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 bandwith
* 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. 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

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