Scott Raymond
Professor Han
CSE 365

FreeNAS and Windows AD Setup

Project Description: For this project, I created a virtual environment where a FreeNAS server could connect with a Windows Active Directory setup, and utilize file sharing and pristine connectivity.

Required Fields: Before beginning, there are a few things that will be required for the project. I would recommend downloading all of the necessary ISO's to install the software. This includes Windows Server 2012 R2, pfSense 2.2.6, FreeNAS 9.3, and Windows 7. It is also necessary to download a Virtualization software. For this project, I used Oracle's VirtualBox.

Step 1: Creating a network for the system.

I decided to use pfSense as a gateway for my system. I read online that it was a simple setup process and it works well as a virtual gateway.

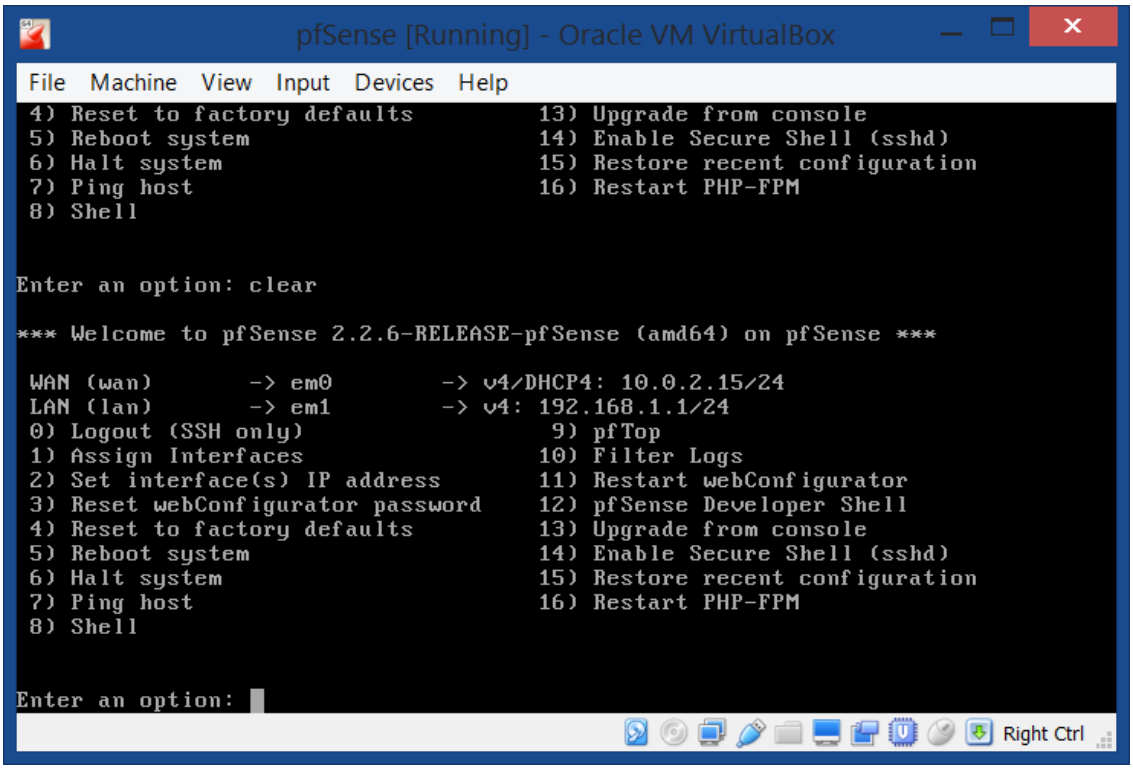
pfSense:
256MB RAM, 2GB hard disk, Adapter 1 NAT, Adapter 2 Internal Network "net"

After booting up the VM for pfSense, press "1", shortly followed by pressing "i" to begin the installation process. Follow a few simple instructions to finish installation. I decided to go for the "Quick and Easy Installtion" to speed up this process.

Once finished and at the main menu, press 1 to setup the Network. Call the WAN network "em0" and call the LAN network "em1". After this press 2 to set the IP addresses. Set the WAN network to DHCP through IPv4, and set the LAN network to a static IP of your choice.

For this project I set the IP to 192.168.1.1

Once completed, this will be the look of the main menu for pfSense.



