

DEVOPS with MULTI-CLOUD

Practice Tasks

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Course : DevOps with Multi-Cloud
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TASK-17 :- Azure SQL.

Date : 10/02/26

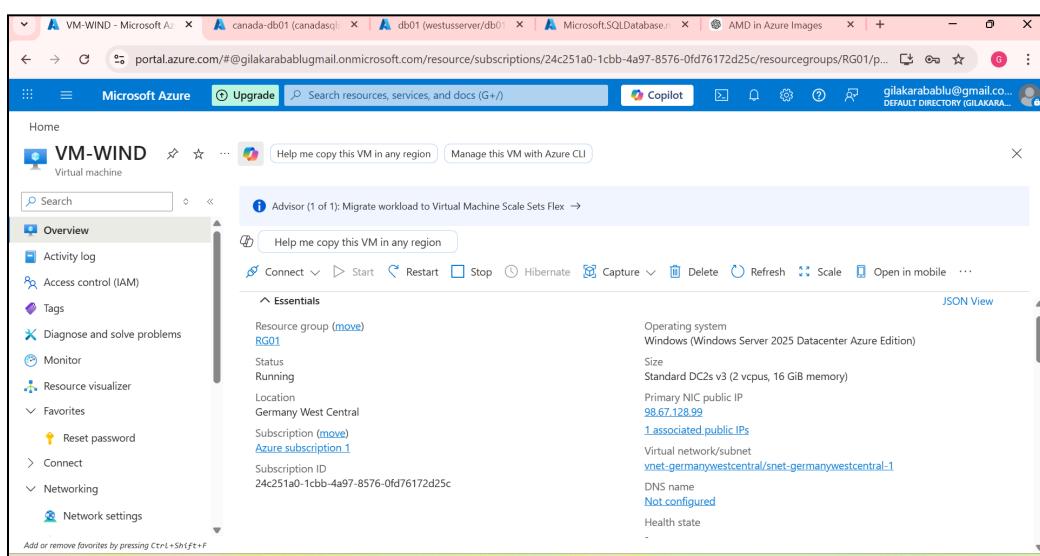
Objective :-

To provide a fully managed relational database service in the cloud for storing, managing, and querying structured data with high availability, security, and scalability.

Azure SQL :-

- Azure SQL Database is a fully managed relational database service in the cloud. It stores structured data in tables using rows and columns
- It supports SQL queries to insert, update, delete, and retrieve data. It provides automatic backups and high availability.

→ Create a windows machine and a database.



The screenshot shows the Microsoft Azure portal interface. The top navigation bar includes links for VM-WIN10-MICRO, canada-db01 (canadasqlsever), db01 (westus2), Microsoft Cloud Dev, AMD in Azure Intel, and SQL - Google Docs. The user's email, gilakarabablu@gmail.com, is visible in the top right. The main page title is "Microsoft Azure" and the search bar says "Search resources, services, and docs (G+)".

The central content area displays the "Overview" of the "canada-db01" database. The left sidebar lists navigation options: Overview, Activity log, Tags, Diagnose and solve problems, Query editor (preview), Mirror database in Fabric (preview), Resource visualizer, Settings, Data management, Integrations, Power Platform, and Security. A "Tags (edit)" link is at the bottom of the sidebar.

The main content area has a banner for "SQLCON Atlanta" and a "Register now" button. It shows the following details:

Essentials	
Resource group (move)	Server name canadasqlsever.database.windows.net
SQL-RG	Elastic pool No elastic pool
Status Online	Connection strings Show database connection strings
Location Canada Central	Pricing tier Basic
Subscription (move)	Earliest restore point 2026-02-11 09:15 UTC
Azure subscription 1	
Subscription ID 24c251a0-1cbb-4a97-8576-0fd76172d25c	

A "JSON View" link is located in the top right corner of the main content area.

Fig (1&2) created a windows machine and database.

→ Now download the SSMS - Sql Server Management Studio in the windows machine, with this application we can connect to the database.

