Azure SQL MI PowerBI

March 2019

Contents

Introduction	1
Understanding Integration Runtime in Azure Data Factory	1
SQL Managed Instance – Power BI	2
Exercise 0: Provisioning an Azure-SSIS Integration Runtime in Azure Data Factory.	10
Overview	10
Exercise 2: Use the Copy Data Tool to Create and Run Data Pipeline	18
Overview	18
Exercise 3: Deploy and Run SSIS Packages from Azure Data Factory SSIS IR	32
Overview	32
Connect to SSISDB	33
Exercise 4: Power BI	27
Overview	27
Conclusion	39

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.

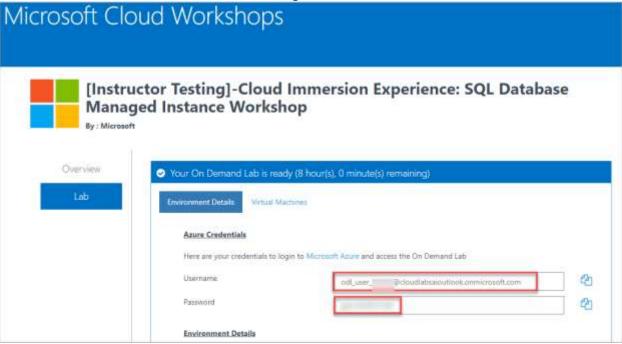
Azure Data Factory offers three types of Integration Runtimes that serve specific data integration capabilities; Azure, Self-hosted, and **Azure-SSIS**. The last type supports the previously mentioned **SSIS Package Execution**, which is what we'll be using in this section of the lab.

SQL Managed Instance – Power BI

Exercise 0: Provisioning a self-service runtime environment for Managed Instance data movement.

Create a Self-Hosted Integration Runtime for Managed Instance:

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



- 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:

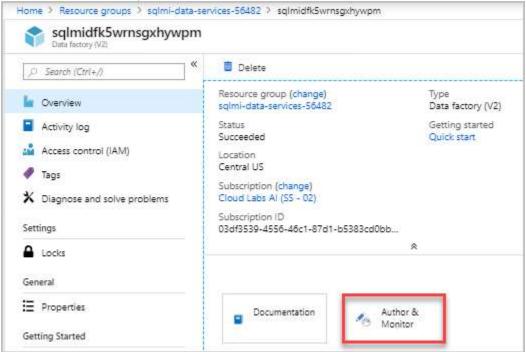


7. Select resource group starting with **sqlmi-data-services-**

8. From the overview blade of the Resource group, **select** the resource with type **Data Factory (V2)** from the resources:



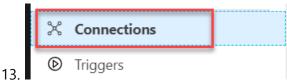
9. From the overview blade of the Data Factory, navigate to the Author & Monitor tile to open the Data Factory user Interface (UI) on a separate tab.



10. Click on Author(Pencil Icon)



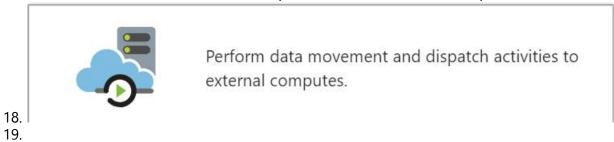
12. Click on Connections



14. Select Integration Runtimes and Click on +New



17. Select Perform data movement and dispatch activities to external computers

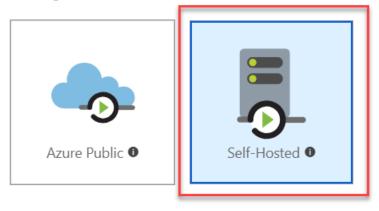


20. Select Self-Hosted and Click Next.

Integration Runtime Setup



Choose the network environment of the data source/destination or external compute to which the integration runtime will connect to for data movement or dispatch activities:



External Resources:

You can use an existing self-hosted integration runtime that exists in another Data Factory. This way you can reuse your existing infrastructure where self-hosted integration runtime is setup.



21.

22. Provide SQLMI-RunTime as name and click next

Integration Runtime Setup

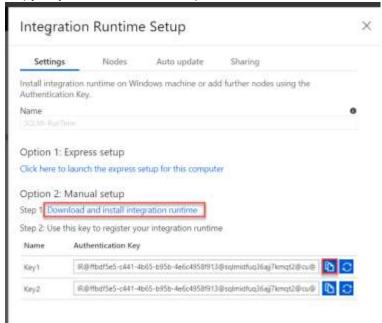
X

Private network support is realized by installing integration runtime to machines in the same on-premises network/VNET as the resource the integration runtime is connecting to. Follow below steps to register and install integration runtime on your self-hosted machines.

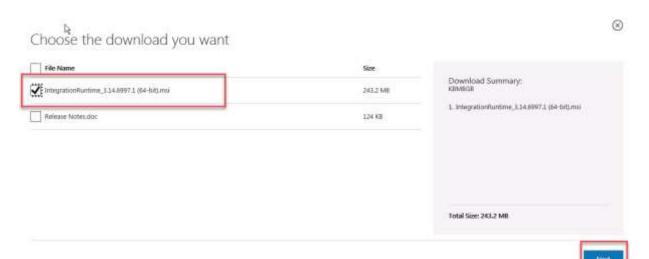


Type

- 23. Self-Hosted
- 24. Copy Keys and save in a safe place.



