

Introducing Azure SQL Database

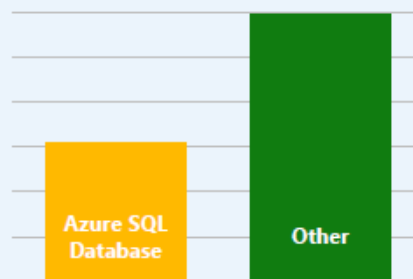


Azure SQL Database benefits

Increased productivity

47% staff hours reclaimed for other tasks

DB management hours



"Now, those people can do development and create more revenue opportunities for us."

Faster time to market

75% faster app deployment cycles



"We can get things out faster with Azure SQL Database"

Lower TCO

53% less expensive than on-prem/hosted



"To be able to do what we're doing in Azure, we'd need an investment of millions."

Reduced risks

71% fewer cases of unplanned downtime



"The last time we had downtime, a half a day probably lost us \$100k"

Azure SQL Database

The intelligent cloud database



Key benefits

Learns and adapts



Scales on the fly



Manages 1000s, like one



Works in your environment



Secures & protects



Differentiating proof

Self-tuning performance with **Index Advisor** and real-time **Threat Detection**

One click scaling, over **11 performance tiers** with zero downtime

Tenant isolation and automatic management of compute and storage with **Elastic Pools**

Popular platforms & languages, from **Python** to **Ruby** to **Java** to **C#** to **.NET**

Built-in HA and data protection with **99.99% SLA**, **Geo-Replication**, & **Point-in-time-Restore**

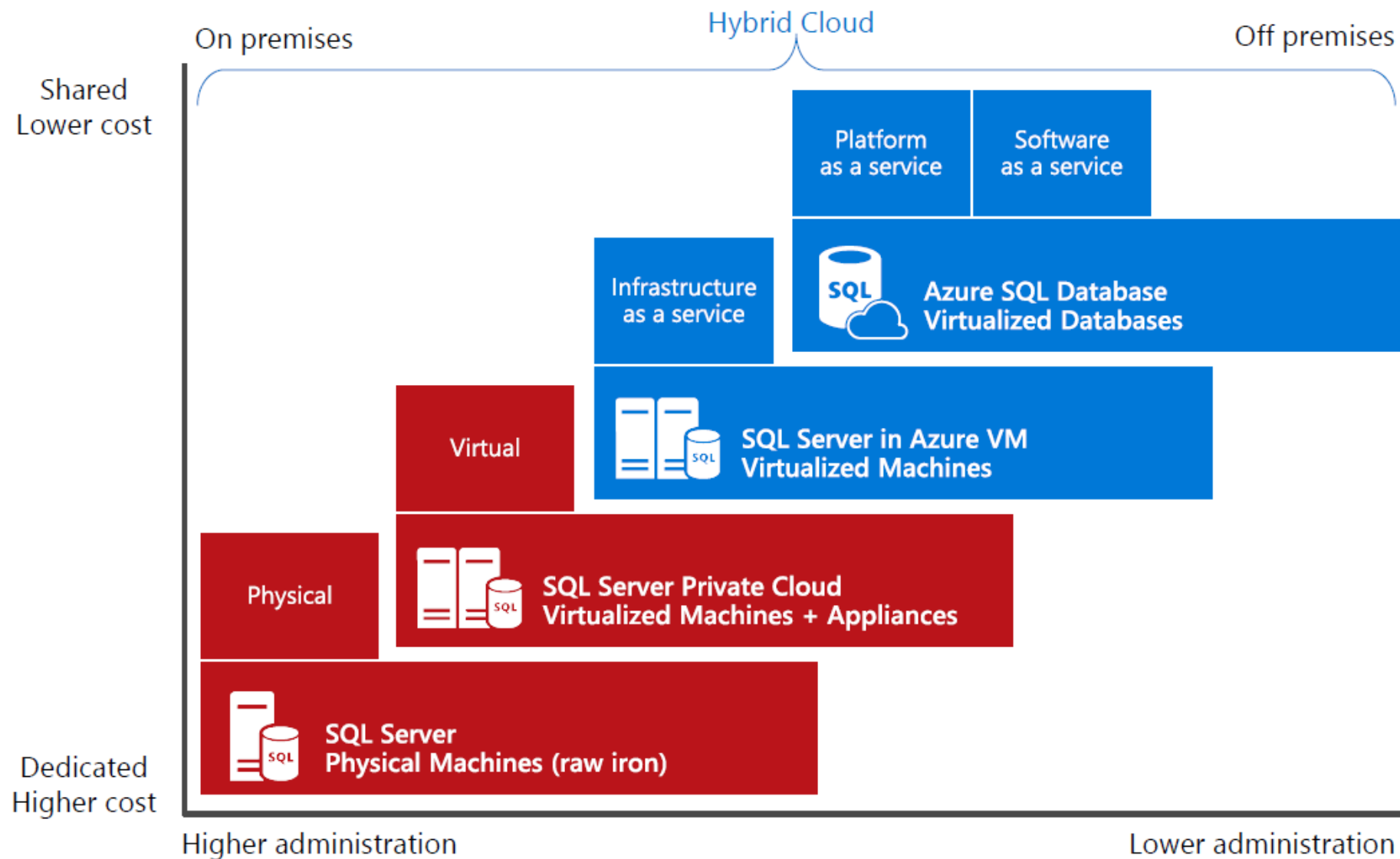
Azure SQL Database

The developer's intelligent cloud-database service

- Built for application developers
- Lets you focus on your business application
- Accelerates your time to market
- Built-in advisors learn your app's unique characteristics; adapts to maximize performance, reliability, and data protection
- Helps you build secure apps and connect to your database by supporting the languages and platforms that you prefer



Data platform continuum



How is it different from VMs?

| | SQL Server in a VM | Azure SQL Database |
|--------------|---|---|
| Best for... | <i>Existing applications which requires full box product functionality.</i> | <i>Applications that need elastic scale and/or reduced overhead.</i> |
| Resources | <i>Customer has ecosystem of IT resources for support and maintenance.</i> | <i>Customer does not want to add additional IT resources for support and maintenance.</i> |
| TCO benefits | <i>Removing CAPEX.</i> | <i>Avoiding CAPEX and OPEX.</i> |
| Scalability | <i>Scale up to 20,000 IOPS</i> | <i>Scale out to thousands of DBs, process TBs of OLTP data</i> |

Learns and adapts

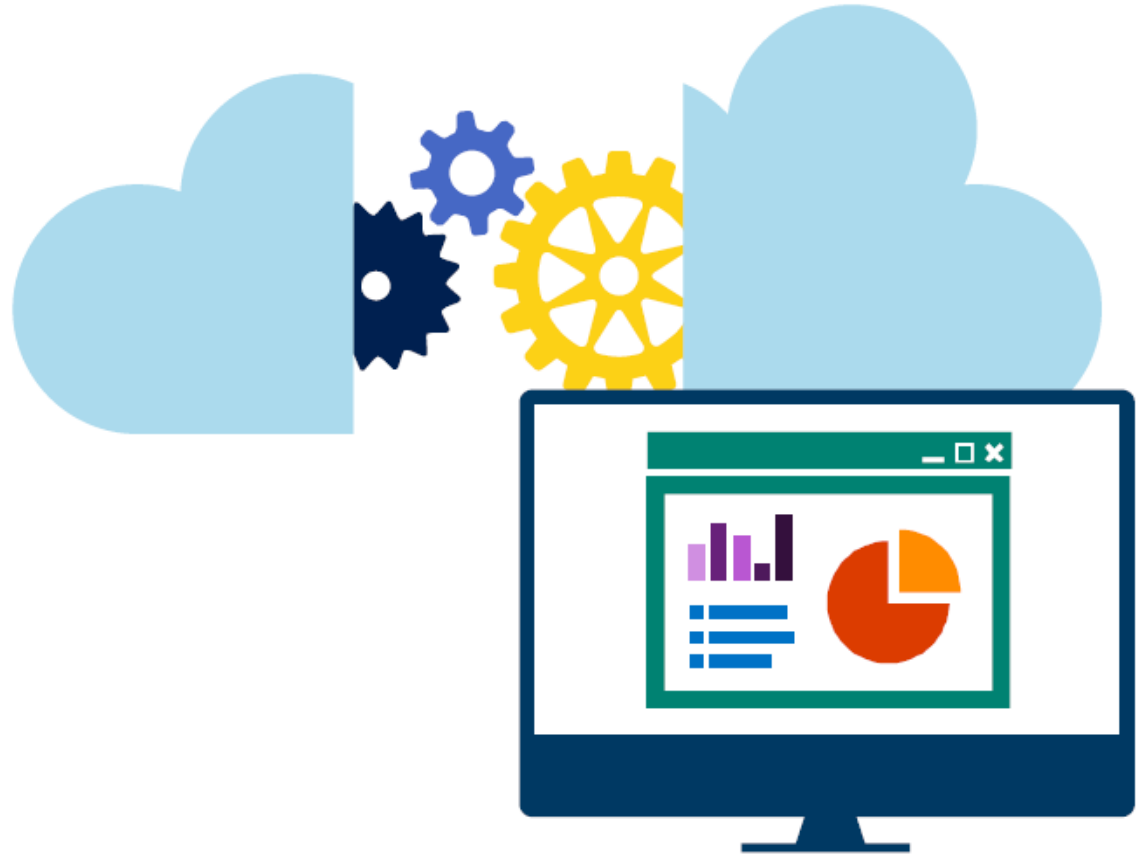


Intelligent capabilities

- Suggests actions for how to optimize your database performance
- Automatically implements solutions that adapt to the app's needs
- Ultimately gives you time back to focus on your business

