Microsoft Azure

Azure and Availability Overcoming Concerns

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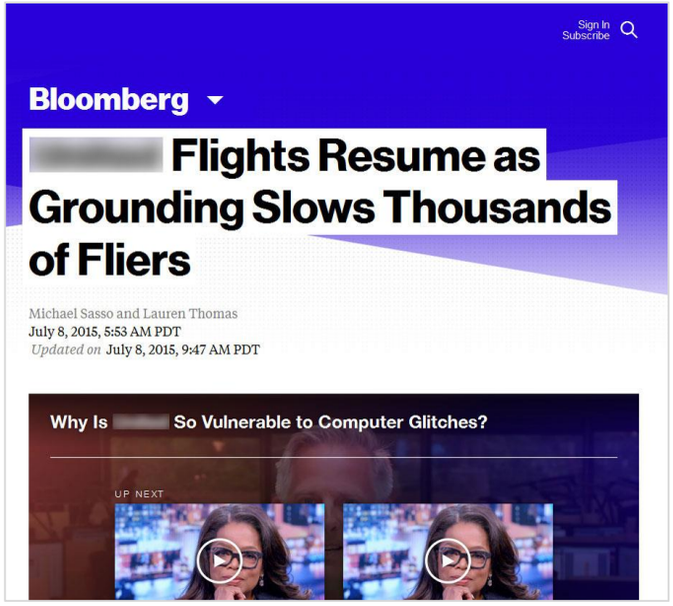
Business continuity for the digital business

The impact of an outage on your digital business

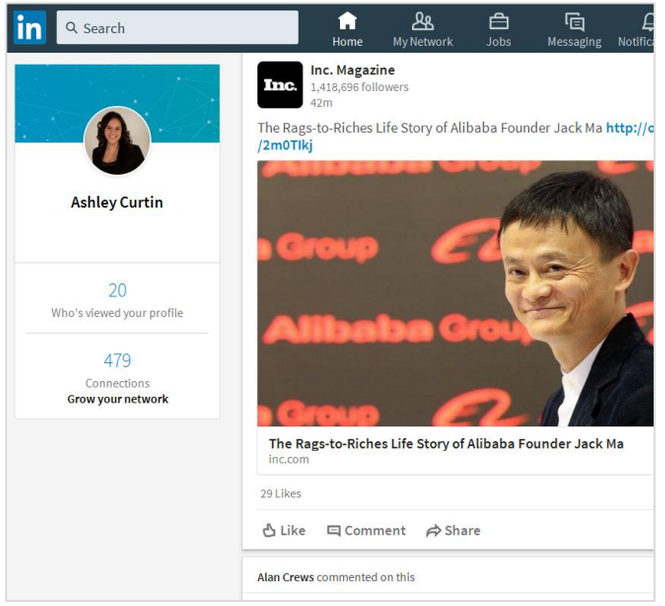
Business continuity and data protection are critical

The outage itself



Your brand

Your IT career



Measuring the impact of an outage

Business continuity and data protection threats by the numbers

$1.25–2.5B

Total cost of unplanned application downtime[1]

$7,900

The per-minute cost of downtime[2]

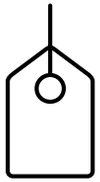
119 minutes

Average recovery time for datacenter outages in minutes[2]

1) IDC Survey: Downtime Costs Large Companies Billions, Feb. 2015
2) One minute of data center downtime costs US$7,900 on average, Dec. 2013

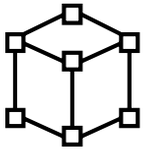
IT challenges implementing business continuity

Business continuity and data protection are critical issues for every organization



Cost

Datacenter cost
Resource cost
Hardware cost



Complexity

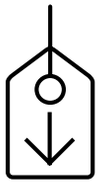
Multiple datacenters
Restoring tape
Managing management software

Compliance

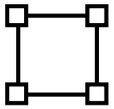
Need to retain data
Need to provide service
Challenging to comply

How Microsoft Azure can help

Accelerate your business continuity strategy



Reduced Cost



Reduced Complexity

Increased Compliance

Reduced cost

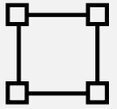
Azure benefits

No need to purchase additional hardware

No secondary site resource costs

Pay for what you use

Reduced Cost



Reduced Complexity

Increased Compliance

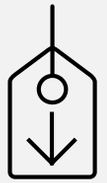
Reduced complexity

Azure benefits

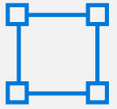
Faster onboarding with cloud services

Simpler execution for testing and failover

Integrated business continuity as a service



Reduced Cost



Reduced Complexity

Increased Compliance

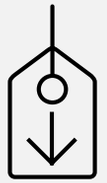
Increased compliance

Azure benefits

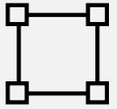
Take advantage of Azure's industry-leading certification portfolio

Deploy in one of Azure's 38 datacenters located around the world

Increase your coverage of applications to meet your compliance requirements



Reduced Cost

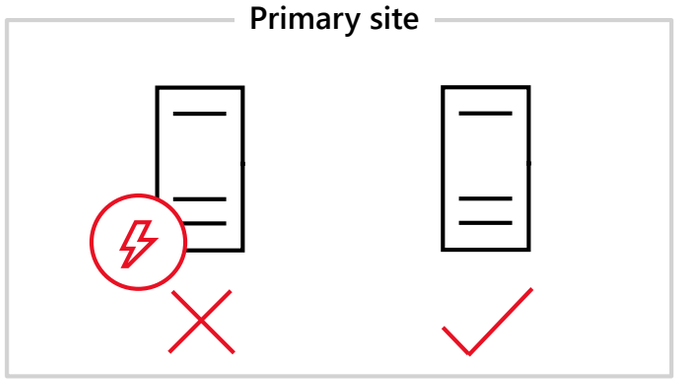


Reduced Complexity

Increased Compliance

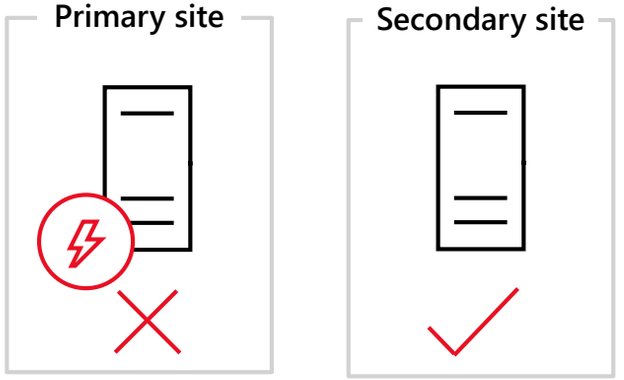
Business continuity strategy

You need all three



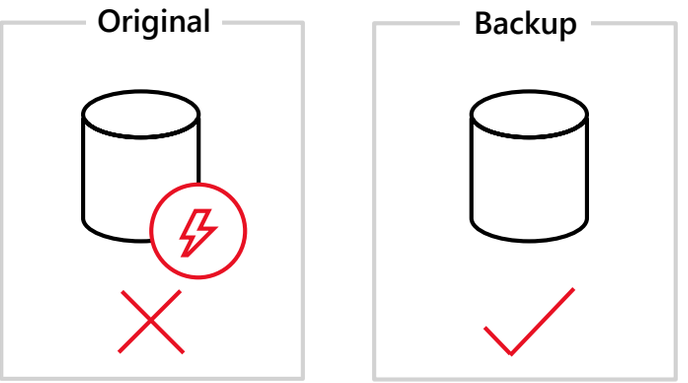
High availability

When your applications have a catastrophic failure, run a second instance



Disaster recovery

When your applications have a catastrophic failure, run them in Azure or a secondary datacenter

