

Step 0: Introduction

In order to practice the Enterprise Content Management by using SharePoint, we need to install two virtual machines:

- ❖ A Domain Controller

The domain controller running on Windows Server 2012 R2. We will be calling the domain cfcode2016.com, This server will host Active Directory, DNS, and Certificate Authority. It will run on 2GB of RAM.

- ❖ A SharePoint Machine

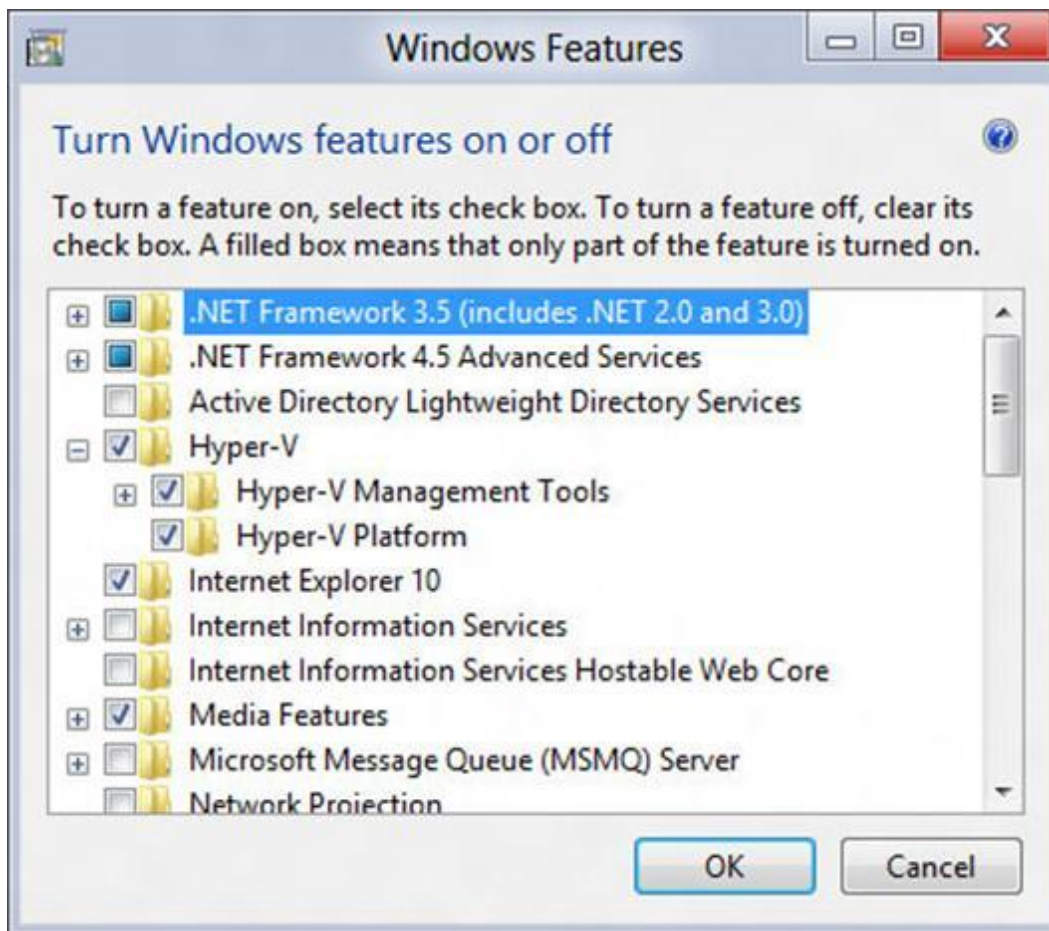
The SharePoint machine will be running using the SharePoint mini-role configuration which should only be used for development and testing. Never production. The plan is to configure SSL certificates, a development and intranet site using Host Named Site Collections (HNSC). Services that will be running on this machine will be Managed Metadata Service, User Profile, Search, Workflows, and Apps. I will be using SQL 2016. We will be installing Visual Studio 2015 directly onto the SharePoint server.

If you don't have MSDN, these products all have 180-day trial licenses available, and you could use them instead. <https://www.microsoft.com/en-GB/evalcenter/>

Step 1: Setting up and configuring Host Computer using Hyper V

- ❖ Turn on the Hyper V

To install Client Hyper-V, you use the well-hidden Windows Feature control panel. (Thanks to the wonders of Start Search in Windows 10, however, it's easily found if you know what you're looking for: Search for *windows features*, filter to Settings, and select *Turn Windows features on or off*.)



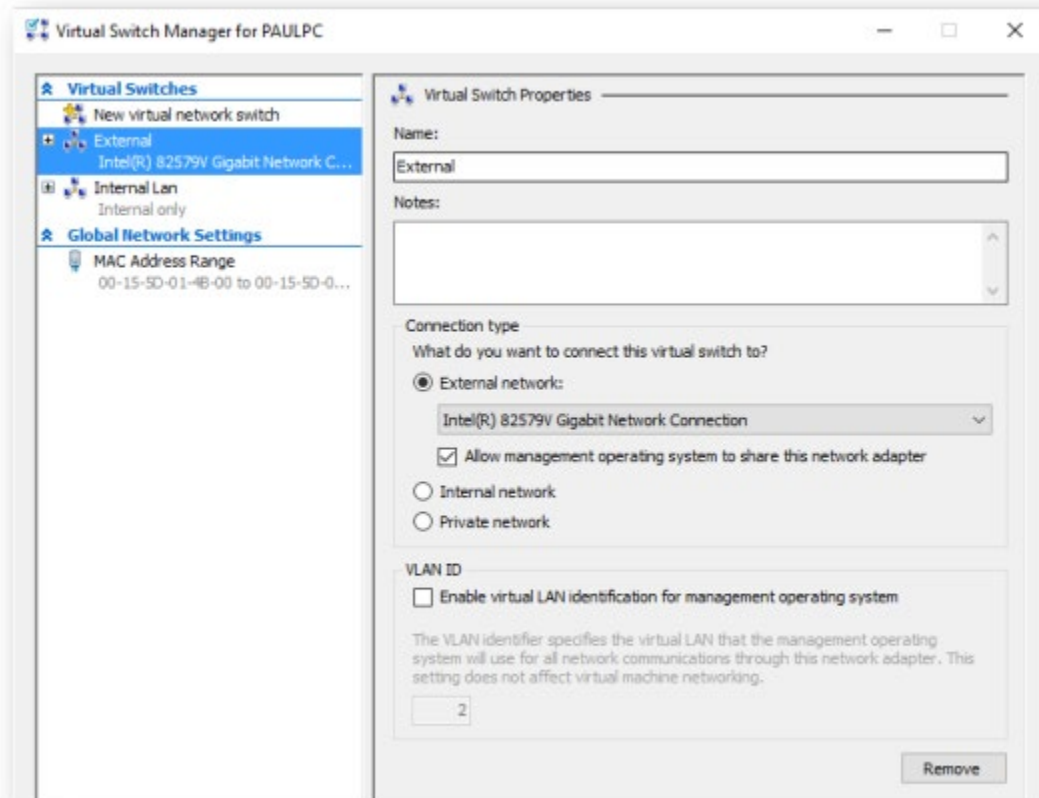
Expand the Hyper-V entry and you'll see two sub-entries, Hyper-V Management Tools and Hyper-V Platform. If the second is grayed out, you can't install Hyper-V. (That said, you may need to turn on virtualization features in your PC's BIOS or UEFI firmware first. So, check that before despairing.)

Select the features you want to install, click OK, and Client Hyper-V will be installed. After a reboot you are good to go.

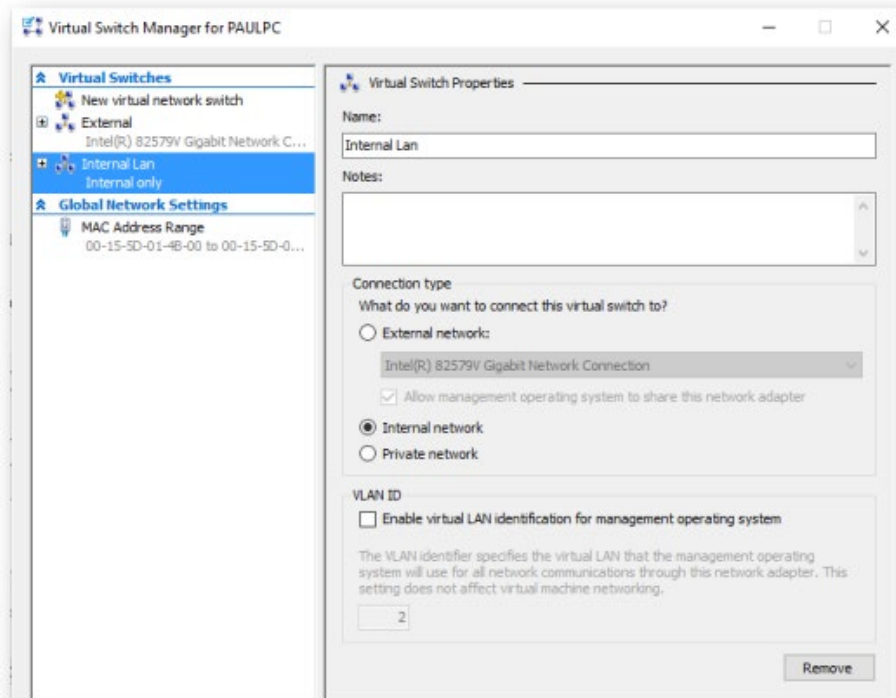
- ❖ Configuring the Network adapters

I will be creating just two Virtual Machines. The Domain Controller machine and the SQL & SharePoint machine. I want the Virtual Machines to have internet access, but to be on their own network IP range. The following instructions will show you my set up.

- Open Hyper V Manager, and on the right-hand side of the screen, click Virtual Switch Manager.
- Create an external adapter (if it is not already there) and point the network to your external network connection of your host machine.



- Then create an Internal adapter. Point that to the Internal network.

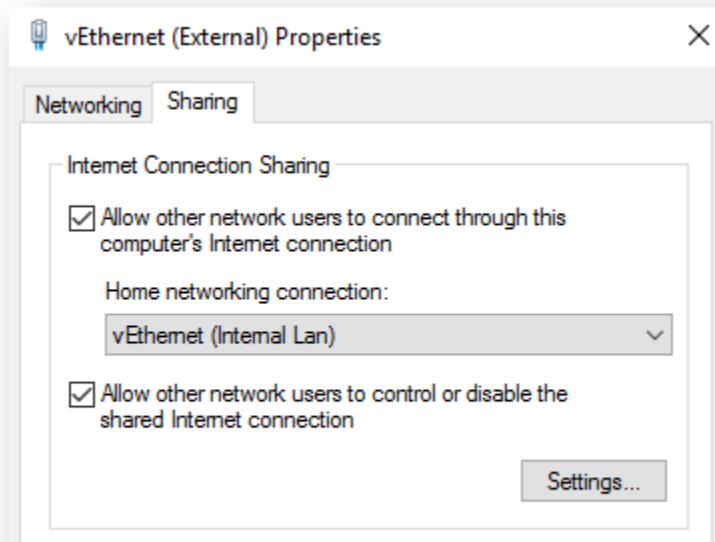


- Click OK. To save your Virtual Switches information.
- On your host machine, open up your Network Connections. In run command, type npca.cpl
- When the Network connections open, you should see your two newly created Network switches.



- Right Click on the External adapter and click Properties.
- Select the Sharing tab, and then tick to 'Allow other network users to connect through this computer's Internet connection.' Then select your Internal adapter

and click OK on the properties.



- The External Adapter should now say Shared

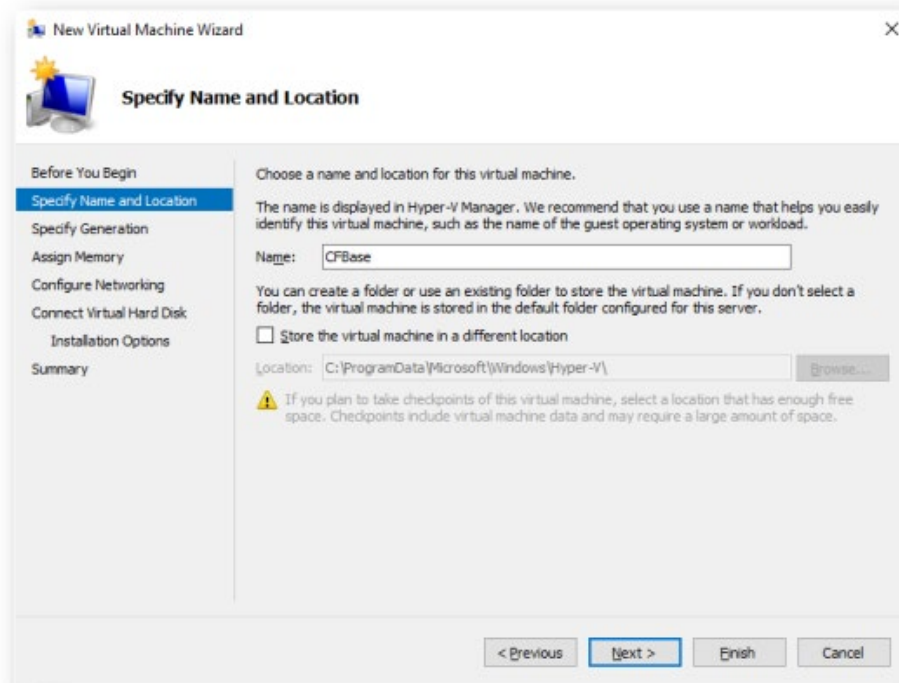


Now we are done.

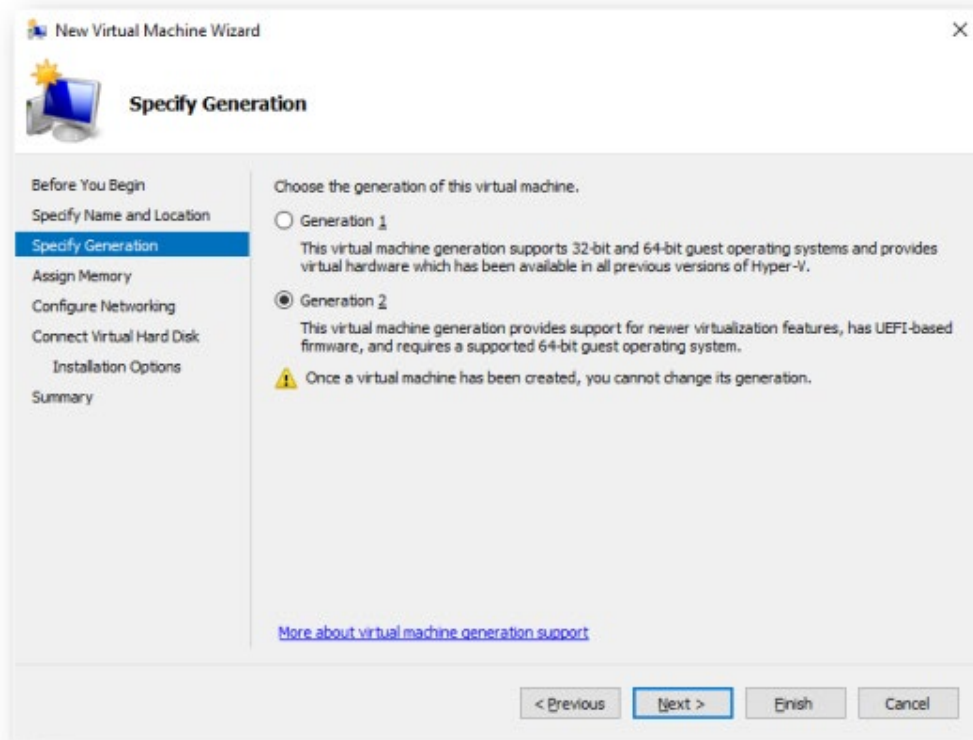
Step 2: Building a base disk to use for differencing disk.


Why am I using differencing disks? To build my dev environment, I need a minimum of 2 servers. An Active Directory, and a SQL & SharePoint server. You could possibly use 3 servers and separate the SQL and SharePoint out, or you might expand out SharePoint and not just use the stand-alone configuration. You might add other servers in the future (You will need a beefy machine for this.) By building a base disk it will save you time in the future, Windows, the basic set up of features, updates, programs will already be on the machine, and you just need to add the extra programs you require for the given server.

- ❖ What needs to go on here?
You need to put on this machine everything that you would probably want on all your virtual machines. Your list might be different to mine.
 - Windows Server 2012 R2 Standard Edition 64 bit.
 - Firefox
 - Chrome – with any extensions
 - Fiddler
- ❖ Creating your Virtual Machine.
 - Open up Hyper-V Manager
 - Under Actions, click on New and select Virtual Machine. Click Next.
 - Name your Virtual Machine, and your choice if you wish to store the virtual machine in a different location. (Preferably on a SSD drive)



- On the Specify Generation page, select Generation 2.



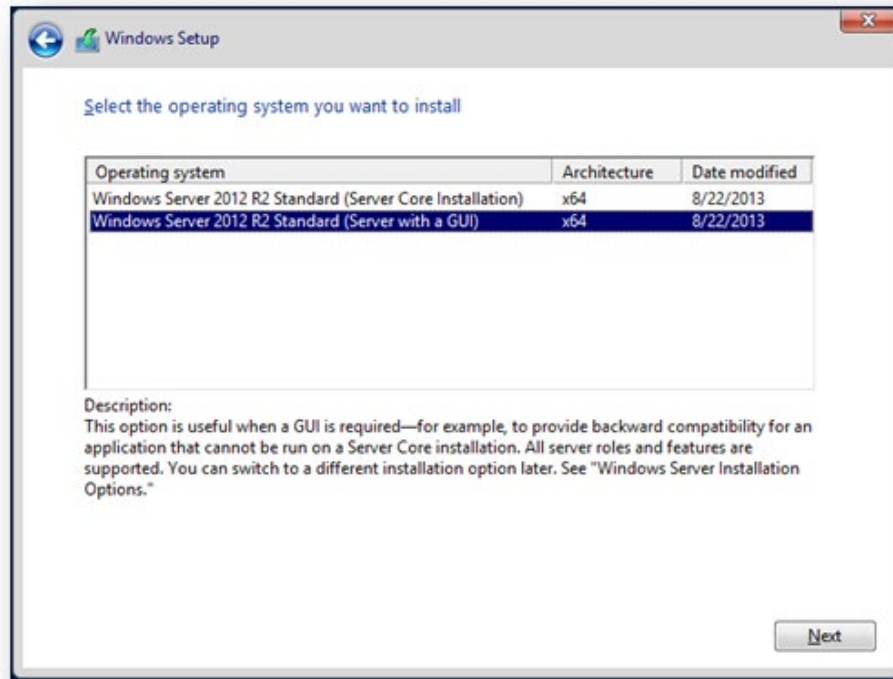
- Assign some memory, at this stage 6GB (6144mb) will be enough for installing everything. Click Next.
 - Configure the Network to point to the External connection and click Next.
 - Name your Virtual Hard Disk. Change the location if you wish, and I recommend creating a 400GB hard disk. (If you have room). We will split the disk inside the virtual machine into 100GB and 300GB for C and D drive. Click Next.
 - Install Options, you can select Install an Operating system from a Boot CD/DVD-ROM and in my case I have selected the Windows Server 2012 R2 with Update (x64) Image file.
- ❖ Install Windows 2012 R2 Server Standard Edition.
 Inside your Hyper V manager, you should now see your Virtual Machine. In my case it is called CFBBase. By right clicking on the machine, you can connect to it. A window will open. You can then click the Start Button. 

- Configure the language. Click Next

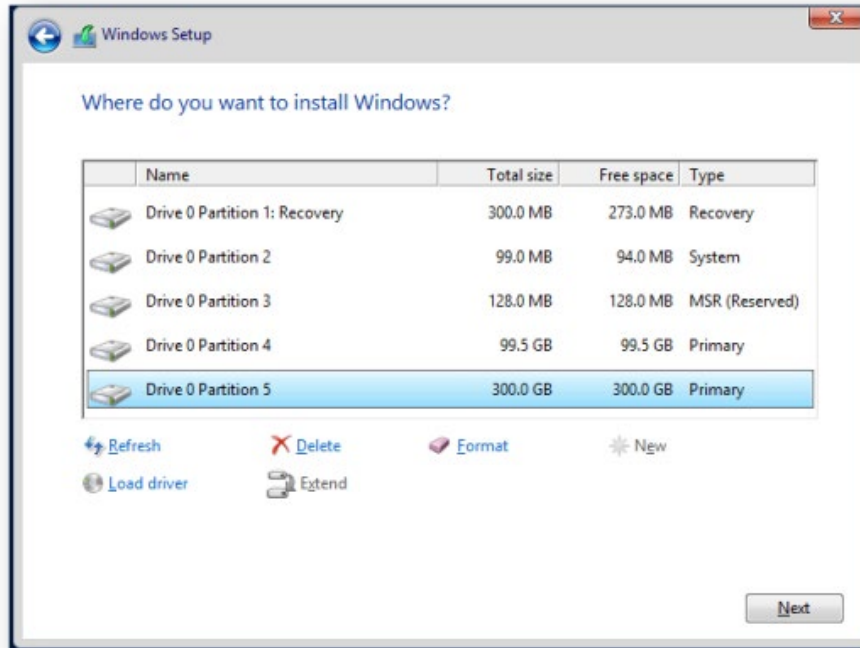


- Then Click Install Now.
- Insert your product key. Click Next.

- Select Windows Server 2012 R2 Standard (Server with a GUI) and then click Next.



- Tick I accept the license terms. Click Next.
- Select the Custom: Install Windows only (advanced) option.
- In the Where do you want to install Windows. Click New Create a new space of 102400MB. This will create a 100GB space. Accept the message that says Windows might create additional partitions for system files. You should now see Drive 0 Partition 1: Recovery, Drive 0 Partition 2, Drive 0 Partition 3, Drive 0 Partition 4 and Drive 0 Unallocated Space. Select the last one and click New, then Apply. This will set up your drive space. Select Drive 0 Partition 4 (100GB) then click Next, and Windows 2012 R2 will start installing on the 100GB drive.

