

CST8921 – Cloud Industry Trends

Lab 5 Report

Title

Building and Managing Serverless Microservices with Azure Functions and Serverless Framework.

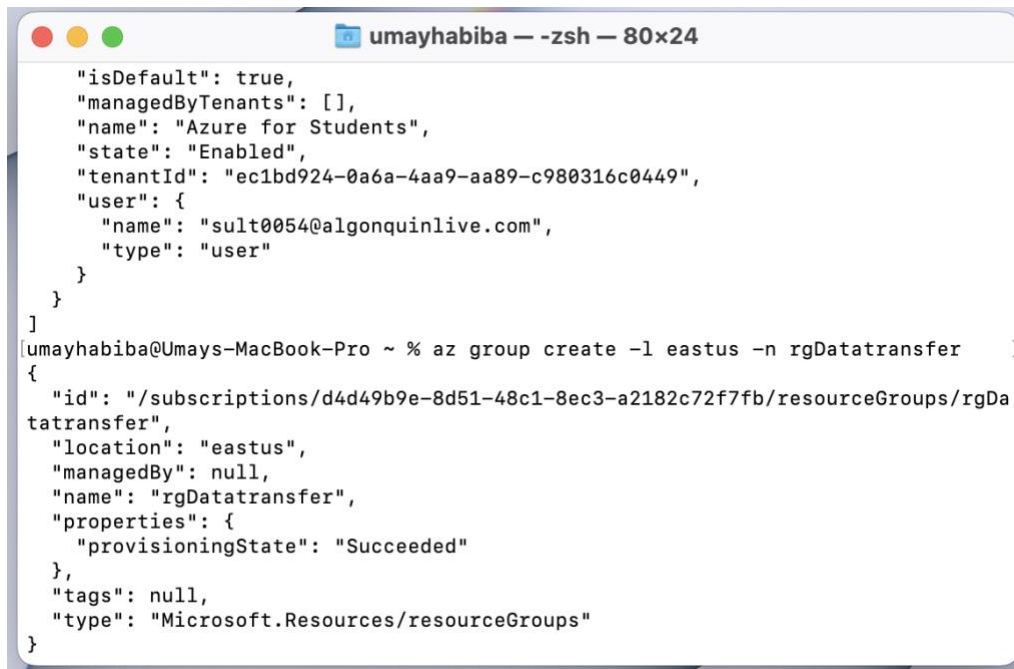
Introduction

Explore serverless computing in the cloud using Azure Functions and the Serverless Framework. Deploy a serverless microservice that migrates data from Azure Event Hubs to Synapse Analytics. Learn the basics of serverless architecture and the seamless integration of Azure services.

Steps

Step 1: Use Provided Template

Create Resource group using CLI : `az group create -l eastus -n rgDatatransfer`



```
umayhabiba --zsh -- 80x24
{
  "isDefault": true,
  "managedByTenants": [],
  "name": "Azure for Students",
  "state": "Enabled",
  "tenantId": "ec1bd924-0a6a-4aa9-aa89-c980316c0449",
  "user": {
    "name": "sult0054@algonquinlive.com",
    "type": "user"
  }
}
]
umayhabiba@Umay's-MacBook-Pro ~ % az group create -l eastus -n rgDatatransfer
{
  "id": "/subscriptions/d4d49b9e-8d51-48c1-8ec3-a2182c72f7fb/resourceGroups/rgDatatransfer",
  "location": "eastus",
  "managedBy": null,
  "name": "rgDatatransfer",
  "properties": {
    "provisioningState": "Succeeded"
  },
  "tags": null,
  "type": "Microsoft.Resources/resourceGroups"
}
```

