

Azure Fundamentals

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Session Objectives & key takeaways

At the end of this session you will be better able to

- Learn Basic Cloud concepts
- Understand Azure Infrastructure As A Service
- Know how to manage IAAS components

Agenda

Introduction

Cloud fundamentals

Azure Virtual Machines

Azure Storage & Disks

Azure SD Networking

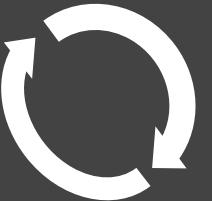
Azure management

Cloud Fundamentals

Reasons for moving to cloud



Economics



Time to Market
Business agility and
flexibility



Elastic



Always up.
Always on.



Usage based



Managed



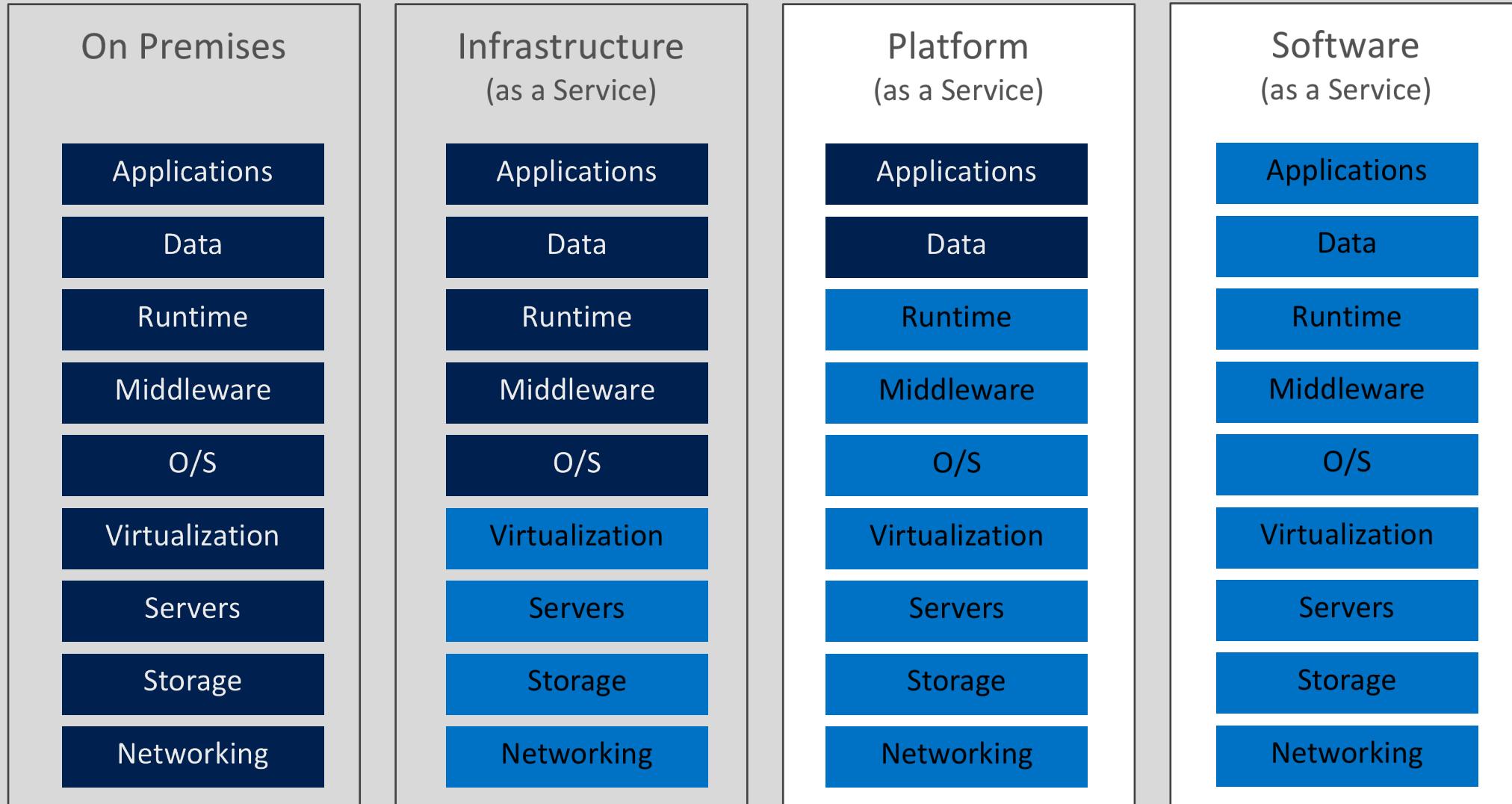
54 regions
worldwide

140 available in
140 countries

hypercloud



Cloud Services



You Manage

Vendor Manages

Platform Services

Security & Management



Compute



Web and Mobile



Developer Services



Hybrid Operations



Integration



Media & CDN



Analytics & IoT



Data



Infrastructure Services

Compute



Storage



Networking



Datacenter Infrastructure (38 Regions)



Marketplace ISV solutions



Product Category

Compute
Networking
Storage
Web + Mobile

Databases
Intelligence + analytics

Internet of Things
Enterprise Integration
Security + Identity

Developer tools
Monitoring + Management

Add-ons
Containers
Blockchain

Azure Active Directory apps

Featured apps

[See all](#)

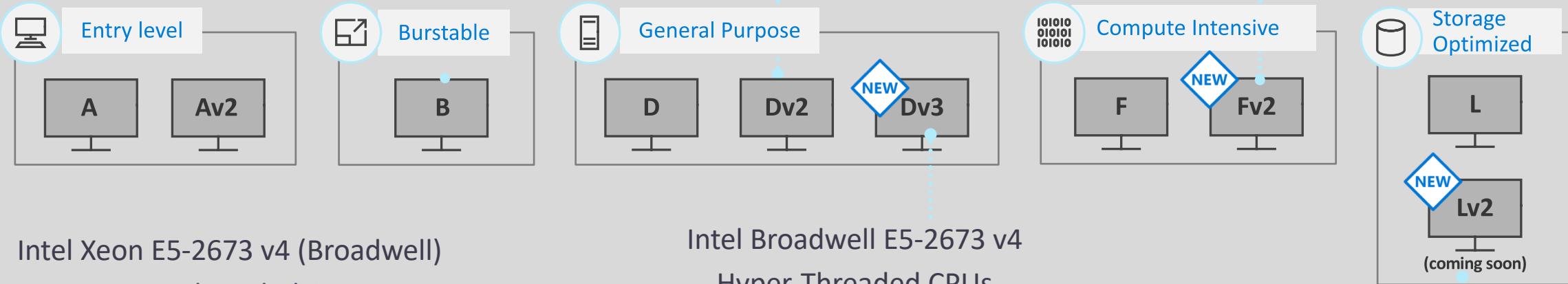
 Citrix XenApp Essentials By Citrix The easiest and fastest way to securely deliver Windows apps from Microsoft Azure to any device. Get it now	 Episerver CMS By Episerver This is a 30 day evaluation version of Episerver CMS. Episerver CMS is a cloud-based platform that makes di... Get it now	 FAST™ Enterprise Edition By Talon FAST™ Enterprise Edition Bring your own license	 Teradata Database Enterprise By Teradata Same full-feature data warehouse software powering analytics at many of the world's great companies. Get it now
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Azure Virtual Machines

Latest VM Sizes

Intel Haswell E5-2673 v3
Lowest cost, flexible CPUs
Up to 8vCPUs, 32GB RAM

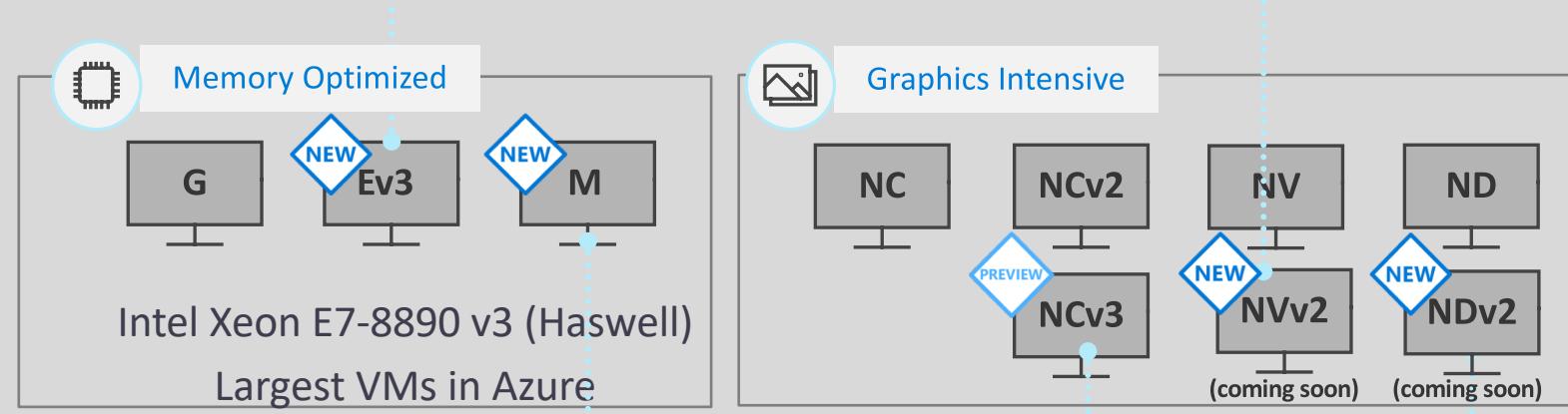
Intel® Xeon® Platinum 8168
processor (Skylake)