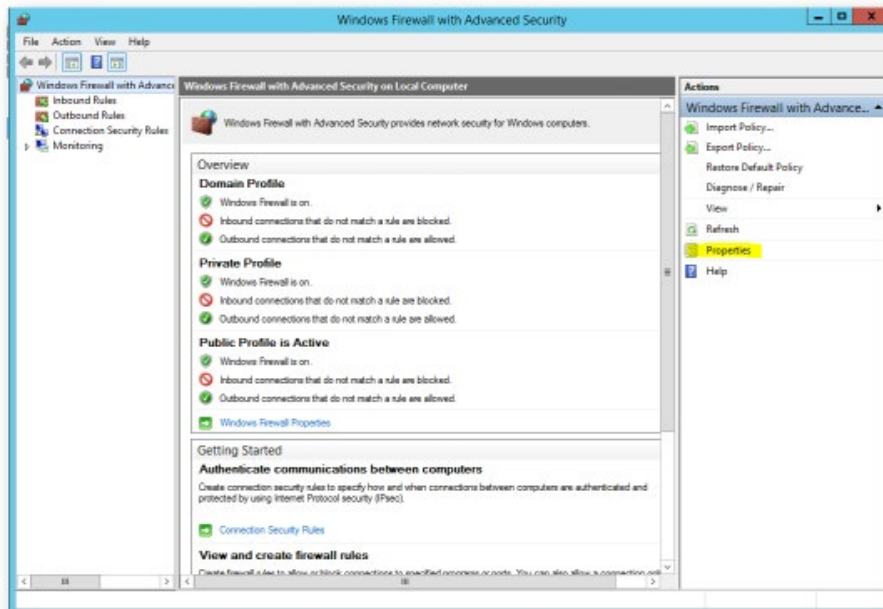


- Once it has finished installing itself, it will ask you for a password for the Administrator. I use Pa55w0rd. Click Finish.
- Now you can log in. To perform Ctrl + Alt + Del in a Hyper V Machine. Press Ctrl + Alt + End.
- ❖ Configuring Windows 2012 R2

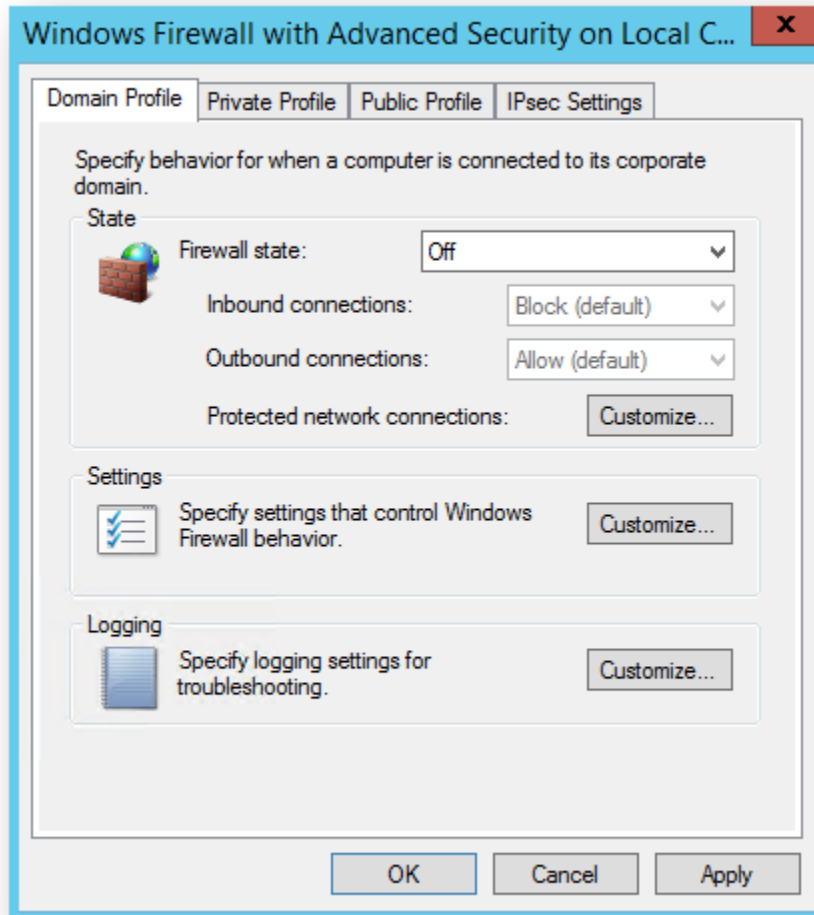
- Once you have logged back in again the Server Manager appears. On the left hand menu, click on Local Server. This will bring up all the properties for this machine.
- Disable the Windows Firewall, by clicking on the Windows Firewall Public: On link.



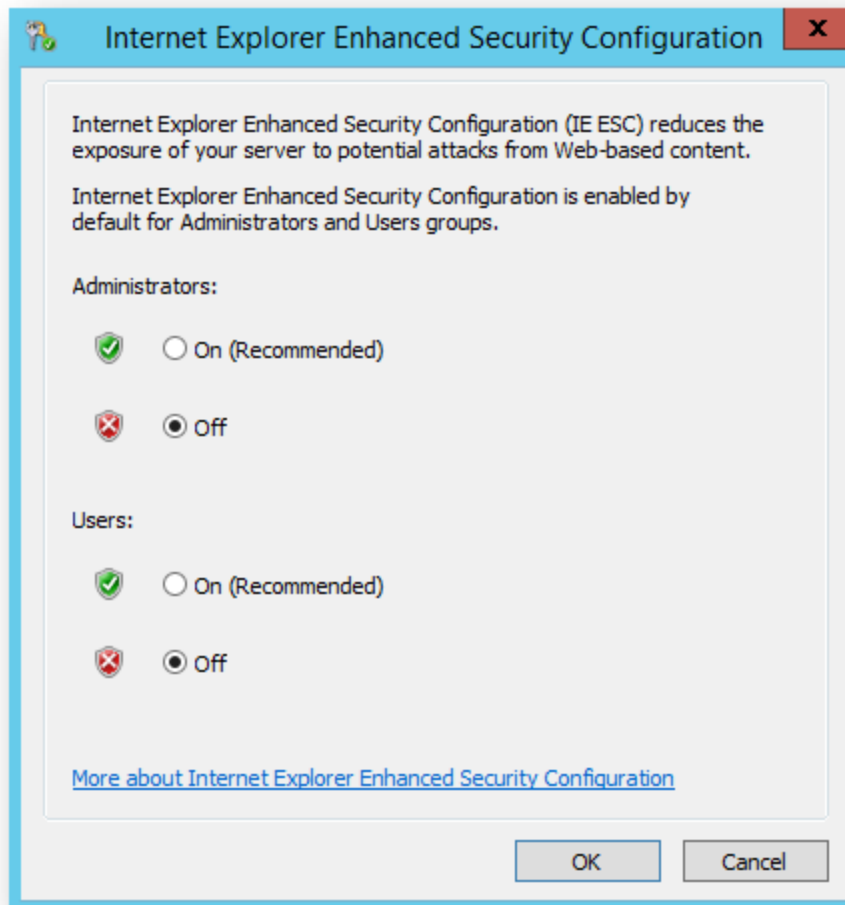
- Then click the Advanced Settings on the left of the screen.
- On the right panel of Windows Firewall with Advanced Security, click Properties.



- For each Tab Profile (Domain, Private, Public) switch the Firewall state to Off. Then Click OK.

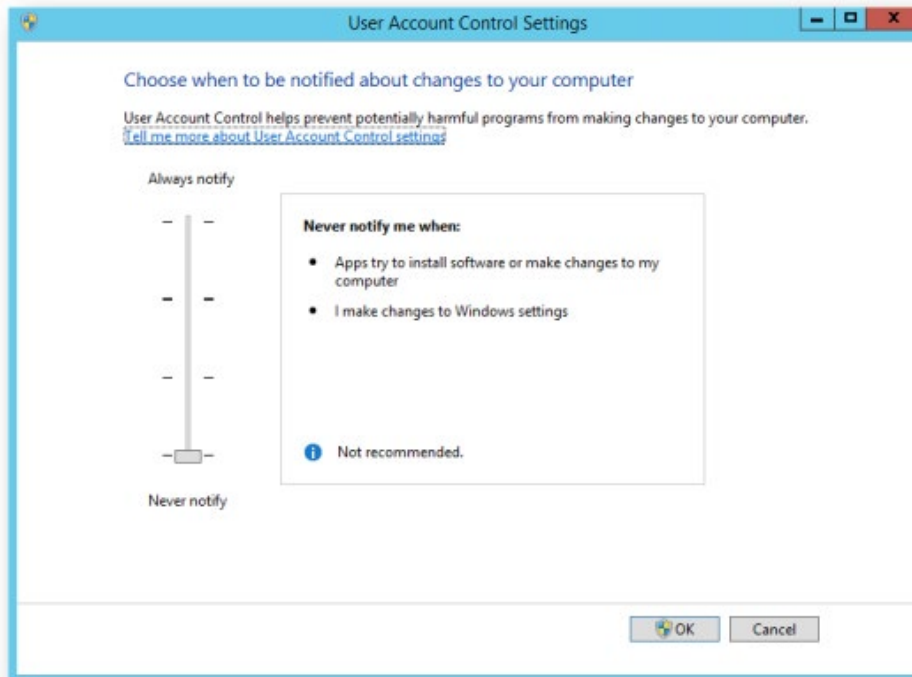


- Back on the Server Manager screen click the On link for IE Enhanced Security Configuration. Then turn this off for Administrators and Users. Click OK.

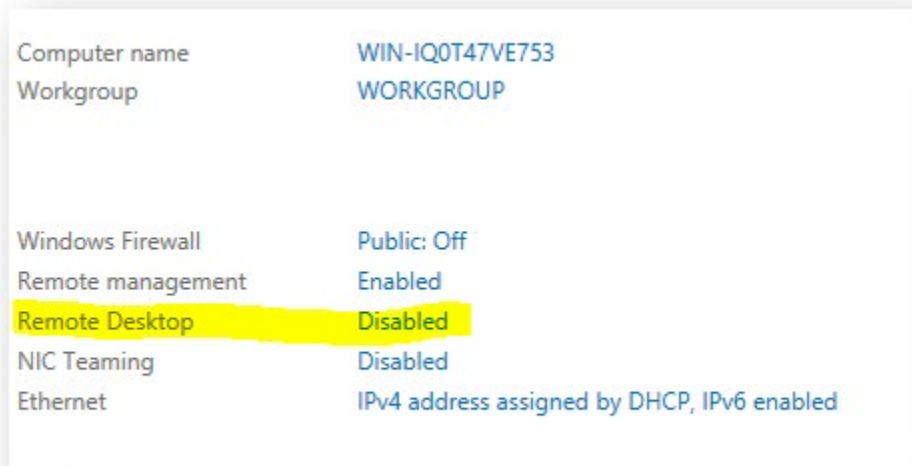


- Go back to the Start menu. Type UAC, and select settings from the right hand side. Click on Change User Account Control Settings.
- On the User Account Control Settings, move the slider down to the bottom. This will prevent the screen keep prompting you when an administrative task needs to

be made. Click OK.



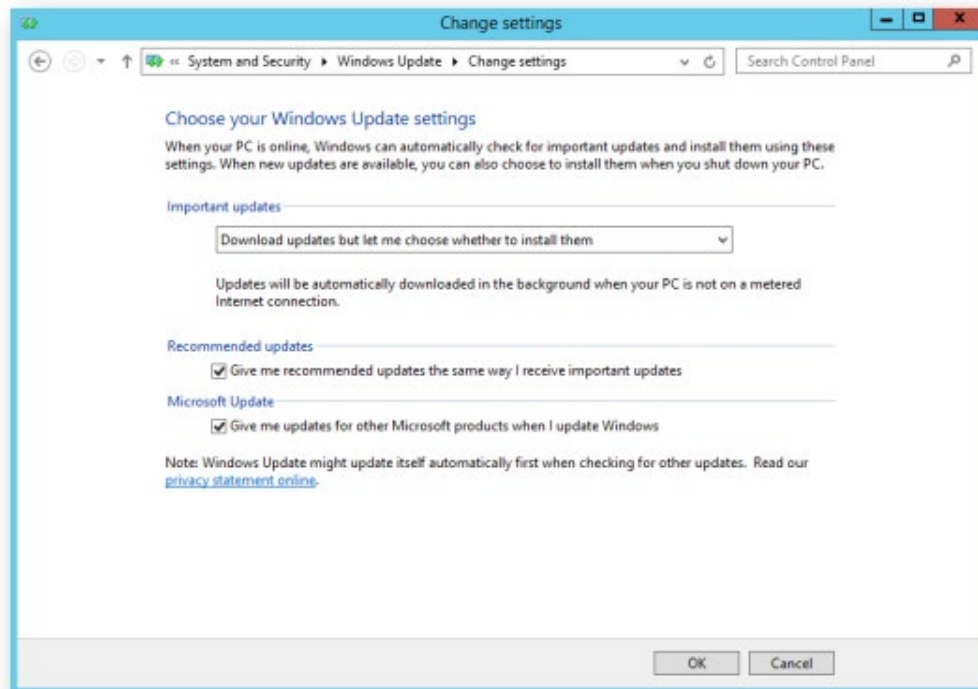
- Back in the Server Manager properties window for the server. Enable Remote Desktop. Click the Disabled link. Then select Allow remote connections to this computer. Click OK.



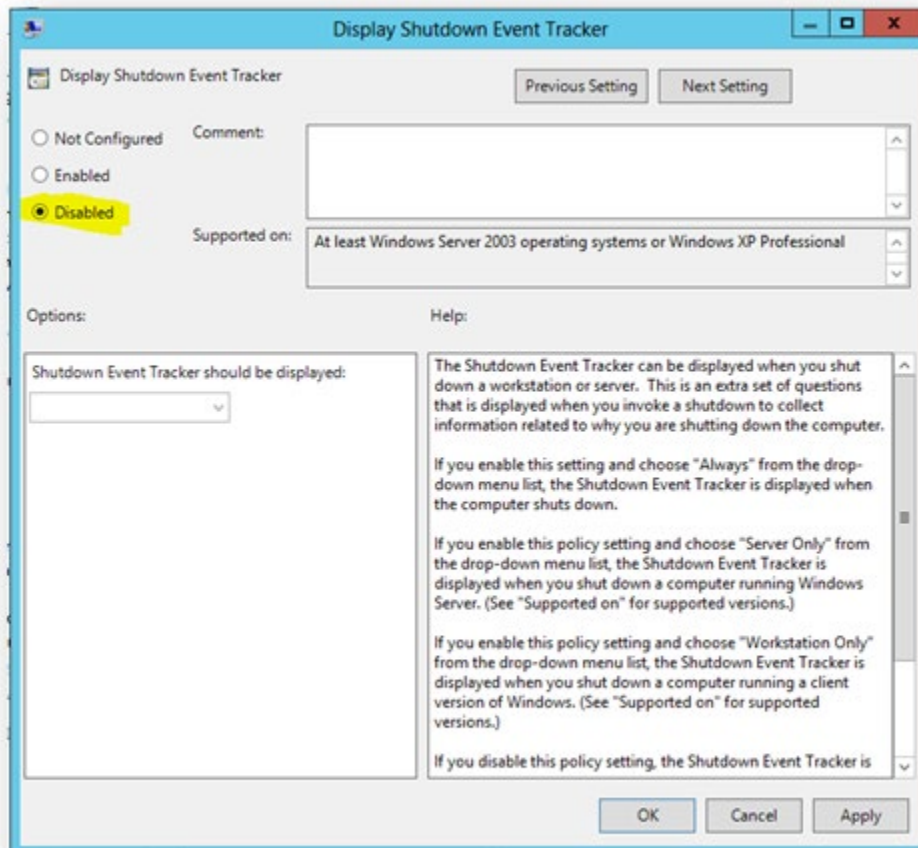
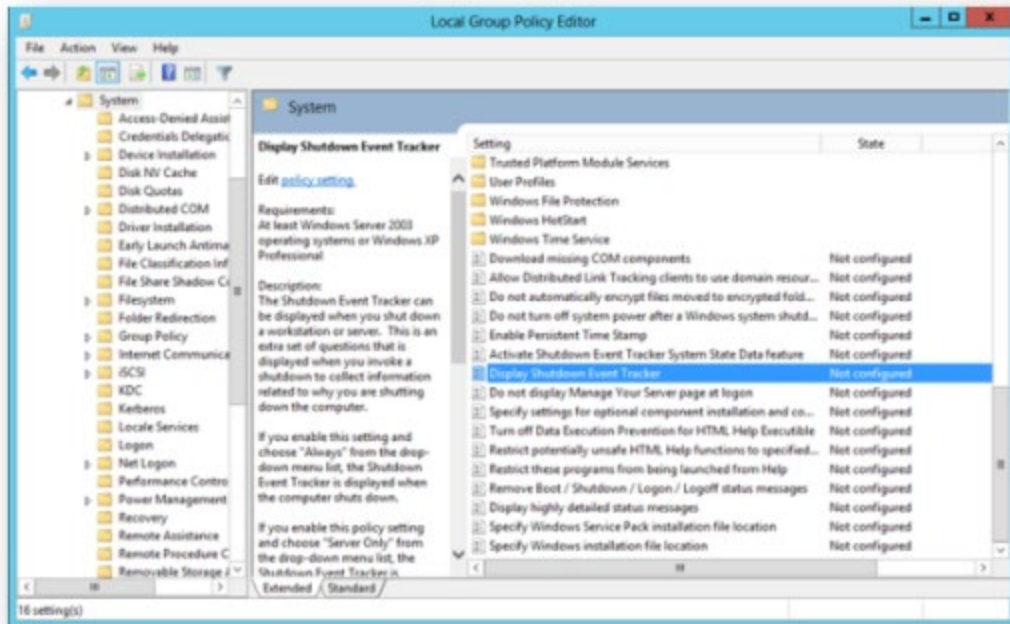
- Back in the Server Manager properties window for the server, Click on Windows Update Not Configured link. This will open the Windows Update Dialog.



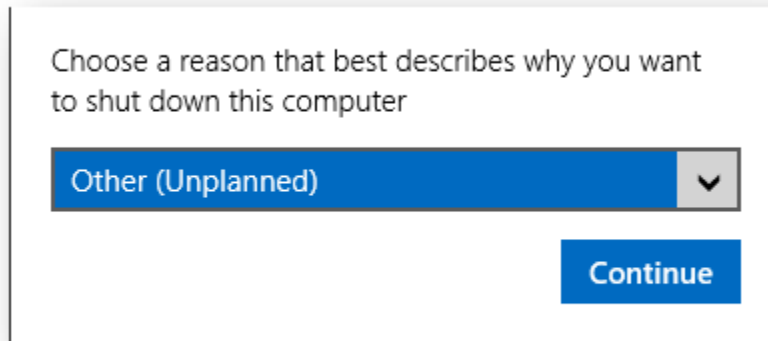
- Click Let me choose my settings. Then on Choose your Windows Update settings, I always have Download updates but let me choose whether to install them. And then I tick Recommended updates. Click OK.



- Your server will now check for updates. Install anything that is outstanding.
Note: You might have to repeat the check for Windows Update process a couple of times.
- ❖ Disable the Shutdown Event tracker
 - Open the start menu and type gpedit.msc. Click on the program to open it.
 - In Group Policy Editor, navigate to Computer Configuration\Administrative Templates\System, open the Display Shutdown Event Tracker policy, and set it to Disabled.



- Now when you shut down you shouldn't see the Shutdown tracker appear.



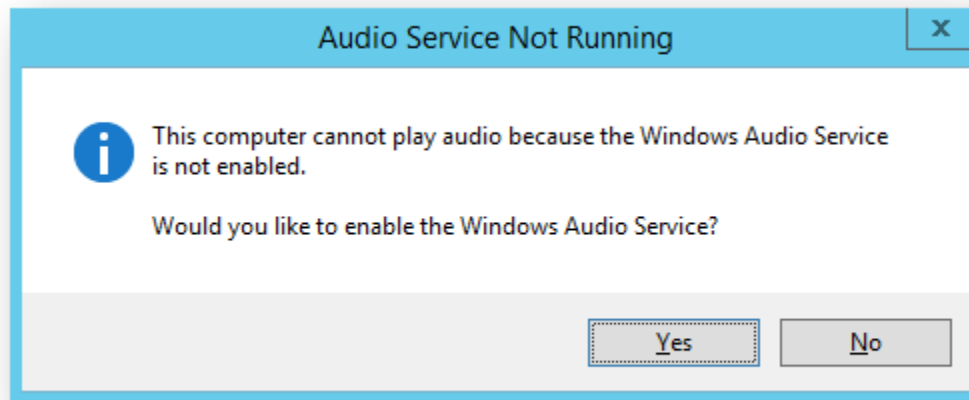
-
- ❖ Enabling the Desktop Experience



- Open up the Server Manager.
- On the right of the screen click Manage > Add Roles and Features
- Click Next.
- Ensure Role-based or Feature-based installation is selected. Click Next.
- On Select destination server click Next.
- On Select server roles click Next.
- On Select features. Expand User Interfaces and infrastructure (Installed) and tick Desktop Experience. Add the additional features that it requires. Click Next.
- Click Install.
- Restart the Server.
- ❖ Getting the Sound to work within your Virtual Machine.
With Hyper V in Windows 10, there is an enhanced session.



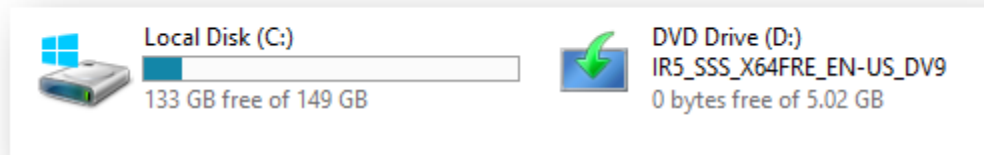
By running in enhanced mode, hovering over the speaker icon in the task bar, it will state that Audio Service isn't running. Right click it, and select sounds. A dialog will then pop up and ask if you want the audio service to be enabled. Click Yes.



The speaker icon will no longer have a red cross over it. And you should be able to hear sound through your VM if you enter the machine by using enhanced mode, or via a remote desktop connection.