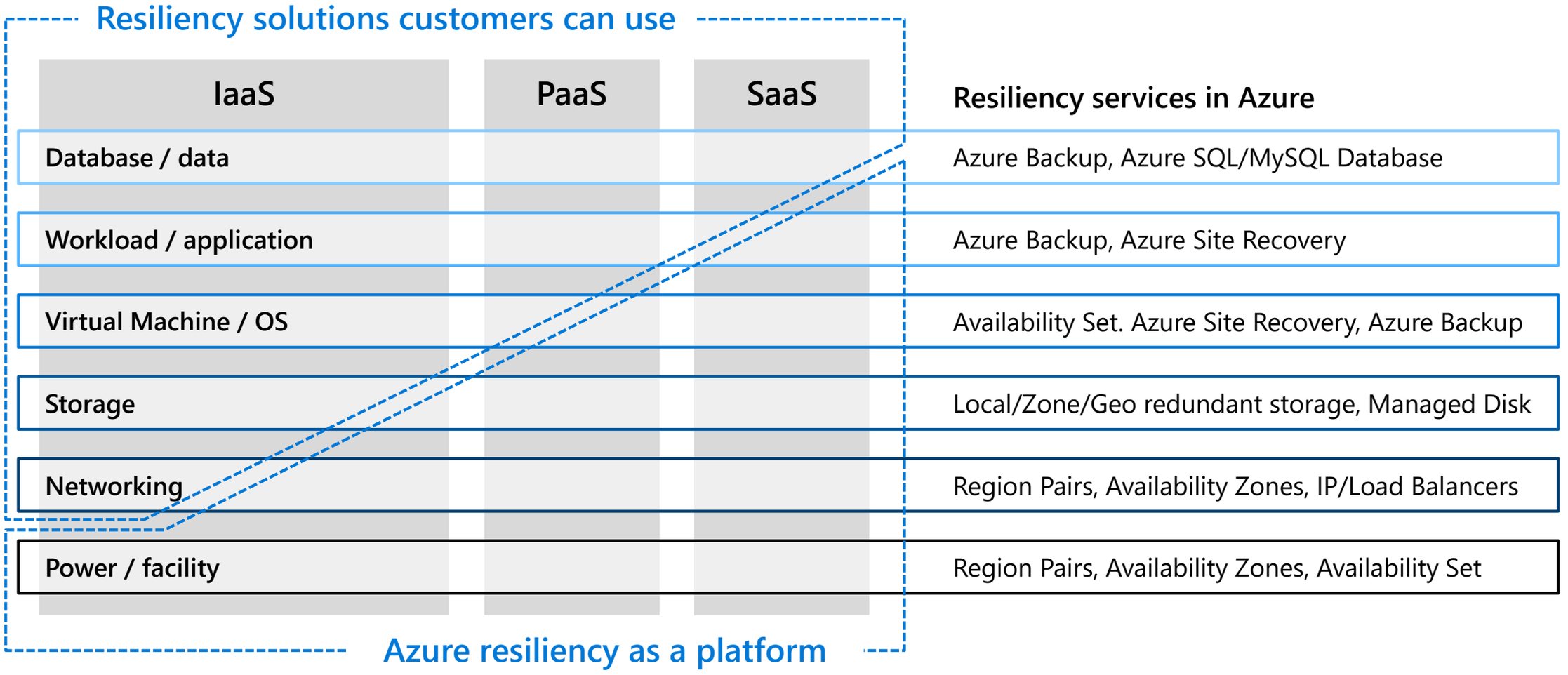


Backup

When your data is corrupted, deleted or lost, you can restore it

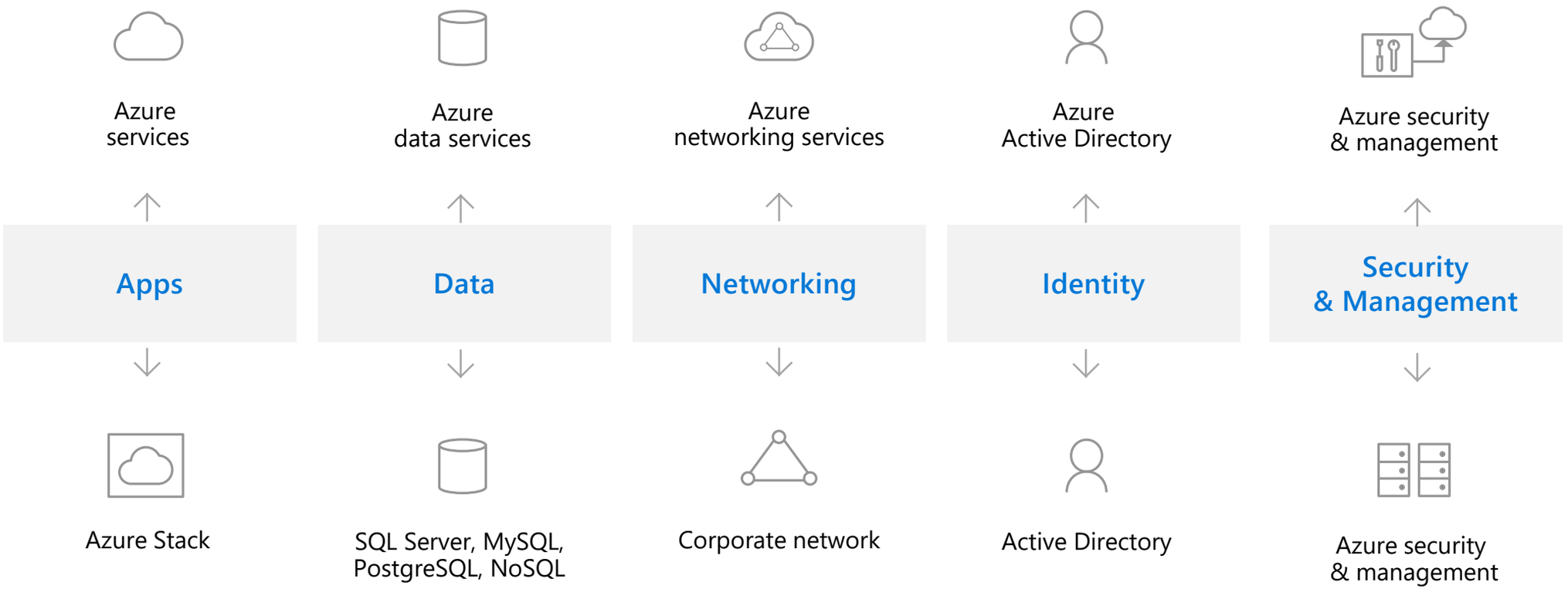
Resiliency in Azure

Azure provides resiliency as a platform and solutions through globe's largest datacenter footprint

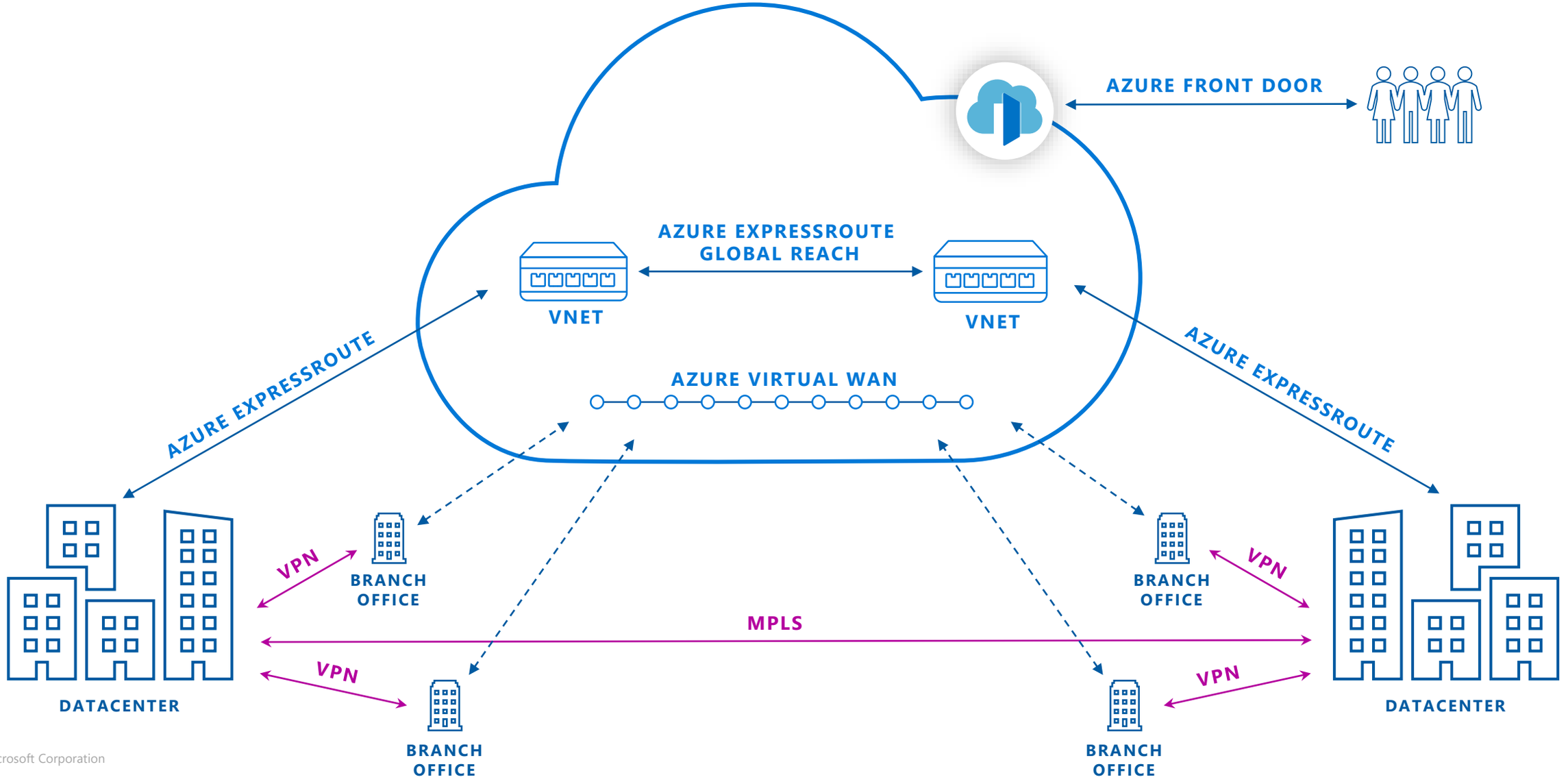


Easily scale with hybrid environments

Azure: the only consistent, comprehensive hybrid cloud



Fast, most flexible hybrid connectivity and app delivery



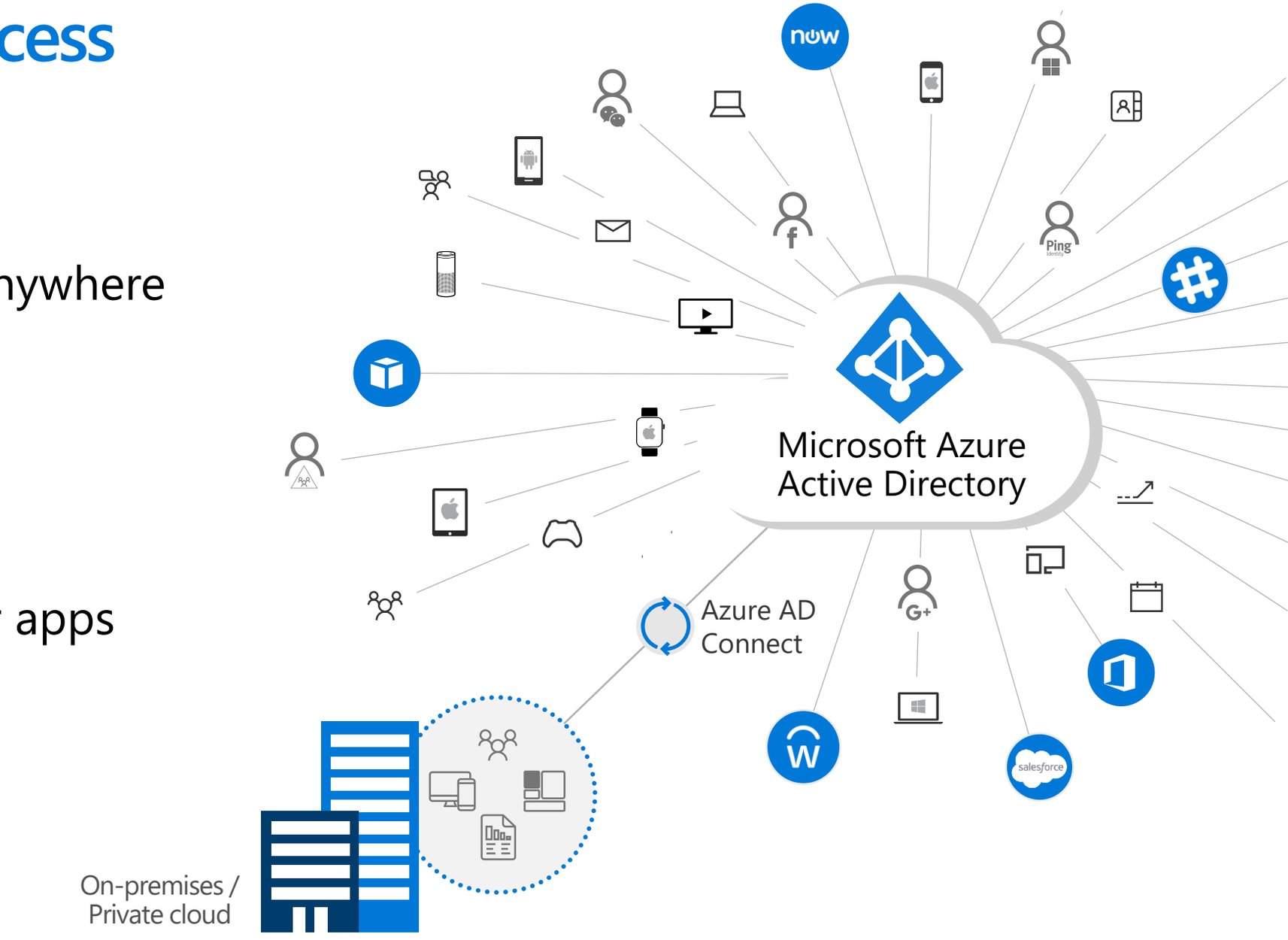
One identity and access management

Single sign on to any app anywhere

Secure user credentials

Collaborate with customers and partners

Accelerate adoption of your apps



Planning for Disaster

HERO products

Protect your data with Azure Backup

Azure Backup landing page: https://aka.ms/azure-backup

Azure Backup's Cloud-First approach: https://aka.ms/azure-backup-cloud-first

Azure Backup blogs: https://aka.ms/azure-backup-blogs

Azure Backup videos: https://aka.ms/azurebackupvideos

Azure Backup documentation: https://aka.ms/azure-backup-documentation

Azure Backup support forum: https://aka.ms/azure-backup-support-forum

Feedback (user voice): https://aka.ms/azure-backup-user-voice

Ensure application availability with Azure Site Recovery

Support matrix for replicating one Azure region to another

Site Recovery documentation: https://aka.ms/siterecovery_documentation

Site Recovery blogs: https://aka.ms/siterecovery_blogs

Site Recovery Academy Course: https://aka.ms/siterecovery_mva

Support forum: https://aka.ms/asrforum

Feedback (user voice): https://aka.ms/ASRuservoice

Build high availability applications with Availability Zones

Visit the Azure regions page for availability: http://aka.ms/AzureRegions

Learn more about Availability Zones: http://aka.ms/AzureAZs

Build a comprehensive resiliency strategy: http://aka.ms/resiliency, http://aka.ms/AZoverview

Azure Backup

Partner opportunities

Deployment scenarios

Assessment and design

Compliance assessment

Design of Backup Infra for Private/Hybrid/Azure workloads

Long term retention to Cloud

Azure Backup Proof Of Concepts

Migration

3rd Party to Azure Backup Migration

Managed services

Managing backup for LoB Apps

Manage LoB Hybrid & Azure environments

Configure and monitor backups

Recover on demand

Backup-as-a-service

Azure Backup Consumption & Monitoring

SLA based backup and recovery experience

Packaged IP

Management IP

Pre-configured custom dashboards (PowerBI)