Intel Xeon E5-2673 v4 (Broadwell)
Hyper-Threaded CPUs
Up to 64 vCPUs, 432GB RAM

Intel Broadwell E5-2673 v4
Hyper-Threaded CPUs
Up to 64 vCPUs, 256GB RAM

AMD EPYC™ 7551 processor



Intel Xeon E7-8890 v3 (Haswell)
Largest VMs in Azure
Up to 128 vCPUs, 4TB RAM

8x1.9 TB SSDs

HANA
optimized



Virtual Machines

Multiple families and sizes, GPUs

HDD/SSD, Managed/Unmanaged Disks, Accelerated Networking

Availability Sets, scheduled events, planned maintenance

Ubuntu, Red Hat, Windows, SUSE, CoreOS

VM Extensions

DevOps Extensions with Chef and Puppet



VM Scale Sets

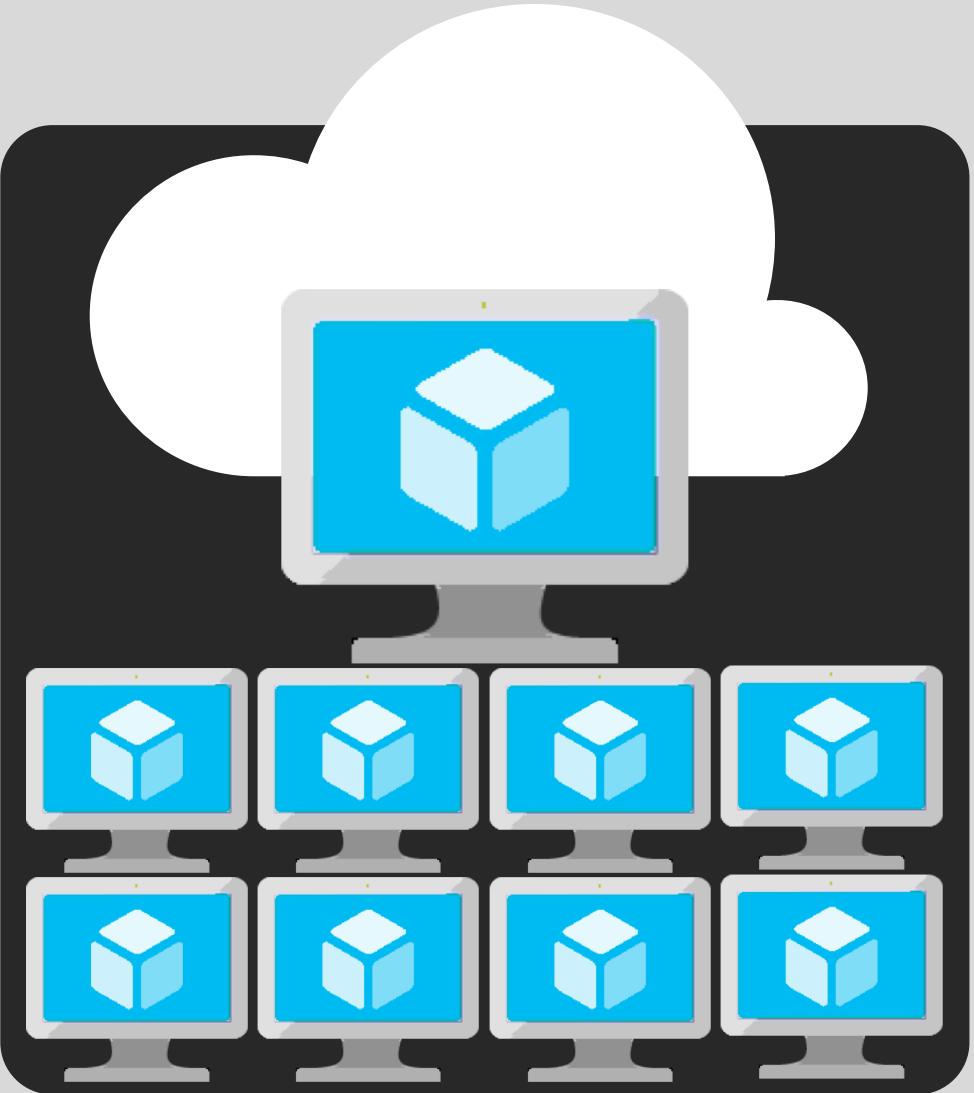
A single resource to provision up to 1000 VMs

Auto-configuration at scale

Auto-scale based on schedule and resource metrics

NEW: Span AvailabilityZones

PREVIEW: Low-priority scale set with up to 80% discount



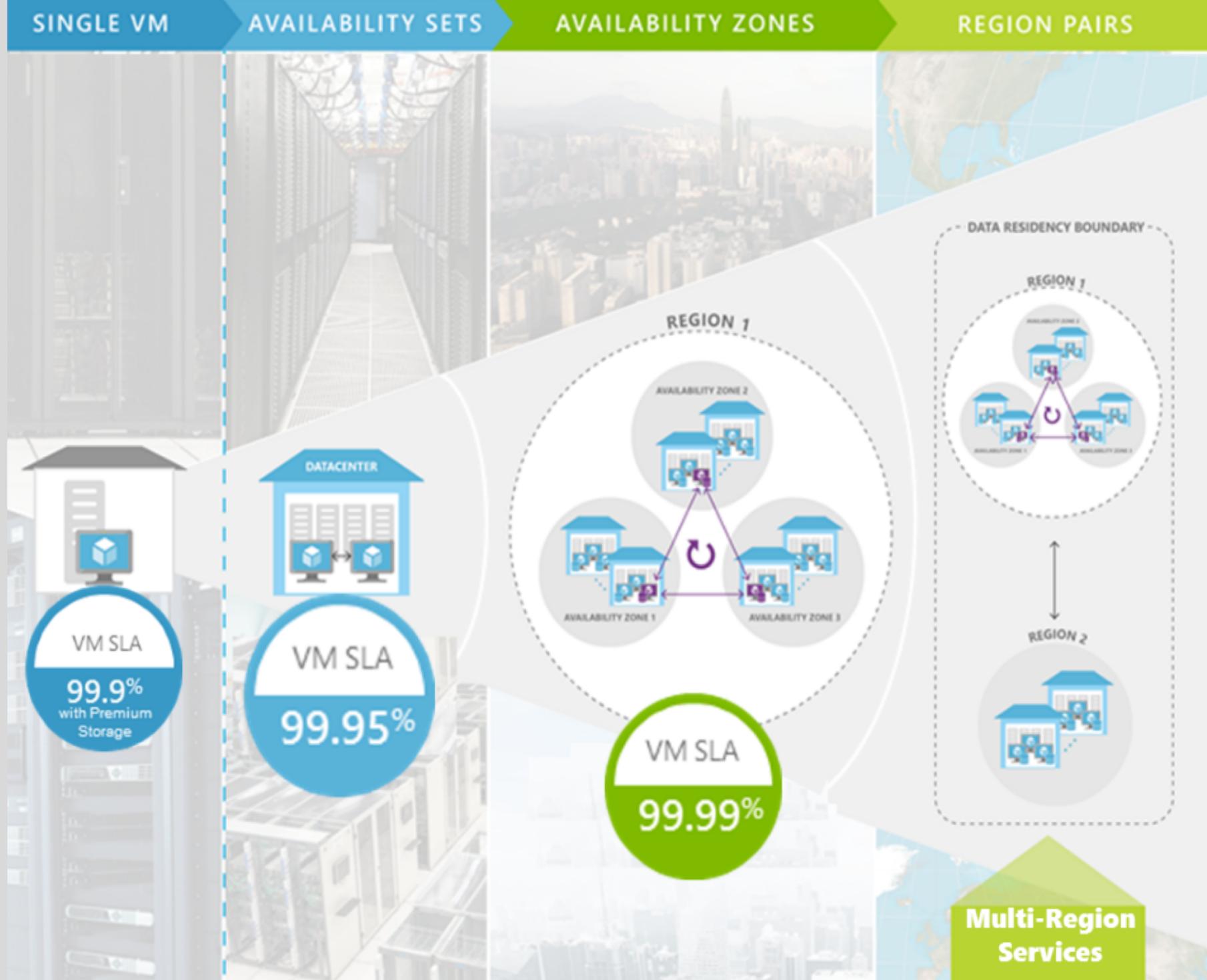
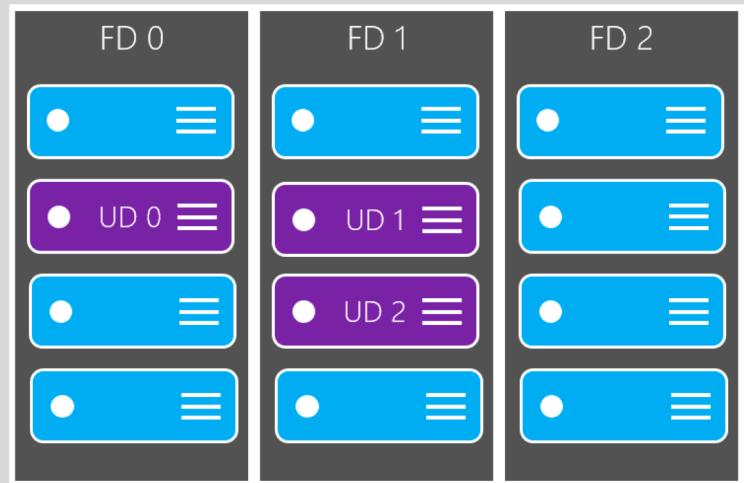
SINGLE VM

