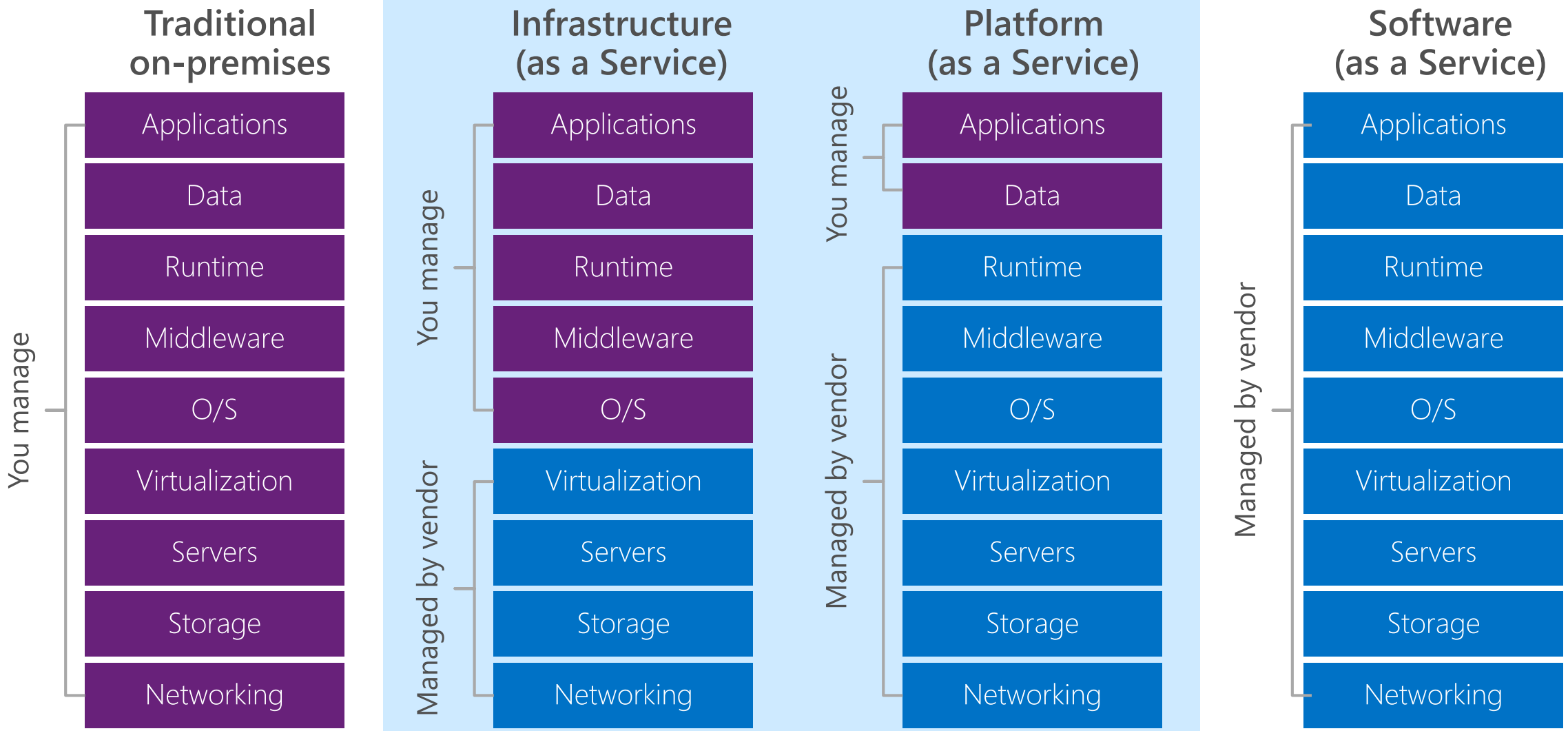
Microsoft

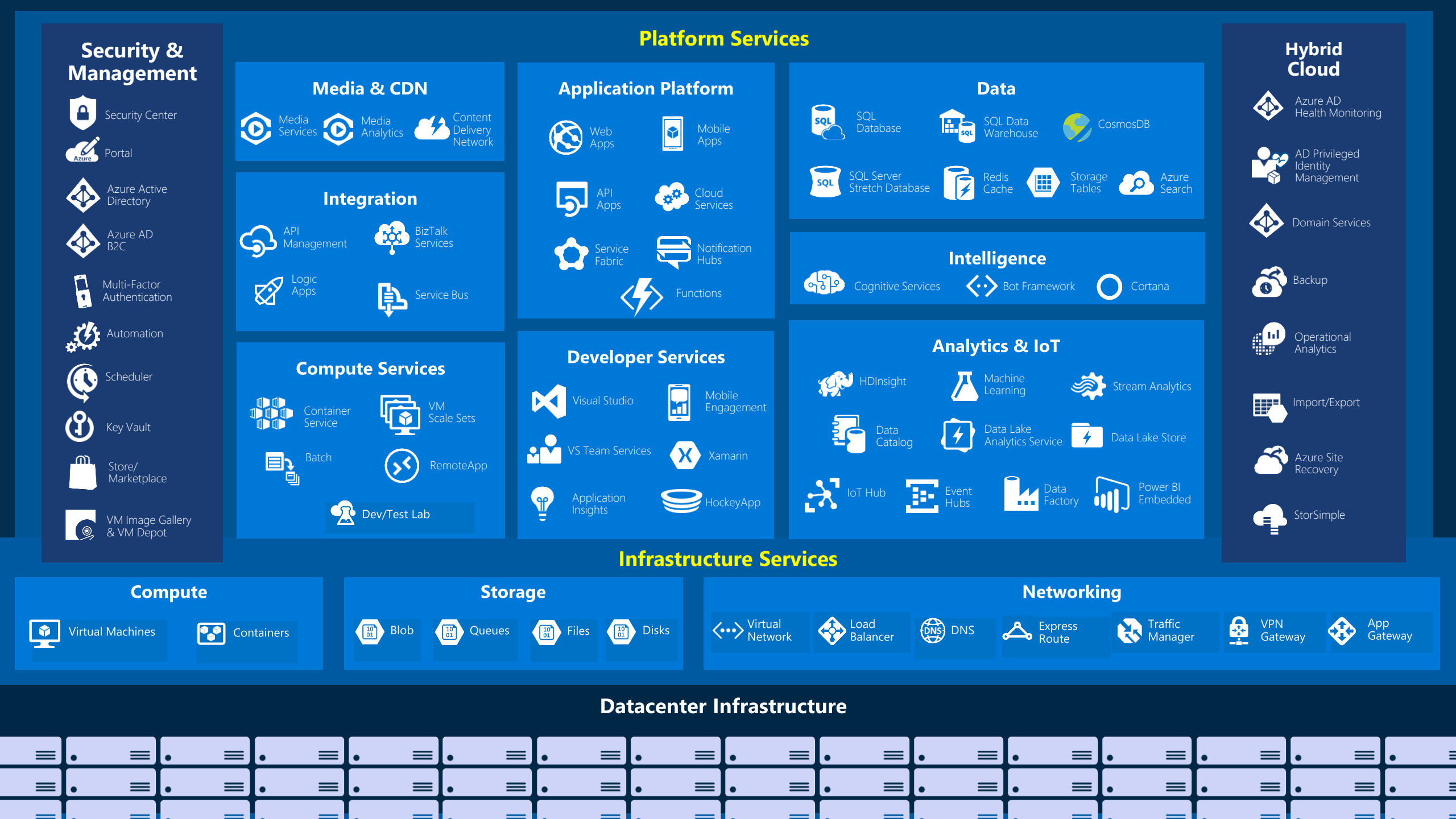
Azure Site Recovery and Azure Backup

Sreedar Radhakrishnan

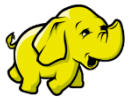
Hyper scale Infrastructure is the enabler

Cloud service models




Platform Services
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
Application Platform
Web Apps
Mobile Apps
API Apps
Cloud Services
Service Fabric
Notification Hubs
Functions
Developer Services
Visual Studio
Mobile Engagement
VS Team Services
Xamarin
Application Insights
HockeyApp
Data
SQL Database
SQL Data Warehouse
CosmosDB
SQL Server Stretch Database
Redis Cache
Storage Tables
Azure Search
Intelligence
Cognitive Services
Bot Framework
Cortana
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
Infrastructure Services
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

Open source support

DevOps		Nagios	VAGRANT		GRUNT				Xamarin	
Management	CHEF	puppet labs	ANSIBLE	SALTSTACK			mist.io	libcloud		SCALR CLOUD MANAGEMENT
Applications		Joomla!	Drupal™		APPRENDA					
App frameworks & tools	php	nodeJS		.JS	Ruby	IJ	eclipse			
Databases & middleware		redis	CLEARDB	cloudera	MySQL™	mongoDB.		Couchbase		
Infrastructure			redhat	suse		bitnami	ORACLE LINUX	FreeBSD	docker	

