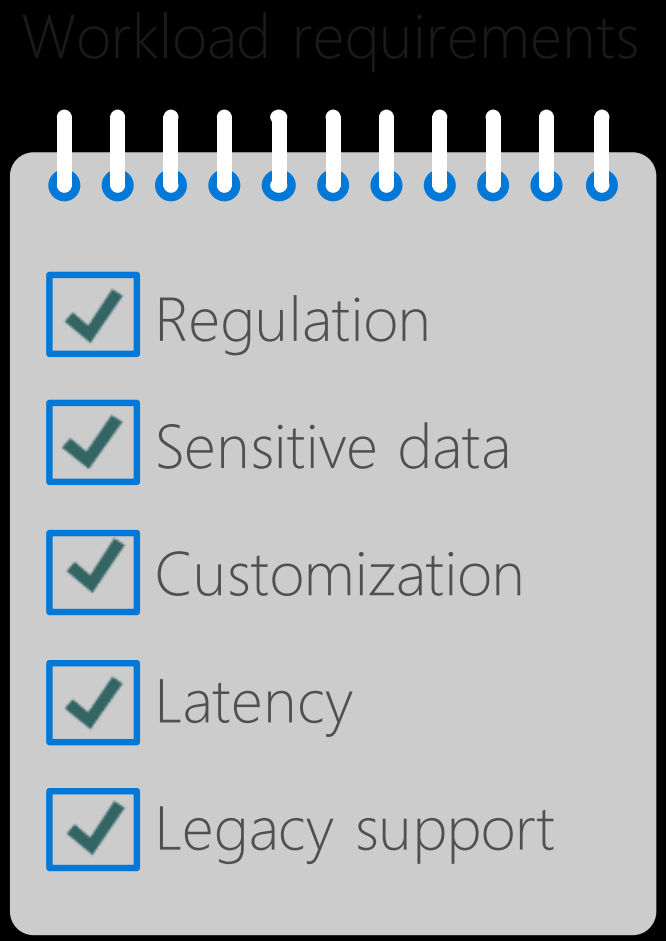
Microsoft

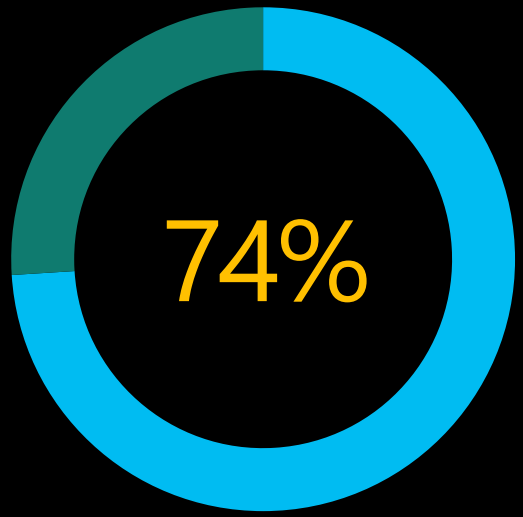
Azure Arc

Yasin Saygılı
Sr. Cloud Solutions Architect @ Turkcell DBS

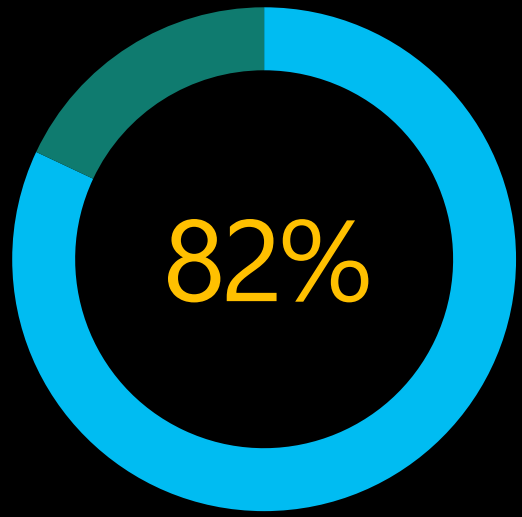
yasin.saygili@turkcell.com.tr

Hybrid cloud, a reality today





Enterprises believe a hybrid cloud will enable business growth[1]



Enterprises have a hybrid cloud strategy, up from 74 percent a year ago[2]

Sources: 1. Avanade, Global Study: Hybrid Cloud–From Hype to Reality (Dec 2014); 2. IDC Cloud Predictions for 2015 (Dec 2014).

Customer environments and application requirements are evolving

Single control plane with Azure Arc

How to govern and operate across disparate environments?

How to ensure security across the entire organization?

How to best enable innovation and developer agility?

How to meet regulatory requirements and overcome technical hurdles?

100's–1,000's of apps

- VMs
- Databases
- Containers
- Serverless

Diverse infrastructure

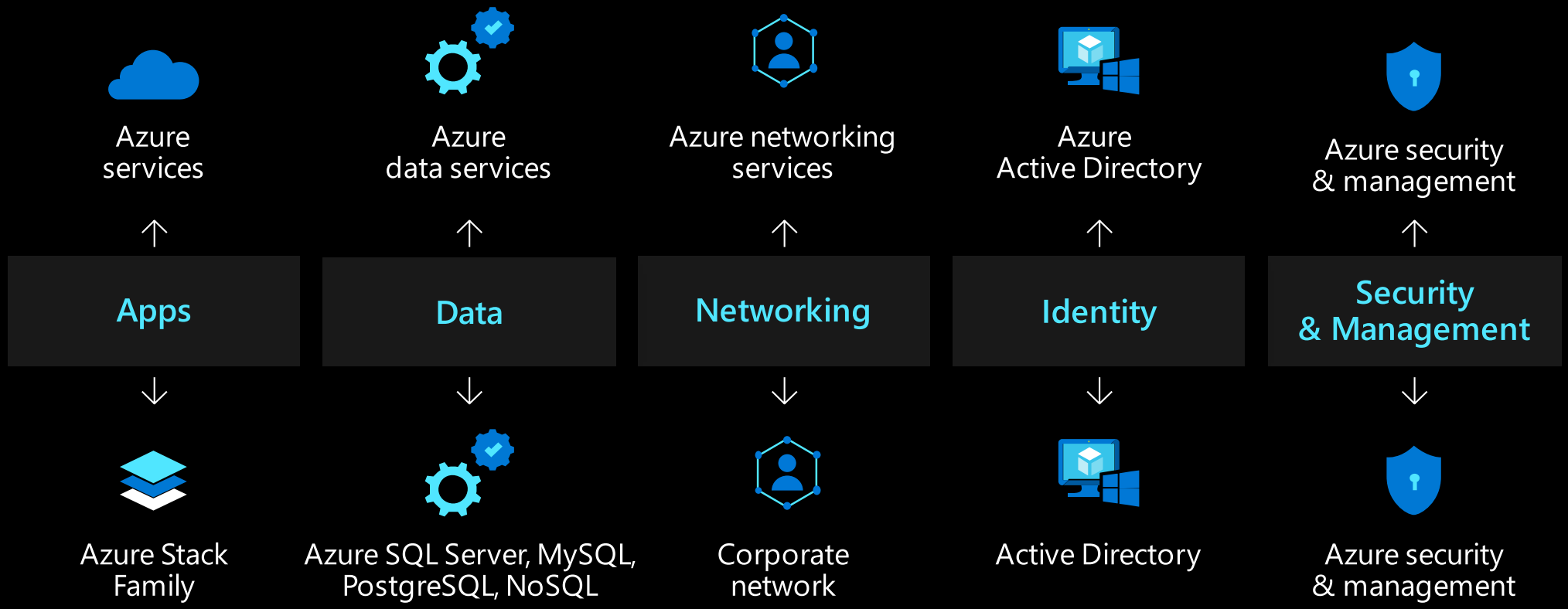
- Datacenters
- Hosters
- Branch offices
- OEM hardware
- IoT devices
- Edge

Multi-cloud

- Microsoft Azure
- aws
- Google Cloud

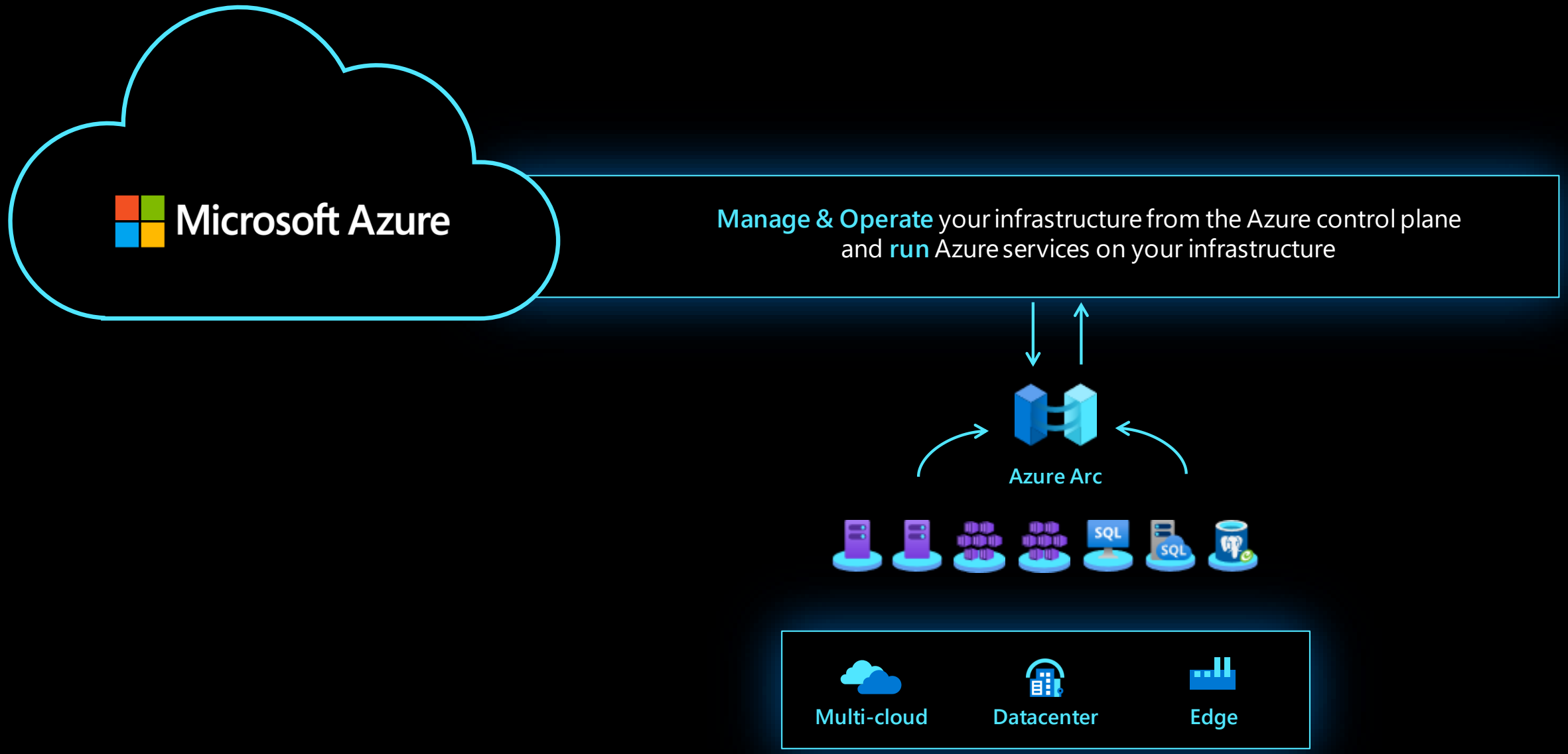
Azure

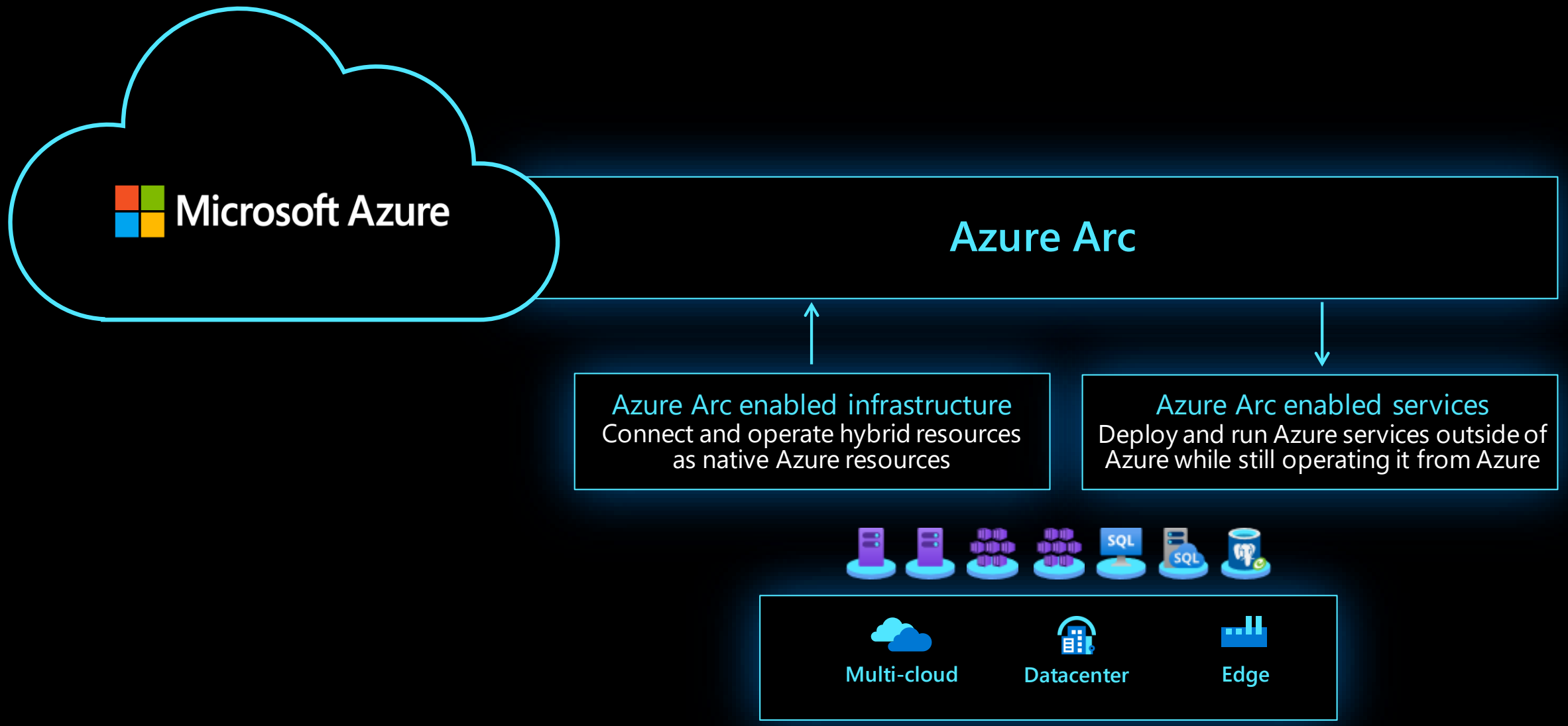
The only consistent, comprehensive hybrid cloud



Azure Hybrid

Innovation anywhere with Azure

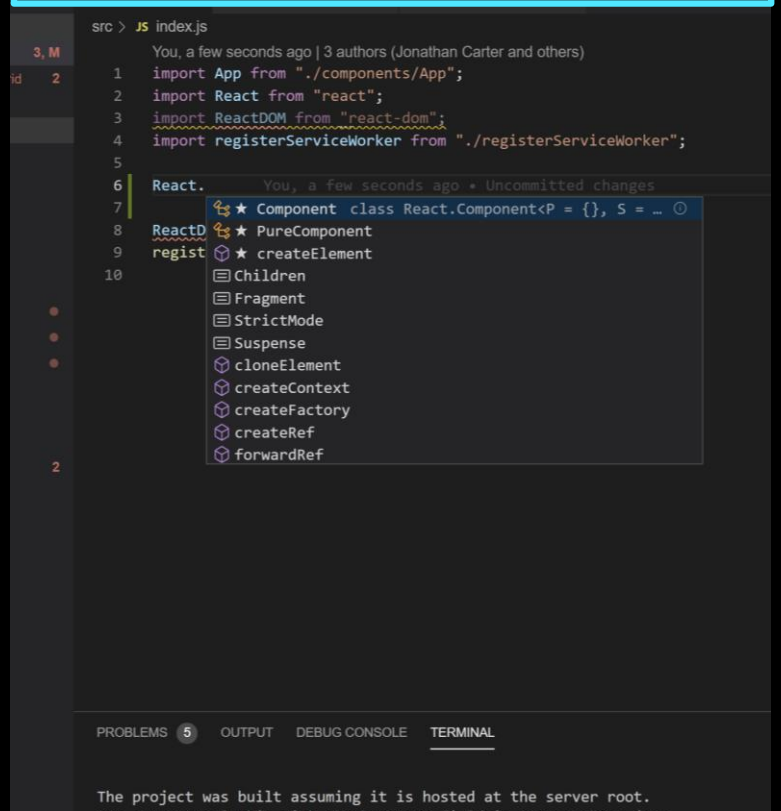

Microsoft Azure
Manage & Operate your infrastructure from the Azure control plane
and run Azure services on your infrastructure
Azure Arc
SQL
SQL
Multi-cloud
Datacenter
Edge


Microsoft Azure
Azure Arc
Azure Arc enabled infrastructure
Connect and operate hybrid resources as native Azure resources
Azure Arc enabled services
Deploy and run Azure services outside of Azure while still operating it from Azure
SQL
SQL
Multi-cloud
Datacenter
Edge

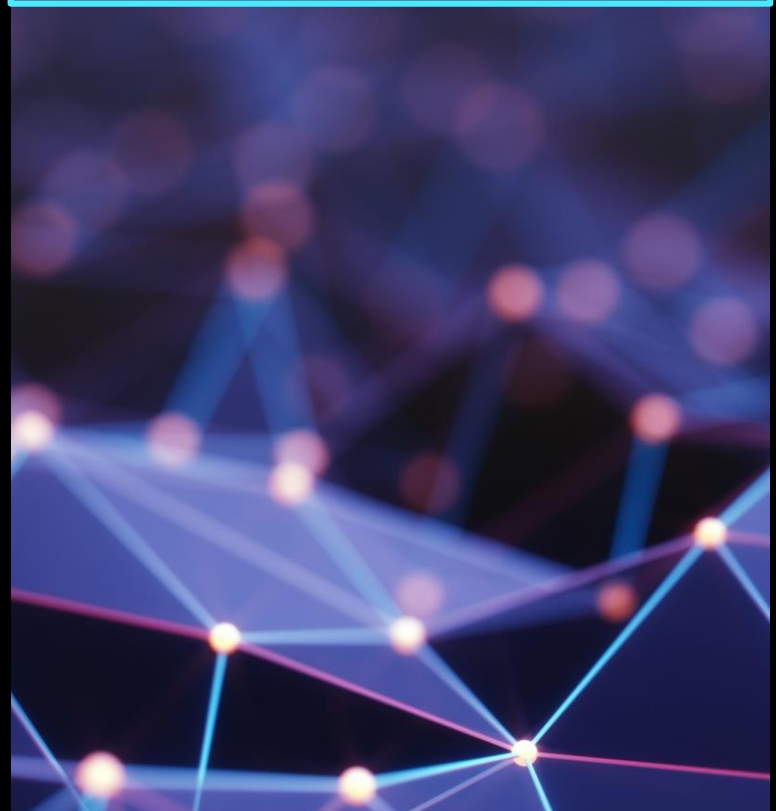
Azure Arc use cases

Organize and govern across environments

At-scale Kubernetes app management



Run data services anywhere

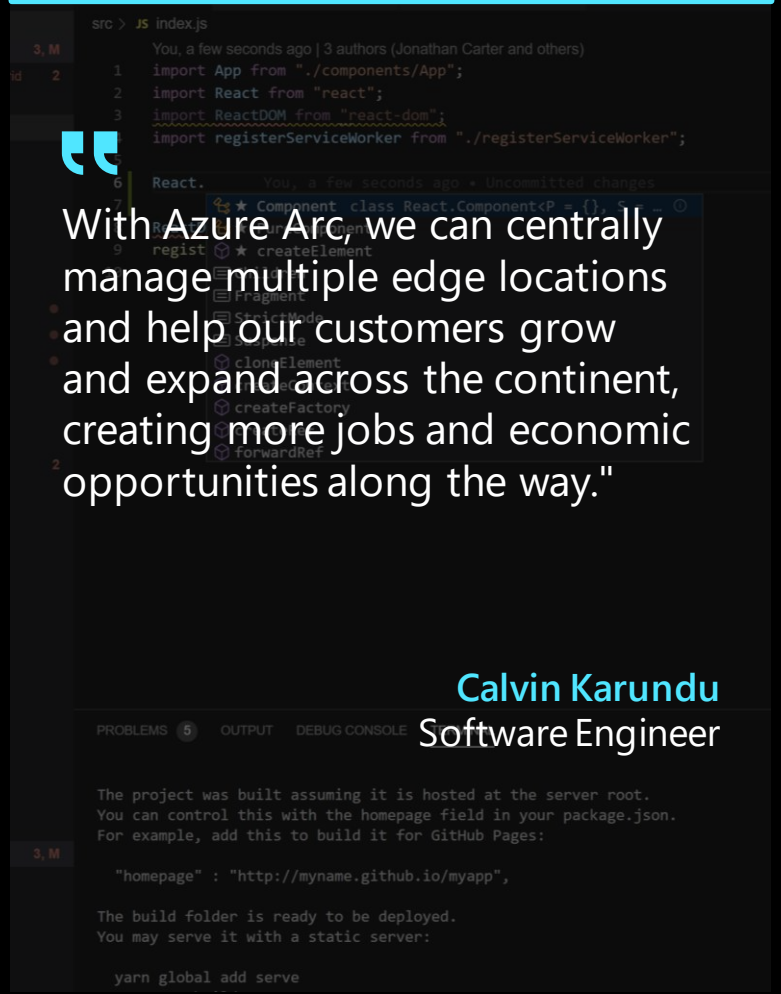


avanade

Azure is already trusted and proven by our customers. Azure Arc uses the same APIs and the same control plane as Azure, providing consistency across the hybrid infrastructure, which increases productivity and reduces risk."

Mike DeLuca
Global Lead for Hybrid

Africa's Talking



With Azure Arc, we can centrally manage multiple edge locations and help our customers grow and expand across the continent, creating more jobs and economic opportunities along the way."

Calvin Karundu
Software Engineer

FERGUSON

For me, the main benefit is that my managers do not have to go to three different places to see the health of our database environment. I want to reinforce this over and over again because that's what's driving us."

Kristina Melo
SQL Database Administrator


Azure Arc
Africa's Talking
atmosera
avanade
BrainScale
ClearDATA
The Software Experts
Crayon
DEXMACH
EY
Building a better working world
FERGUSON
FUJITSU
Insight
KPMG
Red Hat
SIEMENS
Healthineers

Customer challenges when hybrid

Complexity

"I need to have health visibility in a single pane of glass to all my existing and future infrastructure and applications."

Compliance

"I need to manage security and incident management across my public cloud and datacenter assets."

Inconsistency

"I want my on-prem skills to work in the cloud, and my cloud skills to work on-prem."

Regulation

"Our DB layer must remain on-premises due to sensitive patient data and data availability needs."

Latency

"We can't take a dependency on the internet. If we lose connectivity, we still want to be able to access the data."

Legacy

"Our older systems take too much maintenance. We want evergreen technology and to pay for it like a utility."


