



# Azure API Apps Part III

CSCI E-94

Fundamentals of Cloud Computing - Azure

Joseph Ficara

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# Agenda

- Validation
- Azure SQL Basics
- Entity Framework Core Basics
- Strongly Typed Settings



# Validation

- Validation requires three steps
  - 1. Annotate the model with Data Annotations
  - 2. Check `ModelState.IsValid`
    - In action methods
  - 3. Return errors via `BadRequest(ModelState)`



# Validation

## ■ Built in Data Annotations

- See: <http://bit.ly/2SbCUJd>
- Compare
- CreditCard
- CustomValidation
- MaxLength
- MinLength
- Range
- Url
- RegularExpression
- Required
- StringLength
- Password
- EmailAddress
- FileExtensions
- Phone



# Validation

- Model Data Annotations can be applied to
  - A property - to validate that property
    - Independently of any other property
  - The model data as a whole
    - CustomValidation & ValidationAttribute
      - Either support multiple property validation
    - For example:
      - Verify
        - City and State are valid for the ZipCode
          - By examining the collection of items



# Validation

## Model property validation

```
// Name is required and has a max length of 30 characters
```

```
[Required]
```

```
[StringLength(30)]
```

```
public string Name { get; set; }
```

```
// Age must be between 21 and 120
```

```
[Range(21,120)]
```

```
public int Age { get; set; }
```



# Validation

- To use the **CustomValidation** attribute
  - Annotate the Model class
    - With the **CustomValidation** attribute
      - Provide the
        - Model type as the first parameter
        - Validation method name as the second parameter
  - Implement the validation method
    - Its name is the second parameter value
      - The first parameter is the Model instance object
      - The second parameter is the **ValidationContext**
        - Typically, not used for class level validation



# Validation

## Multi-Property Model validation via CustomValidation

```
[CustomValidation(typeof(Customer), "ValidateNameAndEmail")]
public class Customer
{
    public static ValidationResult ValidateNameAndEmail(Customer customer,
                                                         ValidationContext ctx )
    {
        // Verify that the email address contains either the first or last name
        string[] nameParts = customer.Name.ToLowerInvariant().Split(' ');
        ...
        if (customer.EmailAddress.ToLowerInvariant().Contains(nameParts[0]))
        {
            return ValidationResult.Success;
        }
        ...
        return new ValidationResult("Email must contain first or last name",
                                    new List<string> { "Name", "EmailAddress" });
    }
}
```





# Demo

## Validation

### CustomerDemoSolution



# Validation

- Custom error messages are supported
  - Data Annotations allow for user defined
    - Hard coded error message
    - Resource based error messages
      - Supporting localized error messages
- Custom Data Annotations are supported
  - Derive from the [ValidationAttributeClass](#)
    - Override [IsValid](#) method
      - This is where your validation logic goes
    - Optionally override [FormatErrorMessage](#)



# Validation

## ■ Best Practice:

- Design your own error response payload
- Include both
  - Numeric representation of the specific error
    - So, client code can be written for it
  - Human readable description of the error
    - So, developer understands the issue
- Ideally
  - Validate as much as you can and return ALL errors
  - Improves API usability

## Example error response

```
public class ErrorResponse
{
    //The set of properties with invalid values
    public List<PropertyError> propertyErrors { get; set; }

    // Provides a human readable description of the error not localized
    public string topLevelErrorDescription { get; set; }

    // A numeric representation of the error that can be used to code against
    public int topLevelErrorNumber { get; set; }
}
```

## Example error response ...

```
// Defines the property error structure
public class PropertyError
{
    // The name of the property with invalid input
    public string name { get; set; }

    // The invalid input value of the property
    public string value { get; set; }

    // Provides a human readable description of the error not localized
    public string description { get; set; }

    // A numeric representation of the error that can be used to code against
    public int errorNumber { get; set; }
}
```



# Validation





# Azure SQL Basics

- What is Azure SQL?
  - Microsoft's PaaS fully managed SQL offering
- Why do you care?
  - All the benefits of PaaS
  - Migration path from on premise to cloud
    - Feature Comparison See: <http://bit.ly/2FPaKuh>
      - No SQL Jobs
      - No SQL CLR
      - Some on premise T-SQL not supported
      - No Extended Stored Procedures



# Azure SQL Basics

## Why do you care ...

- Automated low/no touch features
  - Automatic backups
  - Click to Geo Replicate
  - Dynamically Scalable
    - Average of 4 seconds interruption
  - New features appear in Azure SQL first!
  - Business continuity
    - Point-In-Time Restore
    - Active geo-replication
- PaaS and IaaS comparison
  - See: <http://bit.ly/2s8hq51>

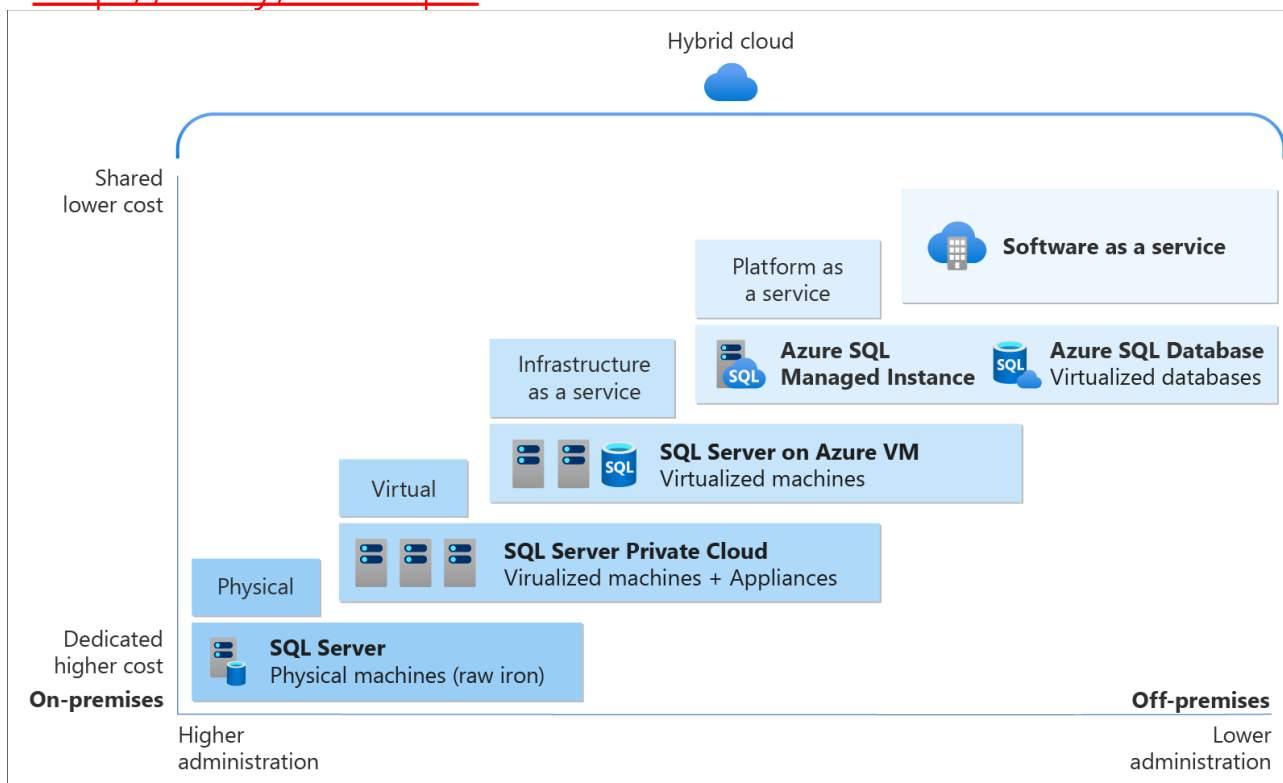




# Azure SQL Basics

## ■ Credit: Azure SQL Documentation

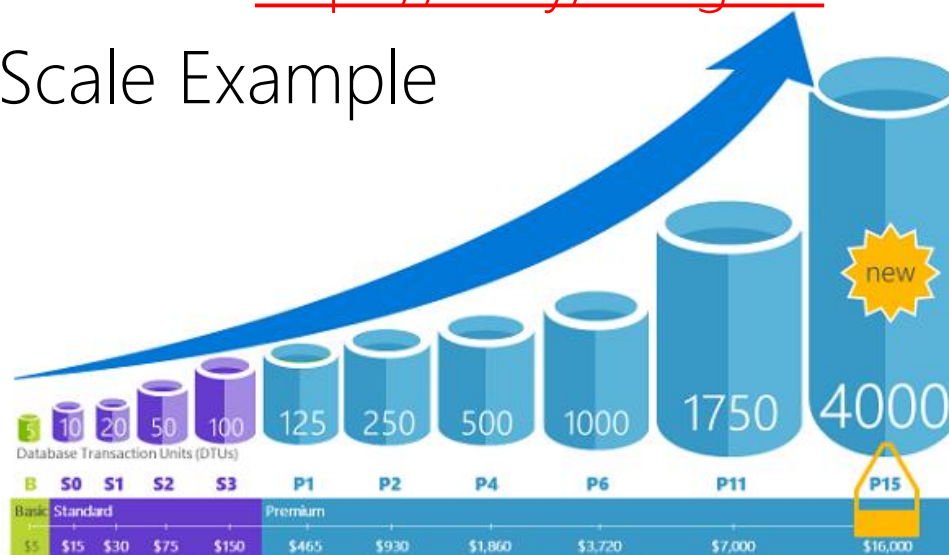
<http://bit.ly/2s8hq51>





# Azure SQL Basics

- Wide range of scalability
  - Single Database Scale: <https://bit.ly/3uc1T2q>
  - Hyperscale service tier: <https://bit.ly/3ugvHed>
  - Elastic Pool: <https://bit.ly/3LdglNR>
- DTU Scale Example

