AZURE DAY ROME 2025

Cloud ovunque serva, AI dove conta: trasforma la tua infrastruttura con Azure Local

Francesco Molfese

Microsoft

PORINI
A DGS COMPANY

Thanks to

Microsoft

PORINI
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BC Soft
consulenza sistemi informativi

KEY2

LOBRA

UNIKEY
Bringing IT knowledge to the people

Packt

JET BRAINS

NET CODE

FRANCESCO MOLFESE

Cloud Infrastructure Director in Impresoft 4ward

Microsoft MVP Cloud Datacenter Management

Community Lead della Cloud Community Italiana www.cloudcommunity.it

Relatore sul blog: francescomolfese.it

Azure Local Star *@Azure Local Tech Talk (LinkedIn)*

IT INDUSTRY TRANSFORMATION: CONTEXT & CHALLENGES

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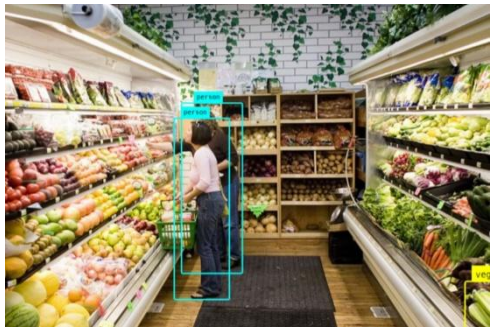
DURABLE SCENARIOS FOR DISTRIBUTED LOCAL INFRASTRUCTURE



Local AI Inferencing
(with a focus on video analytics)

Real-time Data Processing at the Source

Examples: retail loss prevention, smart self-checkout, pipeline monitoring

Mission-Critical Business Continuity

Ensuring Operations During Power and Network Outages

Examples: Factory and Warehouse Operations, Stadiums, Transit Hubs

Control Systems & Near Real-Time Processing

Meeting Extreme Low-Latency Requirements

Examples: Manufacturing Execution System (MES), Industrial Quality Assurance (QA), Financial Infrastructure

Regulatory & DDIL
(Disconnected, Degraded, Intermittent, Limited)
Connectivity

Maintain Local Data and Control

Examples: Government and Military, Energy Infrastructure

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ALTERNATIVE SOLUTIONS TO VMWARE

MICROSOFT OPTIONS AFTER ACQUISITION OF VMWARE

CHALLENGES

- Transition from perpetual licenses to subscriptions
- Limited choice of versions and vendor lock-in
- Risk of product discontinuation
- Concerns about reduced R&D

OPPORTUNITIES

- Microsoft as a strategic alternative
- Support extension for legacy systems
- Cost optimization

Azure Arc

Bring the Azure control plane to your on-premises environment

Azure VMware Solution
Fastest path to the cloud

Azure IaaS and PaaS
Start modernizing

Windows Server
Extend Azure management

Azure Local*
Cloud-connected distributed infrastructure

MITIGATING RISK & DRIVING INNOVATION: AZURE LOCAL

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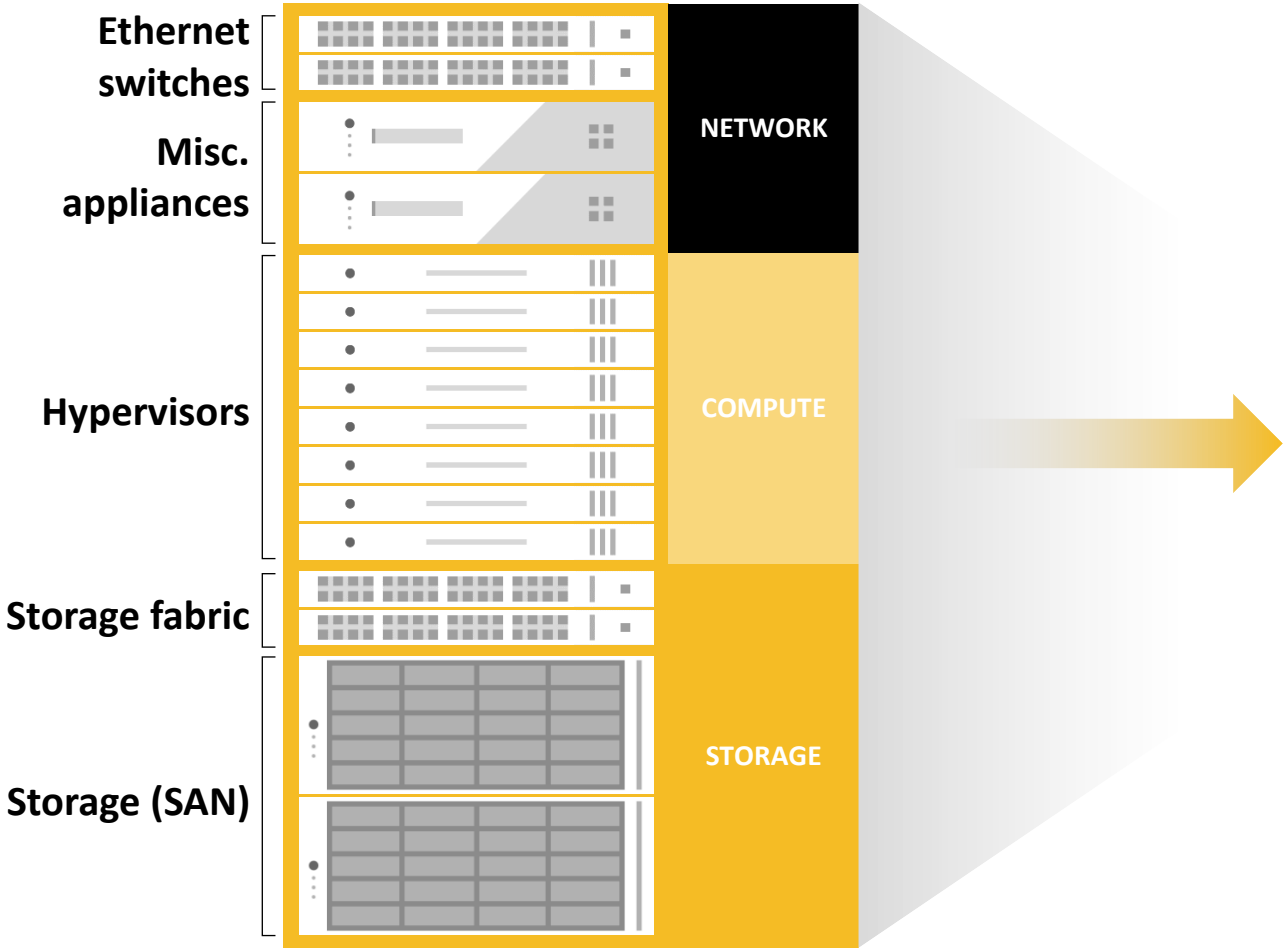
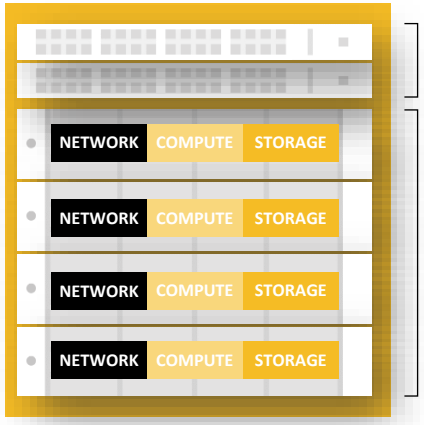
WHAT IS HYPERCONVERGENCE?

LEGACY "THREE TIER" INFRASTRUCTURE



HYPERCONVERGED INFRASTRUCTURE (HCI)



Ethernet switches

Standard x86 servers

+

Local drives

+

The magic of software

HCI is a software-defined, unified system that combines all the disparate and siloed elements of a traditional datacenter

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MODERN, SICURE AND SUSTAINABLE INFRASTRUCTURE WITH AZURE LOCAL

Azure Local

- CHOICE AND CUSTOMIZATION OF HARDWARE
- ENTERPRISE-LEVEL PERFORMANCE
- FAMILIARITY WITH MANAGEMENT AND OPERATION
- AZURE HYBRID BY DESIGN

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LOW-SPEC, LOW-COST OPTIONS FOR EDGE USE CASES

Azure Local [1] Requirements at launch
Windows Server certified
1+ machine
1+ SSD per machine [2]
10 Gbps Ethernet [3]
Doesn't require AD

SuperMicro SYS-E302
Fan-less server

Dell MC-4000r/z + MC-4510c
Rugged two-sled chassis

HPE MicroServer Gen11
Micro tower server

Lenovo ThinkEdge SE350v2
Half-width, half-depth 1U

Example possible solutions

1 : Reduced requirements allowed up to maximum of 3-node cluster 2 : Excludes OS boot disk 3 : Must support Hyper-V virtualization

