Microsoft Power Platform CONFERENCE

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Power Platform Architecture Internals

Ilya Grebnov & Mauktik Gandhi

Whova

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Event Invitation Code: PPCFall2023

Microsoft Power Platform

Power Platform Architecture Internals

Ilya Grebnov
Chief Architect

Mauktik Gandhi
Director of Engineering

Microsoft Power Platform

Power Bi

Power Apps

Power Automate

Power Virtual Agents

Power Pages

AI Builder

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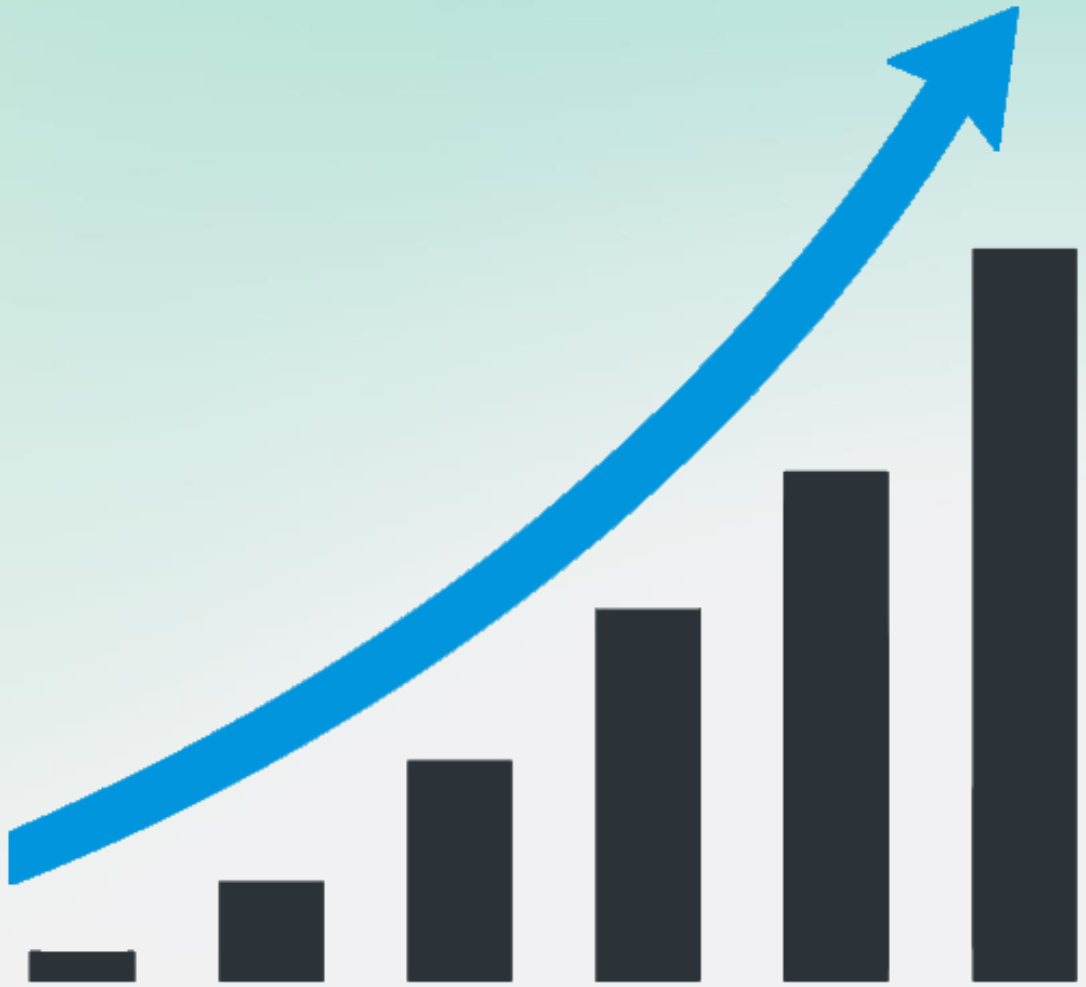
Dataverse

Microsoft Power Platform

How large is Power platform?

How large is the Power platform?

- 400+ Microservices
- 13K+ Azure SQL Elastic pools
- 3.5M+ Azure SQL Databases
- 24PB+ data stored

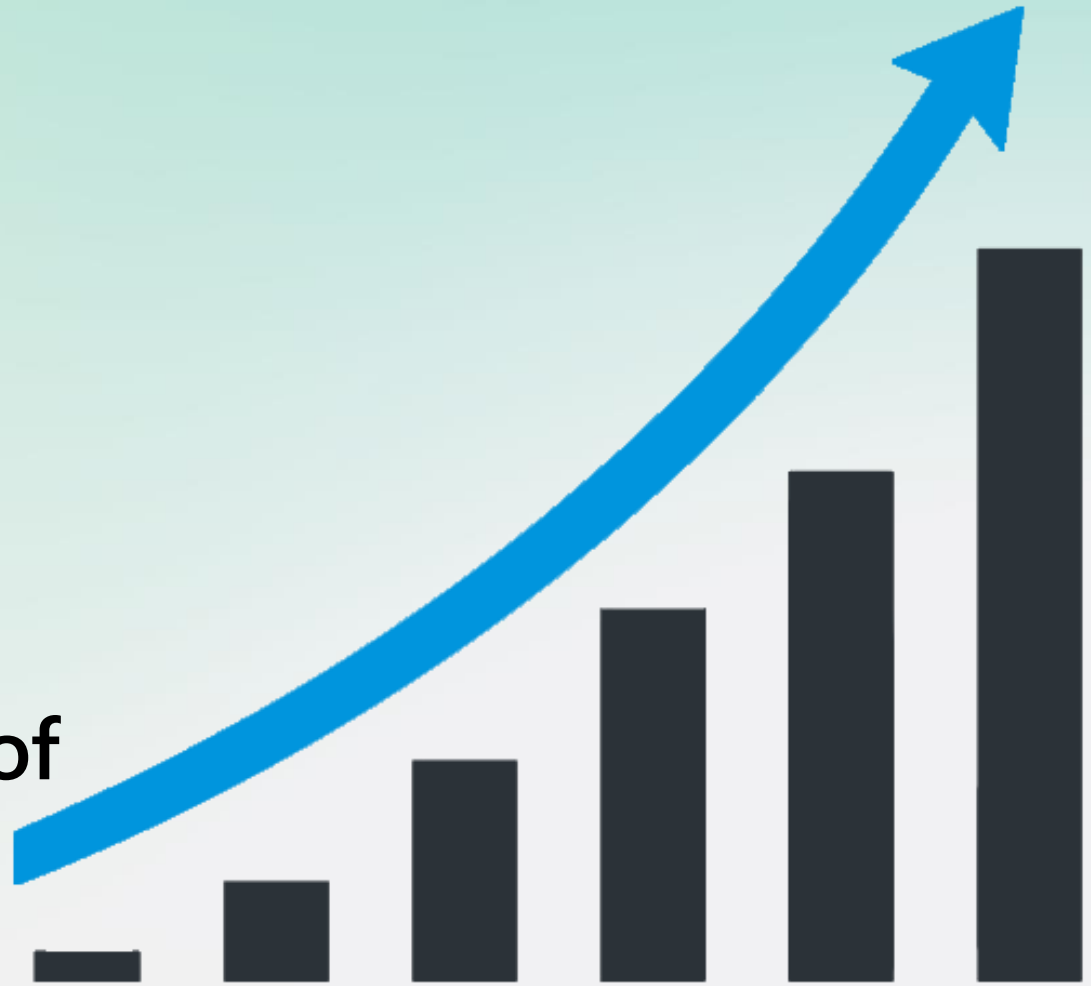


What Azure services does Power Platform leverage?

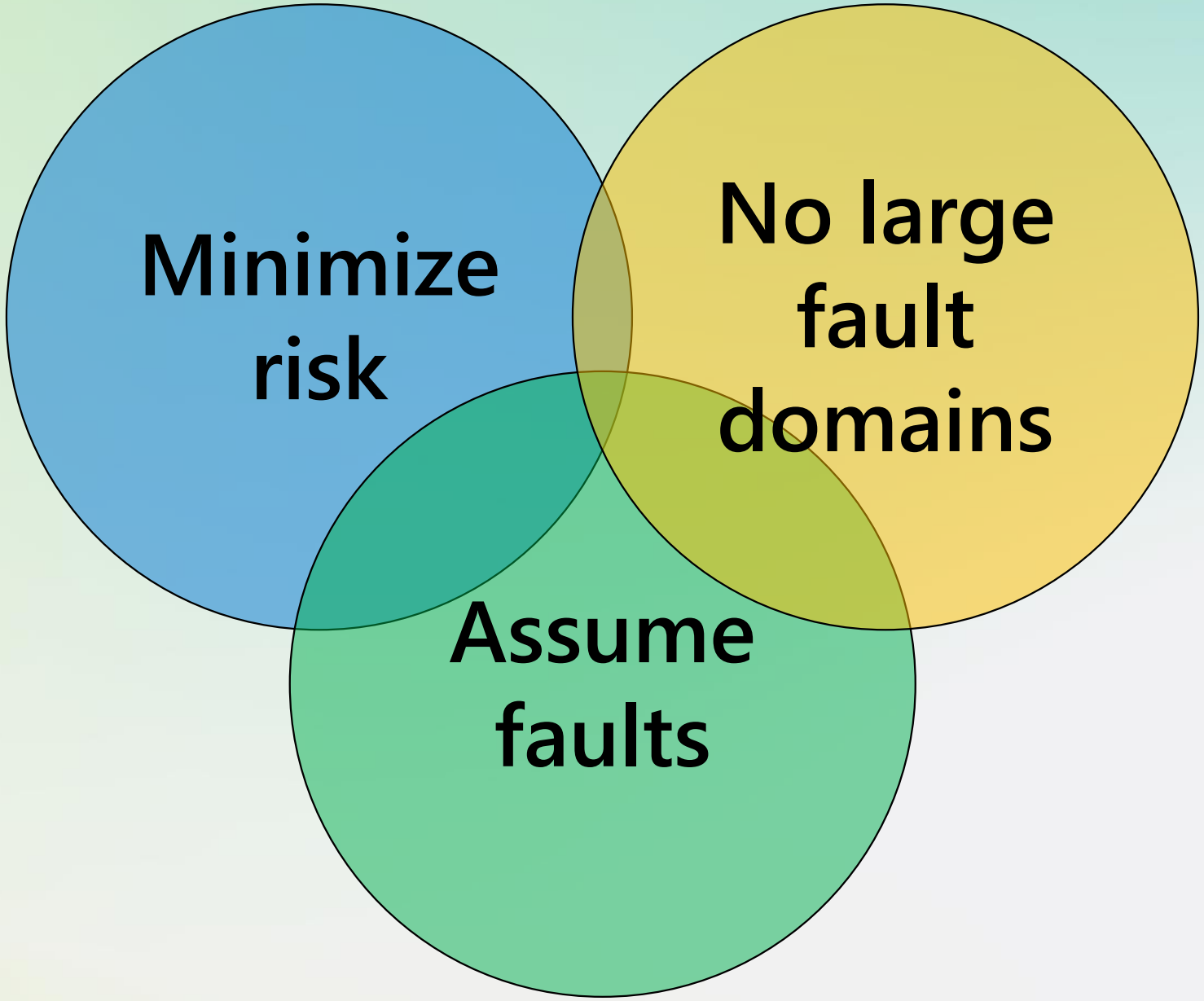
- Advanced Threat Protection
- API Management
- App Center
- App Configuration
- Application Gateway
- Application Insights
- Automation
- Azure Active Directory
- Azure Analysis Services
- Azure App Service
- Azure Applied AI Services
- Azure Arc
- Azure Bastion
- Azure Bot Service
- Azure Cognitive Search
- Azure Cosmos DB
- Azure Data Explorer
- Azure Data Factory v2
- Azure Databricks
- Azure DDOS Protection
- Azure DevOps
- Azure DNS
- Azure Firewall
- Azure Front Door Service
- Azure IoT
- Azure Kubernetes Service
- Azure Maps
- Azure Monitor
- Azure Site Recovery
- Azure Stack Edge
- Azure Synapse Analytics
- Backup
- Chat
- Cloud Services
- Cognitive Services
- Container Instances
- Container Registry
- Content Delivery Network
- Data Lake Analytics & Store
- Event Grid
- Event Hubs
- ExpressRoute
- Functions
- HDInsight
- Key Vault
- Load Balancer
- Log Analytics
- Logic Apps
- Machine Learning Studio
- MS Bing Services
- NAT Gateway
- Notification Hubs
- Power BI Embedded
- Redis Cache
- Scheduler
- Security Center
- Sentinel
- Service Bus
- Service Fabric
- SignalR
- SMS
- SQL Database
- Storage
- Stream Analytics
- Traffic Manager
- Virtual Machines
- Virtual Network
- Voice

The challenges of a fast-growing platform

- We must tackle many complex technical problems at once
- The solutions that worked just a few years ago no longer do
- Faults are an inherent property of complex systems