Multi-cloud


Datacenter


Edge

Microsoft Azure

Azure Arc

Azure Arc enabled infrastructure

Connect and operate hybrid resources as native Azure resources

Visibility

Bring distributed Windows, Linux, SQL and Kubernetes together a single plane of glass

Compliance

Reduce risk and cost by establishing a single governance frame for all your workloads without additional overhead or additional approval processes

Consistency

Simplify the way you work by consolidating tooling and using cloud-native technology and practices everywhere

Azure Arc enabled services

Deploy and run Azure services outside of Azure while still operating it from Azure

Flexibility

Reduce risk and adhere to regulatory requirements by deploying cloud services on-premises

Latency

Deploy data services on-premises, close to your data sources with support for both disconnected and connected workloads

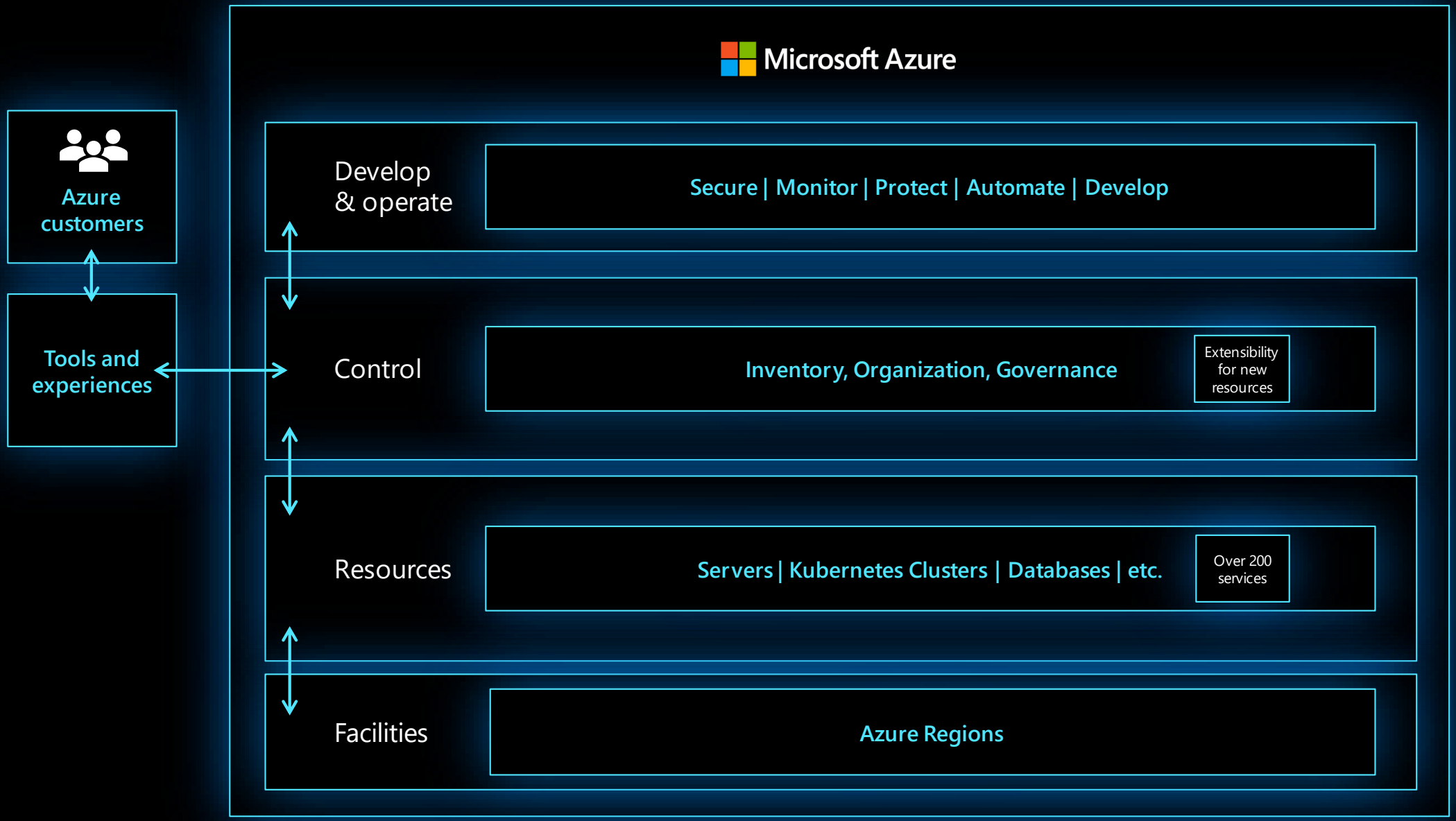
Always current

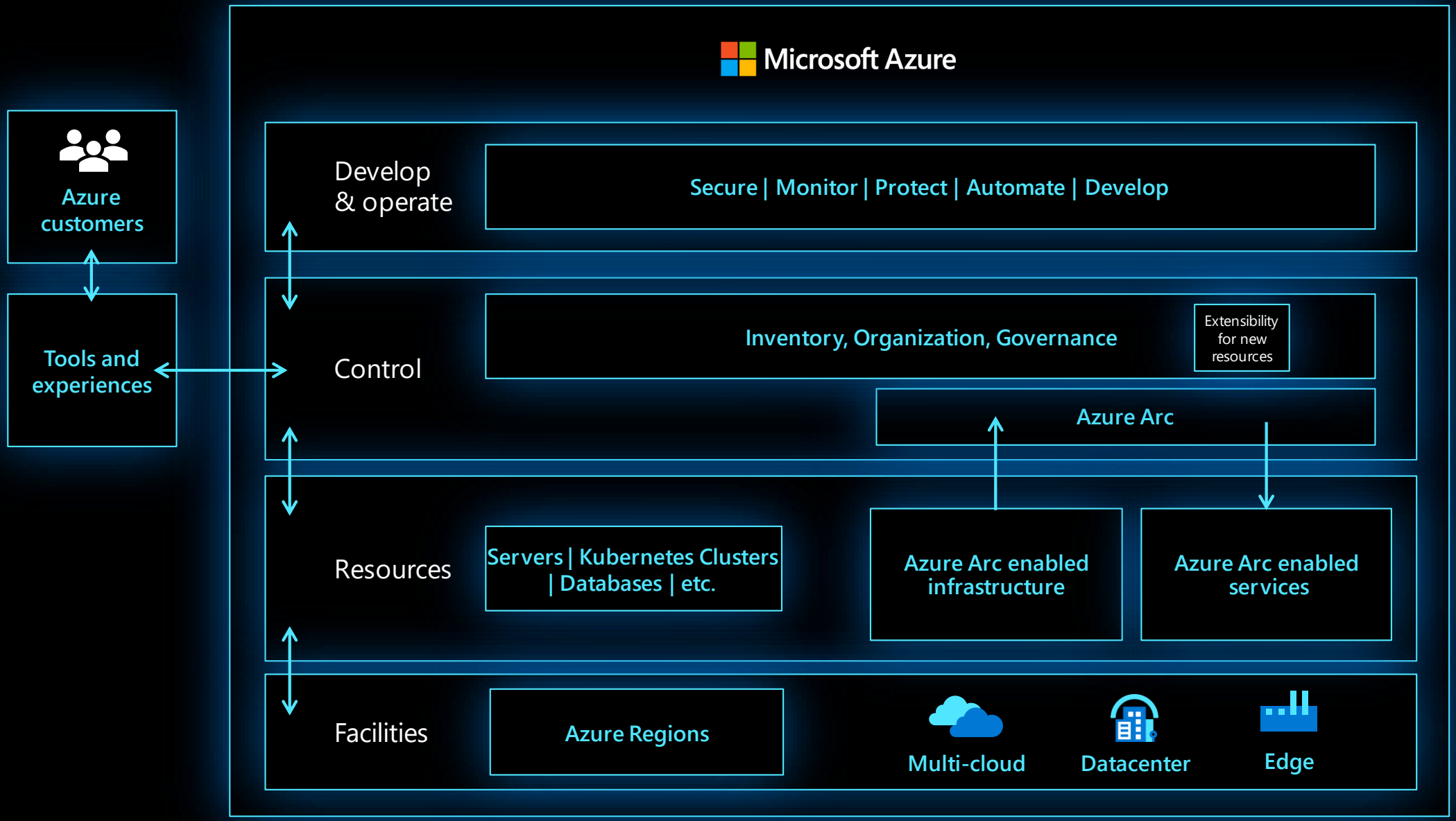
Get evergreen SQL and PostgreSQL Hyperscale on-premises with a cloud billing model

Multi-cloud

Datacenter

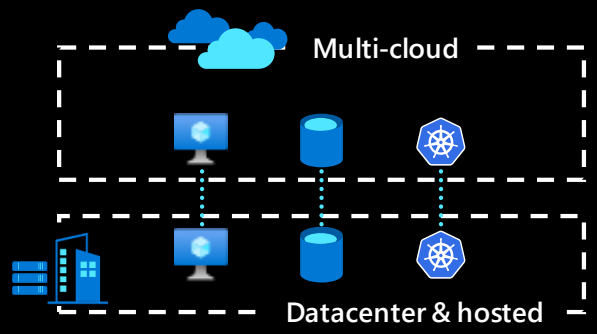
Edge


Microsoft Azure
Azure customers
Tools and experiences
Develop & operate
Secure | Monitor | Protect | Automate | Develop
Control
Inventory, Organization, Governance
Extensibility for new resources
Resources
Servers | Kubernetes Clusters | Databases | etc.
Over 200 services
Facilities
Azure Regions


Microsoft Azure
Azure customers
Tools and experiences
Develop & operate
Secure | Monitor | Protect | Automate | Develop
Control
Inventory, Organization, Governance
Extensibility for new resources
Azure Arc
Resources
Servers | Kubernetes Clusters | Databases | etc.
Azure Arc enabled infrastructure
Azure Arc enabled services
Facilities
Azure Regions
Multi-cloud
Datacenter
Edge

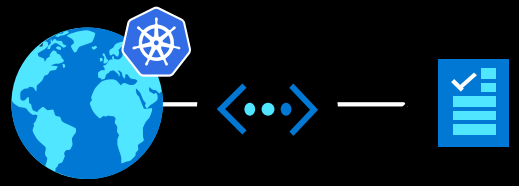
Azure Arc

Bring Azure services and management to any infrastructure



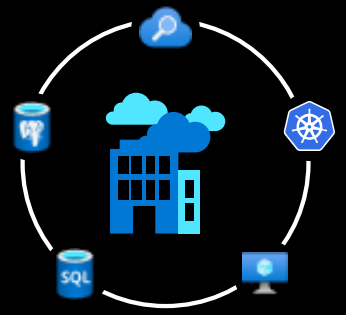
Organize and govern across environments

Get servers and Kubernetes clusters that are sprawling across clouds, datacenters and edge under control by centrally organizing and governing from a single place.



At-scale Kubernetes app management

Deploy and manage Kubernetes applications at scale across environments using DevOps techniques, ensuring that applications are deployed and configured consistently from source control, at scale.



Run data services anywhere

Deploy and manage data services where you need it for latency or compliance requirements. Stay always current with evergreen SQL and seamlessly manage and secure your data assets across on-premises, clouds, and edge.

Azure Arc enabled infrastructure

Bring on-premises and multi-cloud infrastructure to Azure with Azure Arc

Azure Arc enabled servers

Organize, inventory, and monitor
Governance and Security
Simplified role-based operations
Physical, Virtual, Windows, Linux

Windows Server

AWS Linux 2

Now available

Azure Arc enabled SQL Server

Organize, inventory, and monitor
Governance and Security
Use with your existing SQL servers
SQL on Windows or Linux servers

Now in public preview

Azure Arc enabled Kubernetes

Organize, inventory, and monitor
Governance and Security
Monitoring and Policy
GitOps-based zero-touch deploy

AKS on Azure Stack HCI

RANCHER

OpenShift

Public preview

Customer scenario

Organize & govern across environments

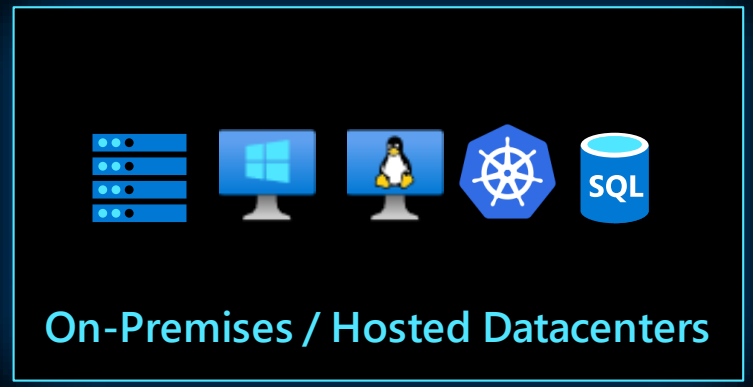
Overview

A large financial institution has sprawling server-based IT systems deployed in corporate datacenters, hosters, and multi-cloud.

The sprawl is overwhelming, and it is impossible to manage and apply consistent governance across the environment and meet compliance needs

Business requirements

- Manage a mix of bare metal, Windows and Linux servers across locations and disparate systems
- Enable IT to apply at scale governance and security policies across all servers
- Enable application owners to apply, audit and remediate compliance to meet their own requirements

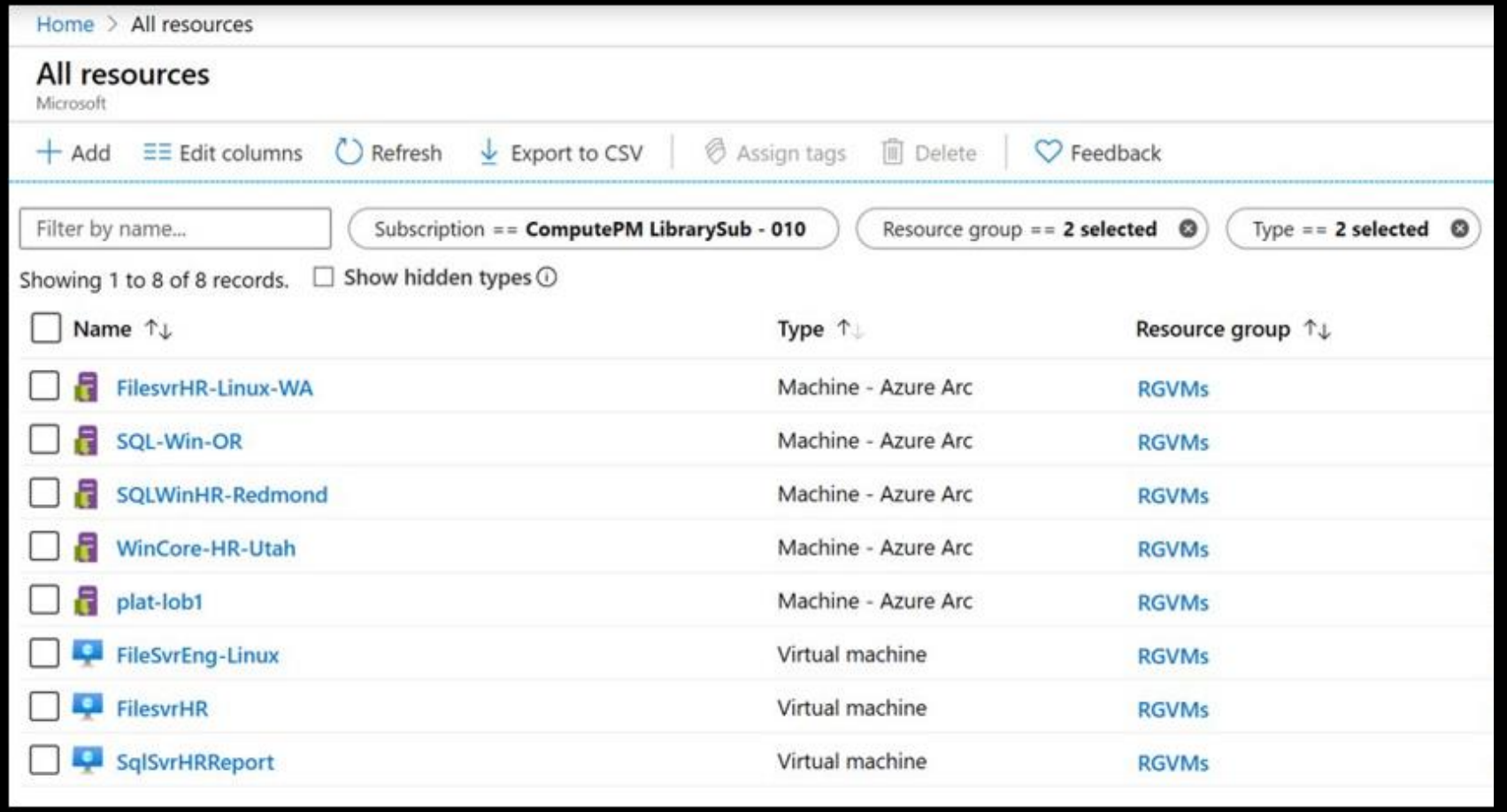


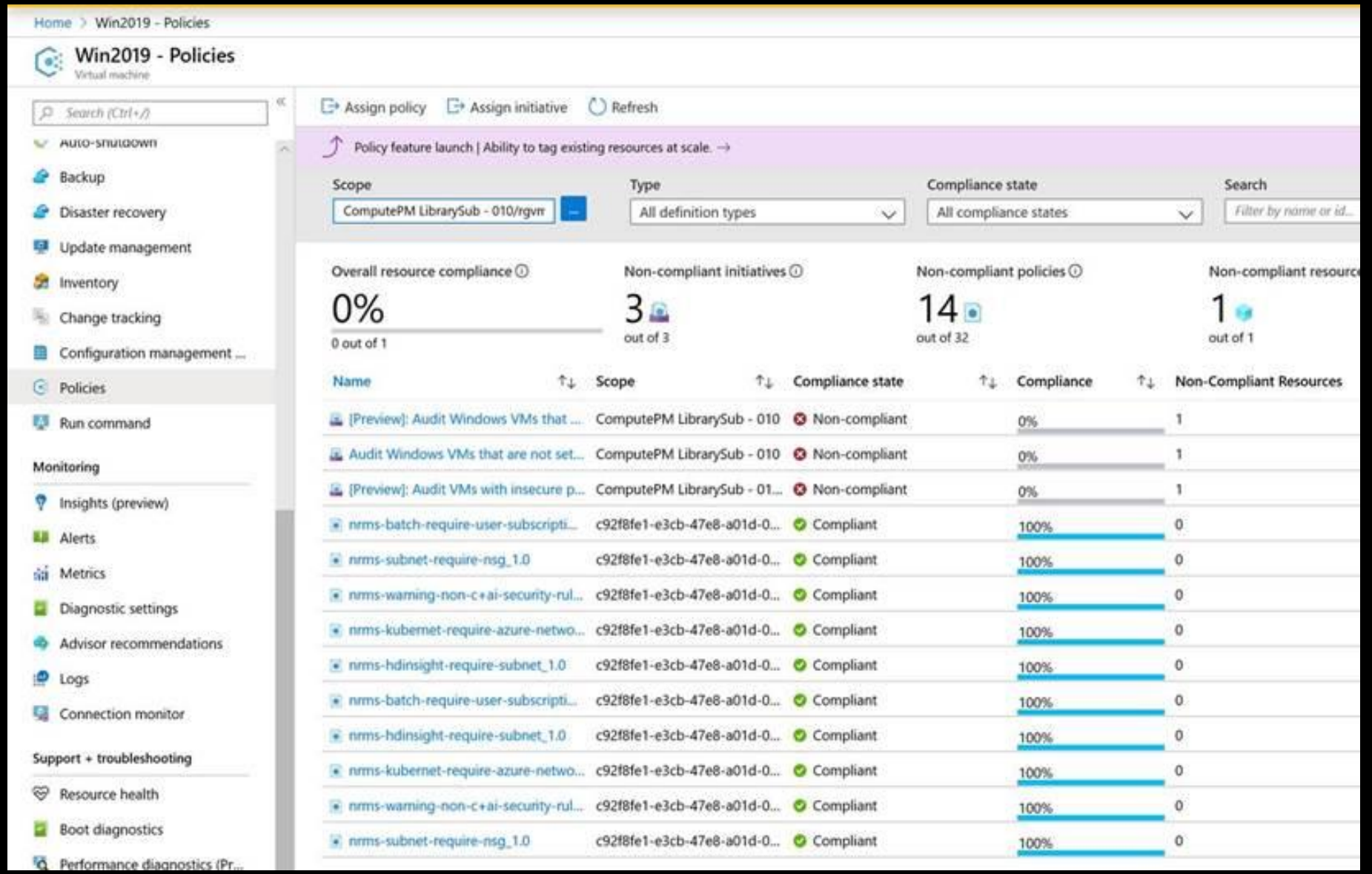
Customer scenario

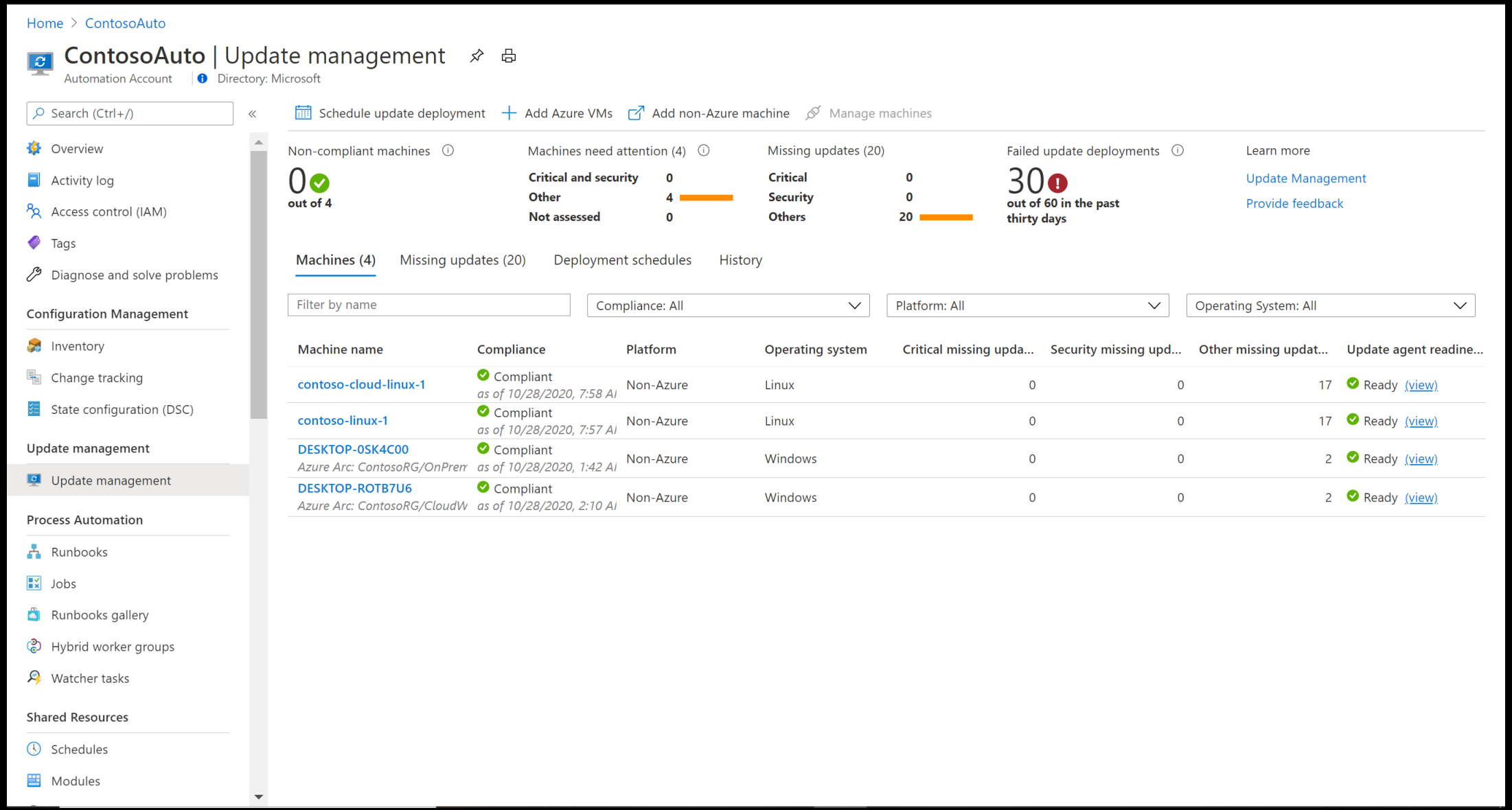
Organize & govern across environments

Key benefits from Azure Arc

- Asset organization and inventory with a unified view in the Azure Portal
- Universal governance anywhere through Azure Policy
- Centralized agent management – Monitoring, Security, Update Management and more
- Built-in server compliance rules
- Central compliance view across all servers
- Self-service remediation
- Integration with Azure Lighthouse

