

# Azure Setup Guide

## Introduction

In the following assignments, you will learn how to set up and use a cloud-hosted database. Thus, your first step will be to set up a SQLServer database in the Azure cloud service and import the flight data. This step is tedious but important: we want you to be able to continue using Azure after the class ends! So, you need to know how to set up the entire system starting from nothing.

**NOTE: These steps take several hours to complete, so start early!**

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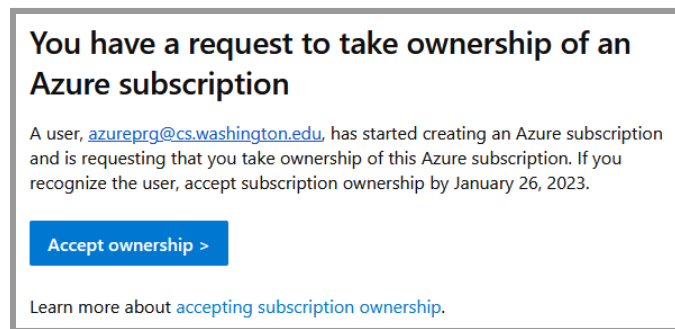
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# Instructions

## Step 1: Create an Azure account and login to Azure portal



- A. You should have an email with the subject "You've been asked to accept Azure subscription ownership". Make sure you are logged into that account, **and only that account**, when you click on the link.
  - a. Eg, if you have an @cs and an @uw account and the mail was sent to your @uw, then you should ONLY be signed into your @uw account.
- B. Click "Accept ownership" to be forwarded to the Azure [portal](#).
- C. Click "Review + accept"

**Accept subscription ownership**

Feedback

Basics Advanced Tags Review + accept

**i** Review the details of this subscription and click Review + accept when you are finished. Some of these properties cannot be modified. If you would like them to be modified, please create another subscription.

A subscription is a container used to provision resources in Azure. It holds the details of all your resources like virtual machines (VM), databases, and more. When you create an Azure resource like a VM, you identify the subscription it belongs to. As you use the VM, the usage of the VM is aggregated and billed monthly.

Subscription details

Subscription name \*

Requesting user

[Review + accept](#) [Previous](#) [Next](#)

- D. Click "Accept"

[Accept](#) [Previous](#) [Next](#)

*The above screenshot shows an example of a subscription; your information will be different. If you have any questions, please contact the course staff.*

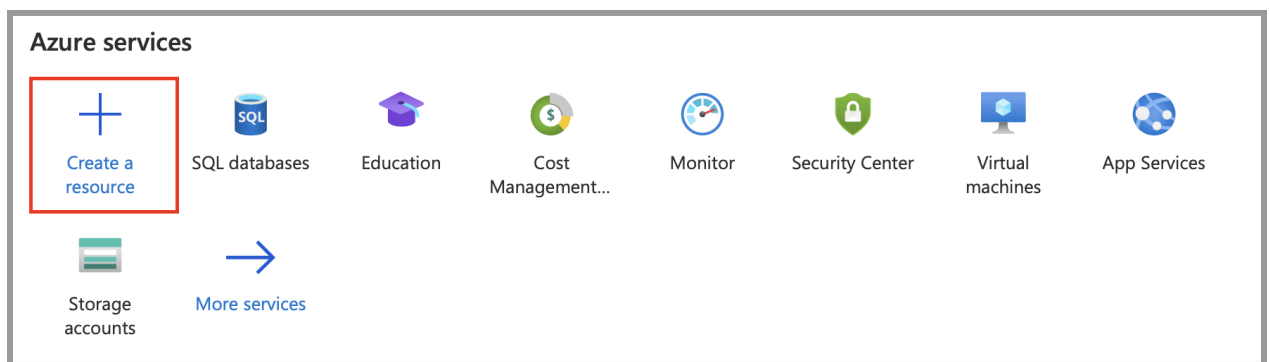
## Step 2: Learn about Azure and SQLServer

Spend some time clicking around, reading documentation, watching tutorials, and generally familiarizing yourself with Azure (the cloud service) and SQLServer (the RDMS).

