



# Azure SQL Database Administration

Module 2



## Learning Units covered in this Module

- Lesson 1: Various Tools to Manage Azure SQL Database
- Lesson 2: Scaling Azure SQL Databases Up and Down
- Lesson 3: Maintenance and Scheduling Jobs in Azure SQL Database

# Lesson 1: Various Tools to Manage Azure SQL Database

# Objectives

After completing this learning, you will be able to:

- Know the different tools that you can use to manage your Azure SQL Database.

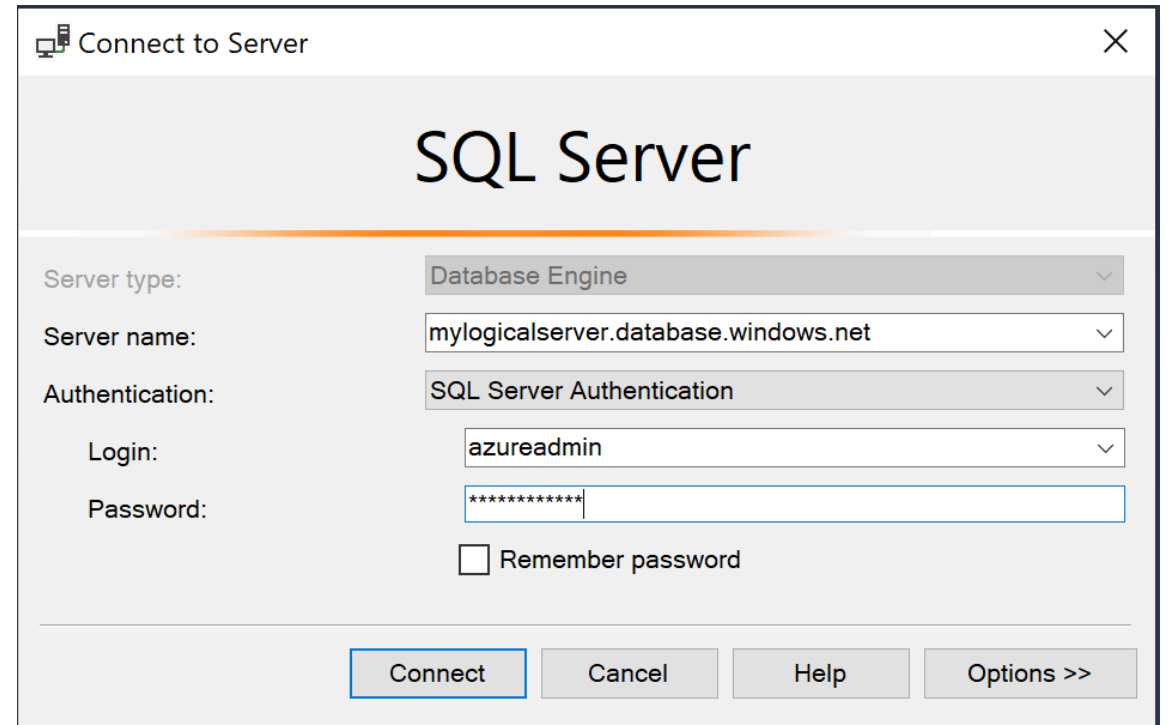


# SQL Server Management Studio

Download  
the latest  
version of  
SSMS.

Get the fully  
qualified  
domain  
name of  
your Azure  
SQL Server.

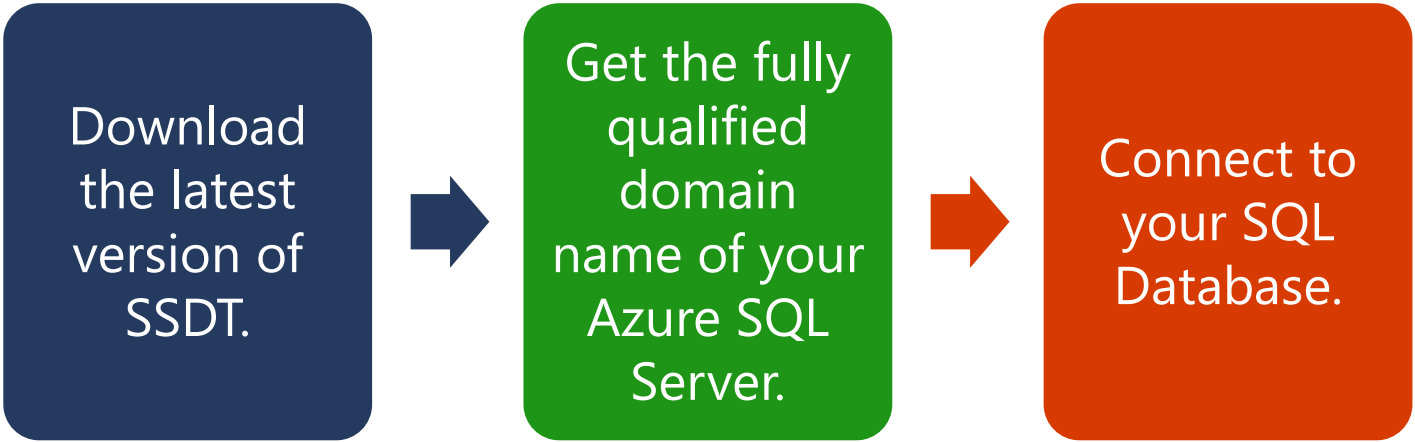
Connect to  
your SQL  
Database.



