

# Azure Fundamentals

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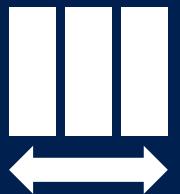
Skill: DevOps Engineer Lead

A screenshot of the Microsoft Learn dashboard at learn.microsoft.com. The left sidebar shows navigation links: Activity, Training, Plans, Challenges, **Credentials** (which is selected), Q&A, Achievements, Collections, and Transcript. The main content area displays four certification cards, each with a "View certification details" link. 1. Microsoft Certified: DevOps Engineer Expert (Expert level, Active, June 15, 2025) 2. Microsoft Certified: Azure Solutions Architect Expert (Expert level, Active, June 15, 2025) 3. Microsoft Certified: Azure Administrator Associate (Associate level, Active, June 15, 2025) 4. Microsoft Certified: Azure Fundamentals (Fundamentals level, Active, May 24, 2024)

# Azure readiness

## New IT reality

Hybrid cloud



## Implementation

Public cloud off-premises



Private cloud on-premises



Commodity

**SaaS (Software as a Service)**  
(Microsoft Dynamics Online, Office 365, etc.)



Application Modernization

**PaaS (Platform as a Service)**  
(Windows Azure Database, Web, Worker, etc.)



Infrastructure Modernization

**IaaS (Infrastructure as a Service)**  
(Windows Azure Virtual Machines)



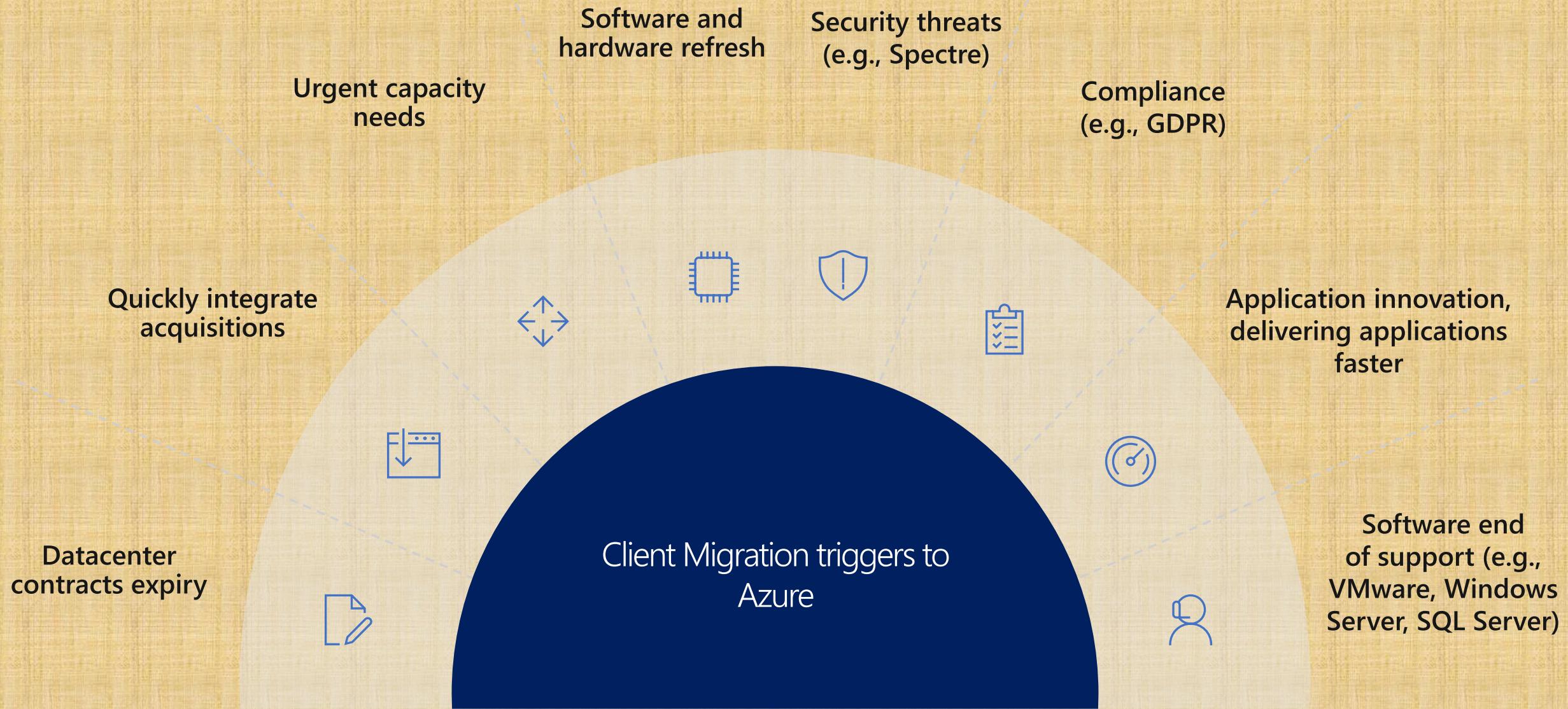
Workloads

Optimized workloads for  
Private IaaS VMs



Cost and  
Savings

# Azure readiness





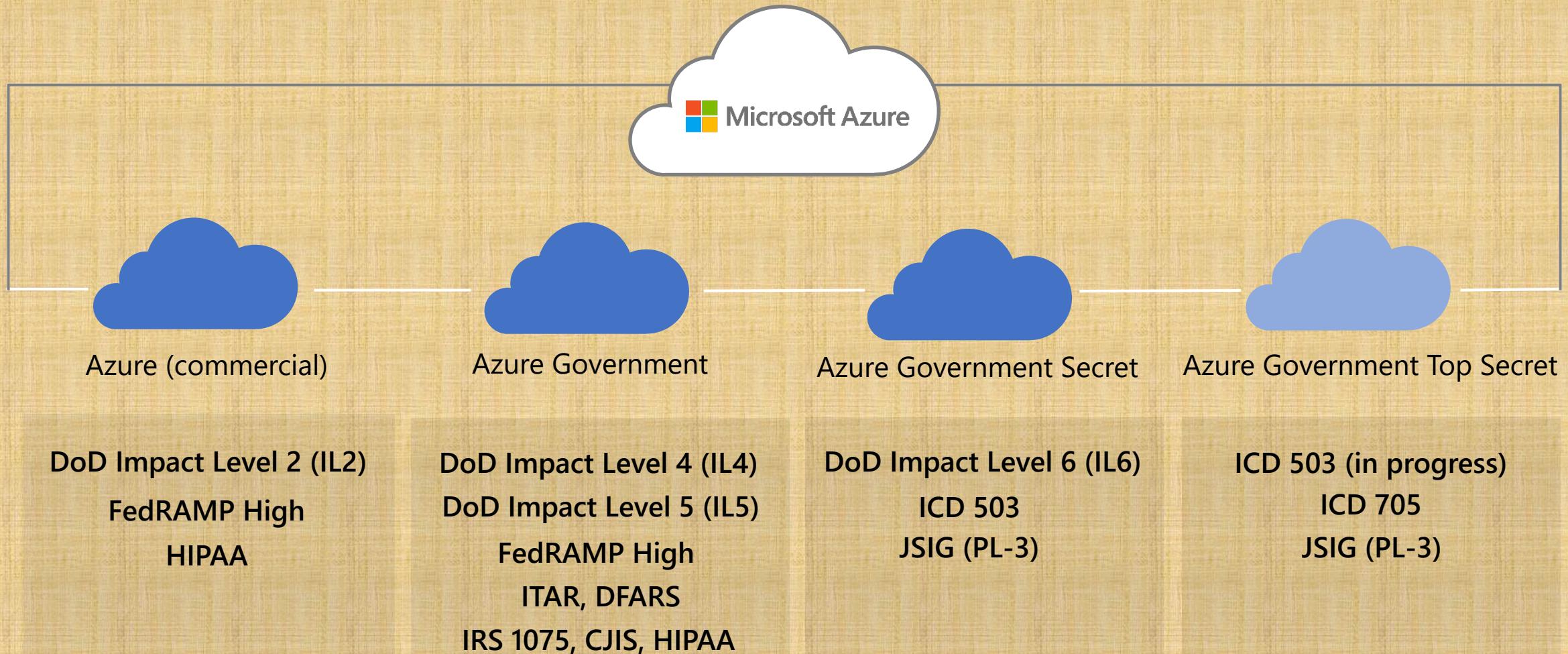
50 AZURE REGIONS

40+

PEERING LOCATIONS

130+ EDGE SITES

# Azure datacenters



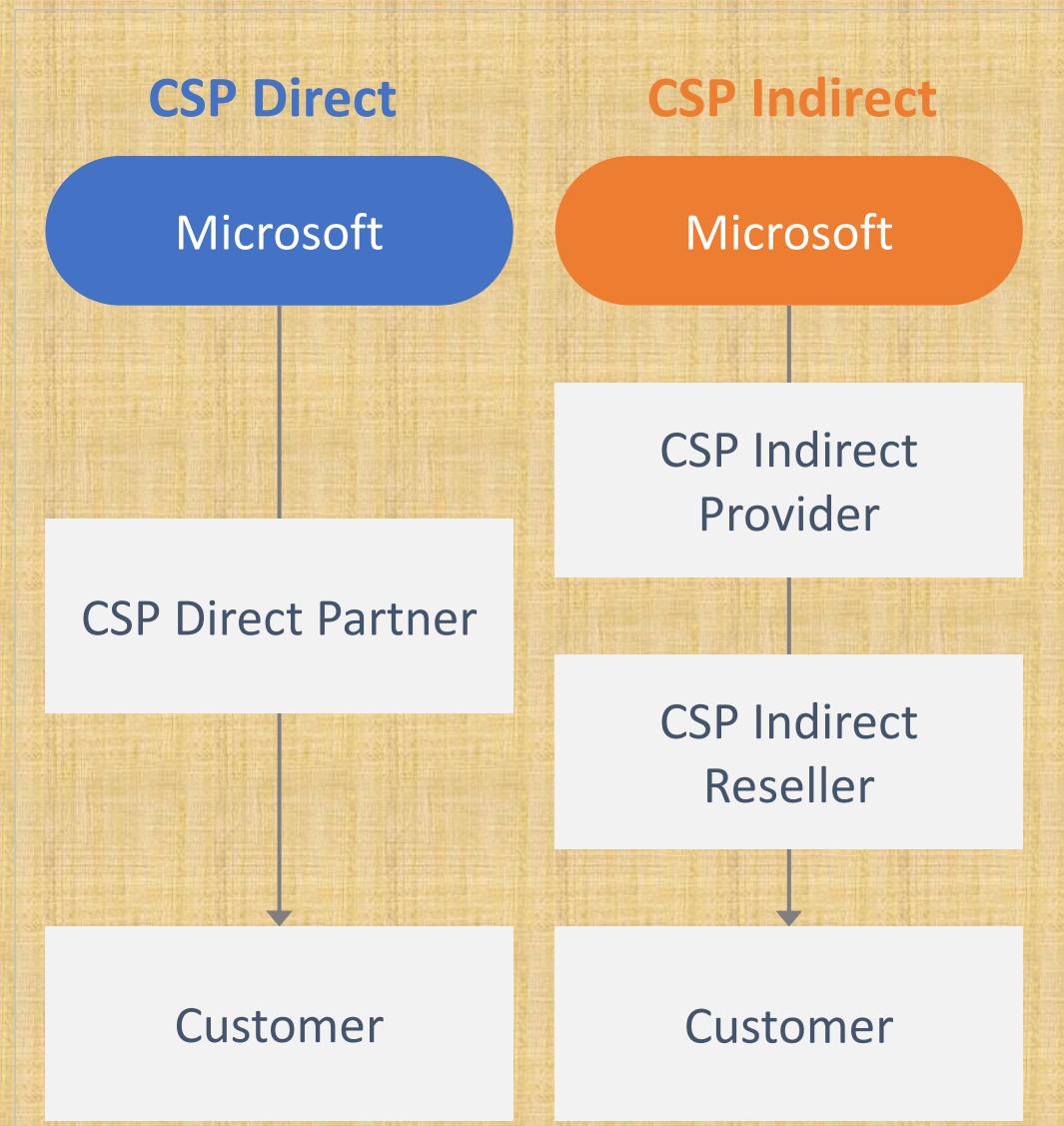
# One program, two different business models