Step 2: Execute Azure CLI Commands

1. Open Azure CLI (Bash).
2. Execute the following commands to create a resource group and deploy resources:

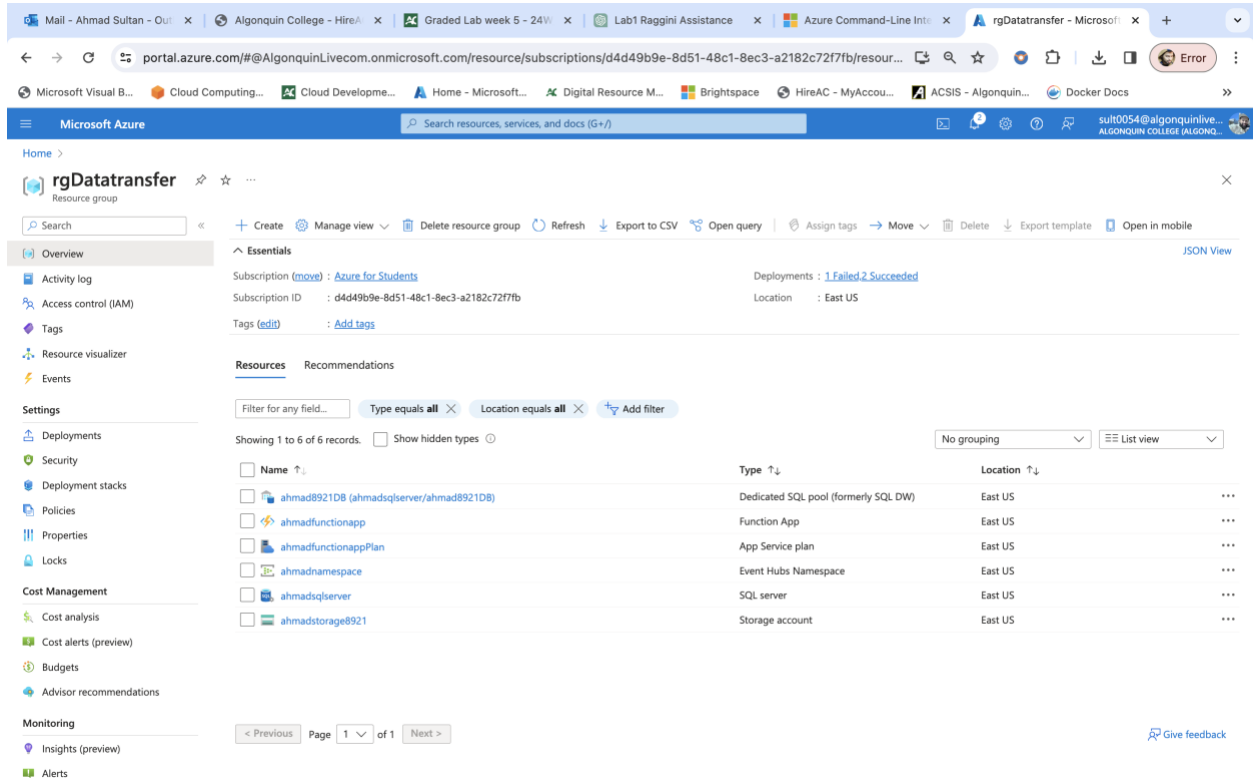
```
az deployment group create \
--resource-group rgDatatransfer \
--template-uri https://raw.githubusercontent.com/Azure/azure-docs-json-samples/master/event-grid/EventHubsDataMigration.json \
--parameters \
eventHubNamespaceName=ahmadnamespace \
eventHubName=ahmadhubdatamigration \
sqlServerName=ahmadsqlserver \
sqlServerUserName=ahmad8921 \
sqlServerPassword=ahmadP@ssw0rd123 \
sqlServerDatabaseName=ahmad8921DB \
storageName=ahmadstorage8921 \
functionAppName=ahmadfunctionapp
```

```
umayhabiba@Umay's-MacBook-Pro ~ % az deployment group create \
--resource-group rgDatatransfer \
--template-uri https://raw.githubusercontent.com/Azure/azure-docs-json-samples/master/event-grid/EventHubsDataMigration.json \
--parameters \
eventHubNamespaceName=ahmadnamespace \
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sqlServerName=ahmadsqlserver \
sqlServerUserName=ahmad8921 \
sqlServerPassword=ahmadP@ssw0rd123 \
sqlServerDatabaseName=ahmad8921DB \
storageName=ahmadstorage8921 \
functionAppName=ahmadfunctionapp

{
  "id": "/subscriptions/d4d49b9e-8d51-48c1-8ec3-a2182c72f7fb/resourceGroups/rgDatatransfer/providers/Microsoft.Resources/deployments/EventHubsDataMigration",
  "location": null,
  "name": "EventHubsDataMigration",
  "properties": {
    "correlationId": "6513e318-50c0-4604-af99-54d9a3cd32f5",
    "debugSetting": null,
    "dependencies": [
      {
        "dependsOn": [
          {
            "id": "/subscriptions/d4d49b9e-8d51-48c1-8ec3-a2182c72f7fb/resourceGroups/rgDatatransfer/providers/Microsoft.Storage/storageAccounts/ahmadstorage8921",
            "resourceGroup": "rgDatatransfer",
            "resourceName": "ahmadstorage8921",