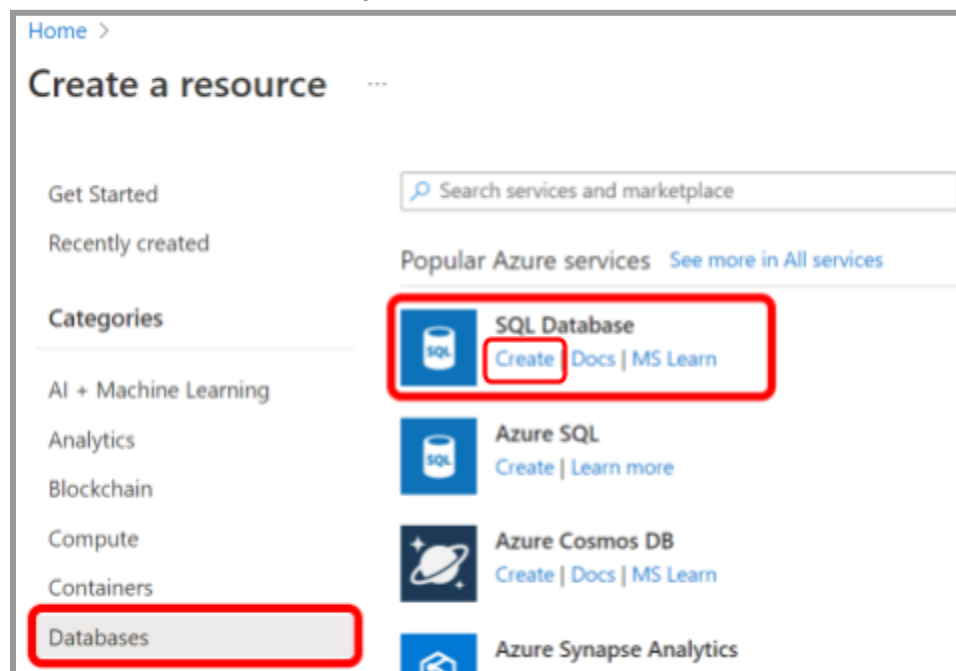
- [SQL Server Tutorial For Beginners](#)
- [SQL Server Technical Documentation](#)
- [SQL Server Tutorial](#)
- [Transact-SQL Reference](#)

## Step 3: Create the database

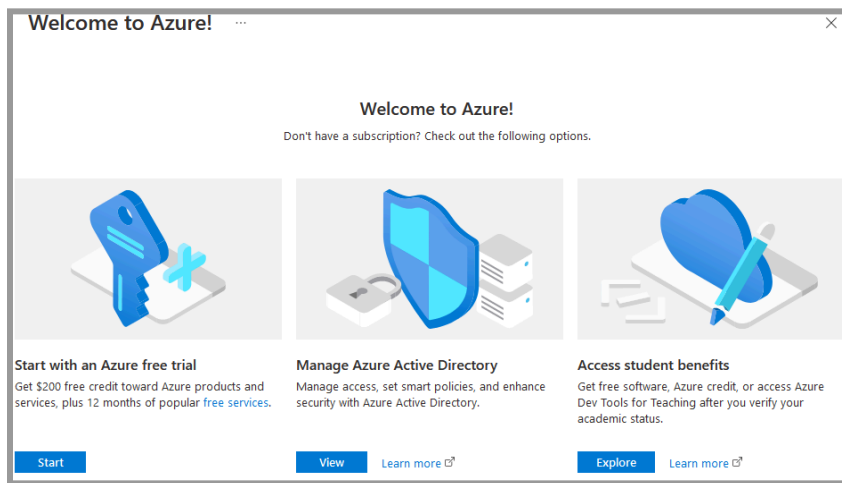
- A. Navigate to the [Azure portal](#).
- B. Under “Azure services”, select “Create a resource”



- C. Select “Databases” under Categories, and then select “Create” for “SQL Database”.



- D. If you see the “Welcome to Azure” screen, your subscription is not currently active. Please ensure that you have completed Step 1 and contact the course staff if you have questions.



- E. Make sure that your “Subscription” is **NOT** set to “Free Trial” or “Azure for Students”. The correct subscription name will either:
- mention “Homework 3”
  - or mention “Microsoft Azure Sponsorship”
  - or mention CSE 344 or CSE 414

Subscription \* ⓘ

*The above screenshot shows an example of a subscription; your information will be different. If you have any questions, please contact the course staff.*

- F. Under Subscription, create a new resource group with a name of your choice.

