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

**Theory:**

Network File System (NFS) is a networking 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 specification was first published by the Internet Engineering Task Force (IETF) as an internet protocol in RFC 1094 in 1989

NFS is one of the most widely used protocols for file servers. NFS implementations are available for most modern operating systems (OSes), including the following:

* Hewlett Packard Enterprise HP-UX
* IBM AIX
* Microsoft Windows
* Linux
* Oracle Solaris

Cloud vendors also implement the NFS protocol for cloud storage, including Amazon Elastic File System, NFS file shares in Microsoft Azure and Google Cloud Filestore.

NFS is an application layer protocol, meaning that it can operate over any transport or network protocol stack. However, in most cases NFS is implemented on systems running the TCP/IP protocol suite. The original intention for NFS was to create a simple andstateless protocol for distributed file system sharing.

Early versions of NFS used the User Datagram Protocol (UDP) for its transport layer. This eliminated the need to define a stateful storage protocol; however, NFS now supports both the Transmission Control Protocol (TCP) and UDP. Support for TCP as a transport layer protocol was added to NFS version 3 (NFSv3) in 1995.

## **How Does the NFS Work?**

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

* has NFS server software installed;
* has at least one network connection for sharing NFS resources; and
* is configured to accept and respond to NFS requests over the network connection.

An NFS client is a host that meets the following requirements:

* has NFS client software installed;
* has network connectivity to an NFS server;
* is authorized to access resources on the NFS server; and
* is configured to send and receive NFS requests over the network connection.

NFS was initially conceived as a method for sharing file systems across workgroups using Unix. It is still often used for ad hoc sharing of resources.

The process of setting up NFS service includes the following three steps, whether on an enterprise file server or on a local workstation:

1. Verify that rpc.mountd or just mountd is installed and working. This is the NFS daemon -- the program that listens to the network for NFS requests.
2. Create or choose a shared directory on the server. This is the NFS mount point. Using the mount point and the server host name or address uniquely identifies the NFS resource.
3. Configure permissions on the NFS server to enable authorized users to read, write and execute files in the file system.

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 configurationmetadata needed to access the file system.

**You will require a few services to make an NFS file system work:**

* **nfs** – The nfs service will start the server and the RPC processes necessary for accepting shared systems.
* **nfslock** – The nfslock service starts the RPC processes and allows NFC clients to lock files.
* **portmap** – You can take port reservations from local services with this one. portmap will respond to messages stating that certain ports are available for file access.

### **Benefits of NFS**

* **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.
* **Cost-effective.** NFS is a low-cost solution for network file sharing that is easy to set up because it uses the existing network infrastructure.
* **Centrally managed.** NFS's centralized management decreases the need for added software and disk space on individual user systems.
* **User-friendly.** The protocol is easy to use and enables users to access remote files on remote hosts in the same way they access local ones.
* **Distributed.** NFS can be used as a distributed file system, reducing the need for removable media storage devices.
* **Secure.** With NFS, there is less removable media like CDs, DVDs, Blu-ray disks, diskettes and USB drives in circulation, making the system more secure.

**There are a few drawbacks to the NFS to notice:**

* A firewall is necessary for running an NFS to keep unwanted parties from entering. Any NFS that does not use this protection will be at risk of harm.
* It may be tough for multiple parties to access a file at the same time, especially if the file is more massive in size.
* Some protocols allow for up to 1 MB of data to move in each read or write request. While today’s protocols can handle immense amounts of requests, the 1 MB standard may be too weak.

**Conclusion:**

An NFS can be necessary when you’re trying to get files out to more people in your network. Be sure you see how an NFS can work if you need assistance in making your network and your file contents more visible to everyone in your business.