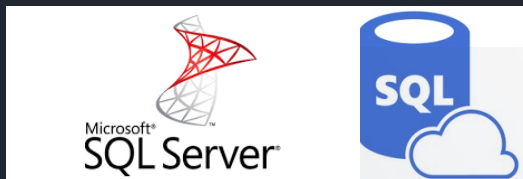


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# The evolution of SQL Server as a Service Azure SQL Managed Instance

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# Javier Villegas

IT Director – DBA and BI Services at MSC

Working with the SQL Server for more than 25 years

Microsoft MVP Data Platform

Microsoft Certified Trainer

Former Azure Data Community Advisory Council

Technical Speaker

SQL PASS, 24 HOP, SQL Saturdays , PASS Marathon , PASS Virtual Groups, PASS Summit, vOpen, Microsoft AI+ Tour, Data Saturdays, Azure Global Bootcamp , GroupBy , PowerBI Summit and DataPlatformGeeks



[@azureenelbar](https://twitter.com/@azureenelbar)  
[@sqlargentina](https://twitter.com/@sqlargentina)

# Azure SQL

The family of SQL cloud to edge databases



## SQL Server on Azure Virtual Machines

Best for lift and shift and/or workloads requiring OS-level access

Infrastructure-as-a-Service



## Azure SQL Managed Instance

Best for modernizing existing apps

Platform-as-a-Service



## Azure SQL Database

Best for supporting modern cloud apps



## Azure SQL Edge

Best for extending apps to IoT edge

Edge Computing



## Azure SQL enabled by Azure Arc

Run Azure SQL on premises and in multi-cloud environments

Azure is the cloud that knows SQL Server best

# Agenda

Introduction

PaaS and SaaS

Azure SQL DB

Azure SQL Managed Instance

Migration

Updates & Roadmap

# SQL



# Why modernize by moving to the cloud?

- Want to increase productivity and decrease costs
  - Data center is too costly and complex to manage
  - Hosting solution is high maintenance
- Want to accelerate your growth
  - Easily get new features to get that competitive edge
  - Expand your reach globally

# How to choose between PaaS and IaaS?

If you:

- Need control over / access to the operating system
- Have to run the app or agents side-by-side with the DB

...then **IaaS** is the right solution for you

Otherwise, recommendation is **PaaS**

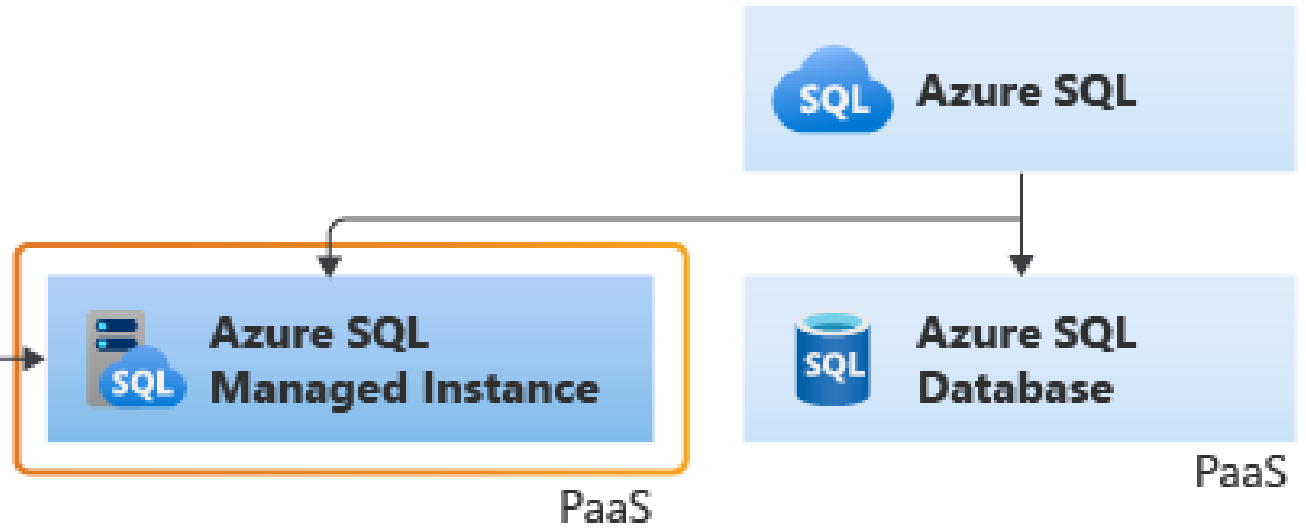
- Better total cost of ownership
- Focus on your business, and put your DBs on autopilot

# What is a Managed Instance

Azure SQL Database Managed Instance is a new capability of Azure SQL Database, providing near 100% compatibility with SQL Server on-premises, providing a native virtual network (VNet) implementation that addresses common security concerns, and a business model favorable for on-premises SQL Server customers. Managed Instance allows existing SQL Server customers to lift and shift their on-premises applications to the cloud with minimal application and database changes. At the same time, Managed Instance preserves all PaaS capabilities (automatic patching and version updates, backup, high-availability), that drastically reduces management overhead and TCO.

## What is SQL Managed Instance?

Deployment option that enables **frictionless migration** for SQL apps and **modernization** in a fully managed service



### Easy lift and shift

Fully-fledged SQL instance with nearly 100% compatibility with on-premises

### Fully managed PaaS

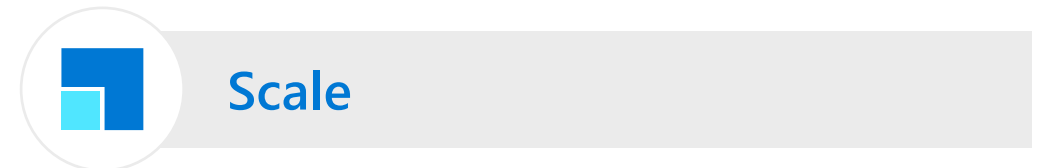
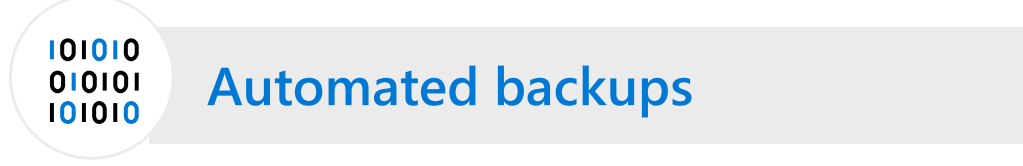
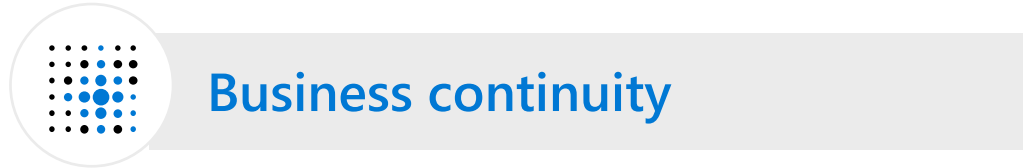
Built on the same PaaS service infrastructure  
All PaaS features

### Full isolation and security

Native VNet implementation  
Private IP addresses



# SQL Server vs Azure SQL PaaS



# Easy migration: nearly 100% like SQL Server

## Data migration

- Native backup/restore
- Log shipping (DMS)

## Security

- TDE
- SQL Audit
- Row level security
- Always Encrypted

## Programmability

- Global temp tables
- Cross-database queries and transactions
- Linked servers
- CLR modules

