

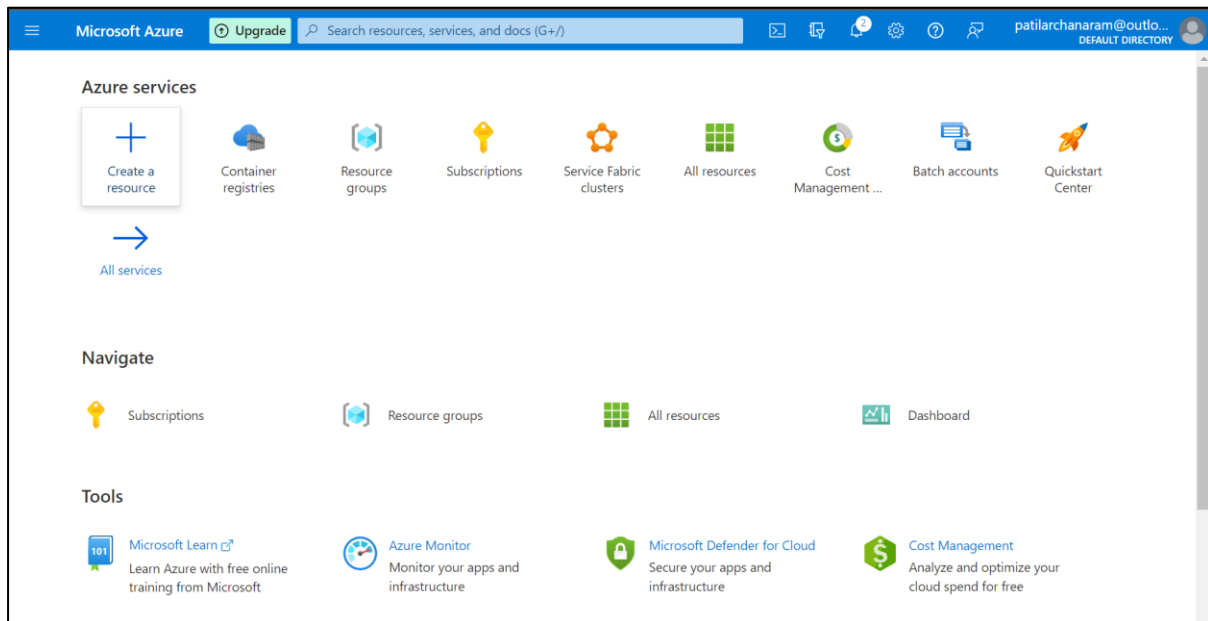
PRACTICAL NO - 03

A) Create an Azure Kubernetes Service Cluster

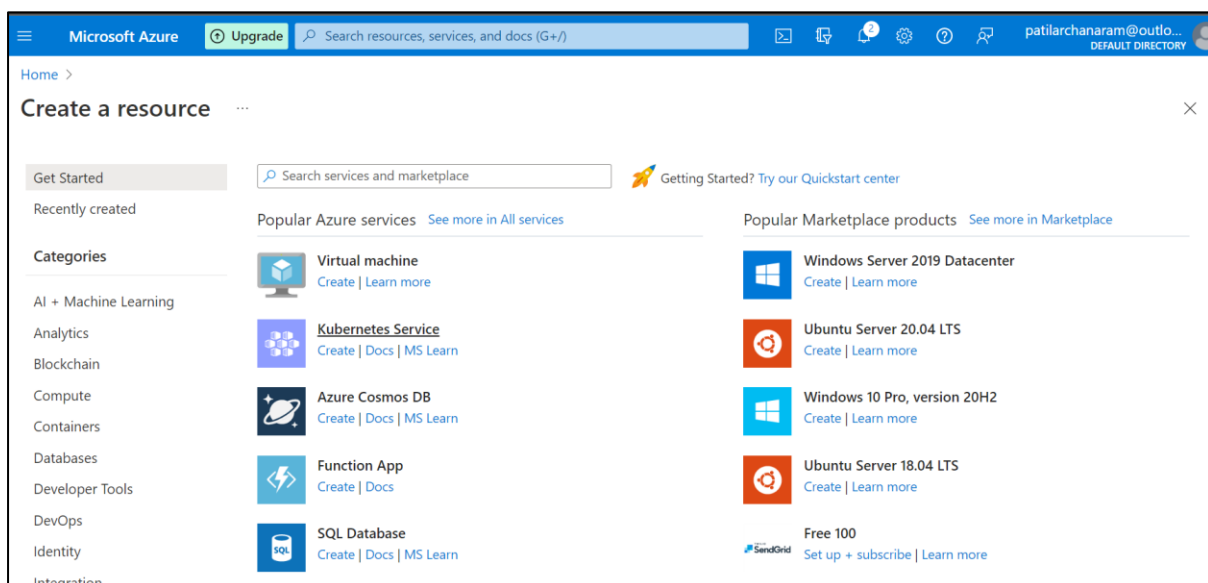
Step I - Sign in to the Azure portal

Step II - Create AKS Cluster

- Select + *Create a resource* from the Microsoft Azure Home page.



- Select Kubernetes Service



- Enter the subscription. Select resource group. If a resource group is not created then click Create new ► Name it ► Ok.

Microsoft Azure Upgrade Search resources, services, and docs (G+)

Home > Create a resource >

Create Kubernetes cluster

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 about Azure Kubernetes Service](#)

Project details

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

Subscription * ⓘ Free Trial

Resource group * ⓘ (New) Resource group
[Create new](#)

Cluster details

Cluster preset configuration

Kubernetes cluster name * ⓘ

Modal Dialog:

A resource group is a container that holds related resources for an Azure solution.

Name * CAD ✓

OK Cancel

[Review + create](#) < Previous Next : Node pools >

- Select Cluster preset configuration.
- Enter cluster name.

The screenshot shows the 'Create Kubernetes cluster' page in the Microsoft Azure portal. The page is titled 'Create Kubernetes cluster' and has a breadcrumb trail 'All services > Kubernetes services >'. Below the title, there are tabs for 'Basics', 'Node pools', 'Access', 'Networking', 'Integrations', 'Advanced', 'Tags', and 'Review + create'. The 'Basics' tab is selected. The page content includes a description of Azure Kubernetes Service (AKS) and a link to 'Learn more about Azure Kubernetes Service'. Under the 'Project details' section, there are two dropdown menus: 'Subscription' (set to 'Free Trial') and 'Resource group' (set to 'CAD'). Below these, there is a link 'Create new'. Under the 'Cluster