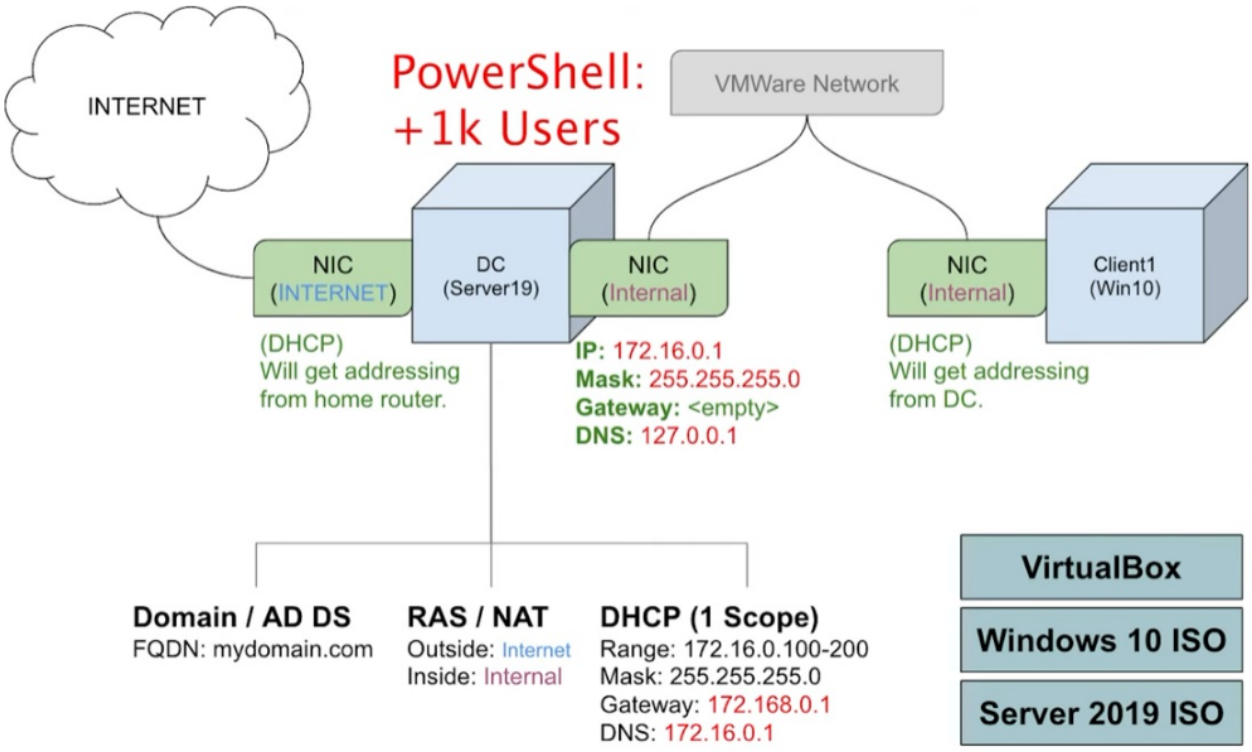
Active Directory Home Lab Setup

By: Robert Russ



The image above was created by Josh Madakor. The topology above shows the setup for the Active Directory Lab.

Purpose:

To learn and simulate Active Directory small enterprise environment. Documentation is important in IT support, so I wanted to improve my documentation skills. I used Josh Madakor's Active Directory Lab video on YouTube (https://youtu.be/MHsI8hJmggI) to create a tutorial for others that want to learn Active Directory.

Technologies needed for MS Active Directory lab on a Windows 11 Pro Host

VirtualBox
Server 2019 ISO
Windows 10 ISO

Download Oracle VirtualBox

> Go to https://www.virtualbox.org/wiki/Downloads
> Click on Windows hosts link
> Go to Downloads and click on the VirtualBox to execute it
> Follow the VirtualBox Setup Wizard: > Click Next > Click Next > Click Yes > Click Install
> Click Finish
> Upgraded VirtualBox Extension Pack

