DAT220x

Delivering a Data Warehouse in the Cloud

Lab 01 | Preparing the Lab Environment, and Provisioning and Connecting to an Azure SQL Data Warehouse

Overview

In this lab, you will provision a Microsoft Azure Virtual Machine (VM) which will be used by all three labs in this course. Once the VM is provisioned, you will complete the setup required to support the labs. There are seven exercises in this lab. You will need to complete all seven before moving on to the next lab.

Note: The four labs in this course are accumulative. You cannot complete the following two 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 preferred (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, within the VM)

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/dat220xaz. Note that the free trial is not available in all regions.

If you already have a Microsoft account that has <u>not</u> 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/dat220xaz and click the

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Free Trial 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 three labs for this course. The Azure VM will should be stopped at the end of each 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).
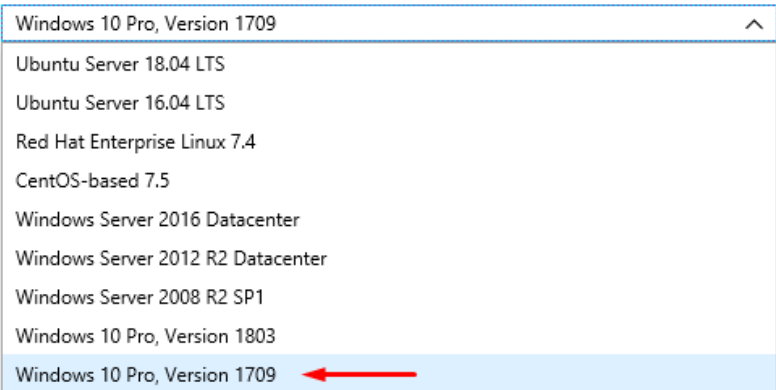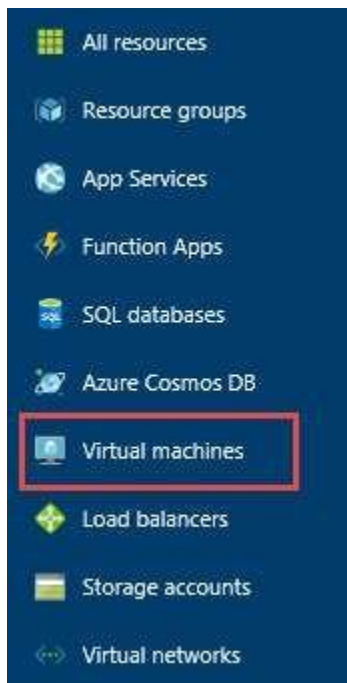

3. In the Virtual Machines blade, click Add.

4. In the Create a Virtual Machine blade, notice the tabs across the top of the blade, with the Basics tab automatically selected.

5. On the Basics tab, select the Subscription and Resource Group. If a Resource Group does not exist, click the Create new link to create a new Resource Group.

6. In the Instance Details section of the Basics blade, provide a name for the virtual machine, then select the region and Availability options.

Create

7. For the Image, click the Image dropdown and select Windows 10 Pro, Version 1079.

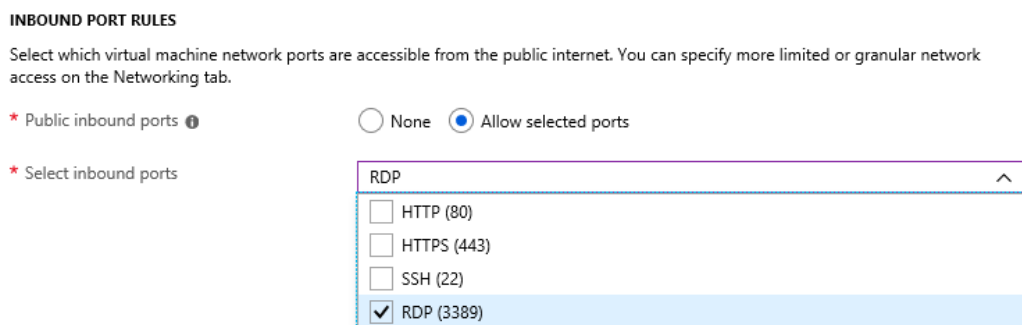8. The Size will automatically populate with a default VM size. To change the VM size, click the Change Size link, and in the Select a VM size blade, select from the sizes available to your subscription, ensuring that the size contains at least 2 cores and 7GB RAM. For example, Size DS2_V3.

9. In the Administrator Account section of the Basics blade, enter a Username and Password.

Be sure to securely record these credentials, as you will be required to use them to sign in to the VM for each lab over the next three weeks.

10. In the Inbound Port Rules section of the Basics blade, select the Allow selected Ports option, then select inbound port 3389 for RDP.

11. Leave the default values for the remaining sections, and click Next to move to the Disks tab.

12. On the Disks tab, the default disk type is Premium SSD. To save costs, change the disk type to Standard SSD or Standard HDD.

13. Click Next to move to the Networking tab.

14. On the Networking tab, ensure that *Allow selected ports* is selected and that inbound port for RDP is selected, then click Next to move to the Management tab.

15. On the Management tab, ensure that all the Monitoring options are set to Off.

Monitoring is a great way to capture Boot and guest OS diagnostic telemetry data specific to your Virtual Machine. Captured telemetry data is stored in your Azure storage account. However, for the purposes of this lab, gathering this data is not needed.

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16. Click Next to go to the Guest Config tab.

17. On the Guest Config tab, accept the defaults and click Next to go to the Tags tab.

18. On the Tags tab, accept the defaults and click Next to go to the Review + Create tab.

19. On the Review + Create tab, review the VM configuration and settings, then click Create to create the VM.

Create

20. On the Azure Portal dashboard, notice the tile providing status of the deployment process.

    The deployment usually takes 5-15 minutes to deploy, and this time depends largely on the VM size selected. The VM blade will open when the deployment completes.
    You cannot proceed to the next task until the deployment completes.

