Build and Manage an AKS Cluster

Ben Weissman
Data Passionist

@bweissman www.solisyon.de

Overview

General Deployment Process

Ways and Tools To Create an AKS Cluster

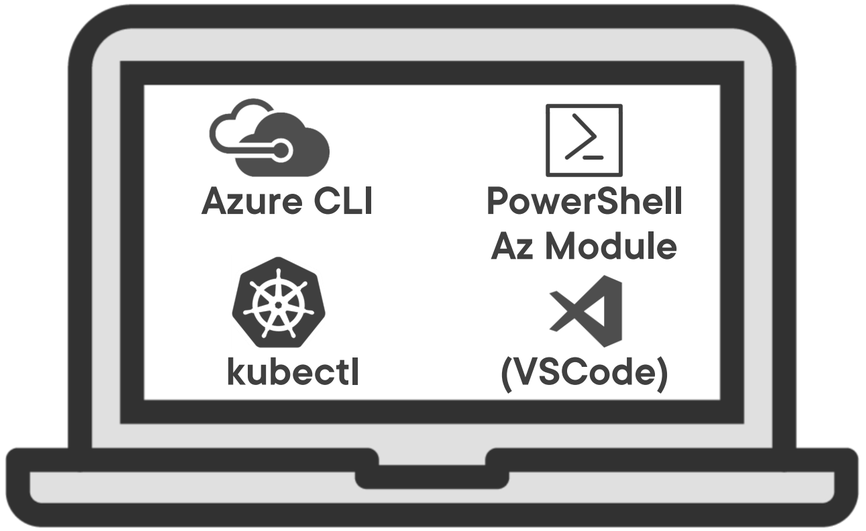
Communicating With Your AKS Cluster

Manually Scaling an AKS Cluster

Deploying a Windows Cluster

Prerequisites

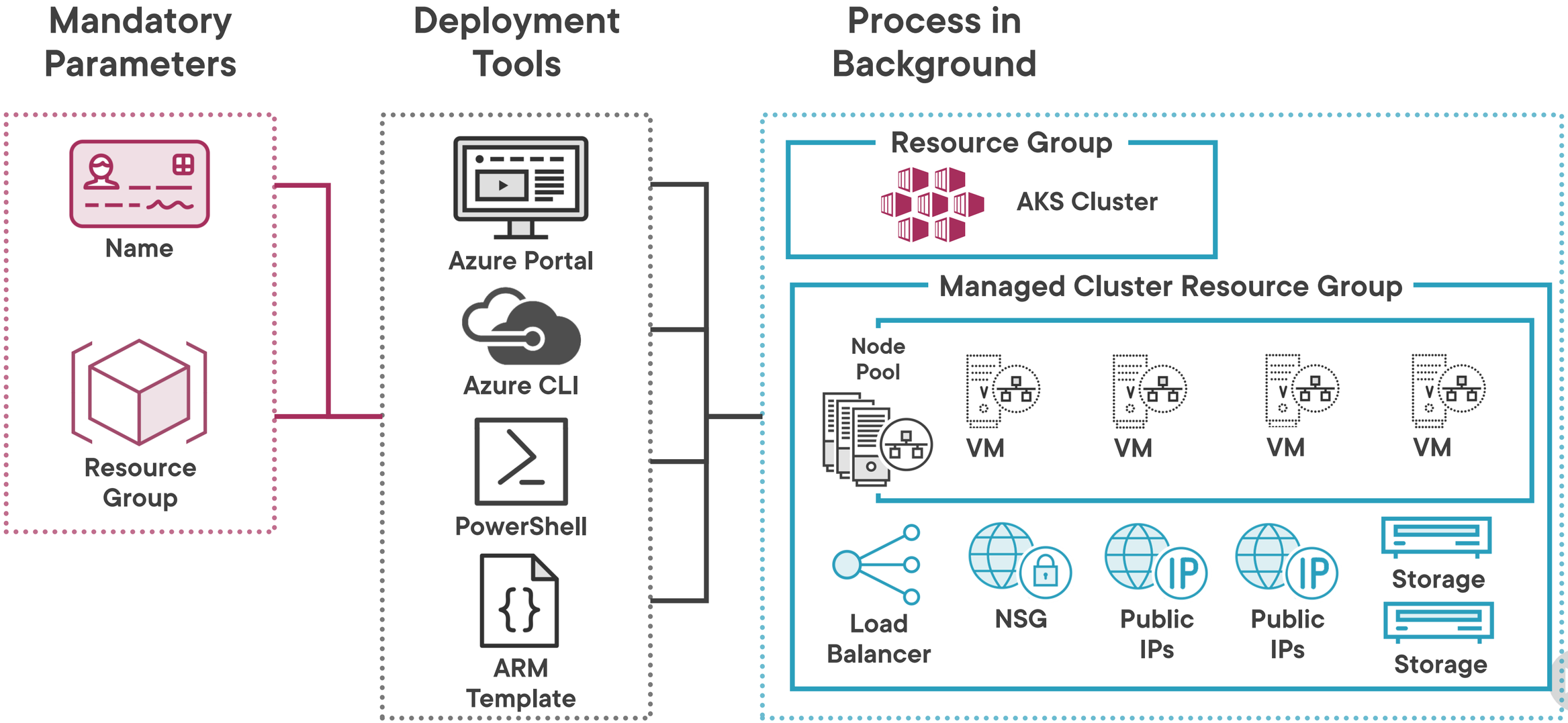
Azure Subscription



Administrative Workstation

