

Kubernetes on Azure

Build, run and monitor your container applications

Daniel Neumann

Technology Solutions Professional
Microsoft

Daniel.Neumann@microsoft.com
[@neumanndaniel](https://twitter.com/neumanndaniel)

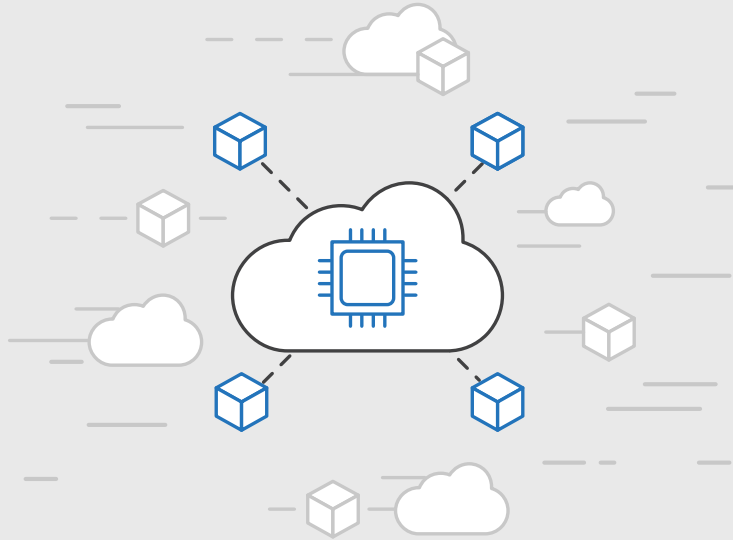
Overview



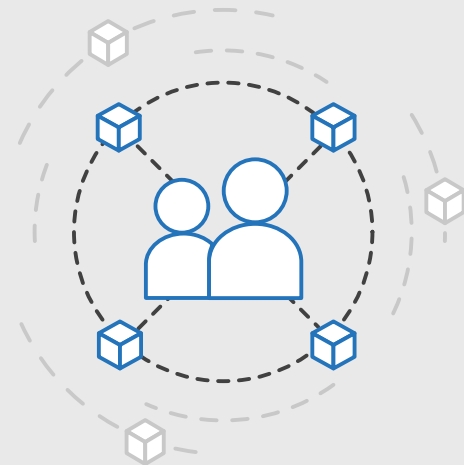
Azure container strategy



Embrace containers
as ubiquitous

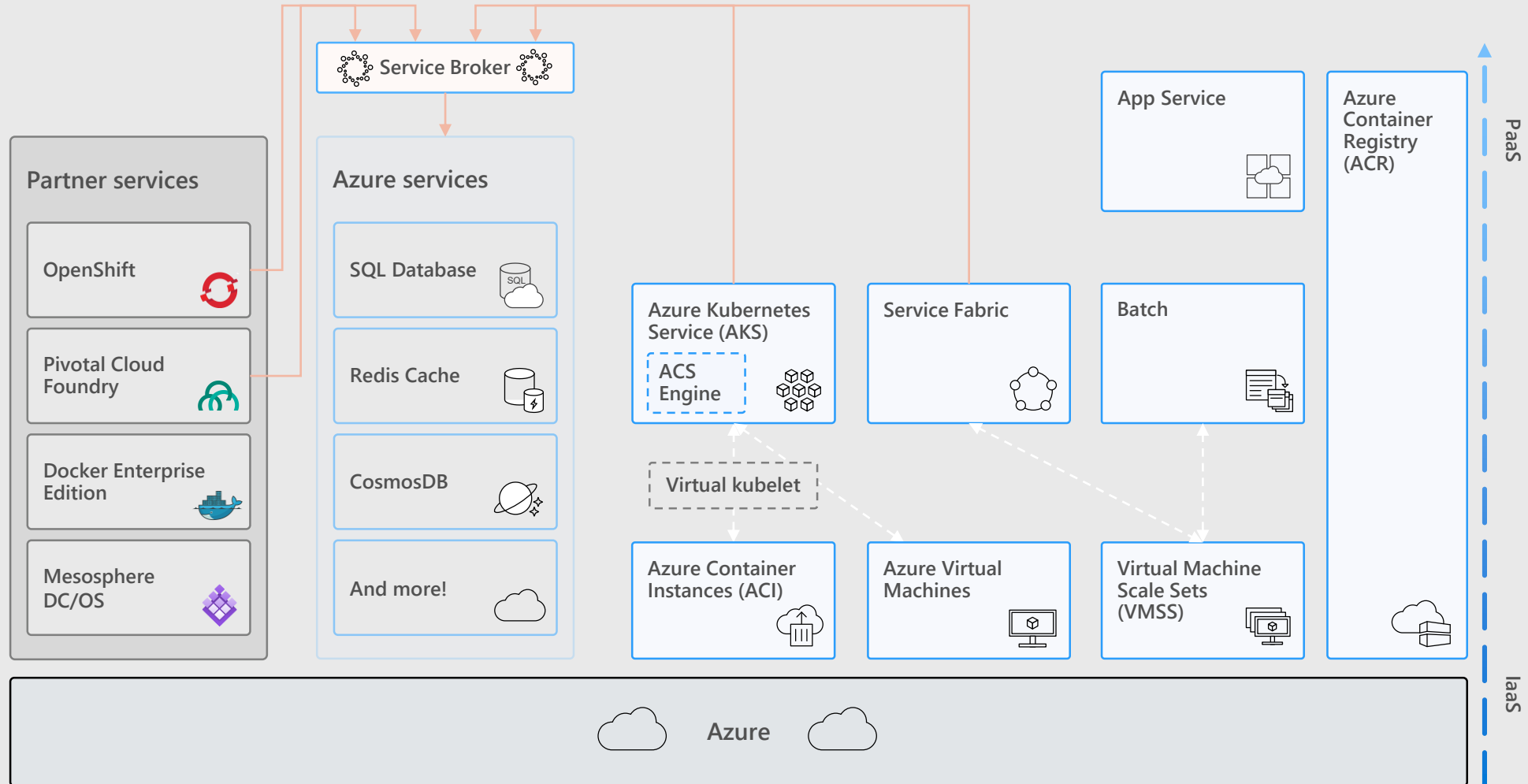


Support containers
across the compute
portfolio



Democratize