## CSP Direct model (1-tier)

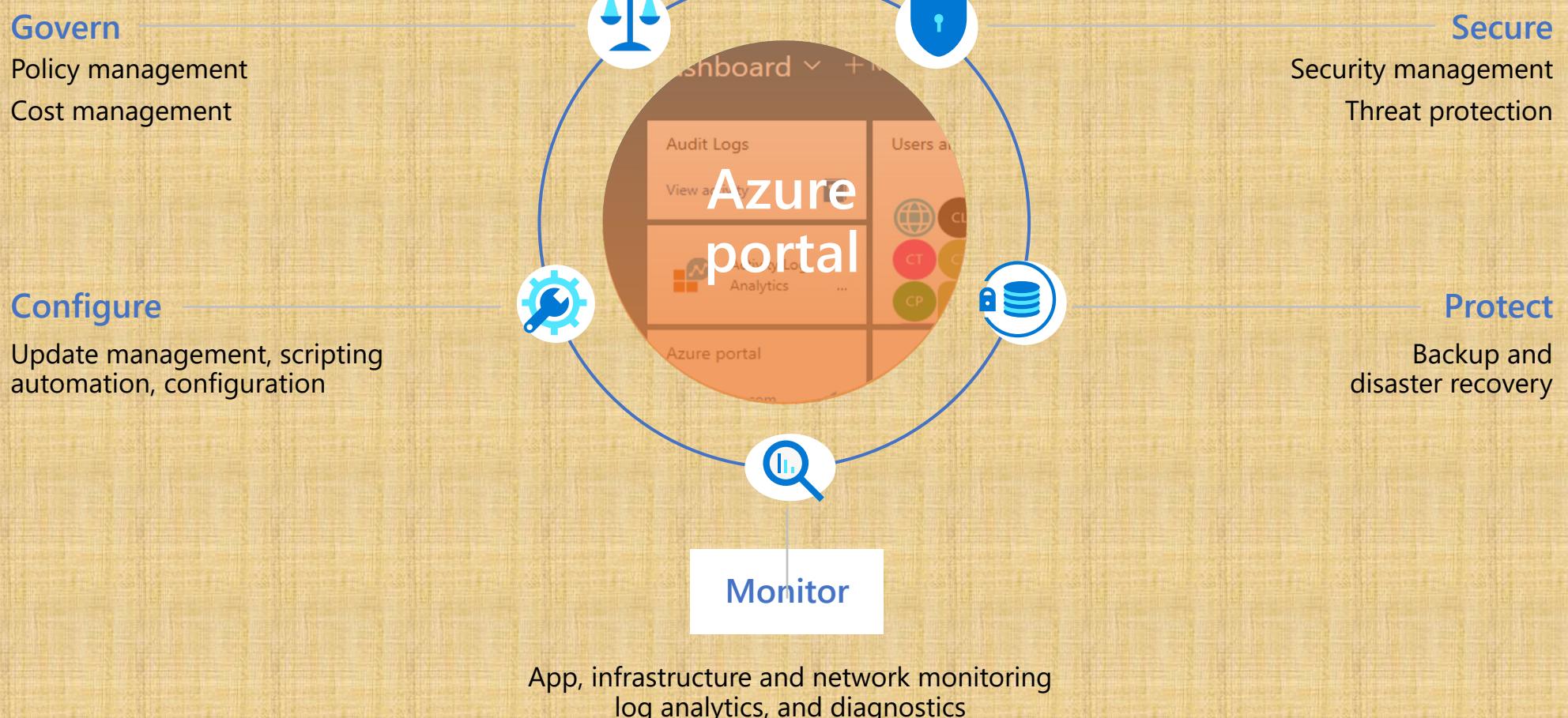
- Partner works with Microsoft directly
- Fixed discount for Azure
- Partner needs to provide billing tools and build support practice
- Credit check during the onboarding process

## CSP Indirect model (2-tier)

- 2 partner tiers:
  - CSP Indirect Provider (aka Distributor) – transacts to Microsoft, provides billing tools and technical support.
  - CSP Indirect Reseller – sells Azure to customers through CSP Indirect Provider.



# Azure portal offers enterprise-grade management



# Azure portal is customizable—portal.azure.com

## Create portal dashboards



By key roles, (e.g., operations, finance, development), key projects, and key service KPIs

The screenshot shows the Azure portal homepage with the following sections:

- Azure services:** Includes links for Create a resource (highlighted with a dashed box), Help + support, Quickstart Center, Virtual machines, Free services, Cost Management..., Advisor, Data Protection vaults, Resource Explorer, and More services.
- Recent resources:** A table showing recent subscriptions and migration projects.

Name	Type	Last Viewed
Azure Customer Success team	Subscription	a year ago
ContosoDemo	Migration project	a year ago
- Navigate:** Links for Subscriptions, Resource groups, All resources, and Dashboard.
- Tools:** Links for Microsoft Learn, Azure Monitor, Security Center, and Cost Management.
- Useful links:** Links for Technical Documentation, Azure Migration Tools, Azure Services, Find an Azure expert, Recent Azure Updates, and Quickstart Center.
- Azure mobile app:** Links for Download on the App Store and GET IT ON Google Play.

# Azure mobile app

Now available on Android and iOS

[Download the app today.](#)

Stay connected to your Azure resources—anytime, anywhere



Monitor and manage your Azure resources on the go

Get notifications and alerts about important health issues

Easily access Service Health events and information

Quickly diagnose and fix issues from your mobile device

Run Azure Cloud Shell scripts (PowerShell or Bash) from the app

Receive Azure Alerts as push notifications via action groups

Dark theme supported

[Learn more](#)  
Check product availability [in your region](#)

# Azure Quickstart Center

Accelerate your  
Azure deployment



A focused view of the top Azure services guides you through options to help you easily build, test, and deploy your project to the cloud.

Not quite ready to launch  
a project? No worries



Built in setup guides enable you to make decisions as you prepare to migrate or drive innovation with Azure services.

Need more learning resources?  
We have you covered



Our recommended learning paths let you take a hands-on approach to building Azure skills and knowledge.

More information: <https://aka.ms/aqc>. Watch videos on [Microsoft Mechanics](#) and [Azure Friday](#).

# Azure policy for enterprise cloud control and compliance

## Enforcement and compliance

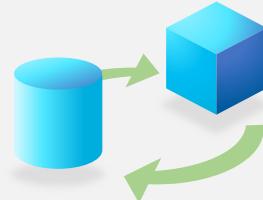


Turn on built-in policies or build custom ones for all resource types

Real-time policy evaluation and enforcement

Periodic and on-demand compliance evaluation

## Apply policies at scale



Apply policies to a Management Group with control across your entire organization

Apply multiple policies and aggregate policy states with policy initiative

Exclusion scope

## Remediation



Real time remediation

Remediation on existing resources

# Azure Advisor

Your free, personalized guide to Azure best practices



Optimize your Azure resources for cost, security, high availability, performance, and operational excellence

Find all your optimization recommendations from across Azure in one place

Quickly and easily act on best practice recommendations with simple, step-by-step guidance and quick links

Get notified about new recommendations and recommendations you haven't actioned yet

More information: [Learn more about Azure Advisor](#)

The screenshot shows the Microsoft Azure Advisor portal interface. At the top, there's a navigation bar with links like King-FM, Merge, Workboard, Cross-Product, Azure CAB, and Advisor. Below that is the main title "Advisor" and a search bar. On the left, there's a sidebar with sections for Overview, Recommendations (Cost, Security, Reliability, Operational Excellence, Performance, All recommendations, Monitoring, Alerts (Preview), Recommendation digests), and Settings (Configuration). The main content area shows various metrics and charts. One chart for "Cost" shows 38,265 USD savings/yr. Another chart for "Operational Excellence" shows 2 recommendations (0 High impact, 1 Medium impact). There are also sections for "Monitoring" and "Alerts (Preview)". The overall theme is dark with light-colored cards for each recommendation category.

# Azure communicates incidents, upcoming maintenance, and health advisories via Azure Service Health

**Azure Service Health alerts is strongly recommended**



Examples of alerts include:

An alert to email your dev team when a resource in a test/dev subscription is impacted

An alert to update ServiceNow via webhook when a resource in production is impacted

An alert to send an SMS to a specific number when resources in a given region are impacted

The screenshot shows the Azure Service Health - Health History interface. On the left is a navigation sidebar with options like 'Service Health', 'Health history', 'Active events', 'Planned maintenance', 'History', 'Health advisor', 'Resource health', 'Alerts', and 'Alerts alerts'. The main area displays a table of active events. One event is highlighted: 'PCA - SQL Database - South Central' with status 'Incident' and 'Azure Service Health test service' as the resource. The summary section indicates an impact between 18:14 UTC and 21:16 UTC on 16 Aug 2019, affecting 14,291,956 users. A video player on the right shows a Microsoft employee speaking about outages, resilience, and Azure Service Health.

## Outages, resilience, & Azure Service Health

Personalized view of Azure health and architecting for resilience

# Azure Monitor

[aka.ms/AzMonOverview](http://aka.ms/AzMonOverview)



Detect & diagnose issues across apps and dependencies with App Insights



Correlate issues at infra level with insights for VMs, AKS, SQL, Networks, etc.



