Create and Configure Azure Kubernetes Service

Michael Teske

AUTHOR EVANGELIST-CLOUD ENGINEER, PLURALSIGHT

Course Coverage of Certification Objectives

Create and Configure Azure Kubernetes Service

- Configure storage for AKS
- Configure scaling for AKS
- Configure network connections for AKS
- Upgrade an AKS cluster

Full certification exam skills outline available at http://bit.ly/az104ms

Create and Configure Azure Kubernetes Service

What is Azure Kubernetes Service

Open-source system for automating deployment, scaling and management of containerized apps

It's a management platform using declarative configuration to orchestrate containers in different compute environments

A Kubernetes deployment is configured as a cluster consisting of at least one master machine and one or more workers machines

Azure Kubernetes Service (AKS) manages hosted Kubernetes clusters

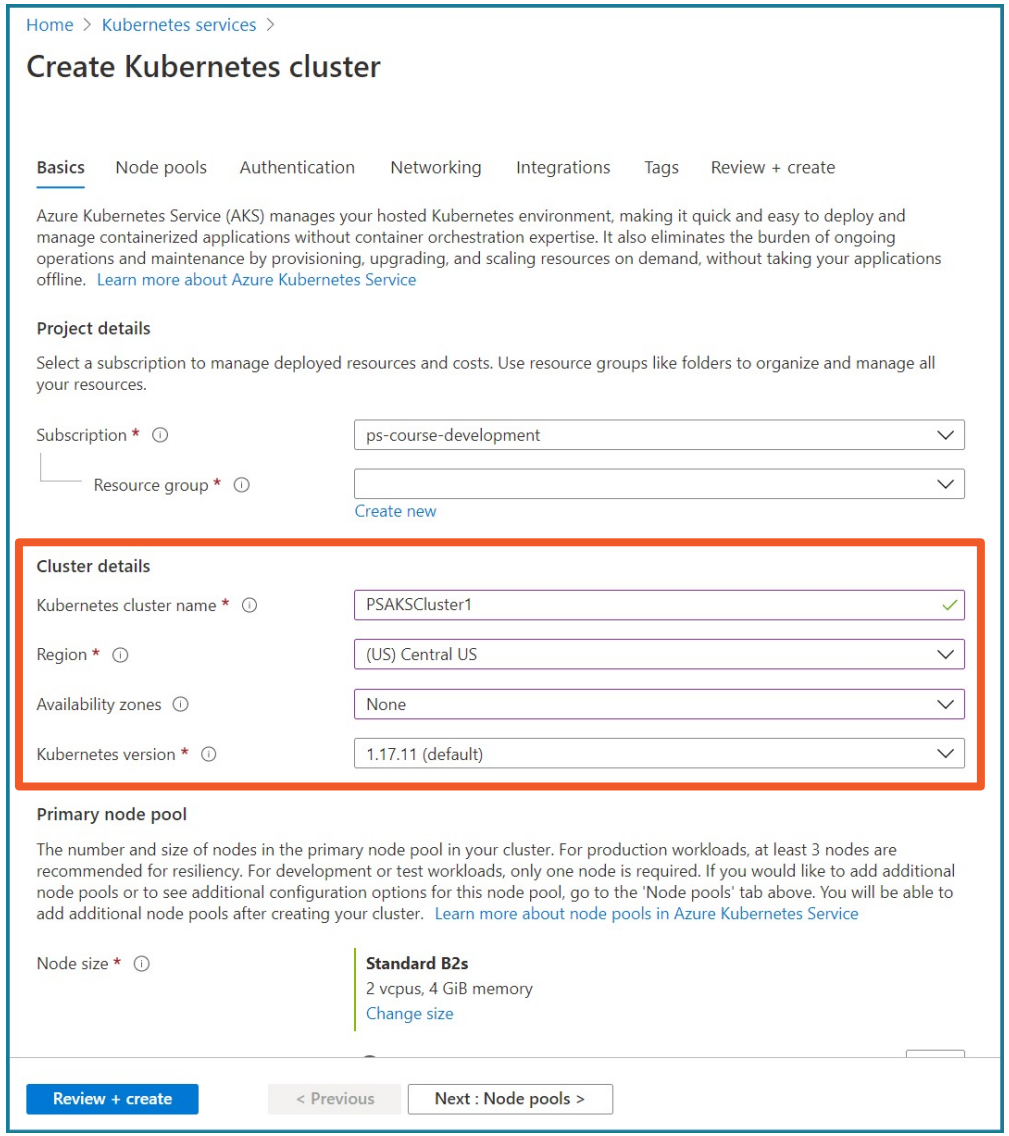
AKS cluster master is managed by Azure and is free

