

# Lab1-Explore Synapse

## BUAN 6390.001 – Analytics Practicum

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Connecting to PowerShell and Creating a resource group

The screenshot displays the Microsoft Azure portal interface. The top navigation bar shows the user is logged in as 'User1-48149597@L00C-1005-PROD-MCA (S00UPROD)'. The main content area is divided into 'Azure services' (with icons for Create a resource, Quickstart Center, Azure AI services, Kubernetes services, Virtual machines, App Services, Storage accounts, SQL databases, Azure Cosmos DB, and More services) and 'Resources'. The 'Resources' section has tabs for 'Recent' and 'Favorite', and a table with columns 'Name', 'Type', and 'Last Viewed'. A message states 'No resources have been viewed recently' with a 'View all resources' button. Below this is a 'Navigate' section with icons for Subscriptions, Resource groups, All resources, and Dashboard. At the bottom, a PowerShell terminal window is open, showing the output of a script that lists properties like SnapshotTime, ContinuationToken, VersionId, ListBlobProperties, AccessTier, TagCount, Tags, ListBlobProperties, Context, and Name. The terminal output indicates the script completed at 02/08/2025 23:57:05 and the user is at the prompt 'PS /home/user1-48149597/dp-203/Allfiles/Labs/01>'. To the right of the terminal, a sidebar titled 'Explore Synapse' provides instructions and a note about password requirements. The sidebar includes a 'Note' about password rules, a list of steps for setting up Synapse Studio, and a preview of the Synapse Studio interface.

labclient.labondemand.com/LabClient/f368be1a-01a4-4a71-812d-67c1f310a6fb

Home - Microsoft Azure x +

https://portal.azure.com/#home

Microsoft Azure

Search resources, services, and docs (G+)

Copilot

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Azure services

Create a resource Quickstart Center Azure AI services Kubernetes services Virtual machines App Services Storage accounts SQL databases Azure Cosmos DB More services

Resources

Recent Favorite

Name Type Last Viewed

No resources have been viewed recently

View all resources

Navigate

Subscriptions Resource groups All resources Dashboard

Switch to Bash Restart Manage files New session Editor Web preview Settings Help

```
SnapshotTime :
ContinuationToken :
VersionId :
ListBlobVersion :
AccessTier : Hot
TagCount : 0
Tags :
ListBlobProperties :
Context : Microsoft.WindowsAzure.Commands.Storage.Common.AzureStorageContext
Name : sales_data/sales.csv

Script completed at 02/08/2025 23:57:05
PS /home/user1-48149597/dp-203/Allfiles/Labs/01>
```

Explore Synapse

1 Hr 42 Min Remaining

Instructions Resources Help

Note: Be sure to remember this password! Additionally, the password cannot contain all or part of the login name.

8. Wait for the script to complete - this typically takes around 20 minutes, but in some cases may take longer. While you are waiting, review the [What is Azure Synapse Analytics?](#) article in the Azure Synapse Analytics documentation.

Explore Synapse Studio

Synapse Studio is a web-based portal in which you can manage and work with the resources in your Azure Synapse Analytics workspace.

1. When the setup script has finished running, in the Azure portal, go to the **dp203-xxxxxxx** resource group that it created, and notice that this resource group contains your Synapse workspace, a Storage account for your data lake, an Apache Spark pool, and a Dedicated SQL pool.
2. Select your Synapse workspace, and in its **Overview** page, in the **Open Synapse Studio** card, select **Open** to open Synapse Studio in a new browser tab. Synapse Studio is a web-based interface that you can use to work with your Synapse Analytics workspace.
3. On the left side of Synapse Studio, use the **>>** icon to expand the menu - this reveals the different pages within Synapse Studio that you'll use to manage resources and perform data analytics tasks, as shown here:

4. View the **Data** page, and note that there are two tabs containing data sources:

End >

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Microsoft Azure

Search resources, services, and docs (G+)

Copilot

User1-48140507@LOOS-PROD-MCA [LOOS-PROD-MCA]

All resources

LOOS-PROD-MCA (LOOS-PROD-MCA@microsoft.com)

+ Create Manage view Refresh Export to CSV Open query Assign tags Delete

Filter for any field... Subscription equals all Resource group equals all Type equals all Location equals all Add filter

0 Insecure resources 0 Recommendations 4 Changed resources

No grouping List view

Name	Type	Resource group	Location	Subscription
datalake3uhw6p9	Storage account	dp203-3uhw6p9	West US 2	MOC Subscription-Iod50161047
spark3uhw6p9 (synapse3uhw6p9/spark3uhw6p9)	Apache Spark pool	dp203-3uhw6p9	West US 2	MOC Subscription-Iod50161047
sql3uhw6p9 (synapse3uhw6p9/sql3uhw6p9)	Dedicated SQL pool	dp203-3uhw6p9	West US 2	MOC Subscription-Iod50161047
synapse3uhw6p9	Synapse workspace	dp203-3uhw6p9	West US 2	MOC Subscription-Iod50161047

< Previous Page 1 of 1 Next > Showing 1 to 4 of 4 records. Give feedback

Switch to Bash Restart Manage files New session Editor Web preview Settings Help

SnapshotTime  
ContinuationToken  
VersionId  
IsLatestVersion  
AccessTier  
TagCount  
Tags  
ListBlobProperties  
Context  
Name  
Microsoft.WindowsAzure.Commands.Storage.Common.AzureStorageContext  
sales\_data/sales.csv

Script completed at 02/09/2025 00:55:28  
PS /home/user1-48140507/dp-203/Allfiles/Labs/01/dp-203/Allfiles/Labs/01>

Explore Synapse

44 Minutes Remaining

Instructions Resources Help

Note: Be sure to remember this password! Additionally, the password cannot contain all or part of the login name.

8. Wait for the script to complete - this typically takes around 20 minutes, but in some cases may take longer. While you are waiting, review the [What is Azure Synapse Analytics?](#) article in the Azure Synapse Analytics documentation.

Explore Synapse Studio

Synapse Studio is a web-based portal in which you can manage and work with the resources in your Azure Synapse Analytics workspace.

1. When the setup script has finished running, in the Azure portal, go to the **dp203-xxxxxxx** resource group that it created, and notice that this resource group contains your Synapse workspace, a Storage account for your data lake, an Apache Spark pool, and a Dedicated SQL pool.