- 25.
- 26. Now, we'll install the runtime binaries on the SQL Server VM.
- 27. Login to SQL Server Virtual Machine using Remote Desktop and Launch a browser window.
- 28. Download the manual setup file form https://www.microsoft.com/en-us/download/details.aspx?id=39717



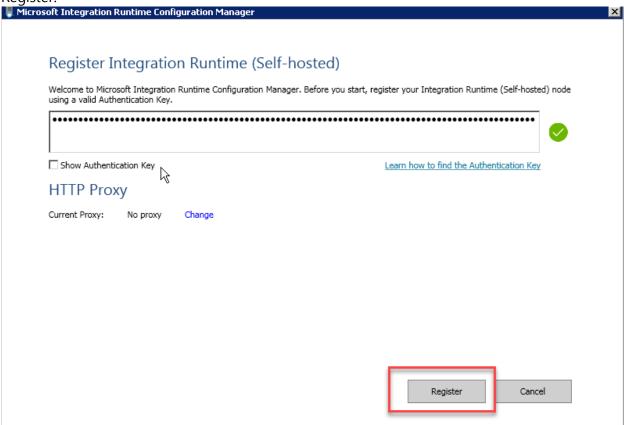
29.30. Once Downloaded, run the executable.



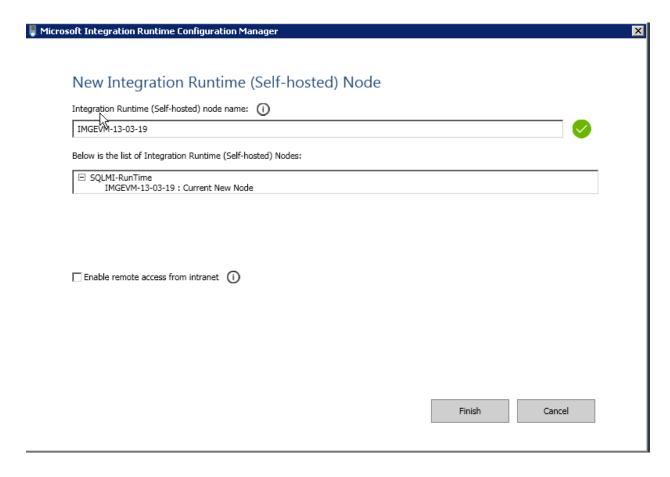
- 32. Click Next
- 33. Accept the terms and conditions and proceed.
- 34. Accept Default Location and Proceed further for installation
- 35. Click Finish once completed.



36. Upon Finishing, it'll launch the Configuration Wizard. Enter the key you copied and click Register.



37. Review the settings and click Finish



- 38. Click Close once configuration is completed.
- 39. Now, In Azure Data Factory you should see this Integration Runtime as Running.



40. Self-Hosted Integration run time setup for SQL managed Instance is now completed.

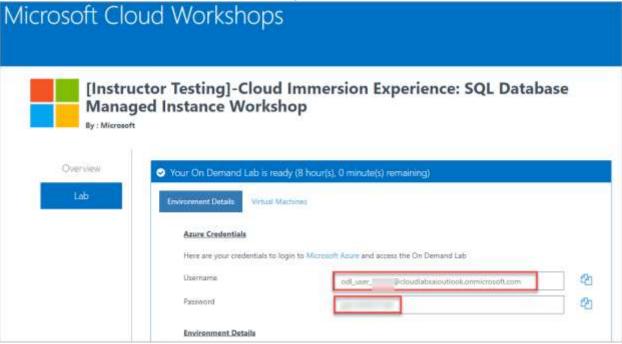
Exercise 2: Provisioning an Azure-SSIS Integration Runtime in Azure Data Factory

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

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



- 42. In the Stay signed in? pop-up window, click No
- 43. 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.
- 44. You will be directed to the dashboard.
- 45. From the left side of the Page, select **Resource Groups**

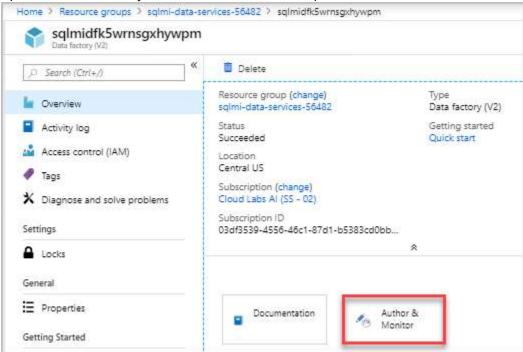
46. Note that you will have access to three Resource groups:



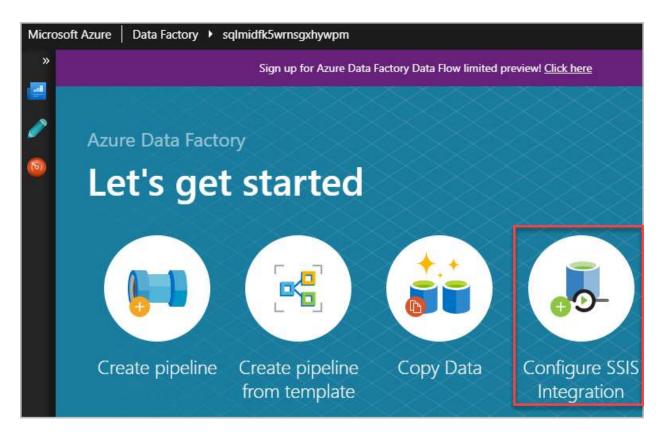
- 47. Select resource group starting with sqlmi-data-services-
- 48. From the overview blade of the Resource group, **select** the resource with type **Data Factory (V2)** from the resources:



49. 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.



