Microsoft

Azure

Kubernetes on Azure

Build, run and monitor your container applications

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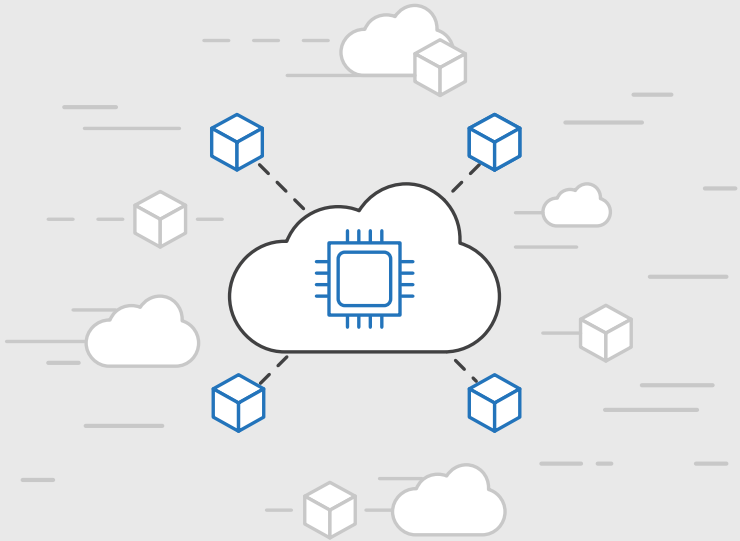
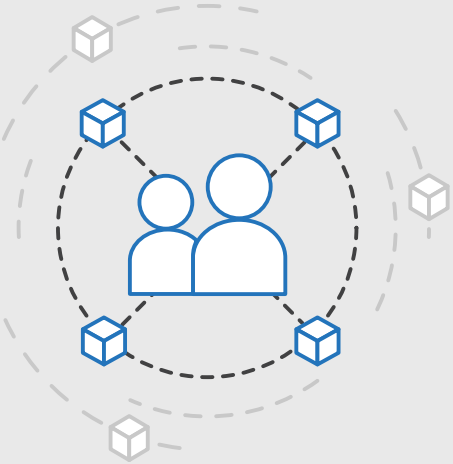
Overview

