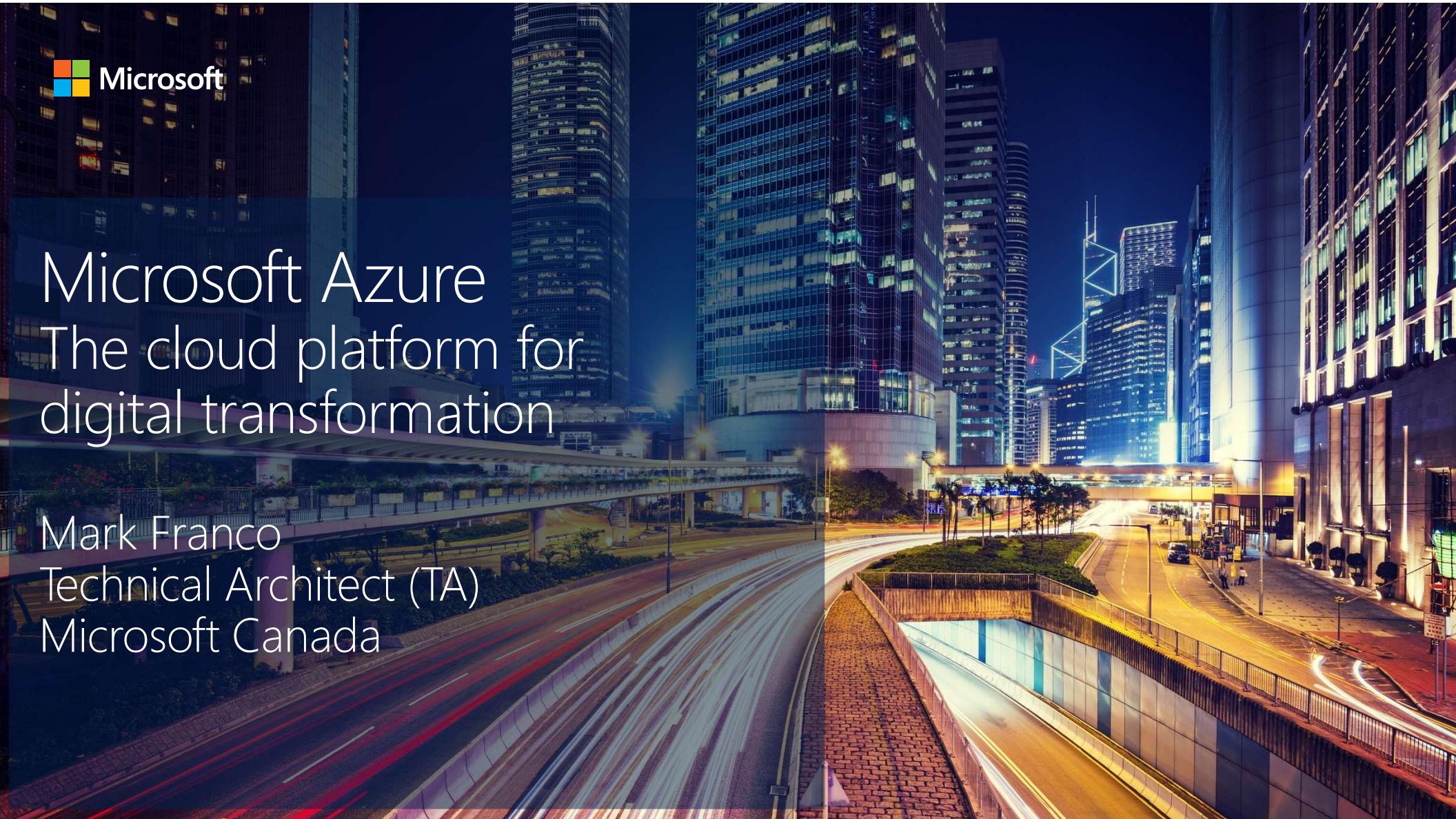




Microsoft Azure

The cloud platform for digital transformation

Mark Franco
Technical Architect (TA)
Microsoft Canada





Microsoft Azure In the Enterprise

Mark Franco
MTC Technical Architect (TA)
Microsoft Canada



Agenda:

- [Microsoft's Cloud Strategy]
- [Overview of Azure IaaS and PaaS]
- [Azure Storage Basics]
- [Open Discussion]

Agenda

- [Azure IaaS and PaaS Demos]
- [Azure Portals and API's]
- [Azure Resource Manager (ARM) API]
- [Azure Storage]
- [Azure Networking Basics]
- [Azure Virtual Networks (Vnets)]
- [Express Route]

Agenda (cont):

- [Azure Network Security Mechanisms]
- [Deploying Globally with Traffic Manager]
- [Cloud Adoption Methodology]
- [Cloud Adoption – Use Cases]
- [Azure Security Center]
- [Operational Analytics - OMS)]

Agenda (cont):

[Appendix]

[Microsoft Azure Stack (MAS)]

[Azure Service Fabric]

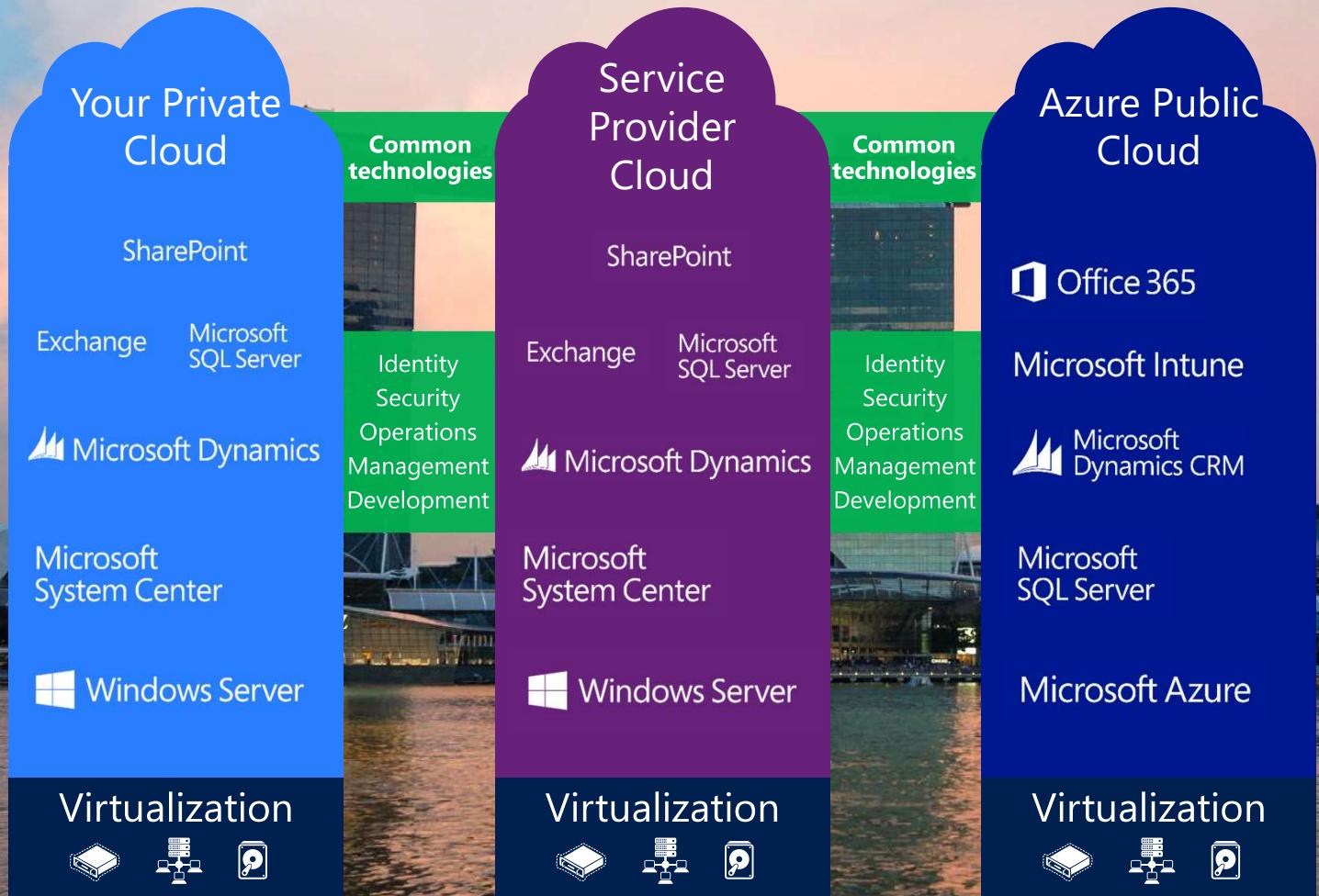
[Azure DEV-OPS]

[Azure described by Gartner]

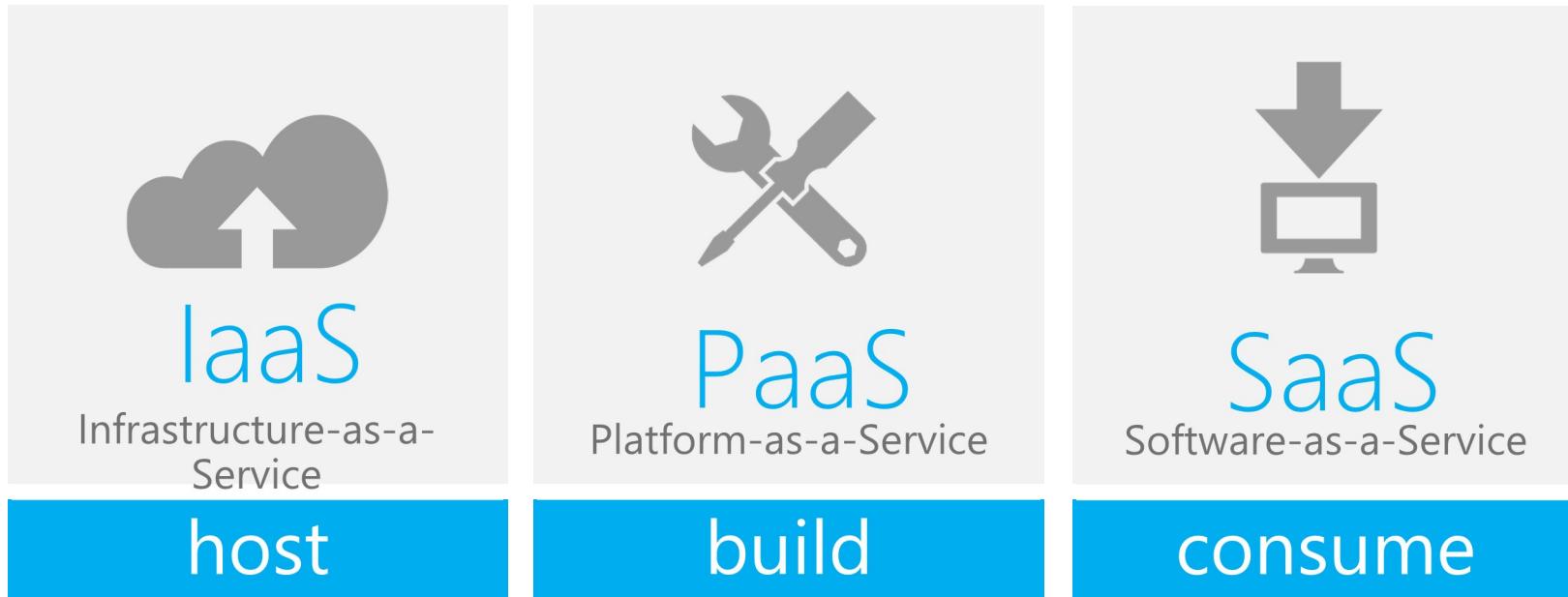
[Miscellaneous]

[Microsoft's Cloud Strategy]

Microsoft's Hybrid Cloud Strategy



What is Cloud Computing?

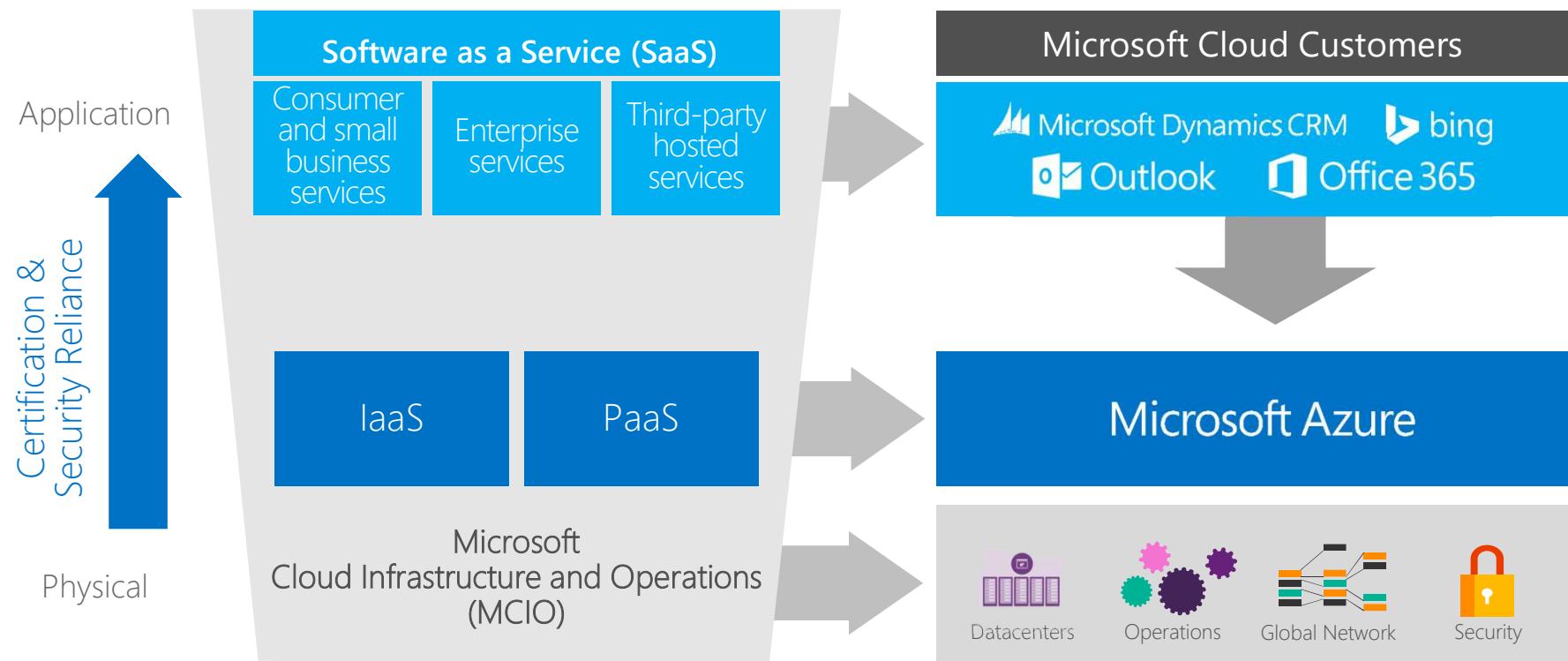


NIST DEFINITION: <http://csrc.nist.gov/publications/nistpubs/800-145/SP800-145.pdf>

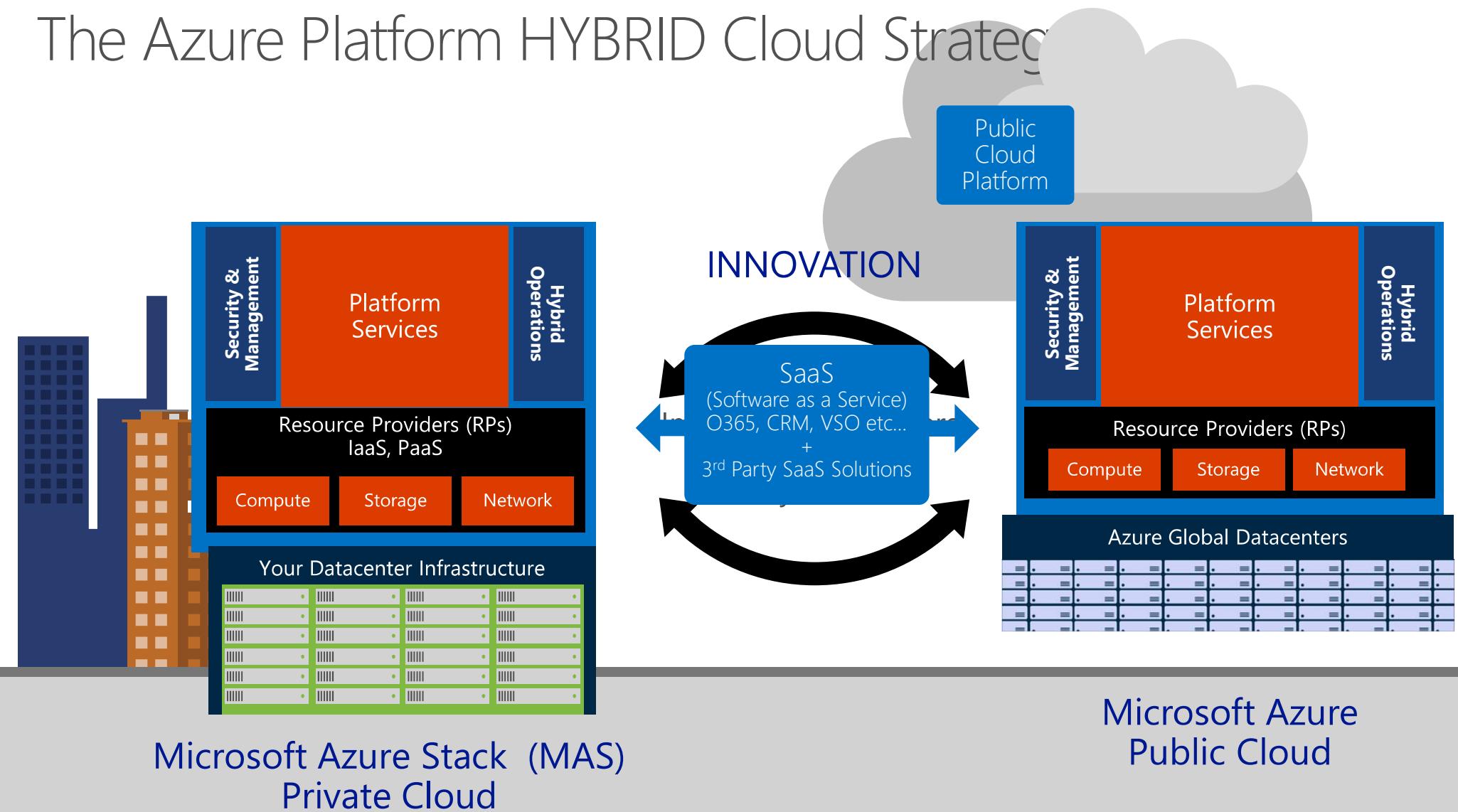
- 1) On demand self service
- 2) Broad network access
- 3) Resources pooling
- 4) Rapid elasticity
- 5) Measured service.



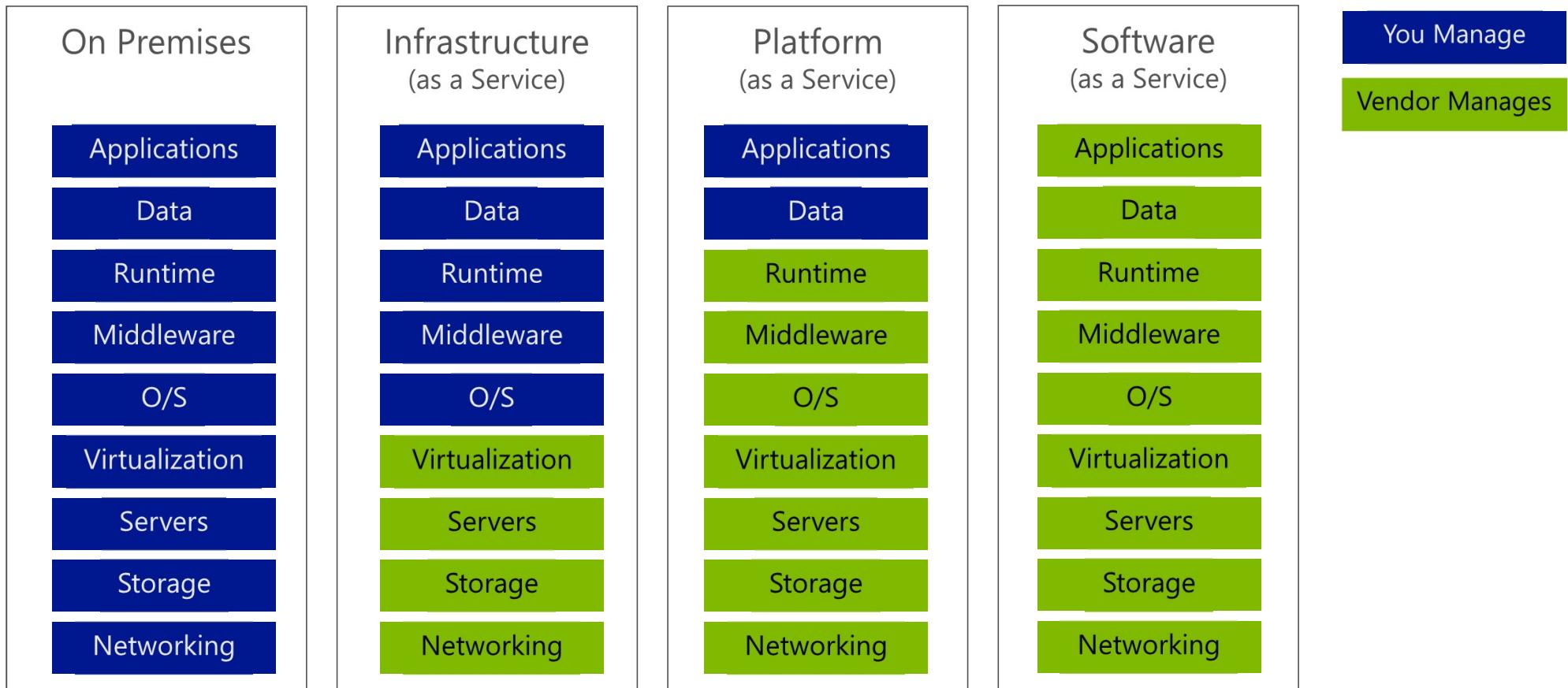
Microsoft's cloud environment



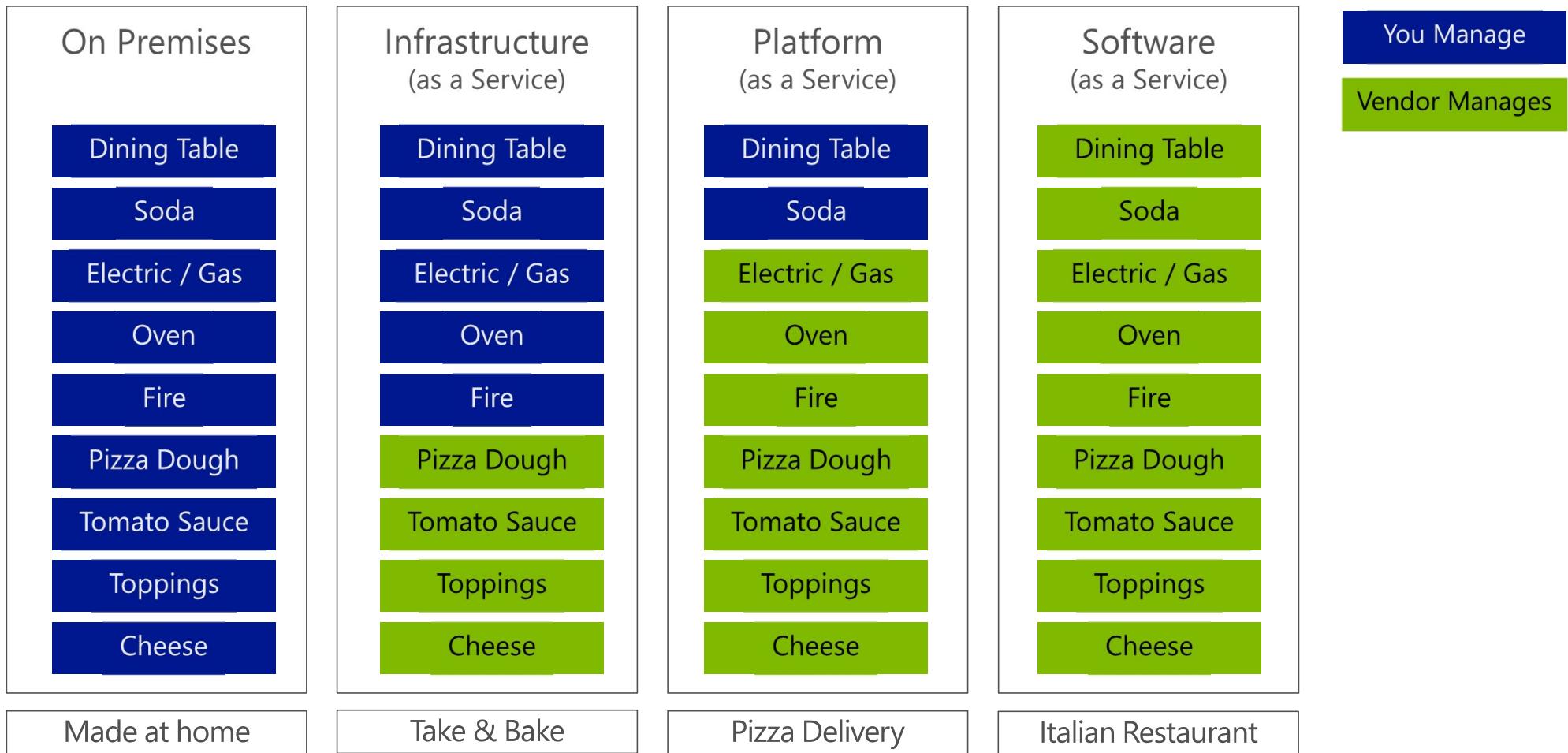
The Azure Platform HYBRID Cloud Strategy



Cloud Services



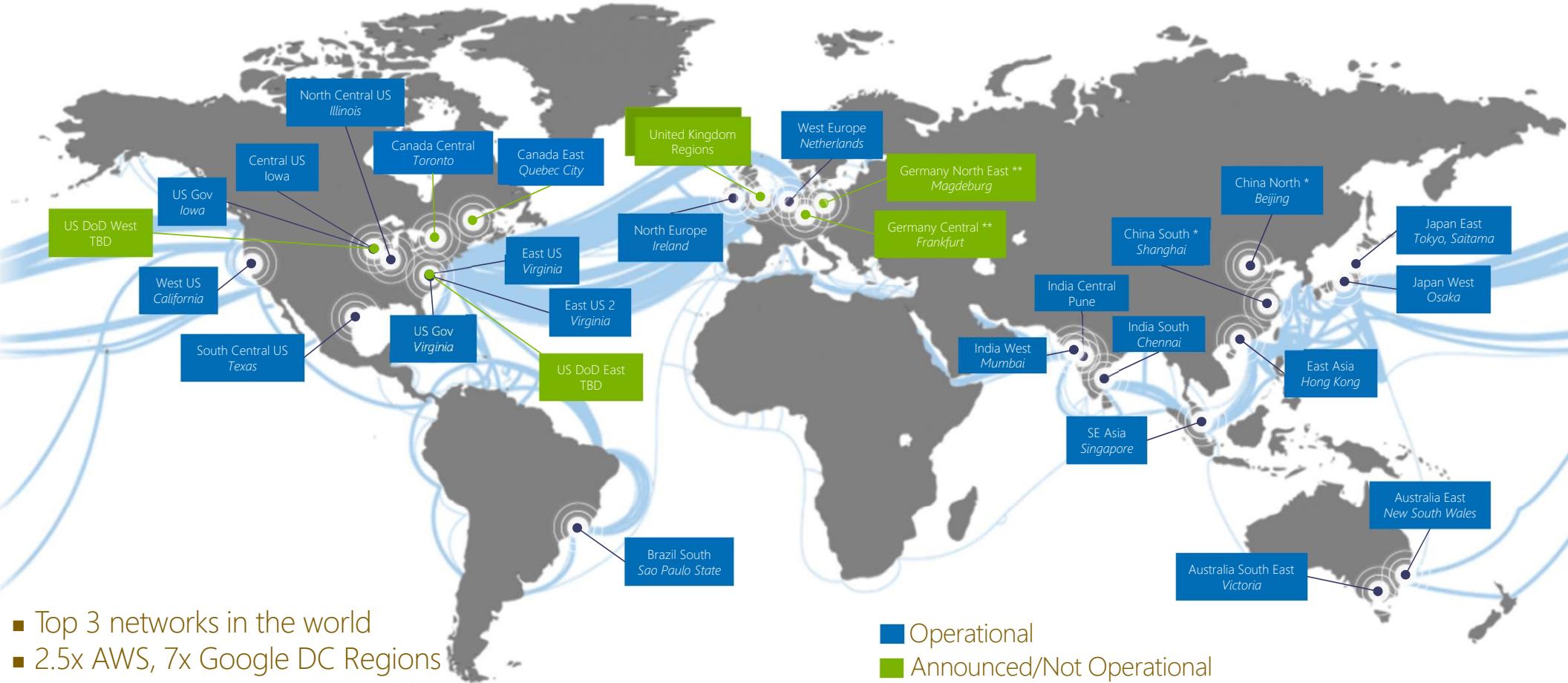
Pizza Services Analogy



[Overview of Azure IaaS and PaaS]

Hyper scale Infrastructure is the enabler

100+ Datacenters across 38 Regions (30 Generally Available) Worldwide

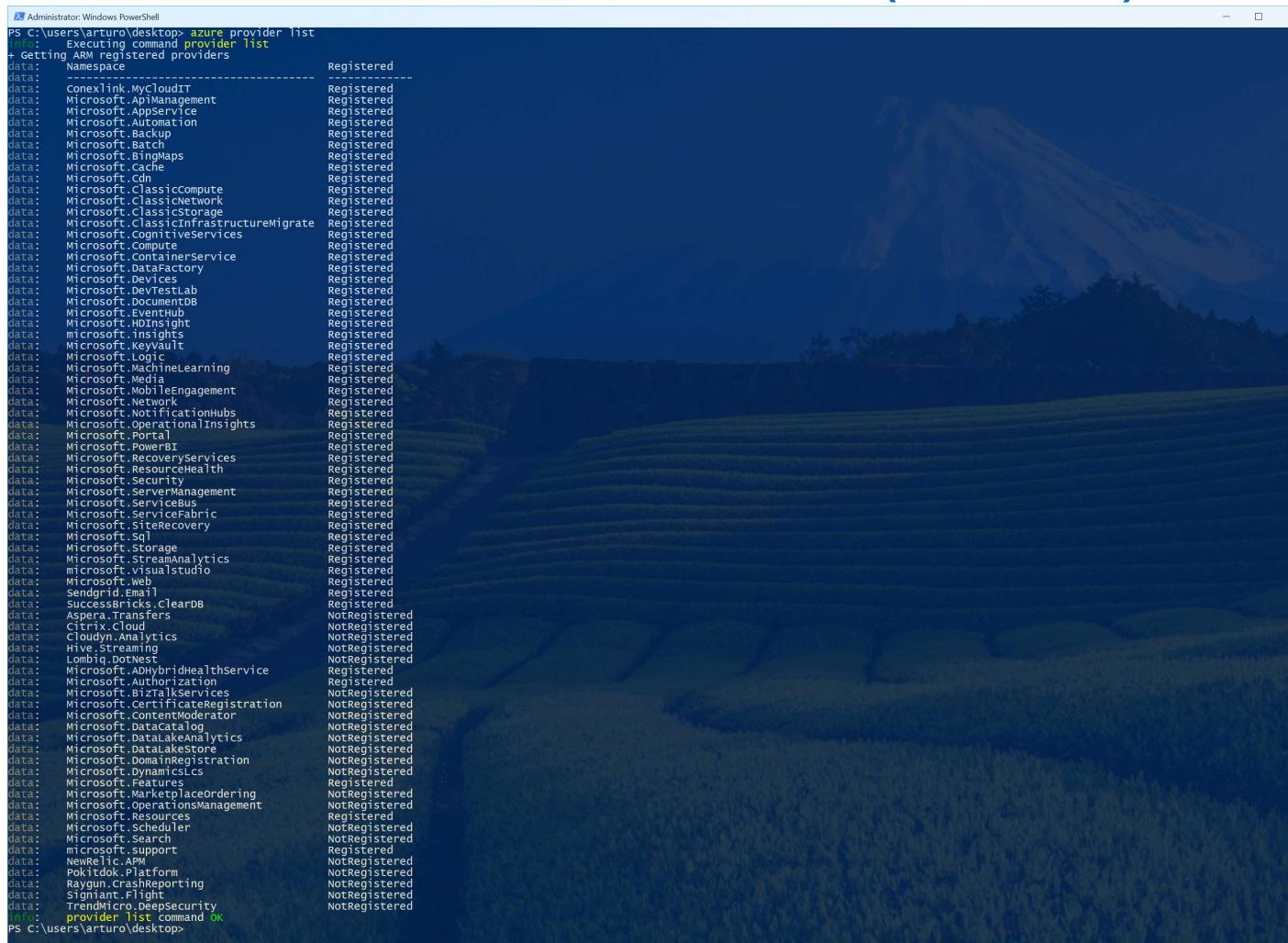


- Top 3 networks in the world
- 2.5x AWS, 7x Google DC Regions
- G Series – Largest VM in World, 32 cores, 448GB Ram, SSD...

Azure locations list (azure cli)

```
Administrator: Windows PowerShell
PS C:\users\arturo\Desktop>
PS C:\users\arturo\Desktop>
PS C:\users\arturo\Desktop>
PS C:\users\arturo\Desktop> azure location list
[info]: Executing command Location List
[warn]: The "location list" command is changed to list subscription's locations. For old information, use "provider list or show" commands.
[info]: Getting locations...
data: Name           Display Name      Latitude   Longitude
data: -----          -----          -----       -----
data: eastasia        East Asia        22.267    114.188
data: southeastasia   Southeast Asia   1.283     103.833
data: centralus        Central US      41.5908   -93.6208
data: eastus           East US         37.3719   -79.8164
data: eastus2          East US 2       36.6681   -78.3889
data: westus           West US         37.783    -122.417
data: northcentralus  North Central US 41.8819   -87.6278
data: southcentralus  South Central US 29.4167   -98.5
data: northeurope      North Europe    53.3478   -6.2597
data: westeurope        West Europe    52.3667   4.9
data: japanwest        Japan West      34.6939   135.5022
data: japaneast         Japan East      35.68     139.77
data: brazilsouth       Brazil South    -23.55    -46.633
data: australiaeast     Australia East  -33.86    151.2094
data: australiasoutheast Australia Southeast -37.8136  144.9631
data: southindia        South India     12.9822   80.1636
data: centralindia      Central India   18.5822   73.9197
data: westindia         West India      19.088    72.868
data: canadacentral    Canada Central  43.653    -79.383
data: canadaeast        Canada East     46.817    -71.217
[info]: Location List command OK
PS C:\users\arturo\Desktop>
```

Azure Resource Providers (via cli)



```
PS C:\users\arturo\desktop> az provider list
[...]
+ getting ARM registered providers
data:   Namespace          Registered
data:   -----  -----
data:   Conexlink.MyCloud    Registered
data:   Microsoft.Billing     Registered
data:   Microsoft.AppService  Registered
data:   Microsoft.Automation  Registered
data:   Microsoft.Backup      Registered
data:   Microsoft.Batch       Registered
data:   Microsoft.BingMaps   Registered
data:   Microsoft.Cache       Registered
data:   Microsoft.Cdn         Registered
data:   Microsoft.ClassicCompute Registered
data:   Microsoft.ClassicNetwork Registered
data:   Microsoft.ClassicStorage Registered
data:   Microsoft.ClassicInfrastructureMigrate Registered
data:   Microsoft.CognitiveServices Registered
data:   Microsoft.Compute     Registered
data:   Microsoft.ContainerService Registered
data:   Microsoft.ContainerRegistry Registered
data:   Microsoft.Devices      Registered
data:   Microsoft.DevTestLab   Registered
data:   Microsoft.DocumentDB   Registered
data:   Microsoft.EventHub     Registered
data:   Microsoft.HDInsight   Registered
data:   Microsoft.Insights     Registered
data:   Microsoft.KeyVault    Registered
data:   Microsoft.Logic       Registered
data:   Microsoft.MachineLearning Registered
data:   Microsoft.Media        Registered
data:   Microsoft.MobileEngagement Registered
data:   Microsoft.Network      Registered
data:   Microsoft.NotificationHubs Registered
data:   Microsoft.OperationalInsights Registered
data:   Microsoft.Orbital       Registered
data:   Microsoft.PowerBI     Registered
data:   Microsoft.RecoveryServices Registered
data:   Microsoft.ResourceHealth Registered
data:   Microsoft.Security     Registered
data:   Microsoft.ServerManagement Registered
data:   Microsoft.ServiceBus   Registered
data:   Microsoft.ServiceFabric Registered
data:   Microsoft.SiteRecovery Registered
data:   Microsoft.Sql           Registered
data:   Microsoft.Storage       Registered
data:   Microsoft.StreamAnalytics Registered
data:   Microsoft.VisualStudio  Registered
data:   Microsoft.Web           Registered
data:   Sendgrid.Email          Registered
data:   SuccessiveCloud.ClearDB Registered
data:   Aspose.Transfers         NotRegistered
data:   Citrix.Cloud             NotRegistered
data:   Cloudyn.Analytics       NotRegistered
data:   Hive.Streaming          NotRegistered
data:   Lombiq.dotNet            NotRegistered
data:   Microsoft.ADHybridHealthService Registered
data:   Microsoft.AzureIntegrationRuntime Registered
data:   Microsoft.BizTalkServices NotRegistered
data:   Microsoft.CertificateRegistration NotRegistered
data:   Microsoft.ContentModerator NotRegistered
data:   Microsoft.DataCatalog    NotRegistered
data:   Microsoft.DataLakeAnalytics NotRegistered
data:   Microsoft.DataLakeStore   NotRegistered
data:   Microsoft.DomainRegistration NotRegistered
data:   Microsoft.FluentAnalytics NotRegistered
data:   Microsoft.FastBlobs      Registered
data:   Microsoft.MarketplaceOrdering NotRegistered
data:   Microsoft.OperationsManagement NotRegistered
data:   Microsoft.Resources      Registered
data:   Microsoft.Scheduler     NotRegistered
data:   Microsoft.Search         NotRegistered
data:   Microsoft.Support        Registered
data:   Microsoft.TrafficManager NotRegistered
data:   Pokitdok.Platform        NotRegistered
data:   Raygun.CrashReporting   NotRegistered
data:   Signiant.Flight          NotRegistered
data:   TrendMicro.DeepSecurity NotRegistered
info: provider list command OK
PS C:\users\arturo\desktop>
```

Security & Management

- Security Center
- Portal
- Azure Active Directory
- Azure AD B2C
- Multi-Factor Authentication
- Automation
- Scheduler
- Key Vault
- Store/ Marketplace
- VM Image Gallery & VM Depot

Media & CDN

- Media Services
- Media Analytics
- Content Delivery Network

Integration

- API Management
- BizTalk Services
- Logic Apps
- Service Bus

Compute Services

- Container Service
- VM Scale Sets
- Batch
- RemoteApp
- Dev/Test Lab

Platform Services

Application Platform

- Web Apps
- Mobile Apps
- API Apps
- Cloud Services
- Service Fabric
- Notification Hubs
- Functions

Data

- SQL Database
- SQL Server Stretch Database
- Redis Cache
- Storage Tables
- Azure Search
- DocumentDB

Intelligence

- Cognitive Services
- Bot Framework
- Cortana

Developer Services

- Visual Studio
- Mobile Engagement
- VS Team Services
- Xamarin
- Application Insights
- HockeyApp

Analytics & IoT

- HDInsight
- Machine Learning
- Stream Analytics
- Data Catalog
- Data Lake Analytics Service
- Data Lake Store
- IoT Hub
- Event Hubs
- Data Factory
- Power BI Embedded

Hybrid Cloud

- Azure AD Health Monitoring
- AD Privileged Identity Management
- Domain Services
- Backup
- Operational Analytics
- Import/Export
- Azure Site Recovery
- StorSimple

Compute

- Virtual Machines
- Containers

Storage

- Blob
- Queues
- Files
- Disks

Networking

- Virtual Network
- Load Balancer
- DNS
- Express Route
- Traffic Manager
- VPN Gateway
- App Gateway

Datacenter Infrastructure (32 Regions, 24 Online)



Platform Services from Microsoft Azure

The screenshot displays the Microsoft Azure Platform Services page, featuring a grid of service icons categorized by function. The services are organized into the following groups:

- Compute:** Virtual Machines, Virtual Machine Scale Sets, Cloud Services, Batch, RemoteApp, Service Fabric, Azure Container Service.
- Web & Mobile:** Web Apps, Mobile Apps, Logic Apps, API Apps, API Management, Notification Hubs, Mobile Engagement, Functions*.
- Data & Storage:** SQL Database, DocumentDB, Redis Cache, Storage: Blobs, Tables, Queues..., StorSimple, Search, SQL Data Warehouse, SQL Server Stretch Database.
- Analytics:** Data Lake Analytics*, Data Lake Store*, HDInsight, Machine Learning, Stream Analytics, Data Factory, Data Catalog, Power BI Embedded.
- Media, Internet of Things & Intelligence:** Media Services, Azure IoT Suite, Azure IoT Hub, Event Hubs, Cortana Intelligence Suite, Cognitive Services*.
- Networking & CDN:** Virtual Network, ExpressRoute, Traffic Manager, Load Balancer, Azure DNS*, VPN Gateway, Application Gateway, Content Delivery Network.
- Enterprise Integration, Identity & Access Management:** BizTalk Services, Service Bus, Backup, Site Recovery, Azure Active Directory, B2C, Domain Services*, Multi-Factor Authentication.
- Developer Services:** Visual Studio Team Services, Azure DevTest Labs, VS Application Insights*, HockeyApp, Developer Tools.
- Management & Security:** Azure Portal, Scheduler, Operations Management Suite, Automation, Log Analytics, Key Vault, Security Center.

* Preview Services | Guidance | Statics | Service Updates | Support Options

English | German

[Azure Storage basics]

Azure Storage Account Services

Blobs



Block: Text or binary data (.log, .exe, jpg, etc.).

Up to 200GB.

Page: Optimized for disks (.vhdx). Supports random read-write. Up to 1TB.

Append Blob: Writes to end of the blob (4MB max) up to 50k times (~195GB)

Tables



NoSQL storage of structured data (entities).

Key/value storage.

A single entity can have up to 255 properties and be up to 1MB.

File Shares



Supports SMB 3.0 protocol.

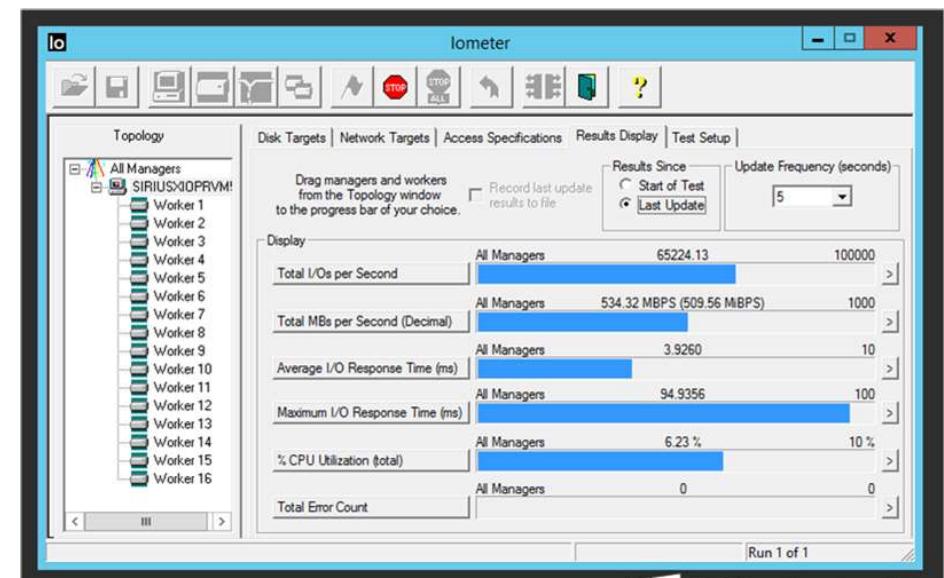
Can be accessed like a traditional file share.

Share files between multiple Virtual Machines.

A single file share can be up to 5TB.

Azure Premium Storage

- Consistent low latency SSD based with predictable IO throughput
- Suitable for high-performance IO-intensive database workloads
- Single digit milliseconds latencies
- Supports up to 1 TB blob/disk size
- Stripe up to 32 disks for a total of
 - 32TB and more than 50,000 IOPS
- Premium Storage Disks work in
 - with DS and GS VM instance sizes



Scalability Targets

Storage Account: 20,000 IOPS



Blobs



500 IOPS or 60MB/second.

Basic/Standard Tier VM: 300/500 IOPS/disk.

DS-Series VM w/Prem. Stg.: 5,000 IOPS/disk.

File Shares



1,000 IOPS or 60MB/second (8K object size).

Tables



2,000 Entities/second (1K entity size)

Queues

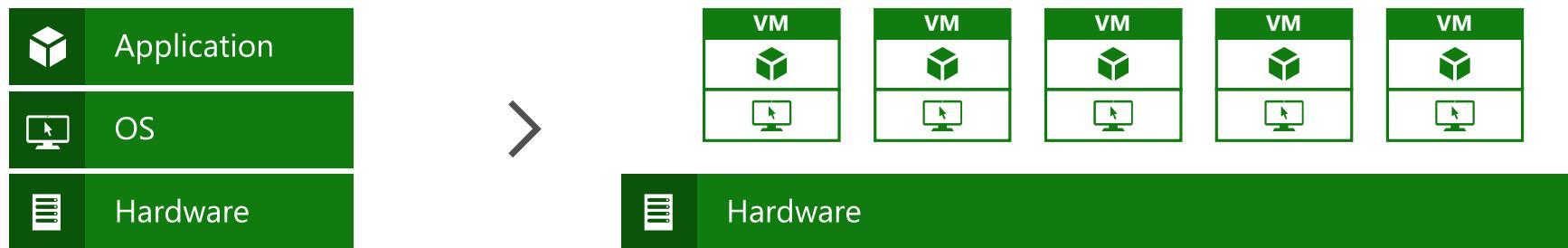


2,000 Messages/second (1K message size).

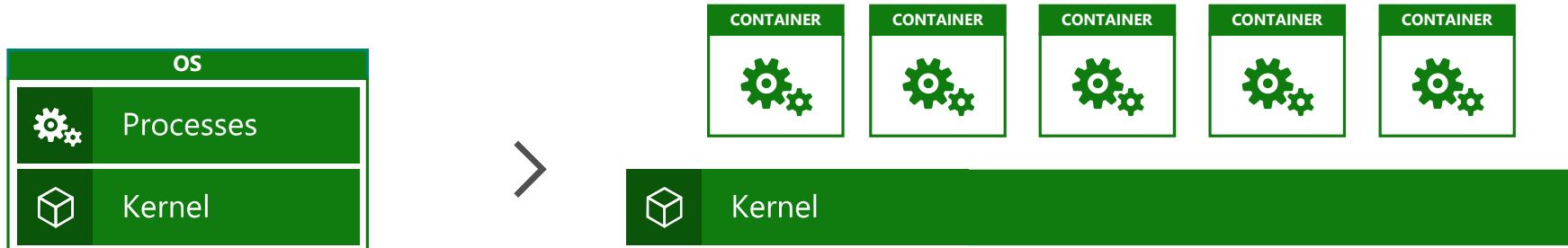
[Overview of Containers]

What is a container?

Traditional virtual machines = hardware virtualization



Containers = Operating system virtualization



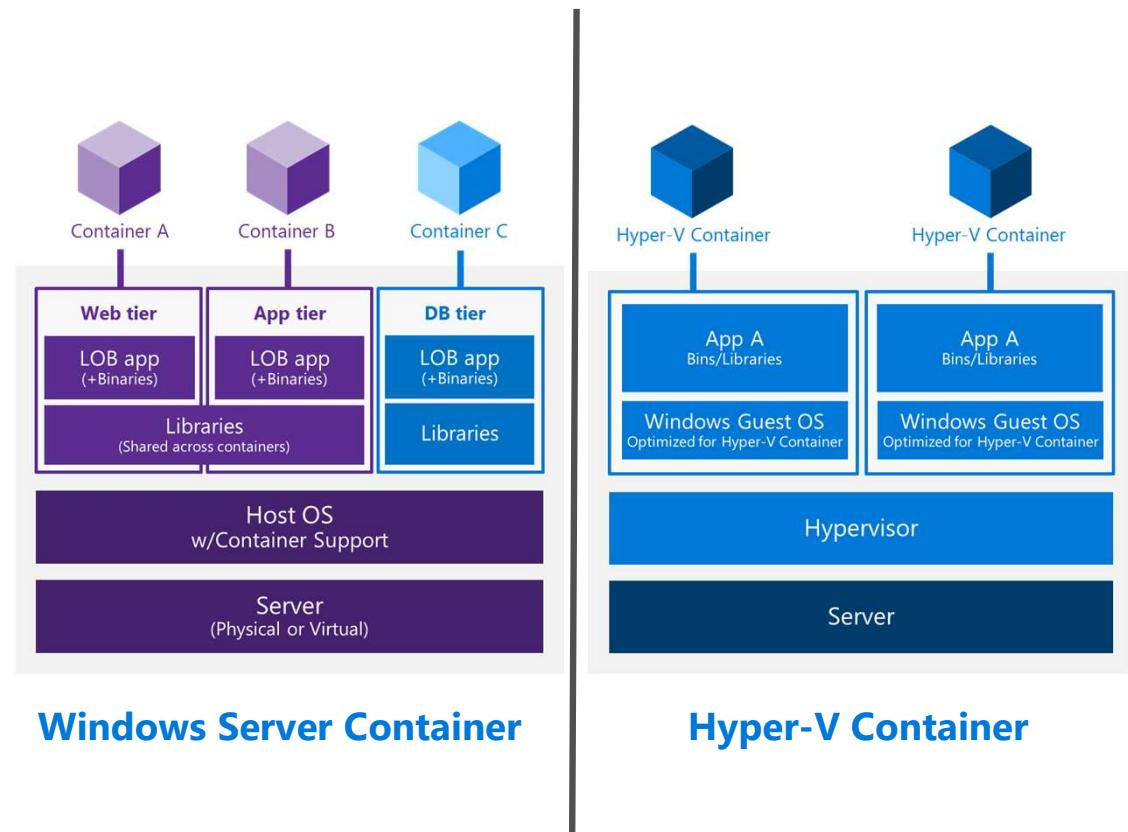
Windows Server 2016 TP3, TP4, TP5

Windows Server Container

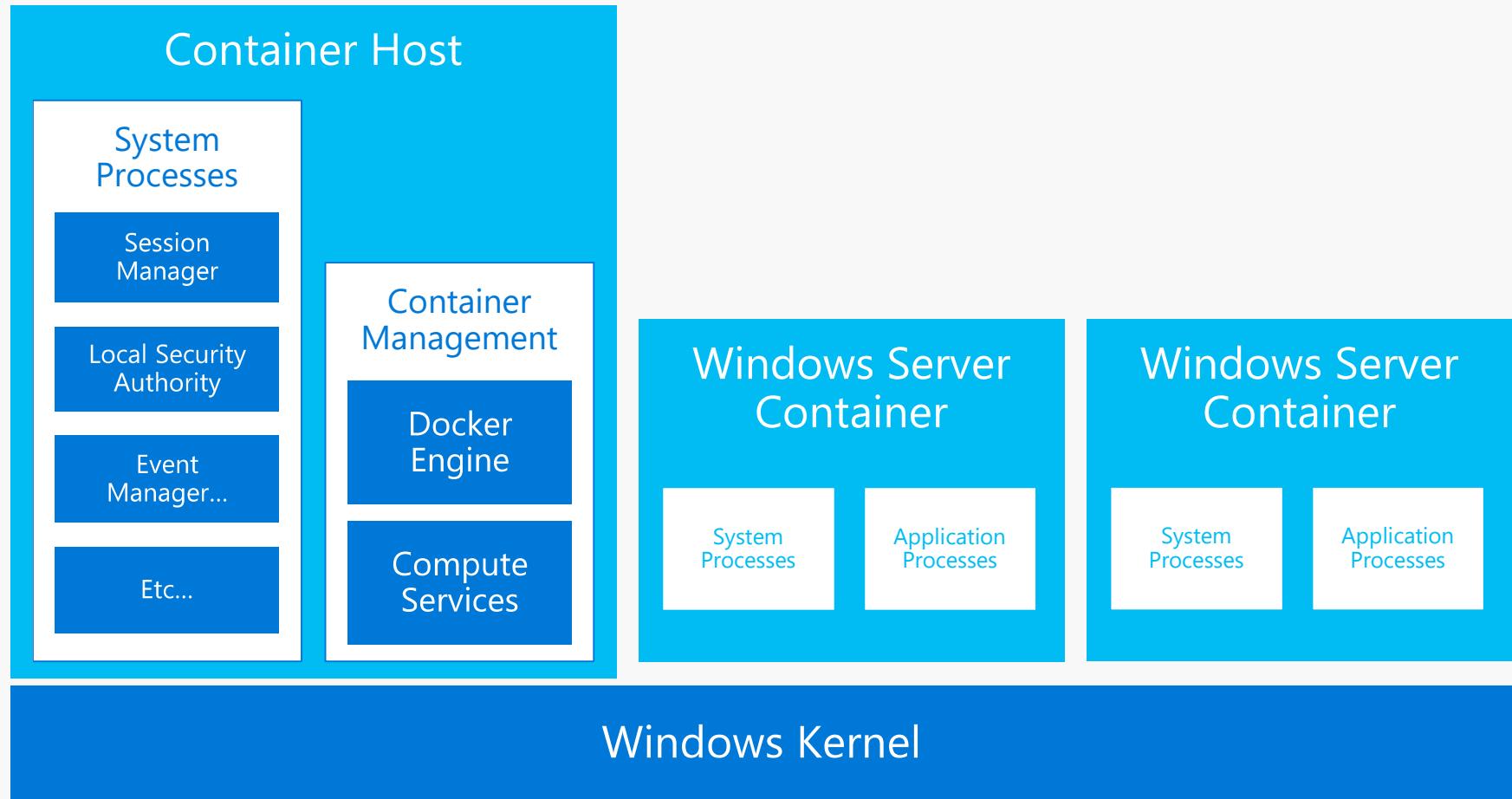
Bring the agility and density of containers to the Windows ecosystem, enabling agile application development and deployment

Hyper-V Container

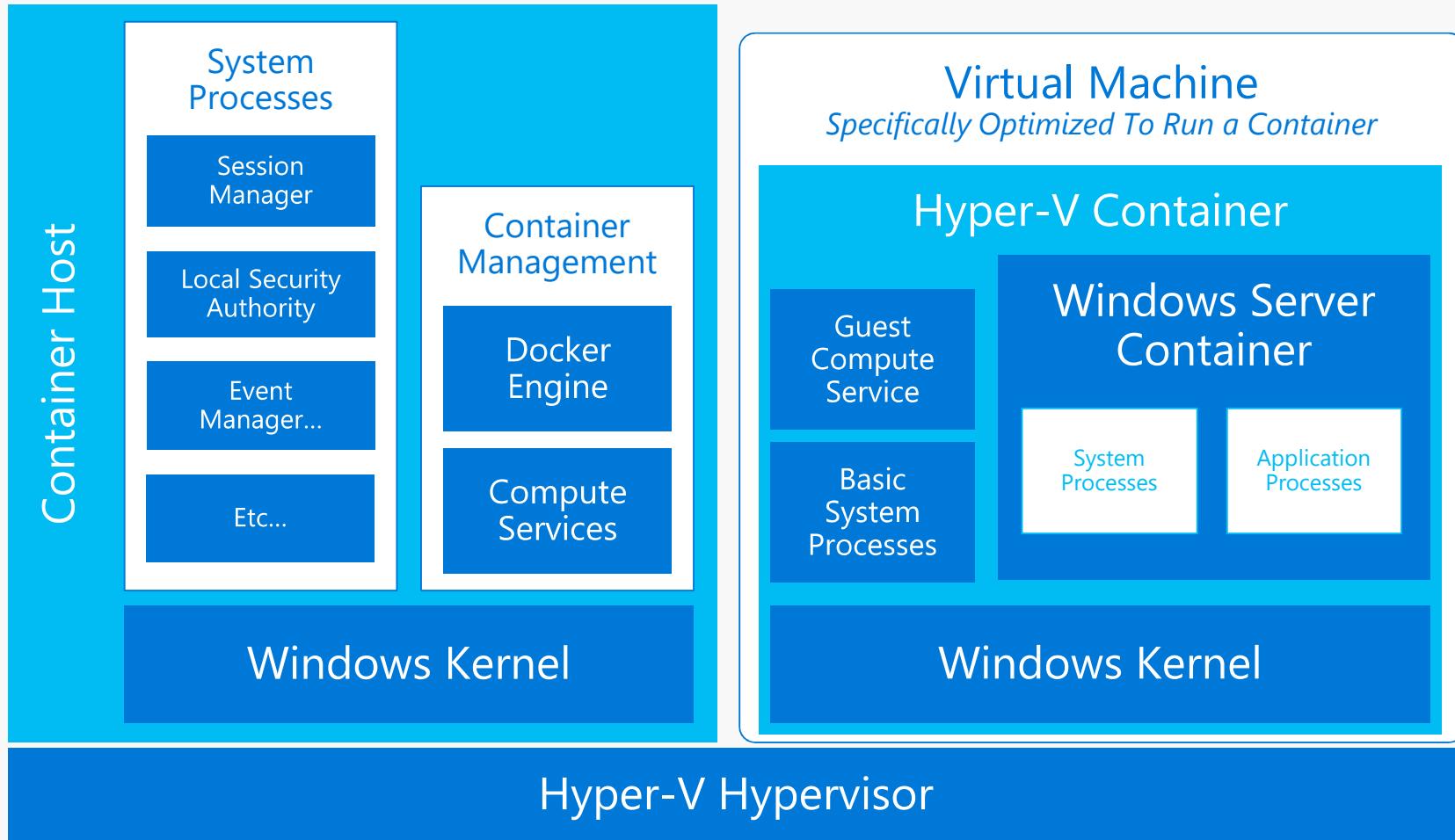
Offer a unique additional level of isolation for sensitive applications with no additional coding required



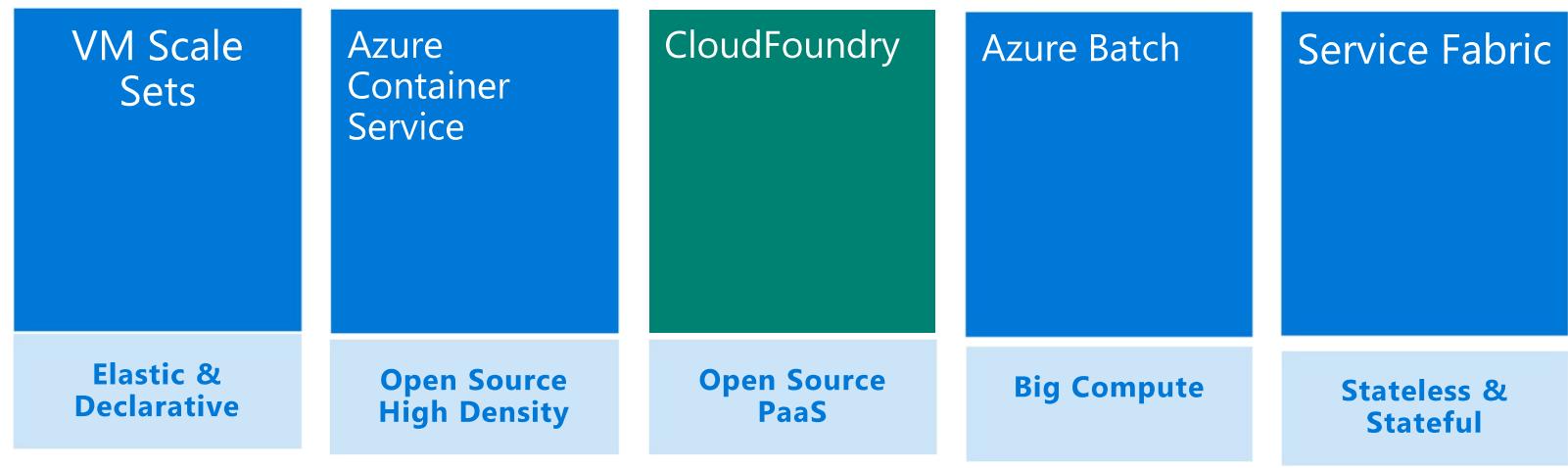
Windows Server Containers



Hyper-V Containers



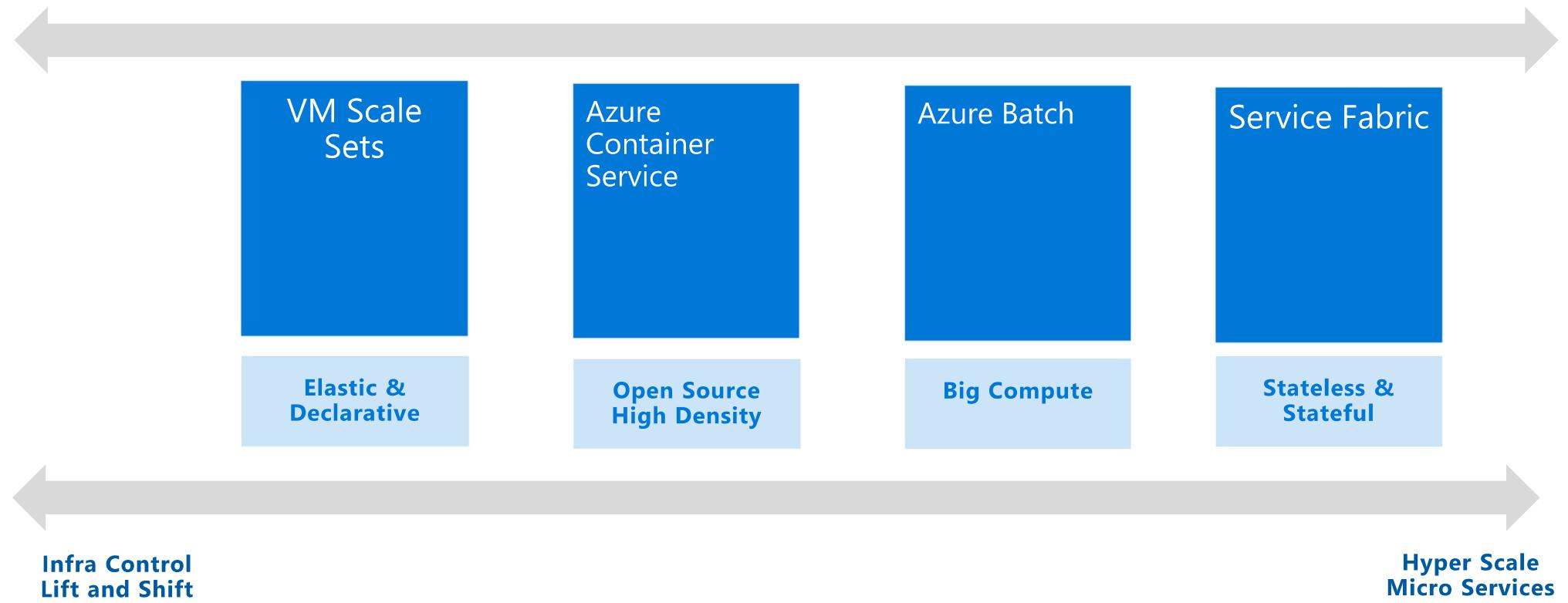
PaaS Options in Azure



Infra Control
Lift and Shift

Hyper Scale
Micro Services

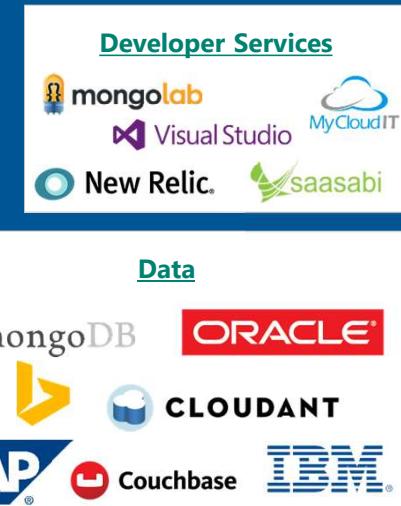
PaaS Options in Azure



[Azure Marketplace]

Azure Marketplace, Partner Solutions (PAYG or BYOL)

Platform Services



Integration



Media & CDN



Analytics & IoT



Data



Infrastructure Services

Compute



Storage



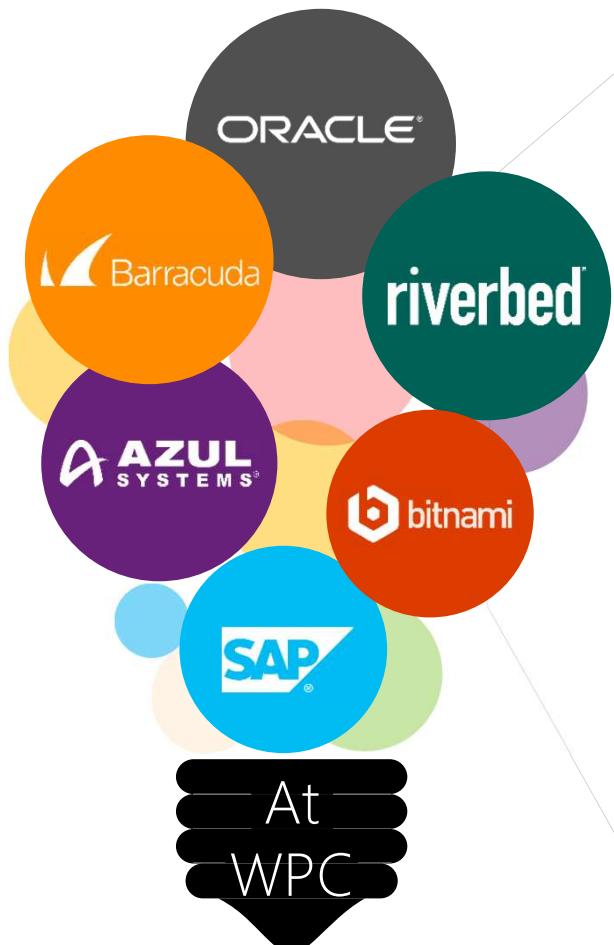
Networking



Datacenter Infrastructure (30 Regions, 24 Online)



A dynamic and growing portfolio of solutions

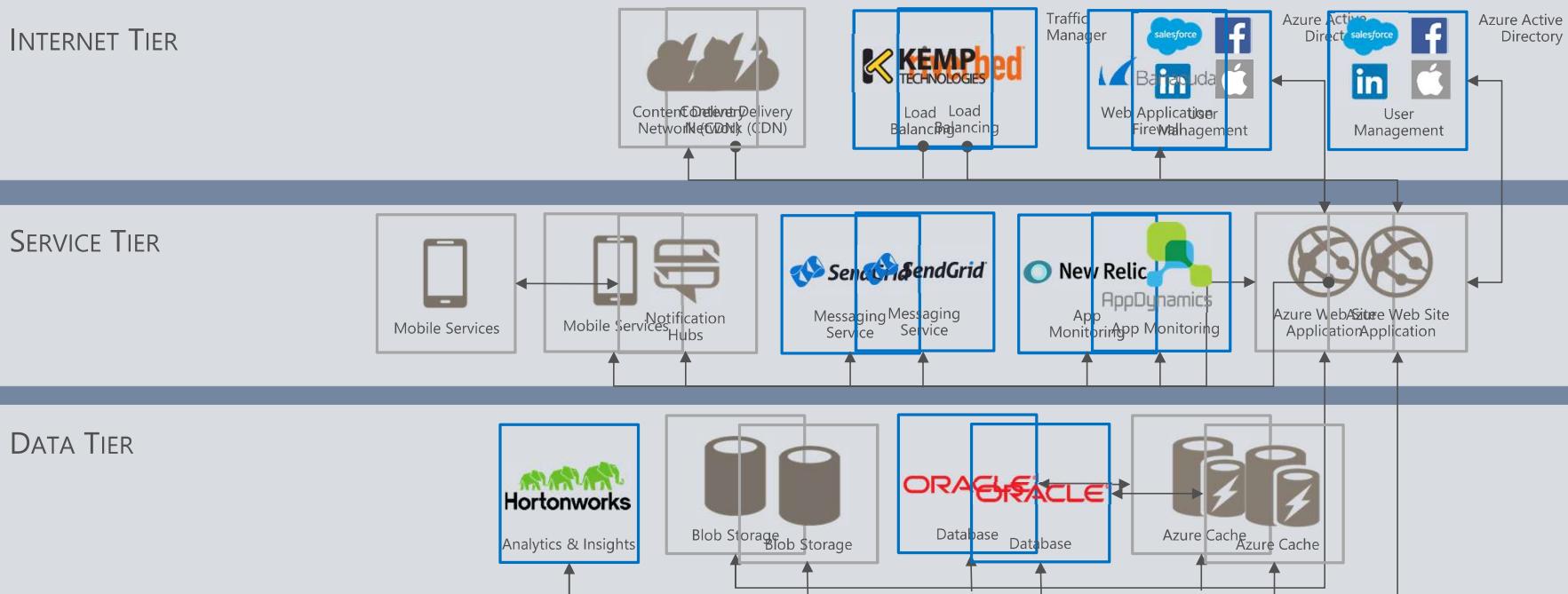


Today



You can build your required workload in Azure based on our extensive marketplace

Simplistic E-commerce Marketing Application



Azure is an open cloud



Pre-integrated SaaS apps in the application gallery



Microsoft Bing Ads

By Microsoft Corporation



Microsoft Developer Network (MSDN)

By Microsoft Corporation



Microsoft OneDrive

By Microsoft Corporation



Office 365 Exchange Online

By Microsoft Corporation



Dynamics CRM

By Microsoft Corporation



Microsoft Account (Windows Live)

By Microsoft Corporation



Skype

By Microsoft Corporation



Yammer

By Microsoft Corporation



ServiceNow

By ServiceNow



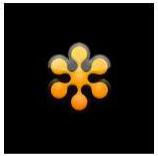
Box

By Box



Salesforce

By Salesforce.com



Citrix GoToMeeting

By Citrix



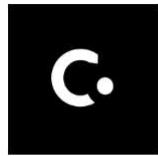
NASDAQ Online

By The NASDAQ OMX Group, Inc.



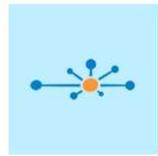
SAP BusinessObjects BI OnDemand

By SAP



Concur

By Concur



Concur TripIt

By TripIt



DocuSign

By DocuSign Inc.



Red Hat OpenShift

By Red Hat, Inc.



Egnyte

By Egnyte, Inc.



Evernote

By Evernote Corporation



MarcomCentral

By PTI Marketing Technologies



McKesson InterQual

Online Learning
By McKesson



Oracle SRM

By Oracle Corporation



Oracle Taleo

By Oracle Corporation



ClearDB

By SuccessBricks, Inc.



SuccessFactors

By SuccessFactors, Inc. A SAP Company



American Express OPEN

Small Business
By American Express Company



IBM Kenexa

By IBM Corp



IBM SmartCloud for Social Business

By IBM Corp



Workday

By Workday



Blogger

By Google



Google

By Google



Google App Engine

By Google



DreamBox Learning

By DreamBox Learning, Inc.



Dropbox for Business

By Dropbox



Facebook

By Facebook



AT&T Business Direct

By AT&T



Twitter

By Twitter



Amazon Web Services (AWS)

By Amazon



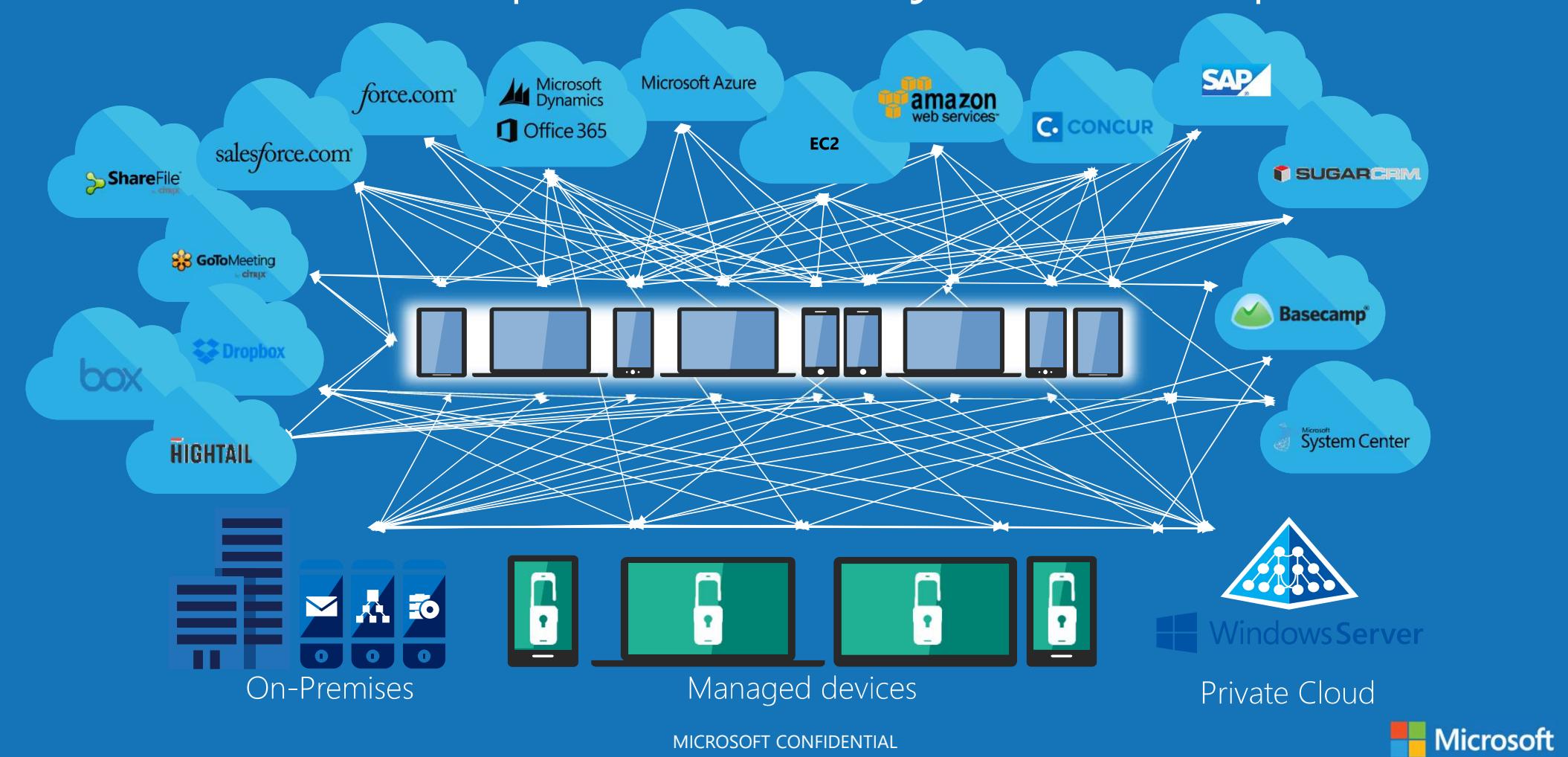
Netflix

By Netflix, Inc.