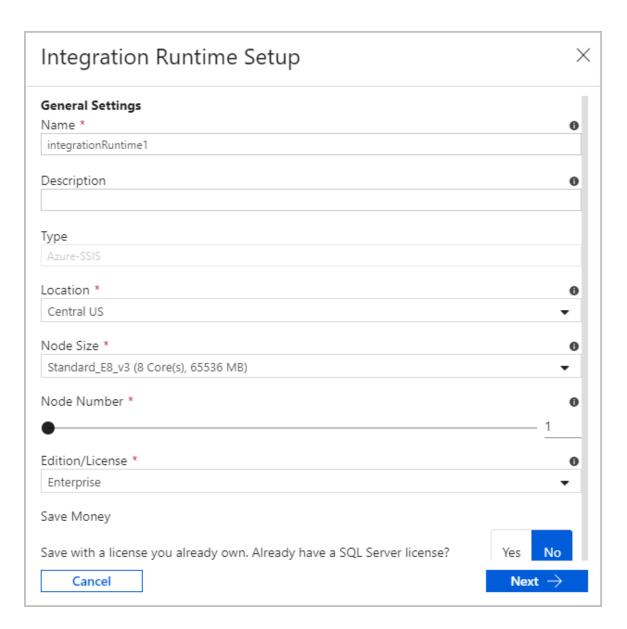
50. On the Let's get started page, click the Configure SSIS Integration Runtime tile



- 51. 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

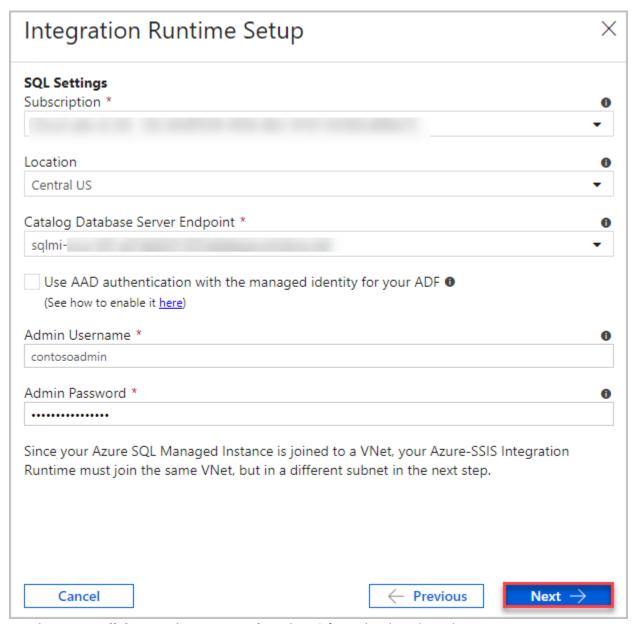
NOTE: The location does not need to be that of your data factory's, but it should be the same as your Azure SQL Database/Managed Instance server's where your **SSISDB** is to be hosted, allowing easy access without incurring excessive traffic.

- 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



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

58. Admin Password: IAE5fAijit0w^rDM

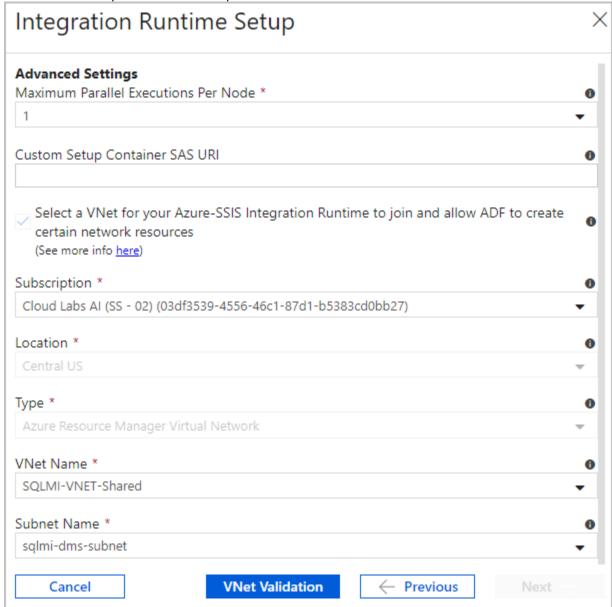


59. **Maximum Parallel Executions Per Node:** select **1** from the dropdown box

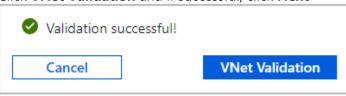
NOTE: the maximum number of packages to execute concurrently per node in your integration runtime cluster. Only supported package numbers are displayed. Select a low number, if you want to use more than one cores to run a single large/heavy-weight package that is compute/memory -intensive. Select a high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

