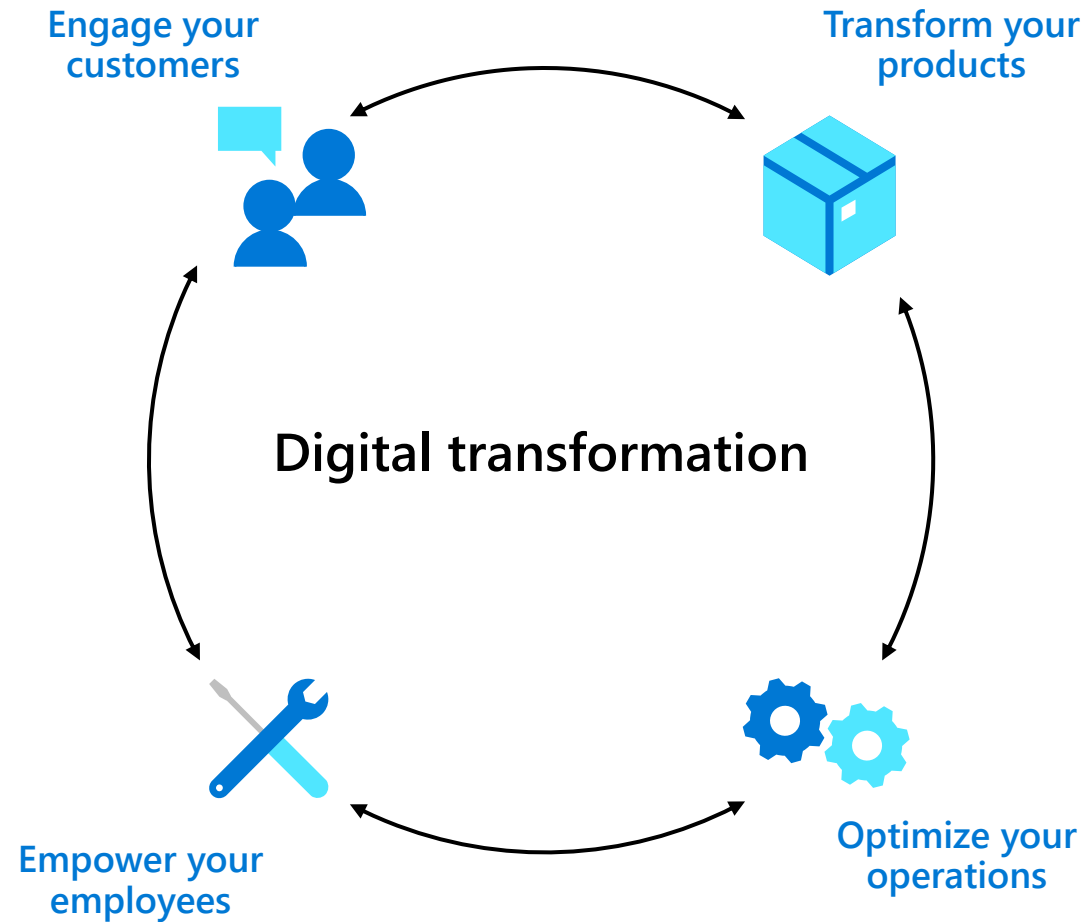




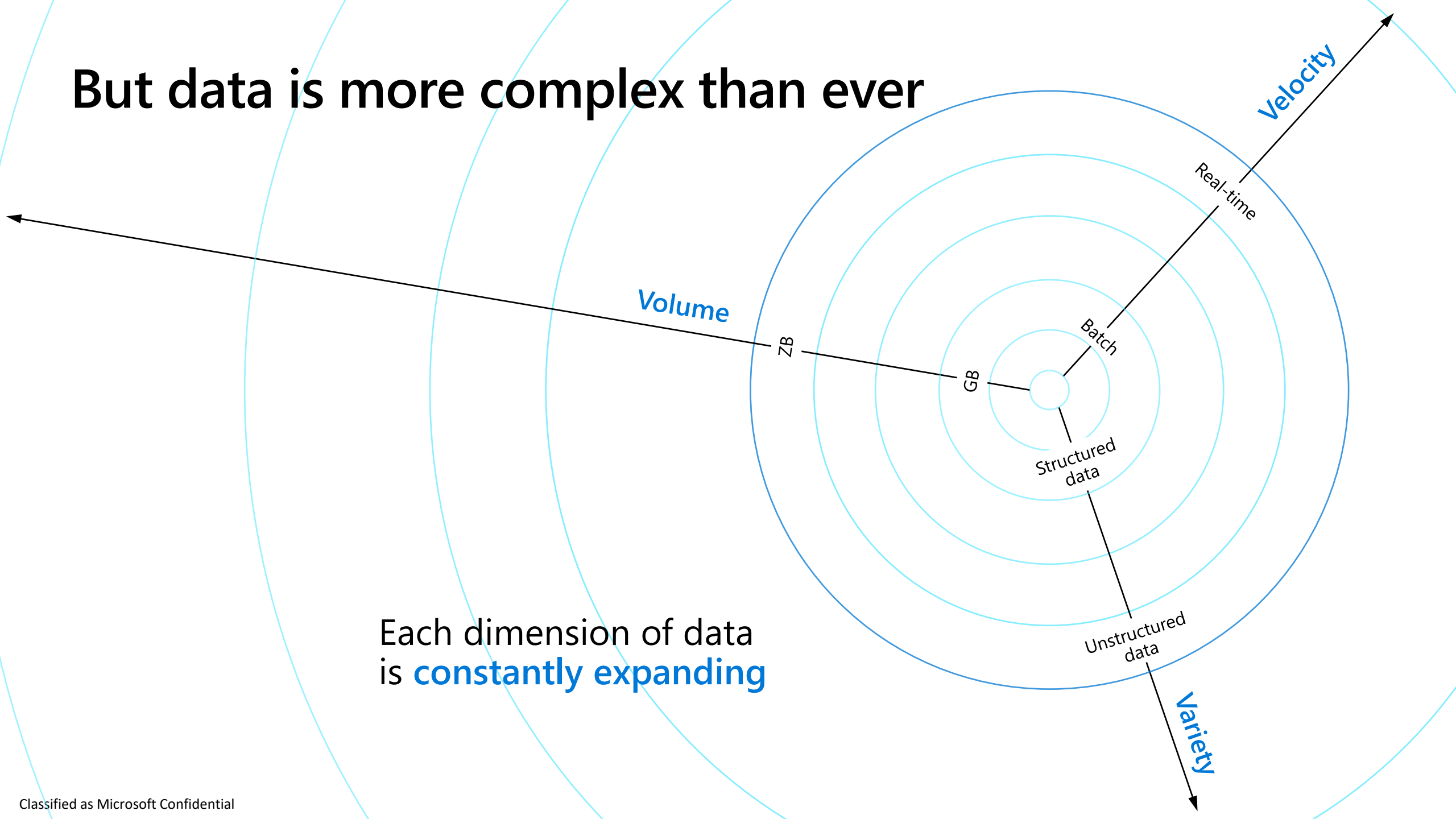
Modernize in the cloud with Azure SQL Database

Field Walking Deck

Technology is shaping how businesses innovate and grow



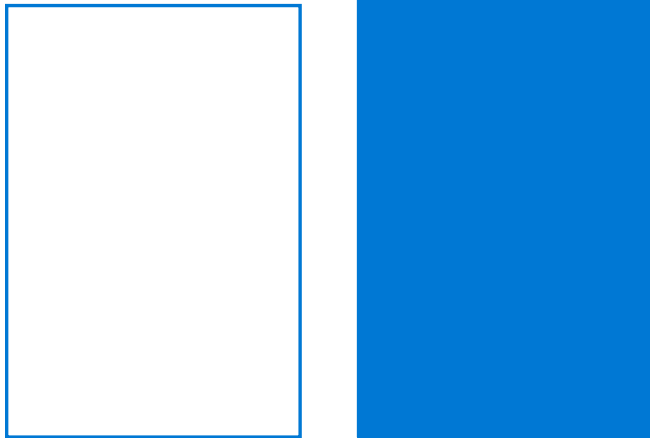
But data is more complex than ever



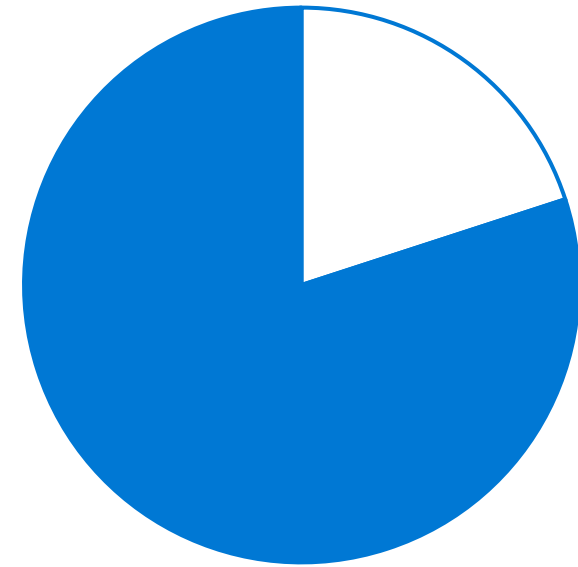
Each dimension of data
is **constantly expanding**

Getting ahead means getting to the cloud

Companies that embrace the cloud
grow **19.6% faster**



More than **80% of organizations**
now adopt cloud-first strategies



IT optimization is key to digital transformation

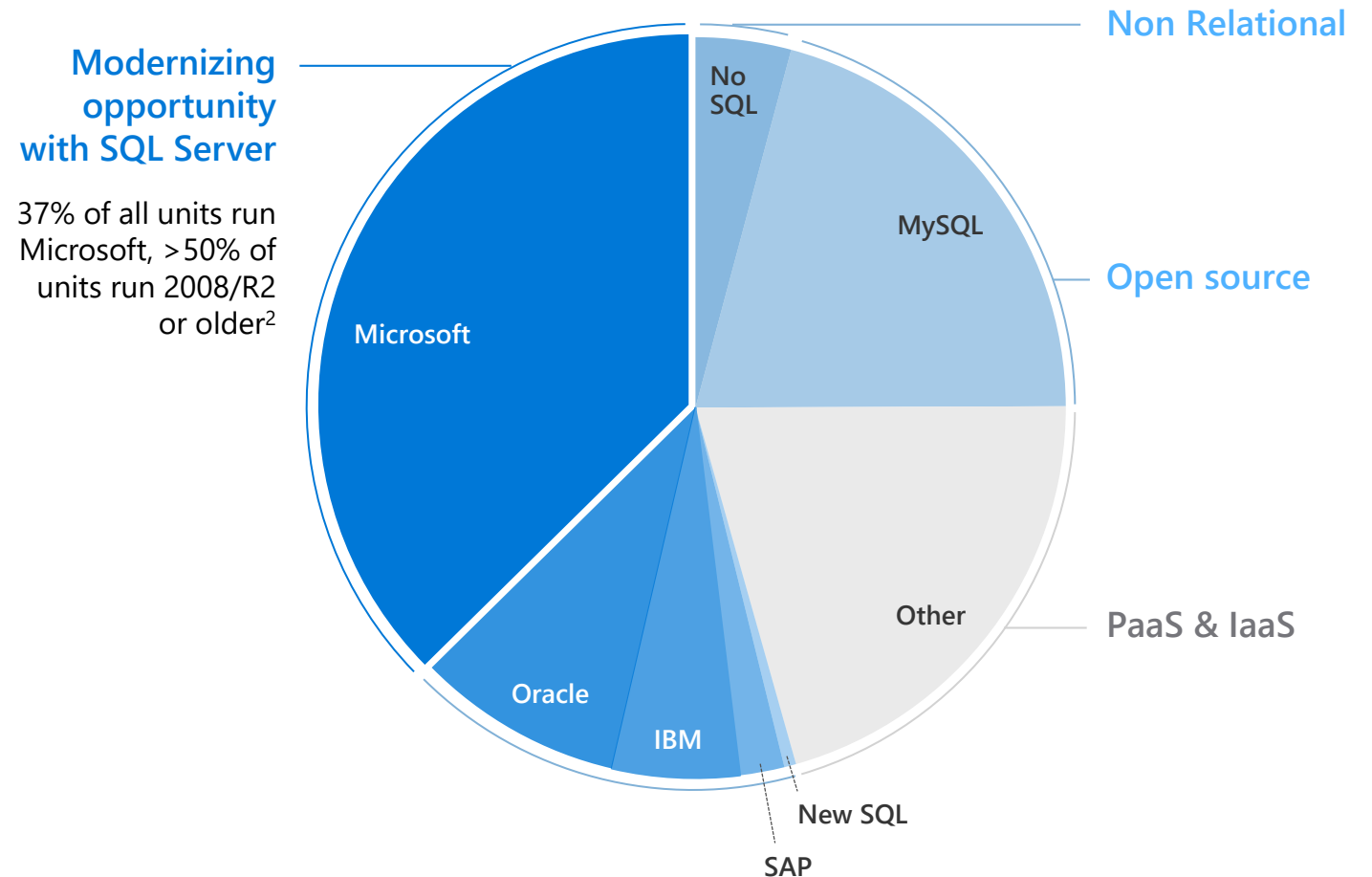
Priorities

Eliminate time spent managing “long tail” of applications – lift and shift to managed cloud

Free up limited IT resources to drive transformation

Migrate business critical apps to cloud – extend and innovate

IDC Worldwide Database Server Forecast

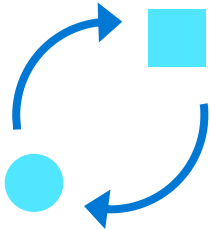


¹Pie Chart ²IDC Worldwide DB Forecast Dec 2016

Migrate to the cloud with Azure SQL Database

Unparalleled security and performance of SQL in a fully managed environment

Seamless and
compatible



The broadest SQL
Server compatibility and
VNET support

Competitive TCO



Up to 80% savings with
Azure Hybrid Benefit
and reserved capacity

Breakthrough
productivity &
performance



Up to 100 TB of on-
demand scalable
storage per DB

Industry-leading
security



Layers of security and
99.99 percent
availability SLA

Built-in
intelligence



Intelligent performance
tuning and intelligent
protection

The best and most economical cloud destination

Migrating SQL Server workloads to the cloud is key to future growth

Migration challenges

- ⚠ Eliminating the costs of re-architecting apps for the cloud
- ⚠ Maintaining security isolation from other tenants in the cloud
- ⚠ Addressing the complexity and time commitment for cloud migration