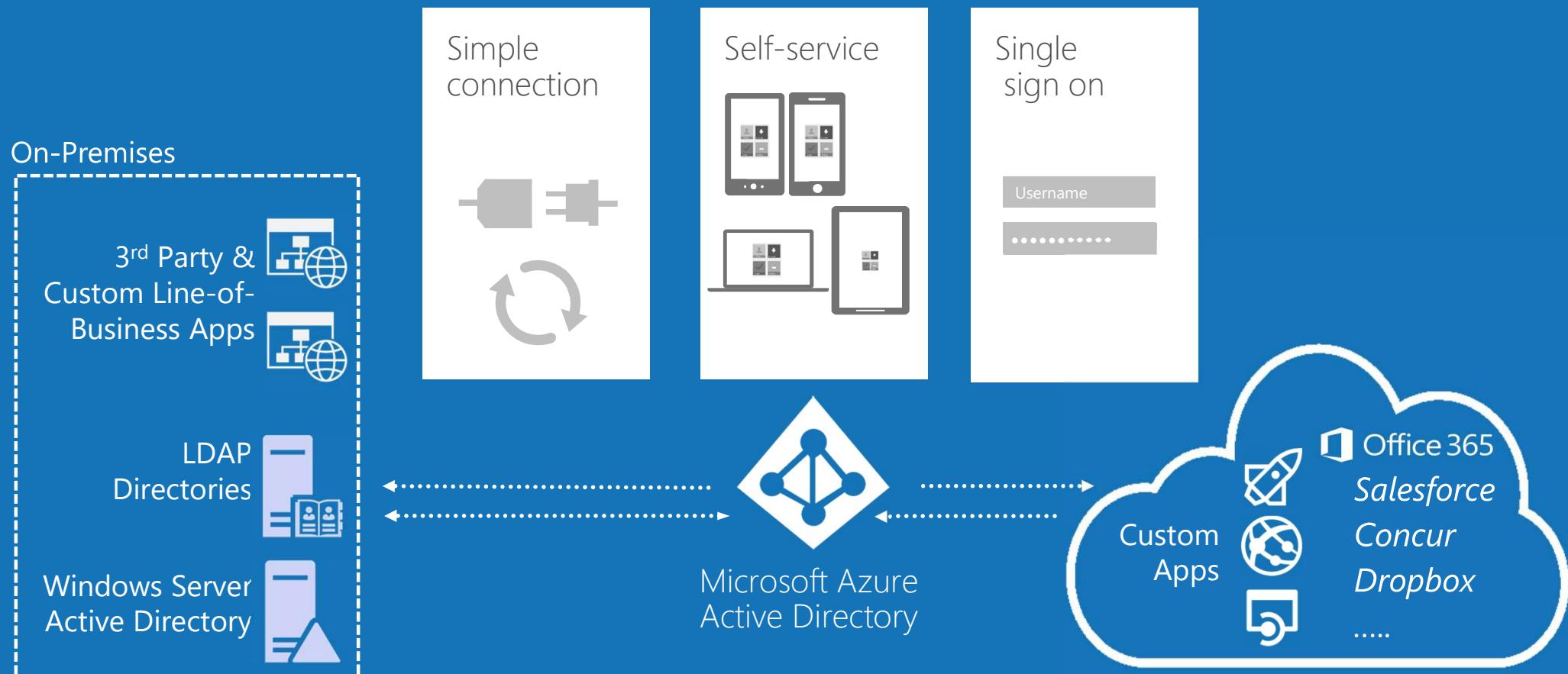
Break

[Hybrid Cloud Identity Management]

Current Enterprise Identity Landscape



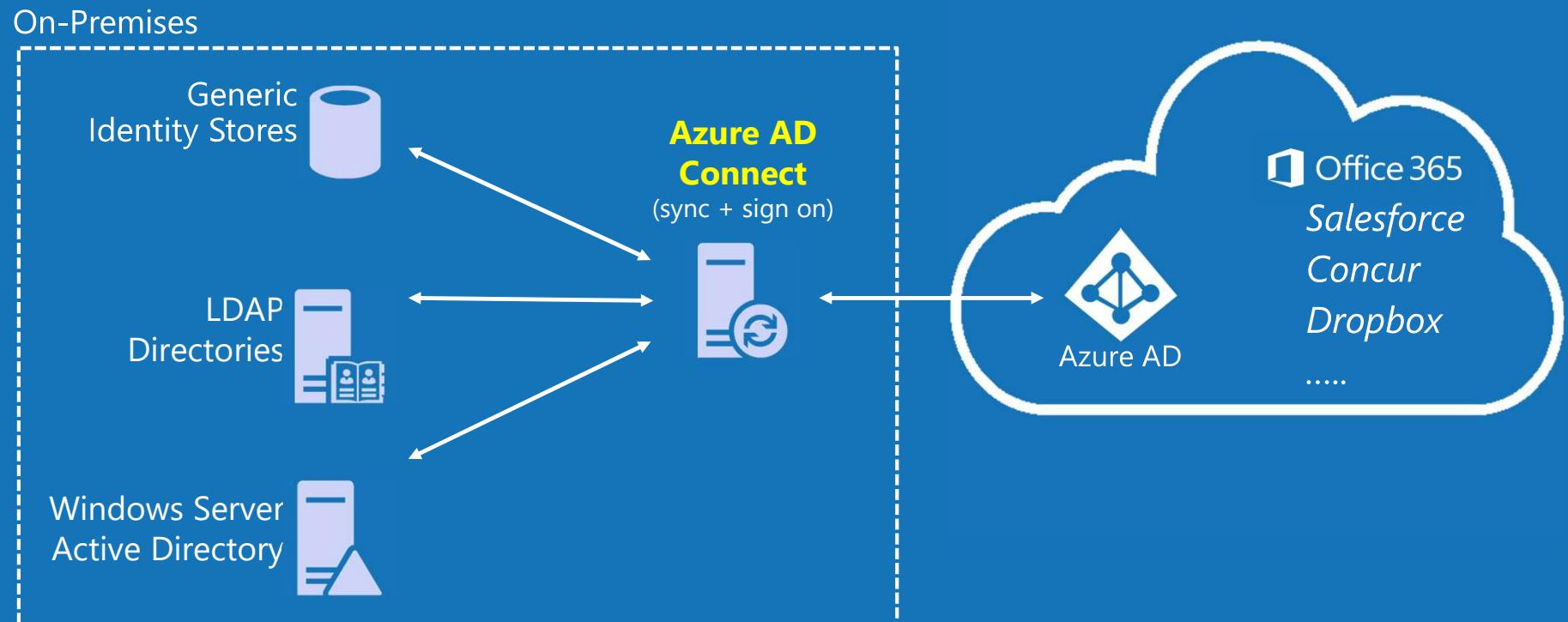
Identity as the foundation



MICROSOFT CONFIDENTIAL



Azure AD Connect – Your Identity Bridge



MICROSOFT CONFIDENTIAL



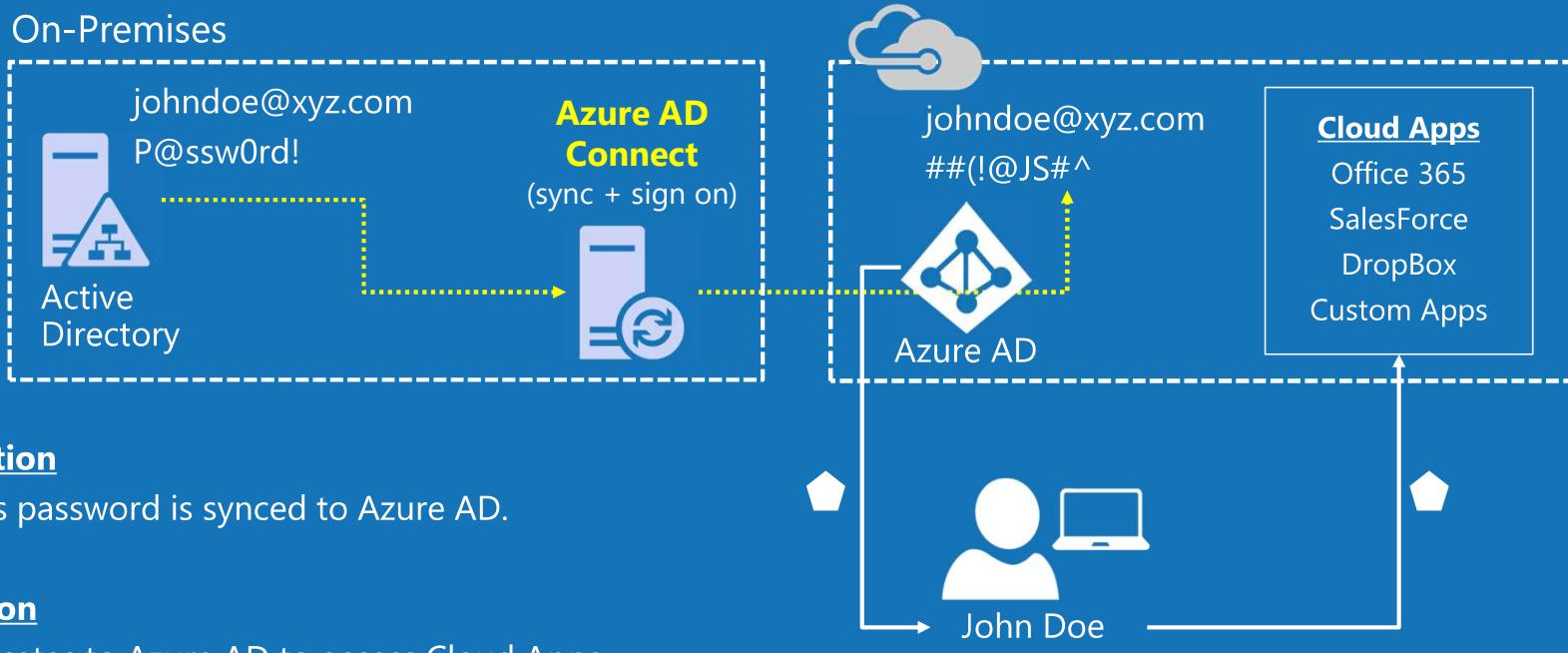
Azure AD Connect: Sign-on Methods

- Password Synchronization
 - A hash of the user's On-Premises password is stored in Azure AD
 - Azure AD handles authentication for cloud apps
- Active Directory Federation Services (AD FS) / SSO
 - User's password is never synchronized to Azure AD
 - Cloud app authentication using federation trust between Azure AD & AD FS
 - Password Synchronization can be used as a backup *

MICROSOFT CONFIDENTIAL



Password Sync sign-on method



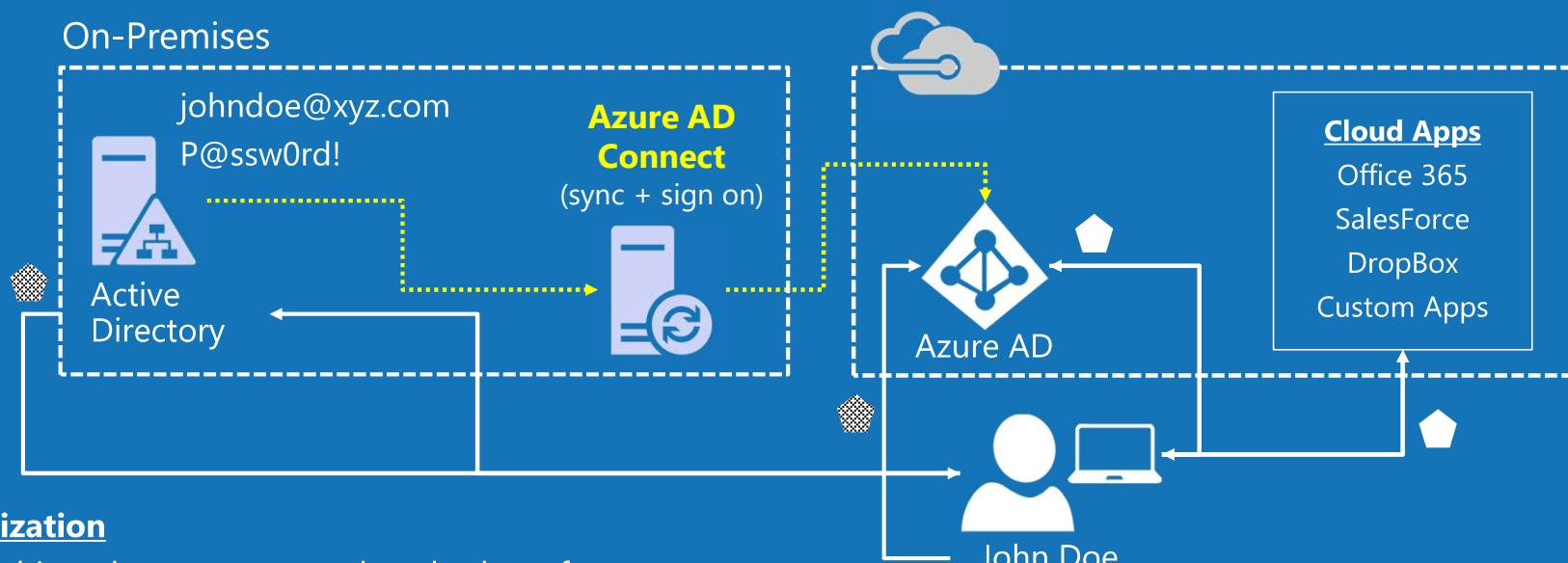
Azure AD Connect - Custom Settings

- Configure Active Directory Federation Services (AD FS)
- Synchronize multiple on-premises directories and forests
- Filter synchronization by group for pilot deployments
- Select attribute used to identify users
- Restrict attributes synchronized for specific apps.
- Write-back capabilities to on-premises directories

Scenarios for AD FS / SSO sign-on

- AD FS is already configured On-Premises
- Security policy prohibits storing passwords in the cloud
- Desktop SSO from a domain-joined machine is required.
- Capabilities that are specific to AD FS are required
 - On-premises multi-factor authentication or smart-card support for SSO
 - Conditional access for both on-premises and cloud resources

AD FS sign-on method



Synchronization

Directory objects but not passwords or hashes of passwords are synchronized to Azure AD

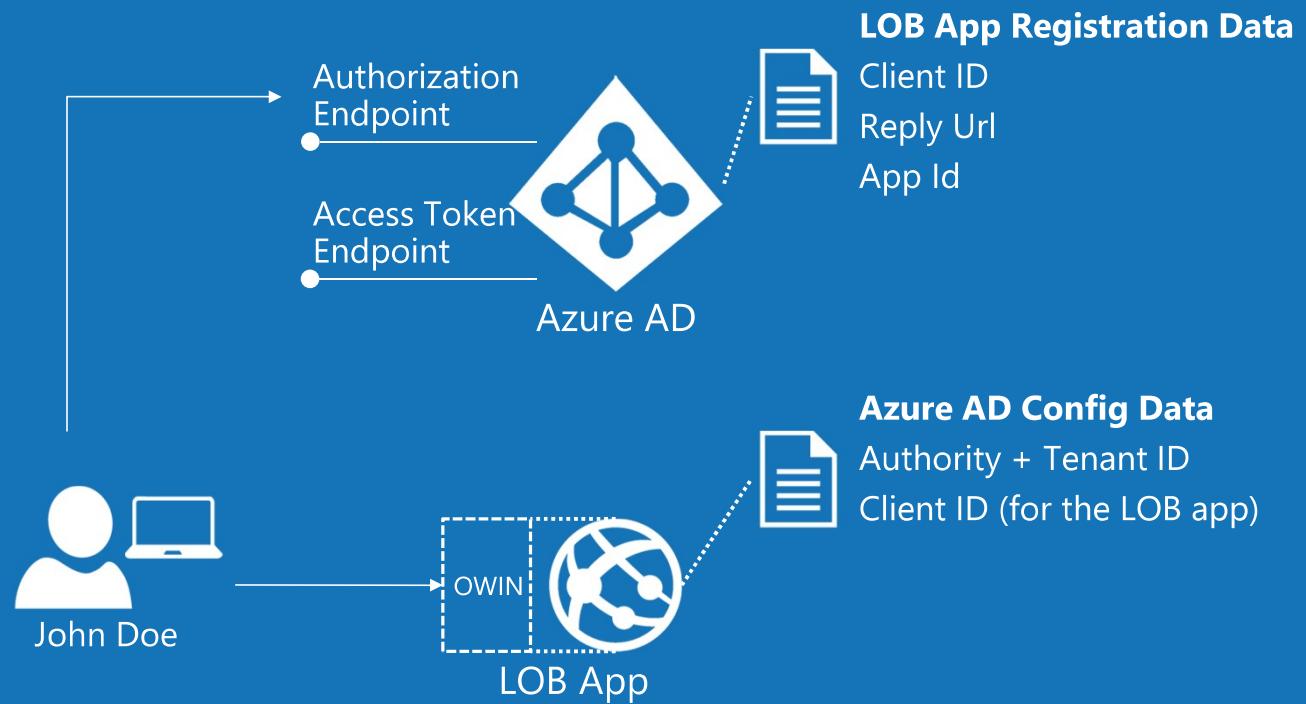
Authentication

User authenticate via Azure AD to access Cloud Apps.

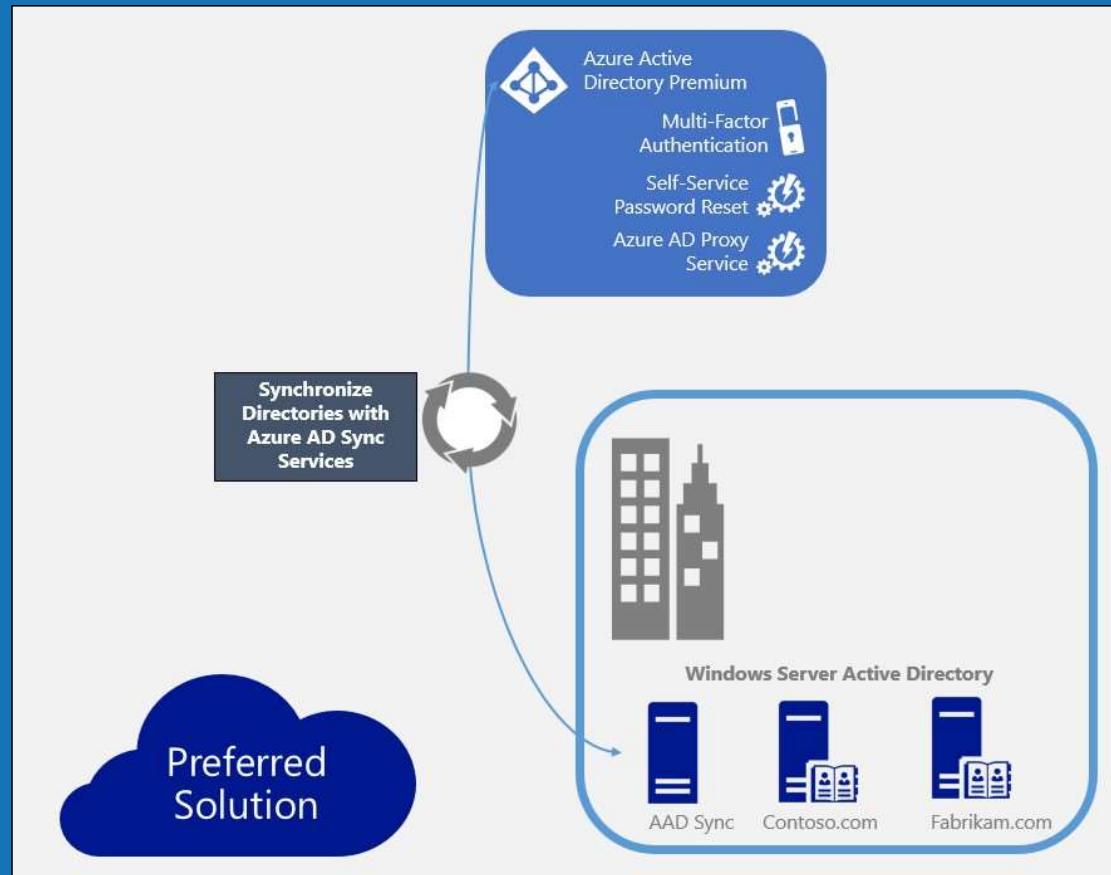
Azure AD will use AD FS On-Premises to authenticate users.

Developing Web Apps for Azure AD using OpenID Connect / OAuth 2.0

1. Unauthenticated user accesses app
2. User is redirected to the Authorization Endpoint
3. User Authenticates
4. User consents to allow app to sign-in as user and read users profile
5. Azure AD issues a token that the user presents to the app
6. The OWIN middleware processes the token and issues a session cookie if the token is valid
7. Authentication cookie is set and user is returned to app



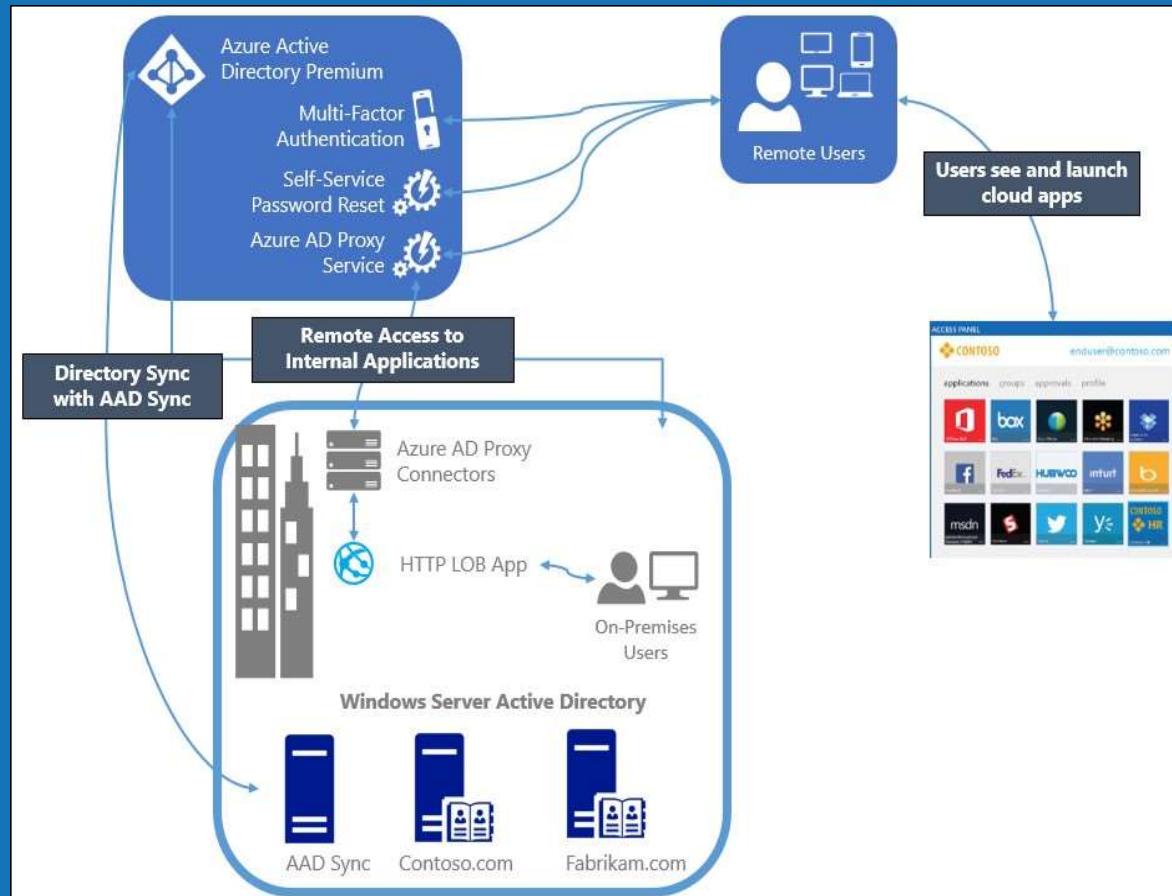
Hybrid Identity preferred solution - 1



MICROSOFT CONFIDENTIAL



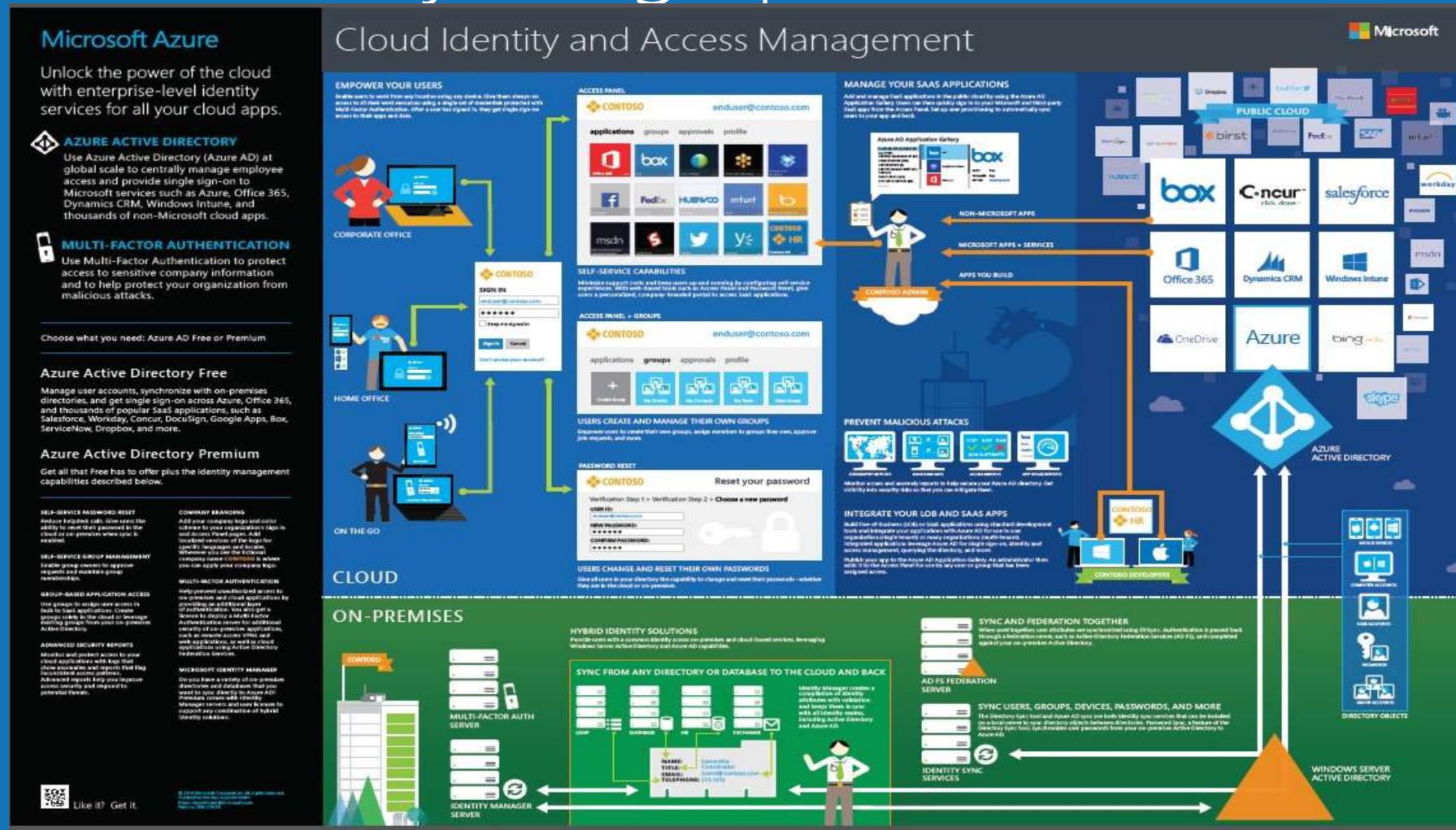
Hybrid Identity preferred solution - 2



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Cloud Identity Infographics



[Azure Active Directory offerings]

Azure Active Directory editions feature comparison

		Azure AD Free	Azure AD Basic	Azure AD Premium
Common Features	Directory as a Service	up to 500K Objects	No Object Limit	No Object Limit
	User/Group Management	Yes	Yes	Yes
	SSO to pre-integrated SAAS Applications /Custom Apps	10 apps per user	10 apps per user	No Limit
	User-Based access management/provisioning	Yes	Yes	Yes
	Self-Service Password Change for cloud users	Yes	Yes	Yes
	Identity Synchronization Tool (Windows Server AD integration, Multi Forest)	Yes	Yes	Yes
	Security Reports	3 Basic Reports	3 Basic Reports	Advanced Security Reports
	Cloud App Discovery	Yes (Basic)	Yes(Basic)	Yes(Advanced)
Premium+Basic Features	Group-based access management/provisioning		Yes	Yes
	Self-Service Password Reset for cloud users		Yes	Yes
	Company Branding (Logon Pages/Access Panel customization)		Yes	Yes
	SLA		Yes	Yes
Premium Features	Identity Synchronization Tool advanced write-back capabilities (On Roadmap)			Yes
	Self-Service Group Management			Yes
	Self-Service Password Reset/Change with on-premises write-back			Yes
	Advanced Usage Reporting			Yes
	Multi-Factor Authentication (Cloud and On-premises (MFA Server))			Yes
	Azure AD Application proxy			Yes
	MIM CAL + MIM Server			Yes
	Administrative Delegation (On Roadmap			Yes

Azure Active Directory Offering Comparison

	Azure AD Free (O365)	Azure AD Premium
Directory as a service	<input checked="" type="checkbox"/> Up to 500,000 objects	<input checked="" type="checkbox"/> No limit
User and group management	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Single sign-on for pre-integrated SaaS and custom applications	<input checked="" type="checkbox"/> 10 apps per user	<input checked="" type="checkbox"/> No limit
Microsoft Directory Synchronization Tool (Windows Server Active Directory extension)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
User-based access management and provisioning	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Group-based access management and provisioning		<input checked="" type="checkbox"/>
Self-service group management for cloud users		<input checked="" type="checkbox"/>
Self-service password change for cloud users	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Self-service password reset for cloud users		<input checked="" type="checkbox"/>
Security reports	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Advanced security reporting (based on machine learning)		<input checked="" type="checkbox"/>
Usage reporting		<input checked="" type="checkbox"/>
Company branding (logon pages and Access Panel customization)		<input checked="" type="checkbox"/>
Multi-factor authentication (all available features on Windows Azure and on-premises environments)		<input checked="" type="checkbox"/>
Service-level agreement (SLA)		<input checked="" type="checkbox"/>
Forefront Identity Manager CAL + Forefront Identity Manager Server		<input checked="" type="checkbox"/>

Azure MFA Offering Comparison

	MFA for O365/Azure Administrators	Windows Azure Multi-Factor Authentication / EMS
Administrators can Enable/Enforce MFA to end-users	✓	✓
Use Mobile app (online and OTP) as second authentication factor	✓	✓
Use Phone call as second authentication factor	✓	✓
Use SMS as second authentication factor	✓	✓
Application passwords for non-browser clients (e.g. Outlook, Lync)	✓	✓
Default Microsoft greetings during authentication phone calls	✓	✓
Custom greetings during authentication phone calls		✓
Fraud alert		✓
MFA SDK		✓
Security Reports		✓
MFA for on-premises applications/ MFA Server.		✓
One-Time Bypass		✓
Block/Unblock Users		✓
Customizable caller ID for authentication phone calls		✓
Event Confirmation		✓

Azure RMS Offering Comparison

	RMS for O365	Azure RMS (EMS)
Consume & Create RMS content with company ID	✓	✓
Protection for content stored in O365	✓	✓
Protection for content stored in on prem Office (Exchange, Sharepoint via RMS Connector)	✓	✓
Bring your own Key (Hybrid protection)	✓	✓
RMS protection for non office files	✓	✓
RMS SDK	✓	✓
RMS On Prem Connector for on-premises Windows Server file shares* (via RMS FCI Connector)		✓

* As of July 1, 2014

Compare Microsoft Intune to MDM for Office 365

Category	Feature	Exchange ActiveSync	MDM for Office 365	Microsoft Intune (cloud only)	Intune + ConfigMgr (hybrid)
Device configuration	Inventory mobile devices that access corporate applications	●	●	●	●
	Remote factory reset (full device wipe)	●	●	●	●
	Mobile device configuration settings (PIN length, PIN required, lock time, etc.)	●	●	●	●
	Self-service password reset (Office 365 cloud only users)	●	●	●	●
Office 365	Provides reporting on devices that do not meet IT policy		●	●	●
	Group-based policies and reporting (ability to use groups for targeted device configuration)		●	●	●
	Root and jailbreak detection		●	●	●
	Remove Office 365 app data from mobile devices while leaving personal data and apps intact (selective wipe)		●	●	●
	Prevent access to corporate email and documents based upon device enrollment and compliance policies		●	●	●
Premium mobile device & app management	Self-service Company Portal for users to enroll their own devices and install corporate apps			●	●
	App deployment (Windows Phone, iOS, Android)			●	●
	Deploy certificates, VPN profiles (including app-specific profiles), email profiles, and Wi-Fi profiles			●	●
	Prevent cut/copy/paste/save as of data from corporate apps to personal apps (mobile application management)			●	●
	Secure content viewing via Managed Browser, PDF Viewer, Image Viewer, and AV Player apps for Intune			●	●
	Remote device lock via self-service Company Portal and via admin console			●	●
PC management	Client PC management (e.g. Windows 8.1, inventory, antimalware, patch, policies, etc.)			●	●
	PC software management			●	●
	Comprehensive PC management (e.g. Group Policy, login scripts, BitLocker management, virtual desktop and power management, custom reporting, etc.)				●
	Windows Server/Linux/UNIX/Mac OS X support				●
	OS deployment and imaging				●

[Azure Security & Compliance Certifications]

Approach to protect cloud infrastructure

- 24 hour monitored
PHYSICAL SECURITY
- Centralized
MONITORING AND ALERTS
- Update
MANAGEMENT

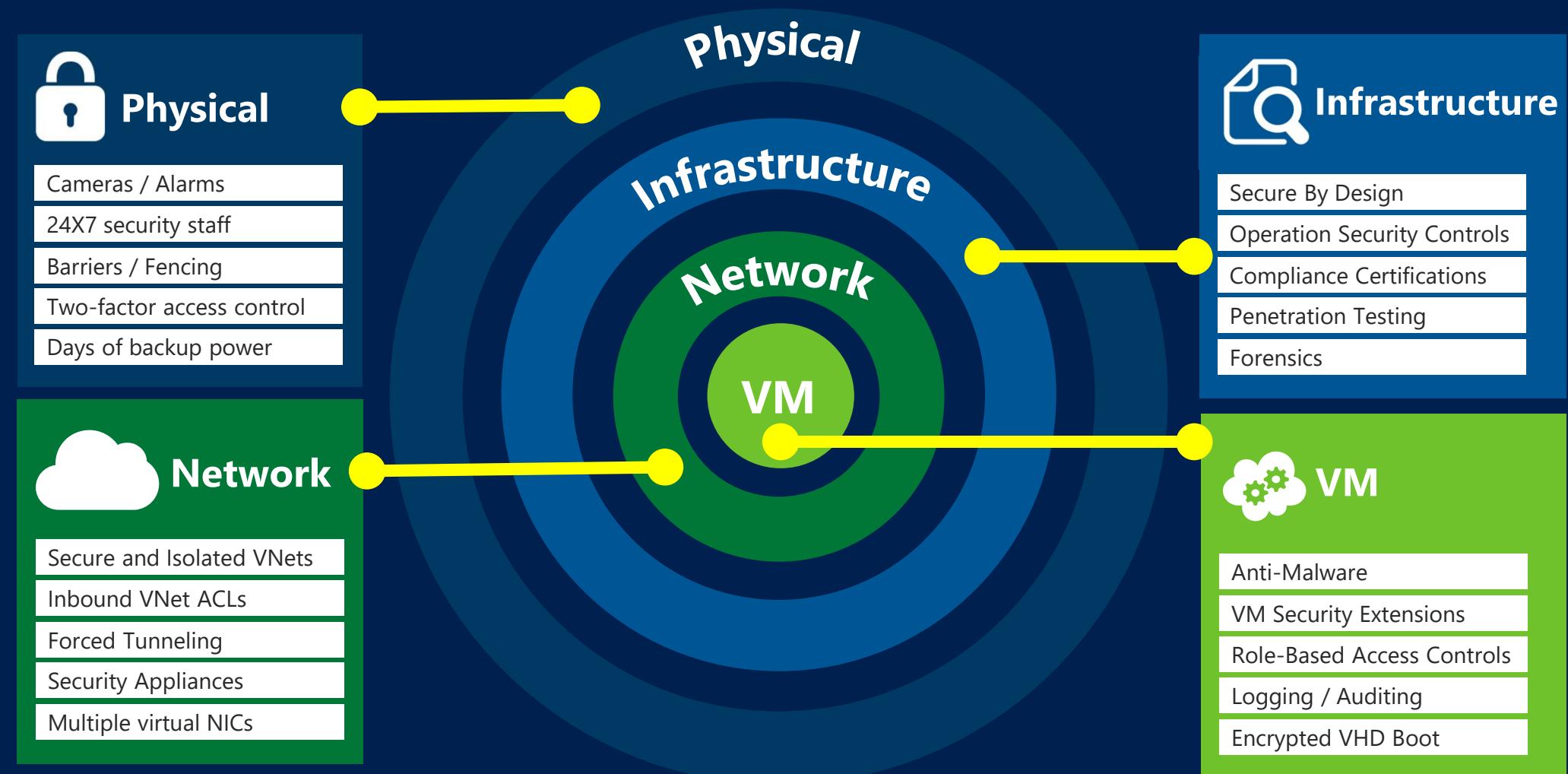


- Anti-Virus/Anti-Malware
PROTECTION

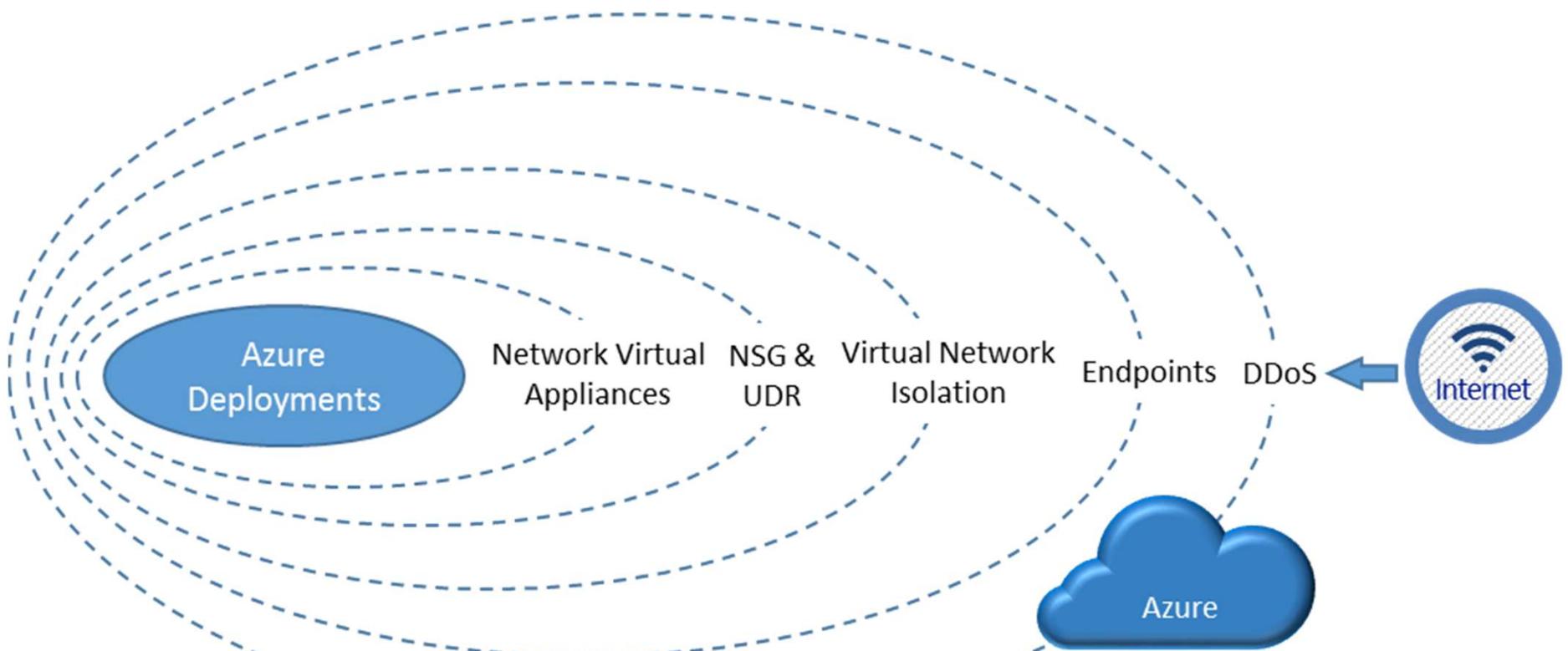
- Penetration **TESTING**

- DDoS **DEFENSE**

Trust and Control



Layers of Security in Azure



Azure Security and Compliance

Secure development, operations, and threat mitigation practices provide a trusted foundation

Private fiber connections to access compute, storage and more using ExpressRoute

ExpressRoute Peer

Customer Site



Customer Site



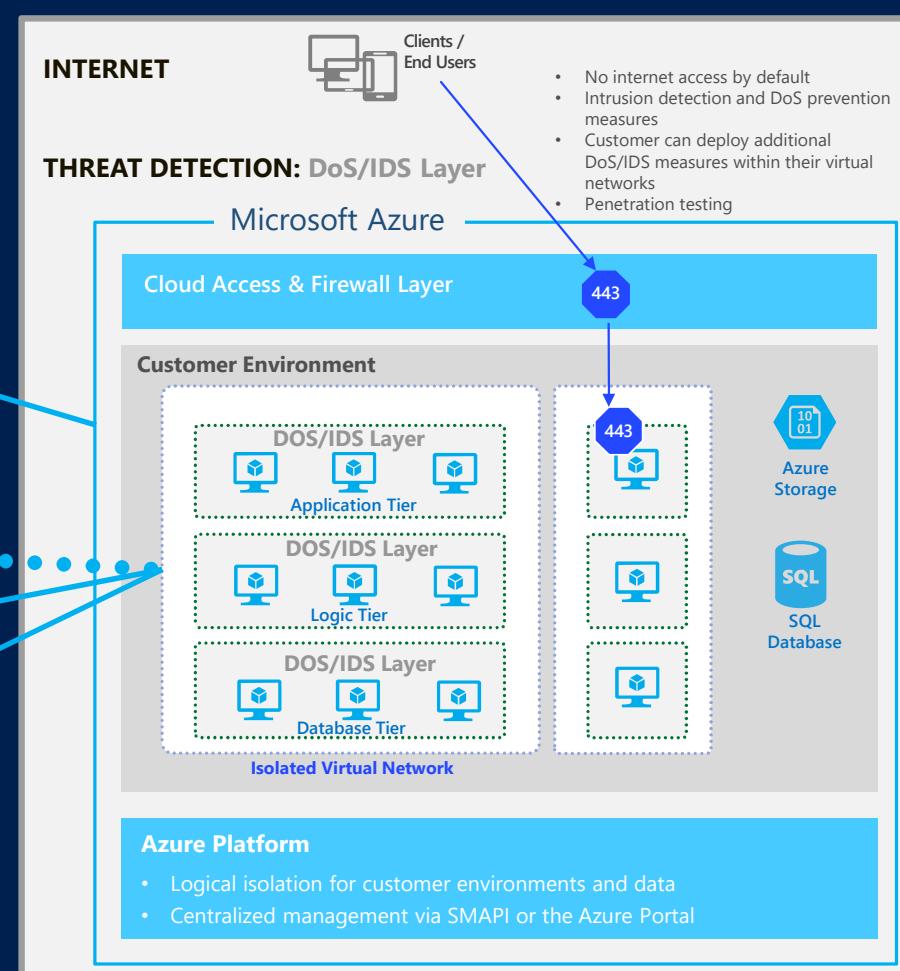
Site-to-Site VPN



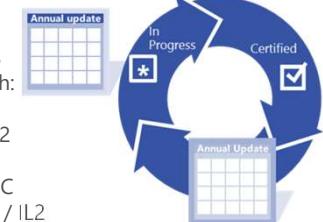
Point-to-Site VPN

Remote Workers

Enables connection from customer sites and remote workers to Azure Virtual Networks using Site-to-Site and Point-to-Site VPNs



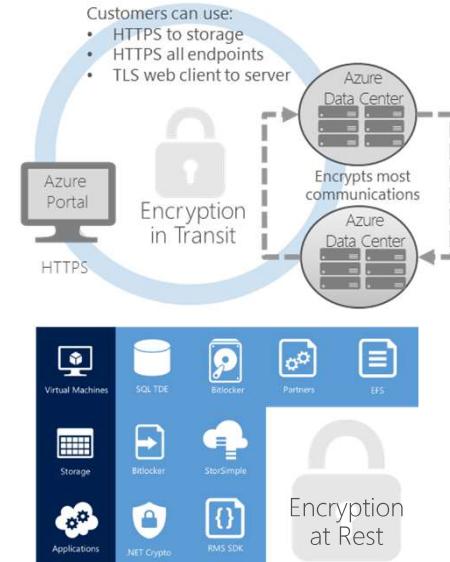
Azure's certification process is ongoing with annual updates and increasing breadth of coverage.



Azure manages compliance with:

- ISO 27001
- SOC1 / SOC2
- HIPAA BAA
- DPA / EU-MC
- UK G-Cloud / IL2
- PCI DSS
- FedRAMP

Azure provides a number of options for encryption and data protection.



Azure Compliance

The largest compliance portfolio in the industry



ISO 27001



SOC 1 Type 2



SOC 2 Type 2



PCI DSS Level 1



Cloud Controls
Matrix



ISO 27018



Content Delivery and
Security Association



Shared
Assessments



FedRAMP
P-ATO



HIPAA /
HITECH



FIPS 140-2



21 CFR
Part 11



FERPA



DISA Level 2



CJIS



IRS 1075



ITAR-ready



Section 508
VPAT



European Union
Model Clauses



EU Safe
Harbor



United Kingdom
G-Cloud



China Multi
Layer Protection
Scheme



China
GB 18030



China
CCCPPF



Singapore
MTCS Level 3



Australian
Signals
Directorate



New
Zealand
GCIO



Japan
Financial Services



ENISA
IAF

Microsoft Cloud Compliance Certifications and Attestations

Regulatory and Compliance Domain	Office 365	Microsoft Dynamics CRM	Microsoft Azure	Microsoft Intune	yammer
 CJIS	Yes	No	Yes	No	No
 EU Model Clauses	Yes	Yes	Yes	Yes	No
 EU Safe Harbor	Yes	Yes	Yes	Yes	Yes
 FedRAMP (Moderate)	Yes	No	Yes	No	No
 FERPA	Yes	Yes	Yes	N/A	Yes
 HIPAA BAA	Yes	Yes	Yes	Yes	No
 US Government Cloud	Yes	Yes	Yes	No	No
 UK G-Cloud (OFFICIAL)	Yes	Yes	Yes	No	No
 ISO 27001:2013 (w/ISO 27018:2014)	Yes	Yes	Yes	Yes	Yes ISO 27001:2005
 PCI DSS Level 1	N/A	N/A	Yes	N/A	N/A
 SOC 1 Type 2 (SSAE 16 / ISAE 3402)	Yes	Yes	Yes	Yes	No
 SOC 2 Type 2 (AT Section 101)	Yes	No	Yes	Yes	No

as of 01/15/15

Customers in the Microsoft Government Cloud



US Department of Agriculture



State of Texas



Environmental Protection Agency



State of Alabama



Health and Human Services



State of New York



Health and Human Services



Los Angeles County



Department of Labour



San Bernardino County Sheriff



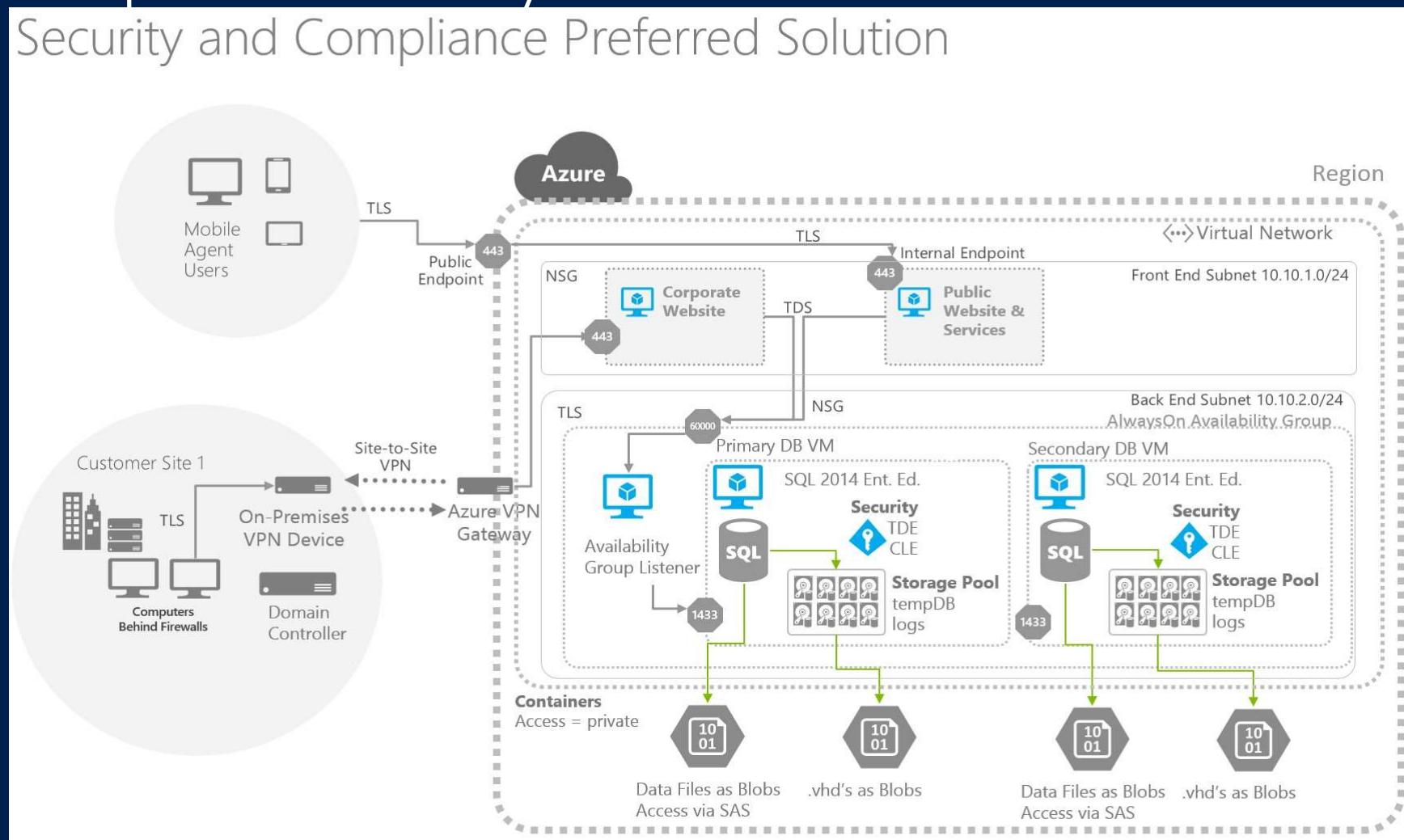
US Department of Commerce



City of Chicago

Example Security solution

Security and Compliance Preferred Solution



[Azure Portals and APIs]

MW1

Azure Management Portals

Current Management Portal

The screenshot shows the Windows Azure Management Portal interface. At the top, there's a navigation bar with 'Windows Azure' and a dropdown menu. Below it, a sidebar lists various service categories: ALL ITEMS, WEB SITES, VIRTUAL MACHINES, MOBILE SERVICES, CLOUD SERVICES (with 11 items), SQL DATABASES (with 17 items), STORAGE (with 16 items), HDINSIGHT (with 0 items), MEDIA SERVICES (with 0 items), and SERVICE BUS. The main area is titled 'all items' and displays a table with columns: NAME, TYPE, STATUS, SUBSCRIPTION, and LOCATION. The table lists 14 resources, all of which are currently running in the West US location under the WAEP Azure Internal Consumption subscription.

NAME	TYPE	STATUS	SUBSCRIPTION	LOCATION
adminwaepci	Cloud service	✓ Running	WAEP Azure Internal Consumption	West US
adminwaepint	Cloud service	✓ Running	WAEP Azure Internal Consumption	West US
adminwaepintapp	Storage Account	✓ Online	WAEP Azure Internal Consumption	West US
adminwaepintdiag	Storage Account	✓ Online	WAEP Azure Internal Consumption	West US
adminwaapple	Cloud service	✓ Running	WAEP Azure Internal Consumption	West US
adminwaepuat	Cloud service	✓ Running	WAEP Azure Internal Consumption	West US
adminwaepuatapp	Storage Account	✓ Online	WAEP Azure Internal Consumption	West US
adminwaepuatdiag	Storage Account	✓ Online	WAEP Azure Internal Consumption	West US
waepci	Cloud service	✓ Running	WAEP Azure Internal Consumption	West US
waepci	SQL Database	✓ Online	WAEP Azure Internal Consumption	West US
waepciapp	Storage Account	✓ Online	WAEP Azure Internal Consumption	West US
waepcidig	Storage Account	✓ Online	WAEP Azure Internal Consumption	West US

<https://manage.windowsazure.com>

New Management Portal

The screenshot shows the Microsoft Azure Management Portal interface. At the top, there's a navigation bar with 'Internal' and 'Microsoft Azure'. The left sidebar has a 'New' button and links to 'Resource groups', 'All resources', 'Recent', 'Web Apps', 'SQL databases', 'Virtual machines (clas...)', 'Virtual machines', 'Cloud services', 'Subscriptions', and 'Browse >'. The main area features a 'Browse all' section with a search icon and text 'Access all your resources, all in one place'. It also includes sections for 'Marketplace' (with icons for cloud services like cloudera and marketplace), 'Service health MY RESOURCES' (with a world map icon), and 'Portal settings'.

<https://portal.azure.com>



Slide 67

MW1 Michael Washam, 2015-01-19

Azure IaaS/PaaS – Two Architectures

Service Management ("classic") ASM

Cloud Services
Affinity Groups
Synchronous VM Deployments
Scripted Automation
Monolithic Network and VM Configuration

Azure Resource Manager("New") ARM

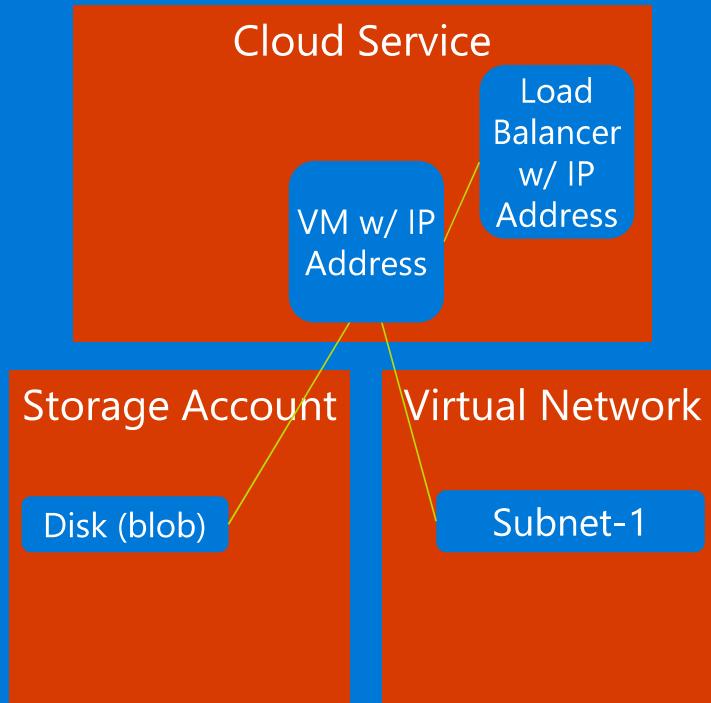
No Cloud Services
No Affinity Groups
Resource Groups (Logical Containers)
Asynchronous VM Deployments
Scripted or Declarative Deployments
Granular API – manage individual components directly

- Virtual Machines & Virtual Networks in classic vs ARM mode cannot be mixed in the same virtual network

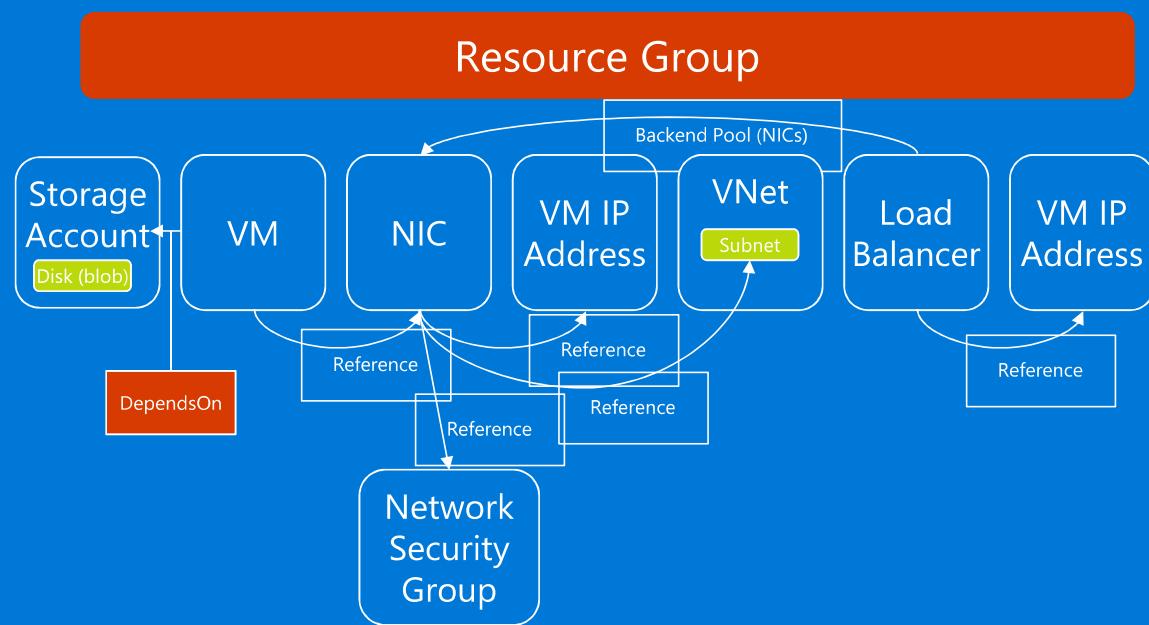
[Azure Resource Manager (ARM) API]

Azure API - Model Differences

Classic Model (v1)



Resource Manager (V2)



Azure Resource Manager

Consistent
management APIs

Resource groups

Templates

Tagging

RBAC

Auditing

Monitoring

Deploy with PS, CLI,
REST API, Visual Studio

Cross-region support

Same for Azure and
AzureStack.

Tools



Microsoft Azure



Command Line



Visual Studio

AZURE RESOURCE MANAGER API

RESOURCE MANAGER



Cloud + On-Premises



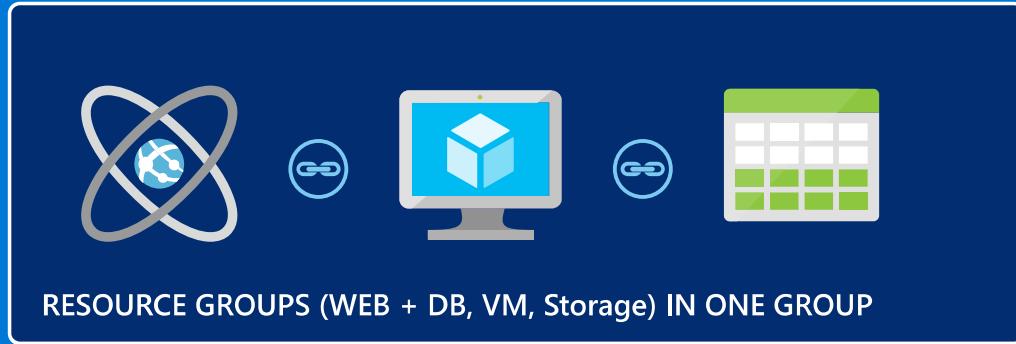
ADFS
AAD

RESOURCE PROVIDER CONTRACT

Provider
Rest Points



Azure Resource Manager



OR



Describe

WHERE
Resource Inventory
WHAT
Component Relationships
HOW
Tags + links + groups

Provision

WHERE
Across Regions
WHAT
Across Resources
HOW
In service and in guest

Control

WHO
Access control
WHAT
Changes
HOW
RBAC



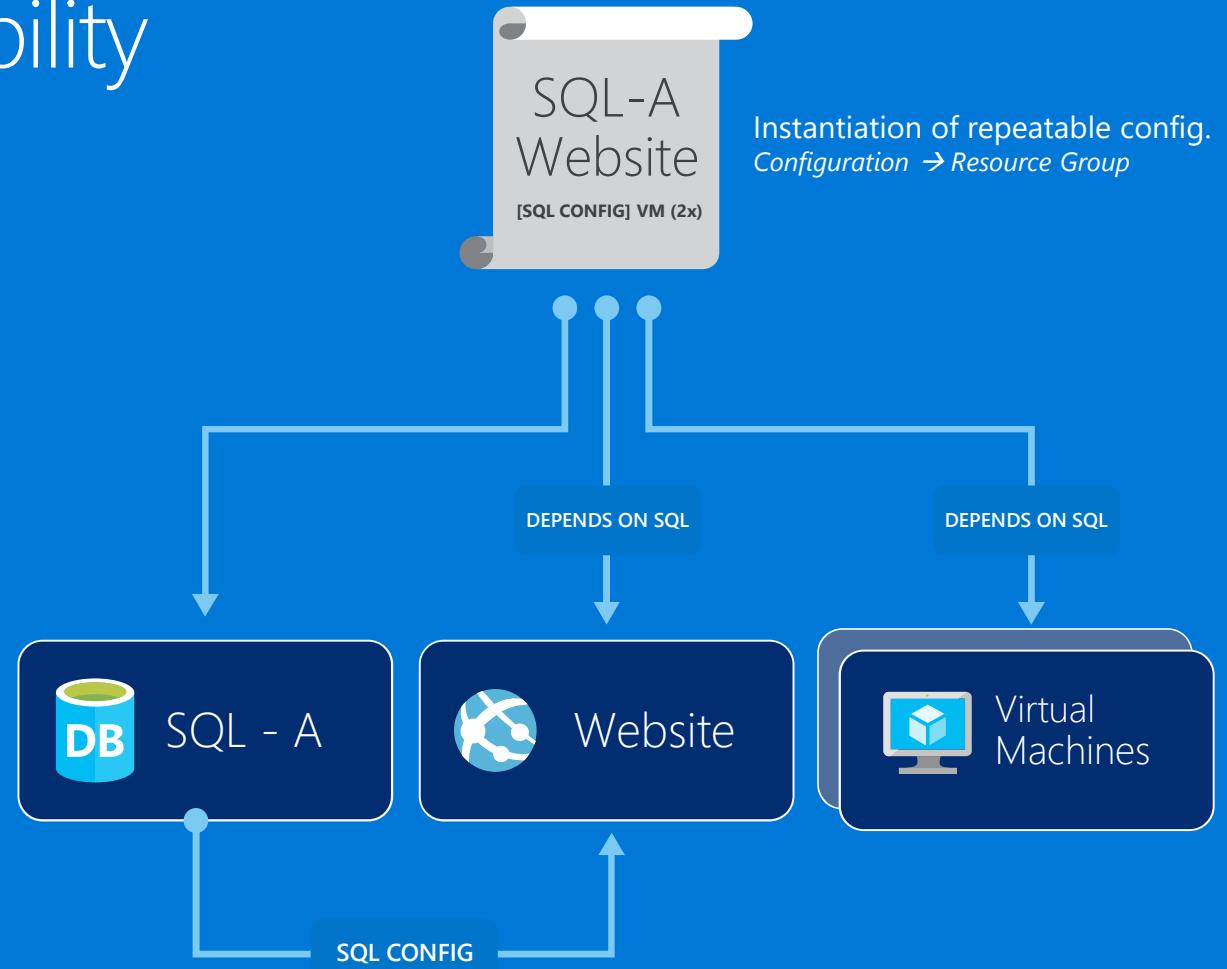
Power of Repeatability

Azure Templates can:

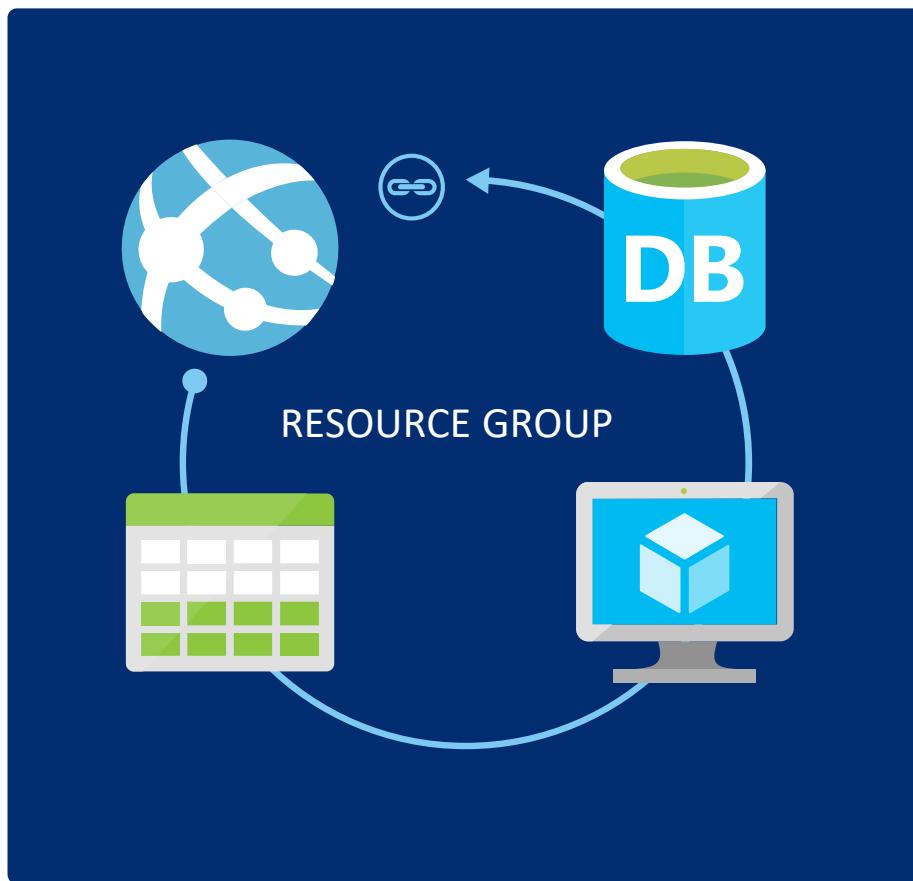
- Ensure Idempotency
- Simplify Orchestration
- Simplify Roll-back
- Provide Cross-Resource Configuration and Update Support

Azure Templates are:

- Source file, checked-in
- Specifies resources and dependencies (VMs, WebSites, DBs) and connections (config, LB sets)
- Parametrized input/output



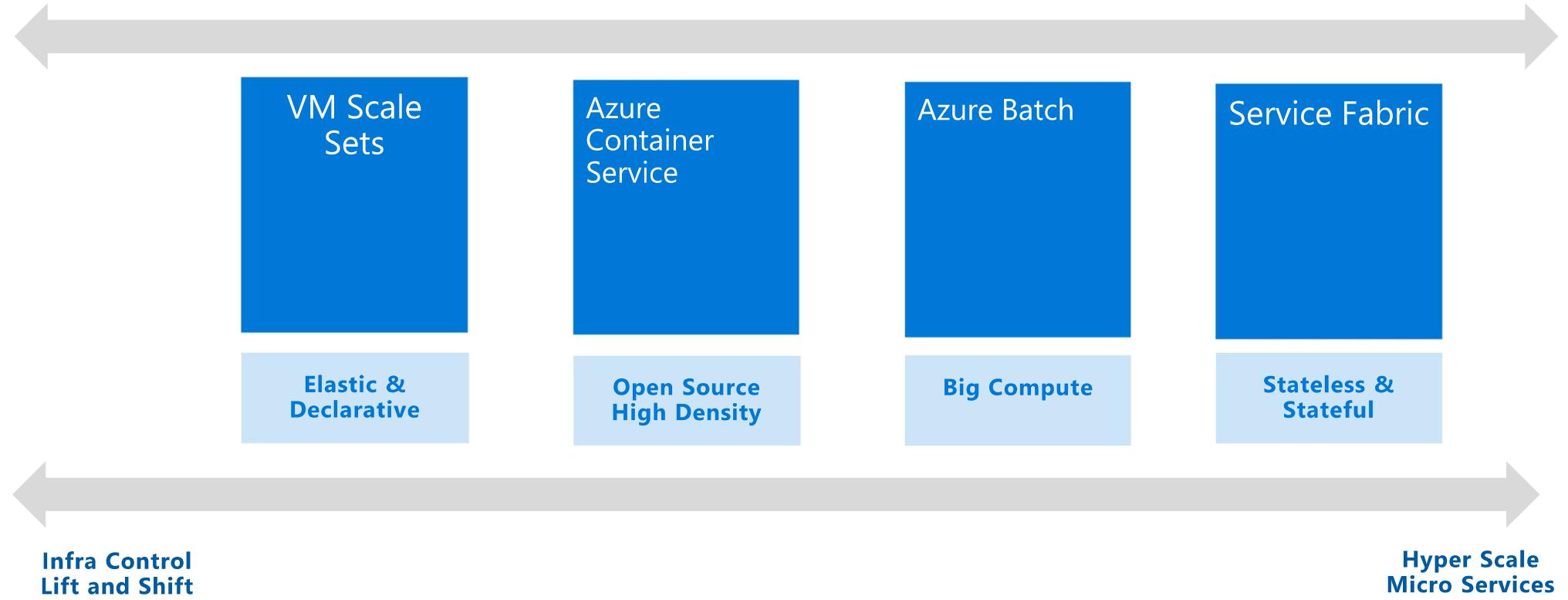
Azure Resource Manager templates



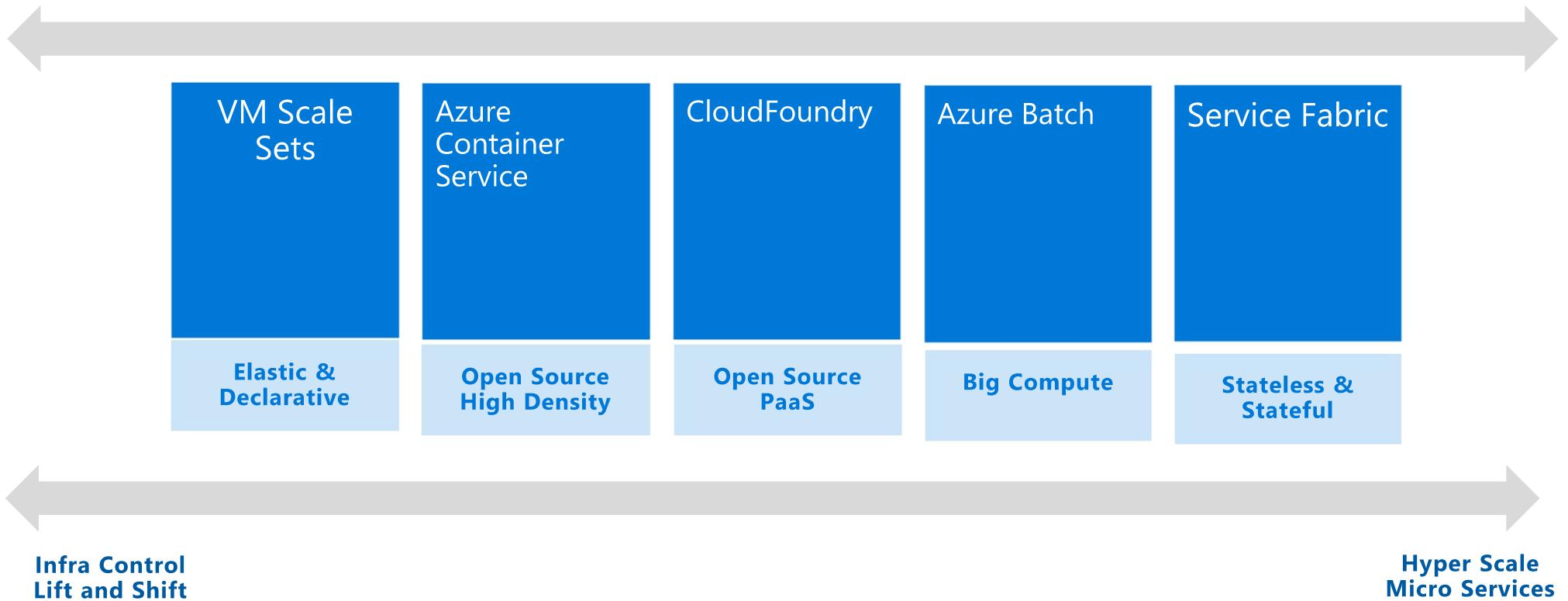
Self-service Declarative Templates
IaaS + PaaS resources
RBAC on API/Portal
Custom Tagging
Centralized Audits



PaaS Options with ARM Stack



PaaS Options with ARM Stack



Basic ARM (empty) template structure

```
{  
  "$schema": "",  
  "contentVersion": "",  
  "parameters": {},  
  "variables": {},  
  "resources": []  
}
```

Creating/Editing ARM templates

A screenshot of Microsoft Visual Studio showing the JSON Outline and Solution Explorer panes for editing an ARM template. The JSON Outline pane displays the structure of the ARM template, including parameters, resources, and scripts. The Solution Explorer pane shows the project structure, including files like 'Deploy-AzureResourceGroup.ps1' and 'azuredploy.parameters.json'. The status bar at the bottom indicates the code is ready.

A screenshot of Visual Studio Code showing two tabs of ARM template code side-by-side. The top tab contains a large template for creating a storage account, and the bottom tab contains a smaller template for creating a storage container. Both tabs show the JSON syntax of the ARM templates.



Visual Studio

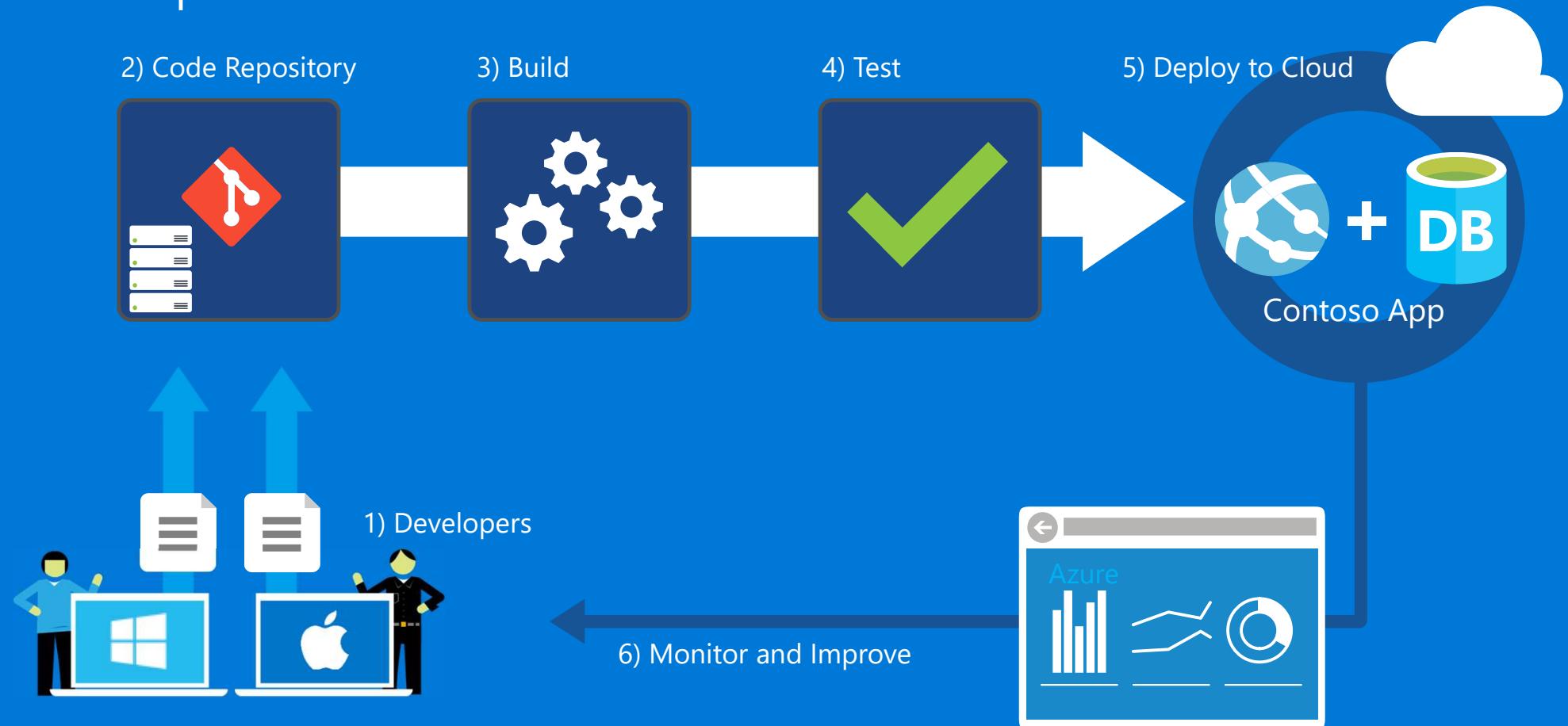
or

Any text editor!



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DevOps basics



Thank You!