## Operational

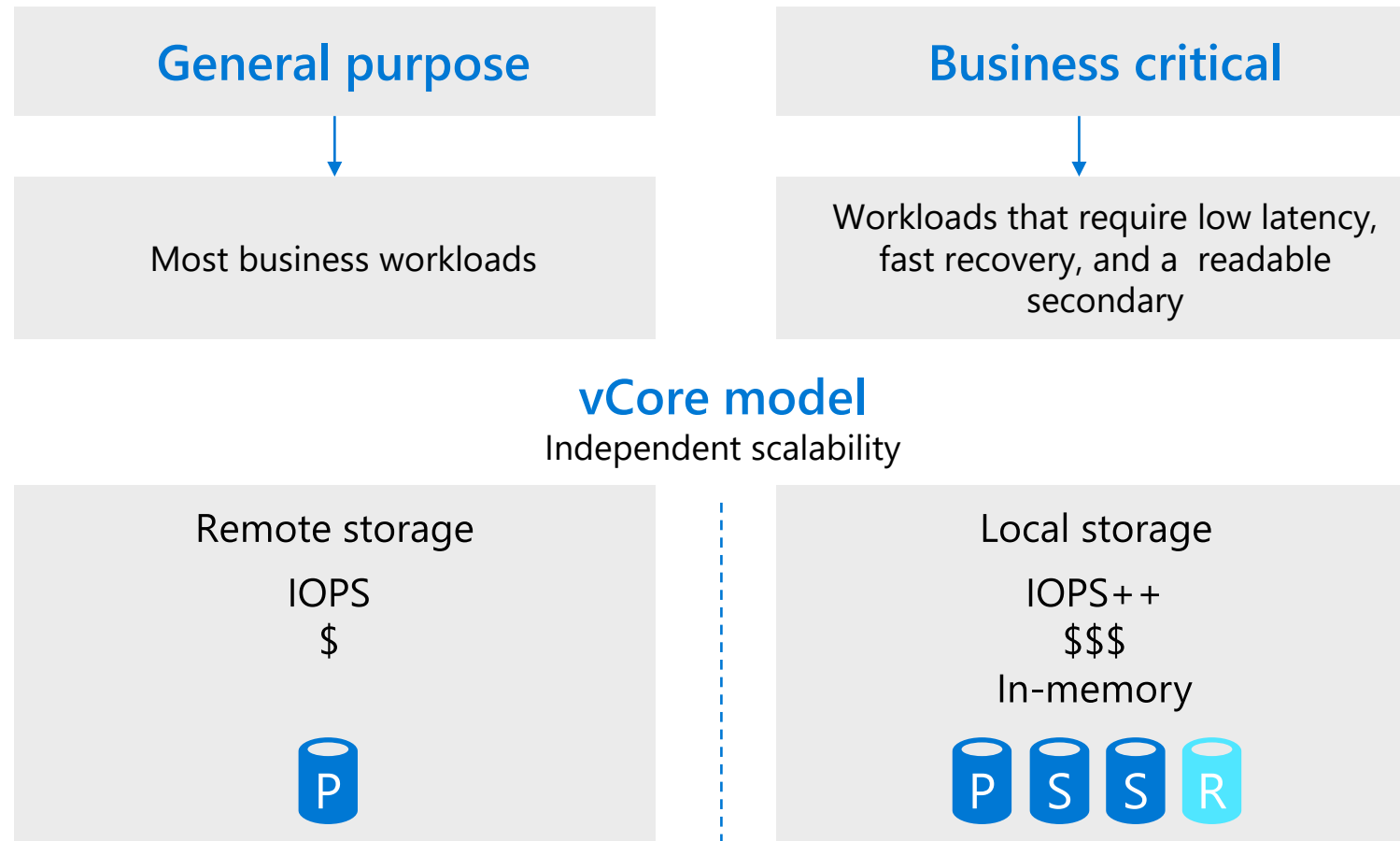
- DMVs & XEvents
- Query Store
- SQL Agent
- DB Mail (external SMTP)

## Scenario enablers

- Service Broker
- Change Data Capture
- Transactional Replication

Supports compatibility modes (SQL Server 2005+)

# Managed Instance service tiers



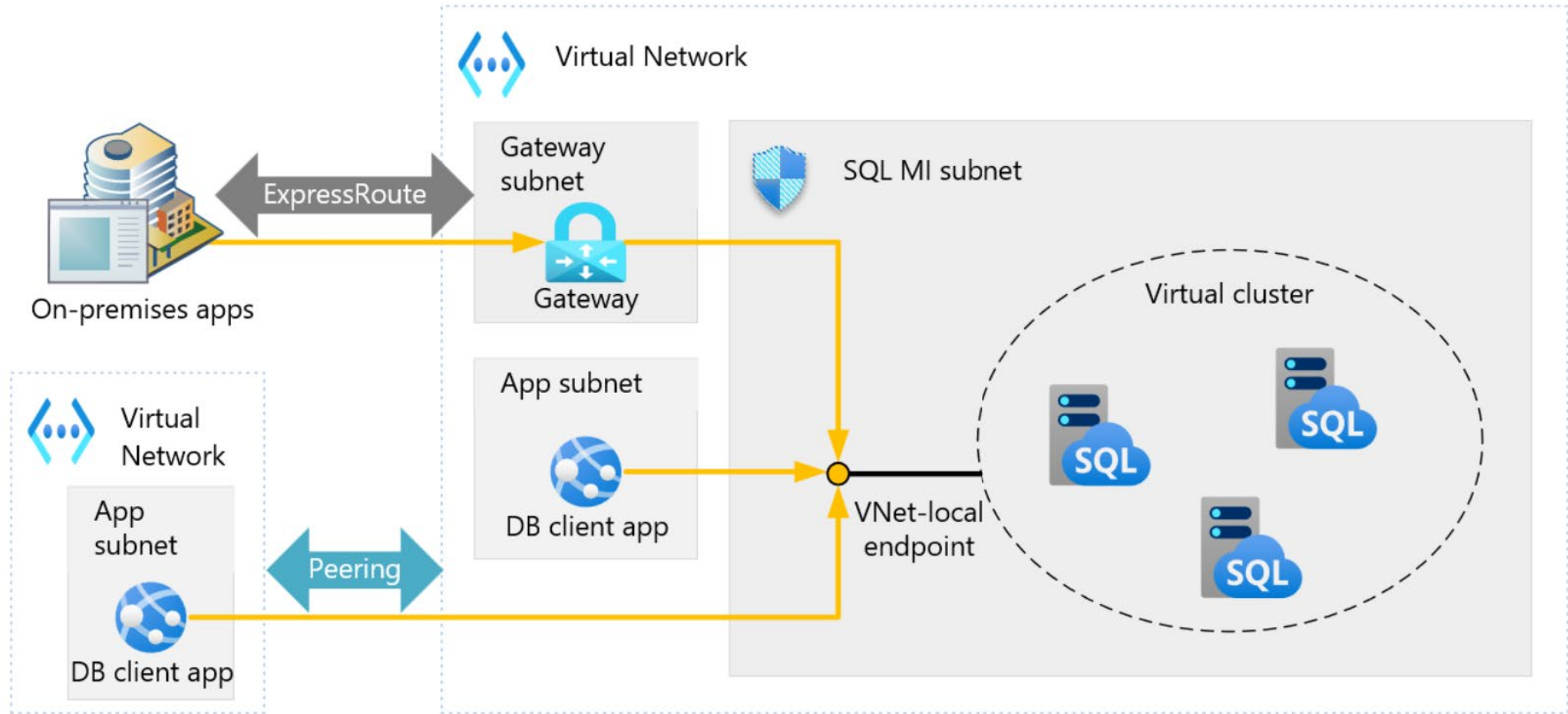
Both service tiers guarantee 99.99% availability and enable you to independently select storage size and compute capacity.

