CST8912 – Cloud Solution Architecture
Lab 4 Report

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Date:05/2/2025
Submitted to: Prof. Tanishq Bansal

Title

Deployment and Management of Azure SQL Database with Data Transfer Using Azure Data Factory

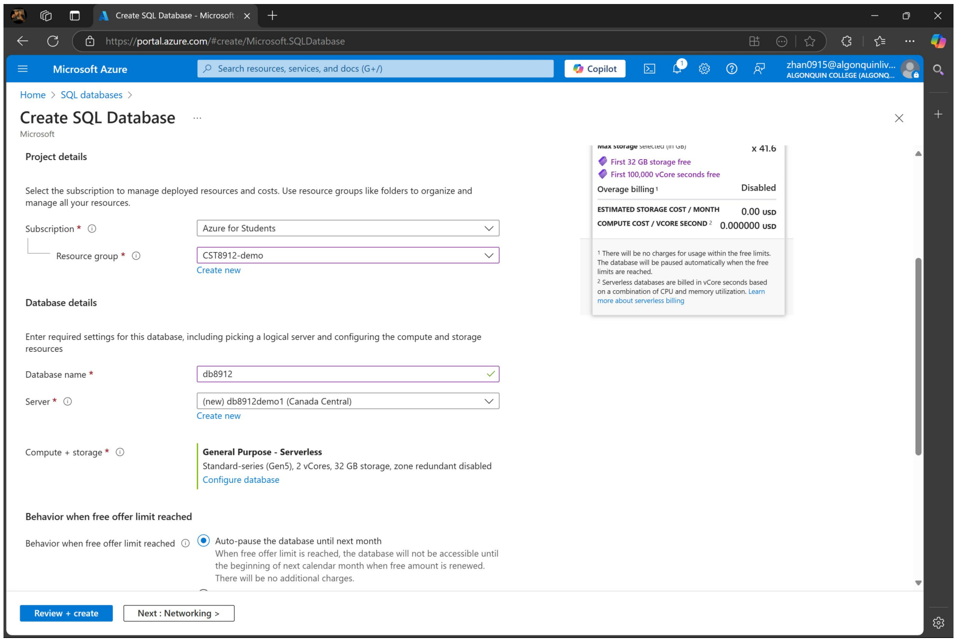
Introduction or Purpose

The purpose of this lab is to explore the key features of Azure SQL Database, perform basic SQL operations, and manage data transfers to Azure Blob Storage using Azure Data Factory. The lab aims to enhance understanding of cloud database deployment, data manipulation, and integration within Microsoft's Azure environment.

Steps Covered in the Lab

Azure SQL Database Configuration:

1. Created a new SQL Database named **db8912** under the resource group **CST8912-demo**.



Create SQL Database - Microsoft
https://portal.azure.com/#create/Microsoft.SQLDatabase
Microsoft Azure
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Copilot
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Create SQL Database
Microsoft

Project details

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription * : Azure for Students
Resource group * : CST8912-demo
Create new

Database details

Enter required settings for this database, including picking a logical server and configuring the compute and storage resources

Database name * : db8912
Server * : (new) db8912demo1 (Canada Central)
Create new

Compute + storage * : **General Purpose - Serverless**
Standard-series (Gen5), 2 vCores, 32 GB storage, zone redundant disabled
Configure database