details' section, there is a dropdown menu for 'Cluster preset configuration' (set to 'Standard (\$\$)') and a text input field for 'Kubernetes cluster name' (set to 'myKubernetesCluster'). At the bottom, there are three buttons: 'Review + create', '< Previous', and 'Next : Node pools >'. The 'Review + create' button is highlighted in blue.

Microsoft Azure

Search resources, services, and docs (G+/I)

All services > Kubernetes services >

Create Kubernetes cluster

Basics Node pools Access 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 about Azure Kubernetes Service](#)

Project details

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

Subscription * ⓘ Free Trial

Resource group * ⓘ CAD
[Create new](#)

Cluster details

Cluster preset configuration Standard (\$\$)
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 * ⓘ myKubernetesCluster

Review + create < Previous Next : Node pools >

- Select region, Kubernetes version, Node count range, and scale method, as shown in the Figure below ► Click on Review + create

The screenshot displays the 'Create Kubernetes cluster' wizard in the Microsoft Azure portal. The interface includes a top navigation bar with the 'Microsoft Azure' logo, an 'Upgrade' button, and a search bar. The breadcrumb trail shows 'All services > Kubernetes services >'. The main heading is 'Create Kubernetes cluster ...'. The configuration fields are as follows:

- Kubernetes cluster name ***: mykubernetescluster
- Region ***: (Asia Pacific) East Asia
- Availability zones**: Zones 1,2,3. A note indicates: 'High availability is recommended for standard configuration.'
- Kubernetes version ***: 1.21.9 (default)
- API server availability**:
 - ☒ 99.95%: Optimize for availability.
 - ☐ 99.5%: Optimize for cost.A note indicates: '99.95% API server availability is recommended for standard configuration.'

