

Setting up & Connecting to the Microsoft Azure SQL Cloud Database

For the purposes of the upcoming assignments we will be using an SQL database hosted in the cloud. Database schema and data, as well as hardware and software needed to run the database, will all be managed by the cloud provider (Microsoft). We will configure our database through the web interface and will be connecting to it though the client applications on your laptop/desktop (web browser, Azure Data Studio IDE, Java application, etc.)

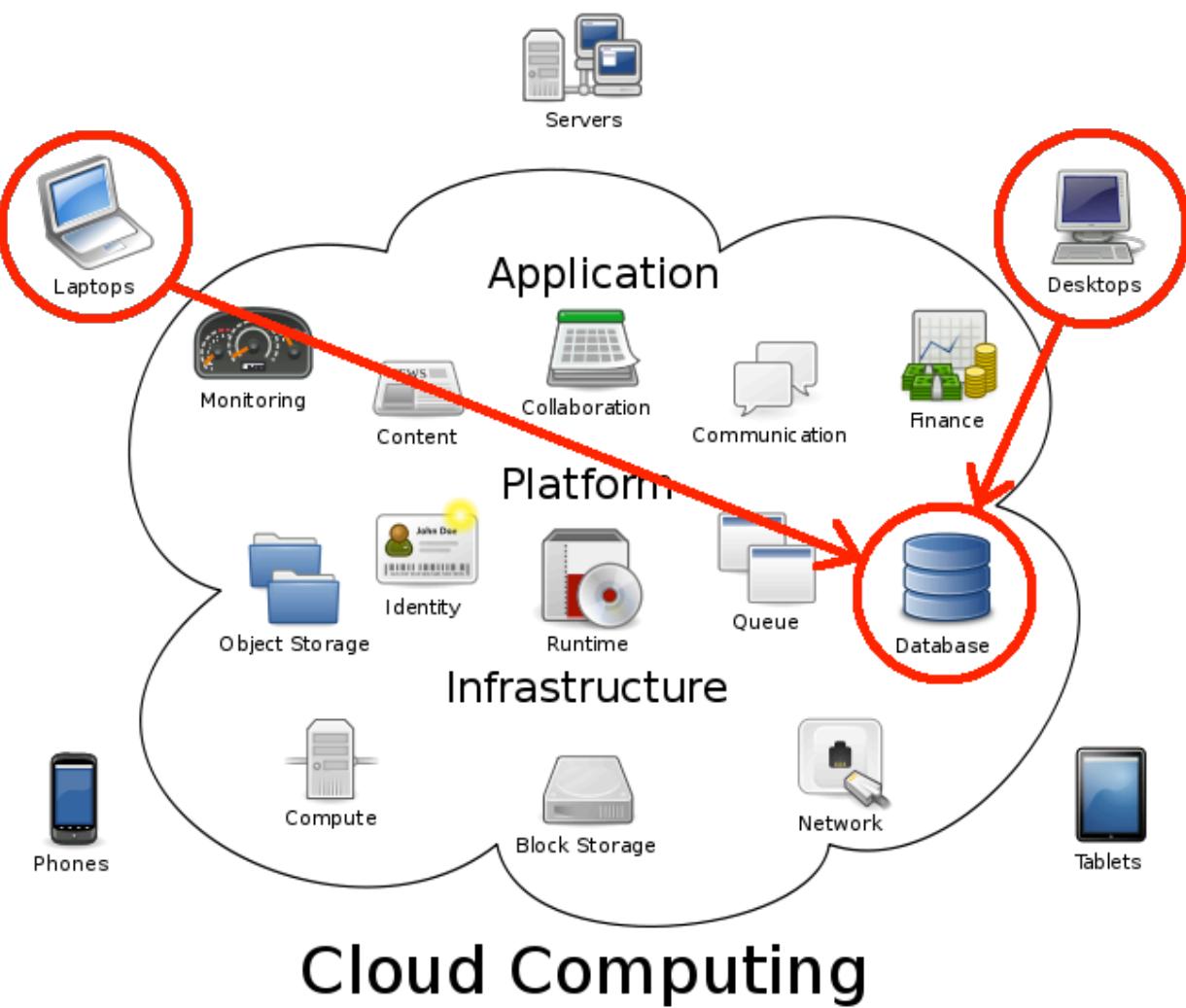


Image source: <https://www.fastmetrics.com/blog/tech/what-is-cloud-computing/>

Using the cloud for the database hosting is a case of purchasing a Platform-as-a-Service (PaaS) from the cloud provider. Doing so allows us to only care about designing the database, queries, and the applications we use to connect and issue queries to the database (see below image). We don't need to be concerned with installing the software and provisioning the hardware to run the database. We also don't need to keep our own desktop/laptop/server running to keep the database alive, as well as we don't require setting up a web server or a domain name so that our database is accessible from the internet. So, as you can tell, this setup is quite convenient.

