Microsoft

Containers as Infrastructure

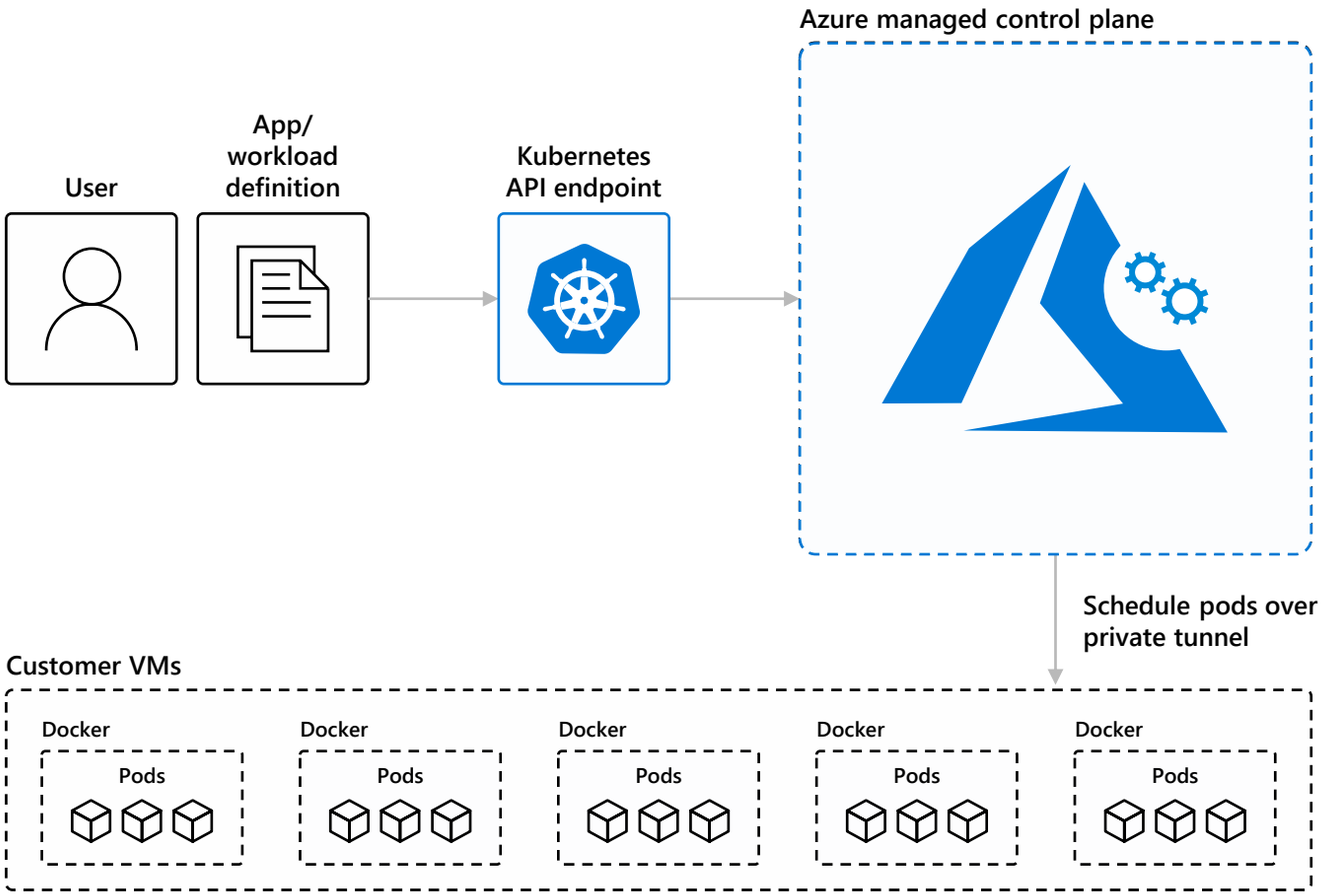
Containers Advanced Topics

Microsoft Services

Objectives

- Learn how Azure Kubernetes Services (AKS) works
- Learn about AKS advanced concepts and administration
- Learn Azure DevOps for Container Automation

Azure Kubernetes Services (AKS)



Your Kubernetes cluster, managed by Azure

Why Azure Kubernetes Service?

Easy to use

- Fastest path to Kubernetes (K8s) on Azure
- Up and running with 3 simple commands
- AKS is free - you only pay for the agent nodes within your clusters, not for the masters

Easy to manage

- The K8s masters are managed by Azure
- Automated upgrades and patching
- Easily scale the cluster up and down
- Self-healing control plane

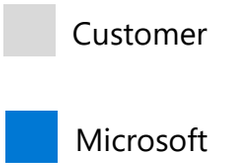
Uses Open APIs

- 100% upstream Kubernetes

Why Azure Kubernetes Service?

Focus on your containers and code, not the infrastructure

Responsibilities	DIY with Kubernetes	Managed Kubernetes on Azure
Containerization		
Application iteration, debugging		
CI/CD		
Cluster hosting		
Cluster upgrade		
Patching		
Scaling		
Monitoring and logging		

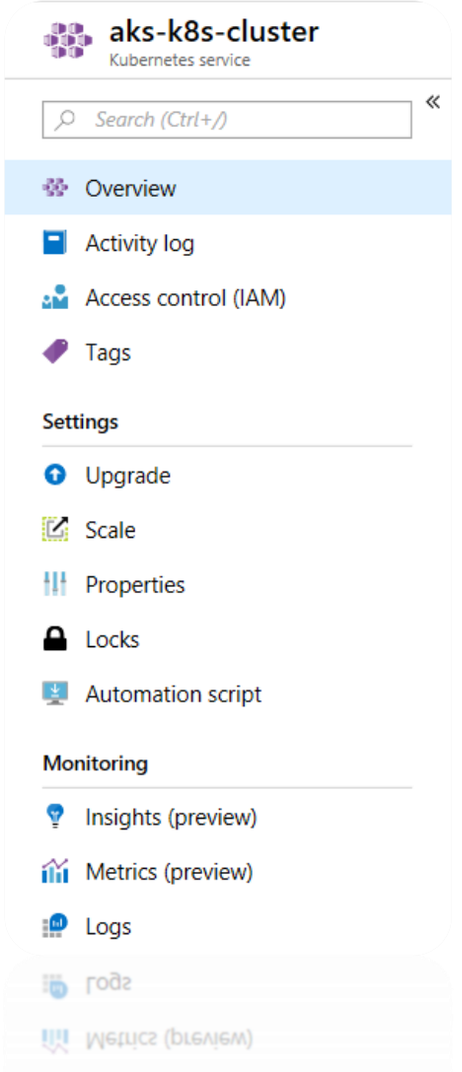


AKS Compliance and Certification

- Azure Kubernetes Service (AKS) has been CNCF certified as Kubernetes conformant.
- Azure Kubernetes Service (AKS) is compliant with SOC, ISO, and PCI DSS.

Kubernetes on Azure Infrastructure

- The cluster => Kubernetes Service



- The underlying resources
  - Nodes
  - Networking resources

aks-agentpool-32926962-nsg	Network security group
aks-agentpool-32926962-routetable	Route table
aks-nodepool1-32926962-0	Virtual machine
aks-nodepool1-32926962-0_OsDisk_1_46350a61bd09498b···	Disk
aks-nodepool1-32926962-nic-0	Network interface
aks-vnet-32926962	Virtual network
kubernetes	Load balancer
kubernetes-a01df684ac10c11e8b6880a58ac1f078	Public IP address
nodepool1-availabilitySet-32926962	Availability set

Getting Started with AKS

```
$ az aks create -g myResourceGroup -n myCluster --generate-ssh-keys
\ Running ..

$ az aks install-cli
Downloading client to /usr/local/bin/kubectl ..

$ az aks get-credentials -g myResourceGroup -n myCluster
Merged "myCluster" as current context ..

$ kubectl get nodes
NAME                       STATUS    AGE       VERSION
aks-mycluster-36851231-0   Ready     4m        v1.13.5
aks-mycluster-36851231-1   Ready     4m        v1.13.5
aks-mycluster-36851231-2   Ready     4m        v1.13.5
```

Managing an AKS Cluster

```
$ az aks list –o table
Name                Location    ResourceGroup     KubernetesRelease  ProvisioningState
------------------  ----------  --------------  -------------------  -------------------
myCluster           westus2     myResourceGroup                1.13.5  Succeeded

$ az aks upgrade -g myResourceGroup -n myCluster –-kubernetes-version 1.13.5
\ Running ..

$ kubectl get nodes
NAME                          STATUS    AGE       VERSION
aks-mycluster-36851231-0   Ready     12m       v1.13.5
aks-mycluster-36851231-1   Ready     8m        v1.13.5
aks-mycluster-36851231-2   Ready     3m        v1.13.5

$ az aks scale -g myResourceGroup -n myCluster --agent-count 10
\ Running ..
```

Demonstration: *Exploring AKS Clusters*

Using kubectl commnads

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Advanced AKS

AKS Administration

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Typical AKS Administration

- Planning a cluster
  - On-premises, in the cloud, managed service?
  - Capacity – how many nodes? What configuration? CPU, Memory
  - Cluster resources – compute, storage, networking
- Upgrading Kubernetes
  - New API version
- Node maintenance
  - OS updates, security patches
  - Hardware repair, upgrades
- Security
- Cluster scaling
  - Adding/removing nodes
- Monitoring
- High availability/Disaster recovery

AKS Admin Task

Volume
Persistent volumes
…

RBAC with AAD.
AAD Integration
Secrets with Key Vault.
….

Services
Network Policies
Virtual Network
Ingress
…

Manually Scale
Horizontal pod autoscaler
Cluster autoscaler
ACI integration with AKS
Kube-Advisor
Updates
….

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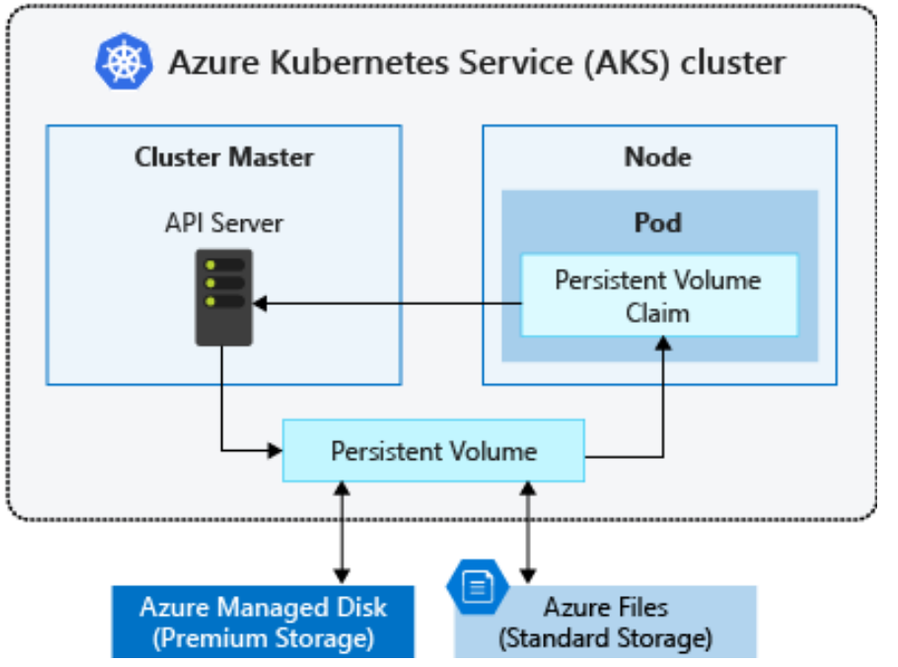
Advanced AKS

Storage

Microsoft Services

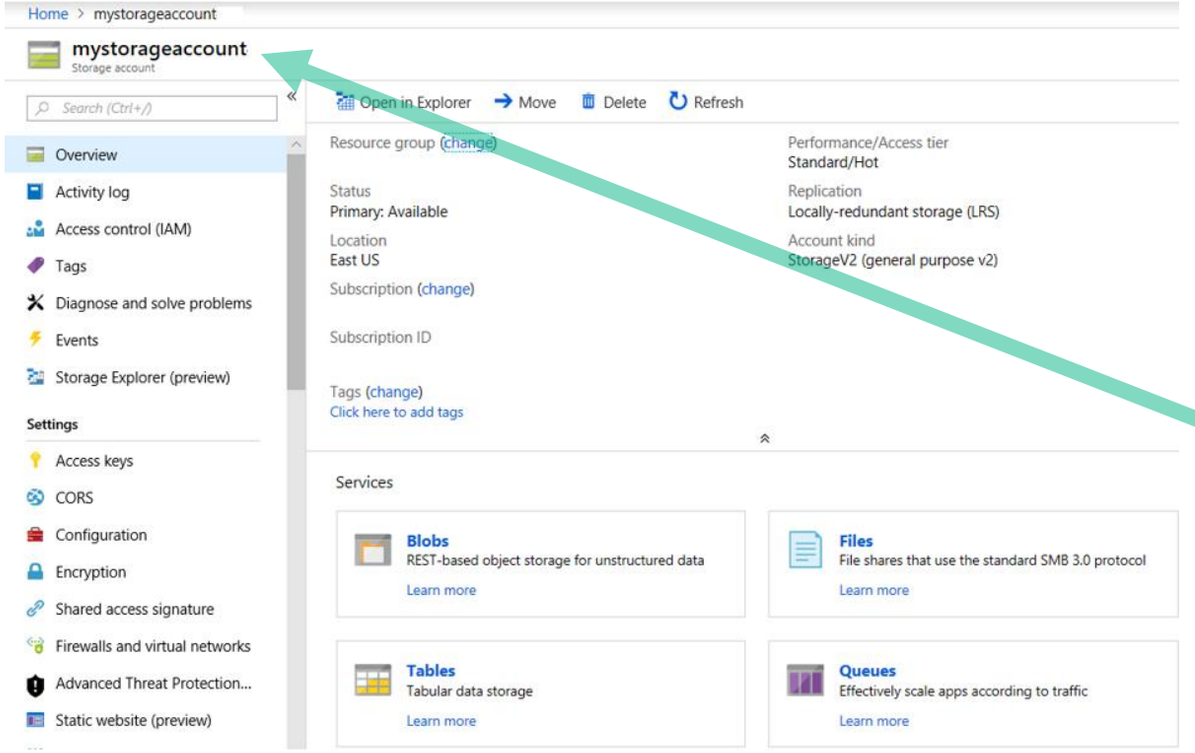
Persistent Volume in AKS

- A persistent volume can be used by one or many pods to read/write persistent data.
- Azure Files and Disk can be mounted statically or dynamically in AKS.
- Azure Disk can only be mounted on one node at a time. (ReadOnlyOnce)
- For persistent volume across multiple nodes, use Azure File.