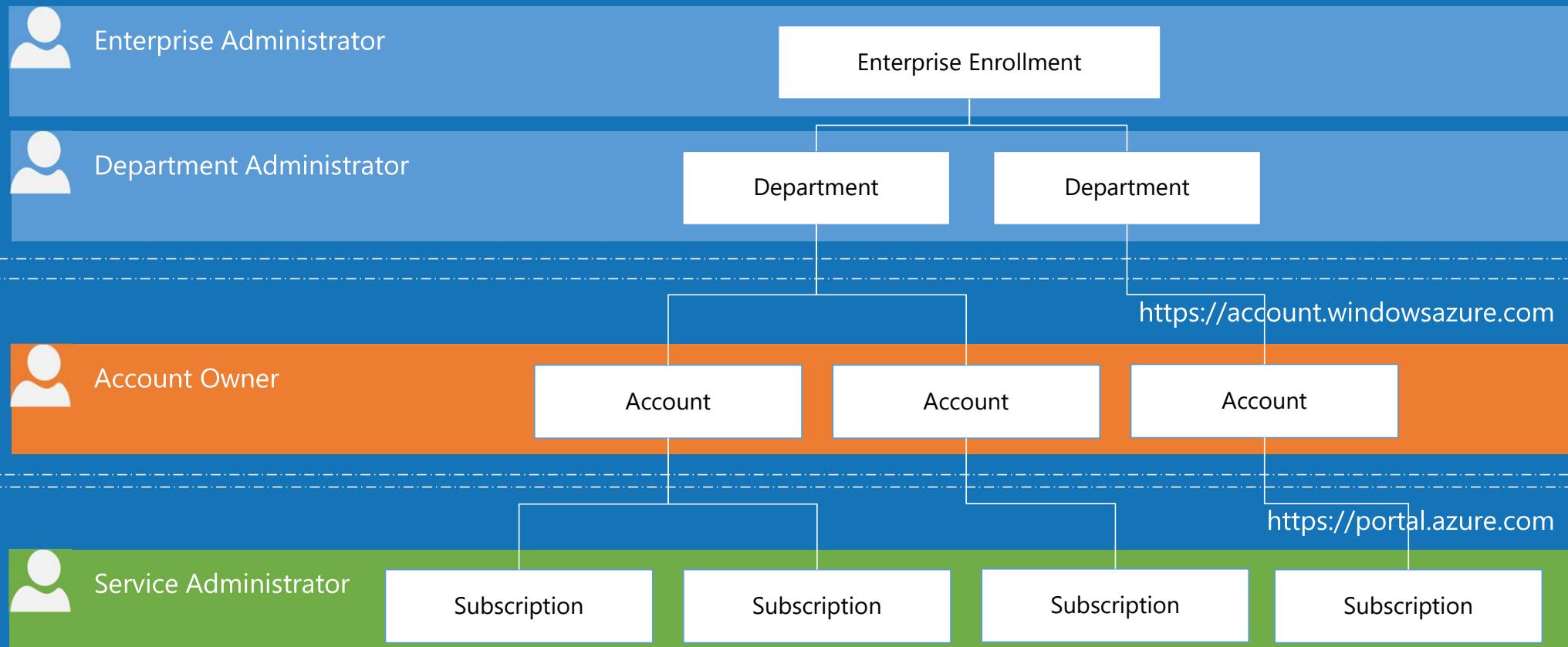
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[Azure IaaS & PaaS demos]

[Azure Subscription Management]

Enterprise Azure Roles and Portals

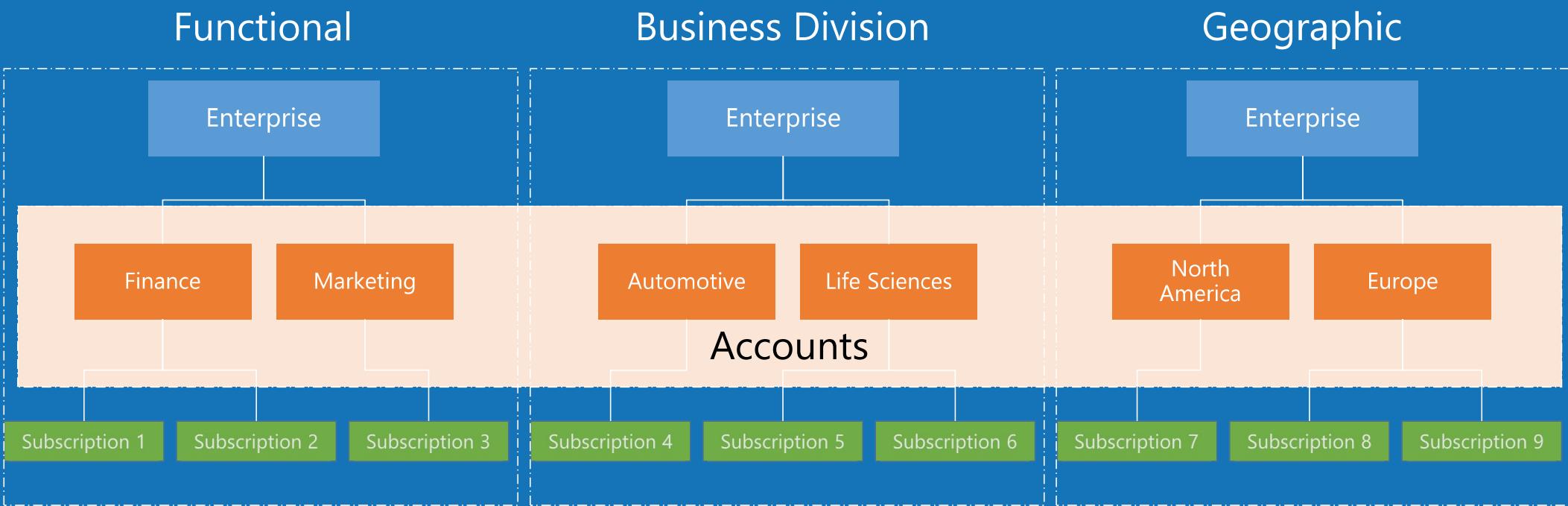
<https://ea.windowsazure.com>



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Account Setup Methodology



Subscriptions have Limits

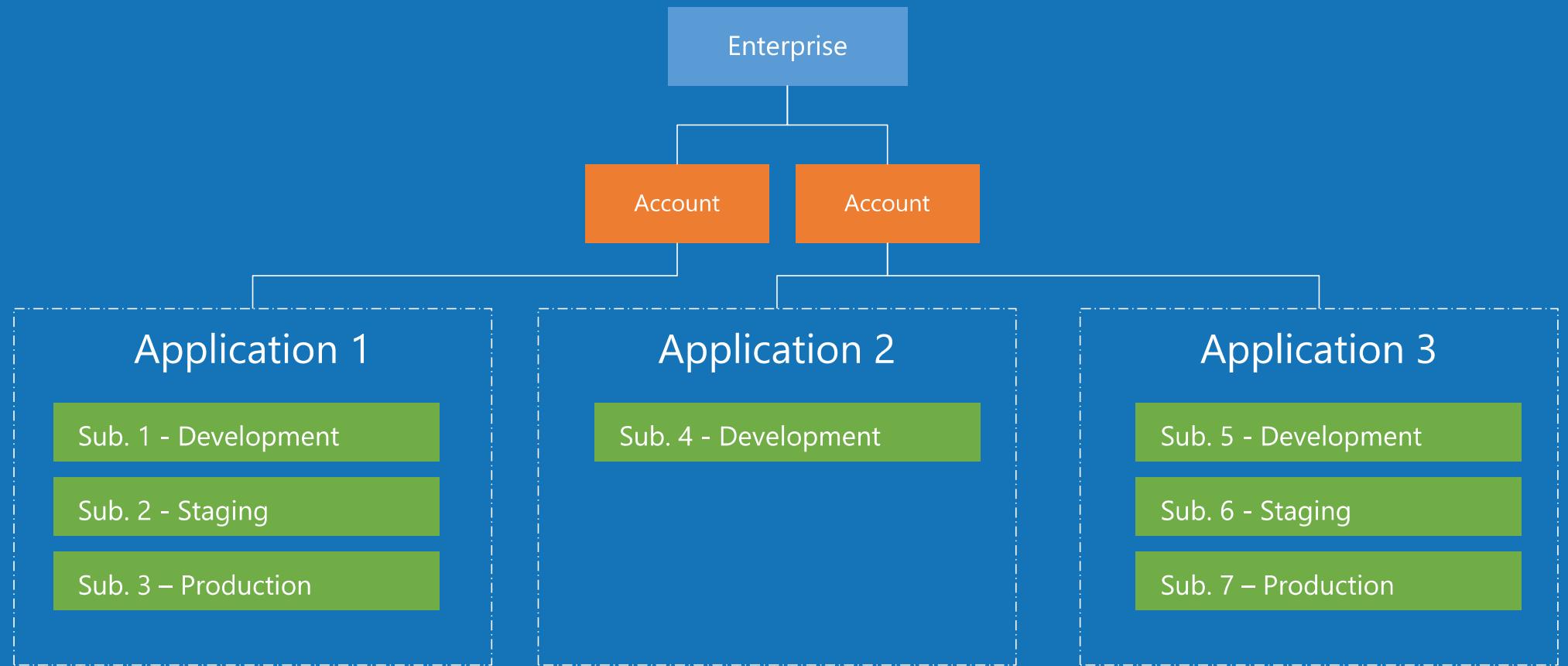
AZURE RESOURCE	Service Management API	Resource Manager API
Cores per subscription	10,000 Global	10,000 Regional (x 17 regions)
Co-administrators per subscription	200 Global, with no RBAC model	Unlimited: AAD groups can recursively contain other groups; full RBAC security model.
Storage accounts per subscription	100	200 (by contacting support)
Hosted Service per subscription	200	Unlimited (deprecated)
Virtual networks per subscription	100 Global	1,000 Regional (x17 regions)
Local networks per subscription	500 Global	Unlimited
Reserved IPs per subscription	100 Global	600 Regional (x17 regions)
VNets per ExpressRoute Circuit	10 Global	N/A (no support for ER with new API)
Hosted service certificates per subscription	400 Global	Unlimited: secrets are now stored in Regional Azure Key Vaults
Affinity groups per subscription	256 Global	Deprecated
Resource Groups per subscription	500 Global	500
Virtual machines per deployment	50 per deployment	100 per deployment
Input Endpoints	150 per cloud service	600 Load Balancers per subscription per region, with each LB supporting 65,000 connections

<https://azure.microsoft.com/en-us/documentation/articles/azure-subscription-service-limits>

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Subscription Setup Methodology



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[Azure Storage]

Azure Storage Account Services

Blobs



Block: Text or binary data (.log, .exe, jpg, etc.).

Up to 200GB.

Page: Optimized for disks (.vhdx). Supports random read-write. Up to 1TB.

Append Blob: Writes to end of the blob (4MB max) up to 50k times (~195GB)

Tables



NoSQL storage of structured data (entities).

Key/value storage.

A single entity can have up to 255 properties and be up to 1MB.

File Shares



Supports SMB 3.0 protocol.

Can be accessed like a traditional file share.

Share files between multiple Virtual Machines.

A single file share can be up to 5TB.

Scalability Targets

Storage Account: 20,000 IOPS



Blobs



500 IOPS or 60MB/second.

Basic/Standard Tier VM: 300/500 IOPS/disk.

DS-Series VM w/Prem. Stg.: 5,000 IOPS/disk.

File Shares



1,000 IOPS or 60MB/second (8K object size).

Tables



2,000 Entities/second (1K entity size)

Queues



2,000 Messages/second (1K message size).

Blob Storage Container Concepts

`http|https://storageaccountname.blob.core.windows.net/`

Container 1
(/VHDs)

VHDs

- /Win2k12-datacenter.vhd

Container 2
(/Logs)

/Log1.log

Container 3
(/Public)

/Photos

- /Pic1.jpg

/Videos

- /MyVideo.mp4

Partition Key=blobname

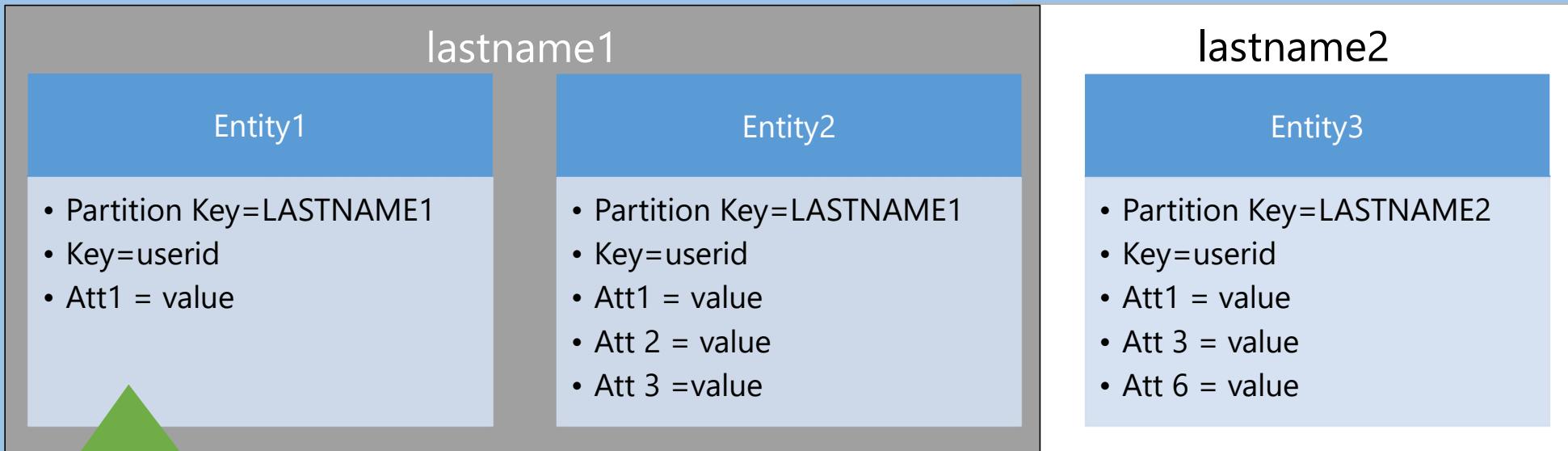
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Table Storage Concepts

[http|https://storageaccountname.table.core.windows.net/TABLENAME/](http://storageaccountname.table.core.windows.net/TABLENAME/)

Partition Key = Last Name (Example)



Partition Key=lastname

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Queue Storage Concepts

`http|https://storageaccountname.queue.core.windows.net/QUEUENAME/`

Queue (Order Processing)

Order1

Order2

OrderN...

Partition Key=queuename

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Files Storage Concepts

`http|https://storageaccountname.files.core.windows.net/`

Share name 1 (archive)

/Folder

- /File1.docx
- /folderA
- /file2.pptx

/folder

- /folder
- Files

Share name 1 (S Drive)

/Folder

- /File1.docx
- /folderA
- /file2.pptx

/folder

- /folder
- files

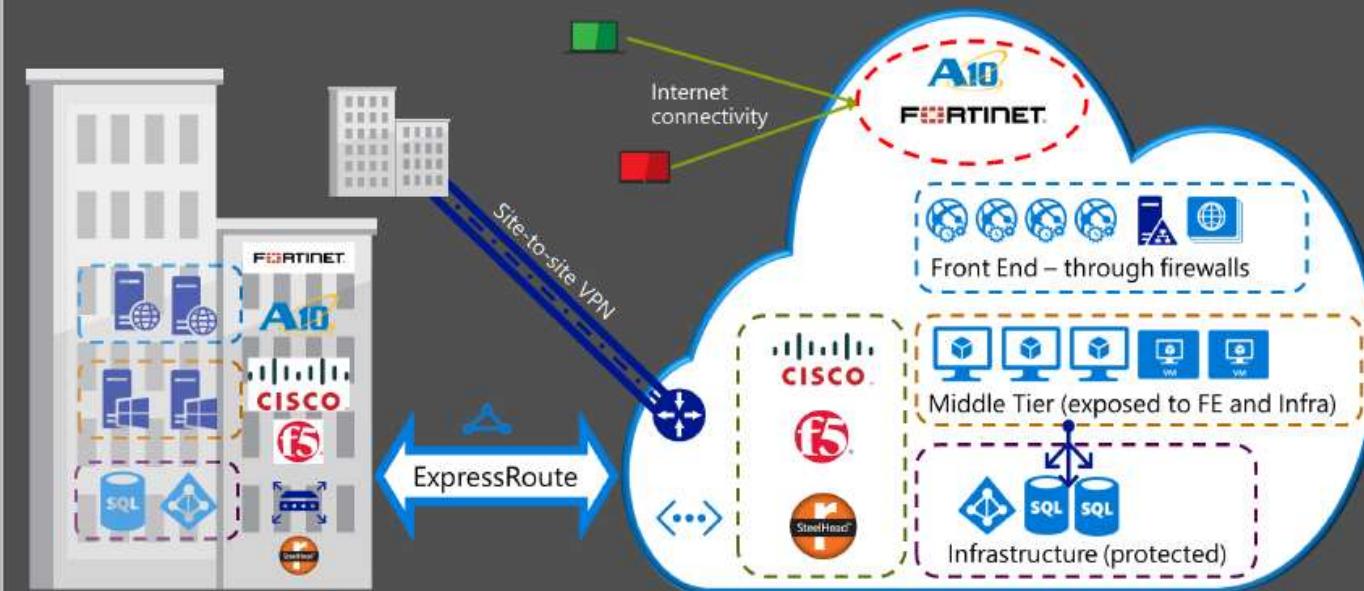
Partition Key=sharename

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[Azure Networking Basics]

Azure Networking Architecture

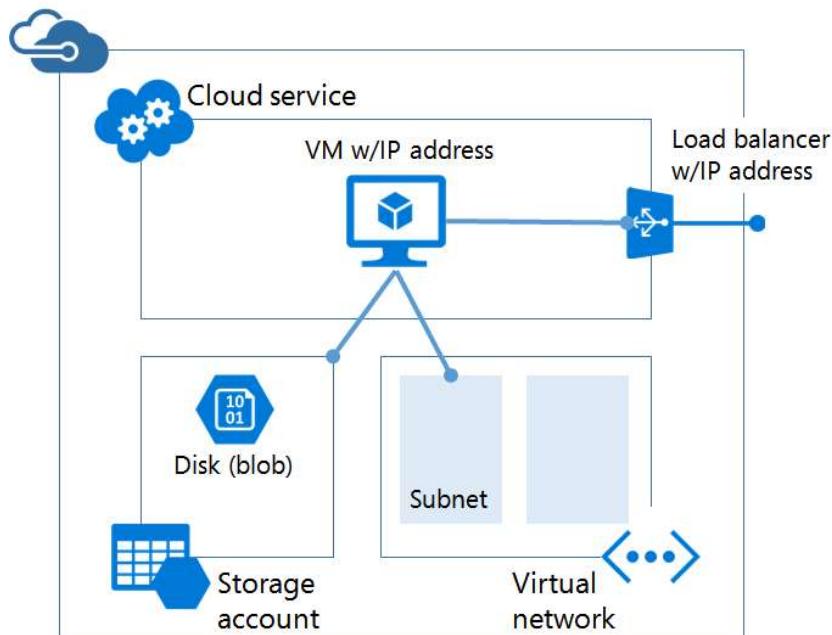


- DDoS Protection
- Service Endpoints (NAT)
- Traffic isolation
- Multi-tier topology
- Cross premises connectivity
- Network Security Group
- Azure DNS – Domain hosting
- APIs, PowerShell, Templates
- User-Defined Routes (UDR) and IP Forwarding
- Network Virtual Appliances:
- ExpressRoute Premium and O365
- VPN ExpressRoute Coexistence
- Network Virtual Appliances
(Security appliances such as firewalls, load balancers, and IDS/IPS (Intrusion Detection/Prevention Services) are available in the Azure Marketplace and VM Gallery)

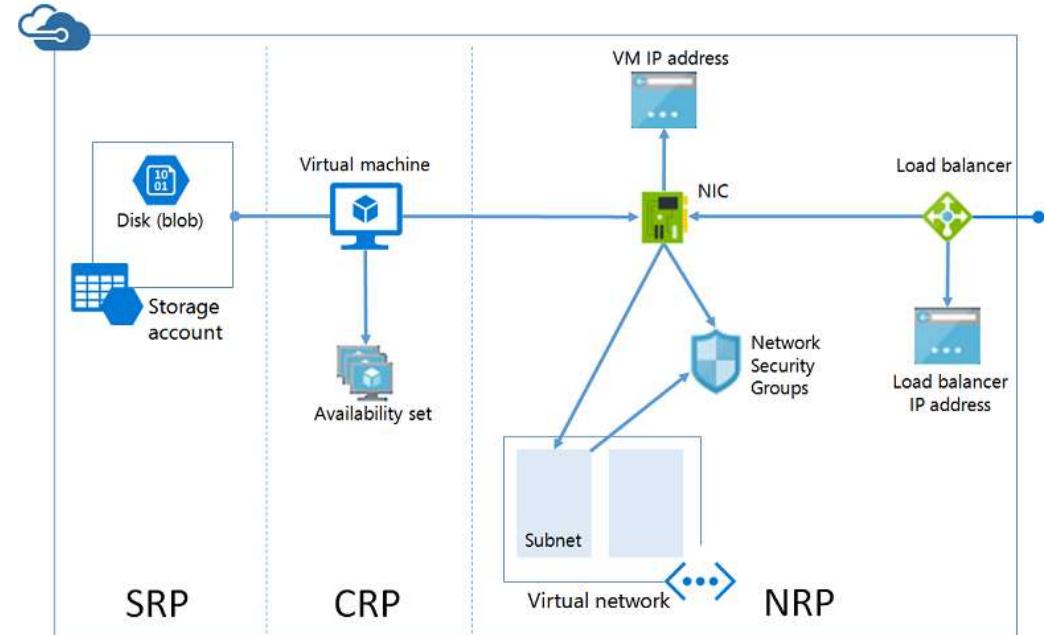


Comparing Network Architectures

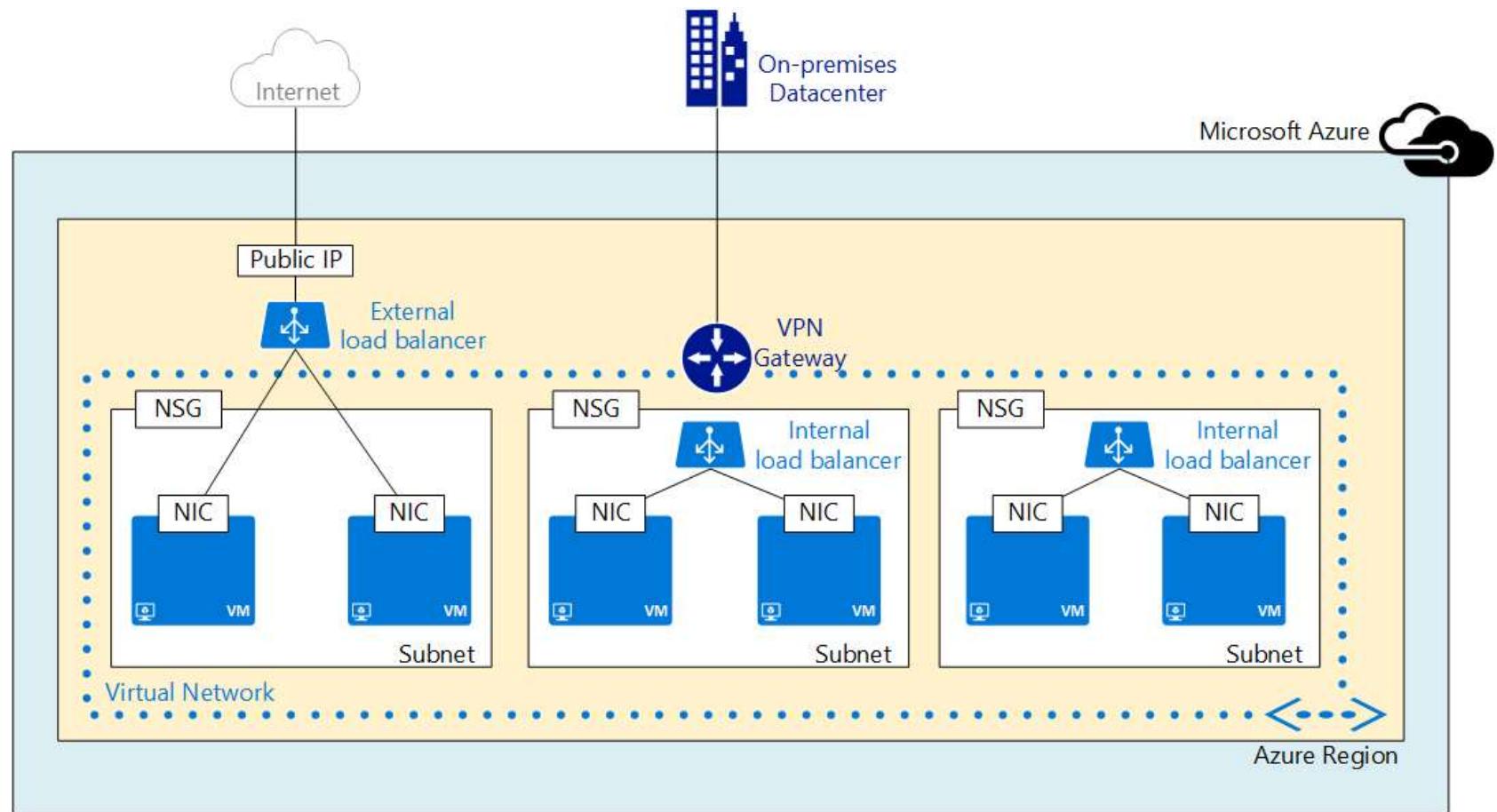
Classic (Service Manager)



Azure Resource Manager



Azure Components



Using the External Load Balancer (Classic)

Endpoint VM1

Public Port: 80

Local Port: 80

Protocol: TCP

Name: HTTP

LBSetName: LBHTTP

Endpoint VM2

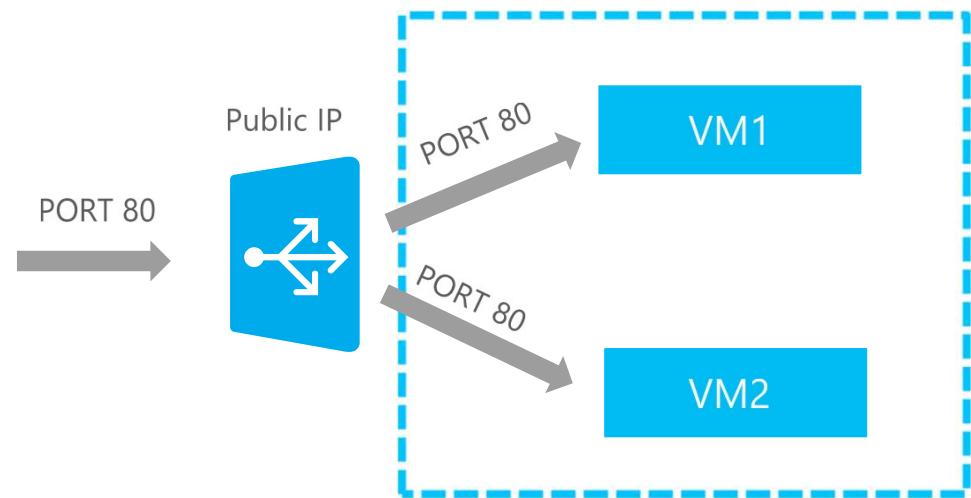
Public Port: 80

Local Port: 80

Protocol: TCP

Name: HTTP

LBSetName: LBHTTP

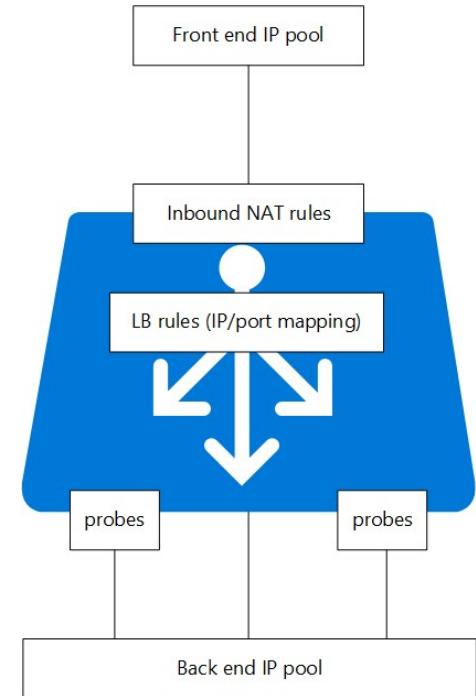


Multiple VMs can share the same public port

Load Balancer - ARM

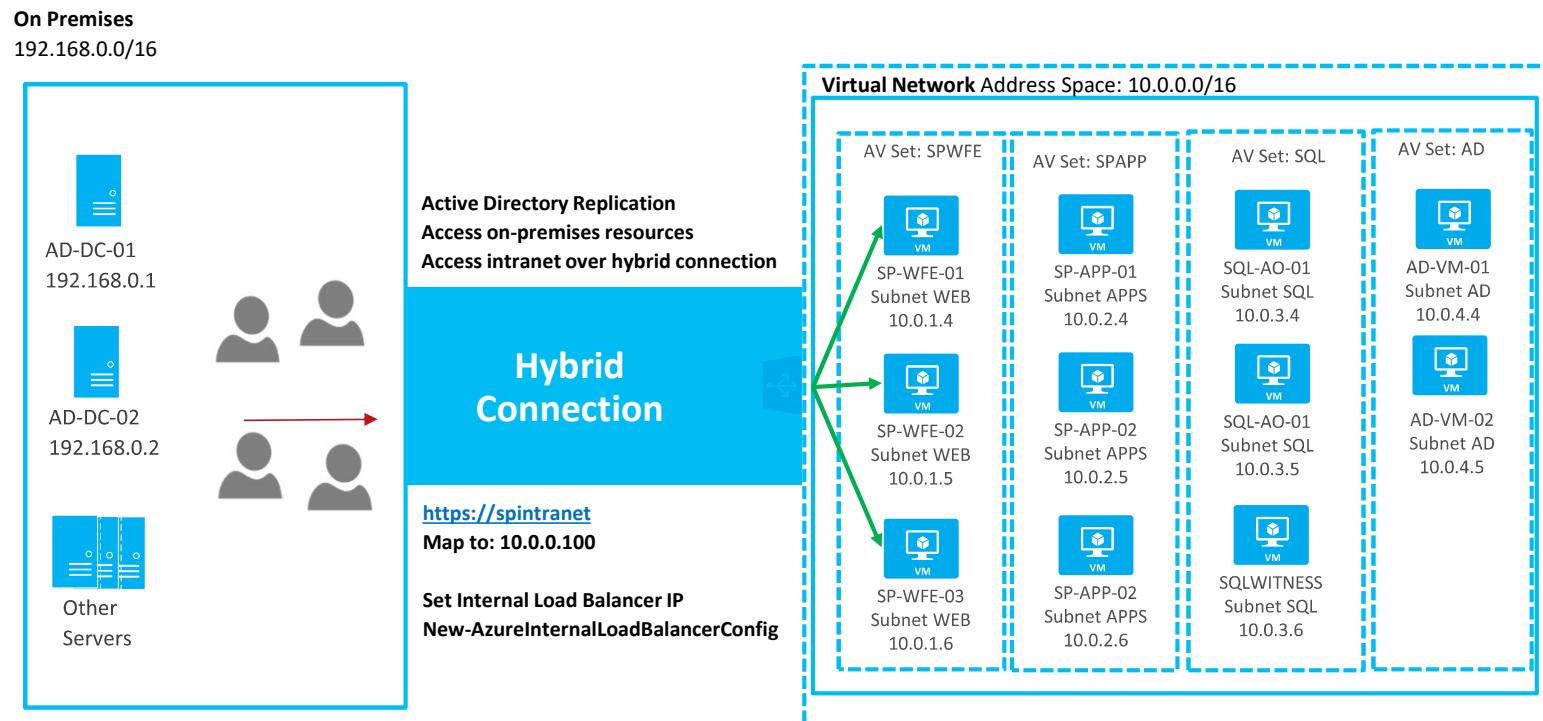
Configure the load balancer directly instead of configuring endpoints on each virtual machine.

- Front end IP configuration
- Backend Address Pool
- Load Balancing Rules
- Probes
- Inbound NAT Rules



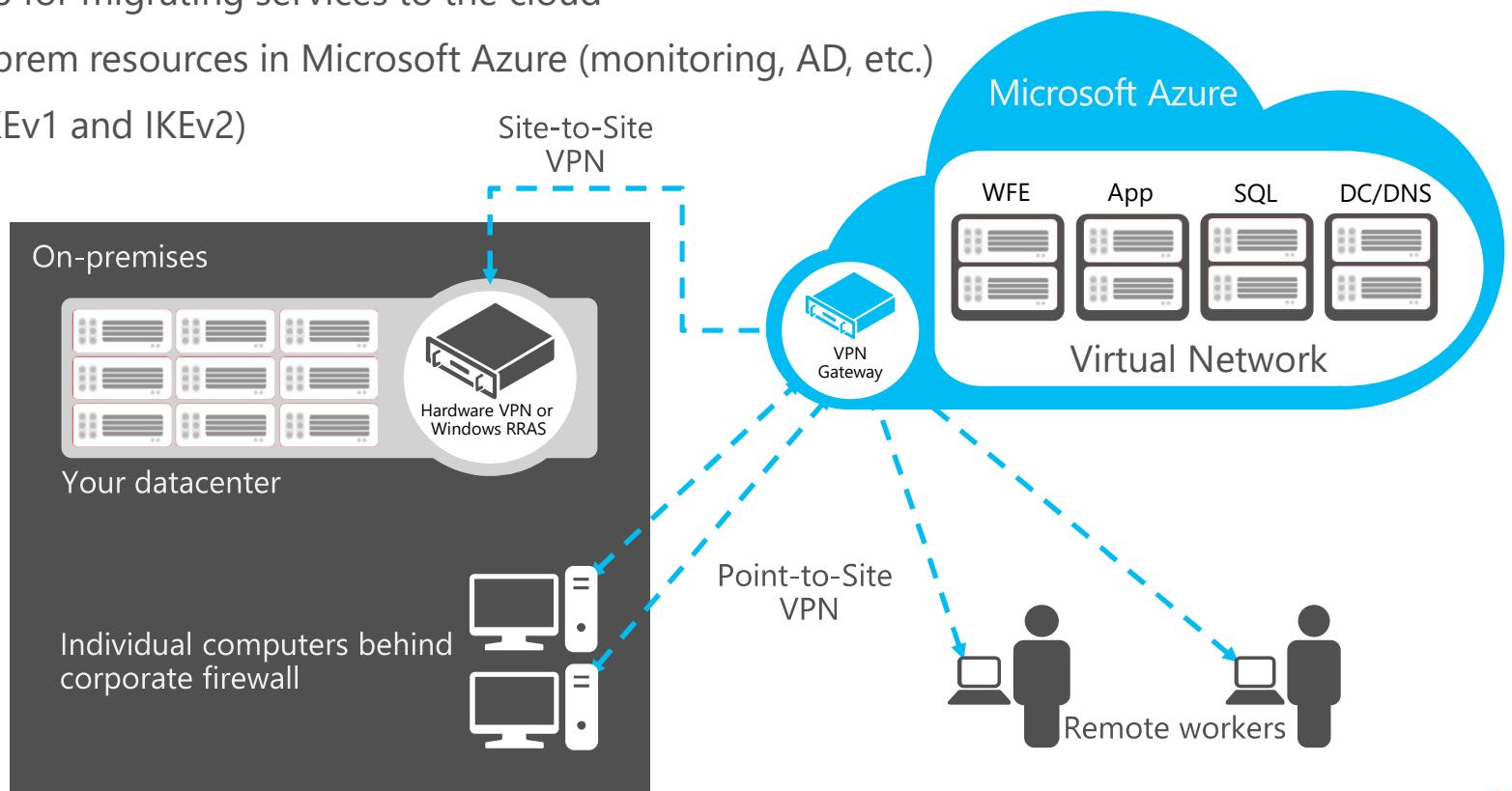
[Azure Virtual Networks]

Internal Load Balancing with Virtual Networks



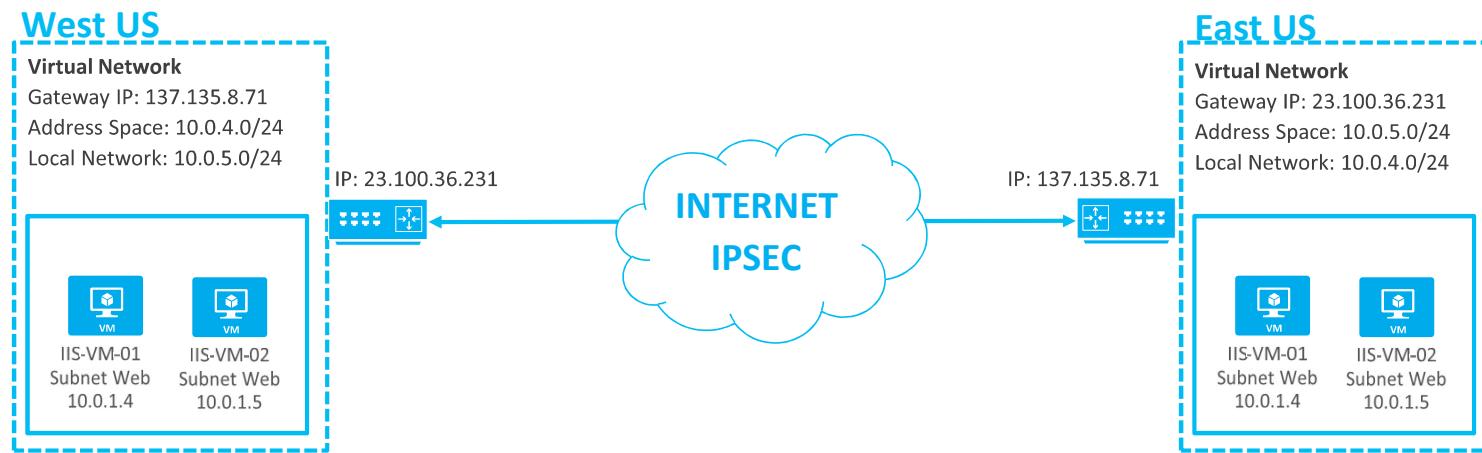
Site-to-Site VPN connect Virtual Network

- Extend on-premises to the cloud securely (IPSec)
- On-ramp for migrating services to the cloud
- Use on-prem resources in Microsoft Azure (monitoring, AD, etc.)
- IPSec (IKEv1 and IKEv2)

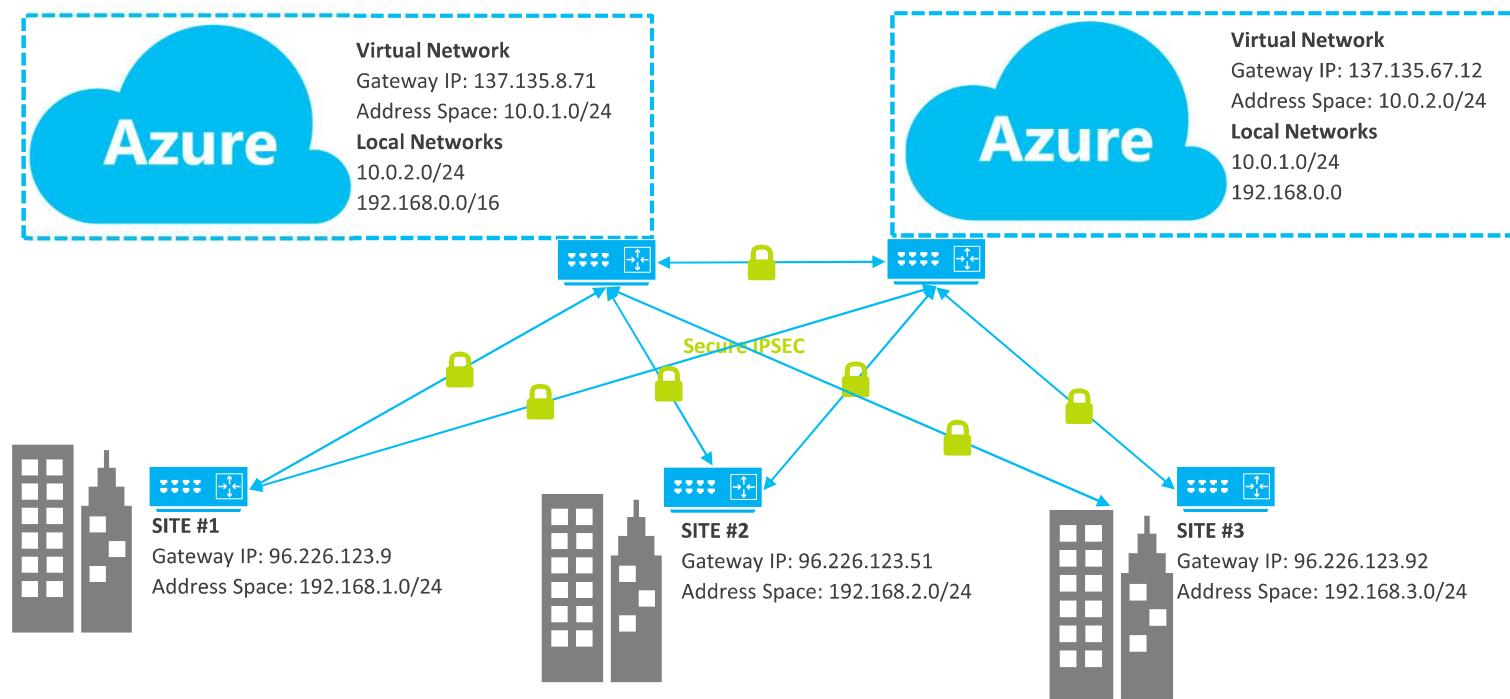


Virtual Network to Virtual Network

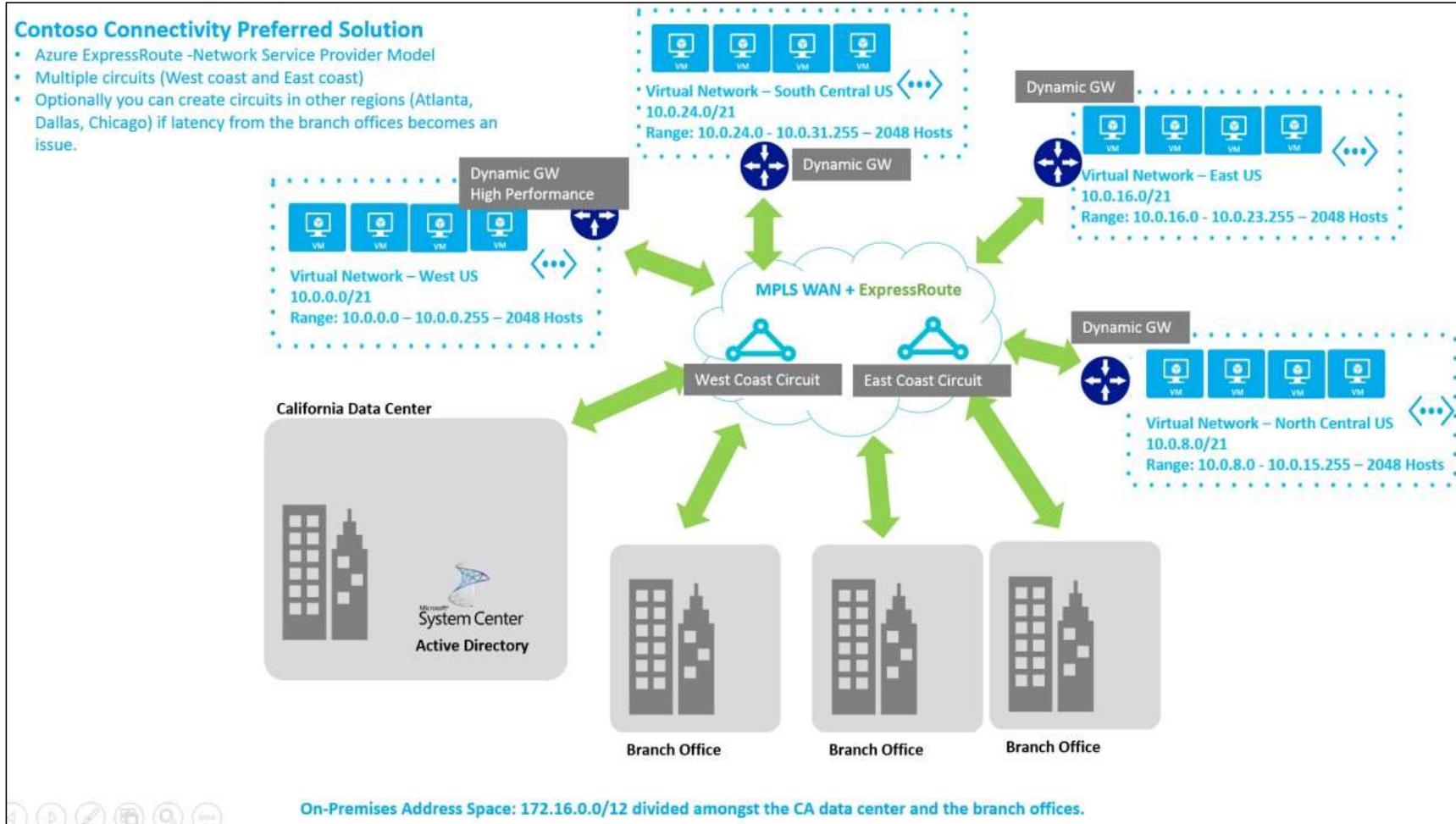
Connect Virtual Networks Across Azure Regions or Subscriptions



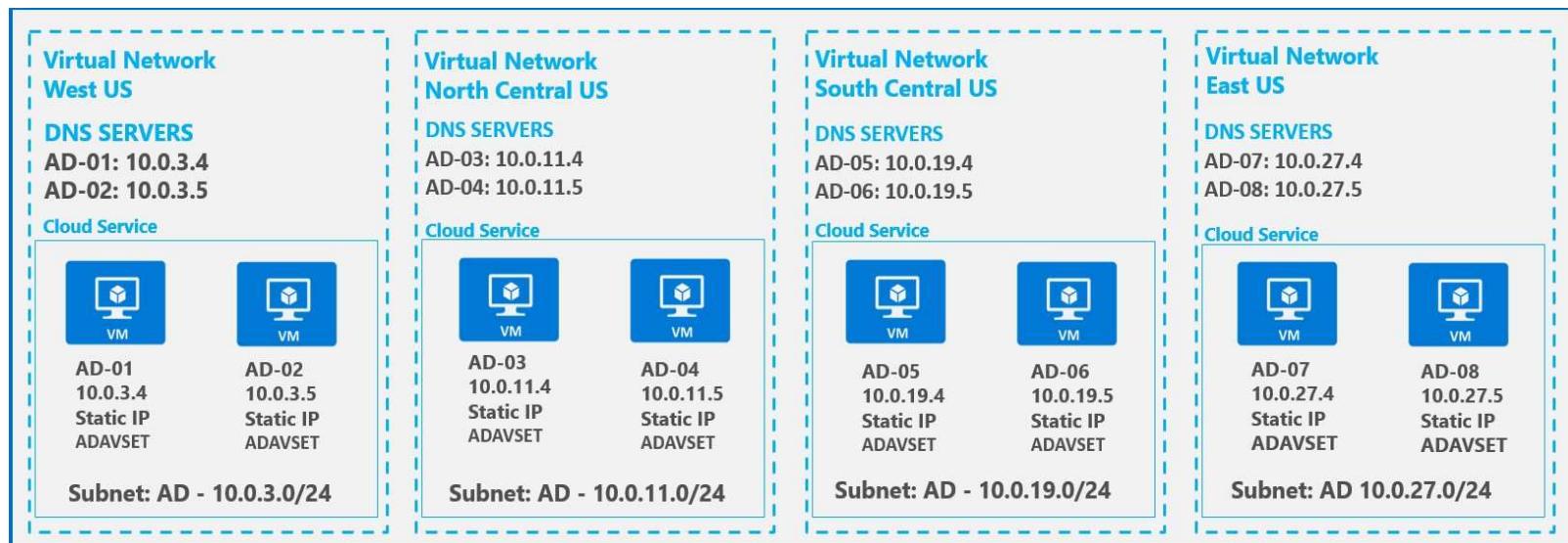
Multi-Site Virtual Networks



Example network customer case - 1

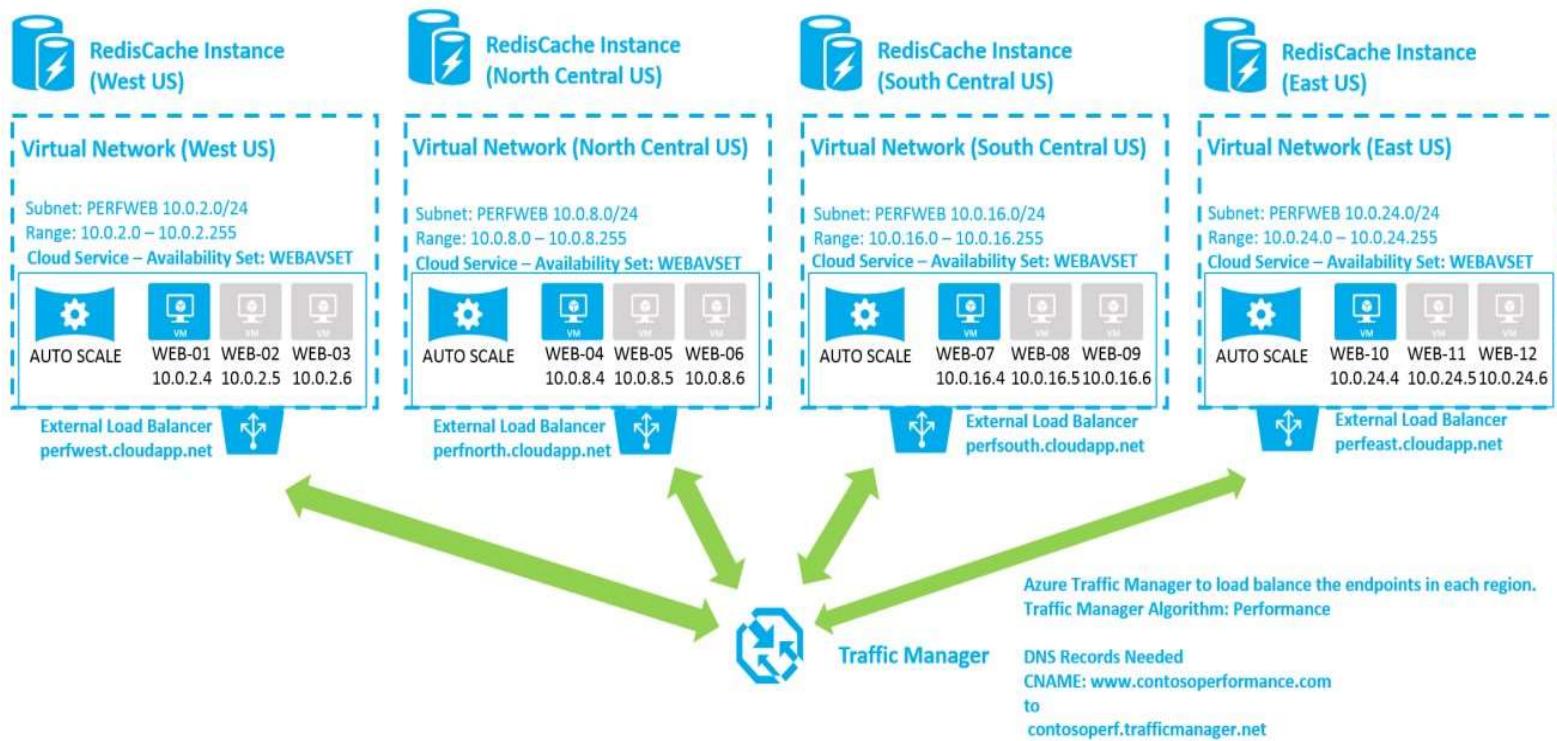


Example network customer case - 2



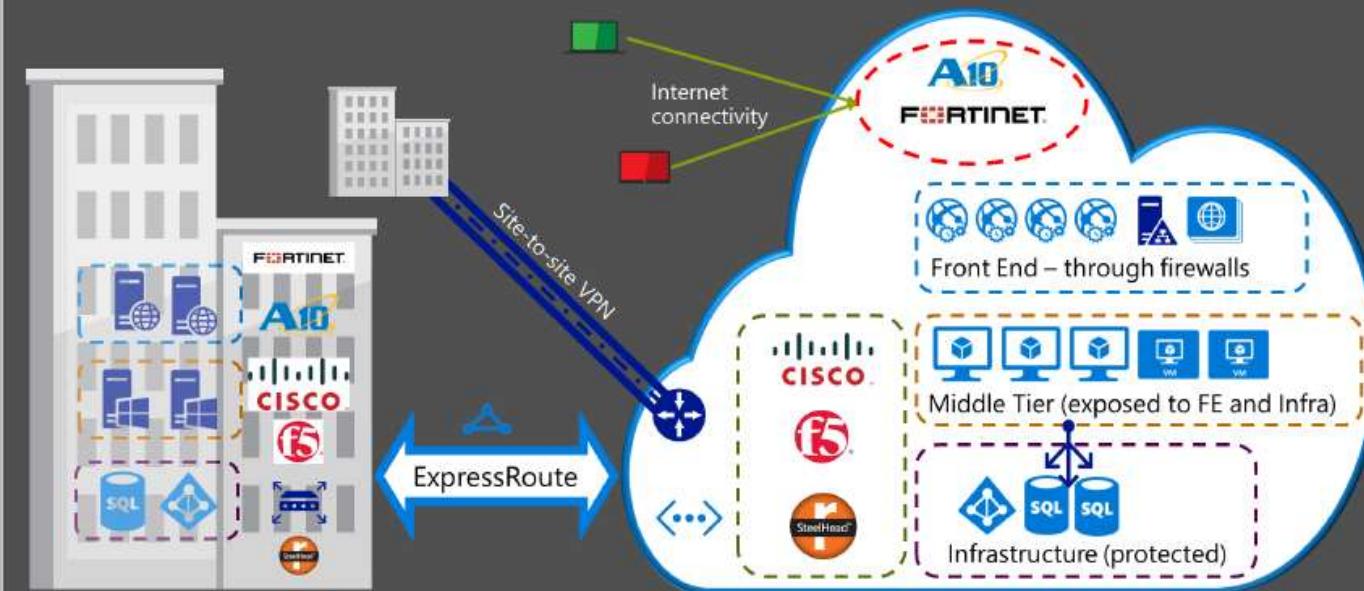
Example network customer case - 3

Contoso Performance Preferred Solution



[Express Route]

Azure Networking Architecture

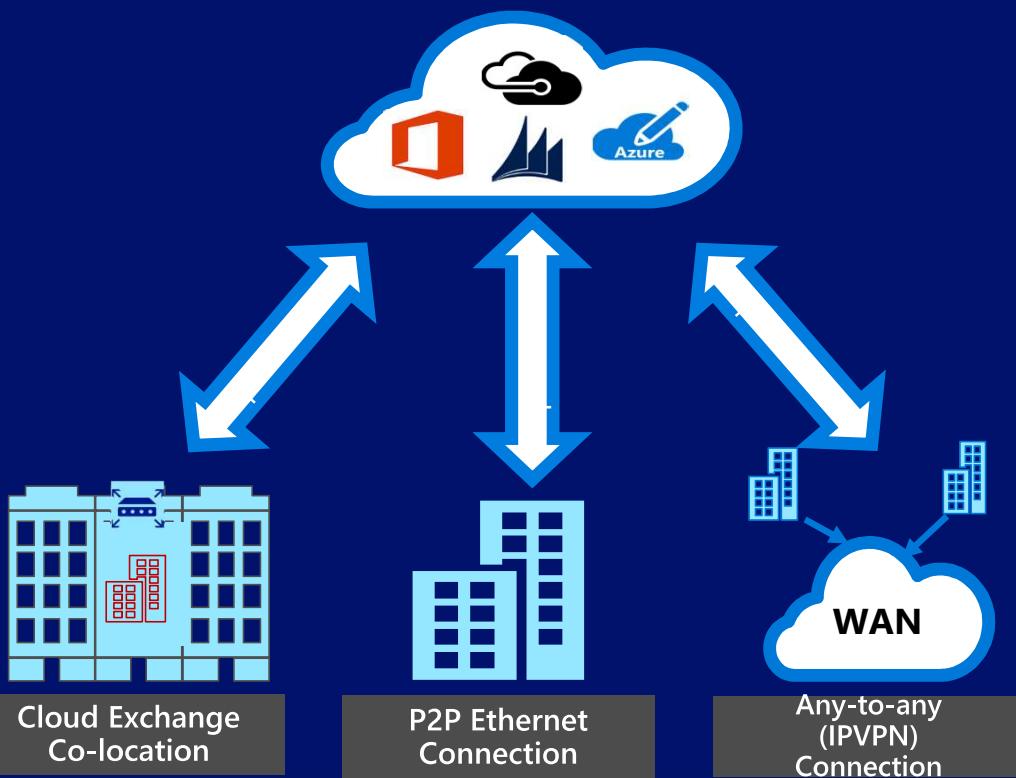


- DDoS Protection
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- VPN ExpressRoute Coexistence
- Network Virtual Appliances
(Security appliances such as firewalls, load balancers, and IDS/IPS (Intrusion Detection/Prevention Services) are available in the Azure Marketplace and VM Gallery)



ExpressRoute - What is it?

ExpressRoute provides a private, dedicated, high-throughput network connection from a customer to Microsoft.



- Predictable performance
- High Throughput
- Private
- Supports advanced workloads
 - OMS (ASR)
 - EMS (Azure AD)
 - Big Data
 - Office 365/Skype for Business

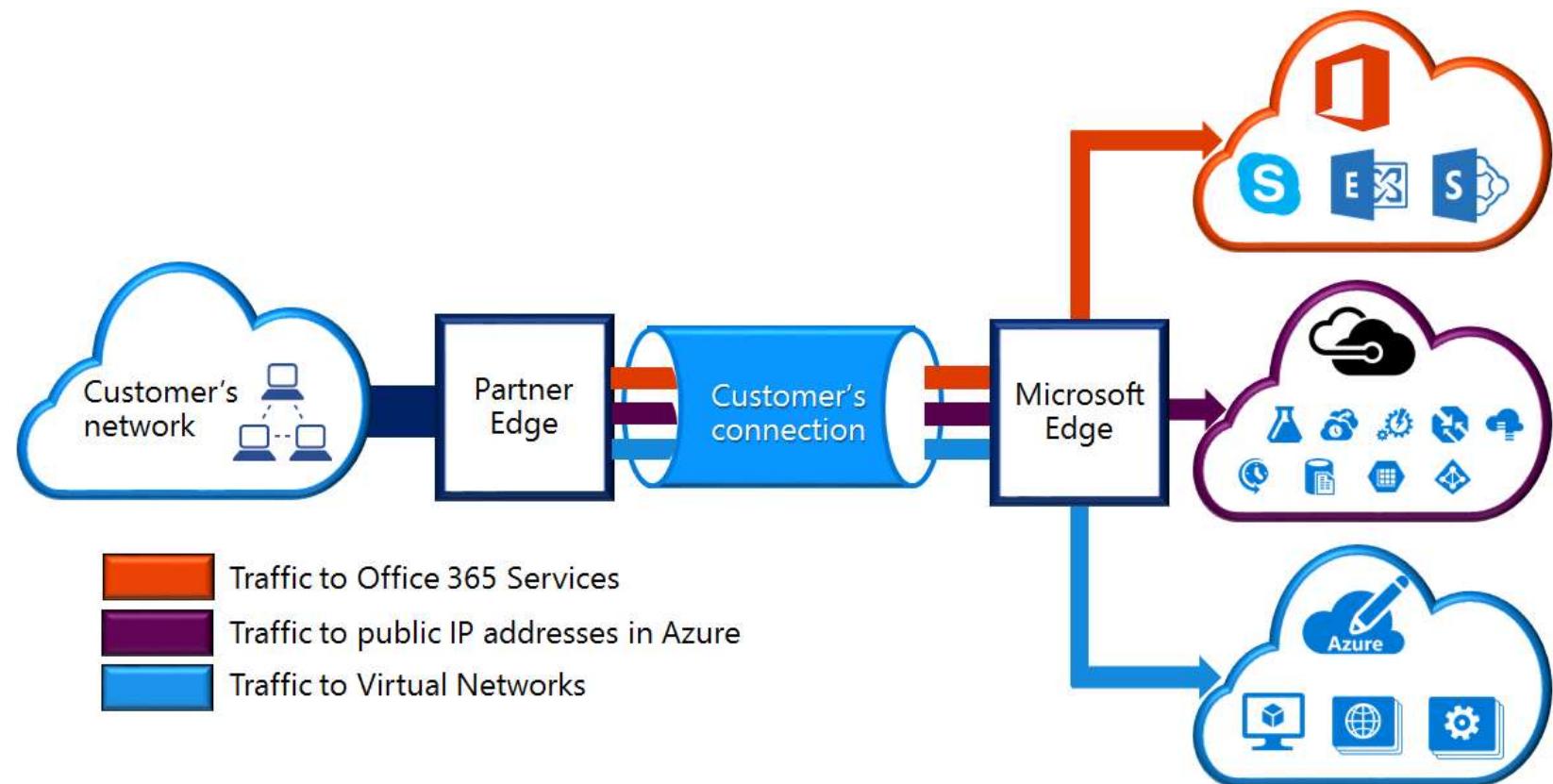


- Connect to all Microsoft Clouds/Workloads
 - Azure (public/private (Gov))
 - Office 365/SfB
 - Dynamics

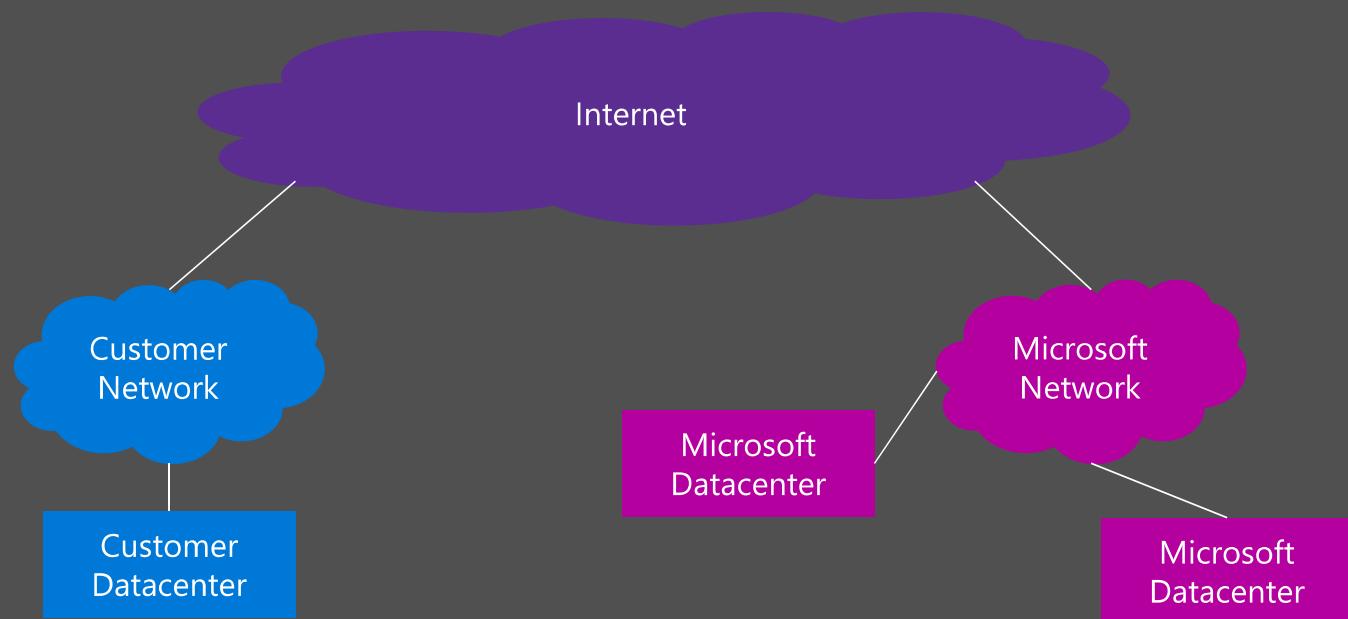


ExpressRoute circuits and routing domains

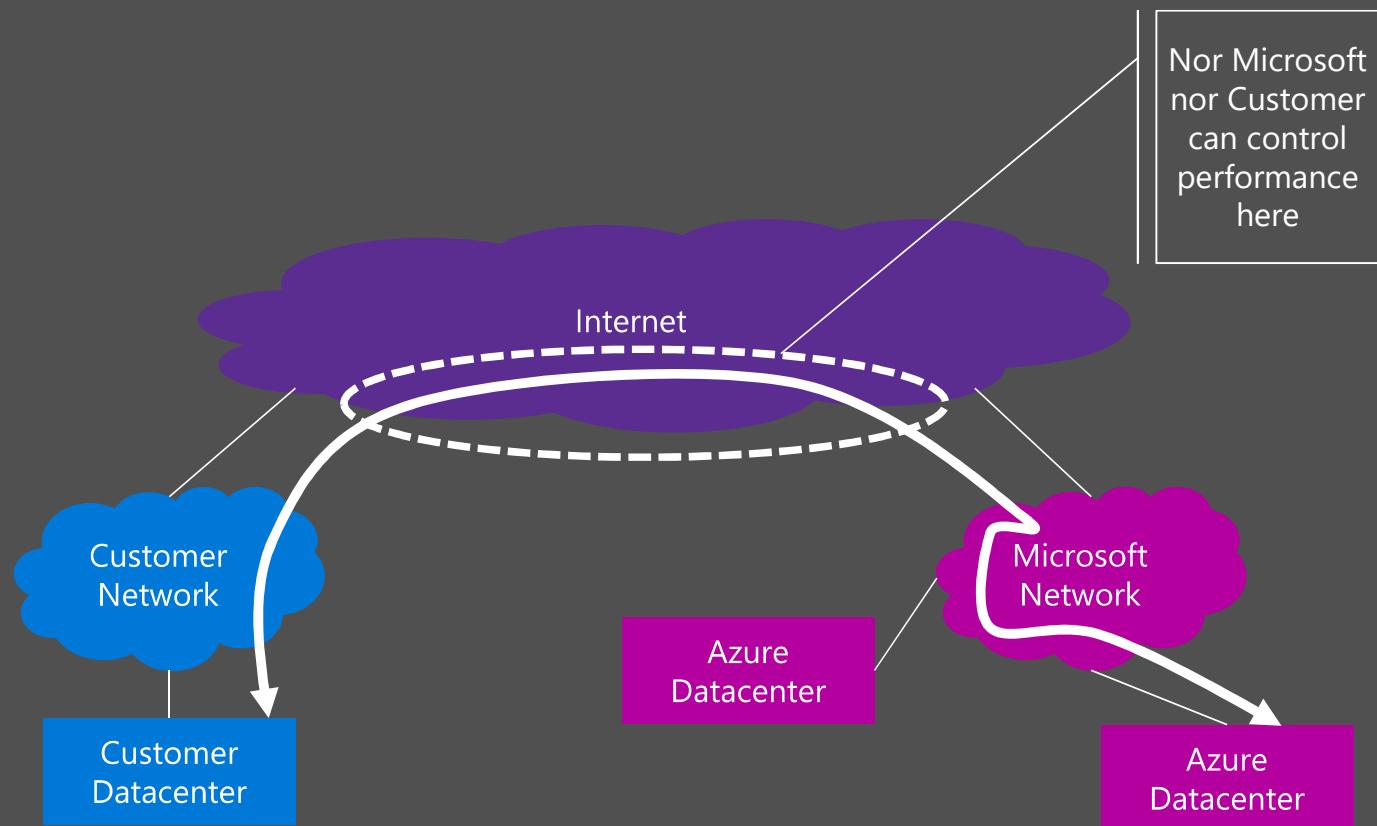
Logical representation of connectivity between your WAN and Microsoft



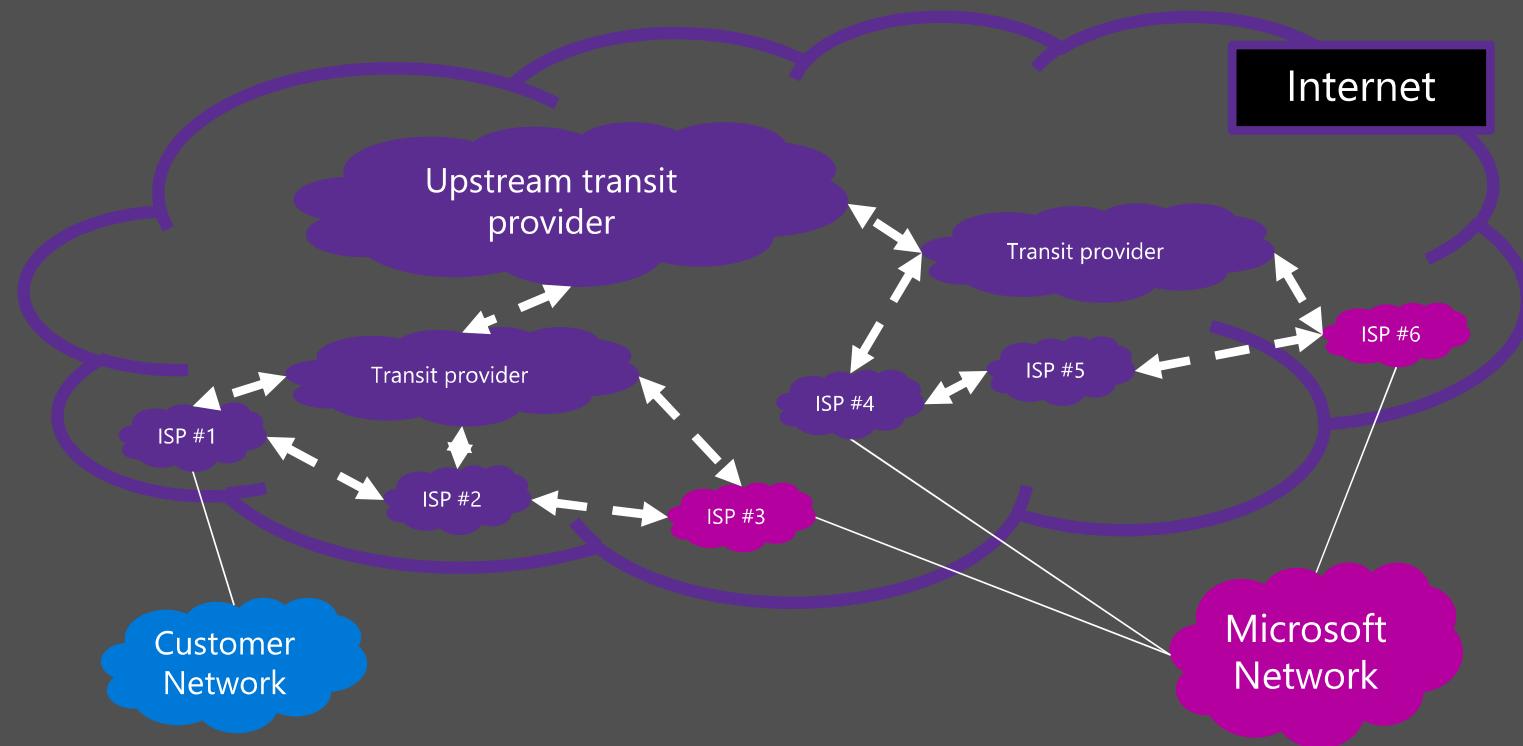
Accessing Microsoft Datacenters Through the Internet



