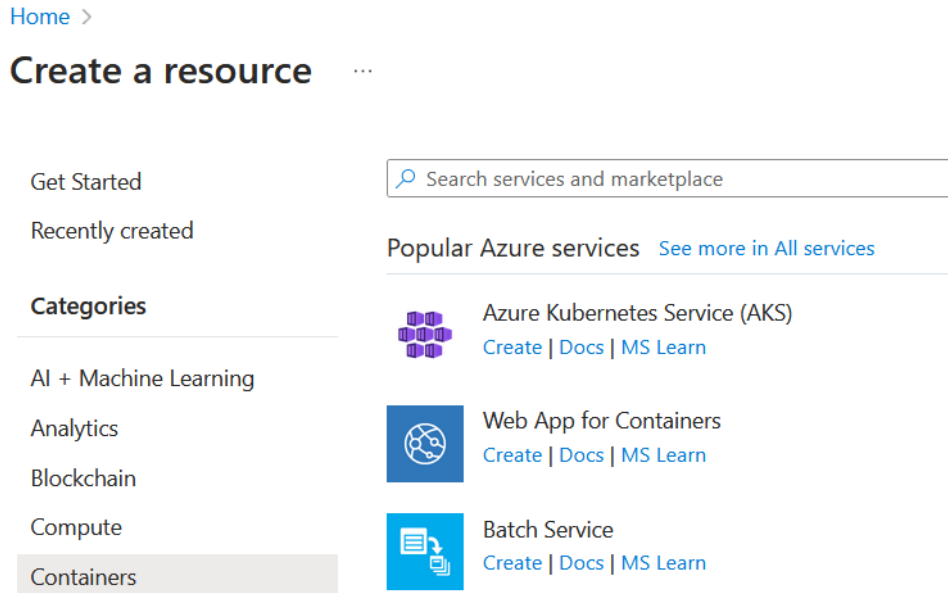


# Deployed Python Application to AKS Cluster

## Create an AKS cluster

1. Sign in to the [Azure portal](#).
2. From the **Home** page, select **Create a resource**.
3. In the **Categories** section, select **Containers** > **Azure Kubernetes Service (AKS)**.



4. On the **Basics** page, configure the following options:

**Basics** Node pools Networking Integrations Advanced Tags Review + create

Azure Kubernetes Service (AKS) manages your hosted Kubernetes environment, making it quick and easy to deploy and manage containerized applications without container orchestration expertise. It also eliminates the burden of ongoing operations and maintenance by provisioning, upgrading, and scaling resources on demand, without taking your applications offline.  
[Learn more](#)

**Project details**

Select a subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription \* ⓘ Azure subscription 1 ▼

Resource group \* ⓘ (New) myAKS\_RG ▼  
[Create new](#)

**Cluster details**

Cluster preset configuration Dev/Test ▼  
To quickly customize your Kubernetes cluster, choose one of the preset configurations above. You can modify these configurations at any time.  
[Learn more and compare presets](#)

Kubernetes cluster name \* ⓘ myAKSCluster ✓

Region \* ⓘ (Asia Pacific) Central India ▼

Availability zones ⓘ None ▼

AKS pricing tier ⓘ Free ▼

Kubernetes version \* ⓘ 1.26.6 (default) ▼

Automatic upgrade ⓘ Enabled with patch (recommended) ▼

Choose between local accounts or Azure AD for authentication and Azure RBAC or Kubernetes RBAC for your authorization needs.

