



# Introduction to Business Continuity in Azure SQL

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# What does this session cover?

What is Business Continuity?

Service Tiers

High Availability

Zone Redundancy

Replicas and Failover Groups



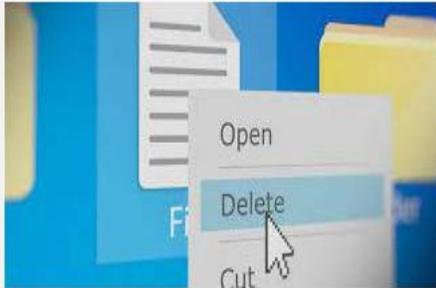
# What is Business Continuity in Azure SQL?



# Business Continuity Problem

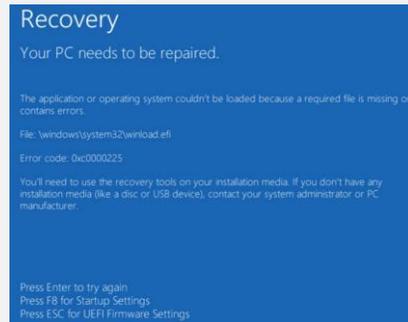
Mechanisms, Policies and Procedures that enable a business to continue operating in face of disruption.

## Customer Error



Customer deleted their data by mistake.

## Equipment Failures



Hardware or other equipment failures

## Natural Disasters



Flood, Hurricanes,  
Tornadoes,  
Earthquakes

## Manmade Disasters



Wars or major  
ecological accidents

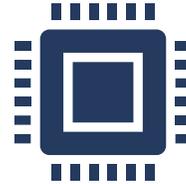
# Availability vs High Availability vs Disaster Recovery



## Availability

Every database comes with core **resiliency and availability built-in**, that protects it against software or hardware failures.

Industry leading financially backed SLA of 99.99% availability.



## High Availability

Continuous availability of the database provided through **Zone Redundancy**.

Automatic in region recovery from zonal hardware and software failures that's transparent to applications.

Higher SLA of 99.995% availability.



## Disaster Recovery

**Customer configured** database replicas or failover groups

Ability to quickly recover the database from a catastrophic regional failure to provide business continuity.

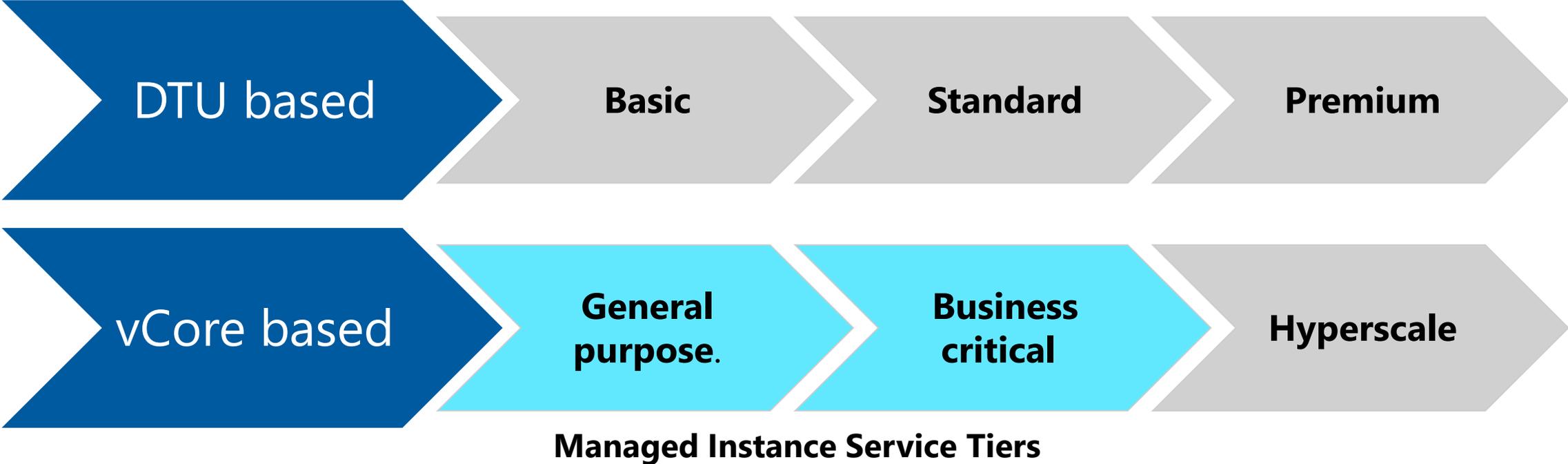
Protect your business by maximizing application availability.



# What are Service Tiers in Azure SQL?



# Overview of Service Tiers



# Changing Service Tiers

## Service and compute tier

Select from the available tiers based on the needs of your workload. The vCore model provides a wide range of configuration controls and offers Hyperscale and Serverless to automatically scale your database based on your workload needs. Alternately, the DTU model provides set price/performance packages to choose from for easy configuration. [Learn more](#)

Service tier

DTUs [Compare DTU options](#)

**5 (Basic)**

Data max size (GB)

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Basic (For less demanding workloads) ▼

### vCore-based purchasing model

General Purpose (Scalable compute and storage options)

Hyperscale (On-demand scalable storage)

Business Critical (High transaction rate and high resiliency)

### DTU-based purchasing model

Basic (For less demanding workloads)

Standard (For workloads with typical performance requirements)

