



# Introduction to Microsoft Azure

Steve Deming  
Sr. Partner Technology Strategist  
Microsoft Corporation

David J. Rosenthal  
VP & GM, Digital Business  
Razor Technology



# RAZOR TECHNOLOGY

# Digital Transformation is Under Way

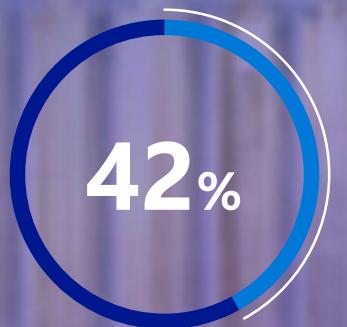
**% of organizations**



Facing Significant  
Industry  
Disruption



Requiring Significant  
Operations and IT  
Transformation



Planning Major Digital  
Transformation for  
Next Year

## DIGITAL TRANSFORMATION LEADERS

**49%** in Business Roles

**45%** in IT Roles

## DIGITAL TRANSFORMATION PROJECT ORIENTATION

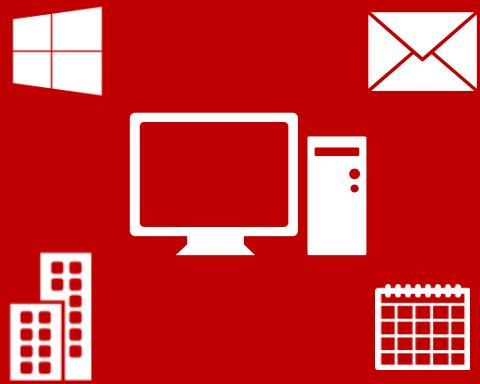
**26%** Run the Business

**46%** Grow the Business

**28%** Transform the Business

# We are in a new era of computing...

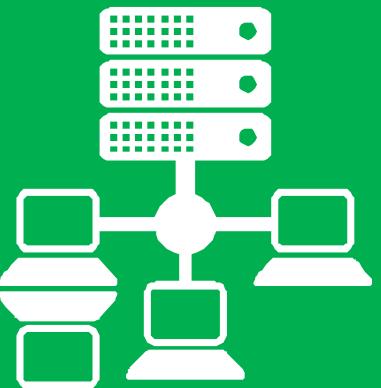
## PC Era



A PC on every desktop

## Internet Era

Connecting servers, PCs, and networks



## Cloud Era



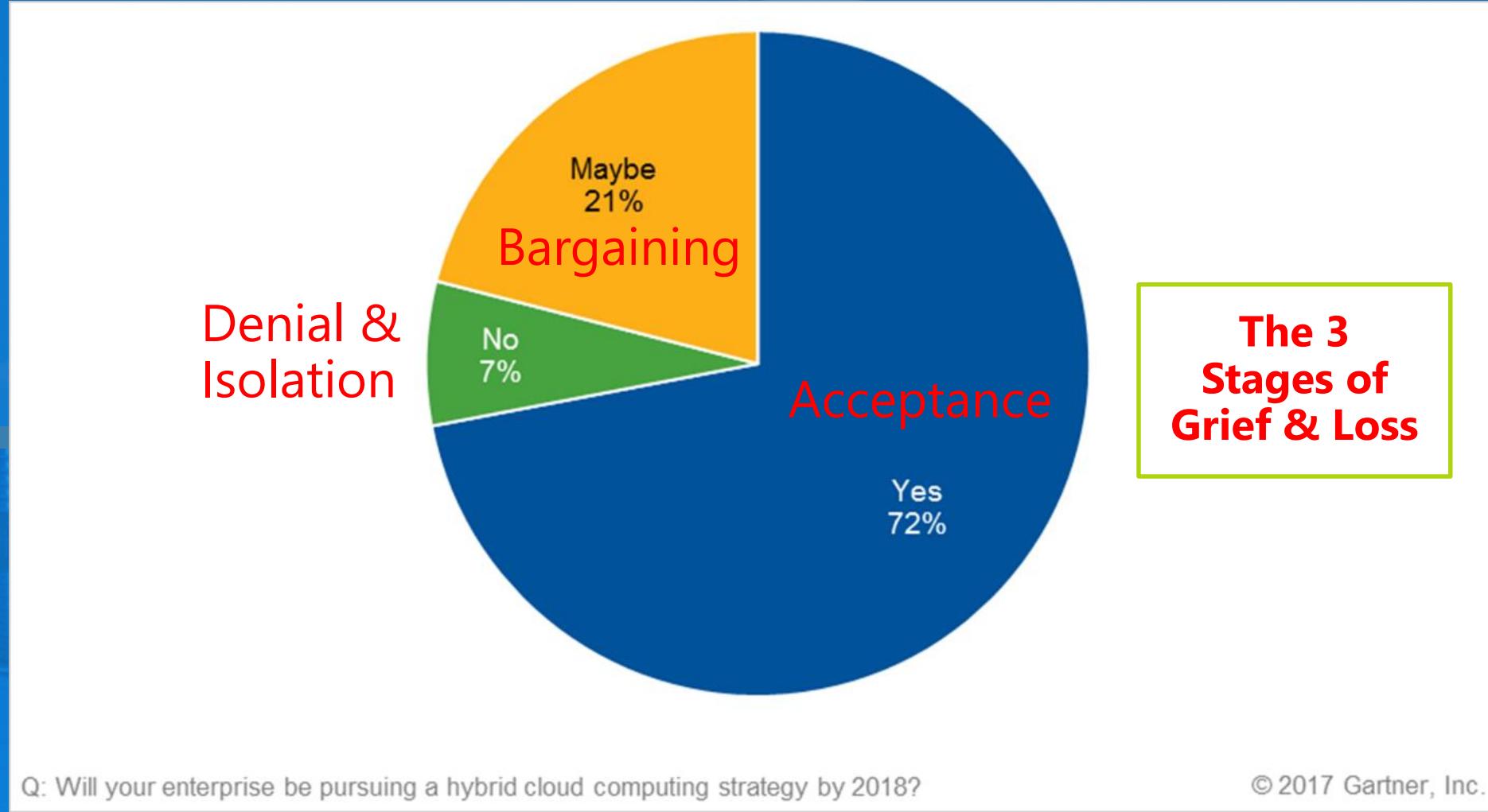
On-demand productivity and hybrid flexibility

# Cloud Computing

*"Cloud computing refers to the on-demand provision of computational resources (data, software) via a computer network, rather than from a local computer."*

Source: Wikipedia

# What Gartner Says



© 2017 Gartner, Inc.

<https://www.gartner.com/doc/reprints?id=1-4J25QC3&ct=171023&st=sb>

# Eight Questions You Should Ask

Who has access to my data?

Are they certified to operate in a compliant environment?

Where is my data stored?

How is my data isolated?

What happens if there is a problem?

What is the response to a legal request?

What is the vendor's history?

What is the product roadmap?

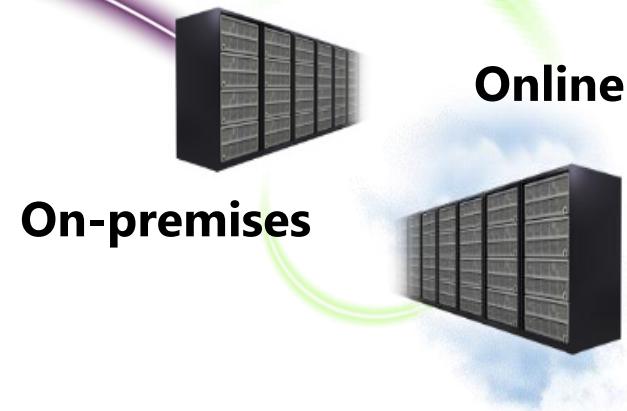
Source: Gartner

# Is the Cloud for Everyone?

**Choose Your Device  
(BYOD)**



**The cloud on  
your terms**



Unified  
Communications

Business  
Intelligence

Content  
Management

Collaboration

Search



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# Your World ...