Separation of Responsibilities

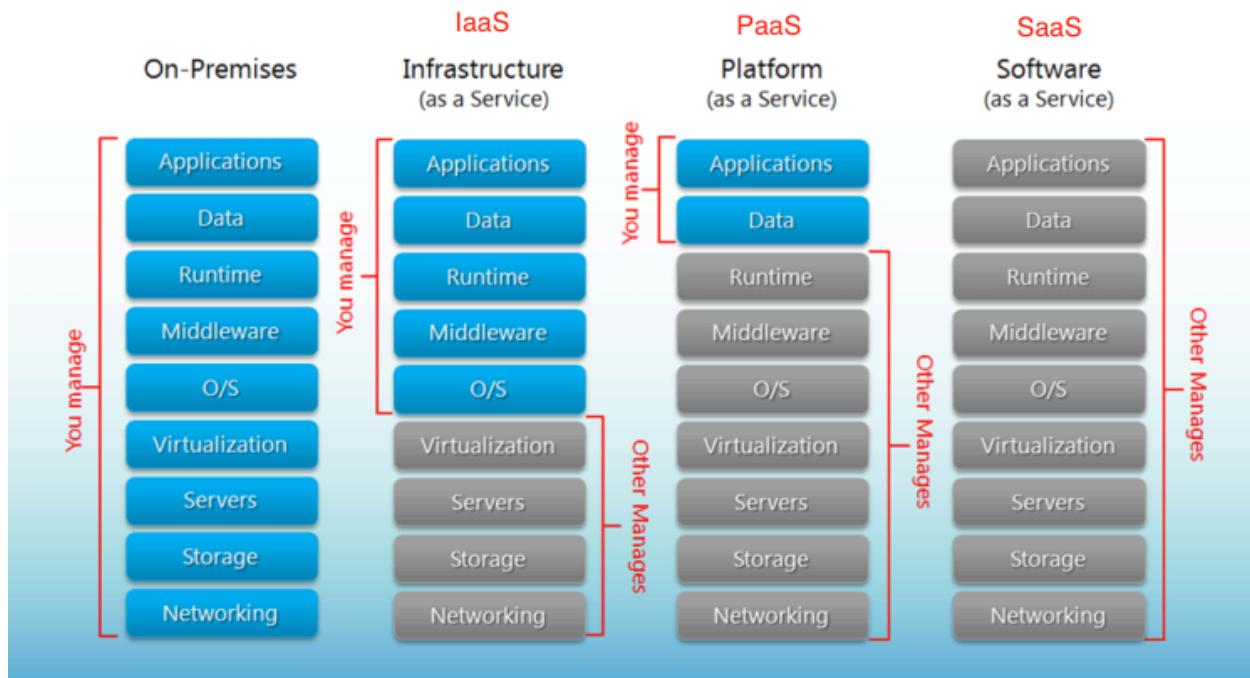
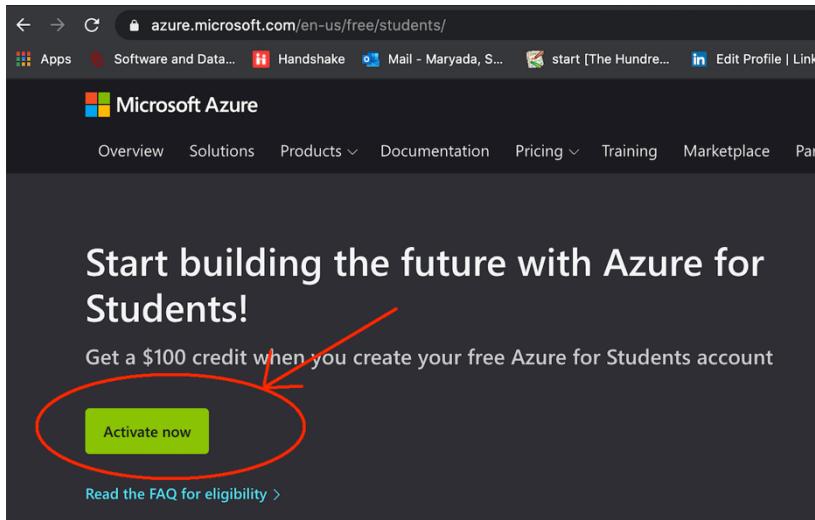


Image source: <http://robertgreiner.com/2014/03/windows-azure-iaas-paas-saas-overview/>

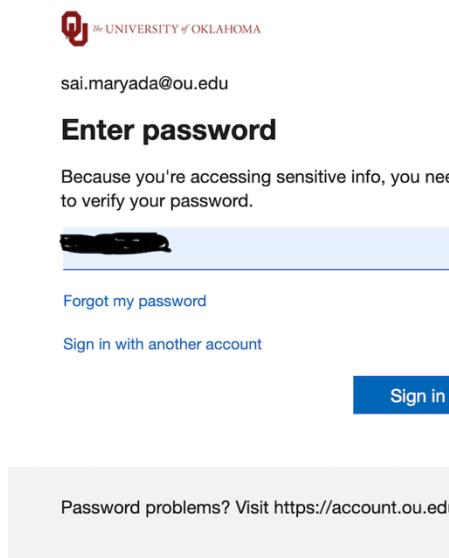
Set-up Steps:

1. Create free Azure Student Account

- Open new **Incognito (this is important)** window in your web browser.
- Go to - <https://azure.microsoft.com/en-us/free/students/>
 - Click on “Activate Now” button



- Above might lead you to <https://login.microsoftonline.com> first where you will be asked to log into your OU account.



- You should get redirected to <https://signup.azure.com> Fill the forms, read and accept subscription agreement, offer details, privacy statement, and communications policy. Click “Sign Up” button.

signup.azure.com/signup?offer=MS-AZR-0170P&correlationId=35 You are screen sharing Stop Share =StudentVerification

Software and Data... Handshake Mail - Maryada, S... start [The Hundre... Edit Profile | Link... Dashboard < My b... Syllabus CS [4|5]

Get \$100 in Azure credits and free access to popular cloud services plus developer tools like Visual Studio Code

1 Your profile

Country/Region ⓘ

United States

Choose the location that matches your billing address. **You cannot change this selection later.** If your country is not listed, the offer is not available in your region. [Learn More](#)

First name

Sai Kiran

Last name

Maryada

Email address for important notifications ⓘ

sai.maryada@ou.edu

Phone

[REDACTED]

By proceeding you acknowledge that if you use your organization's email, your organization may have rights to access and manage your data and account. [Learn more](#)

signup.azure.com/signup?offer=MS-AZR-0170P&correlationId=35 You are screen sharing Stop Share =StudentVerification

Software and Data... Handshake Mail - Maryada, S... start [The Hundre... Edit Profile | Link... Dashboard < My b... Syllabus CS [4|5]

Microsoft Azure

sai.maryada@ou.edu Sign out

Azure for Students

Get \$100 in Azure credits and free access to popular cloud services plus developer tools like Visual Studio Code