Create Azure Kubernetes Cluster

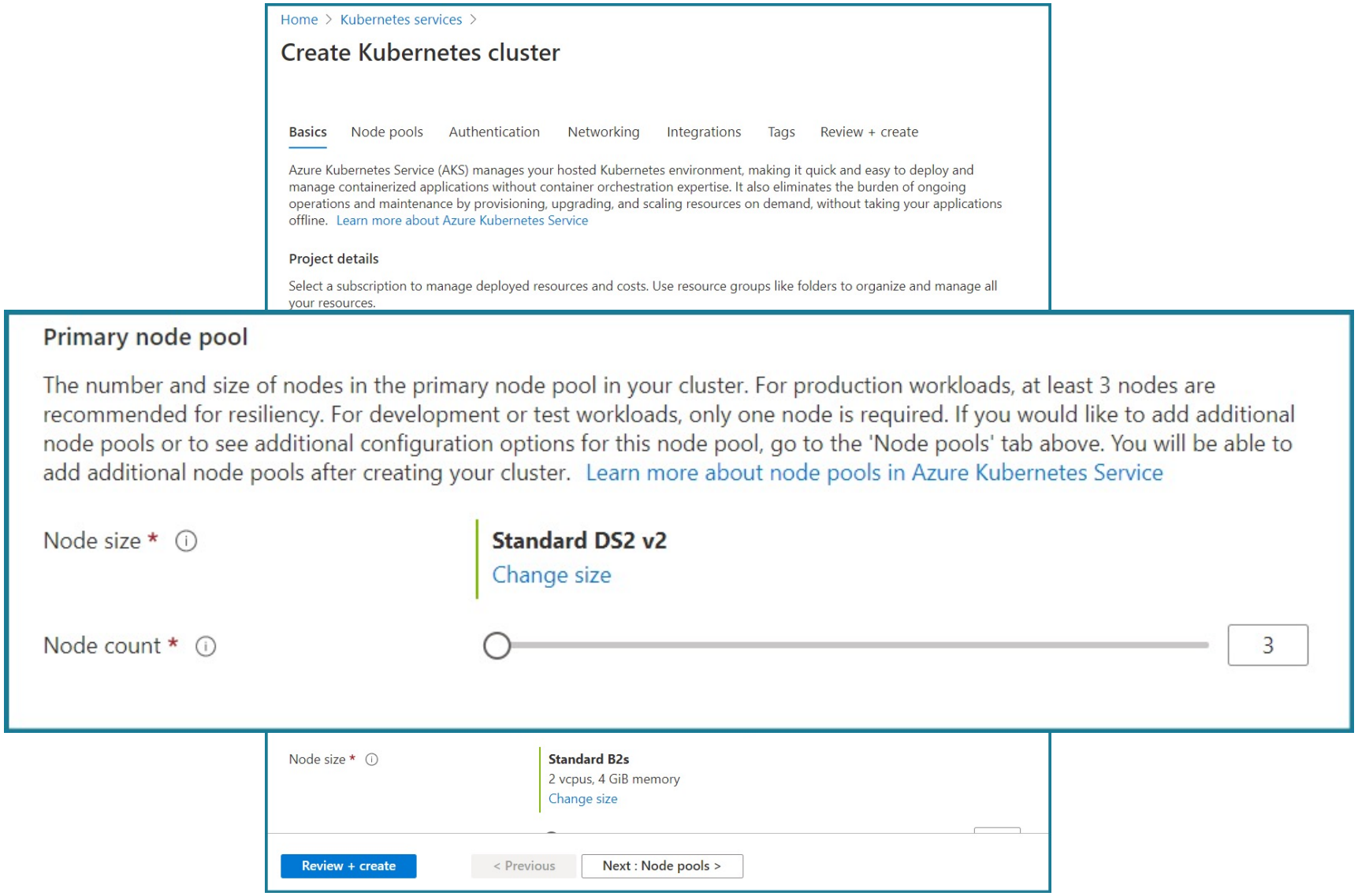
- Nodes of the same configuration are grouped into node pools
- When you create your cluster, you create a system node pool
- The AKS cluster must use virtual machine scale sets for the nodes for autoscaling and multiple node pools
- All node pools must reside in the same virtual network
- AKS cluster must use the *Standard SKU* load balancer to use multiple node pools

Create an Azure Kubernetes Cluster

Create an Azure Kubernetes Cluster



Create an Azure Kubernetes Cluster



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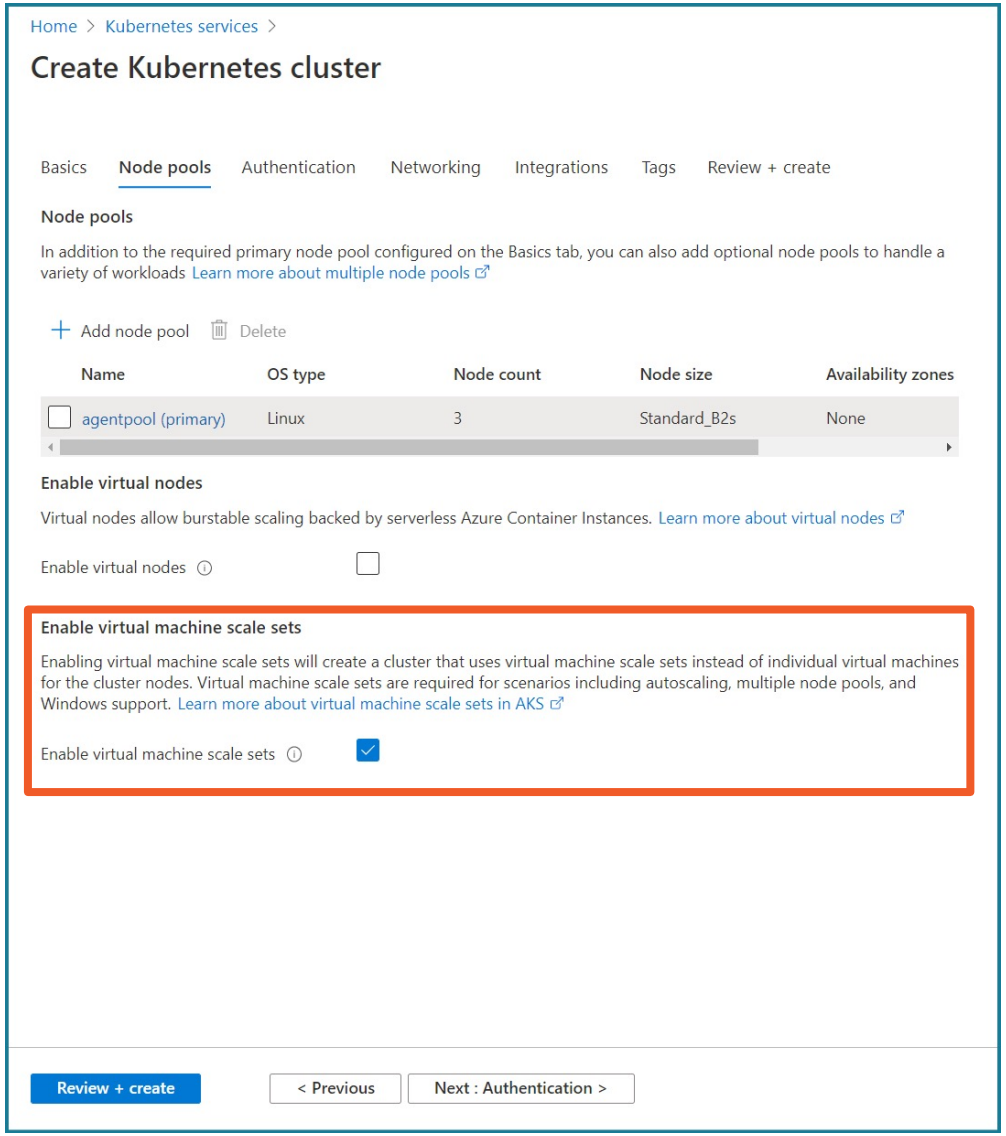