Azure covers 73 compliance offerings

Azure has the deepest and most comprehensive compliance coverage in the industry

Global

- ☑ ISO 27001:2013
- ☑ ISO 27017:2015
- ☑ ISO 27018:2014
- ☑ ISO 22301:2012
- ☑ ISO 9001:2015
- ☑ ISO 20000-1:2011
- ☑ SOC 1 Type 2
- ☑ SOC 2 Type 2
- ☑ SOC 3
- ☑ CSA STAR Certification
- ☑ CSA STAR Attestation
- ☑ CSA STAR Self-Assessment
- ☑ WCAG 2.0

US Gov

- ☑ FedRAMP High
- ☑ FedRAMP Moderate
- ☑ EAR
- ☑ DoD DISA SRG Level 5
- ☑ DoD DISA SRG Level 4
- ☑ DoD DISA SRG Level 2
- ☑ DFARS
- ☑ DoE 10 CFR Part 810
- ☑ NIST SP 800-171
- ☑ NIST CSF
- ☑ Section 508 VPATs
- ☑ FIPS 140-2
- ☑ ITAR
- ☑ CJIS
- ☑ IRS 1075

Industry

- ☑ PCI DSS Level 1
- ☑ GLBA
- ☑ FFIEC
- ☑ Shared Assessments
- ☑ FISC (Japan)
- ☑ APRA (Australia)
- ☑ FCA (UK)
- ☑ MAS + ABS (Singapore)
- ☑ 23 NYCRR 500
- ☑ HIPAA BAA
- ☑ HITRUST
- ☑ 21 CFR Part 11 (GxP)
- ☑ MARS-E
- ☑ NHS IG Toolkit (UK)
- ☑ NEN 7510:2011 (Netherlands)
- ☑ FERPA
- ☑ CDSA
- ☑ MPAA
- ☑ FACT (UK)
- ☑ DPP (UK)
- ☑ SOX

Regional

- ☑ Argentina PDPA
- ☑ Australia IRAP Unclassified
- ☑ Australia IRAP Protected
- ☑ Canada Privacy Laws
- ☑ China GB 18030:2005
- ☑ China DJCP (MLPS) Level 3
- ☑ China TRUCS / CCCPPF
- ☑ EN 301 549
- ☑ EU ENISA IAF
- ☑ EU Model Clauses
- ☑ EU – US Privacy Shield
- ☑ Germany IT-Grundschutz workbook
- ☑ Germany C5
- ☑ India MeitY
- ☑ Japan CS Mark Gold
- ☑ Japan My Number Act
- ☑ Netherlands BIR 2012
- ☑ New Zealand Gov CIO Fwk
- ☑ Singapore MTCS Level 3
- ☑ Spain ENS
- ☑ Spain DPA
- ☑ UK Cyber Essentials Plus
- ☑ UK G-Cloud
- ☑ UK PASF

https://aka.ms/AzureCompliance

Cloud adoption will continue to grow

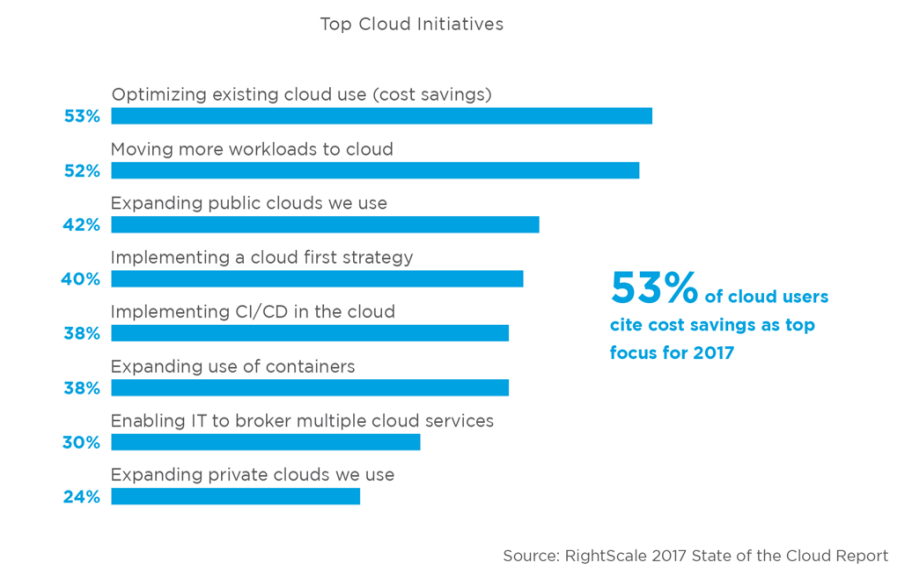
Datacenter consolidation and app migration are key drivers

Cloud IaaS is fastest growing subsegment, projected to grow **36.6% in 2017, 30.1% CAGR for next 5 years**

—Gartner and IDC

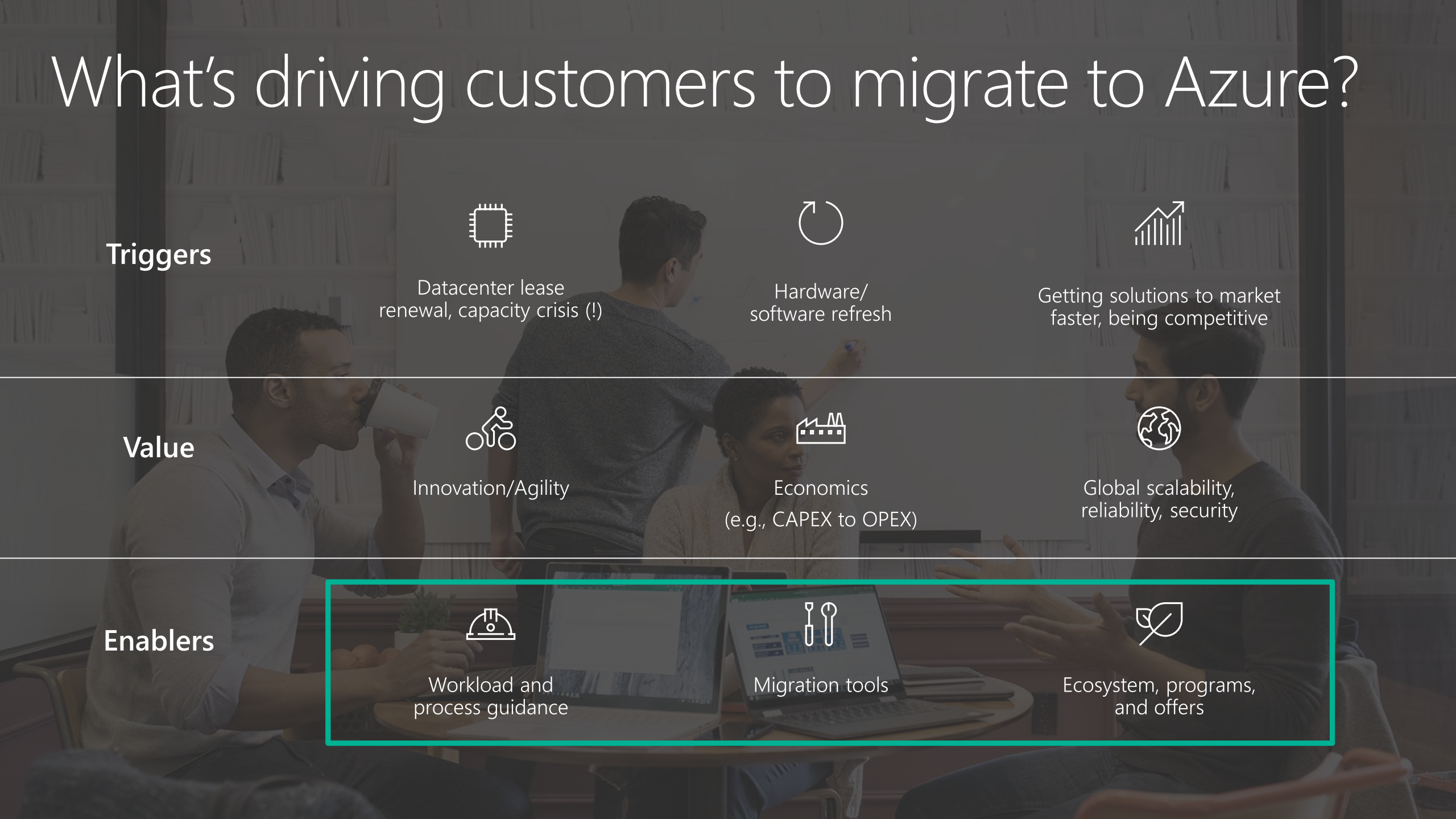
80% of CIOs will be pressured by their business leaders to evaluate **migrating their datacenters** to cloud IaaS

—Gartner



Top 2 initiatives:
1) Moving to the cloud
2) Optimizing what's in it

What's driving customers to migrate to Azure?