The screenshot shows the 'Connect to Server' dialog box with the following fields and options:

- Server type:** Database Engine
- Server name:** mylogicalserver.database.windows.net
- Authentication:** SQL Server Authentication
- Login:** azureadmin
- Password:** [masked with asterisks]
- ☐ Remember password
- Buttons:** Connect, Cancel, Help, Options >>

# SQL Server Data Tools



The screenshot shows the 'Connect' dialog box with the 'Browse' tab selected. The 'Server Name' field contains 'mylogicalserver.database.windows.net'. The 'Authentication' dropdown is set to 'SQL Server Authentication'. The 'User Name' field contains 'azureadmin'. The 'Password' field is masked with dots. The 'Database Name' dropdown is set to '<default>'. The 'Remember Password' checkbox is unchecked. The 'Connect' and 'Cancel' buttons are at the bottom right.

Connect

History Browse

Type here to filter the list

- Local
- Network
- Azure

Server Name: mylogicalserver.database.windows.net

Authentication: SQL Server Authentication

User Name: azureadmin

Password: .....

☐ Remember Password

Database Name: <default>

Advanced...

Connect Cancel

# Azure Data Studio

Download the latest version of Azure Data Studio.

Get the fully qualified domain name of your Azure SQL Server.

Connect to your SQL Database.

Connection Details

Connection type

Microsoft SQL Server

Server

mylogicalserver.database.windows.net

Authentication type

SQL Login

User name

azureadmin

Password

.....

☐ Remember password

Database

<Default>

Server group

<Default>

Name (optional)

Advanced...

Connect

Cancel

# Management APIs

## PowerShell

- New-AzSqlDatabase
- Get-AzSqlDatabase
- Set-AzSqlDatabase
- Remove-AzSqlDatabase
- New-AzResourceGroup
- New-AzSqlServer
- Get-AzSqlServer
- Set-AzSqlServer
- Remove-AzSqlServer
- New-AzSqlServerFirewallRule
- Get-AzSqlServerFirewallRule
- Set-AzSqlServerFirewallRule
- Remove-AzSqlServerFirewallRule
- New-AzSqlServerVirtualNetworkRule

## Azure CLI

- az sql db create
- az sql db list
- az sql db list-editions
- az sql db list-usages
- az sql db show
- az sql db update
- az sql db delete
- az group create
- az sql server create
- az sql server list
- az sql server list-usages
- az sql server show
- az sql server update
- az sql server delete
- az sql server firewall-rule create
- az sql server firewall-rule list
- az sql server firewall-rule show
- az sql server firewall-rule update
- az sql server firewall-rule delete