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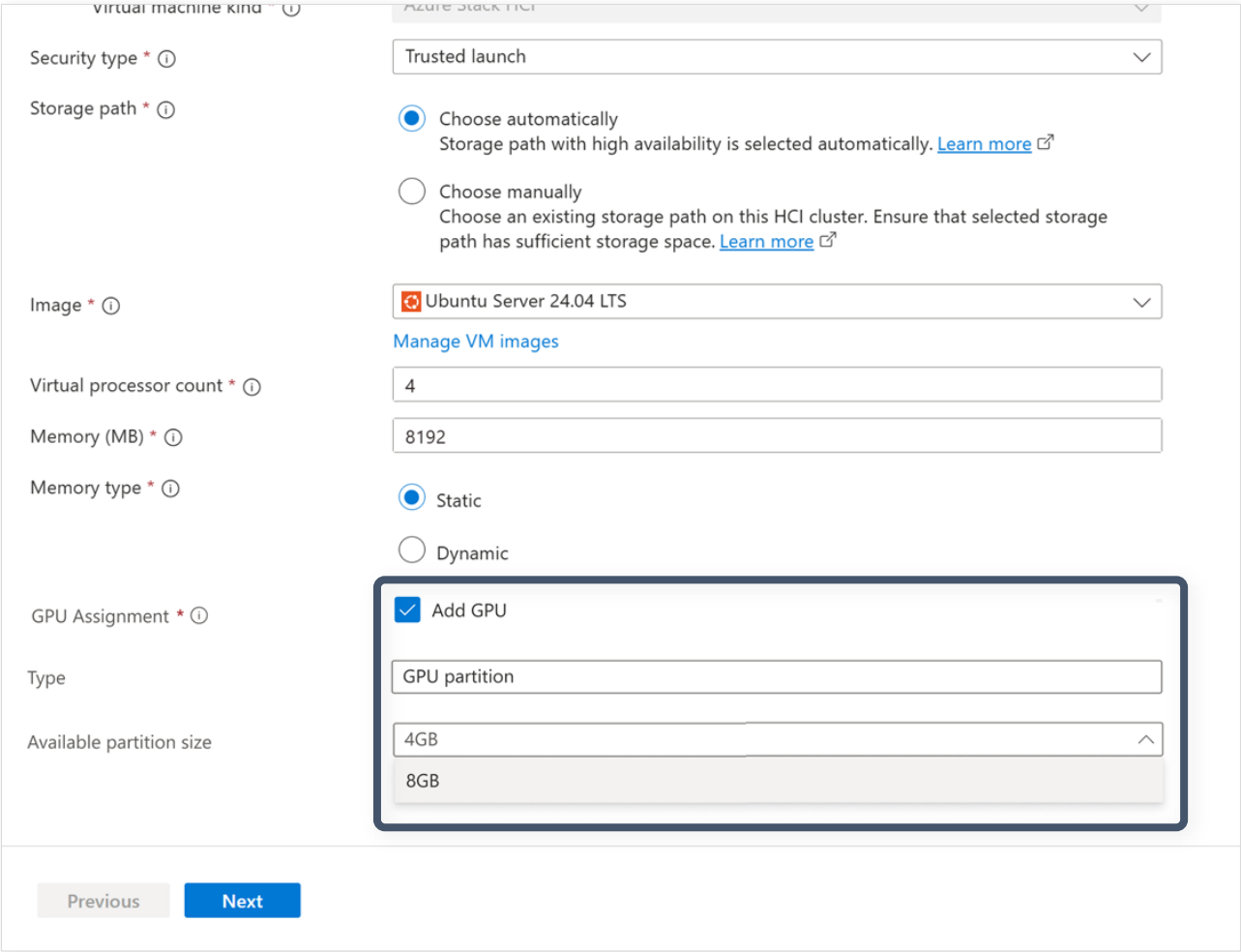
ACCELERATE DEMANDING WORKLOADS WITH GPUs

Over 50 GPU-capable platforms with NVIDIA A2, A16, A40, and others

Dedicate whole GPUs to workloads to maximize AI/ML performance

Partition GPUs to increase density with virtual apps and desktops

VMs with GPU partitioning support **live migration and failover** NEW



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SPECIFIC AND DEDICATED OPERATING SYSTEM

- **Simplified** composition and **more up-to-date components** than Windows Server
- **Only the roles needed** for the solution are included
- Includes the **latest hypervisor** also used in Azure environment, with software-defined storage and networking technologies optimized for virtualization
- **Local user interface is minimal** and is designed to be managed remotely

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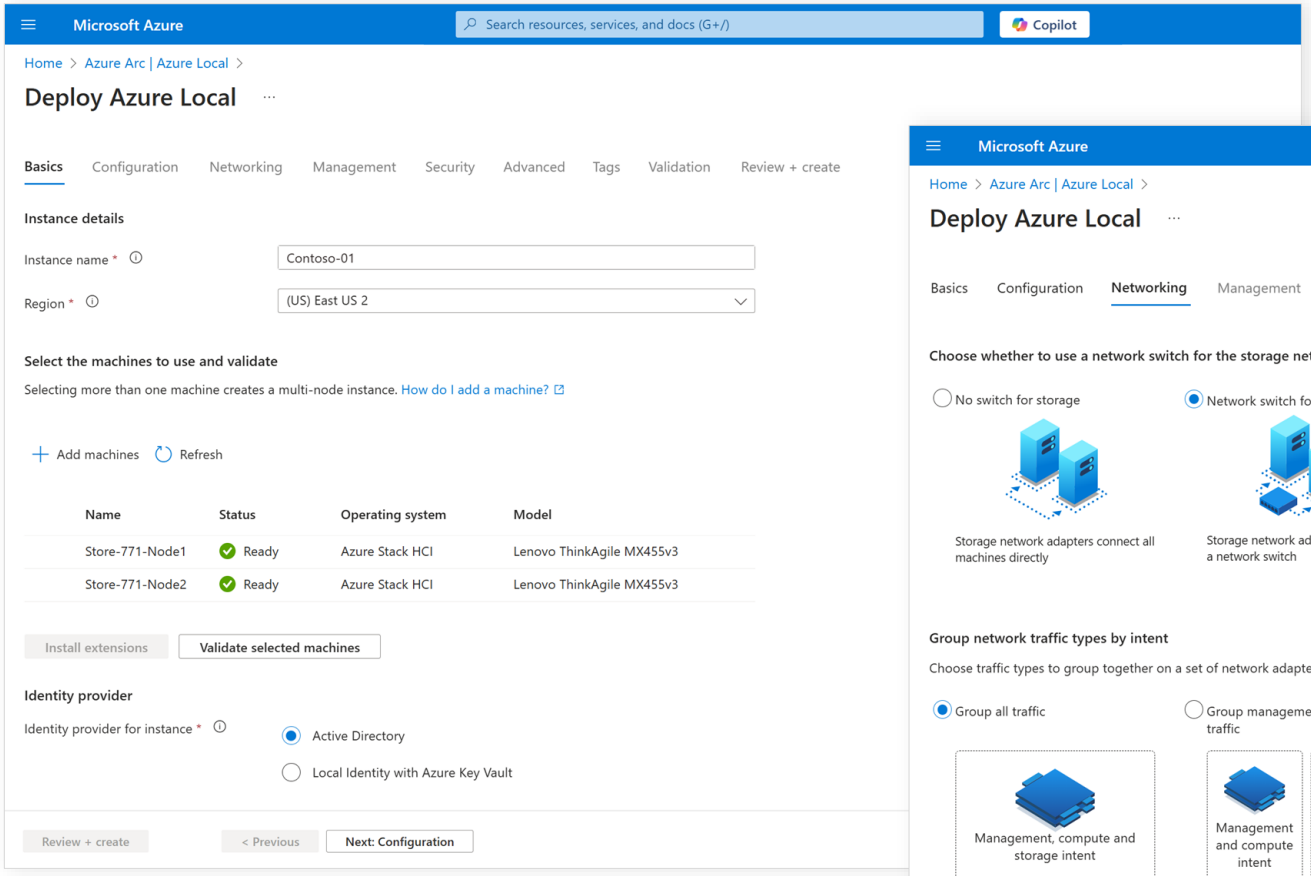
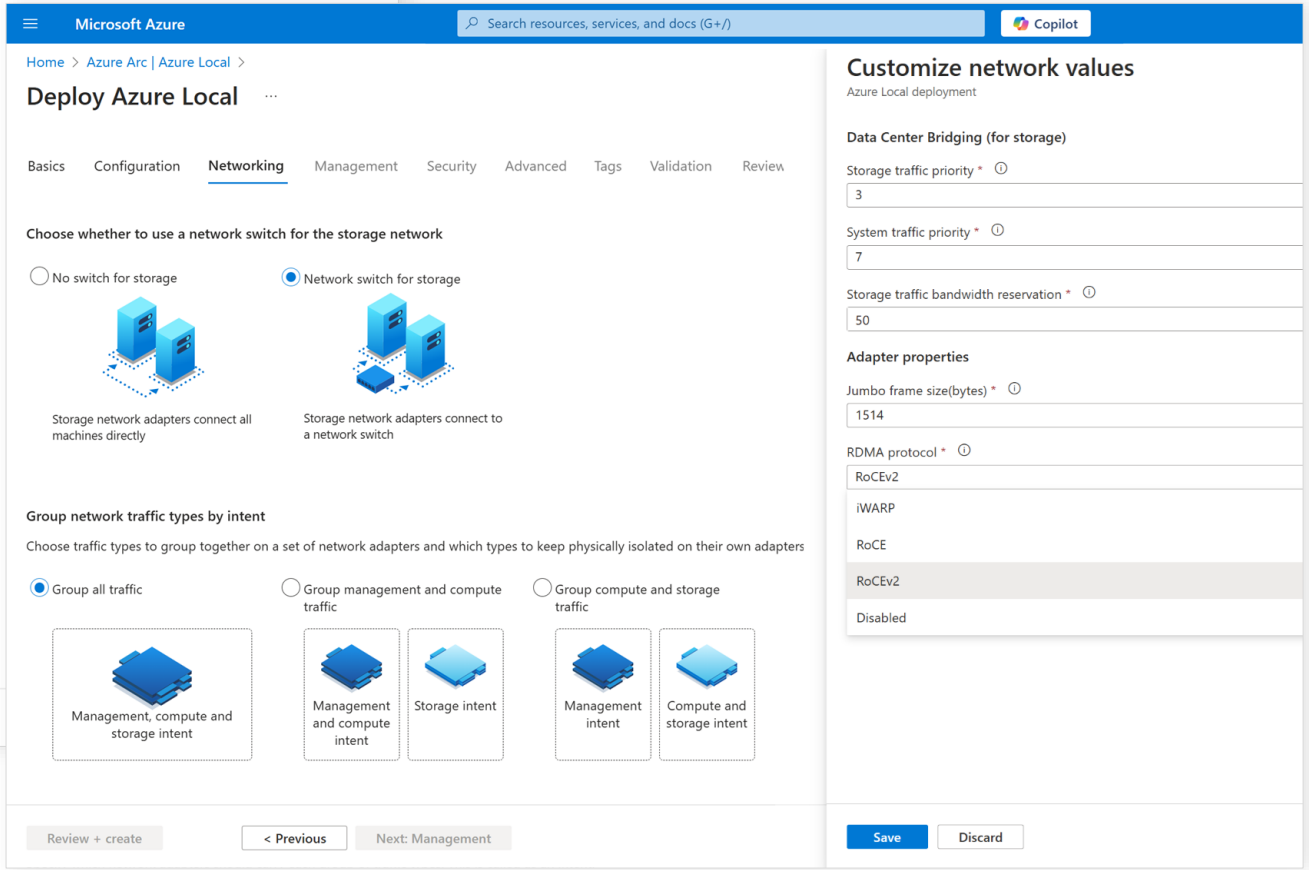
DEPLOY DISTRIBUTED INFRASTRUCTURE FROM THE CLOUD

