DAT224x

Developing a Multidimensional Data Model

Lab 01 | Getting Started

Estimated time to complete this lab is 60 minutes

Overview

In this lab, you will provision a Microsoft Azure Virtual Machine (VM) that will be used by all labs in this course. Once the VM is provisioned, you will complete the setup required to support the labs.

The labs in this course are accumulative. You cannot complete the following labs if this lab has not been successfully completed.

What You'll Need

To complete this lab, you will need the following:

- High-speed and reliable internet connectivity (for remote connections to the VM)
- A second monitor is recommended (for the Remote Desktop connection)
- A Microsoft account (such as one used for outlook.com, Hotmail, or other Microsoft services)
- A Microsoft Azure subscription
- The lab files for this course (available for download from GitHub, as described in this lab)

Creating a Free Trial Azure Subscription

If you already have an Azure subscription, you can skip this section. Otherwise, follow these steps to create a free trial subscription. You will need to provide a valid credit card number for verification, but you will not be charged for Azure services—for more information, refer to https://aka.ms/edx-DAT224x-az. Note that the free trial is not available in all regions.

If you already have a Microsoft account that has not already been used to sign up for a free Microsoft Azure trial subscription, you're ready to get started. If not, don't worry—just create a new Microsoft account at https://signup.live.com.

After you've created a Microsoft account, browse to https://aka.ms/edx-DAT224x-az and then click the **Start Free** link. Then follow the instructions to sign up for a free trial subscription to Microsoft Azure. You'll need to sign in with your Microsoft account if you're not already signed in. Then you'll need to:

- Enter your cellphone number and have Microsoft send you a text message to verify your identity
- Enter the verification code sent to you
- Provide valid payment details—don't worry, your credit card won't be charged for any services you use during the trial period, and the account is automatically deactivated at the end of the trial period, unless you expressly decide to keep it active.

Exercise 1: Provisioning an Azure VM

In this exercise, having signed in to the Azure Portal by using your Azure subscription, you will provision an Azure VM to support all labs for this course.

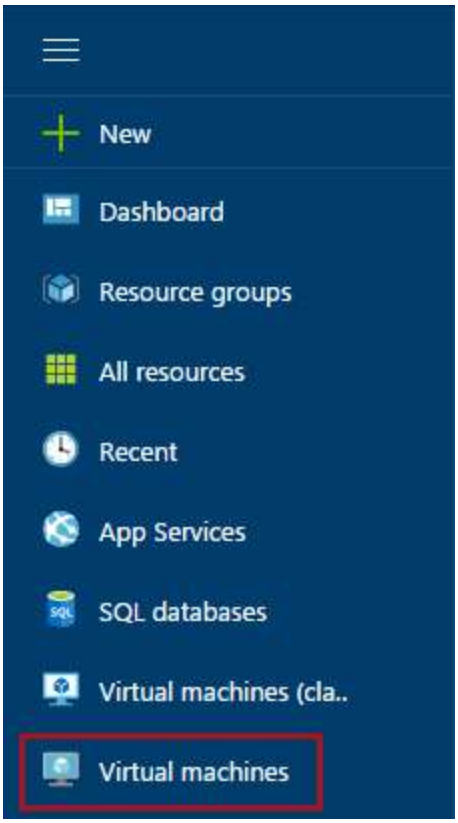
The Azure VM should be stopped when you have completed a lab so that your subscription is not charged (for free trial subscriptions, this will ensure you will have sufficient credits left to complete the labs over the duration of the course).

Provisioning an Azure VM

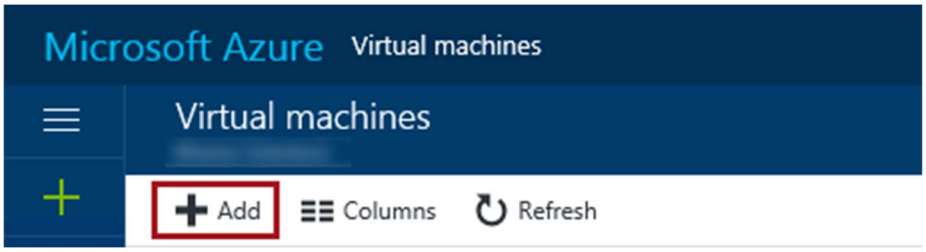
In this task, you will sign in to the Azure Portal, and then provision an Azure VM.

1. Sign in to the **Azure Portal** by using your subscription.

2. In the left pane, select **Virtual Machines**—do not select **Virtual Machines (Classic)**.

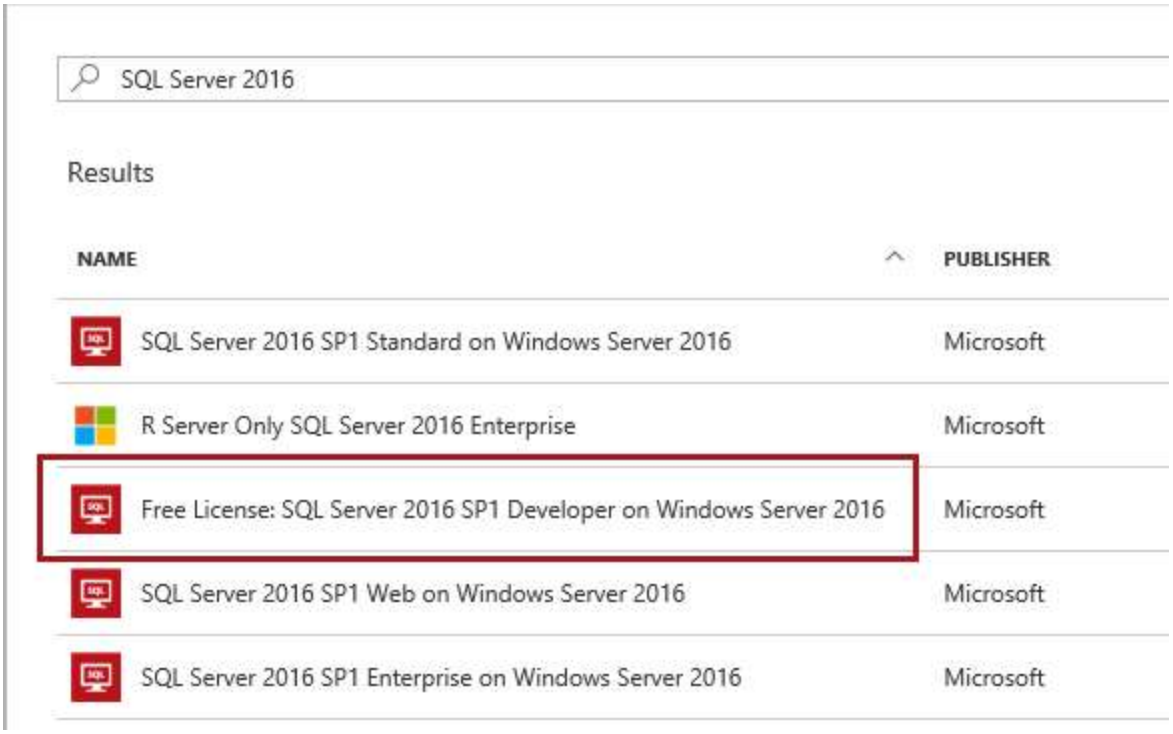


3. In the **Virtual Machines** blade, click **Add**.



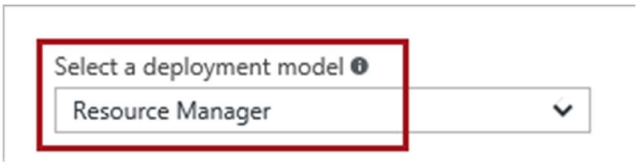
4. In the **Compute** blade, in the search box, enter **SQL Server 2016 Developer**, and then press **Enter**.

