Active Directory using VirtualBox

# Prerequisites:

* [Oracle VirtualBox](https://www.virtualbox.org/)
* ISO Files:
  + [Windows 10](https://www.microsoft.com/en-us/software-download/windows10) or [Windows 11](https://www.microsoft.com/en-us/software-download/windows11)
  + [Windows Server 2019](https://www.microsoft.com/en-us/evalcenter/download-windows-server-2019)
  + [pfSense](https://www.pfsense.org/download/)

# Initial Setup:

* Create three Virtual Machines:
  + AD User (Windows 10/Windows 11):
    - 2+ Cores for CPU
    - 4+ GB of RAM
    - 32+ GB of storage
    - Set up the adapter as Internal Network
  + Windows Server:
    - 2+ Cores for CPU
    - 8+ GB of RAM
    - 32+ GB of Storage
    - Set up the adapter as Internal Network
  + pfSense:
    - 1 or 2 Cores for CPU
    - 2 GB of RAM
    - 16+ GB of Storage
    - Set up Adapter #2 as Internal Network

# pfSense Configuration:

* Perform a default installation of pfSense.
* Choose “Set Interface(s) IP Address” and:
  + Choose “LAN (em1 – static)”.
  + When asked to “Configure IPv4 address LAN interface via DHCP” choose no.
  + When asked to “Enter the new LAN IPv4 address.” enter “192.168.1.1/24”.
  + When asked for the LAN IPv4 upstream gateway address hit enter for none.
  + When asked to “Configure IPv6 address LAN interface via DHCP6” choose no.
  + When asked to “Enter the new LAN IPv6 address.” hit enter for none.
  + When asked “Do you want to enable the DHCP server on LAN” choose yes.
  + When asked to enter the start address for the IPv4 client range enter: “192.168.1.2”.
  + When asked to enter the end address for the IPv4 client range enter: “192.168.1.254”.
  + When asked “Do you want to revert to HTTP as the webConfigurator protocol” choose no.
* The rest of the pfSense set up will be done from the web interface on the AD User machine at the address: <https://192.168.1.1/>.
  + When going through general setup you can leave mostly everything the same but make sure to add 8.8.8.8 and 8.8.4.4 for the DNS.

# Windows Server Configuration:

* Perform a default Windows Server 2019 installation, choosing Standard with the Desktop Experience as the version.
* Hostname: Windows2019
* Timezone: (UTC-05:00) Eastern Time (US & Canda)
* Network Configuration:
  + Static IP: 192.168.1.2
  + Subnet: 255.255.255.0
  + Gateway: 192.168.1.1
  + DNS #1: 8.8.8.8
  + DNS #2: 8.8.4.4
* Install Active Directory and DNS:
  + In Server Manager, click Manage and choose “Add Roles and Features”.
  + On the first, second, and third page, click next.
  + On the “Select server roles” page, choose “Active Directory Domain Services” and “DNS Server”.
  + On the rest of pages, click next until you reach the install page, and then click install.
* Promote the Server to a Domain Controller:
  + In Server Manager, click on the flag on the left of “Manage”, and then click “Promote this server to a domain controller”.
  + On the “Deployment Configuration” page “Add a new forest” and give it a root domain name: “active.directory.local” or whatever you want.
  + On the “Domain Controller Options” page you can leave everything as it is and just enter the password “P@ssw0rd” or whatever you want as the password.
  + On the rest of the pages leave things as is and click next until you reach the install page, and then click install.
* Create an Active Directory user:
  + In Server Manager, click “Active Directory Users and Computers”.
  + Expand the active.directory.local domain.
  + Right click on “Users” and click New > User.
  + Put in “Test” for the user and username, for the password put in “P@ssw0rd” or whatever you want.

# AD User Configuration:

* Perform a default Windows 10 installation, version doesn’t matter.
* Hostname: Windows10
* Timezone: (UTC-05:00) Eastern Time (US & Canda)
* Network Configuration:
  + Static IP: 192.168.1.3
  + Subnet: 255.255.255.0
  + Gateway: 192.168.1.1
  + DNS #1: 192.168.1.2
  + DNS #2: 8.8.8.8
* Connect to the Active Directory Domain:
  + There are two options here:
    - The first option is to go through Settings > Accounts > Access work or school.
      * Click on connect and then click on “Join this device to a local Active Directory domain”.
      * For the domain name type in “ACTIVE”.
      * Then when asked for the user and password put in “Test” for the username and then whatever password you picked for the password.
    - The second option is to open up “Advanced System Settings”, go to “Computer Name”, and click on “Change”
      * From here click on the “Domain” button and type in “ACTIVE”.
      * Then when asked for the user and password put in “Test” for the username and then whatever password you picked for the password.