



Introduction to Azure SQL

Overview

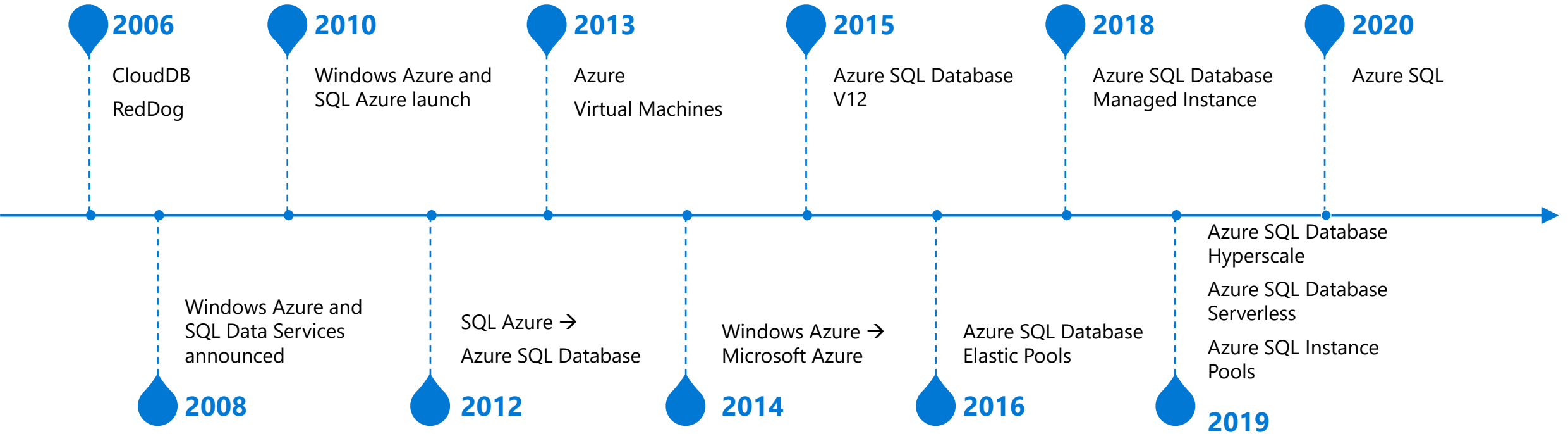
SQL Server on Azure VMs

Azure SQL Managed Instance

Azure SQL Database

Comparison and summary

Azure SQL has come a long way



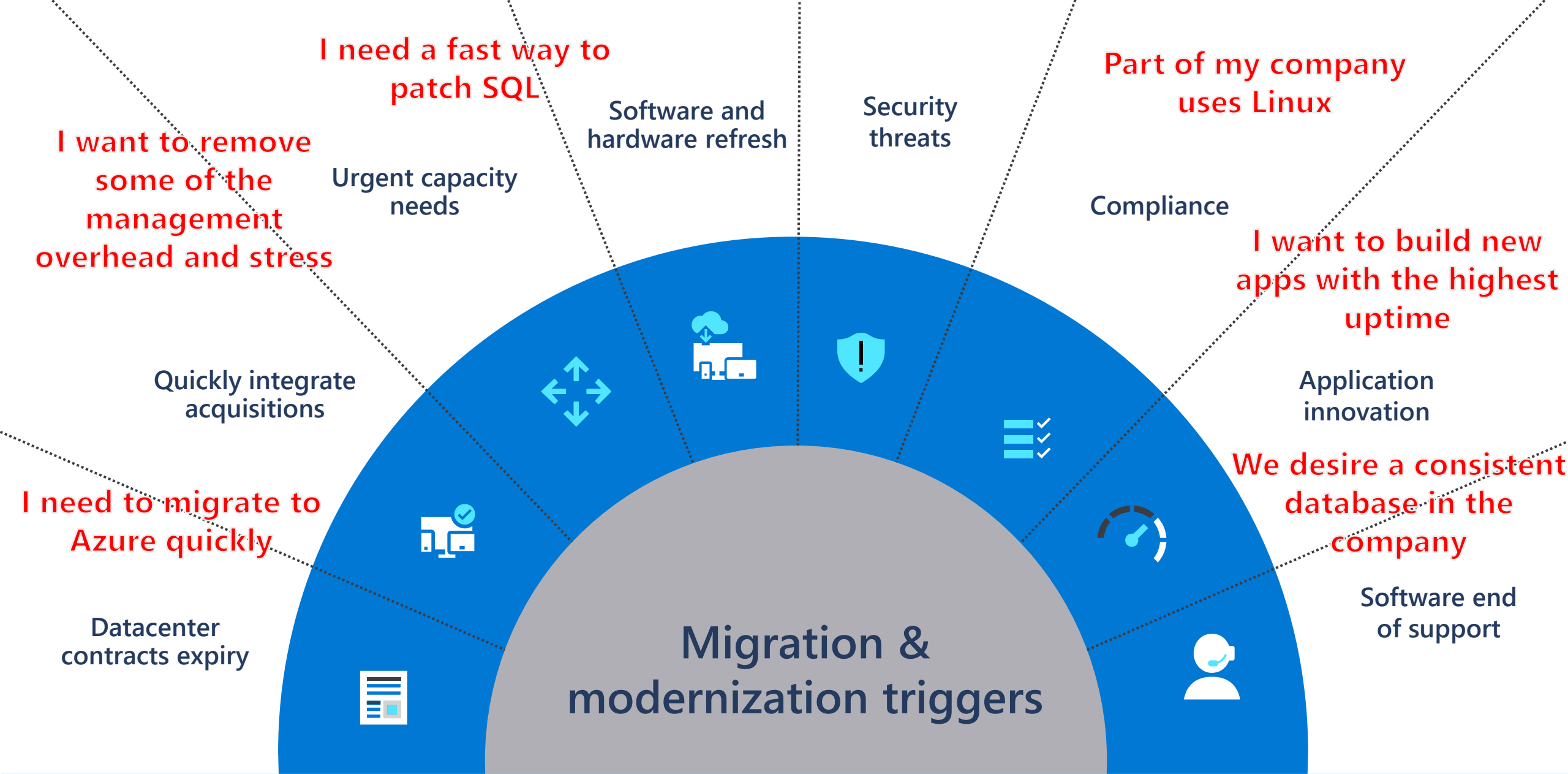
Overview

SQL Server on Azure VMs

Azure SQL MI

Azure SQL Database

Comparison and summary



Azure SQL

A unified SQL portfolio built on the industry-leading SQL Server engine

SQL Server on Azure Virtual Machines



Best for re-hosting and apps requiring OS-level access and control

Automated manageability features and OS-level access

Azure SQL Managed Instance



Best for modernizing existing apps

Offers high compatibility with SQL Server and native VNET support

Azure SQL Database



Best for building new apps in the cloud

Pre-provisioned or serverless compute and Hyperscale storage to meet demanding workload requirements

Infrastructure as a Service

Platform as a Service

Overview

SQL Server on Azure VMs

Azure SQL MI

Azure SQL Database

Comparison and summary

IaaS vs PaaS



Business continuity



High availability



Automated backups



Long term backup retention



Geo-replication



Scale



Advanced security



Version-less



Built-in monitoring



Built-in intelligence

SQL Server on Azure VMs provides the promise of the cloud while maintaining OS control



Customer challenge

I want to migrate to the cloud as fast as possible but maintain operating system control and complete SQL Server functionality



Solution

Get the combined performance, security, and analytics of SQL Server, backed by the flexibility, security, and hybrid connectivity of Azure

Key features

- SQL Server and OS server access
- Expansive SQL and OS versions
- Windows, Linux, Containers
- File stream and Simple Recovery model
- SSAS, SSRS, and SSIS

Azure differentiators

- Free Extended Security Updates for SQL Server 2008/R2
- Automated Backups and Security Updates
- Point in Time Restore with Azure Backup
- Accelerated storage performance with Azure Blob Caching
- 435 percent overall return on an Azure IaaS investment over five years¹



Healthcare software manufacturer saves costs when reusing licenses while moving 600 on-premises VMs to Azure

1. Forrester Consulting. The Total Economic Impact™ of Microsoft Azure SQL Database Managed Instance.

SQL Server on Azure Virtual Machines

Deployment Choices

- Marketplace pre-installed SQL Server on Windows or Linux
- Install your own SQL Server
- Lift and Shift with Azure Migrate (Azure Site Recovery)