Drill down with Log Analytics for troubleshooting & deeper diagnostics

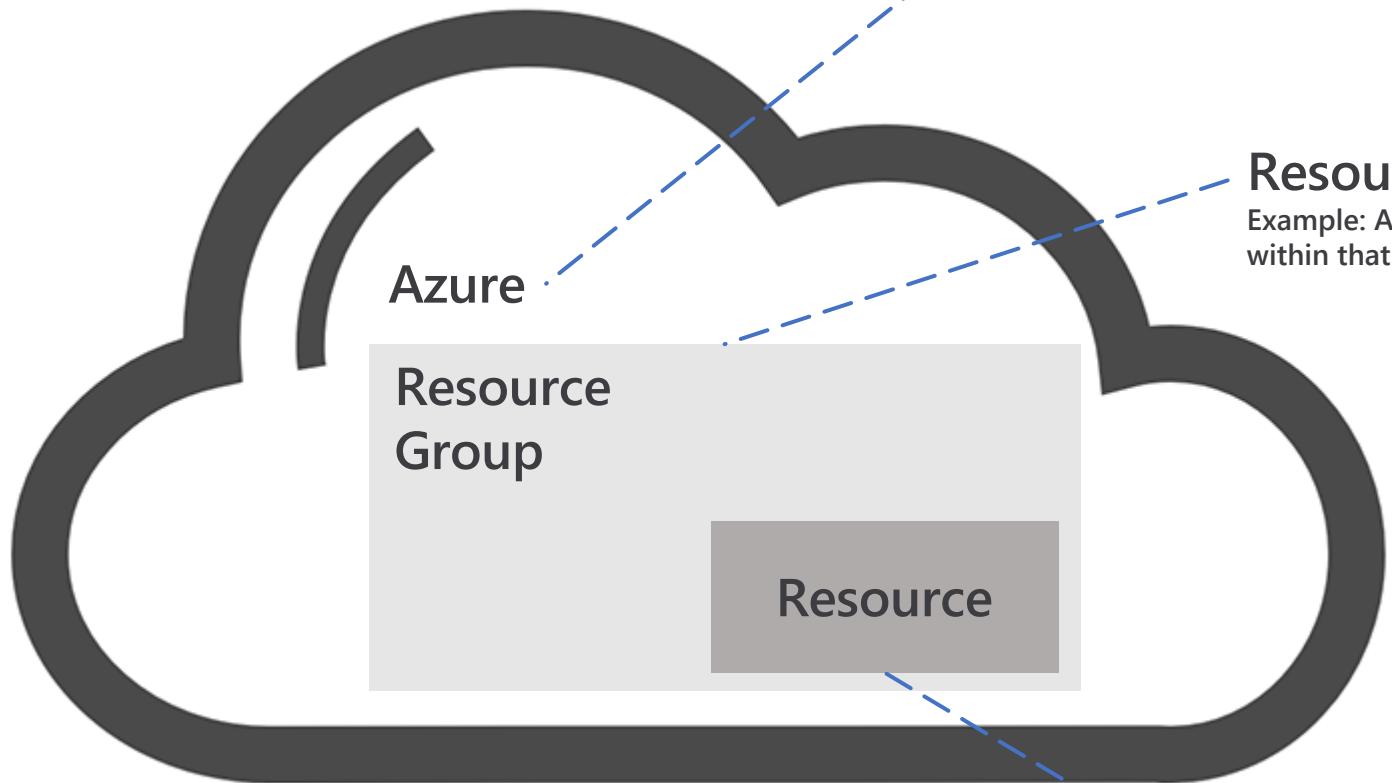


Operationalize at scale with Smart Alerts & Automated Actions



Create visualizations with Azure Dashboards & Workbooks





## Global: Unique across all of Azure

Example: Names of PaaS resources with Public IP endpoints must be unique across all of Azure, because that name is the initial default public DNS name.

## Resource Group: Unique within the resource group

Example: All virtual networks in a resource group must have a unique name for routing within that resource group.

## Resource Attribute: Unique within the parent resource

Example: All subnets within a virtual network must have unique names to avoid segment overlap.

# Infrastructure as a Service



Legacy applications,  
no change

Scale out

Efficiency and speed

Flexibility

---

Lift and shift

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Elasticity

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Improved  
DevOps

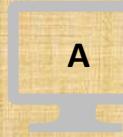
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Managed Service

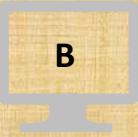
# Compute Options for all Types of Apps



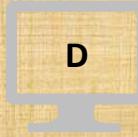
Entry level



Burstable



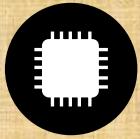
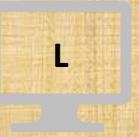
General Purpose



Compute Intensive



Storage Optimized



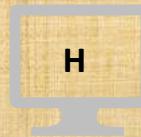
Memory Optimized



Graphics Intensive



High Performance Computing



Purpose-built SAP HANA

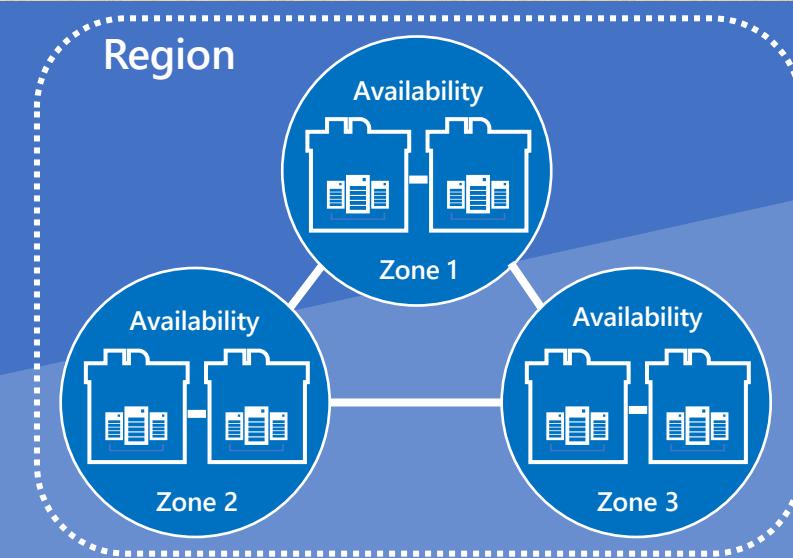
# Azure protection options for all scenarios

