



COSC 416: Topics in Databases (DBaaS)

TOPIC 8: MICROSOFT AZURE SQL



SCHEDULE

1. Intro to Microsoft Azure

2. Announcements:

1. Lab, today and upcoming

2. Quiz #1









The background is a dark blue gradient. In the corners, there are white line-art illustrations of circuit boards or data paths, consisting of straight lines and small circles.

INTRO TO MICROSOFT AZURE SQL

THE MICROSOFT ALTERNATIVE

- So we've looked at Amazon's relational DBaaS offerings – but what about the competitor's offerings?
- Enter *Microsoft Azure*, which offers a number of relational, managed cloud databases
- Like Amazon AWS, Microsoft Azure is a broader cloud computing platform that also offers a variety of server and cloud services

DATABASE MANAGEMENT OPTIONS

	Azure SQL Managed Instance Quickstart tutorial
	SQL Database Quickstart tutorial
	Azure Synapse Analytics (formerly SQL DW) Quickstart tutorial
	Azure Database for MariaDB Learn more
	Azure Database for MySQL Quickstart tutorial
	Azure Database for PostgreSQL Quickstart tutorial

- Microsoft Azure offers a variety of relational database products, ranging from actual virtual machines with OS-access (*not a DBaaS*) to fully managed, elastic database solutions

AZURE SQL

- The premier DBaaS product offered by Microsoft is the Azure SQL service
- This is a fully managed SQL database service with broad advertised compatibility with other SQL database engines
- Azure SQL offers multiple deployment options: managed instances, single databases, and elastic pools

AZURE SQL – UNDERLYING DETAILS

- Azure SQL instances run *Microsoft SQL Server (MSSQL)*, which is commonly used in enterprise applications
 - Unlike engines like PostgreSQL and MySQL, MSSQL is an enterprise application and costs \$\$\$ to license
- Managed instances are simply MSSQL instances with the OS/hardware/dependencies managed for us, while single databases are fully isolated, with the actual MSSQL management being done for us

AZURE SQL – ELASTIC POOLS

- A rather interesting implementation of Azure SQL is the *elastic pool*
- An elastic pool is a collection of single databases (not managed instances), but using a shared pool of resources (CPU, memory, etc)
- Allows databases to be freely moved into and out of the pool, allowing more efficient use of resources depending on circumstances (add to pool when underutilized?)

PRICING OF AZURE SQL

- Sadly, Azure SQL is not offered as part of the free trial that you can get with Microsoft Azure
- Azure will not let you create an Azure SQL instance when in “Free trial” mode
- This is likely due to the fact that MSSQL is licensed software, and Microsoft doesn’t feel like giving people free access to software that otherwise requires a paid license to use

THE GOOD NEWS

- The good news is that we have other options in Azure which are available to free trial accounts, namely managed (free) DBMS's
- Azure offers:
 - Azure Database for MariaDB
 - Azure Database for MySQL
 - Azure Database for PostgreSQL

AZURE'S PRICING MODEL

- Azure uses a rather complex model for choosing resources and pricing of its services
- Two distinct models: vCore and Database Transaction Unit (DTU)
- vCore is used primarily for managed instances, while single databases and elastic pools can use DTUs

VCORE VS DTU

- The major difference between the vCore and DTU units is scalability and transparency
- With vCore, you have an idea of how much RAM and CPU you have/want for your server, and can price out storage and computing power separately
- With DTU, a blended metric is used that combines RAM, CPU, and I/O speed, with pricing being based entirely on DTUs (no separation of storage and computation costs)

WHAT WE'LL BE USING

- We will be primarily working with vCores – DTUs are primarily used for elastic (scalable) instances, while vCores are more similar to what we've seen in Amazon AWS
- Be careful of the pricing!



PRICE SUMMARY

Gen 5 Compute generation

Cost per vCore **32.36**

vCores selected × **1**

+

Basic storage

Cost per GB / month **0.13**

Storage amount selected × **5**

EST. MONTHLY COST 33.00 CAD

Additional charge per usage

See [pricing details](#) for more detail.

CREATING A MYSQL SERVER

- Luckily, we can create Azure Database for MySQL/MariaDB/PostgreSQL instances on our trial account
- This is a relatively straightforward process, and you'll find that the interface is fairly similar to that used in AWS when creating a new database instance

CREATING A MYSQL SERVER

Subscription *

Free Trial

Resource group *

(New) MyAwesomeResourceGroup

Create new

Server details

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

Server name *

cosc417server

Data source *

None Backup

Admin username *

fritter

Password *

.....

Confirm password *

.....

Location *

(US) East US

Version *

5.7

Compute + storage

Basic

A NOTE ON AUTO-GROWTH STORAGE

- One feature you need to be careful of is Azure's auto-growth storage
- This option can be selected when creating a new database instance
- Every time free storage drops below 5%, Azure will automatically increase storage by 5% (or 10% for smaller servers)
- A handy feature for sure, but also a risky one → potential for accidental costs due to unchecked storage scaling, particularly in certain applications (long-term logging, for instance)

COMPARISON WITH AWS

- Azure offers many of the same features as AWS
- Azure offers a more flexible pricing schema, but also has a higher minimal buy-in price than AWS does in some cases
- If you want to use MSSQL for an enterprise application, Azure wins hands down
- Deployment times in general are faster for Azure (seemingly)

CONNECTING TO AN AZURE DATABASE INSTANCE

- Handily, under the “Connection strings” menu option of your newly-created instance, Azure gives you pre-populated connection strings

JDBC

```
String url = "jdbc:mysql://cosc417server.mysql.database.azure.com:3306/{your_database}?useSSL=true&requireSSL=false"; myDbConn = DriverManager.getConnection...
```

Node.js

```
var conn = mysql.createConnection({host: "cosc417server.mysql.database.azure.com", user: "fritter@cosc417server", password: {your_password}, database: {your_dat...
```

PHP

```
$con=mysqli_init(); mysqli_ssl_set($con, NULL, NULL, {ca-cert filename}, NULL, NULL); mysqli_real_connect($con, "cosc417server.mysql.database.azure.com", "fritter...
```

Python

```
cnx = mysql.connector.connect(user="fritter@cosc417server", password={your_password}, host="cosc417server.mysql.database.azure.com", port=3306, database={...
```

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ANNOUNCEMENTS

LAB TODAY

- In the lab today, you should hopefully be finishing off your implementation of the AWS MySQL sandbox program
- The lab is due next Monday
- There is no new lab this week, but if you want to get a head start, pop on over to Azure, create a trial account, and try creating an Azure Database for MySQL instance

QUIZ #1

- Quiz #1 is scheduled for this Wednesday
- Topics covered will include general DBaaS architecture information, as well as specifics of the Amazon AWS DBaaS platform
- Topics will be posted tonight
- There will be a practical component to the quiz, requiring you to create a new database instance using Amazon AWS (and configure it to allow remote access for the testing script)



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SO LONG, FOLKS!