

# The CPT SharePoint 2016 VM Setup Guide

**Setup Time:** 3 to 5 hours

**Overview:** This setup guide is designed to assist you in building a virtual machine (VM) running SharePoint Server 2016 so that you can work through hands-on lab exercises from training courses created by Critical Path Training course that focus on SharePoint 2016, SQL Server 2016 and the Power BI platform. This setup guide can also be used to build a functional development environment running SQL Server 2016, SharePoint Server 2016 and Visual Studio 2015.

This guide begins by walking you through the process of using the Microsoft's Hyper-V to create a new VM and to install the Windows Server 2012 R2 operating system onto a new server VM named **WingtipServer**. You will then create a new Active Directory domain named **wingtip.com** by promoting **WingtipServer** to be a domain controller. After that, you will install SQL Server 2016. Next you will download the installation files for **SharePoint Server 2016**. You will then install and configure SharePoint 2016 and create all of the starting points needed by the lab files.

In later tasks, you will install **SharePoint Designer 2013** and **Visual Studio 2015**. Once you have completed all the tasks in this setup guide, you will have created a VM that can be used as the starting point for any of the SharePoint 2016 training course offered by Critical Path Training such as the Great SharePoint Adventure 2016.

## Task 1: Make Sure You Meet the Hardware Requirements

Before getting started, make sure you have a student workstation that meets the following requirements.

1. Make sure you have a host computer running Windows 10, Windows Server 2016 or Windows Server 2012 R2.
2. Make sure your host computer is configured to run Hyper-V.
3. Make sure your host computer has at least 120GB of free hard drive space
4. Make sure your host computer has enough RAM to run a VM with SharePoint Server 2016
  - a) 16GB is the recommended amount of RAM.
  - b) 12GB should be considered the minimum amount of RAM to achieve acceptable performance.
  - c) Running with less than 12GB of RAM of your host computer will likely lead to poor performance and is not recommended.
5. Make sure your host computer has a connection to the Internet.
  - a) The connection can be based on either a network card with a cable plugged in or a wireless connection.

Note that the instructions and the screenshots of the host computer and the Hyper-V environment in this document were created using Windows 10. Things will look a bit different with Hyper-V if you are running Windows Server 2016 or Windows Server 2012 R2. If you plan to build the VM with a different virtualization product such as VMWare, you will have to make adjustments as you move through this setup guide for the ways in which your virtualization product differs from Hyper-V.

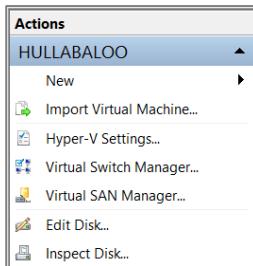
## Task 2: Configure the Hyper-V Network Adapters on the Host Computer

In this task you will configure two Hyper-V network adapters. This task involves creating two virtual switches in Hyper-V that will be used to configure both an internal network adapter and an external network adapter. The internal network adapter will be used to configure a static IP address in the VM. The external network adapter will be used to connect the VM to the Internet.

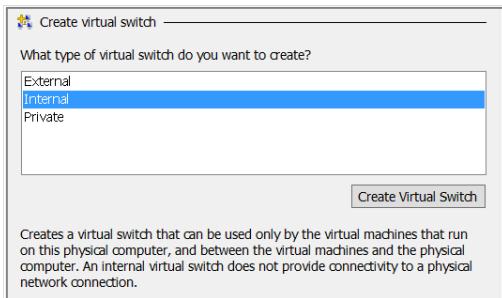
1. Launch the Hyper-V Manager: Start → Administrative Tools → Hyper-V Manager.

The host computer that was used to create the following screenshots is named **HULLABALOO**. Your screen will look a little different because your host computer will have a different name.

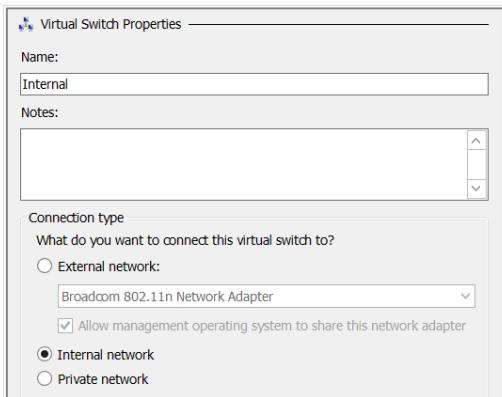
2. Create a new virtual switch named **Internal** for an internal network adapter:
  - a) In the **Actions** pane on the right-hand side of the screen, click **Virtual Switch Manager**.



- b) In the **Virtual Switch Manager** dialog, create a new virtual switch by selecting **Internal** and then clicking the **Create Virtual Switch** button.



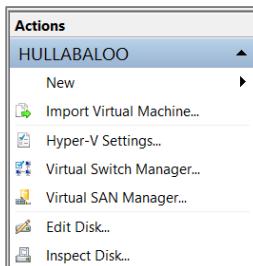
- c) Configure the new virtual switch with the following properties:
- Name:** Internal
  - Connection Type:** Internal network.



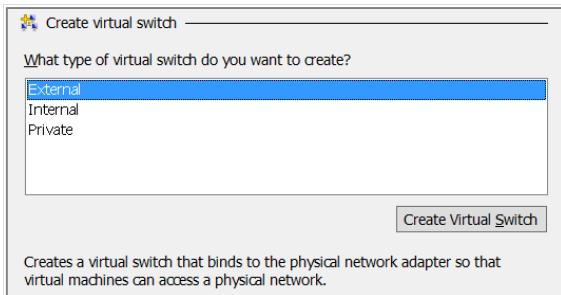
- d) Click **OK** to save your changes.

In the next step you will create an external virtual switch that will be used to connect the VM to the Internet. You can create this external network switch by using either a network adapter with a network cable plugged in or a wireless connection on your host computer. All that is required is that you create the virtual switch using a network adapter on your host computer that can connect to the Internet. The Internet connection is an essential part of the setup for this VM because it's required when running the Prerequisite Installer utility of SharePoint Server 2016.

3. Create a new virtual switch named **External** for an external network adapter:
- In the **Actions** pane on the right-hand side of the screen, click **Virtual Switch Manager**.



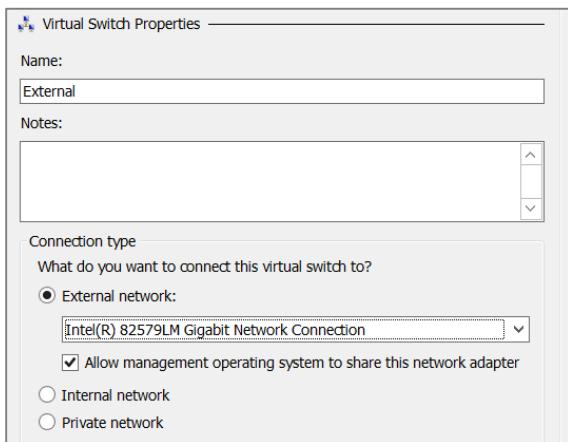
- b) In the **Virtual Switch Manager** dialog, create a new virtual switch by selecting **External** and then clicking the **Create Virtual Switch** button.



- c) Configure the new virtual switch with the following properties:

- i) **Name:** External
- ii) **Connection Type:** External network.

- (1) Make sure to select a network adapter or wireless connection from the host computer in the dropdown menu under the **External network** radio button.

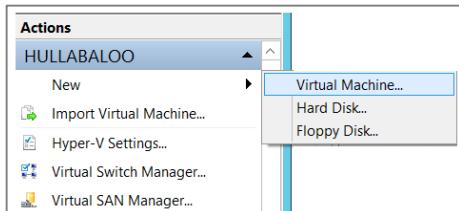


- d) Click **OK** to save your changes.

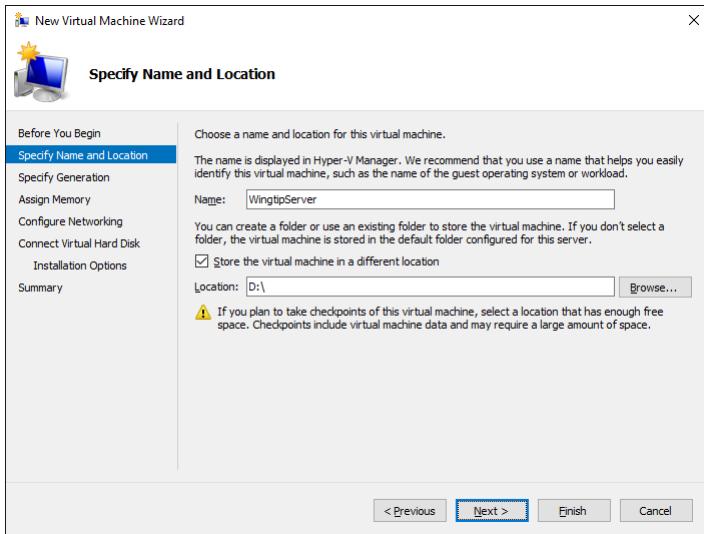
### Task 3: Create a new Virtual Machine (VM) using Hyper-V

To complete this task, you will create a new VM using the Hyper-V environment.

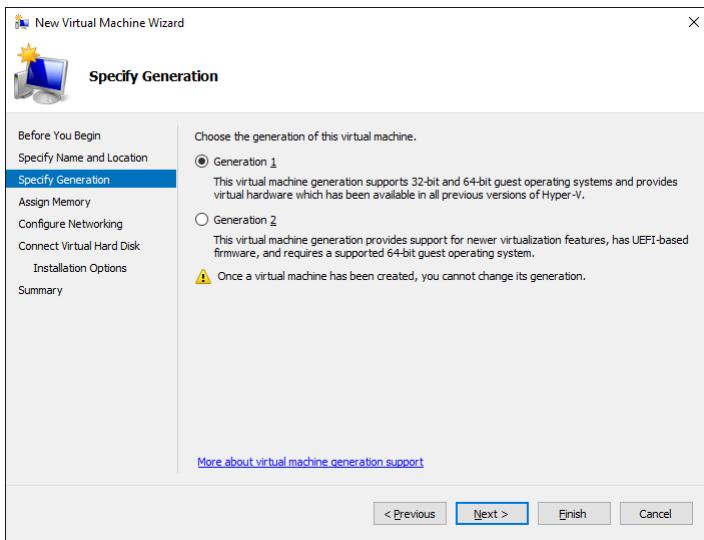
1. If it is not open, launch **Hyper-V Manager**.
2. On the left-hand side of **Hyper-V Manager**, locate the node with the name of the local host computer and select it.
3. In the Actions pane select **New** → **Virtual Machine**.
- a) When you execute this menu command, the Hyper-V Manager will launch the **New Virtual Machine Wizard**.



4. The New Virtual Machine Wizard begins with the Specify Name and location dialog.
  - a) Enter a Name of **WingtipServer**.
  - b) Select a folder path for the **Location** property where the virtual machine files will be stored. Ensure the **Location** path is hosted by a hard drive that has at least 100GB of free space. If possible, configure the **Location** path on a secondary hard drive that is different from the hard drive running the host operating system to improve the performance of your VM.
  - c) Click **Next** to move to the next page of the New Virtual Machine Wizard.



5. On the **Specify Generation** page, select **Generation 1** and then click **Next**.

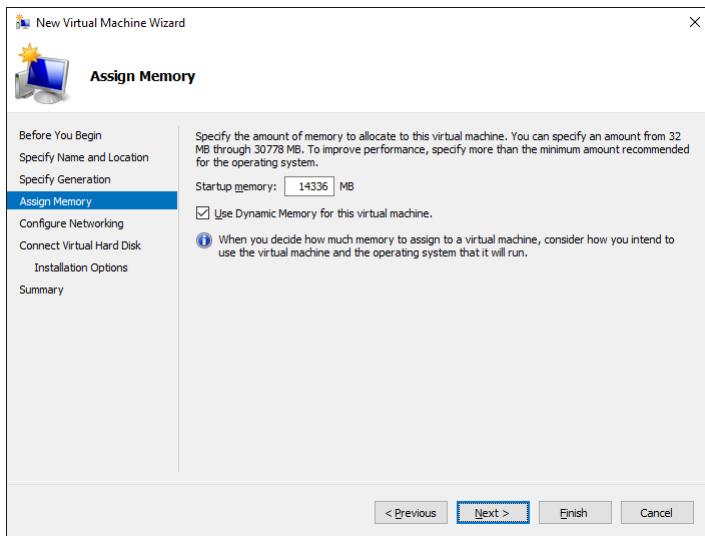


6. In the **Assign Memory** dialog, enter the amount of **Memory** to allocate to the virtual machine.

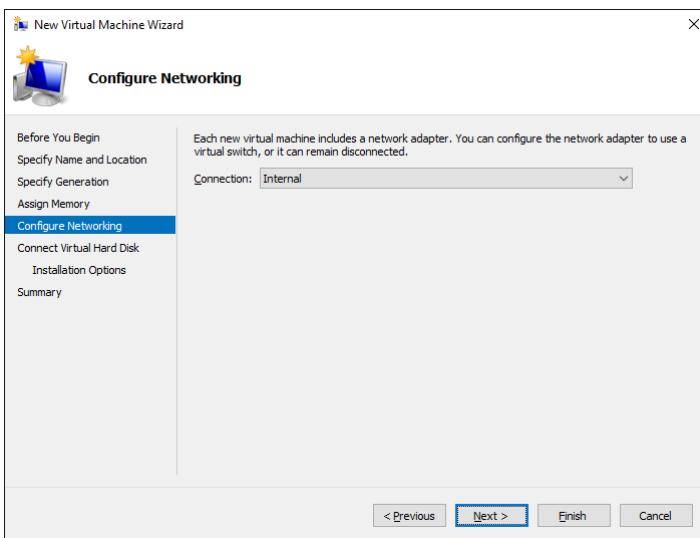
- a) Determine the amount of memory to use for the VM from the following table.

If host machine has this much RAM	Then configure the VM with this much RAM
16 GB or more	14 GB - configure the VM with <b>14336 MB</b> of RAM.
14 GB	12 GB - configure the VM with <b>12288 MB</b> of RAM.
12 GB	10 GB - configure the VM with <b>10240 MB</b> of RAM.
10 GB (not supported)	8 GB - configure the VM with <b>8192 MB</b> of RAM.
8 GB (not supported)	6.5 GB - configure the VM with <b>6656 MB</b> of RAM.

- b) Enter the amount of RAM you calculated in the previous step as the **Startup** memory property. Make sure you enter the number in megabytes (e.g. **14336 MB**). Finally, make sure to leave the **Use Dynamic Memory for this virtual machine** checkbox unchecked. Click **Next** to continue.

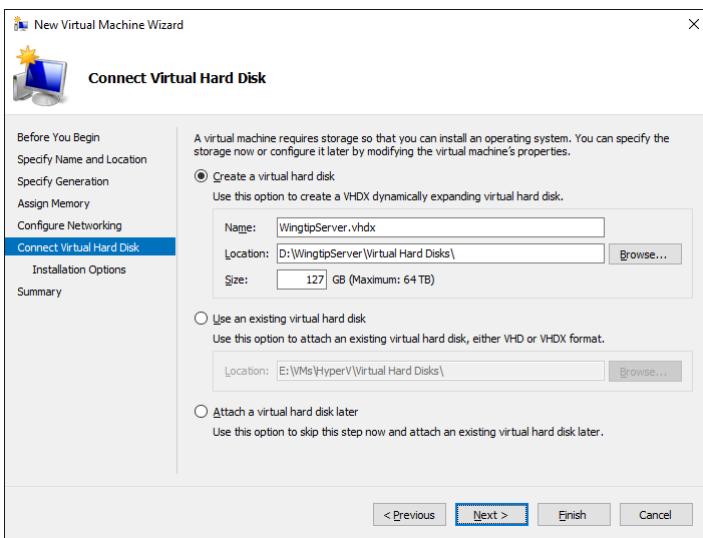


7. In the **Configure Networking** dialog, assign a **Connection** property of the Internal and click **Next**.

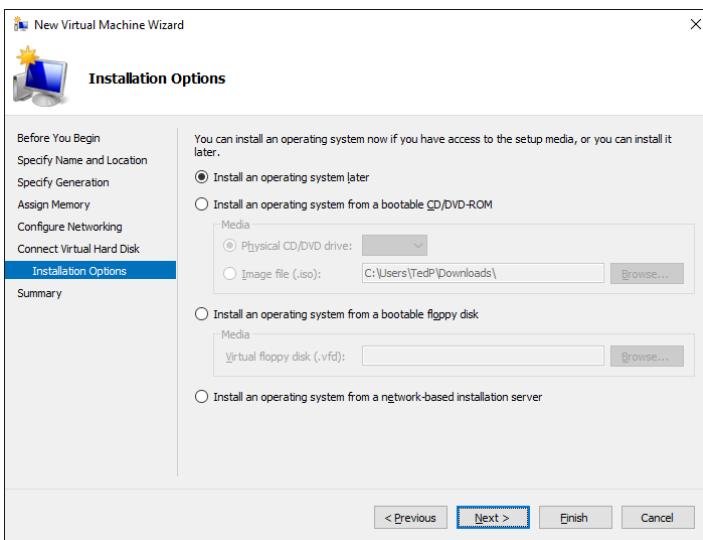


In the next step you will configure the file location for the files Hyper-V uses to store the VM. If possible, configure the VM file location on a separate physical drive that is different than the drive which holds the host computer's operating system. This is one of the best way to increase the performance of a VM.

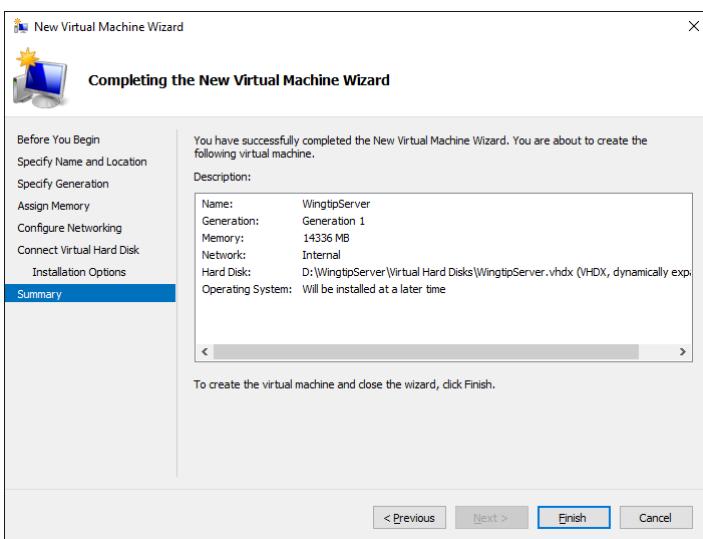
8. In the **Connect Virtual Hard Disk** dialog, accept the default option of **Create a virtual hard disk**. Make sure the **Location** is set to a directory in a local hard drive on our host computer that has at least 120 GB of free space. Click **Next**.



9. In the **Installation Options** dialog, accept the default option which is **Install an operating system later** and click **Next**.

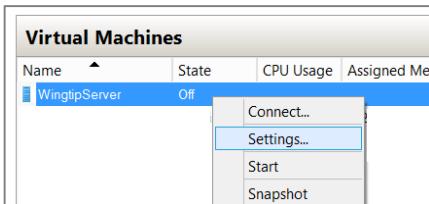


10. On the **Completing the New Virtual Machine Wizard** dialog, review the setting and verify that these settings are what you expected. Click **Finish** to create the new VM.



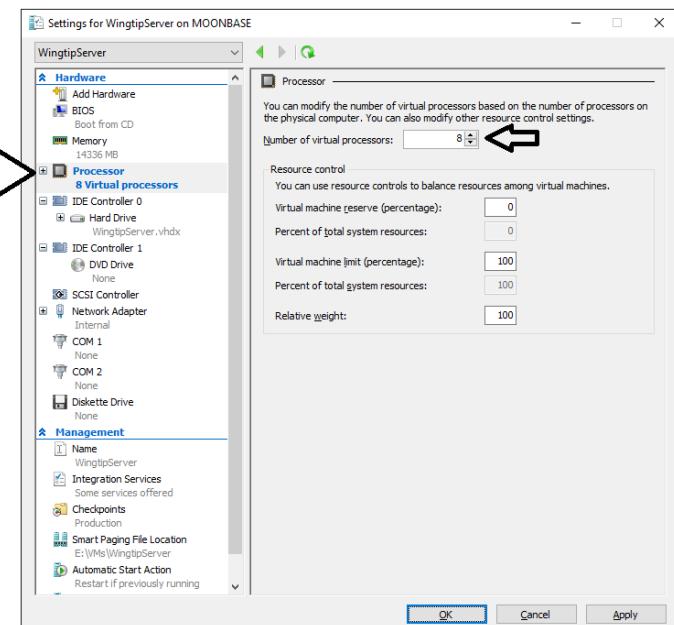
Even though you have finished going through the New Virtual Machine Wizard, there are still two more configuration changes you need to make on the VM before you are ready to install the Windows Server 2016 operating system.

11. In the **Hyper-V Manager** window, right-click the VM you just created and select **Settings**:



12. In the **Settings for WingtipServer** dialog, complete the following steps

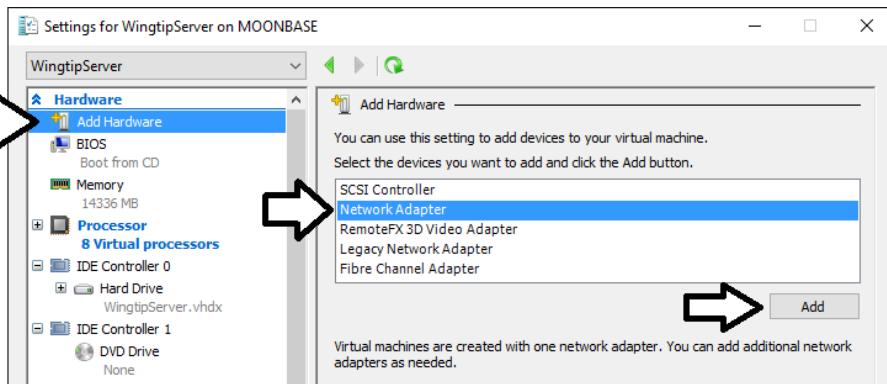
- Select the **Processor** setting and increment the **Number of processors** property value from its default value of **1** to the maximum allowable number for your host machine. You can increment the **Number of processors** property value using the up arrow in the spinner control to its right. Depending on the processor capabilities of your host computer, you should be able to increase this property to a value of either **2**, **4** or **8**.



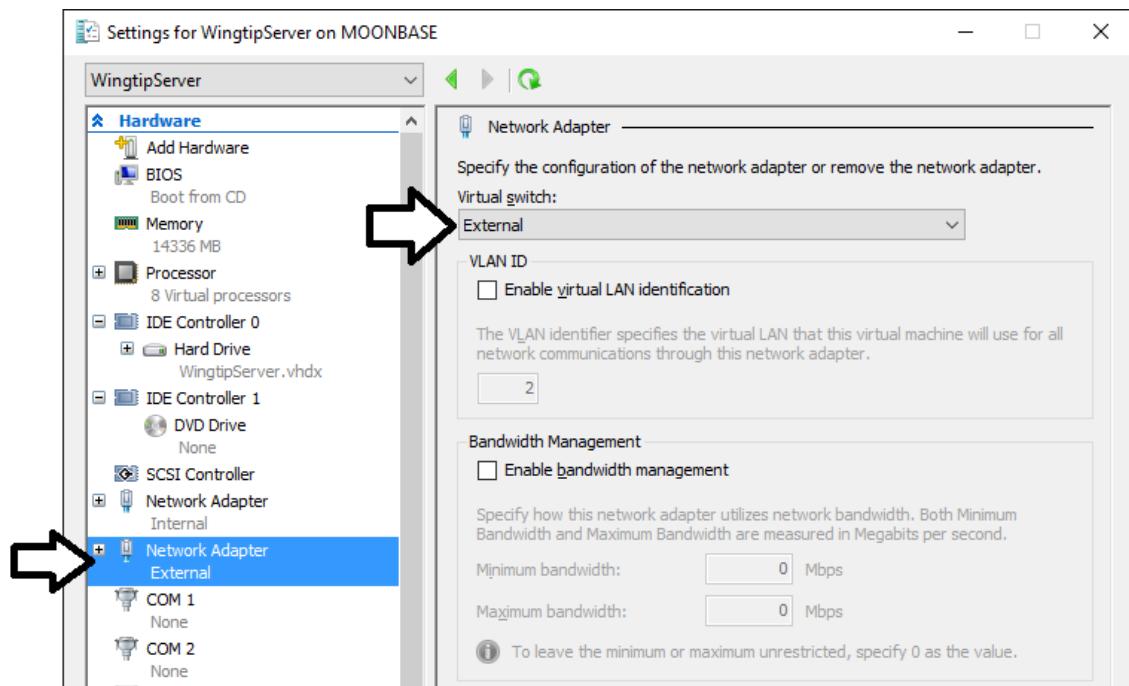
- Click the **Apply** button to save your changes to the **Number of virtual processors** property while leaving the dialog open.

13. Create a second network adapter in the VM.

- In the Settings for WingtipServer dialog, select Add Hardware. Next, select Network Adapter and click Add:



- Once the new Network Adapter has been created, do **not** assign a **Virtual switch** yet. In an upcoming task later in this setup guide you will bind this network adapter to the **External** virtual switch. For now, however, you should leave the **Virtual switch** setting with its default value of **Not connected**.



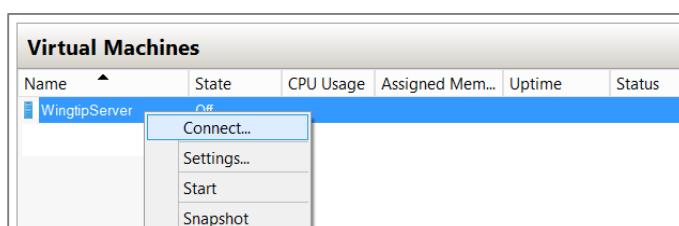
- c) Click **OK** to save the changes you have made to the VM.

At this point you have created and configured a new VM. You are now ready to install Windows Server 2016.

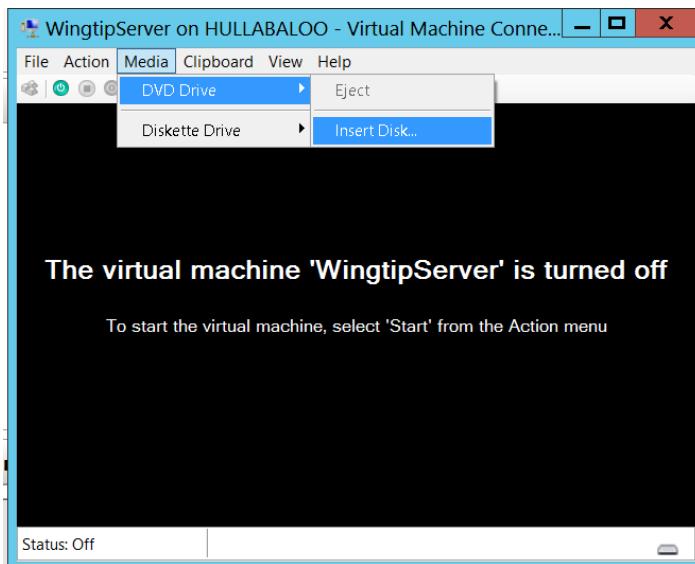
#### Task 4: Install the Windows Server 2012 R2 Operating System

You will begin this task by acquiring the installation files and optionally a product key for Windows Server 2012 R2. After that you will move through the steps of installing the operating system and configuring the VM as a server computer named **WingtipServer**.

1. Obtain a copy of the Windows Server 2012 R2 install binaries.
  - a) Choose between using your own licensed copy of Windows Server 2012 R2 or using a free trial version.
    - i) Note that downloading the free trial version will require that you have a TechNet or an MSDN subscription.
  - b) If you plan to use a licensed copy, acquire the install image (\*.iso) for Windows Server 2012 R2 and the product key.
  - c) If you plan to use a free trial copy of Windows Server 2012 R2, follow these steps:
    - i) Navigate to the evaluation download page at <http://technet.microsoft.com/en-us/evalcenter/hh670538.aspx>.
    - ii) Find the **Download the Evaluation ISO** section and click the **Get Started Now** button underneath to begin the download.
    - iii) When prompted, log in using the credentials for your TechNet or MSDN subscription.
    - iv) Work through the instructions for downloading the Windows Server 2012 installation files in the .ISO file format.
    - v) When you are done, you should have successfully downloaded the .ISO file with the Windows Server 2012 installation files to the hard drive of your host computer.
2. Mount the .ISO file so the **WingtipServer** VM recognizes it as a DVD.
  - a) Navigate to Hyper-V Manager.
  - b) Right-click the **WingtipServer** VM and select the **Connect...** command to display the Hyper-V console window for this VM.



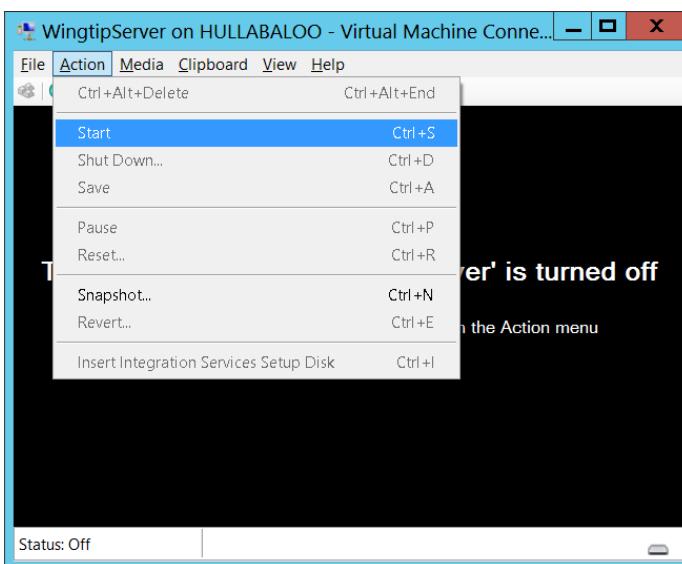
- c) In the Hyper-V console windows for the **WingtipServer** VM, select the **Insert Disk...** command.



- d) When the **Open File** dialog appears, enter the path to the .ISO file with the Windows Server 2012 installation files.  
e) Click **OK**.

3. Start the **WingtipServer** VM.

- a) In the Hyper-V console windows for **WingtipServer**, select the **Start** command from the **Action** menu to start up the VM.

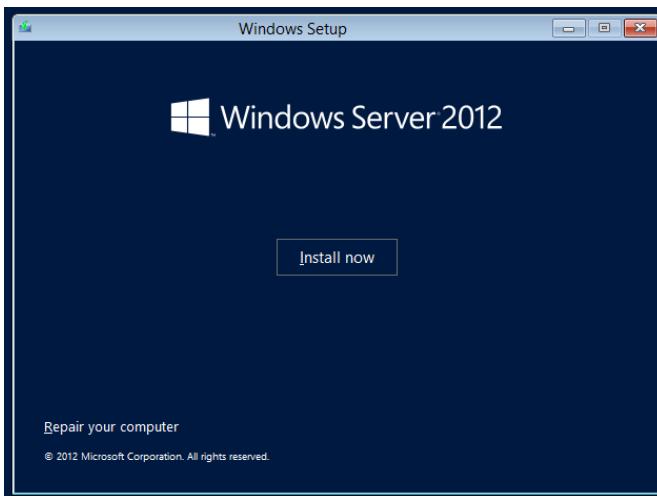


When the **WingtipServer** VM starts, it should automatically start the Windows Server 2012 installation program.

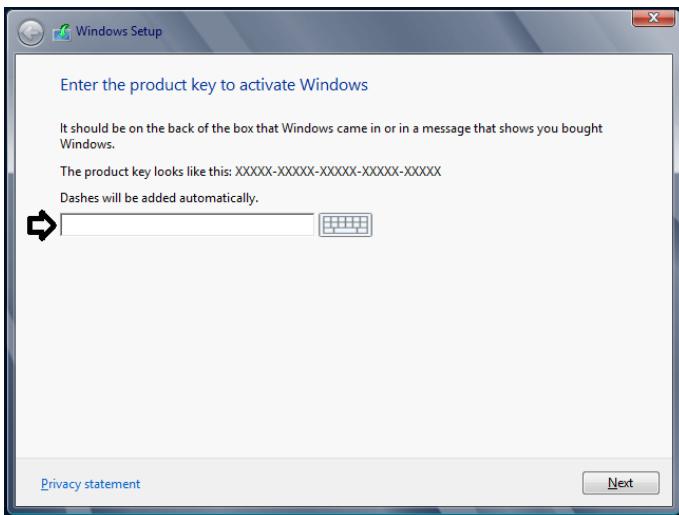
4. After the setup program for Windows Server 2012 loads, it will prompt you with a dialog asking you to select a language. Accept the default of **English** and click **Install** to continue.



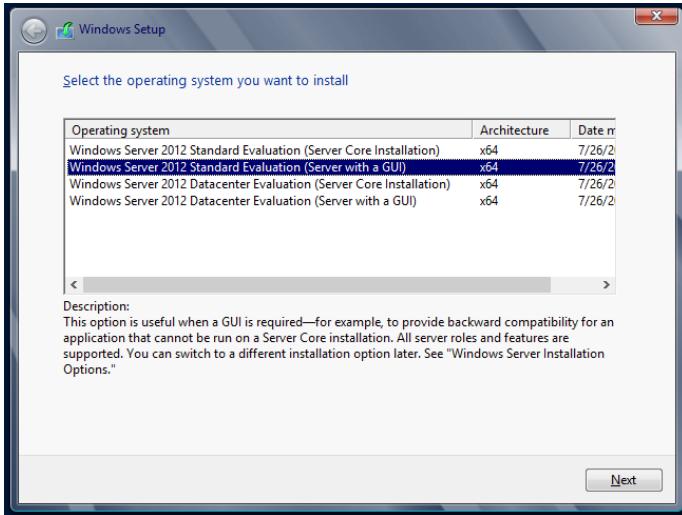
5. At the next dialog, click the **Install Now** button to begin the installation.



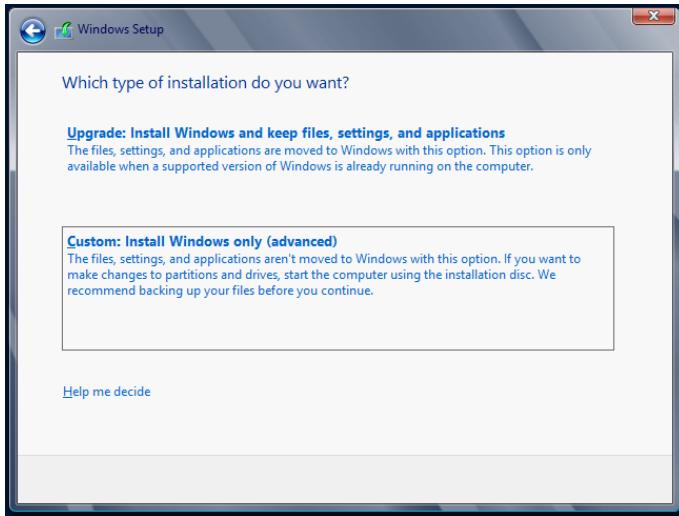
6. Depending on the type of installation files you have for Windows Server 2012, you might be prompted with a dialog which asks you to provide your Windows Server 2012 product key. If so, enter your product key and click **Next**.



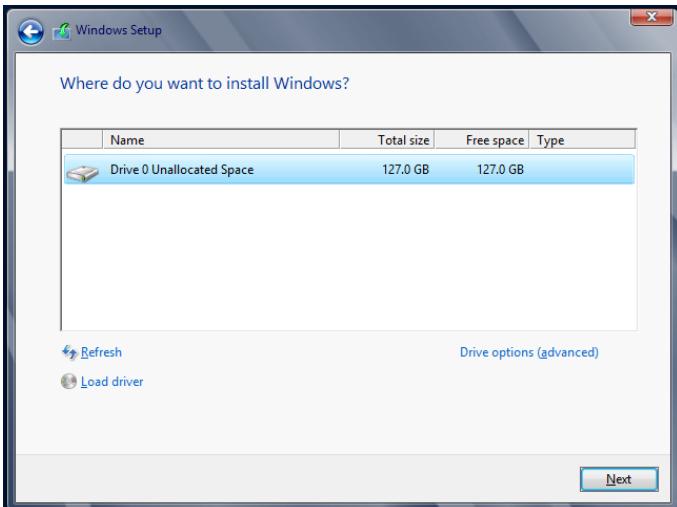
7. Depending on the type of installation files you have for Windows Server 2012, you might be prompted with a dialog which asks you to select the operating system you want to install. If so, select the **64-bit edition of Windows Server 2012 Standard Evaluation (Server with a GUI)** and click **Next**.



8. On the following dialog, agree to the licensing terms and click **Next**.
9. The next dialog prompts you with the question **Which type of installation do you want?**
  - a) Select the installation type of Custom: Install Windows only (advanced)
  - b) Click **Next**.

