



# What's new in Azure SQL Managed Instance



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Product Managers, Azure Data, Microsoft

A stylized graphic of a grill with orange flames and smoke. The text "Data Grillen" and "May 2024" is written on the grill's body in blue.

Data Grillen  
May 2024

# How it started

Oct 1st, 2018  
General Availability

# SQL MI release documentary



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## How it started

Oct 1st, 2018  
General Availability

## How it's going

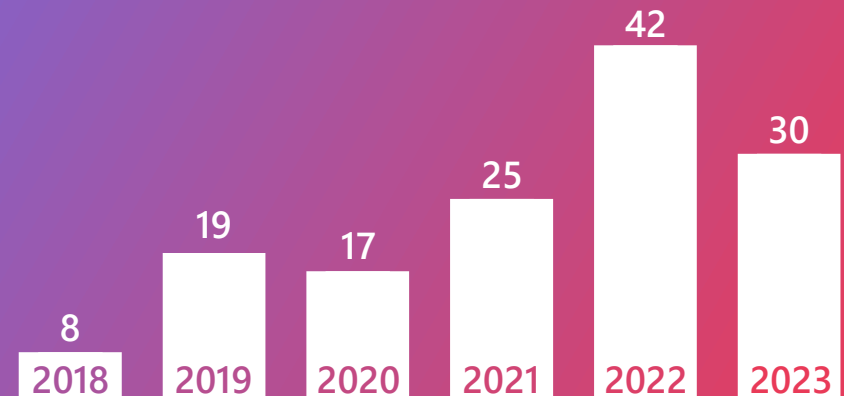
Year 2023  
30+ product updates

## How it started

Oct 1st, 2018  
General Availability

## How it's going

Year 2023  
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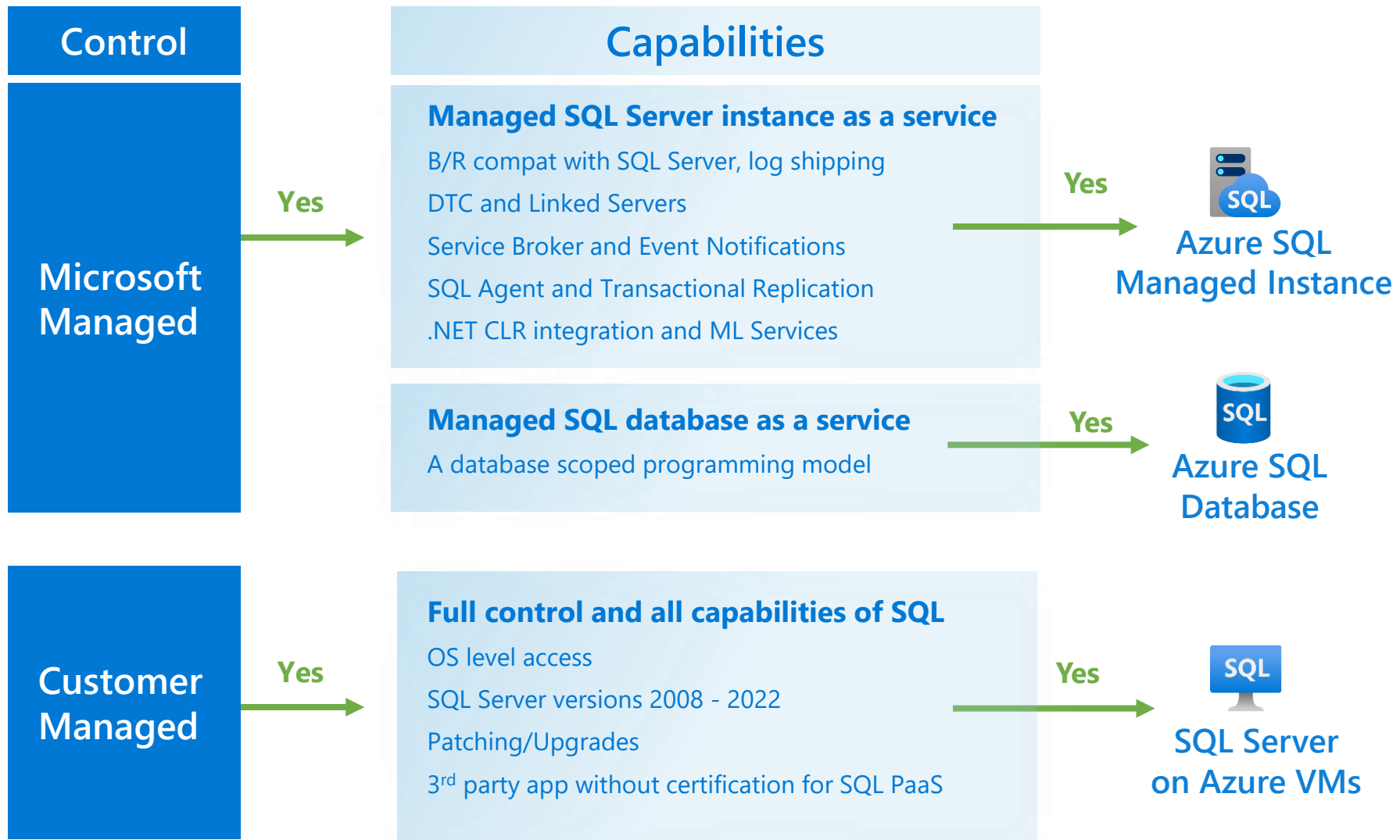
# How it's going

Year 2023  
30+ product updates



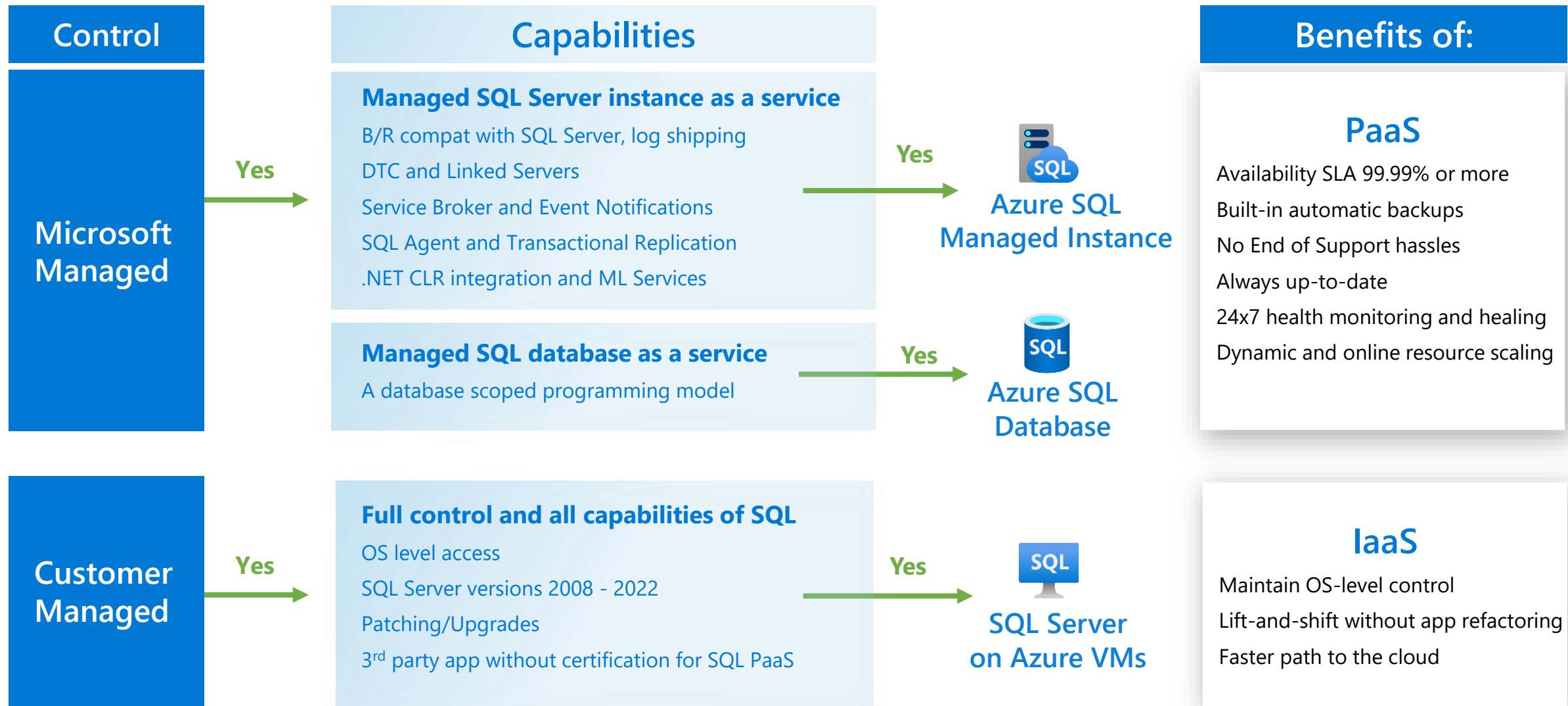
[aka.ms/sqlmi-new](https://aka.ms/sqlmi-new)