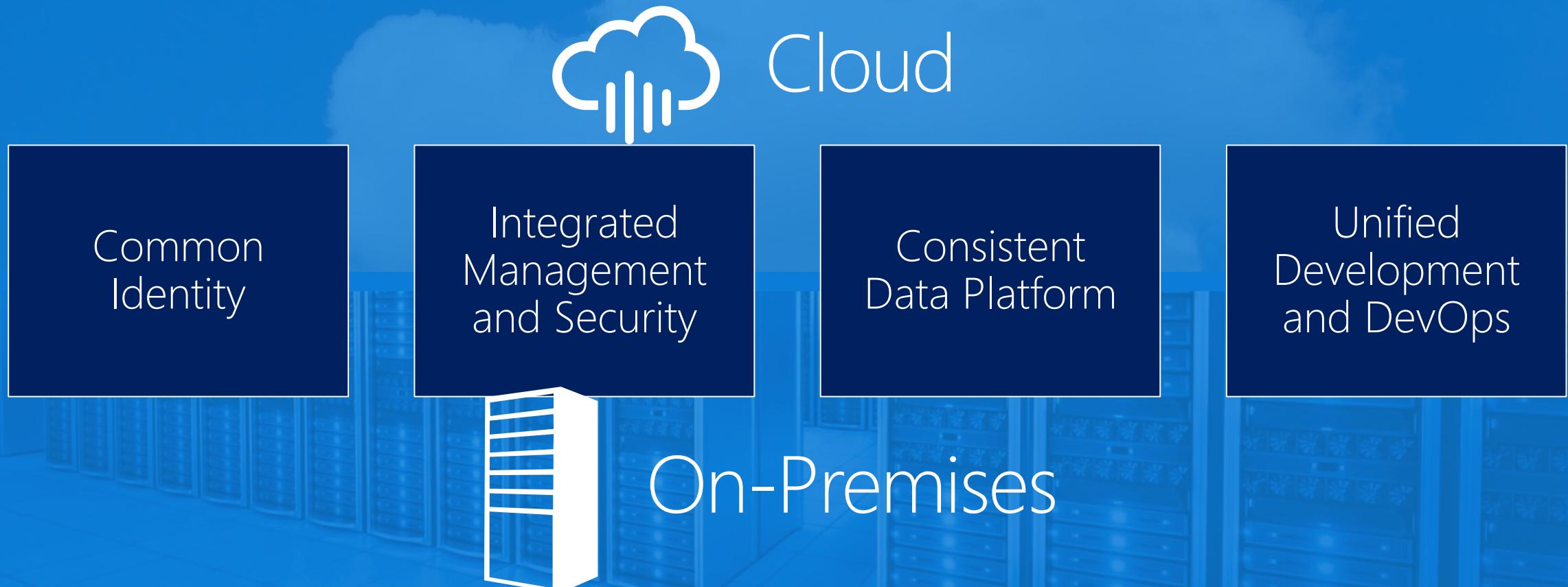


Cloud

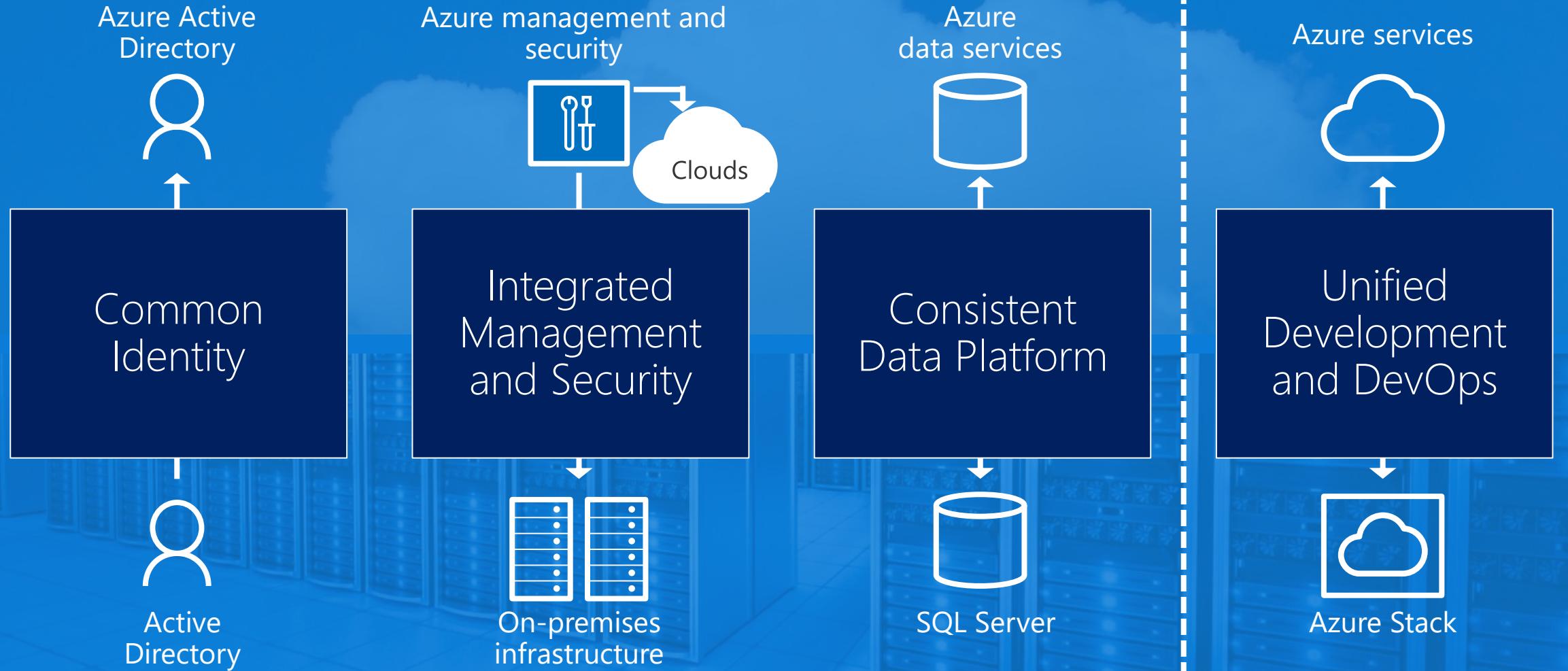


On-Premises

# Hybrid Cloud requires consistency

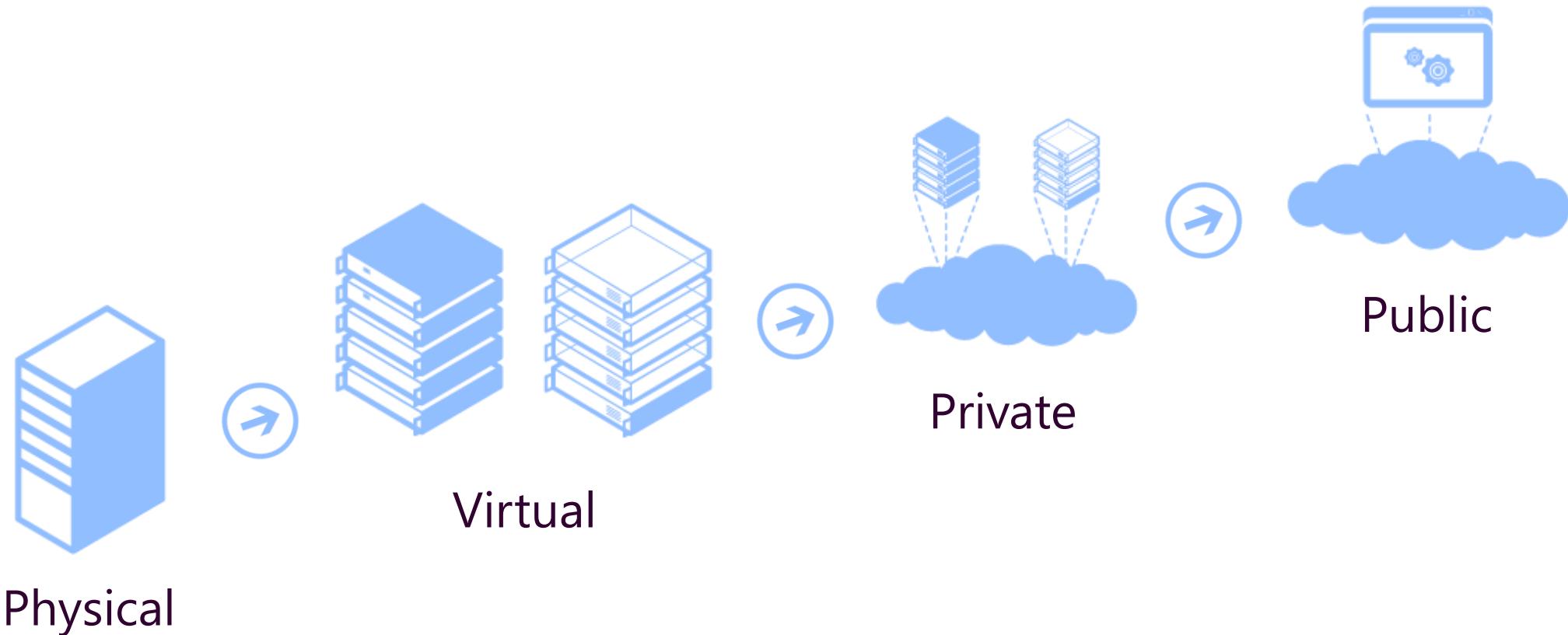


# Microsoft Azure: Only consistent hybrid cloud

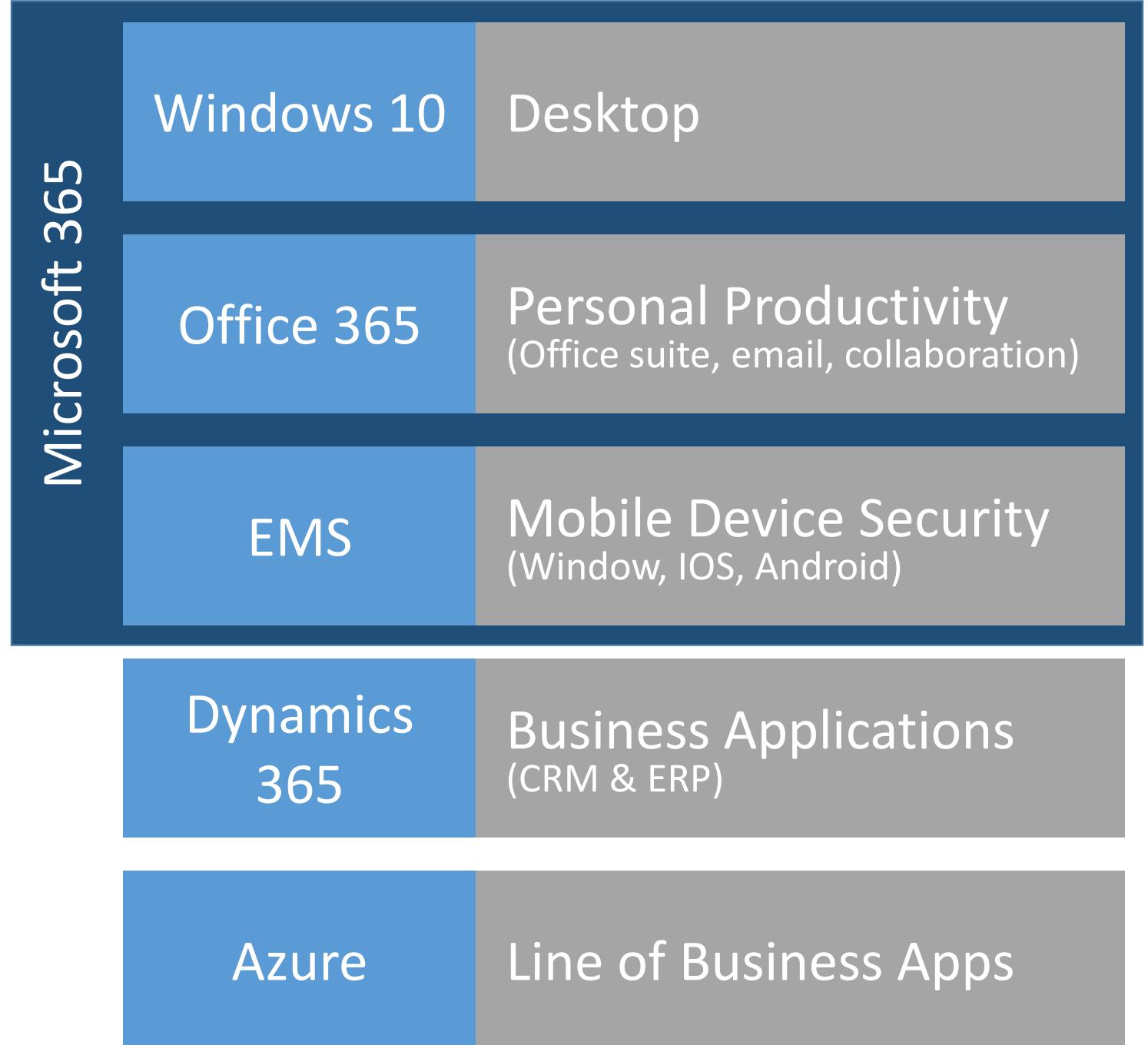


# Cloud on your Terms

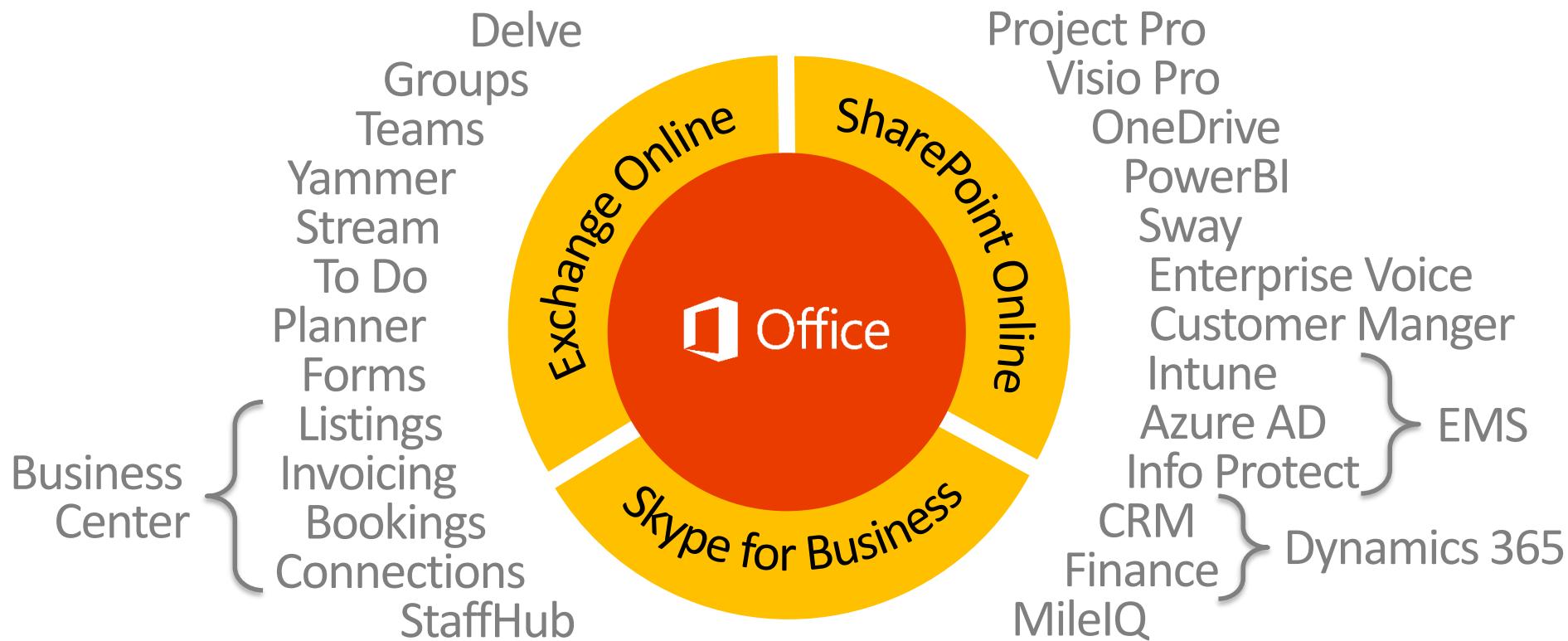
Evolution toward highly virtual, and beyond to cloud



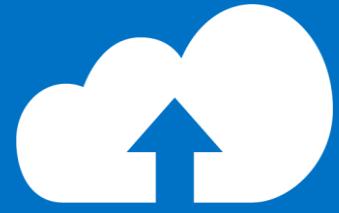
# Modern Productivity



# The Office 365 Ecosystem



# Beyond Office 365



**“IaaS”**

infrastructure as a service

move to it

line of business



**“PaaS”**

platform as a service

build on it



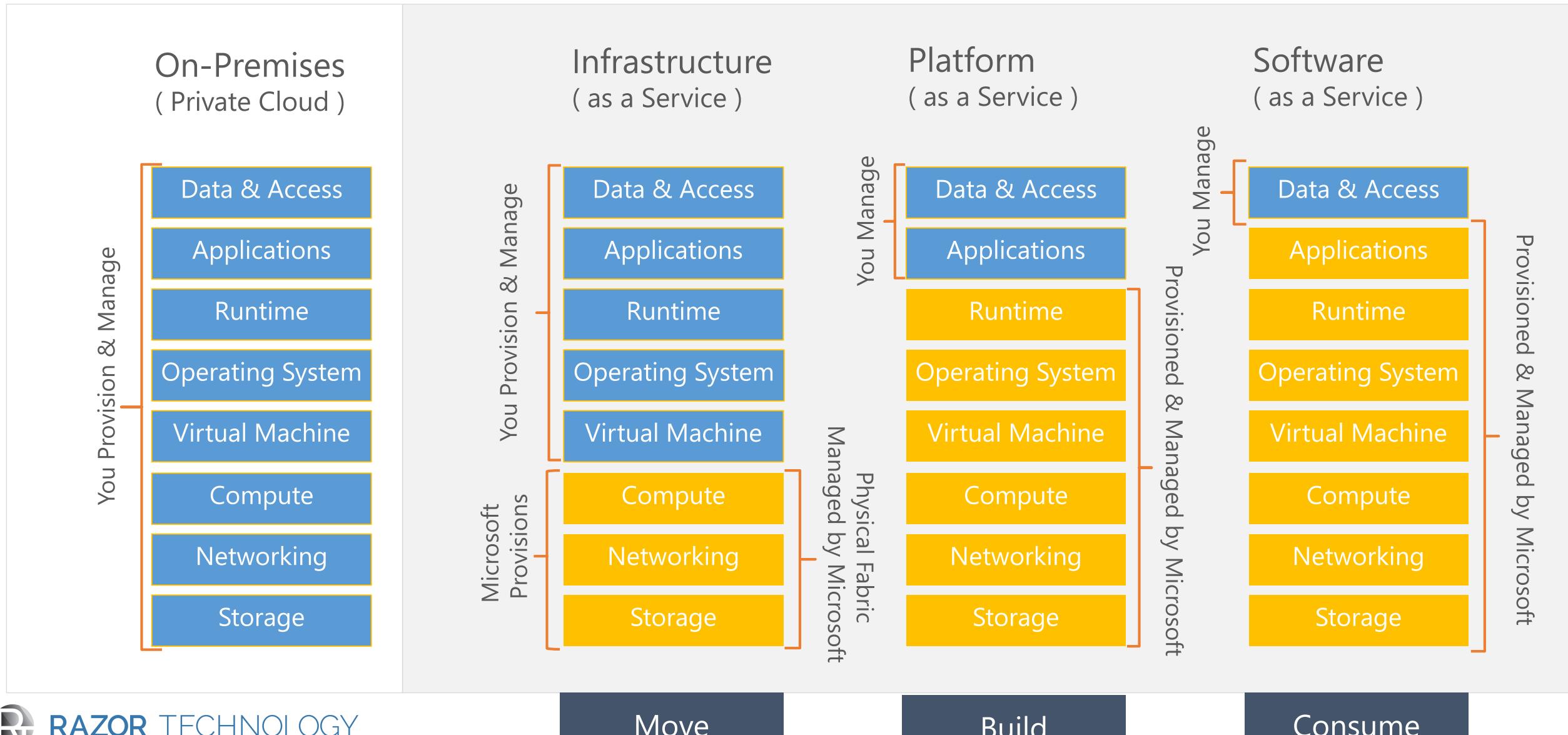
**“SaaS”**

software as a service

consume it

core

# Cloud Computing Models



# Microsoft Azure

## What is it?



# The Microsoft Azure Platform is...

A growing collection of integrated cloud services, *hosted in a hyperscale infrastructure*, which include...