Setup a Static Persistent Volume in AKS

1- Create the storage resource (Storage Account)



2- Create a Storage Class object

```yaml
kind: StorageClass
apiVersion: storage.k8s.io/v1
metadata:
  name: azurefile
provisioner: kubernetes.io/azure-file
mountOptions:
  - dir_mode=0777
  - file_mode=0777
  - uid=1000
  - gid=1000
parameters:
  skuName: Standard_LRS
  storageAccount: mystorageaccount
```

Setup a Static Persistent Volume in AKS

3- Create a cluster role and binding to authorize access

4- Create a persistent volume claim to provision the share

5- Reference shared volume from pod

```yaml
apiVersion: rbac.authorization.k8s.io/v1beta1
kind: ClusterRole
metadata:
  name: system:azure-cloud-provider
rules:
- apiGroups: ['']
  resources: ['secrets']
  verbs:     ['get','create']
---
apiVersion: rbac.authorization.k8s.io/v1beta1
kind: ClusterRoleBinding
metadata:
  name: system:azure-cloud-provider
roleRef:
  kind: ClusterRole
  apiGroup: rbac.authorization.k8s.io
  name: system:azure-cloud-provider
subjects:
- kind: ServiceAccount
  name: persistent-volume-binder
  namespace: kube-system
```

```yaml
apiVersion: v1
kind: PersistentVolumeClaim
metadata:
  name: azurefile
spec:
  accessModes:
    - ReadWriteMany
  storageClassName: azurefile
  resources:
    requests:
      storage: 5Gi
```

```yaml
kind: Pod
apiVersion: v1
metadata:
  name: mypod
spec:
  containers:
    - name: myfrontend
      image: nginx
      volumeMounts:
      - mountPath: "/mnt/azure"
        name: volume
  volumes:
    - name: volume
      persistentVolumeClaim:
        claimName: azurefile
```

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Advanced AKS

Identity, Access Management and Security

Microsoft Services

What is up with all these Service Principals?

- Cluster Service Principal
  - To allow an AKS cluster to interact with other Azure resources, an Azure Active Directory service principal is used.
- AD Integration Objects
  - When configuring Azure AD for AKS authentication, 2 Azure AD application are configured.
  - Server Application - used to get a users Azure AD group membership
  - Client Application - used when logging in with the Kubernetes CLI (kubectl)
- You can rotate/ update them with:

$ az aks update-credentials --resource-group myResourceGroup --name myAKSCluster --reset-service-principal --service-principal $SP_ID --client-secret $SP_SECRET

Role Based Access Control (RBAC)

- In Kubernetes, RBAC is defined with 4 top-level types
  - Cluster Role – Describes a role at the cluster level
  - Role – Describes a role at the namespace level
  - ClusterRoleBinding – Grants permissions defined in a Role at the cluster level to a user, group of users or service account
  - RoleBinding – Grants permissions defined in a Cluster Role or Role at the namespace level to a user, group of users or service account

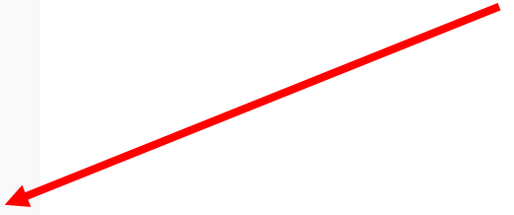
```yaml
kind: Role
apiVersion: rbac.authorization.k8s.io/v1
metadata:
  namespace: default
  name: pod-reader
rules:
- apiGroups: [""] # "" indicates the core API group
  resources: ["pods"]
  verbs: ["get", "watch", "list"]
```

```yaml
# This role binding allows "jane" to read pods in the "default" namespace.
kind: RoleBinding
apiVersion: rbac.authorization.k8s.io/v1
metadata:
  name: read-pods
  namespace: default
subjects:
- kind: User
  name: jane # Name is case sensitive
  apiGroup: rbac.authorization.k8s.io
roleRef:
  kind: Role #this must be Role or ClusterRole
  name: pod-reader # this must match the name of the Role or ClusterRole you wish to bind to
  apiGroup: rbac.authorization.k8s.io
```

Azure Active Directory Integration

- Cluster RBAC can be backed by Azure Active Directory
- Allows user identity to be managed in Azure
- To log into AKS cluster, user will use their AAD authentication token provided with OpenID Connect
  - AKS must have read access to the AAD to read group membership
  - A second AAD application must be created to be able to log in with kubectl

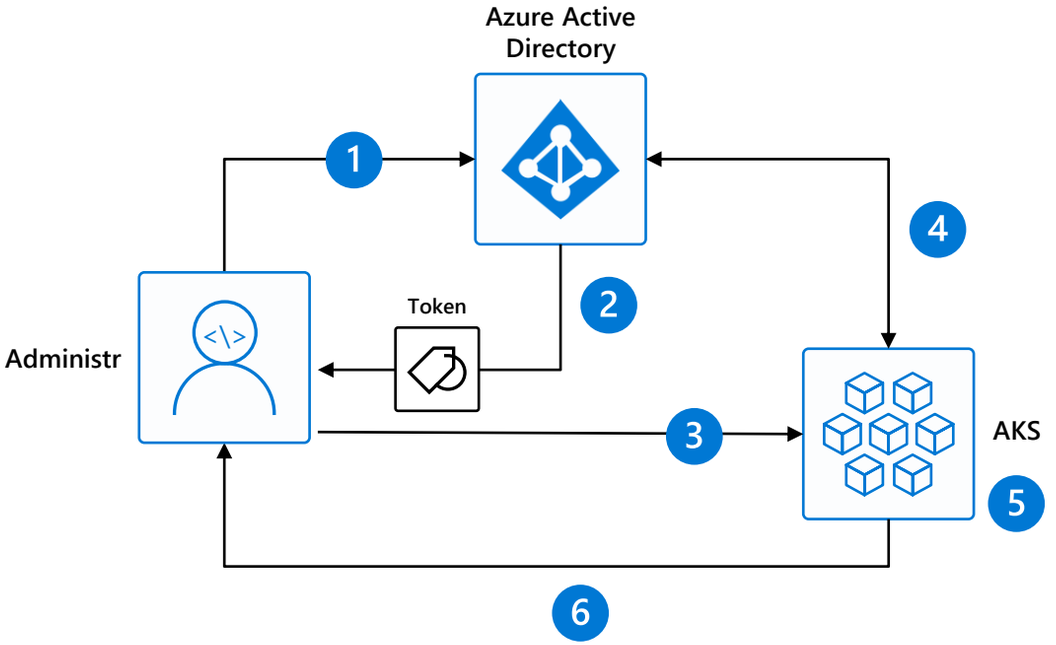
```
apiVersion: rbac.authorization.k8s.io/v1
kind: ClusterRoleBinding
metadata:
 name: contoso-cluster-admins
roleRef:
 apiGroup: rbac.authorization.k8s.io
 kind: ClusterRole
 name: cluster-admin
subjects:
- apiGroup: rbac.authorization.k8s.io
  kind: Group
  name: "894656e1-39f8-4bfe-b16a-510f61af6f41"
```



The group Id will need to be defined is the AAD tenant set at cluster creation

Azure Active Directory Integration

1. Kubernetes Administrator authenticates with AAD
2. The AAD token issuance endpoint issues the access token
3. Developer performs action w/ AAD token.
   Eg. *kubectl create pod*
4. Kubernetes validates token with AAD and fetches the Developer's AAD Groups
   Eg. Dev Team A, App Group B
5. Kubernetes RBAC and cluster policies are applied
6. Request is successful or not based on the previous validation



Kubernetes Admission Controllers

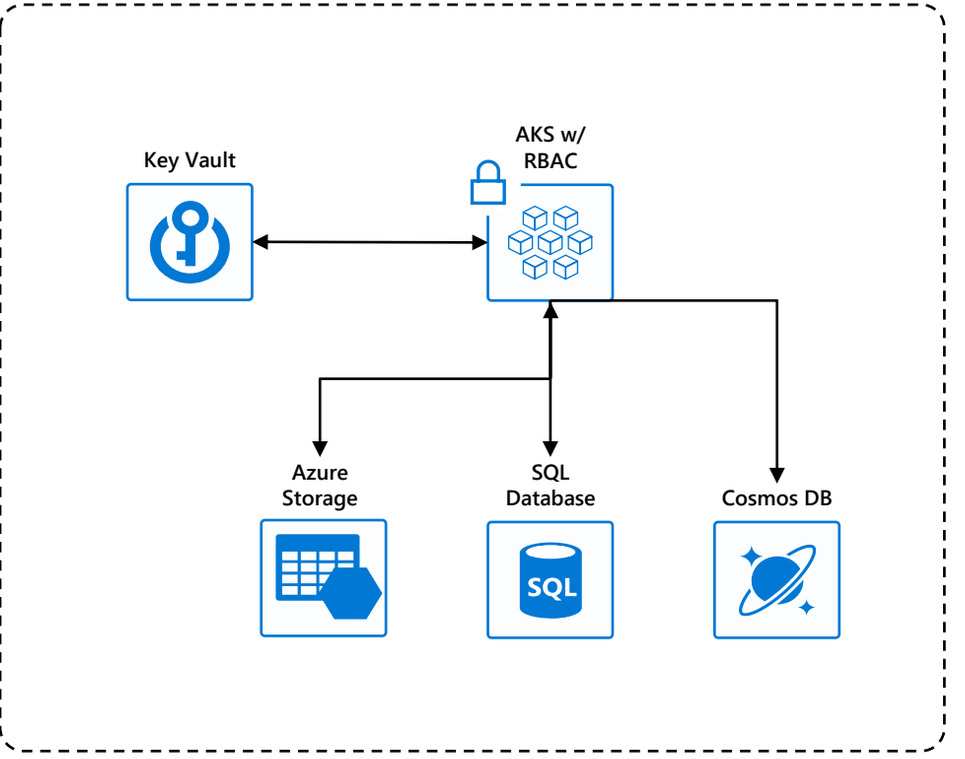
- What is an Admission Controller?
  - Intercepts requests to the Kubernetes API server prior to persistence of the object, but after the request is authenticated and authorized
  - List of features can be enabled to define rules enforcing cluster level policies
- In AKS, we cannot modify the list of Admission controller

- NamespaceLifecycle
- LimitRanger
- ServiceAccount
- DefaultStorageClass
- DefaultTolerationSeconds

- MutatingAdmissionWebhook
- ValidatingAdmissionWebhook
- ResourceQuota
- DenyEscalatingExec
- AlwaysPullImages

Azure Key Vault Integration

- Azure Key Vault is a secret, certificate and key management service.
- FlexVolume is an optional daemonset that enables Kubernetes pods to use Key Vault secrets, certificates, or keys without application integration.
  - Secrets are backed by Azure Key Vault storage
  - To authenticate to the Key Vault, use SP credentials or AAD Pod Identity



Azure / **kubernetes-keyvault-flexvol**

Watch 16 | Unstar 42 | Fork 11

Code | Issues 8 | Pull requests 0 | Projects 0 | Wiki | Insights

Azure keyvault integration with Kubernetes via a Flex Volume

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Advanced AKS

Networking

Microsoft Services

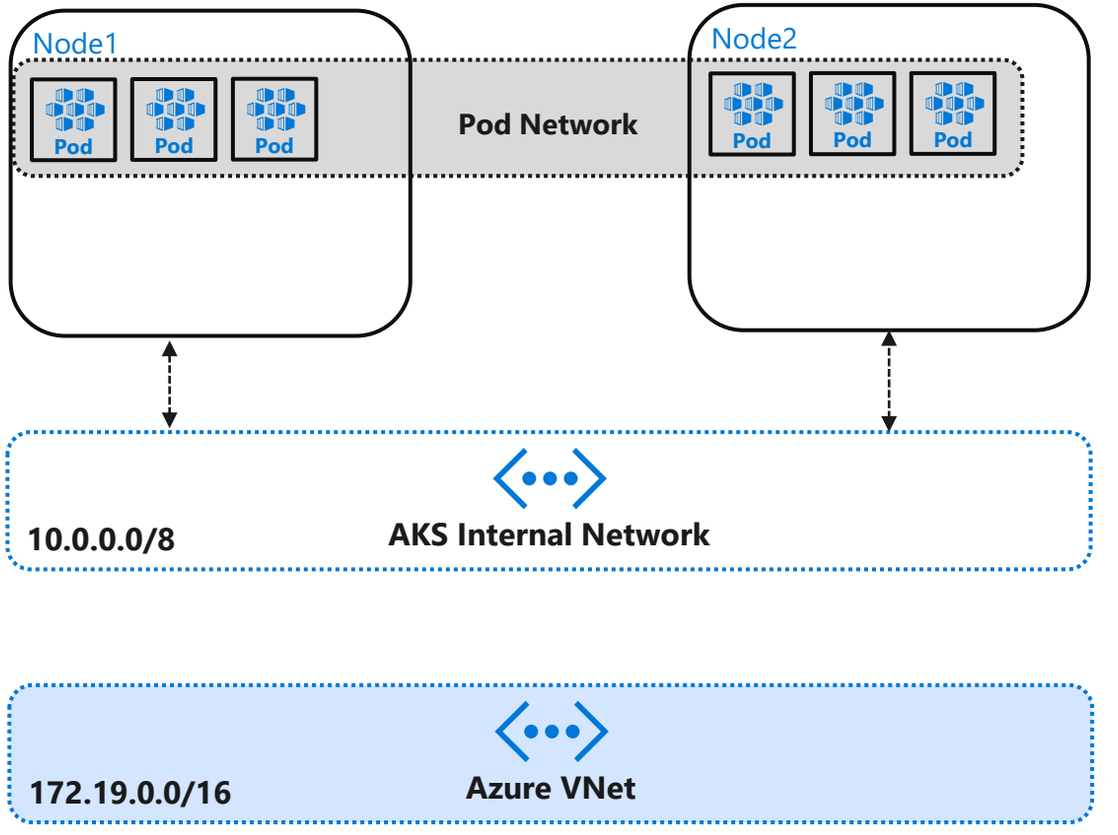
Basic Networking

Uses kubenet network plugin and has the following features

- Nodes and Pods are placed on different IP subnets
- User Defined Routing and IP Forwarding is for connectivity between Pods across Nodes

Drawbacks

- 2 different IP CIDRs to manage
- Performance impact
- Peering or On-premise connectivity is hard to achieve