# Management APIs

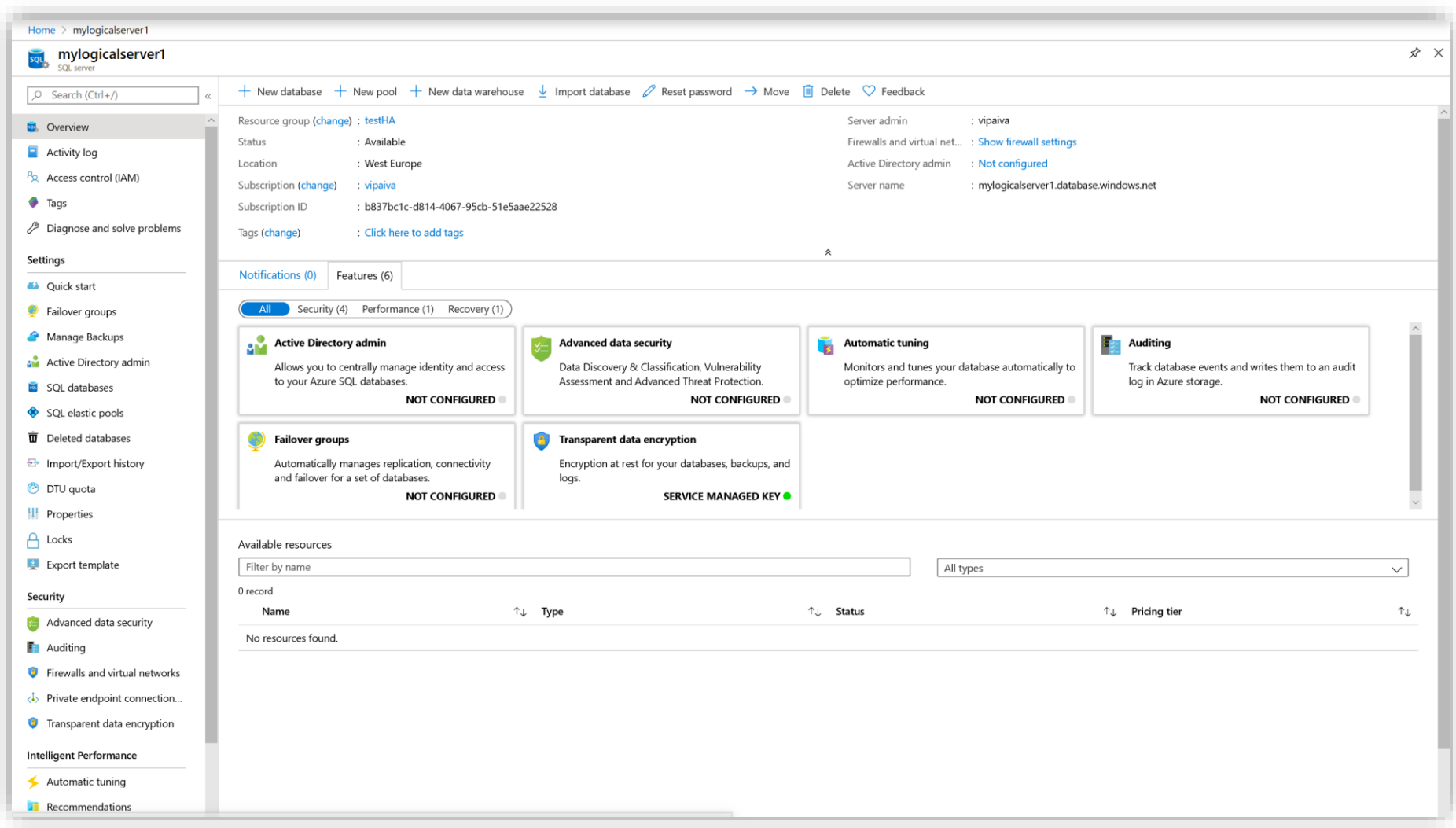
## Transact-SQL

- CREATE DATABASE
- ALTER DATABASE
- DROP DATABASE
- sys.database\_service\_objectives
- sys.dm\_db\_resource\_stats
- sys.resource\_stats
- sys.database\_connection\_stats
- sys.event\_log
- sp\_set\_firewall\_rule
- sys.firewall\_rules
- sp\_delete\_firewall\_rule
- sp\_set\_database\_firewall\_rule
- sys.database\_firewall\_rules
- sp\_delete\_database\_firewall\_rule

## REST API

- Servers - Create or update
- Servers - Delete
- Servers - Get
- Servers - List
- Servers - List by resource group
- Servers - Update
- Databases - Create or update
- Databases - Delete
- Databases - Get
- Databases - List by elastic pool
- Databases - List by server
- Databases - Update
- Firewall rules - Create or update
- Firewall rules - Delete
- Firewall rules - Get
- Firewall rules - List by server

# Azure Portal



# Demonstration

## Connect to your database with SSMS and Azure Portal

- Connect to your database with SSMS.
- Connect to the portal and explore the different options.



# Various Tools to Manage Azure SQL Database

- **Exercise 1:** Connect to your logical server with SQL Server Management Studio.
- **Exercise 2:** Connect to your logical server with SQL Server Data Tools.
- **Exercise 3:** Connect to your Azure SQL Database with Azure Portal.



Questions?



# Knowledge Check

What are the different tools that you can use to manage your Azure SQL Database?

What is the main recommendation to connect to Azure SQL databases regarding the version of the tools?

# Lesson 2: Scaling Azure SQL Databases Up and Down

# Objectives

After completing this learning, you will be able to:

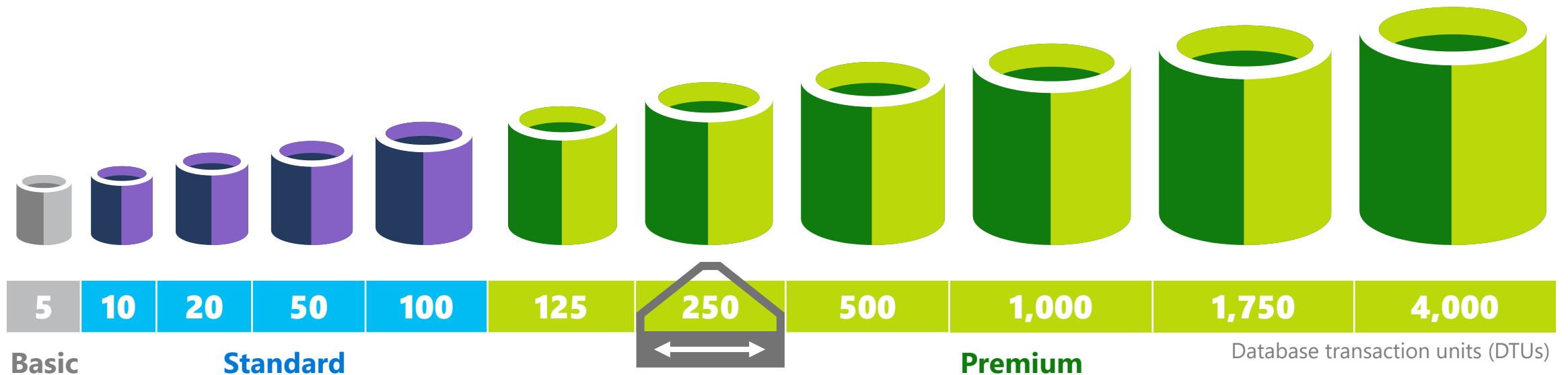
- Describe the vertical scaling options on Azure SQL DB





# Introduction – Scale up or down

- Scale up with one click.
- Accommodate growth and peak workloads.
- Pay for what you need, when you need it.



# Vertical Scaling



Upgrade to a Higher Service  
Tier



Downgrade to a Lower  
Service Tier



Change the Performance  
Level

# Changing Performance Levels (DTU)

## PowerShell

- Set-AzSqlDatabase

## REST

- Update database

## Azure CLI

- az sql db update

## T-SQL

- ALTER DATABASE ... MODIFY  
(EDITION = ...)