1 Your profile

2 **Agreement**

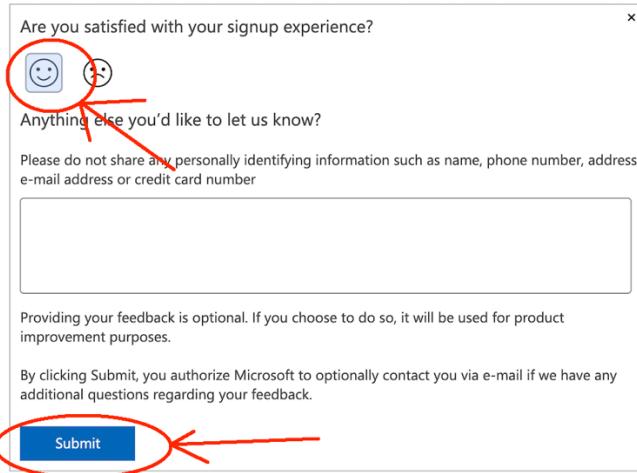
I agree to the [subscription agreement](#), [offer details](#), and [privacy statement](#).
I will receive information, tips, and offers about Azure, including Azure Newsletter, Pricing updates, and other Microsoft products and services.

I would like Microsoft to share my information with select partners so I can receive relevant information about their products and services.

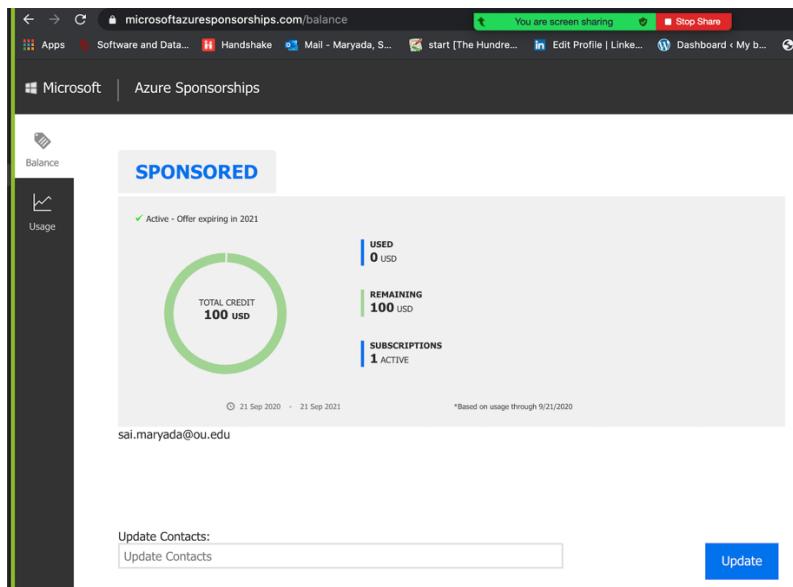
Sign up

- If prompted for feedback, please submit it (see screenshot below).

Your account is all setup. Please finish feedback to continue.



- Doing all above will add \$100 of free credit to your student account to be used within a year. You can check your remaining balance (see the screenshot below) at <https://www.microsoftazuresponsorships.com/Balance>

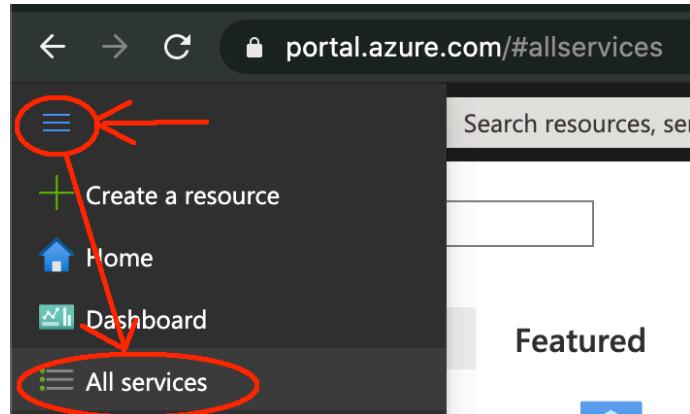


Possible Complications

- We estimate that the free credit provided by the Microsoft for your account would be sufficient for your work in this course **if you carefully follow the instructions below**. However, If you find yourself ineligible for the offer, short of free credit or your student account was (will be) deactivated due to the offer expiring after a year, you need to upgrade it to a pay-as-you-go account (see the link below), in which case your expenditures will sum up to \$5/month if you carefully follow our instructions.
<https://docs.microsoft.com/en-us/azure/billing/billing-upgrade-azure-subscription>

2. Create your personal SQL server

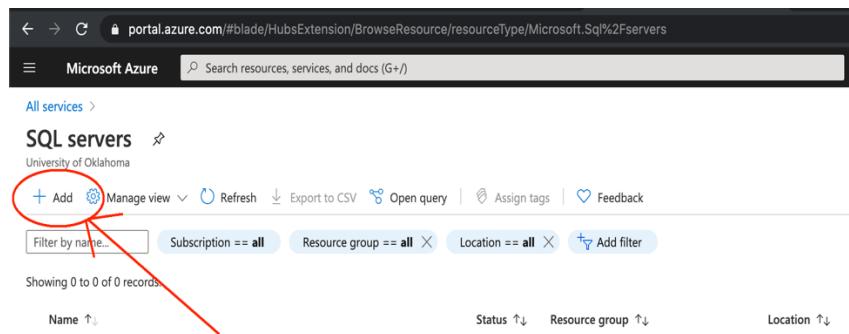
- Navigate to <https://portal.azure.com>
- Unfold the “hamburger” menu and click on “All services”



- Enter SQL into the search bar, select “SQL Server” from the presented options



- You should be redirected to the webpage seen on the screenshot below. Click on “+ Add” button.