- Analytics
- Computing
- Hybrid
- Database
- Archiving
- App Dev.
- Mobile
- Networking
- Storage
- Web

*...for moving faster, achieving more, and saving money.*





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50 AZURE REGIONS

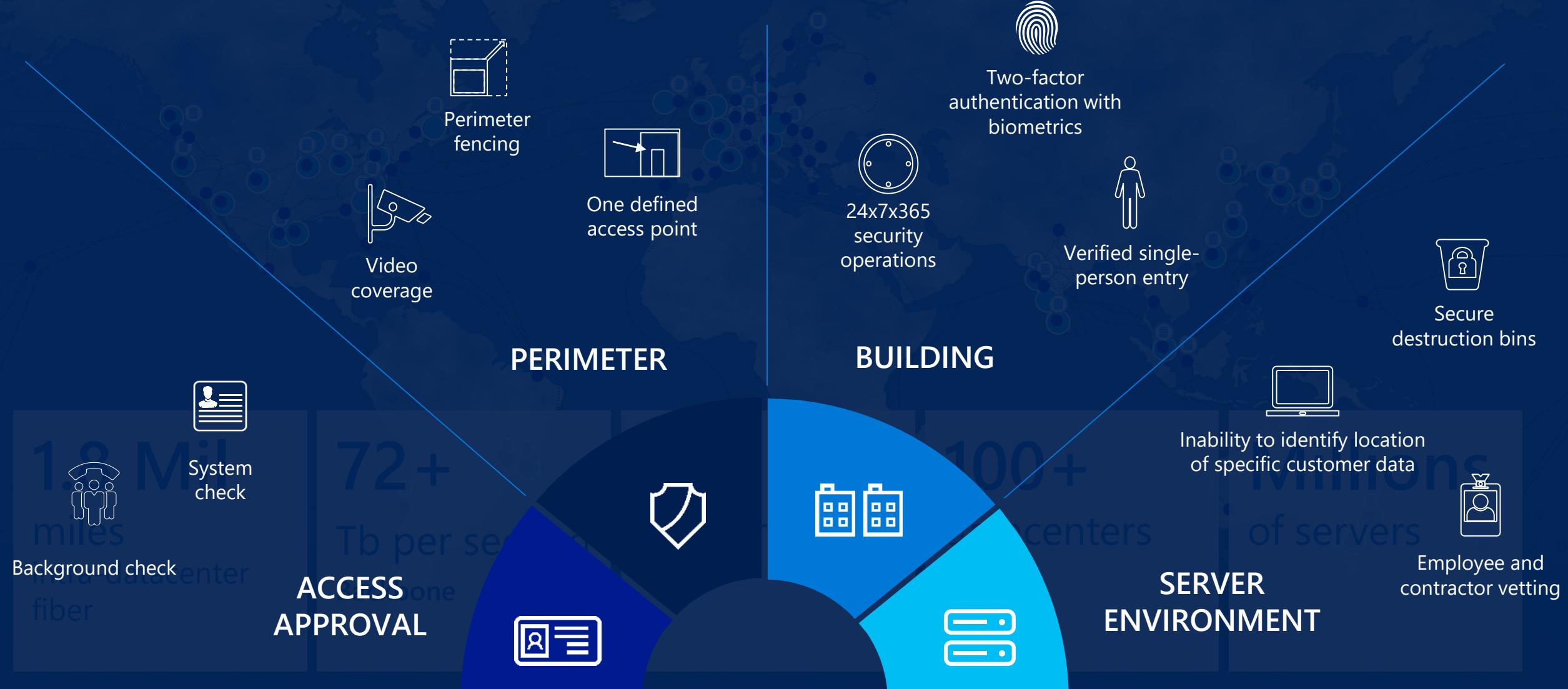
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4500+ PEERING LOCATIONS

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150+ EDGE SITES

# Datacenter security



# Compliance certifications



Tools



Advanced workloads



Core infrastructure



Azure Stack + Hybrid

Global



ISO 27001



ISO 27018



ISO 27017



ISO 22301



SOC 1 Type 2



SOC 2 Type 2



SOC 3



CSA STAR self-assessment



CSA STAR certification



CSA STAR attestation

Industry



PCI DSS level 1



CDSA



MPAA



FACT UK



Shared assessments



FISC Japan



HIPAA / HITECH Act



HITRUST



GxP  
21 CFR Part 11



MARS-E



IG Toolkit UK



FERPA



GLBA



FFIEC

Regional



Argentina  
PDPA



EU  
model clauses



UK  
G-Cloud



China  
DJCP



China  
GB 18030



China  
TRUCS



iDA  
INFOCOMM  
DEVELOPMENT  
AUTHORITY OF  
SINGAPORE



Australia  
IRAP/CCSL



New Zealand  
GCIO



Japan my  
number act



ENISA  
IAF



Japan CS  
mark gold



Spain  
ENS



Spain  
DPA



India  
MeitY



Canada  
privacy laws



Privacy  
shield



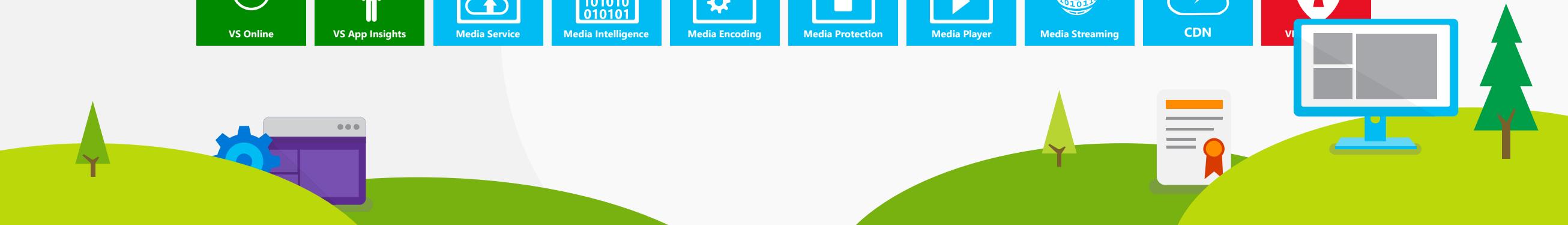
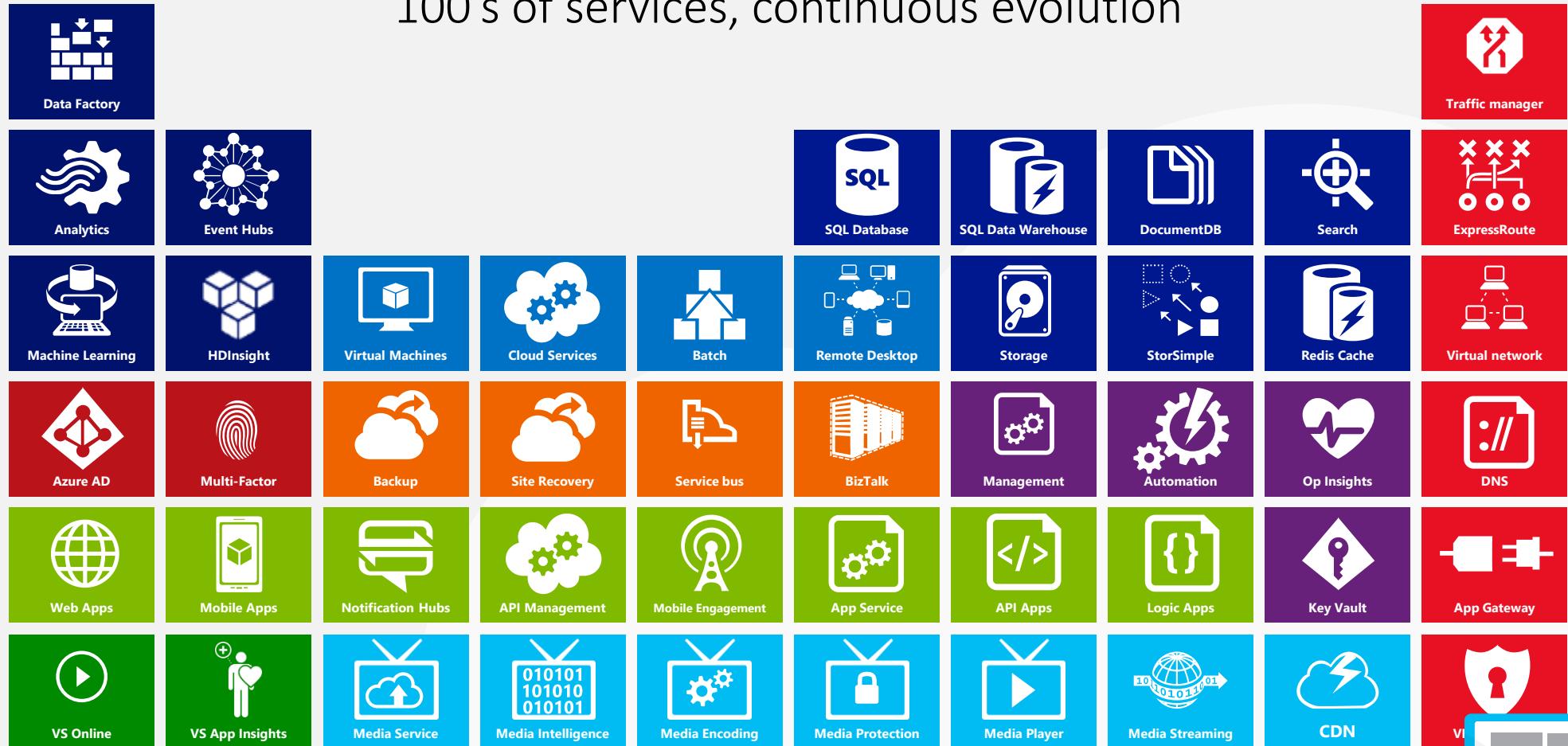
Germany IT  
Grundschutz  
workbook



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# Azure Infrastructure Breadth

100's of services, continuous evolution



# Windows Server & Azure



Hybrid Identity



Workload Backup



Business Continuity



Extending a Network



Hosted Web Services



Desktop as a Service

A bright, modern office interior with large arched windows. Several people are working at desks with laptops. One person is standing and looking at a document. The office is well-lit and has potted plants.

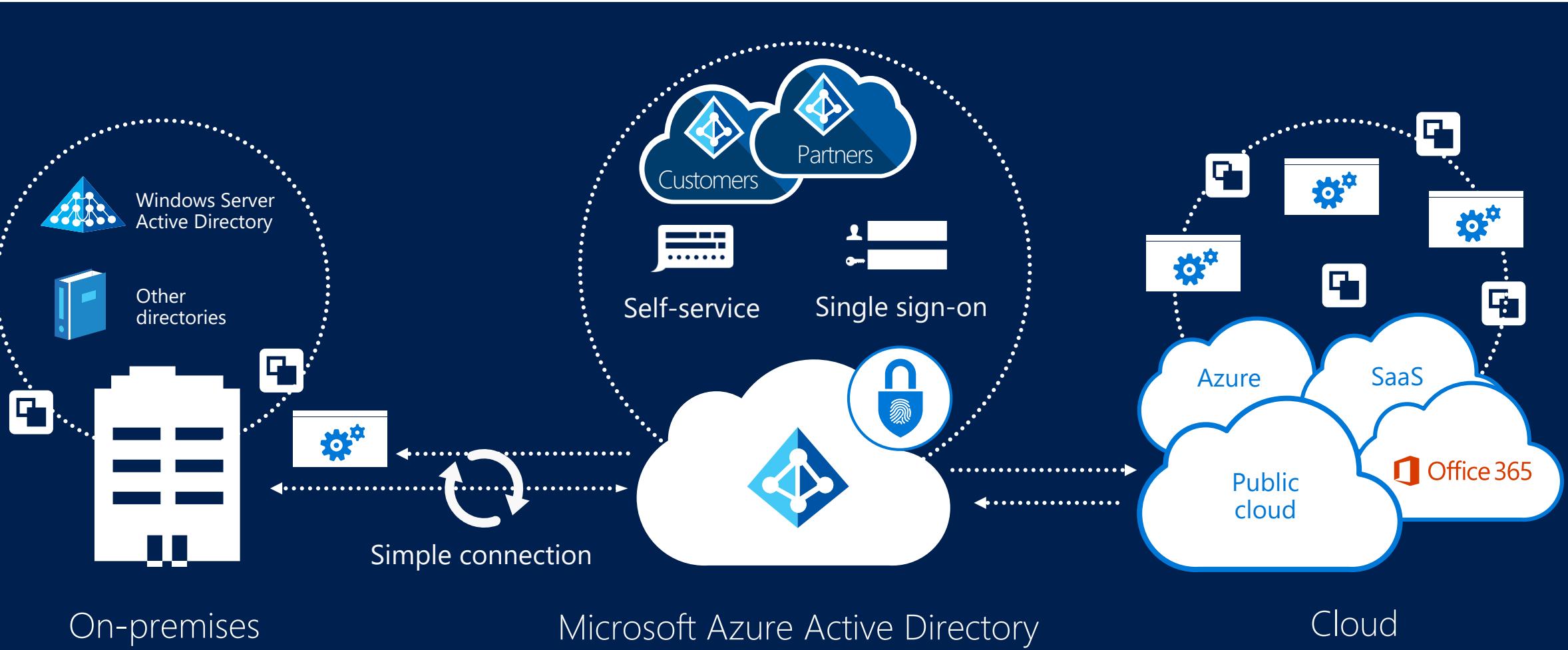
# Hybrid Identity

# Active Directory Domain Services (AD DS)

- Classic on-prem AuthN/AuthZ service available since Server 2000
- 90%+ market penetration
- Provides forests, domains, Organization Units for logical collection and management of objects (computers, users, groups, etc.)
- Requires a domain controller (physical, VM, IaaS VM)
- Primary value-add is group policy and local AuthN/AuthZ
  - Granular management of computer and user settings (aka lock down the desktop)