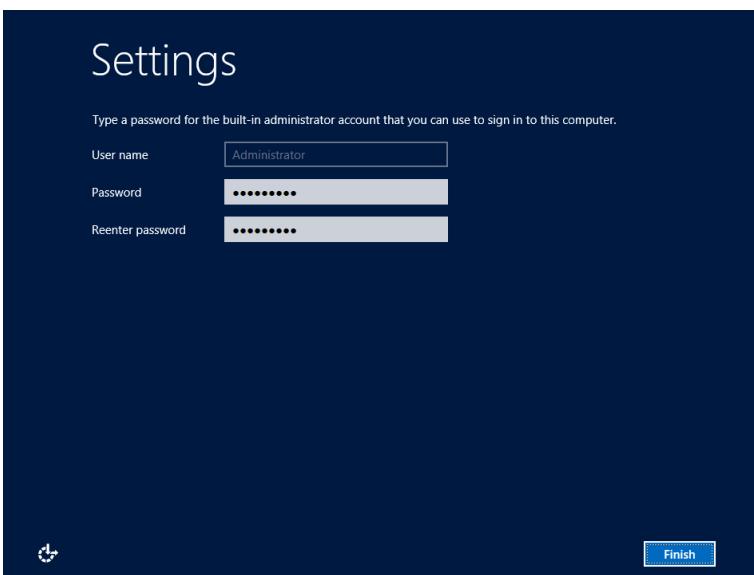


10. The next dialog asks you where you want to install Windows.
  - a) Accept the default configuration which uses a location of **Disk 0 Unallocated Space** as shown below.
  - b) Click **Next** to continue.

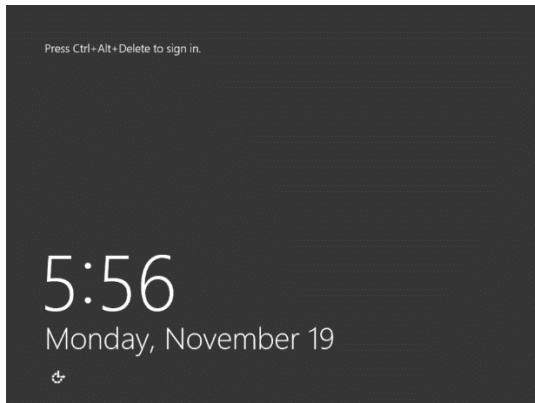


At this point you have given the Windows setup program enough information to install the basic operating system. The Windows Server 2012 setup program will now run for several minutes as it copies and expands files and installs Windows features. You now have a few minutes to get a cup of coffee or catch up on email.

11. Wait until the Windows Server 2012 setup program completes
12. When the setup program has completed, it will prompt you to assign a new password for the **Administrator** account.
  - a) Click **OK** to continue and reset the administrator password.
  - b) Set the password for the **Administrator** account to **Password1**.



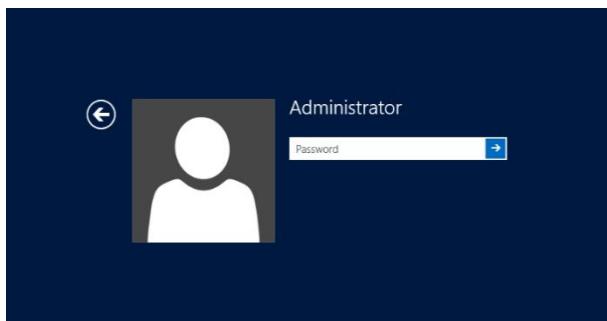
- c) After you have updated the **Administrator** password, you will get a confirmation that the update was successful.
- d) Click **OK** to complete the basic installation of the operating system.
- e) When you click **OK** in the previous step, you will be logged off of the VM and the Hyper-V console window will then display the current date and time as well as the message **Press Ctrl + Alt + Delete to sign in**.



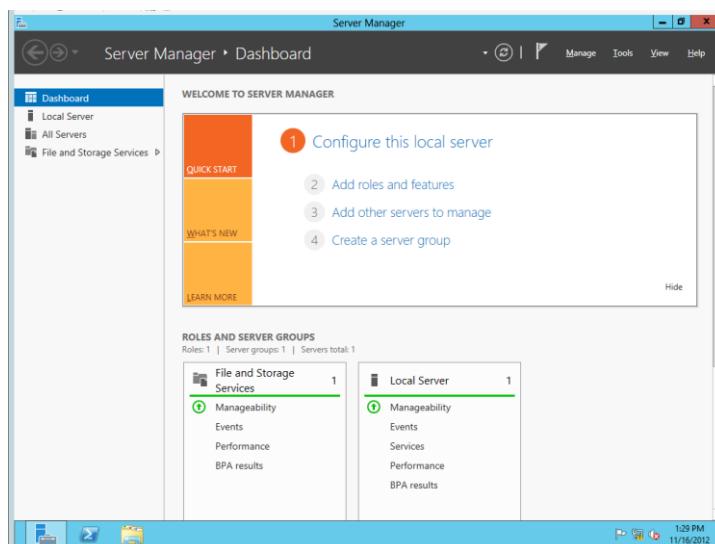
At this point, you have installed the basic operating system for Windows Server 2012 but there are several more configuration changes that you must make. Over the next few steps you will complete the required configuration by changing the computer name of the VM and making a few additional changes to the configuration of the operating system.

13. Log onto the VM using the local **Administrator** account.

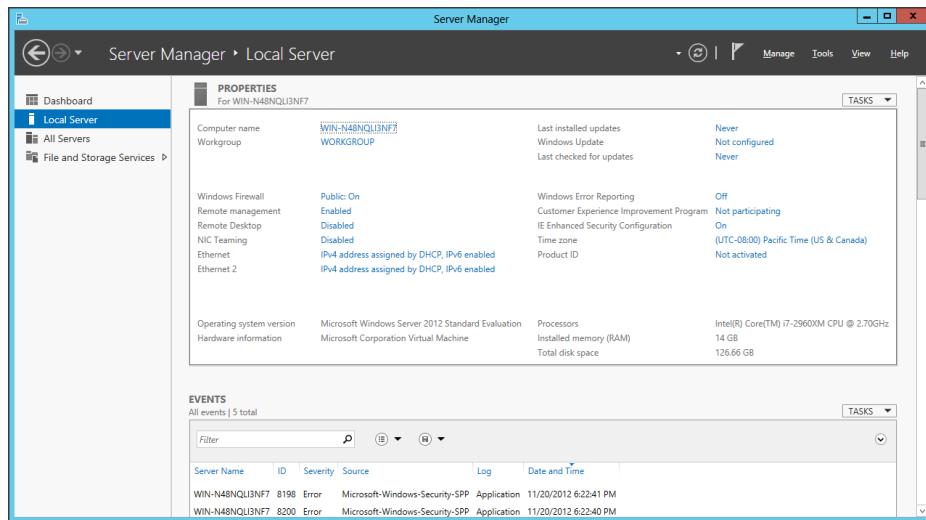
- Do not attempt to log on by pressing the **Ctrl + Alt + Delete**. This keyboard combination will be sent to the host computer instead of the VM running inside Hyper-V.
- Log on to the VM by pressing the **Ctrl + Alt + End** keyboard combination or by selecting the **Ctrl + Alt + Delete** menu command inside the **Action** menu of the Hyper-V console window. When prompted to log on to the **Administrator** account, provide a password of **Password1**.



14. When you log in, Windows Server 2012 automatically displays the **Dashboard** page of the **Server Manager**. If you look at the left-hand portion of the screen, you will notice several navigation links including **Dashboard**, **Local Server**, **All Servers** and **File and Storage Services**.

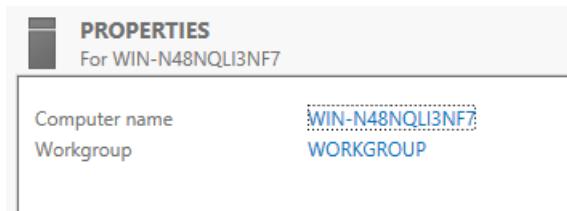


15. Click on **Local Server** link to navigate the main page used to update configuration properties of the local machine. You can see on the right-hand side of the screen there is a large section with a title of **Properties** which displays selected properties of the local machine.

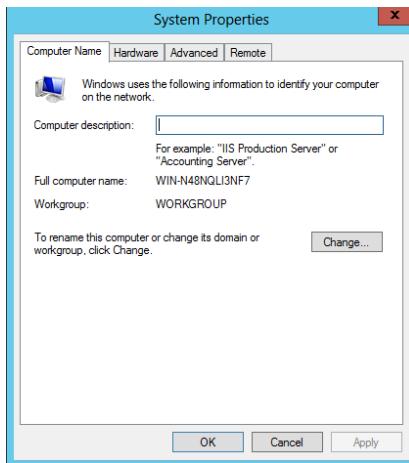


16. Change the **Computer name** of the VM to **WingtipServer**.

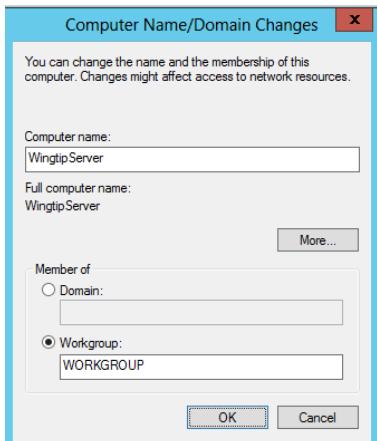
- a) Locate the **Computer name** property which is listed first in the **Properties** section. The current computer name was created by the Windows installation program as part of the initial setup of the operating system. Click on the value of the **Computer name** property to modify it.



- b) At this point you should be at the **Computer Name** tab of the **System Properties** dialog. Click on the **Change** button to update the **Computer name** property.



- c) In the **Computer Name/Domain Changes** dialog, change the **Computer name** property to **WingtipServer**. Click **OK** to save your changes.



- d) When you modify the **Computer name** property, Windows prompts you with a dialog that tells you the machine needs to be restarted to apply the change. Choose **OK** to restart.
- e) After the VM has restarted, log in again using **[Administrator | Password1] (username / password)**.
17. Once you have logged back onto the VM, navigate back to the **Server Manager** and click the **Local Server** node. At this point, you should be able to see the **Properties for WingtipServer** section in the **Server Manager**.

PROPERTIES			
For WingtipServer			
Computer name	WingtipServer	Last installed updates	Never
Workgroup	WORKGROUP	Windows Update	Not configured
		Last checked for updates	Never
Windows Firewall	Public: On	Windows Error Reporting	Off
Remote management	Enabled	Customer Experience Improvement Program	Not participating
Remote Desktop	Disabled	IE Enhanced Security Configuration	On
NIC Teaming	Disabled	Time zone	(UTC-08:00) Pacific Time (US & Canada)
Ethernet	IPv4 address assigned by DHCP, IPv6 enabled	Product ID	Not activated
Ethernet 2	IPv4 address assigned by DHCP, IPv6 enabled		
Operating system version	Microsoft Windows Server 2012 Standard Evaluation	Processors	Intel(R) Core(TM) i7-2960XM CPU @ 2.70GHz
Hardware information	Microsoft Corporation Virtual Machine	Installed memory (RAM)	14 GB
		Total disk space	126.66 GB

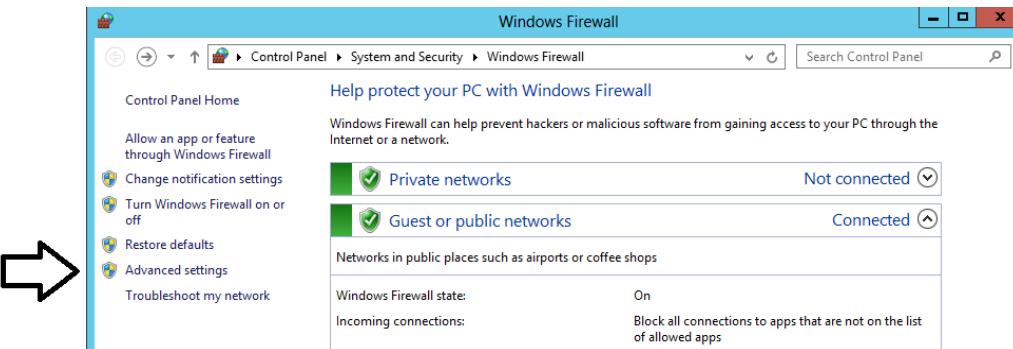
#### 18. Disable Enhanced Security Configuration.

- a) In the Properties for WingtipServer section of the Server Manager, locate the IE Enhanced Security Configuration property in the right-hand column.
- b) You should be able to see that the **Enhanced Security Configuration** mode is configured to be on by default.
- c) Click on the value of On to display the Internet Explorer Enhanced Security Configuration dialog. This will display the Internet Explorer Enhanced Security Configuration dialog.
- d) In the Internet Explorer Enhanced Security Configuration dialog, disable Enhanced Security Configuration for both Administrators and Users by selecting the Off radio buttons as shown below and then click OK.

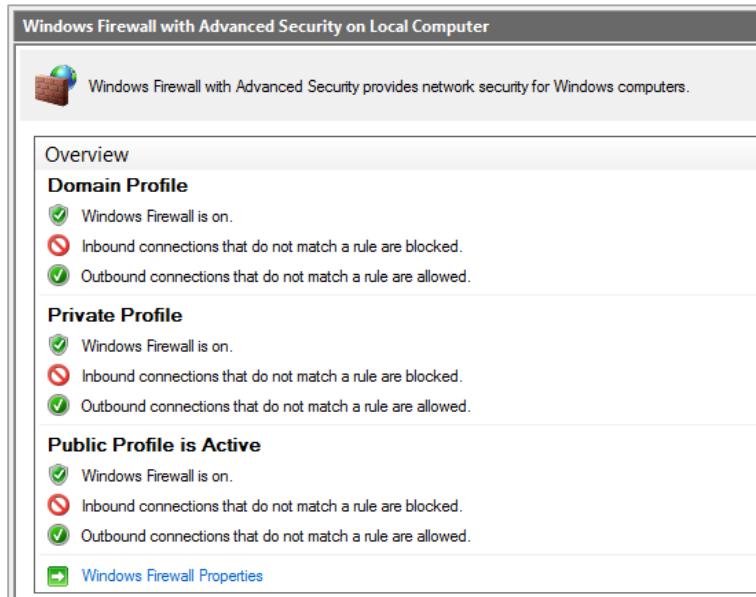


19. Disable the Windows Firewall.

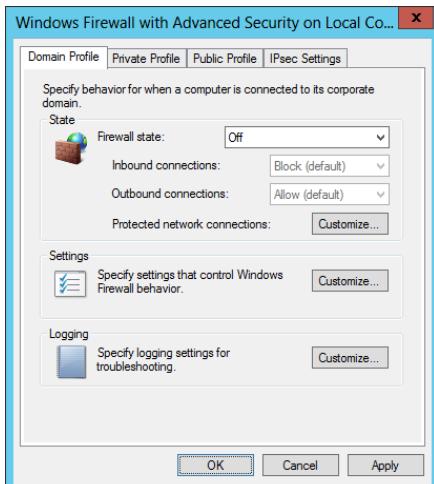
- In the **Properties for WingtipServer** section of the **Server Manager**, locate the **Windows Firewall** property which shows an initial value of **Public: On**. Click on the value of **Public: On** to display the **Windows Firewall** dialog.
- In the Windows Firewall dialog, locate and click the Advanced Settings link to display the Windows Firewall Advanced Settings dialog.



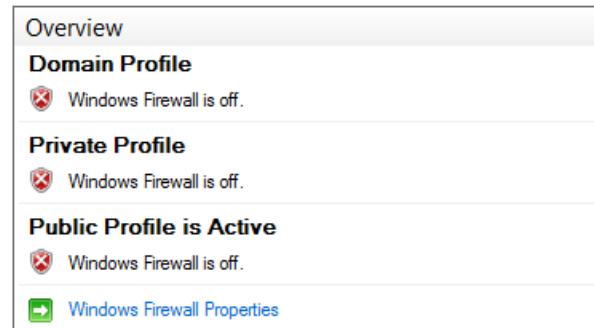
- In the **Windows Firewall Advanced Settings** dialog, you should be able to see that the Windows Firewall for the **Domain Profile**, the **Private Profile** and the **Public Profile** are all enabled. Locate and click the **Windows Firewall Properties** link at the bottom of the **Overview** section to display a tabbed dialog with the title of the **Windows Firewall with Advanced Security on Local Computer**.



- In the **Domain Profile** tab of the **Windows Firewall with Advanced Security on Local Computer** dialog, change the **Firewall state** property setting from **On** to **Off**. Click **Apply** to save your changes while leaving the tabbed dialog open.

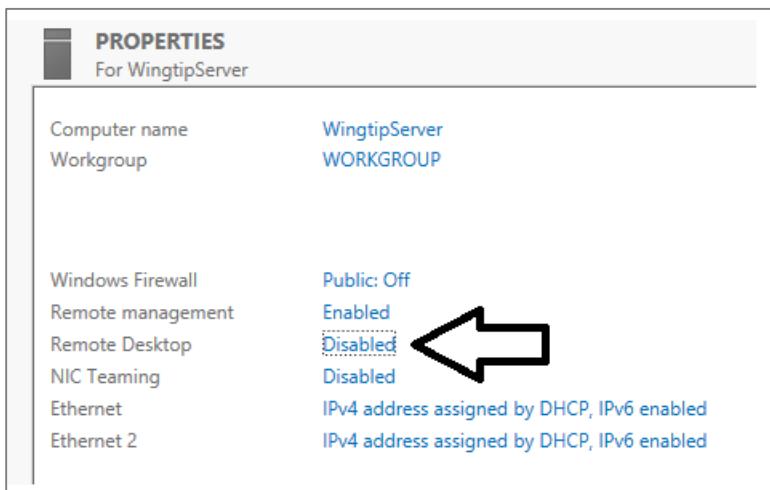


- e) Once you have configured the **Firewall state** property to **Off** on the **Domain Profile** tab, go to the **Private Profile** tab and then the **Public Profile** tab and follow the same steps to disable the firewall for these profiles as well.
- f) Once you have turned off the firewall for all three profiles, click **OK** to dismiss the dialog. You should be able to verify in the **Overview** section of the **Windows Firewall Advanced Settings** dialog that the Windows Firewall has been turned off for the **Domain Profile**, the **Private Profile** and the **Public Profile**.

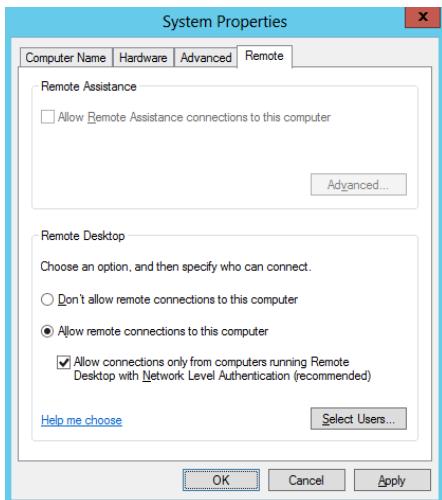


20. Enable Remote Desktop for your VM:

- a) Navigate back to the **Server Manager** and click the **Local Server** node. At this point, you should be able to see the **Properties for WingtipServer** section in the **Server Manager**.
- b) Look inside the **Properties for WingtipServer** section and locate the **Remote Desktop** property which has an initial value of **Disabled**.

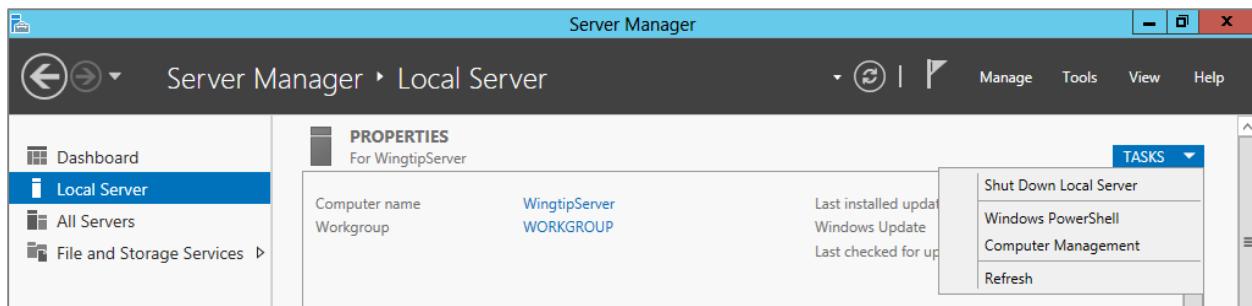


- c) Click on the **Remote Desktop** property value of **Disabled**. This will display the **Remote** tab of the **System Properties** dialog.
  - i) Select the radio button option **Allow for remote connections to this computer**.
  - ii) Check **Allow connections only from computers running Remote Desktop with Network Level Authentication**.
  - iii) Click **OK** to save changes and dismiss the **System Properties** dialog.

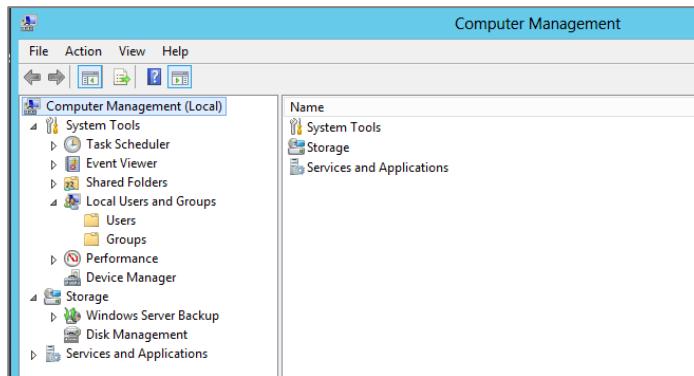


21. Configure the local **Administrators** account so the password never expires.

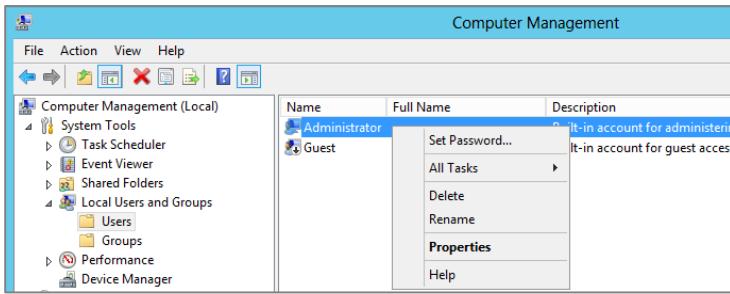
- Navigate to the Properties for WingtipServer section of Server Manager > Local Server.
- Look at the top-right corner of the **Properties for WingtipServer** section and locate the **Tasks** menu. Drop down the **Tasks** menu and select the **Computer Management** menu command to display the Windows server **Computer Management** utility.



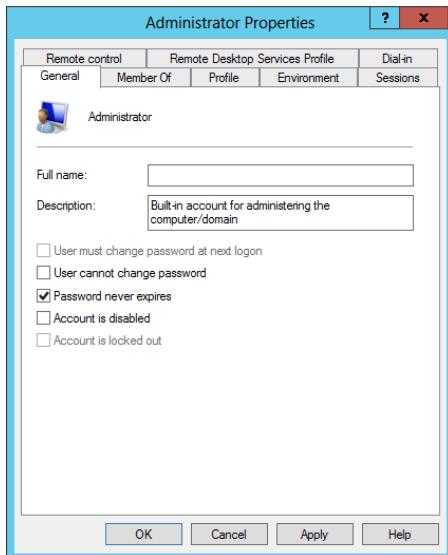
- When the **Computer Management** utility appears, you can see that it provides a tree view control of nodes that represent various configurable components and services on the local machine. Within this collection of nodes, you should be able to locate the **Local Users and Groups** node.



- Navigate to **Local Users and Groups** → **Users** and locate the local **Administrator** account.
- Right-click on the **Administrator** account and click **Properties**.



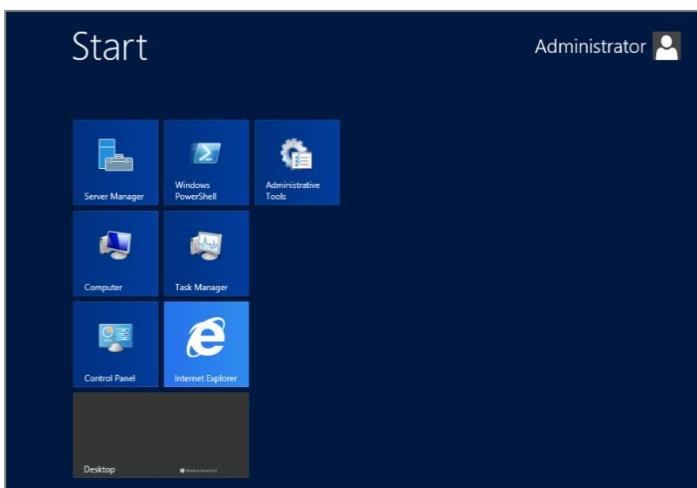
- f) In the Administrator Properties dialog, select the option for Password never expires.



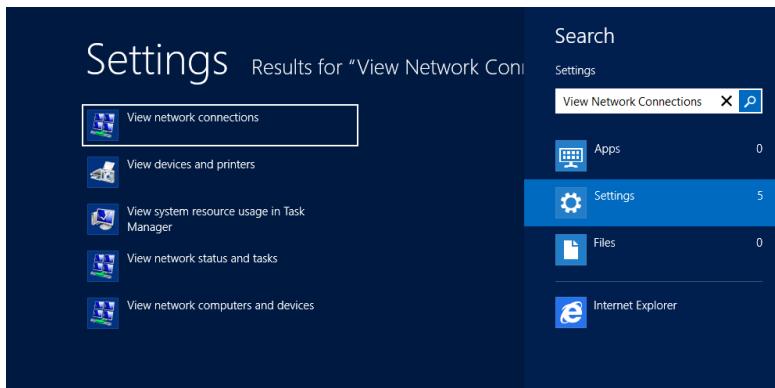
- g) Click **OK** to save your changes and close the **Administrator Properties** dialog.  
 h) Return to the **Local Server** page of the **Server Manager**.

22. Rename the two network connections so you can tell them apart.

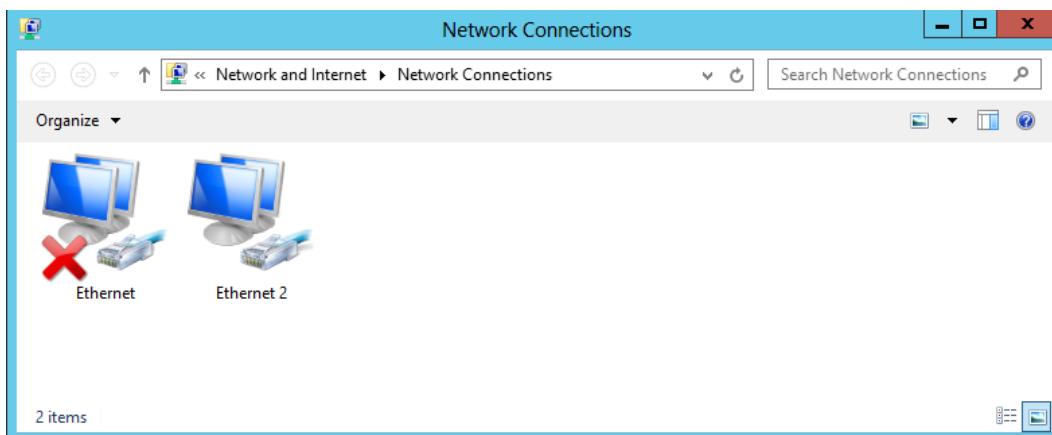
- a) Press the **Windows** key on the keyboard to bring up the Windows Server 2012 **Start page**.  
 b) Your **Start page** should appear as the one shown below.



- c) With the **Start page** showing, go to the keyboard and type in "**View Network Connections**". Click on the **Settings** link on the right as shown in the following screenshot. You should see that Windows found the **View network connections** page. Click on **View network connections** to navigate to that page.

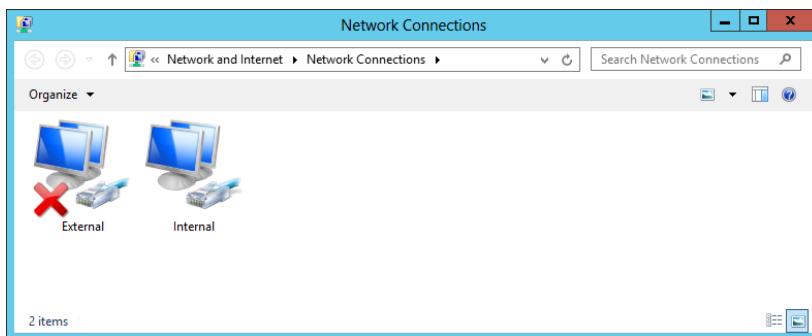


- d) On the **View network connections** page, you should see that the VM has two network connections. You should also be able to see that one of them is connected and the other one with the big red X is disconnected.



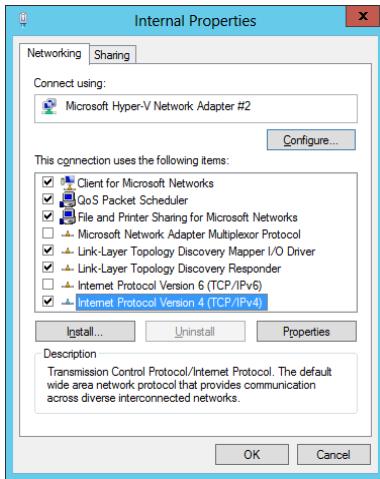
The network connection which is connected is based on network adapter for the VM which is assigned to the virtual switch named **Internal**. The other network connection which is disconnected (e.g. unplugged) has a network adapter that is not currently assigned to a virtual switch. The reason we had you leave the second network adapter unassigned earlier in the setup guide is that it makes it easier to see which network connection is which when initially configuring the VM.

- e) Right-click the network connection which is connected and select **Rename**. Give it a name of **Internal**.  
f) Right-click the network connection which is disconnected and select **Rename**. Give it a name of **External**.

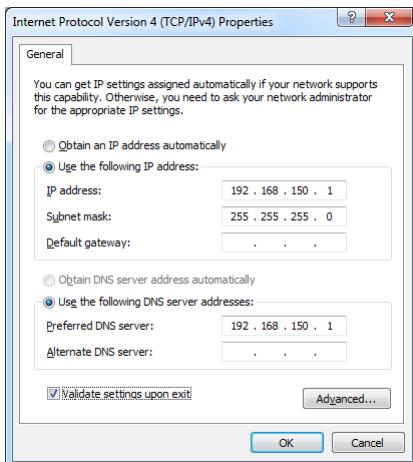


23. Configure a static IP address on **Internal** network connection.

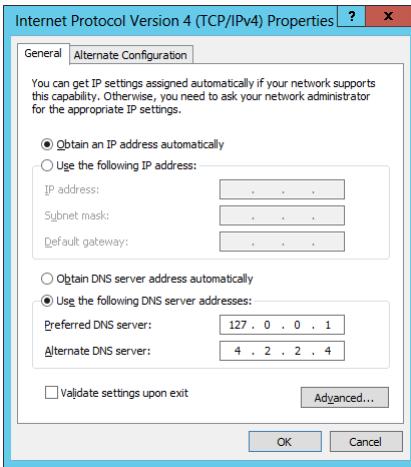
- Right-click the **Internal** network connection and select **Properties**.
- Uncheck the item Internet Protocol Version 6 (TCP/IPv6)
- In the Internal Properties dialog, select the Internet Protocol Version 4 (TCP/IPv4) item and click **Properties**.



- d) In the **Internet Protocol Version 4 Properties** dialog, select the option **Use the following IP address** and enter the following configuration settings:
  - i) IP Address: 192.168.150.1
  - ii) Subnet mask: 255.255.255.0
- e) In the **Internet Protocol Version 4 Properties** dialog, select the option **Use the following DNS Server Addresses** and enter the following configuration setting:
  - i) Preferred DNS Server: 192.168.150.1



- f) Click **OK** to accept the IP settings and **Close** the **Internet Protocol Version 4** dialog.
24. Configure the **External** network connection inside the VM to connect to the Internet:
- a) Open the **Network Connections** window if it is not still open using the same steps from the previous step.
  - b) Right-click the **External** network connection and select **Properties** to display the **External Properties** dialog.
  - c) Uncheck the item Internet Protocol Version 6 (TCP/IPv6)
  - d) Select the Internet Protocol Version 4 (TCP/IPv4) item and click Properties.
  - e) Enter the following information into the resulting dialog to configure the network connections IP settings:
    - i) Select the radio button option **Obtain an IP Address Automatically**
    - ii) Select the radio button option **Use the following DNS server addresses**.
    - iii) Set the **Preferred DNS Server** to **127.0.0.1**.
    - iv) Set the **Alternate DNS Server** to **4.2.2.4**.

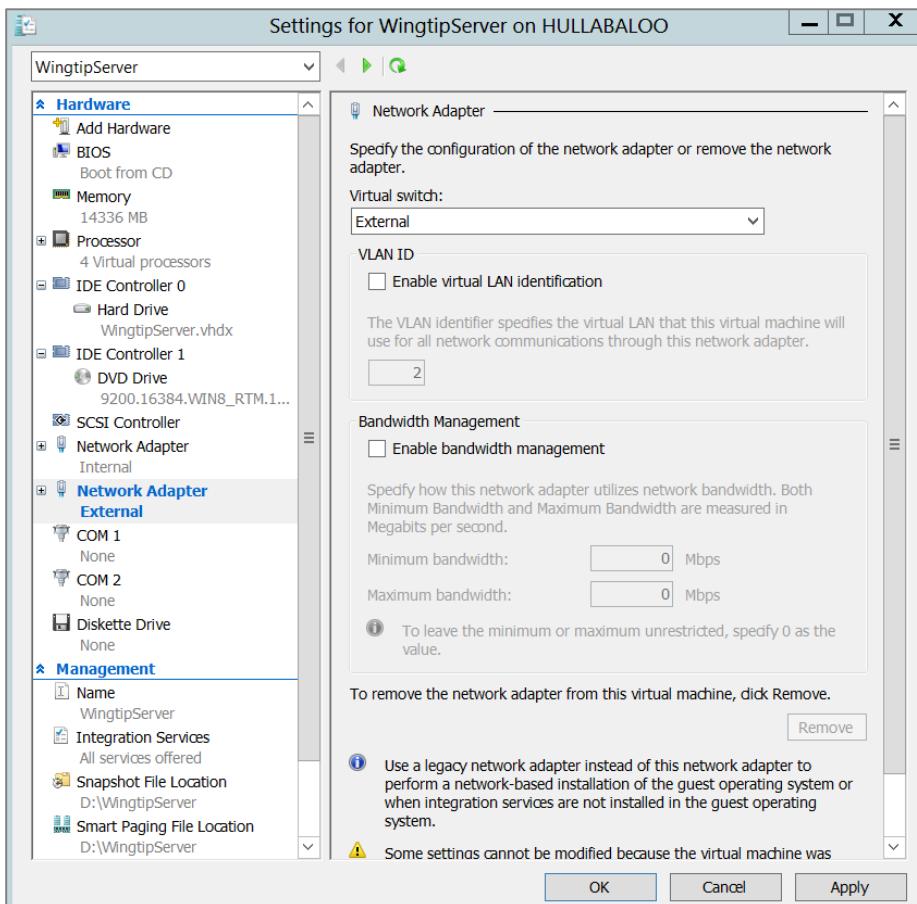


- f) Click **OK** to accept the IP settings and **Close** the **Internet Protocol Version 4** dialog.

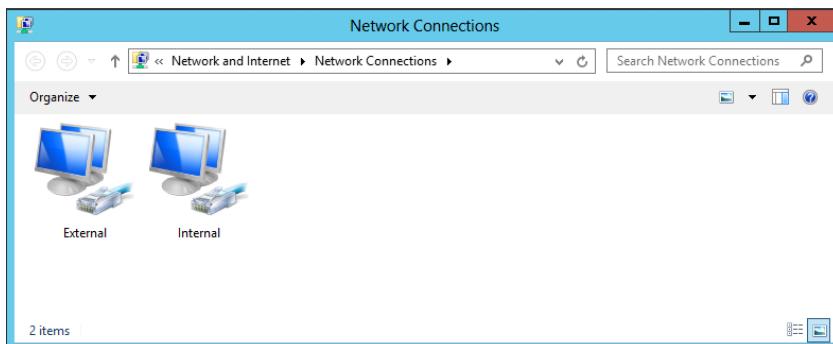
Setting the DNS server addresses for the **External** network connection is important. These settings will ensure that the VM always looks to its local DNS service first when attempting to resolve an Internet domain name to an IP address. The second IP address of **4.2.2.4** is a well-known address of a DNS server on the Internet. This configuration ensures that the VM will always have a secondary DNS service to look up domains on the Internet that the local DNS service cannot find.

## 25. Reconfigure the VM's network adapter in Hyper-V to bind it to the **External** virtual switch.

- Go back to the host computer and open the Hyper-V Manager.
- In the Hyper-V Manager window, right-click the VM named **WingtipServer** and select **Settings**.
- Select the second Network Adapter, the one that is not connected.
- For the **Virtual switch** setting, select **External** and click **OK**. This will effectively connect the **External** network connection in the **WingtipServer** VM to your local LAN and your local DHCP service.



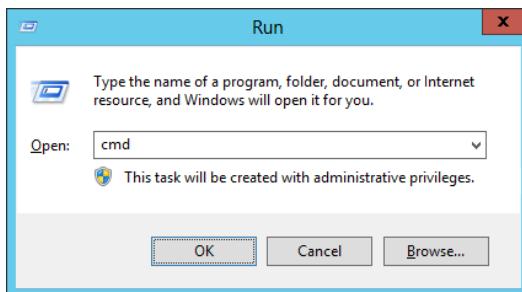
- e) Return back into the user interface of the **WingtipServer** VM.
- f) Navigate back to the **View network connections** page. You should now see that both network connections show they are connected. In other words, the big red X should have disappeared.