**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

DTUs [Compare DTU options](#)

**5 (Basic)**

Data max size (GB)

---

**DTU-based purchasing model**

- Basic (For less demanding workloads)
- Standard (For workloads with typical performance requirements)
- Premium (For IO-intensive workloads)

# Changing Performance Levels (vCore)

## PowerShell

- Set-AzSqlDatabase

## REST

- Update database

## Azure CLI

- az sql db update

## T-SQL

- ALTER DATABASE ... MODIFY (EDITION = ...)

### 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

General Purpose (Scalable compute and storage options) ▾

Compute tier

vCore-based purchasing model

General Purpose (Scalable compute and storage options)

Hyperscale (On-demand scalable storage)

Business Critical (High transaction rate and high resiliency)

Compute Hardware

Select the hardware configuration based on confidential computing hardware depends on

DTU-based purchasing model

Basic (For less demanding workloads)

Standard (For workloads with typical performance requirements)

Premium (For IO-intensive workloads)

Hardware Configuration

up to 80 vCores, up to 408 GB memory

[Change configuration](#)

### Save money

Already have a SQL Server License? Save with a license you already own with Azure Hybrid Benefit. Actual savings may vary based on region and performance tier. [Learn more](#)

☐ Yes ☒ No

vCores [Compare vCore options](#)



2

Data max size (GB) ⓘ



32

# Changing Compute Tier and Hardware (vCore)

## 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

General Purpose (Scalable compute and storage options) ▼

[Compare service tiers](#) ↗

Compute tier

- ☒ **Provisioned** - Compute resources are pre-allocated. Billed per hour based on vCores configured.
- ☐ **Serverless** - Compute resources are auto-scaled. Billed per second based on vCores used.

## Compute Hardware

Select the hardware configuration based on your workload requirements. Availability of compute optimized, memory optimized, and confidential computing hardware depends on the region, service tier, and compute tier.