2. Select your Synapse workspace, and in its **Overview** page, in the **Open Synapse Studio** card, select **Open** to open Synapse Studio in a new browser tab. Synapse Studio is a web-based interface that you can use to work with your Synapse Analytics workspace.

3. On the left side of Synapse Studio, use the **>>** icon to expand the menu - this reveals the different pages within Synapse Studio that you'll use to manage resources and perform data analytics tasks, as shown here:

4. View the **Data** page, and note that there are two tabs containing data sources:

- A **Workspace** tab containing databases defined in the workspace (Production, dedicated PDI, database and Data Catalog database)

End >

## Ingesting Data in the workspace:

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Microsoft Azure

Synapse Analytics

synapse3uhw6p9

User1-48140507@LOOS-PROD-MCA [LOOS-PROD-MCA]

Copy Data tool

Use Copy Data Tool to perform a one-time or scheduled data load from 90+ data sources. Follow the wizard experience to specify your data loading settings, and let the Copy Data Tool generate the artifacts for you, including pipelines, datasets, and linked services. [Learn more](#)

Properties

Select copy data task type and configure task schedule

Task type

**Built-in copy task**  
You will get a single pipeline which is capable of smoothly copying data from over 100 different data sources.

**Metadata-driven copy task**  
You will get parameterized pipelines which can read metadata from an external store to load data at a large scale.

You will get single pipeline to quickly copy objects from data source store to destination in a very intuitive manner.

Task cadence or task schedule \*

☒ Run once now ☐ Schedule ☐ Tumbling window

< Previous Next > Cancel

Explore Synapse

1 Hr 14 Min Remaining

Instructions Resources Help

**Generic protocol tab, select HTTP. Then continue and create a connection to a data file using the following settings:**

- Name:** Products
- Description:** Product list via HTTP
- Connect via integration runtime:** AutoResolveIntegrationRuntime
- Base URL:** <https://raw.githubusercontent.com/azure-data-engineer/master/Allfiles/Labs/01>
- Server Certificate Validation:** Enable
- Authentication type:** Anonymous

4. After creating the connection, on the **Source data store** page, ensure the following settings are selected, and then select **Next >**:

- Relative URL:** Leave blank
- Request method:** GET
- Additional headers:** Leave blank
- Binary copy:** Unselected
- Request timeout:** Leave blank
- Max concurrent connections:** Leave blank

5. On the **Source** step, in the **Configuration** substep, select **Preview data** to see a preview of the product data your pipeline will ingest, then close the preview.

6. After previewing the data, on the **File format settings** page, ensure the following settings are selected, and then select **Next >**:

- File format:** DelimitedText
- Column delimiter:** Comma (,)
- Row delimiter:** Line feed (\n)
- First row as header:** Selected
- Compression type:** None

7. On the **Destination** step, in the **Dataset** substep, select the following settings:

- Destination type:** Azure Data Lake Storage Gen 2
- Connection:** Select the existing connection to your data lake store (this was created for you when you created the workspace).

8. After selecting the connection, on the **Destination/Dataset** step, ensure the following settings are selected, and then select **Next >**:

- Folder path:** files/product\_data
- File name:** products.csv
- Copy behavior:** None
- Max concurrent connections:** Leave blank
- Block size (MB):** Leave blank

9. On the **Destination** step, in the **Configuration**

End >

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https://web.azure.synapse.net/en/home/copywizard?workspace=%2Fsubscriptions%2F26a11754-b2c5-4422-9f5a-6b4348f815%2FresourceGroups%2Fdp203-9e...

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Copy Data tool

Properties

Source

Dataset

Configuration

Destination

Settings

Review and finish

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.

Source type: All

Connection: Products

Integration runtime: AutoResolveIntegrationRuntime

Base URL: https://raw.githubusercontent.com/Microsof...

Relative URL:

Request method: GET

Additional headers:

Binary copy:

Request timeout:

Max concurrent connections:

< Previous Next > Cancel

ENG US 4:26 PM 2/6/2025

Explore Synapse 1 Hr 14 Min Remaining

Instructions Resources Help 100%

Generic protocol tab, select HTTP. Then continue and create a connection to a data file using the following settings:

- Name: Products
- Description: Product list via HTTP
- Connect via integration runtime: AutoResolveIntegrationRuntime
- Base URL: https://raw.githubusercontent.com/azure-data-engineer/master/Allfiles/Labs/01
- Server Certificate Validation: Enable
- Authentication type: Anonymous

4. After creating the connection, on the Source data store page, ensure the following settings are selected, and then select Next >:

- Relative URL: Leave blank
- Request method: GET
- Additional headers: Leave blank
- Binary copy: Unselected
- Request timeout: Leave blank
- Max concurrent connections: Leave blank

5. On the Source step, in the Configuration substep, select Preview data to see a preview of the product data your pipeline will ingest, then close the preview.

6. After previewing the data, on the File format settings page, ensure the following settings are selected, and then select Next >:

- File format: DelimitedText
- Column delimiter: Comma (,)
- Row delimiter: Line feed (\n)
- First row as header: Selected
- Compression type: None

7. On the Destination step, in the Dataset substep, select the following settings:

- Destination type: Azure Data Lake Storage Gen 2
- Connection: Select the existing connection to your data lake store (this was created for you when you created the workspace).

8. After selecting the connection, on the Destination/Dataset step, ensure the following settings are selected, and then select Next >:

- Folder path: files/product\_data
- File name: products.csv
- Copy behavior: None
- Max concurrent connections: Leave blank
- Block size (MB): Leave blank

9. On the Destination step, in the Configuration

End >

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https://web.azure.synapse.net/en/home/copywizard?workspace=%2Fsubscriptions%2F26a11754-b2c5-4422-9f5a-6b4348f815%2FresourceGroups%2Fdp203-9e...

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User1-48140507@LOOSPRODCA.com@microsoft.com

Copy Data tool

Properties

Source

Destination

Dataset

Configuration

Settings

Review and finish

Destination data store

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

Destination type: Azure Data Lake Storage Gen2

Connection: synapselekweball-WorkspaceDefault

Integration runtime: AutoResolveIntegrationRuntime

Folder path: files/product\_data

File name: products.csv

Copy behavior: Select...