- You should be redirected to the web-page seen on the screenshot below with the fields being empty (or having default values).
- Type in the values into the empty fields of the right panel, make appropriate option selections (as seen on the below screenshot), create a new resource group by clicking on “create new” link, pick your own password. Instead of <your4x4> placeholder, use your actual 4x4 (a.k.a OUNetID), which you can look-up at <https://accounts.ou.edu/>
 - Some students reported problems creating database servers in “(US) East US” location. If you’re experiencing it, try picking a different location geographically adjacent to you.
- Finally, click on the “Review + create” button.

Subscription *

Resource group * [Create new](#)

Server name * .database.windows.net

Location *

Administrator account

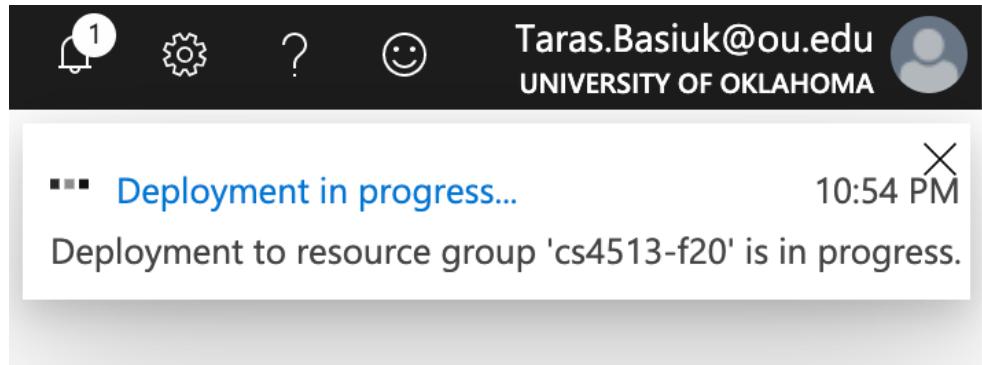
Server admin login *

Password *

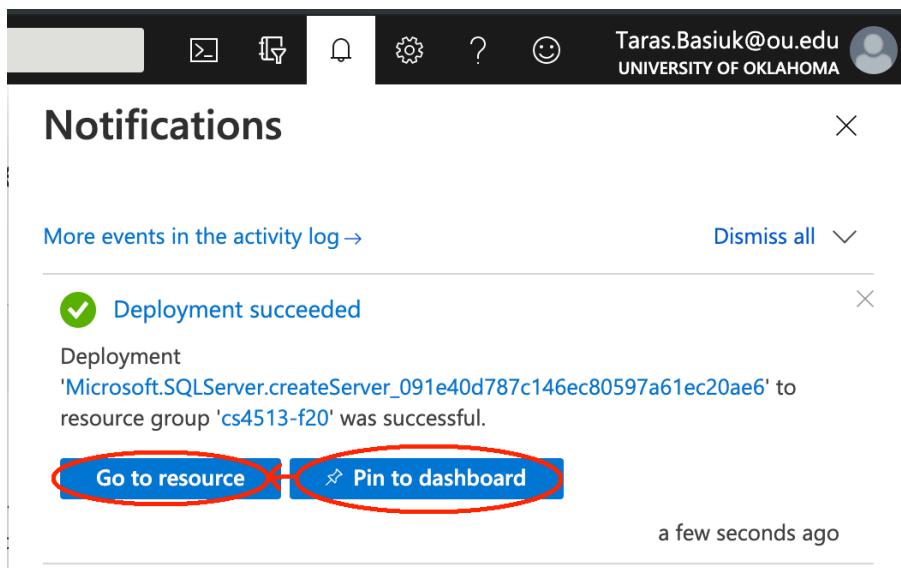
Confirm password *

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

- Clicking the “Create” button on the next screen will start the deployment of your SQL server. Track its progress through the Notifications tab (click little bell on the top right to open).



- Wait for your deployment to finish. Then click on “Pin to dashboard” and “Go to resource”.



Possible Complications

If you made a mistake while creating your SQL server (wrong input for example), short of resetting the password, adjustments cannot be made. Instead, you should delete the server and create a new one. Follow the below instruction regarding the navigation to your newly created SQL server. But instead of following other instructions, click on “Delete” button, confirm the deletion by typing in the server name (“<your4x4>-sql-server”) into the form and click another “Delete” button at the bottom. Now repeat the instructions at the beginning of Part 2, but now hopefully correcting for your mistake.

3. Create your own SQL database

- If you clicked on the “Go to resource” button above, you should see the webpage from the screenshot below. Alternatively, you can click on “Dashboard” under “hamburger” menu on the top left and then click on your newly created SQL server name (<your4x4>-sql-server). Alternatively, your new server should now show up on “SQL Servers” webpage from page 6.

Microsoft Azure Search resources, services, and docs (G+/-) Logout

All services > **your4x4-sql-server** SQL server

Search (Cmd+) + Create database New elastic pool + New Synapse SQL pool (data warehouse) Import database Reset password Move Delete Feedback

Overview + Create database New elastic pool + New Synapse SQL pool (data warehouse) Import database Reset password Move Delete Feedback

Activity log Access control (IAM) Tags Diagnose and solve problems

Essentials

Resource group (change) : cs4513-f20 Server admin : your4x4

Status : Available Firewalls and virtual netw... : Show firewall settings

Location : East US Active Directory admin : Not configured

Subscription (change) : Azure for Students Server name : your4x4-sql-server.database.windows.net

Subscription ID : Tags (change) : Click here to add tags

Notifications (0) Features (6)

All Security (4) Performance (1) Recovery (1)

Active Directory admin NOT CONFIGURED **Advanced data security** NOT CONFIGURED **Automatic tuning** CONFIGURED

Auditing NOT CONFIGURED **Failover groups** NOT CONFIGURED **Transparent data encryption** SERVICE-MANAGED KEY

Deleted databases **Import/Export history** **DTU quota** **Properties** **Locks**

- Click on “+ Create database” button. You should now see the panel below. Please pay some extra attention next.