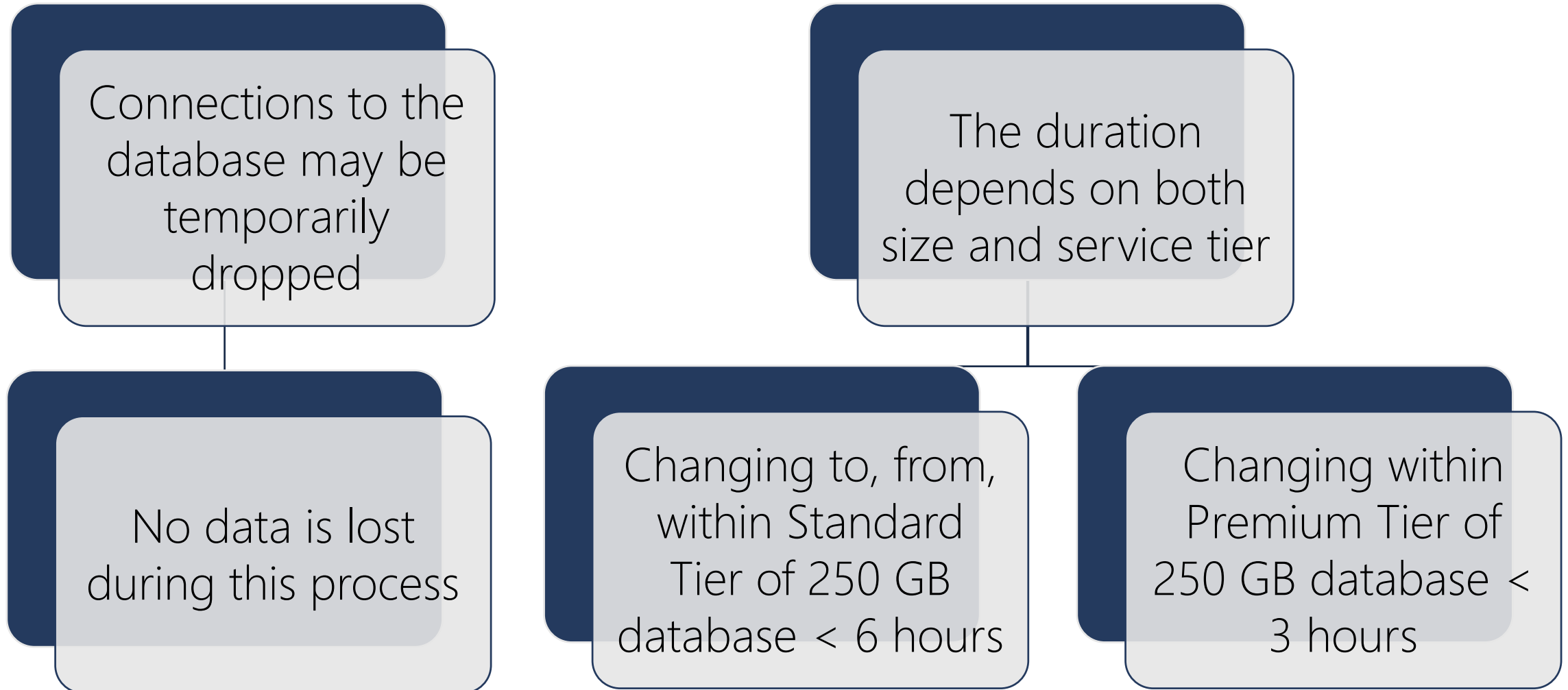
Hardware Configuration

**Gen5**

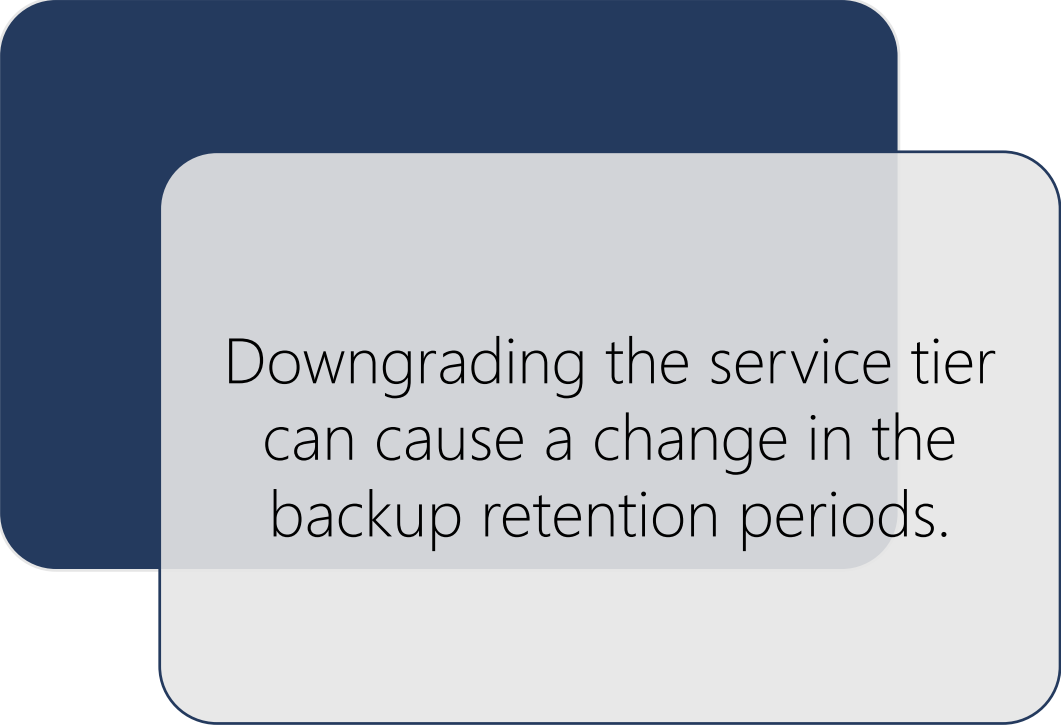
up to 80 vCores, up to 408 GB memory

[Change configuration](#)

# Impact of Database Changes

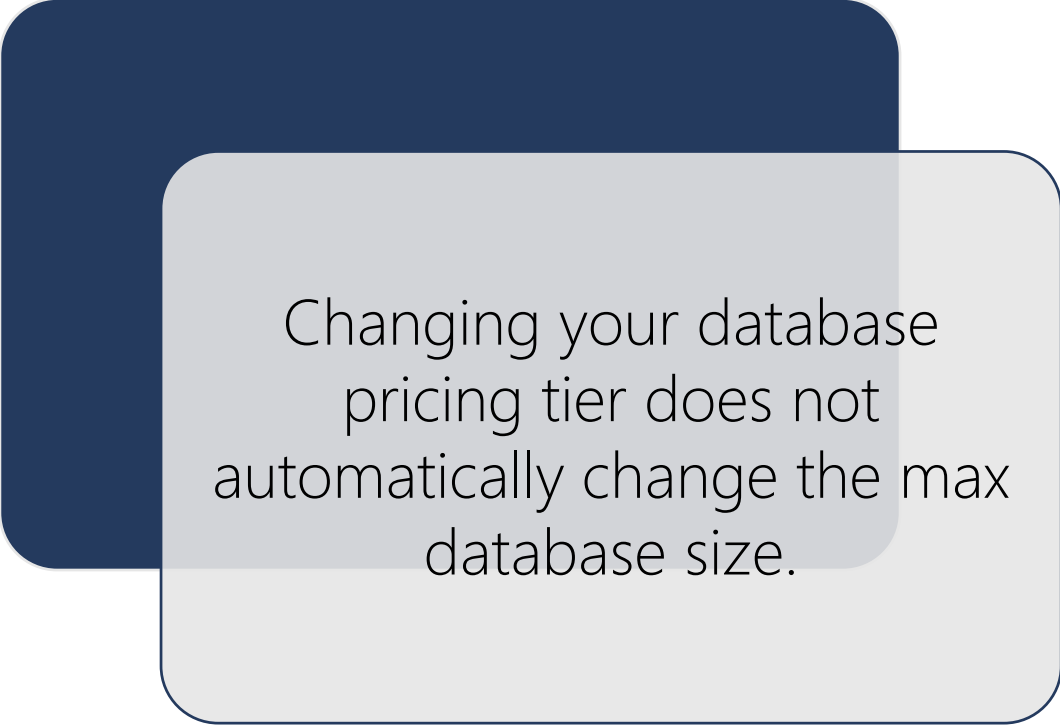


# Impact of Database Changes (continued)



Downgrading the service tier  
can cause a change in the  
backup retention periods.

The diagram consists of two overlapping rounded rectangles. The background rectangle is dark blue, and the foreground rectangle is light gray. The text is centered within the light gray rectangle.