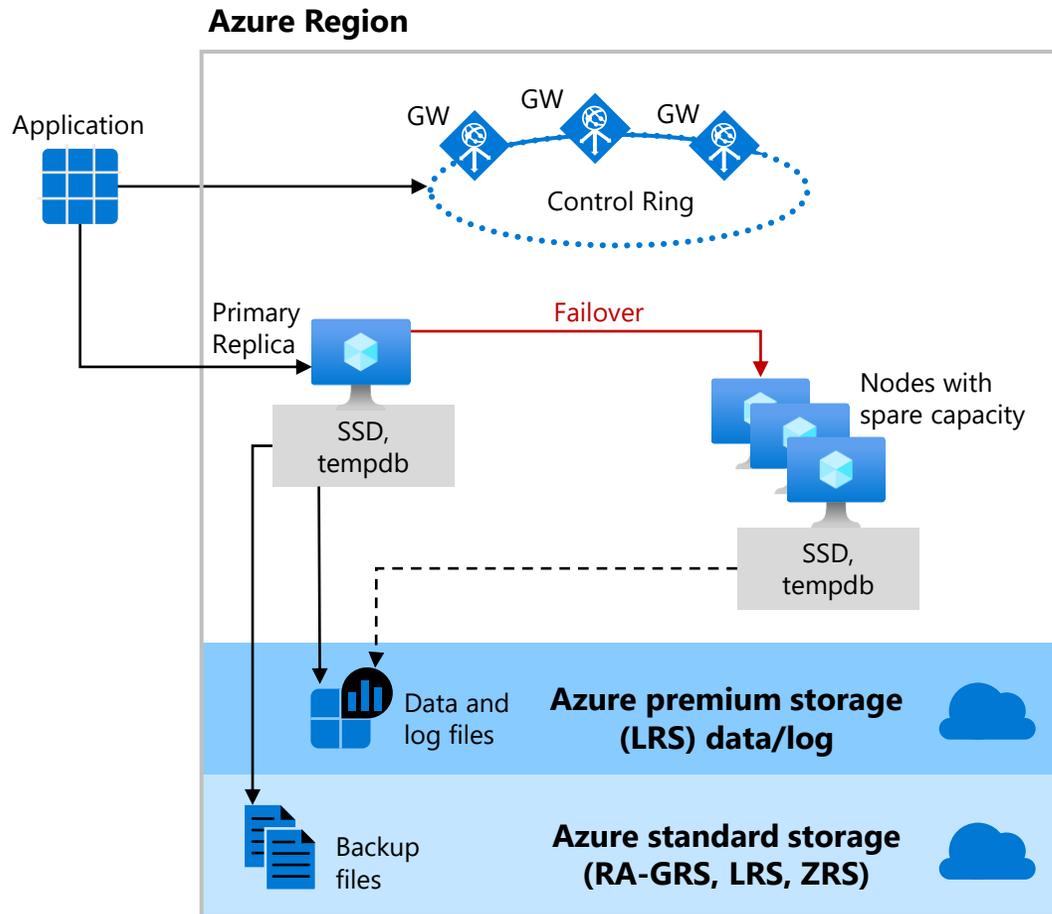
Premium (For IO-intensive workloads)



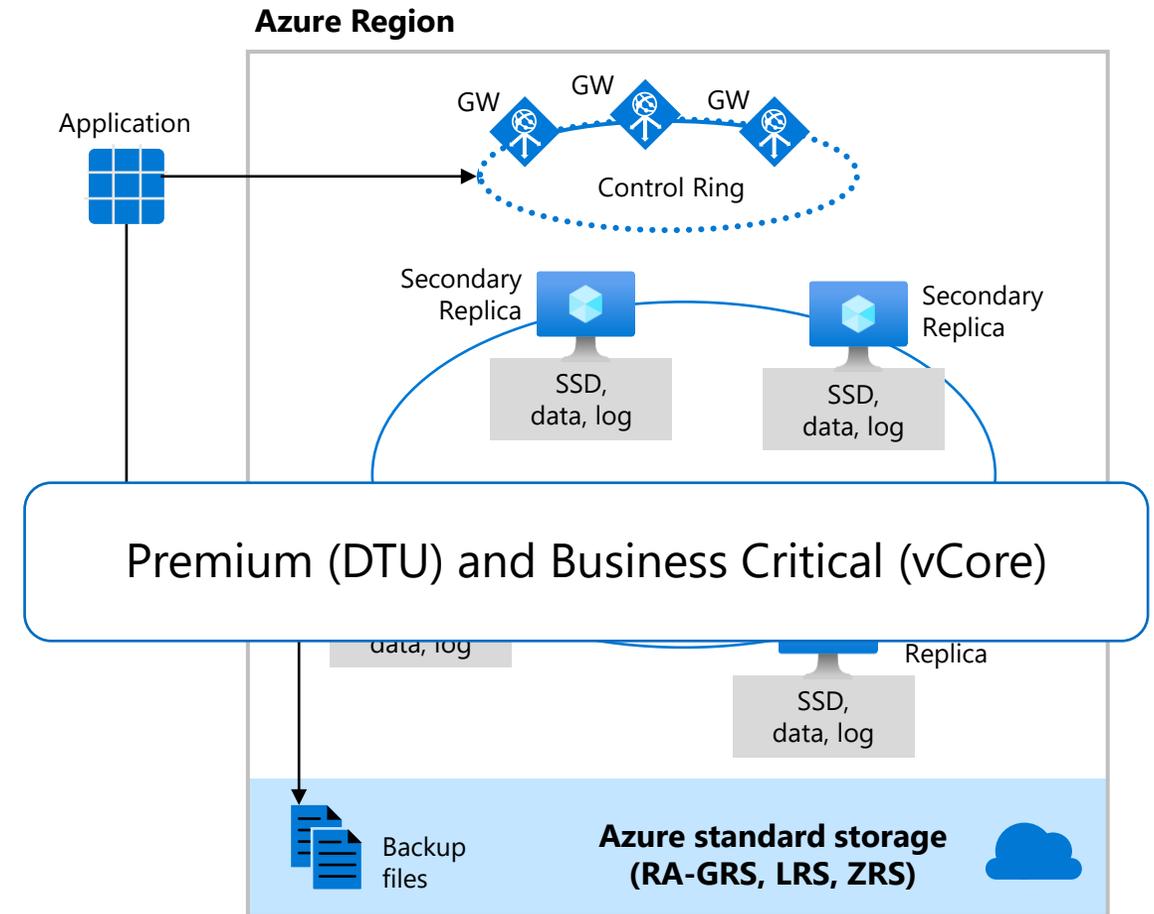
# High Availability in Azure SQL



# Availability Architecture: General Purpose vs Business Critical



Basic (DTU), Standard (DTU), General Purpose (vCore)



**Business Critical (BC) service tier**

# High Availability - General Purpose

Basic (DTU), Standard (DTU), General Purpose (vCore)