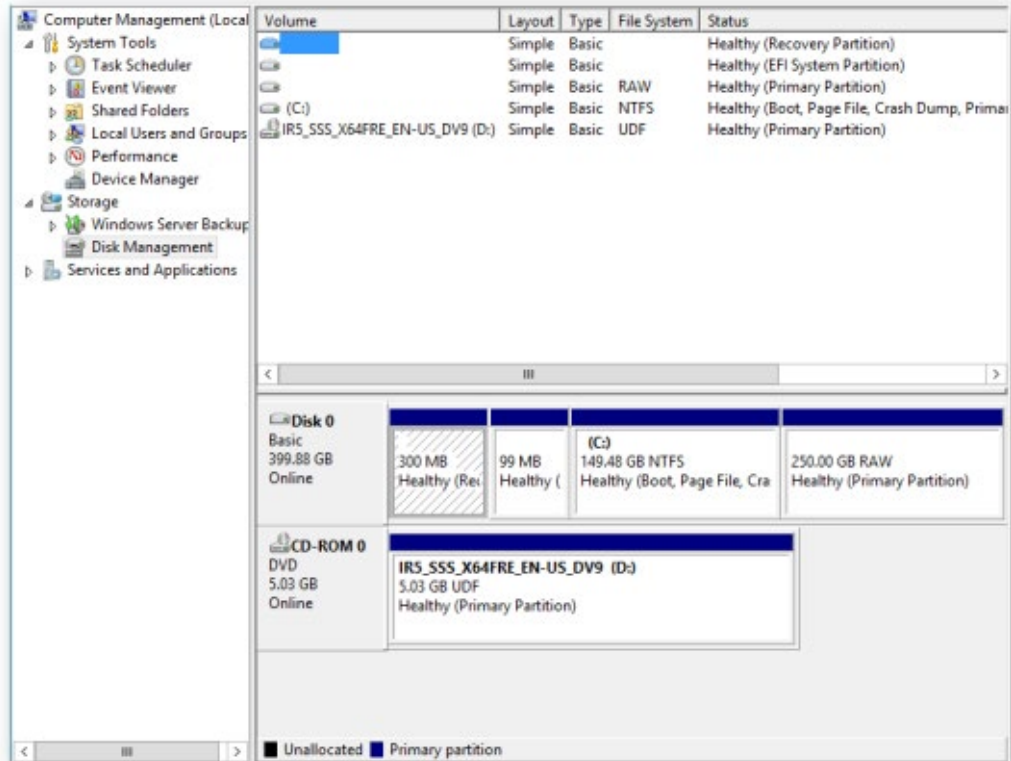
❖ Formatting the second drive.

If you take a look in explorer, you will only see a C:\ drive which should have 149GB. However we created a 400GB disk, and spilt it into 150GB and 250GB. We need to format the second disk.



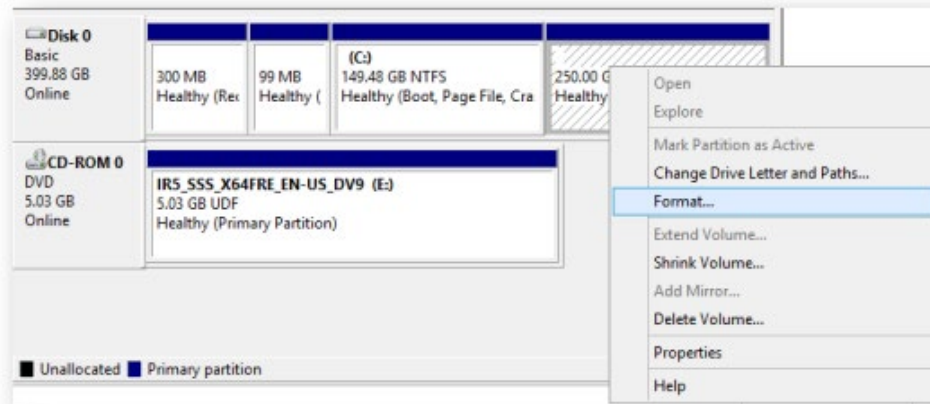
- In Server Manager, in the top right corner, select Tools > Computer Management.

- In the Computer Management window, in the left hand pane, under storage, select Disk Management

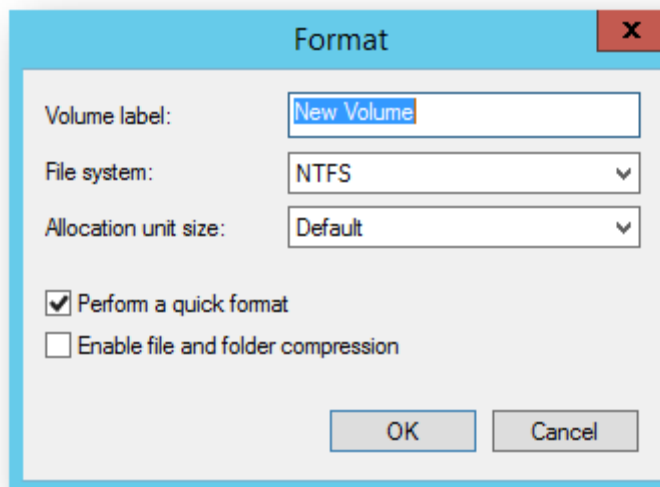


- First thing I will do, is change the CD-ROM drive from D: to E: just so I can have a C and D drive as hard disk.
- Right click CD-ROM 0 at the bottom of the screen. Select Change Drive Letter and Path.
- On the dialog, click the Change button.
- Assign the new drive letter as E. Click OK.
- Click Yes to the warning message.
- Now we will format the 250GB drive.

- A. At the bottom, on Disk 0 row, at the end you should see 250.00 GB RAW. Right click this and select Format

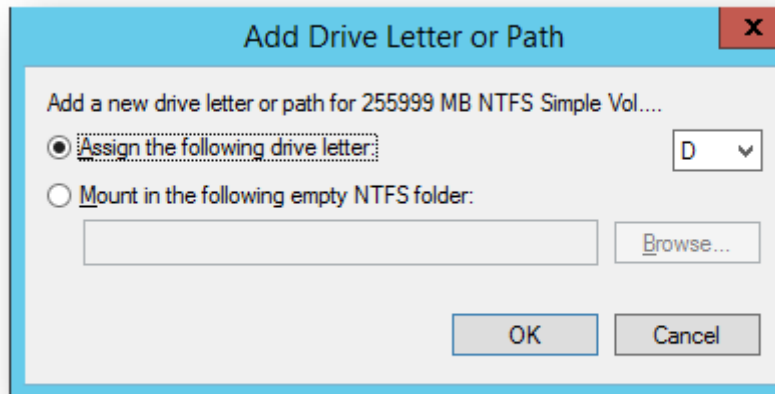


- B. Put a name in the Volume label if you wish. I'm going to delete mine, and then leave everything as it is. Click OK.

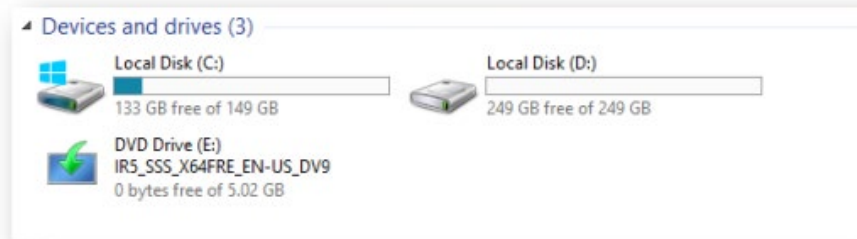


- C. Assuming you have clicked on the correct area, click OK to the Format dialog warning.
D. After the formatting has completed, right click on the area again, and this time, select Change Drive Letter and Paths.
E. On the dialog, click Add.

F. Ensure that D is assigned. Then click OK.



G. Your explorer window will now show a C, D and E drive.



❖ Extra Stuff to install.

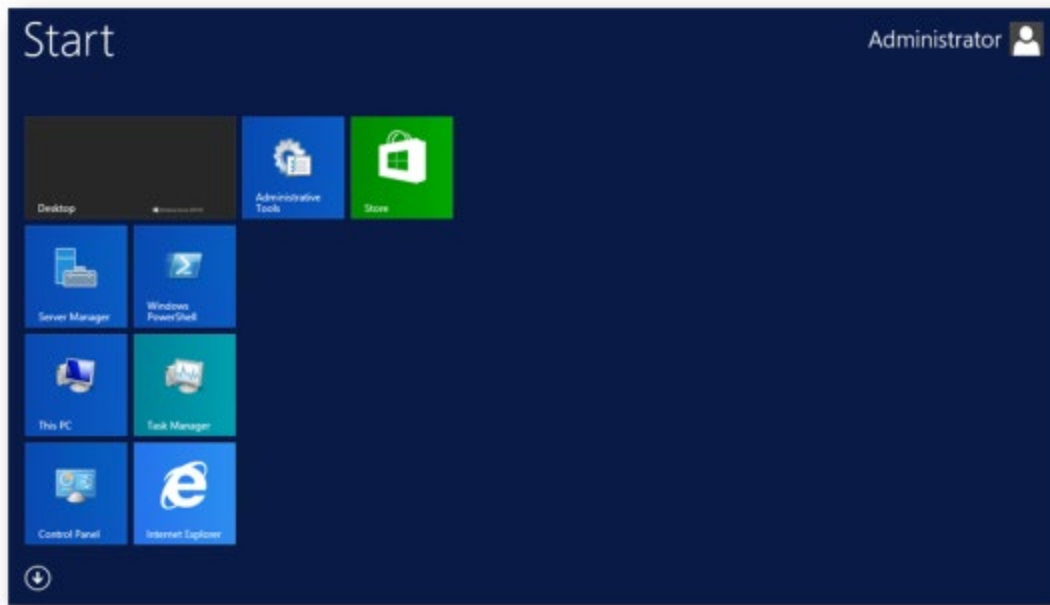
Now you can install any additional software that you want to be available on every virtual machine you build. Below is a list of items I'm installing; you might have more.

- [Chrome](#)
Useful extensions
- [Firefox](#)
[Firebug for FireFox](#)
- [Fiddler](#)
- NotePad++
Any extensions

❖ Setting up the menu

If you currently look at your menu you will notice that everything is everywhere. You can click and drag tiles and position them in more logical sections. By moving them between other sections you can create new sections.

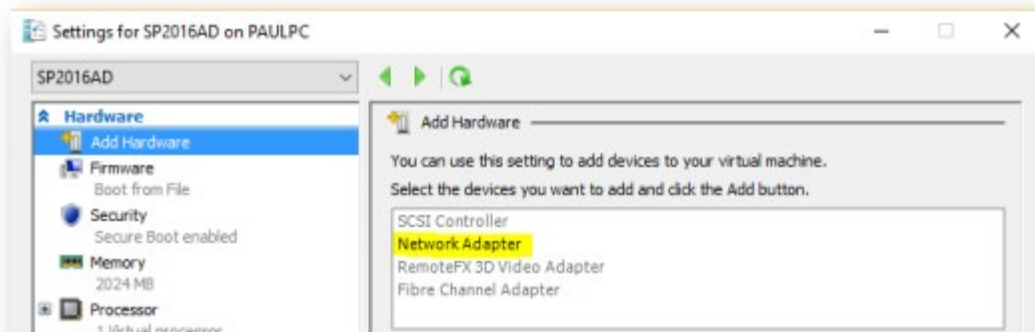
By clicking on the bottom right of the menu screen there is a minus icon. By clicking this, you will zoom out. Then by right clicking a section you can then name it.



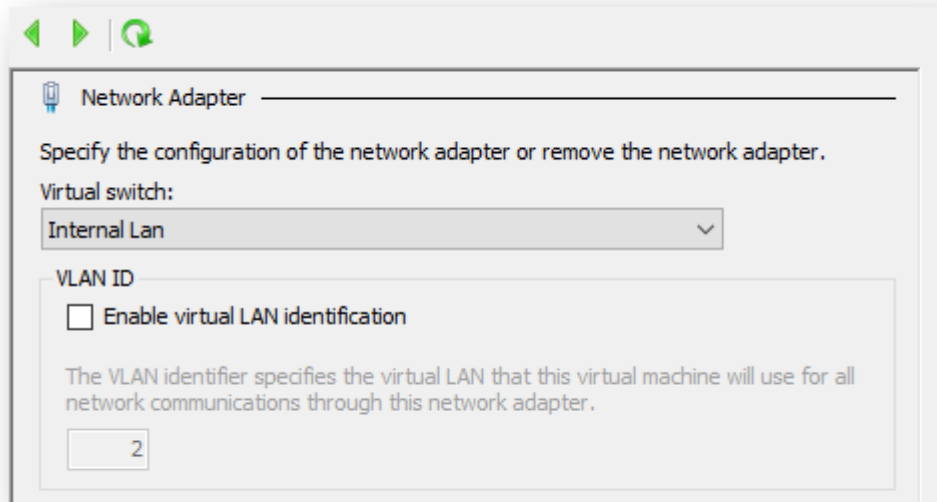
Step 3: Creating your Domain Controller Machine

- First remove the Base Virtual Machine you created in the previous posts from the Hyper V manager. Select the base virtual machine and on the right hand side, under the machine name, click Delete. Don't worry this just deletes the machine, but keeps the virtual machine disk. By deleting this from Hyper V there is no chance of accidentally starting it.
 - Next follow my old blog on Creating your hyper V windows Server 2012 machine from a differencing disk. Give about 2GB of memory to the machine, use generation 2, and call your differencing disk AD2012R2, and the same with the machine name.
 - When you start up your new Virtual Machine based on the base disk, you will be required to enter a valid Key Code for Windows Server 2012 R2 Standard Edition. Let the sysprep process complete, answer any installation questions required and then log in.
 - You now have Virtual Machine that we are going to use for a Domain Controller.
 - You should get Enhanced mode back after login in and rebooting once. I believe hyper V installing tools in the background the first time you login.
- ❖ Adding the Internal Network connection
You can do the following steps with the Virtual Machine switched on or off.

- On the Hyper-V manager screen, right click your newly created Virtual Machine that we are using for Active Directory, and click Settings.
- On the Settings page add a new Network Adapter and click Add



- Select Internal as the Virtual Switch and then click OK.



- ❖ Giving the Virtual Machine a Static External IP Address.
First thing you will need to do is Set the IP of the machine to Static address.
- Log on to the Virtual Machine, as administrator | Pa55w0rd.
- From Start Menu type CMD and open the command prompt.
- Type ipconfig /all

- Here you should see what the current dynamic IP address is for your virtual machine.

```

Administrator: Command Prompt
Microsoft Windows [Version 6.3.9600]
(c) 2013 Microsoft Corporation. All rights reserved.

C:\Users\Administrator>ipconfig /all

Windows IP Configuration

Host Name . . . . . : WIN-4ETSNP6NL0P
Primary Dns Suffix . . . . . :
Node Type . . . . . : Hybrid
IP Routing Enabled. . . . . : No
WINS Proxy Enabled. . . . . : No

Ethernet adapter Ethernet:

Connection-specific DNS Suffix . . :
Description . . . . . : Microsoft Hyper-U Network Adapter
Physical Address. . . . . : 00-15-5D-01-4B-0C
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . . : Yes
Link-local IPv6 Address . . . . . : fe80::ec26:3949:8729:b0f5%12(Preferred)
IPv4 Address. . . . . : 192.168.0.19(Preferred)
Subnet Mask . . . . . : 255.255.255.0
Lease Obtained. . . . . : 19 August 2016 16:59:38
Lease Expires . . . . . : 20 August 2016 16:59:38
Default Gateway . . . . . : 192.168.0.1
DHCP Server . . . . . : 192.168.0.1
DHCPv6 Iaid . . . . . : 301995357
DHCPv6 Client DUID. . . . . : 00-01-00-01-1F-48-E5-00-00-15-5D-01-4B-0C

DNS Servers . . . . . : 192.168.0.1
NetBIOS over Tcpip. . . . . : Enabled

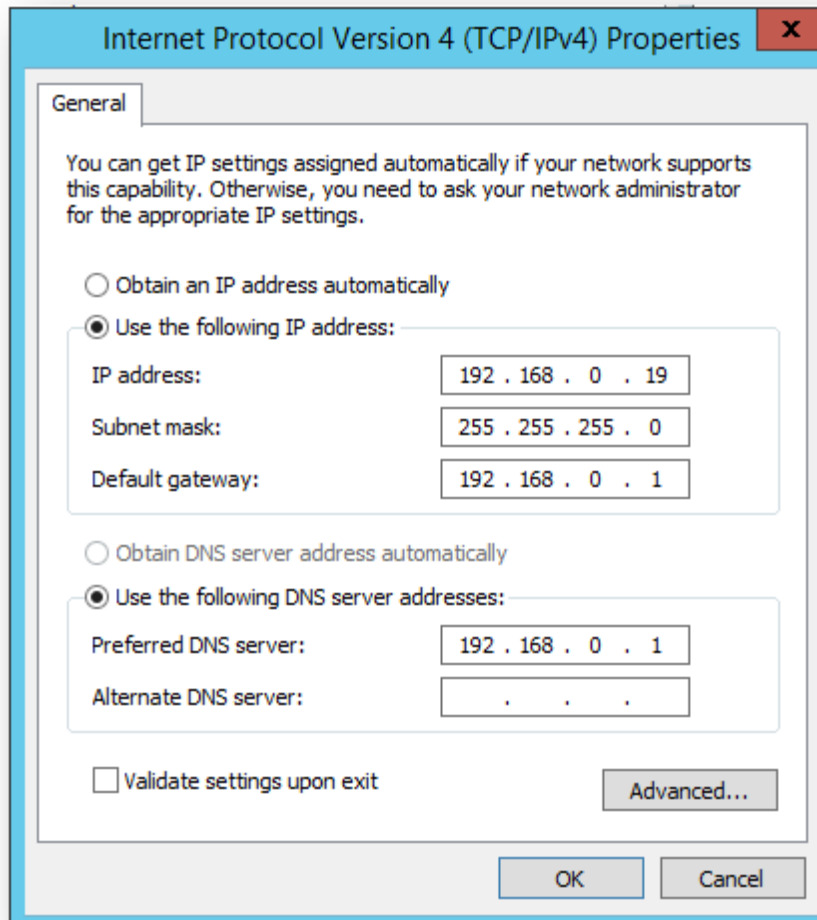
Tunnel adapter isatap.{60FE9646-2E4A-4C76-A6F0-B1492AF5F924}:

Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . . :
Description . . . . . : Microsoft ISATAP Adapter
Physical Address. . . . . : 00-00-00-00-00-00-E0
DHCP Enabled. . . . . : No

```

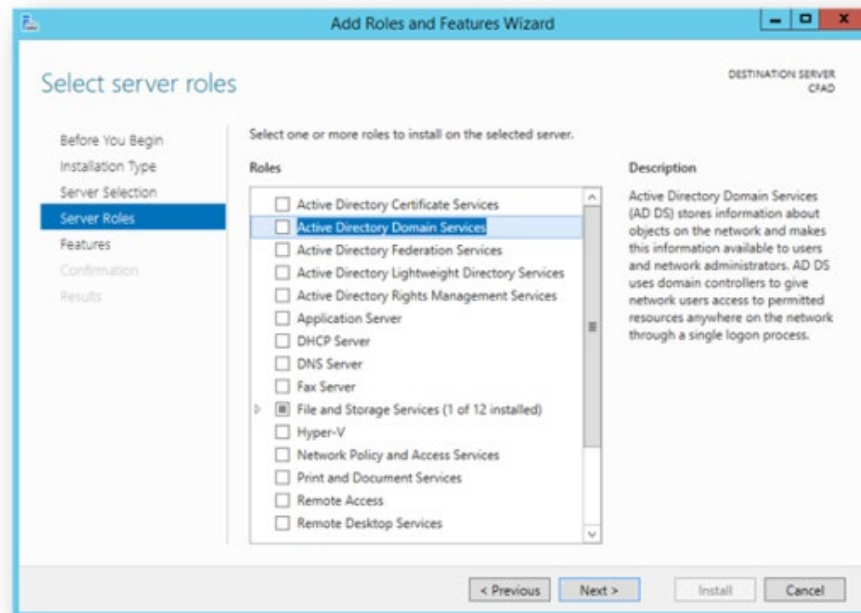
- Back in the start menu, type View Network Connections and under Settings you should see a link.
- Right click your network External adapter and click Properties.
- In the properties windows, select Internet Protocol Version 4 (TCP/IPv4) and then click the Properties button.

- Update the properties form to match your current machine configuration.

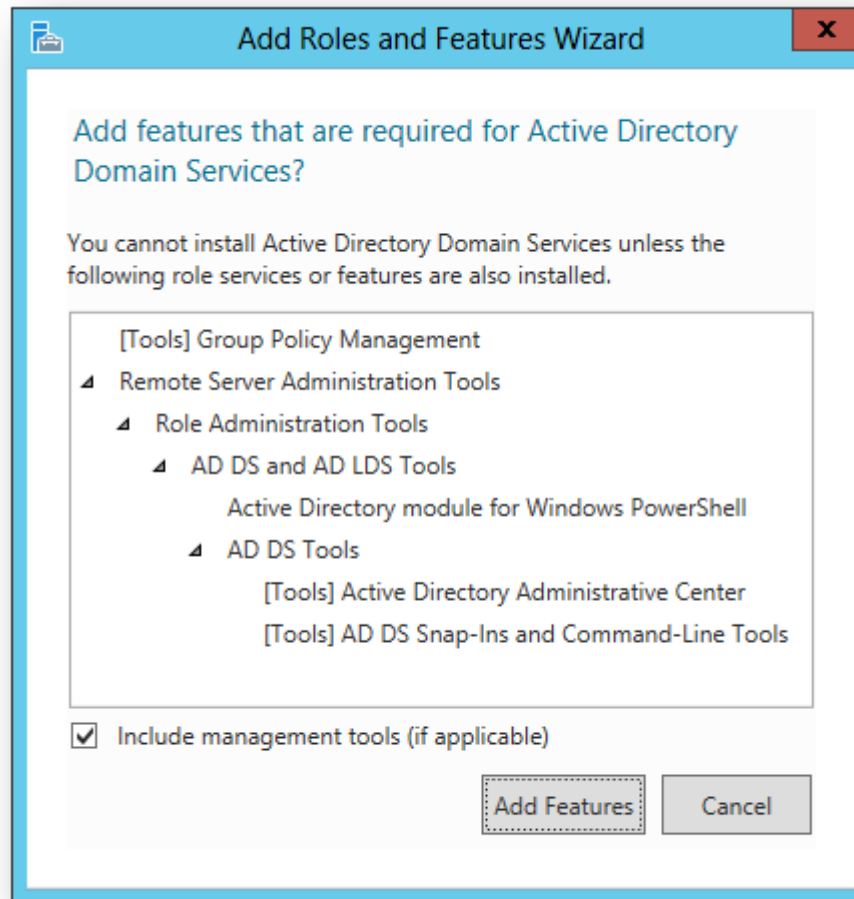


- Click OK. Click Close. After a moment your adapter will reset itself and you should have internet access again.
- ❖ Giving the Virtual Machine a Static Internal IP Address
 - In the start menu, type View Network Connections and under Settings you should see a link.
 - Right click your network internal adapter and click Properties.
 - In the properties windows, select Internet Protocol Version 4 (TCP/IPv4) and then click the Properties button.
 - Update the properties form to have the following information:
 - IP Address: 192.168.137.100
 - Subnet Mask: 255.255.255.0
 - Default gateway: 192.168.137.1
 - Preferred DNS Server: 192.168.137.100
- ❖ Configure the Host internal IP settings.
 - Back on your Host machine. Open the run command and type ncpa.cpl
 - Right click your Internal adapter, and click properties.

