

Azure SQL DB – High Availability And Disaster Recovery Environment

In this blog, we will cover the plan and implement high availability and disaster recovery environment. We cannot stop the disasters, but we can arm ourselves with the high availability and disaster recovery environment. To know more about high availability and disaster recovery, read our full blog.

What Are High Availability And Disaster Recovery?

High availability is a point where it can eliminate a single point of failure, and disaster recovery is the process of getting a system back to its original working state. Both availability and disaster recovery rely on some of the best practices, such as deploying to multiple locations, automatic failover, and monitoring for failures. Disaster recovery focuses on discrete copies of the entire workload, and high availability focuses on the component of workload.

The Importance Of High Availability

- Ensuring business continuity for your application is very important to overcome disaster recovery.
- If your infrastructure goes down for any reason, it might cause an interruption to application users.
- Hence it is very important to ensure high availability for your systems.
- You need to cater to circumstances such let's say, there is an accidental deletion in a table.
- If there is an outage on the data centre that is hosting the Azure SQL Database.

1) High Availability For An Azure SQL Database

- By default, the Azure SQL database service provides high availability.
- It has the required implementation to protect against local hardware and software failures with an SLA of 99.995%.
- But there are many additional features available in the Azure SQL Database service that helps to achieve a plan and implement high availability and disaster recovery environment.

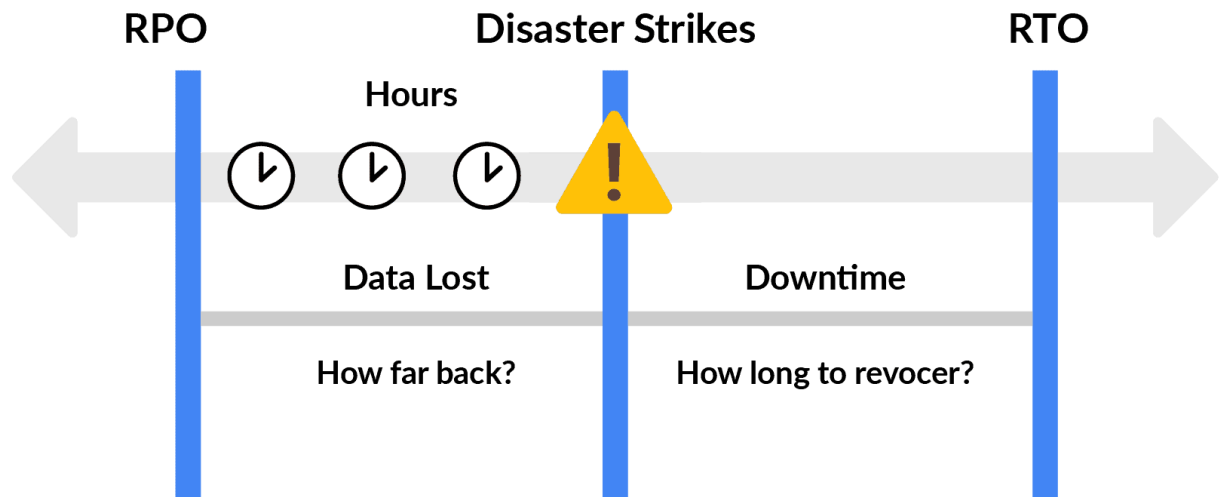
2) Backup Feature For The Azure SQL Database

- There is an automated backup system in place for the Azure SQL database to backup itself, and there is an attention point to restore a database. This is very useful; you can go to the previous restore point if someone deletes the data.
- Different retention periods are depending on the service tier of the database.
- You can also configure long-term retention for your database backups.

3) Protecting Your Application Against A Disaster

- What happens if the Azure data centre hosting the database goes down. It can disrupt your application users.
- Trying to restore the data from a backup can take time. Also, you need to think about the recovery point objective and recovery time objective.