            "resourceType": "Microsoft.Storage/storageAccounts"
          }
        ],
        "id": "/subscriptions/d4d49b9e-8d51-48c1-8ec3-a2182c72f7fb/resourceGroups/rgDatatransfer/providers/Microsoft.EventHub/namespaces/ahmadnamespace",
        "resourceGroup": "rgDatatransfer",
        "resourceName": "ahmadnamespace",
        "resourceType": "Microsoft.EventHub/namespaces"
      },
      {
        "dependsOn": [
          {
            "id": "/subscriptions/d4d49b9e-8d51-48c1-8ec3-a2182c72f7fb/resourceGroups/rgDatatransfer/providers/Microsoft.EventHub/namespaces/ahmadnamespace",
            "resourceGroup": "rgDatatransfer",
            "resourceName": "ahmadnamespace",
            "resourceType": "Microsoft.EventHub/namespaces"
          }
        ],
        "id": "/subscriptions/d4d49b9e-8d51-48c1-8ec3-a2182c72f7fb/resourceGroups/rgDatatransfer/providers/Microsoft.EventHub/namespaces/ahmadnamespace/EventHubs/ahmadhubdatamigration",
        "resourceGroup": "rgDatatransfer",
        "resourceName": "ahmadnamespace/ahmadhubdatamigration",
        "resourceType": "Microsoft.EventHub/namespaces/EventHubs"
      }
    ],
    "dependsOn": [
      {
        "id": "/subscriptions/d4d49b9e-8d51-48c1-8ec3-a2182c72f7fb/resourceGroups/rgDatatransfer/providers/Microsoft.Sql/servers/ahmadsqlserver",
        "resourceGroup": "rgDatatransfer",
        "resourceName": "ahmadsqlserver",
        "resourceType": "Microsoft.Sql/servers"
      },
      {
        "id": "/subscriptions/d4d49b9e-8d51-48c1-8ec3-a2182c72f7fb/resourceGroups/rgDatatransfer/providers/Microsoft.Sql/servers/ahmadsqlserver/databases/ahmad8921DB",
        "resourceGroup": "rgDatatransfer",
        "resourceName": "ahmadsqlserver/ahmad8921DB",
        "resourceType": "Microsoft.Sql/servers/databases"
      }
    ]
  }
}
```