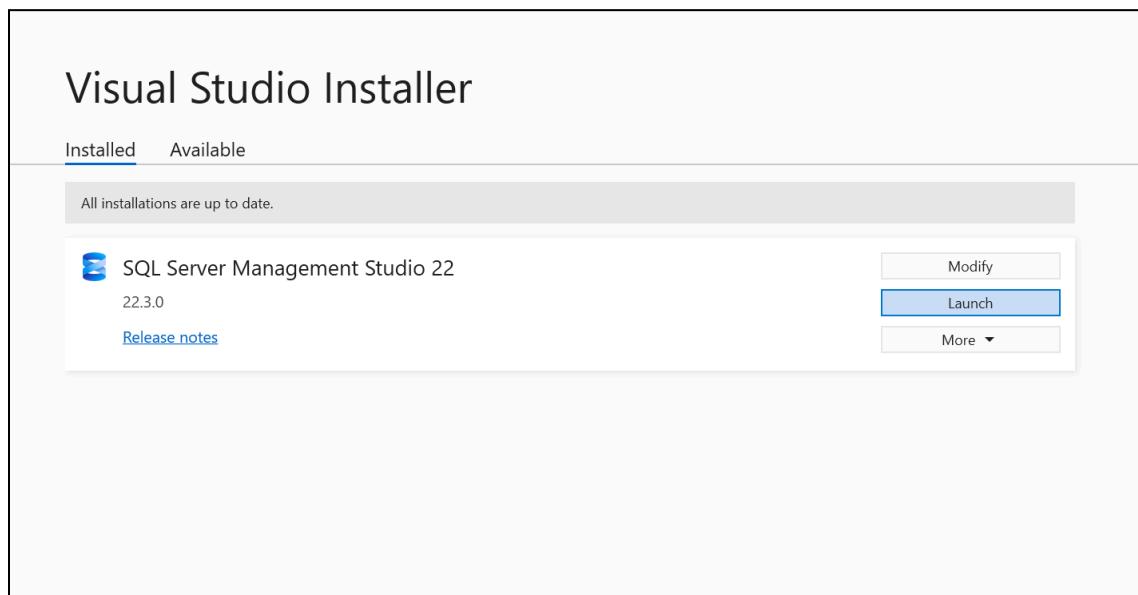
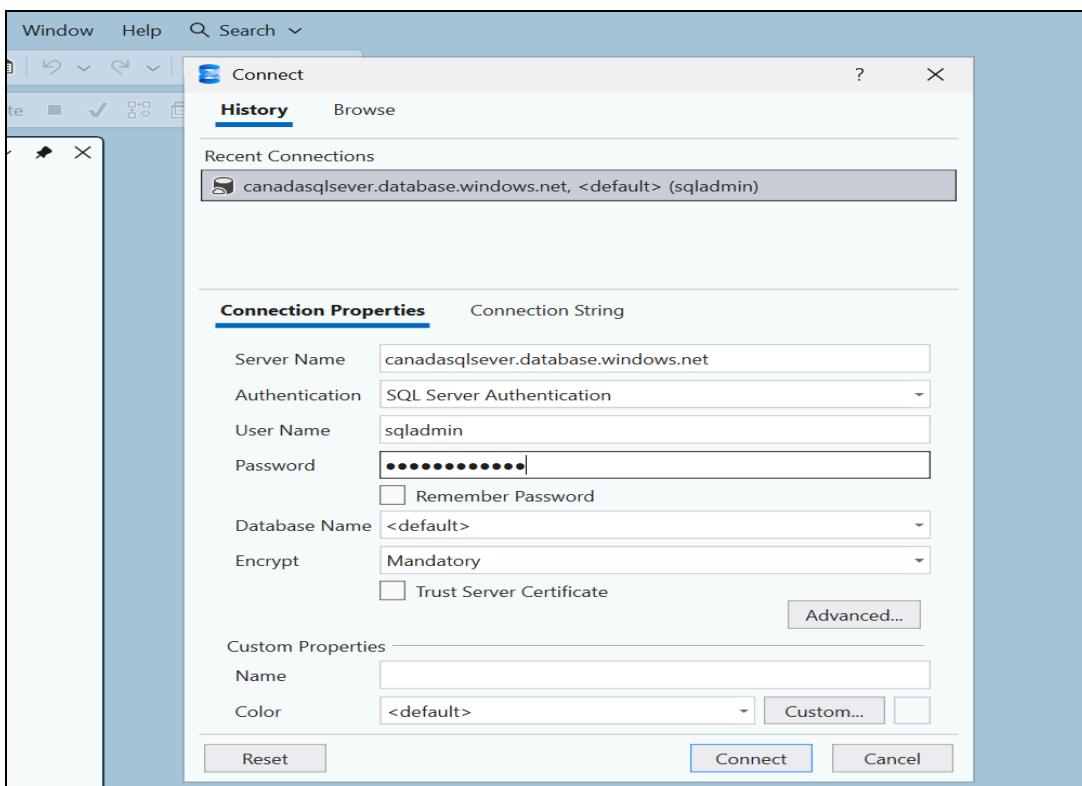