--- Your deployment is underway

Check the status of your deployment, manage resources, or troubleshoot deployment issues. Pin this page to your dashboard to easily find it next time.

Deployment name: CreateVm-MicrosoftWindowsDesktop.Windows-10-RS3-P-20181015210951
Subscription: MPN VS Enterprise
Resource group: westus2-RG

DEPLOYMENT DETAILS (Download)
Start time:
Duration: 38 seconds
Correlation ID: b3bfc3ff-8af1-4378-ab73-470d041044e3

RESOURCE	TYPE	STATUS	OPERATION DETAILS
thisismycoolvm	Microsoft.Compute/virtualMachines	Created	Operation details

21. Once the deployment is complete, click the Go to resource button.

Your deployment is complete

Go to resource

Deployment name: CreateVm-MicrosoftWindowsDesktop.Windows-10-RS3-P-20181015210951
Subscription: MPN VS Enterprise
Resource group: westus2-RG

DEPLOYMENT DETAILS (Download)
Start time: ▬▬▬▬ ▬▬ ▬▬
Duration: 6 minutes 54 seconds
Correlation ID: b3bfc3ff-8af1-4378-ab73-470d041044e3

22. Leave the Azure Portal dashboard open.

Connecting to the VM

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

23. In the VM blade, notice that the VM status is Running.

Resource group (change)
WestUS-RG

Status
Running

You are charged when the VM status is Running, but you are not charged when the VM status is Stopped (Deallocated).

The labs will include steps to remind you to stop the VM.

24. To connect to the VM, click Connect.

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

25. When prompted top open the Remote Desktop File, click Open.

26. If prompted to connect to the unknown publisher, click Connect.

27. In the Windows Security dialog window, click More Choices, then click Use A Different Account.

Use a different account

28. Enter the credentials you created for your VM.

29. Check the Remember Me checkbox.

30. Click OK.

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

Do you want to connect despite these certificate errors?

☑ Don't ask me again for connections to this computer
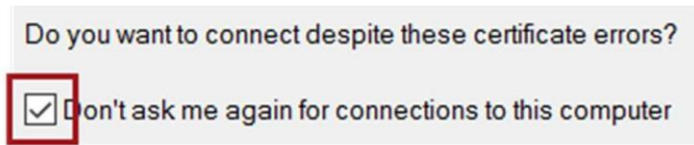
32. Click Yes.

33. 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, having connected to the VM, you will complete several setup tasks.

Installing the Lab Resources

In this task, you will download and extract the lab resources to support all labs for this course.

1. From the Task Bar within the VM, click on the Microsoft Edge icon to open a browser. If necessary, close any welcome tabs.

2. Using the links in the following table, download the software used in the labs. Save them to your Downloads folder. You will install them later in this lab:

Product	Download URL
SQL Server Management Studio (Select the full install, not the upgrade).	https://aka.ms/dat220xssms
Visual Studio Community 2017	https://aka.ms/dat220xvs
Visual Studio Code (Stable build for Windows x64)	https://aka.ms/dat220xvcode
Azure Feature Pack for SSIS (x64 version)	https://www.microsoft.com/en-us/download/details.aspx?id=54798
Azure Storage Explorer	http://storageexplorer.com/

3. When downloaded, open Windows Explorer, and navigate to C:\.

4. Install the downloaded tools in the following order, using the notes in the table:

| Product	Notes
Visual Studio Community 2017	On the Workload tab, ensure no options are selected. In the Individual Components tab, select the SQL Server Data Tools option (which will automatically select others).

SQL Server Management Studio (SSMS)	Accept all defaults.
Azure Feature Pack for SSIS	
Azure Storage Explorer	Accept all defaults.
Visual Studio Code	This is optional, if you would like to try out its features. Suggested additional setup task: select "Add 'Open with Code" checkboxes during installation.

5. After installing the above tools, you will be asked to reboot. Reboot the VM. The VM may need to install Windows and security updates, so the reboot may take a minute or so.

Configuring Management and Development Tools
In this task, you will create shortcuts for commonly used tools.

1. To add a shortcut to the taskbar, press the Windows key, and then type Management Studio. (Make sure the VM has the focus so your desktop does not intercept the keystroke.)
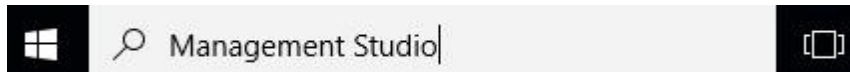
2. When the Microsoft SQL Server Management Studio search result appears, right-click it, and then select Pin to Taskbar. You don't need to launch SSMS for this step.
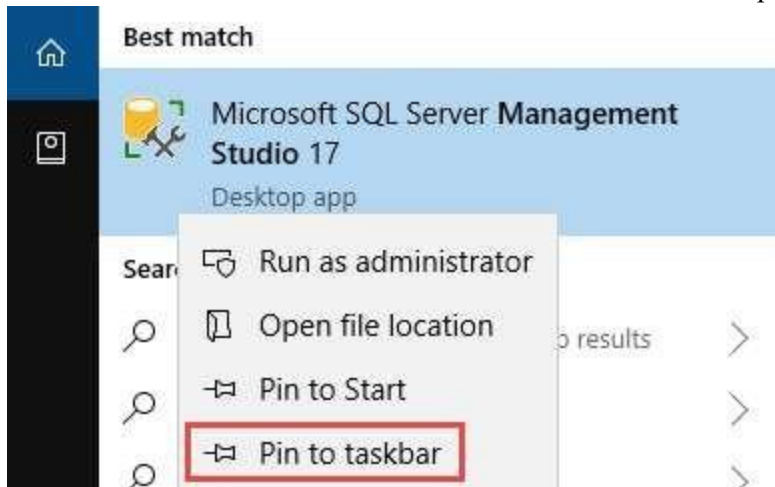
3. Use the same technique to create shortcuts for Visual Studio 2017 and Visual Studio Code (if installed).