Open the shell and attempt to ping google to check for internet connectivity. After this, type in "ifconfig em1" to make sure the IP is correct.

Step 2: Setup the Windows 2012 Server

I use Windows Server 2012 to setup the Active Directory required for the project

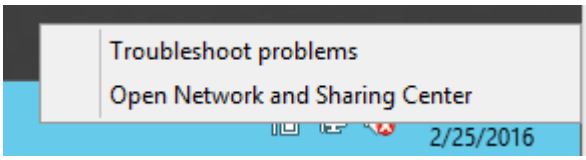
Windows 2012:
2GB RAM, 25GB hard disk, Adapter 1 Internal Network "net"

Begin this installation by selecting the language, and clicking install now.
After this you will be asked for a Product Key. I received my key from Microsoft Dreamspark for being a student. Without that, a key will need to be purchased.

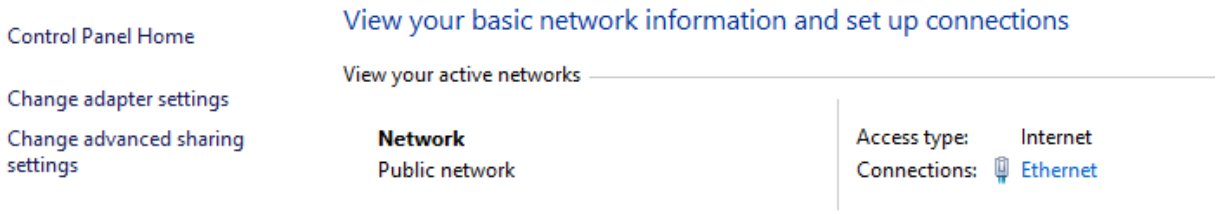
Click the custom installation and select the hard disk created for the install. This will begin the download. Once completed, it will ask you to change the Administrator password to finish.

Once the restart is finished, use the administrator password to log in and begin connecting Windows Server 2012 to the network.

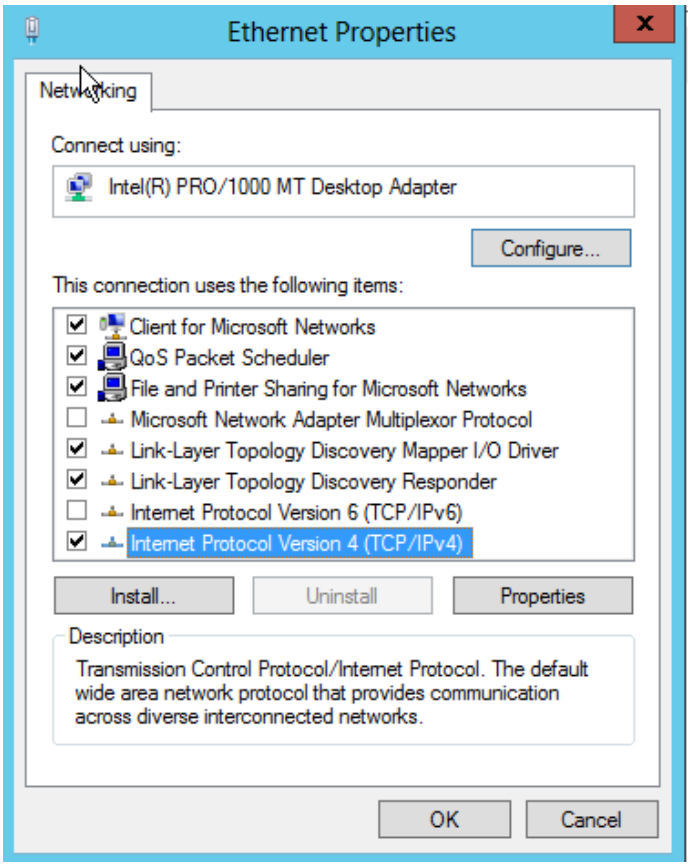
Right click the networking icon in the bottom right corner and select "Open Network and Sharing Center"



