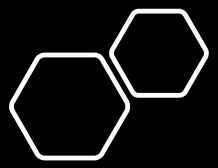
Introduction to Azure Database

- **Types of Databases on Azure:** Azure offers a choice of fully managed relational, NoSQL, and in-memory databases, spanning proprietary and open-source engines, to fit the needs of modern app developers. Infrastructure management—including scalability, availability, and security—is automated, saving you time and money. Focus on building applications while Azure managed databases make your job simpler by surfacing performance insights through embedded intelligence, scaling without limits, and managing security threats.
- Link : https://azure.microsoft.com/en-us/product-categories/databases/



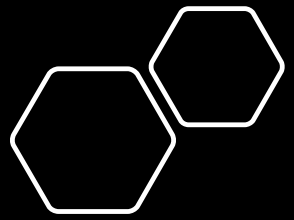
Find the database product you need

IF YOU WANT TO	USE THIS
Managed, intelligent SQL in the cloud	Azure SQL Database
Managed, always up-to-date SQL instance in the cloud	Azure SQL Managed Instance
Migrate your SQL workloads to Azure while maintaining complete SQL Server compatibility and operating system-level access	SQL Server on Azure Virtual Machines
Build scalable, secure, and fully managed enterprise-ready apps on open-source PostgreSQL, scale out single-node PostgreSQL with high performance, or migrate PostgreSQL and Oracle workloads to the cloud	Azure Database for PostgreSQL
Deliver high availability and elastic scaling to open-source mobile and web apps with a managed community MySQL database service, or migrate MySQL workloads to the cloud	Azure Database for MySQL
Deliver high availability and elastic scaling to open-source mobile and web apps with a managed community MariaDB database service	Azure Database for MariaDB
Build applications with guaranteed low latency and high availability anywhere, at any scale, or migrate Cassandra, MongoDB, and other NoSQL workloads to the cloud	Azure Cosmos DB
Power fast, scalable applications with an open-source-compatible in-memory data store	Azure Cache for Redis
Accelerate your transition to the cloud using a simple, self-guided migration process	Azure Database Migration Service
Modernize existing Cassandra data clusters and apps, and enjoy flexibility and freedom with managed instance service	Azure Managed Instance for Apache Cassandra