(Windows, Mac, Linux)

General Deployment Process



Most Common Optional Parameters

SSH Key value or generate SSH Keys

Kubernetes version

Node VM size (Default: Standard_DS2_v2)

Node count (Default: 3)

VNet subnet ID

https://docs.microsoft.com/en-us/cli/azure/aks

Demo

Create an AKS Cluster Using the Azure Portal

Demo

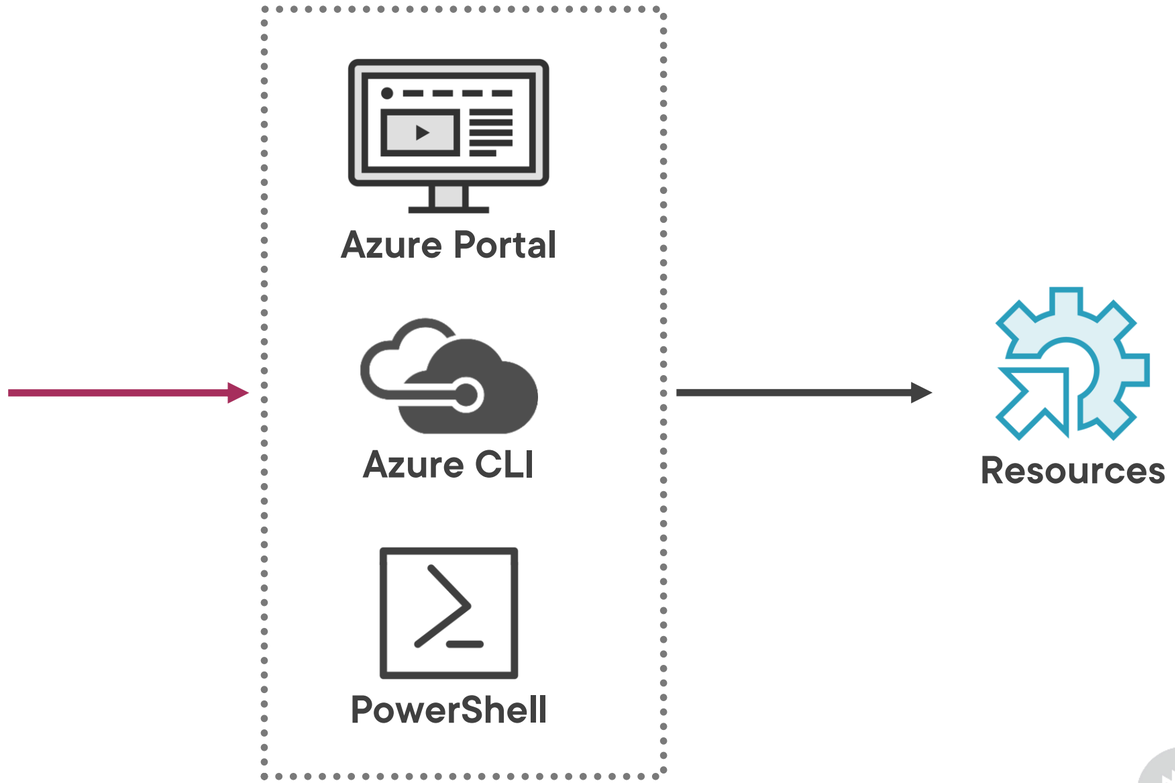
Create an AKS Cluster Using the Azure CLI