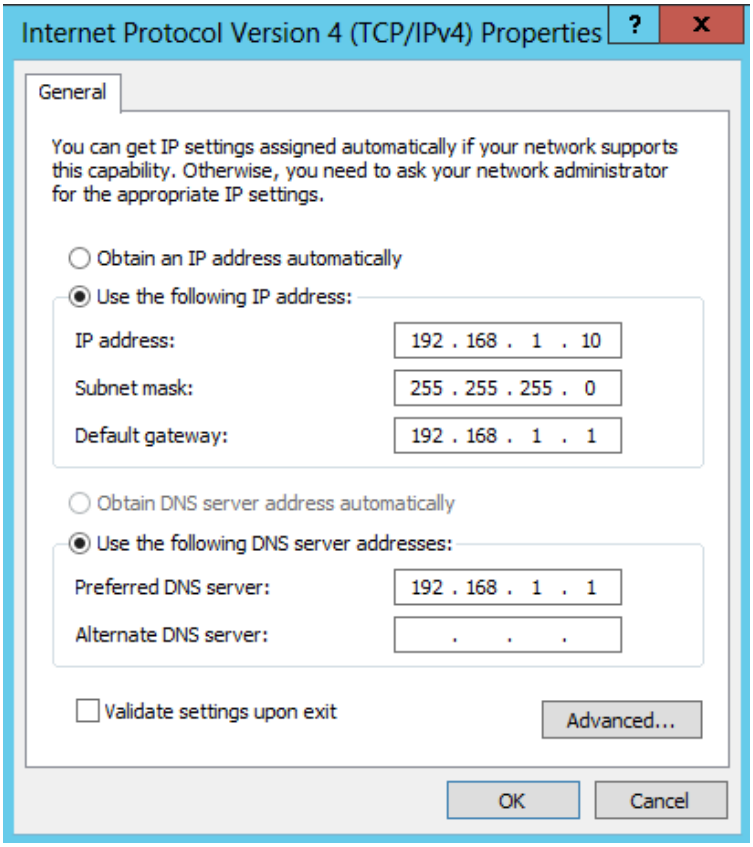
From this page, select “Change adapter settings” from the left hand side.



Right click the available adapter, which is the internal network adapter we made in virtualbox, and select properties. From this window, select “Internet Protocol Version 4 (TCP/IPv4) and select properties.



On this page, check “Use the following IP address:” and add the selected IP address to the network.



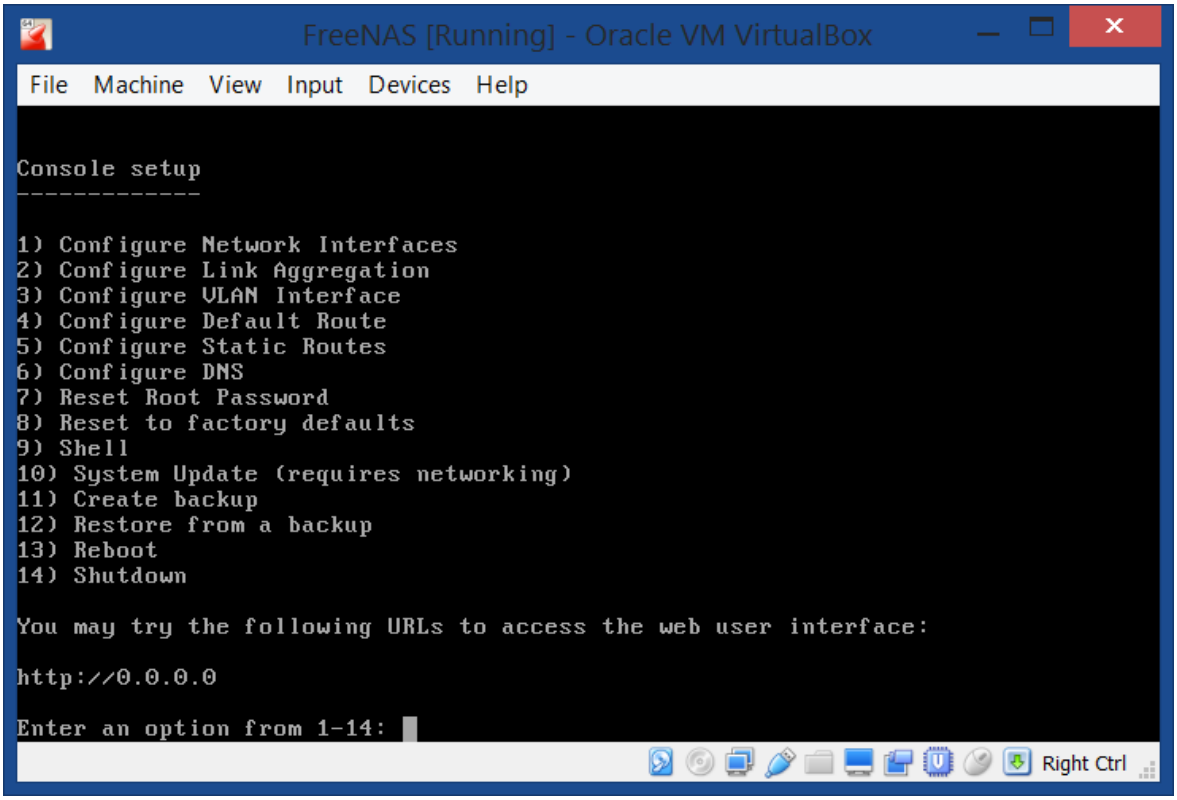
For my Windows Server 2012, I used 192.168.1.10
Be sure to add the pfSense server under default gateway, 192.168.1.1
This server is now connected to the network