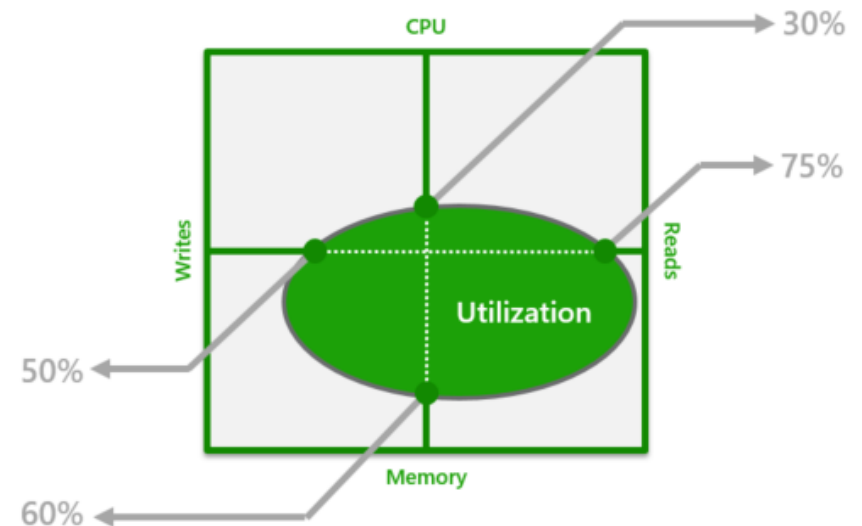


Credit Microsoft docs.microsoft.com



# Azure SQL Basics

- What are DTUs?
  - Data Throughput Units
  - Relative resources assigned to the DB
  - Blended measure
    - CPU
    - Memory
    - Read/Write rates



Credit Microsoft docs.microsoft.com



# Azure SQL Basics

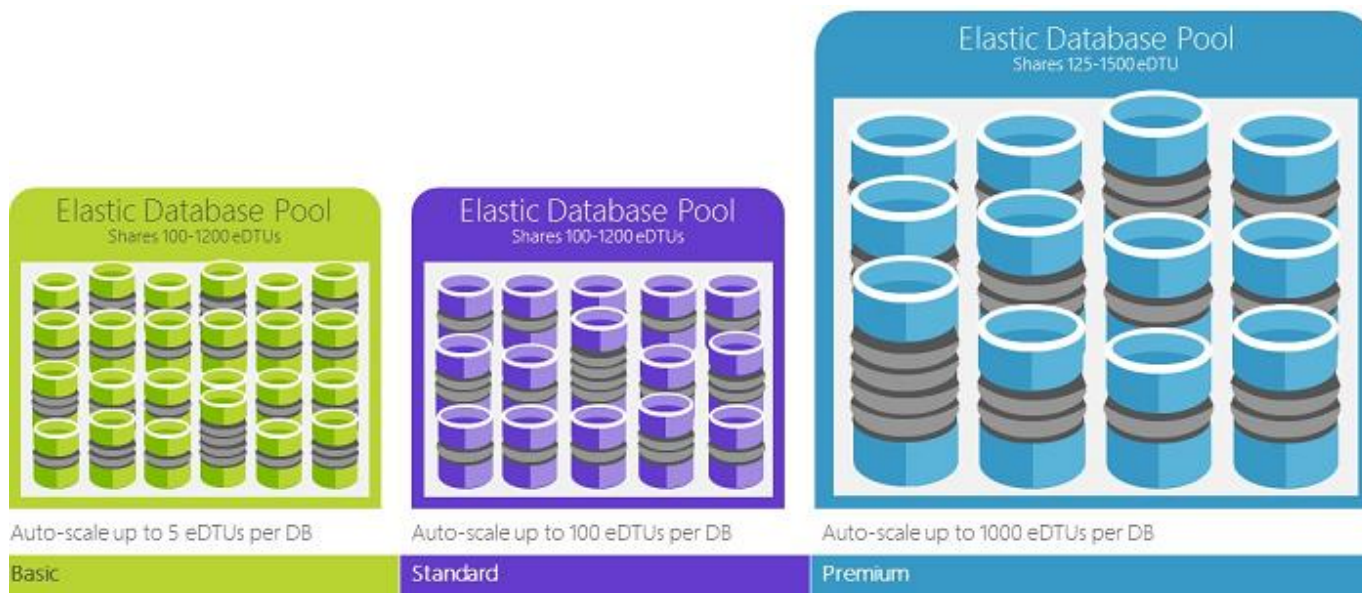
## What are DTUs?...

- Doubling DTUs
  - Doubles set of resources available
- Example:
  - Basic has 5 DTUs
  - P15 has 4000 DTUs
    - Increase of 800x
      - More compute power than a Basic Db with 5 DTUs
  - See: <http://bit.ly/2BGoHwS>
- DTU Calculator: <https://dtucalc.azurewebsites.net/>



# Azure SQL Basics

- Elastic pools maximize resource utilization
  - Credit: Azure SQL Documentation  
<https://bit.ly/3AR1dAA>



Credit Microsoft docs.microsoft.com



# Azure SQL Basics

- Hyperscale service tier
  - 99.995% availability
  - Uses the vCore-based purchasing model
  - Capabilities
    - 100 TB database size
    - Nearly instantaneous database backups
      - With no IO impact on computing resources
    - Fast database restores in minutes
    - Rapid scale out & up



# Azure SQL Basics

## Hyperscale service tier

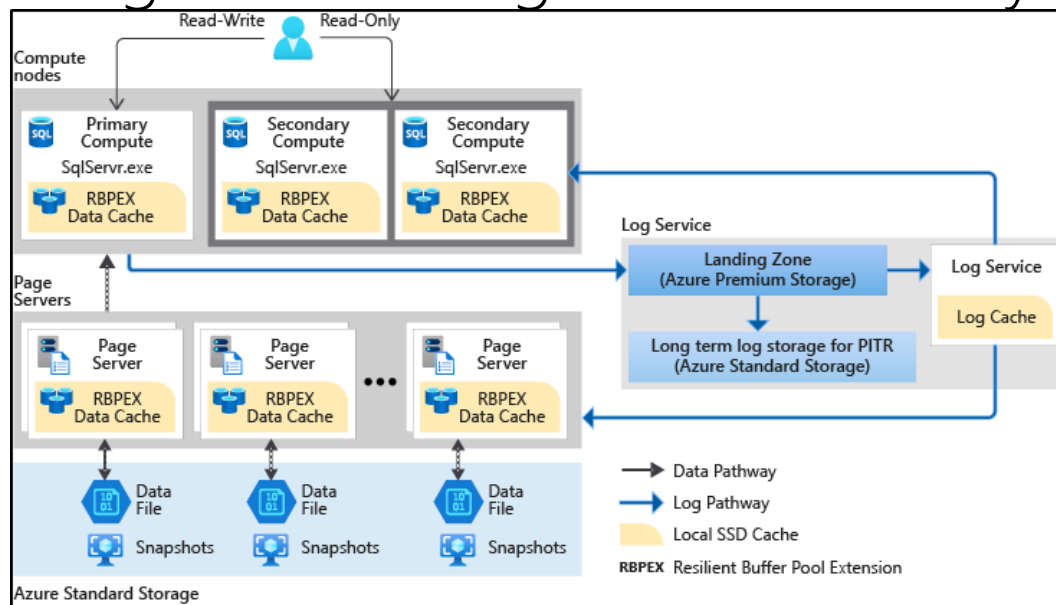
- When should you use it
  - Large database on-premises moving to cloud
  - Cloud limited by maximum database size
  - Small database that
    - Require fast vertical and horizontal scaling
      - Compute scaling
      - instant backup
      - fast database restore



# Azure SQL Basics

## Hyperscale service tier

- Separation of
  - Query processing engine
  - Long-term storage and durability of data



Credit Microsoft docs.microsoft.com





# Azure SQL Basics

- Automatic performance monitoring
  - Suggests indexes based on production usage
    - Can auto create and remove
  - Recommendation:
    - Review before applying
- Intelligent threat detection
  - Alerts upon suspicious activities
- Auditing
  - Track database events and writes



# Azure SQL Basics

- Data encryption at rest
  - Transparent **D**ata **E**ncryption (TDE)
- Data encryption in motion
  - Always Encrypted
    - See: <http://bit.ly/2EHqGQ7>
- Dynamic data masking
  - Policy controlled hides sensitive data
    - See: <http://bit.ly/2vZQo1T>