- g) Refresh the **External** network connection
  - i) Select the **External** network connection you just plugged in
  - ii) With the **External** network connection selected, click the **Disable this Network Device** button in the toolbar.
  - iii) With the **External** network connection selected, click the **Enable this Network Device** button in the toolbar
  - iv) When the network connection is re-enabled, Windows uses the **External** network connection to call out to the local DHCP service to acquire an IP address that will make it possible for the **WingtipServer** VM to access the Internet.
  - v) Open the Internet Explorer and browse to a site on the Internet such as <http://www.bing.com>. You should be able to browse sites on the Internet without any problems.

26. Run the **ipconfig.exe** utility to verify that the VM's IP addresses have been configured properly.

- a) Press the **Windows** key + **R** key keyboard combination to bring up the Windows **Run** menu.
- b) In the **Run** dialog, type in **cmd** and click **OK** to bring up a standard Windows command prompt.



- c) In the command prompt, run the **ipconfig** command to view the IP addresses that have been assigned to the **WingtipServer** VM. You should be able to verify that that the **Internal** network connection has the static IP address you assigned which is **192.168.150.1**. You should also be able to verify that that the **External** network connection has been assigned a dynamic IP address by your local DHCP service.

```

Administrator: C:\Windows\system32\cmd.exe
Microsoft Windows [Version 6.2.9200]
(c) 2012 Microsoft Corporation. All rights reserved.

C:\Users\Administrator>ipconfig

Windows IP Configuration

Ethernet adapter Internal:
  Connection-specific DNS Suffix . : 
  Link-local IPv6 Address . . . . . : fe80::dcc4:af3:134f:925fx13
  IPv4 Address . . . . . : 192.168.150.1
  Subnet Mask . . . . . : 255.255.255.0
  Default Gateway . . . . . : 

Ethernet adapter External:
  Connection-specific DNS Suffix . : home
  Link-local IPv6 Address . . . . . : fe80::d85e:f616:3923:18b3x12
  IPv4 Address . . . . . : 192.168.1.2
  Subnet Mask . . . . . : 255.255.255.0
  Default Gateway . . . . . : 192.168.1.1

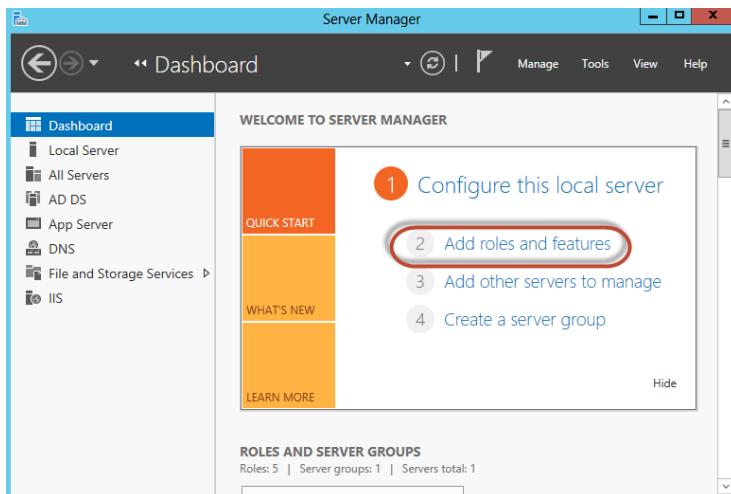
```

27. Enable the Windows Server Desktop Experience feature in the Wingtip Server VM.

- a) Open the **Server Manager**; If necessary, Click the **Server Manager Icon** in the lower left corner of the Windows Server 2012 screen.

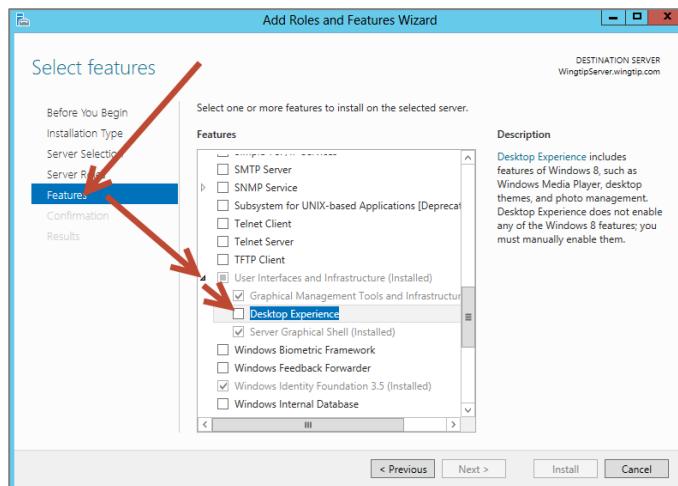


- b) On Server Manager in the right side of the dialog box click **Add roles and features** then Click **Next →Next**



- c) In the Add Roles and Features Wizard:

- Click on **Features** in the left-hand side Select features area
- In the Features list expand User interfaces and infrastructure (Installed)
- Place a check in **Desktop Experience** and then click **Add Features** to the required features dialog box that appears.



- Click **Next** then click **Install**

- d) Restart Windows server when prompted:

- Windows Keyboard key
- Hover the mouse in the **bottom right hand corner** of the screen to bring up the "Charm Bar" then click **Settings**.



iii) Click Power → Restart.



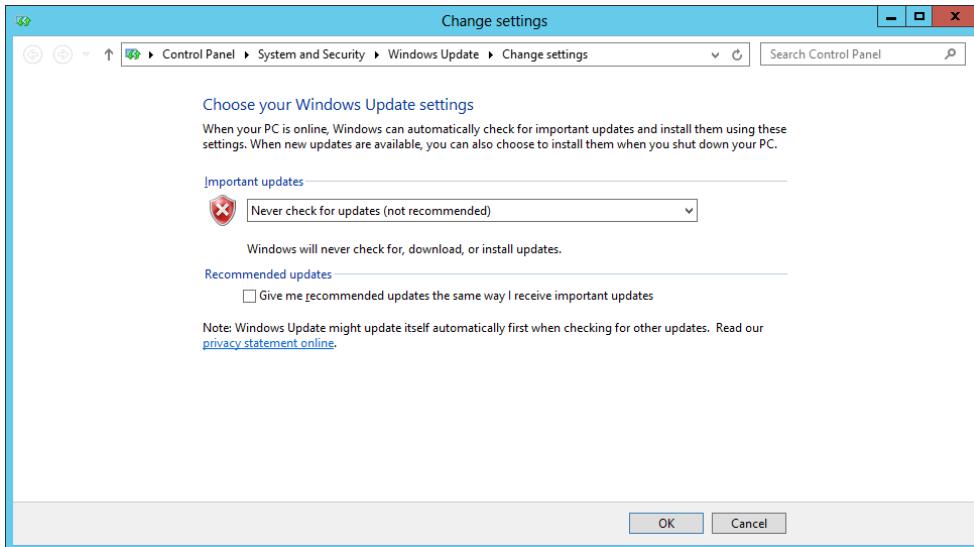
iv) When the Server restarts log back in using the same password (**Password1**)

28. Configure the Windows Update settings for the **WingtipServer** VM.

- Click on the **Windows** key on the keyboard to bring up the Windows Server 2012 **Start menu**.
- With the **Start menu** showing, go to the keyboard and type in "automatic updating". Click on the **Settings** link on the right as shown in the following screenshot. You should see that Windows found the **Turn automatic updating on or off** page. Click on **Turn automatic updating on or off** to navigate to the **Choose your Windows Update settings** page.

The left screenshot shows the Windows Start menu search results for "automatic updating". The "Turn automatic updating on or off" link is highlighted with a red box. The right screenshot shows the Windows Settings search results for "automatic updating". The "Settings" link is highlighted with a red box.

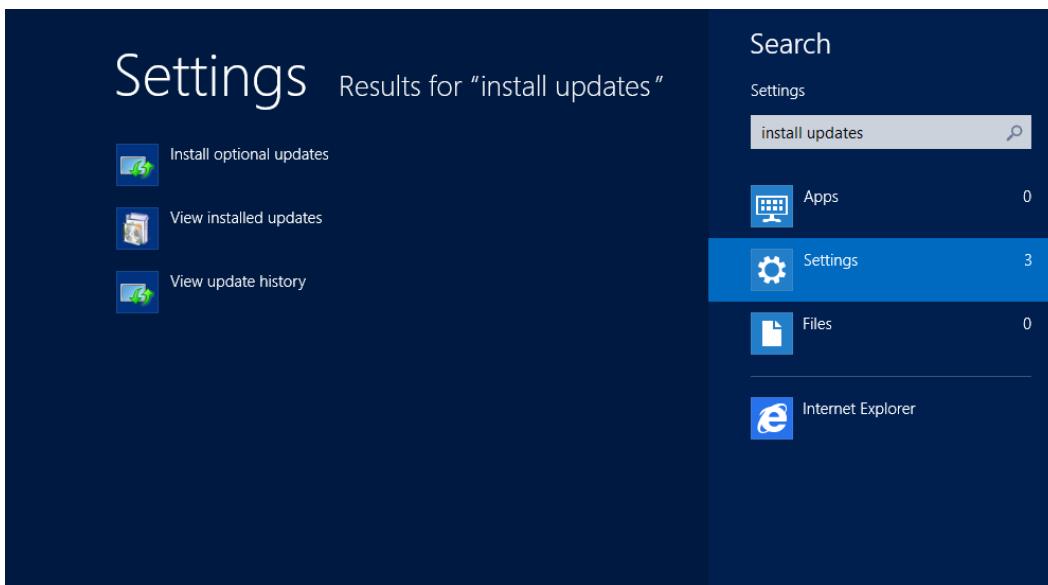
- The **Choose your Windows Update settings** page shown below provides a dropdown menu that allows you to configure how the **WingtipServer** VM will deal with getting Windows Updates. Select the option for **Never check for updates (not recommended)** as shown in the screenshot below and then click **OK** to close the dialog.



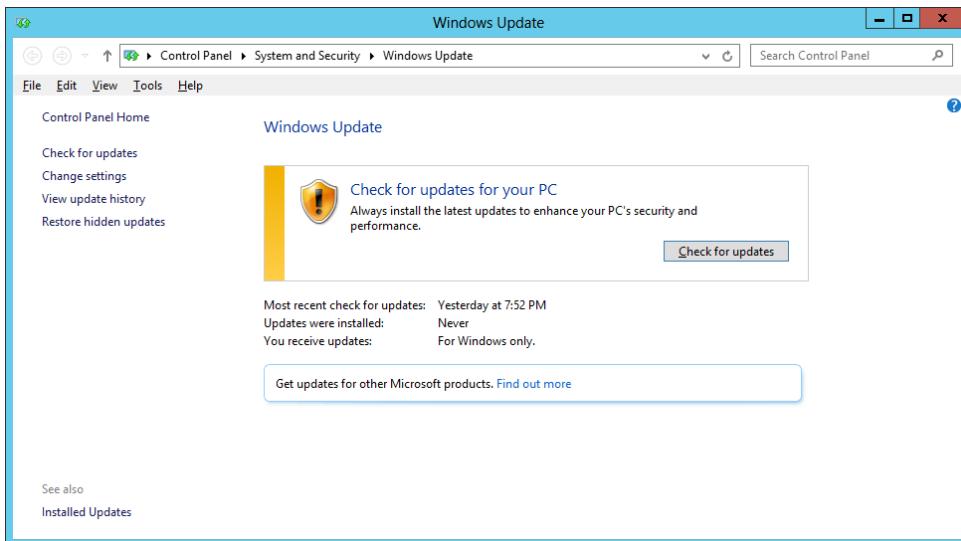
Configuring a computer with a setting of **Never check for updates** isn't what you should use in a production environment. However, it is usually the good choice for a VM which has been created to provide a lab environment because you don't want to be taken by surprise by Windows updates that change the local computer configuration or interrupt the network connection. Instead of configuring Windows to apply updates automatically, you will now run Windows update manually a single time to apply all the important updates and recommended updates to get the **WingtipServer** VM up to date.

29. Update the **WingtipServer** VM with the latest updates using **Windows Update**

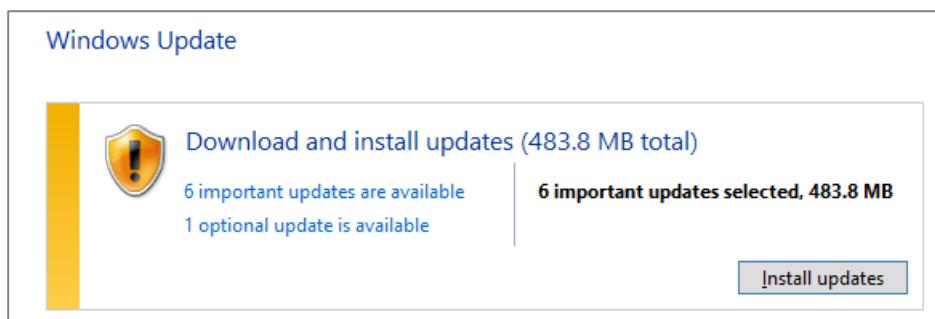
- Click on the **Windows** key on the keyboard to bring up the Windows Server 2012 **Start menu**.
- With the **Start menu** showing, go to the keyboard and type in "**install updates**". Click on the **Settings** link on the right as shown in the following screenshot. You should see that Windows found the **Install optional updates** page. Click on **Install optional updates** to navigate to the **Windows Update** page.



- On the Windows Update page, click the **Check for Updates** button. When you click this button, the Windows operating system will communicate with the Windows Update service on the Internet to determine which Windows updates are available for installation.

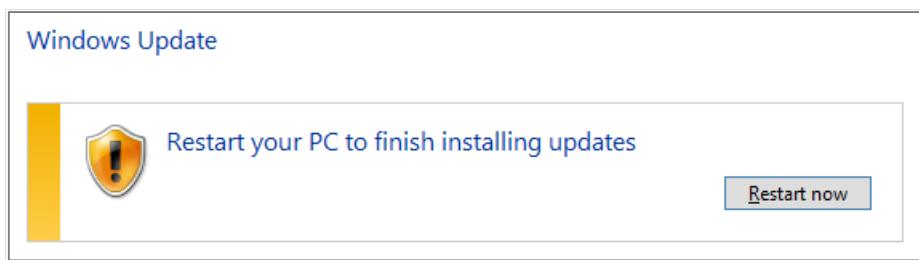


- d) The **Windows Update** page will prompt you to install any available updates. Click the **Install updates** button to install all important and recommended updates. If you are prompted, select **I accept the license terms** for any updates that require it.

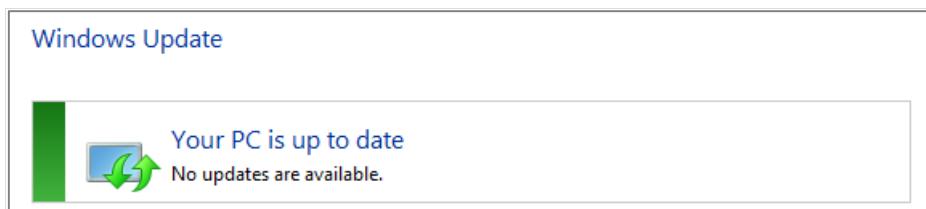


This step can take quite a bit of time so be patient.

- e) If you are prompted to restart your PC during the Windows Update process, click **Restart now** and wait for the VM to restart. Once the VM restarts, log in as **Administrator** and navigate back to the **Windows update** page as you did earlier in this step by searching for "install updates" on the Windows Start page.



- f) Once the first round of updates have been installed, click on **Check for updates** button again on the **Windows Update** page. Repeat the process of running Windows Update, checking for updates and installing them (rebooting if required) until the **Windows Update** page reports that **Your PC is up to date** as shown in the following screenshot.



- g) Once you have applied all the important and recommended updates, close the **Windows Update** page.

30. If you have a Windows Server 2012 product key, activate the Windows operating system.

- If you are using the trial version of Windows Server 2012, you should skip this step and move ahead to the next step.
- Click on the **Windows** key on the keyboard to bring up the Windows Server 2012 **Start menu**.
- With the **Start menu** showing, go to the keyboard and type in "**Windows Activation**". Click on the **Settings** link on the right as shown in the following screenshot. You should see that Windows found the **Windows Activation** page. Click on **Windows Activation** to navigate to the **Windows Activation** page.



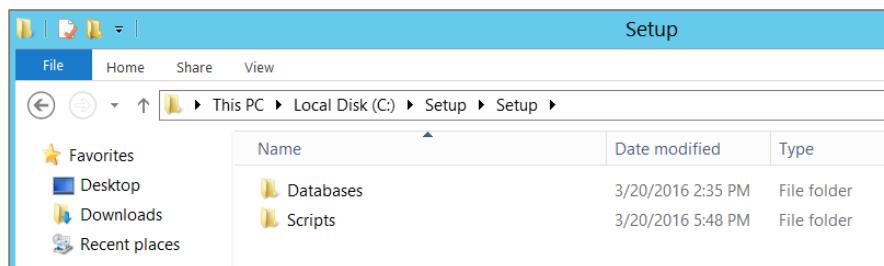
- On the **Windows Activation** page, follow the step to activate your copy of Windows Server 2012.
- Once you have activated the Windows operating system, close the **Activate Windows** page.

At this point you have configured the **WingtipServer** VM with a updated version of Windows Server 2012 R2. In the next task you will move ahead and download and prepare the Windows PowerShell scripts that accompany this setup guide.

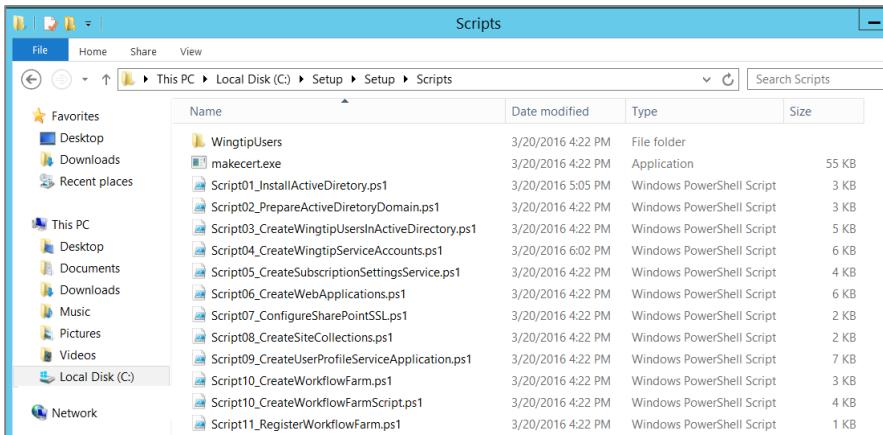
## Task 5: Download and Prepare the PowerShell Scripts for this Setup Guide

In this task you will download the setup files for this guide which include a library of PowerShell scripts that will be used to configure Active Directory and SharePoint Server 2016. You will also prepare the machine to run these scripts by setting the PowerShell execution policy of the VM to bypass mode.

- Copy the setup scripts to your VM.
  - Locate and download the zip archive named **Scripts.zip** located at the following URL.  
<https://github.com/CriticalPathTraining/SharePoint2016VmSetupGuide/raw/master/Setup.zip>
  - Extract all files from **setup.zip** to a new folder on the VM at the path **C:\Setup**.
  - Use the Windows Explorer to verify the files extracted properly and that the **c:\Setup** folder. The **Setup** folder should contain two child folders name **Databases** and **Scripts**.



- Open the scripts folder and inspect its contents. You should see that this folder contains several PowerShell scripts.



## 2. Enable the execution of PowerShell scripts.

- Launch a PowerShell console window using the **Run as Administrator** command.
- Type the following command into the PowerShell console window and press ENTER to execute it.

### **Set-ExecutionPolicy Bypass**

- Confirm your action by typing 'Y' and pressing ENTER.

```
PS C:\setup> Set-ExecutionPolicy Bypass
Execution Policy Change
The execution policy helps protect you from scripts that you do not trust. Changing the execution policy might expose
you to the security risks described in the about_Execution_Policies help topic at
http://go.microsoft.com/fwlink/?LinkID=135170. Do you want to change the execution policy?
[Y] Yes [N] No [S] Suspend [?] Help (default is "Y"): Y
PS C:\setup>
```

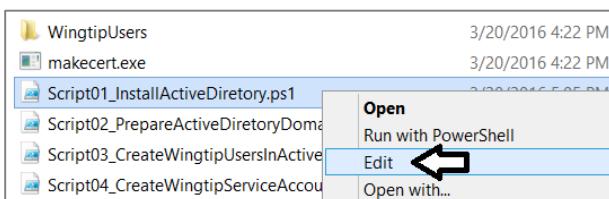
You have now downloaded the PowerShell scripts for this guide and configured your VM so that you can execute these scripts. Over the next few tasks, you will begin to use these scripts to install and configure Active Directory and SharePoint 2016.

## Task 6: Install Active Directory and Create a new Active Directory Domain

Now you will run a PowerShell script to install Active Directory Domain Services and then to create a new Active Directory domain with a domain name of **wingtip.com**. This will involve promoting the WingtipServer VM to a domain controller and install the Windows Server DNS service which will be configured to include a wildcard A record for \*.wingtip.com. The PowerShell script you will run for this task will also update the **hosts** file on the local machine to supply DNS host name resolution for tools such as Visual Studio which often cannot resolve a DNS name using the local DNS service.

### 1. Run the PowerShell script named **Script01\_InstallActiveDirectory.ps1**.

- In Windows Explorer, navigate to the **C:\Setup\Scripts** folder and locate the file **Script01\_InstallActiveDirectory.ps1**.
- Right-click on **Script01\_InstallActiveDirectory.ps1** and then click **Edit** to open the script in the Windows PowerShell ISE.

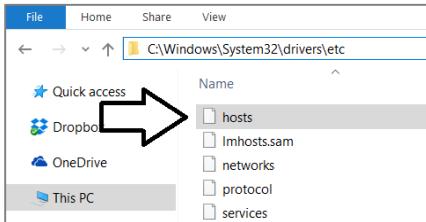


- Once the script **Script01\_InstallActiveDirectory.ps1** has opened in the PowerShell ISE, take a moment to review the PowerShell code inside. Here are the high-level set of steps that are automated by this script.
  - Update the **hosts** file of the local machine to redirect wingtip DNS names to the local loopback address of 127.0.0.1.
  - Install Active Directory Domain Services.
  - Promote the WINGTPSERVER VM to be an Active Directory domain controller.
  - Create a new Active Directory domain with a domain name of **wingtip.com**.
  - Install the Windows Server DNS service and configure **wingtip.com** as a delegated DNS domain.
  - Reboot the VM to complete the Active Directory installation process.

- d) Once you have reviewed what inside the script, execute it using the Windows PowerShell ISE.
  - e) Wait for the script to complete its execution which might take 5-10 minutes.
  - f) When the script completes its execution, the VM will automatically restart.
2. Once the VM has restarted, log back into the VM using the login **WINGTIP\Administrator** and a password of **Password1**.
3. Inspect the updated **HOSTS** file.
- Using Windows Explorer, navigate to the following path to find the LM Host file.

**C:\windows\System32\drivers\etc**

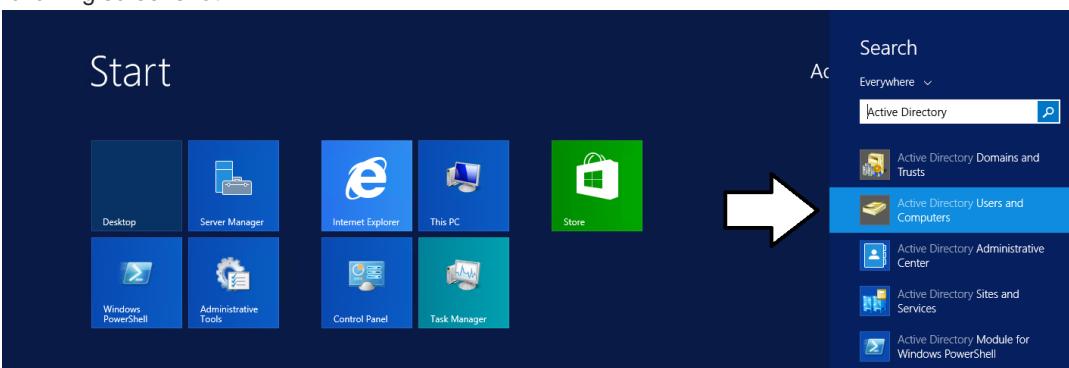
- b) You should see several files in the **C:\Windows\System32\drivers\etc** folder including a file name **hosts** with no extension.



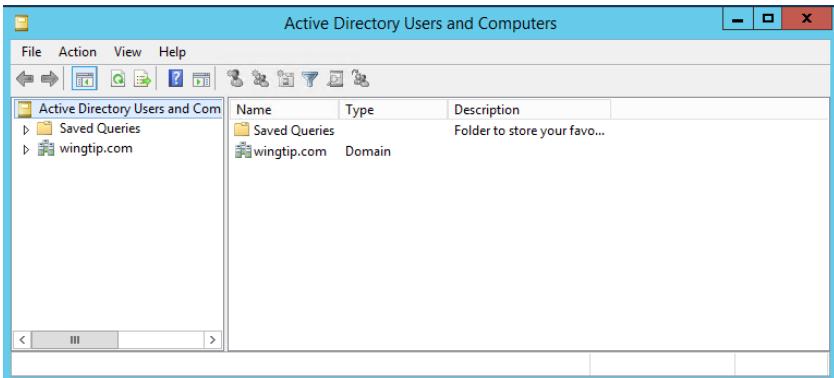
- c) Open the **hosts** file in a text editor such as **NOTEPAD.EXE**.
- d) Inspect the content for the host file which was updated by the PowerShell script you just ran.

```
127.0.0.1      wingtipserver
127.0.0.1      wingtipserver.wingtip.com
127.0.0.1      wingtip.com
127.0.0.1      my.wingtip.com
127.0.0.1      intranet.wingtip.com
127.0.0.1      dev.wingtip.com
127.0.0.1      www.wingtip.com
127.0.0.1      search.wingtip.com
127.0.0.1      research.wingtip.com
127.0.0.1      disco.wingtip.com
127.0.0.1      bi.wingtip.com
```

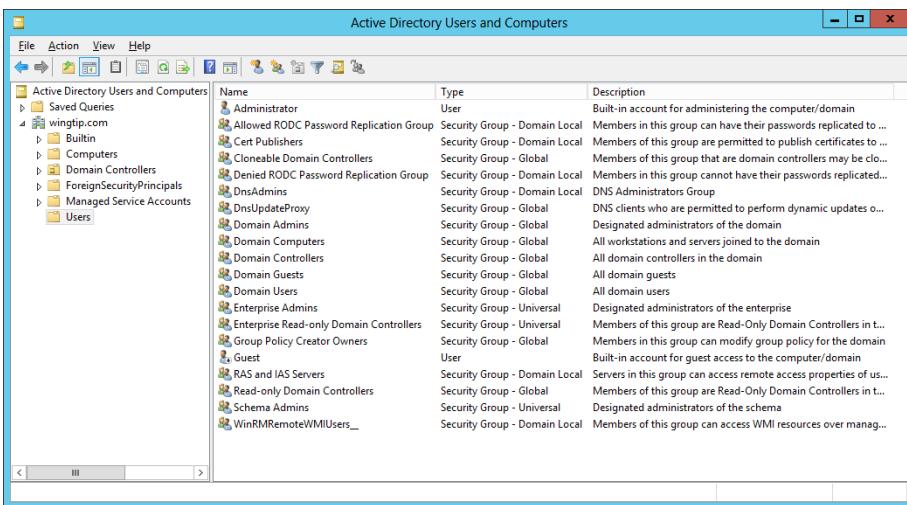
- e) Close the hosts file without saving any changes.
4. Run the PowerShell script named **Script02\_PrepActiveDirectoryDomain.ps1**.
- In Windows Explorer, navigate to **C:\Setup\Scripts** and locate the file **Script02\_PrepActiveDirectoryDomain.ps1**.
  - Right-click on **Script02\_PrepActiveDirectoryDomain.ps1** and then click Run with PowerShell.
  - Here are the high-level set of steps that are automated by this script.
    - Add registry entry to disable local loopback checks
    - Create a new local DNS A record for \*.wingtip.com
    - Add DNS domain of \*.wingtip.com to Trusted Sites in Internet Explorer
5. Launch the **Active Directory Users and Computers** administrative tool.
- Click on the **Windows** key to display the **Windows Start** page.
  - Type **Active Directory** in the Search box and then click on the **Active Directory Users and Computer** tile as shown in the following screenshot.



- c) The **Active Directory Users and Computer** administrative tool should now be running.



6. Use the **Active Directory Users and Computer** administrative tool to inspect the **wingtip.com** domain
  - a) In the **Active Directory Users and Computer** administrative tool, you should see a node for **wingtip.com**.
  - b) Expand the **wingtip.com** node and select the **Users** node inside.
  - c) You should be able to see all the user and group accounts that Windows automatically adds to a new domain.



- d) You have now verified that the **wingtip.com** domain has been properly created and that the **WingtipServer** VM has been promoted to be a domain controller.

Leave the Active Directory Users and Computer administrative tool open because you will continue to use it in the next task.

## Task 7: Create User Accounts and Service Accounts in Active Directory

In this task you will run two more additional PowerShell scripts to create new Active Directory users accounts in the new **wingtip.com** domain. The first script you will run will create a set of sample Active Directory user accounts for typical business users from the fictitious company named Wingtip Toys. The second script you will run will create a set of Active Directory user accounts that will play the role of service accounts that will be used to configure the identity of worker processes created and managed by SQL Server 2016 and SharePoint Server 2016.

1. Run the PowerShell script named **Script03\_CreateWingtipUsersinActiveDirectory.ps1**.
  - a) In Windows Explorer, navigate to **C:\Setup\Scripts** folder and locate **Script03\_CreateWingtipUsersinActiveDirectory.ps1**.
  - b) Right-click **Script03\_CreateWingtipUsersinActiveDirectory.ps1** and click **Edit** to open it in the Windows PowerShell ISE.
  - c) Once **Script03\_CreateWingtipUsersinActiveDirectory.ps1** has opened in the PowerShell ISE, take a moment to review the PowerShell code inside. Here are the high-level set of steps that are automated by this script.
    - i) Creates a set of user accounts
    - ii) Creates a set of Active Directory groups
    - iii) Assigns certain users to Active Directory groups.
  - d) Execute the script **Script03\_CreateWingtipUsersinActiveDirectory.ps1** in the Windows PowerShell ISE.

Now that you have run a script to create a set of user accounts, use the **Active Directory Users and Computer** administrative tool to verify that they have been created successfully.

2. Use the **Active Directory Users and Computer** administrative tool to inspect the new users added to the **wingtip.com** domain
  - a) In the **Active Directory Users and Computer** administrative tool, you should see a node for **wingtip.com**.
  - b) Right-click on **wingtip.com** and click **Refresh** to refresh the underlying data.
  - c) Expand the **wingtip.com** node and select the **Wingtip Users** node inside.
  - d) You should be able to see all the user and group accounts that the PowerShell script added into the new Organization Group with a name of **Wingtip Users**. Maybe you recognize some of the user names of Critical Path Training instructors.

The screenshot shows the Windows Active Directory Users and Computers management console. The left pane displays a tree view of the directory structure under 'wingtip.com'. The 'Users' folder is expanded, and an arrow points to the 'Wingtip Users' folder. The right pane is a table listing users and groups. The 'Wingtip Users' group is listed at the bottom of the table, with a detailed description: 'Users who are Wingtip Content Managers'. Other users listed include Andrew Connell, Ashley Hillier, Asif Rehmani, Bernie Madoff, Chandler Bing, Christina Wheeler, Clyde Bixby, David Mann, Fabian Williams, Gary Lapointe, John Holiday, Katie Bowman, Keith Moon, Ken Sanchez, Matthew McDermott, Maurice Prather, Paul Schaefflein, Scot Hillier, Spencer Reed, Ted Pattison, Wilson Picket, Wingtip Content Managers, Wingtip Sales Team, Wingtip Scientists, and Wouter Van Vugt.

Name	Type	Description
Andrew Connell	User	
Ashley Hillier	User	
Asif Rehmani	User	
Bernie Madoff	User	
Chandler Bing	User	
Christina Wheeler	User	
Clyde Bixby	User	
David Mann	User	
Fabian Williams	User	
Gary Lapointe	User	
John Holiday	User	
Katie Bowman	User	
Keith Moon	User	
Ken Sanchez	User	
Matthew McDermott	User	
Maurice Prather	User	
Paul Schaefflein	User	
Scot Hillier	User	
Spencer Reed	User	
Ted Pattison	User	
Wilson Picket	User	
Wingtip Content Managers	Security Group - Global	Users who are Wingtip Content Managers
Wingtip Sales Team	Security Group - Global	Users who are Wingtip Sales Team
Wingtip Scientists	Security Group - Global	Users who are Wingtip Scientists
Wouter Van Vugt	User	

3. Run the PowerShell script named **Script05\_CreateWingtipServiceAccountsInActiveDirectory.ps1** to create a set of Active Directory user accounts that will be used as service accounts which will be used to provide the identities of various worker process used by SQL Server 2016 and SharePoint 2016.
  - a) In Windows Explorer, navigate to **C:\Setup\Scripts** folder and locate **Script04\_CreateWingtipServiceAccounts.ps1**.
  - b) Right-click **Script04\_CreateWingtipServiceAccounts.ps1** and click **Edit** to open it in the Windows PowerShell ISE.
  - c) Once **Script04\_CreateWingtipServiceAccounts.ps1** has opened in the PowerShell ISE, take a moment to review the PowerShell code inside. Here are the high-level set of steps that are automated by this script.
    - i) Create a set of user accounts to play the role of service accounts
    - ii) Configure selected service accounts to be members of specific groups such as the local Administrators group.
  - d) Execute the script **Script04\_CreateWingtipServiceAccounts.ps1** in the Windows PowerShell ISE.
4. Use the **Active Directory Users and Computer** administrative tool to inspect the new service accounts.
  - a) In the **Active Directory Users and Computer** administrative tool, you should see a node for **wingtip.com**.
  - b) Right-click on **wingtip.com** and click **Refresh** to refresh the underlying data.
  - c) Expand the **wingtip.com** node and select the **Wingtip Service Accounts** node inside.
  - d) You should be able to see new users accounts with names such as **SQL\_SERVER**, **SP\_Farm** and **SP\_Services**.

The screenshot shows the Windows Active Directory Users and Computers management console. The left pane displays a tree view of the directory structure under 'wingtip.com'. The 'Users' folder is expanded, and the 'Wingtip Service Accounts' folder is selected. The right pane is a table listing users. The 'Wingtip Service Accounts' group is listed at the top of the table, with a detailed description: 'Users who are SP\_Content, SP\_Crawler, SP\_Farm, SP\_Services, SP\_UPS, and SP\_Workflow'. Other users listed include SP\_Content, SP\_Crawler, SP\_Farm, SP\_Services, SP\_UPS, and SP\_Workflow.

Name	Type	Description
SP_Content	User	
SP_Crawler	User	
SP_Farm	User	
SP_Services	User	
SP_UPS	User	
SP_Workflow	User	

You will begin using these service accounts in later steps when you begin to create and configure SQL Server 2016 and the local SharePoint farm.

## Task 8: Install SQL Server 2016 RC1

You will begin this task by acquiring the installation files and optionally a product key for SQL Server 2016. After that you will move through the basic steps of installing SQL Server 2016 and configuring it for basic usage within a SharePoint 2016 farm.

Note that this version of the setup guide is using the most recent of SQL Server 2016 which is Release Candidate 1 (RC1) dated 3/18/2016. This setup will be updated for the RTM version of SQL Server 2016 when it becomes available.

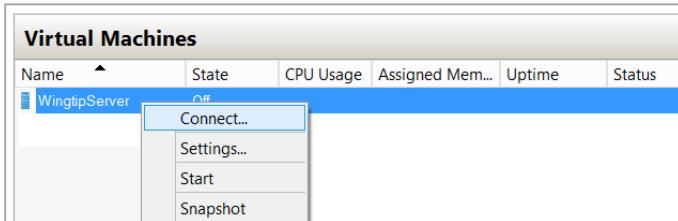
1. Obtain a copy of the 64-bit installation binaries for SQL Server 2016 RC1.

- a) If you need to download the files, you can obtain them from the following link.

<https://www.microsoft.com/en-us/evalcenter/evaluate-sql-server-2016>

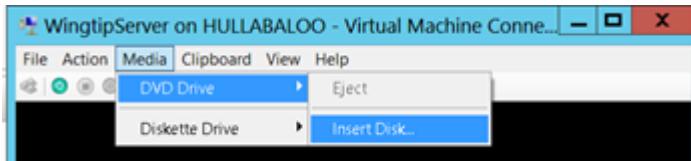
This download is several gigabytes in size so it will take some time to download. The amount of time it takes to download will depend upon the speed of your Internet connection. The actual file name of the ISO file that is downloaded will look something like this - **en\_sql\_server\_2016\_rc\_1\_x64\_dvd\_8444469.iso**.

2. Navigate to the Hyper-V Manager. Right-click the **WingtipServer** VM and select the **Connect...** command to display the Hyper-V console window for this VM.



3. In this step you will configure the VM to load the .ISO file with the SQL Server 2016 installation files as a DVD drive.

- a) In the Hyper-V console windows for the **WingtipServer** VM, select the **Insert Disk...** command.