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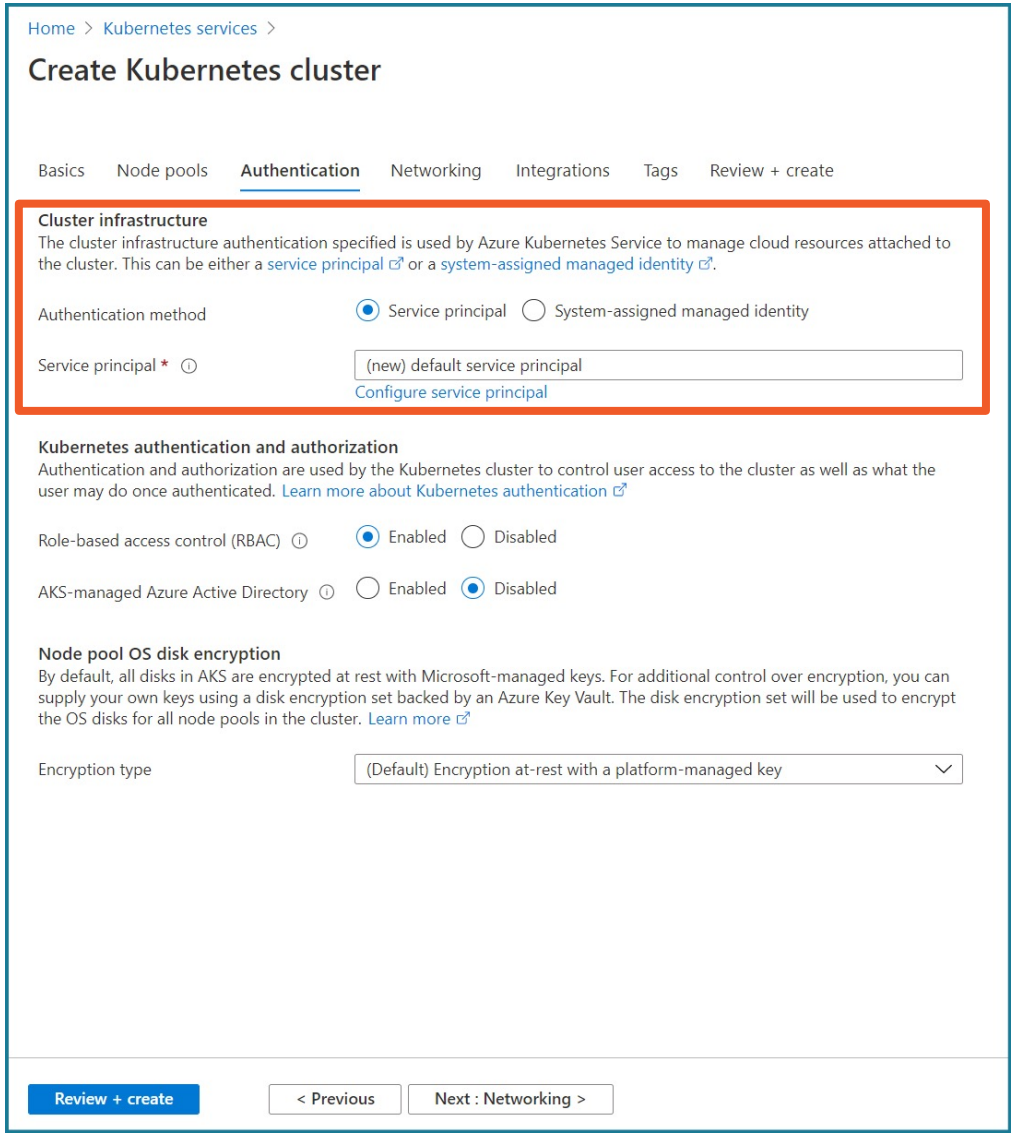

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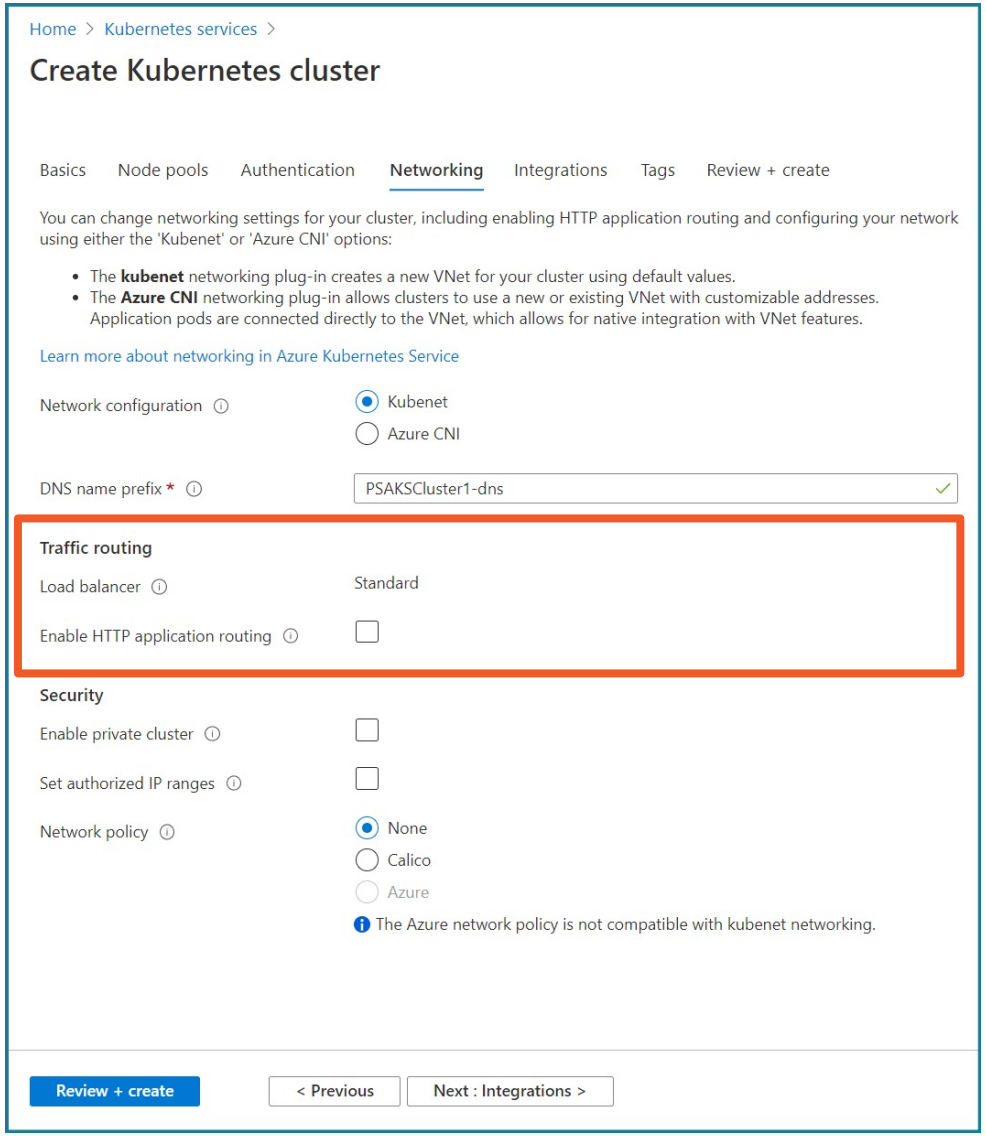