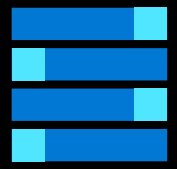

Home > All resources
All resources
Microsoft
Add
Edit columns
Refresh
Export to CSV
Assign tags
Delete
Feedback
Filter by name...
Subscription == ComputePM LibrarySub - 010
Resource group == 2 selected
Type == 2 selected
Showing 1 to 8 of 8 records.
Show hidden types
Name
Type
Resource group
FilesvrHR-Linux-WA
Machine - Azure Arc
RGVMs
SQL-Win-OR
Machine - Azure Arc
RGVMs
SQLWinHR-Redmond
Machine - Azure Arc
RGVMs
WinCore-HR-Utah
Machine - Azure Arc
RGVMs
plat-lob1
Machine - Azure Arc
RGVMs
FileSvrEng-Linux
Virtual machine
RGVMs
FilesvrHR
Virtual machine
RGVMs
SqlSvrHRReport
Virtual machine
RGVMs


Home > Win2019 - Policies
Win2019 - Policies
Virtual machine
Search (Ctrl+/)
Auto-shutdown
Backup
Disaster recovery
Update management
Inventory
Change tracking
Configuration management ...
Policies
Run command
Monitoring
Insights (preview)
Alerts
Metrics
Diagnostic settings
Advisor recommendations
Logs
Connection monitor
Support + troubleshooting
Resource health
Boot diagnostics
Performance diagnostics (Pr...
Assign policy
Assign initiative
Refresh
Policy feature launch | Ability to tag existing resources at scale. →
Scope
ComputePM LibrarySub - 010/rgvm
Type
All definition types
Compliance state
All compliance states
Search
Filter by name or id...
Overall resource compliance
0%
0 out of 1
Non-compliant initiatives
3
out of 3
Non-compliant policies
14
out of 32
Non-compliant resource
1
out of 1
Name
Scope
Compliance state
Compliance
Non-Compliant Resources
[Preview]: Audit Windows VMs that ... ComputePM LibrarySub - 010 Non-compliant 0% 1
Audit Windows VMs that are not set... ComputePM LibrarySub - 010 Non-compliant 0% 1
[Preview]: Audit VMs with insecure p... ComputePM LibrarySub - 01... Non-compliant 0% 1
nrms-batch-require-user-subscripti... c92f8fe1-e3cb-47e8-a01d-0... Compliant 100% 0
nrms-subnet-require-nsg_1.0 c92f8fe1-e3cb-47e8-a01d-0... Compliant 100% 0
nrms-warning-non-c+ai-security-rul... c92f8fe1-e3cb-47e8-a01d-0... Compliant 100% 0
nrms-kubernet-require-azure-netwo... c92f8fe1-e3cb-47e8-a01d-0... Compliant 100% 0
nrms-hdinsight-require-subnet_1.0 c92f8fe1-e3cb-47e8-a01d-0... Compliant 100% 0
nrms-batch-require-user-subscripti... c92f8fe1-e3cb-47e8-a01d-0... Compliant 100% 0
nrms-hdinsight-require-subnet_1.0 c92f8fe1-e3cb-47e8-a01d-0... Compliant 100% 0
nrms-kubernet-require-azure-netwo... c92f8fe1-e3cb-47e8-a01d-0... Compliant 100% 0
nrms-warning-non-c+ai-security-rul... c92f8fe1-e3cb-47e8-a01d-0... Compliant 100% 0
nrms-subnet-require-nsg_1.0 c92f8fe1-e3cb-47e8-a01d-0... Compliant 100% 0


Home > ContosoAuto
ContosoAuto | Update management
Automation Account
Directory: Microsoft
Search (Ctrl+/)
Overview
Activity log
Access control (IAM)
Tags
Diagnose and solve problems
Configuration Management
Inventory
Change tracking
State configuration (DSC)
Update management
Update management
Process Automation
Runbooks
Jobs
Runbooks gallery
Hybrid worker groups
Watcher tasks
Shared Resources
Schedules
Modules
Schedule update deployment
Add Azure VMs
Add non-Azure machine
Manage machines
Non-compliant machines
0
out of 4
Machines need attention (4)
Critical and security 0
Other 4
Not assessed 0
Missing updates (20)
Critical 0
Security 0
Others 20
Failed update deployments
30
out of 60 in the past thirty days
Learn more
Update Management
Provide feedback
Machines (4)
Missing updates (20)
Deployment schedules
History
Filter by name
Compliance: All
Platform: All
Operating System: All
Machine name
Compliance
Platform
Operating system
Critical missing upda...
Security missing upd...
Other missing updat...
Update agent readine...
contoso-cloud-linux-1
Compliant
as of 10/28/2020, 7:58 AI
Non-Azure
Linux
0
0
17
Ready (view)
contoso-linux-1
Compliant
as of 10/28/2020, 7:57 AI
Non-Azure
Linux
0
0
17
Ready (view)
DESKTOP-0SK4C00
Azure Arc: ContosoRG/OnPrem
Compliant
as of 10/28/2020, 1:42 AI
Non-Azure
Windows
0
0
2
Ready (view)
DESKTOP-ROTB7U6
Azure Arc: ContosoRG/CloudW
Compliant
as of 10/28/2020, 2:10 AI
Non-Azure
Windows
0
0
2
Ready (view)

Azure Arc enabled servers

Bring on-premises and multi-cloud servers to Azure with Azure Arc



Reach

Linux and Windows
VM and Bare-Metal
Domain agnostic

Organize and Inventory

At scale searchable inventory
Unify management experience
Consistent VM extensions
Integrate with Azure Lighthouse

Governance and Security

Built-in Azure policies
Server security baselines
Compliance across environments
Centralized agent management – Monitoring, Security, Update Management

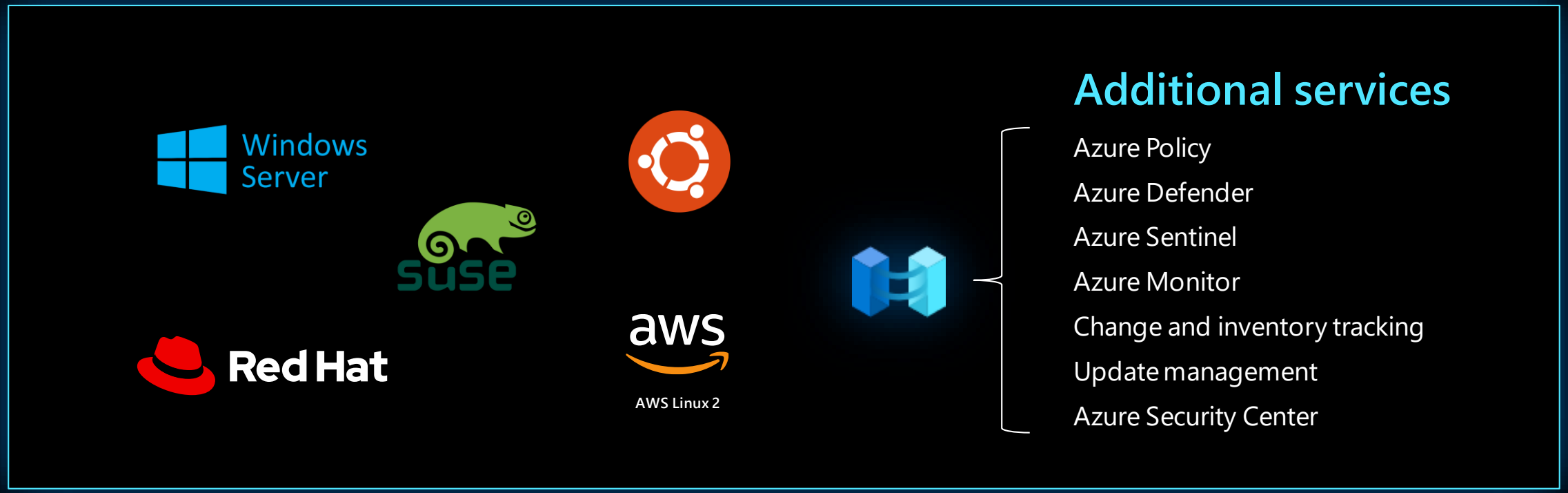
Role-Based Operations

Central IT to manage at-scale operations
Workload owners manage based on their access

Any infrastructure, familiar tools

Azure Arc enabled servers

Azure Arc enabled servers are auto-enrolled with additional Azure services

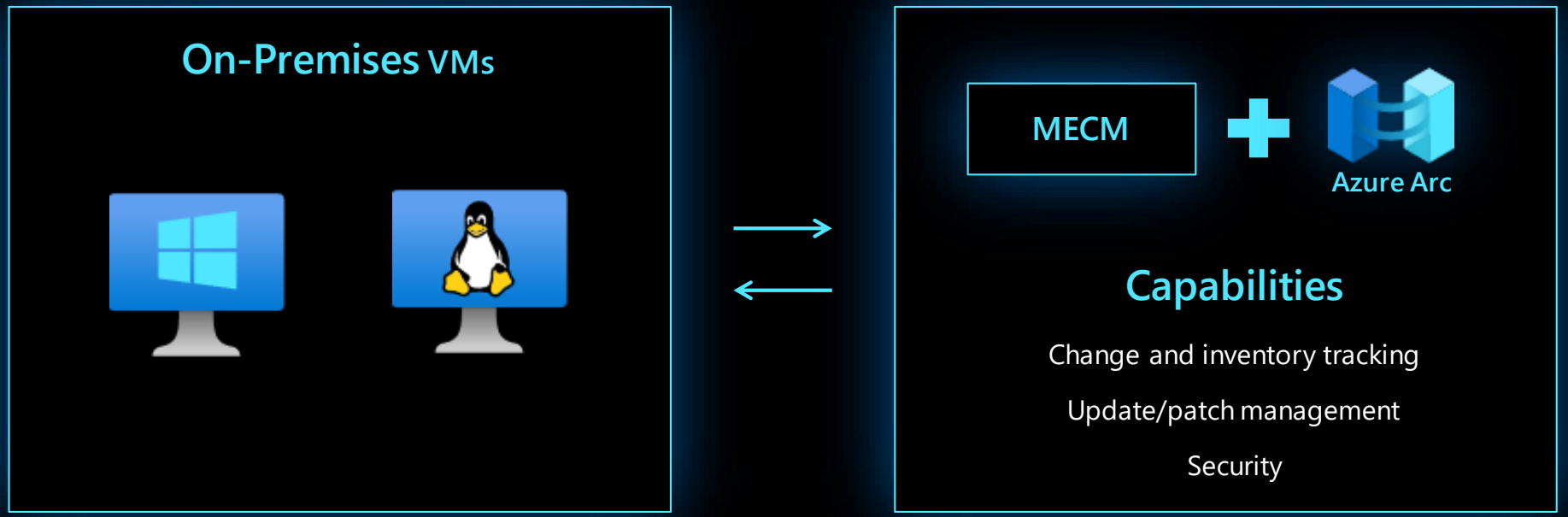


Just turn them on when you want to use them

Azure Arc enabled servers

The future of Microsoft Endpoint Configuration Manager (formerly SCCM)

The Azure management services enabled by Azure Arc can replace much of the functionality of MECM, but we recommend a gradual transition based on the use case. In some cases, MECM cannot be replaced yet.



Azure Arc enabled servers

Co-management with Microsoft Endpoint Configuration Manager (MECM – formerly SCCM)

Use case	MECM	Azure management service enabled by Azure Arc
Software updates on Windows Server machines anywhere	✓ MECM tracks and applies software updates to Windows Server machines in your organization	✓ Azure Update Management uses the Log Analytics agent and can run on supported Windows Server OS for patch/update control
Software updates on Linux machines anywhere	✗ N/A	✓ Azure Update Management uses the Log Analytics agent and can run on supported Linux distributions for patch/update control
Software updates on your Windows clients (running say Windows 10)	✓ MECM manages the deployment of software updates to clients in your organization	✗ N/A
Software updates for on-premises systems which are behind an internet gateway	✓ MECM can work with and configure cloud gateways. Boundary groups. Proxy etc. to manage the machines	✓ Azure Update Management can work with the Log Analytics Gateway, to manage machines behind proxy and firewalls
Server inventory and information collection	✓ MECM CMPivot can provide real time state of machines in the environment	✓ Azure Automation Change Tracking and Inventory tracks changes in virtual machines and server infrastructure
Run custom scripts on machines	✓ MECM has an integrated ability to run custom PowerShell scripts	✓ Use Custom Script Extension in Azure or Process Automation in Azure Automaton to create and manage PowerShell scripts and workflows, Python scripts and graphical runbooks.

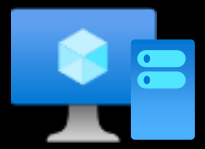
Azure Arc enabled servers

Co-management with Microsoft Endpoint Configuration Manager (MECM – formerly SCCM)

Use case	MECM	Azure management service enabled by Azure Arc
Create, manage and deploy applications on machines	MECM can manage deployment of applications and packages with automation built-in	Use Azure Custom Script Extension to deploy apps and packages to VMs, doesn't have a UI like Software Center in MECM
Manage OS upgrades	MECM can deploy and update Windows via different methods and automate tasks	N/A
Manage policies to mitigate malicious attacks and security vulnerabilities	MECM manages policies for Windows Defender, Bit locker, VPN etc. to secure machines	Azure Security Center provides unified security management and advanced threat protection across hybrid cloud workloads.

Azure Arc enabled SQL Server

Data management benefits for Azure Arc enabled servers



Flexibility

VMs and bare-metal servers

On-premises and multi-cloud

Management

Searchable inventory

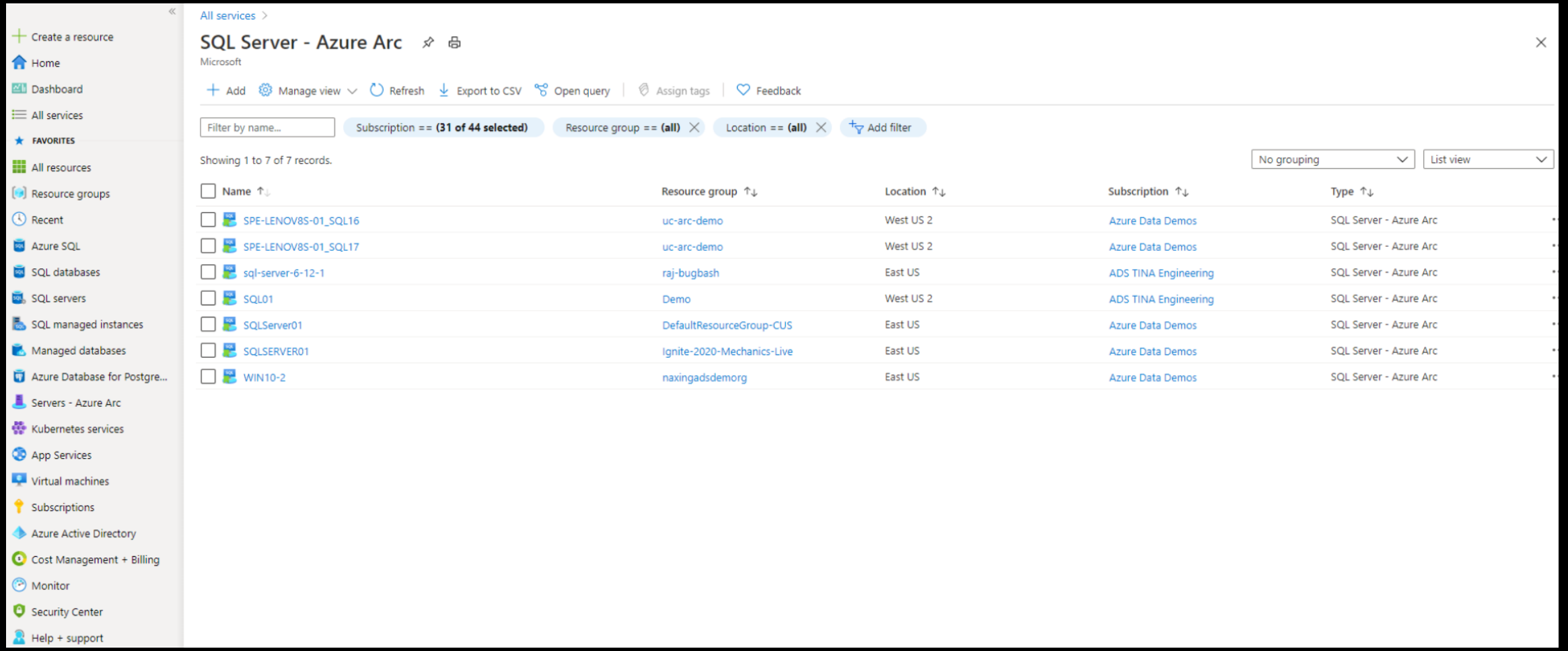
SQL Assessment service

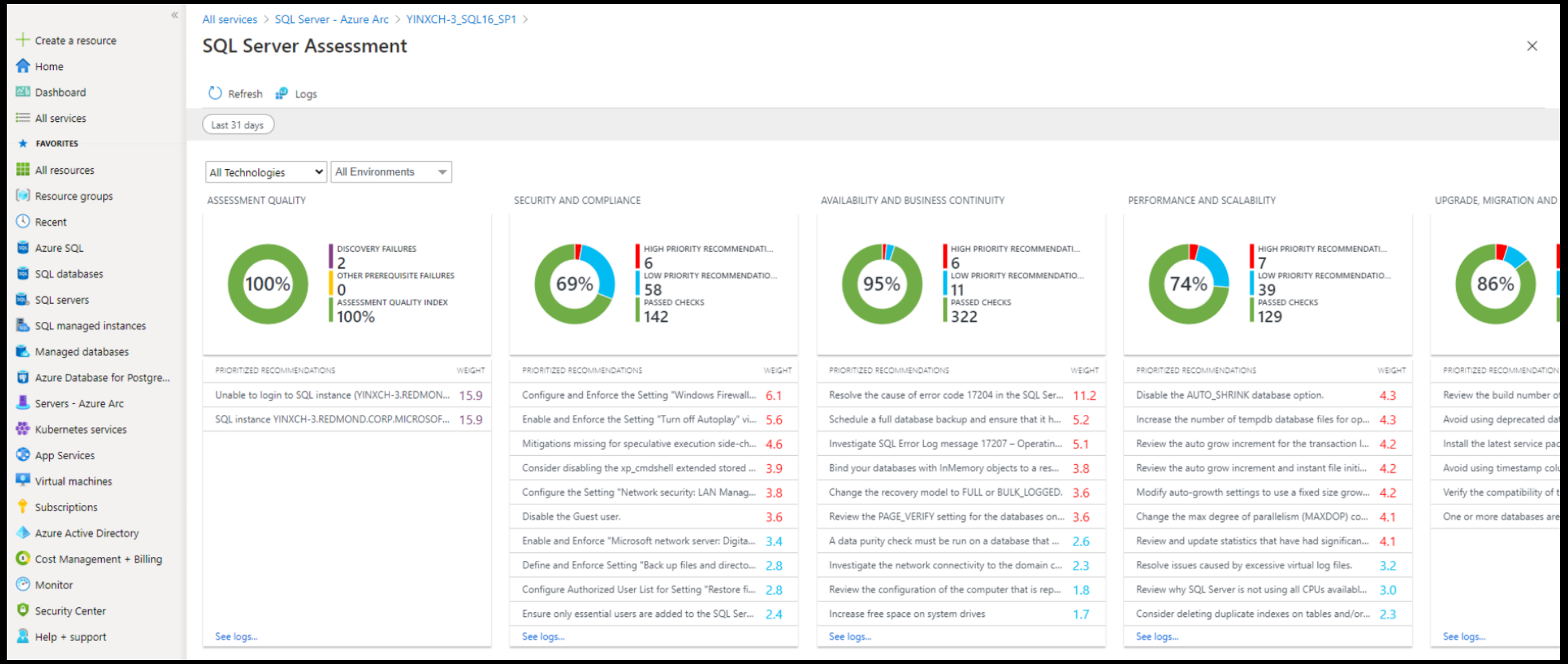
Governance and Security

Azure Policy

Azure Defender

No migration needed for existing SQL Servers


Create a resource
Home
Dashboard
All services
FAVORITES
All resources
Resource groups
Recent
Azure SQL
SQL databases
SQL servers
SQL managed instances
Managed databases
Azure Database for Postgre...
Servers - Azure Arc
Kubernetes services
App Services
Virtual machines
Subscriptions
Azure Active Directory
Cost Management + Billing
Monitor
Security Center
Help + support
All services
SQL Server - Azure Arc
Microsoft
Add
Manage view
Refresh
Export to CSV
Open query
Assign tags
Feedback
Filter by name...
Subscription == (31 of 44 selected)
Resource group == (all)
Location == (all)
Add filter
Showing 1 to 7 of 7 records.
No grouping
List view
Name
Resource group
Location
Subscription
Type
SPE-LENOV8S-01_SQL16 uc-arc-demo West US 2 Azure Data Demos SQL Server - Azure Arc
SPE-LENOV8S-01_SQL17 uc-arc-demo West US 2 Azure Data Demos SQL Server - Azure Arc
sql-server-6-12-1 raj-bugbash East US ADS TINA Engineering SQL Server - Azure Arc
SQL01 Demo West US 2 ADS TINA Engineering SQL Server - Azure Arc
SQLServer01 DefaultResourceGroup-CUS East US Azure Data Demos SQL Server - Azure Arc
SQLSERVER01 Ignite-2020-Mechanics-Live East US Azure Data Demos SQL Server - Azure Arc
WIN10-2 naxingadsdemorg East US Azure Data Demos SQL Server - Azure Arc


Create a resource
Home
Dashboard
All services
FAVORITES
All resources
Resource groups
Recent
Azure SQL
SQL databases
SQL servers
SQL managed instances
Managed databases
Azure Database for Postgre...
Servers - Azure Arc
Kubernetes services
App Services
Virtual machines
Subscriptions
Azure Active Directory
Cost Management + Billing
Monitor
Security Center
Help + support
All services > SQL Server - Azure Arc > YINXCH-3_SQL16_SP1 >
SQL Server Assessment
Refresh
Logs
Last 31 days
All Technologies
All Environments
ASSESSMENT QUALITY
100%
DISCOVERY FAILURES
2
OTHER PREREQUISITE FAILURES
0
ASSESSMENT QUALITY INDEX
100%
PRIORITIZED RECOMMENDATIONS
WEIGHT
Unable to login to SQL instance (YINXCH-3.REDMON... 15.9
SQL instance YINXCH-3.REDMOND.CORP.MICROSOF... 15.9
See logs...
SECURITY AND COMPLIANCE
69%
HIGH PRIORITY RECOMMENDATI...
6
LOW PRIORITY RECOMMENDATIO...
58
PASSED CHECKS
142
PRIORITIZED RECOMMENDATIONS
WEIGHT
Configure and Enforce the Setting "Windows Firewall... 6.1
Enable and Enforce the Setting "Turn off Autoplay" vi... 5.6
Mitigations missing for speculative execution side-ch... 4.6
Consider disabling the xp_cmdshell extended stored ... 3.9
Configure the Setting "Network security: LAN Manag... 3.8
Disable the Guest user. 3.6
Enable and Enforce "Microsoft network server: Digita... 3.4
Define and Enforce Setting "Back up files and directo... 2.8
Configure Authorized User List for Setting "Restore fi... 2.8
Ensure only essential users are added to the SQL Ser... 2.4
See logs...
AVAILABILITY AND BUSINESS CONTINUITY
95%
HIGH PRIORITY RECOMMENDATI...
6
LOW PRIORITY RECOMMENDATIO...
11
PASSED CHECKS
322
PRIORITIZED RECOMMENDATIONS
WEIGHT
Resolve the cause of error code 17204 in the SQL Ser... 11.2
Schedule a full database backup and ensure that it h... 5.2
Investigate SQL Error Log message 17207 – Operatin... 5.1
Bind your databases with InMemory objects to a res... 3.8
Change the recovery model to FULL or BULK_LOGGED. 3.6
Review the PAGE_VERIFY setting for the databases on... 3.6
A data purity check must be run on a database that ... 2.6
Investigate the network connectivity to the domain c... 2.3
Review the configuration of the computer that is rep... 1.8
Increase free space on system drives 1.7
See logs...
PERFORMANCE AND SCALABILITY
74%
HIGH PRIORITY RECOMMENDATI...
7
LOW PRIORITY RECOMMENDATIO...
39
PASSED CHECKS
129
PRIORITIZED RECOMMENDATIONS
WEIGHT
Disable the AUTO_SHRINK database option. 4.3
Increase the number of tempdb database files for op... 4.3
Review the auto grow increment for the transaction l... 4.2
Review the auto grow increment and instant file initi... 4.2
Modify auto-growth settings to use a fixed size grow... 4.2
Change the max degree of parallelism (MAXDOP) co... 4.1
Review and update statistics that have had significan... 4.1
Resolve issues caused by excessive virtual log files. 3.2
Review why SQL Server is not using all CPUs availabl... 3.0
Consider deleting duplicate indexes on tables and/or... 2.3
See logs...
UPGRADE, MIGRATION AND
86%
See logs...