Recovery Time Objective And Recovery Point Objective



1) Recovery Time Objective

The maximum amount of time available to bring the resources running after a failure. Let's say the process takes longer than the recovery time objective, then the database goes down; how long the business use can wait till the database is up and running it could be less than 5 minutes, or it could just stretch about 30 minutes how long the applications can be down.

2) Recovery Point Objective

Recovery point objective is the point in time that How much data loss can the business bear. For example, suppose an infrastructure as a service virtual machine containing servers experiences failure at 11:00 AM. The database within the SQL Server Instance has a Recovery Point Objective of 15 minutes. No matter what, Technology is used to roll back that instance and its databases. This means that the database can be restored at 10:45 AM or later.

Azure SQL Database Backups

- This is a feature that is available with the Azure SQL Database and SQL managed instance service.
- Here the Azure SQL Database uses the in-built Server Technology to create full backups every week, differential backups every 12-24 hours, and transaction log backups every 5 to 10 minutes.
- When it comes to the basic DTU model, the backups are retained for seven days.
- When it comes to the standard and premium DTU model, the backups are retained for 35 days.
- When it comes to the vCore Purchasing model, business-critical backups can be retained between up to 7-35 days.

What Can Be Done With The Database Backups?

- **Point in time restore of an existing database:** Here, you can restore an existing database to a particular point in time in the past.
- **Point in time restore of a deleted database:** Here, you can restore a database that has been deleted. The deleted database can only be restored on the same server.

High Availability And Disaster Recovery Options

1) For IaaS

The options of Infrastructure as a Service (IaaS) and Platform as a Service (PaaS) may differ when it comes to availability. With the infrastructure as a service, you have a Virtual Machine, which means there is an OS with an SQL Server. So administrators are responsible for the control and configuration of the SQL Server.

When using IaaS, you can use these features to increase availability in SQL Server.

Feature name	Protects
Always on availability groups(AG)	Database
Always on failover cluster Instance	Instance
Log shipping	Database

2) For PaaS

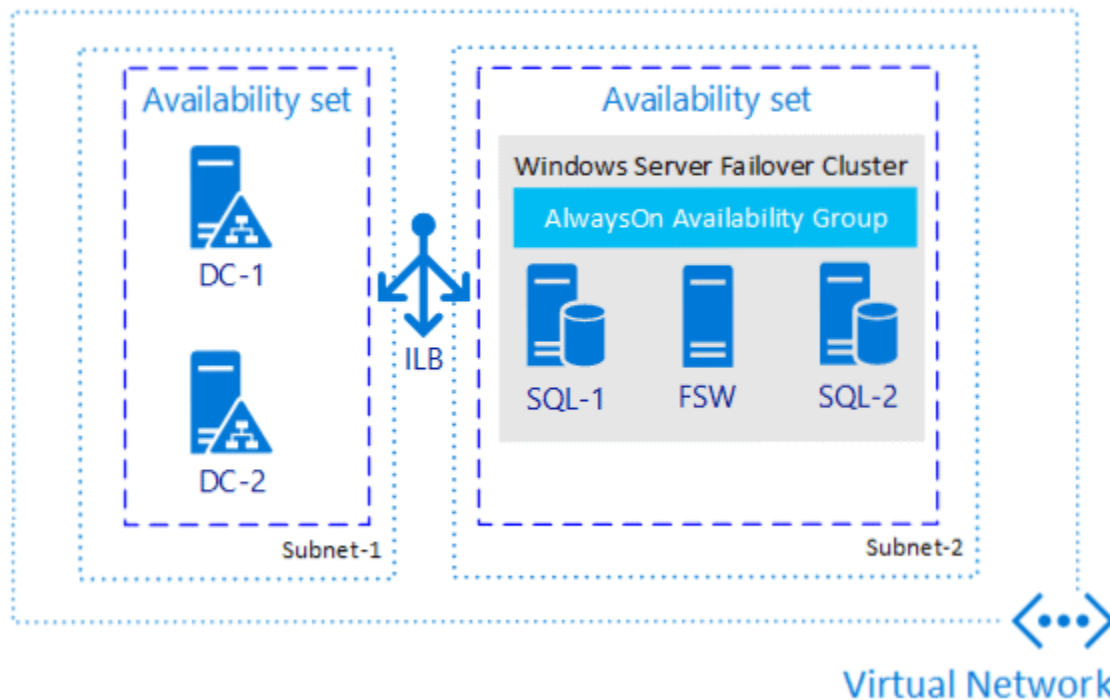
And if we choose a platform as a service for deployments such as Azure SQL database, the high availability and disaster recovery solutions are built over the platform; we just need to enable them there is no option for the high configuration to implement high availability and disaster recovery environment.