- b) When the **Open File** dialog appears, enter the path to the .ISO file with the SQL Server 2016 installation files.
- c) Click **OK**.

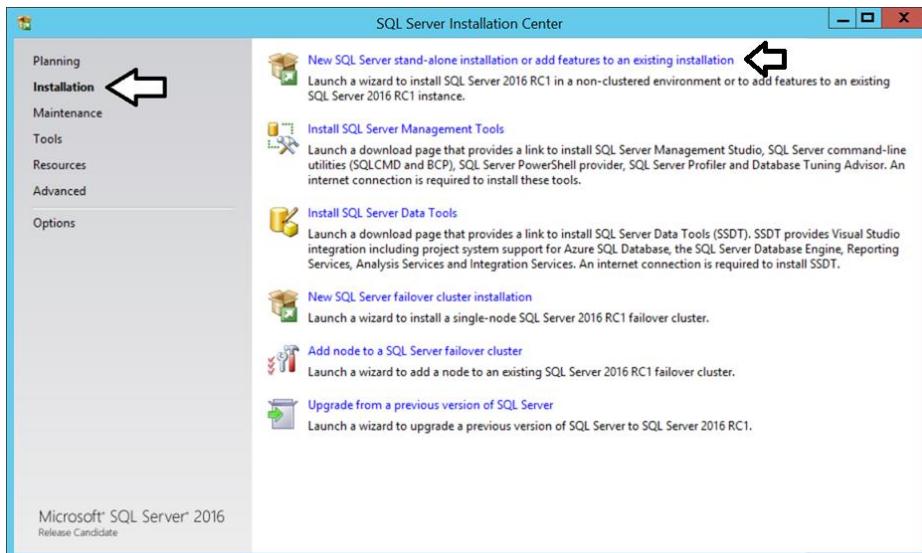
4. Navigate back into the user interface of the **WingtipServer** VM.

5. Depending on your configuration, the SQL Server installation program in the DVD might or might not start automatically.

- a) If the **AutoPlay** dialog box is open, click run **setup.exe**.
- b) If the **AutoPlay** dialog box is not open, use Windows Explorer to navigate to the DVD drive and execute the **setup.exe** file in the root of the DVD drive.
- c) Wait for the SQL Server installation program to initialize and display the **SQL Server Installation Center** dialog.

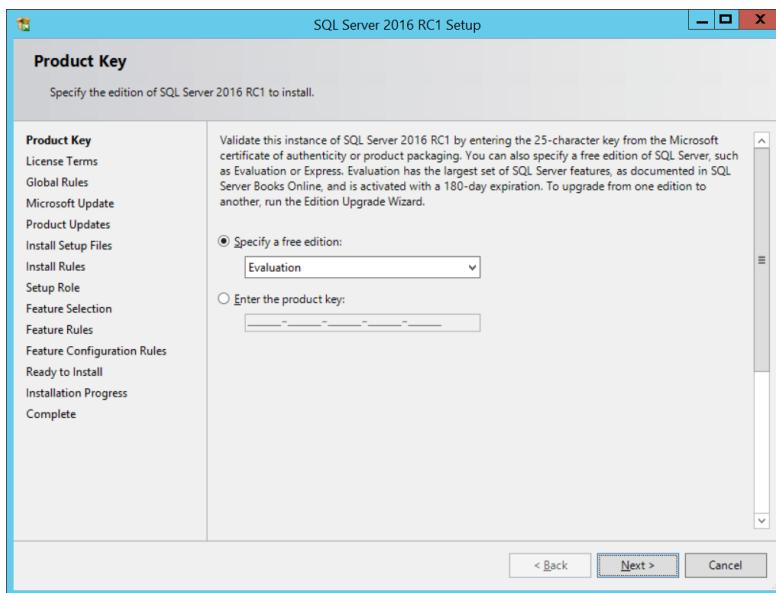
6. Install a default instance of SQL Server 2016.

- a) In the **SQL Server Installation Center** dialog, click the **Installation** link on the left-hand side and then click the link with the caption of **New SQL Server stand-alone installation or add features to an existing installation** on the right-hand side.

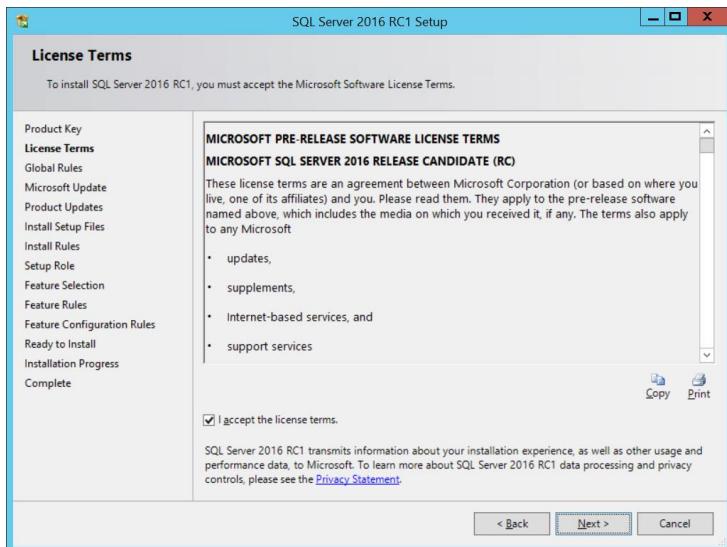


The installation of SQL Server 2016 is different from previous versions of SQL Server when it comes to installing the SQL Server Management Tools. With previous versions of SQL Server, the SQL Server Management Tools can be installed by the same installation process used to install the SQL Server database engine. With SQL Server 2016, the SQL Server Management Tools are not installed with the main SQL Server installation process. Instead, they are installed with a separate installation program that you will see at the end of this task.

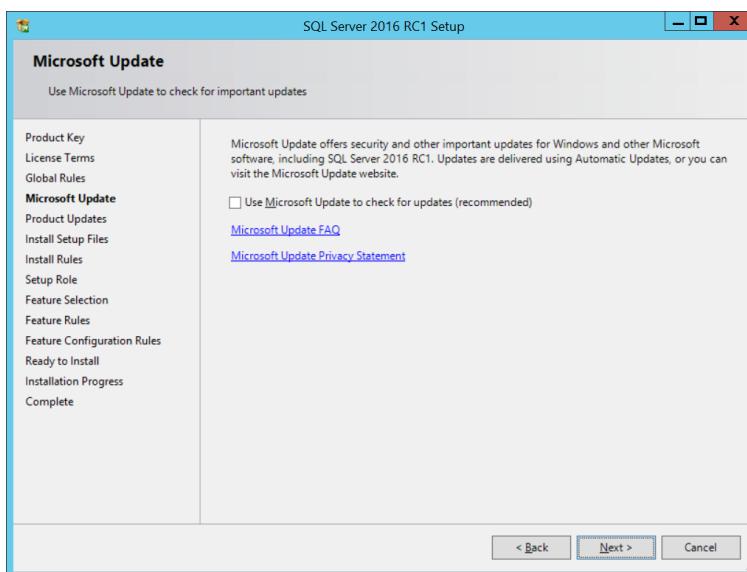
- On the **Setup Support Rules** page, the installer will check for potential issues before installing.
- Click **Next** on the **Product Key** page.



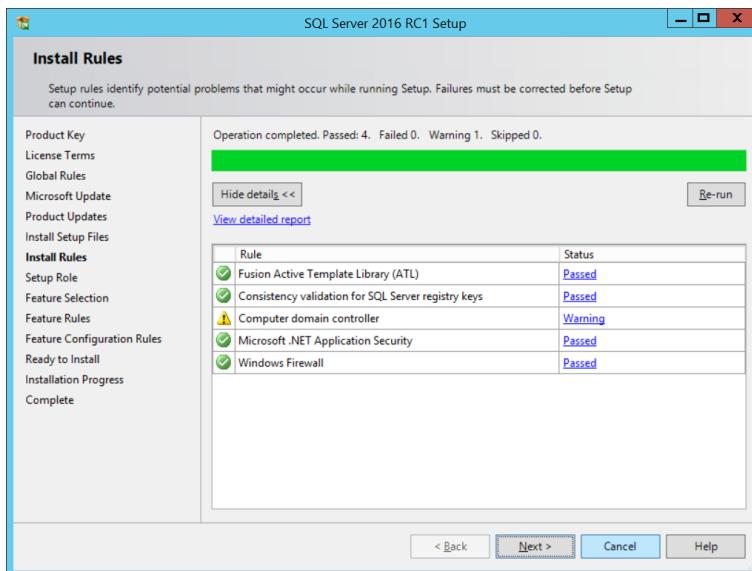
- On the **License Terms** page, agree to the terms and select **Next**.



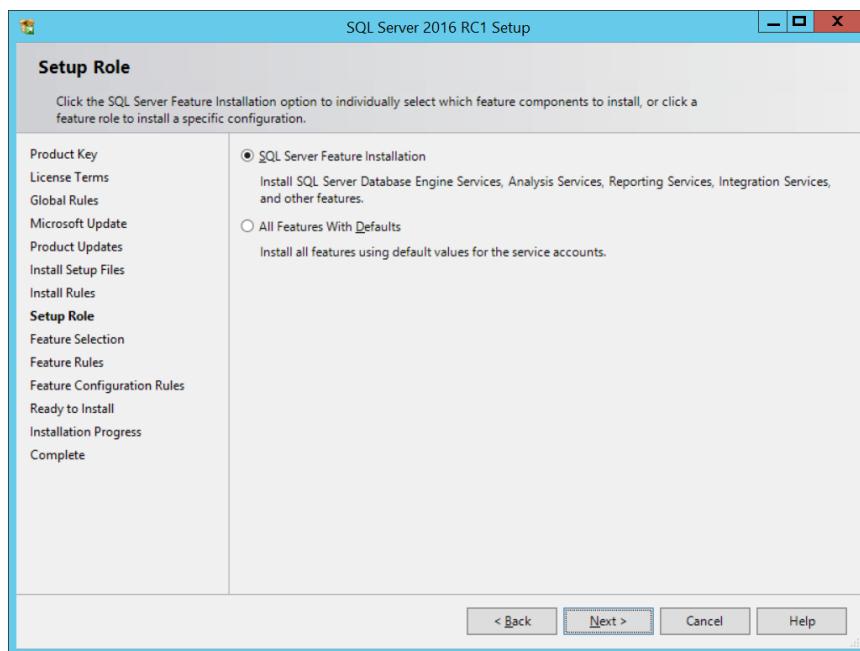
- e) On the **Microsoft Update** page, unselect **Use Microsoft Update to check for updates** and click **Next**.



- f) On the **Install Rules** page, you should see the test results for a set of setup rules. You should expect to see a single warning indicating that the current machine is a domain controller. All other rules should show success. Click **Next**.



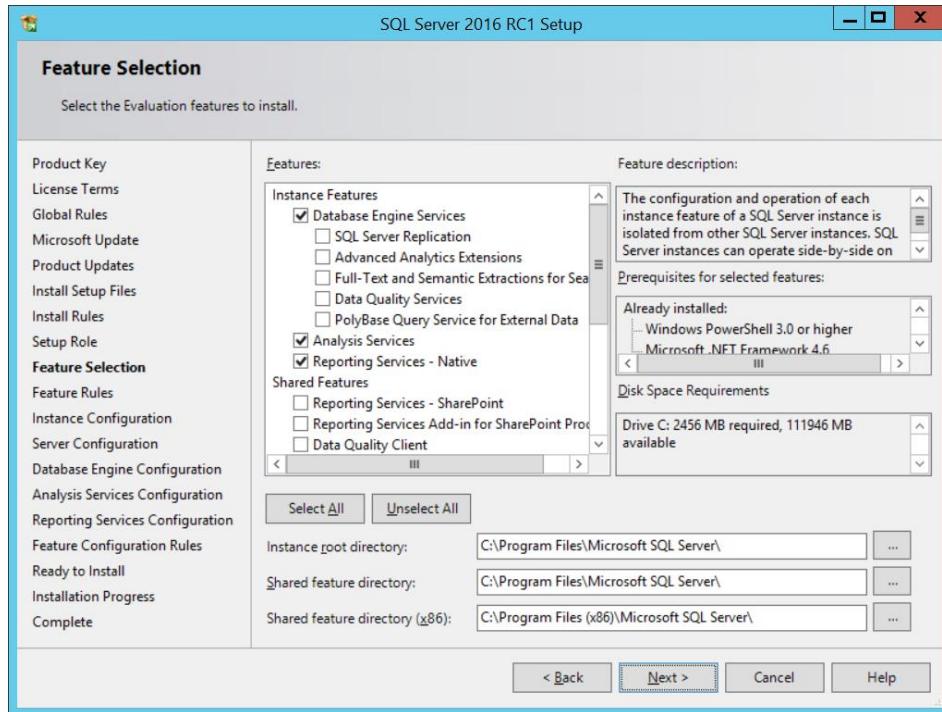
- g) On the **Set Role** page, accept the default setting of **SQL Server Feature Installation** and click **Next**.



You will begin the SQL Server 2016 installation process by creating a default instance of the SQL Database Engine, SQL Server Analysis Services and SQL Server Reporting Services with a name of **WINGTIPSERVER**. After you complete the initial install of the default instance, you will then re-run the SQL Server 2016 installer program to create a second instance of the SQL Database Engine named **WINGTIPSERVER\SHAREPOINT** which will be used to create and manage all the databases used by SharePoint Server 2016, Service Bus and Workflow Manager.

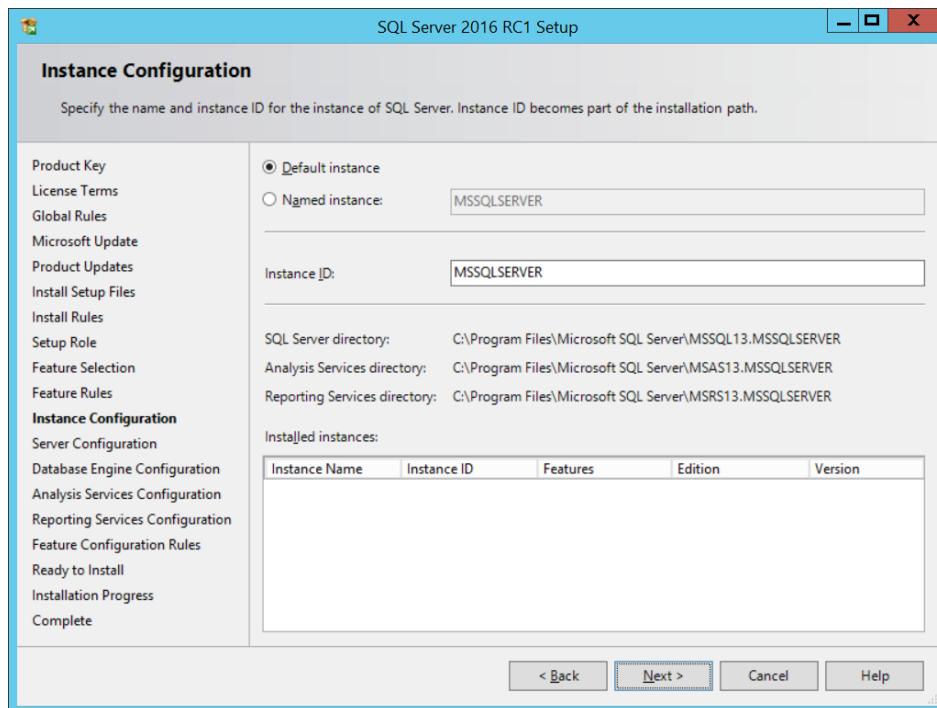
- h) On the **Feature Selection** page, check the following Instance Features and click **Next**:

- i) Database Engine Services
- ii) Analysis Services
- iii) Reporting Services - Native

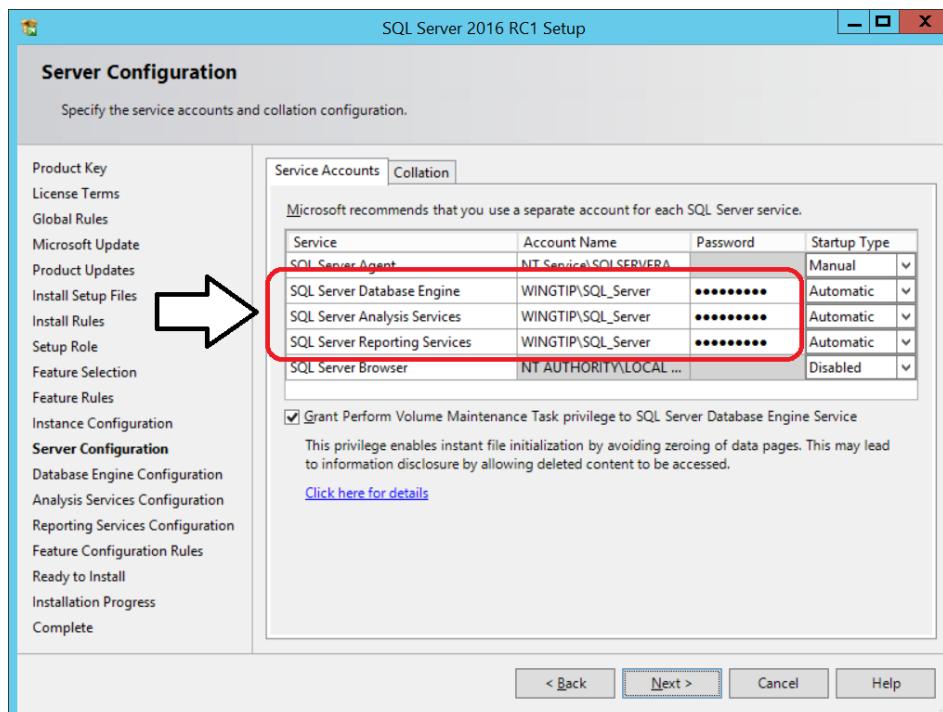


Note that you do not need to select anything below in the **Shared Features** section at this point – this is different from previous versions of SQL Server where you installed the SQL Server Management Tools from the Shared Features section.

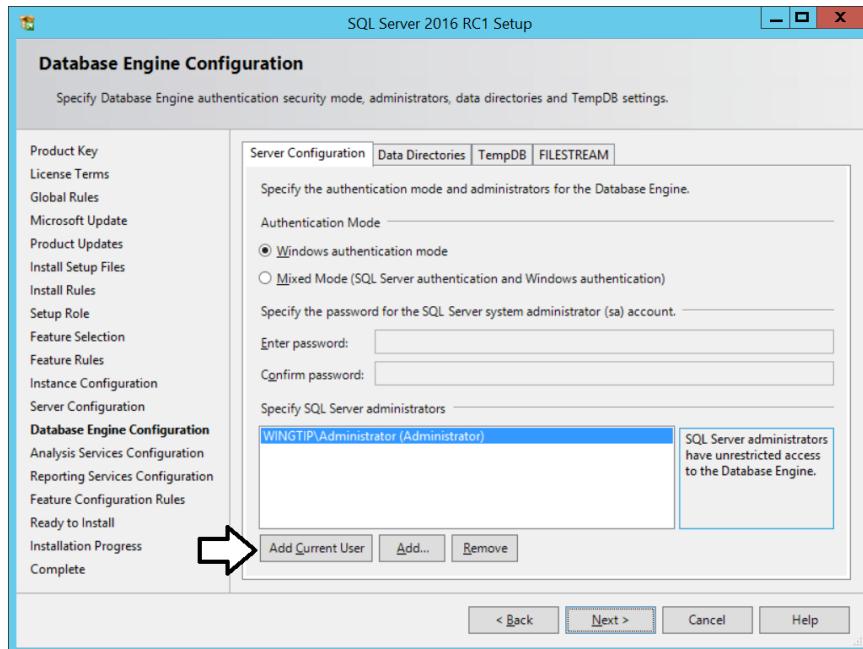
- i) On the **Installation Rules** page, accept all the default settings and click **Next**.
- j) On the **Instance Configuration** page, accept all the default settings and click **Next**.



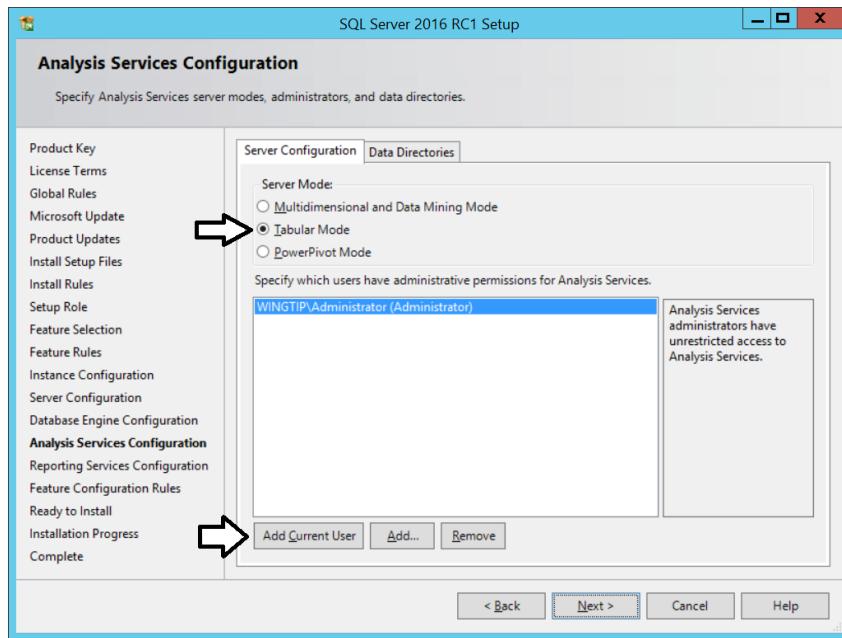
- k) On the **Disk Space Requirements** page, accept all the default settings and click **Next**.
- l) On the **Service Account** tab of the **Server Configuration** page, do the following:
  - i) Change the **Account Name** for the **SQL Server Database Engine** to **WINGTIP\SQL\_SERVER**.
  - ii) Change the **Account Name** for the **SQL Server Analysis Services** to **WINGTIP\SQL\_SERVER**.
  - iii) Change the **Account Name** for the **SQL Server Reporting Services** to **WINGTIP\SQL\_SERVER**.
  - iv) Enter a password of **Password1** for each occurrence where you used the service account **WINGTIP\SQL\_SERVER**.
  - v) Click **Next** to move to the next page.



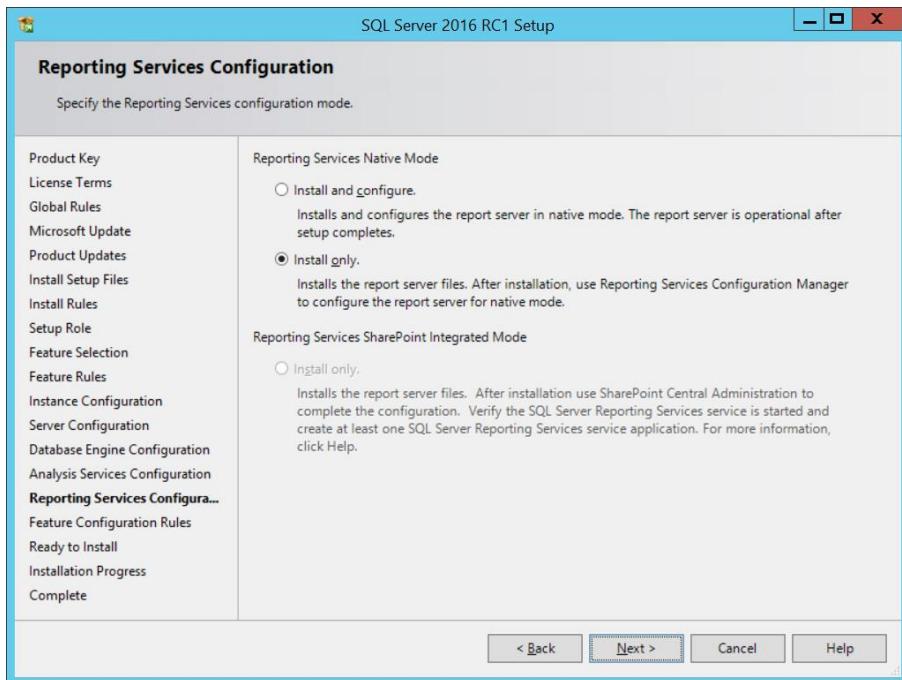
- m) On the **Database Engine Configuration** page inside the **Server Configuration** tab, click the **Add Current User** button to configure the **WINGTIP\Administrator** account as a system administrator for this SQL Server instance and then click **Next** to move to the next page



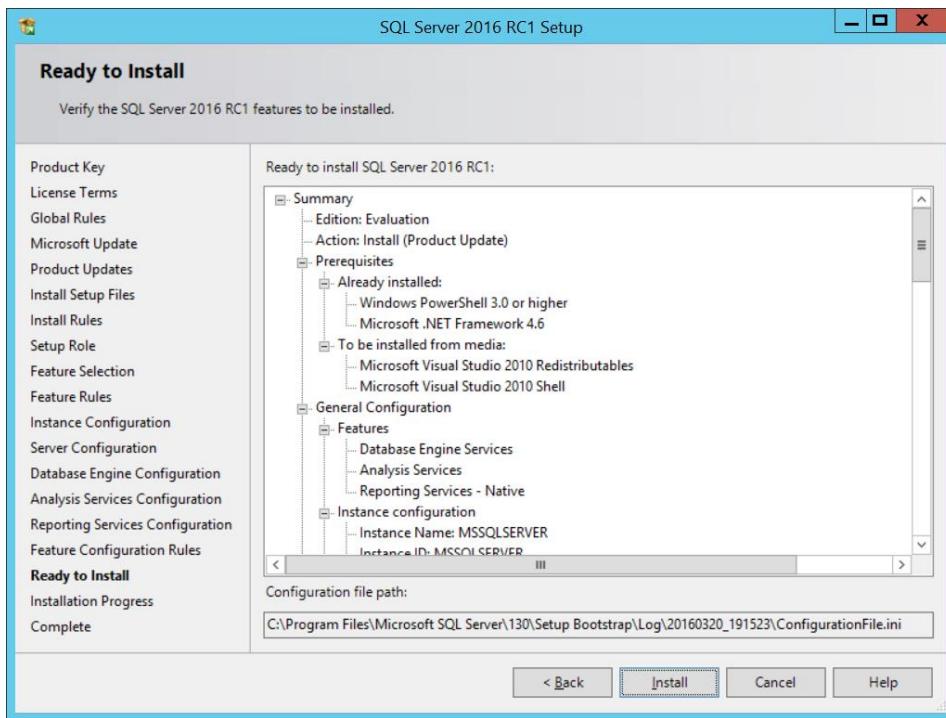
- n) On the **Analysis Services Configuration** page inside the **Server Configuration** tab, select a Server Mode of **Tabular**. After that, click **Add Current User** to configure the **WINGTIP\Administrator** account with administrative permissions and then click **Next** to move ahead to the next page.



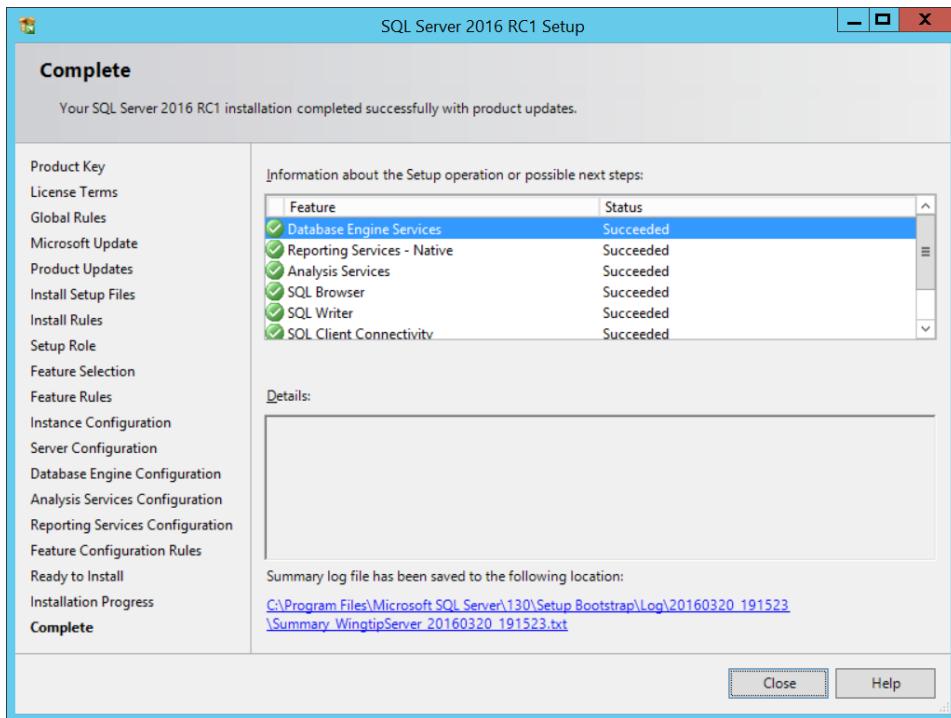
- o) On the **Reporting Services Configuration** page, select the **Install Only** option inside the **Reporting Service Native Mode** section and click **Next** to move ahead.



- p) On the **Error Reporting** page, accept the default values and click **Next**.
- q) On the Installation **Configuration Rules** page, accept the default settings and click **Next**.
- r) When you get to the **Ready to Install** page, you are finally at the point where you can begin the installation. Click the **Install** button and wait for the SQL Server installation program to complete which will take about 10-15 minutes to complete.



- s) When the installation finishes, the **Complete** page is displayed showing the features that were successfully installed.

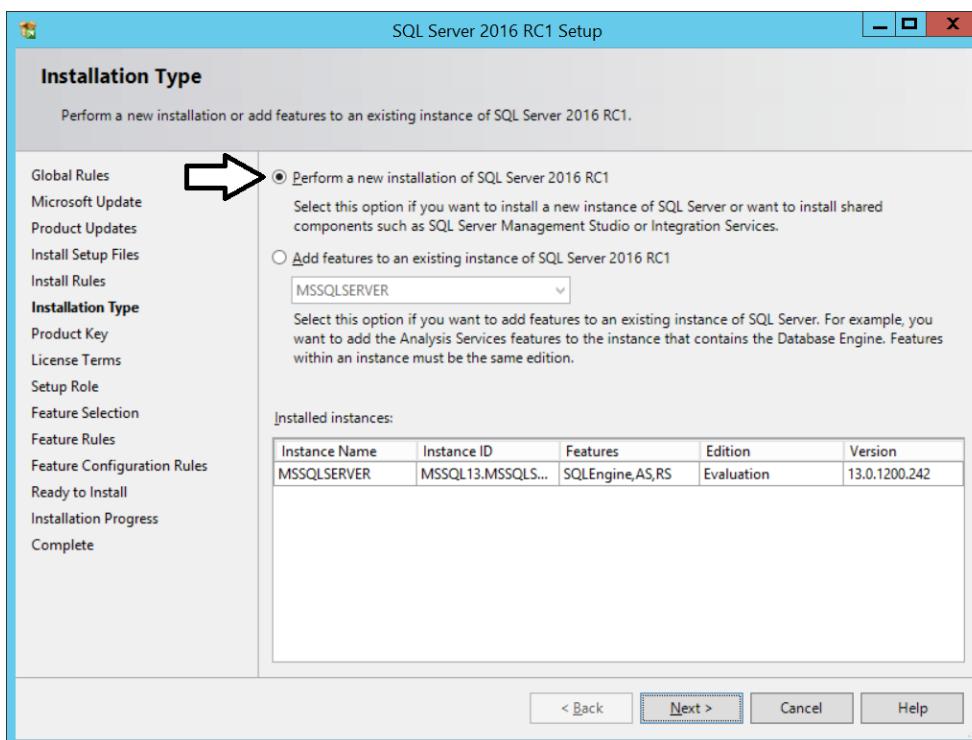


- t) Click **Close** to complete the installation.

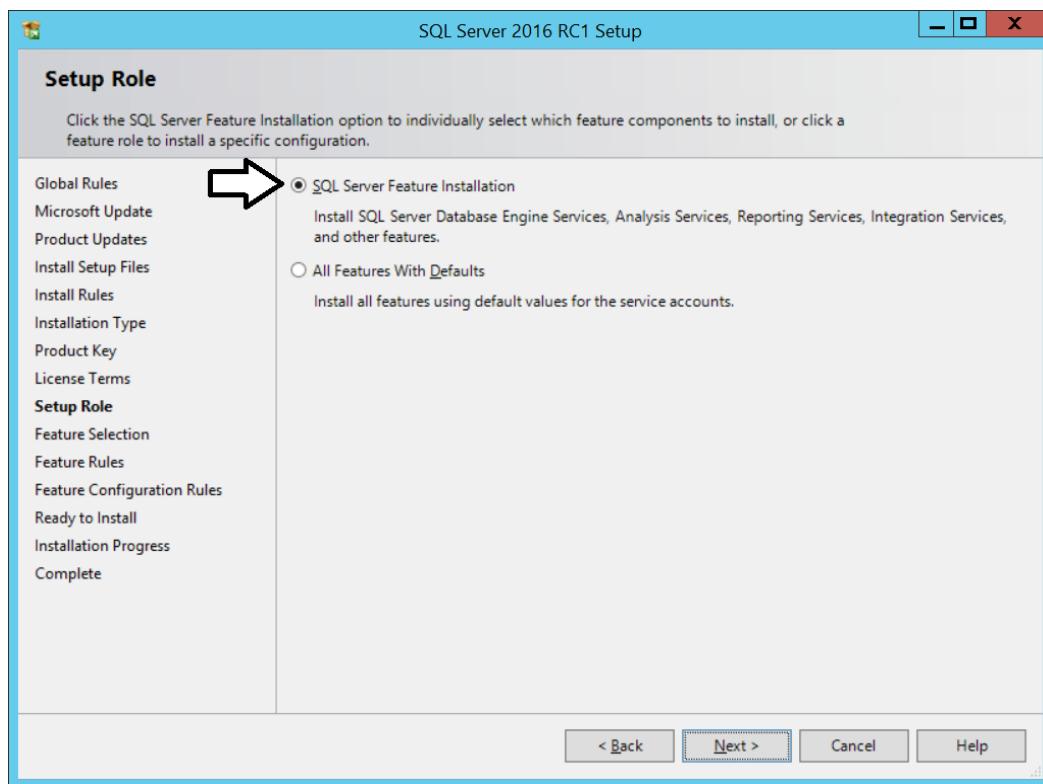
You have now successfully installed SQL Server 2016 with a default instance for the SQL Server Database Engine, SQL Server Analysis Services and SQL Server Reporting Services. Now it is time to rerun the SQL Server setup program so you can install a second instance of the SQL Server Database Engine named **WINGTIPSERVER\SHAREPOINT**.

7. In the **SQL Server Installation Center** dialog, complete the following steps:

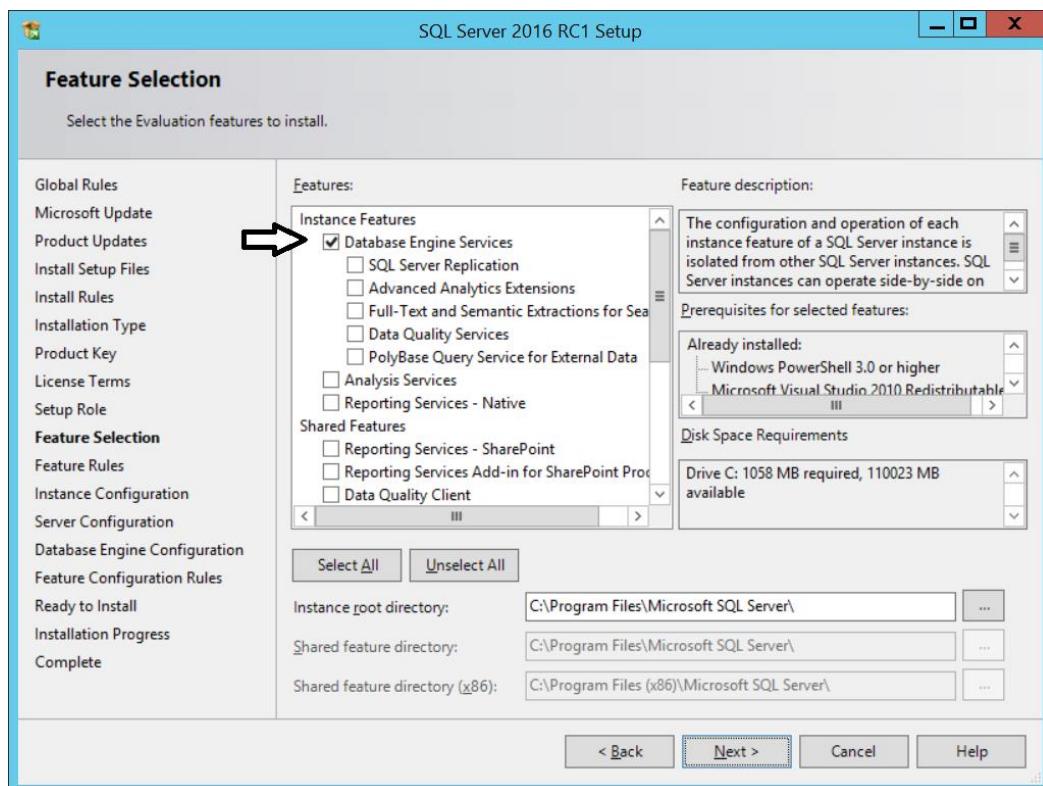
- Click the **Installation** link on the left-hand side.
- Click the **New SQL Server stand-alone installation or add features to an existing installation** link on the right-hand side.
- Move through the pages of the SQL Server 2016 Setup wizard until you reach the **Installation Type** page.
- Select the option to **Perform a new installation of SQL Server 2016 RC1** and click **Next**.