# Identity as the core of the enterprise

Azure Active Directory as the control plane

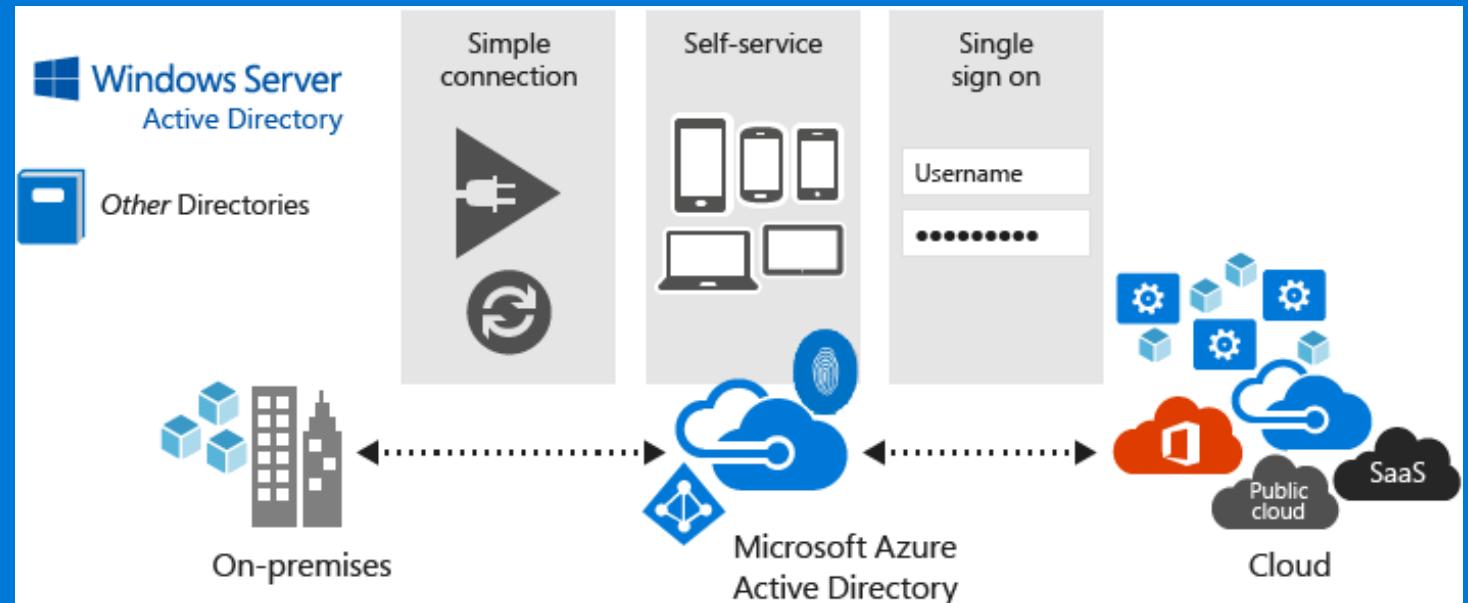


# Azure Active Directory (AAD)

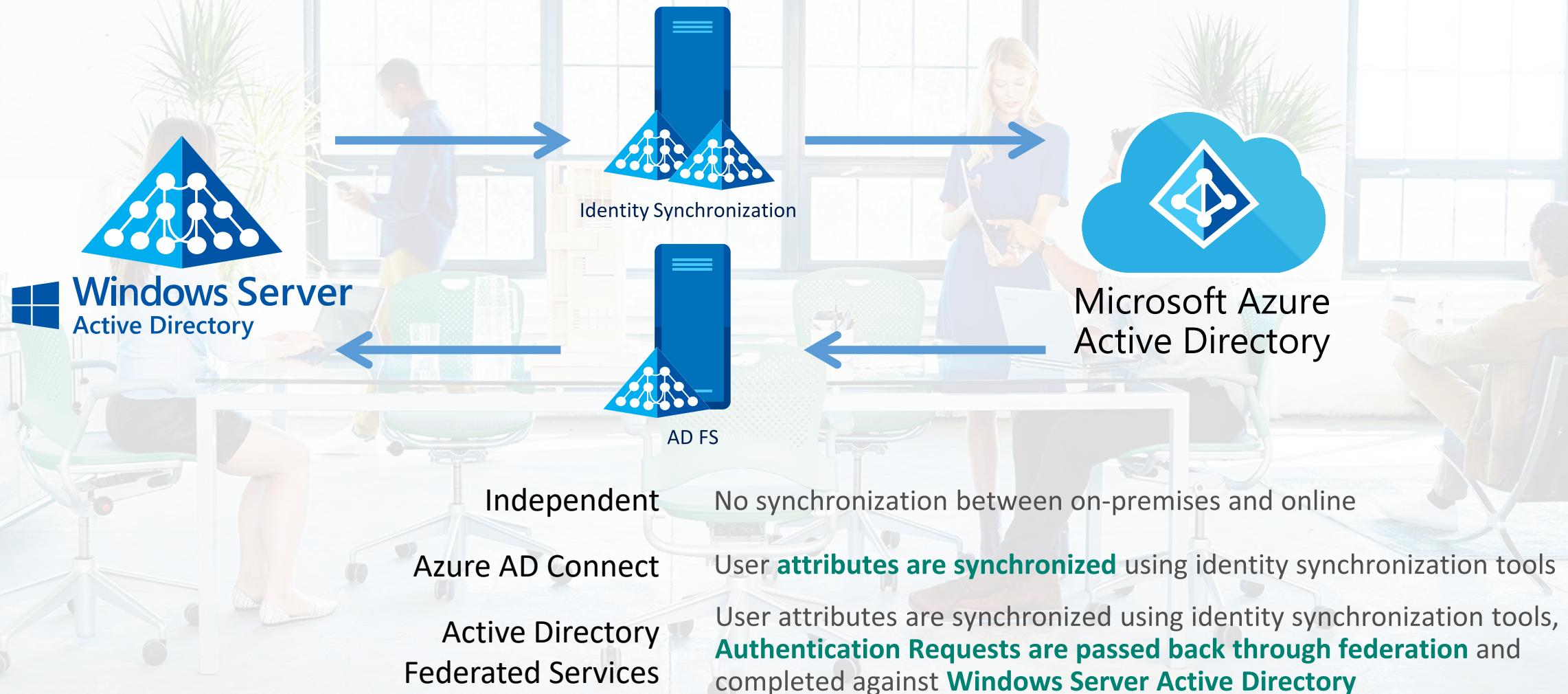
- Microsoft's multi-tenant cloud based directory and identity management service
- Comes in four editions
  - Free
  - Basic
  - Premium P1
  - Premium P2
- Users and groups are created in a flat structure without OUs or GPOs
- Authentication is performed through protocols such as SAML, WS-Federation, and OAuth

# Azure Active Directory (AAD)

- Key Features
  - Single Sign-On (SSO)
  - Self-Service Password Change
  - Multi-Factor Authentication (MFA)
  - AD Join for Windows 10
  - Company Branding



# Hybrid Identity Scenarios



# THE REAL Question: Can I eliminate my on-premises servers?

- **We know where email and documents will go... right?**
  - Office 365!
- **Do I still need a server for Active Directory?**
  - Do I really use all of Active Directory?
    - User Authentication, Machine Authentication, Group Policies
  - Are all of the desktops Windows 10?
    - Windows 10 Domain Join with Microsoft Intune
  - Do I have a mix of desktops?
    - Lift & Shift server into Azure
  - What's the future?

A bright, modern office interior with large arched windows. Several people are working at their desks, which are equipped with laptops and papers. A man is seated in a chair, looking towards the right side of the frame. The office is decorated with several potted plants.

# Business Continuity

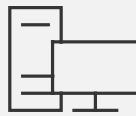
"Failure is ALWAYS an option."

Adam Savage,  
MythBusters

# Choose the Best Architecture for Your Needs

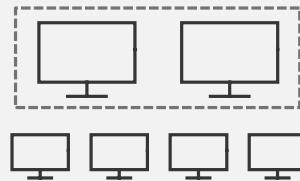
## INDUSTRY-ONLY

VM SLA  
99.9%

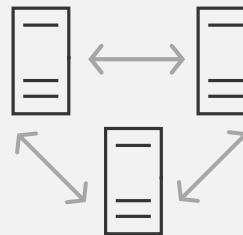


## INDUSTRY-LEADING HIGH AVAILABILITY SLA

VM SLA  
99.95%

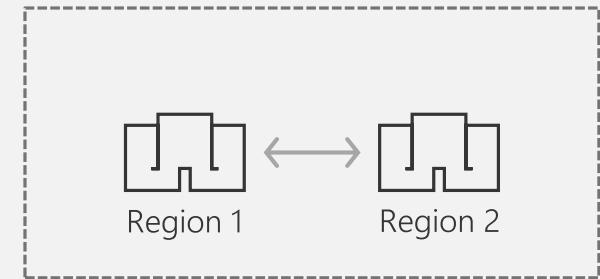


VM SLA  
99.99%



## INDUSTRY-LEADING DISASTER RECOVERY

REGIONS  
50



### SINGLE VM

Protection with Premium Storage

### AVAILABILITY SETS

Protection against failures within datacenters

### AVAILABILITY ZONES

Protection from entire datacenter failures

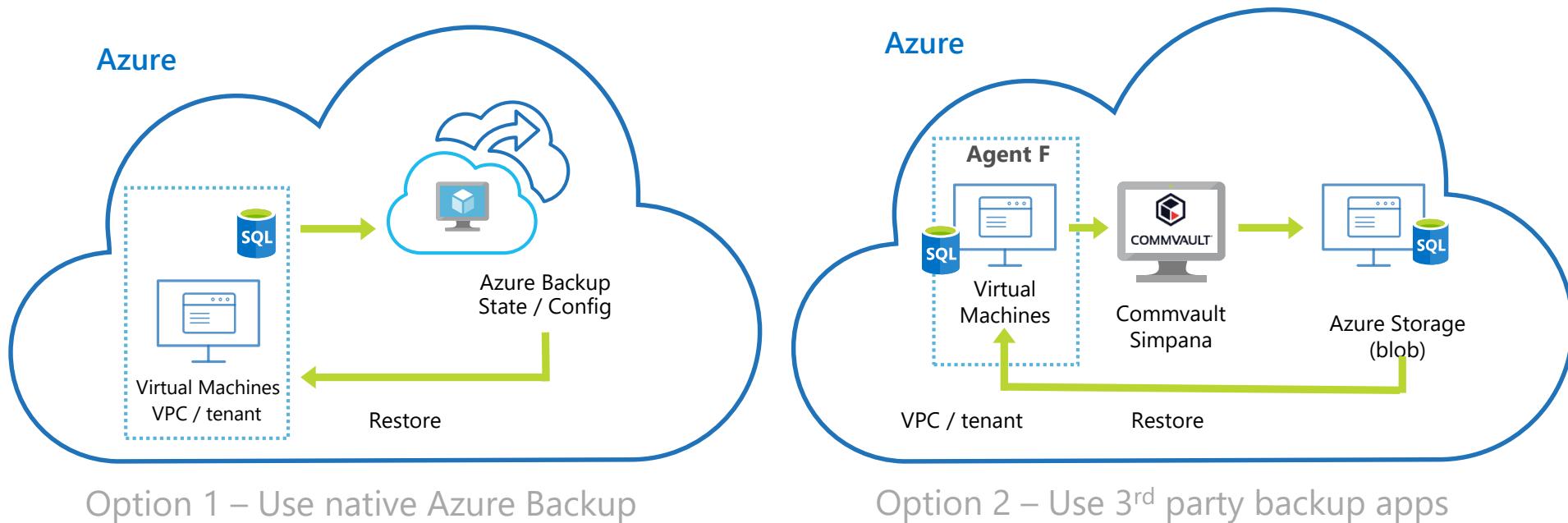
### REGION PAIRS

Protection from disaster with Data Residency compliance

# Azure Backup

Simple and reliable cloud integrated backup as a service

- Secure and reliable backup as a service alternative to tape
- Integrated with GUIs of Windows Server Backup or System Center Data Protection Manager.
- Supports images, files, Exchange, SQL, and SharePoint.

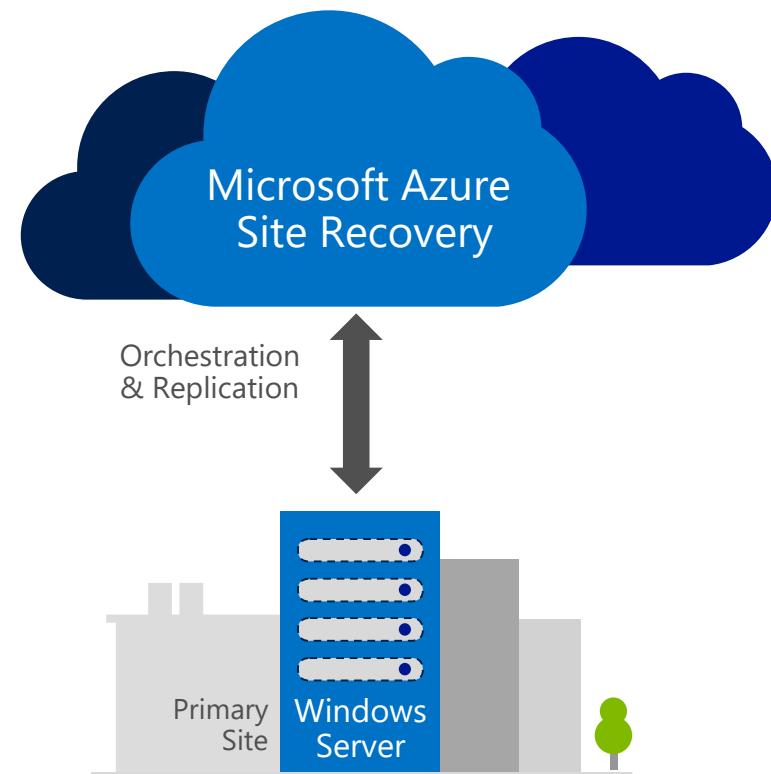


# Business Continuity

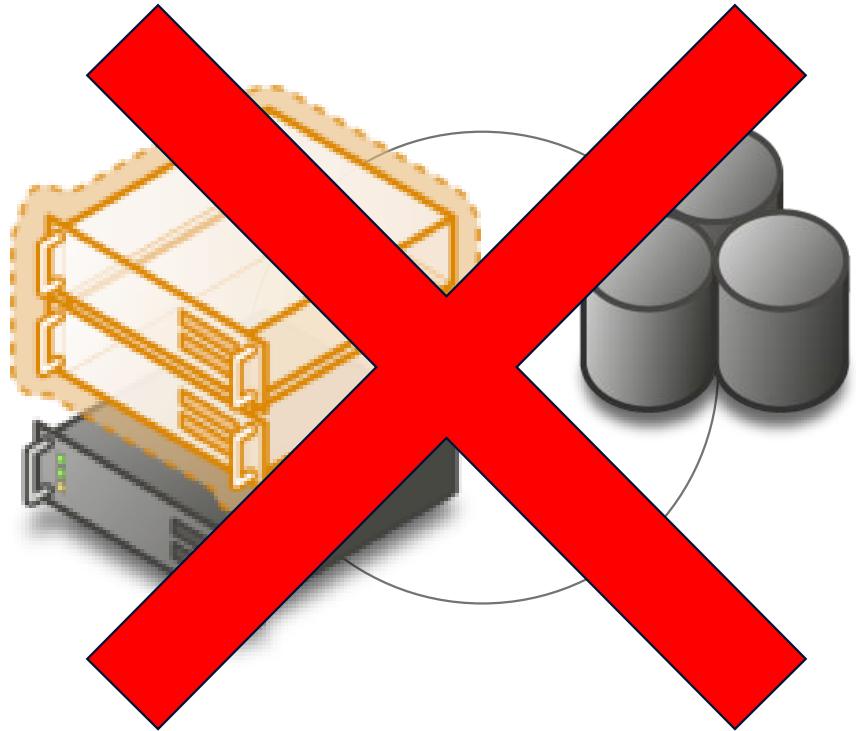
## Via Azure Site Recovery

- Get your business back up and running in minutes with near-zero data loss
- Use Azure as your DR site
- Automated VM protection & replication
- Remote health monitoring
- Customizable recovery plans
- No-impact recovery plan testing
- Orchestrated recovery of tiered applications