# Azure SQL Basics

- Row-level security (RLS)
  - Control access to rows based on
    - Group membership, Execution context
    - See: <http://bit.ly/2sc303x>





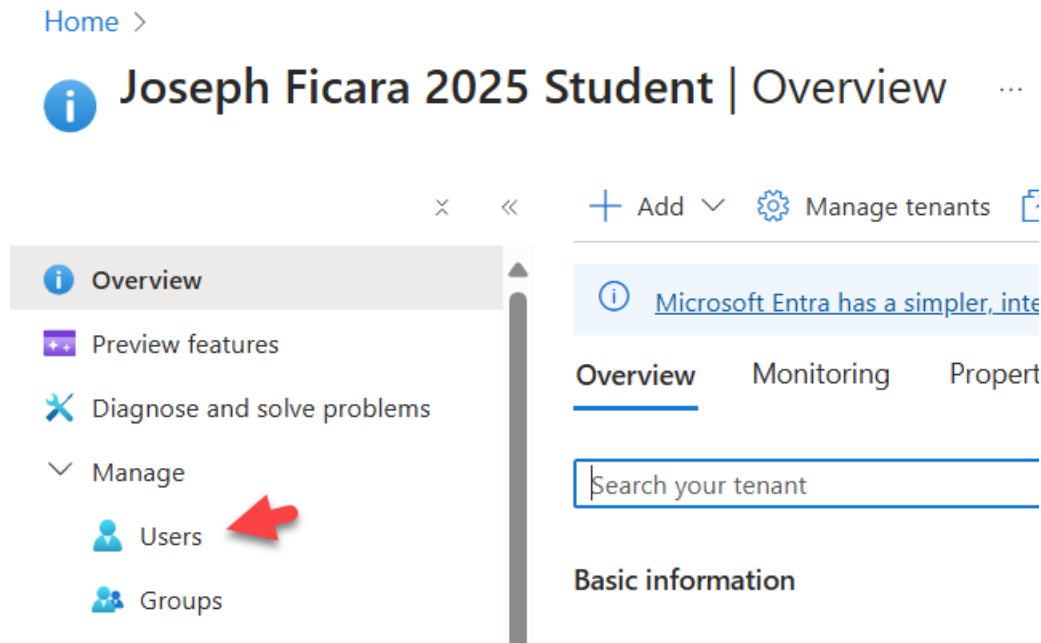
# Azure SQL Basics

- Let's do a walkthrough
  - Creating Azure SQL instance
- Basic Steps:
  - Create an Entra User **dbadmin**
    - To choose later as the admin to your db server
  - Choose Azure SQL
  - Pick Single Database
  - Enter database name
  - Create / Pick resource group
  - Create a server
  - Choose Basic 5 DTUs, 100MB (\$4.90 usd)



# Azure SQL Basics

- Go to Entra ID
  - Select Users





# Azure SQL Basics

- Select All Users
  - Click New user
    - Create new user

Home > Joseph Ficara 2025 Student | Users >

**Users** ...  
Joseph Ficara 2025 Student

+ New user ▾ Edit (Preview) ▾ Delete Download

All users

Audit logs

Sign-in logs

Diagnose and solve problems

Deleted users

Password reset

User settings

Bulk operation results

New support request

**Create new user**  
Create a new internal user in your organization

**Invite external user**  
Invite an external user to collaborate with your organization

**Create new external user**  
Create a new customer, citizen, or business partner in your organization

**User name**

carainstructor2025@ou

caraharvardinstructor@

**Joseph Ficara Demo Student 2025** jficara2025@outlook.com



# Azure SQL Basics

- Enter the user's details
  - User Principal name **dbadmin**
  - Display name: DB Admin
    - Password - Copy it!
    - Auto-generate password
      - Is checked
    - Account enabled
      - Is checked



# Azure SQL Basics

Home > Joseph Ficara 2025 Student | Users > Users >

## Create new user

Create a new internal user in your organization

Basics Properties Assignments Review + create

Create a new user in your organization. This user will have a user name like alice@contoso.com. [Learn more](#)

### Identity

User principal name \* dbadmin @ jficara2025.onmicrosoft.com

Domain not listed? [Learn more](#)

Mail nickname \* dbadmin

☒ Derive from user principal name

Display name \* DB Admin

Password \* .....

☒ Auto-generate password

Account enabled ☒

[Review + create](#) < Previous Next: Properties > [Give feedback](#)





# Azure SQL Basics

- Login to the portal
  - User Principal name **dbadmin**
    - dbadmin@yourdomain.onmicrosoft.com
  - Use the password you copied earlier
    - If you forgot to do this
      - Go to the user in Entra Id
      - Assign a new password
  - Assign a new password
  - Add multi factor authentication support
    - **Log in to portal, set new password, setup MFA**



# Azure SQL Basics

- If you forgot the password
  - To your Entra Id User
    - Go to Entra Id
    - Select the User
    - Reset the password

Home > Joseph Ficara 2025 Student | Users > Users >

**DB Admin** ...  
User

Search [ ] × <<

Edit properties Delete Refresh **Reset password**

Overview Monitoring Properties

Audit logs

**Reset password** ×

DB Admin


The user 'dbadmin@jficara2025.onmicrosoft.com' will be assigned a temporary password that must be changed on the next sign in. To display the temporary password, click 'Reset password'.

**Reset password**



# Azure SQL Basics

## ■ Basic Steps:

- **DONE:** Create an Entra User **dbadmin**
  - To select later as the admin to your db server
-  ■ Create a SQL Database
  - Choose Azure SQL
- Pick Single Database
- Enter database name
- Create / Pick resource group
- Create a server
- Choose **Basic 5 DTUs, 100MB (\$4.90 usd)**



# Azure SQL Basics

[Dashboard](#) > [Create a resource](#) > [Marketplace](#) >

## Azure SQL

Microsoft



### Azure SQL

[Add to Favorites](#)

Microsoft | Azure Service

★ 4.5 (4 ratings)

Plan

Azure SQL

Create



#### Overview

[Plans](#)

[Usage Information + Support](#)

[Ratings + Reviews](#)

Azure SQL allows you to create and manage your SQL Server resources from a single view, ranging from fully managed PaaS databases to IaaS virtual machines with direct OS and database engine access. All deployment options enable you to bring your on-premises licenses to Azure using Azure Hybrid Benefit.

#### Databases

Single databases are optimized for modern application development of new cloud-born applications. Databases provide a fully managed SQL experience with extensive and easy to use manageability features.

**Includes:** single databases, elastic pools, and database servers

#### Managed instances

Managed instances provide the PaaS benefits of SQL databases with added capabilities that were previously only available in SQL virtual machines. This includes a native virtual network and near 100% compatibility with on-premises SQL Server.

**Includes:** single instances, instance pools

#### SQL virtual machines

SQL virtual machines offer an IaaS architecture with extensive control over SQL Server and the underlying OS. Deployments include a management resource that focuses on SQL configuration and enables license updates with no server downtime.

**Includes:** 60+ available images combining SQL Server 2008-2019 and a variety of available OS and license types



# Azure SQL Basics

[Dashboard](#) > [New](#) > [Azure SQL](#) >

## Select SQL deployment option

Microsoft

 [Feedback](#)

### How do you plan to use the service?



#### SQL databases

Best for modern cloud applications. Hyperscale and serverless options are available.

Resource type

Single database

[Show details](#)

[Create](#)



#### SQL managed instances

Best for most migrations to the cloud. Lift-and-shift ready.

Resource type

Single instance

[Show details](#)

[Create](#)



#### SQL virtual machines

Best for migrations and applications requiring OS-level access. Lift-and-shift ready.

Image

[Create](#)

[Show details](#)



#### Single database

Single databases are a great fit for modern, cloud-born applications that need a fully managed database with predictable performance.

##### Featured capabilities:

- ✓ Hyperscale storage (up to 100TB)
- ✓ Serverless compute
- ✓ Easy management



#### Elastic pool

Elastic pools provide a cost-effective solution for managing the performance of multiple databases with variable usage patterns.

##### Featured capabilities:

- ✓ Resource sharing for cost optimization
- ✓ Simplified performance management



#### Database server

Database servers are used to manage groups of single databases and elastic pools.

##### Featured capabilities:

- ✓ Access management
- ✓ Backup management
- ✓ Business continuity management



# Azure SQL Basics

**Basics** Networking Security Additional settings Tags Review + create

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](#)

Want to try Azure SQL Database for free? Create a free serverless database with the first 100,000 vCore seconds, 32GB of data, and 32GB of backup storage free per month for the lifetime of the subscription. Limit ten free databases per subscription. [Learn more](#)

Apply offer

SQL Database Hyperscale: Low price, high scalability, and best feature set. [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 \* 01-Lab\_Joe\_Ficara Student

Resource group \* (New) rg-sqldata  
[Create new](#)

## Database details

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

Database name \* sqlldb-cscie94-2025

Server \* (new) sql-cscie94-2025 (East US 2)  
[Create new](#)

Want to use SQL elastic pool? ☐ Yes ☒ No

Workload environment ☒ Development ☐ Production

Default settings provided for Development workloads. Configurations can be modified as needed.



