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Aim : Case study on Network File System(NFS).

What is NFS?

Network File System (NFS) is a network protocol for distributed file sharing. A file system defines the way data in the form of files is stored and retrieved from storage devices, such as hard disk drives, solid-state drives and tape drives. NFS is a network file sharing protocol that defines the way files are stored and retrieved from storage devices across networks.

The NFS protocol defines a network file system, originally developed for local file sharing among Unix systems and released by Sun Microsystems in 1984. The NFS protocol specification was first published by the Internet Engineering Task Force (IETF) as an internet protocol in RFC 1094 in 1989. The current version of the NFS protocol is documented in RFC 7530,which documents. Support for TCP as a transport layer protocol was added to NFS version 3 (NFSv3) in 1995.

How does the Network File System work?

NFS is a client-server protocol. An NFS server is a host that meets the following requirements:

- Has NFS server software installed

- has NFS client software installed;

- has network connectivity to an NFS server;

Setting up an NFS client machine to access an NFS server can be done manually, using the mount command or using an NFS configuration file-- /etc/exports. Each line in the NFS config file contains a mount point, an IP address or a host domain name and any configuration metadata needed to access the file system.

Versions of NFS

NFSv4, the current version of NFS, and other versions subsequent to NFS version 2 (NFSv2) are usually compatible after client and server machines negotiate a connection.

NFS versions from the earliest to the current one are as follows:

Sun Network Filesystem released March 1984

Sun Microsystems published the first implementation of its network file system in March 1984. The objective was to provide transparent, remote access to file systems. Sun intended to differentiate its NFS project from other Unix file systems by designing it to be easily portable to other OSes and machine architectures.

NFSv4 released April 2003

The update to NFSv4 was first documented in RFC 3010 in 2000. This is the first version of the NFS specification that the IETF published as a proposed standard; prior versions were published as informational.

New and improved features in this update included the following:

- Support for strong authentication, integrity and privacy;

- Support for advanced file caching;

- Improved internationalization capability;

Advantages of NFS

Among many benefits for organizations using NFS are the following:

- Mature. NFS is a mature protocol, which means most aspects of implementing, securing and using it are well understood, as are its potential weaknesses.

- Open. NFS is an open protocol, with its continued development documented in internet specifications as a free and open network protocol.

Disadvantages of NFS

Some of the drawbacks of using NFS include the following:

- Dependence on RPCs makes NFS inherently insecure and should only be used on a trusted network behind a firewall. Otherwise, NFS will be vulnerable to internet threats.

- Some reviews of NFSv4 and NFSv4.1 suggest that these versions have limited bandwidth and scalability and that NFS slows down during heavy network traffic. The bandwidth and scalability issue is reported to have improved with NFSv4.2.

Conclusion

NFS provides centralized data storage, increased efficiency, data security, and scalability. But it has some limitations that security concern for sharing sensitive data over public networks and doesn't support hierarchical storage management.