# Choosing the right Azure SQL offering





# Choosing the right Azure SQL offering



# SQL MI Service tiers

## General Purpose

**Remote** storage.

Utilizes a **standby** node for HA.

Great for **most workloads**.

## Business Critical

**Local SSD** storage.

Utilizes several **active** replicas for HA.

Great for workloads that require **low latency, fast recovery, or readable secondary**.

# SQL MI Hardware configurations

## Standard-series (Gen 5)

Up to 80 vCores.

**5.1GB of RAM per vCore.**

408 GB maximum RAM

BC up to 4 TB and GP up to 16 TB  
of reserved storage.

## Premium-series

Up to 128 vCores.

**7 GBs of RAM per vCore.**

560 GB maximum RAM.

Up to **16TB** of reserved storage.

Up to 32TB with Next-gen GP.

## Premium-series memory optimized

Up to 128 vCores.

**13.6 GBs of RAM per vCore.**

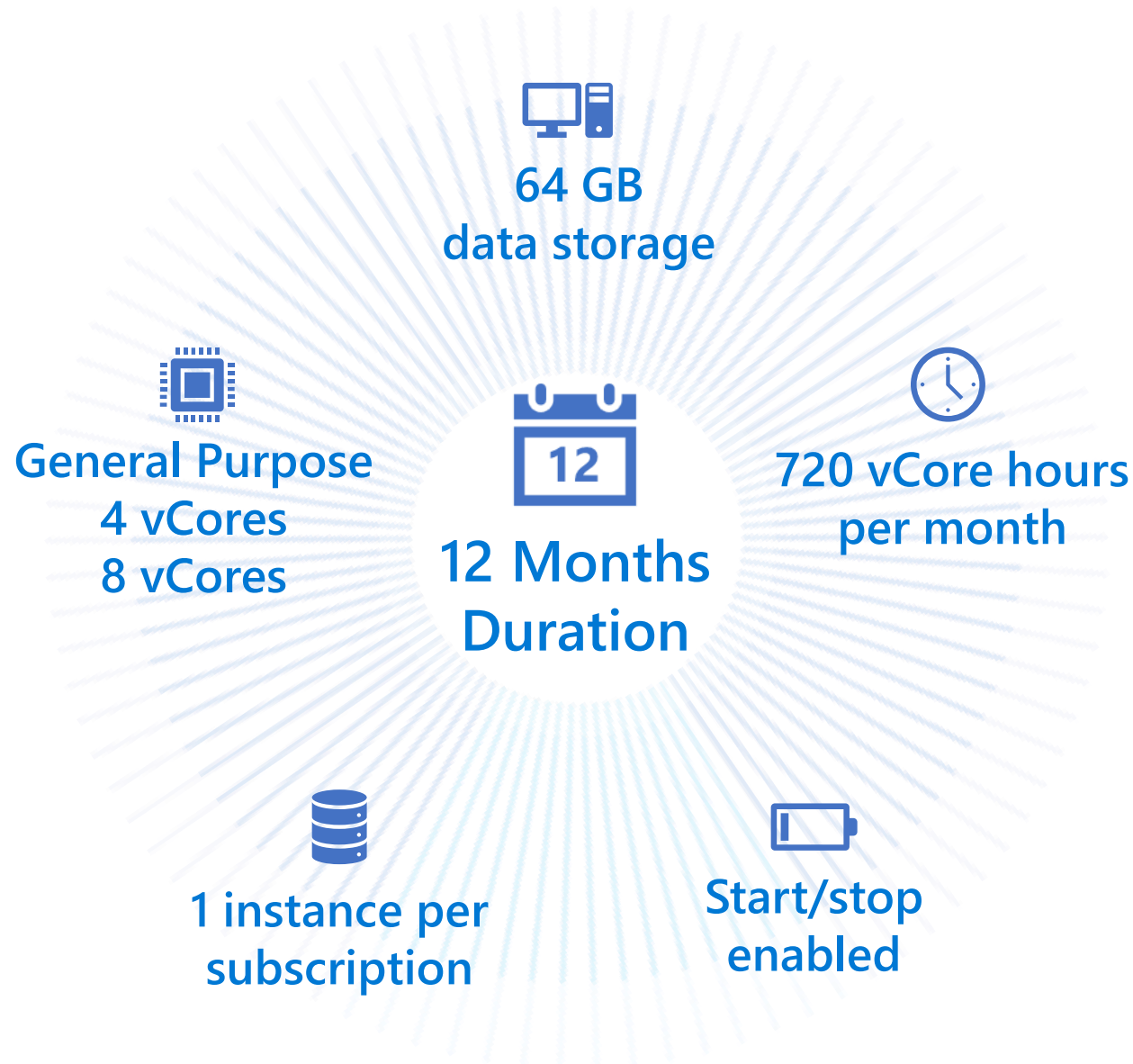
870 GB maximum RAM.

Up to **16TB** of reserved storage.