Authentication and Authorization ⓘ Local accounts with Kubernetes RBAC ▼

5. Select **Next: Node pools**. On the **Node pools** page specify the Node size and Node Count.

### Node pools

In addition to the required primary node pool configured on the Basics tab, you can also add optional node pools to handle a variety of workloads [Learn more about node pools](#) ↗

+ Add node pool 🗑️ Delete

<input type="checkbox"/>	Name	Mode	Node size	OS type	Node count
<input type="checkbox"/>	agentpool	System	Standard_DS2_v2 (change)	Linux	2

### Enable virtual nodes

Virtual nodes allow burstable scaling backed by serverless Azure Container Instances. [Learn more about virtual nodes](#) ↗

Enable virtual nodes ⓘ ☐

### Node pool OS disk encryption

By default, all disks in AKS are encrypted at rest with Microsoft-managed keys. For additional control over encryption, you can supply your own keys using a disk encryption set backed by an Azure Key Vault. The disk encryption set will be used to encrypt the OS disks for all node pools in the cluster. [Learn more](#) ↗

Encryption type (Default) Encryption at-rest with a platform-managed key ▼

6. Select **Next: Networking**, Keep the default **Networking** options, which uses the kubernetes networking plug-in.

Basics Node pools **Networking** Integrations Advanced Tags Review + create

You can choose between two networking options: 'Kubernetes' or 'Azure CNI'.

- The **kubernetes** plugin allows for pods to receive IPs from a private host range in an overlay IP range fashion.
- The **Azure CNI** Vnet plugin allows for pods to receive IPs from the Azure subnet directly.

[Learn more about networking in Azure Kubernetes Service](#)

Network configuration ⓘ ☒ Kubernetes ☐ Azure CNI

Bring your own virtual network ⓘ ☐

DNS name prefix \* ⓘ myAKScluster-dns ✓

### Traffic routing

Load balancer ⓘ Standard

### Security

Enable private cluster ⓘ

☐

Set authorized IP ranges ⓘ


☐


Network policy ⓘ

☐ None

☒ Calico

☐ Azure

 Calico network policy is recommended for dev/test configuration.


 The Azure network policy is not compatible with kubernetes networking.

## 7. Select **Next: Integrations**. Keep the default **Integrations** options.

Basics Node pools Networking **Integrations** Advanced Tags Review + create

Connect your AKS cluster with additional services.


### Microsoft Defender for Cloud

Microsoft Defender for Cloud provides unified security management and advanced threat protection across hybrid cloud workloads. [Learn more](#) 

 Your subscription is protected by Microsoft Defender for Cloud basic plan.

### Azure Container Registry

Connect your cluster to an Azure Container Registry to enable seamless deployments from a private image registry.

[Learn more about Azure Container Registry](#) 

Container registry

None



[Create new](#)

### Azure Monitor

In addition to the CPU and memory metrics included in AKS by default, you can enable Container Insights for more comprehensive data on the overall performance and health of your cluster. Billing is based on data ingestion and retention settings.

[Learn more about container performance and health monitoring](#)

[Learn more about pricing](#)

☒ Default configuration

Enable container logs, Prometheus metrics, and Grafana visualizations.

☐ Custom configuration

☐ Off

Default configuration settings

#### Container logs

Log Analytics workspace

None

#### Prometheus metrics

Azure Monitor workspace

None

#### Grafana visualizations

Grafana workspace

None

### Alerting


Enable recommended alert rules ⓘ ☐

### Azure Policy

Apply at-scale enforcements and safeguards for AKS clusters in a centralized, consistent manner through Azure Policy.  
[Learn more about Azure Policy for AKS](#) ↗

Azure Policy

☐ Enabled ☒ Disabled

 Azure policy is recommended for dev/test configuration.

## 8. Select **Next: Advanced**. Keep the default **Advanced** options.

Basics Node pools Networking Integrations **Advanced** Tags Review + create

Enable secret store CSI driver ⓘ ☐

Infrastructure resource group ⓘ

MC\_myAKS\_RG\_myAKSCluster\_centralindia ✓


[Edit](#)

## 9. Select **Next: Tags**. On the tags page, Enter the Name and Value to create tags.

Basics Node pools Networking Integrations Advanced **Tags** Review + create

Tags are name/value pairs that enable you to categorize resources and view consolidated billing by applying the same tag to multiple resources and resource groups. [Learn more about tags](#) ↗

Note that if you create tags and then change resource settings on other tabs, your tags will be automatically updated.