- 60. Custom Setup Container SAS URI: Leave blank
- 61. Select a VNet...: Leave checked

62. Select the subscription from the dropdown.



63. Click VNet Validation and if successful, click Next



64. 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: Licenselncluded

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

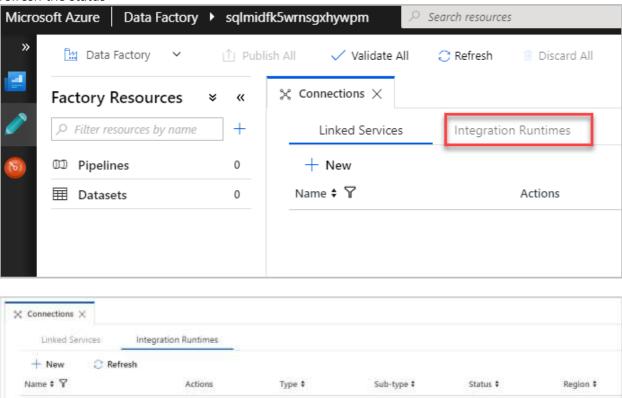
If you want to change any of the above settings, click Previous to do so.

Cancel



Finish

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



Running

Starting

Public

Auto Resolve

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).

Azure

Azure-SSIS

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.

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

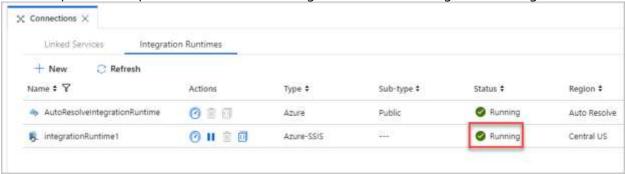
089

O P 8 0

AutoResolveIntegrationRuntime

| integrationRuntime1

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



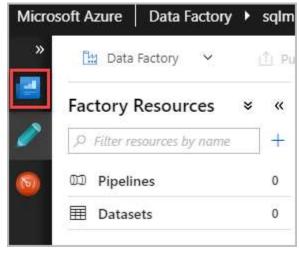
Exercise 2: Use the Copy Data Tool to Create and Run Data Pipeline

Overview

In this exercise, we'll use copy data tool to copy data from on-prem SQL Server to SQL MI.

Task 1:

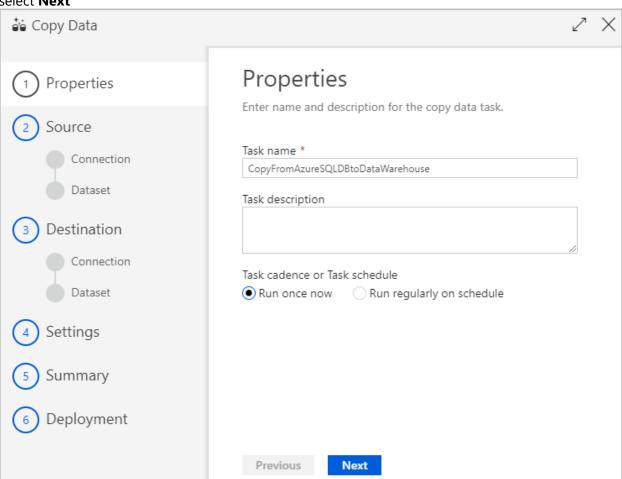
 On the left-hand column of the screen, click the blue **Data Factory** icon to return to the home screen



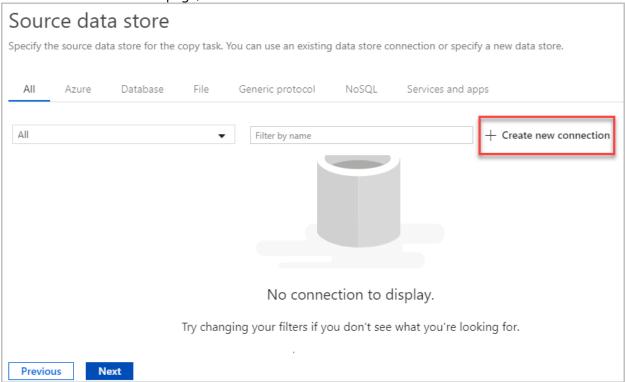
2. On the Let's get started page, select the Copy Data tile to launch the Copy Data tool



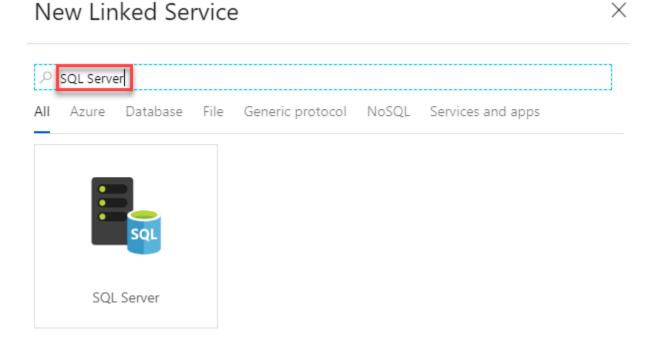
3. On the **Properties** page, under **Task name**, enter **CopyFromAzureSQLDBtoMI**, then select **Next**