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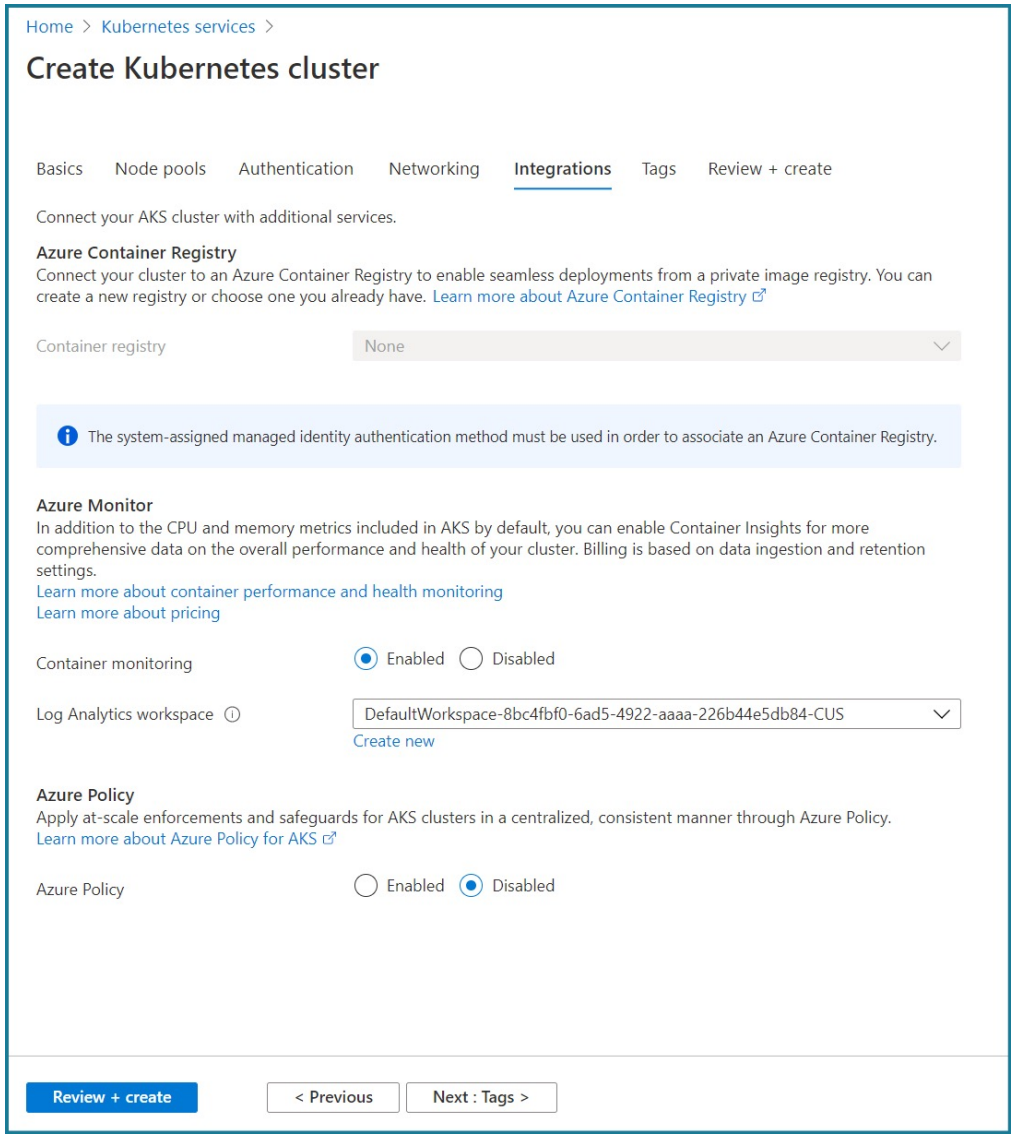

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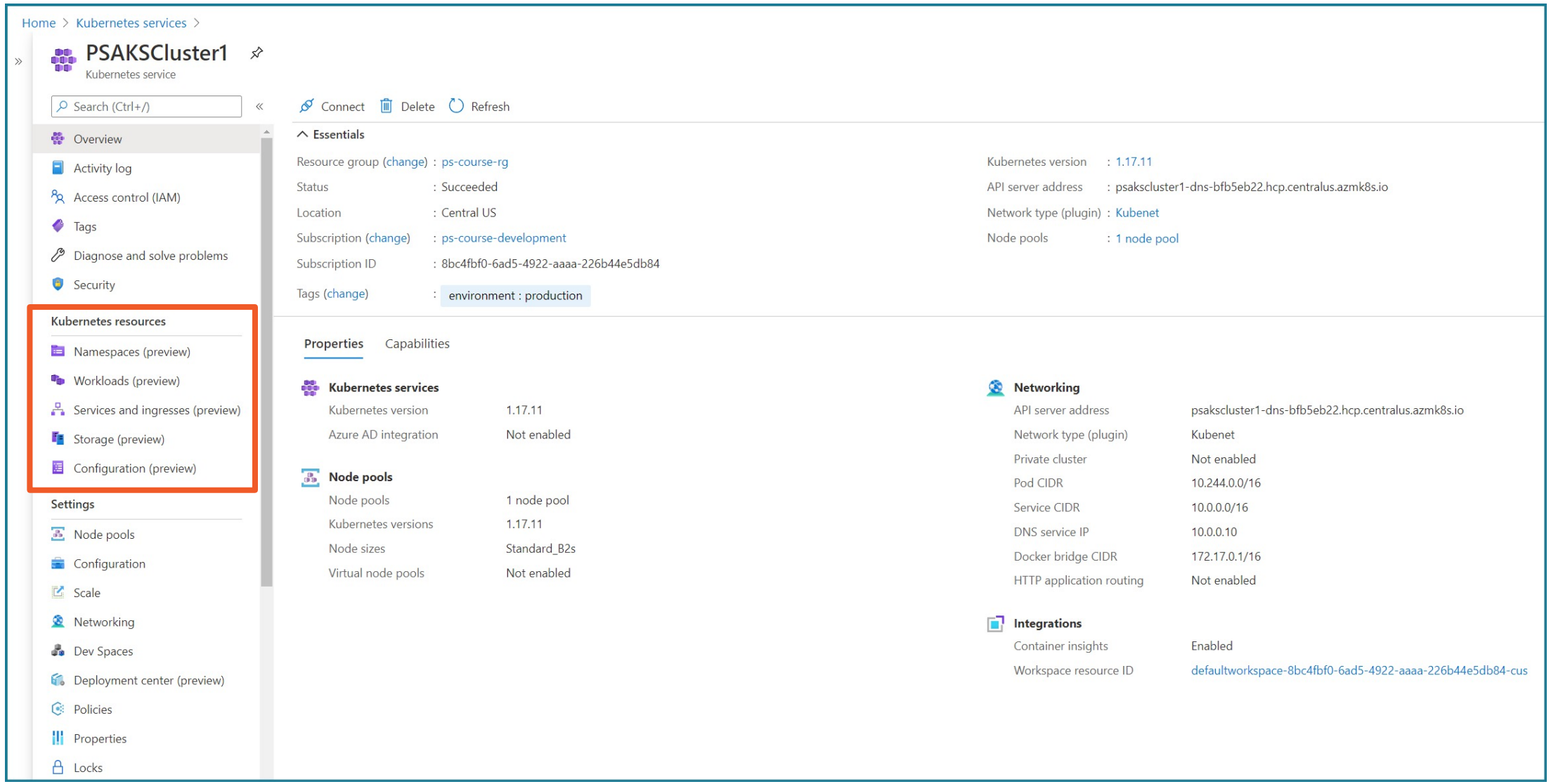