Changing your database  
pricing tier does not  
automatically change the max  
database size.

The diagram consists of two overlapping rounded rectangles. The background rectangle is dark blue, and the foreground rectangle is light gray. The text is centered within the light gray rectangle.

# Demonstration

## Scale up an Azure SQL Database

- Scale up an Azure SQL Database and verify that the database has moved to the selected pricing tier.





# Scale up or down an Azure SQL Database

- **Exercise 1:** Scale up\down an Azure SQL Database.
- **Exercise 2:** Verify the database is at the selected pricing tier.



Questions?



# Knowledge Check

True or false: Database will remain offline and unavailable during the scale up\down operation.

What are the various methods to change the performance levels and edit?

# Lesson 3: Maintenance and Scheduling Jobs in Azure SQL Database

# Objectives

After completing this learning, you will be able to:

- Understand how to perform maintenance and job scheduling in Azure SQL Database



# Maintenance Tasks



Index maintenance as is on premises.



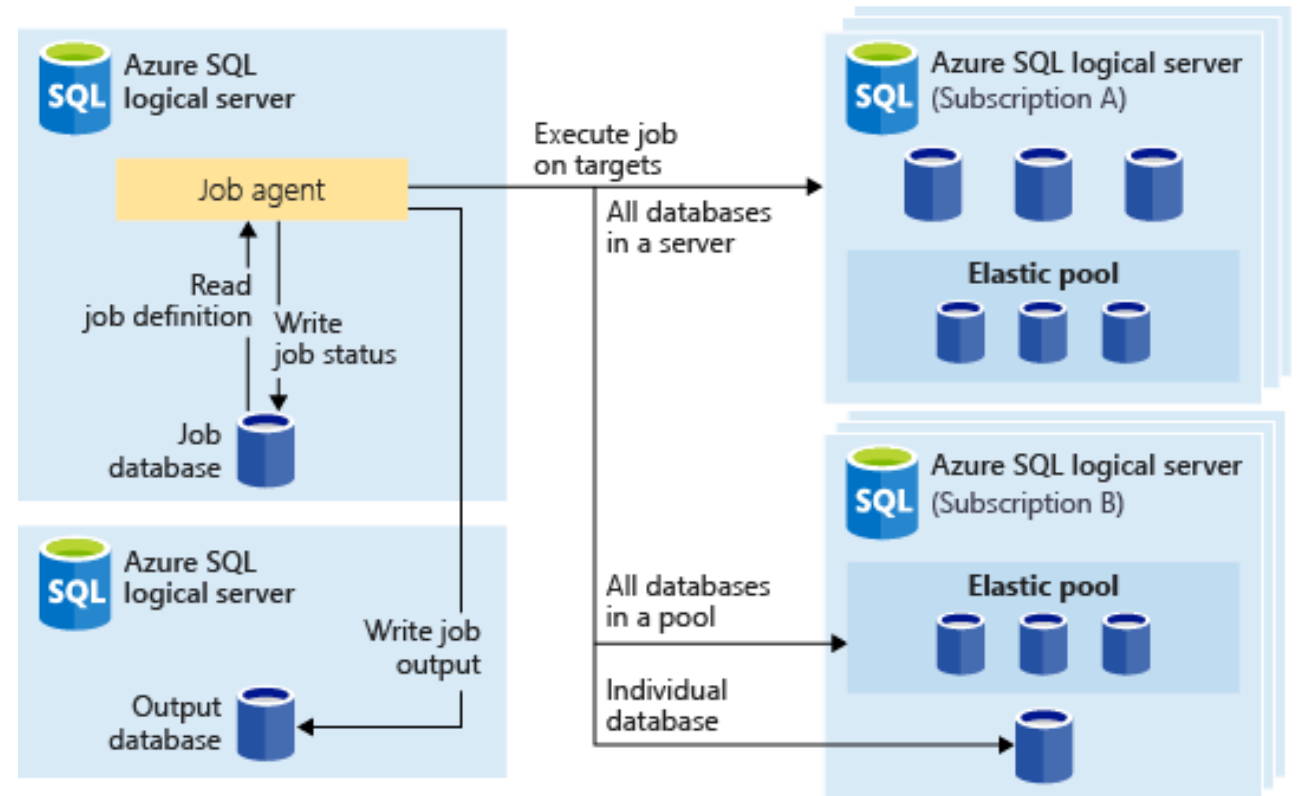
Update statistics as is on premises.



Support for running DBCC CHECKDB.

# What are Elastic Database Jobs?

Elastic Database Jobs provide the ability to run one or more T-SQL scripts in parallel, across a large number of databases, on a schedule or on-demand.



# Why use Elastic Jobs?

## Manage many databases

- Easily do schema changes, credentials management, reference data updates, performance data collection or tenant (customer) telemetry collection.
- Schedule administrative tasks for example: Index Maintenance.

## Collect data for reporting

- Aggregate data from a collection of Azure SQL Databases into a single destination table.

## Reduce Overhead

- No need to connect to each DB separately.
- Scripts are executed against a group of databases.

## Flexibility

- Define custom groups of Azure SQL Databases, and define schedules for running a job.