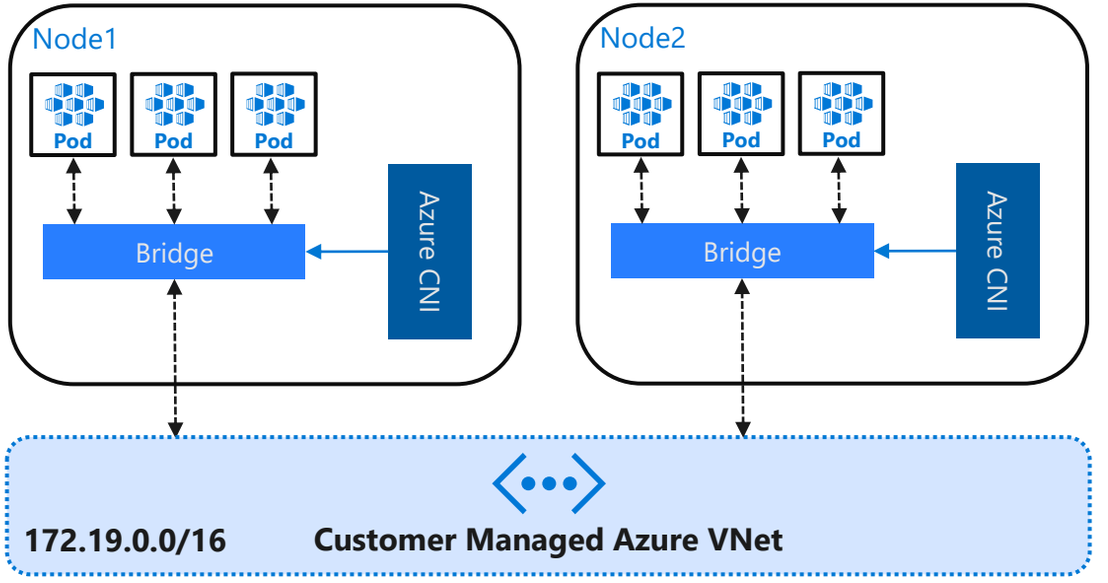


Advanced Networking

- CNI is a vendor-neutral protocol, used by container runtimes to make requests to Networking Providers
- Azure CNI is an implementation which allows you to integrate Kubernetes with your VNET

Advantages

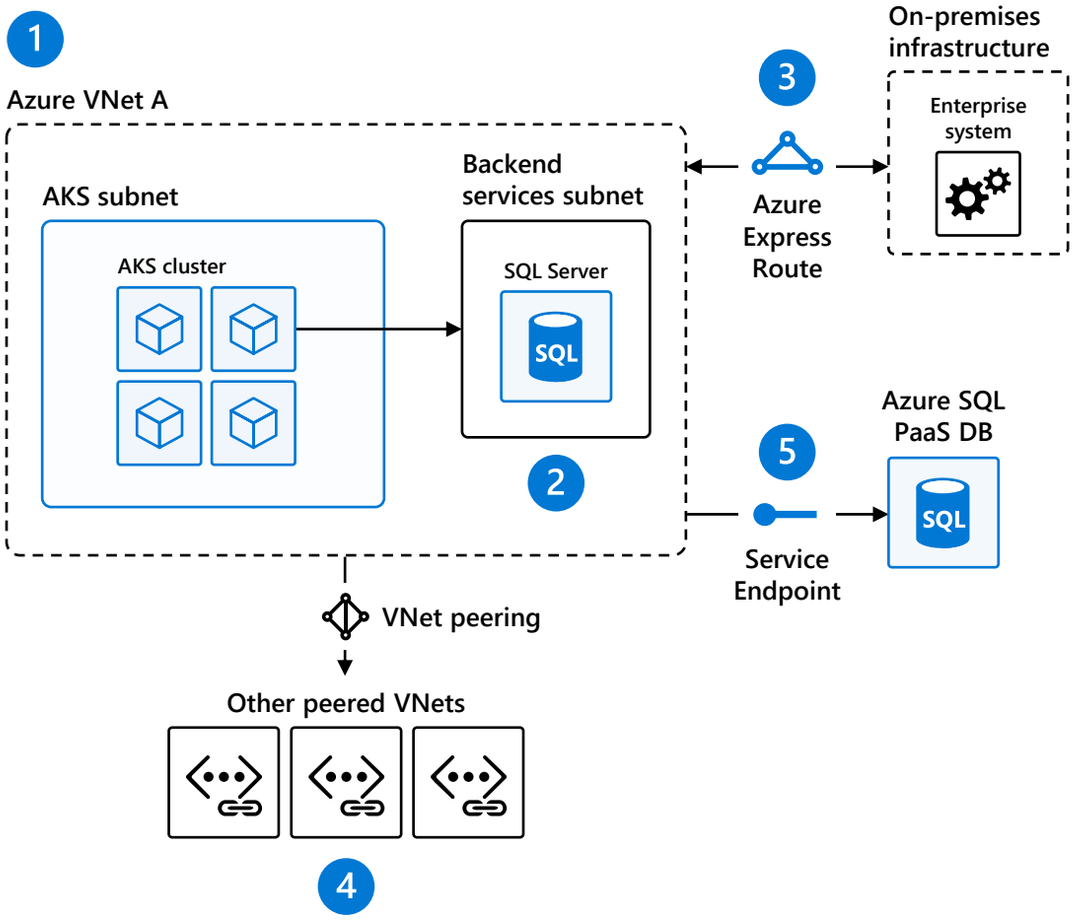
- Single IP CIDR to manage
- Better performance
- Peering and On-Premise connectivity is out of the box



Scenarios enabled by Advanced Networking

1. Uses Azure subnet for both your containers and cluster VMs
2. Allows for connectivity to existing Azure services in the same VNet
3. Use Express Route to connect to on-premises infrastructure
4. Use VNet peering to connect to other VNets
5. Connect AKS cluster securely and privately to other Azure resources using VNet endpoints

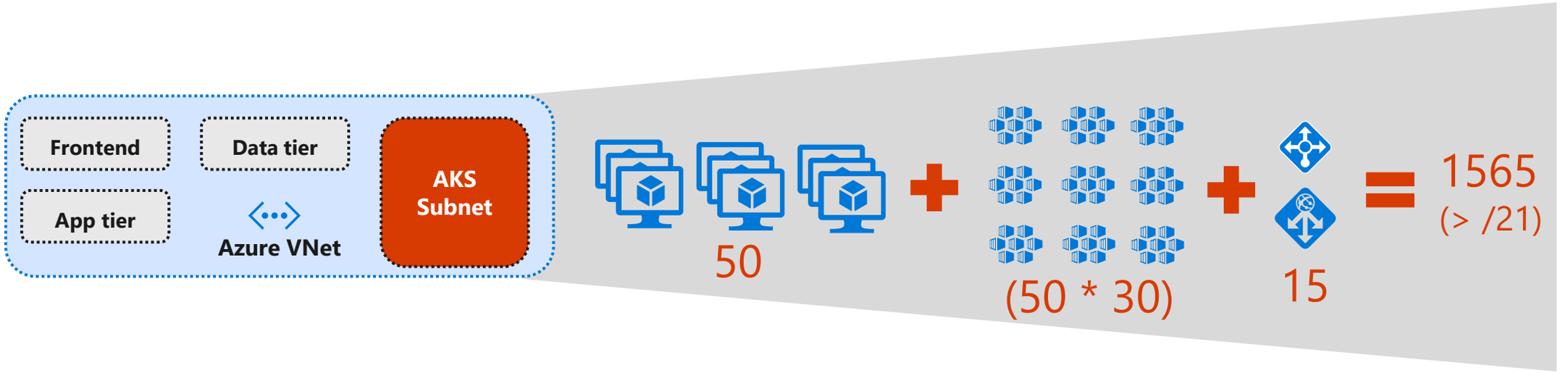
AKS VNet integration works seamlessly with your existing network infrastructure



Advanced Networking: Prerequisites

- Virtual networks for AKS clusters must allow outbound internet connectivity
- No more than one AKS cluster in the same subnet
- AKS clusters may not use 169.254.0.0/16, 172.30.0.0/16, or 172.31.0.0/16 for the Kubernetes service address range
- The service principal used by the AKS cluster must have at least Network Contributor permissions on the subnet within your virtual network. If you wish to define a custom role instead of using the built-in Network Contributor role, the following permissions are required:
  - Microsoft.Network/virtualNetworks/subnets/join/action
  - Microsoft.Network/virtualNetworks/subnets/read

Advanced Networking: Planning your Cluster



Additional subnets

Kubernetes service address range

- Non-overlapping with other subnets in your network (does not need to be routable) and not 169.254.0.0/16, 172.30.0.0/16 and 172.31.0.0/16.
- Smaller than /12

Docker bridge address

- Non-overlapping with AKS Subnet

Service, Ingress and Ingress Controllers

Service

- Logical set of Pods and a policy by which to access them.
- The set of Pods targeted by a Service is (usually) determined by a Label Selector.
- Services provide important features that are standardized across the cluster: load-balancing (L4), service discovery between applications, and features to support zero-downtime application deployments.

Ingress

A Kubernetes API that manages external access to the services in the cluster

- Supports HTTP and HTTPs
- Path and Subdomain based routing
- SSL Termination
- Save on Public IPs

Ingress Controller

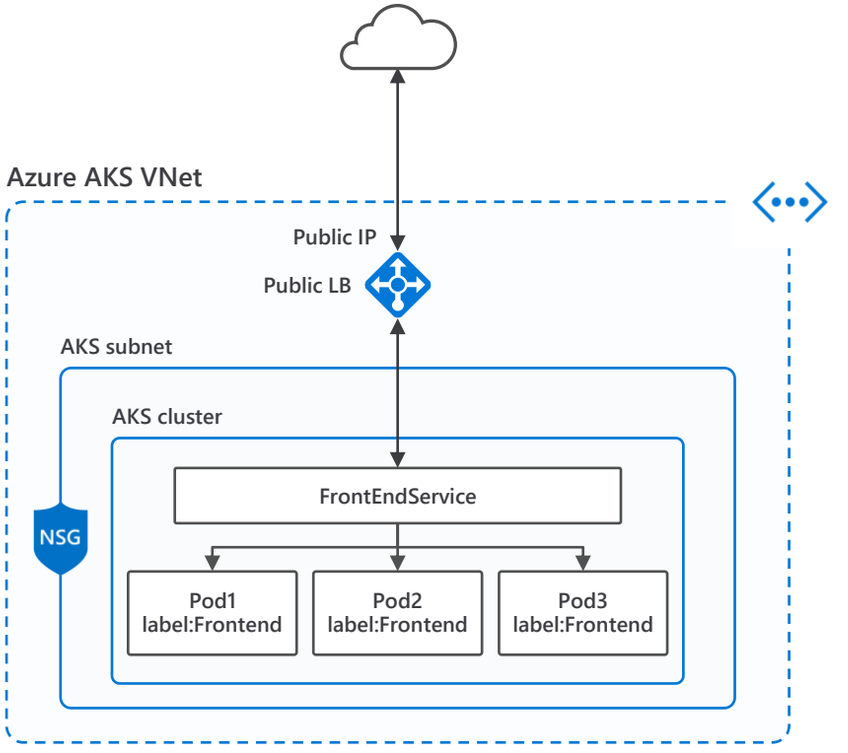
A daemon, deployed as a Kubernetes Pod, that watches the Ingress Endpoint for updates. Its job is to satisfy requests for ingresses.

Some popular Ingress Controllers include nginx, Traefik and HAProxy.

Public Service

- Service type LoadBalancer
- Basic layer 4 load balancing (TCP/ UDP)
- Each service is assigned an IP and Public IP on the load balancer

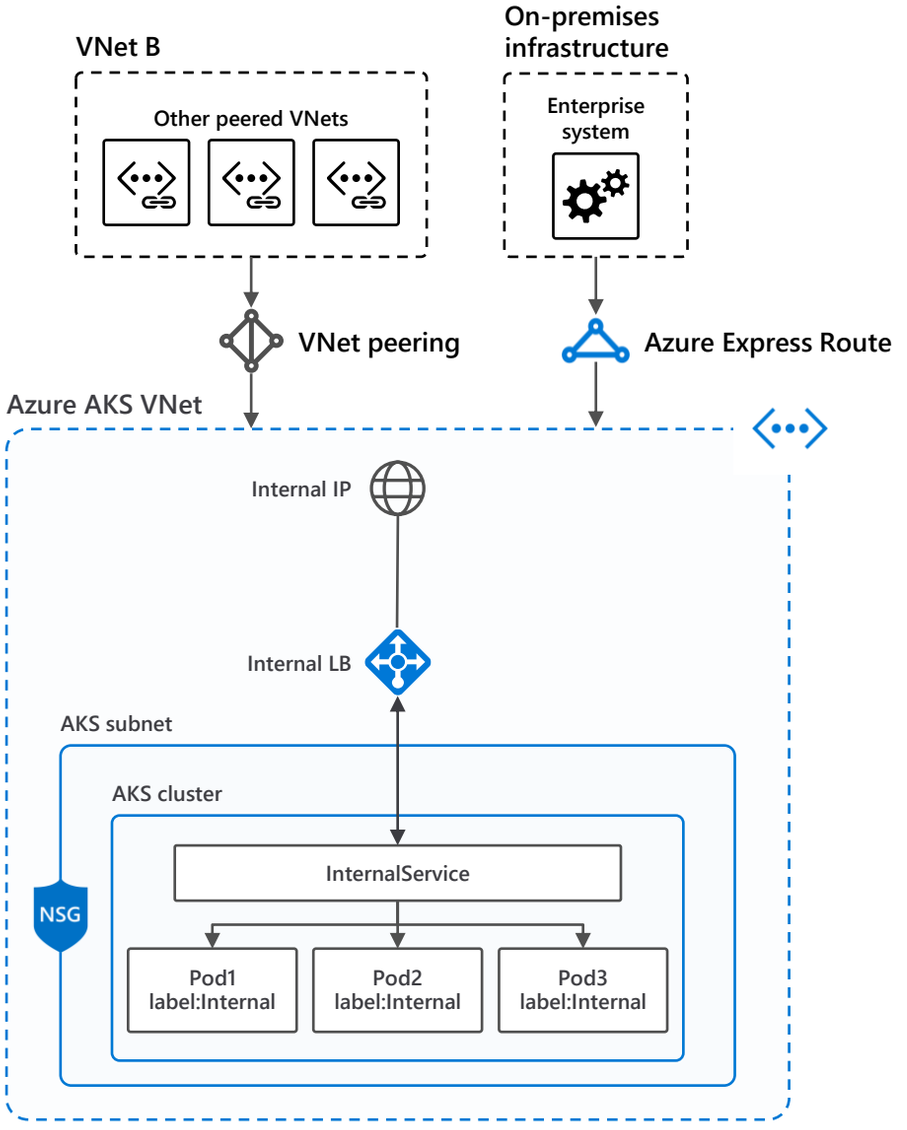
```
apiVersion: v1
kind: Service
metadata:
  name: frontendservice
spec:
  loadBalancerIP: X.X.X.X
  type: LoadBalancer
  ports:
  - port: 80
  selector:
    app: frontend
```