Fig (3) installed the ssms application in the Windows machine.



fig(4) login into the canada database using sql authentication.

```
# canadaserver
select * from [SalesLT].[Customer] where CustomerID in (10,11,12)
```

CustomerID	NameStyle	Title	FirstName	MiddleName	LastName	Suffix	CompanyName	SalesPerson	EmailAddress	Phone
10	0	Ms.	Kathleen	M.	Garza	NULL	Rural Cycle Emporium	adventure-worksj0s61	kathleen0@adventure-works.com	139.166.214.120:1433
11	0	Ms.	Katherine	NULL	Harding	NULL	Sharp Bikes	adventure-worksj0s61	katherine0@adventure-works.com	99.166.214.120:1433
12	0	Mr.	Johnny	A.	Caprio	Jr.	Bikes and Motorbikes	adventure-worksjgarrett1	johnny0@adventure-works.com	11.166.214.120:1433

fig(5) successfully connected to db and executing queries.

→ with the ssms application we can query and manage the data in the database, like add, delete etc.

→ Now create a replica of the canada db in another region for data security. Because in case if our db is crashed or a region is completely down then we can't access our data so to avoid this we create a replica of our database.

The screenshot shows the Microsoft Azure portal interface for managing a SQL database. The main page is titled 'canada-db01 (australiaeastserver/canada-db01) | Overview'. On the left, there's a sidebar with links for Overview, Activity log, Tags, Diagnose and solve problems, Query editor (preview), Mirror database in Fabric (preview), Resource visualizer, Settings, Data management (Replicas, Sync to other databases), and Integrations. The main content area displays the following details:

- Resource group: [\(move\)](#) **SQL-RG**
- Status: Online
- Location: Australia East
- Subscription: [\(move\)](#) **Azure subscription 1**
- Subscription ID: 24c251a0-1cbb-4a97-8576-0fd76172d25c
- Server name: [australiaeastserver.database.windows.net](#)
- Elastic pool: **No elastic pool**
- Connection strings: [Show database connection strings](#)
- Pricing tier: **Basic**
- Earliest restore point: No restore point available
- Replica type: None

fig(6) Replica of canada db in australia server.

→ Here, The primary db is in the canada server and secondary db is in the australia server.

→ Now the primary db has R/W permissions.

→ The secondary db has only read permissions.

→ whenever there is a crash or region down then the secondary db becomes the primary db and will have R/W permissions, till the primary db is ok.

→ There are two types of replications :-

- Replica :-

- Used for DB to DB replication, i.e one db is replicated into another db in another server.
- It is database level.

- Failover group :-

- Used for replication of multiple db's into another server.
- It is server level.

→ Now connect to the secondary db.