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

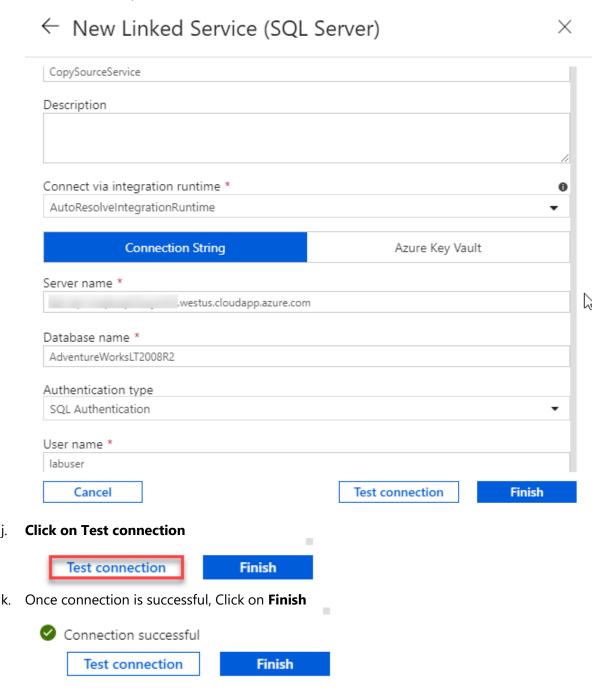


5. Search **SQL Server** and select **SQL Server** from the gallery, and then select **Continue**

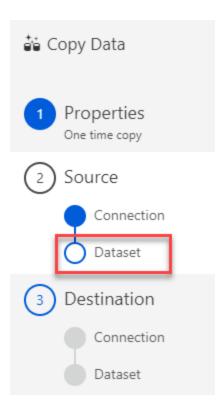


- 6. On the New Linked Service page, enter the following information:
 - a. Name: Enter CopySourceService
 - b. **Description:** Leave blank
 - c. Connection via Integration Runtime: Select AutoResolveIntegrationRuntime

- d. Connection String or Azure Key Vault: Select Connection String
- e. Server name: Provide SQL Server VM DNS Name
- f. Database Name: Provide the database name of the database
- g. Authentication Type: Select SQL Authentication
- h. User name: labuser
- i. **Password:** demopassword1!



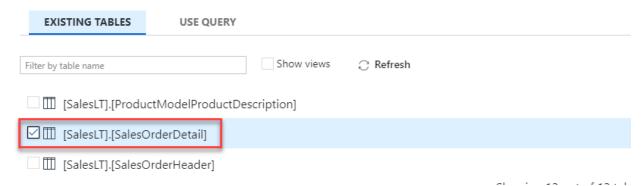
7. Select the newly created linked service as source, then click **on Dataset**



8. On the **Select tables from which to copy the data or use a custom query** page, select the Table [[SalesLT].[SalesOrderDetail] then click **next**

Select tables from which to copy the data or use a custom query.

You can select multiple tables, or you can provide single custom query.

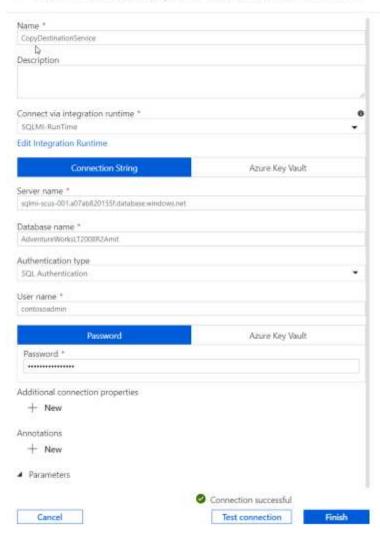


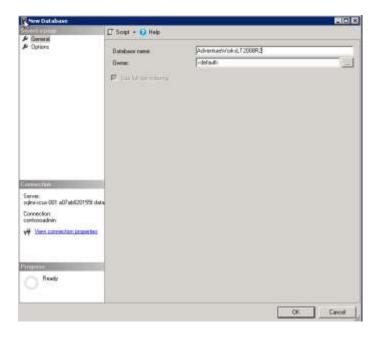
- 9. On the **Destination data store** page, click + **Create new connection** to add a connection
- 10. Select Azure SQL Database Managed Instance from the gallery, and then select Continue



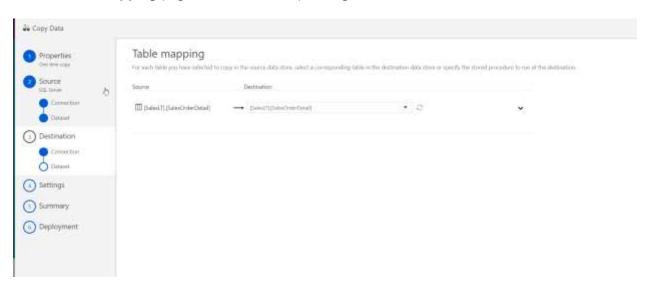
- 11. On the **New Linked Service** page, enter the following information:
 - a. Name: Enter CopyDestinationService
 - b. **Description:** Leave blank
 - c. Connection via Integration Runtime: Select SQLMI-Runtime (Your previously created runtime)
 - d. Connection String or Azure Key Vault: Select Connection String
 - e. **Server name:** Provide SQL MI Server Name
 - f. **Database Name:** Enter the database you created earlier for this.
 - g. Authentication Type: Select SQL Authentication
 - h. User name: Enter contosoadmini. Password: Enter IAE5fAijit0w^rDM
 - j. Click Finish