Triggers

Datacenter lease renewal, capacity crisis (!)

Hardware/ software refresh

Getting solutions to market faster, being competitive

Value

Innovation/Agility

Economics (e.g., CAPEX to OPEX)

Global scalability, reliability, security

Enablers

Workload and process guidance

Migration tools

Ecosystem, programs, and offers

Approaches to workload migration

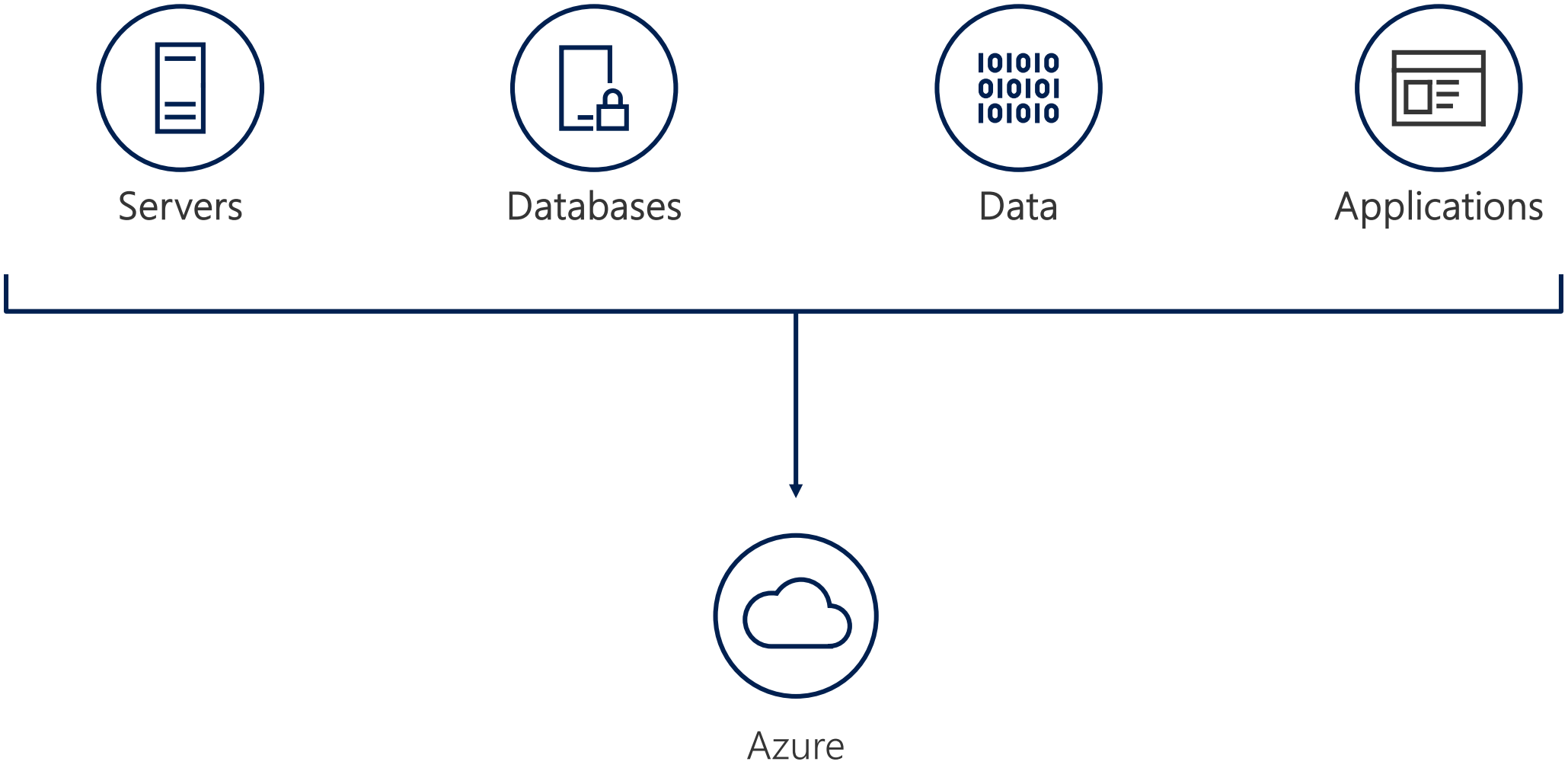
Lift and shift

Operational efficiency,
lower risk and effort

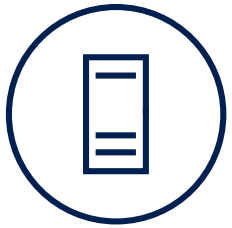
Modernize

Agility and innovation,
more effort

What are customers looking to migrate?



Migrating workloads to Azure: Scenario guidance



Servers

[Windows Server, Linux – physical or virtual]

Lift and shift legacy apps (e.g., web servers) and infrastructure (e.g., AD, DNS) to Azure IaaS

Refactor corporate apps/workloads to O365 (e.g., SharePoint, Exchange, Lync/SfB)

Modernize critical workloads to latest OS in Azure

Databases

[SQL Server]

Lift & shift SQL Server apps to Azure SQL Database Managed Instance (MI); consider SQL IaaS for 3rd party integration needs

Lift and shift SQL DW/BI workloads to Azure SQL Database MI or Azure SQL DW

Modernize critical SQL apps to Azure SQL Database

Data

[Archive, Blob, File servers]

Replicate over the network (E.g., Azure Copy, Azure Archive Storage)

Refactor file servers to Azure Files

Transfer offline based on data volume (e.g., using Azure Data Box, Azure Import/Export)

Applications

[internal LOB apps, customer facing apps - .NET/LAMP]

Re-host legacy apps on Azure IaaS

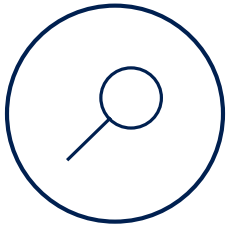
Refactor critical app components (e.g., Azure container service, DevOps)

Rearchitect key apps (e.g., Azure App Service, Azure Functions)

Attach Azure management and security to every migrated workload (e.g., backup, monitoring, security assessments)

A proven approach to Azure migration

Tops-down buy in: Business case | Executive sponsorship | LoB, app dev, & IT stakeholder alignment

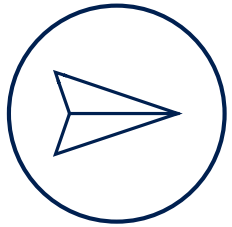


Discover

Automated server, app, and database discovery

Intelligent workload right-sizing and costing for maximum ROI

Workload configuration analyses and recommendations

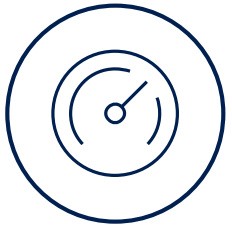


Migrate

Effortlessly lift and shift servers, apps, databases, and data

Easily containerize existing applications and infrastructure

PaaS modernization options for apps and databases



Optimize

Secure & well managed infrastructure (e.g., backup, monitoring, security assessments, cost management)

Continual right-sizing suggestions

Azure Hybrid Benefit and Azure RI recommendations

Foundational investments: Capabilities (e.g., networking, identity, security) | Process (e.g., DevOps) | Skills