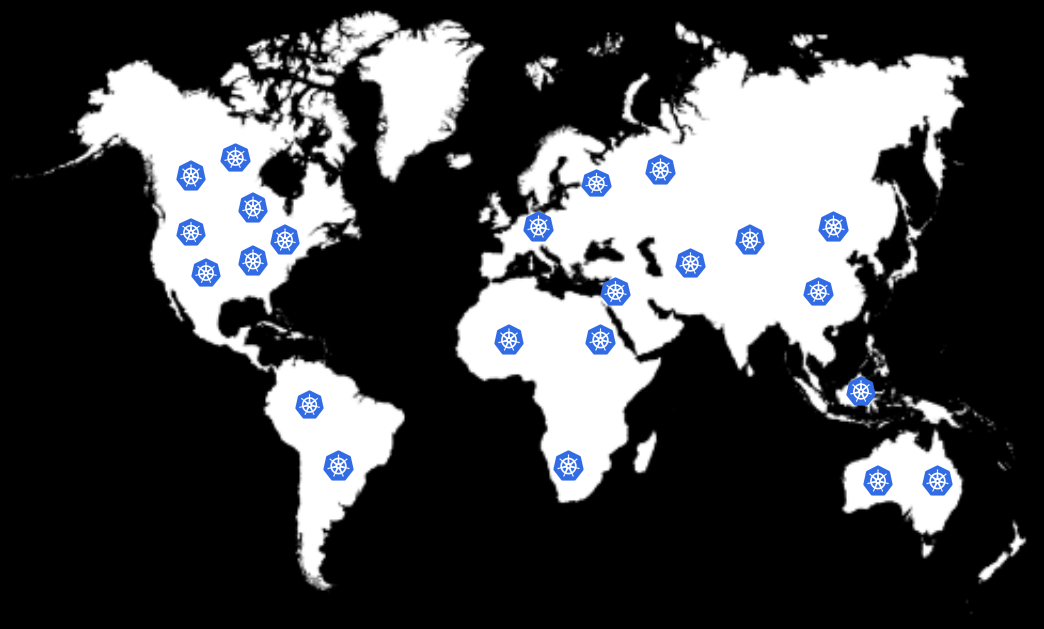
Customer scenario

At-scale Kubernetes app management

Overview

A retailer with 100s of stores would like to move all in-store applications to containers running on a K8s clusters

They are faced with the challenge of how to uniformly deploy, configure and manage their containerized applications across multiple locations



Business requirements

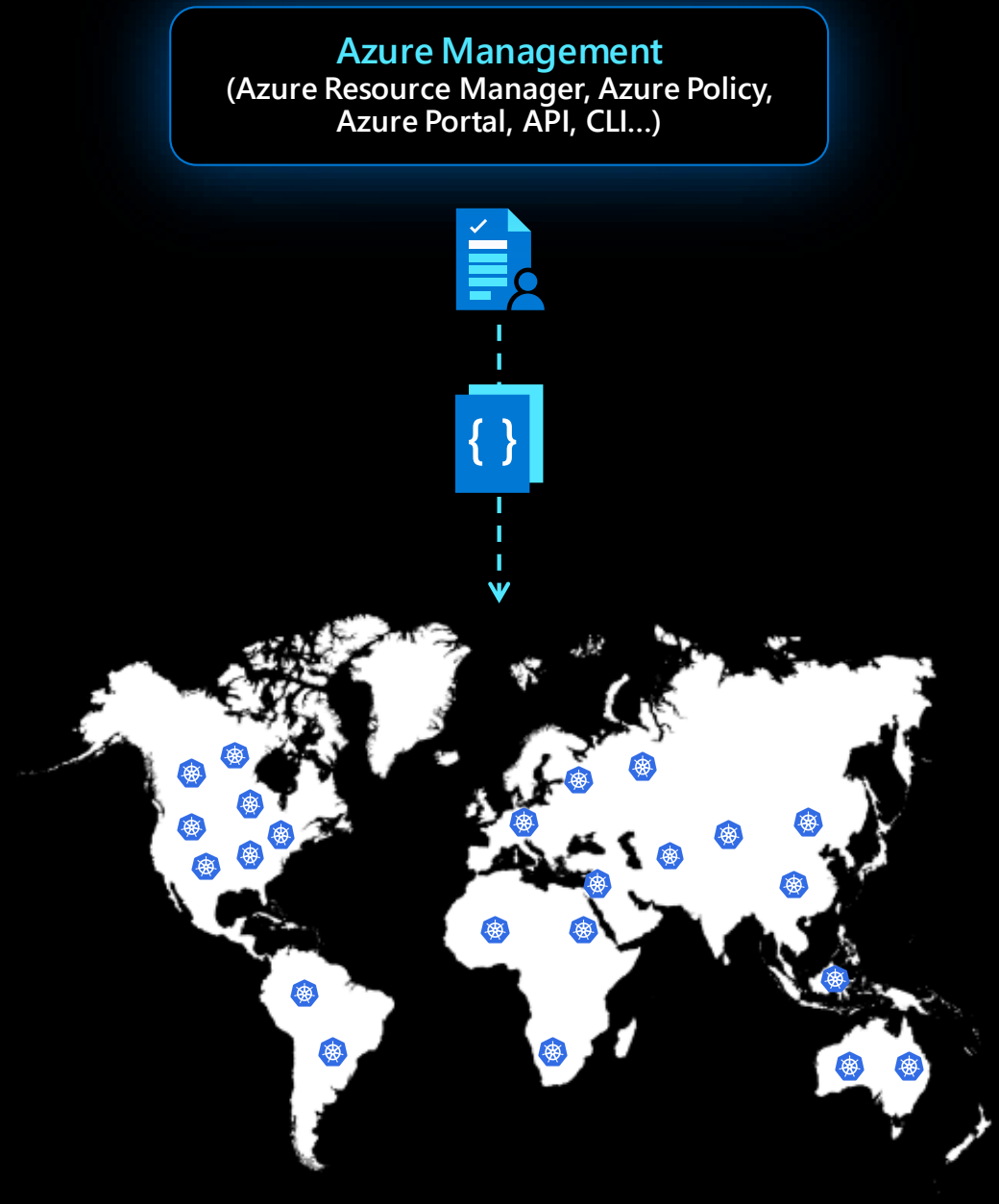
- Bootstrap a new store to fully run with the applications and configuration that this store requires
- Enable IT to apply and monitor at scale governance across all stores
- Monitor the state of applications and configuration in all stores
- Integrate DevOps and Safe Deployment Practices for applications running in stores

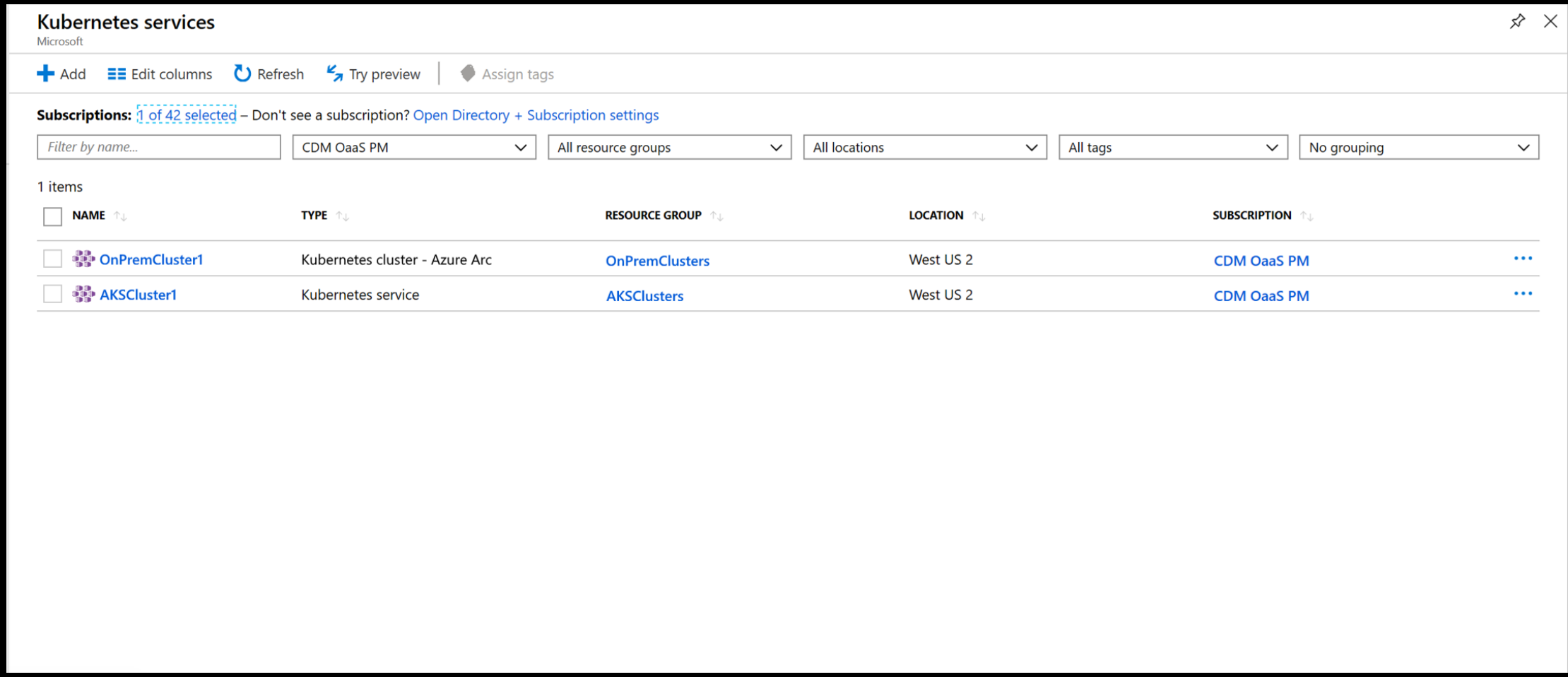
Customer scenario

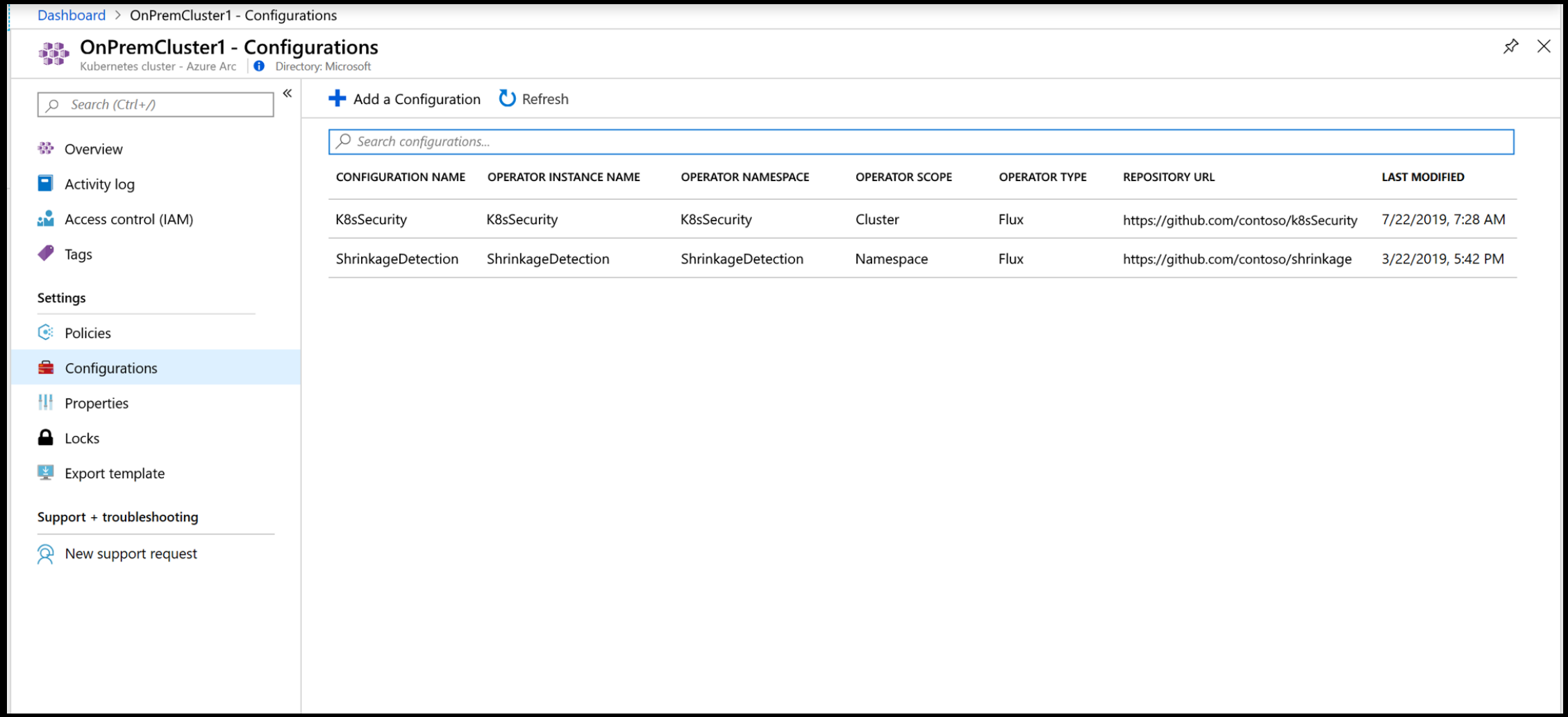
At-scale Kubernetes app management

Key benefits from Azure Arc

- Asset organization and inventory with a unified view in the Azure Portal across all locations
- GitOps-based model for deploying configuration as code to one or many clusters
- Application deployment and update at scale
- Source control based Safe Deployment Procedures when rolling new applications and configurations
- Developer tooling agnostic—use the tools they want




Kubernetes services
Microsoft
Add
Edit columns
Refresh
Try preview
Assign tags
Subscriptions: 1 of 42 selected – Don't see a subscription? Open Directory + Subscription settings
Filter by name...
CDM OaaS PM
All resource groups
All locations
All tags
No grouping
1 items
NAME
TYPE
RESOURCE GROUP
LOCATION
SUBSCRIPTION
OnPremCluster1
Kubernetes cluster - Azure Arc
OnPremClusters
West US 2
CDM OaaS PM
AKSCluster1
Kubernetes service
AKSClusters
West US 2
CDM OaaS PM


Dashboard > OnPremCluster1 - Configurations
OnPremCluster1 - Configurations
Kubernetes cluster - Azure Arc
Directory: Microsoft
Search (Ctrl+/)
Overview
Activity log
Access control (IAM)
Tags
Settings
Policies
Configurations
Properties
Locks
Export template
Support + troubleshooting
New support request
Add a Configuration
Refresh
Search configurations...
CONFIGURATION NAME
OPERATOR INSTANCE NAME
OPERATOR NAMESPACE
OPERATOR SCOPE
OPERATOR TYPE
REPOSITORY URL
LAST MODIFIED
K8sSecurity
K8sSecurity
K8sSecurity
Cluster
Flux
https://github.com/contoso/k8sSecurity
7/22/2019, 7:28 AM
ShrinkageDetection
ShrinkageDetection
ShrinkageDetection
Namespace
Flux
https://github.com/contoso/shrinkage
3/22/2019, 5:42 PM

Azure Arc enabled Kubernetes

Now in Preview

Connect, manage, and operate Kubernetes clusters and applications running anywhere using Azure Arc

Connect

Support for multiple flavors
Deploy to an existing cluster
OSS ecosystem friendly

Configure

Configure GitOps workflows
Enforce desired state across clusters
Cluster & Namespace support

Operate and Monitor

Azure Monitor Integration
Health status reporting
Cluster & App observability

Govern and Secure

Built-in Azure Policies
Cluster security baseline
Role-Based Access Control
Compliance across environments

Any infrastructure, any Kubernetes

kubeadm

AKS

OpenShift

EKS

GKE

VMware Tanzu

Customer scenario

Run Azure data services anywhere

Overview

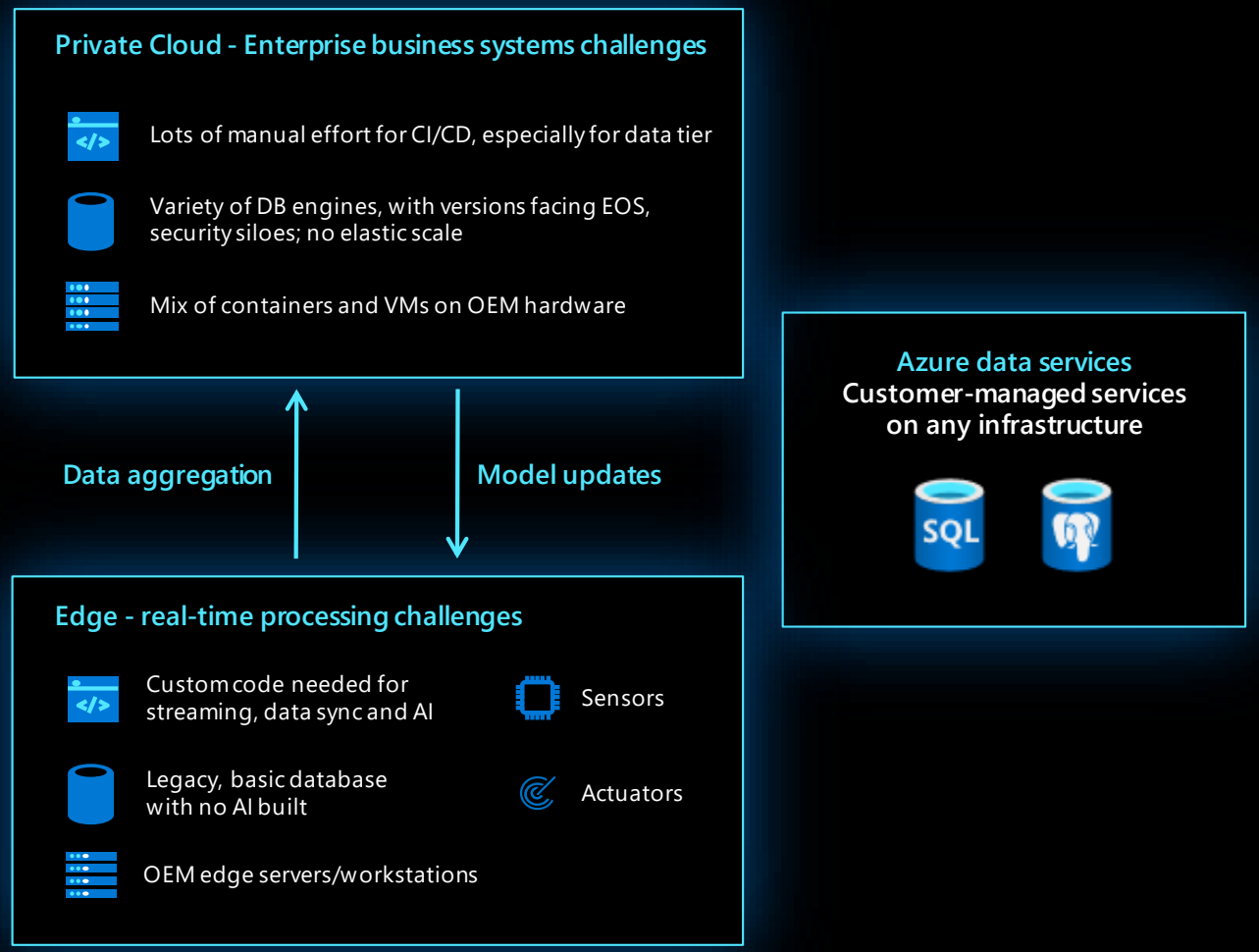
An Energy company aims for an efficient and fully automated operation with AI everywhere

Customer operates various production sites, as well as run utility transporting from extraction to retail distribution

Massive data volume at the edge and need real-time insights

Business requirements

- Leverage existing OEM hardware and any Kubernetes
- Automation at scale for IT control systems e.g., HA/DR, backup, CI/CD, DevOps
- Latest innovation automatically deployed from edge to cloud
- Consistent security and governance

