Azure SQL MI PowerBI

March 2019

Contents

Introduction

In this lab, you will learn key concepts in data integration centered on orchestrating and operationalizing data movement and data transformation activities, as well as cloud-based SSIS package execution via Azure Data Factory's Integration Runtime feature. You will establish connections with both on-premises SQL Server Databases, as well as Managed Instances in the cloud, to allow the creation of data pipelines that run from your sources, all the way to your destination. Then, you will lift-and-shift native SSIS packages onto the cloud to allow for more seamless control and monitoring during executions. Finally, you'll complete the journey of your data by establishing a connection to a live Power BI Desktop report, where you will be able to visualize directly the various components and insights contained in your data.

Understanding Integration Runtime in Azure Data Factory

Integration Runtime (IR) *is the* **compute infrastructure** *used by Azure Data Factory to provide the following data integration capabilities across different network environments:*

- **Data Movement:** Moving data between data stores in public and private networks.
- **Activity Dispatch:** Monitoring transformation activities running on a variety of compute services.
- **SSIS Package Execution:** Natively execute SQL Server Integration Services (SSIS) packages in a managed Azure compute environment.

Azure Data Factory *offers three types of Integration Runtimes that serve specific data integration capabilities; Azure, Self-hosted, and* ***Azure-SSIS****. The last type supports the previously mentioned* ***SSIS Package Execution****, which is what we'll be using in this section of the lab.*

SQL Managed Instance – Power BI

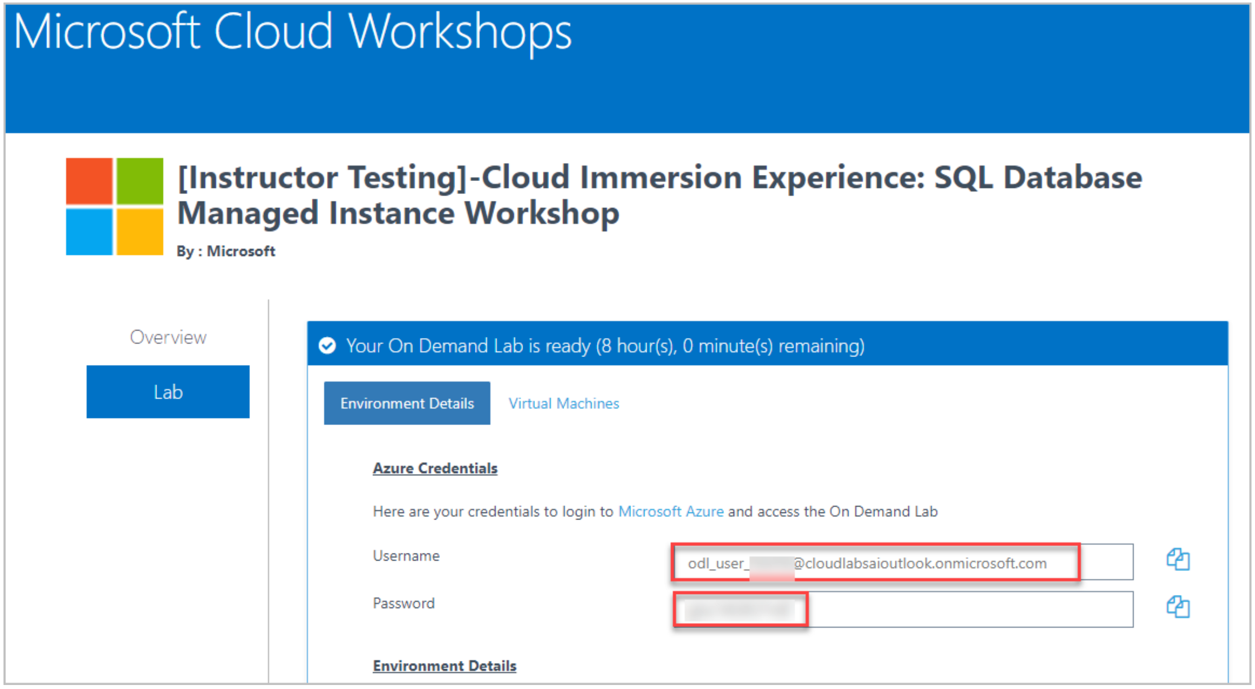
Exercise 0: Provisioning an Azure-SSIS Integration Runtime in Azure Data Factory

Overview

This section will provide you with the ability to use the Azure Portal to create the foundation needed for the Integration Runtime's infrastructure to effectively host and manage the executions of SSIS packages residing virtually anywhere in the world.

Task 1: Configure Integration Runtime Setup

1. Launch a browser and navigate to https://portal.azure.com. Once prompted, login with the Azure Credentials from the Lab Details Page.



Microsoft Cloud Workshops

[Instructor Testing]-Cloud Immersion Experience: SQL Database Managed Instance Workshop

By : Microsoft

Your On Demand Lab is ready (8 hour(s), 0 minute(s) remaining)

Azure Credentials

Here are your credentials to login to Microsoft Azure and access the On Demand Lab

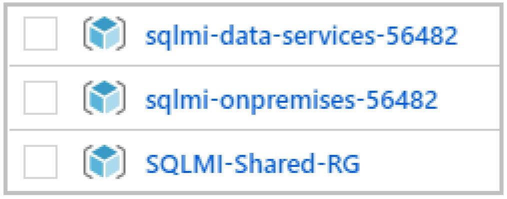
Username odl_user_[redacted]@cloudlabsaioutlook.onmicrosoft.com

Password [redacted]

Environment Details

2. In the Stay signed in? pop-up window, click No
3. In the Welcome to Microsoft Azure pop-up window, click Maybe Later
   Note: If you receive a pop-up for Azure Advisor, click the X in the top right corner of the pop-up to close it.
4. You will be directed to the dashboard.
5. From the left side of the Page, select **Resource Groups**