## Cost summary

**Basic (Basic)**  
Cost per DTU (in USD) 0.98  
DTUs selected x 5  
**ESTIMATED COST / MONTH 4.90 USD**

Compute + storage \* 0

**Basic**  
2 GB storage  
[Configure database](#)

## Backup storage redundancy

Choose how your PITR and LTR backups are replicated. Geo restore or ability to recover from regional outage is only available when geo-redundant storage is selected.

Backup storage redundancy ☒ Locally-redundant backup storage  
☐ Zone-redundant backup storage  
☐ Geo-redundant backup storage  
☐ Geo-Zone-redundant backup storage [Preview]

Review + create

Next : Networking >



# Azure SQL Basics

[Dashboard](#) > [Create a resource](#) > [Create SQL Database](#) >

## 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 \* 1 →  ✓  
Location \*  ✓

### 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](#) or 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  
3 → ☒ Use both SQL and Azure AD authentication  
☐ Use SQL authentication

Set Azure AD admin \*  
**Not Selected**  
[Set admin](#) 4 →

Server admin login \* 7 →  ✓  
Password \* 8 →  ✓  
Confirm password \* 7 →  ✓

OK

## Azure Active Directory

Azure Active Directory

5 →  
db admin  
dbadmin@jficarademo.onmicrosoft.com 6 →  
Selected

### Selected item

db admin  
dbadmin@jficarademo.onmicrosoft.com  
Remove

10 → Select



# Azure SQL Basics

[Dashboard](#) > [Create a resource](#) > [Marketplace](#) > [Azure SQL](#) > [Select SQL deployment option](#) > [Create SQL Database](#) >

## Configure ...

Feedback

### 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



Basic (For less demanding workloads) ▼

[Compare service tiers](#)

DTUs [Compare DTU options](#)

### 5 (Basic)

Data max size (GB)

2

[Apply](#)



### Cost summary

#### Basic (Basic)

Cost per DTU (in USD)

0.98

DTUs selected

x 5

ESTIMATED COST / MONTH



4.90 USD





# Azure SQL Basics

Subscription \* ⓘ

Teaching Staff Labs\_Joe Demo\_Ficara

Resource group \* ⓘ

rg\_lectures

[Create new](#)

ESTIMATED COST / MONTH

4.90 USD

## Database details

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

Database name \*

sqldb-classdemo

Server \* ⓘ

(new) sql-cscie94classdemoserver (East US)

[Create new](#)

Want to use SQL elastic pool? ⓘ

☐ Yes ☒ No

Workload environment

☒ Development  
☐ Production

**i** Default settings provided for Development workloads. Configurations can be modified as needed.

Compute + storage \* ⓘ

**Basic**  
2 GB storage  
[Configure database](#)

## Backup storage redundancy

Choose how your PITR and LTR backups are replicated. Geo restore or ability to recover from regional outage is only available when geo-redundant storage is selected.

Backup storage redundancy ⓘ

☒ Locally-redundant backup storage  
☐ Zone-redundant backup storage

[Review + create](#)

[Next : Networking >](#)



# Azure SQL Basics

[Dashboard](#) > [SQL databases](#) > [Create SQL Database](#) >

## Create SQL Database

Microsoft

Basics **Networking** Security Additional settings Tags Review + create

Configure network access and connectivity for your server. The configuration selected below will apply to the selected server 'sql-cscie94-2025' and all databases it manages. [Learn more](#)

### Network connectivity

Choose an option for configuring connectivity to your server via public endpoint or private endpoint. Choosing no access creates with defaults and you can configure connection method after server creation. [Learn more](#)

Connectivity method \*

- ☐ No access  
☒ Public endpoint  
☐ Private endpoint

### 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

### Connection policy

Configure how clients communicate with your SQL database server. [Learn more](#)

Connection policy

- ☒ Default - Uses Redirect policy for all client connections originating inside of Azure (except Private Endpoint connections) and Proxy for all client connections originating outside Azure  
☐ Proxy - All connections are proxied via the Azure SQL Database gateways  
☐ Redirect - Clients establish connections directly to the node hosting the database

### Encrypted connections

This server supports encrypted connections using Transport Layer Security (TLS). For information on TLS version and certificates, refer to connecting with TLS/SSL. [Learn more](#)


Minimum TLS version

TLS 1.2

[Review + create](#)

[< Previous](#)

[Next : Security >](#)



Cost summary

<b>Basic (Basic)</b>	
Cost per DTU (in USD)	0.98
DTUs selected	x 5
<b>ESTIMATED COST / MONTH</b>	<b>4.90 USD</b>



# Azure SQL Basics

[Dashboard](#) > [SQL databases](#) >

## Create SQL Database

Microsoft

[Basics](#) [Networking](#) [Security](#) [Additional settings](#) [Tags](#) [Review + create](#)

### 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

### Ledger

Ledger cryptographically verifies the integrity of your data and detects any tampering that might have occurred. [Learn more](#)

Ledger **Not configured**  
[Configure ledger](#)

### Server identity

Use system assigned and user assigned managed identities to enable central access management between this database and other Azure resources. [Learn more](#)

Server identity **Not enabled**  
[Configure Identities](#)

### Transparent data encryption key management

Transparent data encryption encrypts your databases, backups, and logs at rest without any changes to your application. To enable encryption, go to each database. Database level settings if enabled, will override the server level setting. [Learn more](#)


Server level key ☐ **Service-managed key selected**  
[Configure transparent data encryption](#)

Database level key ☐ **Not configured**  
[Configure transparent data encryption](#)

### Always Encrypted

Always Encrypted is a family of industry-leading data protection features that provide a separation between those who own the data and can view it, and those who manage the data but should have no access, on-premises database administrators, cloud database operators, or other high-privileged but unauthorized users. [Learn more](#)

Enable secure enclaves ☐ ☐ ON ☒ OFF



Cost summary

<b>Basic (Basic)</b>	
Cost per DTU (in USD)	0.98
DTUs selected	x 5
<b>ESTIMATED COST / MONTH</b>	<b>4.90 USD</b>

[Review + create](#)

[< Previous](#)

[Next : Additional settings >](#)



# Azure SQL Basics

Dashboard > SQL databases >

## Create SQL Database

Microsoft

Basics Networking Security **Additional settings** Tags Review + create

Customize additional configuration parameters including collation & sample data.

### 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](#)

### Maintenance window

Select a preferred maintenance window from the drop-down. During maintenance, databases remain available, but some updates may require a failover. The system default maintenance window (5pm to 8am) limits most activities to this time, but urgent updates may occur outside of it. To ensure all updates occur only during the maintenance window, select a non-default option. [Learn more](#)

Maintenance window

System default (5pm to 8am)

**Review + create**

< Previous

Next : Tags >



### Cost summary

#### Basic (Basic)

Cost per DTU (in USD)

0.98

DTUs selected

x 5

ESTIMATED COST / MONTH

4.90 USD



# Azure SQL Basics

Dashboard > SQL databases >

## Create SQL Database

Microsoft

Basics Networking Security Additional settings **Tags** Review + create

Tags are name/value pairs that enable you to categorize and view consolidated billing by applying the same tag to multiple resources and resource groups. [Learn more](#)


Note that if you create tags and then change resource settings on other tabs, your tags will be automatically updated.

Name	Value	Resource
<input type="text"/>	:	<input type="text"/> 3 selected

Review + create

< Previous

Next : Review + create >



### Cost summary

<b>Basic (Basic)</b>	
Cost per DTU (in USD)	0.98
DTUs selected	x 5
<b>ESTIMATED COST / MONTH</b>	<b>4.90 USD</b>



# Azure SQL Basics

## Create SQL Database

Microsoft

Basics Networking Security Additional settings Tags Review + create

### Product details

SQL database  
by Microsoft  
[Terms of use](#) | [Privacy policy](#)

**Estimated cost per month**  
4.90 USD

### 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	01-Lab_Joe_Ficara Student
Resource group	rg-sqldata
Region	East US 2
Database name	sqlldb-cscie94-2025
Server	(new) sql-cscie94-2025
Authentication method	SQL and Microsoft Entra authentication
Server admin login	Sqlldbadmin
Microsoft Entra Admin	dbadmin@jficara2025.onmicrosoft.com
Compute + storage	Basic: 2 GB storage
Backup storage redundancy	Locally-redundant backup storage

### Networking

Allow Azure services and resources to access this server	Yes
Add current client IP address	Yes
Private endpoint	None
Minimum TLS version	1.2
Connection Policy	Default

### Security

Identity	Not enabled
Transparent data encryption (Server level)	Service-managed key selected
Database level customer-managed key	Not configured
Database level user assigned managed identity	Not configured
Advanced data security	Not now
Always Encrypted with secure enclaves	Not configured
Sql Ledger(Database)	Disabled
Digest Storage	Disabled

### Additional settings

Use existing data	Blank
Collation	SQL_Latin1_General_CP1_CI_AS
Maintenance window	System default (5pm to 8am)

### Tags

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

**Cost summary**

<b>Basic (Basic)</b>	
Cost per DTU (in USD)	0.98
DTUs selected	x 5
<b>ESTIMATED COST / MONTH</b>	<b>4.90 USD</b>



# Azure SQL Basics

- If you forgot during...
  - Modify your firewall rules
    - On the Azure SQL Server
  - Allow access to
    - Your client IP Address



## Caution ■ Azure services and resources

- Any service in Azure can “reach” your SQL Server
  - **From other subscriptions of other customers**
  - Services **must have valid have credentials**
    - Defense in depth reduced with this option turned on
  - Alternative -> Network segmentation



# Azure SQL Basics

Microsoft Azure

Home > Create a resource >

## Create SQL Database

Microsoft

Basics **Networking** Security Additional settings Tags Review + create

Configure network access and connectivity for your server. The configuration selected below will apply to the selected server 'sql-cscie94-2024' and all databases it manages. [Learn more](#)

### Network connectivity

Choose an option for configuring connectivity to your server via public endpoint or private endpoint. Choosing no access creates with defaults and you can configure connection method after server creation. [Learn more](#)

Connectivity method \*

1 ☐ No access  
☒ Public endpoint  
☐ Private endpoint

### 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.

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

3 Add current client IP address \* ☐ No ☒ Yes

This option configures the firewall to allow connections from IP addresses allocated to any Azure service or asset, including connections from the subscriptions of other customers.