Behaves like Failover Cluster Instance

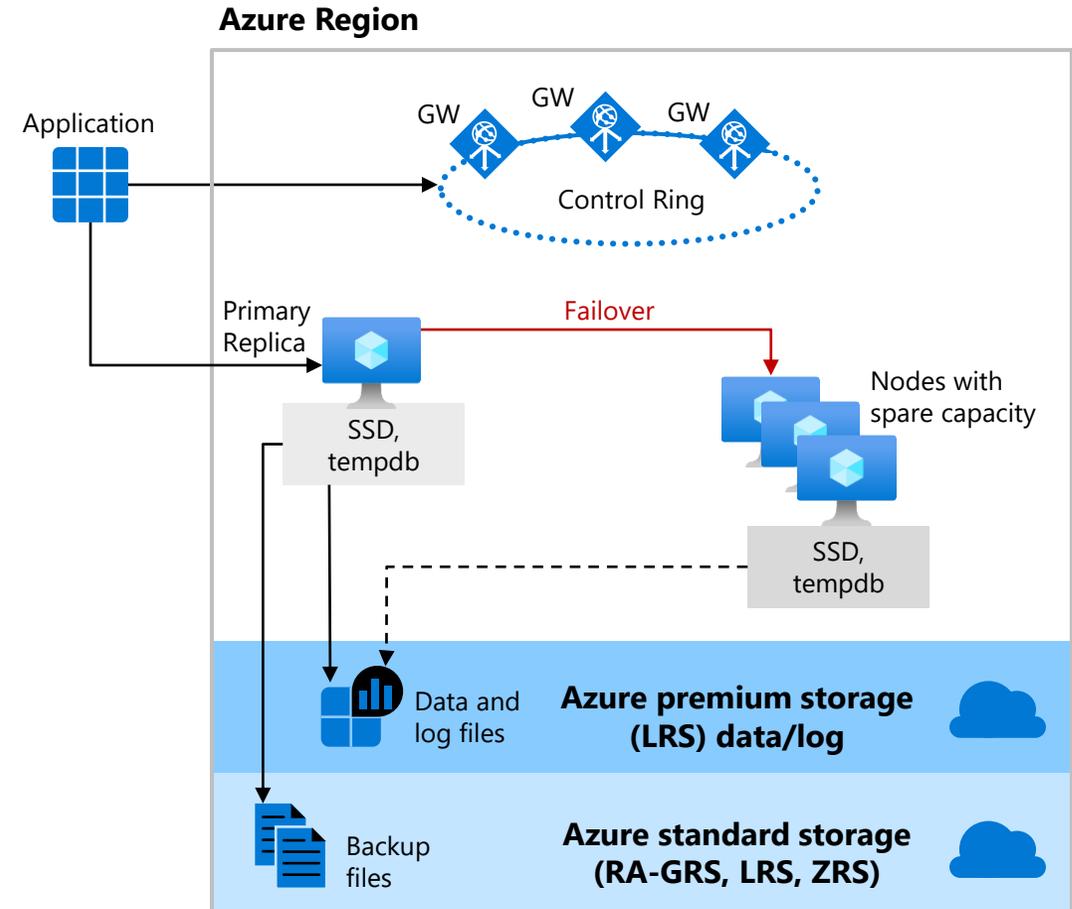
Remote storage provides data redundancy

Backup files are in a different location with geo-redundancy

Failover decisions based on SQL and Service Fabric

Recovery time depends on spare capacity

Connectivity redirection built-in



# High Availability - Business Critical

Premium (DTU) and Business Critical (vCore)

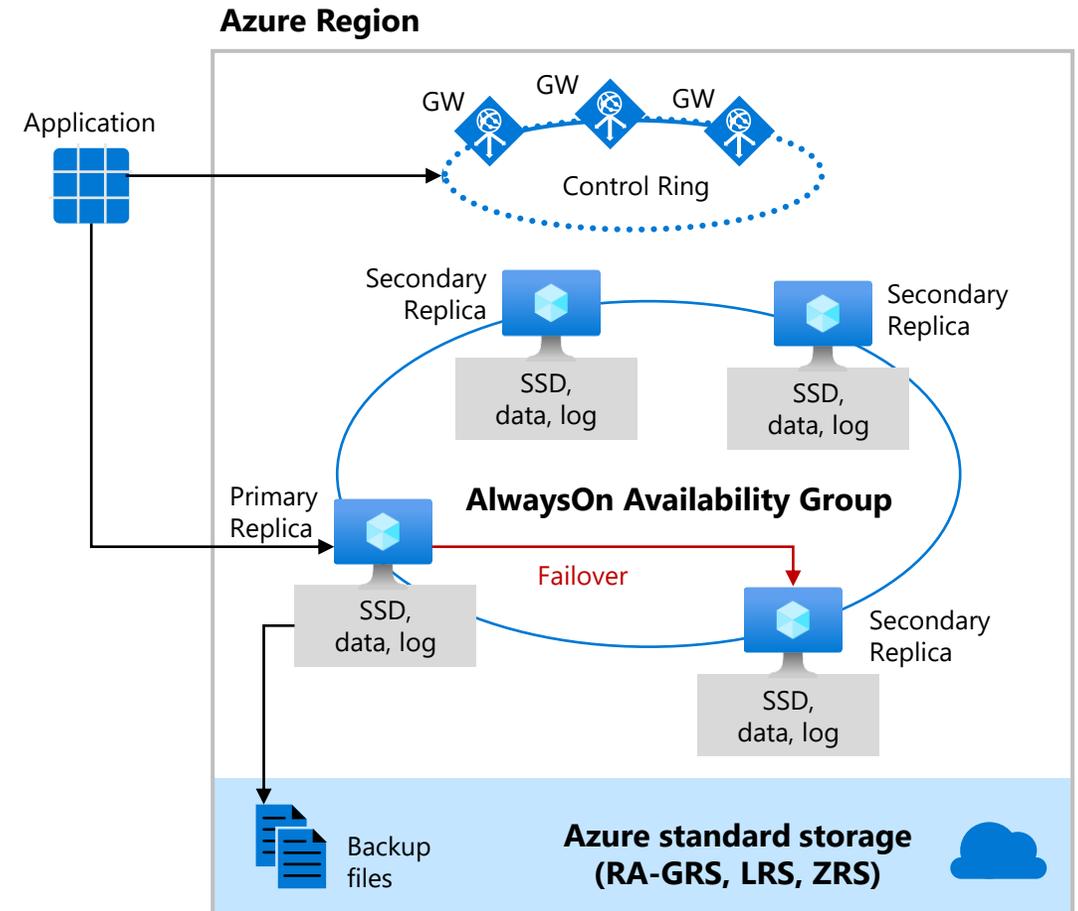
High availability is implemented using a technology like SQL Server Always On Availability Groups.

High availability is achieved by replicating both compute and storage to additional nodes.

The cluster includes a single primary replica for read-write workloads, and up to three secondary replicas.

The failover is initiated by the Azure Service Fabric.

As an extra benefit, the premium availability model includes Read Scale-Out feature.



# Connection Policy

**Redirect (recommended):** Clients establish connections directly to the node hosting the database, leading to reduced latency and improved throughput.