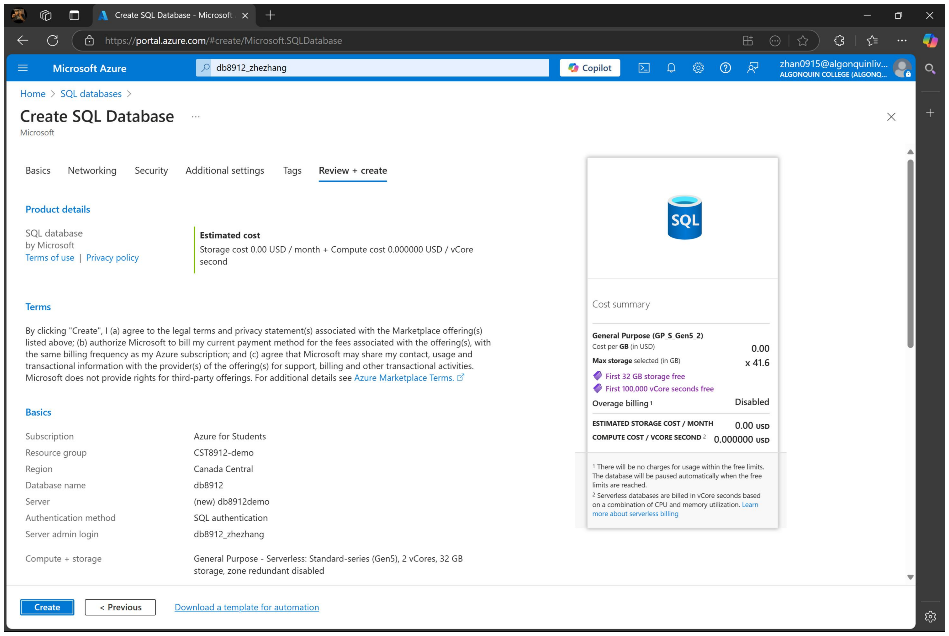
Behavior when free offer limit reached

Behavior when free offer limit reached: ● Auto-pause the database until next month
When free offer limit is reached, the database will not be accessible until the beginning of next calendar month when free amount is renewed. There will be no additional charges.

Max storage selected (in GB) x 41.6
First 32 GB storage free
First 100,000 vCore seconds free
Overage billing[1] Disabled
ESTIMATED STORAGE COST / MONTH 0.00 USD
COMPUTE COST / VCORE SECOND[2] 0.000000 USD

[1] There will be no charges for usage within the free limits. The database will be paused automatically when the free limits are reached.
[2] Serverless databases are billed in vCore seconds based on a combination of CPU and memory utilization. Learn more about serverless billing

2. Configured a new server **db8912demo** with SQL authentication.



https://portal.azure.com/#create/Microsoft.SQLDatabase

Home > SQL databases >

Create SQL Database

Microsoft

Basics | Networking | Security | Additional settings | Tags | **Review + create**

Product details

SQL database
by Microsoft
Terms of use | Privacy policy

Estimated cost
Storage cost 0.00 USD / month + Compute cost 0.000000 USD / vCore second

Terms

By clicking "Create", I (a) agree to the legal terms and privacy statement(s) associated with the Marketplace offering(s) listed above; (b) authorize Microsoft to bill my current payment method for the fees associated with the offering(s), with the same billing frequency as my Azure subscription; and (c) agree that Microsoft may share my contact, usage and transactional information with the provider(s) of the offering(s) for support, billing and other transactional activities. Microsoft does not provide rights for third-party offerings. For additional details see Azure Marketplace Terms.

Basics

Subscription	Azure for Students
Resource group	CST8912-demo
Region	Canada Central
Database name	db8912
Server	(new) db8912demo
Authentication method	SQL authentication
Server admin login	db8912_zhezhang
Compute + storage	General Purpose - Serverless: Standard-series (Gen5), 2 vCores, 32 GB storage, zone redundant disabled

Cost summary

General Purpose (GP_S_Gen5_2)

Cost per **GB** (in USD)	0.00
Max storage selected (in GB)	x 41.6
First 32 GB storage free	
First 100,000 vCore seconds free	
Overage billing [1]	Disabled
ESTIMATED STORAGE COST / MONTH	0.00 USD
COMPUTE COST / VCORE SECOND [2]	0.000000 USD

[1] There will be no charges for usage within the free limits. The database will be paused automatically when the free limits are reached.

[2] Serverless databases are billed in vCore seconds based on a combination of CPU and memory utilization. Learn more about serverless billing