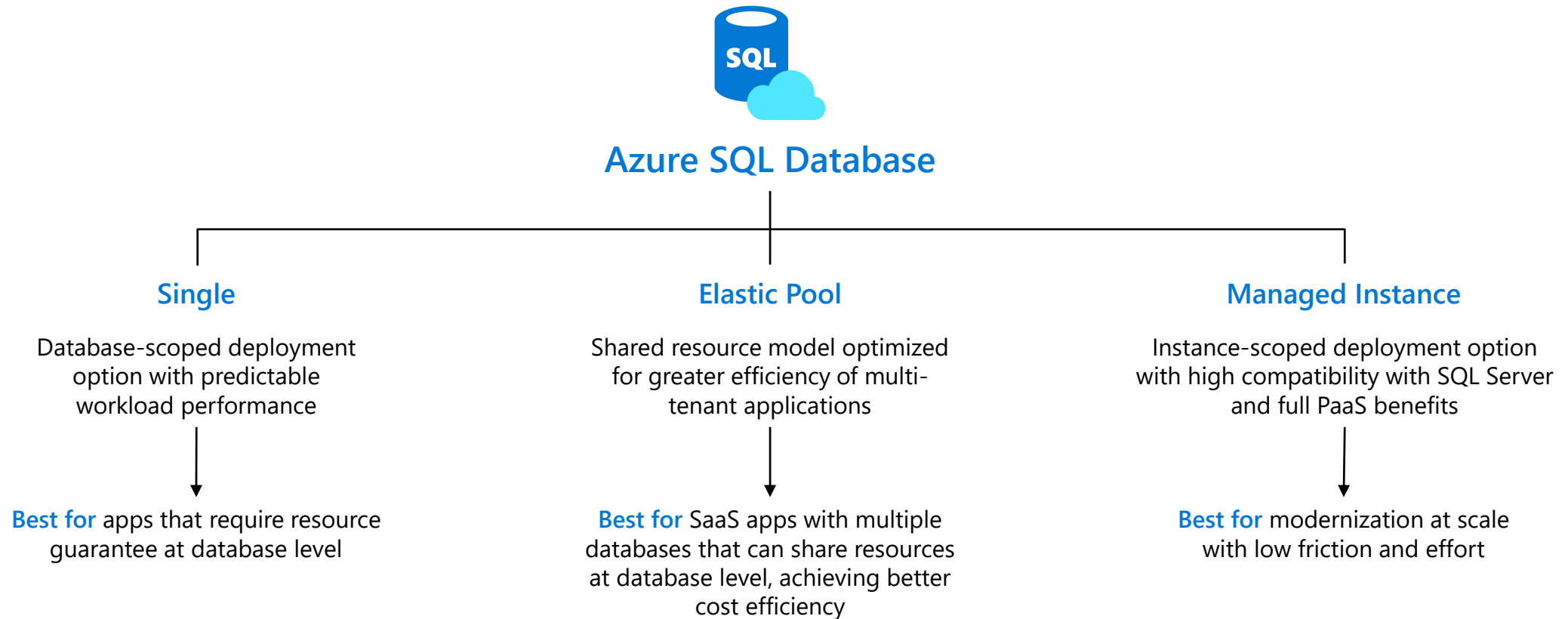
Azure SQL Database offers the most seamless path to the cloud



Azure SQL Database solutions

- ✓ Managed Instance combines the best of SQL Server with the operational and financial benefits of the cloud
- ✓ Native Virtual Network (VNET) support with Managed Instance
- ✓ Database Migration Service migrates from multiple sources at scale to accelerate the transition to the cloud

Azure SQL Database hosting options

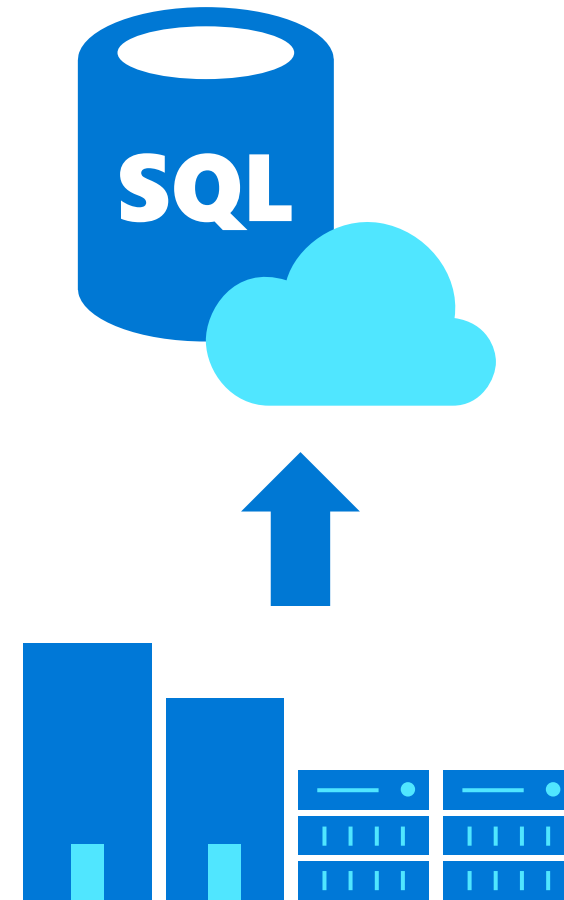


Azure SQL Database Managed Instance

Combining the best of SQL Server with the benefits of a fully-managed, intelligent service

- Full SQL Server surface area
- Native VNET integration
- Always up to date
- Built-in HA with Always-on
- 99.99% SLA out of the box
- Built-in intelligent performance and security

Migrating to Managed Instance means virtually no code changes to your apps



Dedicated resources and familiar tools

Enable full isolation from other tenants without resource sharing

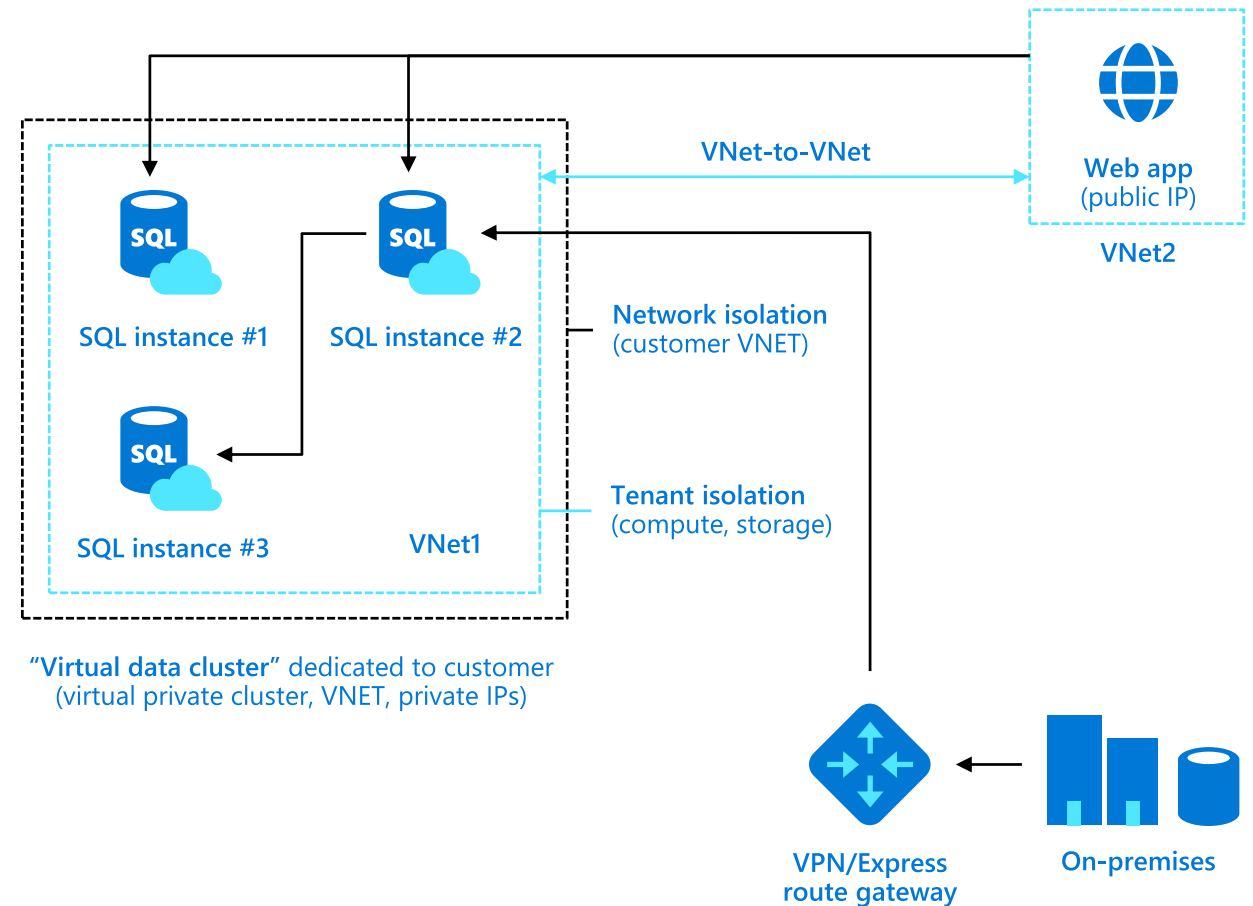
Promote secure communication over private IP addresses with native VNET integration

Enable your on-premise identities on cloud instances, through integration with Azure Active Directory and AD Connect

Combine the best of SQL Server with the benefits of a fully-managed service

Use familiar SQL Server features in SQL Database Managed Instance

VNET support in SQL Database Managed Instance



Accelerate the journey with Azure Database Migration Service

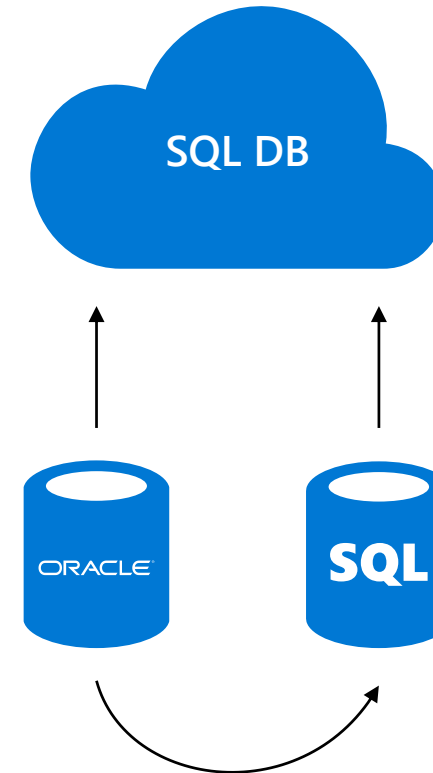
Fully managed Azure service platform for seamless and frictionless data migration at scale

Database migrations with minimal downtime

Migrate SQL Server & 3rd party databases to Azure SQL Database

Built for scale and reliability

Azure Database Migration Service



The deep costs of on-premises data management

Total cost of ownership challenges

- ⚠ Significant on-premises operational and infrastructure costs
- ⚠ Recouping on-premises licensing investments in the cloud
- ⚠ Managing costs across unpredictable or variable workloads
- ⚠ Demonstrating ROI on dev/test and non-production workloads

Azure SQL Database offers the most cost effective path to the cloud



Azure SQL Database solutions

- ✓ Reduce costs with a fully-managed, intelligent relational cloud database
- ✓ Leverage your on-premises licenses in the cloud with Azure Hybrid Benefit
- ✓ Save even more by prepaying for compute resources with reserved capacity pricing
- ✓ Save on dev/test workloads with discounted dev/test pricing

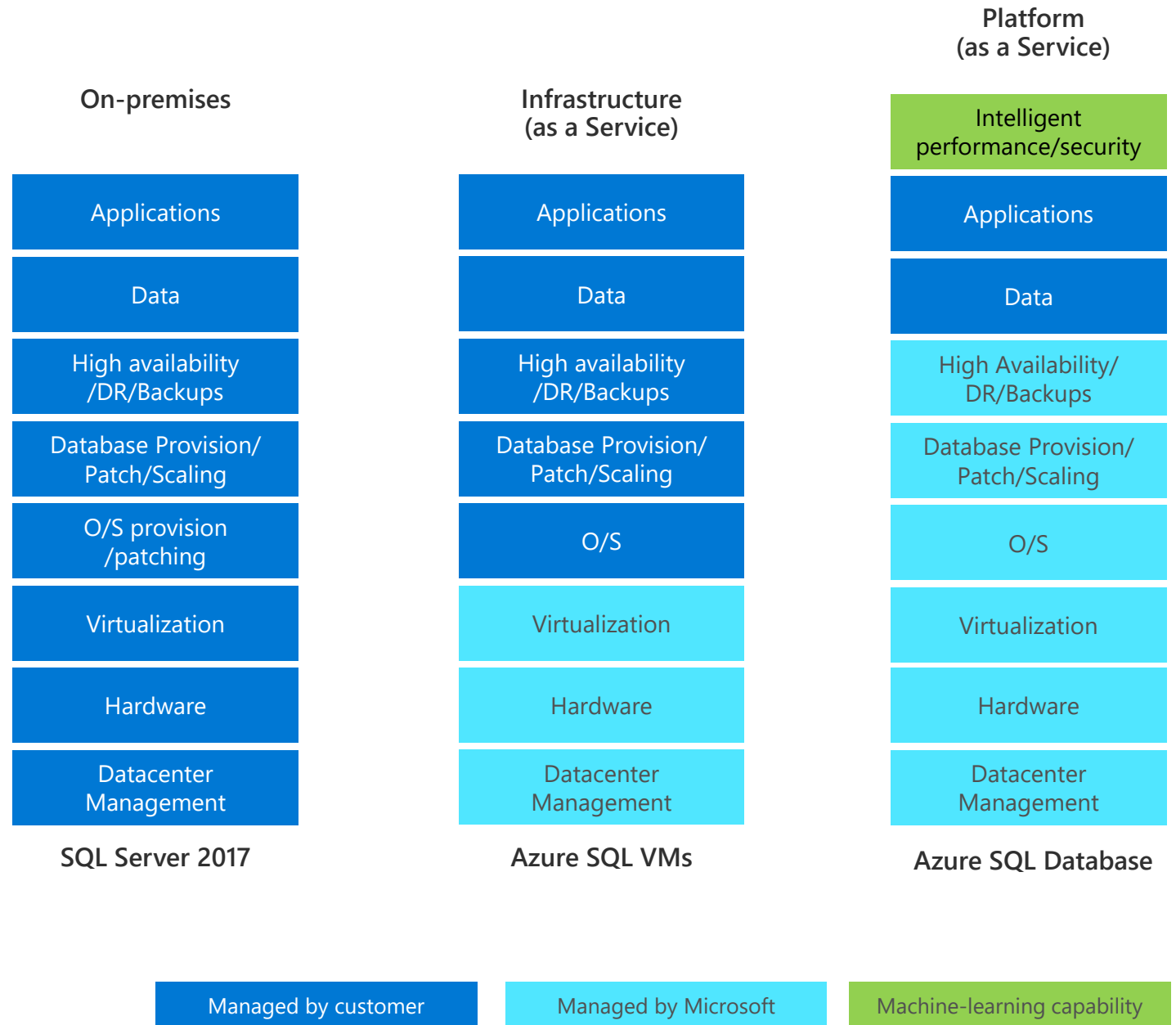
Saving opportunity for modernizing your data estate is significant