container
technology

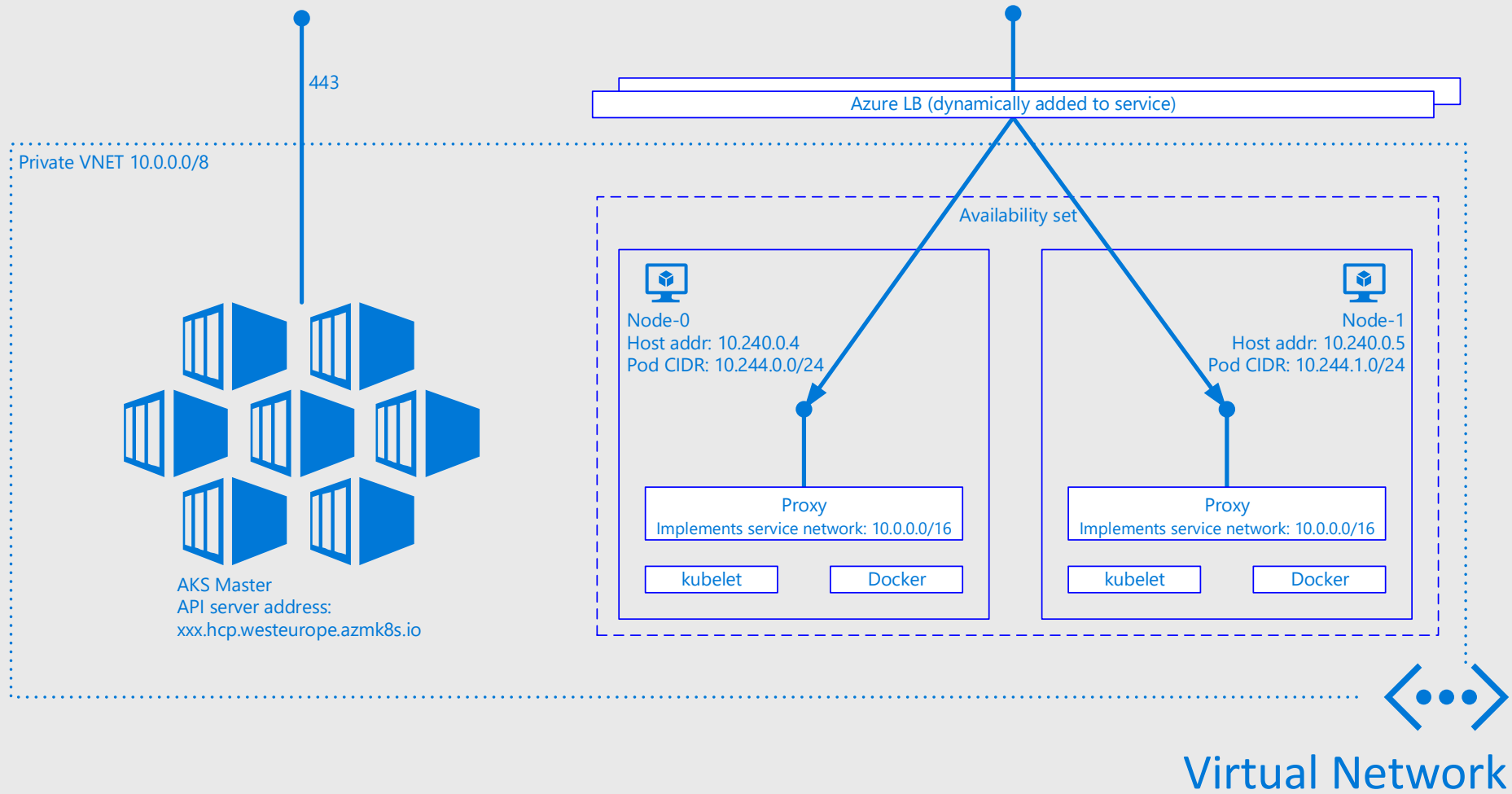
Azure container ecosystem



Azure Kubernetes Service



Azure Kubernetes Service



Azure Kubernetes Service

Simplify the deployment, management, and operations of Kubernetes

Automated Kubernetes version upgrades and patching

- Automated reboot: <https://github.com/weaveworks/kured>

Easy cluster scaling

- Cluster Autoscaler
- Horizontal Pod Autoscaler

Self-healing hosted control plane (masters)

