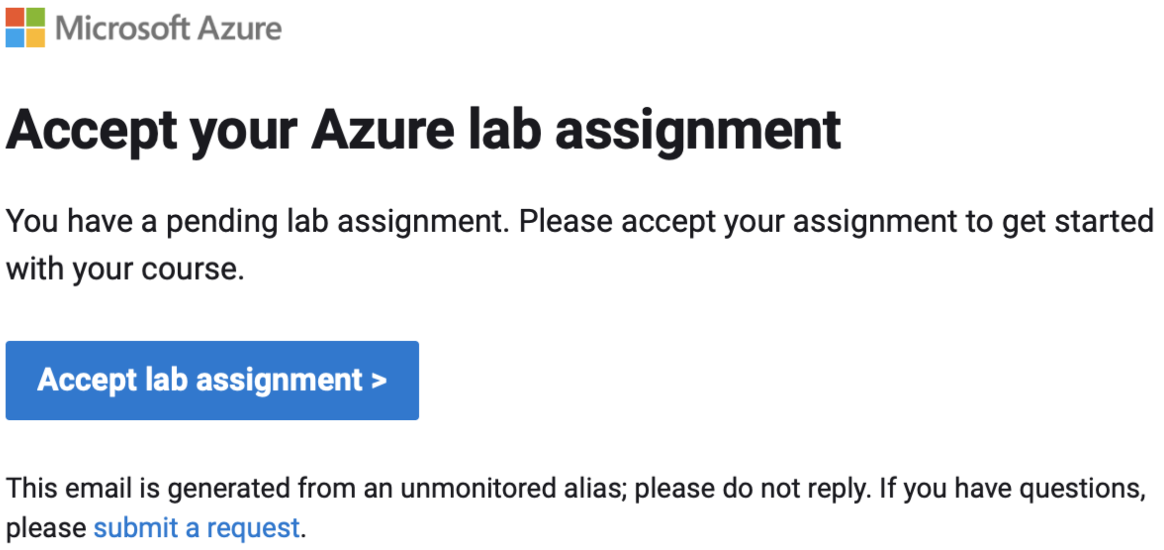
In the following assignments, we want you to learn how to use an Azure SQL database from scratch. Your first step will thus be to set up a database in the Azure service and import your data. This step may seem tedious but it is crucially important. We want you to be able to continue using Azure after the class ends. For this, you need to know how to use the system starting from nothing.

NOTE: These steps will take some time to complete, so start early!

A. Setting up an Azure SQL Database

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



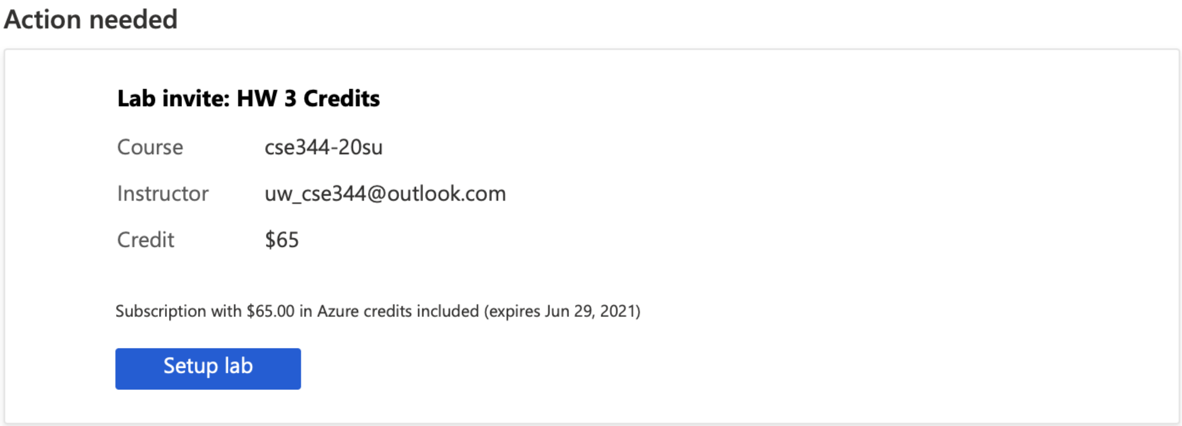
Accept your Azure lab assignment

You have a pending lab assignment. Please accept your assignment to get started with your course.

This email is generated from an unmonitored alias; please do not reply. If you have questions, please submit a request.

1. Click on the "Accept lab assignment" link in the email "Action required: Accept your lab assignment", log in using your uw.edu account and password.
2. Afterward, you will be forwarded to the Azure portal.0

3. Under “Action needed”, click “Setup lab”. This might take a while.



Action needed

Lab invite: HW 3 Credits

Course	cse344-20su
Instructor	uw_cse344@outlook.com
Credit	$65

Subscription with $65.00 in Azure credits included (expires Jun 29, 2021)

NOTE: The above screenshot is showing an old invite for a different class and your information will be different. If you have any questions, please contact the course staff.