Migration tools

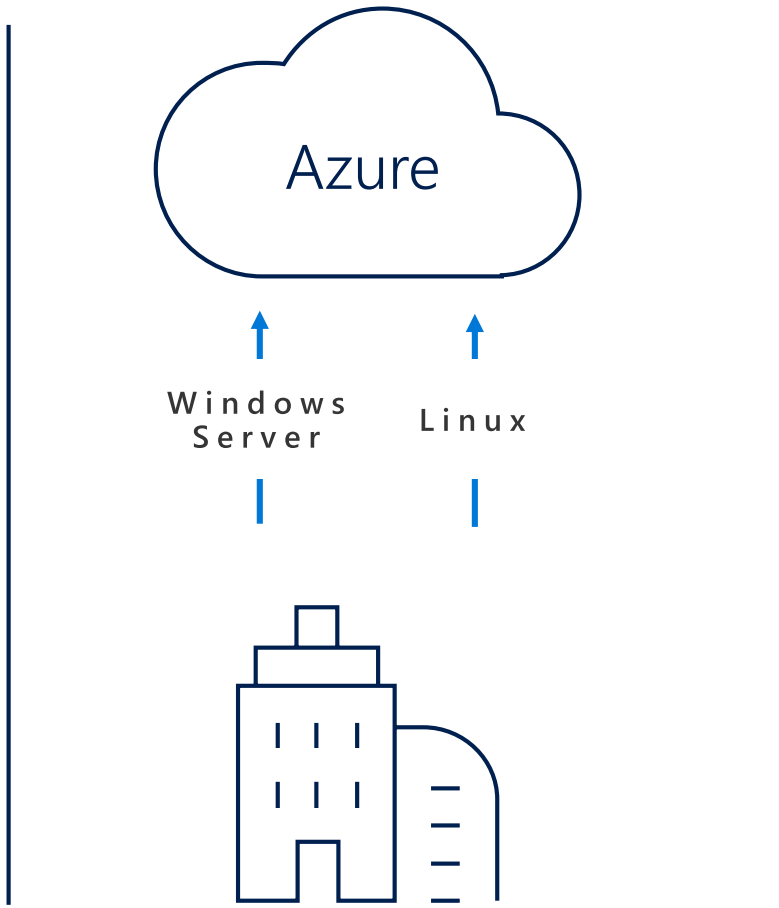
Choice of tools for every stage of workload migration

	Discover	Migrate	Optimize
Microsoft	Azure Migrate Database Migration Assistant	Azure Site Recovery Azure Database Migration Service Azure Data Box	Azure management and Security (e.g., backup, monitoring, security assessment) Azure Cost Management (Cloudyn)
Partners	MOVERE, Cloudamize, ATTUNITY	VEEAM, turbonomic, DATOMETRY	Zerto, CloudEndure®, MORPHIS	CloudAtlas®, Corent, Informatica

Azure Migrate

What does it do?

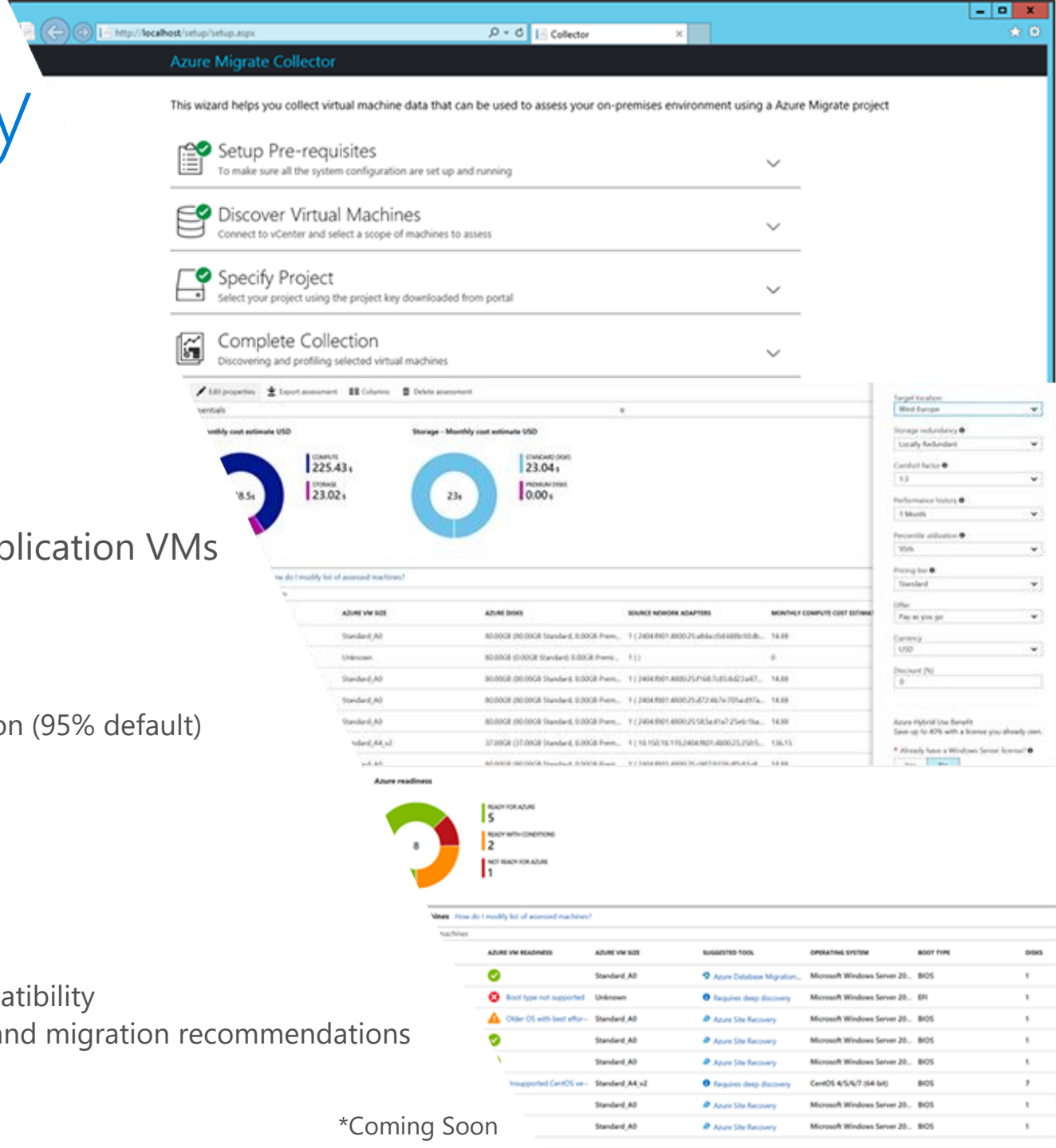
- Easily **discover** on-premises **VMs and apps**, including rich service dependency maps
- Insightful workload **assessments**:
  - Right-sized Azure resources based on utilization history
  - Estimated monthly run costs in Azure
  - Migration risks and recommended tools
  - Built-in dependency mapping



Azure Migrate discovery and assessment

Intelligent right-sizing and analysis

- Agentless VM discovery through virtual appliance
  - Supporting vSphere
  - Windows Server and Linux VMs
- Dependency mapping to ensure full visibility of all application VMs
  - Understand all server and application connections
  - Discover unknown relationships to ensure thorough migration
- Intelligent right-sizing
  - Recommendations for Azure series targeting indicated utilization (95% default)
- Cost analysis
  - Application group cost analysis for superior budgeting
  - Region and currency specific
  - Enabled for Azure Hybrid Benefit for Windows Server
- Azure readiness
  - Deep assessment of virtual machines to determine Azure compatibility
  - Reporting on VM readiness, suggested configuration updates and migration recommendations
  - Azure Database Migration Service integration



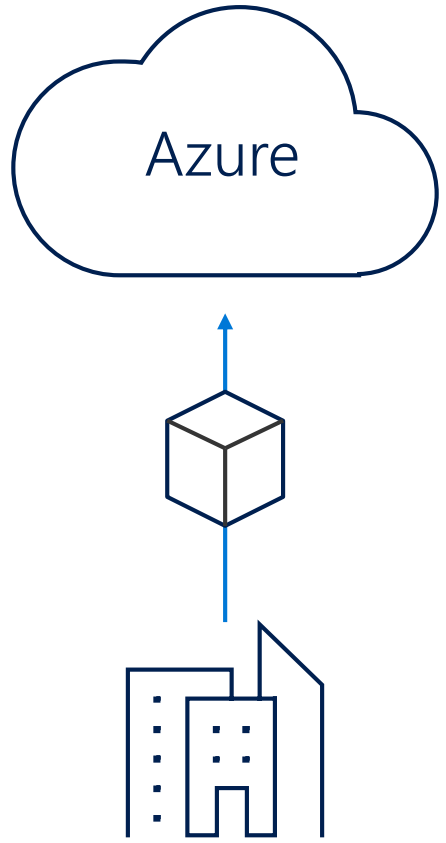
*Coming Soon

Azure Site Recovery (ASR)

Migrate applications/VMs to Azure IaaS with confidence

Effortless migration of VMs and apps to Azure

- **Zero** application **data loss** during migration
- **Near-zero** application downtime during migration
- **Broad coverage** for hypervisors, applications, operating systems, and Azure features
- No-impact application testing in Azure
- **Free** usage during migration