Step 3:

Confirm the resources is created



Microsoft Azure portal interface showing the 'rgDatatransfer' resource group. The 'Resources' tab is active, displaying a table of resources created in the East US location.

Subscription (move): [Azure for Students](#)
Subscription ID: d4d49b9e-8d51-48c1-8ec3-a2182c72f7fb
Location: East US
Deployments: 1 Failed 2 Succeeded

Tags (edit): [Add tags](#)

Resources Recommendations

Filter for any field... Type equals all Location equals all Add filter

Showing 1 to 6 of 6 records. Show hidden types

Name	Type	Location
ahmad8921DB (ahmadsqlserver/ahmad8921DB)	Dedicated SQL pool (formerly SQL DW)	East US
ahmadfunctionapp	Function App	East US
ahmadfunctionappPlan	App Service plan	East US
ahmadnamespace	Event Hubs Namespace	East US
ahmadsqlserver	SQL server	East US
ahmadstorage8921	Storage account	East US

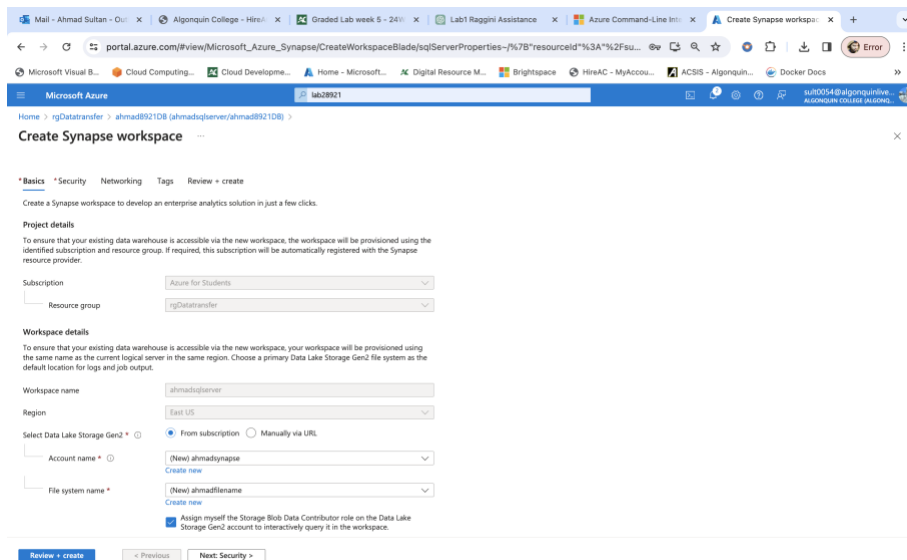
Navigation: < Previous Page 1 of 1 Next >

Give feedback

Step 4:

Create Table in Azure Synapse Analytics

1. In the Azure portal, navigate to the Synapse Analytics resource.
2. Select "Dedicated SQL pool" and then "Query editor (preview)."
3. Enter your username and password.
4. Run the SQL script provided to create the "Fact_WindTurbineMetrics" table.



Create Synapse workspace

* Basics * Security Networking Tags Review + create

Create a Synapse workspace to develop an enterprise analytics solution in just a few clicks.

Project details

To ensure that your existing data warehouse is accessible via the new workspace, the workspace will be provisioned using the identified subscription and resource group. If required, this subscription will be automatically registered with the Synapse resource provider.

Subscription: Azure for Students
Resource group: rgDataTransfer

Workspace details

To ensure that your existing data warehouse is accessible via the new workspace, your workspace will be provisioned using the same name as the current logical server in the same region. Choose a primary Data Lake Storage Gen2 file system as the default location for logs and job output.

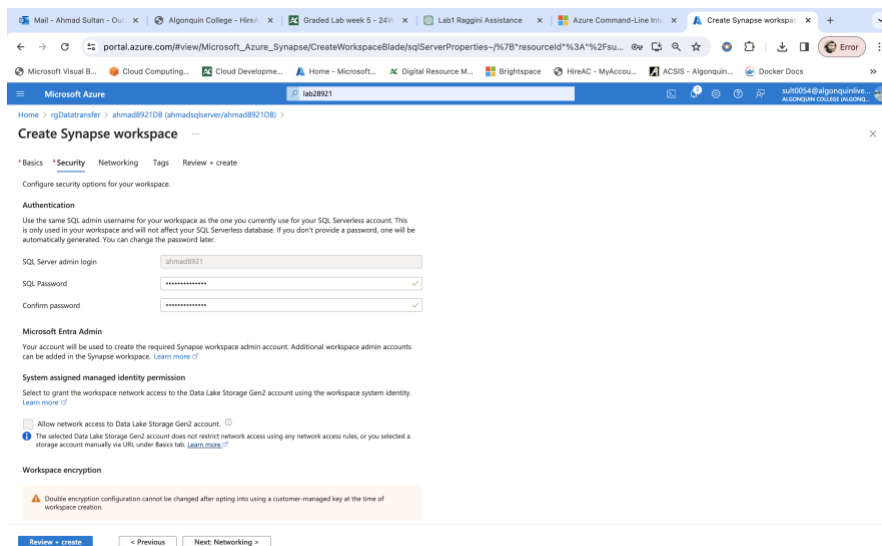
Workspace name: ahmadqlserver
Region: East US