SQL IaaS Agent Extension

- Unlock Licensing and Edition Flexibility
- Automated Backups and Security Updates
- Manage VMs through Azure SQL in portal

Sizes and Storage Performance

- Memory or Storage optimized sizes for best performance
- Data and log on Premium Storage Managed Disks
- Azure Blob Read Caching for data disks

- Tempdb on local SSD
- Ultra disks for extremely low latency needs
- Max practical database size ~20TB

Networking and Security

- Virtual Networks to integrate with on-premises
- Azure Defender services

HADR

- Azure VM built-in HA
- Azure Storage built-in DR
- Azure Backup and Automated backups to Azure Blob Storage
- File-Snapshot Backups

- Failover Cluster Instance with Azure Premium File Share
- Always On Availability Groups with Cloud Witness
- Hybrid Availability Group Secondary replicas
- HADR on RedHat Linux with Pacemaker and fencing

Overview

SQL Server on Azure VMs

Azure SQL MI

Azure SQL Database

Comparison and summary

Azure SQL managed instance eases cloud migration



Customer challenge

I want to migrate to the cloud, remove management overhead, but I need instance-scoped features (Service Broker, SQL Server Agent, Machine Learning Services, DTC, CLR...)



Solution

Managed instance combines leading security features with SQL Server compatibility and business model designed for on-premises customers

Key features

- Single instance or instance pool
- SQL Server surface area (vast majority)
- Native virtual network support
- Fully managed service
- On-premise identities enabled with Azure AD and AD Connect

Azure differentiators

- Near zero downtime migration using log shipping
- Fully managed business continuity with failover groups
- Projected return on investment of 212 percent over three years¹
- The best of SQL Server with the benefits of a managed service



Komatsu easily migrated 1.5 TBs of data thanks to near complete compatibility with SQL Server, plus 49% cost reduction and 25-30% performance gains.

1. Forrester Consulting. The Total Economic Impact™ of Microsoft Azure SQL Database Managed Instance.

Azure SQL Database is built for modern cloud apps



Customer challenge

I want to build modern apps, potentially multi-tenanted, with the highest uptime and predictable performance



Solution

Azure SQL Database is a highly scalable cloud database service with built-in high availability and machine learning

Key features

- Single database or elastic pool
- Hyperscale storage (100TB+)
- Serverless compute
- Fully managed service
- Private link support
- High availability with AZ isolation

Azure differentiators

- Industry highest availability SLA of 99.995%
- Industry only business continuity SLA with 5 second RPO and 30 second RTO
- Price-performance leader for mission-critical workloads while costing up to 86 percent less than AWS RDS (GigaOm)



AccuWeather uses Azure SQL Database to provide an automated, scalable weather prediction service

1. Forrester Consulting. The Total Economic Impact™ of Microsoft Azure SQL Database Managed Instance.

Overview

SQL Server on Azure VMs

Azure SQL MI

Azure SQL Database

Comparison and summary

Knowledge check

Consider the following scenario:

You want to migrate to the cloud, but you leverage a third-party application which requires access to the operating system (OS). Which Azure SQL deployment option will be the easiest to move to?

- A. SQL Server in an Azure virtual machine
- B. Azure SQL Managed Instance
- C. Azure SQL Database - single database
- D. Azure SQL Database - elastic pool

Go here: aka.ms/kc011

Consider the following scenario:

You want to migrate to the cloud and remove some of the management associated with SQL Server, but your application leverages CLR and Service Broker capabilities from SQL Server. Which Azure SQL deployment option will be the easiest to move to?

- A. SQL Server in an Azure virtual machine
- B. Azure SQL Managed Instance
- C. Azure SQL Database - single database
- D. Azure SQL Database - elastic pool

Azure SQL MI or DB?