Azure container strategy

Embrace containers as ubiquitous

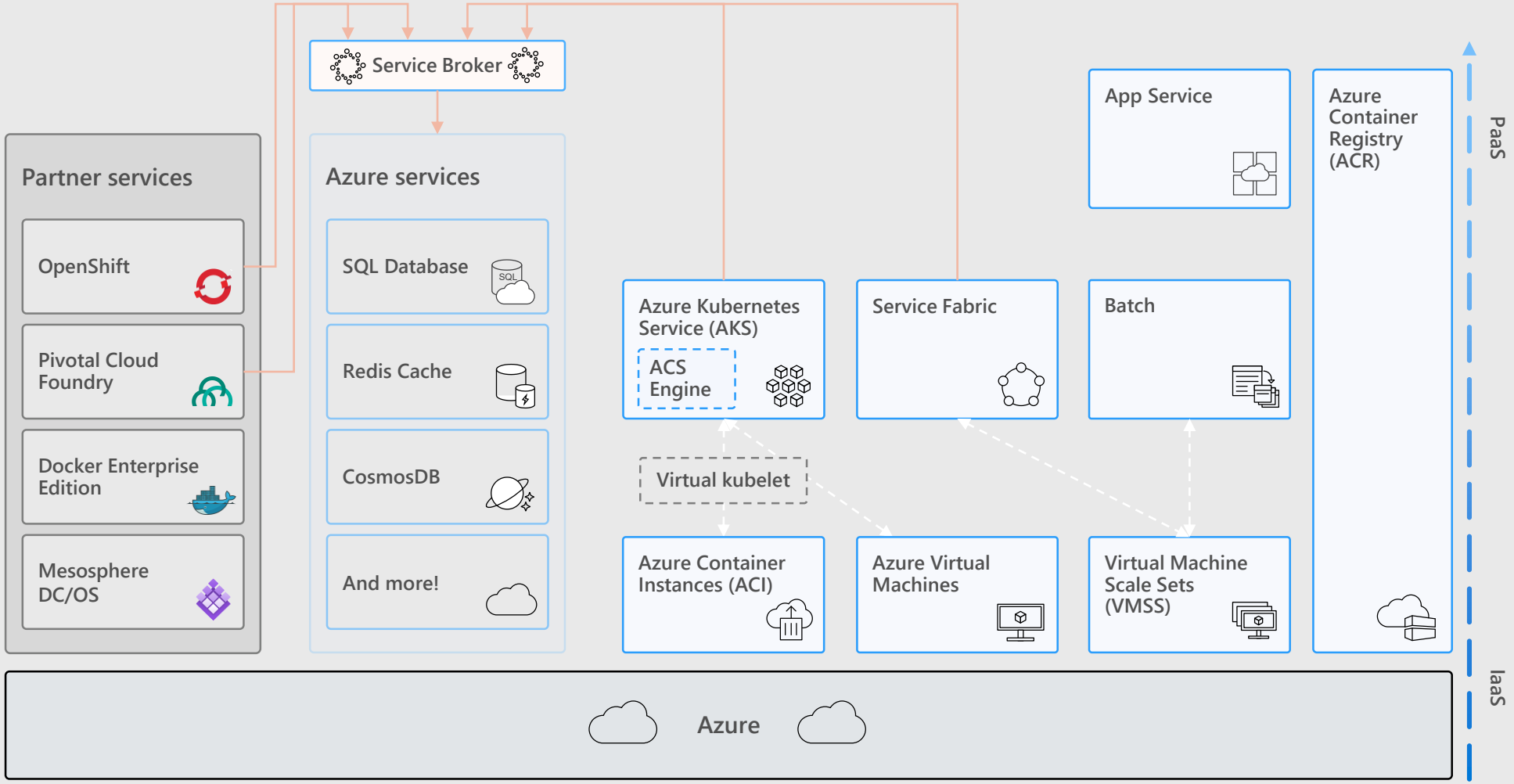


Support containers across the compute portfolio



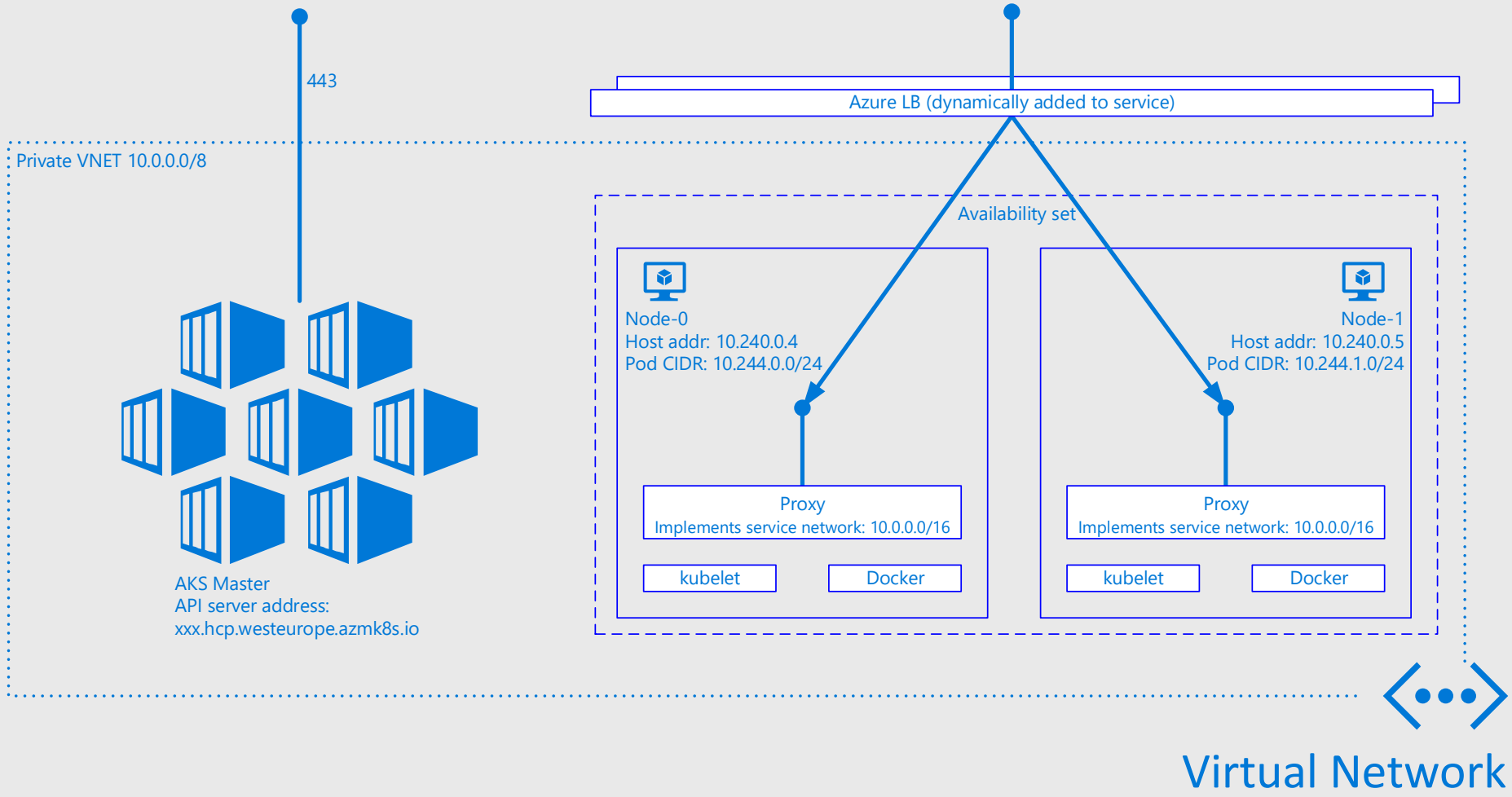
Democratize container technology

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

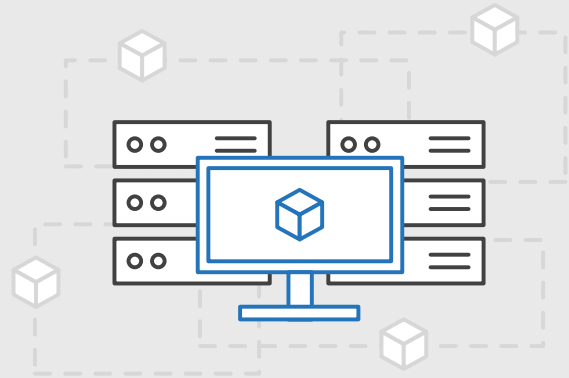
Integration with Azure Monitor

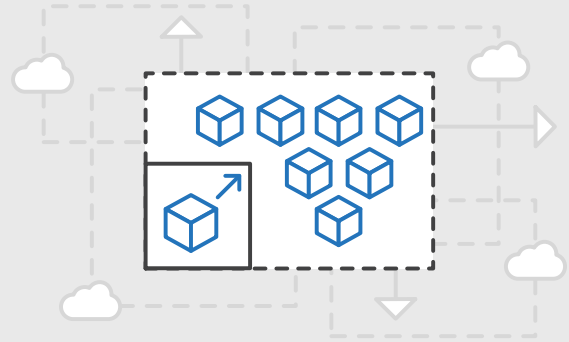
HTTP application routing

- 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

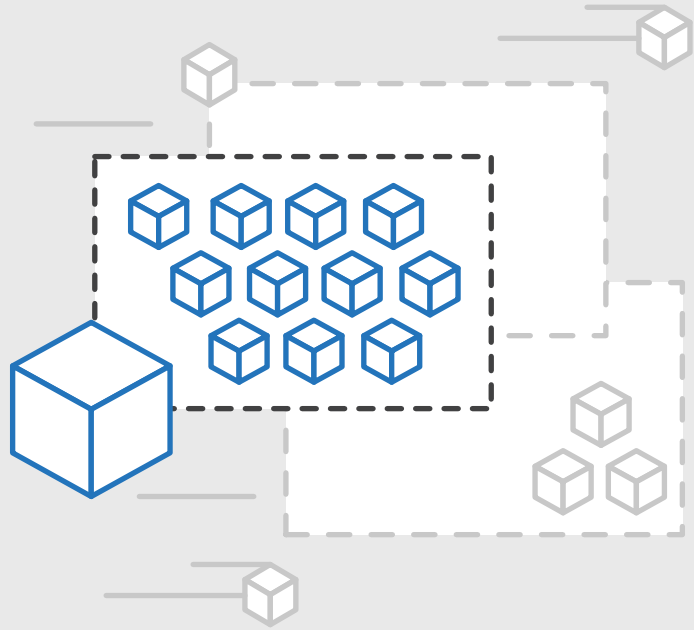