Map Azure Database with Database Feature

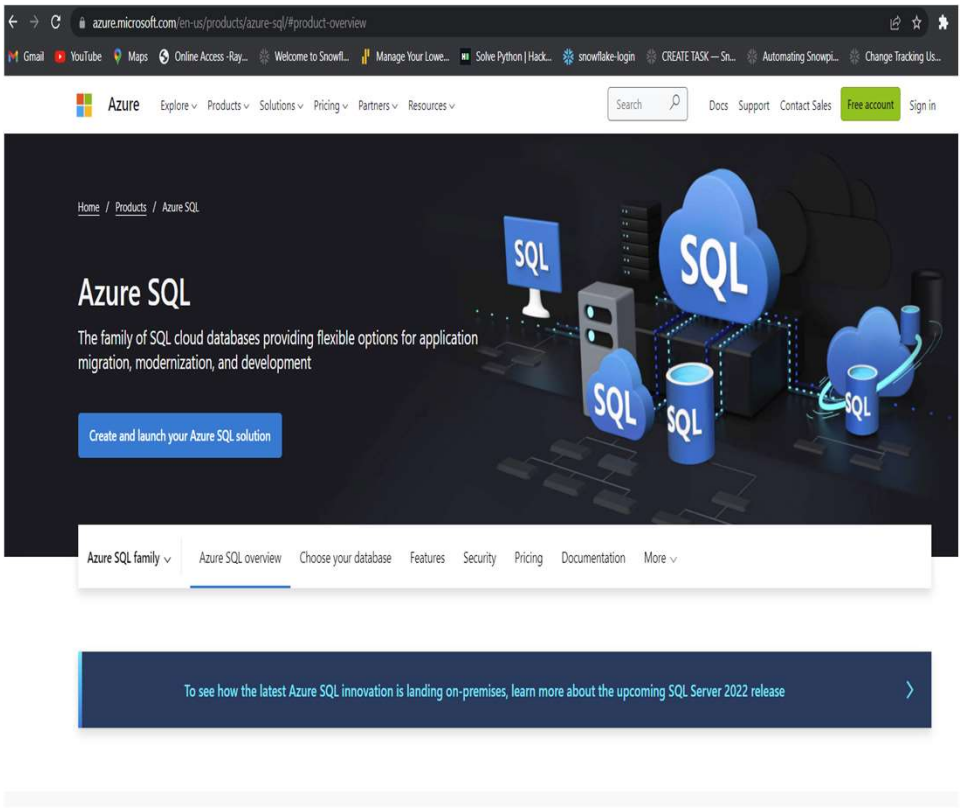
	Azure SQL Database	Azure SQL Managed Instance	SQL Server on Virtual Machines	Azure Database for PostgreSQL	Azure Database for MySQL	Azure Database for MariaDB	Azure Cosmos DB	Azure Cache for Redis
Relational Database	✓	✓	✓	✓	✓	✓		
Non-Relational Database (NoSQL)							✓	
In-Memory Database								✓
Data Models	Relational	Relational	Relational	Relational	Relational	Relational	Multi-Model: Document Wide-column Key-Value Graph	Key-Value
Hybrid	✓	✓	✓	✓ *(Hyperscale)*				
Serverless Compute	✓						✓	
Storage Scale Out	✓ *(Hyperscale)*			✓ *(Hyperscale)*			✓	✓
Compute Scale Out	✓ *(Hyperscale - read-only)*			✓ *(Hyperscale)*			✓	✓
Distributed Multi-Master Writes (Write data to different regions)							✓	✓ *(Coming Soon)*

QuickStart	Description
SQL Server Management Studio	This quickstart demonstrates how to use SSMS to connect to a database, and then use Transact-SQL statements to query, insert, update, and delete data in the database.
Azure Data Studio	This quickstart demonstrates how to use Azure Data Studio to connect to a database, and then use Transact-SQL (T-SQL) statements to create the TutorialDB used in Azure Data Studio tutorials.
Azure portal	This quickstart demonstrates how to use the Query editor to connect to a database (Azure SQL Database only), and then use Transact-SQL statements to query, insert, update, and delete data in the database.