Download Server 2019 ISO

> Go to https://www.microsoft.com/en-us/evalcenter/download-windows-server-2019
> Click ISO downloads 64-bit edition for English (United States) link
> Create an ISO folder that is easy to locate and to put your ISO files
> Go to Downloads and cut the Server 2019 file to move it to the ISO folder

Download Windows 10 ISO

> Go tohttps://www.microsoft.com/en-us/evalcenter/evaluate-windows-10-enterprise
> Click Download the ISO - Enterprise under Get started for free
> Complete the free trial information. Note: You can use made up information
> Click ISO downloads 64-bit edition for English (United States) link
> Go to Downloads and cut the Server 2019 file to move it to the ISO folder
> Go to Downloads and click on the Windows 10 file to execute it

Create Virtual Machines (VMs)

Create Server 2019 VM
> Go to VirtualBox
> Click New at the to top
> Type in Name: DC-1
> Click Version drop down box to select Other Windows (64-bit)
> Click Next
> Change Memory to 2048MB or 2GB
> Leave Processors as 1
> Click Next
> Click Finish

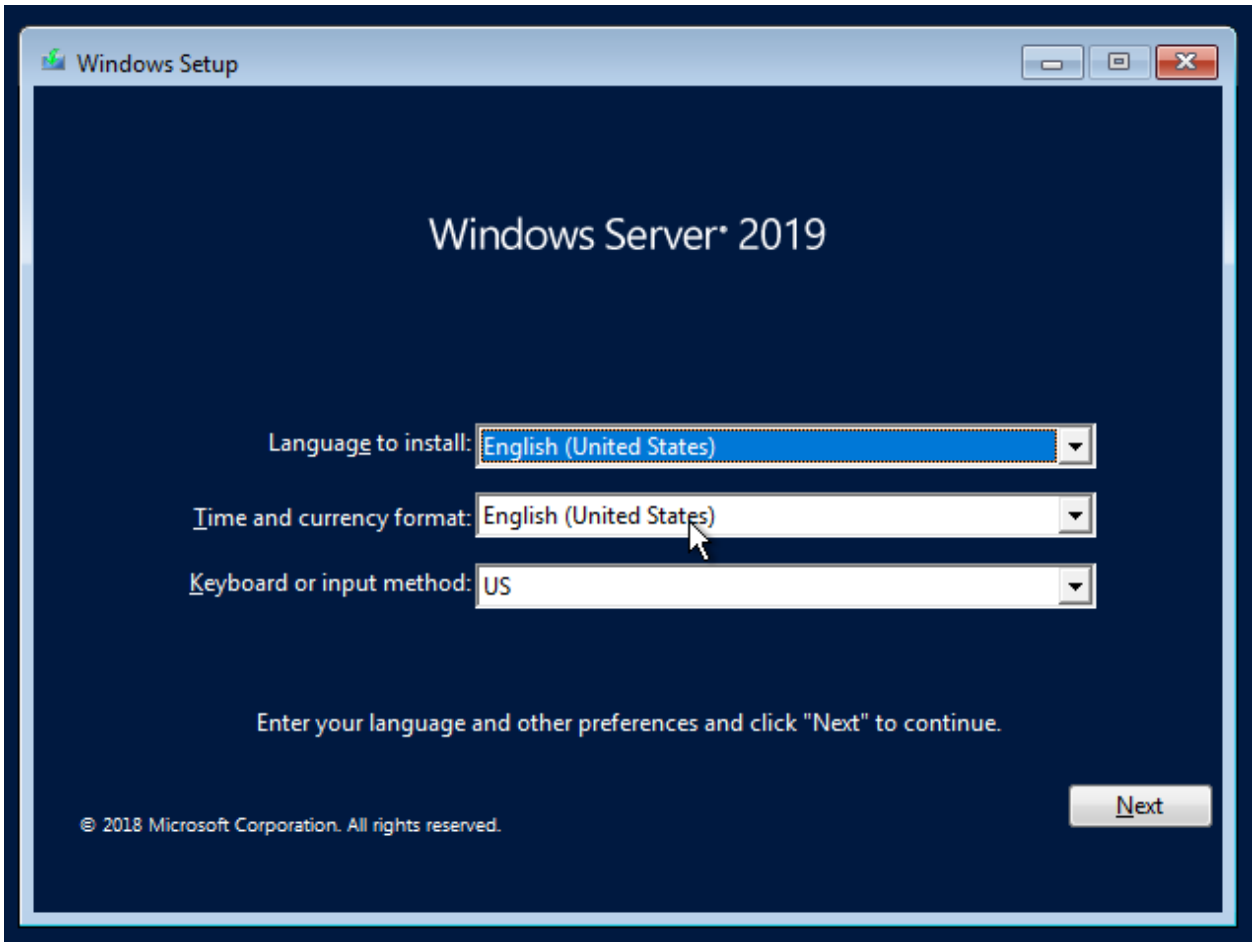
Configure Windows Server 2019 (DC-1) VM

> Select DC
> Click on Settings at the top
> Click Advanced tab
> Change the Shared Clipboard and Drag'n'Drop to Bidirectional
> Click on Systems > Processor - to increase processing speed change the number of processors
> Go to Network
> Go to Adapter 1 and set it to NAT (Network Address Translation) to connect to home internet
> Keep Enable Network Adaper checked
> Add another adapter by clicking on the tab labeled Adapter 2
> Click the check box for Enable Network Adapter
> Click drop down menu Attached to: to select Internal Network
> Click OK
> Finished configuring it