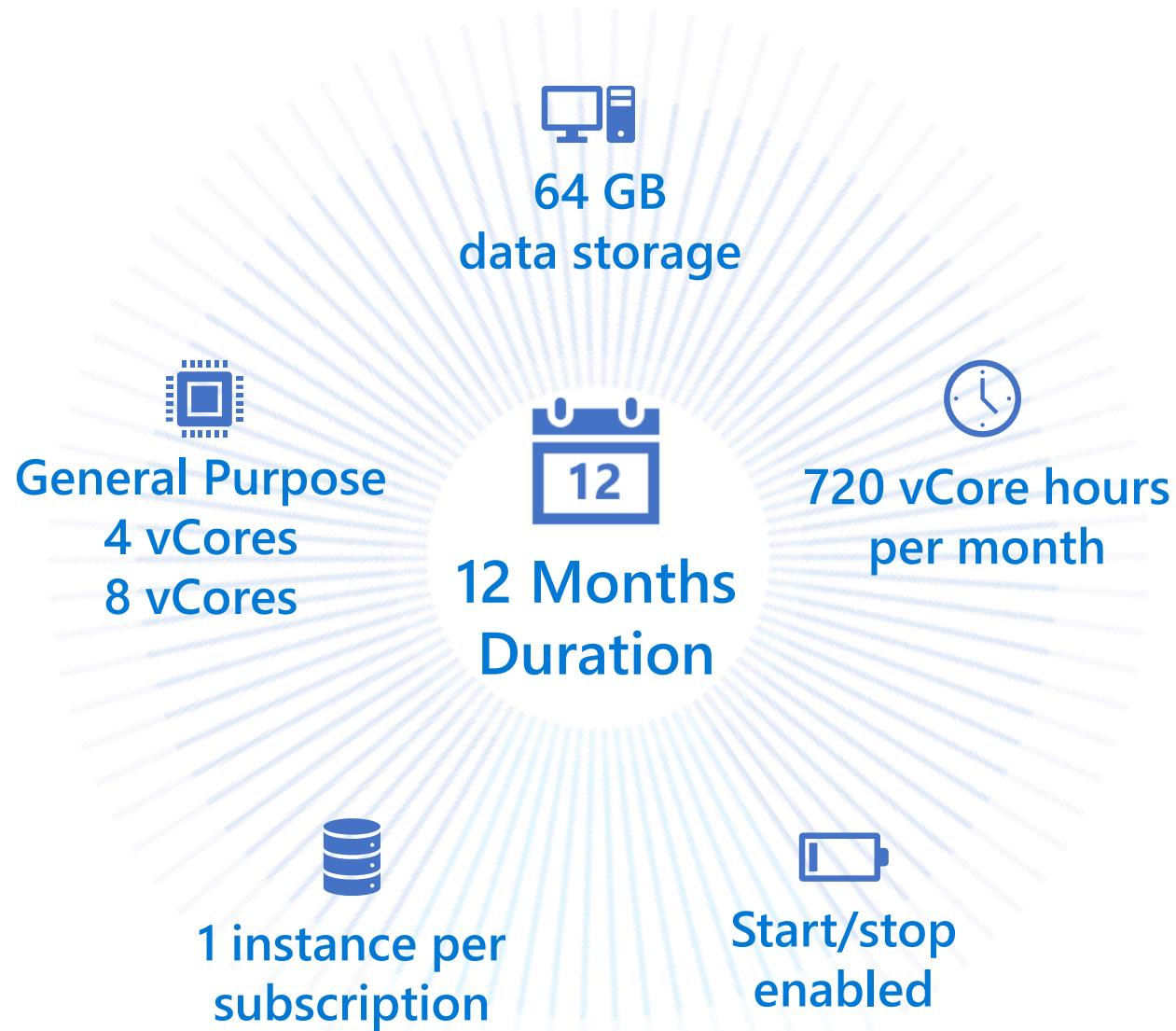
Up to 32TB with Next-gen GP.

C'mon! The announced topic was  
**What's new?**

# Free offer for Azure SQL Managed Instance



# Free offer for Azure SQL Managed Instance



## Public preview

720 vCore free hours every month, **for 12 months.**

**Example:** test from Mon to Fri, 9 to 5, for an entire year.

One 4 or 8 vCore SQL MI with 64GB storage per subscription.

Available now for **Pay-as-you-go** and **Azure in CSP** subscriptions.

# Instance Pools refresh

SQL MI 2 vCores	SQL MI 2 vCores
SQL MI 2 vCores	SQL MI 2 vCores
SQL MI 4 vCores	SQL MI 2 vCores
	SQL MI 2 vCores

16-vCore SQL MI pool



## Public Preview (Refresh)

Instance pool **update**: vCores, license, HW type, FMW.

Instance **move in/out** of a pool.

**Azure Portal**: create instance pool; create pooled instance.

**Premium Hardware** (Gen8) support.

Fast instance provisioning <5 min.



# Improved price/perf & flexibility in the BC tier

96 -> 192  
Mips

For Business Critical **premium-series** hardware:

	Previously	Now
8 vCores+	1 TB	<b>2 TB</b>
16 vCores+	2 TB	<b>4 TB</b>
24 vCores+	2 TB	<b>5.5 TB</b>

For Business Critical **premium-series memory optimized** hardware:

	Previously	Now
8 vCores+	1 TB	<b>2 TB</b>
16 vCores+	2 TB	<b>4 TB</b>
24 vCores+	2 TB	<b>5.5 TB</b>
32 vCores+	4 TB	<b>8 TB</b>
48 vCores+	4 TB	<b>12 TB</b>

Hardware generation ⓘ

- ☐ Standard-series (Gen 5) - Intel Broadwell, 5,1 GB RAM/vCore
- ☒ Premium-series - Intel Ice Lake, 7 GB RAM/vCore, up to 560 GB
- ☐ Premium-series - memory optimized - Intel Ice Lake, 13,6 GB RAM/vCore, up to 870,4 GB

vCores ⓘ



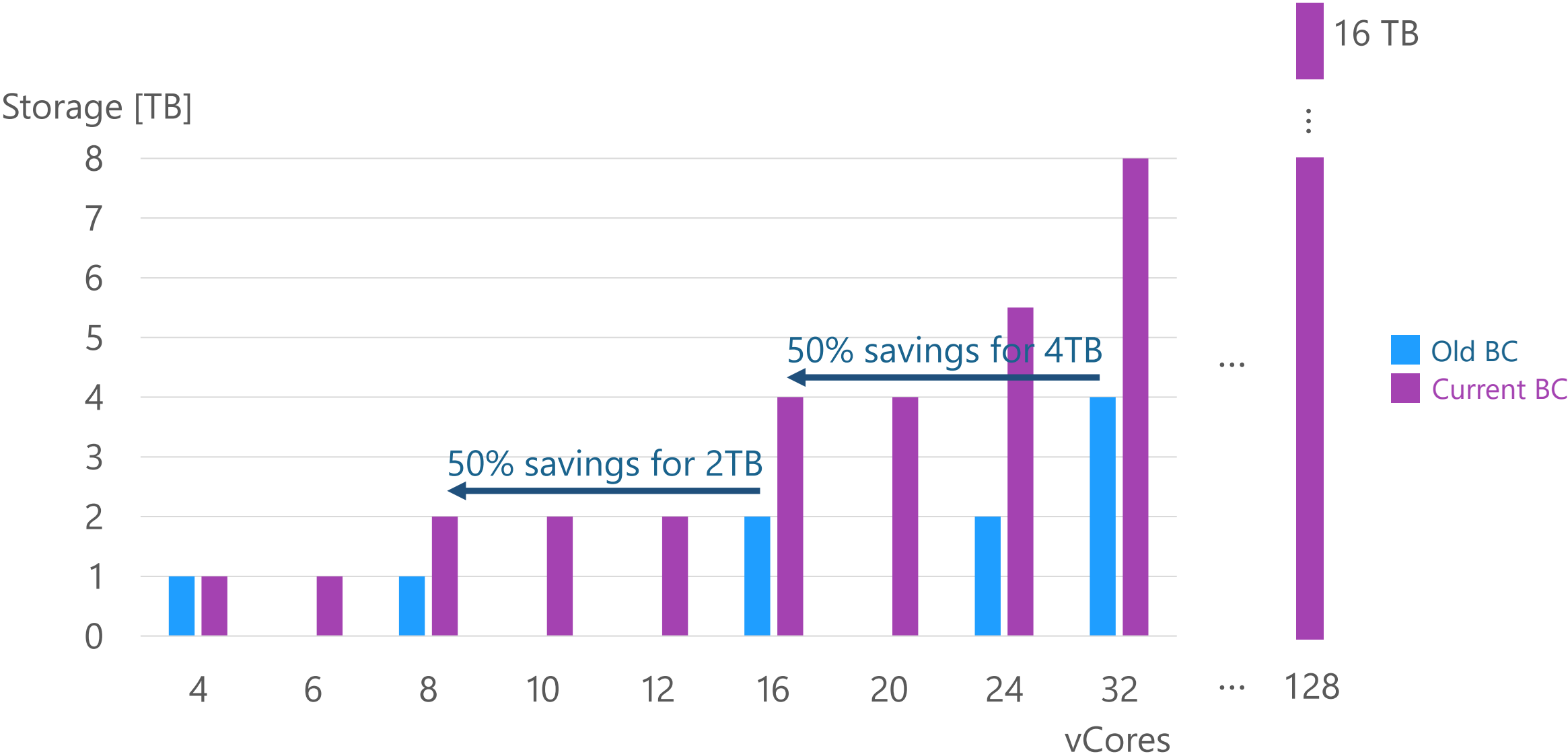
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vCores ⓘ



# Business Critical: more flexibility, less costs



# Next-Gen General Purpose



## Storage model per instance

No longer per file.