Primary node pool

The number and size of nodes in the primary node pool in your cluster. For production workloads, at least 3 nodes are recommended for resiliency. For development or test workloads, only one node is required. If you would like to add additional node pools or to see additional configuration options for this node pool, go to the 'Node pools' tab above. You will be able to add additional node pools after creating your cluster. [Learn more about node pools in Azure Kubernetes Service](#)

- Node size ***: Standard DS2 v2. A note indicates: 'Standard DS2_v2 is recommended for standard configuration.' A link 'Change size' is available.
- Scale method ***:
 - ☐ Manual
 - ☒ AutoscaleA note indicates: 'Autoscaling is recommended for standard configuration.'
- Node count range ***: A slider set from 1 to 2.

At the bottom, there are three buttons: 'Review + create' (highlighted in blue), '< Previous', and 'Next : Node pools >'.

- If will get a message as *Validation Passed* as shown below ► click on Create.

Microsoft Azure Upgrade Search resources, services, and docs (G+/I)

All services > Kubernetes services >

Create Kubernetes cluster ...

✓ Validation passed

Basics Node pools Access Networking Integrations Advanced Tags Review + create

Basics

Subscription	Free Trial
Resource group	CAD
Region	East Asia
Kubernetes cluster name	myKubernetesCluster
Kubernetes version	1.21.9

Node pools

Node pools	1
Enable virtual nodes	Disabled

Access

Authentication method	System-assigned managed identity
Role-based access control (RBAC)	Enabled
AKS-managed Azure Active Directory	Disabled
Encryption type	(Default) Encryption at-rest with a platform-managed key

Networking

Network configuration	Kubenet
DNS name prefix	mvKubernetesCluster-dns

Create < Previous Next > [Download a template for automation](#)

- Deployment will get started. Wait for a few minutes. Once deployment is completed ► click on 'Go to resource'.

Microsoft Azure | Search resources, services, and docs (G+)

All services > microsoft.aks-20220414161330 | Overview

Deployment

Search (Ctrl+/) « Delete Cancel Redeploy Refresh

Overview

We'd love your feedback →

✓ Your deployment is complete

Deployment name: microsoft.aks-20220414161330 Start time: 4/14/2022, 4:21:28 PM
Subscription: [Free Trial](#) Correlation ID: 4e5deff3-34aa-4caa-ae9f-25d587c0aeb3
Resource group: [CAD](#)

Deployment details (Download)

Resource	Type	Status	Operation details
ClusterMonitoringMetricPublisherRoleAssi	Microsoft.Resources/deployments	OK	Operation details
myKubernetesCluster	Microsoft.ContainerService/managedC...	OK	Operation details
SolutionDeployment-20220414162114	Microsoft.Resources/deployments	OK	Operation details
WorkspaceDeployment-2022041416211	Microsoft.Resources/deployments	OK	Operation details

Next steps

[Create a quick start application](#) Recommended
[Create a Kubernetes deployment](#) Recommended
[Integrate automatic deployments within your cluster](#) Recommended
[Connect to cluster](#) Recommended

[Go to resource](#) [Connect to cluster](#)

- You will get navigated to the newly created Azure Kubernetes Service Cluster.

Microsoft Azure | Search resources, services, and docs (G+)

All services > microsoft.aks-20220414161330 > myKubernetesCluster

Kubernetes service

Search (Ctrl+/) « Create Connect Start Stop Delete Refresh Give feedback

Overview

Activity log
Access control (IAM)
Tags
Diagnose and solve problems
Security

Kubernetes resources

Namespaces
Workloads
Services and ingresses
Storage
Configuration

Settings

Node pools
Cluster configuration
Networking
Open Service Mesh
GitOps (preview)
Deployment center (preview)