Select Data Lake Storage Gen2: From subscription (selected) Manually via URL

Account name: (New) ahmadqlstorage
File system name: (New) ahmadqlstorage

☒ Assign myself the Storage Blob Data Contributor role on the Data Lake Storage Gen2 account to interactively query it in the workspace.

[Review + create](#) [< Previous](#) [Next Security >](#)



Create Synapse workspace

* Basics * Security Networking Tags Review + create

Configure security options for your workspace.

Authentication

Use the same SQL admin username for your workspace as the one you currently use for your SQL Serverless account. This is only used in your workspace and will not affect your SQL Serverless database. If you don't provide a password, one will be automatically generated. You can change the password later.

SQL Server admin login: ahmadqlserver
SQL Password:
Confirm password:

Microsoft Entra Admin

Your account will be used to create the required Synapse workspace admin account. Additional workspace admin accounts can be added in the Synapse workspace. [Learn more](#)

System assigned managed identity permission

Select to grant the workspace network access to the Data Lake Storage Gen2 account using the workspace system identity. [Learn more](#)

☐ Allow network access to Data Lake Storage Gen2 account.

Workspace encryption

Double encryption configuration cannot be changed after opting into using a customer-managed key at the time of workspace creation.

[Review + create](#) [< Previous](#) [Next: Networking >](#)

Microsoft Azure

Home > rgDataTransfer > ahmad8921DB (ahmadsqlserver/ahmad8921DB)


Create Synapse workspace

Validation succeeded

* Basics * Security Networking Tags Review + create

Product Details

Azure Synapse Analytics workspace by Microsoft

Serverless SQL est. cost/TB 

5.00 USD

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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	rgDataTransfer
Region	East US
Workspace name	(new) ahmadsqlserver
Data Lake Storage Gen2 account	(new) https://ahmadsynapse.dfs.core.windows.net
Data Lake Storage Gen2 file system	(new) ahmadfilename
Managed resource group	None
Role assignments	The Storage Blob Data Contributor role will be assigned on the specified Data Lake Storage Gen2 account to both the workspace managed identity and the current user.

[Create](#) [< Previous](#) [Next >](#)

Step 5:

Enter your username and password and if there is any message about allowing client on access to server then select allowlist IP <your address> on server <your sql server> and select OK

Microsoft Azure

Home > Microsoft Azure Synapse Analytics - 20240206183225 | Overview > rgDataTransfer > ahmad8921DB (ahmadsqlserver/ahmad8921DB)

ahmad8921DB (ahmadsqlserver/ahmad8921DB) | Query editor (preview)

Dedicated SQL pool (formerly SQL DW)

Search Login + New Query Open query Feedback Getting started

Settings

- Workload management
- Maintenance schedule
- Quick start
- Geo-backup policy
- Connection strings
- Properties
- Locks

Security

- Auditing
- Data Discovery & Classification
- Dynamic Data Masking
- Microsoft Defender for Cloud
- Transparent data encryption

Common Tasks

- Query editor (preview)
- Build dashboards + reports
- Model and cache data
- Open in Visual Studio

Monitoring

Query editor (preview) is a tool to run SQL queries against Azure SQL Database in the Azure portal. It is designed for lightweight querying and object exploration in your database. For more information and troubleshooting, [Learn more](#)