# Service Tier Comparison

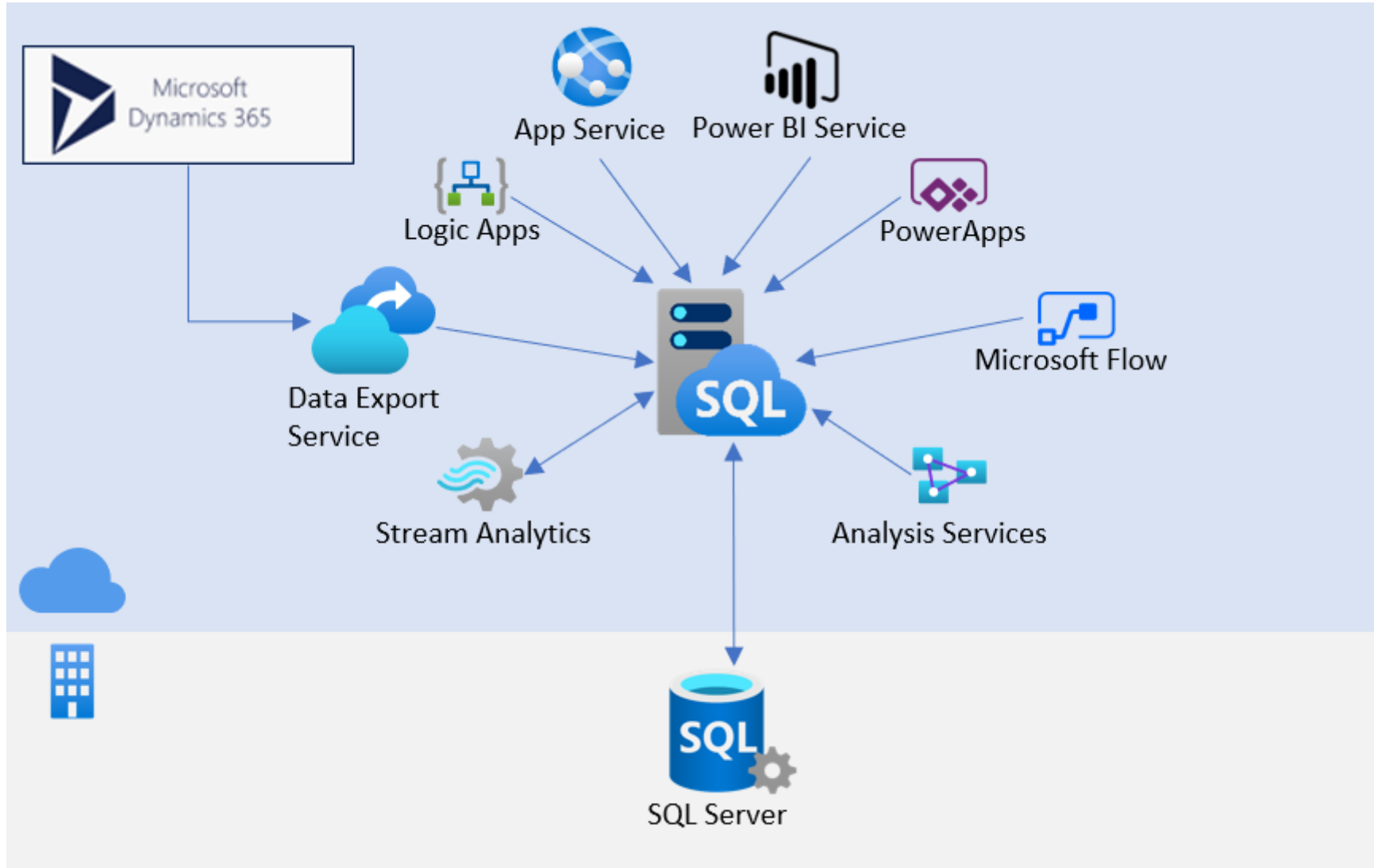
	General Purpose	Business Critical
vCores	4*-80	4-80 + 4-80 (replica)
Memory (GB/vCore)	5.1	5.1 + 5.1 (replica)
Availability SLA	99.99%	
Storage	8 TB	4 TB
IO latency	5-10 ms	1-2 ms
IOPS	Up to 30K	Up to 110K
Log throughput	22MB/s	48 MB/s
TempDB size	24 GB/vCore	No specific limit
Log file size	Up to 2 TB	
In-memory OLTP	No	Yes
Read-only replica	No	Yes
Price	1	~2.5

\* 2 vCores is a minimal size for General Purpose in an instance pool

# High-level connectivity architecture



# Integration with Cloud Services



# Migration Tools

Discover, assess, get Azure recommendations, migrate to Azure SQL

## Azure Migrate



- Lift and shift an entire VM
- Discover and assess SQL Server
- Deployment recommendations
- Migration cost estimation
- App migration assessment

## Azure SQL Migration extension



- Cross platform
- Powered by Database Migration Service
- Assess SQL Server for possible migration blockers/warnings
- Azure recommendations
- Offline or online migrations

## Azure CLI and PowerShell



- Automate end-to-end migrations
- Powered by Database Migration Service
- Assess SQL Server for possible migration blockers/warnings
- Azure recommendations
- Offline or online migrations

# Start your migration journey today

## Assess



Discover, assess and estimate cost to run your databases in Azure with [Azure Migrate](#)

## Migrate



Use the [Azure Database Migration Service](#) to migrate your on-premises database to Azure

## Optimize



Take advantage of offers such as [Azure Hybrid Benefit](#) and [Azure Reserved Instances](#)

## Secure and manage



Get industry-leading security with [Azure Security Center](#), and protect your data in the cloud with [Azure Backup](#)