Intelligent capabilities

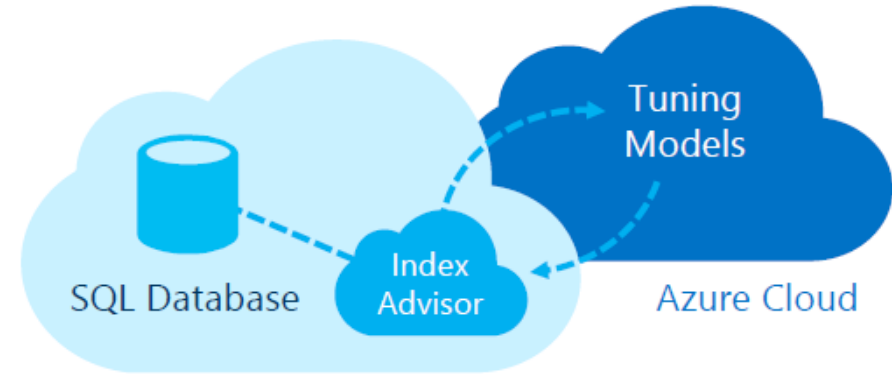
- Built-in performance monitoring with intelligent advisors helps reduce troubleshooting time
- The Azure management portal exposes real-time metrics
- Azure SQL Database includes Intelligent advisors:
 - Database Advisor
 - Query Performance Insight
 - Query Store



Database Advisor

Improve the database with recommendations

- Index tuning recommendations tailored to each DB
 - Recommendations are based on the observed usage, and evolve as the DB workload changes
 - Support for CREATE and DROP index
- Intelligent service for implementing and validating the index recommendations
 - Full-auto mode – service takes full care of the indexes for your DB
 - Manual “review and apply” mode for full control
- Report + visualization of index impact
- Parameterize query recommendations
- Fix schema issues recommendations



Query Performance Insight

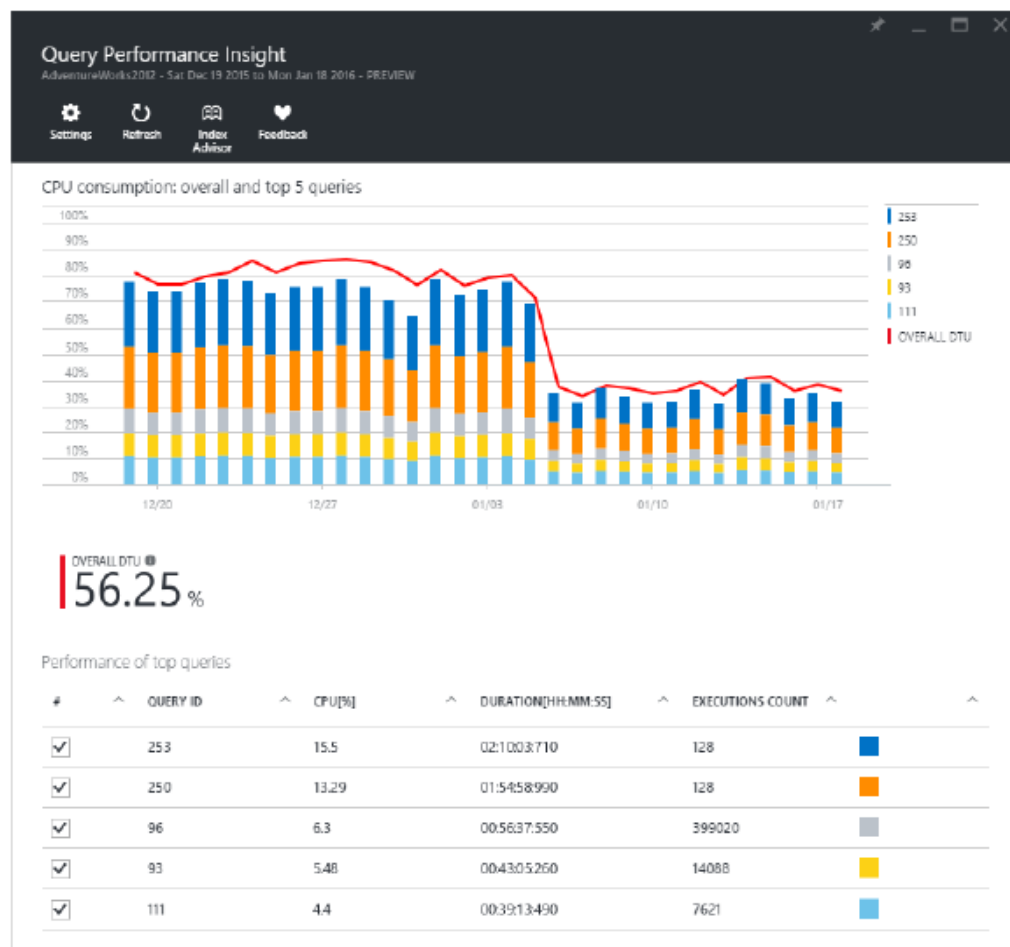
See how database resources are being consumed

See the most CPU-intensive queries:

- Customize your view by selecting observation interval, number of queries, and aggregation type
- View aggregated statistics about your workload: total duration and number of executions

Drill down to a specific query:

- Get granular view on query execution intervals
- View query text



Query Store

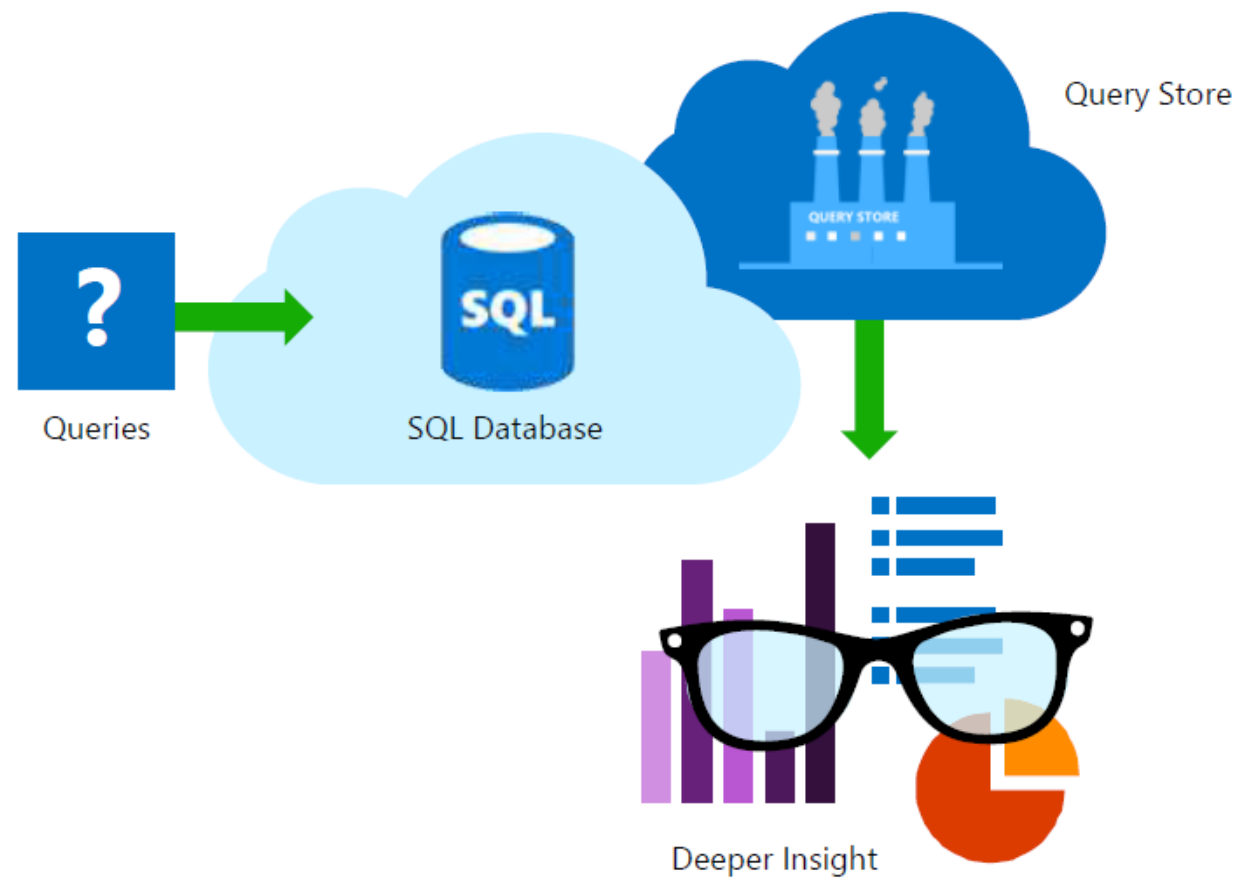
Comprehensive query-performance information when you need it most