Step 3: Setup FreeNAS 9.3

FreeNAS is the Linux machine that we will be connecting with the active directory for transferring files and users.

FreeNAS 9.3:
2GB Ram, 2GB hard disk, Adapter 1 Internal Network “net”
Make another hard disk for later use. I made mine 10GB.

Upon booting the ISO, select “Install” and begin the very straightforward install process. Reboot the system when finished. Once finished, this will be the main menu



First, select 1 to change the IP address of FreeNAS. I changed mine to 192.168.1.11

Then select 4 to set the default gateway to the pfSense server, which is 192.168.1.1

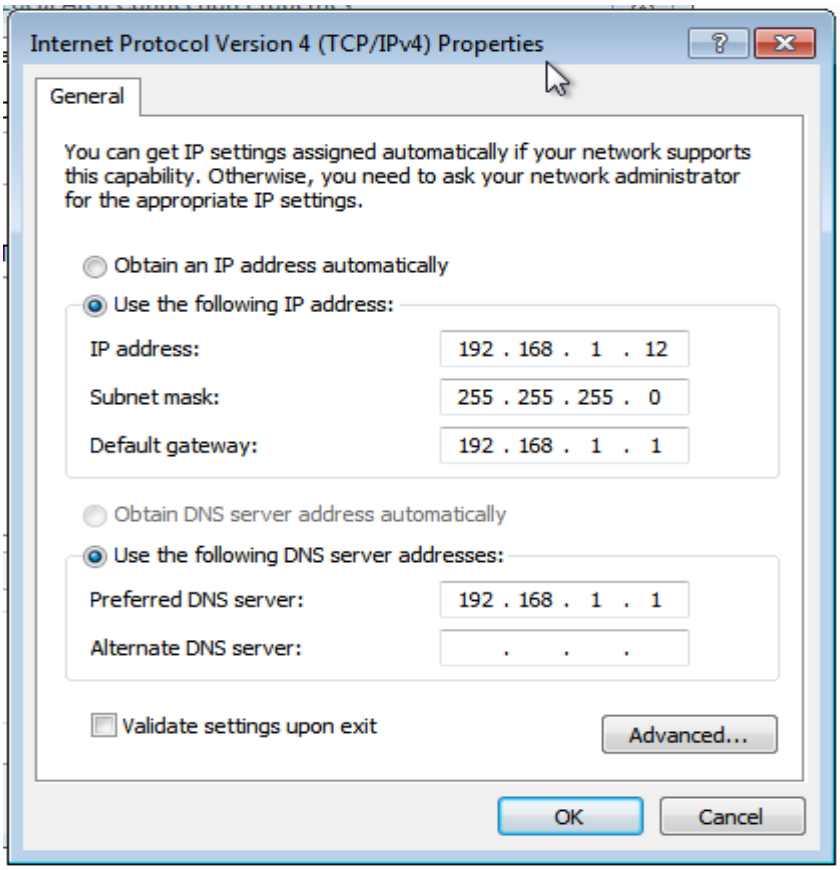
Step 4: Setup Windows 7 Server

Windows 7:
1 GB Ram, 25GB hard disk, Adapter 1 Internal Network "net"

Upon booting up the Windows 7 ISO, it will ask to select a language, followed by inputting a Product Key. For this project, I used a trial version of Windows so I left the product key entry blank.