- In the properties windows, select Internet Protocol Version 4 (TCP/IPv4) and then click the Properties button.
- Update the properties form to have the following information:
 - IP Address: 192.168.137.1
 - Subnet Mask: 255.255.255.0
 - Default gateway: 192.168.137.1
 - Preferred DNS Server: 192.168.137.100
- ❖ Change the name of the Machine.
 - From the Server Manager screen. Click on Local Server.
 - Where it says Computer Name, click the link.
 - This will open the System Properties dialog box.
 - Click on the Change button.
 - Enter the name of the server. I have called mine 'CFAD'
 - Click OK.
 - Click OK and reboot when asked.
- ❖ Setting up the Domain Controller.
 - Login to the CFAD virtual machine using administrator | Pa55w0rd
 - On the Server Manager > Dashboard, click (2) Add roles and features
 - On the Add Roles and Feature Wizard you will be present with Before you begin. Click Next
 - On Installation Type select Role-Based or Feature-based installation
 - On Select destination server accept the default of Select a Server from the server pool with CFAD selected. Click Next
 - On the Server Roles, select "Active Directory Domain Services"

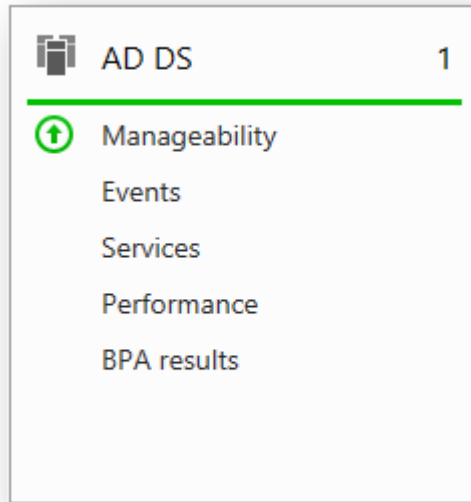


- Accept the Additional features required, by clicking Add Features.

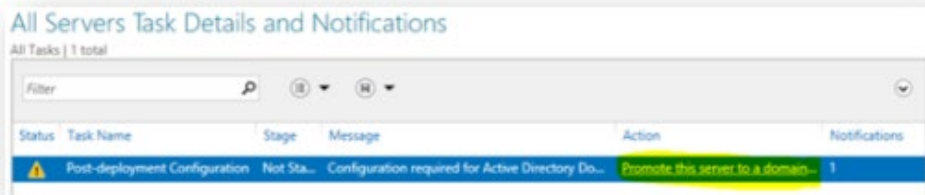


- Keep press Next until you reach the Confirmation screen. Then click Install.
Once it is installed click Close on the Wizard page.
- Back on the Server Manager Dashboard you will see the item AD DS added to the Roles and Server Groups. Click on the title of AD DS. Note it will say at the top of the screen Configuration required for Active Directory Domain Services at

CFAD. At the far right of this message click More...



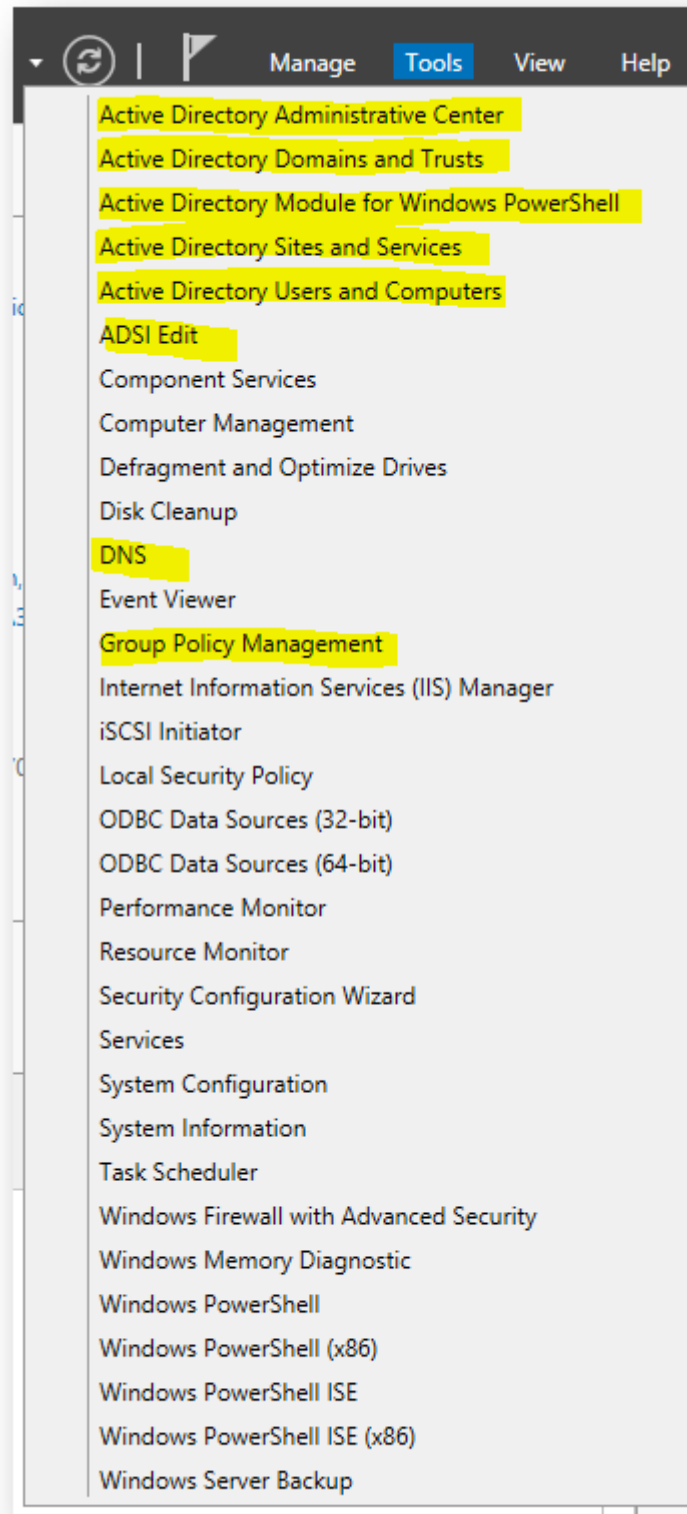
- The more link will bring up the All Servers Task Detail dialog. It will show an action of Promote this server to a domain. Click on that link.

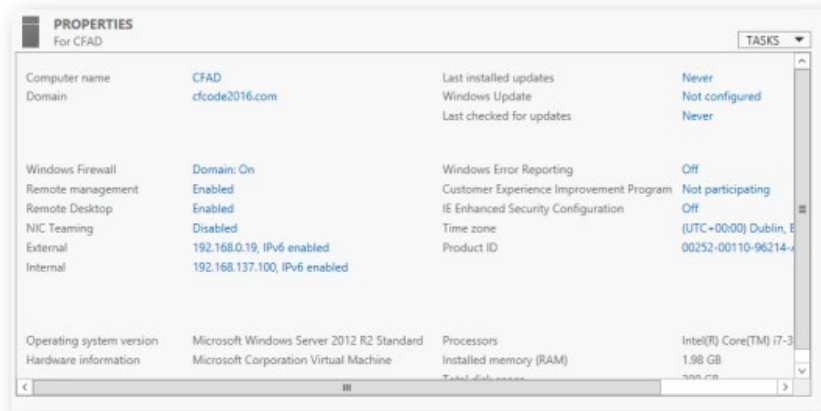


- On the Deployment Configuration screen select Add a New Forest.
 - I named my root domain cfcode2016.com. Click Next.
 - The next screen seems to processes for some time. I thought the screen was locked/froze but after a minute or so it was fine.
 - Give a password of Pa55w0rd to the Directory Services Restore Mode (DSRM) password. Click Next
 - Ignore the DNS Options warning. Click Next.
 - It then check the NetBIOS domain name. (This too takes a little time to show.) Click Next.
 - Next it will specify the Path locations of the AD DS database, log files, and SYSVOL. Accept the defaults and click Next.
 - The next page allows you to review your selection, and export to a Windows PowerShell script if you wish to automate additional installations. Click Next.
 - Before the actual install of AD, all prerequisites are checked. If all prerequisite checks are passed then click install. You can ignore warnings.
 - The machine will restart automatically after the promotion of the server to a DC has finished.

- Once the server has rebooted and you have log on to it, if you click on Server Manager | Tools, you will notice that the following items have been installed:
 - Active Directory Administrative Center
 - Active Directory Domains and Trust
 - Active Directory Module for Windows PowerShell
 - Active Directory Sites and Services
 - Active Directory Users and Computers
 - ADSI Edit
 - DNS

- Group Policy Management



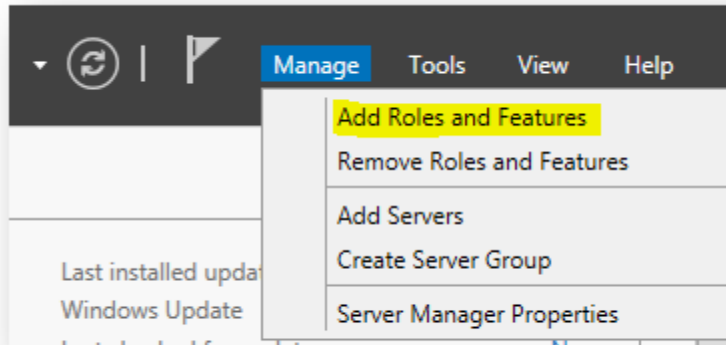


- Now is a good time to shut down the machine and perform a checkpoint in hyper V manager. That way if you don't get something right in the next post, you can always revert back your machine back to the end of this post. (Wish I followed my own advice sometimes).

Step 4: Installing Certificate Authority

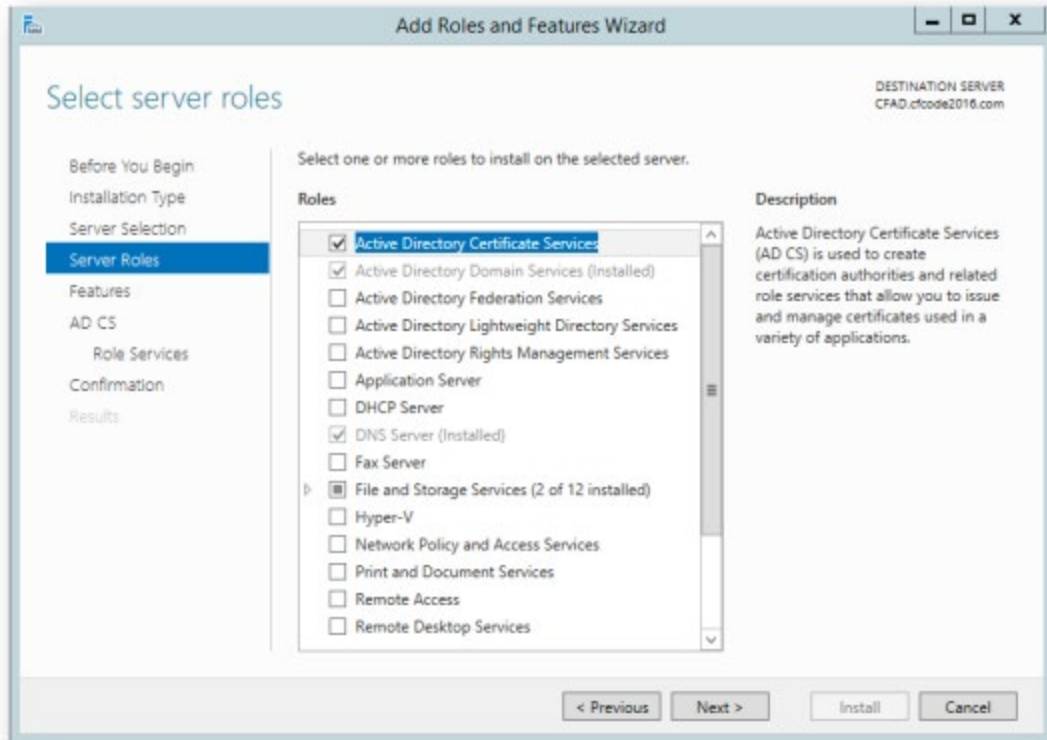
To allow our SharePoint sites to use SSL, these certificates come from a trusted certificate authority. This is what we are going to create

- On your domain controller, open up Server Manager
- On the right, click Manage > Add Roles and Features



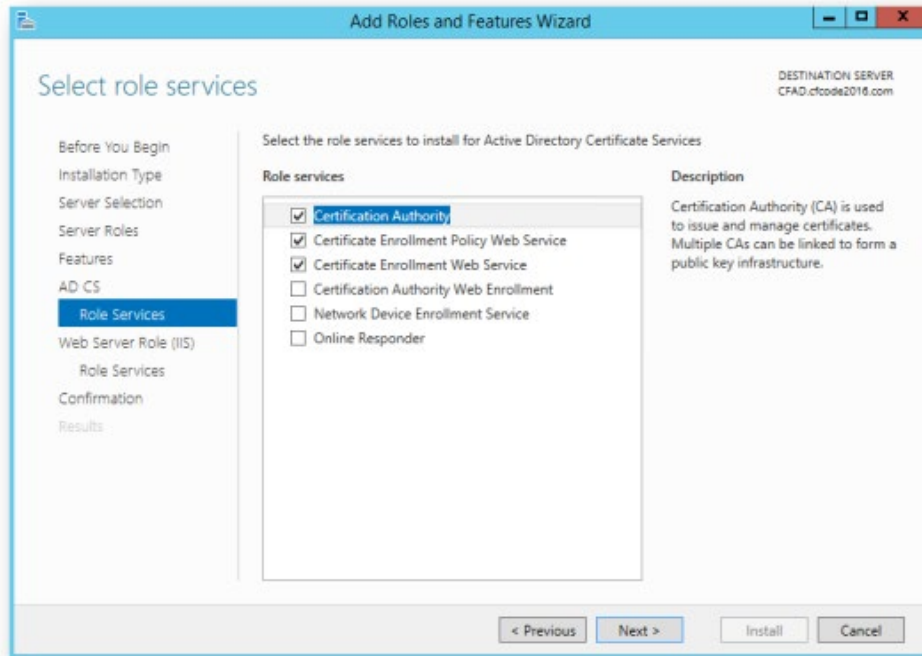
- Click Next
- On Select installation type ensure that Role-based or feature based installation is selected. Click Next
- On Select destination server screen, keep default choice of your domain controller, and click Next.

- Select Active Directory Certificate Services and click Add Features when dialog pops up. Click Next.

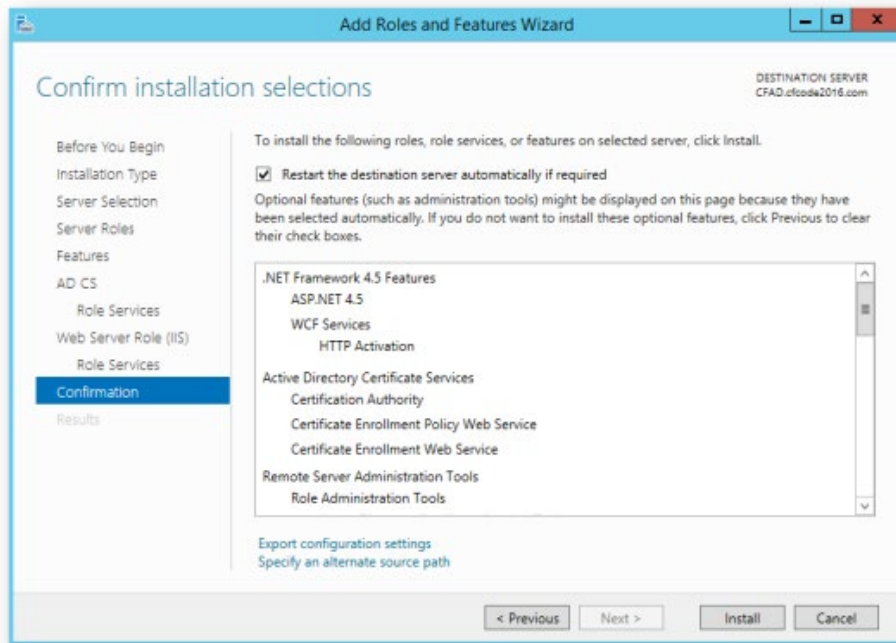


- On Select features click Next.
- On Active Directory Certificate Services screen, it informs you how you cannot change the name or domain settings of this computer. Click Next.
- On Select role services, select the following
 - Certification Authority
 - Certificate Enrollment Policy Web Service
 - Certificate Enrollment Web Service

- Click Add Features when prompted.

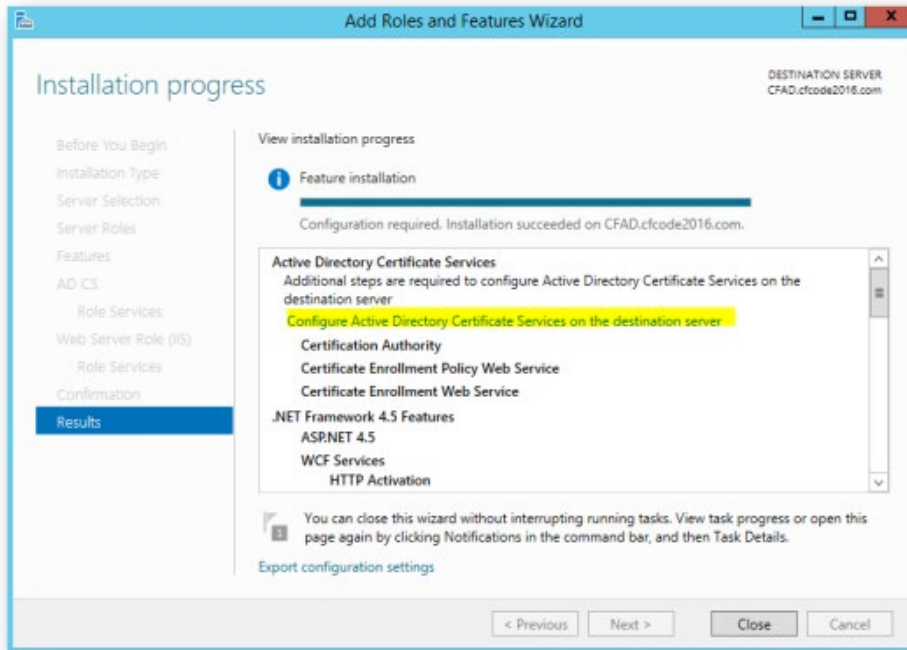


- On Web Server Role (IIS) click Next.
- On the Select role services click Next
- Tick the Restart the destination server automatically if required, say yes to the dialog prompt. Then click Install.