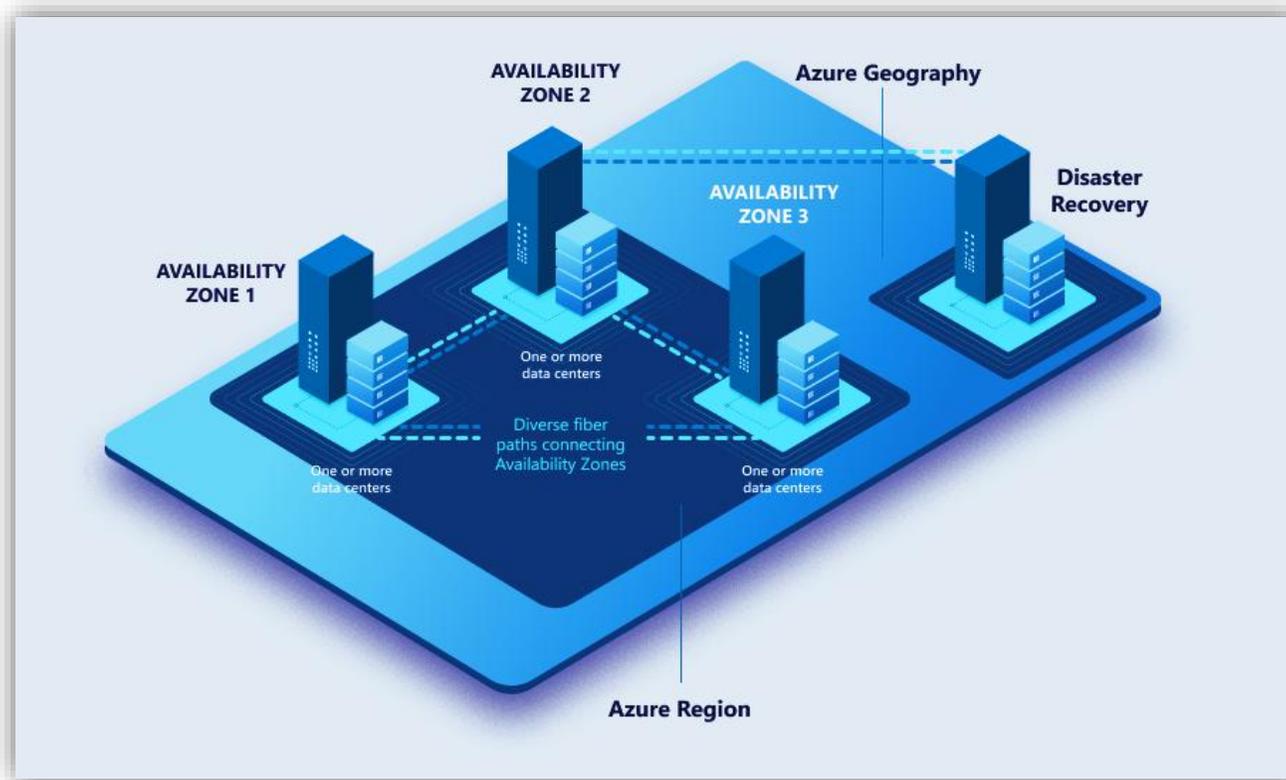
**Proxy:** In this mode, all connections are proxied via the Azure SQL Database gateways, leading to increased latency and reduced throughput.

**Default:** This is the connection policy in effect on all servers after creation unless you explicitly alter the connection policy to either Proxy or Redirect.

The screenshot displays the Azure SQL Central interface for a SQL server. The left-hand navigation pane includes sections for Overview, Activity log, Access control (IAM), Tags, Quick start, Diagnose and solve problems, Settings, Data management, Security, Networking (highlighted with a red box), Microsoft Defender for Cloud, Transparent data encryption, Identity, Auditing, Intelligent performance, Automatic tuning, and Recommendations. The main content area is titled 'Networking' and features tabs for 'Public access', 'Private access', and 'Connectivity' (highlighted with a red box). Under 'Connectivity', there is a section for 'Outbound networking' with a 'Restrictions disabled' status and a link to 'Configure outbound networking restrictions'. Below this is the 'Connection Policy' section, which is also highlighted with a red box. It contains the text 'Configure how clients communicate with your SQL database server. Learn more' and a 'Connection policy' heading. Three radio button options are listed: 'Default' (selected), 'Proxy', and 'Redirect'. The 'Default' option is described as using Redirect policy for all client connections originating inside of Azure (except Private Endpoint connections) and Proxy for all client connections originating outside Azure. The 'Proxy' option states that all connections are proxied via the Azure SQL Database gateways. The 'Redirect' option states that clients establish connections directly to the node hosting the database. At the bottom of the page, there is an 'Encryption in transit' section with a 'Minimum TLS version' dropdown menu set to 'TLS 1.3'.

# Storage redundancy

To enable high durability of backups several ways of replication are offered on instance creation.