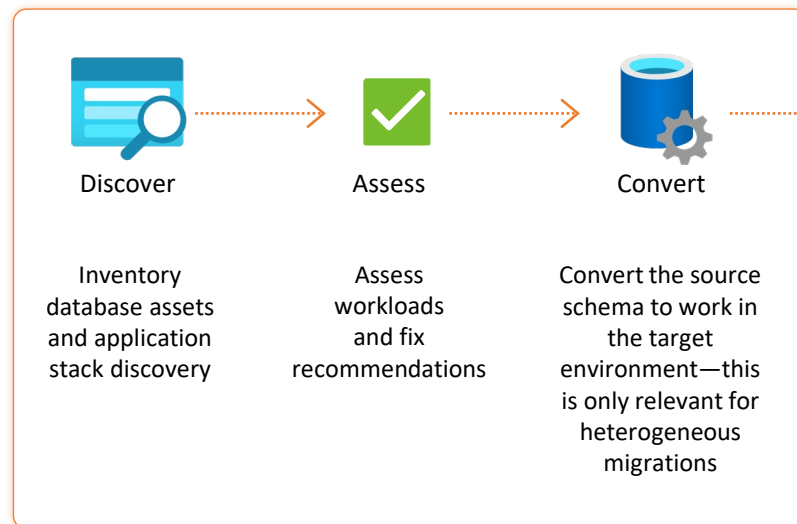
On-premises .....> Azure



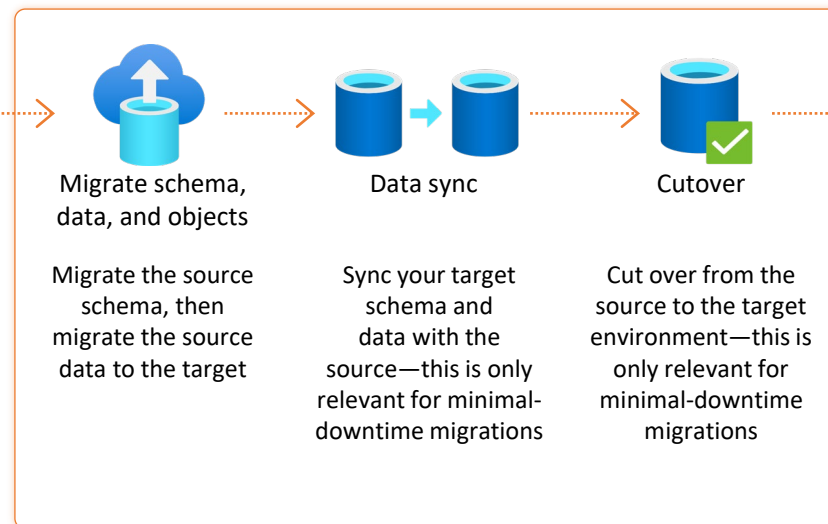
# Data migration process



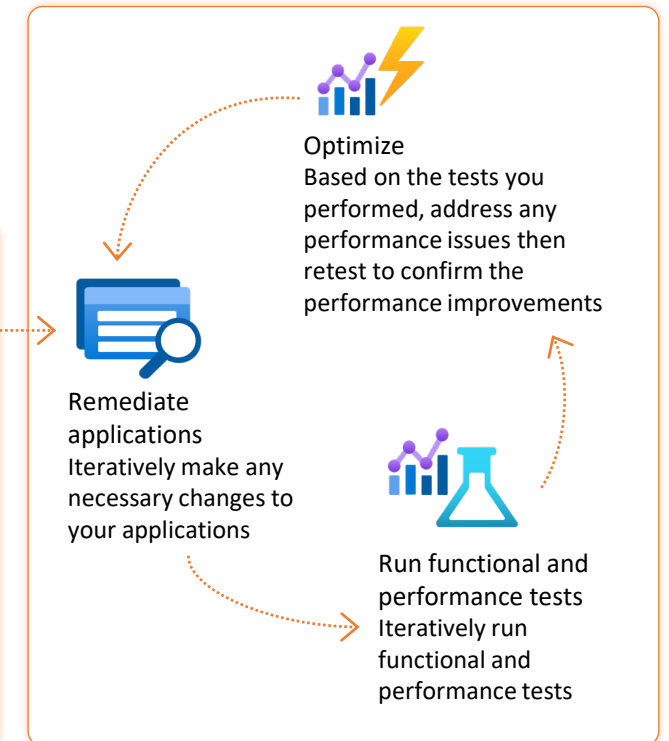
## Pre-migration



## Migration



## Post-migration



# Azure Migrate: A Central Hub for Datacenter Migration

## Assess and Migrate SQL Server

Assess your on-premises databases and receive a full report including the best-fit Azure SQL platform for your current environment

## Multiple Scenarios

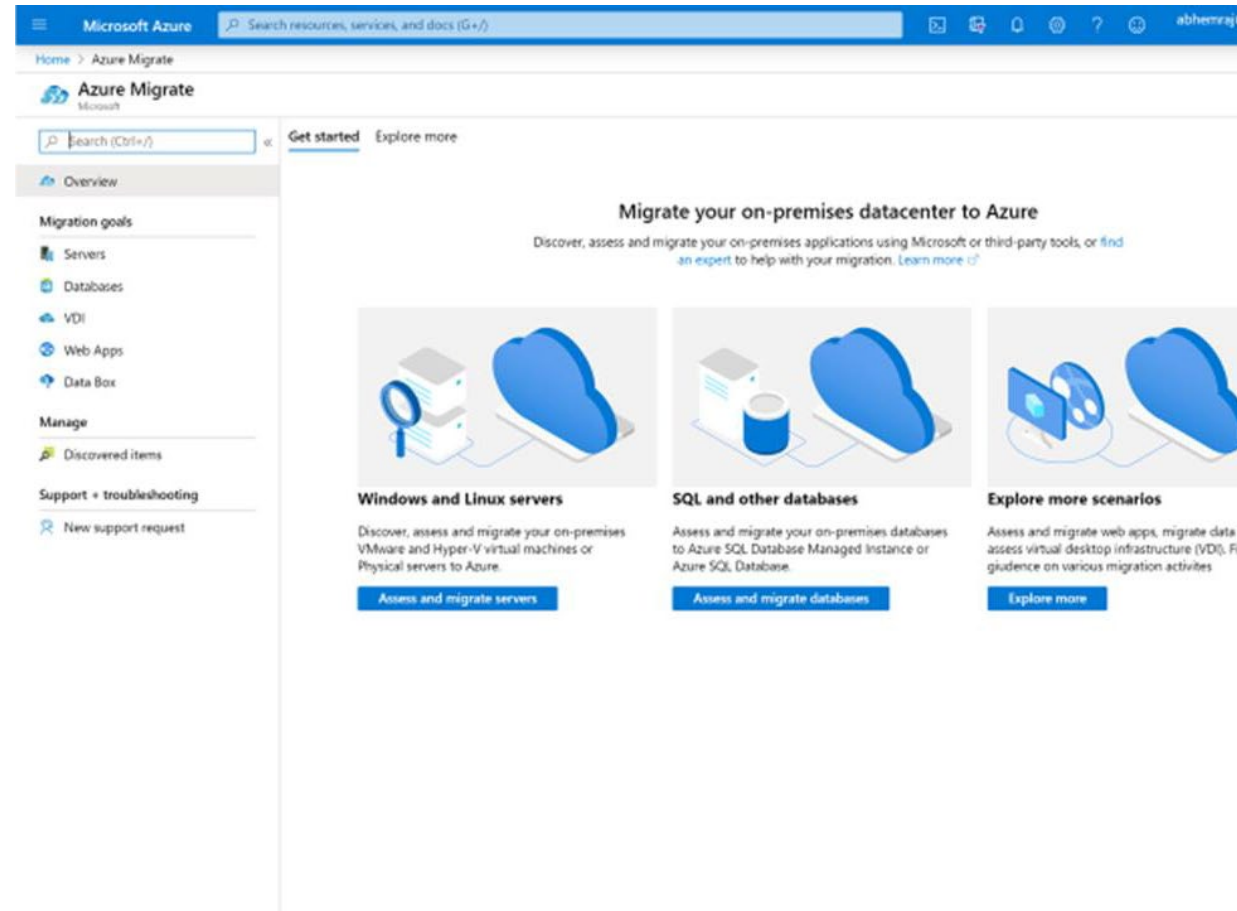
Migrate Windows and Linux Servers, Databases, Data, Web Applications and Virtual Desktops

## Diverse Capabilities

Comprehensive discovery, assessment, and migration capabilities powered by Azure and third-party tools