← → C portal.azure.com/#create/Microsoft.SQLDatabase

Microsoft Azure Search resources, services, and docs (G+/-)

Home > SQL servers > your4x4-sql-server >

Create SQL Database

Microsoft

Create a SQL database with your preferred configurations. Complete the Basics tab then go to Review + Create to provision with smart defaults, or visit each tab to customize. [Learn more](#)

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 cs4513-f20

Database details

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

Database name * cs-dsa-4513-sql-db

Server your4x4-sql-server (East US)

Want to use SQL elastic pool? * Yes No

Compute + storage * General Purpose
 Gen5, 2 vCores, 32 GB storage
 [Configure database](#)

Review + create Next : Networking >

- Type “cs-dsa-4513-sql-db” into “Database name” field.
- **Click on “Configure database” link.** Once you see the “Configure” page, click on “Looking for basic, standard, premium?” (see screenshot below)

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

Microsoft Azure Search resources, services, and docs (G+/)

Home > SQL servers > your4x4-sql-server > Create SQL Database > Configure

Feedback

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

Compute tier

Provisioned Compute resources are pre-allocated
Billed per hour based on vCores configured

Serverless Compute resources are auto-scaled
Billed per second based on vCores used

Compute Hardware

Basic For less demanding workloads

Standard For workloads with typical performance requirements

DTUs What is a DTU?

10 20 50 100 200 400 8

Data max size

100 MB

Apply

- Select “Standard” tab (or “Basic”, if you ended up having to pay for the database out of your own pocket, it’s cheaper) and click the “Apply” button (see the screenshot below).

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

Microsoft Azure Search resources, services, and docs (G+/)

Home > SQL servers > your4x4-sql-server > Create SQL Database > Configure

Feedback

Basic For less demanding workloads

Standard For workloads with typical performance requirements

DTUs What is a DTU?

10 20 50 100 200 400 8

Data max size

100 MB

Apply

- Now your “SQL database” panel should look like below. Verify that “Compute + storage” no longer lists “Gen5, 2 vCores, 32 GB” configuration. Only then click on “Review + create” button. If you don’t do the verification, your free credits will evaporate pretty quickly.

Subscription: Azure for Students

Resource group: cs4513-f20

Database name: cs-dsa-4513-sql-db

Server: your4x4-sql-server (East US)

Want to use SQL elastic pool? No

Compute + storage: Standard S0 (10 DTUs, 250 GB storage) [Configure database](#)

Review + create

- Clicking “Create” button on the next screen will start the deployment of your SQL database. Wait until it finishes by checking your notifications. Click on “Pin on dashboard” after it does.

Deployment succeeded

Deployment
'Microsoft.SQLDatabase.newDatabaseExistingServer_3243342a53f84df0' to resource group 'cs4513-f20' was successful.

Go to resource

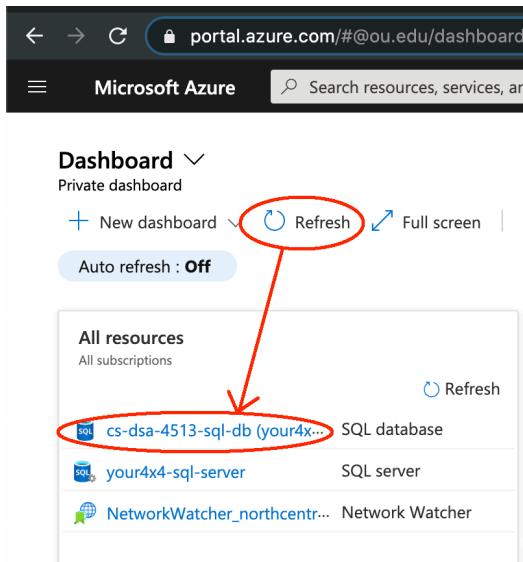
Pin to dashboard

a few seconds ago

Possible Complications

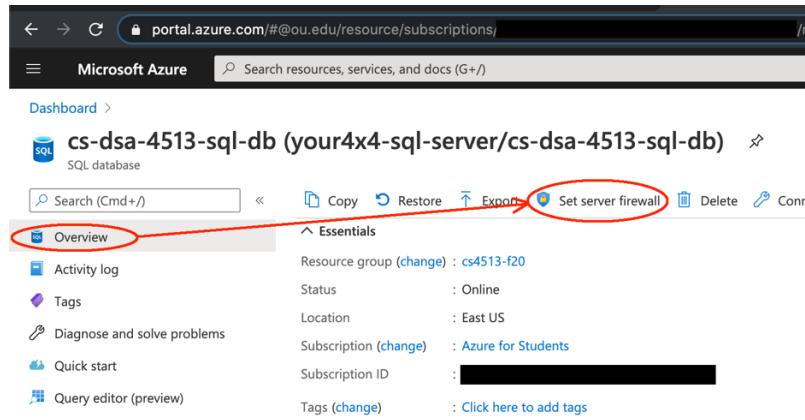
If you've made a mistake while creating your SQL database, see the below instructions on how to navigate to it, delete it using the corresponding icon, and recreate it correcting for your mistake.

- Next, first click on the “Dashboard” from the “hamburger” menu, then click on refresh, and then on the “cs-dba-4513-sql-db” (see the screenshot below).



The screenshot shows the Microsoft Azure Dashboard. At the top, there is a header with a refresh button, a search bar, and a 'Microsoft Azure' logo. Below the header, a 'Dashboard' section is shown with the text 'Private dashboard'. A 'Refresh' button is circled in red. Below this, there is a section titled 'All resources' with a 'Refresh' button. A list of resources is shown, with the first item, 'cs-dsa-4513-sql-db (your4x...', circled in red. Other items in the list include 'your4x4-sql-server' and 'NetworkWatcher_northcenter...'. A red arrow points from the 'Refresh' button in the header to the circled 'cs-dsa-4513-sql-db' item in the list.