AVAILABILITY SETS

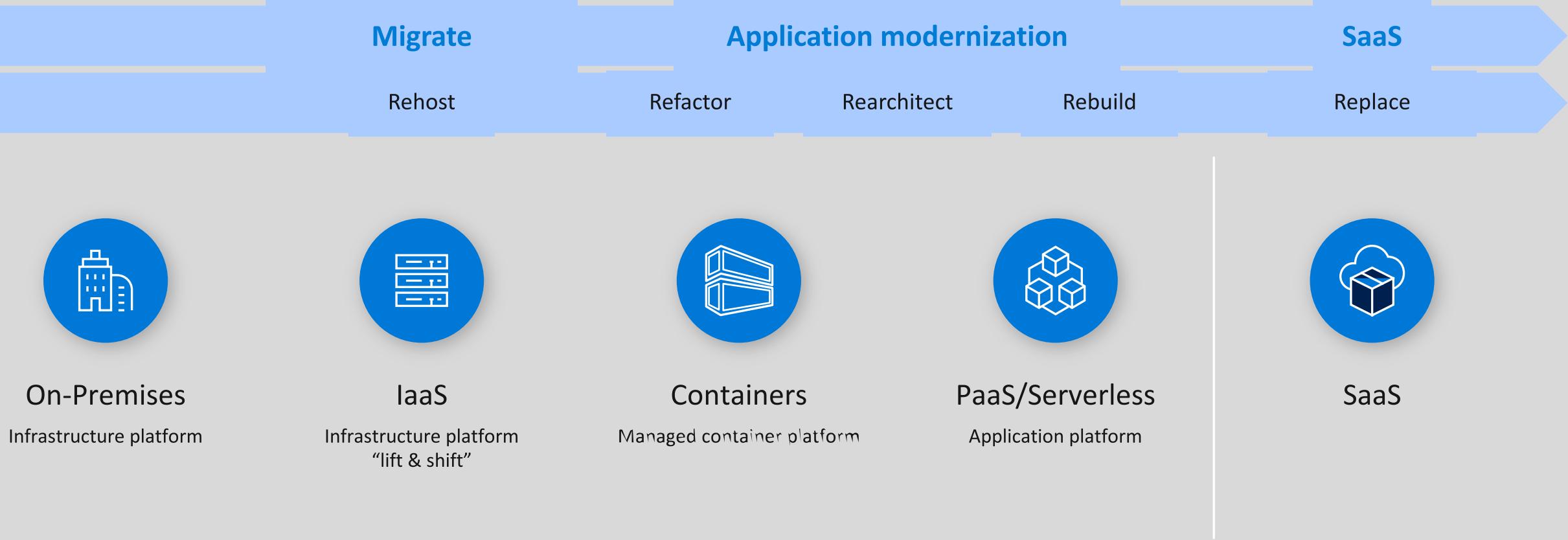
AVAILABILITY ZONES

REGION PAIRS

Availability



Different paths—one journey



Azure Storage & Disks

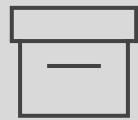
Secure, scalable, and highly available storage options for every use case



Disk storage

Premium
Standard

Reliable, persistent, high performing storage for Virtual Machines



Object storage

Azure Blobs

Secure, centralized storage target for backup/disaster recovery



File storage

Azure Files

Azure NetApp Files

Lift and shift of legacy applications that require file shares to the cloud



Data transport

Azure Import/Export

Azure DataBox

Move or migrate data into Azure



Hybrid storage

Azure StorSimple

Azure File Sync

Avere*

Secure, intelligent data tiering between on-premises and cloud storage

Azure Storage



Blob Storage



Table Storage



Queue Storage



File Storage

Containers/ blobs

Structured data

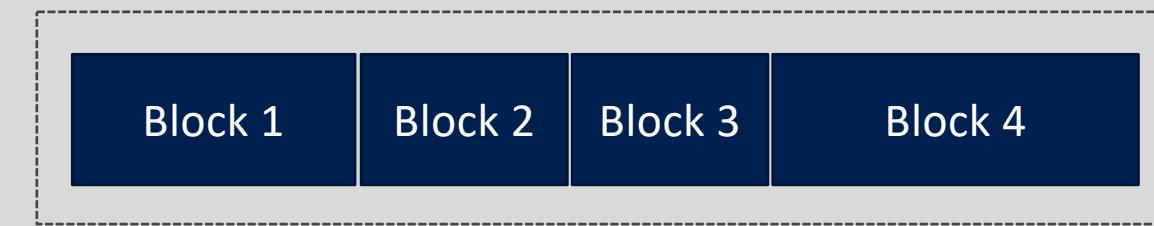
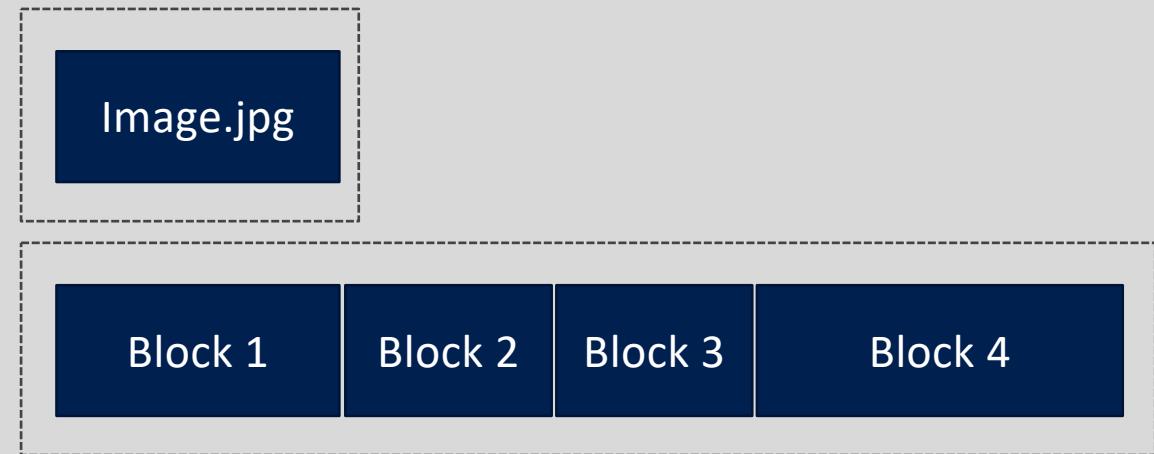
entities