Max concurrent connections:

Block size (MB):

Metadata: + New

< Previous Next > Cancel

ENG US 4:28 PM 2/6/2025

Explore Synapse 1 Hr 12 Min Remaining

Instructions Resources Help 100%

Additional headers: Leave blank

Binary copy: Unselected

Request timeout: Leave blank

Max concurrent connections: Leave blank

5. On the Source step, in the Configuration substep, select Preview data to see a preview of the product data your pipeline will ingest, then close the preview.

6. After previewing the data, on the File format settings page, ensure the following settings are selected, and then select Next >:

- File format: DelimitedText
- Column delimiter: Comma (,)
- Row delimiter: Line feed (\n)
- First row as header: Selected
- Compression type: None

7. On the Destination step, in the Dataset substep, select the following settings:

- Destination type: Azure Data Lake Storage Gen 2
- Connection: Select the existing connection to your data lake store (this was created for you when you created the workspace).

8. After selecting the connection, on the Destination/Dataset step, ensure the following settings are selected, and then select Next >:

- Folder path: files/product\_data
- File name: products.csv
- Copy behavior: None
- Max concurrent connections: Leave blank
- Block size (MB): Leave blank

9. On the Destination step, in the Configuration substep, on the File format settings page, ensure that the following properties are selected. Then select Next >:

- File format: DelimitedText
- Column delimiter: Comma (,)
- Row delimiter: Line feed (\n)
- Add header to file: Selected
- Compression type: None
- Max rows per file: Leave blank
- File name prefix: Leave blank

10. On the Settings step, enter the following settings and then click Next >:

- Task name: Copy products
- Task description: Copy products data
- Fault tolerance: Leave blank
- Enable logging: Unselected
- Enable staging: Unselected

11. On the Review and Finish step, on the Review

End >

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https://web.azure.synapse.net/en/home/copywizard/workspace=%2Fsubscriptions%2F26a11754-b2c5-4422-9f5a-684348f8b15%2FresourceGroups%2Fdp203-9e... User1-48140507@LODSPRODMDCA.onmicrosoft.com

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### Copy Data tool

Properties Source Destination Settings Review and finish Review Deployment

#### Summary

You are running pipeline to copy data from HTTP to Azure Data Lake Storage Gen2.

HTTP → Azure Data Lake Storage Gen2

#### Properties

Task name	Copy products
Task description	Copy products data
Source	
Connection name	Products
Dataset name	SourceDataset_1.txt
Column delimiter	-
Row delimiter	-
Escape character	\
Quote char	"
First row as header	true
Destination	
Connection name	synapse9ekwba8-WorkspaceDefaultStorage
Dataset name	DestinationDataset_1.txt
Column delimiter	-
Row delimiter	-
Escape character	\
Quote char	"
First row as header	true

< Previous Next Cancel

#### Explore Synapse

1 Hr 10 Min Remaining

Instructions Resources Help 100%

7. On the **Destination** step, in the **Dataset** substep, select the following settings:

- Destination type: Azure Data Lake Storage Gen 2
- Connection: Select the existing connection to your data lake store (this was created for you when you created the workspace).

8. After selecting the connection, on the **Destination/Dataset** step, ensure the following settings are selected, and then select **Next >**:

- Folder path: files/product\_data
- File name: products.csv
- Copy behavior: None
- Max concurrent connections: Leave blank
- Block size (MB): Leave blank

9. On the **Destination** step, in the **Configuration** substep, on the **File format settings** page, ensure that the following properties are selected. Then select **Next >**:

- File format: DelimitedText
- Column delimiter: Comma (,)
- Row delimiter: Line feed (\n)
- Add header to file: Selected
- Compression type: None
- Max rows per file: Leave blank
- File name prefix: Leave blank

10. On the **Settings** step, enter the following settings and then click **Next >**:

- Task name: Copy products
- Task description: Copy products data
- Fault tolerance: Leave blank
- Enable logging: Unselected
- Enable staging: Unselected

11. On the **Review and finish** step, on the **Review** substep, read the summary and then click **Next >**.

12. On the **Deployment** step, wait for the pipeline to be deployed and then click **Finish**.

13. In Synapse Studio, select the **Monitor** page, and in the **Pipeline runs** tab, wait for the **Copy products** pipeline to complete with a status of **Succeeded** (you can use the **Refresh** button on the Pipeline runs page to refresh the status).

14. View the **Integrate** page, and verify that it now contains a pipeline named **Copy products**.

View the ingested data

1. On the **Data** page, select the **Linked** tab and expand the **synapse\*xxxxxxx\* (Primary) datalake** container hierarchy until you see the **files** file storage folder. Then select the **products.csv** file.

End >

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https://web.azure.synapse.net/en/home/copywizard/workspace=%2Fsubscriptions%2F26a11754-b2c5-4422-9f5a-684348f8b15%2FresourceGroups%2Fdp203-9e... User1-48140507@LODSPRODMDCA.onmicrosoft.com

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### Copy Data tool

Properties Source Destination Settings Review and finish Review Deployment

#### Deployment complete

Deployment step	Status
Validating copy runtime environment	Succeeded
> Creating datasets	Succeeded
> Creating pipelines	Succeeded
> Running pipelines	Succeeded

Datasets and pipelines have been created. You can now monitor and edit the copy pipelines or click finish to close Copy Data Tool.

Finish Edit pipeline Monitor

#### Explore Synapse

1 Hr 9 Min Remaining

Instructions Resources Help 100%

substep, on the **File format settings** page, ensure that the following properties are selected. Then select **Next >**:

- File format: DelimitedText
- Column delimiter: Comma (,)
- Row delimiter: Line feed (\n)
- Add header to file: Selected
- Compression type: None
- Max rows per file: Leave blank
- File name prefix: Leave blank

10. On the **Settings** step, enter the following settings and then click **Next >**:

- Task name: Copy products
- Task description: Copy products data
- Fault tolerance: Leave blank
- Enable logging: Unselected
- Enable staging: Unselected

11. On the **Review and finish** step, on the **Review** substep, read the summary and then click **Next >**.

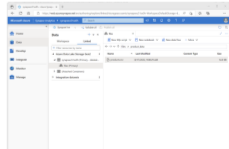
12. On the **Deployment** step, wait for the pipeline to be deployed and then click **Finish**.

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14. View the **Integrate** page, and verify that it now contains a pipeline named **Copy products**.