Create a user on this PC and a password to be used, followed by setting the timezone.

Similarly to Windows Server 2012, right click the networking icon in the bottom right side of the screen. Click "Open Network and Sharing Center"
From this screen on the right side select "Change adapter settings". Right click the adapter we made from virtualbox and select properties. From the properties screen, select "Internet Protocol Version 4 (TCP/IPv4), and click properties below the box. You will see a box similar to this:



From this box, check “Use the following IP address:” and add your selected IP address to the network. I made my Windows 7 machine 192.168.1.1

Be sure to add the default gateway as the pfSense server. This will connect you to the network and internet.

Step 5: Setting up Active Directory, DNS, and DHCP

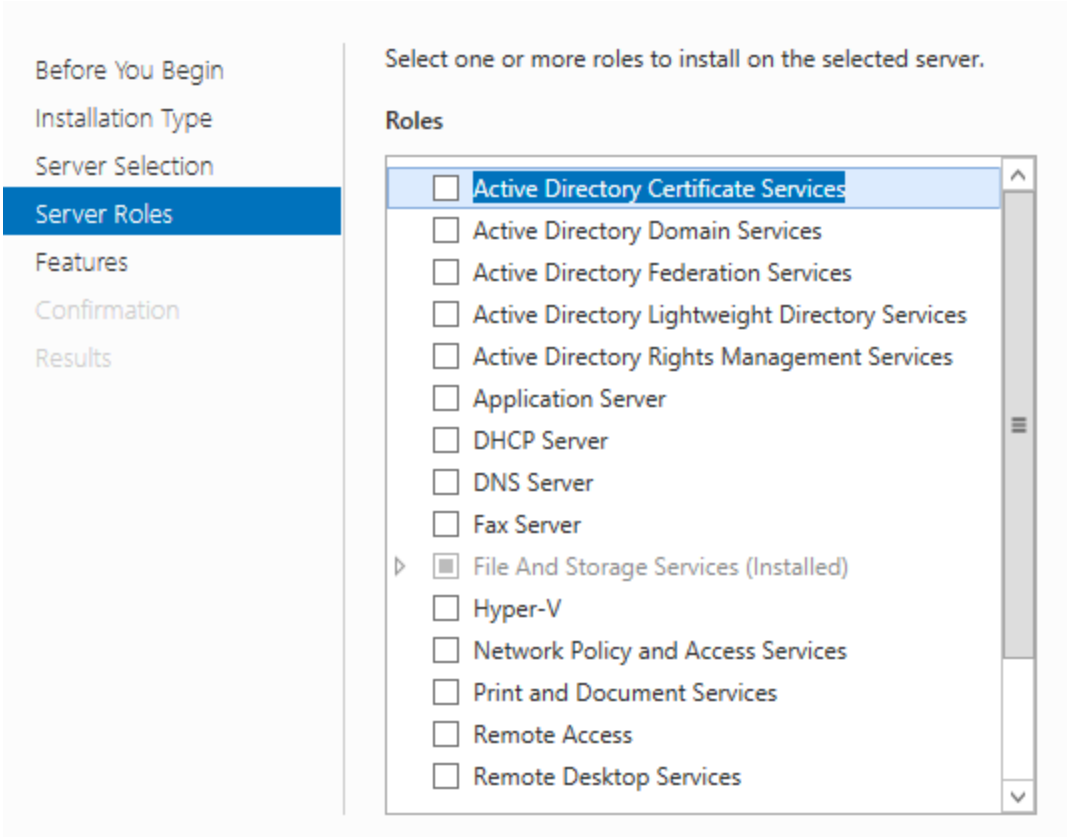
With that, all of our Virtual Machines should be properly setup and connected to the network. Therefore, we shall open up Windows Server 2012 and begin setting up the Active Directory.

The first step should be to change the computer's name to something that matters. From Server Manager, click Local Server on the left. And then click “Computer Name” in the window.