Introducing Availability Zones, protecting from datacenter level failures



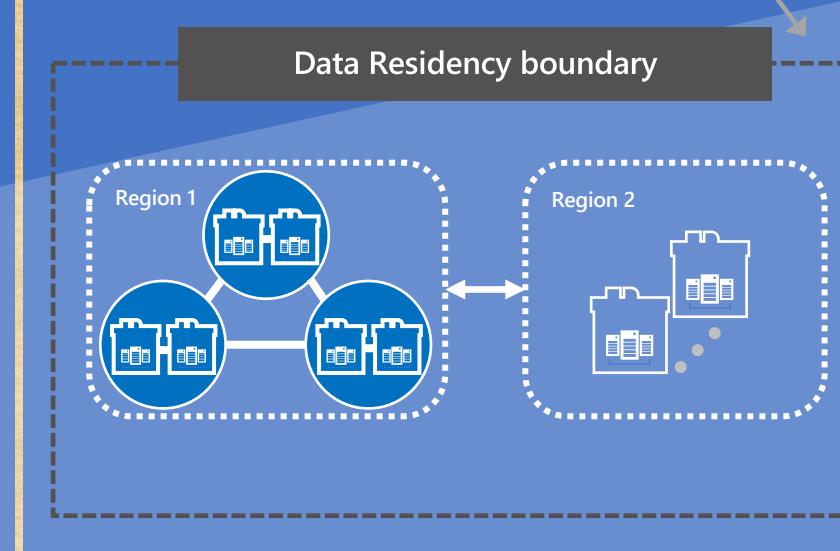
## Availability Sets

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

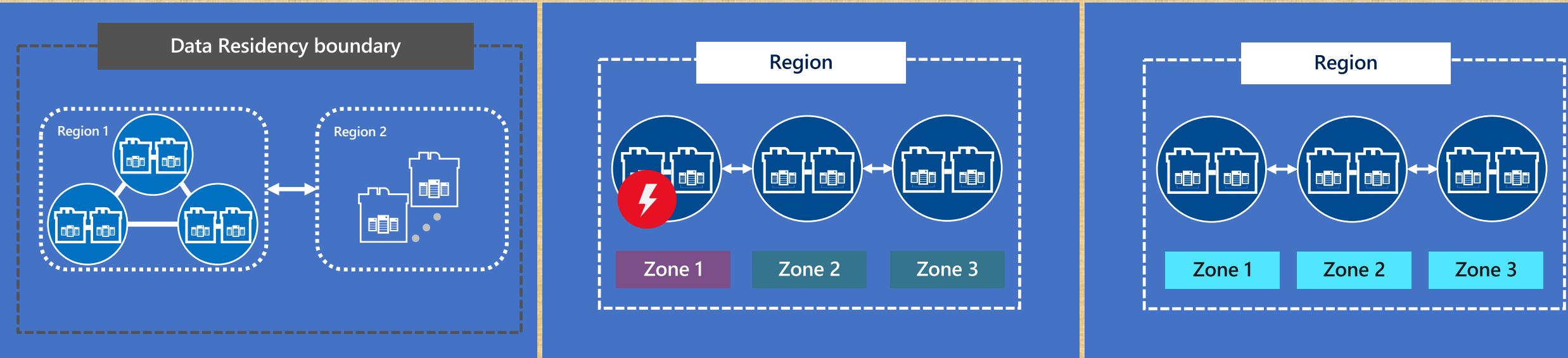


## Region Pairs

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

# Availability Zones

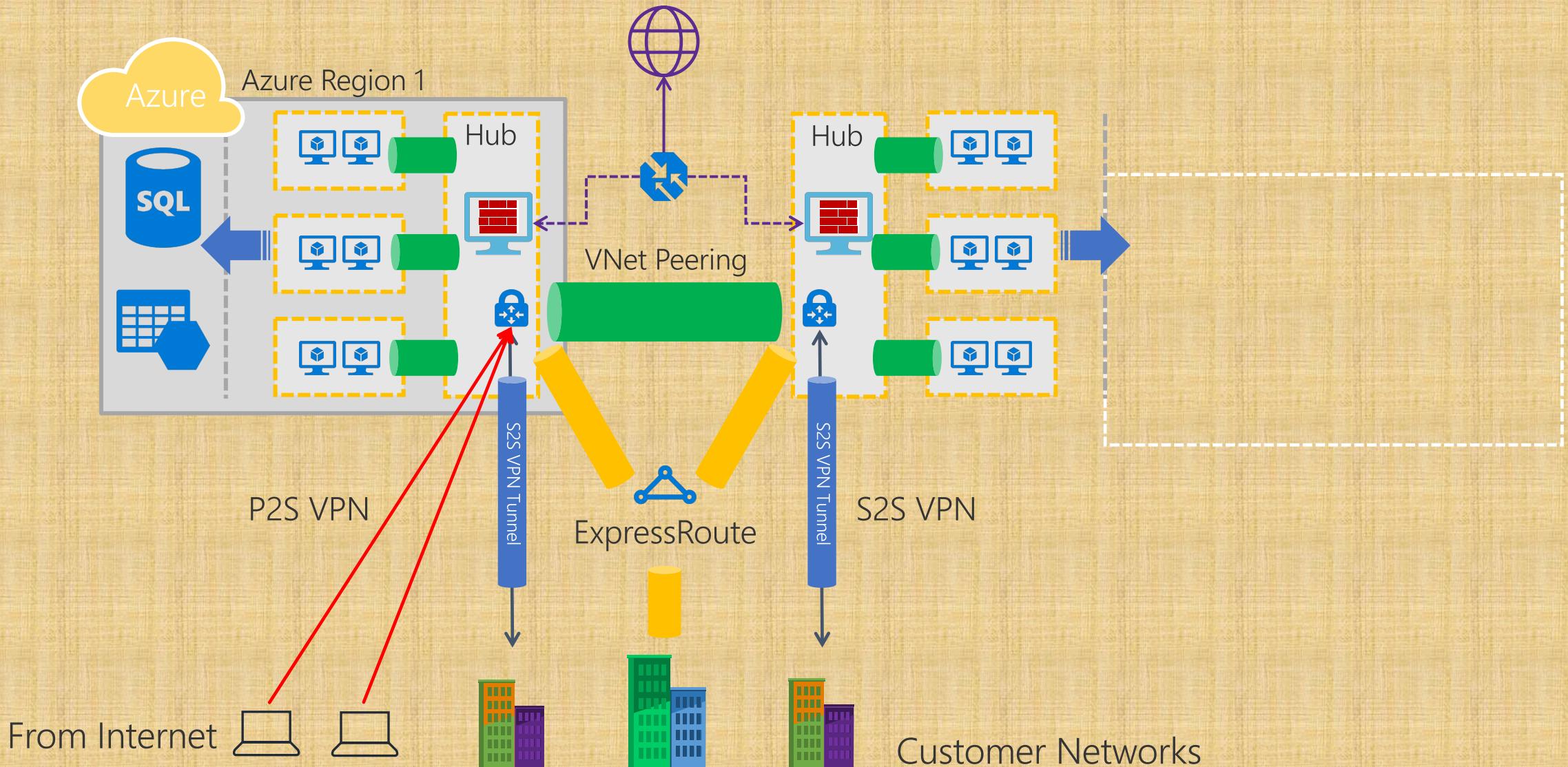
Part of Azure's native HA/DR solutions, providing protection from datacenter failure



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

# Azure Routing



# Cloud Services - ARM

New Azure Resource Manager (ARM)—based deployment model

Increase availability with built-in regional resiliency.

Feature parity with Azure Cloud Services deployed using Azure Service Manager (ASM).

Access ARM capabilities such as role-based access and control (RBAC), tags, policy, and deployment templates.

[Documentation](#)

Preview



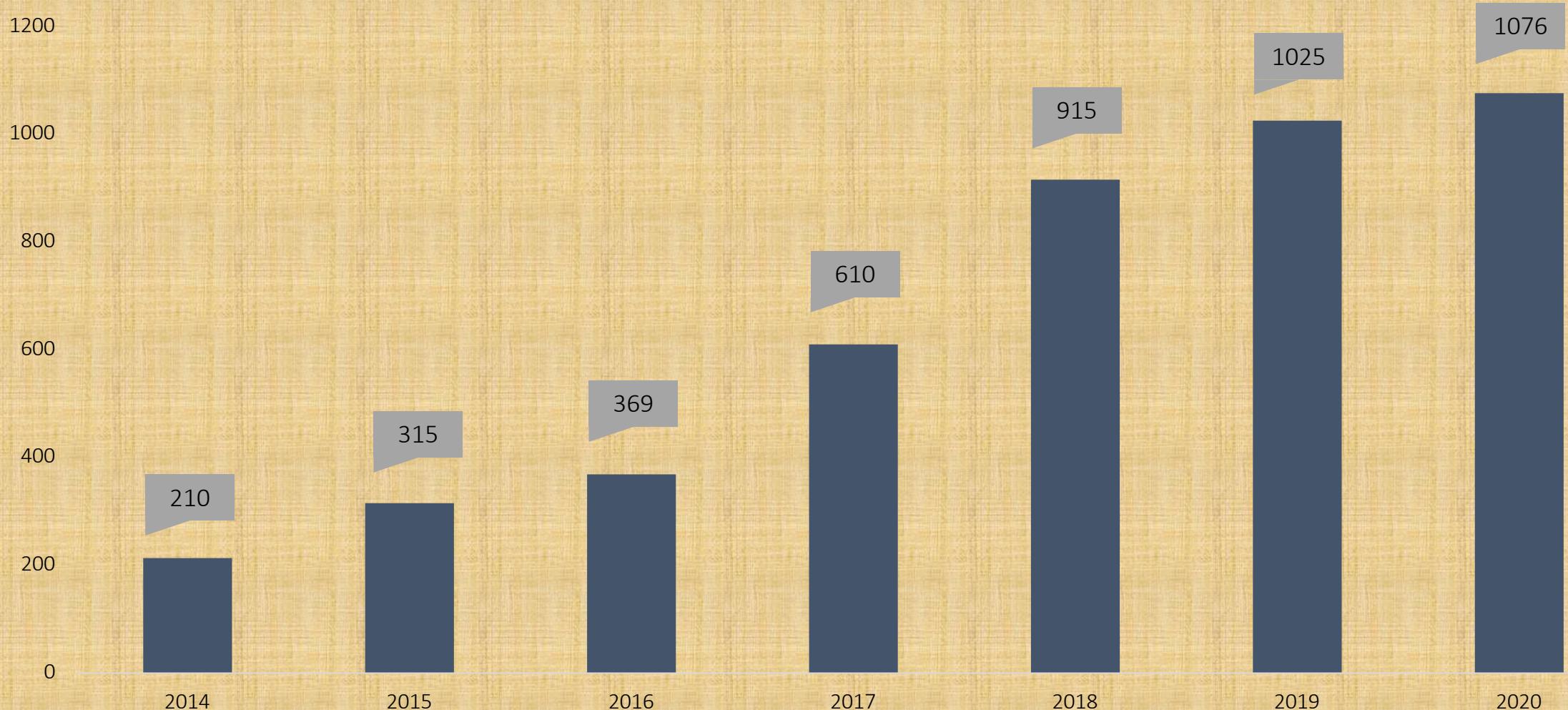
Cloud Services (classic)—ASM



Cloud Services (extended support)—ARM

Build regionally resilient cloud services using Azure Resource Manager

# Pace of innovation | capabilities



# Azure retirements

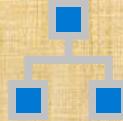
- Azure is 12 years old; retirements are part of the natural lifecycle of any service or feature
- Retirements do not mean that all Azure customers are impacted
- Continuous innovation and modernization of Azure services helps unlock new and better opportunities
- It is our commitment to provide customers as much time and information, to plan thoughtfully

Our customer commitment	How we communicate	Where we communicate	When we communicate
<p>Minimum 12-month notice to remove any material feature or functionality, or discontinue a service*</p> <p>Minimum 90-day notice to retire anything else</p> <p><a href="#">Modern Lifecycle Policy</a></p> <p><a href="#">Online Services Terms</a></p> <p>*excluding Previews</p>	<p>Targeted communications directly to active usage Azure subscriptions</p> <p>Viewable by anyone with admin permissions on subscription</p>	<p><b>Authenticated</b></p> <ul style="list-style-type: none"><li>• Health advisory message in <a href="#">Azure Service Health</a>*</li><li>• Direct email to admins</li></ul> <p><b>Unauthenticated</b></p> <ul style="list-style-type: none"><li>• <a href="#">Azure Updates</a> post</li><li>• Banner messages on retiring service pages</li></ul> <p><small>*Set up a <a href="#">Service Health Alert</a> to receive an email, text, vmail, as well</small></p>	<p>Initial retirement notification per policy</p> <p>Reminder messages at T-6 months, T-3 months, T-1 month, then weekly until T-0</p> <p>Will send an update notification if any plans significantly change</p>

# Azure AD · Core Reliability Principles



Highly Redundant



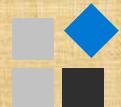
Safe Deployment



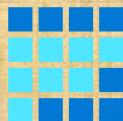
No single points of failure



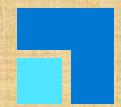
Modern Verification



Multiple levels of isolation



Cell-Based Architecture



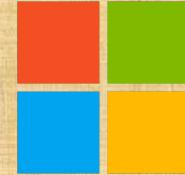
Elastic scalability



Independent backup  
authentication service

# Azure products

AI + Machine Learning	Media
Analytics	Hybrid
Blockchain	Migration
Compute	Mixed Reality
Containers	Mobile
Databases	Networking
Developer Tools	Security
DevOps	Storage
Identity	Web
Integration	Windows Virtual Desktop
Internet of Things	Microsoft Game <a href="#">Development</a>
Management	



# Microsoft Azure

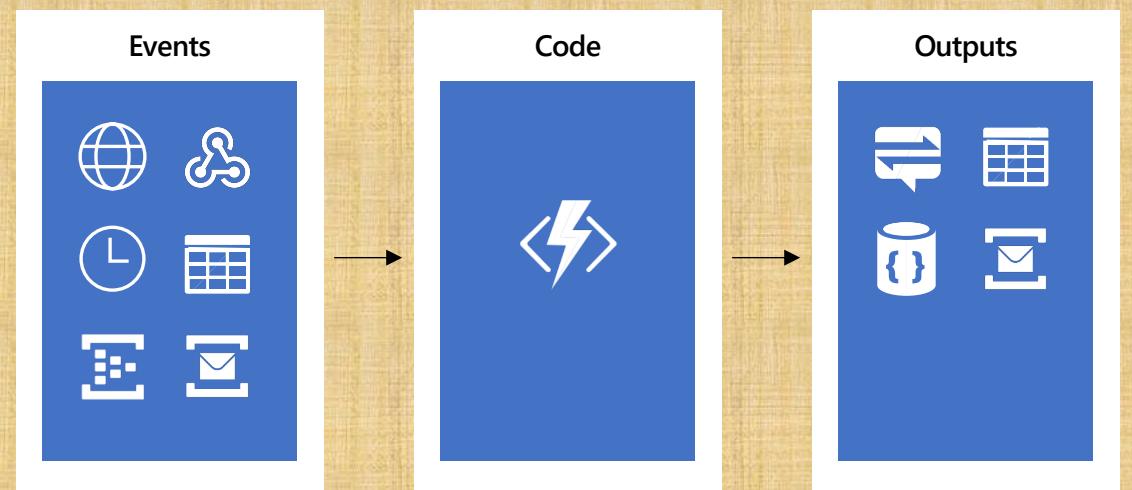
With over 6,000 services, Azure has a wide range of flexible offerings. Azure draws on Microsoft's vast data capacity to provide software, platform, and infrastructure as a service.