Resource group \* ⓘ  [Create new](#)

- G. Choose a database name.

Database name \*

H. Create a new server.



Server \* ⓘ Select a server Create new

a. Choose a server name

**\*\*\*Do not use the @ symbol in your server name!\*\*\***

This naming requirement is strictly necessary for future homeworks. If you do not follow this advice, you'll have to reset your login information later.

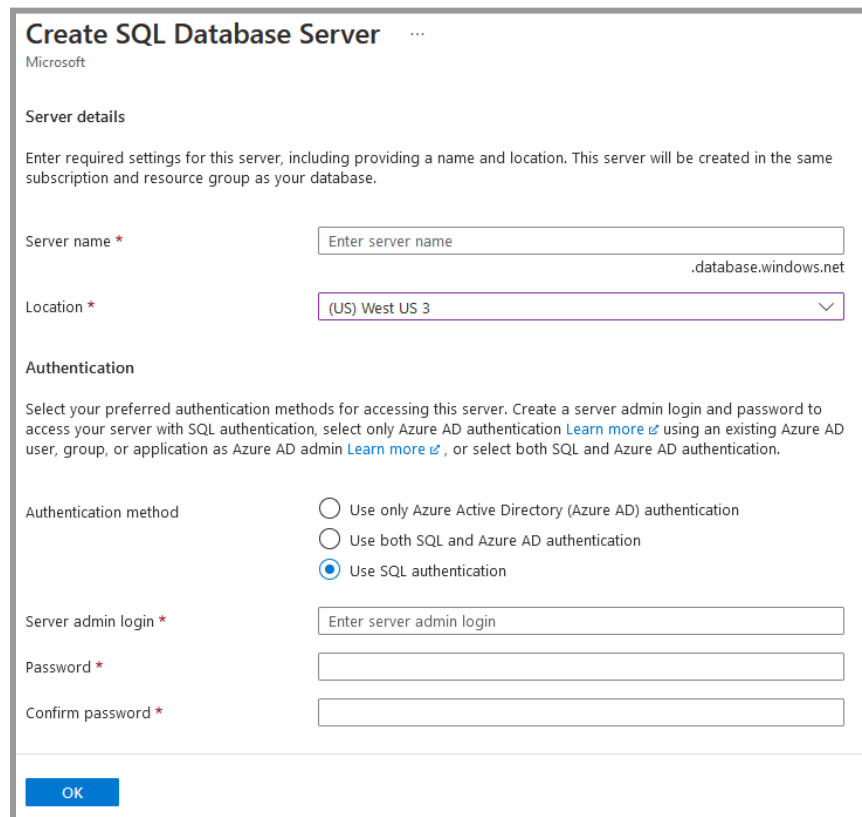
b. Choose the server location that's closest to you

- For example, if you're located in Seattle and one of the "US West" locations is available, choose that location
- If none of the US West locations are available, you can pick another location

c. Set the authentication method to "Use SQL authentication".

d. Select an admin login and password; **don't lose these values!** Once again,

**\*\*\*Do not use the @ symbol in your admin login or password!\*\*\***



**Create SQL Database Server** ...

Microsoft

**Server details**

Enter required settings for this server, including providing a name and location. This server will be created in the same subscription and resource group as your database.

Server name \*  .database.windows.net

Location \* (US) West US 3

**Authentication**

Select your preferred authentication methods for accessing this server. Create a server admin login and password to access your server with SQL authentication, select only Azure AD authentication [Learn more](#) using an existing Azure AD user, group, or application as Azure AD admin [Learn more](#), or select both SQL and Azure AD authentication.

Authentication method

☐ Use only Azure Active Directory (Azure AD) authentication

☐ Use both SQL and Azure AD authentication


☒ Use SQL authentication

Server admin login \*

Password \*

Confirm password \*

I. Ensure that "Want to use SQL elastic pool?" is set to **NO**.



Want to use SQL elastic pool? \* ⓘ ☐ Yes ☒ No

J. Under Workload Environment, select Production

Workload environment

☐ Development
   
☒ Production

- K. **VERY IMPORTANT:** Under “Compute + storage”, do **NOT** use the default “General Purpose” as this costs about \$400 per month and you will burn through your credits before you finish the assignment. (We want Standard S0: 10 DTUs, and 250 GB storage.)