Azure Cloud Shell

Task automation

CI/CD agents

Small-scale batch processing

Simple web apps



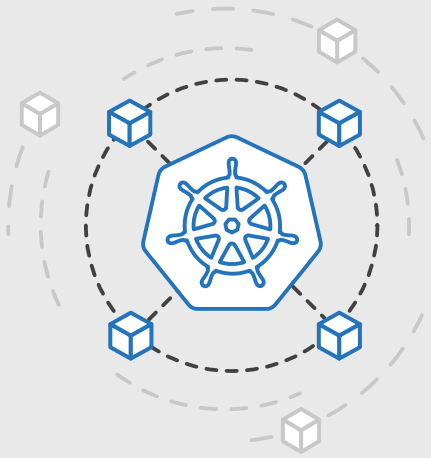
Azure Container Instances

Region availability

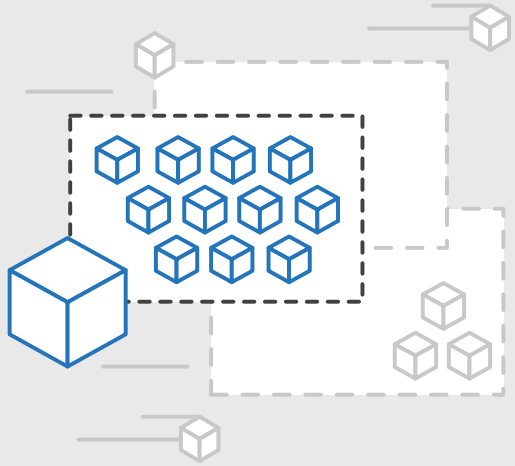
Location	OS	CPU	Memory (GB)
West Europe, North Europe, West US, East US	Linux	4	14
West US2, Southeast Asia	Linux	2	7
Australia East, East US 2, Central US	Linux	1	1.5
West Europe, North Europe, West US, East US	Windows	4	14
West US2, Southeast Asia	Windows	2	3.5