Welcome to SQL Database Query Editor

SQL server authentication

Login *

ahmad8921

Password *

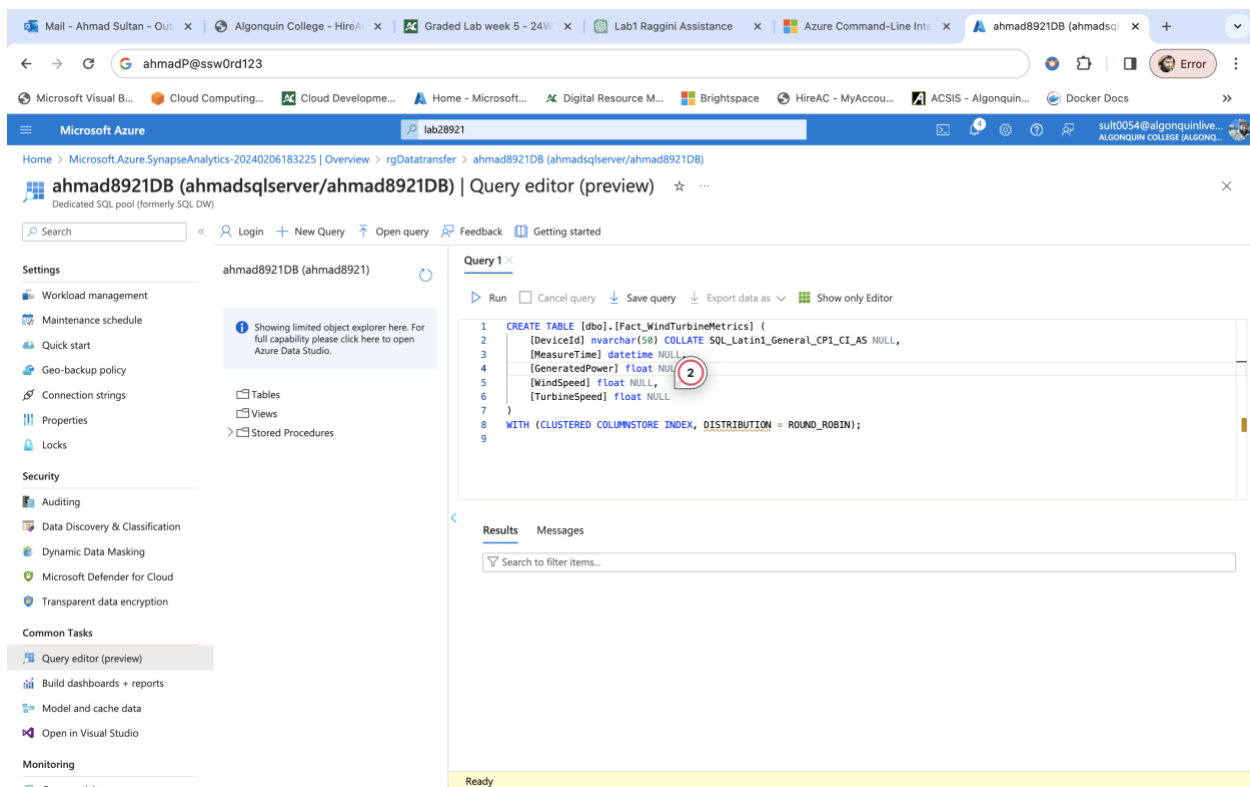
OK

Microsoft Entra authentication

[Continue as suh0054@algonquinlive.com](#)

Step 6: In query window, copy and run the following script

```
CREATE TABLE [dbo].[Fact_WindTurbineMetrics] (
    [DeviceId] nvarchar(50) COLLATE SQL_Latin1_General_CP1_CI_AS NULL,
    [MeasureTime] datetime NULL,
    [GeneratedPower] float NULL,
    [WindSpeed] float NULL,
    [TurbineSpeed] float NULL
)
WITH (CLUSTERED COLUMNSTORE INDEX, DISTRIBUTION = ROUND_ROBIN);
```



The screenshot displays the Microsoft Azure portal interface for the 'ahmad8921DB' database. The 'Query editor (preview)' is active, showing the following SQL script:

```
1 CREATE TABLE [dbo].[Fact_WindTurbineMetrics] (
2     [DeviceId] nvarchar(50) COLLATE SQL_Latin1_General_CP1_CI_AS NULL,
3     [MeasureTime] datetime NULL,
4     [GeneratedPower] float NULL,
5     [WindSpeed] float NULL,
6     [TurbineSpeed] float NULL
7 )
8 WITH (CLUSTERED COLUMNSTORE INDEX, DISTRIBUTION = ROUND_ROBIN);
9
```

The interface includes a left sidebar with navigation options such as 'Settings', 'Security', and 'Common Tasks'. The main area shows the query editor with a 'Run' button and a 'Results' section below. The status bar at the bottom indicates 'Ready'.