6. Note that you will have access to three Resource groups:

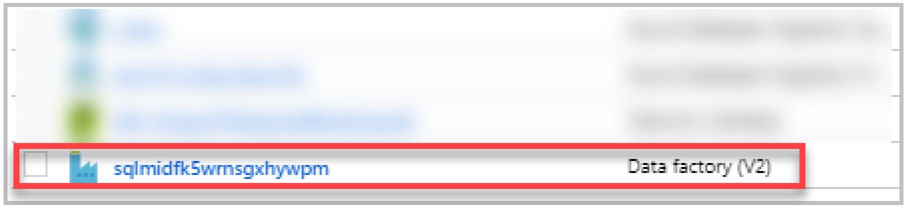


□ sqlmi-data-services-56482

□ sqlmi-onpremises-56482

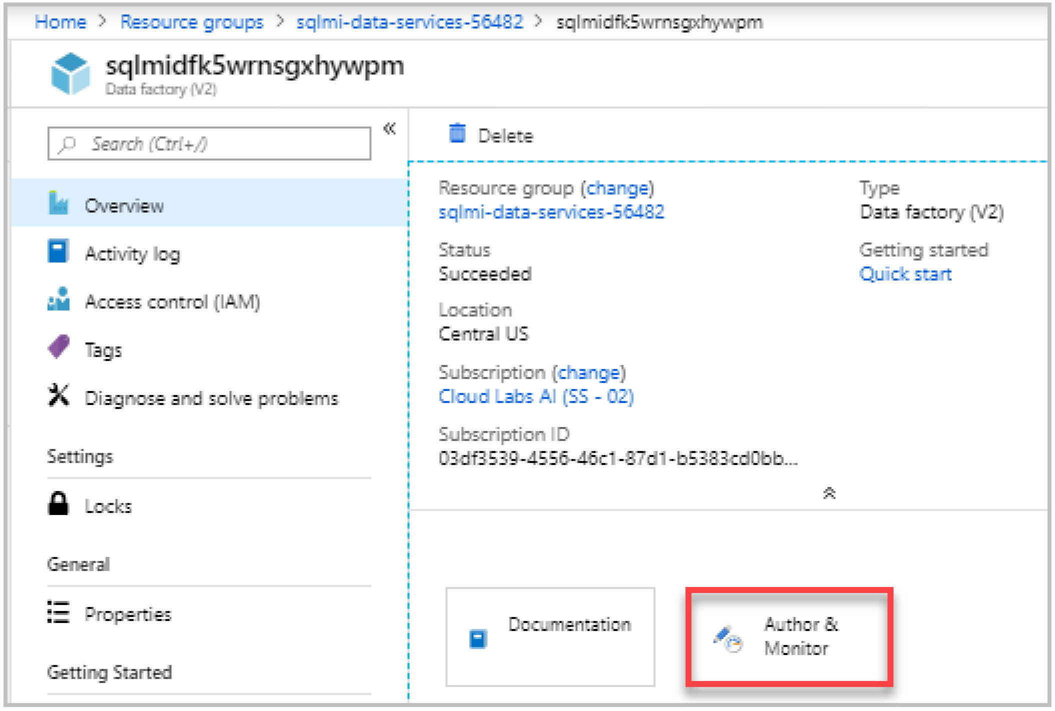
□ SQLMI-Shared-RG

7. Select resource group starting with **sqlmi-data-services-**
8. From the overview blade of the Resource group, **select** the resource with type **Data Factory (V2)** from the resources:



□ sqlmidfk5wrnsgxhywpm	Data factory (V2)

9. From the overview blade of the Data Factory, navigate to the Author & Monitor tile to open the Data Factory user Interface (UI) on a separate tab.



Home > Resource groups > sqlmi-data-services-56482 > sqlmidfk5wrnsgxhywpm

sqlmidfk5wrnsgxhywpm
Data factory (V2)

Resource group (change)
sqlmi-data-services-56482

Status
Succeeded

Location
Central US

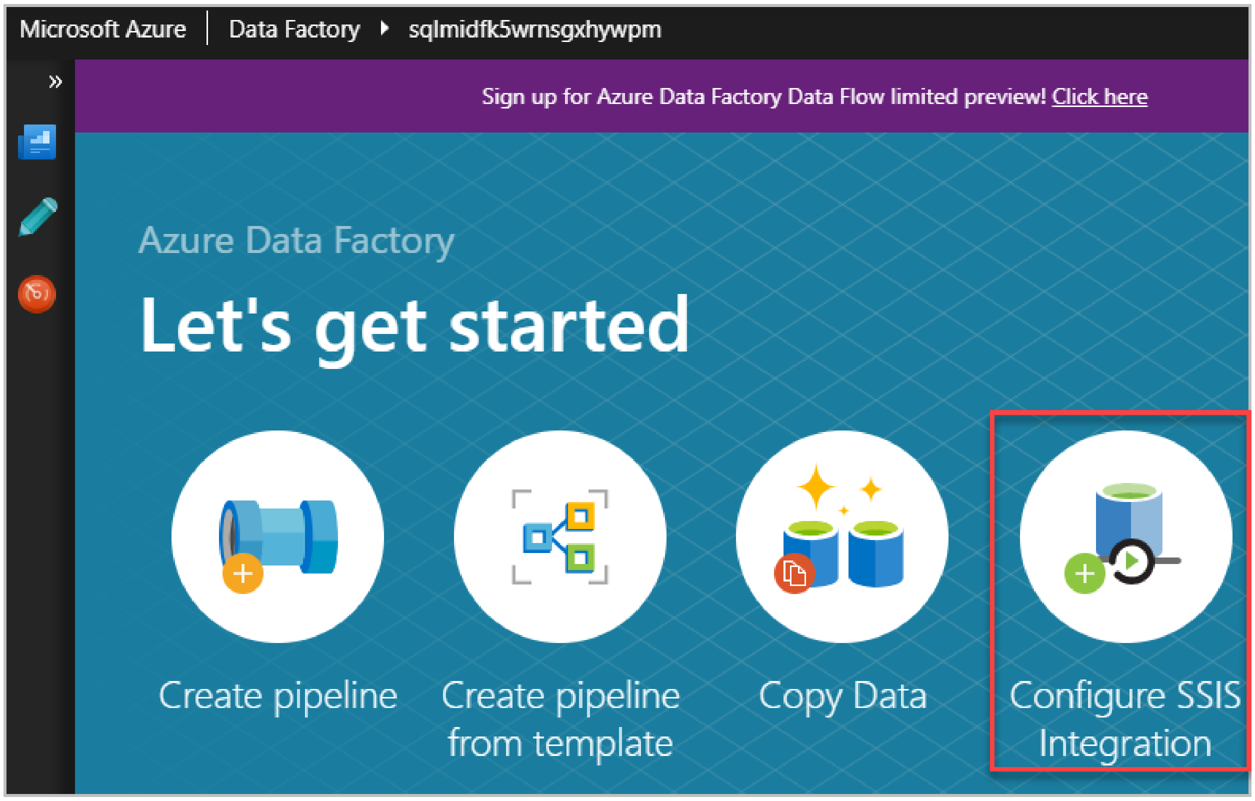
Subscription (change)
Cloud Labs AI (SS - 02)

Subscription ID
03df3539-4556-46c1-87d1-b5383cd0bb...

Type
Data factory (V2)

Getting started
Quick start

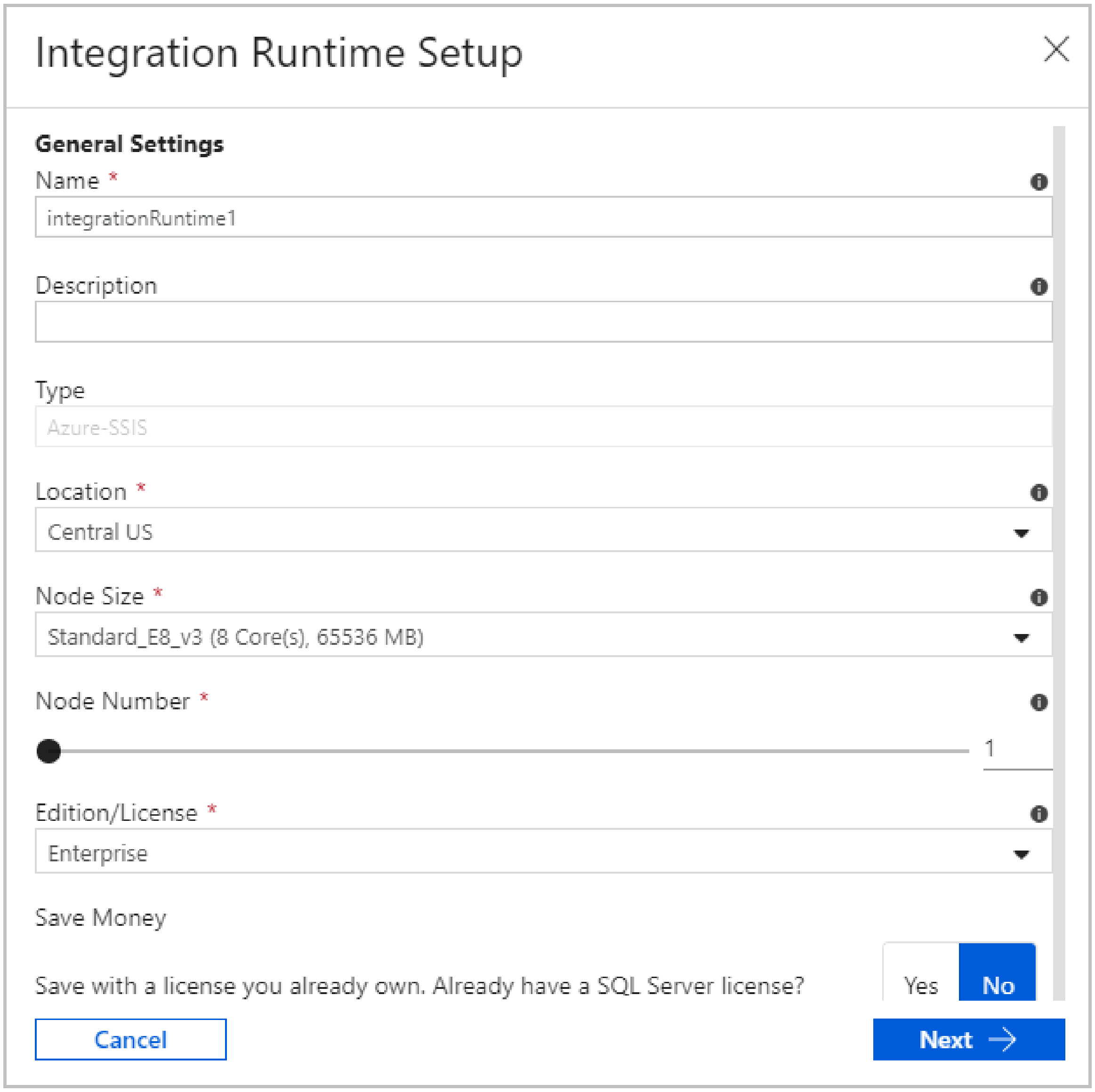
10. On the **Let's get started** page, click the **Configure SSIS Integration Runtime** tile


