Project Summary

Features of the Project

NTP Synchronization:

Both servers are synchronized through ntp to time.tntech.edu.

Windows:

This was already set up for us when we received the box

Linux:

We set up the ntp daemon to use time.tntech.edu as a source server

DNS Integration:

Our Windows machine is the primary DNS server for the CSC3550-3.LOCAL domain. Our Linux machine was then set to be the secondary zone/name server for CSC3550-3.LOCAL with it pulling all of the necessary DNS records from the Windows machine.

Windows:

When the `dcpromo` command was run to promote our Windows machine to a domain controller, we gave the domain the name of CSC3550-3. Because there was not a DNS server already set up, the `dcpromo` command setup a new DNS server on our Windows machine with a SOA record, a NS record pointing to the Windows machine, and an A record or CSC3550-3W which is the name of the Windows machine.

Linux:

Once bind9 was installed, a new zone for CSC3550-3.LOCAL was added to /etc/bind/named.conf.local. This zone specifies that it is a slave zone, or secondary zone, and where to pull record changes from, which in this case is the address of the Windows machine.
Back on the Windows machine, we need to set DNS to allow bind secondaries, and then set up the zone-transfers from the Windows to the Linux, as well as add a NS and A record for the Linux machine.

Active Directory (AD) Integration:

Our Windows machine, as the domain controller, is the keeper of all of the Active Directory records, such as users, computers, and groups. Our goal was to enable the Active Directory users to be able to log into the Linux machine and be able to use it's resources.

Windows:

Active Directory was placed onto the computer with the `dcpromo` command mentioned earlier. As already stated, our Windows machine became a Domain Controller, which meant that it contains the Active Directory for the domain that it is controlling, CSC3550-3.LOCAL.

Linux:

To start with, there needed to be a way that the Linux machine could verify that a person logging into it was a valid AD user with the correct password. For this we installed Kerberos, a program that is used to grant tickets permitting activities. Kerberos can talk to both the Windows machine and the Linux machine and provide authentication for the AD users. Our next step was to install Samba and Winbind. Winbind works with Samba (to the point of placing it's configuration in Samba's configuration file) to give the AD users user ID's and other things necessary for them to use the Linux machine. Once they were installed and configured, the command `net ads join` allowed us to join the the CSC3550-3.LOCAL domain controlled by the Windows machine. This allowed us to log into the Linux machine using our AD accounts and use the utilities there.

NFS Filesystem Home Directories:

We were tasked to take a NFSv4 share on the network, mount it to our Linux machine, and use that share to place our users home directories on the Linux machine.

Linux:

We placed the correct mount string in /etc/fstab so that the share would be automatically mounted upon system boot. We also modified our user creation script so that it set the newly created users' home directories to be on /homedirs which is where we mounted the share to.

Unfortunately, we have had quite a few problems with this share. It seems that only root can write to the share, and sometimes it seems as if Winbind treats the Windows Domain Administrators differently than other users on the share as well. This has been the largest issue with the system to date.

WordPress powered Web-Content:

We have created web-content for Lighthouse Christian Camp Ministries, a Christian non-profit organization that reaches out to many different areas of the community. This was put up through Apache and WordPress on our Linux machine.

Linux:

        The first thing that we needed in order to serve a website was a web server. For this need we installed and setup Apache. Once Apache was setup and ready we downloaded the archive for WordPress from the official website and followed the instructions on the site for installation. During this process we were required to install other pieces of software needed by WordPress, such as the php interpreter and the mysql database. Once this process was complete we were able to log onto WordPress and then add the pages. The content for these pages came both from the official website of Lighthouse Christian Camp Ministries and from the experience of one of the group members.

Best Feature

Active Directory Integration:

We feel that the Active Directory Integration is the best feature within our project. This is partially because it uses and relies on many of the previously implemented features whose implementation went quite smoothly and whose performance has been quite stable. In practice, we did have some trouble at the start with Active Directory Users logging into the Linux machine as local users on the Linux Machine. This issue was solved by forcing the local Linux users to have a different user id range than what was allowed to the Active Directory users accessing the system. Once this issue was resolved we had no more problems with AD users on the Linux system. In fact, we were even able to give sudo permissions to an AD user!

Worst Feature

NFSv4 Accessibility:

We have had nothing but problems with the use of NFSv4 in our network share. The root user is the only user who is able to write anything to the NFS file system, and even the root user is not able to do much. There are many instances where the root user is not able to change the ownership of files, or other things that root should be able to do. Even when other users own a directory on the share, they still do not have the permissions to write to it. We have meet with the administrator of the NFS share on several occasions, but he is just as confused as we are on what could be causing these problems.

Values Learned By Group Members

One of the big things that was made abundantly clear to all of the members of the group was the importance of Google in attempting to solve some of the issues that we ran up against during the course of the project. Yes, it is possible and even likely that we would find erroneous information or solutions that did not quite fit our setup, but it was also good to be able to find someone who had our problem and the solution that fixed it for both him and us.

Also during the course of the project we had changed a pam configuration file and did not make a backup or try a test login, because of this, we made it so that we could not even log in to our Linux machine even from the console. From this we learned the importance of backup, especially of configuration files, and especially when dealing with pam.

Support Documentation

DNS:

There were a couple web sites that were used to help discover what we needed to do in order to get bind and the secondary DNS zone working, they were:

http://wiki.kartbuilding.net/index.php/DNS_-_Bind9

http://www.linuxquestions.org/questions/linux-server-73/secondary-dns-server-setup-w-a-windows-domain-606825/

Active Directory Integration:

The main resource used to integrate the Linux machine to Active Directory is found here:

https://help.ubuntu.com/community/ActiveDirectoryWinbindHowto

Also though, we had an issue with AD users logging into the Linux machine as local users, this was caused by their user id's being overlapping. In order to fix this we changed the uid range for local users (in /etc/login.defs) and the uid range for AD users (in /etc/samba/smb.conf) so that the ranges are no longer overlapping.

NFSv4 Mount:

This site, in conjunction with the e-mails that were sent to the class by our instructor, was used to mount the nfs share:

http://www.cyberciti.biz/tips/ubuntu-linux-nfs-client-configuration-to-mount-nfs-share.html

However, the instructions on that site were for NFSv3. In the version of Ubunutu that we were using as our Linux machine, the nfs module was not automatically loaded into the kernel. Because of this, we needed to append the line `nfs` to the file /etc/modules in order to load the nfs modules at boot time.