On-premises costs tend to be driven by hardware and data center management costs

Infrastructure-as-a-Service reduces cost categories related to data center and compute

Platform-as-a-Service off-loads customers' most administrative tasks to Azure, further improving efficiency with machine-learning capabilities for performance and security

- **Managed Instance:** instance-level deployment for lift-shift existing apps to Azure, fully backward compatible
- **Single database:** database-level deployment for new apps

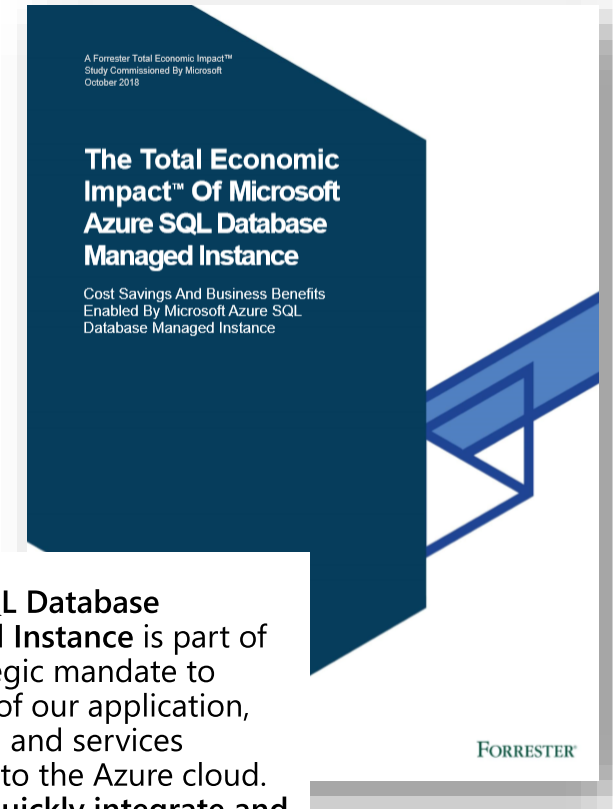
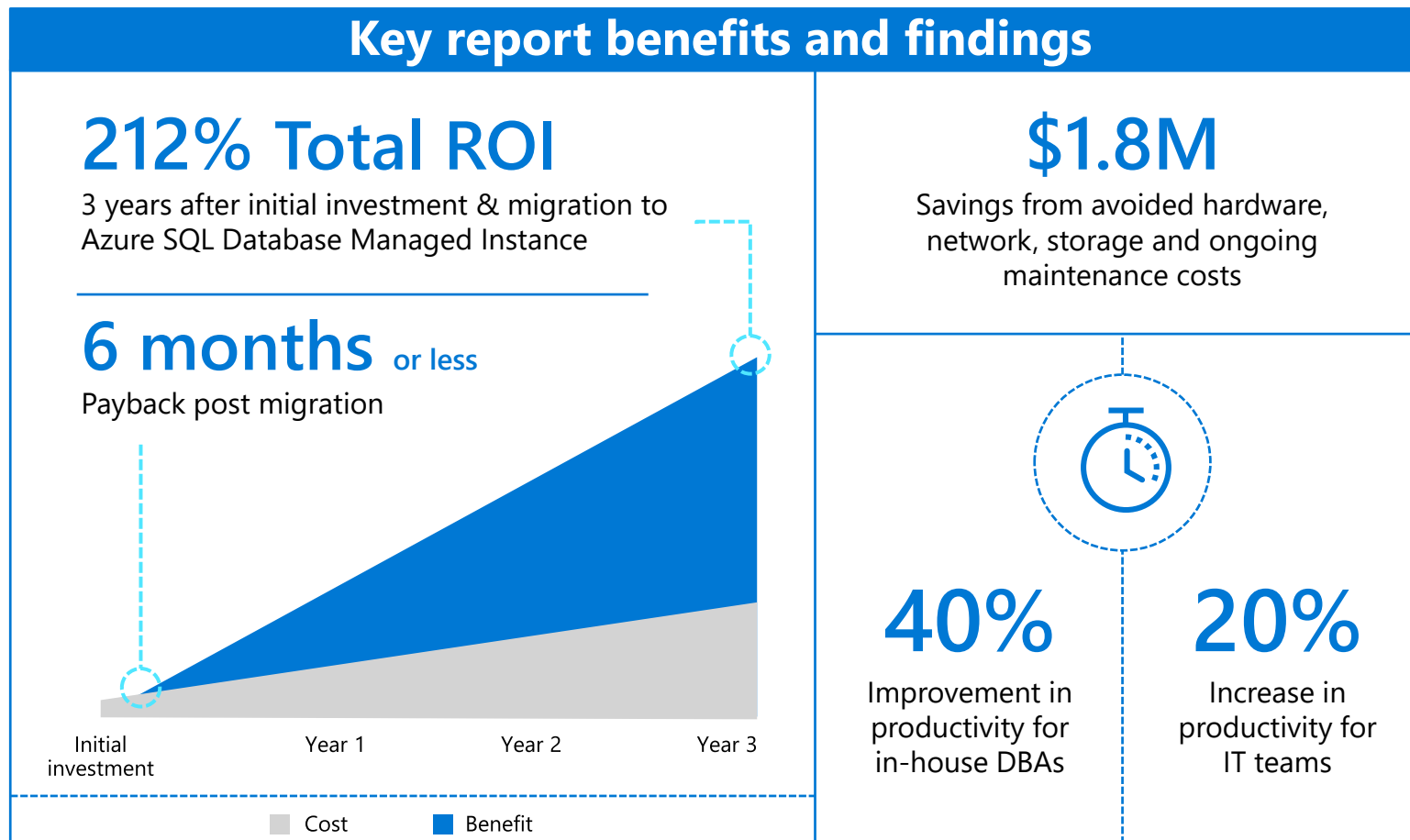


Focus on your business

Your work so far	How SQL Database helps
Hardware purchasing and management	Built-in scale on-demand
Protect data with backups (with health checks and retention)	Built-in point-in-time restore
High availability implementation	Built-in 99.99% SLA and auto-failover
Disaster recovery implementation	Built-in geo-redundancy and geo-replication
Ensure compliance with standards on your own	Built-in easy to use features
Secure your data from malicious users and mistakes	Built-in easy to use features
Role out updates and upgrades	Built-in updates and upgrades
Monitor, troubleshoot, and manage at scale	Built-in easy to use features
Tune and maintain for predictable performance	Built-in easy to use features
	We take care of database chores

The Total Economic Impact of Azure SQL Database Managed Instance

Microsoft commissioned Forrester Consulting to conduct a Total Economic Impact™ study to examine potential cost savings and business benefits enterprises would achieve from migrating on-premises workloads to Azure SQL Database Managed Instance.



“

Azure SQL Database Managed Instance is part of our strategic mandate to move all of our application, database, and services footprint to the Azure cloud. We can quickly integrate and are more nimble and more efficient as a result.

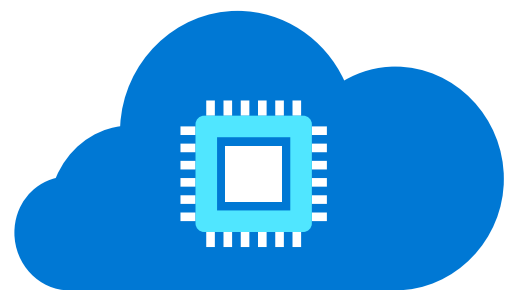
*Head of development,
technology company*

”

Download the full Total Economic Impact™ of Azure SQL Database Managed Instance report at aka.ms/ForresterTEI_SQLDB_ManagedInstance

Committed to choice

What is a virtual core (vCore)?



Flexible, transparent, independently-defined resource options

- Representation of compute power in the cloud via the logical CPU available for your server
- Configure compute and storage independently
- Enables right-sizing the destination environment by translating on-premises requirements
- Best if you value flexibility, control and transparency

Choose from three storage architectures in the vCore-based model



	General purpose	Hyperscale	Business critical
Best for	Most budget-oriented workloads	VLDB workloads with highly scalable storage and read-scale requirements	Critical business applications with high IO requirements.
Compute tiers	1, 2, 4, 8, 16, 24, 32, 40, 80 vCores		
Storage	Premium remote 32GB – 8TB per instance	Local SSD Auto-scale up to 100TB of storage	Local SSD 32GB – 4TB per instance
HA	1 replica, no read-scale	Multiple replicas, up to 15 read-scale, partial local cache	3 replicas, 1 read-scale replica, zone-redundant HA
In-Memory	Not supported	Not supported	Supported

The vCore-based model opens the door to additional savings from Azure Hybrid Benefit, reserved capacity pricing and dev/test pricing

Azure is the most cost-effective cloud for SQL Server

Azure Hybrid Benefit, an Azure-only benefit for customers with active SA or subscriptions on SQL Server cores



Significantly reduce the costs of migrating to the cloud



Pay only the 'base rate' in Azure on SQL Server on Azure VM (IaaS), Azure SQL Database (PaaS), and ADF v2 SSIS



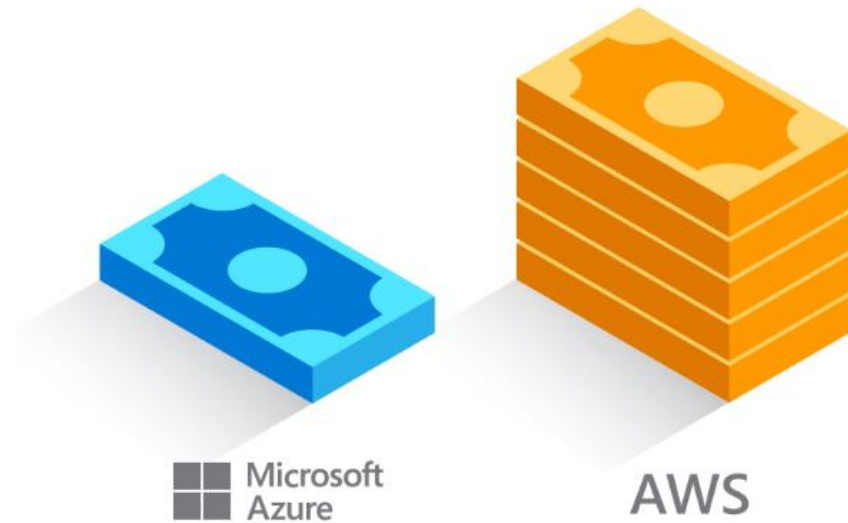
Available for SQL Server core licenses only



Customers can use on premises cores or cloud vCores



Cores can be used on-premises and in Azure simultaneously for up to 180 days, to allow for migration



AWS is 5x more expensive than Azure

[Azure vs. AWS homepage](#)
[5x substantiation page](#)

Unique benefit for highly virtualized workloads

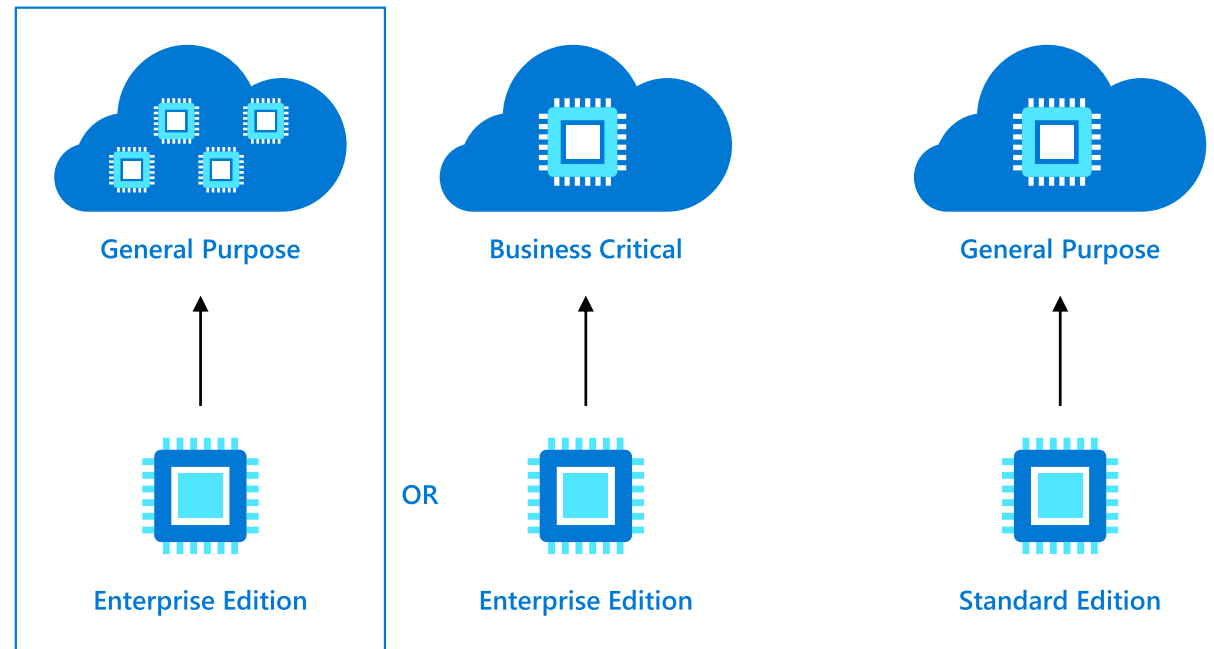
Azure Hybrid Benefit for SQL Server provides a unique benefit for highly virtualized workloads