View the ingested data

1. On the **Data** page, select the **Linked** tab and expand the **synapse\*xxxxxxx\* (Primary) datalake** container hierarchy until you see the **files** file storage for your Synapse workspace. Then select the file storage to verify that a folder named **product\_data** containing a file named **products.csv** has been copied to this location, as shown here:



End >

## Viewing the ingested data:

The screenshot displays the Microsoft Azure Synapse Studio interface. The left sidebar shows navigation options: Home, Data, Develop, Integrate, Monitor, and Manage. The main pane is titled 'Data' and shows a 'Workspace' tab with a 'Linked' view. It lists resources under 'Azure Data Lake Storage Gen2', including 'synapse3uhw6p9 (Primary - d...)' and 'files (Primary)'. Below this, there are sections for 'Attached Containers' and 'Integration datasets'. A large graphic with the text 'Select an item' and 'Use the resource explorer to select or create a new item' is centered in the main pane.

On the right side, there is a panel titled 'Explore Synapse' with a '34 Minutes Remaining' timer. Below this, the 'View the ingested data' section provides instructions:

1. On the **Data** page, select the **Linked** tab and expand the **synapse\*xxxxxxx\* (Primary) data lake** container hierarchy until you see the **files** file storage for your Synapse workspace. Then select the file storage to verify that a folder named **product\_data** containing a file named **products.csv** has been copied to this location, as shown here:

The instructions include a screenshot of the file storage hierarchy showing the 'product\_data' folder and the 'products.csv' file.

2. Right-click the **products.csv** data file and select **Preview** to view the ingested data. Then close the preview.

**Use a serverless SQL pool to analyze data**

Now that you've ingested some data into your workspace, you can use Synapse Analytics to query and analyze it. One of the most common ways to query data is to use SQL, and in Synapse Analytics you can use a serverless SQL pool to run SQL code against data in a data lake.

1. In Synapse Studio, right-click the **products.csv** file in the file storage for your Synapse workspace, point to **New SQL script**, and select **Select TOP 100 rows**.
2. In the **SQL Script 1** pane that opens, review the SQL code that has been generated, which should be similar to this:

```
SQL
-- This is auto-generated code
SELECT TOP 100 *
FROM
OPENROWSET(
    BULK 'https://datalakexxxxxxx.dfs.core.windows.net/product_data/products.csv',
    FORMAT = 'CSV'
)
```

The bottom of the interface shows the Windows taskbar with the Start button, search bar, and several application icons. The system tray indicates the language is ENG US, the time is 5:06 PM, and the date is 2/8/2025.

labclient.labondemand.com/LabClient/f368be1a-01a4-4a71-812d-67c1f310a6fb

synapse3uhw6p9 - Azure Syna... synapse3uhw6p9 - Azure Syna... synapse3uhw6p9 - Azure Syna...

https://web.azuresynapse.net/en/authoring/explore/linked/storageaccounts/synapse3uhw6p9-WorkspaceDefaultStorage-datalake3uhw6p9%2Ffiles?... User1-48140507@L00SPRODMCA.onmicrosoft.com L00S-PROD-MCA

Microsoft Azure | Synapse Analytics | synapse3uhw6p9

Home Data Develop Integrate Monitor Manage

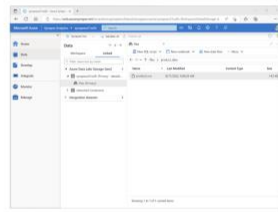
DataWorkspaceLinkedFilter resources by nameAzure Data Lake Storage Gen22synapse3uhw6p9 (Primary - dataa...files (Primary)(Attached Containers)Integration datasets2

filesNew SQL scriptNew notebookNew data flowNew integration datasetMoreproducts.csv2/8/2025, 5:02:24 PMContent TypeSize14.0 KB

Showing 1 to 1 of 1 cached items

Explore Synapse32 Minutes RemainingInstructionsResourcesHelp100%

Summary and then click **Next >**.  
12. On the **Deployment** step, wait for the pipeline to be deployed and then click **Finish**.  
13. In Synapse Studio, select the **Monitor** page, and in the **Pipeline runs** tab, wait for the **Copy products** pipeline to complete with a status of **Succeeded** (you can use the **Refresh** button on the Pipeline runs page to refresh the status).  
14. View the **Integrate** page, and verify that it now contains a pipeline named **Copy products**.

View the ingested data  
1. On the **Data** page, select the **Linked** tab and expand the **synapse3uhw6p9 (Primary) datalake** container hierarchy until you see the **files** file storage for your Synapse workspace. Then select the file storage to verify that a folder named **product\_data** containing a file named **products.csv** has been copied to this location, as shown here:  
  
2. Right-click the **products.csv** data file and select **Preview** to view the ingested data. Then close the preview.

Use a serverless SQL pool to analyze data  
Now that you've ingested some data into your workspace, you can use Synapse Analytics to query and analyze it. One of the most common ways to query data is to use SQL, and in Synapse Analytics you can use a serverless SQL pool to run SQL code against data in a data lake.  
1. In Synapse Studio, right-click the **products.csv** file in the file storage for your Synapse workspace, point to **New SQL script**, and select **Select TOP 100 rows**.  
2. In the **SQL Script 1** pane that opens, review the SQL code that has been generated, which should be similar to this:

## Querying data using SQL:

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synapse3uhw6p9 - Azure Syna... synapse3uhw6p9 - Azure Syna... synapse3uhw6p9 - Azure Syna...

https://web.azuresynapse.net/en/authoring/explore/linked/sqlscripts/SQL%20script%201?workspace=%2Fsubscriptions%2F26a11754-b2c6-4422-9f... User1-48140507@L00SPRODMCA.onmicrosoft.com L00S-PROD-MCA

Microsoft Azure | Synapse Analytics | synapse3uhw6p9

Home Data Develop Integrate Monitor Manage

DataWorkspaceLinkedFilter resources by nameAzure Data Lake Storage Gen22synapse3uhw6p9 (Primary - dataa...files (Primary)(Attached Containers)Integration datasets2

filesSQL script 1This is auto-generated code1SELECT TOP 100 \*FROMOPENROWSET(BULK 'https://datalake3uhw6p9.dfs.core.windows.net/files/p...FORMAT = 'CSV',PARSER\_VERSION = '2.0') AS [result]10

ResultsMessagesViewTableChartExport results00:00:10 Query executed successfully.