## Centralized Visibility

Centralized migration repository delivering end-to-end tracking and insights



# Azure Database Migration Service

Migrate your databases to Azure at scale



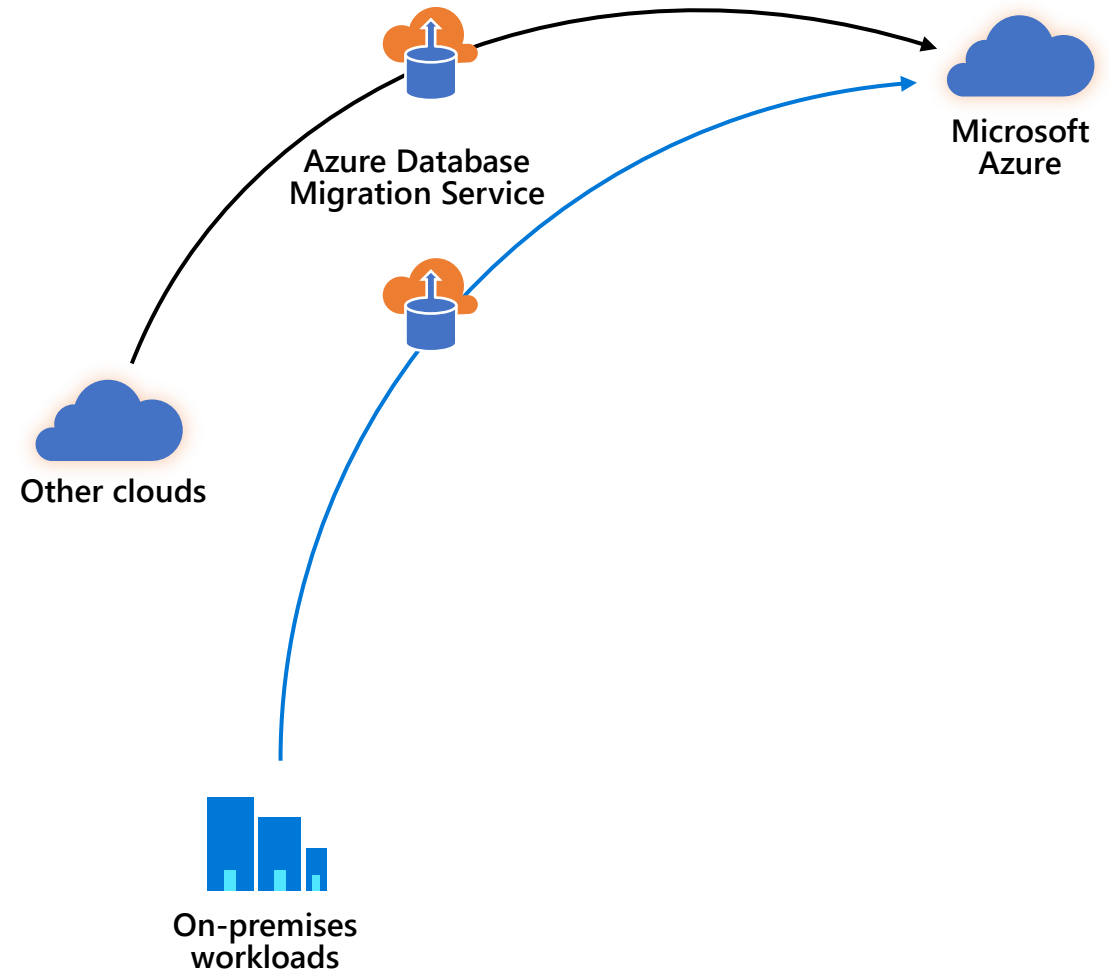
A comprehensive service, including a detailed guide, designed for seamlessly migrating your databases to Azure



Highly resilient and self-healing migration experience, with near-zero downtime

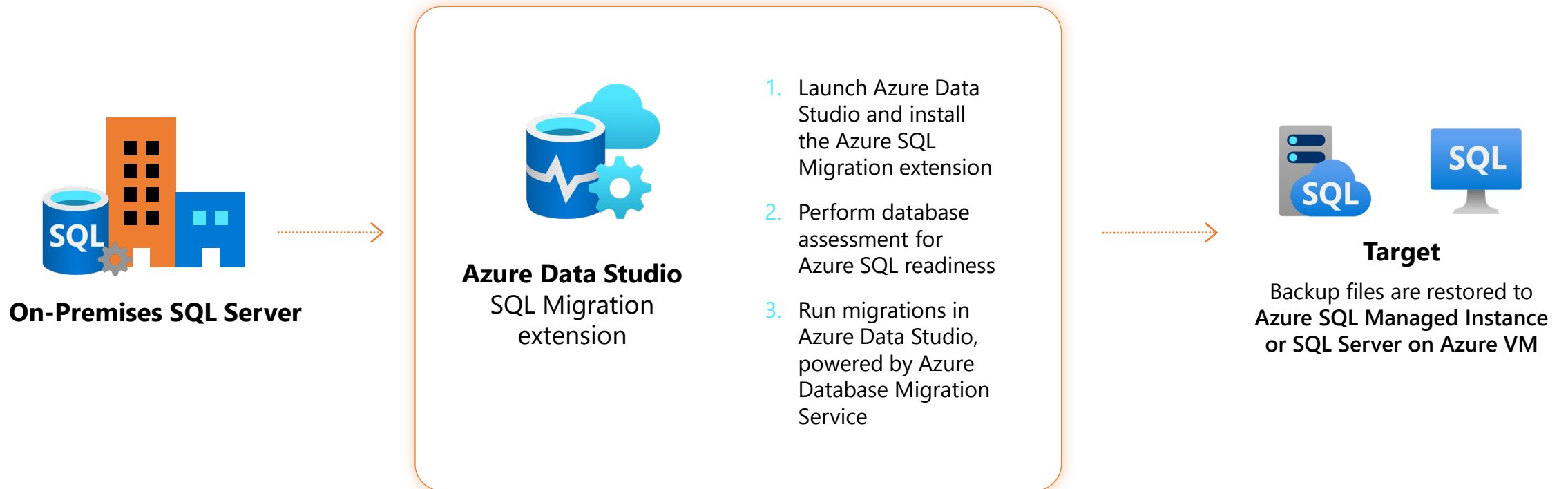


Completely automate your database migration project and find the migration scenario that best fits your needs



# SQL Migration extension in Azure Data Studio

Powered by Azure Database Migration Service



Get started with the [Azure SQL Migration extension](#) in Azure Data Studio

# Benefits of migrating using Azure Data Studio

Migrate using Azure SQL Migration extension powered by Azure Database Migration Service

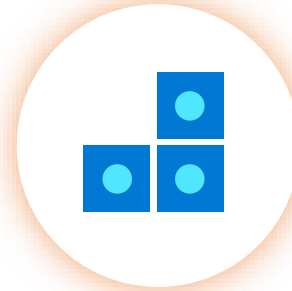
## Integrated Assessment



Assessment rules ([Azure SQL Managed Instance migration](#) & [Azure SQL Database migration](#)) are published in docs.

Assessment engine is based on robust and scalable [TSQL script DOM parser](#).

## Easy set up & configuration



Easy to install cross-platform desktop tool with responsive UI.

Setup Database Migration Service and install self hosted integration runtime (SHIR) with easy-to-follow steps in the migration wizard.

Simple firewall rules and does not mandate the requirement of Express Route.

