This video will look at the two file sharing protocols SMB and NFS. SMB is the primary file sharing protocol developed for Windows computers and NFS is the primary file sharing protocol that was developed for UNIX based systems.

SMB (Server Message Block)

- Originally designed by IBM
  - Additional features added by Microsoft
- CIFS (Common Internet File System)
  - A dialect of SMB
- SMB 2.0 introduced in Windows Vista
  - Reduced chattiness of the protocol
- SMB 3.0 introduced in Windows 8/2008 R2
  - Additional functionality and improvements

Server Message Block or SMB was originally designed by IBM back in the 80's. After its inception, Microsoft took the protocol and added some features to it. The additions included features such as LAN Manager. Services such as this allowed Windows systems to map shared drives and have this new share act as a local drive on the computer. For simplicity's sake, I will skip the 3rd and 4th point but we will get back to those in a minute. With the release of Windows Vista, Microsoft also released SMB 2.0. This was a major revision of SMB which, besides adding additional features, reduced the "chattiness" of the protocol. In other words, it reduced the bandwidth used or data amount transmitted, over the network. SMB 3.0 was released with Windows 8 and Server 2008 R2. With more improvements and added functionality, SMB 3.0 was aimed towards increasing effectiveness in Datacenters. When mapping a share, Windows will automatically perform the negotiation and sort out what version of SMB to use.

Now what were the points that we skipped? In the late 90's Microsoft had attempted to rename SMB to CIFS or Common Internet File System. Unfortunately for Microsoft, this attempt was unsuccessful so they were skipped in order to avoid confusion. CIFS had additional features, but the name simply did not catch on and Microsoft simply went back to SMB in future versions. Due to this, CIFS is referred to as a dialect of SMB though you may hear CIFS and SMB used synonymously, but they are basically referring to Windows file sharing. Moving forward however, the term CIFS should really not be used as it is a relic of the past and it should only be considered SMB.

NFS (Network File System)

- Developed originally by Sun
- Released as version 2
- Version 3 included additional features
  - 64bit support, files larger then 2 gigabytes
- Version 4
  - Performance and security improvements

The next file system we will be examining is Network File System, or NFS. Originally developed by Sun in the late 80's, NFS version 1 was used internally within Sun Microsystems and never released publically. It was Version 2 that was released to the public however. This provided basic file sharing capabilities and was used extensively within Unix based systems. As they released Version 3 in 1995, it was enhanced to add 64bit support and was able to handle files larger than 2 gigabytes. In 2000, Sun released version 4 of NFS with added performance along with security improvements. This allowed for security methods to be applied and utilized to authenticate users, e.g. Kerberos. These security measures made NFS version 4 much more secure when compared to previous revisions.

In The Real World

- Windows shares support
  - SMB or NFS or both
- Use native protocol when possible
- NFS good for host authentication
- Windows good for user authentication
- Choice comes down
  - Which operating system you are using
  - Software requirements

Now I want to ask you a question. In the real world, which protocol would you use? Windows shares support both SMB and NFS, or even both at the same time. It is merely a matter of configuring which one you need or configuring both if you need to utilize both. Ideally, you'll want to use a native protocol when possible. For example, if you are connecting two Unix systems, it will be best to utilize NFS. If you are connecting two Windows systems, SMB would be the obvious choice. Even though both achieve the goal of file sharing, there are differences in the way Windows and Unix based systems handle file systems and the users that will be using the systems. Mixing the two can lead to compatibility problems. As NFS is good for host authentication, it makes connecting two servers together rather easy. This can be placed in the boot up configuration and the data would be available to the operating system without the need for a user to be logged in. You could even connect to another server based on the IP address alone. Conversely, Windows requires user authentication in order to connect to an SMB share and generally the user is required to be logged in. It is possible to circumvent this and you would do this for some services running on the local system, but it is, unfortunately, not as simple as NFS makes it. Windows is an excellent choice for using authentication. Until NFS version 4, this was something that NFS did not handle well and was prone to more security problems. If you are using a domain, then Windows handles user authentication very well. Ultimately, the decision will be made on what operating systems you are using and your software requirements. In future videos, we will discuss how Windows file sharing (SMB) works and also how to incorporate NFS using Windows Server.