Visual Studio Code	This quickstart demonstrates how to use Visual Studio Code to connect to a database, and then use Transact-SQL statements to query, insert, update, and delete data in the database.



Azure SQL

- Link : https://azure.microsoft.com/en-us/products/azure-sql/#product-overview
- Azure SQL ---> SQL Servers ---> SQL Databases
- Hyperscale and serverless options are available.



Azure SQL Database Details

- Azure SQL Database is one of the key data storage solution for structured data in Azure. If you need to manage structured data via schema, constraints and relationships or you need to explore your data via rich query language then this might be the right service for you.
- Link : https://azure.microsoft.com/en-us/products/azure-sql/database/

Why relational databases?

Relational databases are

1. Perfect for managing **structured data** via
    1. Schema
    2. Constraints
    3. Relationships
2. Include **rich query** capabilities

Azure SQL Database Deployment Method

Deployment models

Azure SQL Database provides the three deployment options:

Single is a fully managed, isolated database

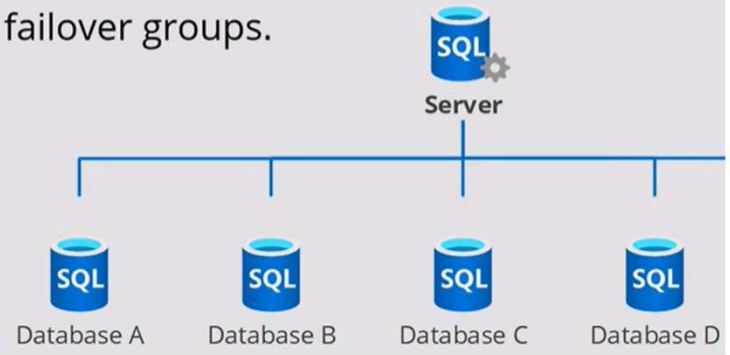
Elastic Pool is a collection of single databases with a shared set of resources