messages

Files/dir

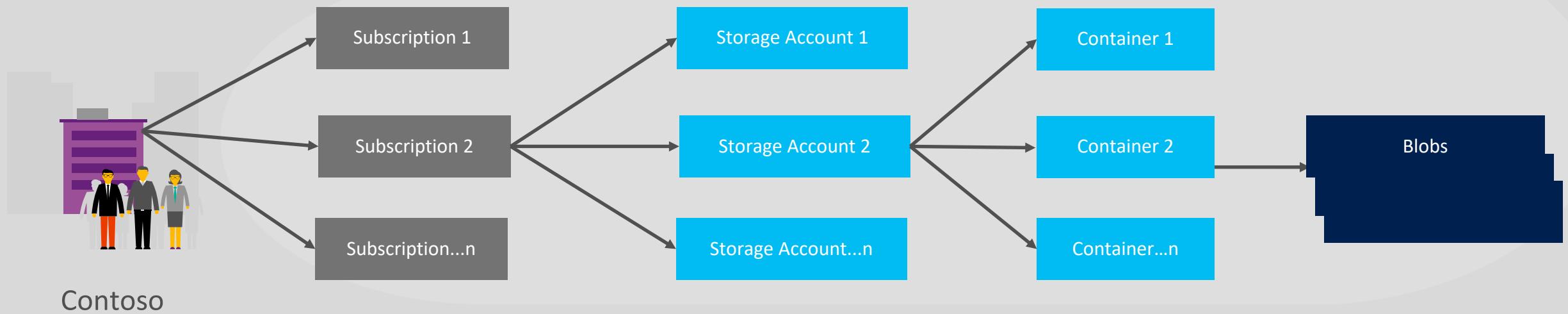
Types of Blobs

- Block Blobs
 - Most object storage scenarios
 - Documents, images, video, etc.
- Append Blobs
 - Multi-writer append only scenarios
 - Logging, Big Data Analytics output
- Page Blobs
 - Page aligned random reads and writes
 - IaaS Disks, Event Hub, Block level backup



Blob Storage Concepts

Microsoft Azure



<http://<StorageAccount>.blob.core.windows.net/<Container>/<Blob>>

http://**foo**.blob.core.windows.net/**images**/**2016/September/Annika.jpg**

Account Name

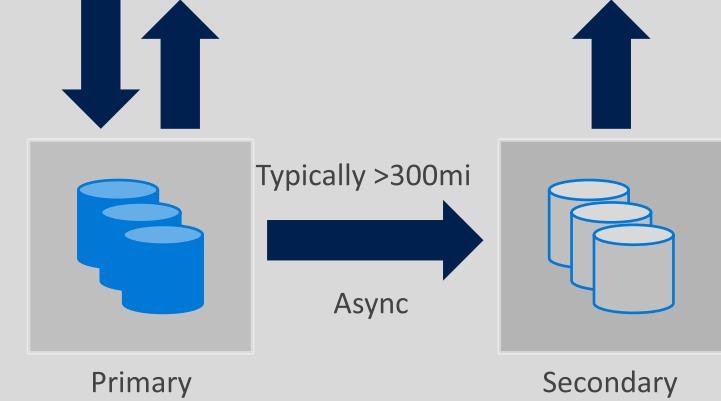
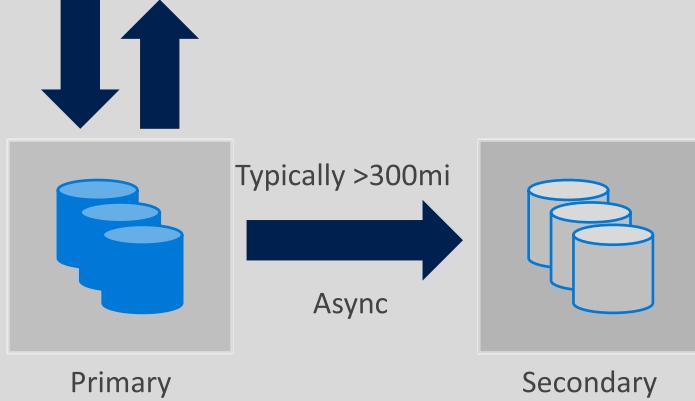
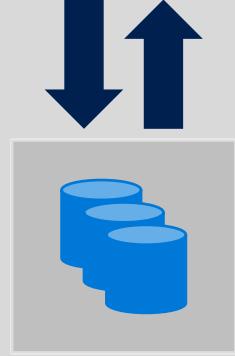
Container Name

Virtual directories + Blob

Object storage for every use case

Azure Blob		Hot		Cool		Archive
		Frequently accessed data		Less frequently accessed data		Rarely accessed data
 Per TB per month	\$18.40		\$10.00		\$2.00	
 Per 10k write operations	\$0.05		\$0.10		\$0.10	
 Retrieval times	Immediate		Immediate		Hours	
Use cases	Cloud native application data storage		Repository for server backups		Medical records archiving	

Azure Durability



LRS

- 3 replicas, 1 region
- Protects against disk, node, rack failures
- Write is ack'd when all replicas are committed
- Superior to dual-parity RAID

GRS

- 6 replicas, 2 regions (3/region)
- Adds protection against major regional disasters
- Write is ack'd when committed on primary, asynchronous to secondary

RA-GRS

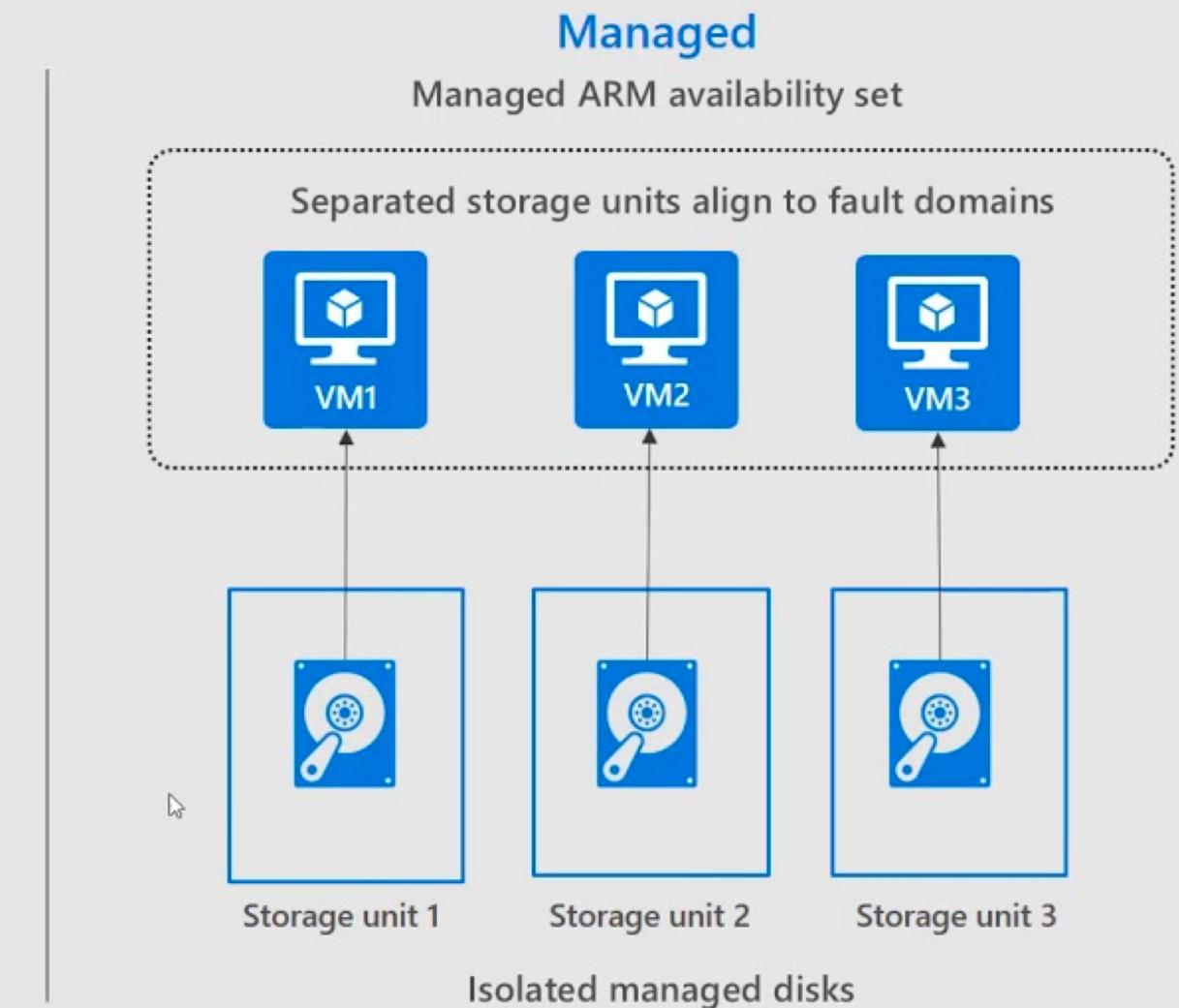
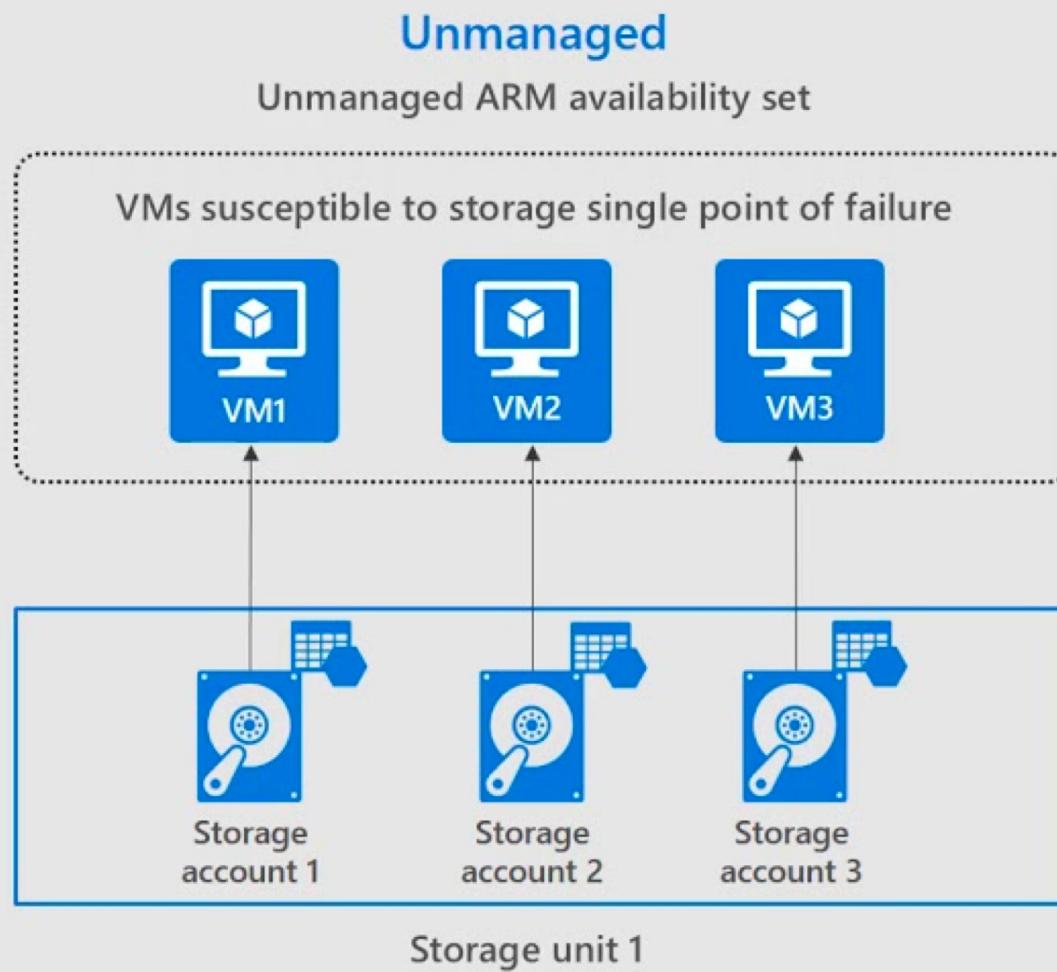
- GRS + Read access to secondary if primary is unavailable
- Secondary has separate endpoint
- RPO delay to secondary can be queried