Principles of good fault tolerant architecture

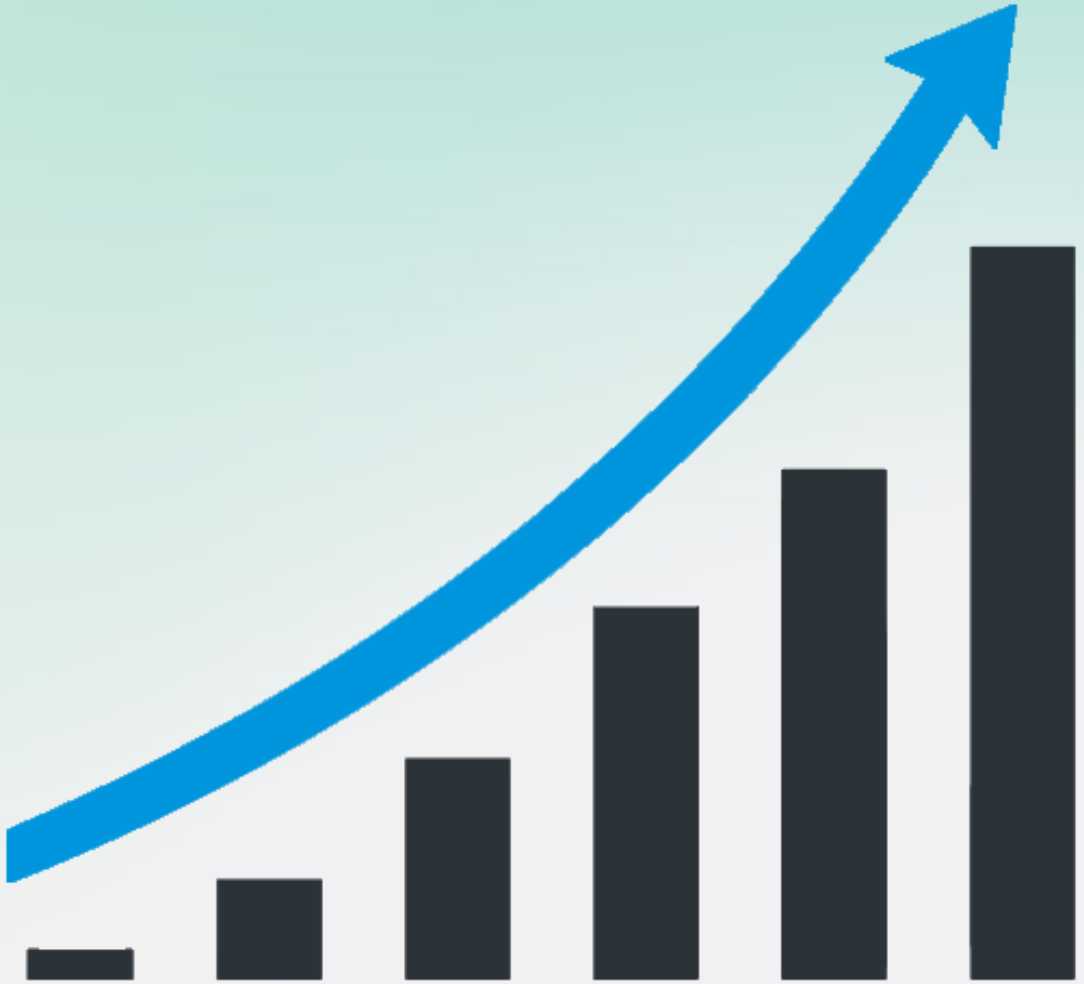


The challenges of a fast-growing platform

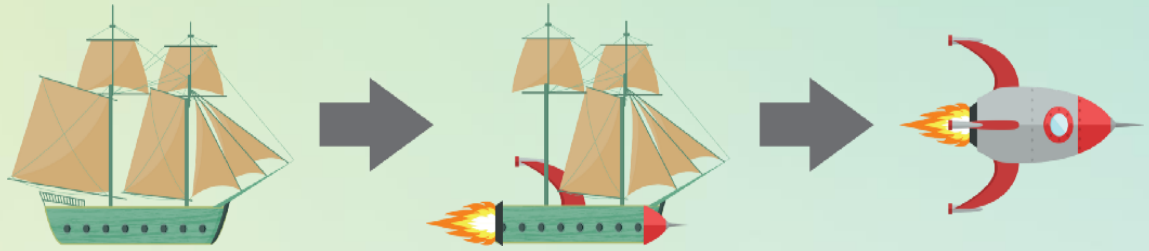
Power Platform

Core Services

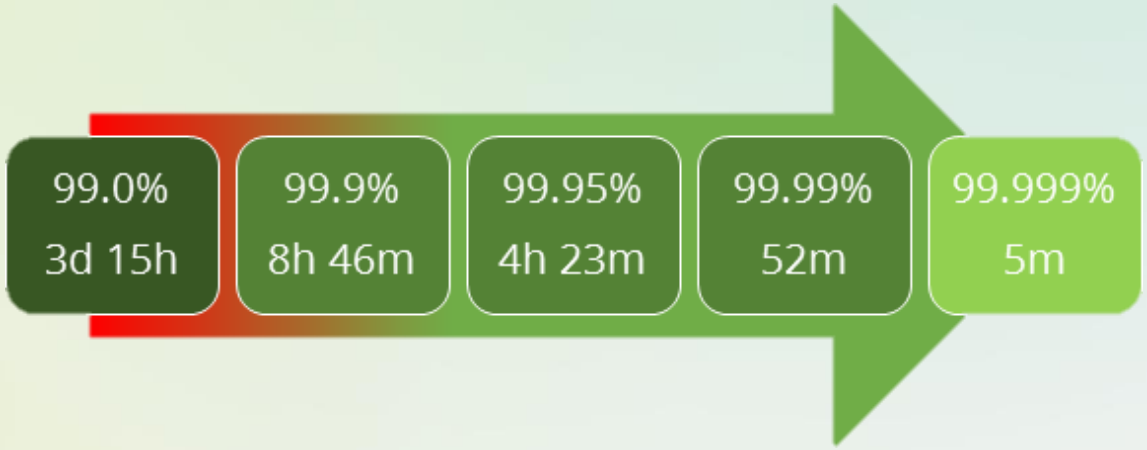
Azure Infrastructure



Power Platform “Project Standard”



Project Theseus



Invincible Platform

Project Standard

“Project Standard” Themes

- Isolation
- Zone Redundancy
- Data Integrity
- Safe Change Management
- Diagnostics Standardization
- Infrastructure Optimization

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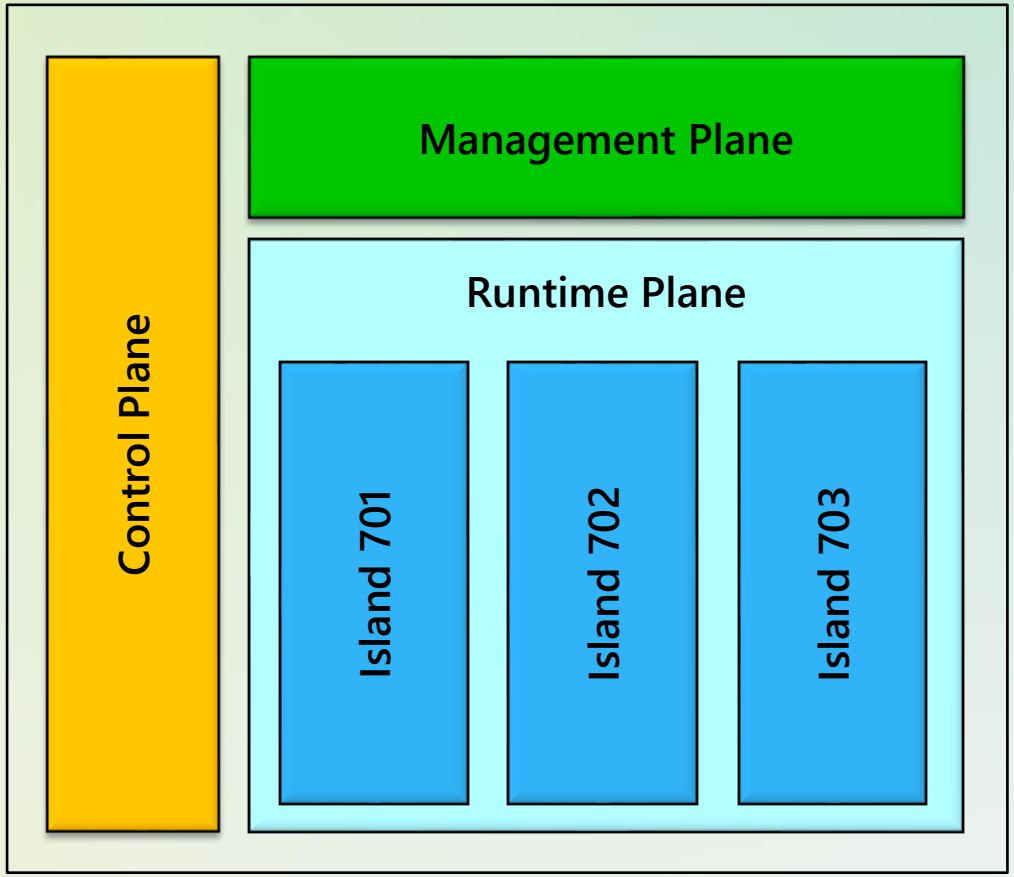
Isolation