Managed Instance is a fully managed instance of the SQL Server

SQL Database Server Vs SQL Database

SQL Database Server vs SQL Database

Database **Server** act as a central administrative point for **multiple single** or **pooled databases**, logins, firewall rules, auditing rules, threat detection policies, and failover groups.



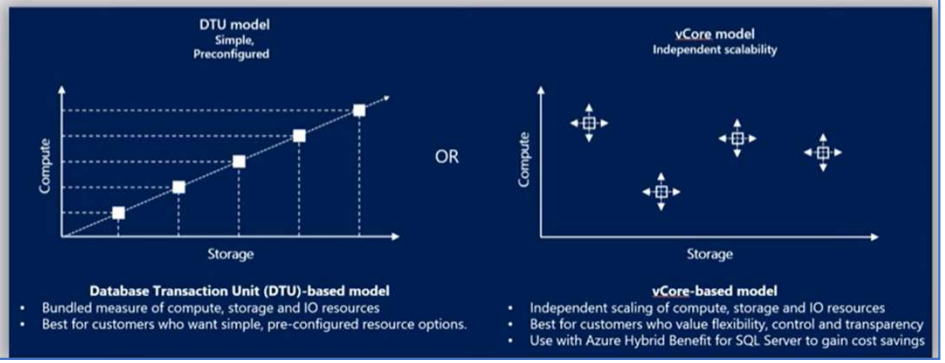
Azure SQL Database pricing

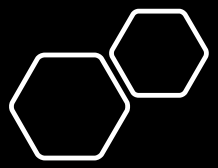
Link : https://docs.microsoft.com/en-us/azure/azure-sql/database/purchasing-models

Link : https://azure.microsoft.com/en-us/pricing/details/azure-sql-database/single/

Azure SQL Database offers two purchasing models

- Database transaction unit (**DTU**)-based purchasing model
- Virtual core (**vCore**)-based purchasing model (recommended)
- **Serverless** model (vCore)-based





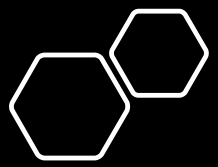
Advance Features of Azure SQL Databases

SQL Database offers a lot of **availability** features like

- Automatic backups
- Point-in-time restores
- Active geo-replication
- Auto-failover groups
- Zone-redundant databases

Steps to Create to Azure SQL → Azure Servers →Azure Databases

- **Azure SQL ---> SQL Servers ---> SQL Databases**
- Azure Storage Account ---> Azure Blob / Queue /Files/ Tables
- Step1 : Search for Azure SQL in Azure Portal .
- Step2 : Click on Create Azure SQL Resource
- Step3 : Select SQL deployment option
- Step4 : Select SQL database ---> Select the Single Database
- Step5 : Click on Create
- Step6 : After above steps , we would see the page for Database Creation : Create SQL Database
- Step7 : Create a **SQL Server** also before **creating the SQL Database**
- Step8 : While Creating the SQL Database , we can create the SQL Server right in there or We can Create SQL Server all together Separately . Create the SQL Server Separately and make a note Login Details .
- **Note** : Above Steps are valid currently , But we have seen that Azure frequently changes its features and its configuration. Above steps might slight change in future.