ACI Connector for Kubernetes

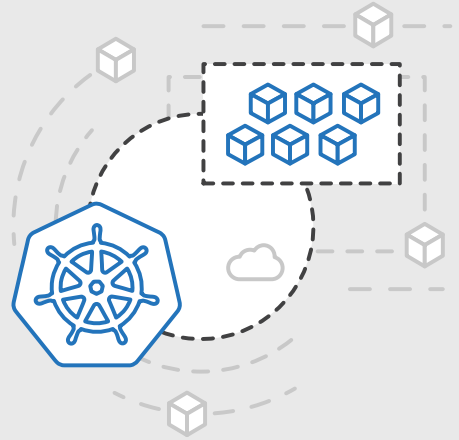
aka Virtual Kubelet



Kubernetes provides rich orchestration capabilities



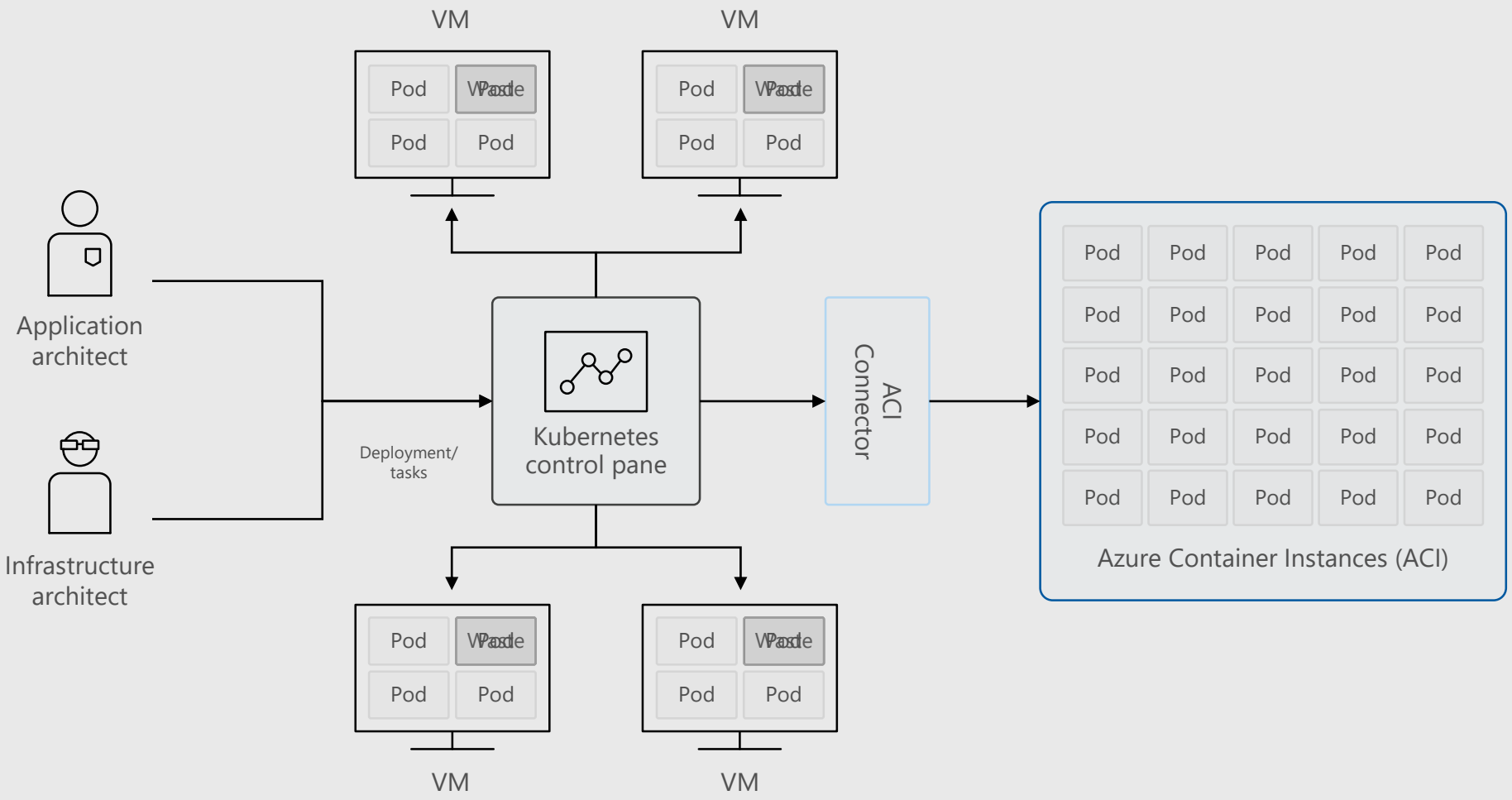
ACI provides infinite container-based scale