Internal Service

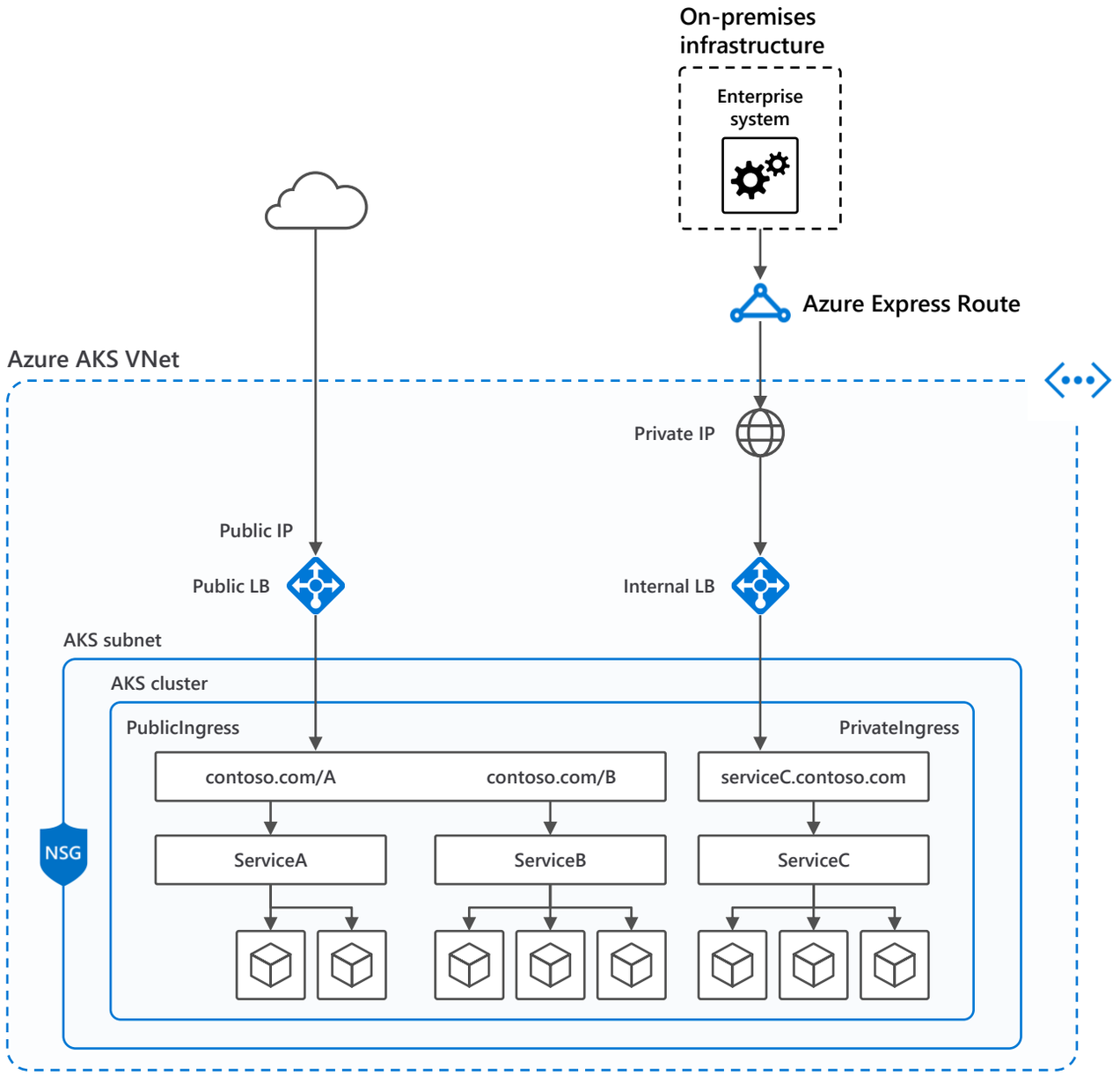
- Service type LoadBalancer
- Basic layer 4 load balancing (TCP/ UDP)
- Each service is assigned a subnet IP on the load balancer

```
apiVersion: v1
kind: Service
metadata:
  name: internalservice
  annotations:
    service.beta.kubernetes.io/azure-load-balancer-internal:
"true"
spec:
   type: LoadBalancer
   loadBalancerIP: 10.240.0.25
   ports:
   - port: 80
   selector:
    app: internal
```

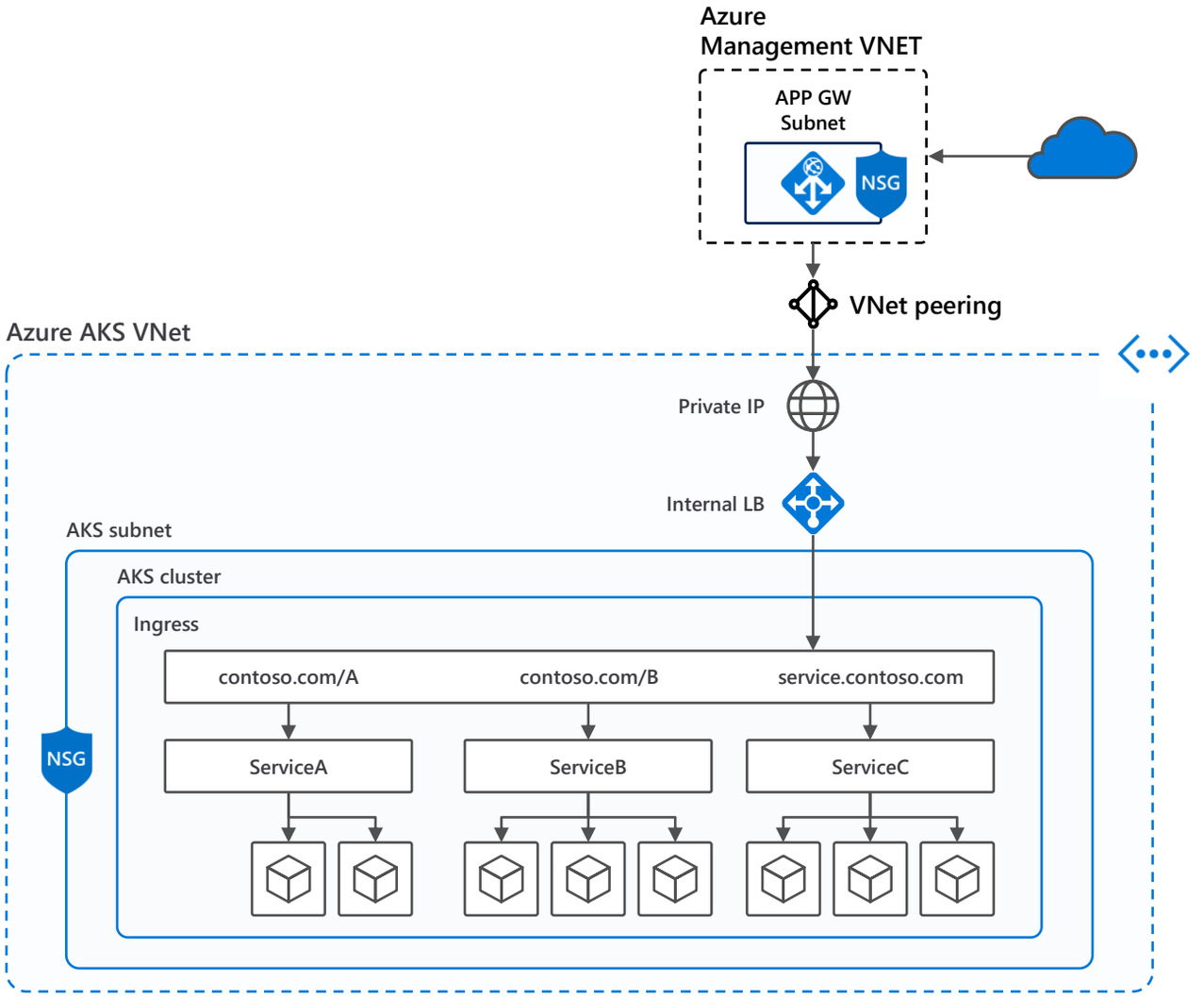


Ingress

```
kind: Ingress
metadata:
 name: contoso-ingress
   annotations: kubernetes.io/ingress.class:
”PublicIngress"
spec:
 tls:
 - hosts:
   - contoso.com
   secretName: contoso-secret
 rules:
   - host: contoso.com
     http:
      paths:
      - path: /a
        backend:
         serviceName: servicea
         servicePort: 80
      - path: /b
        backend:
         serviceName: serviceb
         servicePort: 80
```



Application Gateway Ingress

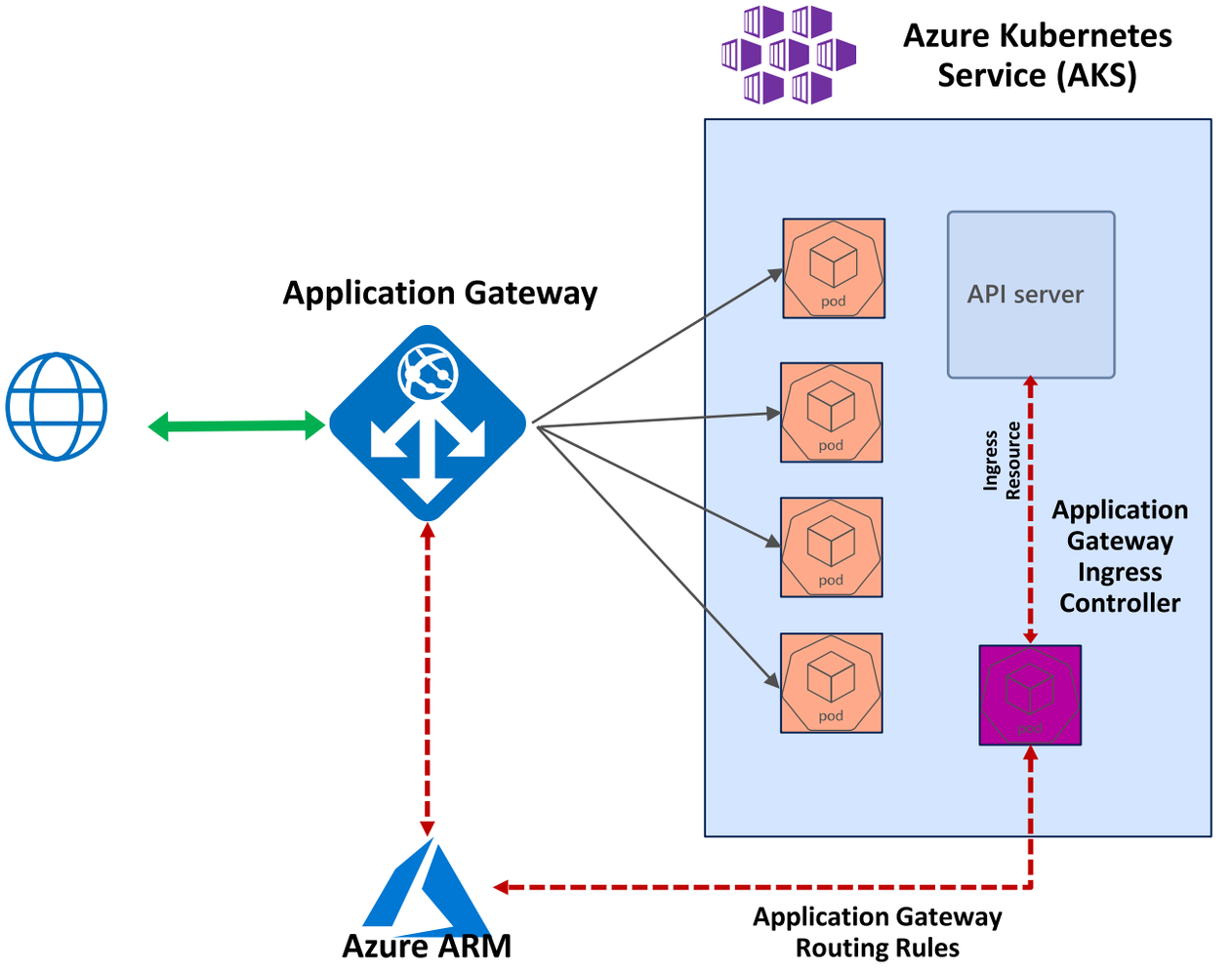


Application Gateway Ingress Controller

Preview

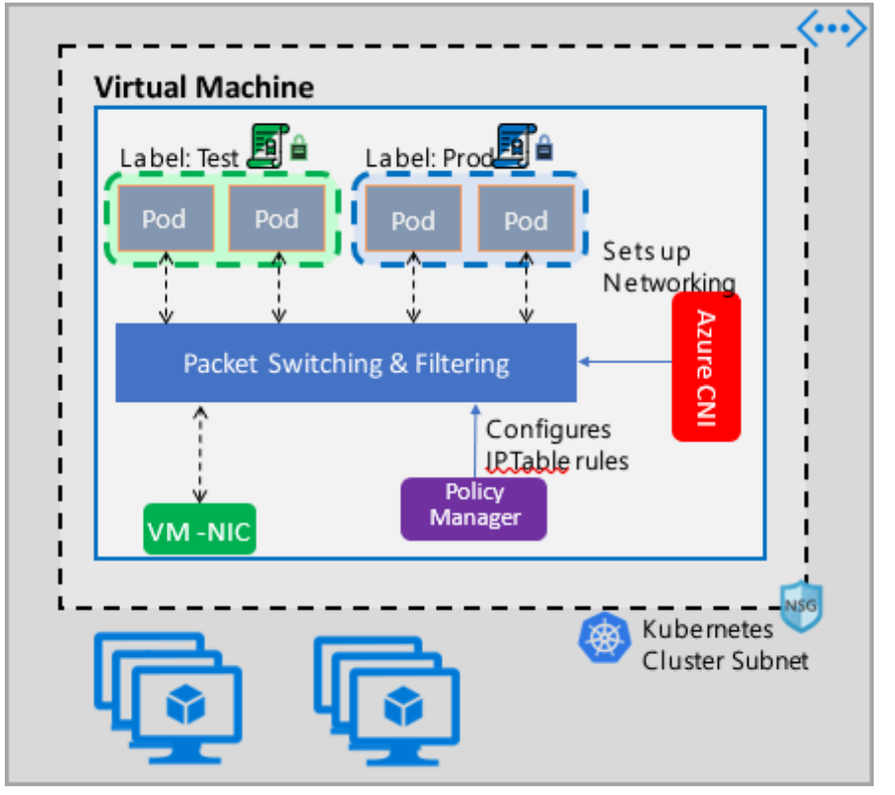
- Attach Application Gateways to AKS Clusters
- Load Balance from the Internet to pods
- Supports features of k8s ingress resource – TLS, multi-site and path-based routing

https://github.com/Azure/application-gateway-kubernetes-ingress



Network Policy

- Provides micro-segmentation for containers – think NSGs for VMs
- Label-based selection of Pods
- Policy resource yaml file specifies Ingress and Egress policies
- Works in conjunction with Azure CNI
- Supported in aks-engine
  - Set **networkPolicy** setting to azure in cluster definition file