Step 2: Learn about Azure SQL Server

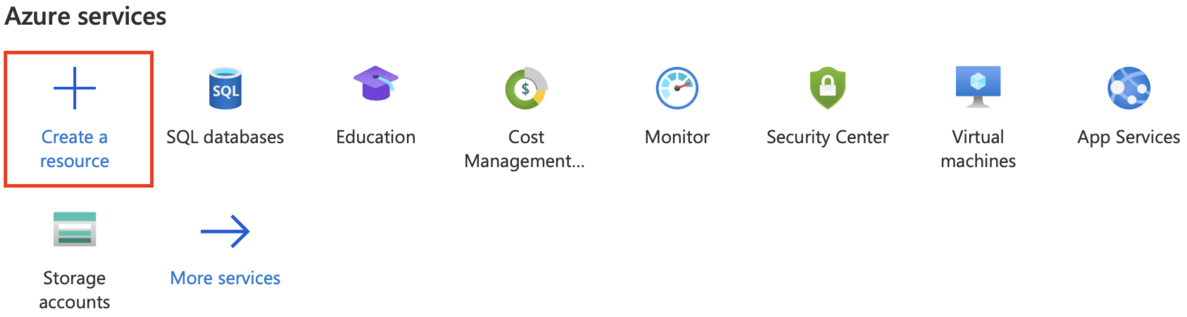
Spend some time clicking around, reading documentation, watching tutorials, and generally familiarizing yourself with Azure and SQL Server.
Resources:

- SQL Server Tutorial For Beginners
- SQL Server Technical Documentation
- SQL Server Tutorial
- Transact-SQL Reference

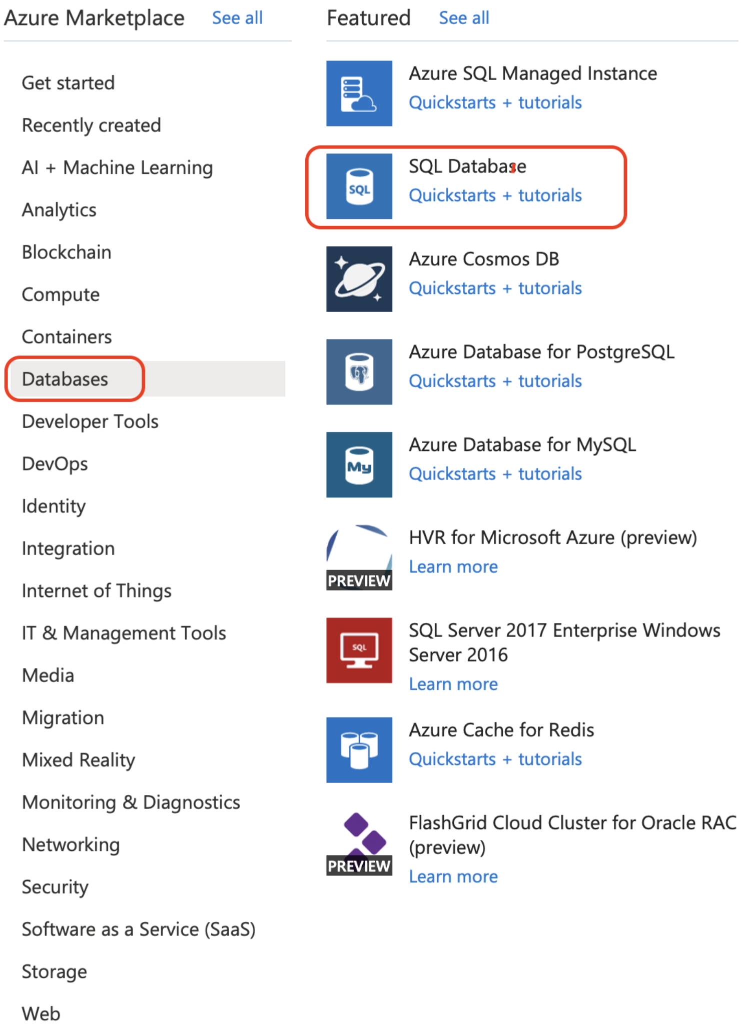
Step 3: Create a database

1. Navigate to the Azure portal.

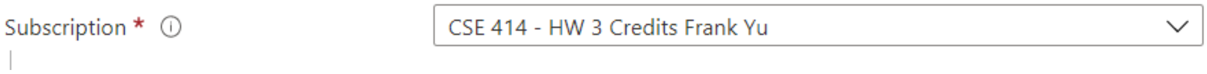
2. Select “Create a resource” under Azure services.



3. Select “Databases” under Azure Marketplace, and then select “SQL Database” under Featured.

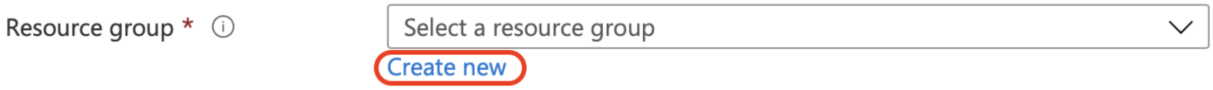


4. Make sure that your “Subscription” is **NOT** set to “Free Trial” or “Azure for Students”. The correct subscription name will either:
    a. mention “Homework 3”
    b. or mention “Microsoft Azure Sponsorship”