**Aligned** with all  
other SQL offerings.

5x

## 500 user databases

**5x** more than  
the current limit of  
100 user databases.



## Improved storage performance

**2x** max data IOPS and  
improving.

**60%** increased  
max log rate.

**2x** better latency.

Max data throughput  
**1200MB/s**.

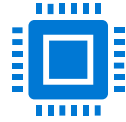
2x

## Increased max storage size

**2x** max storage size.

This means up to **32TB**  
of reserved storage.

# Next-Gen General Purpose



## vCore flexibility

2x more click stops.

Now you can choose 4,  
6, 8, 10, 12, 16, 20... 128



## IOPS flexibility

**Slider** for adding more  
IOPS to your instance.

**And more!**

# November 2022 Feature Wave

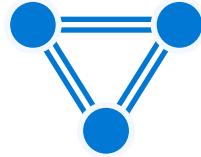


## Start/Stop for GP

Have SQL MIs work only when needed.

Manual or scheduled start/stop actions.

**Cost optimization.**



## Zone Redundancy for BC and GP

Compute nodes spread across **three AZs**.

Data storage automatically configured to ZRS.

GA for BC and Public Preview for GP.



## Distributed transactions

With **MS DTC support**, run distributed transactions between MIs, SQL Servers, and custom applications hosted anywhere.



## Simplified networking

Isolation of service traffic reduces misconfiguration issues in networking.

**Fewer mandated network rules** allow even stronger security posture.

# Link feature for Azure SQL Managed Instance



## GA

Create MI link from SQL Server 2016, 2019, 2022 to SQL MI.

Use **read-only database replica** on SQL MI, for unlimited amount of time.

Online database migration from SQL Server to SQL MI, with minimal downtime.



## Public preview

Create MI link **from SQL MI to SQL Server 2022**.

MI link failover between SQL Server 2022 and SQL MI (orchestrated **externally** via tooling).

# Database copy and move

## GA

Perform **online** database copy or move **across SQL MIs**.

User controls when the operation finishes.

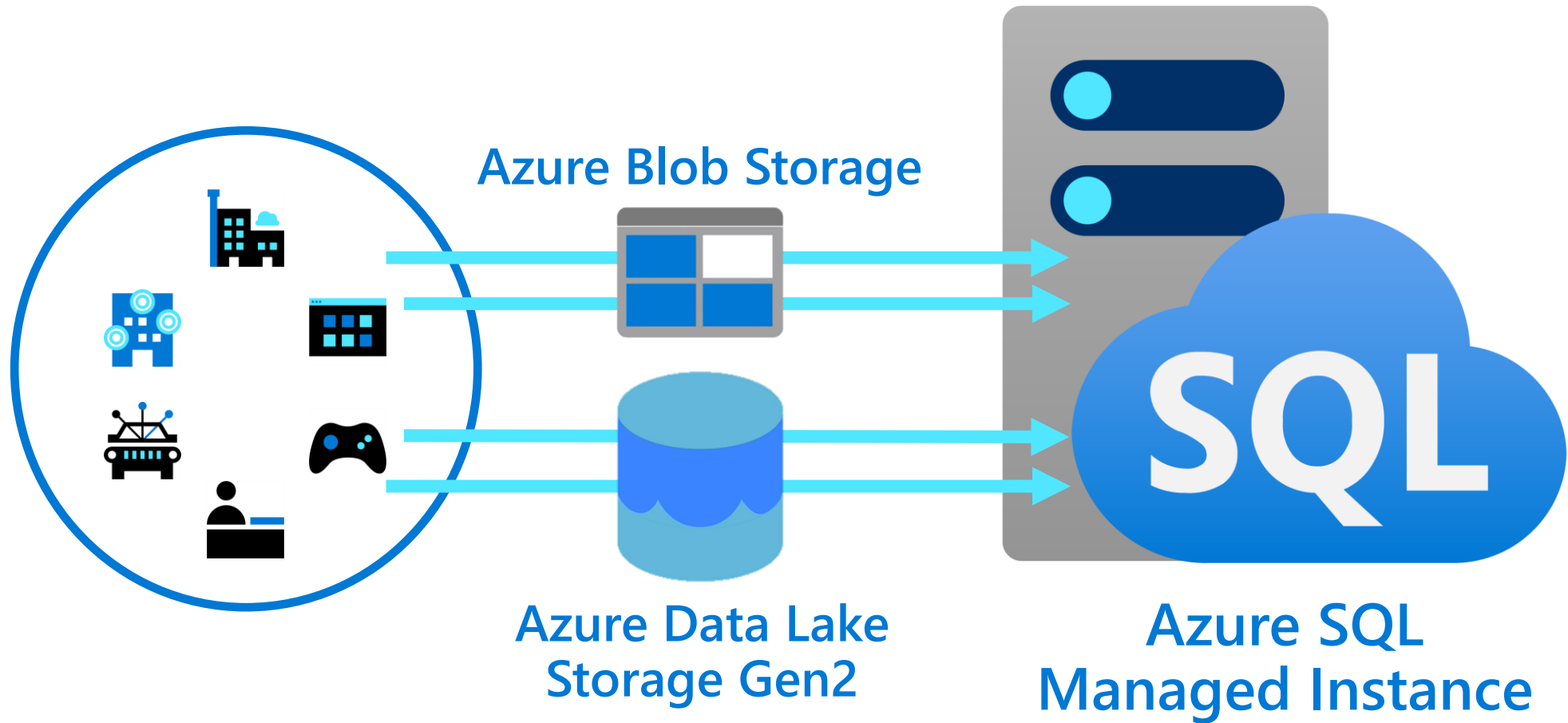
Support for **cross subscription** operations.

Move operation guarantees no data loss during the cutover.

[aka.ms/sqlmi-dbcopy](https://aka.ms/sqlmi-dbcopy)



# Data Virtualization with CETAS (export capability)



# Data Virtualization with CETAS (export capability)

## Formats

CSV  
Parquet  
JSON

## T-SQL

External tables  
Views  
OPENROWSET

## About

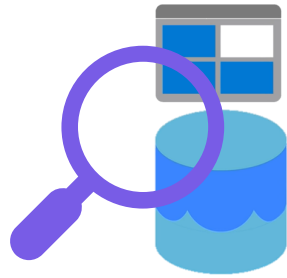
Evolution of PolyBase  
No installations  
Better performance  
Predicate pushdown  
Partition elimination

# Data Virtualization with CETAS (export capability)

Storage  
reduction



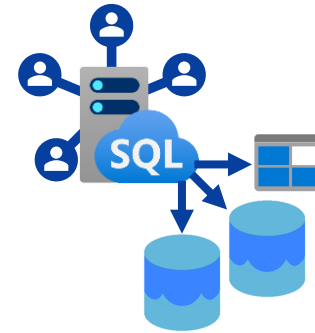
Data  
exploration



Relational  
abstraction



Single  
source of truth



Remote  
data import



# Ledger

Store and protect **sensitive data** in a tamper-evident and cryptographically verifiable way.