Workload-data recorder for your database:

- Queries, plans, and compilation and runtime statistics available at your fingertips
- Allows you to easily identify and fix performance issues in the minutes

Enables the following scenarios:

- Finding regressed queries
- Identifying top resource consuming queries
- Ad-hoc workload optimization
- Smooth application upgrades



Scale on the fly



- Predictable performance
- Scales performance
- No app downtime
- Pay for what you need
- In-Memory & Real-time operational analytics



Designed for predictable performance

Redefined

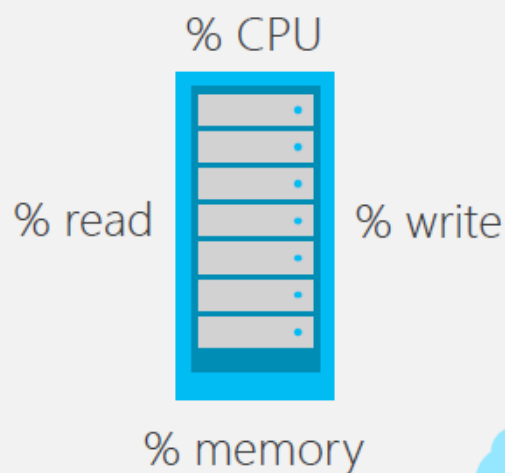


Across Basic, Standard, and Premium, each performance level is assigned a defined level of throughput

Measure of power



Introducing the Database Transaction Unit (DTU) which represents database power and replaces hardware specs



DTU is defined by the bounding box for the resources required by a database workload and measures power across the six performance levels.

| | | |
|---------------|--------------|-----------------|
| Basic — 5 DTU | S0 — 10 DTU | P1 — 125 DTU |
| | S1 — 20 DTU | P2 — 250 DTU |
| | S2 — 50 DTU | P4 — 500 DTU |
| | S3 — 100 DTU | P6 — 1,000 DTU |
| | | P11 — 1,750 DTU |
| | | P15 — 4,000 DTU |



SQL Database service tiers (single DB model)

| | BASIC | STANDARD | | | | PREMIUM | | | | |
|--|--|--------------------------------|------|------|-------|-------------------------------|-------|---------|---------|---------|
| | | S0 | S1 | S2 | S3 | P1 | P2 | P4 | P6 | P11 |
| Built For | Light transactional workloads | Medium transactional workloads | | | | Heavy Transactional Workloads | | | | |
| Available SLA | 99.99%* | | | | | | | | | |
| Max Storage | 2 GB | 250 GB | | | | 500 GB | | | 1 TB | |
| Point-in-time Restore ("oops" Recovery) | Any point within 7 days | Any point within 14 days | | | | Any point within 35 days | | | | |
| Business Continuity | Geo-restore, Active geo-replication, up to four readable secondary backups | | | | | | | | | |
| Security | Always Encrypted, Transparent Data Encryption, Azure Active Directory authentication, Auditing, row-level security, dynamic data masking | | | | | | | | | |
| Performance Objectives | Transactions per hour | Transactions per minute | | | | Transactions per second | | | | |
| Database Transaction Units (DTUs) | 5 | 10 | 20 | 50 | 100 | 125 | 250 | 500 | 1,000 | 1,750 |
| Available Tiers (\$/Month) and GA Price | \$4.99 | \$15 | \$30 | \$75 | \$150 | \$465 | \$930 | \$1,860 | \$3,720 | \$7,001 |

*The 99.99% availability SLA does not apply to the existing Web and Business editions, which will continue to be supported at 99.9% availability.

Service Tiers for SQL Azure Database Applied

| | Basic | Standard | | | | Premium | | | | | |
|---------------------------------|--|------------------------|-----|-------|-------|------------------------|-------|-------|--------|--------|--------|
| | | S0 | S1 | S2 | S3 | P1 | P2 | P4 | P6/P3 | P11 | P15 |
| DTUs | 5 | 10 | 20 | 50 | 100 | 125 | 250 | 500 | 1,000 | 1,750 | 4,000 |
| Max database size (GB) | 2 | 250 | | | | 500 | | | | 1,000 | 1,000 |
| Max In-memory OLTP storage (GB) | N/A | N/A | N/A | N/A | N/A | 1 | 2 | 4 | 8 | 14 | 32 |
| Max concurrent workers | 30 | 60 | 90 | 120 | 200 | 200 | 400 | 800 | 1,600 | 2,400 | 6,400 |
| Max concurrent logins | 30 | 60 | 90 | 120 | 200 | 200 | 400 | 800 | 1,600 | 2,400 | 6,400 |
| Max concurrent sessions | 300 | 600 | 900 | 1,200 | 2,400 | 2,400 | 4,800 | 9,600 | 19,200 | 32,000 | 32,000 |
| Point-in-time restore | Any point last 7 days | Any point last 35 days | | | | Any point last 35 days | | | | | |
| Disaster recovery | Active Geo-Replication, up to 4 readable secondary backups | | | | | | | | | | |

Scale DTU's

- No downtime (just connections drop)
- Takes under 2 minutes

Change your pricing tier
Browse the available plans and their features
Database Transaction Units (DTUs) describe the relative capacity of the performance level of Basic, Standard, and Premium databases. They are based on a blended measure of CPU, memory, [Learn more](#)

★ Recommended | View all

| P1 Premium | P2 Premium | P4 Premium |
|--|--|--|
| 125 DTUs | 250 DTUs | 500 DTUs |
| Up to 500 GB | Up to 500 GB | Up to 500 GB |
| Geo-Replication | Geo-Replication | Geo-Replication |
| Point In Time Restore... | Point In Time Restore... | Point In Time Restore... |
| Auditing | Auditing | Auditing |
| 465.00 USD/MONTH (ESTIMATED 31 P1 D...) | 930.00 USD/MONTH (ESTIMATED 31 P2 D...) | 1,860.00 USD/MONTH (ESTIMATED 31 P4 D...) |

| P6 Premium | P11 Premium | P15 Premium |
|--------------------------|--------------------------|--------------------------|
| 1000 DTUs | 1750 DTUs | 4000 DTUs |
| Up to 500 GB | Up to 1024 GB | Up to 1024 GB |
| Geo-Replication | Geo-Replication | Geo-Replication |
| Point In Time Restore... | Point In Time Restore... | Point In Time Restore... |
| Auditing | Auditing | Auditing |

Select

Left Sidebar:

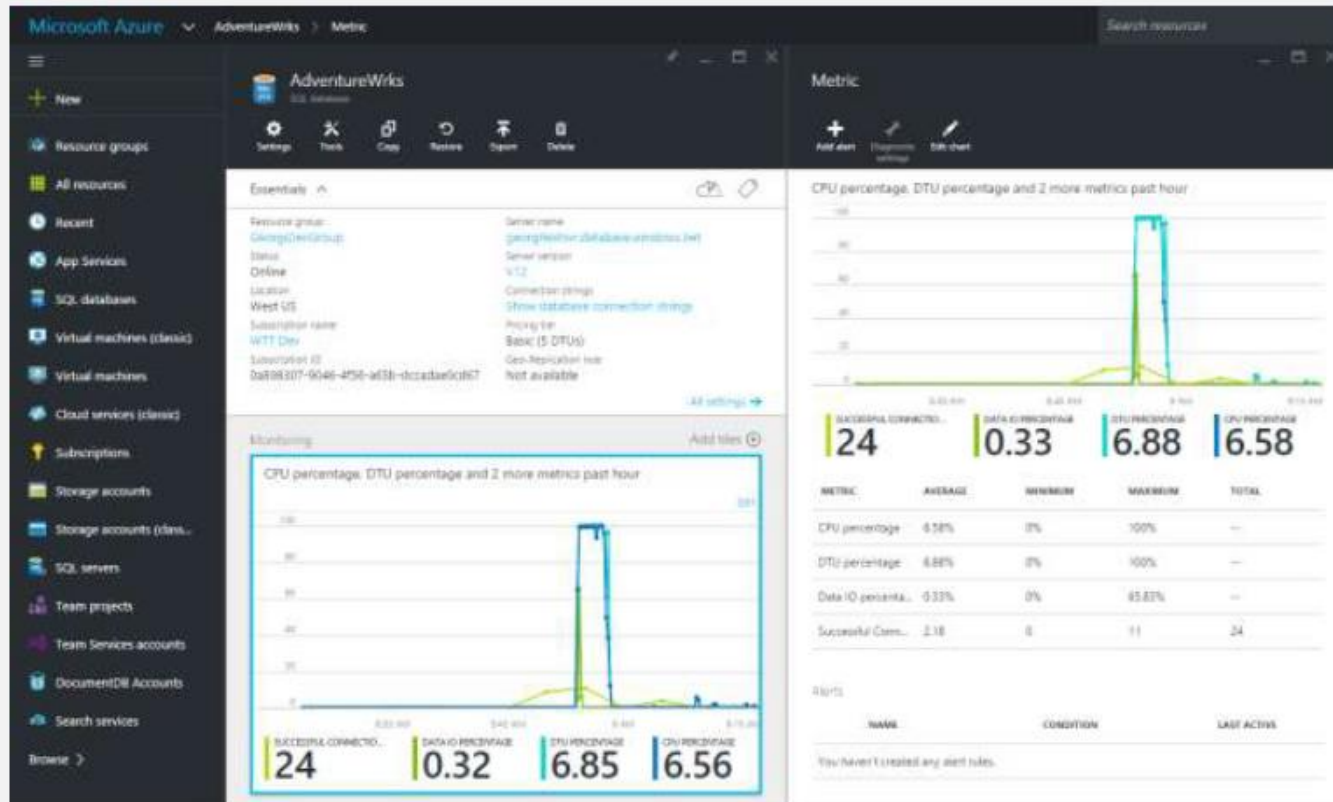
- Search (Ctrl + /)
- Overview
- Activity logs
- Billing tags
- Diagnose and solve problems
- SETTINGS
 - Pricing tier (scale DTUs)
 - Geo-Replication
 - Auditing & Threat detection
 - Dynamic data masking
 - Transparent data encryption
 - Properties
 - Locks
 - Automation script
- MONITORING
 - Alert rules
 - Database size
 - Diagnostics

Dashboard views of metrics

Monitor



Get in-depth views via Portal and APIs.