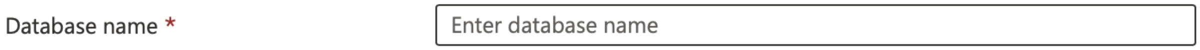
Subscription * ⓘ CSE 414 - HW 3 Credits Frank Yu

5. Under Subscription, create a new resource group with a name.



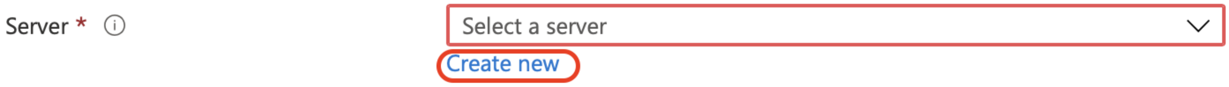
Resource group * ⓘ Select a resource group

6. Choose a database name.



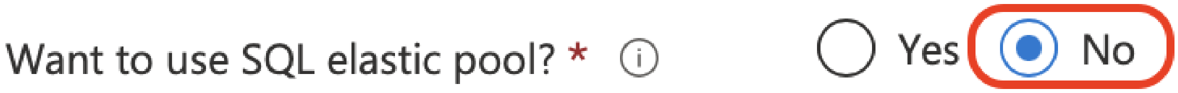
Database name * Enter database name

7. Create a new server. Enter your server name, admin login, and password. Choose the server location based on where you are at. For example, if you’re located in Seattle, choose “West US 3”. Make sure Authentication method is set to 'Use SQL authentication'.



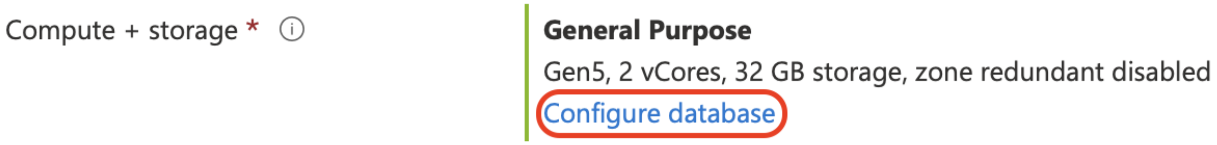
Server * ⓘ Select a server

8. Make sure that “Want to use SQL elastic pool?” is set to **NO.**



Want to use SQL elastic pool? * ⓘ ○ Yes [✓ ● No]

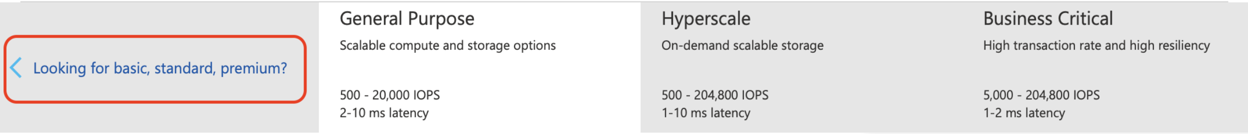
9. Next, for “Compute + storage”, click on “Configure database”, a second panel will open.



Compute + storage * ⓘ

General Purpose
Gen5, 2 vCores, 32 GB storage, zone redundant disabled

10. On the banner, click on “Looking for basic, standard, premium?”.



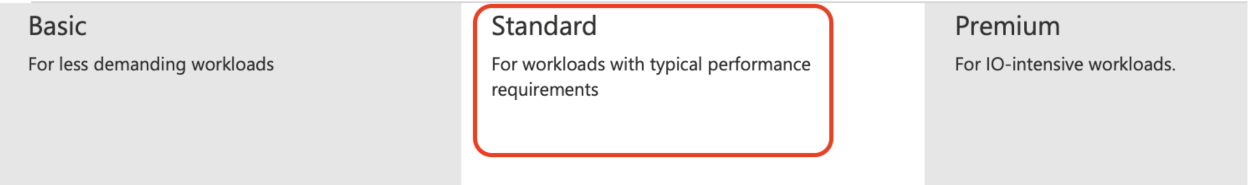
< Looking for basic, standard, premium?

General Purpose
Scalable compute and storage options
500 - 20,000 IOPS
2-10 ms latency

Hyperscale
On-demand scalable storage
500 - 204,800 IOPS
1-10 ms latency

Business Critical
High transaction rate and high resiliency
5,000 - 204,800 IOPS
1-2 ms latency