ZRS : zone redundant storage

Azure Disks: Overview

- What are Azure Disks?
 - Persistent data disks for Azure IaaS VMs
 - Backed by Page Blobs in Azure Storage
 - Two types of durable storage: SSD (Premium Disks) & HDD (Standard Disks)
- Capabilities
 - High I/O performance and low latency (>80,000 IOPS and >2,000 MB/sec disk throughput per VM)
 - Server Side Encryption at Rest, Azure Disk Encryption (BitLocker)
 - Specialized VMs with Blob Cache technology
 - REST Interface
 - Enterprise grade durability with three replicas
 - Snapshots for backup, with advanced API support
 - Ability to expand Disks in place

Difference Between Unmanaged & Managed



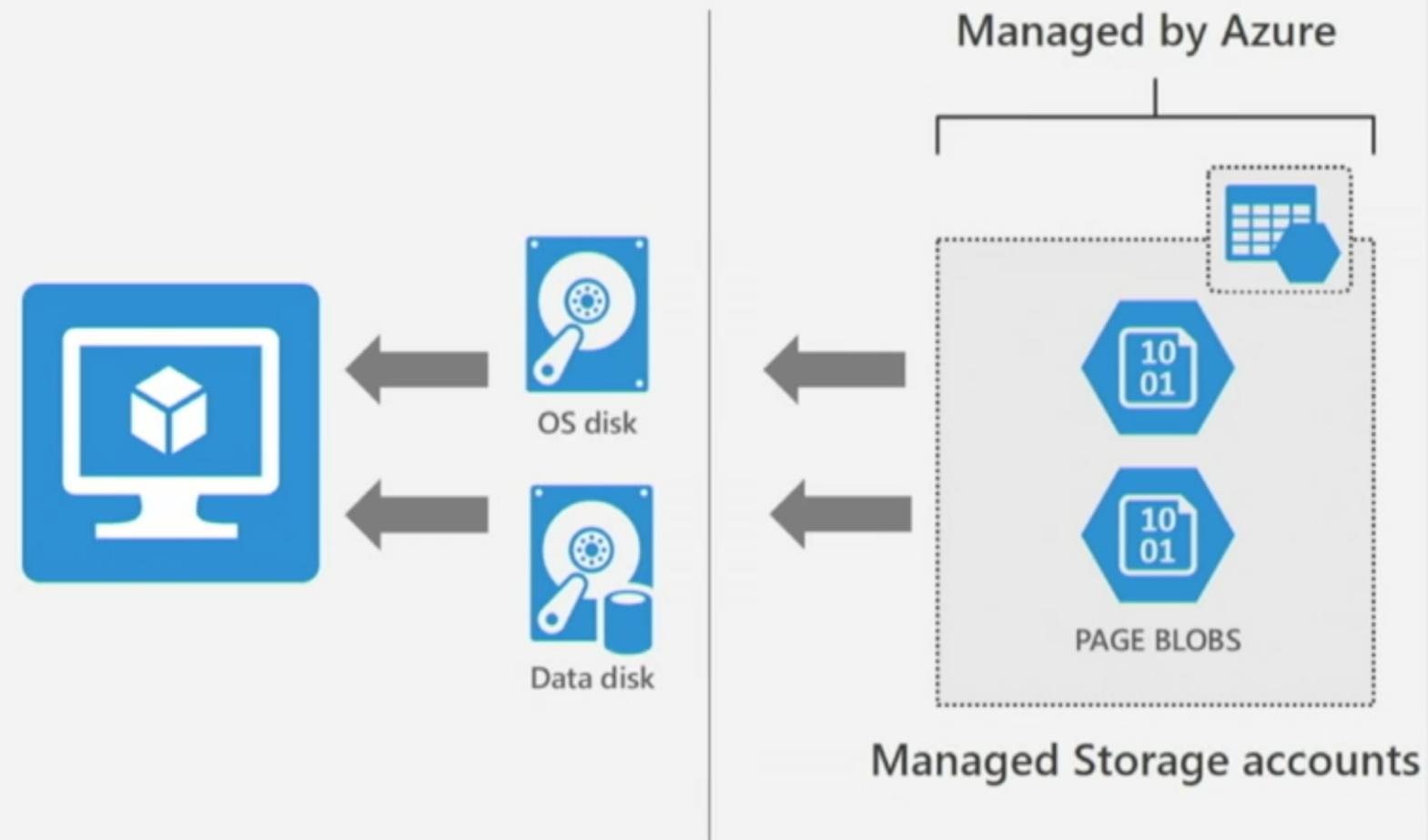
What is managed disks?