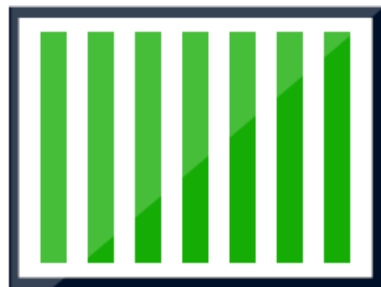


In-Memory technology for real-time performance

Expedite query and transaction processing speed

AZURE SQL DATABASE

In-Memory
Analytics



100x
performance gains

In-Memory OLTP



Up to
30x
faster transactions



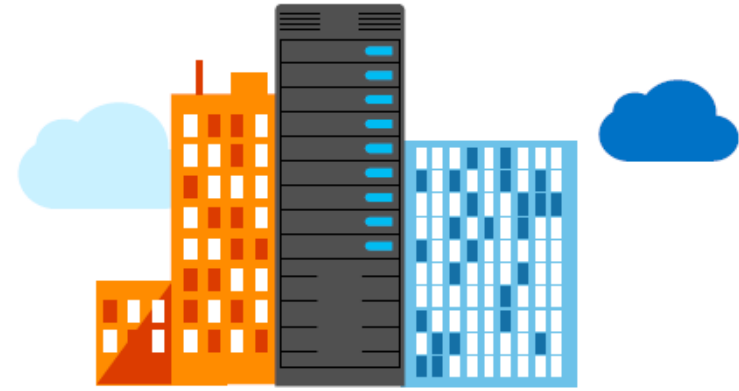
Breakthrough Performance
Real-time Operational Analytics



Real-time business insight
based on operational data



Build multitenant apps with isolation and efficiency



Multitenant efficiency

- Maximize efficiency with elastic database pools
- Manage and monitor growth without the administrative overhead of managing each database



Elastic Database

Auto-scaling you control.

ELASTIC POOLS

Shares Elastic Database Transaction Units (eDTUs) across many databases



Elastic Database auto-scales
eDTUs as needed

- Pools automatically scale performance and storage capacity for elastic databases on the fly.
- You can control the performance assigned to a pool, add or remove elastic databases on demand, and define performance of elastic databases without affecting the overall cost of the pool.
- Don't worry about managing the usage needs of individual databases.

Elastic Pools

Buy fixed number of eDTUs, share the compute across many databases

ELASTIC DATABASE POOLS



Auto-scale up to
5 eDTUs per database

Auto-scale up to
100 eDTUs per database

Auto-scale up to
1,000 eDTUs per database

Basic

Standard

Premium



SQL Database service tiers (elastic DB model)

| | Basic Pool | Standard Pool | Premium Pool |
|---|--|--------------------------------|-------------------------------|
| Built For | Light transactional workloads | Medium transactional workloads | Heavy Transactional Workloads |
| Available SLA | 99.99%* | | |
| Max # of DBs/Pool | 400 | 400 | 50 |
| eDTU range per pool | 100-1,200 | 100-1,200 | 125-1,500 |
| Point-in-time Restore ("Oops" Recovery) | Any point within 7 days | Any point within 35 days | Any point within 35 days |
| Business Continuity | Geo-restore, restore to any Azure region & Active geo-replication, up to four online (readable) secondary backups | | |
| Security | Always Encrypted, Transparent Data Encryption, Azure Active Directory authentication, Auditing, row-level security, dynamic data masking | | |
| Performance Objectives | Transactions per hour | Transactions per minute | Transactions per second |
| Available Tiers (\$/Month) and GA Price | \$149-\$1,800/month | \$223-\$2,701/month | \$697-\$8,370/month |

*The 99.99% availability SLA does not apply to the existing Web and Business editions, which will continue to be supported at 99.9% availability.

Elastic Tools

manage operational activities across multiple databases

ELASTIC DATABASE POOLS



ELASTIC DATABASE TOOLS

Elastic database jobs

Elastic database queries

Elastic database transactions

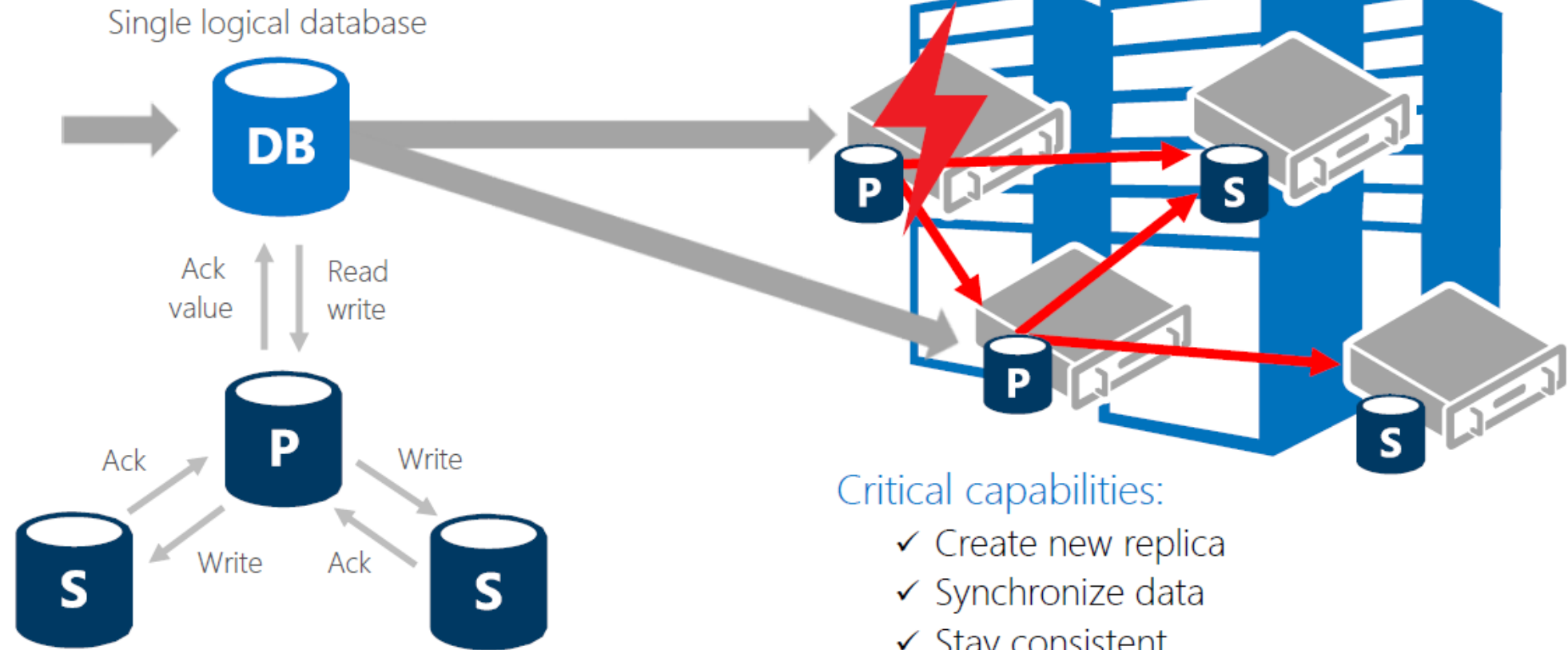
Support management and increased efficiency for multi-database environments

Protects and secures your app data



- Built-in protection and security
- Meets stringent regulatory-compliance requirements
- Minimal custom coding
- Advanced encryption technologies
- Powerful business-continuity features

High-availability platform



Reads are completed at the primary

Writes are replicated to secondaries

Critical capabilities:

- ✓ Create new replica
- ✓ Synchronize data
- ✓ Stay consistent
- ✓ Detect failures
- ✓ Failover
- ✓ 99.99% availability