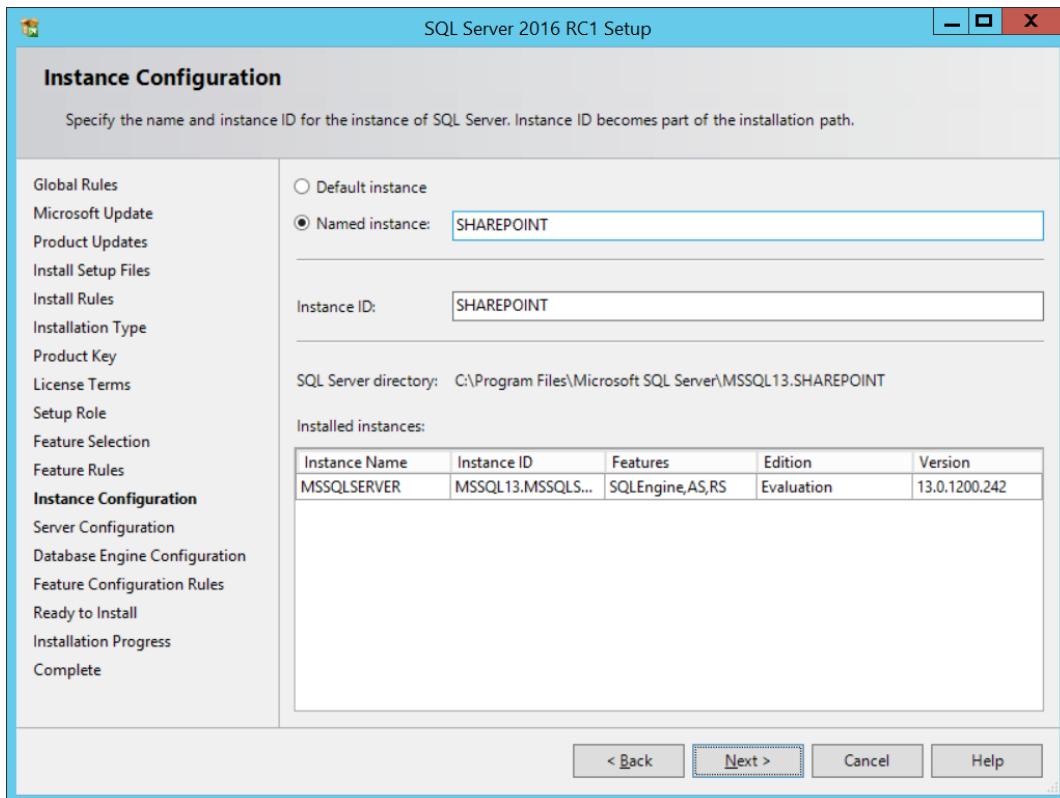
- e) On the **Setup Role** page, select **SQL Server Feature Installation** and click **Next**.



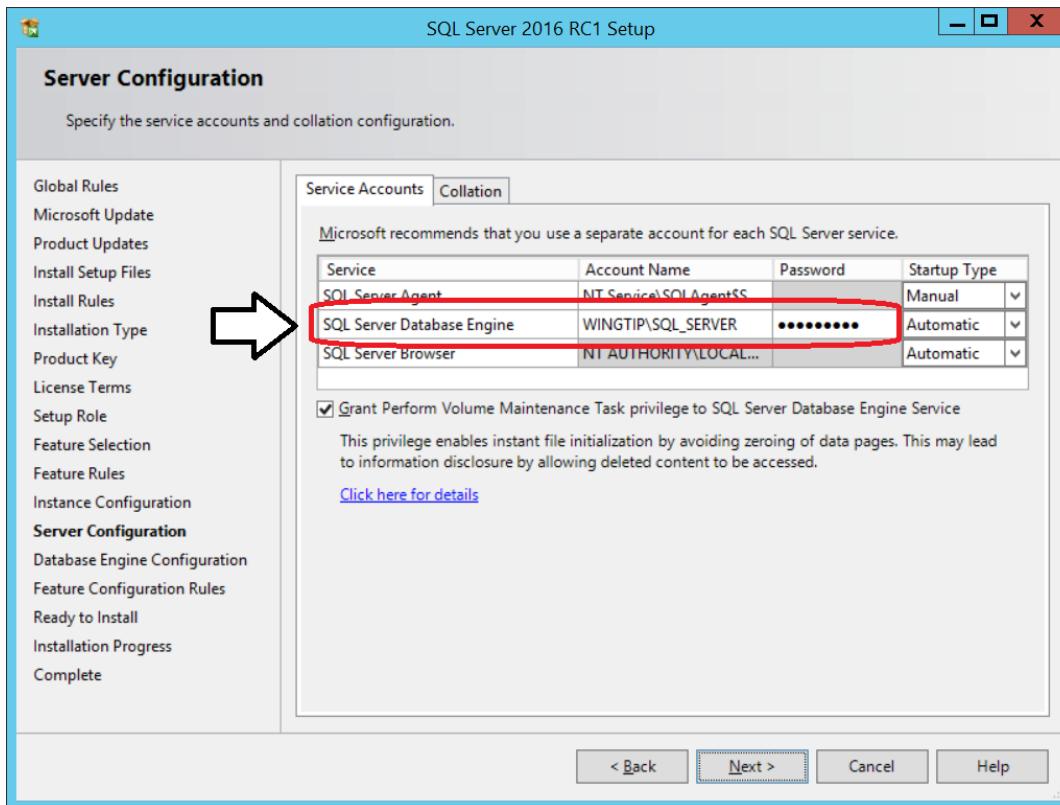
- f) On the **Feature Selection** page, select the option for **Database Engine Service** as shown in the following screenshot and then click **Next**.



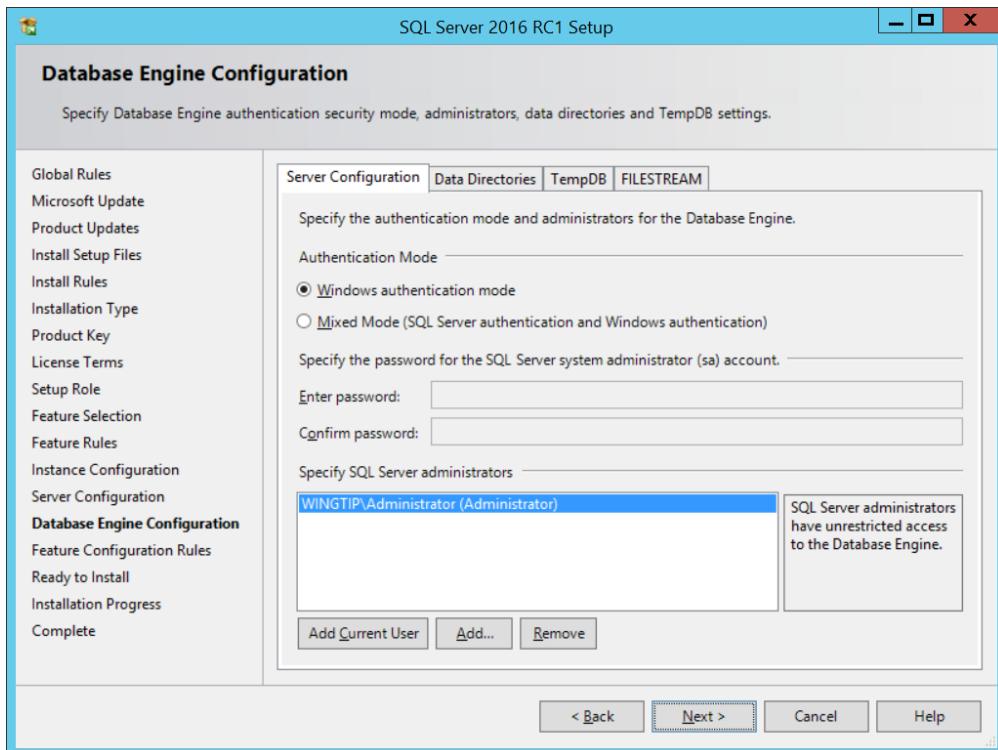
- g) On the **Instance Configuration** page, select **Named instance**, enter a name of **SharePoint** and then click **Next**.



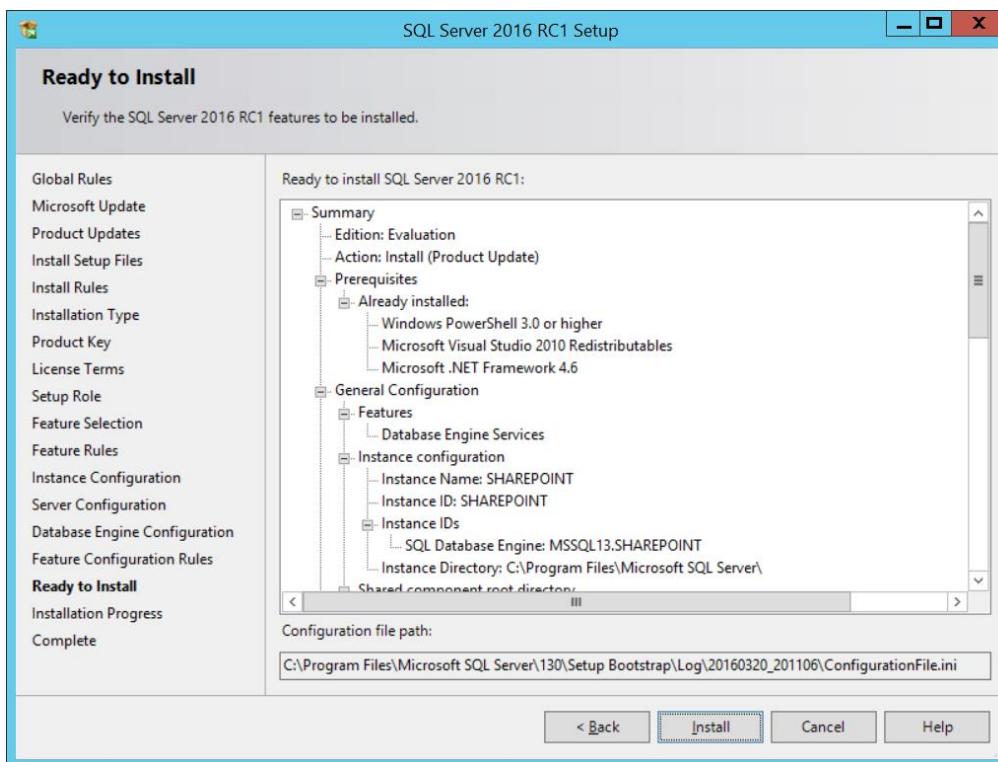
- h) Inside the **Service Account** tab of the **Server Configuration** page, change the **Account Name** for the **SQL Server Database Engine** to **WINGTIP\SQL\_SERVER** and enter a password of **Password1**. Click **Next** to move to the next page.



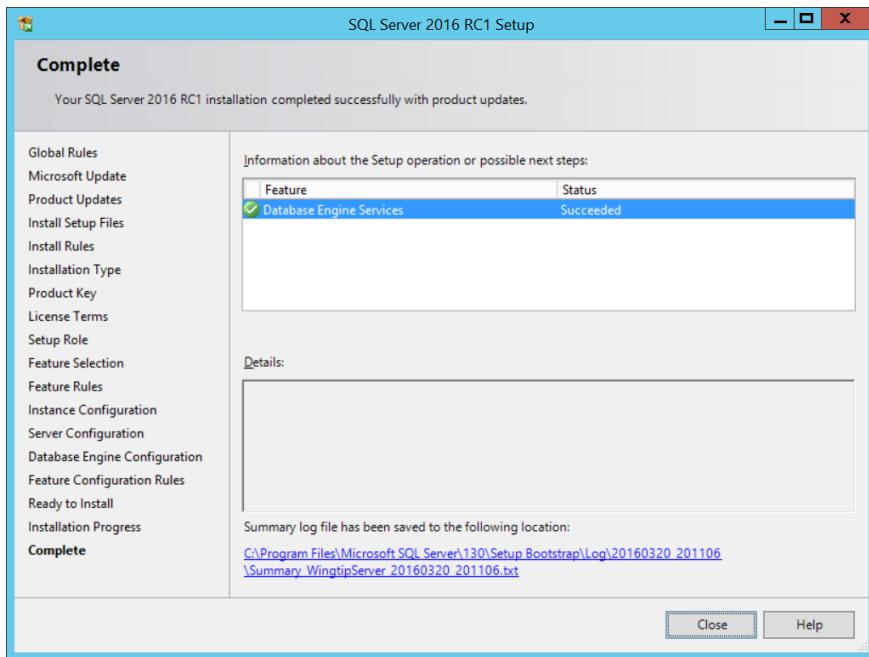
- i) On the **Database Engine Configuration** page inside the **Server Configuration** tab, click the **Add Current User** button to configure the **WINGTIP\Administrator** account as a system administrator for this SQL Server instance then click **Next**.



- j) When you reach the **Ready to Install** page, click **Install** to begin the installation process.

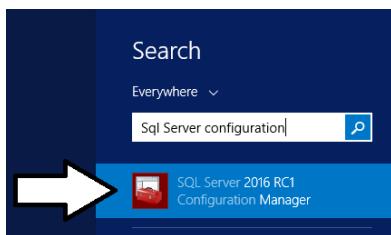


- k) After several minutes the installation should complete and you will see the **Complete** dialog. Click **Close** to complete the installation process for the named **SHAREPOINT** instance of the SQL Server Database engine.

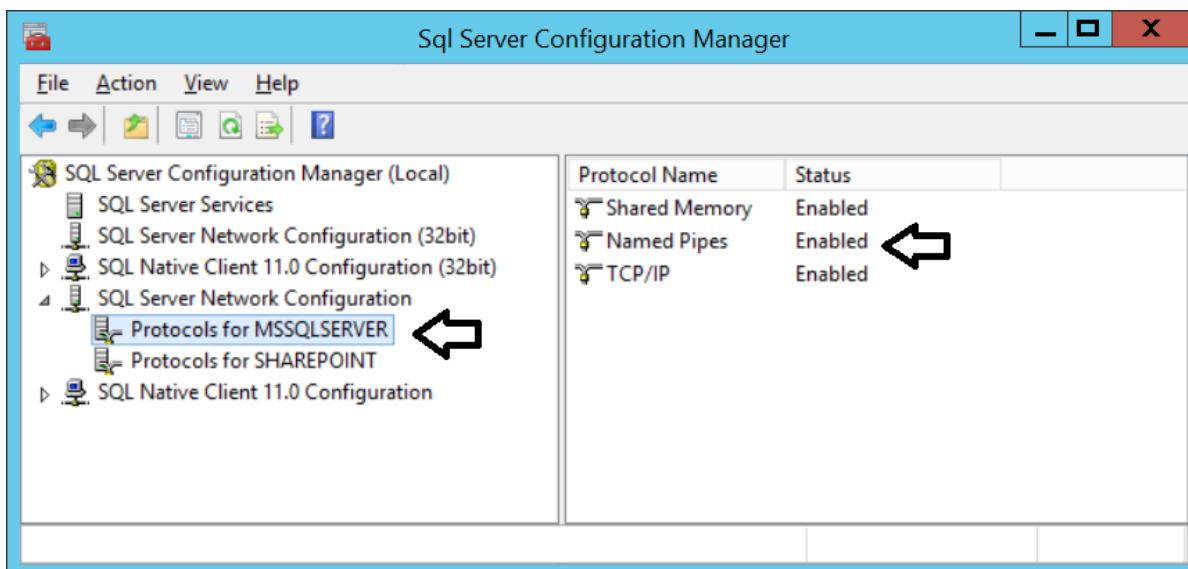


Next, you will configure SQL Server to enable the use of Named Pipes as a communications protocol.

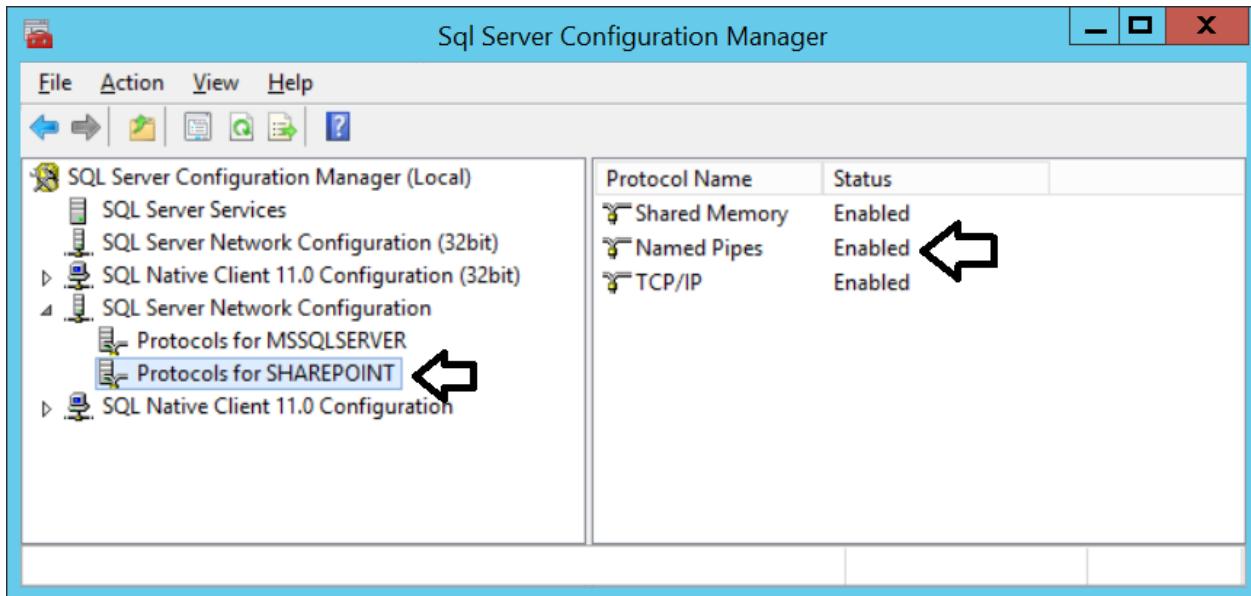
8. Configure the Named Pipes protocol using the SQL Server Configuration Manager.
  - a) Press the **Windows** key to navigate to the Windows Start page.
  - b) Locate and click the SQL Server Configuration tile to launch the SQL Server Configuration Manager.



- c) In the SQL Server Configuration Manager, expand the nodes of the tree view control on the left to display the path of **SQL Server Configuration Manager >> SQL Server Network Configuration >> Protocols for MSSQLSERVER**.
- d) On the right-hand side, locate the property setting for the **Named Pipes** protocol. This protocol is initially in a disabled state.
- e) Right click on the **Named Pipes** property and select the **Enabled** command.

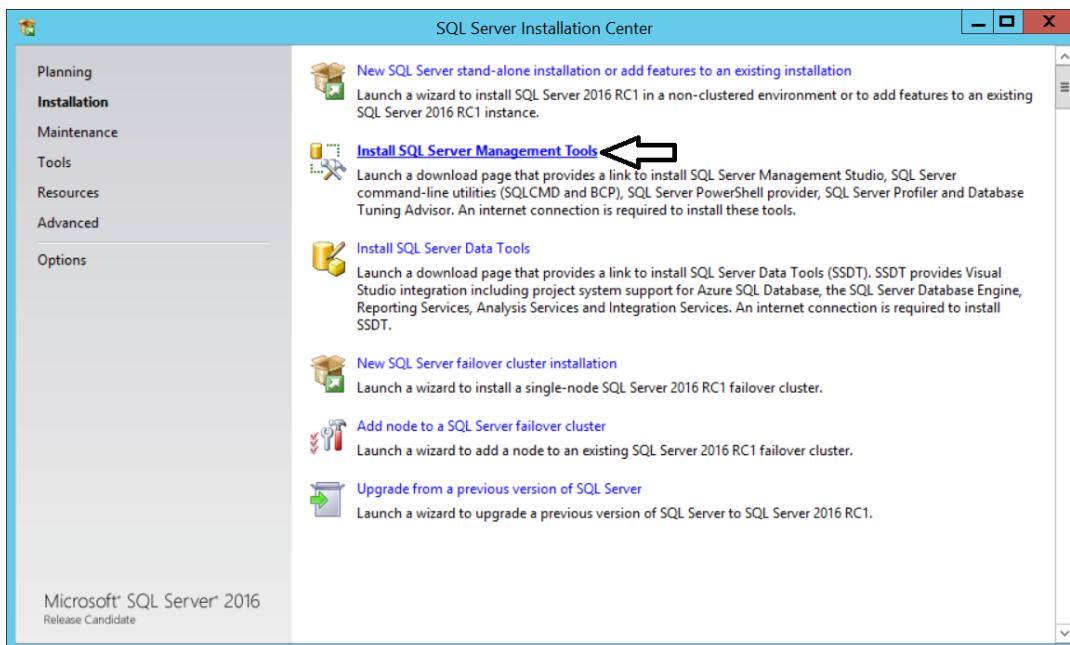


- f) Repeat the same set of steps to enable **Named Pipes** for the **Protocols for SHAREPOINT** instance.



- g) Close the SQL Server Configuration Manager.

9. Install the SQL Server Management Studio and connect to the two instances of the SQL Server Database Engine.
- Return to the **SQL Server Installation Center** dialog
  - Click the **Installation** link on the left-hand side and then click **Install SQL Server Management Tools** on the right-hand side.



At this point, you will be redirected to a Microsoft-sponsored web page from which you can download and install the latest version of the SQL Server Management tools named **SQL Server Management Studio**.

- c) Click the **Download SQL Server Management Studio March 2016 preview** link to begin the download.

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... > SQL Server > SQL Server Tools > SQL Server Management Tools with SSMS \*

Download SQL Server Management Studio (SSMS)

SQL Server Management Studio - Changelog (SSMS)  
SQL Server Management Studio - Release Notes  
Previous SQL Server Management Studio Releases  
SQL Server Management Studio - License Terms  
Use SQL Server Management Studio  
Object Explorer

Updated: March 18, 2016

SQL Server Management Studio (SSMS) is an integrated environment for accessing, configuring, managing, administering, and developing all components of SQL Server. SSMS combines a broad group of graphical tools with a number of rich script editors to provide developers and administrators of all skill levels access to SQL Server. This release features improved compatibility with previous versions of SQL Server, a light weight stand-alone web installer, and toast notifications within SSMS when new releases become available.

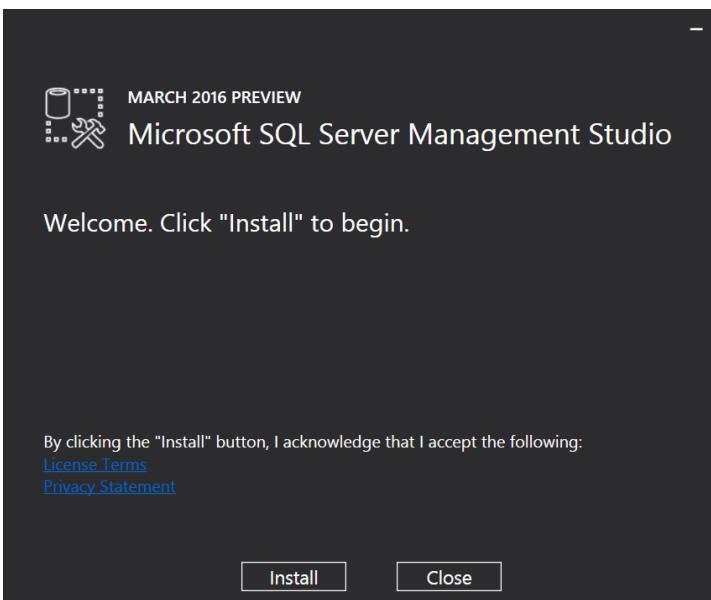
Download SSMS preview

Download SQL Server Management Studio March 2016 preview

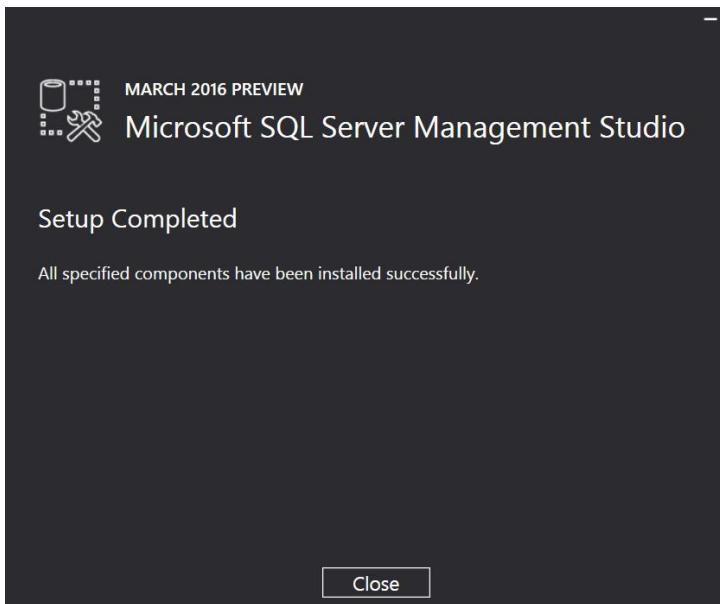
- d) Once the setup file named **SSMS-Setup-ENU.exe** has downloaded, click **Run** to begin the installation process.



- e) When you see the installation program's **Welcome** page, click **Install** to continue with the installation.

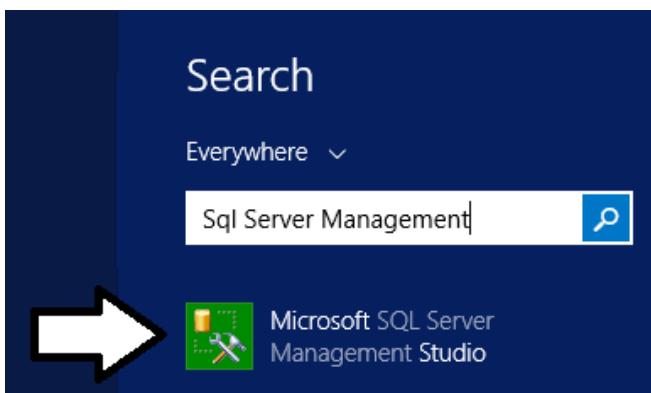


- f) Wait until the installation completes and you see the **Setup Completed** page. Click **Close**.

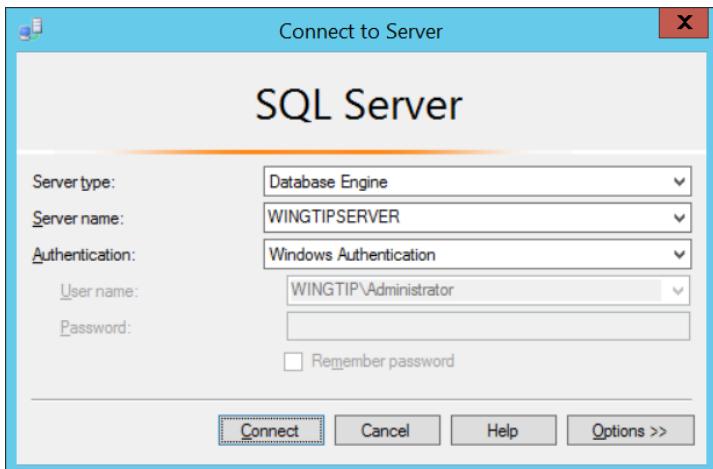


10. Launch SQL Server Management Studio and connected to the two instances of the SQL Server Database Engine.

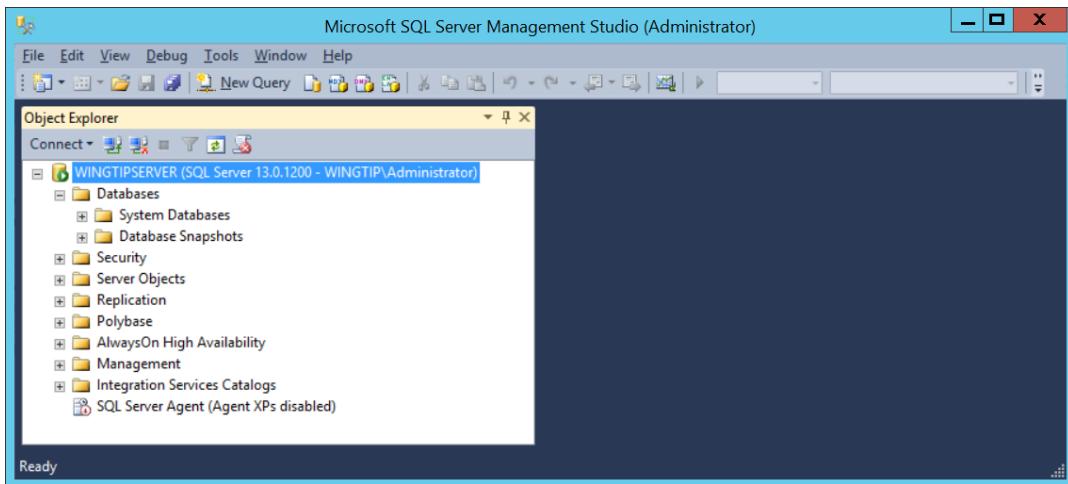
- Press the **Windows** key to navigate to the Windows Start page.
- Locate and click the SQL Server Management Studio tile to launch SQL Server Management Studio.



- When you are prompted with the **Connect to Server** dialog, enter a server name of **WINGTIPSERVER** to connect to the default instance. Make sure **Windows Authentication** is selected for the **Authentication** setting and click the **Connect** button.



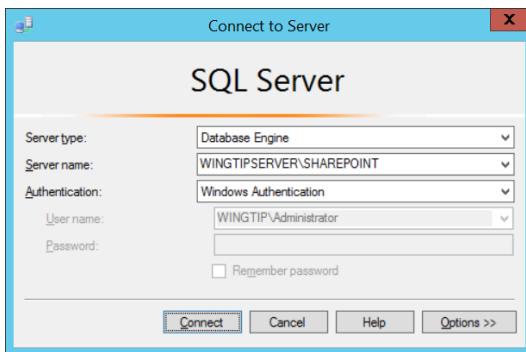
- Once **SQL Server Management Studio** has connected to the **SQL Server Database Engine**, you should see the **Object Explorer** with a tree view control with **WINGTIPSERVER** as its top-level node. Expand the **Databases** node and then the **System Databases** node.



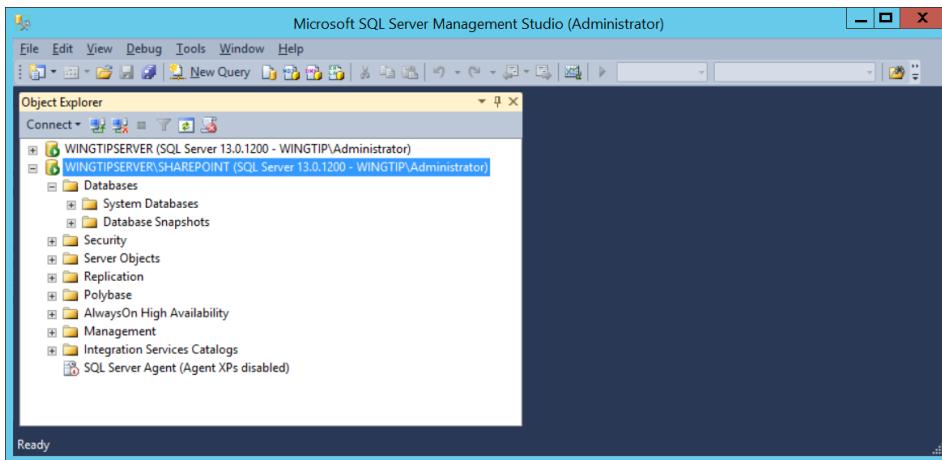
You should be able to see the system database such as master model and tempdb. However, there are no user-created databases yet. You can create or import whatever SQL Server databases you would like to load on this VM.

11. Connect to the named **SHAREPOINT** instance of the **SQL Server Database Engine**.

- Drop down the **Connect** menu in the **Object Explorer** and select the **Database Engine...** command.
- When you are prompted with the **Connect to Server** dialog, enter a server name of **WINGTIPSERVER\SHAREPOINT** to connect to the named **SharePoint** instance. Make sure **Windows Authentication** is selected for the **Authentication** setting and click the **Connect** button.



- You should be able to connect to and examine the **WINGTIPSERVER\SHAREPOINT** named instance.



Currently, there are no databases in the **WINGTIPSERVER\SHAREPOINT** named instance. However, this is the place where SharePoint Server 2016 will create databases as you are creating and configuring a local SharePoint 2016 farm. As you work your way through this setup guide, SharePoint will create as many as 18 databases in this named instance. There are additional databases that will be created in the SharePoint named instance when you install and configure Workflow Manager and Service Bus to add support for SharePoint 2013 workflows.

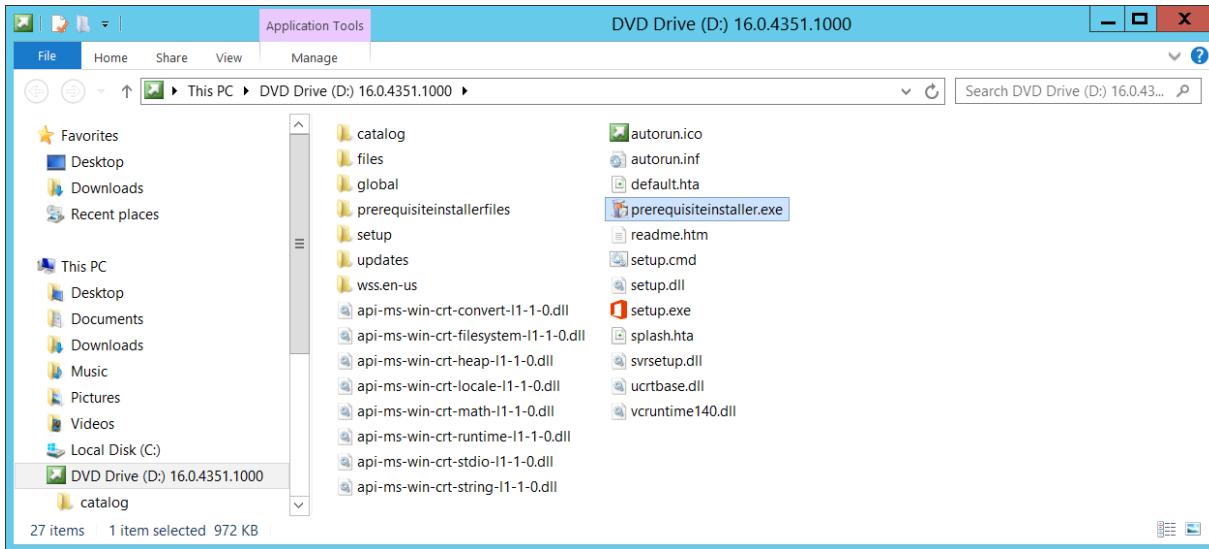
12. Close SQL Server Management Studio.

## Task 9: Install SharePoint Server 2016 RTM

In this task you will install the RTM version of SharePoint Server 2016. Once the product has been installed, you will create a local SharePoint farm and then run PowerShell scripts to configure this SharePoint 2016 farm with service applications, web applications and site collections. You will also work through the steps of configuring support for the User Profile Service and the SharePoint Search Service.

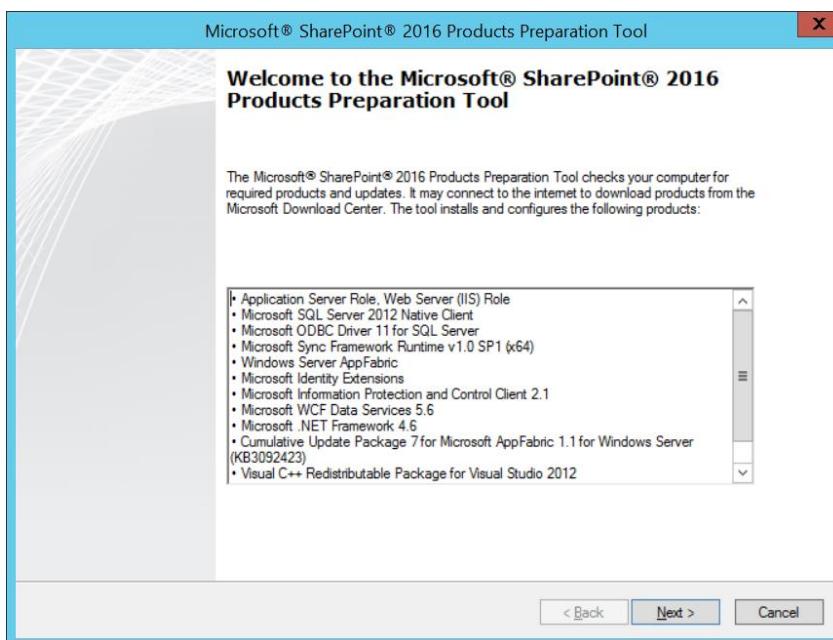
### 1. Obtain the installation files for SharePoint Server 2016.