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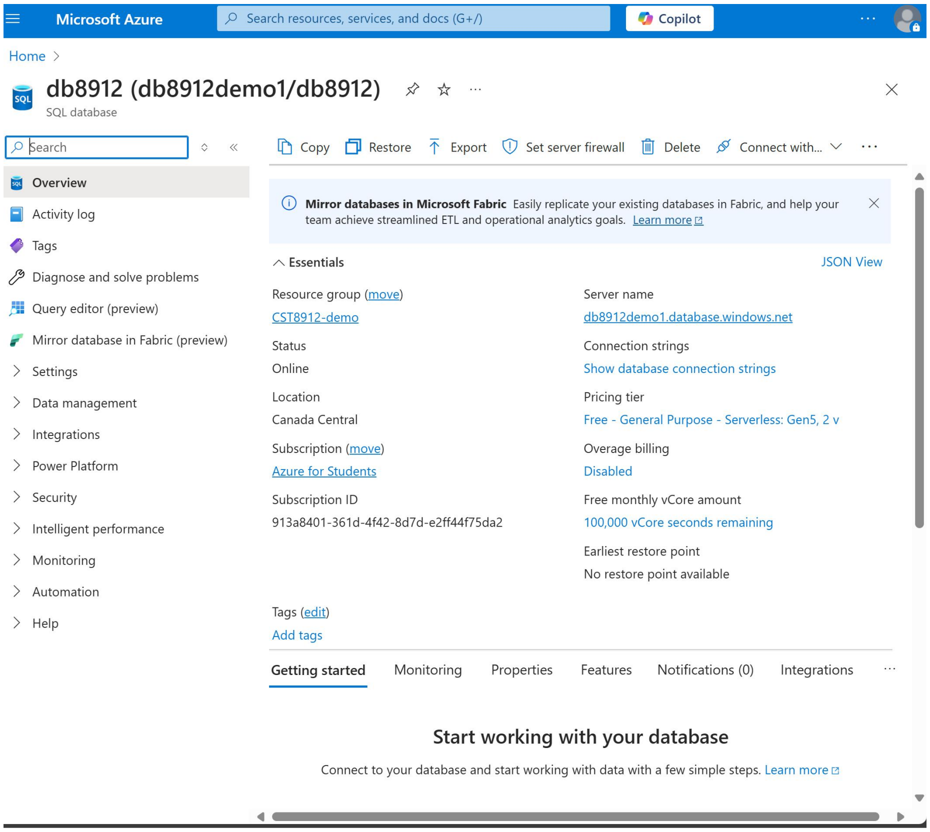
SQL
Create
< Previous
Download a template for automation

3. Enabled public endpoint connectivity and configured firewall rules to allow client IP access.
4. Used sample data for initial database setup.



Home >

db8912 (db8912demo1/db8912)

SQL database

Mirror databases in Microsoft Fabric Easily replicate your existing databases in Fabric, and help your team achieve streamlined ETL and operational analytics goals. Learn more

Essentials

Resource group (move)	Server name
CST8912-demo	db8912demo1.database.windows.net
Status	Connection strings
Online	Show database connection strings
Location	Pricing tier
Canada Central	Free - General Purpose - Serverless: Gen5, 2 v
Subscription (move)	Overage billing
Azure for Students	Disabled
Subscription ID	Free monthly vCore amount
913a8401-361d-4f42-8d7d-e2ff44f75da2	100,000 vCore seconds remaining
	Earliest restore point
	No restore point available

Tags (edit)
Add tags

Start working with your database

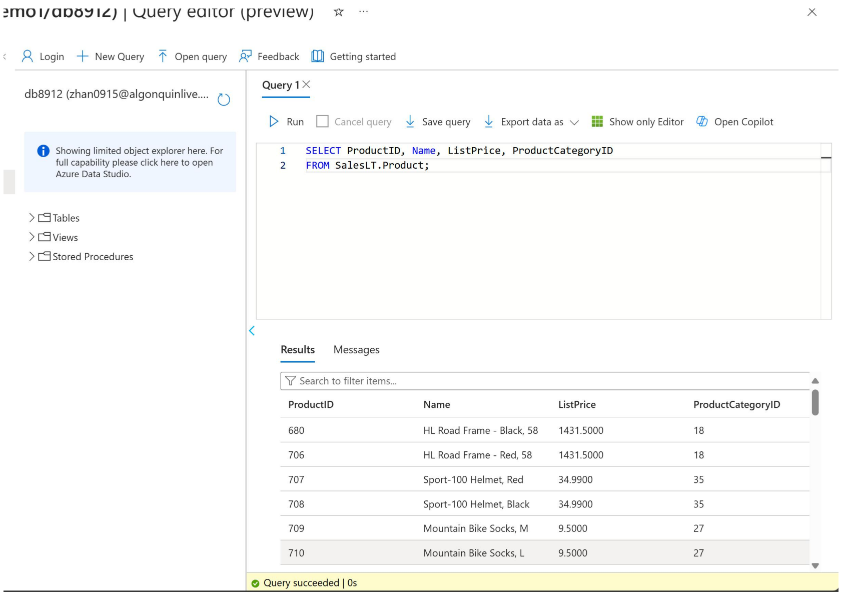
Connect to your database and start working with data with a few simple steps. Learn more

Query Execution:

1. Accessed the Query Editor (Preview) and signed in with admin credentials.
2. Executed SQL queries to retrieve data from the SalesLT.Product table and join it with the ProductCategory table:

SELECT ProductID, Name, ListPrice, ProductCategoryID

FROM SalesLT.Product;


emo1/db8912) | Query editor (preview)
Login
New Query
Open query
Feedback
Getting started
db8912 (zhan0915@algonquinlive....
Showing limited object explorer here. For full capability please click here to open Azure Data Studio.
Tables
Views
Stored Procedures
Query 1
Run
Cancel query
Save query
Export data as
Show only Editor
Open Copilot
Results
Messages
Search to filter items...

```
SELECT ProductID, Name, ListPrice, ProductCategoryID
FROM SalesLT.Product;
```

ProductID	Name	ListPrice	ProductCategoryID
680	HL Road Frame - Black, 58	1431.5000	18
706	HL Road Frame - Red, 58	1431.5000	18
707	Sport-100 Helmet, Red	34.9900	35
708	Sport-100 Helmet, Black	34.9900	35
709	Mountain Bike Socks, M	9.5000	27
710	Mountain Bike Socks, L	9.5000	27

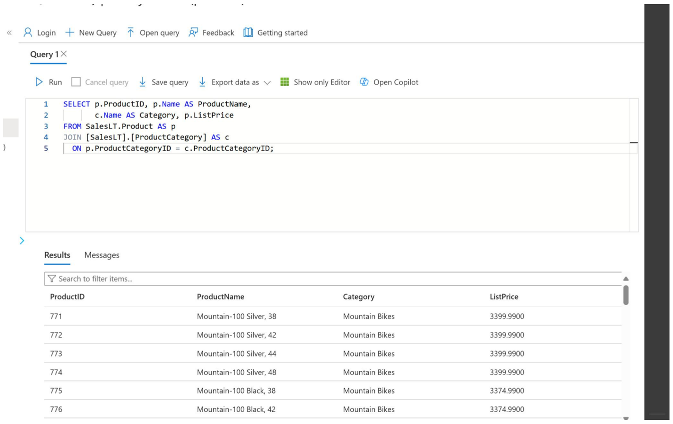
Query succeeded | 0s

SELECT p.ProductID, p.Name AS ProductName, c.Name AS Category, p.ListPrice

FROM SalesLT.Product AS p

JOIN [SalesLT].[ProductCategory] AS c

ON p.ProductCategoryID = c.ProductCategoryID;

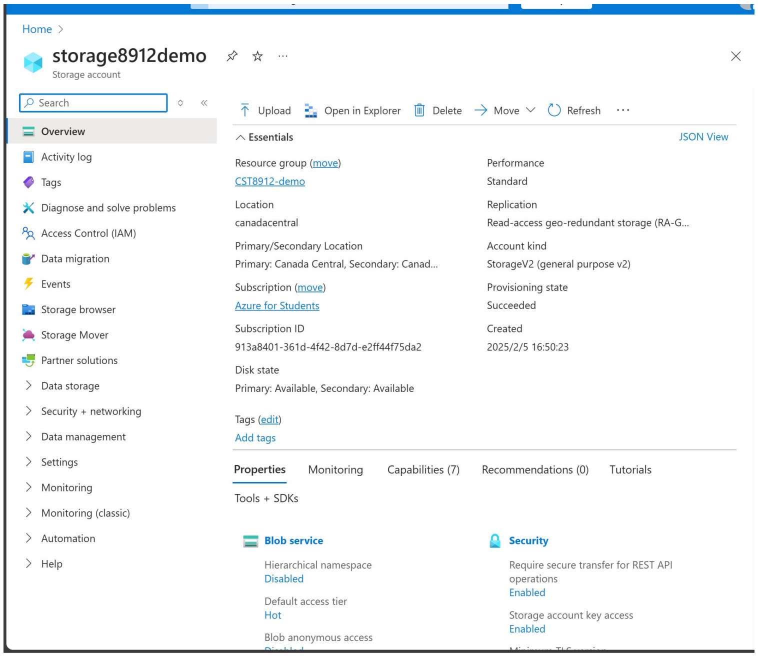


```
SELECT p.ProductID, p.Name AS ProductName,
       c.Name AS Category, p.ListPrice
FROM SalesLT.Product AS p
JOIN [SalesLT].[ProductCategory] AS c
  ON p.ProductCategoryID = c.ProductCategoryID;
```

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

Azure Storage Account Setup:

1. Created a new storage account.



Resource group (move)
CST8912-demo

Location
canadacentral

Primary/Secondary Location
Primary: Canada Central, Secondary: Canad...

Subscription (move)
Azure for Students

Subscription ID
913a8401-361d-4f42-8d7d-e2ff44f75da2

Disk state
Primary: Available, Secondary: Available

Performance
Standard

Replication
Read-access geo-redundant storage (RA-G...