DEMO :Create and manage SQL servers and single databases in Azure SQL Database

- Link for Azure SQL : https://azure.microsoft.com/en-us/products/azure-sql/
- Link for Azure SQL Servers: https://azure.microsoft.com/en-us/services/sql-database/campaign/#overview
- Link for SQL Databases :https://azure.microsoft.com/en-us/products/azure-sql/database/#overview

Azure SQL

- Link https://azure.microsoft.com/en-us/products/azure-sql/
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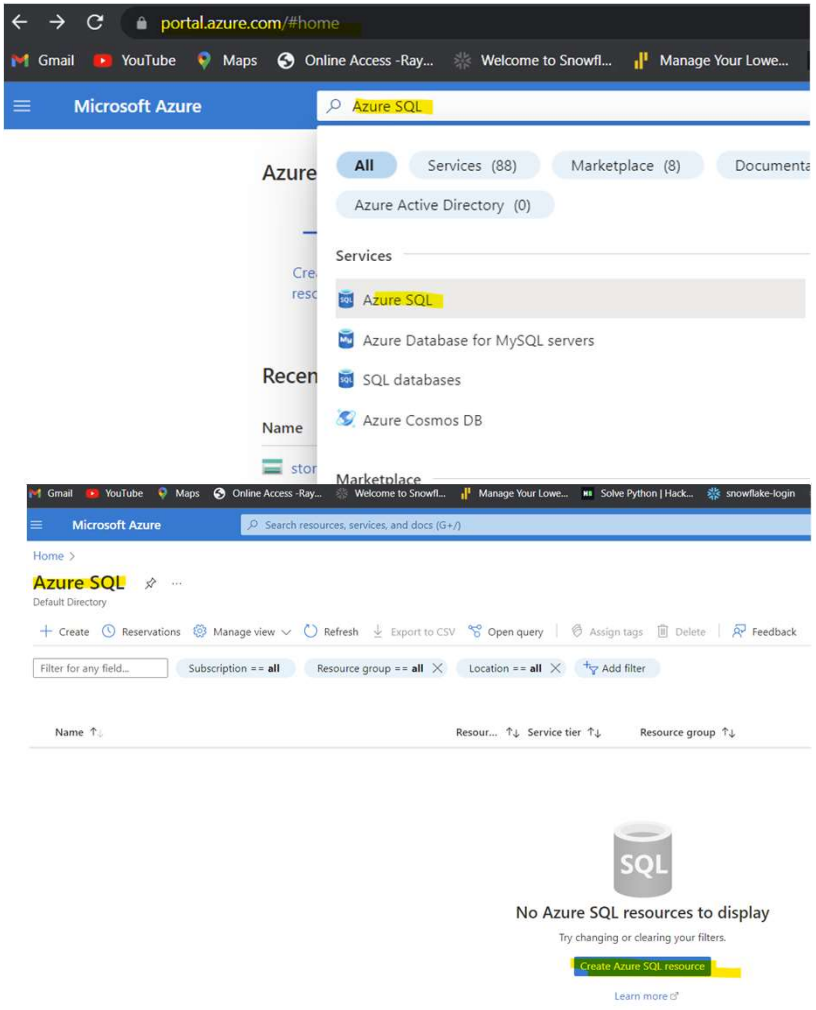
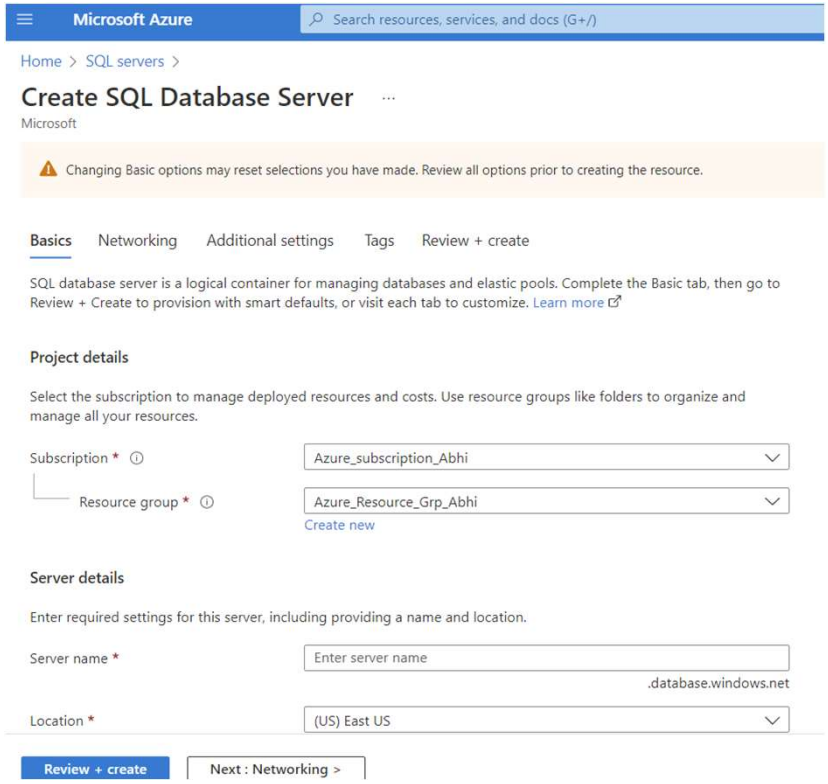


