Database maintenance with Azure SQL Elastic Jobs (GA)

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Slide and demo: https://bit.ly/3TYanVW

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Agenda

- Azure SQL Database maintenance tasks
  - Required activities
  - Methods
  - Azure SQL Elastic Jobs (v2 ☺)

The starting point

- Azure SQL Database hasn't got a native scheduling service like SQL Agent of the on-premise instances

- When a database(s) is deployed in Azure SQL Database, possible solutions to perform maintenance activities must be studied!

Required activities for Azure SQL DB maintenance

- Is database maintenance still an important factor even for Azure SQL Database?
  - **Yes, it is**!
  - Azure SQL Database is a PaaS solution, but Microsoft is responsible for the **infrastructure** and **backup management**, nothing else
  - Logical corruption checks, Index and Statistics maintenance and so on are under the DBA responsibility

Backups

Backups

- Azure SQL Database automatically creates database backups
  - Full backups every week
  - Differential backups every 12 hours
  - Transaction log backups every 5-10 minutes
- Backups are stored in read-access geo-redundant storage replicated to a paired data center

Backups can be used for..

- Restore
  - Existing database to a point-in-time
  - Deleted database to the time it was deleted
  - Database to another geographical region
  - Database from a specific long-term backup
  - https://bit.ly/34Y1IY2

Backups retention

- All Azure SQL databases have a default backup retention period of **7** days

- Backup retention period can be changed up to **35** days (at 7-days chunks)

- Backups of deleted databases will be kept according to the retention period fixed

- https://bit.ly/2SpEOq0

Backups long-term retention (LTR)

- If you want to keep your backups for a period of time longer than the maximum allowed, you can evaluate the long-term backup retention service

- By using long-term retention, you can store specific backups up to **10** years

- https://bit.ly/2EOPVkr

Maintenance activities

Maintenance activities

- The maintenance activities to undertake, when database solutions are implemented in Azure SQL, are:
  - Integrity check
  - Index maintenance
  - Statistics update

General methods for DB maintenance activities

- The typical methods to do maintenance activities are:
  - Database Maintenance Plans
  - Ola Hallengren's Maintenance Solution Suite
  - Use of DBATools with PowerShell

- On-premise maintenance activities are scheduled with:
  - SQL Agent
  - Windows Scheduled Task
  - Cron in Linux environment
  - Third parties' tools

# Methods for Azure SQL DB maintenance activities

- In Azure SQL Database we have several methods to do maintenance operations, this is the complete list:
  - Linked Server
  - Database Maintenance Plan
  - Azure Automation Services
  - Azure SQL Database Elastic Jobs
- It is advised to use the stored procedures of the suite **SQL Server Maintenance Solution** done by Ola Hallengren
  - https://ola.hallengren.com