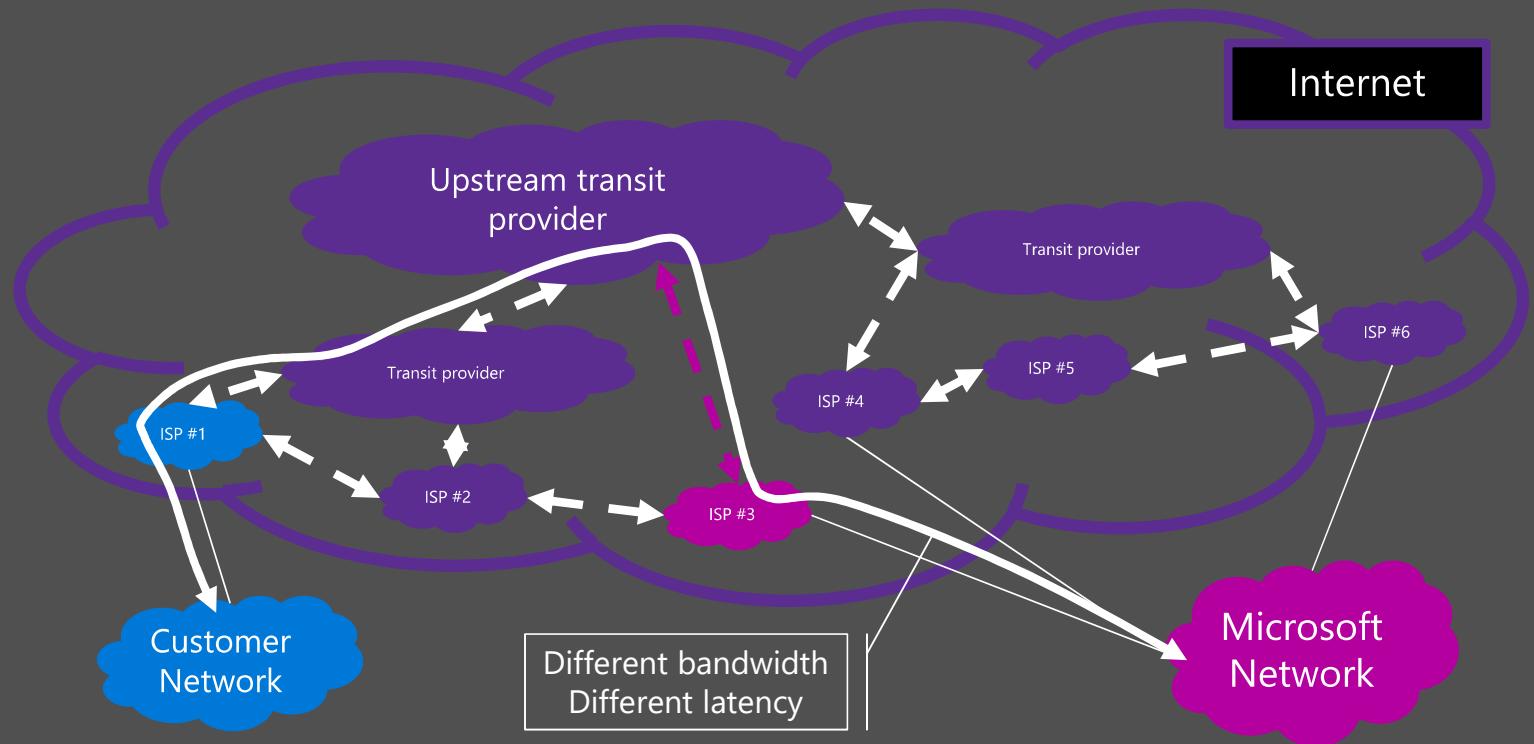
Accessing Azure Through the Internet



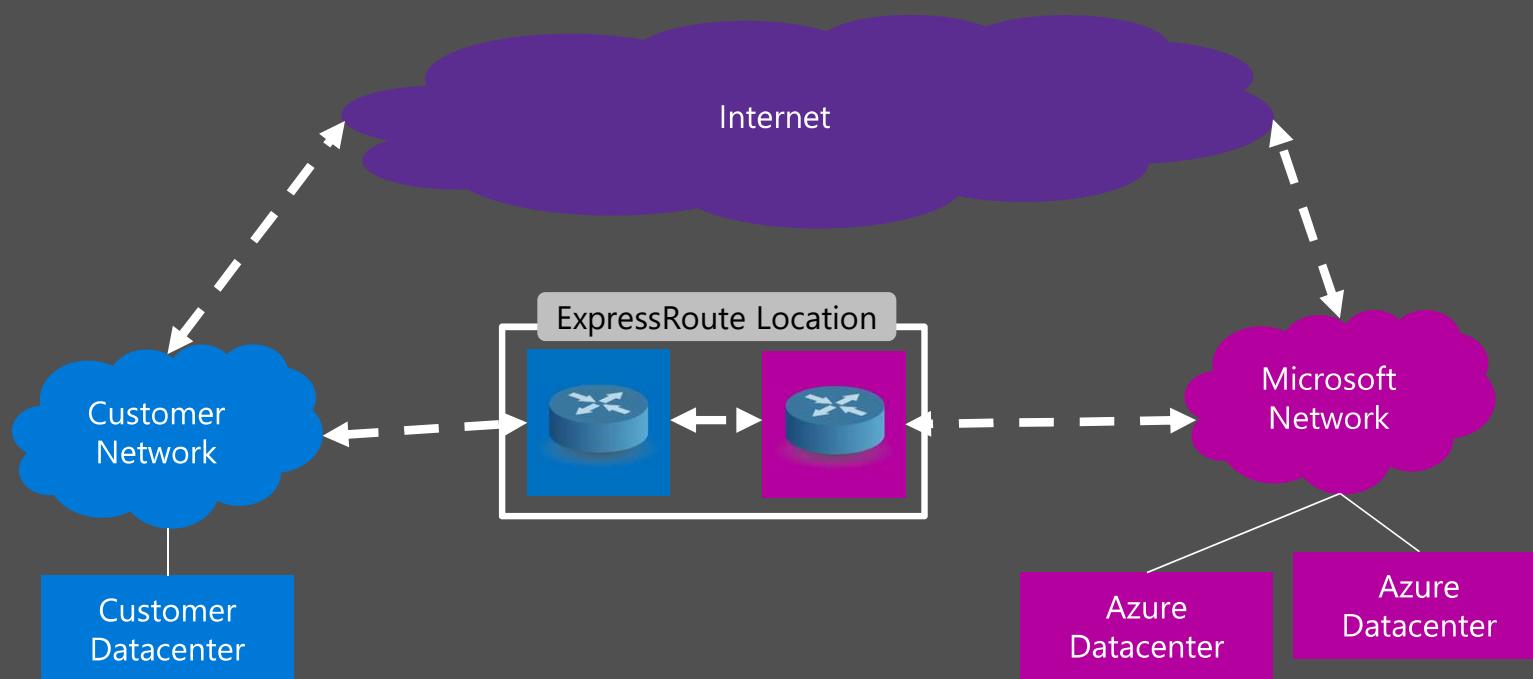
How Internet works



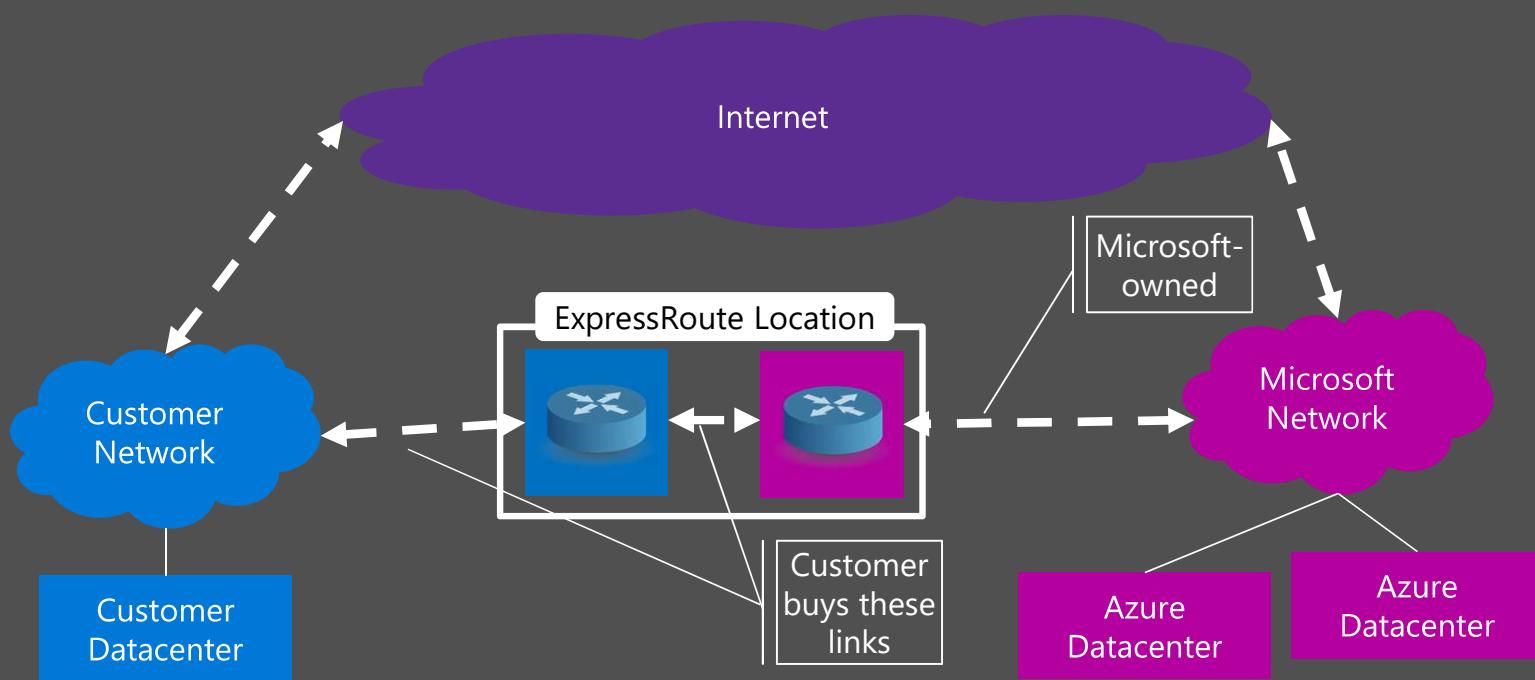
How Internet works



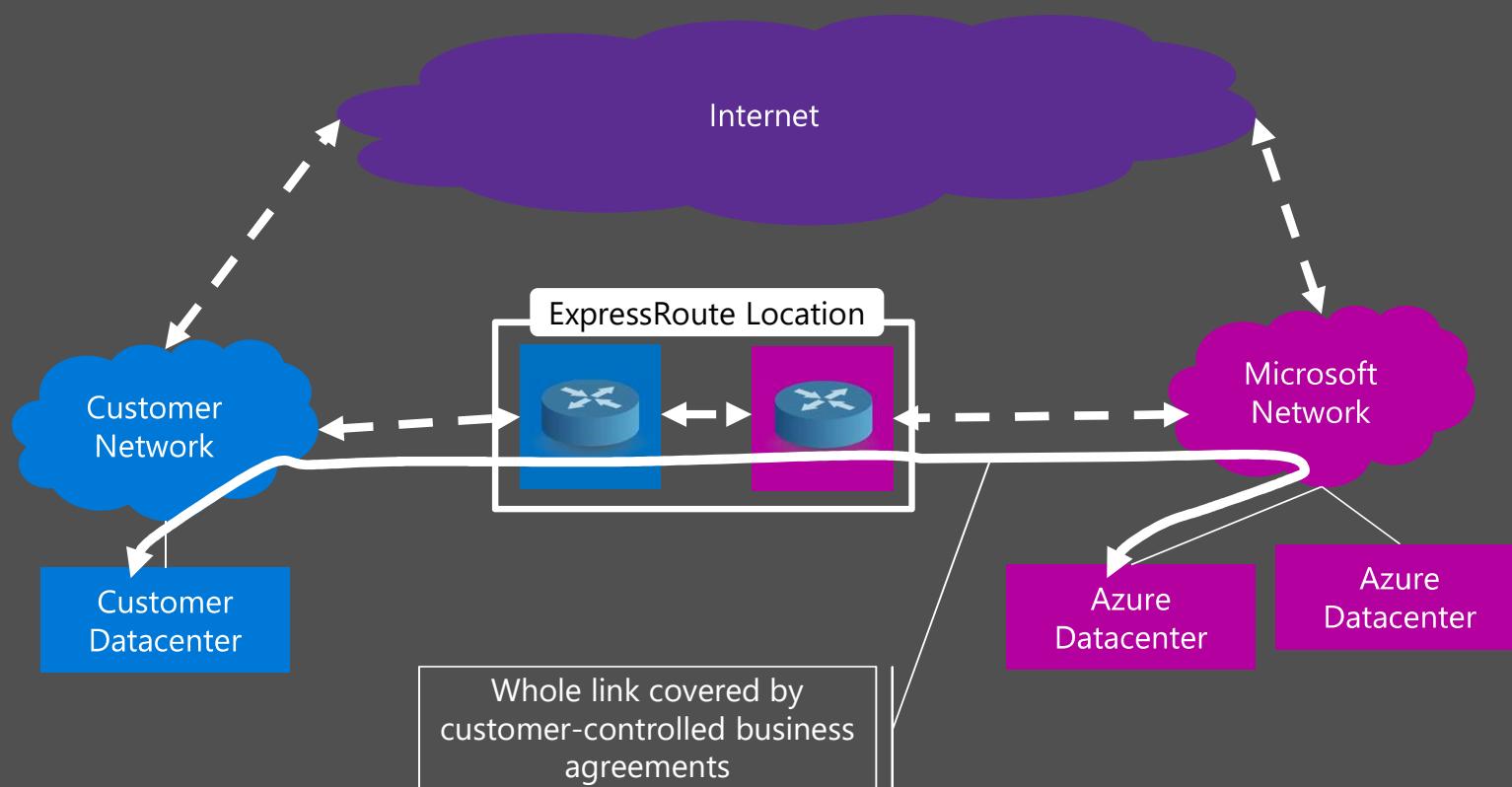
ExpressRoute: Dedicated Connectivity



ExpressRoute: Dedicated Connectivity

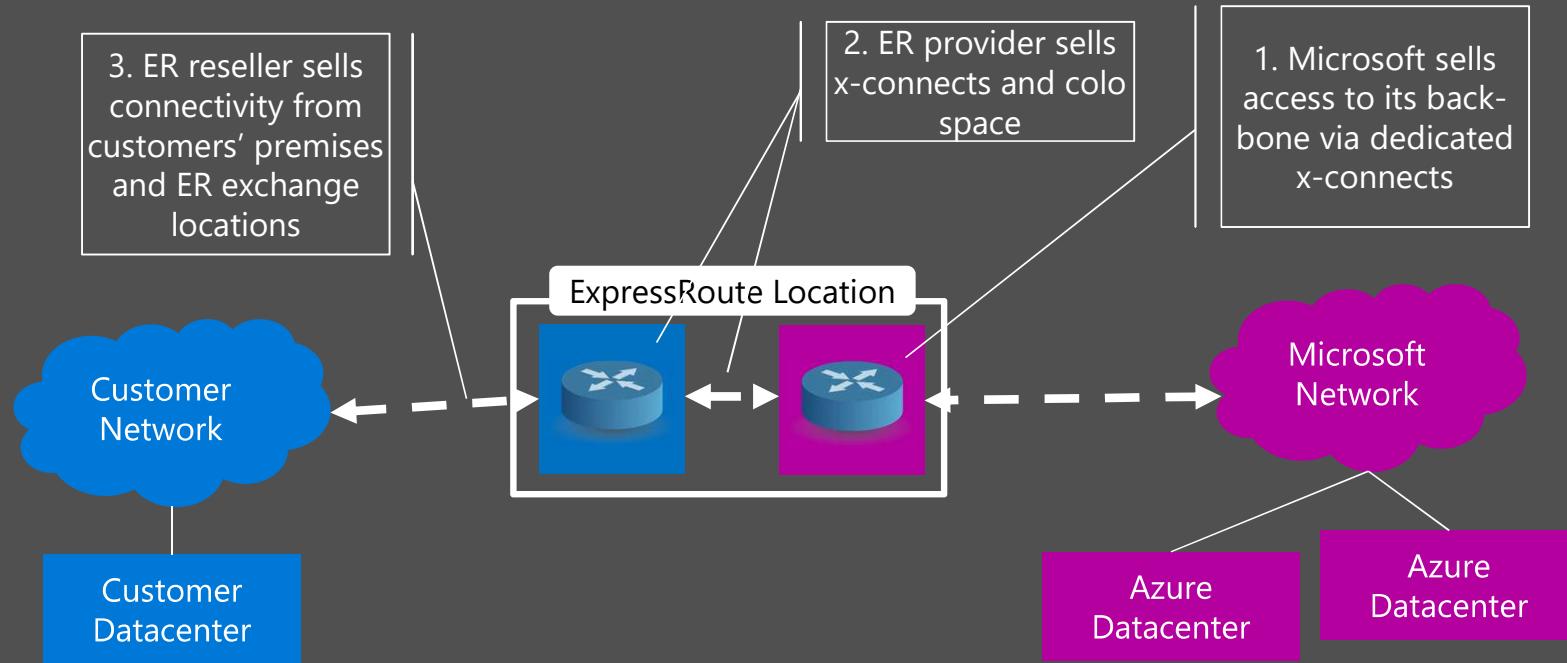


ExpressRoute: Dedicated Connectivity



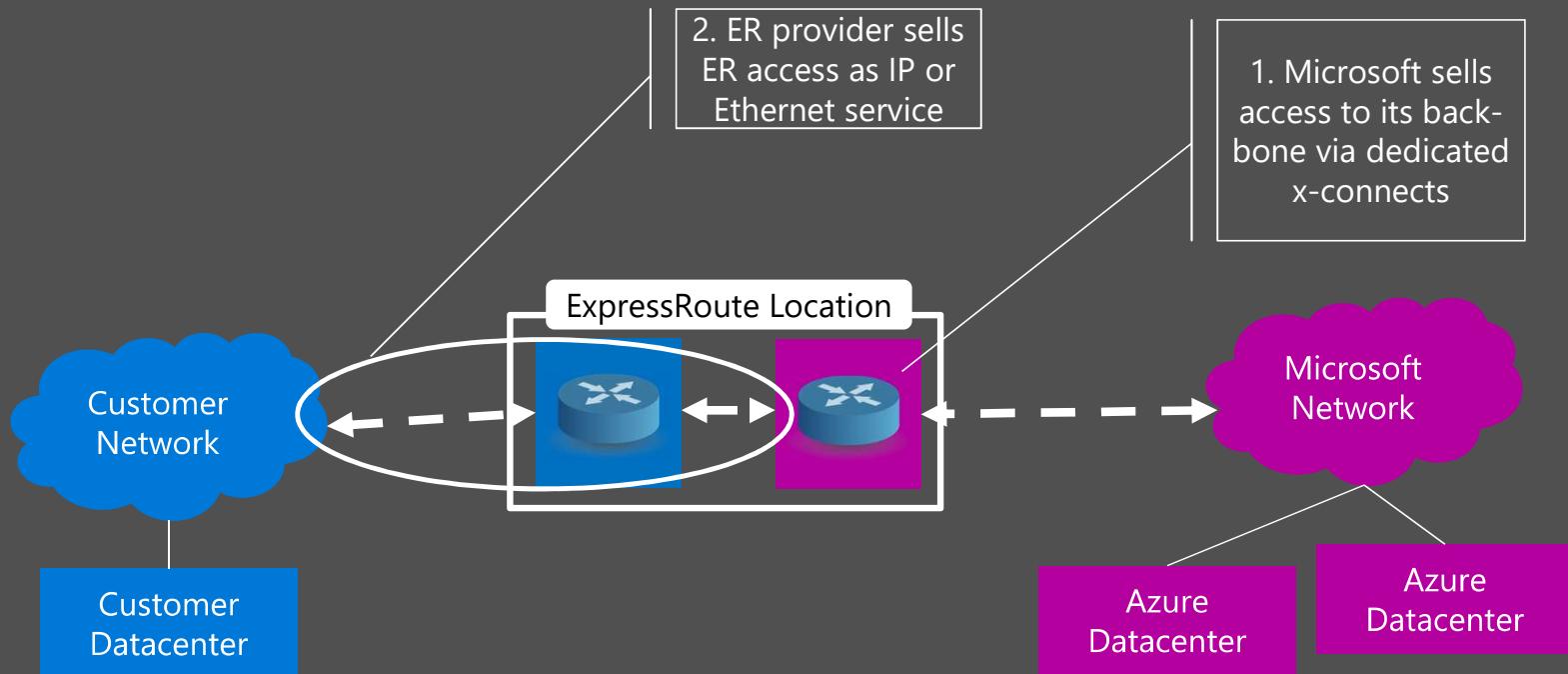
ER Option #1, Cloud Exchange (EXP)

(Equinix, Cologix, Telecity Group, InterXion...)



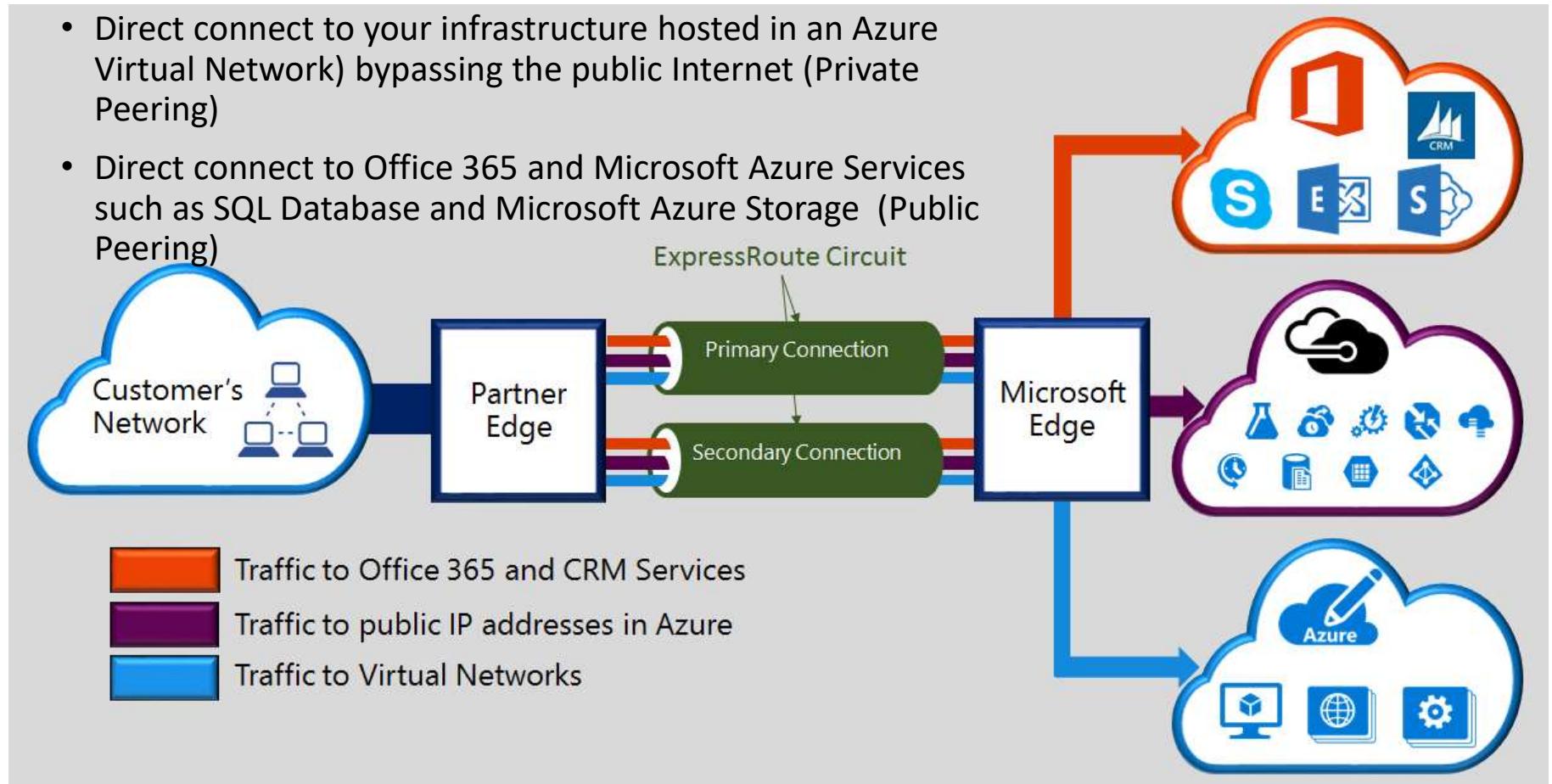
ER Option #2 Network Service Provider - NSP

(Bell Canada, BT, Orange, AT&T, Colt, ...)

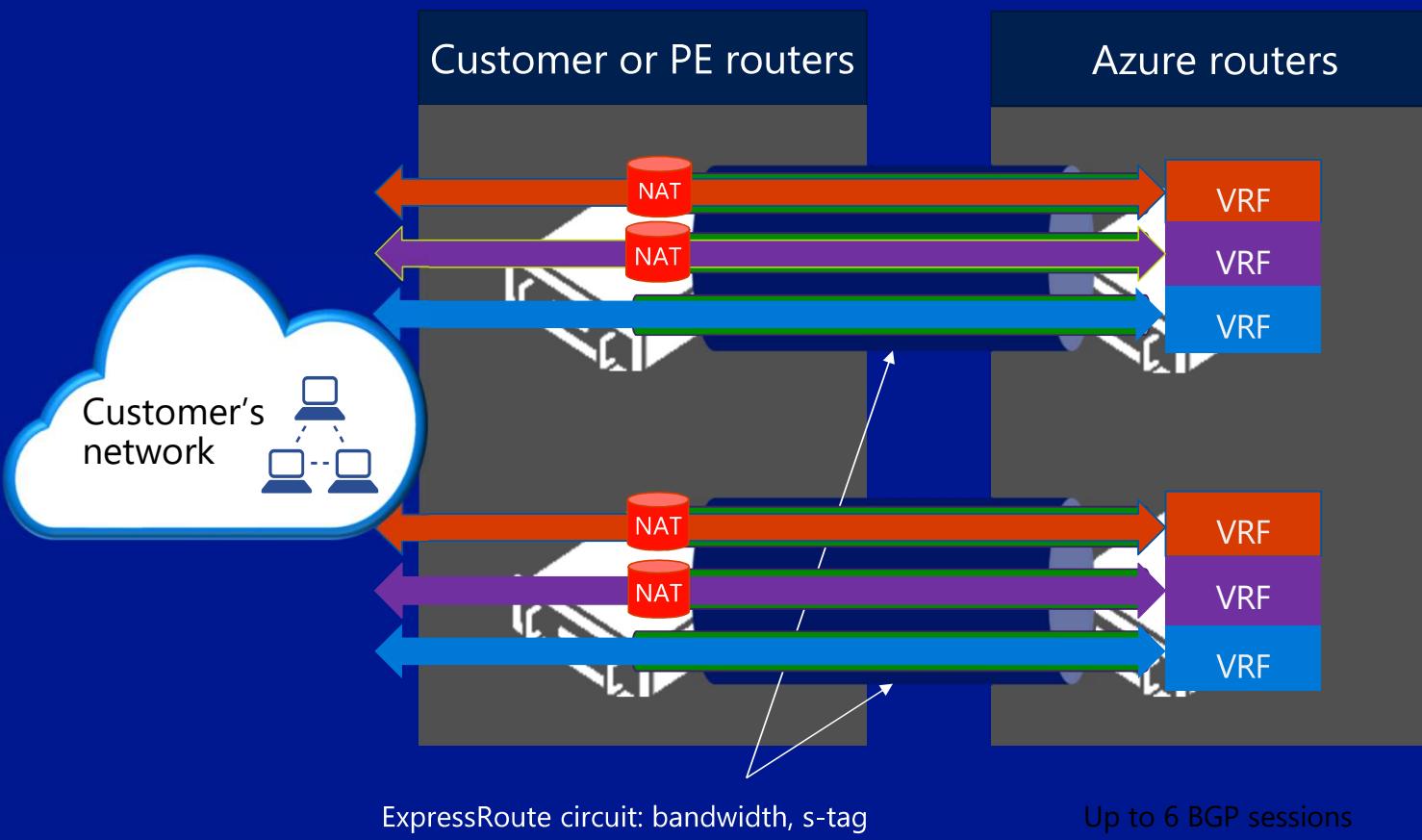


Express Route Technical Overview

- Direct connect to your infrastructure hosted in an Azure Virtual Network (bypassing the public Internet (Private Peering))
- Direct connect to Office 365 and Microsoft Azure Services such as SQL Database and Microsoft Azure Storage (Public Peering)



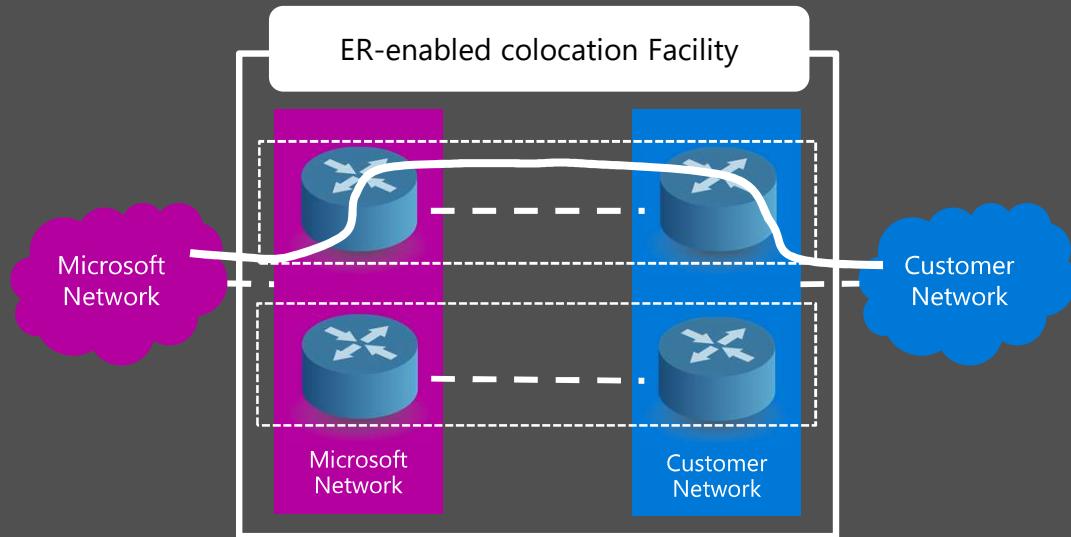
Implementation



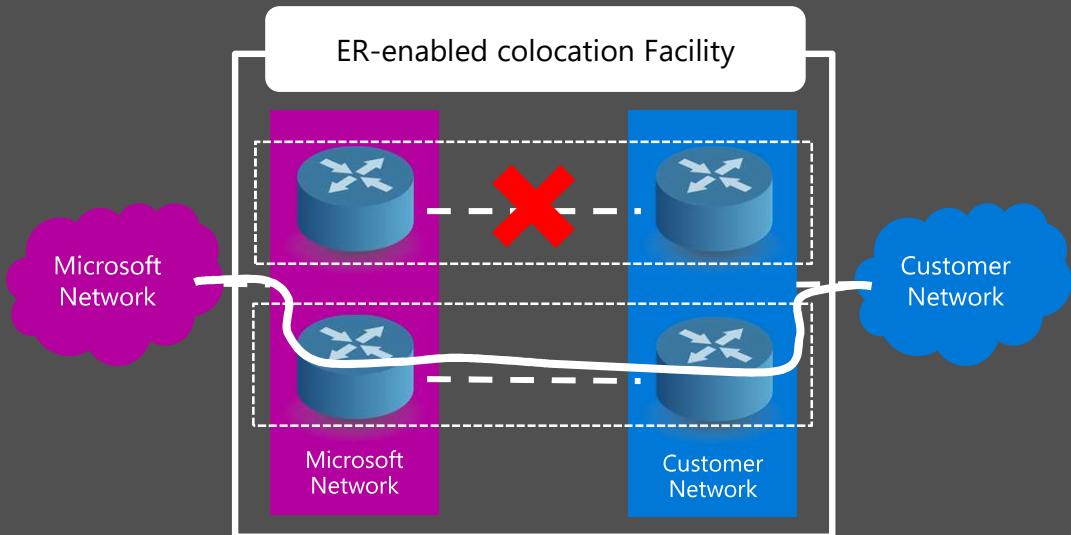
Redundancy

- Each ER circuit consists of 2 connections to 2 Microsoft Enterprise edge routers from the connectivity provider / your network edge.
- Microsoft will require dual BGP connection from the connectivity provider / your side – one to each MSEEE.
- You may choose not to deploy redundant devices / Ethernet circuits at your end.

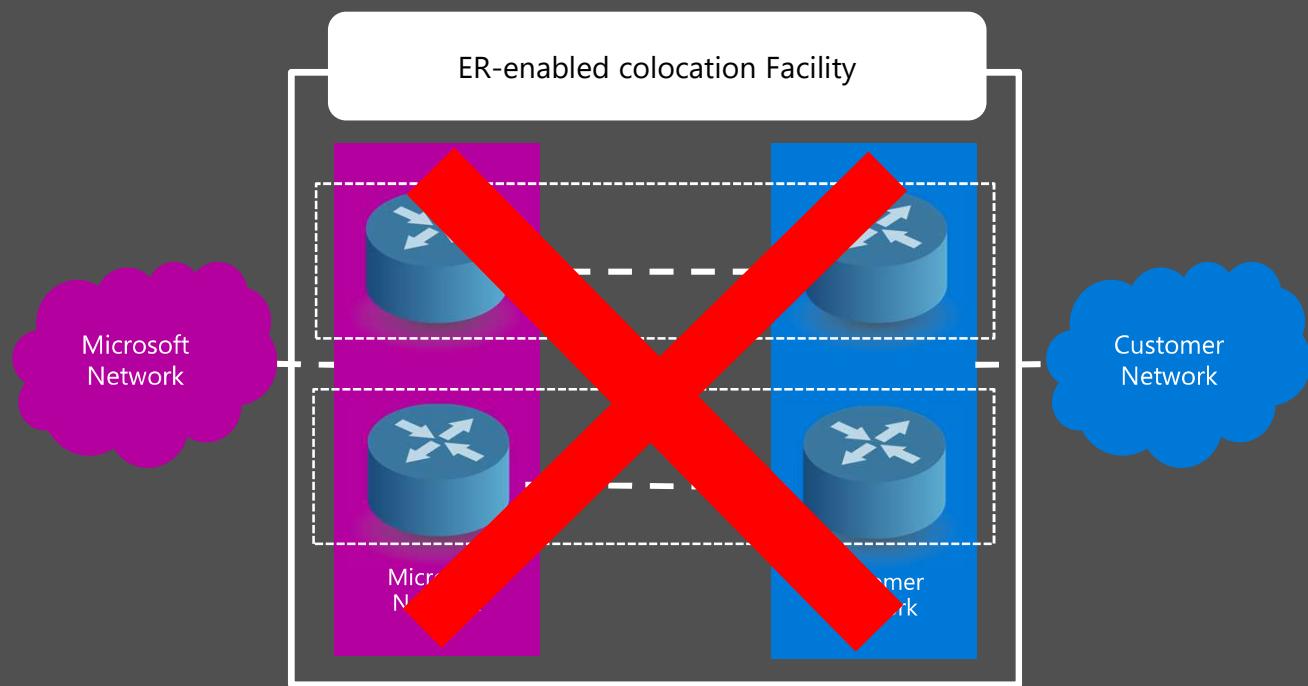
Redundancy



ER provides native resiliency to local faults, such as a broken link or a malfunctioning NIC in a router

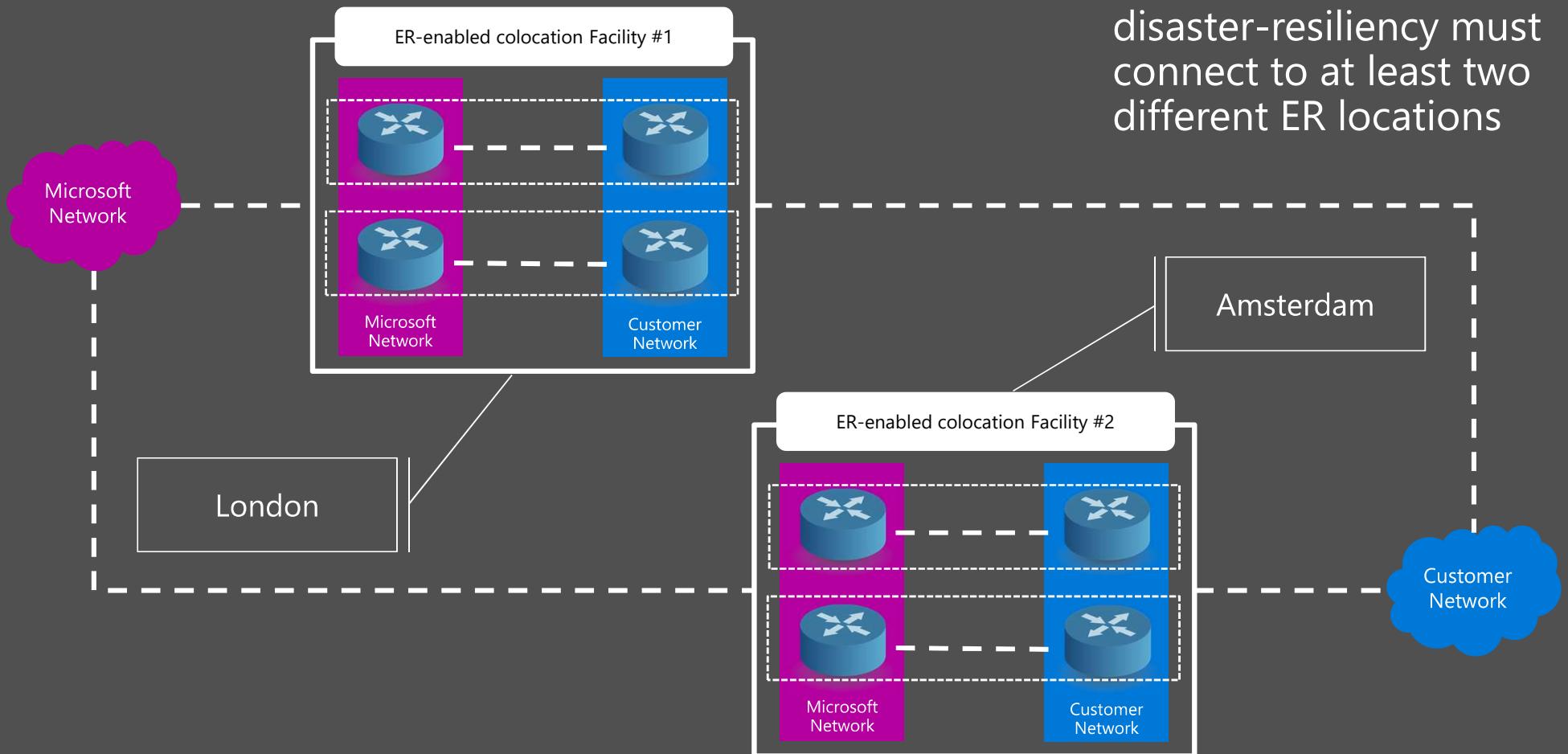


ER Disaster Resiliency

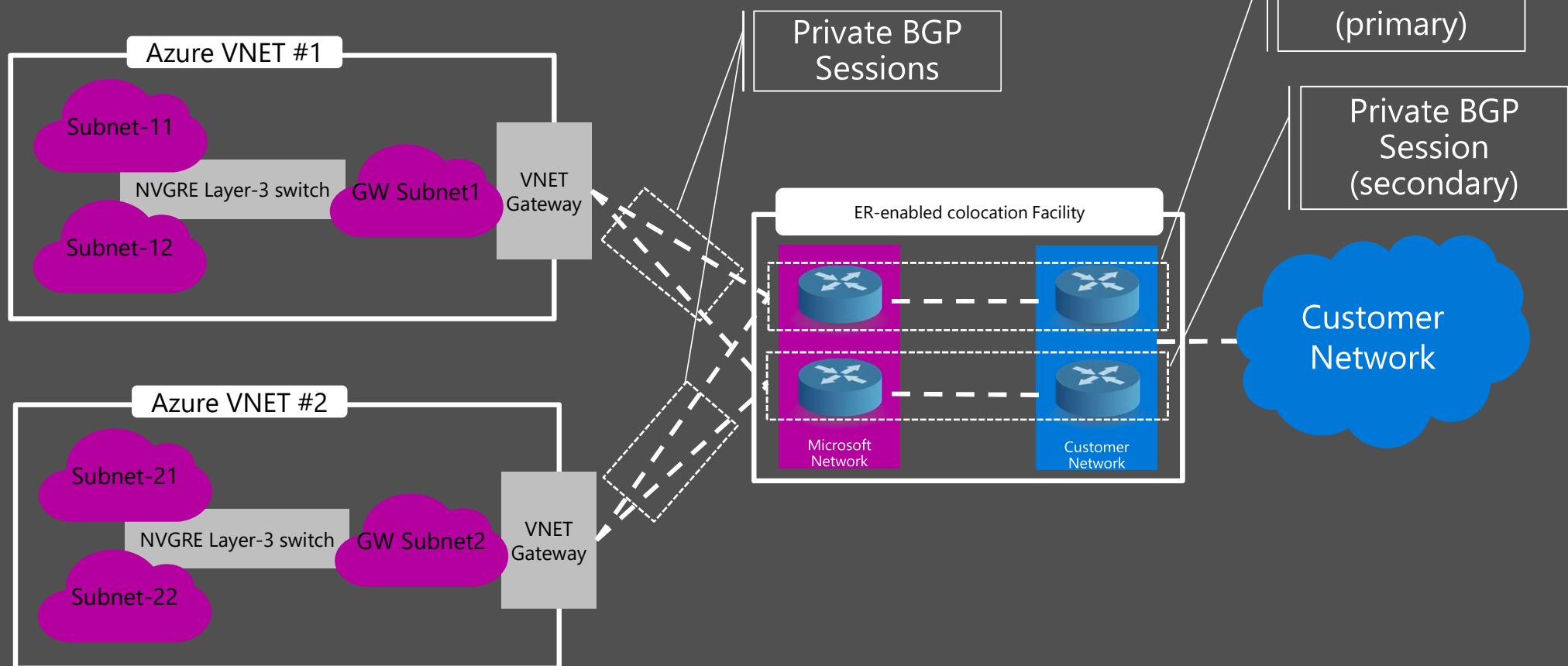


ER does NOT provide native resiliency to major disasters that impact an entire ER location

ER Disaster Resiliency

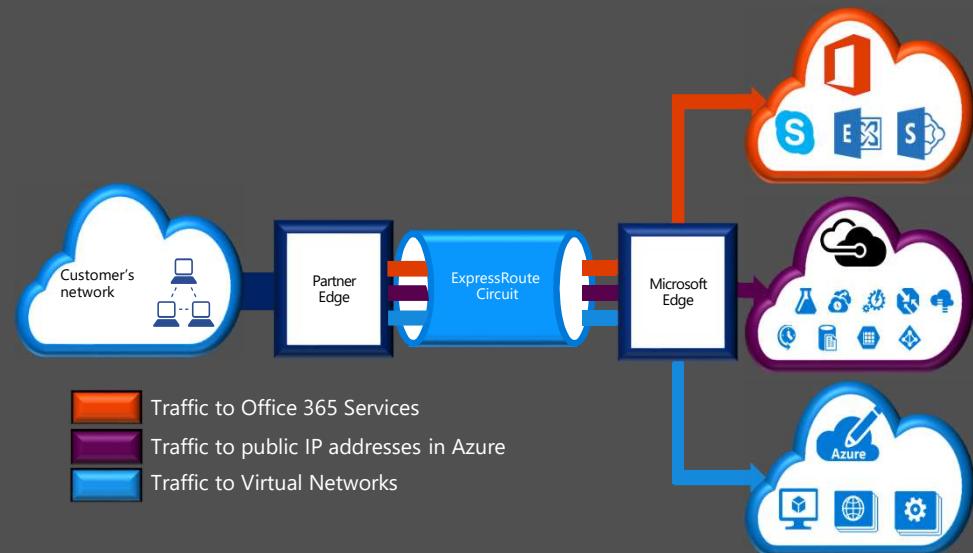


Linking multiple VNETs to an ER circuit



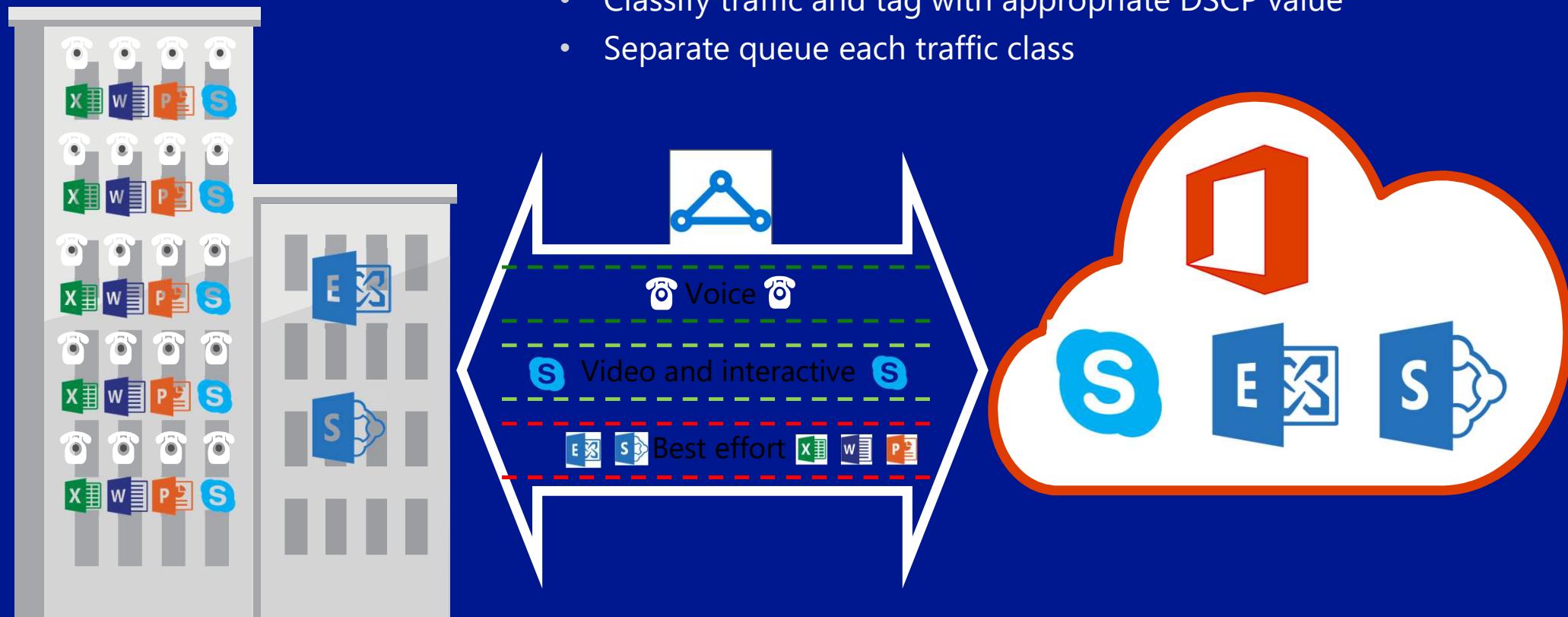
ExpressRoute for O365

- ExpressRoute for O365 – architecturally similar to ExpressRoute for Azure Public services
 - Microsoft Endpoints are Public IPs (same IPs that are accessible over the Internet)
 - Contextually similar from the customer security perspective
 - Advertised towards customers via BGP with additional community tagging
 - Customer->service traffic is being SNATed on the way
- ...but with noteworthy differences
 - O365 flows include outbound and inbound connections
 - O365 scenarios are highly distributed at the source (client) and destination (services) and have high connection concurrency
 - QoS requirements for Skype for Business scenarios
 - SNAT is at Partner/Customer layer



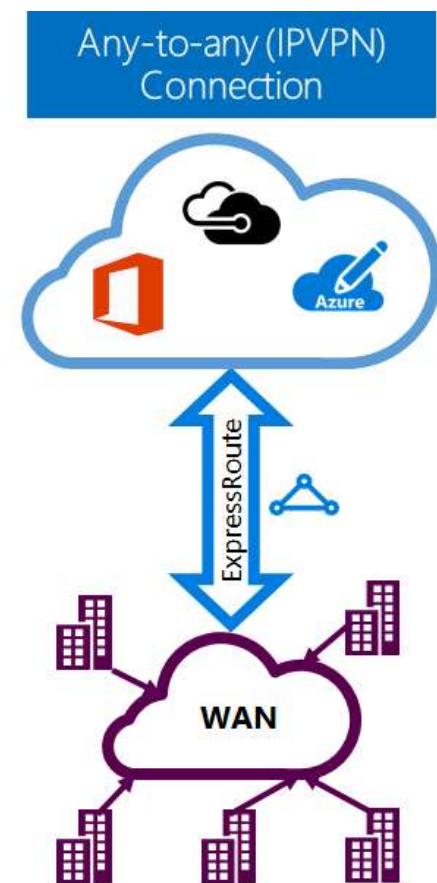
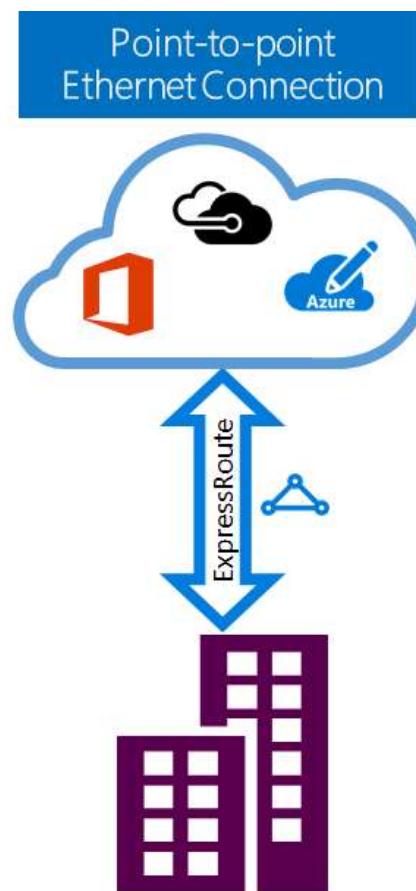
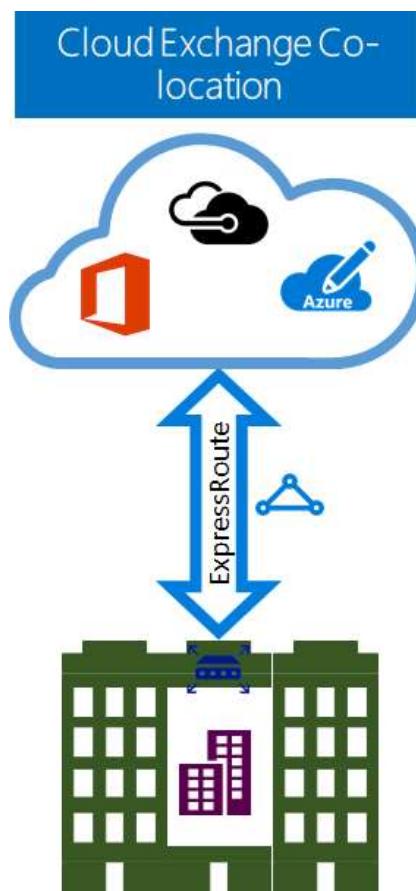
Quality of Service (QoS)

- Voice, video, data transfers need to be treated differently
- Voice and video sensitive to latency and jitter
- Classify traffic and tag with appropriate DSCP value
- Separate queue each traffic class

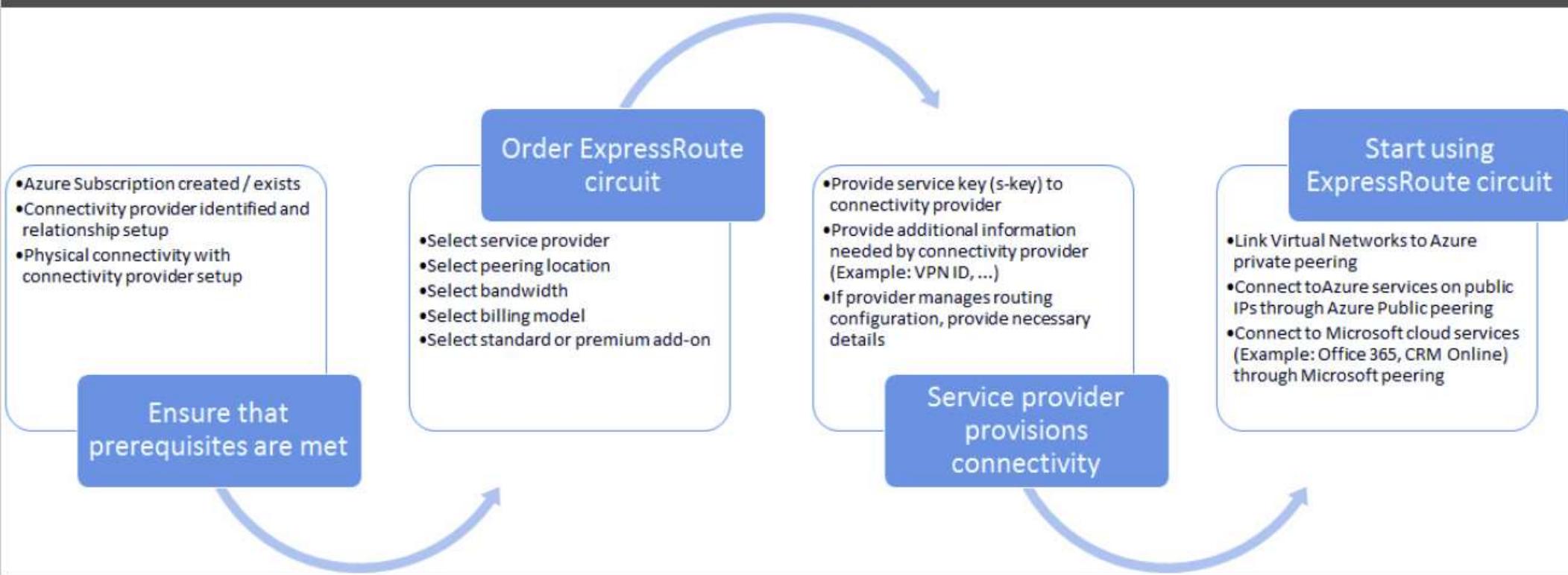


Connect Your Network to Azure

ExpressRoute Connectivity Options



Start with ExpressRoute



ExpressRoute Pricing Plans

Bandwidth	Metered Data - Port Only	Unlimited Data		
	All Zones	Zone 1	Zone 2	Zone 3
50 Mbps	\$55	\$300	\$610	\$872
100 Mbps	\$100	\$575	\$1,230	\$1,300
200 Mbps	\$145	\$1,150	\$2,300	\$3,220
500 Mbps	\$290	\$2,750	\$5,200	\$5,200
1 Gbps	\$436	\$5,700	\$8,700	\$8,700
2 Gbps	\$872	\$11,400	\$17,400	\$17,400
5 Gbps	\$2,180	\$25,650	\$41,000	\$41,000
10 Gbps	\$5,000	\$51,300	\$82,000	\$82,000

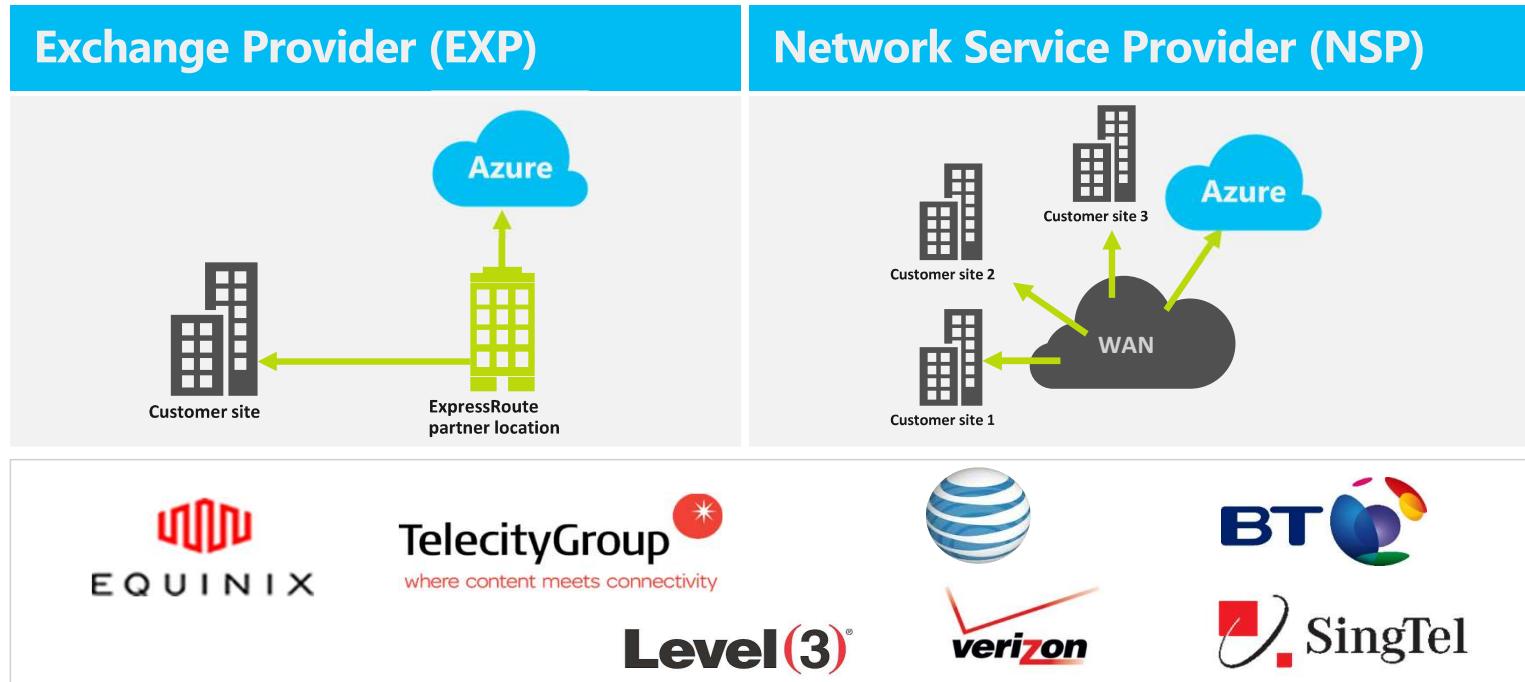
- <https://azure.microsoft.com/en-us/pricing/details/expressroute/>
- Egress is \$0.025 per GB for Zone 1, \$0.05 per GB for Zone 2, and \$0.14 per GB for Zone 3
- Zone 1= US/Europe, Zone 2 = Asia/Pacific, Zone 3 = Brazil
- Office 365 Requires Premium Add-On Circuits

ExpressRoute Premium Add-on Pricing

Bandwidth	Current Premium Add-On Price	New Price for Premium Add-On	
		All Zones	Zone 1
50 Mbps	\$3,000	\$75	\$100
100 Mbps	\$3,000	\$100	\$175
200 Mbps	\$3,000	\$150	\$300
500 Mbps	\$3,000	\$400	\$800
1 Gbps	\$3,000	\$750	\$1,450
2 Gbps	\$3,000	\$1,500	\$2,250
5 Gbps	\$3,000	\$3,000	\$3,000
10 Gbps	\$3,000	\$3,000	\$3,000

- New and Existing customers using ER for O365/SfB and CRMOL
 - EA customers with active circuits will get premium add-on automatically enabled
 - Premium add-on will be required and included with ExpressRoute to O365/CRMOL free of charge for customers 500 seats or more of O365.
- Azure customers
 - New April 1st Premium add-on charges apply for Azure-only customers and circuits.

ExpressRoute Providers



Express Route

Connectivity providers



Geopolitical region	Azure regions	ExpressRoute locations
North America	East US, West US, East US 2, Central US, South Central US, North Central US, Canada Central, Canada East	Atlanta, Chicago, Dallas, Las Vegas+, Los Angeles, New York, Seattle, Silicon Valley, Washington DC, Montreal+, Toronto
South America	Brazil South	Sao Paulo
Europe	North Europe, West Europe	Amsterdam, Dublin, London
Asia	East Asia, Southeast Asia	Hong Kong, Singapore
Japan	Japan West, Japan East	Osaka, Tokyo
Australia	Australia Southeast, Australia East	Melbourne, Sydney
India	India West, India Central, India South	Chennai, Mumbai

Azure Subscriptions quotas

ExpressRoute Limits

Resource	Default Limit
ExpressRoute circuits per subscription	10
ExpressRoute circuits per region per subscription for ARM	10
Maximum number of routes for Azure private peering with ExpressRoute standard	4,000
Maximum number of routes for Azure private peering with ExpressRoute premium add-on	10,000
Maximum number of routes for Azure public peering with ExpressRoute standard	200
Maximum number of routes for Azure public peering with ExpressRoute premium add-on	200
Maximum number of routes for Azure Microsoft peering with ExpressRoute standard	200
Maximum number of routes for Azure Microsoft peering with ExpressRoute premium add-on	200
Number of virtual network links allowed per ExpressRoute circuit	see table in next page

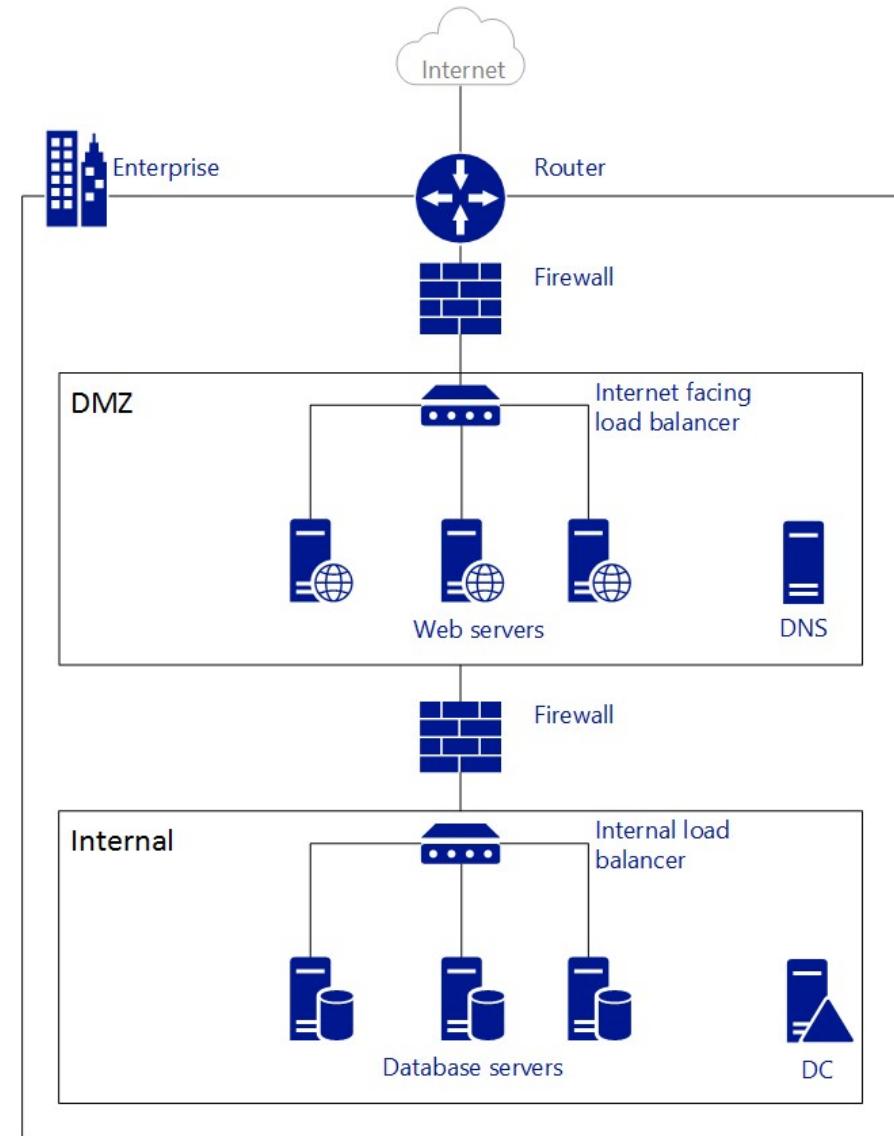
Azure Subscription quotas

Number of Virtual Networks per Express Route Circuit

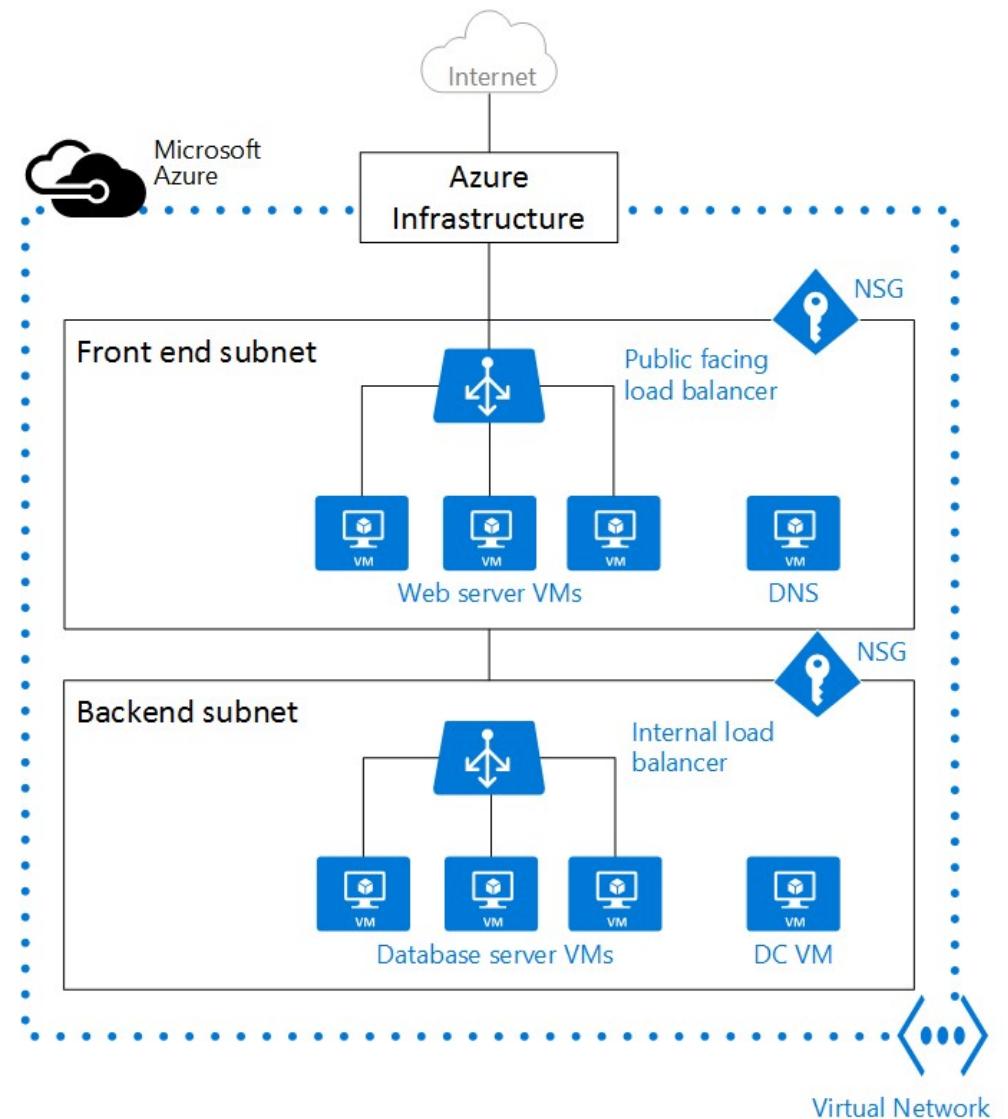
Circuit Size	Number of VNet links for standard	Number of VNet Links with Premium add-on
10 Mbps	10	Not Supported
50 Mbps	10	20
100 Mbps	10	25
200 Mbps	10	25
500 Mbps	10	40
1 Gbps	10	50
2 Gbps	10	60
5 Gbps	10	75
10 Gbps	10	100

[Azure Network Security Mechanisms]

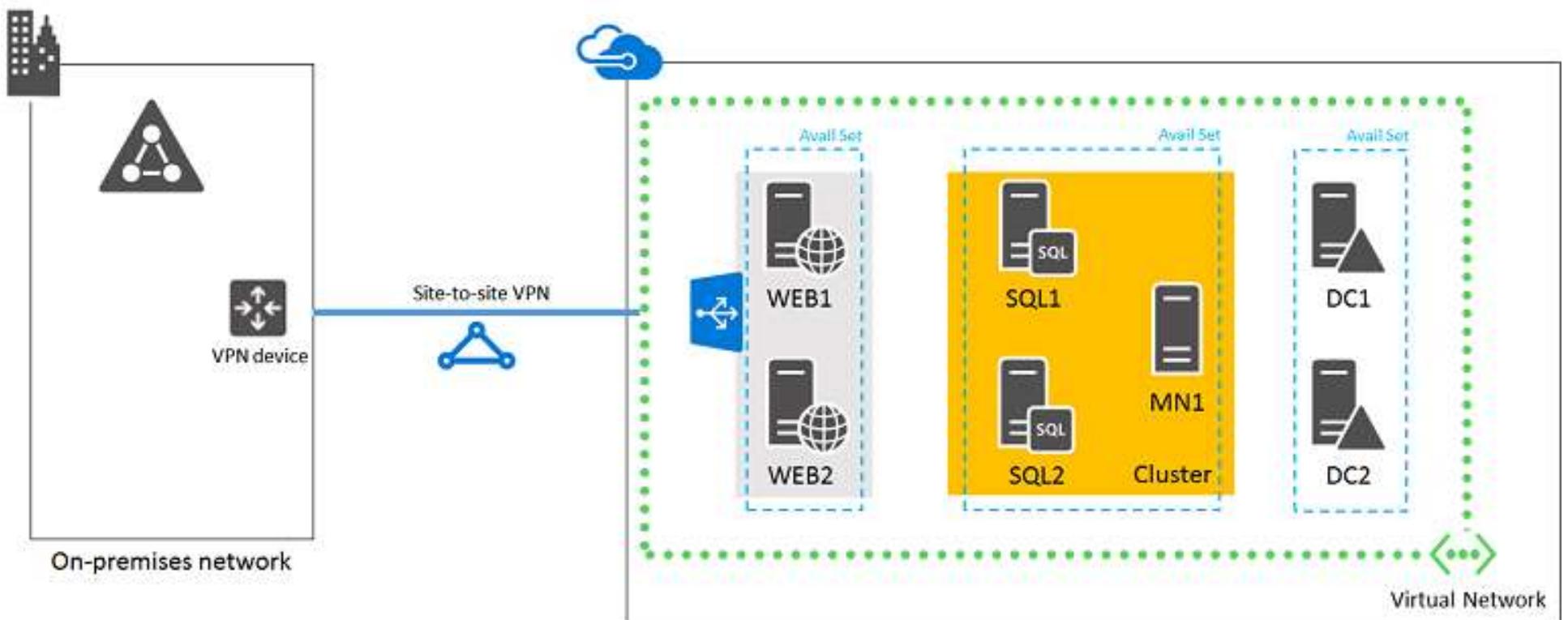
Typical On-premises Infrastructure



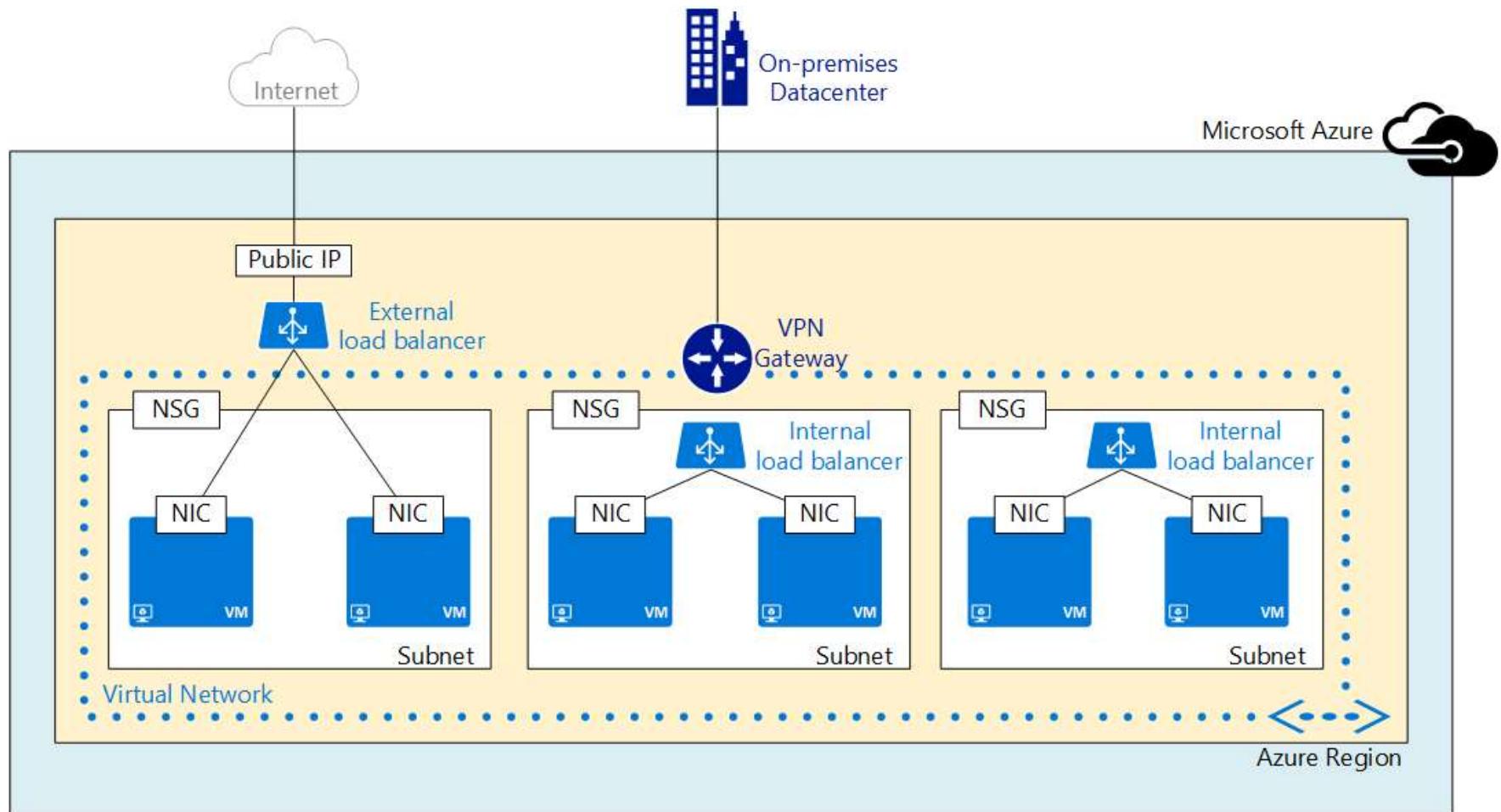
Example Azure Cloud Infrastructure



Extending On-premises to Azure



Extending On-Premises to Azure (Cont.)



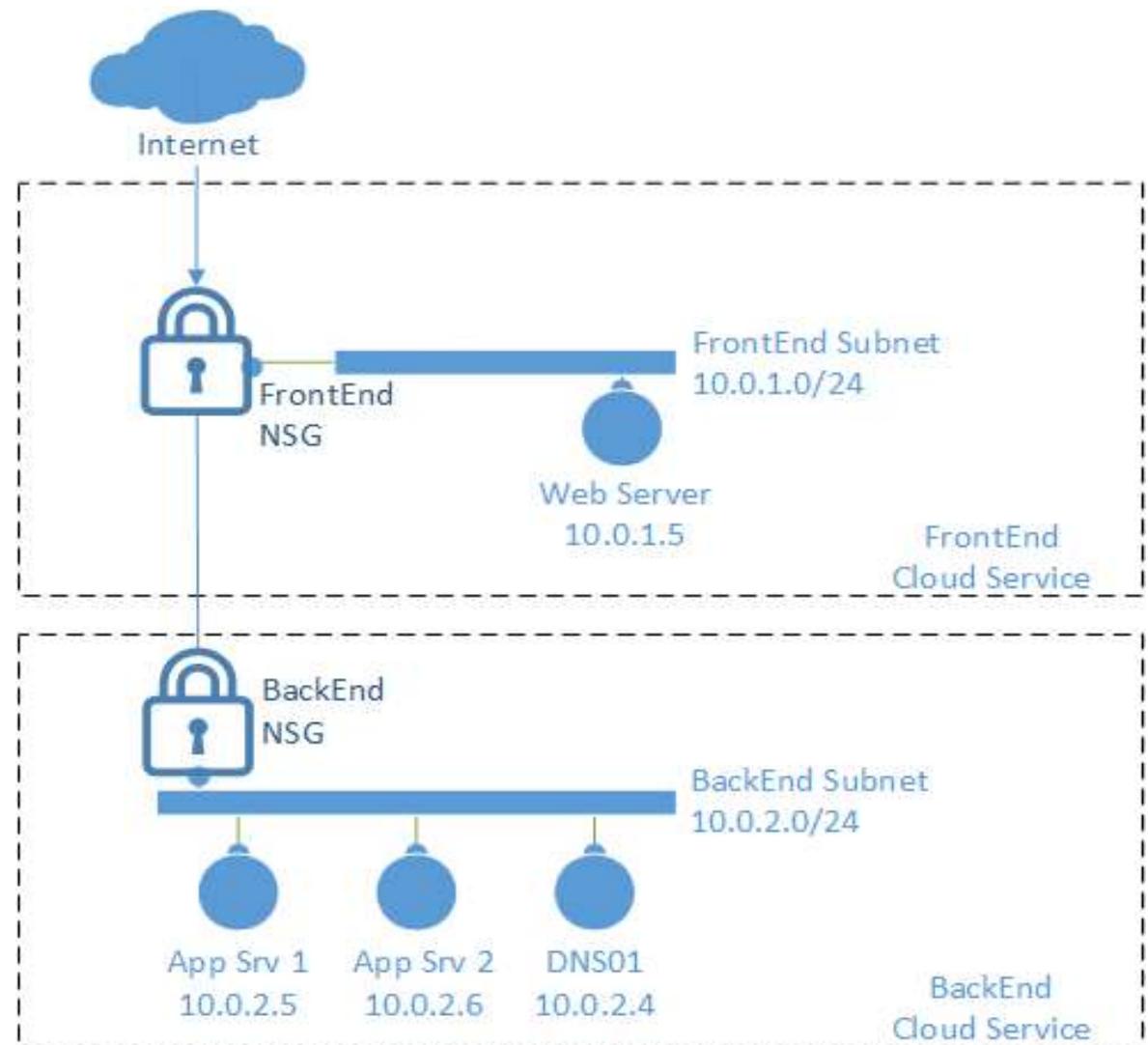
Network Security Groups (NSGs)

- Network security group (NSG) contains a list of Access Control List (ACL) rules that allow or deny network traffic to your VM instances in a Virtual Network.
- NSGs can be associated with either subnets or individual VM instances within that subnet.
- When a NSG is associated with a subnet, the ACL rules apply to all the VM instances in that subnet.
- In addition, traffic to an individual VM can be restricted further by associating a NSG directly to that VM.

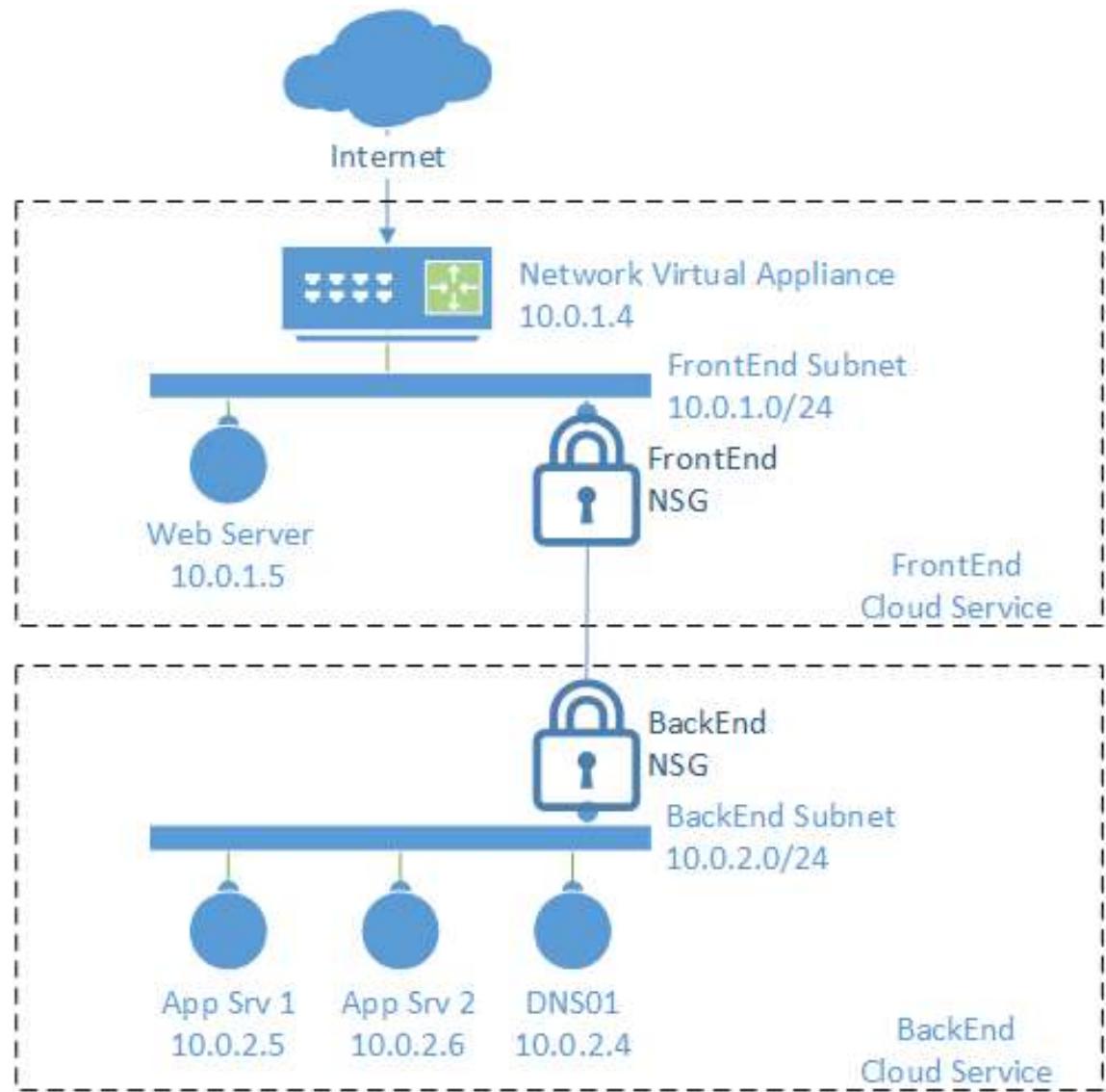
NSG Limits

Description	Default Limit	Implications
Number of NSGs you can associate to a subnet, VM, or NIC	1	This means you cannot combine NSGs. Ensure all the rules needed for a given set of resources are included in a single NSG.
NSGs per region per subscription	100	By default, a new NSG is created for each VM you create in the Azure portal. If you allow this default behavior, you will run out of NSGs quickly. Make sure you keep this limit in mind during your design, and separate your resources into multiple regions or subscriptions if necessary.
NSG rules per NSG	200	Use a broad range of IP and ports to ensure you do not go over this limit.