# Elastic Job Components

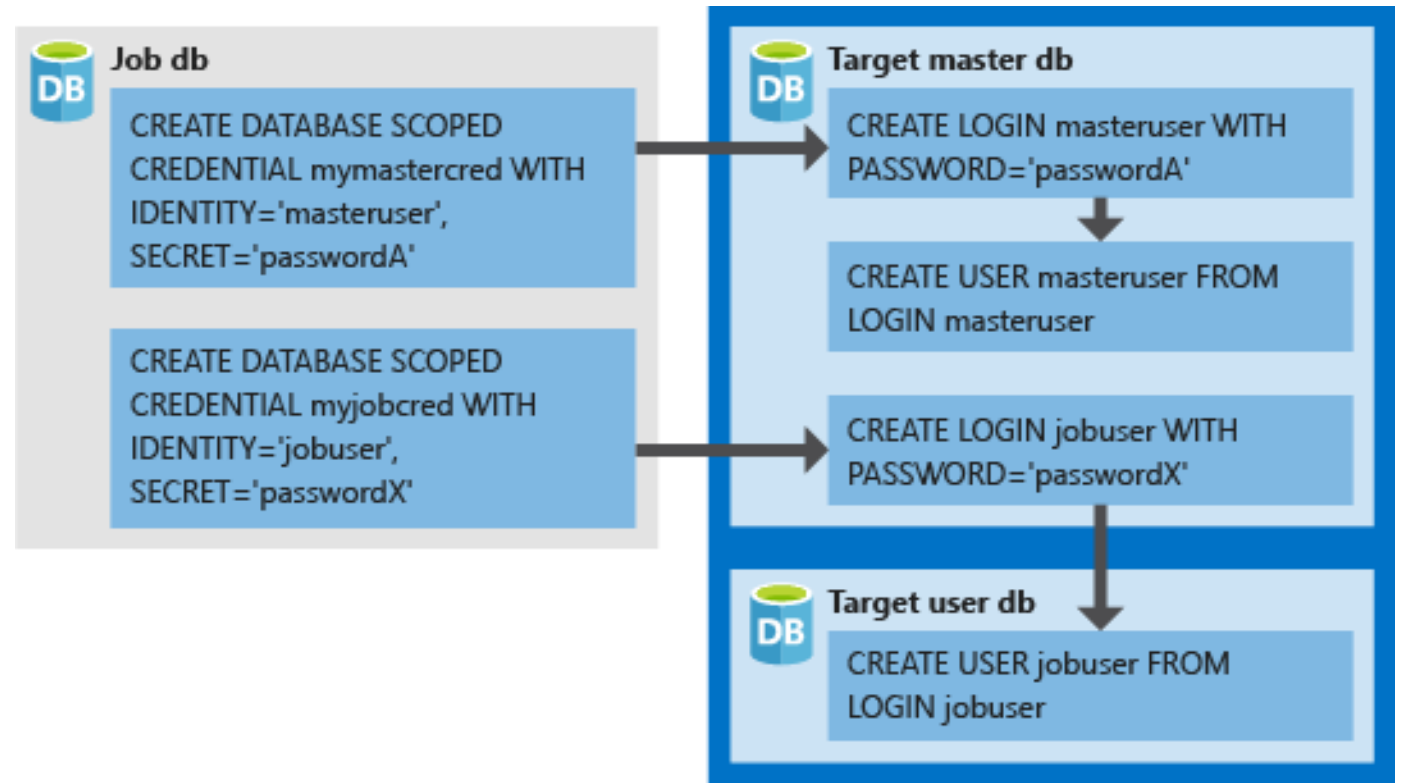
Component	Description
Elastic Job Agent	The Azure resource you create to run and manage Jobs.
Job Database	An Azure SQL database the job agent uses to store job related data, job definitions, etc.
Target Group	The set of servers, pools, databases, and shard maps to run a job against.
Job	A job is a unit of work that is comprised of one or more job steps. Job steps specify the T-SQL script to run, as well as other details required to execute the script.

# Credentials for running jobs

Database Scoped  
Credentials

Used to connect to  
master database

Create a user in every  
database.