Azure SQL Database Elastic Jobs

Now the most important part of the session is going to start

Azure SQL Database Elastic Jobs
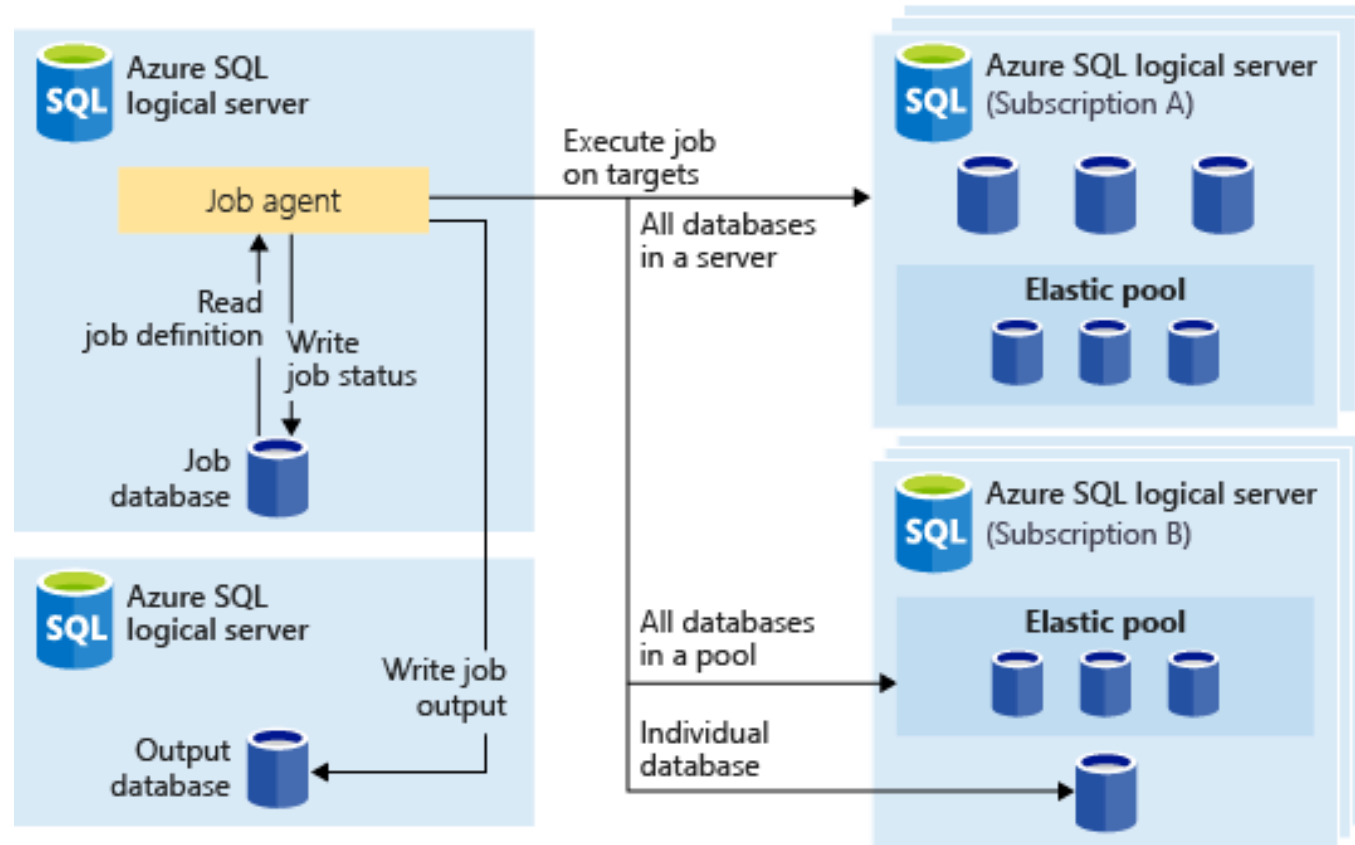
Azure SQL Database Elastic Jobs

- Azure SQL Database Elastic Jobs is the **most complete** solution for **automation** of scheduled activities to be performed on Azure SQL Database

- Starting from April 11th , 2024 it's in **general availability**!

- It runs jobs whose definitions are stored in a "Job database"

- Jobs are T-SQL scripts scheduled to act for a group of Azure SQL databases

When to use Elastic Jobs

- Automate **management tasks** and **schedule** them
- Configure jobs to execute across a **collection** of databases on a recurring basis, such as during off-peak hours
  - This is a significant differentiation from SQL Agent, which cannot dynamically enumerate the target databases, especially in SaaS customer scenarios where databases are added/deleted dynamically
- Collect data for reporting
- Data movement

Azure SQL Database Elastic Jobs

- Main new capabilities added, from November 2023 (refresh) to GA:

  - Microsoft Entra ID 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
  - Dynamic enumeration target databases in target servers and elastic pools
  - Jobs can be composed of multiple steps to customize the execution sequence
  - All functionalities can be accessed through portal, PowerShell, T-SQL and REST APIs
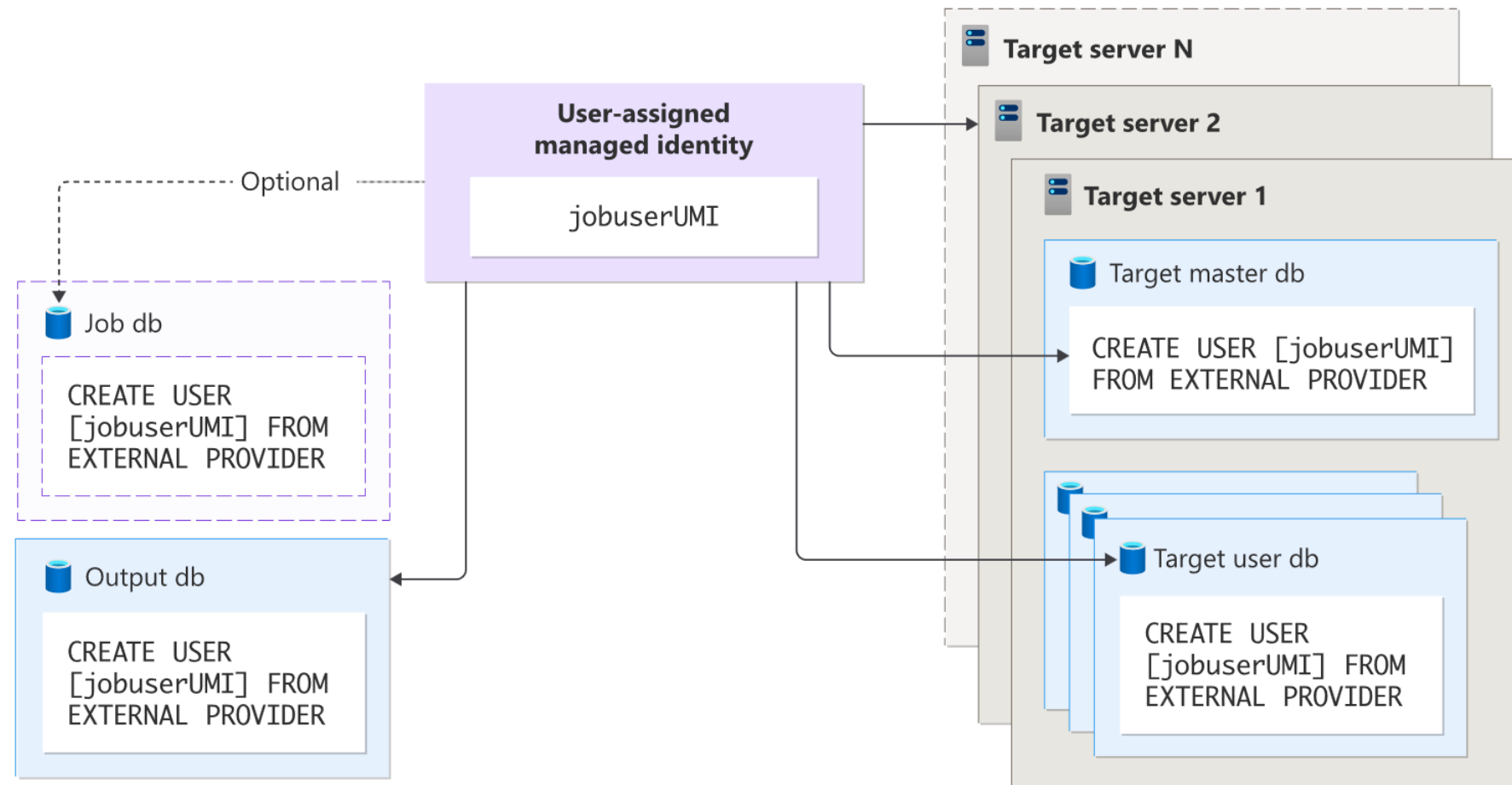 - Azure portal has also been significantly enhanced

The job database

- Azure SQL Database Elastic Jobs requires an empty database with service level of "**S1**" or higher hosted in an Azure SQL Database

  - This DB is also known as "job database" and it's like the MSDB for on-premises instance