Cost savings – pay only for running agent pool nodes

Azure Kubernetes Service

A fully managed Kubernetes cluster

Custom VNET with Azure CNI

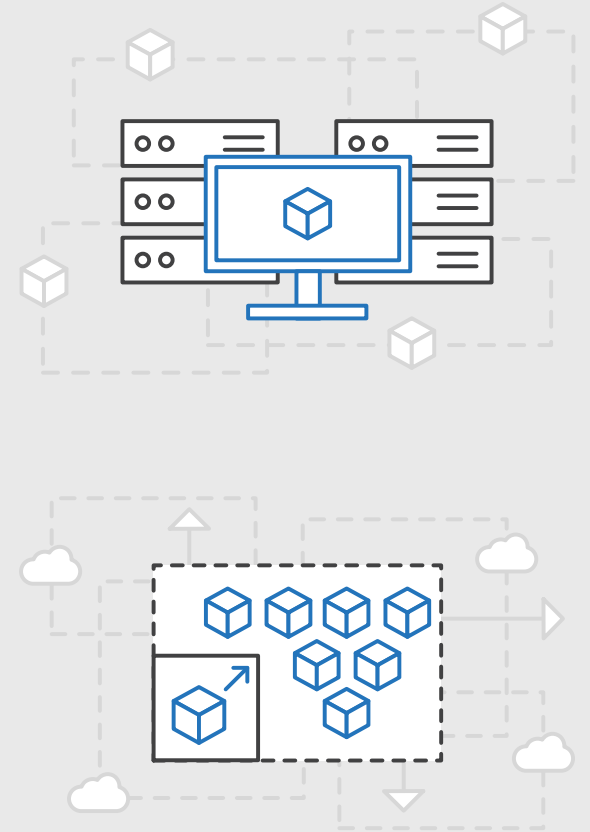
Integration with Azure Monitor

HTTP application routing

- Azure-integrated Kubernetes ingress controller
- Supports DNS endpoints for Kubernetes ingress resources

RBAC support

Azure Active Directory integration



Azure Kubernetes Service

Region availability

GA regions

- Australia East
- Canada Central / Canada East
- Central US
- East US / East US 2
- West US / West US 2
- Japan East
- Southeast Asia
- UK South
- North Europe / West Europe



Azure Kubernetes Service

Limits

Resource	Default Limit
Max nodes per cluster	100
Max pods per node (basic networking with Kubenet)	110
Max pods per node (advanced networking with Azure CNI)	30*
Max cluster per subscription	100
▪ * This value can be customized through ARM template deployment.	

Create Azure Kubernetes Service

1. `az group create --name aks-demo-rg --location westeurope`
2. `az aks create --resource-group aks-demo-rg --name aks-demo-cluster --node-count 3 --node-vm-size Standard_D2s_v3 --generate-ssh-keys`
3. `az aks get-credentials --resource-group aks-demo-rg --name aks-demo-cluster`

Azure Container Instances



Azure Container Instances

Easily run serverless containers

Fast startup times

Hypervisor-level security

Custom sizes

Public IP connectivity and DNS name

Persistent storage – Azure Files

Linux and Windows containers

Co-scheduled groups



Azure Container Instances

Common scenarios

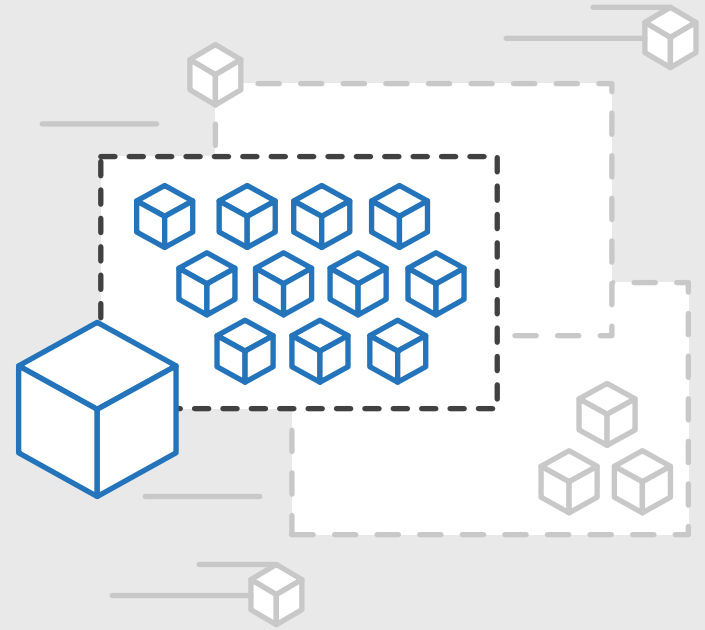
Azure Cloud Shell

Task automation

CI/CD agents

Small-scale batch processing

Simple web apps



Azure Container Instances

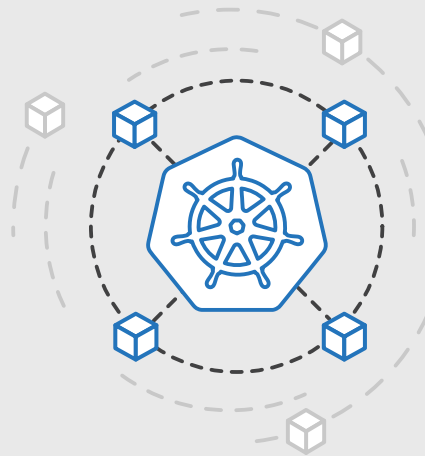
Region availability

Location	OS	CPU	Memory (GB)
West Europe, North Europe, West US, East US	Linux	4	14
West US2, Southeast Asia	Linux	2	7
Australia East, East US 2, Central US	Linux	1	1.5
West Europe, North Europe, West US, East US	Windows	4	14
West US2, Southeast Asia	Windows	2	3.5