Convert on-premises cores to vCores to maximize value of investments

1 Enterprise license core =
4 General Purpose cores (virtualization benefit)

SQL Server license trade-in values

SQL Database vCore-based options



SQL Server with Software Assurance

Reserved Capacity for Azure SQL Database

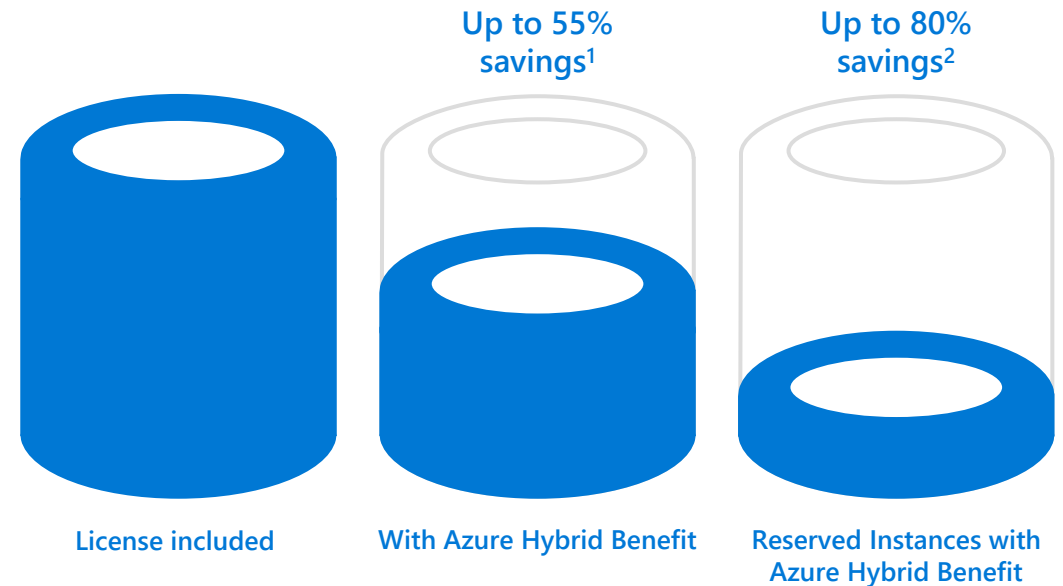
Prepay Azure SQL Database resources in advance and save up to 33%

Budget and forecast better with upfront payment for one-year or three-year terms

Exchange or cancel reservations as your needs evolve

Scale up or down within a performance tier and region with auto-fit

Move SaaS apps between elastic pools and single databases and keep your reserved instance benefit



¹ Savings based on eight vCore Managed Instance Business Critical in East US Region, running 730 hours per month. Savings are calculated from full price (license included) against base rate (applying Azure Hybrid Benefit for SQL Server), which excludes Software Assurance cost for SQL Server Enterprise edition, which may vary based on EA agreement. Actual savings may vary based on region, instance size and performance tier. Prices as of May 2018, subject to change.

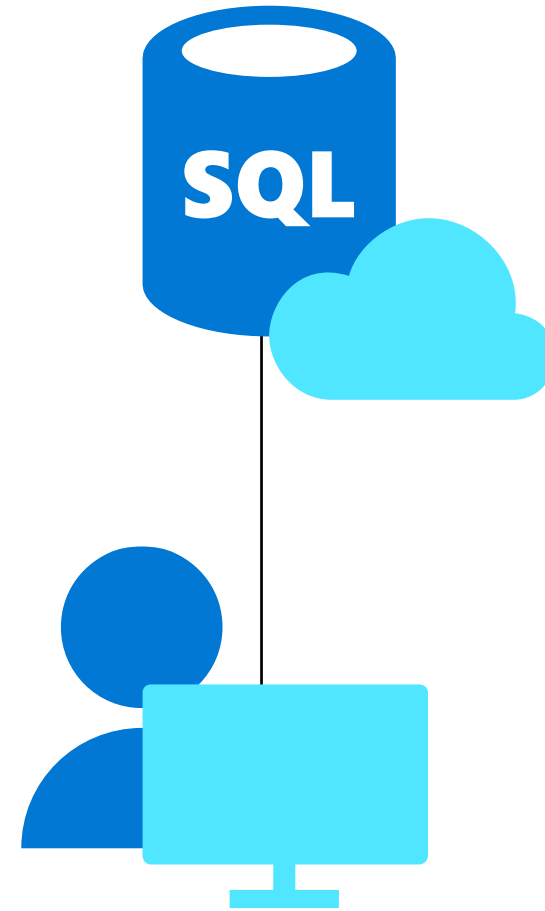
² Savings based on eight vCore SQL Database Managed Instance Business Critical in West 2 US Region, running 730 hours per month. Savings are calculated from on demand full price (license included) against base rate with Azure Hybrid Benefit plus 3-year reserved capacity commitment. Savings excludes Software Assurance cost for SQL Server Enterprise edition, which may vary based on EA agreement. Actual savings may vary based on region, instance size and performance tier. Prices as of May 2018, subject to change.

Azure Dev/Test pricing for SQL Database

Discounted rates up to 55% off to support your ongoing development and testing

Dev/Test pricing available for vCore-based deployment options

Eligible with active Visual Studio subscription



Inefficient data management and performance limitations

Productivity and performance challenges

- ⚠ Managing trade-offs between growth and VLDB performance
- ⚠ Throughput and latency block path to faster data insights
- ⚠ Inability to effectively scale for multitenancy

Breakthrough productivity and performance for workloads large and small



Azure SQL Database solutions

- ✓ Quickly Hyperscale to 100TB regardless of size of data operation
- ✓ Faster transactions, queries and insights with in-memory OLTP and analytics
- ✓ Multi-tenant apps easily built in a preferred environment

Hyperscale your database

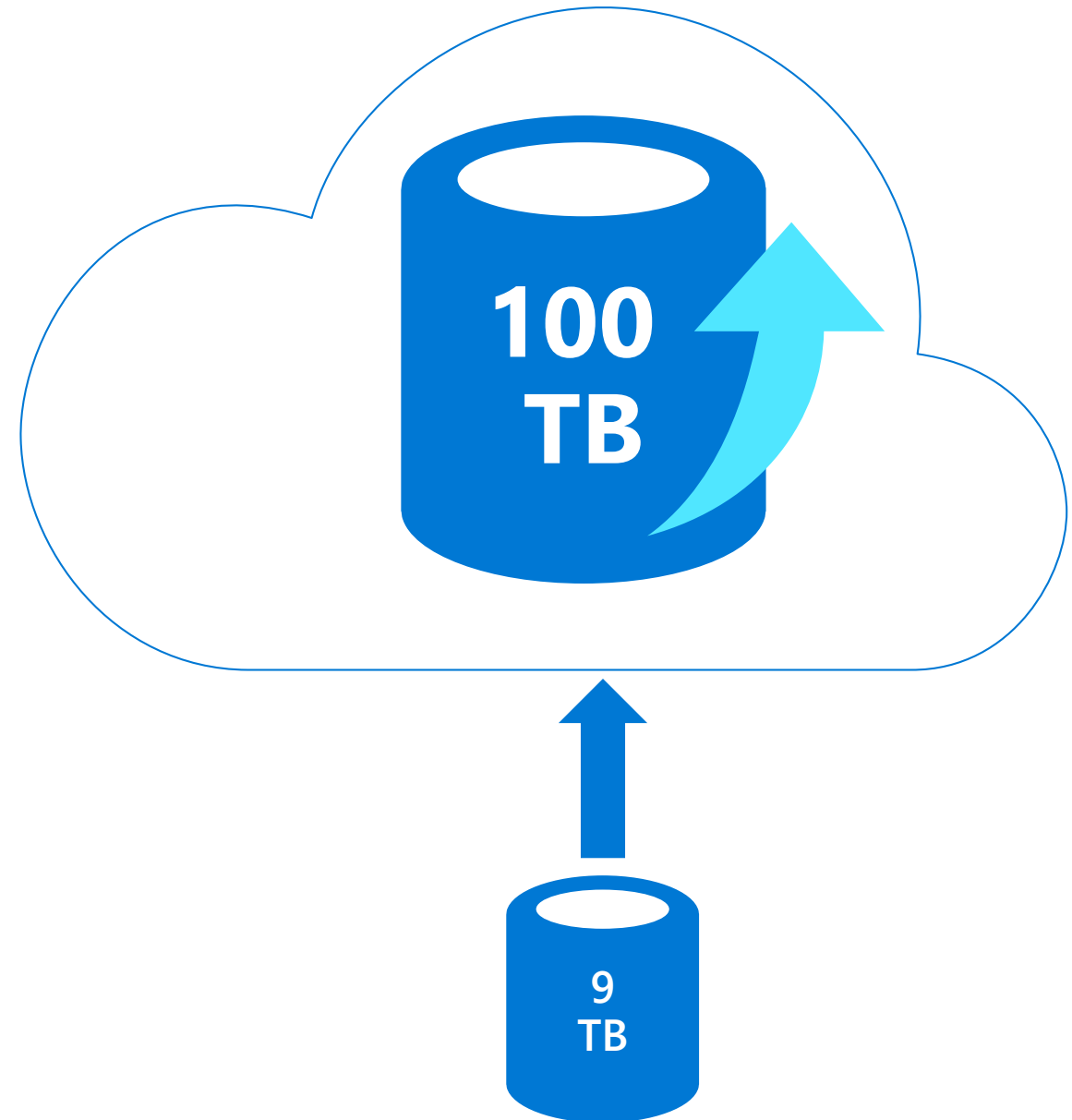
Hyperscale is a new, highly scalable service tier that adapts on-demand to your workload's needs, auto-scaling up to 100TB per database.

Storage dynamically adapts to your workloads' needs, auto-scaling up to 100TB.

Provision one or more additional compute nodes that can serve your read-only workload and use them as a hot-standby, in case of failover.

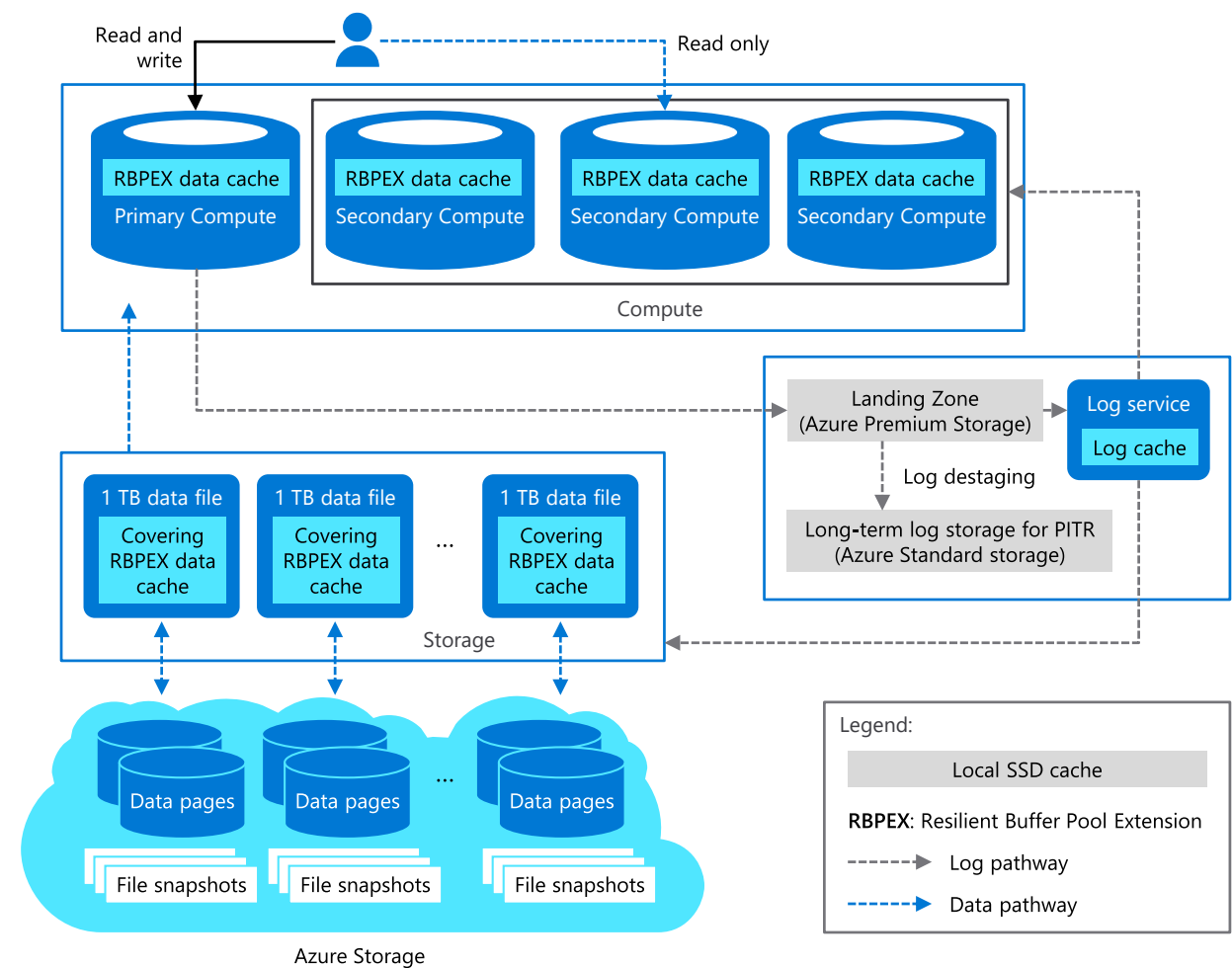
Perform operations in constant time, regardless of the size of the data operation.

Compute and storage resources scale rapidly and independently without sacrificing performance.