Islands Architecture – The Planes

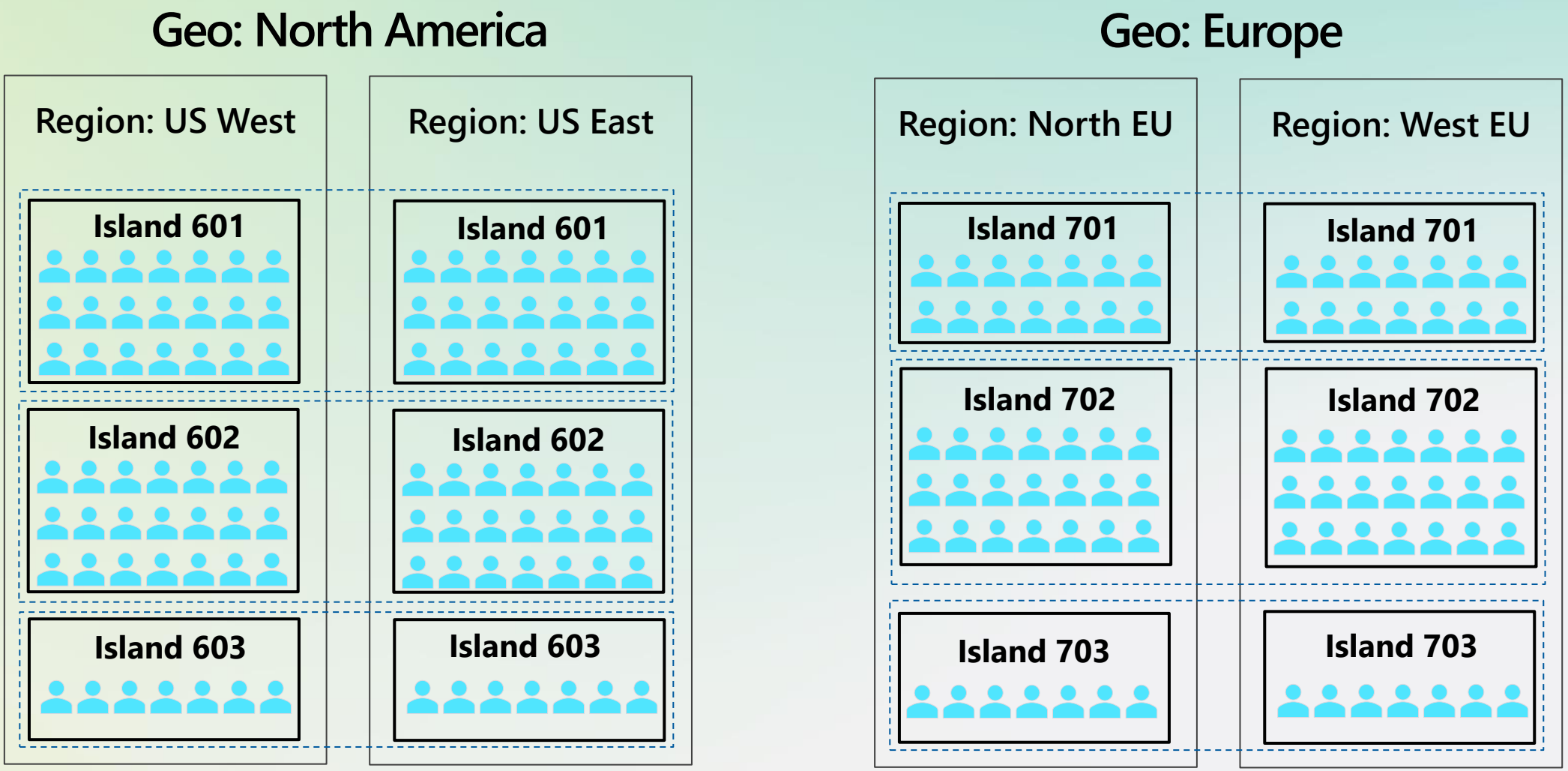


Control Plane builds out and manages infrastructure and deploys services

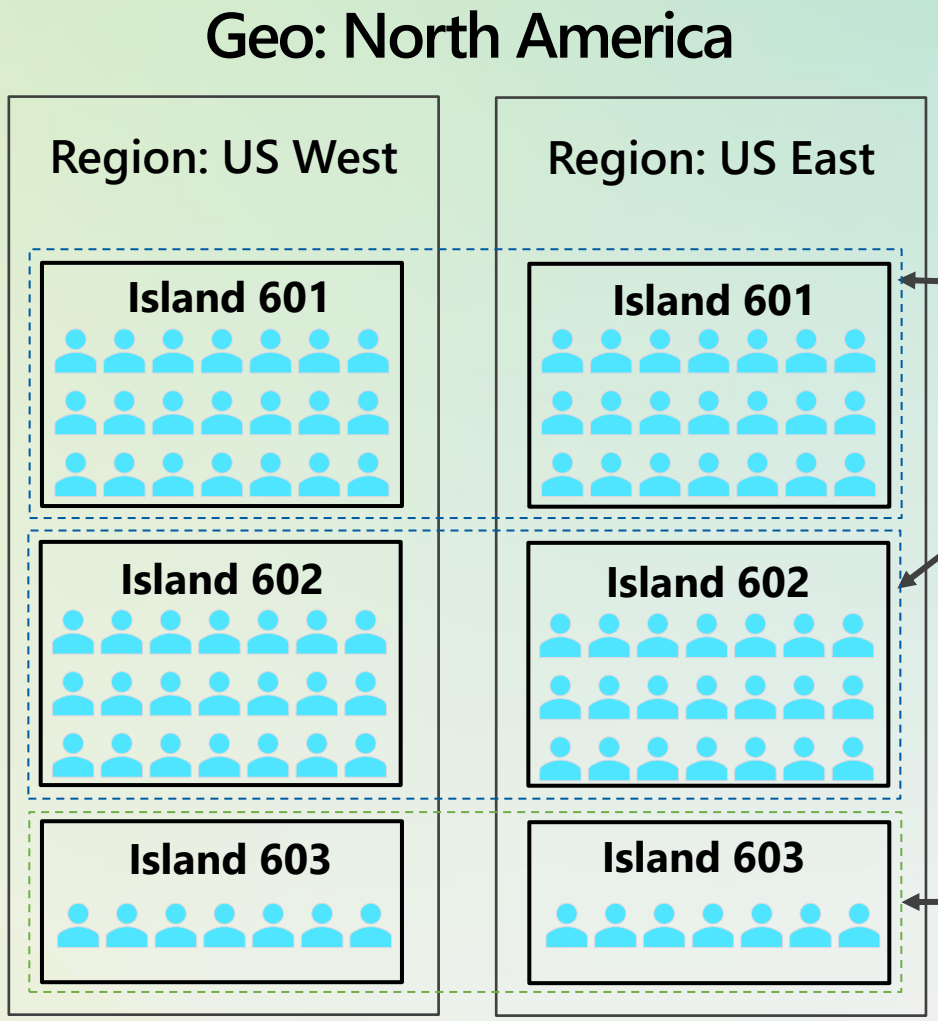
Management Plane orchestrates customer lifecycle and provides discovery services

Runtime Plane provides customer functionality and is partitioned

Runtime Plane – Fault Isolation



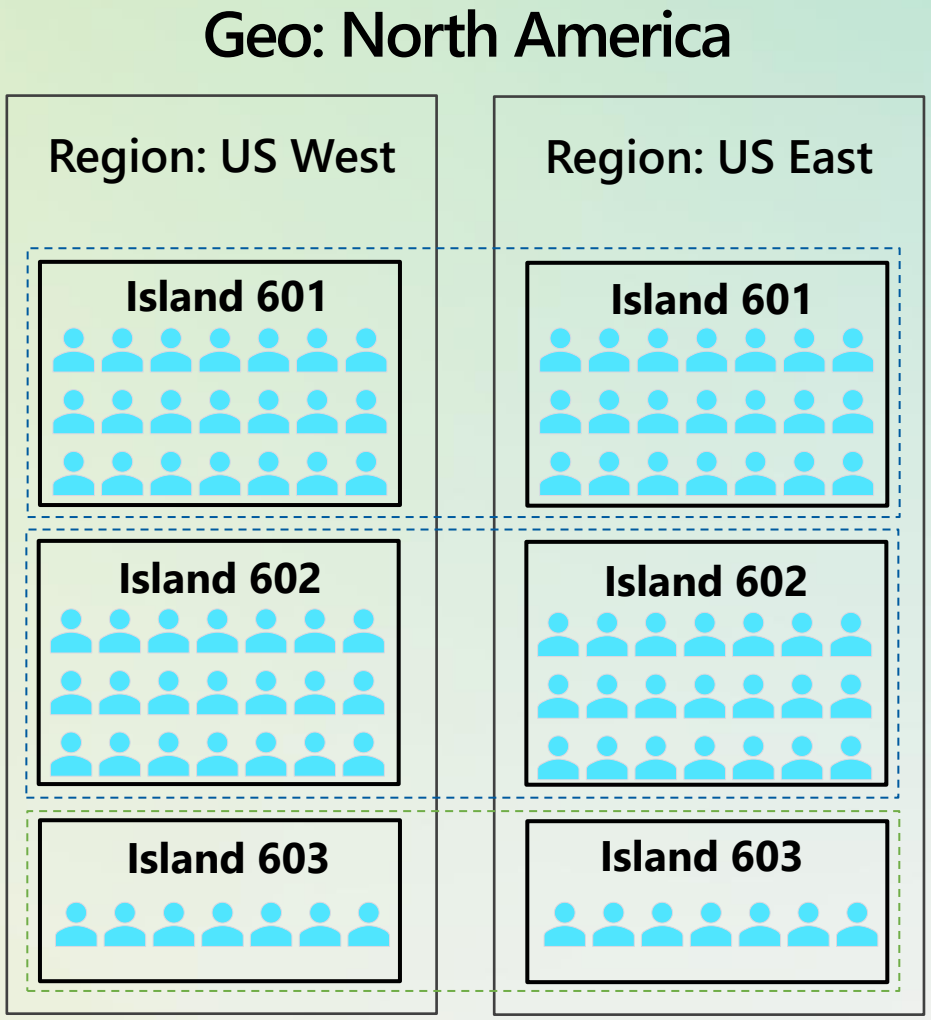
Runtime Plane – Fault Isolation



Islands – Thousands of customers each, and new customers are automatically placed into an island based on utilization