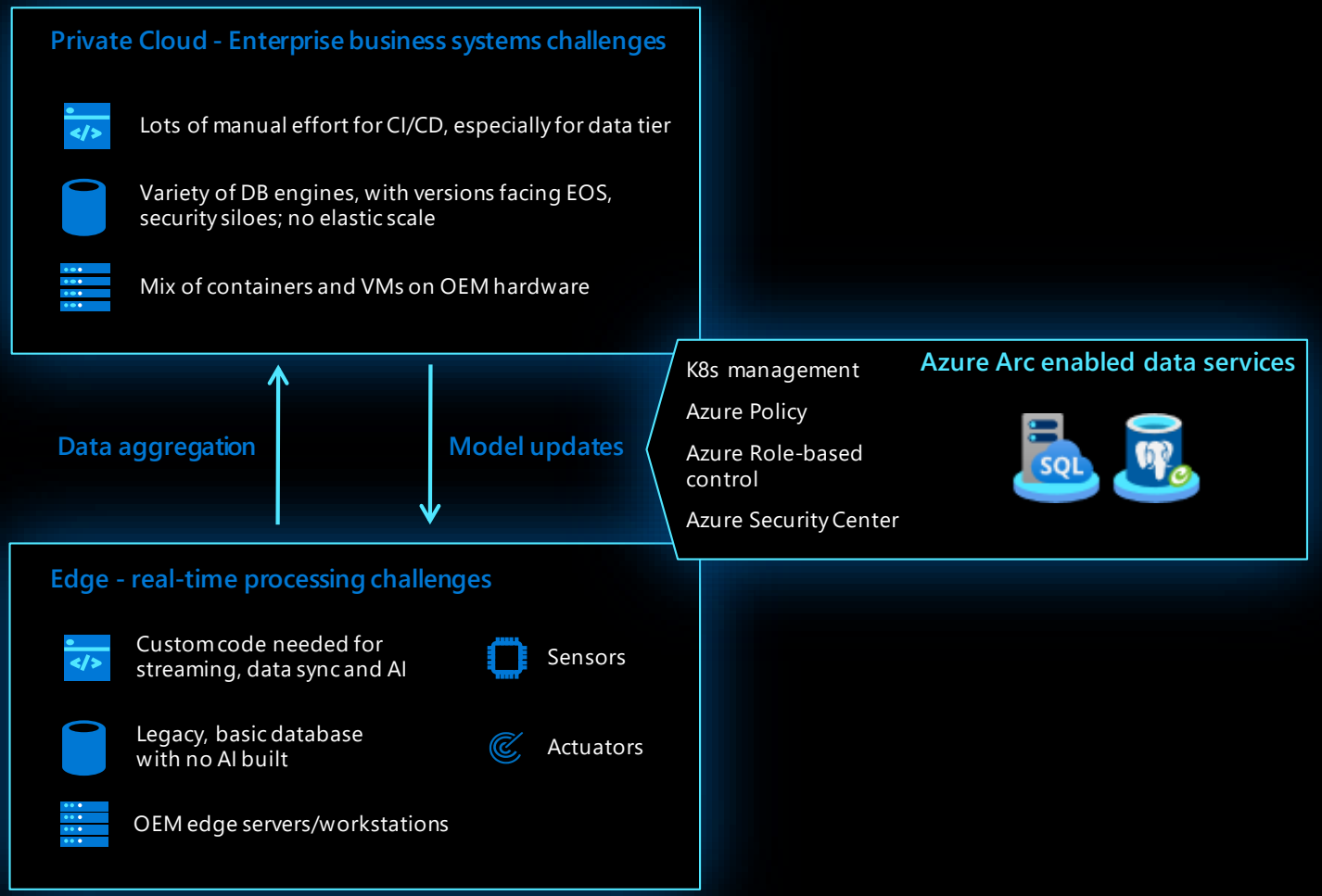


Customer scenario

Run Azure data services anywhere

Key benefits from Azure Arc

- Any infrastructure, any K8s
- Always on the latest, no end-of-support with evergreen SQL in Azure SQL DB
- Elastic scale on-premises with PostgreSQL Hyperscale
- Azure SQL Database Edge with built-in AI for real-time edge analytics
- Automation at scale with unified management of all data & AI assets
- Market leading security & governance consistently deployed everywhere



Azure Arc enabled data services

Bring Azure data services to on-premises, multi-cloud, and edge with Azure Arc

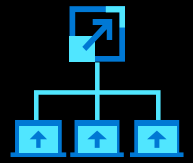
PREVIEW | Azure SQL Managed Instance | Azure Database for PostgreSQL Hyperscale

Disconnected support

Cloud benefits for both disconnected and connected workloads

Always current

Automated updates
Evergreen SQL
Hyperscale on-premises



Elastic scale

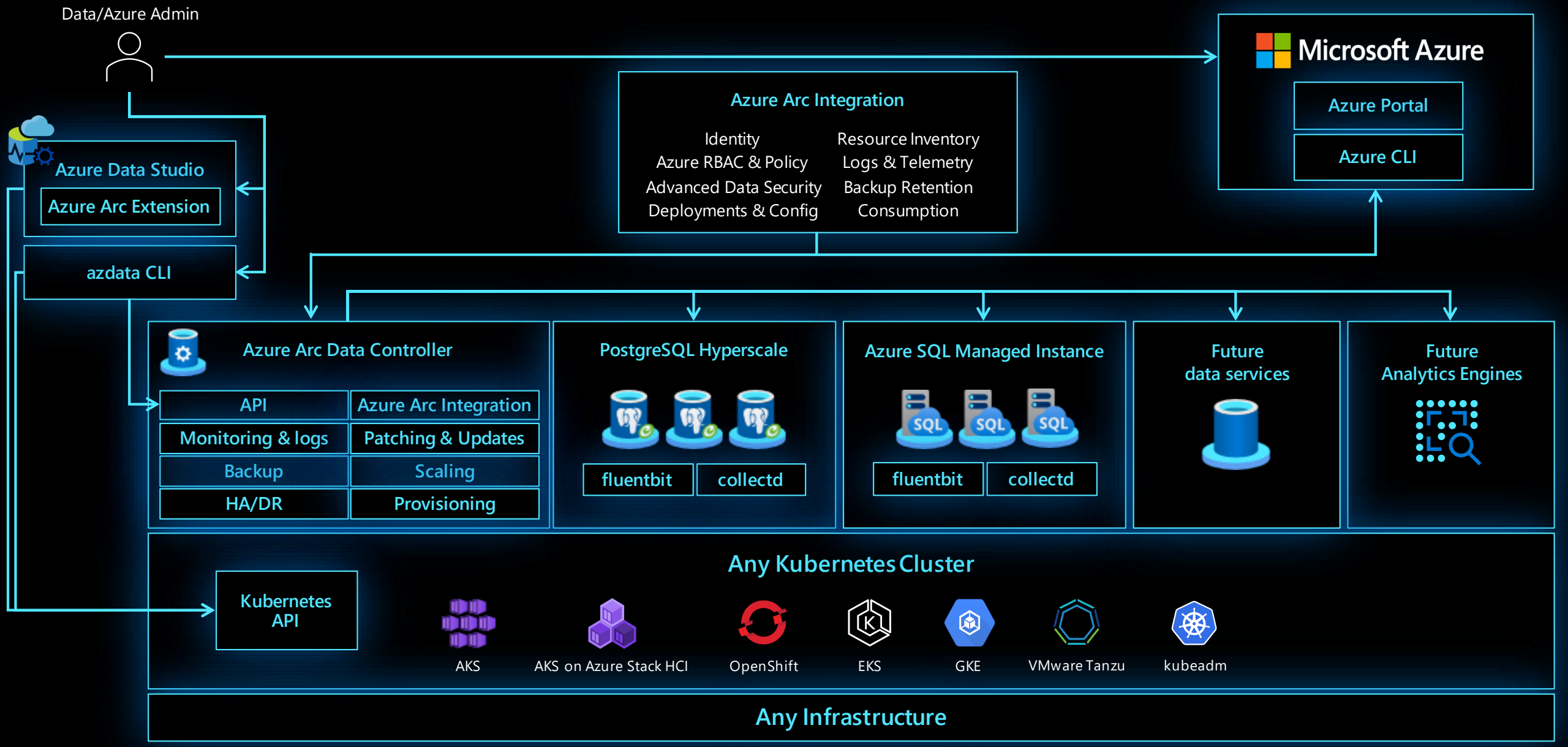
Deploy in seconds
Scale up, scale out
Automation at scale

Unified management

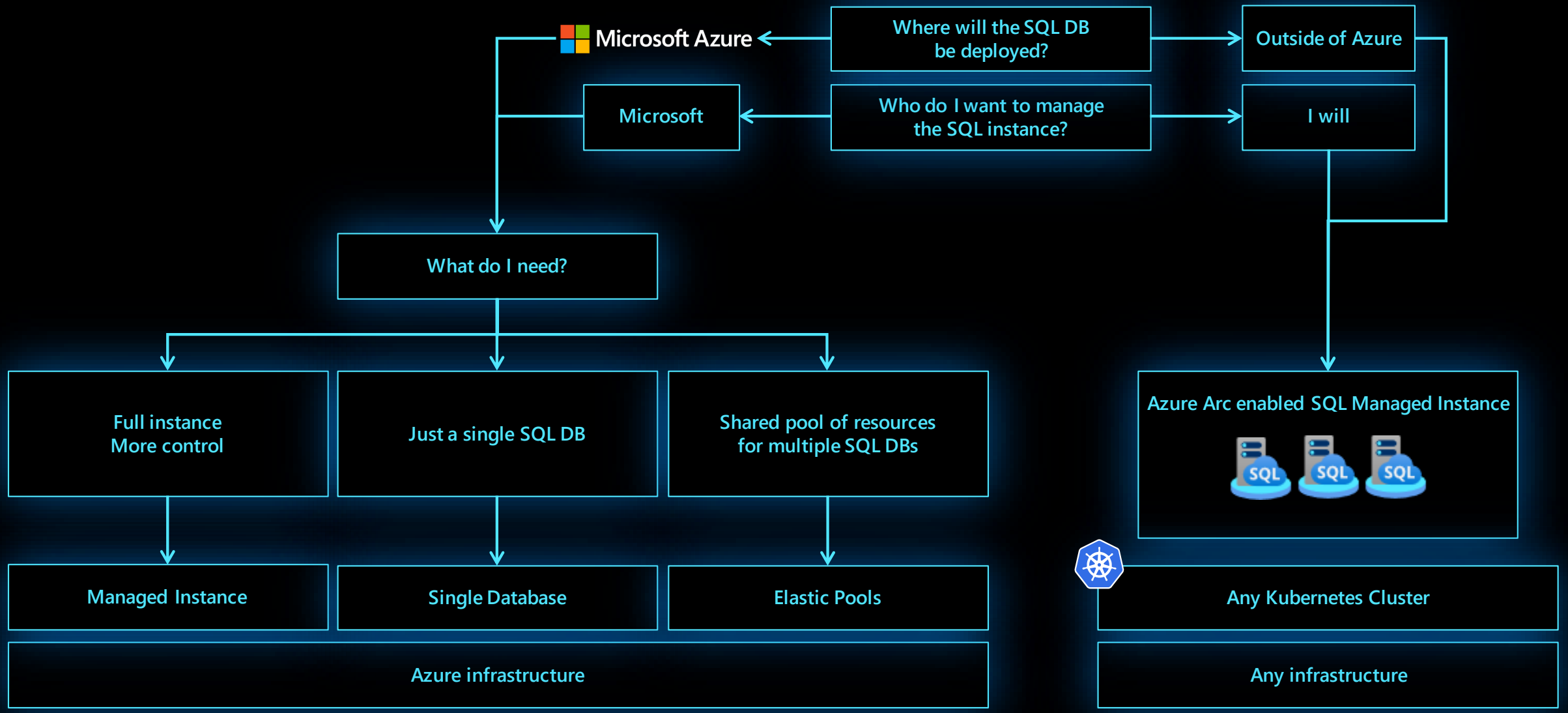
Single view for on-prem and clouds
Consistent workflows

Any hardware, any Kubernetes

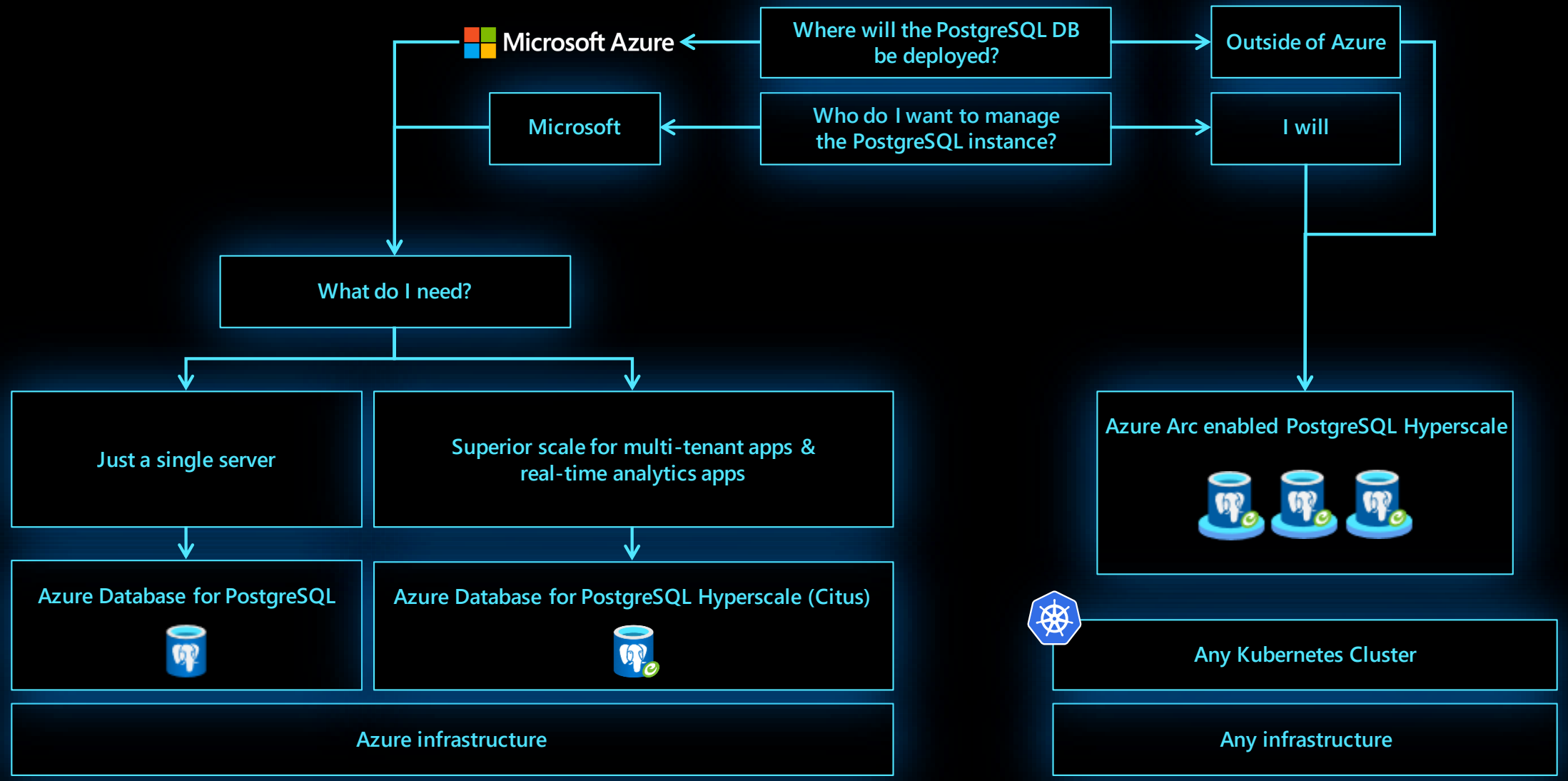
Azure Arc enabled data services Architecture



Which SQL Database deployment do I need?



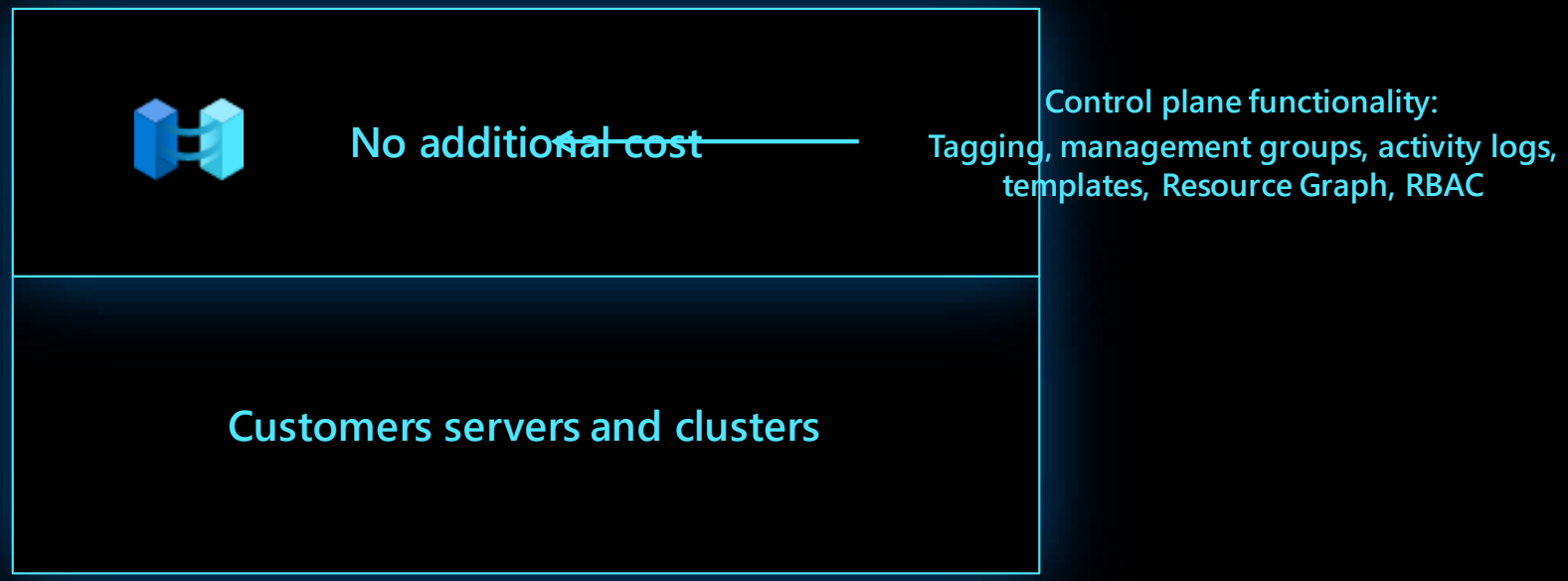
Which PostgreSQL Database deployment do I need?



Management capabilities comparison by deployment model

Built-in Capabilities	Deployment Model		
	Customer Infrastructure		Azure
	SQL Server / PostgreSQL	Azure Arc enabled databases	Azure PaaS databases
Database security features	✓	✓	✓
Elastic / "Limitless" scalability	✗	✓ Limited by the capacity of customer infrastructure	✓
Automatic HA/DR	✗	✓ Customer responsible for underlying HW/K8s availability	✓
Auto upgrade, patching	✗	✓	✓
Auto backup-restore	✗	✓	✓
Monitoring	✗	✓	✓
Compliance certifications	✗ Customer responsible for compliance certification	✗ Customer responsible for compliance certification	✓ 90+ certifications
Data sovereignty	✓	✓	✓ Azure regions not available in all countries yet
Customer control	✓	✓	✓ Pre-defined HW options No control over HW/OS
Fully managed by Microsoft	✗ Customer-managed	✗ Customer-managed using software provided by Microsoft	✓
Guaranteed availability SLA	✗ Customer-managed	✗ Customer-managed using software provided by Microsoft	✓

Azure Arc enabled servers pricing



Azure Arc enabled servers pricing

Azure Policy—guest configuration
Azure Monitor
Azure Security Center
Azure Defender—standard
Azure Sentinel
Backup
Log Analytics
Service Map
Application Insights
Network Watcher
Azure Sentinel
Config and Change Management

Control plane functionality:
Tagging, management groups, activity logs, templates, Resource Graph, RBAC

Azure Arc enabled servers pricing

Example 1

Scenario 1: A customer onboards 50 Windows (or Linux) servers that are running on-premises to Azure with Azure Arc and tags these servers in Azure, applies RBAC, organizes these servers into management groups and queries properties with Azure Resource Graph. In addition, the customer also applies a set of common Azure Policy Guest Configurations across all these servers.

The applicable cost components are:

Component	Cost
Connectivity to Azure Arc, Tagging, RBAC, Management Groups and Azure Resource Graph	$0
Azure Policy Guest Configurations	$6/server/month (Unlimited policies)

For more details on Azure Arc pricing visit our pricing page: https://aka.ms/azurearcpricing

Azure Arc enabled servers pricing

Example 2

Scenario 2: A customer onboards 50 Windows (or Linux) servers that are running on-premises to Azure with Azure Arc and tags these servers in Azure, applies RBAC, organizes these servers into management groups and queries properties with Azure Resource Graph. The customer also applies a set of common Azure Policy Guest Configurations across all these servers. In addition, the customer deploys the Log Analytics agent extension to monitor the on-premises servers (Azure Monitor).

The applicable cost components are:

Component	Cost
Connectivity to Azure Arc, Tagging, RBAC, Management Groups and Azure Resource Graph	$0
Azure Policy Guest Configurations	$6/server/month (Unlimited policies)
Azure Monitor	Same Azure Monitor pricing that is applicable to Azure VMs (Refer to the Azure Monitor Pricing page to learn more)

For more details on Azure Arc pricing visit our pricing page: https://aka.ms/azurearcpricing

Addressable Revenue Opportunity

Large TAM; millions of on-premises servers, double digit growth in containers

Expand management to on-premises servers

~12m on-premises physical servers growing to ~15 million by 2024[1]

~50-70m virtual machines growing to 80-90m by 2024[2]

Grow your business with containers

Use of containers growing from 70% to ~90%[3]

Double digit growth

Large enterprises shift to containers

Serve expanding edge workloads

~50% of the data will be created on edge by 2023[4]

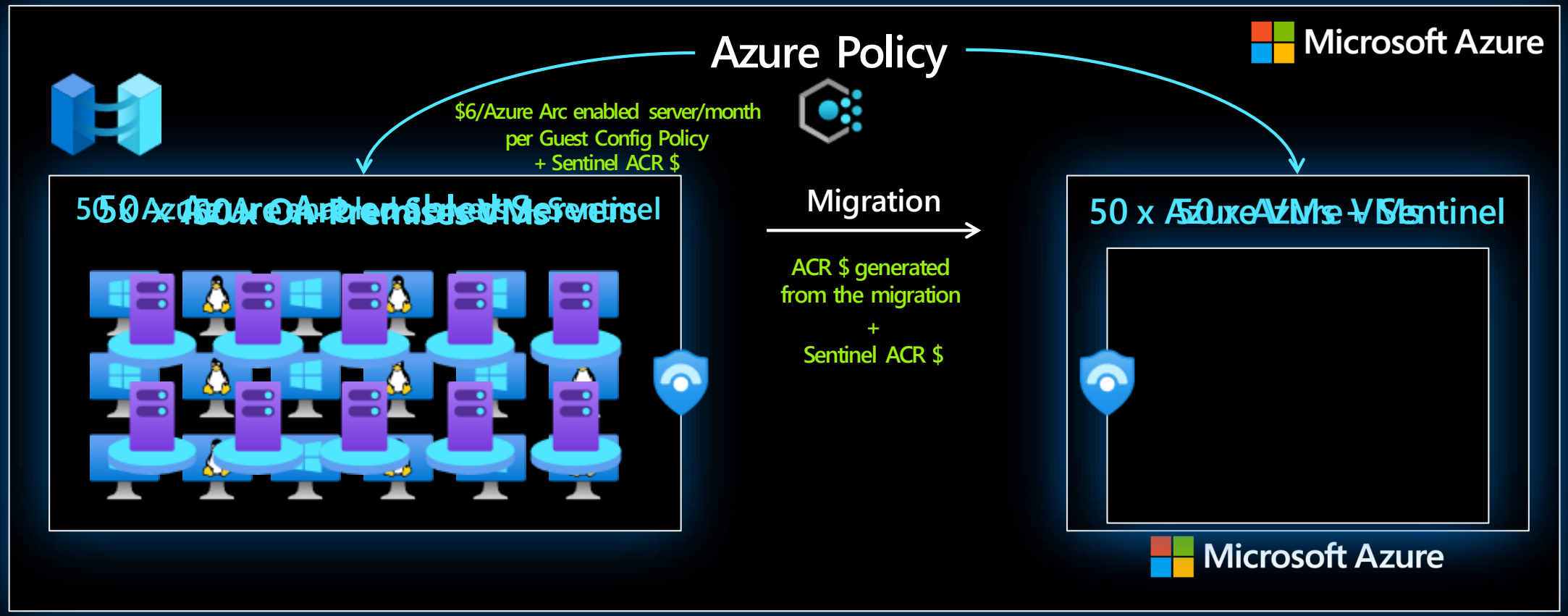
Healthcare pandemic accelerating edge devices adoption;

expand your business with it

1. IDC Enterprise Infra Tracker; 2. Assumption: 1 physical servers = ~4 virtual machines, 3. CNCF, production and development 4. Gartner; Top 10 trends Dec '19

Example: Azure Arc Partner Opportunity – Migration + Sentinel

Scenario: A customer has 100 VMs (Linux/Windows) running on-premises. The VMs consist of file servers, SQL instances, web servers and backend servers. You as a partner have been brought in to conduct an analysis of the infrastructure, execute the migration and implement Azure Sentinel as a SIEM solution using a unified operations strategy.