11. Select “Standard”.

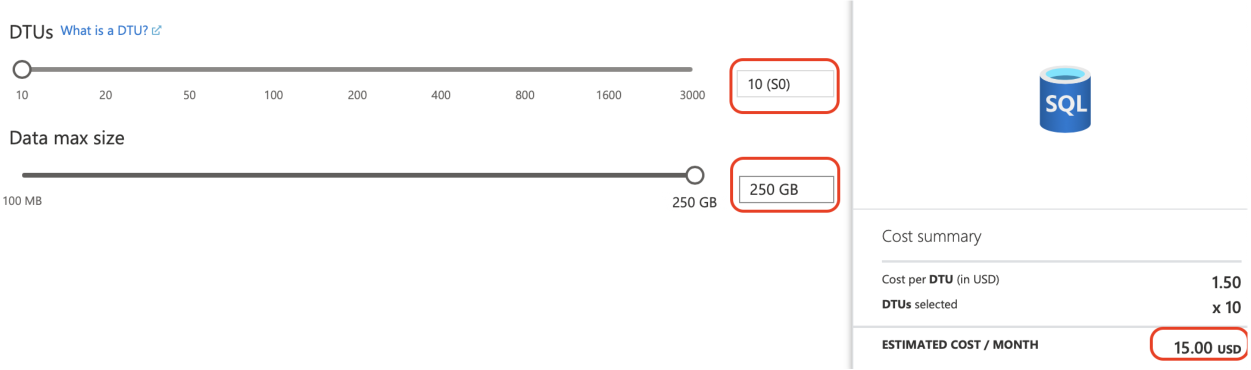


Basic
For less demanding workloads

Standard
For workloads with typical performance requirements

Premium
For IO-intensive workloads.

12. Check your DTUs, Data max size, and estimated cost/month.



DTUs What is a DTU?

10 (S0)

Data max size

250 GB

Cost summary

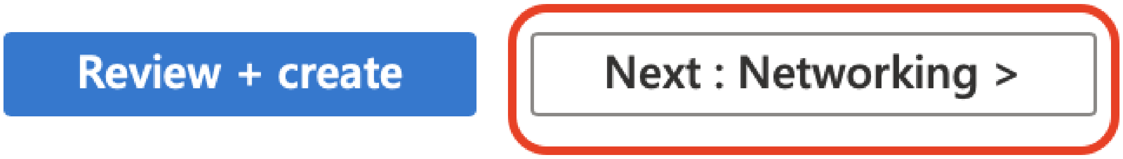
Cost per **DTU** (in USD) 1.50

DTUs selected x 10

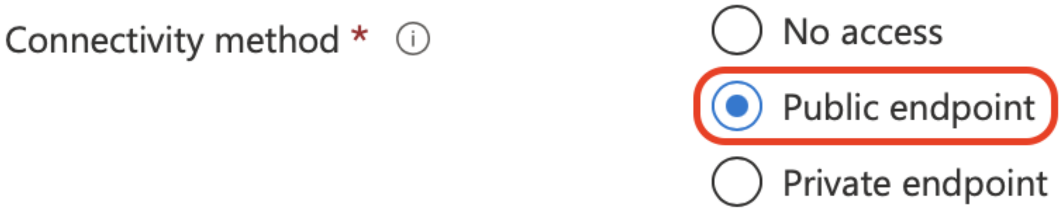
ESTIMATED COST / MONTH 15.00 USD

13. Click on “Apply” at the bottom of the page.

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



15. For “Connectivity method”, select “Public endpoint”.



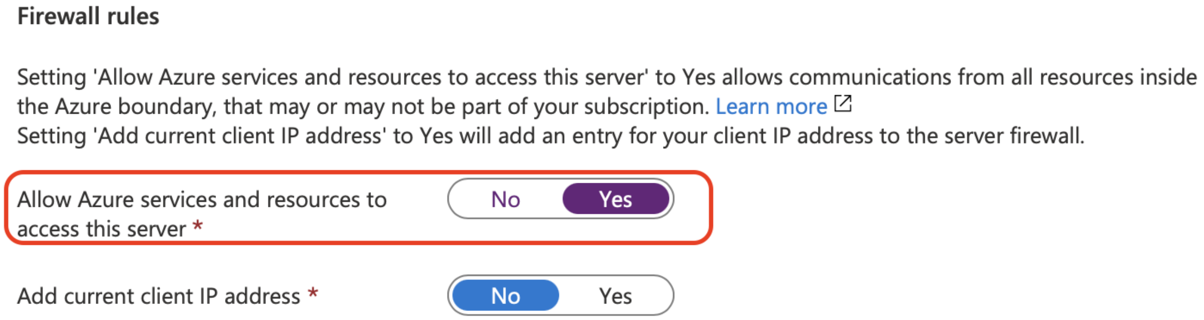
Connectivity method * ⓘ

○ No access

● Public endpoint

○ Private endpoint

16. Under “Firewall rules”, make sure that “Allow Azure services and resources to access this server” is set to “Yes”.



Firewall rules

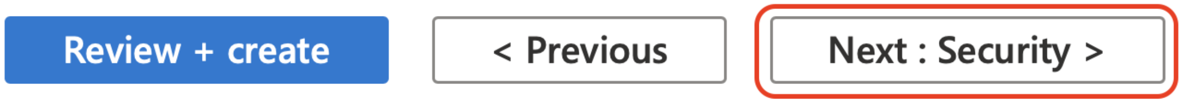
Setting 'Allow Azure services and resources to access this server' to Yes allows communications from all resources inside the Azure boundary, that may or may not be part of your subscription. Learn more