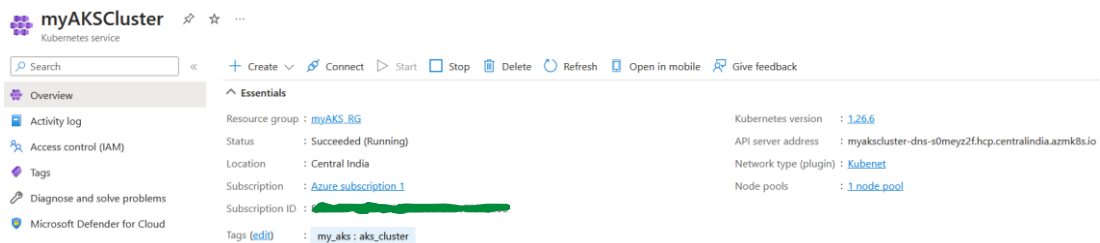
Name ⓘ	Value ⓘ	Resource
myaks	aks_cluster	2 selected ✓ 



## 10. Select **Next: Review + create**.

When you navigate to **Review + create** tab, Azure runs validation on the settings that you have chosen. If validation passes, you can proceed to create the AKS cluster by selecting **Create**.






## 11. It takes a few minutes to create AKS cluster. When your deployment is complete, navigate to your resource by either:

- Selecting **Go to resource**, or
- Browsing to the AKS cluster resource group and selecting the AKS resource.



**myAKSCluster**   ...

Search ⓘ Create ▾ Connect ▶ Start □ Stop □ Delete ↺ Refresh ⓘ Open in mobile ⓘ Give feedback ⓘ

**Overview**  Activity log  Access control (IAM)  Tags  Diagnose and solve problems  Microsoft Defender for Cloud

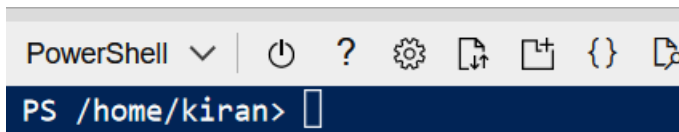
**Essentials**

Resource group	: myAKS_RG	Kubernetes version	: 1.26.6
Status	: Succeeded (Running)	API server address	: myakscluster-dns-s0meyz2fhcp.centralindia.azmk8s.io
Location	: Central India	Network type (plugin)	: Kubenet
Subscription	: Azure subscription 1	Node pools	: 1 node pool
Subscription ID	: [REDACTED]		
Tags (edit)	: my_aks : aks_cluster		

## Connect to the Cluster

To manage a Kubernetes cluster, use Kubernetes command-line client, [kubectl](#).  
`kubectl` is already installed in Azure Cloud Shell.

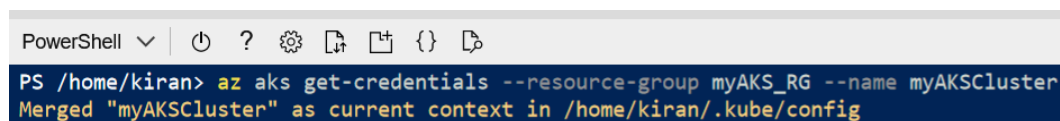
1. Open the Cloud Shell using the >\_ button on the top of the Azure portal.



```
PowerShell | [Power] ? [Settings] [Copy] [Paste] [Terminal] [Help]
PS /home/kiran>
```

2. Connect to your Kubernetes cluster using the [az aks get-credentials](#) command.  
Following command downloads credentials and configures the Kubernetes CLI to use them.

```
az aks get-credentials --resource-group myAKS_RG --name myAKSCluster
```



```
PowerShell | [Power] ? [Settings] [Copy] [Paste] [Terminal] [Help]
PS /home/kiran> az aks get-credentials --resource-group myAKS_RG --name myAKSCluster
Merged "myAKSCluster" as current context in /home/kiran/.kube/config
```

3. Verify the connection to your cluster using `kubectl get` to return a list of the cluster nodes.

```
kubectl get nodes
```



```
PS /home/kiran> kubectl get nodes
```

Output shows the node created. Make sure the node status is *Ready*:

NAME	STATUS	ROLES	AGE	VERSION
aks-agentpool-37975187-vmss000000	Ready	agent	13m	v1.26.6
aks-agentpool-37975187-vmss000001	Ready	agent	13m	v1.26.6

## Deploy the Application

Kubernetes manifest file defines a cluster's desired state.