Simple - Abstracts storage accounts from customers

Granular access control – Top level ARM resource, apply Azure RBAC

Better performance - Storage account limits do not apply

Big scale - Up to 10,000 disks per region per subscription



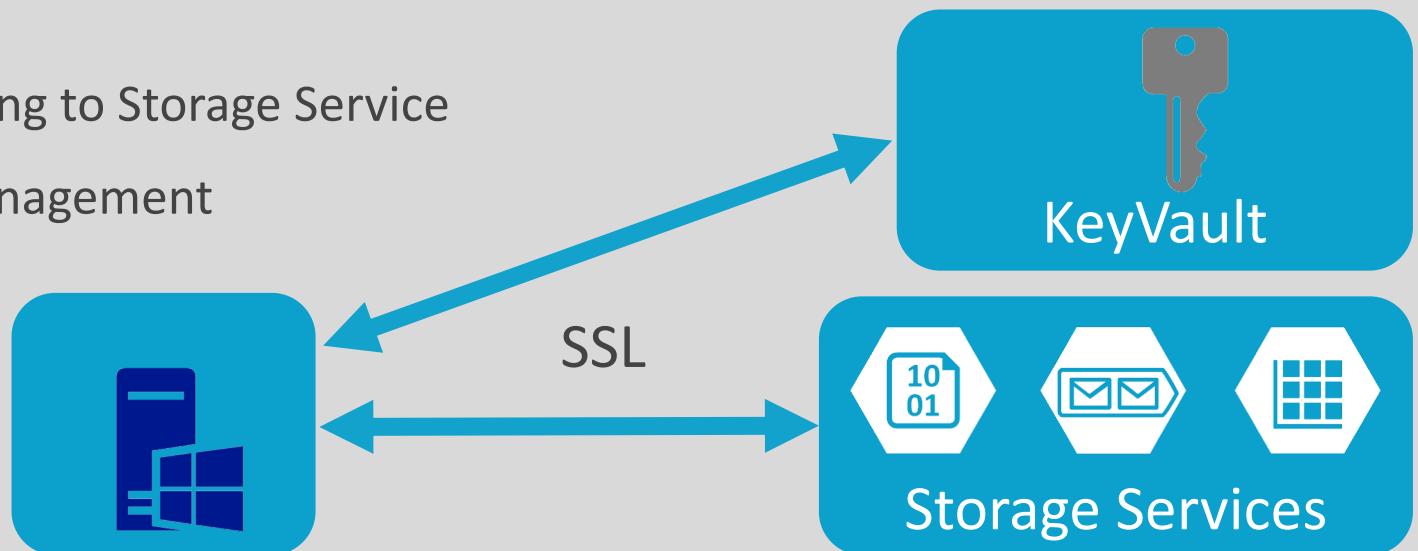
Encryption at Rest

- Blob Storage Service Encryption

- Blob Storage Service automatically encrypts your data
- SSL used to secure data sent to Storage Service
- Microsoft manages all key management practices including compliance

- Application Encryption

- Applications can encrypt data prior to sending to Storage Service
- Includes support for KeyVault based key management
- Supports Blob, Table and Queue storage
- Avail in .NET/Java Storage Client libraries



Common Partner Solutions

- Hybrid Storage with Azure

Partner	Product Solution	Key Differentiators
 NASUNI	Enterprise File Service	SMB/NFS, global file sharing/locking, global deduplication and compression, Extensive Snapshot Capabilities, Replication
 SoftNAS	SoftNAS Cloud NAS	Unified storage (iSCSI, SMB/NFS), Deduplication and Compression, Extensive Snapshot/Cloning Capabilities, Replication
 NetApp	ONTAP Cloud	NFS, SMB, iSCSI, Deduplication and Compression, Extensive Snapshot/Cloning Capabilities, Replication
 DELL EMC	CloudArray Isilon CloudPools	iSCSI, SMB, NFS, Deduplication and Compression
 TALON	CloudFAST	SMB, global file sharing/locking, intelligent file caching
 Quantum	StorNext Flex Tier	SMB, CIFS, NFS, IP, AFP, FTP, WebDav, High performance tiered Global-Namespace, Global File Sharing/Locking
 panzura	Panzura Global NAS Appliance	SMB/NFS, global file sharing/locking, Compression and Deduplication, Extensive Snapshot Capabilities
 COHESITY	DataPlatform	SMB, NFS, global data deduplication, snapshots, replication
 ctera	Cloud Storage Gateway	SMB, NFS, AFP, FTP, WebDAV, rsync, iSCSI, CTERA Mobile, CTERA Sync desktop application, web browser

Azure SD Networking

Robust networking infrastructure services



Virtual Network

Provision private networks, optionally connect to on-premise datacenters. NSG, User Defined Routes, & IP addresses



Load Balancer

Deliver high availability and network performance to your applications



Application Gateway/WAF

Build scalable and highly-available web front ends in Azure



DDoS Protection

Protect your Azure resources from DDoS attacks



VPN Gateway

Establish secure, cross-premise connectivity



Azure DNS

Host your DNS domain in Azure



Content Delivery Network

Ensure secure, reliable content delivery with broad global reach



Traffic Manager

Route incoming traffic for high performance and availability



ExpressRoute

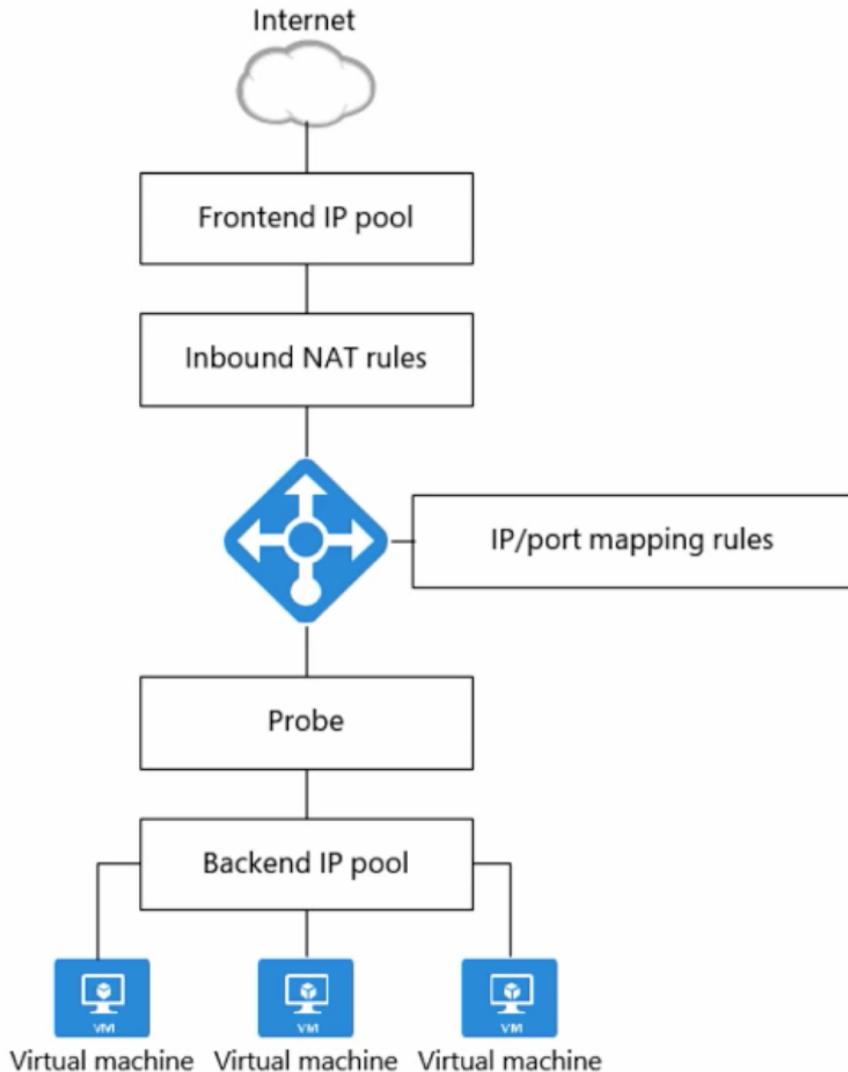
Dedicated private network fiber connections to Azure