Explore Synapse31 Minutes RemainingInstructionsResourcesHelp100%

Use a serverless SQL pool to analyze data  
Now that you've ingested some data into your workspace, you can use Synapse Analytics to query and analyze it. One of the most common ways to query data is to use SQL, and in Synapse Analytics you can use a serverless SQL pool to run SQL code against data in a data lake.  
1. In Synapse Studio, right-click the **products.csv** file in the file storage for your Synapse workspace, point to **New SQL script**, and select **Select TOP 100 rows**.  
2. In the **SQL Script 1** pane that opens, review the SQL code that has been generated, which should be similar to this:  

```
SQL
-- This is auto-generated code
SELECT
TOP 100 *
FROM
OPENROWSET(
    BULK 'https://datalake3uhw6p9.dfs.core.windows.net/files/p...
    FORMAT = 'CSV',
    PARSER_VERSION = '2.0'
) AS [result]
```

  
This code opens a rowset from the text file you imported and retrieves the first 100 rows of data.  
3. In the **Connect** to list, ensure **Built-in** is selected - this represents the built-in SQL Pool that was created with your workspace.  
4. On the toolbar, use the **Run** button to run the SQL code, and review the results, which should look similar to this:  

C1	C2	C3	C4
ProductID	ProductName	Category	ListPrice
771	Mountain-100 Silver, 38	Mountain Bikes	3399.9900
772	Mountain-100 Silver, 42	Mountain Bikes	3399.9900
...	...	...	...

  
5. Note the results consist of four columns named C1, C2, C3, and C4; and that the first row in the results contains the names of the data fields. To fix this problem, add a **HEADER\_ROW = TRUE** parameter to the **OPENROWSET** function as shown here (replacing **datalake3uhw6p9** with the name of your data lake storage account), and then rerun the query:



labclient.labondemand.com/LabClient/f368be1a-01a4-4a71-812d-67c1f310a6fb

Microsoft Azure | Synapse Analytics | synapse3juhw6p9

Workspace Linked

Filter resources by name

Azure Data Lake Storage Gen2 2

files (Primary)

files (Attached Container)

Integration datasets 2

SQL script 1

Other users in your workspace may have access to modify this item. Do not use this item unless you trust all users who may have access to the workspace.

Connect to Built-in

Properties

General Related (0)

Name SQL script 1

Description

Type sql script

Size 241 bytes

Results settings per query First 5000 rows (default) All rows

Results Messages

View Table Chart Export results

Search

ProductID ProductName Category ListPrice

771	Mountain-100 ...	Mountain Bikes	3399.99
772	Mountain-100 ...	Mountain Bikes	3399.99
773	Mountain-100 ...	Mountain Bikes	3399.99
774	Mountain-100 ...	Mountain Bikes	3399.99
775	Mountain-100 ...	Mountain Bikes	3374.99
776	Mountain-100 ...	Mountain Bikes	3374.99
777	Mountain-100 ...	Mountain Bikes	3374.99

00:00:02 Query executed successfully.

ENG US 5:10 PM 2/8/2025

Explore Synapse 29 Minutes Remaining

Instructions Resources Help

100%

dataLakexxxxxx with the name of your data lake storage account), and then rerun the query:

```
SQL
SELECT TOP 100 *
FROM OPENROWSET(
    BULK 'https://datalakexxxxxx.dfs.core
    FORMAT = 'CSV',
    PARSE_VERSION='2.0',
    HEADER_ROW = TRUE
) AS [result]
```

Now the results look like this:

ProductID	ProductName	Category	ListPrice
771	Mountain-100 Silver, 38	Mountain Bikes	3399.9900
772	Mountain-100 Silver, 42	Mountain Bikes	3399.9900
...	...	...	...

6. Modify the query as follows (replacing dataLakexxxxxx with the name of your data lake storage account):

```
SQL
SELECT Category, COUNT(*) AS ProductCount
FROM OPENROWSET(
    BULK 'https://datalakexxxxxx.dfs.core
    FORMAT = 'CSV',
    PARSE_VERSION='2.0',
    HEADER_ROW = TRUE
) AS [result]
GROUP BY Category;
```

7. Run the modified query, which should return a resultset that contains the number products in each category, like this:

Category	ProductCount
Bib Shorts	3
Bike Racks	1

End >

labclient.labondemand.com/LabClient/f368be1a-01a4-4a71-812d-67c1f310a6fb

Microsoft Azure | Synapse Analytics | synapse3juhw6p9

Workspace Linked

Filter resources by name

Azure Data Lake Storage Gen2 2

files (Primary)

files (Attached Container)

Integration datasets 2

SQL script 1

Other users in your workspace may have access to modify this item. Do not use this item unless you trust all users who may have access to the workspace.

Connect to Built-in

Properties

General Related (0)

Name SQL script 1

Description

Type sql script

Size 241 bytes

Results settings per query First 5000 rows (default) All rows

Results Messages

View Table Chart Export results

Search

Category ProductCount

Bib-Shorts	3
Bike Racks	1
Bike Stands	1
Bottles and Cages	3
Bottom Brackets	3
Brakes	2
Caps	1

00:00:01 Query executed successfully.

ENG US 5:12 PM 2/8/2025

Explore Synapse 27 Minutes Remaining

Instructions Resources Help

100%

6. Modify the query as follows (replacing dataLakexxxxxx with the name of your data lake storage account):

```
SQL
SELECT Category, COUNT(*) AS ProductCount
FROM OPENROWSET(
    BULK 'https://datalakexxxxxx.dfs.core
    FORMAT = 'CSV',
    PARSE_VERSION='2.0',
    HEADER_ROW = TRUE
) AS [result]
GROUP BY Category;
```

7. Run the modified query, which should return a resultset that contains the number products in each category, like this:

Category	ProductCount
Bib Shorts	3
Bike Racks	1
...	...

8. In the Properties pane for SQL Script 1, change the Name to Count Products by Category. Then in the toolbar, select Publish to save the script.

9. Close the Count Products by Category script pane.

10. In Synapse Studio, select the Develop page, and notice that your published Count Products by Category SQL script has been saved there.

11. Select the Count Products by Category SQL script to reopen it. Then ensure that the script is connected to the Built-in SQL pool and run it to retrieve the product counts.