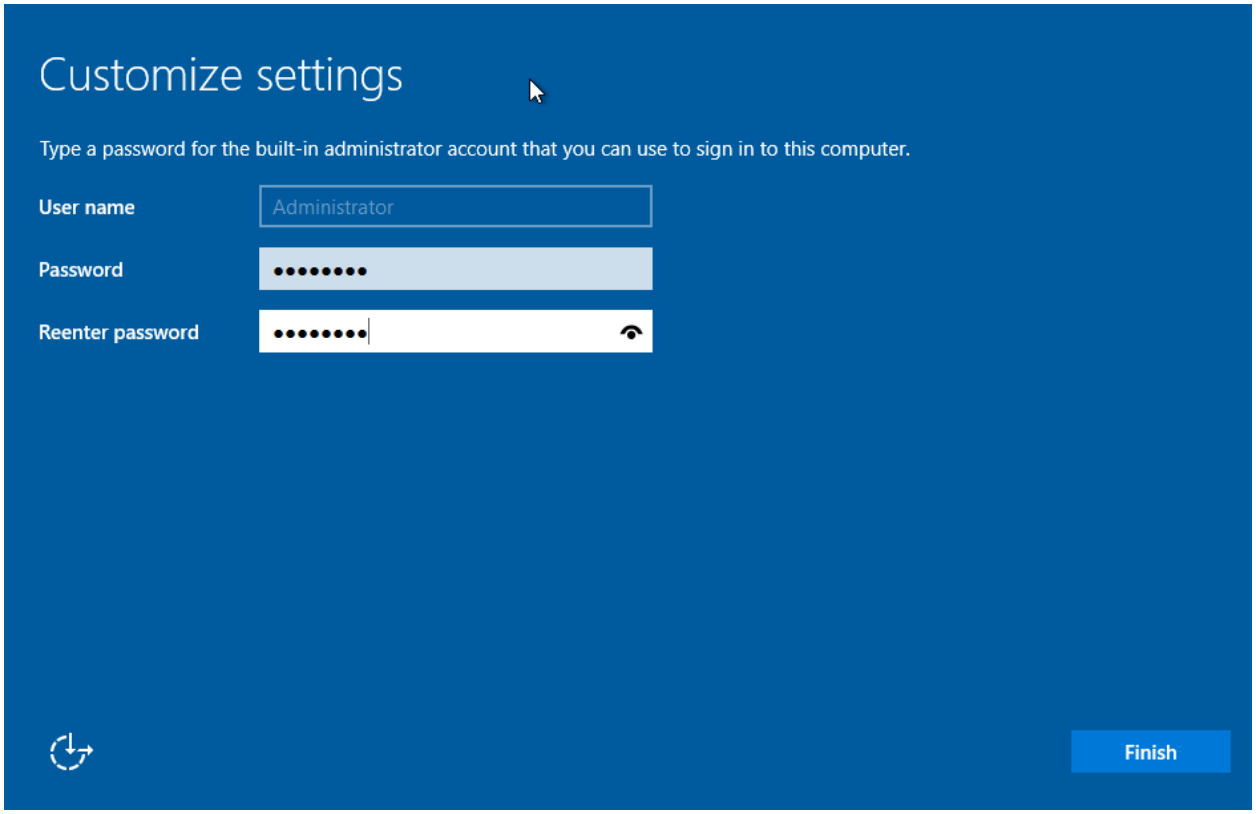
Install Windows Server 2019

> Select DC-1 in VirtualBox
> Click Settings at the top

> Select Storage
> Click on the Disc image to the right of Optical Drive:
> Click Choose a Disk File
> Find the Windows Server 2019 ISO file and select it (virtual CD/DVD drive)
> Click OK
> Click Start (start the VM)
> This is what your VM screen should look like after Windows Server 2019 booted up



> Click Next > Install Now
> Select the Standard Evaluation (Desktop Experience)
> Click Next
> Check Box to accept > Next
> Select Custom: Install Windows only (advanced) > Next
> Wait until the screen below pops up



> Create a password (Homelab123!) > click Finish