## Minimal downtime migrations



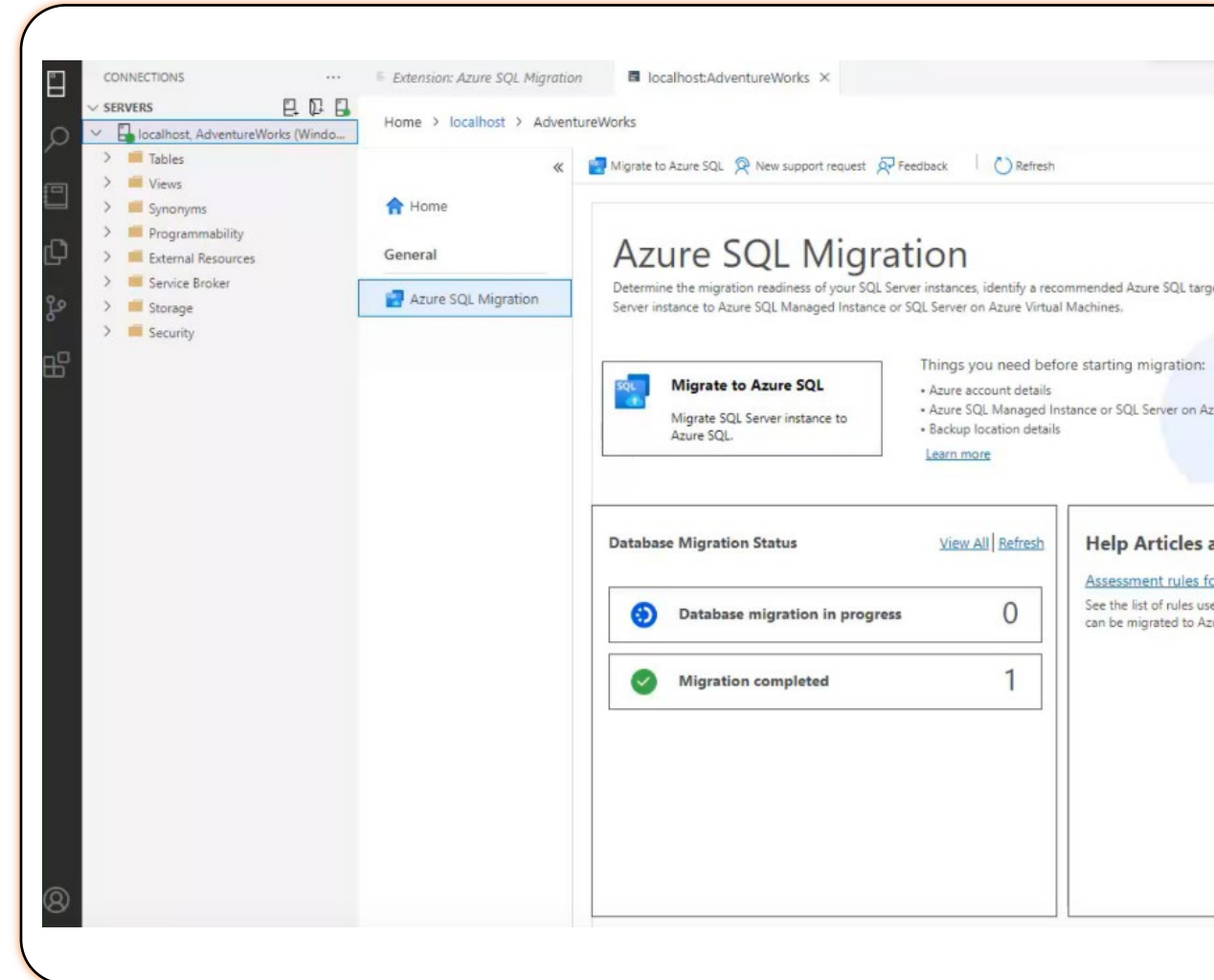
Minimal downtime migrations to both Azure SQL Managed Instance and SQL Server on Azure Virtual Machines.

# Azure SQL Migration extension in Azure Data Studio

Powered by Azure Database Migration Service (DMS)

## Follow these simple steps to get started:

1. Click on 'Migrate to Azure SQL'
2. **Azure Account** – Select your Azure account or create a new one
3. **Source configuration** – Select the database you want to assess for migration
4. **Azure SQL Target** – Subscription, location and resource group
5. **Select Migration mode** – Online or offline migration
6. **Choose database backup** – Select the location of your database backups to use
7. **Create database migration service** – Install self host integration runtime
8. **Start migration process**



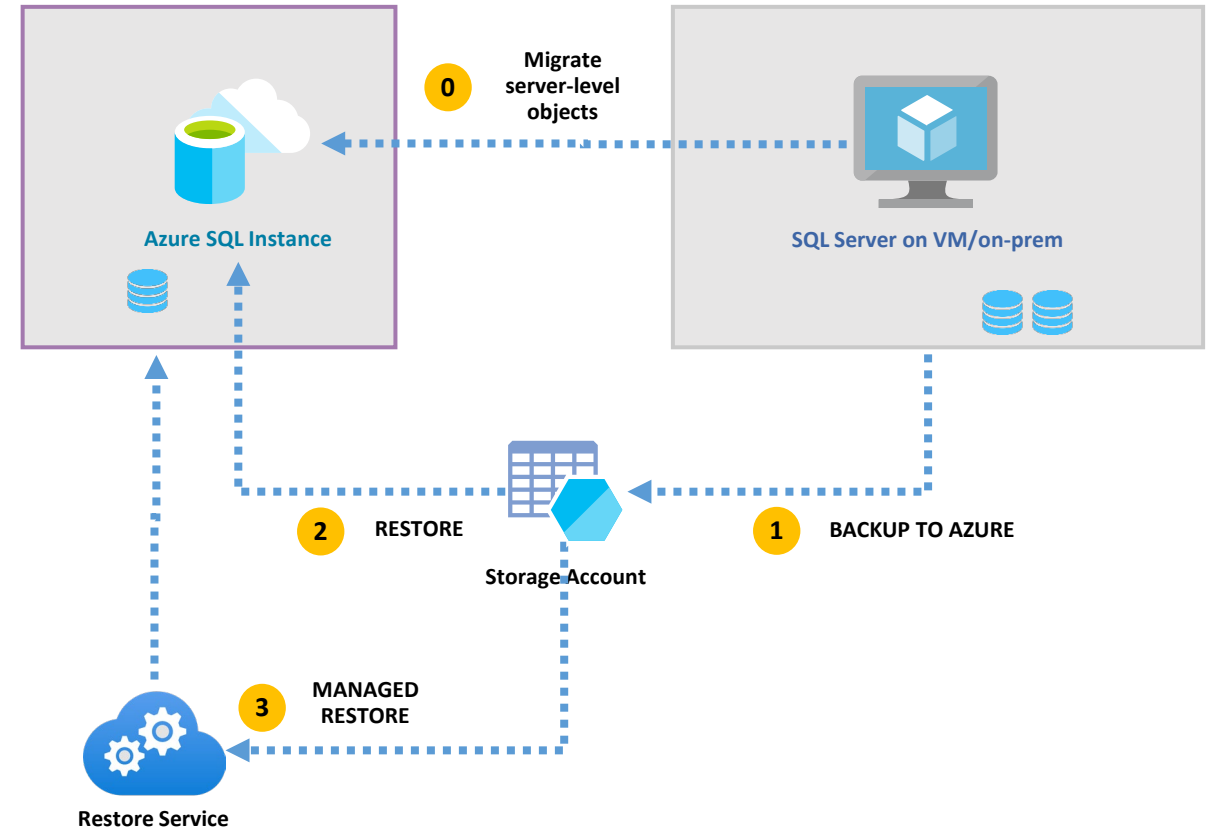
# Easy Database Migration

## Offline

- Native backup/restore
- BACKUP WITH CHECKSUM

## Online

- Data Migration Service
- Replication
- Log shipping



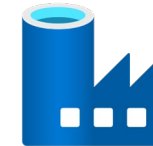
# Your business intelligence tools in Azure