Compute + storage \* ⓘ

#### General Purpose

Standard-series (Gen5), 2 vCores, 32 GB storage, zone redundant disabled

[Configure database](#)

Click on “Configure database” and in the next screen, set the Service Tier to “Standard”.

Service tier

Standard (Budget friendly) ▾

[Compare service tiers](#)

The estimated cost should be around \$15 per month. If you don’t see this price, go back to the previous step and make sure you have configured the service tier correctly.

#### Service and compute tier

Select from the available tiers based on the needs of your workload. The vCore model provides a wide range of configuration controls and offers Hyperscale and Serverless to automatically scale your database based on your workload needs. Alternately, the DTU model provides set price/performance packages to choose from for easy configuration. [Learn more](#)

Service tier Standard (For workloads with typical performance requirements) ▾


[Compare service tiers](#)

DTUs [Compare DTU options](#)

10

Data max size (GB)

250



#### Cost summary

<b>Standard (S0)</b>	
Cost per DTU (in USD)	1.47
DTUs selected	x 10
<b>ESTIMATED COST / MONTH</b>	<b>14.72 USD</b>

- L. Click on "Apply" at the bottom of the page.

Apply

- M. Click on “Next: Networking” at the bottom of the page.

Review + create

Next : Networking >

- N. For “Connectivity method”, select “Public endpoint”.

Connectivity method \* ⓘ

☐ No access

☒ Public endpoint

☐ Private endpoint

- O. Under “Firewall rules”, ensure that “Allow Azure services and resources to access this server” is set to “Yes”.

**Firewall rules**

Setting 'Allow Azure services and resources to access this server' to Yes allows communications from all resources inside the Azure boundary, that may or may not be part of your subscription. [Learn more](#) ⓘ

Setting 'Add current client IP address' to Yes will add an entry for your client IP address to the server firewall.

Allow Azure services and resources to access this server \* ☐ No ☒ Yes

Add current client IP address \* ☐ No ☐ Yes

- P. Click on “Next: Security” at the bottom of the page.

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

- Q. Ensure “Microsoft Defender for SQL” is set to “Not now”.

**Microsoft Defender for SQL**

Protect your data using Microsoft Defender for SQL, a unified security package including vulnerability assessment and advanced threat protection for your server. [Learn more](#) ⓘ

Get started with a 30 day free trial period, and then 15 USD/server/month.

Enable Microsoft Defender for SQL \* ⓘ ☐ Start free trial

☒ Not now

- R. Click on “Next: Additional settings” at the bottom of the page.

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

- S. Under “Data source”, ensure that “Use existing data” is set to “None”.

**Data source**  
Start with a blank database, restore from a backup or select sample data to populate your new database.  
Use existing data \* None Backup Sample

**Database collation**  
Database collation defines the rules that sort and compare data, and cannot be changed after database creation. The default database collation is SQL\_Latin1\_General\_CP1\_CI\_AS. [Learn more](#) [🔗](#)  
Collation \* ⓘ SQL\_Latin1\_General\_CP1\_CI\_AS  
[Find a collation](#)

- T. Click on “Review + create” at the bottom of the page.

Review + create < Previous Next : Tags >

- U. Click on “Create” at the bottom of the page.

Create < Previous [Download a template for automation](#)

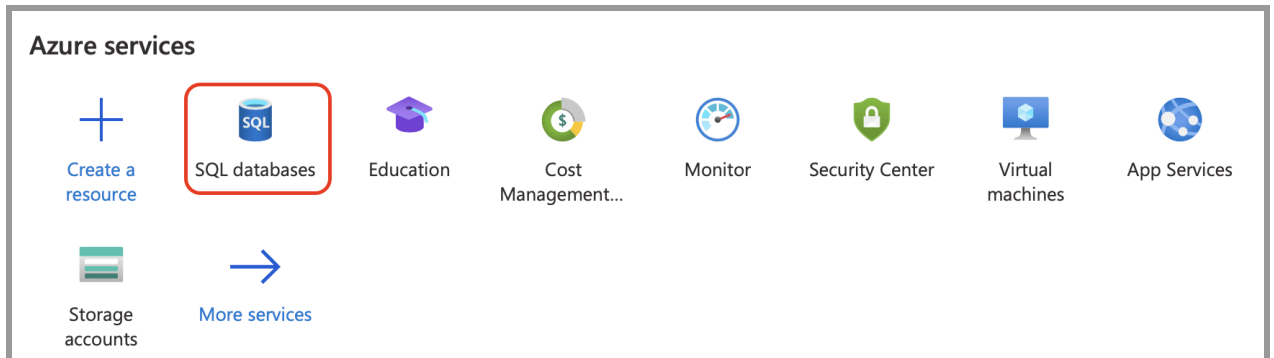
- V. Wait a few minutes! If you encounter any issues, please contact the course staff!

