

# Using NAS as a Gateway to SAN

Dave Rosenberg  
Hewlett-Packard Company  
825 14<sup>th</sup> Street SW  
Loveland, CO 80537  
dave\_rosenberg@hp.com



# Using NAS as a Gateway to SAN

- Network Attached Storage (NAS) is a purpose-built device (appliance) that presents file systems to client systems via a network.
- A Storage Area Network (SAN) is a dedicated network of interconnected storage and servers that offers any-to-any communication between these devices and allows multiple servers to access the same storage device independently.

# Using NAS as a Gateway to SAN

- Can you connect a NAS device into a SAN so network clients get efficient file system access to all that SAN storage?

**Absolutely!**

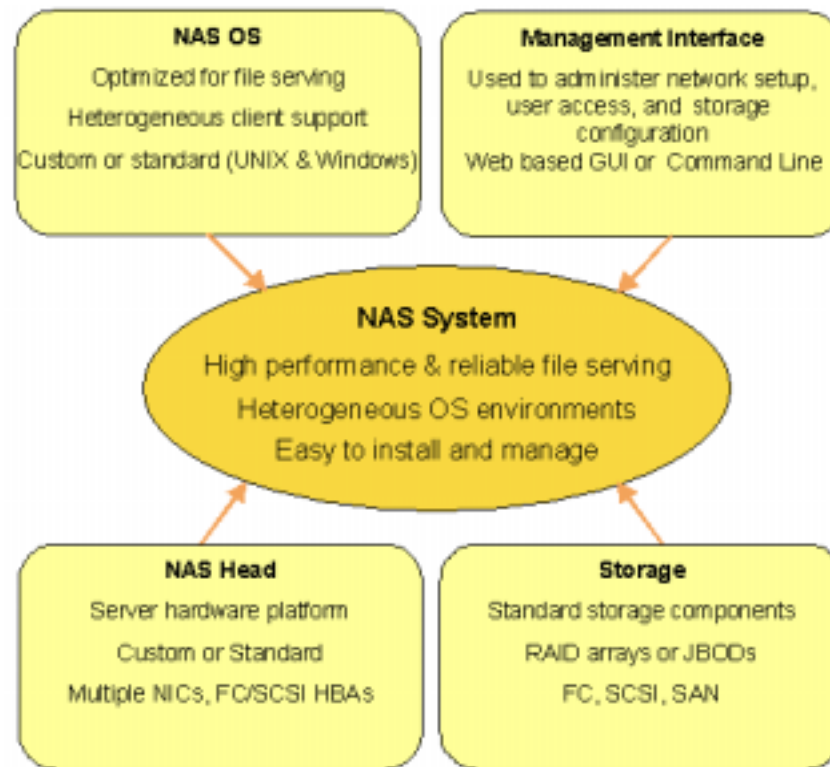
# Overview

- The need for storage is growing at an unprecedented rate.
- How to meet that need and keep IT budgets under control remains at the forefront for most enterprise system managers.
- NAS and SAN are two technologies that can help.

# NAS

- NAS devices are essentially dedicated file servers.
- A NAS device consists of:
  - Processor
  - Network interface
  - Disk storage
  - NAS software

# NAS Architecture



# Benefits of NAS

- Multiple file system access (Heterogeneous):
  - Windows (SMB/CIFS)
  - UNIX (NFS)
- Inexpensive implementation
  - Ease of installation on the network
  - Ease of maintenance
- Protection against hardware failures
- Embedded Virus protection

# SAN

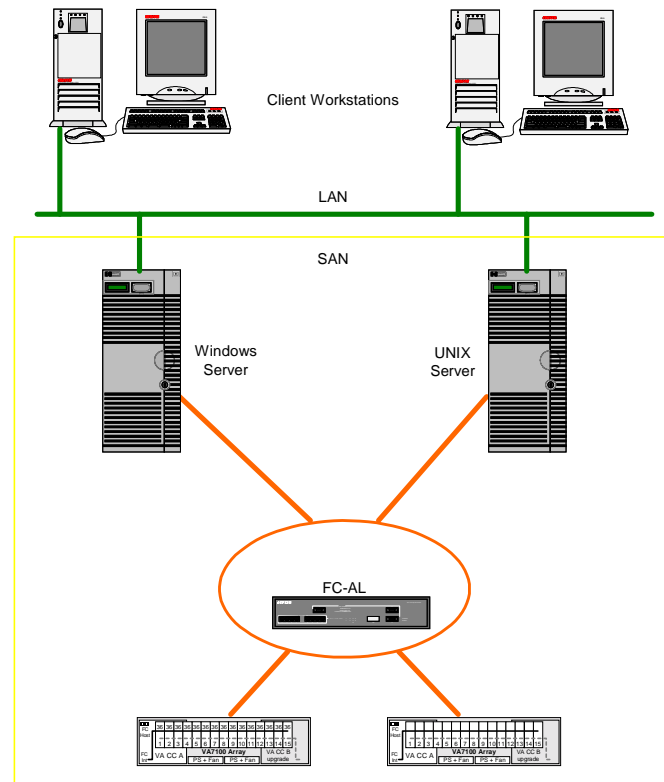
- SAN provides an efficient method for linking storage systems.
- SAN consist of:
  - Storage devices
  - Servers (Hosts)
  - HBA (Host Bus Adapters)
  - Fabric (Fiber Channel Cable and Switches)