# Azure Functions

Python, PowerShell users can now create serverless workflows to orchestrate complex data processing and data science workloads in Azure Functions.

[Learn more.](#)

Check product availability [in your region](#).



# Azure Spot Virtual Machines

- Public Preview
- March 2021



Improved runtime and ease of use



## Simulate Evictions

Using REST API

Available now in Preview

[Access the new capabilities via the Azure portal.](#)  
[Documentation.](#)



## Try/Restore

Automatically try and restore  
evicted VMs

Available now in Preview

# Virtual Machine Scale Sets



Simplified management and scalability



Increased application resiliency



Greater operational agility

Read the [documentation](#)

Visit the [website](#)

Preview

Flexible orchestration mode

Dashboard > Virtual machine scale sets >

### Create a virtual machine scale set

Project details

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription \*

Resource group \*  [Create new](#)

Scale set details

Virtual machine scale set name \*

Region \*

Availability zone [\(i\)](#)

Orchestration

A scale set has a "scale set model" that defines the attributes of virtual machine instances (size, number of data disks, etc). As the number of instances in the scale set changes, new instances are added based on the scale set model.

[Learn more about the scale set model](#)

Orchestration mode \* [\(i\)](#)

**Uniform:** optimized for large scale stateless workloads with identical instances

**Flexible (preview):** achieve high availability at scale with identical or multiple virtual machine types

[Review + create](#) [< Previous](#) [Next : Disks >](#)

# Azure Disk Storage

- Upcoming (March – June 2021)
- ZRS support for Azure Managed disks (GA)
- Performance tiers w/o downtime (GA)
- Cross-region snapshot copy (preview/GA)
- Disk attach/detach latency improvements (preview/GA)
- Ultra Disk region expansion (ongoing) (GA)
- [Learn more about Azure Disk Storage](#)
- [Azure Disk Documentation](#)
- Stay up to date with the latest releases on the [Azure Blog](#)



**Standard HDD**  
Standard HDDs 2,000 IOPS and 500 MBps



**Premium SSD**  
Premium SSDs 20,000 IOPS and 900 MBps



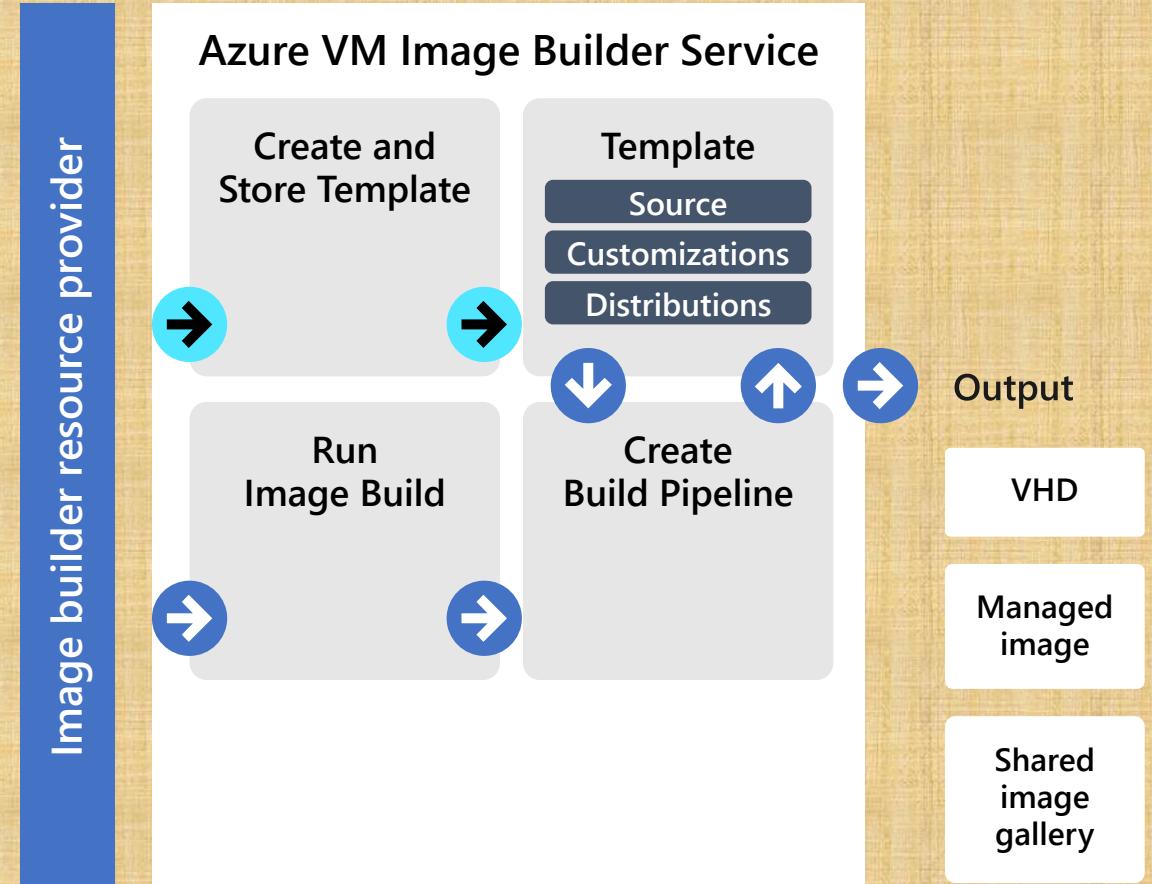
**Standard SSD**  
Standard SSDs 6,000 IOPS and 750 MBps



**Ultra Disk**  
Ultra Disk 160,000\* IOPS and 2000 MBps

# Azure Image Builder Service

- Images creation for multiple scenarios:
- Create Linux, Windows Server and Client images for Azure, and Azure Stack.
- Use existing image security configurations to build compliant images.
- Patch existing custom images, using Linux commands or Windows Update
- Support for multiple Linux distros, Windows Virtual Desktop environments, Azure Market Place images etc.
- Build images for specialized VM sizes, such as creating images for GPU VM sizes.
- Full Image Management:
- In combination with the Azure Shared Image Gallery, you now have a complete image management system, with image patching, versioning, regional replication, and role-based access control.
- [Documentation](#)
- [Private Preview announcement and sign up page](#)



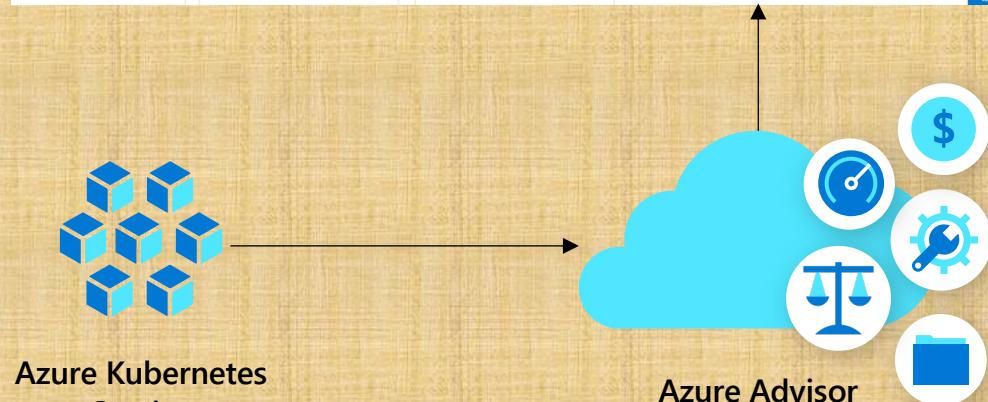
# Azure Kubernetes Service (AKS)

## Built-in best practices

- Kubernetes Cloud adoption framework
- Consolidation and sharing of best practices about Kubernetes adoption from Microsoft employees, partners, and customers ([details](#)).
- Learn new skills and discover the power of Azure Kubernetes Service and other Microsoft products with step-by-step guidance.
- Explore cost optimization strategies to use on Azure for your cloud-native application development process by using Azure Kubernetes Service (AKS) ([details](#)).
- Cloud native applications on Azure

The screenshot shows the Microsoft Azure Advisor interface. It displays a grid of cards for different categories: High Availability, Security, Performance, Operational Excellence, and Cost. Each card shows the number of recommendations, the count of impacted resources, and a bar chart indicating the impact level (High, Medium, Low). For example, the Cost category shows 24,266 USD savings/yr\* and 52 impacted resources.

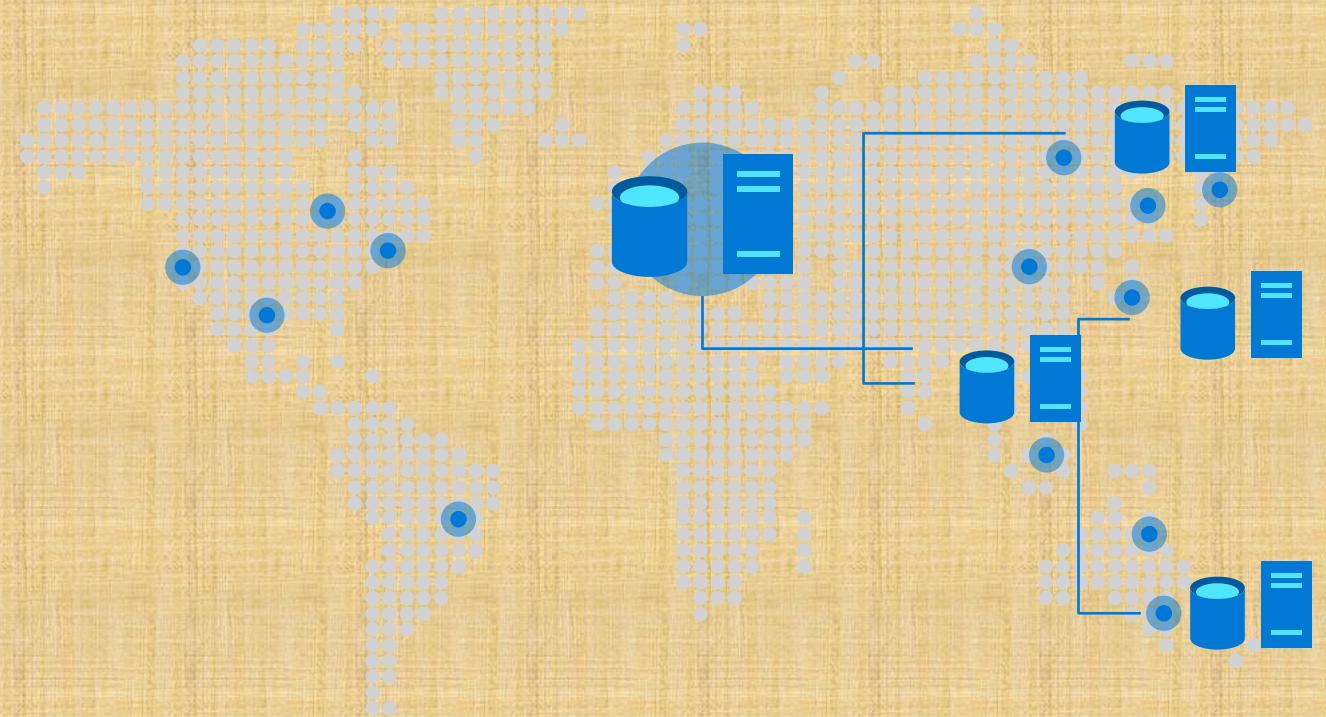
Category	Recommendations	Impacted Resources
High Availability	8	272
Security	40	272
Performance	3	3
Operational Excellence	1	1
Cost	5	52