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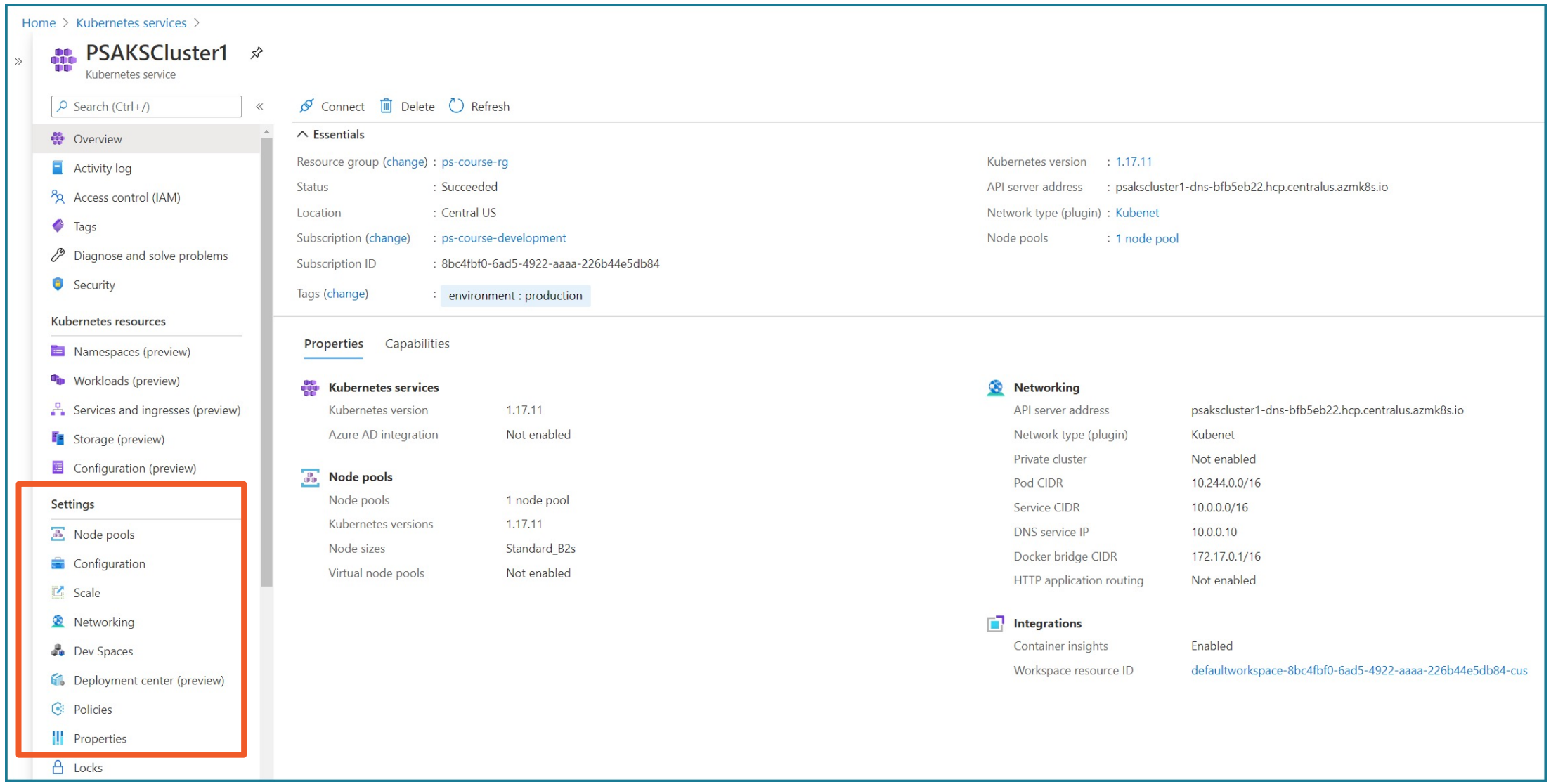