Use this to change the computer’s name. I changed mine to WinServer.
From this same page, be sure to set the timezone to the proper setting. Mine is PST.

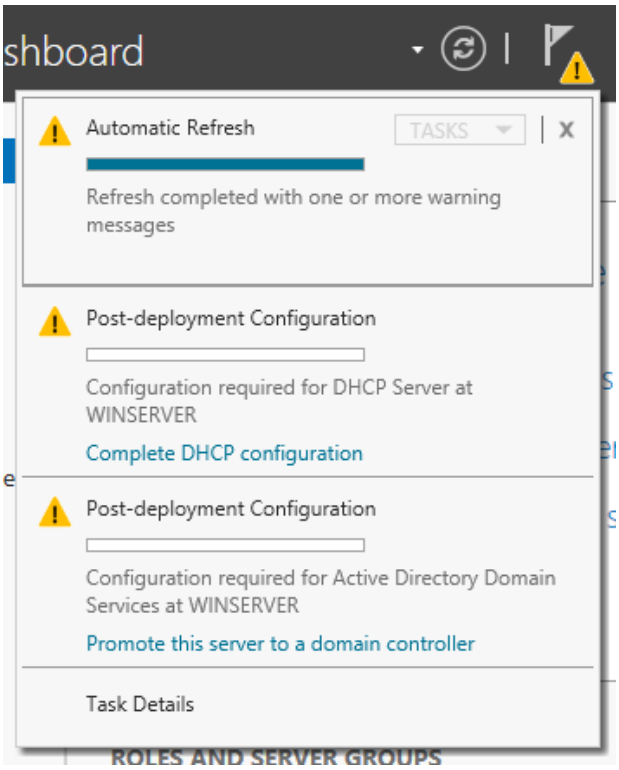
Next we will begin adding roles and features. Click “Manage” at the top right of Server Manager. Then click “Add Roles and Features”.

Click next on the first page. On the second page, be sure that “Role Based or feature based installation” is selected. Click next.
On the third page, click next again. You should now be on this screen:



Enable “Active Directory Domain Services”, “Active Directory Lightweight Directory Services”, “DHCP Server”, “DNS Server”. Click Next.
Continue clicking next until the Confirmation page is reached. Check the box that says “Restart”. Click Install to begin installing these features.

Once the system has rebooted and the features have been installed, reopen Windows Server 2012, and Click the Flag at the top of Server Manager.



From here, select at the bottom “Promote this server to a domain controller”
On this page, check “Add a new forest” and create a root domain name. For this project I simply chose “project.local”. Click next.

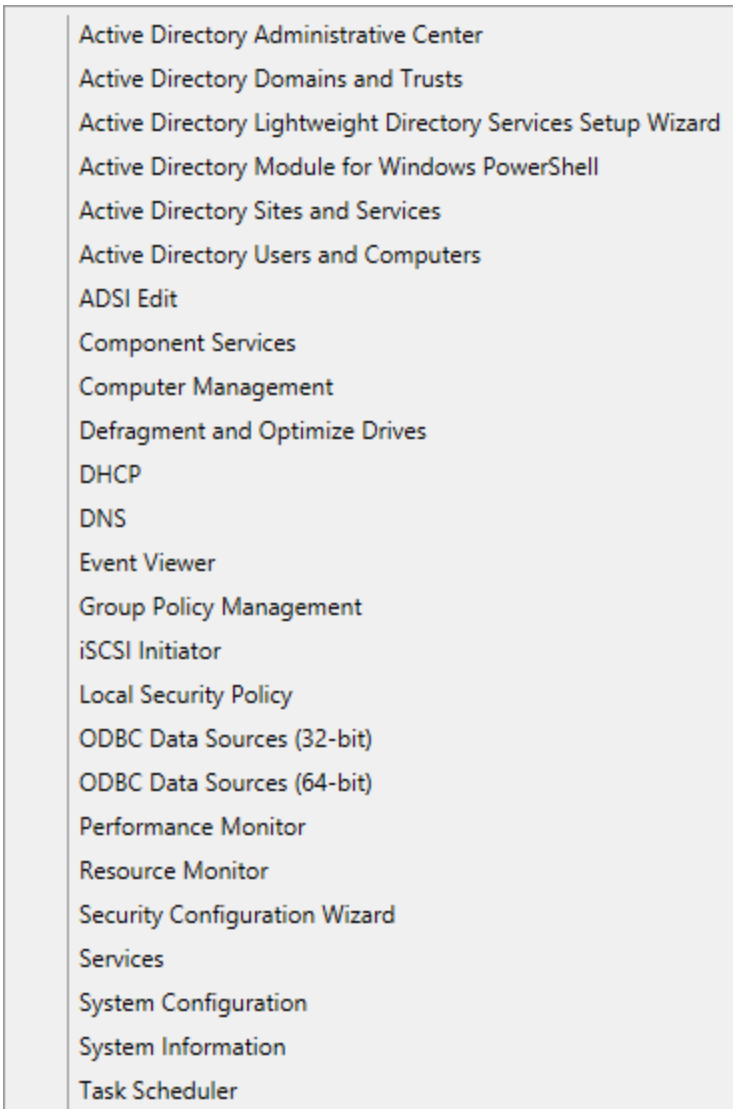
Create a Directory Services Restore Mode Password. Click next. On the next page DNS Options, just click next.