\leftarrow New Linked Service (Azure SQL Database Mana... imes

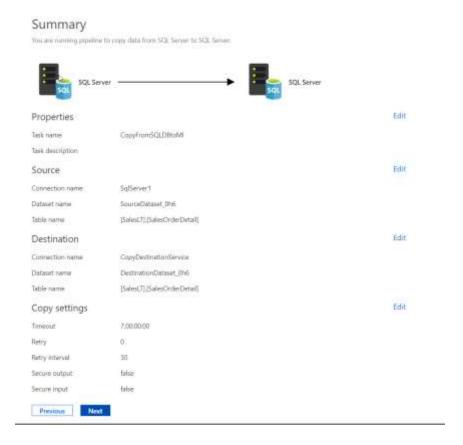




- 12. Select the newly created linked service as sink, then click **Next**
- 13. On the **Table mapping** page, Select the corresponding table and select **Next**

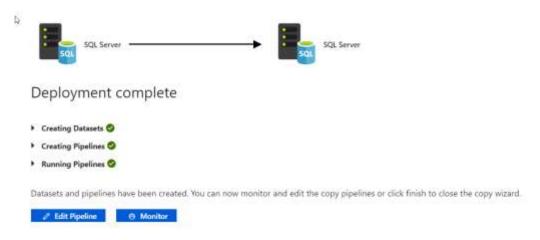


- 14. On the Column mapping page, select Next
- 15. On the **Settings** page, Keep default and Click **Next**
- 16. On the **Summary** page, review the settings, and then select **Next**



17. 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 4: Power BI

Overview

Task 1:

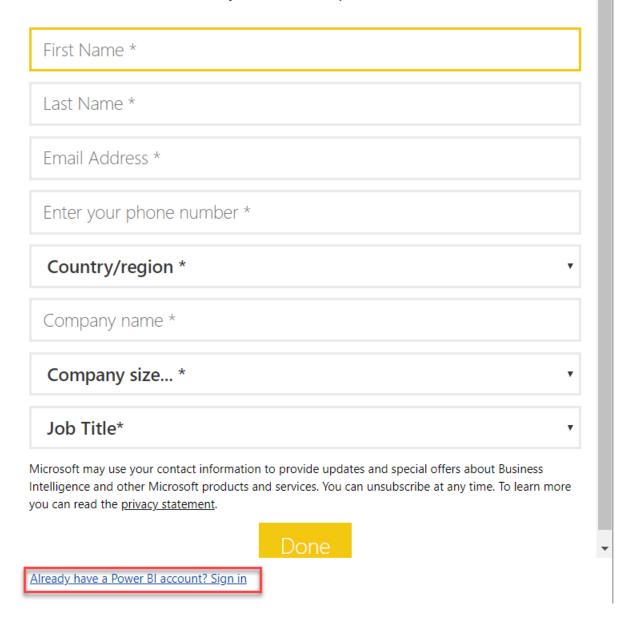
1. Connect to lab-jump-vm using RDP, You can copy the VM DNS Name using Lab details page/email or through azure portal.



- 2. Double click **Power BI Desktop** icon on desktop to launch **Power BI Desktop**
- 3. Note: If you have PowerBI desktop installed in your local machine, you can also use that optionally to complete this exercise
- 4. Upon opening the window, a **Welcome to Power BI Desktop** pop-up will appear. Click on Sign in at the bottom.

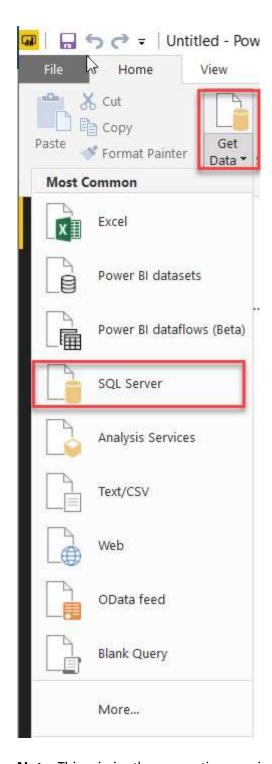
Welcome to Power BI Desktop

Where can we send you the latest tips and tricks for Power BI?



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.