Islands vary by size and allocated capacity per customer

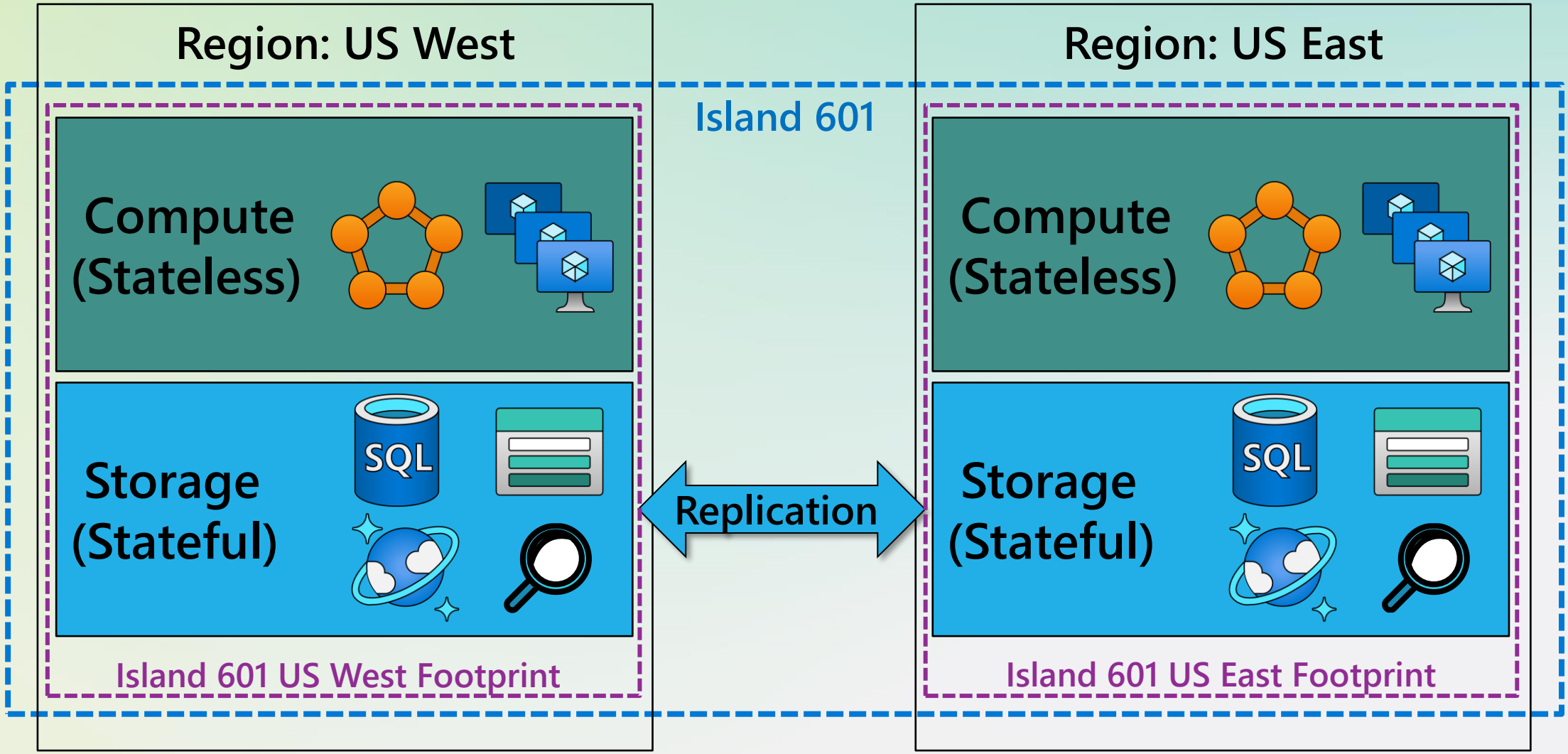
Runtime Plane – Fault Isolation



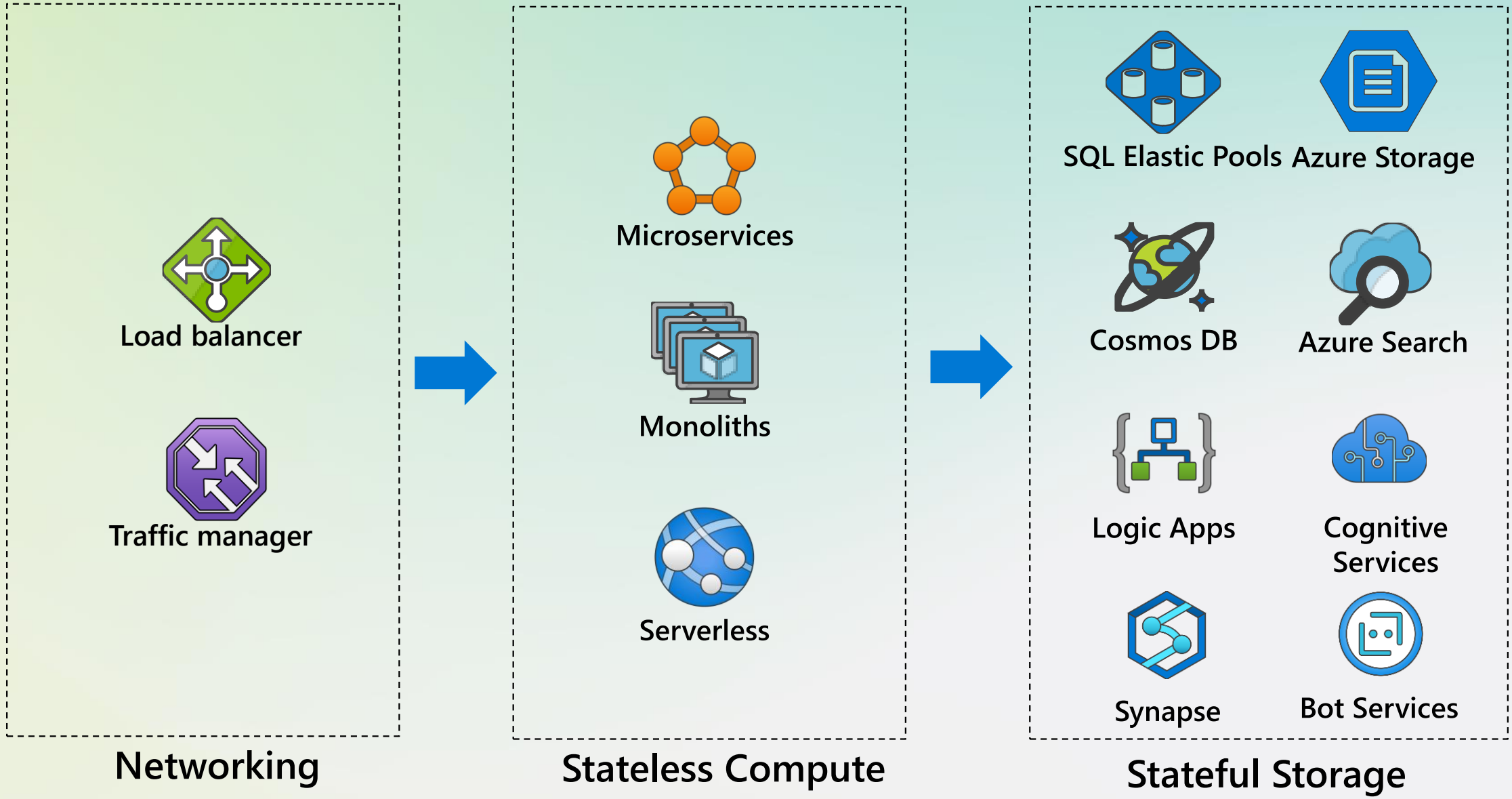
Island is NOT unit of capacity

Island is unit of isolation corresponding to a fault domain of ~3% of customers

Inside an Island

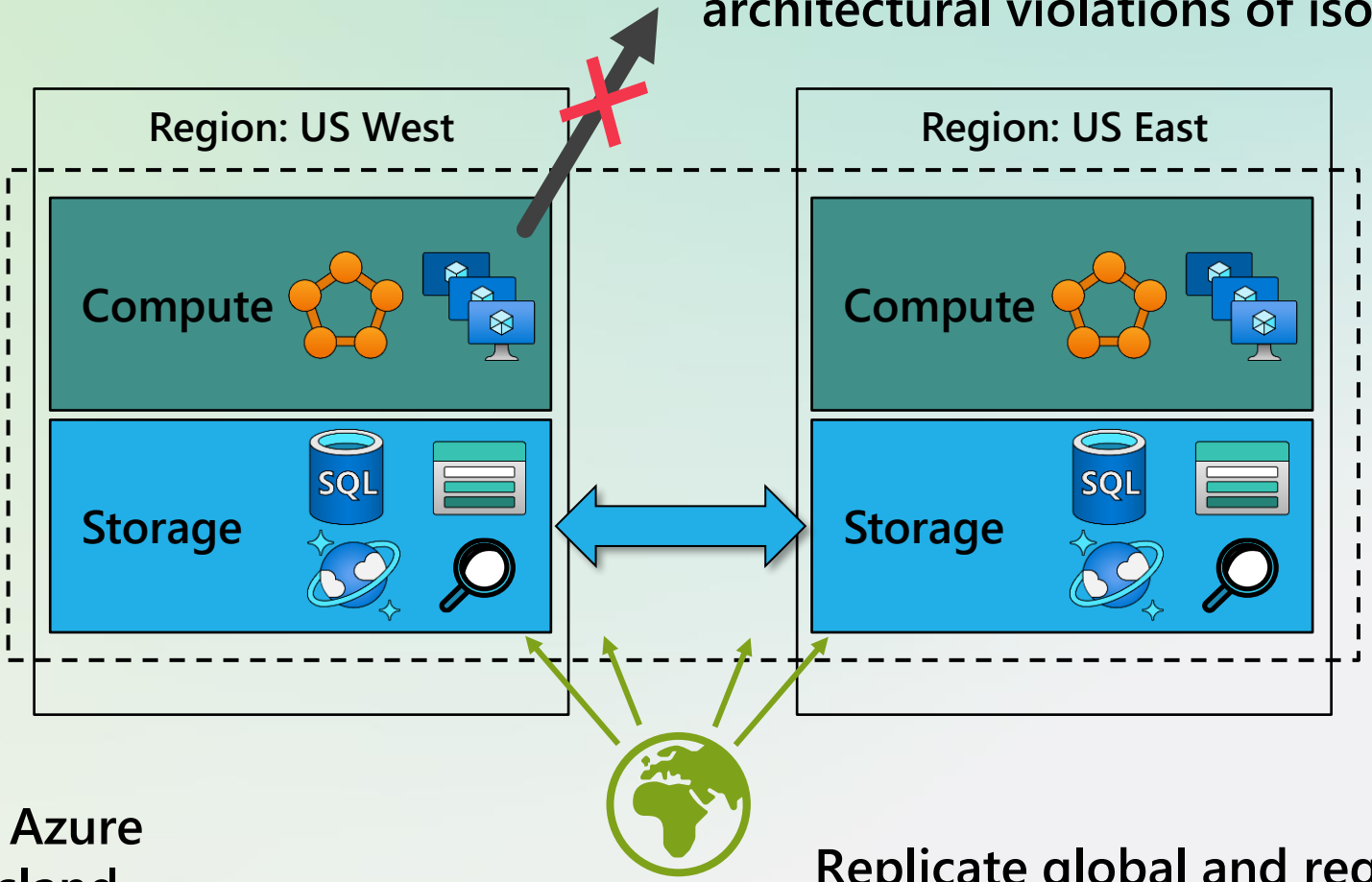


Inside an Island Footprint



Building and Maintaining Isolation

Systematically detect and address architectural violations of isolation



Isolate compute and Azure resources within an island

Replicate global and region level state into the island for services to access the data locally

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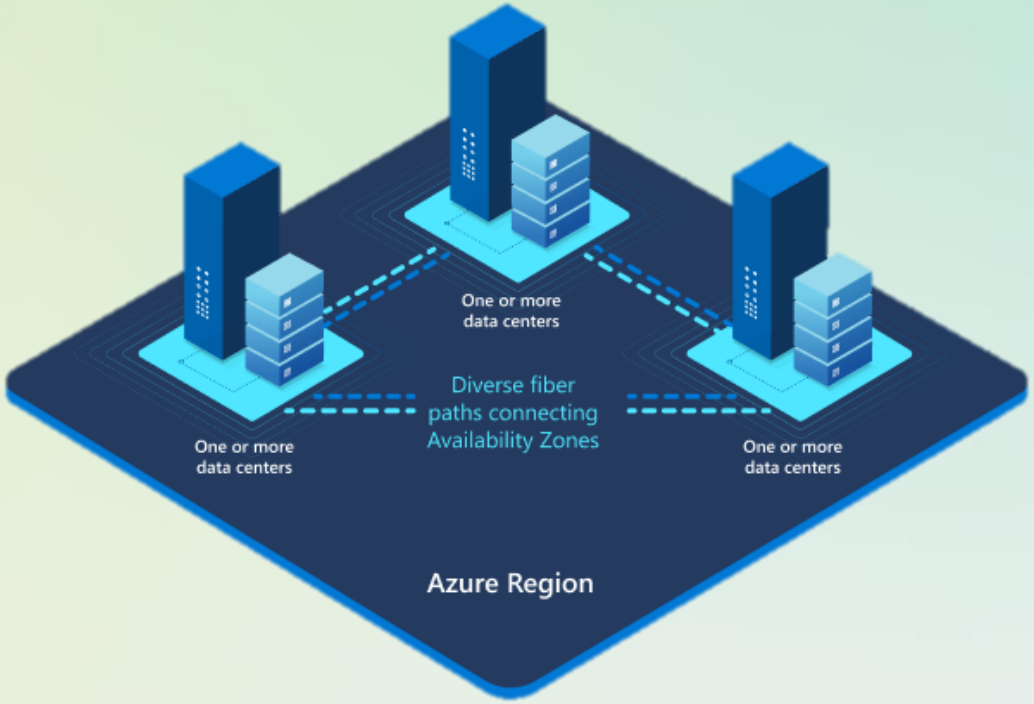
Zone Redundancy

What is zone redundancy?