Demo

Create an AKS Cluster Using PowerShell

Create an AKS Cluster Using an ARM Template

```
{
  "$schema": "https://schema.management.azure.com
             /schemas/2019-04-01/deployment
             Template.json#",
  "contentVersion": "1.0.0.1",
  "parameters": {
    ...
  },
  "resources": [
    ...
  ],
  "outputs": {
    ...
  }
}
```



Create an AKS Cluster Using an ARM Template

Parameters

```
"parameters": {
    "clusterName": {
      "type": "string",
      "defaultValue": "akscluster
    },
    "agentCount": {
      "type": "int",
      "defaultValue": 3,
      "minValue": 1,
      "maxValue": 50
    },
    "agentVMSize": {
      "type": "string",
      "defaultValue": "Standard_DS2_v2"
    },
    "sshRSAPublicKey": {
      "type": "string"
    }
  },
```


```
"clusterName": {
  "type": "string",
  "defaultValue": "akscluster
```

Create an AKS Cluster Using an ARM Template

Parameters

```
"parameters": {
   "clusterName": {
     "type": "string",
     "defaultValue": "akscluster"
   },
   "agentCount": {
     "type": "int",
     "defaultValue": 3,
     "minValue": 1,
     "maxValue": 50
   },
   "agentVMSize": {
     "type": "string",
     "defaultValue": "Standard_DS2_v2"
   },
   "sshRSAPublicKey": {
     "type": "string"
   }
 },
```

```
"agentCount": {
  "type": "int",
  "defaultValue": 3,
  "minValue": 1,
  "maxValue": 50
```

Create an AKS Cluster Using an ARM Template

Parameters

```
"parameters": {
   "clusterName": {
     "type": "string",
     "defaultValue": "akscluster"
   },
   "agentCount": {
     "type": "int",
     "defaultValue": 3,
     "minValue": 1,
     "maxValue": 50
   },
   "agentVMSize": {
     "type": "string",
     "defaultValue": "Standard_DS2_v2"
   },
   "sshRSAPublicKey": {
     "type": "string"
   }
 },
```

```
"agentVMSize": {
  "type": "string",
  "defaultValue": "Standard_DS2_v2"
```

Create an AKS Cluster Using an ARM Template

Parameters

```
"parameters": {
   "clusterName": {
     "type": "string",
     "defaultValue": "akscluster"
   },
   "agentCount": {
     "type": "int",
     "defaultValue": 3,
     "minValue": 1,
     "maxValue": 50
   },
   "agentVMSize": {
     "type": "string",
     "defaultValue": "Standard_DS2_v2"
   },
   "sshRSAPublicKey": {
     "type": "string"
   }
 },
```


```
"sshRSAPublicKey": {
  "type": "string"
```

Create an AKS Cluster Using an ARM Template

Resources

```
"resources": [
 {
    "type": "Microsoft.ContainerService/managedClusters",
    "apiVersion": "2020-03-01",
    "name": "[parameters('clusterName')]",
    "location": "[resourceGroup().location]",
    "properties": {
      "dnsPrefix": "aks",
      "agentPoolProfiles": [
        {
          "name": "agentpool",
          "count": "[parameters('agentCount')]",
          "vmSize": "[parameters('agentVMSize')]",
        }
      ],
      "linuxProfile": {
        "adminUsername": "aksadmin",
        "ssh": {
          "publicKeys": [
            {
              "keyData": "[parameters('sshRSAPublicKey')]"
            }
          ]
        }
      }
    },
    "identity": {
        "type": "SystemAssigned"
    }
  }
],
```