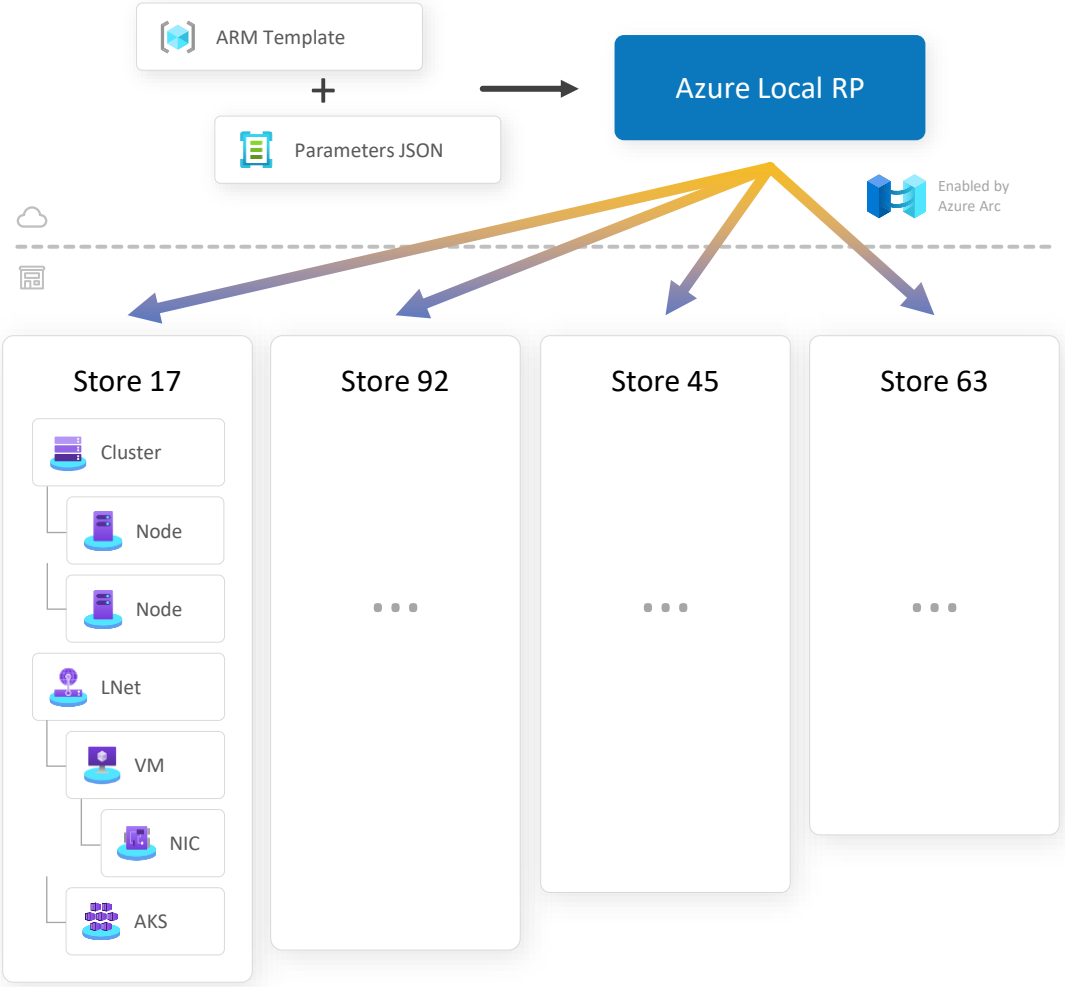




REPEAT AND SCALE WITH INFRASTRUCTURE-AS-CODE

Contoso-Store-092.parameters.json

```
29  "parameters": {
30    "clusterName": {
31      "value": "Contoso-Store-092"
32    },
33    "useDhcp": {
34      "value": false
35    },
36    "networkingPattern": {
37      "value": "hyperConverged"
38    },
39    "physicalNodesSettings": {
40      "value": [
41        {
42          "name": "Node1",
43          "ipv4Address": "100.156.94.11"
44        },
45        {
46          "name": "Node2",
47          "ipv4Address": "100.156.94.12"
48        },
49        {
50          "name": "Node3",
51          "ipv4Address": "100.156.94.13"
52        }
53      ]
54    },
55    "securityLevel": {
56      "value": "Recommended"
57    },
58    "clusterWitnessStorageAccountName": {
59      "value": "contoso092storageaccount"
```



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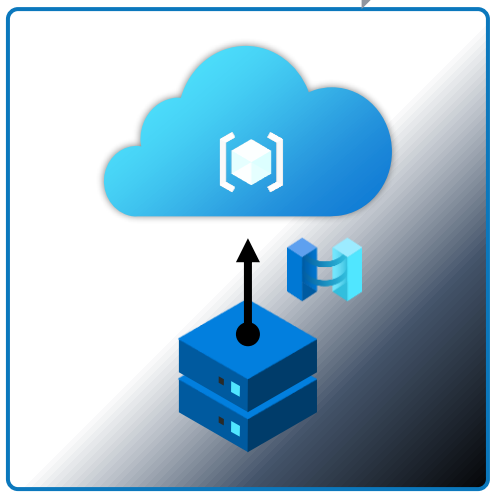
ARC ENABLED INFRASTRUCTURE: WHAT DOES IT MEAN?

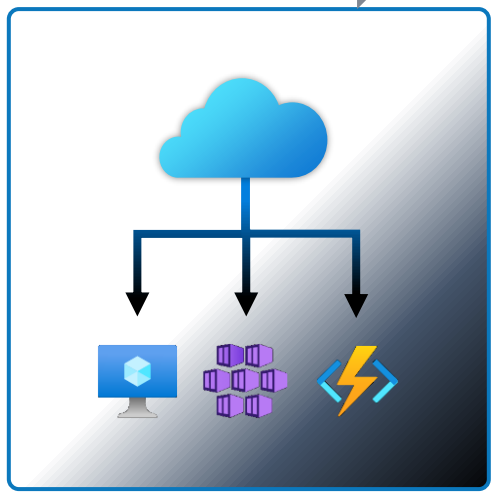
1

Deploy Azure Local and it appears immediately as Azure Arc enabled resource in the Azure portal



2

From Arc in the Portal, you can deploy containers, virtual machines, and services



3

Deployed resources appear in the Portal via Arc too, so you can manage, secure, govern them

4

Support, observability, and updates for Azure Local provided through Arc

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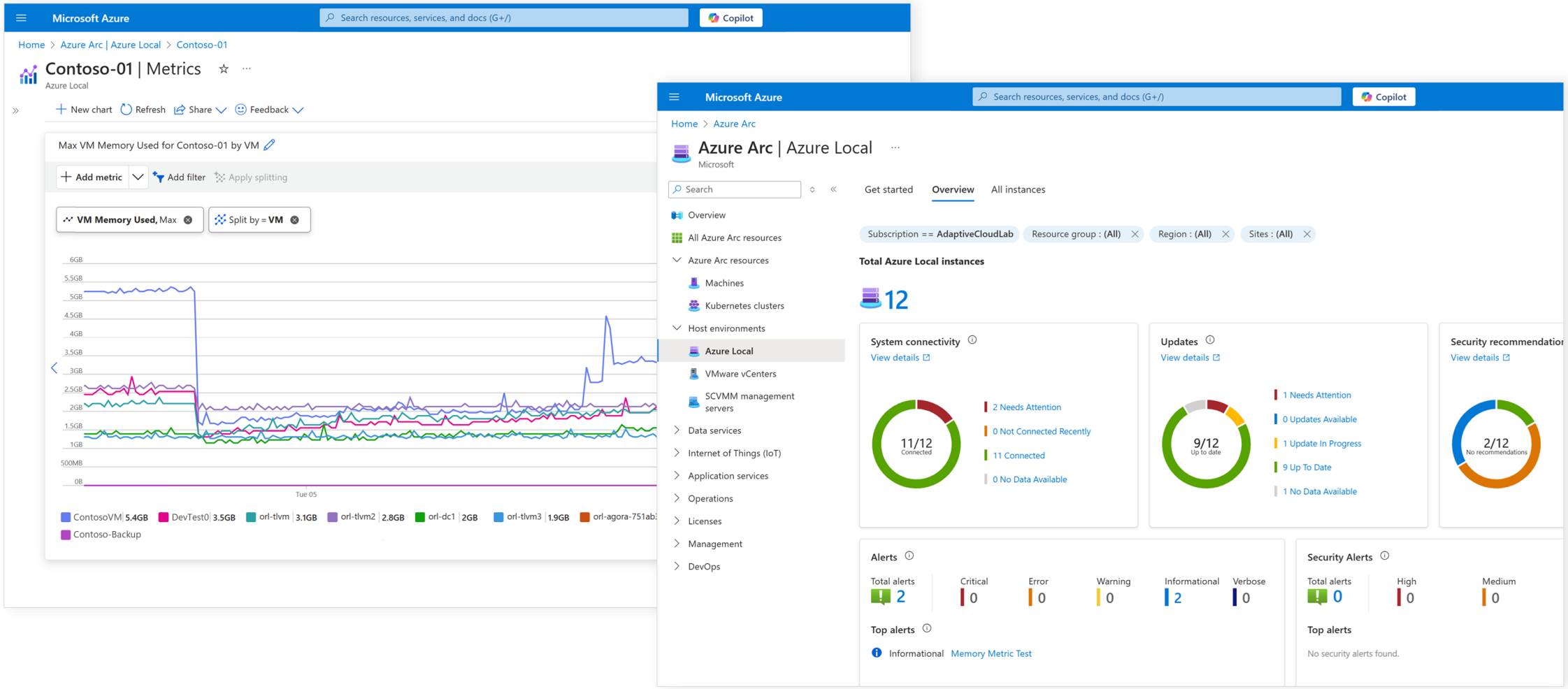
CENTRAL VISIBILITY ACROSS ALL YOUR LOCATIONS