# Benefits of SAN

- SAN allows scaling of storage to match individual server (user) needs.
  - Can easily grow by attaching additional storage devices.
- Provide raw block level storage access.
- Allow general purpose servers.
- Multiple vendors' devices can be managed as a single storage pool.

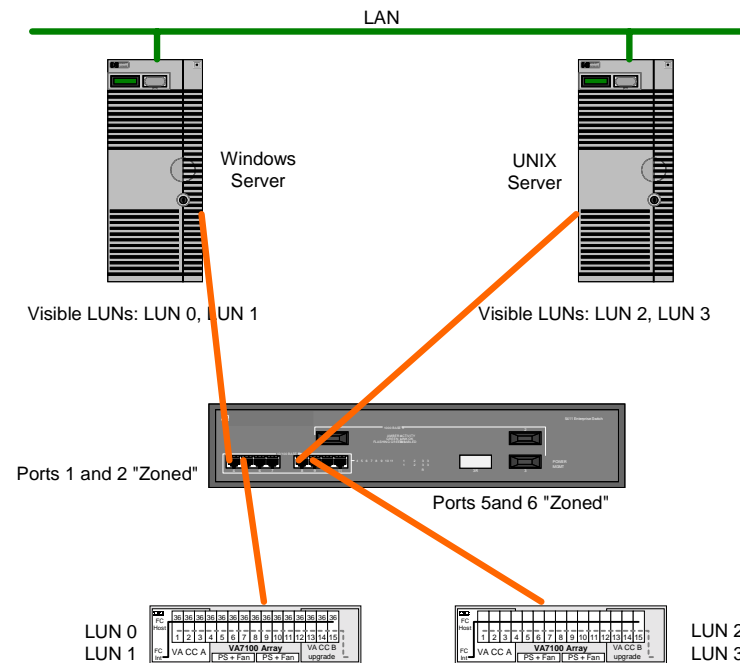
# SAN Architecture



# Storage Allocation

- Storage in a SAN is allocated to servers by Logical Unit Numbers (LUNS)
- Server Level Control
  - Access governed at each SAN server
  - Requires special software on each server
- Access Control Within the Network
  - Managed within network switches by “zoning” port connections
  - More secure