Automated backups, monitoring, alerting and logging

Workload backup and restore

Application-consistent backups for custom workloads

Pre and post scripts for Linux workloads

Azure Site Recovery

Partner opportunities

CSP support

All ASR scenarios now support ARM and CSP model

Partner owns customer relationship and billing

Partner offers value added services

Model each customer to a subscription and a vault

API support

Automation through PowerShell and Rest APIs

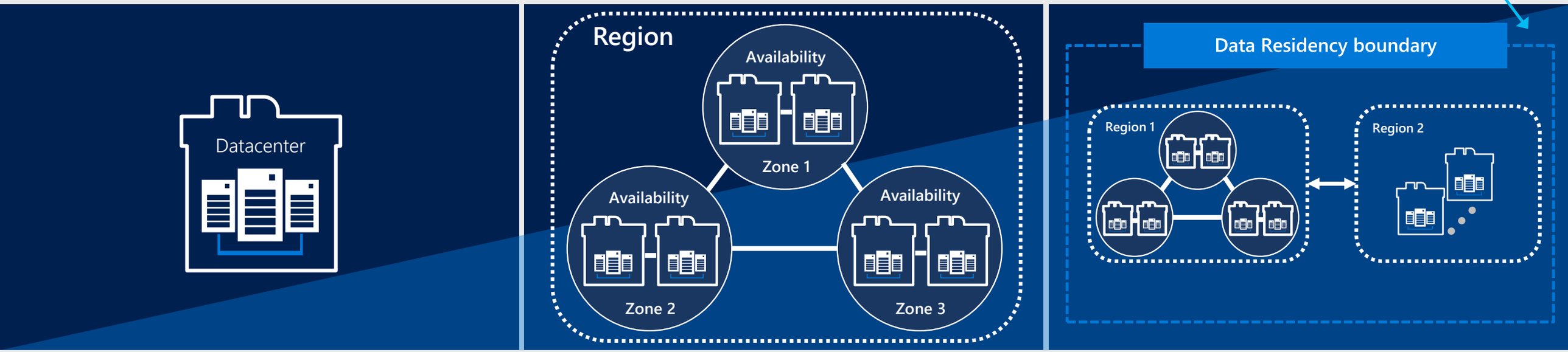
Azure Stack support

Restore configuration and service data using the Infrastructure Backup Service

Availability Zones, Regions, Geo-Redundancy and Failover solutions

Azure protection options for all scenarios

Introducing Availability Zones, protecting from datacenter level failures



Availability Sets

High Availability protection from hardware failures in a datacenter.

Availability Zones

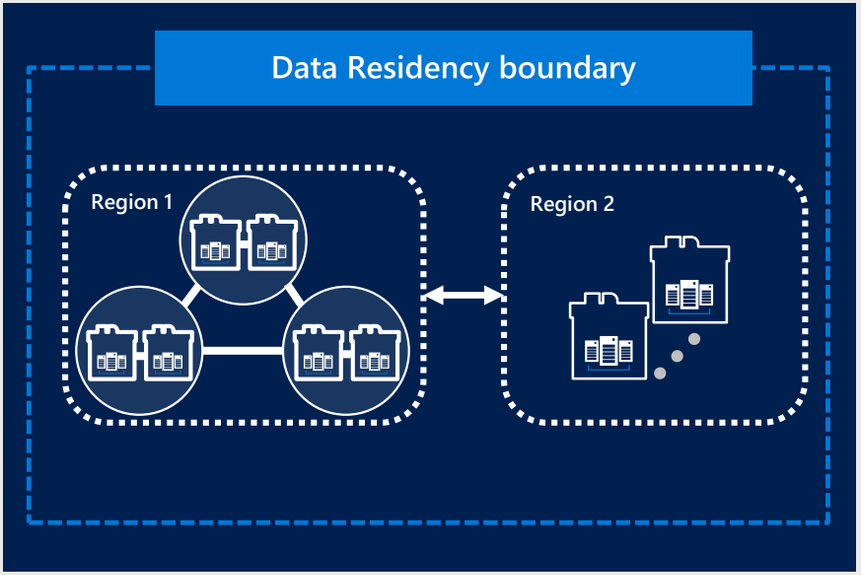
High Availability protection against loss of datacenters. Multiple datacenters per physically separated zone. Each zone features independent network, cooling, and power.

Region Pairs

Protection for your data and applications from the loss of an entire region with Geo-redundant storage (GRS) and Azure Site Recovery.

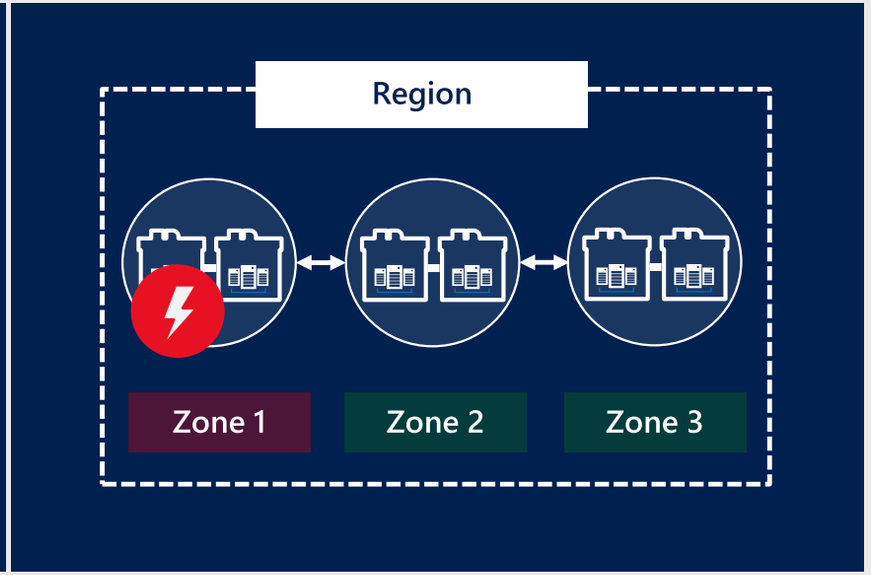
Availability Zones

Part of Azure's native HA/DR solutions, providing protection from datacenter failure



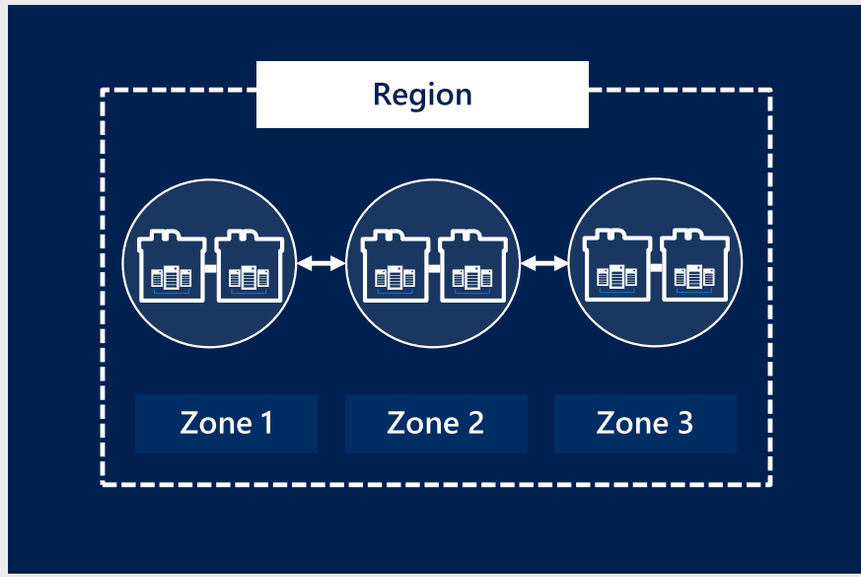
Comprehensive resiliency with Data Residency

Availability Zones and a paired region within the same data residency boundary provides high availability, disaster recovery, and backup.



Protect against entire datacenter loss

Each zone is physically separated and consists of one or more datacenters with independent power, network, and cooling. Applications and data are replicated through zone-redundant services.

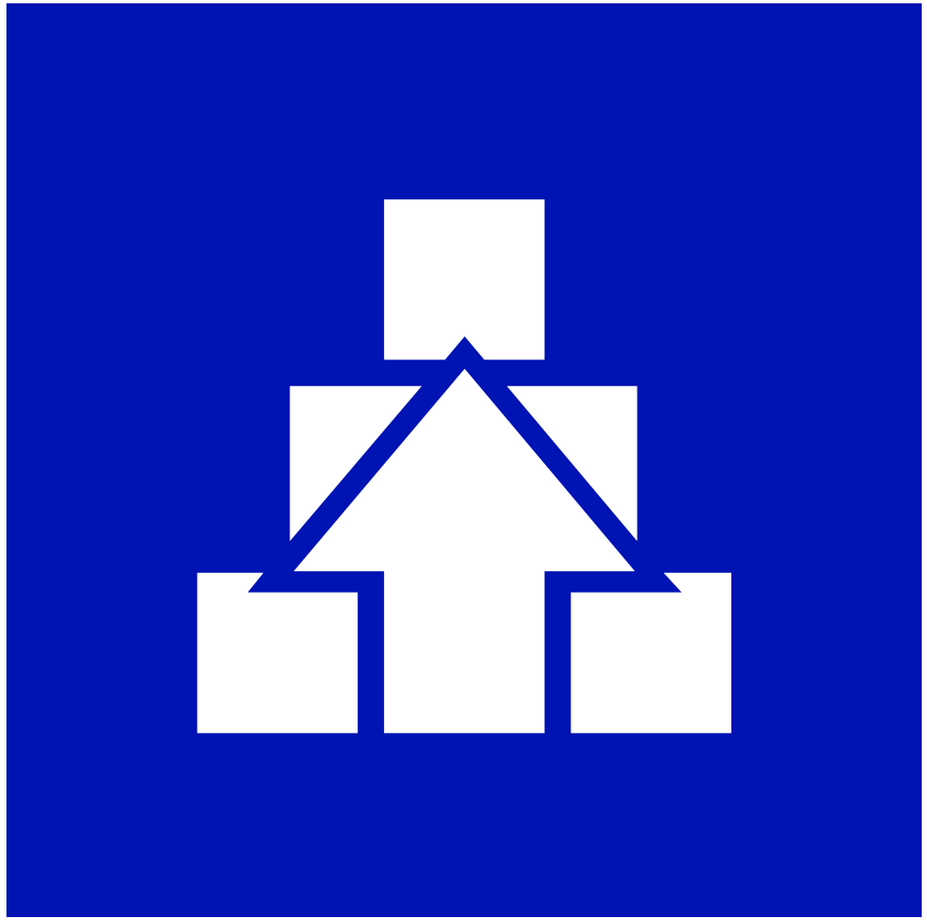


Run mission-critical applications with 99.99% SLA

High Availability supported with industry best SLA when two or more VMs are running in separate Availability Zones within a region.