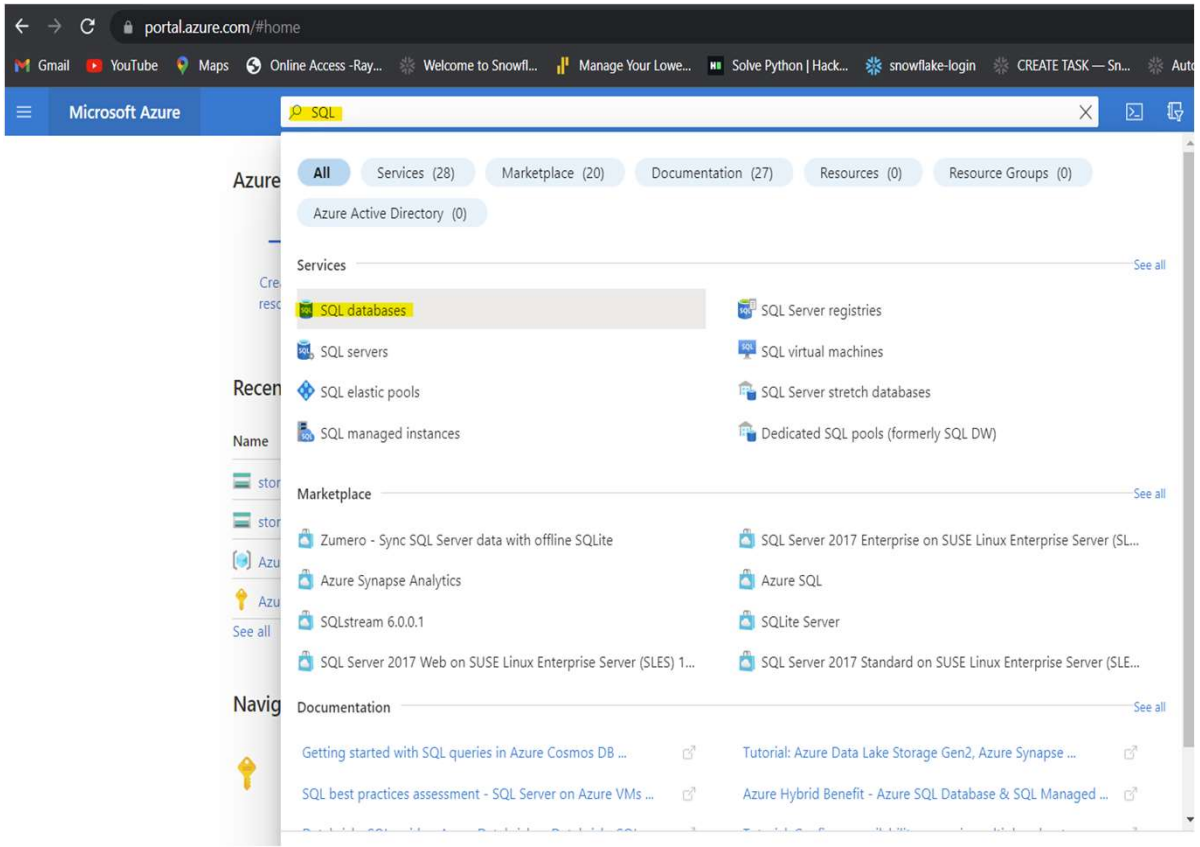
Create Azure SQL Server

- Link : https://azure.microsoft.com/en-us/services/sql-database/campaign/#overview
- Login into Portal and search for SQL Server.
- Select the SQL Server and Fill Up all Information and create SQL Server.
- Remember the Login Details.
- This SQL Server can be used in SQL Databases which we would create and Spin-up .
- This is similar to Storage Account



Create SQL Database

- Login into Portal and search for SQL Database.
- Select SQL Database



Install SQL Server Management Studio (SSMS)

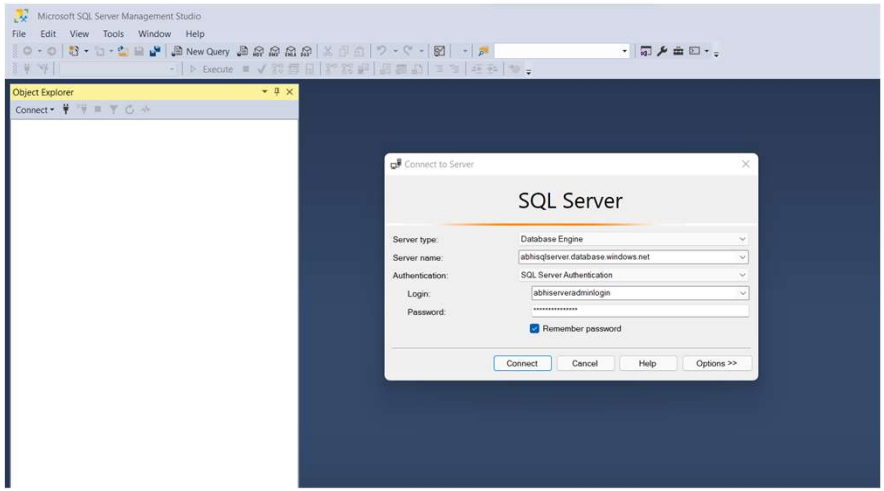
Download : Free Download for SQL Server Management Studio (SSMS) 18.11.1

Link : https://docs.microsoft.com/en-us/sql/ssms/download-sql-server-management-studio-ssms?view=sql-server-ver15

Link : https://docs.microsoft.com/en-us/azure/azure-sql/database/connect-query-ssms

