

Azure Arc overview



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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



Google Cloud

ORACLE



IBM Cloud

Azure Hybrid

Innovation anywhere with Azure



Single control plane with Azure Arc



Bring Azure services
to any infrastructure



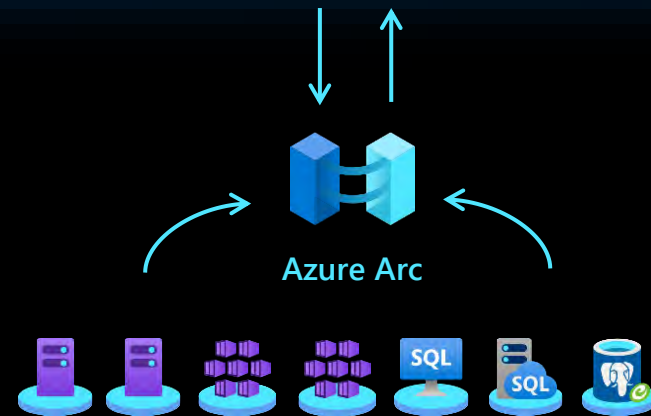
Modernize datacenters
with Azure Stack



Extend to the edge
with Azure IoT



Manage & Operate your infrastructure from the Azure control plane
and run Azure services on your infrastructure