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

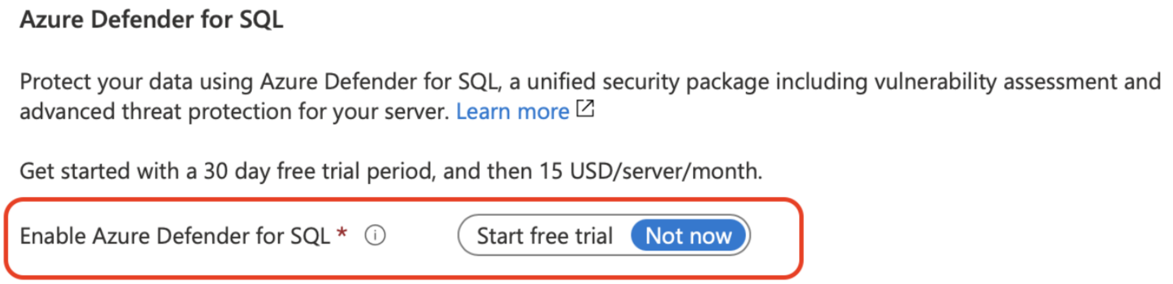
Allow Azure services and resources to access this server * No [✓ Yes]

Add current client IP address * [✓ No] Yes

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



18. Make sure that “Enable Azure Defender for SQL” is set to “Not now”.



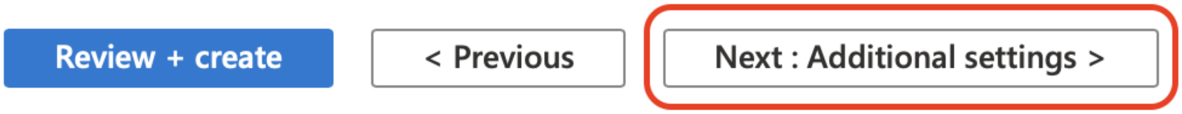
Azure Defender for SQL

Protect your data using Azure Defender for SQL, a unified security package including vulnerability assessment and advanced threat protection for your server. Learn more

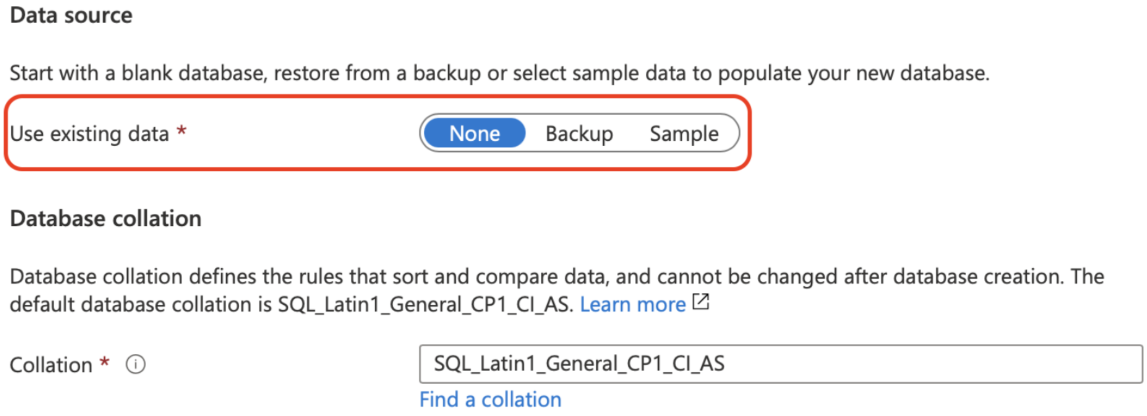
Get started with a 30 day free trial period, and then 15 USD/server/month.

Enable Azure Defender for SQL * ⓘ Start free trial [✓ Not now]

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



20. Make sure 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

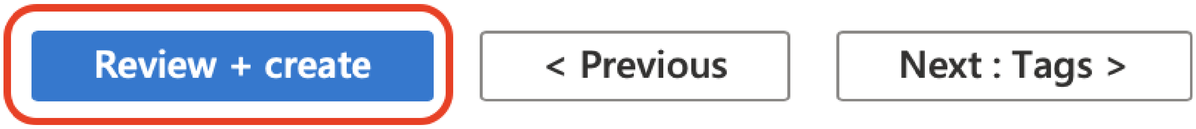
Database collation

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

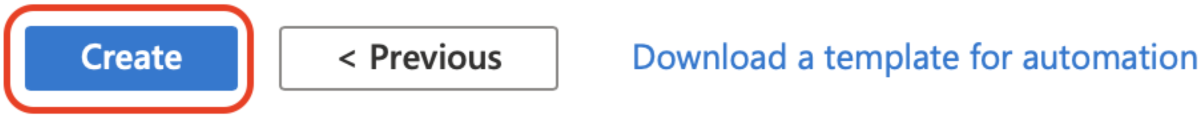
Collation * ⓘ SQL_Latin1_General_CP1_CI_AS

Find a collation

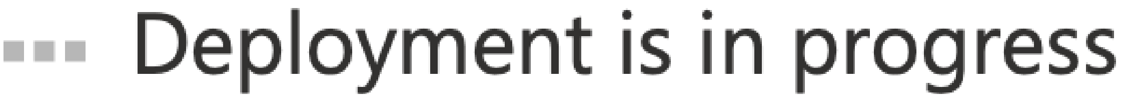
21. Click on “Review + create” at the bottom of the page.



