

Milestone 5: Data recovery simulation

1. As a test to restore database, I selected to delete the following three tables from the database.

AdventureWorks22 > Tables and then proceeded to delete the first three tables:

(a) AWBuildVersion

(b) dbo.DatabaseLog

(c) dbo.ErrorLog

The screenshot shows the Microsoft SQL Server Management Studio (SSMS) interface. On the left, the Object Explorer displays the 'AdventureWorks2022' database structure, with the 'Tables' folder expanded. The 'AWBuildVersion' table is highlighted. In the center, a SQL query is entered in the query editor:

```
SELECT TOP (1000) [SystemInformationID]
, [Database Version]
, [VersionDate]
, [ModifiedDate]
FROM [AdventureWorks2022].[dbo].[AWBuildVersion]
```

Below the query editor, the 'Results' pane shows a single row of data:

	SystemInformationID	Database Version	VersionDate	ModifiedDate
1	1	15.0.4280.7	2023-01-23 13:08:53.190	2023-05-08 12:07:29.843

2. You can see some errors already from the assessment summary:

Step 2: Assessment summary and SKU recommendations

[Refresh Assessment](#) | [Refresh SKU](#) | [Start data collection](#) | [Stop data collection](#) | [Import performance data](#) | [Recommendation parameters](#)

✔ We have completed the assessment of your SQL Server instance 'localhost'.

View assessment summary and SKU recommendations for Azure SQL targets

Azure SQL Database (PaaS)

ASSESSMENT RESULTS ⓘ
(for 1 assessed databases)

✔

Migration readiness

Ready

Needs review

Not ready

1

0

0

Assessment findings

Blockers

Warnings

0

1

RECOMMENDED CONFIGURATION ⓘ

Azure recommendation is not available. Click 'Start data collection' button above to get started.

Azure SQL Managed Instance (PaaS)

ASSESSMENT RESULTS ⓘ
(for 1 assessed databases)

✔

Migration readiness

Ready

Needs review

Not ready

1

0

0

Assessment findings

Blockers

Warnings

0

1

RECOMMENDED CONFIGURATION ⓘ

Azure recommendation is not available. Click 'Start data collection' button above to get started.

SQL Server on Azure Virtual Machine (IaaS)

ASSESSMENT RESULTS ⓘ
(for 1 assessed databases)