> Go to Input at the top > Keyboard
> Insert Ctrl+Alt+Delete
> Enter password to login
> Click Yes for Networks screen
> To improve VM experience
> Go to Devices at the top
> Insert Guest Additions CD image
> Close out the Windows to get back to the desktop
> Click on File Explorer at the bottom
> Go to This PC
> Double Click on CD Drive (D:) Virtual Guest Additions
> Select by double clicking VBoxWindowsAdditions-amd64
> Click Next > Next > Install
> Select I want to reboot later > Ok
> Start the DC-1 VM
> Repeat the process to login

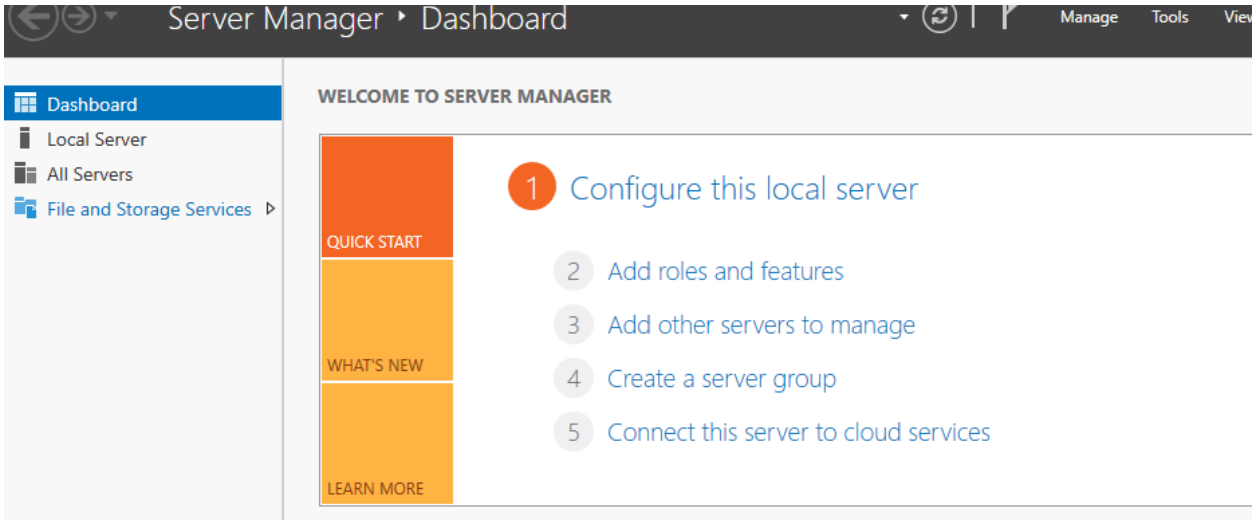
Set up IP addressing

> At the bottom right corner, click on the Network ICON
> Network Connected
> Click on Change adapter options