Multi-cloud


Datacenter


Edge



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




Multi-cloud


Datacenter


Edge

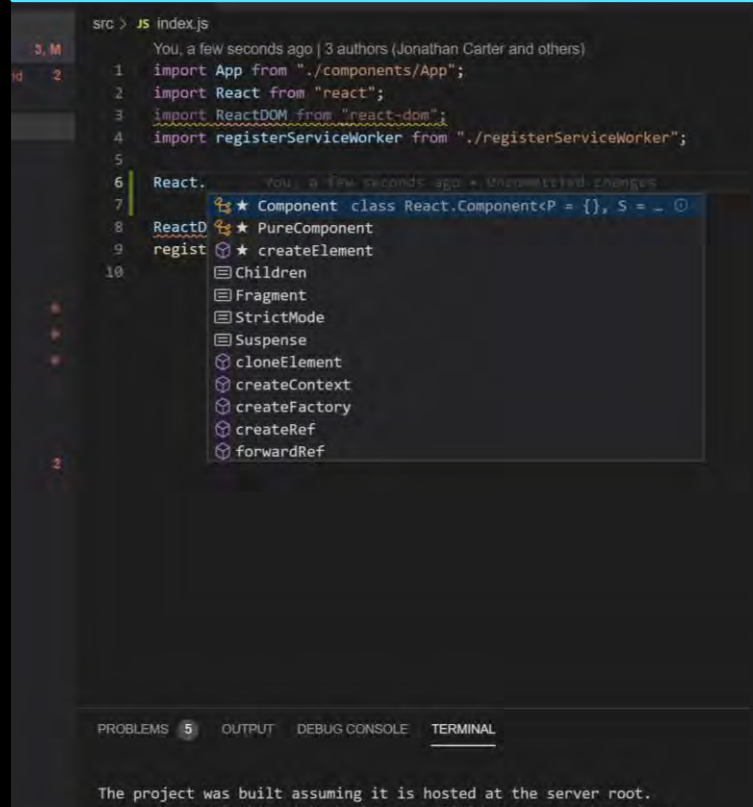


Azure Arc use cases

Organize and govern
across environments

At-scale Kubernetes
app management

Run data
services anywhere





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

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

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



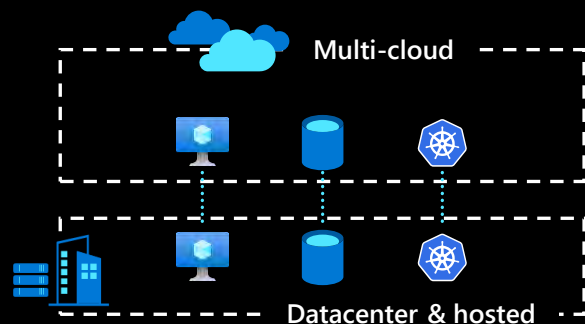
Datacenter



Edge

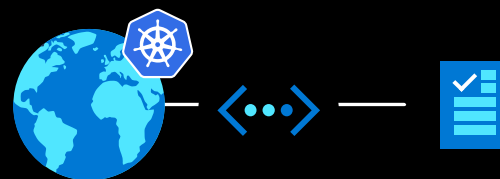
Azure Arc

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



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



RANCHER



OpenShift



AKS on Azure
Stack HCI

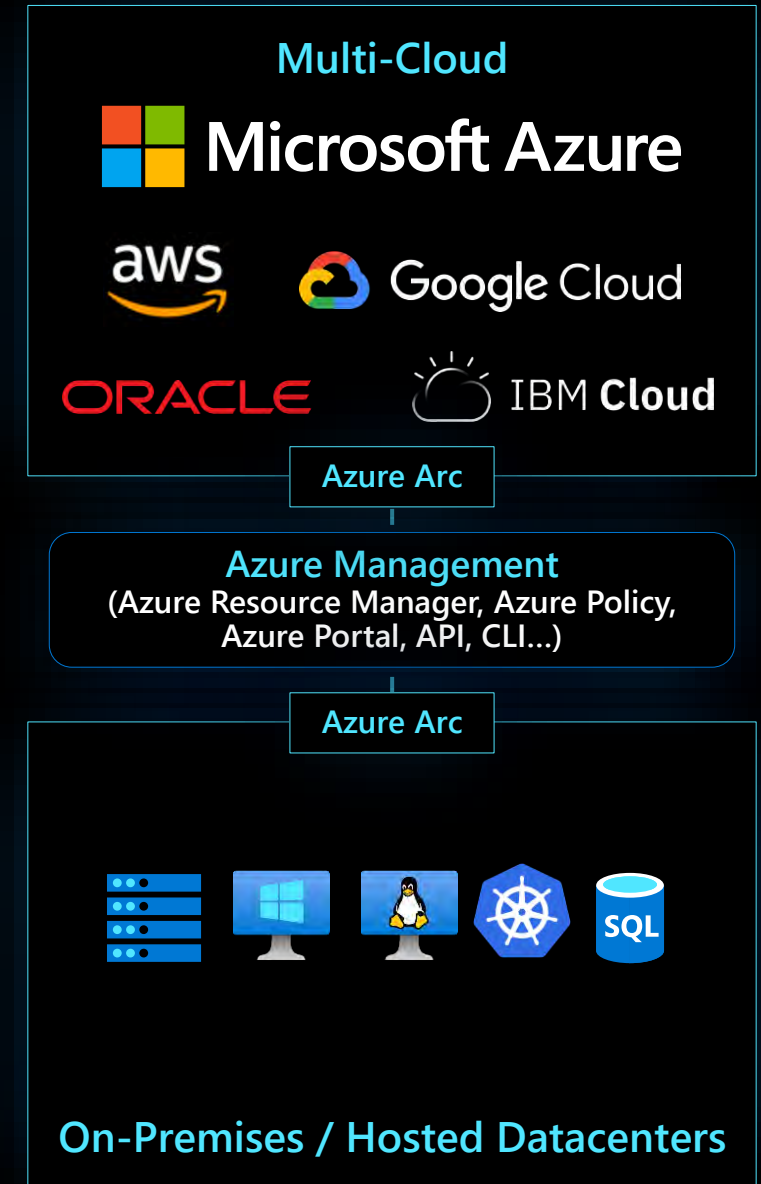
Public preview

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 ⓘ

<input type="checkbox"/> Name ↑↓	Type ↑↓	Resource group ↑↓
<input type="checkbox"/>  FilesvrHR-Linux-WA	Machine - Azure Arc	RGVMs
<input type="checkbox"/>  SQL-Win-OR	Machine - Azure Arc	RGVMs
<input type="checkbox"/>  SQLWinHR-Redmond	Machine - Azure Arc	RGVMs
<input type="checkbox"/>  WinCore-HR-Utah	Machine - Azure Arc	RGVMs
<input type="checkbox"/>  plat-lob1	Machine - Azure Arc	RGVMs
<input type="checkbox"/>  FileSvrEng-Linux	Virtual machine	RGVMs
<input type="checkbox"/>  FilesvrHR	Virtual machine	RGVMs
<input type="checkbox"/>  SqlSvrHRReport	Virtual machine	RGVMs

Win2019 - Policies

Virtual machine

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/rgvrType
All definition typesCompliance state
All compliance statesSearch
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 resources ⓘ