... Deployment is in progress



## Step 4: Set the Server Firewall

- A. Once the deployment is complete, navigate to [Azure portal](#). Under “Azure services”, click on “SQL database”.

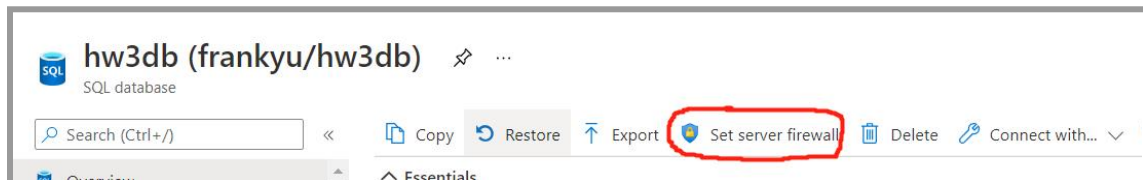


- B. Click on the database that you just created.

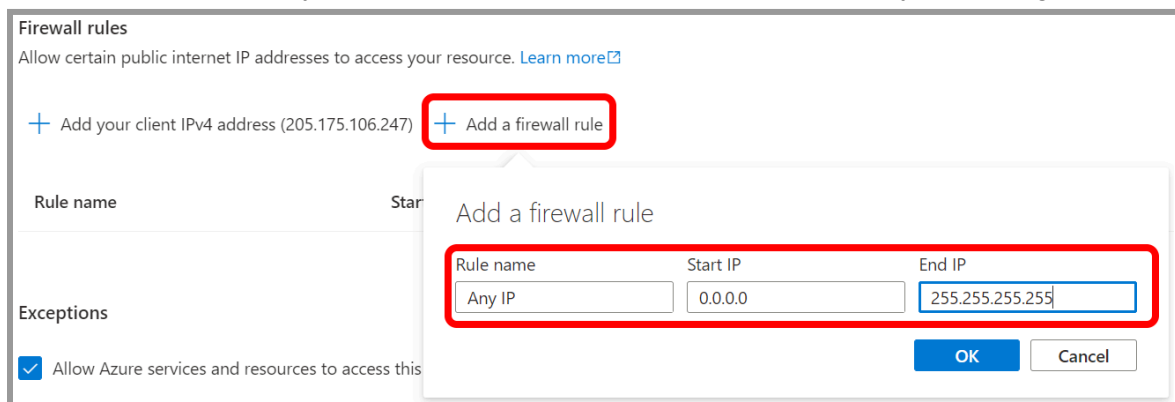


*The above screenshot shows an example of a database; yours will be named differently.  
If you have any questions, please contact the course staff.*

- C. At the top of the page, click on “Set server firewall”.



- D. Add a new firewall rule that allows connections from any client. For “Start IP”, type in “0.0.0.0”, for “End IP”, type in “255.255.255.255”. Remember to save your settings!



### Firewall rules

Allow certain public internet IP addresses to access your resource. [Learn more](#)

+ Add your client IPv4 address (76.135.170.188)

+ Add a firewall rule

Rule name	Start IPv4 address	End IPv4 address	
<input type="text" value="Any IP"/>	<input type="text" value="0.0.0.0"/>	<input type="text" value="255.255.255.255"/>	