On-premises to Microsoft Azure protection

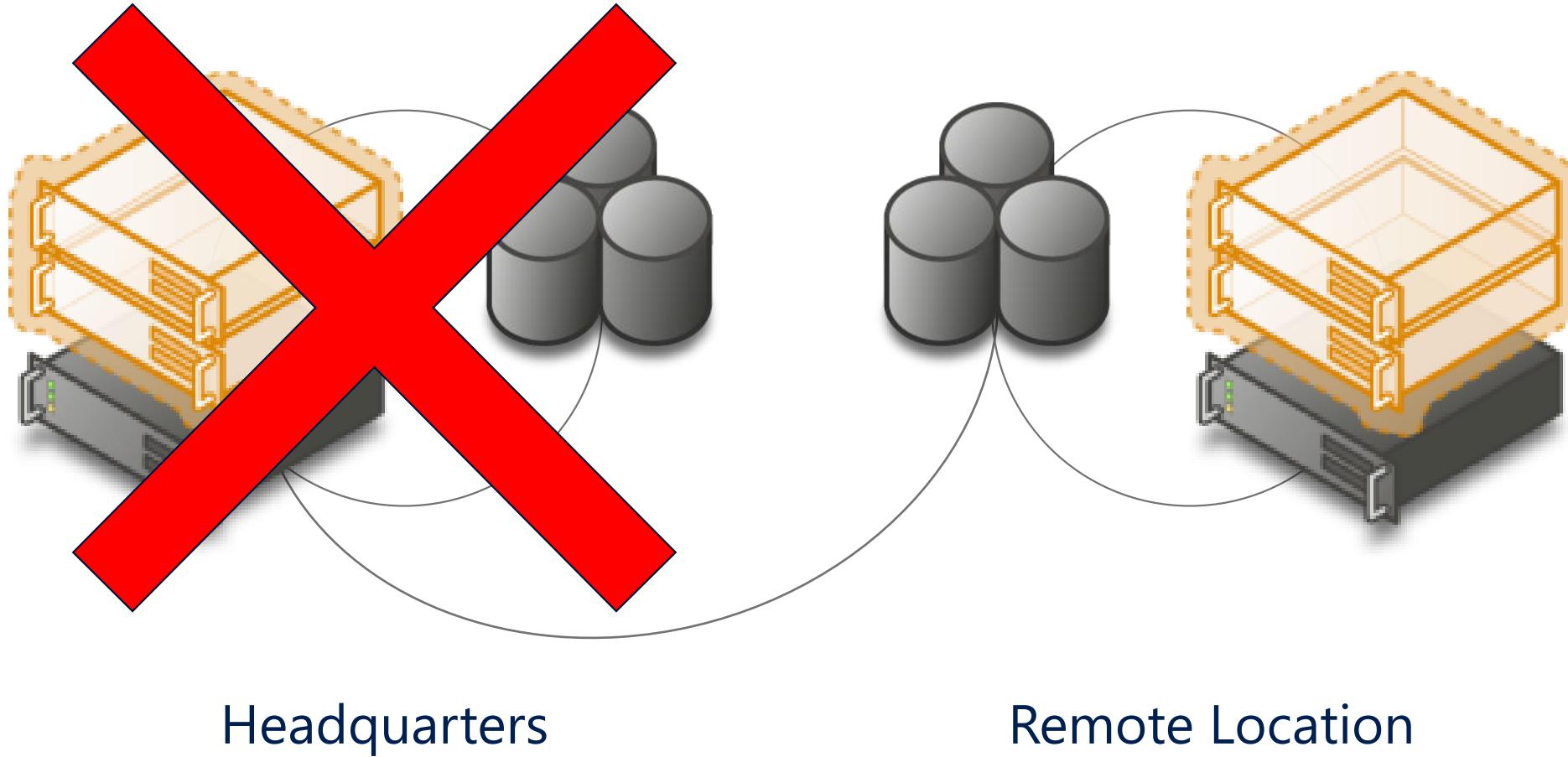


# Hyper-V

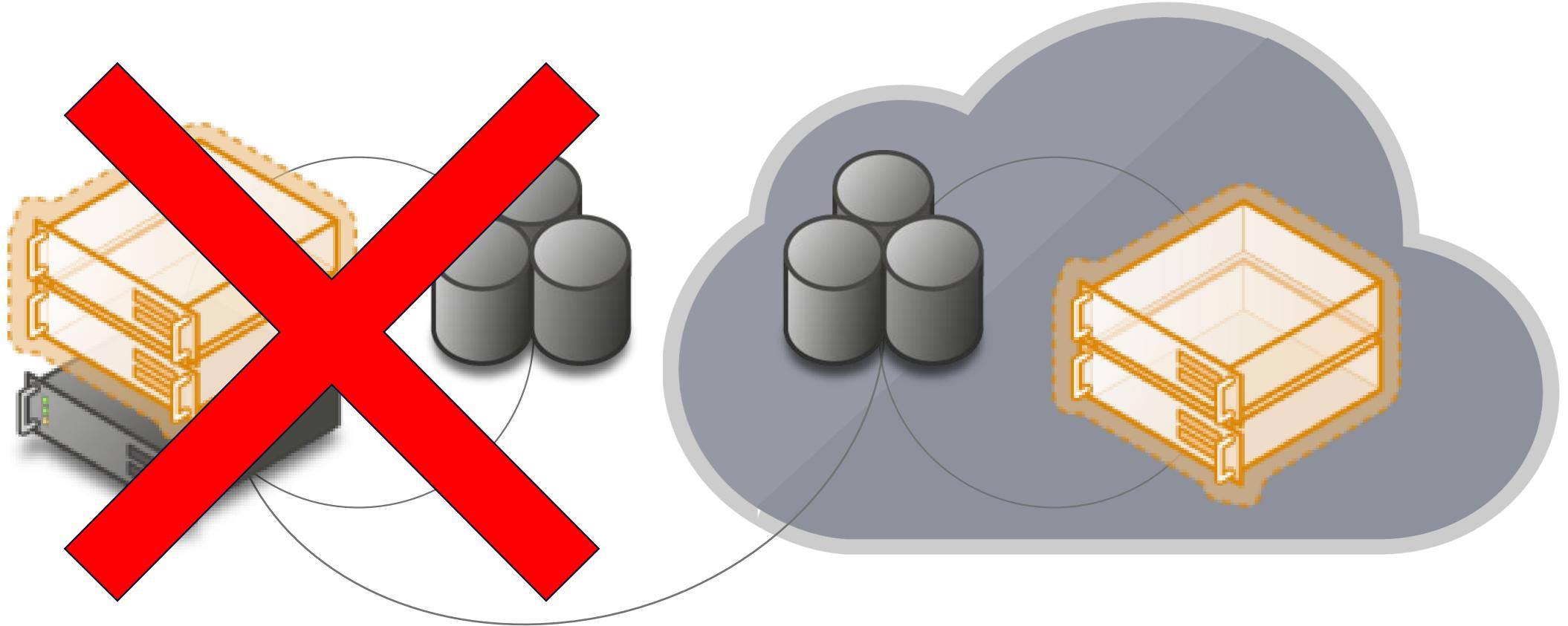


Headquarters

# Hyper-V Replica



# Azure Site Recovery



Headquarters

Azure



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# Migrate to Azure



Migrate from multiple environments

VMware, Hyper-V, physical, Azure and Amazon Web Services

No-impact migration testing

When replicating workloads into Azure, execute tests to ensure readiness

Move applications with near-zero downtime

Move a single application or an entire datacenter to the cloud with minimal impact to production users

A bright, modern office interior with large arched windows. Several people are working at desks with green chairs. A man is sitting in a black chair in the foreground, looking towards the right.

# Extending a Network

# Core infrastructure



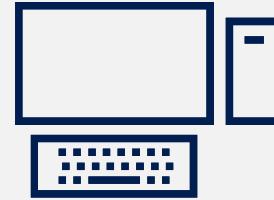
## Storage

Disks  
Blob storage  
File sync  
Hot and cold



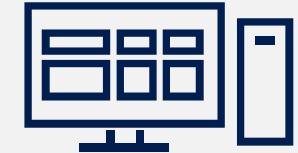
## Networking

Virtual networks  
VPN, ExpressRoute  
Load balancer  
DNS, Traffic Manager



## Compute

Virtual machines  
Availability sets  
VM scale sets  
Controlled maintenance



## Management

Log Analytics  
Cloud Shell  
Site Recovery  
Security Center

### RECENT ANNOUNCEMENTS

[Azure Cost Management](#)

[Azure availability zones](#)

[Reserved VM instances](#)

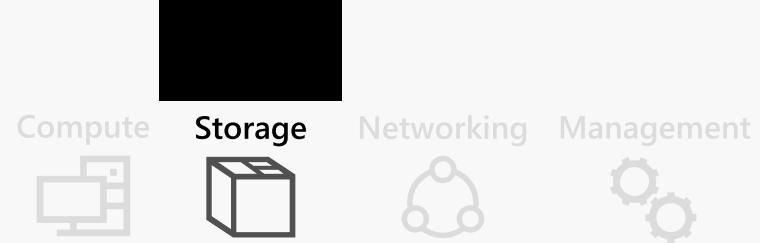


# Azure Storage



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# Azure Storage



IaaS



Storage



Virtual  
machines



Networking

## Disks

Persistent disks for Azure IaaS VMs

Premium Storage Disks option: SSD based, high IOPS, low latency

## Files

Fully Managed File Shares in the Cloud

SMB and REST access

“Lift and shift” legacy apps

Synch with on-premises (New!)

## Blobs

Highly scalable, REST based cloud object store

Block Blobs: Sequential file I/O

Cool Tier Available

Page Blobs: Random-write pattern data

Append Blobs

## Tables

Massive auto-scaling NoSQL store

Dynamic scaling based on load

Scale to PBs of table data

Fast key/value lookups

## Queues

Reliable queues at scale for cloud services

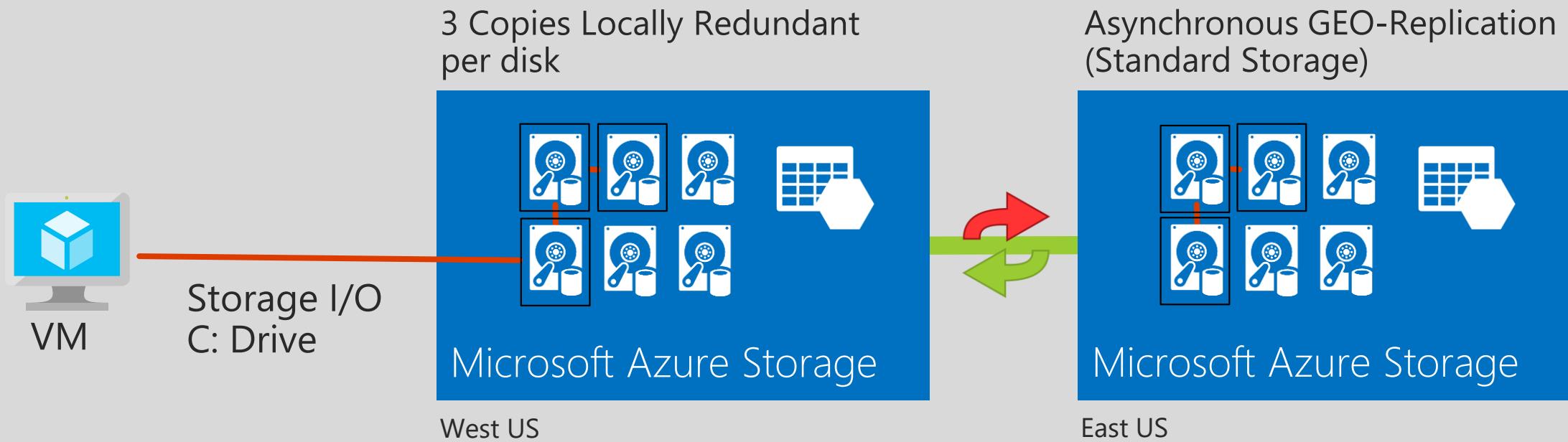
Decouple and scale components

Message visibility timeout and update message to protect against unreliable dequeuers

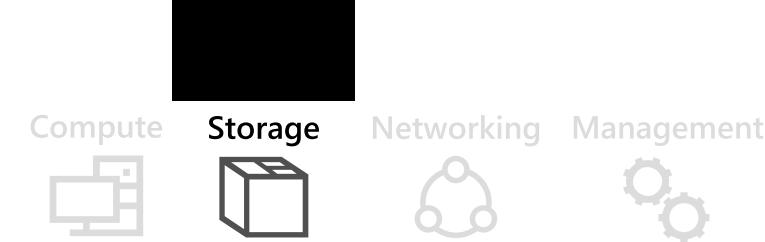
**Built on a unified Distributed Storage System**

Durability, Encryption at Rest, Strongly Consistent Replication, Fault Tolerance, Auto Load-Balancing

# VM Storage Basics



# Virtual Machine Storage Basics



## Premium disks

SSD based, high IOPS,  
low latency

Up to 64 TB, 80000 IOPs

**Appropriate for data base, file servers, and interactive applications that have a dependency on high IOPs and low latency storage.**



## Standard disks

Magnetic disks, HDD based.  
Up to 500 IOPs/disk

**Appropriate for web and application servers that do not have a dependency on high IOPs or low latency storage.**



## Files

"SMB File Share"

SMB 3.0

**Shared storage (read/write multiple virtual machines), replace file servers, support legacy applications and support lift and shift style workloads**

# Hot vs. Cold

Hot

- Data that is in active use
- Data that is staged for processing

Cold

- Backup, archival and disaster recovery datasets
- Older media content
- Large data sets
- Original (raw) data that must be preserved
- Compliance and archival data



# Azure Networking



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# Connectivity Options to Azure

Compute

Storage

Networking

Management



	Secure point-to-site connectivity		<ul style="list-style-type: none"><li>• POC Efforts</li><li>• Small scale deployments</li><li>• Connect from anywhere</li></ul>
	Secure site-to-site VPN connectivity		<ul style="list-style-type: none"><li>• Connect to Azure compute from on-premises or another Azure region</li></ul>
	VNet Peering within region		<ul style="list-style-type: none"><li>• In-region VNet-to-VNet connectivity</li><li>• Direct VM-to-VM connectivity</li><li>• Peer VNets for routing and transit</li></ul>
	ExpressRoute private connectivity		<ul style="list-style-type: none"><li>• Private connectivity from your on-premises data center to Azure virtual networks and PaaS Services</li></ul>



# Azure Virtual Networking Components

Virtual Network

Network Interface

Public IP Address

Network Security Group



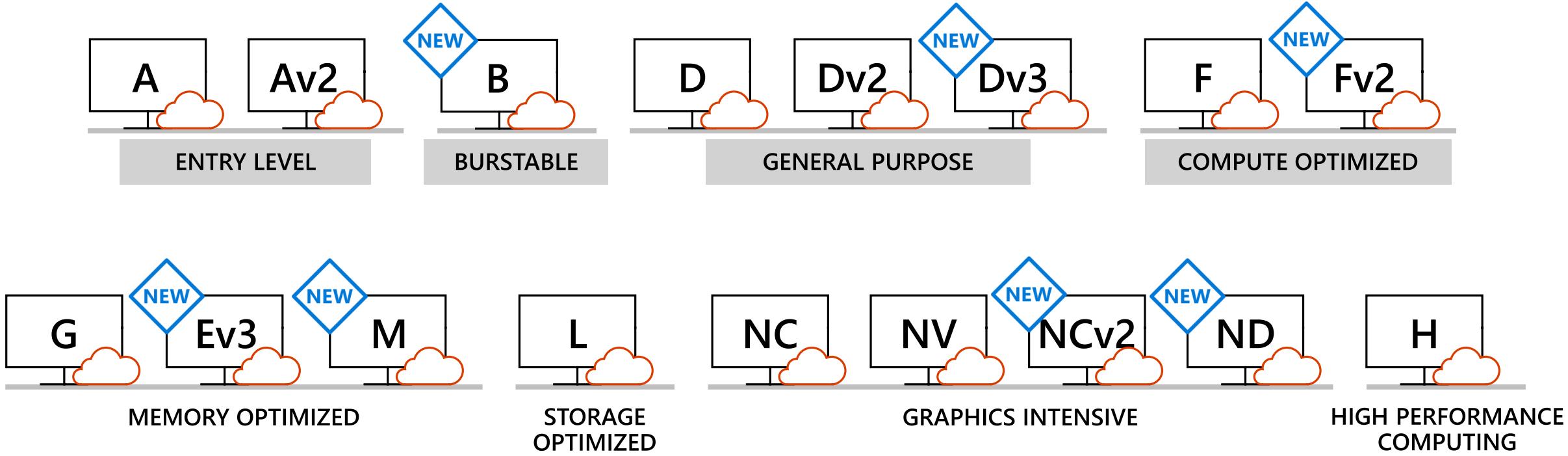


# Azure Compute (Virtual Machines)



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# Compute options for all types of apps