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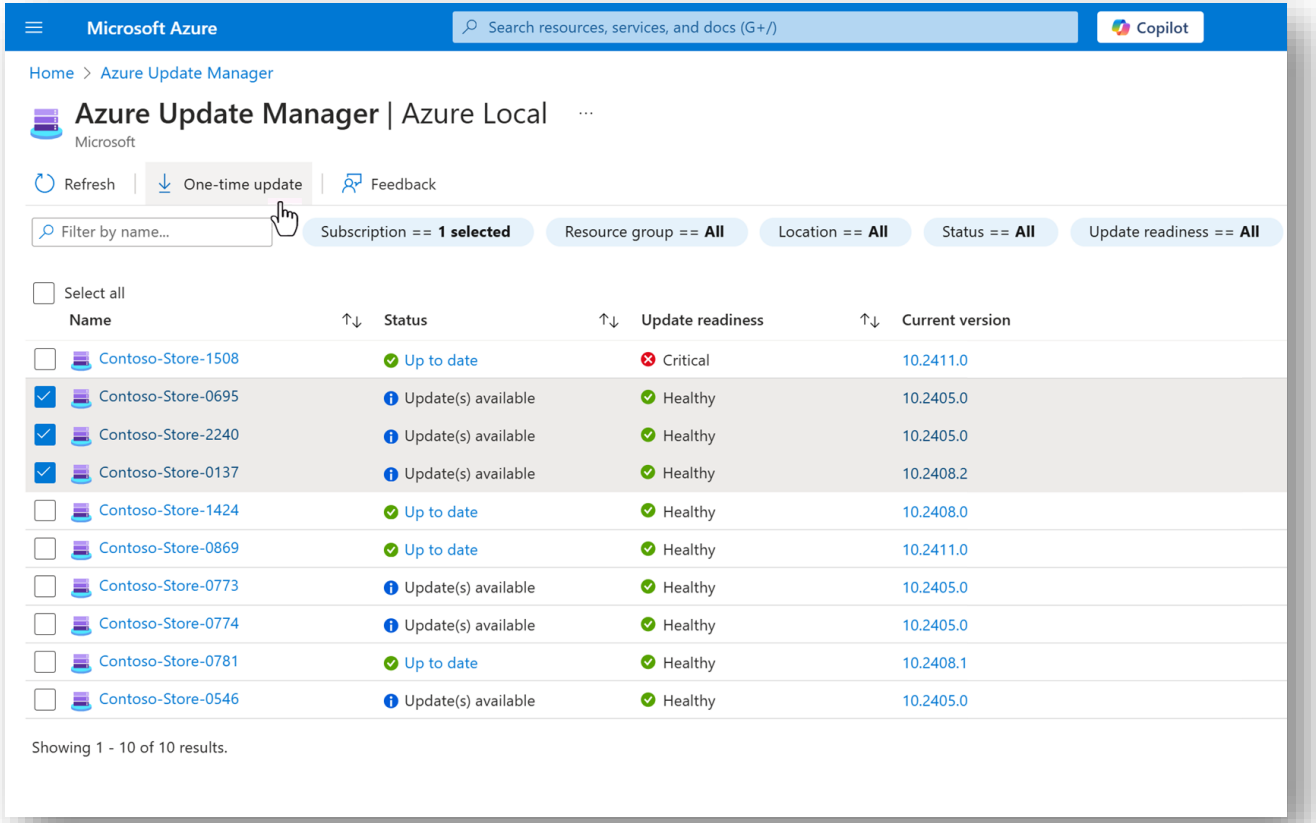
ONE-CLICK INFRASTRUCTURE UPDATES FROM THE CLOUD

Conveniently view and manage updates across locations in Azure Update Manager

Full-stack update package includes all Azure Local software plus OEM content [1]

Non-disruptive (workloads keep running)

You control when to apply updates



1 : Firmware and driver packages available for Premier solutions like Dell APEX Cloud Platform and Lenovo ThinkAgile MX455 V3

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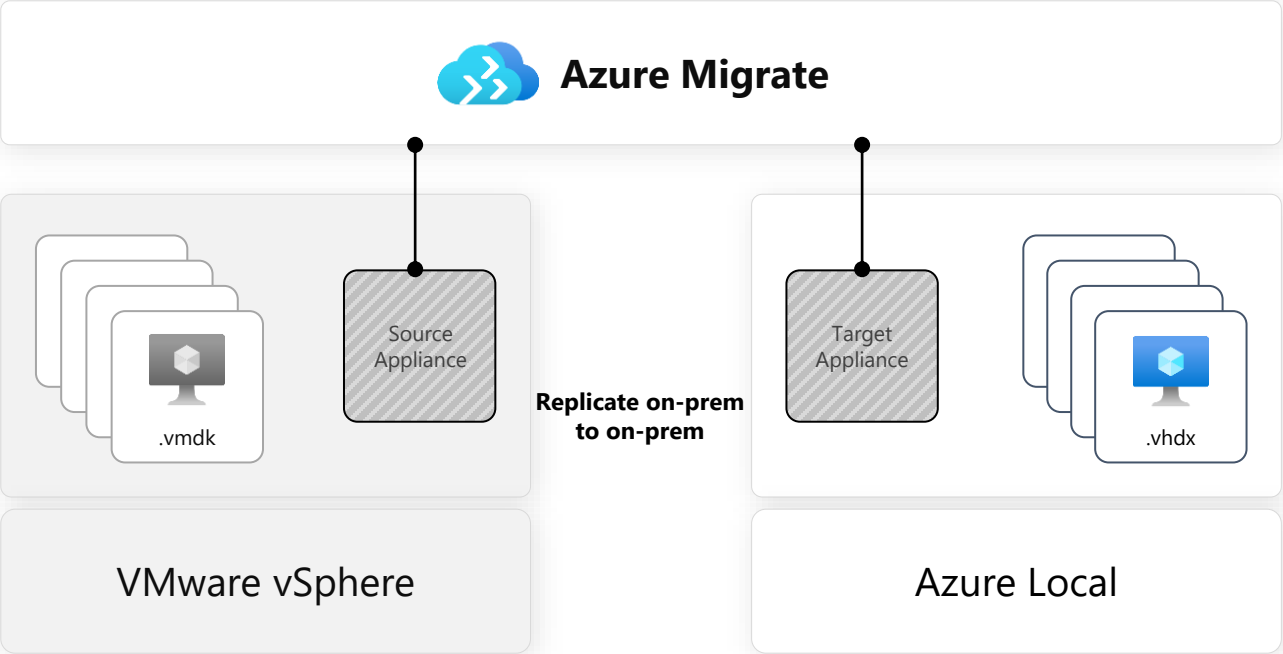
AZURE MIGRATE TO AZURE LOCAL

FROM VMWARE/BROADCOM SOURCES

- Use the **Azure Migrate control plane, Portal, and APIs** to migrate VMs from on-prem to on-prem
- **Guided wizard** experience and **real-time monitoring**
- **Interacts directly with vCenter** (no guest agent required) and supports VMs with multiple disks, static IPs, older guest OSes (2008 R2+), etc.
- Replication remains **fully on-premises**
- **No additional cost**



BUSINESS STRENGTHS OF AZURE LOCAL

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INCREASING THE SECURITY LEVEL

- Cross-layer security on hardware and firmware, built into OS features, that can help protect servers from advanced threats
  - **Secured-core** via an easy configuration experience from Windows Admin Center
- Ability to obtain **free major security patches for Microsoft's legacy products that have passed the support deadline**, via the Extended Security Update (ESU) program

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STRONG DEFAULT SECURITY FOR APPS AND INFRASTRUCTURE

Management and security tools

Centralized security management
Azure Policy, OS Config

Simplified compliance
Azure Policy, Azure Security Benchmarks

Security posture mgmt.
Azure Policy, Monitor, Defender for Cloud

Simplified operational hardening

VM isolation
Hardware enforced VM isolation

Privileged access
JIT, JEA, PIM, PAM, CG

Network security
Datacenter Firewall, Secure DNS

Sensitive workload protection

OS + firmware protection
TVM, Guest attestation

Confidential Compute*
CVM, Guest & workload attestation

Data-at-rest and integrity protection

Encryption + data protection
SMB, BitLocker

System security + zero trust
Hardened defaults, Trusted Boot, Certificates, Cryptography, Code Signing and Integrity, Device Attestation, Zero trust

Secured-core certification

Hardware root-of-trust
TPM 2.0,, DRTM, Secure Boot

Silicon assisted security
Firmware, DMA, Memory, Secured Kernel

Highly regulated industries

Security assurance

Certification

Secure supply chain

Host component governance
Provenance, patching and continuous vulnerability management of OS components

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Home > Microsoft Defender for Cloud

Microsoft Defender for Cloud | Recommendations

Showing subscription 'AdaptiveCloudLab'

Search

- General
  - Overview
  - Getting started
  - Recommendations
  - Attack path analysis
  - Security alerts
  - Inventory
  - Cloud Security Explorer
  - Workbooks
  - Community
  - Diagnose and solve problems
- Cloud Security
  - Security posture
  - Regulatory compliance
  - Workload protections
  - Data security
  - Firewall Manager

Refresh | Download CSV report | Open query | Governance report | Guides & Feedback | Switch to classic view

Search by title / resource | Risk factors == All | Risk level == All | Resource type == 6 selected | Add filter | Group by title:

Title	Affected resources	Risk factors
Machines should have a vulnerability assessment solution	49/106 resources	
Storage accounts should restrict network access using virtual network rules	47/53 Storage accounts	Exposure to the Internet
Machines should be configured securely (powered by MDVM)	19/21 resources	Exposure to the Internet, Vulner
Diagnostic logs in Key Vault should be enabled	15/29 Key vaults	
Azure Local machines should meet Secured-core requirements	9/11 Azure Local	
Vulnerabilities in security configuration on your Linux machines should be remediate...	6/21 resources	Exposure to the Internet
Non-internet-facing virtual machines should be protected with network security gro...	6/14 Virtual machines	
Immutable (read-only) root filesystem should be enforced for containers	5/11 Kubernetes - Azure Arc	
Guest Attestation extension should be installed on supported Windows virtual machi...	5/5 Virtual machines	
Services should listen on allowed ports only	5/11 Kubernetes - Azure Arc	
Kubernetes clusters should disable automounting API credentials	5/11 Kubernetes - Azure Arc	

Microsoft Defender for Cloud with Azure Local

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MAXIMIZING THE INVESTMENTS ALREADY MADE

- Azure Local **can integrate with your existing environment and popular third-party solutions**
- The administrative management of Azure Local **does not require specific software**, but **existing management tools** such as Admin Center, PowerShell, System Center Virtual Machine Manager and even third-party tools can be adopted
- By adopting Azure Local and Azure Arc, **cloud management models can also be applied** to the on-premises environment, greatly simplifying the user experience
- Azure Local allows you to take full advantage not only of the investments you have already made in tools, but **also in the skills of your IT staff.**

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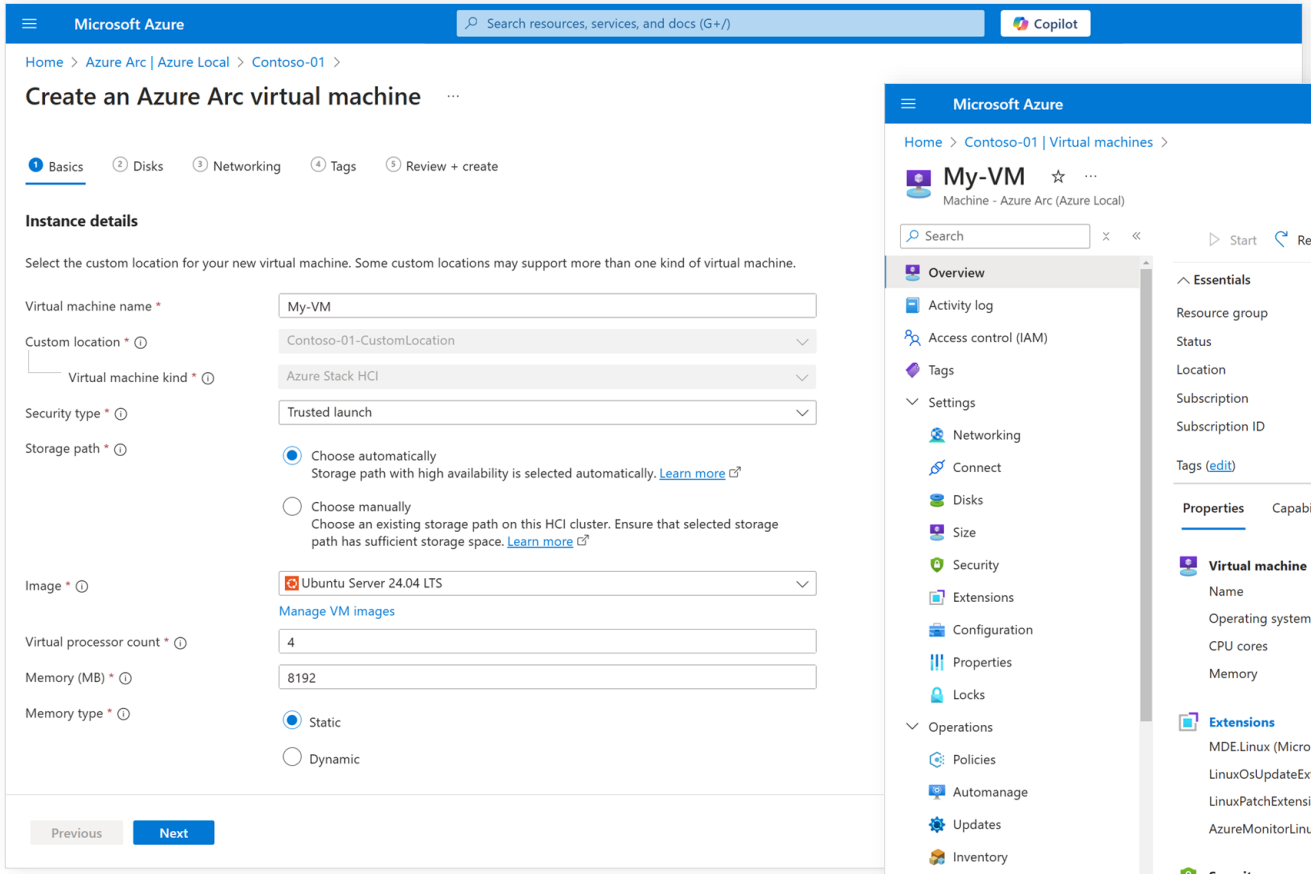
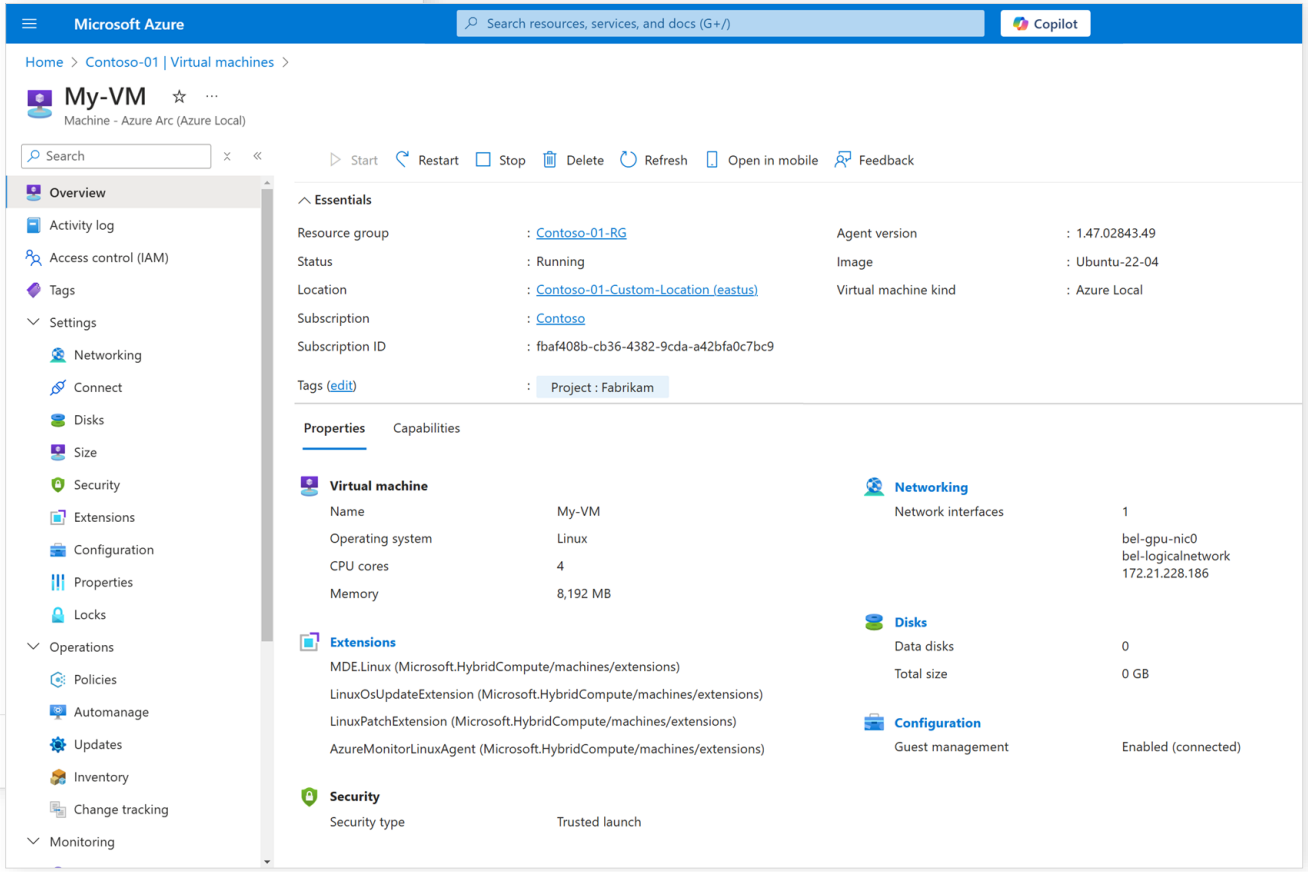
FULL-FEATURED, GENERAL-PURPOSE VIRTUAL MACHINES





AI, VDI & EMERGING TRENDS:

How Azure Local Powers Modern Virtualization & Artificial Intelligence Projects

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Azure Virtual Desktop with Azure Local

Microsoft Azure | Search resources, services, and docs (G+/) | Copilot

Home > Azure Virtual Desktop

Azure Virtual Desktop | Host pools

Microsoft

Search

- Overview
- Quickstart
- Manage
  - Host pools
  - Application groups
  - Workspaces
  - App attach
  - Scaling plans
  - Users
  - Custom image templates

Create | Manage view | Refresh | Export to CSV | Open query | Assign tags | Delete

Filter for any field... | Subscription equals **all** | Resource group equals **all** | Location equals **all** | Add filter

Showing 1 to 4 of 4 records.