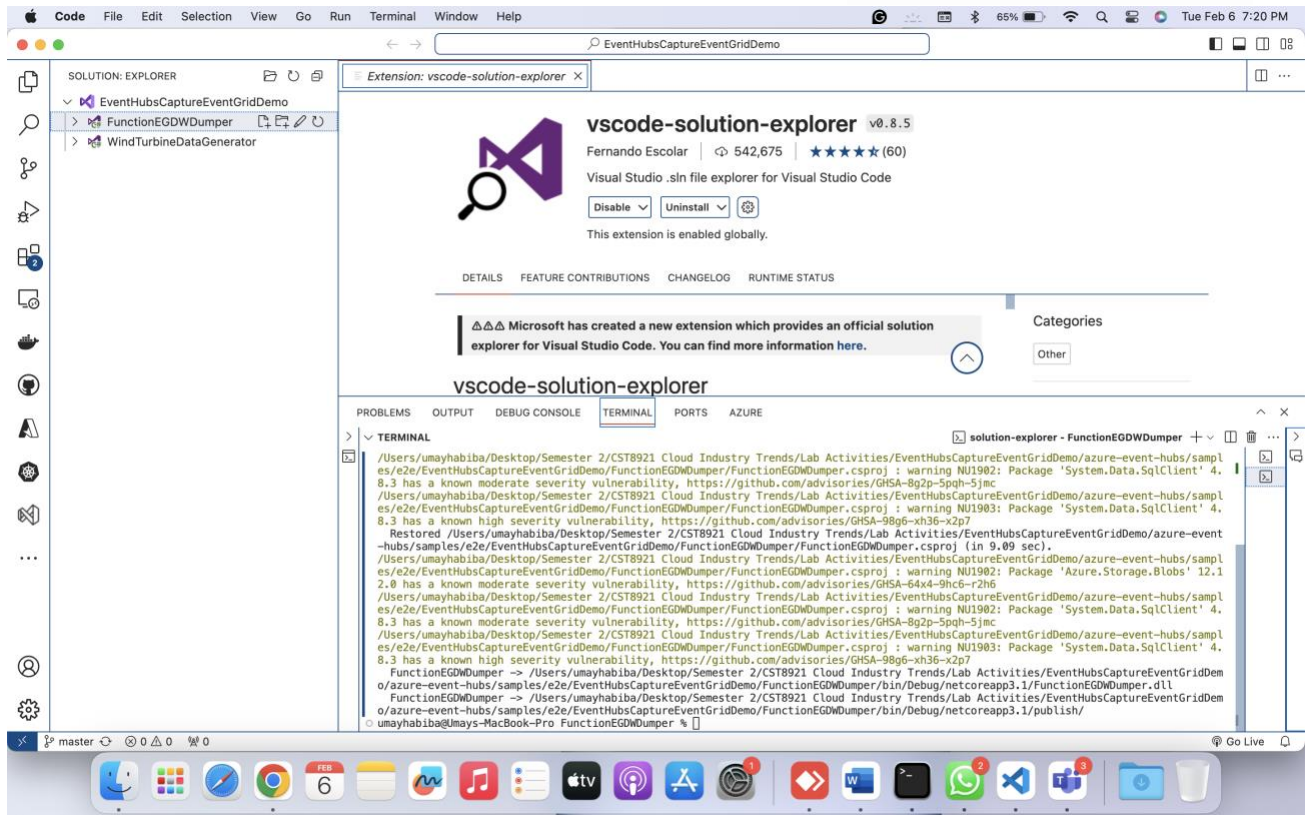
The screenshot shows the Microsoft Azure portal interface for the 'ahmad8921DB' database. The 'Query editor (preview)' is open, displaying a SQL query to create a table named 'Fact_WindTurbineMetrics'. The query is as follows:

```
1 CREATE TABLE [dbo].[Fact_WindTurbineMetrics] (
2   [DeviceId] nvarchar(50) COLLATE SQL_Latin1_General_CP1_CI_AS NULL,
3   [MeasureTime] datetime NULL,
4   [GeneratedPower] float NULL,
5   [WindSpeed] float NULL,
6   [TurbineSpeed] float NULL
7 )
8 WITH (CLUSTERED COLUMNSTORE INDEX, DISTRIBUTION = ROUND_ROBIN);
9
```