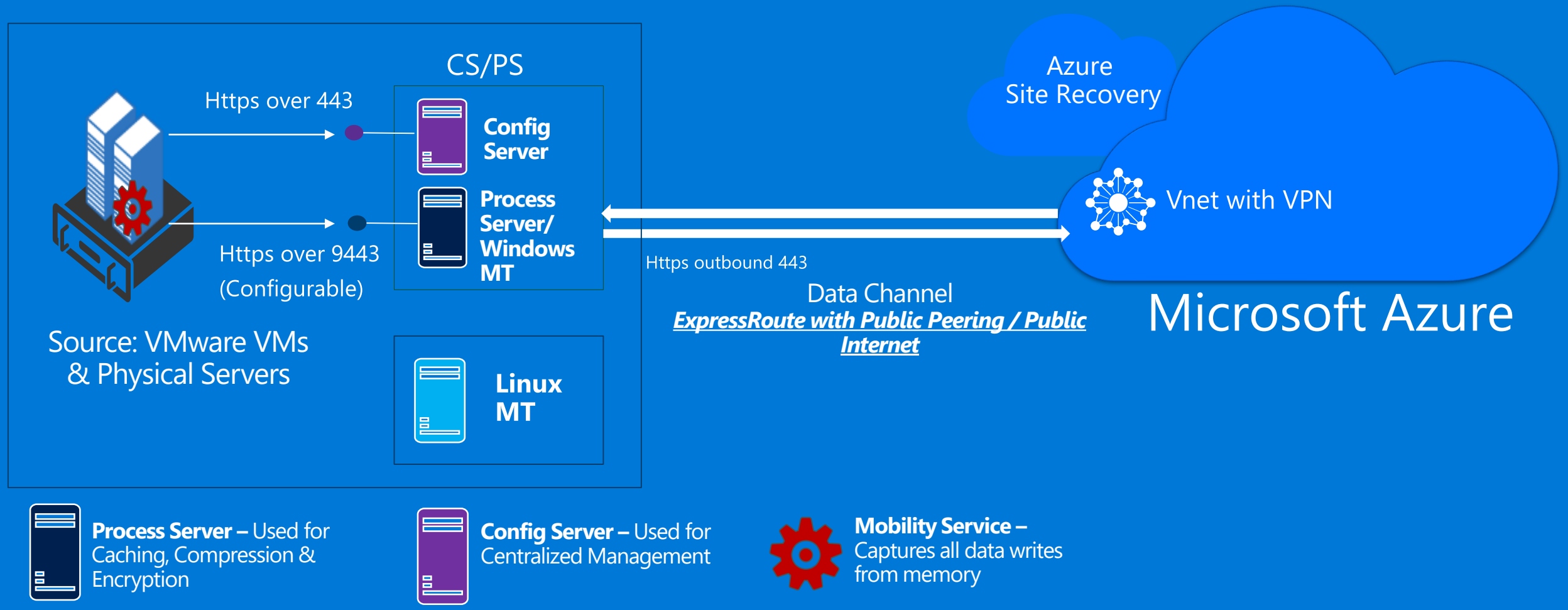


ASR Deployment Requirements

Replicate to Azure

- Azure Account
- Azure Storage Account
  - In Azure Portal you can use GRS or LRS Storage
  - In Azure Portal Premium Storage is supported
- Azure Network
- On-Premises
  - vSphere hosts/vCenter server: You'll need one or more vSphere host servers running VMware VMs. We recommend that you deploy a vCenter server to manage those hosts
  - VMware VM's
- Protected Machines

VMware/Physical to Azure DR/Migration



ASR Components

Configuration Server:

- Coordinates communication between your on-premises environment and Azure, and manages data replication and recovery.

Process server:

- It receives replication data from protected source machines, optimizes it with caching, compression, and encryption, and sends the data to Azure storage.
- Handles push installation of the Mobility service to protected machines, and performs automatic discovery of VMware VMs.

Master target server:

- Handles replication data during failback from Azure.

VPN connection:

- For failback you'll need a VPN connection (or Azure ExpressRoute) set up from the Azure network to the on-premises site.

ASR Components

Mobility Service:

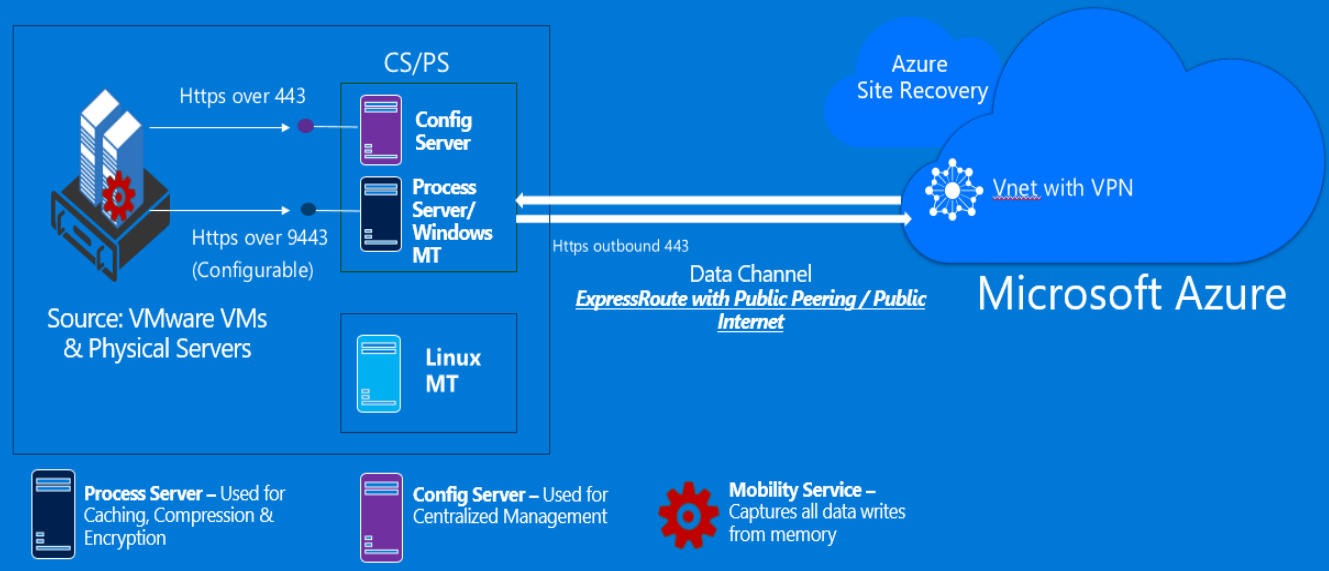
- This component is deployed on every machine (VMware VM or physical server) that you want to replicate to Azure. It captures data writes on the machine and forwards them to the process server.

Azure:

- You don't need to create any Azure VMs to handle replication and failover to Azure.
- The storage account and network must be in the same region as the Recovery Services vault.