# Azure SQL Database

## Geo-replication for Hyperscale

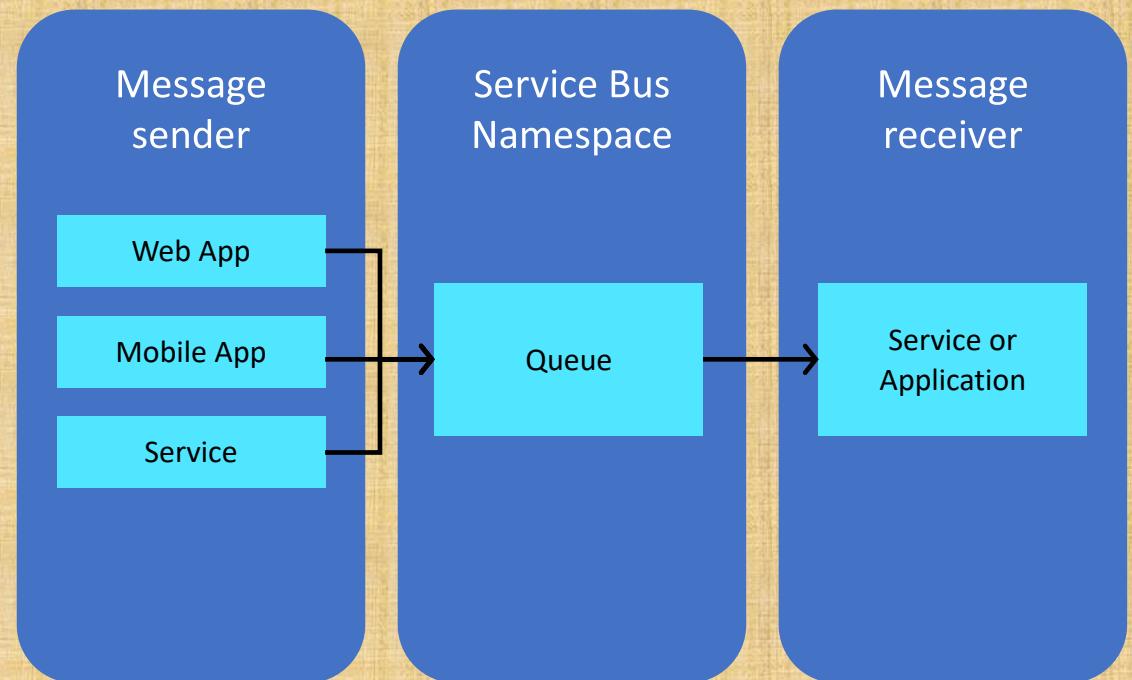
- Perform quick disaster recover of your Hyperscale databases
- Create up to four readable secondaries on Hyperscale in different regions.
- Use geo-replication load balance read-only workloads and provide access to data in multiple regions.
- Store full backups for up to 10 years.
- Easily restore your backups as a new database.
- Check product availability in your region.



Up to 4 secondaries

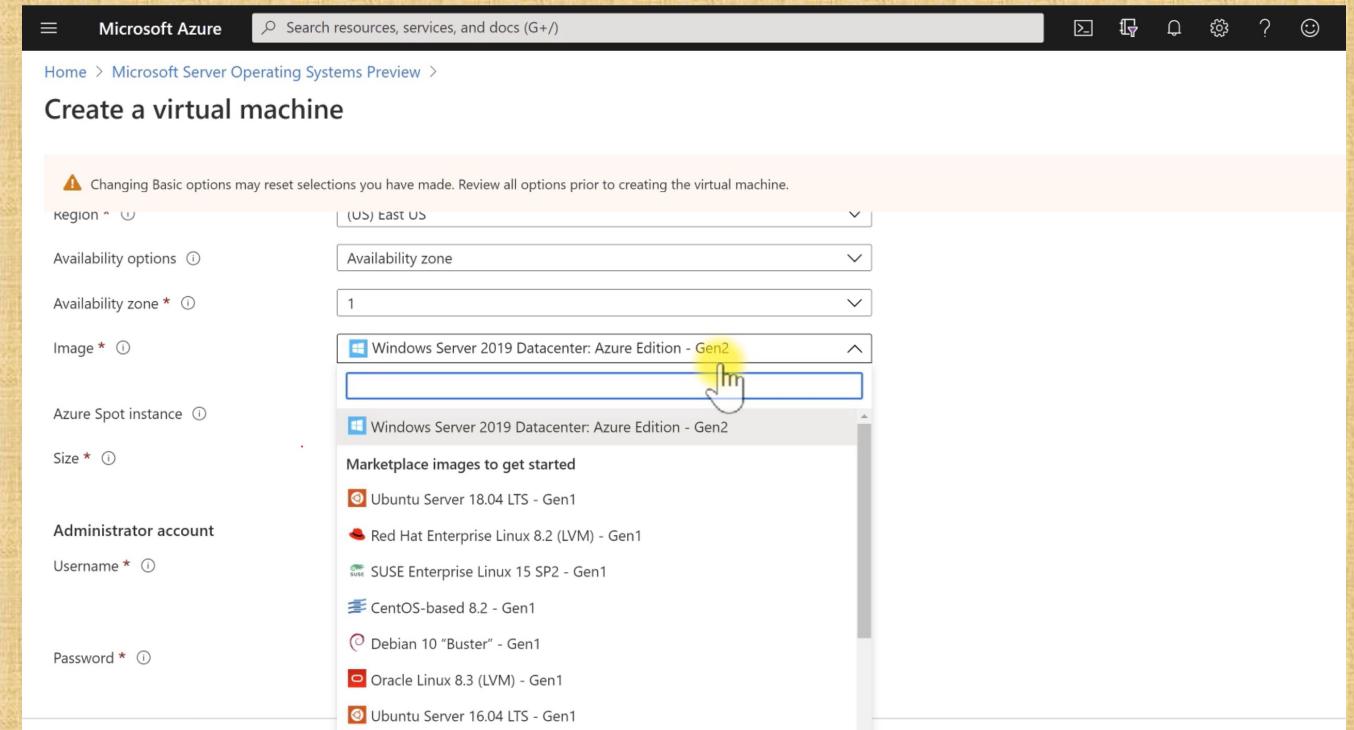
# Service Bus

- Reliable cloud messaging as a service (MaaS) and simple hybrid integration
- Java Message Service (JMS) support—Public Preview—ETA Q1 2021.
- Customers can now lift and shift Java workloads from on-premises or IaaS environments to leverage the best of Azure's PaaS offerings.
- Support for large messages—Public Preview—ETA Q1 2021.
- Service Bus will support message sizes up to 100 MB.
- [Learn more](#)



# Azure Automanage for Windows Server & Linux

- Eliminate downtime for apps and services running on Windows Server
- Deploy security patches in seconds without reboot
- Help protect against critical threats
- Automatic enrollment for ease of service discoverability
- Support for all major Linux distributions—CentOS, RHEL, Ubuntu, and SLES
- Key services include backup, monitoring, update management, security center, and more!
- [Learn more](#)



# Azure Front Door Standard & Premium

Secure Cloud CDN with Intelligent Threat Protection.

## Intelligent Security Protection

- WAF, DDoS and Bot Manager protection
- Integrated Private Link service to access resources securely
- Powered by Microsoft Threat Intelligence

## Dynamic App Acceleration

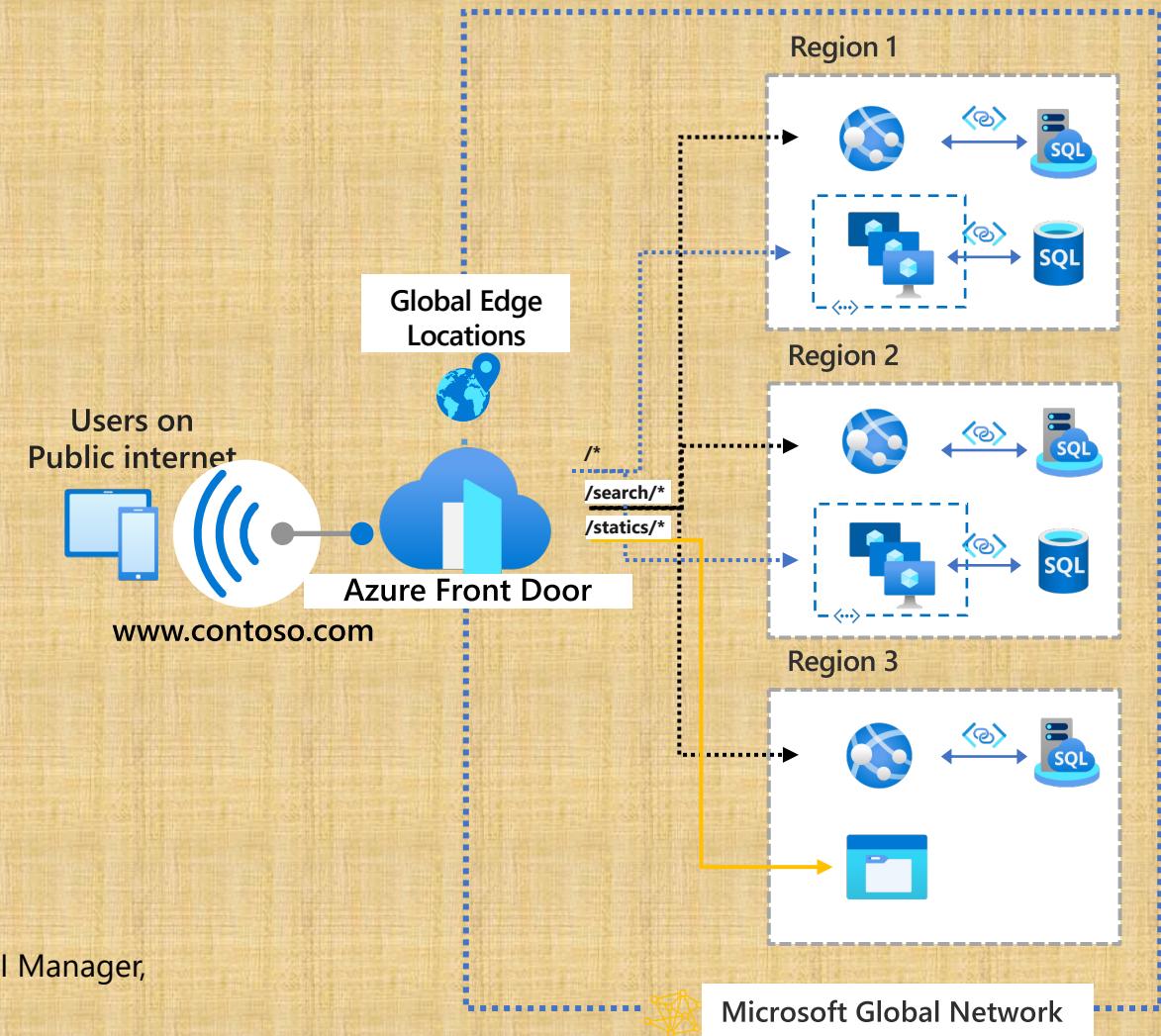
- SSL offload and dynamic app acceleration at the edge
- Instant scalability with global HTTP load balancing and fail over
- Azure-managed domain and TLS cert experience DNS + Key Vault