### Connection policy

Configure how clients communicate with your SQL database server. [Learn more](#)

4 Connection policy ☒ Default - Uses Redirect policy for all client connections originating inside of Azure (except Private Endpoint connections) and Proxy for all client connections originating outside Azure  
☐ Proxy - All connections are proxied via the Azure SQL Database gateways  
☐ Redirect - Clients establish connections directly to the node hosting the database

### Encrypted connections

This server supports encrypted connections using Transport Layer Security (TLS). For information on TLS version and certificates, refer to connecting with TLS/SSL. [Learn more](#)

5 **Review + create** < Previous Next : Security >

Cost summary

Basic (Basic)	
Cost per DTU (in USD)	0.98
DTUs selected	x 5
<b>ESTIMATED COST / MONTH</b>	<b>4.90 USD</b>

**Caution**

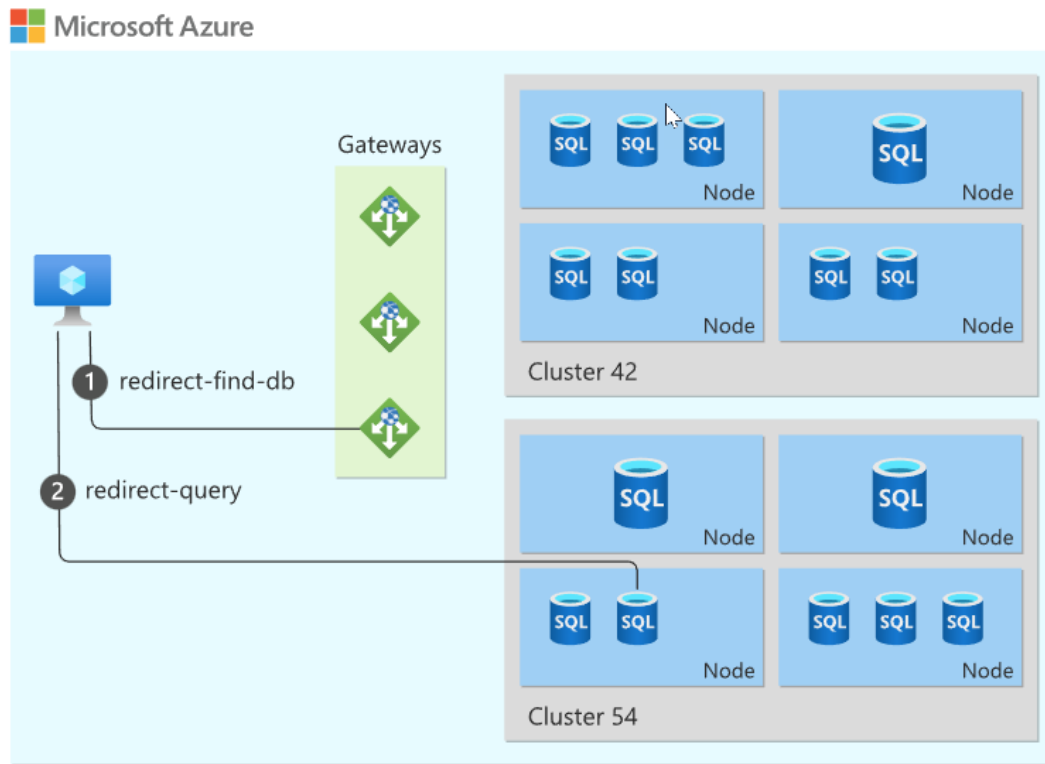




# Publishing to Azure

## Redirect Policy (Default)

- Connectivity from within Azure

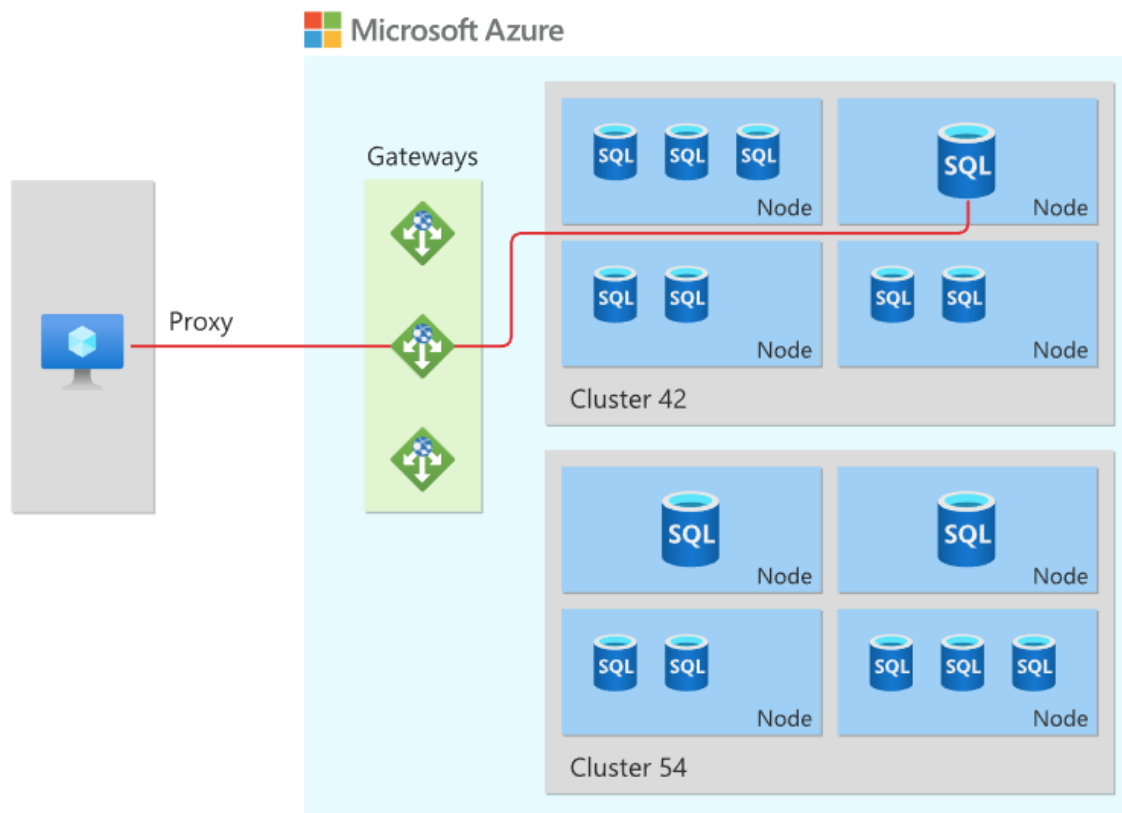




# Publishing to Azure

Redirect Policy (Default)

- Connectivity from outside azure





# Azure SQL Basics

- You can access the database via
  - Visual Studio
    - Server Explorer
      - Add database connection
  - Azure Data Studio
    - Linux, Mac, Windows
  - SQL Server Management Studio
    - Download here: <http://bit.ly/2GPIpFF>



# Demo

## Azure SQL Basics

Azure Portal

SQL Management Studio

Azure Data Studio



# Azure SQL Basics

- How do I
  - Reset my Azure SQL Server password?
  - Find my Azure SQL Server Admin Id

Dashboard >

sql-cscie94classdemoserver SQL server

Search

+ Create database + New elastic pool + New dedicated SQL pool (formerly SQL DW) ↓ Import database **Reset password** → Move ▾ ...