- 5. Login with the Azure Username and Password you received upon signup.
- 6. On the opening screen for Power BI Desktop, click **Get data**,
- 7. On the Get Data blade, click on SQL Server database

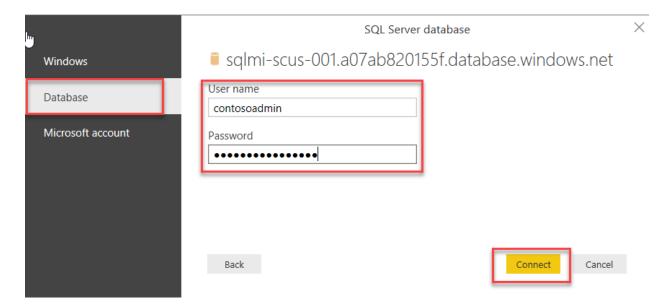


Note: This mimics the connection requirements for our datawarehouse to be able to communicate with Power BI the same way a SQL Server database would.

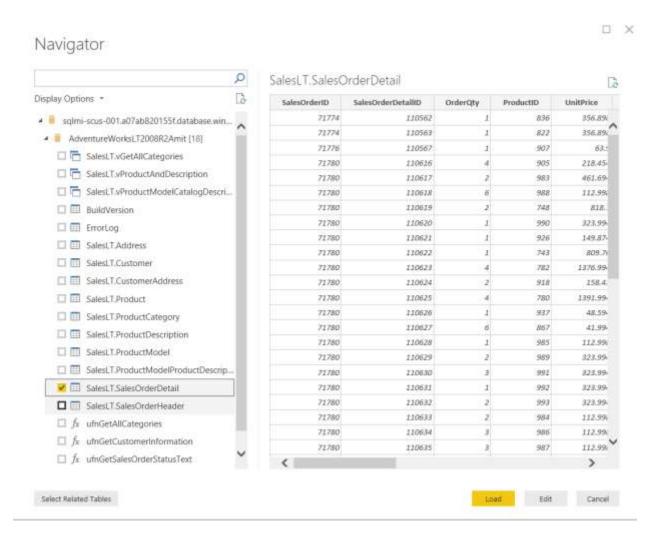
- 8. Click **Database**, then **SQL Server database**
- 9. Enter the Hostname of your SQL MI Instance under server
- 10. Make sure **Import** is selected under **Data Connectivity mode**
- 11. Click **OK**



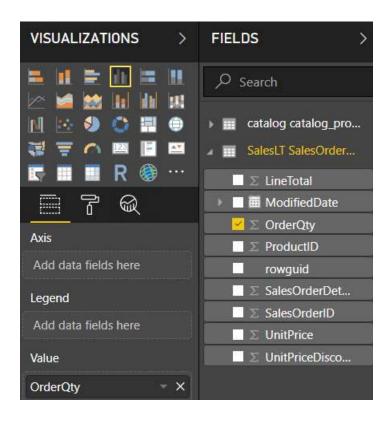
- 12. On the left-hand side of the window, click the **Database** tab
 - User name: Enter contosoadmin
 Password: Enter IAE5fAijit0w^rDM



- 13. Under Databases, You can select AdventureWorksDB
- 14. Select the SalesOrderDetails table and move Click Load.



15. Data is now loaded, You can use PowerBI to design the reports and dashboards.



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

Overview

T

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 **IntegrationRunTime1** 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**

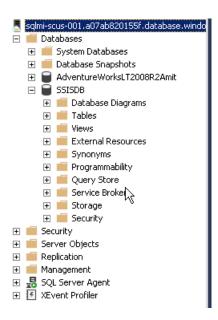
Connect to SSISDB

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. Login to the SQL Server Virtual Machine via Remote desktop.
- 2. Double click SSMS icon on desktop to launch SQL Server Management Studio
- 3. In the **Connect to Server** dialog box, enter the following information:
- 4. Server name: Hostname of your SQL Managed Instance
- 5. Authentication: Select SQL Server Authentication
 - 1. User name: Enter contosoadmin
 - 2. Password: Enter IAE5fAijit0w^rDM
- 6. Click the **Options** button
- 7. Click on the **Connection Properties** tab
- 8. Click on the dropdown for selecting a database

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

- 9. Click **SSISDB** and make sure it's highlighted
- 10. Click **Ok**
- 11. 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

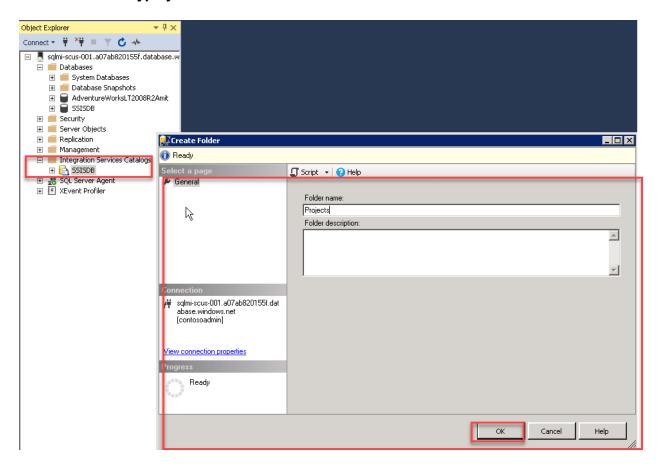


Deploying a Project/Package

14. Under Object Explorer, Browse through Integration Service Catalogue

Right click on SSISDB, select Create Folder

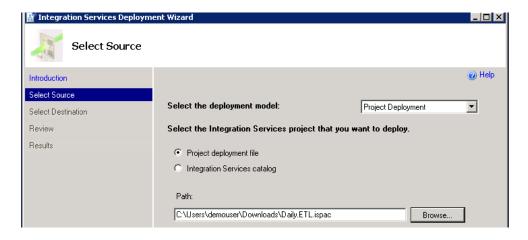
15. Name the folder **Myproject**, click **ok**