Familiar T-SQL interface.

Ideal for scenarios such as **financial transactions, healthcare records, audit logs**, etc.

Cryptographically **attest to 3rd parties**, such as auditors or other business parties, that your data is trusted and isn't tampered with.

[aka.ms/sqlmi-ledger](https://aka.ms/sqlmi-ledger)

# Reserved Capacity for Premium-series

## Reserved Instances for

Premium-series & Memory Optimized Premium-series hardware (and Gen5 Standard series, ofc).

One of the most effective methods to **optimize costs** when running your SQL workloads on SQL MI.

By purchasing 1-year or 3-years Reserved Instances (RI) you can reduce your compute costs **up to 55%**.

[aka.ms/sqlmi-ri](https://aka.ms/sqlmi-ri)

# New SQL license benefits

Old

## AHB

Azure Hybrid Benefit enables you to use SQL licenses purchased through SA for vCores in Azure SQL Managed Instance.

New

## Failover rights license benefit - FoG

**License-free** Geo-DR passive replica.

You **can't run RO** workload on license free geo-secondary.

You still pay for the vCores and reserved storage.

New

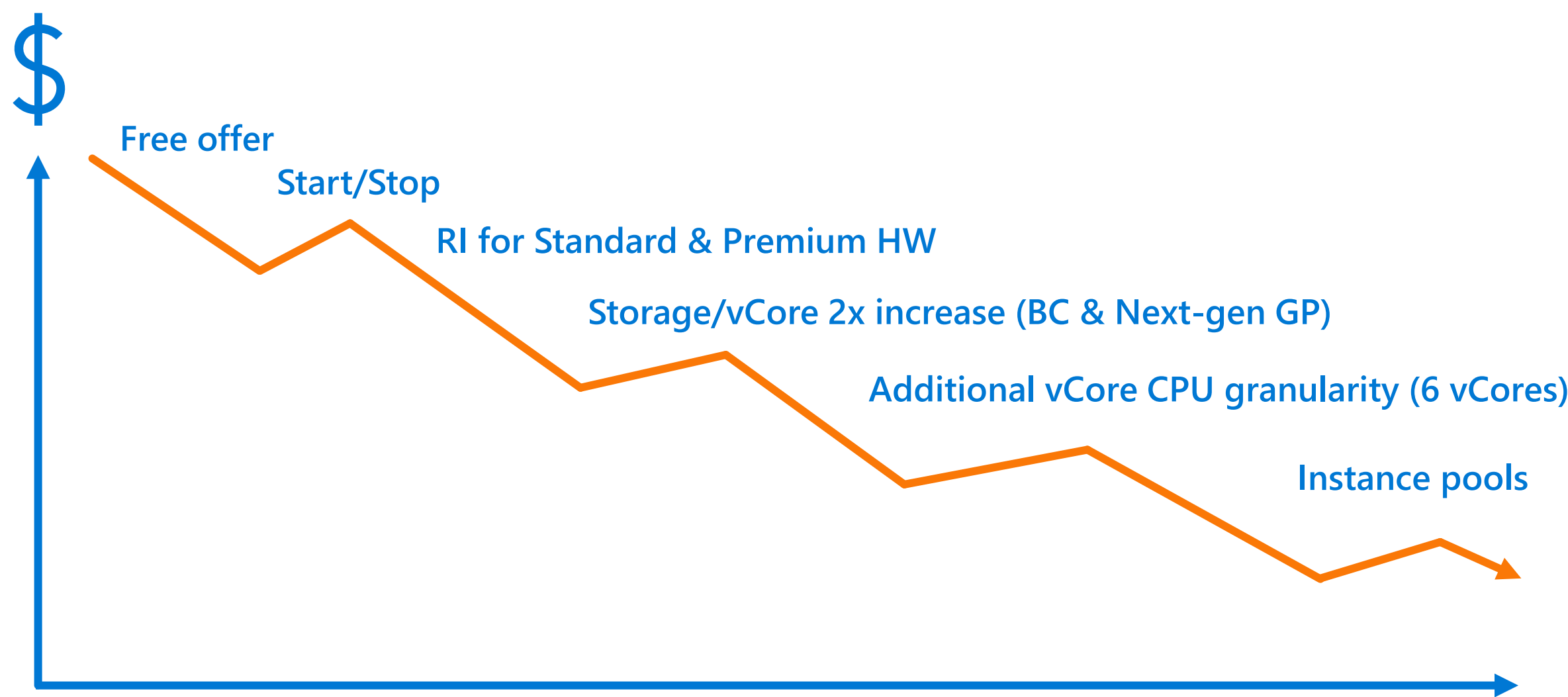
## Hybrid Failover rights license benefit - MI link

License-free SQL MI that's stand-by passive replica in a hybrid link between SQL MI and SQL Server.

You **can't run RO** workload on license-free stand-by SQL MI replica.

You still pay for the vCores and reserved storage.

# Reducing costs with latest features





# Private Endpoints for Azure SQL Managed Instance

Microsoft Azure (Preview)

Home > sqlmi01

sqlmi01 | Private endpoint connections

SQL managed instance

Search

Backups

Failover

Security

Network

Microsoft

Transparent

Private endpoint connections

SQL trust groups

✓ Approve ✗ Reject 🗑 Remove

Private Endpoint Connection

Private endpoint connections allow connections from within a Virtual Network to a private IP using the private endpoint feature. Connections using these private endpoints specified below provide access to all databases in this instance.

Search... 3 selected

CONNECTION NAME	STATE	PRIVATE ENDPOINT NAME	REQUEST/RESPONSE MESSAGE
myPEC1-ef9fd2df-978fe2d18a1b	Approved	myPEC1	Approving myPEC1
myPEC2-8950f0cd-53bcb4917028	Pending	myPEC2	

