

# A Practical Approach to High Availability and Disaster Recovery in Azure

CCoE for Practitioners

# High Availability vs Disaster Recovery



- **High Availability** - eliminating single points of failure using failover mechanism  
Ex. Failover using Azure Site Recovery



- **Disaster recovery** - getting a system back to an operational state after meltdown using backups  
Ex. Recovering from dirty data using Azure Backup

# Elements of High Availability

## REDUNDANCY

Ensuring that any elements critical to system operations have an additional, redundant component that can take over in case of failure.

## MONITORING

Collecting data from a running system and detecting when a component fails or stops responding.

## FAILOVER

A mechanism that can switch automatically from the currently active component to a redundant component, if monitoring shows a failure of the active component.

# Elements of Disaster Recovery

## Service Level Agreement

level of service expected by a customer from a supplier, laying out the metrics by which that service is measured

Ex **99.99%** SLA means 52:34 of downtime per year

## Recovery Time Objective

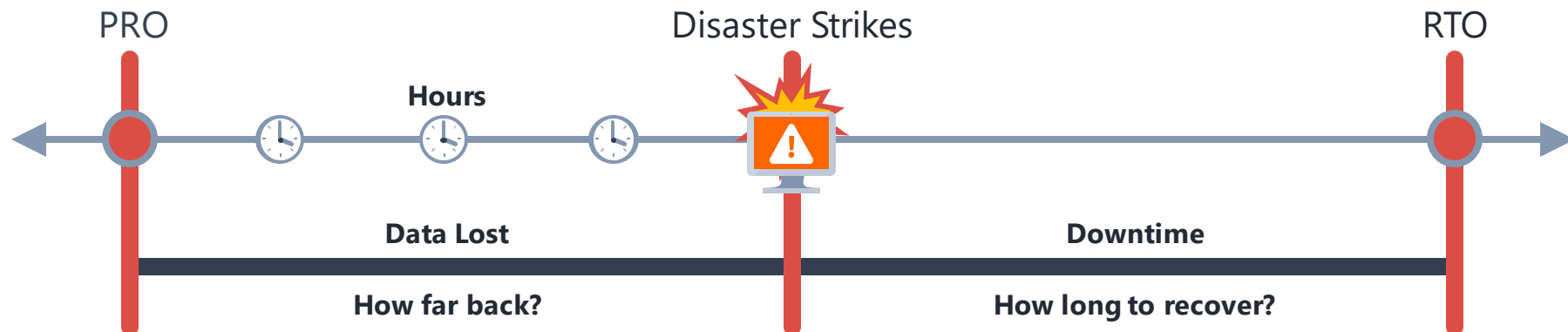
corresponds to the maximum time under which a failed workload must be recovered

Ex **5 min** to full recovery

## Recovery Point Objective

represents the maximum amount of data that an organization can afford to lose

Ex **6 hours** of data



# Looks good, but how much does it cost?

## High Availability

**2x Current Infra**



network load balancing

## Disaster Recovery

**2x Current Storage**



backup network traffic

# High Availability vs Disaster Recovery

	PRO	RTO	Operational Recovery	Data corruption Recovery	Cost
High Availability	Seconds	Seconds	Auto*	NO	High
Disaster Recovery	Hours	Hours	Manual	YES	Low