Protect from data loss or corruption

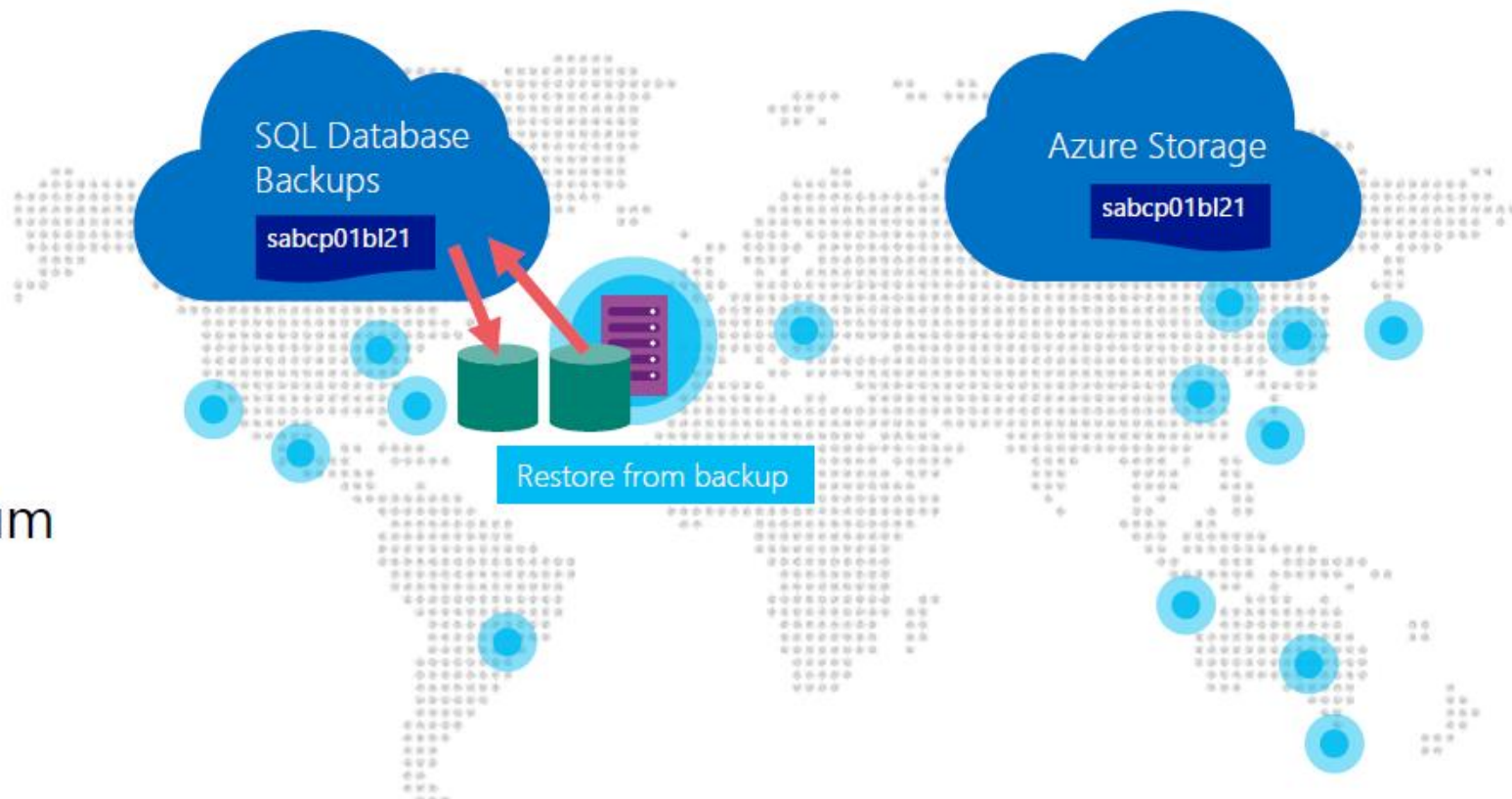
Restore to point-in-time or to point-of-deletion