5. Select the **Free License: SQL Server 2016 SP1 Developer on Windows Server 2016** image.

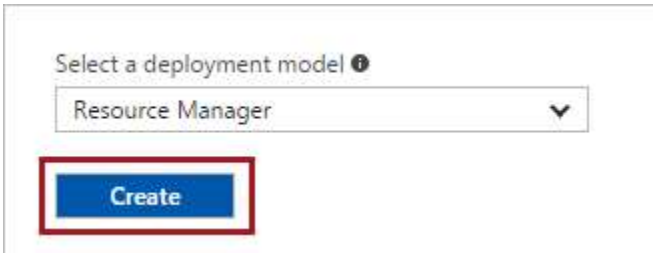


6. In the image blade, review the text that describes the virtual machine setup.

7. In the lower section of the blade, in the **Select a Deployment Model** dropdown list, ensure that **Resource Manager** is selected.



8. To provision the virtual machine, click **Create**.



9. Notice that the **Create Virtual Machine** blade opens, and that also the **Basics** blade (step 1) opens.

10. In the **Name** box, enter a name for the virtual machine (this will become the name of the machine).

11. In the **VM Disk Type** dropdown list, select **HDD**.

12. In the **User Name** box and **Password** boxes, enter appropriate values (this will become the machine administrator account).

    The password must be at least 12 characters in length, and must have three of the following: one lower case character, one upper case character, one number, or one special character.

    Be sure to securely record these credentials, as you will be required to use them to sign in every time you will connect to the VM.

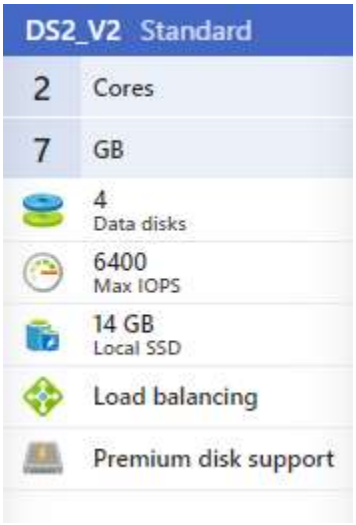
13. In the **Resource Group** box, enter **Lab**.

14. In the **Location** box, select a data center that is near you.

15. Click **OK**.

16. In the **Choose a Size** blade, scroll down to locate and select the **DS2_V2** size.

    The labs in this course will not require excessive storage, memory or processing. Also, you will be prompted to deallocate your VM between labs, and so the monthly cost will only apply when the VM is running.

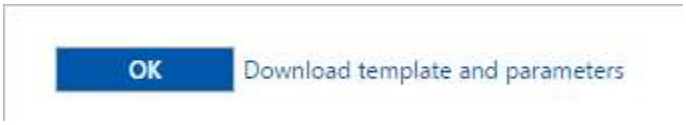


17. Click **Select**.

18. In the **Settings** blade, to accept the default settings, click **OK**.

19. In the **SQL Server Settings** blade, to accept the default settings, click **OK**.

20. In the **Summary** blade, click **OK**.



21. On the **Azure Portal** dashboard, notice the tile displaying the status of the deployment process.

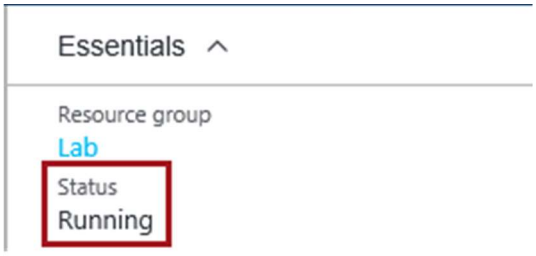
The deployment usually takes 15-20 minutes to complete, and this time depends largely on the VM size selected. The VM blade will open when the deployment completes.

22. Proceed to the next task when the deployment completes.

Connecting to the VM

In this task, once the VM has successfully deployed, you will connect to the VM.

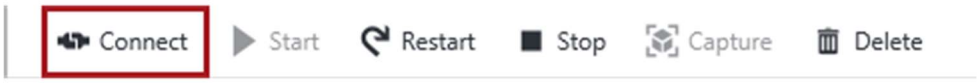
1. In the VM blade, notice that the VM blade automatically opens, and that the VM status is **Running**.



*You are charged when the VM status is **Running**, but you are not charged—except for a relatively smaller storage cost—when the VM status is **Stopped (Deallocated)**.*

Each lab will include steps to remind you to stop and optionally deallocate the VM between labs. You should consider doing this if you choose to commence the next lab at a much later time.

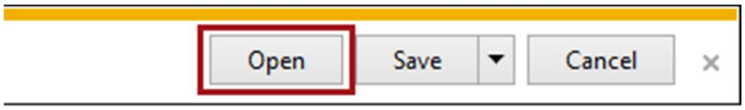
2. To connect to the VM, click **Connect**.



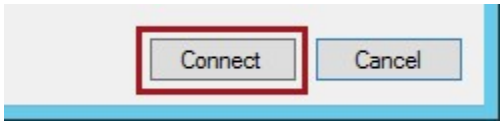
A Remote Desktop File (.rdp) file is downloaded to the desktop.

This file can be used to reconnect to the remote desktop session, but note that if you deallocate the VM and later re-start the VM, it will be likely that a different IP address will be assigned.

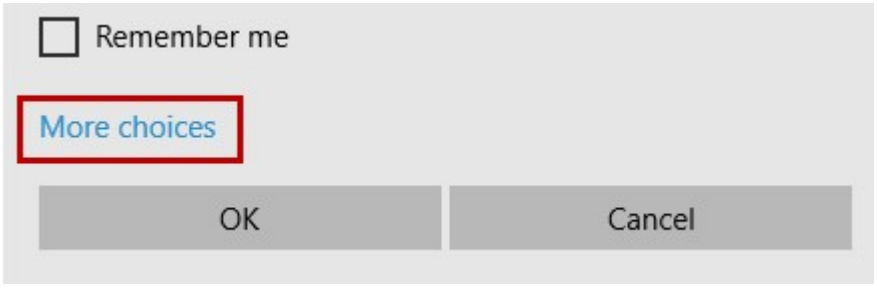
3. When prompted by the web browser to open the Remote Desktop File, click **Open**.



4. If prompted to connect to the unknown publisher, click **Connect**.

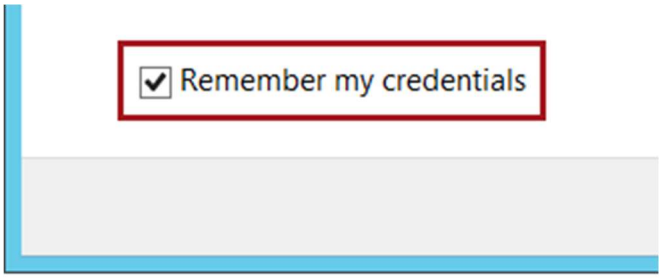


*To enter your credentials, you may need to select **More Choices**, and then select **Use a Different Account**.*



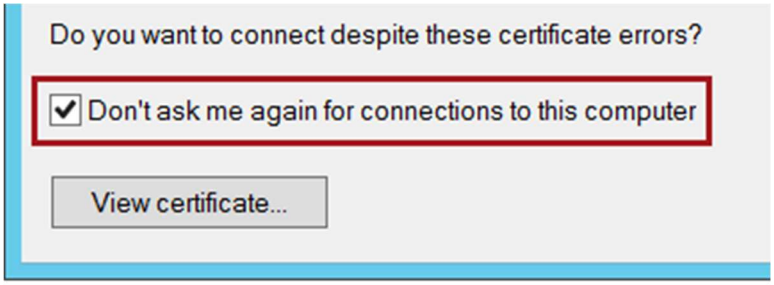
5. In the **Windows Security** window, enter the credentials you created for your VM.

6. Check the **Remember My Credentials** checkbox.



7. Click **OK**.

8. In the **Remote Desktop Connection** window, check the **Don't Ask Me Again for Connections to This Computer** checkbox.