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
nrm-batch-require-user-subscripti...	c92f8fe1-e3cb-47e8-a01d-0...	Compliant	100%	0
nrm-subnet-require-nsg_1.0	c92f8fe1-e3cb-47e8-a01d-0...	Compliant	100%	0
nrm-warning-non-c+ai-security-rul...	c92f8fe1-e3cb-47e8-a01d-0...	Compliant	100%	0
nrm-kubernetes-require-azure-netwo...	c92f8fe1-e3cb-47e8-a01d-0...	Compliant	100%	0
nrm-hdinsight-require-subnet_1.0	c92f8fe1-e3cb-47e8-a01d-0...	Compliant	100%	0
nrm-batch-require-user-subscripti...	c92f8fe1-e3cb-47e8-a01d-0...	Compliant	100%	0
nrm-hdinsight-require-subnet_1.0	c92f8fe1-e3cb-47e8-a01d-0...	Compliant	100%	0
nrm-kubernetes-require-azure-netwo...	c92f8fe1-e3cb-47e8-a01d-0...	Compliant	100%	0
nrm-warning-non-c+ai-security-rul...	c92f8fe1-e3cb-47e8-a01d-0...	Compliant	100%	0
nrm-subnet-require-nsg_1.0	c92f8fe1-e3cb-47e8-a01d-0...	Compliant	100%	0

ContosoAuto | Update management

Automation Account | Directory: Microsoft

Search (Ctrl+/)



Schedule update deployment



Add Azure VMs



Add non-Azure machine



Manage machines

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

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

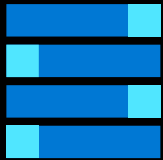
Platform: All

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 AM	Non-Azure	Linux	0	0	17	✔ Ready (view)
contoso-linux-1	✔ Compliant as of 10/28/2020, 7:57 AM	Non-Azure	Linux	0	0	17	✔ Ready (view)
DESKTOP-0SK4C00 <small>Azure Arc: ContosoRG/OnPrem</small>	✔ Compliant as of 10/28/2020, 1:42 AM	Non-Azure	Windows	0	0	2	✔ Ready (view)
DESKTOP-ROT87U6 <small>Azure Arc: ContosoRG/CloudW</small>	✔ Compliant as of 10/28/2020, 2:10 AM	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



Additional services

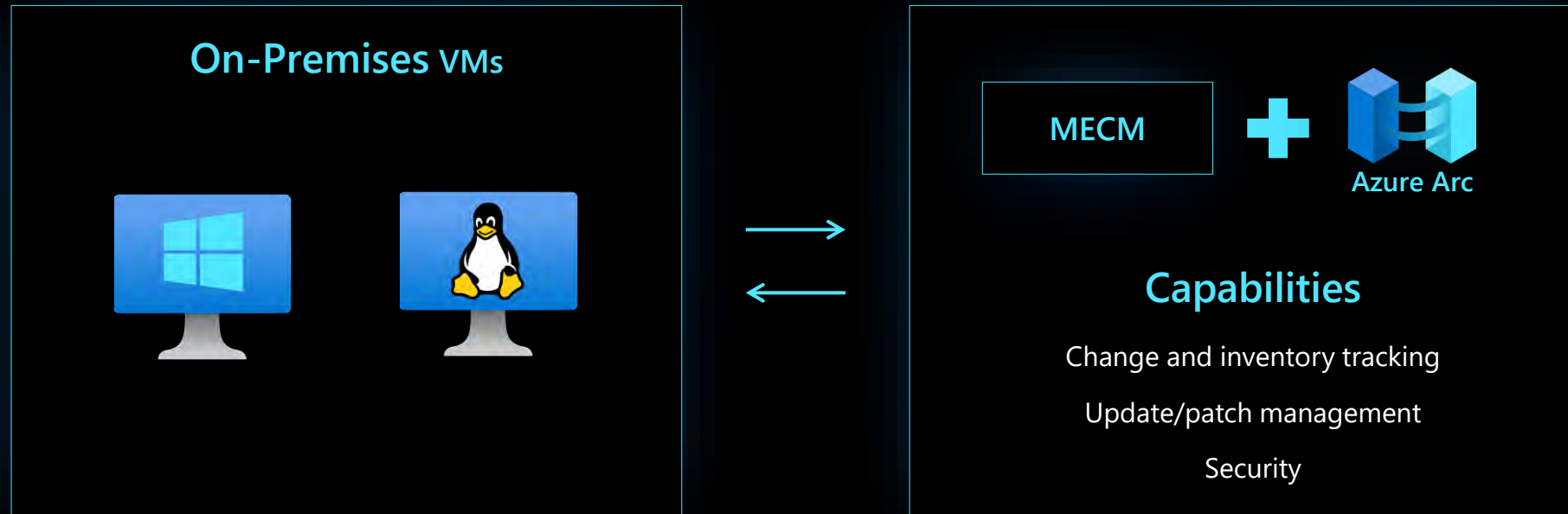
- Azure Policy
- Azure Defender
- Azure Sentinel
- Azure Monitor
- Change and inventory tracking
- Update management
- Azure Security Center