The ACI Connector for K8s brings them together

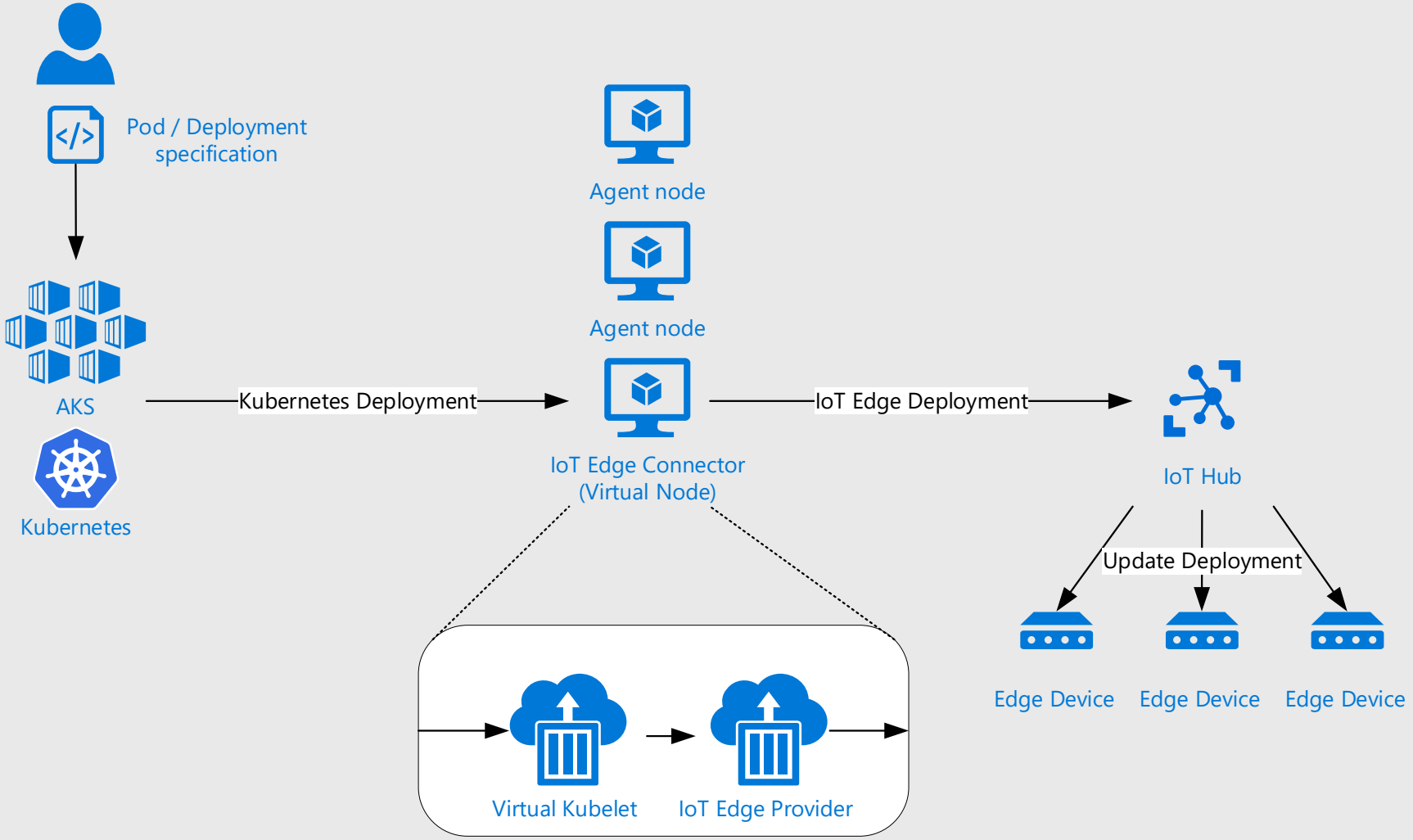
Azure Container Instances

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

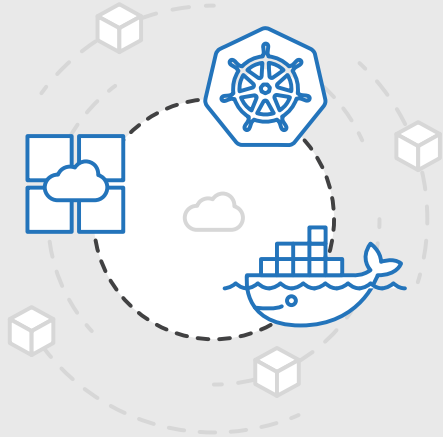
Azure Container Registry

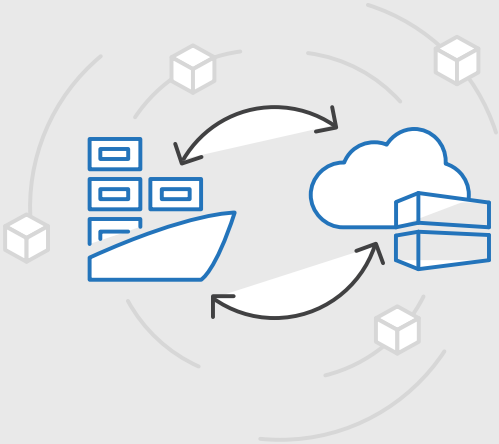
Docker private registry

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

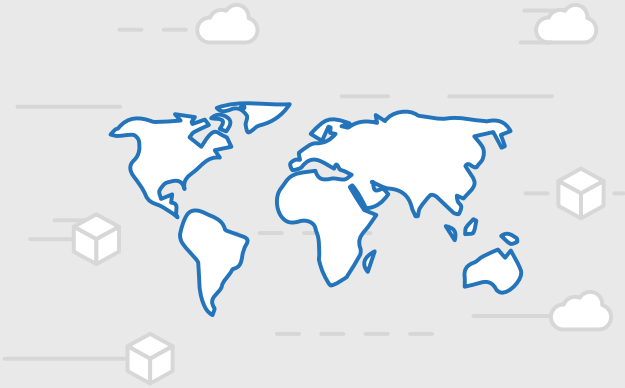
Geo-redundant storage