4. Use the same technique to add a shortcut for Azure Storage Explorer.

Exercise 3: Confirming Visual Studio configuration

In this exercise, you will validate the installation of SQL Server Data Tools into Visual Studio.

Confirming the installation of SSDT

In this task, you will verify that SSDT has been added, including SSIS templates, to the Visual Studio 2017 installation.

5. Using the shortcut you created in the previous step, launch Visual Studio 2017. The initial startup may take a moment.

6. In Visual Studio, click the Help menu, then click About Microsoft Visual Studio. Scroll down in the list of installed products to confirm that SQL Server Data Tools, as in the screenshot below:

7. If the products appear, continue with the next step. If not, exit Visual Studio and reinstall SSDT from your Downloads folder. Resume the lab at the start of this exercise.

8. Click the View menu and click SQL Server Object Explorer. You will use this pane frequently in your work with SQL DW.

9. Exit Visual Studio

Exercise 4: Provision an Azure Storage Account

In this exercise, you will add an Azure Storage Account to your Lab resource group, and connect to the account from Azure Storage Explorer.

Provision Azure Storage for Blob Storage

In this task, you will use the Azure portal to provision and configure a storage account and add a container for blob storage.

1. Open or switch to Microsoft Edge. In a new tab navigate to the Azure portal: https://portal.azure.com.

2. Log in with the same credentials you used to sign up for your Azure account (not the login you created for the lab VM).

3. From the Portal Dashboard, click Create a resource. On the New blade, click Storage then select Storage account.
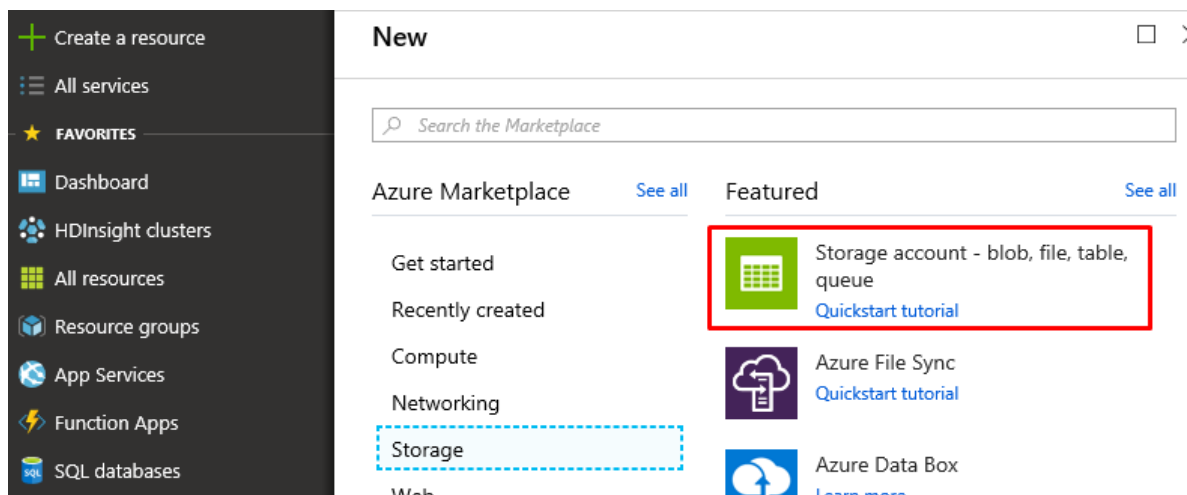
4. In the Create Storage Account blade, notice the tabs along the top of the blade, similar to the process for creating a virtual machine.

5. One the Basics tab, select the subscription and Resource Group. Be sure to select the same Resource Group selected or created in Exercise 1 for the virtual machine.

6. In the Instance Details section of the Basics blade, provide a storage account name then select the location for the storage account.

7. Set the remaining items per the following table:

Option	Value

Performance	Select the **Standard** option
Account Kind	Select **StorageV2**
Replication	Select **RA-GRS** (read-access geo-redundant storage)
Access tier	Select the **Hot** option

8. Click Next to move to the Advanced tab.

9. On the Advanced tab, accept the defaults and click Next to go to the Tags tab.

10. On the Tabs tab, click Next to go to the Review + Create tab.

11. On the Review + Create tab, review the storage account configuration, then click Create. The deployment usually takes less than a minute to deploy.

12. Click the Go to resource button once the deployment is complete.

13. Examine the right-side blade. Review the Essentials settings, and note the Services area:

Resource group (change)
westus2-RG

Status
Primary: Available, Secondary: Available

Location
West US 2, West Central US

Subscription (change)

Subscription ID

Tags (change)
Click here to add tags

Services

Blobs
REST-based object storage for unstructured data

Learn more

Files
File shares

Learn mor

14. Click Blobs in the Services area.

15. In the Blob Service blade, note the message about containers.

16. Click the plus symbol next to Container.

+ Container   ↻ Refresh

17. In the New container blade, enter labcontainer. Leave the Access type set to Private.

18. Click Create. This will close the blade and return you to the Blob service blade.

19. Review the name and URL of your container:

NAME	URL
labcontainer	https://crdat220.blob.core.windows.net/labc...

20. Leave the browser window open for the next task.

Connect to your Azure Storage with Azure Storage Explorer

In this task, you will use the Azure portal to provision and configure a storage account, and add a container for blob storage.

1. Using your Task Bar shortcut or another method, launch Microsoft Azure Storage Explorer.

2. Review the pane on the left side. Note the leftmost toolbar button to Connect to Azure Storage.
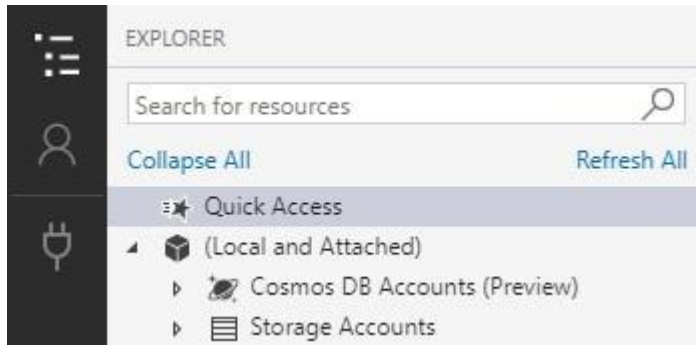
3. Click Add Account.