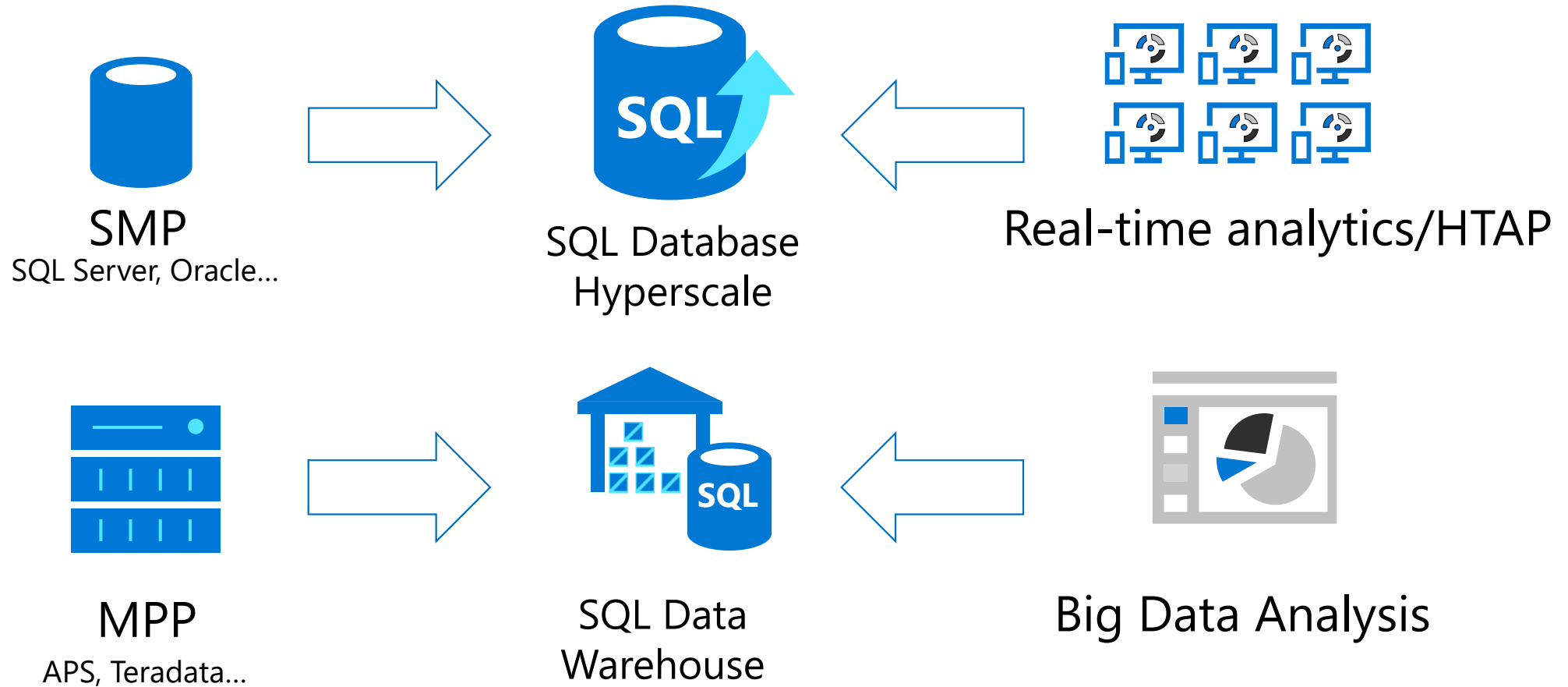


Built on a new cloud-born architecture

Hyperscale decouples compute, log and storage



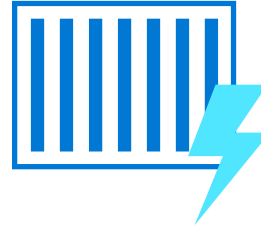
Choose Hyperscale for your data marts



Breakthrough productivity and performance

Realize the benefits of real-time operational analytics

Enable scale-up with near zero downtime through cloud-born innovation



30x
faster transactions with in-memory OLTP



100x
performance gains with in-memory analytics

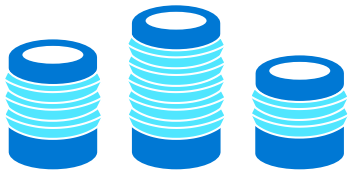


near **100%**
uptime with dynamic scalability

Increase productivity with elastic databases

Manage and monitor multi-tenant apps with the isolation benefits of one customer per database

Free yourself from the administration overhead of designing, buying, building, and managing each customer's environment



Elastic database pools
and elastic database
pricing model



Elastic database tools:
client library and
split-merge service



Elastic database job



Elastic database
queries (preview) and
transactions

Security threats are more present than ever

Security challenges

- ⚠ Inability to protect data 24x7
- ⚠ Threat monitoring is limited and inconsistent
- ⚠ More compliance standards require better access control

Protect your data at all times with Azure SQL Database



Azure SQL Database solutions

- ✓ Protect sensitive data with Always Encrypted and Dynamic Data Masking
- ✓ Proactively monitor for vulnerabilities and threats with intelligent Advanced Threat Protection
- ✓ Enable database access control with Azure Active Directory and multi-factor authentication

Always Encrypted

Overview

Protect data at rest and in motion, on premises and in the cloud

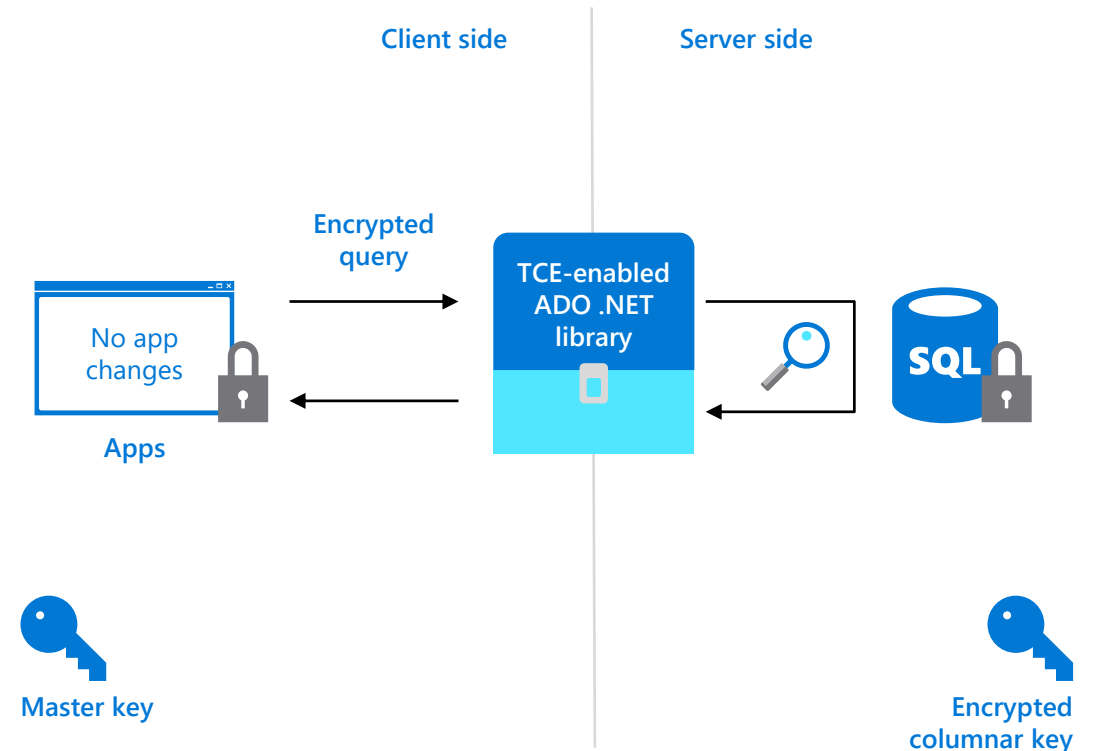
Transparent client-side encryption, while SQL Server executes T-SQL queries on encrypted data

Benefits

Sensitive data remains encrypted and queryable at all times on-premises and in the cloud

Unauthorized users never have access to data or keys

No application changes



Dynamic data masking

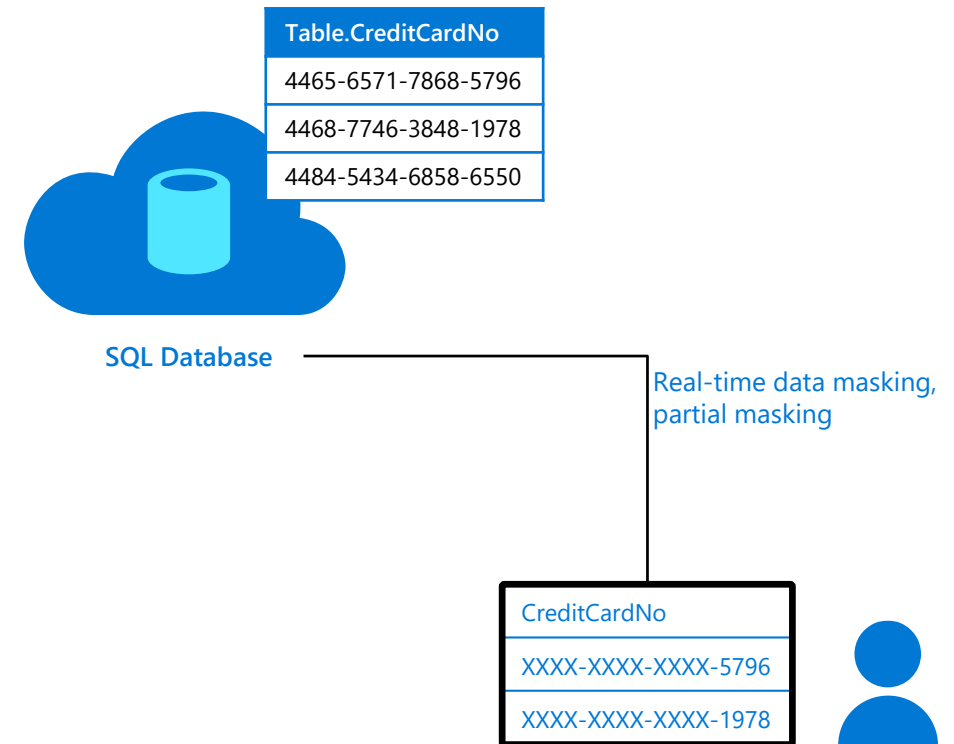
Prevent abuse of sensitive data by hiding it from users

Easy configuration in new Azure Portal

Policy-driven at table and column level, for a defined set of users

Data masking applied in real-time to query results based on policy

Multiple masking functions available, such as full or partial, for various sensitive data categories (credit card numbers, SSN, etc.)



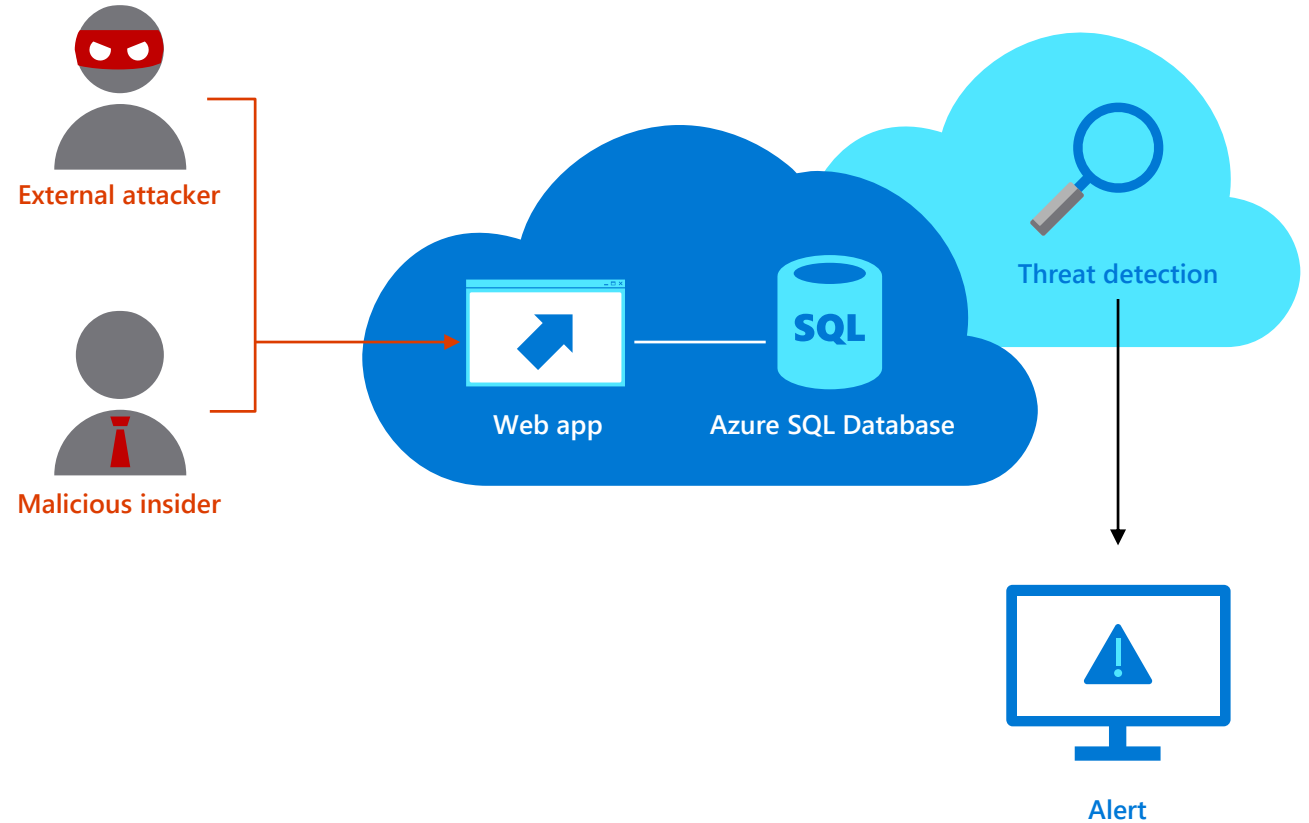
Threat detection

Detect anomalous database activities that could indicate a potential threat

Configure threat detection policy in Azure Portal

Receive alerts from multiple database threat detectors that identify anomalous activities