✔

Migration readiness

Ready

Needs review

Not ready

1

0

0

Assessment findings

Blockers

Warnings

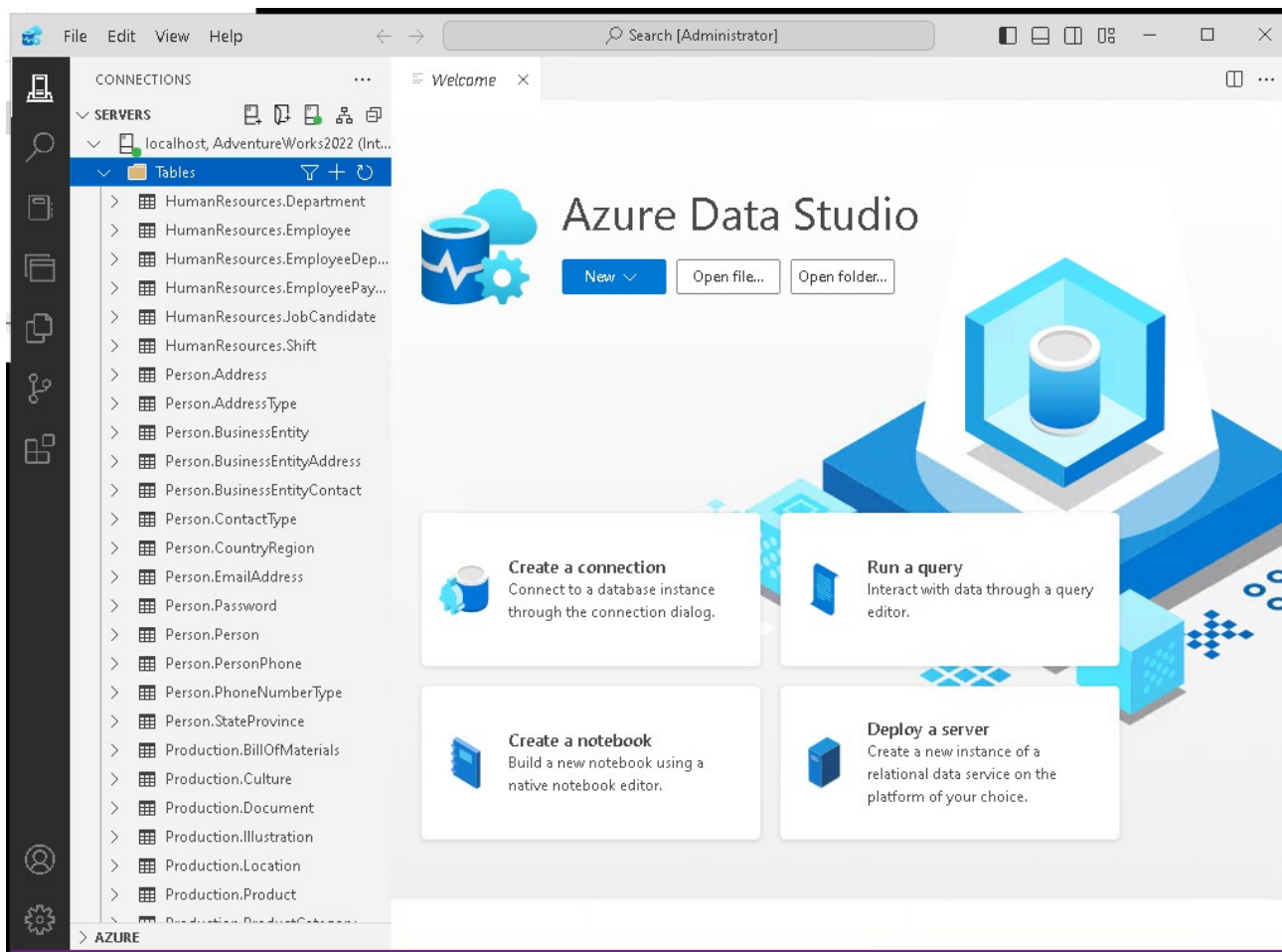
0

0

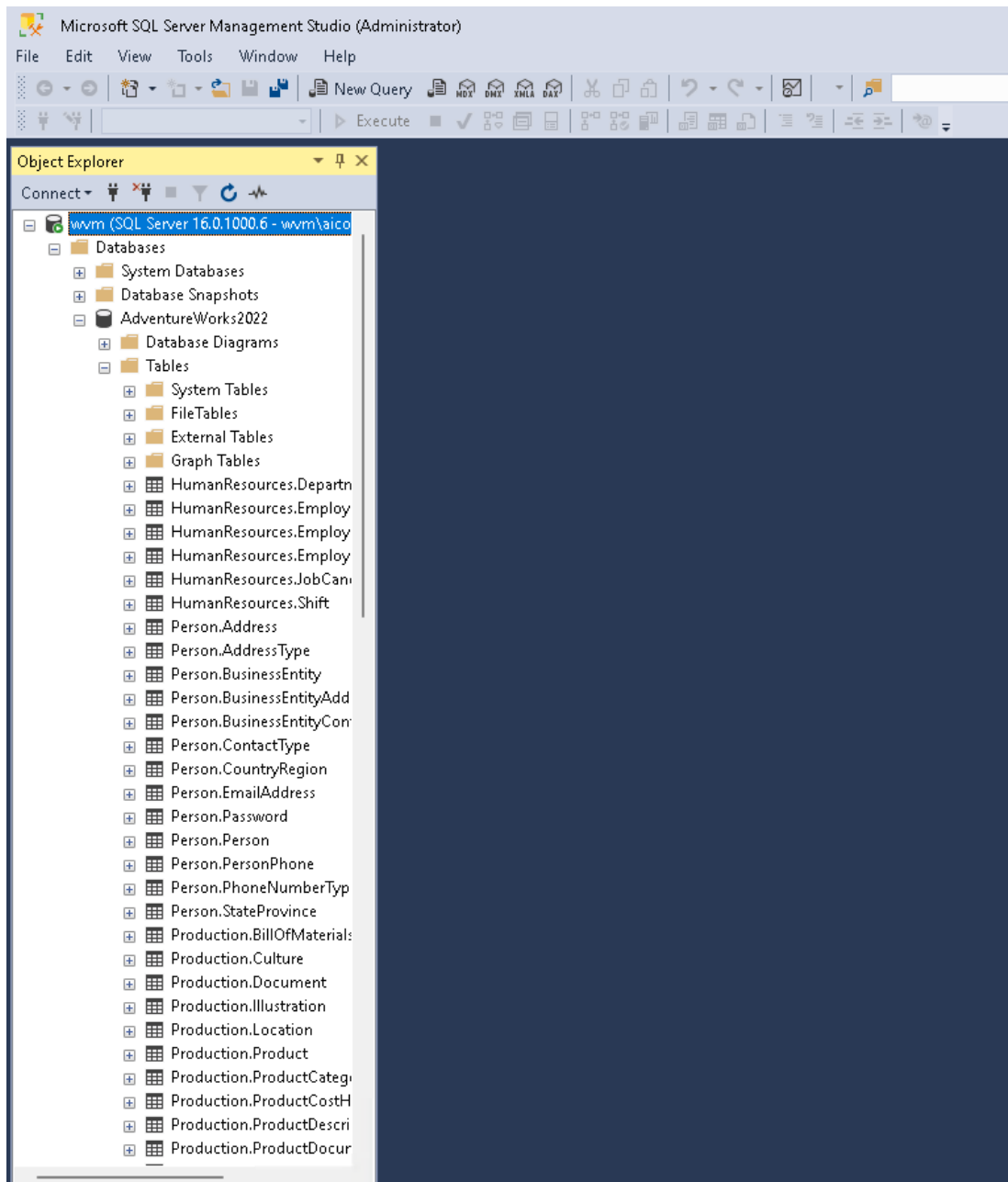
RECOMMENDED CONFIGURATION ⓘ

Azure recommendation is not available. Click 'Start data collection' button above to get started.