Build a DMZ using NSGs



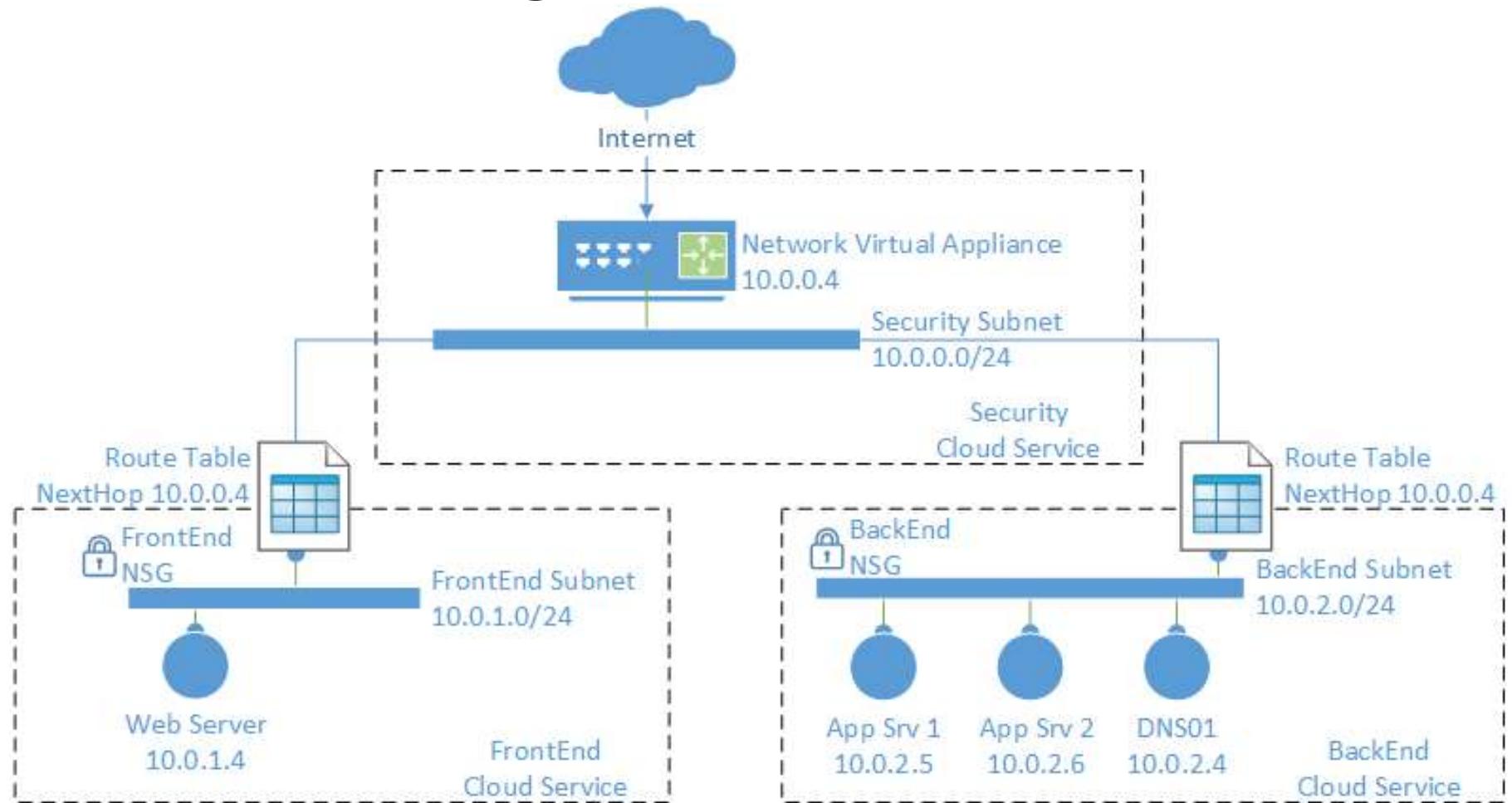
Build a DMZ using NSGs & a Firewall



User Defined Routes (UDRs)

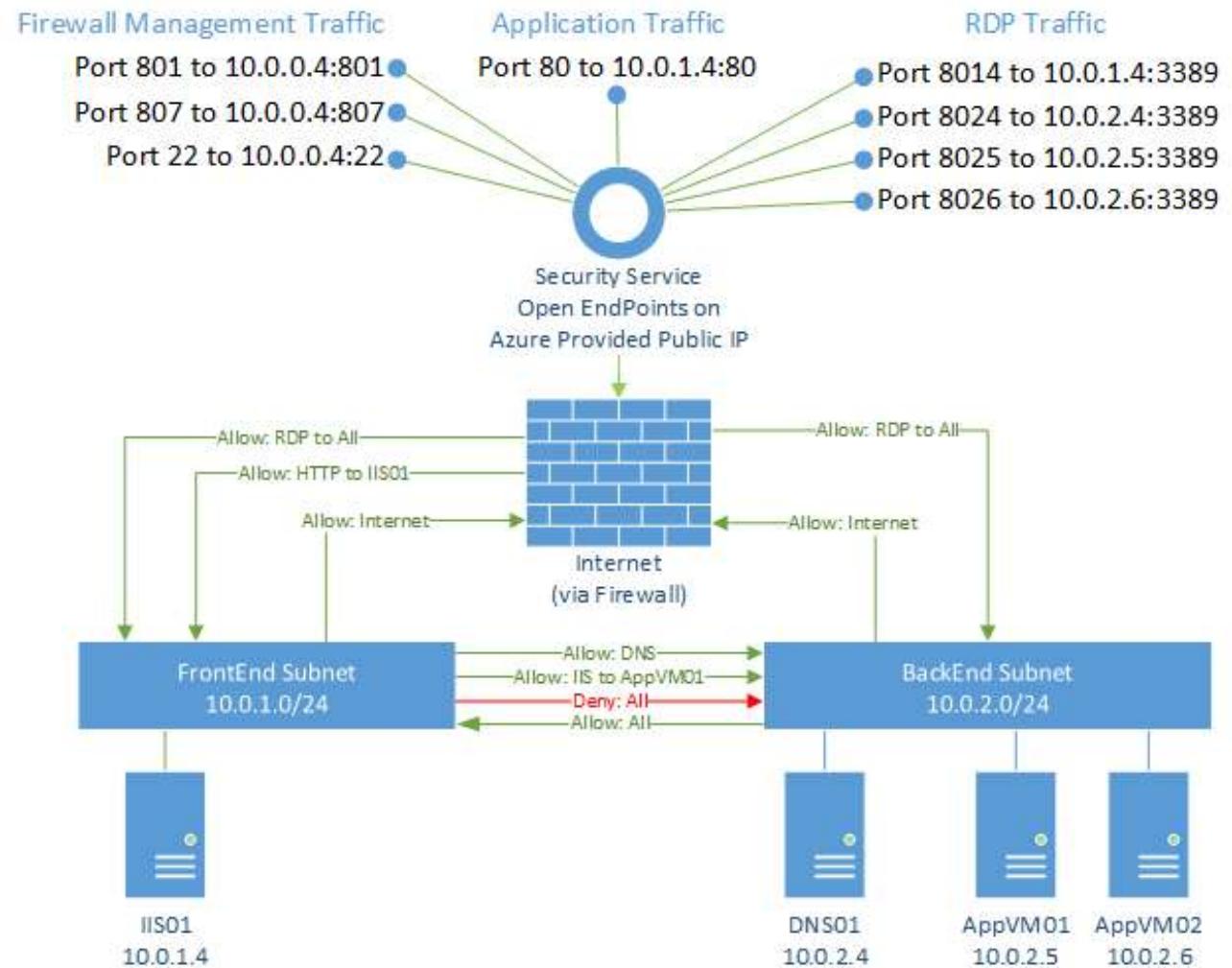
- For most environments you will only need the system routes already defined by Azure. However, you may need to create a route table and add one or more routes in specific cases, such as:
 - Force tunneling to the Internet via your on-premises network.
 - Use of virtual appliances in your Azure environment.
- In the scenarios above, you will have to create a route table and add user defined routes to it. You can have multiple route tables, and the same route table can be associated to one or more subnets. And each subnet can only be associated to a single route table. All VMs and cloud services in a subnet use the route table associated to that subnet.
- Subnets rely on system routes until a route table is associated to the subnet. Once an association exists, routing is done based on Longest Prefix Match (LPM) among both user defined routes and system routes. If there is more than one route with the same LPM match then a route is selected based on its origin in the following order:
 - User defined route
 - BGP route (when ExpressRoute is used)
 - System route

Build a DMZ using NSGs, UDR & A Firewall



Build a DMZ using NSGs, UDR & a Firewall

Firewall Rules =>



[Deploying Globally with Traffic Manager]

Traffic Manager – DNS Based Load Balancer

Three Load Balancing Algorithms

Performance, Round Robin, Fail Over

Map your domain name to yourservice.trafficmanager.net with CNAME

contoso.com -> contosotm.trafficmanager.net

Map cloud service URLs in global data centers to Traffic Manager Profile.

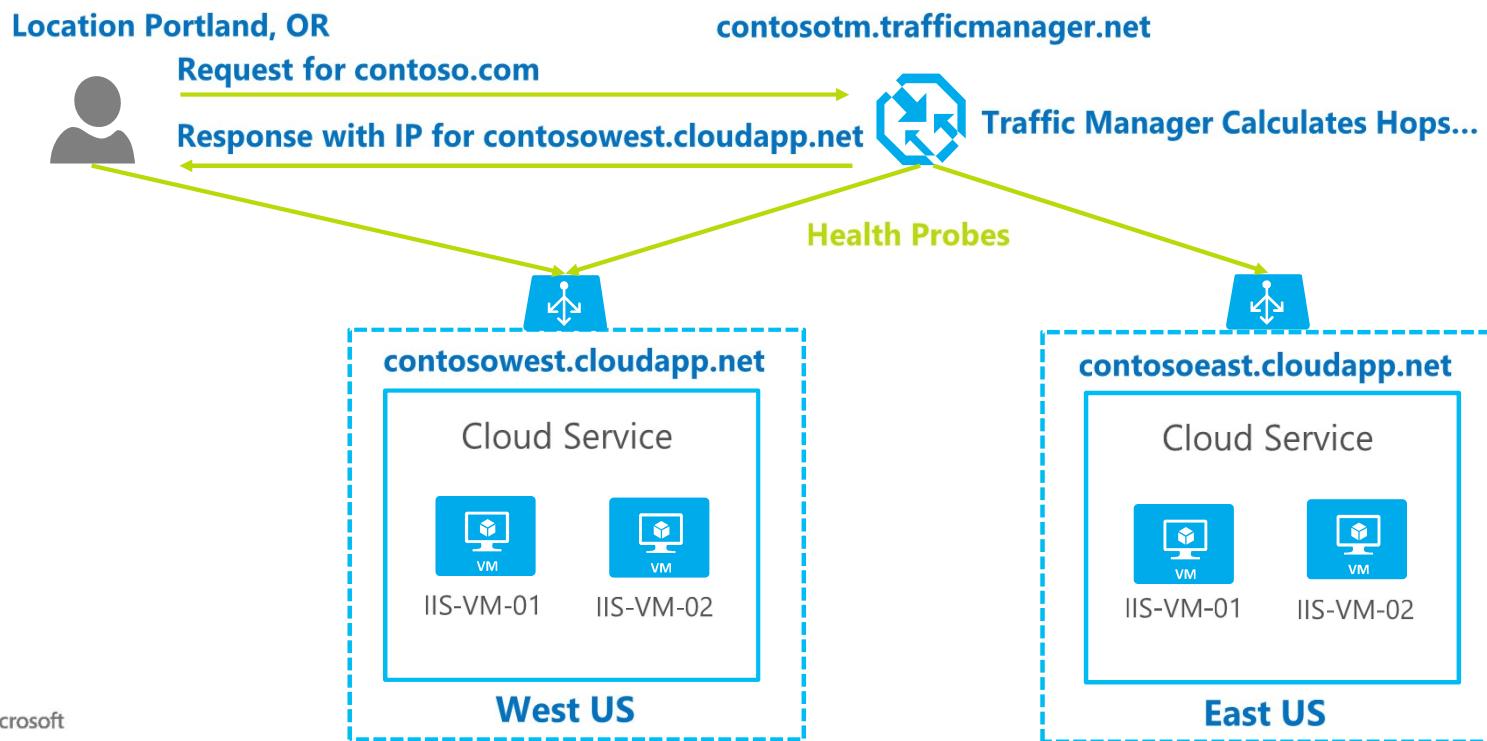
contosoeast.cloudapp.net

contosowest.cloudapp.net

Built in HTTP Health Probes for High Availability

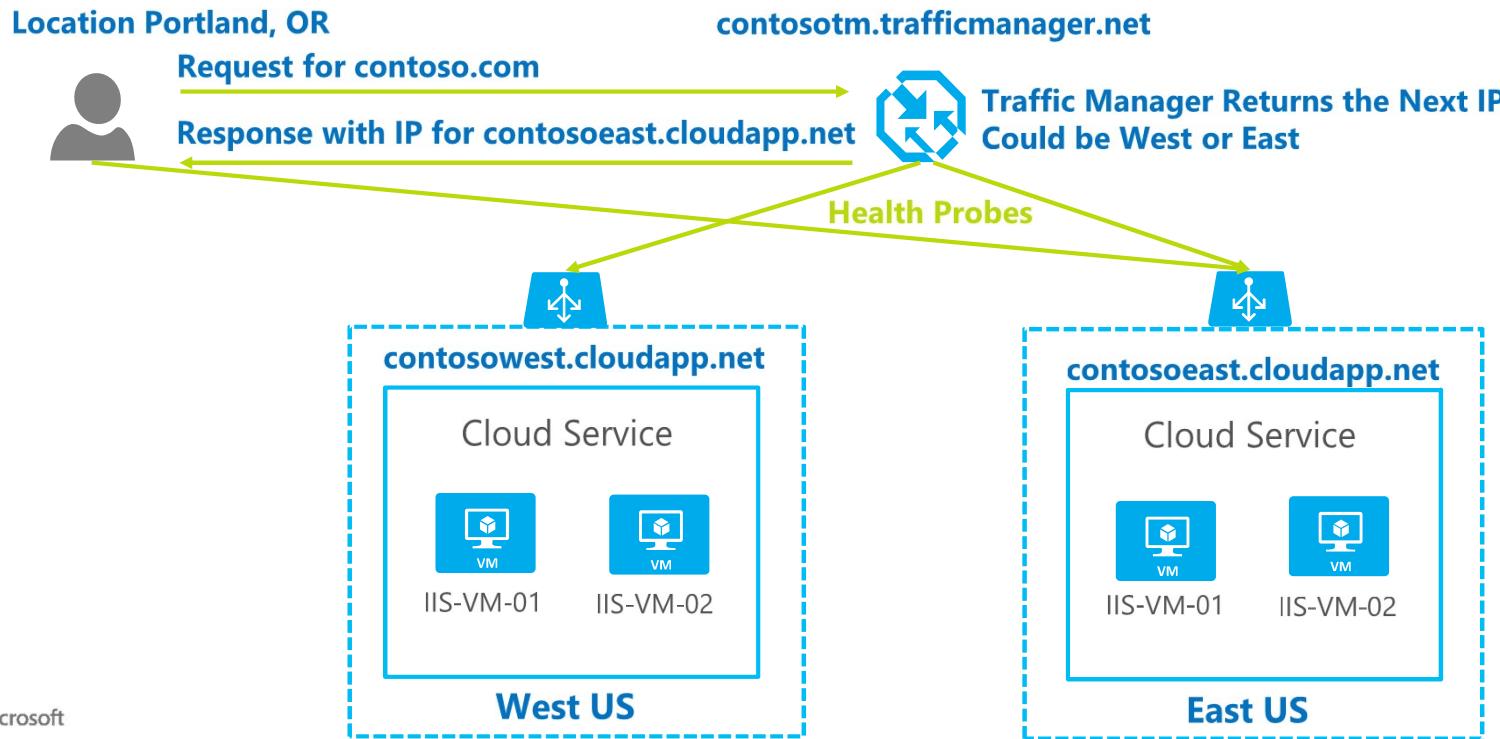
Performance

Traffic Manager determines fastest route for the client and returns IP for the appropriate cloud service.



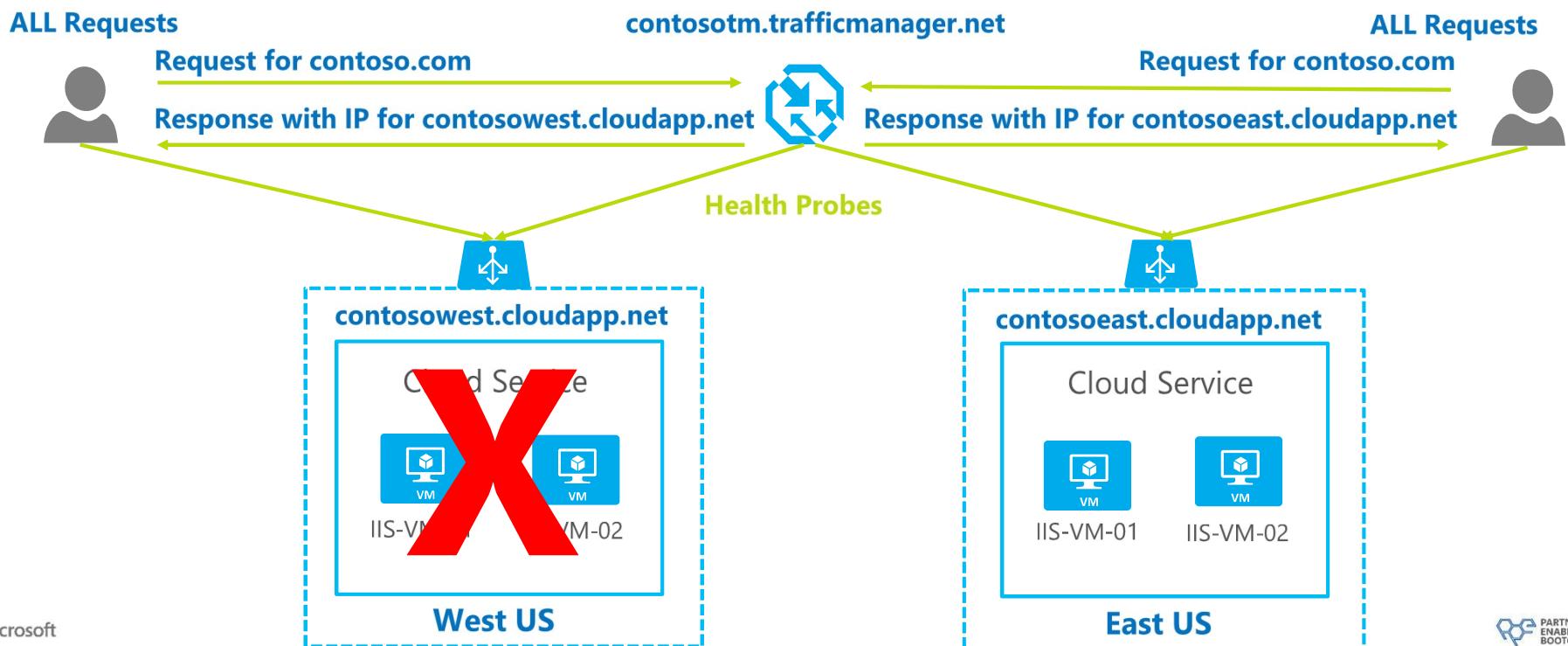
Round Robin

Traffic Manager returns IPs in a round robin fashion regardless of client location.



Failover

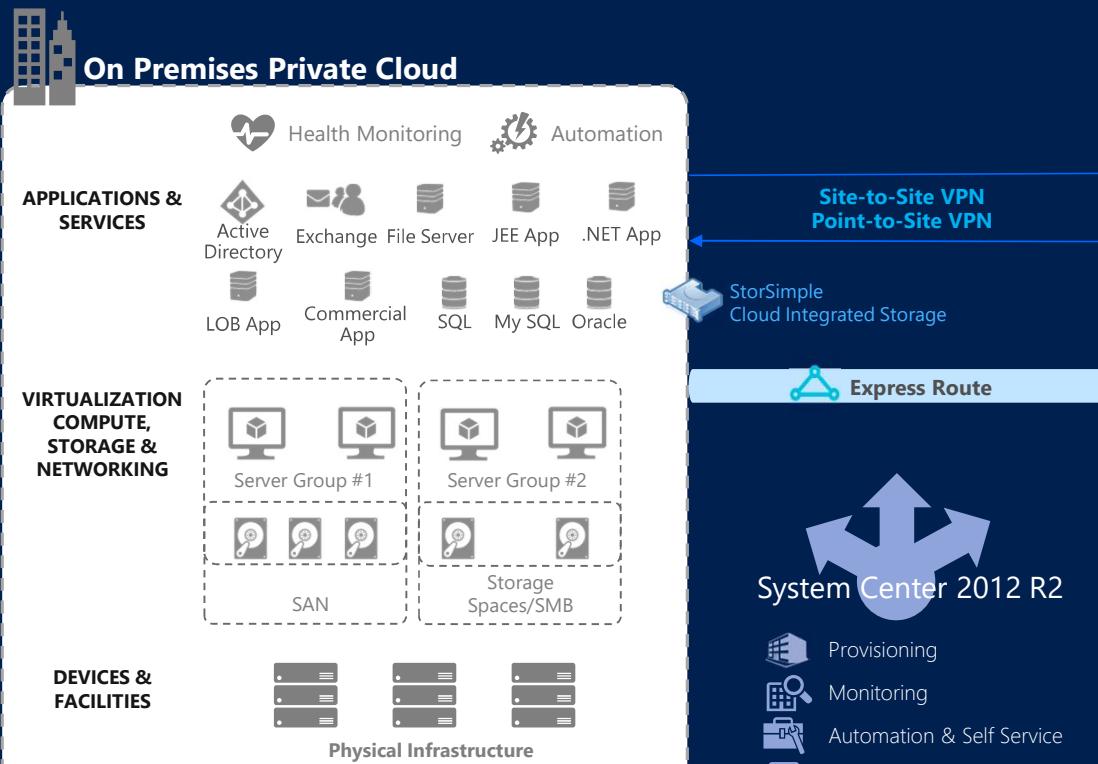
Traffic Manager always returns the IP address of the primary cloud service unless it fails a health check.



[Cloud Adoption Methodology]

Azure Cloud Adoption

Moving forward in the journey



Example Cloud Adoption Approach

Three-phased approach

1 Commodity workloads move to SaaS

Microsoft IT already takes advantage of its SaaS offerings with employees using Office 365, Yammer, and OneDrive. The company also uses Dynamics Online.

2 New development and modern applications move to PaaS

New applications are optimized for cloud computing. Focus is on functionality rather than infrastructure.

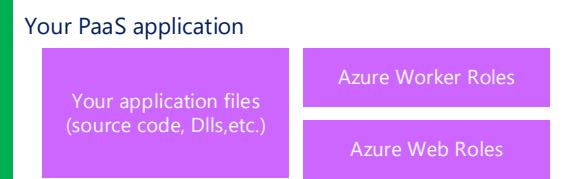
3 Existing applications move to IaaS

Existing applications are moved to IaaS virtual machines using one of two approaches:

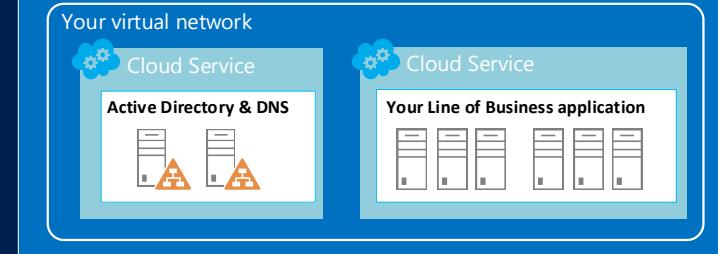
- **Lift and shift**—existing virtual machines are shifted to the cloud.
- **Build in the cloud**—applications are prebuilt in Azure and traditional methods are used to backup and restore data.



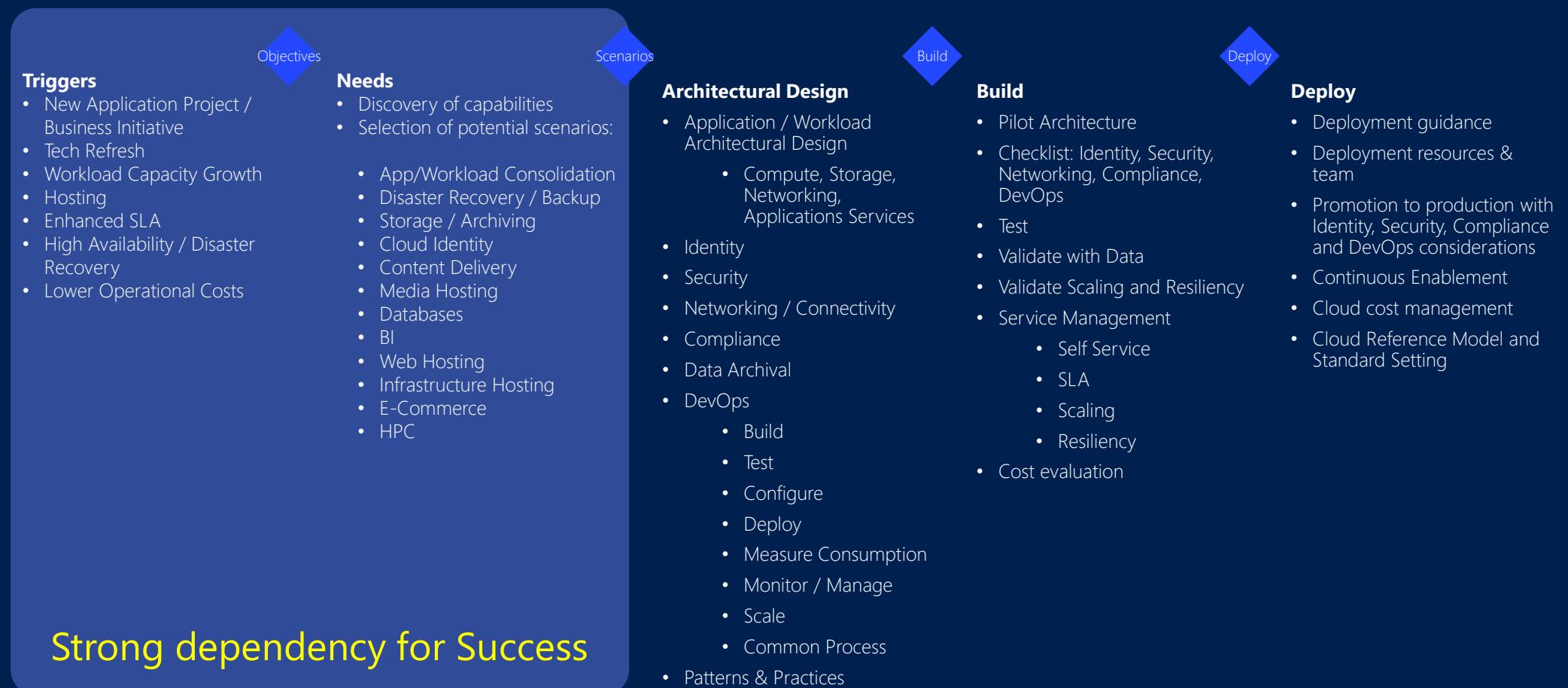
Azure PaaS



Azure IaaS



Cloud Adoption Cycle - Methodology



Towards Cloud Service Delivery Model

Managed Service Level - SLA



- Virtual Machines
- Virtual Networks
- Virtual Disk Storage
- Site Recovery Services

Classic Enterprise Management Tools

IaaS (VMs)

- VMs with JSON template deployment
- Azure Cloud Services
- Azure ServiceFabric
- Config Extensions such as Chef, Puppet, or PS DSC
- Hadoop on VMs via Horton Works Template
- Container Orchestration

Deployment Packages (Cloud Services)
Desired State Config
Template Driven

PaaS (on VMs)

- Web App Services including API, Logic, and Mobile Apps
- ServiceBus & Queues
- Event Hub, IOT Hub
- Stream Analytics
- Azure SQL Database, DW
- HDInsight (Managed Hadoop)
- Machine Learning, AzureML
- Application Insights
- Operational Insights / OMS
- Key Vault
- Table Storage, DocDB, ...
- & many more

Managed Services
Content & Code
Continuous Integration
Auto-Scaling, Update, etc.

Managed PaaS Services

- Office 365
- Azure Active Directory
- Azure Rights Management
- Azure MFA
- Azure Remote App
- Mobile Engagement
- PowerBI
- CRM Online
- Visual Studio Online
- Etc.

Managed Applications
Multi-Tenant Services
Public, High-Scale Services
Granular Pricing

SaaS

Infrastructure Oriented Services

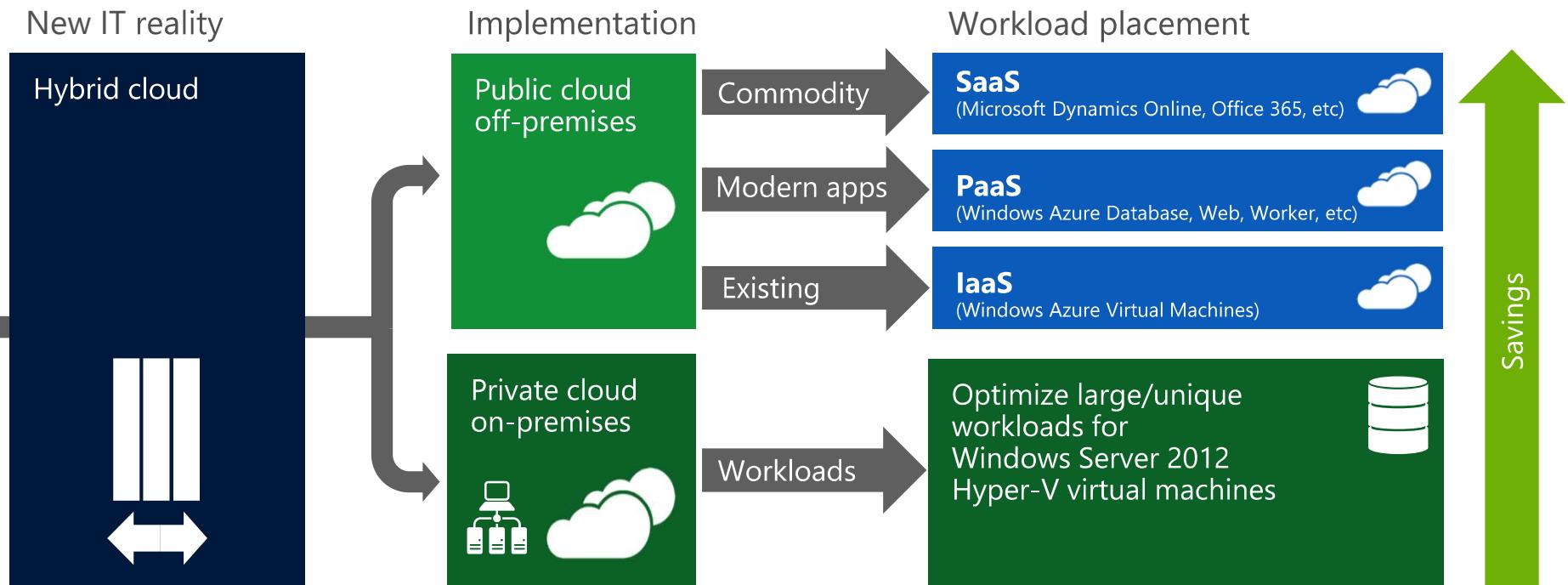
Dev-Ops

No-Ops

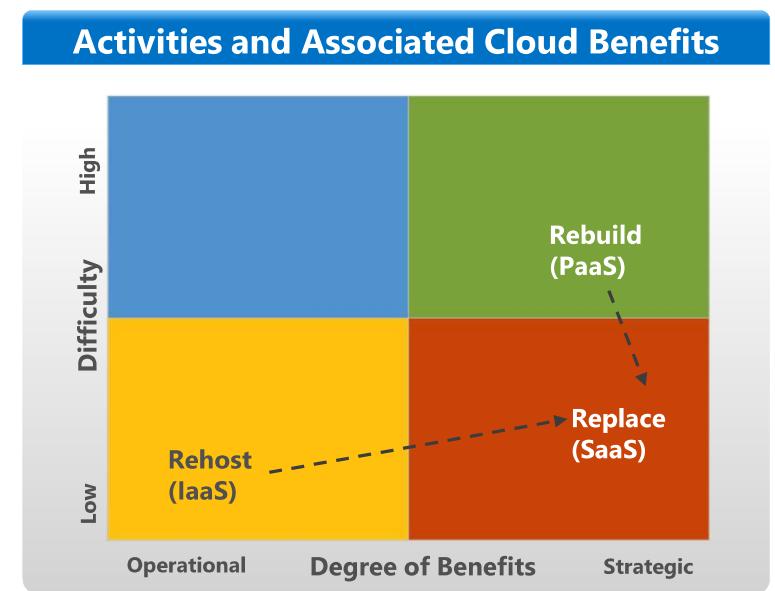
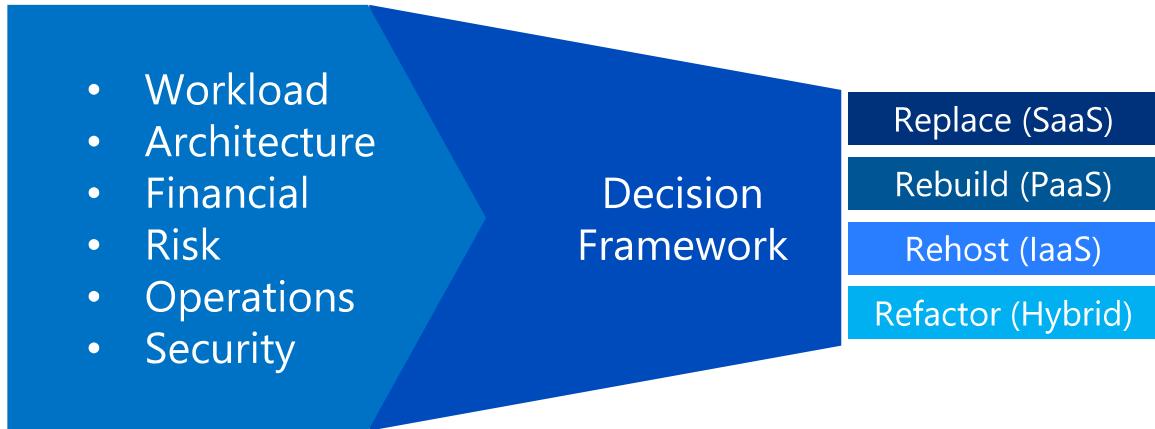
Time-to-Market Impact



Hybrid Cloud Mindset

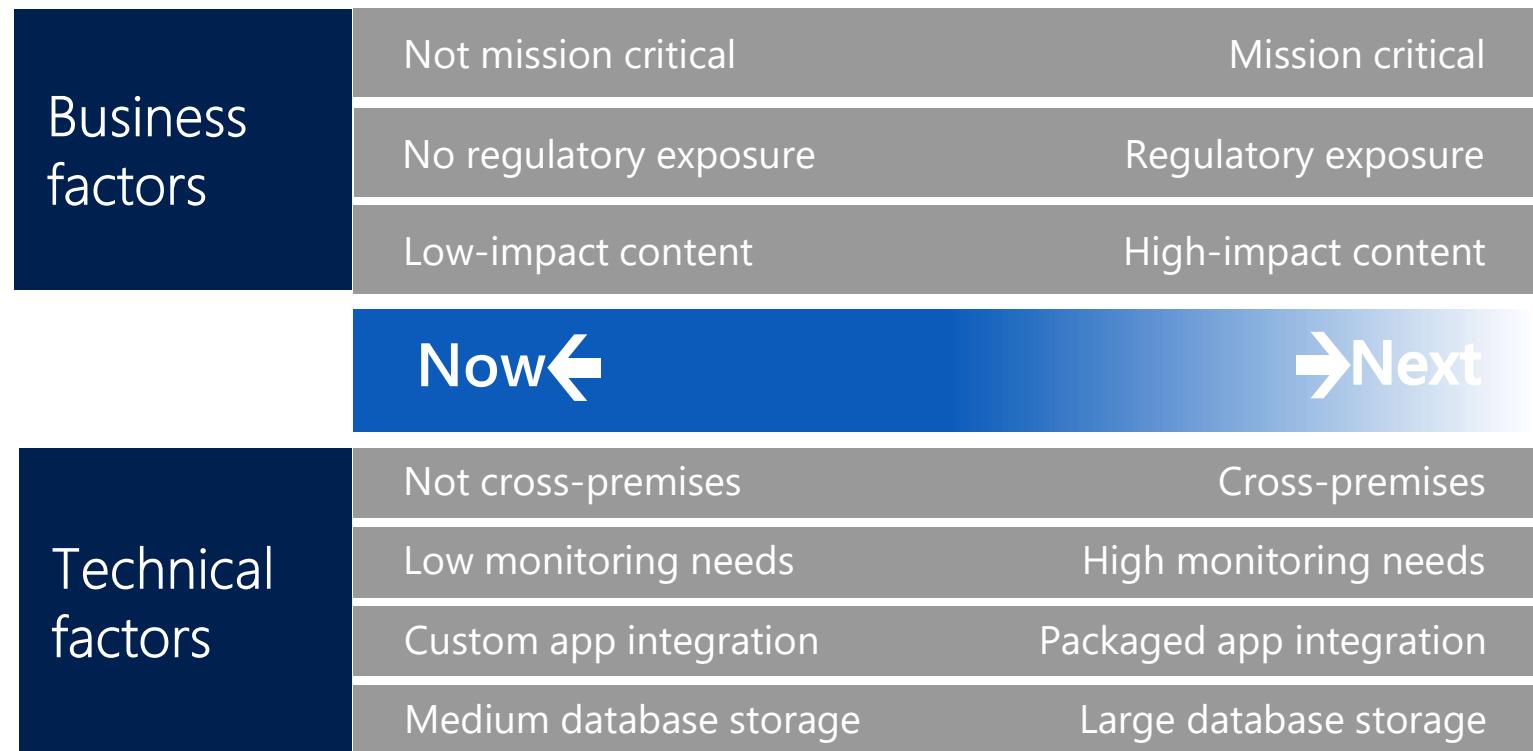


Maximize Benefits

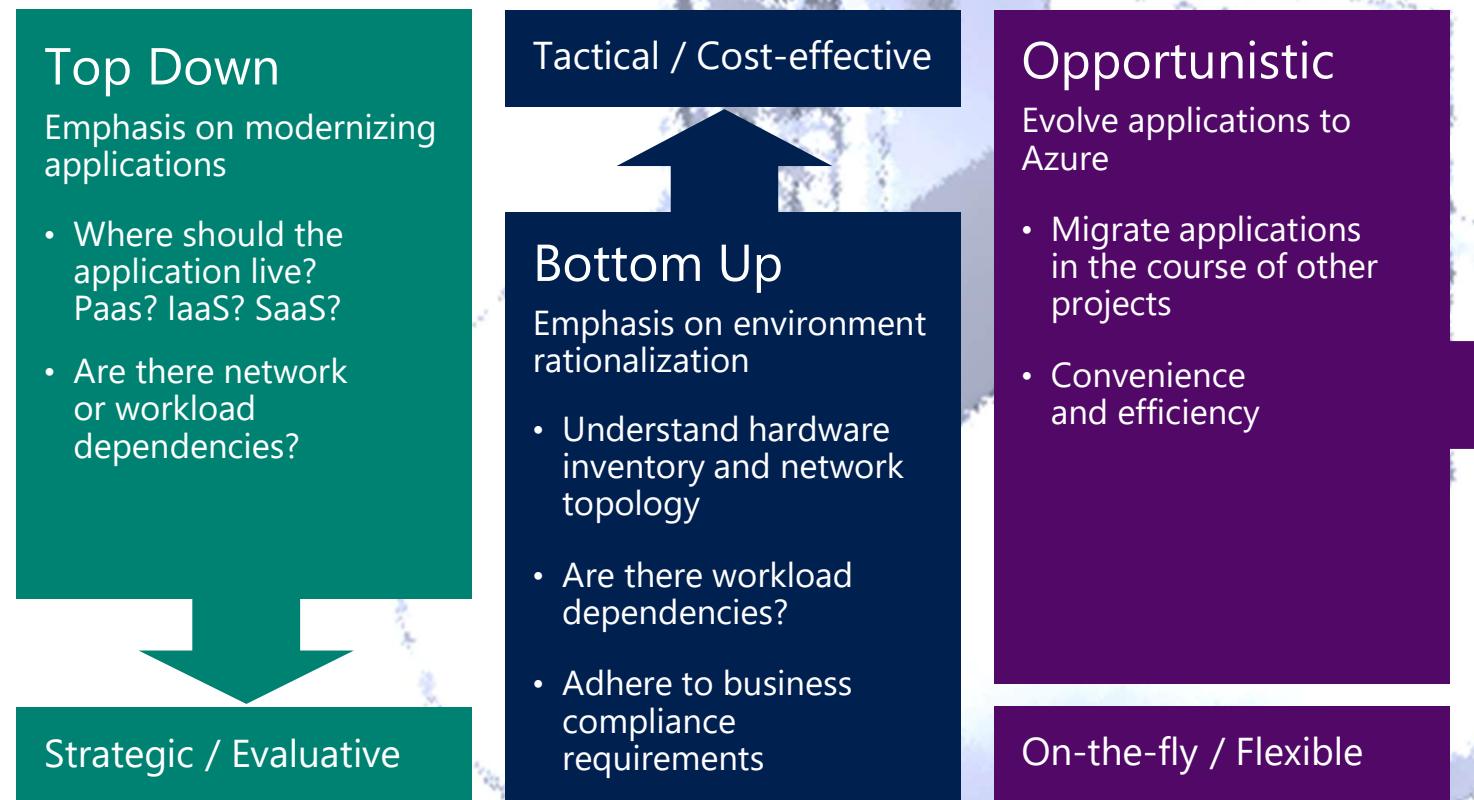


A simple Rehost (IaaS) of a workload typically provides less benefits than replacing the workload with a cloud offering (SaaS)...

Workload Migration Precedence



Migration Emphasis



Workload Considerations

Business Considerations

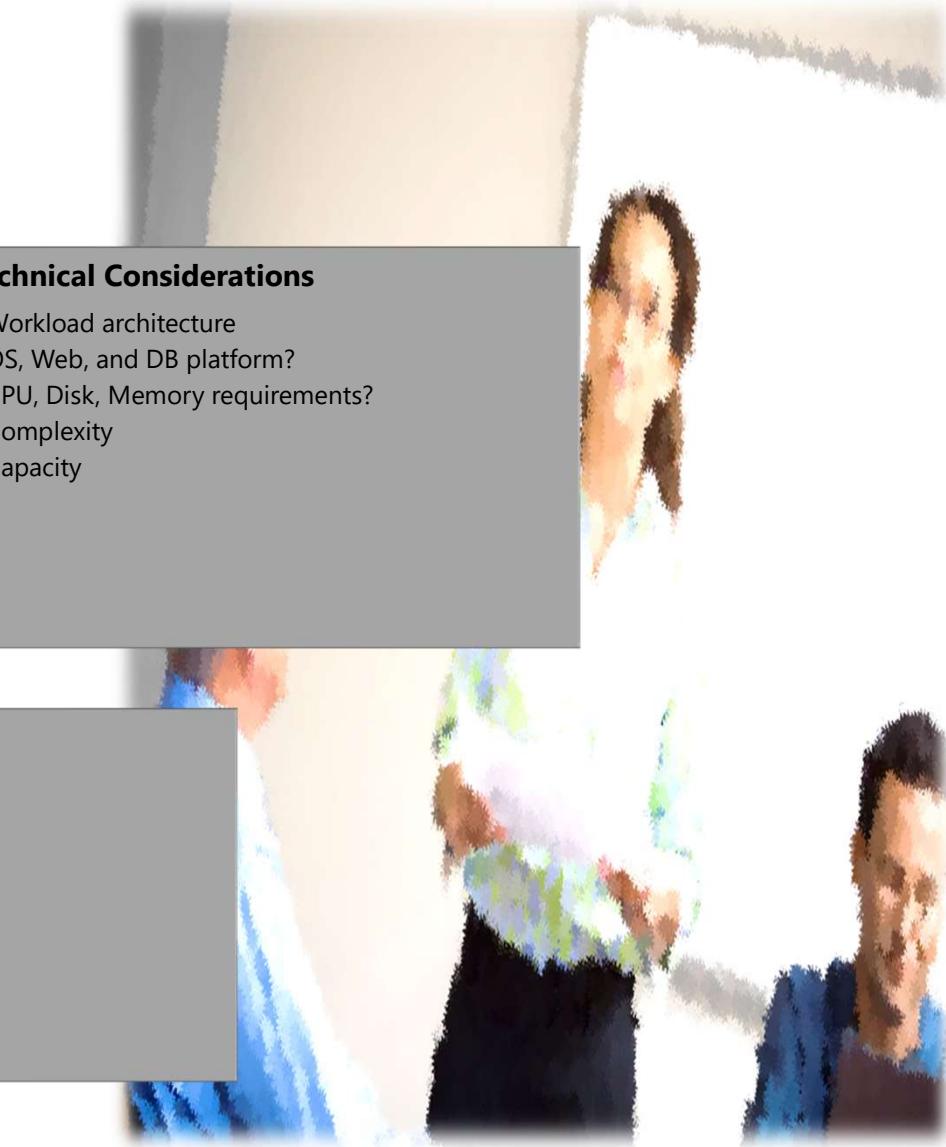
- TCO – true cost of workload
- Redundant
- Business Critical
- Financial impact
- Dev
- Test
- New

Technical Considerations

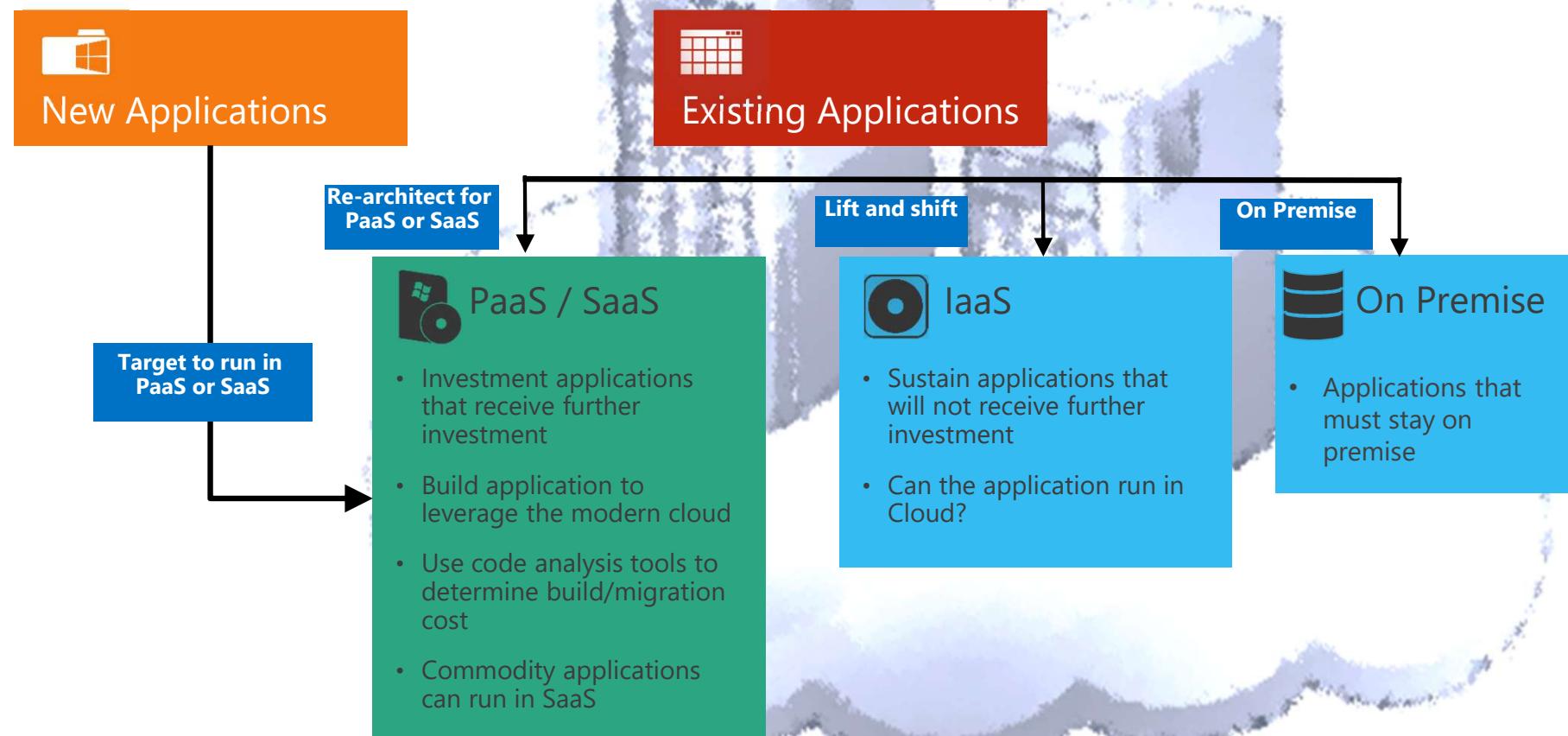
- Workload architecture
- OS, Web, and DB platform?
- CPU, Disk, Memory requirements?
- Complexity
- Capacity

GRC Considerations

- SLA
- Compliance
- Sensitive data
- Performance
- Security



Workload Migration Path



Lift and Shift (IaaS) Migration

Cloud Adoption Framework

- Identify Technical Blockers
 - Hard Blockers
 - Potential Blockers
- Evaluate servers against Blockers
- Remediate Potential Blockers

Application Analysis

Cloud Adoption Decision Framework

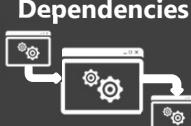
Server Technical Assessment



Right sizing



Application Dependencies



Application Roadmap (PaaS / SaaS)



Business Factors



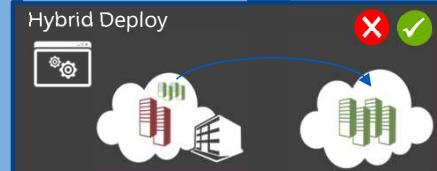
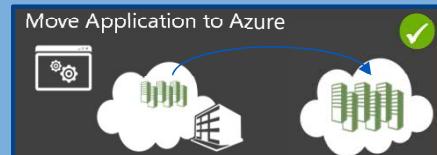
Remediation



Drives Cloud IaaS migration decisions

IaaS Migration Plan

Azure IaaS (Rehost)

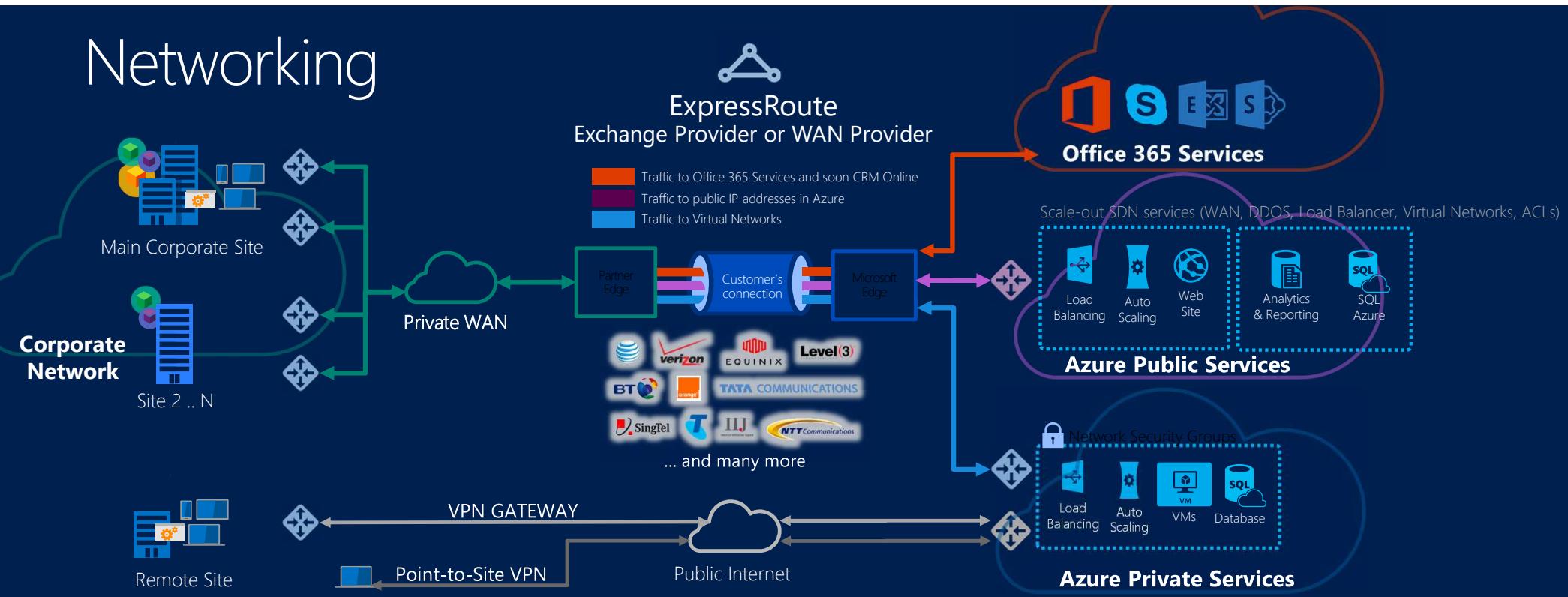


On-Prem IaaS (Retain / Retire)



[Cloud Adoption – Use Cases]

Networking



Backend Connectivity

- ExpressRoute for private enterprise grade connectivity
- VPN Gateways for secure site-to-site connectivity
- Point-to-site for dev / test

Front-End Access

- Dynamic/Reserved Public IP addresses
- Direct VM access, ACLs for security
- Load balancing
- DNS services: hosting, traffic management
- DDoS protection

Native Azure security

- Network Isolation
- Network Security Groups
- User Defined Routing
- Network Virtual Appliance

Virtual Network

- "Bring Your Own Network"
- Segment with subnets and security groups
- Control traffic flow with User Defined Routes

RBAC / Identity & Access Management

Microsoft Azure Active Directory



Encrypted Synchronization



On-premises



Cloud HR

Standards Based Integration:

- OAuth2 & OpenID Connect
- SAML
- WS-Federation
- REST based Graph API
- SCIM
- FIDO

Consumer identity providers



Public Cloud, Your Apps,
2500+ popular SaaS apps

Identity Driven Security



ACTIONS

Conditions

- ✓ Location (IP range)
- ✓ Device state
- ✓ User group
- ✓ Risk

Allow access

Enforce MFA per user/app

Block access

Office 365 Microsoft Azure

On-premises applications

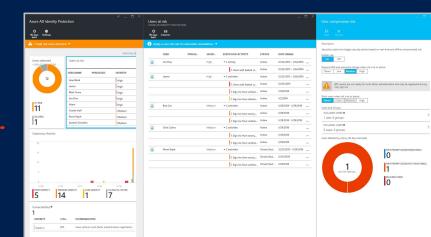
NOTIFICATIONS, ANALYSIS,
REMEDIATION, RISK-BASED POLICIES

CLOUD APP
DISCOVERY

PRIVILEGED IDENTITY
MANAGEMENT

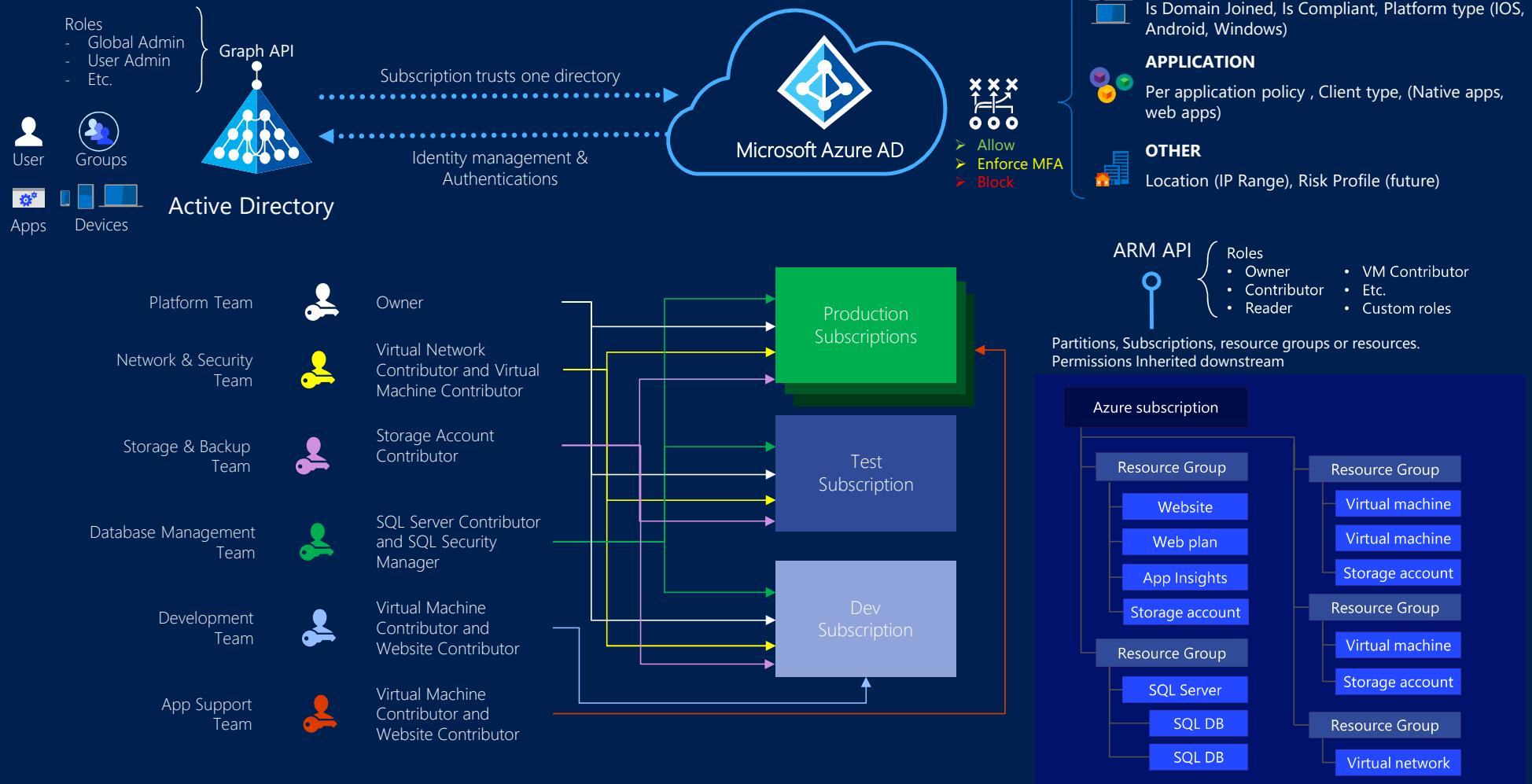
Azure Active Directory Identity Protection
(Preview)

- ⚡ Brute force attacks
- ❗ Leaked credentials
- ❗ Suspicious sign-in activities
- ❗ Infected devices
- ❗ Configuration vulnerabilities



- Consolidated view to examine suspicious user activities and configuration vulnerabilities
- Remediation recommendations

Subscription Management



Automation



Scripting Language

POWERSHELL

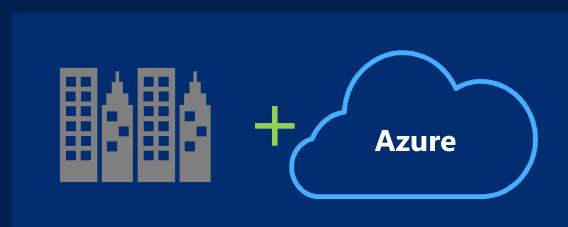
- Task automation and configuration management framework
- Command-line shell and associated scripting language built on the .NET Framework
- Full access to COM and WMI, enabling administrators via WS-Management and CIM enabling management of remote Linux systems and network devices



Model / API / Engine

AZURE RESOURCE MANAGER

- Deploy - Automate initial deployments and upgrades using templates
- Manage - Access control, policies, auditing and tagging support management post-deployment
- Monitor - Monitor related resources as a group



Orchestration Service

AZURE AUTOMATION

- Automation as a Service
- An orchestration service in Azure to automate repetitive or long-running processes

Script Authoring Environment

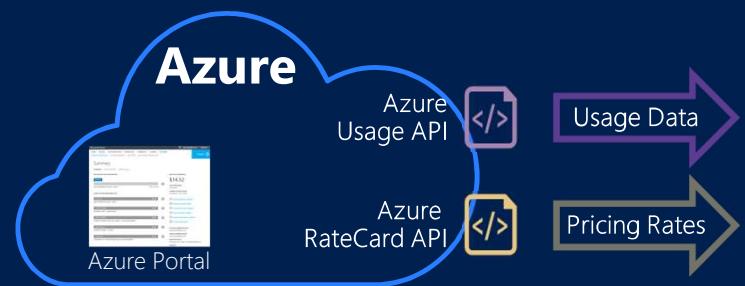
- Uses PowerShell Workflows
- Combination of PowerShell 4.0 and WF
- Uses Integration Modules, very similar to PowerShell Modules

Scheduling and Monitoring

- Execute scripts on a schedule
- Review execution status on a dashboard



Billing and Cost Management



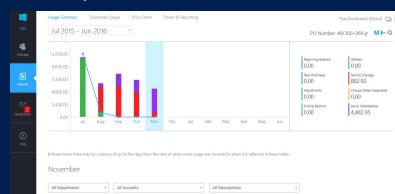
</> Azure Usage API – retrieve resource usage data, along with resource tags and resource metadata.

- Azure Role-based Access Control
- Hourly or Daily Aggregations
- Instance metadata provided (includes resource tags)
- Resource metadata provided
- Usage for all offer types

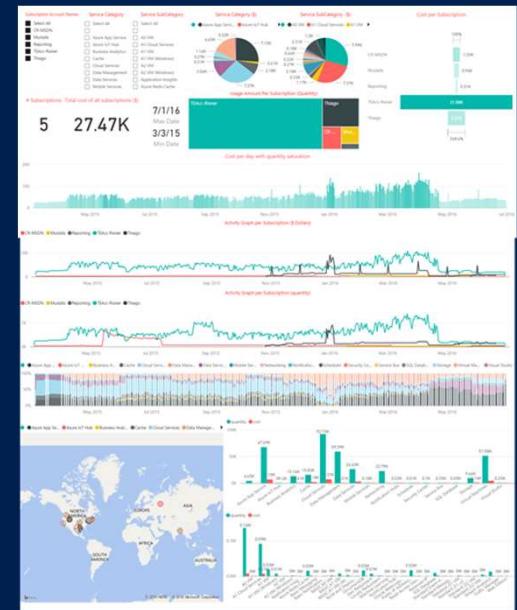
</> Azure RateCard API – retrieve list of resources available for an Azure offer, along with the associated pricing details.
*For enterprise customers use EA Portal Pricing Sheet

- Azure Role-based Access Control
- Support for Pay-as-you-go, MSDN, Monetary commitment, and Monetary credit offers (EA not supported)

Enterprise Portal



Azure Billing Portal



Sample Partner Offerings:

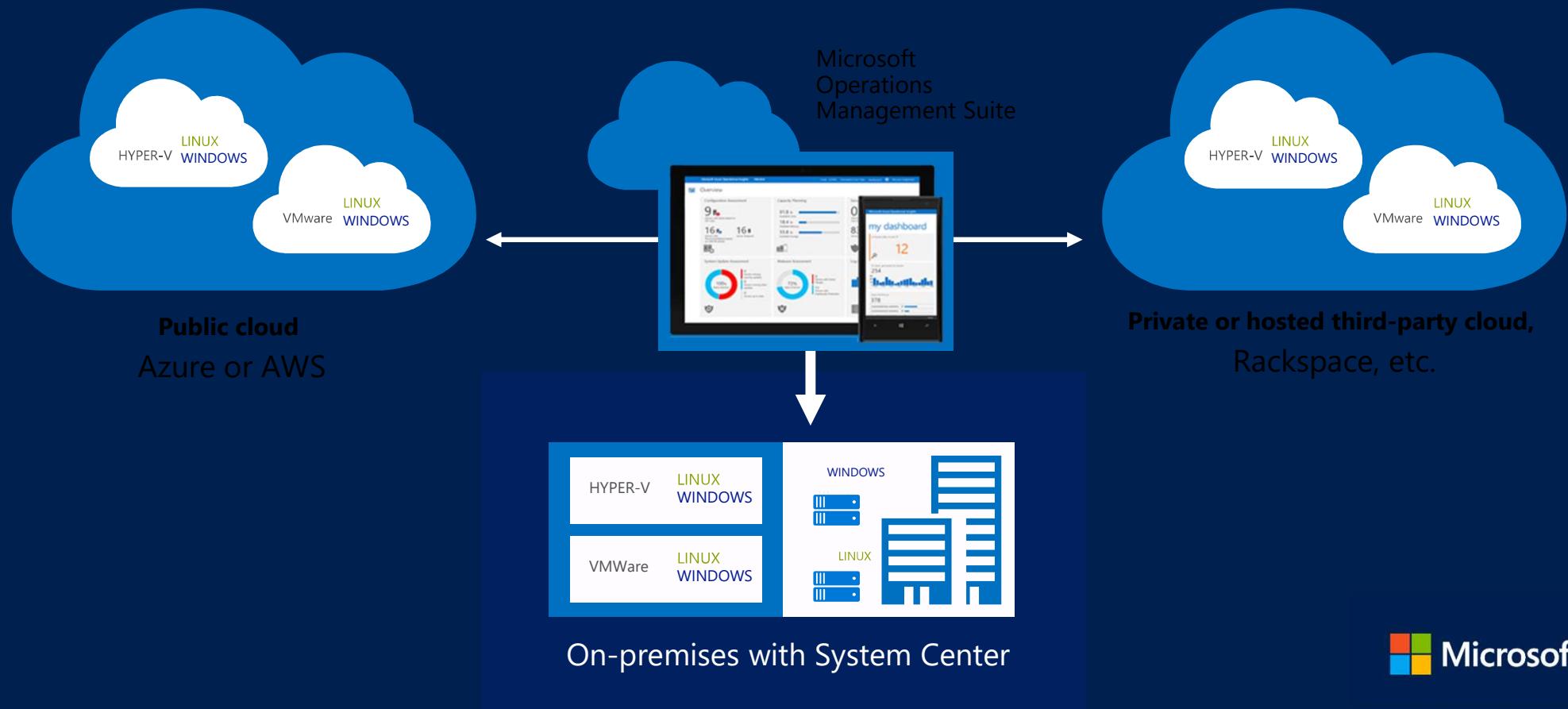


<https://azure.microsoft.com/en-us/blog/announcing-the-release-of-the-azure-usage-and-billing-portal/>

- Registration website
- Dashboard website
- SQL Database
- Storage Queue
- Scheduled daily pull
- Continuous pull
- Power BI Dashboard to display the results

Microsoft hybrid IT management

Simplified guest and workload management, both on-premises and in the cloud



InPrivate <https://0f571d2d-a13b-4778-a1df-31fe982ab344.portal.mms.microsoft.com/>

Microsoft Operations Management Suite

Data Plan: Free OpInsightsDemo

Overview

Log Search

AD Assessment

4 Servers Assessed

3 High Priority Recommendations

6 Low Priority Recommendations

72 Passed Checks

Malware Assessment

35% NEEDS ATTENTION

1 Servers with Active Threats

38 Servers with Inadequate Protection

Capacity Planning

23.6 % Available Cores

62.3 % Available Memory

42.5 % Available Storage

Backup

ITPRodBackup

13 Servers backed up

3 TB Backup data

Solutions Gallery

Alert Management

0 Active critical alerts in the last 24 hours

1pm 5pm 9pm 1am 5am 9am

4 Active warning alerts in the last 24 hours

1pm 5pm 9pm 1am 5am 9am

Automation

ITAutomation

9 Runbooks

15 Jobs in the last 7 days

Change Tracking

20 Software changes in the last 24 hours

4/26 4/28 4/29 4/30 5/2

6 Windows service changes in the last 24 hours (excludes Status)

4/26 4/28 4/29 4/30 5/2

Security and Audit

95 Active Computers in the last 24 hours

64 Accounts Authenticated in the last 24 hours

Feedback

?

https://mvpworkspace.portal.mms.microsoft.com/ Overview - Microsoft Operations Management Suite

Microsoft Operations Management Suite Data Plan: Free MVPWorkspace

Overview > Dependency Monitor Live 10:04 AM 10 min. 10:14 AM EDT || Pause

Servers Total Response Time Show Self-Links Servers Processes Legend CONFIG SUMMARY

Search... OS Server DNS Name(s)

bsdemo-docker
bsdemo-was2
demo-AD
demo-ws1
demo-oracle1
demo-ms
bsdemosql1

Easily identify critical systems and view live, interactive dependency maps across Windows and Linux systems

RD00155D6190EE Azure demo-ws1 Apache HTTP Server
RD00155D618B66 Azure bsdemo1 (WebSphere)
bsdemo1 (WebSphere)
dmgr (WebSphere)
nodeagent (WebSphere)
backup.pl (Perl)
master
rpc.statd
rpcbind
sshd
ApachePlugin.pl (B...
BlueStripe Collector
cupsd
JavaAgentPlugin.pl...
System Center Mana...
WebSpherePlugin.pl...

137.116.112.250
google-public-dns-b....
demo-oracle1 Hyper-V Server
bsdemo-ora2 VMware Host

demo-ms demo-hyperv1.hqdemo.local 4 Hyper-V Server

Automatically discovers every connection for every process in the target system

DNS Name(s): demo-ws1.hqdemo.local
IPV4: 10.250.0.36
OS: RHEL 6.5
CPUs: 2
Memory: 3071 MB
Host Name: Hyper-V Server

[View Full Configuration...](#)

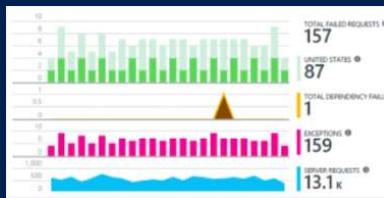
EXPORT

The screenshot displays the Microsoft Operations Management Suite's Dependency Monitor feature. On the left, a sidebar lists servers categorized by operating system (OS). The 'demo-ws1' server is selected, highlighted with a blue background. The main pane shows a dependency map where 'demo-ws1' is the central node. It connects to several other nodes: '137.116.112.250', 'google-public-dns-b....', 'demo-oracle1' (a 'Hyper-V Server'), and 'bsdemo-ora2' (a 'VMware Host'). Additionally, 'demo-ws1' has multiple internal connections to various processes listed on its right, such as 'Apache HTTP Server', 'bsdemo1 (WebSphere)', 'dmgr (WebSphere)', 'nodeagent (WebSphere)', 'backup.pl (Perl)', 'master', 'rpc.statd', 'rpcbind', 'sshd', 'ApachePlugin.pl (B...)', 'BlueStripe Collector', 'cupsd', 'JavaAgentPlugin.pl...', 'System Center Mana...', and 'WebSpherePlugin.pl...'. A callout box on the left emphasizes the ability to 'Easily identify critical systems and view live, interactive dependency maps across Windows and Linux systems'. Another callout box on the right highlights that the tool 'Automatically discovers every connection for every process in the target system'. The top right corner shows a 'CONFIG SUMMARY' box with details like DNS name, IP address, OS version, and memory usage.

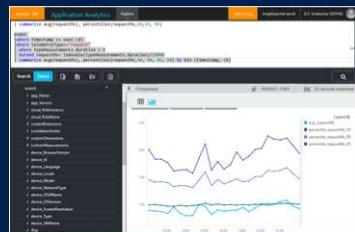
Application Insights

Detect, triage, and diagnose issues in your web apps and services

Exceptions and performance diagnostics



Interactive data analytics



Azure Diagnostics



Proactive Detection



DevOps and Application Lifecycle Management



Outside-in monitoring

- URL pings and web tests from 16 global points of presence

Observed user behavior

- Real user monitoring for deeper diagnostic insights

Sources of Telemetry

Developer traces and events

- Whatever the developer would like to send to Application Insights

Observed application behavior

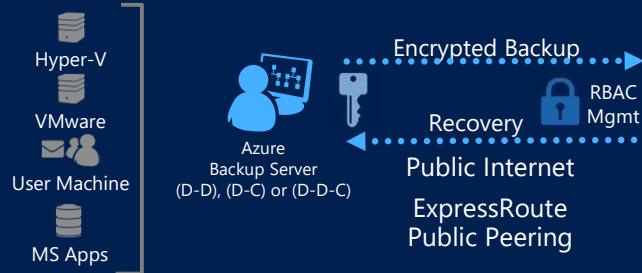
- No coding required – service dependencies, queries, response time, exceptions, logs, etc.

Infrastructure performance

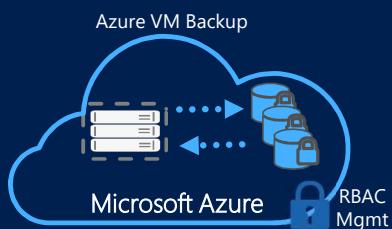
- System performance counters

Backup, Recovery and Migration

Azure Backup



- RBAC limited initially
- Scheduled or ad-hoc backups
- LRS or GRSBackup Vault
- Encrypted in-flight & at rest
- Can protect:
 - Hyper-V & VMware
 - Windows & Linux
 - Microsoft Applications
 - Client machines
- Retention up to 99 years
- Support matrix [here](#)

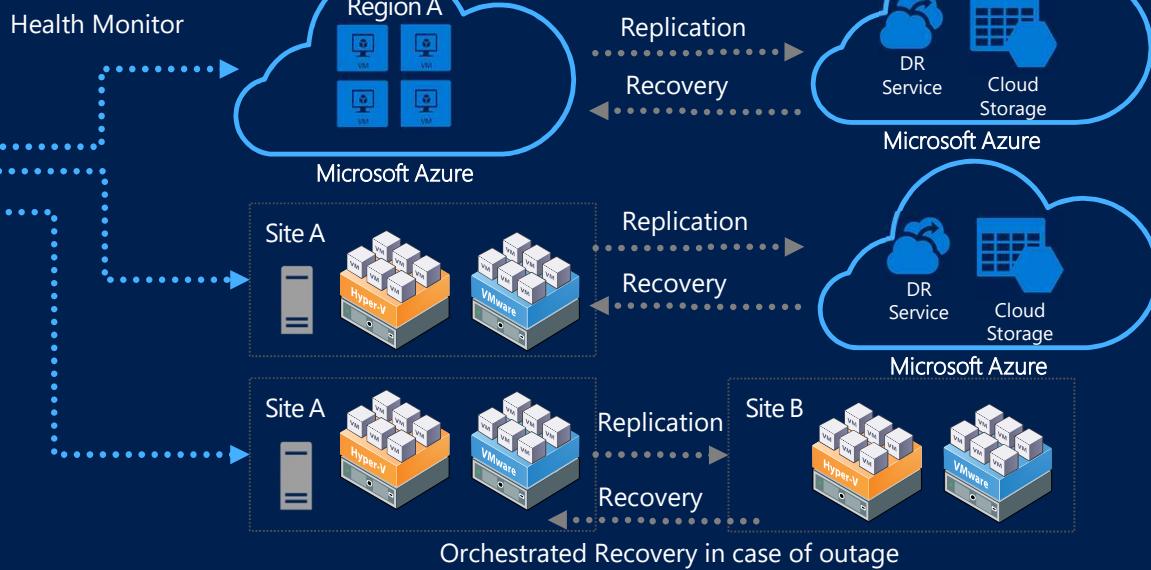


- Recover even deleted VMs
- RBAC limited initially
- Scheduled or ad-hoc backups
- Encrypted in-flight & at rest
- Can protect:
 - Windows & Linux
 - Microsoft Applications
- Retention up to 99 years
- Support matrix [here](#)

Azure Site Recovery

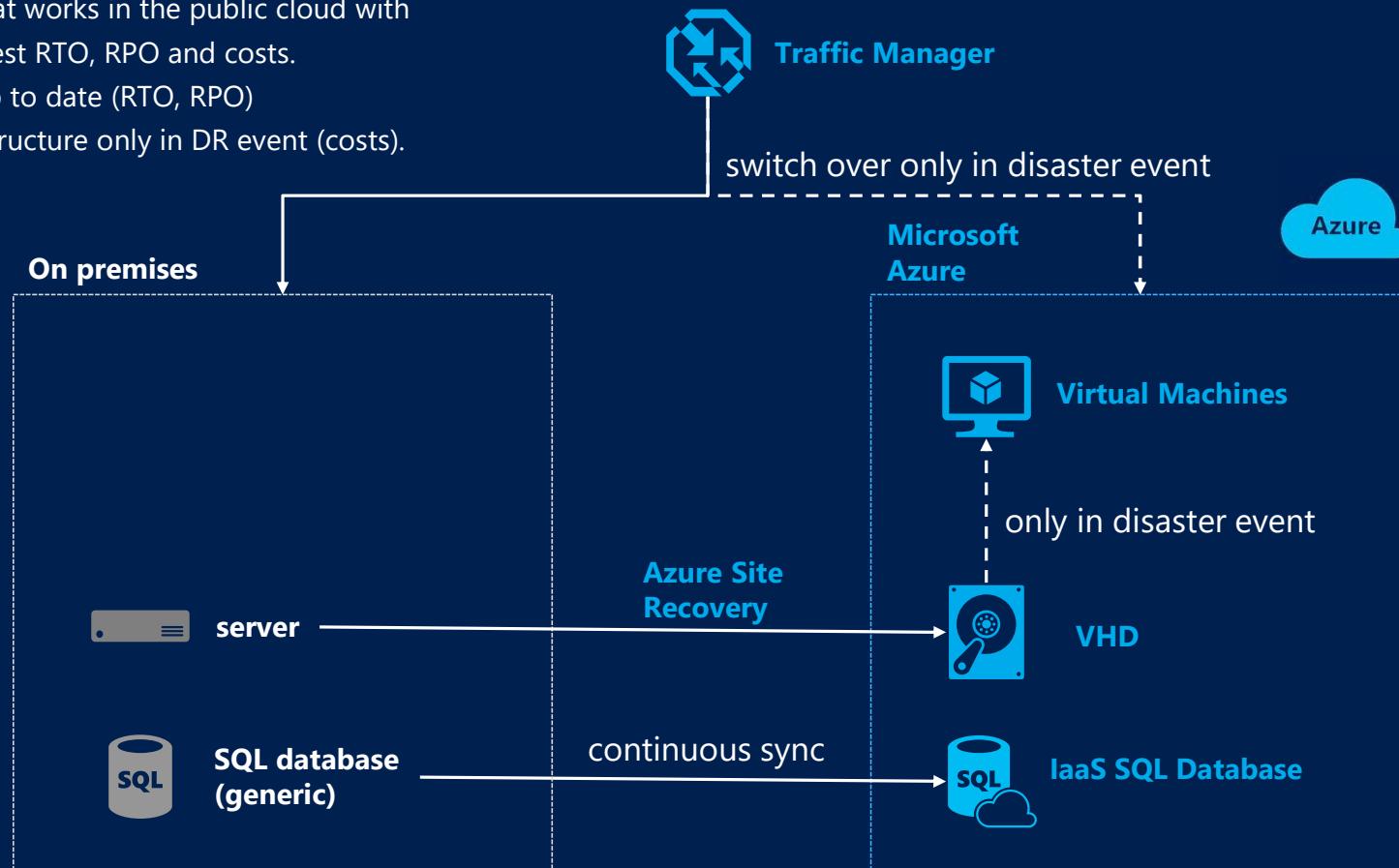


- Encrypted in-flight & at-rest
- On-demand compute
- Heterogeneous
- Scalable
- Powerful automation
- ExpressRoute or Public Internet



The Most Common Pattern for Disaster Recovery

A DR pattern that works in the public cloud with providing the best RTO, RPO and costs.
Keep storage up to date (RTO, RPO)
and boot infrastructure only in DR event (costs).