Availability Sets: Fault and Update Domains

Fault and Update Domains



Fault Domains

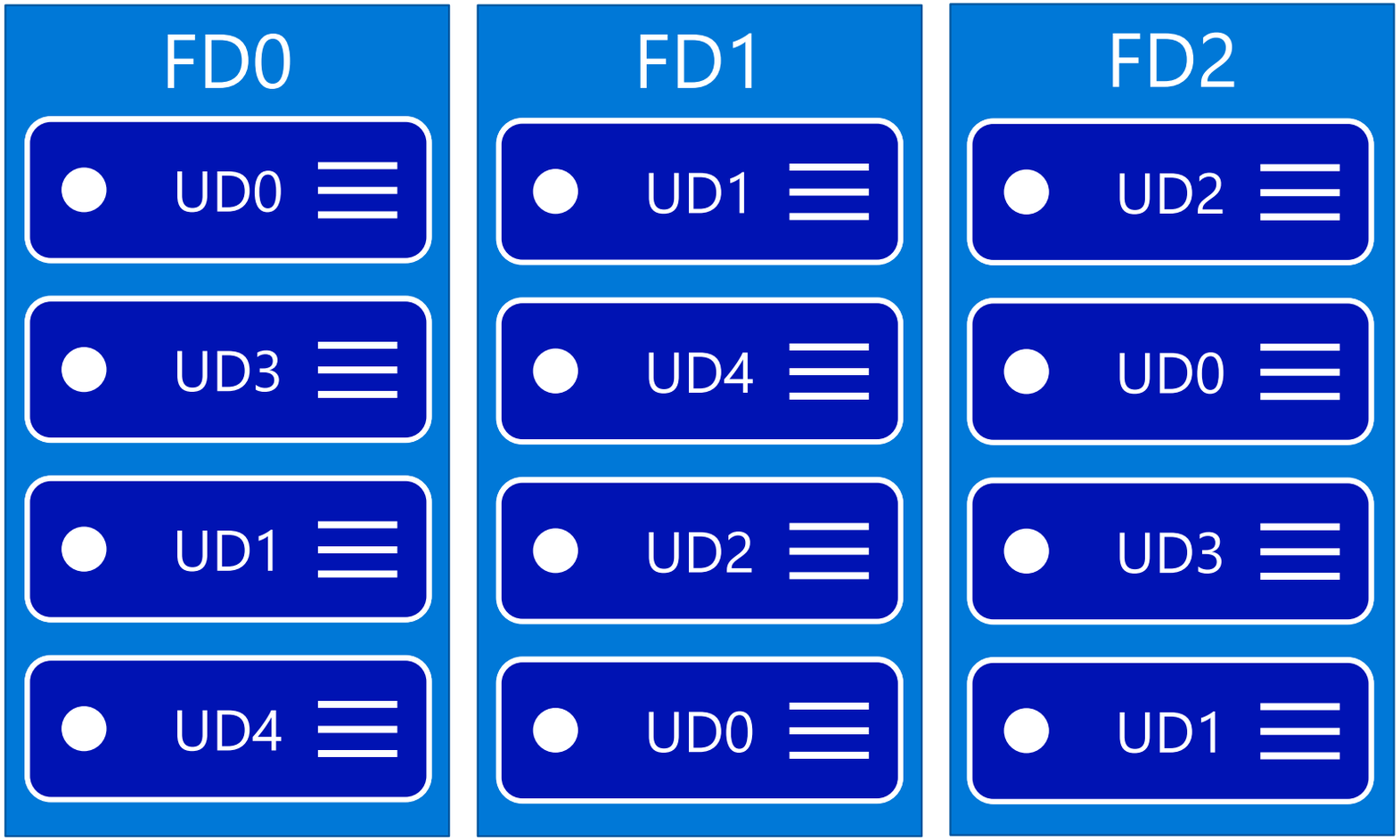
- Represent groups of resources anticipated to fail together
- i.e. Same rack, same server
- Fabric spreads instances across fault at least 2 fault domains

Update Domains

- Represents groups of resources that will be updated together
- Host OS updates honour service update domains
- Specified in service definition
- Default of 5 (up to 20)

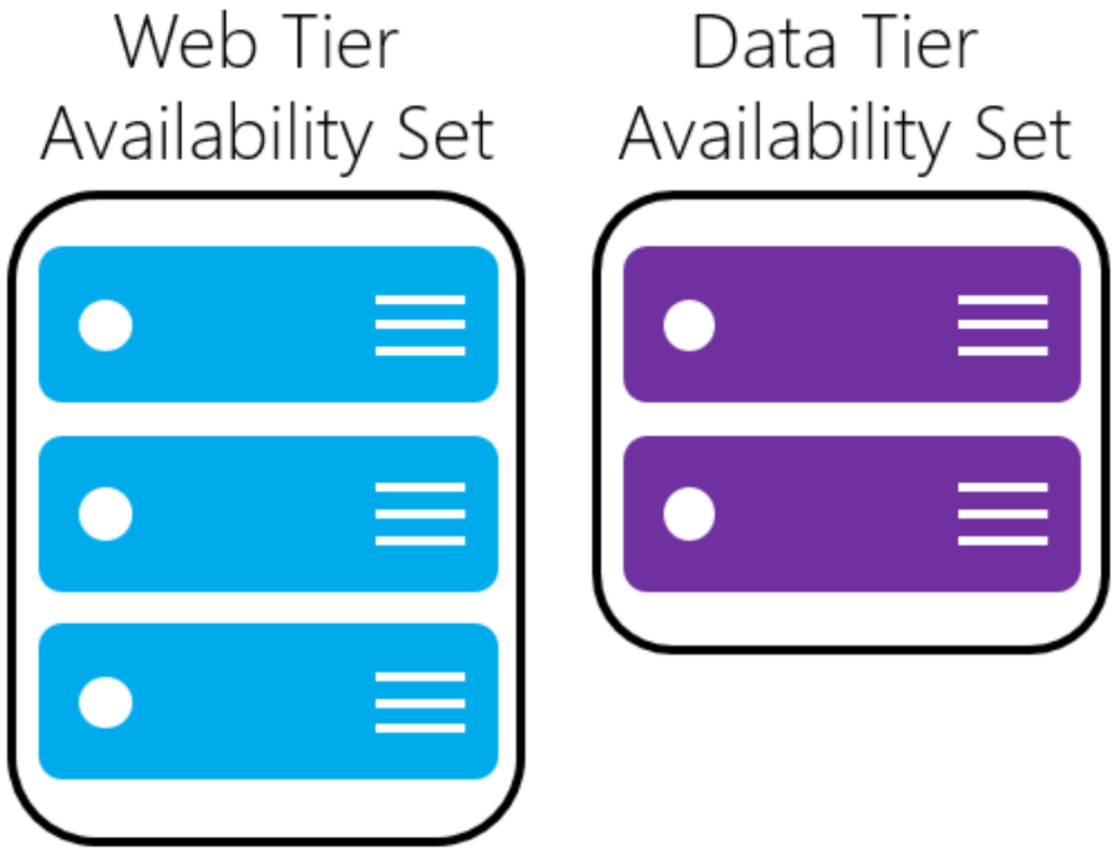
Fabric spreads role instances across Update Domains and Fault Domains

Availability Set

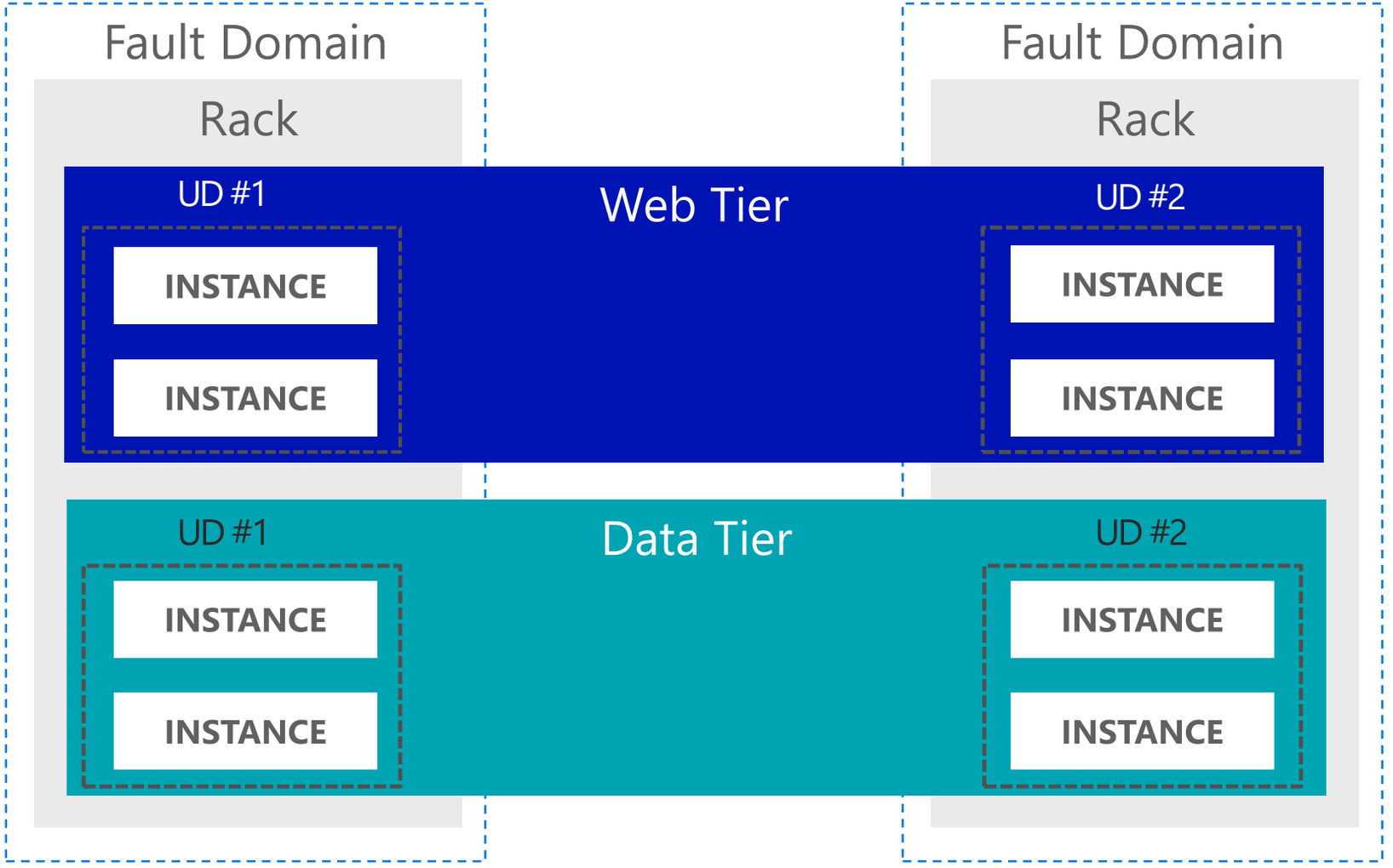


Scenario – Multi Tier Application

- Configure each application tier into separate availability sets
- By configuring at least two virtual machines in an availability set for each tier, you guarantee that at least one virtual machine in each tier will be available at all times

