

NAS: Network Attached Storage

A NAS device ("appliance"), usually an integrated processor plus disk storage, is attached to a TCP/IP-based network (LAN or WAN), and accessed using specialized file access/file sharing protocols. File requests received by a NAS are translated by the internal processor to device requests

Characteristics

- * A **NAS** device is attached to a **TCP/IP** based network (LAN or WAN)
- * Accessed using **CIFS** and **NFS** — specialized I/O protocols for file access and file sharing
- * A **NAS** device is sometimes also called a file server, or "filer" or "**NAS** appliance"
- * Receives an **NFS** or **CIFS** request over a network and has an internal processor which translates that request to the SCSI block-I/O commands to access the appropriate device
- * Works through ethernet media
- * Has a 10Mbps to 1Gbps bandwidth
- * Works with **NFS** and **CIFS** I/O Protocol
- * In contrast to "block I/O" used by **DAS** and **SANs**, **NAS** I/O requests are called "file I/Os"
- * A **NAS** appliance generally supports disk storage, and sometimes CD-ROM, in an integrated package
- * **NAS** device is generally only a **NAS** device and attaches only to processors over a **LAN** or **WAN**

Advantages

- * Easier to install
- * **NAS** appliance can usually be installed on an existing **LAN/WAN** network
- * Hosts can potentially start to access **NAS** storage quickly, without needing disk volume definitions or special device drivers
- * **NAS** pooling can minimize the need to manually reassign capacity among users
- * Provides file sharing
- * **NAS** devices often can handle several thousand I/Os per second with good average response time
- * Large number of users being able to access the same storage device

Disadvantages

- * More expensive than **DAS**
- * As the number of **NAS** nodes increases, cost do as well
- * Less faster than **SAN**
- * **NAS** will generally not scale as well as **SAN** in performance
- * Buying an integrated **NAS** means less time

Application Environment

- * Data sharing, staging, and movement between various host systems
- * Data access by Unix, Linux, NT, and others
- * Data sharing including Internet Web content for Web server farms



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SAN: Storage Area Network

Storage resides on a dedicated network. Like DAS, I/O requests access devices directly. Today, most SANs use Fibre Channel media, providing an any-to-any connection for processors and storage on that network

Characteristics

- * Dedicated network for storage devices and the processors that access those devices
- * **SANs** today are usually built using Fibre Channel technology
- * I/O requests to disk storage on a **SAN** are called "block I/Os"
- * Longer distance between processors and storage
- * Higher availability
- * Improved performance
- * A larger number of processors can be connected to the same storage device compared to typical built in device attachment facilities
- * Software can allow multiple **SAN** devices to appear as a single pool of storage accessible to all processors on the **SAN**
- * Storage on a **SAN** can be managed from a single point of control

Advantages

- * All devices on a **SAN** can be pooled—multiple disk and tape systems
- * Easier to manage
- * Provides file sharing
- * Faster than **NAS**
- * Use of a dedicated network (though this is possible with **NAS**)
- * **SAN** network speed (100MBps Fibre Channel vs. 10Mbps or 100Mbps Ethernet)
- * More scalable

Disadvantages

- * Less easier to install than **NAS**
- * Take more time planning, including design of a Fibre Channel network and selection/installation of **SAN** management software
- * More expensive than **NAS**
- * Require specialized hardware and software to manage the **SAN** and provide many of its potential benefits
- * An organization must add new skills to manage this sophisticated technology

Application Environment

- * Storage or server consolidation
- * Performance sensitive with low latency including database and OLTP
- * Large I/Os or data transfer applications
- * LAN-free or Serverless backup



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