22. Click on “Create” at the bottom of the page.

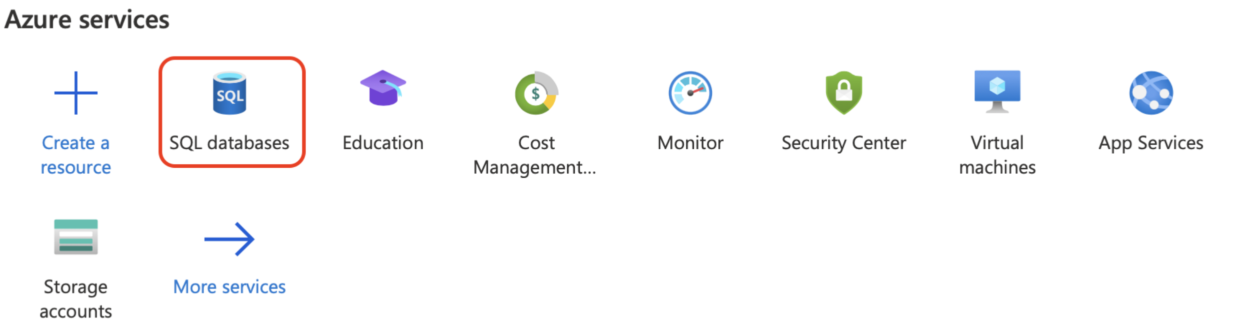


23. Wait a few minutes! If you encounter any issues, please contact the course staff!

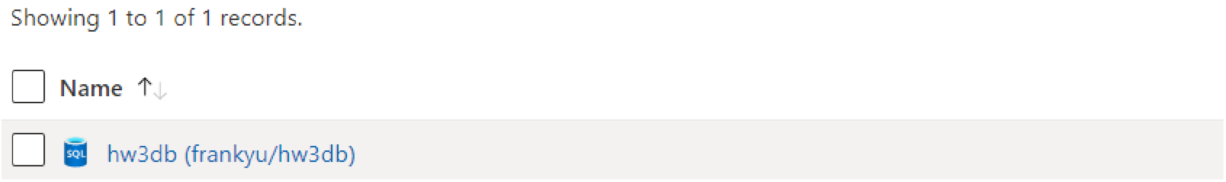


Deployment is in progress

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

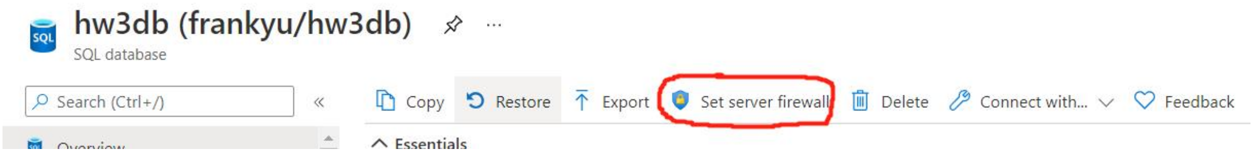


25. Click on the database that you just created.

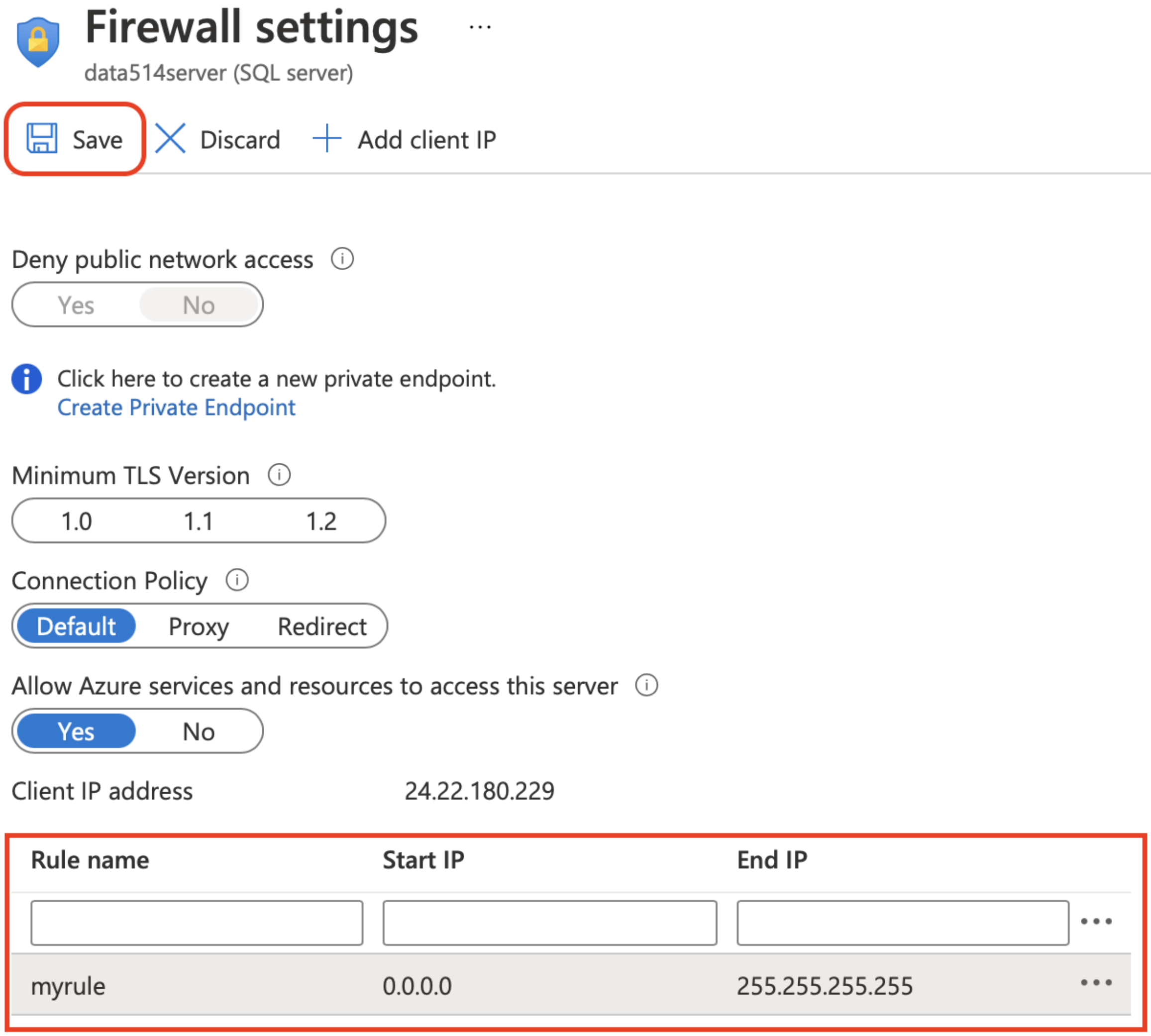

Showing 1 to 1 of 1 records.

□	Name ↑↓
□	hw3db (frankyu/hw3db)

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



27. Add a new 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 settings

data514server (SQL server)

Deny public network access: Yes [✓ No]

Click here to create a new private endpoint.