- Navigate to <https://www.microsoft.com/en-us/download/details.aspx?id=51493>.
- Click download to download the SharePoint Server 2016 installation file named **officeserver.img**.
- Double-click on **officeserver.img** to mount it as the **D:\** drive.
- Navigate to the D:\ drive with the installation file and locate the file named **PrerequisiteInstaller.exe**.

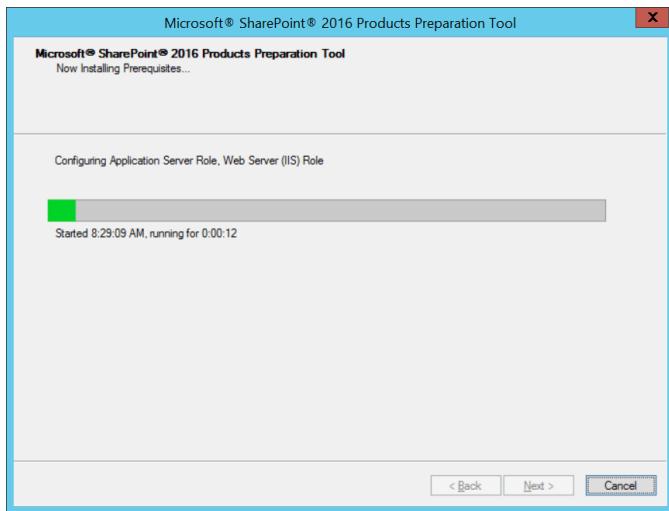


### 2. Run the SharePoint 2016 Prerequisite Installer.

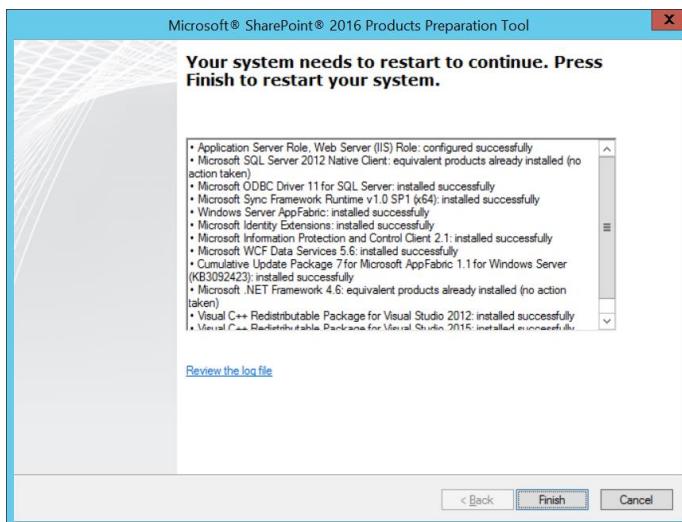
- Double-click on **PrerequisiteInstaller.exe** to launch the Prerequisite Installer.
- Click **Next** at the welcome screen.



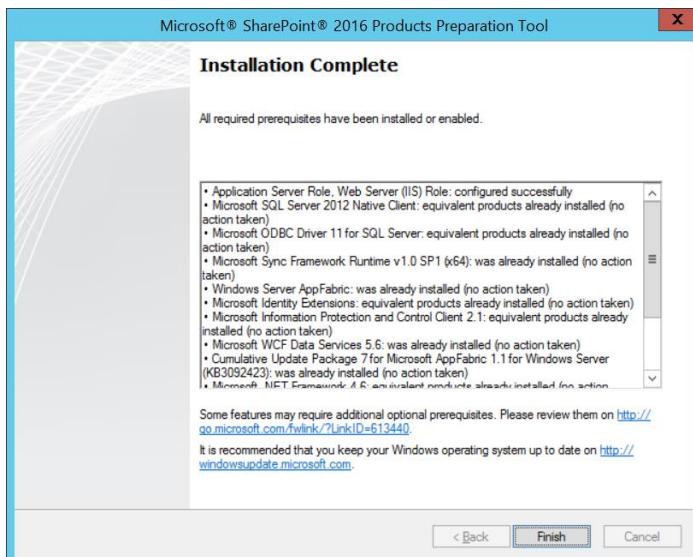
- Clicking the I accept the terms of the Licence agreement(s) checkbox and then click Next.
- Wait while the Prerequisite Installer runs.



- e) When you are prompted with the following dialog indicating that you need to restart the system, click the **Finish** key.



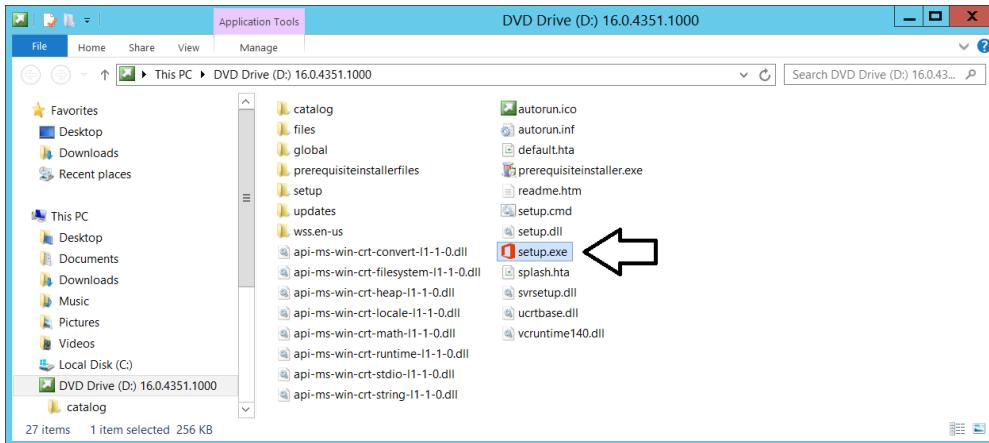
- f) Wait for the VM to restart and then log back in as **WINGTIP\Administrator**. The Prerequisite Installer should resume automatically and continue with the installation.  
g) When you see the **Installation Complete** dialog, click **Finish** to close the Prerequisite Installer.



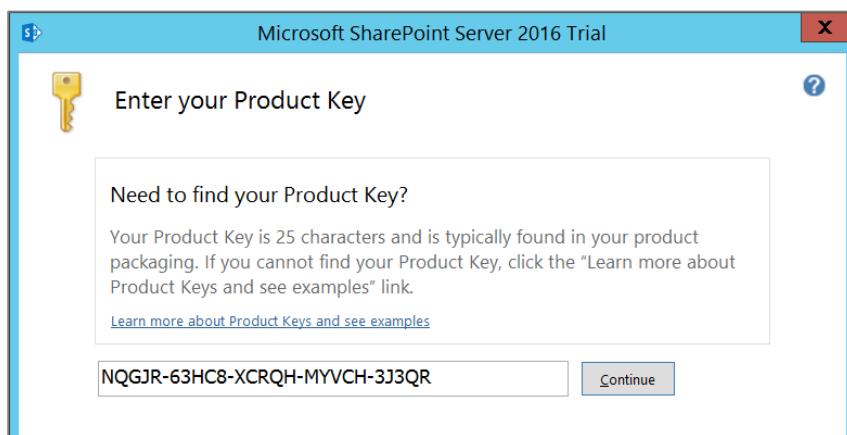
At this point all prerequisites required by SharePoint Server 2016 have been installed. Now it's time to install the RTM version of SharePoint Server 2016.

3. Install SharePoint Server 2016.

- Navigate to the D:\ drive with the installation file and locate the file named **setup.exe**.

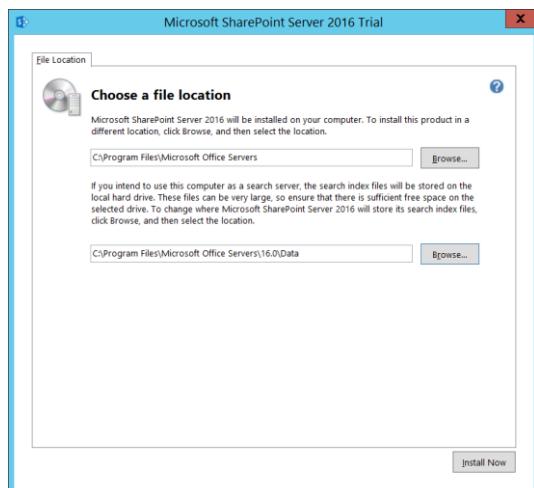


- When prompted to **Enter your Product Key**, enter your own product key for SharePoint Server 2016 or alternatively enter the trial product key of **NQGJR-63HC8-XCRQH-MYVCH-3J3QR** and then click **Continue**.

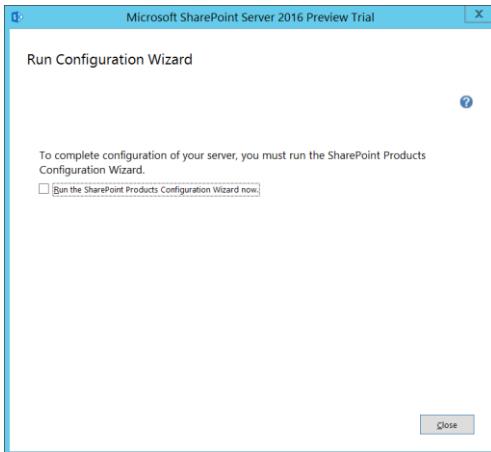


4. On the **Read the Microsoft Software License Terms** page, check the checkbox to accept the terms and click **Continue**.

5. On the **Choose a file location** page, accept the default settings and click **Install Now**.



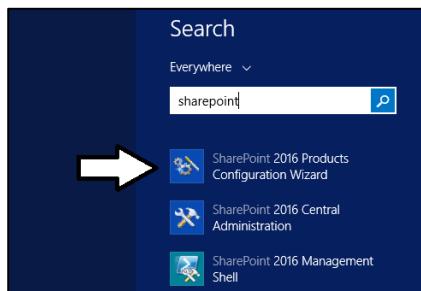
- When the SharePoint Server 2016 installation program completes, it displays the **Run Configuration Wizard** page as shown in the following screenshot. Ensure the **Run the SharePoint Products Configuration Wizard** checkbox is **NOT** selected and then click **Close**.



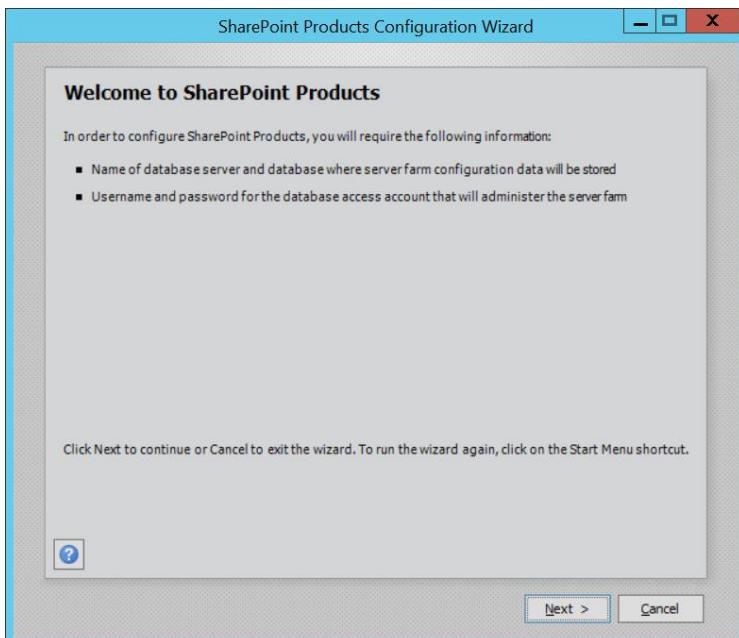
## Task 10: Create and Configure a Local SharePoint 2016 Farm

In this task, you will create a new SharePoint 2016 farm using the **SharePoint 2016 Products Configuration Wizard**. Next, you will use the Farm Configuration wizard to provision an initial set of service applications. After that, you will run PowerShell scripts to provision the primary web application and to create a set of sample site collections. You will then complete this task by walking through the steps to provision and configure an instance of the User Profile Service and the SharePoint Search Service.

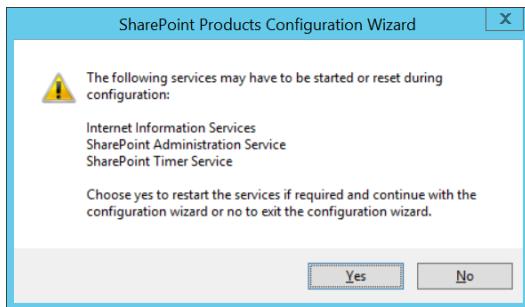
1. Create a new SharePoint farm using the SharePoint 2016 Products Configuration Wizard.
  - a) Press the **Windows Key** to open the **Start menu**.
  - b) On the Start menu find the **SharePoint 2016 Products Configuration Wizard** tile and click on it.



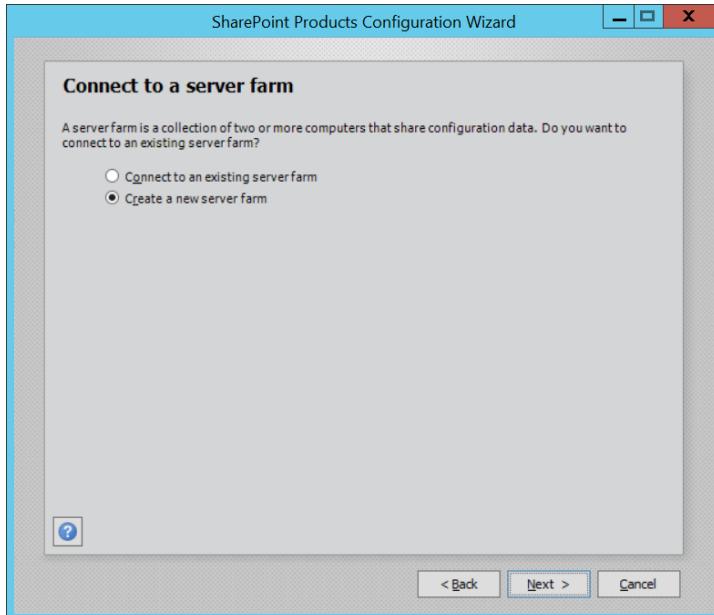
- c) On the **Welcome to SharePoint Products** page, click **Next**.



- d) If prompted to start or reset services, click **Yes**.

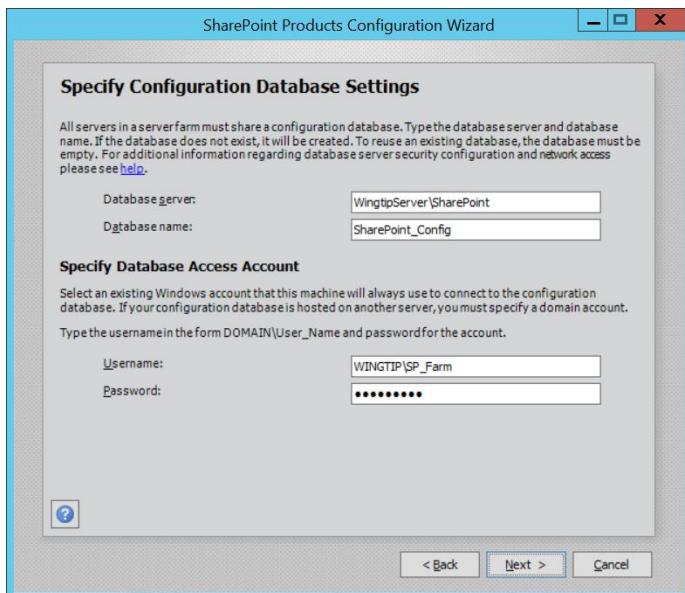


- e) On the **Connect to a server farm** page, select **Create a new server farm** and click **Next**.



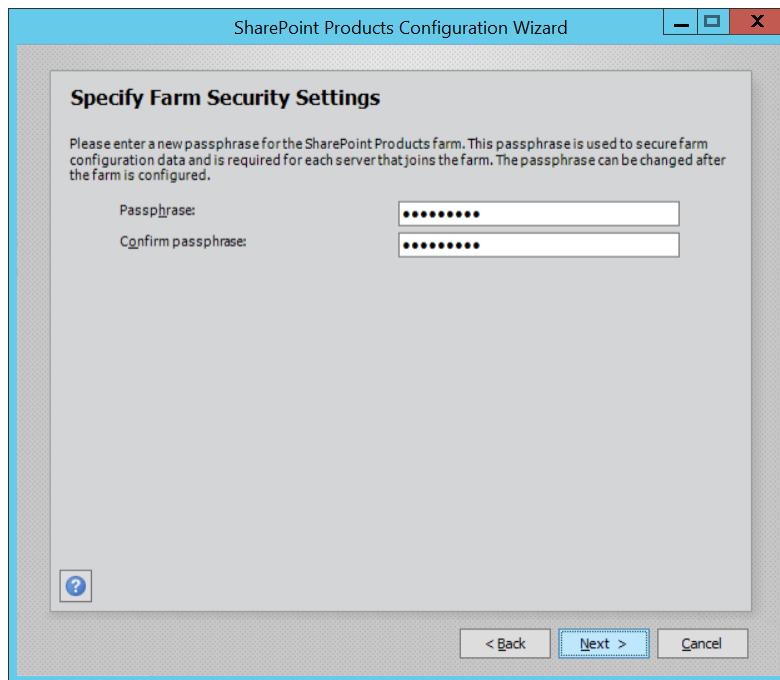
- f) On the **Specify Configuration Database Settings** page, use the following to complete the page and click **Next**:

- Database server: **WingtipServer\SharePoint**
- Database name: **SharePoint\_Config**
- Username: **WINGTIP\SP\_Farm**
- Password: **Password1**

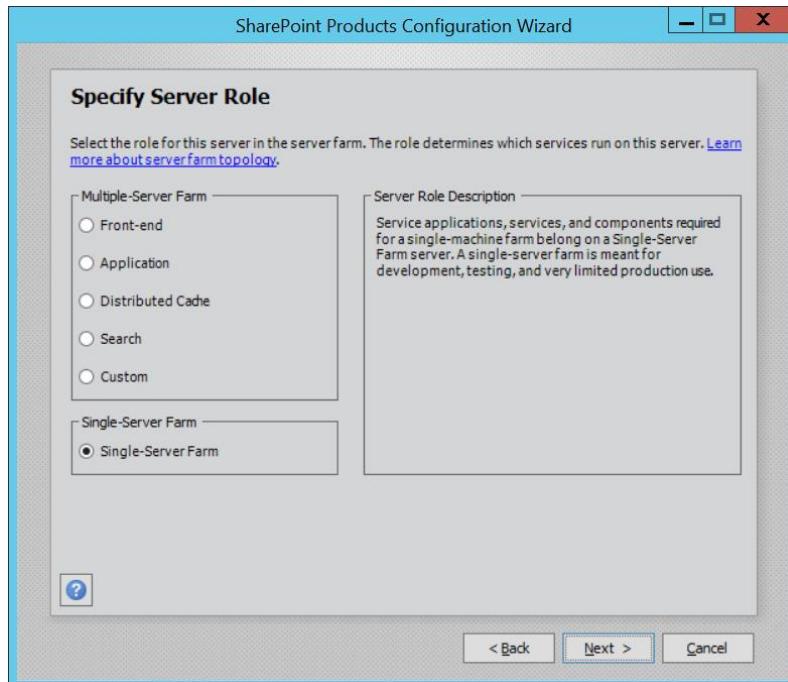


This step is important. Make sure you give the **Database server** setting a value of **WINGTIPSERVER\SHAREPOINT** and not **WINGTIPSERVER**. That's because you want all the databases that are created by SharePoint to be created in the **SharePoint** named instance of the SQL Server Database Engine and not in the default instance.

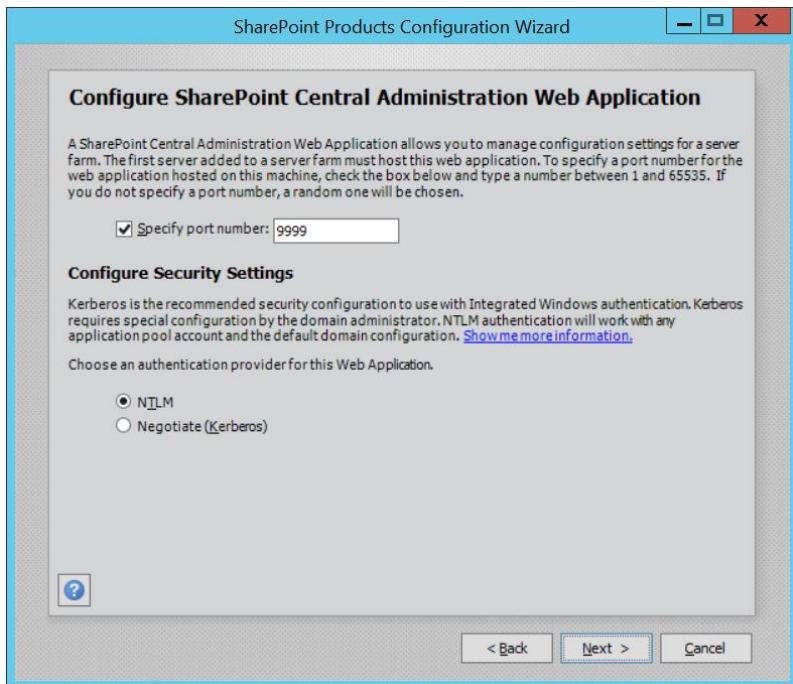
- g) On the **Specify Farm Security Settings** page, enter **Password1** into both textboxes and click **Next**.



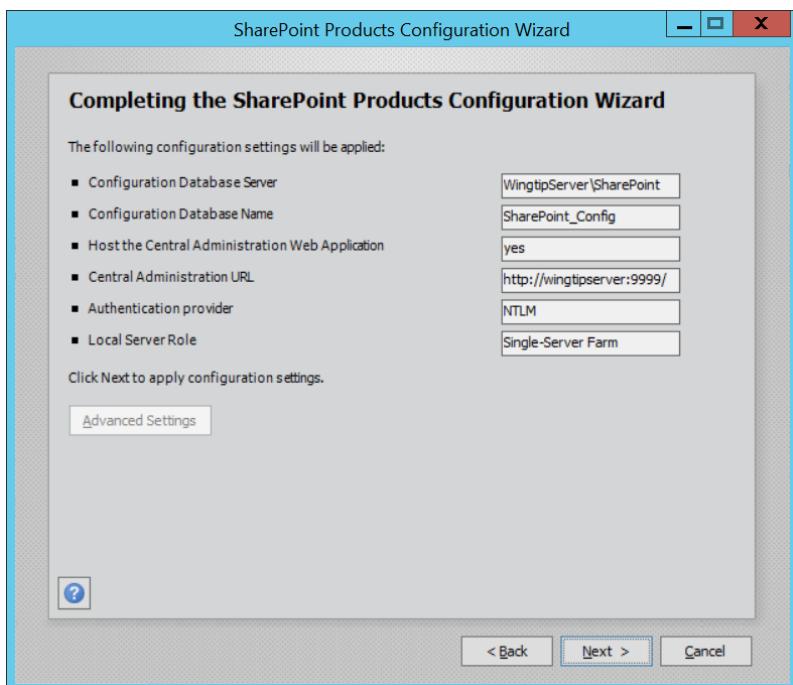
- h) On the **Specify Server Role** page, select **Single-server Farm** and click **Next**.



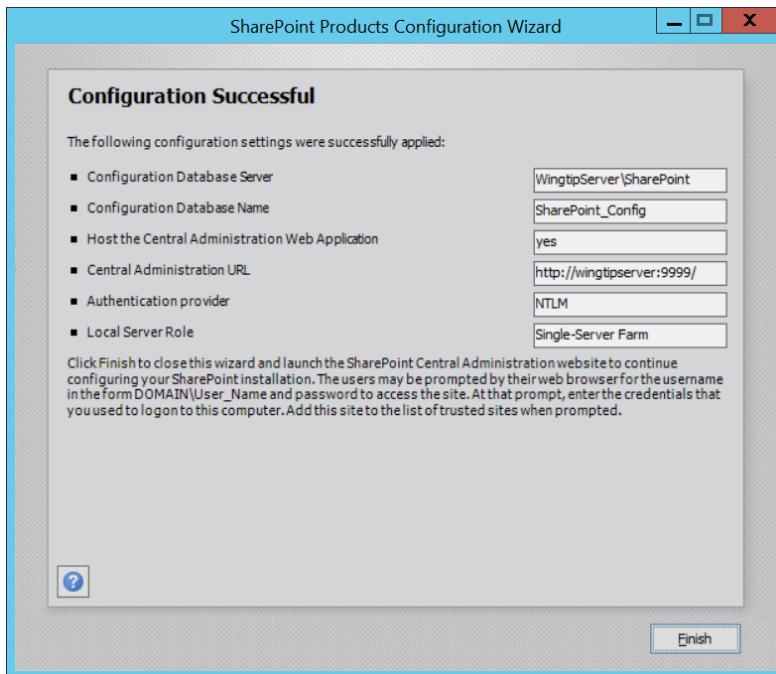
- i) On the **Configure SharePoint Central Administration Web Application** page, check the **Specify port number** checkbox and enter a value of **9999**, then Click **Next**.



- j) On the **Completing the SharePoint Products Configuration Wizard** page, click **Next**.

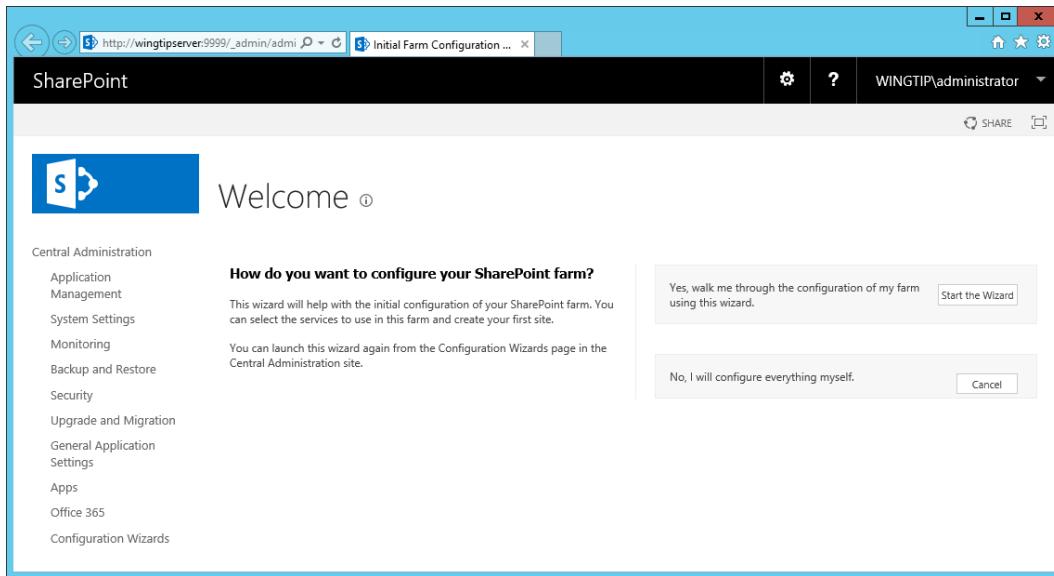


- k) When the installer completes, it will display the **Confirmation Successful** page. Click **Finish** to close the **SharePoint Products Configuration Wizard**.



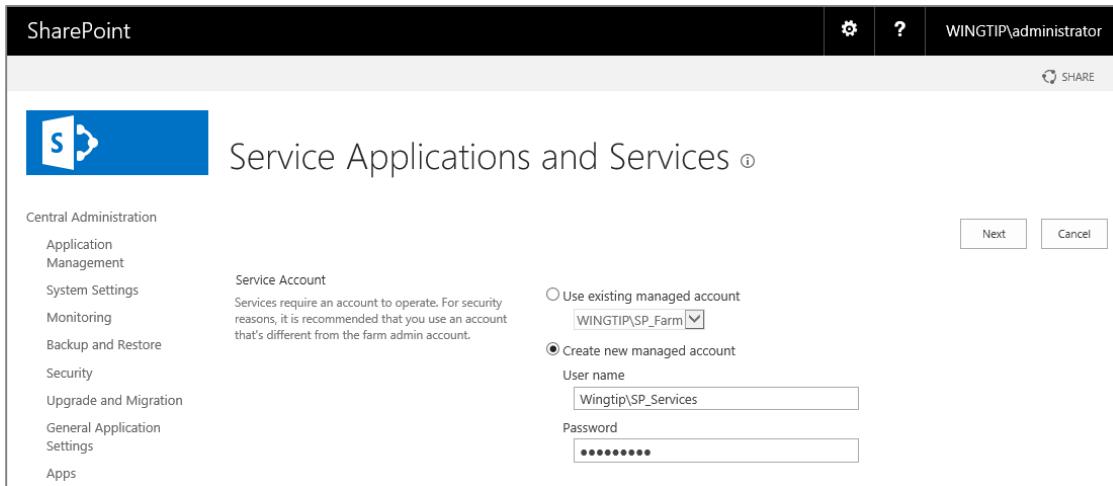
Note that when you click **Finish** to close the **SharePoint Products Configuration Wizard**, a session of the Internet Explorer is launched and you are directed to a Welcome page in SharePoint Central Administration which will prompt you to continue the configuration process by running the Farm Configuration Wizard.

- I) Click **No, I don't wish to participate** on the Customer Experience Improvement Program screen and click **OK**
- m) On the **Welcome** screen select **Yes, walk me through the configuration of my farm using this wizard** to start the Farm Configuration Wizard.



At this point, the **SharePoint Farm Configuration Wizard** should start which will allow you to create an initial set of SharePoint service applications and to configure which SharePoint service should be enabled.

2. Run the Farm Configuration Wizard.
  - a) When the Farm Configuration Wizard runs, it displays a page with a title of **Service Applications and Services**.
  - b) In the **Service Account** section, select **Create new managed account**.
  - c) Enter a User name of **WINGTIP\SP\_Services**.
  - d) Enter a Password of **Password1**.



- e) Scroll down in the **Service Applications and Services** page to the **Service Applications** section. In the **Service Applications** section, select the following service applications and make sure all others are unselected.
- App Management Service
  - Business Data Connectivity Service
  - Managed Metadata Service
  - Secure Store Service
  - State Service
  - Usage and Health data collection
  - Workflow Service Application

The set of service applications you have select should match the following screenshot. Note that an instance of the User Profile Service Application and the Search Service Application will be created in a later step in this setup guide.

<input type="checkbox"/> <b>Access Services 2010</b> Allows viewing, editing, and interacting with Access Services 2010 databases in a browser.	<input type="checkbox"/> <b>PerformancePoint Service Application</b> Supports the monitoring and analytic capabilities of PerformancePoint Services such as the storage and publication of dashboards and related content.	<input checked="" type="checkbox"/> <b>Usage and Health data collection</b> This service collects farm wide usage and health data and provides the ability to view various usage and health reports.
<input type="checkbox"/> <b>Access Services</b> Allows viewing, editing, and interacting with Access Services databases in a browser.	<input type="checkbox"/> <b>PowerPoint Conversion Service Application</b> Enables the conversion of PowerPoint presentations to various formats.	<input type="checkbox"/> <b>User Profile Service Application</b> Adds support for My Sites, Profiles pages, Social Tagging and other social computing features. Some of the features offered by this service require Search Service Application and Managed Metadata Services to be provisioned. <a href="#">Learn about security implications related to this option</a>
<input checked="" type="checkbox"/> <b>App Management Service</b> Allows you to add SharePoint Apps from the SharePoint Store or the App Catalog.	<input type="checkbox"/> <b>Project Server Service Application</b> Project Services supports collaborative work management capabilities including the storage and management of projects, resources, tasks, assignments, and timesheets.	<input type="checkbox"/> <b>Visio Graphics Service</b> Enables viewing and refreshing of Visio Web Drawings.
<input checked="" type="checkbox"/> <b>Business Data Connectivity Service</b> Enabling this service provides the SharePoint farm with the ability to upload BDC models that describe the interfaces of your enterprises' line of business systems and thereby access the data within these systems.	<input type="checkbox"/> <b>Search Service Application</b> Index content and serve search queries.	<input type="checkbox"/> <b>Word Automation Services</b> Provides a framework for performing automated document conversions.
<input type="checkbox"/> <b>Lotus Notes Connector</b> Search connector to crawl the data in the Lotus Notes server.	<input type="checkbox"/> <b>Secure Store Service</b> Provides capability to store data (e.g. credential set) securely and associate it to a specific identity or group of identities.	<input checked="" type="checkbox"/> <b>Workflow Service Application</b> Workflow Service
<input type="checkbox"/> <b>Machine Translation Service</b> Performs automated machine translation.	<input type="checkbox"/> <b>State Service</b> Provides temporary storage of user session data for SharePoint Server components.	
<input checked="" type="checkbox"/> <b>Managed Metadata Service</b> This service provides access to managed taxonomy hierarchies, keywords and social tagging infrastructure as well as Content Type publishing across site collections.		

- f) Scroll down in the **Service Applications and Services** page to the **Services** section. In the **Services** section, select the following services and make sure all other services are not selected.
- Claims to Windows Token Service
  - Distributed Cache
  - Microsoft SharePoint Foundation Subscriptions Settings Service
  - Microsoft SharePoint Foundation Workflow Timer Service

The services you have select should match the following screenshot.

Services

Select the services you want to run in your farm.

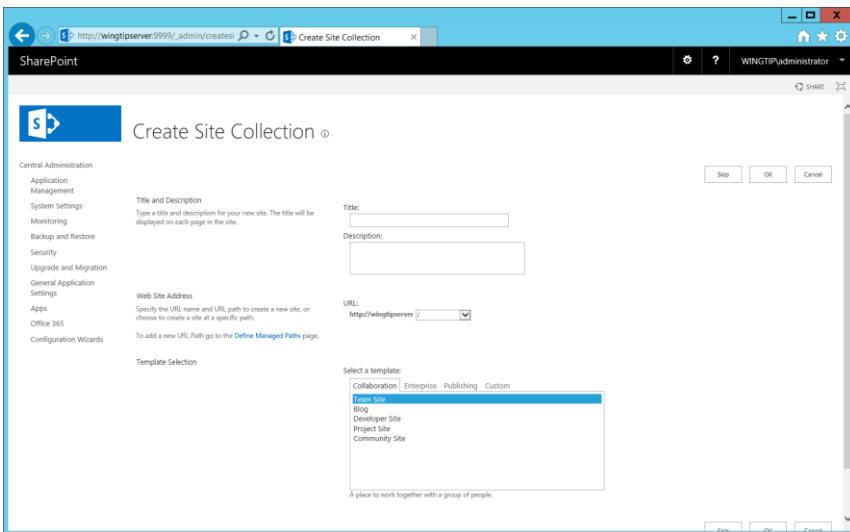
<input checked="" type="checkbox"/> <b>Claims to Windows Token Service</b>	Converts user claim tokens to Windows tokens. This service is used for services that don't support claims authentication.
<input checked="" type="checkbox"/> <b>Distributed Cache</b>	Provides caching features in SharePoint Server. The microblog features and feeds rely on the Distributed Cache to store data for fast retrieval across all entities.
<input type="checkbox"/> <b>Document Conversions Launcher Service</b>	Schedules and starts the document conversions on a server.
<input type="checkbox"/> <b>Document Conversions Load Balancer Service</b>	Balances document conversion requests across the server farm.
<input type="checkbox"/> <b>Microsoft SharePoint Foundation Sandboxed Code Service</b>	Supports running sandboxed code on computers in the farm. The computers can include web servers and application servers.
<input checked="" type="checkbox"/> <b>Microsoft SharePoint Foundation Subscription Settings Service</b>	Stores settings and configuration data for your organization.
<input checked="" type="checkbox"/> <b>Microsoft SharePoint Foundation Workflow Timer Service</b>	Supports the Microsoft SharePoint Foundation Timer service with configuration settings for timed workflow events.
<input type="checkbox"/> <b>Request Management</b>	Evaluates logic rules against incoming user requests in order to determine the action to take, and determines the computers in the farm that should handle these requests.
<input type="checkbox"/> <b>SharePoint Server ASP.NET Session State Service</b>	Controls how user session data is stored when filling out a form using InfoPath Forms Services.

- g) Click the **Next** button at the bottom of the page to begin the **Farm Configuration** wizard.
- h) Wait for the **Farm Configuration** wizard to complete its work.

The Farm Configuration Wizard will take several minutes to run. When it runs, it provisions all the SharePoint service applications you have selected. It also starts and initializes the SharePoint services you selected. After the Farm Configuration wizard completes its work provisioning service applications and starting services, it then provisions a new SharePoint Web Application. However, this Web Application is not created using best practices. Therefore, this setup guide provides a PowerShell script to delete this less-than-perfect web application created by the wizard and to replace it with a new Web Application that is created and configured using SharePoint best practices.

After creating a new web application, the **Farm Configuration Wizard** displays the **Create Site Collection** page giving you the option to create a site collection in the new Web Application it has created. However, it doesn't make any sense to create a new site collection because you will be deleting this Web Application over the next few steps.

- i) When you are prompted with the **Create Site Collection** page, click the **Skip** button to skip this step.



- j) You should now see a page which displays the list of the work performed by the Farm Configuration wizard.

### This completes the Farm Configuration Wizard.

Details of this SharePoint farm:

Site Title: N/A  
Site URL: [N/A](#)

Service Applications:

- Secure Store Service Application
- State Service
- Workflow Service Application
- Managed Metadata Service
- App Management Service Application
- Security Token Service Application
- Application Discovery and Load Balancer Service Application
- Usage and Health Data Collection Service Application
- Business Data Connectivity Service Application

#### Hybrid features in SharePoint 2016

With hybrid features, you can take a best-of-both-worlds approach by providing access to Office 365 productivity services and offerings directly within SharePoint Server 2016. To learn more about SharePoint hybrid solutions, visit the '[SharePoint Hybrid Solutions Center](#)'.