"type": "Microsoft.ContainerService/managedClusters",

Create an AKS Cluster Using an ARM Template

Resources

```
"resources": [
 {
    "type": "Microsoft.ContainerService/managedClusters",
    "apiVersion": "2020-03-01",
    "name": "[parameters('clusterName')]",
    "location": "[resourceGroup().location]",
    "properties": {
              "dnsPrefix": "aks",
      "agentPoolProfiles": [
               {
                 "name": "agentpool",
                 "count": "[parameters('agentCount')]",
                 "vmSize": "[parameters('agentVMSize')]",
               }
             ],
      "linuxProfile": {
        "adminUsername": "aksadmin",
        "ssh": {
          "publicKeys": [
            {
              "keyData": "[parameters('sshRSAPublicKey')]"
            }
          ]
        }
      }
    },
    "identity": {
        "type": "SystemAssigned"
    }
  }
],
```

```
"agentPoolProfiles": [
          {
            "name": "agentpool",
            "count": "[parameters('agentCount')]",
            "vmSize": "[parameters('agentVMSize')]",
          }
        ],
```

Create an AKS Cluster Using an ARM Template

Outputs

```
"outputs": {
 "controlPlaneFQDN": {
    "type": "string",
    "value": "[reference(parameters('clusterName')).fqdn]"
  }
```


```
"outputs": {
  "controlPlaneFQDN": {
     "type": "string",
     "value": "[reference(parameters('clusterName')).fqdn]"
   }
```


Citation: https://github.com/Azure/azure-quickstart-templates/blob/master/101-aks/azuredeploy.json

https://docs.microsoft.com/en-us/azure/templates/microsoft.containerservice/managedclusters?tabs=json

ARM Templates with Bicep

.bicecp files can be deployed directly through PowerShell and Azure CLI

https://github.com/Azure/bicep/

JSON

```
"parameters": {
    "clusterName": {
      "type": "string",
      "defaultValue": "akscluster"
    },
    "agentCount": {
      "type": "int",
      "defaultValue": 3,
      "minValue": 1,
      "maxValue": 50
    },
    "agentVMSize": {
      "type": "string",
      "defaultValue": "Standard_DS2_v2"
    },
    "sshRSAPublicKey": {
      "type": "string"
    }
  }
```