Use a manifest to create all objects needed to run the Azure Vote application. This manifest includes two Kubernetes deployments:

- Azure Vote Python applications.
- Redis instance.

2 Kubernetes Services are also created:

- Internal service for the Redis instance.
- External service to access the Azure Vote application from the internet.

1. In the Cloud Shell, open an editor and create a file named `azure-vote.yaml`.
2. Paste in the following YAML definition:

```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: azure-vote-back
spec:
  replicas: 1
  selector:
    matchLabels:
      app: azure-vote-back
  template:
    metadata:
      labels:
        app: azure-vote-back
    spec:
      nodeSelector:
        "kubernetes.io/os": linux
      containers:
        - name: azure-vote-back
          image: mcr.microsoft.com/oss/bitnami/redis:6.0.8
          env:
            - name: ALLOW_EMPTY_PASSWORD
              value: "yes"
          resources:
            requests:
              cpu: 100m
              memory: 128Mi
            limits:
              cpu: 250m
              memory: 256Mi
          ports:
            - containerPort: 6379
              name: redis
```

---

```
apiVersion: v1
kind: Service
metadata:
  name: azure-vote-back
spec:
  ports:
    - port: 6379
  selector:
    app: azure-vote-back
```

---

```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: azure-vote-front
spec:
  replicas: 1
  selector:
    matchLabels:
      app: azure-vote-front
  template:
    metadata:
      labels:
```

```

    app: azure-vote-front
spec:
  nodeSelector:
    "kubernetes.io/os": linux
  containers:
  - name: azure-vote-front
    image: mcr.microsoft.com/azuredocs/azure-vote-front:v1
    resources:
      requests:
        cpu: 100m
        memory: 128Mi
      limits:
        cpu: 250m
        memory: 256Mi
    ports:
    - containerPort: 80
    env:
    - name: REDIS
      value: "azure-vote-back"
---
apiVersion: v1
kind: Service
metadata:
  name: azure-vote-front
spec:
  type: LoadBalancer
  ports:
  - port: 80
  selector:
    app: azure-vote-front

```

3. Deploy the application using the `kubectl apply` command and specify the name of your YAML manifest:

```
PS /home/kiran> kubectl apply -f azure-vote.yaml
```

Output shows the successfully created deployments and services:

```

deployment.apps/azure-vote-back created
service/azure-vote-back created
deployment.apps/azure-vote-front created
service/azure-vote-front created

```

## Test the Application

When the application runs, a Kubernetes service exposes the application front end to the internet.

- To monitor progress, use the `kubectl get service` command with the `--watch` argument.

```
PS /home/kiran> kubectl get service azure-vote-front --watch
```

- Once the **EXTERNAL-IP** address changes from *pending* to actual public IP address, use CTRL-C to stop the `kubectl watch` process.

Output shows a valid public IP address assigned to the service:

NAME	TYPE	CLUSTER-IP	EXTERNAL-IP	PORT(S)	AGE
azure-vote-front	LoadBalancer	[REDACTED]	[REDACTED]	80:31547/TCP	103s

- Use the `kubectl get` command and look for existing Pods:

```
PS /home/kiran> kubectl get pods
```

NAME	READY	STATUS	RESTARTS	AGE
azure-vote-back-[REDACTED]	1/1	Running	0	10m
azure-vote-front-[REDACTED]	1/1	Running	0	10m

- To see the Azure Vote app in action, open a web browser to the external IP address of your service.

### Azure Voting App

Cats

Dogs

Reset

Cats - 0 | Dogs - 0

### Azure Voting App

Cats

Dogs

Reset

Cats - 5 | Dogs - 5