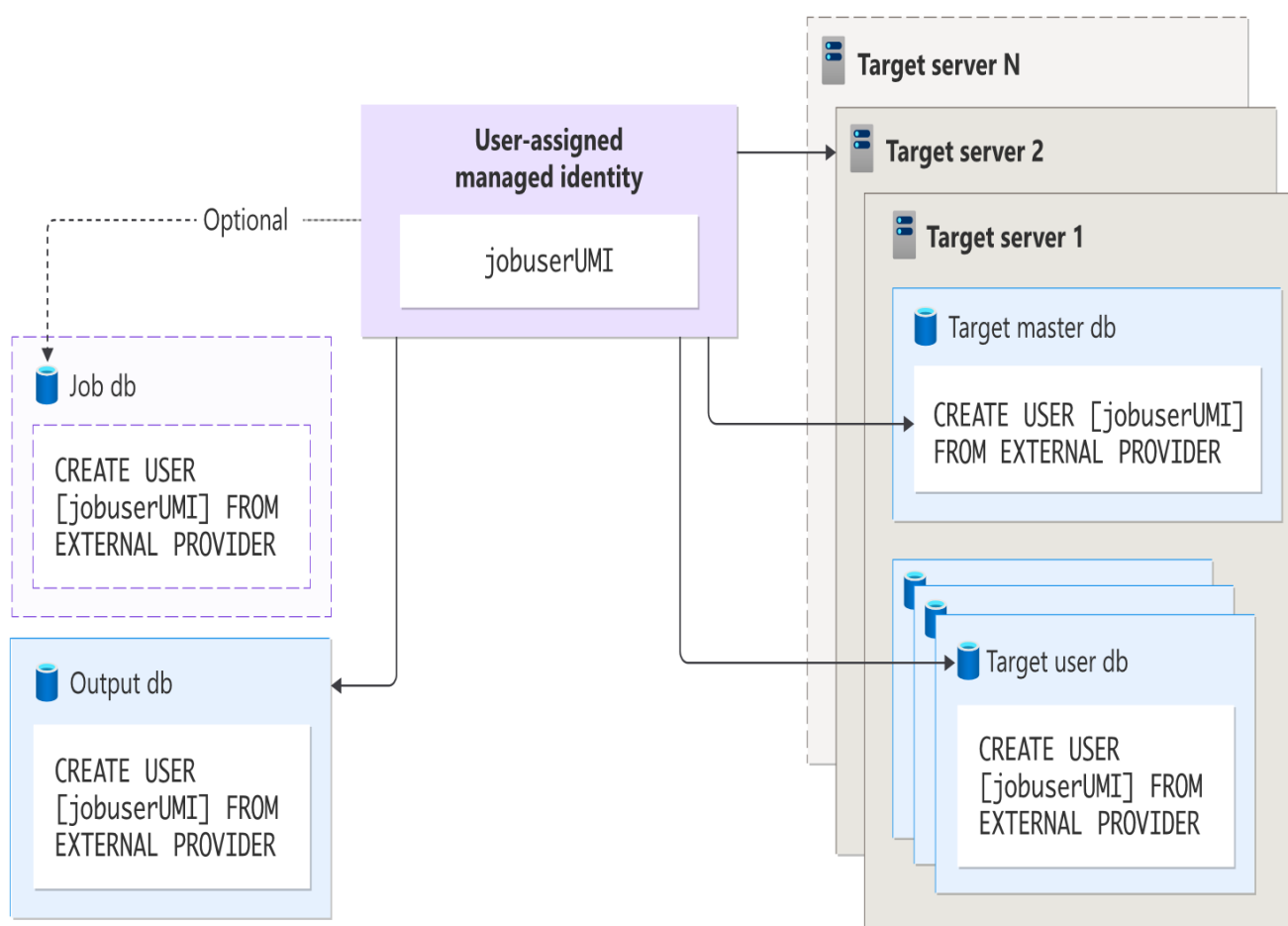
# General availability: Elastic Jobs in Azure SQL Database

Announced in April 2024 and includes new features

Main new capabilities added in the General Availability release include:

- Microsoft Entra ID (formerly Azure Active Directory) support
- Service-managed Private Link support.
- Integration with Azure Alerts for job execution status
- Easily scale Job Agent's tier to connect to more targets concurrently.
- View and monitor your Jobs through enhanced Portal

# Authentication via user-assigned managed identity (UMI)



Central administration of authentication and permissions.

Uses Microsoft Entra and certificate-based authentication

Entra ID authentication is recommended over Database Scoped Credentials

# Demonstration

## Setting up an Elastic Agent Service

- Create an Elastic Agent Service Job to perform index and statistics maintenance



# Elastic Database Jobs

Create and manage an elastic database job.



# Scheduling Jobs



Microsoft Azure SQL Database does not support SQL Server Agent.



Instead, use Azure Automation or Elastic jobs or use SQL Server Agent from a Linked server.

# Using SQL Server Agent



Create a linked server to the Azure Database.



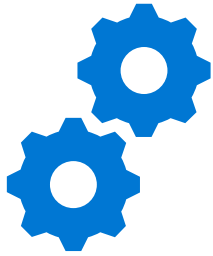
Schedule the job from your on-premises or Azure VM SQL Server by using the linked server.



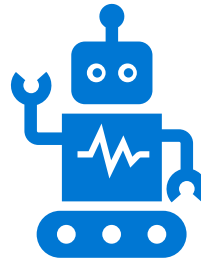
# Azure Automation

Microsoft Azure Automation provides a way for users to automate the manual, long-running, error-prone, and frequently repeated tasks that are commonly performed in a cloud and enterprise environment.

# Azure Automation - Runbook



Automating processes with runbooks.



Runbook is a set of tasks that perform some automated process in Azure Automation.



Based on Windows PowerShell/  
Windows PowerShell Workflow.

# Azure Automation vs. SQL Server Agent Job

Azure Automation	SQL Server Agent Job
Create an Azure Automation Account	Create an SQL Server Agent Job
Create a runbook	Create a Job Step
Test the runbook	Start Job at Step
Publish the runbook	Save the job
Schedule the runbook	Schedule the SQL Server Agent Job
View jobs of the runbook	View History

# Demonstration

Scheduling jobs using Azure Automation



Questions?



# Knowledge Check

True or False; Index maintenance still needs to be done by the DBA?

True or False; SQL Server Jobs are scheduled as in on premises using SQL Server Agent for Azure SQL database?

Why should you use Elastic Jobs. Give some examples?

Questions?



# Knowledge Check

Read Scale-Out feature is available in which Service Tiers?

How many replicas are enabled to load balance read-only query workloads?

How do you connect to a read-only replica?



# Module Summary

Various Tools to  
Manage Azure  
SQL Database

Scaling Azure SQL  
Databases Up and  
Down

Maintenance and  
Scheduling Jobs in  
Azure SQL Databas