### Exceptions

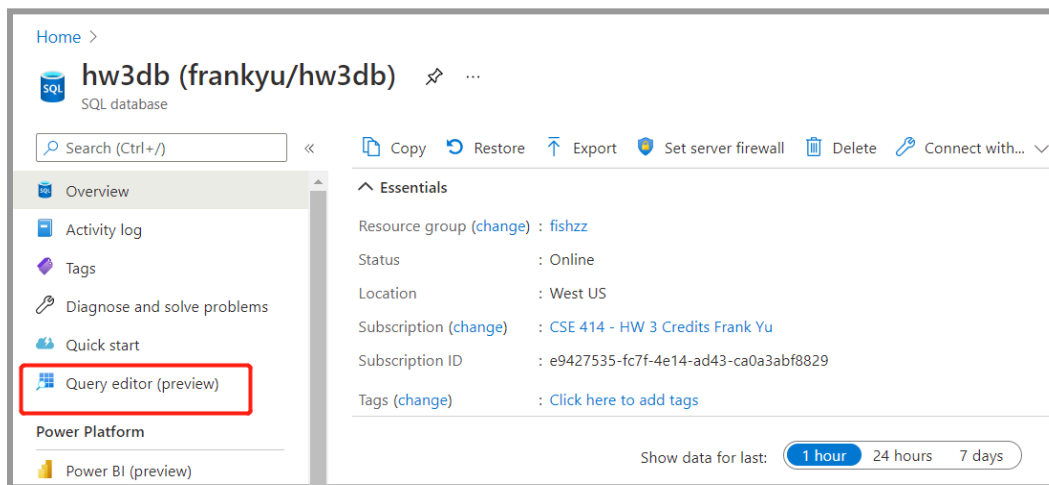
☒ Allow Azure services and resources to access this server ⓘ

E. You have successfully set up your first SQLServer database on Azure!

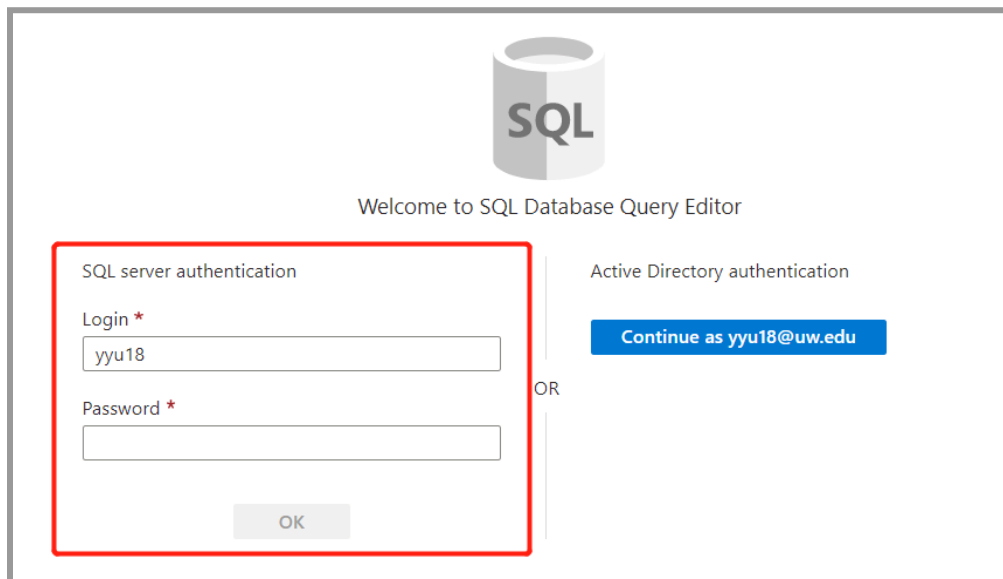
## Step 5: Try out the built-in Query editor

The simplest way to play with the database is using the built-in Query editor. To launch this:

- A. Navigate to the SQL database you just created.
- B. Click on “Query editor (preview).”



- C. Log in using the admin login and password you created above (Step 3H).



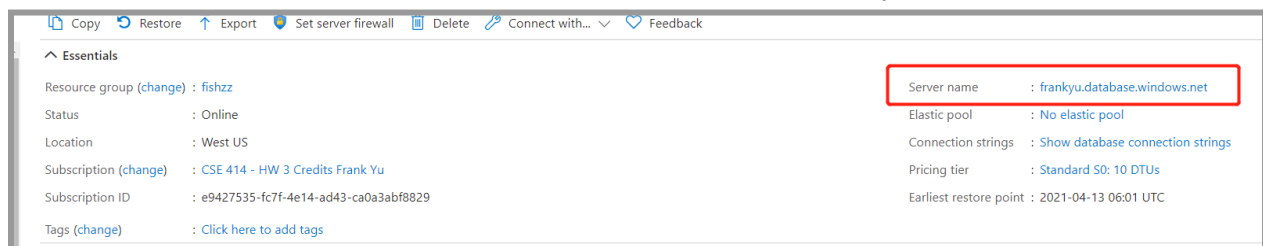
*The above screenshot shows an example of a login; your information will be different. If you have any questions, please contact the course staff.*