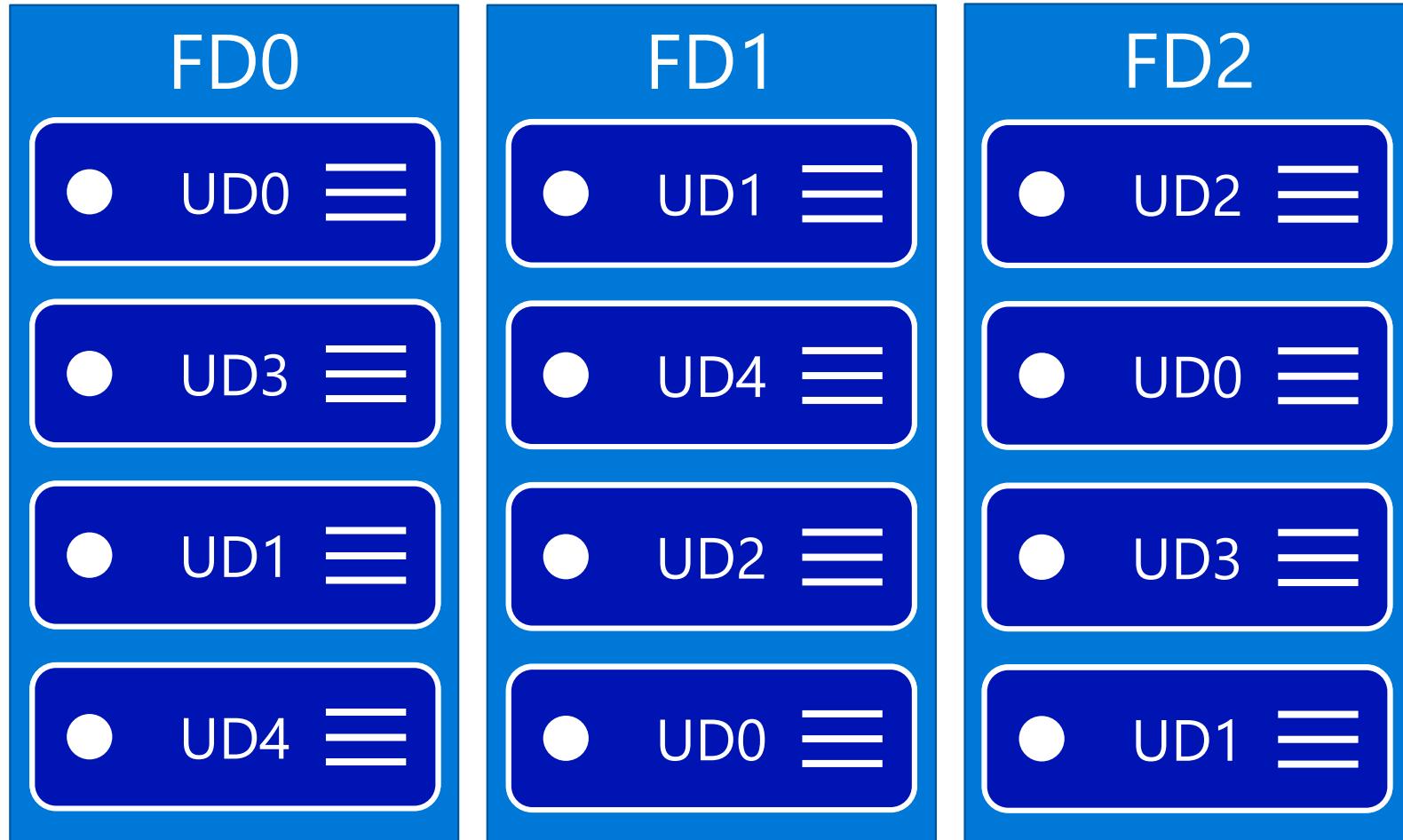


PURPOSE-BUILT FOR  
SAP HANA

# Design for Availability

- **Availability Set** – Two or more Virtual Machines grouped together to avoid a single point of failure.
- **Fault Domain** - The group of Virtual Machines that share a common power source and network switch. By default, the Virtual Machines configured within your Availability Set are separated across up to three fault domains
- **Update Domain** - For a given availability set, up to five sets of Update Domains are created to indicate groups of virtual machines and underlying physical hardware that can be rebooted at the same time.

# Availability Set



# Availability Set

The screenshot shows the Azure portal interface for the 'SMBLive-H2' availability set. The left sidebar contains navigation links: Overview (selected), Activity log, Access control (IAM), Tags, Virtual machines, Properties, Locks, Automation script, New support request, and Support + TROUBLESHOOTING.

**Essentials**

- Resource group ([change](#)) **SMBLive-H2**
- Location **West US**
- Subscription name ([change](#)) **Demo Account 1 MSTS2**
- Subscription ID [REDACTED]

**Fault domains**

- 3
- 5
- 6

**Update domains**

- 0
- 1
- 2
- 3
- 4
- 0

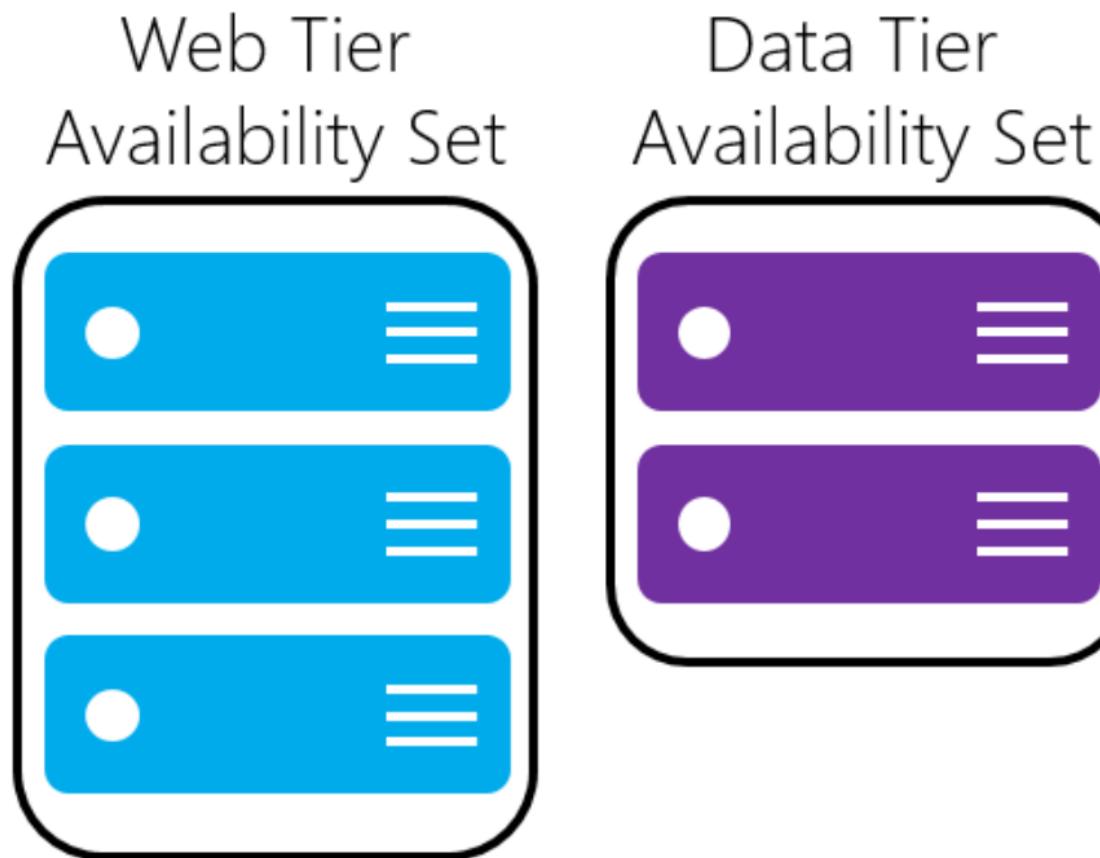
**Virtual machines**

NAME	STATUS	FAULT DOMAIN	UPDATE DOMAIN
TS2-WebTier-1	Running	0	0
TS2-WebTier-2	Running	1	1
TS2-WebTier-3	Running	2	2
TS2-WebTier-4	Creating	0	3
TS2-WebTier-5	Creating	1	4
TS2-WebTier-6	Creating	2	0



# Scenario – Multi Tier Application

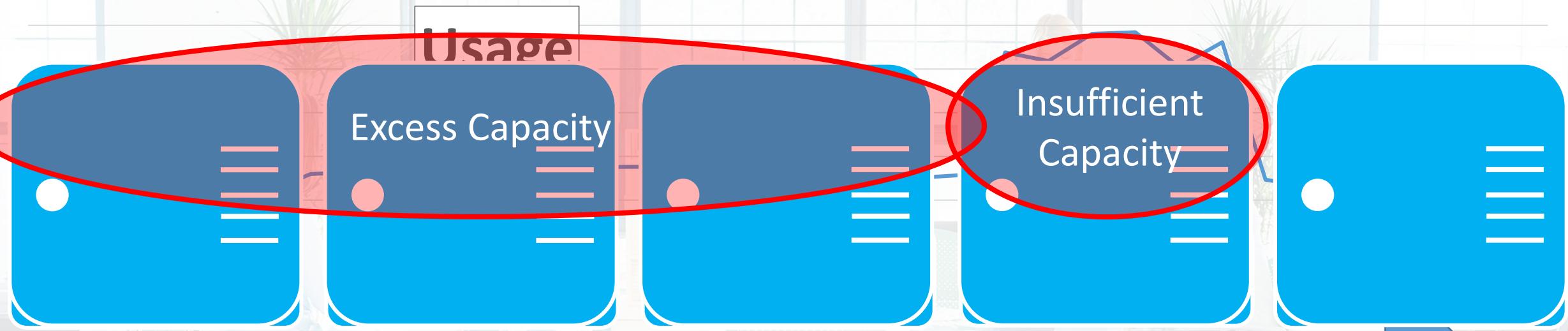
- Configure each application tier into separate availability sets
- By configuring at least two virtual machines in an availability set for each tier, you guarantee that at least one virtual machine in each tier will be available at all times



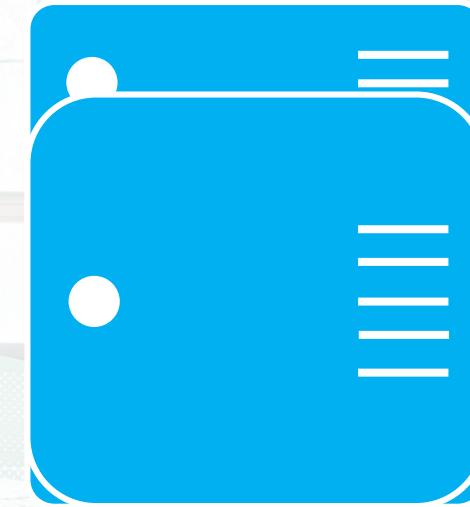
# Storage Requirements to Ensure HA

1. Keep all disks (OS and data) associated with a VM in the same storage account
2. Storage account [limits](#) should be considered when adding more VHDs to a storage account
3. Use separate storage account for each VM in an Availability Set. Multiple VMs in the same availability set must NOT share the same storage account. It is acceptable for VMs across different Availability Sets to share storage accounts as long as the best practices above are followed

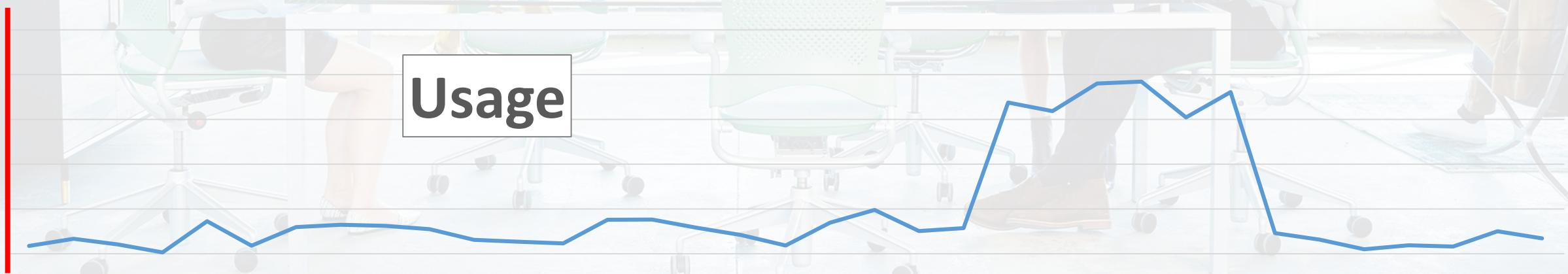
# Design for Scale



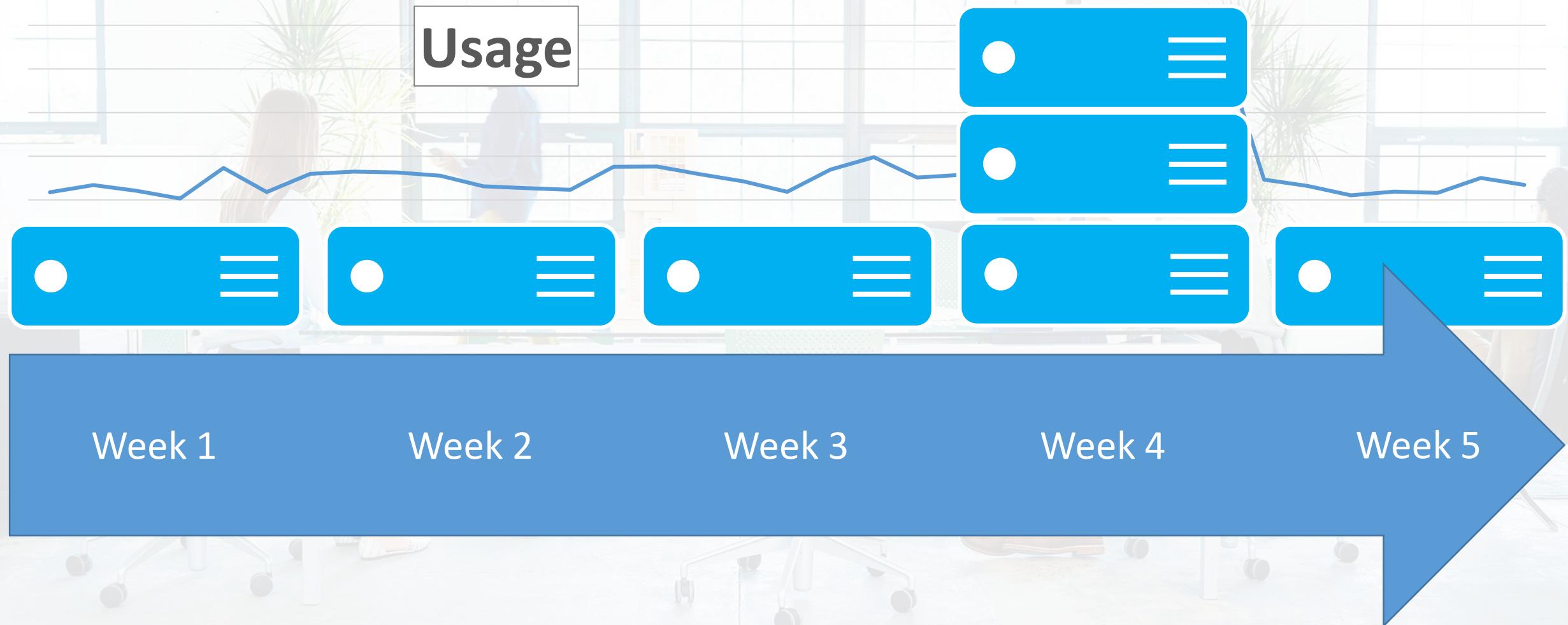
# Scale Up vs. Scale Out



Usage



# Scale vs. Time





# Azure Management & Security



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# Management & Security

Compute



Storage



Networking



Management



## Azure Active Directory

Cloud based directory and identity management



## Azure Resource Manager

Organize, deploy and control resources in Azure



## Azure Advisor

Optimize across four different areas: high availability, performance, security, and cost



## Azure Key Vault

Protect secrets such as passwords and keys securely



## Azure Site Recovery

Orchestrated failovers/back to Azure, Azure to Azure or data center to data center – great for migration!