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 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

<input type="checkbox"/> Name ↑	Resource group ↑↓	Location ↑↓	Subscription ↑↓	Type ↑↓
<input type="checkbox"/> SPE-LENOV8S-01_SQL16	uc-arc-demo	West US 2	Azure Data Demos	SQL Server - Azure Arc
<input type="checkbox"/> SPE-LENOV8S-01_SQL17	uc-arc-demo	West US 2	Azure Data Demos	SQL Server - Azure Arc
<input type="checkbox"/> sql-server-6-12-1	raj-bugbash	East US	ADS TINA Engineering	SQL Server - Azure Arc
<input type="checkbox"/> SQL01	Demo	West US 2	ADS TINA Engineering	SQL Server - Azure Arc
<input type="checkbox"/> SQLServer01	DefaultResourceGroup-CUS	East US	Azure Data Demos	SQL Server - Azure Arc
<input type="checkbox"/> SQLSERVER01	Ignite-2020-Mechanics-Live	East US	Azure Data Demos	SQL Server - Azure Arc
<input type="checkbox"/> WIN10-2	naxingadsdemorg	East US	Azure Data Demos	SQL Server - Azure Arc

SQL Server Assessment

Last 31 days

All Technologies All Environments

ASSESSMENT QUALITY



All prerequisites successfully met.

See logs...

SECURITY AND COMPLIANCE



PRIORITIZED RECOMMENDATIONS	WEIGHT
Enable and Enforce the Setting "Turn off Autoplay" via Group Policy	5.6
Mitigations missing for speculative execution side-channel	4.6
Configure the Setting "Network security: LAN Manager authentication" to be disabled	3.8
Enable and Enforce "Microsoft network server: Digitally sign communications (if you don't want to sign anyone's communications)"	3.4
Configure Authorized User List for Setting "Restore files and folders" to be disabled	2.8
Define and Enforce Setting "Back up files and directories" to be disabled	2.8
Ensure only essential users are added to the SQL Server Administrators group	2.4
Create SQL Server logins based on Windows Active Directory accounts	2.3
Create a SQL Server Audit to log configuration changes	2.3
Create a SQL Server Audit to log creation, modification, and deletion of database objects	2.3

See logs...

AVAILABILITY AND BUSINESS CONTINUITY



PRIORITIZED RECOMMENDATIONS	WEIGHT
Schedule a full database backup and ensure that it has completed successfully	5.2
Change the recovery model to FULL or BULK_LOGGED	3.6
Review the non-default Agent XPs option setting on the SQL Server Agent	1.2
Place data files and transaction log files on separate disks	1.1
Investigate occurrences of event ID 7026 in the Microsoft SQL Server Event Viewer	1.0
Investigate occurrences of event ID 7031 in the Microsoft SQL Server Event Viewer	1.0

See logs...

PERFORMANCE AND SCALABILITY



PRIORITIZED RECOMMENDATIONS	WEIGHT
Modify auto-growth settings to use a fixed size growth and file	4.2
Move database files from the system disk to another disk	3.8
Consider creating supporting indexes for tables with large data	2.3
Review the SQL Server instance configuration setting "max server memory (MB)"	1.5
Review the 'system managed' page file setting on the SQL Server	1.4
Separate tempdb and user database files by placing them on different disks	1.1
Upgrade the affected database(s) compatibility level to 110	1.1
Untrusted constraints have been identified, check if they are necessary	0.9
Review SQL Server Top Waits	0.6
Investigate Trace Flag 4199 is not enabled to control the number of active queries	0.6

See logs...

UPGRADE, MIGRATION AND DEPLOYMENT



PRIORITIZED RECOMMENDATIONS	WEIGHT
Install the latest service pack or hotfix for the SQL Server	1.9
Consider enable server network protocol Named Pipes	0.0

See logs...