Explore audit log around the time of an event



Vulnerability Assessment

Get visibility

Discover sensitive data and potential security holes

Remediate

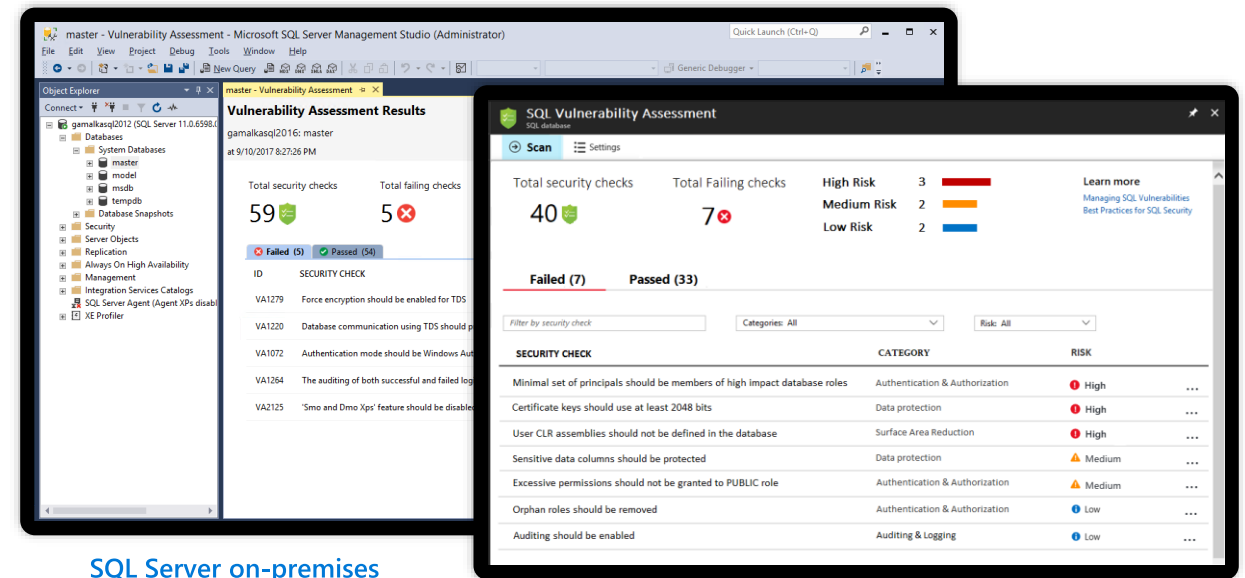
Actionable remediation and security hardening steps

Customize

Baseline policy tuned to your environment, allowing you to focus on deviations

Report

Pass internal or external audits to facilitate compliance



SQL Server on-premises

Azure SQL Database



Vulnerability Assessment

Identifies, tracks, and resolves SQL security vulnerabilities



Developer/DBA

Information Protection

Discover, classify and protect sensitive data

Protect the data, not just the database

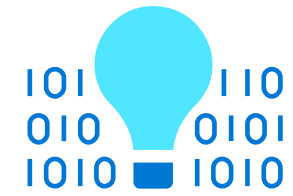
Gain visibility to sensitive data located in servers, databases and table columns

Promote compliance and adherence to GDPR

Enable persistent labeling with metadata that flows with data outside the database boundaries

Classify sensitive data through multiple approaches: manual, recommended, automatic classification, E2E with MIP

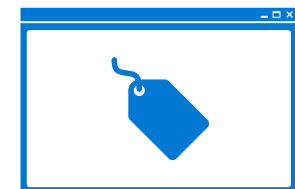
Audit access to sensitive data



Discover



Classify



Label

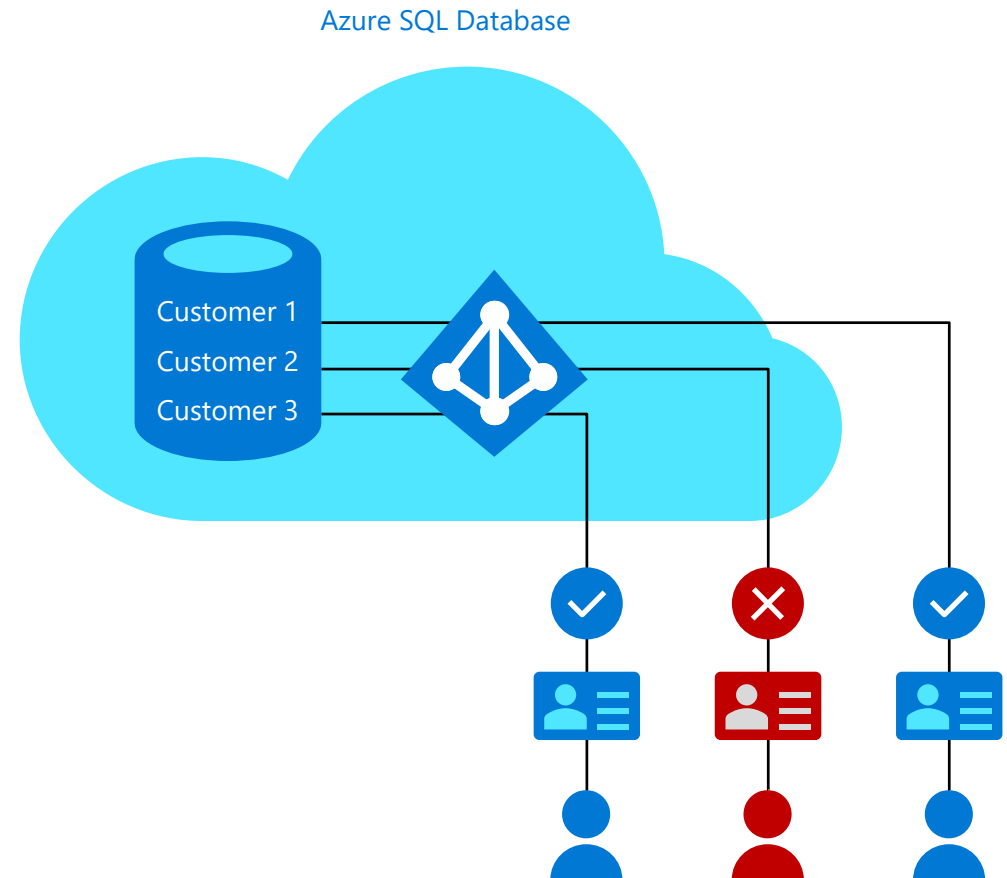
Azure Active Directory and multifactor authentication

Overview

- Manage user identities in one location
- Enable access to Azure SQL Database and other Microsoft services with Azure Active Directory user identities and groups

Benefits

- Alternative to SQL Server authentication
- Limits proliferation of user identities across databases
- Allows password rotation in a single place
- Enables management of database permissions by using external Azure Active Directory groups
- Eliminates the need to store passwords



Summarizing the Layers of protection



Azure Active Directory

Centrally manage and control identity and user access



Encryption

Encrypt a database, associated backups, and log files at rest—without changing your app



Data protection

Protect data at rest, in motion, or in use



Row-Level Security

Control which users can access specific row-level data



Auditing and threat detection

Get notified of potential threats with auditing tools and anomalous activity alerting



Regulatory compliance

Leverage ISO/IEC 27001/27002, Fed RAMP/FISMA, SOC, HIPPA, and PCI DSS compliance

Too many resources
spent managing data
distracts from driving
business growth

Challenges limiting growth

- ⚠ Limited resources focused on constant monitoring and optimization
- ⚠ Troubleshooting query performance complicated and time-consuming
- ⚠ Training machine learning models outside the database introduces performance and security risks

Azure SQL Database learns trends and applies intelligence for greater performance



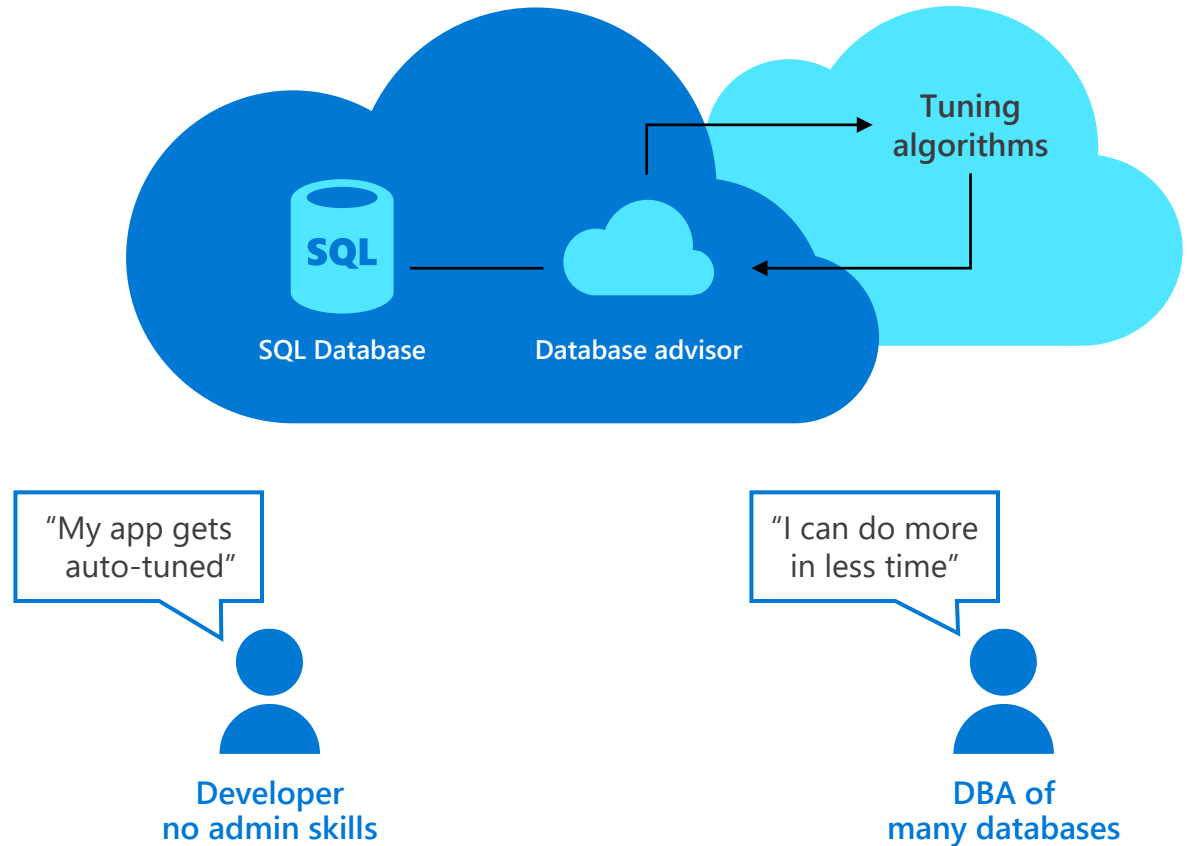
Azure SQL Database solutions

- ✓ Automatic tuning and built in services to save resources
- ✓ Adaptive Query Processing for constant performance improvements
- ✓ Machine Learning Services with R offers in-database machine learning

Built-in intelligence to protect and optimize

Intelligent Performance learns unique database patterns and automatically tunes for improved performance

Intelligent Protection powers advanced data security features that monitor, detect, and alert on malicious activities and discover, track and remediate potential database vulnerabilities



Continuously optimized by the platform

One-click to enable

Prevent and mitigate issues

No app changes needed

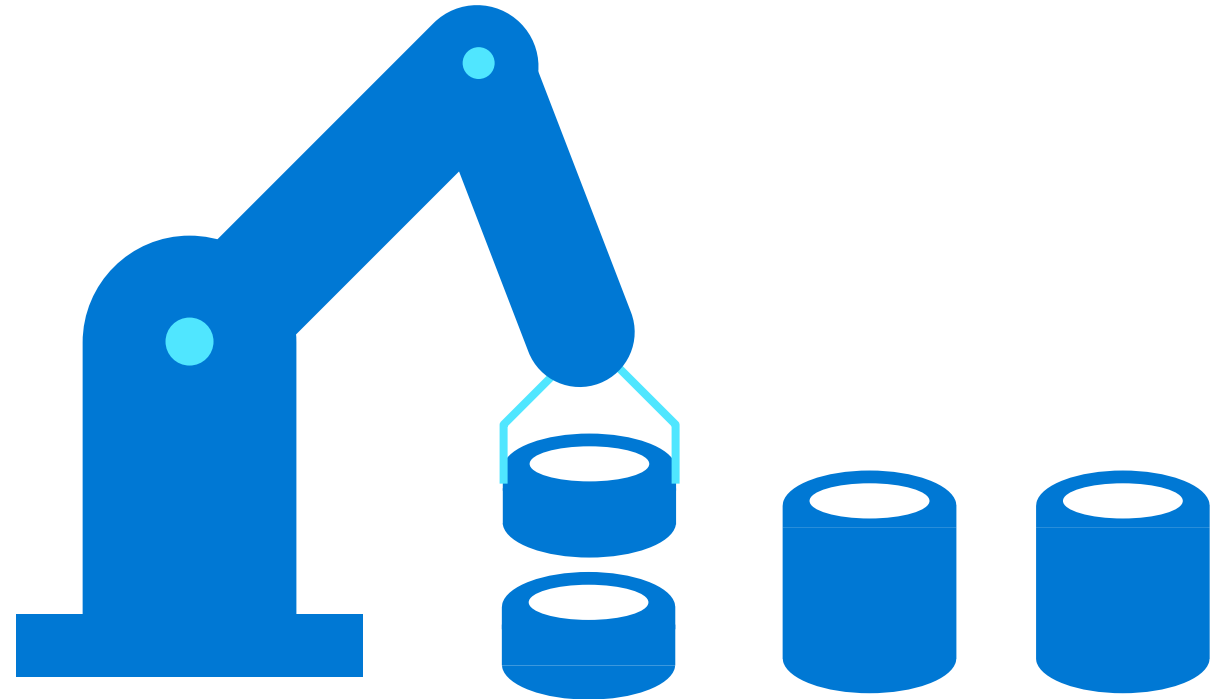
Tuning actions

- Create missing indexes

- Drop unused/duplicate indexes

- Force last good plan

Automatic tuning



Spend less time troubleshooting

SQL Database optimizes query performance for you – no additional effort required

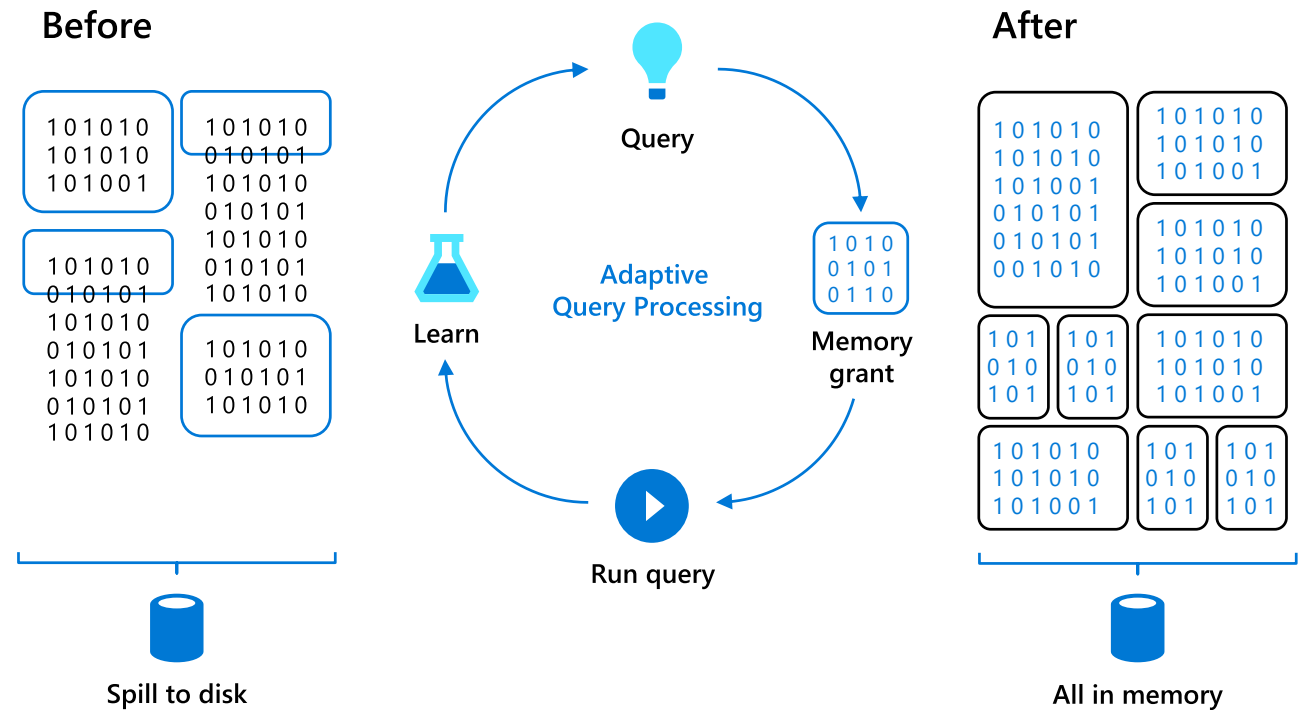
Responds and corrects memory issues for repeating queries – now for ALL workload types