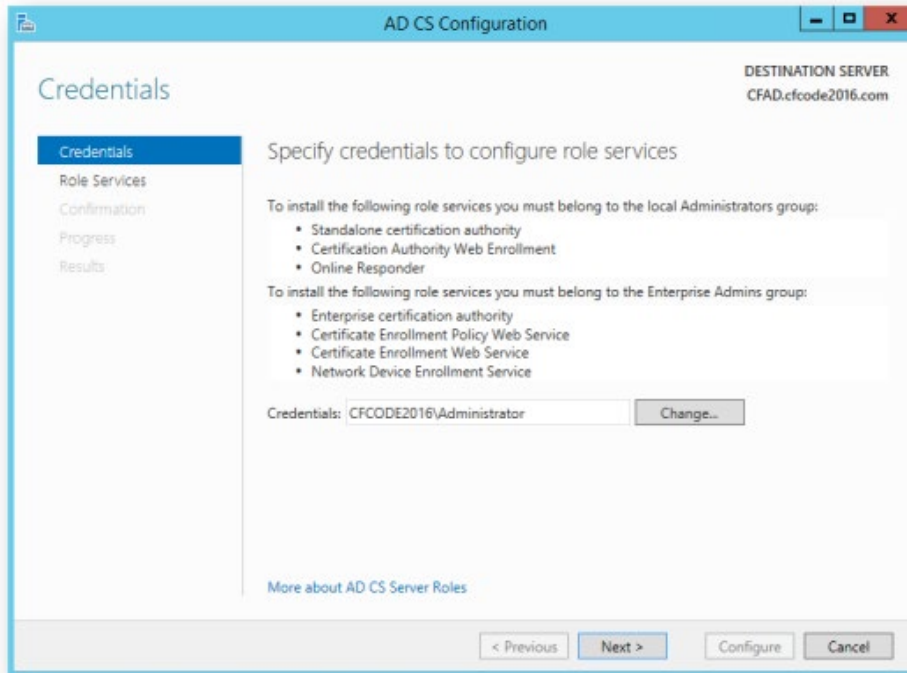


- Once the installation completes, you need to configure the Certification Services, click the link [Configure Active Directory Certificate Services](#) on the destination

server

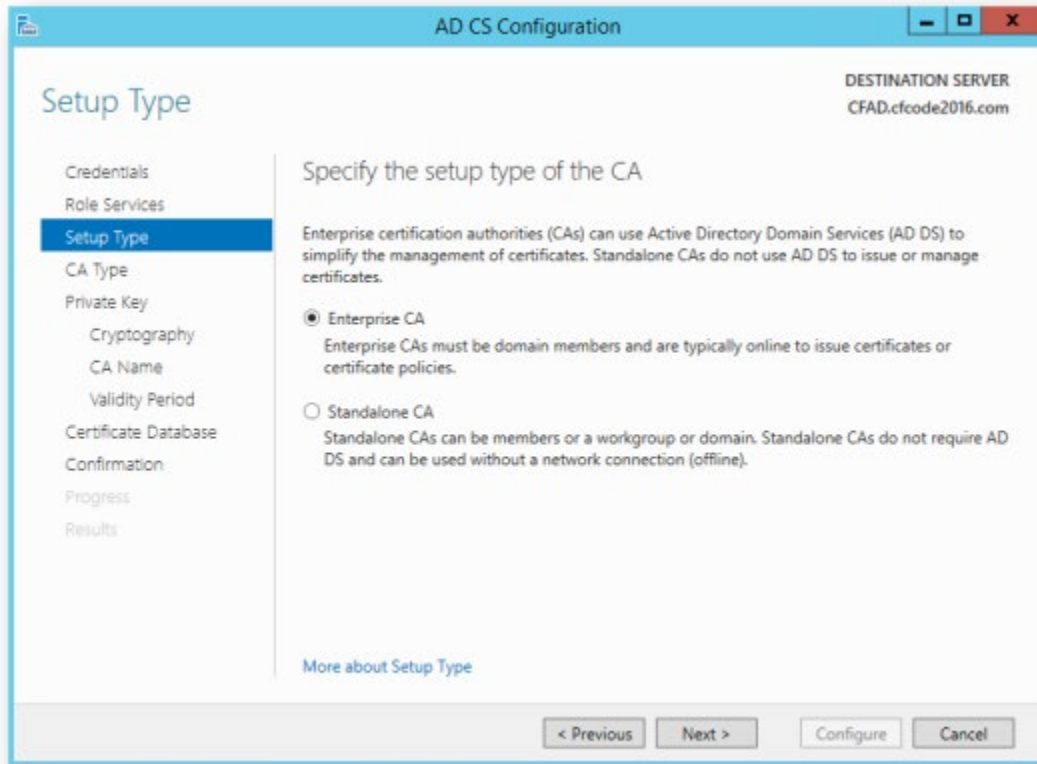


- On the Credentials screen, ensure you are using domain admin account. Click Next

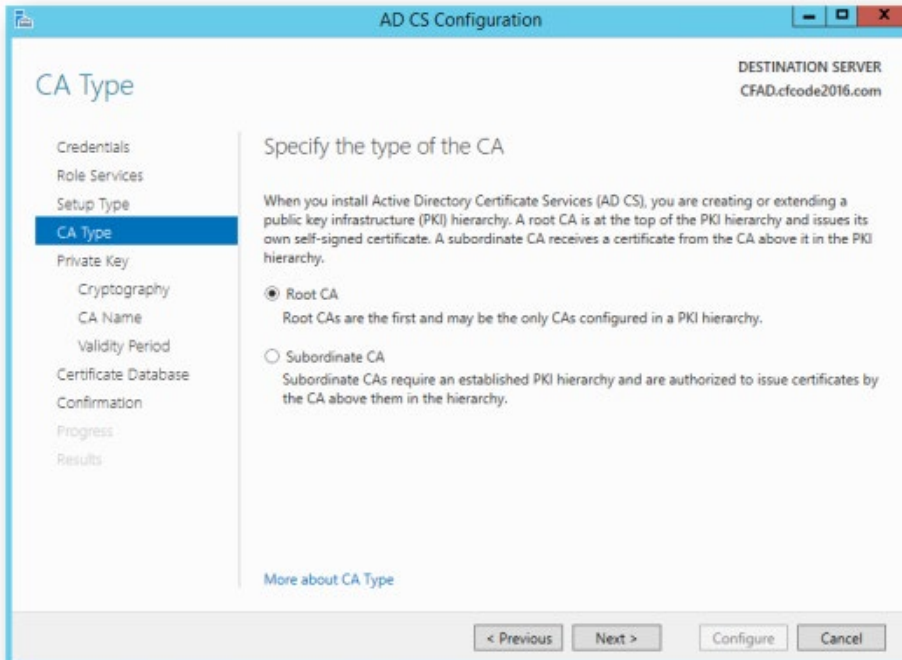


- On Role Services tick Certification Authority, then click Next

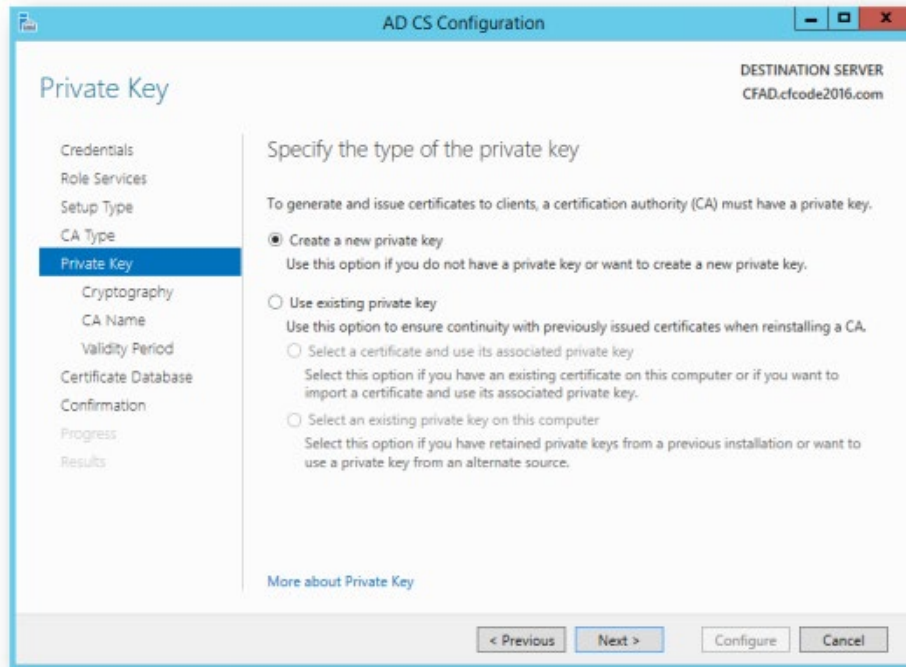
- On Setup Type, leave the default of Enterprise CA, click Next



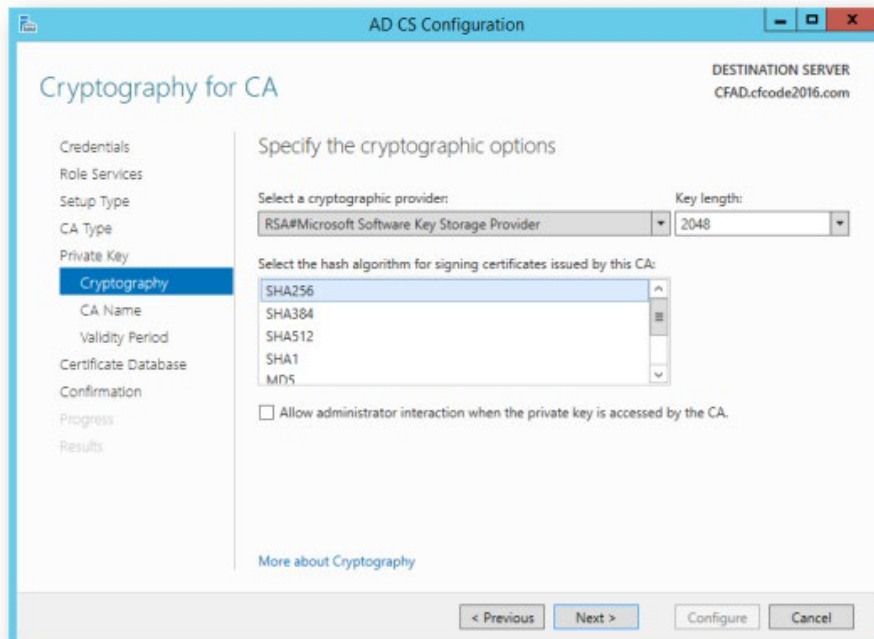
- Since this is the first CA in the domain, on CA Type leave the default of Root CA. Click Next



- On Private Key leave it as Create a new private key and click Next



- On Cryptography for CA select SHA256. Click Next



- On CA Name, for development environment, I recommend to rename it to something simple like MY-CA or you can leave as is (You'll need to remember this much later).

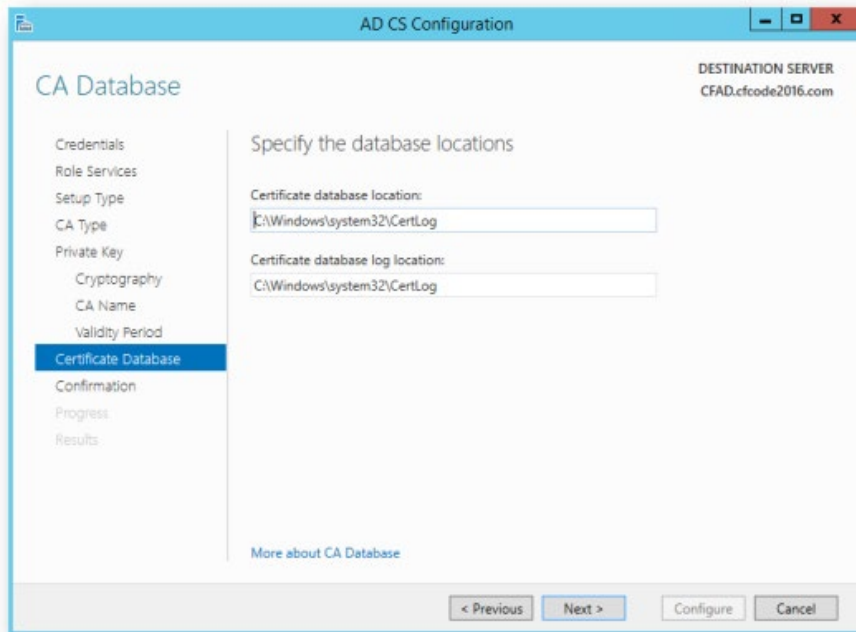
Click Next.

The screenshot shows the 'AD CS Configuration' wizard window. The title bar reads 'AD CS Configuration'. In the top right corner, it says 'DESTINATION SERVER CFAD.cfcode2016.com'. On the left side, there is a navigation pane with the following items: Credentials, Role Services, Setup Type, CA Type, Private Key, Cryptography, CA Name (highlighted in blue), Validity Period, Certificate Database, Confirmation, Progress, and Results. The main area is titled 'CA Name' and contains the following text: 'Specify the name of the CA. Type a common name to identify this certification authority (CA). This name is added to all certificates issued by the CA. Distinguished name suffix values are automatically generated but can be modified.' Below this text are three input fields: 'Common name for this CA:' with the value 'MY-CA', 'Distinguished name suffix:' with the value 'DC=cfcode2016,DC=com', and 'Preview of distinguished name:' with the value 'CN=MY-CA,DC=cfcode2016,DC=com'. At the bottom of the main area, there is a link 'More about CA Name'. At the bottom of the window, there are four buttons: '< Previous', 'Next >', 'Configure', and 'Cancel'.

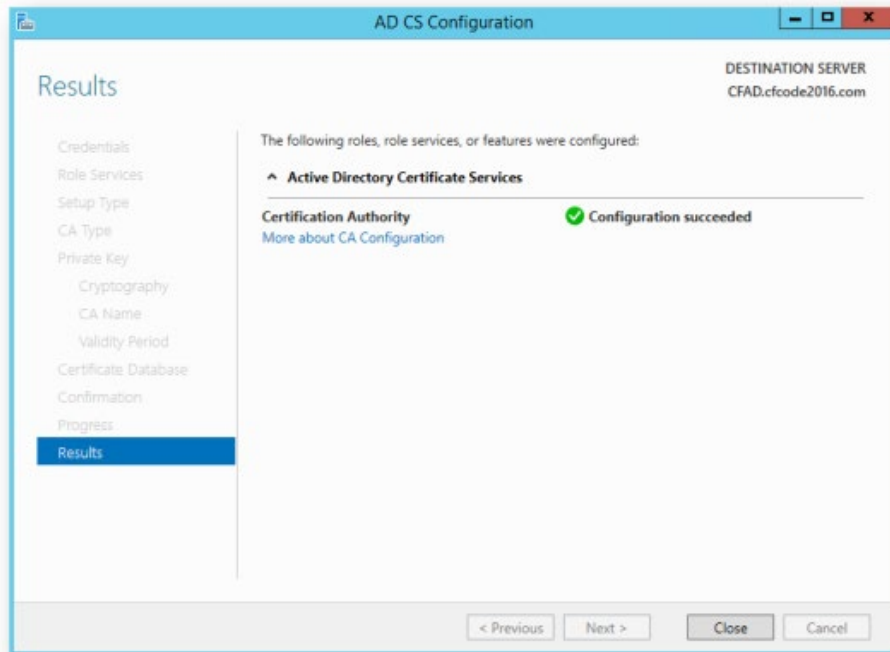
- On Validity Period, you can change the number of years if you wish. I would imagine in 5 years SharePoint 2016 will be old hat, and be using SharePoint 2020. Click Next.

The screenshot shows the 'AD CS Configuration' wizard window. The title bar reads 'AD CS Configuration'. In the top right corner, it says 'DESTINATION SERVER CFAD.cfcode2016.com'. On the left side, there is a navigation pane with the following items: Credentials, Role Services, Setup Type, CA Type, Private Key, Cryptography, CA Name, Validity Period (highlighted in blue), Certificate Database, Confirmation, Progress, and Results. The main area is titled 'Validity Period' and contains the following text: 'Specify the validity period. Select the validity period for the certificate generated for this certification authority (CA):'. Below this text is a dropdown menu showing '5' in a text box and 'Years' in a dropdown arrow. Below the dropdown is the text 'CA expiration Date: 23/08/2021 12:43:00'. Below that is the text: 'The validity period configured for this CA certificate should exceed the validity period for the certificates it will issue.' At the bottom of the main area, there is a link 'More about Validity Period'. At the bottom of the window, there are four buttons: '< Previous', 'Next >', 'Configure', and 'Cancel'.

- Accept the default locations of the CA Database. Click Next.

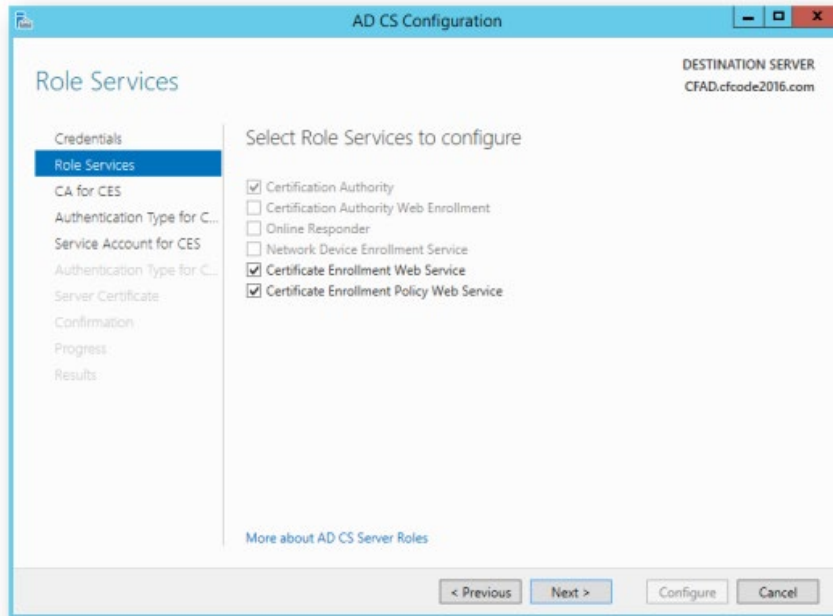


- On the final screen, Confirmation, click Configure. You will be presented with a succeeded screen. Click Close. You will be prompted with a Do you want to configure additional role services? Dialog. Click Yes.

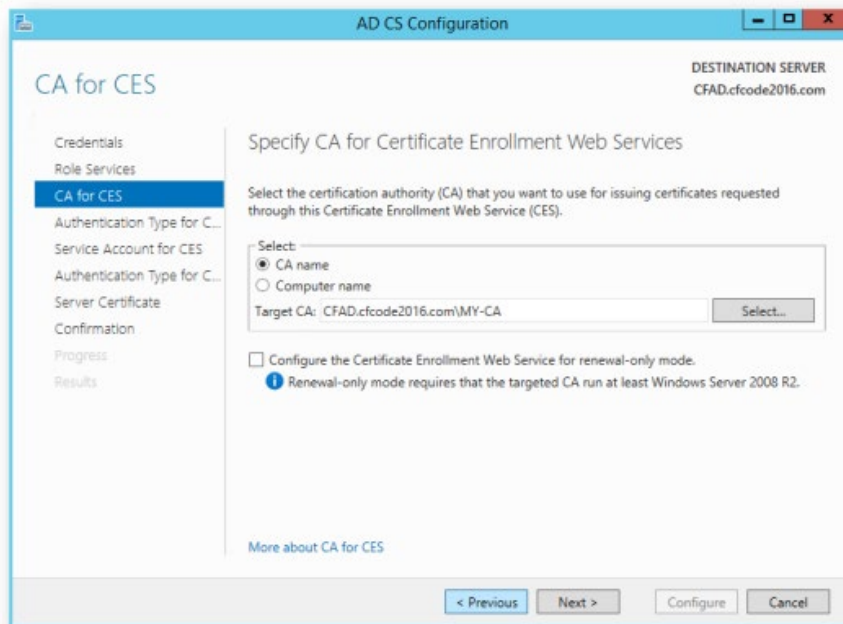


- After clicking yes, you will be presented back with the Credentials screen. Click Next

- On the Role Services screen, now select both Certificate Enrollment Web Service and Certificate Enrollment Policy Web Service. Click Next.

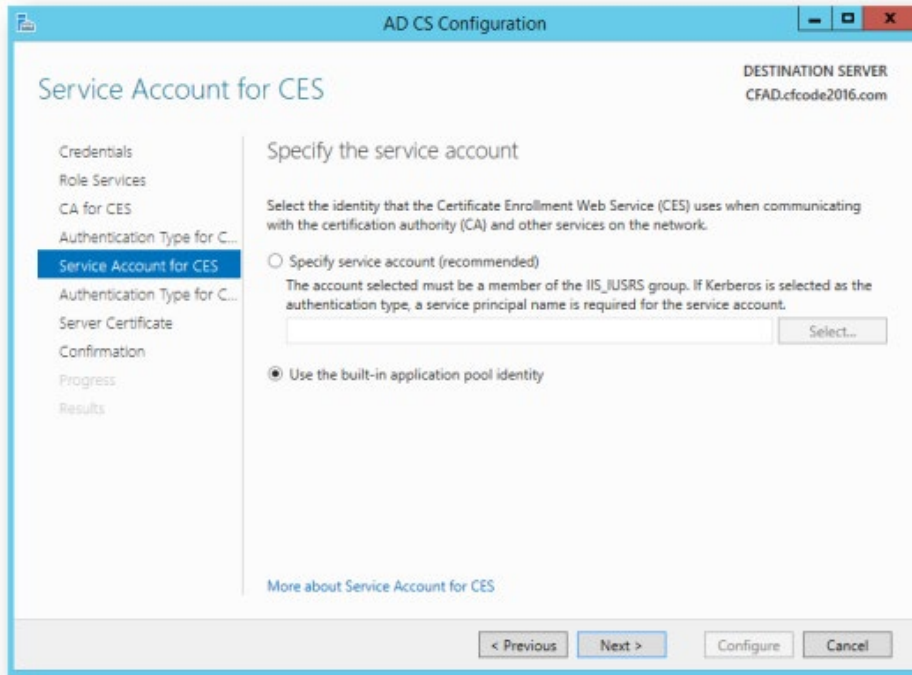


- On the CA for CES screen, leave as is and click Next. This will allow your target CA to issue web certificates to SharePoint and other web servers. Click Next.

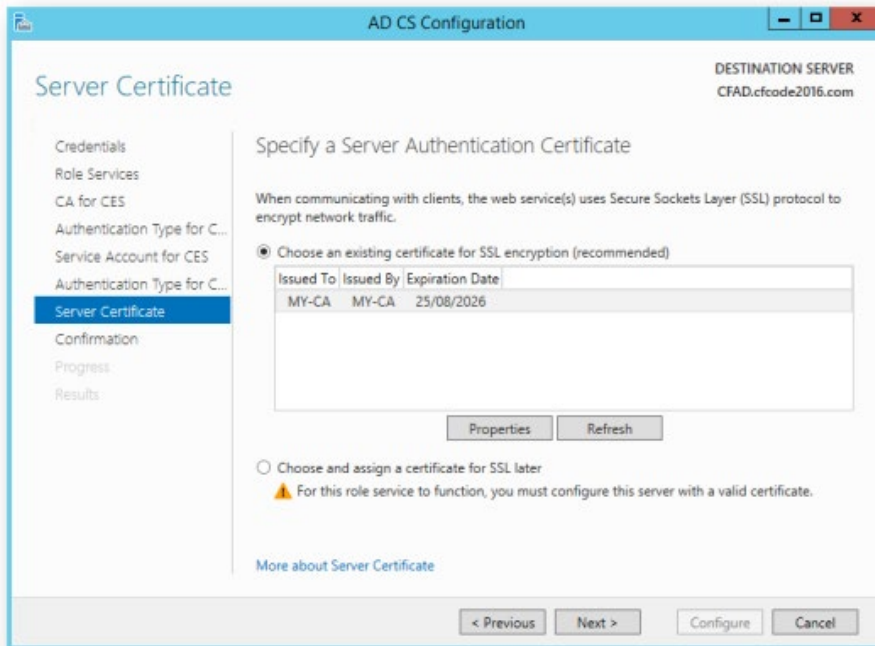


- The Authentication Type for CES keep as the default Windows integrated authentication click Next.