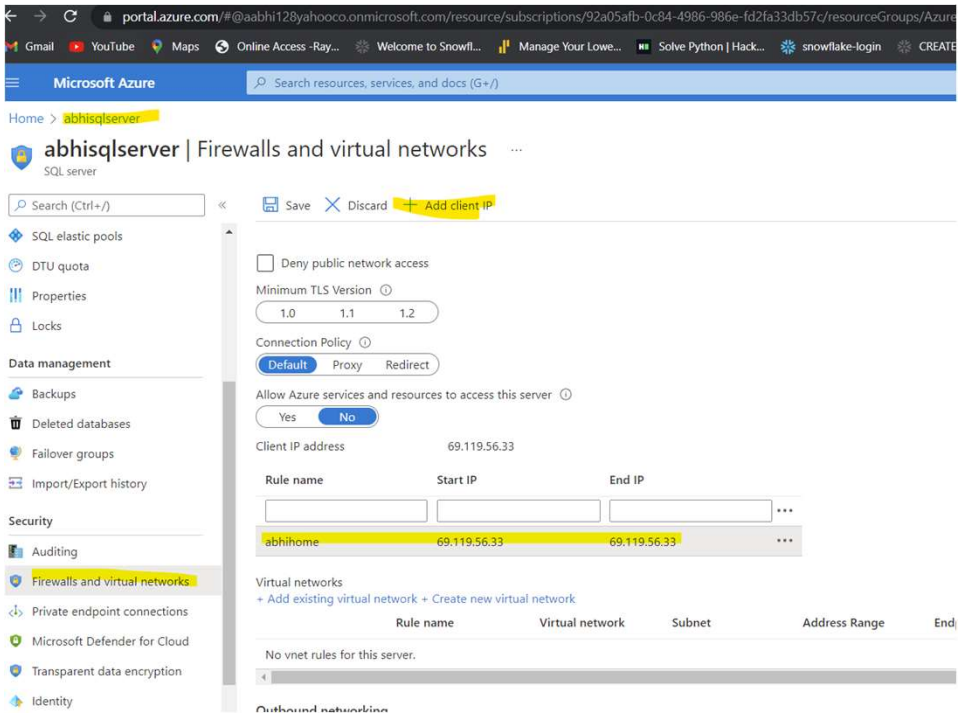
Configure MS SQL Server Management Studio with Azure Server and Database Details

- ❑ Server Name :
- ❑ Server admin login/ Admin Username :
- ❑ Password :
- ❑ Database :



Issues while Configuring even after above steps

- It might throw error that IP address not configured.
- Then come back to SQL Server page and add your IP address like below :



Demo to Add Tables and data in SQL Server Management Studio table and Run Queries

- SQL QUERY in MS SQL Server Management Studio :

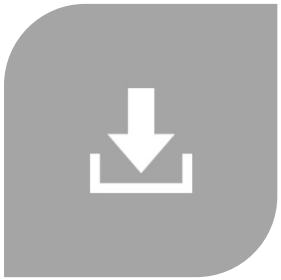
```
create table Player (
PlayerName Varchar(100),
PlayerID Integer,
TeamNo Integer,
Score Integer);
```

- select * from [dbo].[Player];
- drop table [dbo].[Player];

- INSERT INTO Player (PlayerName,PlayerID,TeamNo,Score) VALUES ('Messi',999,111,9);
- INSERT INTO Player (PlayerName,PlayerID,TeamNo,Score) VALUES ('Ronaldo',101,111,10);
- INSERT INTO Player (PlayerName,PlayerID,TeamNo,Score) VALUES ('Pele',100,122,15);
- INSERT INTO Player (PlayerName,PlayerID,TeamNo,Score) VALUES ('Pele',100,144,15);
- INSERT INTO Player (PlayerName,PlayerID,TeamNo,Score) VALUES ('Smith',88,122,15);