Move to Azure VMs or choose managed services for data integration and analysis

## SSIS

Your platform for building **data integration and transformation** solutions

→ SSIS in Azure  
Data Factory (ADF)



## SSRS

Your platform for creating, deploying, and managing mobile **paginated reports**

→ Power BI (PBI)



## SSAS

Your platform for creating and analyzing **tabular data models**

→ Azure Analysis  
Services (AAS)



## SSAS

Your platform for creating and analyzing **multidimensional data models**

→ SQL Server Analysis  
Services (IaaS)





# Features obsolete in the cloud (or have a better alternative)

- Always-On Availability Groups – SQL Database Managed Instance includes build-in HA and supports geo-replication for cross-region disaster recovery or read scale scenarios
- All “flavors” of native backup/restore (differential backup, copy-only log backup, etc.) – SQL Database Managed Instance includes automated backup and point in time restore. Additionally, copy-only full backup will be available
- Windows Authentication – Azure Active Directory (AAD) is the alternative in the cloud
- Managed Data Warehouse – [OMS](#) (Operations Management Suite) integration is the alternative in the cloud
- Policy Based Management – Majority of common DBA tasks are preformed automatically in SQL Database

# Features that have been retired

- Database Mirroring – Built-in HA / geo-replication are better alternatives
- Extended stored procedures – Customers should use CLR

# Features that are considered

~~—Filestream~~

~~—Filetable~~

- Cross-instance distributed transactions (and other transactions types that require MS DTC) (Preview)
- Master Data Services (MDS)
- Data Quality Services (DQS)
- Stretch Database
- Policy based management

<https://feedback.azure.com/forums/915676-sql-managed-instance/suggestions/35659075-add-support-for-filestream-filetable>

# How to programmatically identify a Managed Instance

The following table shows several properties, accessible through Transact SQL, that you can use to detect that your application is working with Managed Instance and retrieve important properties.

Property	Value	Comment
@@VERSION	Microsoft SQL Azure (RTM) - 12.0.2000.8 Jul 3 2019 10:02:53 Copyright (C) 2019 Microsoft Corporation	This value is same as in SQL Database.
SERVERPROPERTY ('Edition')	SQL Azure	This value is same as in SQL Database.
SERVERPROPERTY('EngineEdition')	8	This value uniquely identifies Managed Instance.
@@SERVERNAME, SERVERPROPERTY ('ServerName')	Full instance DNS name in the following format:..database.windows.net, where is name provided by the customer, while is auto-generated part of the name guaranteeing global DNS name uniqueness ("wcus17662feb9ce98", for example)	Example: my-managed-instance.wcus17662feb9ce98.database.windows.net

# Key features and capabilities of a Managed Instance

<b>PaaS benefits</b>	<b>Business continuity</b>
<ul style="list-style-type: none"><li>No hardware purchasing and management</li><li>No management overhead for managing underlying infrastructure</li><li>Quick provisioning and service scaling</li><li>Automated patching and version upgrade</li><li>Integration with other PaaS data services</li></ul>	<ul style="list-style-type: none"><li>99.99% uptime SLA</li><li>Built in high availability</li><li>Data protected with automated backups</li><li>Customer configurable backup retention period (fixed to 7 days in Public Preview)</li><li>User-initiated backups</li><li>Point in time database restore capability</li></ul>
<b>Security and compliance</b>	<b>Management</b>
<ul style="list-style-type: none"><li>Isolated environment (VNet integration, single-tenant service, dedicated compute and storage)</li><li>Encryption of the data in transit</li><li>Azure AD authentication, single sign-on support</li><li>Adheres to compliance standards same as Azure SQL database</li><li>SQL auditing</li><li>Threat detection</li></ul>	<ul style="list-style-type: none"><li>Azure Resource Manager API for automating service provisioning and scaling</li><li>Azure portal functionality for manual service provisioning and scaling</li><li>Data Migration Service</li></ul>

# Latest features

[4 vCores on Gen5 hardware generation](#)

Support for subscriptions with [Azure monthly credit for Visual Studio subscribers](#)

Support for [SharePoint 2016 and SharePoint 2019](#) and [Dynamics 365 Business Central](#)

[Configure time zone](#) during instance creation.

Create instances with [server-level collation of your choice](#).

Geo-restore functionality enables you to [restore your database to another data center using PowerShell](#).

(Preview) [Re-create dropped databases using PowerShell](#)

Managed instances are protected with [built-in firewall](#).

# Latest features

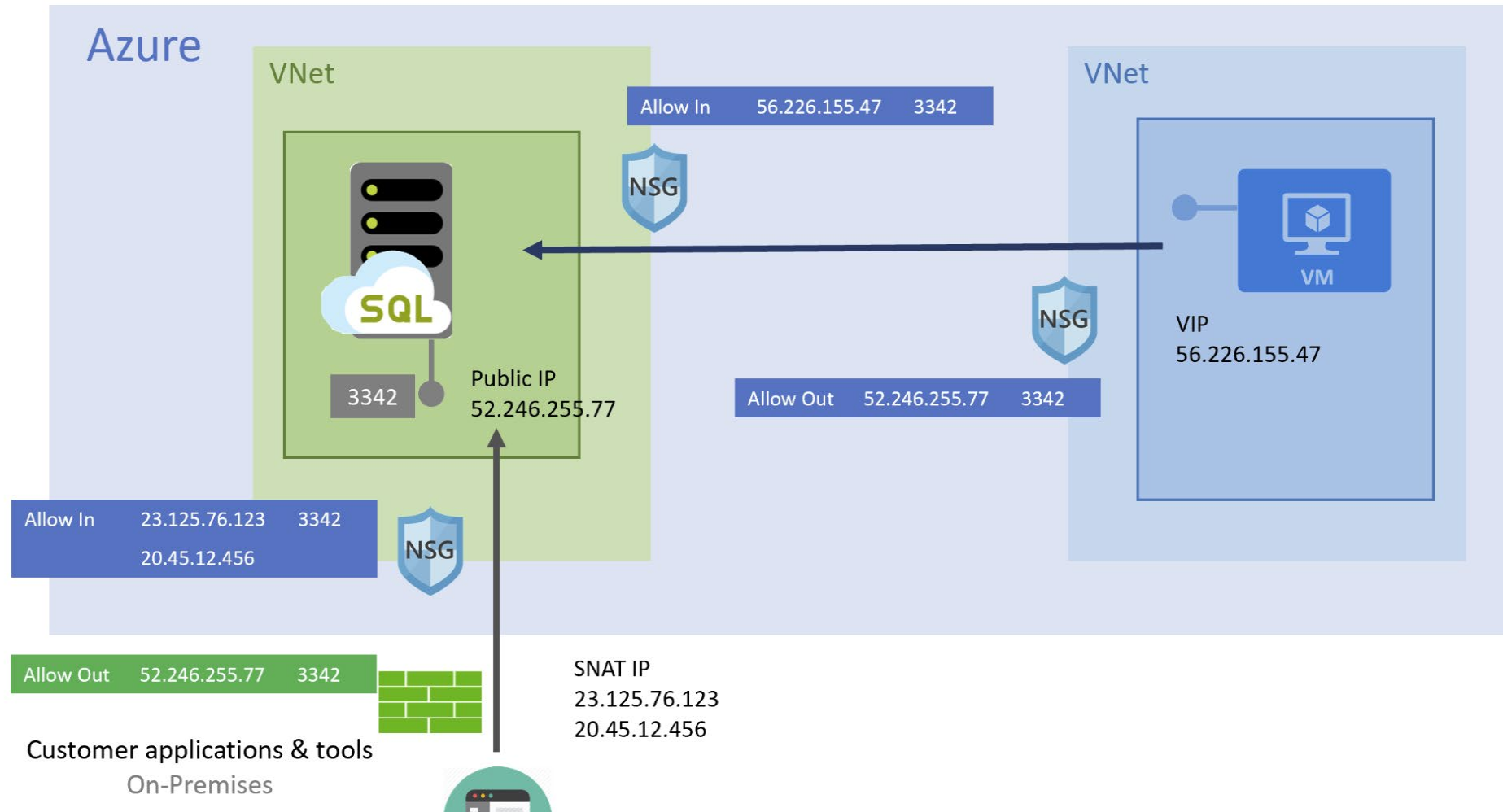
(Preview) [Bring your own encryption keys](#) while migrating on-premises databases that already have enabled Transparent Data Encryption (TDE).