- This should bring you to your new database overview.
- Now we need to create Firewall rules to allow outside connection to your DB
 - Click on “Overview” and then “Set server firewall”



The screenshot shows the 'Overview' page for the 'cs-dsa-4513-sql-db' SQL database. At the top, there is a header with a search bar and a 'Microsoft Azure' logo. Below the header, the database name 'cs-dsa-4513-sql-db (your4x4-sql-server/cs-dsa-4513-sql-db)' is shown. A 'Set server firewall' button is circled in red. Below the header, there is a 'Search (Cmd +/)' input field and a toolbar with 'Copy', 'Restore', 'Export', 'Set server firewall', 'Delete', and 'Conn' buttons. The 'Overview' tab is selected and circled in red. The 'Essentials' section displays resource group, status, location, subscription, and tags information. The 'Set server firewall' button is located in the toolbar above the 'Essentials' section.

- You should now see a panel corresponding to the screenshot below (with the input fields being empty).
- Type in “AllowAll” for “Rule Name” field.
- Type in “0.0.0.0” for “Start IP” field.
- Type in “255.255.255.255” for “End IP” field.
- Click the “Save” icon.

Dashboard > cs-dsa-4513-sql-db (your4x4-sql-server/cs-dsa-4513-sql-db) >

Firewall settings

your4x4-sql-server (SQL server)

Deny public network access Yes No

To set Deny Public Network Access, click here to create a new private endpoint.

Minimum TLS Version > 1.0 > 1.1 > 1.2

You are setting the Minimal TLS Version property for all SQL Database and SQL Data Warehouse databases associated with this server. Any login attempts from clients using TLS version less than the Minimal TLS Version shall be rejected.

Connection Policy Default Proxy Redirect

Allow Azure services and resources to access this server Yes No

Connections from the IPs specified below provides access to all the databases in your4x4-sql-server.

Client IP address 68.97.28.30

Rule name	Start IP	End IP	...
AllowAll	0.0.0.0	255.255.255.255	<input type="button" value=""/>

- Wait for the updated firewall rules to be deployed.

Notifications

More events in the activity log → Dismiss all

Successfully updated server firewall rules

Successfully updated firewall rules for server: your4x4-sql-server

a few seconds ago

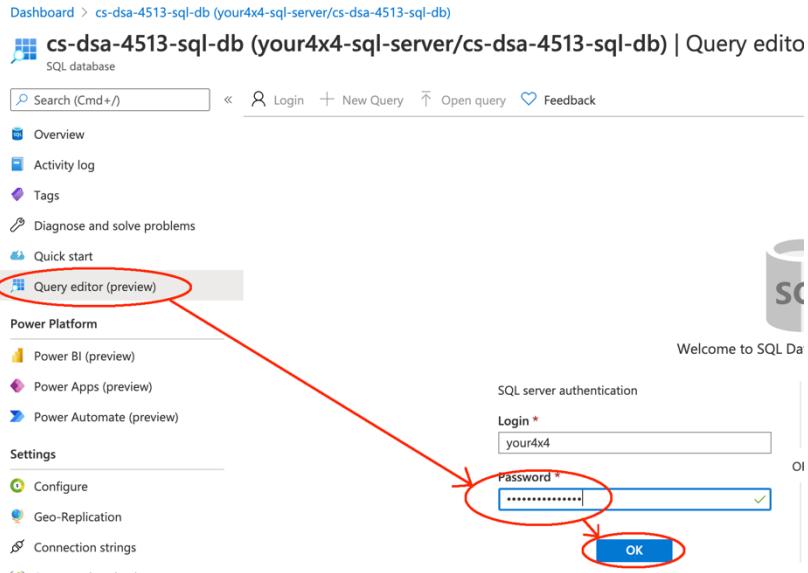
- **WARNING** Doing above allows connections to your SQL server from the entire internet. This should be fine for a class project. In general case, however, you would only allow connections from the IP ranges you trust.

Possible Complications

If you've made a mistake while creating a new firewall rule, select it from the list, it will become editable, make appropriate changes, don't forget to click on the "Save" icon (see below).

RULE NAME	START IP	END IP	...
			...
AllowAll	0.0.0.0	255.255.255.255	...

- Now, run some sample queries to test your DB
 - Navigate back to the database overview (from Dashboard)
 - Click on “Query editor (preview)”
 - Use your server admin login and password to log in



- Run some sample queries (see Appendix A below) to make sure your database works (see the screenshot below).

1. **WARNING** You will get logged out from the query editor automatically after some time passes (~30 minutes) and your queries will get discarded. Make sure to work on your queries in some outside environment (see Part 4 below, for example) which persists them and only copy-paste them into the online editor immediately prior to execution.

The screenshot shows the Azure SQL Database Query editor (preview). At the top, there are buttons for 'Run', 'Cancel query', 'Save query', 'Export data as', and 'Show only Editor'. The 'Run' button is circled in red. Below the buttons is a code editor with the following SQL script:

```

1 -- While working on the database design, it's useful to start from scratch every time
2 -- Hence, we drop tables in reverse order they were created (so the foreign keys not violated)
3 DROP TABLE IF EXISTS Enrollment;
4 DROP TABLE IF EXISTS Class;
5 DROP TABLE IF EXISTS Student;
6
7 -- Create tables
8 CREATE TABLE Student (
9   id INT PRIMARY KEY,
10  first_name VARCHAR(64) NOT NULL,
11  last_name VARCHAR(64) NOT NULL

```

At the bottom, there are 'Results' and 'Messages' tabs. The 'Messages' tab shows an error message:

```

Failed to execute query. Error: Violation of PRIMARY KEY constraint 'PK_Student_3213E83F8DBE'. Cannot insert the value NULL into column 'first_name', table 'cs-dsa-4513-sql-db.dbo.Student'. The INSERT statement conflicted with the CHECK constraint "CHK_classification". The conflict occurred in the object 'Student'. The INSERT statement conflicted with the CHECK constraint "CHK_gpa". The conflict occurred in the object 'Student'. The INSERT statement conflicted with the FOREIGN KEY constraint "FK_enrollment". Cannot insert duplicate key in object 'Enrollment'. The INSERT statement conflicted with the FOREIGN KEY constraint "FK_student_id". The conflict occurred in the object 'Enrollment'. The INSERT statement conflicted with the FOREIGN KEY constraint "FK_class_code". The conflict occurred in the object 'Class'. The statement has been terminated.