MyPEC2-8950f0cd-53bcb4917028 Pending MyPEC2

# TDS 8

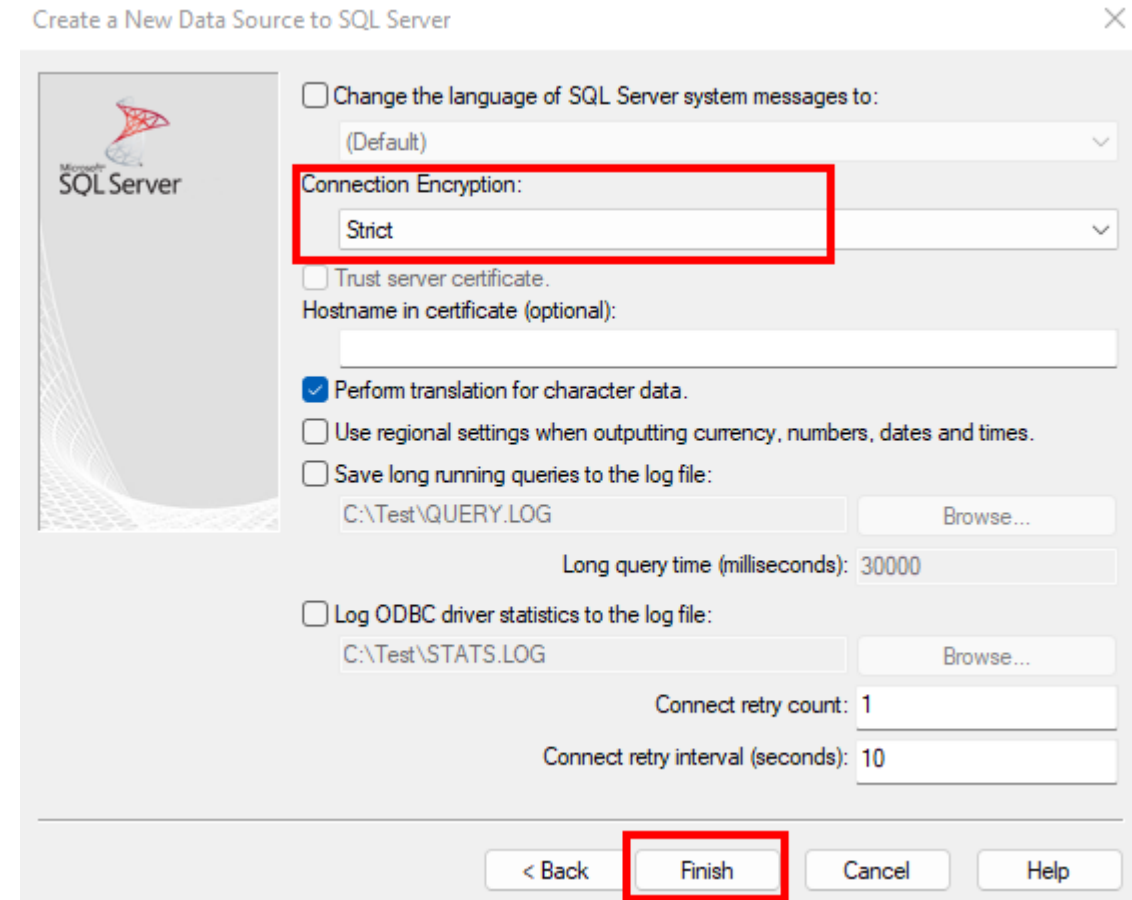
The Tabular Data Stream (TDS) protocol is an application layer protocol used by clients to connect to SQL Server. SQL Server uses Transport Layer Security (TLS) to encrypt data that is transmitted across a network between an instance of SQL Server and a client application.

TDS is a secure protocol, but in previous versions of SQL Server, encryption could be turned off or not enabled. To meet the standards of mandatory encryption while using SQL Server, an iteration of the TDS protocol was introduced: TDS 8.0.

The TLS handshake now precedes any TDS messages, wrapping the TDS session in TLS to enforce encryption, making TDS 8.0 aligned with HTTPS and other web protocols.

TDS 8 introduces compatibility with TLS 1.3

To use TDS 8.0, SQL Server 2022 (16.x) added strict as an additional connection encryption type to SQL Server drivers (Encrypt=strict). To use the strict connection encryption type, download the latest version of the .NET, ODBC, OLE DB, JDBC, PHP, and Python drivers.



Create a New Data Source to SQL Server

☐ Change the language of SQL Server system messages to: (Default)

**Connection Encryption:** Strict

☐ Trust server certificate.

Hostname in certificate (optional):

☒ Perform translation for character data.

☐ Use regional settings when outputting currency, numbers, dates and times.

☐ Save long running queries to the log file: C:\Test\QUERY.LOG Browse...

Long query time (milliseconds): 30000

☐ Log ODBC driver statistics to the log file: C:\Test\STATS.LOG Browse...

Connect retry count: 1

Connect retry interval (seconds): 10

< Back **Finish** Cancel Help

# Backup-restore compatibility with SQL Server 2022

Azure SQL MI has a full  
SQL Server 2022 storage engine  
compatibility.







New – released few days after DataGrillen 2024

## Update policy

Azure SQL Managed Instance offers the following two update policies:

**SQL Server 2022**

**Always-up-to-date**

Learn more at  
[aka.ms/sqlmi-up](https://aka.ms/sqlmi-up)

# Restore backups from AWS S3 to Azure SQL MI

The image illustrates the process of restoring a backup from AWS S3 to Azure SQL Managed Instance (MI) using SQL Server Enterprise Manager. The process is divided into two main parts: locating the backup in S3 and configuring the restore operation in SQL Server.

**Part 1: AWS S3 Console**

The AWS S3 console shows the 'TestFolder/' bucket. The 'Objects (3)' list contains three backup files: 'TestBackup\_file01.bak', 'TestBackup\_file02.bak', and 'TestBackup.bak'. The 'TestBackup.bak' file is selected (indicated by a blue checkmark and an orange arrow labeled 1). The 'Copy URL' button is highlighted (indicated by a red box and an orange arrow labeled 2).

**Part 2: SQL Server Enterprise Manager**

The 'Restore Database' dialog box is open, showing the 'General' tab. The 'Source' section is set to 'Device' (indicated by an orange arrow labeled 1). The 'Select backup devices' dialog box is open, showing the 'Backup media type' set to 'URL' (indicated by an orange arrow labeled 2) and the 'Backup media' list containing 'URL', 'S3 URL', and 'Add' (indicated by an orange arrow labeled 3). The 'Select S3 backup file location' dialog box is open, showing the 'S3 URL' field with the value 'S3://yours3bucket.endpoint/filepath.bak' (indicated by an orange arrow labeled 4) and the 'Secret Key' and 'Access Key' fields (indicated by an orange arrow labeled 5).