- On Service Account for CES switch the radio button to use Use the built-in application pool identity. Click Next

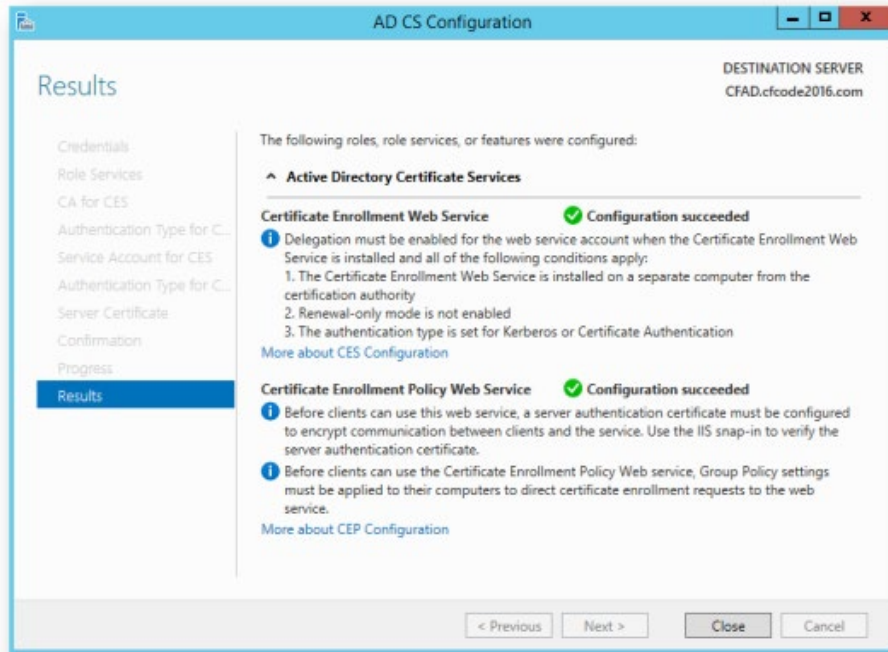


- The Authentication Type for CEP leave as Windows integrated authentication. Click Next.
- On the Server Certificate screen, select your existing self-signed certificate. Click Next



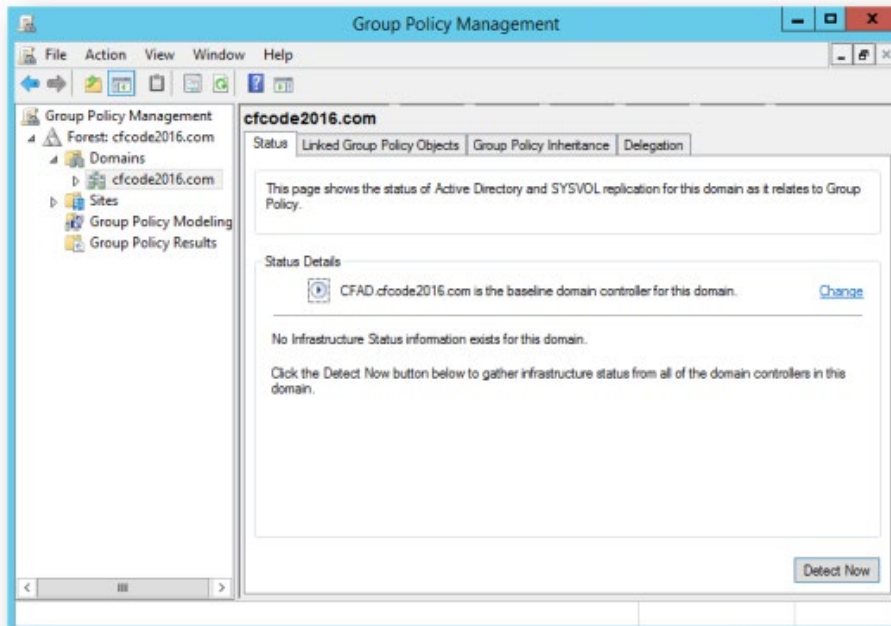
- On the last screen, click Configure.

- Finally, you are presented with success messages. Click Close.

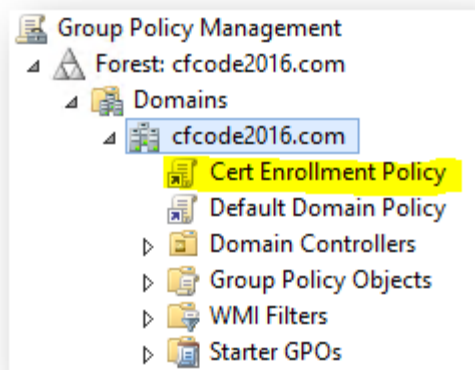


- Your Certificate Authority is now complete and ready to give our certs to your SharePoint farm. This will be configured later after we have at least installed SharePoint.
- ❖ Setting up a Global Policy for Certificate Enrollment.
Here we are going to change a global policy for all machines added to the domain. This is so Auto enrollment of certificate policies is allowed.
- Open up the Group Policy Management console, by typing gpmc.msc in a run window.

- Expand the Forest down to our domain.

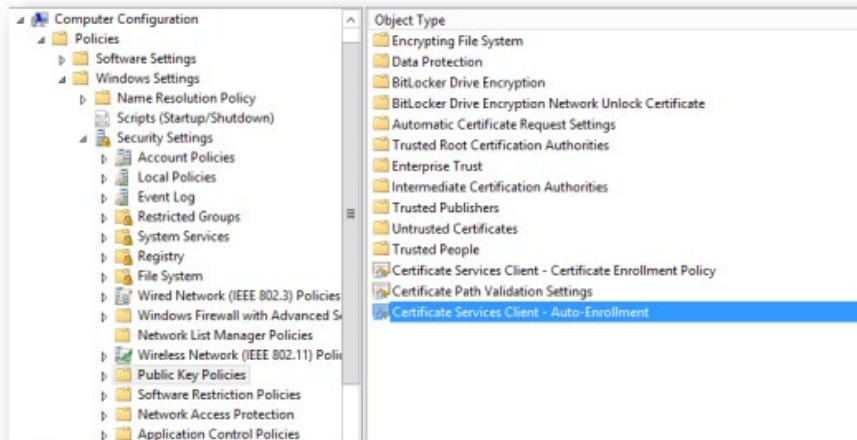


- Right click the domain and select Create a GPO in this domain, and Link it here...
- In the New GPO dialog, give it the name of Cert Enrollment Policy, and click OK.
- In the left pane of Group Policy Management expand your domain and at the top you should see Cert Enrollment Policy, right click it and select edit.



- Navigate down to Computer Configuration > Policies > Windows Settings > Security Settings > Public Key Policies and double click Certificate Services Client – Auto

Enrollment

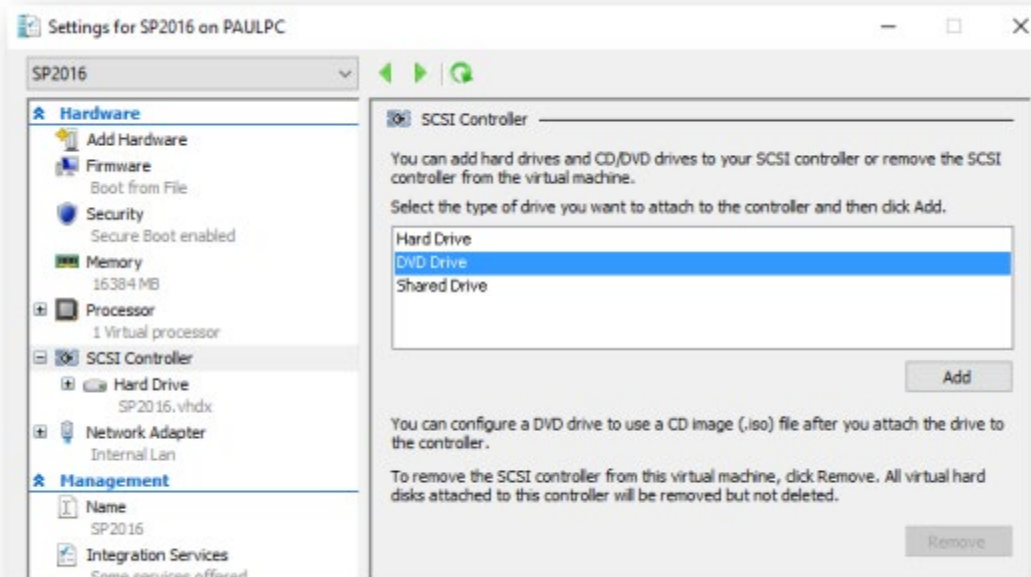


- In the dialog, set the Configuration Model to Enabled. Click OK.

Step 5: Creating your SQL & SharePoint Machine

- Follow my old blog on Creating your hyper V windows Server 2012 machine from a differencing disk. Give about 16GB (16,384Mb) of memory to the machine, and only add the Internal Network connection.
 - When you start up your new Virtual Machine based on the base disk, you will be required to enter a valid Key Code for Windows Server 2012 R2 Standard Edition. Let the sysprep process complete, answer any installation questions required and then log in.
 - You now have Virtual Machine that we are going to use for our SQL and SharePoint.
 - Enhanced mode of Hyper V will work after you have logged in once, and then reboot. (Believe tools install themselves in the background).
 - ❖ Set Static IP address
 - In the start menu, type View Network Connections and under Settings you should see a link.
 - Right click your network internal adapter and click Properties.
 - In the properties windows, select Internet Protocol Version 4 (TCP/IPv4) and then click the Properties button.
 - Update the properties form to have the following information:
 - IP Address: 192.168.137.200
 - Subnet Mask: 255.255.255.0
 - Default gateway: 192.168.137.1
 - Preferred DNS Server: 192.168.137.100
 - ❖ Change the name of the Machine.
 - From the Server Manager screen. Click on Local Server.
 - Where it says Computer Name, click the link.
 - This will open the System Properties dialog box.
 - Click on the Change button.
 - Enter the name of the server. I have called mine 'CFSP2016'
 - Click OK.
 - Click OK and reboot when asked.
 - ❖ Add the SharePoint machine to the Domain.
 - From the Server Manager screen. Click on Local Server.
 - Where it says Workgroup, click the link.
 - This will open the System Properties dialog box.
 - Click on the Change button.
 - Click on the Domain radio button. Type in the name of your domain you gave your machine in the previous blog post. (Part 4- Installing Active Directory)
 - Enter the name of the server. I have called mine 'CFSP2016'
 - Click OK.
 - Click OK and reboot when asked.
- Important from now on:* When you sign in, ensure you sign in as domain\administrator not computerName\Administrator, defaults to computerName\Administrator. To ensure that when you type administrator into the SharePoint server to run as domain admin, it doesn't automatically think that you mean built in administrator, we are going to rename the administrator built in account.
- From the Start menu, type User, and select Edit local users and groups

- In the left hand pane, select Users.
 - On the right hand pane, right click Administrator and select Rename
 - Change the name to something other than Administrator. I've renamed mine to Admin.
 - If you log out, and try to log in as COMPUTERTNAME\Administrator it will state the password is incorrect. Change this to COMPUTERTNAME\Admin then try your password. You should be able to log in.
- ❖ Adding a DVD drive for ISO in Virtual Machine.
- Before I can install SQL or SharePoint I need a way to install my ISO files onto my Virtual Machine. These steps will show you how to add a DVD player to your virtual machine that will allow you to read ISO files.
- Open up Hyper-V Manager, right click your Virtual machine that you are using for SQL & SharePoint and click settings.
 - Within the settings window, under Hardware select SCSI controller. Then select DVD Drive, and click Add.



- Then ready for the next step, select Image File: and find your SQL Server 2016 Standard Edition ISO file.

Step 6: Creating the Accounts required

Please note that the following setup is just for a simple development environment. You should read the Microsoft SharePoint Server 2016 Prepare for Installation section.

First we need to create 9 different accounts.

SP_Farm – SharePoint Farm account

SP_Setup – SharePoint Setup Account

SP_Content – SharePoint Content account for the Content Databases

SP_Services – SharePoint account for the Shared Services within SharePoint

SP_SQL – The account to run SQL with.

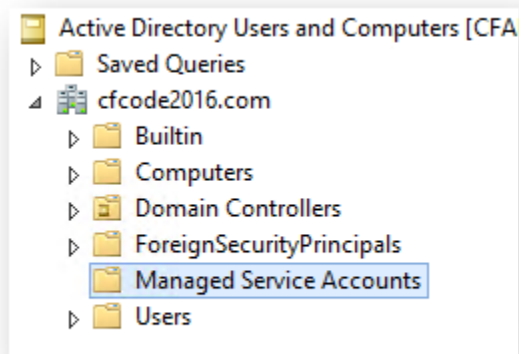
SP_Search – The account used for SharePoint Search Crawler

SP_UserProfile – The account used for User Profile service

SP_SuperUser – SharePoint publishing infrastructure super user account

SP_SuperReader -SharePoint publishing infrastructure super reader account

- Log into the Domain Controller.
- In the Start Menu, type Active Directory Users and Computers. Select the application.
- Expand the tree in the left hand pane to see the Managed Service Accounts OU. Select the Managed Service Accounts OU.



- Right click on Managed Service Accounts and select New > User. Create a new user called SP_Farm. Set the Full Name and Log on name to SP_Farm. Click Next.

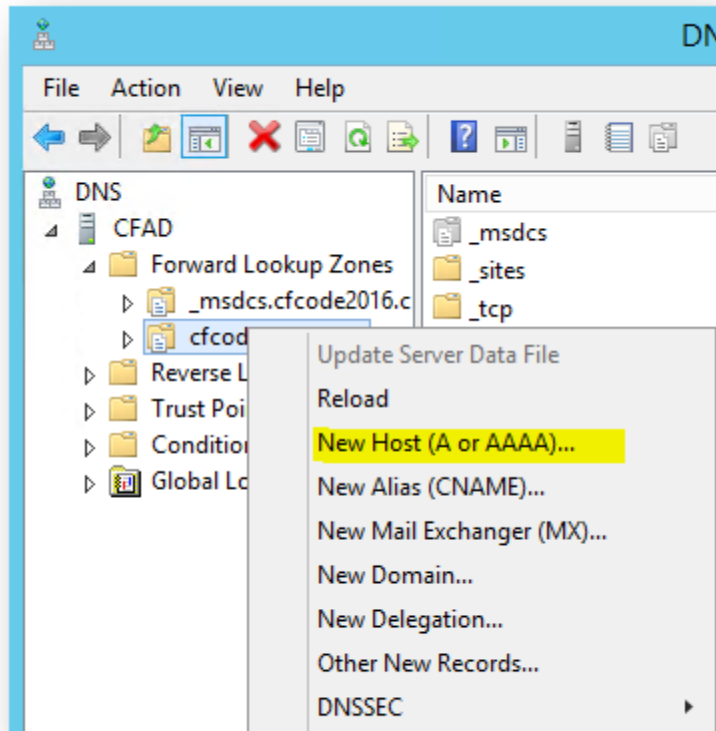
The screenshot shows the 'New Object - User' dialog box. At the top, it says 'Create in: cocode2016.com/Users'. Below this, there are several input fields:

- First name: SP_Farm
- Initials: (empty)
- Last name: (empty)
- Full name: SP_Farm
- User logon name: SP_Farm
- User logon name (pre-Windows 2000): CFCODE2016\

 At the bottom, there are three buttons: '< Back', 'Next >', and 'Cancel'.

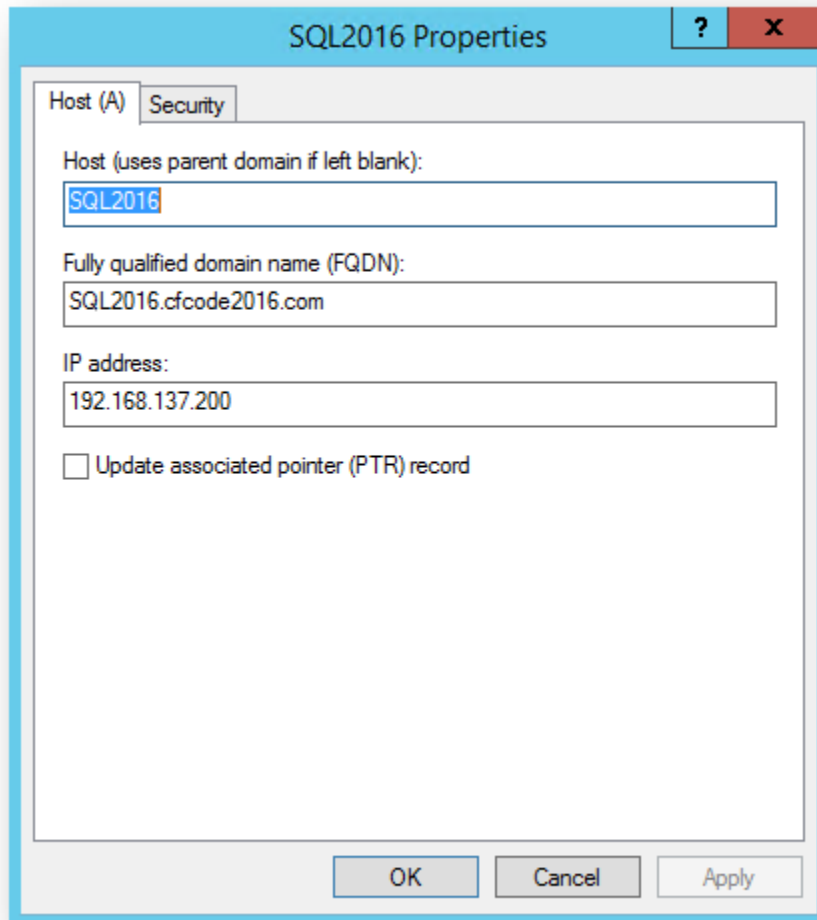
- In the password dialog screen, enter the following and click Next.
 - Password and Confirm Password: *Pa55w0rd*
 - Untick User must change password at next logon.
 - Leave User cannot change password as unticked.
 - Tick Password never expires
 - Leave Account is disabled as unticked
 - Click Next. Then Finish
- Repeat the steps 1-4 for the remaining accounts (SP_Setup, SP_Content, SP_Services, SP_SQL, SP_Search, SP_UserProfile, SP_SuperUser, SP_SuperReader, and SP_Unattended)
- You could add any users here, but when creating their accounts, add them to User OU not the Managed Service Accounts
- ❖ Setting up Host names (SQL2016, Intranet, Dev, HNSC, my)
 - On your Domain controller, in the start menu, type DNS. Open the application to the DNS Manager
 - Expand the forward lookup zones contained in the left panel.

- Right click on the zone cfcode2016.com and click on a New Host (A or AAAA)



- Type in the name of the record. In this case we are going to name our SQL Server SQL2016. Set the IP address as the IP address where we are installing SQL.

This was configured in our previous post as 192.168.137.200. Click on Add Host.



The image shows a Windows dialog box titled "SQL2016 Properties" with a "Host (A)" tab selected. The dialog contains the following fields and options:

- Host (uses parent domain if left blank): SQL2016
- Fully qualified domain name (FQDN): SQL2016.cfcode2016.com
- IP address: 192.168.137.200
- Update associated pointer (PTR) record

At the bottom of the dialog are three buttons: "OK", "Cancel", and "Apply".

- You will then get a verification dialog, and after click OK. You will see the record has been created in the right pane of the DNS manager.
- To Check that this is all working, open a command prompt, and type
ipconfig -flushdns
Then type
ping SQL2016

```
C:\Users\Administrator>ping SQL2016
Pinging SQL2016.cfcode2016.com [192.168.137.200] with 32 bytes of data:
Reply from 192.168.137.200: bytes=32 time<1ms TTL=128
Reply from 192.168.137.200: bytes=32 time<1ms TTL=128
Reply from 192.168.137.200: bytes=32 time<1ms TTL=128
Reply from 192.168.137.200: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.137.200:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

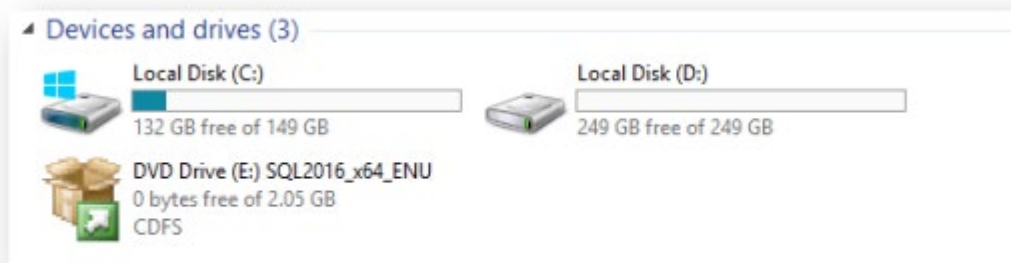
C:\Users\Administrator>_
```

Note: If it's unable to ping, you might have the firewall switched on for domains on your VM's. You can turn this off. (Remember this is development machine only)

Step 7: Setting up directories for SQL.

We are going to set up following directories on the d: drive.

- Bring up Explorer by click on Windows Key + E
- Double click on the D drive.
- Create the following directories.
 - D:\SQL
 - D:\SQL\Data
 - D:\SQL\Logs
 - D:\SQL\Temp\Data
 - D:\SQL\Temp\Logs
 - D:\SQL\Backup
- ❖ Installing SQL Server 2016 Standard Edition 64 bit
From the Step 5 of these steps we have already inserted the ISO file into the virtual machine. By opening Explorer inside the virtual machine, you should see DVD Drive with the SQL disk inserted.