> Find the Ethernet adapter that connects to home internet and rename it _Internet_ by right clicking and selecting rename
> The other Ethernet adapter will be connect to Internal Network and rename it _Internal_
> Right Click on _Internal_ > Properties
> Double Clicking On Internal Protocol Version 4 (TCP/IPv4)
> Select Use the following IP address and enter the following information
> IP address: 172.16.0.1
> Subnet mask: 255.255.255.0
> Default gateway: Leave blank because the DC will serve as the gateway
> Preferred DNS server: 127.0.0.1 Loopback address
> Click OK > OK

Rename PC
> Click start menu
> Settings > Systems > About
> Rename PC > DC-1 (Domain Controller 1)
> Restart > Continue
> Repeat login process

Add Domain Controller
> Click on Add roles and features



> Click Next > Next
> Select the server
> Select the checkbox Active Directory Domain Services
> Click Add Features
> Make sure there is a check in the checkbox for Active Directory Domain Services
> Click Next > Next > Install
> Once the installed, click Close
> Click on the flag with ! at the top right
> Click link Promote this server to a domain controller

> Select Add a new forest
> Enter mydomain.com for Root domain name
> Enter a password > click Next > Next > Next > Next > Next > Install
> Repeat login procedure

Create Domain Adminstrator Account

> Click Start
> Windows Administrative Tools
> Active Directory Users and Computers
> Right Click mydomain.com on the left > New
> Organizational Unit
> Enter _ADMINS
> Uncheck the checkbox
> Right click _ADMIN > New > User
> Enter first and last name
> Enter username a-rruss
> Naming convention (a = admin > first letter of first name > last name)
> Click Next
> Enter password
> For this lab, uncheck User must change password at next logon (in corporate environmen leave it checked)
> For this lab, check Password never password (in corporate environment do not check this box) > Next > Finish
> Make user Domain Admin by right click name > Properties
> Member Of tab > Add
> Enter domain admins
> Check Names > OK > Apply > Ok

Use Domain Admin Account

> Click on Start Menu to sign out
> Repeat login procedures except go to Other User at the bottom left corner of the screen

Install Remote Access Server (RAS) / Network Access Translation (NAT)

This will allow clients to access the internet through DC-1.

> Enter credentials from the new Domain Admin Account created
> Click on Add Roles and Features > Next > Next
> Select Server > Next
> Select Remote Access > Next > Next > Routing > Add Features > Next > Next > Next > Next
> Install > Close
> Click on Tools top right corner
> Routing and Remote Access
> Right Click DC-1
> Configure and Enable Routing and Remote Access > Next
> Network Acces Translation (NAT) > Next

> Choose First Option > Select _Internet_ > Next > Finish

Set up DHCP Server on Domain Controller

> Click Add roles and features > Next > Next
> Select Server > Next
> DHCP Server
> Add Features > Next > Next > Next > Install > Close
> Click on Tools > DHCP
> Right Click on IPv4 > New Scope > Next
> Enter under Name 172.16.0.100-200 > Next
> Enter in Start IP address: 172.16.0.100
> Enter in End IP address: 172.16.0.200
> Enter in Length: 24 > Next
> No Exclusions > Next
> Lease Duration will depend on use case for the lab leave it 8 days > Next
> Select yes, I want to configure the DHCP options for the scope now? > Next
> Use DC-1 IP address 172.16.0.1 > Next > Next > Next
> Yes, I want to activate the scope now? > Next > Finish
> Right Click dc-1 > authorize
> Right Click dc-1
> Refresh (IPv4 and IPv6 should have green check marks)

Configure Domain Controller to browse the internet.

Note: Don't do this in a corporate environment only in a lab environment.