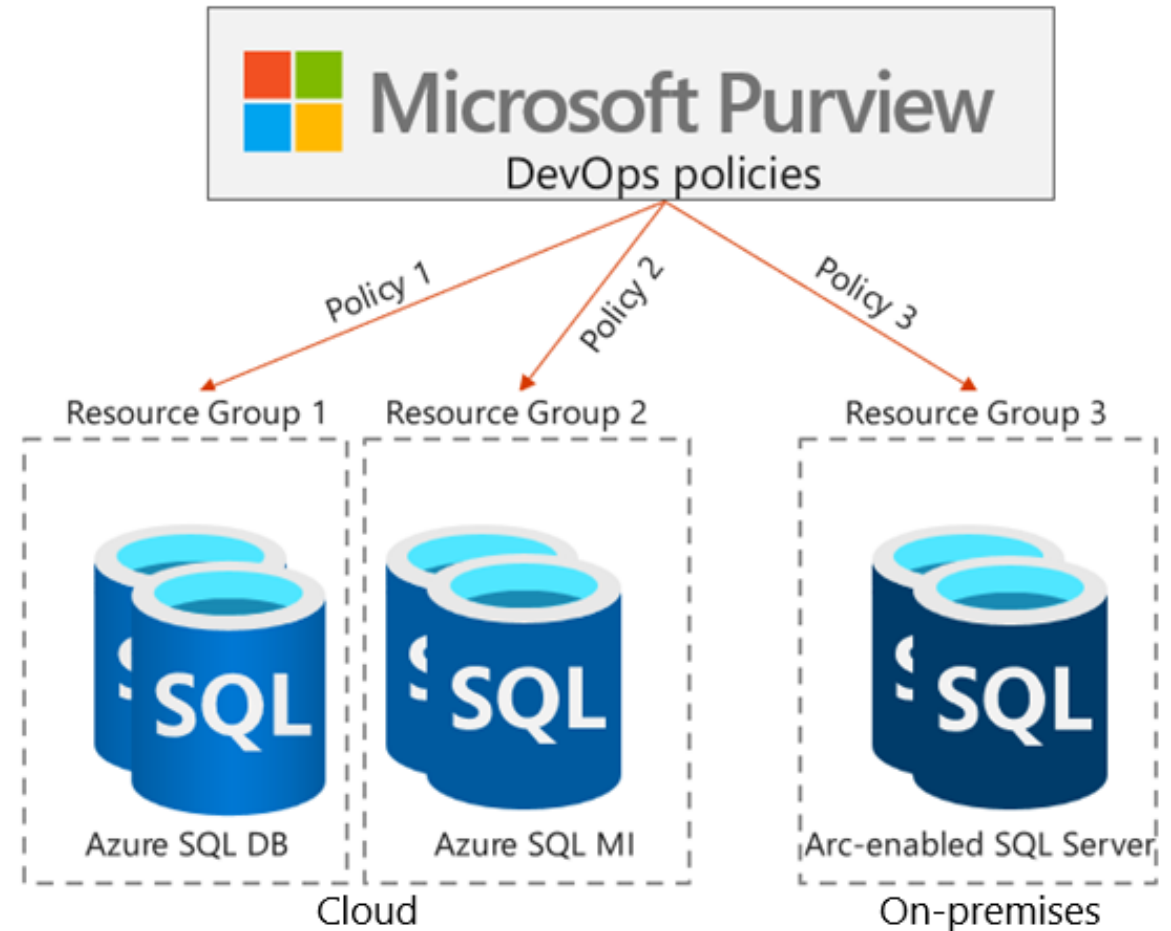
**Connection and Progress**

The 'Connection' section shows the connection to the Azure SQL Managed Instance. The 'Progress' section shows the restore operation is 'Ready'.

# Microsoft Purview DevOps policies for Azure SQL MI (Preview & GA)

DevOps policies, a special type of Microsoft Purview access policies, allow customers to **manage access to system metadata on data sources** that have been registered for Data use management in Microsoft Purview. This feature enables IT/DevOps personal to ensure that their critical database estate is healthy, performing to expectations and is secure.

Customers can author access policies through Microsoft Purview experience and then apply them to Azure SQL data sources individually or at scale, **without the need to directly connect to databases or to explicitly create logins or users on a server**. In this release the SQL Performance Monitor, and SQL Security Auditor roles are eligible for assignment.



# Azure SQL bindings for Azure Functions (GA)

Azure SQL trigger uses SQL change tracking functionality to monitor a SQL table for changes and trigger a function when a row is created, updated, or deleted. It can be used in many scenarios such as change streaming from an Azure SQL database, participating in event-based architectures, as well as real time updating of web pages and applications.

- Create a T-SQL table
- Enable Change Tracking (CT) on it
- Create an Azure Function
- Add SQL Binding Libraries to your project
- Create your table Class Object in C#/Java/etc
- Create SQL Trigger function
- Add SQL Binding code

Bash

Copy

```
dotnet add package Microsoft.Azure.Functions.Worker.Extensions.Sql
```

Input binding



object in function



SQL query results



Output binding



object in function



SQL table



SQL trigger



SQL data change



starts function





# General Availability of XML compression for Azure SQL Database and Managed Instance (GA)

```
EXEC sp_spaceused 'demo.ProductModelXMLDemo';
```

name	rows	reserved	data	index_size	unused
ProductModelXMLDemo	128	976 KB	872 KB	16 KB	88 KB

```
create primary XML index.
```

```
CREATE PRIMARY XML INDEX idx_xml_catalog_desc ON demo.ProductModelXMLDemo (CatalogDescription);
```

```
EXEC sp_spaceused 'demo.ProductModelXMLDemo';
```

name	rows	reserved	data	index_size	unused
ProductModelXMLDemo	128	1752 KB	872 KB	720 KB	160 KB

=====

Scenario:1 - Uncompressed clustered index and compressed XML index

We can enable XML compression on index by rebuilding

```
ALTER INDEX idx_xml_catalog_desc ON demo.ProductModelXMLDemo REBUILD WITH (XML_COMPRESSION = ON);
```

```
EXEC sp_spaceused 'demo.ProductModelXMLDemo';
```

name	rows	reserved	data	index_size	unused
ProductModelXMLDemo	128	1560 KB	872 KB	504 KB	184 KB

Table structure & Primary XML Index

```
=====
```

-- Scenario:2 Compressed table and uncompresses index

-- Enable XML compression on table and rebuild.

-- Since we created compressed XML index in last step, we will drop and create without compression

```
ALTER TABLE demo.ProductModelXMLDemo REBUILD WITH (XML_COMPRESSION = ON);
```

```
GO
```

```
DROP INDEX IF EXISTS idx_xml_catalog_desc ON demo.ProductModelXMLDemo;
```

```
GO
```

```
CREATE PRIMARY XML INDEX idx_xml_catalog_desc ON demo.ProductModelXMLDemo (CatalogDescription);
```

```
GO
```

```
EXEC sp_spaceused 'demo.ProductModelXMLDemo';
```

name	rows	reserved	data	index_size	unused
ProductModelXMLDemo	128	1104 KB	216 KB	720 KB	168 KB

=====

-- Scenario:3 - Compressed table and compressed index

-- Enable XML compression on index and rebuild. Table was already compressed in last step

```
ALTER INDEX idx_xml_catalog_desc ON demo.ProductModelXMLDemo REBUILD WITH (XML_COMPRESSION = ON);
```

```
GO
```

```
EXEC sp_spaceused 'demo.ProductModelXMLDemo';
```

name	rows	reserved	data	index_size	unused
ProductModelXMLDemo	128	912 KB	216 KB	504 KB	192 KB


Secondary XML Index

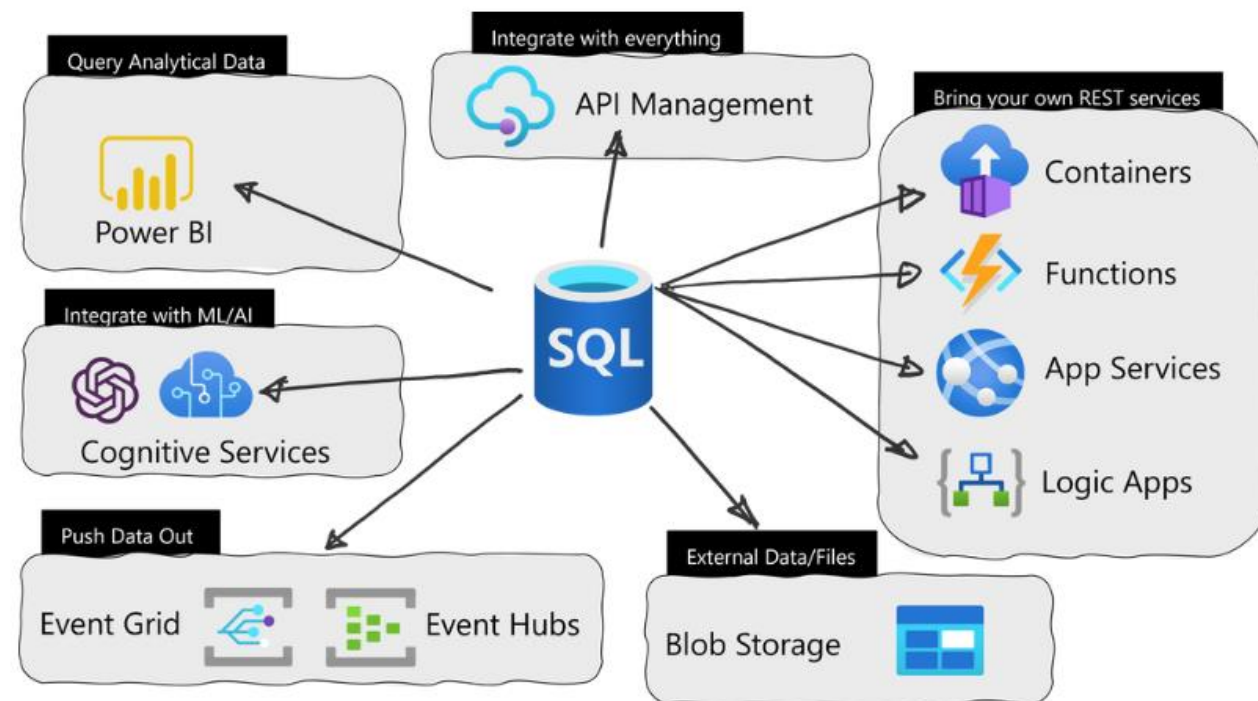
# Invoking REST API from SQL MI

## Private Preview for Azure SQL Managed Instance.

"Right from Azure SQL Database, developers can call REST/GraphQL endpoints of other Azure Services. With a quick call to the stored procedure `sp_invoke_external_rest_endpoint`, you can have data processed via an Azure Function, update a PowerBI dashboard, talk to Cognitive Services, or access OpenAI, Azure Blob Storage, Azure Files, Azure Queue Services and Azure Table Services."