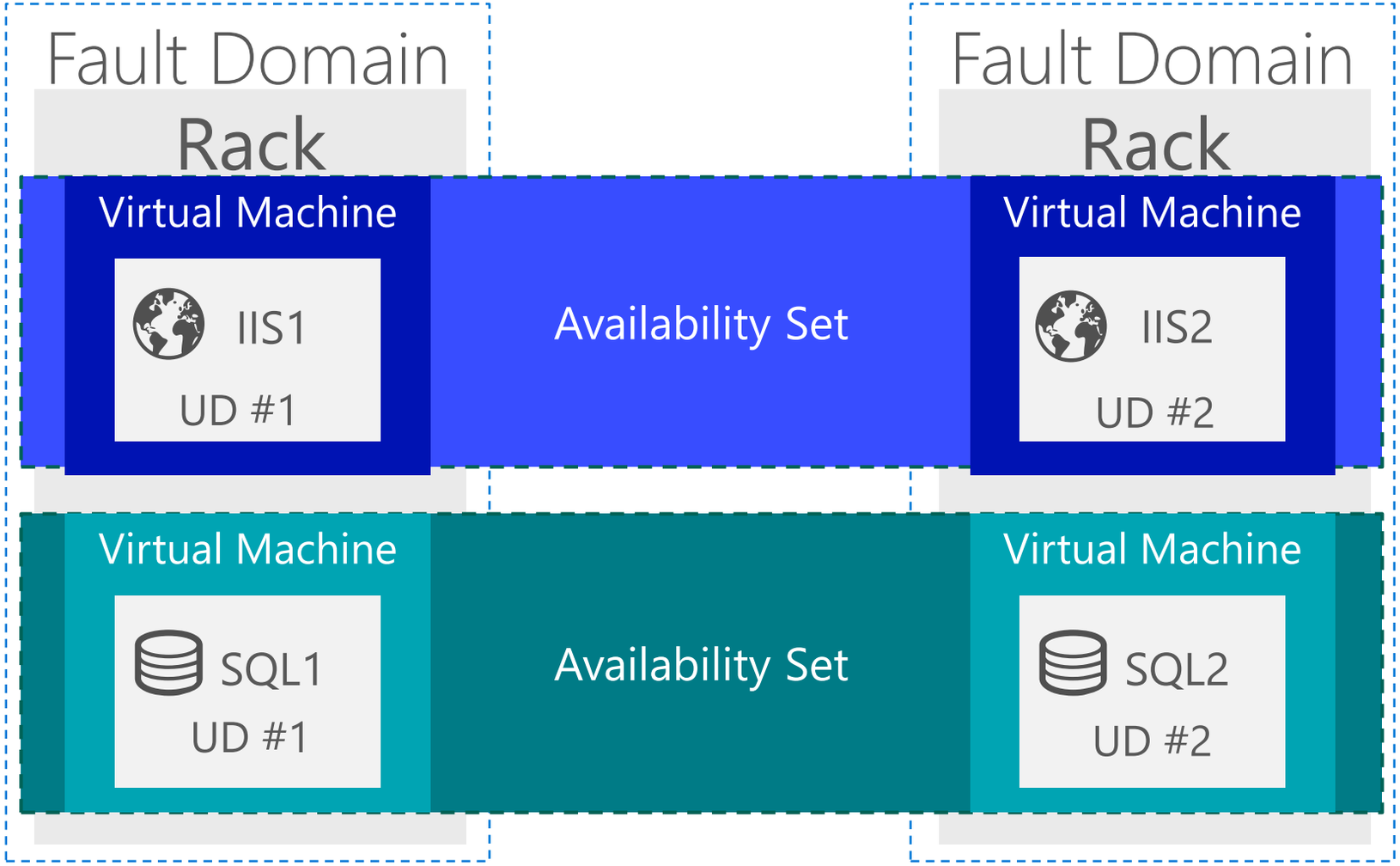


Fault and Update Domains



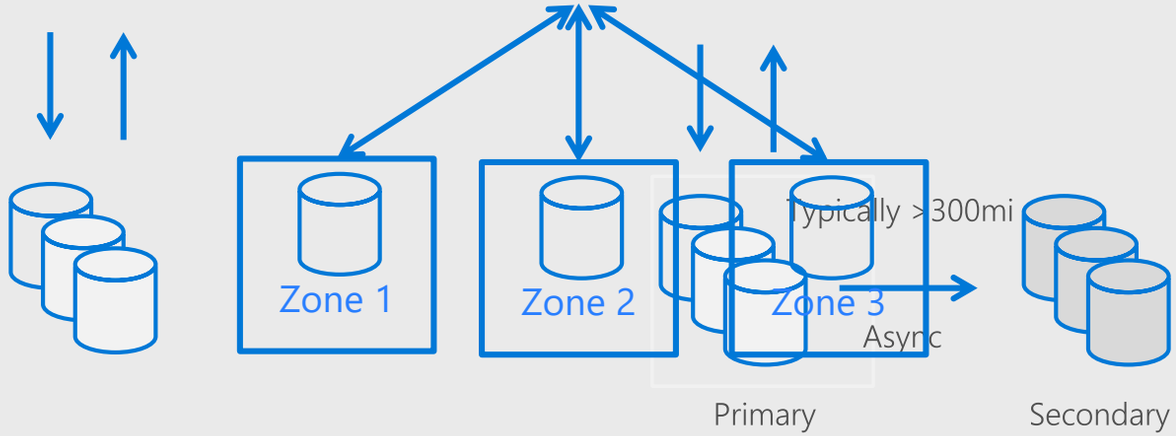
Virtual Machine Availability Sets

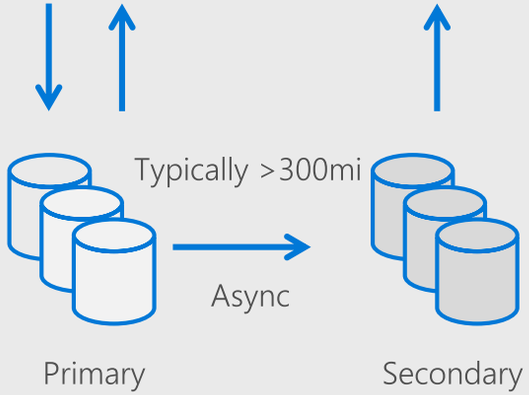
Update Domains are honored by host OS updates



High performance cloud storage and identity management

Storage redundancy models





Locally-redundant storage (LRS)

3 replicas, 1 region

Protect against disk, node, rack failures

Write is ack'd when all replicas are committed

Superior to dual-parity RAID

Zone-redundant storage (ZRS) v2

3 replicas **across 3 Zones**

Protect against disk, node, rack and **zone** failures

Synchronous writes to all 3 zones

Geo-redundant storage (GRS)

6 replicas, 2 regions (3/region)

Protects against major regional disasters

Asynchronous to secondary

Read-access Geo-redundant storage (RA-GRS)

GRS + Read access to secondary

Separate secondary endpoint

RPO delay to secondary can be queried

Managed Disks Overview

Hides complexity of storage accounts and scale limits

Simpler management for customers

Better performance

Storage account limits do not apply

Granular access control

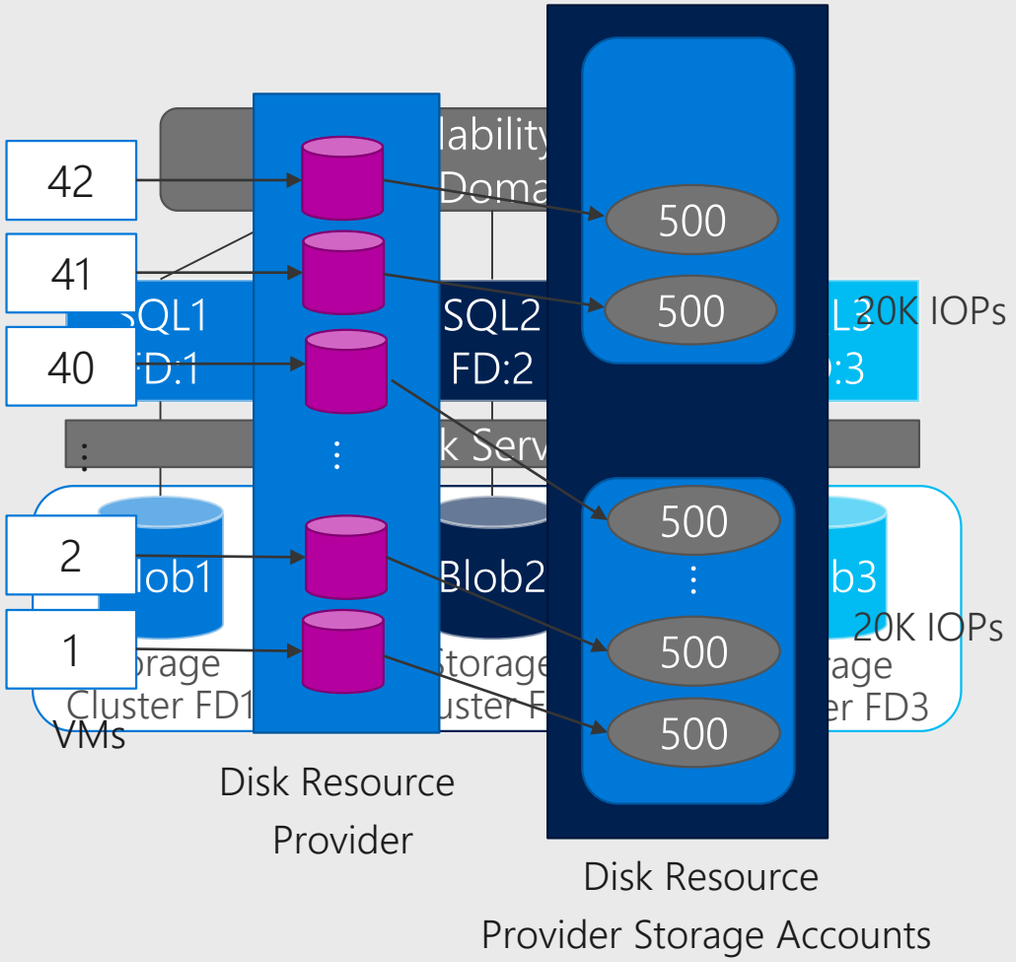
Top level ARM resource, apply Azure RBAC

Smarter about Availability sets

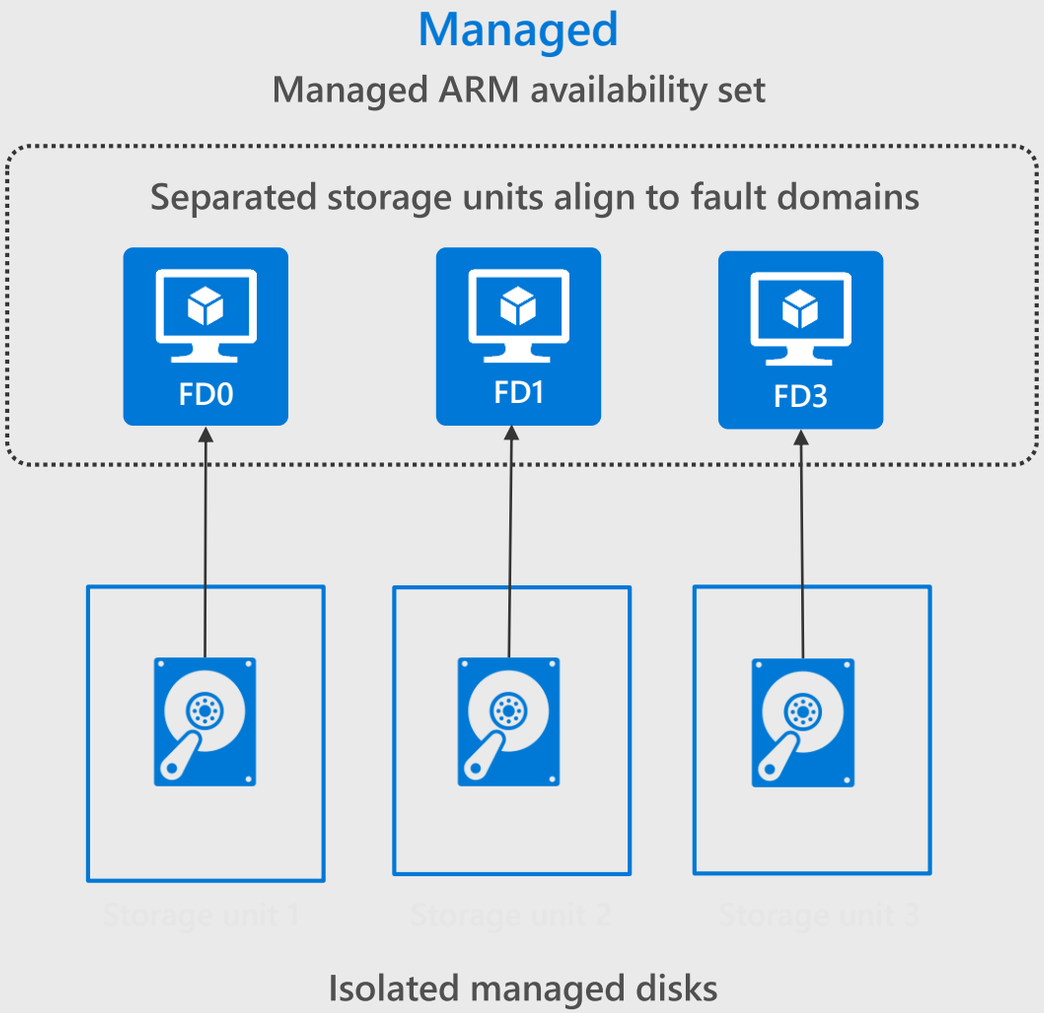
Different fault domains – Disks in different Storage clusters