```

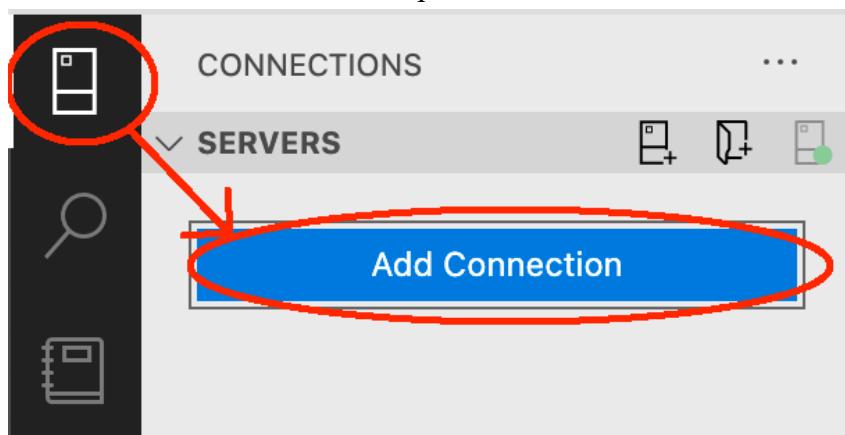
- Whenever you have a table created with some data in it, you can select it in Tables folder and browse the data in it by using the “Select Top 1000 Rows” tab (you will be asked to acknowledge that you’re using a “preview” feature).

The screenshot shows the Azure Data Studio interface. The top navigation bar includes 'Login', 'New Query', 'Open query', 'Feedback', and a refresh icon. The connection name is 'cs-dsa-4513-sql-db (your4x4)'. The left sidebar shows a tree view with 'Tables' expanded, containing 'dbo.Class', 'dbo.Enrollment', 'dbo.Student', 'Views', and 'Stored Procedures'. A context menu is open over 'dbo.Student', with 'Select Top 1000 Rows' highlighted. The main area displays 'Query 2' with the SQL command 'SELECT TOP (1000) * FROM [dbo].[Student]'. The preview pane shows the following data:

id	first_name	last_name	gpa	major	classification
1	John	Doe		CS	Freshman
2	Jane	Doe		DSA	Freshman
3	Jack	Doe	4	CS	Sophomore
4	Jill	Doe	4	DSA	Sophomore

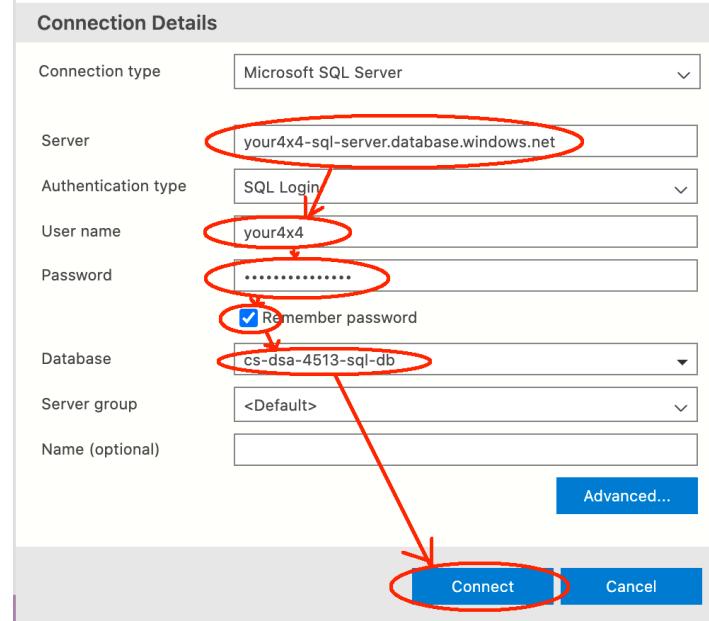
4. (Recommended) Download & Install SQL Operations Studio

- You will need a development environment for working on your SQL queries with a bit more support than what Azure Portal Query Editor provides, we recommend you download & install SQL Operations Studio according to the instructions here <https://docs.microsoft.com/en-us/sql/azure-data-studio/download>
- Launch Azure Data Studio, close “Welcome” tab
- Click on “Servers” icon to the top left, click on “Add Connection” button



- You should now see the “Connection” panel to the right, which has some mostly empty input fields at the bottom.

- Fill out the input fields and make the selections as described below
 - Server => “<your4x4>-sql-server.database.windows.net”
 - Username => “<your4x4>”
 - Password => “<password you’ve chosen>”
 - Database => Pick cs-dsa-4513-sql-db (option takes few seconds to appear, given other fields are typed-in correctly).



- Click on “Connect” button. Once connected, your SQL server should be added to the servers list (see below).



- You can now “right click” on your server and select “New Query”. This will open a query editor for you to work with (see below).
- You now should have everything you need to complete the Graded Homework #2.

```

1  -- While working on the database design, it's usefull to start from scratch every time
2  -- Hence, we drop tables in reverse order they are created (so the foreign keys not
3  DROP TABLE IF EXISTS Enrollment;
4  DROP TABLE IF EXISTS Class;
5  DROP TABLE IF EXISTS Student;
6
7  -- Create tables
8  CREATE TABLE Student (
9      id INT PRIMARY KEY,
10     first_name VARCHAR(64) NOT NULL,
11     last_name VARCHAR(64) NOT NULL,
12     gpa REAL,
13     major VARCHAR(16) NOT NULL,
14     classification VARCHAR(10) NOT NULL,
15     CONSTRAINT CHK_gpa CHECK (gpa BETWEEN 0.0 AND 4.0),
16     CONSTRAINT CHK_classification CHECK (classification IN ('Freshman', 'Sophomore', 'Junior', 'Senior'))
17 );
18

```

Results Messages

2:23:49 AM Started executing query at Line 1
 (2 rows affected)
 Msg 2627, Level 14, State 1, Line 73
 Violation of PRIMARY KEY constraint 'PK__Student__3213E83F5A24078B'. Cannot insert duplicate key values into column 'id'.
 The statement has been terminated.