Overview

Activity log

Essentials

Resource group ([move](#))  
[rg\\_lectures](#)

**Server admin**  
sqlbadmin

JSON View



# Azure SQL Basics





# Entity Framework Core Basics

- What is Entity Framework Core?
  - It's an Object Relational Mapping technology
  - Many similarities to Entity Framework 6
    - But built from scratch for .NET Core
      - See: <http://bit.ly/2S8zxTg>
    - For differences between EF 6 and EF Core
      - See: <http://bit.ly/2Fq2KQp>
  - Conceptually like other ORMs like
    - Hibernate
    - nHibernate



# Entity Framework Core Basics

- Provider support for popular databases
  - SQL Server
  - My SQL
  - PostgreSQL
  - Oracle - For purchase
  - SQLite
  - SQL Compact - Only works on .NET Framework
  - DB2
  - In-memory (for testing)





# Entity Framework Core Basics

- Model generation support
  - Reverse engineer existing database
    - First time reverse engineer only
    - Update model still not there 😞
      - [Update model from database · Issue #831 · dotnet/efcore \(github.com\)](#)
  - Generate model from C# classes
    - Code First



# Entity Framework Core Basics

- Note **E**ntity **F**ramework 6 Fans...
  - In EF Core there is no:
    - EDMX file
      - Not planned
    - Relationship visualization
      - “High priority feature” in backlog
      - EF Core Power Tools is an option
        - See: [Home · ErikEJ/EFCorePowerTools Wiki \(github.com\)](https://github.com/ErikEJ/EFCorePowerTools/wiki)
- EF Core roadmap
  - See: <http://bit.ly/2RVvRB4>



# Entity Framework Core Basics

- Can you use EF Core with .NET Core?
  - Yes, with caveat
- How?
  - Create .NET Core projects
    - Using .NET 4.8 framework as option
  - .NET 4.8 is .NET Standard 2.0 compatible
    - .NET Standard 2.0 defines an API surface area
      - It's a specification that represents:
        - A set of APIs that all .NET platforms have to implement.
    - See .NET Standard FAQ: <https://bit.ly/3uwtZ8x>



# Entity Framework Core Basics

- Let's build a .NET 9 Web API app that Uses
  - .NET 9 Web API
  - Entity Framework Core 9
  - Azure SQL
- Creates, Updates, Retrieves and Deletes
  - Customer entities
  - Address entities
    - Customer has a 1 to many relationships to Address



# Entity Framework Core Basics

- Basic support requires 8 steps
  - 1. Create a .NET 9 Web API project
  - 2. Add the Nuget Package
    - Microsoft.EntityFrameworkCore.SqlServer (9.0.x)
  - 3. Create a Customer entity
    - Annotate it with what property represents the key
  - 4. Create a Database in Azure SQL
  - 5. Add connection string information
    - To Web API App (Both (a) local and (b) Azure)
      - Note don't keep Azure permanently just for testing!



# Connection Strings

## Local connection string

// Local: Step 5a

```
"ConnectionStrings": {  
  "DefaultConnection": "Server=(localdb)\\mssqllocaldb;  
                        Database=<dbname>;  
                        Trusted_Connection=True;  
                        MultipleActiveResultSets=true",  }
```

// Example:

```
"ConnectionStrings": {  
  "DefaultConnection": "Server=(localdb)\\mssqllocaldb;  
                        Database=cscie94-efdemo-2025;  
                        Trusted_Connection=True;  
                        MultipleActiveResultSets=true" }
```



# Connection Strings

## Azure SQL Authentication connection string

DON'T KEEP THESE SETTINGS IN YOUR CONFIG FILE

PUT THEM IN THE AZURE PORTAL UNDER CONNECTION STRINGS

```
// Azure: Step 5b
```

```
// Obtained from the portal
```

```
"ConnectionStrings": {  
  "DefaultConnection": "Server=tcp:<servername>,1433;  
    Initial Catalog=<databaseName>;  
    Persist Security Info=False;  
    User ID={sql user id};  
    Password={sql password};  
    MultipleActiveResultSets=False;  
    Encrypt=True;  
    TrustServerCertificate=False;  
    Connection Timeout=30;"  },
```



# Connection Strings

## Azure Microsoft Entra ID Authentication connection string

### Active Directory Authentication

Uses identity associated with the "process"

```
"Connectionstrings": {  
  "Defaultconnection": "Server= tcp:<servername>,1433;  
    Initial Catalog=<your database name>;  
    Encrypt=True;  
    TrustServerCertificate=False;  
    Connection Timeout=30;  
    Authentication=Active Directory Default" }
```

### Example

```
"Connectionstrings": {  
  "Defaultconnection": "Server=tcp:sql-cscie94-2025.database.windows.net,1433;  
    Initial Catalog=sqlldb-cscie94-efdemo-2025;  
    Encrypt=True;  
    TrustServerCertificate=False;  
    Connection Timeout=30;  
    Authentication=Active Directory Default" }
```





# Entity Framework Core Basics

Basic support requires 8 steps...

- 6. Create a class that derives from **DbContext**
  - a) Creates the database if it does not exist
  - b) Add a **DbSet<Customer>** Customers property
    - Used to indicate creation of Customer table
  - C) Override **OnModelCreating**
    - To configure table to entity linking
- 7. Create a **DBInitializer** class
  - To seed the database with data
- 8. Update the **program.cs**
  - To setup the service provider with your context
    - This is the class created in step 6



# Entity Framework Core Basics

- What do we have now?
  - Project that will
    - Create a database
    - Create a Customer table
    - Populate Customer table with seed data
  - Work with Azure SQL or LocalDb
- What's next?
  - Wire up controller methods
    - To Create, Update, Get and Delete Data



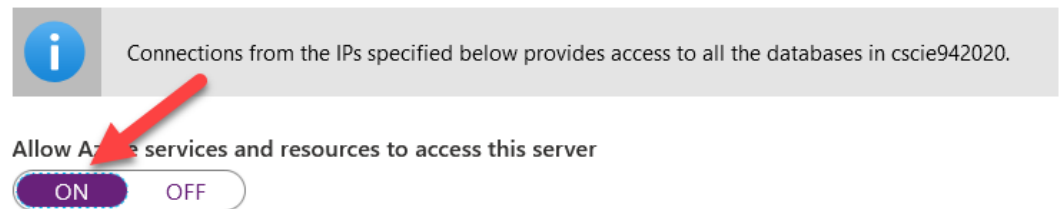
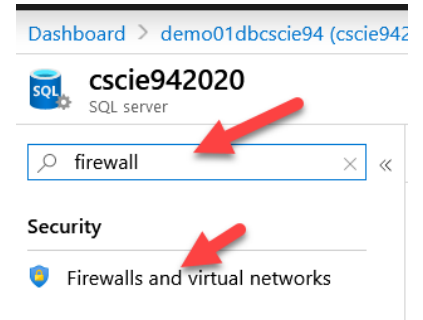
# Entity Framework Core Basics

- In your Controller
  - 1. Modify Constructor
    - To take your class that's derived from `DbContext`
    - Save the value in a local private variable
  - 2. Create payload and result classes
    - Are used for input (payload) and result definitions
    - These enforce validation using attributes
    - Expose only public properties
  - Use LINQ and the context instance
    - To Create, Update, Delete, and Retrieve data



# Publishing to Azure

- Ensure your database server allows access
  - By default, its set not to
    - Go to the database server
    - Type "firewall"
    - Click on the "Firewalls and virtual networks"
    - Set:
      - Allow Azure services and resources to access this server
      - ON





# Publishing to Azure

## ⚠ Caution

- Any service in Azure can “*reach*” your SQL Server
  - From other subscriptions of other customers
  - Services must have valid have credentials
  - Defense in depth
    - Reduced with this option turned on
  - Alternative
    - Network segmentation



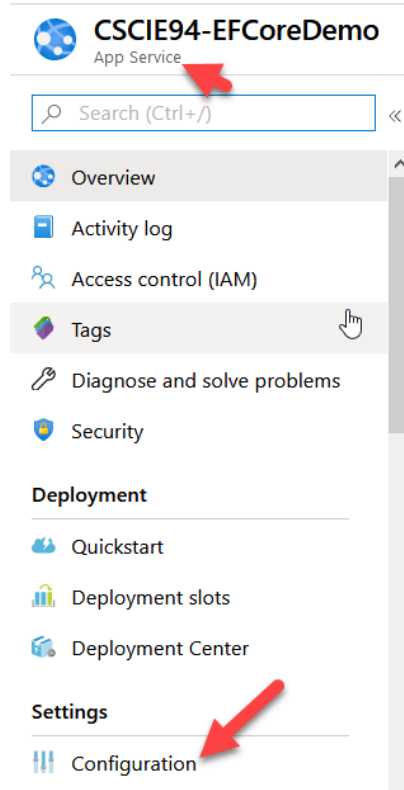
# Publishing to Azure

- If using settings files...
  - Have an appsettings.**Production**.json file
    - Correctly configured as part of your project
  - Set the **application setting** in the [Azure portal](#)
    - **ASPNETCORE\_ENVIRONMENT**
      - To Production
  - Set the **connection string** in the [Azure portal](#)
    - **DefaultConnection**
      - To the connection string from your database
      - Be sure to include the **id** and **password**



# Publishing to Azure

- Better Option - Configuration Settings
  - **Application settings** & **Connection string**








# Publishing to Azure



- Better Option - Configuration Settings
  - **Application settings** & **Connection string**

[Application settings](#) [General settings](#) [Default documents](#) [Path mappings](#)

## Application settings


Application settings are encrypted at rest and transmitted over an encrypted channel. You can choose to display them in plain text in your browser by using the controls below. Application Settings are exposed as environment variables for access by your application at runtime. [Learn more](#)

+ New application setting  Show values  Advanced edit  Filter

Name	Value	Source	Deploym
ASPNETCORE_ENVIRONMENT	 Hidden value. Click show values button >	App Config	
WEBSITE_NODE_DEFAULT_VERSION	 Hidden value. Click show values button >	App Config	

## Connection strings

Connection strings are encrypted at rest and transmitted over an encrypted channel.