Microsoft Azure
Data Factory
sqlmidfk5wrnsgxhywpm
Sign up for Azure Data Factory Data Flow limited preview! Click here
Azure Data Factory
Let's get started
Create pipeline
Create pipeline from template
Copy Data
Configure SSIS Integration

11. On the **General Settings** form of Integration Runtime Setup page, enter the following information:
    a. **Name:** integrationRuntime1
    b. **Description:** Leave blank
    c. **Location:** Select **location of the resource group** from the dropdown

NOTE: The location does not need to be that of your data factory's, but it should be the same as your Azure SQL Database/Managed Instance server's where your **SSISDB** is to be hosted, allowing easy access without incurring excessive traffic.

    d. **Node Size:** Select **Standard_E8_v3** from the dropdown *This node's high memory-to-CPU ratio results in superior performance when working with **large database servers** - which this lab will. Another case where selecting a large node size would be beneficial is when you anticipate running **compute/memory-intensive SSIS packages**
    e. **Node Number:** Select **1** by using the slider. *The number of nodes you select determines the cluster size of your IR, which impacts performance when running parallel SSIS packages. **Select a large cluster if you plan on running many packages in parallel***
    f. **Edition/License:** Select **Enterprise** from the dropdown, as it will allow the use of advanced/premium features on your integration runtime, showcasing various features during this lab
    g. **Save Money:** Click **No**



Integration Runtime Setup

General Settings

Name *

integrationRuntime1

Description

Type

Azure-SSIS

Location *

Central US

Node Size *

Standard_E8_v3 (8 Core(s), 65536 MB)

Node Number *

1

Edition/License *

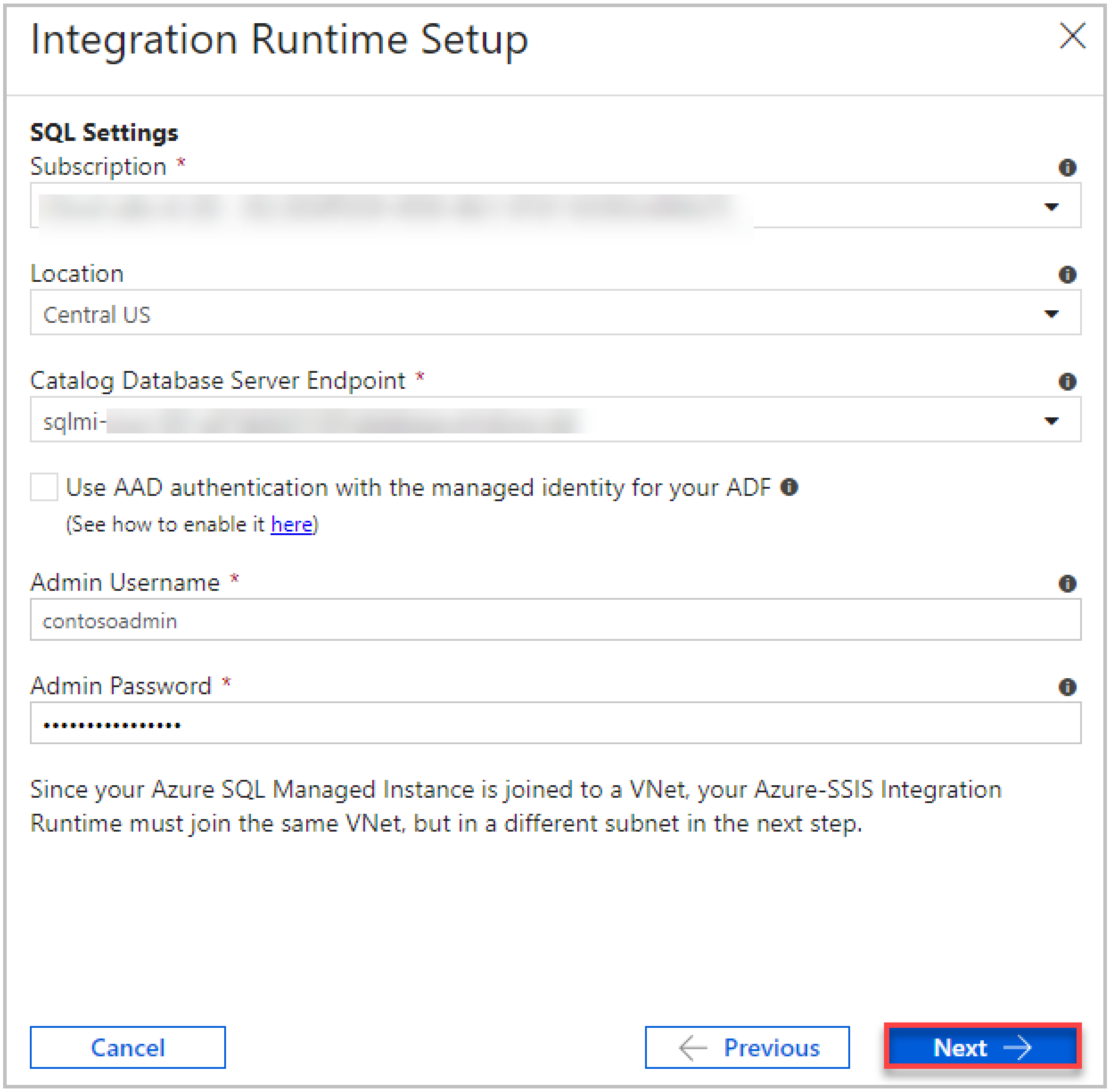
Enterprise

Save Money

Save with a license you already own. Already have a SQL Server license? Yes [✓ No]

12. Click **Next** to bring up the **SQL Settings** portion of Integration Runtime Setup page, and provide the following information:
13. **Subscription:** Select your default subscription
14. **Location:** Select your resource group location from the dropdown, as it is recommended that you select the same location of your integration runtime
15. **Catalog Database Server Endpoint:** Select the available Database Server Endpoint from the Dropdown.
16. **Do not** check **Use AAD authentication with your ADF MSI**
17. **Admin Username:** contosoadmin

18. **Admin Password: IAE5fAijit0w^rDM**



Integration Runtime Setup

SQL Settings

Subscription *

[redacted]

Location

Central US

Catalog Database Server Endpoint *

sqlmi-[redacted]

□ Use AAD authentication with the managed identity for your ADF

(See how to enable it here)

Admin Username *

contosoadmin

Admin Password *

••••••••••••••••

Since your Azure SQL Managed Instance is joined to a VNet, your Azure-SSIS Integration Runtime must join the same VNet, but in a different subnet in the next step.