12. In the Results pane, select the Chart view, and then select the following settings for the chart:

- Chart type: Column
- Category column: Category
- Legend (series) columns: ProductCount
- Legend position: bottom - center
- Legend (series) label: Leave blank
- Legend (series) minimum value: Leave blank
- Legend (series) maximum value: Leave blank

End >

## Using the Chart view:

The screenshot displays the Microsoft Azure Synapse Studio interface. The central pane shows the 'Count Products by Category' SQL script, which is an auto-generated code snippet. The script is as follows:

```
1 -- This is auto-generated code
2 SELECT
3     Category, COUNT(*) AS ProductCount
4 FROM
5     OPENROWSET(
6         BULK 'https://datalake3uhw69.dfs.core.windows.net/files/pr
7         FORMAT = 'CSV',
8         PARSE_VERSION = '2.0',
9         HEADER_ROW = TRUE
10    ) AS [result]
11 GROUP BY Category;
```

The 'Results' pane at the bottom shows the data in 'Table' view, with columns 'Category' and 'ProductCount'. The 'Chart' view is also visible, showing a bar chart of the data. The 'Properties' pane on the right shows the script's details, including its name 'Count Products by Category', type 'sql script', and size '241 bytes'.

On the right side of the image, there is a list of instructions for the task:

8. In the **Properties** pane for **SQL Script 1**, change the **Name** to **Count Products by Category**. Then in the toolbar, select **Publish** to save the script.
9. Close the **Count Products by Category** script pane.
10. In Synapse Studio, select the **Develop** page, and notice that your published **Count Products by Category** SQL script has been saved there.
11. Select the **Count Products by Category** SQL script to reopen it. Then ensure that the script is connected to the **Built-in** SQL pool and run it to retrieve the product counts.
12. In the **Results** pane, select the **Chart** view, and then select the following settings for the chart:
  - Chart type: Column
  - Category column: Category
  - Legend (series) columns: ProductCount
  - Legend position: bottom - center
  - Legend (series) label: Leave blank
  - Legend (series) minimum value: Leave blank
  - Legend (series) maximum value: Leave blank
  - Category label: Leave blank

The resulting chart should resemble this:

Category	ProductCount
Bib Shorts	3
Bike Racks	1
...	...



## Using Spark pool to analyze data

The screenshot displays the Microsoft Azure Synapse Analytics interface. The left sidebar shows navigation options: Home, Data, Develop, Integrate, Monitor, and Manage. The main workspace is titled 'Notebook 1' and contains a code cell with the following Python code:

```
1 %Spark
2 df = spark.read.load('abfs://files@datalake3uhw6p9.dfs.core.windows.net/product_data/product
3 ## If header exists uncomment line below
4 , header=True
5 )
6 display(df.limit(10))
```

The code cell shows a successful job execution: '4 sec - Command executed in 3 sec 963 ms by User1-48140507 on 5:22:15 PM, 2/8/2025'. Below the code, a table of product data is displayed:

ProductID	ProductName	Category	ListPrice
771	Mountain-100 Silver, 38	Mountain Bikes	3399.9900
772	Mountain-100 Silver, 42	Mountain Bikes	3399.9900
773	Mountain-100 Silver, 44	Mountain Bikes	3399.9900
774	Mountain-100 Silver, 48	Mountain Bikes	3399.9900
775	Mountain-100 Black, 38	Mountain Bikes	3374.9900
776	Mountain-100 Black, 42	Mountain Bikes	3374.9900
777	Mountain-100 Black, 44	Mountain Bikes	3374.9900
778	Mountain-100 Black, 48	Mountain Bikes	3374.9900
779	Mountain-200 Silver, 38	Mountain Bikes	2319.9900
780	Mountain-200 Silver, 42	Mountain Bikes	2319.9900

On the right side, the 'Explore Synapse' panel shows a table with columns c0, c1, c2, and c3, containing product data. Below the table, instructions are provided for running the code cell and verifying the results.

6. Uncomment the `, header=True` line (because the products.csv file has the column headers in the first line), so your code looks like this:

```
Python
%Spark
df = spark.read.load('abfs://files@datalake3uhw6p9.dfs.core.windows.net/product_data/product
## If header exists uncomment line below
, header=True
)
display(df.limit(10))
```

7. Rerun the cell and verify that the results look like this:

ProductID	ProductName	Category	ListPrice
771	Mountain-100 Silver, 38	Mountain Bikes	3399.9900
772	Mountain-100 Silver, 42	Mountain Bikes	3399.9900
...	...	...	...

Notice that running the cell again takes less time, because the Spark pool is already started.

8. Under the results, use the **+ Code** icon to add a new code cell to the notebook.

9. In the new empty code cell, add the following code:

```
Python
df_counts = df.groupby(df.Category).count()
display(df_counts)
```

10. Run the new code cell by clicking its **>** icon, and review the

End >

## Using the Chart view option

The screenshot shows the Microsoft Azure Synapse Analytics interface. On the left, there's a navigation pane with options like Home, Data, Develop, Integrate, Monitor, and Manage. The main area displays a notebook titled 'Count Products by Category'. The notebook contains a Python code cell with the following code:

```
1 df_counts = df.groupby(df.Category).count()
2 display(df_counts)
```

The code has been executed successfully, and the results are displayed as a horizontal bar chart. The x-axis is labeled 'Sum(count)' and ranges from 0 to 50. The y-axis is labeled 'Category' and lists various bicycle components. The chart shows the count for each category, with 'Mountain Bikes' having the highest count at approximately 45.

On the right side of the interface, there's a sidebar titled 'Explore Synapse' with instructions and resources. The instructions include:

9. In the new empty code cell, add the following code:

```
Python
df_counts = df.groupby(df.Category).count()
display(df_counts)
```
10. Run the new code cell by clicking its ▶ icon, and review the results, which should look similar to this:

Category	count
Headsets	3
Wheels	14
...	...
11. In the results output for the cell, select the **Chart** view. The resulting chart should resemble this:

Below the instructions, there's a section titled 'Use a dedicated SQL pool to query a data warehouse' with a paragraph explaining the benefits of using a dedicated SQL pool for querying data in a data lake. It mentions that an enterprise analytics solution uses a data lake to store and prepare unstructured data that can then be loaded into a relational data warehouse to support business intelligence (BI) workloads. In Azure Synapse Analytics, these data warehouses can be implemented in a dedicated SQL pool.

1. In Synapse Studio, on the **Manage** page, in the **SQL pools** section, select the **sql\*xxxxxxx\*** dedicated SQL pool row and

The screenshot shows the Microsoft Azure Synapse Analytics interface, specifically the 'SQL pools' section. The left navigation pane is the same as in the previous screenshot. The main area displays the 'SQL pools' page, which includes a description of the serverless SQL pool and a table showing the current state of the SQL pools.