Security and Compliance

Security Development Lifecycle

Operations Security

Assume Breach, Incident Response

CSA Cloud Secure Access & Isolation

Matrix Access via VPN or Express route
Network Segregation, SQL Isolation,
Intrusion detection & DoS prevention

HIPAA/
HITECH

Ongoing Compliance Certification

cloud services independently validated through certifications and attestations, as well as third-party audits

ISO 27001:2005 FISMA ATO

RBAC & Access Control

RBAC, Least Privilege / Just-in-Time (JIT) Access
Active Directory, Two Factor Authentication
Vulnerability Scanning, Security Logs

Encryption & Data Protection

Data Segregation, Protection At-rest and In-transit
Encryption in Transit & at Rest, Key Vault Service
Data Residency, Redundancy, Destruction

Azure has the largest compliance portfolio in the industry



Introducing Azure Security Center

Continuous security monitoring

Integrated security management

Built in threat detections and alerts

Works with broad ecosystem of security solutions



Barracuda

CISCO

Check Point
SOFTWARE TECHNOLOGIES LTD.

TREND
MICRO

IMPERVA
INCAPSULA

FORTINET

CLOUDFLARE

IMPERVA
SECURESPHERE

All resources - Microsoft X + ms.portal.azure.com/ Microsoft Azure Security Center Security alerts Brute Force attempts were detected Connor MacLeod

Security Center

Prevention

Resources health

- VIRTUAL MACHINES: HIGH SEVERITY (14), MEDIUM SEVERITY (26), LOW SEVERITY (2)
- NETWORKING: HIGH SEVERITY (1), MEDIUM SEVERITY (13), LOW SEVERITY (15)
- SQL: HIGH SEVERITY (1), MEDIUM SEVERITY (13), LOW SEVERITY (15)
- APPLICATIONS: HIGH SEVERITY (1), MEDIUM SEVERITY (13), LOW SEVERITY (15)

Recommendations: 12 TOTAL

Security policy

QUICKSTART

Detection

Security alerts

Brute Force attempts were detected

Attacker IP: 90.150.112.27
Attacker Location: Russia

RDP activity per hour

Threat map

DESCRIPTION	DETECTED BY	EVENTS	DATE	STATE	SEVERITY
Incident detected: database breach	Microsoft	1	7/15	Open	!
A user account password has been... Critical malware action failed	Microsoft	2	7/14	Open	⚠
Traffic to malicious IP 3.3.3.3	Antimalware	3	7/14	Open	⚠
Brute Force attempts were detect... Exploitable Process Detected (sql-s... SQL Injection attempt from 103.3...	Microsoft	1	7/13	Open	!
Non-critical malware action failed	Antimalware	1	7/13	Open	⚠
Traffic to malicious IP 104.12.112...	Microsoft	1	7/10	Open	!
SQL Injection attempt from 103.3...	Microsoft	4	7/9	Open	!
Traffic to malicious IP 121.14.112...	Microsoft	1	7/8	Open	!
Brute Force attempts were detect... DDOS Attack from 103.14.120.12...	Web Applic...	2	7/8	Open	⚠
SQL Injection attempt from 103.3...	Web Applic...	4	7/6	Open	!
Non-critical malware action failed	Antimalware	3	7/5	Closed	⚠

Security Center

PREVIEW

Prevention

Resources health

Virtual machines	<div style="width: 20%; background-color: red;"></div>
Networking	<div style="width: 20%; background-color: red;"></div>
SQL	<div style="width: 20%; background-color: red;"></div>
Applications	<div style="width: 20%; background-color: red;"></div>

Recommendations

12 Total

Filter

DESCRIPTION	RESOURCE	STATE	SEVERITY	...
Enable data collection	1 subscriptions	Resolved	High	...
Enable Antimalware	7 virtual mac...	Open	High	...
Secure web application using web appli...	2 virtual mac...	Open	High	...
Enable Network Security Groups on sub...	4 subnets	Open	High	...
Enable Network Security Groups on net...	5 network int...	Open	High	...
Enable server SQL Auditing	sqlserver1a	Open	High	...
Enable database SQL Auditing	SQL-Db1	Open	High	...
Enable Transparent Data Encryption	SQL-Db1	Open	High	...
Apply system updates	10 virtual ma...	Open	High	...
Resolve mismatch baseline rules	VM-L3	Open	High	...
Restrict access through public external...	3 network se...	Open	Medium	...
Reboot after system updates	VM-W2	Open	Medium	...
Configure ACLs for endpoint	2 endpoints	Open	Medium	...

Detection

Security alerts

4
3
2
1
0

22 SUN 29 SUN 6 SUN

HIGH 5 LOW 1

// Scenarios

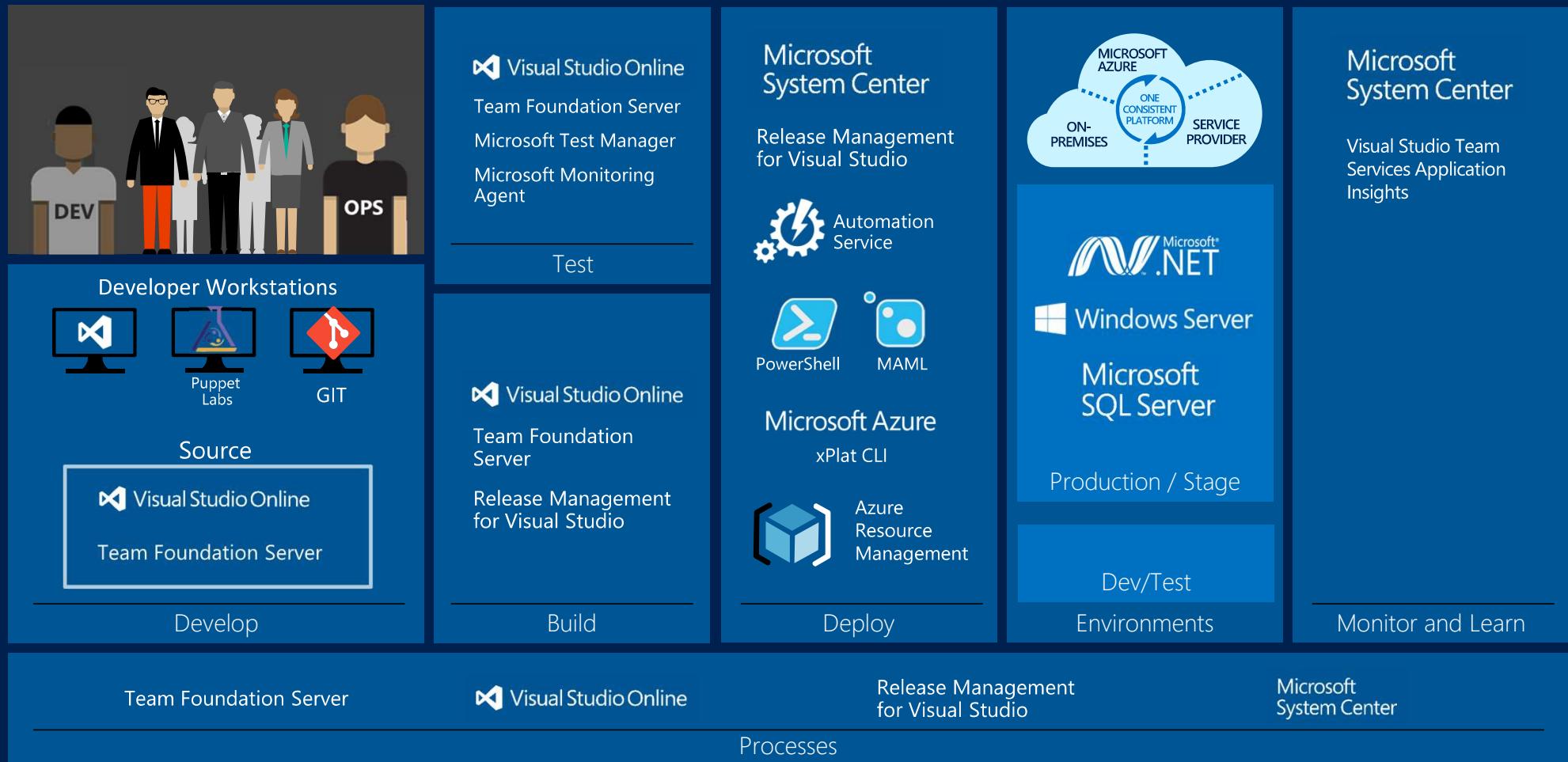
Platform Services from Microsoft Azure

The screenshot displays the "Interactive Azure Platform" interface at azureplatform.azurewebsites.net/en-us. The page is titled "Microsoft Azure" and features a grid of service icons categorized into several groups:

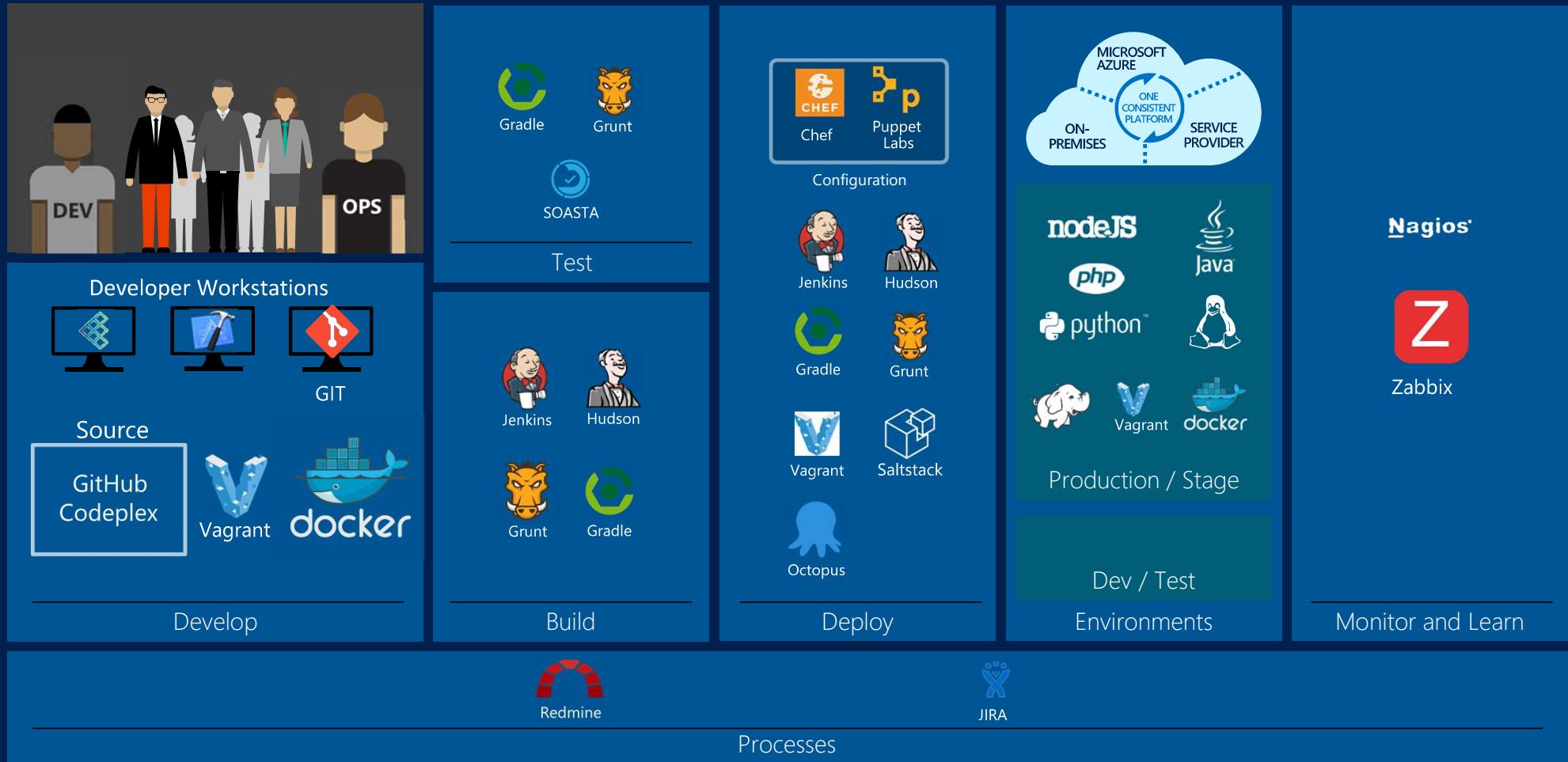
- Compute:** Virtual Machines, Virtual Machine Scale Sets, Cloud Services, Batch, RemoteApp, Service Fabric, Azure Container Service.
- Web & Mobile:** Web Apps, Mobile Apps, Logic Apps, API Apps, API Management, Notification Hubs, Mobile Engagement, Functions*.
- Data & Storage:** SQL Database, DocumentDB, Redis Cache, Storage: Blobs, Tables, Queues..., StorSimple, Search, SQL Data Warehouse, SQL Server Stretch Database.
- Analytics:** Data Lake Analytics*, Data Lake Store*, HDInsight, Machine Learning, Stream Analytics, Data Factory, Data Catalog, Power BI Embedded.
- Media, Internet of Things & Intelligence:** Media Services, Azure IoT Suite, Azure IoT Hub, Event Hubs, Cortana Intelligence Suite, Cognitive Services*.
- Networking & CDN:** Virtual Network, ExpressRoute, Traffic Manager, Load Balancer, Azure DNS*, VPN Gateway, Application Gateway, Content Delivery Network.
- Enterprise Integration, Identity & Access Management:** BizTalk Services, Service Bus, Backup, Site Recovery, Azure Active Directory, B2C, Domain Services*, Multi-Factor Authentication.
- Developer Services:** Visual Studio Team Services, Azure DevTest Labs, VS Application Insights*, HockeyApp, Developer Tools.
- Management & Security:** Azure Portal, Scheduler, Operations Management Suite, Automation, Log Analytics, Key Vault, Security Center.

* Preview Services | Guidance | Statics | Service Updates | Support Options | English | German

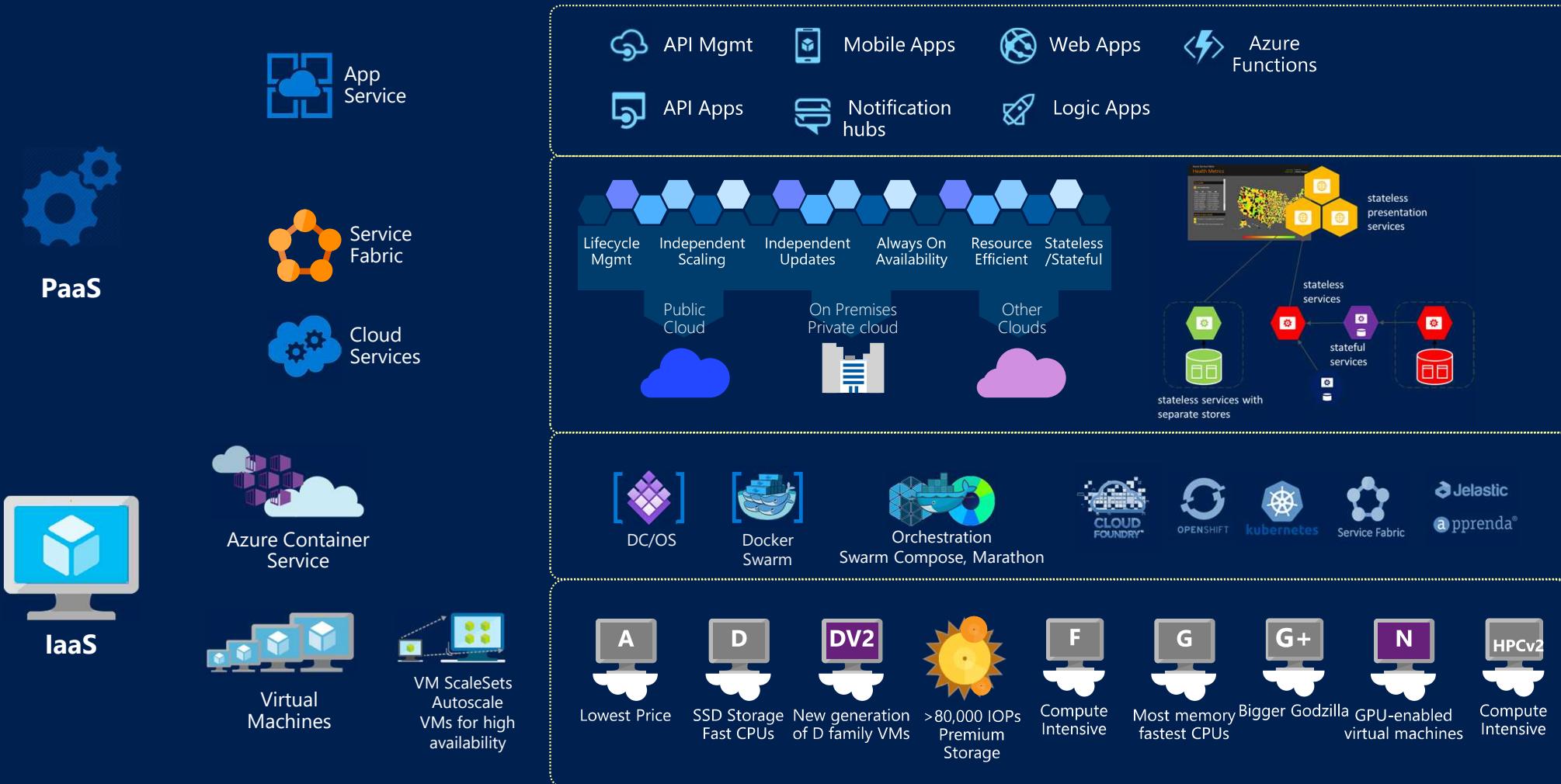
Microsoft Dev Ops - Ecosystem



Heterogeneous Dev Ops Ecosystem



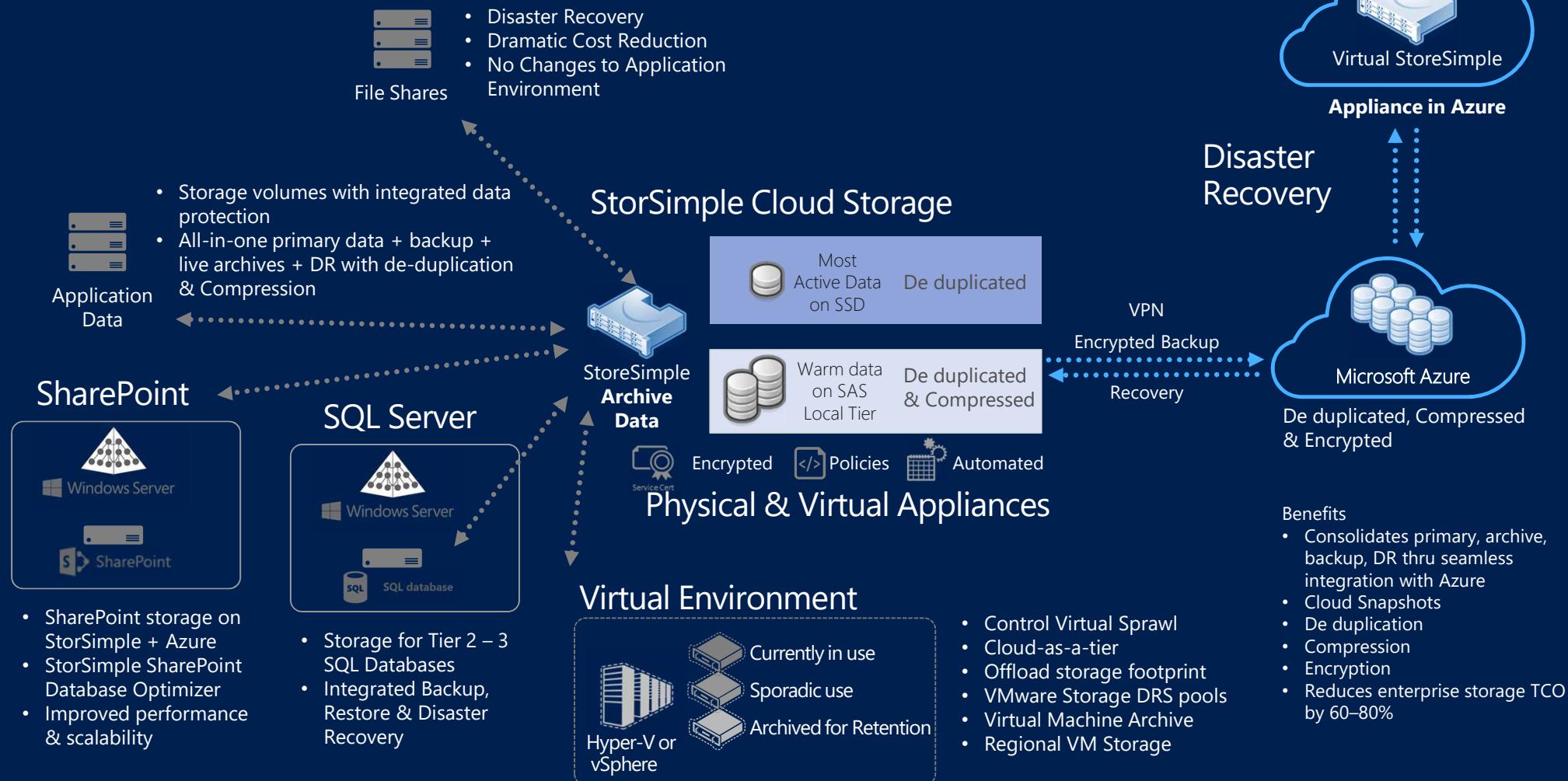
IaaS, PaaS, Microservices



Azure is an open cloud, and a rich eco-system



Hybrid Cloud Scenarios



SQL Server Hybrid Cloud Scenarios

SQL Development



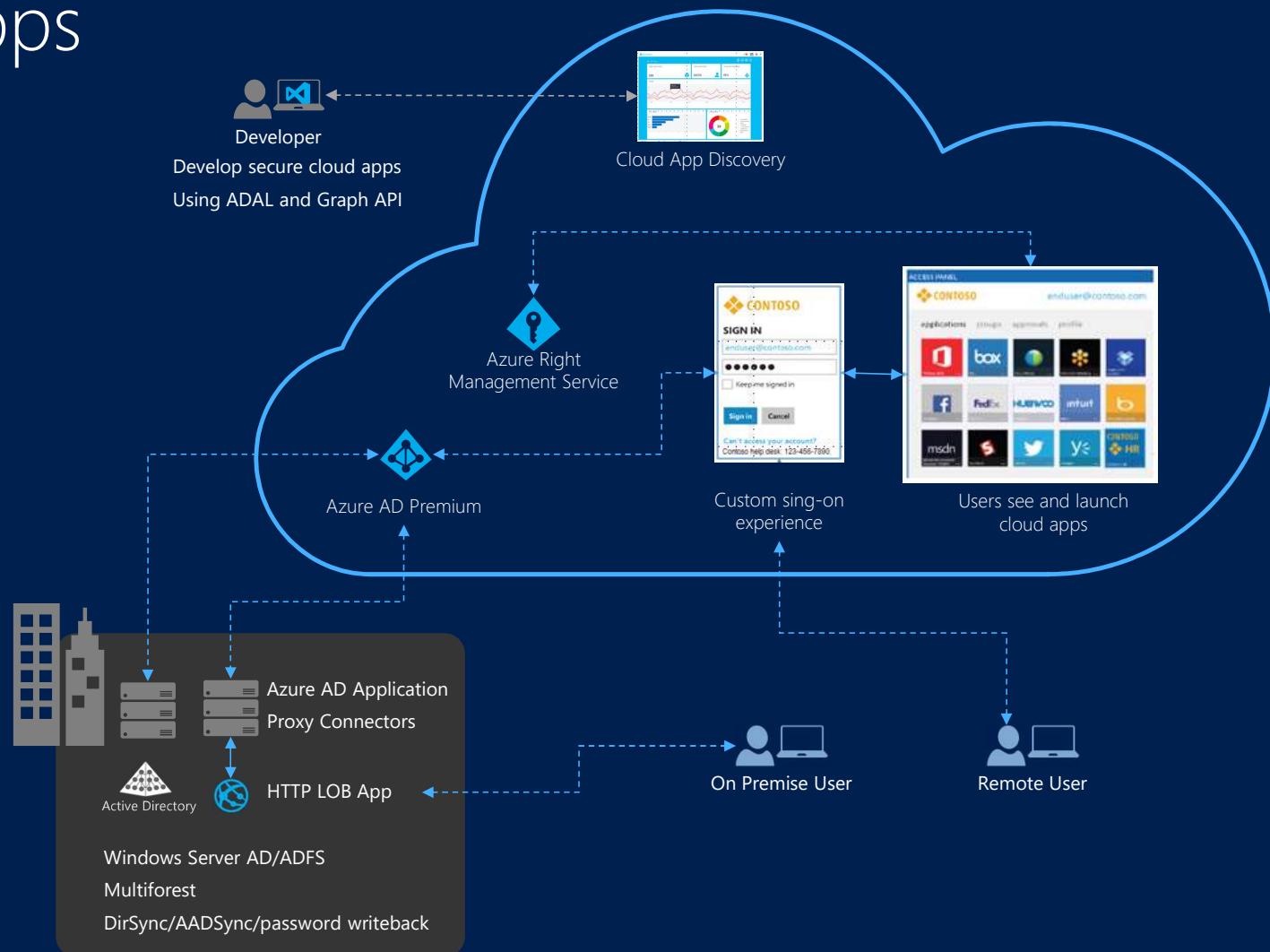
SQL Backup/Recovery



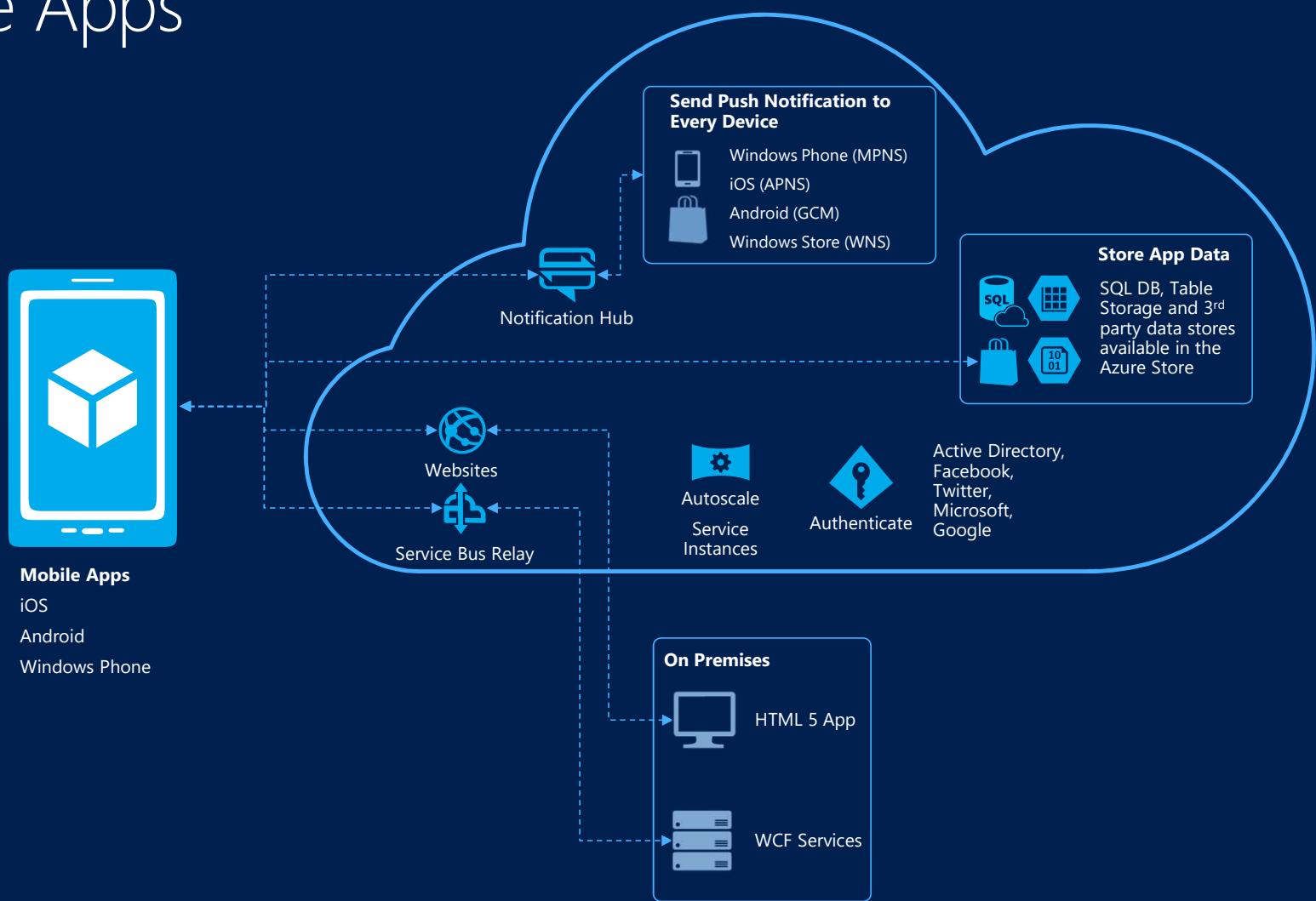
SQL Business Continuity



Web Apps



Mobile Apps



Media Services

CONSUME

iOS, Android, Windows, XBOX



DELIVER

Reach your audience
Caching

Content encryption/decryption
Dynamic packaging

Streaming Service

Delivery of Multiple Formats
To virtually any device



Content Delivery Network (CDN)

PROCESS

UPLOAD ENCODE PACKAGE ENCRYPT

CONTENT MONITOR ENCODE AD PROCESS

MEDIA CREATION



Pre Recorded Media

Live Streaming Events



Cloud Upload & Storage



Encoding,
Packaging,
and Indexing



Content Protection



Live & On Demand
Streaming
with integrated
CDN



Player
Clients



API MANAGEMENT



Monetize digital assets

Publishing access to this data as an API allows organizations to monetize these existing assets
E.g. Fantasy Data, ESPN, US News & World Reports, New York Times



Transform product to platform

Exposing core product functionality as an API introduces licensing and ecosystem opportunities
E.g. Salesforce, Bluegarden, SpeakTolt



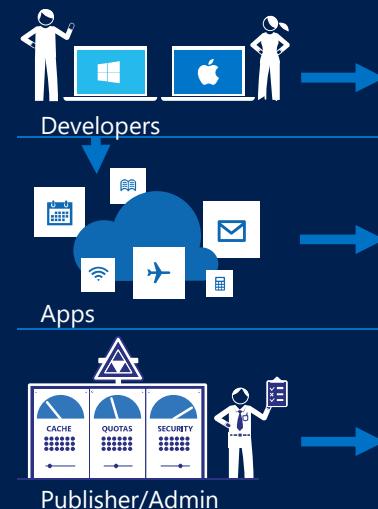
Create content channels

Allow third-party content syndication on partner websites
Creates opportunities for new digital distribution channels
E.g. Washington Post, Wellmark



Drive Internal agility

Enable IT or developers quickly build apps without spending months customizing existing systems across agencies
E.g. MSIT



AZURE API MANAGEMENT



Developer Portal



Proxy

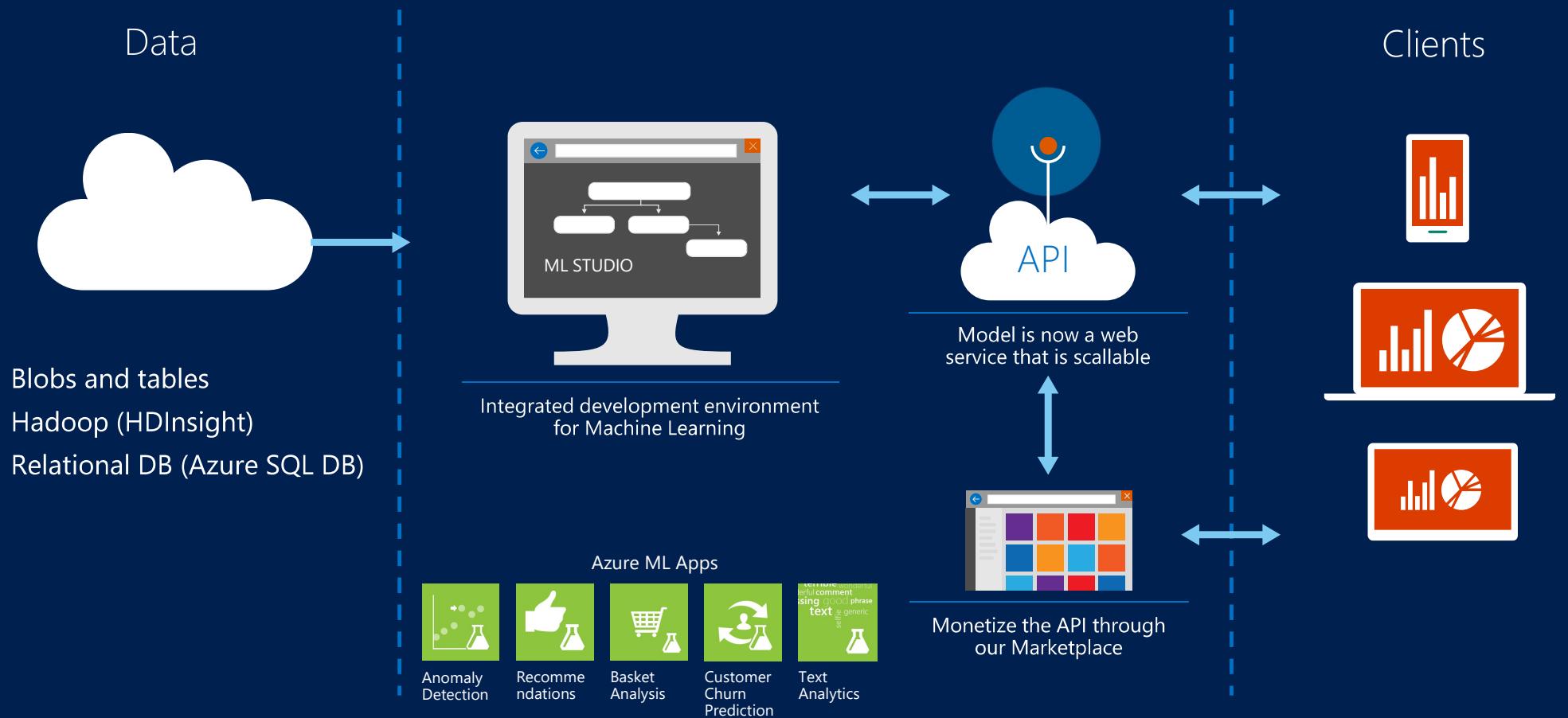


Publisher portal

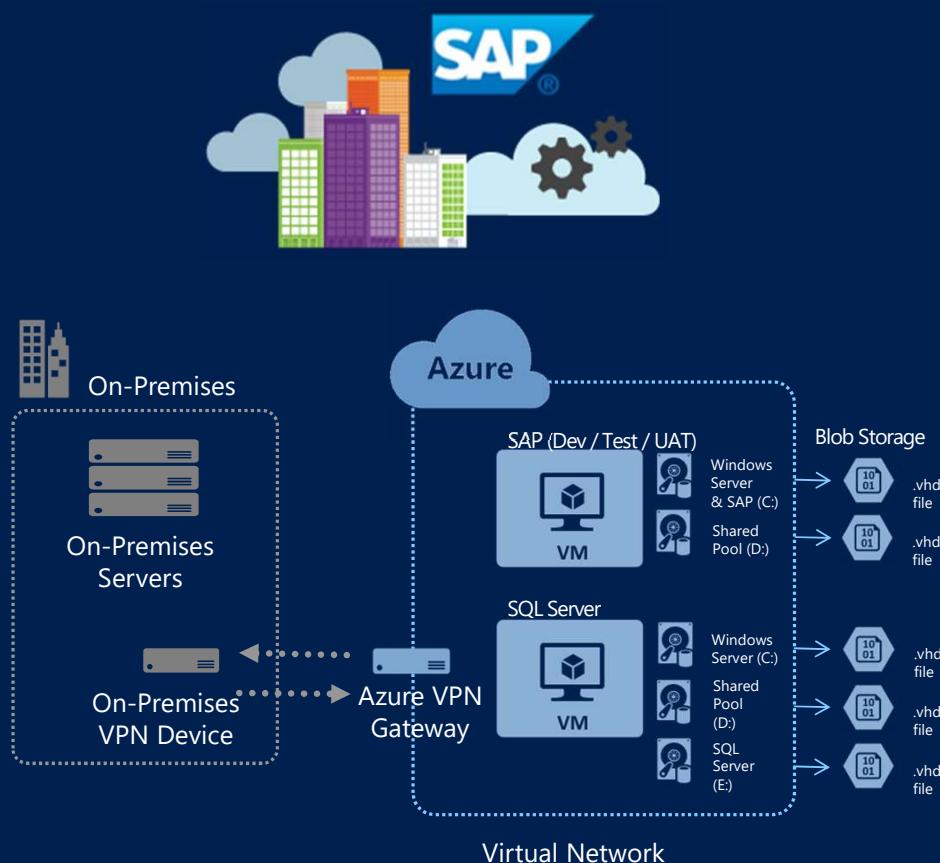
Can be hosted anywhere and authored in any language on any platform.

Azure ML and the ML marketplace

Data -> Predictive model -> Operational web API in minutes



SAP on Microsoft Azure



SAP CERTIFICATIONS

SAP HANA	Supported OS	Azure Offerings
SAP HANA Developer Edition (including the HANA client software comprised of SQLODBC, ODBO-Windows only, ODBC, JDBC drivers, HANA studio, and HANA database) ¹	SUSE Linux Enterprise	A7, A8
HANA One	SUSE Linux Enterprise	DS14_v2 (upon general availability)
SAP S/4HANA	SUSE Linux Enterprise	Controlled Availability for GS5 ² SAP HANA on Azure (Large instances) upon general availability
Suite on HANA, OLTP	SUSE Linux Enterprise	SAP HANA on Azure (Large instances) upon general availability
HANA Enterprise for BW, OLAP	SUSE Linux Enterprise	GS5 for single node deployments SAP HANA on Azure (Large instances) upon general availability

¹Customers can try SAP HANA Developer Edition on Azure using the [SAP Cloud Appliance Library](#).

²Contact your Microsoft or SAP account manager for more information.

SAP NetWeaver certifications	Guest Operating System	RDBMS	Virtual Machine Types
SAP Business Suite Software	Windows, SUSE Linux Enterprise	SQL Server, Oracle ² , DB2, SAP ASE ³	A5 to A11, D11 to D14, DS11 to DS14, GS1 to GS5
SAP Business All-in-One	Windows, SUSE Linux Enterprise	SQL Server, Oracle ² , DB2, SAP ASE ³	A5 to A11, D11 to D14, DS11 to DS14, GS1 to GS5
SAP BusinessObjects BI	Windows	N/A	A5 to A11, D11 to D14, DS11 to DS14, GS1 to GS5
SAP NetWeaver ¹	Windows, SUSE Linux Enterprise	SQL Server, Oracle ² , DB2, SAP ASE ³	A5 to A11, D11 to D14, DS11 to DS14, GS1 to GS5

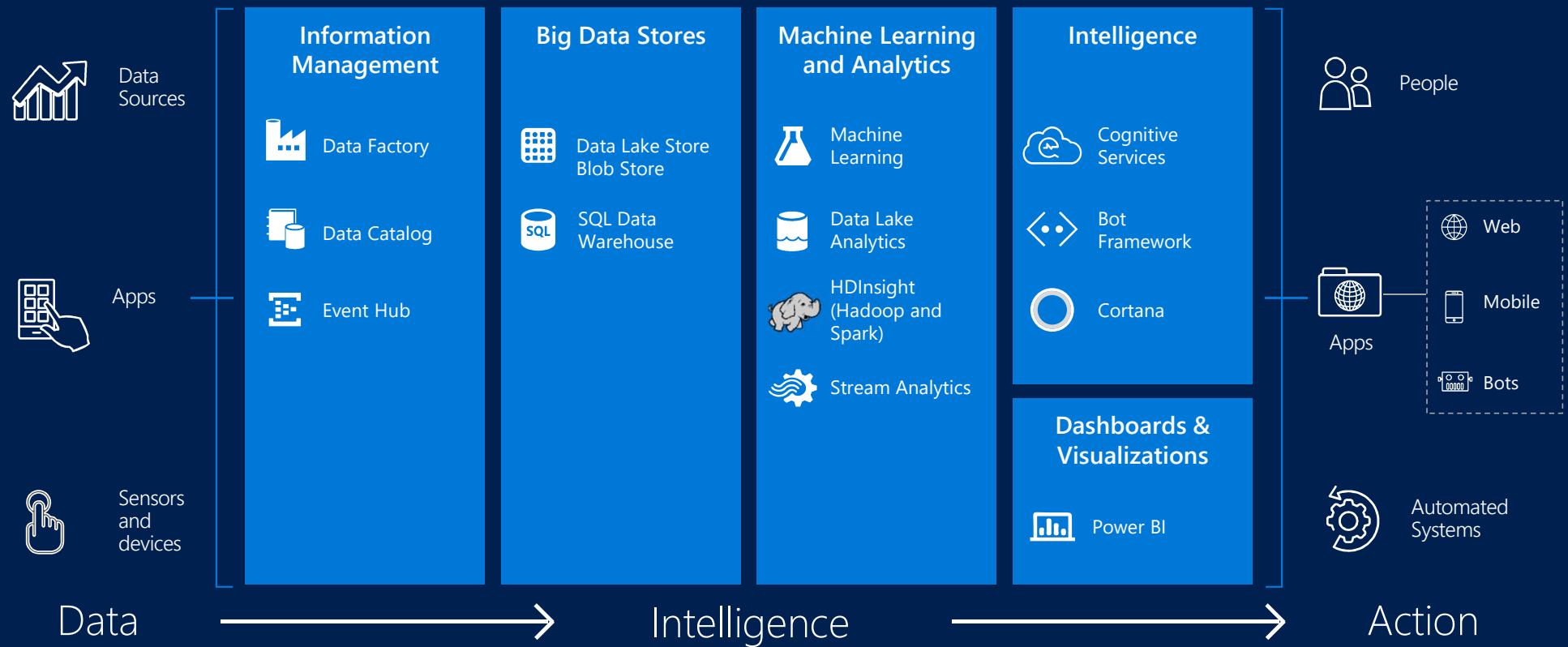
¹Only NetWeaver 7.00 and later SAP releases of NetWeaver are supported for deployment in Azure

²Oracle Database 11g R2 Patchset 3 (11.2.04), Single Instance. Certified on Windows Server only.

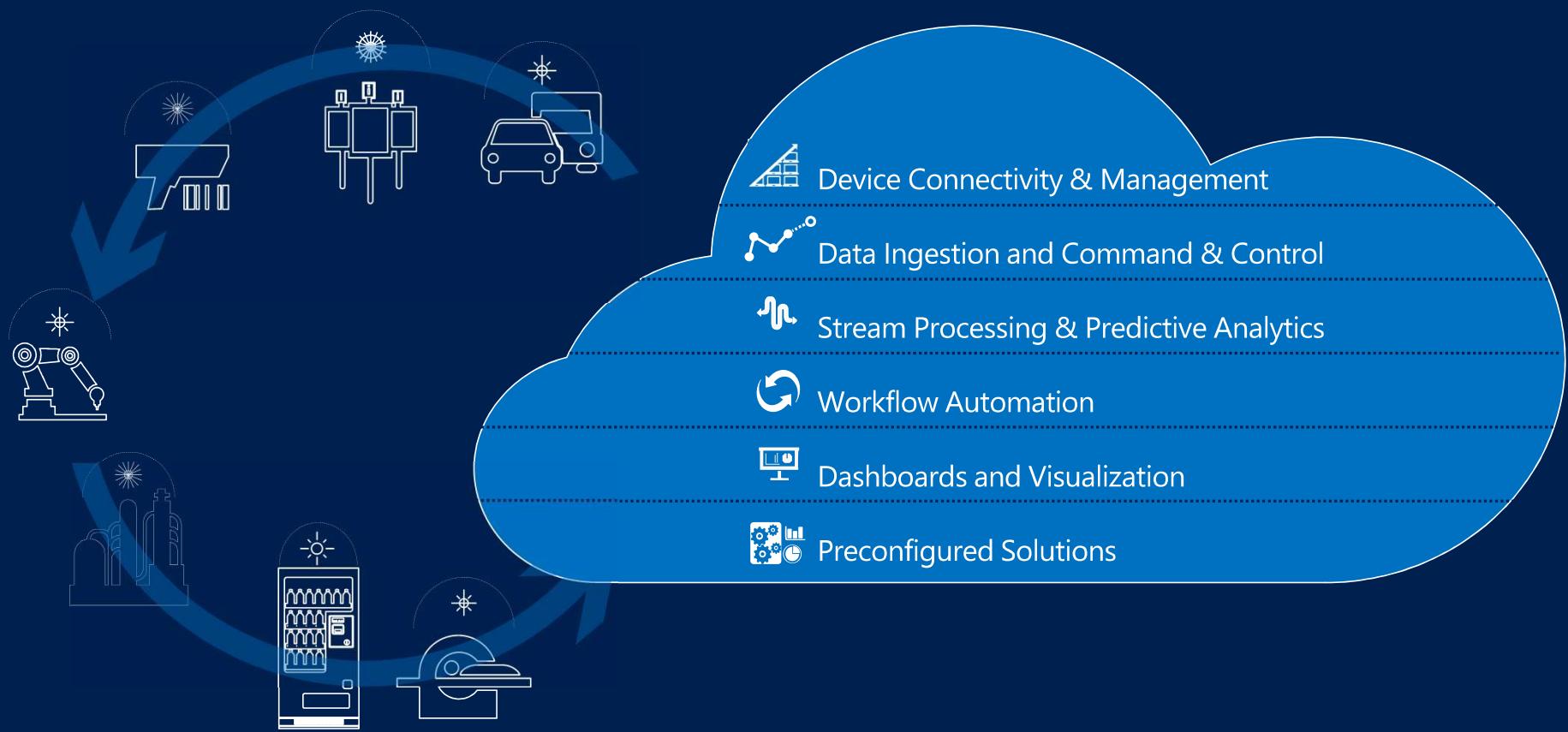
³SAP Adaptive Server Enterprise 16

Cortana Intelligence Suite

Transform data into intelligent action



Azure IoT Suite

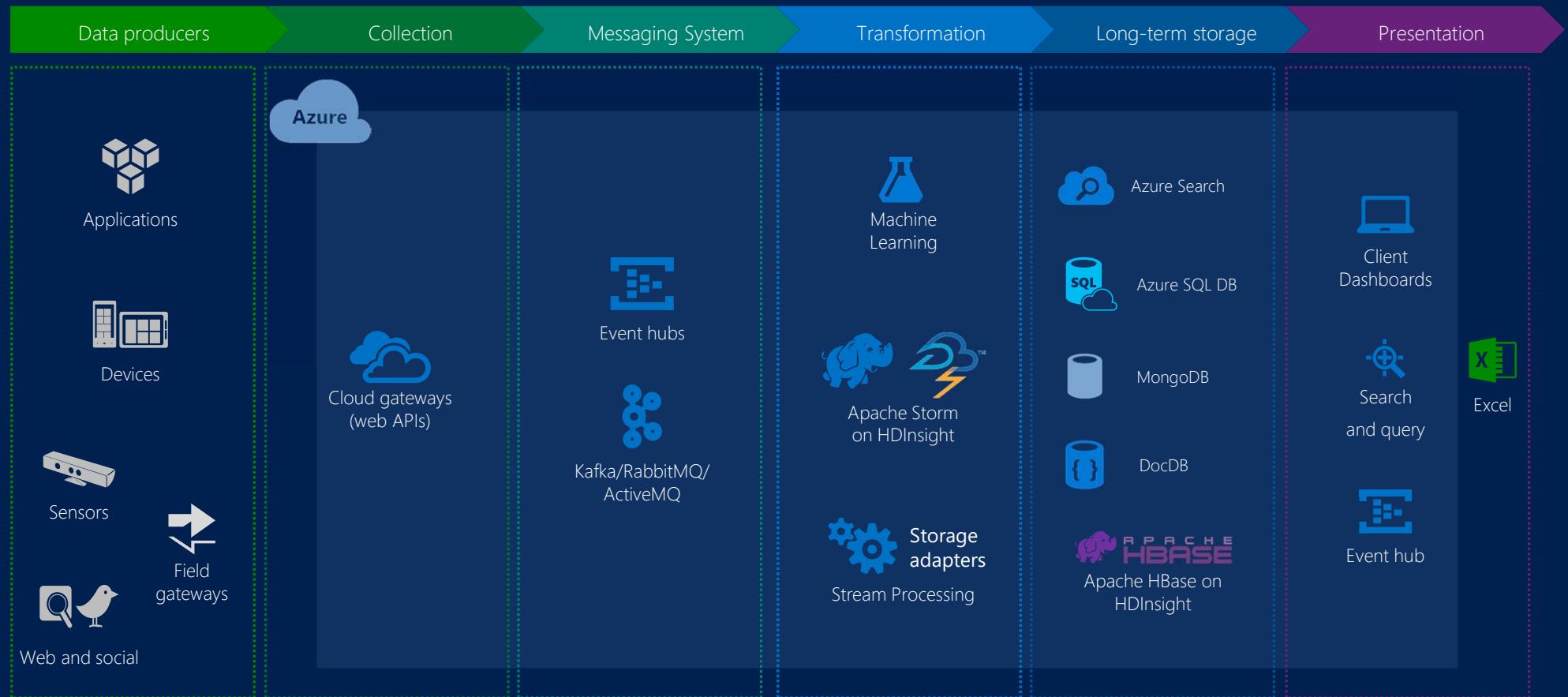


Microsoft Azure IoT Services

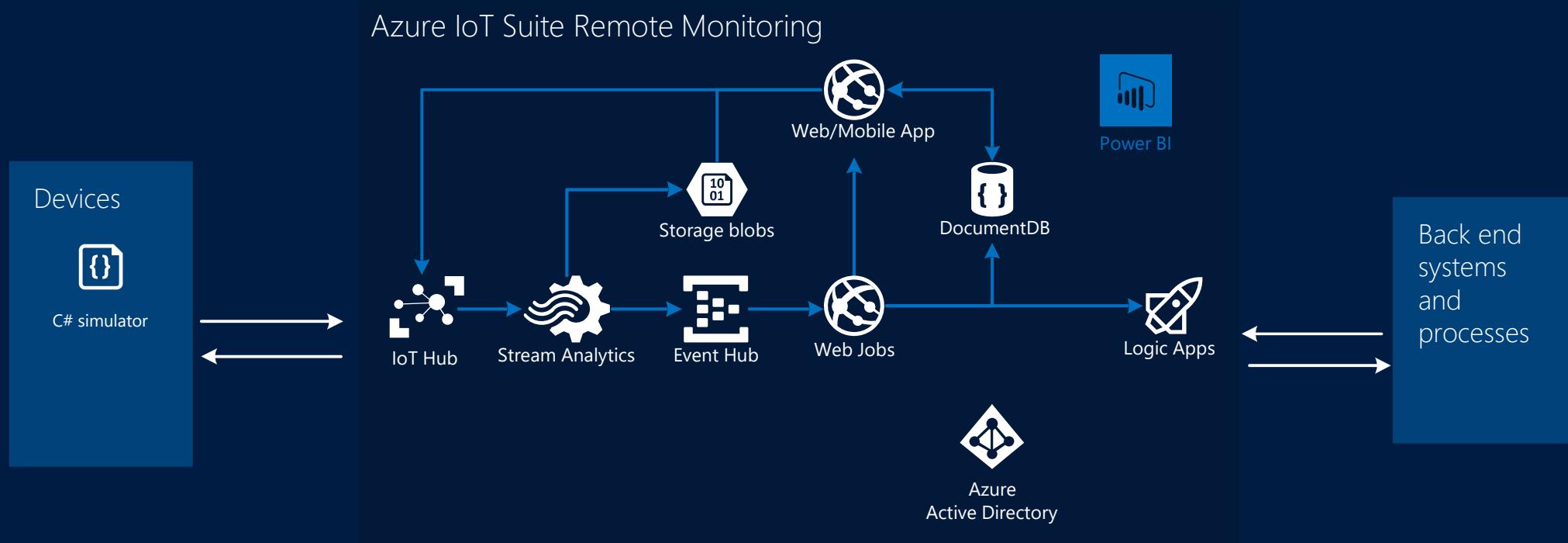
Devices	Device Connectivity	Storage	Analytics	Presentation & Action
	Event Hub	SQL Database	Machine Learning	App Service
	IoT Hub	Table/Blob Storage	Stream Analytics	Power BI
	Service Bus	DocumentDB	HDInsight	Notification Hubs
	External Data Sources	3 rd party Databases	Data Factory	Mobile Services
			Data Lake*	BizTalk Services

(* service in Preview)

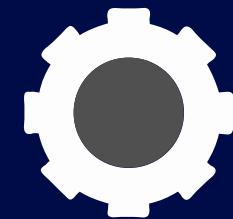
Big Data Flow for an IoT Scenario



What you get with remote monitoring preconfigured solution

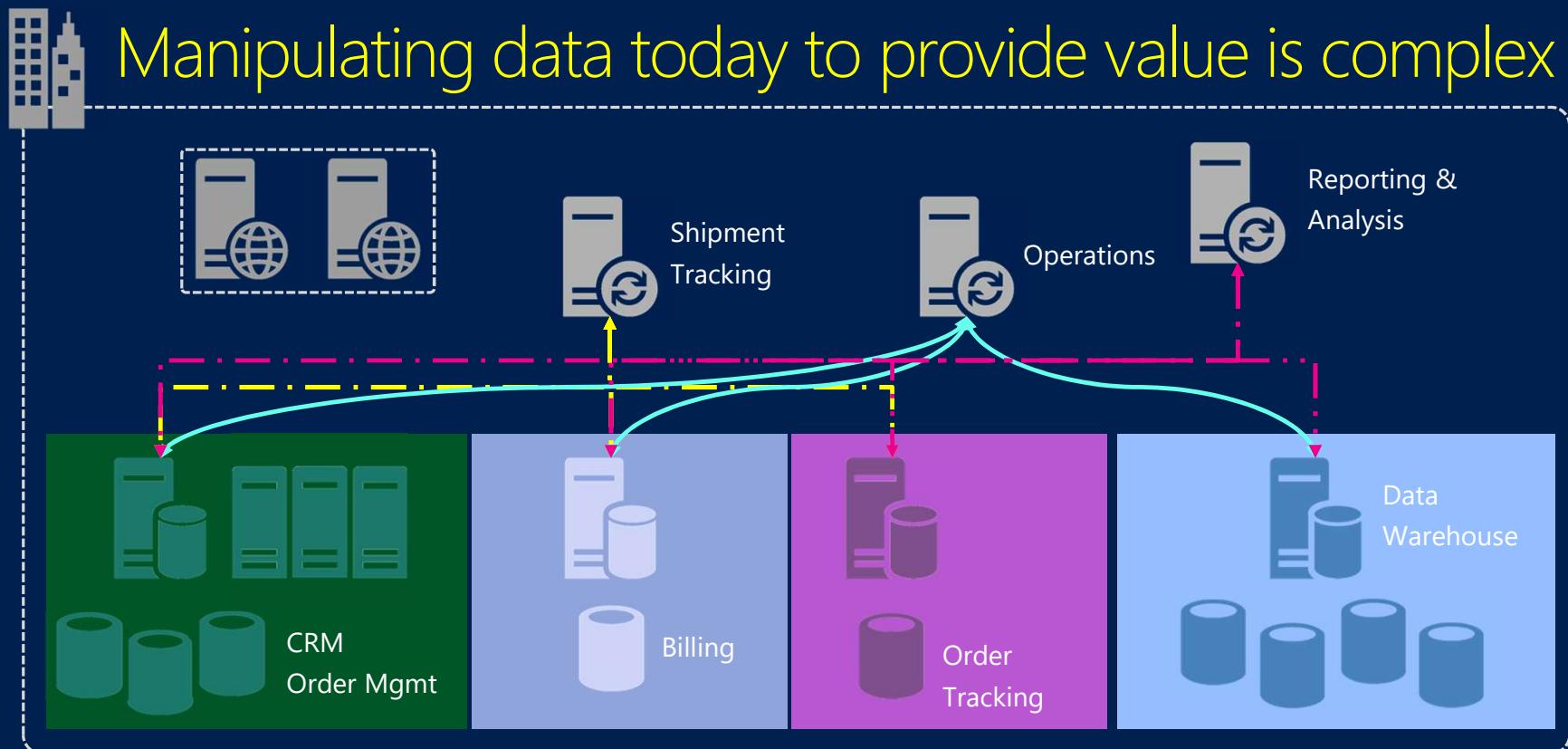


Microsoft Cognitive Services - *democratizing intelligence*



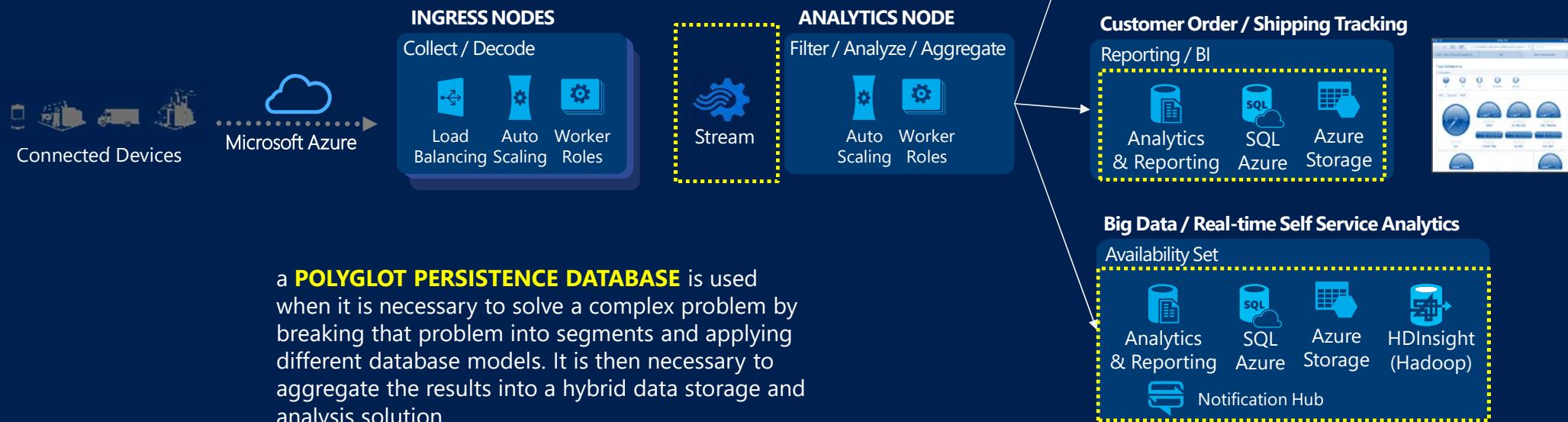
// A different way to architect

// Data in the enterprise exists on silos

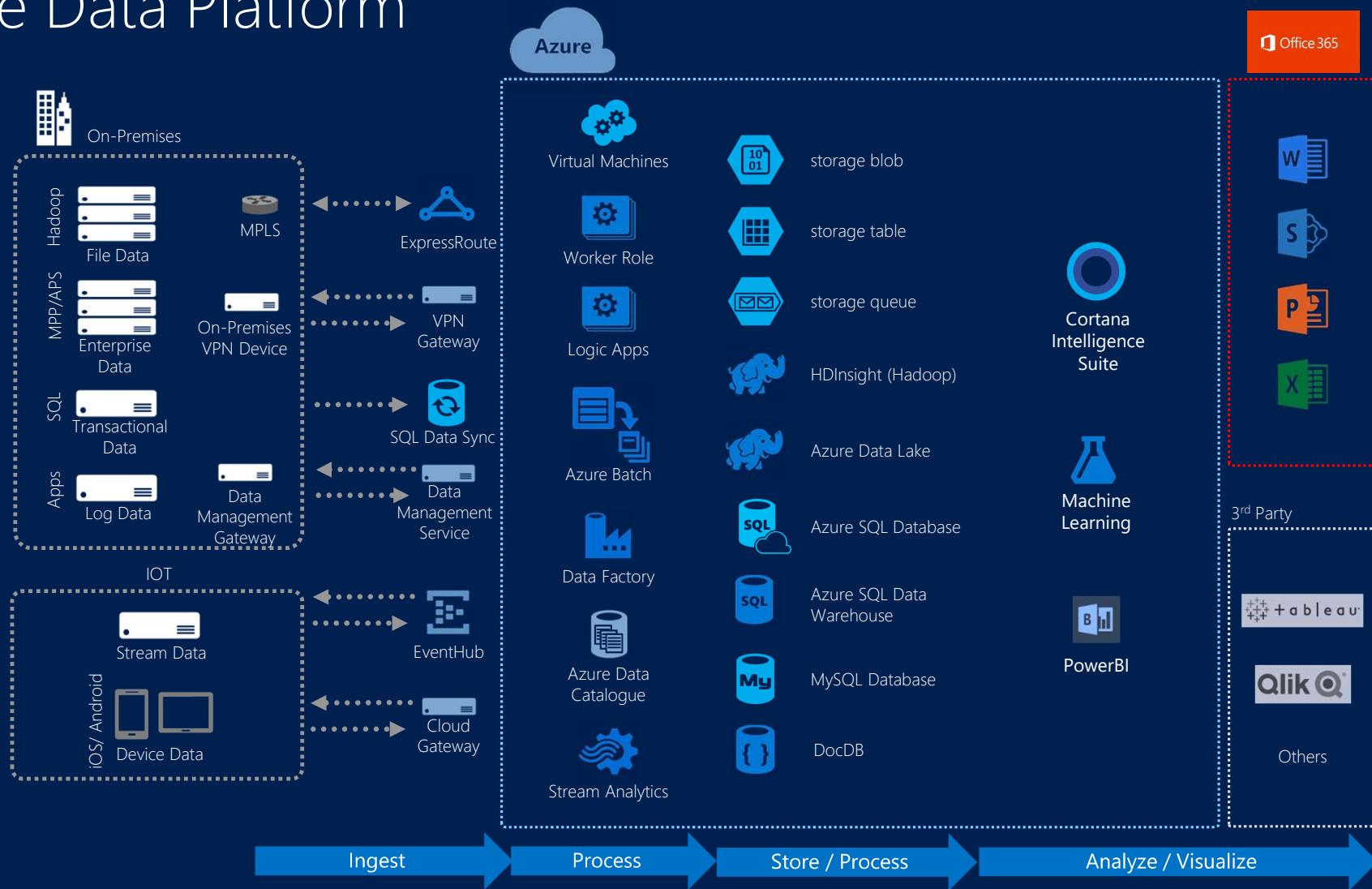


Lambda Architectures and Polyglot Persistence

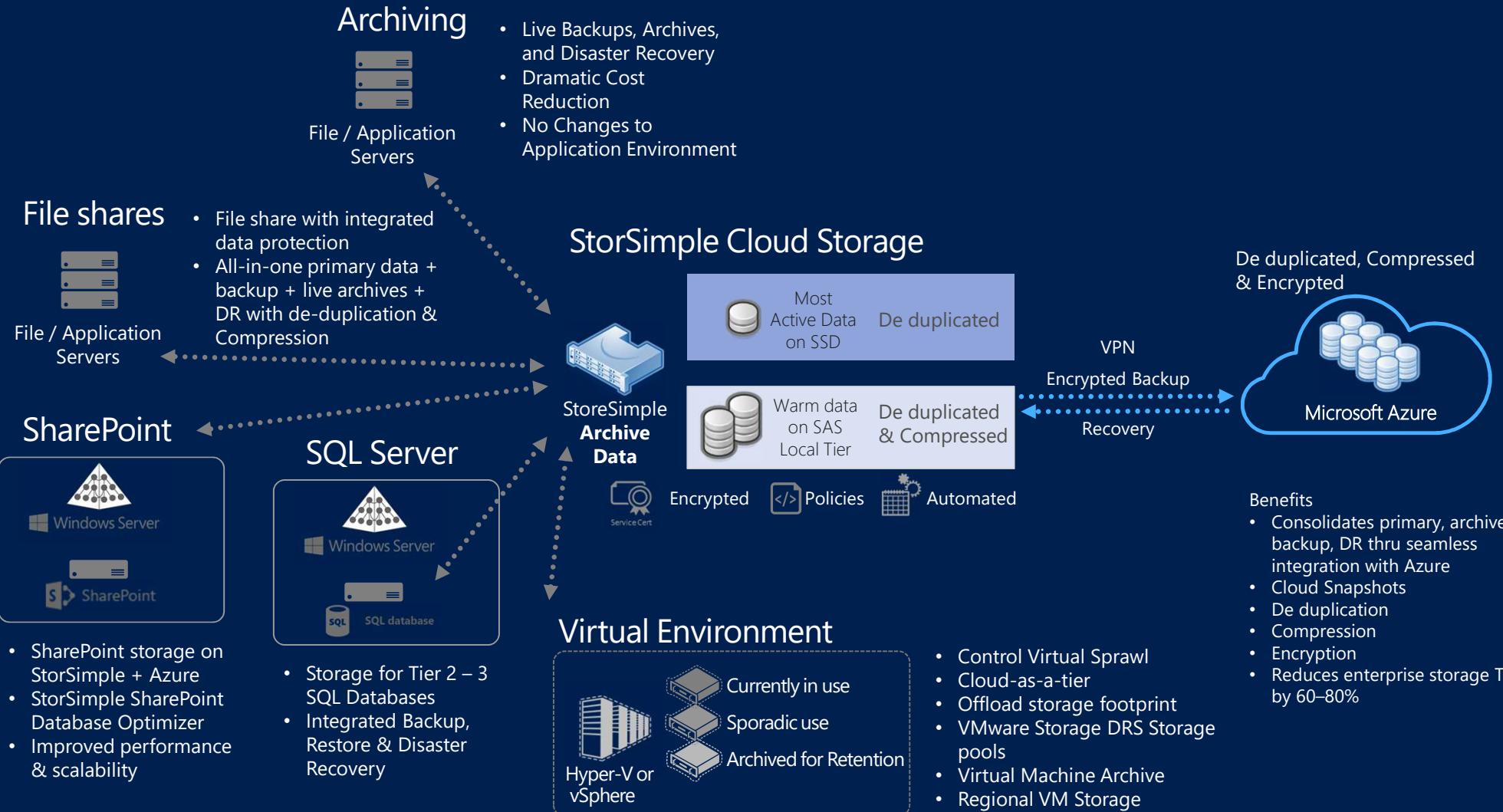
LAMBDA ARCHITECTURE is a data-processing architecture designed to handle massive quantities of data by taking advantage of both batch- and stream-processing methods.



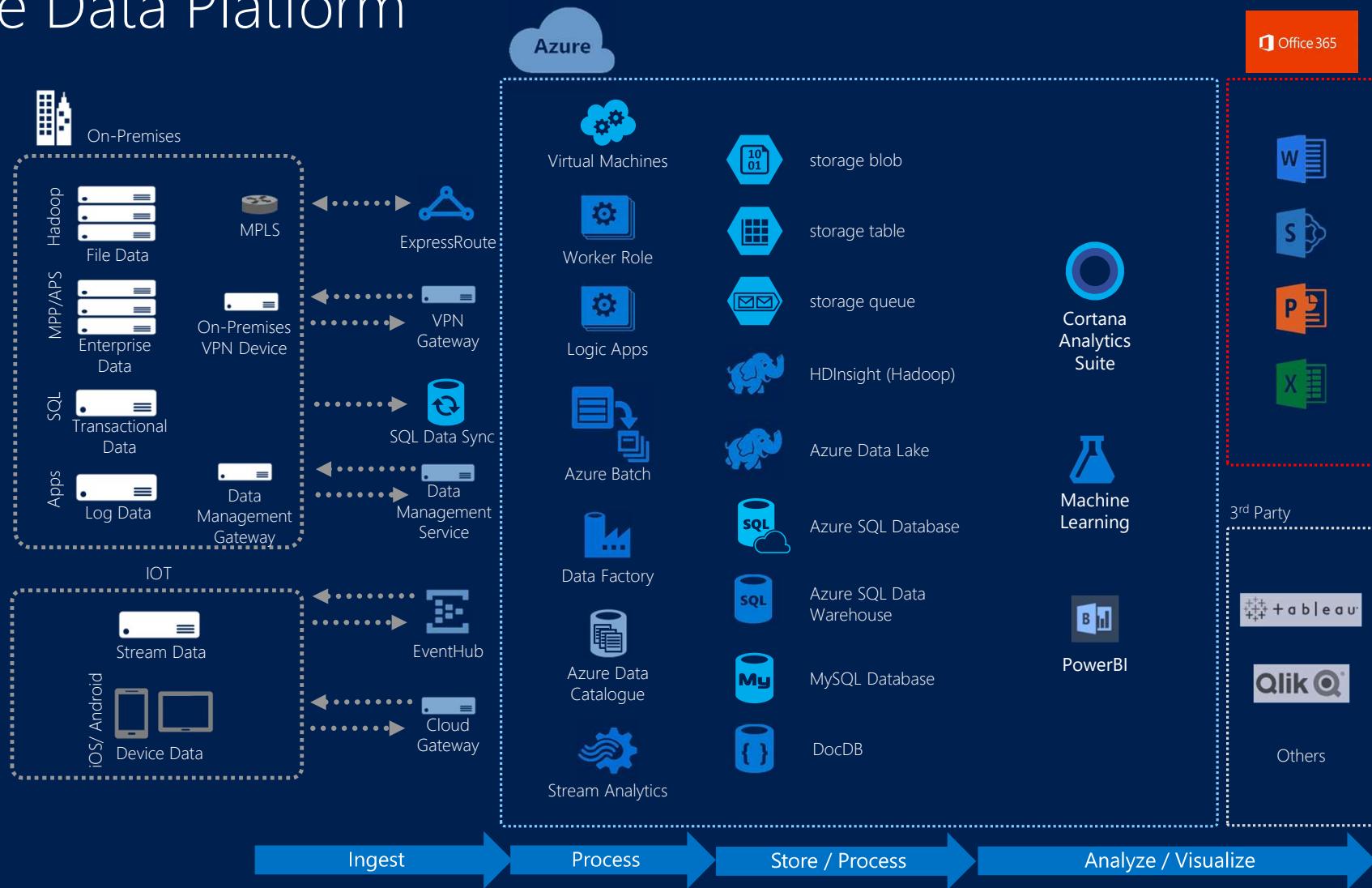
Azure Data Platform



Hybrid Cloud Scenarios



Azure Data Platform



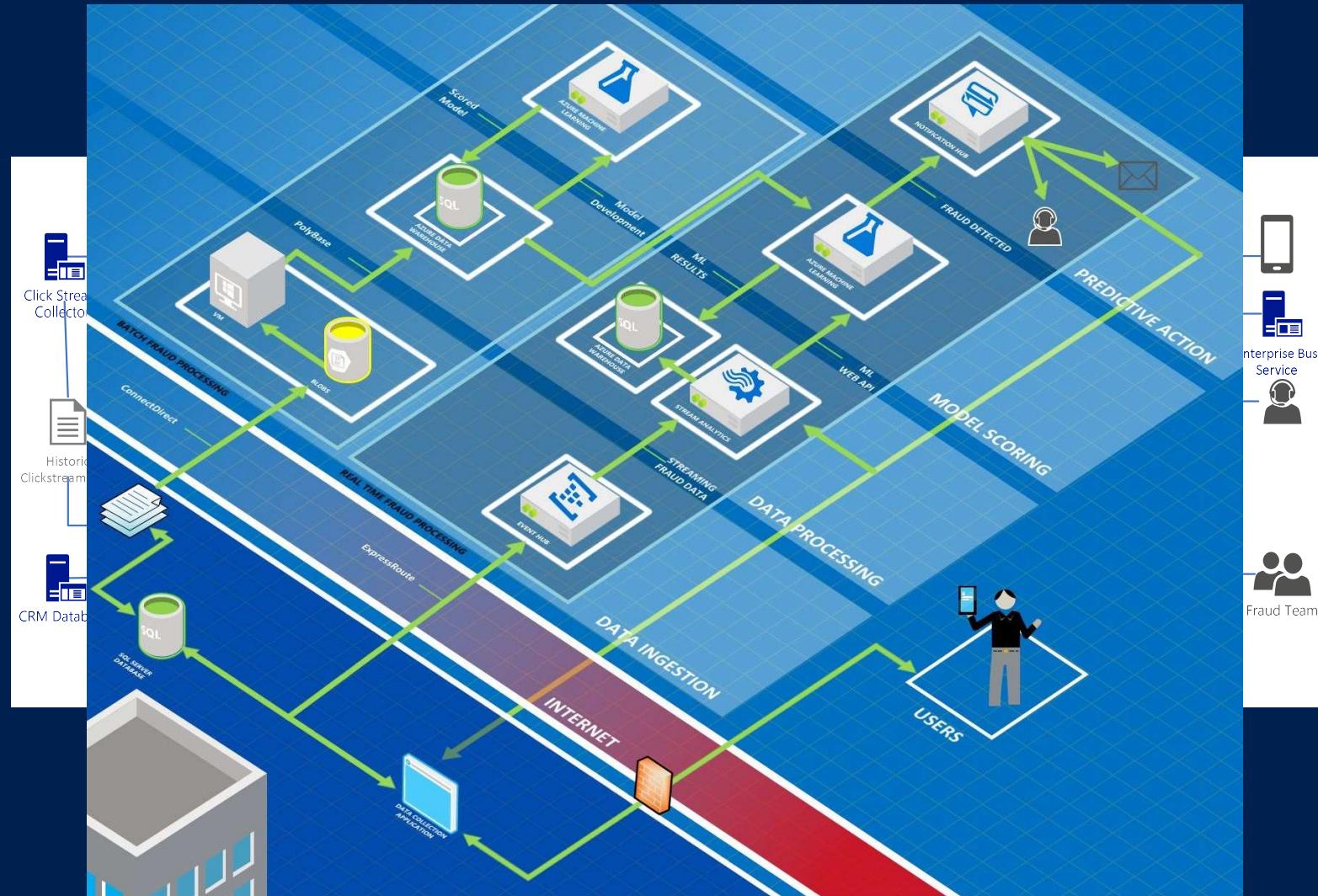
// Architecture Samples

Real time behavioral fraud prevention for their mobile banking app

Large Bank

Need Real time behavioral fraud prevention for a Bank's mobile banking app

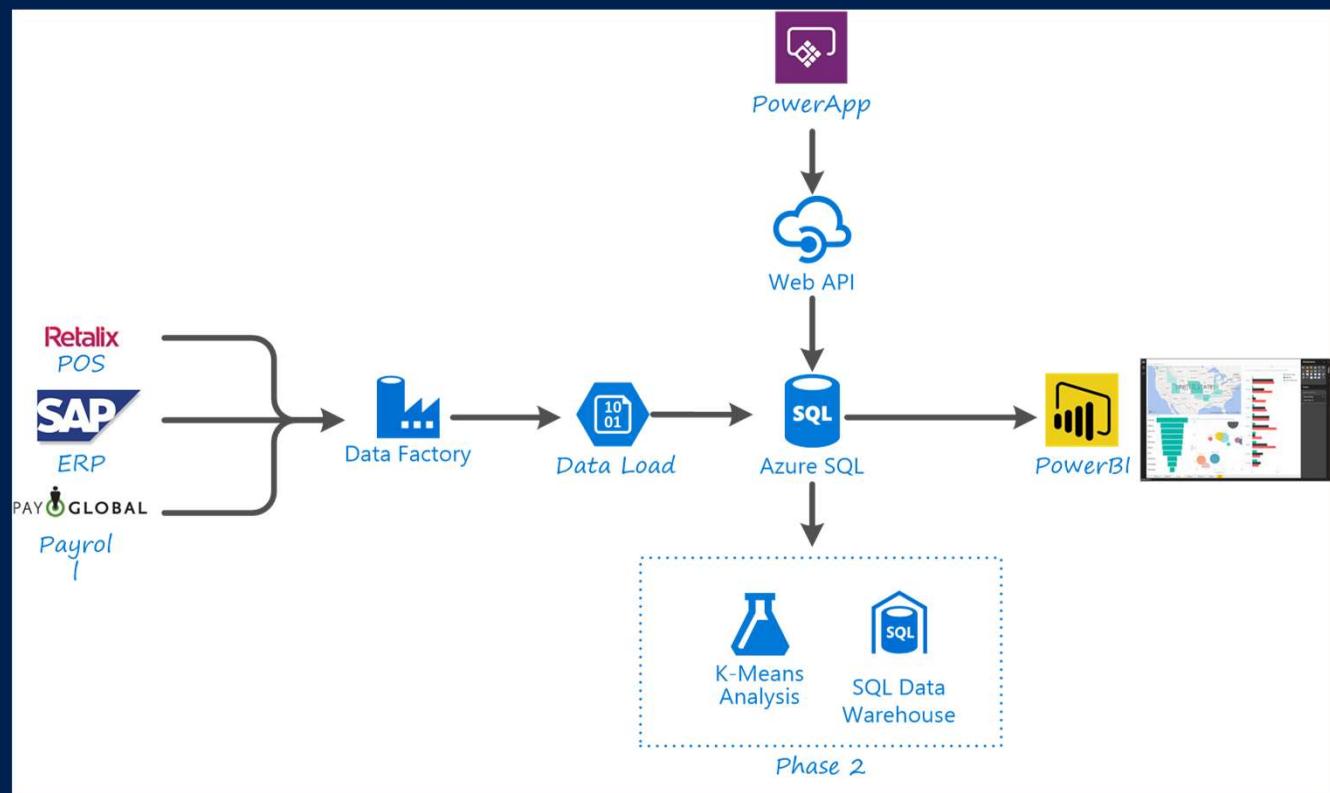
The Solution: Lambda architecture that we presented to a Tier 1 FSI Bank, for real time behavioral fraud prevention for their mobile banking app. We use static data from the static and model build architecture to build the real time engine



Customer Demand Match to Staffing and Shifts for Retail Large Retail Company

Need: Struggling to match customer demand with staffing levels in store to ensure the highest level of customer service but also to manage costs during off peak periods.