Click Configure Hybrid Features or "Office 365" in the left navigation pane to begin configuring hybrid features. Otherwise, click Finish to continue to the SharePoint Central Administration page where you can continue configuring other settings for your farm.

To return to this wizard, or access additionally installed wizards, click '[Configuration Wizards](#)' in the left navigation pane.

You have now completed the initial work to create a new SharePoint 2016 farm by first running the SharePoint 2016 Products Configuration Wizard and then by running the Farm Configuration wizard. Next, you will execute a series of PowerShell scripts to configure the local farm with a new SharePoint web application, samples site collections and a few more service applications.

3. Inspects the set of service application instances that were created by the Farm Configuration Wizard.
  - a) Navigate to the Home page of SharePoint Central Administration.
  - b) Click the **Manage service application** link in the **Application Management** section to navigate to the Manage Service Applications page.



- c) On the **Manage Service Applications** page, you can see the service applications that have been created in the local farm. What you see on the **Manage Service Applications** page should match the following screenshot.

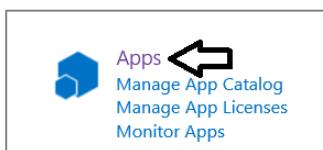
	Name	Type	Status
Central Administration	App Management Service	App Management Service Application	Started
Application Management	App Management Service	App Management Service Application Proxy	Started
System Settings	Application Discovery and Load Balancer Service Application	Application Discovery and Load Balancer Service Application	Started
Monitoring	Application Discovery and Load Balancer Service Application Proxy_f1f67b81-7cb6-4593-85dc-b04b54378462	Application Discovery and Load Balancer Service Application Proxy	Started
Backup and Restore	Business Data Connectivity Service	Business Data Connectivity Service Application	Started
Security	Business Data Connectivity Service	Business Data Connectivity Service Application Proxy	Started
Upgrade and Migration	Managed Metadata Service	Managed Metadata Service	Started
General Application Settings	Managed Metadata Service	Managed Metadata Service Connection	Started
Apps	Secure Store Service	Secure Store Service Application	Started
Office 365	Secure Store Service	Secure Store Service Application Proxy	Started
Configuration Wizards	Security Token Service Application	Security Token Service Application	Started
	State Service	State Service	Started
	State Service	State Service Proxy	Started
	Usage and Health data collection	Usage and Health Data Collection Service Application	Started
	Usage and Health data collection	Usage and Health Data Collection Proxy	Started
	Workflow Service Application	Workflow Service Application	Started
	Workflow Service Application Proxy	Workflow Service Application Proxy	Started

Note that earlier when running the Farm Configuration wizard, you selected the checkbox to create the service application named **Site Subscription Settings Service**. Now you will run a PowerShell script to create a service application instance of the **Site Subscription Settings Service**. The reason you are doing this is that an instance of the **Site Subscription Settings Service** is required support SharePoint add-ins (aka SharePoint apps).

4. Run the PowerShell script to provision a service application and proxy for the **Site Subscription Settings Service**.
  - a) Navigate to the **Scripts** folder in the Windows explorer.
  - b) Right-click on **Script06\_CreateSubscriptionSettingsService.ps1** and select Run with PowerShell.
  - c) Wait for the script to run and complete its work.
  - d) Press ENTER or close the console window when complete.
5. Verify that the service application for the **Site Subscription Settings Service** has been successfully created.
  - a) Return to the browser and navigate to the home page of **SharePoint Central Administration**.
  - b) Locate and click the **Manage service application** link in the Application Management section.
  - c) If you were already at the **Manage Service Application page**, then you must refresh the page.
  - d) Make sure you can see the **Site Subscription Settings Service Application** you just created.

Name	Type
App Management Service	App Management Service Application
App Management Service	App Management Service Application Proxy
Application Discovery and Load Balancer Service Application	Application Discovery and Load Balancer Service Application
Application Discovery and Load Balancer Service Application Proxy_f1f67b81-7cb6-4593-85dc-b04b54378462	Application Discovery and Load Balancer Service Application Proxy
Business Data Connectivity Service	Business Data Connectivity Service Application
Business Data Connectivity Service	Business Data Connectivity Service Application Proxy
Managed Metadata Service	Managed Metadata Service
Managed Metadata Service	Managed Metadata Service Connection
Secure Store Service	Secure Store Service Application
Secure Store Service	Secure Store Service Application Proxy
Security Token Service Application	Security Token Service Application
Site Subscription Settings Service Application	Microsoft SharePoint Foundation Subscription Settings Service Application
Microsoft SharePoint Foundation Subscription Settings Service Application Proxy	Microsoft SharePoint Foundation Subscription Settings Service Application Proxy
State Service	State Service
State Service	State Service Proxy

- e) Return to the home page of Central Administration.
- f) Locate the **Apps** section at the bottom of the home page. Click on the **Apps** link to navigate to the **Apps** page.



- g) On the **Apps** page, click the **Configure App URLs** link in the **App Management** section.

The screenshot shows the 'Apps' page in SharePoint. At the top, there are two main sections: 'SharePoint and Office Store' and 'App Management'. Under 'App Management', there are links for 'Manage App Catalog', 'Monitor Apps', 'Configure App URLs', and 'App Permissions'. A large blue downward-pointing arrow is overlaid on the 'Configure App URLs' link.

- h) On the **Configure App URLs** page, verify that the **App domain** has a configured value of **wingtip.com** and also that **App prefix** has a configured value of **WingtipTenant**.

The screenshot shows the 'Configure App URLs' page. It displays the configuration pattern: <app prefix> - <app id>. <app domain>. The 'App domain' field is set to 'wingtip.com' and the 'App prefix' field is set to 'WingtipTenant'.

- i) Return to the home page of Central Administration

6. Run the PowerShell script to create two new web application in the local farm.

- Navigate to the **C:\Setup\Scripts** folder in the Windows explorer.
- Right Click on the **Script06\_CreateWebApplications.ps1** script and select **Run with PowerShell**.
- Wait for script to finish (this will take several minutes).
- Press ENTER or close the console window when complete

When you run **Script06\_CreateWebApplications.ps1**, this script will begin its work by deleting the existing web application that was created by the farm Configuration wizard. Next, it will create a new Web Application Pool using the identity of **WINGTIP\SP\_Content** and along with a new web application with a root URL of <http://wingtipserver>. This web application will serve as the primary web application in which you will create sample site collections. The run **Script06\_CreateWebApplications.ps1** script will also create a second web application that will be used to host OneDrive sites for each user.

When the script finishes, it will launch a browser and navigate to a Team site that was created at the root URL of the primary web application which is <http://wingtipserver>.

7. Take a moment to examine the new Team Site that has been created at <http://wingtipserver>.

The screenshot shows the 'Wingtip Team Site - Home' page. The top navigation bar includes back, forward, search, and refresh buttons, along with the URL 'http://wingtipserver/\_layouts/15/start.aspx#/SitePages/Home.aspx'. The page title is 'Wingtip Team Site'. On the left, there's a navigation bar with 'SharePoint' and 'Sites' tabs, and links for 'BROWSE' and 'PAGE'. Below the navigation is a 'Wingtip Team Site' logo. The main content area features a 'Get started with your site' message and five cards: 'Share your site.', 'Working on a deadline?', 'Add lists, libraries, and other apps.', 'What's your style?', and 'Your site. Your brand.'.

8. Run the PowerShell script to configure the primary web application with a wildcard SSL certificate.

- Navigate to the **C:\Setup\Scripts** folder in the Windows explorer.
- Right Click on the **Script07\_ConfigureSharePointSSL.ps1** script and select **Run with PowerShell**.

- c) Wait for script to finish.
9. Run the PowerShell script to create a set of sample site collections.
- a) Navigate to the **C:\Setup\Scripts** folder in the Windows explorer.
  - b) Right-click on the **Script08\_CreateSiteCollections.ps1** script and select **Run with PowerShell**.
  - c) Wait for script to finish (this will take several minutes).
  - d) Press ENTER or close the console window when complete
10. Take a minute to quickly inspect the sample site collections that have just been created.
- a) Inspect the **Team Site** that has been created at <https://intranet.wingtip.com>.
  - b) Inspect the **Search Center** site that has been created at <https://search.wingtip.com>.
  - c) Inspect the **Discovery Center** site that has been created at <https://disco.wingtip.com>.
  - d) Inspect the **Publishing Portal** site that has been created at <https://www.wingtip.com>.
  - e) Inspect the **BI Center** site that has been created at <https://bi.wingtip.com>.
  - f) Inspect the **Developer** site that has been created at <https://dev.wingtip.com>.
11. Run the PowerShell script to provision a service application for the SharePoint User Profile service.
- a) Navigate to the **Scripts** folder in the Windows explorer.
  - b) Right Click on the **Script09\_CreateUserProfileServiceApplication.ps1** script and select **Run with PowerShell**.
  - c) Wait for script to finish (this will take a minute or two to complete).
  - d) Press ENTER or close the console window when complete.
12. Import User Profile Information from Active Directory.
- a) Return to the browser and navigate to Central Administration.
  - b) Click **User Profile Service Application** to navigate to the administration page of the User Profile service.
  - c) In the Synchronization section, select **Configure Synchronization Settings**.

Manage Profile Service: User Profile Service Application

People  
Manage User Properties | Manage User Profiles | Manage User Sub-types | Manage Audiences | Schedule Audience Compilation |  
Manage User Permissions | Compile Audiences | Manage Policies

Synchronization  
Configure Synchronization Connections | Start Profile Synchronization

- d) On the Synchronization Connections page, select Create New Connection.

Synchronization Connections

Use this page to manage the list of connections to use to import from Active Directory.

**Create New Connection**

- e) Enter the following values on this form:
- i) Connection Name: **Wingtip Users**
  - ii) Type: **Active Directory**
  - iii) **Connection Settings:**
    - (1) Fully Qualified Domain Name: **wingtip.com**
    - (2) Specify a domain controller: **selected**
    - (3) Domain controller name: **WingtipServer**
    - (4) Authentication Provider Type: **Windows Authentication**
    - (5) Account Name: **WINGTIP\SP\_UPS**
    - (6) Password (and Confirm Password): **Password1**

## Add new synchronization connection

Use this page to configure a connection to a directory service server to synchronize users.

\* Indicates a required field

### Connection Name

### Type

 Active Directory Import

### Connection Settings

Fully Qualified Domain Name (e.g. contoso.com):

For Active Directory connections to work, this account must have directory sync rights.

Authentication Provider Type:

Authentication Provider Instance:

Account name: \*

Example: DOMAIN\user\_name

Password: \*

Confirm password: \*

Port:

Use SSL-secured connection

Filter out disabled users

Filter in LDAP syntax for Active Directory Import.

- f) Scroll down the page to the **Containers** section.
- g) Click the **Populate Containers** button. After the tree view control loads, expand the **WINGTIP** node and select the Organizational Unit named **Wingtip Users** by placing a checkbox as shown below.

**Containers**

Choose which containers you want to be synchronized.

**Populate Containers**

- WINGTIP**
  - WINGTIP
  - Computers
  - Domain Controllers
  - ForeignSecurityPrincipals
  - Managed Service Accounts
  - Program Data
  - System
  - Users
  - Wingtip Service Accounts
  - Wingtip Users

**Select All**

- h) Click **OK** to save the connection.
- i) You should now see the connection named **Wingtip AD users** on the **Synchronization Connections** page.

## Synchronization Connections

Use this page to manage the list of connections to import sources such as Active Directory, LDAP Directory and Business Data Connectivity. User information will be imported from these sources.

 [Create New Connection](#)

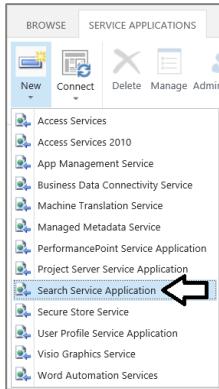
Name	Type	Source
Wingtip AD Users	Active Directory	WINGTIP.COM

13. Return to the User Profile Service Application management page
  - a) **Application Management > Manage Service Applications > User Profile Service Application.**
14. Finally, start a synchronization import:
  - a) Under **Synchronization**, select **Start Profile Synchronization**.
  - b) Select **Start Full Synchronization** and click **OK**
  - c) Wait for this to finish
  - d) You will be taken back to the **User Profile Service Application** page.
  - e) Refresh the **User Profile Service Application** page to see the **Number of User Profiles**. Once the Active Directory import process completes, there should be between 20 to 25 user profiles.

<b>Profiles</b>	
Number of User Profiles	25
Number of User Properties	109
Number of Organization Profiles	1
Number of Organization Properties	15
<b>Audiences</b>	
Number of Audiences	1
Uncompiled Audiences	0
Audience Compilation Status	Idle
Audience Compilation Schedule	Every Saturday at 01:00 AM
Last Compilation Time	Not compiled
<b>Profile Synchronization Settings</b>	
Synchronization Schedule (Incremental)	every 5 minutes between 0 and 0
Profile Synchronization Status	Idle

At this point you have configured the **User Profile Service Application** and you have also successfully imported profiles from the local Active Directory domain in the UPA database. Now, you will create and configure one more service application to provide support in your SharePoint farm to run searches with the SharePoint Search Service.

15. Create a new service application instance of the SharePoint Search Service.
  - a) In a browser, navigate to the home page of Central Administration.
  - b) Click **Manage Service Applications** in the Application Management section.
  - c) On the Service Applications page, select the drop down under **New** in the ribbon and select the **Search Service Application** option.



- d) On the **Create New Search Service Application** page set the following items:
  - i) Service Application Name: **Search Service Application**
  - ii) Search Service Account: **WINGTIP\SP\_Services**

Create New Search Service Application

Specify the properties for this Search Service Application. The settings you specify here can be changed later using the properties button in the Manage Service Applications page.

A new Search Service Application will have an initial topology with all search components on one application server and all databases on one database server. The topology of this application can be changed later using PowerShell cmdlets.

Name Provide a unique name for this Service Application.	Service Application name <input type="text" value="Search Service Application"/>
Search Service Application type Select the check box to make this a Cloud Search Service Application that crawls on-premises content in a cloud hybrid search solution. <a href="#">Learn more</a>	<input type="checkbox"/> Cloud Search Service Application
Search Service Account This is the Windows Service account for the SharePoint Server Search Service. This setting affects	Search Service Account <input type="text" value="WINGTIPSP_Services"/> <a href="#">Register new managed account</a>

iii) Application Pool for Search Admin Service: **Use existing application pool**

(1) Name: **SharePoint Web Services Default**

iv) Application Pool for Search Query and Site Settings Web Service

(1) Name: **SharePoint Web Services Default**

Application Pool for Search Admin Web Service

Choose the Application Pool to use for this Service Application. This defines the account and credentials that will be used by this web service.

You can choose an existing application pool or create a new one.

Application Pool for Search Query and Site Settings Web Service

Choose the Application Pool to use for this Service Application. This defines the account and credentials that will be used by this web service.

You can choose an existing application pool or create a new one.

<input checked="" type="radio"/> Use existing application pool <input type="text" value="SharePoint Web Services Default"/>	<input type="radio"/> Create new application pool <input type="text"/>
Select a security account for this application pool <input type="text" value="WINGTIPSP_Content"/> <a href="#">Register new managed account</a>	
<input checked="" type="radio"/> Use existing application pool <input type="text" value="SharePoint Web Services Default"/>	<input type="radio"/> Create new application pool <input type="text"/>
Select a security account for this application pool <input type="text" value="WINGTIPSP_Content"/> <a href="#">Register new managed account</a>	

**OK**   **Cancel**

v) Click **OK** at bottom of window and wait for the Search Service Application to be provisioned.

vi) When you see the **Manage Search Topology** screen with the success message, click **OK** to continue.

16. Configure the Search Service Application.

- Next we need to configure the identity of the Search Service Application Crawl Account
- In Central Administration Navigate to the main Search Administration page of the **Search Service Application**.
- Central Administration → Manage service applications → Search Service Application link

If you see an error on the search administration page stating that the search service is not able to connect to the machine that hosts the administration component you can try to reboot the server and try returning to the page.

- Inspect the properties in the **System Status** section and locate the property named **Default content access account**.
- Currently, the **Default content access account** property should have a value of **WINGTIP\SP\_Services**.
- Click on the link which shows the property value of **WINGTIP\SP\_Services** to configure it to use a different account. A dialog will appear that allows you to add a new account and password. Add the **WINGTIP\SP\_Crawler** account and a password / confirm password of **Password1** and then click **OK** to save your changes.
- The Default content access account should now be set to **WINGTIP\SP\_Crawler**.

## Search Service Application: Search Administration

### System Status

Administrative status	Running
Crawler background activity	None
Recent crawl rate	0.00 items per second
Searchable items	102
Recent query rate	0.00 queries per minute
Default content access account	WINGTIP\SP_Crawler



- g) Update the Contact e-mail address for crawls setting to **administrator@wingtip.com**.
- h) Update the Global Search Center URL to **<https://search.wingtip.com/Pages/results.aspx>**.

System Status	
Administrative status	Running
Crawler background activity	None
Recent crawl rate	0.00 items per second
Searchable items	102
Recent query rate	0.00 queries per minute
Default content access account	WINGTIP\SP_Crawler
Contact e-mail address for crawls	administrator@wingtip.com
Proxy server for crawling and federation	None
Search alerts status	On Disable
Query logging	On Disable
Global Search Center URL	<a href="https://search.wingtip.com/Pages/results.aspx">https://search.wingtip.com/Pages/results.aspx</a>



- i) Return to the main Search Administration page of the Search Service Application.

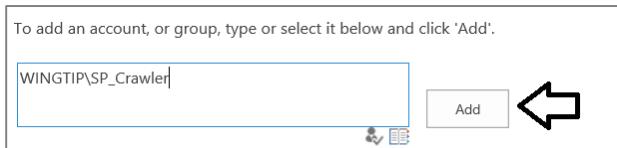
When you configure a new identity for the crawler account by updating the **Default content access account** property, SharePoint will automatically add a user policy to each existing web application to provide the account will Full-Read access. Therefore, you do not need to worry about configuring permissions for the crawler account to access SharePoint sites. However, SharePoint will not automatically configure permissions for the crawler account to properly access the User Profile Service Application. You will configure the permissions that are required in the following step.  
(Note: you would also need to provide access to any external content you wished to crawl)

### 17. Provide the **WINGTIP\SP\_Crawler** account with access to the User Profile Service Application.

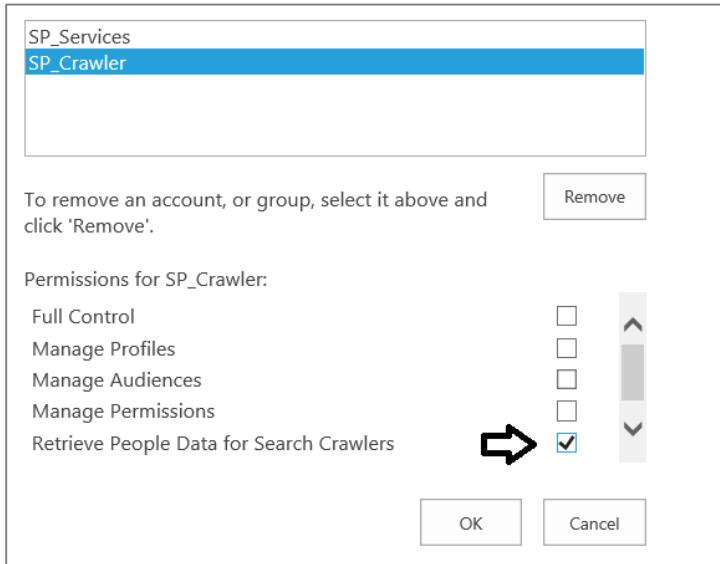
- a) Navigate to the Manage service applications page and select the User Profile Service Application
- b) **Central Administration → Manage service applications** → just select **User Profile Service Application** (but do not click the link (i.e. click anywhere on this line but the link itself to highlight/select this application))
- c) With the **User Profile Application Service** selected, click the **Administrators** button in the Ribbon.

The screenshot shows the SharePoint Central Administration interface. In the top navigation bar, 'SharePoint' and 'Sites' are visible. Below it, the 'BROWSE' tab is selected. Under 'SERVICE APPLICATIONS', there is a list of service applications: State Service, Usage and Health data collection, User Profile Service Application, and Workflow Service Application. The 'User Profile Service Application' item is highlighted with a blue selection bar. A large black arrow points from the left towards this highlighted item.

- d) In the Administrators for User Profile Service Application page, enter **WINGTIP\SP\_Crawler** and then click Add.



- e) Configure the **WINGTIP\SP\_Crawler** account with the **Retrieve People Data for Search Crawlers** permission.



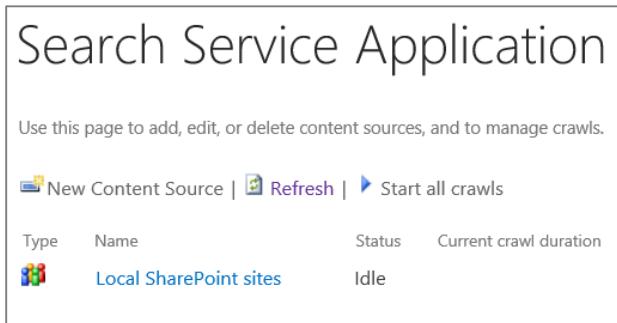
- f) Click **OK** to save your configuration changes.

18. Run a full crawl of the Search Service Application.

- Return to **Manage Service Applications** page.
- Click on the **Search Service Application** link to navigate to the main Search Administration page.
- Click the **Content Sources** link in the **Crawling** section to navigate to the **Manage Content Source** page.



- On the **Manage Content Source** page you should see a single content source named **Local SharePoint Sites**.



- e) Use the drop down menu on **Local SharePoint sites content source** to start a full crawl of the content.

Type	Name	Status	Current crawl duration
	Local SharePoint sites	Idle	

- Edit
- View Crawl Log
- Start Full Crawl**
- Start Incremental Crawl

The full crawl process will likely take about 5 minutes or so to complete.

- f) Click the Refresh link about once per minute to see if the crawl has completed. When the crawl is still underway, you should see the **Status** of this Content Source is set to **Crawling Full**.

Type	Name	Status	Current crawl duration
	Local SharePoint sites	Crawling Full	00:00:50

- g) Continue to click Refresh until you see that the crawling process has completed and the **Status** is set to **Idle**.

Type	Name	Status	Current crawl duration	Last crawl duration
	Local SharePoint sites	Idle		00:03:54

19. Run a search against the SharePoint Search Service to verify that it is working correctly.

- Navigate to the Search Center site at <https://search.wingtip.com>.
- Type in a search using the text value of **ContentClass:STS\_SITE** and then click the search button.

SharePoint | Sites

EDIT LINKS

Search

ContentClass:STS\_SITE

Note that the search text **ContentClass:STS\_SITE** is used to run a search that returns only top-level sites.

- c) If the search application has been properly configured, you should see search results which include the site collections that you created earlier.

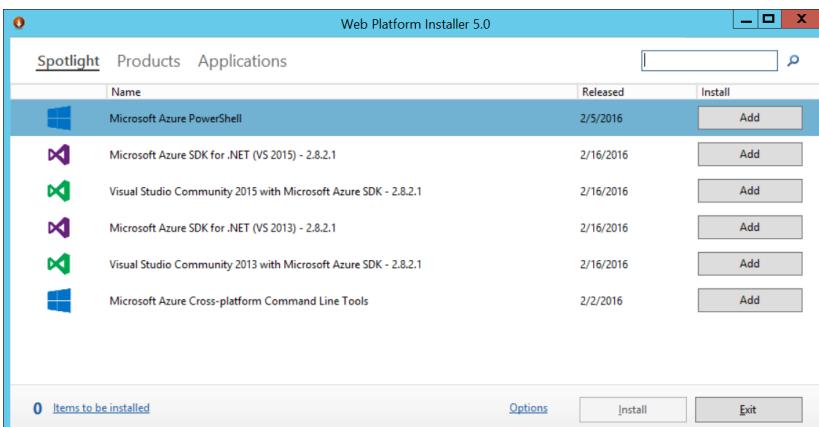
The screenshot shows the SharePoint search interface. At the top, there's a navigation bar with icons for SharePoint and Sites. Below the navigation bar is a search bar containing the query "ContentClass:STS\_SITE". To the right of the search bar is a magnifying glass icon. Underneath the search bar, there are four navigation links: Everything, People, Conversations, and Videos. A dropdown menu titled "Preference for results in English" is visible. On the left side, there's a sidebar titled "Result type" with options: SharePoint Site, Team Site, Web page, Author, administrator, System Account, SP\_Crawler, SP\_Farm, and SHOW MORE. The main content area displays search results. One result is "Wingtip Dev Site" with a link to "dev.wingtip.com". Another result is "Wingtip BI Center" with a link to "bi.wingtip.com". A third result is "Wingtip Intranet" with a note that there are no items to show in the "Documents" library and a link to "intranet.wingtip.com". The final result is "Wingtip Toys" with a note that these links will help get started and a link to "www.wingtip.com".

Congratulations! Search appears to be working correctly. Time to move ahead and add support for SharePoint 2013 workflows.

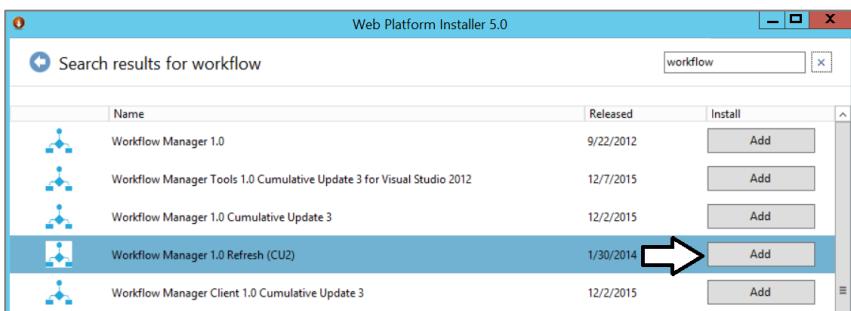
## Task 11: Configure Support for SharePoint 2013 Workflows

In this step you will work through the steps required to add support for SharePoint 2013-style workflows. You will begin by installing two new services named Workflow Manager and Service Bus to provide infrastructure support for SharePoint 2013 workflows. Next, you will configure Workflow Manager by running a PowerShell script to create a Workflow Manager farm. You will complete this task by running a second PowerShell script to register the Workflow Manager farm with the local SharePoint farm. After this, you will verify that that SharePoint 2013 workflow support is working by installing SharePoint Designer 2013 and creating and running a test SharePoint 2013 workflows.

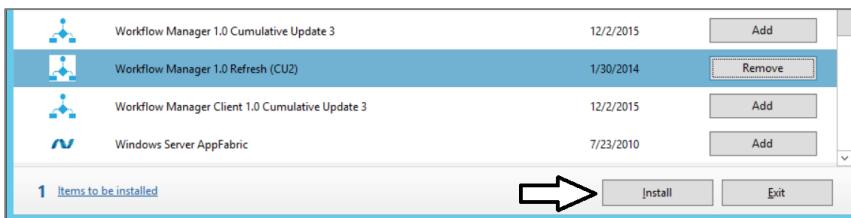
1. Install an instance of the Workflow Manager product by running the Microsoft Web Platform Installer
  - a) Ensure you are logged into the **WingtipServer** VM using the account **WINGTIP\Administrator | Password1**.
  - b) Open Internet Explorer and browse to the following address:  
**<http://www.microsoft.com/web/downloads/platform.aspx>**
  - c) Click **Download** and run the installer.
  - d) After the installation process, you should be able to launch the Web Platform Installer as shown in the following screenshot



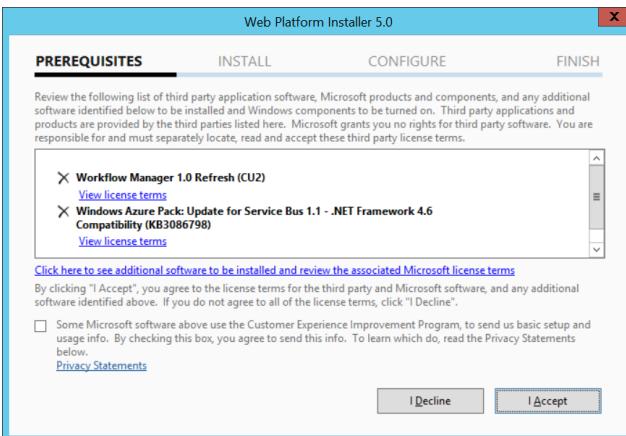
2. In the **Web Platform Installer 5.0** use the Search box at the top right to search for **Workflow**
- When searching for Workflow, you should find a product named **Workflow Manager 1.0 Refresh (CU2)**.
  - Click the **Add** button for **Workflow Manager 1.0 Refresh (CU2)**.



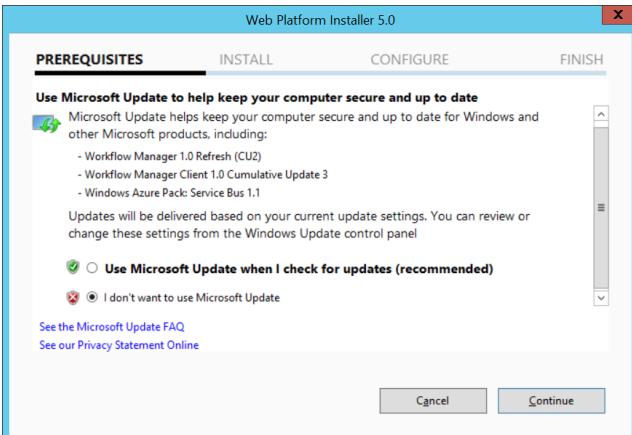
- Click **Install** to begin the installation process for Workflow Manager.



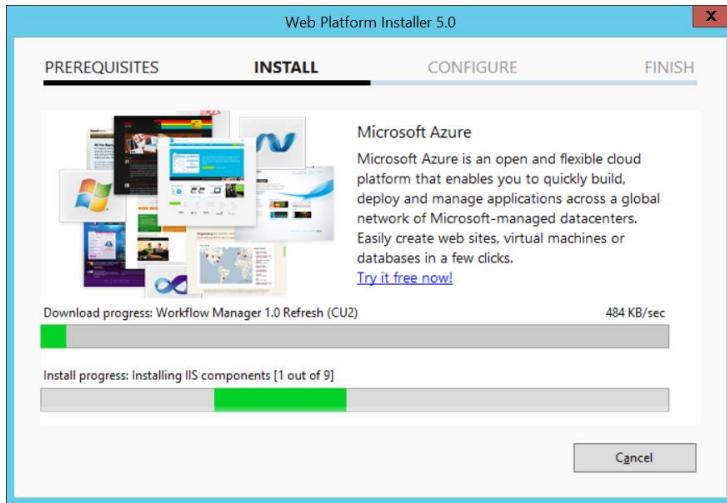
- On the **Prerequisites** page, uncheck the checkbox and click **I Accept**.



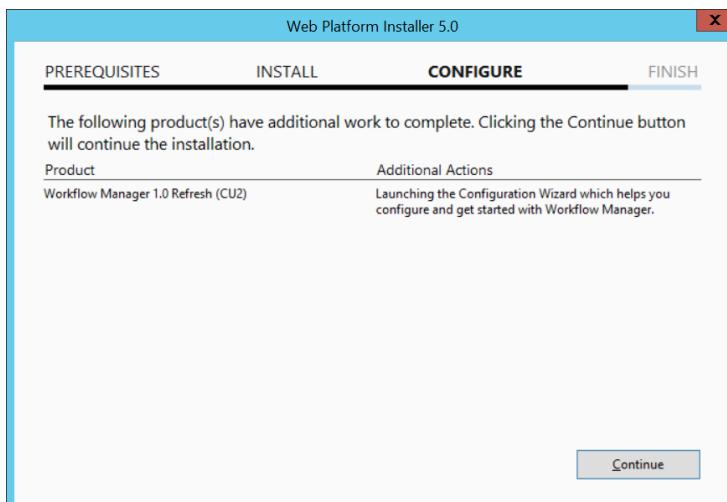
- If prompted about updates, select **I don't want to use Microsoft Updates** and click **Continue**.



- Once the install process has started, wait until it completes.



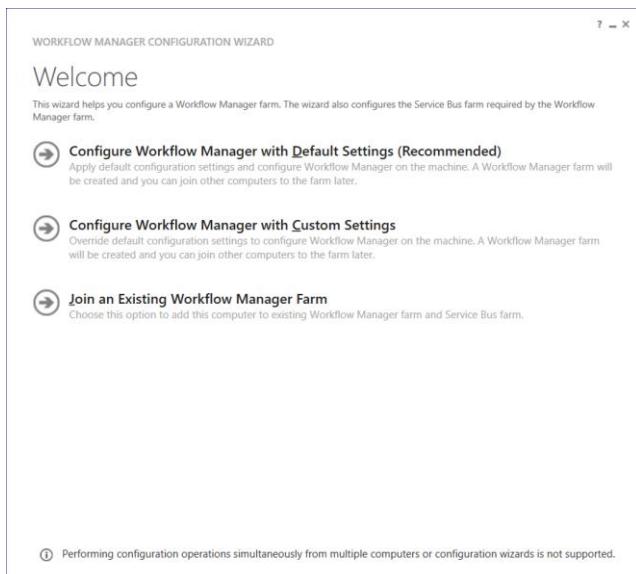
- g) On the **Configure** page, click **Continue**.



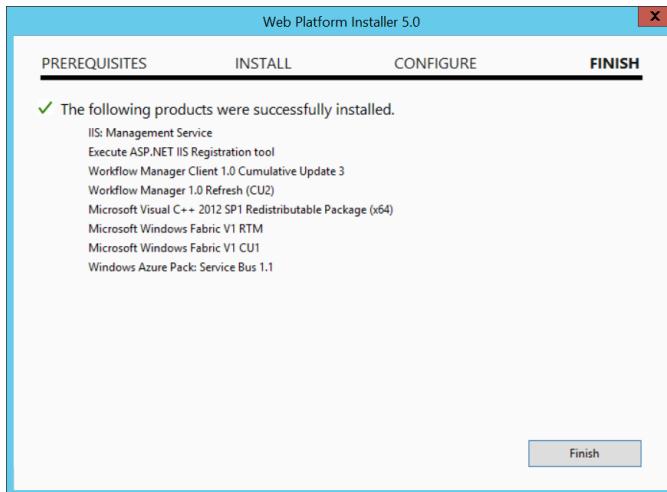
- h) When installation is complete, you will see a **Welcome** page.

At this point, you DO NOT want to configure Workflow Manager using this wizard. Instead, you will configure Workflow Manager by executing a PowerShell script in an later in this task.

- i) Do not select any option on the **Welcome** page but instead close this page by clicking the X menu in the upper right corner.



- j) You should now see the **FINISH** page which displays a list of what has been installed including Workflow Manager and all its dependency components. Click **Finish** to close the Web Platform Installer.



Now that you have installed the Workflow Manager and Service Bus products, the next step is to run a PowerShell script to create a local farm for each of these service so that they can be integrated to the local SharePoint farm.

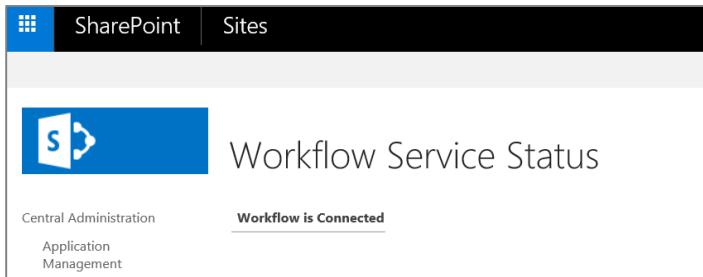
3. Using Windows Explorer, navigate to **C:\Setup\Scripts**.
4. Right Click on the **Script10\_CreateWorkflowFarm.ps1** and select Run with PowerShell
  - a) Wait for the script to start. If you are prompted by User Account Control and click **Yes**.
  - b) A second PowerShell window will open and a subsequent script will be autorun under the identity of **WINGTIP\SP\_Workflow** which is required to correctly create and configure the Workflow Manager farm. Note that this script will take a couple of minutes to run so be patient.
  - c) When the script runs, it will configure the Service Bus and Workflow Management Services.
5. Right Click on the **Script11\_RegisterWorkflowFarm.ps1** and select **Run with PowerShell**.
  - a) Running this script will create a connection between the local SharePoint farm and the Workflow Manager farm to enable support for SharePoint 2013 workflows.
  - b) The script should just take 10-15 seconds to complete.

If you first attempt to execute **Script11\_RegisterWorkflowFarm.ps1** fails with an access denied error, this might be due to the workflow manager not being fully provisioned. Wait 20-30 seconds and attempt to execute the script again so it runs without experiencing an error.

6. Check the Workflow Management Service to verify
  - a) Return to the **Manage Service Applications** page.
  - b) Click on the **Workflow Service Application** link at the bottom of the page.

State Service	State Service	Started
State Service	State Service Proxy	Started
Usage and Health data collection	Usage and Health Data Collection Service Application	Started
Usage and Health data collection	Usage and Health Data Collection Proxy	Started
User Profile Service Application	User Profile Service Application	Started
User Profile Service Application	User Profile Service Application Proxy	Started
Workflow Service Application	Workflow Service Application	Started
Workflow Service Application Proxy	Workflow Service Application Proxy	Started

- c) Verify that the **Workflow Service Status** page displays the message “*Workflow is Connected*”.