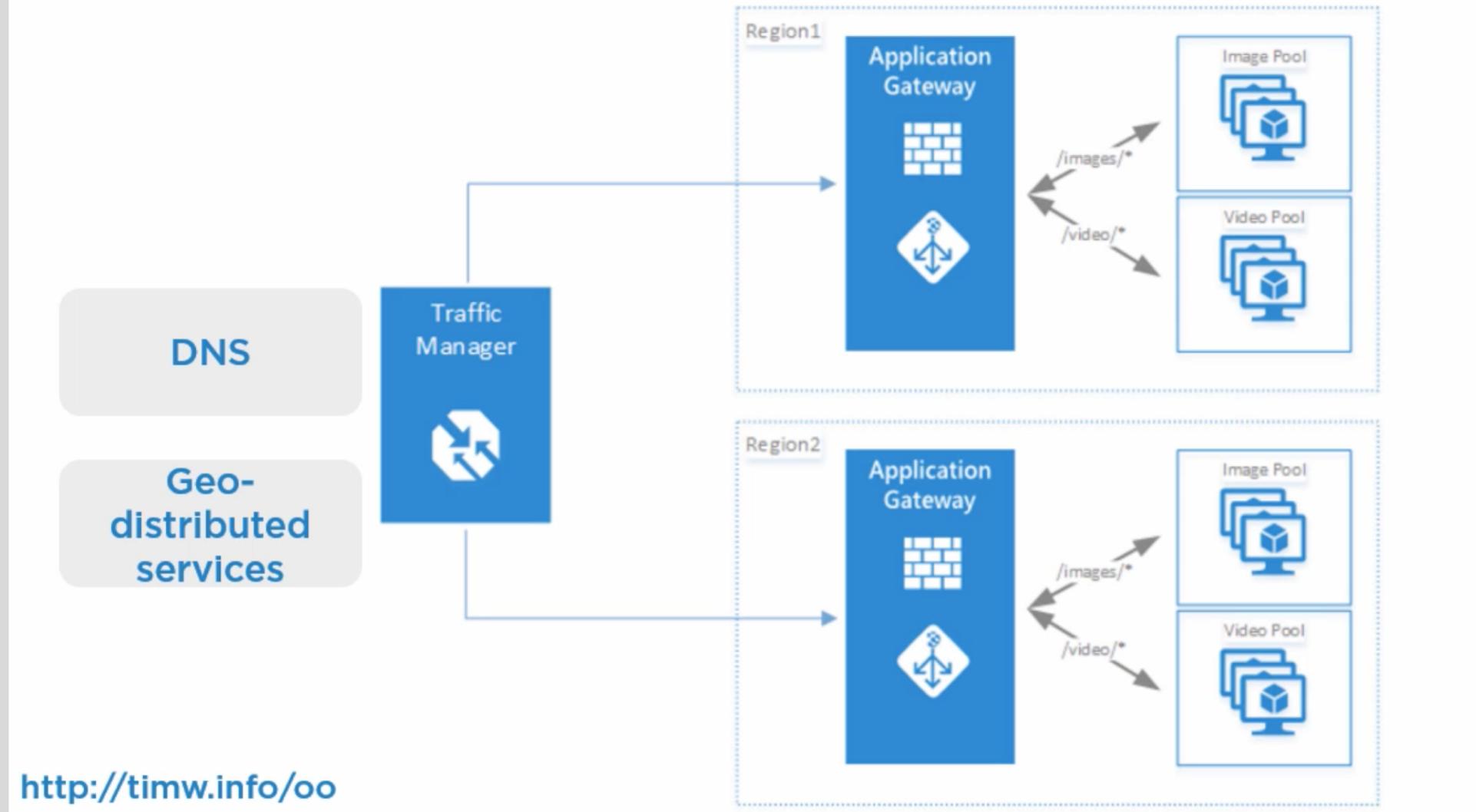
Network Watcher

Network performance monitoring and diagnostics solution

Azure Load Balancer Resources



Other Load Balancing Options



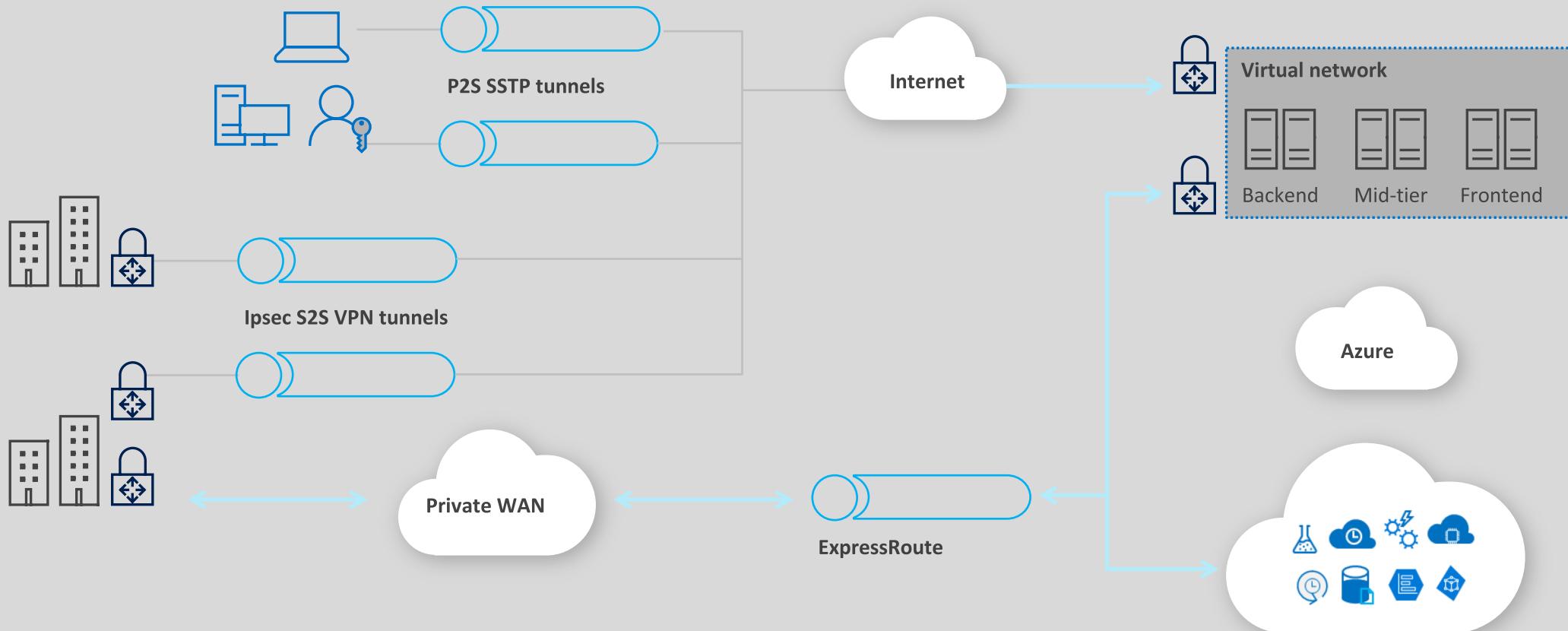
Connecting to Azure

Cloud	Customer	Characteristics
	Internet Connectivity	 <ul style="list-style-type: none">• Internet facing with public IP addresses in Azure• DNS, load balancing, DDoS protection, WAF
	Remote access point-to-site connectivity	 <ul style="list-style-type: none">• Remote Access to VNet/On-prem• Connect from anywhere• Mac, Linux, Windows• Radius/AD authentication
	Site-to-site VPN connectivity	 <ul style="list-style-type: none">• High throughput, secure cross-premises connectivity• BGP, active-active for high availability & transit routing
	ExpressRoute private connectivity	 <ul style="list-style-type: none">• Private connectivity to Microsoft services (O365, Azure PaaS services)• Mission critical workloads

Connecting in Azure

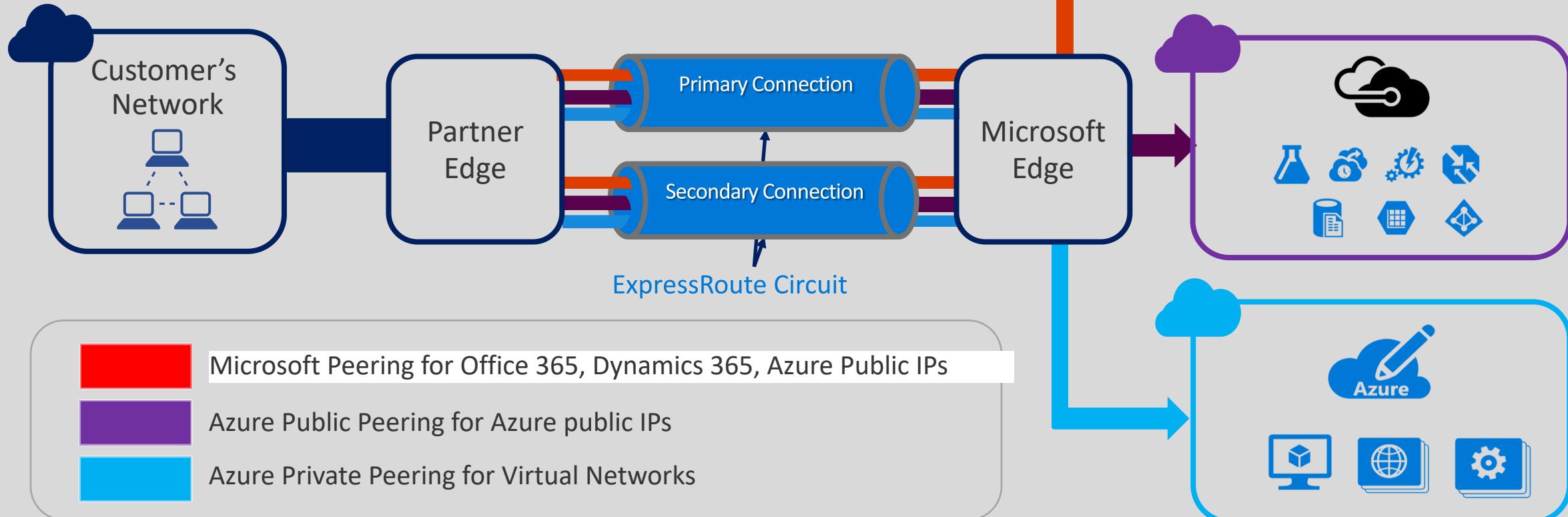
Cloud	Cloud	Characteristics
	VNet Peering	<ul style="list-style-type: none">• Same-/cross-region direct, private VM-to-VM connectivity• NSG & UDR across VNets• GatewayTransit for hub-and-spoke
	VNet-to-VNet via Gateways	<ul style="list-style-type: none">• Transitive routing via BGP and VPN gateways• Secure connectivity via IPsec/IKE across Azure WAN links