Network Policy

- Pod Selector
- PolicyTypes
- Ingress, egress
  - Ingress
- namespaceSelector
- podSelector
- ipBlock

```yaml
apiVersion: networking.k8s.io/v1
kind: NetworkPolicy
metadata:
  name: test-network-policy
spec:
  podSelector:
    matchLabels:
      role: db
  policyTypes:
  - Ingress
  - Egress
  ingress:
  - from:
    - podSelector:
        matchLabels:
          role: frontend
  egress:
  - to:
    - ipBlock:
        cidr: 10.0.0.0/24
```

When to use NSG vs Network Policy

- Azure Network Security Groups
  - Use it to filter North-South traffic, that is, traffic entering and leaving your cluster subnet

- Kubernetes Network Policies
  - Use it to filter East-West traffic, meaning, traffic between pods in your cluster

Demonstration: *Network*

Running your app with services exposed via ELB

Working with Network Policies

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Advanced AKS

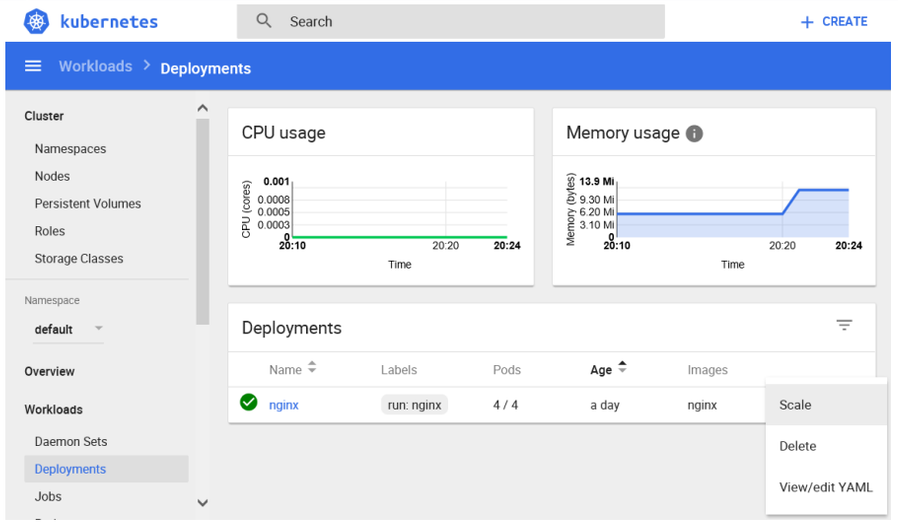
Scaling

Microsoft Services

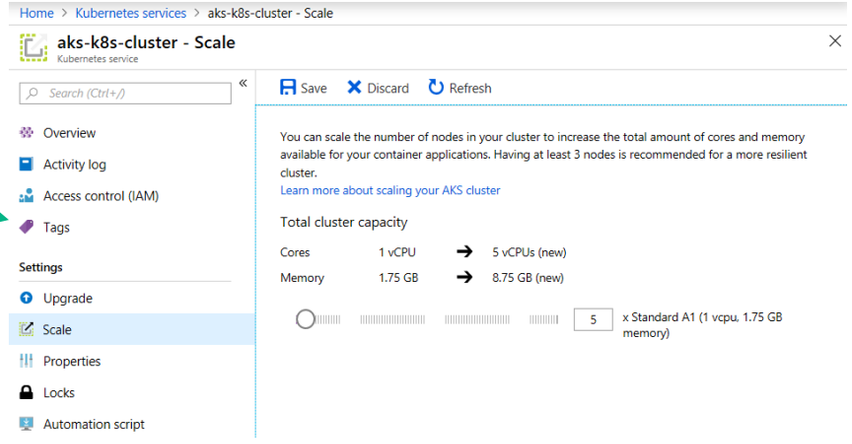
Manually Scale

- Scaling Pods
  - Using the kubectl CLI for
  - From the Kubernetes dashboard
- Scaling Nodes
  - Using the Azure CLI
  - From the Azure Portal
    - Adding a node takes several minutes to complete

```
PS C:\> kubectl scale deployments/nginx --replicas=4
deployment "nginx" scaled
```




```
az aks scale --resorce-group=MyReosurceGroup --name=myAKSCluster
```



Manual scaling is tedious and ineffective

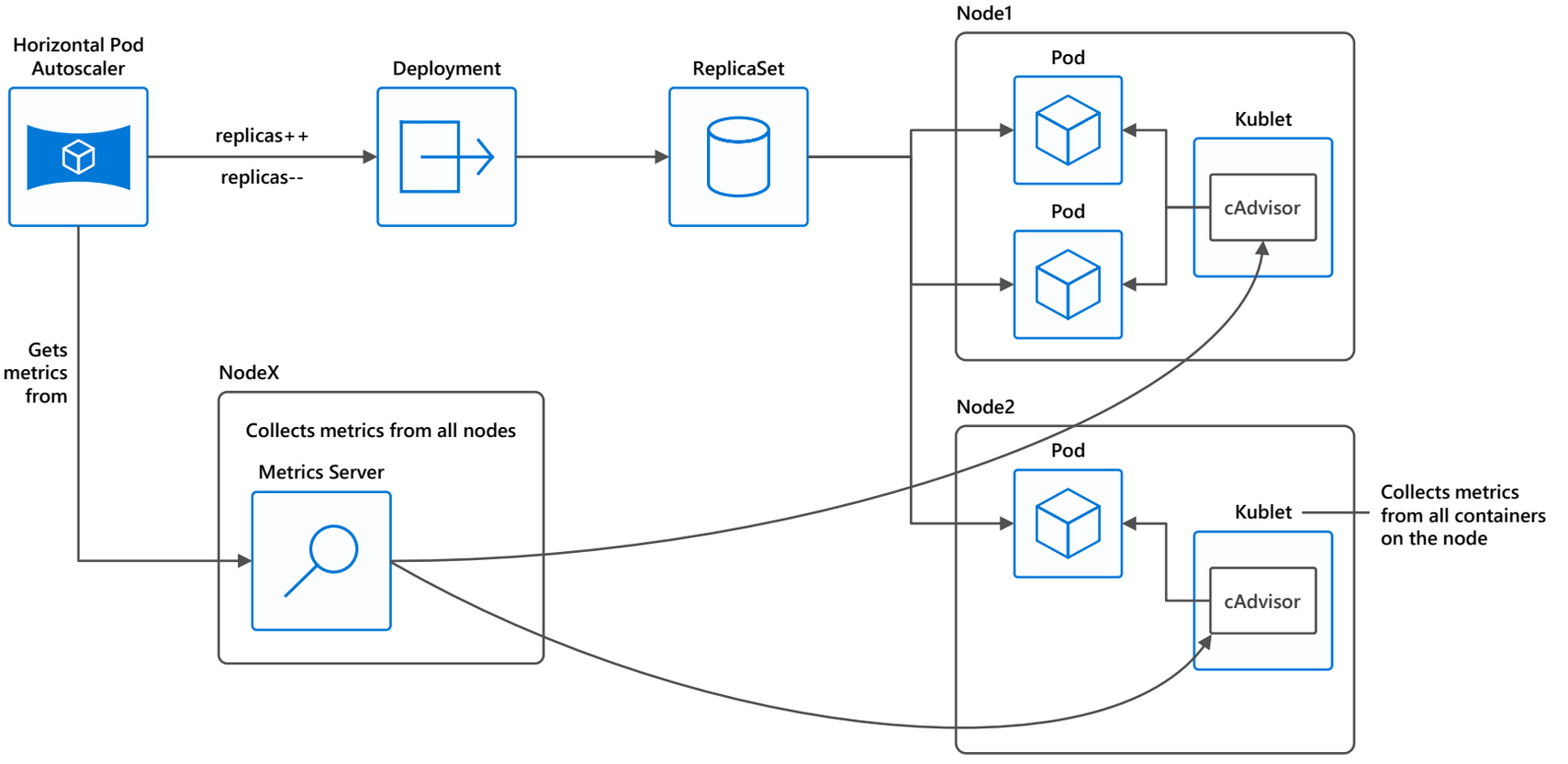
Horizontal Pod Autoscaler

- Works on built-in metrics as well as custom or application-provided metrics
- Can be setup imperatively with **kubectl autoscale** command or declaratively with the **HorizontalPodAutoscaler** K8s object
- Convenient to scale **deployments**

```
kubectl autoscale deployment azure-vote-front --cpu-percent=50 --min=3 --max=10
```

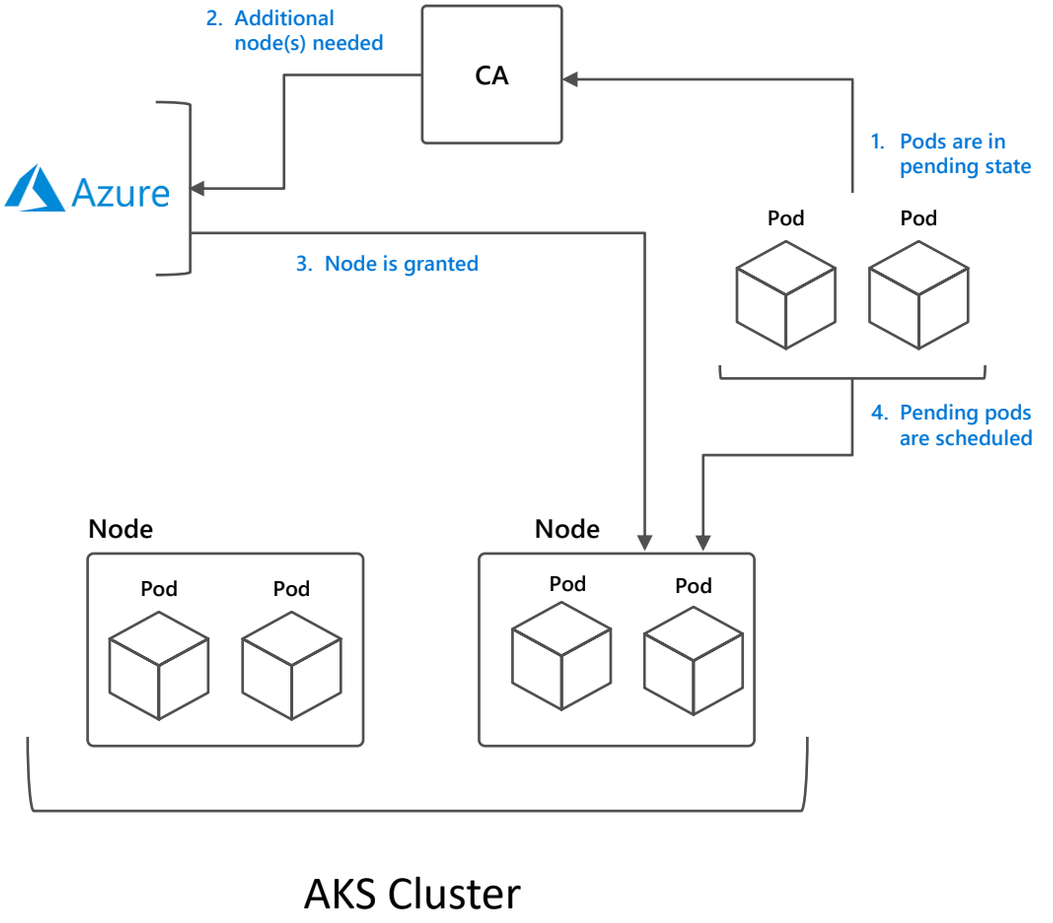
```yaml
apiVersion: autoscaling/v2beta2
kind: HorizontalPodAutoscaler
metadata:
  name: php-apache
  namespace: default
spec:
  scaleTargetRef:
    apiVersion: apps/v1
    kind: Deployment
    name: php-apache
  minReplicas: 1
  maxReplicas: 10
  metrics:
  - type: Resource
    resource:
      name: cpu
      target:
        type: Utilization
        averageUtilization: 50
```

How HPA works



Cluster Autoscaler

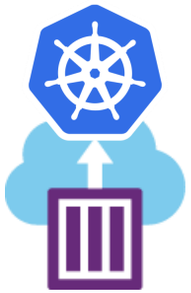
- Scales nodes based on pending pods
- Scale up and scale down
- Reduces dependency on monitoring
- Removes need for users to manage nodes and monitor service usage manually



Container Orchestrator with Infinite Scale

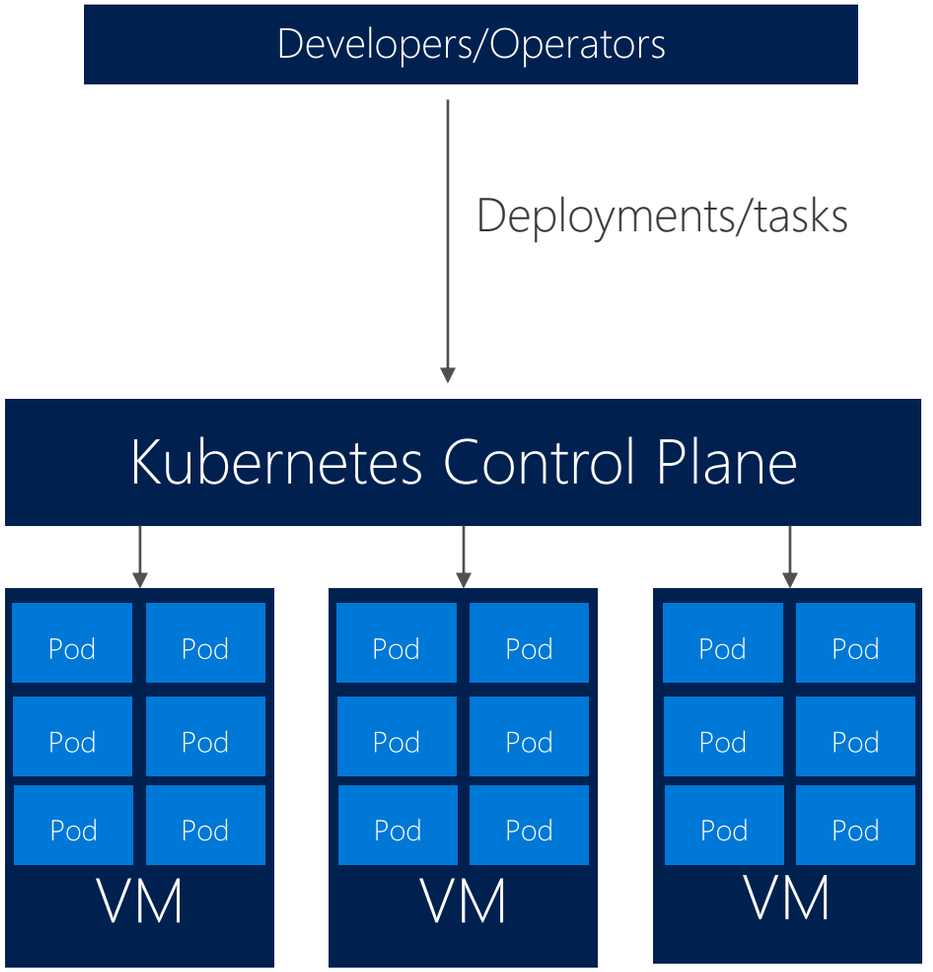
Kubernetes provides rich orchestration capabilities