## Step 5.1: Use VSCode! (Optional)

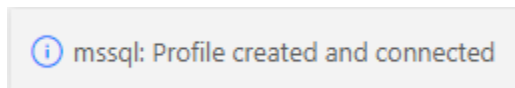
Besides using the built-in query editor, you can also connect VSCode to your database. Visual Studio Code, also known as VSCode, is a free source code editor made by Microsoft. It runs on Windows, Linux, and macOS.

Read the instructions [here](#) to set up your VSCode! More specifically, follow the steps in:

- [“Install the mssql extension in VSCode”](#)
- [“Create or open a SQL file”](#)
- (most importantly) [“Connect to SQL Server”](#)
  - Your server name can be found in the dashboard for your SQL database.



- Ensure you do not skip the “Database name”. Enter the database you created.
- For Authentication Type, select “SQL Login”
- After creating the profile, you should see



- Press Ctrl+Shift+E to execute SQL statements in the active SQL file (or click the green arrow in the top right corner)
- *Note that if you are logged into attu you will not be able to connect to your Azure database.* Close the remote connection (File -> Close Remote Connection) and then try connecting to again.

## Step 6: Ingest the data!

- A. Declare where the flights data can be found by declaring an external data source. In your SQLServer query editor, run the following:

```
CREATE EXTERNAL DATA SOURCE flightdata_blob
WITH (TYPE = BLOB_STORAGE,
LOCATION = 'https://introdatablob.core.windows.net/flightdata'
);
```

- B. Execute your create table statements from hw2
- Don't copy the SQLite-specific statements, such as ``PRAGMA foreign_keys=ON`` or ``.mode`` statements.
  - If your tables haven't been created before proceeding with the following steps, you will have a bad time**

- C. Import the flight data into your newly-created tables and set up indexes on them.

```
bulk insert Carriers from 'carriers.csv'
with (ROWTERMINATOR = '0x0a',
DATA_SOURCE = 'flightdata_blob', FORMAT='CSV', CODEPAGE = 65001, --UTF-8
encoding
FIRSTROW=1,TABLOCK);

bulk insert Months from 'months.csv'
with (ROWTERMINATOR = '0x0a',
DATA_SOURCE = 'flightdata_blob', FORMAT='CSV', CODEPAGE = 65001, --UTF-8
encoding
FIRSTROW=1,TABLOCK);

bulk insert Weekdays from 'weekdays.csv'
with (ROWTERMINATOR = '0x0a',
DATA_SOURCE = 'flightdata_blob', FORMAT='CSV', CODEPAGE = 65001, --UTF-8
encoding
FIRSTROW=1,TABLOCK);

-- Import for the large Flights table.
-- This last import might take a little under 10 minutes on the
-- provided server settings
bulk insert Flights from 'flights-small.csv'
with (ROWTERMINATOR = '0x0a',
DATA_SOURCE = 'flightdata_blob', FORMAT='CSV', CODEPAGE = 65001, --UTF-8
encoding
FIRSTROW=1,TABLOCK);
```

```
-- After you run the code above successfully, you can move on to creating the
indexes.

-- Indexes, which we'll discuss later this quarter, will make your
-- homework queries run much faster (optional, but STRONGLY recommended).
-- In aggregate, these three statements will take about 10 minutes
create index Flights_idx1 on Flights(origin_city,dest_city,actual_time);
create index Flights_idx2 on Flights(actual_time);
create index Flights_idx3 on Flights(dest_city,origin_city,actual_time);
```

- D. In order to verify that your imports were successful, do some `SELECT COUNT(*)` statements. If everything is set up correctly, you should have:
- 1594 rows for Carriers.
  - 12 rows for Months.
  - 8 rows for Weekdays.
  - 1148675 rows for Flights.
- E. Congratulations! You're done with the setup and can proceed back to the homework.