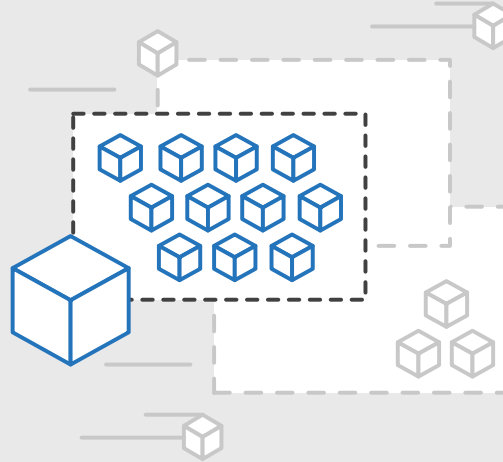


ACI Connector for Kubernetes

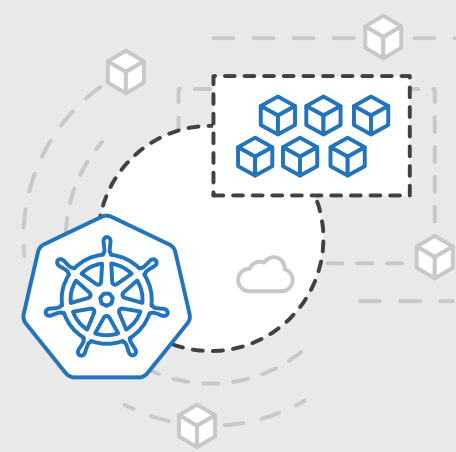
aka Virtual Kubelet



Kubernetes provides
rich orchestration
capabilities



ACI provides infinite
container-based scale

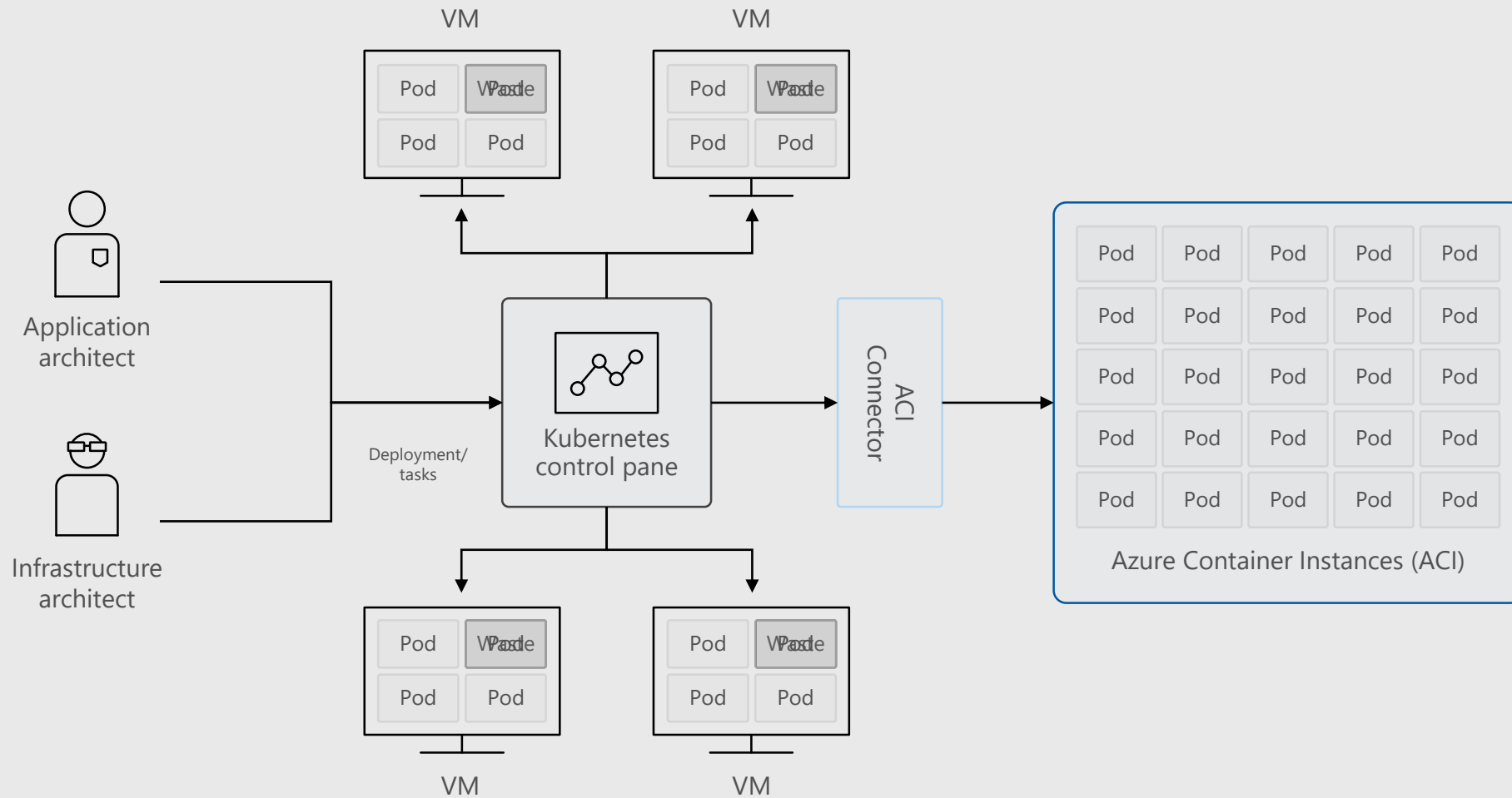


The ACI Connector for
K8s brings them
together



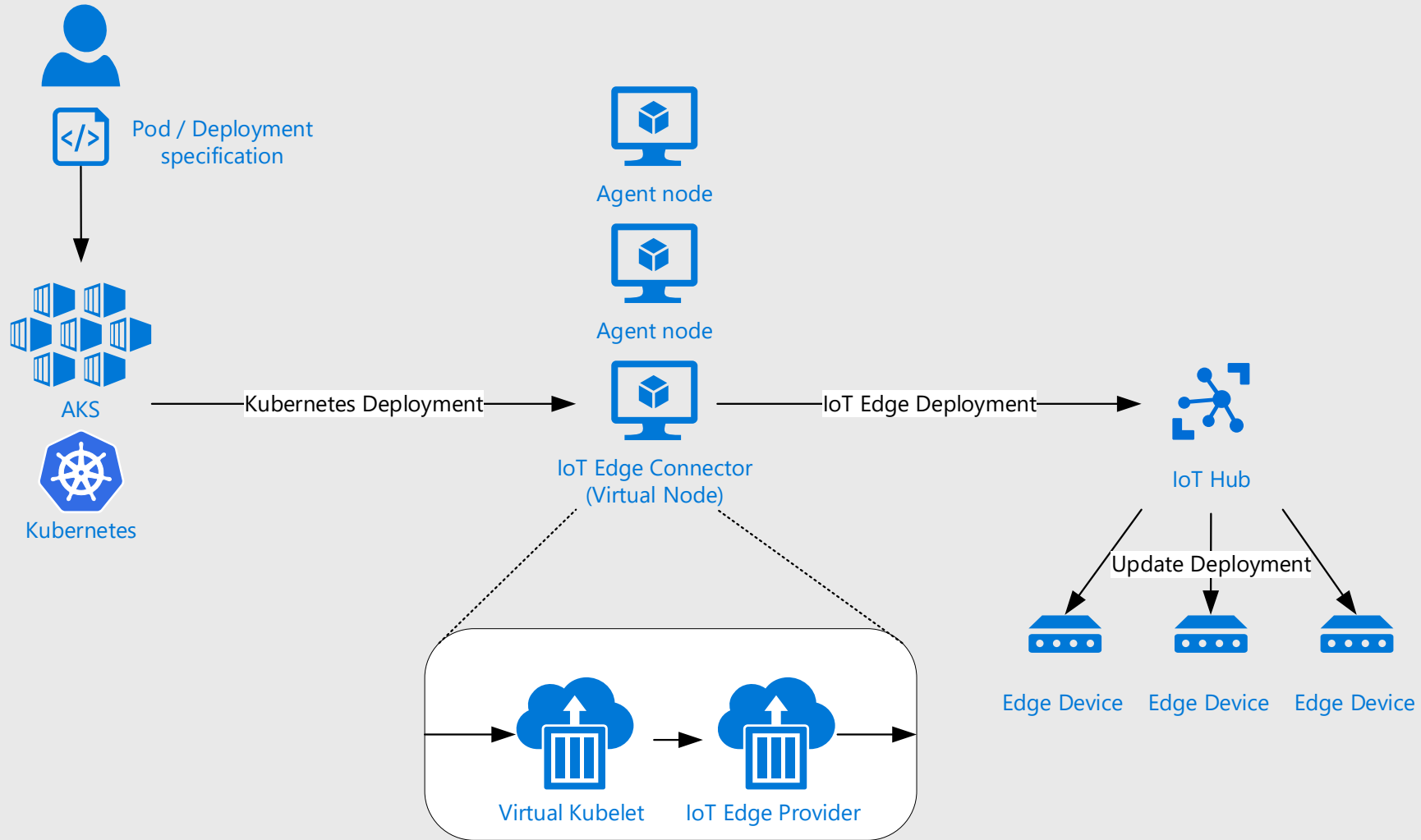
Azure Container Instances

Bursting with the ACI Connector aka Virtual Kubelet



Virtual Kubelet

IoT Edge Connector



Create Azure Container Instances

1. `az group create --name aci-demo-rg --location westeurope`
2. `az container create --resource-group aci-demo-rg --name acidemocontainer --image microsoft/aci-helloworld --dns-name-label aci-demo-container --ports 80`
3. `az container exec --resource-group aci-demo-rg --name acidemocontainer --exec-command "/bin/sh,,`
4. `http://aci-demo-container.westeurope.azurecontainer.io/`

Azure Container Registry

A faint, dark gray network diagram is visible in the background. It features a central large circle connected to several smaller circles, which are further connected to other circles, creating a web-like structure. The circles and lines are semi-transparent.