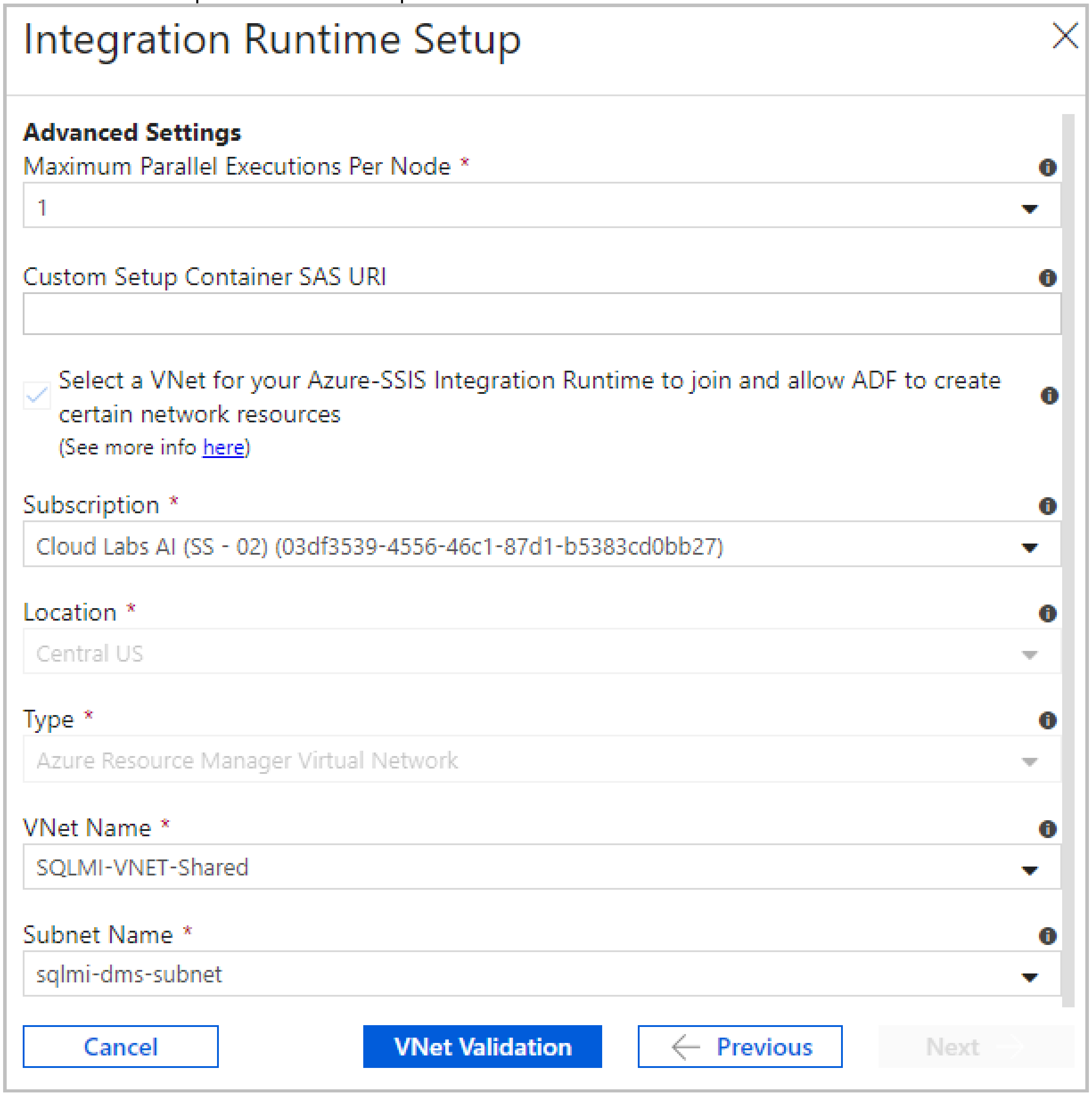
19. **Maximum Parallel Executions Per Node:** select **1** from the dropdown box

    NOTE: the maximum number of packages to execute concurrently per node in your integration runtime cluster. Only supported package numbers are displayed. Select a low number, if you want to use more than one cores to run a single large/heavy-weight package that is compute/memory -intensive. Select a high number, if you want to run one or more small/light-weight packages in a single core.

20. **Custom Setup Container SAS URI:** Leave blank
21. **Select a VNet…:** Leave checked

NOTE: Selecting whether you want to join your integration runtime to a virtual network: You should check it if you use Azure SQL Database with virtual network service endpoints/Managed Instance to host SSISDB or require access to on-premises data.

22. Select the subscription from the dropdown.



Integration Runtime Setup

Advanced Settings

Maximum Parallel Executions Per Node *: 1

Custom Setup Container SAS URI

☑ Select a VNet for your Azure-SSIS Integration Runtime to join and allow ADF to create certain network resources (See more info here)

Subscription *: Cloud Labs AI (SS - 02) (03df3539-4556-46c1-87d1-b5383cd0bb27)