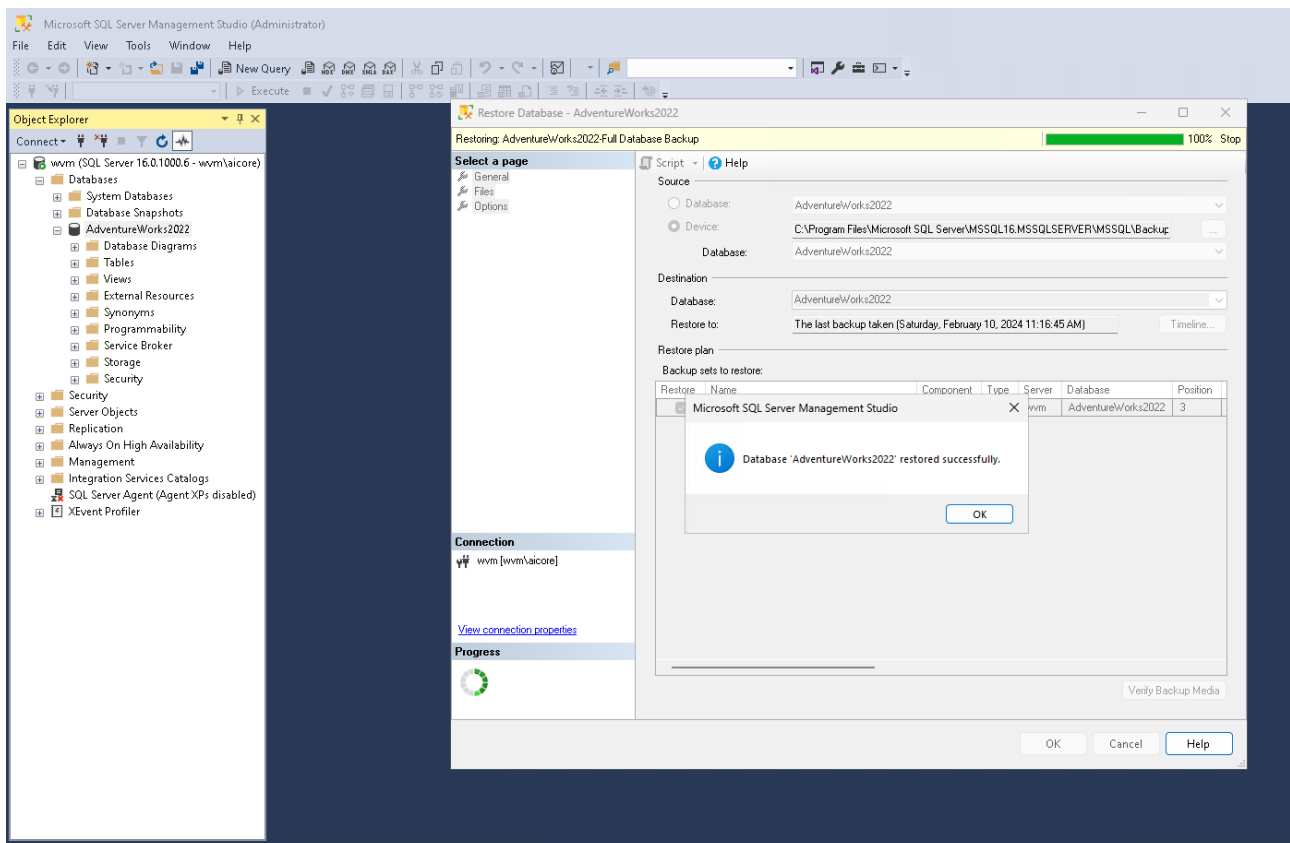
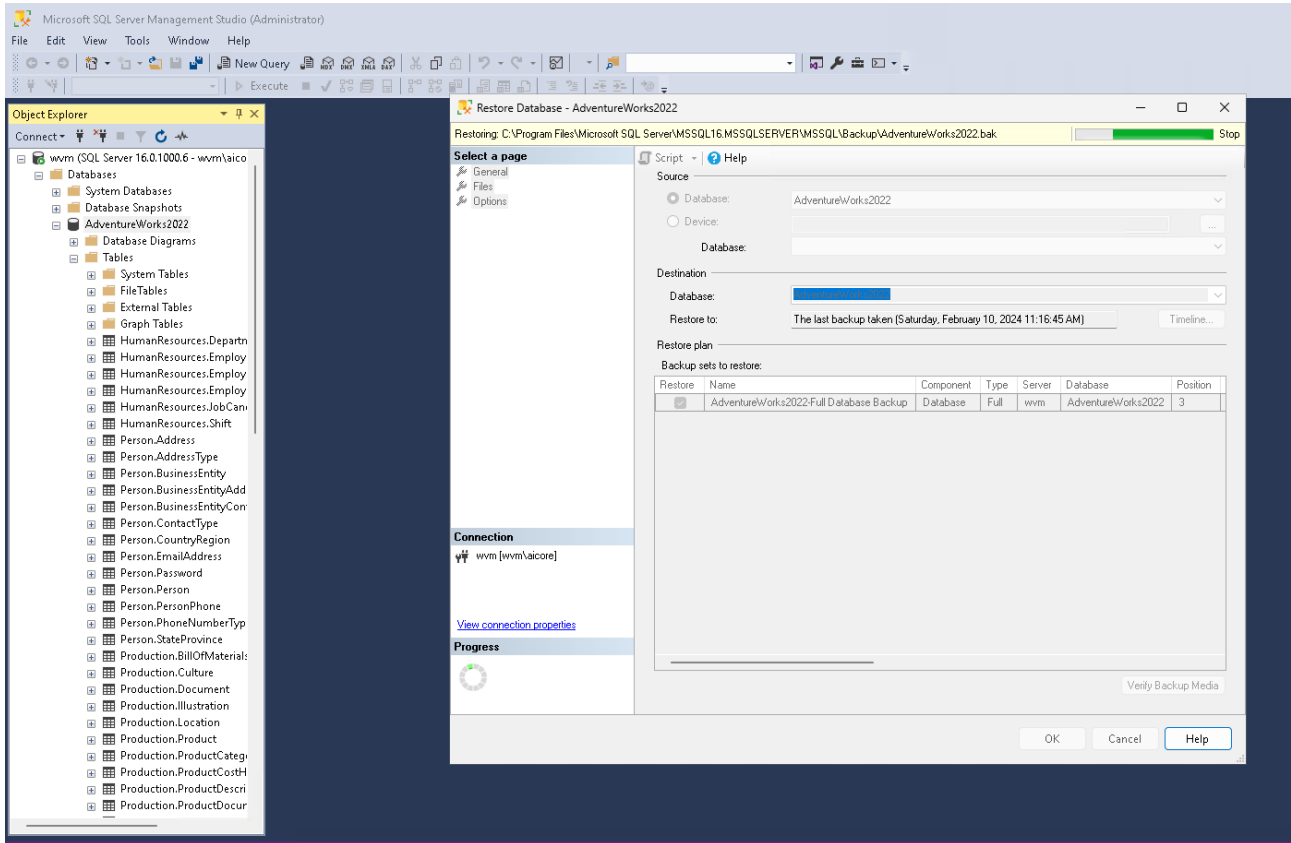
and the three tables are missing from a quick inspection of the database from azure data studio:



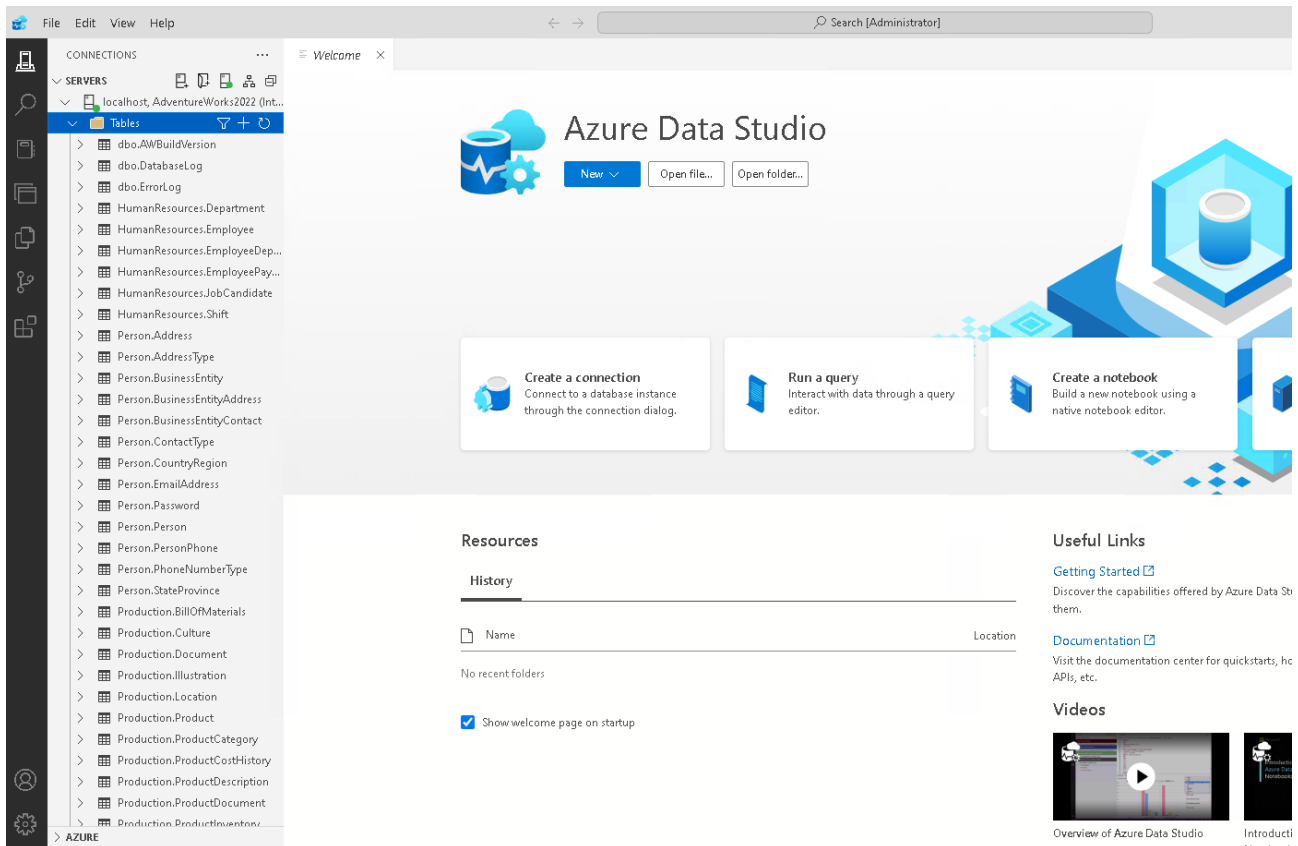
before backup:



restoring database:



also verified successful backup in azure data studio:



Carried out the same exercise from azure cloud services. This time I restored data back back a few hours, at 10AM this morning, before mimicking data loss:

Microsoft Azure

Search resources, services, and docs (G+)

Home >

Microsoft.SQLDatabase.newDatabaseRestoreExistingServerWithPricin | Overview

Deployment

Search

DeleteCancelRedeployDownloadRefresh

Overview

Inputs

Outputs

Template

Deployment is in progress

Deployment name : Microsoft.SQLDatabase.newDatabaseRestoreExistingServerWithPricin

Subscription : Jakir Hussain Cloud

Resource group : wvm-rg

Start time : 2/10/2024, 1:19:42 PM

Correlation ID : 6f8dde62-e583-46d7-9131-2841120fbd5

Deployment details

Resource	Type	Status	Operation details
adventureworks22/AdventureWorks2022_2024-02-10T10-00Z	SQL database	Accepted	Operation details

Deployment completed.

Microsoft Azure

Search resources, services, and docs (G+)

Home >

Microsoft.SQLDatabase.newDatabaseRestoreExistingServerWithPricin | Overview

Deployment

Search

DeleteCancelRedeployDownloadRefresh

Overview

Inputs

Outputs

Template

Your deployment is complete

Deployment name : Microsoft.SQLDatabase.newDatabaseRestoreExistingServerWithPricin

Subscription : Jakir Hussain Cloud

Resource group : wvm-rg

Start time : 2/10/2024, 1:19:42 PM

Correlation ID : 6f8dde62-e583-46d7-9131-2841120fbd5

Deployment details

Next steps

Go to resource

Geo replication of the same server in Azure SQL database:

Microsoft Azure

Search resources, services, and docs (G+/I)

Home >

Microsoft.SQLDatabase.newDatabaseCopyNewServer_7387c2fd61dd4d028 | Overview

Deployment

Search

Delete Cancel Redeploy Download Refresh

Overview

Inputs

Outputs

Template

Deployment is in progress

Deployment name : Microsoft.SQLDatabase.newDatabaseCopyNewServer_7387c2fd61dd4d028

Subscription : [Jakir Hussain Cloud](#)

Resource group : [wmm-rg](#)

Start time : 2/10/2024, 5:28:43 PM

Correlation ID : 31e8a01e-b00d-42d5-b13c-0bc44cc71158

Deployment details

Resource	Type	Status	Operation details
wmm-prod-replica	SQL server	Accepted	Operation details

now we have two: primary and geo replica:

Microsoft Azure

Search resources, services, and docs (G+I)

Home > Microsoft.SqlDatabase.newDatabaseCopyNewServer_7387c2fd61dd4d028 | Overview > AdventureWorks2022_2024-02-10T10-00Z (wvm-prod-replica/AdventureWorks2022_2024-02-10T10-00Z)

AdventureWorks2022_2024-02-10T10-00Z (wvm-prod-replica/AdventureWorks2022_2024-02-10T10-00Z) | Replicas ☆ ⋮

SQL database

Search

«

+ Create replica

Refresh

Feedback

Overview

Activity log

Tags

Diagnose and solve problems

Query editor (preview)

Settings

Compute + storage

Connection strings

Properties

Locks

Data management

Replicas

Sync to other databases

Want to enable disaster recovery at lower price? Create standby replica for General Purpose or Business Critical service tier, with savings of up to 40%. [Learn more](#)

Geo replicas for your database are listed below. Geo replicas reside on a different logical server from the primary and protect against regional failures or prolonged data center outage. [Learn more](#)