Use table variables and scalar user-defined functions without performance penalties

Relational data warehouse queries automatically benefit from batch mode processing

Allow for memory efficient, high performing approximate count distinct operations on very large data sets

Adaptive Query Processing



Built-in intelligence that drives insights

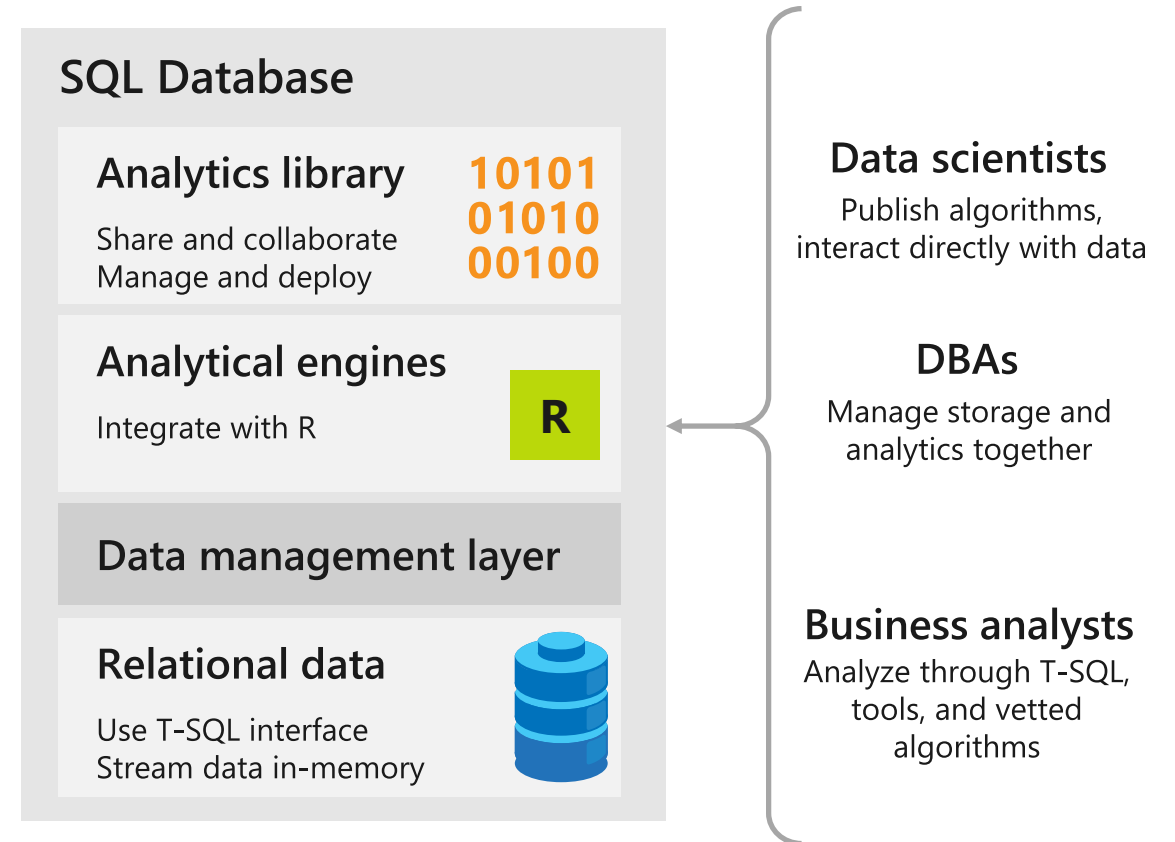
R integration enables end to end machine learning in Azure SQL Database – without moving data

Operationalize your machine learning scripts and models directly in a fully-managed database in the cloud.

Expose predictions to any application using your database, easily and seamlessly.

Take advantage of predictions via simple stored procedures for apps connecting to SQL Database.

SQL Database with Machine Learning services with R



“We were able to deploy our TimeXtender solution into production on Azure SQL Database Managed Instance in a matter of weeks. We immediately realized a 49 percent cost savings and the promise of applying artificial intelligence through machine learning to our data is an exciting opportunity for us.”

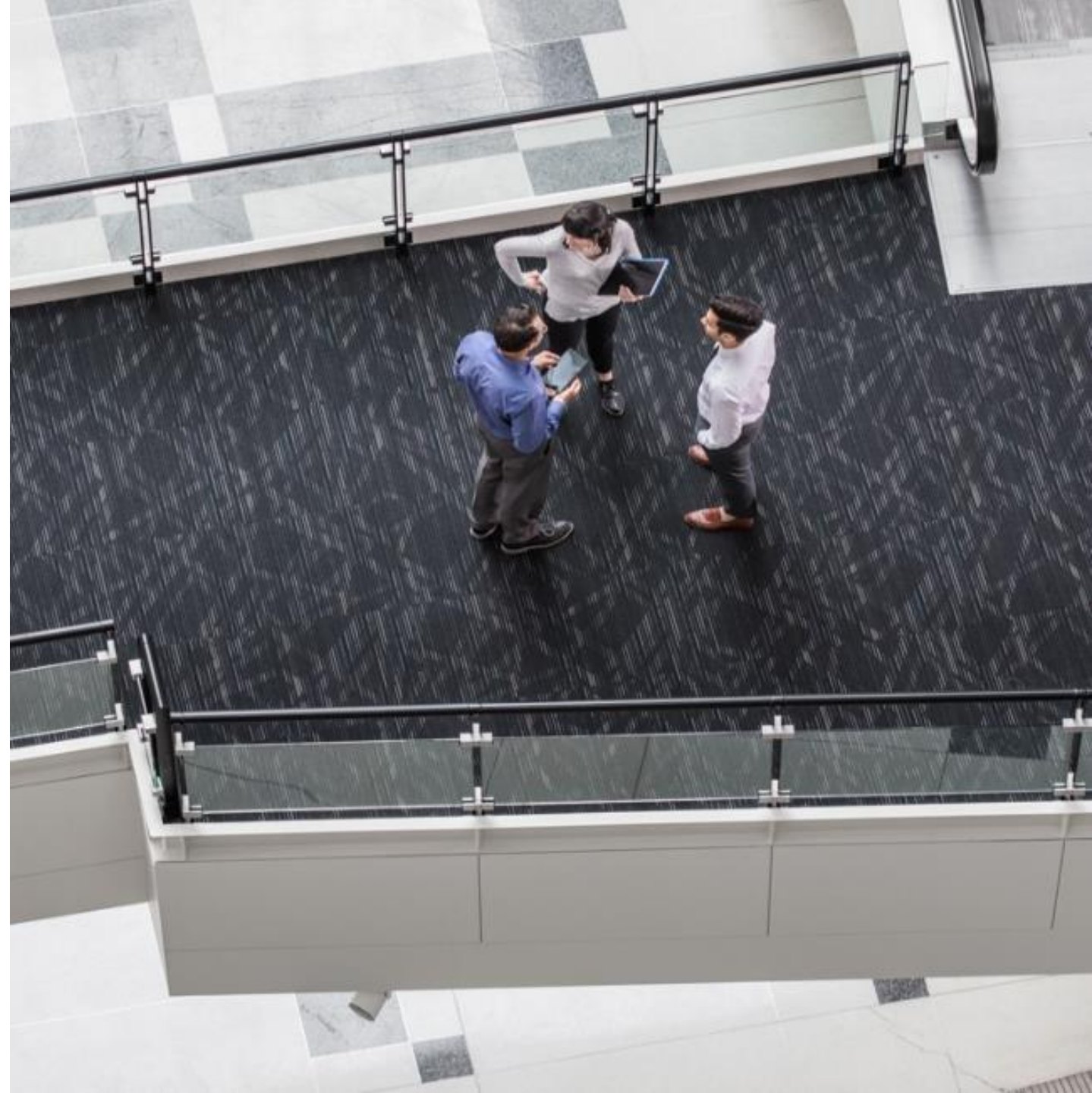


John Steele,
General Manager of Business
Technology & Systems, Komatsu
Australia



“SQL Database Managed Instance gave us a reliable database setup, without the need to worry about the underlying server, disk-system, backup or other hardware. This is invaluable because our team focus is to be database-consumers not database-caretakers.”

Charlotte Lindahl,
Project Manager, KMD



“We were able to migrate an app with zero friction to a Managed Instance, with features like CLR and SQL Agent just working. Database Migration Service will be crucial for pulling off migrations like this at scale.”



Sankar G. Prayaga
Lead Engineer, EY



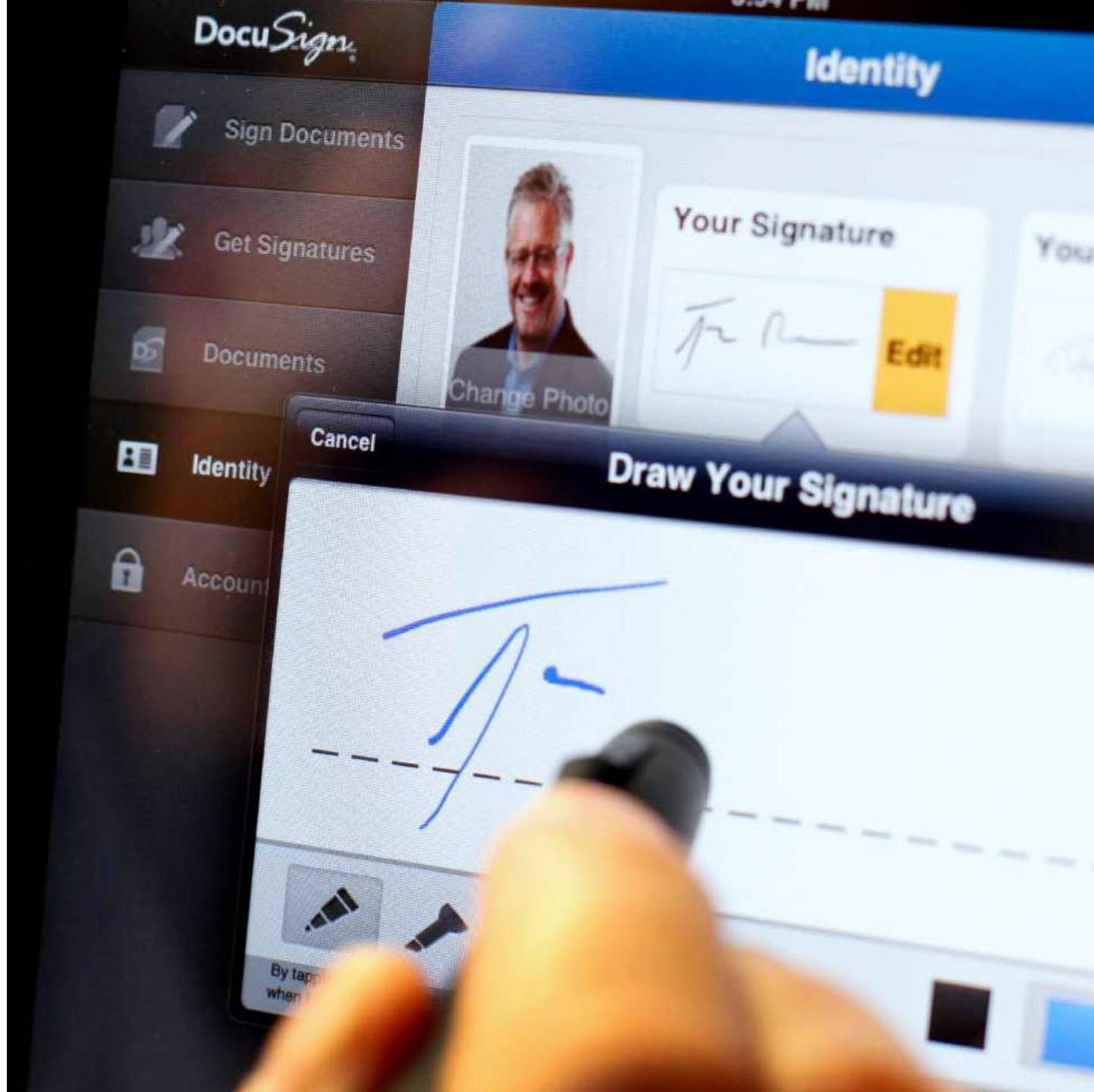
"SQL Managed Instance is that happy medium we were looking for. We needed the power and compatibility of SQL Server, but without the management overhead and cost that comes with running VMs 24x7. Not only will we get that power and ease of management, we'll also be able to use the Azure Hybrid Use benefit, which allows us to use our existing SQL Server licensing through Software Assurance. Developing, deploying and managing our application is getting a whole lot easier and cheaper with Azure and SQL Managed Instance."



Robert Shurbet
Pivot Technology Solutions



“We deploy our SQL Server schema elements into a Managed Instance and we point the application via connection string change directly over to the Managed Instance.”