Create a NetBIOS domain name. It auto selects the section of the domain name before the “dot”. I left it as default as “PROJECT”. Click next. On the next page “Paths” click next.

Review the options to make sure they are correct. Then click next. Finally, click install.

Once this installation has finished, go back to the flag in Server Manager, and click “Complete DHCP configuration”.
On the first page click next. Then on the second page click Commit. After this simply click close.

Go back to Server Manager and click on the tools button in the top right. You will be greeted with this list of options:



From this list, select DNS.
In this window it should say the name of your computer on the left (mine being WinServer). Expand this to reveal several folders. Right click the folder that says “Reverse Lookup Zones” and select “New Zone”
Select “Primary Zone” and select next. After this, check the line that says “To all DNS servers running on domain controllers in this forest:”. Click next. Then select IPv4 and click next.

For Network ID, put in the first 3 sections of the IP address. Which for me would, 192.168.1
Do not put the 4th section. Click next. Click next again. Then click finish. The new zone will be seen in the folder.

Back in the Server Manager, select the tools button in the top right and click DHCP

Expand the option on the left hand side, right click IPv4, and select “New Scope”

Name the scope. I named mine “LAB”. On the next you will be asked to enter a range of addresses that the scope distributes. I stated with 192.168.1.100 and ended with 192.168.1.200 This gives 100 IP addresses in the scope. Click next until the option is available “Yes I want to configure these options now”. Select this, and click next.

It will ask for an IP address. Put the default gateway address, (192.168.1.1) and click add. Then click next. Continue clicking next until it gives you the option to activate the scope. Select yes, and then finish.

Step 6: Creating Users, Files, and UID’s in AD

In Windows Server 2012, open Server Manager, click tools in the top right, and select “Active Directory Users and Computers”.