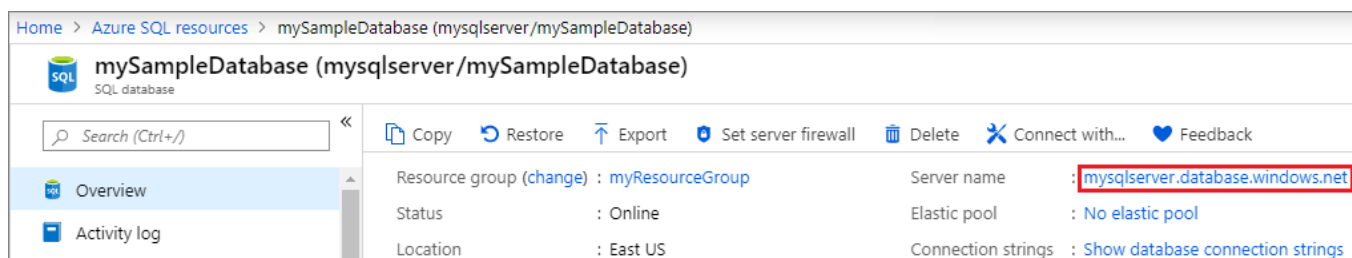
Name ↑↓	Server ↑↓	Region ↑↓	Fallover policy ↑↓	Pricing tier ↑↓
▼ Primary				
AdventureWorks2022_2024-02-10T10-00Z	adventureworks22	UK South	None	Basic
▼ Geo replicas				
AdventureWorks2022_2024-02-10T10-00Z	wvm-prod-replica	East US		Basic

Test Failover and Tailback

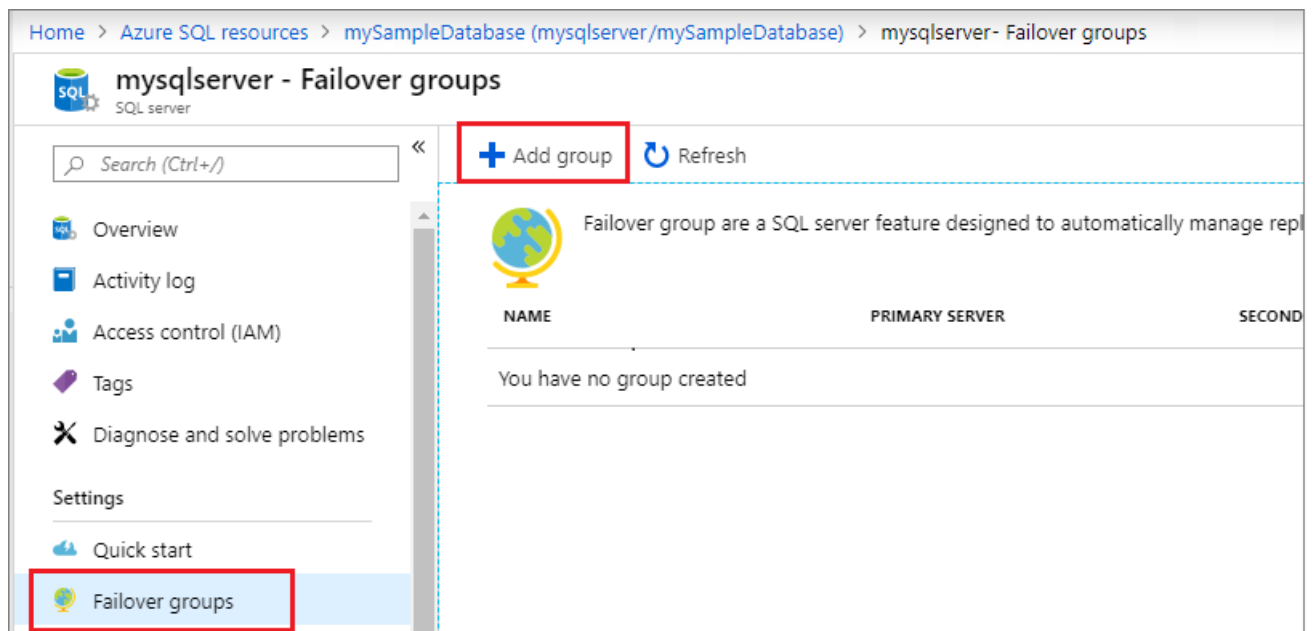
Initiating a Test Failover to the Secondary Region

Create your failover group and add your single database to it using the Azure portal.

1. Select **Azure SQL** in the left-hand menu of the [Azure portal](#). If **Azure SQL** isn't in the list, select **All services**, then type Azure SQL in the search box. (Optional) Select the star next to **Azure SQL** to favorite it and add it as an item in the left-hand navigation.
2. Select the database you want to add to the failover group.
3. Select the name of the server under **Server name** to open the settings for the server.



4. Select **Failover groups** under the **Settings** pane, and then select **Add group** to create a new failover group.



5. On the **Failover Group** page, enter or select the required values, and then select **Create**. Either create a new secondary server, or select an existing secondary server. The secondary server in the failover group must be in a different region than the primary server.

- **Databases within the group:** Choose the database you want to add to your failover group. Adding the database to the failover group will automatically start the geo-replication process.

Home > Azure SQL resources > mySampleDatabase (mysqlserver/mySampleDatabase) > mysqlserver - Failover groups > Failover group > Databases

Failover group

Create a failover group to automatically failover databases in it.

* Failover group name

failovergrouptutorial

.database.windows.net

* Secondary server

mysqlsecondary (East US)

Read/Write failover policy

Automatic

Read/Write grace period (hours)

1 hours

Database within the group

Select databases to add

Databases

for failover group

Select all

Selected/Eligible databases
0/1

Filter items...