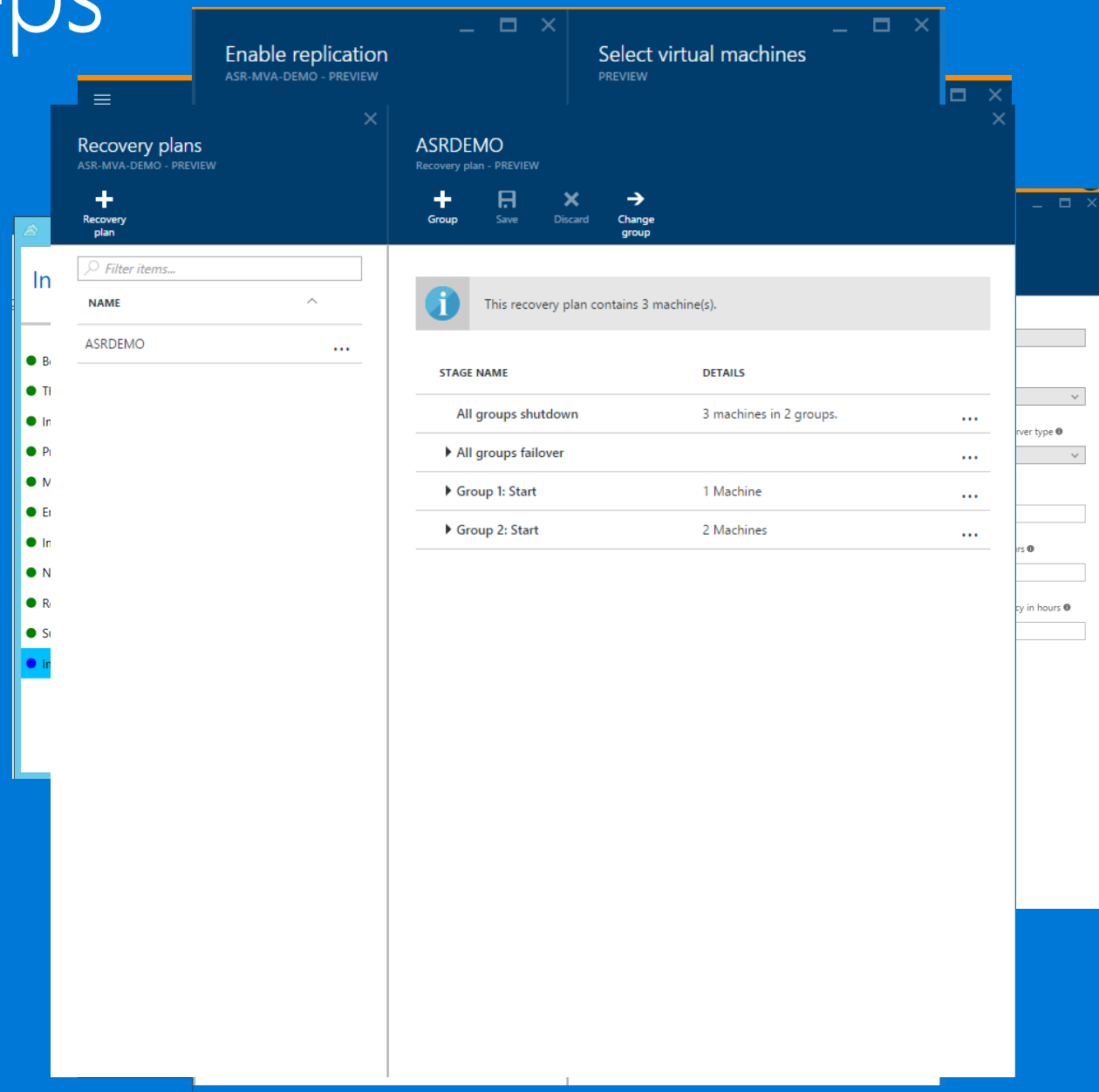
VMware/Physical to Azure DR/Migration

- ✓ Replicate VMware VMs to Azure (Supports VSphere 6.5 6.0, 5.5)
- ✓ Replicate Windows & Linux VMs (or Physical Machines)
- ✓ App & Crash Consistency
- ✓ RPO of minutes
- ✓ Support for Unplanned and Test Failover
- ✓ Integrated Failback with smart sync
- ✓ Recovery Plan support
- ✓ Simple, consistent Azure UX



Protection & Failover Steps

- Create a Recovery Services Vault
- Install & Register On-premises Software
- Add VCenter Server
- Create & Associate a Replication Policy
- Replicate Virtual Machines
- Configure VM properties/Network
- Perform Test Failover
- Create Recovery Plan & Failover
- Configure re-protection & Failback



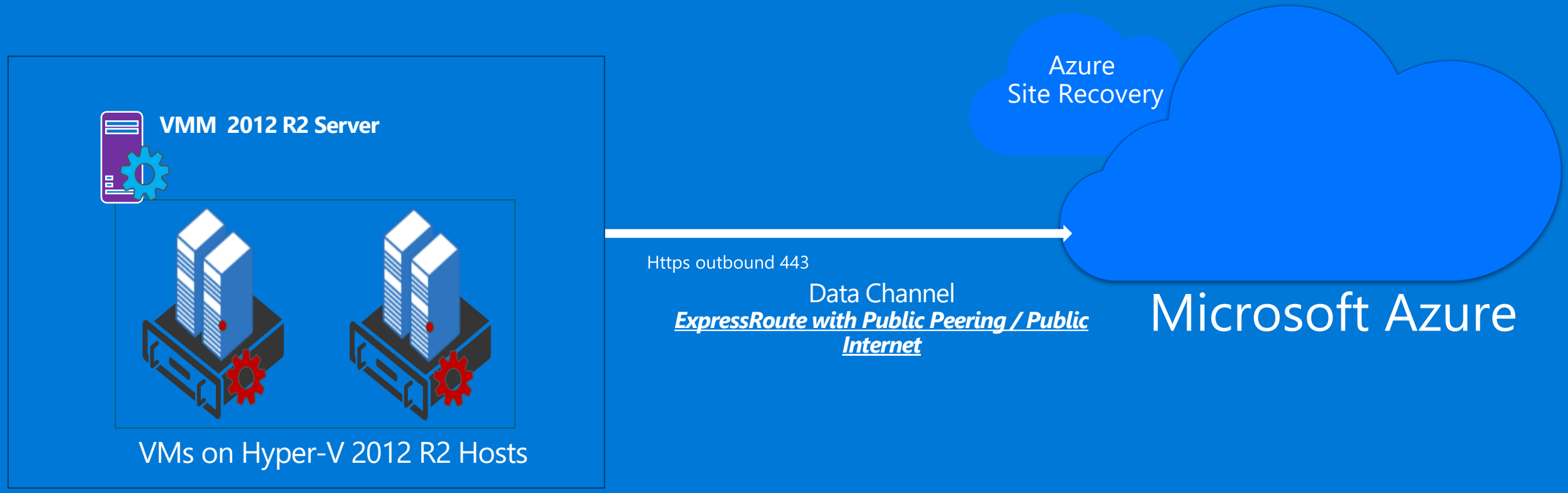
Comprehensive workload support

Host	vCenter Server and vSphere support 6.5, 6.0, 5.5 Hyper-V Physical
Windows Guest OS support	Windows Server 2016 NEW Windows Server 2012 R2 Windows Server 2012 Windows Server 2008 R2
Linux Guest OS support	RHEL 5.*, 6.* and 7.* Cent OS 5.*, 6.* and 7.* Ubuntu 14.04 and 16.04 LTS NEW SUSE Enterprise Server 11 SP3, SP4 OEL 6.4 and 6.5 Debian 7 and 8 support NEW
Azure platform support	Managed Disk NEW Up to 4TB data disk support NEW Encrypted Storage NEW Azure Hybrid Benefit NEW