Azure SQL managed instance

Single instance

SQL Server surface area (vast majority)
Native virtual network support
Fully managed service
Max storage 16TB (Preview)

Instance pool

Pre-provision compute resources for migration
Enables cost-efficient migration.
Ability to host smaller instances (2Vcore)
Currently in public preview



Azure SQL Database

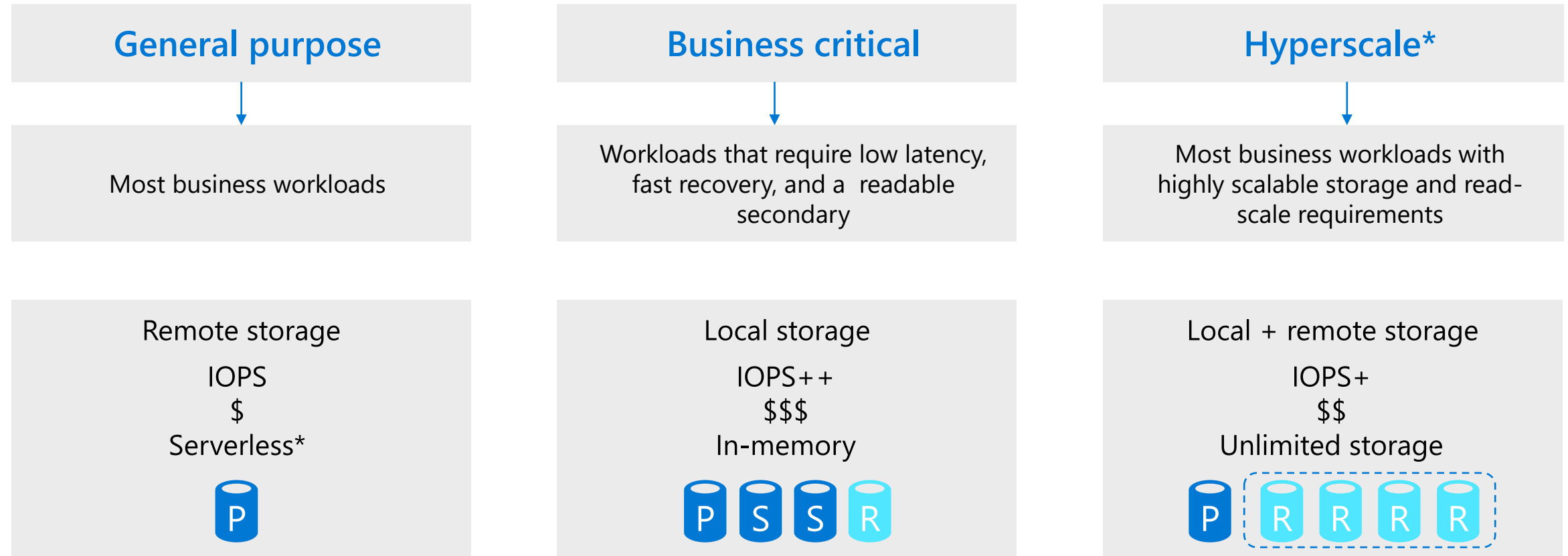
Single database

Hyperscale storage (up to 100TB)
Serverless compute
Fully managed service
Private Link support

Elastic pool

Resource sharing between multiple databases to price optimize
Simplified performance management for multiple databases
Fully managed service