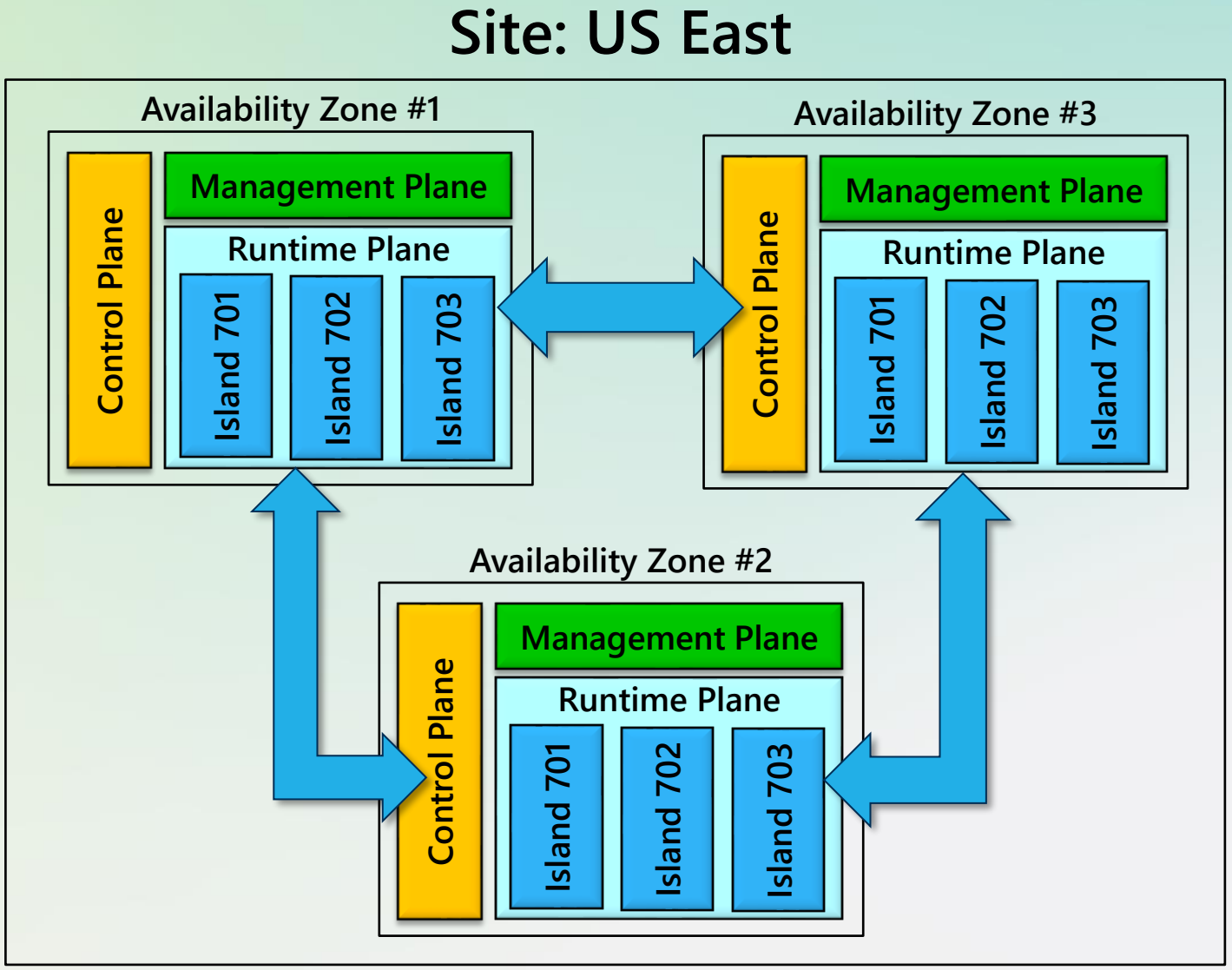


Azure Availability Zones are isolated groups of datacenters

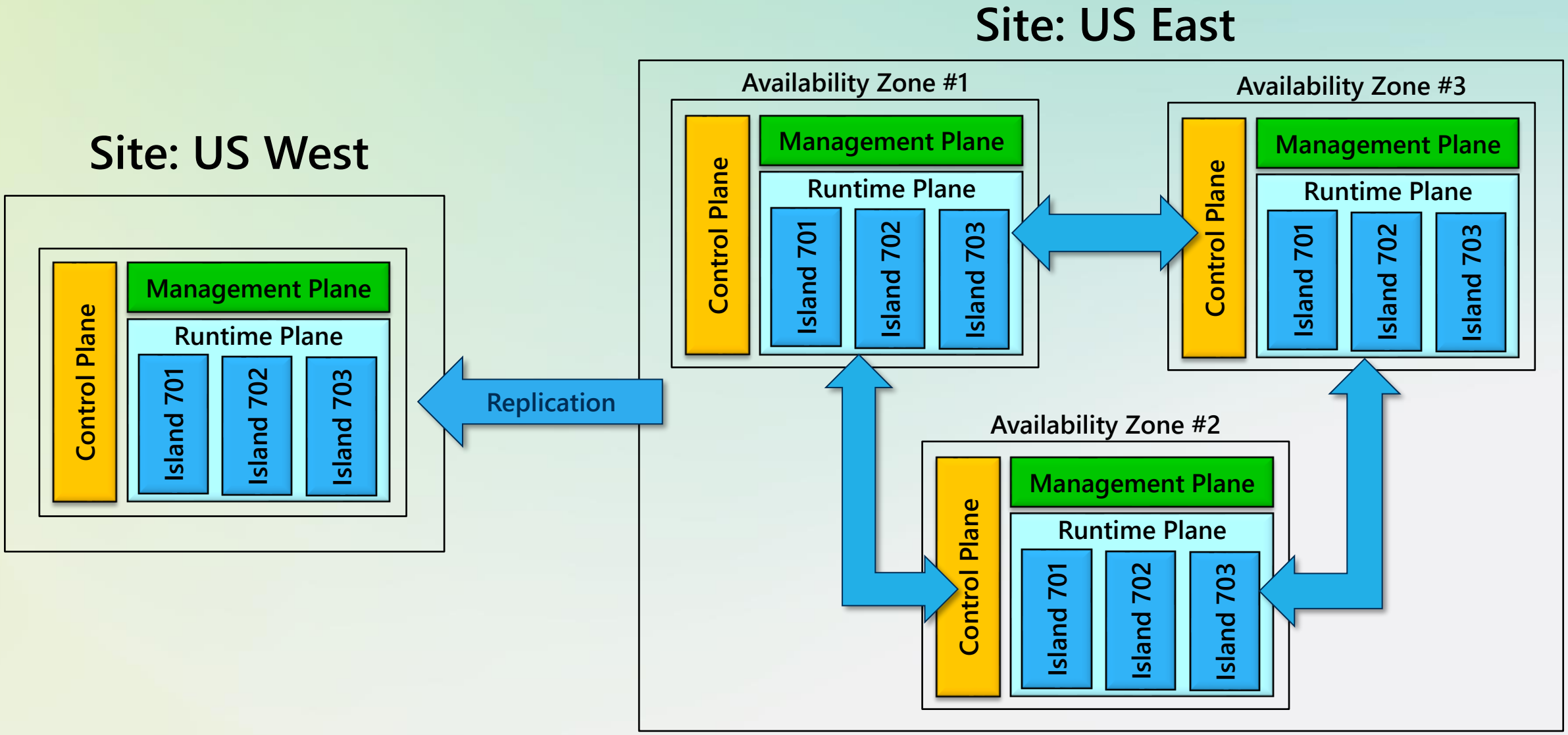
Protect against infrastructure disruptions

Ensure high availability and business continuity

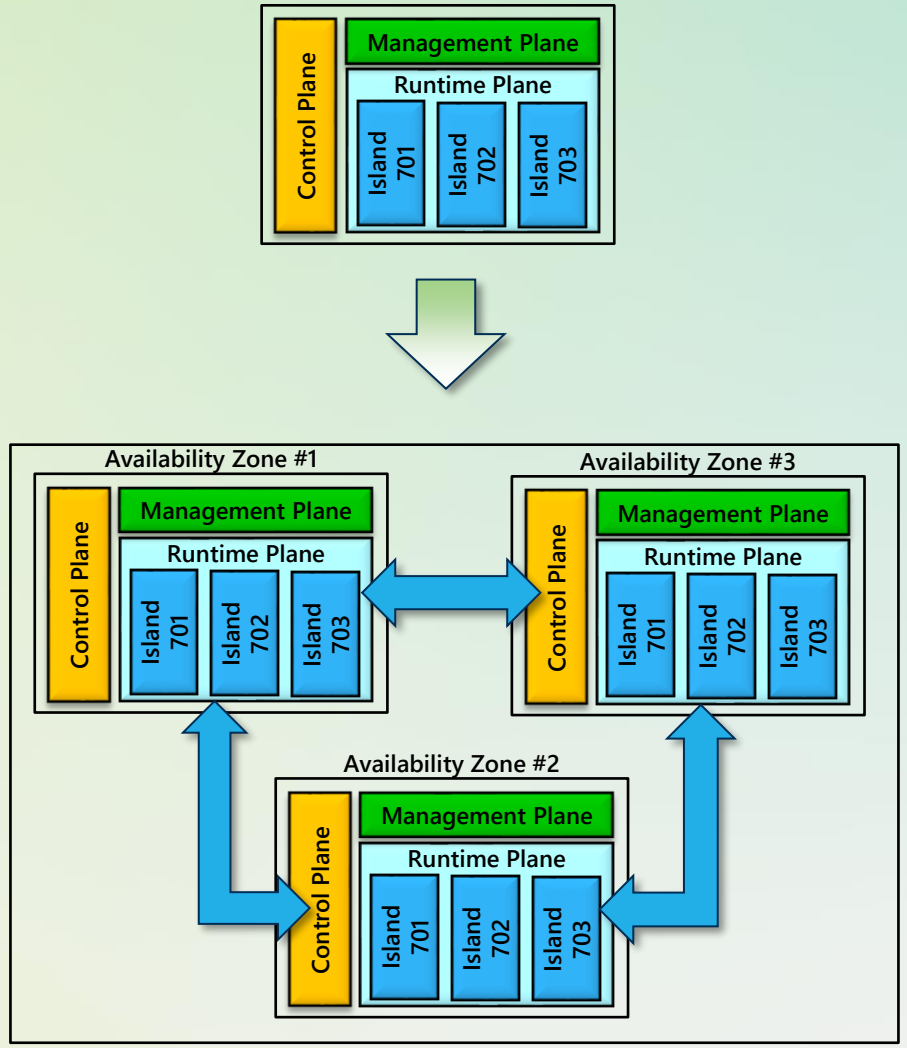
Zone Redundant Infrastructure



Cross Region Replication



Migrating Infrastructure and Customers



Enable zone redundancy for compute and 50+ Azure dependencies

Develop an online migration solution for all dependencies

Move customer environments from single zone to multi zone regions

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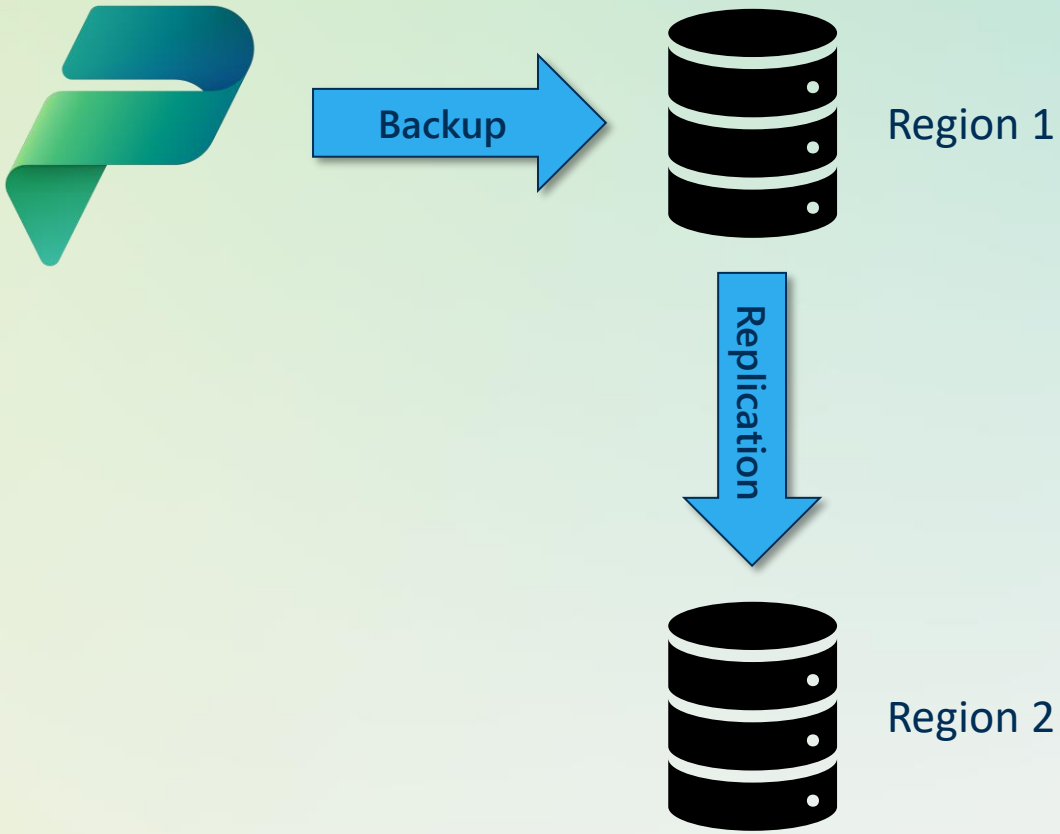
Data Integrity