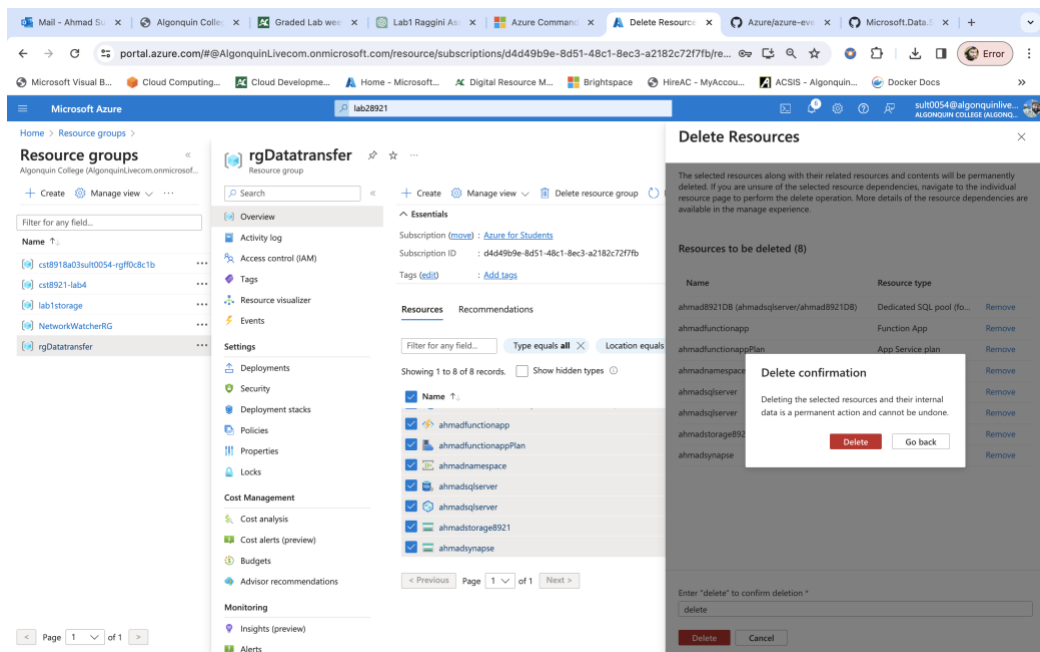
The interface also shows a left sidebar with various settings and a bottom status bar indicating 'Query succeeded | 2s'.

Step 7:

1. Publish azure function app
2. In VS code, open eventshubcaptureeventgriddemo.sln Download [GitHub](#) and save the file into the FunctionEGDDumper subfolder of the EventHubsCaptureEventGridDemo folder.
3. In Solution Explorer, right-click FunctionEGDWDumper project, and select Publish.
4. In the following screen, select Start or Add a publish profile.
5. In the Publish dialog box, select Import Profile for Target, and select Next.
6. On the Import profile tab, select the publish settings file that you saved earlier in the FunctionEGDWDumper folder, and then select Finish.
7. When Visual Studio has configured the profile, select Publish. Confirm that the publishing succeeded.



Step 8: Delete resources after lab



Results

By the end of this lab, we will have successfully deployed a serverless solution for data migration, leveraging Azure Functions and Event Grid. Gain insights into serverless computing principles and the management of serverless applications using the Serverless Framework. Unfortunately, we were not able to complete lab 5, last step, which is publishing the app was giving a problem. I will try to work but now submitting all the steps completed.