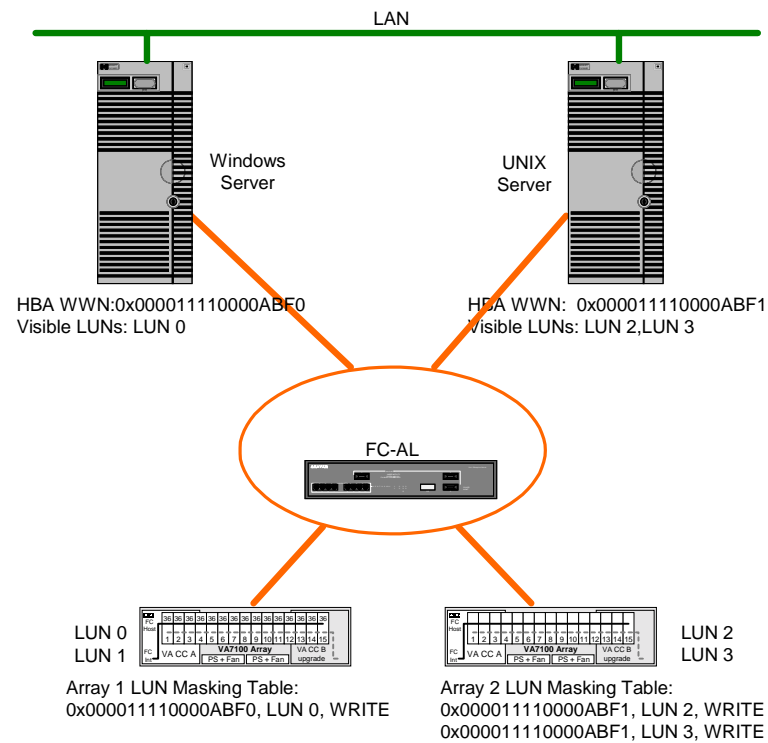
# Access Control Within the Network



# Storage Allocation

- Access Control Within the Storage Array
  - Most secure and flexible
  - Access governed by storage array
  - Utilizes unique “World-Wide-Name”
  - Requires “LUN masking” tables at each array
  - Servers can only see assigned storage

# Access Control by the Storage Array



# NAS and SAN Together

- Increasing volume requirements are pushing the bandwidth and performance limits of traditional NAS.
- The net effect is a convergence of NAS and SAN technologies.
- The combining of NAS and SAN, referred to as “NAS/SAN fusion” allows IT managers to capitalize on the advantages of both networked storage approaches.

# NAS/SAN Fusion

- NAS/SAN fusion results in significant benefit to IT managers and system users..
- The “head” of the NAS is used as a dedicated file server.
- The SAN becomes a pool of storage for use by the NAS head.
- Thus, the NAS head becomes a file level “gateway” into the SAN.



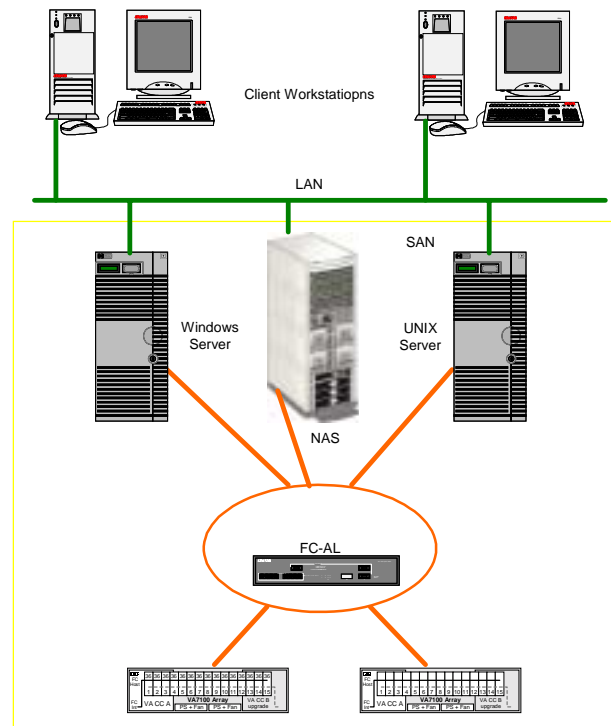
# NAS/SAN Fusion

- General purpose servers placed on a SAN are either Windows or UNIX file system based.
  - NAS/SAN fusion provides both Windows and UNIX clients access to the same data.
- Backing up NAS can be difficult and is not always reliable.
  - With NAS/SAN fusion, the backup of SAN-resident data is collectively controlled by the SAN. Backup is simpler.

# How to Incorporate NAS Into an Existing SAN

- Incorporating NAS into an existing SAN is not very different from adding any other server on a SAN.
- NAS just happens to be a server dedicated to file sharing.
- If you are converting a stand-alone NAS to operate on a SAN, you may need to add a Fiber Channel HBA to your NAS head.

# How to Incorporate NAS Into an Existing SAN (cont)



# How to Incorporate NAS Into an Existing SAN (cont)

- Identify LUNs to be allocated to NAS.
- Use either network zoning or array LUN masking to make LUNs available to the NAS device.
- Connect the NAS to the IP network and Fiber Channel.
- Configure the NAS on the IP network as defined by the manufacturer.

# How to Incorporate NAS Into an Existing SAN (cont)

- Configure the NAS Storage
- NAS should automatically “discover” LUNs allocated to it
- Create Volumes from LUNs
- Create Volume Groups from Volumes
- Create File Systems across Volumes
- Expose File Systems as either Windows “Shares” or UNIX “Exports”

# The Future of NAS/SAN Fusion

- NAS and SAN management tasks are segregated and require human oversight.
- Market demand requires devices from multiple manufacturers to coexist and be managed by a centralized Storage Area Manager.
- Several developers are moving towards achieving this interoperability based on the “Common Information Model (CIM)”.

# The Future of NAS/SAN Fusion

- It will be there!