Support Matrix

https://aka.ms/asr_supportmatrix

Hyper-V to Azure (with VMM) for DR/Migration



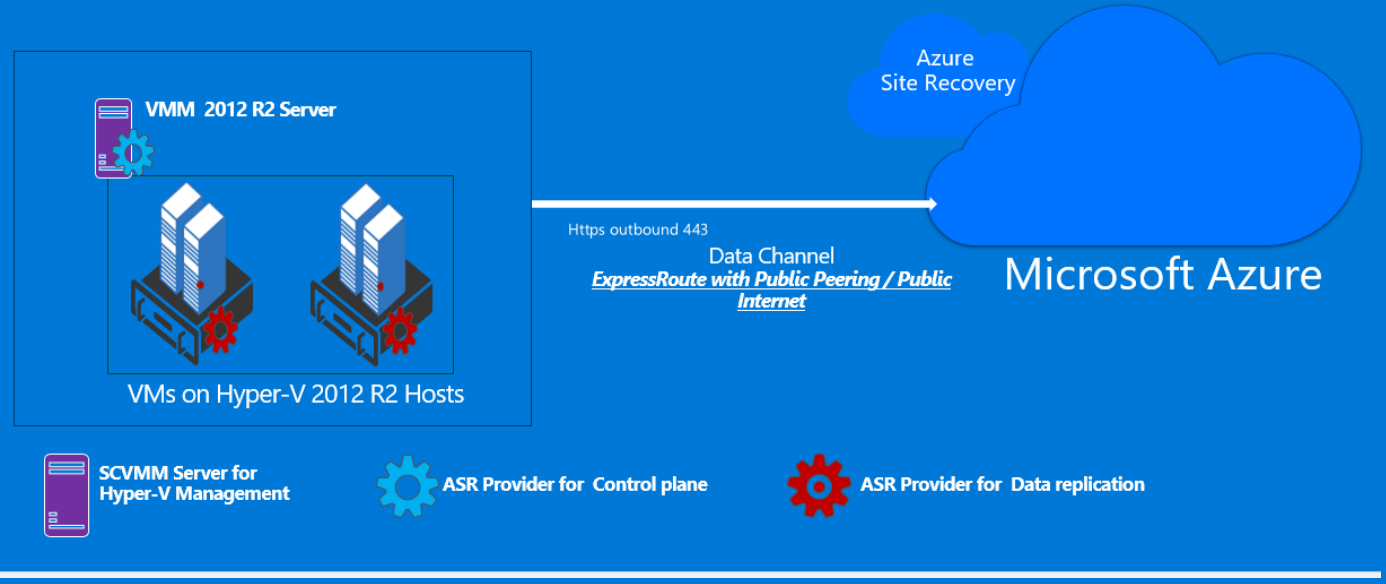
SCVMM Server for Hyper-V Management

ASR Provider for Control plane

ASR Provider for Data replication

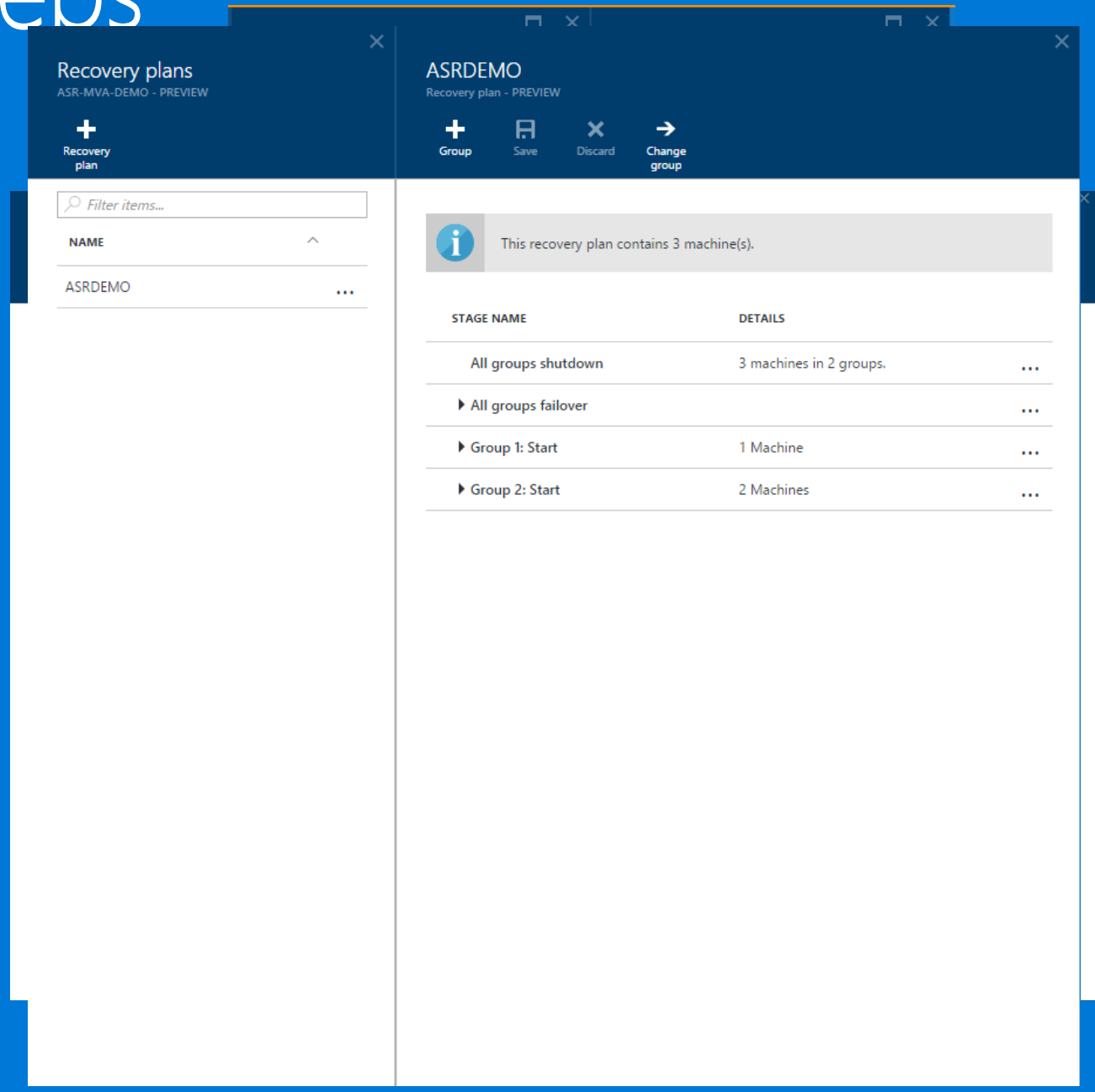
Hyper-V to Azure (with VMM)

- ✓ Replicate Hyper-V 2012R2 and 2016 VMs to Azure
- ✓ Replicate Windows & Linux VMs
- ✓ App & Crash Consistency
- ✓ Supports Gen1 & Gen2, VHD/VHDx
- ✓ RPO of seconds & minutes
- ✓ Support for Planned, Unplanned and Test Failover
- ✓ Integrated Failback
- ✓ Recovery Plan support
- ✓ Simple, consistent Azure UX

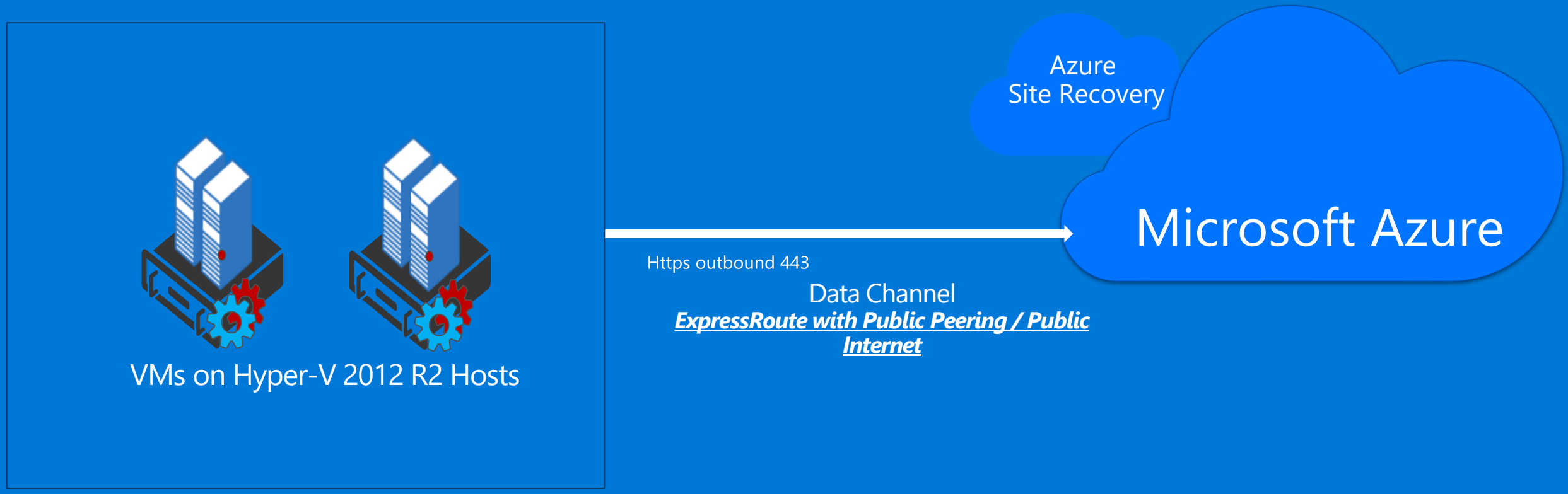


Protection & Failover Steps

- Create a Recovery Services Vault
- Install & Register ASR Provider on VMM
- Install ASR agent on Hosts
- Create & Associate a Replication Policy
- Replicate Virtual Machines
- Configure Network Settings
- Perform Test Failover
- Create Recovery Plan & Failover
- Configure re-protection & Failback