Account kind
StorageV2 (general purpose v2)

Provisioning state
Succeeded

Created
2025/2/5 16:50:23

Tags (edit)
Add tags

Blob service

Hierarchical namespace
Disabled

Default access tier
Hot

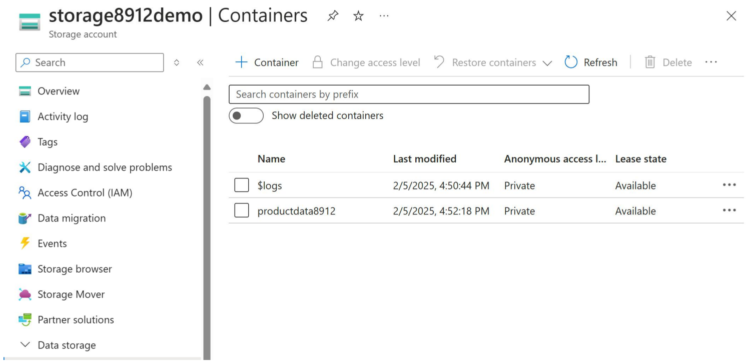
Blob anonymous access

Security

Require secure transfer for REST API operations
Enabled

Storage account key access
Enabled

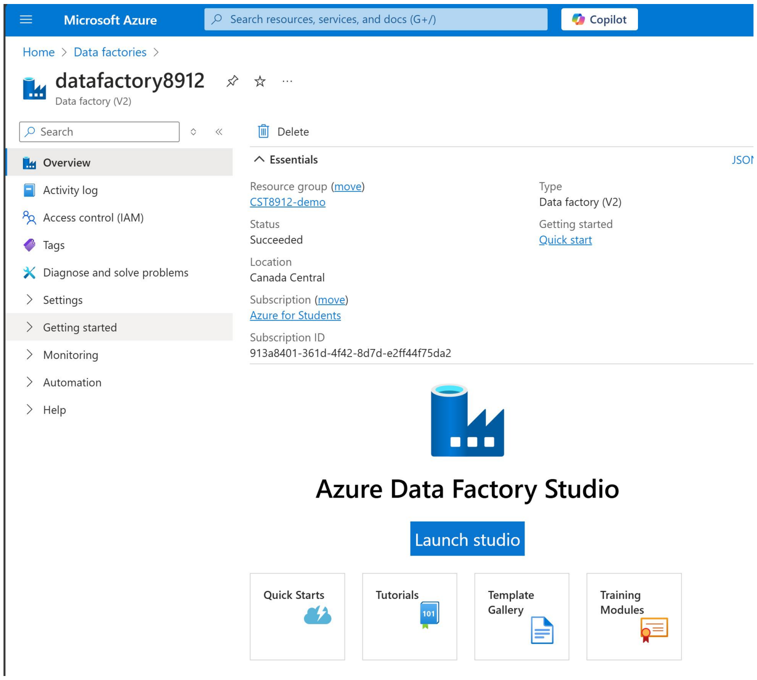
2. Created a container named **productdata8912**.



Name	Last modified	Anonymous access l...	Lease state
$logs	2/5/2025, 4:50:44 PM	Private	Available
productdata8912	2/5/2025, 4:52:18 PM	Private	Available

Azure Data Factory Configuration:

1. Created a new Azure Data Factory resource.



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Home > Data factories >

datafactory8912
Data factory (V2)

Search

- Overview
- Activity log
- Access control (IAM)
- Tags
- Diagnose and solve problems
- Settings
- Getting started
- Monitoring
- Automation
- Help

Delete

Essentials | JSON

Resource group (move)
CST8912-demo

Status
Succeeded

Location
Canada Central

Subscription (move)
Azure for Students

Subscription ID
913a8401-361d-4f42-8d7d-e2ff44f75da2

Type
Data factory (V2)