Service tiers – SQL Database and Managed Instance

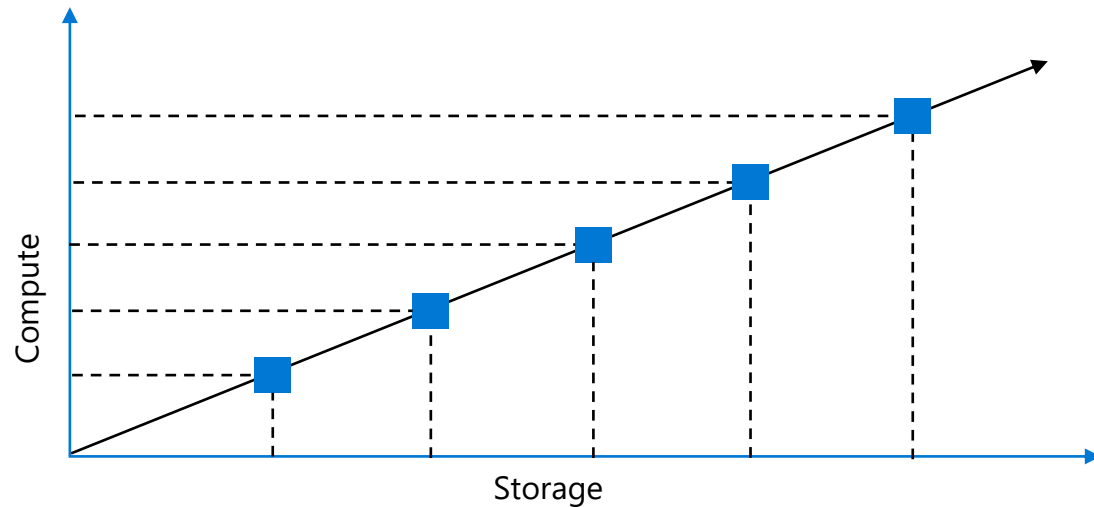


*Not in managed instance

Purchasing models - Single Database

DTU model

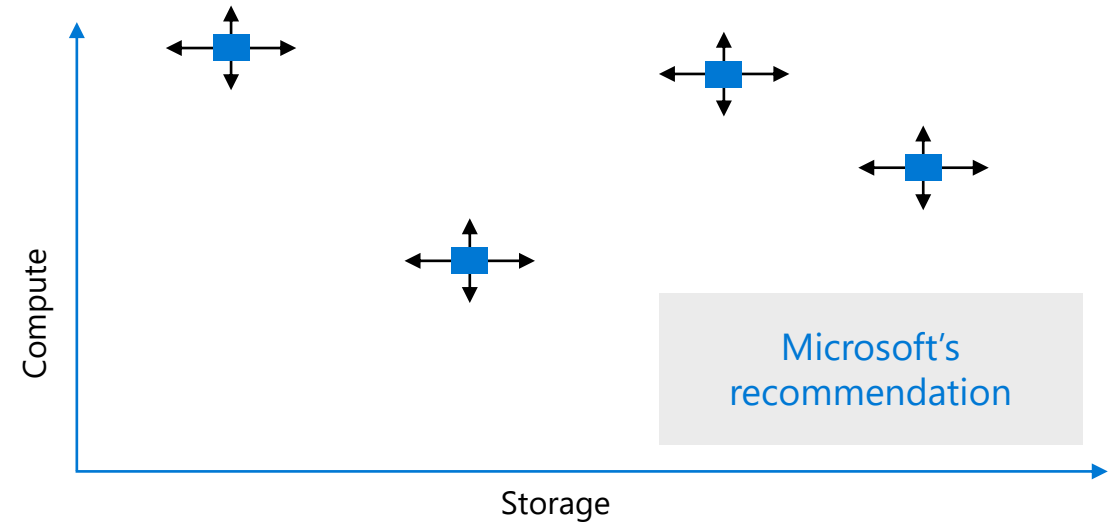
Simple, preconfigured



Pre-packaged, bundled unit that represents the database power
Designed for predictable performance, but somewhat inflexible and limited in options
DTU sizing offers simplicity of choice

vCore model

Independent scalability



This model allows you to independently choose compute and storage resources. It also allows you to use **Azure Hybrid Benefit** for SQL Server and **Reserved Capacity** to gain cost savings.