Hybrid connectivity overview



ExpressRoute

- ✓ Direct connectivity Microsoft Cloud Services
- ✓ Built-in performance
- ✓ Enterprise-grade Microsoft peering SLA for availability
- ✓ Integrated monitoring ExpressRoute health with Performance Monitor



ExpressRoute locations



Seattle
Silicon Valley 2
Silicon Valley
Las Vegas
Los Angeles

Montreal
Toronto
Denver
Chicago
Dallas
New York City
Washington DC
Washington DC 2
Atlanta
Miami
San Antonio

Dublin
Newport, Wales
London
Paris
London 2
Marseille

Amsterdam 2

Amsterdam

Seoul
Busan
Tokyo
Osaka

Hong Kong
Chennai
Mumbai

Kuala Lumpur

Singapore 2

Singapore

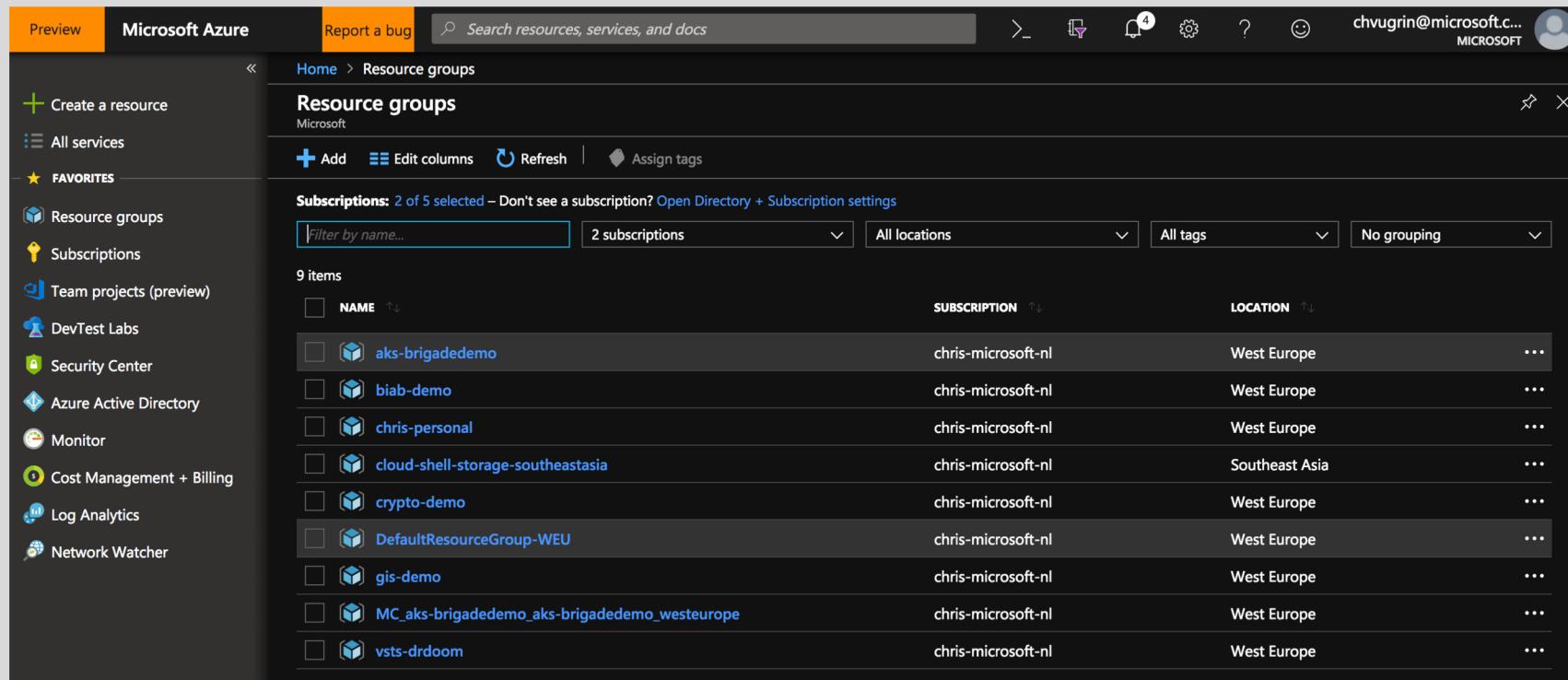
Johannesburg
Cape Town

Canberra
Sydney
Melbourne

Sao Paulo

Manage Azure

Manage Azure



The screenshot shows the Microsoft Azure portal interface. The top navigation bar includes 'Preview', 'Microsoft Azure', 'Report a bug', a search bar ('Search resources, services, and docs'), and user account information ('chvugrin@microsoft.com MICROSOFT'). Below the navigation is a left sidebar with links for 'Create a resource', 'All services', and 'FAVORITES' (Resource groups, Subscriptions, Team projects (preview), DevTest Labs, Security Center, Azure Active Directory, Monitor, Cost Management + Billing, Log Analytics, Network Watcher). The main content area is titled 'Resource groups' under 'Microsoft'. It displays a table of 9 items, each representing a resource group with columns for 'NAME', 'SUBSCRIPTION', and 'LOCATION'. The table shows 2 subscriptions (chris-microsoft-nl and chris-microsoft-nl) across locations like West Europe, Southeast Asia, and West Europe. Each row has a '...' button for more options.

NAME	SUBSCRIPTION	LOCATION
aks-brigadedemo	chris-microsoft-nl	West Europe
biab-demo	chris-microsoft-nl	West Europe
chris-personal	chris-microsoft-nl	West Europe
cloud-shell-storage-southeastasia	chris-microsoft-nl	Southeast Asia
crypto-demo	chris-microsoft-nl	West Europe
DefaultResourceGroup-WEU	chris-microsoft-nl	West Europe
gis-demo	chris-microsoft-nl	West Europe
MC_aks-brigadedemo_aks-brigadedemo_westeurop	chris-microsoft-nl	West Europe
vsts-drdoom	chris-microsoft-nl	West Europe



Portal

Azure-cli / PowerShell

<https://shell.azure.com>

API; python/
java/.net/nodejs etc

ARM templates

<https://resources.azure.com/>
Armviz.io

DSC

Get started links

Managing Infrastructure with Microsoft Azure – Getting Started

<https://www.microsoft.com/handsonlabs/learningPaths/SelfPacedLabs?learningPathCourseId=5a691bba-74bd-4ab8-b06f-38e7231f7c9f>

Microsoft Azure Virtual Machines – Getting Started

<https://www.microsoft.com/handsonlabs/learningPaths/SelfPacedLabs?learningPathCourseId=3D8230D9-D742-401F-8431-3740511CC0CB>

Microsoft Azure IaaS Monitoring and Management – Getting Started

<https://www.microsoft.com/handsonlabs/learningPaths/SelfPacedLabs?learningPathCourseId=84BAD88C-28D1-4749-AD25-E85BBA184673>

Microsoft Azure Security – Getting Started

<https://www.microsoft.com/handsonlabs/learningPaths/SelfPacedLabs?learningPathCourseId=0833444A-27BF-4613-822C-9069E3869987>

Implementing Microsoft Azure Networking

<https://www.microsoft.com/handsonlabs/LearningPaths/SelfPacedLabs?learningPathCourseId=7BA0718D-D39A-4E94-86AC-085DA677C7E3>

Mastering Microsoft Azure Resource Manager

<https://www.microsoft.com/handsonlabs/learningPaths/SelfPacedLabs?learningPathCourseId=EC6A449B-E09D-4A2A-9D85-F68BE38439F4>

Questions ?



Microsoft