The backups can be all located within

1. LRS: The same building (Local)
2. ZRS: Same region, different buildings (Zone)
3. GRS: Across paired regions (Geo)

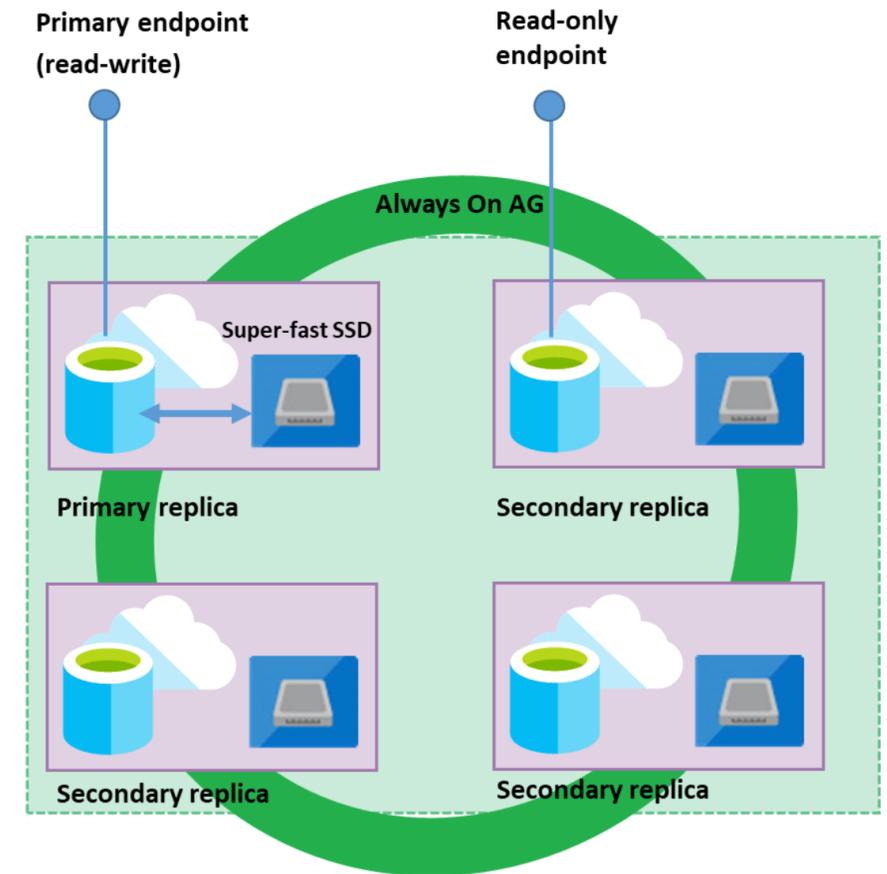
# Read Scale-Out

Read Scale-Out redirects the read-only client connections to one of the read-only replicas available instead of sharing the read-write replica.

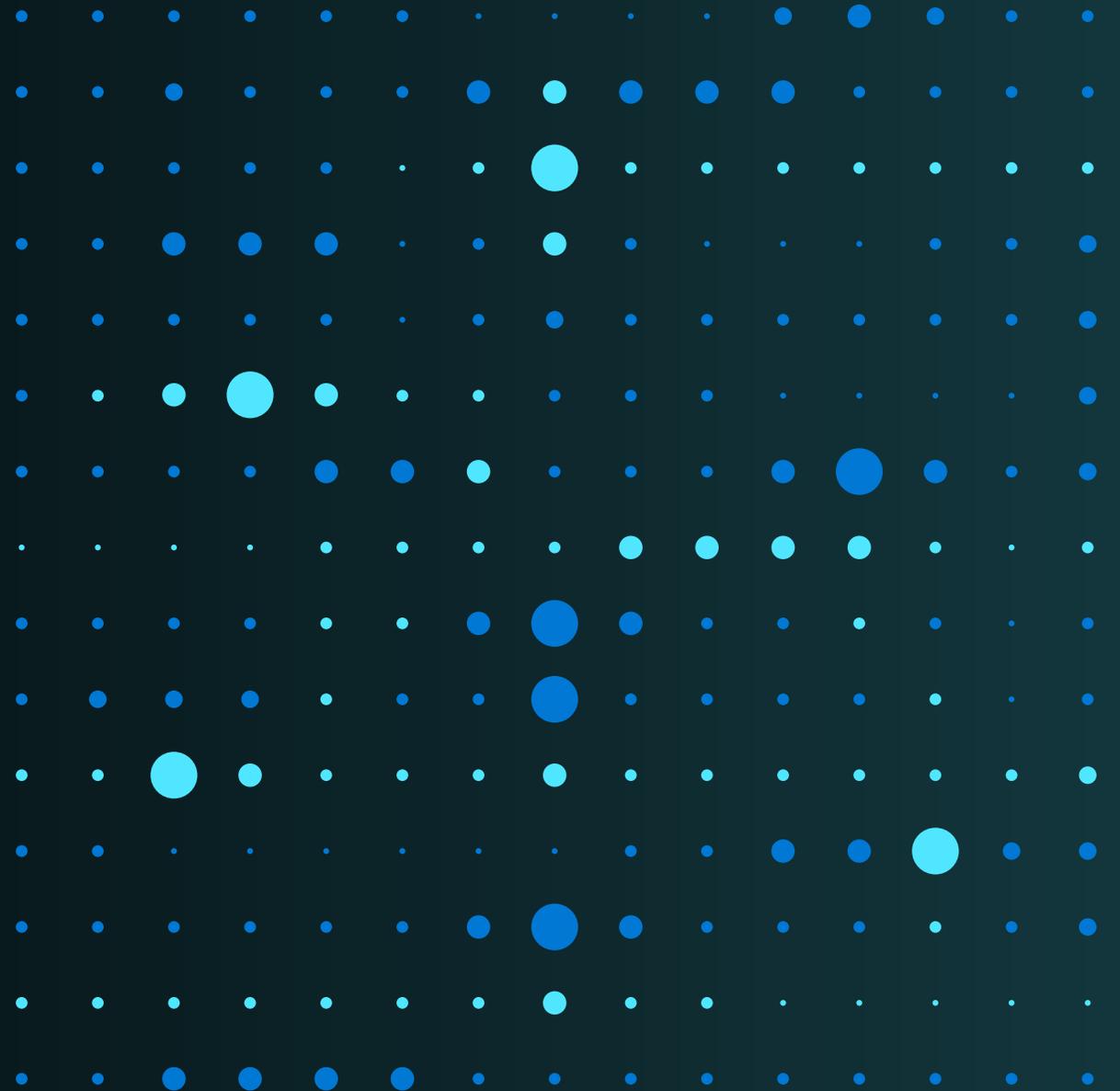
Use **ApplicationIntent=ReadOnly**; to connect to the read-only replica.

Effectively isolate the read-only workload from the main read-write workload and doubles the compute capacity of the database or elastic pool at no additional charge.

This is ideal to scale-out for complex analytical workloads without affecting the primary OLTP workload.