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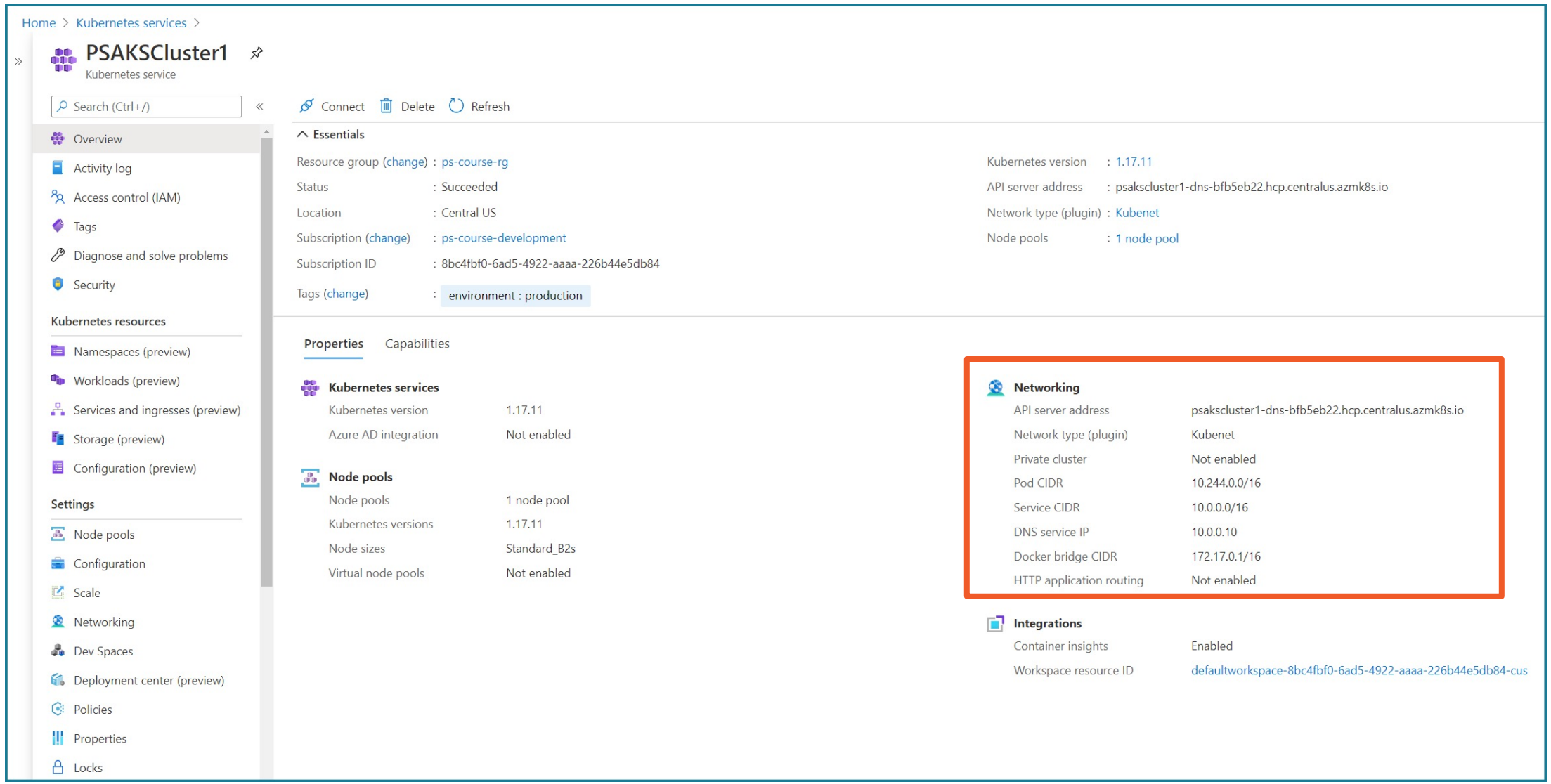
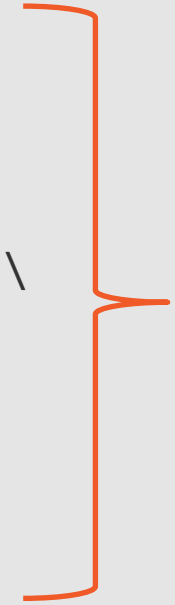


Create a AKS Single Node Cluster

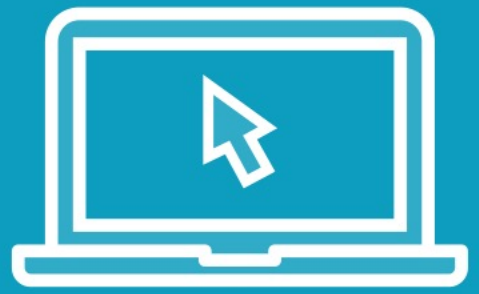
```
# Create a basic single-node AKS cluster

az aks create \
    --resource-group ps-course-rg \
    --name PSAKSCluster \
    --vm-set-type VirtualMachineScaleSets \
    --node-count 2 \
    --generate-ssh-keys \
    --load-balancer-sku standard
```



Add an AKS Node Pool

```
# Add and AKS Node Pool
az aks nodepool add \
    --resource-group ps-course-rg \
    --cluster-name PSAKSCluster \
    --name mynodepool \
    --node-count 3
```

Demo



Create an AKS Cluster and Node Pool

Configure Storage for Azure Kubernetes Service

Storage Concepts for AKS

Volumes

Persistent Volumes

Storage classes

Persistent volume claims

Storage Types and Capabilities

Use case	Volume plugin	Read/write once	Read-only many	Read/write many	Windows Server container support
Shared configuration	Azure Files	Yes	Yes	Yes	Yes
Structured app data	Azure Disks	Yes	No	Yes	Yes
unstructured data, file system operations	BlobFuse	Yes	Yes	Yes	No