## Fast Global Content Delivery Network(CDN)

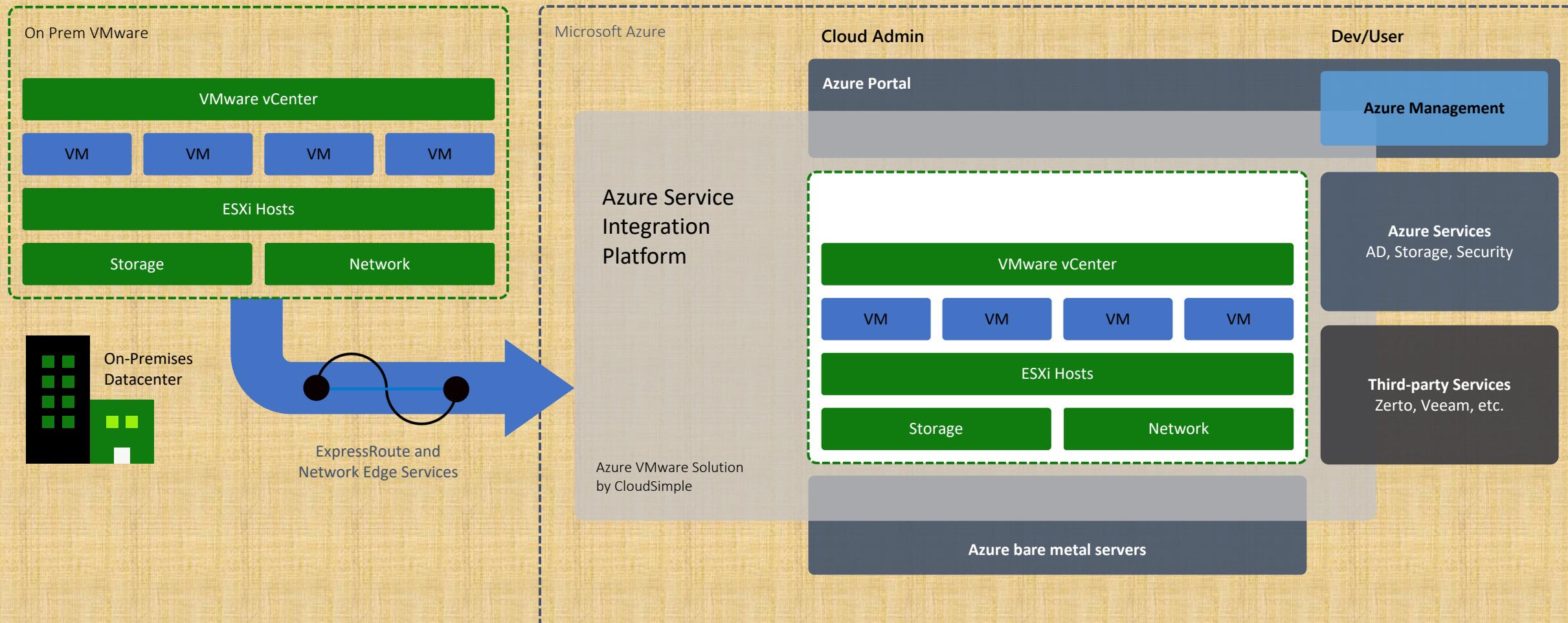
- Built on Microsoft massively-scaled private global network
- Supports static/dynamic content caching, file, OTT and VOD
- Low latency, high thru-put from cloud or on-prem to global users

## Cloud-native and Developer Friendly

- Fully REST API driven to automate and streamline deployment
- Tightly integrated with Azure services including App Service, Storage, API Manager, App Gateway and Azure Sentinel



# Azure VMware Solution by CloudSimple - Components



# Microsoft Azure Sentinel

- Cloud-native SIEM for intelligent security analytics for your entire enterprise
- Limitless cloud speed and scale
- Faster threat protection with AI
- Easy integration with your existing tools
- Streamlined and cost-effective data collection
- [Learn more](#)
- Check product availability [in your region](#)



# Azure Virtual Desktop

- Azure Virtual Desktop is a comprehensive desktop and app virtualization service running on the cloud. It is the only service that delivers simplified management, multi-session Windows 10, optimizations for Office 365 ProPlus, and support for Remote Desktop Services environments. The richest Office 365 experience in virtualized environments including support for Microsoft Teams with audio/video redirection.
- [Learn more](#) and [Get started today](#).



# Azure Files

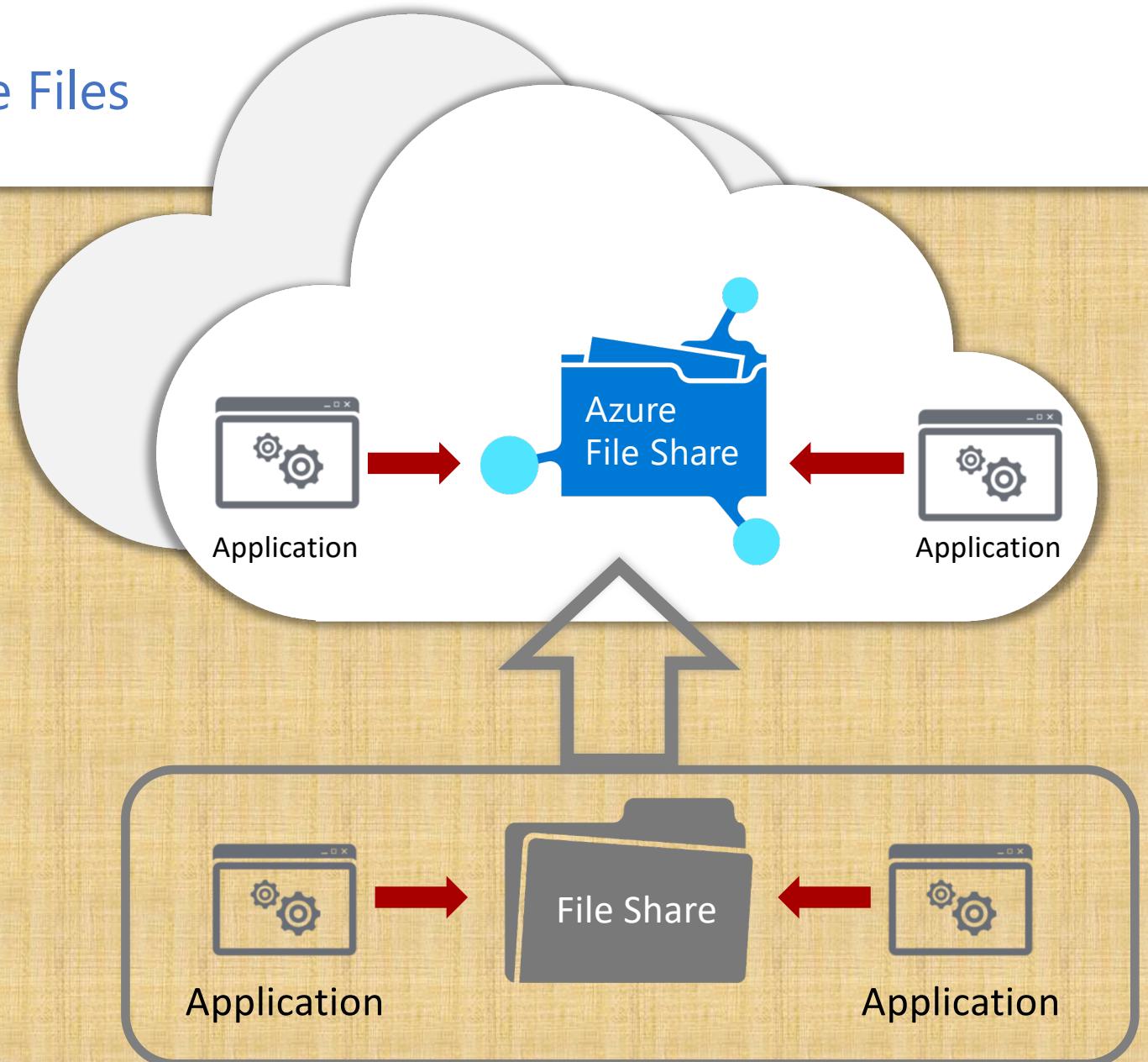
Lift and shift on-prem Apps to Azure Files

Works with Data Box or use Azure File Sync to move data up

Migrate on-premises apps such as SQL FCI, file processing that use file share storage to Azure.