Easy migration from Standard to Premium

Minimal downtime with background migrations



Enhanced Availability - Availability set isolation



Disks - Best Practices

Always use Premium Disks for Production workloads

RAID for redundancy is **not** necessary

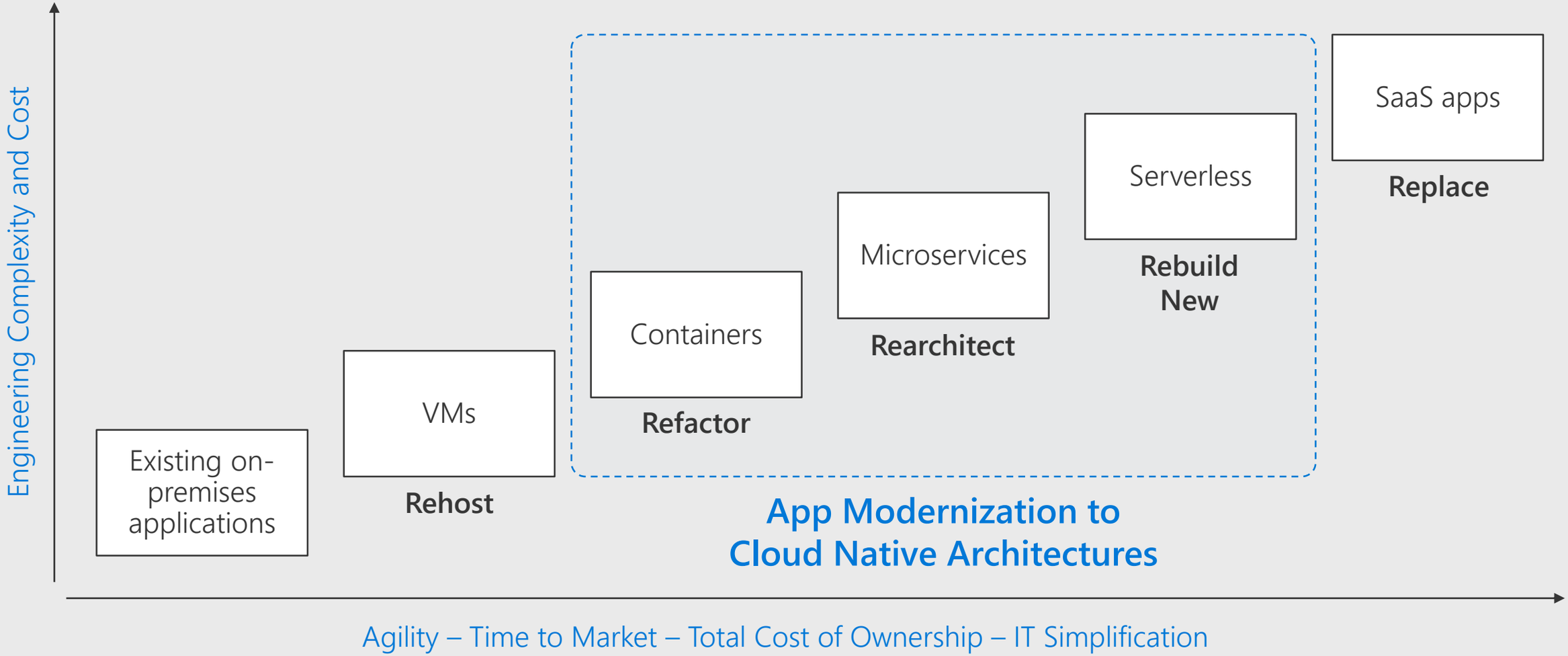
- RAID for performance as needed
- Durability doesn't remove the need for backups

Performance

- Local ssd is **definitely** temporary, use if you can tolerate loss
- Enable read caching where appropriate for better performance
- Understand VM limits vs Disk limits for performance

Cloud Native Patters: Developing Applications for the Cloud World

Cloud app **continuum**



What are **microservices**?

A Software Architectural Style

Applications are composed of small, independent modules that communicate with each other using well-defined APIs. Not platform specific.

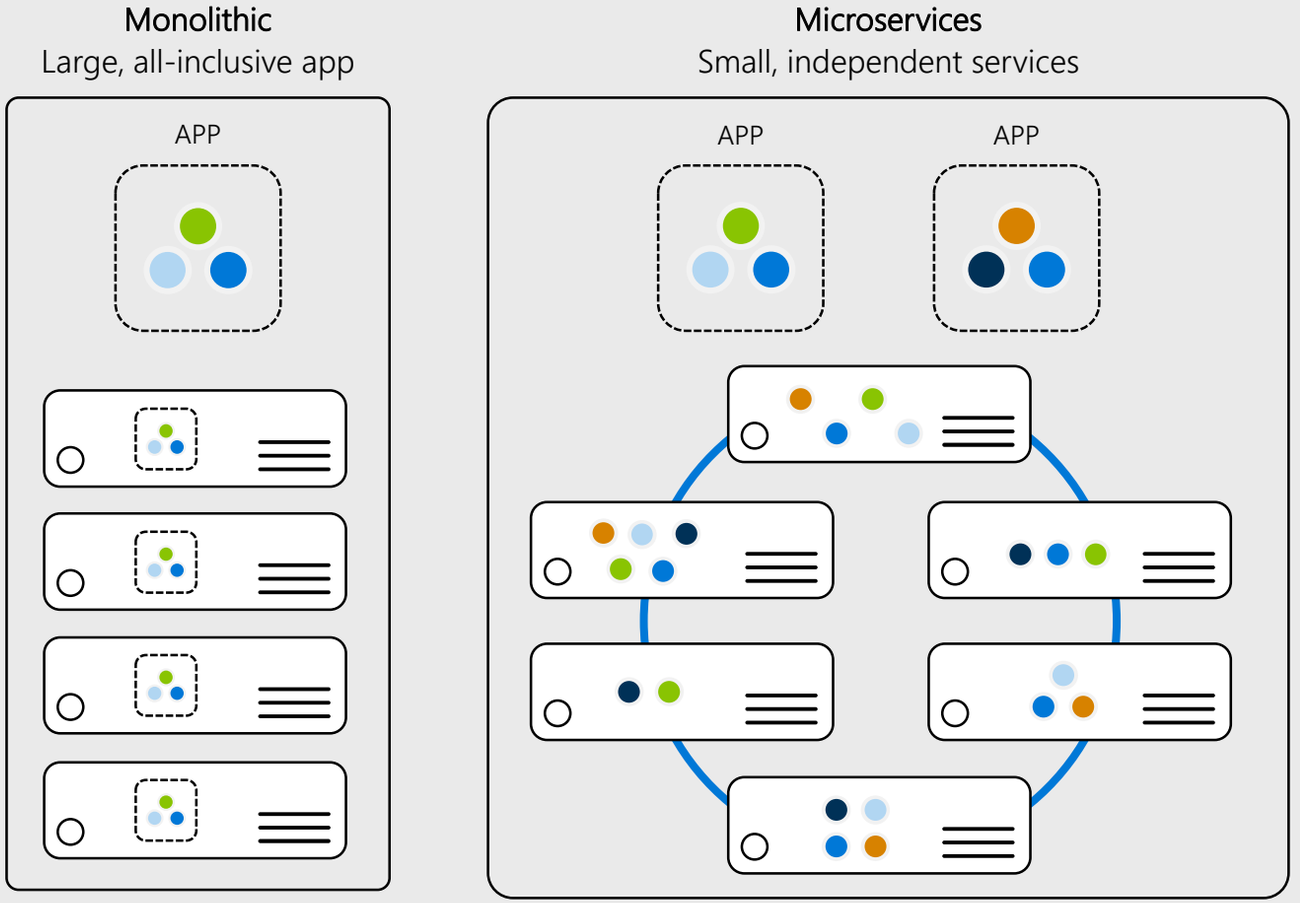
Decoupled

These service modules are highly decoupled building blocks that are small enough to implement a single functionality but together can form larger systems

Independently versioned, deployed & scaled

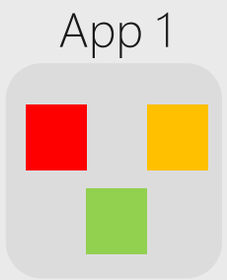
With a microservices architecture, developers can create, manage and improve application services independently, even using different languages

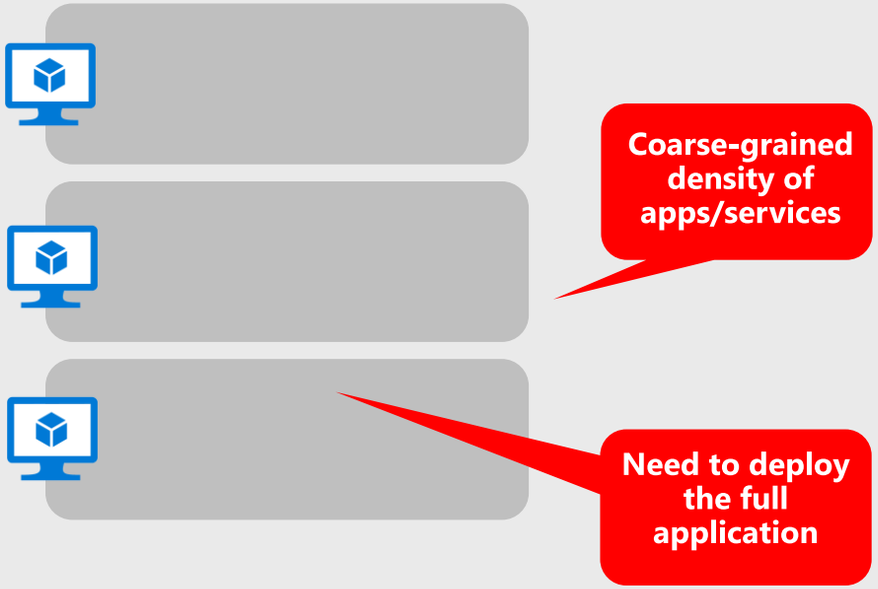
Containers provide the consistent format and isolation desired by microservices.



Traditional application approach

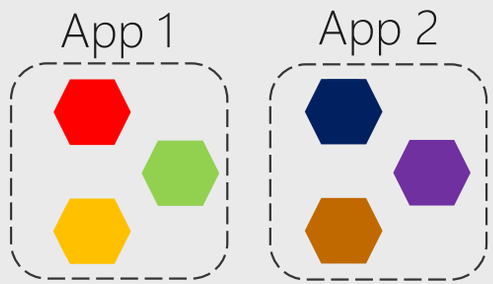
- A traditional application has its functionality within a few processes componentized with layers and libraries
- Scales by cloning the app on multiple servers/VMs