Ensuring data is always backed up

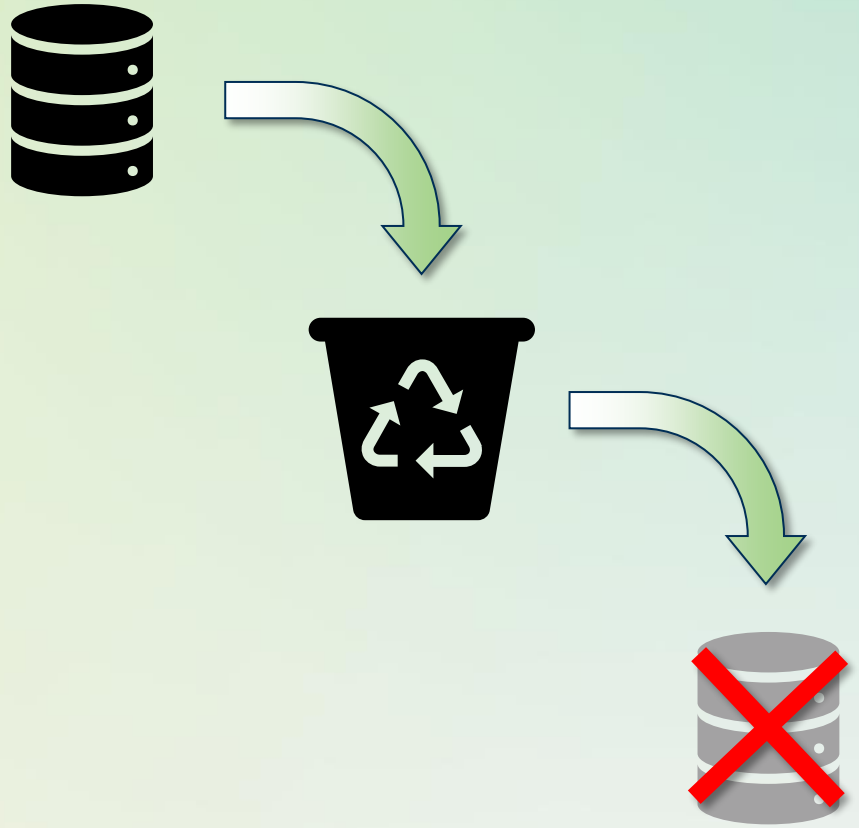


Continuous automatic backup across all data stores

Ability to restore to any point in the backup window

Backup replicated across multiple datacenters

Always start with soft delete



Data is soft deleted first and purged after a safety period

Quicker recovery from unintended deletes

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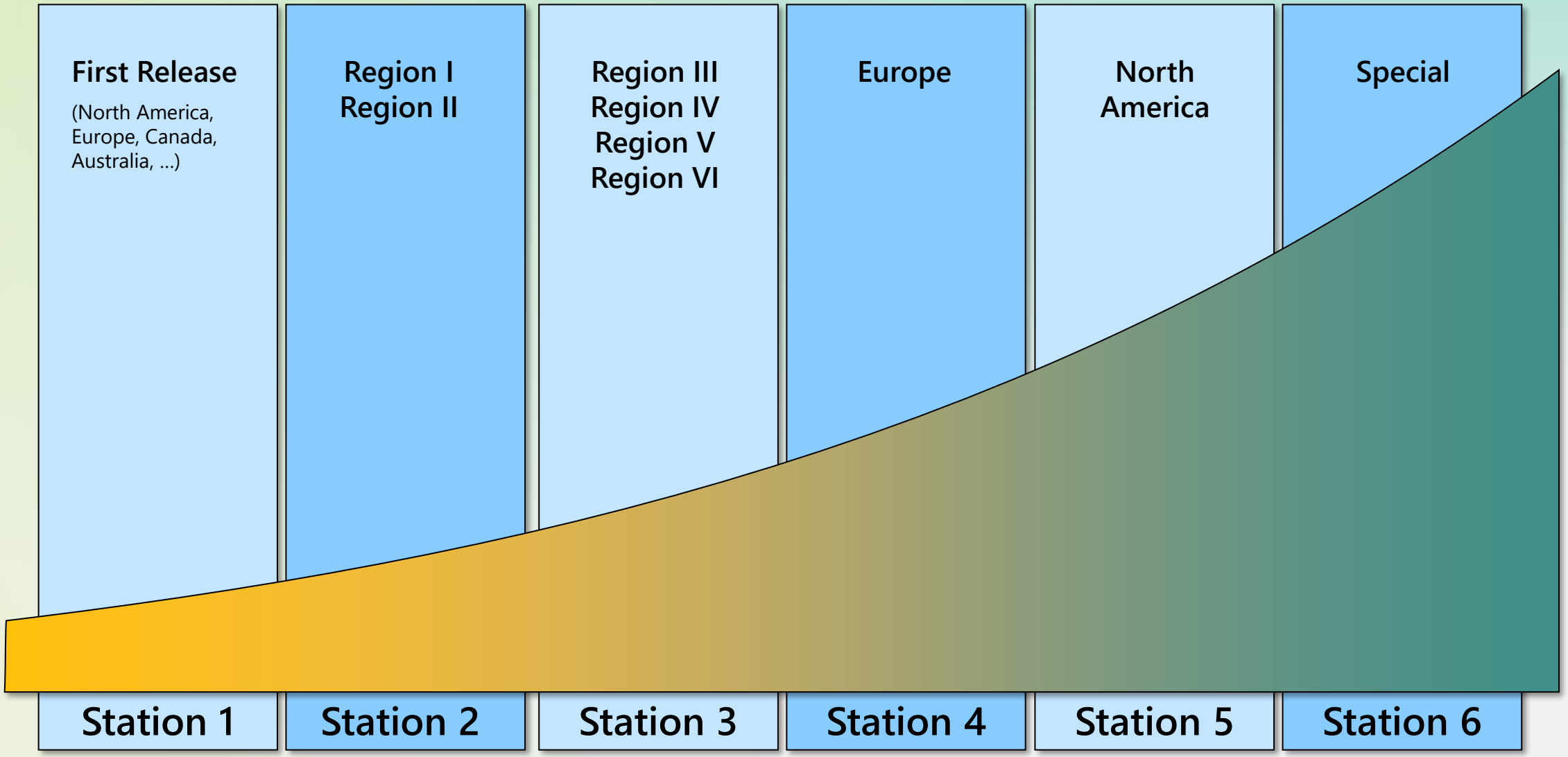
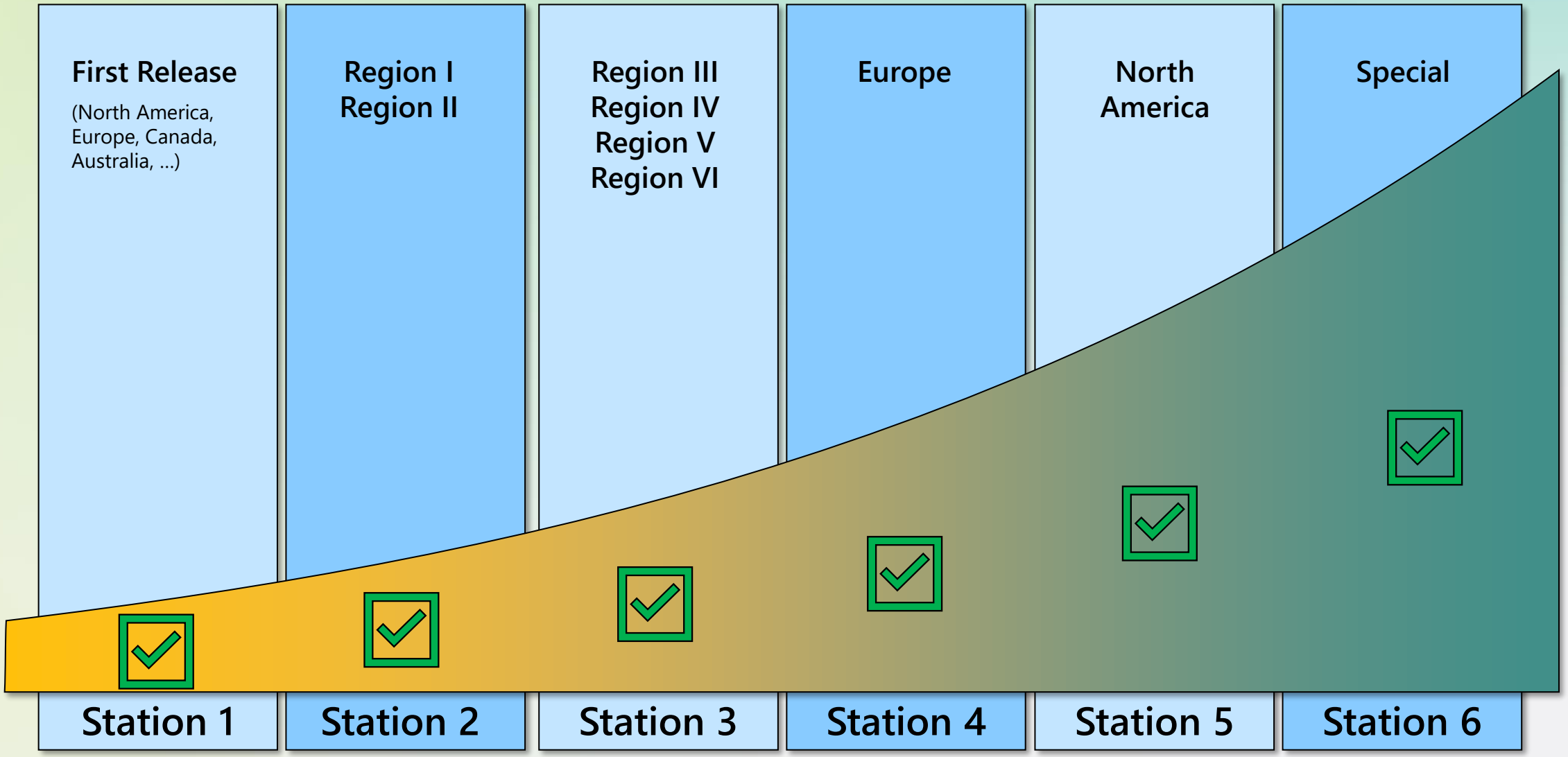
Safe Change Management

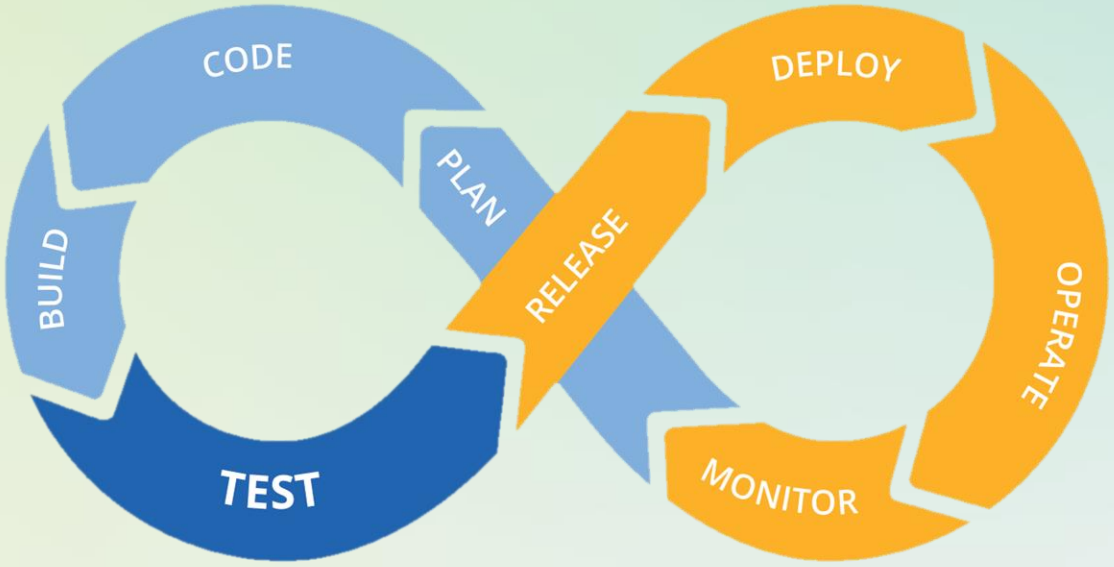
Safe Change Management



Safe Change Management

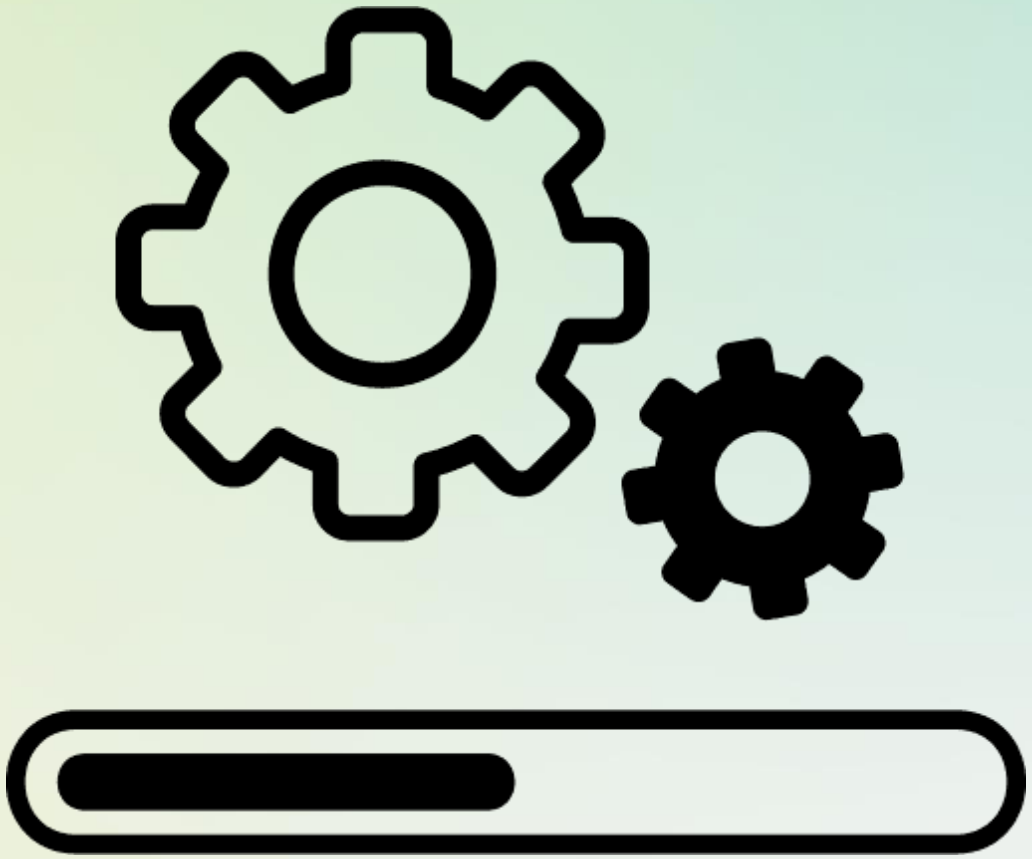


Safe Change Management



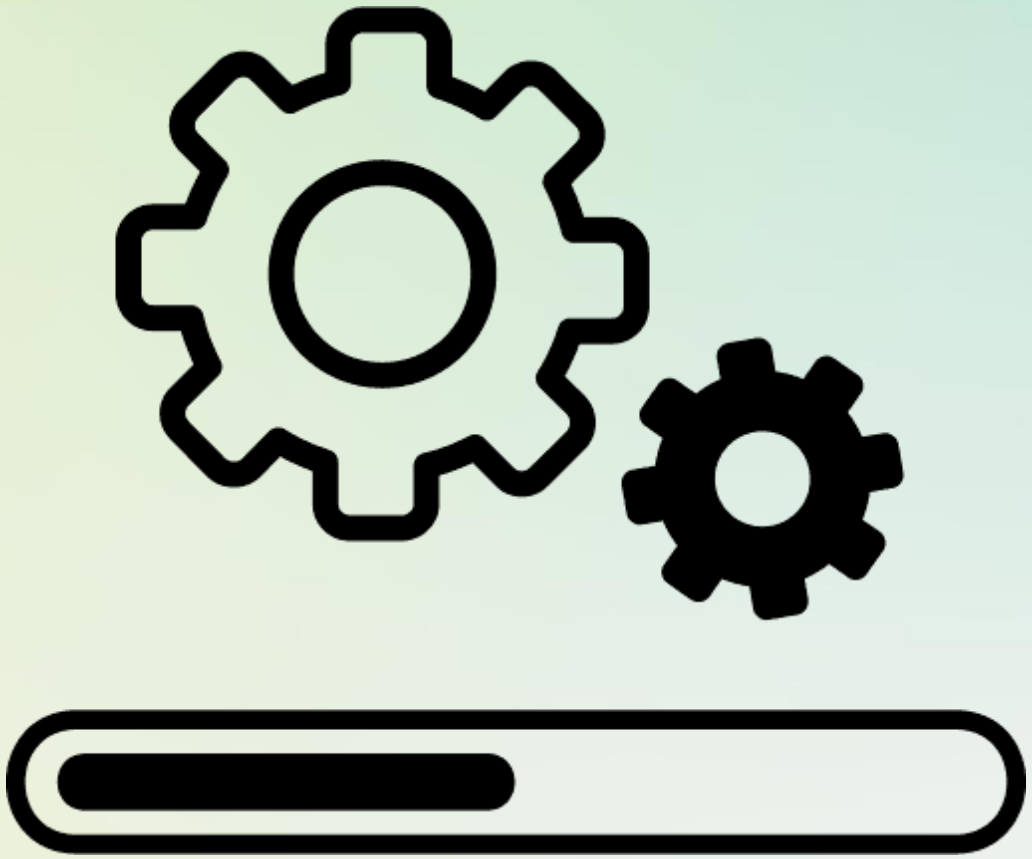
- Deployments
- Hotfixes
- Configuration
- Maintenance

Software updates



Most common maintenance operation is OS software updates.