9. Click **Yes**.

10. If you have a second monitor, maximize the Remote Desktop window inside a single monitor.

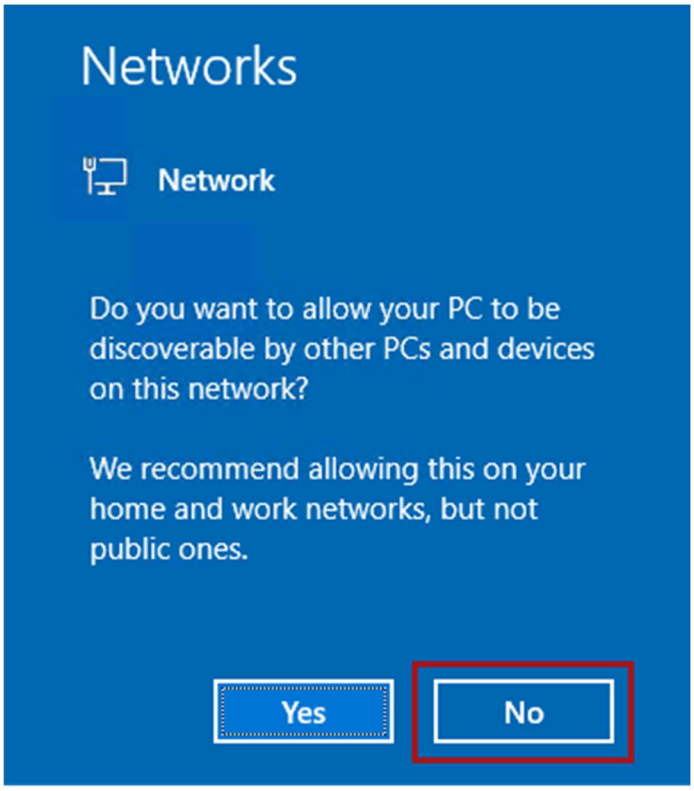
Exercise 2: Setting Up the Azure VM

In this exercise, you will complete several VM setup tasks.

Configuring the Server

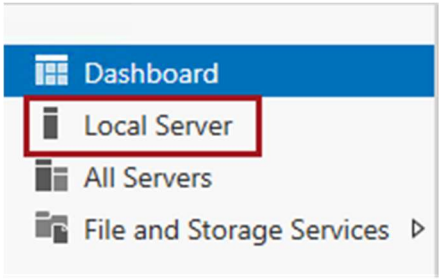
In this task, you will configure the server to support the lab experience.

1. In the Remote Desktop window, when the **Networks** panel opens at the right, to ensure that the machine is not discoverable by other machines, click **No**.

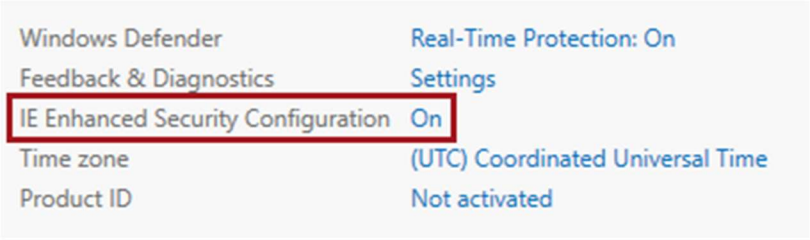


2. Wait until **Server Manager** opens (it will open automatically).

3. In **Server Manager**, in the left pane, select **Local Server**.

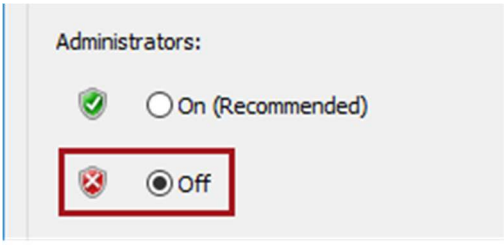


4. In the **Properties** pane, notice that **IE Enhanced Security Configuration** is set to **On**.



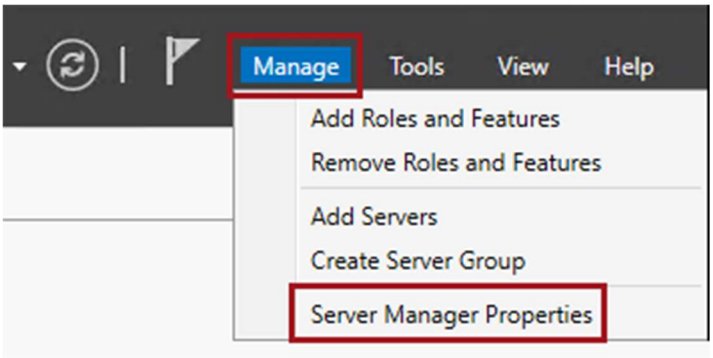
5. Click the **On** link.

6. In the window, for **Administrators**, select the **Off** option.

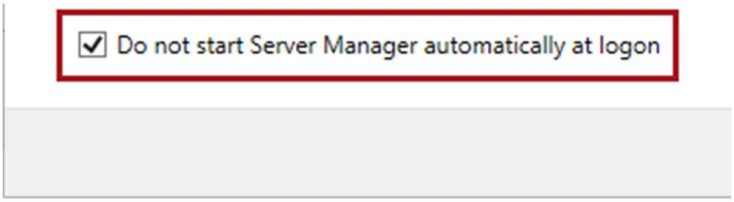


7. Click **OK**.

8. Located at the top-right corner, select **Manage**, and then select **Server Manager Properties**.

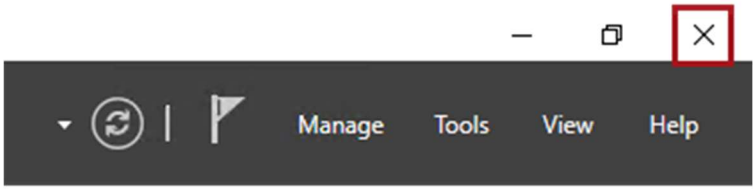


9. In the window, check the **Do Not Start Server Manager Automatically at Logon**.



10. Click **OK**.

11. To close Server Manager, located at the top-right corner, click **X**.

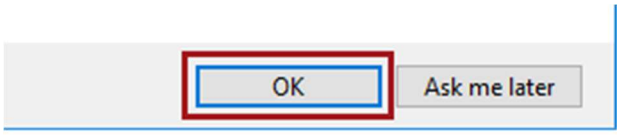


Installing the Lab Resources

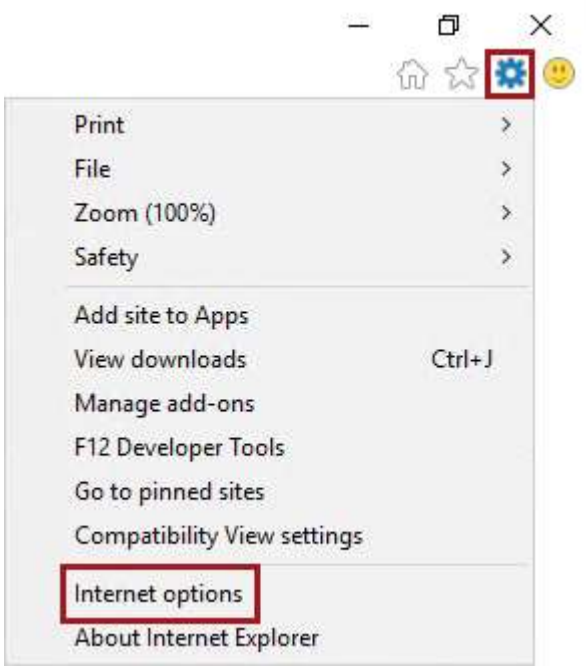
In this task, you will download and extract the lab resources that support the labs.

1. To open Internet Explorer, on the taskbar, click the **Internet Explorer** shortcut.

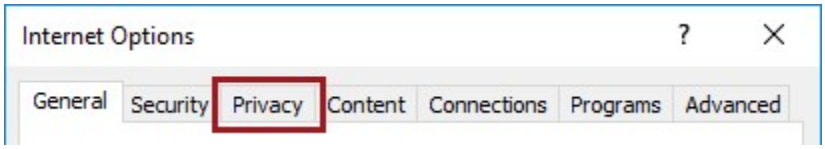
2. In the **Internet Explorer 11** window, to accept the recommended settings, click **OK**.



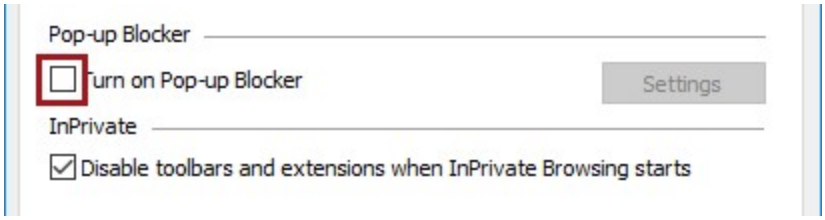
3. At the top-right corner, click the settings icon, and then select **Internet Options**.