## External REST Endpoint Invocation is now GA!

By  [Brian Spendolini](#)  
Published Aug 28 2023 05:00 AM 👁 10K Views



On behalf of the Engineering and Product Management teams, we are happy to announce that External REST Endpoint Invocation is now GA!

# Database Watcher

## A single pane of glass dashboards

Collection from **DMVs**.

Runs on Microsoft compute.

Requires **minimal access** to customer resources.

Private or public connectivity.

Parametrized templates for common alerting.

User-owned Azure Data Explorer cluster.



Elastic pools, serverless, Hyperscale, replicas



GP, BC, Next-gen GP



SQL Server 2016+ on Azure VMs

## Customers don't pay for

Watcher resources.

Dashboards.

Per instance, database, elastic pool, per user costs.

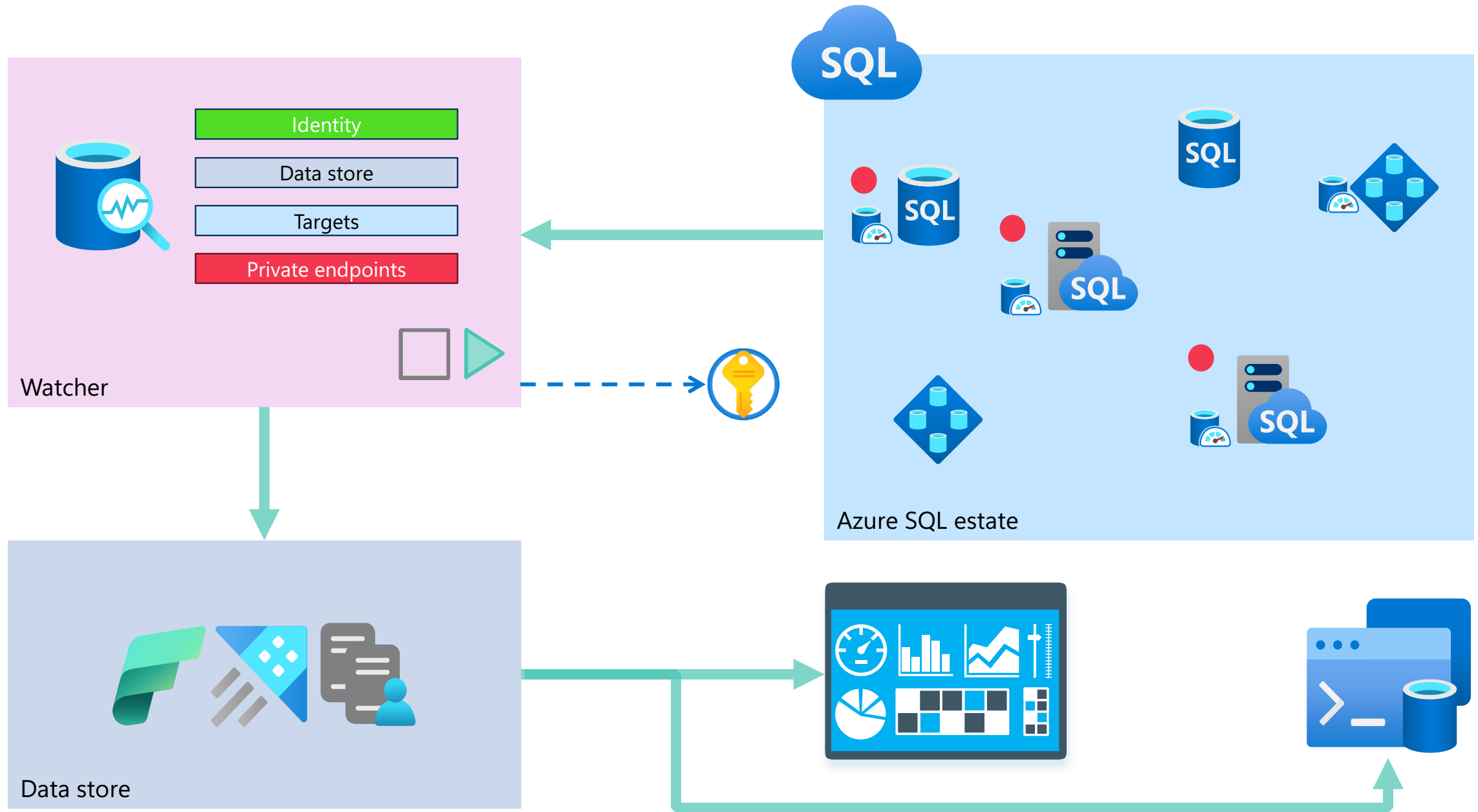
## Customers pay for

**Azure Data Explorer cluster** compute and storage. Can use an existing cluster and can use free cluster for POCs and evaluation.

Alerts.

Key Vault (if used).

# How Database Watcher works





Search



Auto refresh: Off

- Overview
- Activity log
- Access control (IAM)
- Resource visualizer
- Favorites
- Monitoring
- Dashboards**
- Configuration
  - Identity
  - Managed private endpoints
  - SQL targets
  - Data store
- Automation

▼ Data store



Azure SQL databases

13



Azure SQL elastic pools

2



Azure SQL managed instances

3

▼ Learn more



We've talked about many things...

[aka.ms/sqlmi-youtube](https://aka.ms/sqlmi-youtube)



Demo of setting up private endpoint to Azure SQL Managed Instance

1.1K views • 5 months ago



High availability for Azure SQL Managed Instance with a DEMO

729 views • 5 months ago



Demo of Start/Stop for Azure SQL Managed Instance | GA...

237 views • 5 months ago



Discover awesome SQL MI releases we've made in November 2023 |...

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Restore a database from AWS S3 Bucket to Azure SQL Managed...

197 views • 5 months ago



DTC for Azure SQL Managed Instance - run distributed...

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Importing custom and 3rd party DLLs into Azure SQL Managed...

172 views • 6 months ago



Listener endpoint and migration to Azure SQL Managed Instance

1K views • 6 months ago

Contact SQL MI product group  
**[aka.ms/contact-sqlmi](https://aka.ms/contact-sqlmi)**



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**Newsletter**

[aka.ms/sqlmi-letter](https://aka.ms/sqlmi-letter)

**Blog**

[aka.ms/sqlmi-blog](https://aka.ms/sqlmi-blog)

**ML in year 2023**

[aka.ms/sqlminov23](https://aka.ms/sqlminov23)

**Documentation**

[aka.ms/sqlmi-whatsnew](https://aka.ms/sqlmi-whatsnew)

**GitHub**

[aka.ms/sqlmi-new](https://aka.ms/sqlmi-new)



# Thank you!



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