> Click Configure this local server
> Click IE Enhanced Security Configuration On > Off > Off (Avoids spam messages) > OK
> Click Internet Explorer
> Go to https://github.com/joshmadakor1/AD_PS
> Click Green Code
> Download Zip File to the Desktop
> Extract Zip File to the Desktop
> Open Unzipped File
> Click Names txt file
> Add Your Name at the Top of the File (1000 names from random name generator)
> Save > Close
> Go to Start Menu
> Windows Powershell
> Right Click Windows PowerShell ISE > More
> Run As Administrator
> Open Icon
> Desktop
> Unzipped Folder
> Select 1_CREATE_USERS
> Enter Set-ExecutionPolicy Unrestricted on the command line > Enter

> Click Yes to All
> Enter cd C:\Users\a-rruss\Desktop\AD_PS-master
> Enter cd AD_PS-master
> Press Play button at the top to run the script > OK or Run once

PowerShell Script (written by Josh Madakor) to Create 1000 Users

```
# ----- Edit these Variables for your own Use Case ----- #
$PASSWORD_FOR_USERS   = "Homelab123!"
$USER_FIRST_LAST_LIST = Get-Content .\names.txt
# ------------------------------------------------------ #

$password = ConvertTo-SecureString $PASSWORD_FOR_USERS -AsPlainText -Force
New-ADOrganizationalUnit -Name _USERS -ProtectedFromAccidentalDeletion $false

foreach ($n in $USER_FIRST_LAST_LIST) {
   $first = $n.Split(" ")[0].ToLower()
   $last = $n.Split(" ")[1].ToLower()
   $username = "$($first.Substring(0,1))$($last)".ToLower()
   Write-Host "Creating user: $($username)" -BackgroundColor Black -ForegroundColor Cyan

   New-AdUser -AccountPassword $password `
            -GivenName $first `
            -Surname $last `
            -DisplayName $username `
            -Name $username `
            -EmployeeID $username `
            -PasswordNeverExpires $true `
            -Path "ou=_USERS,$(([ADSI]``"").distinguishedName)" `
            -Enabled $true
}
```

Create Virtual Machine in VirtualBox for Windows 10 Client

> Open VirtualBox
> Click New
> Enter the Name: CLIENT1 (Win 10)
> Select Version: Windows 10 (64 bit) > Next
> Select for Memory Size 4GB (4096 MB)
> Choose the number of processors that works for your system (I chose 2 CPUs) > Next
> Choose Disk Space (50 GB) > Next > Click Finish
> Select CLIENT1 (WIN 10) VM in VirtualBox
> Settings > Advanced > Change Shared Clipboard and Drag'n Drop setting to Bidirectional
> Click Network on the left
> Change Attached to: Internal Network > OK

Add ISO to the VM

> Click Storage on the left > Select Empty
> Select the CD Icon on the right
> Select Choose Disk File
> Find ISO in the folder with your ISOs > OK

Installing Windows 10 Enterprise to the Client1 (Win 10) VM on VirtualBox

> Select CLIENT1 (Win 10) > Click Start > Choose Language > Next > Install now
> Select I accept the license terms > Next > Select Custom > Next
> Select Region > Yes
> Select Keyboard Layout > Yes > Skip
> Click Domain Join Instead at the bottom left
> Enter Name user > Next
> Enter Password > Next > Confirm Password > Next
> Enter Security Questions > Next
> Turn off the privacy settings > Accept > Not Now
> Check IP address by Selecting Opening the Command Line (CMD) through the start menu
> Enter ipconfig in the CMD prompt

Change Configurations in DHCP through DC-1

Start DC-1 VM in VirtualBox
> Open Server Manager
> Select Tools
> Select DHCP
> Select IPv4 down arrow
> Select Server Options
> Right click Server Options
> Select Configure Options
> Check 003 Router
> Enter in IP address the DC-1 IP address 172.16.0.1 > Click Add > OK

Join CLIENT1 to Domain mydomain.com

> Select Client1 (Win 10) VM
> Select Settings
> Select Network to check the Network settings is set for internal network (if not, set it as internal network) > OK
> Start the VM > Log on
> Select Start Menu
> Settings > System > About
> Rename this PC (Advanced)
> Click Change
> Enter PC name as CLIENT1
> Select Member Of Domain
> Enter mydomain.com > OK

> Enter username and password of your admin account for DC-1
> Restart VM

Now, CLIENT1 has joined the mydomain.com on DC-1.

Things to Investigate Further

- Sync Microsoft Azure Active Directory to this on-premise set-up.
- To learn how to secure Active Directory, attack Active Directory with a hacking tool such as Bloodhound.