Bicep

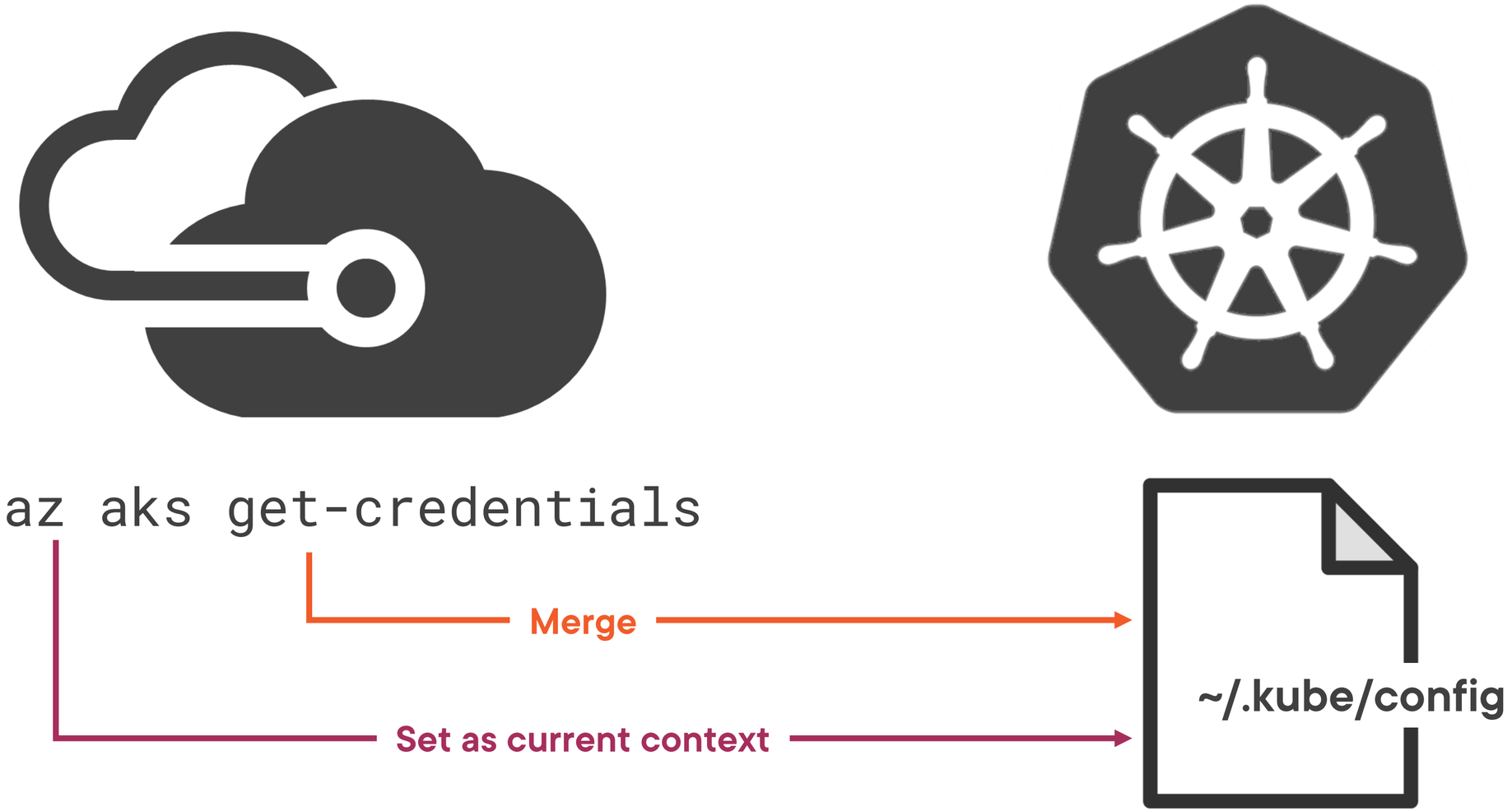
```
param clusterName string = 'akscluster'

@minValue(1)
@maxValue(50)
param agentCount int = 3
param agentVMSize string = 'Standard_DS2_v2'
param sshRSAPublicKey string
```