# Zone Redundancy in Azure SQL?



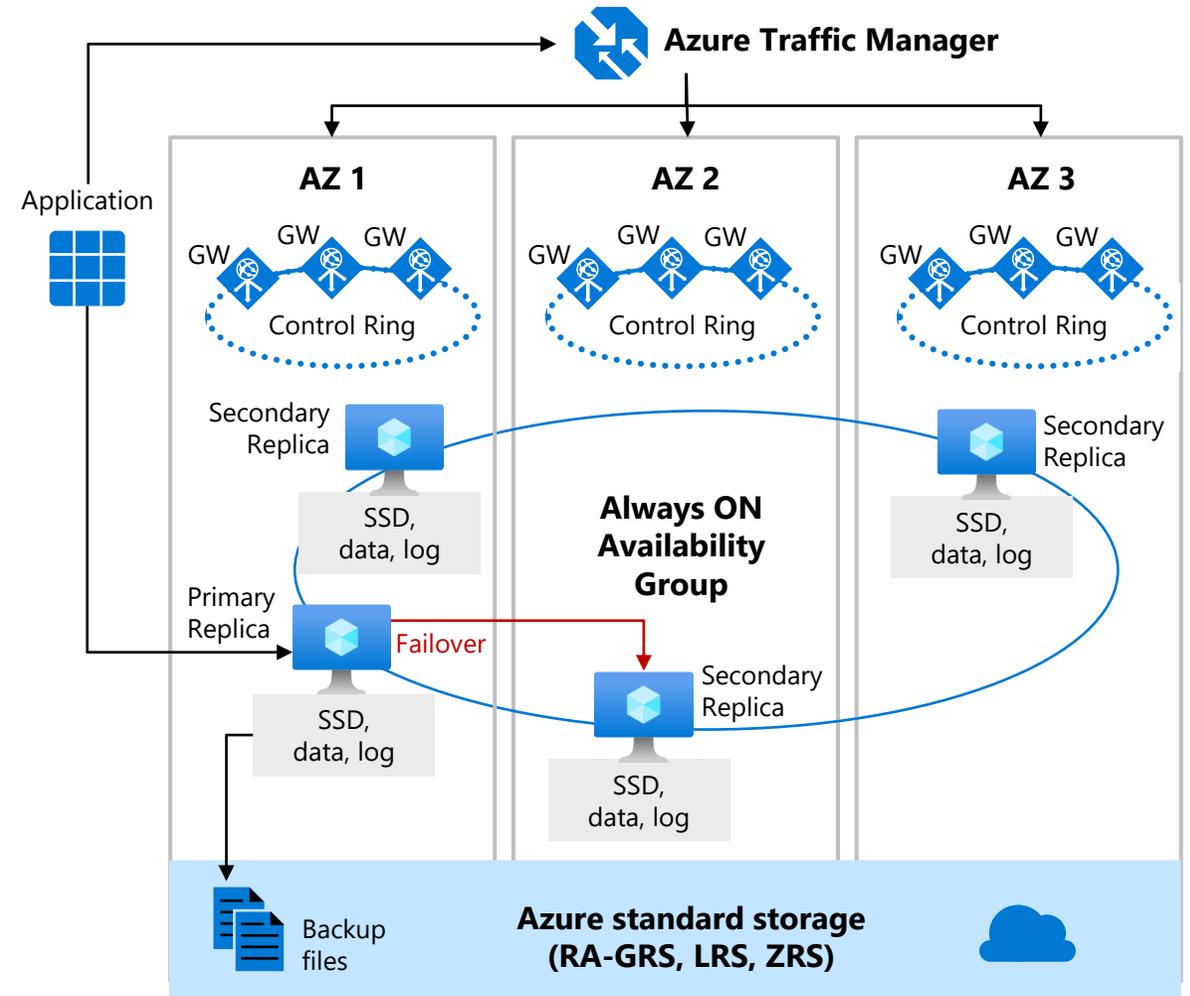
# Zone redundant configuration – Premium and Business Critical

By default, the cluster of nodes for the premium availability model is created in the same datacenter.

SQL Database can place different replicas of the Business-Critical database to different availability zones in the same region.

The routing is controlled by Azure Traffic Manager (ATM).

The zone redundant databases have replicas in different datacenters with some distance between them, the increased network latency may impact the performance.



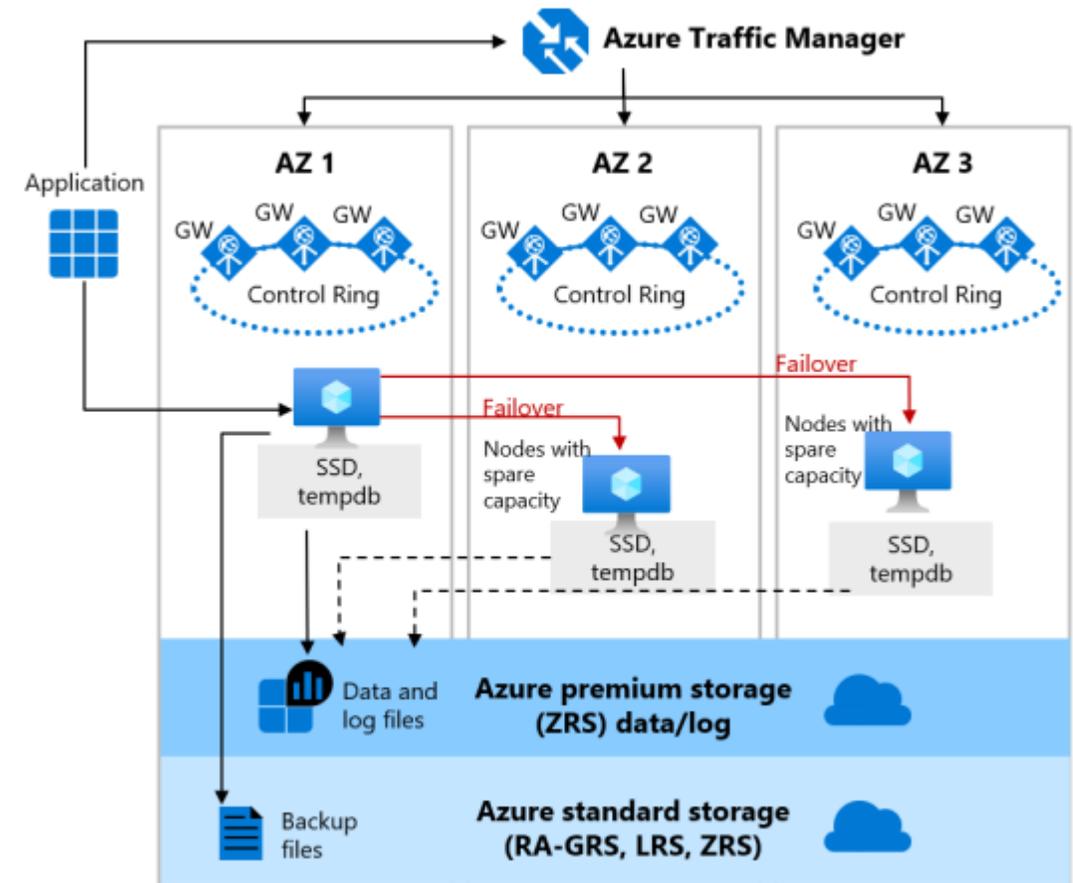
# Zone redundant configuration – General Purpose

Zone redundant configurations for the General-Purpose service tier became Generally Available in December 2022. Only available in select regions.

A stateful data layer with the database files (.mdf/.ldf) that are stored in Zone Redundant Storage (ZRS) and are synchronously copied across three physically isolated Azure availability zones.