Configure Scaling for Azure Kubernetes Service

Scaling Options

Manual scale pods or nodes

Horizontal pod auto-scaler

Cluster auto-scaler

Scaling

```
# Manual scale pods

kubectl scale --replicas=5 deployment/azure-vote-front

# Manual scale nodes

az aks scale --resource-group ps-course-rg --name myAKSCluster --node-count 3

# Autoscale

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

Scaling

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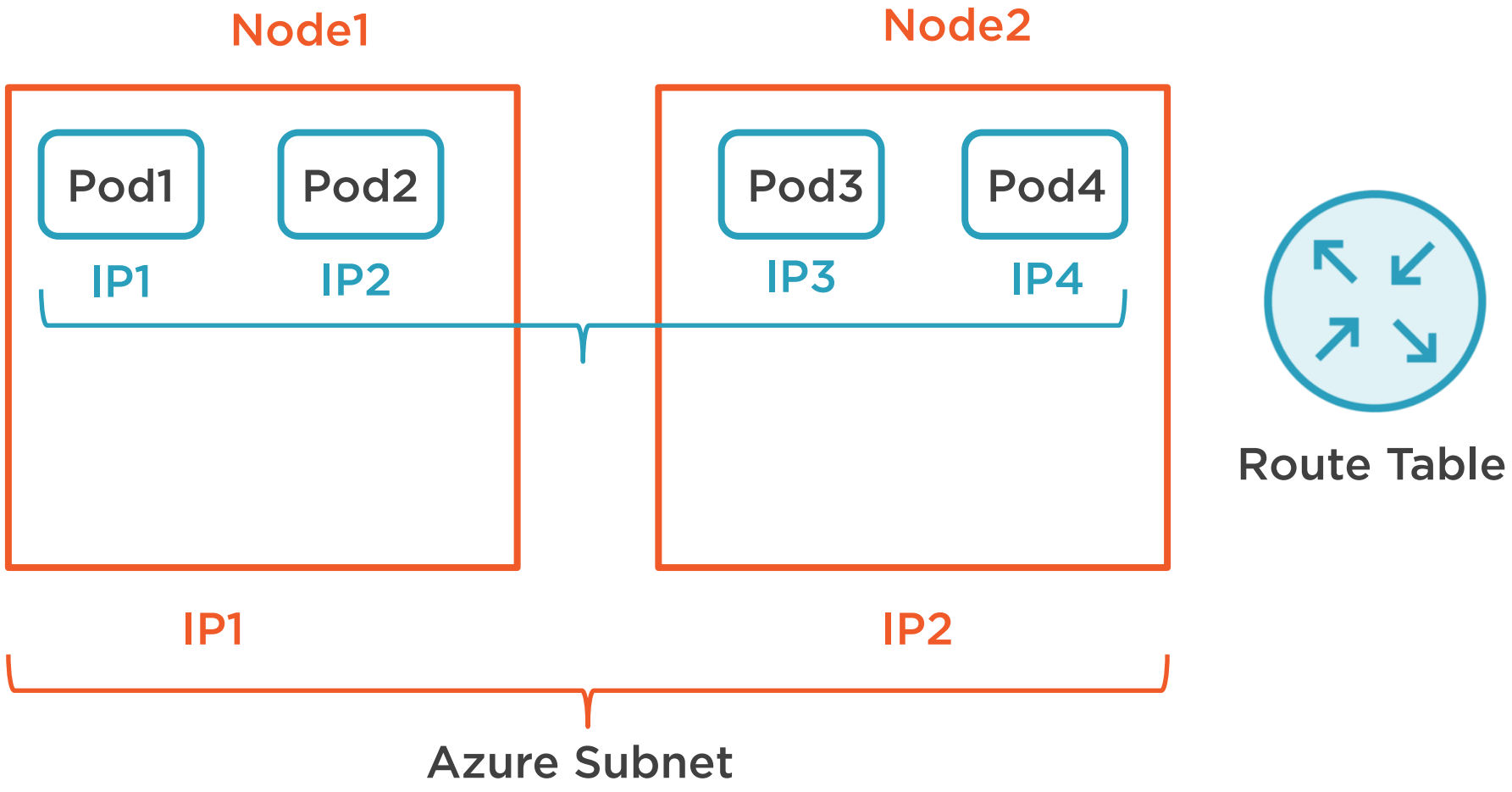
Configure Networking for Azure Kubernetes Service

Kubenet and Azure CLI

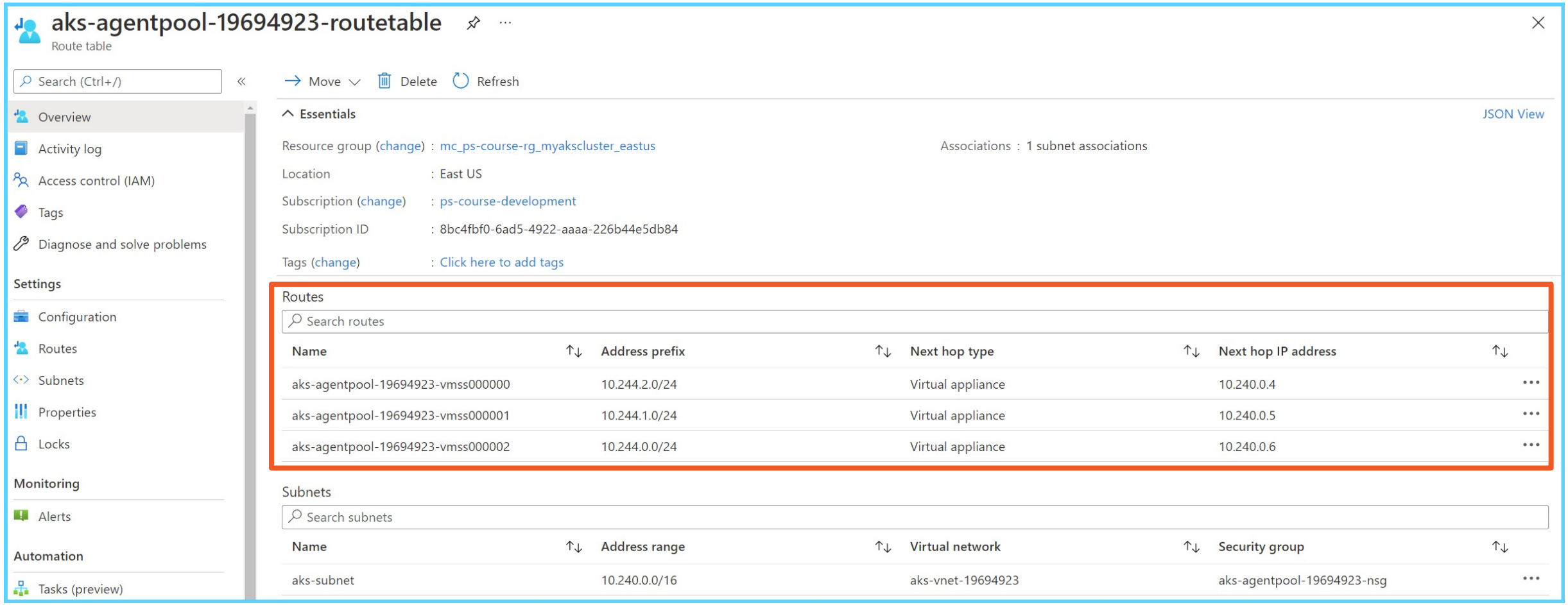
Capabilities	Kubenet	Azure CNI
Deploy cluster in existing or new VNet	Supported-UDRs manually applied	Supported
Pod->Pod connectivity	Supported	Supported
Pod->VM, VM in same vNet	Works when initiated by pod	Works both ways
Pod->VM, VM in peered vNet	Works when initiated by pod	Works both ways
On-prem access using VPN	Works when initiated by pod	Works both ways
Access to resources secured by service endpoints	Supported	Supported
Expose Kubernetes service using a load balancer, App Gateway, or ingress controller	Supported	Supported

Link: https://bit.ly/2QZvpHz

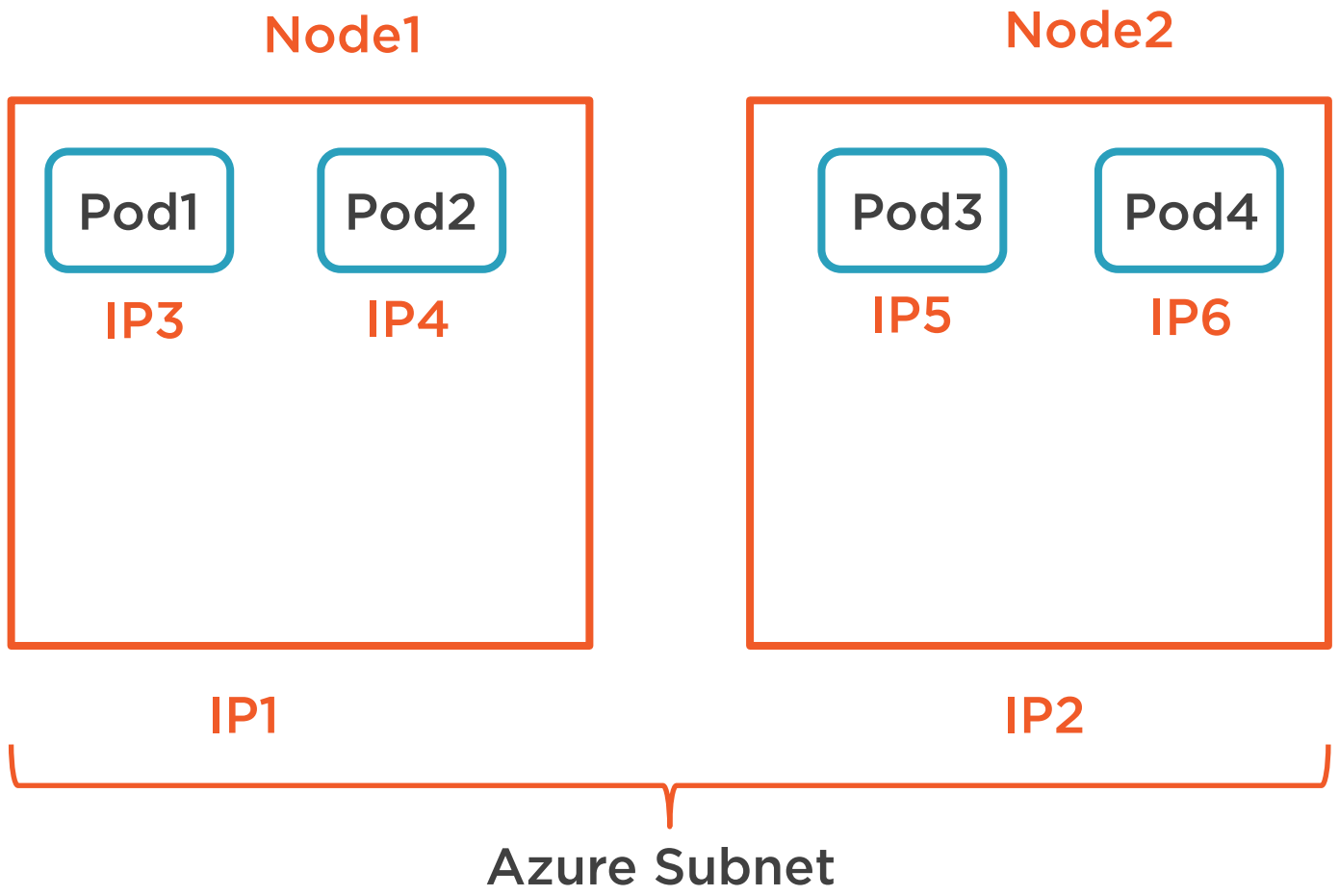
Kubenet


Node1
Node2
Pod1
Pod2
Pod3
Pod4
IP1
IP2
IP3
IP4
Route Table
IP1
IP2
Azure Subnet

Kubenet


aks-agentpool-19694923-routetable
Route table
Search (Ctrl+/)
Move
Delete
Refresh
Overview
Activity log
Access control (IAM)
Tags
Diagnose and solve problems
Settings
Configuration
Routes
Subnets
Properties
Locks
Monitoring
Alerts
Automation
Tasks (preview)
Essentials
JSON View
Resource group (change) : mc_ps-course-rg_myakscluster_eastus
Location : East US
Subscription (change) : ps-course-development
Subscription ID : 8bc4fbf0-6ad5-4922-aaaa-226b44e5db84
Tags (change) : Click here to add tags
Associations : 1 subnet associations
Routes
Search routes
Name
Address prefix
Next hop type
Next hop IP address
aks-agentpool-19694923-vmss000000
10.244.2.0/24
Virtual appliance
10.240.0.4
aks-agentpool-19694923-vmss000001
10.244.1.0/24
Virtual appliance
10.240.0.5
aks-agentpool-19694923-vmss000002
10.244.0.0/24
Virtual appliance
10.240.0.6
Subnets
Search subnets
Name
Address range
Virtual network
Security group
aks-subnet
10.240.0.0/16
aks-vnet-19694923
aks-agentpool-19694923-nsg

Azure CNI


Node1
Node2
Pod1
Pod2
Pod3
Pod4
IP3
IP4
IP5
IP6
IP1
IP2
Azure Subnet

Upgrade an Azure Kubernetes Cluster