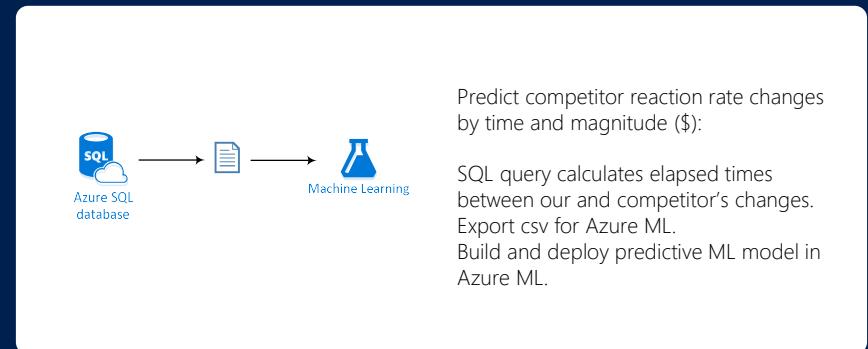
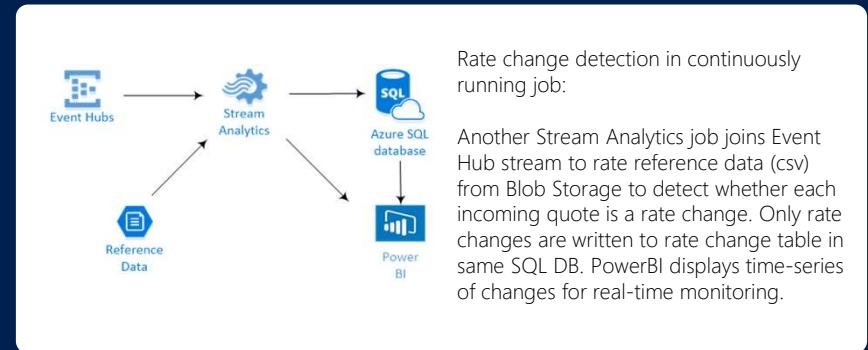
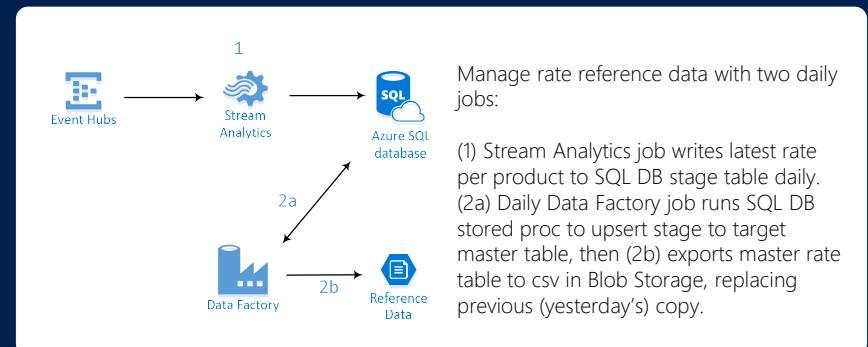
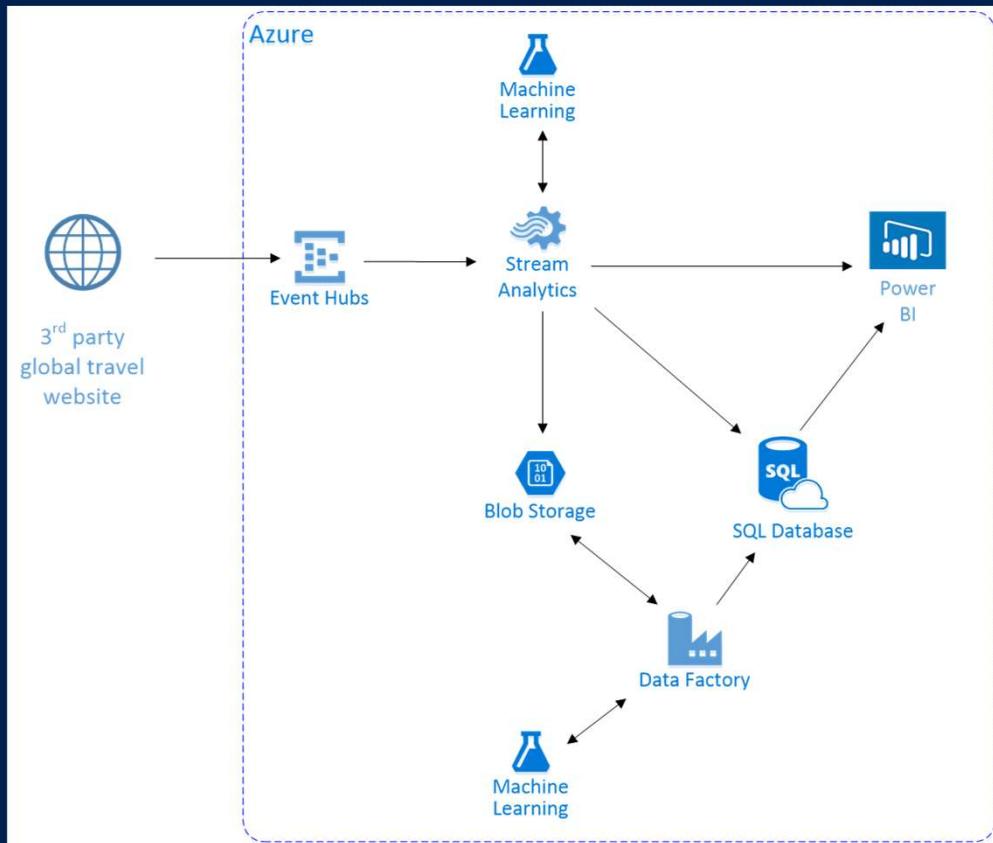
The Solution combines data sources from ERP (SAP) Point of Sale (Retalix) and Payroll (Payglobal) all located on premises and copying the data to the cloud using ADF, then importing into Azure SQL. The customers Productivity team have developed a data model which calculates optimal staffing based on 15 minute interval data, this uses over 200 factors from the data in the algorithm. Using PowerApps, store owners can see their sales budget and enter sales forecast, based on regional factors, which is then processed through the model to give a new staff allocation model. Reports on the data are then published via PowerBI to allow the store owners to explore the data further.





Competitive Pricing Intelligence

Rental car company

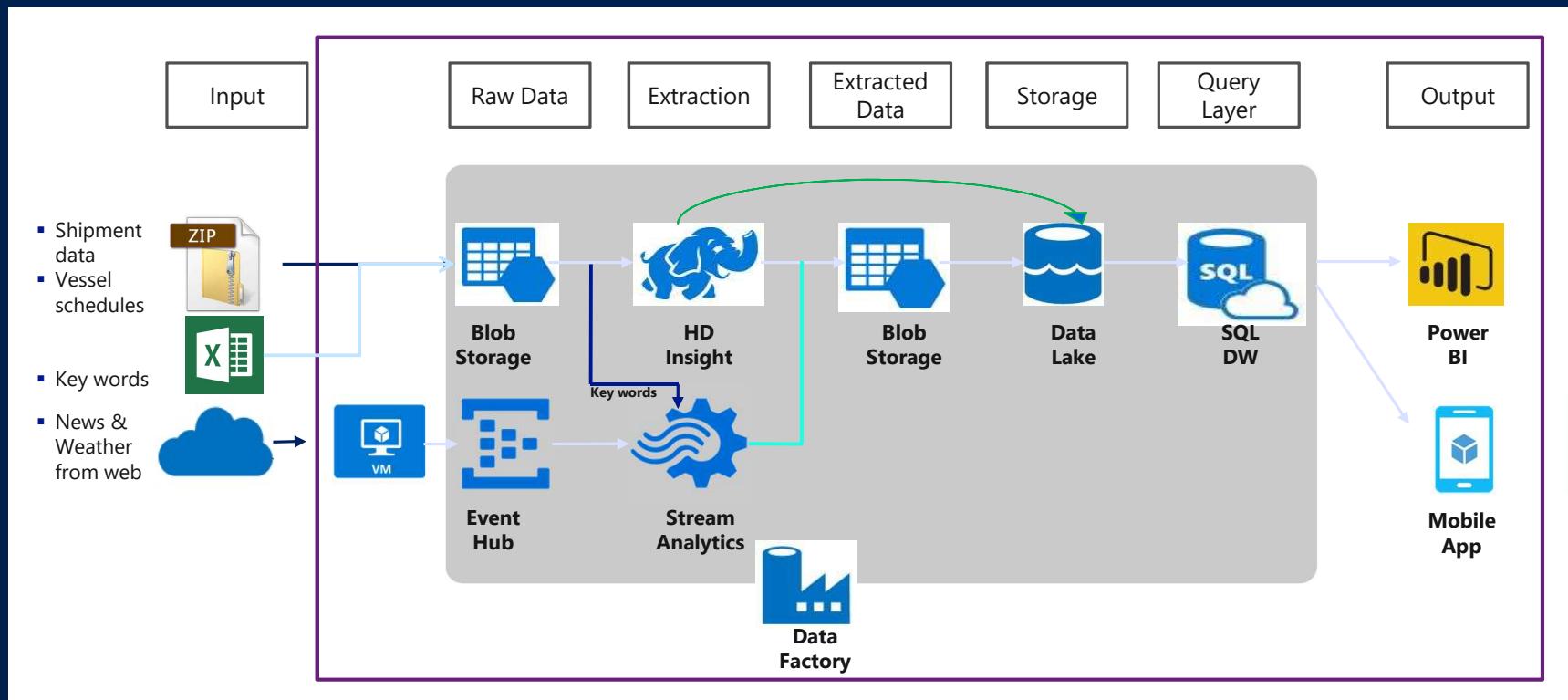


Dynamically shipping routes change system

Land & Sea shipping company

The current situation does not allow a customer to change the selected route for a shipment, that has the potential to delay shipments due to disruptions along the selected route.

The solution allows the company and its customers to change a specific route based on disruptions along the current route. I.e. change from sea shipping to land shipping, due to a weather, or threat conditions (typhoon, terror attacks, etc) along the route.



Loyalty Program for Retail

Large WW Retail Company company

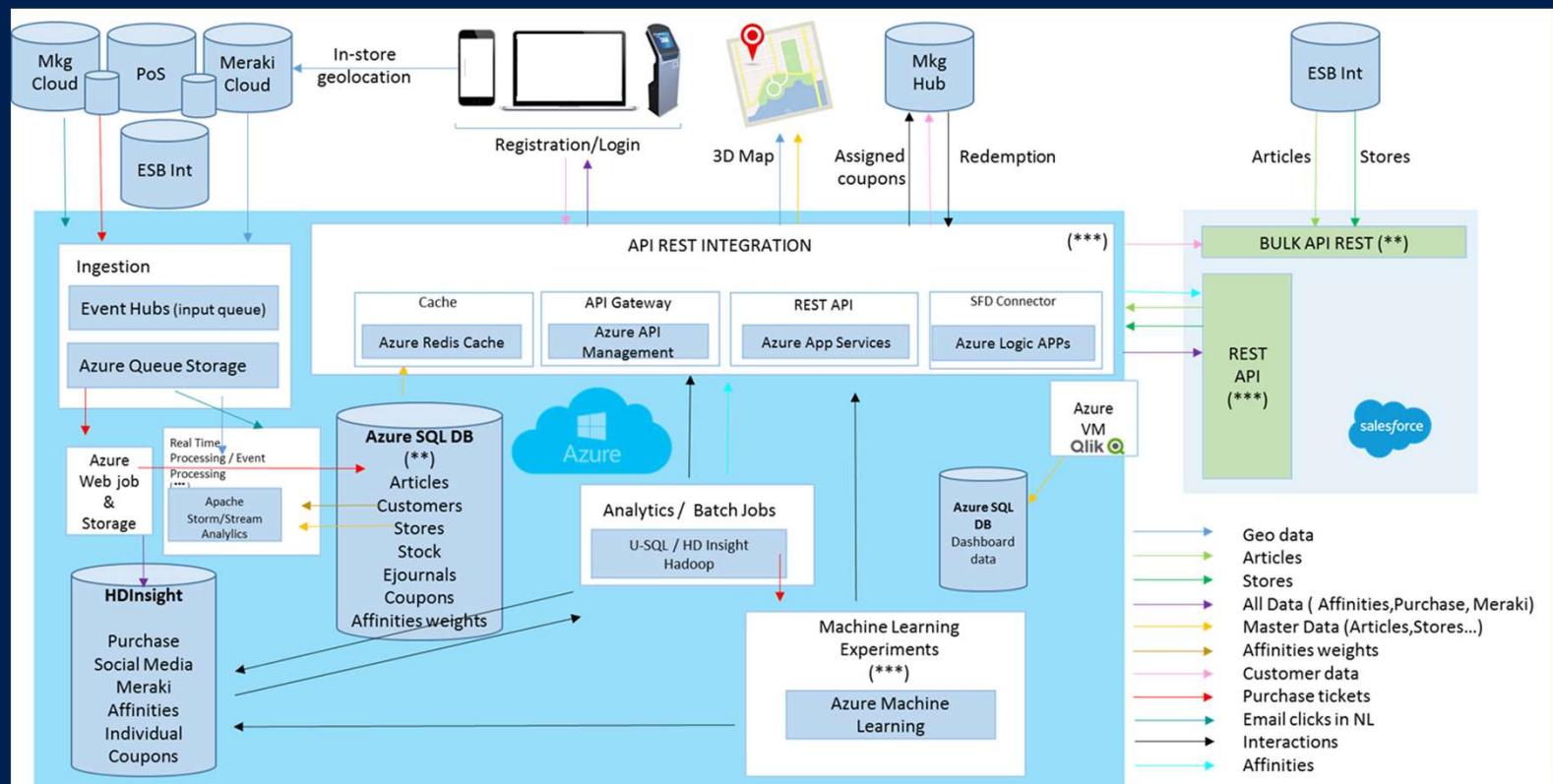
THE SOLUTION CONTAINS:

- dynamic customer segmentation
- personalized e-couponing and marketing
- real-time stock information
- and more

Multi device (mobile, web, store access points)

Application which lets the retailer to "personalize" customer transactions

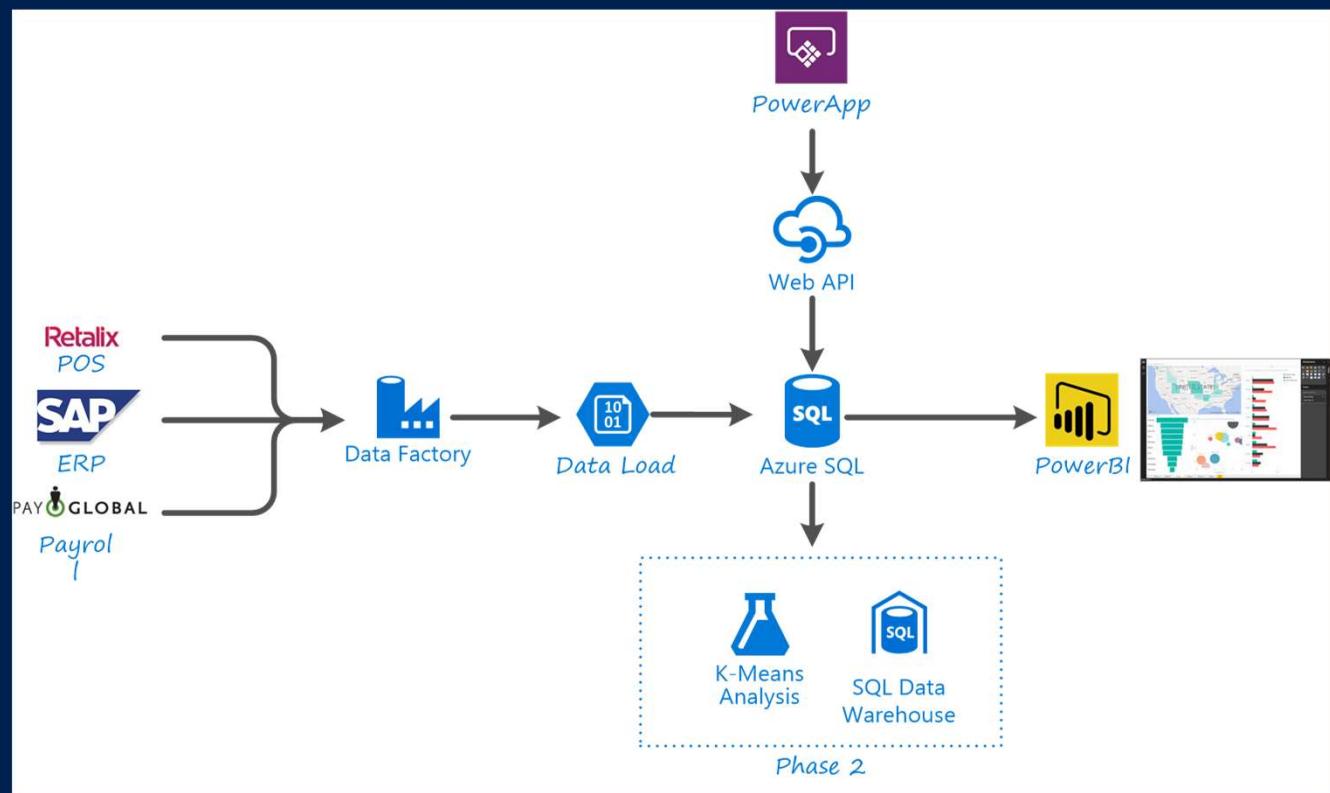
Customer get highly valuable services such as personalized coupons/marketing, real-time stock information for each store/product combination,



Customer Demand match to Staffing and Shifts for Retail Large Retail Company

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Customer Feedback and Social Media Sentiment Aggregation and Reporting Online Travel Agency

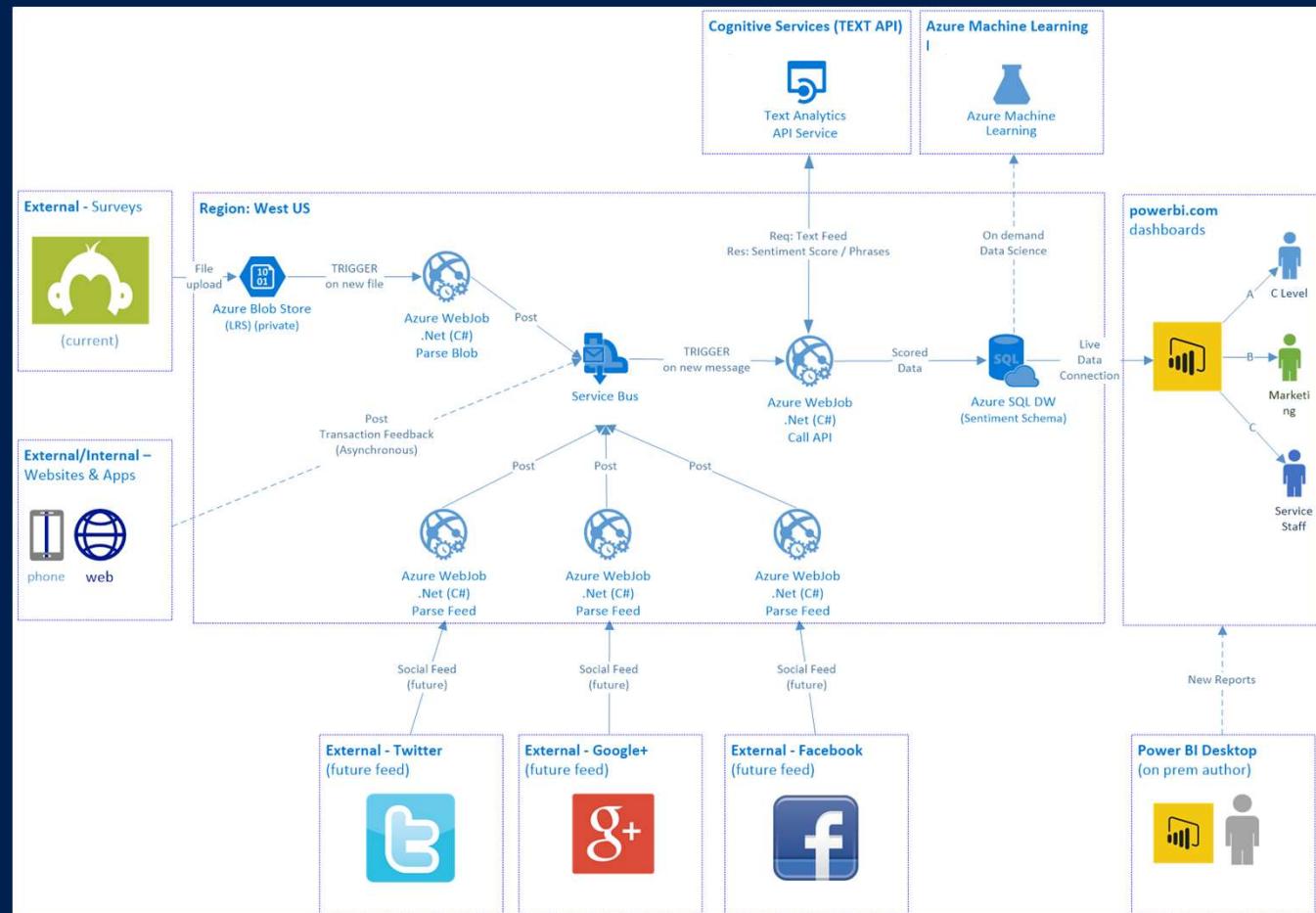
Need: Feedback in the form of surveys is gathered from Call center, survey systems and the website. Currently the data is aggregated and analysed manually. There is no analysis on Social Media sentiment or feedback gathering. Sentiment and topics need to be scored to be surfaced in intuitive and compelling dashboards that enables staff to understand what drives a positive customer sentiment outcome.

Business Impact

Improved time to value. The feedback forms are automatically processed by the solution reducing operator effort and surfacing sentiment data.

Ease of future expansion. The solution deploys a batch reporting pipeline that can be easily expanded to other customer touchpoints (ie Twitter, Facebook, Google+, YouTube) and real-time transactional feeds.

Deep Analytics. The solution allows machine learning to mine for insight such as correlations between sales/marketing and sentiment, and identify which customer characteristics relate to having a positive experience with the travel services.



PHI and PII Customer Record Encrypted Archiving with Search

Large Healthcare provider

Need: Need for a document store to archive customer records that contain PHI (Protected Health Information) and PII(Personally Identifiable Information) data.

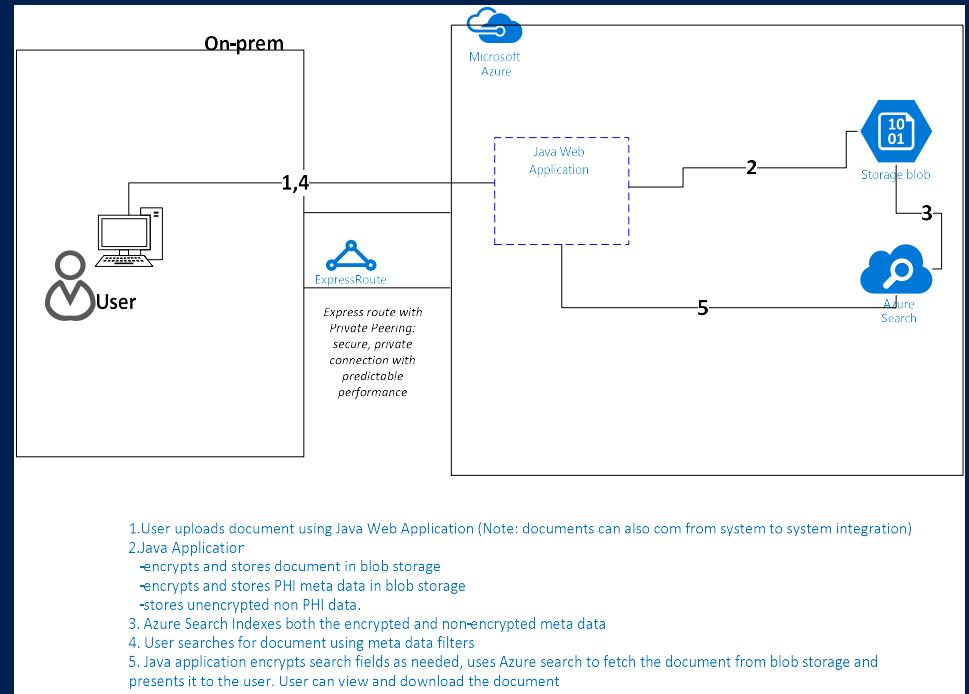
- Store documents in encrypted format.
- Associate meta data to the documents. Some of the meta data is PHI and PII and therefore it needs to be encrypted.
- Search and retrieve the documents based on the meta data fields.

Solution

- **Java based Web Application/Front End** - Authentication, User interface and the ability to Search, Retrieve and Download documents.
- **Azure Blob storage:** For storing documents as well as the custom meta data. The PHI and PII meta data will be encrypted before storing in blob storage. We are exploring two options for encrypting the documents:
 - Java Application pre-encrypts the document before it stores in the blob storage.
 - Use the native encryption capabilities of blob storage. This is the preferred option.
- **Azure Search:** Used to index the meta data and search documents based on meta data. For non-encrypted meta data, standard Azure search with all of its capabilities will be used. For the encrypted meta data, the exact match feature of Azure search will be used.

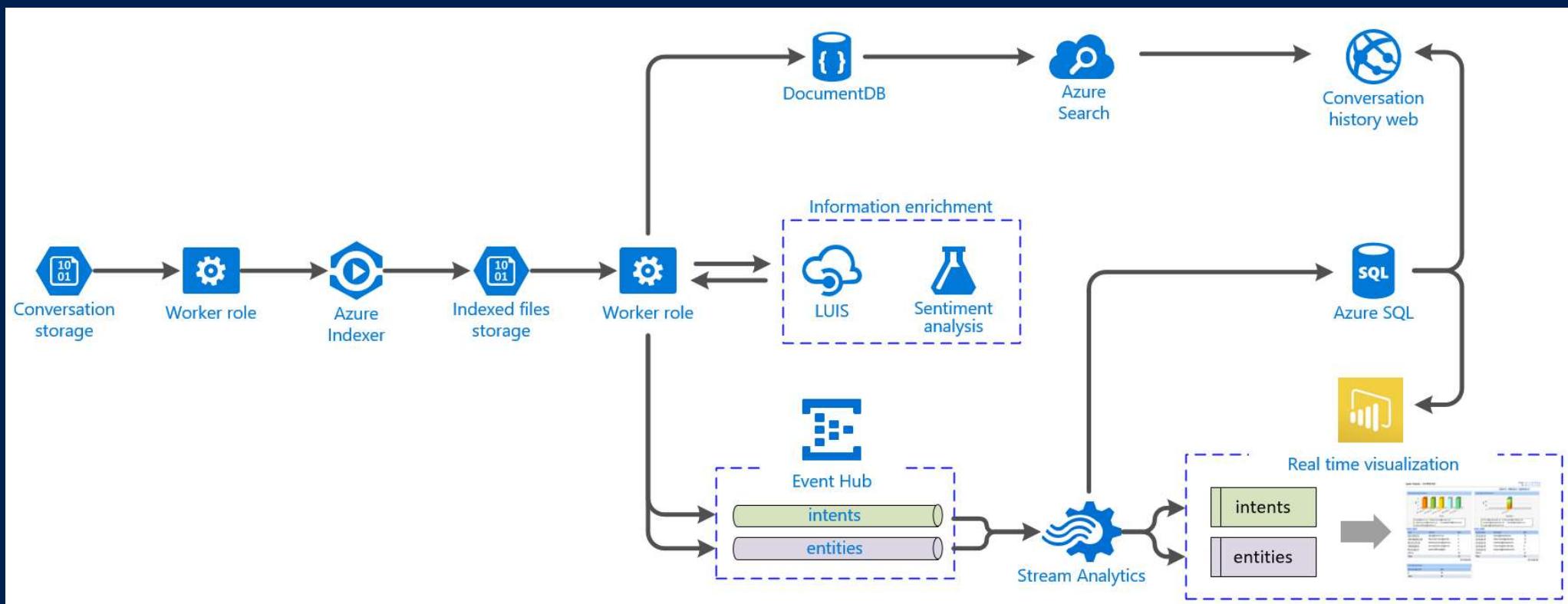
THE CORE BENEFIT OF THIS APPROACH IS BASICALLY THE CORE BENEFIT OF AZURE ITSELF.

THE MINIMAL AMOUNT OF WORK THAT WAS NEEDED TO ENABLE COMPLEX FEATURES LIKE ELASTIC STORAGE, ENCRYPTION AND SEARCH ENGINE CAPABILITIES.



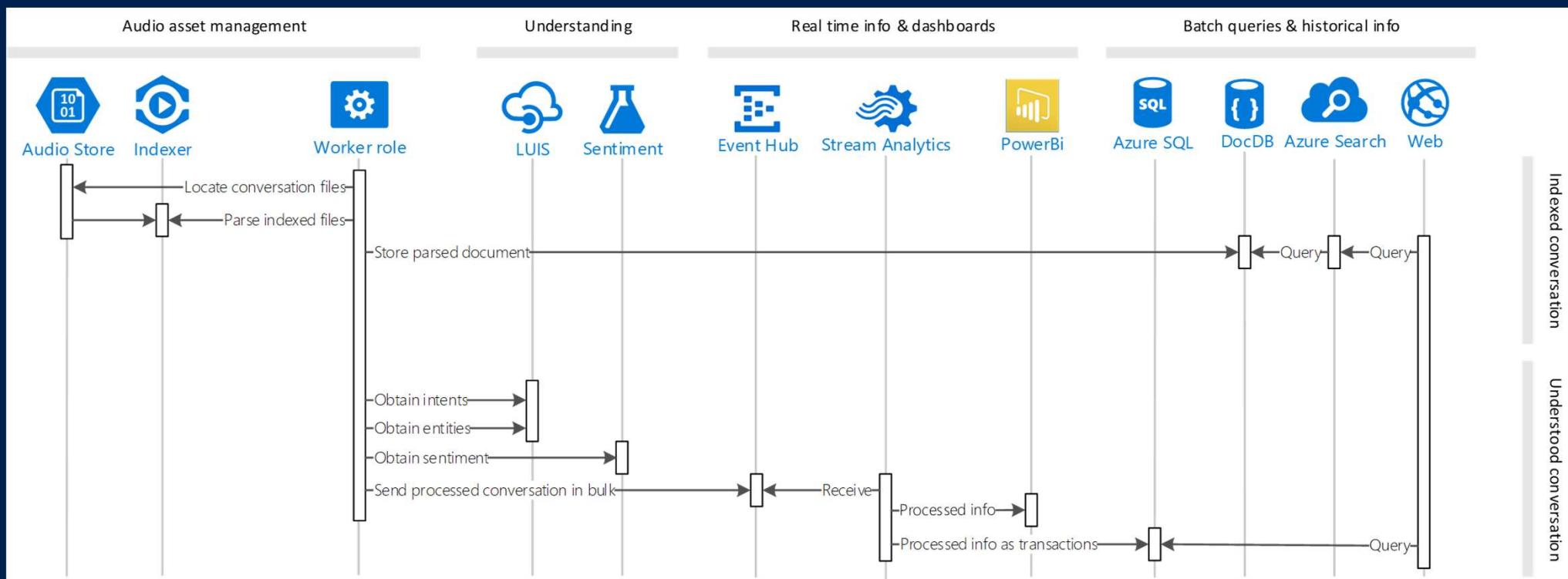
What would you do with Call center audio files?

Financial Services Call center solution architecture



Financial Services Call center solution architecture

PoC component interaction



Callcenter analytics



Real-time analysis

Understand caller intentions

Obtain caller sentiment

Business key concepts

Conversation history

How do you manage and record police response?

IoT Law Enforcement Officer POC



IOT Officer Devices Map

Controls

Auto Mode Interval (ms) 2000

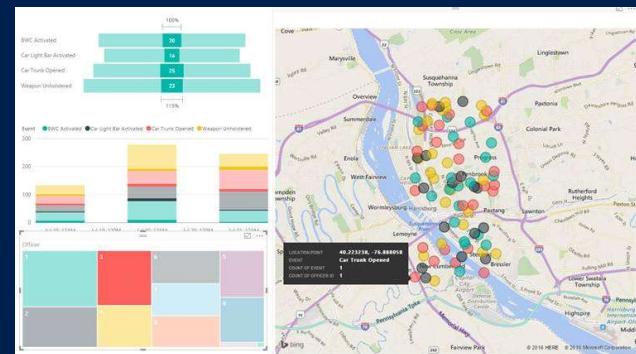
Reset All Officers

Auto Mode to simulate clicking the events randomly on a interval. I used this to populate data quickly.

Officer	Long	Lat	Events
Officer 1	40.267256	-76.842279	Weapon Holstered BWC Deactivated Car Light Bar Deactivated Car Trunk Closed
Officer 2	40.22149	-76.884796	Weapon Holstered BWC Deactivated Car Light Bar Deactivated Car Trunk Closed
Officer 3	40.269261	-76.842279	Weapon Holstered BWC Deactivated Car Light Bar Deactivated Car Trunk Closed
Officer 4	40.286584	-76.887271	Weapon Holstered BWC Deactivated Car Light Bar Deactivated Car Trunk Closed
Officer 5	40.222242	-76.850216	Weapon Holstered BWC Deactivated Car Light Bar Deactivated Car Trunk Closed
Officer 6	40.258742	-76.875222	Weapon Holstered BWC Deactivated Car Light Bar Deactivated Car Trunk Closed

© 2016 - IOT Officer

Unholstering a Weapon turns on the body camera, status if the policer is logged (GPS, car light bar, trunk, doors)



Allow easy creation of Officers (IOT Devices), which includes activating/deactivating devices.

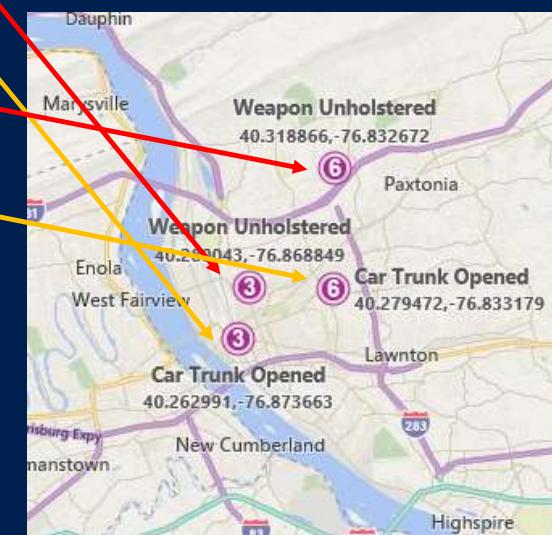
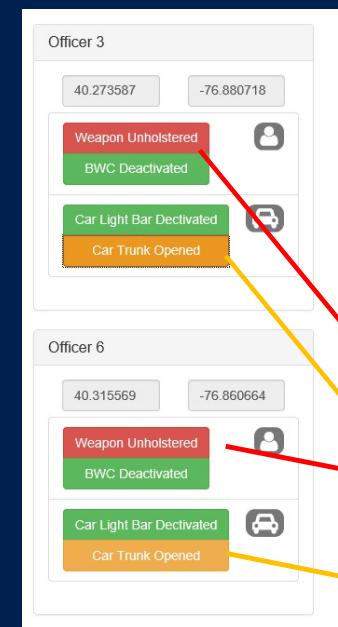
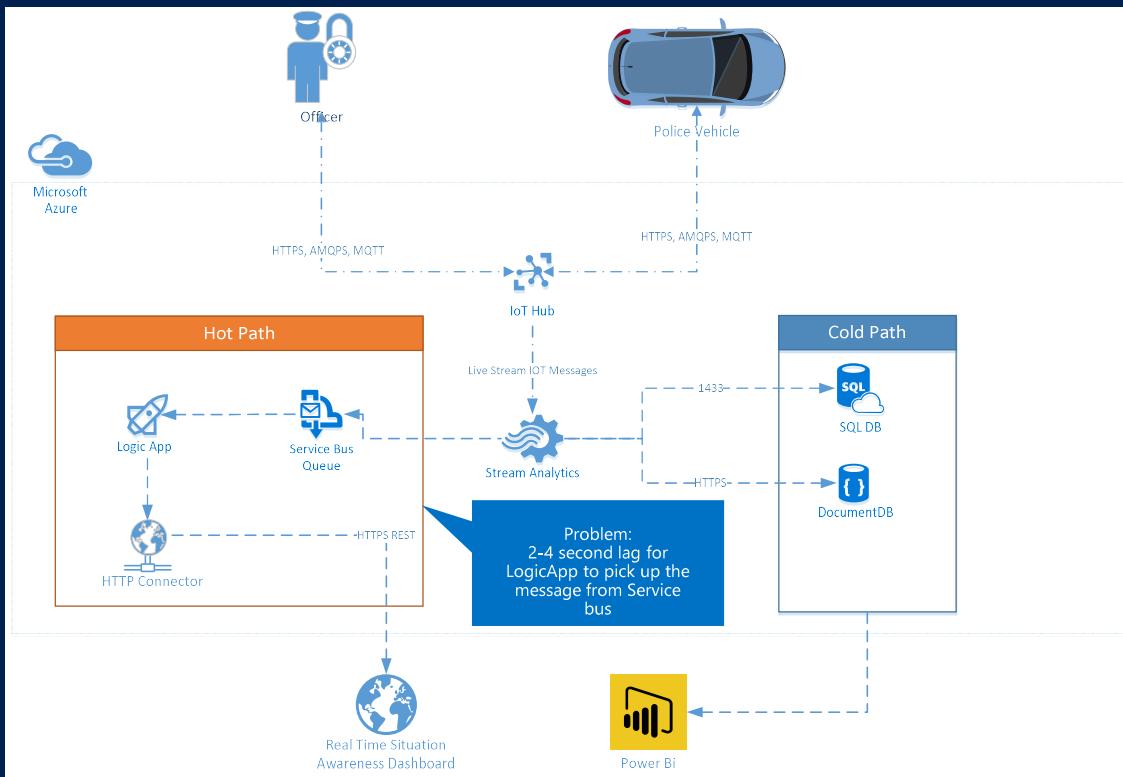
- Each Officer has long/lat coordinates which get randomized with a city radius. Every 2 seconds the officer gets a new location.
- Simulate Sending 4 types of events (can be expanded or more). When a button is clicked it sends a IOT message from a simulated IOT Device.
 - Weapon Unholstered
 - Body Warn Camera Activated
 - Police Car Light Bar Activated
 - Police Car Trunk Opened
- Each Event can be clicked independently which will send a IOT Message to IOT Hub.
- Website has a AutoMode which will simulate random events from the above devices to be sent to IOT Hub.
- IOT Messages are sent to a Cold Path which uses Document DB and SQL Server (I use both to show flexibility).
- PowerBI connects to DocumentDB and visualizes the officers events (includes plotting Long/Lat on Map)
- A hot path which reports officer events in real-time to a Bing Map using Bing API and SignalR.
 - 1-N people can have the map open and all see the same events occurring.
 - SignalR sends the same messages to all devices who have the map displayed.
 - You can click on the map event dashboard and zoom into the officers location.

IoT Law Enforcement Officer POC

<http://iotofficer.azurewebsites.net/>

Unholstering a Weapon turns on the body camera, status if the policer is logged (GPS, car light bar, trunk, doors)

2-3 Days to build this POC



[Azure Security Center]

Introducing Azure Security Center

Continuous security monitoring

Integrated security management

Built in threat detections and alerts

Works with broad ecosystem of security solutions



Barracuda

CISCO

Check Point
SOFTWARE TECHNOLOGIES LTD.

TREND
MICRO

IMPERVA
INCAPSULA

FORTINET

CLOUDFLARE

IMPERVA
SECURESPHERE

Security Center

PREVIEW

Prevention

Resources health

Virtual machines	
Networking	
SQL	
Applications	

HIGH SEVERITY: 15 | MEDIUM SEVERITY: 2 | LOW SEVERITY: 2

Recommendations

12 Total

Security policy

Quickstart

Detection

Security alerts

HIGH: 5 | LOW: 1

Virtual machines

PREVENTION STATUS - PREVIEW

Status breakdown

ONBOARDING STEPS

TOTAL

No onboarding steps required.

PREVENTION STEPS

TOTAL

Prevention Step	Count	VMs
Antimalware not installed	7 of 11 VMs	
Baseline rules mismatch	1 of 11 VMs	
Missing system updates	10 of 11 VMs	
Restart pending	1 of 11 VMs	

Virtual machines

NAME	ONBOARDING	SYSTEM UPDATES	ANTIMALWARE	BASELINE
VM-W6	✓	?	!	✓
VM-W5	✓	?	!	✓
VM-W4	✓	?	✓	✓
VM-W2	✓	!	✓	✓
VM-L3	✓	?	?	✓
VM-CL-W1	✓	?	✓	✓
node14	✓	!	!	✓
node13	✓	!	!	✓
node12	✓	!	!	✓

≡ + 🌐

Security Center PREVIEW

Prevention

Resources health

Virtual machines	
Networking	
SQL	
Applications	

HIGH SEVERITY | 15 | MEDIUM SEVERITY | 2 | LOW SEVERITY | 2 |

Recommendations

Add tiles

12 Total

Filter

Security policy

Quickstart

Detection

Security alerts

HIGH | 5 | LOW | 1 |

Recommendations PREVIEW

Filter

DESCRIPTION	RESOURCE	STATE	SEVERITY	...
Enable data collection	1 subscriptions	Resolved	ⓘ High	...
Enable Antimalware	7 virtual mac...	Open	ⓘ High	...
Secure web application using web appli...	2 virtual mac...	Open	ⓘ High	...
Enable Network Security Groups on sub...	4 subnets	Open	ⓘ High	...
Enable Network Security Groups on net...	5 network int...	Open	ⓘ High	...
Enable server SQL Auditing	sqlserver1a	Open	ⓘ High	...
Enable database SQL Auditing	SQL-Db1	Open	ⓘ High	...
Enable Transparent Data Encryption	SQL-Db1	Open	ⓘ High	...
Apply system updates	10 virtual ma...	Open	ⓘ High	...
Resolve mismatch baseline rules	VM-L3	Open	ⓘ High	...
Restrict access through public external...	3 network se...	Open	⚠ Medium	...
Reboot after system updates	VM-W2	Open	⚠ Medium	...
Configure ACLs for endpoint	2 endpoints	Open	⚠ Medium	...

Security Center PREVIEW

Prevention

Resources health

- Virtual machines: 15 (High)
- Networking: 2 (Medium)
- SQL: 2 (Low)
- Applications: 15 (High)

Recommendations

12 Total

Security policy

Quickstart

Detection

Security alerts

22 SUN 29 SUN 6 SUN

HIGH SEVERITY | MEDIUM SEVERITY | LOW SEVERITY

15 | 2 | 2

Security alerts

PREVIEW

Filter

4
3.5
3
2.5
2
1.5
1
0.5
0

22 SUN 29 SUN 6 SUN

HIGH | LOW

5 | 1

ALERT	COUNT	DETECTED BY	DATE	STATE	SEVERITY	...
RDP brute force attack detected	1	Microsoft	12/06	Active	High	...
Network communication with a malicious m...	1	Microsoft	12/01	Active	High	...
Suspicious RDP activity detected	1	Microsoft	11/30	Active	High	...
Suspicious process executed	1	Microsoft	11/29	Active	High	...
Network logon with plain text credentials	1	Microsoft	11/29	Active	High	...
Antimalware Action Taken	2	Microsoft Antimal...	11/29	Active	Low	...

[Operational Analytics]

How OMS was born

System Center Operations Manager

Enterprise grade
Management packs
Custom rules
Product/Custom
Knowledgebase

System Center Advisor

Microsoft's customer
support knowledge
Runs in the cloud
Connects with OpsMgr

Azure Automation

IT Automation

Azure Site Recovery

Azure Backup

Utilize Azure for internal site
recovery
Backup to Azure from your existing
on premises virtual machines
Connect with System Center Data
Protection Manager

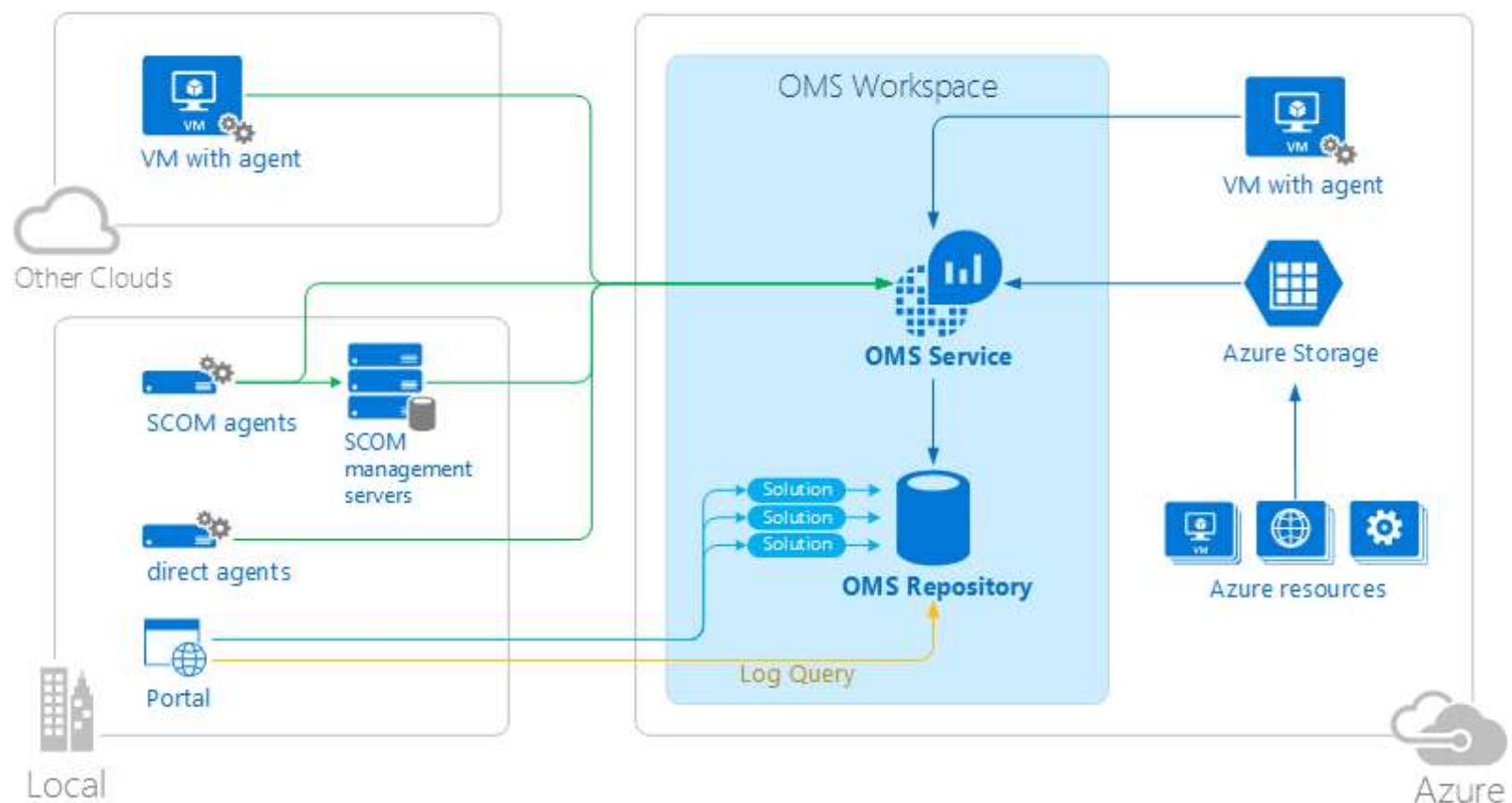
Operational Insights

Constructed a log analytics
platform
New portal
Additional solutions
Stronger OpsMgr
connection

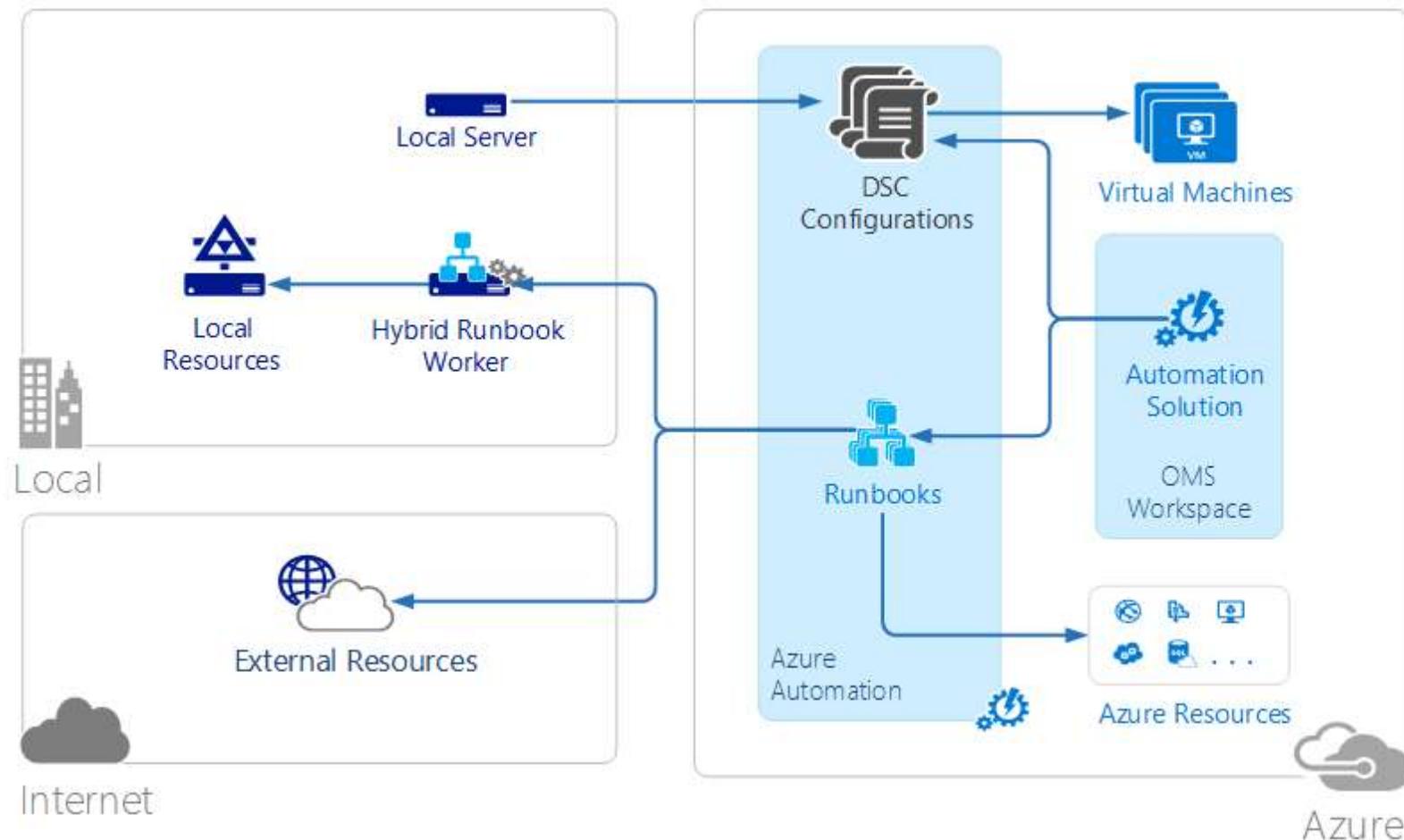
Operations Management Suite

Connects with
Automation and BCDR

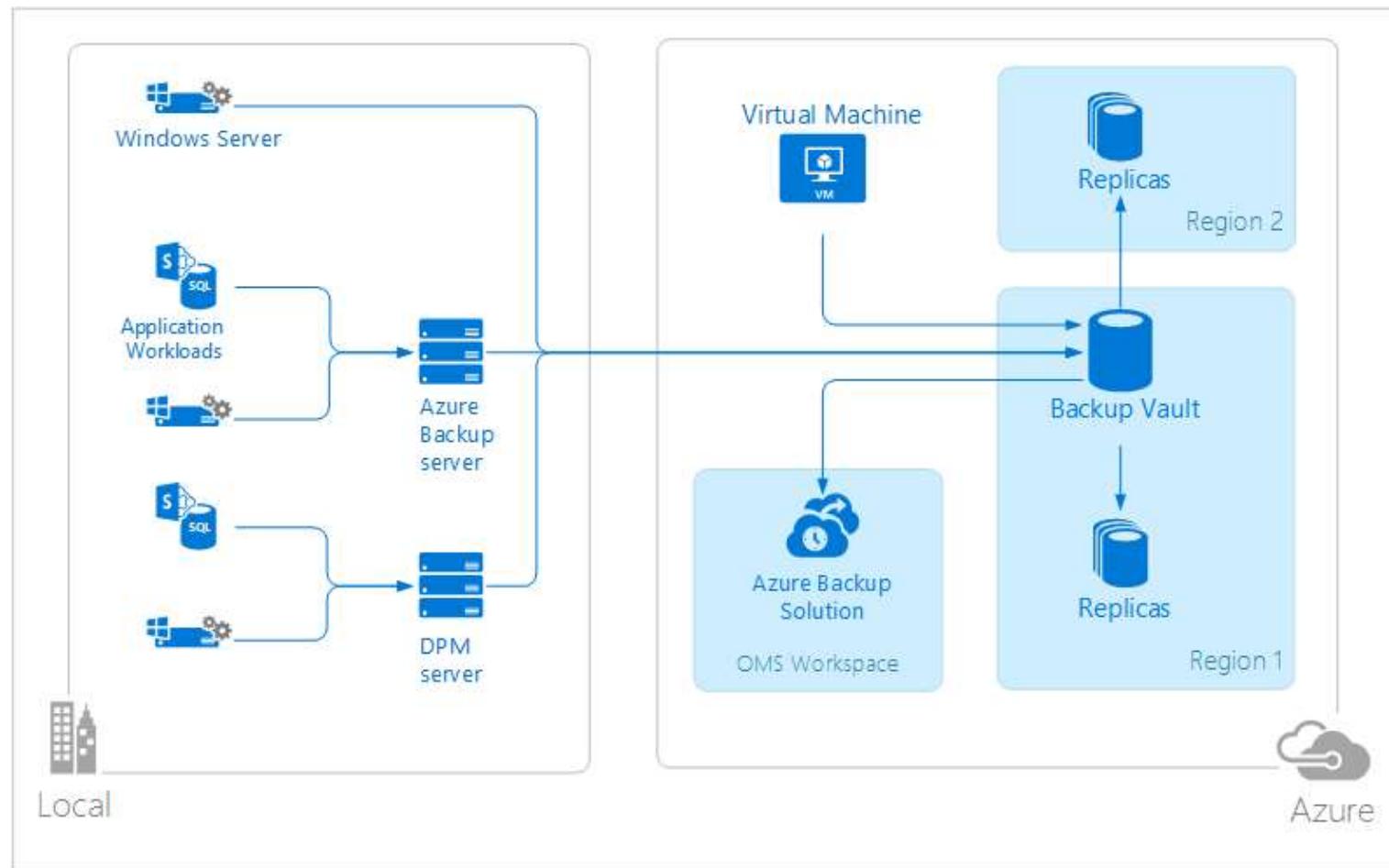
OMS Components for LOGS analytics



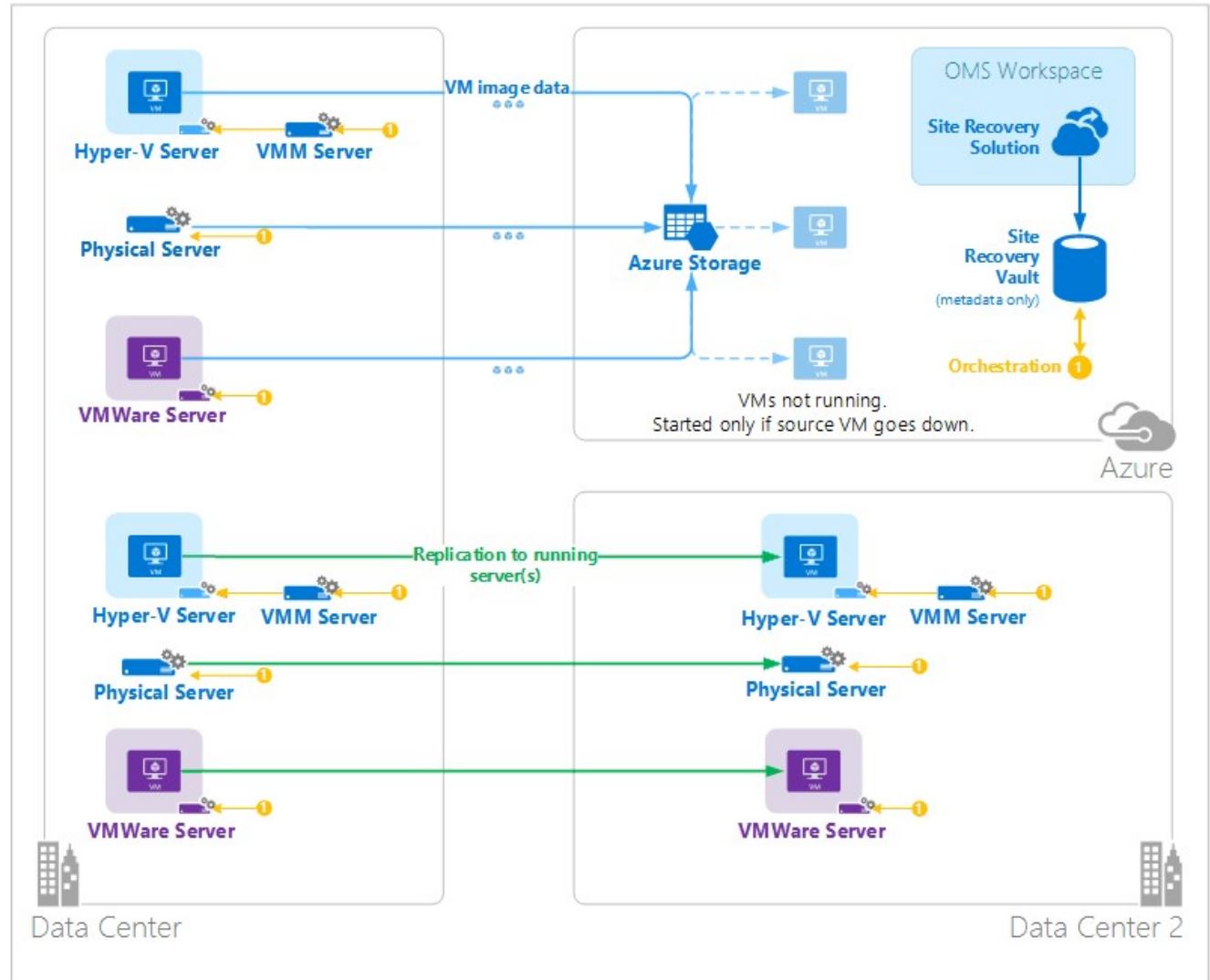
Azure Automation



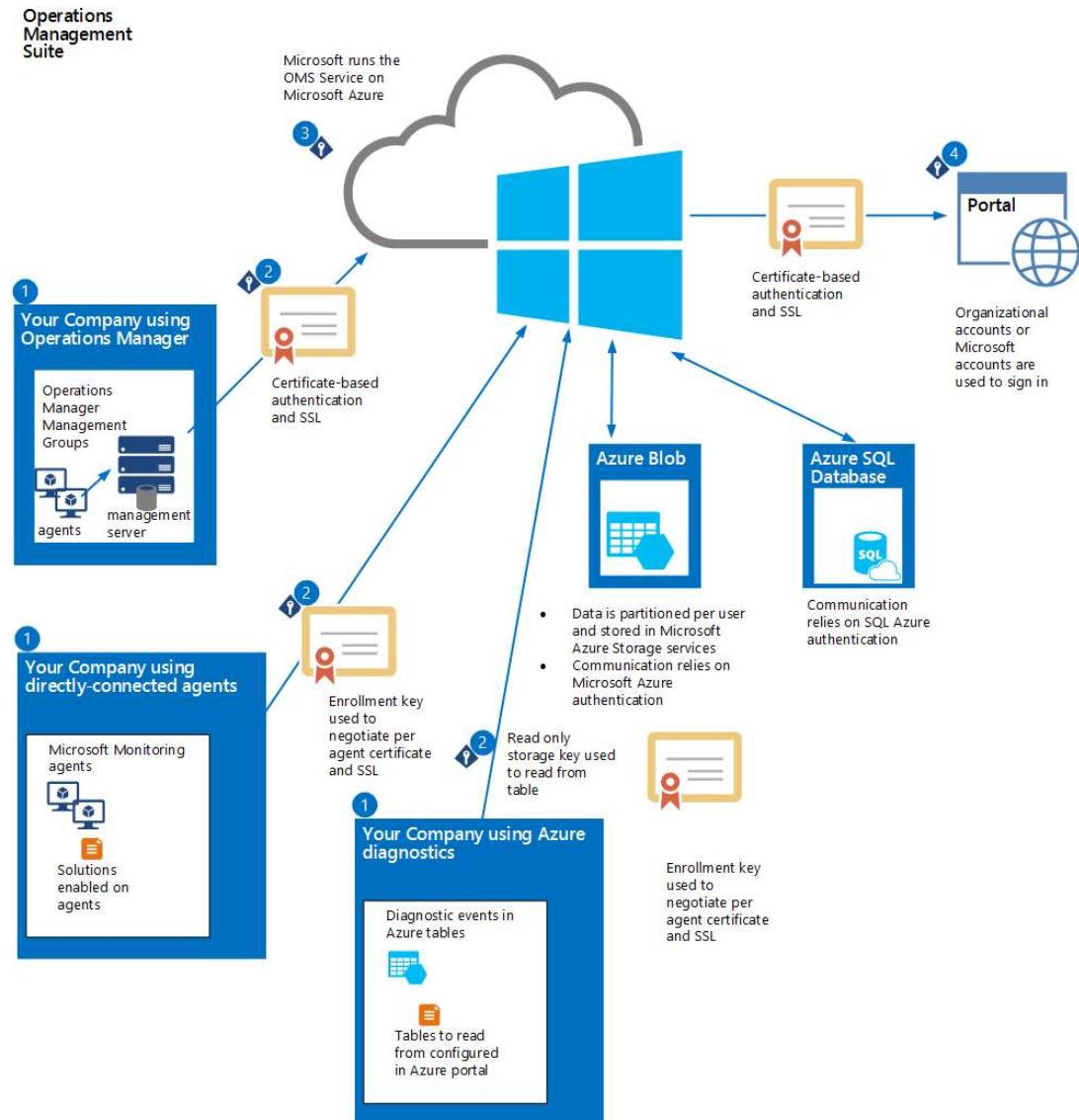
Azure Backup



Azure Site Recovery (ASR)



OMS Security



Operational Insights with OMS

Machine Data



Gather raw
machine data

Apply
logic, visualization a
nd **data acquisition**
rules

Provide
Assessments
Recommendations,
Forecast, Trends

Explore Data from
the Portal



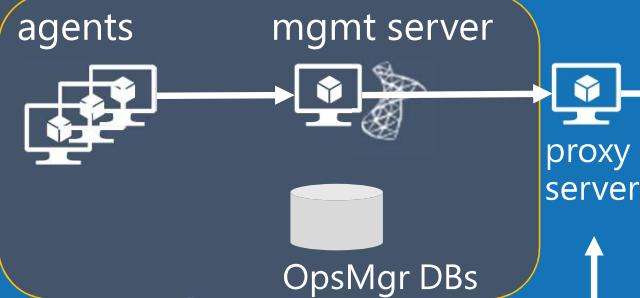
Solution Packs

MICROSOFT CONFIDENTIAL



Your Environment

1 'multiple' mgmt groups



2 Data being forward to Advisor bypass on-premises databases; adds no load to them

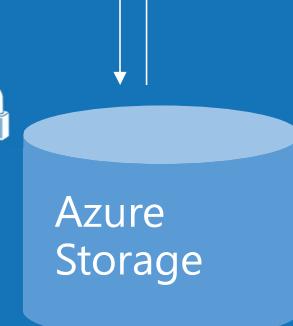
3 Agents directly connecting to Op Insights

4 Certificate Based Authentication & SSL
Data Compression

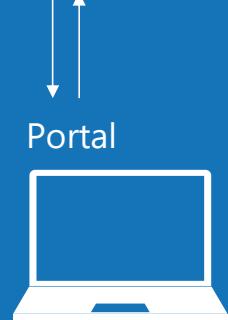
6 Separate Azure file partition for each customer workspace
Uses Azure Secure Authentication Service to Storage communication

5 Service run by authorized personnel in operations team
All activities are logged & can be audited

Microsoft Azure Operational Analytics



7 Certificate Based Authentication & SSL
Authenticate via Org Account or Microsoft Account



MICROSOFT CONFIDENTIAL



InPrivate <https://0f571d2d-a13b-4778-a1df-31fe982ab344.portal.mms.microsoft.com/>

Microsoft Operations Management Suite

Data Plan: Free OpInsightsDemo

Overview

Log Search

AD Assessment

4 Servers Assessed

3 High Priority Recommendations

6 Low Priority Recommendations

72 Passed Checks

Malware Assessment

35% NEEDS ATTENTION

1 Servers with Active Threats

38 Servers with Inadequate Protection

Capacity Planning

23.6 % Available Cores

62.3 % Available Memory

42.5 % Available Storage

Backup

ITPRodBackup

13 Servers backed up

3 TB Backup data

Solutions Gallery

Alert Management

0 Active critical alerts in the last 24 hours

1pm 5pm 9pm 1am 5am 9am

4 Active warning alerts in the last 24 hours

1pm 5pm 9pm 1am 5am 9am

Automation

ITAutomation

9 Runbooks

15 Jobs in the last 7 days

Change Tracking

20 Software changes in the last 24 hours

4/26 4/28 4/29 4/30 5/2

6 Windows service changes in the last 24 hours (excludes Status)

4/26 4/28 4/29 4/30 5/2

Security and Audit

95 Active Computers in the last 24 hours

64 Accounts Authenticated in the last 24 hours

Feedback

?

Solutions Gallery



AD Assessment

Free

Assess the risk and health of Active Directory environments.



Capacity Planning

Free

Calculates current and future utilization of each component of your environment.



Security and Audit

Free

Provides the ability to explore security related data and helps identify security breaches.



Wire Data

Free

Provides the ability to explore wire data and helps identify network related issues.



Automation

Owned

Automate time consuming and frequently repeated tasks in the cloud and on-premises.



Change Tracking

Owned

Track configuration changes across your servers.



System Update Assessment

Owned

Identify missing system updates across your servers.



Alert Management

Free

Manage your Operations Manager alerts across your servers.



Configuration Assessment

Free

Identify configuration problems across your servers.



SQL Assessment

Free

Assess the risk and health of SQL Server environments.



Malware Assessment

Owned

View status of antivirus and antimalware scans across your servers.



Backup

Owned

Manage Azure IaaS VM backup and Windows Server backup status for your backup vault.



Azure Site Recovery

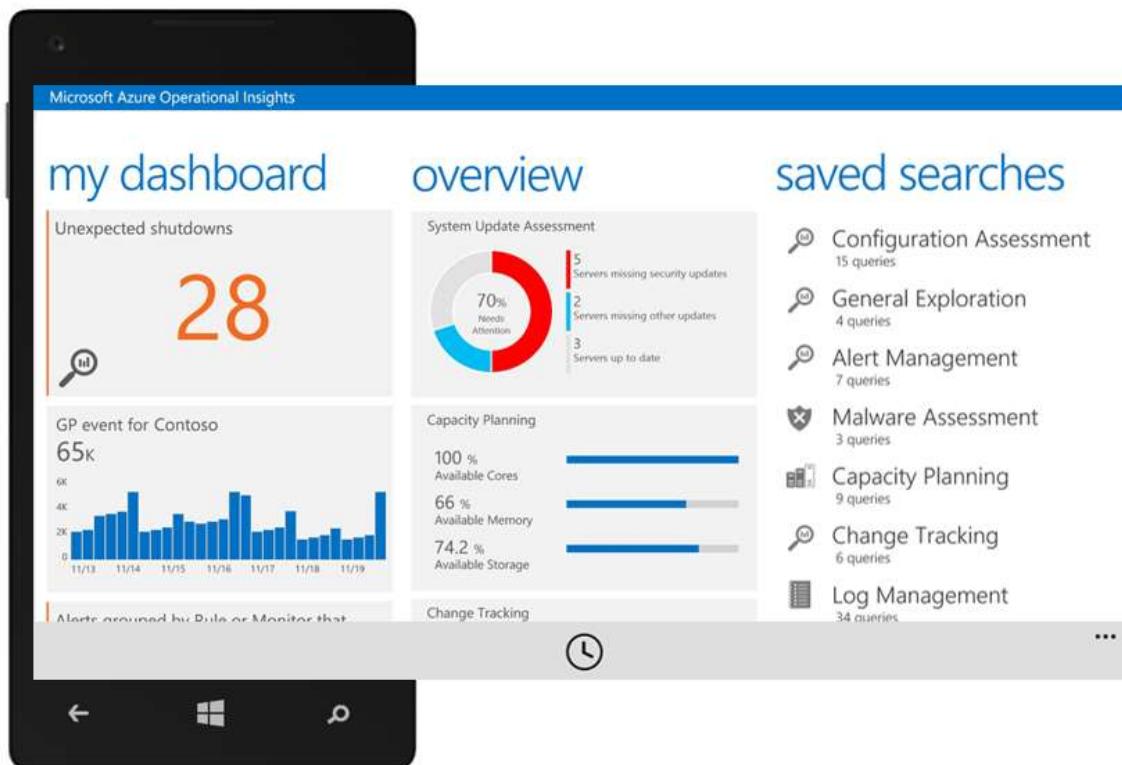
Owned

Monitor virtual machine replication status for your Azure Site Recovery Vault.