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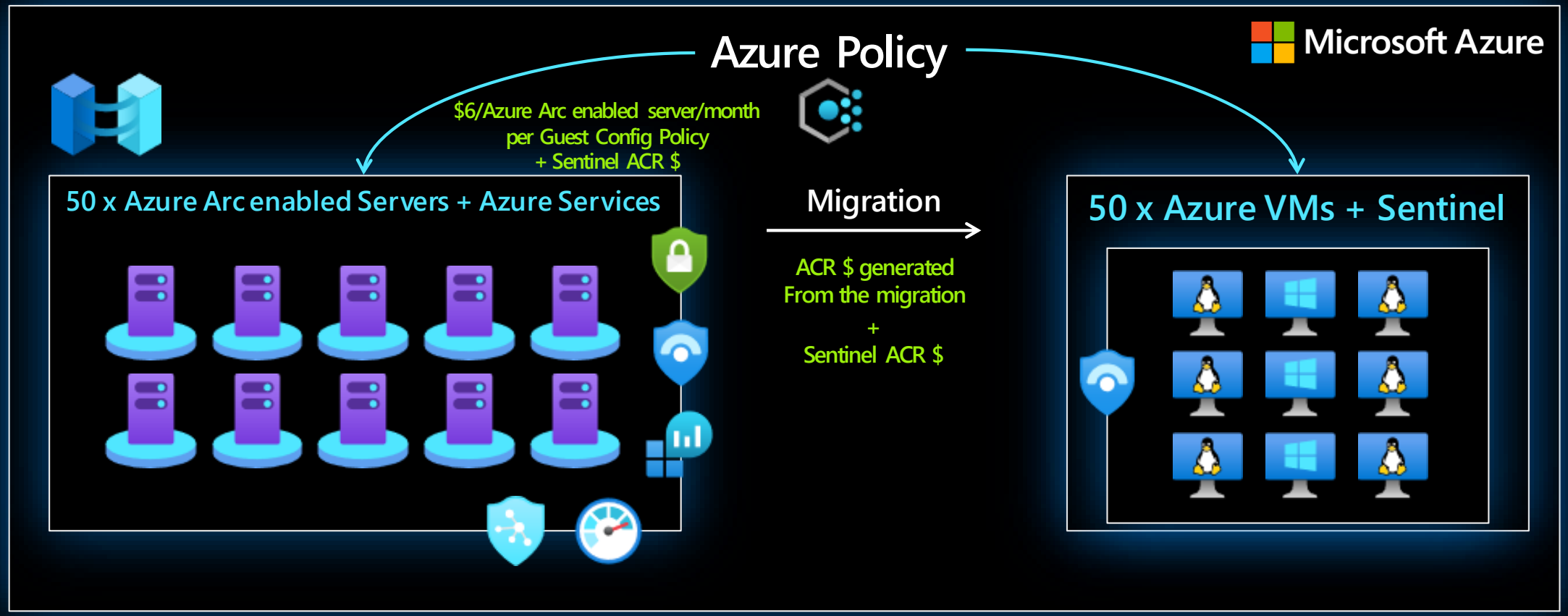
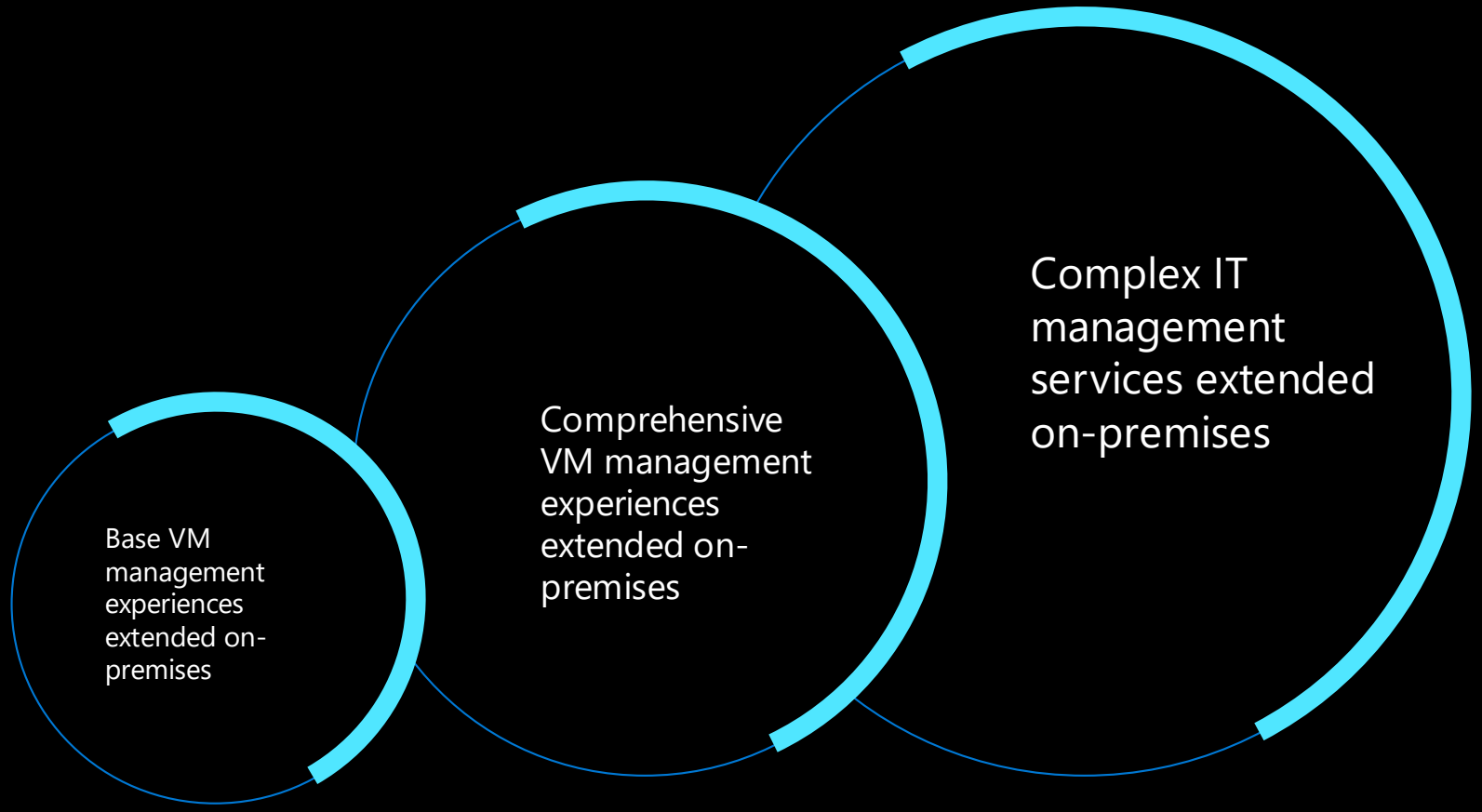


Azure Arc Partner Opportunity

Use case	Azure services enabled by Azure Arc	Outcomes
Organize and govern across environments	Azure Policy, Azure Monitor, Log Analytics, Security Center, Azure Sentinel, Azure Update Management	1. Adoption services (x% revenue, y% margin) 2. Managed services (x% revenue, y% margin) 3. Accelerators (x% revenue, y% margin)
At-scale Kubernetes app management	Azure K8s Config Management, Azure Policy for Kubernetes, Azure Monitor for Containers	1. Adoption services (x% revenue, y% margin) 2. Managed services (x% revenue, y% margin) 3. Accelerators (x% revenue, y% margin)
Run data services anywhere	Azure SQL Managed Instance, Azure PostgreSQL Hyperscale	1. Adoption services (x% revenue, y% margin) 2. Managed services (x% revenue, y% margin) 3. Accelerators (x% revenue, y% margin)

Contoso MSP delivering value with Azure Arc



Pricing for Arc enabled Kubernetes and data services

Both Azure Arc enabled Kubernetes and Azure Arc enabled data services are in preview. We will announce pricing details closer to GA.

What do we hear from customers?

"I need to manage security and incident management across my public cloud and datacenter assets through policy enforcement and automation."

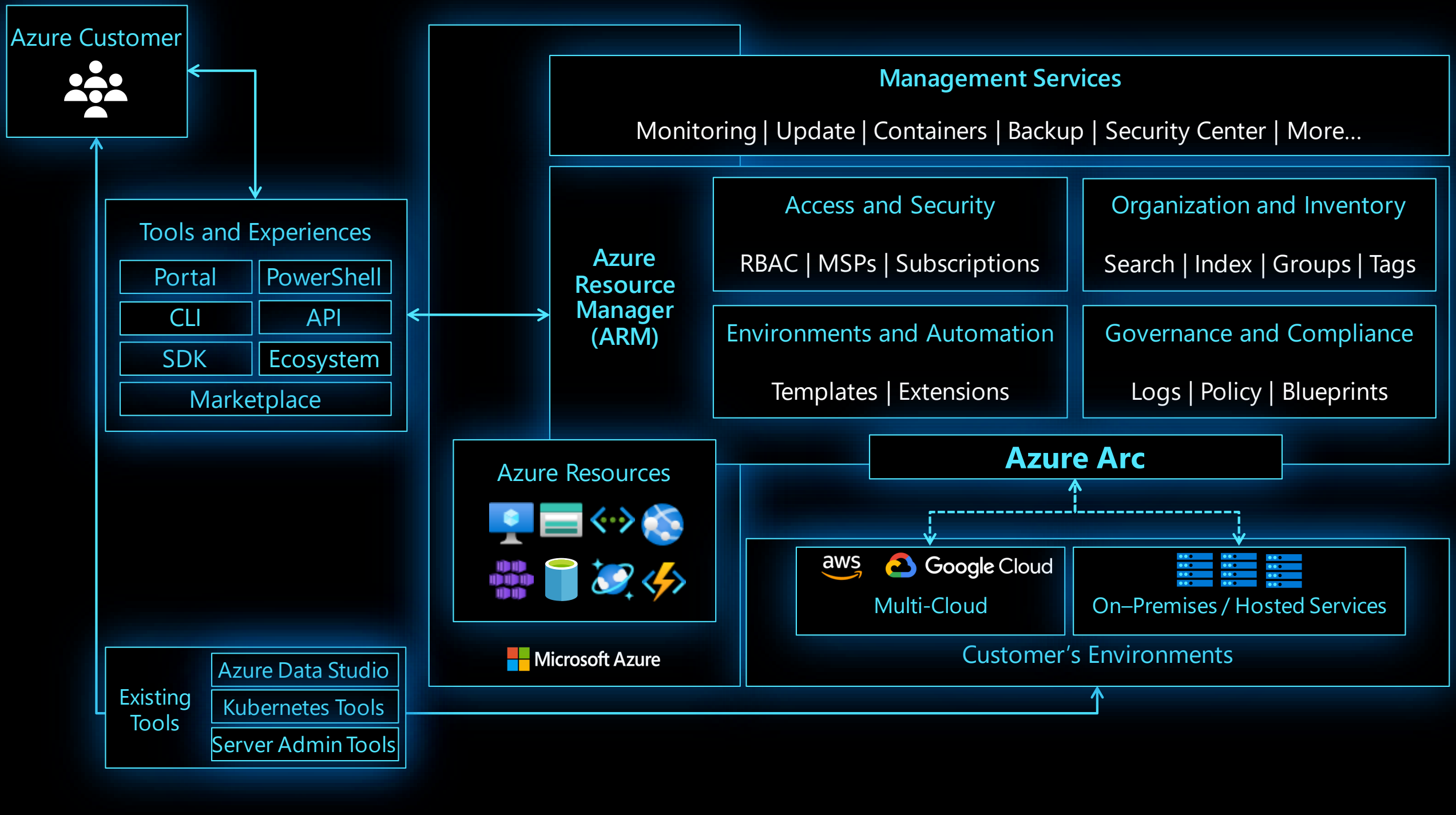
"As a Managed Service Provider, I need to operate and govern my customer's Azure ,on-premises and other clouds environments."

"I want my on-premises servers to have strong integration with Azure and tools like Security Center and Sentinel."

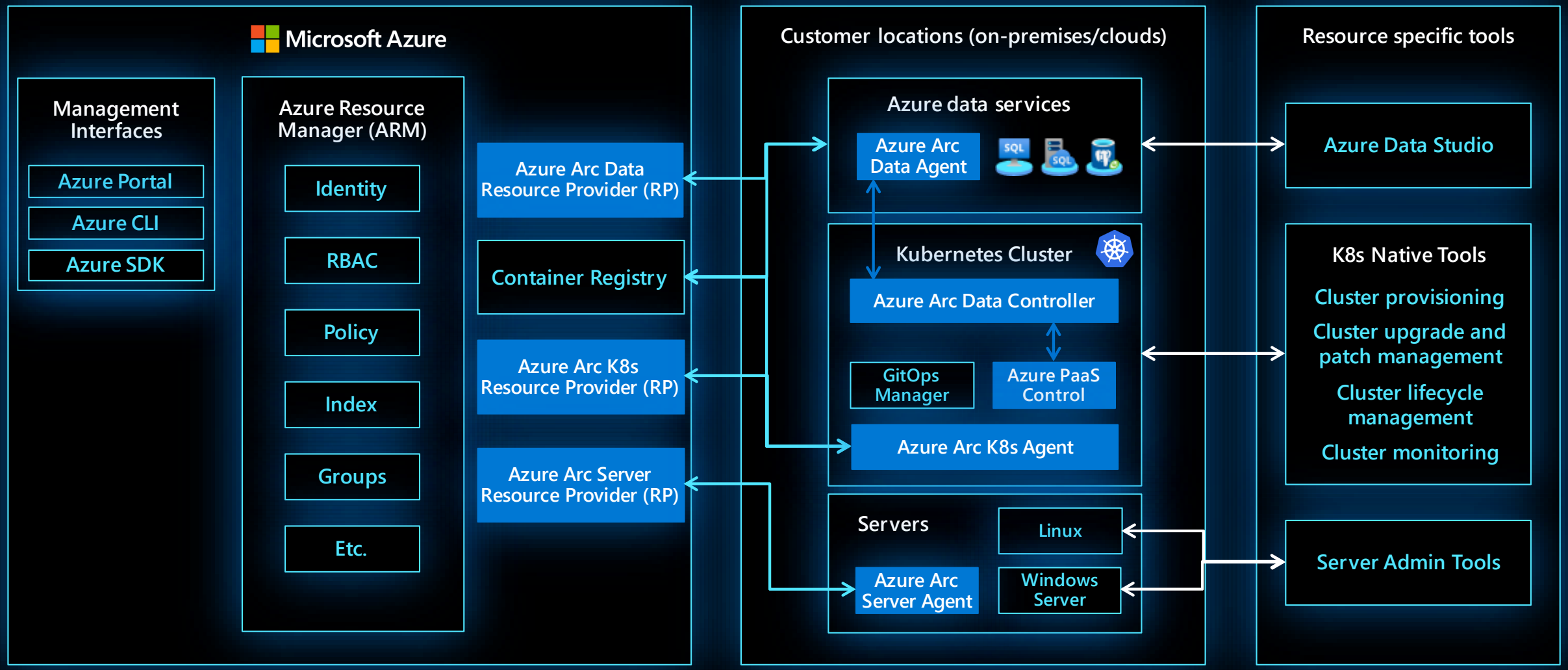
"As a DevOps Engineer, I would like for all my applications in our existing and future production Kubernetes clusters, to be deployed with same versioning and with no configuration drift."

"As an SRE (Site Reliability Engineer), I need to have health visibility in single pane of glass fashion to all my existing and future Kubernetes clusters, infrastructure and applications."

"We use SQL Server to integrate with our mission critical application platform, but the DB layer must remain on-premises due to sensitive patient data and data availability needs."


Azure Customer
Tools and Experiences
Portal
PowerShell
CLI
API
SDK
Ecosystem
Marketplace
Existing Tools
Azure Data Studio
Kubernetes Tools
Server Admin Tools
Management Services
Monitoring | Update | Containers | Backup | Security Center | More...
Azure Resource Manager (ARM)
Access and Security
RBAC | MSPs | Subscriptions
Organization and Inventory
Search | Index | Groups | Tags
Environments and Automation
Templates | Extensions
Governance and Compliance
Logs | Policy | Blueprints
Azure Resources
Microsoft Azure
Azure Arc
aws
Google Cloud
Multi-Cloud
On–Premises / Hosted Services
Customer's Environments

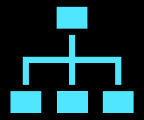
Azure Arc Architecture



Azure Arc Components

GitOps – Definition & Principles

Git as the source of truth for a system



Git as the single place where we operate

(create, change, and delete)

All changes are observable

System state described declaratively

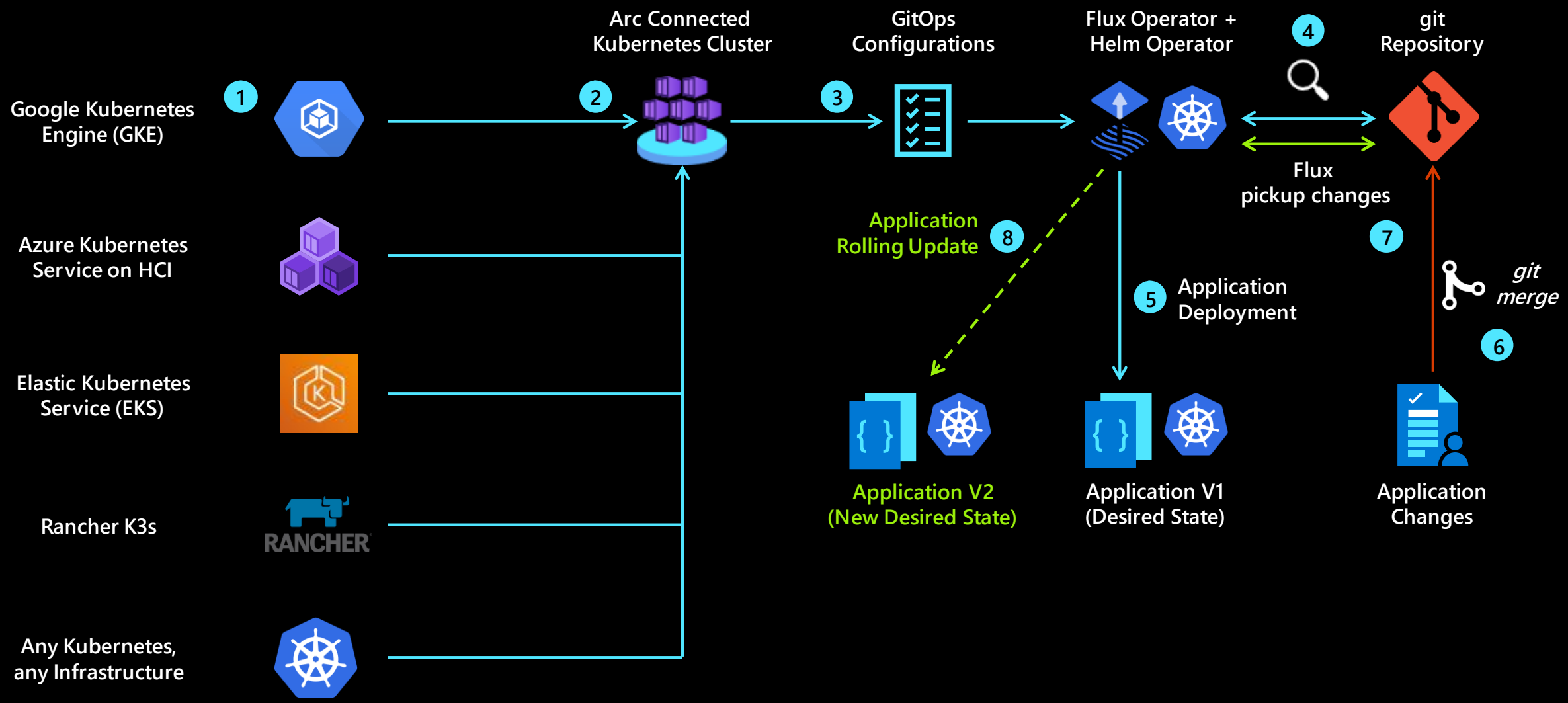
State declaration versioned in source control

Approved changes are applied automatically

Agents enforce desired state

https://www.weave.works/technologies/gitops/

Azure Arc enabled Kubernetes GitOps Flow



The Azure Arc Jumpstart GitHub Repository

1. Provide a “zero to hero” scenarios for multiple environments and deployment type using as much automation as possible

2. Create a ”supermarket” experience by being able to take “off the shelf” scenarios and implement it

3. Meeting Azure Arc customers where they are

https://aka.ms/AzureArcJumpstart

Get started

Azure Arc enabled servers is now generally available, get started today: https://aka.ms/Azure-Arc

Try Azure Arc enabled Kubernetes, in preview: https://aka.ms/Azure-Arc-Kubernetes

Try Azure Arc enabled data services, in preview: https://aka.ms/hybrid-data-services

Learn more

Azure Arc Jumpstart: https://aka.ms/AzureArcJumpstart

Technical documentation: https://aka.ms/AzureArcDocs

Azure Arc Learning Path: https://aka.ms/AzureArcLearn

Additional Resources

Onboarding a server to Azure Arc

Using Azure Policy with Arc enabled servers

Servers & Containers: Managing with Lighthouse

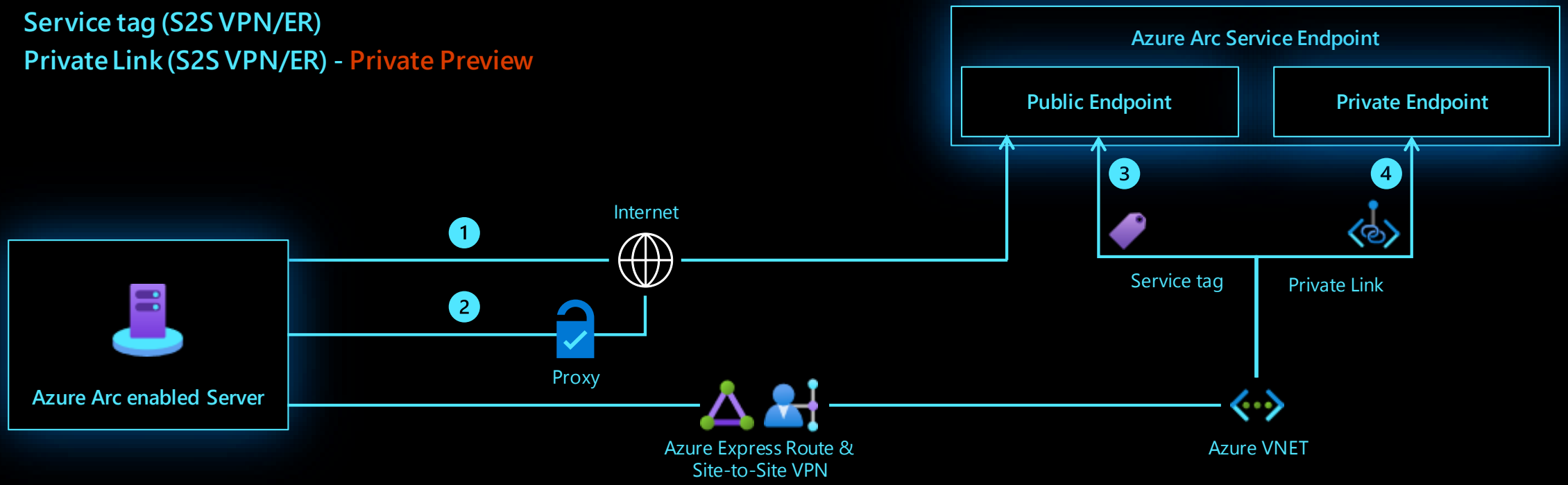
Extensions and logs for Arc enabled servers