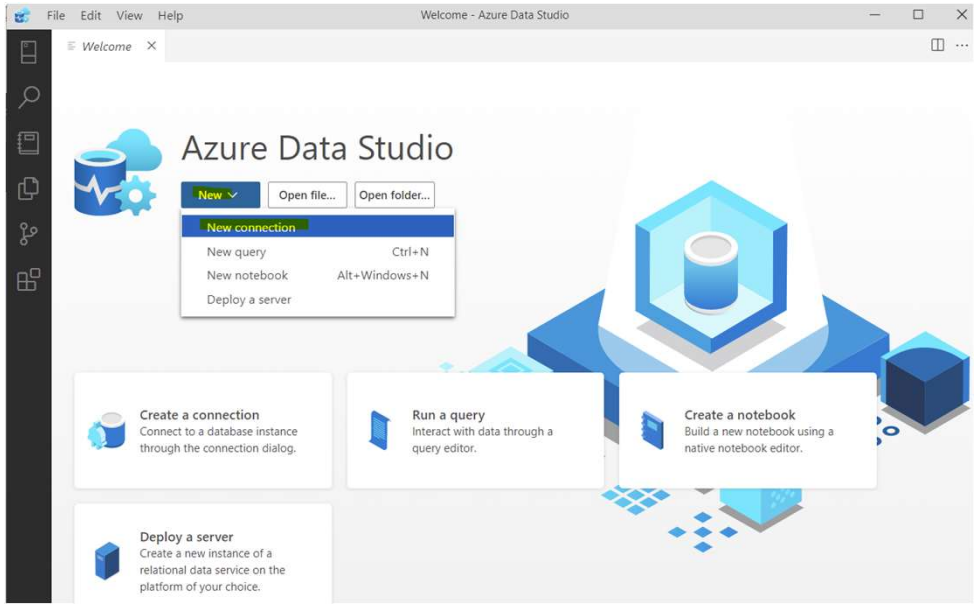
Quickstart: Use Azure Data Studio to connect and query Azure SQL database

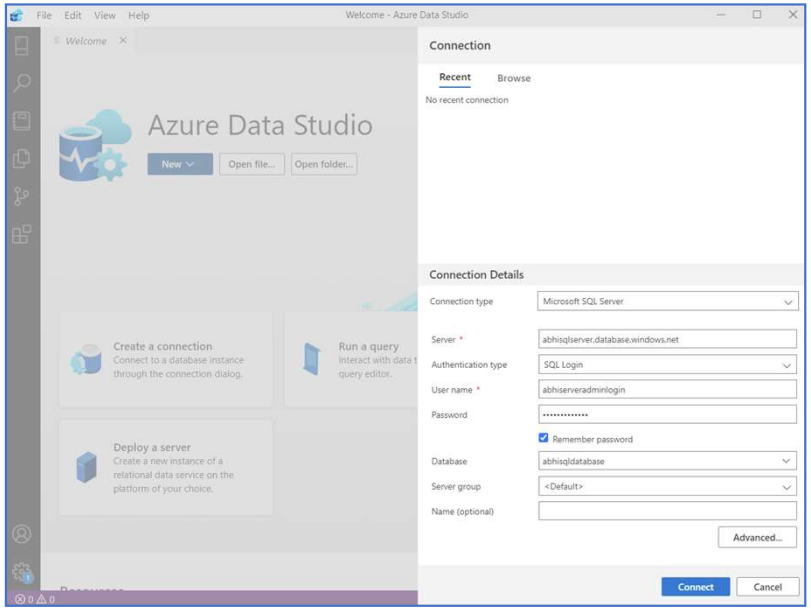
LINK : HTTPS://DOCS.MICROSOFT.COM/EN-US/SQL/AZURE-DATA-STUDIO/QUICKSTART-SQL-DATABASE?TOC=%2FAZURE%2FSQL-DATABASE%2FTOC.JSON&VIEW=SQL-SERVER-VER15



DOWNLOAD AND RUN THE AZURE DATA STUDIO USER INSTALLER FOR WINDOWS.

Demo :Login to Azure Data Studio and Create tables and run Queries





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- INSERT INTO Player (PlayerName,PlayerID,TeamNo,Score) VALUES ('Smith',88,122,15);

Additional Link : Azure SQL Database

- Link for Azure SQL : https://portal.azure.com/#blade/HubsExtension/BrowseResource/resourceType/Microsoft.Sql%2Fazuresql
- Link : https://docs.microsoft.com/en-us/azure/azure-sql/database/single-database-create-quickstart?tabs=azure-portal
- Link : https://docs.microsoft.com/en-us/azure/azure-sql/managed-instance/instance-create-quickstart
- Link : https://docs.microsoft.com/en-us/azure/azure-sql/virtual-machines/windows/sql-vm-create-portal-quickstart


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