OPERATIONS AND MONITORING



PRIORITIZED RECOMMENDATIONS	WEIGHT
Create a schedule to run DBCC CHECKDB regularly	6.1
Review the SQL Server Error Log retention setting	2.2
Configure Auditing for Account Logon: Credential Validation	0.4
Configure Auditing for Account Management: User Authentication	0.4
Configure Auditing for Detailed Tracking: Audit PNP	0.4
Configure Auditing for Logon-Logoff: Audit Account Name	0.4
Configure Auditing for Logon-Logoff: Audit Group Membership	0.4
Configure Auditing for Logon-Logoff: Audit Other Logon Fields	0.4
Configure Auditing for Object Access: Audit Detailed	0.4
Configure Auditing for Object Access: Audit File Share	0.4

See logs...

Customer scenario

At-scale Kubernetes app management

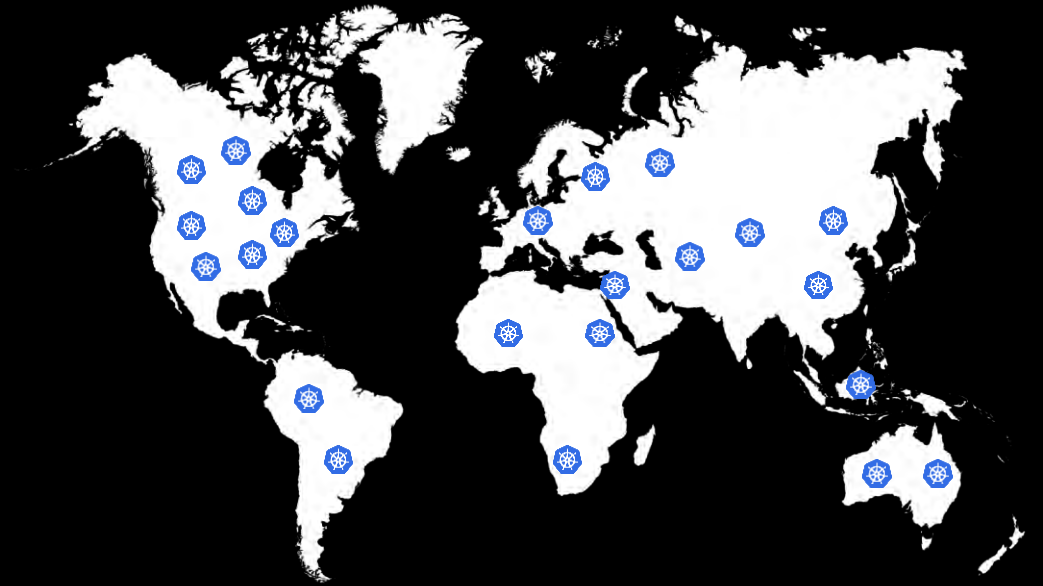
Overview

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



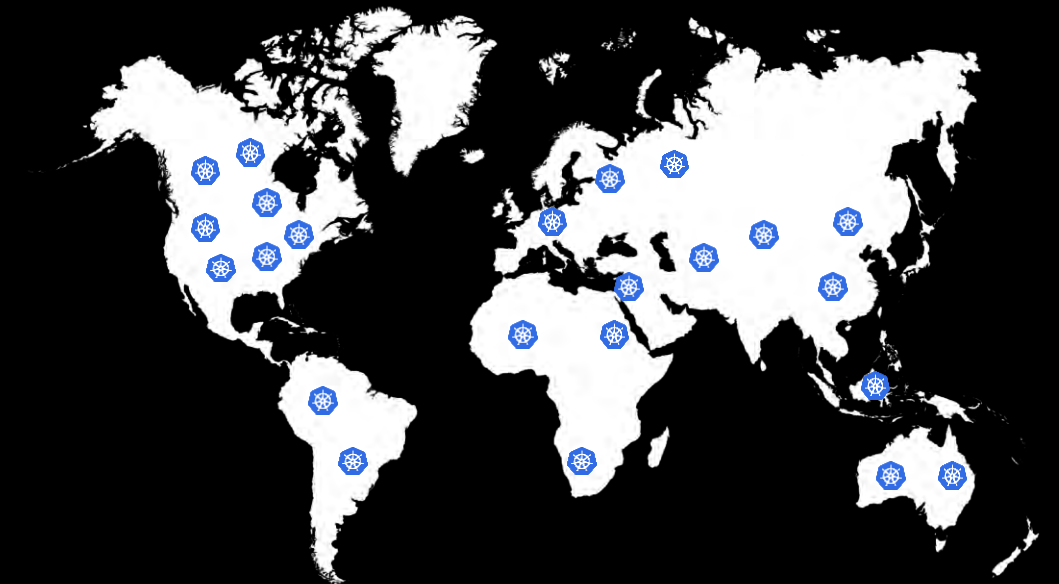
Customer scenario

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

Azure Management
(Azure Resource Manager, Azure Policy, Azure Portal, API, CLI...)