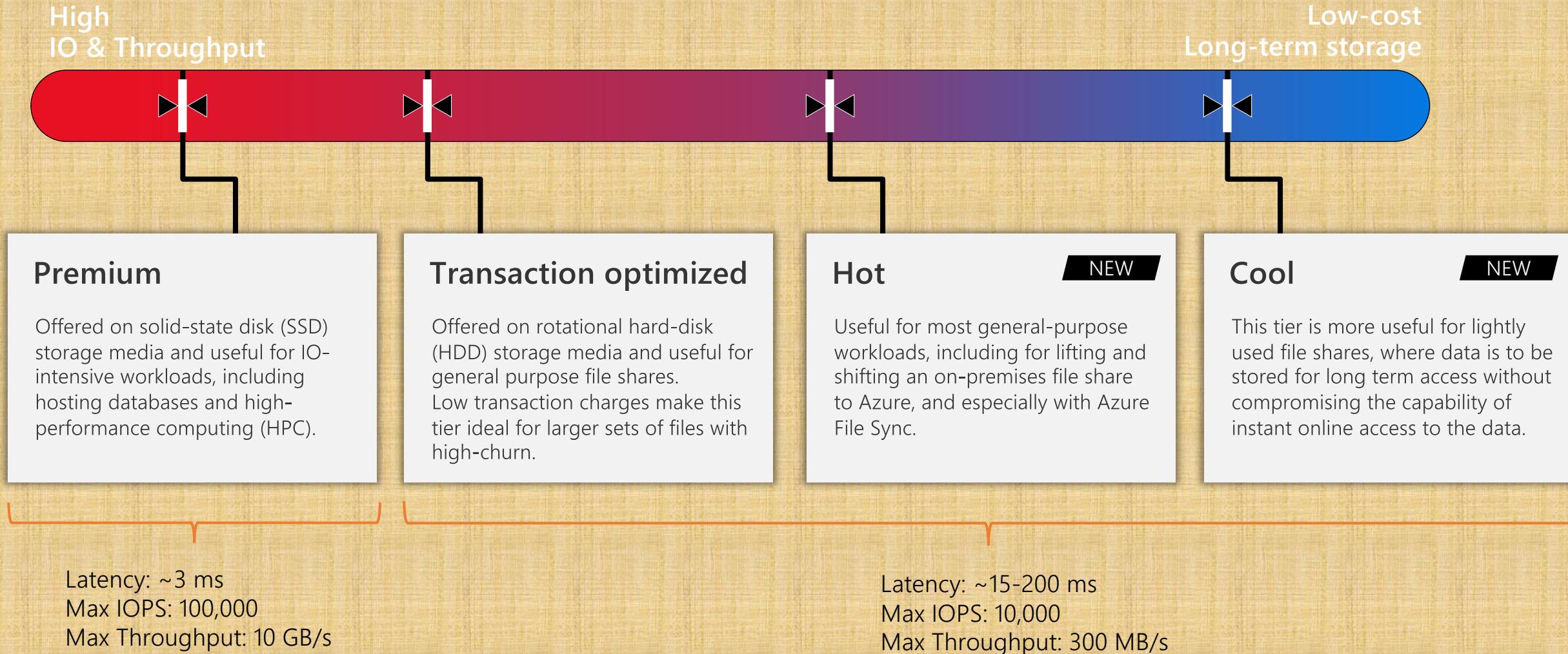
Reuse existing file-based data access layers in your cloud apps.

Zero downtime migration for Windows Servers using Azure File Sync



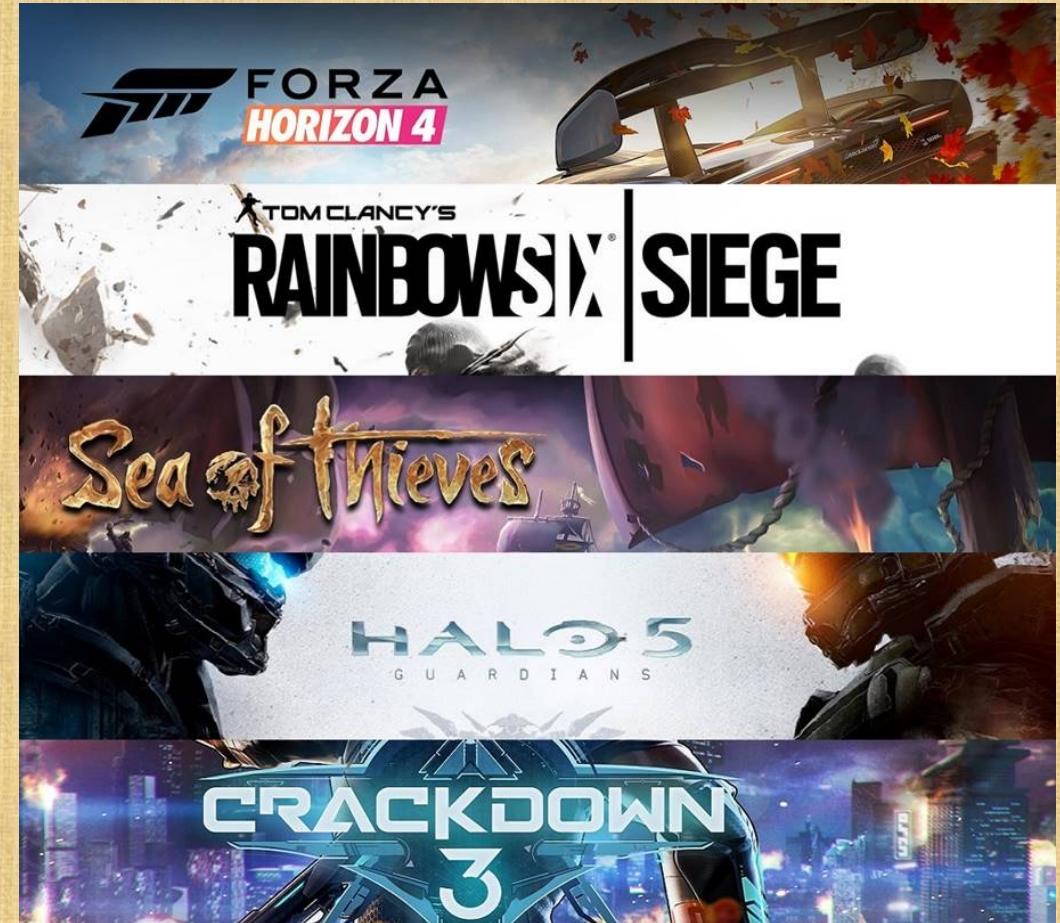
# Azure Files Pricing Structure

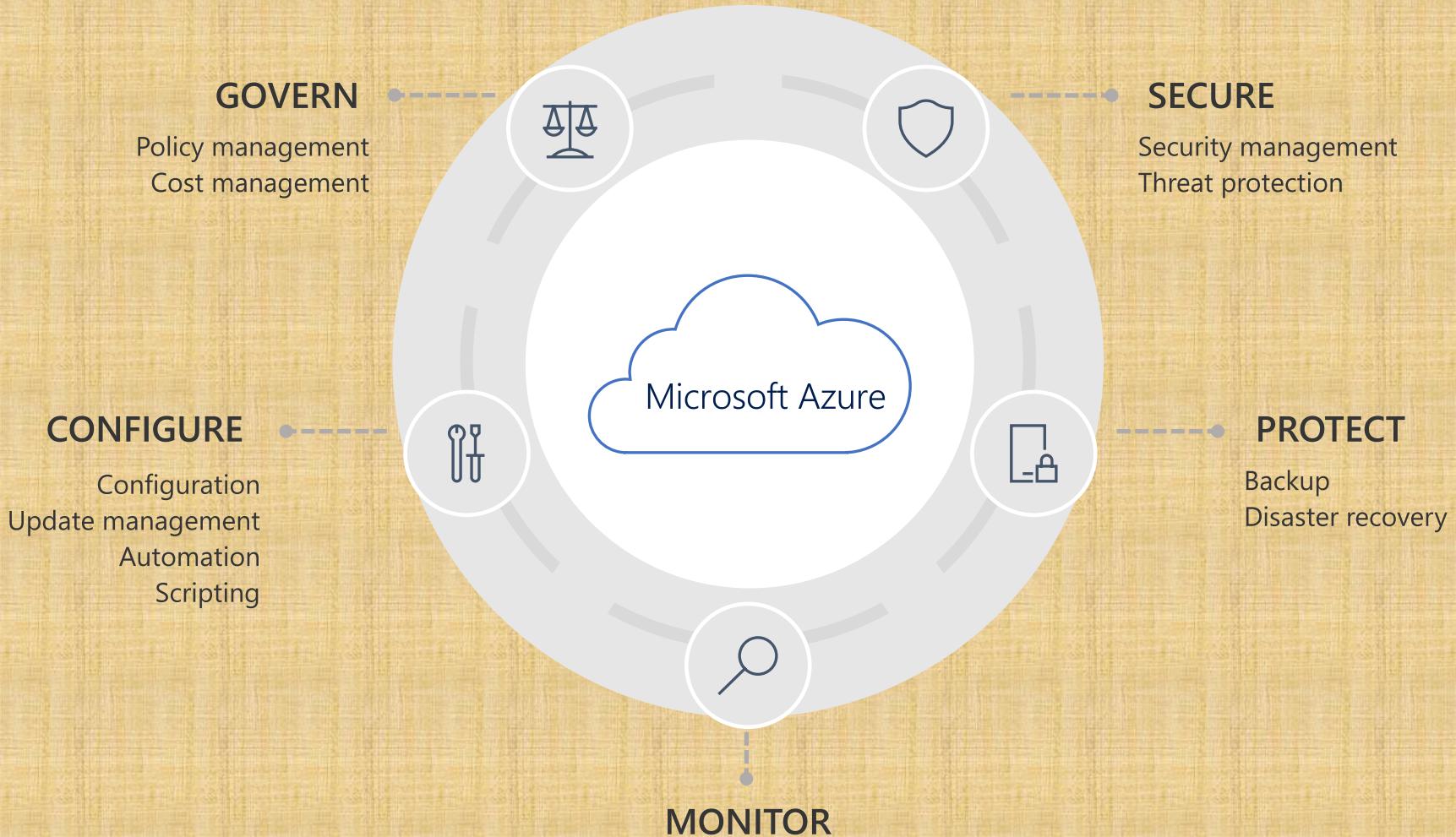
- Choose the best tier for **your workload**



# PlayFab Multiplayer Servers

- Multiplayer Servers  
Dynamically respond to player demand with the ability to easily and efficiently scale custom multiplayer servers. Go from supporting 100 players to 100,000 (and back) in minutes. Handle peaks in demand without impacting the game experience.
- With the proven scale of Xbox and Azure Launch and scale on a global infrastructure, powered by the same multiplayer servers running games like Forza Horizon 4, Rainbow Six Siege, Sea of Thieves, and Halo 5.
- Control costs without sacrificing performance By only paying for Azure resources allocated for gameplay, plus a small pool of standing-by machines. Developers have choice to use either Linux or Windows to containerize their game server code.
- [Documentation](#) | [Product page](#) | [Read the blog](#)
- Check product availability [in your region](#)





## Additional Resources

- [What is Azure?](#)
- [Get started with Azure](#)
- [Get your Azure free account](#)
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Thank You