Azure Container Instances provides infinite container-based scale

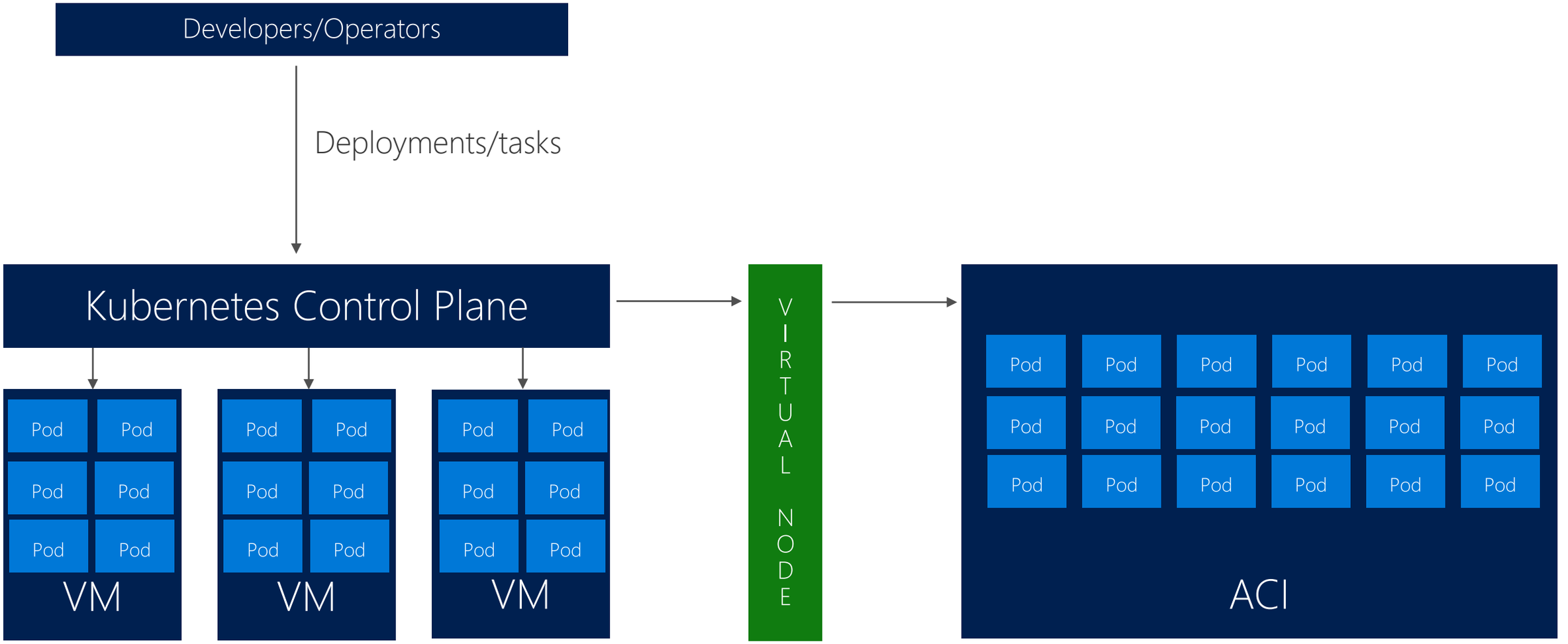


The ACI Connector for Kubernetes brings them together

Bursting with the Virtual Node



Bursting with the Virtual Node



Microsoft

Azure Containers Offerings

AKS Admin Tool and Cluster Maintenance

Microsoft Services

Supporting Kubernetes Version in AKS

- AKS supports four minor versions of Kubernetes:
  - The current minor version that is released upstream (n)
  - Three previous minor versions. Each supported minor version also supports two stable patches.
- For example, if AKS introduces 1.11.x today, support is also provided for 1.10.a + 1.10.b, 1.9.c+ 1.9d, 1.8.e + 1.8f (where the lettered patch releases are two latest stable builds).
- If you upgrade an AKS cluster, Kubernetes minor versions cannot be skipped
- When you deploy an AKS cluster in the portal or with the Azure CLI, the cluster is always set to the n-1 minor version and latest patch

Nodes Update, Upgrade and Patches

- Regular maintenance, security and cleanup tasks
  - Maintain, update and upgrade hosts and Kubernetes - Monthly ideal, 3 months maximum
  - Security patches
    - AKS automatically applies security patches to the nodes on a nightly schedule
    - You're responsible to reboot as required, leveraging tools like Kured DaemonSet https://github.com/weaveworks/kured

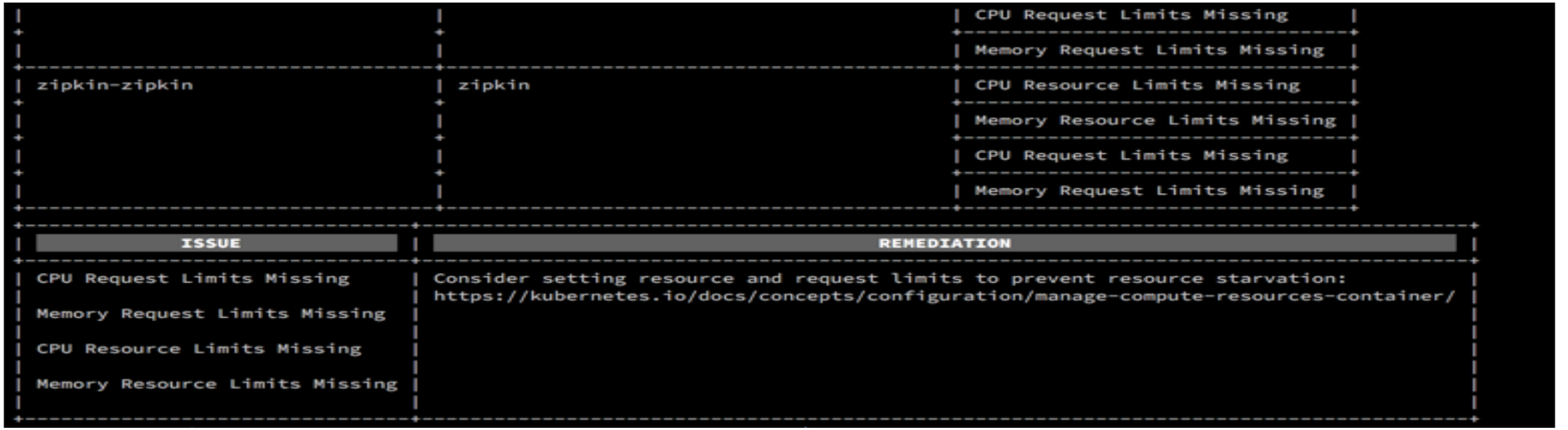
- Upgrade to new versions

```
$ az aks upgrade --name
myAKSCluster \
--resource-group myResourceGroup \
--kubernetes-version 1.10.6
```

- Running benchmarks and tests to validate cluster setup
  - Kube-bench
  - Kube-hunter
  - Others

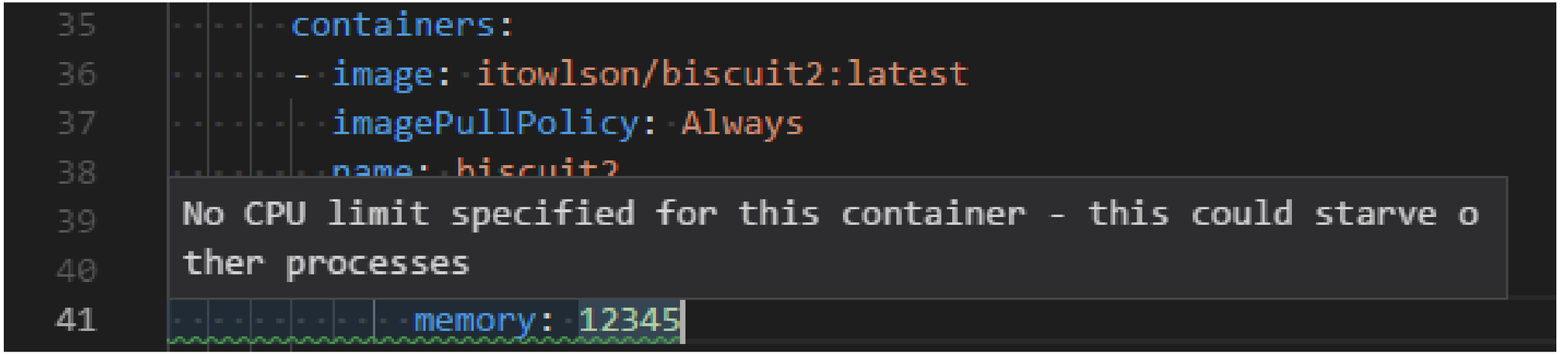
Kube-Advisor

- Diagnostic tool for Kubernetes clusters. Today, it returns pods that are missing resource and request limits.
- More info can be found at https://github.com/Azure/kube-advisor



VS Code extension for warnings

- Kubernetes VS Code extension adding warnings for resource request/limits
- More info can be found at https://github.com/Azure/vscode-kubernetes-tools



Microsoft

Azure DevOps for Container Automation

Azure Containers Offerings

Microsoft Services

What is DevOps?

DevOps is the union of people, processes, and tools to enable continuous delivery of value to our customers.

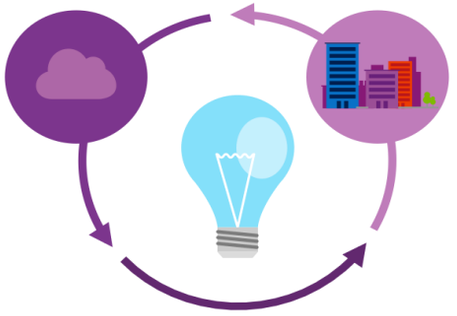
Increase flow of value

Shorten cycle times

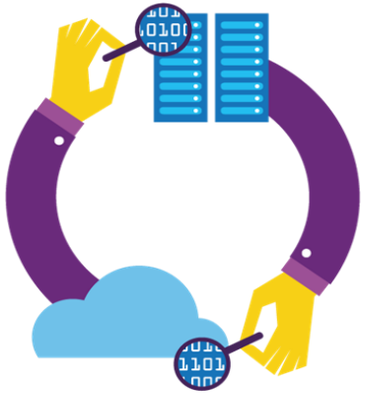
Continuously Improve

What are the benefits?

Shorten cycle times and deliver value faster



Improve quality and availability



Optimize resources and **eliminate waste**

Deliver **innovation** with digital-era **velocity**

Azure DevOps...
the evolution of Visual Studio Team Services

Visual Studio
Team Services

Azure DevOps

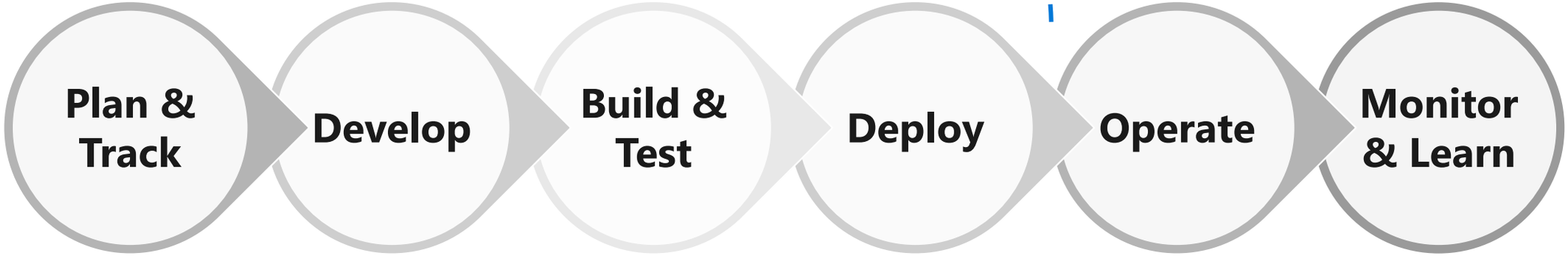
Azure
Boards

Azure
Repos

Azure
Artifacts

Azure
Pipelines

Azure
Test Plans



Azure Boards

Track work with Kanban boards, backlogs, team dashboards, and custom reporting

Connected from idea to release

Track all your ideas at every development stage and keep your team aligned with all code changes linked directly to work items.