Name	Location	Host po...	Load bal...	Applicati...
Regional-EastUS	East US	Pooled	Breadth-first	29
Regional-WestEurope	West Europe	Pooled	Depth-first	17
Local-Site337	Custom Location	Pooled	Depth-first	6
Local-Site092	Custom Location	Pooled	Depth-first	1

Microsoft Azure | Search resources, services, and docs (G+/) | Copilot

Home > Azure Virtual Desktop | Host pools > Local-Site337 >

Local-Site337 - Session hosts

Host pool

Add | Refresh | Export to CSV | Turn drain mode on | Turn drain mode off | Assignment | Remove | Start | Restart | Stop

Filter by Name | Status: 12 selected | Drain mode: 2 selected

Name	Health state	Total sessions	Drain mode	VM Location	Subscription	Agent version
win10multivm1.poc01.local	Available	10	Off	-	AdaptiveCloudLab	1.0.10004.2100
win10multivm2.poc01.local	Available	10	Off	-	AdaptiveCloudLab	1.0.10004.2100
win11multi05.poc01.local	Available	10	Off	-	AdaptiveCloudLab	1.0.10004.2100
win11multi07.poc01.local	Available	10	Off	-	AdaptiveCloudLab	1.0.10004.2100
win11multi08.poc01.local	Available	10	Off	-	AdaptiveCloudLab	1.0.10004.2100
win11multi09.poc01.local	Available	10	Off	-	AdaptiveCloudLab	1.0.10004.2100
win11multi10.poc01.local	Available	10	Off	-	AdaptiveCloudLab	1.0.10004.2100
win11multi-vm20.poc01.local	Available	10	Off	-	AdaptiveCloudLab	1.0.10004.2100

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BENEFITS OF AZURE VIRTUAL DESKTOP ON AZURE LOCAL

- **Hybrid Flexibility:** run AVD workloads on-premises while maintaining full integration with Azure services.
- **Latency Optimization:** deliver low-latency desktop experiences by hosting workloads closer to end users.
- **Data Residency Compliance:** keep sensitive data on-premises to meet regulatory and compliance requirements.
- **Centralized Management:** unified control through Azure Portal for both cloud and edge VDI infrastructure.
- **Cost Efficiency:** leverage existing hardware and licensing models to reduce cloud consumption costs.
- **Business Continuity:** enhance resilience by maintaining local VDI access even during internet or Azure outages.
- **Scalable and Secure:** easily scale resources & apply Azure security features like Microsoft Defender for Endpoint.

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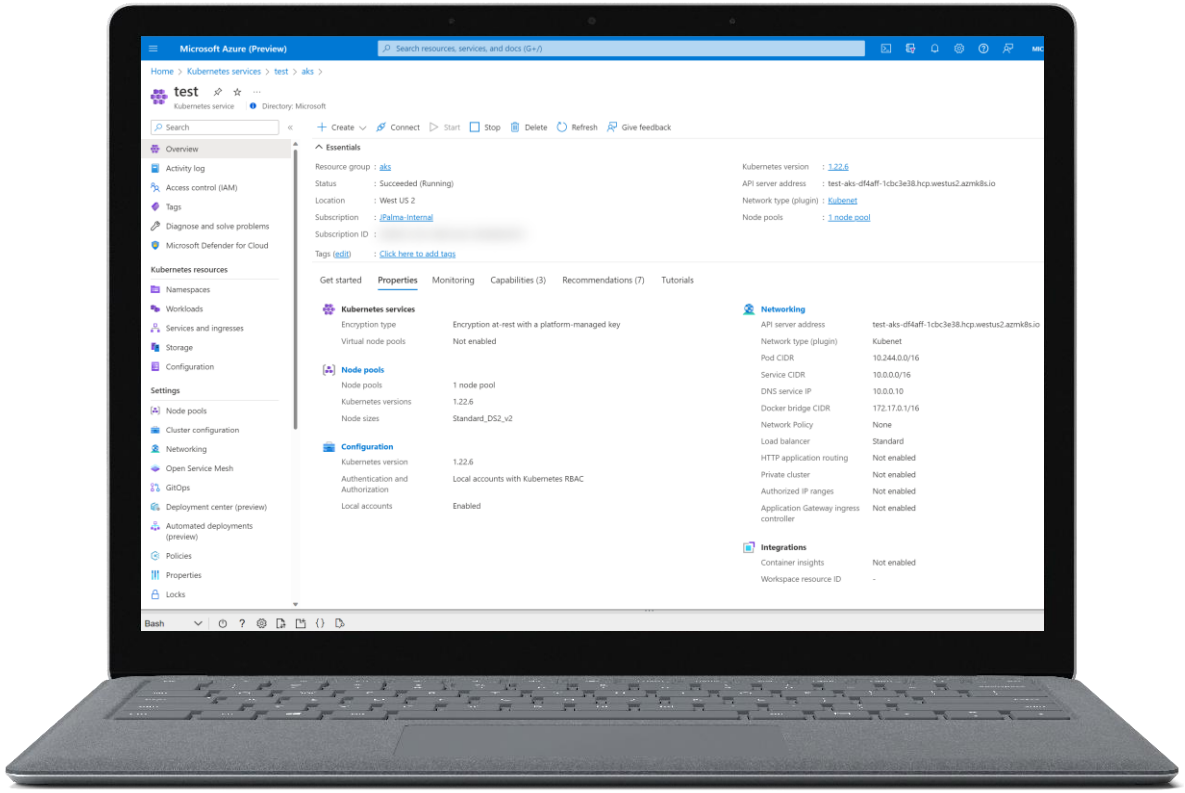
AZURE KUBERNETES SERVICE (AKS)

Fully managed Kubernetes

- Fully managed Kubernetes clusters in 4 minutes
- Seamless DevSecOps with CI/CD integration
- Enterprise-grade security and policy controls
- Standard Kubernetes at the operational edge
- Cost efficient for your applications
- Availability in more regions than any other cloud provider
- Fully automated day 2 operations (scaling, upgrades, monitoring, healing)



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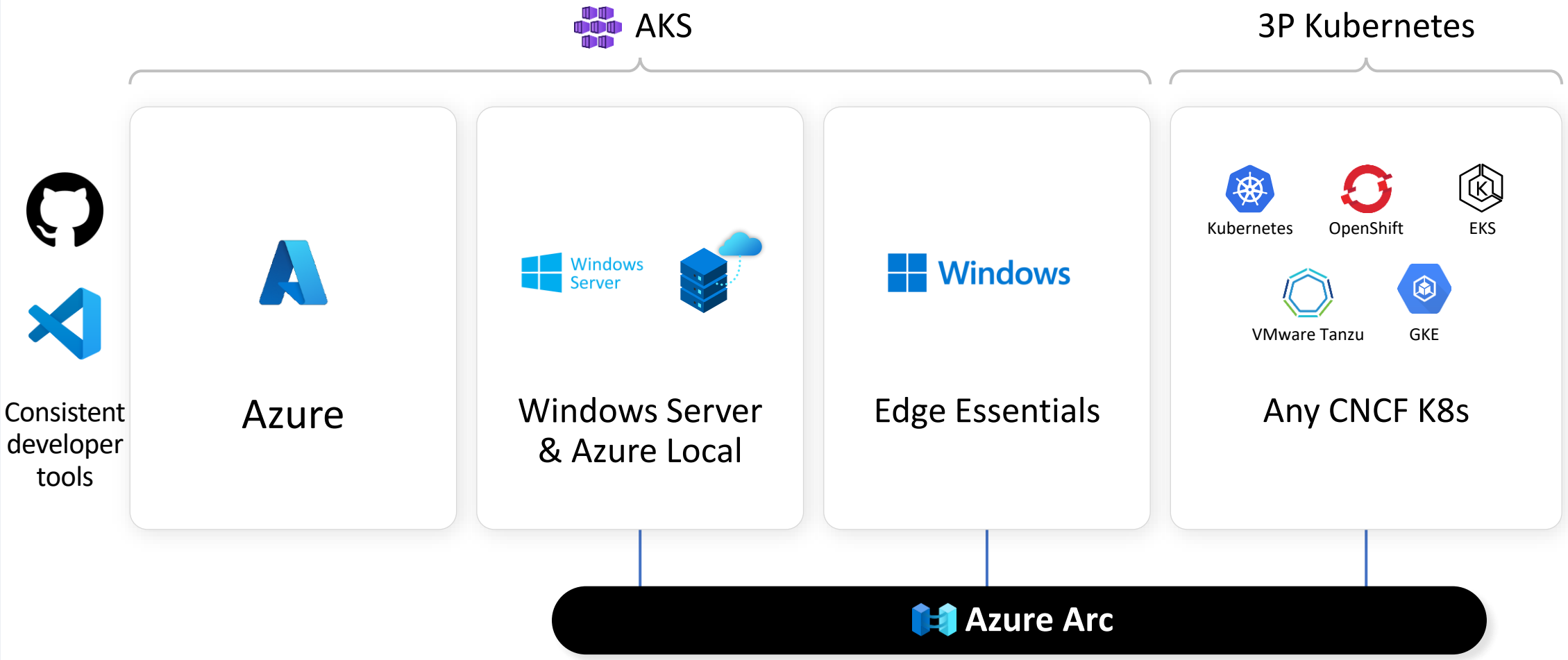
MANAGED KUBERNETES FROM CLOUD TO EDGE