Minimum TLS Version: 1.0 1.1 1.2

Connection Policy: [✓ Default] Proxy Redirect

Allow Azure services and resources to access this server: [✓ Yes] No

Client IP address 24.22.180.229

Rule name	Start IP	End IP
myrule	0.0.0.0	255.255.255.255

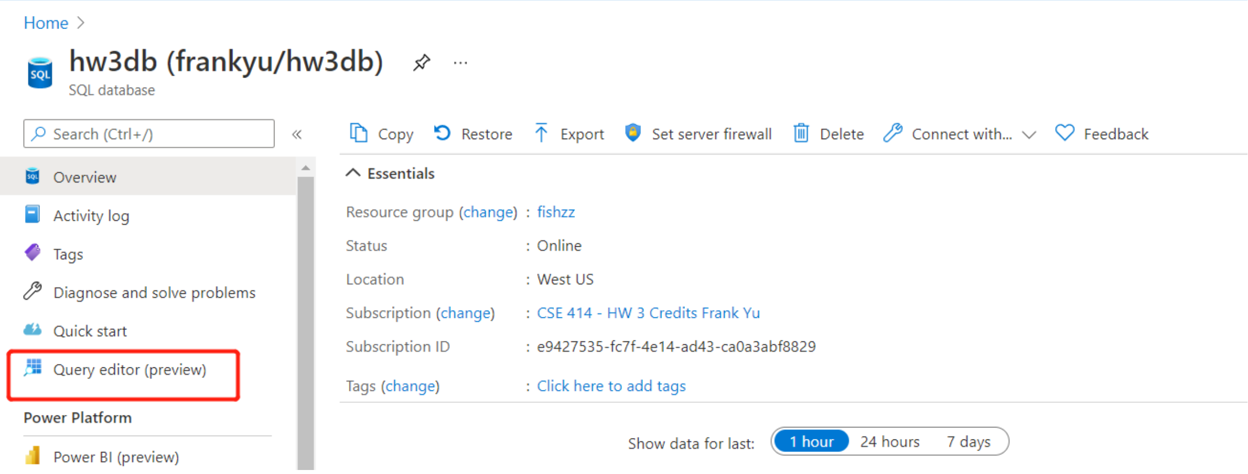
28. You have successfully set up your first SQL database on Azure!

Step 4: Try out the built-in Query editor

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

1. Navigate to the SQL database you just created (see 22 & 23 in the above section).

2. Click on “Query editor (preview).



Resource group (change) : fishzz

Status : Online

Location : West US

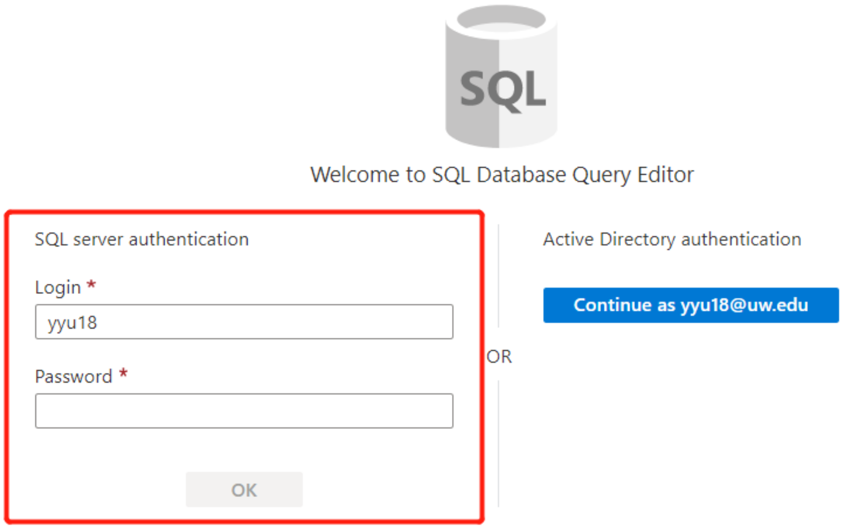
Subscription (change) : CSE 414 - HW 3 Credits Frank Yu