4. In the Connect to Azure Storage dialog, note the choices. You may either log in with your Azure account, provide a connection string or SAS (shared access signature) URI, or provide a storage account name and key. For this lab, you will log in with your account. (To use the name/key method, you will need to return to the Portal and copy the access key from the Storage account settings.)

5. Ensure that Add an Azure Account is selected, and click Sign In…

6. Log in with the same Microsoft account you used to access the Azure Portal.

7. Review the subscription selection in the left pane of the Storage Explorer. Select the account in which you created the storage account in the previous task. Click Apply if needed.

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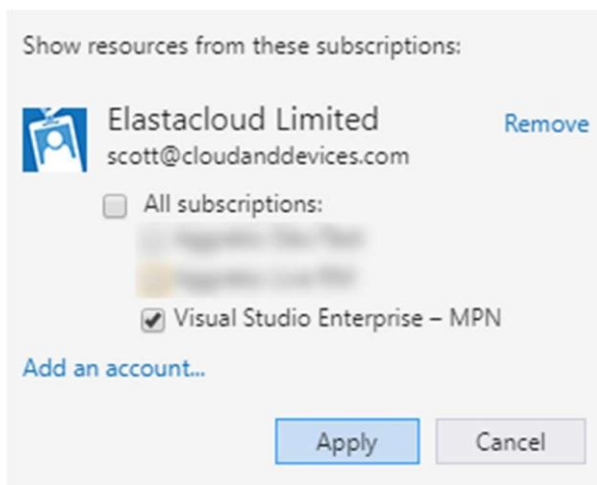
8. In the treeview, locate your storage account by name. Expand to view the Blob Containers and your labcontainer that you created in the portal.

9. In the treeview, right-click on Blob Containers node, and click Create Blob Container.

10. Enter labcontainer2 as the name of the new container and press Enter.

11. Switch to Microsoft Edge and return, if necessary to the Blob service blade for your storage account.

12. Verify that the labcontainer2 container is displayed in the list of containers. If necessary, use the blade's Refresh link:
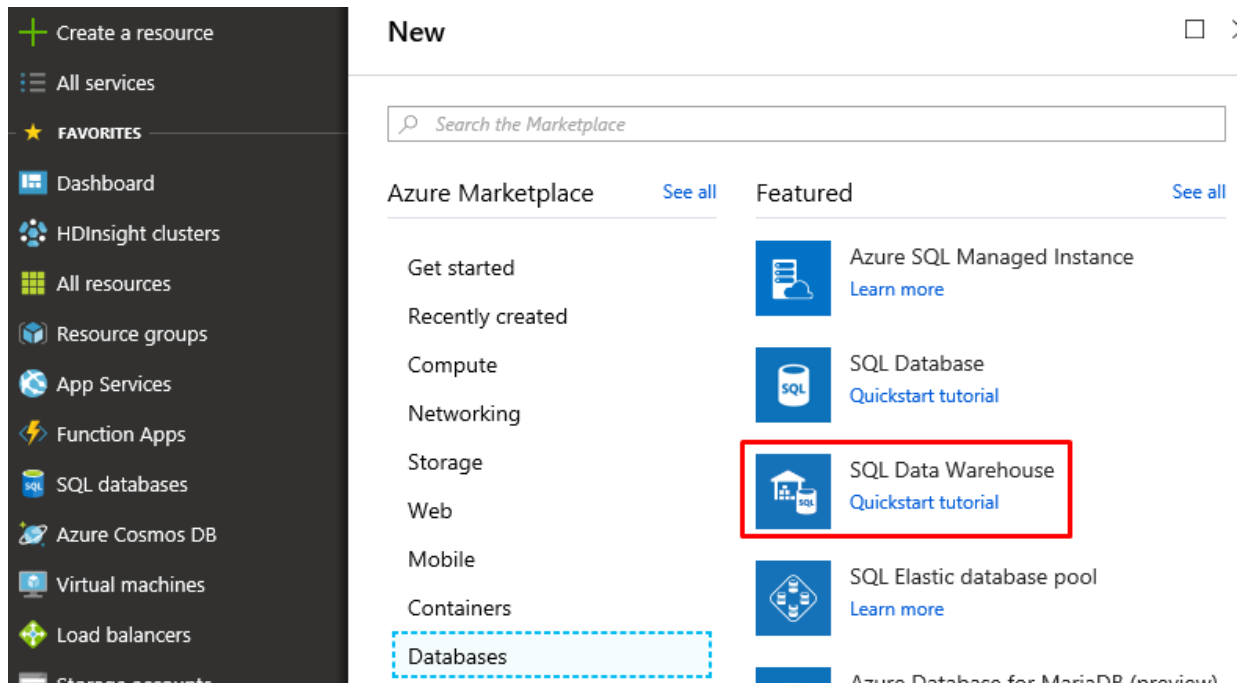

13. You should have confirmed the configuration of the storage account, and connectivity from the Azure Storage Explorer.

Exercise 5: Provision SQL DW

In this exercise, you will provision and configure a new SQL DW.

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

2.   In the Portal, click New, Databases, then click SQL Data Warehouse:

3.   On the SQL Data Warehouse blade, provide values for the following settings, leaving the others with defaults:

Setting	Value	Notes
Database name	Create a name, for example, **200xdw**.	This does not need to be unique, unlike the server name below
Subscription	Select the same subscription you used in Exercise 1	
Resource group	Select the Resource Group created or selected in Exercise 1	
Select source	Select Sample, then select the AdventureWorksDW database.	