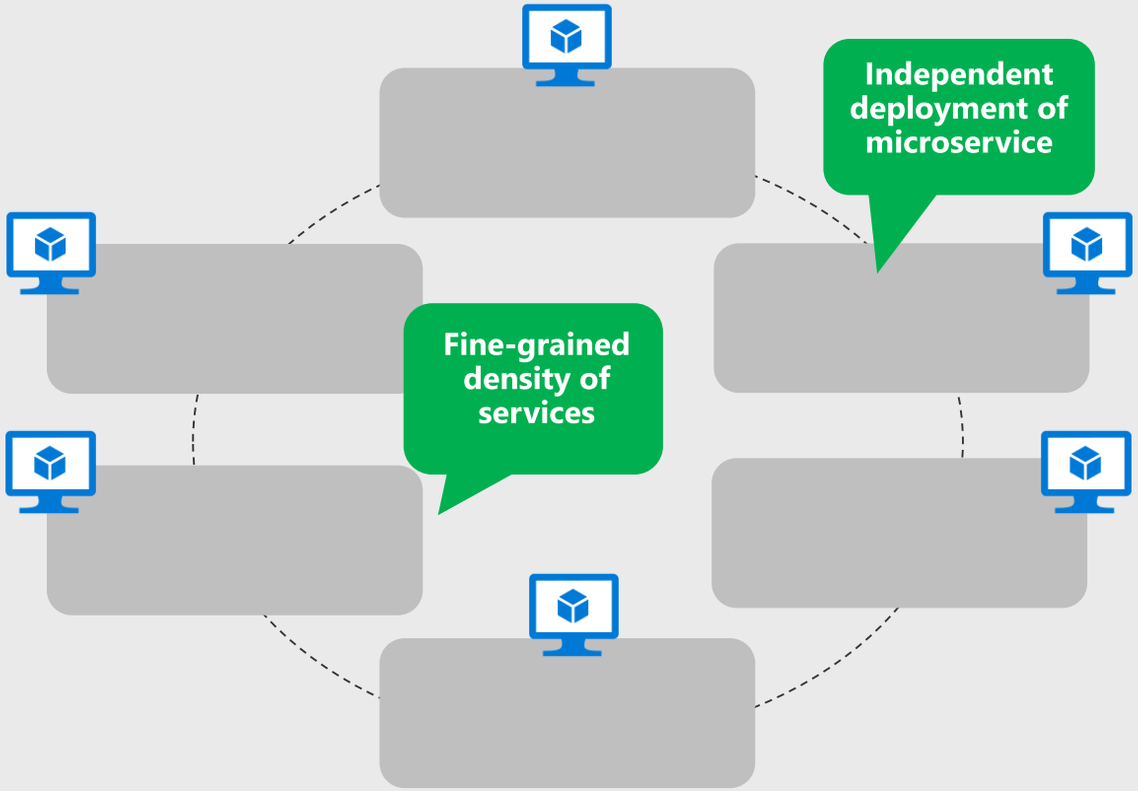




Microservices application approach

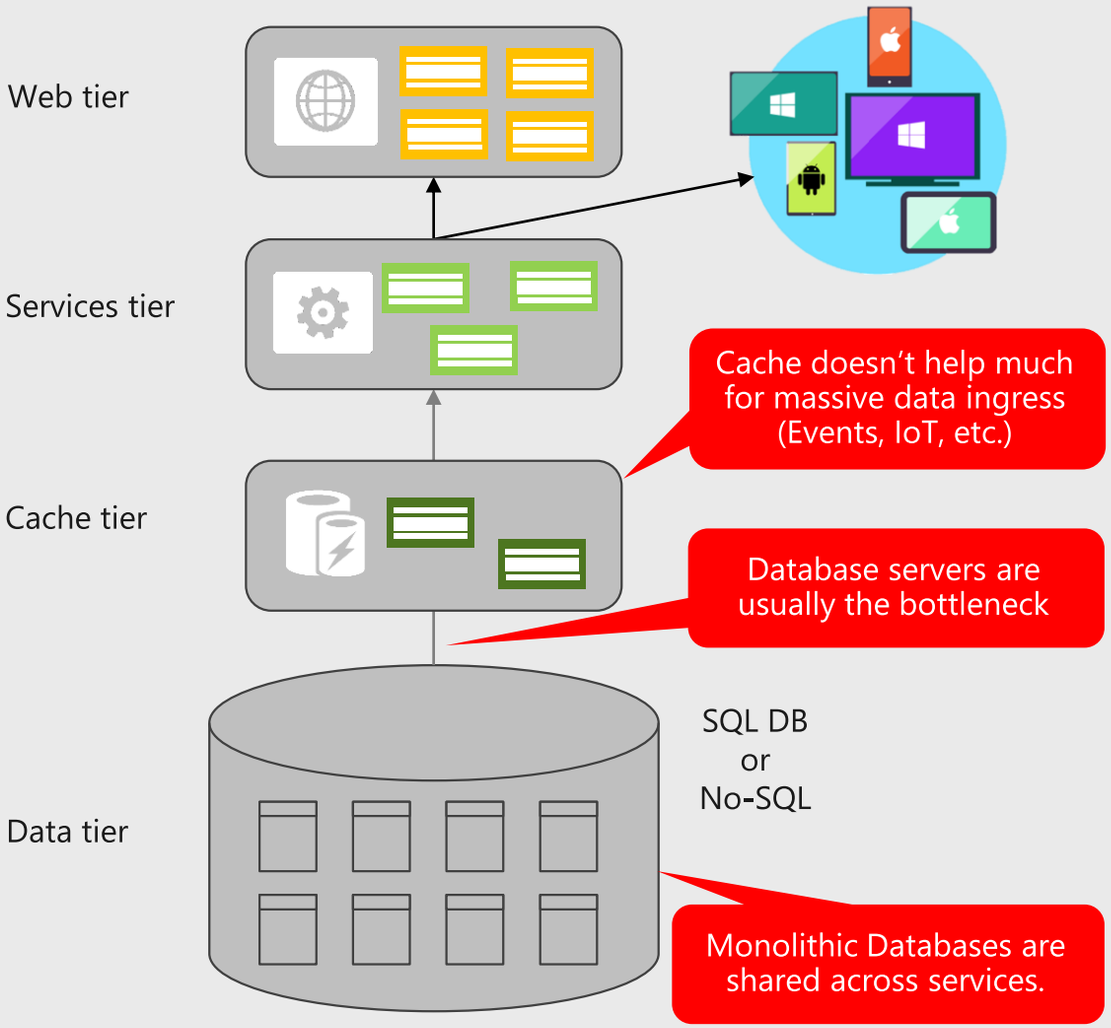
- A microservice application segregates functionality into separate smaller services
- Scales out by **deploying each service independently** with multiple instances across servers/VMs





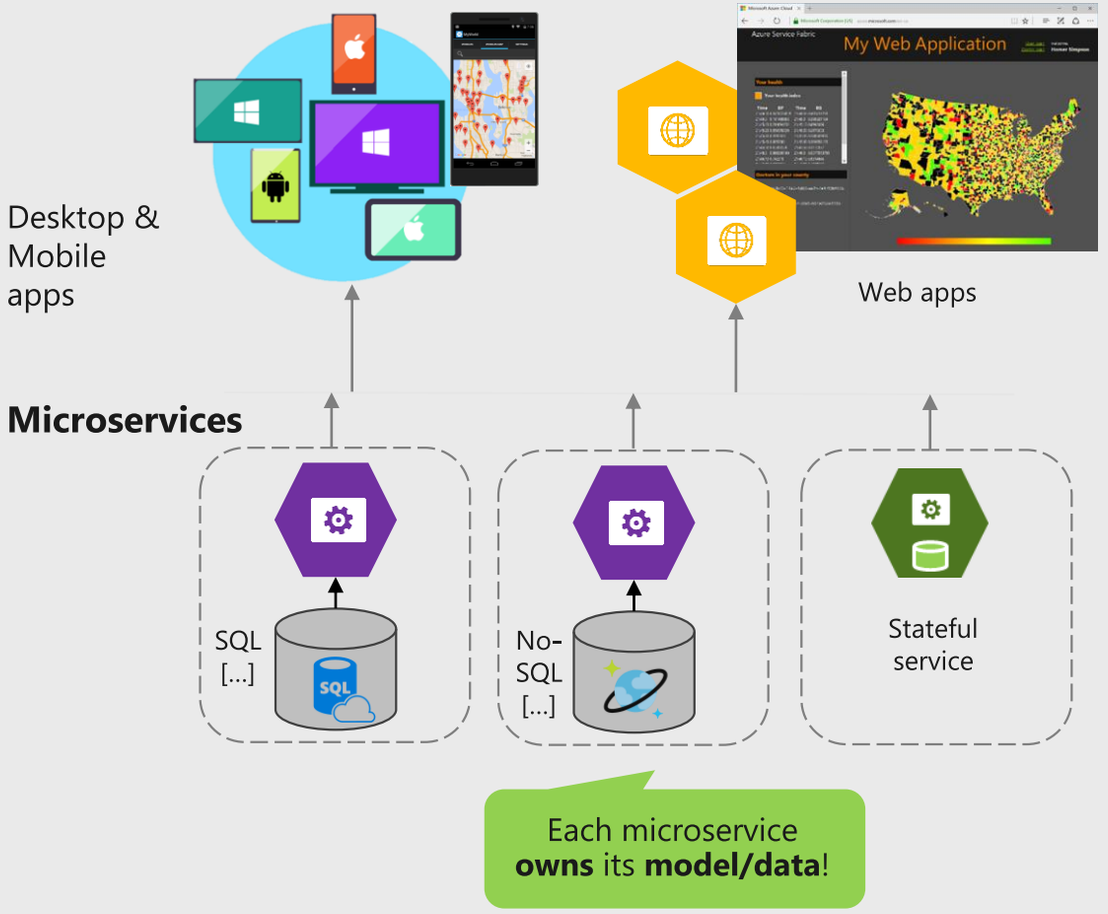
Traditional application approach

- Single monolithic database
- Tiers of specific technologies



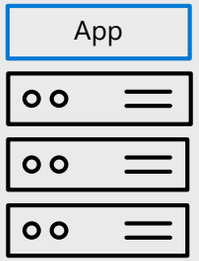
Data in Microservices approach

- Graph of interconnected microservices
- State/data typically scoped to the microservice
- Remote Storage for cold data

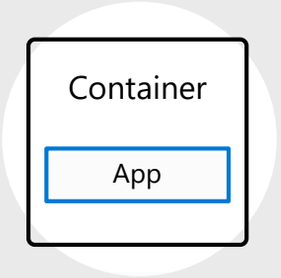


How can containers help your app modernization journey?

From **traditional systems** to a **portfolio of modern apps**



Existing/New Applications



Lift and shift to containers

Each host often runs **8** containers at a time[1]

Microservices

Seconds to deploy, churns **12x** faster[1]

Continuous innovation with DevOps

46x more frequent for code delivery[2]

1: Datadog Report: 8 Surprising Facts About Real Docker Adoption; 2: 2017 state of DevOps Report