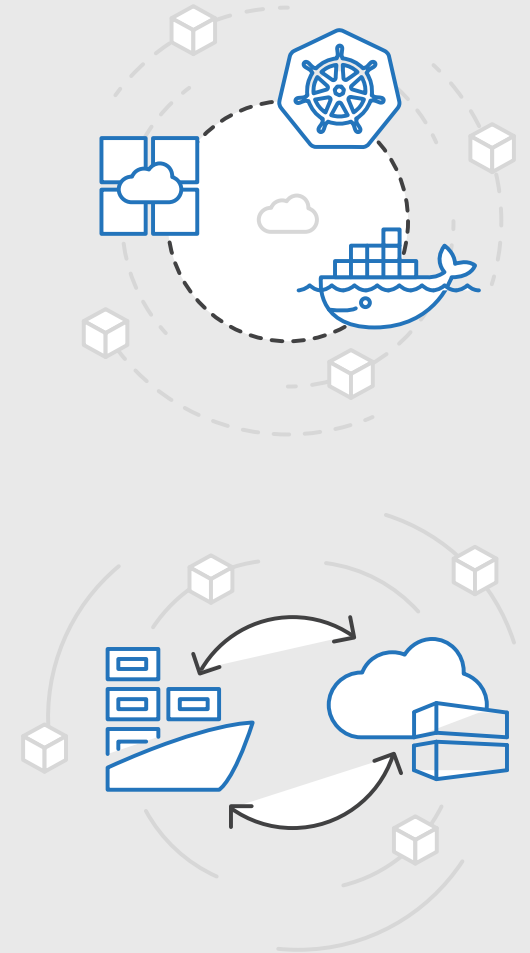
Azure Container Registry

Docker private registry

Maintain Windows and Linux container images in a single registry

Use familiar, open-source Docker command line interface (CLI) tools

Simplify registry access management with Azure Active Directory



Azure Container Registry

Encryption-at-rest

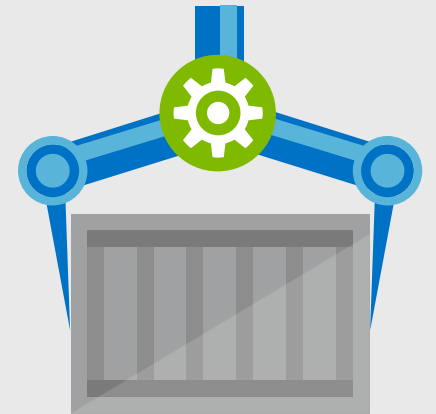
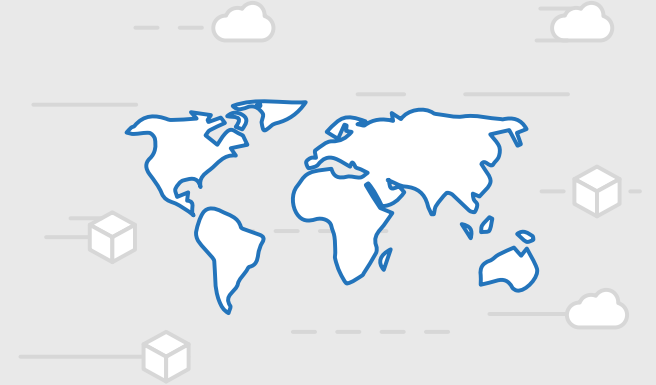
Geo-redundant storage

Geo-replication support

ACR Build - Lifecycle Management, OS & Framework Patching

Secure by default Container Registries

Trusted images support



Create Azure Container Registry

1. `az group create --name acr-demo-rg --location westeurope`
2. `az acr create --resource-group acr-demo-rg --name aksdemoacr --sku Basic --admin-enabled $true`

A faint, light gray network diagram is visible in the background. It consists of several circular nodes of varying sizes connected by thin lines. A large central node is connected to several other nodes, some of which are further connected to each other, forming a web-like structure.

Azure Monitor container health

Container monitoring solution

Azure Monitor container health

Requirements

- Azure Log Analytics workspace
- Container Insights solution

Supports

- Azure Kubernetes Service

The screenshot displays the 'azst-aks1 - Health (preview)' page in the Azure Monitor console. The interface is divided into a left sidebar, a main content area, and a right-hand details pane.

Left Sidebar: Contains navigation links for Overview, Activity log, Access control (IAM), Tags, and a SETTINGS section with Upgrade, Scale, Properties, Locks, and Automation script. A MONITORING section includes Metrics (preview) and Health (preview) (which is selected). A SUPPORT + TROUBLESHOOTING section includes a New support request link.

Main Content Area: Shows the 'Nodes' tab for the 'azst-aks1' cluster. It includes a search bar, a time range filter set to 'Last 6 hours', and a 'Add Filter' button. Below these are tabs for Cluster, Nodes, Controllers, and Containers. A table lists the health of various components:

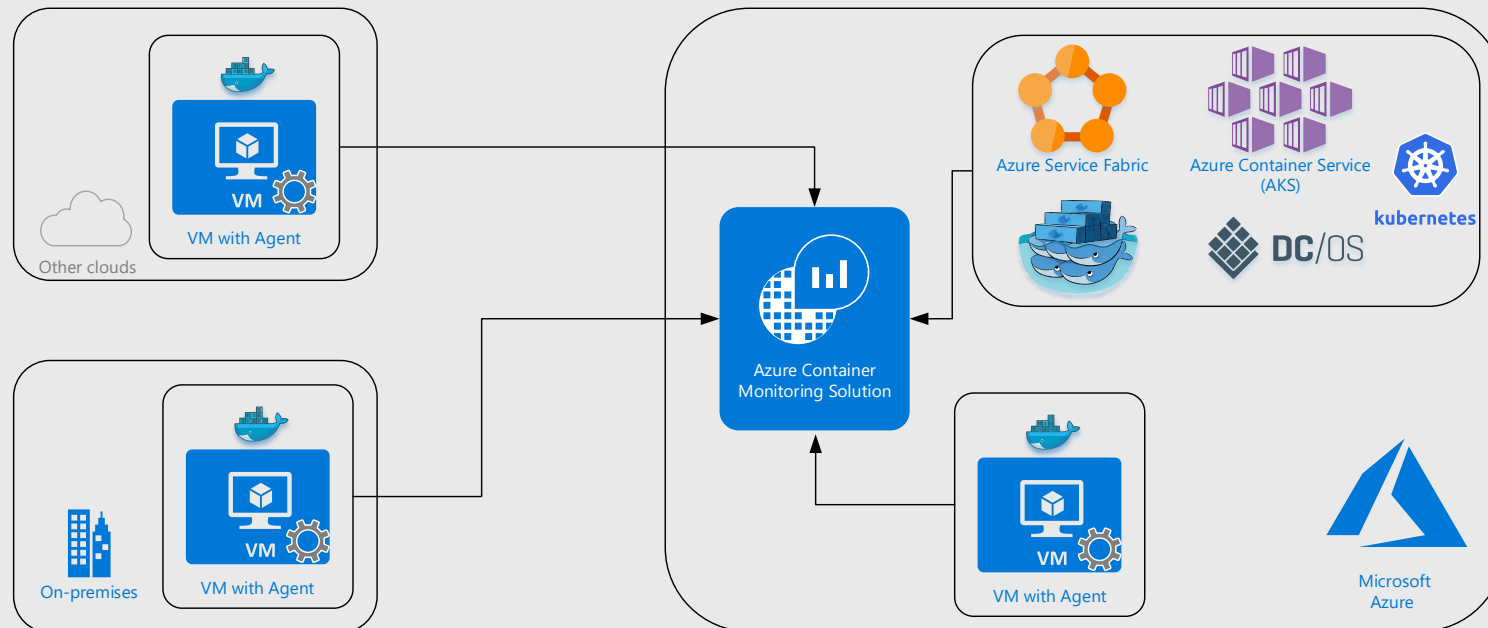
NAME	STATUS	95TH %	95TH	CONTAINERS	UPTIME	CONTROLLER	TREND 95TH % (1 BAR = 15...)
aks-agentpool-1...	Ok	18%	1.38 GB	23	5 hours	-	
Other Processes	-	9%	705.3 MB	-	-	-	
omsagent-h...	Ok	3%	278.87 MB	1	5 hours	omsagent	
omsagent	Ok	3%	278.87 MB	1	5 hours	omsagent	
addon-http-...	Ok	1%	114.01 MB	1	5 hours	addon-http-a...	
addon-...	Ok	1%	114.01 MB	1	5 hours	addon-http-a...	
tunnelfront-...	Ok	1%	90.81 MB	1	5 hours	tunnelfront-58...	
tunnel-f...	Ok	1%	90.81 MB	1	5 hours	tunnelfront-58...	
dysk-flexvol-...	Ok	0.6%	45.54 MB	2	5 hours	dysk-flexvol-in...	
kernel-...	Ok	0.5%	43.06 MB	1	5 hours	dysk-flexvol-in...	
flexvol-...	Ok	0%	2.48 MB	1	5 hours	dysk-flexvol-in...	
kube-svc-re...	Ok	0.4%	35.12 MB	1	5 hours	kube-svc-redir...	