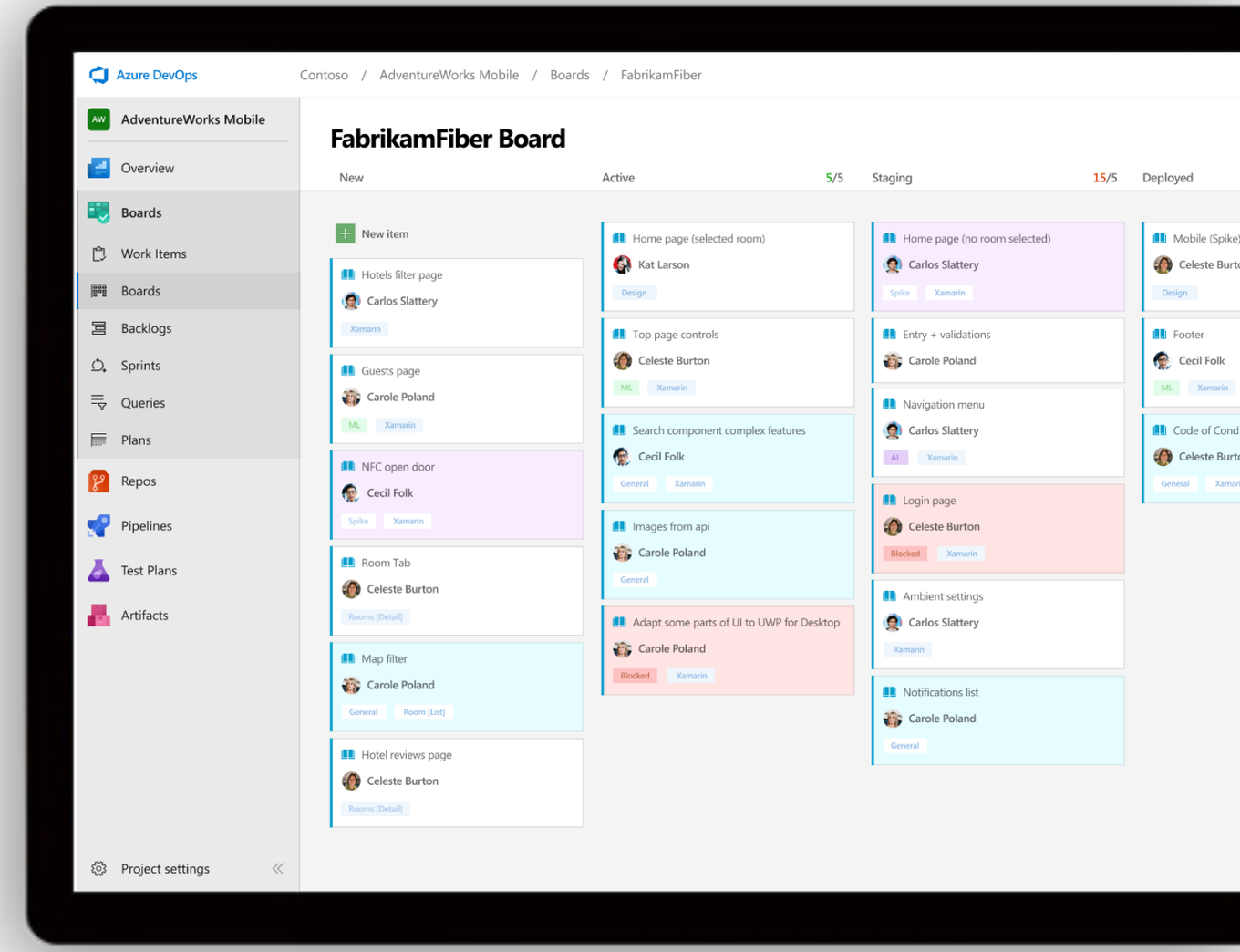
Scrum ready

Use built-in scrum boards and planning tools to help your teams run sprints, stand-ups, and planning meetings.

Project insights

Gain new insights into the health and status of your project with powerful analytics tools and dashboard widgets.

https://azure.com/devops



Azure Repos

Unlimited private Git repo hosting and support for TFVC that scales from a hobby project to the world's largest Git repositories

Works with your Git client

Securely connect with and push code into your Git repos from any IDE, editor, or Git client.

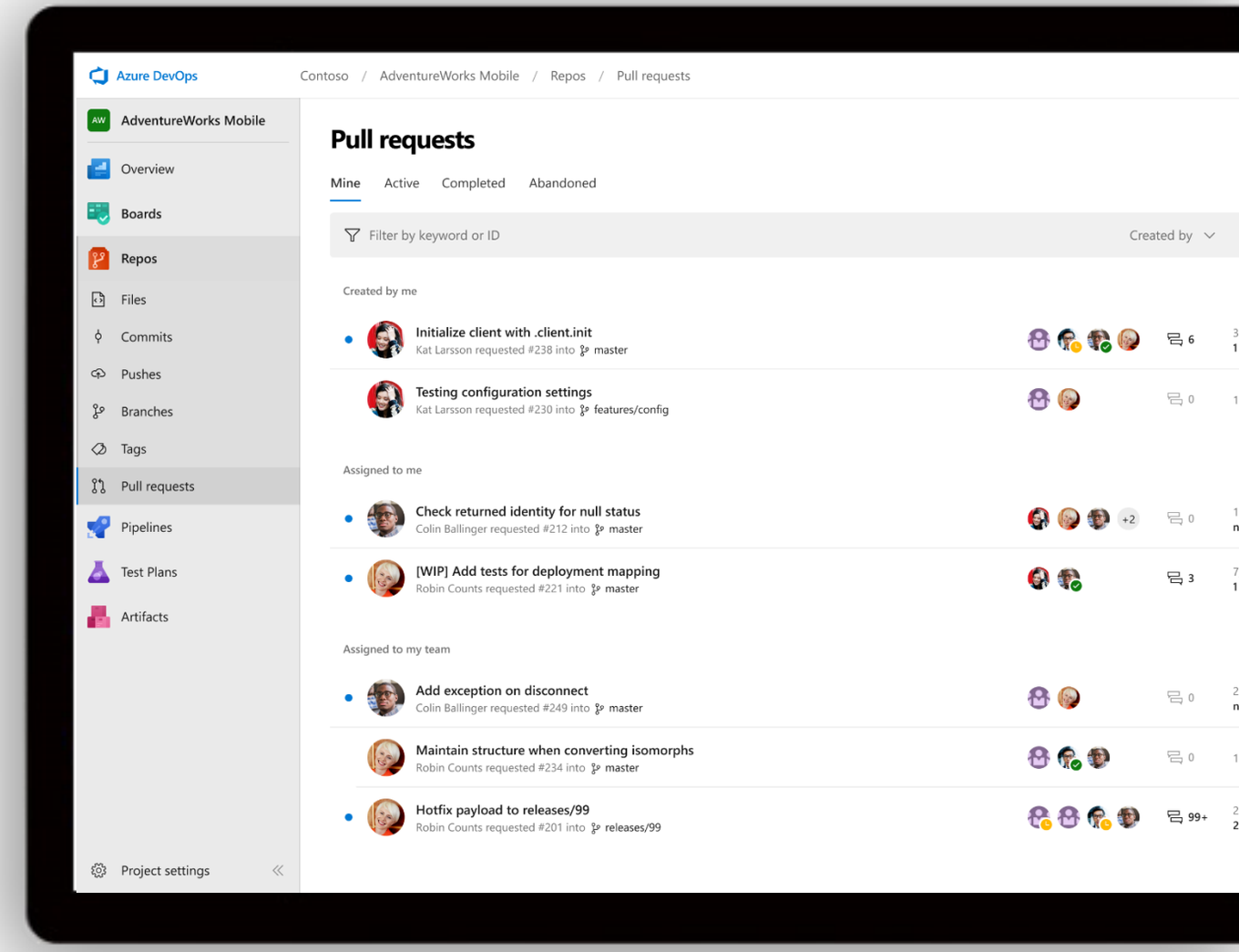
Web hooks and API integration

Add validations and extensions from the marketplace or build your own using web hooks and REST APIs.

Semantic code search

Quickly find what you're looking for with code-aware search that understands classes and variables.

https://azure.com/devops



Azure Artifacts

Create and share Maven, npm, and NuGet package feeds from public and private sources – fully integrated into CI/CD pipelines

Manage all package types

Get universal artifact management for Maven, npm, and NuGet.

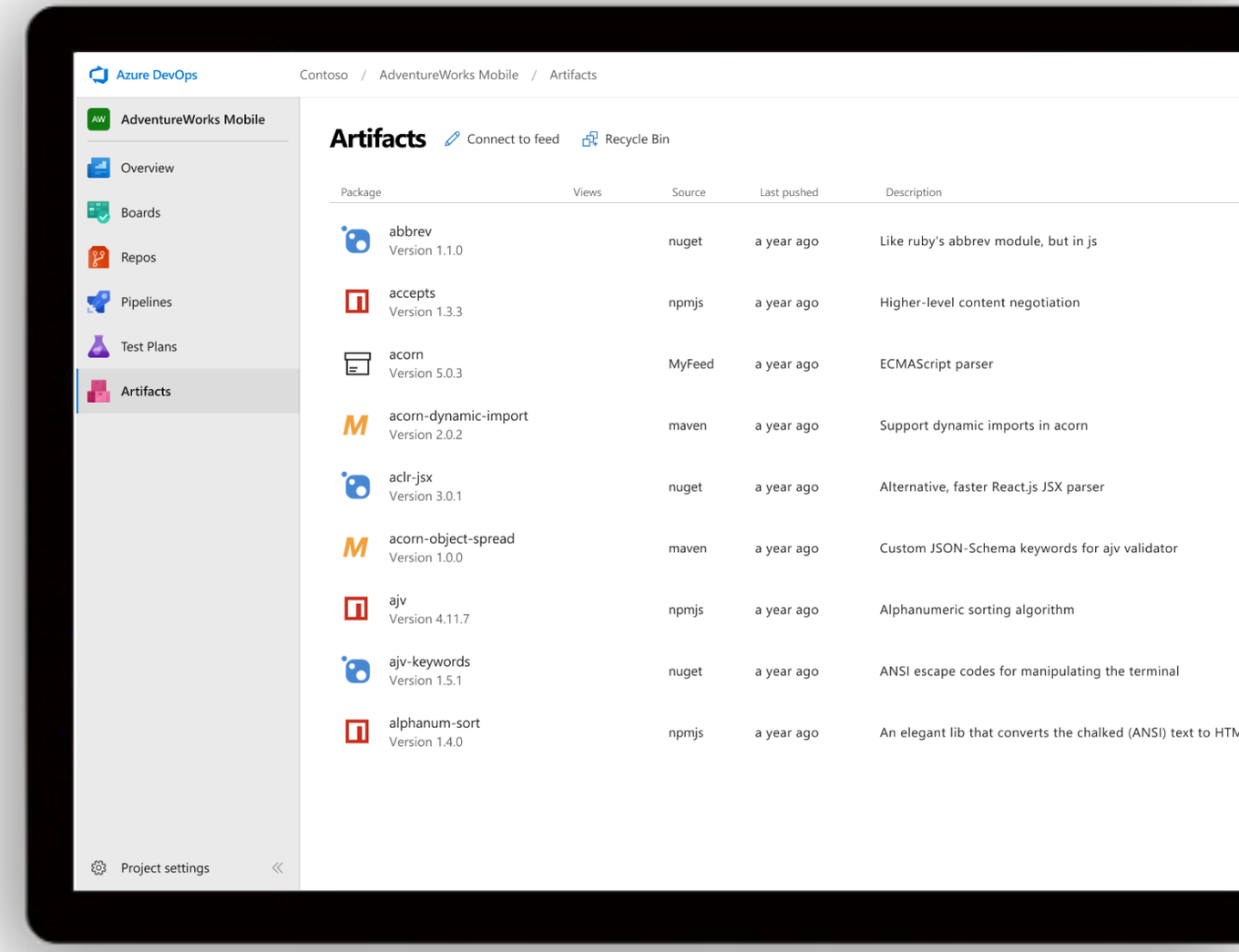
Add packages to any pipeline

Share packages, and use built-in CI/CD, versioning, and testing.

Share code efficiently

Easily share code across small teams and large enterprises.

https://azure.com/devops



Azure Test Plans

Get end-to-end traceability. Run tests and log defects from your browser. Track and assess quality throughout your testing lifecycle.

Capture rich data

Capture rich scenario data as you execute tests to make discovered defects actionable. Explore user stories without test cases or test steps. You can create test cases directly from your exploratory test sessions.

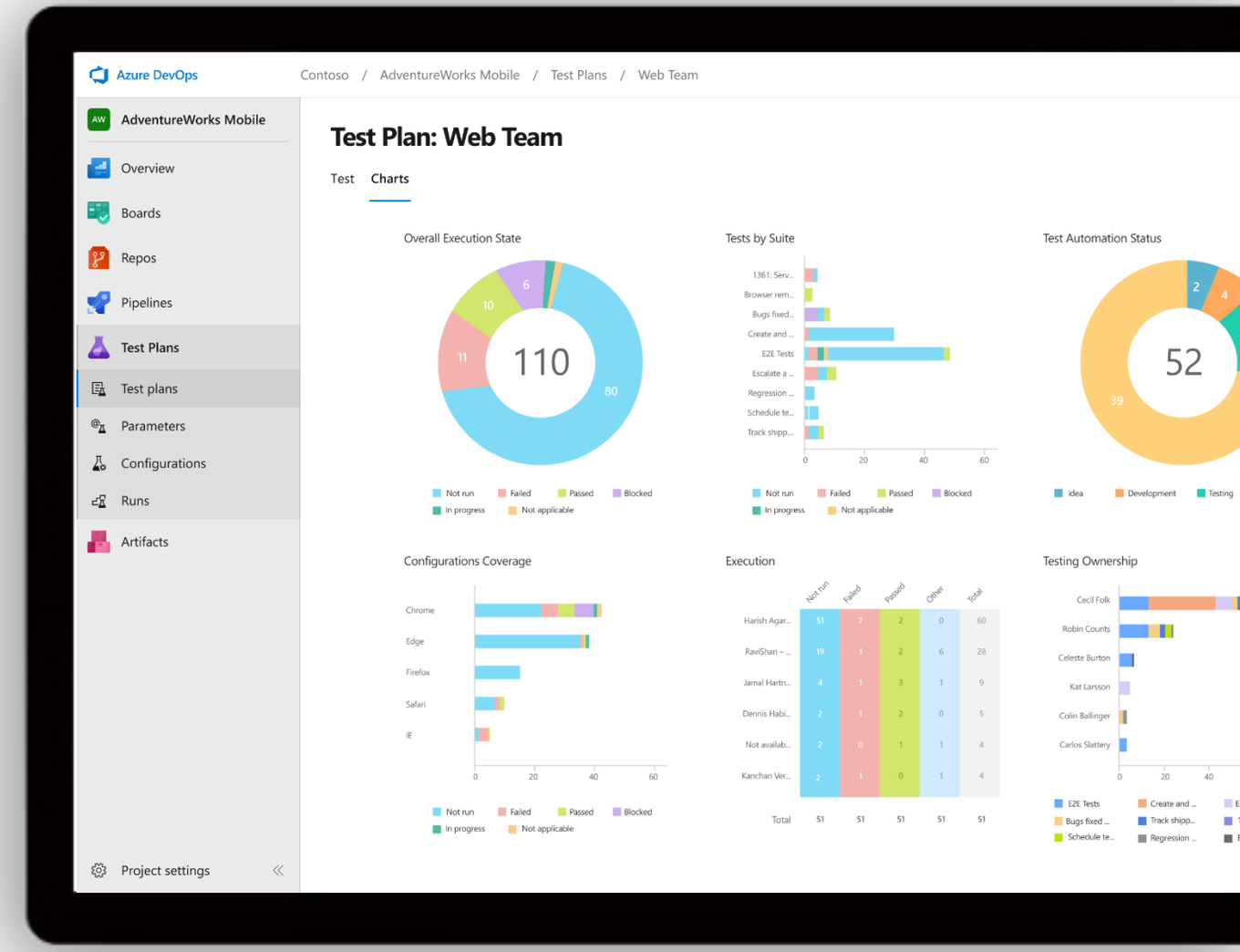
Test across web and desktop

Test your application where it lives. Complete scripted tests across desktop or web scenarios. Test on-premises application from the cloud and vice-versa.