4. In the **Internet Options** window, select the **Privacy** tab.



5. Uncheck the **Turn On Pop-up Blocker** checkbox.



6. Click **OK**.

7. Maximize the Internet Explorer window.

8. In the **URL** box, enter https://github.com/MicrosoftLearning/DAT224-SSAS-MD.

   Tip: You can copy-and-paste the URL into the Remote Desktop window.

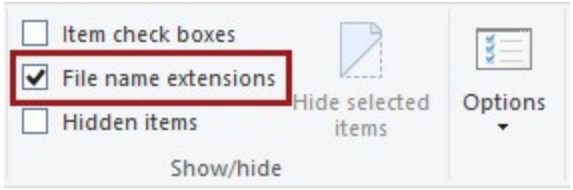
9. On the web page, click the **DAT224x-Analysis-Services-Multidimensional.zip** link.

10. To download the lab resources, click **Download**.

11. Download the file (**Save As**) to **F:**.

12. When downloaded, open File Explorer.

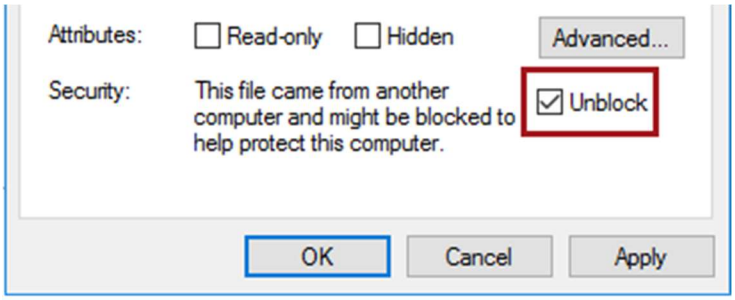
13. In the File Explorer window, on the **View** ribbon, check **File Name Extensions**.



14. Navigate to **F:**.

15. Right-click the **DAT224x-Analysis-Services-Multidimensional.zip** file, and then select **Properties**.

16. In the window, check **Unblock**.

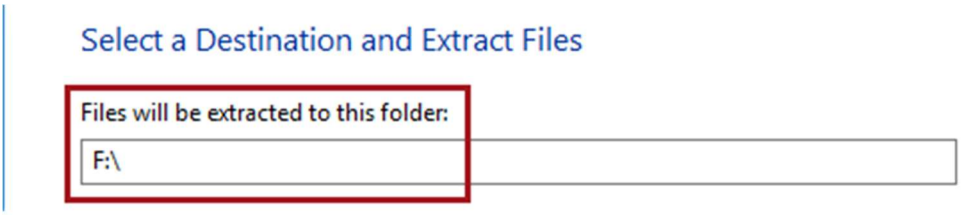


17. Click **OK**.

18. To extract the file content, right-click the **DAT224x-Analysis-Services-Multidimensional.zip** file, and then select **Extract All**.

19. In the window, replace the folder path with **F:**.

    *Be sure to extract the files to **F:**, otherwise later steps in this lab will fail.*



20. Click **Extract**.

21. Optionally, delete the **DAT224x-Analysis-Services-Multidimensional.zip** file.

22. Verify that you have the **F:\Labs** folder.

Installing the Sample Database

In this task, you will run a script to install a sample database and configure database permissions.

1. In File Explorer, navigate to the **F:\Labs\Lab01\Assets** folder.

2. Double-click the **Setup-Database.cmd** file.

   *The setup will restore the **AdventureWorksDW2016** database. The database has been modified from the original sample for the purposes of this course.*

3. When the script execution completes, press any key to close the console window.

Installing the Model

In this task, you will run a script to install the model preview.

1. In the **F:\Labs\Lab01\Assets** folder, right-click the **Setup-Model.ps1** file, and then select **Run with PowerShell**.

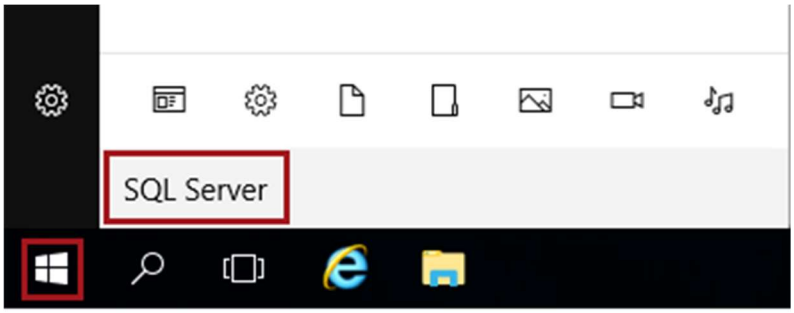
   *The setup will restore the **Reseller Sales** database. The database represents the final solution produced by the lab, and you will preview the cube in this lab.*

2. When the script execution completes, press any key to close the PowerShell window.

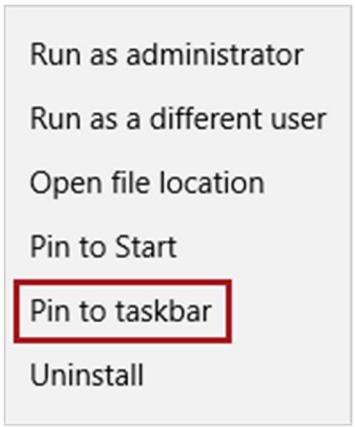
Configuring SQL Server Management Studio

In this task, you will configure SQL Server Management Studio (SSMS). This tool will be required to explore database, and to also execute scripts.

1. To add a shortcut to the taskbar, at the bottom-left corner, click the **Windows** icon, and then commence typing **SQL Server**.



2. In the **Apps** section, when the search result appears, right-click **Microsoft SQL Server Management Studio**, and then select **Pin to Taskbar**.



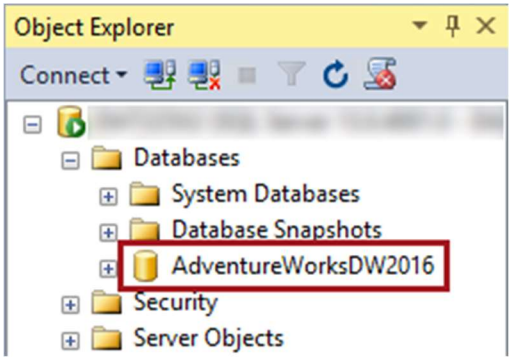
3. Return to the desktop, and then click the **SQL Server Management Studio** shortcut.

It may take 1-2 minutes for SSMS to setup.

4. In the **Connect to Server** window, click **Connect**.

5. To verify that the **AdventureWorksDW2016** database was restored, in **Object Explorer** (located at the left), expand the **Databases** folder.

6. Verify that the **AdventureWorksDW2016** database is listed.



7. To close SQL Server Management Studio, on the **File** menu, select **Exit**.

You may receive a popup notification from SSMS that a later version is available for download. There is no need to install a later version to complete the labs.

Installing SQL Server Data Tools

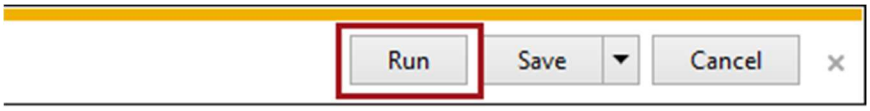
In this task, you will install SQL Server Data Tools (SSDT). This tool is required to develop an Analysis Services Multidimensional project.