OMS Solutions pre-requisites

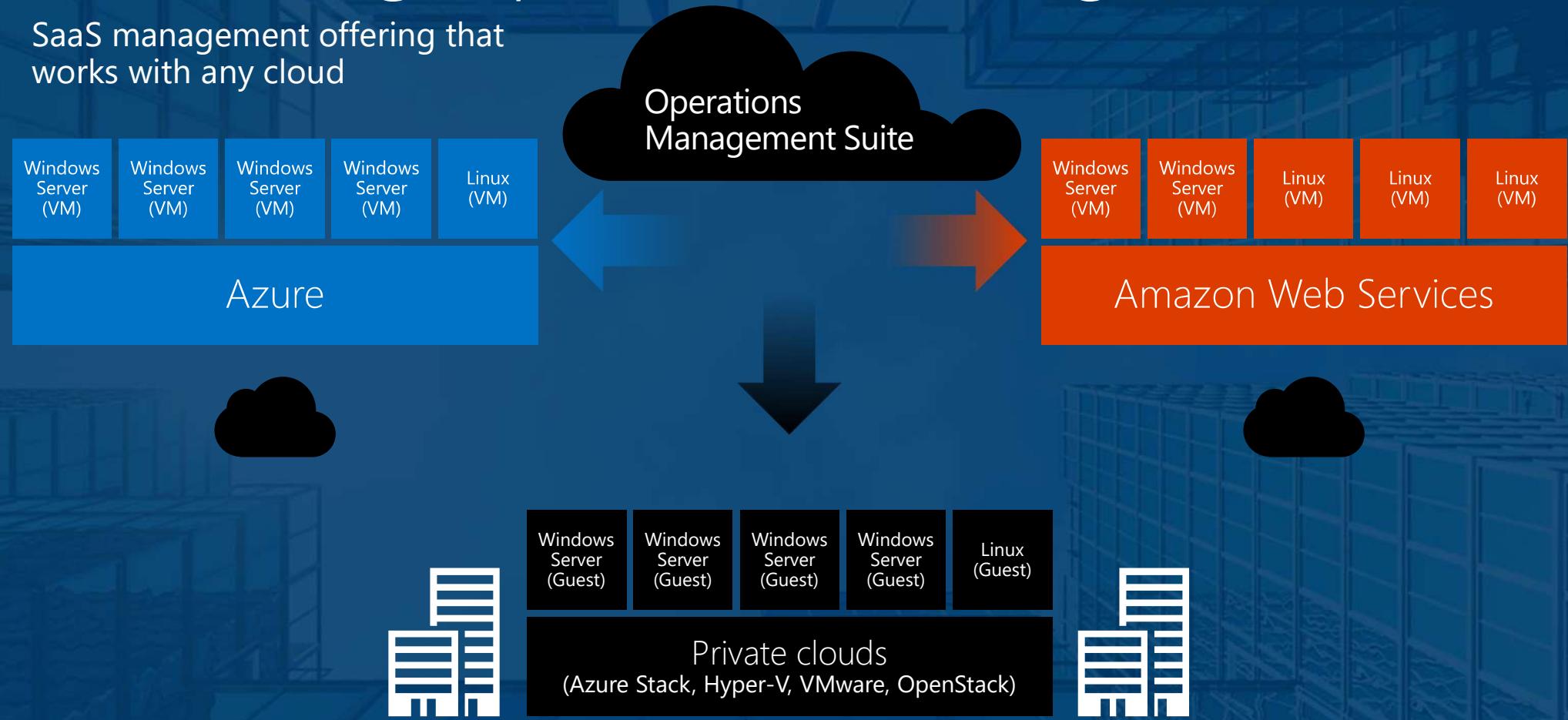
OMS Solutions - Data type	Platform (OS)	Direct Agent	SCOM agent	Azure Storage	SCOM required?	SCOM agent data sent via management group	Collection frequency
AD Assessment	Windows	Yes	Yes	No	No	Yes	7 days
AD Replication Status	Windows	Yes	Yes	No	No	No	5 days
Alerts (Nagios)	Linux	Yes	No	No	No	No	on arrival
Alerts (Zabbix)	Linux	Yes	No	No	No	No	1 minute
Alerts (Operations Manager)	Windows	No	Yes	No	Yes	Yes	3 minutes
Antimalware	Windows	Yes	Yes	No	No	Yes	hourly
Capacity Management	Windows	No	Yes	No	Yes	Yes	hourly
Change Tracking	Windows	Yes	Yes	No	No	Yes	hourly
Change Tracking	Linux	Yes	No	No	No	No	hourly
Configuration Assessment (legacy Advisor)	Windows	No	Yes	No	Yes	Yes	twice per day
ETW	Windows	No	No	Yes	No	No	5 minutes
IIS Logs	Windows	Yes	Yes	Yes	No	No	5 minutes
Network Security Groups	Windows	No	No	Yes	No	No	10 minutes
Office 365	Windows	No	No	No	No	No	on notification
Performance Counters	Windows	Yes	Yes	No	No	No	as scheduled, minimum of 10 seconds
Performance Counters	Linux	Yes	No	No	No	No	as scheduled, minimum of 10 seconds
Service Fabric	Windows	No	No	Yes	No	No	5 minutes
SQL Assessment	Windows	Yes	Yes	No	No	Yes	7 days
SurfaceHub	Windows	Yes	No	No	No	No	on arrival
Syslog	Linux	Yes	No	No	No	No	from Azure storage: 10 minutes; from agent: on arrival
System Updates	Windows	Yes	Yes	No	No	Yes	at least 2 times per day and 15 minutes after installing an update
Windows security event logs	Windows	Yes	Yes	Yes	No	No	for Azure storage: 10 min; for the agent: on arrival
Windows firewall logs	Windows	Yes	Yes	No	No	No	on arrival
Windows event logs	Windows	Yes	Yes	Yes	No	Yes	for Azure storage: 1 min; for the agent: on arrival
Wire Data	Windows (2012 R2 / 8.1 or later)	Yes	Yes	No	No	No	every 1 minute

Monitoring on the go

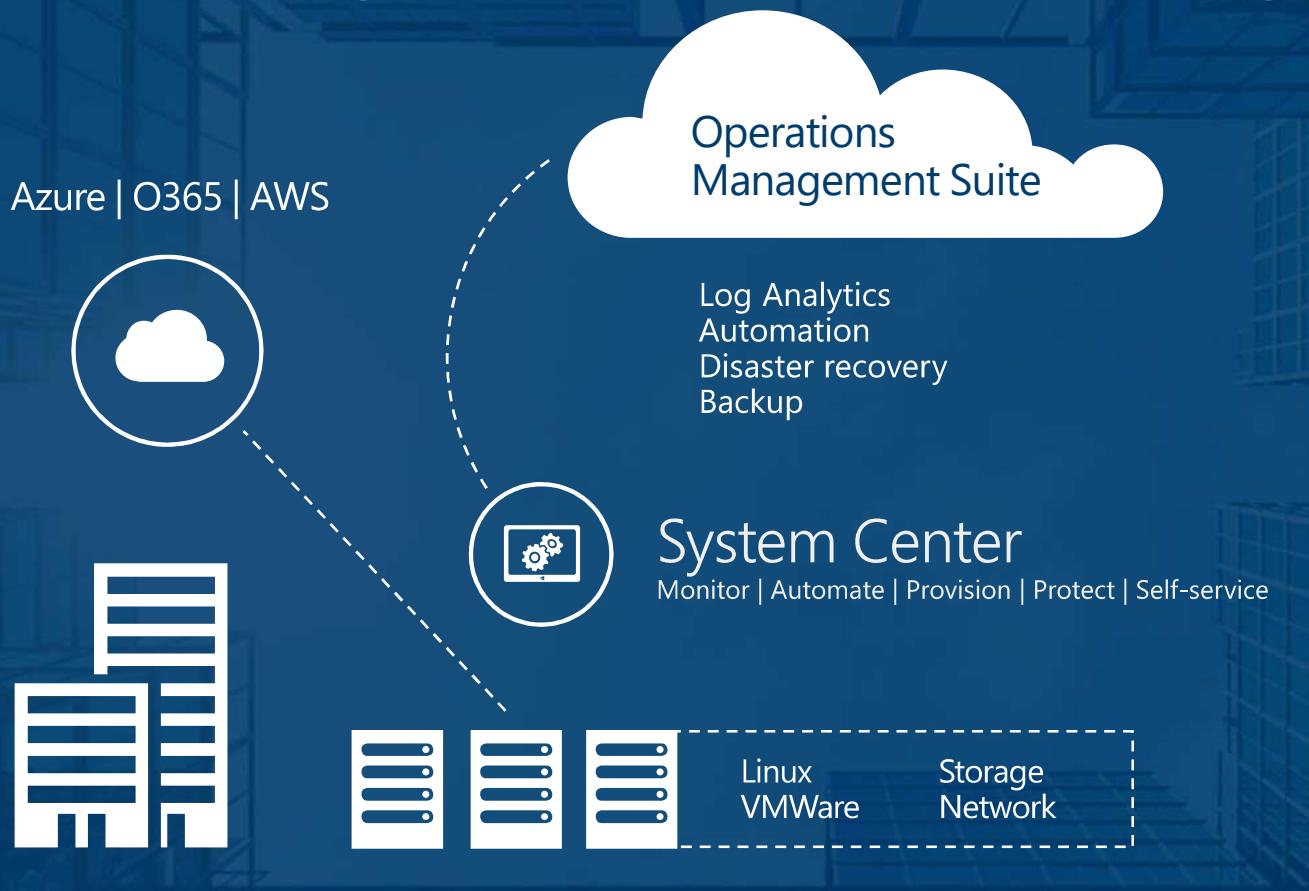


Introducing Operations Management Suite

SaaS management offering that works with any cloud



Introducing Operations Management Suite



System Center foundation

Hybrid and Heterogeneous

Innovation through cloud cadence

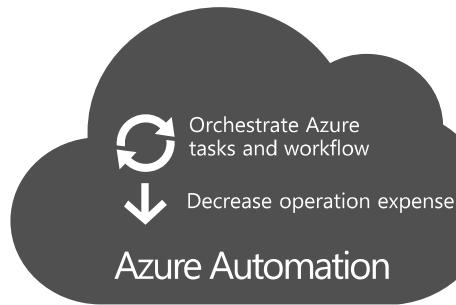
Starting the journey | Modern management

OMS Hybrid management capabilities

Operations



Automation



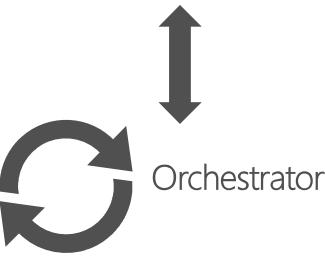
Backup



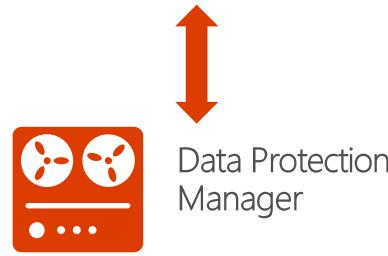
Disaster recovery



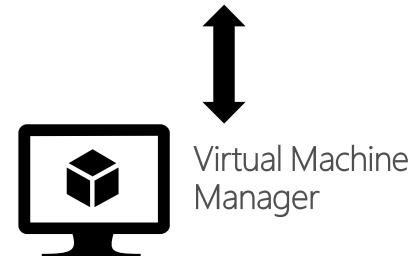
- Azure and third-party cloud operations monitoring
- Cloud workload and virtual machine monitoring
- Office 365 monitoring
- DevOps integration and cloud-based application monitoring



- Azure and third-party cloud workflow management
- Rich automation and workflow consistency



- Backup in Azure or to Azure
- App-consistent recovery points
- Integrated workflows for backup, recovery, and monitoring

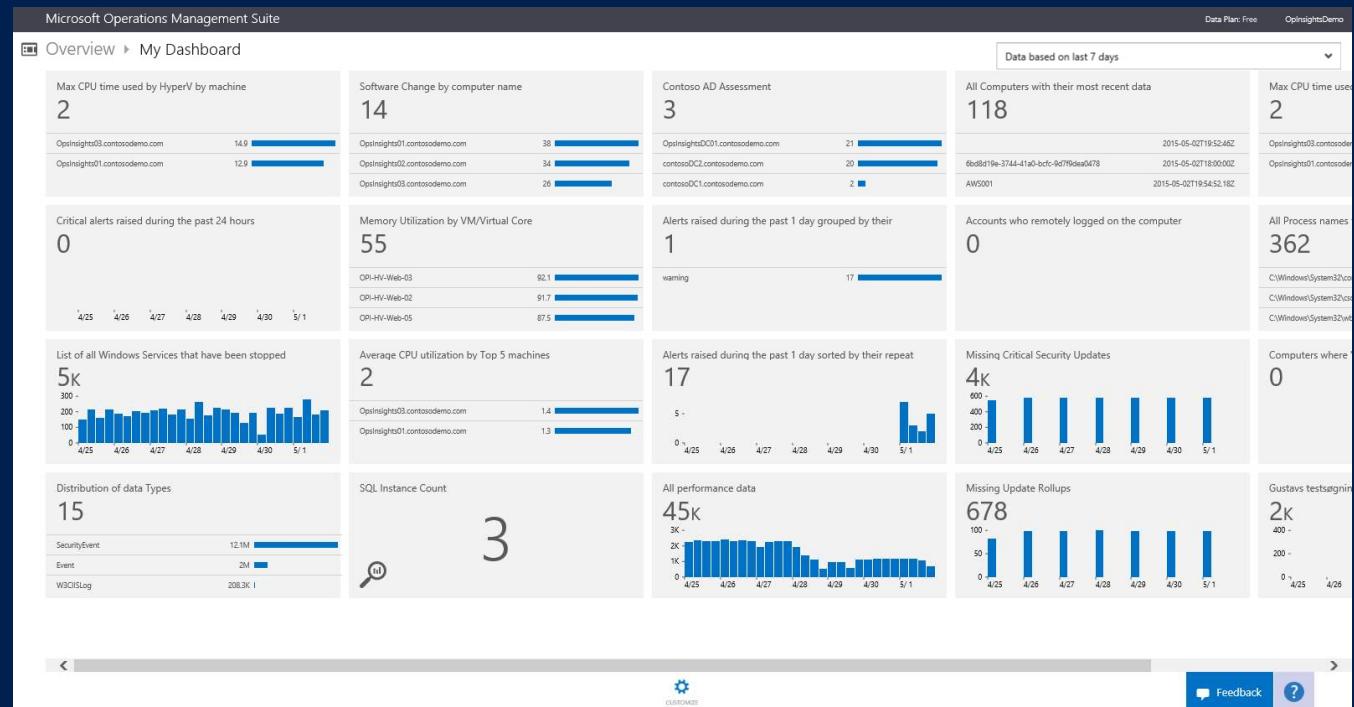


- Replication and recovery to Azure
- Continuous health monitoring

Custom Dashboard

Visualize all of your saved searches, providing a single lens to all your environment.

- Custom or sample searches
- Customizable visual information
- Shareable across teams



Solution Packs

Collection of logic, visualization and data acquisition rules

- Powered by search
- Metrics pivoted around a particular problem areas
- Investigate and resolve operational issues
- Can be added/removed and customized

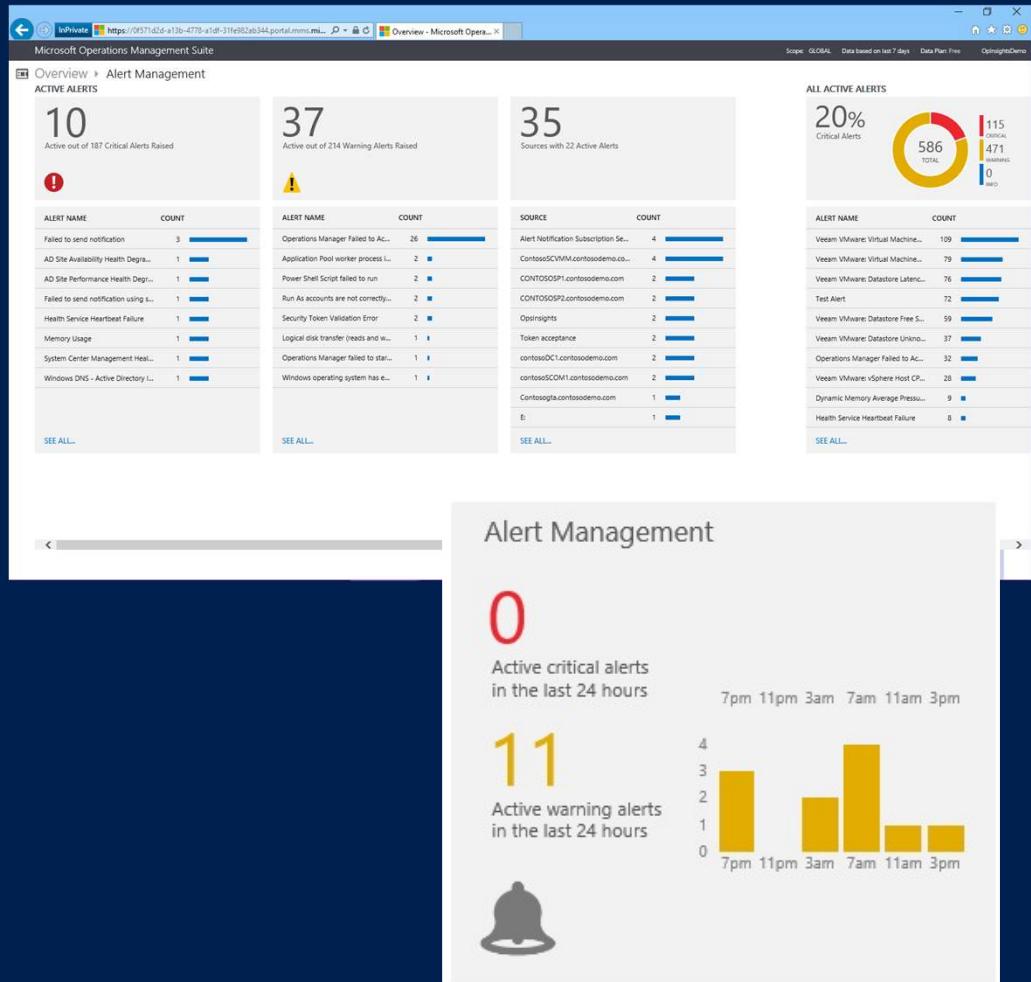


Solution Packs

Alert Management

Expose your integrated System Center Operations Manager alerts

- Web based Alert visualization
- Integrated search for deeper analysis
- Common alert queries

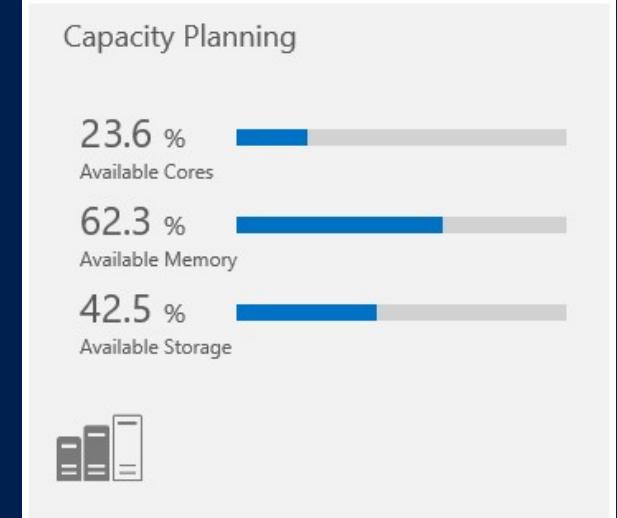
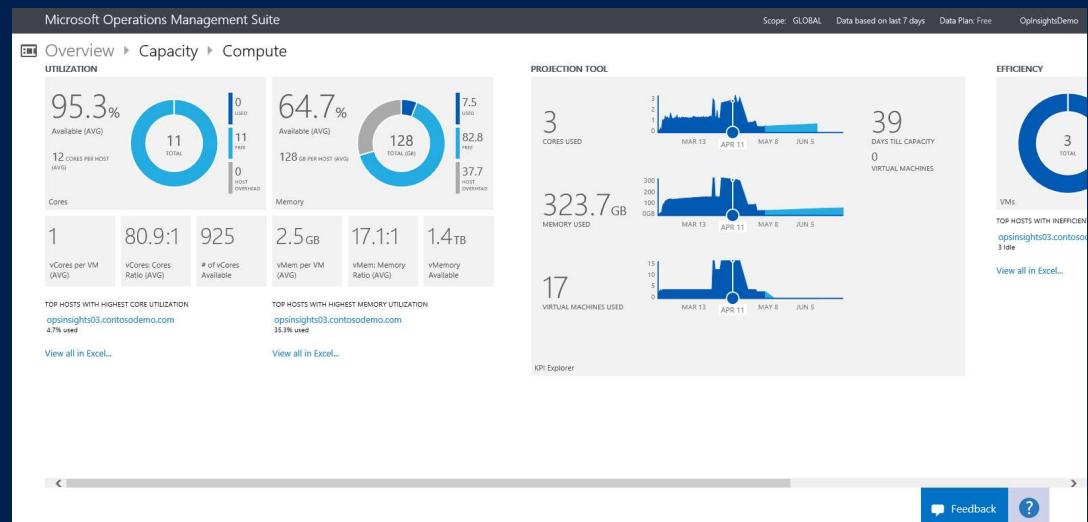


Solution Packs

Capacity planning

Plan for future capacity and trends using historical data

- VM utilization and efficiency
- Compute projection
- Storage utilization

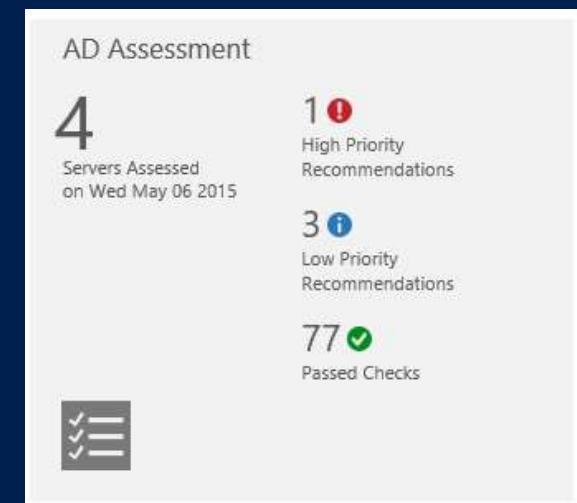
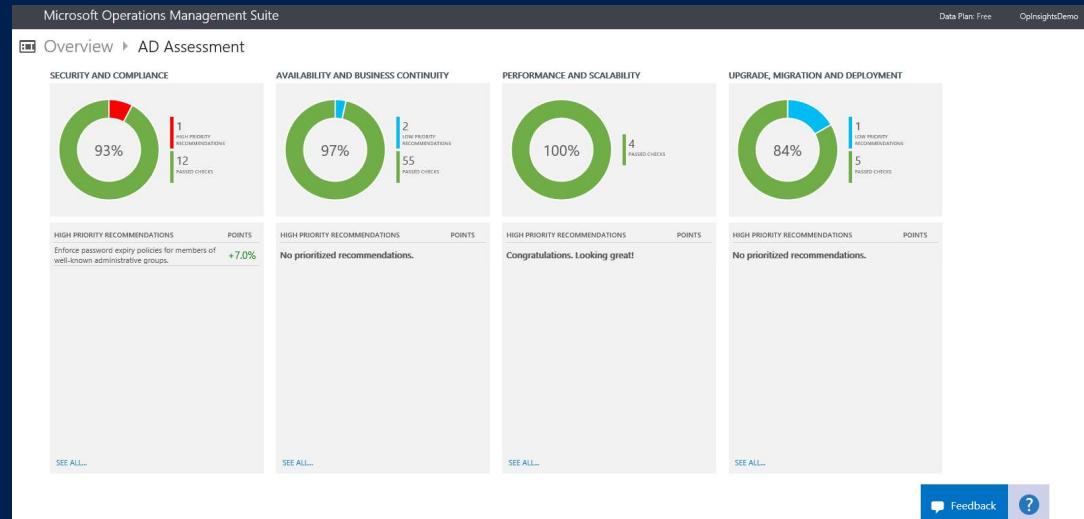


Solution Packs

Active Directory Assessment

Using best practices and data collection, identify potential issues

- Security and Compliance
- Availability and business continuity
- Performance and security
- Upgrade, migration and deployment

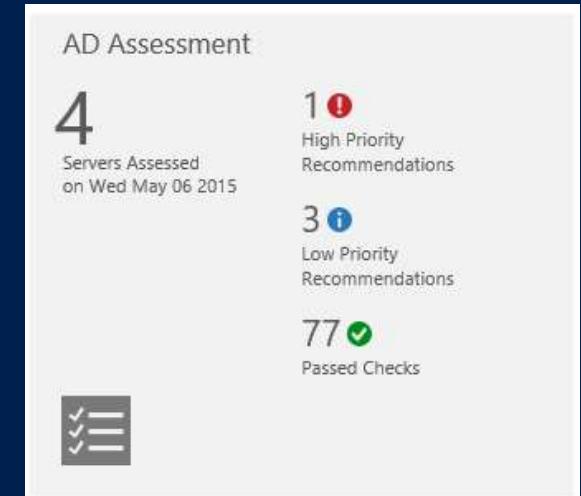
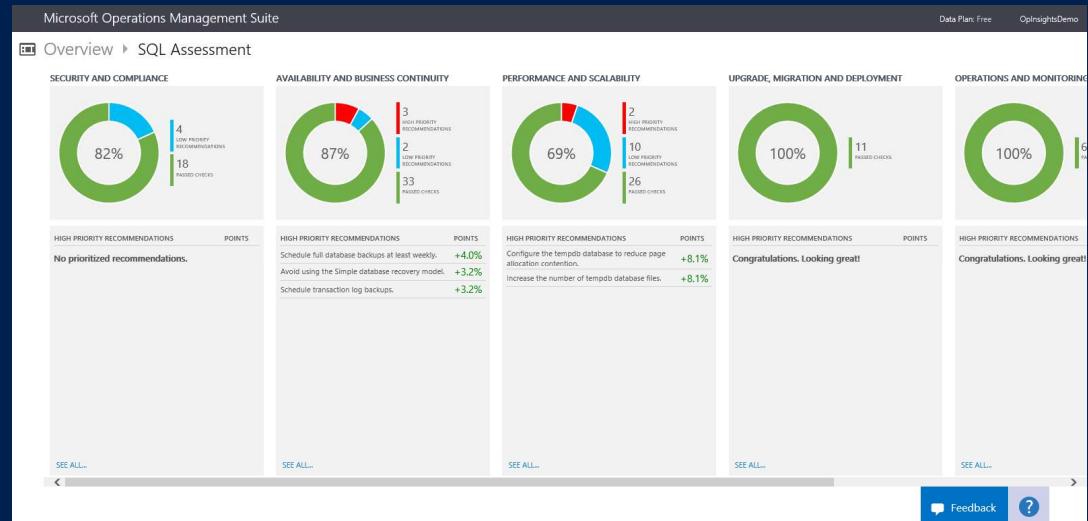


Solution Packs

SQL Server Assessment

Using best practices and data collection, identify potential issues

- Security and Compliance
- Availability and business continuity
- Performance and security
- Upgrade, migration and deployment
- Operations and monitoring
- Change and configuration

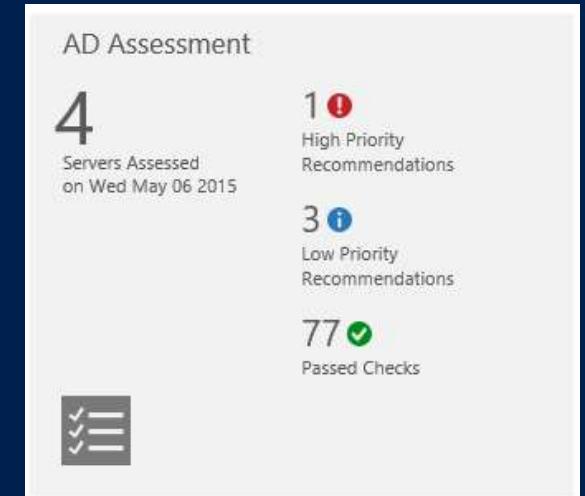
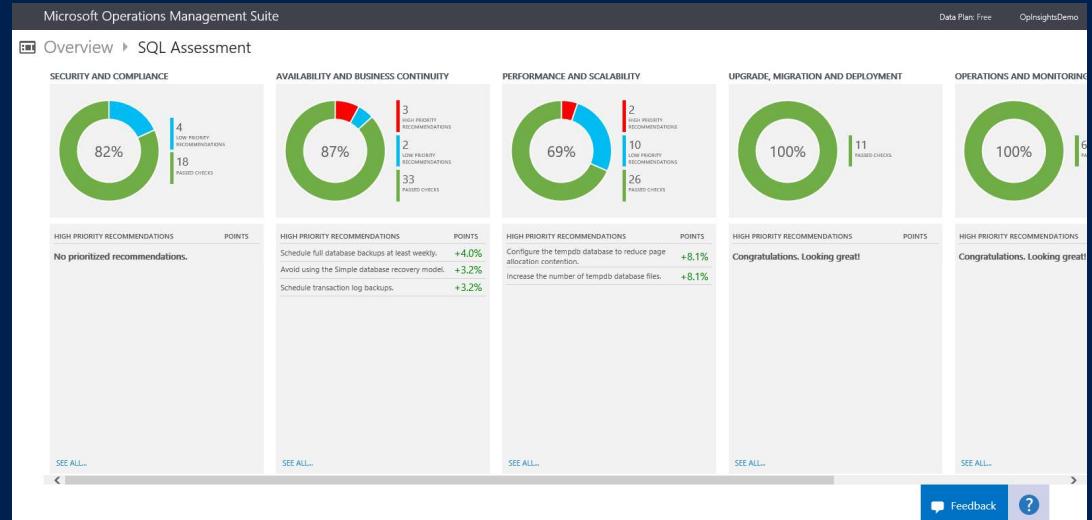


Solution Packs

SQL Server Assessment

Using best practices and data collection, identify potential issues

- Security and Compliance
- Availability and business continuity
- Performance and security
- Upgrade, migration and deployment
- Operations and monitoring
- Change and configuration

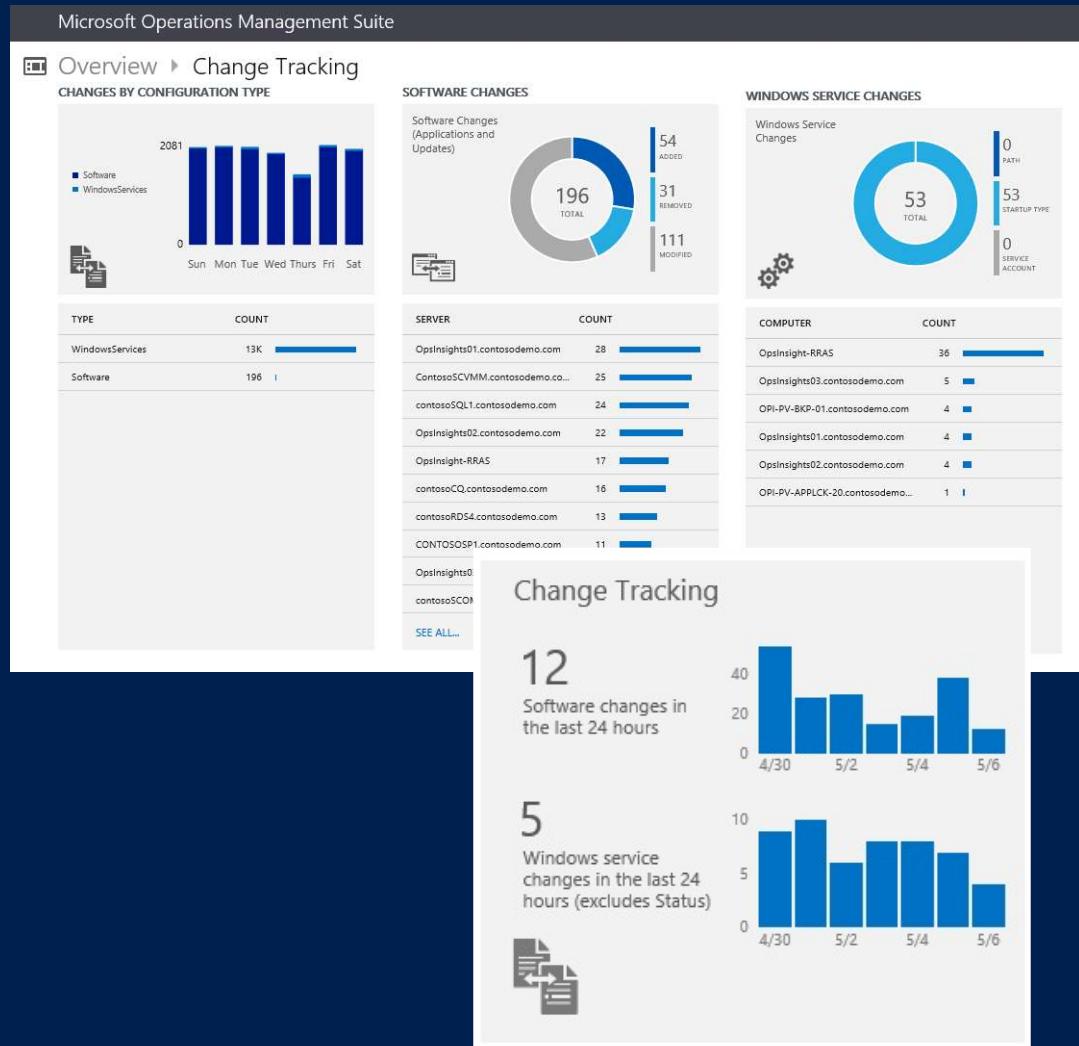


Solution Packs

Change tracking

Track every change on your system across any environment

- Configuration type change
- Software changes
- Application changes
- Windows Service changes



Backup and recovery dashboard

Quick glance view of backup and protection status

- Registered servers
- Backup size
- Jobs status
- Link into Azure portal for backup and recovery

The screenshot shows the Microsoft Operations Management Suite Backup dashboard. At the top, it displays '13 Registered servers' and '126.7 GB Total data protected in Azure'. Below this, there's a summary message about the importance of backing up data. On the left, a 'Backup' section for 'ITPRodBackup' shows '13 Servers backed up' and '126.7 GB'. On the right, an 'Azure Site Recovery' section shows '2 Registered servers' and '0 Failed jobs in the last 24 hours'.

Microsoft Operations Management Suite

Overview ▶ Backup
Summary: ITPRodBackup

13 Registered servers

126.7 GB Total data protected in Azure

Data is the heart of any organization and backing up this data is a key part of a business strategy. Cloud based backup solutions provide a reliable, inexpensive zero capital investment and se. are everywhere Cloud. Azure Ba tions including : Folders, Windows IaaS VMs. Lear

Backup

ITPRodBackup

13 Servers backed up

126.7 GB

Backup data

Azure Site Recovery

2 Registered servers

0 Failed jobs in the last 24 hours

Security Solution Pack

Security context

Quick view of security position across your enterprise

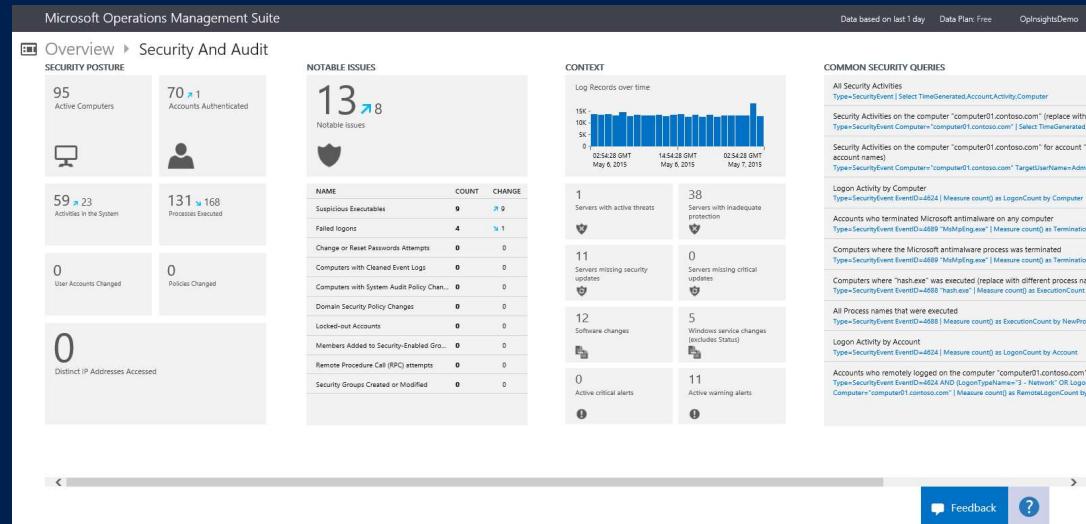
- Active threats
- Patch status
- Software changes
- Service changes
- Critical and warning alerts



Security and audit

Collect security related events and perform forensic, audit and breach analysis.

- Security posture
- Notable issues
- Summary threats



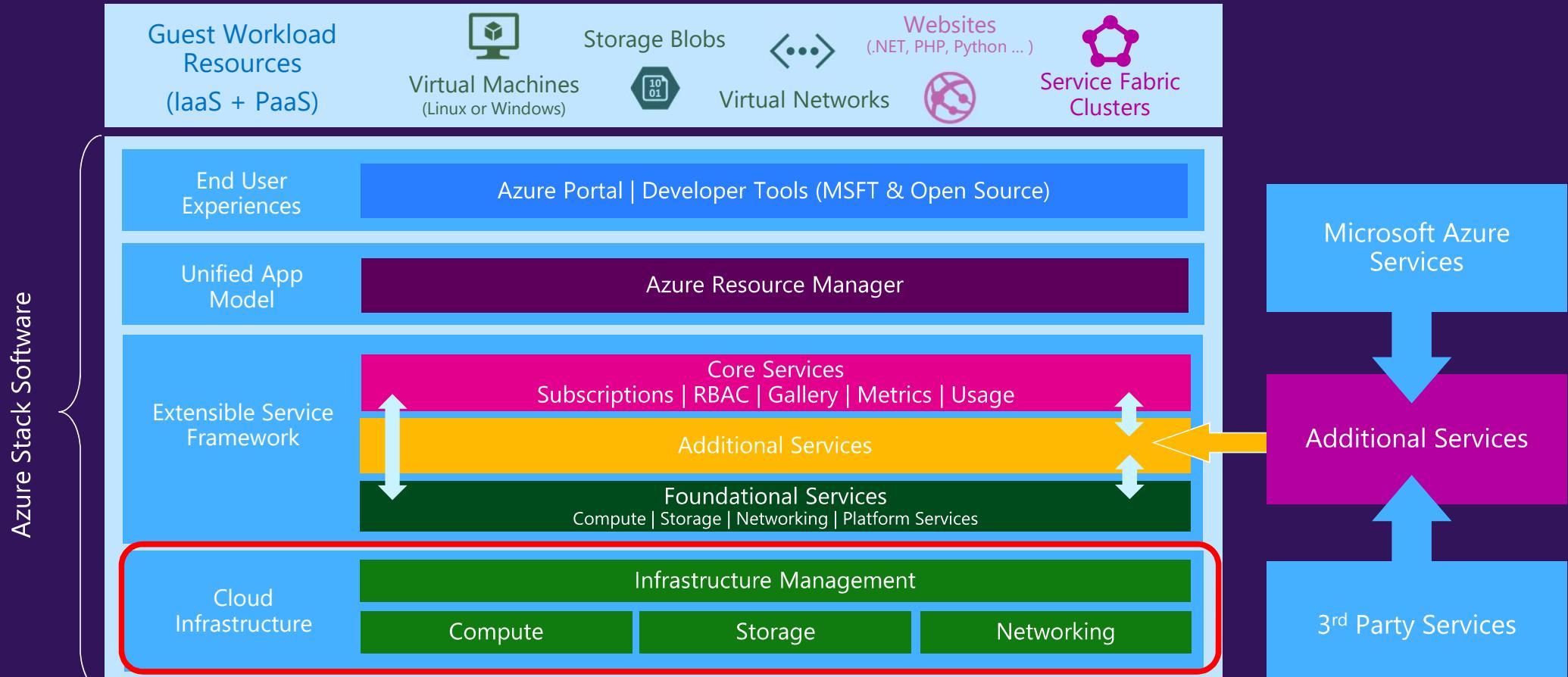
Thank you



[Appendix]

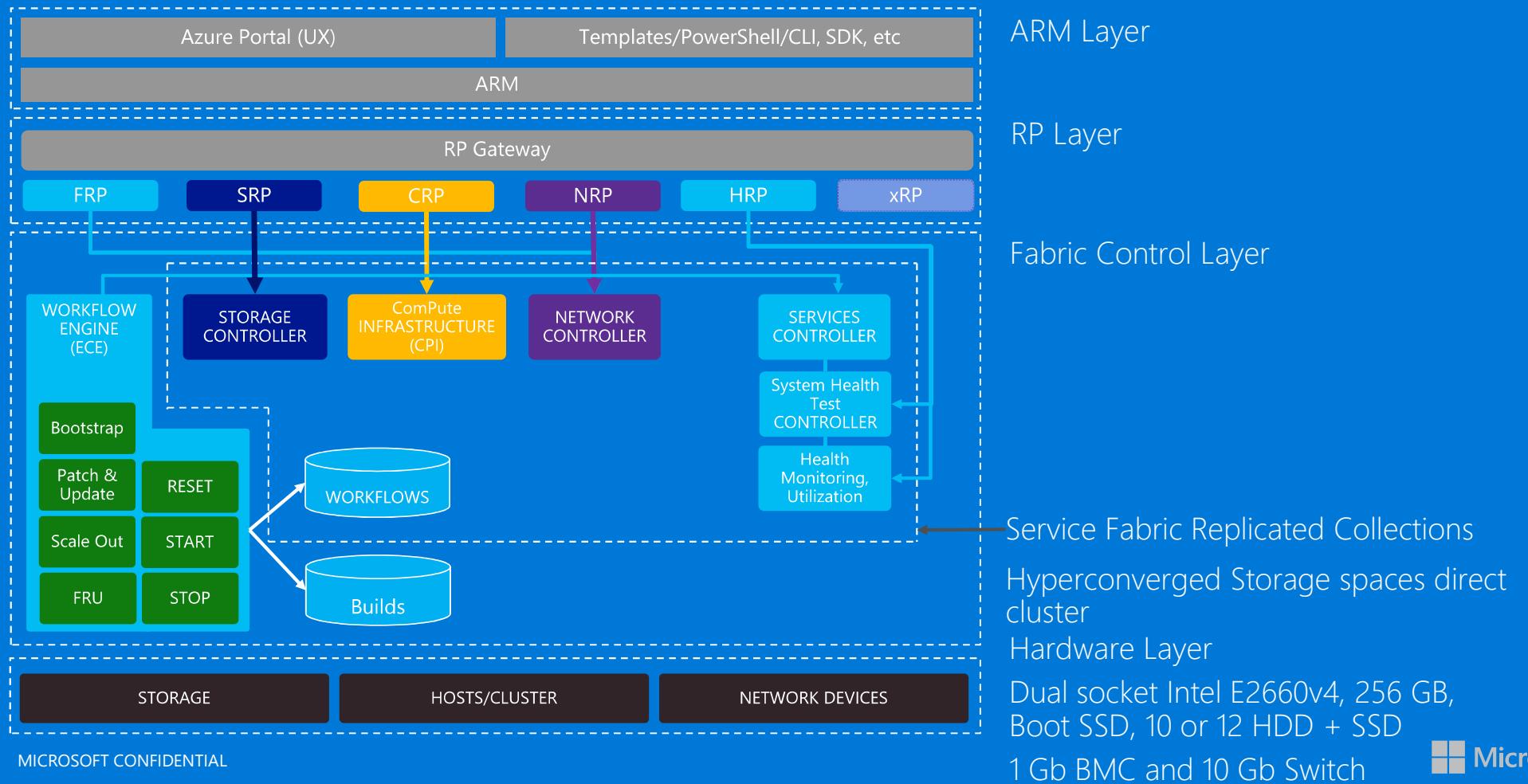
[Microsoft Azure Stack (MAS)]

Azure Stack Architecture Summary



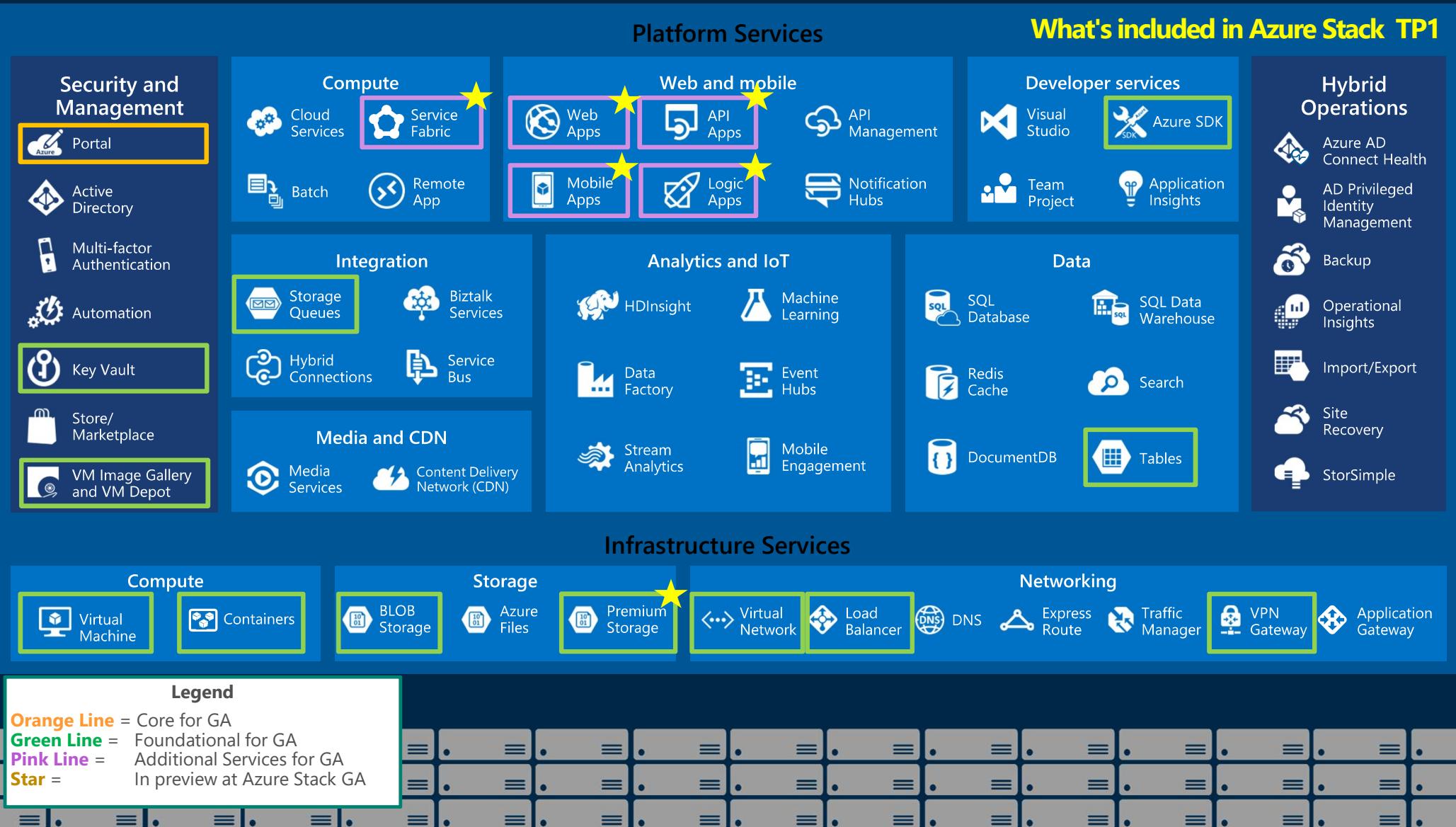
MICROSOFT CONFIDENTIAL

Azure Stack Architecture Overview



MICROSOFT CONFIDENTIAL





Azure Stack Integrated Systems

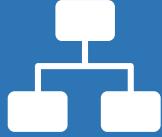
Faster time to value

More
Customization

Do-it-yourself



Reference
Architecture



Integrated
Systems



Speed &
Standardization

Robust platform for iterating on Azure services rapidly

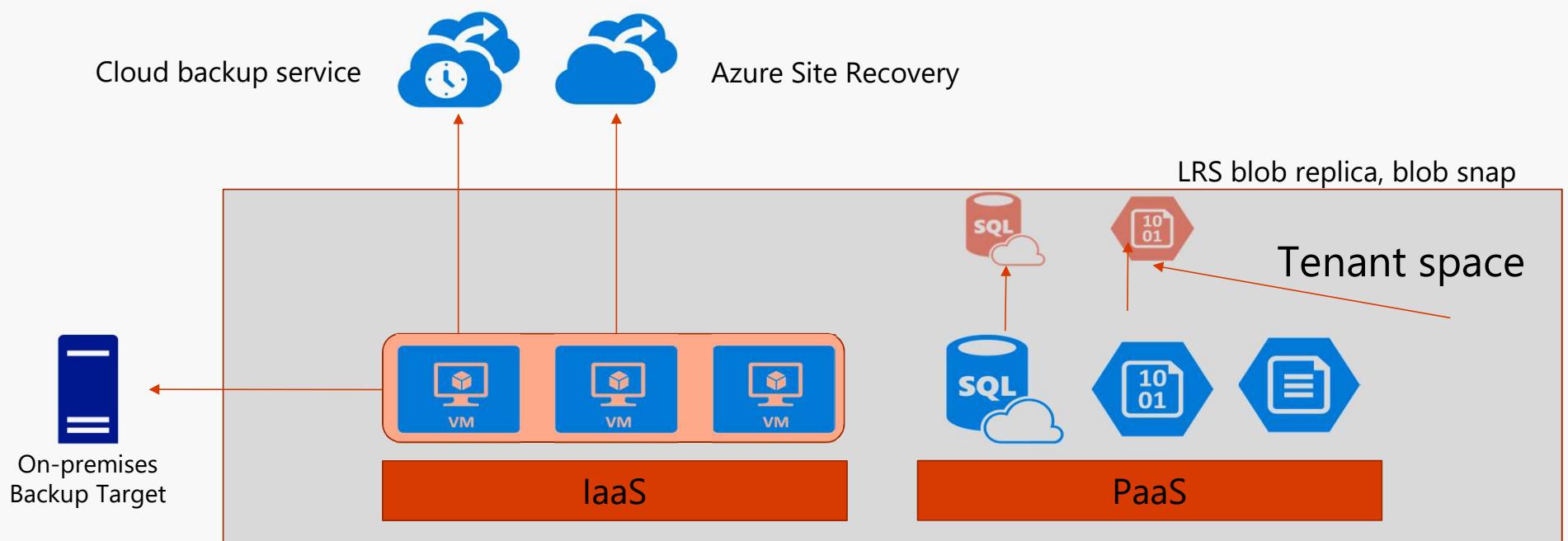
Updated frequently (once a month) with validated updates

Integrated Systems – data tells a story

Likelihood to Try or Deploy Azure Stack: Impact on interest if offered as a hardware appliance



Azure Stack Backup and DR



[Azure Service Fabric]

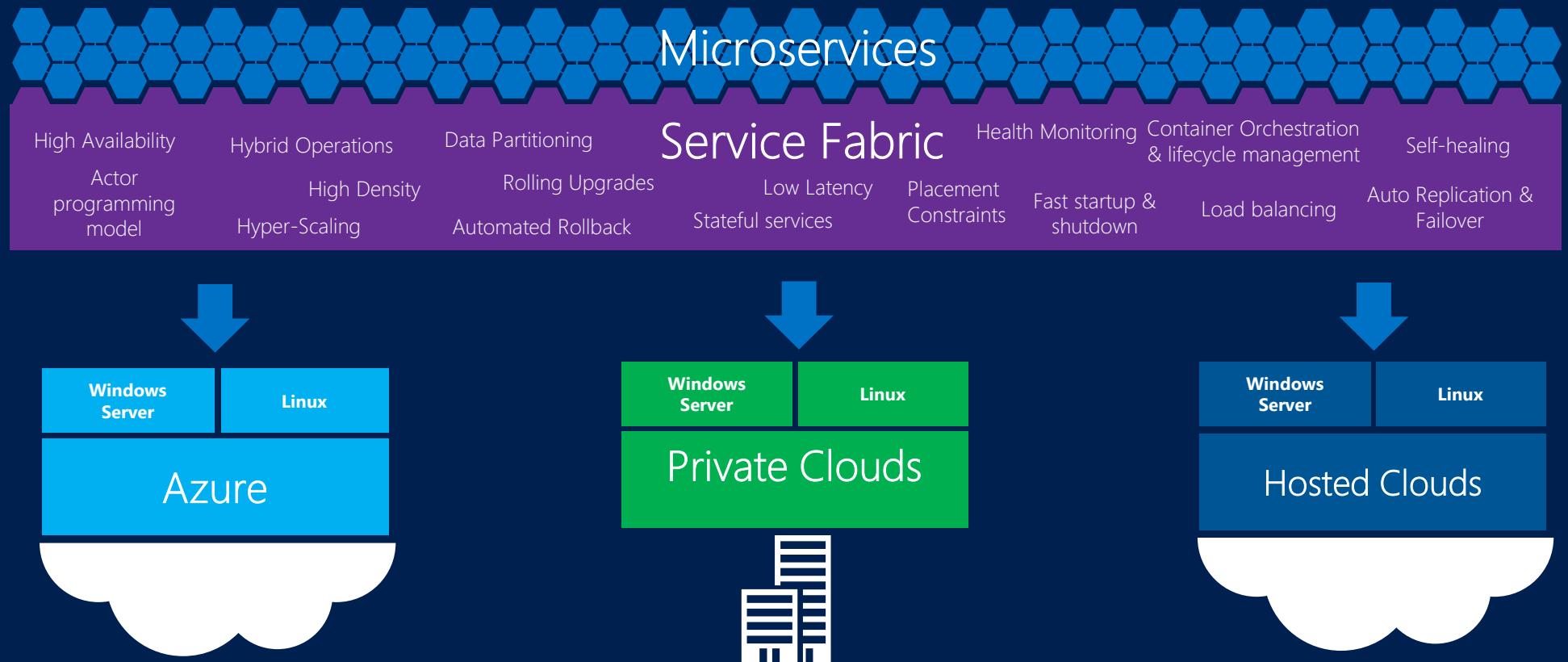
Azure Service Fabric

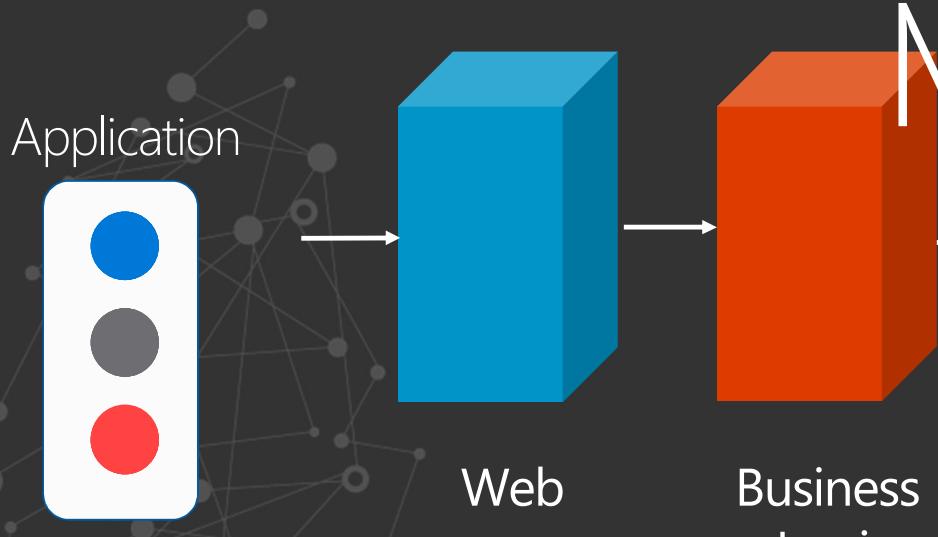
High-control distributed computing framework

- Foundation technology we use internally
- Create stateless + stateful microservices
- Enable Hyper-scale, self-healing, orchestration
- Windows Server + Linux
- Multi-cloud support

Microsoft Azure Service Fabric

A platform for reliable, hyperscale, microservice-based applications





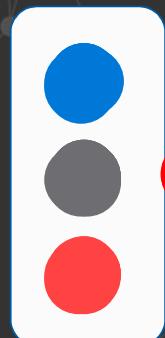
Microservices

L

- coupling
- endent update
- Independent scale
- Data
- Independent partitioning

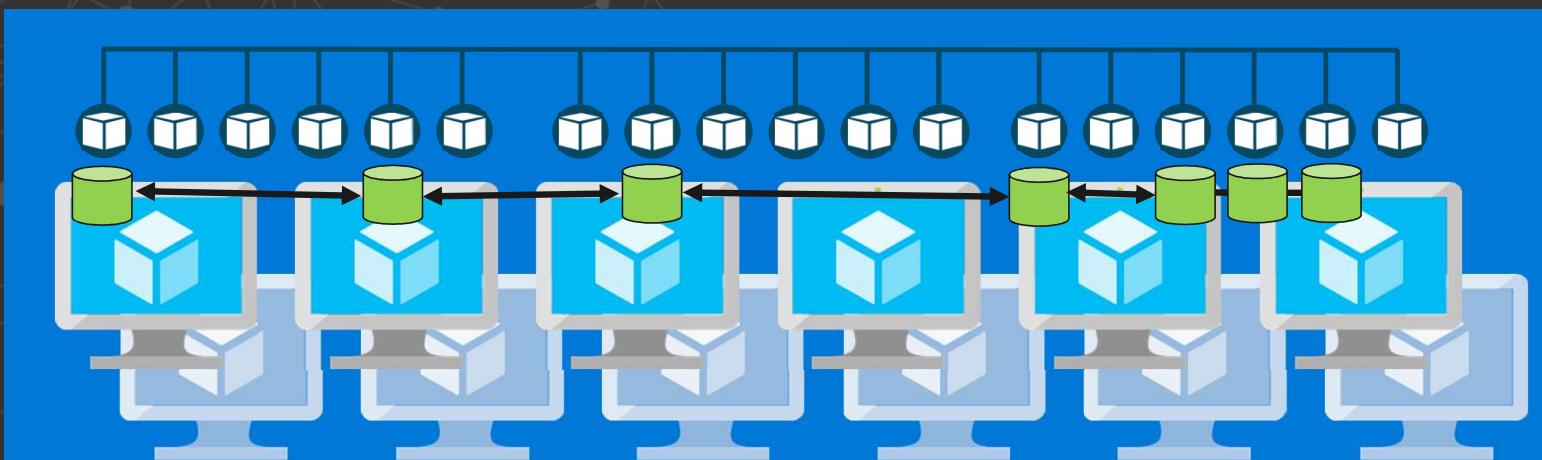


Service Fabric



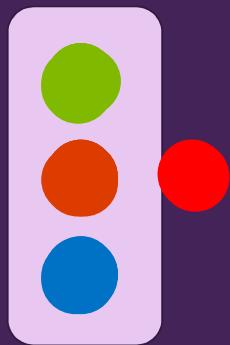
Application

- Manages deployment
- Manages scaling
- Manages updating
- Manages partitioning/replication

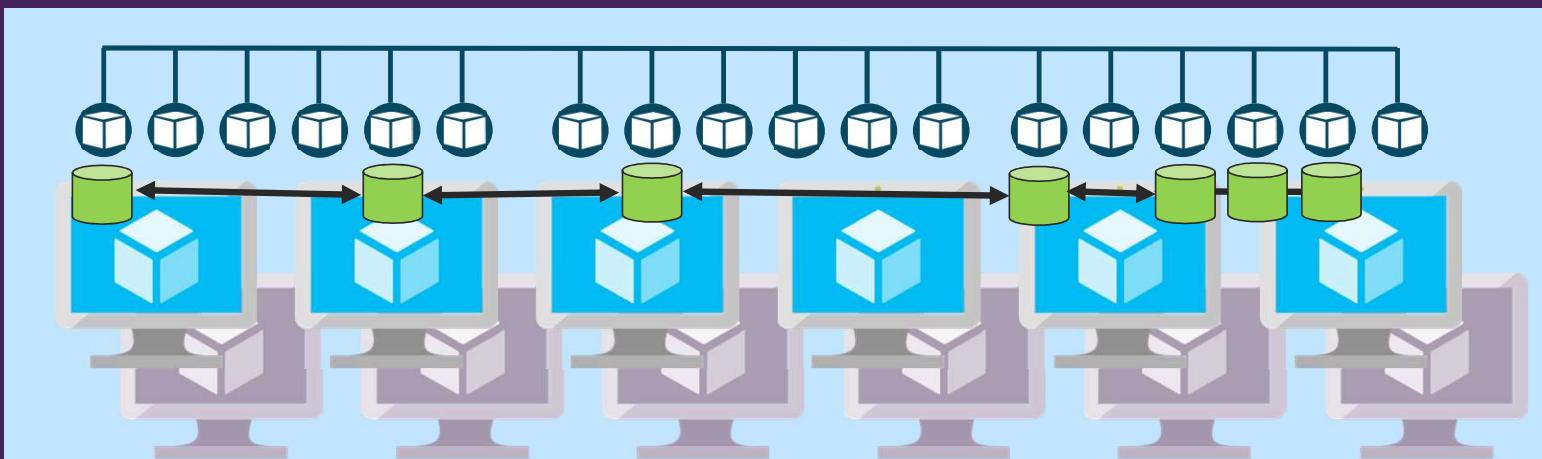


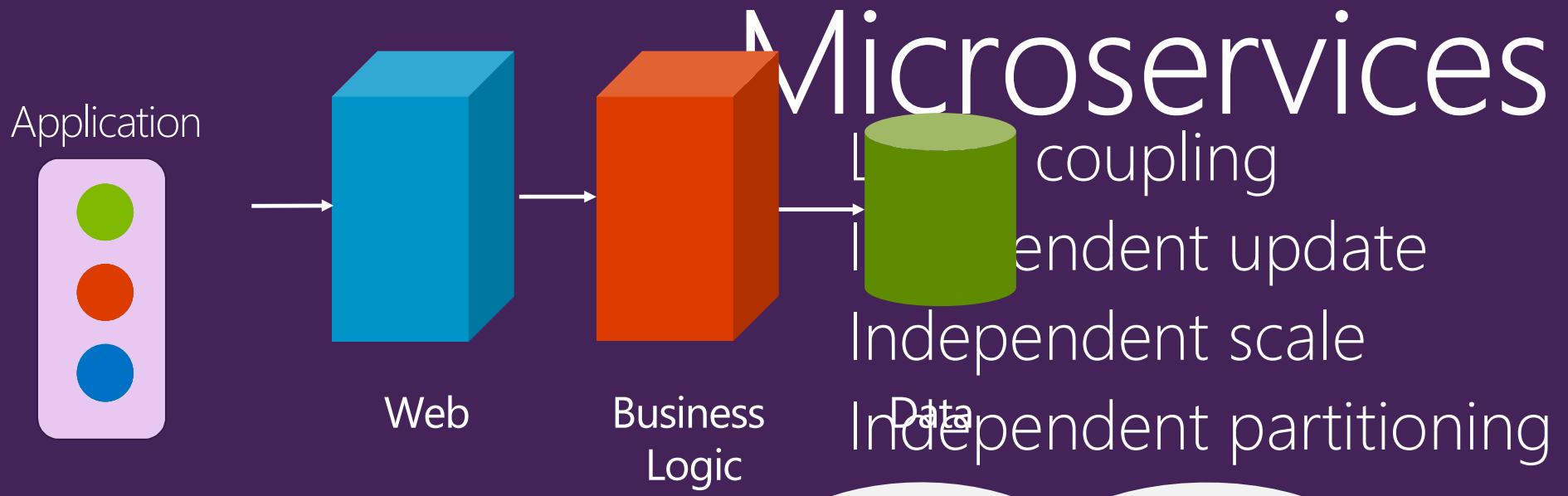
Service Fabric

Application



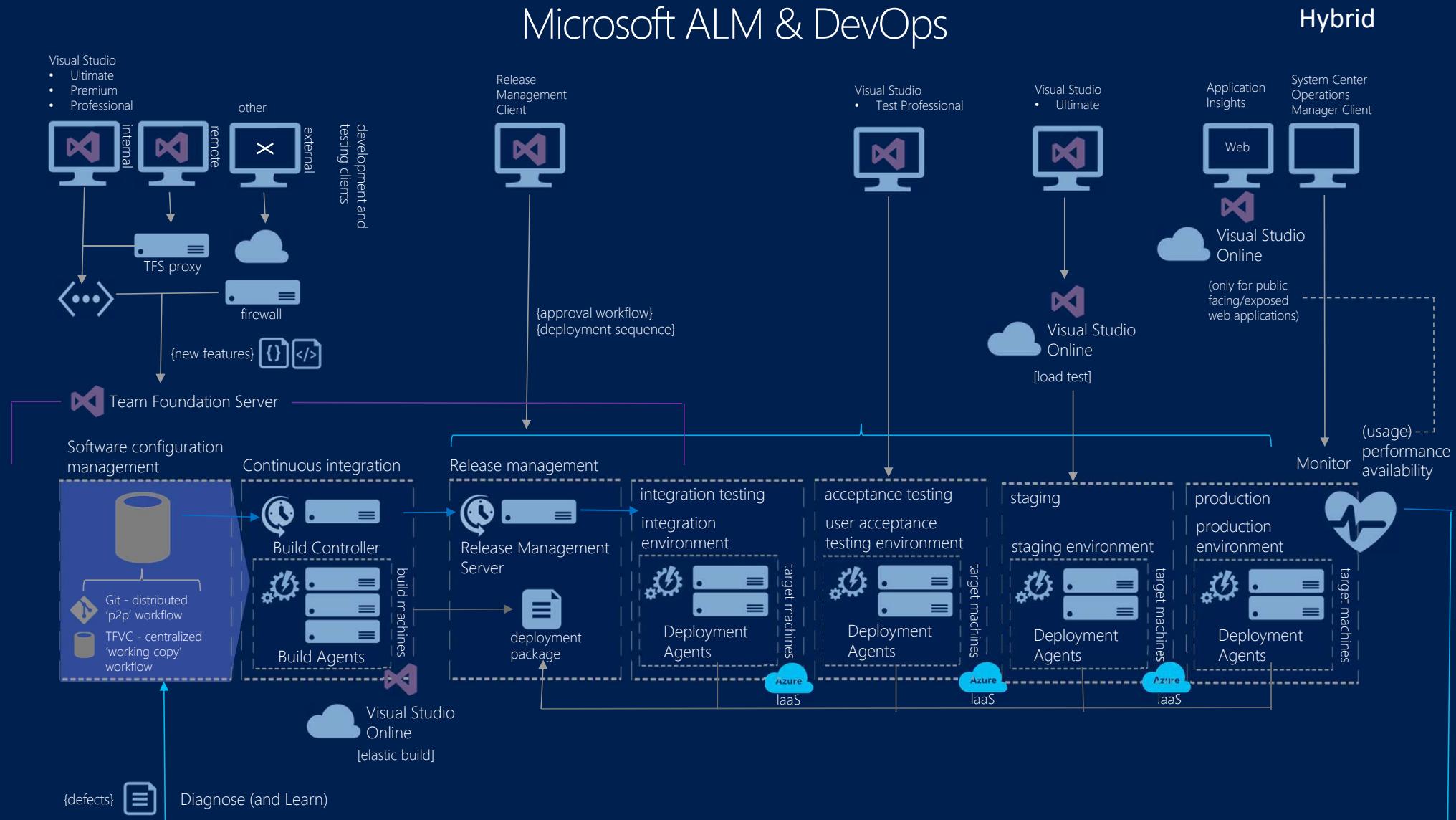
Manages deployment
Manages scaling
Manages updating
Manages partitioning/replication



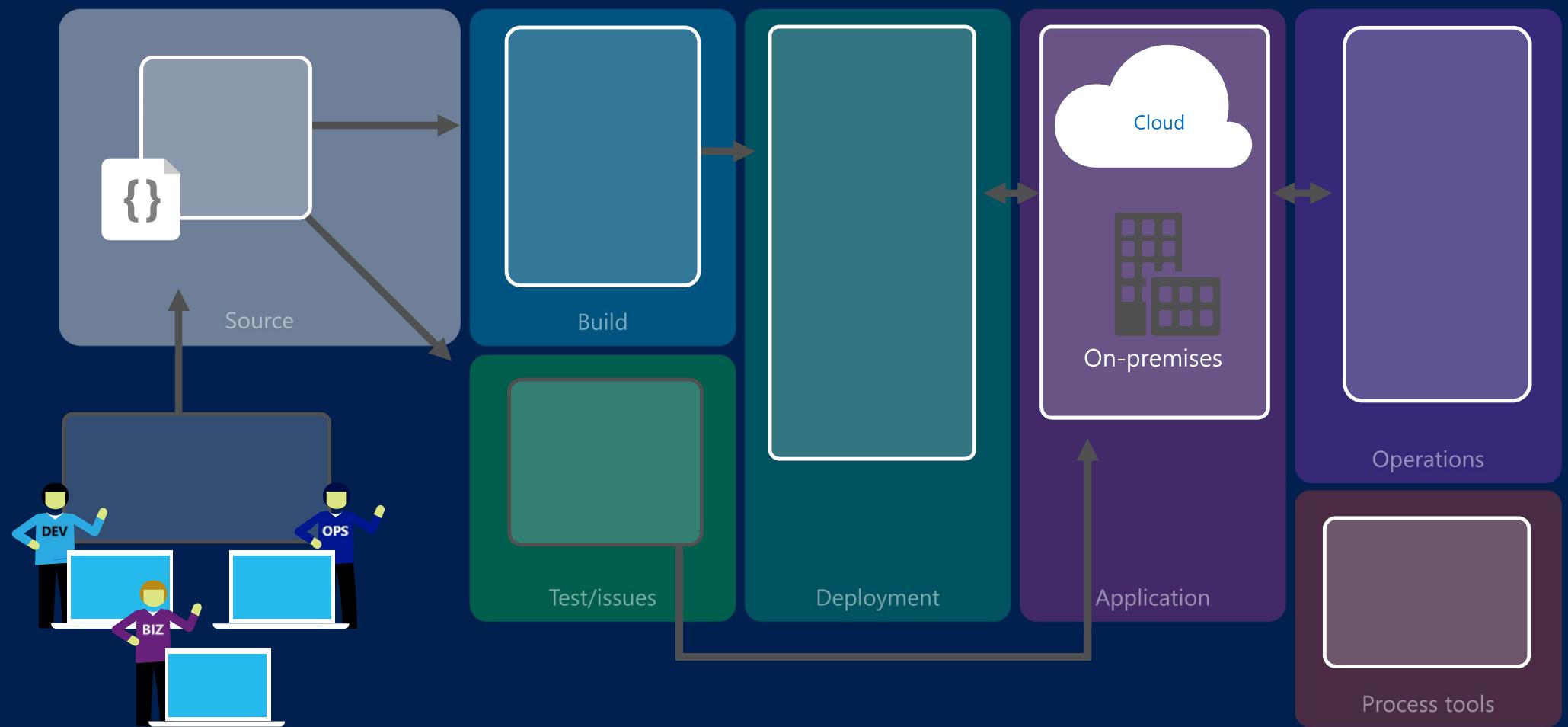


[Azure Dev-Ops]

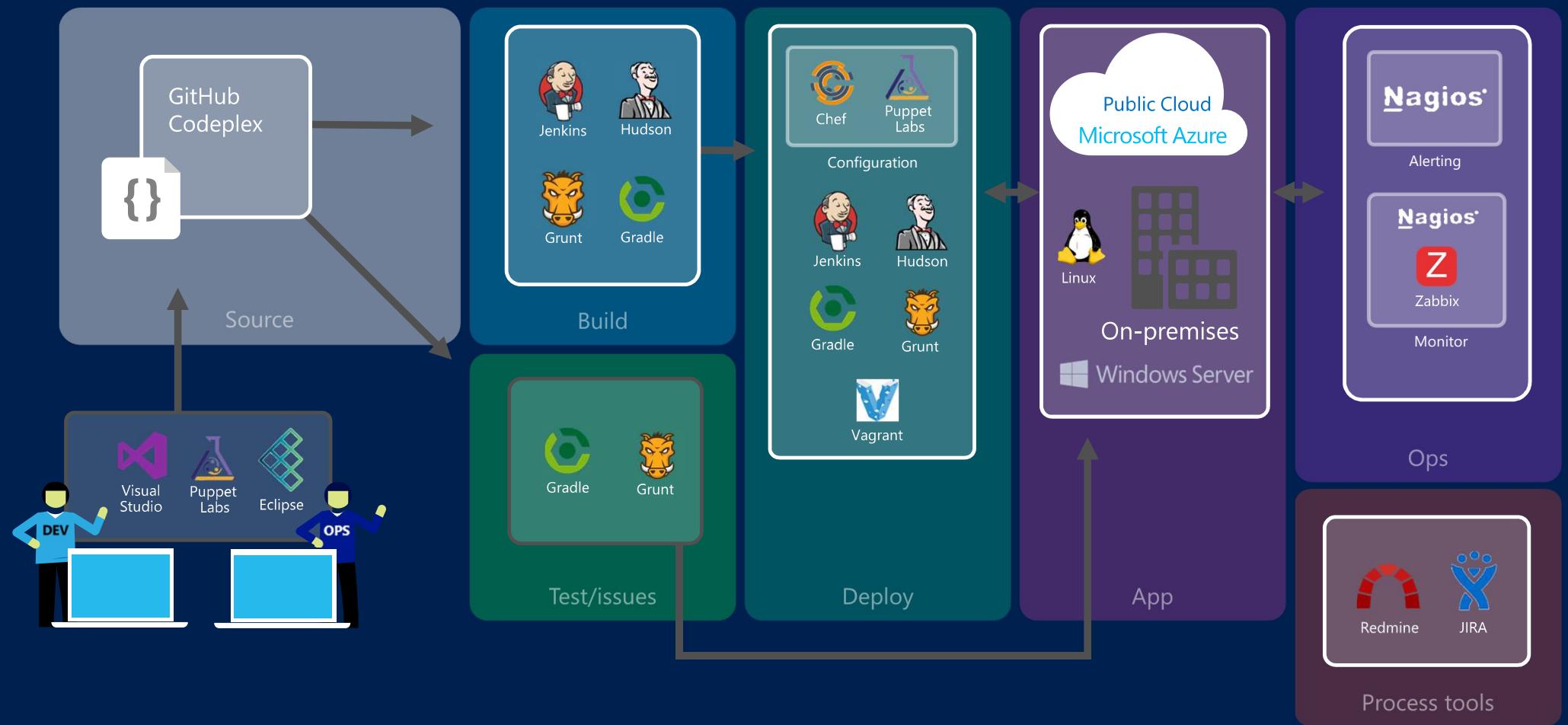
Microsoft ALM & DevOps



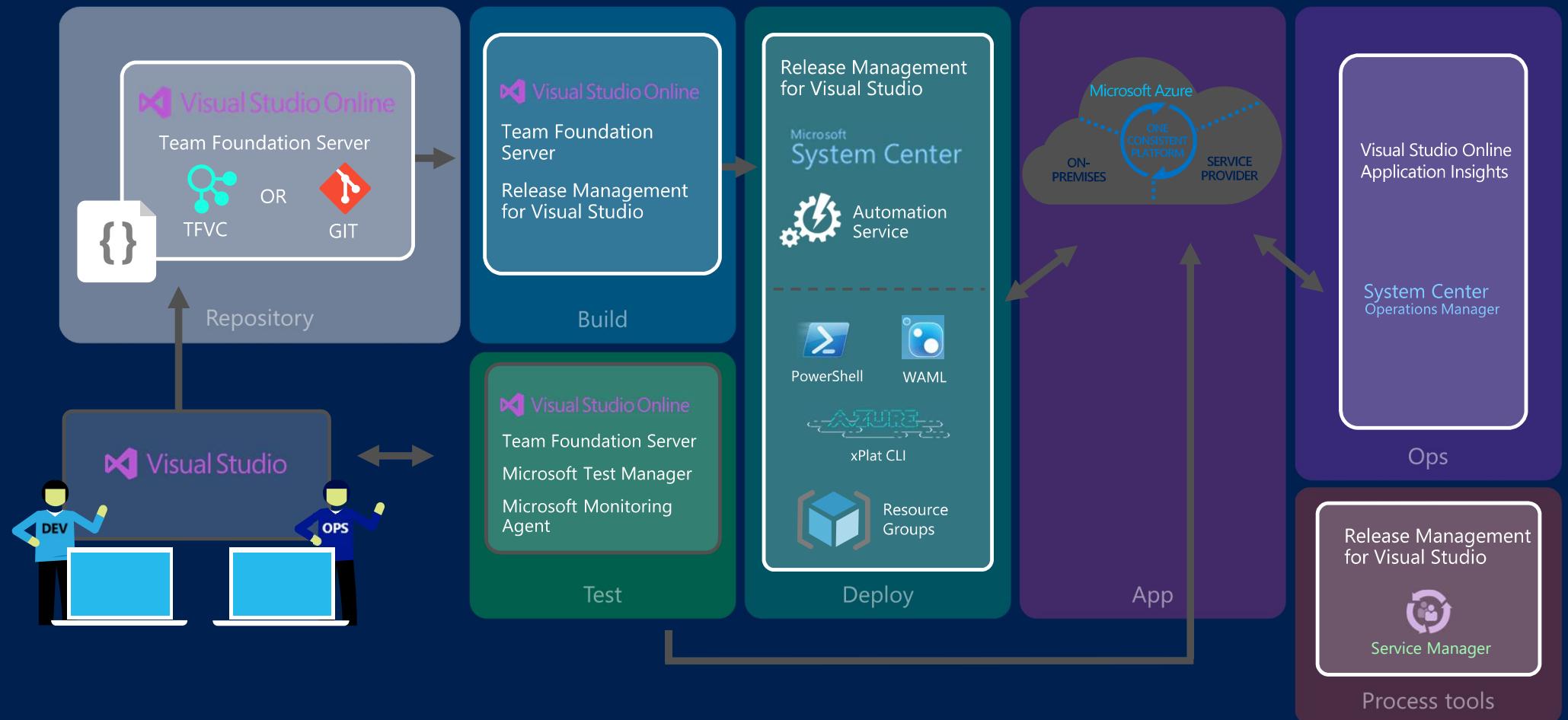
ALM framework



Open Source Ecosystem



Microsoft Ecosystem



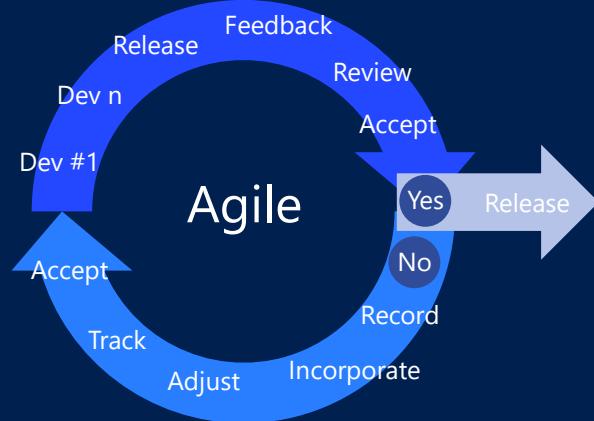
Considerations ... we should be thinking in new ways

INFRASTRUCTURE

- 100% virtualisation
- 100% automation
- Support for multiple diverse workloads
- Full end-to-end high-availability
- Sub-system scale-out
 - Storage
 - Networking
 - Compute
- Cost to serve reduction
- Removal of middleware
- Hardware platform agnostic
- Just in time provisioning

APPLICATION LIFECYCLE

MANAGEMENT



ARCHITECTURAL MODELS

	On-Premises IT with Off-Premises Cloud
	On-Premises IT with Multiple Off-Premises Clouds
	Cloud Stripping
	Distributed Community Cloud
	Lift and Shift
	Batch at Scale/Bursting
	Images in CDN
	Adding Odata
	Shopping Cart
	Compliance
	Partner + PaaS
	Cloud-Optimized
	Outsourcing
	Synchronizing
	Scaling and Caching
	Pull Back
	Big Data
	Consumerization via Virtual Desktop Interface

[Azure described by Gartner]

What do others say...?



A look inside Gartner Magic Quadrants...

- Microsoft leads in core cloud technologies, IaaS, PaaS, Private and Public Clouds
- Microsoft leads in 19 Gartner MQ's (and a Visionary or Challenger in 17 others)

Magic Quadrant for
Cloud Infrastructure as a
Service Worldwide
(May 2015)

LEADER



Magic Quadrant for
Public Cloud Storage
Services
(June 2015)

LEADER



Magic Quadrant for
Enterprise Application
Platform as a Service
(March 2015)

LEADER



Magic Quadrant for
Business Intelligence and
Analytics Platforms
(Feb 2015)

LEADER



Magic Quadrant for
X86 Server Virtualization
Infrastructure
(July 2015)

LEADER



Magic Quadrant for
Operational Database
Management Systems
(Oct 2015)

LEADER



Topic Area	Magic Quadrant	Last Release	Microsoft	Amazon
Application Development	Application Development Life Cycle Management	Feb-15	Leader	
Business Applications	Business Intelligence and Analytics Platforms	Feb-15	Leader	
Software Infrastructure	Client Management Tools	May-15	Leader	
Software Infrastructure	Cloud Infrastructure as a Service	May-15	Leader	Leader
Business Applications	CRM Customer Engagement Center	Apr-15	Leader	
Software Infrastructure	Data Warehouse Database Management Systems	Feb-15	Leader	Challenger
Business Applications	Enterprise Application Platform as a Service	Mar-15	Leader	
Software Infrastructure	Enterprise Content Management	Oct-15	Leader	
Application Development	Horizontal Portals	Sep-15	Leader	
Software Infrastructure	Integrated Software Quality Suites	Aug-14	Leader	
Software Infrastructure	On-premises Application Integration Suites	Jul-14	Leader	
Business Applications	Operational Database Management Systems	Oct-15	Leader	Leader
Software Infrastructure	Public Cloud Storage Services	Jun-15	Leader	Leader
Business Applications	Sales Force Automation	Jul-15	Leader	
Software Infrastructure	Secure Email Gateways	Jun-15	Leader	
Business Applications	Social Software in the Workplace	Oct-15	Leader	
Communications Equipment	Unified Communications	Aug-15	Leader	
Software Infrastructure	Web Conferencing	Dec-15	Leader	
Software Infrastructure	x86 Server Virtualization Infrastructure	Jul-15	Leader	

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