Containers in Azure

App Service

Deploy web apps or APIs using containers in a PaaS environment

Service Fabric

Modernize .NET applications to microservices using Windows Server containers

Kubernetes Service

Scale and orchestrate Linux containers using Kubernetes

Container Instance

Elastically burst from your Azure Kubernetes Service (AKS) cluster

Ecosystem

Bring your Partner solutions that run great on Azure

Azure Container Registry

Docker Hub

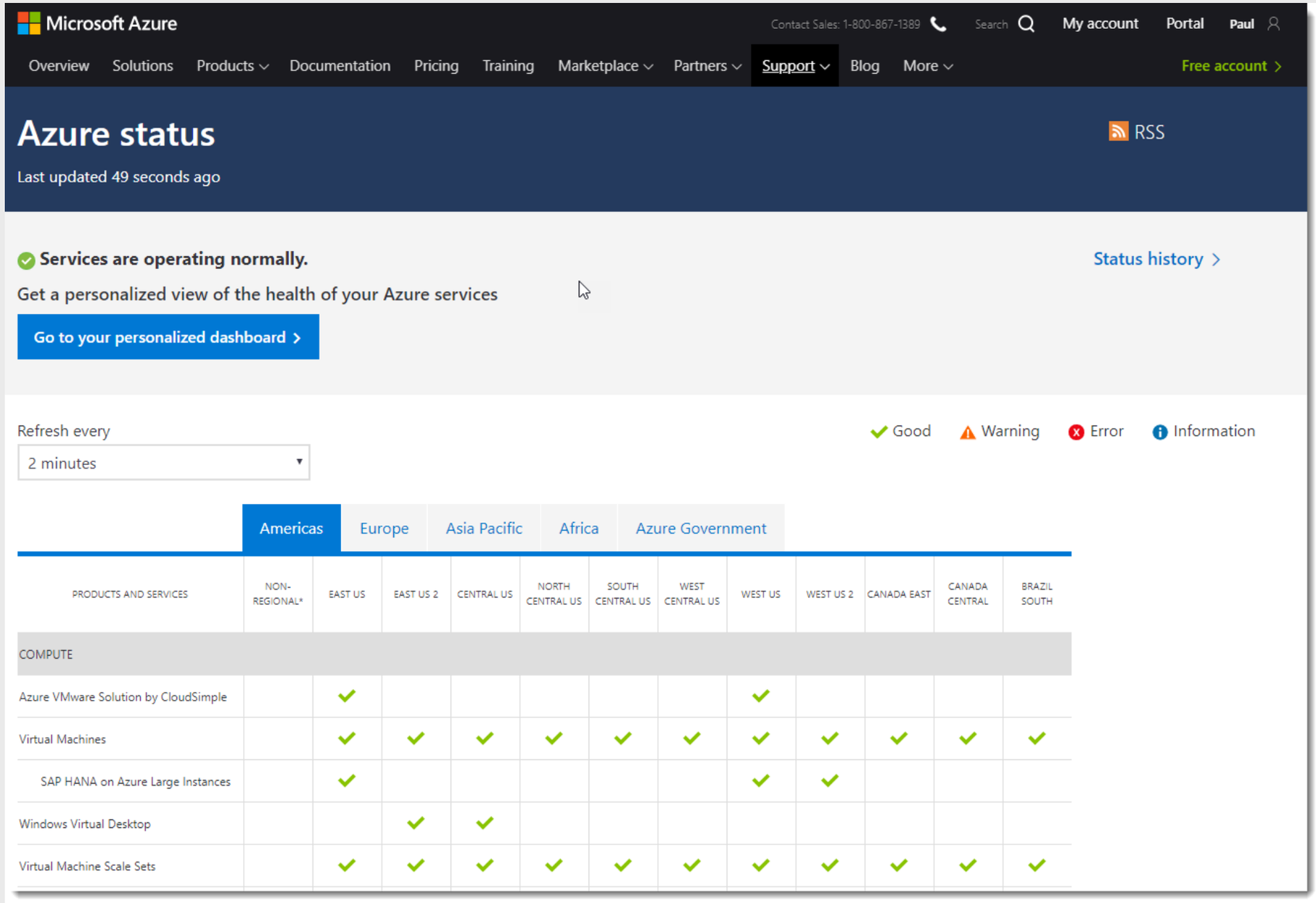
Choice of developer tools and clients

Key takeaways

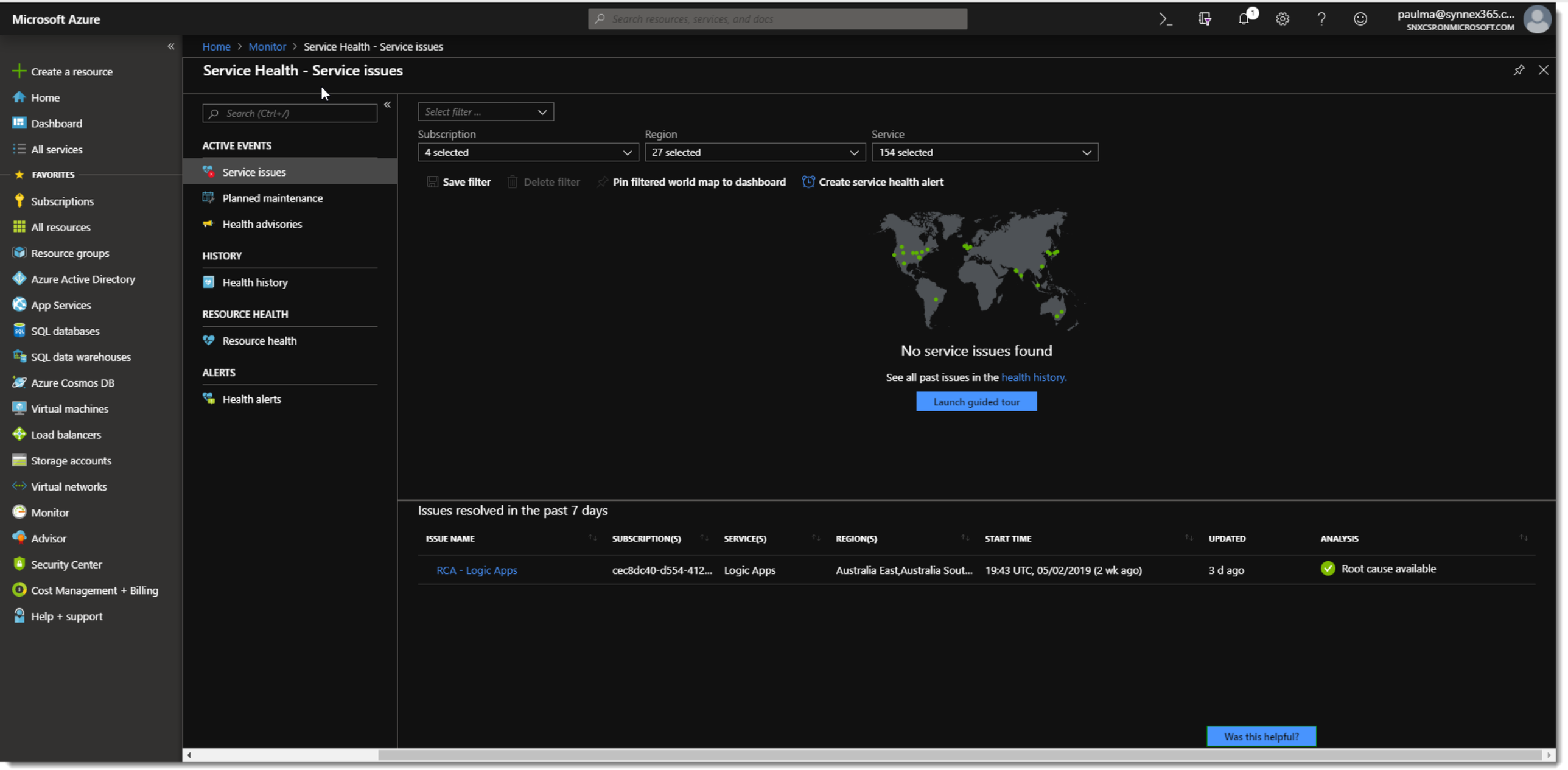
- Microservices allow you to evolve, deploy and scale parts of the application independently
- Microservices offer great benefits but also new challenges (distributed software challenges)
- Microservices are not suitable for all apps, but for large, scalable and long-term evolving applications with typically multiple autonomous development teams
- But you can start extending your existing monolithic apps with new microservices, step-by-step

24/7 Support, health monitoring and 99.95% availability

Azure Status Dashboard



Azure Service Health – Azure Portal



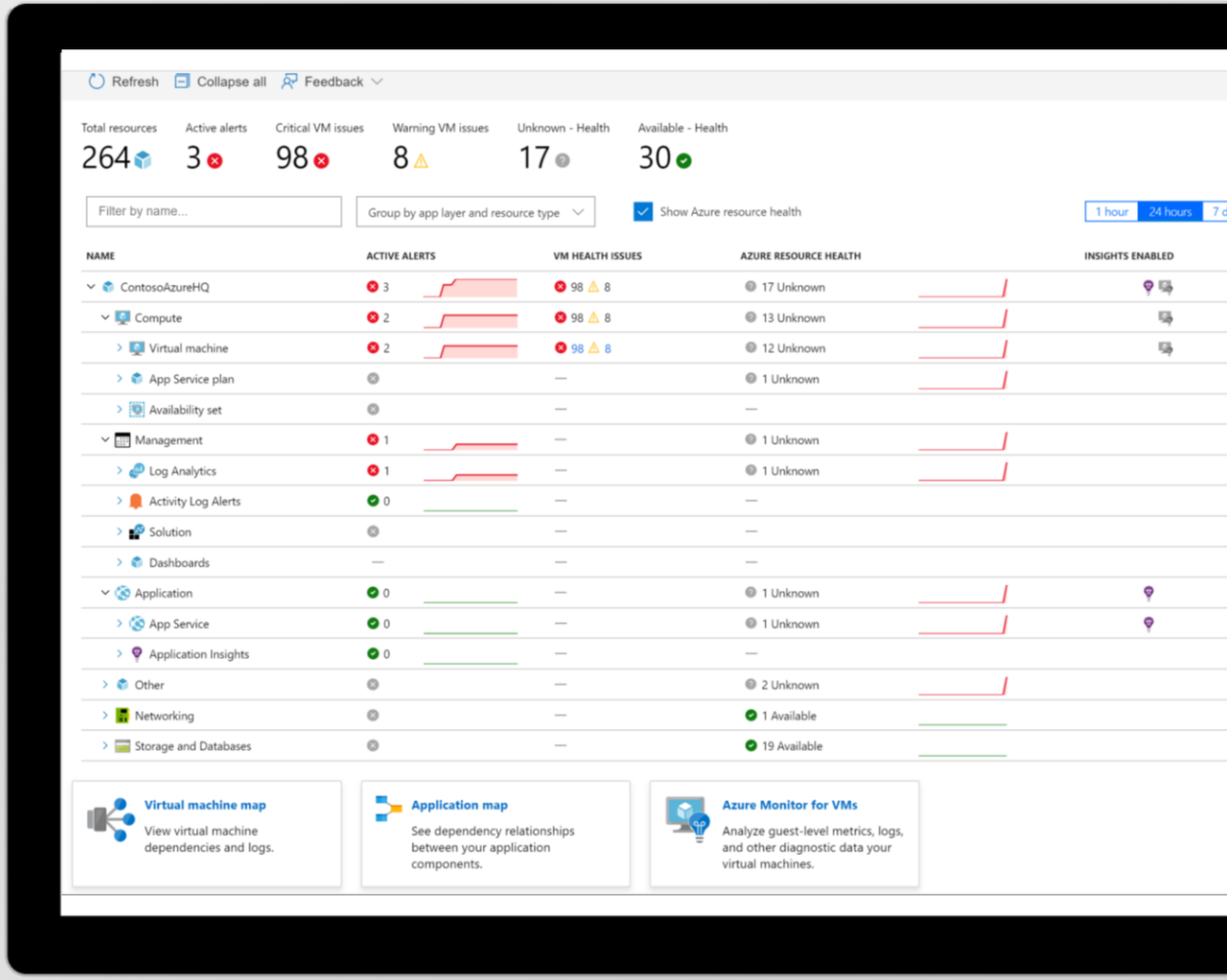
Full Stack Visibility in Resource Groups

Monitor health state of all resources

See alerts firing across app & infra

Jump to Application Map or VM Map

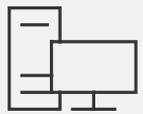
Drill down into failures or perf issues



Choose the Best Architecture for Your Needs

INDUSTRY-ONLY

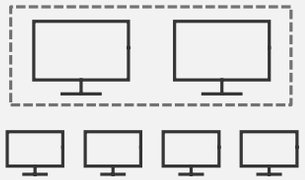
VM SLA
99.9%



SINGLE VM
Protection with Premium Storage

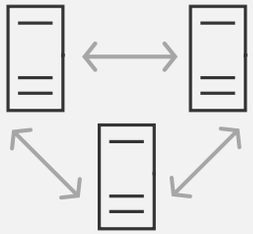
INDUSTRY-LEADING HIGH AVAILABILITY SLA

VM SLA
99.95%



AVAILABILITY SETS
Protection against failures within datacenters

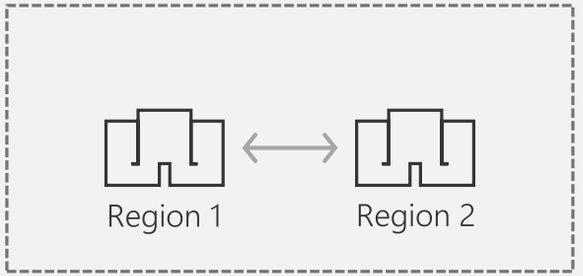
VM SLA
99.99%



AVAILABILITY ZONES
Protection from entire datacenter failures

INDUSTRY-LEADING DISASTER RECOVERY

REGIONS
50



REGION PAIRS
Protection from disaster with Data Residency compliance

Questions to Ask Your Customer

1. What are your plans for EOS for Windows 2008, are you aware Microsoft is offering extended support if you move to Azure?
2. How do you address security in BYOD scenarios
3. How do you address ups and downs in resource needds
4. What technology challenges do you have today that keep you from being competitive

Resources

Design your application for self healing when failures occur

- In a distributed system, failures happen. Hardware can fail. The network can have transient failures. Rarely, an entire service or region may experience a disruption, but even those must be planned for.

Cloud Design Patterns

- These design patterns are useful for building reliable, scalable, secure applications in the cloud.

Calculate SLA for Cloud Services