Now that you have configured support for SharePoint 2013 workflows, you will install the SharePoint Designer 2013 so you can create and run a simple SharePoint 2013 workflow for testing purposes.

7. Download and install SharePoint Designer 2013.

- In a browser, navigate to the page at the following URL.

<https://www.microsoft.com/en-us/download/details.aspx?id=35491>

- Click the **Download** button.
- Select the installation file for the 64-bit version of SharePoint Designer 2013 named **sharePointdesigner\_64bit.exe**.

File Name	Size
<input checked="" type="checkbox"/> sharepointdesigner_64bit.exe	324.1 MB
<input type="checkbox"/> sharepointdesigner_32bit.exe	282.2 MB

Download Summary:  
1. sharepointdesigner\_64bit.exe

- Click **Next** to download **sharePointdesigner\_64bit.exe**.
- When prompted, begin the installation process for SharePoint Designer 2013.
- Move through all the steps and complete the installation.

8. Install **SharePoint Designer 2013 Service Pack 1**.

- In a browser, navigate to the page at the following URL.

<https://www.microsoft.com/en-us/download/details.aspx?id=42009>

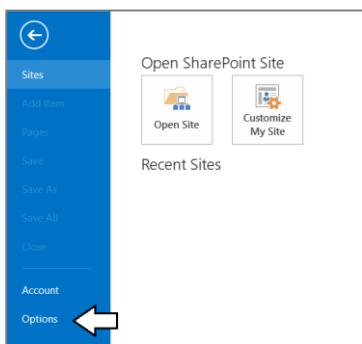
- Click the **Download** button.
- When prompted, install service pack 1 and step through the installation steps until it is completed.

9. Open SharePoint Designer 2013

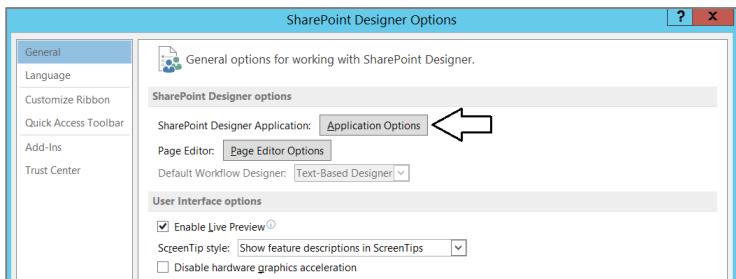
- Press the Windows key and type SharePoint Designer
- Select the SharePoint Designer 2013 tile
- Select Use recommended settings and click Accept
- Close** the Office Welcome pop-up window

10. Configure SharePoint Designer 2013 Application Option.

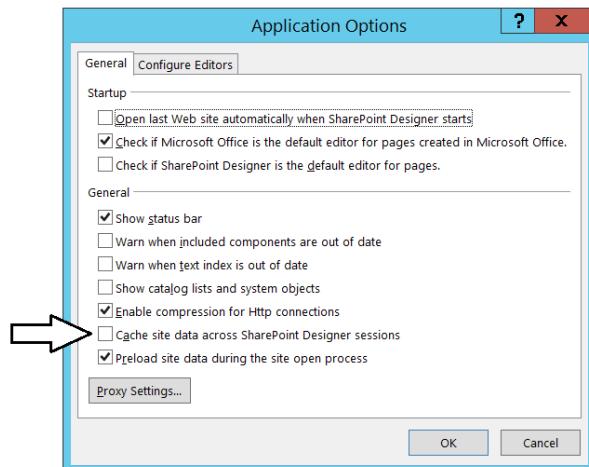
- Click on the **Options** link in the bottom, left-hand side corner of the SharePoint Designer window.



- In the **SharePoint Designer Options** dialog, click the **Application Options** button.



- c) In the **Application Options** dialog, uncheck the checkbox labeled **Cache site data across SharePoint Designer sessions**.



- d) Click **OK** to close the **Applications Options** dialog.  
e) Click **OK** to close the **SharePoint Designer Options** dialog.

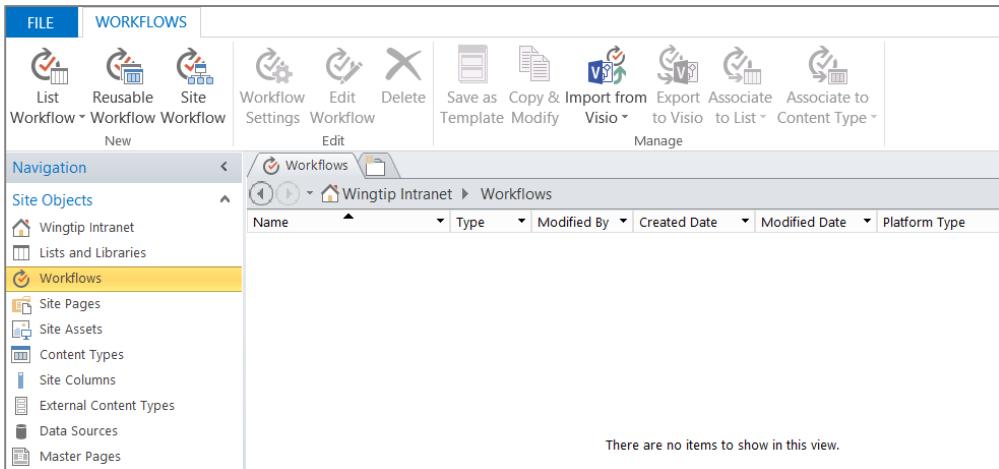
11. Use SharePoint Designer to open the Wingtip Intranet Team Site at <https://intranet.wingtip.com>.

- Click **Open Site**, set the site name to <https://intranet.wingtip.com> and then click **Open**.
- Wait for SharePoint Designer to open the site.
- Take a moment to inspect the contents of the by clicking the navigation links in the **Site Objects** list on the left-hand side.

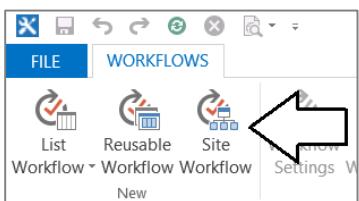
Name	Permissions
administrator	Full Control
Excel Services Viewers	View Only
Ted Pattison	Full Control
WINGTIP\domain users	Contribute

12. Create a new SharePoint 2013 workflow.

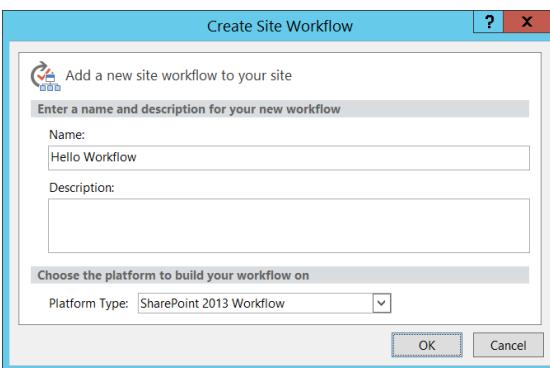
- Click on the **Workflows** link in the **Site Objects** list.
- You should be able to verify that there are currently no existing workflows in the site.



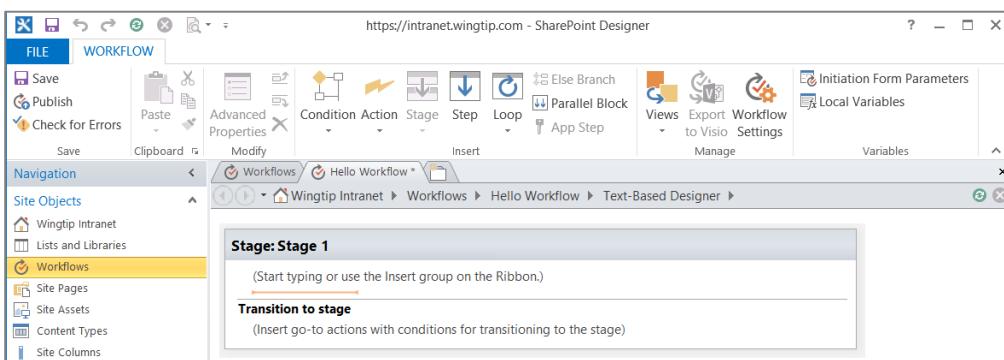
- c) In the ribbon, click the **Site Workflow** button to display the **Create Site Workflow** dialog.



- d) Inspect the Platform Type option at the bottom of the **Create Site Workflow** dialog box. You should see **SharePoint 2013 Workflow** as a choice. As long as you see **SharePoint 2013 Workflow** as a choice, you know that you have successfully configured support for SharePoint 2013 workflows in the local farm.
- e) Enter a **Name of Hello Workflow**, set **Platform Type** to **SharePoint 2013 Workflow** and click **OK** to create the new workflow.



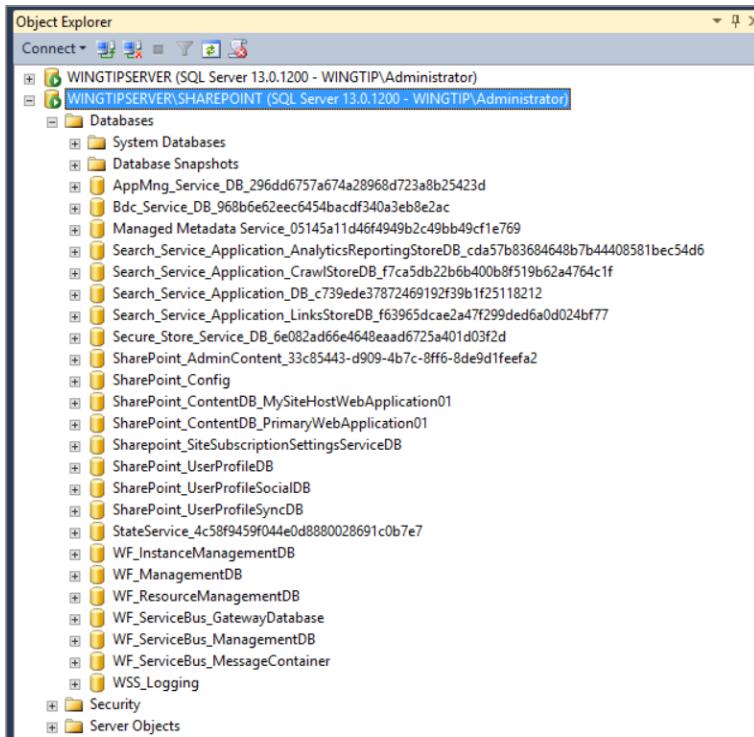
13. Once the workflow has been created, you should be able to work with it in the workflow designer as shown in the following screenshot.



At this point you have done enough to verify that your VM provides support for creating SharePoint 2013 workflows with SharePoint Designer 2013. Feel free to continue working with SharePoint Designer if you want to continue building out and testing the workflow you have just created. Now, this VM setup guide will move ahead to the task of installing Visual Studio 2015.

14. Look behind the scenes to see how many databases have been created in the WINGTIPSERVER\SHAREPOINT SQL instance.

- Return to **SQL Server Management Studio**.
- Refresh the **Databases** collection in the **WINGTIPSERVER\SharePoint** instance.
- You should see a large set of databases similar to what you can see in the following screenshot.

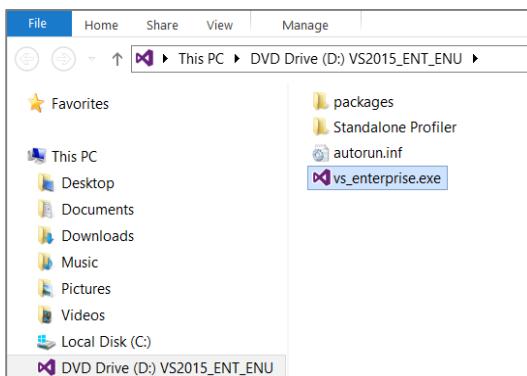


Hey, don't forget that this is SharePoint. You're never supposed to read or write to these databases directly.

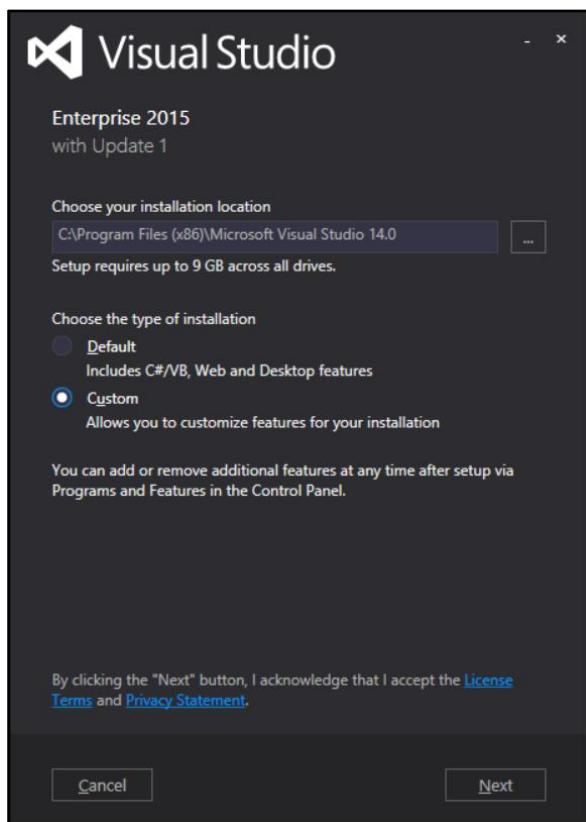
## Task 12: Install Visual Studio 2015 with Update 1

In this section you will install Visual Studio 2015 with Update 1 and then you will install the latest version of the Office/SharePoint tools for Visual Studio.

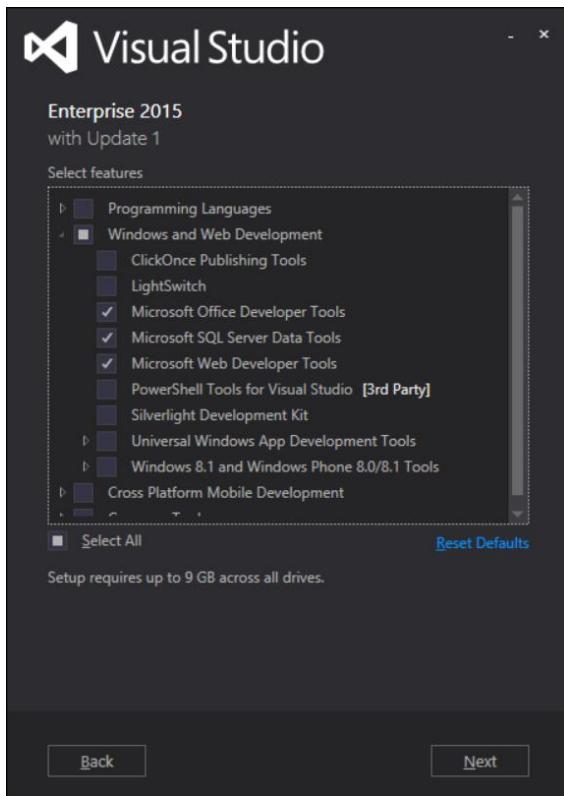
- Download the ISO file with the installation files for Visual Studio 2015 with Update 1.
  - You can use either the Visual Studio 2015 Enterprise version or the Visual Studio 2015 Professional version.
  - If possible, download the 64-bit version of Visual Studio 2015 with Update 1 and not the 32-bit version.
  - If you are an MSDN subscriber, you can download this from the MSDN Members Downloads page,
  - A trial version can be downloaded from <https://www.visualstudio.com/en-us/downloads/download-visual-studio-vs.aspx>.
- Configure the VM to see the ISO file as the D:\ drive.
  - Once you do this, you should be able to see the ISO file has been mounted as a drive in the VM.
  - From inside the VM, inspect the installation files for Visual Studio 2015 on the D:\ drive.
  - You should be able to locate the file to begin the installation process named **vs\_enterprise.exe**.



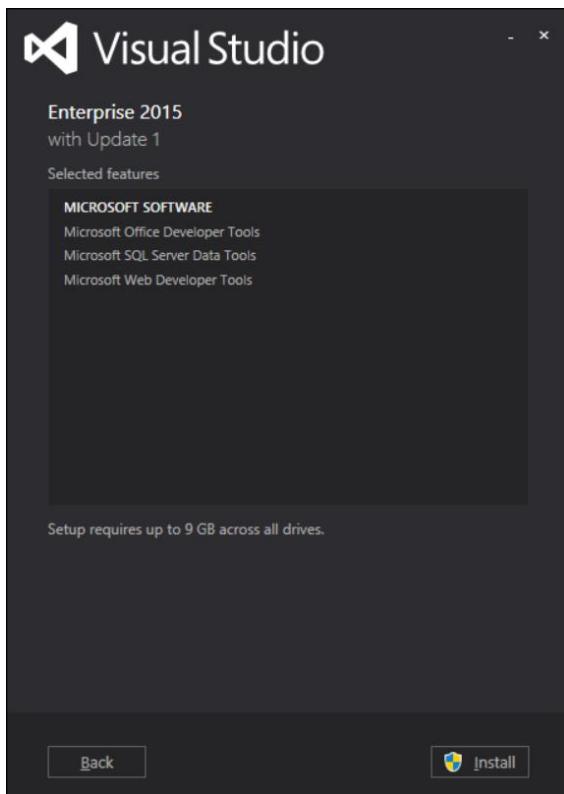
3. Install Visual Studio 2015 with Update 1.
  - a) Double-click **vs\_ultimate\_download.exe** to begin the installation process.
  - b) Select **Custom** for the **Choose the type of installation** option and click **Next**.



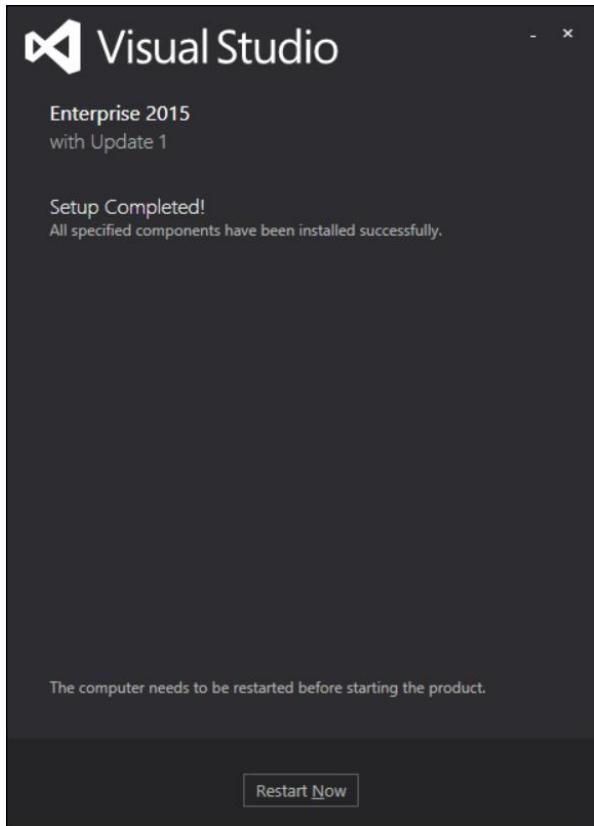
- c) When you get to the dialog where you are prompted to **Select features**, select the following features.
  - i) Microsoft Office Developer Tools
  - ii) Microsoft SQL Server Data Tools
  - iii) Microsoft Web Developer Tools
- d) Click **Next** to continue.



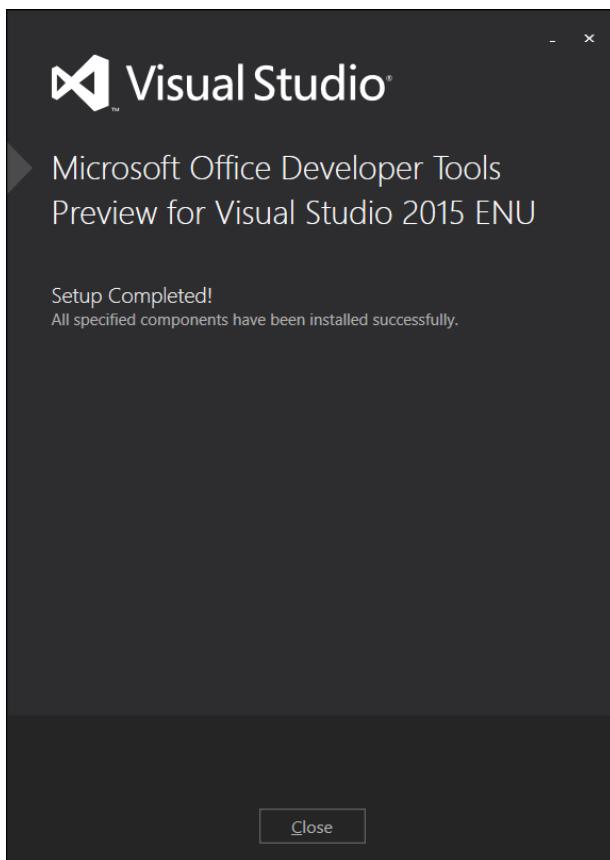
- e) Click Install to begin the installation process.



- f) Wait for the install to finish which should take approximately 20 minutes.



- g) When prompted with the **Setup Complete** dialog, click the **Restart Now** button to restart the VM.
- h) When the VM restarts, log back in as **WINGTIP\Administrator** using a password of **Password1**.
- i) At this point, Visual Studio 2015 with Update 1 should be installed.



The new release of these tools are due out the week of the Build conference which is 3/30. This link will need to be updated.

4. Update the SharePoint/Office developer tools in Visual Studio for SharePoint 2016.

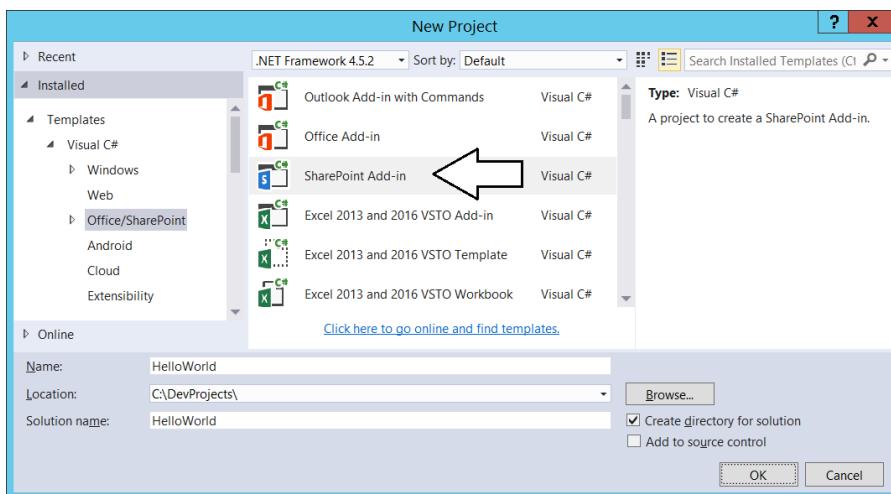
- a) Using a browser, navigate to the page at the following URL

<https://www.microsoft.com/en-us/download/details.aspx?id=49972>

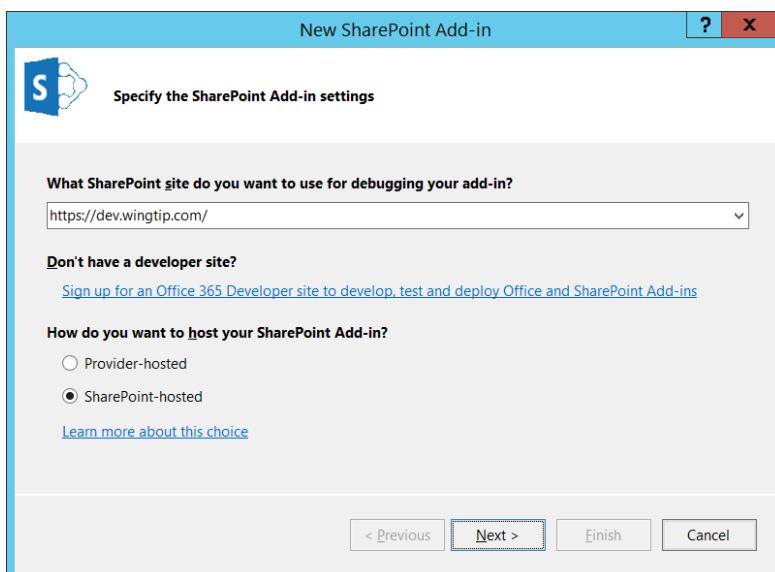
- b) Click **Download** to download the **Microsoft Office Developer Tools Preview for Visual Studio 2015** dated 11/19/2015.  
c) Download and run the installation file named **officetools\_bundle.exe**.  
d) Move through all dialogs to complete the installation of the update Office/SharePoint Tools in Visual Studio.

5. Test the VM by creating and running a new Visual Studio 2015 project for a SharePoint Add-in.

- a) Launch Visual Studio 2015.  
b) Using the **File** Menu select **New Project**  
c) In the **New Project** dialog, Expand **Templates > Visual C# > Office/SharePoint**.  
d) Select the **SharePoint Add-in** project template.  
e) Enter a project name of **HelloWorld** and click **OK** to begin creating the new project.

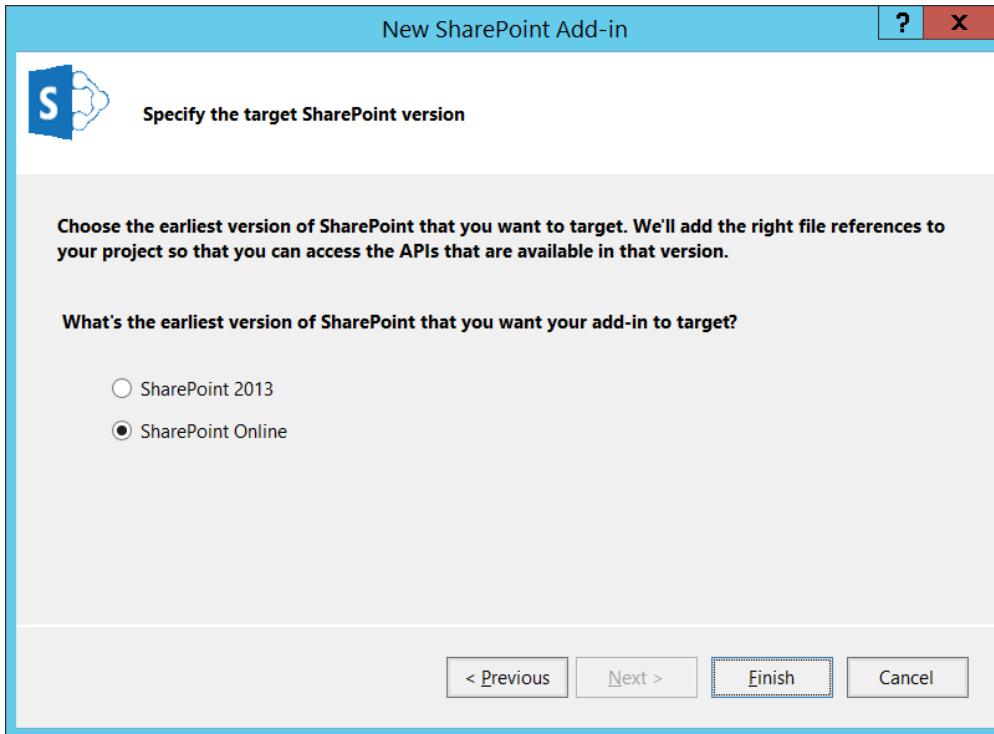


- f) On the Specify the SharePoint Add-in settings page...  
i) Enter a debugging site URL of <https://dev.wingtip.com>.  
ii) Select **SharePoint-hosted** for the **How do you want to host your SharePoint Add-in?** option.  
iii) Click **Next**.

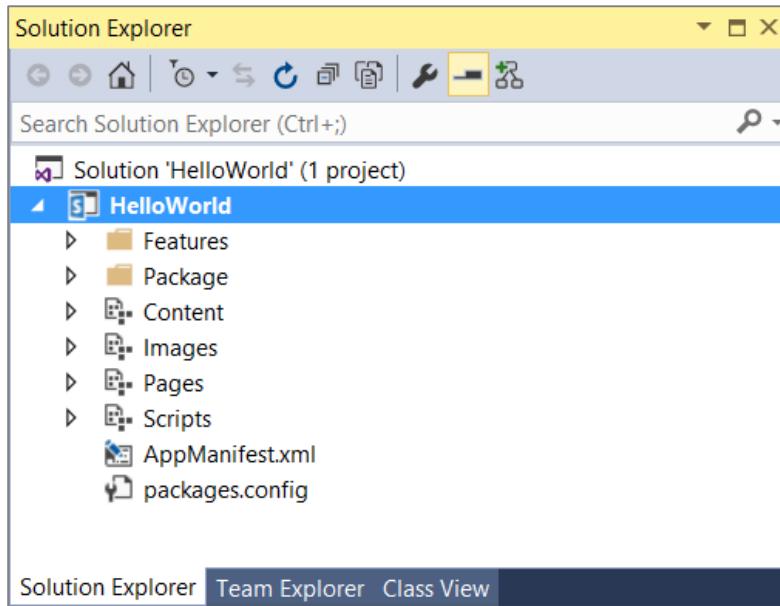


The current version of the updated Office/SharePoint tools has a few issues you will need to work through. These issues should disappear when the Office/SharePoint developer tools are updated for the RTM release of SharePoint 2016. In the meantime, you will learn a few tricks over the next few steps to get projects up and running with the preview version of the Visual Studio tools.

- g) On the **Specify the target SharePoint version** page, select **SharePoint Online** and click **Finish**.



- h) The new **SharePoint-hosted add-in** project should now be created.



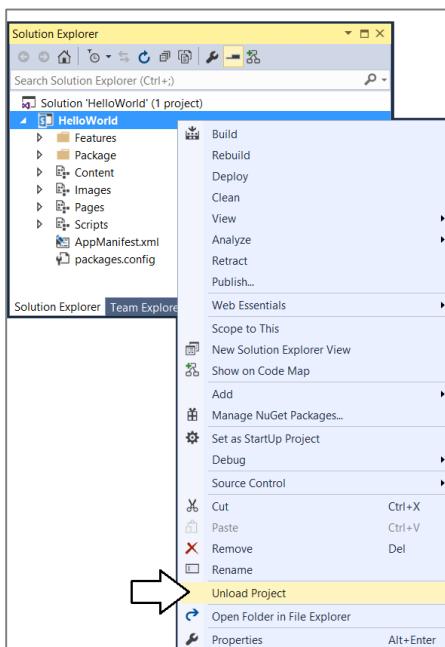
6. Test the project by running it in the Visual Studio debugger.

- a) Press the **{F5}** key and try to begin a debugging session with the project. When you do, you will receive an error indicating that the project is not configured with the correct version of SharePoint for the local SharePoint farm.

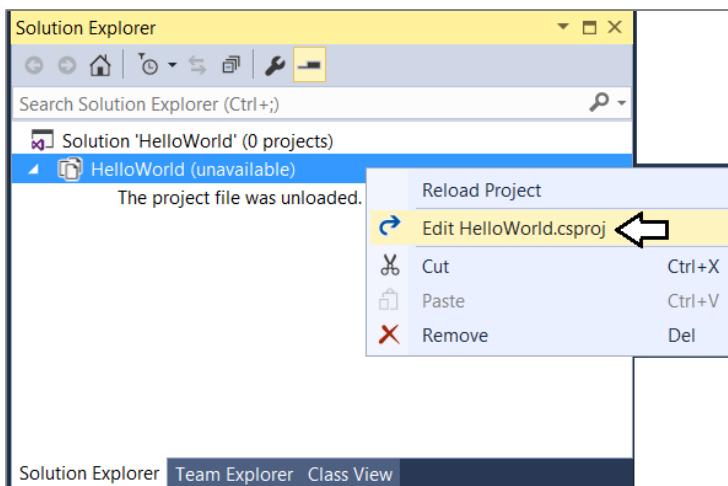
Error List			
Code	Description	Project	File
	The required version of SharePoint Foundation or SharePoint Server is not installed on this system. The target version of the SharePoint project is 16.1.	Bob	

7. Update the Visual Studio project file named **HelloWorld.csproj** to support SharePoint 2016.

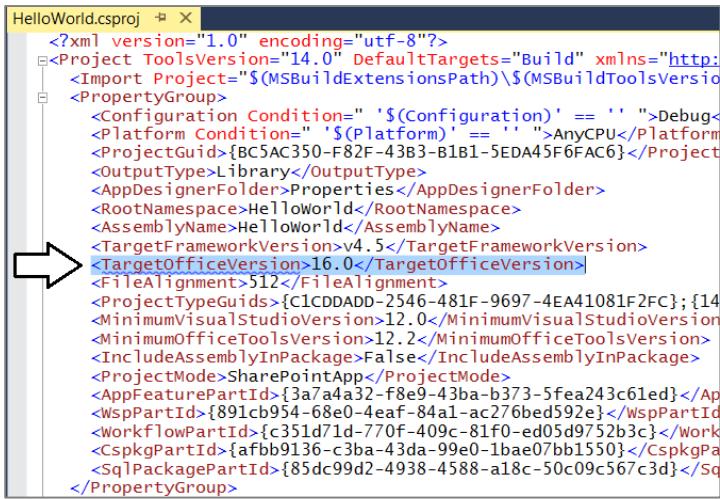
- a) In the Solution Explorer, right click on the **HelloWorld** project and select the **Unload Project** command.



- b) Right-click on the **HelloWorld** project again and select the **Edit HelloWorld.csproj** command.



- c) In the **HelloWorld.csproj** file, locate the **TargetOfficeVersion** element and update its value from **16.1** to **16.0**.

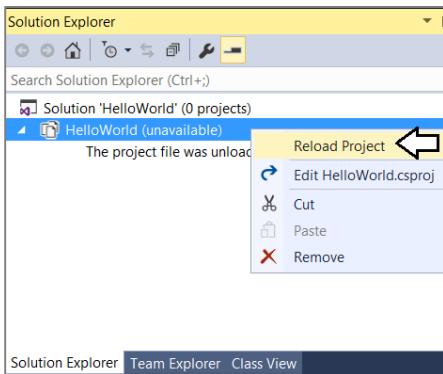


```

<?xml version="1.0" encoding="utf-8"?>
<Project ToolsVersion="14.0" DefaultTargets="Build" xmlns="http://schemas.microsoft.com/developer/msbuild/2003">
  <Import Project="$(MSBuildExtensionsPath)\$(MSBuildToolsVersion)\Microsoft.Common.props" />
  <PropertyGroup>
    <Configuration Condition=" '$(Configuration)' == '' ">Debug</Configuration>
    <Platform Condition=" '$(platform)' == '' ">AnyCPU</Platform>
    <ProjectGuid>{BC5AC350-F82F-43B3-B1B1-5EDA45F6FAC6}</ProjectGuid>
    <OutputType>Library</OutputType>
    <AppDesignerFolder>Properties</AppDesignerFolder>
    <RootNamespace>HelloWorld</RootNamespace>
    <AssemblyName>HelloWorld</AssemblyName>
    <TargetFrameworkVersion>v4.5</TargetFrameworkVersion>
    <TargetOfficeVersion>16.0</TargetOfficeVersion>
    <FileAlignment>512</FileAlignment>
    <ProjectTypeGuids>{C1CDDADD-2546-481F-9697-4EA41081F2FC};{14024D90-CE4D-4C4E-A1D9-6A5D1E4B334A};{3A7A4A32-F8E9-43BA-B373-5FEA243C61ED};{891CB954-68E0-4EAF-84A1-AC276BED592E};{C351D71D-770F-409C-81F0-ED05D9752B3C}</ProjectTypeGuids>
    <MinimumVisualStudioVersion>12.0</MinimumVisualStudioVersion>
    <MinimumOfficeToolsVersion>12.2</MinimumOfficeToolsVersion>
    <IncludeAssemblyInPackage>False</IncludeAssemblyInPackage>
    <ProjectMode>SharePointApp</ProjectMode>
    <AppFeaturePartId>{3a7a4a32-f8e9-43ba-b373-5fea243c61ed}</AppFeaturePartId>
    <WspPartId>{891cb954-68e0-4eaf-84a1-ac276bed592e}</WspPartId>
    <WorkflowPartId>{c351d71d-770f-409c-81f0-ed05d9752b3c}</WorkflowPartId>
    <CspkgPartId>{afbb9136-c3ba-43da-99e0-1bae07bb1550}</CspkgPartId>
    <SqlPackagePartId>{85dc99d2-4938-4588-a18c-50c09c567c3d}</SqlPackagePartId>
  </PropertyGroup>

```

- Save and close **HelloWorld.csproj**.
- Right-click on the **HelloWorld** project and select the **Reload Project** command.



Now the project should be correctly configured so you can run a debugging session using the local SharePoint 2016 farm.

- Press the **{F5}** key to begin a debugging session.
  - Visual Studio should build and install the HelloWorld add-in.
  - You should be directed to the start page of the add-in at a page running out of the **wingtip.com** domain.



Congratulations. You have now completed the CPT SharePoint 2016 VM Setup Guide and you have a VM that you can use to complete the lab exercise for the Great SharePoint 2016 Adventure. You also have a VM that provides a development environment for general development with the SharePoint 2016 platform.