  - The "job database" is used for defining jobs and tracking the status and history of job executions
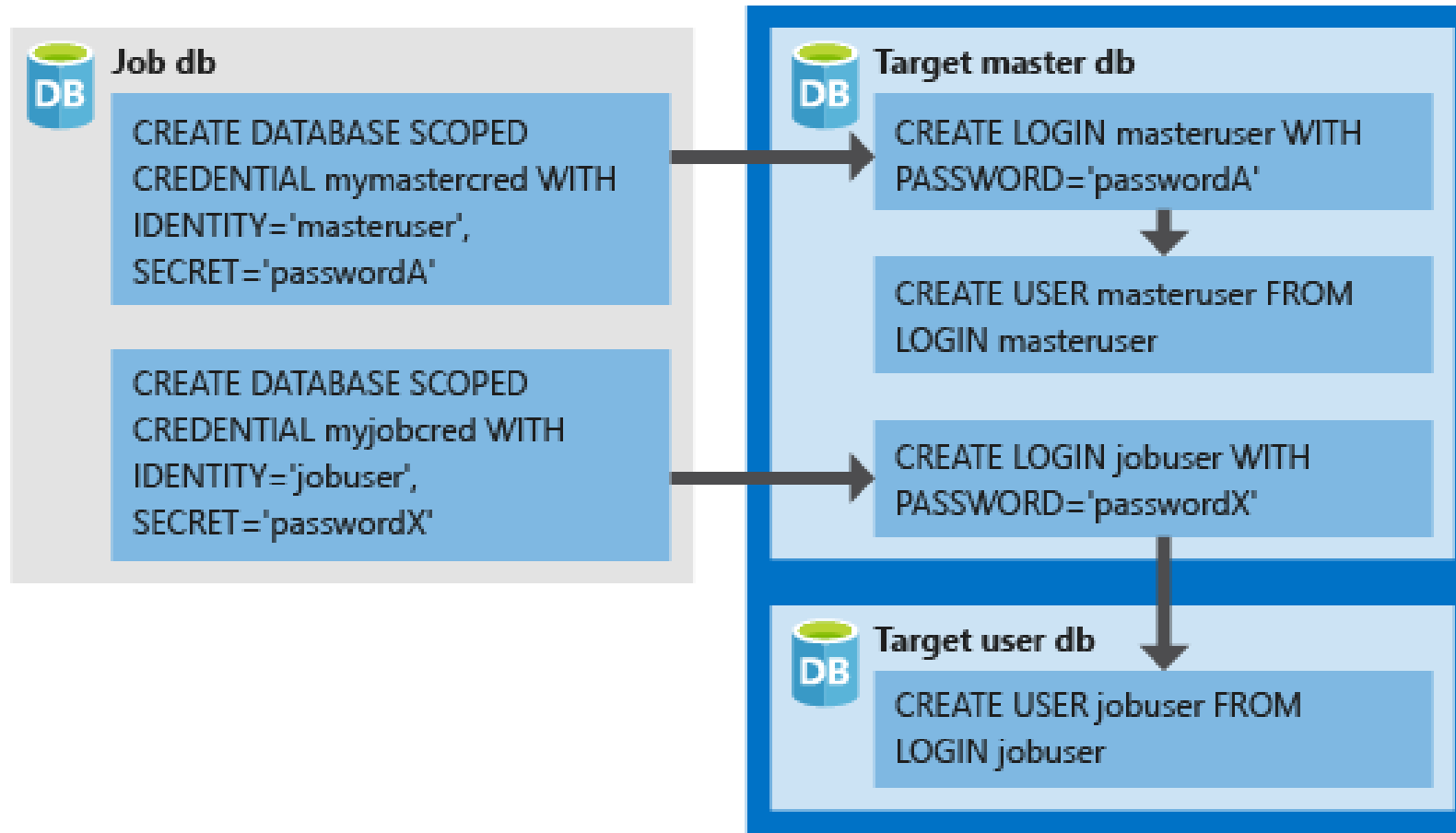
Elastic jobs authentication

- The elastic job agent can connect to the server(s)/database(s) specified by the target group via two authentication options:

  - Microsoft Entra (formerly Azure Active Directory) authentication with a user-assigned managed identity (UMI) – Recommended option