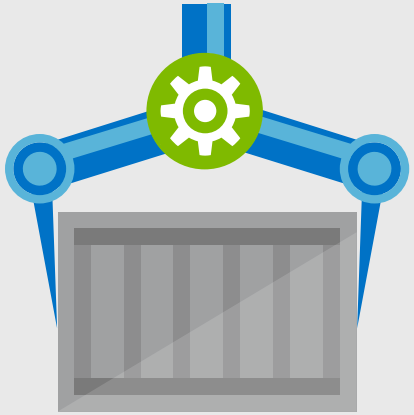
Geo-replication support

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
```

Azure Monitor container health

Container monitoring solution

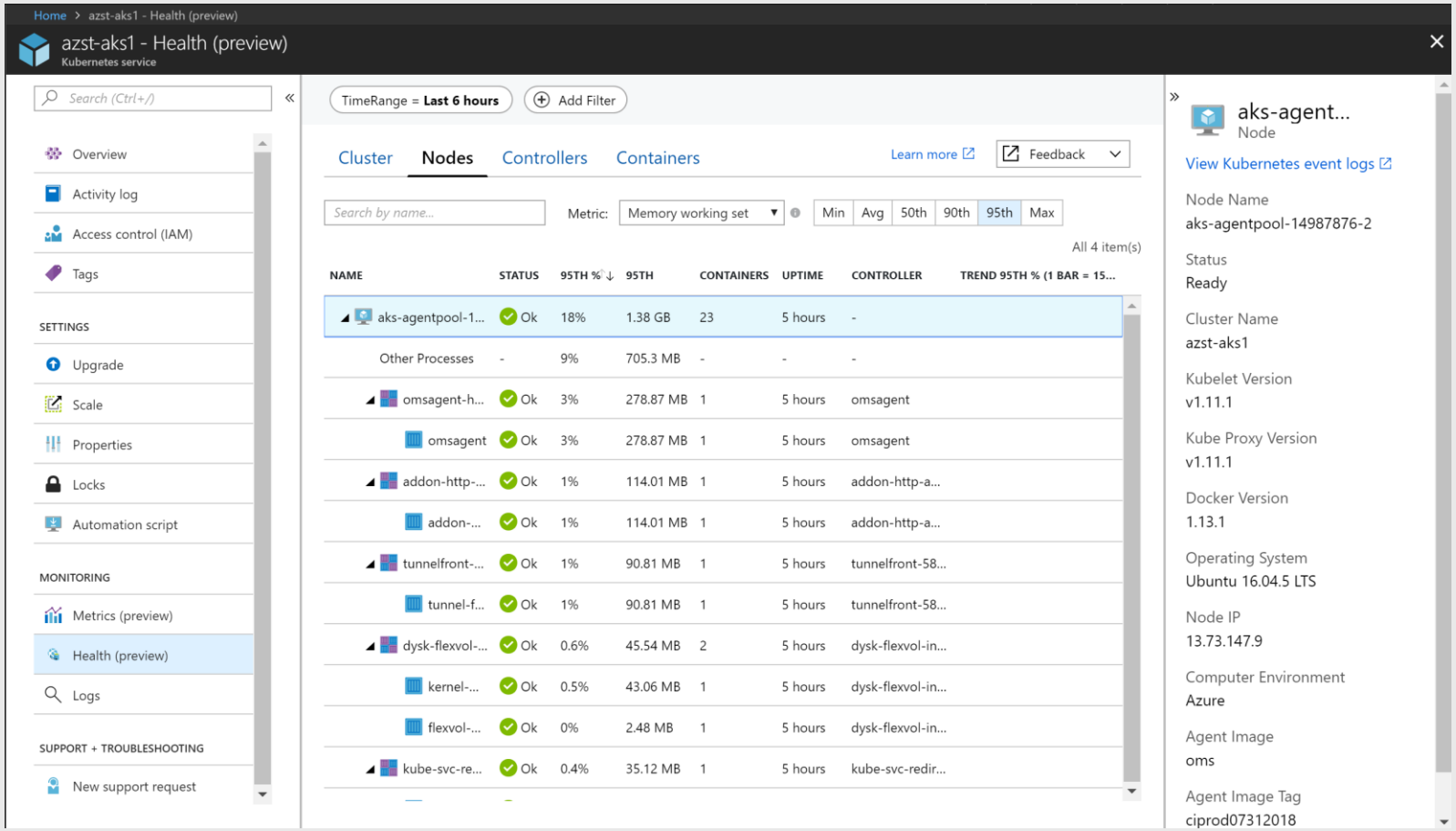
Azure Monitor container health

Requirements

- Azure Log Analytics workspace
- Container Insights solution

Supports

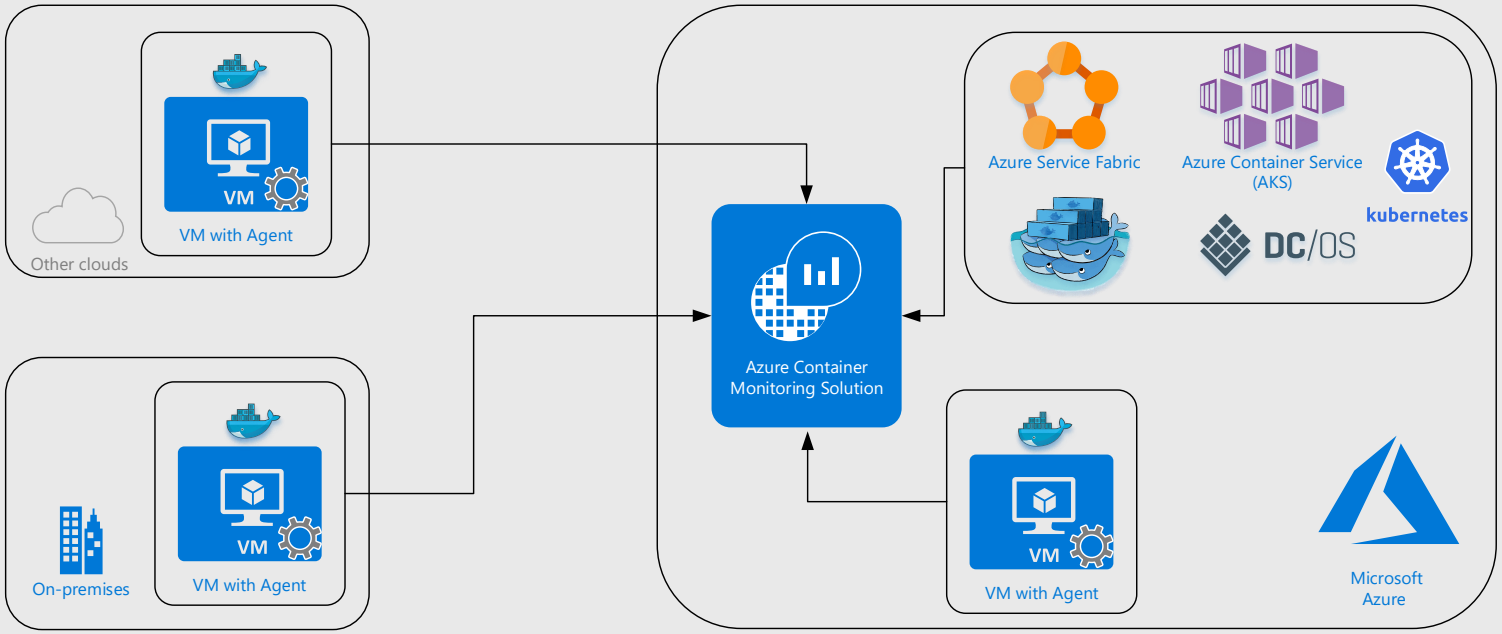
- Azure Kubernetes Service