Automatic backups

Self-service restore

Tiered retention policy

- 7 days Basic
- 35 days Standard*, Premium

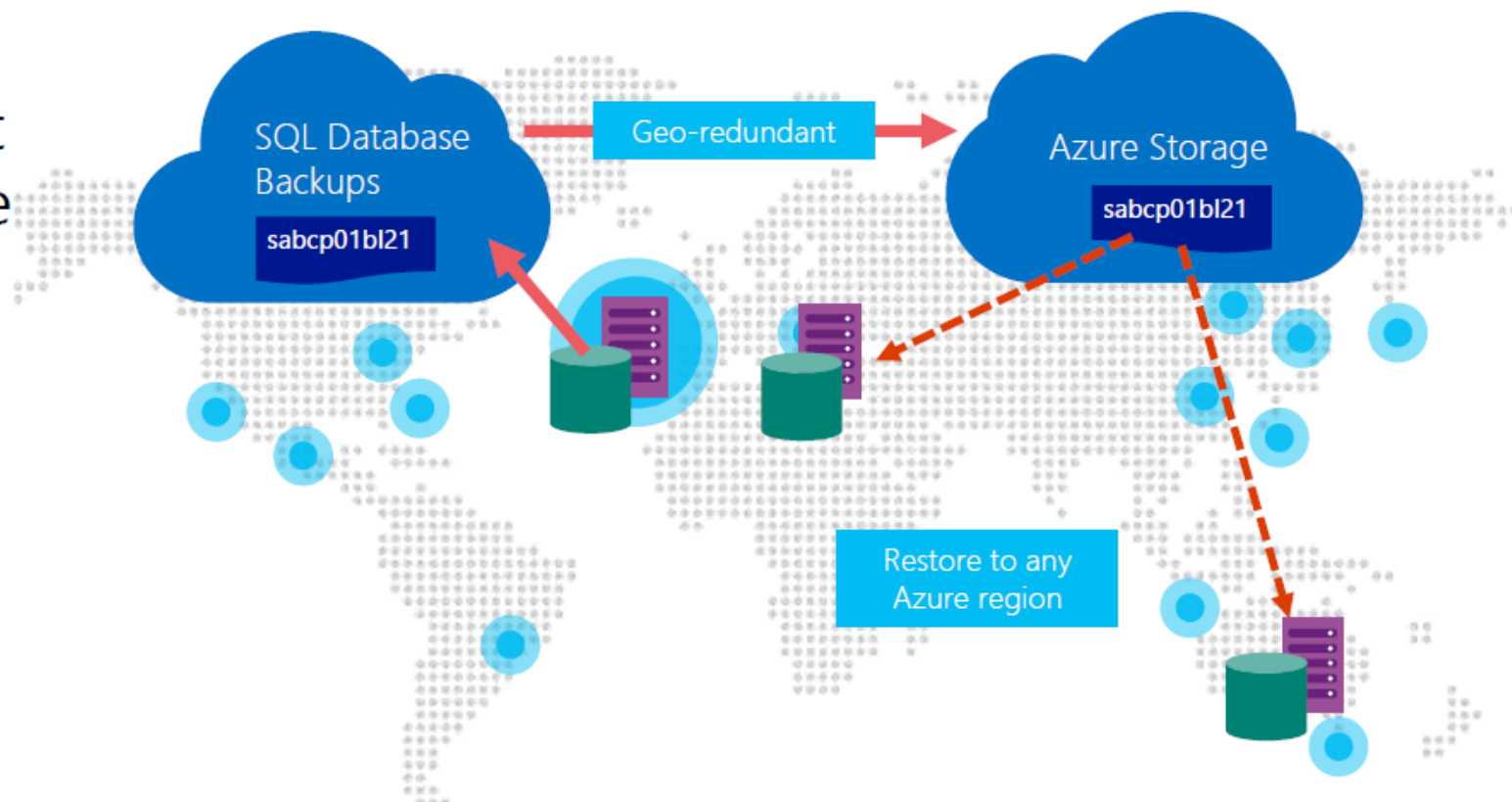


Geo-restore protects from disaster

Built-in disaster recovery capability available for every database

Restore from geo-redundant backups maintained in Azure Storage

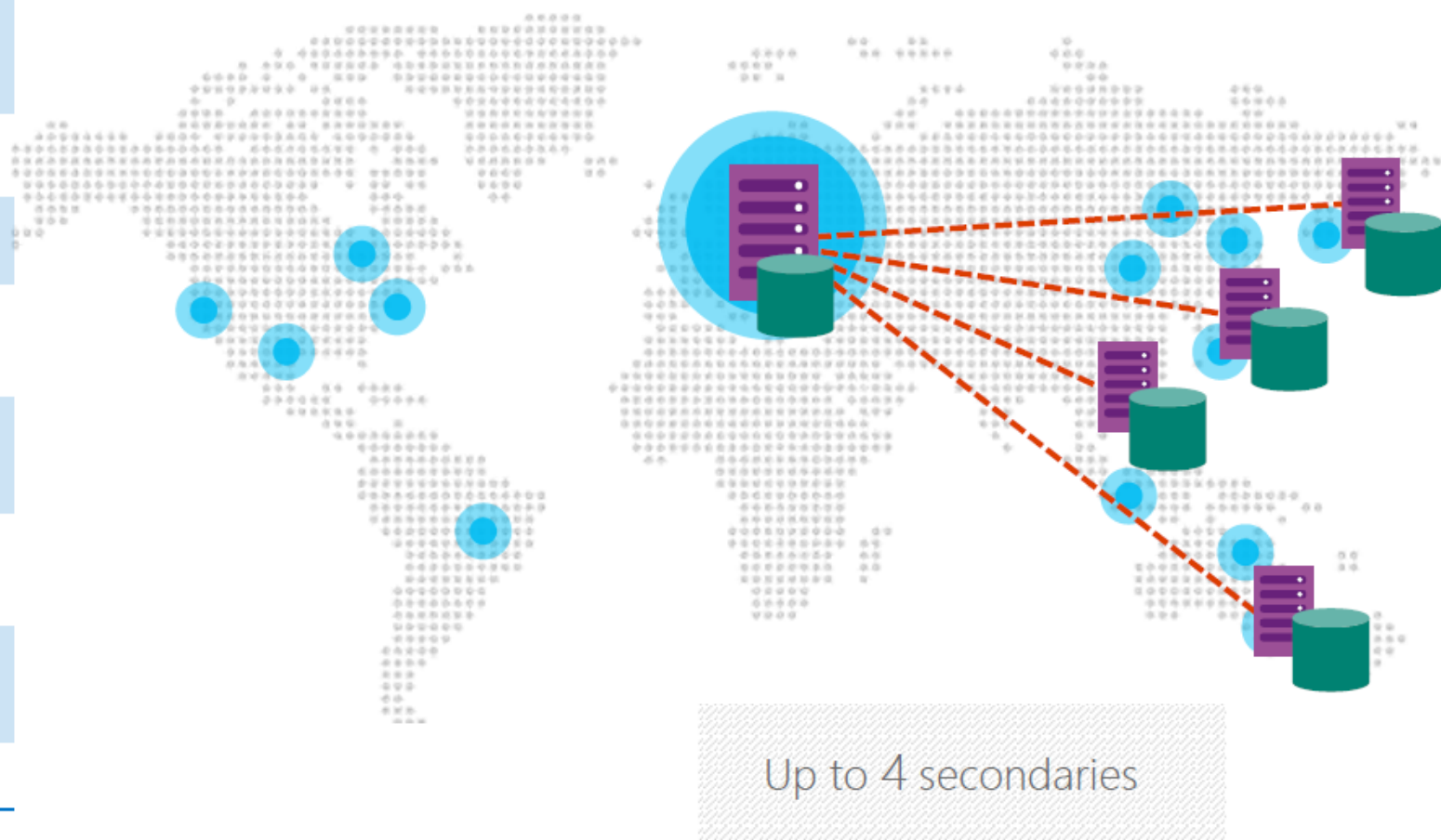
Restore to any Azure region



Active geo-replication

Mission critical business continuity

| | |
|-------------------------------|--|
| Service levels | Basic, Standard and Premium Self Service |
| Readable Secondaries | Up to 4 |
| Regions available | Any Azure region |
| Replication | Automatic, Asynchronous |
| Manageability tools | REST API, PowerShell or Azure Portal |
| Recovery Time Objective (RTO) | <1 hour |
| Recovery Point Objective | <5 mins |
| Failover | On Demand |



Setup Disaster Recovery

Port

Delete

Quickstart

Server name

jstestsqlbserver.database.windows.net

Server version

V12

Connection strings

Show database connection strings

Pricing tier

S0 Standard (10 DTUs)

Geo-Replication role

Not configured

All settings


Add tiles

Edit

Geo-Replication

jstestsqlbserver/testjs

Select a region on the map or from the Target Regions list to create a secondary database.



| SERVER/DATABASE | STATUS |
|-----------------|--------------------------------|
| PRIMARY | |
| ✓ East US | jstestsqlbserver/testjs Online |

Create secondary

Create geo-replicated secondaries to protect against prolonged datacenter outages. Secondary database implications. [Learn more](#)