1. In Internet Explorer, navigate to https://aka.ms/edx-DAT224x-ssdt.

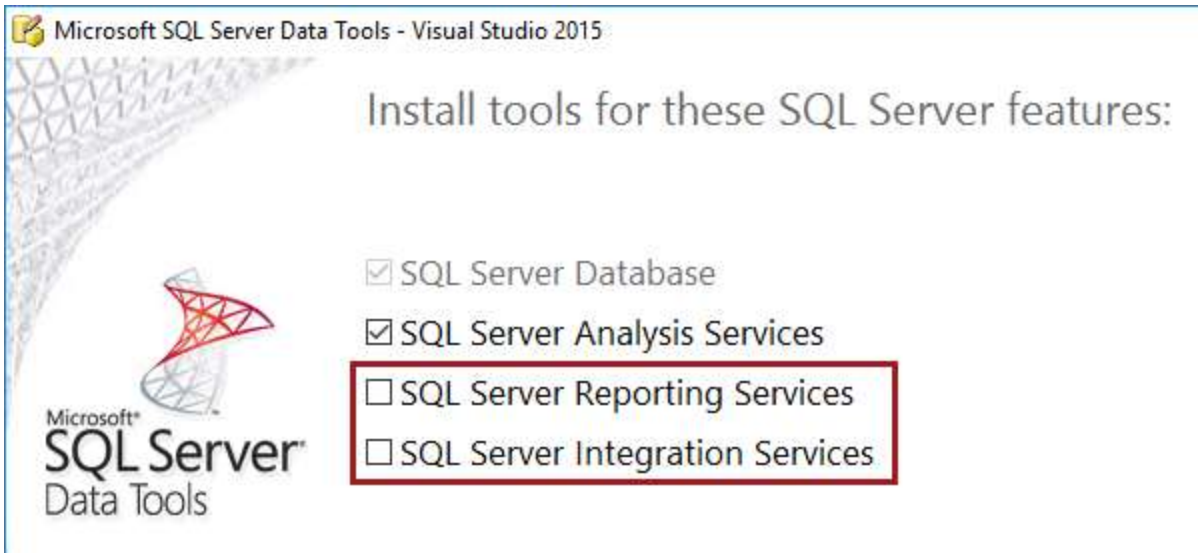
Tip: You can copy-and-paste the URL into the Remote Desktop window.

2. Click the **Download SQL Server Data Tools** link.

3. When prompted by Internet Explorer to run the **SSDTSetup.exe** file, click **Run**.

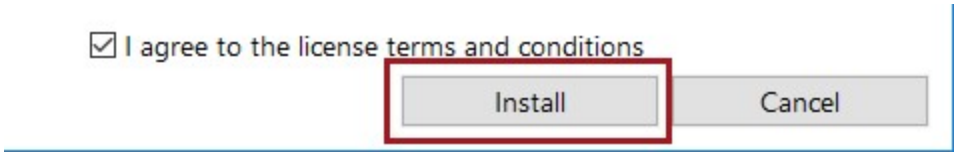


4. In the installation window, uncheck the **SQL Server Reporting Services** and **SQL Server Integration Services** checkboxes.



5. Click **Next**.

6. Read the license terms, and if you accept them, check the checkbox.
7. Click **Install**.



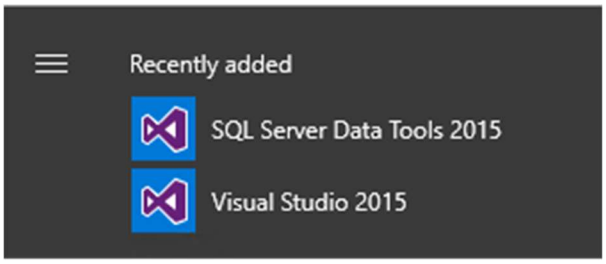
The installation usually takes 5-10 minutes to complete.

8. When the installation completes, click **Close**.

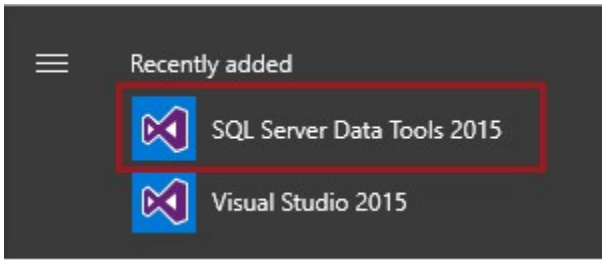
Configuring SQL Server Data Tools

In this task, you will configure SSDT.

1. To launch SSDT, at the bottom-left corner, click the **Windows** icon, and notice the items in the **Recently Added** section.

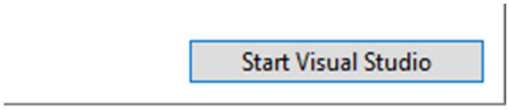


2. Select **SQL Server Data Tools 2015**.



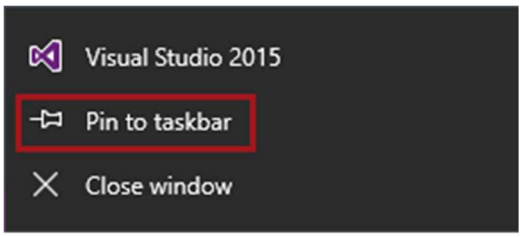
3. In the Visual Studio getting started window, in the **Development Settings** dropdown list, select **Business Intelligence Settings**.

4. Click **Start Visual Studio**.



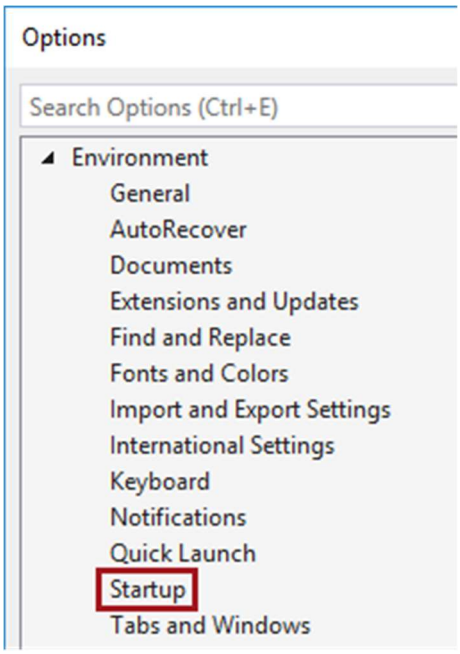
It may take 1-2 minutes for SSDT to setup.

5. To create a shortcut, on the taskbar, right-click the **Visual Studio 2015** icon, and then select **Pin to Taskbar**.



6. To configure the SSDT environment, on the **Tools** menu, select **Options**.

7. In the **Options** window, in the left pane, select the **Startup** page.



8. In the **At Startup** dropdown list, select **Show Empty Environment**.

9. Click **OK**.

10. To close SSDT, on the **File** menu, select **Exit**.

*You will work with SSDT to create an Analysis Services Multidimensional Project in **Lab 02**.*

Installing Microsoft Office

In this task, you will install Microsoft Office. This tool is required to create PivotTable reports to help test the design of your Analysis Services multidimensional model.

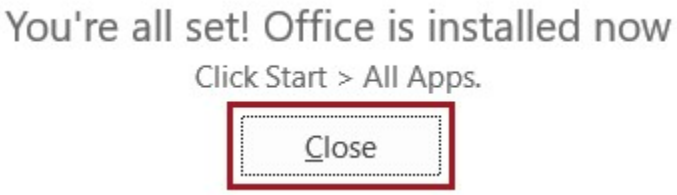
1. In Internet Explorer, navigate to https://aka.ms/edx-DAT224x-o64v

   Tip: You can copy-and-paste the URL into the Remote Desktop window.

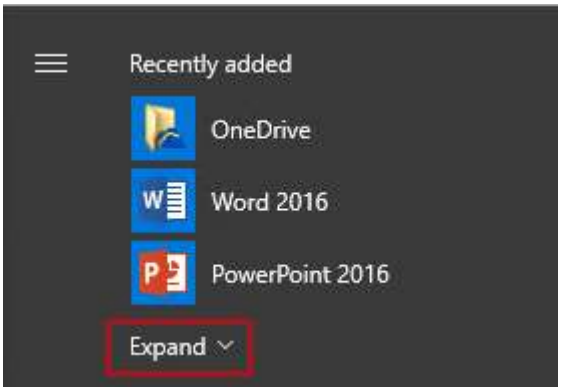
2. When prompted by Internet Explorer to run the setup file, click **Run**.

   The installation usually takes 10-15 minutes to complete.