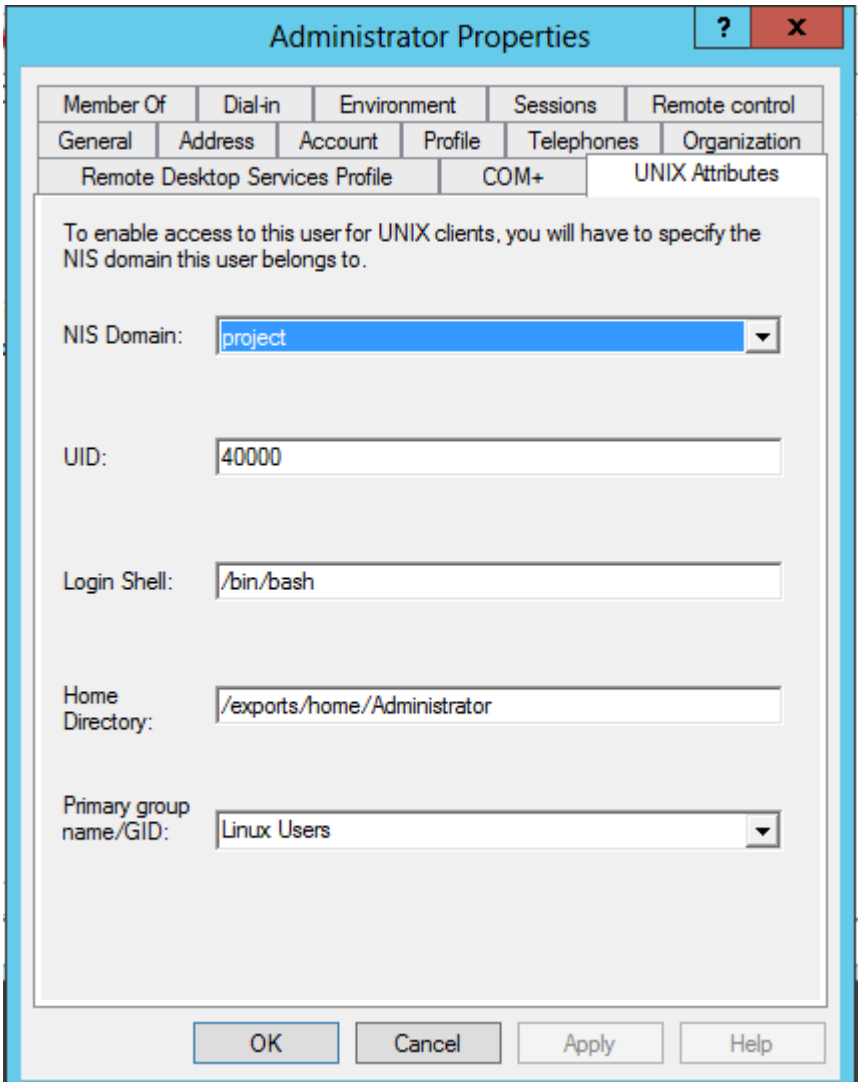
Expand the section on the left side that is titled your domain name “project.local”
Click on the folder that says users and click the “add new user” icon at the top.

I named this user after me. Name: Scott Raymond, User logon: raymonds, create password and finish.
Next we want to enable UNIX Extensions:
https://msdn.microsoft.com/en-us/library/cc731178.aspx#BKMK_command
here is a link that lists the commands we need to use to do this. I will explain what I did below
For Windows Server 2012 or 2012 R2:
Open powershell
PS C:\Users\Administrator> dism.exe /online /enable-feature /featurename:adminui /all
PS C:\Users\Administrator> dism.exe /online /enable-feature /featurename:nis /all
PS C:\Users\Administrator> dism.exe /online /enable-feature /featurename:psync /all
After typing these three lines and installing their data, reboot

Go to tools in Server Manager and select “Active Directory Users and Computers”
Go to users and create these groups:
Linux Users, Linux Admins, Media
Set Unix Attributes: Right click each group, select properties, and UNIX attributes tab. Assign the NIS domain and these UID’s
Linux Admins: 30006, Linux Users: 30004, Domain Admins: 30001, Domain Users: 30000
Media: 30005

Right click the name of the user you created, for me this is Scott Raymond. Go to properties and click the Unix attributes tab. Set NIS domain and UID to 40001. Change login shell to /bin/bash.
Change home directory to /exports/home/raymonds
Change primary group to Linux Users

Apply these same settings to the Administrator, except change the UID to 40000.
The Admin should look like this:



Next add both the Adminstrator and User account to Media and Linux Users.
Right click these files and head to properties, then the Unix attributes tab. Click add to add these two user to Linux. Then click the members tab and add them to the Windows side.

Next, do these same steps except to the Linux Admins file, and add only the Adminstrator.

Step 7: Bind FreeNAS to AD

As of right now, I have not been able to successfully bind Active Directory and my FreeNAS server together. I have continuously been troubleshooting and attempting to solve this issue, but currently I have not been able to find a complete solution to my problems.

I have made several alterations to the FreeNAS GUI, but have come to no avail in connectivity issues.

I feel my problems with this project came from a massive lack of experience in working with Windows Active Directory and FreeNAS, for I have never worked with either before now. While I feel as though I have gained numerous new skills throughout the course of working on this assignment, I have still failed to accomplish to primary task.

Final Thoughts

While this project took a lot out of me, I feel as though I have gained a fair amount of knowledge from it. I am certain with a few more days of work I might be able to get it working the way it should, but as of right now, I am happy with the amount I have learned from working on it.