Demo

Create an AKS Cluster Using ARM Templates

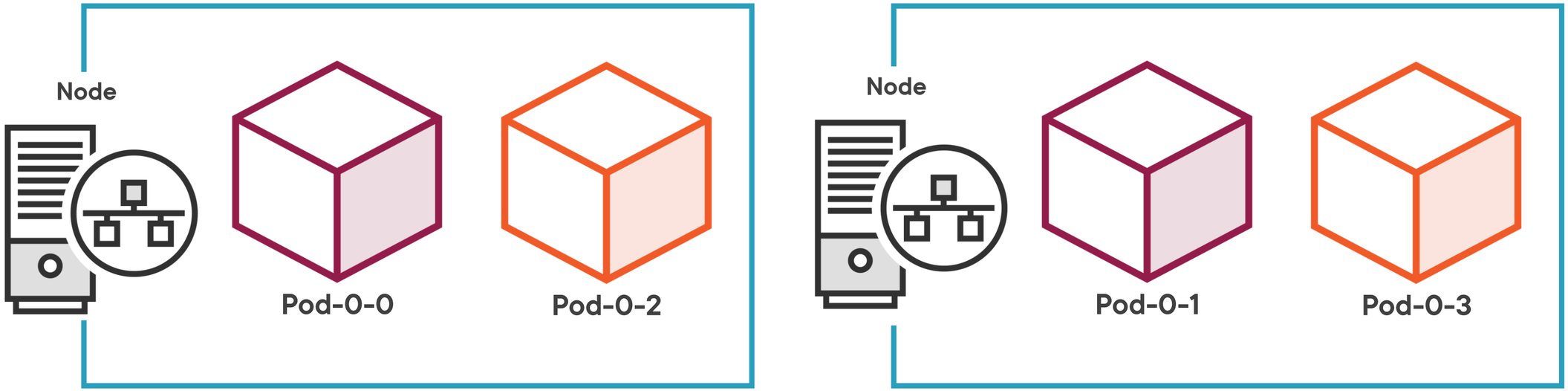
Communicating with Your AKS Cluster



Demo

Communicating with Your AKS Cluster

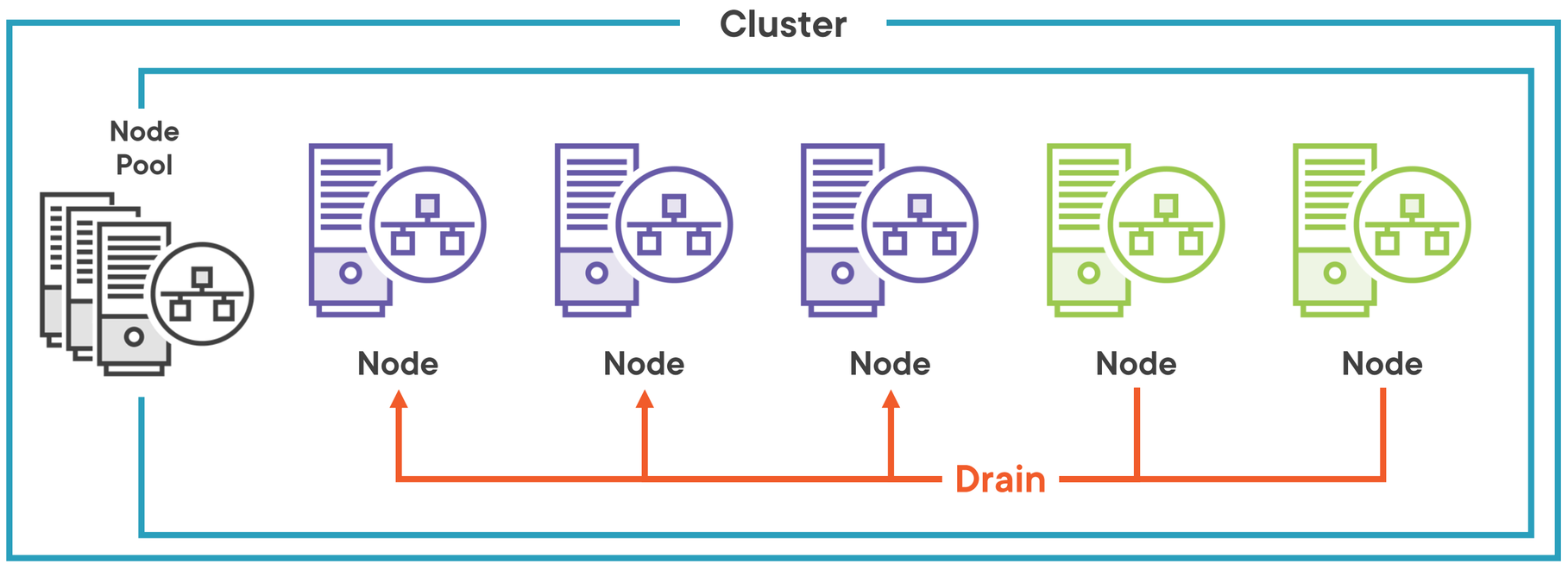
Manual Scaling an AKS Cluster - Pods




```
kubectl scale <Pod> --replicas=4
```