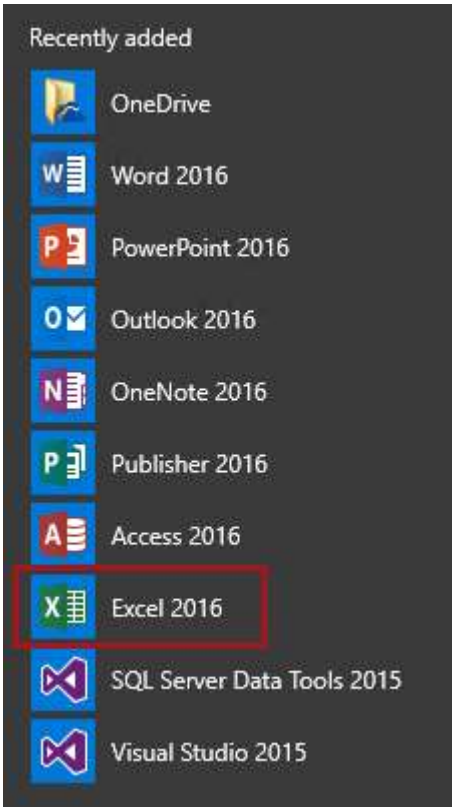
3. When the installation completes, click **Close**.



4. To launch Excel, at the bottom-left corner, click the **Windows** icon, and expand the items in the **Recently Added** section.



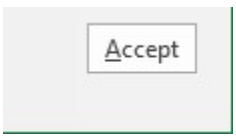
5. Select **Excel 2016**.



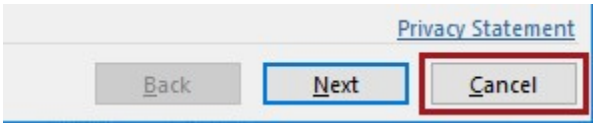
6. When Excel launches, to close the **Activate Office** window, click **X**.

A trial period is available for up to 30 days, during which you will have ample time to complete the labs for this course. Once the trial period expires, you will have the option to purchase an Office 365 subscription.

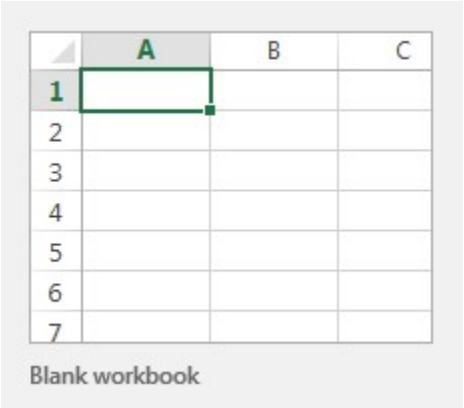
7. In the **First Things First** window, if you agree to the Microsoft Office License Agreement, click **Accept**.



8. In the **Microsoft Office Activation Wizard** window, click **Cancel**.



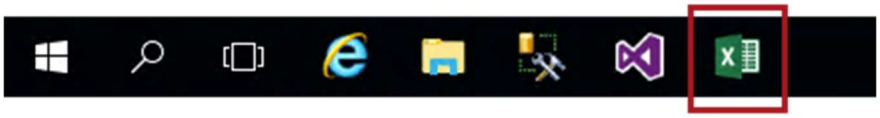
9. To create a blank workbook, select the **Blank Workbook** template.

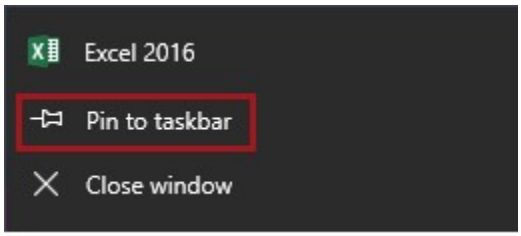


10. Notice the yellow warning banner.

11. To hide the banner, at the far right, click **X**.

12. To create a shortcut, on the taskbar, right-click the **Excel 2016** icon, and then select **Pin to Taskbar**.





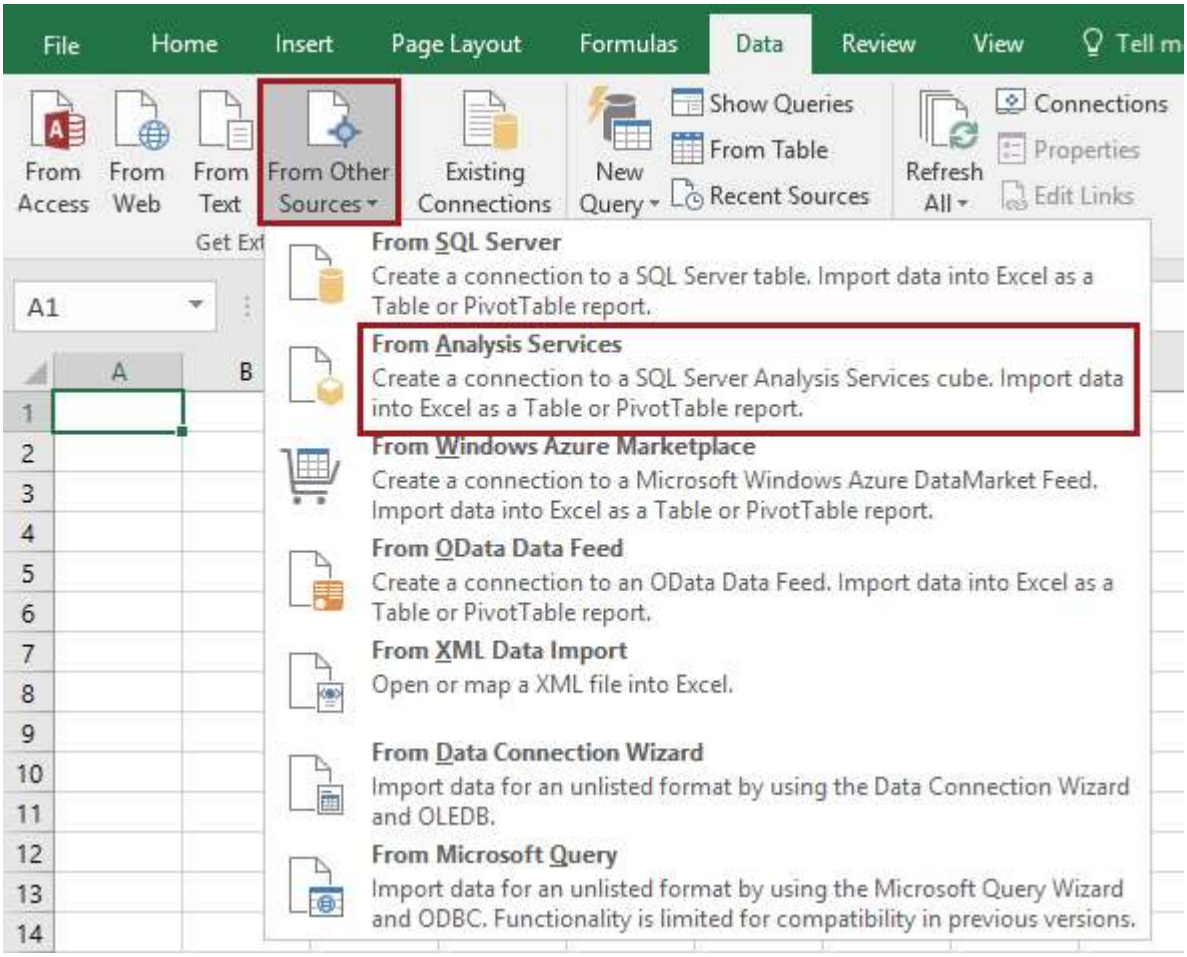
Exercise 3: Exploring the Lab Solution

In this exercise, you will explore the lab solution by connecting to the data model in Excel, and creating a PivotTable report.

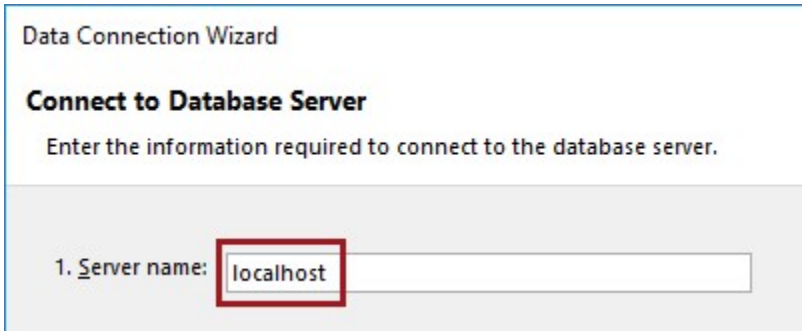
Exploring the Lab Solution

In this task, you will explore the lab solution by connecting to the data model in Excel, and creating a PivotTable report.