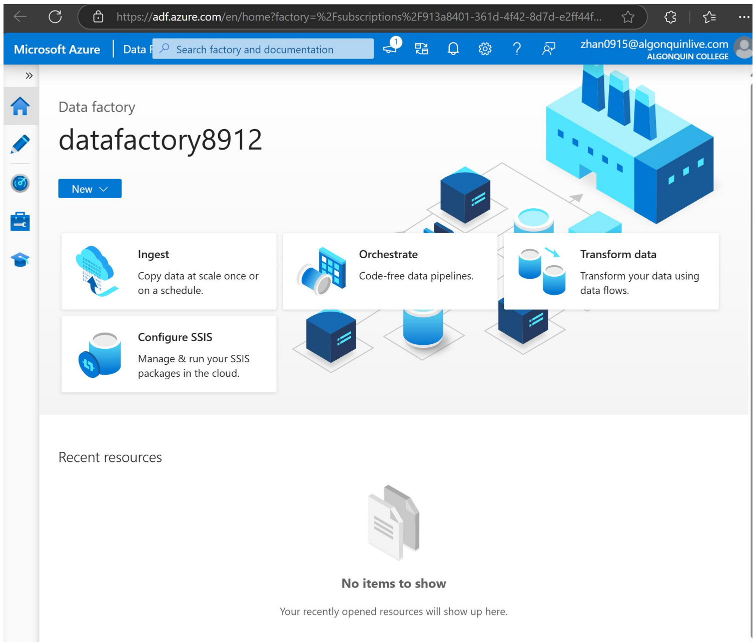
Getting started
Quick start

Azure Data Factory Studio

Launch studio

Quick Starts | Tutorials | Template Gallery | Training Modules

2. Launched Azure Data Factory Studio and selected the “Ingest Data” option.



https://adf.azure.com/en/home?factory=%2Fsubscriptions%2F913a8401-361d-4f42-8d7d-e2ff44f...

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Data factory
datafactory8912

New

Ingest
Copy data at scale once or on a schedule.

Orchestrate
Code-free data pipelines.

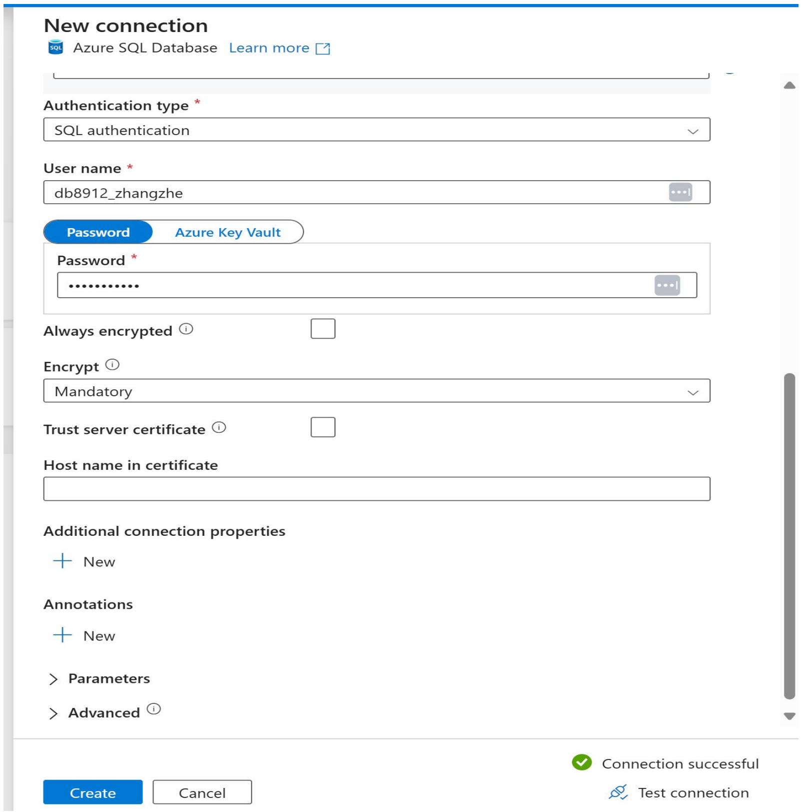
Transform data
Transform your data using data flows.

Configure SSIS
Manage & run your SSIS packages in the cloud.

Recent resources

No items to show
Your recently opened resources will show up here.