- For the high availability, the options are Active geo-Replication and failover groups.
- Azure Database For SQL Provides the SLA, which guarantees the availability of 99.99, means no downtime.
- If a node-level interruption occurs, the database server automatically creates a new node and attaches the data storage.

Examples Of High Availability And Disaster Recovery Solution

1) Always On Availability Groups

If you need high availability, not disaster recovery so configuring, the availability groups is the finest method. The below image shows you how an availability group in a single region could look like.

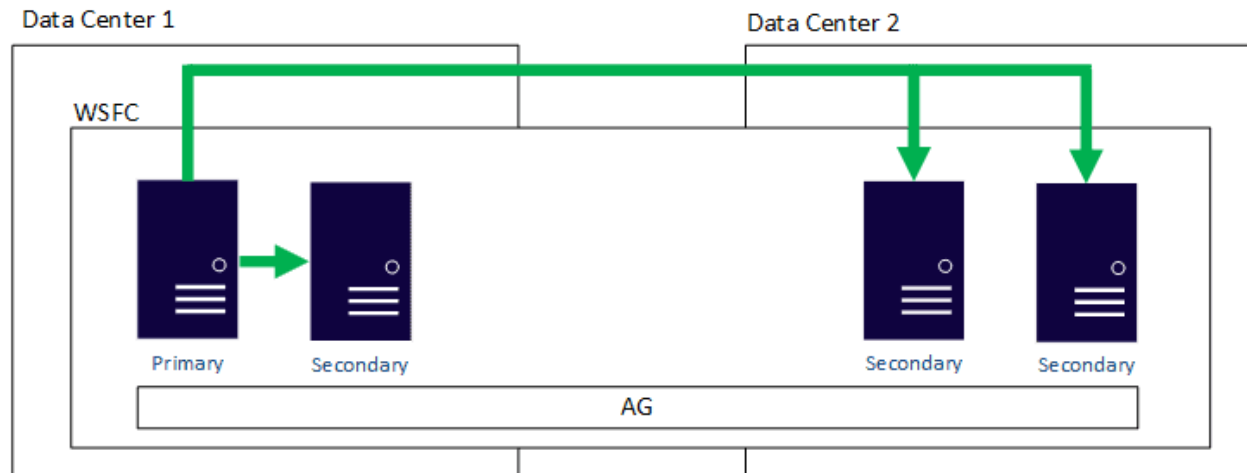


Why This Architecture Is Ubiquitous

- This architecture protects data having replica on a different virtual machine.
- This will allow you to meet the RPO and RTO with no minimal data loss if implemented properly.
- During the patching scenarios, the architecture provides enhanced availability.
- There is less complication than when using an FCI (Failover cluster instance) because there is no need for shared storage.

2) Multi-Region Or Hybrid Always On Availability Groups

In disaster recovery, this architecture requires **Active Directory Domain Service** and **Domain Name System** to be available in every region and On-premises as well if this comes under the hybrid solution.