The table shows the following information:

Name	Type	Status	Size
Built-in	Serverless	Online	Auto
sql3uhw6p9	Dedicated	Online	DW100c

Below the table, there's a section titled 'Use a dedicated SQL pool to query a data warehouse' with a paragraph explaining the benefits of using a dedicated SQL pool for querying data in a data lake. It mentions that an enterprise analytics solution uses a data lake to store and prepare unstructured data that can then be loaded into a relational data warehouse to support business intelligence (BI) workloads. In Azure Synapse Analytics, these data warehouses can be implemented in a dedicated SQL pool.

1. In Synapse Studio, on the **Manage** page, in the **SQL pools** section, select the **sql\*xxxxxxx\*** dedicated SQL pool row and then use its ▶ icon to resume it.
2. Wait for the SQL pool to start. This can take a few minutes. Use the ◀ Refresh button to check its status periodically. The status will show as **Online** when it is ready.
3. When the SQL pool has started, select the **Data** page; and on the **Workspace** tab, expand **SQL databases** and verify that **sql\*xxxxxxx\*** is listed (use the ▶ icon at the top-left of the page to refresh the view if necessary).
4. Expand the **sql\*xxxxxxx\*** database and its **Tables** folder, and then in the ... menu for the **FactInternetSales** table, point to **New SQL script**, and select **Select TOP 100 rows**.
5. Review the results of the query, which show the first 100 sales transactions in the table. This data was loaded into the database by the setup script, and is permanently stored in the database associated with the dedicated SQL pool.
6. Replace the SQL query with the following code:

```
sql
SELECT d.CalendarYear, d.MonthNumberOfYear, d.
p.EnglishProductName AS Product, SUM(o.
FROM dbo.FactInternetSales AS o
JOIN dbo.DimDate AS d ON o.OrderDateKey = d.Da
JOIN dbo.DimProduct AS p ON o.ProductKey = p.P
GROUP BY d.CalendarYear, d.MonthNumberOfYear,
ORDER BY d.MonthNumberOfYear
```
7. Use the ▶ Run button to run the modified query, which returns the quantity of each product sold by year and month.

labclient.labondemand.com/LabClient/f368be1a-01a4-4a71-812d-67c1f310a6fb

synapse3uhwfp9 - Microsoft A...

synapse3uhwfp9 - Azure Synap...

synapse3uhwfp9 - Azure Synap...

https://web.azure.synapse.net/en/authoring/explorer/workspace/sqlscripts/SQL%20script%201?workspace=%2Fsubscriptions%2F26a11754-b2c6-442...

Microsoft Azure

Synapse Analytics

synapse3uhwfp9

Search

User1-48140507@L0D5PROD-MCA.onmicrosoft.com

LOGS PROD-MCA

Home

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Data

Workspace

Linked

Filter resources by name

SQL database

sql3uhwfp9 (SQL)

Tables

dbo.DimCurrency

dbo.DimCustomer

dbo.DimDate

dbo.DimGeography

dbo.DimProduct

dbo.DimProductCategory

dbo.DimProductSubcategory

dbo.DimPromotion

dbo.DimSalesTerritory

dbo.FactInternetSales

Columns

External tables

External resources

Views

Programmability

Schemas

Security

Files

Count Products by C...

SQL script 1

Run

Undo

Publish

Query plan

Connect to

sql3uhwfp9

1 SELECT d.CalendarYear, d.MonthNumberOfYear, d.EnglishMonthName,

2 p.EnglishProductName AS Product, SUM(o.OrderQuantity) AS UnitsSold

3 FROM dbo.FactInternetSales AS o

4 JOIN dbo.DimDate AS d ON o.OrderDateKey = d.DateKey

5 JOIN dbo.DimProduct AS p ON o.ProductKey = p.ProductKey

6 GROUP BY d.CalendarYear, d.MonthNumberOfYear, d.EnglishMonthName, p.EnglishProductName

7 ORDER BY d.MonthNumberOfYear

Results

Messages

View

Table

Chart

Export results

Search

CalendarYear

MonthNumberOfYear

EnglishMonthName

Product

UnitsSold

2022

1

January

Mountain-500 ...

2

2022

1

January

Women's Mou...

19

2021

1

January

Road-250 Red...

6

2022

1

January

Road-250 Red...

15

2022

1

January

Short-Sleeve C...

33

2021

1

January

Road-250 Black...

14

2021

1

January

Road-250 Red...

13

00:00:11 Query executed successfully.

ENG

US

5:30 PM

2/8/2025

Explore Synapse

24 Minutes Remaining

Instructions

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100%

section, select the **sql\*xxxxxxxx\*** dedicated SQL pool row and then use its **>** icon to resume it.

2. Wait for the SQL pool to start. This can take a few minutes. Use the **Refresh** button to check its status periodically. The status will show as **Online** when it is ready.

3. When the SQL pool has started, select the **Data** page; and on the **Workspace** tab, expand **SQL databases** and verify that **sql\*xxxxxxxx\*** is listed (use **v** icon at the top-left of the page to refresh the view if necessary).

4. Expand the **sql\*xxxxxxxx\*** database and its **Tables** folder, and then in the **...** menu for the **FactInternetSales** table, point to **New SQL script**, and select **Select TOP 100 rows**.

5. Review the results of the query, which show the first 100 sales transactions in the table. This data was loaded into the database by the setup script, and is permanently stored in the database associated with the dedicated SQL pool.

6. Replace the SQL query with the following code:

sql  
SELECT d.CalendarYear, d.MonthNumberOfYear, d.  
p.EnglishProductName AS Product, SUM(o.  
FROM dbo.FactInternetSales AS o  
JOIN dbo.DimDate AS d ON o.OrderDateKey = d.Da  
JOIN dbo.DimProduct AS p ON o.ProductKey = p.P  
GROUP BY d.CalendarYear, d.MonthNumberOfYear,  
ORDER BY d.MonthNumberOfYear

7. Use the **Run** button to run the modified query, which returns the quantity of each product sold by year and month.

8. If it is not already visible, show the **Properties** page by selecting the **Properties** button (which looks similar to **□**) on the right-end of the toolbar. Then in the **Properties** pane, change the query name to **Aggregate product sales** and use the **Publish** button on the toolbar to save it.