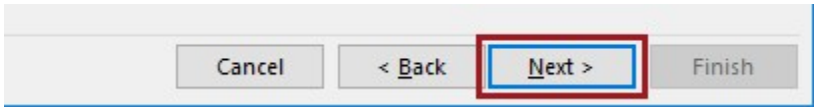
1. In Excel, on the **Data** ribbon, in the **Get External Data** group, click **From Other Sources**, and then select **From Analysis Services**.



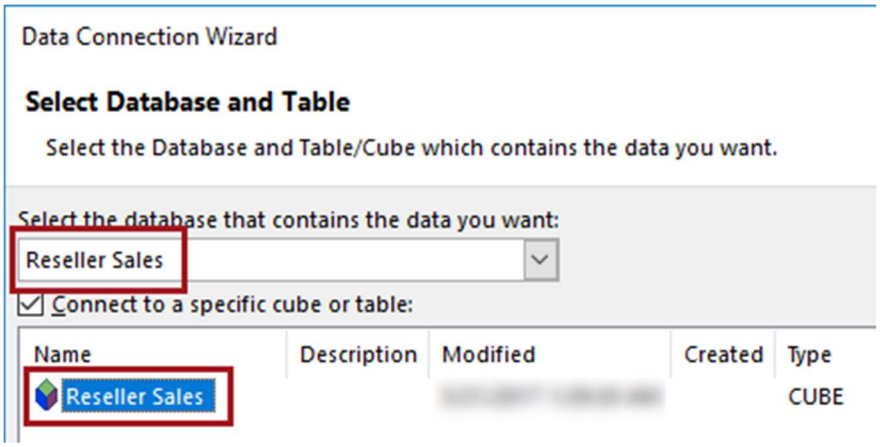
2. In the **Data Connection Wizard** window, in the **Server Name** box, enter **localhost**.



3. Click **Next**.



4. At the **Select Database and Table** step, in the dropdown list, notice that the **Reseller Sales** database is selected, as is the model named **Reseller Sales**.



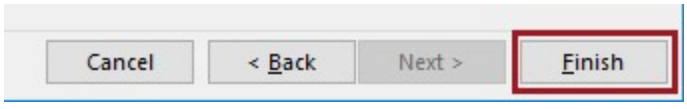
5. Click **Next**.

6. At the **Save Data Connection File and Finish** step, in the **File Name** box, replace the text with **Reseller Sales.odc**.

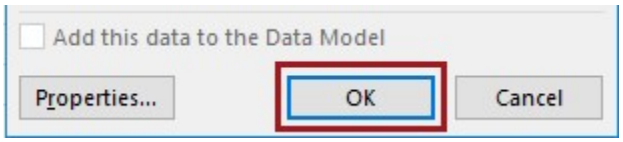
   *An Office Data Connection (ODC) file stores the connection properties, and it will be created in the **My Data Sources** folder. You will reuse this connection to test your cube in **Lab 04**.*

7. In the **Friendly Name** box, replace the text with **Reseller Sales**.

8. Click **Finish**.



9. In the **Import Data** window, notice that the **PivotTable Report** option is selected, and then click **OK**.

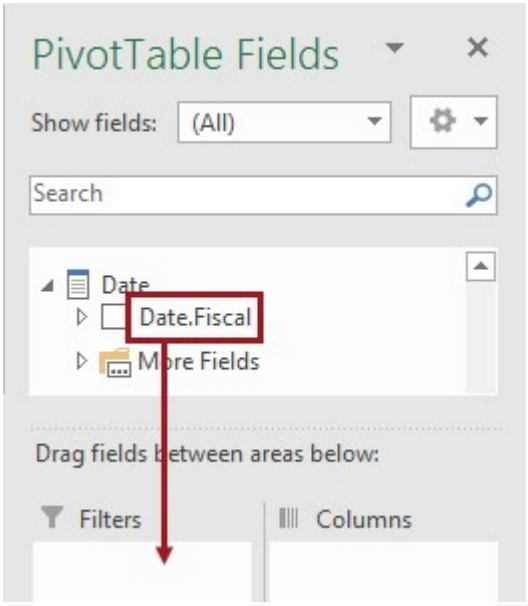


10. Notice the **PivotTable Fields** pane at the right.

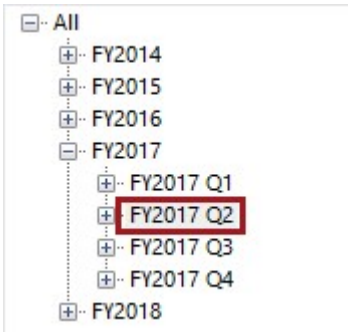
    This pane surfaces the interface of the model.

11. In the **PivotTable Fields** pane, scroll down to locate the **Date** table.

12. From inside the **Date** table, drag the **Date.Fiscal** hierarchy to the **Filters** drop zone.

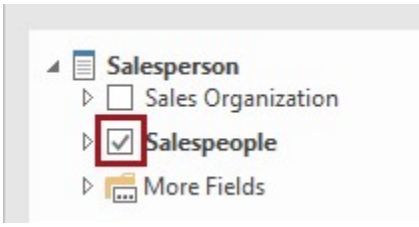


13. In the **Date.Fiscal** PivotTable filter (cell **B1**), click the down-arrow, expand the **All | FY2017** members, and then select the **FY2017 Q2** member.



14. Click **OK**.

15. In the **PivotTable Fields** pane, from inside the **Salesperson** dimension, check the **Salespeople** hierarchy to add it to the **Rows** drop zone.



16. In the **PivotTable Fields** pane, in this order, select the following measures.

Measure Group	Measure
Sales	Sales
Quota	Quota Variance Variance%
Sales	Profit%

17. Verify that the PivotTable report returns four groups on the rows.

	A	B	C	D	E	F
1	Date.Fiscal	FY2017 Q2				
2						
3	Row Labels	Sales	Quota	Variance	Variance%	Profit%
4	⊞Europe	2,300,280	2,425,000	-124,720	-5.14%	0.36%
5	⊞NA	200,894	170,000	30,894	18.17%	1.19%
6	⊞North America	6,051,229	5,900,000	151,229	2.56%	-0.70%
7	⊞Pacific	385,158		385,158		-1.19%
8	**Grand Total**	**8,937,561**	**8,495,000**	**442,561**	**5.21%**	**-0.40%**

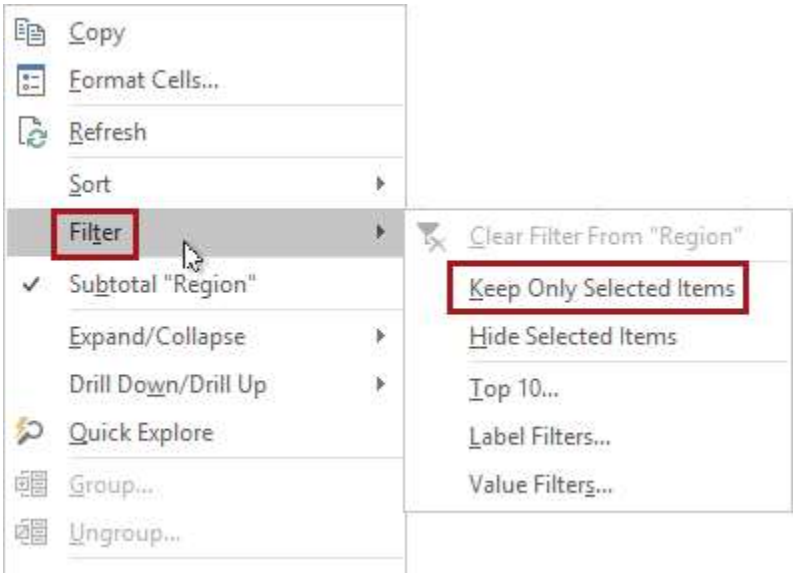
18. In cell **A6**, expand the **North America** member to reveal the countries.