## Azure Backup

Protect your virtual machines, data, or enterprise workloads by securely backing it up to Azure

# Azure Resource Manager (ARM)

Compute



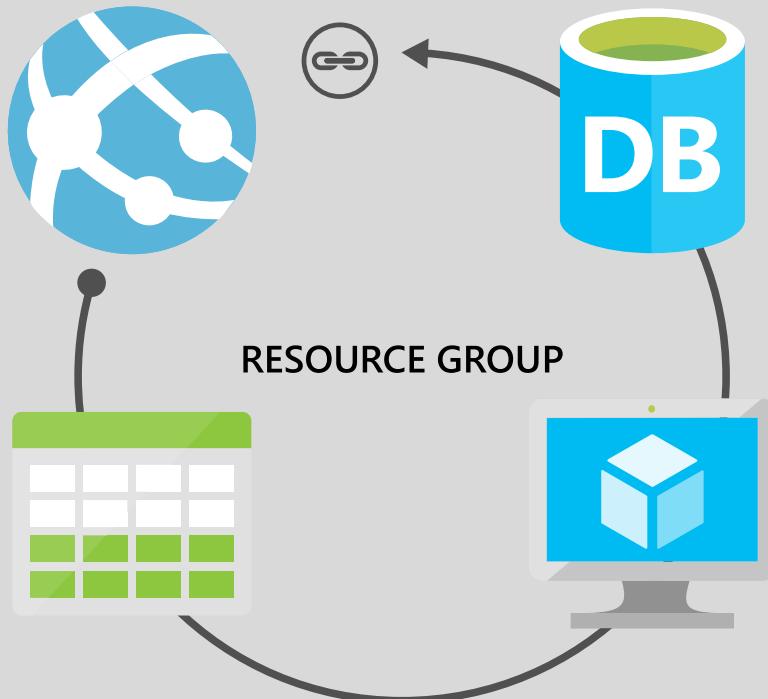
Storage



Networking



Management



**Enable application management within Azure**

**Resource groups are containers that can contain multiple IaaS + PaaS resources**

**Templatize application deployment and configuration, supports DevOps**

**Governance and control with Role Based Access Control (RBAC), policies and resource locks**

# Azure Security Center

## Understand your cloud security state

Define security policies for your Azure subscriptions and to help guide resource owners correctly implement required controls

Easily deploy integrated cloud security solutions from Microsoft and trusted security partners

Detect threats and respond fast by combining Microsoft global threat intelligence and expertise, with insights into cloud security-related events across your Azure deployments, Security Center helps you detect actual threats early and reduce false positives.

The screenshot shows the 'Recommendations' section of the Azure Security Center. It includes a 'Prevention' summary with counts for HIGH, MEDIUM, and LOW severity issues across VIRTUAL MACHINES, NETWORKING, SQL, and APPLICATIONS. A 'Recommendations' card shows 12 total items. To the right is a table of specific recommendations with columns for DESCRIPTION, RESOURCE, STATE, and SEVERITY. A sidebar lists available web application firewalls from partners like Barracuda, PS Networks, IMPERIA, INCAPULSA, and Cloudflare.

The screenshot shows the 'Security alerts' section of the Azure Security Center. It displays a chart of detected security events by severity (HIGH, MEDIUM, LOW) and a detailed list of incidents. One incident is highlighted: 'Brute Force attempts were detected'. The interface also includes a timeline chart of RDP activity per hour and a world map showing threat locations.

# Azure Log Analytics

## Insights & Analytics

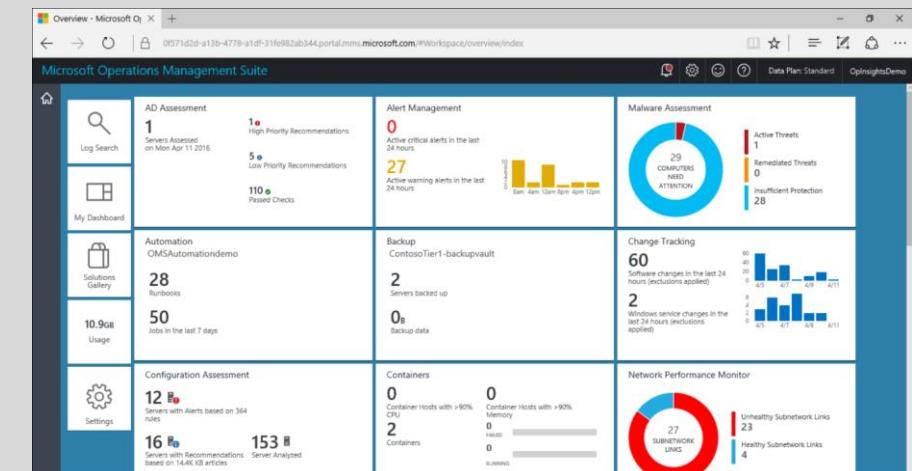
Gain visibility across your hybrid cloud

Deliver insights across your datacenters and public clouds, including Azure and AWS.

Easy collection, correlation, and visualization of your machine data

Insight into physical, virtual, and cloud infrastructure health, capacity, and usage

Collect, store, and analyze log data from virtually any Windows Server and Linux source.





## Core infrastructure

Compute • Networking • Storage • Security • Identity

## Advanced workloads

Web	Media
Mobile	Analytics
Microservices	Databases
Containers	Internet of Things
Integration services	AI + Machine Learning

Azure Stack + Hybrid



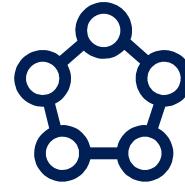
# Application development



**kubernetes**

Azure Container Service (AKS)

Managed Kubernetes,  
automated upgrades



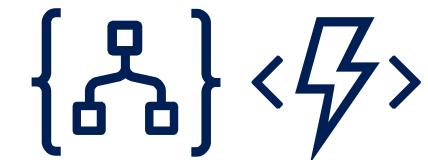
Service fabric

Build, deploy and  
operate applications at scale



App service

Web, mobile and  
API apps



Logic apps  
+ Functions

Event-driven,  
serverless computing

## Recent announcements

[Azure container instances](#)

[Hybrid cloud java and Spring apps to Azure](#)

[Cosmos DB and Azure functions native integration](#)

# Business insights



Tools



Advanced  
workloads

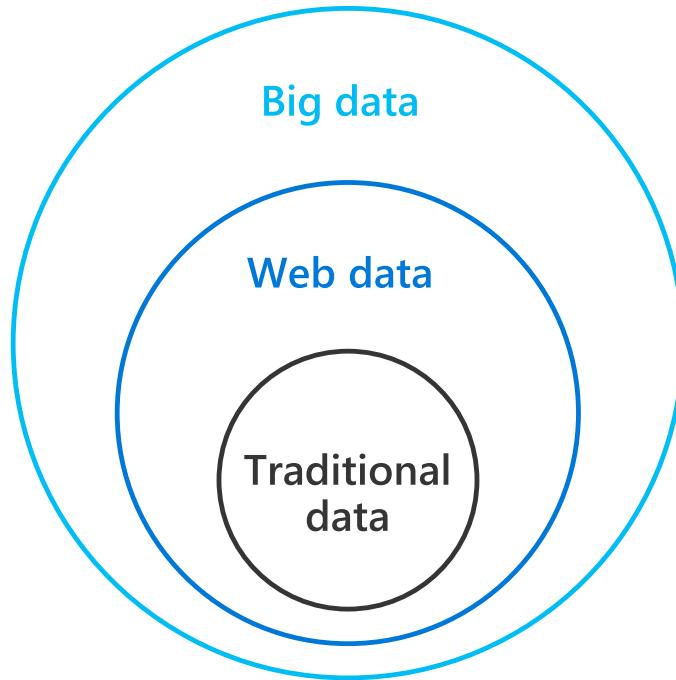


Core  
infrastructure



Azure Stack  
+ Hybrid

## Back-end power

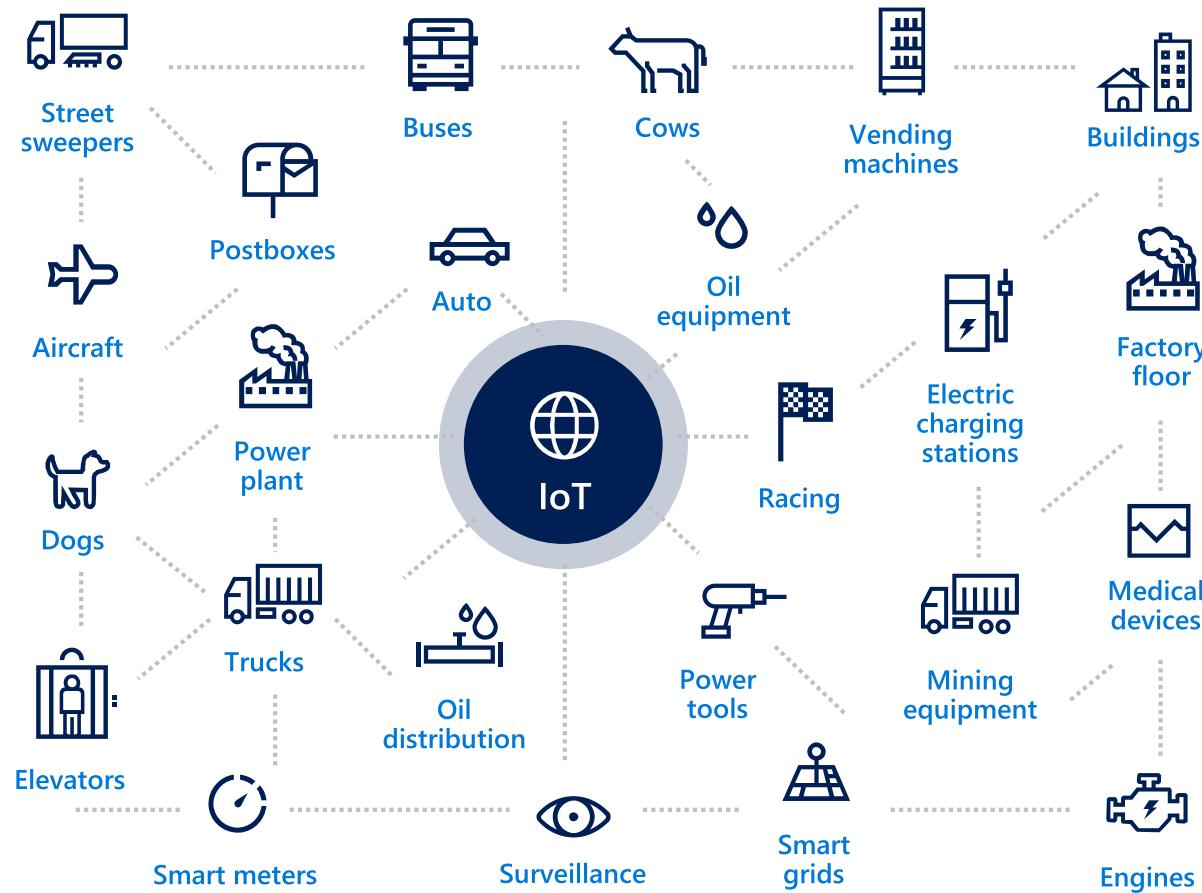


## Front-end insights



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# Internet of things



## Azure IoT suite

- Device connectivity and management
- Data ingestion, command and control
- Stream processing and predictive analytics
- Workflow automation and integration
- Dashboards and visualization
- Preconfigured solutions
- Remote monitoring
- Predictive maintenance
- Connected factory (new)