4.   Click Server.

5.   On the Server blade, click Create a new server.

6.   On the New Server blade, provide values for the following settings, leaving the others with defaults:

Setting	Value	Notes
Server name		This must be unique across Azure.
Server admin login		
Password		Must be at least 8 characters
Confirm password		Write this down for future use in the course labs.
Location	Select the same region as the other services created in this lab.	

7.   Click Select.

8.   Click Performance.

9.   On the Configure Performance pane, ensure the Gen2 tab is selected and move the slider to the right and left to see the different DWU sizes available.

10. Move the slider all the way to the left, to 100 DWU.

11. Click Apply.

12. Click Pin to Dashboard for your own convenience.

13. Review your settings, then click Create.

14. Watch for the notification of the successful deployment.

Exercise 6: Configure SQL DW after deployment

In this exercise, you will review and configure your new SQL DW.

1. In the Azure Portal, review the SQL DW blade. If necessary, click on the pinned item representing
    your SQL DW to open the blade.
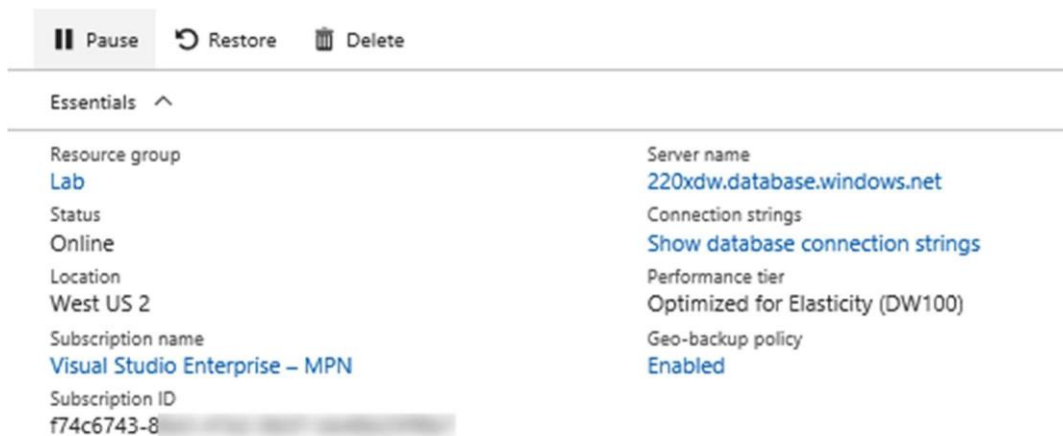
2. Note the Server name link. This will be the address you will need to supply to client applications later
    in the labs.

3. Note the SQL DW database name in the upper left corner. You will need to note this to connect to the
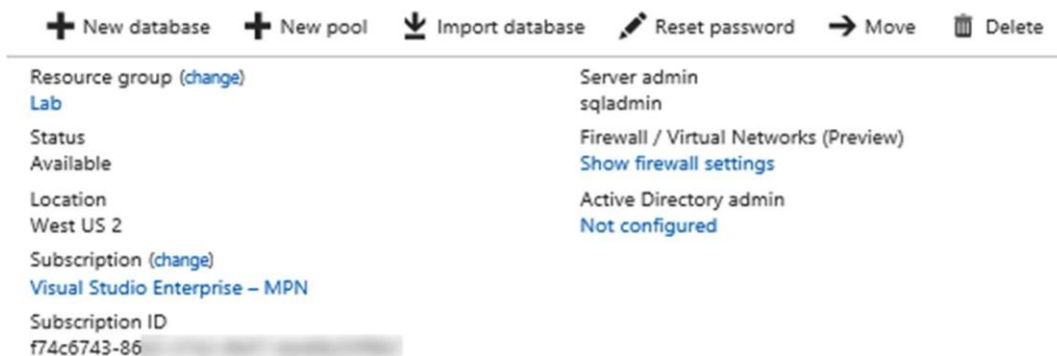   database from clients once you have connected to the server. For example:

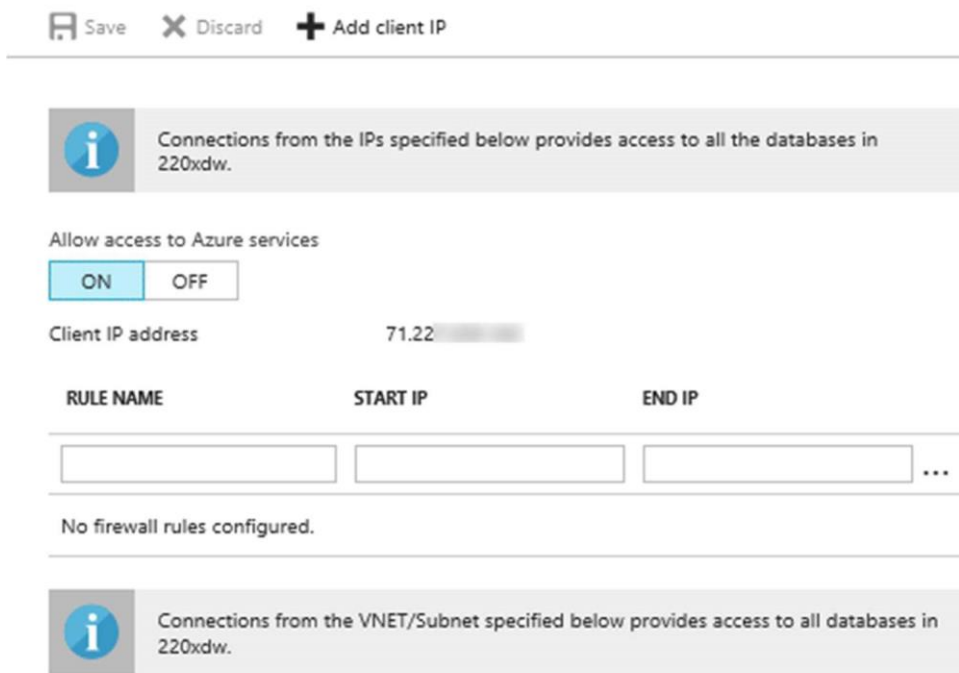4. Review the links to Common tasks. You will use some of these in labs:
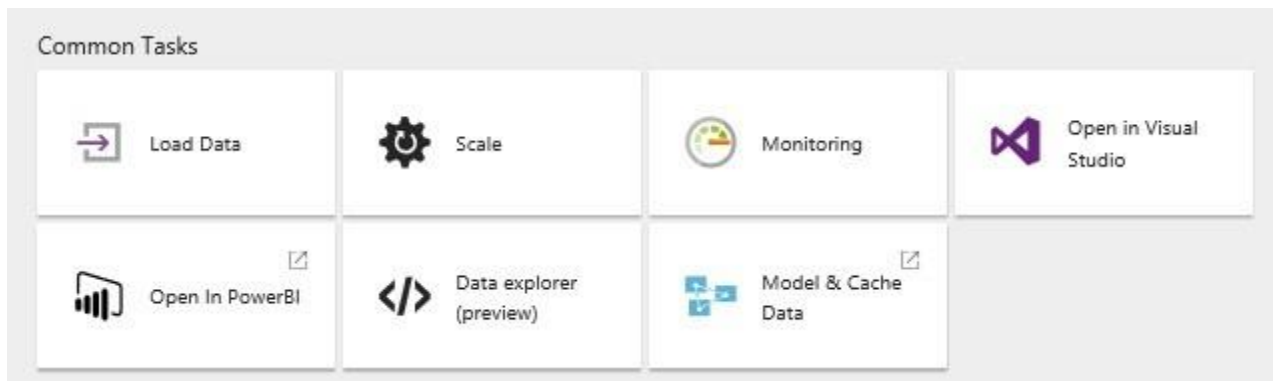
5. Click the link under Server name in the Essentials section.

6. Review the Essentials section in the Server blade:

7. Note the Server admin name and link to firewall settings. Click Show firewall settings.

8. In the Firewall settings blade, review the existing rules.

9. If you selected Allow access to Azure services during provisioning, it will be set to ON here.   If you did not, turn it on now and click Save.

10. Note that no other rules are configured, and no other IP addresses have been authorized to connect to your SQL DW. Question: will your Azure lab VM be able to connect to the SQL DW with the current settings?

11. Close the Firewall settings blade to return to the SQL server blade.

12. Close the SQL server blade to return to the SQL data warehouse blade.

13. Note the location of the Pause link. Do not select it now, but you will pause your SQL DW at the end of this lab.

14. Close the SQL data warehouse blade to return to the Dashboard. Leave the Portal window open for the next exercise.

Exercise 7: Connect to SQL DW from Clients

In this exercise, you will connect to the SQL DW to complete the exercises in this lab.

1. Use your taskbar shortcut (or other preferred method) to launch SQL Server Management Studio (SSMS).

2. In the Connect to Server dialog, enter the Server name of your SQL DW, using the information in the Portal.

3. Change the Authentication drop-down list to SQL Server Authentication.

4. In the Login and Password boxes, provide the Server admin and password you configured during provisioning of the SQL DW. For your convenience, click Remember password.

5. Click Connect.

6. In the Object Explorer pane, expand the node for your SQL DW, and continue to expand nodes to see the database and sample tables that were loaded into your SQL DW during provisioning.
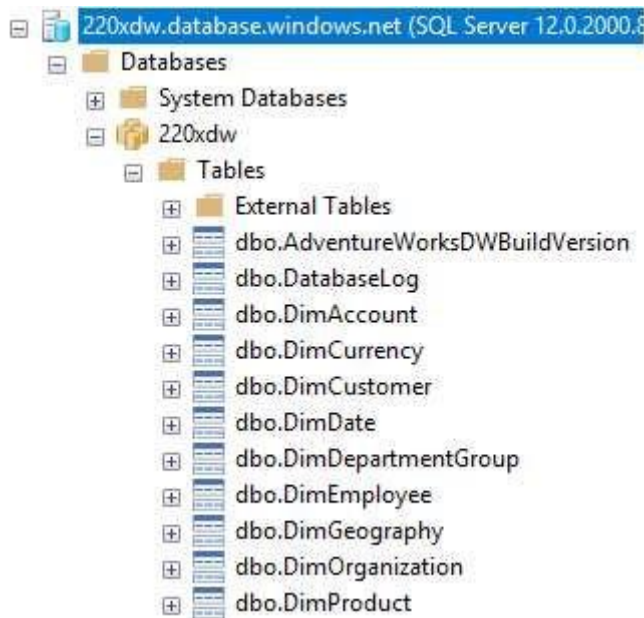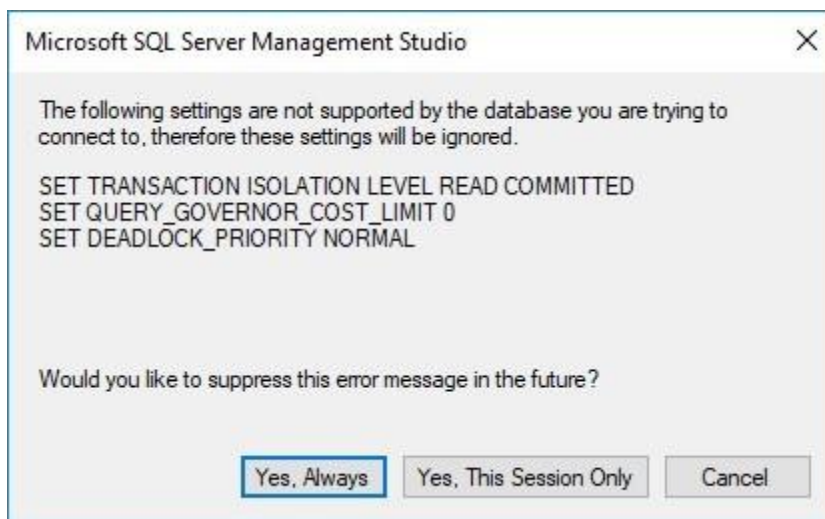
7. Expand the Views node and locate the view dbo.SalesByCategory.