3. Configured the source as Azure SQL Database and tested the connection.



New connection

Azure SQL Database Learn more

Authentication type *

SQL authentication

User name *

db8912_zhangzhe

Password *

•••••••••••

Always encrypted □

Encrypt

Mandatory

Trust server certificate □

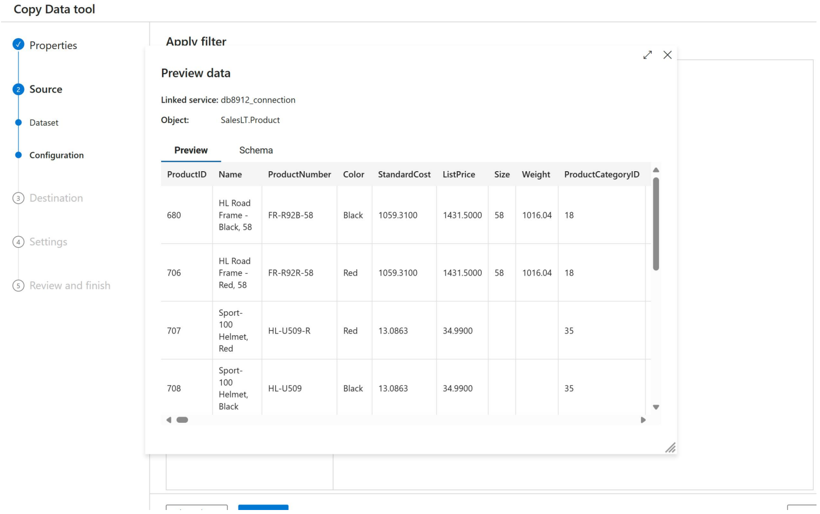
Host name in certificate

Additional connection properties

Annotations

✓ Connection successful

4. Selected the **SalesLT.Product** table as the data source.



Copy Data tool

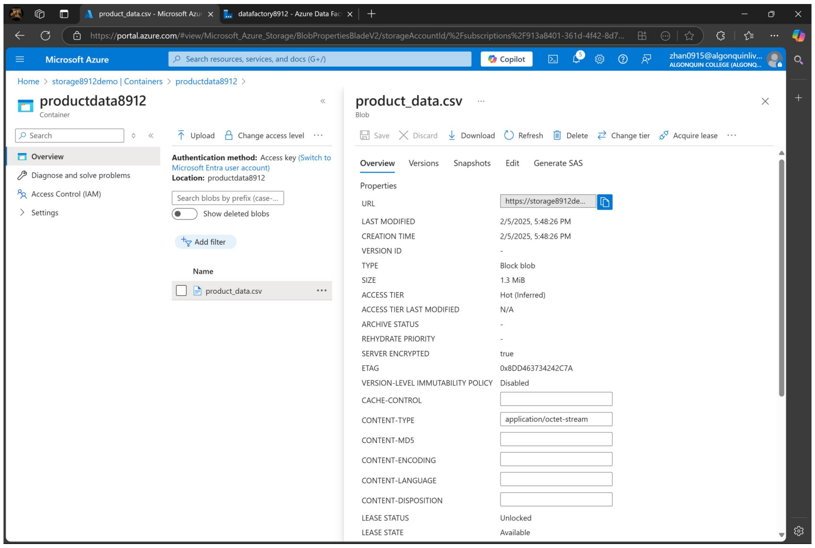
Preview data

Linked service: db8912_connection

Object: SalesLT.Product

ProductID	Name	ProductNumber	Color	StandardCost	ListPrice	Size	Weight	ProductCategoryID
680	HL Road Frame - Black, 58	FR-R92B-58	Black	1059.3100	1431.5000	58	1016.04	18
706	HL Road Frame - Red, 58	FR-R92R-58	Red	1059.3100	1431.5000	58	1016.04	18
707	Sport-100 Helmet, Red	HL-U509-R	Red	13.0863	34.9900			35
708	Sport-100 Helmet, Black	HL-U509	Black	13.0863	34.9900			35

5. Configured the destination as Azure Blob Storage, connected to the storage account, and specified the folder path and file name.
6. Ran the data pipeline to copy data.



productdata8912
Container

Authentication method: Access key (Switch to Microsoft Entra user account)
Location: productdata8912