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

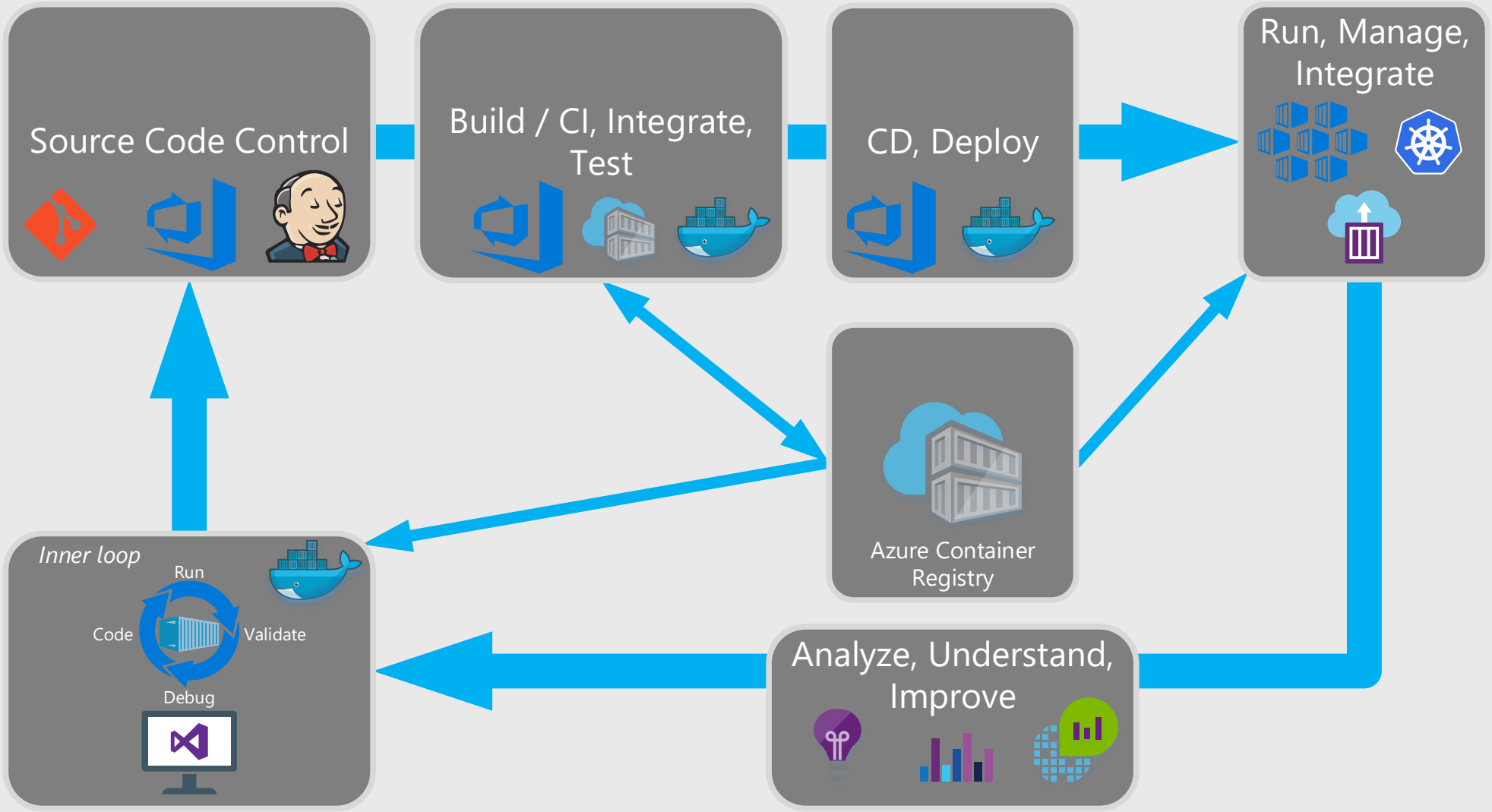
Track bugs, work items, feedback, and more

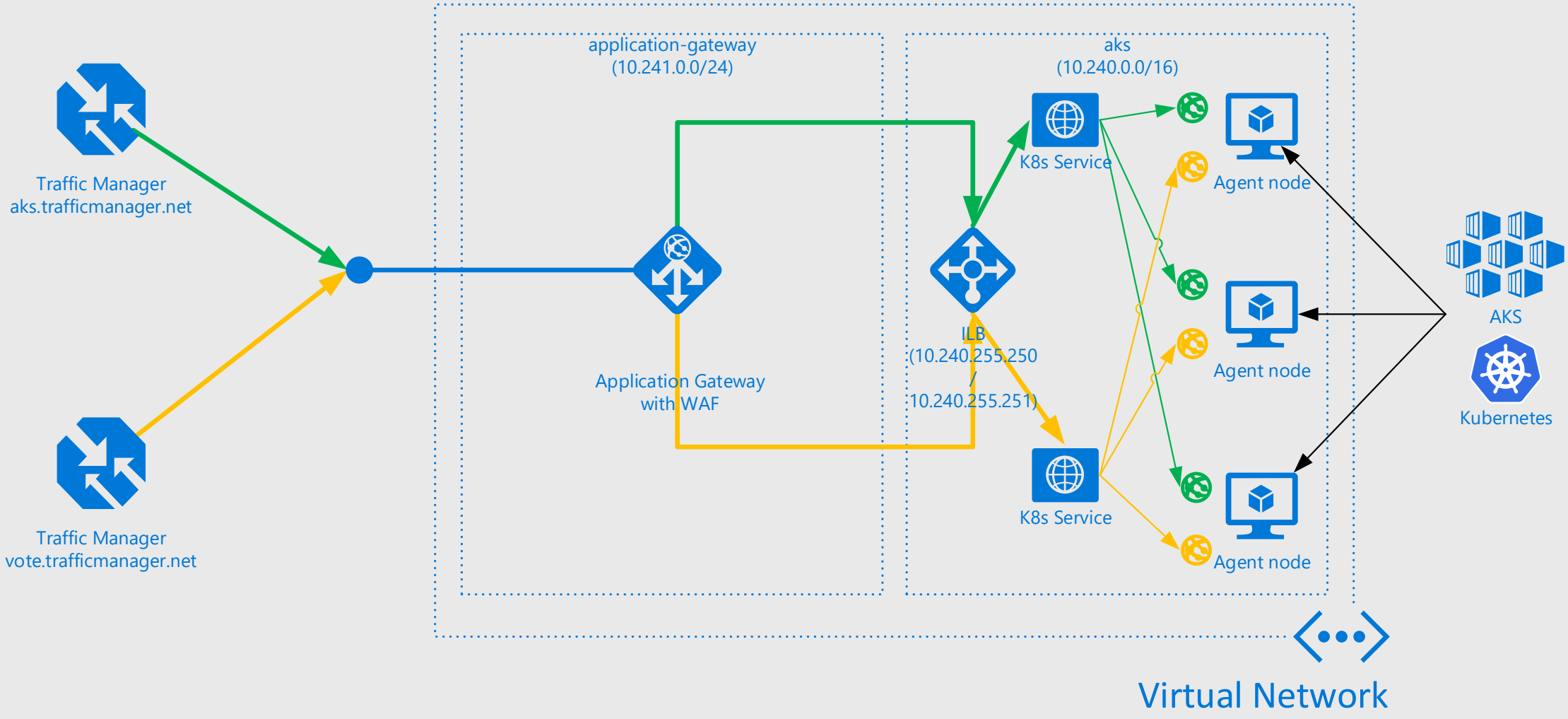
Cloud-powered continuous integration and deployment

Enterprise-grade services scale to any team size

Free for up to five users

Big Picture


Source Code Control
Build / CI, Integrate, Test
CD, Deploy
Run, Manage, Integrate
Azure Container Registry
Inner loop
Run
Code
Validate
Debug
Analyze, Understand, Improve


application-gateway
(10.241.0.0/24)
aks
(10.240.0.0/16)
Traffic Manager
aks.trafficmanager.net
Traffic Manager
vote.trafficmanager.net
Application Gateway
with WAF
ILB
(10.240.255.250
/
10.240.255.251)
K8s Service
K8s Service
Agent node
Agent node
Agent node
AKS
Kubernetes
Virtual Network

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