For zone-redundant serverless and provisioned General-Purpose databases, nodes with spare capacity are readily available in other Availability Zones for failover.

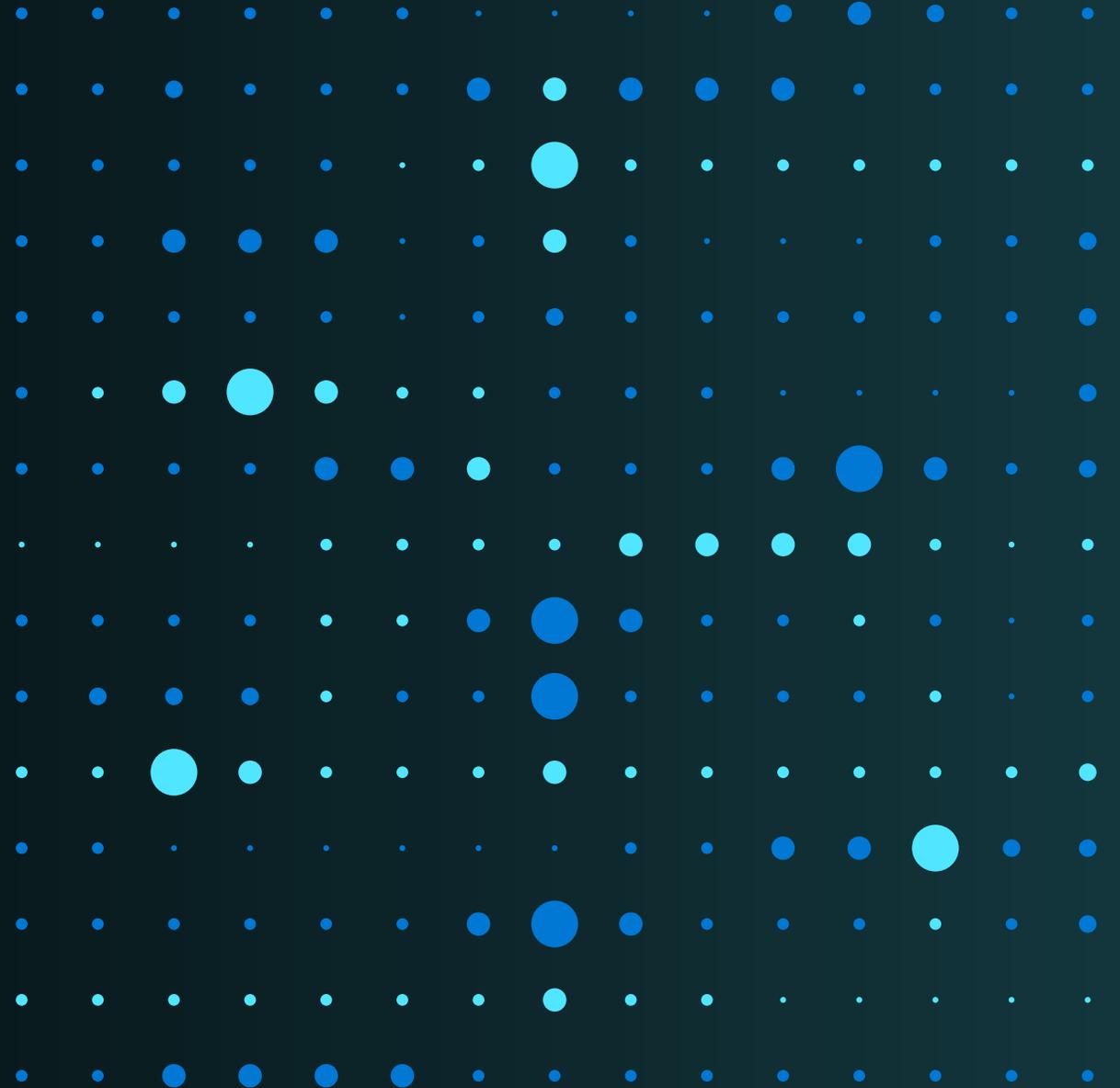
Zone redundancy for the General-Purpose service tier does come with an additional cost that includes charges for the extra resources required to maintain nodes with spare capacity across multiple Availability Zone



# Demo Time

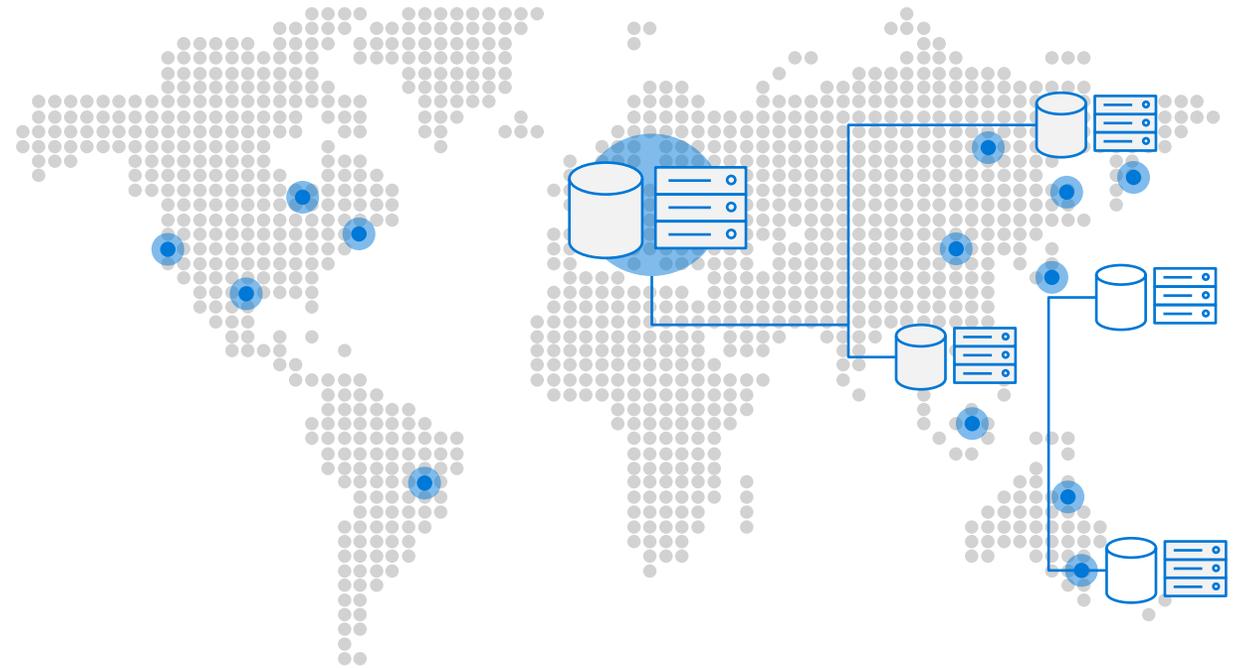


# Disaster Recovery in Azure SQL?



# Active Geo-replicas

Service levels	Basic, standard, 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 minutes
Failover	On demand



Up to 4 secondaries

# Stand-by Replicas

Available for General Purpose or Business Critical service tiers.