Flexible deployment options on the infrastructure of your choice



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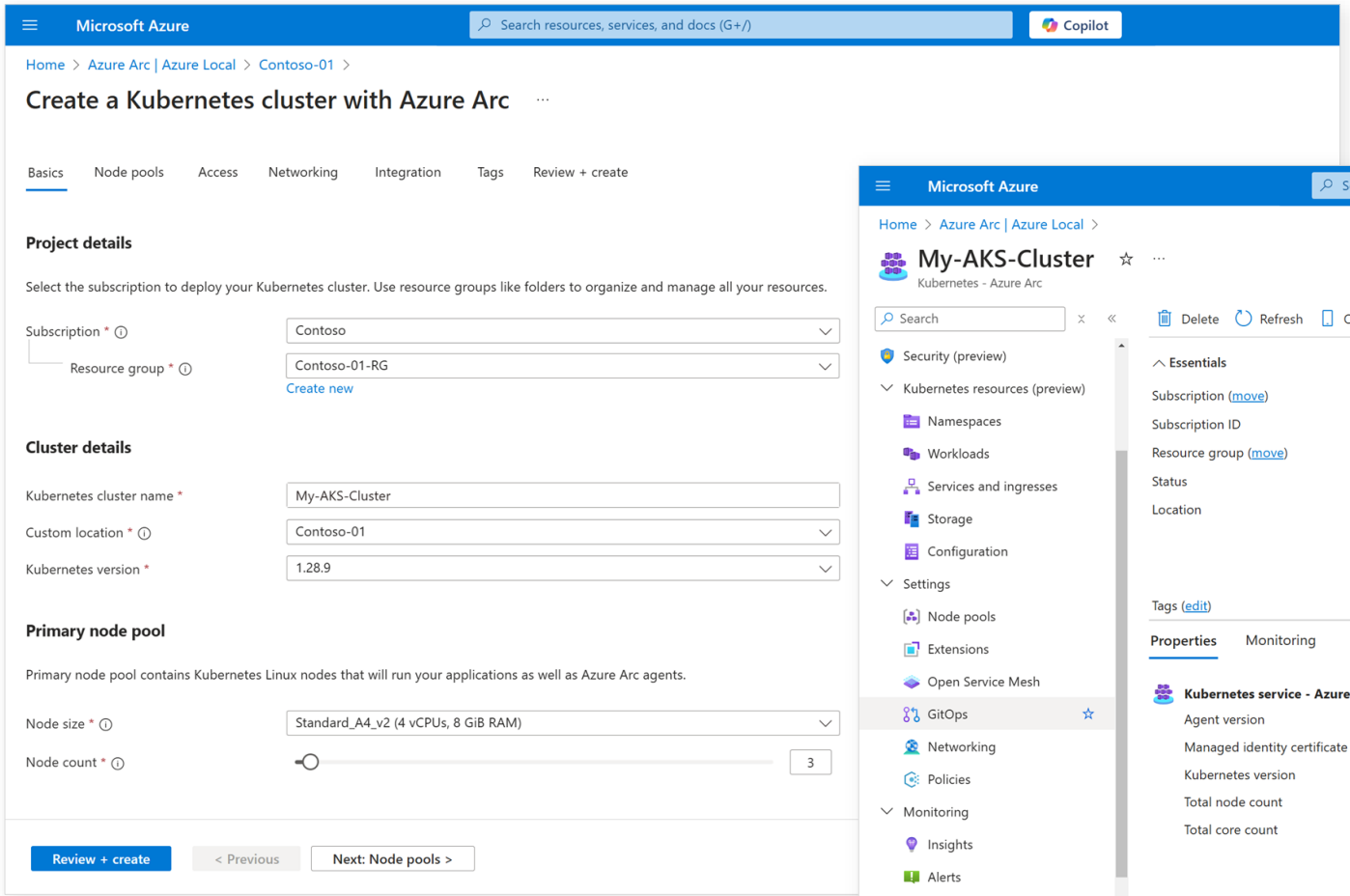
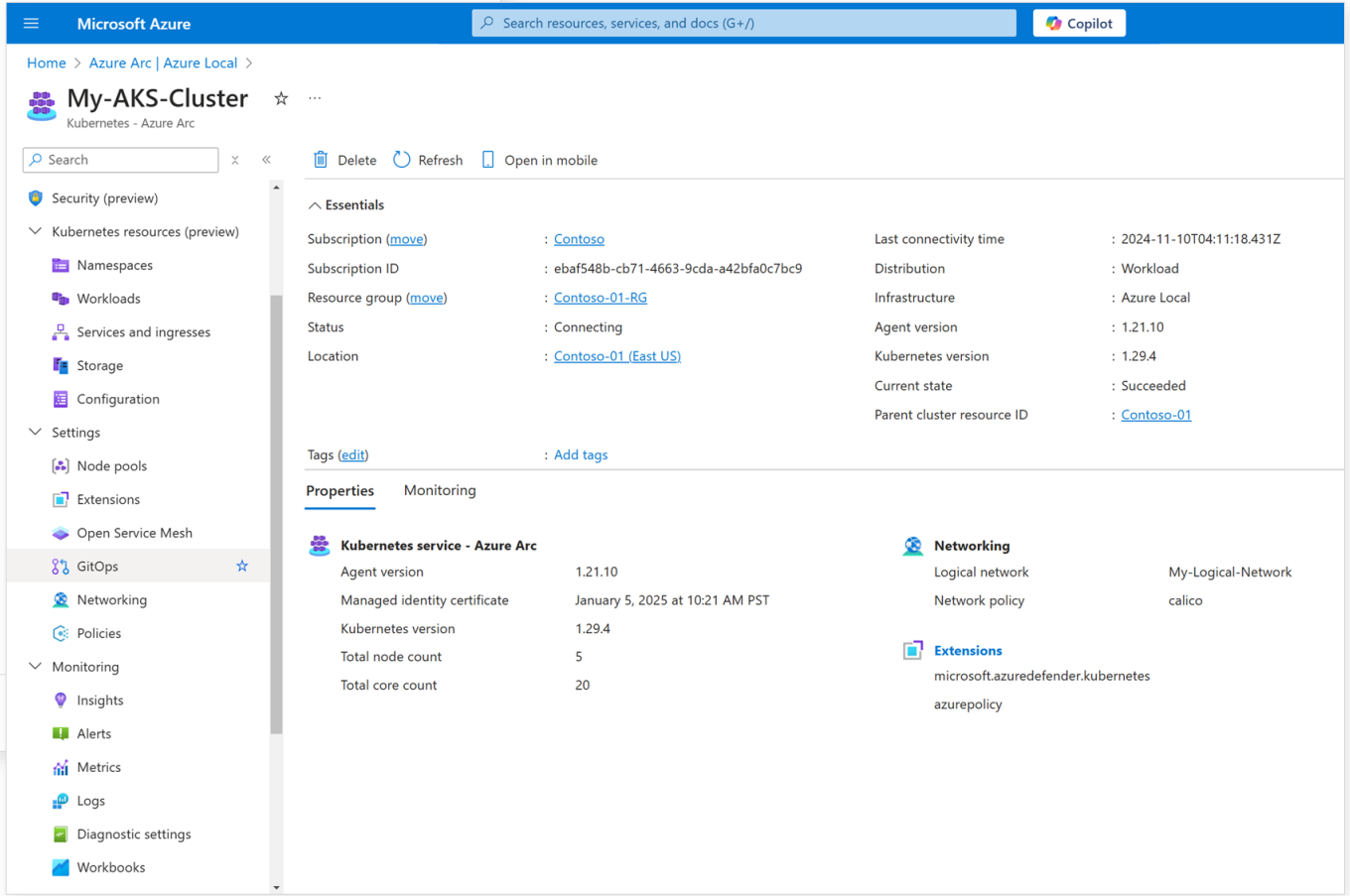
AZURE KUBERNETES SERVICE BUILT-IN AND INCLUDED





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BRING AZURE APP, DATA, AND AI SERVICES ANYWHERE

Management services

Portal | Copilot | Graph | Identity | Defender | Monitor | Updates | Policy | Support | Billing

Cloud region

Distributed location

Enabled by Azure Arc

Popular

Windows and Linux | Azure Virtual Desktop | Azure IoT Operations

App services

App Service | Functions | Logic Apps

Data services

Arc-enabled SQL Server | Managed instance | PostgreSQL

AI services

NEW

Video Indexer | Local AI search (preview) | Machine Learning

Foundational services

Virtual machines | Kubernetes services | Logical networks | Storage paths

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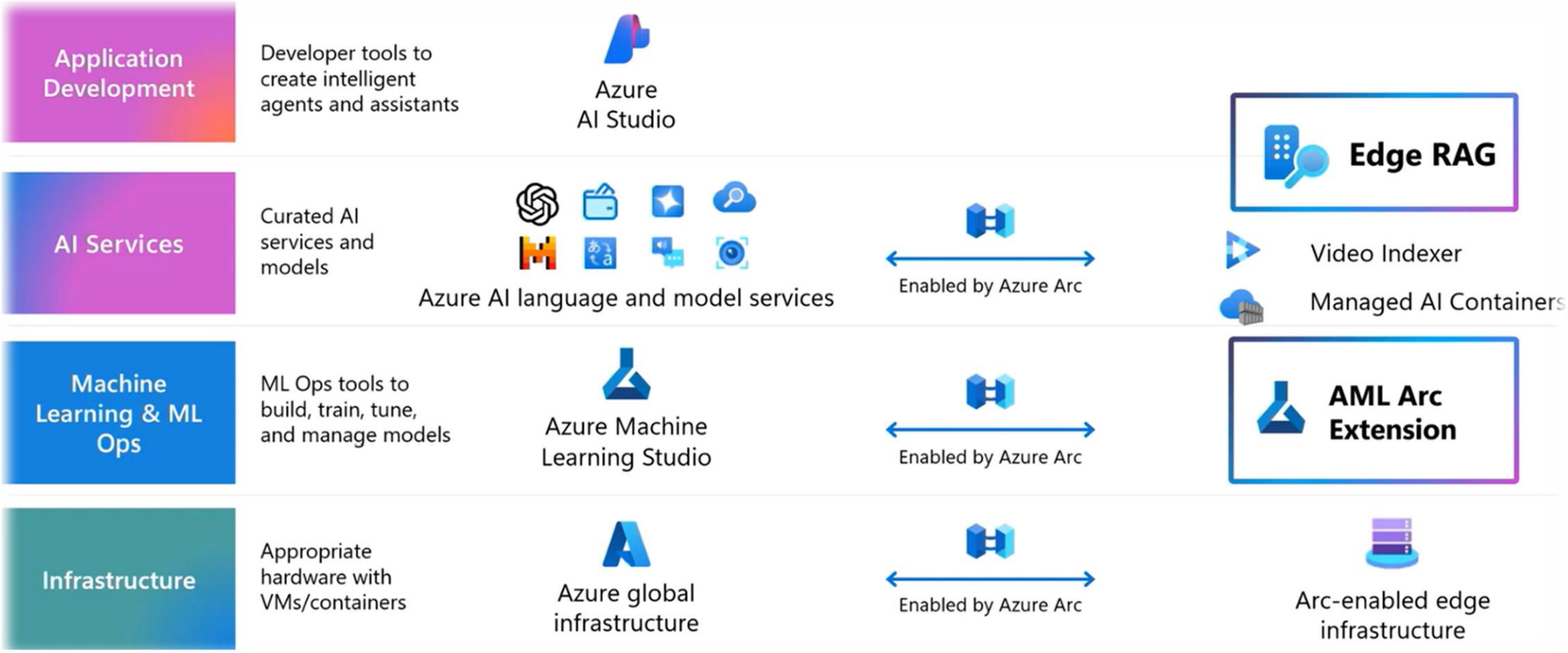
AZURE AI PORTFOLIO FROM CLOUD TO EDGE



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WHAT'S NEW IN AI AT THE EDGE

Edge RAG

"I want to augment language models with our organization's private, on-premises data to build AI applications."