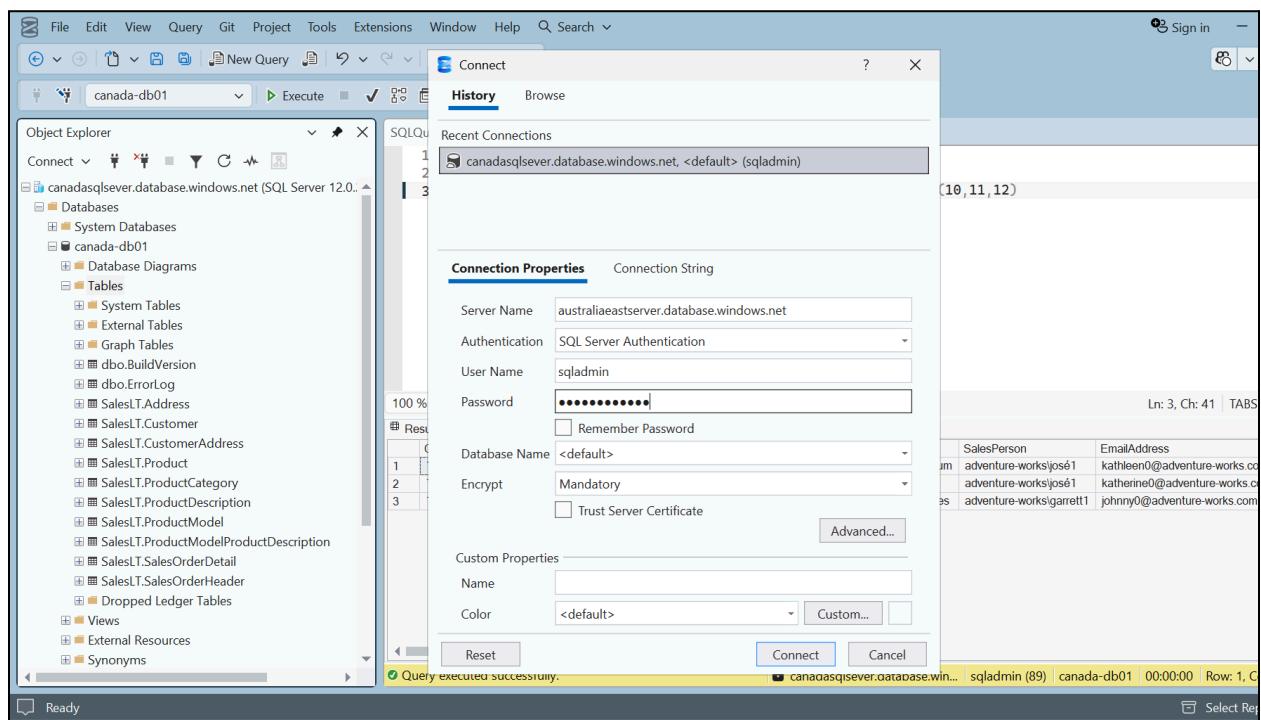


Fig (7) login to the secondary db using the SQL authentication.

```

1 #australiaserver
2
3 select * from [SalesLT].[Customer] where CustomerID in (10,11,12)

```

CustomerID	NameStyle	Title	FirstName	MiddleName	LastName	Suffix	CompanyName	SalesPerson	EmailAddress	Phone
10	0	Ms.	Kathleen	M.	Garza	NULL	Rural Cycle Emporium	adventure-worksjose1	kathleen0@adventure-works.com	150-5
11	0	Ms.	Katherine	NULL	Harding	NULL	Sharp Bikes	adventure-worksjose1	katherine0@adventure-works.com	926-5
12	0	Mr.	Johnny	A.	Caprio	Jr.	Bikes and Motorbikes	adventure-worksjgarrett1	johnny0@adventure-works.com	112-5

fig(8) successfully connected to the secondary db.

→ Now try to execute some commands in both databases.

- If we delete some records in the primary db, the changes are automatically updated in the secondary db also.
- They are always in sync and updated within milliseconds.
- But if we try to change the from the secondary db it shows error, since the secondary db has only read permission.
- If we want to update from secondary db then we have to perform the forced failover.

The screenshot shows the SSMS interface with two query panes. The left pane displays system tables like SalesLT.Product, SalesLT.Customer, etc. The right pane contains the following SQL code:

```

1 #australiaserver
2
3 select * from [SalesLT].[Customer] where CustomerID in (10,11,12)
4
5 delete from [SalesLT].[Customer] where CustomerID in (10,11,12)

```

The 'Messages' pane at the bottom shows an error message:

```

Msg 3906, Level 16, State 2, Line 5
Failed to update database "canada-db01" because the database is read-only.

Completion time: 2026-02-11T10:40:38.0729213+00:00

```

fig(9) showing error because the secondary db has only read permission.

→ Now let's perform the forced failover, so that the secondary db becomes the primary.

The screenshot shows the Azure portal interface for managing databases. The URL is <https://portal.azure.com/#@gilakarababu@gmail.onmicrosoft.com/resource/subscriptions/24c251a0-1ccb-4a97-8576-0fd76172d25c/resourceGroups/SQL-R...>. The left sidebar shows options like Overview, Activity log, Tags, Diagnose and solve problems, Query editor (preview), Mirror database in Fabric (preview), Resource visualizer, Settings, Data management, and Replicas. The 'Replicas' option is selected. The main content area displays the database replication configuration:

Name	Server	Region	Failover policy	Pricing tier	Replica state
canada-db01	canadasqlserver	Canada Central	None	Basic	Online
canada-db01	australiaeastserver	Australia East		Basic	Readable

→ goto canada db > replicas > select the replica & forced failover.