9. Close the query pane, and then view the **Develop** page to verify that the SQL script has been saved.

10. On the **Manage** page, select the **sql\*xxxxxxxx\*** dedicated SQL pool row and use its **■** icon to pause it.

Delete Azure resources

Now that you've finished exploring Azure Synapse Analytics, you should delete the resources you've created to avoid unnecessary Azure costs.

1. Close the Synapse Studio browser tab and return to the Azure portal.

2. On the Azure portal, on the **Home** page, select **Resource**

End >

labclient.labondemand.com/LabClient/f368be1a-01a4-4a71-812d-67c1f310a6fb

synapse3uhwfp9 - Microsoft A...

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https://web.azure.synapse.net/en/management/sqlpools?workspace=%2Fsubscriptions%2F26a11754-b2c6-4422-9f5a-6b4348f8b15%2FResourceGro...

Microsoft Azure

Synapse Analytics

synapse3uhwfp9

Search

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LOGS PROD-MCA

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SQL pools

The serverless SQL pool, built-in, is immediately available for your workspace. Dedicated SQL pools can be configured to adapt to team or organizational requirements and constraints. [Learn more](#) (?)

+ New

Refresh

Filter by name

Showing 1-2 of 2 items (1 Serverless, 1 Dedicated)

Table with 5 columns: Name, Type, Status, Size

Table with 2 rows: Built-in (Serverless, Online, Auto), sql3uhwfp9 (Dedicated, Online, DW100c)

Pause pool

There are no active user queries. Would you like to continue and pause dedicated SQL pool sql3uhwfp9?

Pause Cancel

Explore Synapse

22 Minutes Remaining

Instructions

Resources

Help

100%

section, select the **sql\*xxxxxxxx\*** dedicated SQL pool row and then use its **>** icon to resume it.

2. Wait for the SQL pool to start. This can take a few minutes. Use the **Refresh** button to check its status periodically. The status will show as **Online** when it is ready.

3. When the SQL pool has started, select the **Data** page; and on the **Workspace** tab, expand **SQL databases** and verify that **sql\*xxxxxxxx\*** is listed (use **v** icon at the top-left of the page to refresh the view if necessary).

4. Expand the **sql\*xxxxxxxx\*** database and its **Tables** folder, and then in the **...** menu for the **FactInternetSales** table, point to **New SQL script**, and select **Select TOP 100 rows**.

5. Review the results of the query, which show the first 100 sales transactions in the table. This data was loaded into the database by the setup script, and is permanently stored in the database associated with the dedicated SQL pool.

6. Replace the SQL query with the following code:

sql  
SELECT d.CalendarYear, d.MonthNumberOfYear, d.  
p.EnglishProductName AS Product, SUM(o.  
FROM dbo.FactInternetSales AS o  
JOIN dbo.DimDate AS d ON o.OrderDateKey = d.Da  
JOIN dbo.DimProduct AS p ON o.ProductKey = p.P  
GROUP BY d.CalendarYear, d.MonthNumberOfYear,  
ORDER BY d.MonthNumberOfYear

7. Use the **Run** button to run the modified query, which returns the quantity of each product sold by year and month.

8. If it is not already visible, show the **Properties** page by selecting the **Properties** button (which looks similar to **□**) on the right-end of the toolbar. Then in the **Properties** pane, change the query name to **Aggregate product sales** and use the **Publish** button on the toolbar to save it.

9. Close the query pane, and then view the **Develop** page to verify that the SQL script has been saved.

10. On the **Manage** page, select the **sql\*xxxxxxxx\*** dedicated SQL pool row and use its **■** icon to pause it.

Delete Azure resources

Now that you've finished exploring Azure Synapse Analytics, you should delete the resources you've created to avoid unnecessary Azure costs.

1. Close the Synapse Studio browser tab and return to the Azure portal.

2. On the Azure portal, on the **Home** page, select **Resource**

End >

## Deleting Resource group:

The screenshot displays the Microsoft Azure portal interface. On the left, the 'Resource groups' list shows 'dp203-3uhw6p9' selected. The main pane shows the 'Delete a resource group' dialog for 'dp203-3uhw6p9'. The dialog states: 'The following resource group and all its dependent resources will be permanently deleted.' It lists the resource group to be deleted and the dependent resources to be deleted (4): datalake3uhw6p9 (Storage account), spark3uhw6p9 (Apache Spark pool), sql3uhw6p9 (Dedicated SQL pool), and synapse3uhw6p9 (Synapse workspace). A text box prompts the user to 'Enter resource group name to confirm deletion' with 'dp203-3uhw6p9' entered. Below the text box are 'Delete' and 'Cancel' buttons. At the bottom, a terminal window shows a PowerShell script completion message: 'Script completed at 02/09/2025 00:55:28 PS /home/user1-48140507/dp-203/Allfiles/Labs/01/dp-203/Allfiles/Labs/01> []'.

Microsoft Azure portal interface showing the 'Delete a resource group' dialog for 'dp203-3uhw6p9'. The dialog lists the resource group to be deleted and the dependent resources to be deleted (4): datalake3uhw6p9, spark3uhw6p9, sql3uhw6p9, and synapse3uhw6p9. A text box prompts the user to 'Enter resource group name to confirm deletion' with 'dp203-3uhw6p9' entered. Below the text box are 'Delete' and 'Cancel' buttons.

Terminal output showing script completion:

```
SnapshotTime :  
ContinuationToken :  
VersionId :  
IsLatestVersion :  
AccessTier : Hot  
TagCount : 0  
Tags :  
ListBlobProperties :  
Context : Microsoft.WindowsAzure.Commands.Storage.Common.AzureStorageContext  
Name : sales_data/sales.csv  
Script completed at 02/09/2025 00:55:28  
PS /home/user1-48140507/dp-203/Allfiles/Labs/01/dp-203/Allfiles/Labs/01> []
```

Conclusion: In this lab, I got hands-on experience with Microsoft Azure Synapse and its data analytics features. I started by connecting to PowerShell and setting up a resource group. Then, I ingested data into the Synapse workspace and explored it using SQL queries. I also used the Chart view to visualize insights and worked with Spark pools to analyze large datasets more efficiently. Finally, I wrapped up by deleting the resource group, giving me a full cycle understanding of how to manage and analyze data in Synapse. This lab provided hands-on experience with Azure Synapse's data ingestion, querying, and visualization capabilities.