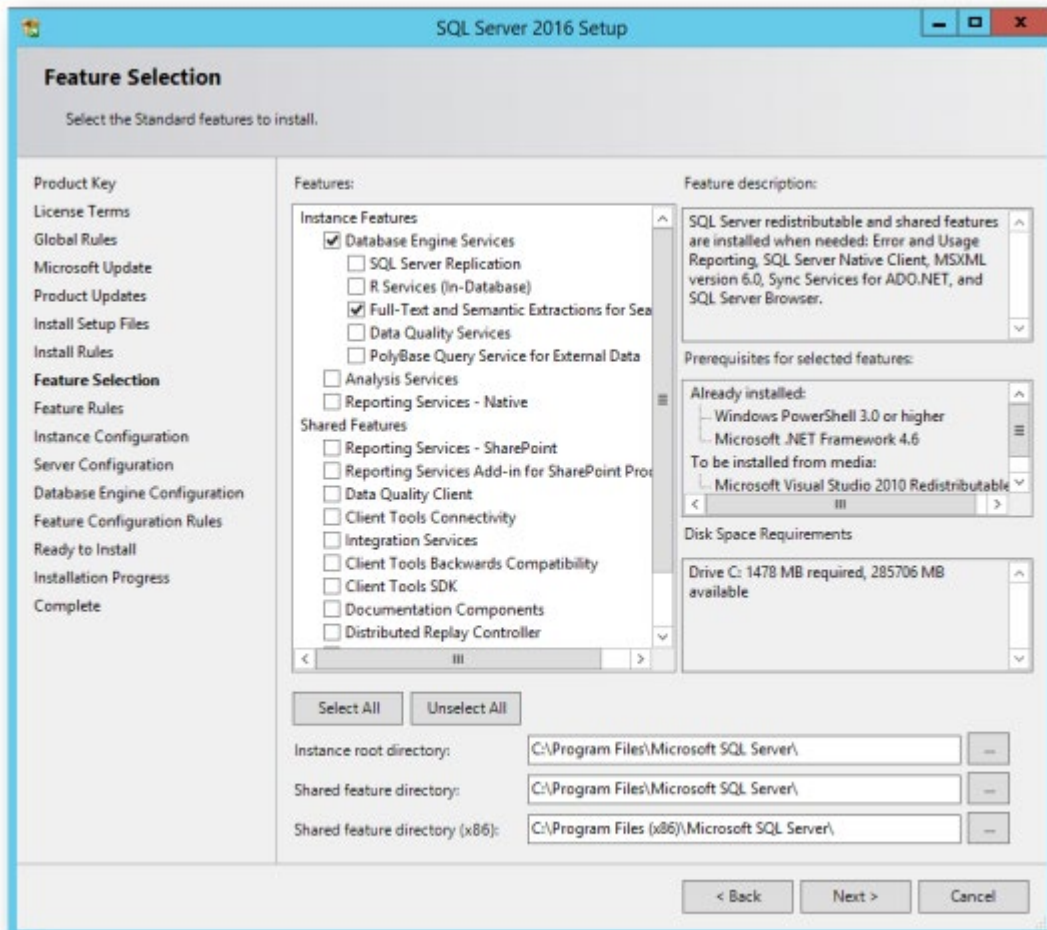


- Double click on the DVD drive, or run Setup.exe
- The SQL Server Installation Center will open up. On the left hand side, click Installation.
- Click on New SQL Server stand-alone installation or add features to an existing installation



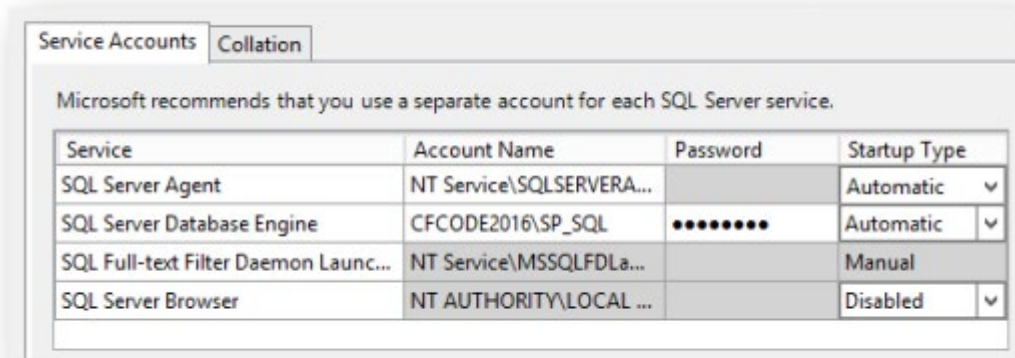
- The product key should already be entered, click Next, accept the License Terms. Click Next.

- Tick Use Microsoft Update to check for updates (Recommended). Click Next.
- Setup install rules will identify any problems that might occur when installing SQL Server Setup support files. They should all pass. (Ignore warnings) Click Next.
- On the Feature Selection Page. Select Database Engine Services, Full-Text and Semantic Extractions for Search. Click Next.

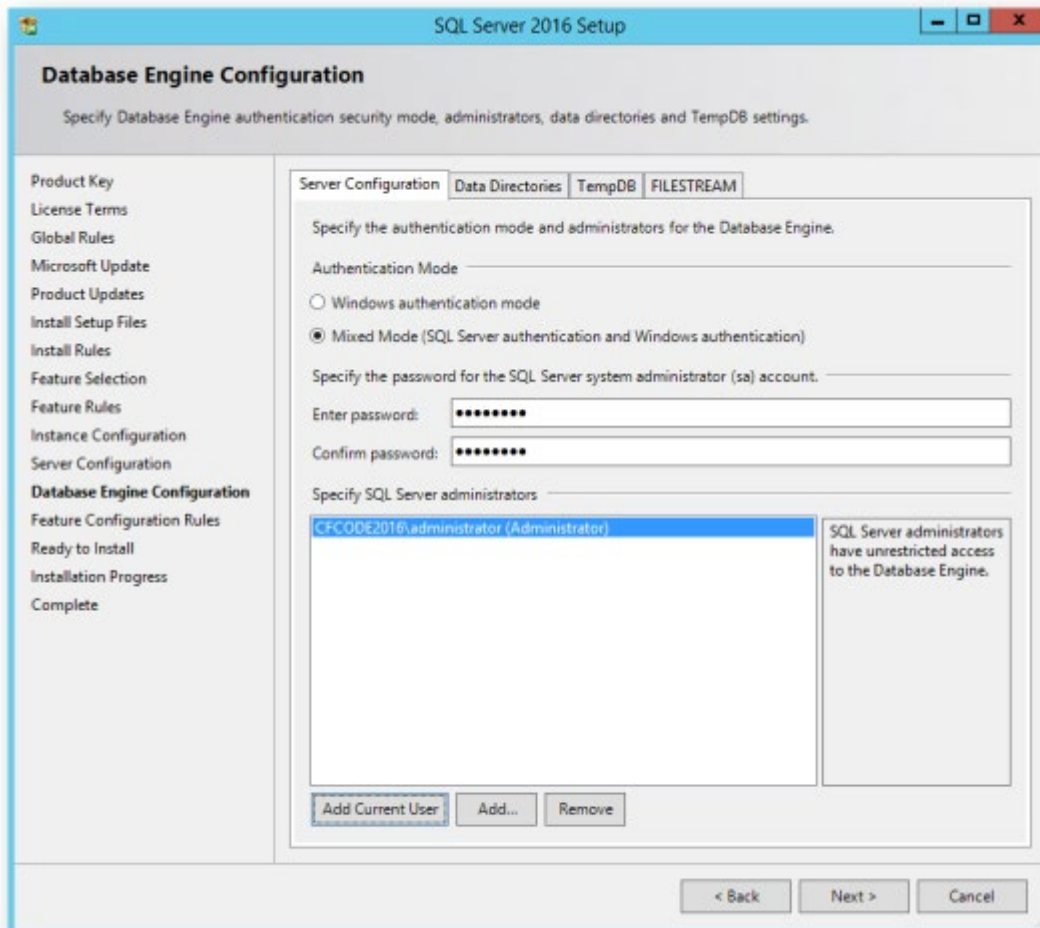


- On the Installation Rules page click Next.
- On the Instance Configuration page click Next.
- On the Server Configuration page, change the SQL Server Agent Start Up Type to Automatic. Also change the SQL Server Database Engine to use

your SP_SQL account, and enter the password. Pa55w0rd



- Click Next
- On the Database Engine Configuration page, select Mixed Mode and enter the password and confirm password as Pa55w0rd. And Click Add Current User.

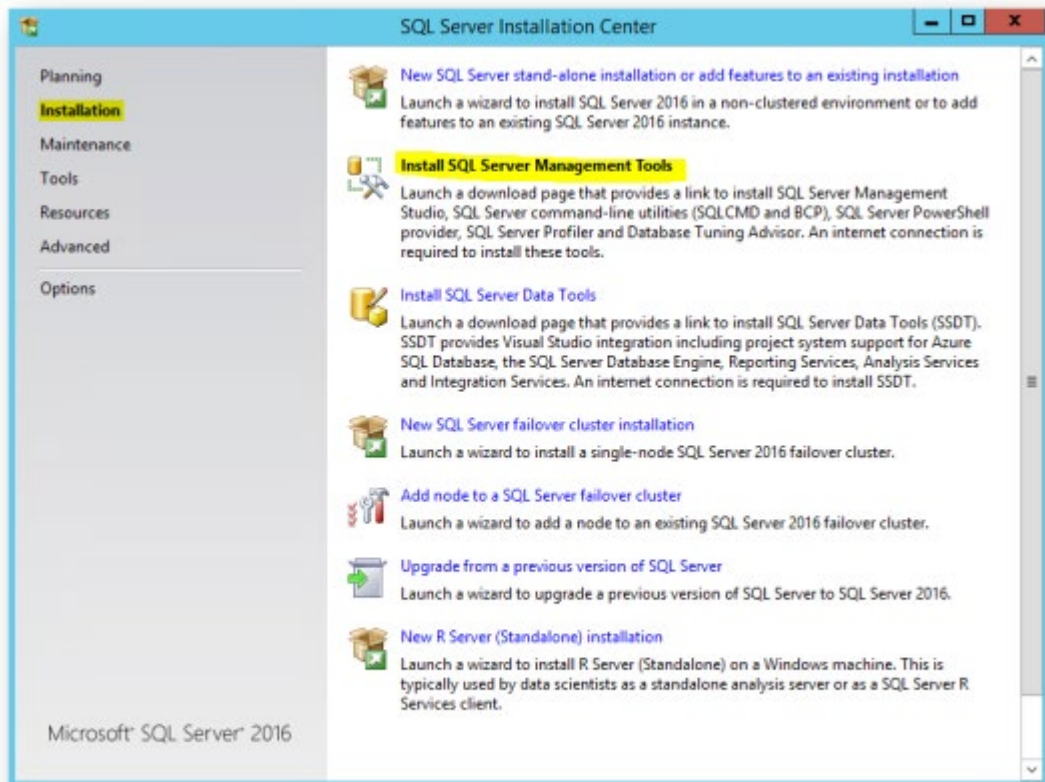


- On the Data Directories tab, change the location of the directories.
 - Data Root Directory – d:\SQL
 - User Database Directory – d:\SQL\Data

- User Database Log Directory – d:\SQL\Log
 - Backup Directory – d:\SQL\BackUp
 - On the TempDB tab
 - Data Directories – d:\SQL\Temp\Data
 - Log Directory – d:\Sql\Temp\Log
 - On the FILESTREAM tab, tick Enable FileStream for Transact-SQL access and Enable FILESTREAM for file I/O access. Click Next.
 - On the Ready to Install page, click Install
 - After installation your SQL Server 2016 is installed. You may be asked to reboot.
- ❖ Installing SQL Server Management Tools

It seems that SQL 2016 have now separated out the SQL Server and SQL Server Management Tools. So this is an additional step to carry out.

- Back on the SQL Server Installation Center (run setup.exe from DVD drive if not showing), click on Install SQL Server Management Tools



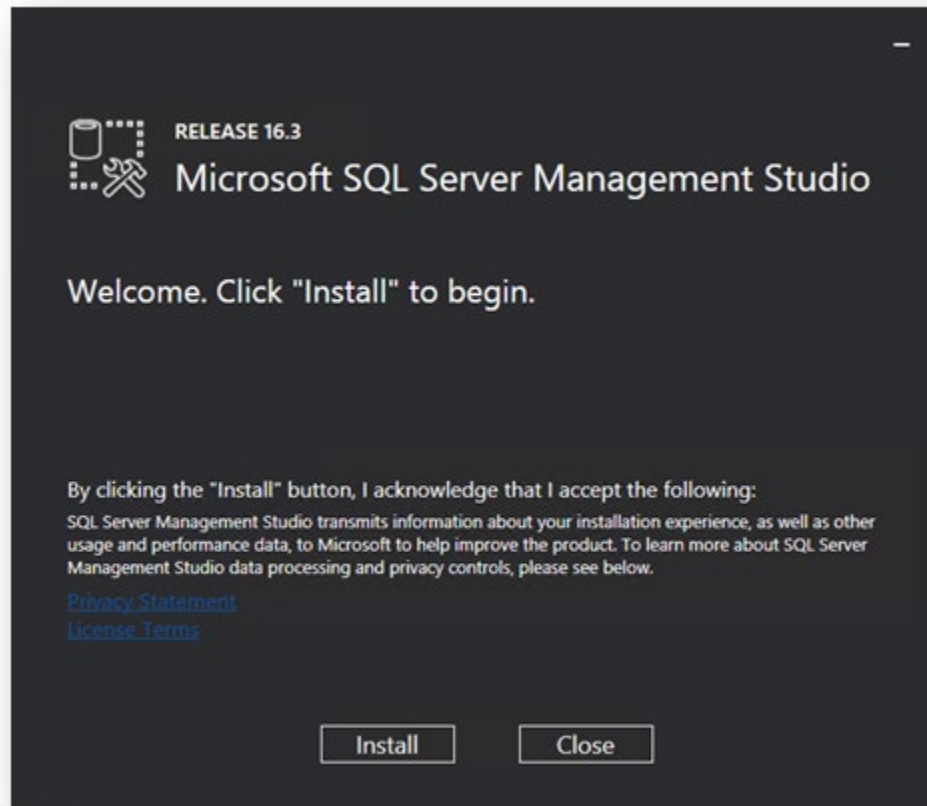
- This takes you off to a website address <https://msdn.microsoft.com/en-us/library/mt238290.aspx> to download the SQL Server Management Studio (SSMS)

seperately.

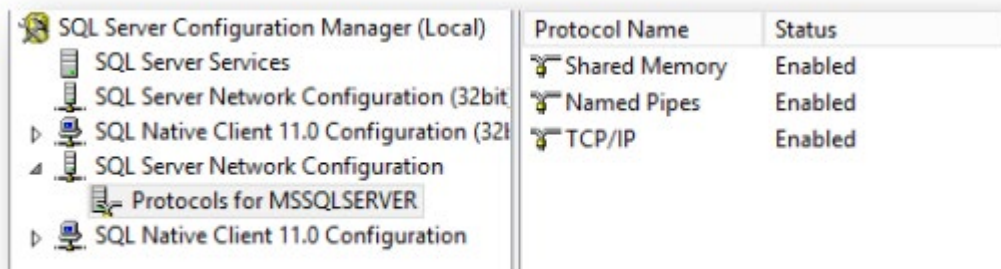


- Click the download link, and run it. (Or Save and run it afterwards) Over 800MB in size.

- Click Install.



- Once installed, you will get a success message. Close this screen.
- ❖ Configuring SQL Server 2016
 - From the start screen type SQL Server Configuration Manager and select the application.
 - Click to expand SQL Server Network Configuration (not the 32 bit), and choose Protocols for MSSQLSERVER, and ensure TCP/IP and Named Pipes are enabled. To enable them right click them and select Enable. Click OK at the warning.



- Close the SQL Server Configuration Manager.
- ❖ Apply the DisableLoopbackCheck Registry Fix

- Click the Windows PowerShell icon in the Taskbar.

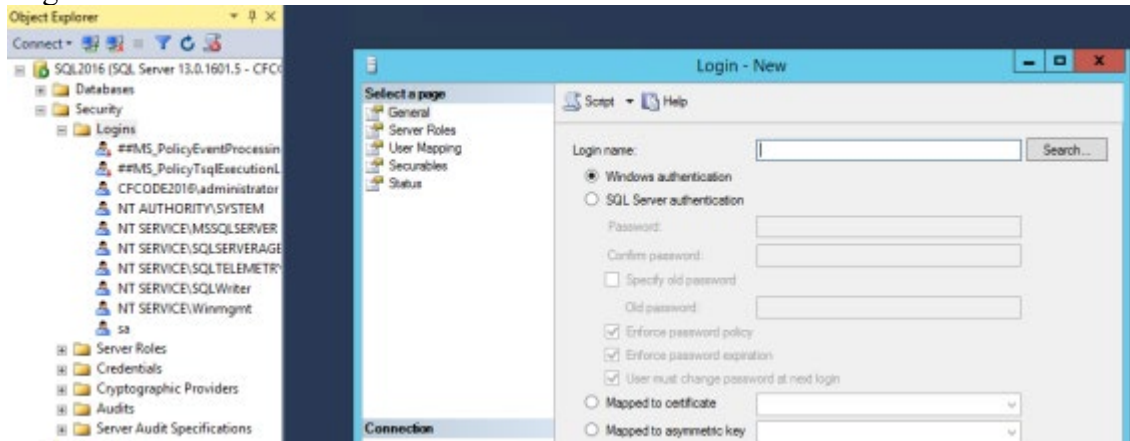


- Run the following PowerShell commands, pressing [Enter] after each one:
`$regKeyPath = "HKLM:\System\CurrentControlSet\Control\Lsa"`
`$key = "DisableLoopbackCheck"`
`New-ItemProperty -Path $regKeyPath -Name $key -Value "1" -PropertyType dword`

❖ Giving SP_Setup account access

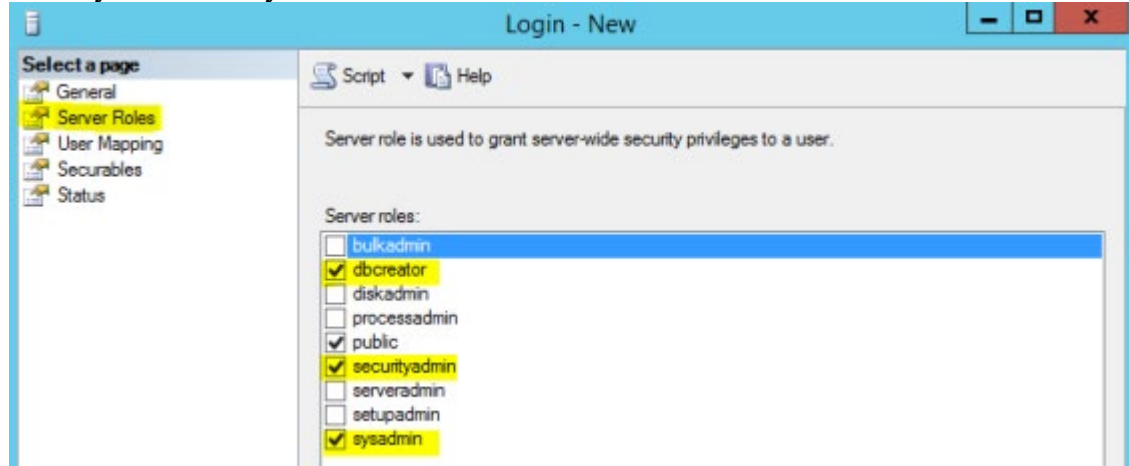
Note: If you continue without doing the DisableLoopback Check registry you will get an error message saying "Login Failed. The login is from an untrusted domain and cannot be used with Windows authentication"

- From the start screen type SQL Server 2016 Management Studio and open the application.
- Change the server name to SQL2016 (we set a host name in an earlier post) and logon as Windows authentication.
- Expand Security from the object explorer and right click Logins and select New Login...



- Next to the Login Name click Search
- Ensure the Location is set for Entire Directory, and then type SP_Setup and click Check Names.
- Click OK.

- On the left hand panel, select the Server Roles page, and tick dbcreator, securityadmin and sysadmin. Then click OK.



Now we can think about Installing SharePoint 2016.

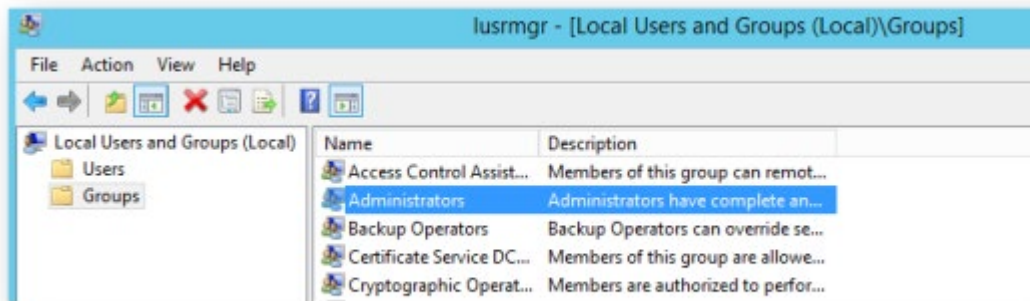
Installing SharePoint 2016 – (This post)

- ❖ Giving SP_Setup Account administrative privilege on your SQL/SharePoint Virtual Machine

Before we can start installing SharePoint 2016, we want to install it using a Setup account. In Part 6 we created the SP_Setup account, now we need to add this to the administrators group of the local machine.

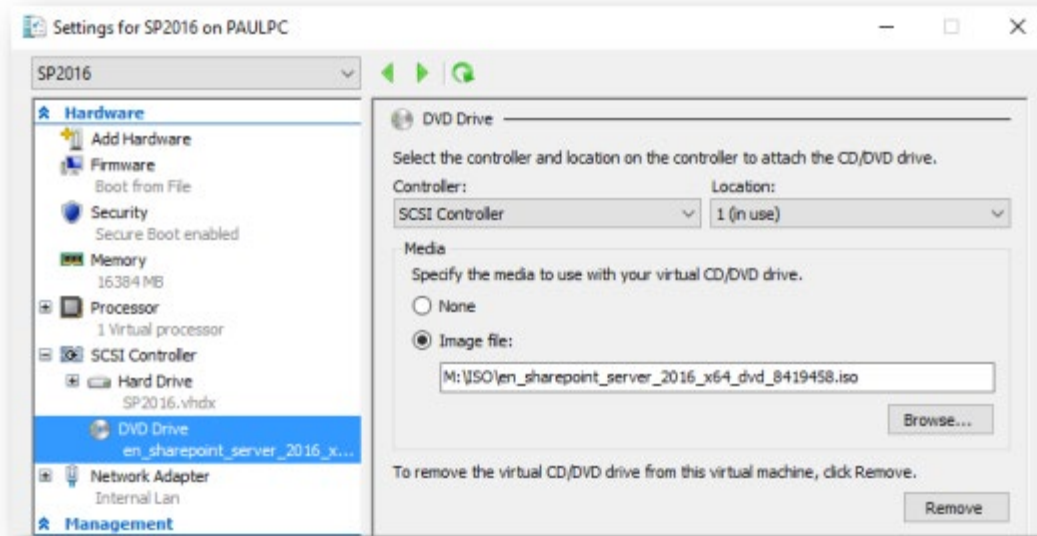
- On the start menu, type Edit local users and groups and select the application

In the left-hand pane, click Groups. Then double click Administrators group to open it up.