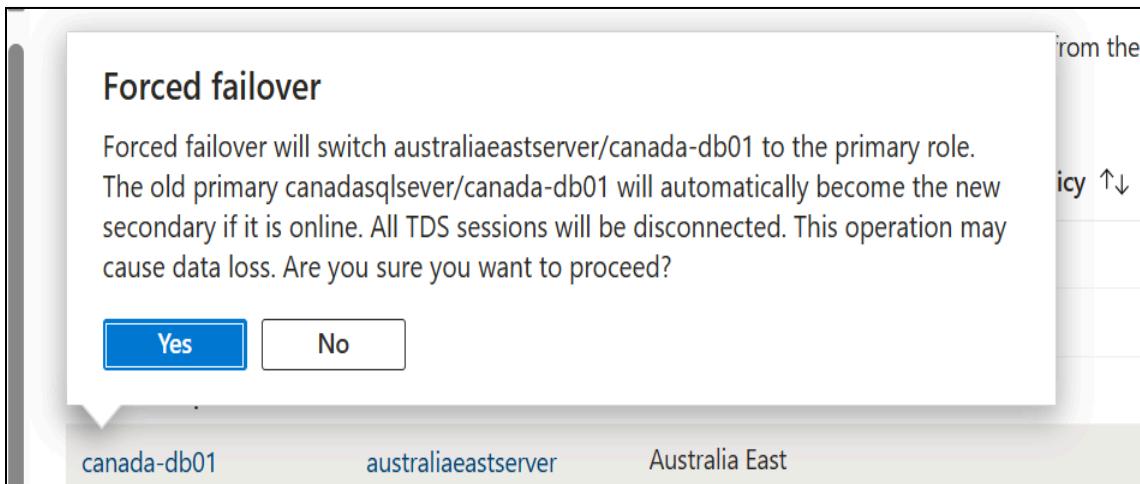


Fig (8&9) successfully forced failover.

→ Now we can execute the R/W queries in the secondary db and the primary db will have only read permission. Since we have forced failover of the database.

A screenshot of the SQL Server Management Studio (SSMS) interface. The title bar shows "SQL Server Management Studio - [Server Name]". The main window displays a query editor with the following SQL code:

```
1 #australiaserver
2
3 select * from [SalesLT].[Customer] where CustomerID in (10,11,12)
4
5 delete from [SalesLT].[Customer] where CustomerID in (10,11,12)
6
7 select * from [SalesLT].[Customer] where CustomerID in (1,2,3)
8
9 delete from [SalesLT].[Customer] where CustomerID in (1,2,3)
```

The results pane at the bottom shows the output: "(3 rows affected)".

fig(10) Delete Query executed in secondary since it has R/W permissions.

```

1 # canadaserver
2
3
4
5
6
7
8

```

```

Msg 3906, Level 16, State 2, Line 7
Failed to update database "canada-db01" because the database is read-only.

Completion time: 2026-02-11T10:53:08.6964152+00:00

```

fig(11) showing error in primary db since it has only read permission.
→ Now create multiple db's in a server and perform “failover group”.

Name	Role	Secondary server	Status
db01			Online
db02			Online

Showing 1 - 2 of 2 results.

Create standby replica No Yes

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

Select

fig(12) created two db's in westus server and added them in the failover group for replication.

- In the failover group we can select the required number of db's from a server for replication to another server.
- goto server > failover group > select the required number of db's.

The screenshot shows the Microsoft Azure portal interface. The top navigation bar includes tabs for 'canada-db01 (canadasqlserver)', 'failov - Microsoft Azure', 'AMD in Azure Images', 'SQL - Google Docs', and other browser tabs. The main content area is titled 'failov' under 'Microsoft Azure'. On the left, there's a sidebar with options like 'Overview', 'Activity log', 'Access control (IAM)', 'Tags', 'Quick start', 'Diagnose and solve problems', 'Resource visualizer', and 'Settings'. Under 'Settings', there are links for 'Microsoft Entra ID', 'SQL databases', and 'SQL elastic pools'. The main pane displays 'Available resources' with a search bar and filter options ('Filter by name' and 'All types'). It lists '2 databases': 'db01' and 'db02', both categorized as 'SQL database', 'Status: Online', and 'Pricing tier: Basic'. At the top of the main pane, there are buttons for 'Create database', 'New elastic pool', 'New dedicated SQL pool (formerly SQL DW)', 'Import database', 'Reset password', and 'Move'.

fig(13) successfully completed the failover group.

- Here, we replicated the db's from westus server in westus region to failov server in indonesia region.

□ Conclusion:

Azure SQL Database is a fully managed and secure cloud database service. It offers automatic backups, scaling, and high availability, making it suitable for modern applications in Azure.