Best for customers who value flexibility, control and transparency

Azure SQL Database Serverless



Line of business apps

Expense reporting and employee tracking apps
Procurement systems



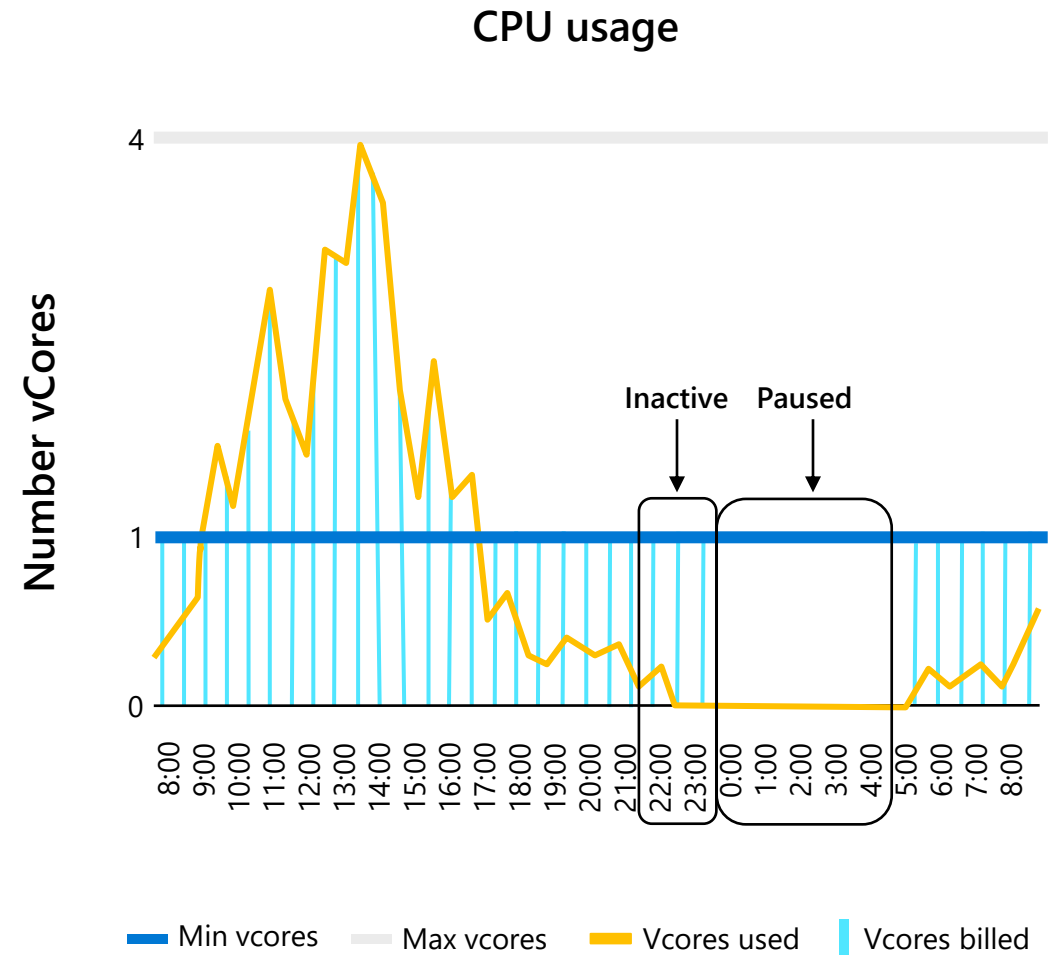
E-commerce

Opening new marketplaces, marketing
campaigns, sales promotions

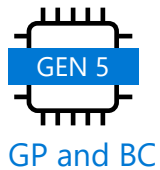


Dev/test workloads

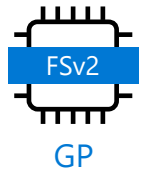
Handling unpredictable workload needs



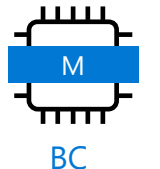
Hardware



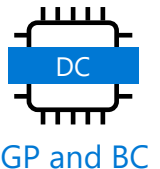
Balanced memory and compute
80 vCore limit
Max 408Gb Memory and 4TB storage



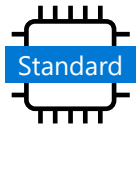
Compute optimized – **fastest clock speed**
72 vCore limit
Max 136Gb Memory and 4TB storage



Memory optimized
128 vCore limit
Max **3.68TB** Memory and 4TB storage



Confidential computing – **Intel SGX**
8 vCore limit
Max 36Gb Memory and 3TB storage



Gen5 - Balanced memory and compute
80 vCore limit
Max 408Gb Memory
GP = 16TB Storage BC = 4TB Storage



Faster CPU/More memory - **Intel Ice Lake**
80 vCore limit
Max **560Gb** Memory
GP = 16TB Storage BC = 5.5TB Storage



Memory optimized - Intel Ice Lake
64 vCore limit
Max **870Gb** Memory
GP = 16TB Storage **BC = 16TB** Storage

Knowledge check

Consider the following scenario:

You're moving an application and database to Azure, but your database is currently 62 TB, with plans to continue to grow. You don't currently leverage any instance-scoped features. Which Azure SQL deployment option will be the easiest to move to?