A secondary database replica that is used *only* for disaster recovery. Cannot have any workloads running on it, or applications connecting to it.

Provides you with the number of vCores licensed to the primary database at no extra charge under the failover rights benefit.

Save on licensing costs up to 40%. You're still billed for the compute and storage that the secondary database uses.

Home > SQL databases > MySampleDatabase (mydocsamplesqlserver/MySampleDatabase) | Replicas >

## Create SQL Database - Geo Replica

Microsoft

**Basics**   Review + create

### Replica configuration

Choose a replica type. Geo and standby replicas both offer independent compute + storage and security configuration from the primary, as well as an accessible endpoint. [Learn more](#)

Replica type \*

- Geo replica - Resides on a different logical server from the primary, protects against prolonged region outages.
- Standby replica - Resides on a different logical server from the primary. Allows for disaster recovery in anticipation of a failover event. Cannot serve read queries. Does not incur additional licensing cost.

I confirm that I will use the secondary replica as a standby replica. \*

# Failover groups extend geo-replication

Enables geo-replication for a group of databases within a server.

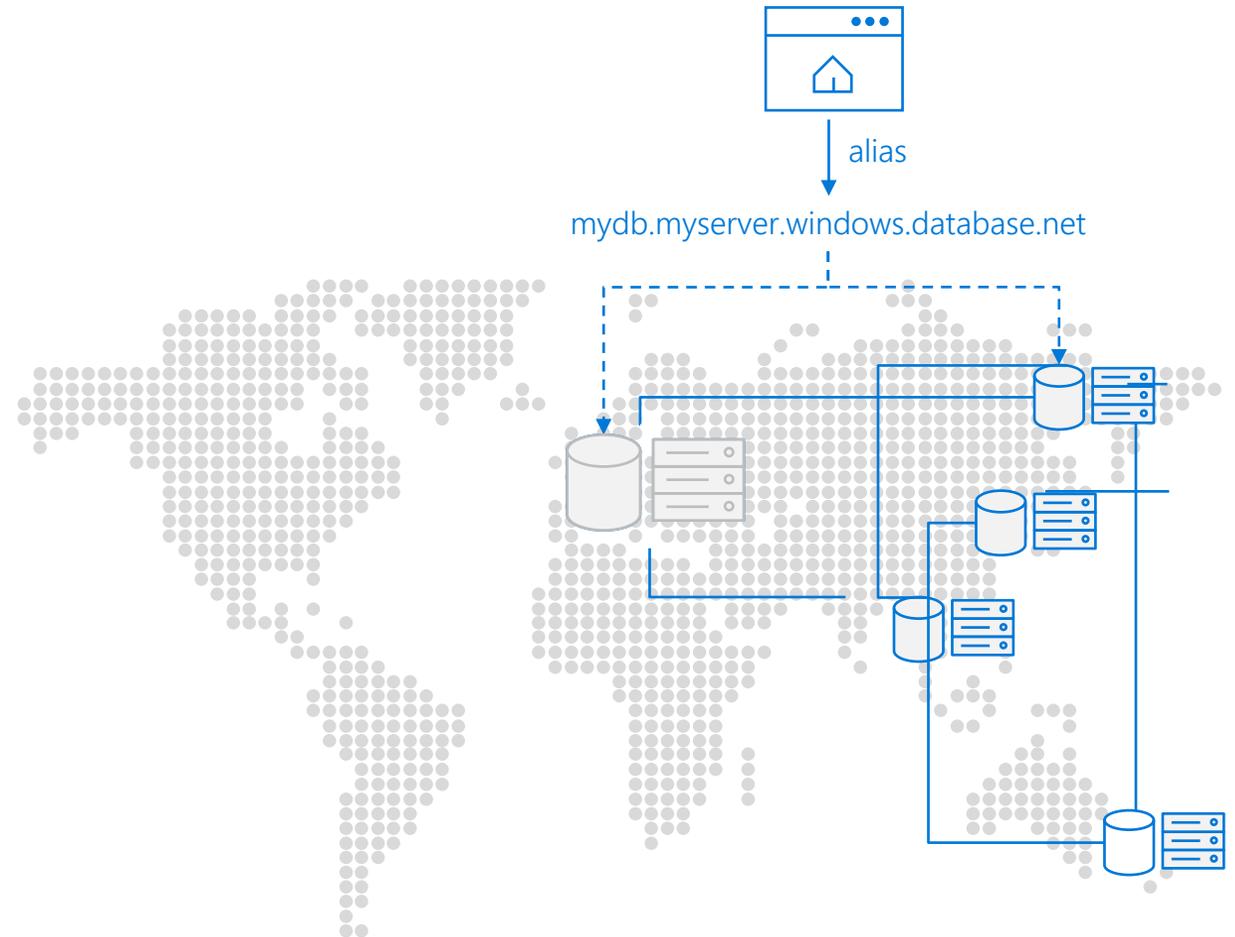
Automatically or manually failover a group of databases.

Available for all service tiers.

Configure the auto-failover policy that best meets your application needs.

Usage of and listener end-points.

DNS record is automatically updated.



# Active geo-replication vs auto-failover groups

	Geo-replication (Database)	Auto-failover groups (Server)
Automatic failover	No	Yes
Fail over multiple databases simultaneously	No	Yes
Update connection string after failover	Yes	No
Managed instance supported	No	Yes
Can be in same region as primary	Yes	No
Multiple replicas	Yes	No
Supports read-scale	Yes	Yes

# Demo Time

# Questions?

Dankie Faleminderit **Shukran** Chnorakaloutioun Hvala Blagodaria

Děkuji **Tak** Dank u Tānan Kiitos **Merci** Danke Ευχαριστώ A dank

Mahalo הודו. **Dhanyavād** Köszönöm Takk Terima kasih **Grazie** Grazzi

**Thank you!**

감사합니다 Paldies Choukrane Ačiū **Благодарам** ありがとうございます

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Ďakujem Tack Nandri Kop khun **Teşekkür ederim** Дякую Хвала Diolch