(Preview) Use [Geo-distributed failover groups](#) to keep a copy of the instance in the another region and ensure that your data will be available even in the regional disaster scenario.

[Configure backup retention up to 35 days](#) for Point-in-time restore. Long-term backup retention (up to 10 years) is still not enabled so you can use [Copy-only backups](#) as an alternative.

(Preview) Create [Instance-level Azure AD server principals \(logins\)](#) using [CREATE LOGIN FROM EXTERNAL PROVIDER](#).

# Public Endpoint



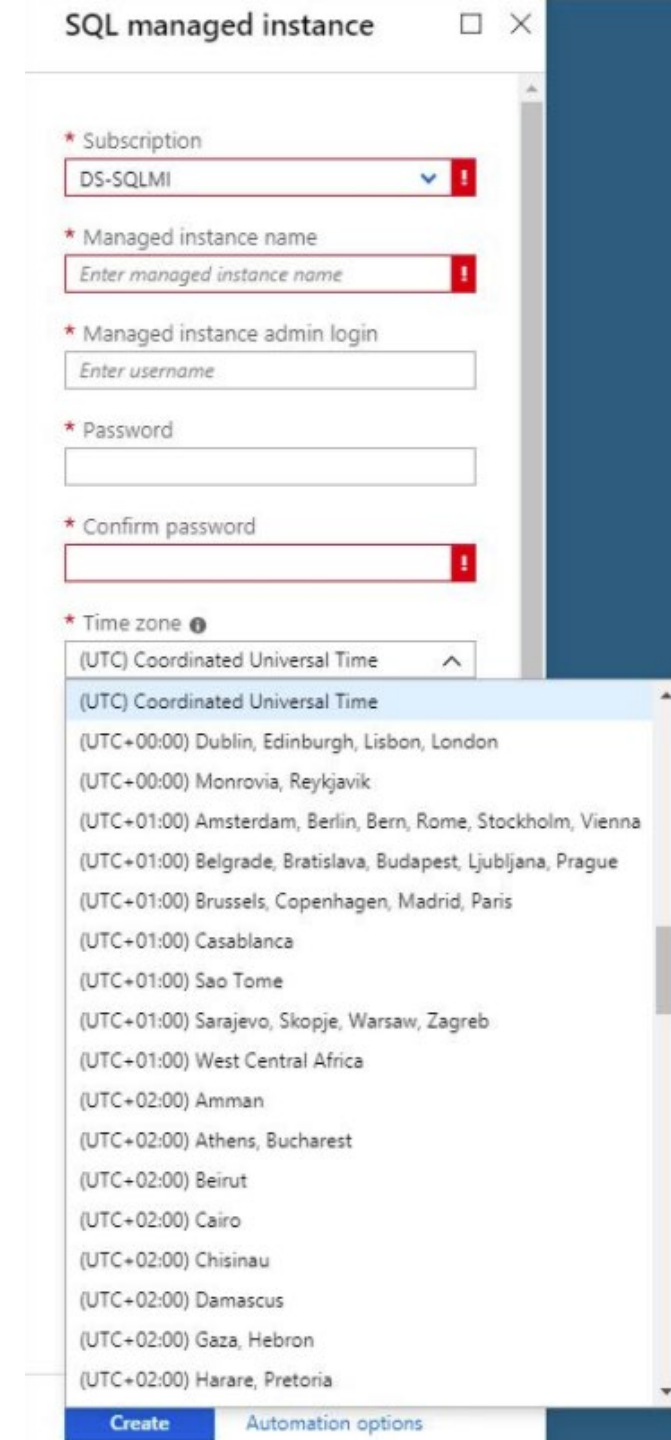


# Time zones in Azure SQL Database Managed Instance

08/13/2019 • 8 minutes to read •   

Coordinated Universal Time (UTC) is the recommended time zone for the data tier of cloud solutions. Azure SQL Database Managed Instance also offers a choice of time zones to meet the needs of existing applications that store date and time values and call date and time functions with an implicit context of a specific time zone.

T-SQL functions like [GETDATE\(\)](#) or CLR code observe the time zone set on the instance level. SQL Server Agent jobs also follow schedules according to the time zone of the instance.





[Updates](#) / [Global trace flags are now available in Azure SQL Database Managed Instance](#)

# Global trace flags are now available in Azure SQL Database Managed Instance

Posted on Wednesday, August 21, 2019

You can now enable trace flags in Azure SQL Database Managed Instance using [DBCC TRACEON](#) Transact-SQL statement.

Trace flags are commonly used to customize and alter behavior of the SQL Server Database Engine. Enabling trace flags can help improve compatibility of your Managed Instance Database Engine and SQL Server Database Engine.

Managed Instance supports a subset of trace flags that cannot affect availability or stability of Managed Instance. In the first release, the following trace flags are supported: 460, 2301, 2389, 2390, 2453, 2467, 7471, 8207, 9389, 10316, and 11024 The list of supported trace flags will be expanded in the future based on customer requests.

You can enable or disable global trace flags at the instance level using the [DBCC TRACEON](#) Transact-SQL command, as shown in the following example:

```
dbcc traceon(11024, -1)
```


Be sure to thoroughly test these options before rolling into a production environment.

To learn more, see [Trace Flags in SQL Server and Azure SQL Managed Instance](#).

# Create Azure SQL Managed Instance ...

Microsoft



 This subscription is ready to opt in to November 2022 feature wave - you can get started today. [Click here to learn more.](#) →

Basics

Networking

Security

Additional settings

Tags

Review + create

## New benefits and features

The November 2022 feature wave introduced new features and automatic benefits for Azure SQL Managed Instance.

The benefits in the feature wave include:

- **Fast instance provisioning.** It takes less time to deploy an instance.
- **Simplified connectivity architecture.** The connectivity architecture of SQL Managed Instance is simplified by removing the management endpoint and reducing the number of mandatory rules.
- **Enhanced virtual cluster.** The functionality of the underlying virtual cluster is enhanced.

These new preview features were introduced in the wave:

- **Instance stop/start:** You can start and stop your instance at your discretion to save on billing costs for vCores and SQL Server licensing.
- **Zone redundancy for Business Critical tier:** You can deploy your Business Critical tier managed instance across multiple availability zones to improve the availability of your service.
- **Managed DTC:** Run distributed transactions in mixed environments.

DEMO

# Azure SQL Database Managed Instance



# Learn more

## All about MI

QR: <https://cutt.ly/uhPpJoz>



# Training

## Azure SQL Fundamentals

QR: <https://cutt.ly/ngnX9ob>



# Azure SQL Managed Instance



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