Right-hand Details Pane: Shows details for the selected 'aks-agent...' node. It includes the Node Name (aks-agentpool-14987876-2), Status (Ready), Cluster Name (azst-aks1), Kubelet Version (v1.11.1), Kube Proxy Version (v1.11.1), Docker Version (1.13.1), Operating System (Ubuntu 16.04.5 LTS), Node IP (13.73.147.9), Computer Environment (Azure), Agent Image (oms), and Agent Image Tag (ciprod07312018).

Container monitoring solution

Supports

- Docker Swarm, DC/OS, Kubernetes, Service Fabric & Red Hat OpenShift
- Windows Server & Linux



Visual Studio Team Services



Visual Studio Team Services

Unlimited free private code repositories – Git or TFVC

Track bugs, work items, feedback, and more

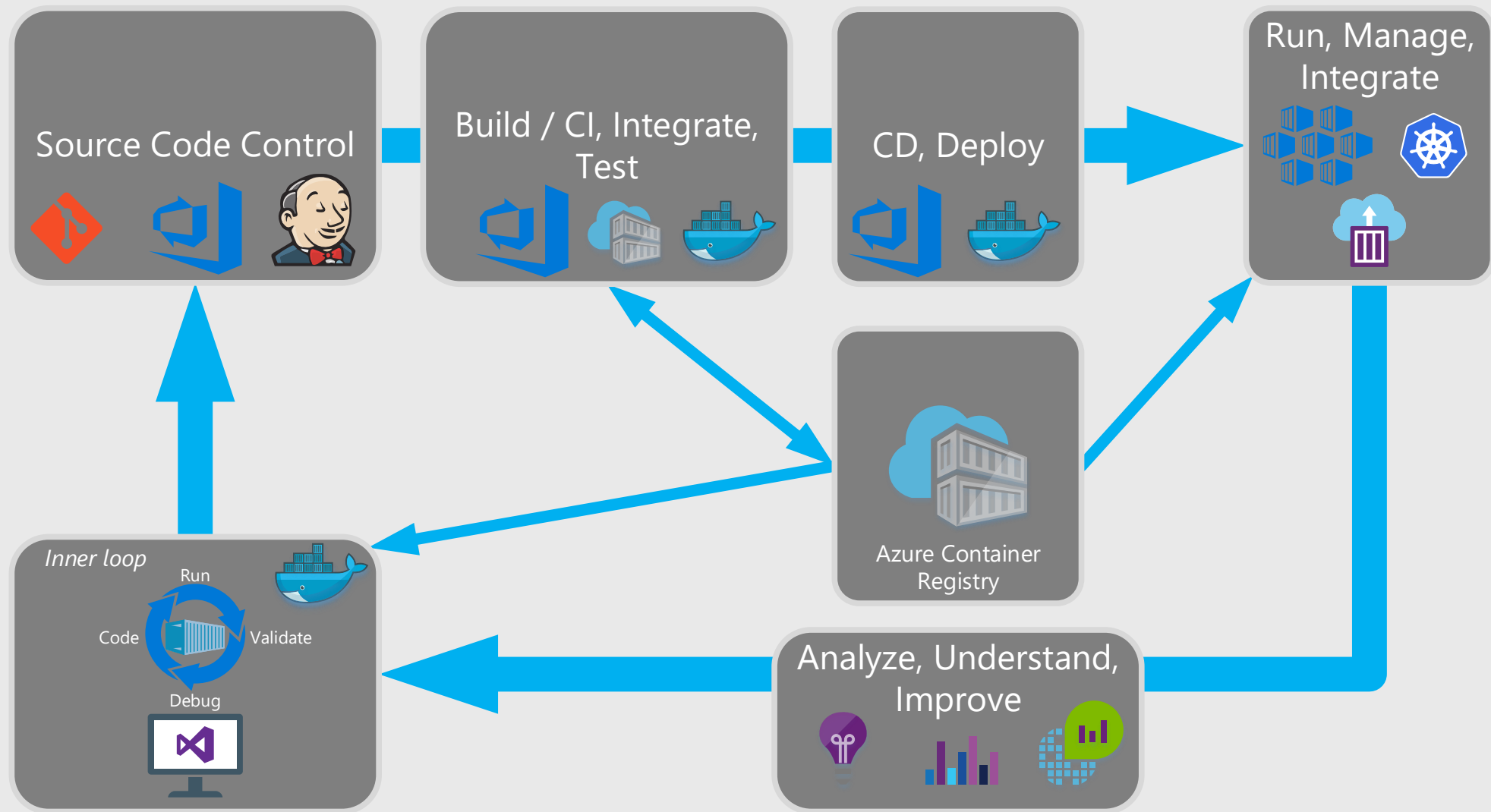
Cloud-powered continuous integration and deployment