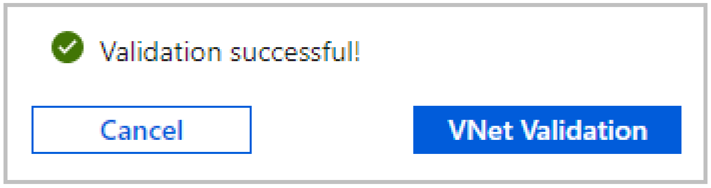
Location *: Central US

Type *: Azure Resource Manager Virtual Network

VNet Name *: SQLMI-VNET-Shared

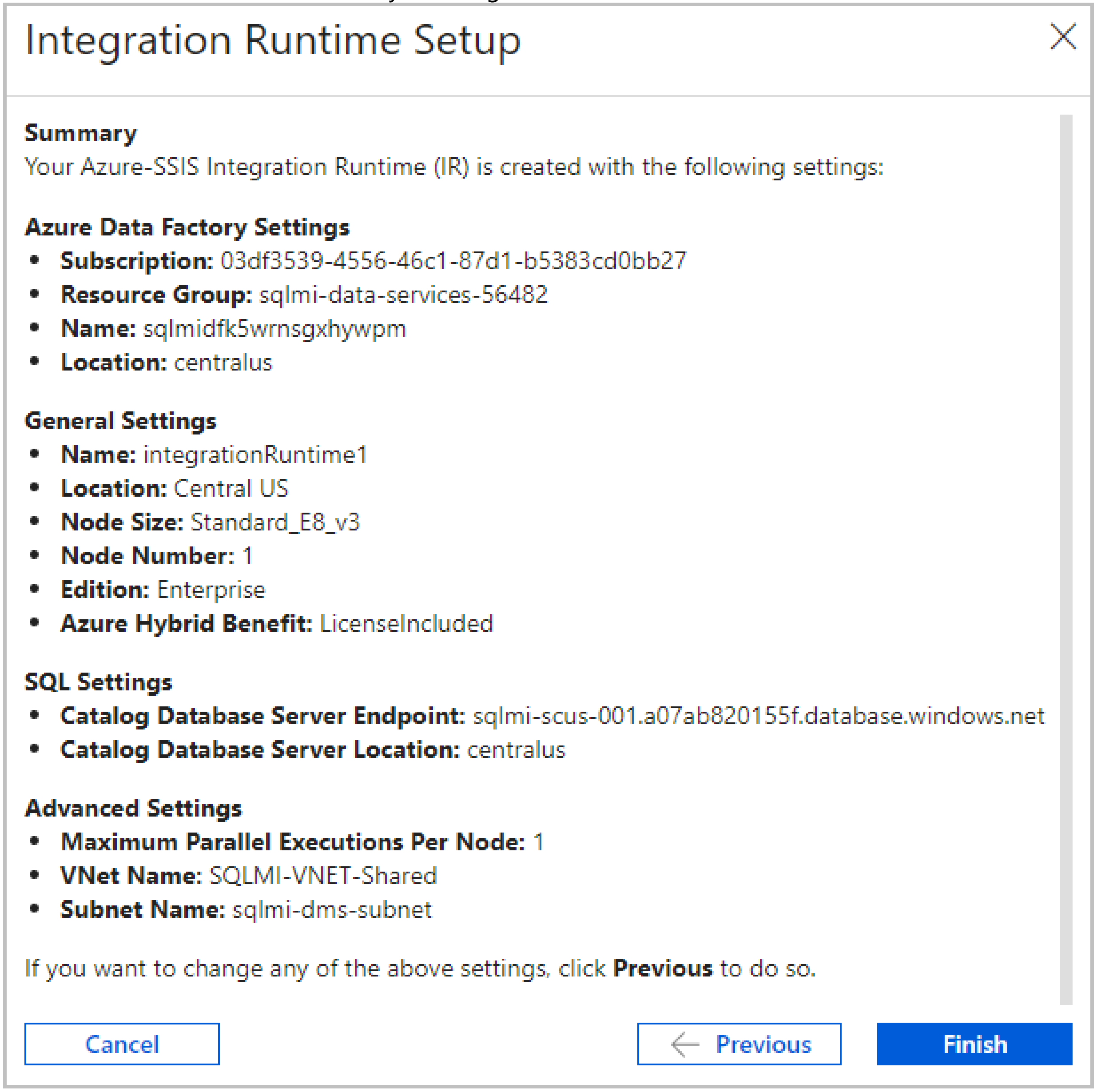
Subnet Name *: sqlmi-dms-subnet

23. Click **VNet Validation** and if successful, click **Next**



Validation successful!

24. Click **Finish** to start the creation of your integration runtime



Integration Runtime Setup

Summary
Your Azure-SSIS Integration Runtime (IR) is created with the following settings:

Azure Data Factory Settings

- **Subscription:** 03df3539-4556-46c1-87d1-b5383cd0bb27
- **Resource Group:** sqlmi-data-services-56482
- **Name:** sqlmidfk5wrnsgxhywpm
- **Location:** centralus

General Settings

- **Name:** integrationRuntime1
- **Location:** Central US
- **Node Size:** Standard_E8_v3
- **Node Number:** 1
- **Edition:** Enterprise
- **Azure Hybrid Benefit:** LicenseIncluded

SQL Settings

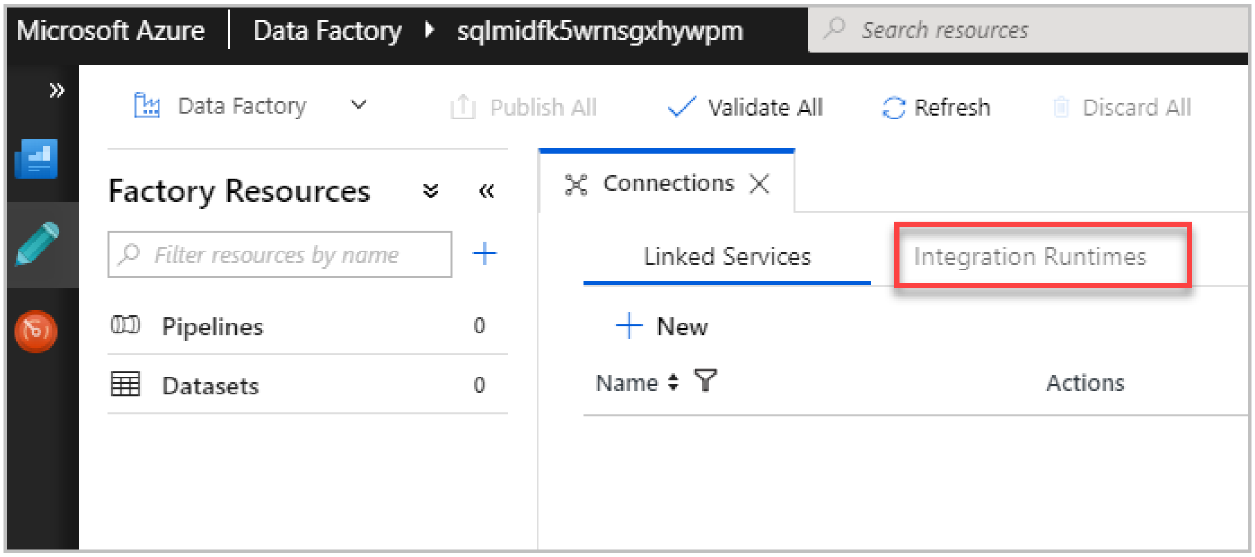
- **Catalog Database Server Endpoint:** sqlmi-scus-001.a07ab820155f.database.windows.net
- **Catalog Database Server Location:** centralus

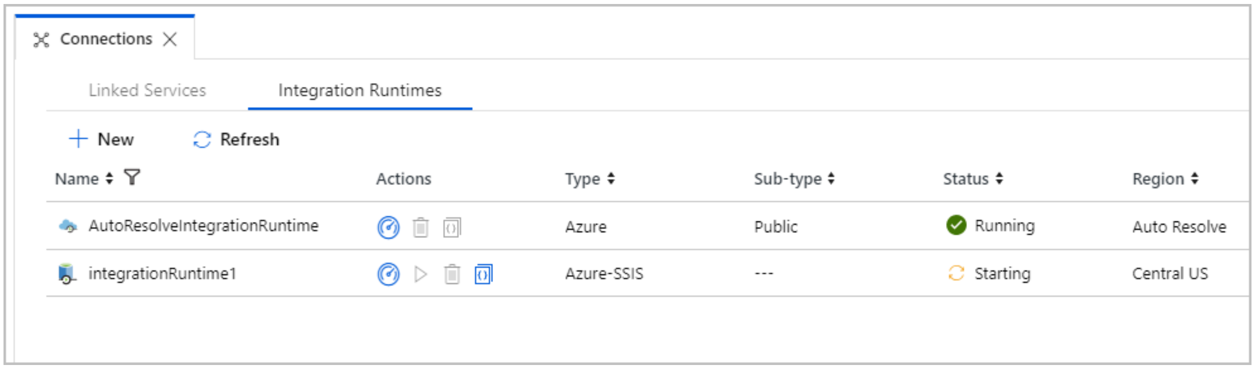
Advanced Settings

- **Maximum Parallel Executions Per Node:** 1
- **VNet Name:** SQLMI-VNET-Shared
- **Subnet Name:** sqlmi-dms-subnet

If you want to change any of the above settings, click **Previous** to do so.