- 16. Expand My Project Click on the **Projects** node
- 17. Right-click on the **Projects** node and select **Deploy project** to launch the **Services Deployment Wizard**

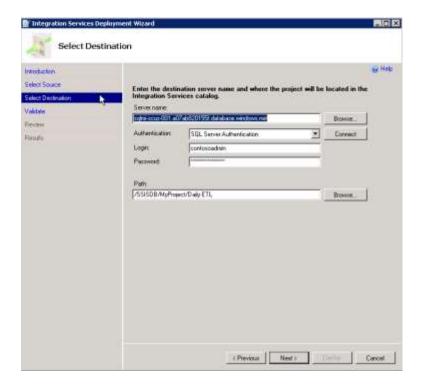
NOTE: You can deploy a project from the current catalog **or** from the file system.

- 18. On the **Introduction** page of the wizard, review the introduction, then click **Next** to open the **Select Source** page
- 19. Download Daily.ETC.ispac from https://github.com/Microsoft/sql-server-samples/releases/download/wide-world-importers-v1.0/Daily.ETL.ispac
- 20. On the **Select Source** page, select **Project deployment file** and browse through file explorer to select latest download Daily.ETC.ispac file.

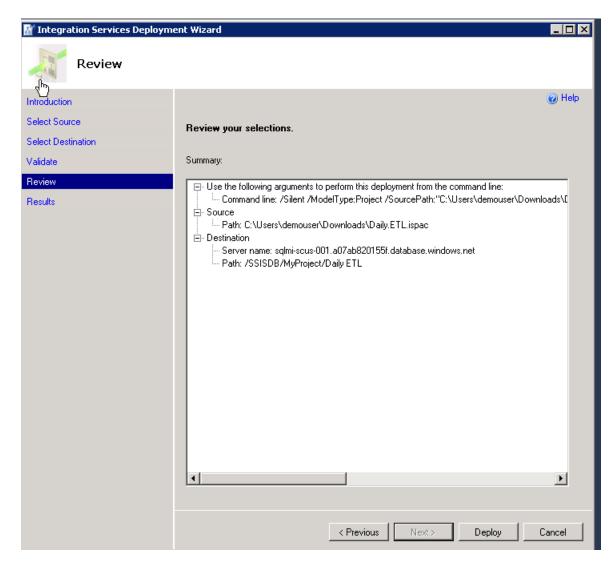


NOTE: To deploy a project that is already deployed to an SSIS catalog database, select **Integration Services** catalog, and then enter the server name and the path to the project in the catalog.

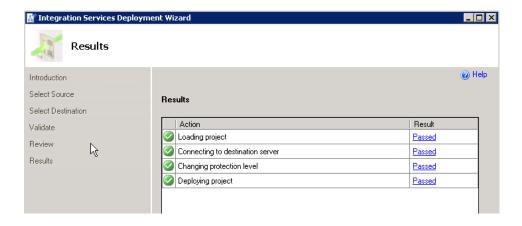
- 21. On the **Select Destination** page, select
- 22. Server Name Keep Default (SQL MI Hostname)
- 23. Authentication: SQL
- 24. User name: Enter contosoadmin
- 25. Password: Enter IAE5fAijit0w^rDM
- 26. Click Connect
- 27. Click **Next** after you **Connect**



- 28. On Validate page, click Next
- 29. On the **Review** page, review the settings you selected
- 30. Click **Deploy** to start the deployment process

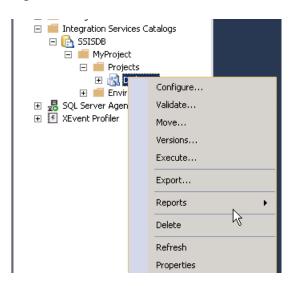


31. Once complete, the **Results** page will display successes and/or failures of any actions. Once complete, click **Close** to exit the wizard

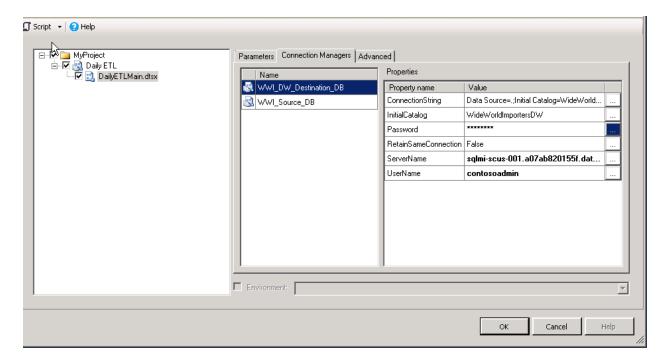


Running a Package

- 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 Manager 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 Labuserby 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

Stop the Azure-SSIS Integration Runtime

- 1. Login to Azure Portal with your Lab Credentails.
- 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.