Hyper-V to Azure for DR/Migration



Current IaaS Disaster Recovery Strategies

Challenges with current approaches

Active-Active deployment

- High operational cost
- Application coverage may be limited

Leveraging RA-GRS / GRS to build your own DR

- High RTO
- No application consistency

Replication using third party tools

- High operational cost
- Only data replication; no application-aware recovery

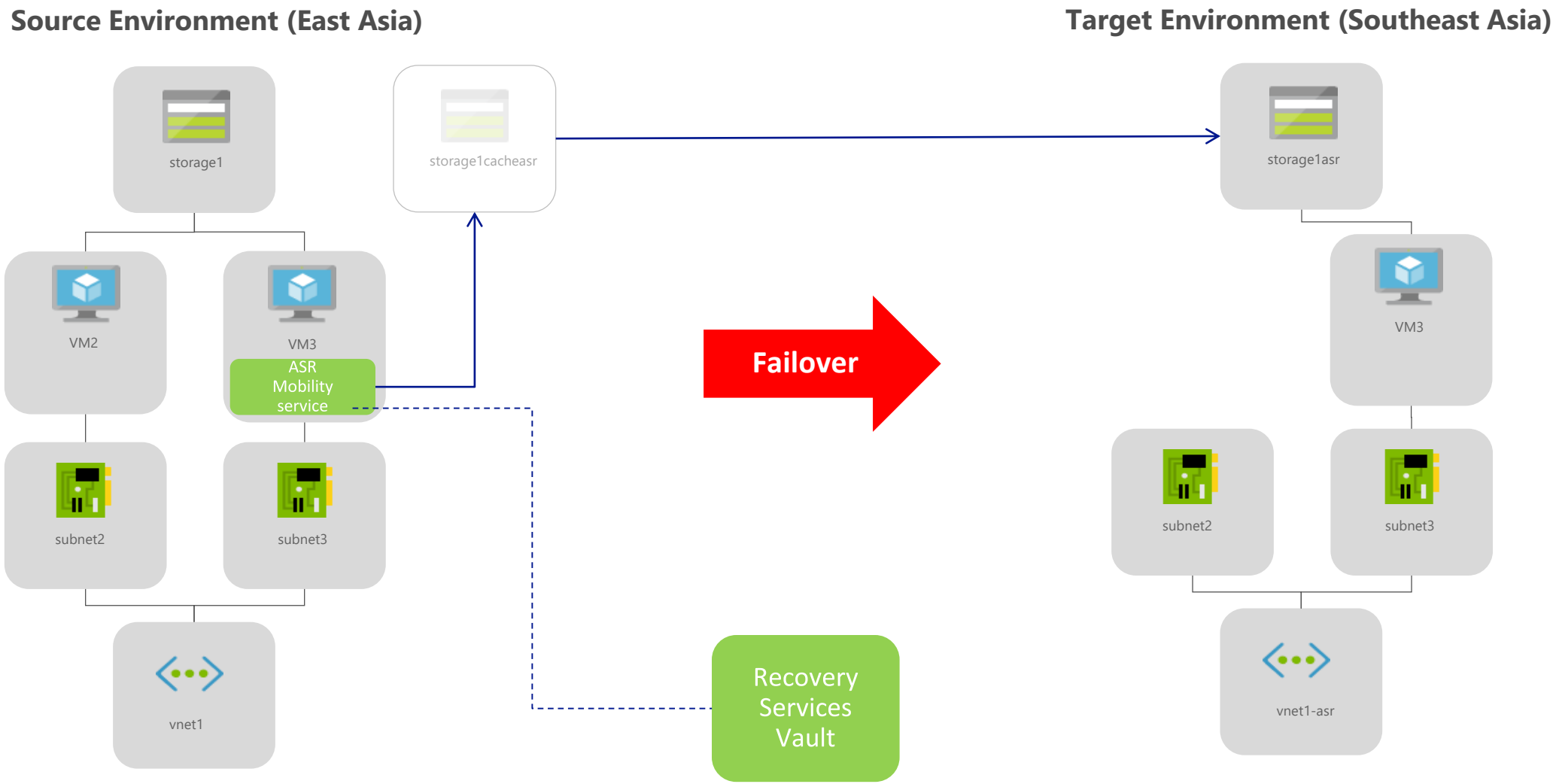
Comparison Matrix

	Active-Active Deployment	Storage Replication	3rd-party	Azure Site Recovery
DR infrastructure	$	$	$$	No additional Infrastructure
Simplicity	↓	↔	↓	One-click protection and recovery
DR drill support	✖	✖	✖	No impact DR drills
Application consistency	↔	✖	↔	Yes
RTO	↑	↓	↔	Within minutes
RPO	↔	↓	↔	Within seconds

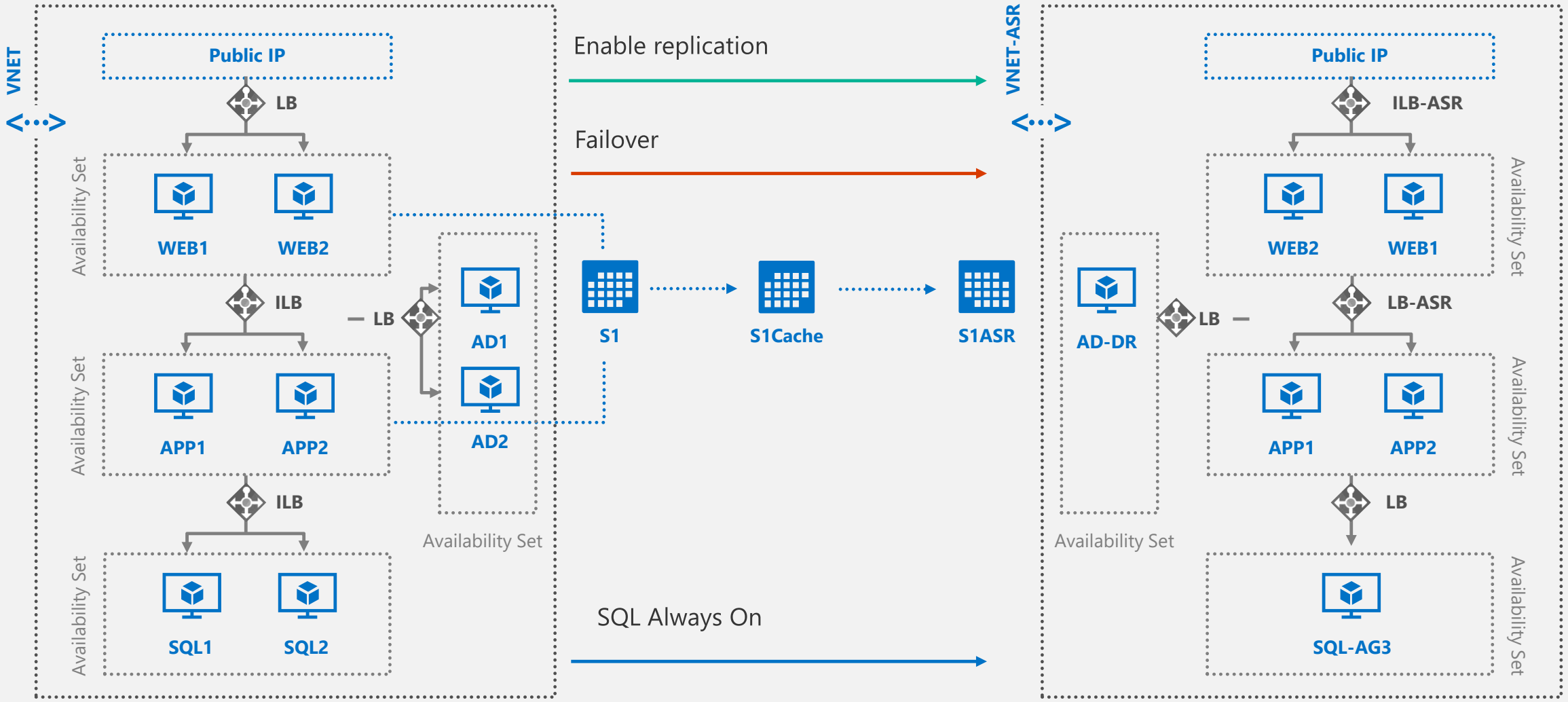
Azure IaaS DR with Site Recovery

- ✓No DR infrastructure
- ✓Automated protection and replication
- ✓Best in class RPO and RTO
- ✓No-impact DR Drill
- ✓Orchestrated recovery plans for application DR
- ✓Failback support

High Level Architecture



Application-aware disaster recovery



Azure Backup Overview

Consistent management from anywhere

Backup of Azure IaaS VMs

First-class protection for cloud assets

Protect remote apps

Disk for operational recovery with cloud LTR

Protect enterprise apps

Eliminate tapes with heterogeneous solution

Fundamental cloud-first architecture

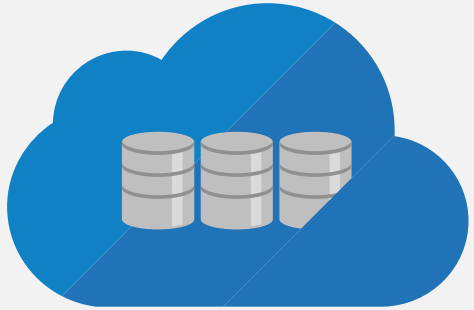
Cloud Backup Approaches

Cloud as storage target

- On-premises infrastructure
- Crude restore
- Complex maintenance

Cloud as another datacenter

- High compute cost
- IaaS limitations
- Multi-vendor & licensing



Backup as a Service

- No compute, no software license cost
- Free, intelligent restores
- PAYG, cloud scale

Azure Backup Scenarios

Azure Scenarios

- Azure IaaS VM Backup
- Azure Backup (MARS) – File and Folder
- SQL Azure (PaaS) Backup

On-Premises Hybrid IT Scenarios

- Long-term Retention and Off-siting
- Branch-Office remote-site backups
- VMWare Backup