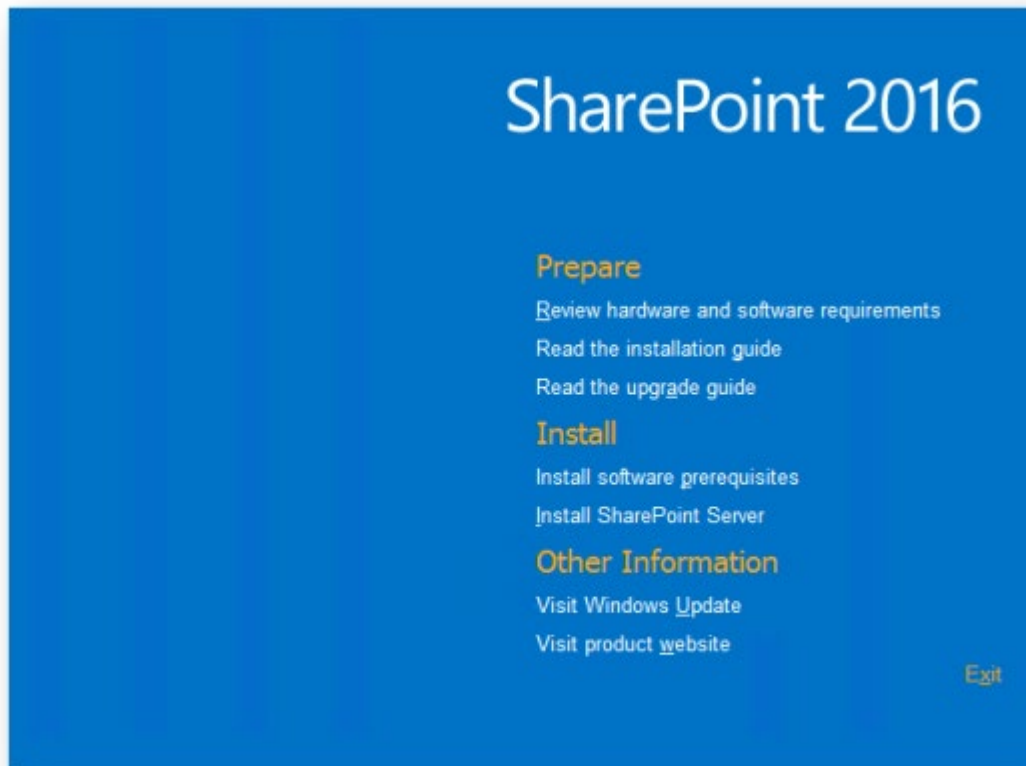


- Click on **Add...** and enter **SP_Setup**. Click on **OK**, and then **OK** again to close the Administrators property box.
- Sign out of the SQL/SharePoint Virtual Machine as Administrator, and sign back in as **SP_Setup**
- ❖ Insert SharePoint Server 2016 disk
 - From the Hyper V Manager on your host machine, right click and select **Settings...**

- Under the DVD Drive, change the image file from SQL 2016 to SharePoint 2016. Click **OK**.

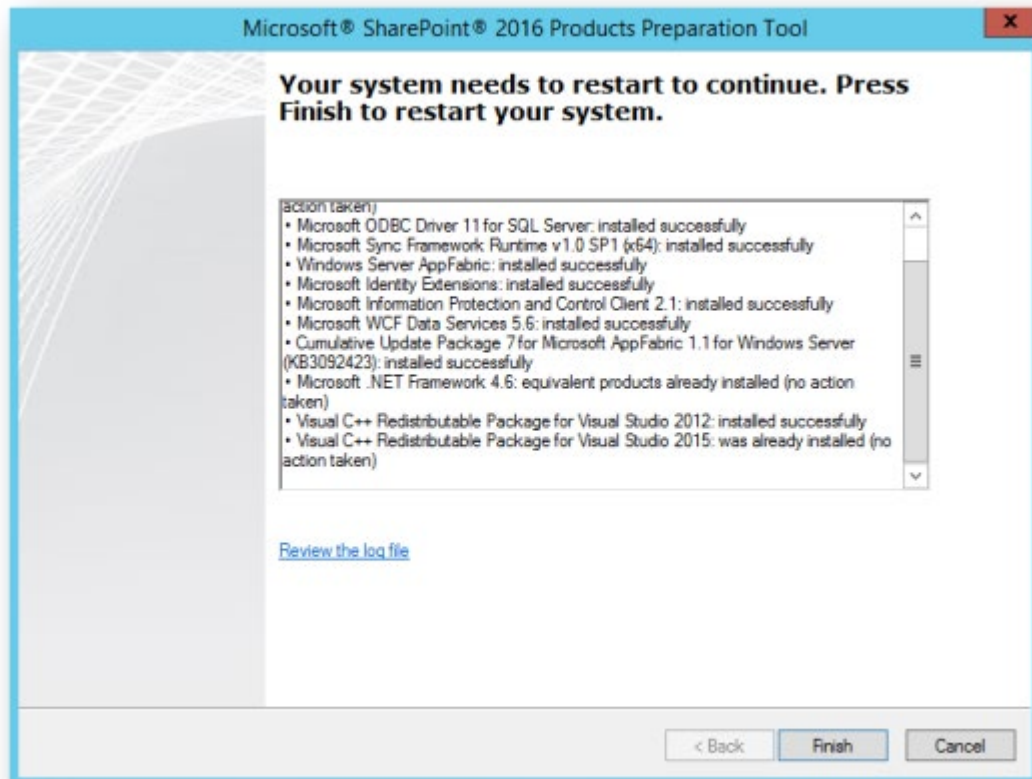


- ❖ Install SharePoint 2016 prerequisites.
 - Go back within the Virtual Machine, and double click the D drive, or run splash.hta

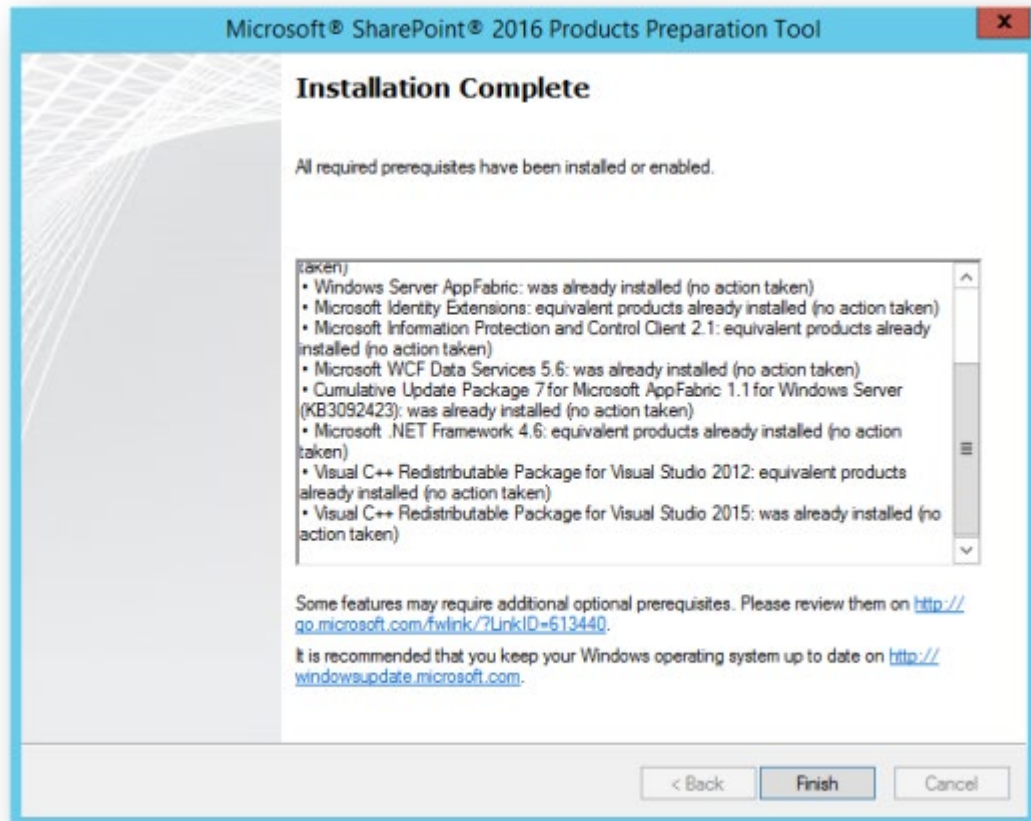


- Click the **Install Software Prerequisites** link.
- In the **Microsoft SharePoint 2016 Products Preparation Tool** dialog, click **Next**

- Accept the License Terms. Click **Next**.
- The prerequisites for SharePoint 2016 will be installed and set up. When it has completed, will be asked to reboot. Click **Finish**

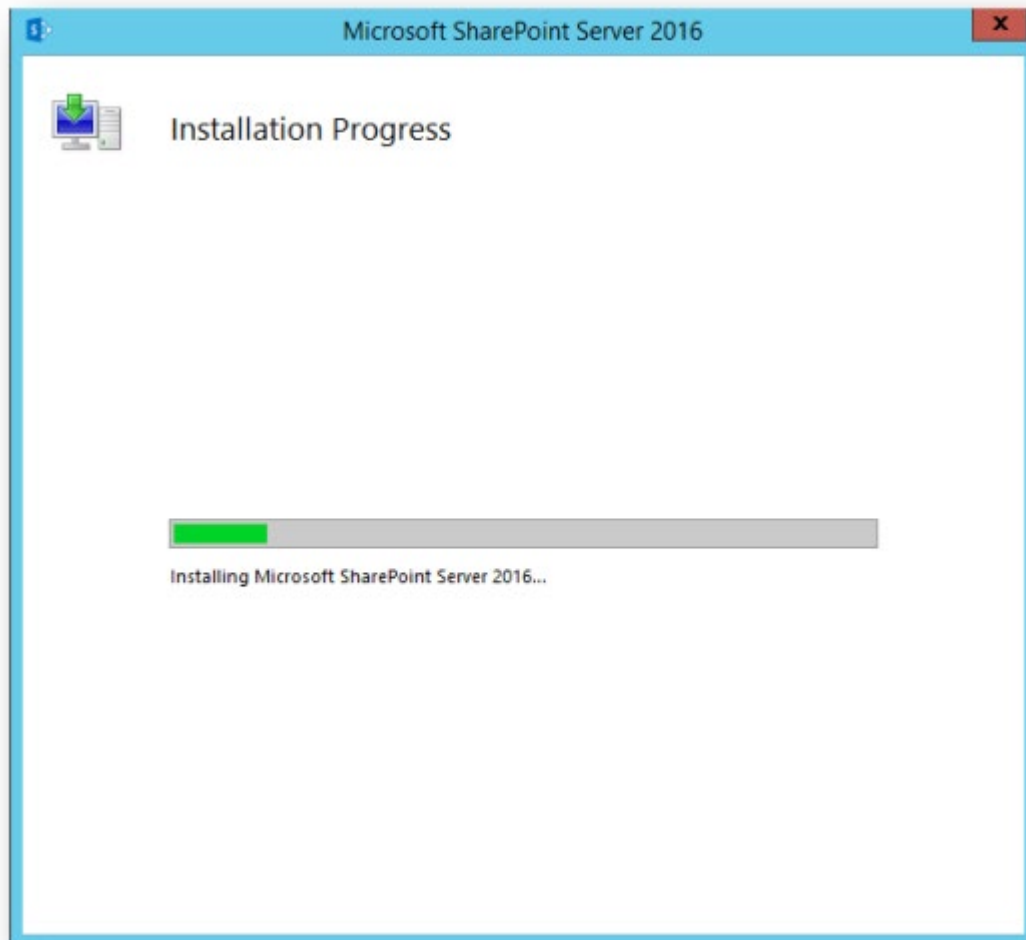


- After a reboot and logged back in as SP_Setup, the installer continued. The prerequisites finally completed. Click **Finish**

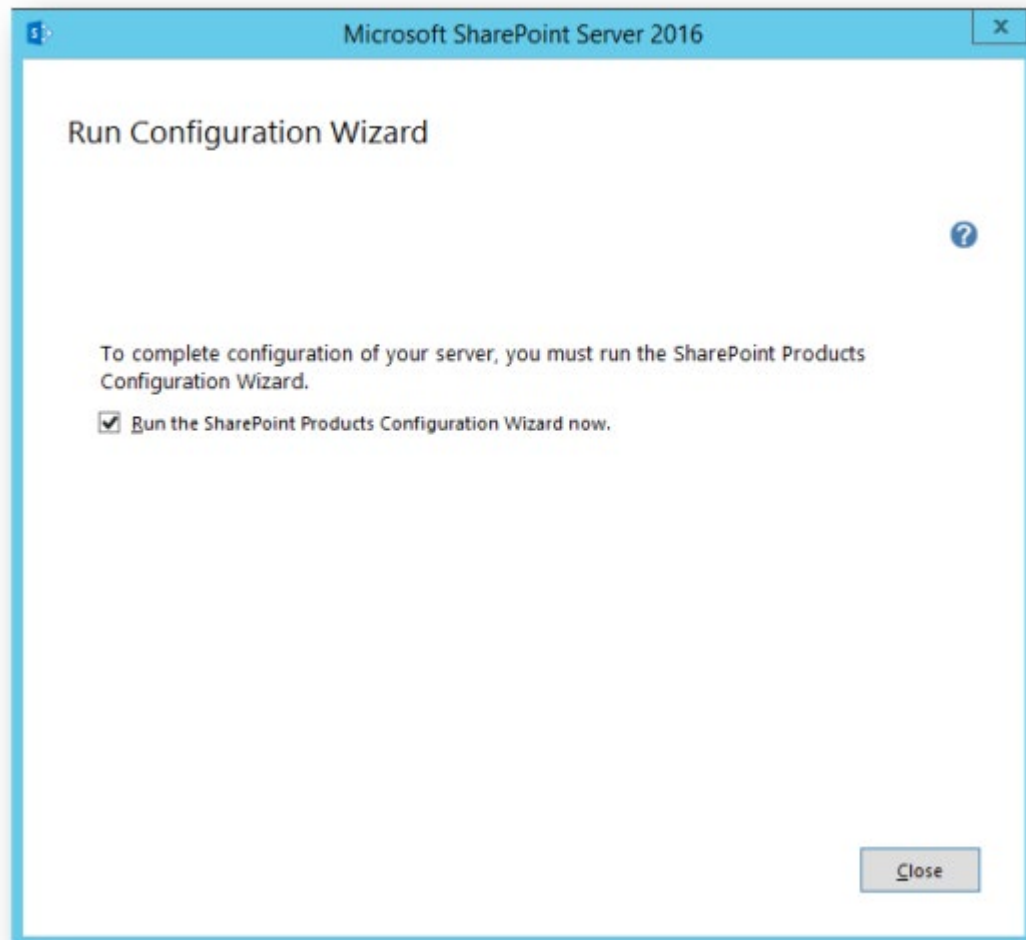


- ❖ Installing SharePoint 2016
 - Double click the D drive, or run splash.hta
 - Click **Install SharePoint Server**
 - When prompted **Enter your Product key**. Click **Continue**.
 - Tick **I accept the terms of this agreement**. Click **Continue**.

- Accept the default file location (Unless you have a reason not to). Click **Install Now**.



- When it has finished. Run the configuration wizard by clicking **Close**.



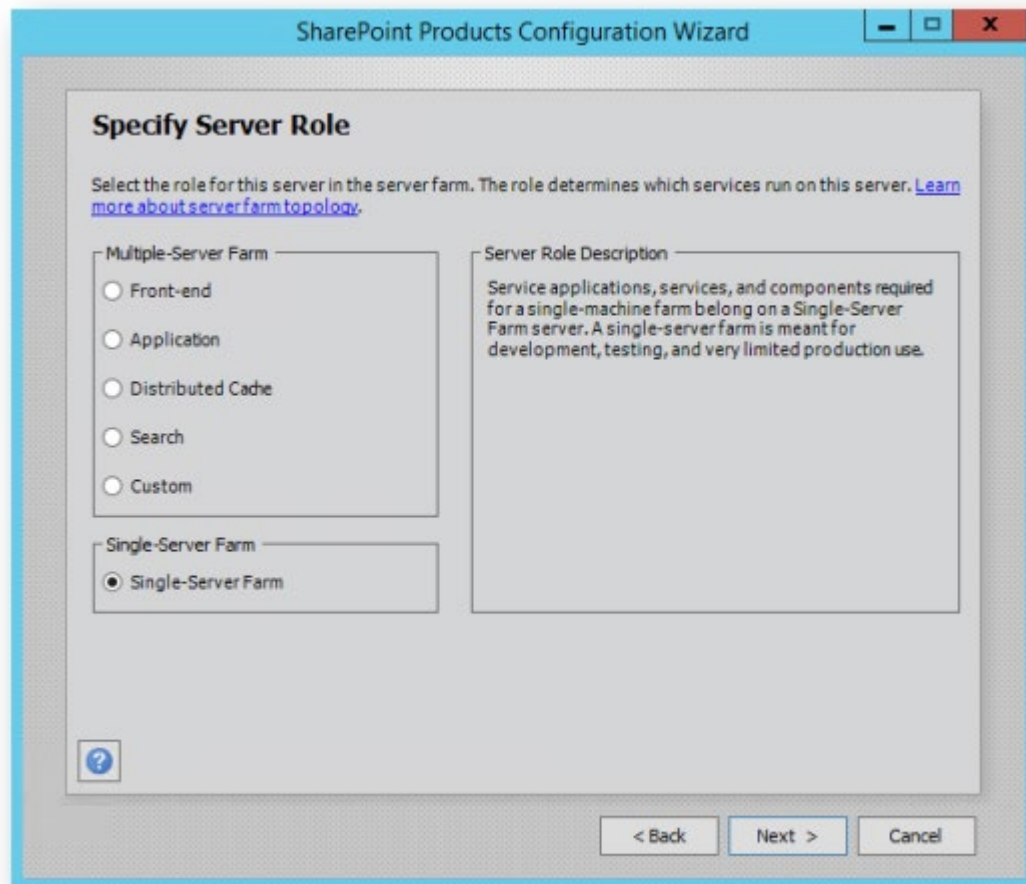
- On the **Welcome to SharePoint Products** click **Next >**
- Accept the dialog warning that services may have to be started or reset during configuration. Click **Yes**.
- On **Connect to a server farm**, select **Create a new server farm**. Click **Next >**
- On the **Specify Configuration Database settings**
 - A. Database Server: **SQL2016**
 - B. Database Name: **SharePoint_Config**
 - C. UserName: **cfcode2016\SP_Farm**

D. Password: Pa55w0rd
Click Next >

The screenshot shows the 'Specify Configuration Database Settings' step of the SharePoint Products Configuration Wizard. The window title is 'SharePoint Products Configuration Wizard'. The main heading is 'Specify Configuration Database Settings'. Below the heading is a paragraph of instructions: 'All servers in a server farm must share a configuration database. Type the database server and database name. If the database does not exist, it will be created. To reuse an existing database, the database must be empty. For additional information regarding database server security configuration and network access please see [help](#).' There are two input fields: 'Database server:' with the value 'SQL2016' and 'Database name:' with the value 'SharePoint_Config'. Below this is the section 'Specify Database Access Account' with instructions: 'Select an existing Windows account that this machine will always use to connect to the configuration database. If your configuration database is hosted on another server, you must specify a domain account. Type the username in the form DOMAIN\User_Name and password for the account.' There are two input fields: 'Username:' with the value 'cfcode2016\SP_Farm' and 'Password:' with a masked password of eight dots. At the bottom right are three buttons: '< Back', 'Next >', and 'Cancel'. A help icon (?) is located at the bottom left.

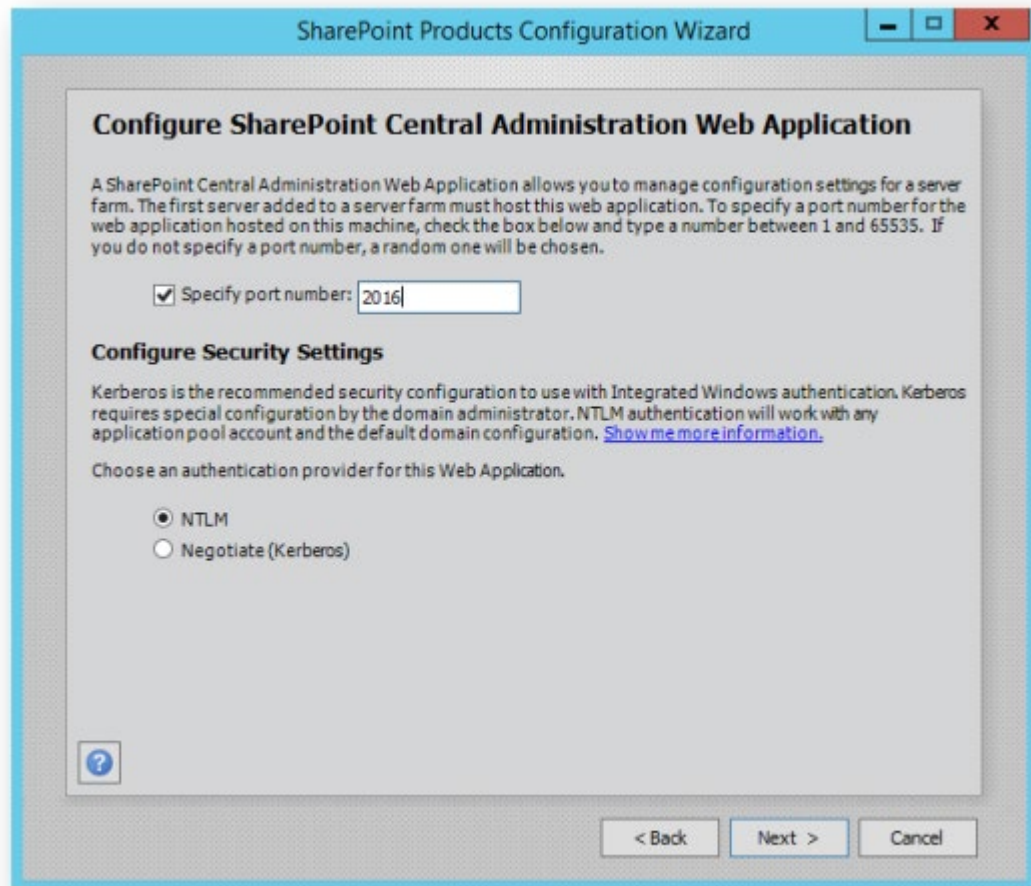
- On **Specify Farm Security Settings** put the Passphrase as **Pa55w0rd**. Click **Next >**

- On **Specify Server Role** as this is a development environment, select **Single Server Farm**. Then click **Next >**



- On **Configure SharePoint Central Administration Web Application** tick **Specify port number**. Type in the number 2016. Select **NTLM** for security settings.

Click **Next >**.



- On the final page **Completing the SharePoint Products Configuration Wizard** it will display a summary of what you have selected. Click **Next >**
- When the installer has finished, you will be presented with **Configuration Successful**. Click **Finish**. Internet explorer will open Central Administration allowing you to complete the installation. Click **Cancel** to Configure your SharePoint Farm. There is

no need to run the wizard and better doing each service separately as you need it.