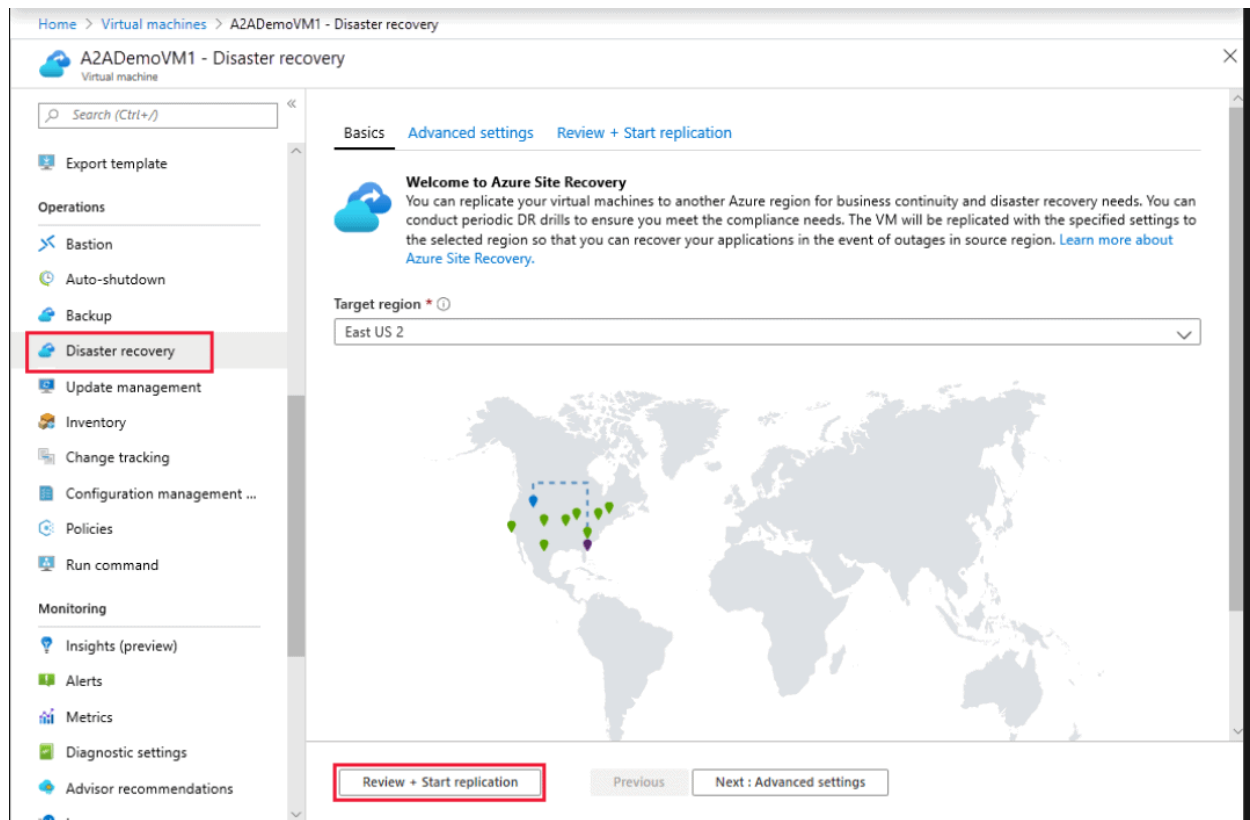


Why This Architecture Is Considered

- The availability groups naturally provide redundancy with additional replicas of data.
- This architecture provides features that use high availability and disaster recovery.
- This architecture works with the enterprise edition and standard edition of the SQL Server.

3) Azure Site Recovery

In disaster recovery, It generally replicates the running workloads on a physical and virtual machine from a primary location to a secondary location.



Why This Architecture Is Considered

- Azure site recovery meets the recovery point objective and recovery time objective.
- Azure site recovery is part of the platform.

Frequently asked questions

Q.1) What is a Recovery point objective?

The restore in point in time to which data needs to be recovered after a failure.

Q.2) What is a hybrid solution?

A solution that has resources in another cloud, as well as on-premises or Azure Cloud.

Q.3) What is available after failover with database-level protection in SQL Server?

Database level protection means that anything captured in the transaction log for a user or database for the application is accounted as a part of the availability feature.