[Eric Fleischman](#)
Vice-President and Chief Architect

Tools for your migration journey

Data Migration Assistant (DMA)

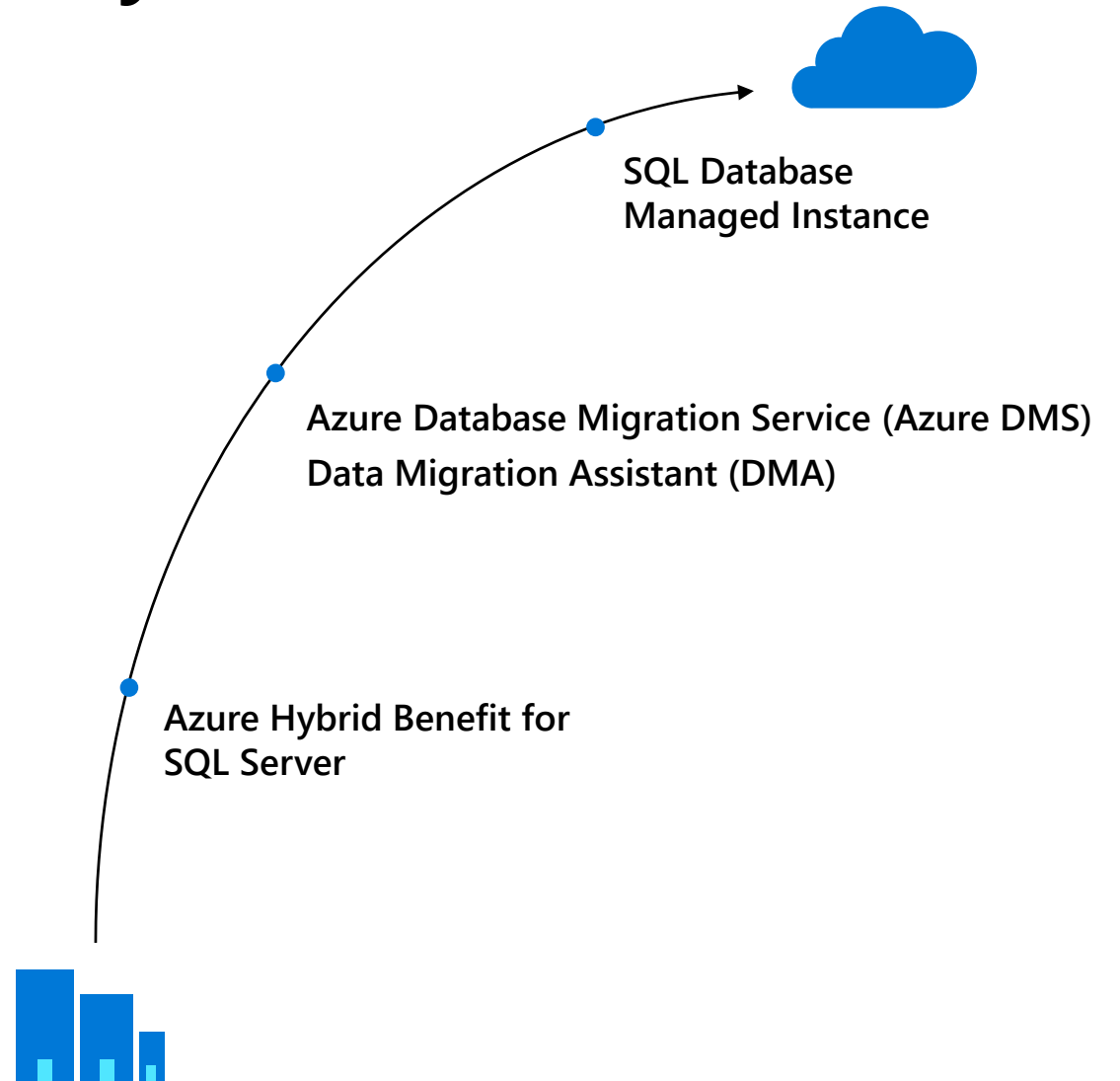
Enables upgrades to SQL Server and Azure SQL Database

Azure Hybrid Benefit for SQL Server

Maximizes current on-premises license investments to facilitate migration.

Azure SQL Database Managed Instance

Facilitates lift and shift migration from on-premises SQL Server to PaaS.



Your single destination for all things migration

Provides guidance, tools, and partners in context of your migration scenario

Enables you to:

- Build your case, find others like you

- Assess your environment

- Identify the right migration strategies

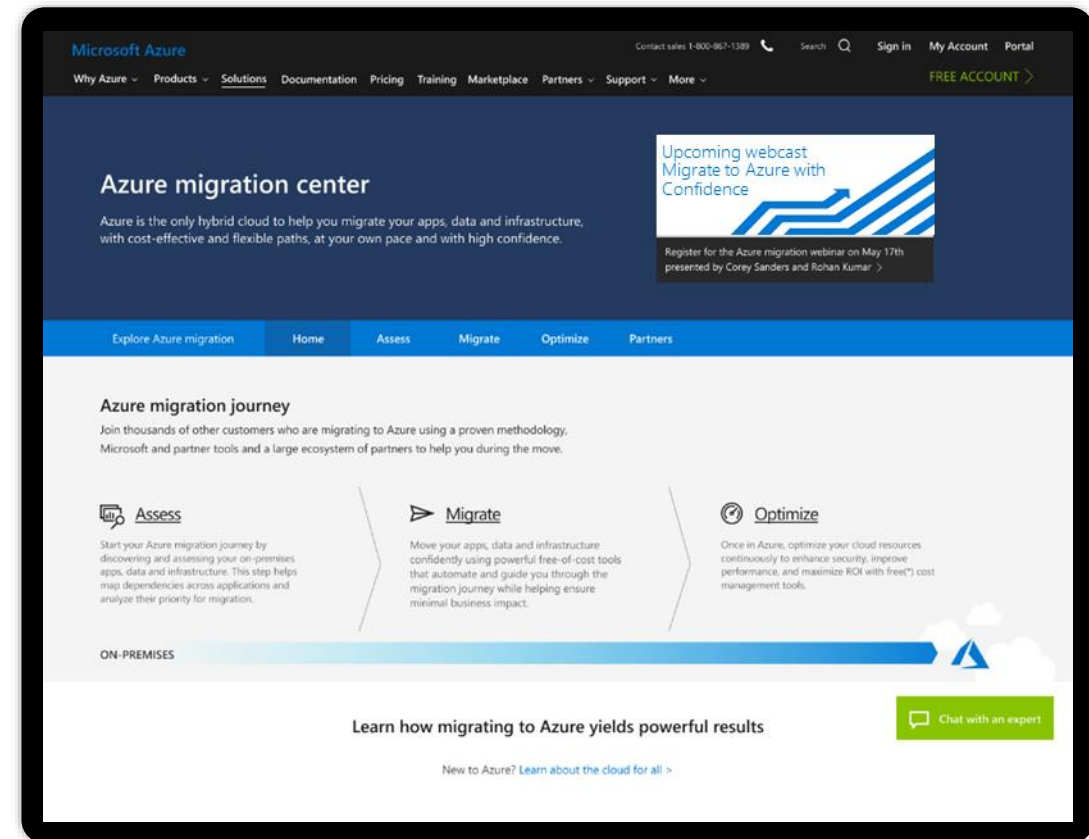
- Optimize your cloud resources

- Connects you to a migration expert

 - Chat enabled, backed by engineering resources

 - Guides you to FastTrack, partner, seller, or DIY outcomes

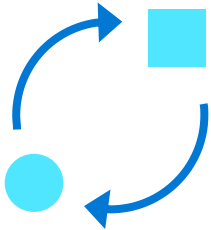
Azure migration center



[Azure.com/Migration](https://azure.com/Migration)

Migrate to the cloud with Azure SQL Database

Seamless and compatible



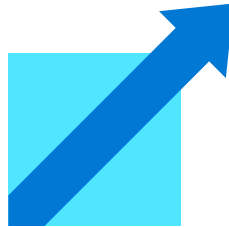
The broadest SQL Server compatibility and VNET support

Competitive TCO



Up to 80% savings with Azure Hybrid Benefit and reserved capacity

Breakthrough productivity & performance



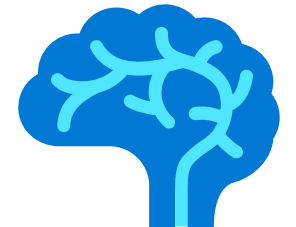
Up to 100 TB of on-demand scalable storage per DB

Industry-leading security



Layers of security and 99.99 percent availability SLA

Built-in intelligence



Intelligent performance tuning and intelligent protection

The best and most economical cloud destination

LEARN MORE

- [Azure SQL Database](#)
- [SQL Database Managed Instance](#)
- [Create a Managed Instance](#)
- [Forrester Consulting Total Economic Impact™ study](#)
- [Azure Hybrid Benefit for SQL Server](#)
- [Azure Database Migration Service](#)
- [Migration Guide](#)
- [SQL Server Integration Services](#)
 - Hands-on-lab to lift SSIS to Azure with Azure Data Factory: [aka.ms/adflab 2](https://aka.ms/adflab2)

Reach out to your Microsoft seller or partner to schedule a
Modern Data Estate assessment

BUSINESS INTELLIGENCE SERVICES

Not installed side-by-side with Managed Instance

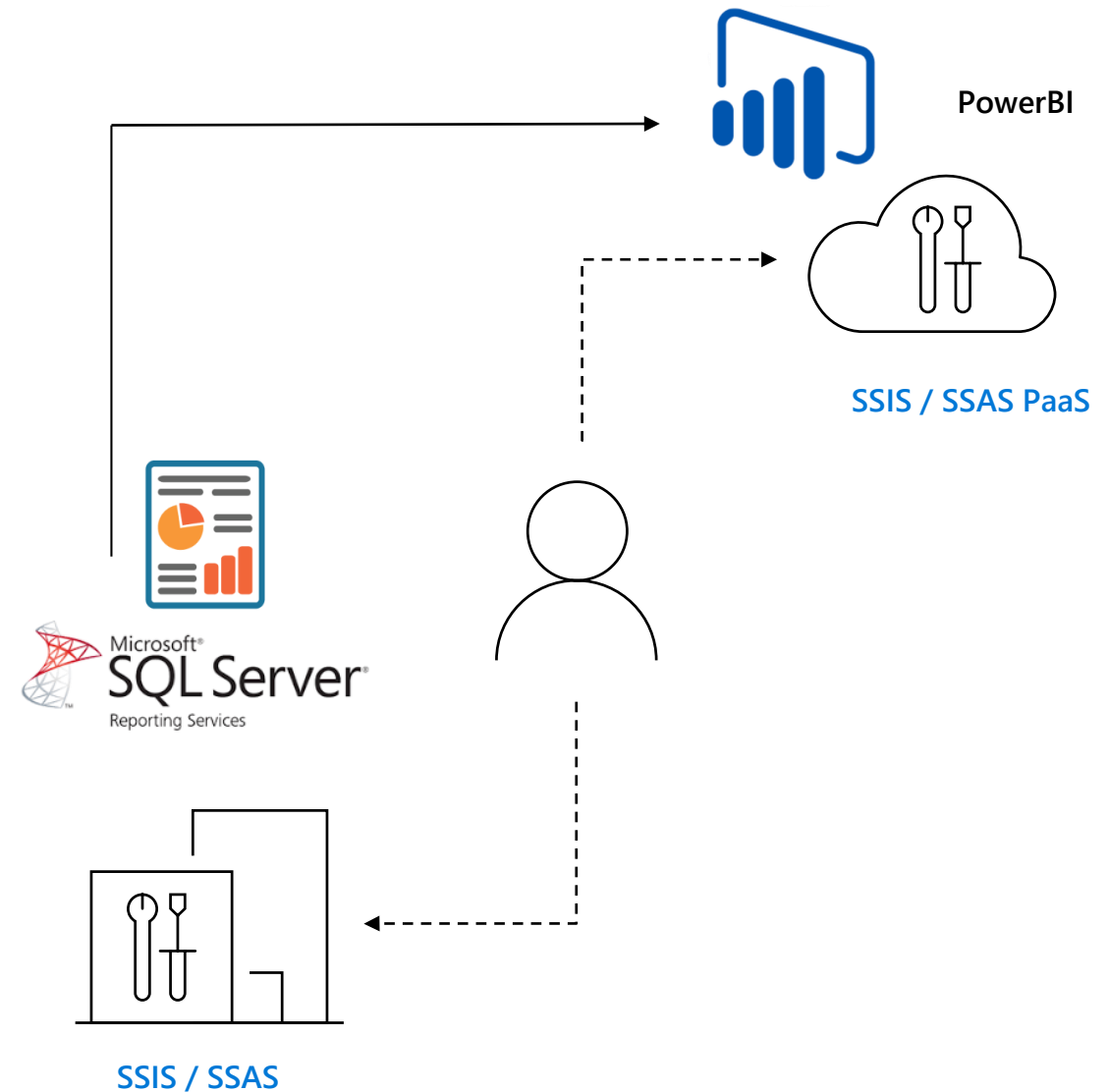
Migrate your SSIS packages to new SSIS on Azure Data Factory (PaaS service)

Migrate your OLAP models to Azure Analysis Services

... or run these services in Azure virtual machines

For SSRS: run in a virtual machine, or switch to Power BI

Recommendation - move BI solutions to PaaS model



APPLYING AZURE HYBRID BENEFIT

Azure Hybrid Benefit for SQL Server is available to all vCore-based options

The number of instances eligible for Azure Hybrid Benefit is calculated based upon

- number and type of licenses you are exchanging
- Managed Instance vCore selection, rounding down to the nearest whole value.



How to calculate instances eligible for the hybrid benefit

Example:

Customer A has:

10 Standard Edition license cores
10 Enterprise Edition license cores

Wants a:

8 vCores Managed Instance

Calculation = (10 Standard license cores * 1 core) + (10 Enterprise license cores * 4 cores) = **50 cores**

Eligible number of instances:

(50 cores / 8 vCore instance) = **6 eligible instances**

Example:

Customer B has:

5 Standard Edition license cores
20 Enterprise Edition license cores

Wants a:

16 vCores Managed Instance

Calculation = (5 Standard license cores * 1 core) + (20 Enterprise license cores * 4 cores) = **85 cores**

Eligible number of instances:

(85 cores / 16 vCore instance) = **5 eligible instances**

1 Standard license core = 1 General Purpose core

1 Enterprise license core = 4 General Purpose cores (virtualization benefit)