Azure Arc enabled Kubernetes: onboarding and inventory

Azure Arc enabled servers

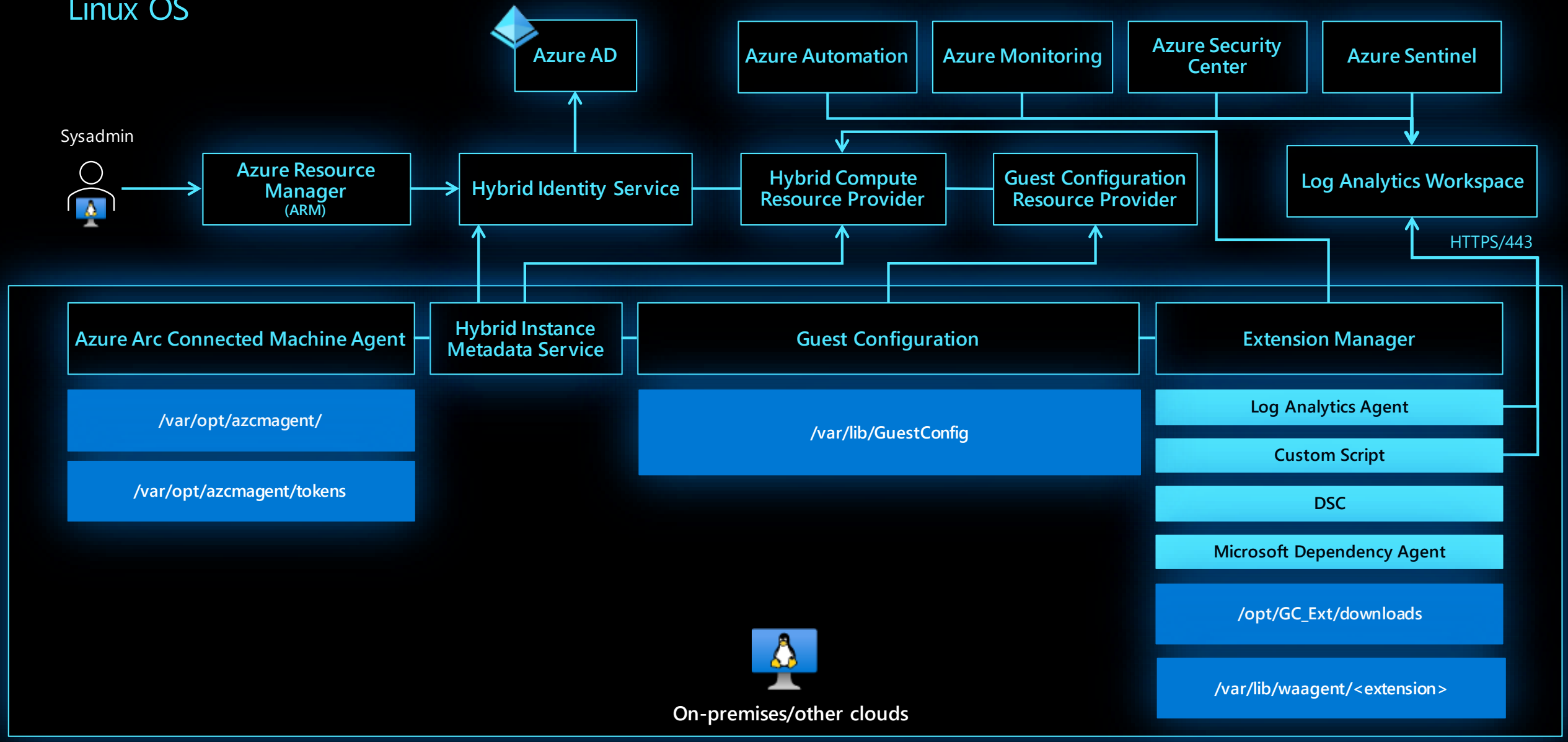
Connectivity Options

1. Direct connection (Internet)
2. Connection via Proxy (Internet)
3. Service tag (S2S VPN/ER)
4. Private Link (S2S VPN/ER) - Private Preview