25. On the **Connections** tab, switch to **Integration Runtimes** if needed. Select **Refresh** to refresh the status





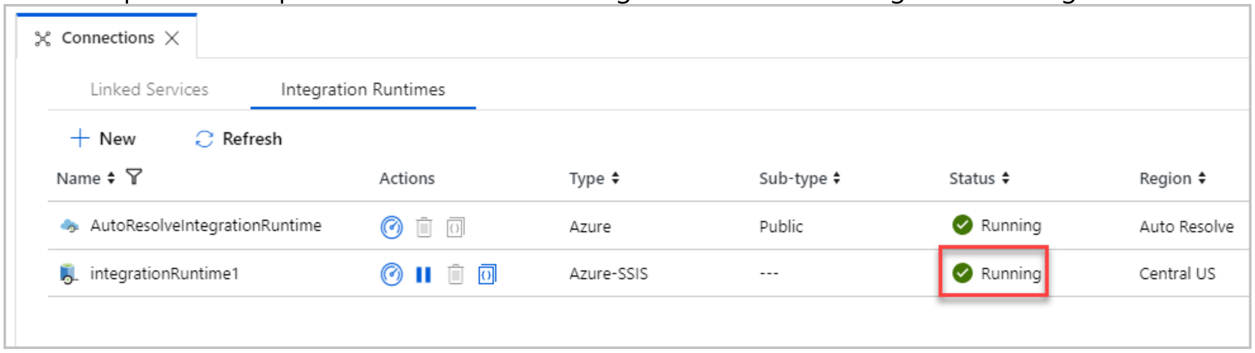
Name	Actions	Type	Sub-type	Status	Region
AutoResolveIntegrationRuntime		Azure	Public	Running	Auto Resolve
integrationRuntime1		Azure-SSIS	---	Starting	Central US

NOTE: This process takes approximately **20 to 30 minutes** to complete due to the Azure Feature Pack for SSIS and the Access Redistributable installations. This is taking place while the Data Factory service connects to your Azure SQL Database server to prepare the **SSIS Catalog** (SSISDB database).

NOTE: Use the links in the **Actions** column to stop/start, edit, or delete the integration runtime. Use the last link to view JSON code for the integration runtime. The edit and delete buttons are enabled only when the IR is stopped.

26. Please continue with the lab while the integration runtime installs

27. Once the process completes the status of the integrationRuntime1 changes to Running.



Name	Actions	Type	Sub-type	Status	Region
AutoResolveIntegrationRuntime		Azure	Public	Running	Auto Resolve
integrationRuntime1		Azure-SSIS	---	Running	Central US

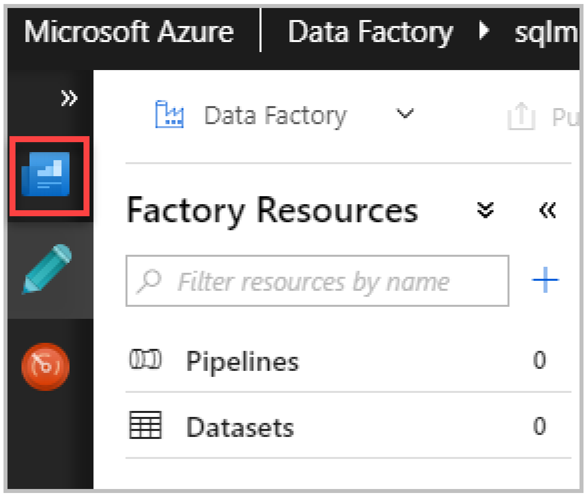
Exercise 2: Use the Copy Data Tool to Create and Run Data Pipeline

Overview

I

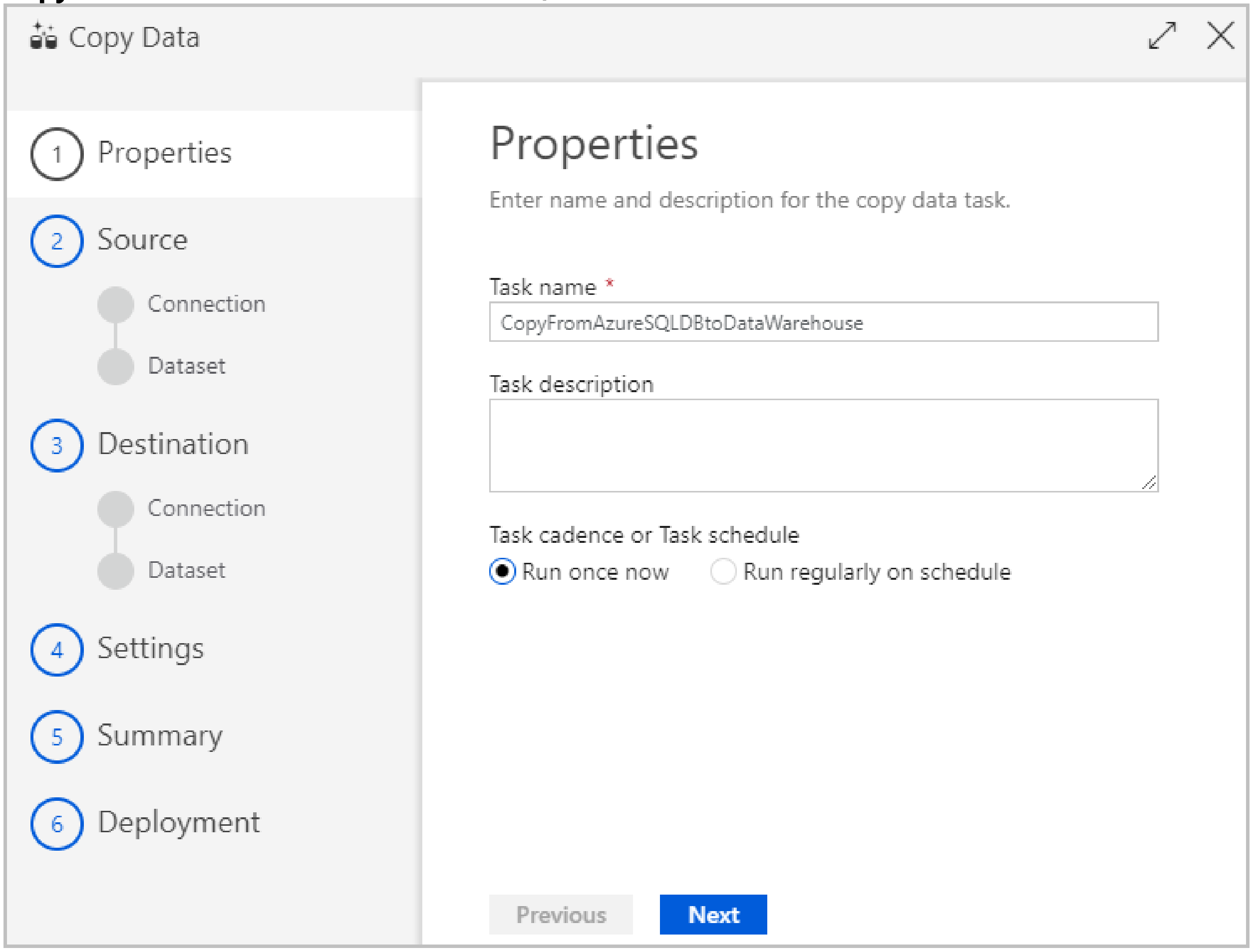
Task 1:

1. On the left-hand column of the screen, click the blue **Data Factory** icon to return to the home screen



2. On the **Let's get started** page, select the **Copy Data** tile to launch the **Copy Data tool**

3. On the **Properties** page, under **Task name**, enter **CopyFromAzureSQLDBtoDataWarehouse,** then select **Next**



Properties

Enter name and description for the copy data task.