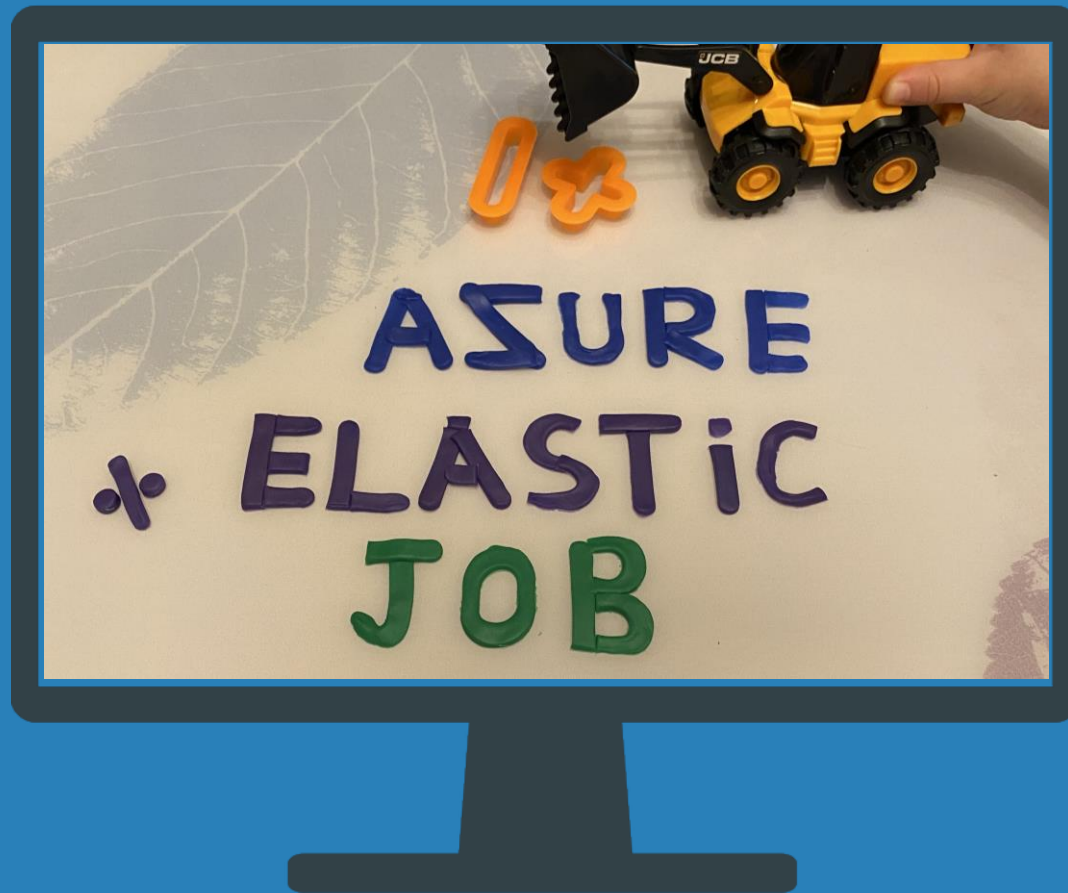 - Database-scoped credentials (previously, this was the only method of authentication)

Microsoft Entra authentication with UMI

Authentication via database-scoped credentials

Job db

CREATE DATABASE SCOPED
CREDENTIAL mymastercred WITH
IDENTITY='masteruser',
SECRET='passwordA'

CREATE DATABASE SCOPED
CREDENTIAL myjobcred WITH
IDENTITY='jobuser',
SECRET='passwordX'

Target master db

CREATE LOGIN masteruser WITH
PASSWORD='passwordA'

CREATE USER masteruser FROM
LOGIN masteruser

CREATE LOGIN jobuser WITH
PASSWORD='passwordX'

Target user db

CREATE USER jobuser FROM
LOGIN jobuser

DEMO

Pricing

- Billing for Job agents has started at GA time, April 11th , 2024
- Billing cards in the Azure portal page will show estimated cost based on the provisioned job agent tier
  - Billing for the job agents in national clouds are expected to start a little later, depending on the billing pipeline deployment in those regions
- Job Agents will be billed based on its selected capacity tier of the Job Agent

Limitations and availability

- Azure SQL Team is actively working to remove as many limitations as possible ☺

- Anyway, you can refer to the documentation for a list of known limitations, here: https://aka.ms/EJ-limitations

- Elastic Jobs is available in all the regions that Azure SQL Database is available

Summary and Resources

Summary

- Database maintenance is an important factor also for Azure SQL
- Azure SQL Database is a PaaS solution, but Microsoft is responsible for the infrastructure and backup management, nothing else
  - Database maintenance is under the DBA responsibility
- Elastic Jobs is a fully integrated Azure SQL Database service that allows you to automate and manage administrative tasks across multiple SQL databases in a secure and scalable way
- Jobs can be run on a schedule or on-demand, targeting any tier of Azure SQL Database

Resources

- [Automate management tasks in Azure SQL](#)

- [Elastic jobs in Azure SQL Database](#)

- [Create, configure, and manage elastic jobs](#)

- [Troubleshooting common issues with Elastic Jobs in Azure SQL Database](#)

- Automating Azure SQL Database maintenance tasks
  - 1° Part: https://bit.ly/3clqzJE
  - 2° Part: https://bit.ly/2wOpJG6
  - 3° Part: https://bit.ly/3VYBDGC

Q&A

Thanks!