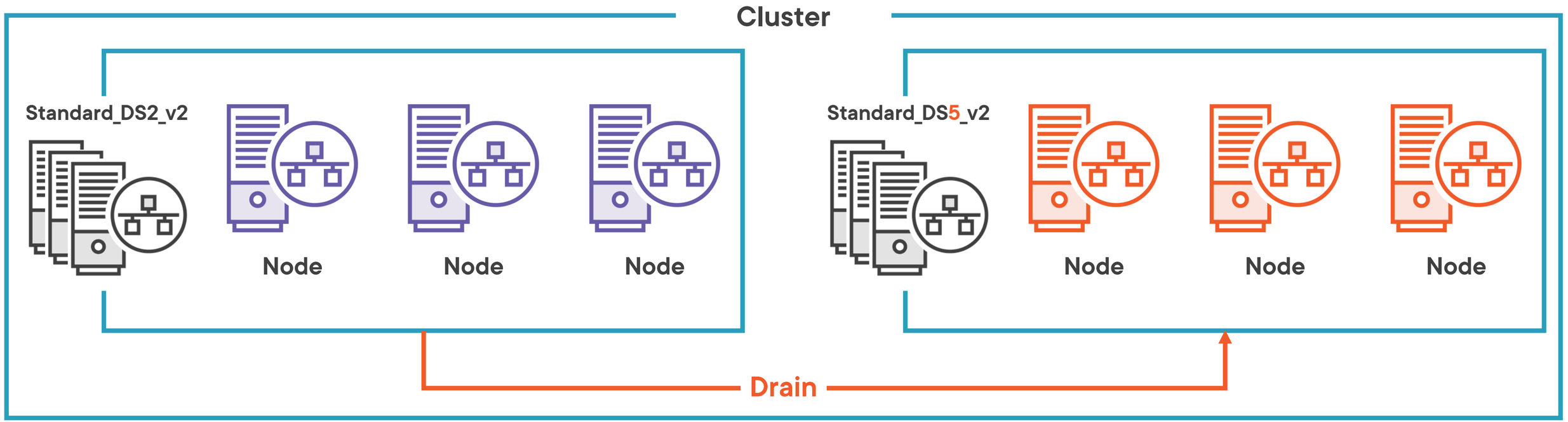
Manual Scaling an AKS Cluster – Node Count

Remove Nodes through Deployment Tool



Be considerate of workloads when scaling down!

Manual Scaling an AKS Cluster – Node Size

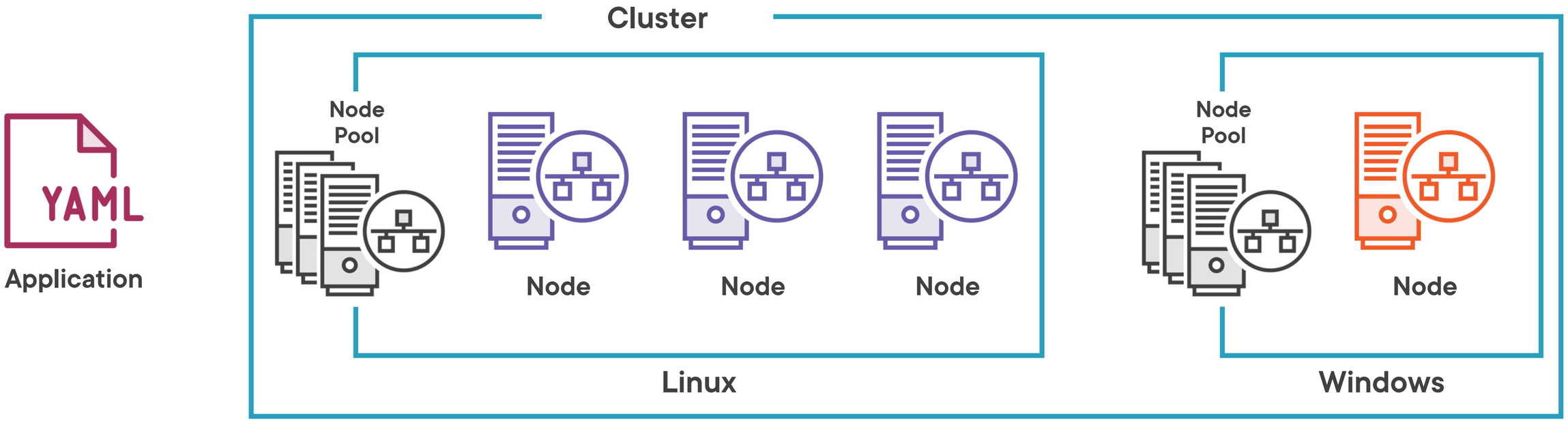


Demo

Scale Up Node Count Through Azure Portal

Scale Down Node Count Through Azure CLI

Windows Node Pools




```
...
spec:
      nodeSelector:
        "beta.kubernetes.io/os": windows
...
```

Demo

Deploy a Windows Node Pool

Summary

- AKS Creates an Extra RG per Cluster
- AKS Can Be Deployed Through the Azure Portal, Azure CLI, Azure PowerShell and ARM Templates
- Communication Runs Through kubectl
- AKS Clusters Can Be Manually Scaled
- Windows Node Pools Are Also Supported