# High Availability

Resource Type	Azure features	Reference
Compute	<ul style="list-style-type: none"> <li>• Availability Set</li> <li>• Availability Zones</li> </ul>	<a href="#">Availability sets overview - Azure Virtual Machines   Microsoft Docs</a> <a href="#">Availability options for Azure Virtual Machines - Azure Virtual Machines   Microsoft Docs</a> <a href="#">Regions and Availability Zones in Azure   Microsoft Docs</a>
Storage	<ul style="list-style-type: none"> <li>• Azure Storage Redundancy (LRS, ZRS, GRS, RA-GRS, GZRS)</li> </ul>	<a href="#">Data redundancy - Azure Storage   Microsoft Docs</a> <a href="#">Use geo-redundancy to design highly available applications - Azure Storage   Microsoft Docs</a>
Database	<ul style="list-style-type: none"> <li>• Azure SQL Database &amp; Azure SQL Managed Instance (Standard and Premium availability model)</li> <li>• Azure SQL Database &amp; Azure SQL Managed instance auto-failover group</li> <li>• Always On Availability Group</li> <li>• Always On Failover Cluster</li> </ul>	<a href="#">What is Azure SQL Managed Instance? - Azure SQL Managed Instance   Microsoft Docs</a> <a href="#">High availability - Azure SQL Database and SQL Managed Instance   Microsoft Docs</a> <a href="#">High availability, disaster recovery, business continuity - SQL Server on Azure VM   Microsoft Docs</a> <a href="#">Set up disaster recovery for SQL Server with Azure Site Recovery - Azure Site Recovery   Microsoft Docs</a> <a href="#">Auto-failover groups - Azure SQL Database &amp; SQL Managed Instance   Microsoft Docs</a> <a href="#">Overview of SQL Server Always On availability groups - SQL Server on Azure VM   Microsoft Docs</a> <a href="#">Availability groups: a high-availability and disaster-recovery solution - SQL Server Always On   Microsoft Docs</a>
Network	<ul style="list-style-type: none"> <li>• Traffic Manager</li> <li>• Azure Front Door</li> <li>• Application Gateway</li> <li>• Network Load Balancer</li> </ul>	<a href="#">Azure Traffic Manager   Microsoft Docs</a> <a href="#">Azure Front Door   Microsoft Docs</a> <a href="#">Quickstart: Set up high availability with Azure Front Door Service - Azure portal   Microsoft Docs</a> <a href="#">What is Azure Application Gateway   Microsoft Docs</a>
App Services	<ul style="list-style-type: none"> <li>• App Services Environment</li> </ul>	<a href="#">Highly available multi-region web app - Azure Architecture Center   Microsoft Docs</a> <a href="#">High availability enterprise deployment using App Services Environment - Azure Reference Architectures   Microsoft Docs</a> <a href="#">Multi-tier web application built for HA/DR - Azure Example Scenarios   Microsoft Docs</a>
Containers	<ul style="list-style-type: none"> <li>• Azure Kubernetes Service (AKS)</li> </ul>	<a href="#">Best practices for AKS business continuity and disaster recovery - Azure Kubernetes Service   Microsoft Docs</a>

# Disaster Recovery

Resource Type	Azure features	Reference
Compute	<ul style="list-style-type: none"> <li>Azure Backup (Azure Virtual Machine)</li> <li>Azure Site Recovery</li> </ul>	<a href="#">What is Azure Backup? - Azure Backup   Microsoft Docs</a> <a href="#">Overview of operational backup for Azure Blobs - Azure Backup   Microsoft Docs</a> <a href="#">About Azure Site Recovery - Azure Site Recovery   Microsoft Docs</a>
Storage	<ul style="list-style-type: none"> <li>Azure Backup (Azure Storage (Azure Files))</li> </ul>	<a href="#">Overview of Backup center - Azure Backup   Microsoft Docs</a>
Database	<ul style="list-style-type: none"> <li>Azure Backup (SQL in Azure VM)</li> <li>Azure SQL Database &amp; Azure SQL Database Managed Instance Built-in Backup</li> </ul>	<a href="#">Back up multiple SQL Server VMs from the vault - Azure Backup   Microsoft Docs</a> <a href="#">Set up disaster recovery for SQL Server with Azure Site Recovery - Azure Site Recovery   Microsoft Docs</a> <a href="#">Backup &amp; restore with Azure Blob Storage - SQL Server   Microsoft Docs</a>
App Services	<ul style="list-style-type: none"> <li>Backup and Restore</li> </ul>	<a href="#">Back up your app in Azure</a> <a href="#">Back up an app - Azure App Service   Microsoft Docs</a> <a href="#">Architecture Center   Microsoft Docs</a> <a href="#">Multi-tier web application built for HA/DR - Azure Example Scenarios   Microsoft Docs</a>
On-Premises	<ul style="list-style-type: none"> <li>Azure StorSimple</li> <li>Backup Server, Azure Backup</li> </ul>	<a href="#">Archive on-premises data to the cloud</a> <a href="#">Microsoft Azure StorSimple Virtual Array overview   Microsoft Docs</a> <a href="#">Introduction to Azure File Sync   Microsoft Docs</a> <a href="#">Back up on-premises applications and data to the cloud</a>
All resources	<ul style="list-style-type: none"> <li>Infrastructure as Code (IaaS)</li> </ul>	<a href="#">What is Infrastructure as Code? - Azure DevOps   Microsoft Docs</a> <a href="#">Repeatable Infrastructure - Azure Architecture Center   Microsoft Docs</a>



# Thank You!

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