MA/RA/ESA/EMA, and MSA storage arrays
- Services; warranty uplifts
- Installation and configuration service
- CarePAQ Priority Services supplying 24x7 support with a maximum response ranging down to 2 hours for hardware and 30 minutes for software

StorageWorks NAS E7000v2 Hardware

The StorageWorks NAS e7000v2 is qualified in a heterogeneous open SAN as both a stand-alone or clustered server and follows the same Windows 2000 SAN hardware rules found in this guide.

Refer to the *StorageWorks NAS Executor E7000v2 QuickSpec* document for additional information, including the latest IP network controller hardware support:

http://h18006.www1.hp.com/products/quickspecs/11004_div/11004_div.html

StorageWorks NAS 8000 Features

HP StorageWorks NAS 8000 solutions provide easily managed network-attached storage (NAS) solutions in dedicated storage and SAN configurations for customers that require file-sharing flexibility. With an HP operating system optimized for file serving, NAS 8000 solutions attach directly to Ethernet networks, and deliver- low maintenance and high uptime. Cluster technology is available for environments requiring mission-critical access to data.

The NAS 8000 solutions support Windows, UNIX, and Linux. Network administration, user access, and storage configurations are all easily managed through the Command View NAS or command line interfaces. The NAS Data Path Manager software enables management and control of the data paths.

- Multi-protocol File Serving (Windows, UNIX/Linux)
- Users, groups share creation/management
- Quotas
- Manageability
- Backup support
- Anti-virus support
- Snapshot capabilities
- High Availability
- Cluster support
- Redundant hardware components
- Integrated Lights Out (iLO) Connectivity
- 10/100 Ethernet
- Gigabit Ethernet
- Fibre Channel storage connectivity using the XP, VA, EVA 5000, EMA & MA arrays
- Services; warranty uplifts
- Installation and configuration service

StorageWorks NAS 8000 Hardware

The StorageWorks NAS 8000 is qualified in a heterogeneous open SAN as both a stand-alone or clustered server and follows the same Linux SAN hardware rules found in this guide.

Refer to the *StorageWorks NAS 8000 QuickSpec* document for additional information, including the latest IP network controller hardware support:

http://www.hp.com/products1/storage/products/nas/8000/specifications.html

Also refer to the *hp StorageWorks NAS 8000 SAN Storage Configuration Guide* technical whitepaper available at:

http://welcome.hp.com/country/us/eng/prodserv/storage.html

StorageWorks NAS SAN Configuration and Zoning Rules

The StorageWorks NAS b3000v2 and the StorageWorks NAS e7000v2 follow the same Windows 2000 SAN configuration and zoning rules found in this guide. The StorageWorks NAS 8000 follows the same Linux SAN configuration and zoning rules found in this guide.

StorageWorks NAS SAN Fabric Rules

The StorageWorks NAS b3000v2, the StorageWorks NAS e7000v2, and the StorageWorks NAS 8000 are supported in SAN fabrics consisting exclusively of switch models listed for the B-Series Product Line or exclusively of switch models listed for the M-Series Product Line.

StorageWorks NAS SAN Storage Rules

Storage is broken up into three types of elements and each of these elements is composed of the previous level's elements.

SAN Storage Elements are managed with the SAN Management Appliance. The lowest level of storage management occurs at the physical drive level. Physical drives are placed into the external storage enclosure or enclosures of the SAN storage network and are grouped into RAIDsets for fault tolerance and better performance.

Note: The following section pertains to version one of the b3000 and e7000; for additional rules pertaining to version two products, please read the section entitled "Storage Volumes."

Virtual Replicator Elements and File Elements are managed with the NAS Web GUI. Virtual Replicator provides volume virtualization for the NAS device by allowing for the creation of virtual disks from Virtual Replicator pools, which contain the LUNs managed on the SAN. These pools are logical abstractions that aggregate the disk space from one or more LUNs into a large set of disk blocks. From the pool of blocks, virtual disks are created and presented to the operating system as New Technology File System (NTFS) volumes. Without interrupting service, virtual disks can be dynamically grown online when there is a need for more space. When using Virtual Replicator, review the following constraints:

There is a maximum of 256 LUNs available to the connected NAS devices.

If multiple LUNs are used to form a pool, they must all be from the same controller pair.

Disk Administrator from Windows 2000 should not be used to manage Virtual Replicator disks. The two management tools do not have an awareness of each other and compatibility issues can arise between the two management tools.