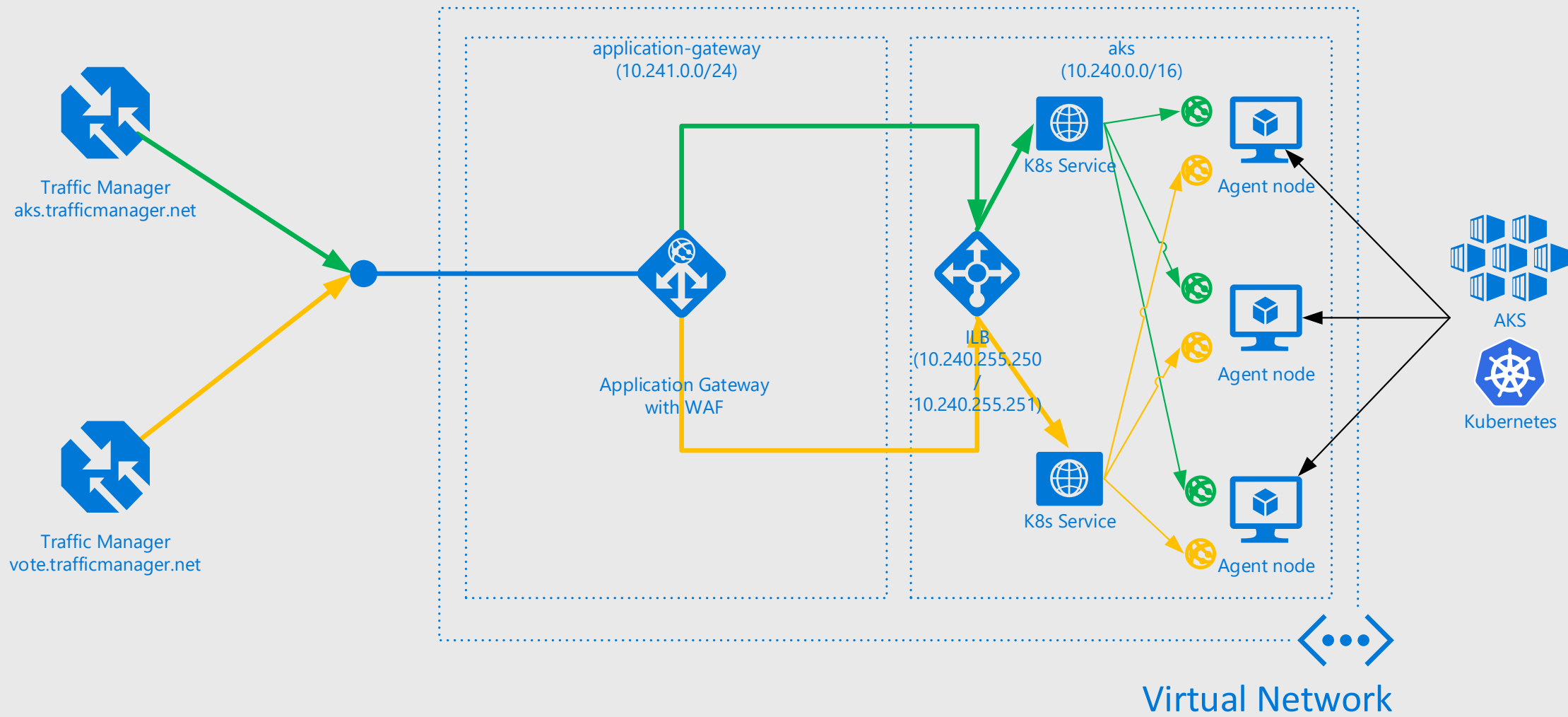
Enterprise-grade services scale to any team size

Free for up to five users

Big Picture







Demo



Demo steps

Part 1

Kickoff the deployment script in Azure Cloud Shell

- <https://github.com/neumanndaniel/kubernetes/tree/master/on-azure>

Create a new project in VSTS

Clone / import the Azure Voting App repository in VSTS

- <https://github.com/Azure-Samples/azure-voting-app-redis.git>

Modify azure-vote-all-in-one-redis.yaml

- Change image: to aksdemoacr.azurecr.io/azure-vote-front:latest

Demo steps

Part 2

Create build definition

- <https://docs.microsoft.com/en-us/vsts/build-release/apps/containers/build?view=vsts&tabs=web#adapt-your-ci-pipeline>
- Agent queue: Hosted Linux Preview

Create release definition

- <https://docs.microsoft.com/en-us/vsts/build-release/apps/cd/azure/deploy-container-kubernetes?view=vsts>
- Agent queue: Hosted Linux Preview
- Create Kubernetes Service Connection
 - `kubectl config view -o yaml --raw=true`

Kickoff CI/CD pipeline

Summary



Take aways

Azure Kubernetes Service is the future

- Simplified management
- Focus on your container workloads

Azure Container Registry

- Managed Docker private registry with geo-replication support for simplified management and operations

Azure Monitor container health / container monitoring solution

- Azure Kubernetes Service / hybrid container monitoring

Visual Studio Team Services

- The swiss army knife