Region

West US

Database name

testjs

Pricing tier

S0 Standard

* Secondary type

Non-readable

* Target server

Configure required settings

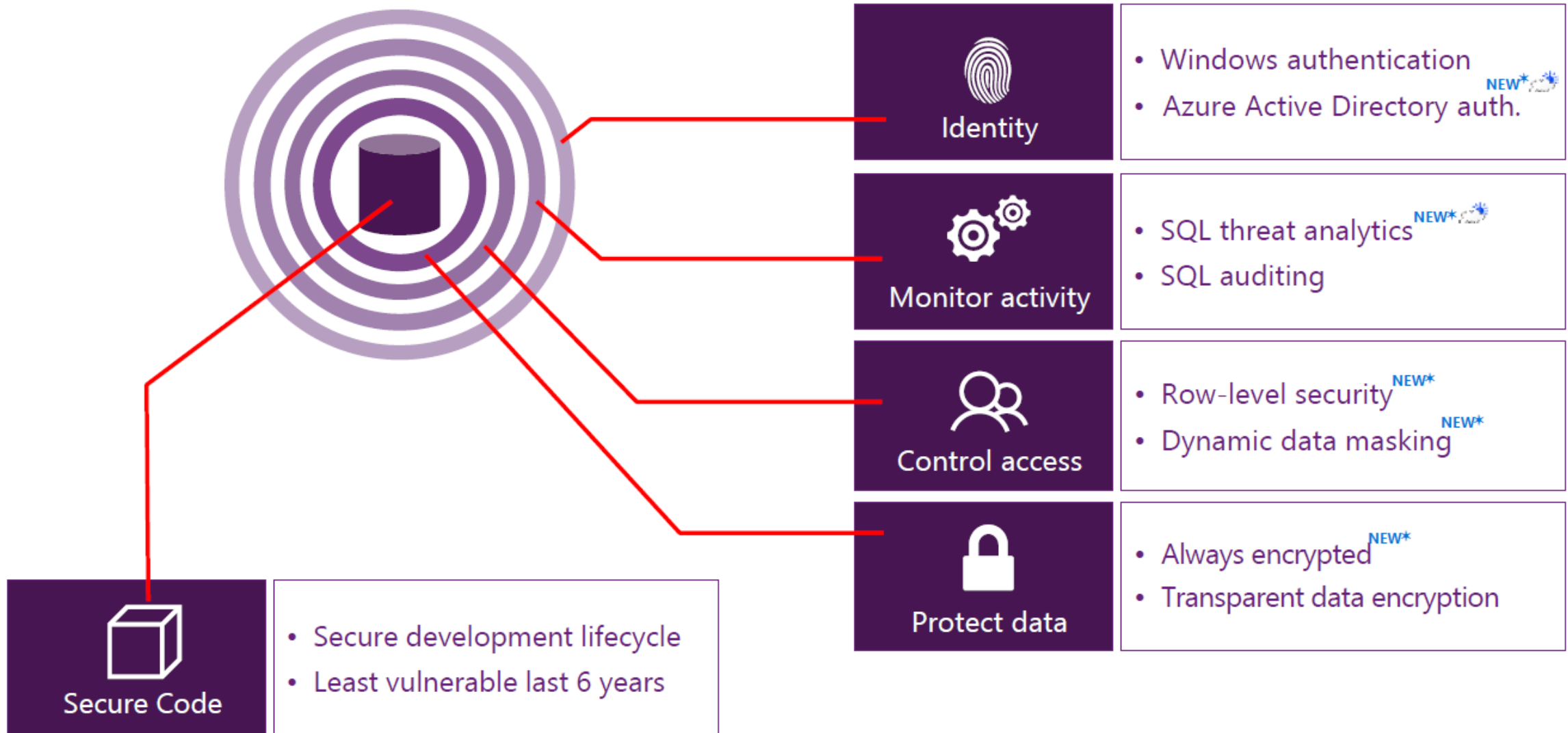
Elastic database pool

☐ Pin to dashboard

OK

Most secure database

Surrounded by layers of protection



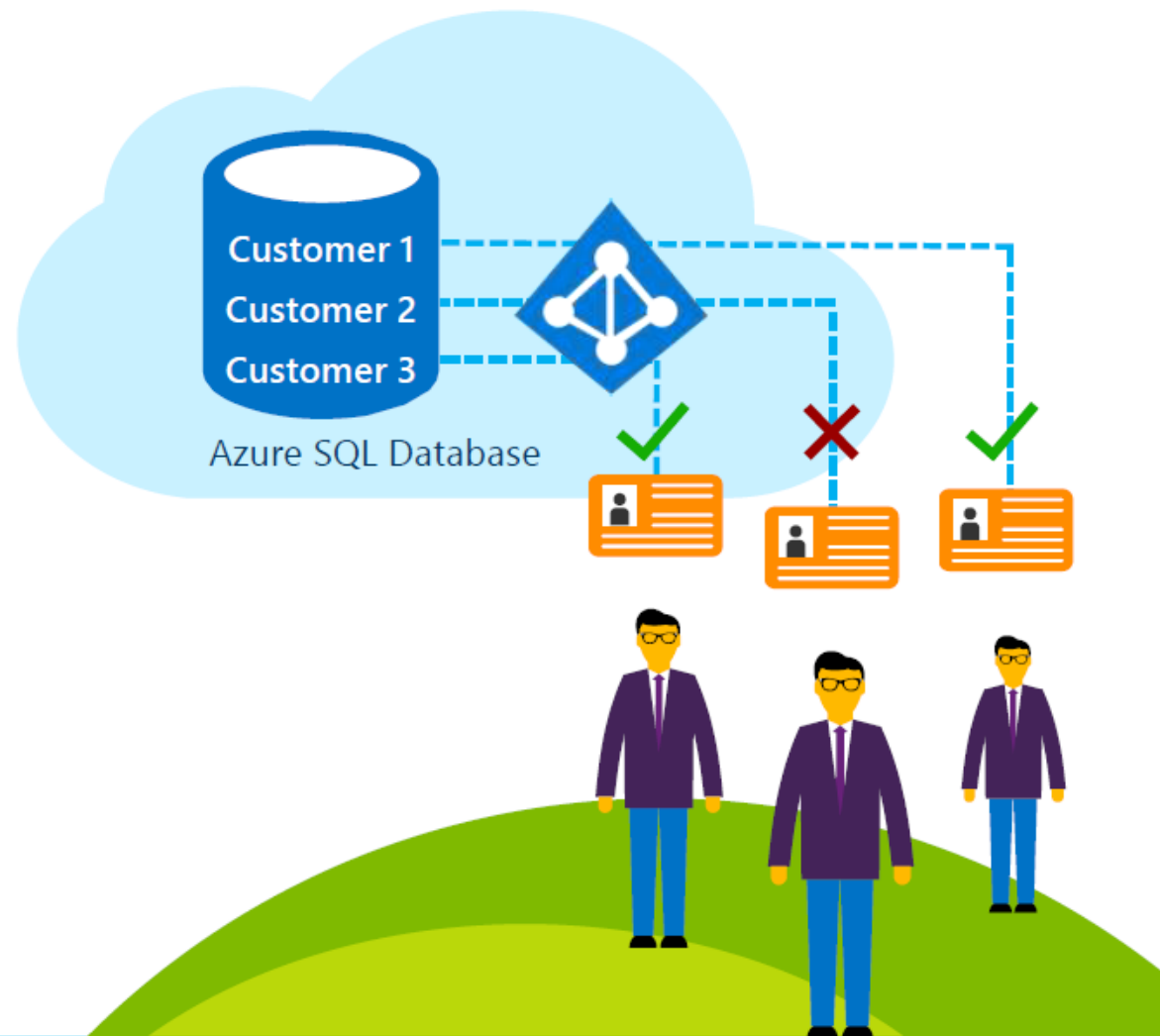
Azure Active Directory authentication

Manage user identities in one location.

Use Azure Active Directory user identities and groups to enable access to Azure SQL Database and other Microsoft services.

Benefits include:

- Limit proliferation of user identities
- Allow password rotation in one place
- Eliminate password storing



Row-level security

Protect data privacy by ensuring the right access across rows

Give users access only the rows applicable to their role

Simplify the design and coding of security in your apps

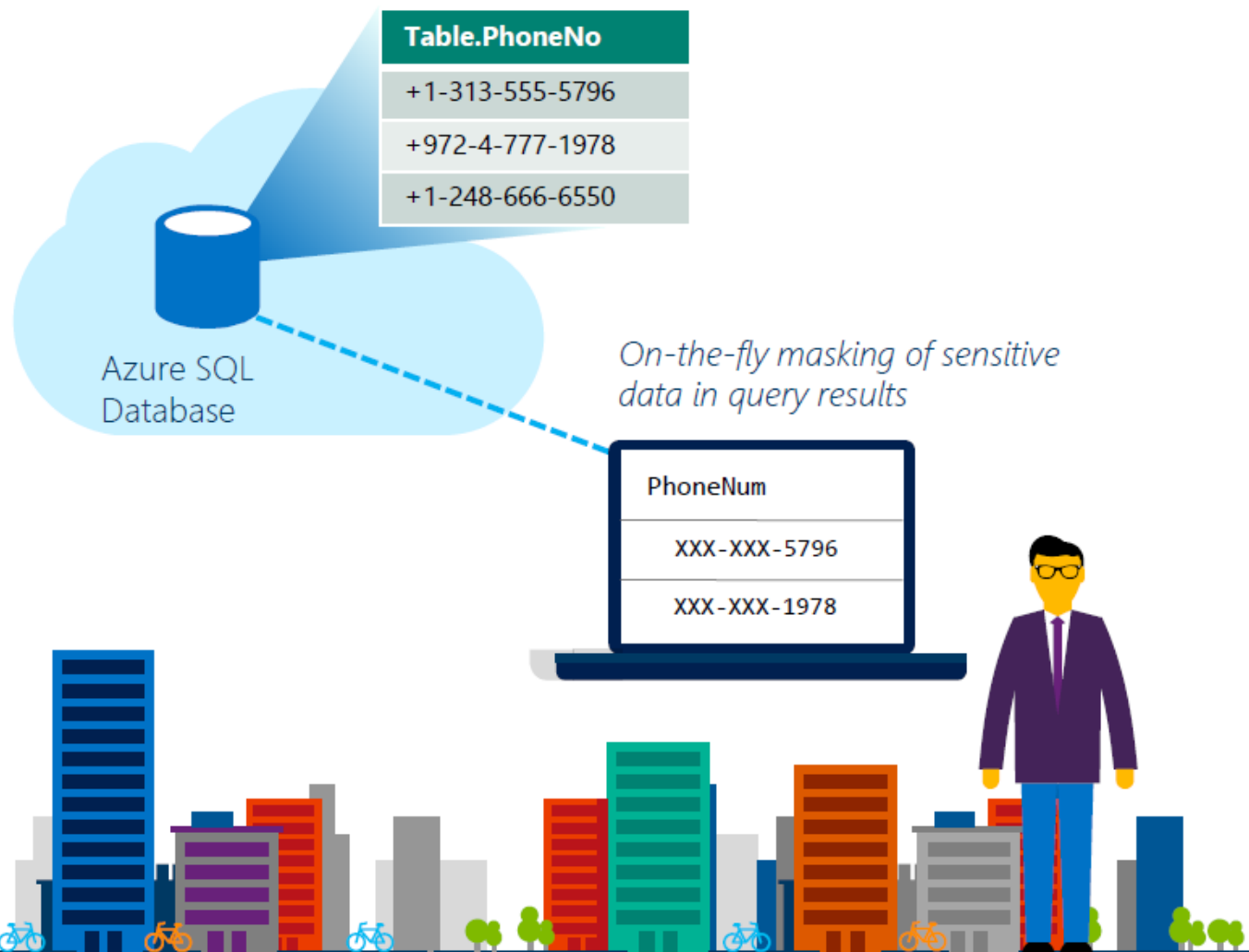
Administer with SQL Server Management Studio or SQL Server Data Tools



Dynamic data masking

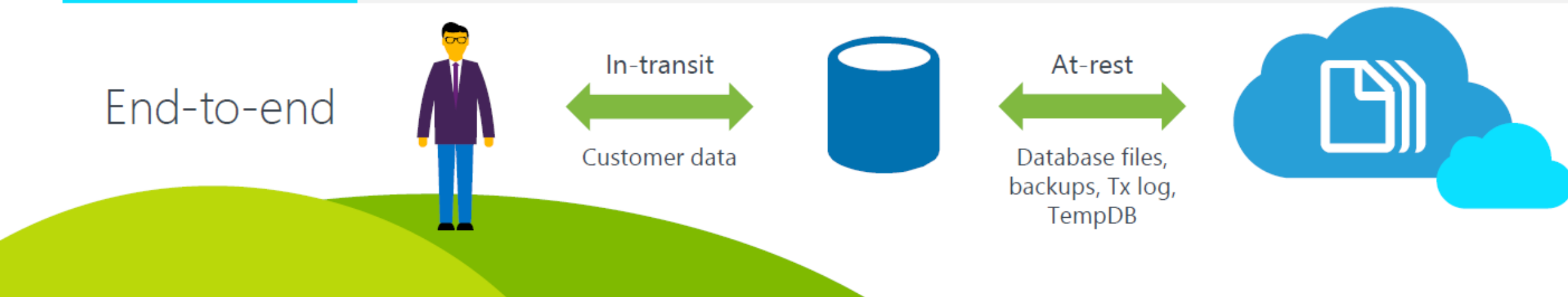
Limit the exposure of sensitive data by hiding it from users

- Auto-discovery of potentially sensitive data to mask
- Configurable masking policy from the Azure portal or via DDL in the server
- On-the-fly obfuscation of data in query results
- Flexibility to define a set of privileged users for un-masked data access