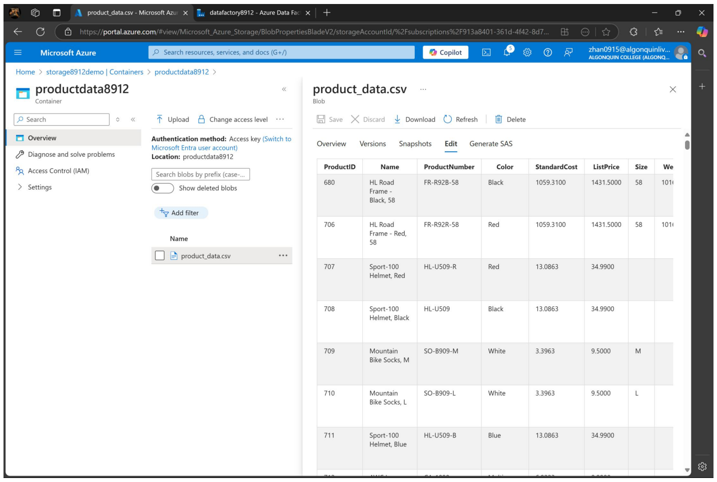
product_data.csv
Blob

Properties

URL	https://storage8912de...
LAST MODIFIED	2/5/2025, 5:48:26 PM
CREATION TIME	2/5/2025, 5:48:26 PM
VERSION ID	-
TYPE	Block blob
SIZE	1.3 MiB
ACCESS TIER	Hot (Inferred)
ACCESS TIER LAST MODIFIED	N/A
ARCHIVE STATUS	-
REHYDRATE PRIORITY	-
SERVER ENCRYPTED	true
ETAG	0x8DD463734242C7A
VERSION-LEVEL IMMUTABILITY POLICY	Disabled
CACHE-CONTROL	
CONTENT-TYPE	application/octet-stream
CONTENT-MD5	
CONTENT-ENCODING	
CONTENT-LANGUAGE	
CONTENT-DISPOSITION	
LEASE STATUS	Unlocked
LEASE STATE	Available

Verification:

1. Verified the **CSV** file in the **productdata8912** container to ensure data was copied successfully.



productdata8912
Container

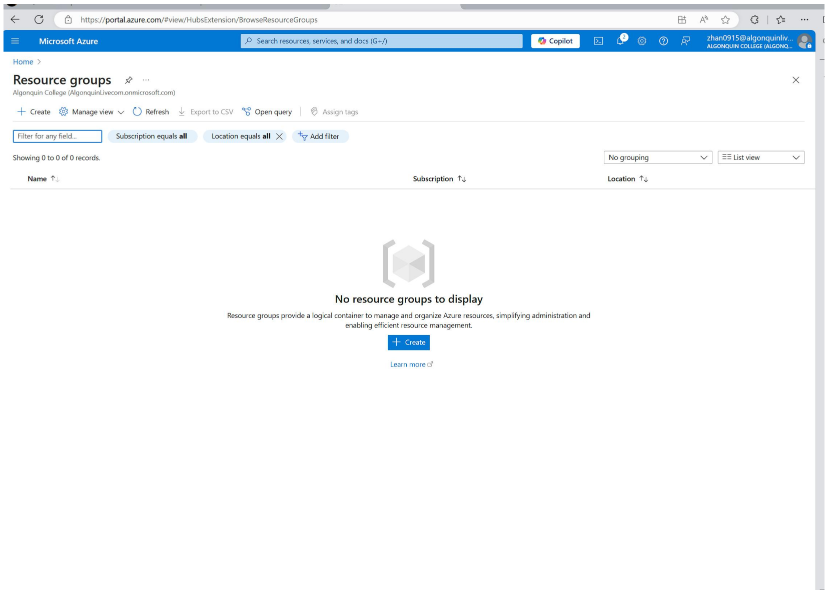
Authentication method: Access key (Switch to Microsoft Entra user account)
Location: productdata8912

product_data.csv
Blob

ProductID	Name	ProductNumber	Color	StandardCost	ListPrice	Size	We
680	HL Road Frame - Black, 58	FR-R92B-58	Black	1059.3100	1431.5000	58	101
706	HL Road Frame - Red, 58	FR-R92R-58	Red	1059.3100	1431.5000	58	101
707	Sport-100 Helmet, Red	HL-U509-R	Red	13.0863	34.9900		
708	Sport-100 Helmet, Black	HL-U509	Black	13.0863	34.9900		
709	Mountain Bike Socks, M	SO-B909-M	White	3.3963	9.5000	M	
710	Mountain Bike Socks, L	SO-B909-L	White	3.3963	9.5000	L	
711	Sport-100 Helmet, Blue	HL-U509-B	Blue	13.0863	34.9900		

Resource Cleanup:

1. Deleted all resources created during the lab to prevent unnecessary charges.



Resource groups

Algonquin College (AlgonquinLivecom.onmicrosoft.com)

Subscription equals **all** | Location equals **all** | No grouping

Showing 0 to 0 of 0 records.

No resource groups to display

Resource groups provide a logical container to manage and organize Azure resources, simplifying administration and enabling efficient resource management.

Results

- Successfully created and configured Azure SQL Database and Azure Storage.
- Verified SQL queries ran without errors, returning the expected data.
- Data was accurately transferred from SQL Database to Blob Storage.

References

- Microsoft Azure Documentation
- YouTube Tutorials:
  - Azure SQL Database Overview
  - Azure Data Factory Basics

(Insert all relevant screenshots as evidence of each step completed.)