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](#)

CDM OaaS PM

▼

All resource groups

▼

All locations

▼

All tags

▼

No grouping

▼

1 items

<input type="checkbox"/>	NAME ↑↓	TYPE ↑↓	RESOURCE GROUP ↑↓	LOCATION ↑↓	SUBSCRIPTION ↑↓
<input type="checkbox"/>	 OnPremCluster1	Kubernetes cluster - Azure Arc	OnPremClusters	West US 2	CDM OaaS PM ⋮
<input type="checkbox"/>	 AKSCluster1	Kubernetes service	AKSClusters	West US 2	CDM OaaS PM ⋮



OnPremCluster1 - Configurations

Kubernetes cluster - Azure Arc | Directory: Microsoft



Search (Ctrl+/)



+ Add a Configuration Refresh

Overview

Activity log

Access control (IAM)

Tags

Settings

Policies

Configurations

Properties

Locks

Export template

Support + troubleshooting

New support request

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

Private Cloud - Enterprise business systems challenges



Lots of manual effort for CI/CD, especially for data tier



Variety of DB engines, with versions facing EOS, security siloes; no elastic scale



Mix of containers and VMs on OEM hardware

Data aggregation

Model updates

Edge - real-time processing challenges



Custom code needed for streaming, data sync and AI



Sensors



Legacy, basic database with no AI built



Actuators



OEM edge servers/workstations

Azure data services
Customer-managed services
on any infrastructure

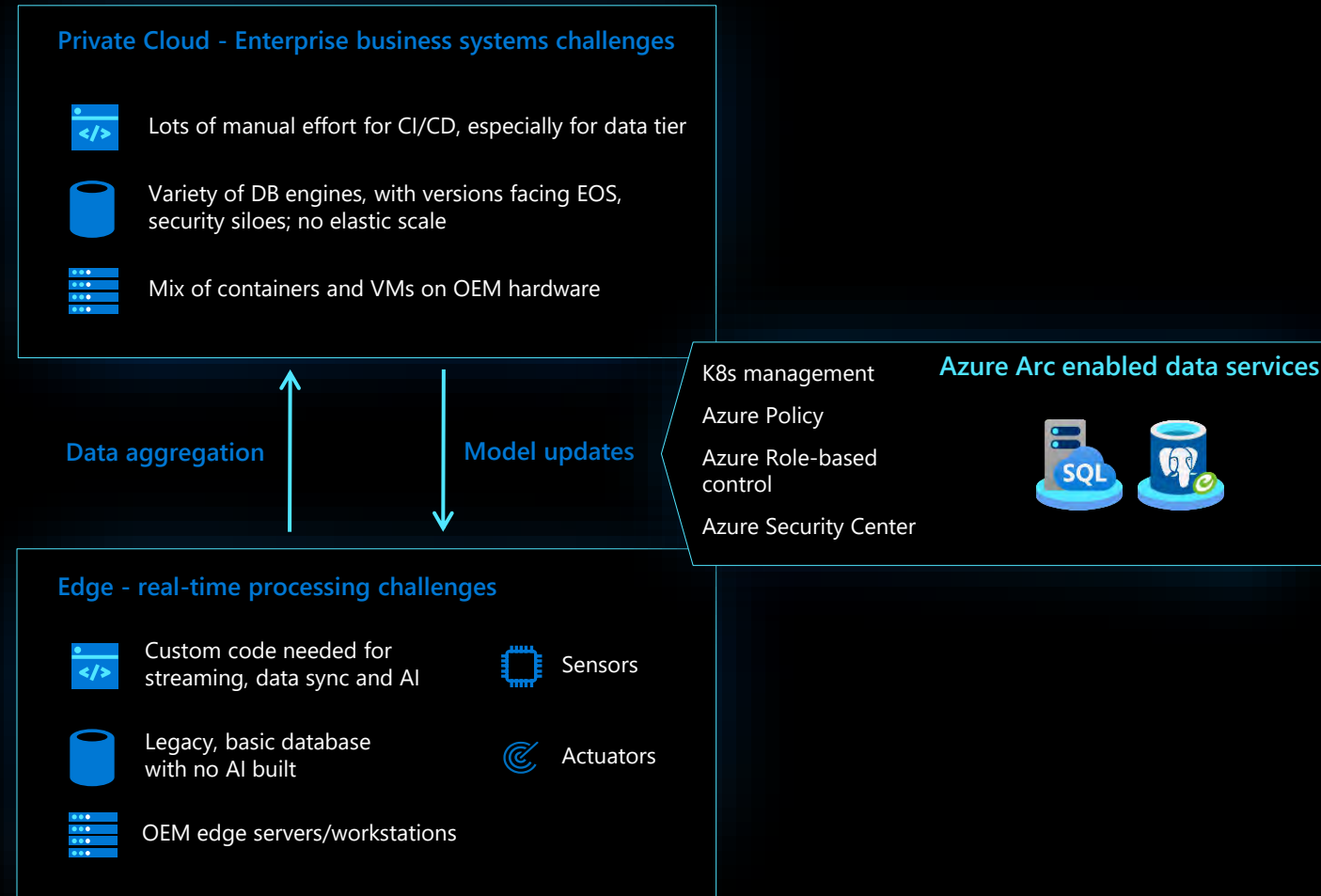


Customer scenario

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



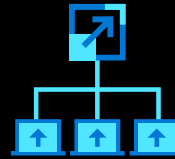
Disconnected support

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

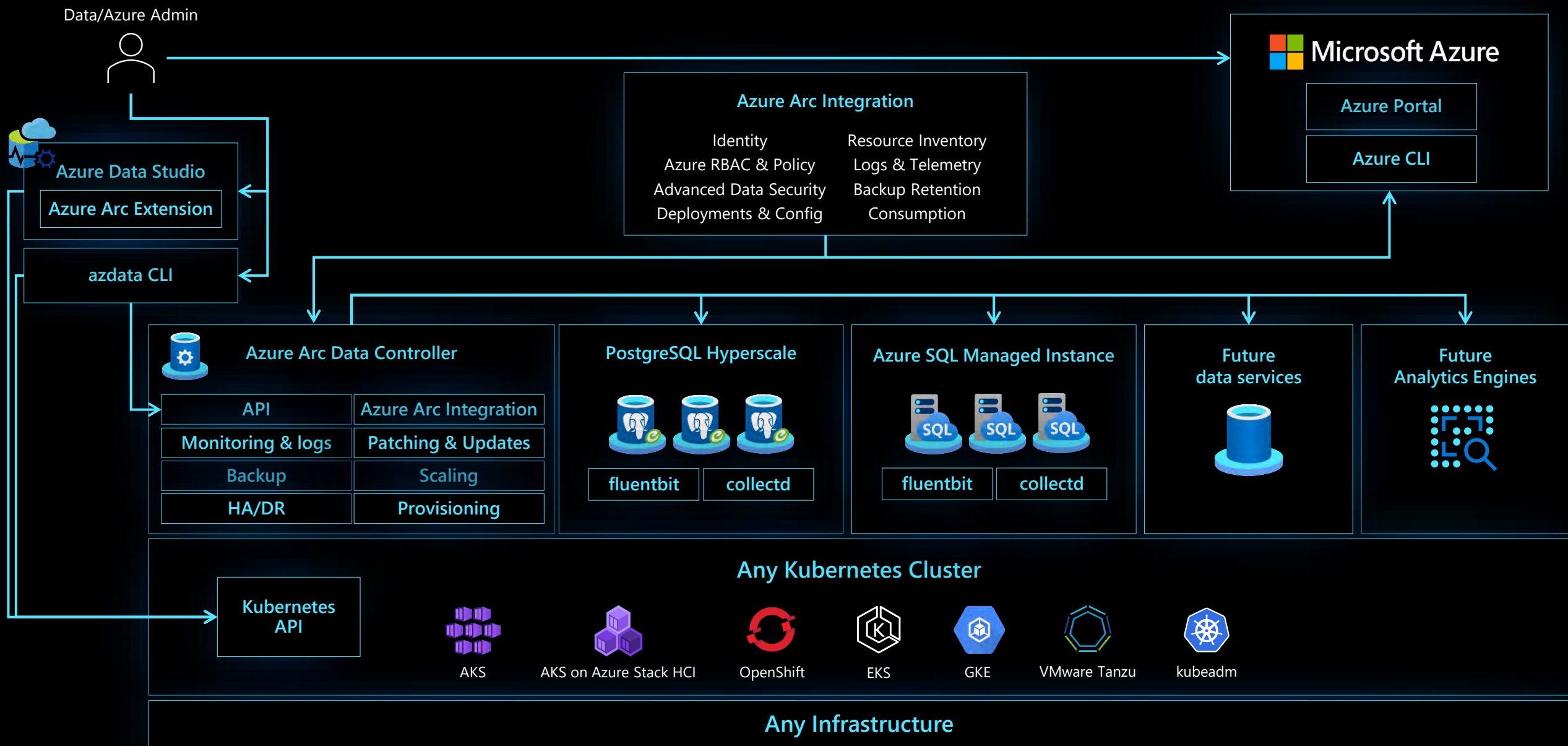
Single view for on-prem and clouds
Consistent workflows