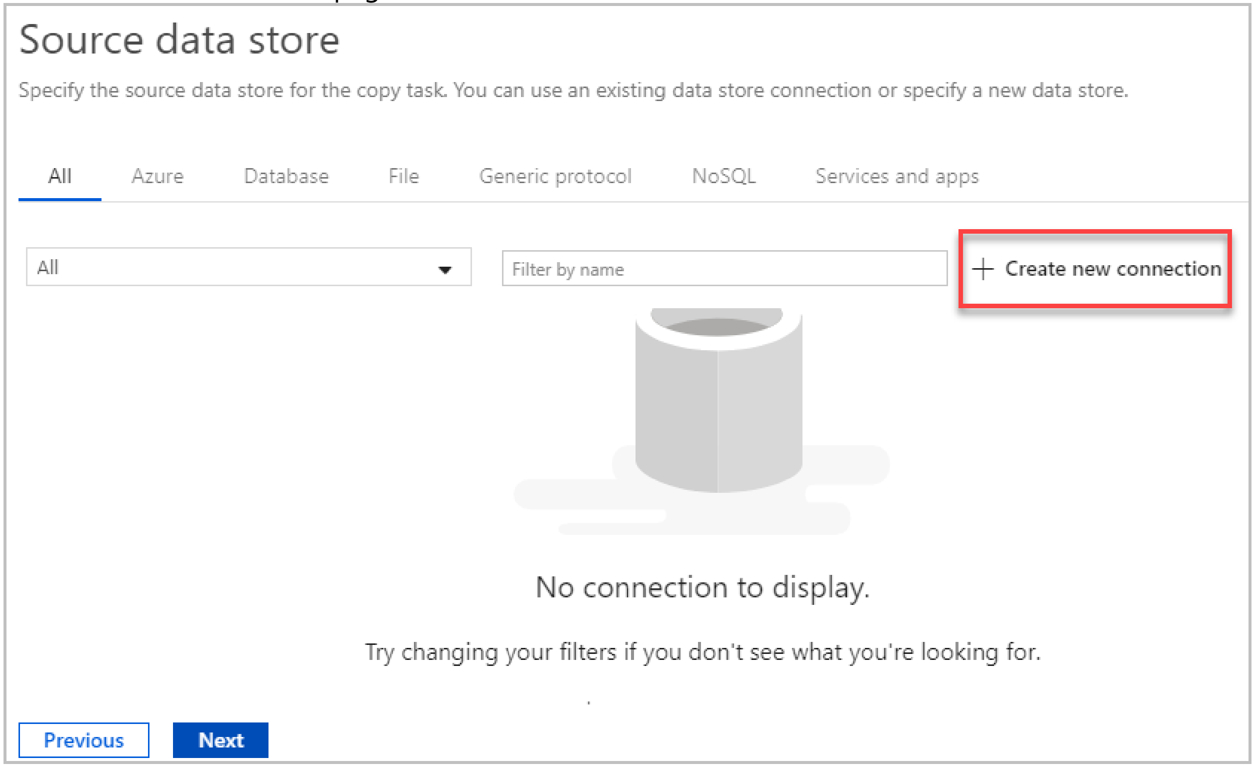
Task name *: CopyFromAzureSQLDBtoDataWarehouse

Task description:

Task cadence or Task schedule

● Run once now ○ Run regularly on schedule

4. On the **Source data store** page, click **+ Create new connection**



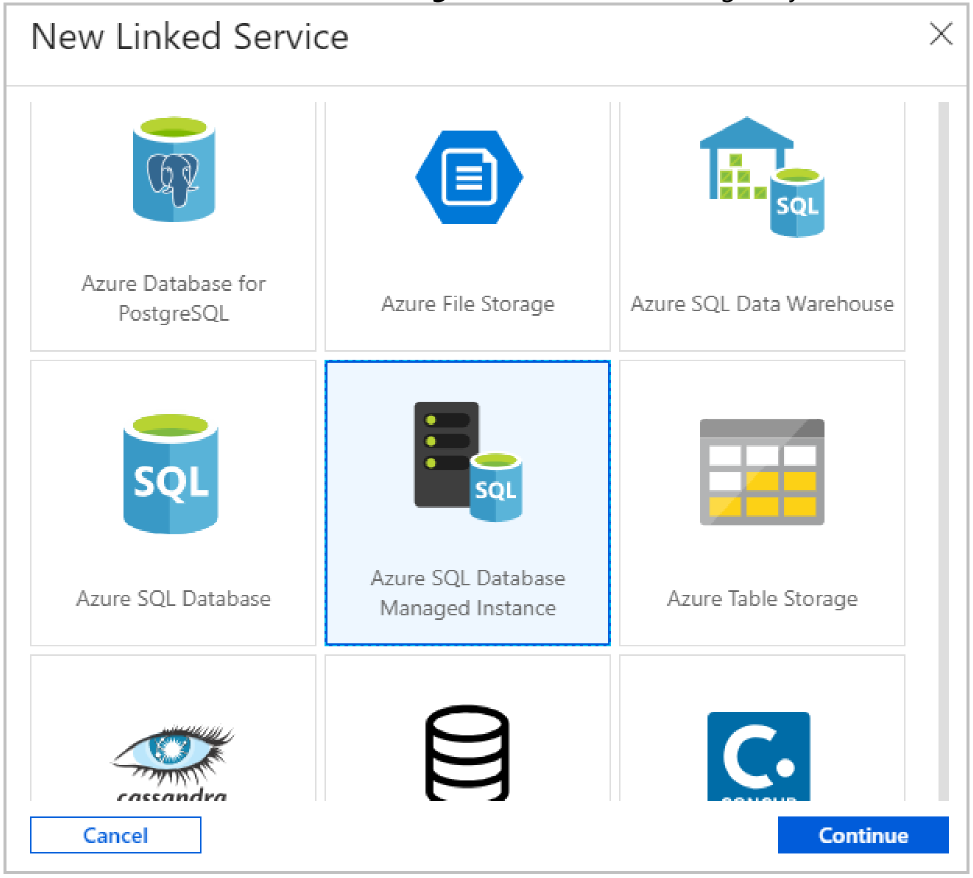
Source data store

Specify the source data store for the copy task. You can use an existing data store connection or specify a new data store.

No connection to display.

Try changing your filters if you don't see what you're looking for.

5. Select **Azure SQL Database Managed Instance** from the gallery, and then select **Continue**



New Linked Service

6. On the New Linked Service page, enter the following information:
    a. **Name:** Enter **CopySourceService**
    b. **Description:** Leave blank
    c. **Connection via Integration Runtime:** Select **AutoResolveIntegrationRuntime**
    d. **Connection String or Azure Key Vault:** Select **Connection String**
    e. **Account Selection Method:** Select **From Azure subscription**
    f. **Azure subscription:** select **default subscription**
    g. **Server name:** Provide SQL MI Server
    h. **Database Name:** Provide **the database name of the database you migrated**
    i. **Authentication Type:** Select **SQL Authentication**
    j. **User name:** contosoadmin
    k. **Password: IAE5fAijit0w^rDM**
    l. **Click on Test**
    m. Click **Finish**
7. Select the newly created linked service as source, then click **Next**
8. On the **Select tables from which to copy the data or use a custom query** page, select the Table **[Purchasing].[PurchaseOrders]**, then click **next**
9. On the **Destination data store** page, click **+ Create new connection** to add a connection
10. Select **Azure SQL Data Warehouse** from the gallery, and then select **Continue**
11. On the **New Linked Service** page, enter the following information:
12. **Name:** Enter **CopyDestinationService**
13. **Description:** Leave blank
14. **Connection via Integration Runtime:** Select **AutoResolveIntegrationRuntime**
15. **Connection String or Azure Key Vault:** Select **Connection String**
16. **Account Selection Method:** Select **From Azure subscription**
17. **Azure subscription:** select
18. **Server name:** Provide SQL MI Server Name
19. **Database Name:** Select **DataWarehouse-**
20. **Authentication Type:** Select **SQL Authentication**
21. **User name:** Enter **LabUser**
22. **Password:** Enter
23. Click **Finish**
24. Select the newly created linked service as sink, then click **Next**
25. On the **Table mapping** page, select **Next**
26. On the **Column mapping** page, select **Next**
27. On the **Settings** page, Uncheck **Enable Staging**, and **Allow polybase**
28. Click **Next**
29. On the **Summary** page, review the settings, and then select **Next**
30. On the **Deployment** page, select **Monitor** to monitor the pipeline (task)