8. On the SSMS toolbar, click the New Query button.

9. Note the dialog that appears on connection to the SQL DW. By default, SSMS sets certain connection-level settings, of which these three are not currently supported:

Microsoft SQL Server Management Studio   ✕

The following settings are not supported by the database you are trying to connect to, therefore these settings will be ignored.

SET TRANSACTION ISOLATION LEVEL READ COMMITTED
SET QUERY_GOVERNOR_COST_LIMIT 0
SET DEADLOCK_PRIORITY NORMAL

Would you like to suppress this error message in the future?

Yes, Always   Yes, This Session Only   Cancel

10. Click Yes, Always to suppress this message for future connections from this VM.

11. Click in the new query window, then confirm that your SQL DW database name appears in the database list on the toolbar:


12. In the query window, enter the following T-SQL query: SELECT SalesAmount, ProductLine FROM dbo.SalesByCategory;

13. Click the Execute button on the toolbar.

14. Review the results. Note the information provided in the status bar at the bottom of the SSMS window:
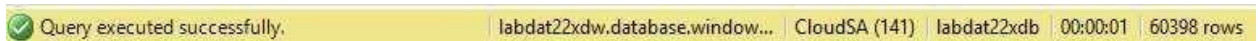

15. You have now successfully connected to and queried your SQL DW.

16. Exit SSMS.

17. Using your task bar shortcut (or other preferred method), launch Visual Studio 2017.

18. If the SQL Server Object Explorer pane is not visible, select it from the View menu.

19. In the SQL Server Object Explorer toolbar, click the Add SQL Server button:
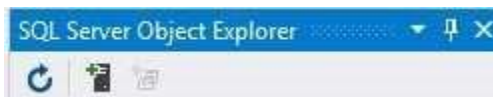

20. Like SSMS, you can directly add the Server name and credentials of your SQL DW to the Connect dialog. However, you can also associate your Azure subscription with Visual Studio, and browse your Azure resources. Let's do that.

21. In the Connect dialog, expand the Azure node:
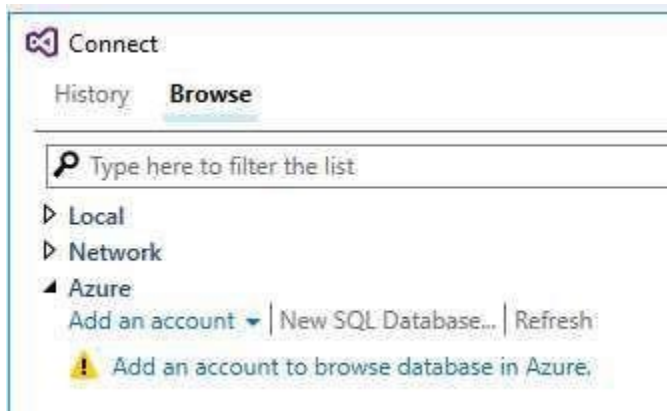
22. If you haven't added an account to Visual Studio already, click Add an account and log in to your Microsoft account (the same one you used to log in to the portal).

23. The Connect dialog will refresh to display a list of Azure SQL DW and (SQL DB) databases associated with your subscription:
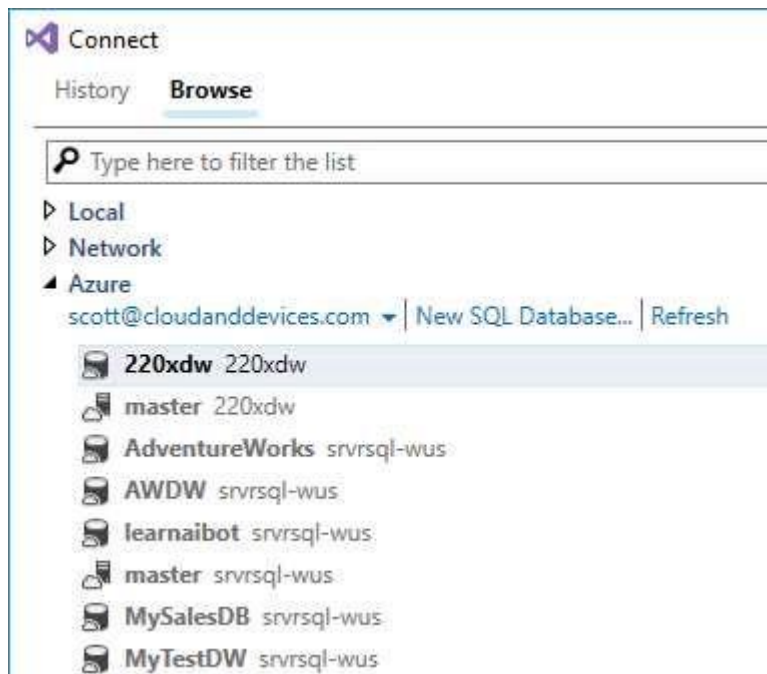
24. Select your lab database, and notice that the connection string is filled out for you in the lower portion of the dialog. Provide your User Name and Password, then click Connect.