- A. SQL Server in an Azure virtual machine
- B. Azure SQL Managed Instance
- C. Azure SQL Database - single database
- D. Azure SQL Database - elastic pool

Consider the following scenario:

You have an Azure SQL Database with the Serverless compute tier database deployed, with an auto-pause delay of two hours. After two hours of no activity, what happens to your database and incurred charges?

A. Azure will pause your database to stop compute costs and only charge you for storage

B. The database resources are reduced to a lower service tier to reduce costs.

Interfaces for Azure SQL

Dashboard > New > Azure SQL > Select SQL deployment option

Select SQL deployment option

Microsoft

Feedback

How do you plan to use the service?

SQL databases

Best for modern cloud applications. Hyperscale and serverless options are available.

Resource type

Single database

Create Show details

SQL managed instances

Best for most migrations to the cloud. Lift-and-shift ready.

Resource type

Single instance

Create Show details

SQL virtual machines

Best for migrations and applications requiring OS-level access. Lift-and-shift ready.

Image

Create Show details



T-SQL



Powershell

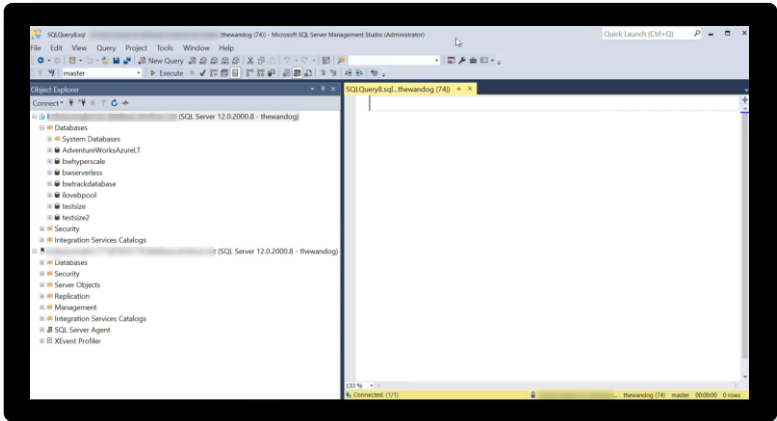


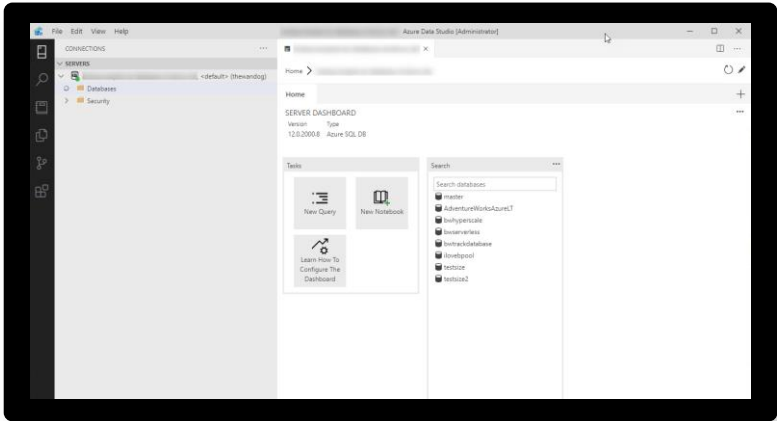
az cli

REST API

sqlcmd

bcp





Overview

SQL Server on Azure VMs

Azure SQL MI

Azure SQL Database

Comparison and summary

Summary

- ✔ Azure SQL has evolved into **the world's database**
- ✔ **Azure SQL includes** Virtual machine, Managed Instance, and Database
- ✔ **SQL Server on Azure Virtual Machines** is best for 100% lift and shift
- ✔ **Azure SQL Managed Instances:** Database engine instance + power of PaaS
- ✔ **Azure SQL Database** for modern cloud apps providing you the most PaaS capabilities



Additional Resources:

[Pricing Calculator](#)

[Pay Less with Azure](#)

[Choose the right deployment option in Azure SQL](#)

[Purchasing models](#)

[Service tiers](#)
[vCore Model](#)

[AzureSQL Blog](#)