NAME	ROLE	SECONDARY SERVER	STATUS
mySampleDatabase			Online

Summary

Databases on secondary (excluding ones in Elastic Pools)
Elastic Pools on secondary server

0
0

Monthly cost

Microsoft Azure

Search resources, services, and docs (G+J)

Home >

Microsoft.SQL.FG-dea34c70-458b-466b-92d8-aacb93502dd7 | Overview

Deployment

Search

Delete Cancel Redeploy Download Refresh

Overview

Inputs

Outputs

Template

✓ Your deployment is complete

Deployment name : Microsoft.SQL.FG-dea34c70-458b-466b-92d8-aacb93502dd7

Subscription : Jakir Hussain Cloud

Resource group : wvm-rg

Start time : 2/10/2024, 6:12:10 PM

Correlation ID : ca96bc58-baea-4624-abdc-2215b3213342

> Deployment details

> Next steps

Go to resource

Microsoft Azure

Home > Microsoft.Sql.FG-dea34c70-458b-466b-92d8-aac93502dd7 | Overview

adventureworks22/aw22-failover-group

microsoft.sql/servers/failovergroup

Search

RefreshDeleteOpen in new window

Overview

Activity log

Access control (IAM)

Settings

Locks

Automation

Tasks (preview)

Export template

Help

Support + Troubleshooting

Essentials

Resource group (move) : wwm-rg

Subscription (move) : Jakir Hussain Cloud

Subscription ID : dc6b50d9-00b8-493b-867b-8986e4660eec

Tags (edit) : Add tags

Properties

Replication role ⓘPrimary

Replication state ⓘCATCH_UP

Partner servers ⓘView value as JSON

Databases ⓘView value as JSON

Secondary type ⓘ---

Read write endpoint

Failover policy ⓘManual

Read only endpoint

Failover policy ⓘDisabled

Target server ⓘ/subscriptions/dc6b50d9-00b8-493b-867b-8986e4660eec/r...

Resource id : /subscriptions/dc6b50d9-00b8-493b-867b-8986e4660eec/r...

Type : Microsoft.Sql/servers/failoverGroups

SQL Server Downloads | Microsoft

microsoft.com

Or, download a free specialized edition

This tab was discarded to save resources.

going to resource:

Access fail-over groups:

Microsoft Azure

Search resources, services, and docs (G+)

Home > SQL databases > AdventureWorks2022_2024-02-10T10-00Z (adventureworks22/AdventureWorks2022_2024-02-10T10-00Z) > adventureworks22

adventureworks22 | Failover groups

SQL server

Search

Overview

Activity log

Access control (IAM)

Tags

Quick start

Diagnose and solve problems

Settings

Microsoft Entra ID

SQL databases

SQL elastic pools

DTU quota

Properties

Locks

+ Add group

Refresh

Feedback

Want to enable disaster recovery at lower price? Create standby replica for General Purpose or Business Critical service tier, with savings of up to 40%. [Learn more](#)

Failover group are a SQL server feature designed to manage replication, connectivity and failover of a set of databases.

Name	Primary server	Secondary server	Read/Write failover policy	Grace Period (minutes)
aw22-failover-group	adventureworks22	wm-prod-replica	Customer managed	

which should now indicate two servers in the fail-over group:

Microsoft Azure

Search resources, services, and docs (G+)

Home > SQL databases > AdventureWorks2022_2024-02-10T10-00Z (adventureworks22/AdventureWorks2022_2024-02-10T10-00Z) > adventureworks22 | Failover groups >

aw22-failover-group

adventureworks22

Save

Discard

Add databases

Edit configuration

Remove databases

Failover

Forced Failover


Delete

Configuration details

Databases within group

Databases selected to be added (0)

Databases selected for removal (0)



Server	Role	Read/Write failover policy
adventureworks22 (UK South)	Primary	Customer managed
wm-prod-replica (East US)	Secondary	

select failover and yes:

Microsoft Azure

Search resources, services, and docs (G+/J)

[Home](#) > [SQL databases](#) > [AdventureWorks2022_2024-02-10T10-00Z \(adventureworks22/AdventureWorks2022_2024-02-10T10-00Z\)](#) > [adventureworks22 | Failover groups](#) >

aw22-failover-group

adventureworks22

Save

Discard

Add databases

Edit configuration

Remove databases

Failover

Forced Failover

Delete


Warning

This will switch all secondary databases to the primary role. All TDS sessions will be disconnected. All new TDS sessions will be automatically re-routed to the secondary server, which now becomes primary server. Failover performs full data synchronization between primary and secondary databases and guarantees no data loss.

Yes

No

Yes



Server	Role	Read/Write failover policy
adventureworks22 (UK South)	Primary	Customer managed
wwm-prod-replica (East US)	Secondary	

in a few moments you will see the servers swap roles where the replica is now the primary:

Microsoft Azure

Search resources, services, and docs (G+/J)

[Home](#) > [SQL databases](#) > [AdventureWorks2022_2024-02-10T10-00Z \(adventureworks22/AdventureWorks2022_2024-02-10T10-00Z\)](#) > [adventureworks22 | Failover groups](#) >

aw22-failover-group

adventureworks22

Save

Discard

Add databases

Edit configuration

Remove databases

Failover

Forced Failover

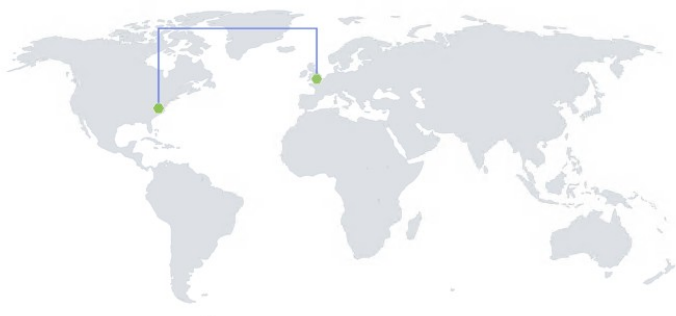
Delete

Configuration details

Databases within group

Databases selected to be added (0)

Databases selected for removal (0)



Server	Role	Read/Write failover policy
wwm-prod-replica (East US)	Primary	Customer managed
adventureworks22 (UK South)	Secondary	

Select **Failover** again to fail the servers back to their original roles

By following these steps, you can safely perform a test failover to verify your disaster recovery environment's functionality. and then perform a tailback to revert to the primary region.

Microsoft Azure

Search resources, services, and docs (G+)

[Home](#) > [SQL databases](#) > [AdventureWorks2022_2024-02-10T10-00Z \(adventureworks22/AdventureWorks2022_2024-02-10T10-00Z\)](#) > [adventureworks22 | Failover groups](#) >

aw22-failover-group

adventureworks22

Save

Discard

Add databases

Edit configuration

Remove databases

Failover

Forced Failover

Delete

Warning

This will switch all secondary databases to the primary role. All TDS sessions will be disconnected. All new TDS sessions will be automatically re-routed to the secondary server, which now becomes primary server. Failover performs full data synchronization between primary and secondary databases and guarantees no data loss.