+ New connection string  Show values  Advanced edit  Filter

Name	Value	Type	Deploymen...	Delete	Edi
DefaultConnection	 Hidden value. Click st	Custom			





# Publishing to Azure

- Database connection string is found here

Dashboard >



**demo01dbcscie94** (

SQL database



Search (Ctrl+/)



Copy



Restore



Export



Set server firewall



Delete



Overview



Activity log



Tags



Diagnose and solve problems



Quick start



Query editor (preview)

## Power Platform



Power BI (preview)



Power Apps (preview)

## Essentials

JSON View

Resource group ([change](#))  
**rg-shared**

Status  
Online

Location  
East US

Subscription ([change](#))  
**Microsoft Azure Sponsorship 2**

Subscription ID  
[Redacted]

Tags ([change](#))  
[Click here to add tags](#)

Server name  
[Redacted]

Elastic pool  
**No elastic pool**

Connection strings  
[Show database connection strings](#)

Pricing tier  
**Basic**

Earliest restore point  
2021-02-03 00:37 UTC






# Publishing to Azure

- Database connection string is found here

Dashboard > demo01dbcscie94 (cscie942021/demo01dbcscie94)

 **demo01dbcscie94** ( ) | Connection strings ×  
SQL database

Search (Ctrl+ /) <<

Overview  
Activity log  
Tags  
Diagnose and solve problems  
Quick start  
Query editor (preview)

Power Platform

ADO.NET JDBC ODBC PHP Go

ADO.NET (SQL authentication)

```
Server=tcp: .database.windows.net,1433;Initial Catalog=demo01dbcscie94;Persist Security Info=False;User ID: ;Password={your_password};MultipleActiveResultSets=False;Encrypt=True;TrustServerCertificate=False;Connection Timeout=30;
```

[Download ADO.NET driver for SQL server](#)



# Publishing to Azure

- ID can be found on the SQL Server blade
  - You can also reset the password here

[Dashboard](#) >



**demo01dbcscie94** ( [redacted] /demo01dbcscie94)



SQL database



Copy



Restore



Export



Set server firewall



Delete



Connect with... ▾



Feedback

## ^ Essentials

[JSON View](#)

Resource group ([change](#)) : rg-shared

Server name : [redacted].database.windows.net

Status : Online

Elastic pool : No elastic pool



[redacted]



SQL server



[+ Create database](#) [+ New elastic pool](#) [+ New dedicated SQL pool \(formerly SQL DW\)](#) [↓ Import database](#) [✎ Reset password](#) [→ Move ▾](#) [...](#)

## ^ Essentials

[JSON View](#)

Resource group ([change](#))  
rg-shared

Status

Server admin

ID

[redacted]

Firewalls and virtual networks



# Demo

## EntityFramework Demo

EFCoreDemoSolution.sln



# SQL Server Management Studio

## Tips

- Connecting to Local Db
  - (LocalDb)\mssqllocaldb

The screenshot shows the 'Connect to Server' dialog box with the following settings:

- Server type:** Database Engine
- Server name:** (LocalDb)\mssqllocaldb
- Authentication:** Windows Authentication
- User name:** JOSEPH-PC\Joseph
- Password:** (empty field)
- ☐ Remember password

Buttons at the bottom: Connect, Cancel, Help, Options >>



# SQL Server Management Studio

## Tips

- Excellent tool for
  - Ad-hoc queries
  - Modifying data
- To keep consistent
  - Use EF Core Code First to generate tables
- Quickest way to iterate
  - Drop table
    - Ensure you stop debugging
    - Choose close all connections



# Demo

## SQL Server Management Studio

### Query Local and Azure DB



# Azure Regions & Latency

- Latency
  - Data transfer time between regions
    - Time it takes to travel over the distance
- Charges for region-to-region data transfer
  - **Egress** is typically charged
    - Outbound traffic,
      - ~\$0.02 USD per GB between regions in North America
        - See: [Pricing - Bandwidth | Microsoft Azure](#)
  - **Ingress** is not typically charged
    - Inbound traffic





## East US to West US

81



# Azure Regions & Latency

- Some resources
  - Must exist in the same region
    - For performance
    - Compliance
    - Operation



# Azure Regions & Latency

- Some examples:
  - App service & App Service Plan
  - Azure Functions & App Service Plan
  - Azure Logic Apps and Logic App Workflows
  - Resources within the same virtual network
    - Different VNETs can be connected across regions



# Azure Regions & Latency

- Recommendation
  - Keep **high traffic** resources in same region
    - App Service and Database its connected to
  - Application Insights
    - Same region as the services sending data to it
      - Reduces cost and latency



# Azure Regions & Latency

- Can resource groups contain resources in different regions?
  - **Yes**
- Why would you do this?
  - Management
  - Billing
  - Access control
  - Unified lifecycle
  - Cross-region applications





# Azure Regions & Latency

- Reminder... Latency
  - Data transfer time between regions
    - Time it takes to travel over the distance
- Let's look at a demo
  - Remember this number ...
    - **71ms** West Coast to East Coast



# Azure Regions & Latency

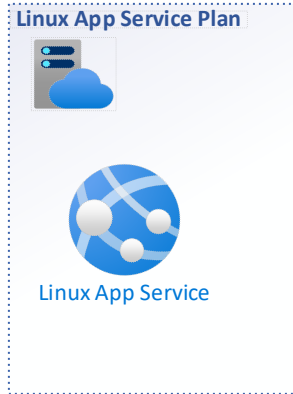
Courtesy Microsoft Documentation: [Azure network round-trip](#)