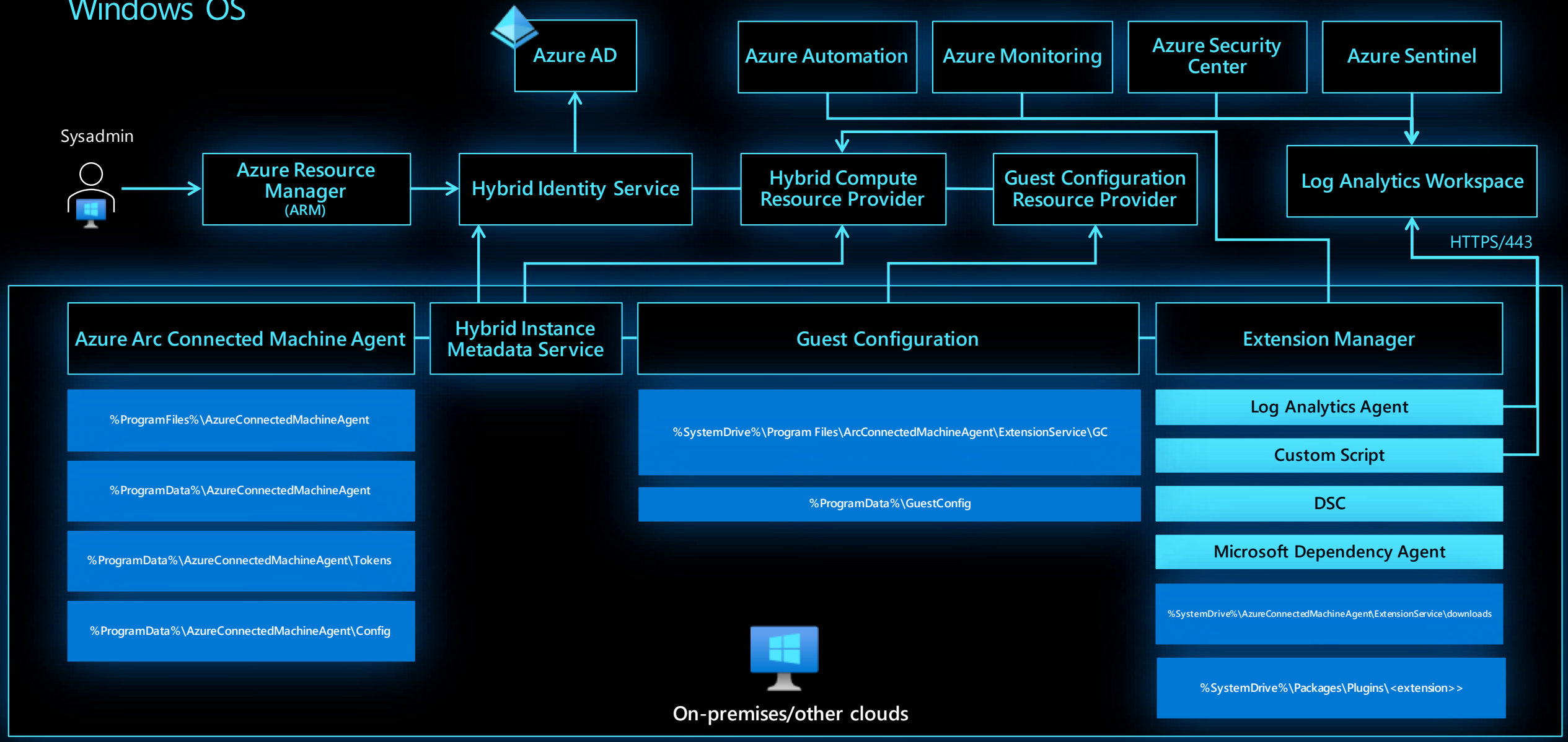
Azure Arc enabled servers architecture

Linux OS



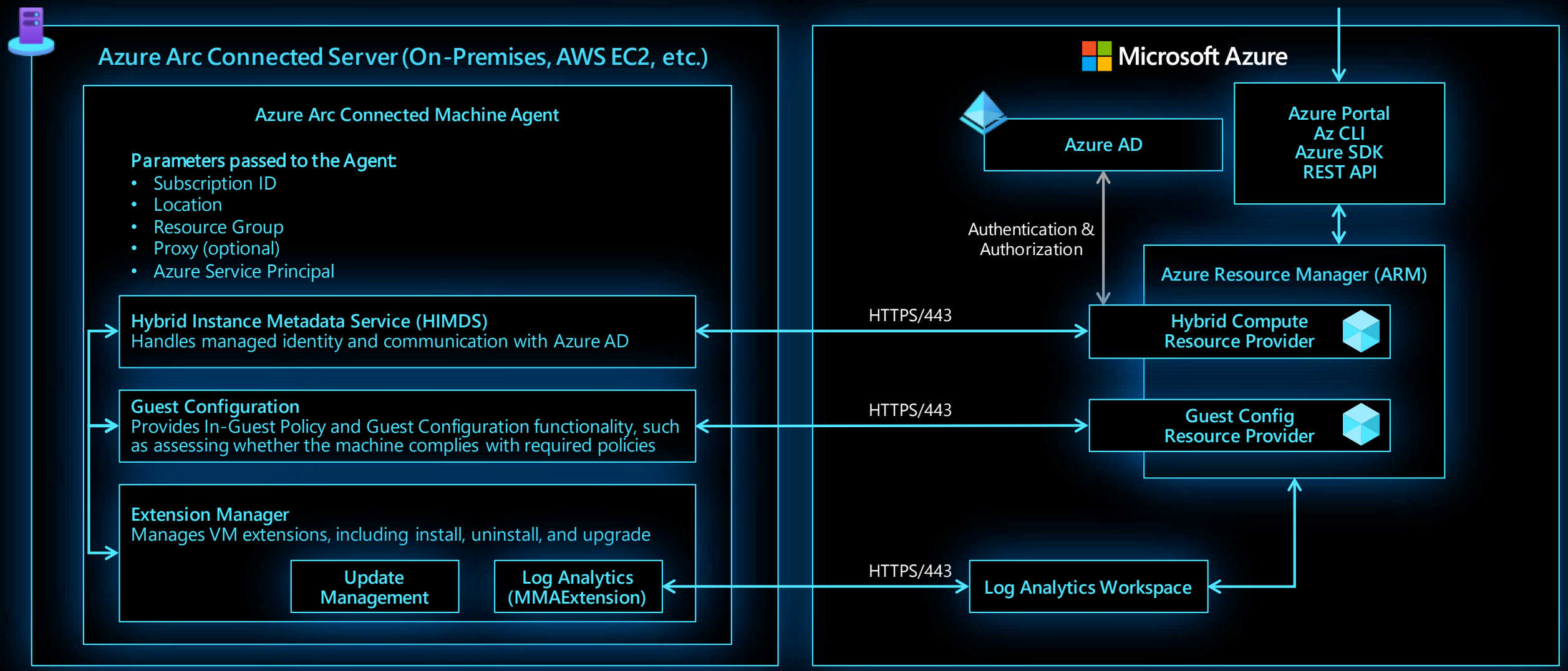
Azure Arc enabled servers architecture

Windows OS



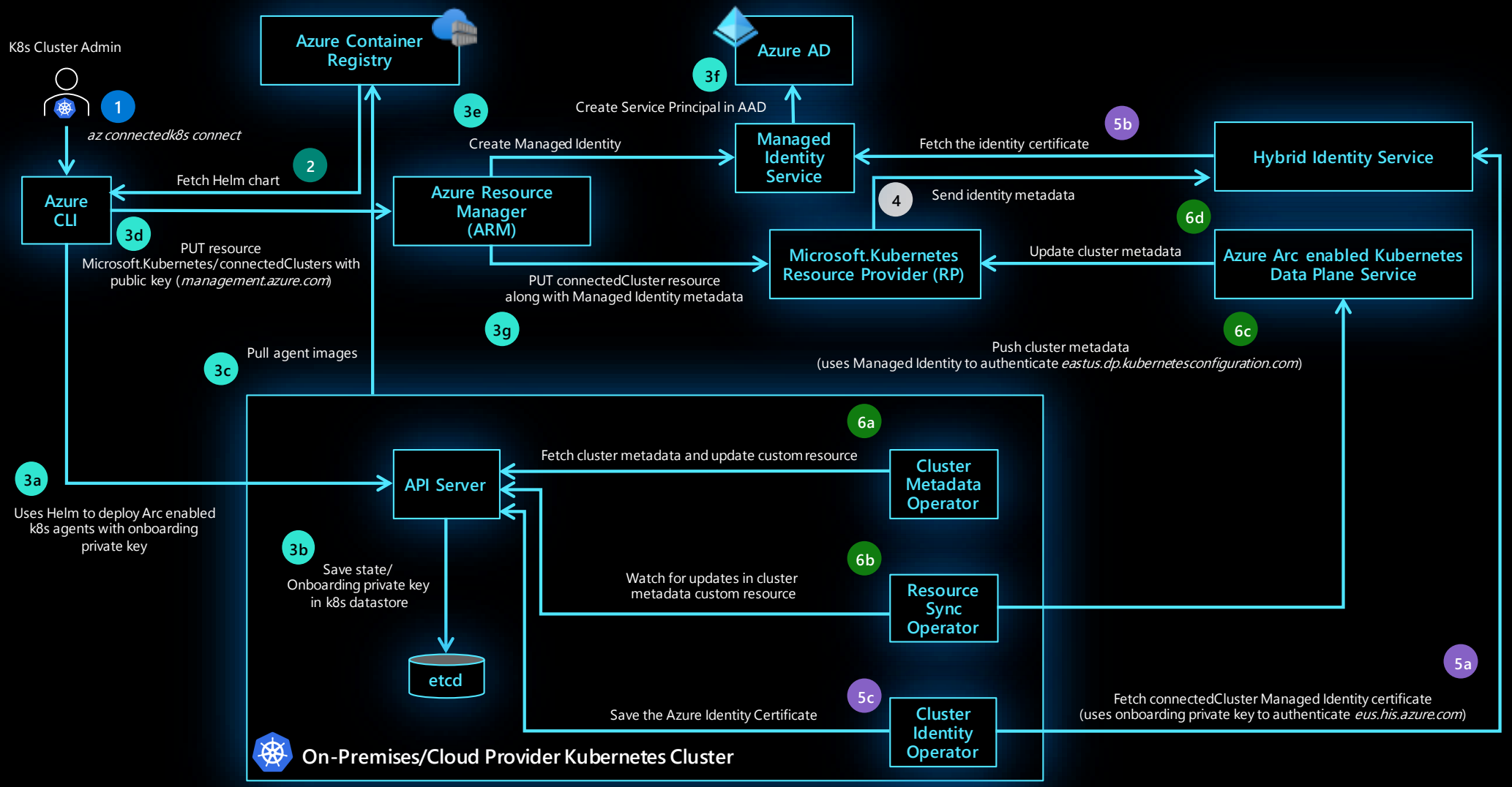
Azure Arc enabled servers

Connected Machine Agent



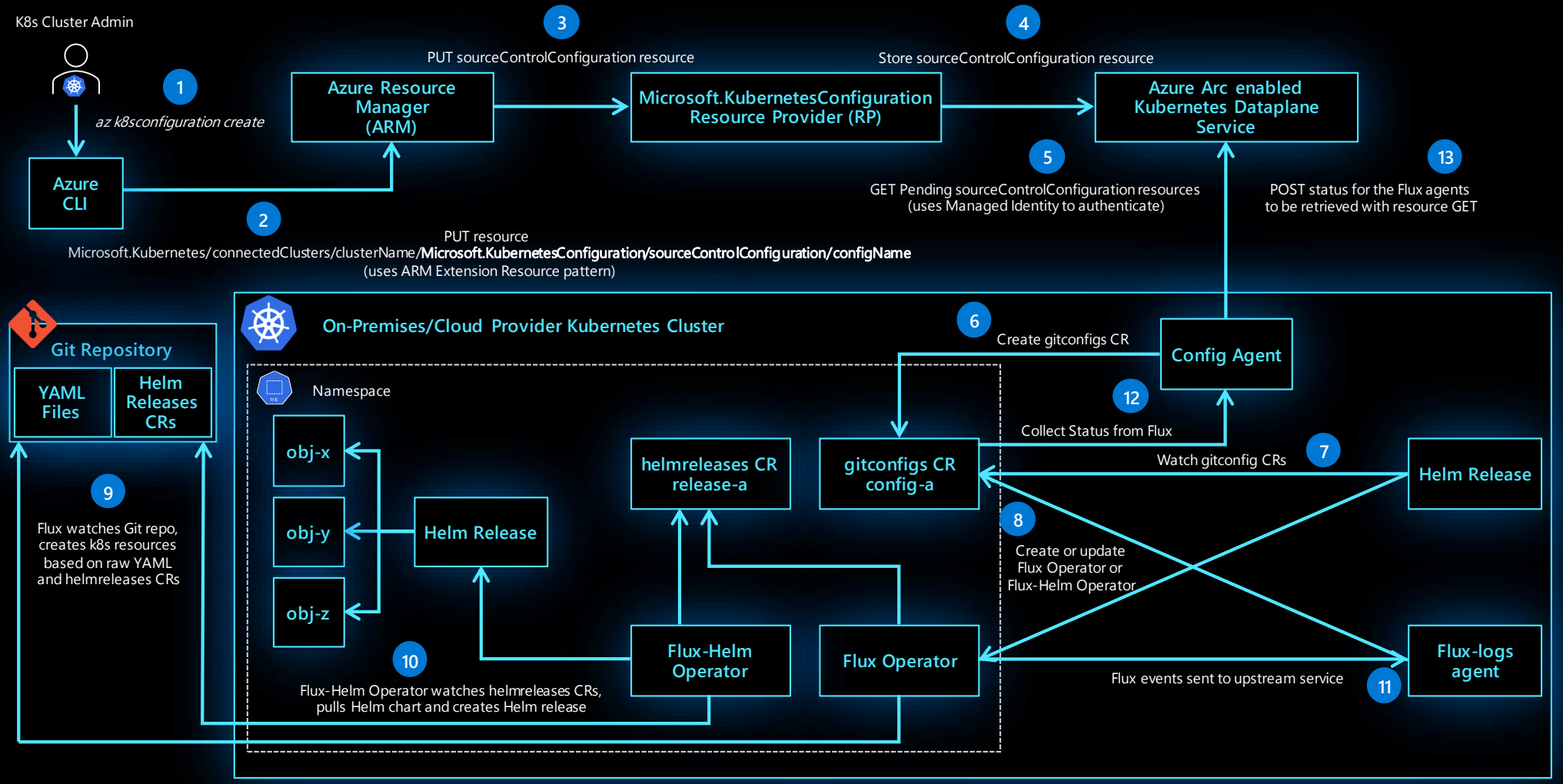
Azure Arc enabled Kubernetes

Onboarding



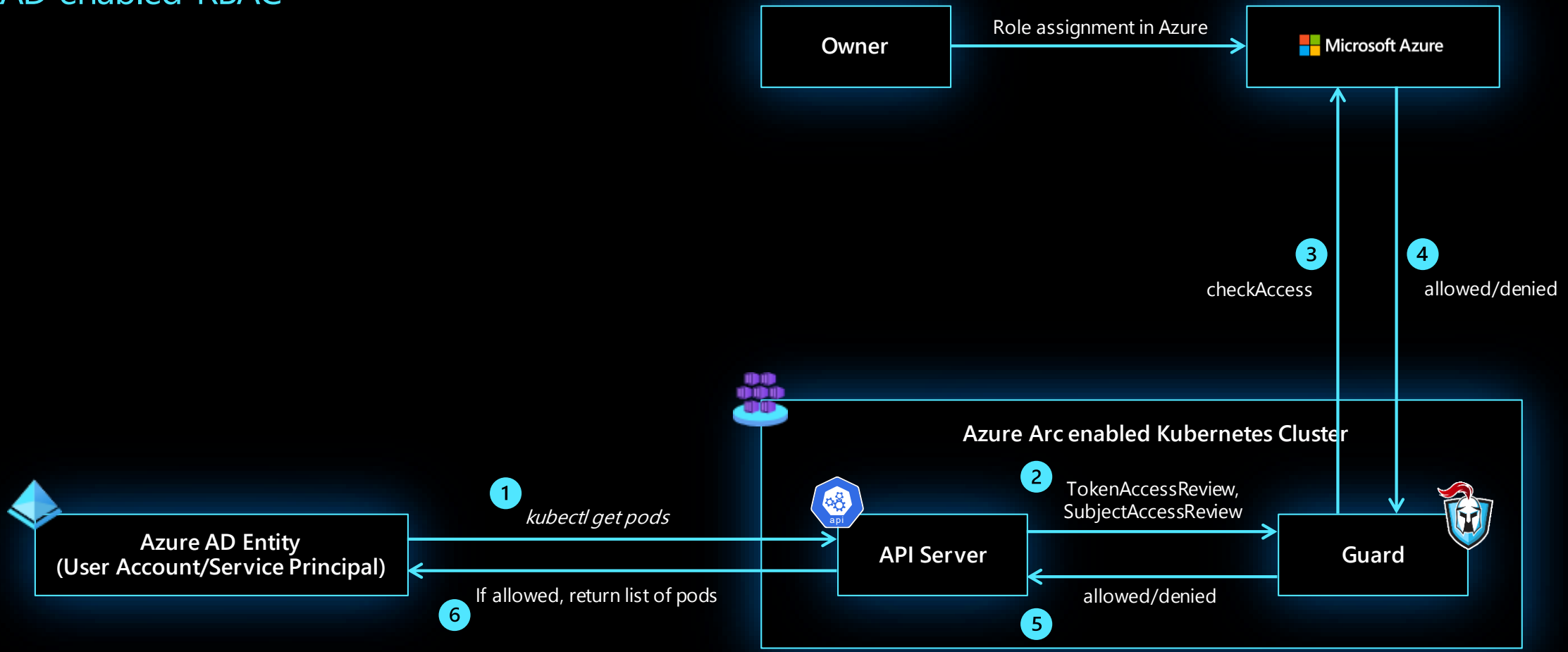
Azure Arc enabled Kubernetes

GitOps Configuration



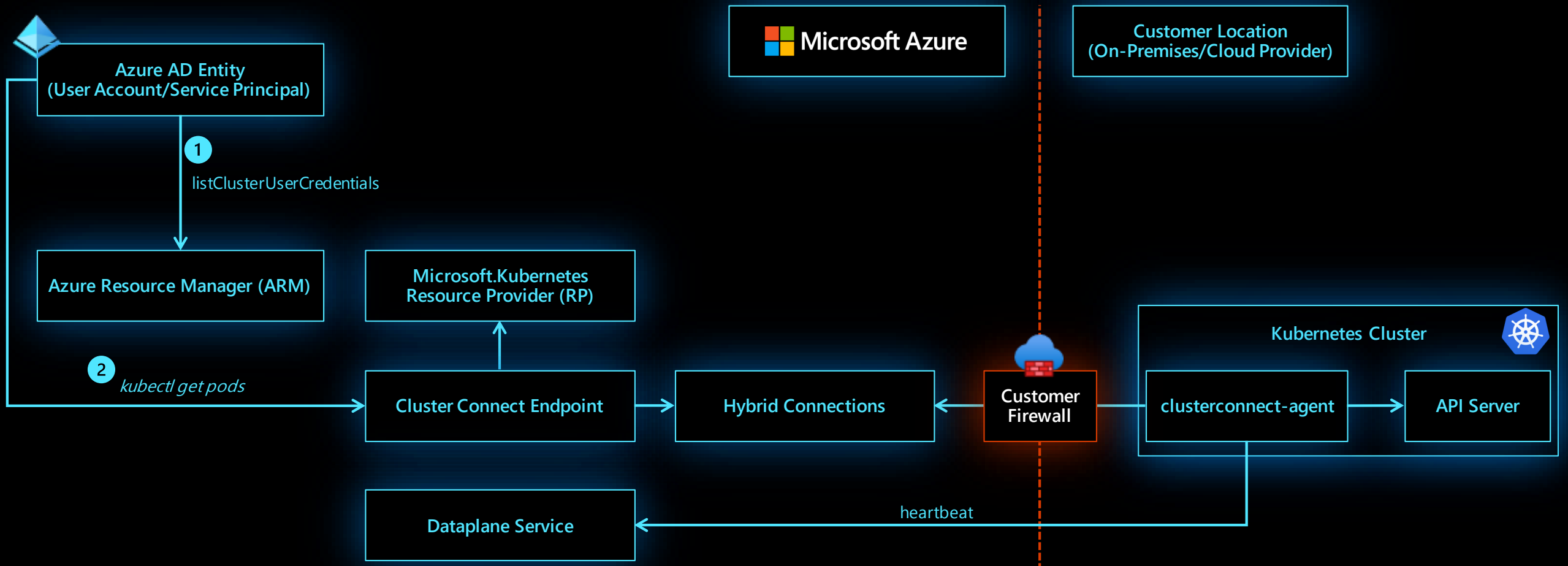
Azure Arc enabled Kubernetes

AAD enabled RBAC



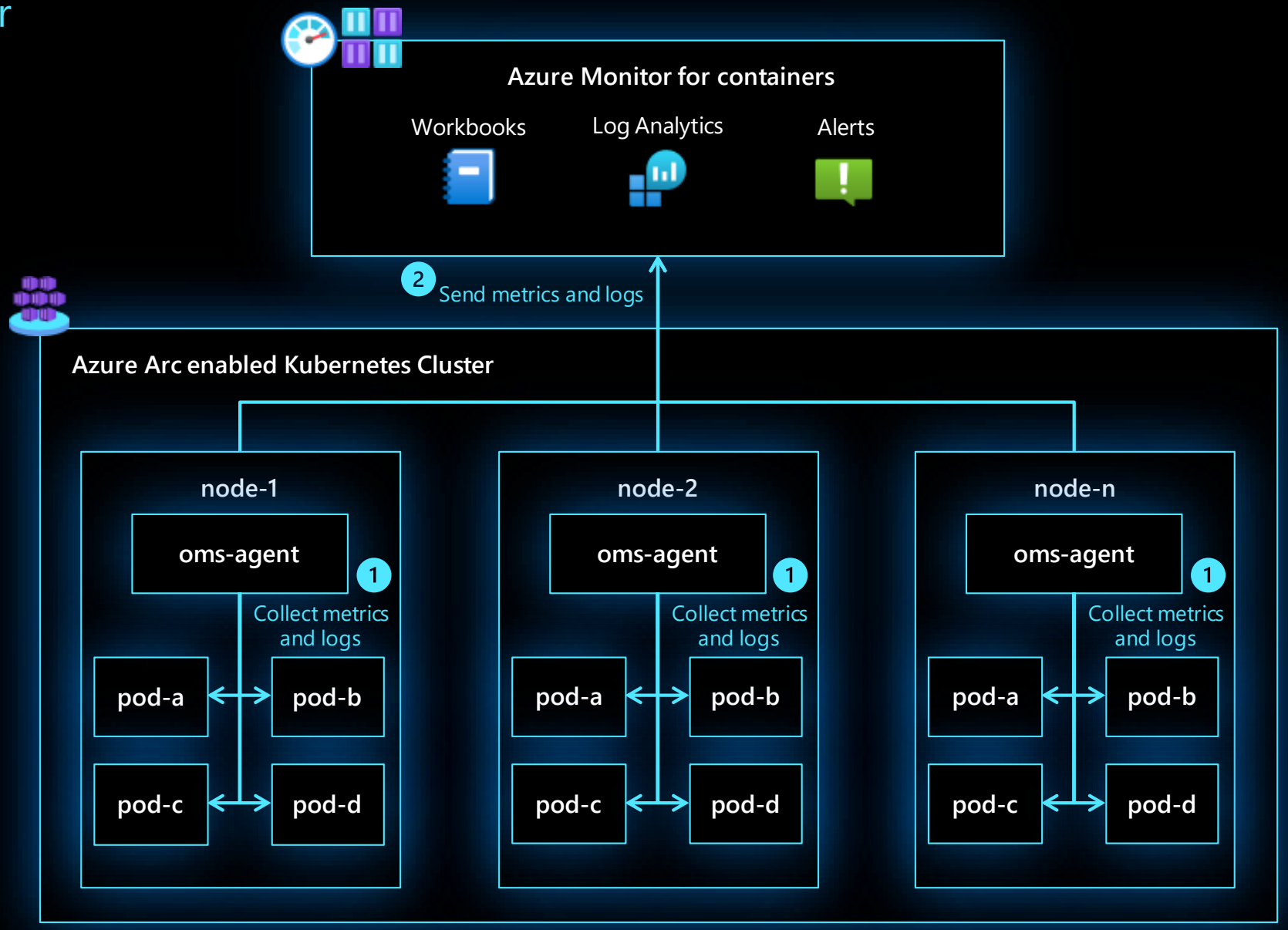
Azure Arc enabled Kubernetes

Cluster Connect



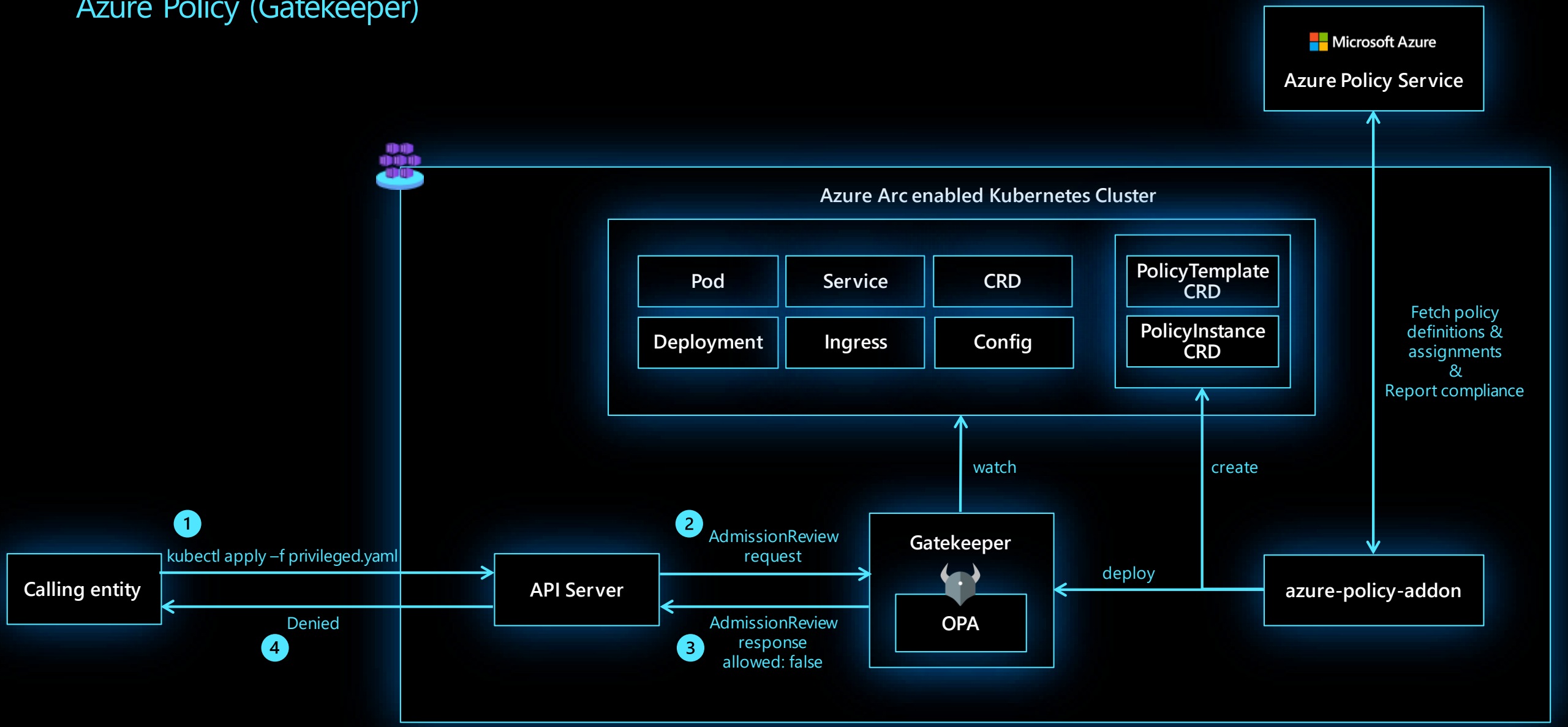
Azure Arc enabled Kubernetes

Azure Monitor

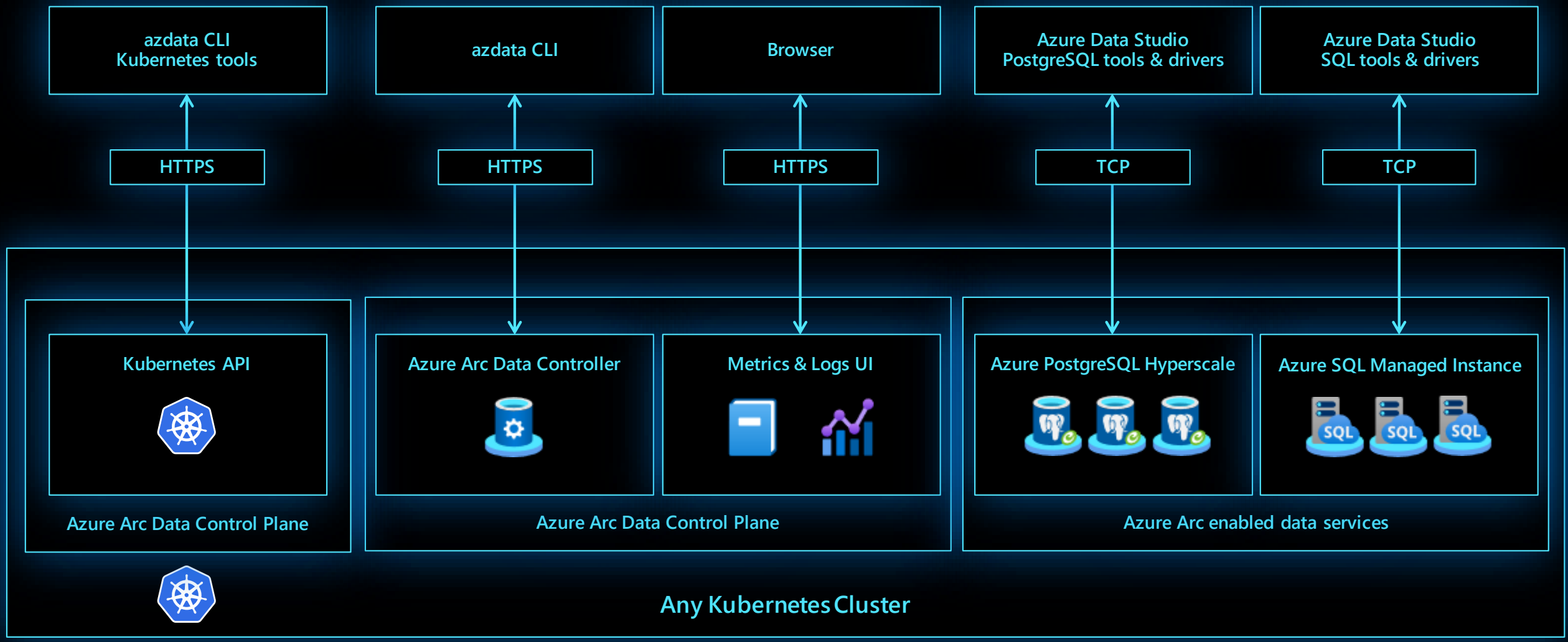


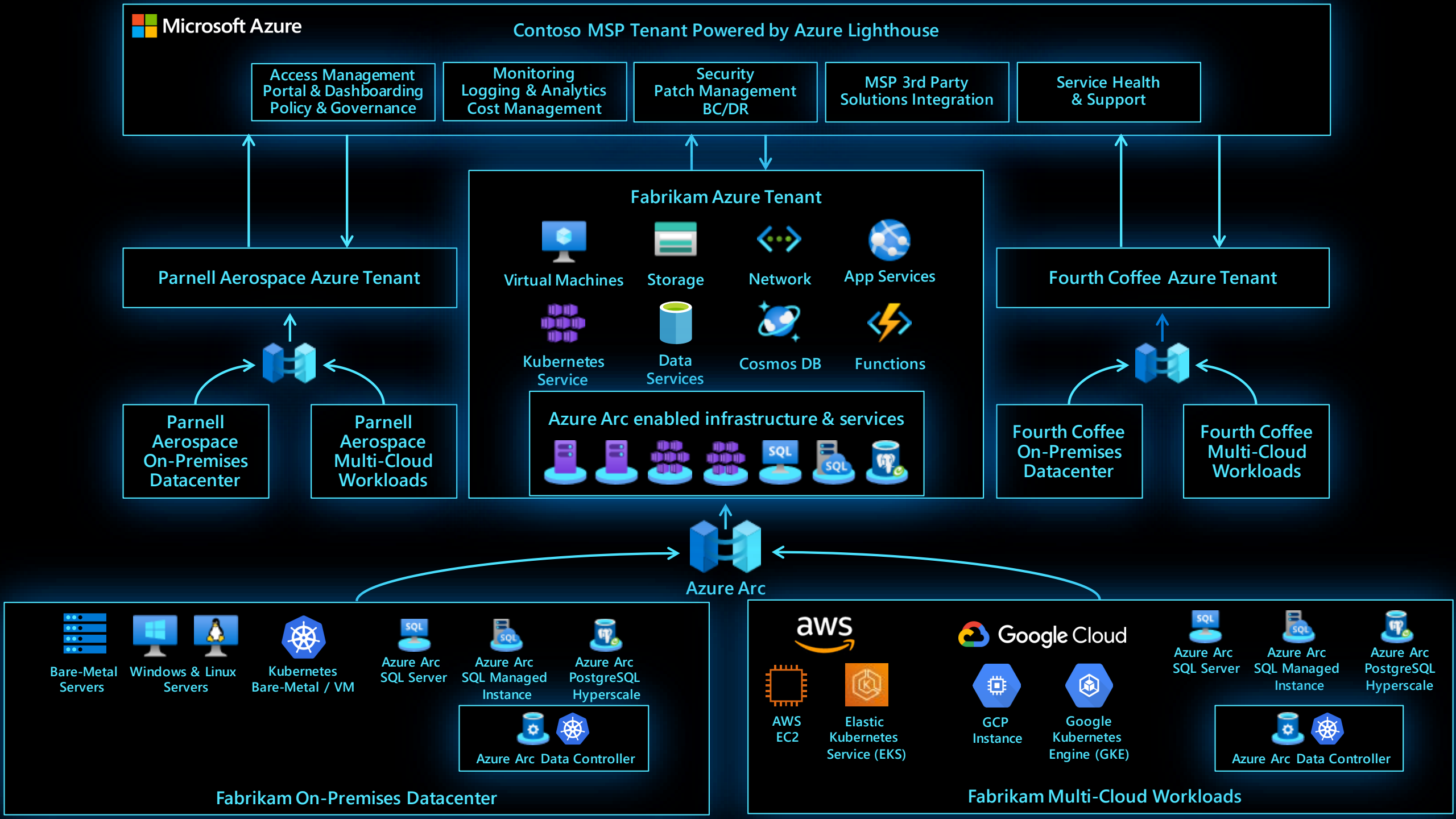
Azure Arc enabled Kubernetes

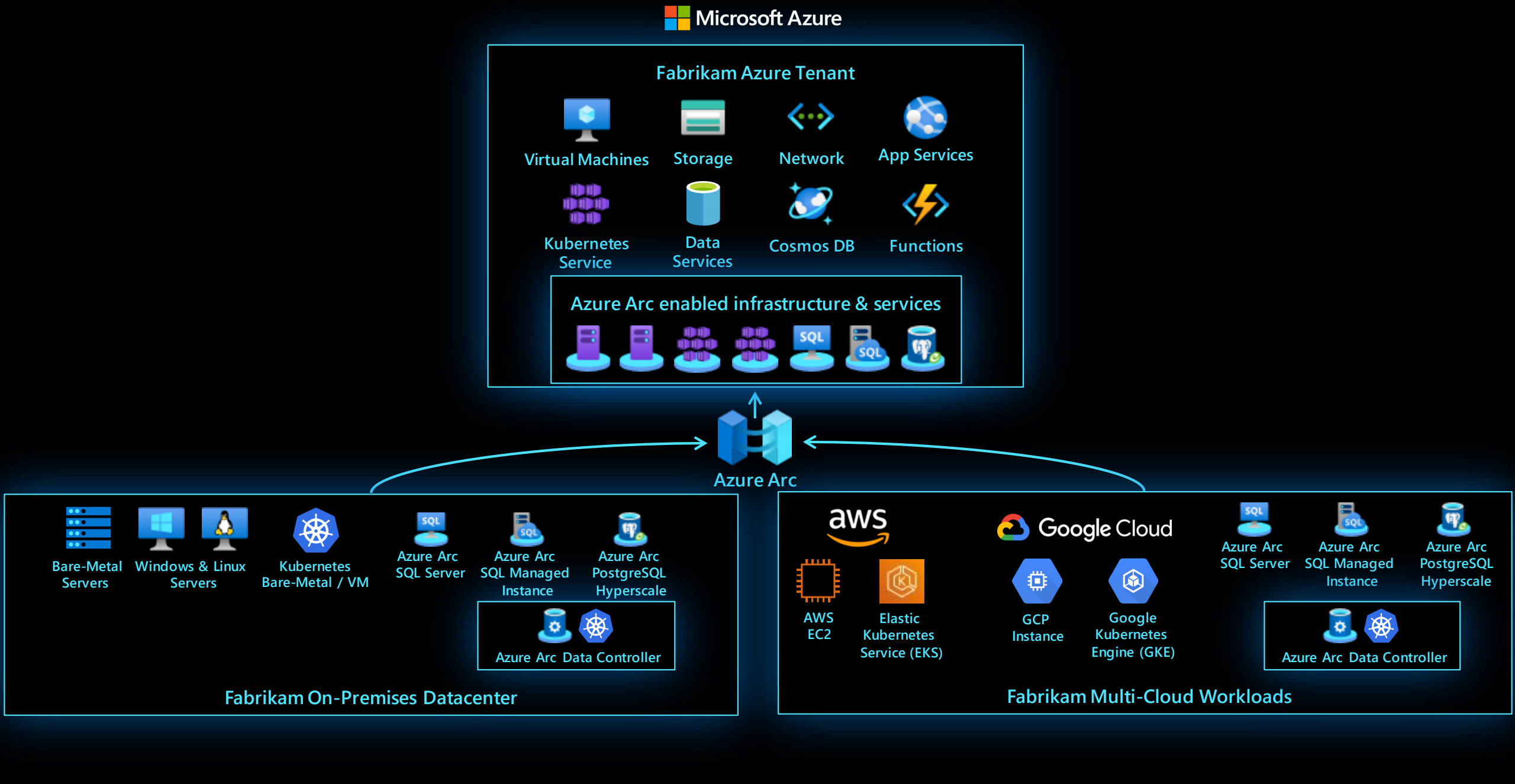
Azure Policy (Gatekeeper)



Azure Arc enabled Data Services Endpoints




Microsoft Azure
Contoso MSP Tenant Powered by Azure Lighthouse
Access Management
Portal & Dashboarding
Policy & Governance
Monitoring
Logging & Analytics
Cost Management
Security
Patch Management
BC/DR
MSP 3rd Party
Solutions Integration
Service Health
& Support
Fabrikam Azure Tenant
Virtual Machines
Storage
Network
App Services
Kubernetes
Service
Data
Services
Cosmos DB
Functions
Azure Arc enabled infrastructure & services
Parnell Aerospace Azure Tenant
Parnell
Aerospace
On-Premises
Datacenter
Parnell
Aerospace
Multi-Cloud
Workloads
Fourth Coffee Azure Tenant
Fourth Coffee
On-Premises
Datacenter
Fourth Coffee
Multi-Cloud
Workloads
Azure Arc
Bare-Metal
Servers
Windows & Linux
Servers
Kubernetes
Bare-Metal / VM
Azure Arc
SQL Server
Azure Arc
SQL Managed
Instance
Azure Arc
PostgreSQL
Hyperscale
Azure Arc Data Controller
Fabrikam On-Premises Datacenter
aws
AWS
EC2
Elastic
Kubernetes
Service (EKS)
Google Cloud
GCP
Instance
Google
Kubernetes
Engine (GKE)
Azure Arc
SQL Server
Azure Arc
SQL Managed
Instance
Azure Arc
PostgreSQL
Hyperscale
Azure Arc Data Controller
Fabrikam Multi-Cloud Workloads


Microsoft Azure
Fabrikam Azure Tenant
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Cosmos DB
Functions
Azure Arc enabled infrastructure & services
SQL
SQL
Azure Arc
Bare-Metal Servers
Windows & Linux Servers
Kubernetes Bare-Metal / VM
Azure Arc SQL Server
Azure Arc SQL Managed Instance
Azure Arc PostgreSQL Hyperscale
Azure Arc Data Controller
Fabrikam On-Premises Datacenter
aws
AWS EC2
Elastic Kubernetes Service (EKS)
Google Cloud
GCP Instance
Google Kubernetes Engine (GKE)
Azure Arc SQL Server
Azure Arc SQL Managed Instance
Azure Arc PostgreSQL Hyperscale
Azure Arc Data Controller
Fabrikam Multi-Cloud Workloads

Resources

Azure Arc all up overview

aka.ms/arc-introvideo

Introducing Azure Arc

aka.ms/azurearcpricing

Azure Arc pricing page

aka.ms/arc-techcommunity

Deep dives on Azure Arc, best practices and more

aka.ms/arc-customerstories

Learn how other customers are implementing Azure Arc

https://aka.ms/arc-feedback

Public Q&A forum

AzureArcContact@microsoft.com

Ask to be added to a common Teams site and monthly call with engineering

Azure Arc enabled Kubernetes & servers

aka.ms/arc-blog

Azure Arc: Extending Azure management to any infrastructure

aka.ms/arc-k8svideo

Kubernetes—Managing K8 clusters outside of Azure with Azure Arc

aka.ms/arc-serversvideo

Server management—Organize all your servers outside of Azure with Azure Arc

aka.ms/arc-serversdocs

Documentation for Azure Arc enabled servers

aka.ms/arc-k8sdocs

Documentation for Azure Arc enabled Kubernetes

aka.ms/AzureArcJumpstart

Azure Arc "Jumpstart" GitHub repository

Azure Arc enabled data services

aka.ms/arc-datablog

Blog – Run Azure data services on-premises, at the edge, and multi-cloud with Azure Arc

aka.ms/arc-data-mechanicsvideo

Demos on Azure Arc enabled data services, including SQL and PostgreSQL Hyperscale

aka.ms/arc-data-ignitevideo

Ignite 2020 session—Bring Azure data services to on-premises, multi-cloud and edge

aka.ms/arc-datadocs

Documentation for Azure Arc enabled data services

Microsoft

Thank you

Yasin Saygılı
Sr. Cloud Solutions Architect @ Turkcell DBS

yasin.saygili@turkcell.com.tr