25. Browse your SQL DW database in the Object Explorer pane.
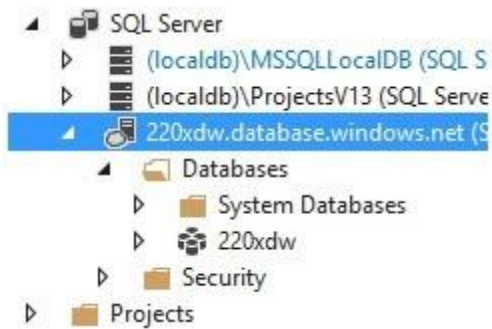
26. Right-click on the database node, and click New Query… from the context menu:
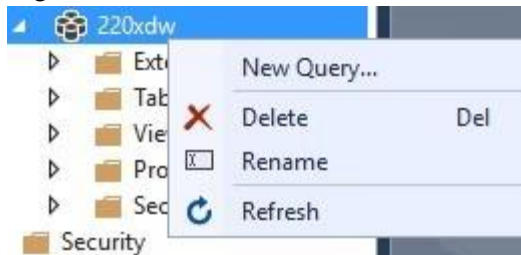
27. In the query window, enter the same query you used in SSMS:
SELECT SalesAmount, ProductLine FROM dbo.SalesByCategory;

28. In the toolbar at the top of the query window, mouse over the triangle to discover the
Execute button. Note: this is not the Attach… button on the Visual Studio toolbar.

29. Review the results and the status bar to see connection and query information. As you have seen, the
query experience is similar between SSMS and Visual Studio. You may use whichever tool you
prefer to perform labs in this course.

30. Exit Visual Studio.

You have now completed the lab. Be sure to complete the Finishing Up exercise to shut down, and
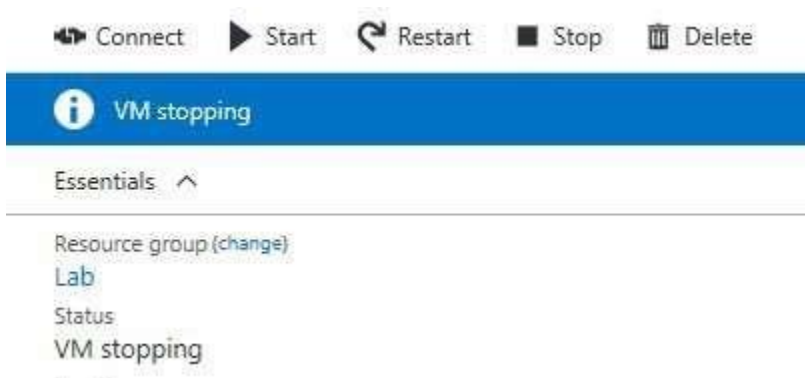stop the VM.

Finishing Up

In this task, you will shut down and stop the VM and pause the SQL Data Warehouse. If you are immediately continuing on to further labs in this course, you can skip this task. However, costs will continue to be incurred by the VM and data warehouse until they have been stopped and paused and deallocated using the steps below.

1. Close all open applications.

2. Right-click on the Windows button in the bottom left corner of your screen. Click on Shut down or sign out. Be sure this is the menu for you VM and not your desktop!
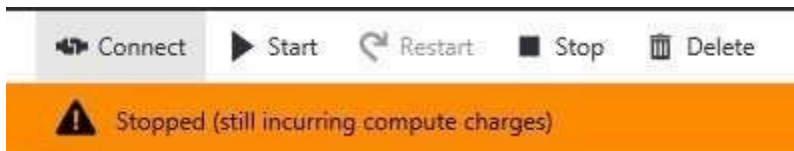

3. Click shut down.

4. In the Azure Portal Web browser page on your desktop, wait until the status of the VM updates.

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

5. To deallocate the VM, click Stop.

6. When prompted to stop the VM, click Yes.

Stop this virtual machine
Do you want to stop 'DAT220X'?

| Yes | No |

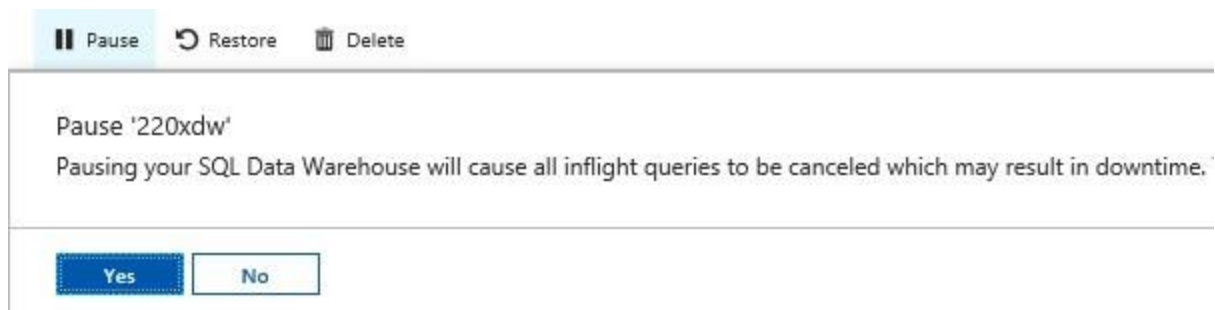The deallocation can take several minutes to complete.

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

Resource group
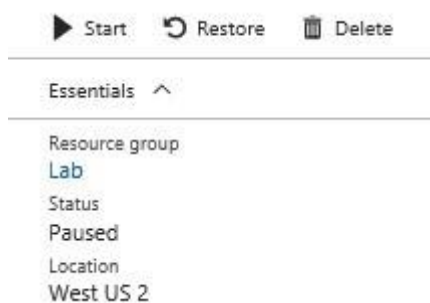Lab
Status
Stopped (deallocated)

In this state, the VM is now not billable.

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

8. In the Azure Portal Web browser page on your desktop, open the SQL Data Warehouse created earlier.

9. In the Essentials pane, click Pause.

‖ Pause   ↺ Restore   🗑 Delete

Pause '220xdw'
Pausing your SQL Data Warehouse will cause all inflight queries to be canceled which may result in downtime.

| Yes | No |

10. Verify that the SQL DW is in a Paused state (this may take several minutes).

▶ Start   ↺ Restore   🗑 Delete

Essentials ∧

Resource group
Lab
Status
Paused
Location
West US 2

11. Sign out of the Azure Portal.