Get end-to-end traceability

Leverage the same test tools across your engineers and user acceptance testing stakeholders. Pay for the tools only when you need them.

https://azure.com/devops



Azure Pipelines

Cloud-hosted pipelines for Linux, Windows and macOS, with unlimited minutes for open source

Any language, any platform, any cloud

Build, test, and deploy Node.js, Python, Java, PHP, Ruby, C/C++, .NET, Android, and iOS apps. Run in parallel on Linux, macOS, and Windows. Deploy to Azure, AWS, GCP or on-premises

Extensible

Explore and implement a wide range of community-built build, test, and deployment tasks, along with hundreds of extensions from Slack to SonarCloud. Support for YAML, reporting and more

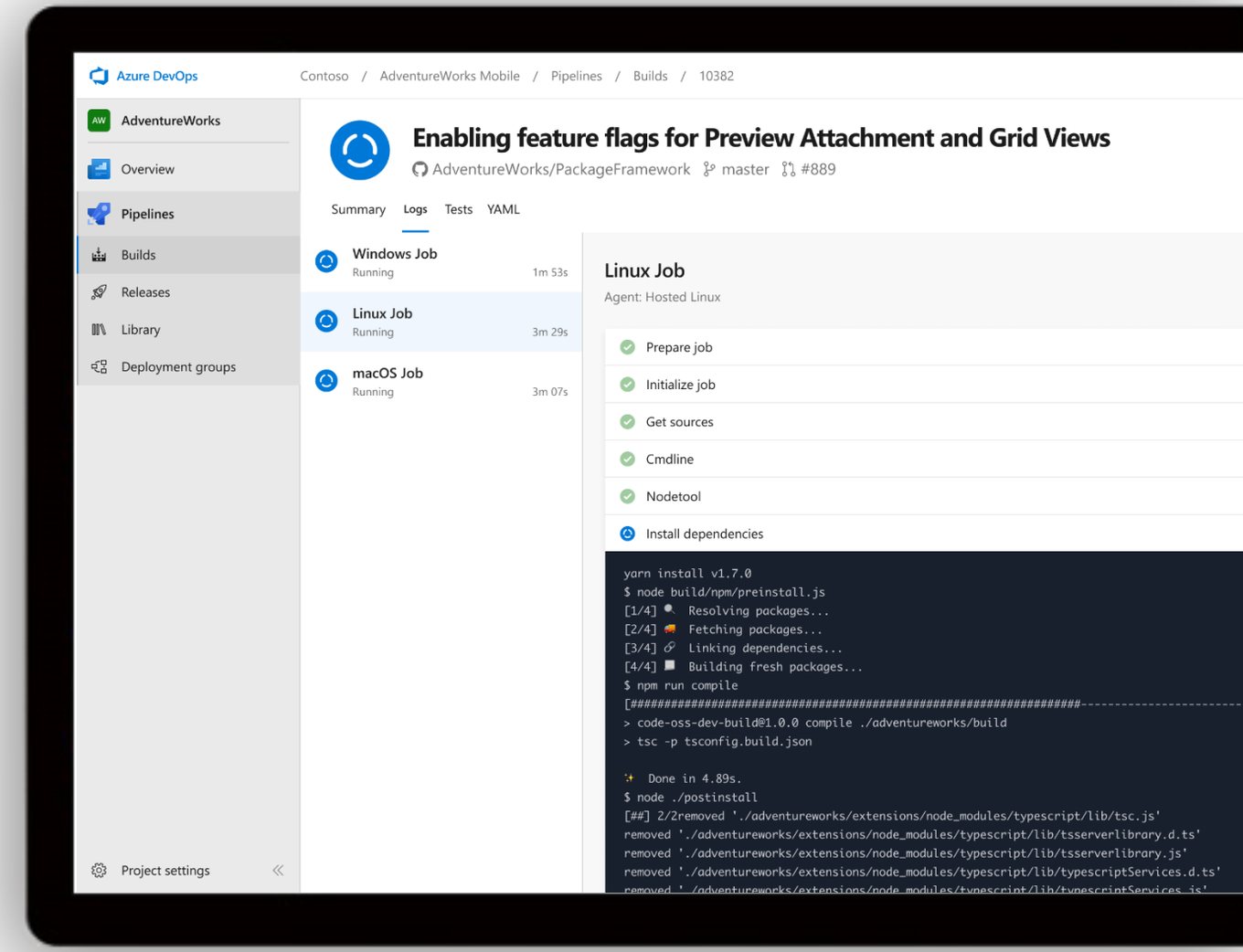
Containers and Kubernetes

Easily build and push images to container registries like Docker Hub and Azure Container Registry. Deploy containers to individual hosts or Kubernetes.

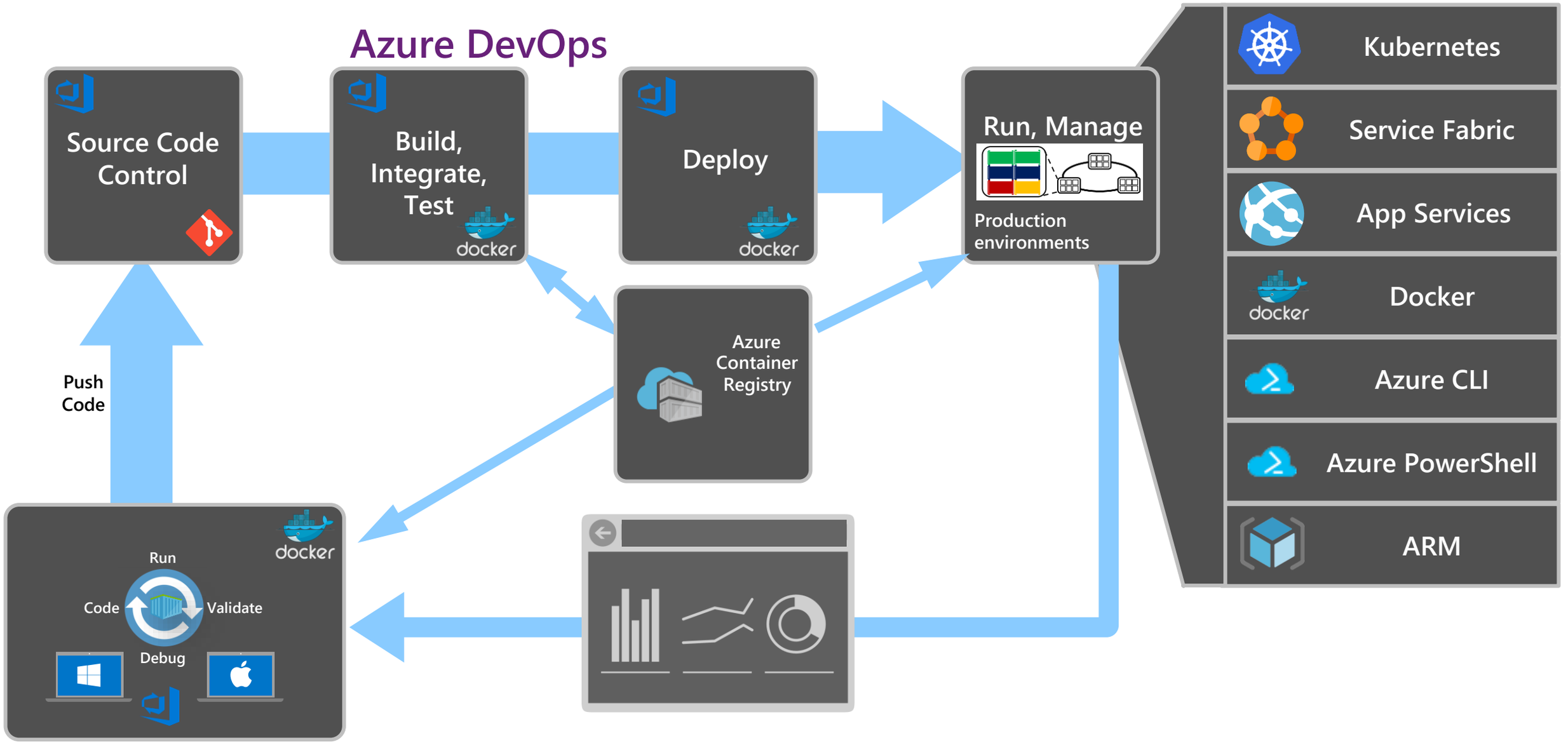
Best-in-class for open source

Ensure fast continuous integration/continuous delivery (CI/CD) pipelines for every open source project. Get unlimited build minutes for all open source projects with up to 10 free parallel jobs across Linux, macOS and Windows

https://azure.com/pipelines

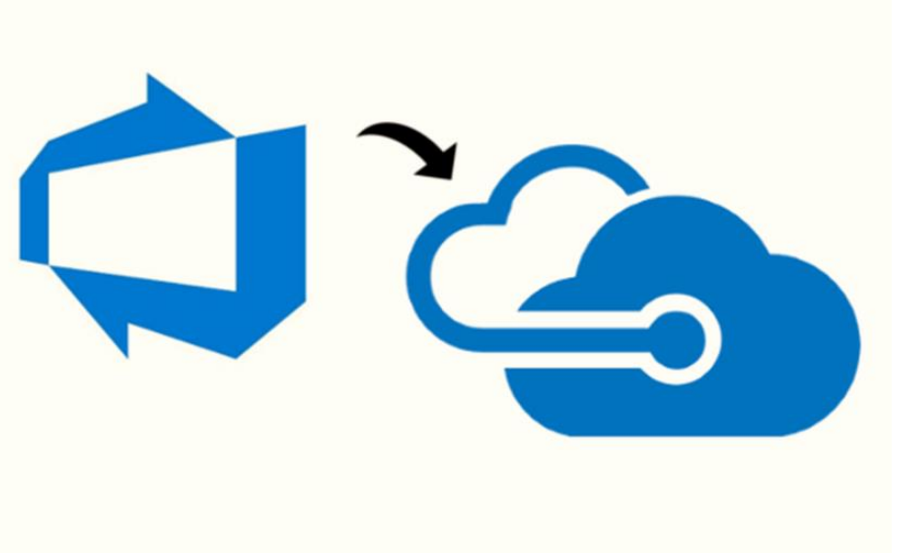


Containerized Workflow Pipeline



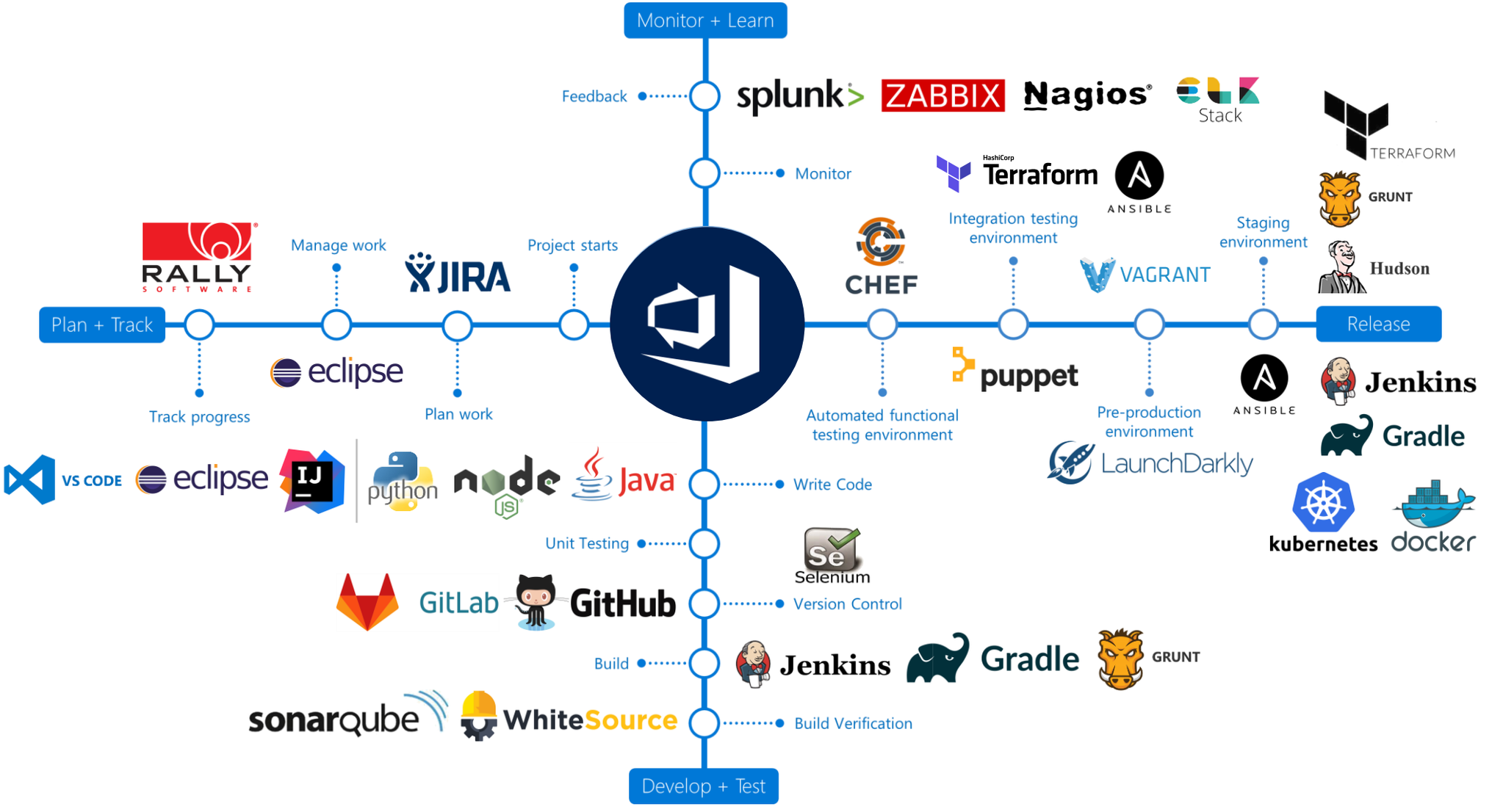
Azure DevOps

- Azure Integration
  - Formerly VSTS – Azure Native
  - Service Endpoints
  - Azure DevOps extensions



- DevOps Projects
  - Present a simplified experience where you can bring your existing code and Git repository or choose from one of the sample applications to create a continuous integration (CI) and continuous delivery (CD) pipeline to Azure.

Azure DevOps + Partners



Lab: AKS Advanced

Upgrading your AKS Cluster

Working with NGINX and Azure Files

Running your app with services exposes via ELB

Working with Network Policies

Session resources

- DevOps information @ https://aka.ms/devops
- Azure DevOps overview @ https://aka.ms/azuredevops
- Azure DevOps documentation @ https://aka.ms/vstsdocs
- Azure DevOps Projects @ https://aka.ms/devopsprojects
- AKS + Jenkins @ AKS+Jenkins
- AKS + Azure DevOps @ AKS+DevOps
- AKS + ASP.Net Core + DevOps Projects @ AKS+DevOpsProjects