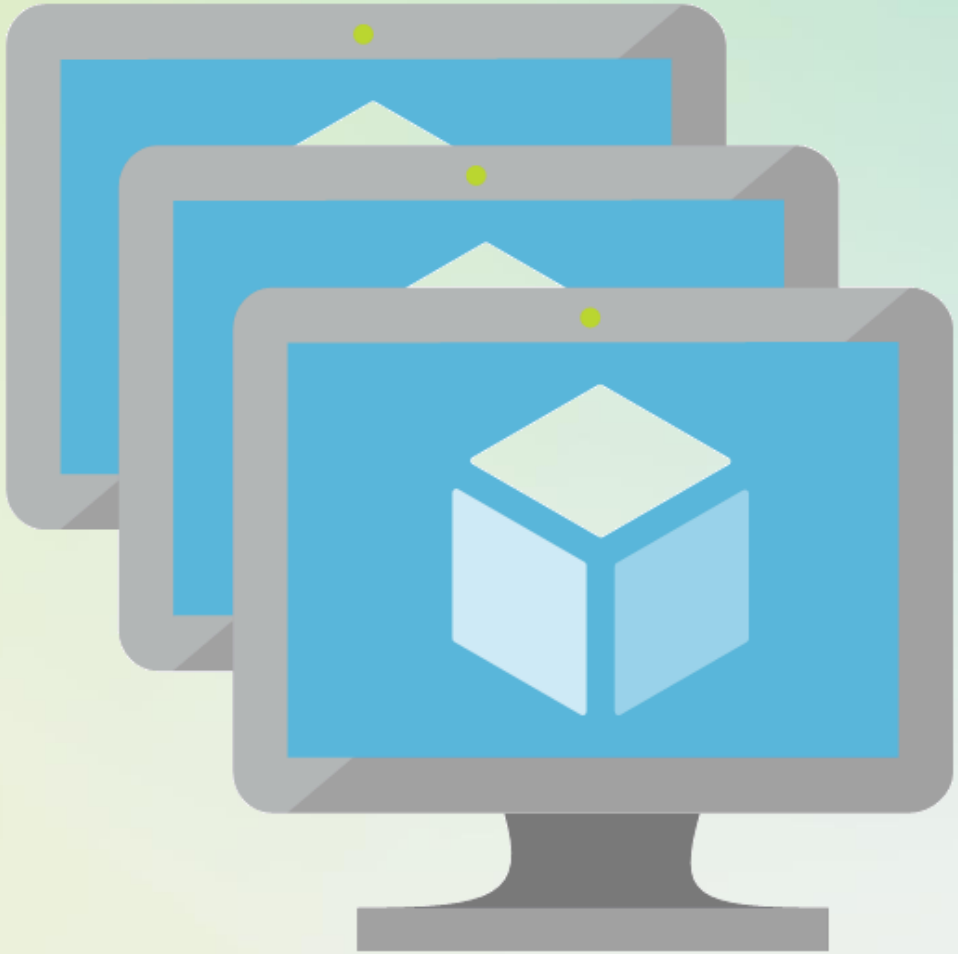
Software updates



Standardize OS Image:

- Windows Server 2022
- Mariner 2.0 for Linux

Software updates



Azure Virtual Machine Scale Set automatic OS image upgrades

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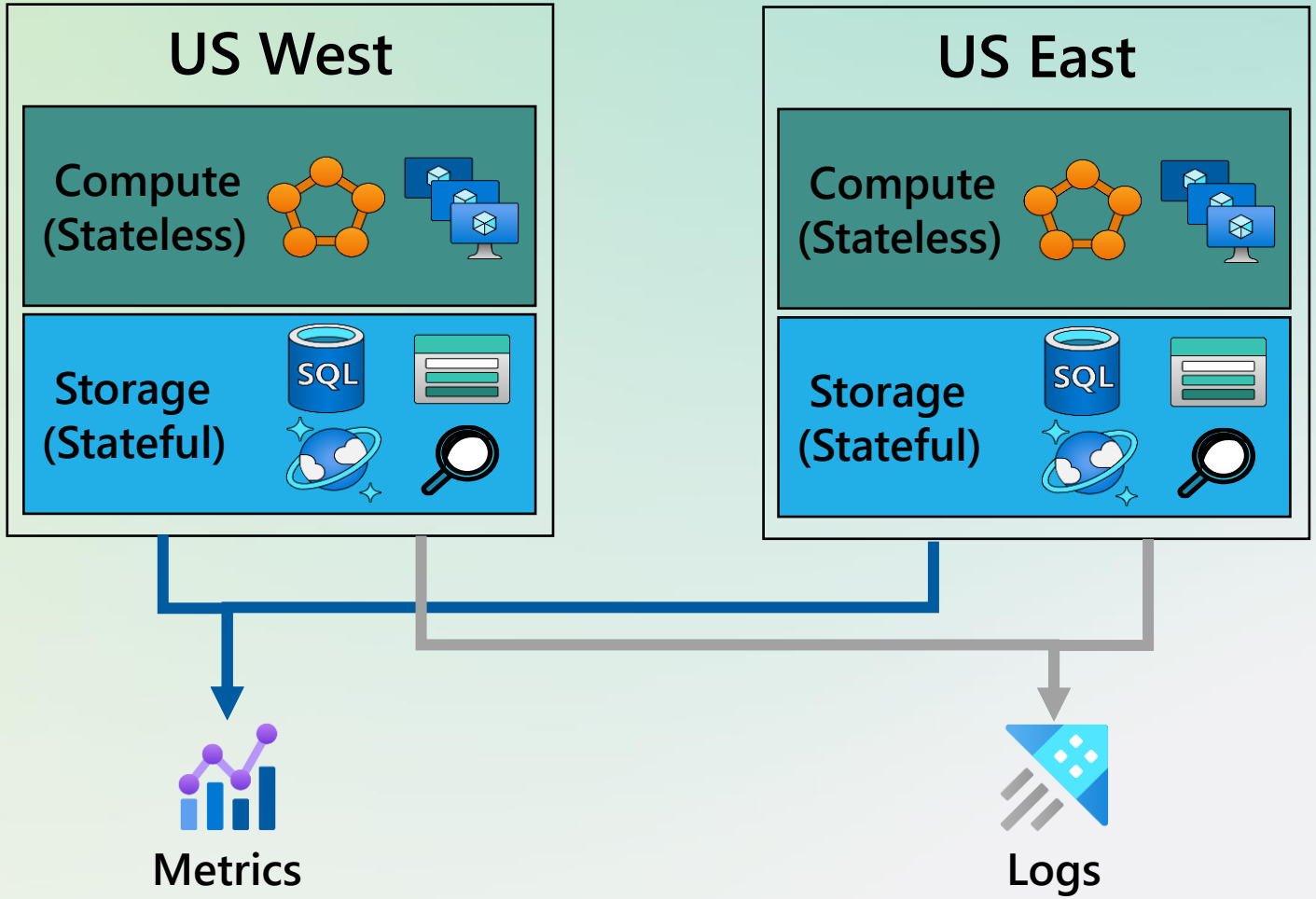
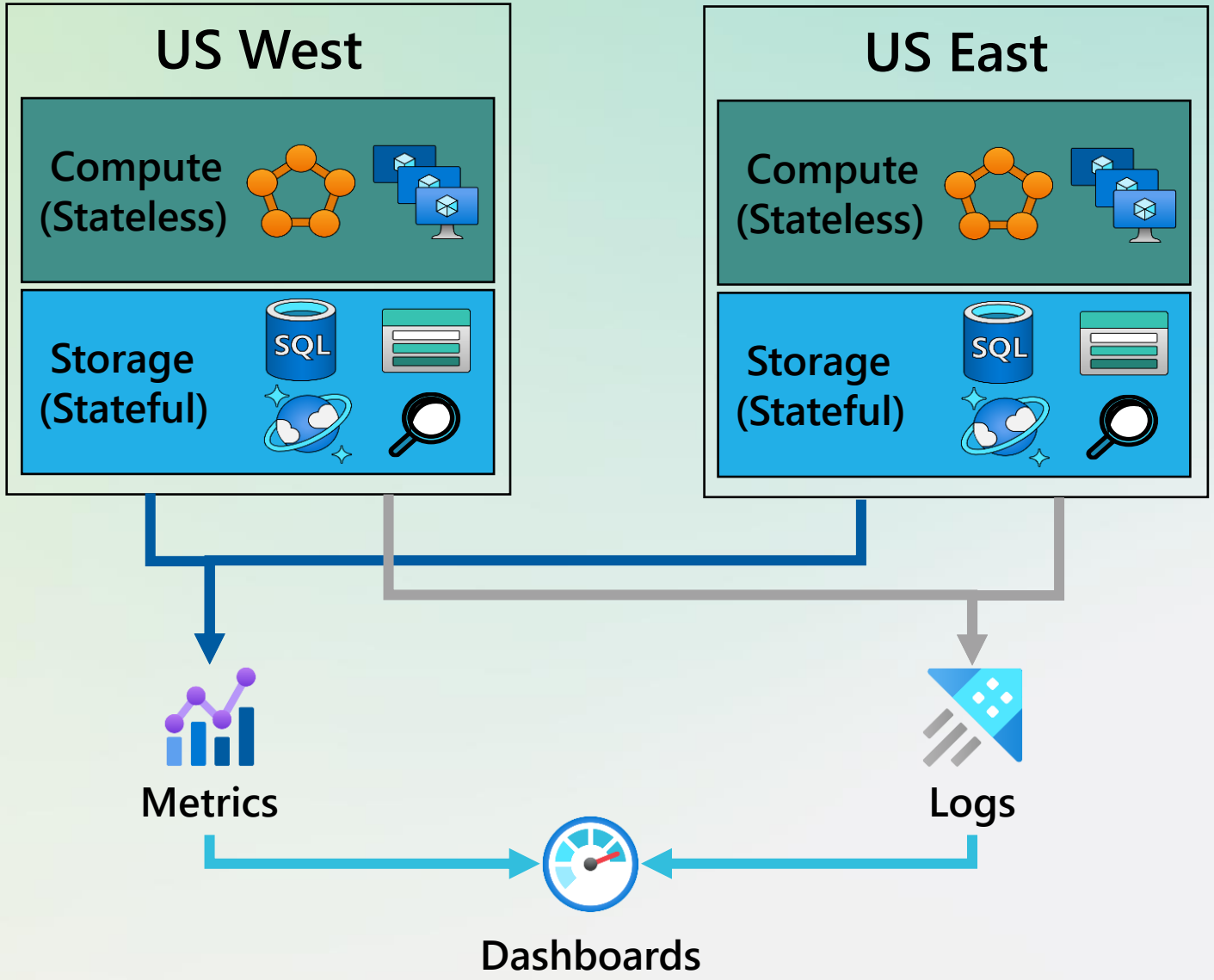
Diagnostics Standardization