Arc-enabled Azure Machine Learning

"I want to deploy generative and traditional AI models to the edge and manage their lifecycle from the cloud."

Edge RAG

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WHAT IS RETRIEVAL-AUGMENTED GENERATION (RAG)?

- **Retrieve**: Pulls relevant information from external sources (documents, databases, vector indexes).
- **Generate**: Produces accurate, contextualized responses using the retrieved information.

RAG enhances the precision of language model responses, reduces hallucinations, and leverages up-to-date data without retraining.

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WHY RAG ON AZURE LOCAL?

RAG capabilities on Azure Local and enable customers to:

- **Ground AI in their own data**—whether stored in Azure, on-premises, or across multicloud environments—without needing to move or duplicate it.
- **Maintain data sovereignty and compliance by** keeping sensitive data within jurisdictional boundaries while still enabling AI to reason over it.
- **Accelerate time to insight** by integrating RAG into existing applications and workflows using Azure Arc.

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RAG ON AZURE LOCAL

Enable Generative AI with On-Premises Data

Overview

Available as a native extension via **Azure Arc for Kubernetes**, this solution brings RAG capabilities to private cloud environments with:

- End-to-end data ingestion & retrieval pipeline
- Local developer portal with prompt engineering, evaluation, and monitoring

User Experience

A **No-Code/Low-Code** interface with controls for inference models, customizable parameters, and system prompts tailored to specific use cases.

Key Benefits

✅ **Data Privacy & Compliance:** keep sensitive data on-premises, ensuring regulatory and policy adherence
✅ **Low Latency:** local processing for fast, real-time responses
✅ **Bandwidth Efficiency:** no need to transfer large datasets to the cloud
✅ **Scalability & Flexibility:** use Azure Arc to manage and scale Kubernetes clusters across environments

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KEY USE CASES & SCENARIOS

Financial Services

- **Compliance Checks**: Automate regulatory document reviews
- **Customer Assistance**: Provide personalized support
- **Sales Pitch Generation**: Tailor marketing using client insights

Manufacturing

- **Issue Resolution**: Real-time troubleshooting with local data
- **Operational Efficiency**: Analyze production for optimization
- **Predictive Maintenance**: Forecast failures, schedule maintenance

Public Sector

- **Decision Making**: Summarize datasets for fast insights
- **Training & Education**: Generate learning content
- **Public Safety**: Analyze local data to detect threats

Healthcare

- **Patient Care**: Create personalized treatment plans
- **Medical Research**: Leverage clinical data for R&D
- **Operational Management**: Optimize patient flow and resources

Retail

- **Personalized Marketing**: Target campaigns using purchase history
- **Inventory Management**: Optimize stock levels via sales trends
- **Customer Insights**: Understand behavior to refine offerings

Arc-enabled Azure Machine Learning

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OVERVIEW

Arc-enabled Azure Machine Learning

Cloud-connected control plane

Train, validate, deploy and monitor custom models

Think of AI/ML models like regression models, predictive models, image classification etc.

**** Existing capability***

Seamlessly deploy pre-packaged, validated AI models to edge

Think of traditional AI models like computer vision, translate, anomaly detect etc., and Gen AI models like Phi-3 & Mistral.

****New Capability***

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Support for open-source Foundational Models

- **5 ready to use AI models for the Edge**
- Phi 3.5 – Language model
- Google T5 – Text translation model
- OpenAI Whisper – Speech detection model
- MMDetection YOLO – Object detection model
- Mistral 7B

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Curated set of validated models

Sizing guidance documentation

Validated catalog of models

Simplified orchestration

Simplified discovery and deployment of AI models via Azure portal

Unified management

Enterprise-ready

Seamless management, updates & monitoring in Azure ML Studio

Uses existing Azure Machine Learning extension

Microsoft's security and compliance standards

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Extension Deployment

User Persona

Infrastructure/Kubernetes Admin responsible for setting up infrastructure and to manage lifecycle management.

User can

- Lifecycle management of the extension
- Configure the extension for training or inferencing
- Ensure sufficient resources available to the solution

User Interface at Ignite

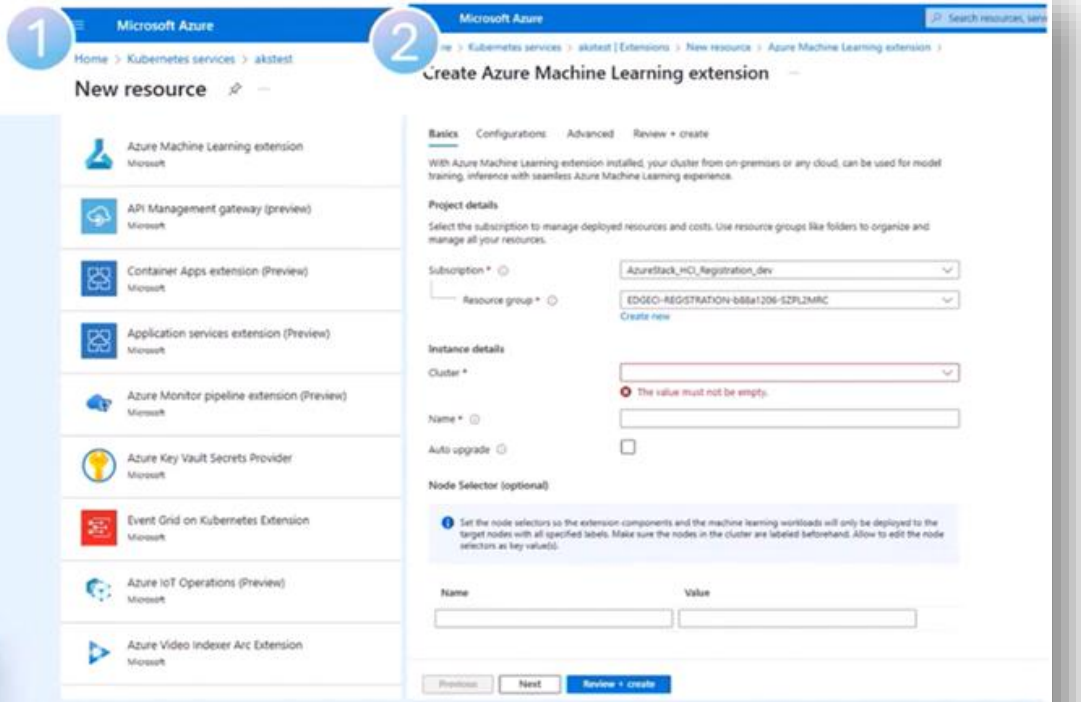
- Azure Portal
- Azure CLI

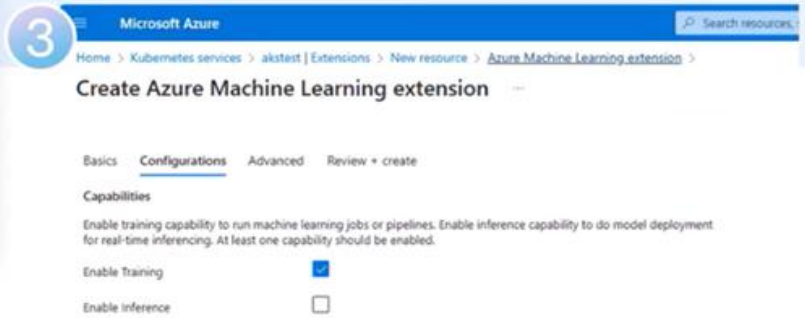
Kubernetes infra supported

Any Arc-enabled K8s

Configuration Modes

Training or Inference or Both





AZURE DAY

Demo: Azure Local – Management, Operations & AI Services

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WINDOWS SERVER vs AZURE LOCAL

Windows Server

On-Premises Workload Focus:
If the organization needs to keep most workloads on-premises with minimal cloud integration, Windows Server 2025 is the ideal choice.

Reduced Budget:
For companies not yet ready to invest in subscription-based solutions, the traditional licensing model of Windows Server can be more cost-effective.

Hardware Compatibility:
For those wanting to reuse existing hardware, Windows Server offers greater flexibility in compatibility.

Azure Local

Hybrid Cloud Environments:
For organizations already adopting a hybrid cloud strategy, Azure Local provides integrated management, simplifying control of resources across distributed environments.

Resilience and Disaster Recovery:
Azure Local enhances resilience and offers advanced disaster recovery options.

Infrastructure Modernization:
For those modernizing infrastructure with hyper-converged technologies and strong cloud integration, Azure Local is the ideal solution to support the transition.

CLOSING REMARKS & NEXT STEPS

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ADAPTIVE CLOUD APPROACH ENABLED BY AZURE ARC

Cloud services & tools

- Operate with AI-enhanced central **management & security**
- Develop and scale **applications** across boundaries
- Unify **data and AI** across a distributed estate

Global infrastructure

60+ Azure regions | **Azure Local** | Existing infrastructure

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THANK YOU!!!