	A	B	C	D	E	F
1	Date.Fiscal	FY2017 Q2				
2						
3	Row Labels	Sales	Quota	Variance	Variance%	Profit%
4	⊞Europe	2,300,280	2,425,000	-124,720	-5.14%	0.36%
5	⊞NA	200,894	170,000	30,894	18.17%	1.19%
6	⊟North America	6,051,229	5,900,000	151,229	2.56%	-0.70%
7	⊞Canada	1,058,864	1,000,000	58,864	5.89%	-1.04%
8	⊞United States	4,992,365	4,900,000	92,365	1.88%	-0.63%
9	⊞Pacific	385,158		385,158		-1.19%
10	**Grand Total**	**8,937,561**	**8,495,000**	**442,561**	**5.21%**	**-0.40%**

19. In cell **A8**, expand the **United States** member to reveal the regions.

	A	B	C	D	E	F
1	Date.Fiscal	FY2017 Q2				
2						
3	Row Labels	Sales	Quota	Variance	Variance%	Profit%
4	⊞Europe	2,300,280	2,425,000	-124,720	-5.14%	0.36%
5	⊞NA	200,894	170,000	30,894	18.17%	1.19%
6	⊟North America	6,051,229	5,900,000	151,229	2.56%	-0.70%
7	⊞Canada	1,058,864	1,000,000	58,864	5.89%	-1.04%
8	⊟United States	4,992,365	4,900,000	92,365	1.88%	-0.63%
9	⊞Central	762,003	800,000	-37,997	-4.75%	-0.50%
10	⊞Northeast	809,122	750,000	59,122	7.88%	-0.48%
11	⊞Northwest	1,193,396	1,350,000	-156,604	-11.60%	-0.29%
12	⊞Southeast	605,255	600,000	5,255	0.88%	-0.14%
13	⊞Southwest	1,622,590	1,400,000	222,590	15.90%	-1.18%
14	⊞Pacific	385,158		385,158		-1.19%
15	Grand Total	8,937,561	8,495,000	442,561	5.21%	-0.40%

20. To focus on one region, in cell **A11**, right-click the **Northwest** member, and then select **Filter | Keep Only Selected Items**.



21. In cell **A6**, expand the **Northwest** member to reveal the salespeople.

	A	B	C	D	E	F
1	Date.Fiscal	FY2017 Q2				
2						
3	Row Labels	Sales	Quota	Variance	Variance%	Profit%
4	North America	1,193,396	1,350,000	-156,604	-11.60%	-0.29%
5	United States	1,193,396	1,350,000	-156,604	-11.60%	-0.29%
6	Northwest	1,193,396	1,350,000	-156,604	-11.60%	-0.29%
7	David Campbell	380,815	300,000	80,815	26.94%	1.28%
8	Pamela Ansman-Wolfe	362,722	600,000	-237,278	-39.55%	1.63%
9	Tete Mensa-Annan	449,859	450,000	-141	-0.03%	-3.16%
10	Grand Total	1,193,396	1,350,000	-156,604	-11.60%	-0.29%

22. To add a member property, in cell **A7**, right-click the **David Campbell** member, and then select **Show Properties In Report | Phone**.

	A	B	C	D	E	F	G
1	Date.Fiscal	FY2017 Q2					
2							
3	Row Labels	Phone	Sales	Quota	Variance	Variance%	Profit%
4	North America		1,193,396	1,350,000	-156,604	-11.60%	-0.29%
5	United States		1,193,396	1,350,000	-156,604	-11.60%	-0.29%
6	Northwest		1,193,396	1,350,000	-156,604	-11.60%	-0.29%
7	David Campbell	740-555-0182	380,815	300,000	80,815	26.94%	1.28%
8	Pamela Ansman-Wolfe	340-555-0193	362,722	600,000	-237,278	-39.55%	1.63%
9	Tete Mensa-Annan	615-555-0153	449,859	450,000	-141	-0.03%	-3.16%
10	Grand Total		1,193,396	1,350,000	-156,604	-11.60%	-0.29%

23. In cell **B1**, filter by **FY2017 Q1**.

Lab-based Knowledge Check

Lab 01 ► PivotTable Review

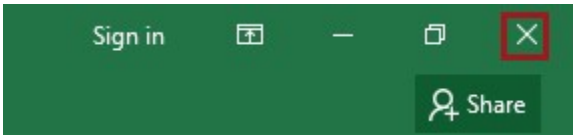
What exact sales amount was achieved by salesperson **Pamela Ansman-Wolfe** in **FY2017 Q1**.

What exact profit percentage did **Tete Mensa-Annan** achieve in **FY2017 Q1**?

You may need data from this step to answer a Lab-based Knowledge Check associated with this module.

At this time, we recommend that you open the **Module 1 Lab-based Knowledge Check** portion of the course in EdX to answer the questions as you complete this lab.

24. To close Excel, at the top-right corner, click **X**.



25. If prompted to save changes, click **Don't Save**.

You have now completed the lab. In the next lab, you will commence the development of a Multidimensional Project.

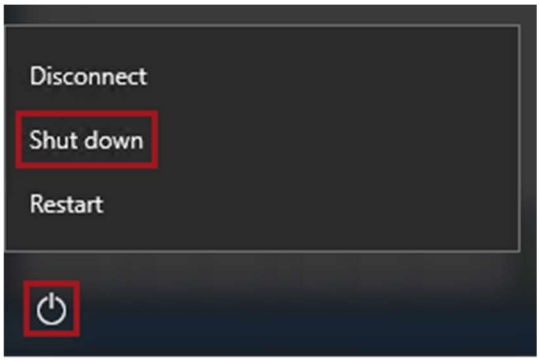
If you are not immediately continuing with the next lab, you should complete the ***Finishing Up*** *exercise to shut down and stop the VM.*

Finishing Up

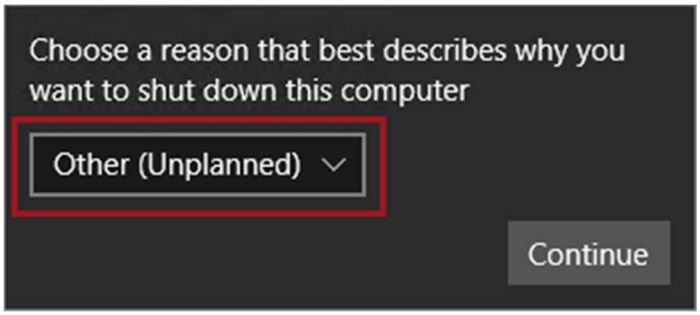
In this exercise, you will shut down and stop the VM.

1. Close all open applications.

2. Press the **Windows** key, and then in the **Start** page, located at the bottom-left, click the **Power** button, and then select **Shut Down**.

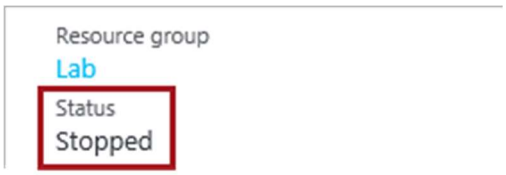


3. When prompted to choose a reason, to accept the default.



4. Click **Continue**.

5. In the **Azure Portal** Web browser page, wait until the status of the VM updates to **Stopped**.



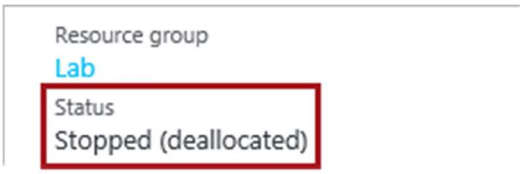
In this state, however, the VM is still billable.

6. Optionally, to deallocate the VM, click **Stop**.

   Deallocation will take some minutes to complete, and also extends the time required to restart the VM. Consider deallocating the VM if you want to reduce costs, or if you choose to complete the next lab after an extended period.

   The deallocation can take several minutes to complete.

7. Verify that the VM status updates to **Stopped (Deallocated)**.



   In this state, the VM is now not billable—except for a relatively smaller storage cost.

   Note that a deallocated VM will likely acquire a different IP address the next time it is started.

8. Sign out of the **Azure Portal**.