Yes

No

Server	Role	Read/Write failover policy
wwm-prod-replica (East US)	Primary	Customer managed
adventureworks22 (UK South)	Secondary	

Result of tailback:

Home > SQL databases > AdventureWorks2022_2024-02-10T10-00Z (adventureworks22/AdventureWorks2022_2024-02-10T10-00Z) > adventureworks22 | Failover groups >

aw22-failover-group

adventureworks22

Save Discard Add databases Edit configuration Remove databases Failover Forced Failover Delete

Configuration details

Databases within group

Databases selected to be added (0)

Databases selected for removal (0)



Server	Role	Read/Write failover policy
adventureworks22 (UK South)	Primary	Customer managed
wwm-prod-replica (East US)	Secondary	

Milestone 7 – screenshot evidence. ms entra id

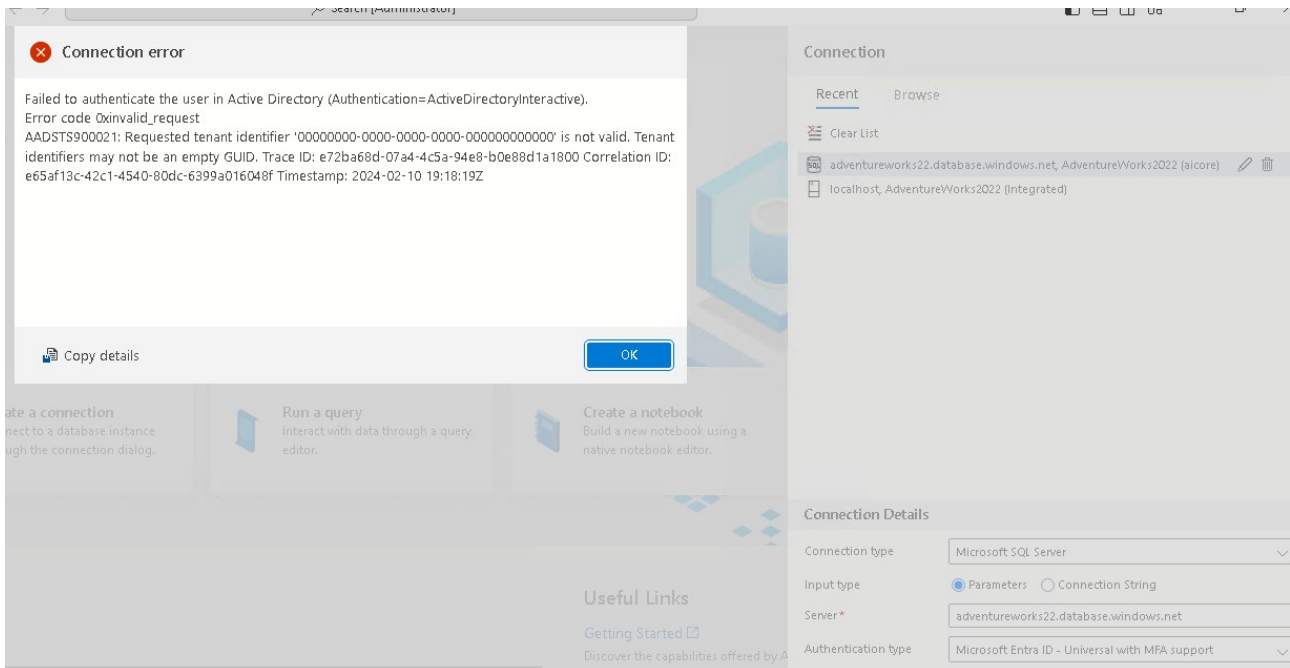
make sure you click ‘save’

then disconnect from current connection and manage connection. Change to ‘Microsoft entra ID’

The screenshot shows the Microsoft SQL Server Enterprise Manager interface. The left pane displays the 'SERVERS' tree with 'adventureworks2022.database.windows.net:AdventureWorks2022' selected. The middle pane shows the 'Home' and 'General' tabs. The right pane displays the 'Search' results for tables in the AdventureWorks2022 database. The search criteria is 'Search by name of type (t, v, f, or sp)'. The results table lists various tables and their schemas.

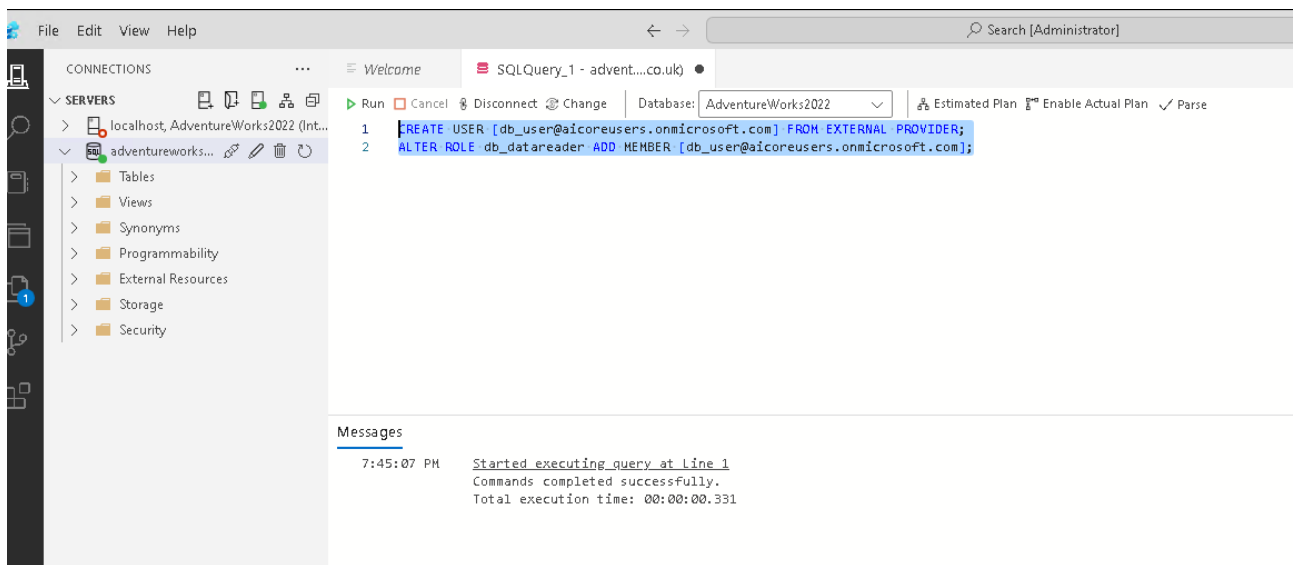
Name	Schema	Type	Actions
__migration_status	dbo	Table	...
AWBuildVersion	dbo	Table	...
DatabaseLog	dbo	Table	...
ErrorLog	dbo	Table	...
Department	HumanResources	Table	...
Employee	HumanResources	Table	...
EmployeeDepartmentHistory	HumanResources	Table	...
EmployeePayHistory	HumanResources	Table	...
JobCandidate	HumanResources	Table	...
Shift	HumanResources	Table	...
Address	Person	Table	...
AddressType	Person	Table	...
BusinessEntity	Person	Table	...
BusinessEntityAddress	Person	Table	...
BusinessEntityContact	Person	Table	...
ContactType	Person	Table	...
CountryRegion	Person	Table	...