    NOTE: Notice that the Monitor tab on the left is automatically selected. The Actions column includes links to view activity run details and to rerun the pipeline

Exercise 3: Deploy and Run SSIS Packages from Azure Data Factory SSIS IR

Overview

I

Task 1:

Verify the Integration Runtime you created earlier in the lab has completed.

1. On the monitor page, click the **Integration Runtimes** tab near the top of the page
2. Verify that **MyFirstIntegrationRuntime**has a Status of **Running**, If its status is **Starting** then wait for the Runtime to complete before continuing.

   NOTE: Click the refresh button to update the status

   NOTE: This process takes approximately **20 to 30 minutes**

Connect to SSISDB

To deploy and then run the package on Azure SQL Database, you'll need to first **connect** to the SSIS Catalog database (SSISDB). To do so, complete the following steps:

1. Double click **SSMS** icon on desktop to launch **SQL Server Management Studio**
2. In the **Connect to Server** dialog box, enter the following information:
3. **Server name: azuresql-<**
4. **Authentication:** Select **SQL Server Authentication**, as you cannot connect to an Azure SQL Database with Windows authentication
5. **Login: LabUser**
6. **Password:**
7. Click the **Options** button
8. Click on the **Connection Properties** tab
9. Click on the dropdown for selecting a **database**

   NOTE: If a dialogue box appears and asks to connect first, click **Yes**.

10. Click **SSISDB** and make sure it's highlighted
11. Click **OK**
12. Click **Connect**
13. In the **Object Window** on your left, navigate to **Integration Services Catalogs** and click the **Expand Object** icon (plus sign "+"), then expand the **SSISDB** object as well

Deploying a Project/Package

14. Right click on **SSISDB**, select **Create Folder**

15. Name the folder **Myproject**, click **ok**
16. Click on the **Projects** node
17. Right-click on the **Projects** node and select **Deploy project** to launch the **Services Deployment Wizard**

    NOTE: You can deploy a project from the current catalog **or** from the file system.

18. On the **Introduction** page of the wizard, review the introduction, then click **Next** to open the **Select Source** page
19. On the **Select Source** page, select **Project deployment file** and enter **C:\temp\Daily.ETL.ispac**

    NOTE: To deploy a project that is already deployed to an SSIS catalog database, select **Integration Services** catalog, and then enter the server name and the path to the project in the catalog.

20. On the **Select Destination** page, select

Enter the following information as the **User name** and **Password**:

22. Click Next
23. **User name: LabUser**
24. **Password: <inject key="AzureAdUserPassword"></inject>**
25. Click **Connect**
26. Click **Next** after you **Connect**
27. On **Validate** page, click Next
28. On the **Review** page, review the settings you selected
29. Click **Deploy** to start the deployment process
30. Once complete, the **Results** page will display successes and/or failures of any actions. Once complete, click **Close** to exit the wizard

Running a Package

32. Refresh the **Projects** folder in SSMS
33. Select **Daily ETL**
34. Right-click and select **Execute**
35. After the **Execute Package** dialog box opens, click the **Connection Manages** tab
36. Edit the values for **Password**, **ServerName**, and **Username** on the Destination and Source Databases
37. Click on the Destination DB name **WWI_DW_Destination_DB** to change the settings
38. Change the Password to by clicking the **...**on the **Password** field
39. Change the ServerName to by clicking the **...** on the **ServerName** field
40. Change the UserName to **Labuser**by clicking the **...** on the **UserName** field
41. Click on the source DB name **WWI_Source_DB** to change the settings
42. Change the Password to by clicking the **...**on the **Password** field

43. Change the ServerName to **database.windows.net** by clicking the **...** on the **ServerName** field
44. Change the UserName to **LabUser** clicking the **...** on the **UserName** field
45. Click **OK** to run the package
46. Click **yes** to open **Execution Report** to review

Exercise 4: Power BI

Overview

Task 1:

1. Double click **Power BI Desktop** icon on desktop to launch **Power BI Desktop**
2. Upon opening the window, a **Welcome to Power BI Desktop** pop-up will appear. Complete the form as follows:
3. **First Name:** Enter Your First Name
4. **Last Name:** Enter **Your Last Name**
5. **Email Address:** Enter
6. **Enter your phone number:** Enter **555-555-5555**
7. **Country/region:** Select **United States**
8. **Company name:** Enter **Contoso Inc**
9. **Company size:** Select **1000+**
10. **Job Title:** Select **Other**
11. Click **Done**

    Note: If Power BI Desktop doesn't display a screen showing **Success!** within 30 seconds, you may need to click **Turn on protected mode** on the bottom of your application browser.

12. Exit out of the browser inside the application once it displays **Success!**
13. On the opening screen for Power BI Desktop, click **Get data**,
14. On the **Get Data** blade, click on **SQL Server database**

    Note: This mimics the connection requirements for our datawarehouse to be able to communicate with Power BI the same way a SQL Server database would.

15. Click **Database**, then **SQL Server database**
16. Click **Connect**
17. Enter for the **Server** box
18. Make sure **Import** is selected under **Data Connectivity mode**
19. Click **OK**
20. On the left-hand side of the window, click the **Database** tab

21. For the **User name** enter LabUser
22. **Password:**
23. Select **DataWarehouse**, Check the box next to **Purchasing.PurchaseOrders**
24. Click **Load**
25. On the left hand column of the screen, click the upper-most of the three icons, which when hovered over with the cursor, should display "Report", click **Report**
26. On the right hand side of the screen, under the **Visualizations** header, click the upper left-hand icon titled **Stacked bar chart**, drag the icon onto the blank canvas in the middle of the screen
27. Under the **Fields** header to the right of the Visualizations menu, click both the **OrderDate** and **SupplierID** checkboxes

Stop the Azure-SSIS Integration Runtime

1. On the desktop open a web browser and navigate to <copy>https://portal.azure.com/ </copy>
2. Navigate to your Azure Data Factory: **DataFactory**
3. Click the **Author & Monitor** tile to open the Data Factory user interface (UI) on a separate tab
4. On the left hand side navigation bar, click the pen icon (Author)
5. On the Factory Resources page, near the bottom, click the **Connections** button
6. When the Connections tab is displayed, click the **Integration Runtimes** tab
7. Click the Pause\Stop button in the Actions section of the **MyFirstIntegrationRuntime** to stop the service
8. When asked "Are you sure you want to Stop integration runtime", click **Stop**

Conclusion

In this lab you've learned how to create and configure Integration Runtimes in Azure Data Factory to facilitate cloud-based execution, modification, and monitoring of natively hosted SSIS packages. Then, you've learned how to create a simple yet robust data pipeline to create a reliable data copying strategy. Finally, you learned how the entire process comes together for the end-user by connecting the output data to Power BI Desktop, where you can create and visualize various reports and dashboards to gain insight into your data.