Any hardware, any Kubernetes



Azure Arc enabled data services Architecture



Azure Arc enabled servers pricing



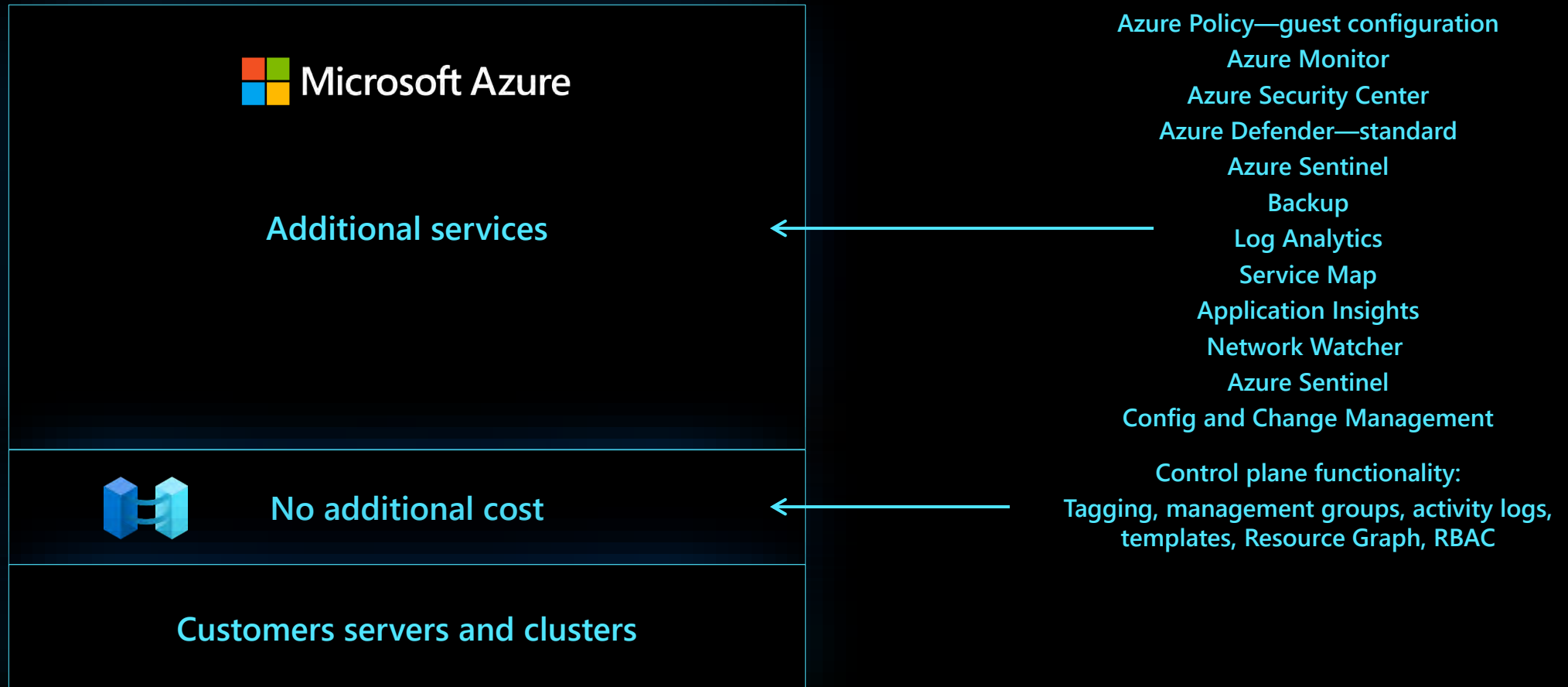
No additional cost

Control plane functionality:

Tagging, management groups, activity logs,
templates, Resource Graph, RBAC

Customers servers and clusters

Azure Arc enabled servers pricing





Thank you