Source Region	Australia Central	Australia Central 2	Australia East	Australia Southeast	Brazil South	Canada Central	Canada East	Central India	Central US	East Asia	East US	East US 2	France Central	France South	Germany North	Germany West Central	Israel Central	Italy North	Japan East	Japan West	Korea Central	Korea South	North Central US	North Europe	Norway East	Norway West	Poland North	Qatar Central	South Africa North	South Africa West	South Central US	South India	Southeast Asia	Sweden Central	Switzerland North	Switzerland West	UAE Central	UAE North	UK South	UK West	West Central US	West Europe	West India	West US	West US 2	West US 3		
Australia Central			3	10	18	304	201	211	148	177	127	203	198	265	274	296	292	313	288	108	114	132	129	190	296	308	304	305	184	280	295	166	131	101	312	284	284	178	182	287	290	164	291	173	148	168	150	
Australia Central 2	4		9	15	304	200	211	149	177	127	203	198	278	267	288	284	307	282	107	114	132	129	190	286	300	294	297	183	281	294	166	131	100	305	278	279	178	181	276	278	164	281	172	148	167	149		
Australia East	10	9		16	316	196	206	147	174	123	201	197	293	267	297	296	306	281	103	110	131	135	184	294	302	306	301	189	289	291	163	134	83	306	279	279	178	181	276	278	160	287	170	140	161	146		
Australia Southeast	19	15	16		312	207	216	137	185	119	213	207	266	255	277	272	294	267	115	122	143	137	191	294	302	306	301	189	289	291	163	134	83	306	279	279	178	181	276	278	160	287	170	140	161	146		
Brazil South	305	304	317	312		131	136	307	149	323	119	118	190	166	204	199	226	198	278	280	303	309	13	294	302	306	301	189	289	291	163	134	83	306	279	279	178	181	276	278	160	287	170	140	161	146		
Canada Central	201	199	194	205	130		15	213	24	205	20	23	102	98	115	110	136	110	158	165	235	177	1	294	302	306	301	189	289	291	163	134	83	306	279	279	178	181	276	278	160	287	170	140	161	146		
Canada East	210	209	204	214	135	15		218	33	215	29	32	111	107	124	119	142	117	167	174	191	187	2	294	302	306	301	189	289	291	163	134	83	306	279	279	178	181	276	278	160	287	170	140	161	146		
Central India	148	147	147	135	307	213	218		231	87	203	205	126	131	140	135	158	137	121	128	118	111	22	294	302	306	301	189	289	291	163	134	83	306	279	279	178	181	276	278	160	287	170	140	161	146		
Central US	178	177	174	185	149	25	34	233		184	33	37	116	116	130	126	155	128	137	144	198	160	1	294	302	306	301	189	289	291	163	134	83	306	279	279	178	181	276	278	160	287	170	140	161	146		
East Asia	124	123	120	114	320	203	212	84	180		213	206	212	201	223	219	241	216	49	42	40	33	19	294	302	306	301	189	289	291	163	134	83	306	279	279	178	181	276	278	160	287	170	140	161	146		
East US	200	199	201	211	116	18	26	200	31	215		9	87	83	101	90	123	96	169	175	224	185	21	87	109	97	111	194	225	208	35	224	233	117	94	90	182	184	77	82	45	89	222	71	66	59		
East US 2	196	195	196	204	116	23	33	206	35	208	10		84	88	97	92	128	100	160	167	188	180	26	96	108	101	108	196	230	213	34	228	232	116	99	95	186	188	68	91	50	91	225	69	70	53		
France Central	287	278	294	266	190	103	113	127	116	217	90	85		14	18	13	54	25	251	247	240	107	20	31	25	27	125	157	141	112	148	186	35	16	13	114	116	10	13	131	12	147	150	137				
France South	275	267	268	255	186	99	109	132	116	206	85	89	15		26	21	44	16	244	249	236	229	102	30	41	35	35	114	155	138	116	154	181	43	15	10	102	105	20	23	130	22	153	153	148	140		
Germany North	297	288	298	278	204	117	126	142	130	228	103	99	19	26		13	67	28	264	267	258	252	121	35	23	27	13	138	171	154	128	159	195	21	16	18	125	128	25	27	145	16	162	165	164	154		
Germany West Central																																																
Israel Central	290	282	296	270	197	110	119	134	123	220	96	92	11	19	11		59	20	250	261	251	244	114	27	25	25	20	130	164	148	122	151	188	28	8	11	118	120	17	19	138	11	153	160	157	146		
Italy North	314	307	307	295	226	138	144	159	156	245	126	130	55	44	67	61		51	278	284	276	269	144	72	83	81	69	155	196	183	155	174	213	85	48	51	142	145	61	64	171	69	182	194	190	173		
Japan East	286	278	279	266	197	110	117	138	127	218	97	101	24	15	25	20	50		249	256	248	241	115	42	38	37	34	126	168	150	126	159	188	41	13	13	113	116	31	35	141	25	154	165	162	147		
Japan West	108	107	104	115	278	159	169	127	137	52	170	163	252	244	263	252	277	252		11	32	26	148	253	272	264	276	156	253	267	128	104	73	279	254	250	152	155	244	245	123	251	143	108	100	111		
Korea Central	115	114	110	122	281	166	178	129	144	46	177	170	257	249	267	263	284	259	12		19	13	155	259	278	268	279	163	261	274	134	111	73	263	262	258	160	162	249	252	130	254	150	115	107	118		
Korea South	133	132	134	144	302	236	193	119	197	43	229	198	247	236	258	254	278	250	33	19		9	218	263	271	267	267	153	251	265	166	101	70	275	247	249	149	152	252	255	179	254	140	160	124	148		
North Central US	129	129	136	137	308	179	188	113	160	37	188	182	241	229	252	247	269	243	27	13	10		174	256	265	260	261	146	244	258	152	95	64	268	240	236	144	146	246	249	149	248	134	132	124	133		
North Europe	190	190	185	195	137	18	28	225	14	195	24	27	107	102	121	115	144	117	149	155	218	173		105	127	117	131	214	246	228	37	248	213	132	114	110	202	205	94	98	28	109	243	51	49	55		
Norway East	296	283	290	281	187	99	106	146	112	229	88	95	19	28	33	28	70	41	252	257	261	254	104		39	34	39	139	172	155	122	160	198	43	33	27	127	129	13	16	132	19	164	156	152	138		
Norway West	309	300	303	290	211	114	124	154	136	240	108	110	32	41	23	27	83	39	272	276	271	265	127	40		10	31	150	184	167	136	170	208	11	30	33	138	140	30	34	150	25	176	172	171	158		
Poland North	305	294	307	286	199	110	115	148	129	238	102	103	25	35	27	27	81	39	264	269	267	260	118	35	11		35	146	177	160	133	162	204	17	30	33	134	136	25	27	145	18	172	167	167	149		
Qatar Central	306	297	303	286	210	123	129	151	141	237	113	112	28	35	13	22	69	34	277	279	267	261	129	41	29	34		146	180	163	141	165	205	26	25	27	134	136	31	35	155	23	173	175	177	159		
South Africa North	184	182	182	170	296	208	213	41	226	121	196	199	124	114	136	131	153	126	155	161	152	145	214	140	149	144	145		118	131	224	55	90	153	125	122	16	17	130	133	240	132	65	264	254	243		
South Africa West	280	278	279	266	326	239	244	138	257	218	227	230	156	154	170	164	195	167	252	250	241	245	172	183	178	179	117		20	255	153	188	186	165	161	105	102	162	165	271	163	158	294	291	274			
South Central US	295	294	295	282	311	223	228	153	241	233	110	214	141	138	154	151	183	152	268	274	265	257	228	158	167	160	163	132	21		239	168	203	170	148	145	121	118	147	151	255	147	174	278	275	258		
South India	166	165	162	173	142	48	58	230	27	174	38	33	110	114	127	123	153	126	127	134	165	150	36	123	136	132	137	224	256	238		230	204	141	127	124	212	214	114	117	26	118	252	36	48	22		
Southeast Asia	132	131	131	119	326	237	242	26	232	70	225	230	148	155	159	153	173	162	104	111	101	94	247	162	170	162	165	55	154	169	230		38	173	163	150	52	56	149	156	223	156	44	203	19			

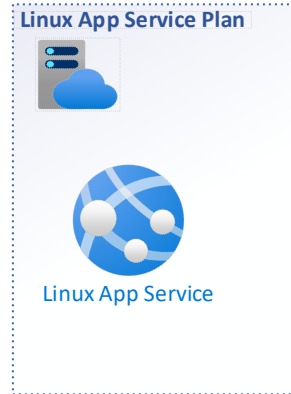


# Azure Regions & Latency

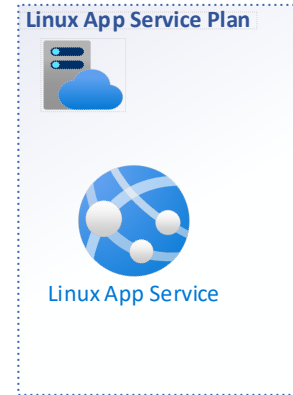
East US



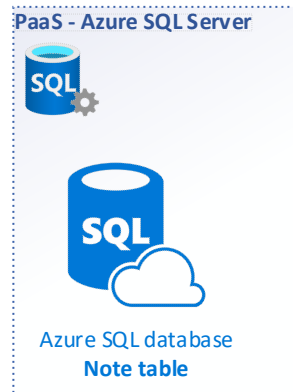
Central US



West US



East US



~0ms

~33ms

~71ms





# Demo

Latency in action - Azure

app-efcoredemo-eastus-cscie94

app-efcoredemo-westus-cscie94



# Azure Regions & Latency?





# Strongly Typed Settings

- .NET Core - Strongly Typed Settings
  - Allow for
    - Grouping of settings
      - All Search related settings
      - All Limit related settings
    - Are strongly typed
      - Reduces effort in converting from strings
  - Are easy to setup!



# Strongly Typed Settings

- Here are 7 steps
  - 1. Define your settings
    - Add them to JSON config file
  - 2. Define C# class that models JSON settings
  - 3. Instantiate your C# Class
  - 4. Bind it to the settings
  - 5. Use Dependency Injection
    - To add a singleton of instance from step 3



# Strongly Typed Settings

- Here are 7 steps
  - 6. Update controller to take in your class
  - 7. Save a local instance
    - You access your settings via the saved instance



# Strongly Typed Settings

Configure an App Service app in the Azure portal

- Notes: <http://bit.ly/38UjpdR>
  - To set a setting in the Azure Portal
    - Setting name is combination of
      - Section name and property name
    - Windows
      - **<section name>:<property name>**
        - Ex: **CustomerLimits:MaxCustomers**
    - Linux
      - **<section name>\_\_<property name>**
        - Ex: **CustomerLimits\_\_MaxCustomers**
        - The **\_\_** is a double under score



# Demo

## Strongly Typed Settings

EFCoreDemoSolution.sln



# Strongly Typed Settings







# Further Reading

- Fundamentals of Azure Second Edition
  - Authors: Michael Collier, Robin Shahan
  - ISBN: 978-1-5093-0296-3
  - Chapters 6 (Databases)
    - See: <http://bit.ly/2GCpikP>



# Further Reading

- Pro ASP.NET Core 7
  - Author: Adam Freeman
  - ISBN: 978-1633437812
  - Chapters 7,17,18,32



# Further Reading

- Pro C# 10 with .NET 6
  - Author: Andrew Troelsen, Philip Japikse
  - ISBN: 978-1484278680
  - Chapters 21-23 (Entity Framework Core)
  - Chapters 30-34 (ASP.NET Core)



# Links

- ASP.NET Core Validation
  - <http://bit.ly/2nm7xeq>
- Entity Framework Core
  - <http://bit.ly/2GmCkQK>
- ASP.NET Core Fundamentals
  - <http://bit.ly/2BdLSdf>
- Azure SQL
  - <http://bit.ly/2DJz4RZ>



# Links

- Azure Data Studio
  - <http://bit.ly/3XcRi1R>
- SQL Server Management Studio
  - <http://bit.ly/2GP1pFF>