Subscription ID : e9427535-fc7f-4e14-ad43-ca0a3abf8829

Tags (change) : Click here to add tags

Show data for last: 1 hour 24 hours 7 days

3. Log in using the username and password you created during step 7 in the above section.



SQL
Welcome to SQL Database Query Editor
SQL server authentication
Active Directory authentication
Continue as yyu18@uw.edu
OR
OK

Login * yyu18

Password *

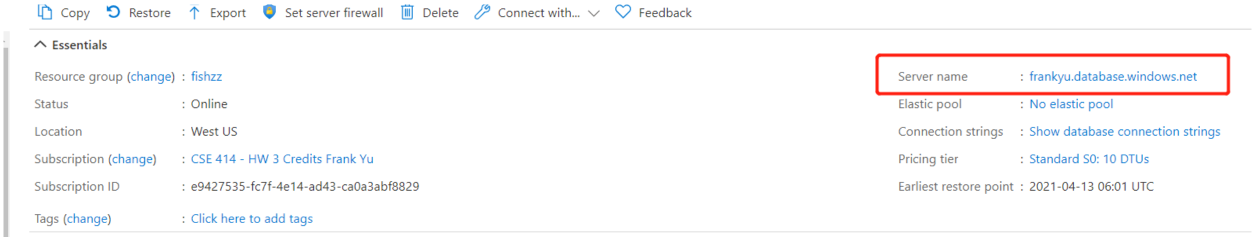
4. That’s it!

Step 4.1: Use an IDE! (Optional)

Besides using the built-in query editor, another option would be to connect VS Code to your database. Visual Studio Code is a freeware source-code editor made by Microsoft for Windows, Linux, and macOS.

Read the instructions here to set up your VS Code! More specifically, follow the steps in “Install and Start Visual Studio Code”, “Install the mssql extension”, “Create or open a SQL file”, and most importantly, “Connect to SQL Server”.

When you’re connecting to SQL Server, you will be prompted to enter your Server name. This can be found in the dashboard for your SQL database.



Resource group (change)	: fishzz	Server name	: frankyu.database.windows.net
Status	: Online	Elastic pool	: No elastic pool
Location	: West US	Connection strings	: Show database connection strings
Subscription (change)	: CSE 414 - HW 3 Credits Frank Yu	Pricing tier	: Standard S0: 10 DTUs
Subscription ID	: e9427535-fc7f-4e14-ad43-ca0a3abf8829	Earliest restore point	: 2021-04-13 06:01 UTC
Tags (change)	: Click here to add tags		

Step 5: Ingest the data!

Important: You would need to create your tables first before ingesting the data!

Follow the following steps to ingest the data from our remote host to your SQL database.

1. Create an external data source. Copy and paste the following code in your Query editor and execute.

```
CREATE EXTERNAL DATA SOURCE cse414blob
WITH (TYPE = BLOB_STORAGE,
LOCATION = 'https://cse344.blob.core.windows.net/cse344-22wi'
);
```

2. Execute your create table statements; you can just copy over your `CREATE TABLE` statements from hw2 (don’t copy the `` `PRAGMA foreign_keys=ON` `` or the ‘.mode’ statements; those are specific to SQLite).

3. Copy and paste the following code in your Query editor and execute.

```
bulk insert Carriers from 'carriers.csv'
with (ROWTERMINATOR = '0x0a',
DATA_SOURCE = 'cse414blob', FORMAT='CSV', CODEPAGE = 65001, --UTF-8
encoding
FIRSTROW=1,TABLOCK);
```

```sql
bulk insert Months from 'months.csv'
with (ROWTERMINATOR = '0x0a',
DATA_SOURCE = 'cse414blob', FORMAT='CSV', CODEPAGE = 65001, --UTF-8 encoding
FIRSTROW=1,TABLOCK);

bulk insert Weekdays from 'weekdays.csv'
with (ROWTERMINATOR = '0x0a',
DATA_SOURCE = 'cse414blob', 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 = 'cse414blob', FORMAT='CSV', CODEPAGE = 65001, --UTF-8 encoding
FIRSTROW=1,TABLOCK);

-- Indexes to make your query run faster (optional, but recommended)
-- This will take about 3-4 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);
```

4. In order to verify that your imports were successful, do some SELECT COUNT(*) statements. The correct input should have:
    - 1594 rows for Carriers.
    - 12 rows for Months.
    - 8 rows for Weekdays.
    - 1148675 rows for Flights.