

### 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 Enviroment

\* 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. 10Mbitps or 100Mbitps 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

### Advantages

- \* Easier to install
- \* Can be installed on an existing **LAN/WAN** network



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