Azure SQL Database encryption: overview

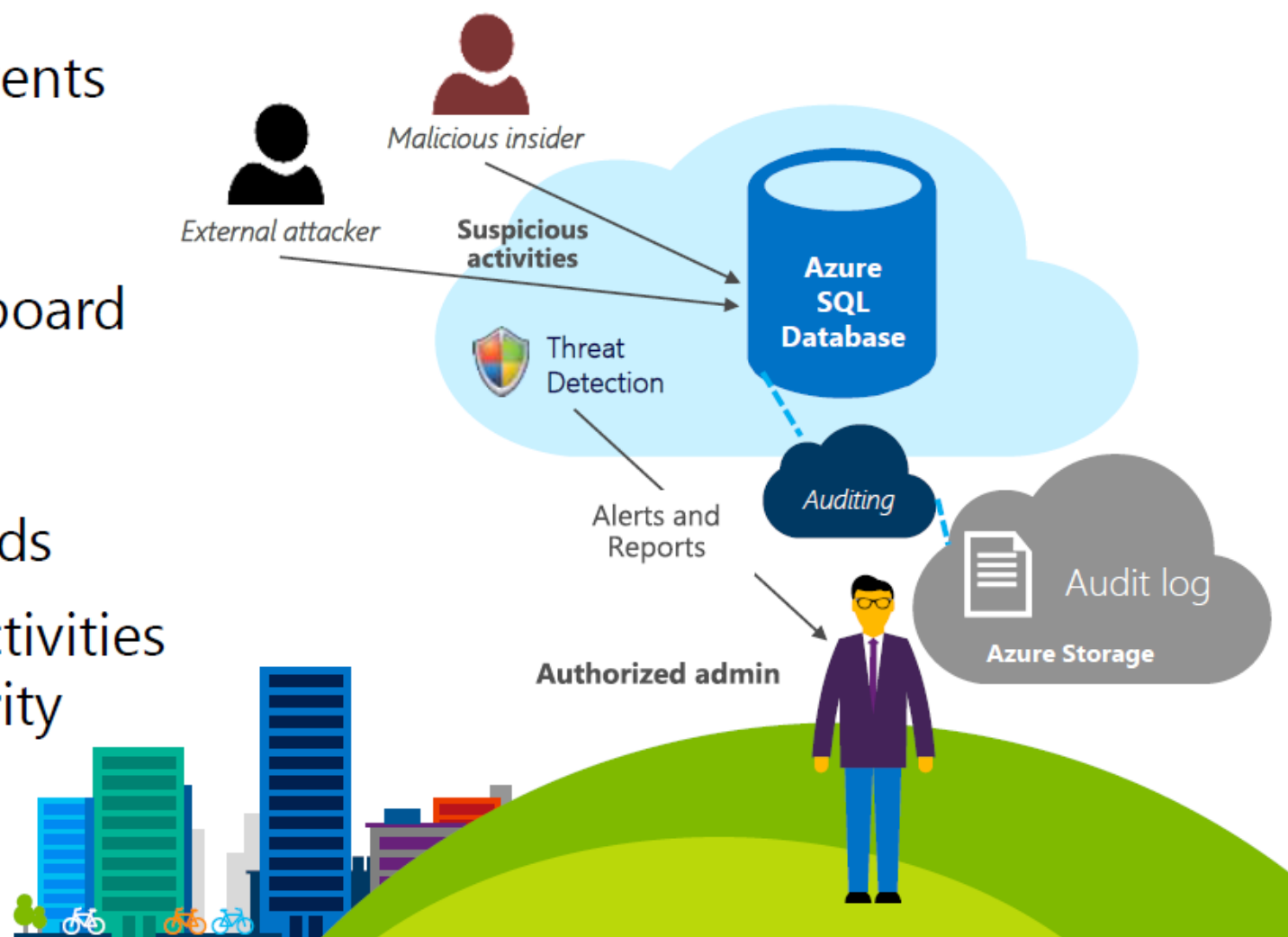
| Encryption type | Type | Customer value |
|-----------------------|--|--|
| Encryption-in-transit | Transport Layer Security (TLS) from the client to the server | Protects data between the client and the server against snooping and man-in-the-middle attacks. Azure SQL Database is phasing out Secure Sockets Layer (SSL) 3.0 and TLS 1.0 in favor of TLS 1.2. |
| Encryption-at-rest | Transparent Data Encryption (TDE) for Azure SQL Database | Protects data on the disk. Key management is done by Azure, which makes it easier to obtain compliance. |
| Encryption-end-to-end | Always Encrypted for client-side column encryption | Data is protected end-to-end, but the application is aware of encrypted columns. This is used in the absence of data masking and TDE for compliance-related scenarios. |



Auditing and Threat Detection

Gain real-time insights and streamline compliance-related tasks

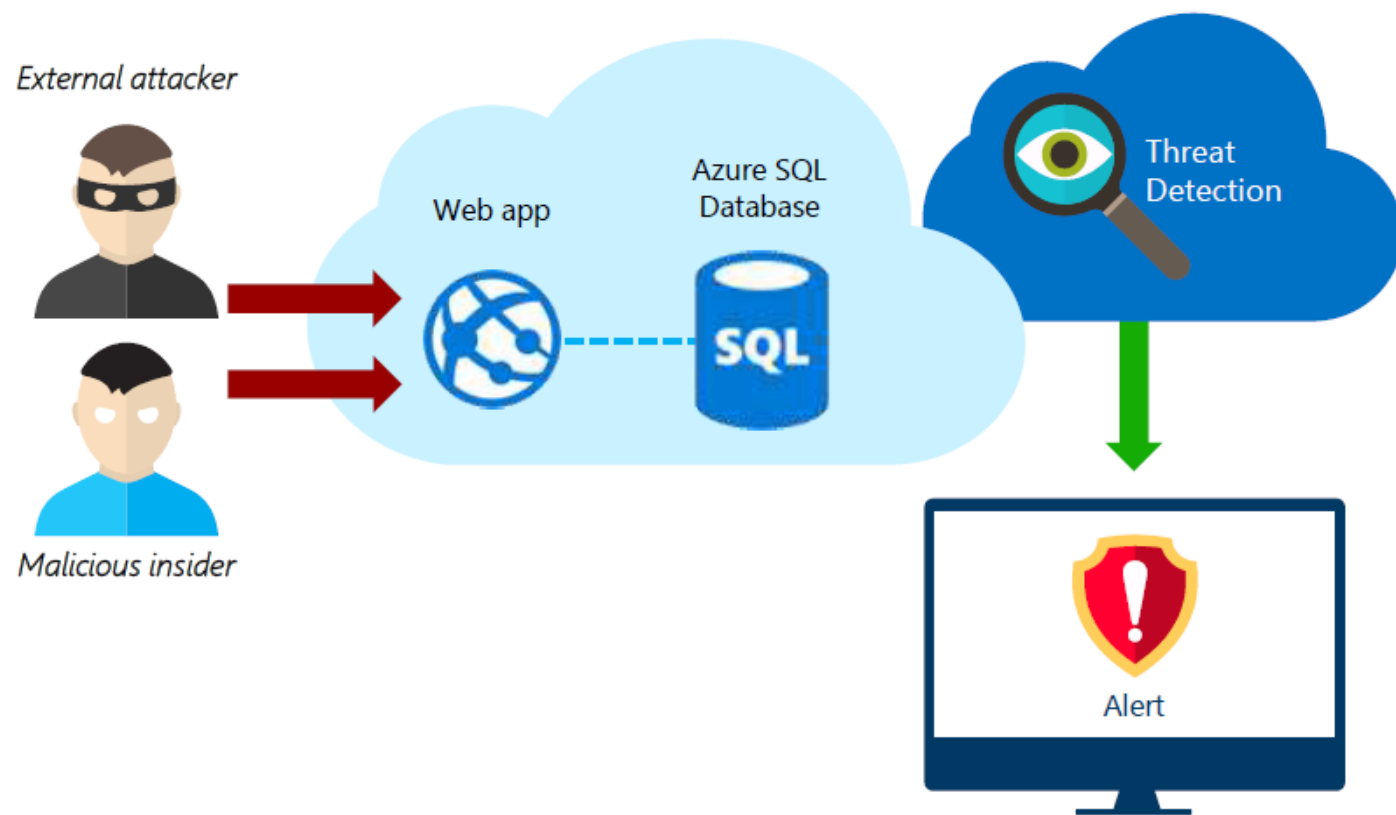
- **Retain** an audit trail of selected events and activities
- **Report** on database activity—preconfigured reports and a dashboard help get you started quickly
- **Analyze** reports to find suspicious events, unusual activities, and trends
- **Receive proactive alerts** about activities that might indicate potential security threats using the new Threat Detection feature



Threat Detection

Detects anomalous database activities that could indicate a potential threat

- Configure Threat Detection policy in the Azure portal
- Receive alerts from multiple database-threat detectors that identify anomalous activities
- Explore the audit log around the time of an event



Status: Public preview

Azure SQL Database service tiers

| | Basic | Standard | Premium |
|--|---|---|--|
| Built for ... | Light transactional workloads | Medium transactional workloads | Heavy transactional workloads |
| Availability SLA | 99.99% | | |
| Database max size | 2 GB | 250 GB | 1 TB |
| Point-in-time restore ("oops" recovery) | Any point within 7 days | Any point within 35 days | Any point within 35 days |
| Disaster recovery | Active geo-replication, up to four readable secondary backups | | |
| Security | Auditing, Row-Level Security, dynamic data masking | | |
| Performance objectives | Transactions per hour | Transactions per minute | Transactions per second |
| Database throughput units (DTUs) | Basic: 5 | S0: 10 S1: 20 S2: 50 S3: 100 | P1: 125 P2: 250 P4: 500 P6: 1,000 P11: 1,750 P15: 4,000 |
| Available tiers (\$/month) and GA price | Basic: \$4.99 | S0: \$15 S1: \$30 S2: \$75 S3: \$150 | P1: \$465 P2: \$930 P4: \$1,860 P6: \$3,720 P11: \$7,001 P15: \$16,003 |

Thank You