Helpful links:

1. Your Microsoft Azure Landing Page
 - a. <https://portal.azure.com>
2. Azure Student Account Free Credit Balance
 - a. <https://www.microsoftazuresponsorships.com/Balance>
3. Azure SQL Documentation (and especially helpful sections for this class)
 - a. <https://docs.microsoft.com/en-us/sql/t-sql/language-reference>
 - i. Statements
 - ii. Queries
 - iii. Data Types
 - iv. Functions

Appendix A. Sample SQL queries

```

-- While working on the database design, it's usefull to start from scratch every time
-- Hence, we drop tables in reverse order they are created (so the foreign keys not
-- violated)
DROP TABLE IF EXISTS Enrollment;
DROP TABLE IF EXISTS Class;
DROP TABLE IF EXISTS Student;

-- Create tables
CREATE TABLE Student (

```

```

    id INT PRIMARY KEY,
    first_name VARCHAR(64) NOT NULL,
    last_name VARCHAR(64) NOT NULL,
    gpa real,
    major VARCHAR(16) NOT NULL,
    classification VARCHAR(10) NOT NULL,
    CONSTRAINT CHK_gpa CHECK (gpa BETWEEN 0.0 AND 4.0),
    CONSTRAINT CHK_classification CHECK (classification IN ('Freshman', 'Sophomore',
    'Junior', 'Senior'))
);

CREATE TABLE Class (
    code VARCHAR(10) PRIMARY KEY,
    name VARCHAR(64),
    description VARCHAR(1024)
);

CREATE TABLE Enrollment (
    student_id INT,
    class_code VARCHAR(10),
    semester VARCHAR(6) NOT NULL,
    year INT NOT NULL,
    grade CHAR(1),
    CONSTRAINT PK_enrollment PRIMARY KEY (student_id, class_code, semester, year),
    CONSTRAINT FK_student_id FOREIGN KEY (student_id) REFERENCES Student,
    CONSTRAINT FK_class_code FOREIGN KEY (class_code) REFERENCES Class,
    CONSTRAINT CHK_semester CHECK (semester IN ('Spring', 'Fall')),
    CONSTRAINT CHK_grade CHECK (grade IN ('A', 'B', 'C', 'D', 'F'))
);

-- Insert some valid records

-- Students without GPA
INSERT INTO Student
    (id, first_name, last_name, major, classification)
VALUES
    (1, 'John', 'Doe', 'CS', 'Freshman'),
    (2, 'Jane', 'Doe', 'DSA', 'Freshman');

-- Students with GPA
INSERT INTO Student
VALUES
    (3, 'Jack', 'Doe', 4.0, 'CS', 'Sophomore'),
    (4, 'Jill', 'Doe', 4.0, 'DSA', 'Sophomore');

-- Classes
INSERT INTO Class
VALUES

```

```

('CS4513', 'Database Management Systems', 'Just read the syllabus.'),
('CS5513', 'Advanced Database Management Systems', NULL);

-- Enrollments without grades
INSERT INTO Enrollment
  (student_id, class_code, semester, year)
VALUES
  (1, 'CS4513', 'Fall', 2020),
  (2, 'CS4513', 'Fall', 2020);

-- Enrollments with grades
INSERT INTO Enrollment
VALUES
  (3, 'CS5513', 'Spring', 2020, 'A'),
  (4, 'CS5513', 'Spring', 2020, 'A');

-- Try inserting some invalid records (none should succeed)
INSERT INTO Student VALUES (1, 'Valid', 'Val', 4.0, 'CS', 'Sophomore'); -- PK
Violation
INSERT INTO Student VALUES (5, NULL, 'Val', 4.0, 'CS', 'Sophomore'); -- NOT NULL
Violation
INSERT INTO Student VALUES (5, 'Valid', 'Val', 4.0, 'CS', 'Master'); -- 
CHK_classification Violation
INSERT INTO Student VALUES (5, 'Valid', 'Val', 5.0, 'CS', 'Sophomore'); -- CHK_gpa
Violation
INSERT INTO Enrollment VALUES (3, 'CS5513', 'Spring', 2020, 'A'); -- PK_enrollment
violation
INSERT INTO Enrollment VALUES (10, 'CS5513', 'Spring', 2020, 'A'); -- FK_student_id
violation
INSERT INTO Enrollment VALUES (3, 'CS1234', 'Spring', 2020, 'A'); -- FK_class_code
violation

-- Run some sample SELECT queries
SELECT * FROM Student; -- Get everything stored in Student table
SELECT description FROM Class WHERE code = 'CS4513'; -- Get the description of the
DBMS class

-- Get the average GPA of students for each classification
SELECT classification, avg(gpa)
FROM Student
GROUP BY classification;

-- Get the names of students who ever got an A in CS5513 class
SELECT first_name, last_name
FROM Student, Enrollment
WHERE
  Student.id = Enrollment.student_id AND
  Enrollment.class_code = 'CS5513' AND

```

```
Enrollment.grade = 'A';

-- Run some UPDATE queries AND DELETE queries
UPDATE Enrollment SET grade = 'B' WHERE student_id = 1 AND class_code = 'CS4513' AND
semester = 'Fall' AND year = 2020;
DELETE FROM Enrollment WHERE student_id = 2 AND class_code = 'CS4513' AND semester =
'Fall' AND year = 2020;
SELECT * FROM Enrollment; -- Verify results
```