A pool can consist of eight LUNs. In addition, a pool should not be larger than 16TB in size since that is the maximum amount of virtual disk space that can be used, although the pool could be larger to allow for snapshot space.

The LUNs composing a Virtual Replicator pool must be treated synchronously. For example, if LUNs 8, 9, and 10 are used to compose a single pool, and LUN 9 is restored from a backup, snapshot, or clone, the Virtual Replicator pool would be corrupted, resulting in complete data loss.

A maximum of eight virtual disks can be carved out of a single pool.

Each virtual disk must be presented as a drive letter or a mount point on the NAS device for users and the operating system to be able to access the virtual disk. Although it is possible to create a virtual disk and not map it to a drive letter or mount point, neither the users nor the administrator would have access to the storage space contained within that virtual disk.

All the units that make up a pool should have the same high availability characteristics (RAID levels and striping methods). If one LUN member of the pool goes offline, the entire pool is unavailable.

The current version of NAS does not support the use of CONCATSETS (concatenated sets). Virtual Replicator pool participants must remain the same size. Virtual Replicator also performs the same function as CONCATSETS, so this functionality is provided at the software level, rather than at the controller level, by adding LUNs to the pool.

When using Data Replication Manager (DRM) for remote data replication, the LUNs of a pool must all be treated synchronously. When using DRM, be sure to group all the LUNs of a single pool into an association set so that the LUNs are kept in sync as they are replicated to the remote or target storage subsystem.

File System Elements. The file systems are NTFS formatted with drive letter assignments from the virtual disks that are created by Virtual Replicator.

Storage Volumes. LUNS are configured through Disk Manager with the b3000v2 and e7000v2. Basic and dynamic disks are supported in a stand-alone architecture. Only basic disks are supported in a cluster architecture. The volumes must be NTFS formatted in a cluster architecture..

StorageWorks NAS B3000v2 Storage Rules

A Standalone NAS b3000v2 server supports up to 4 MSA1000s.

A NAS b3000v2 Cluster supports up to 6 MSA10000s.

The StorageWorks NAS b3000v2 supports MSA, EVA3000, EVA5000, and VA arrays with the following recommended storage firmware versions:

- MSA1000 FW is 2.38 (for Tru64 FW is 3.2x)
- EVA3000 v2 FW is v2.004
- EVA5000 v2 FW is v2.002
- EVA5000 v3 FW is v3.000
- VA 7x00 FW is HP18
- VA 7x10 FW is A100

StorageWorks NAS E7000v2 Storage Rules

The StorageWorks NAS e7000v2 supports SAN storage using the RA8000, MA8000, ESA12000, EMA12000 using ACS V8.6x and V8.7x software.

The StorageWorks NAS e7000v2 supports SAN storage using the Enterprise Virtual Array Controller using V1.02 and V2.00x software.

The HSG or HSV controllers may be shared, using Selective Storage Presentation (SSP), to allow heterogeneous storage support to other operating systems.

The StorageWorks NAS e7000v2 supports XP ,VA, MSA, EVA, and MA/RA/ESA/EMA arrays with the following recommended firmware versions:

- MSA1000 FW is 2.38 (for Tru64 FW is 3.2x)
- EVA3000 v2 FW is v2.004
- EVA5000 v2 FW is v2.002
- EVA5000 v3 FW is v3.000
- VA 7x00 FW is HP18
- VA 7x10 FW is A100
- XP FW is 21.05.06 (for Tru64 FW is 21.04.32)
- MA/RA/ESA/EMA FW is V87F-0

StorageWorks NAS 8000 Storage Rules

The StorageWorks NAS 8000 supports SAN storage using the RA8000, MA8000, ESA12000, EMA12000, Enterprise Virtual Array 5000, HP Virtual Array 7xxx series, and XP series disk arrays. Recommended firmware versions are as follows:

- XP FW is 21.05.06 (for Tru64 FW is 21.04.32)
- VA 7x00 FW is HP18
- VA 7x10 FW is A100
- EVA5000 v2 FW is v2.002
- EVA5000 v3 FW is v3.000
- MA/RA/ESA/EMA FW is V87F-0

The StorageWorks NAS 8000 supports SAN storage using the Enterprise Virtual Array 5000.

The StorageWorks NAS 8000 can access storage on a variety of devices within a SAN device, including the HP Virtual Array 71x0 and 74x0 series storage, and HP XP series disk arrays using SecureManager VA or SecureManager XP.