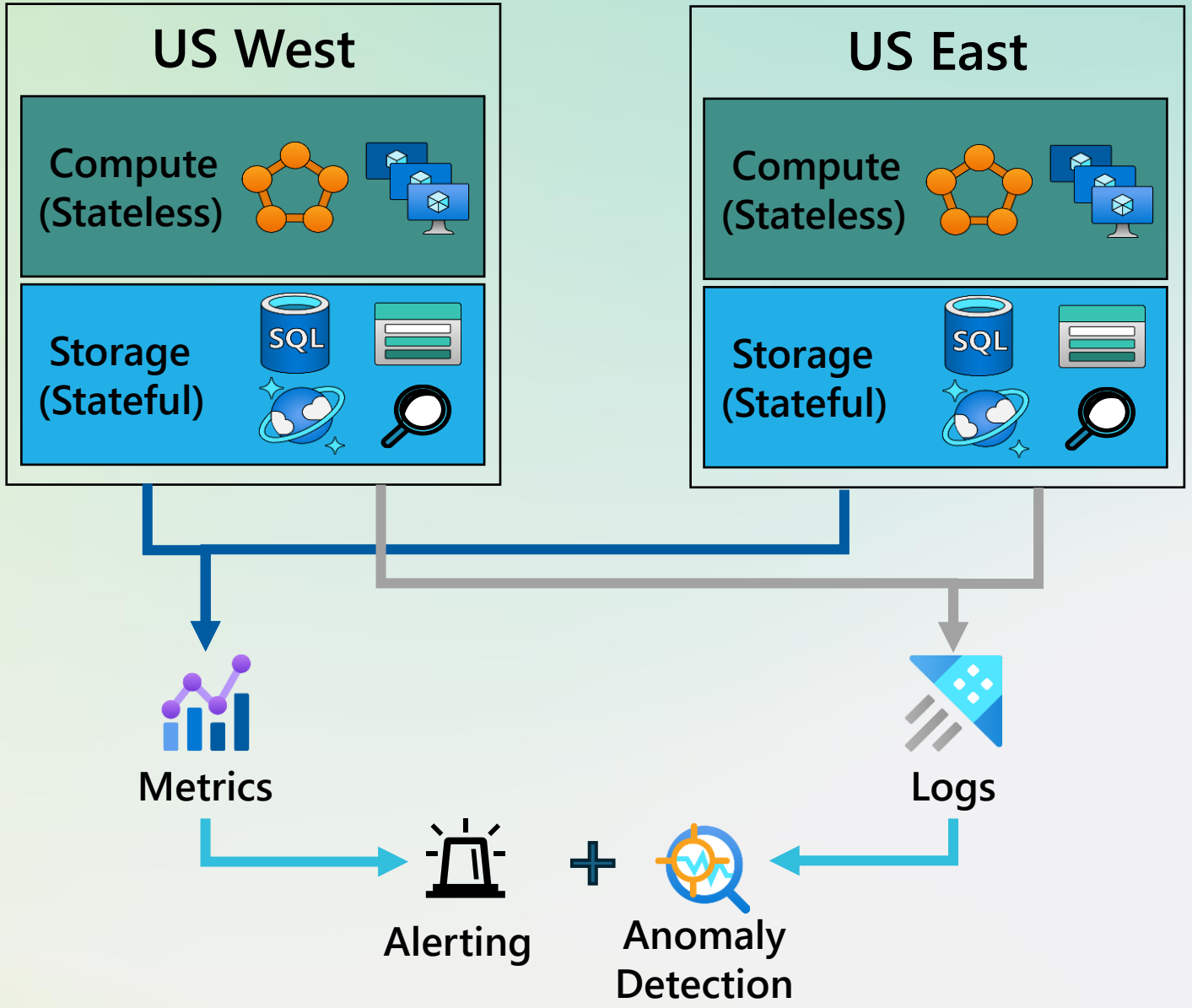
Common telemetry store



Telemetry dashboards and ad hoc queries



AI driven advanced monitoring



Deep Collaboration with Azure

Send health signals to Azure to improve detection of platform issues

Run synthetic Power Platform workload in Azure test rings

Cross team postmortems to drive fixes at every layer in the stack

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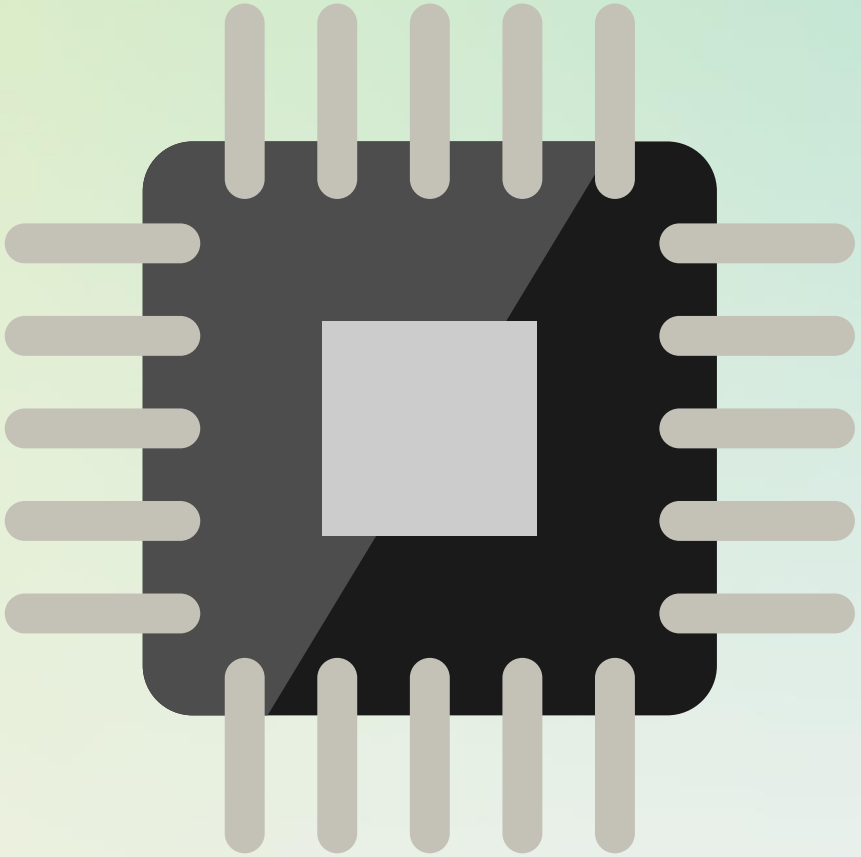
Infrastructure Optimization

Optimize the Hardware

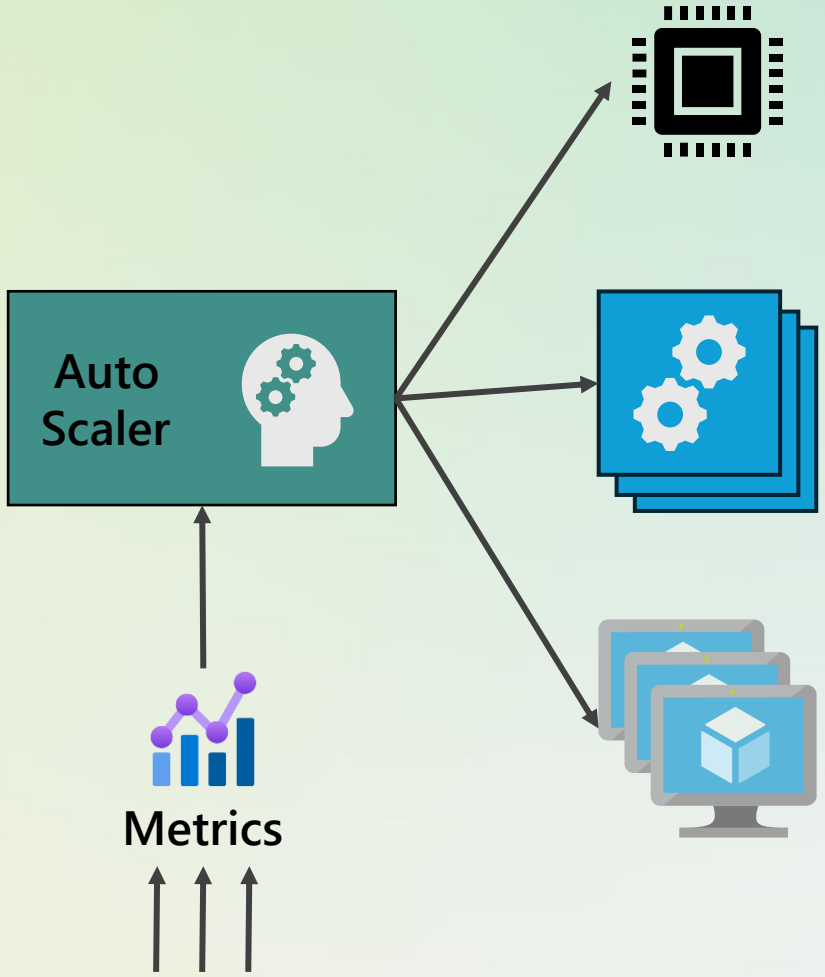


General purpose vs. Memory optimized compute and Hardware generations

CosmosDB instances optimized for large storage

GPU pools for AI

Auto Scale Compute

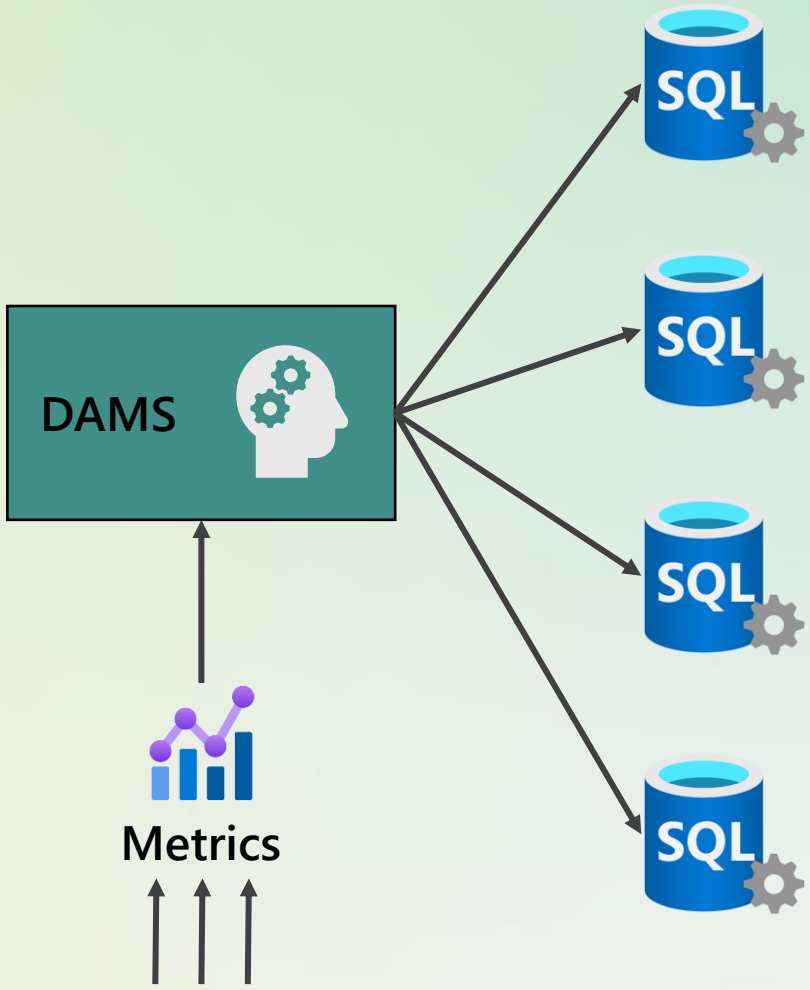


Allocate additional CPU and memory to processes

Create additional process replicas and balance load

Provision more VMs to increase total compute capacity for clusters

Automatically Tune SQL



Optimize indexes and statistics

Automatic query tuning when there is resource contention or slow queries

Dynamic page and row compression depending on usage

Automated DTU tuning when resource consumption is high

“Project Standard” Themes Recap

- Isolation
- Zone Redundancy
- Data Integrity
- Safe Change Management
- Diagnostics Standardization
- Infrastructure Optimization

Questions

Questions?

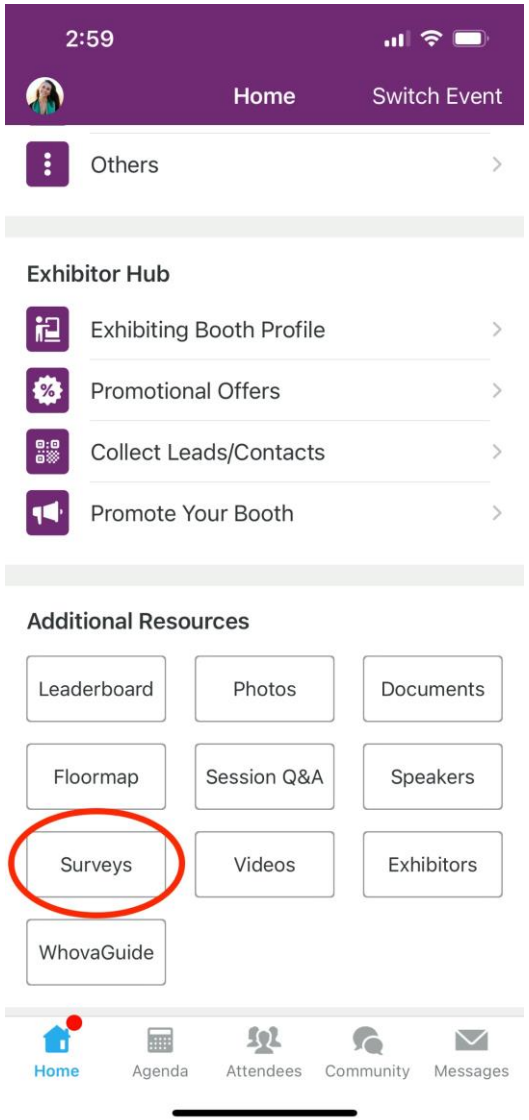
Microsoft Power Platform

Thank you and see you next year!

Ilya Grebnov
Software Architect
ilygre@microsoft.com

Mauktik Gandhi
Director of Engineering
mgandhi@microsoft.com

Session Feedback Surveys



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