you will be unable to connect vis azure data studio if you fail to save previous action, as I found out:

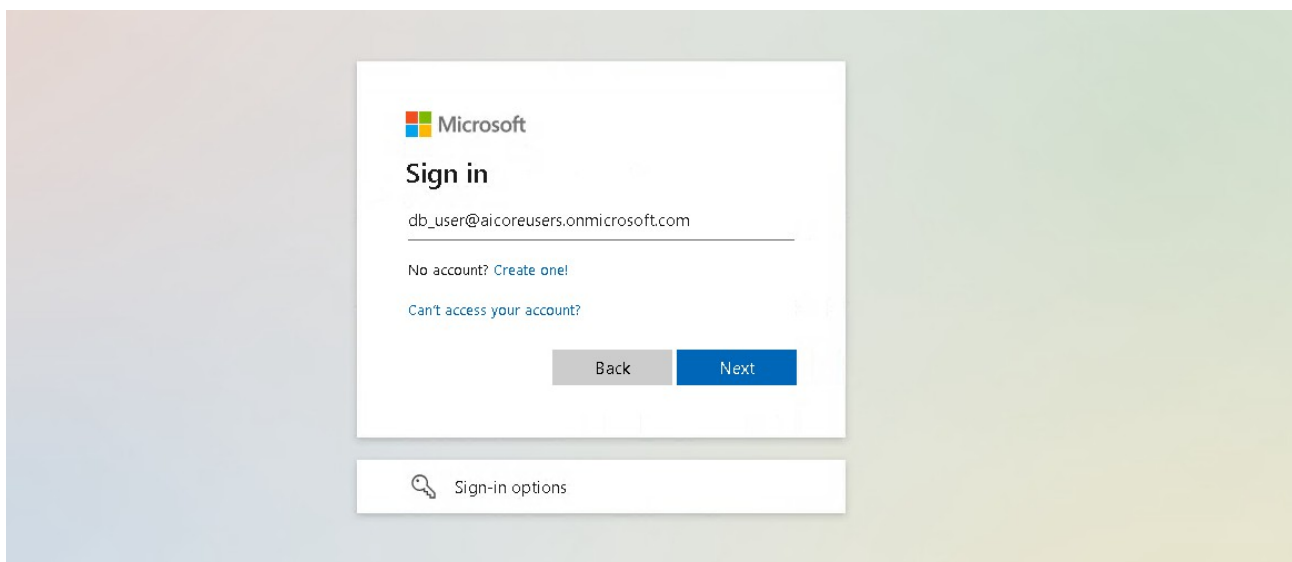


Thus I had to return to the previous screen on azure services (on browser window) and click save. This allowed me to log back in.

Creating a DB Reader User:



Test the DB Reader's User Access:



you will be prompted to change the password on first login:



db_user@aicoreusers.onmicrosoft.com

Update your password

You need to update your password because this is the first time you are signing in, or because your password has expired.

.....

.....

.....

Back

Sign in



db_user@aicoreusers.onmicrosoft.com

Action Required

Your organization requires additional security information. Follow the prompts to download and set up the Microsoft Authenticator app.

[Use a different account](#)

You have 14 days until this is required.


Ask later

[Next](#)

Depending on your companies setup, you may be asked to setup MFA for the new user account. If this is the case, have your preferred MFA app at hand so you can follow the steps to authenticate the new user.

Keep your account secure

Authenticator app



Enter code

Enter the 6-digit code shown in the Authenticator app.

Enter code

Back

Next

You can then proceed to connecting via azure data studio with the new credentials:

Connection

RecentBrowse

Clear List

adventureworks22.database.windows.net, AdventureWorks2022 (Jakir Hussain - jax...

adventureworks22.database.windows.net, AdventureWorks2022 (aicore)

localhost, AdventureWorks2022 (Integrated)

Connection Details

Connection type

Microsoft SQL Server

Input type

☒ Parameters ☐ Connection String

Server*

adventureworks22.database.windows.net

Authentication type

Microsoft Entra ID - Universal with MFA support

Account

db reader - db_user@aicoreusers.onmicrosoft.com

Database

AdventureWorks2022

Encrypt

Mandatory (True)

Trust server certificate

True

Server group

<Default>

Name (optional)

Advanced...

Connect

Cancel

Authenticator app

Done

After logging you should check that you have setup the user, testing reading the database with success:

The screenshot displays the SQL Server Enterprise Manager interface. On the left, the 'SERVERS' tree shows the 'AdventureWorks2022' database expanded, with the 'dbo.AWBuildVersion' table selected. The central pane shows a SQL query: `SELECT TOP (1000) [SystemInformationID], [Database Version], [VersionDate], [ModifiedDate] FROM [dbo].[AWBuildVersion]`. The 'Database' dropdown is set to 'AdventureWorks2022'. The 'Results' pane at the bottom shows a single row of data.

	SystemInformationID	Database Version	VersionDate	ModifiedDate
1	1	15.0.4280.7	2023-01-23 13:08:53.190	2023-05-08 12:07:29.843

testing access to modify to database which should fail, as this user should correctly only have read access.