# High performance computing



Tools



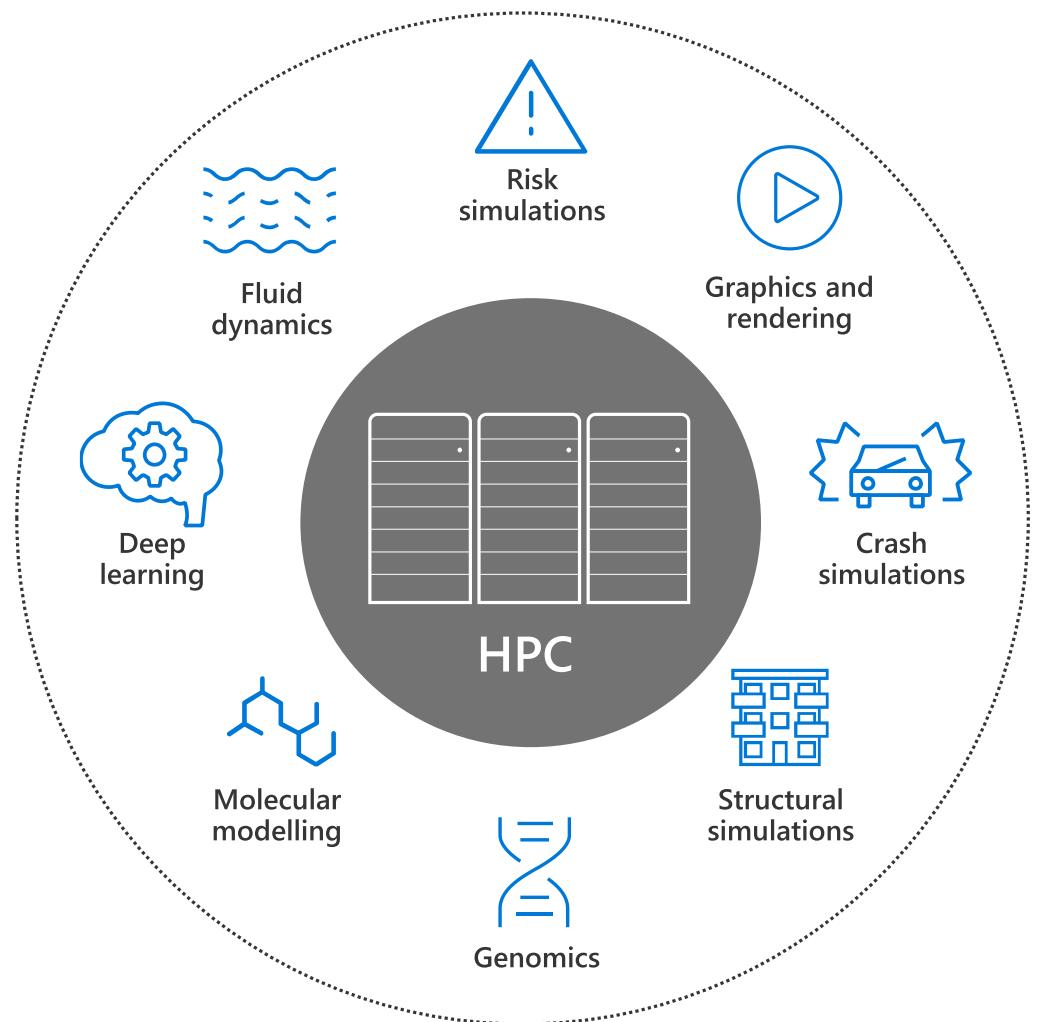
Advanced workloads



Core infrastructure

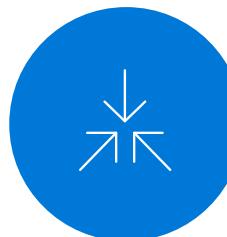


Azure Stack + Hybrid



## Most performant infrastructure

Low latency networking with RDMA and Infiniband



## Open and integrated

From CentOS and Ubuntu to enterprise support like SuSe and Redhat



## Granular cost control and governance

Flexible consumption and cost savings with low-priority VMs on Azure



RAZOR TECHNOLOGY

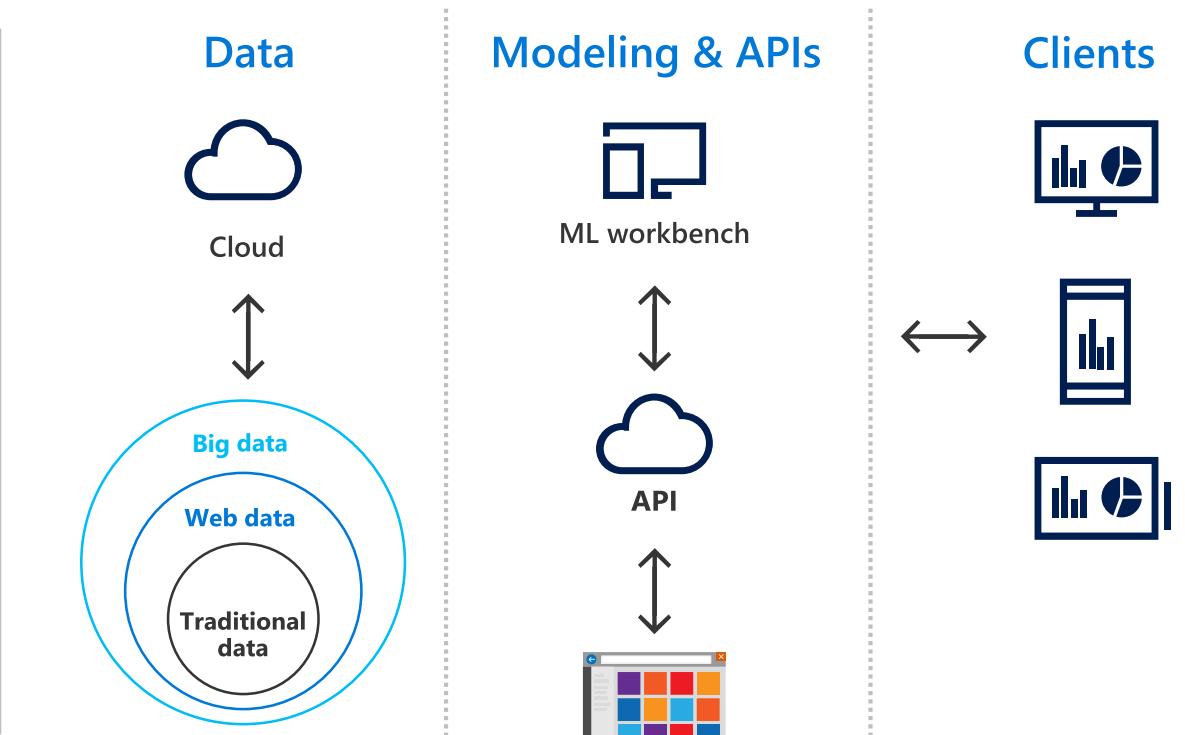
# Machine learning



## Azure machine learning templates

- Demand forecasting
- Predictive maintenance
- Vehicle telemetry

## Azure machine learning services



## Recent announcements

[ML workbench](#)

[ML experimentation service](#)

[ML model manager service](#)

# Cognitive services



Tools



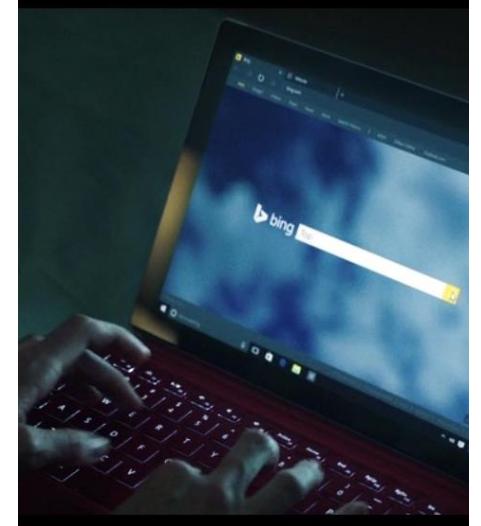
Advanced  
workloads



Core  
infrastructure



Azure Stack  
+ Hybrid



## Vision

From faces to feelings, allow apps to understand images and video

Show me what is in the image

## Speech

Hear and speak to users by filtering noise, identifying speakers and understanding intent

Convert this text to speech please...

## Language

Process text and learn how to recognize what users want

Play today's conference call...

## Knowledge

Tap into rich knowledge amassed from the web, academia or your own data

Top publications in AI...

## Search

Locate relevant information among billions of web pages, images, videos and news with Bing APIs

Fraud prevention results...



RAZOR TECHNOLOGY

# Azure Stack

## Azure Services Available On Premises



Tools



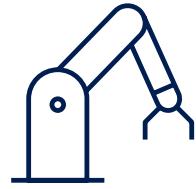
Advanced  
workloads



Core  
infrastructure



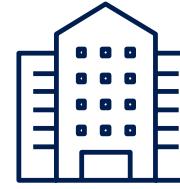
Azure Stack  
+ Hybrid



At the edge and  
disconnected



Meet every regulatory  
requirement

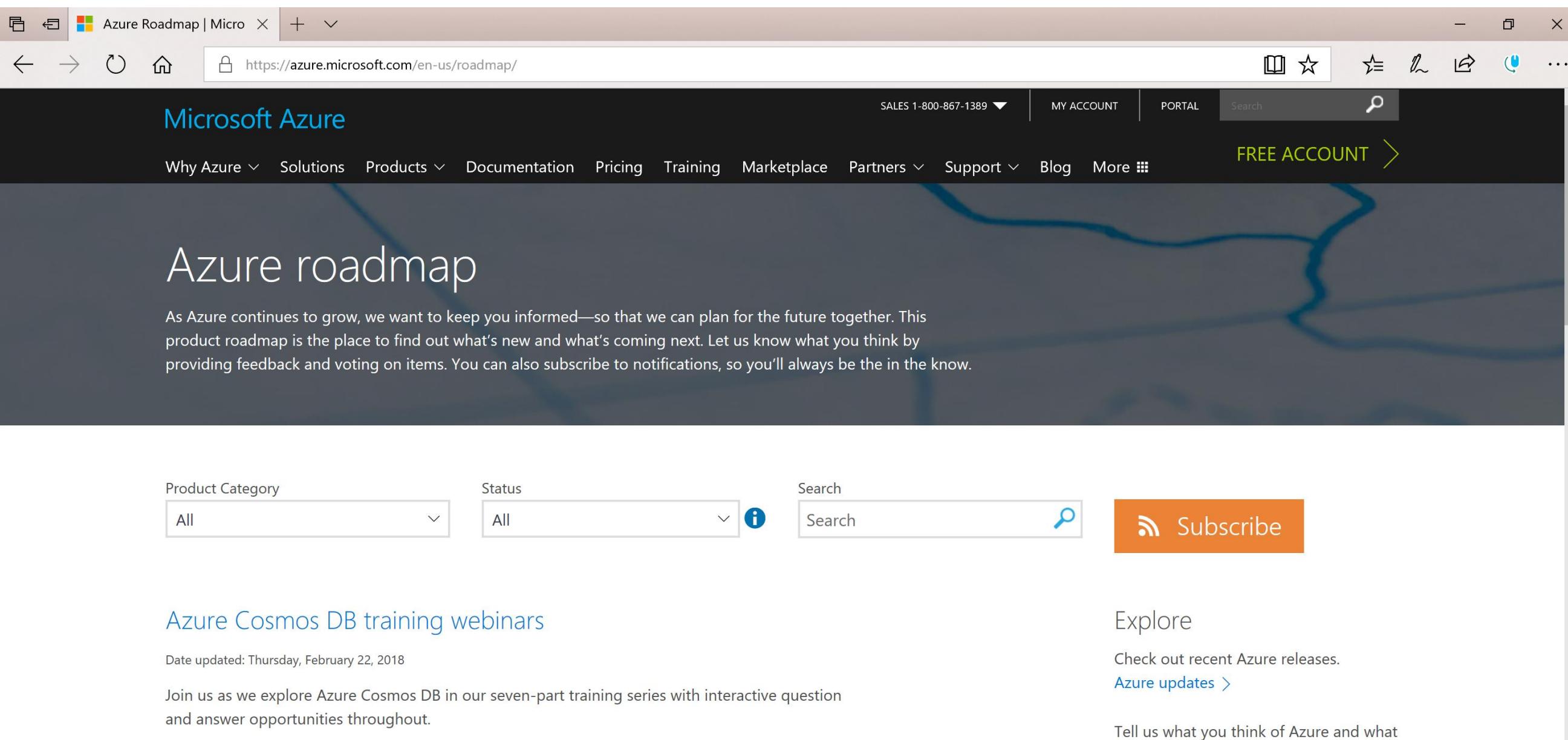


Cloud application  
model on-premises

A bright, modern office interior with large arched windows. Several people are working at desks with laptops and papers. A man is sitting in a chair, looking towards the right. The office is decorated with potted plants and has a overall professional yet comfortable atmosphere.

# Readiness Tools

# Azure.Microsoft.com/Roadmap



A screenshot of a web browser displaying the Microsoft Azure Roadmap page. The page has a dark header with the Microsoft Azure logo and navigation links like 'Why Azure', 'Solutions', 'Products', 'Documentation', 'Pricing', 'Training', 'Marketplace', 'Partners', 'Support', 'Blog', and 'More'. A prominent search bar is at the top right. Below the header, a large banner features the text 'Azure roadmap' and a descriptive paragraph about keeping users informed. At the bottom, there are filters for 'Product Category' (All), 'Status' (All), a search bar, and a 'Subscribe' button. Two specific items are highlighted: 'Azure Cosmos DB training webinars' and 'Explore'.

Azure Roadmap | Micro X + ▾

https://azure.microsoft.com/en-us/roadmap/

Microsoft Azure

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## Azure roadmap

As Azure continues to grow, we want to keep you informed—so that we can plan for the future together. This product roadmap is the place to find out what's new and what's coming next. Let us know what you think by providing feedback and voting on items. You can also subscribe to notifications, so you'll always be the in the know.

Product Category

Status

Search

All

All

Search

Subscribe

Azure Cosmos DB training webinars

Date updated: Thursday, February 22, 2018

Join us as we explore Azure Cosmos DB in our seven-part training series with interactive question and answer opportunities throughout.

Explore

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Azure updates >

Tell us what you think of Azure and what

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Microsoft Azure MOOC X +

https://www.mooc-list.com/tags/microsoft-azure

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## Microsoft Azure MOOCs and Free Online Courses

A GLOBAL FIRST: ROOT USES AI IN THEIR DATA CENTERS

Machine learning reduces downtime risks and augments core maintenance programs.

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# <https://www.microsoft.com/handsonlabs>

Hands-on Labs

Instructor Led Labs

Self-paced Labs

Help

## Get hands-on with cloud technologies from Microsoft

Practice with the latest cloud products and services in a live environment and advance your cloud skills for free.

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### Featured Instructor Led Labs

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Getting Hands-on with Building Line-of-Business Application on Microsoft Azure

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Getting Hands-on with Security in Microsoft Azure

[View Class Schedule >](#)

### Featured Self-paced Labs

[View all Self-paced Labs !\[\]\(20932790b4e6e760b9a4767f966dc51f\_img.jpg\)](#)

UNDER MAINTENANCE

# Azure Sample Architectures

<https://azure.microsoft.com/en-us/solutions/architecture/>

## Azure solution architectures

Architectures to help you design and implement secure, highly-available, performant and resilient solutions on Azure.

### Solution architectures

Search

Search



Solutions

All

Products

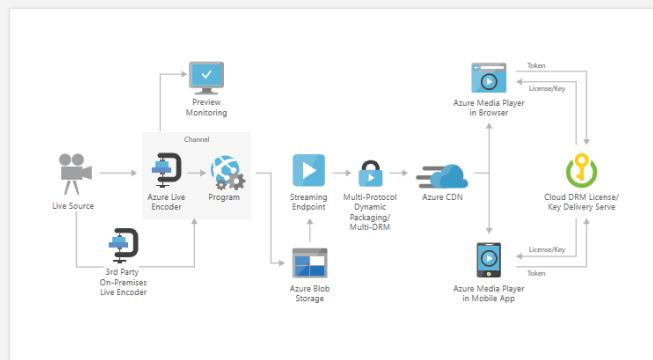
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Tags

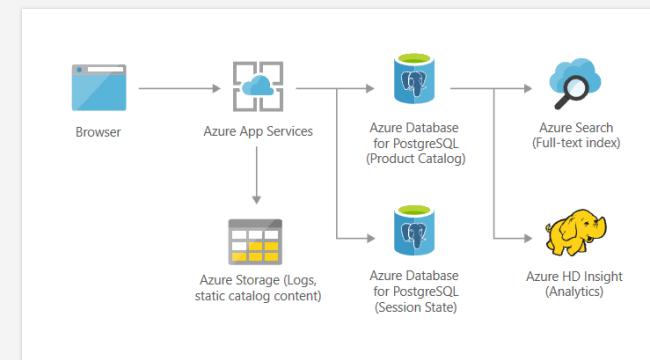
All

Industries

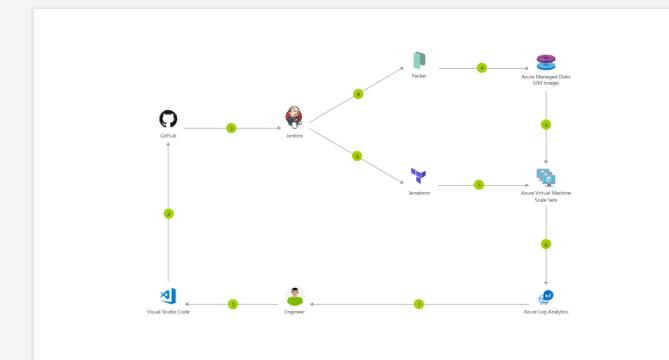
All



Live streaming digital media



Retail and e-commerce using Azure



Immutable Infrastructure CI/CD using Azure

# Azure Migration Tools

## Discover

### Microsoft

Microsoft Assessment and Planning (MAP) Toolkit

Azure Migrate

Database Migration Assistant

### Partners



**TSO Logic**



**BitTitan**



**MOVERE**

## Migrate

Azure Site Recovery

Database Migration Service  
Public Preview

## Optimize

Operations Management Suite



**CloudAtlas®**



**VELOSTRATA**

**Zerto**

**veeAM**



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- VP & General Manager
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5 Tower Bridge  
300 Barr Harbor Dr., Suite 705  
West Conshohocken, PA 19428

[www.razor-tech.com](http://www.razor-tech.com)  
[David.Rosenthal@razor-tech.com](mailto:David.Rosenthal@razor-tech.com)

Cell: 215.801.4430  
Office: 866.RZR.DATA





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