```
# Show current version of AKS

 az aks show --resource-group ps-course-rg --name myAKSCluster --output table

# Get available upgrades for the cluster

az aks get-upgrades --resource-group ps-course-rg --name myAKSCluster

# Upgrade cluster

az aks upgrade --resource-group ps-course-rg --name myAKSCluster --kubernetes-version KUBERNETES_VERSION
```

Upgrading a cluster

You can only upgrade one minor version at a time.

- You can upgrade from 1.14.x to 1.15.x
- You cannot upgrade from 1.14.x to 1.16.x

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Overview

Create and Configure Azure Container

- Registries are the locations of our images
- Image source is the image pulled from the registry
- Restart policies include:
  - Always
  - On failure
  - Never
- Container groups are co-located containers on the same host

Overview

Create and Configure Azure Kubernetes Service

- Kubernetes is a container management platform
- A Kubernetes deployment is configured as a cluster consisting of at least one master machine and one or more worker machines
- Standard Load balancer is required for additional features such as autoscaling
- Clusters can be configured using VM scale sets
- Node pools reside in the same Vnet

Overview

Create and Configure Azure Kubernetes Service

- Scaling can include the number of nodes and or the number of pods
- Kubenet uses a routing table for inter-pod comms
- Kubnet assigns a CIDR block of unique, reusable IPs
- Azure CNI assigns IPs from the subnet to the worker nodes and pods
- You cannot skip minor versions when you're upgrading a cluster

For Further Learning

Remember the course exercise files

- Links to the Azure Docs sites for additional studying and deeper dives
- Any code used in the demos.
- PowerPoint slides for review purposes

Questions?

- Join the conversation in the discussion tab in the Pluralsight player
- Hit me up on LinkedIn