

Network Attached Storage / NAS

NAS Vs SAN Vs DAS

A network-attached storage (NAS) device is a server that is dedicated to nothing more than file sharing. NAS does not provide any of the activities that a server in a server-centric system typically provides, such as e-mail, authentication or file management. NAS allows more hard disk storage space to be added to a network that already utilizes servers without shutting them down for maintenance and upgrades. With a NAS device, storage is not an integral part of the server. Instead, in this storage-centric design, the server still handles all of the processing of data but a NAS device delivers the data to the user. A NAS device does not need to be located within the server but can exist anywhere in a LAN and can be made up of multiple networked NAS devices.

Network Attached Storage - The Basics

Are you new to network storage? If so then this series of articles is for you! Over the next few months we are going to take a look at the basic principles of network storage and answer questions like 'What is network storage?' and 'Why do we use it?' After covering the basics, subsequent articles will look at specific technologies in more detail. All of the articles in the series will have one simple aim; to educate and inform you about network storage. So, without further ado, lets get to it!

In basic terms, network storage is simply about storing data using a method by which it can be made available to clients on the network. Over the years, the storage of data has evolved through various phases. This evolution has been driven partly by the changing ways in which we use technology, and in part by the exponential increase in the volume of data we need to store. It has also been driven by new technologies, which allow us to store and manage data in a more effective manner.

In the days of mainframes, data was stored physically separate from the actual processing unit, but was still only accessible through the processing units. As PC based servers became more commonplace, storage devices went 'inside the box' or in external boxes that were connected directly to the system. Each of these approaches was valid in its time, but as our need to store increasing volumes of data and our need to make it more accessible grew, other alternatives were needed. Enter network storage.

Network storage is a generic term used to describe network based data storage, but there are many technologies within it which all go to make the magic happen. Here is a rundown of some of the basic terminology that you might happen across when reading about network storage.

Direct Attached Storage (DAS)

Direct attached storage is the term used to describe a storage device that is directly attached to a host system. The simplest example of DAS is the internal hard drive of a server computer, though storage devices housed in an external box come under this banner as well. DAS is still, by far, the most common method of storing data for computer systems. Over the years, though, new technologies have emerged which work, if you'll excuse the pun, out of the box.

Network Attached Storage (NAS)

Network Attached Storage, or NAS, is a data storage mechanism that uses special devices connected directly to the network media. These devices are assigned an IP address and can then be accessed by clients via a server that acts as a gateway to the data, or in some cases allows the device to be accessed directly by the clients without an intermediary.

The beauty of the NAS structure is that it means that in an environment with many servers running different operating systems, storage of data can be centralized, as can the security, management, and backup of the data. An increasing number of companies already make use of NAS technology, if only with devices such as CD-ROM towers (stand-alone boxes that contain multiple CD-ROM drives) that are connected directly to the network.

Some of the big advantages of NAS include the expandability; need more storage space, add another NAS device and expand the available storage. NAS also bring an extra level of fault tolerance to the network. In a DAS environment, a server going down means that the data that that server holds is no longer available. With NAS, the data is still available on the network and accessible by clients. Fault tolerant measures such as RAID, which we'll discuss later), can be used to make sure that the NAS device does not become a point of failure.

Storage Area Network (SAN)

A SAN is a network of storage devices that are connected to each other and to a server, or cluster of servers, which act as an access point to the SAN. In some configurations a SAN is also connected to the network. SAN's use special switches as a mechanism to connect the devices. These switches, which look a lot like a normal Ethernet networking switch, act as the connectivity point for SAN's. Making it possible for devices to communicate with each other on a separate network brings with it many advantages. Consider, for instance, the ability to back up every piece of data on your network without having to 'pollute' the standard network infrastructure with gigabytes of data. This is just one of the advantages of a SAN which is making it a popular choice with companies today, and is a reason why it is forecast to become the data storage technology of choice in the coming years. According to research company IDC, SAN's will account for 70% of all network storage by 2004.

Irrespective of whether the network storage mechanism is DAS, NAS or SAN, there are certain technologies that you'll find in almost every case. The technologies that we are referring to are things like SCSI and RAID. For years SCSI has been providing a high speed, reliable method for data storage. Over the years, SCSI has evolved through many standards to the point where it is now the storage technology of choice. Related, but not reliant on SCSI,

is RAID. RAID (Redundant Array of Independent Disks) is a series of standards which provide improved performance and/or fault tolerance for disk failures. Such protection is necessary as disks account for 50% of all hardware device failures on server systems. Like SCSI, RAID, or the technologies used to implement it, have evolved, developed and matured over the years.

In addition to these mainstays of storage technology, other technologies feature in our network storage picture. One of the most significant of these technologies is Fibre channel (yes, that that's fiber with an 're'). Fibre Channel is a technology used to interconnect storage devices allowing them to communicate at very high speeds (up to 10Gbps in future implementations). As well as being faster than more traditional storage technologies like SCSI, Fibre Channel also allows for devices to be connected over a much greater distance. In fact, Fibre Channel can be used up to six miles. This allows devices in a SAN to be placed in the most appropriate physical location.

Other developments are coming through that will change the way that we use and access network storage. One of these advances pegged to make a large contribution to the growing success of network storage in general is iSCSI. iSCSI is a technology that allows data to be transported to and from storage devices over an IP network. What it actually does is serialize the data from a SCSI connection. Using iSCSI, the concept of network storage can be taken anywhere that IP can go, which as the Internet proves, is basically anywhere. Technologies like Fibre Channel and iSCSI are a big factor in how fast people are able to afford and implement network storage solutions.