Essentials

Resource group: [CAD](#) Kubernetes version: [1.21.9](#)
Status: Succeeded (Running) API server address: mykubernetescluster-dns-6b6fa3d2.hcp.eastasia.azmk8s.io
Location: eastasia Network type (plugin): [Kubenet](#)
Subscription: [Free Trial](#) Node pools: [1 node pool](#)
Subscription ID: e5661717-1f56-4a46-a24a-785ccdec9902
Tags (edit): [Click here to add tags](#)

Get started **Properties** Monitoring Capabilities Recommendations Tutorials

Kubernetes services

Encryption type	Encryption at-rest with a platform-managed key
Virtual node pools	Not enabled

Node pools

Node pools	1 node pool
Kubernetes versions	1.21.9
Node sizes	Standard_DS2_v2

Configuration

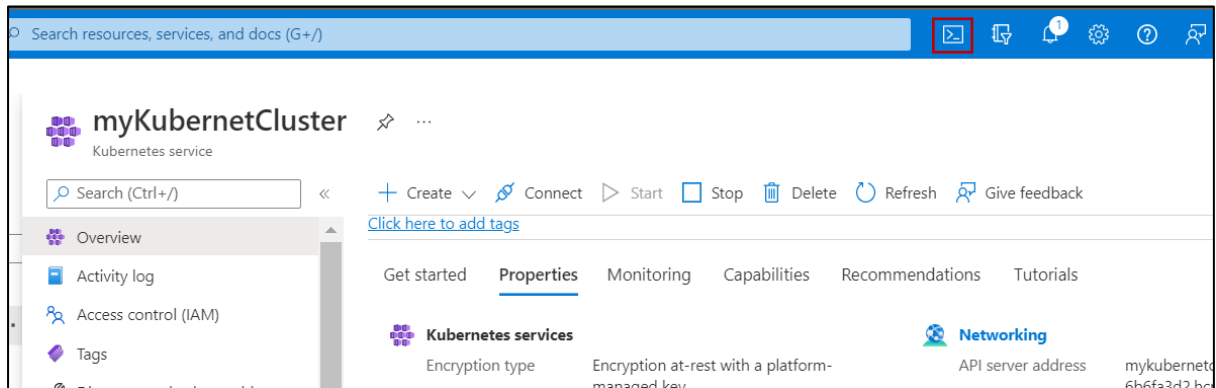
Kubernetes version	1.21.9
Kubernetes RBAC	Enabled
AKS-managed AAD	Not enabled

Networking

API server address	mykubernetescluster-dns-6b6fa3d2.hcp.eastasia.azmk8s.io
Network type (plugin)	Kubenet
Pod CIDR	10.244.0.0/16
Service CIDR	10.0.0.0/16
DNS service IP	10.0.0.10
Docker bridge CIDR	172.17.0.1/16
Network Policy	None
Load balancer	Standard
HTTP application routing	Not enabled
Private cluster	Not enabled
Authorized IP ranges	Not enabled
Application Gateway ingress	Not enabled

Step III - Connect to the cluster

- To manage a Kubernetes cluster, use the Kubernetes command-line client, `kubectl`. The `kubectl` is already installed if you use Azure Cloud Shell.
- Open *Cloud Shell* using the `>` button on the top of the Azure portal. ➤ *Bash*



```
Bash
Requesting a Cloud Shell.Succeeded.
Connecting terminal...

Welcome to Azure Cloud Shell

Type "az" to use Azure CLI
Type "help" to learn about Cloud Shell

archana@Azure:~$
```

- Configure `kubectl` to connect to your Kubernetes cluster using the `az aks get-credentials` command. The following command downloads credentials and configures the Kubernetes CLI to use them.

`az aks get-credentials -g [Resource Group] -n [Name of Azure Kubernetes Service]`

```
archana@Azure:~$ az aks get-credentials -g CAD -n myKubernetesCluster
Merged "myKubernetesCluster" as current context in /home/archana/.kube/config
archana@Azure:~$
```

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

`kubectl get nodes`

```
archana@Azure:~$ kubectl get nodes
NAME                                STATUS    ROLES    AGE    VERSION
aks-agentpool-14713057-vmss000001 Ready    agent    10h    v1.21.9
```

B) Deploy Application on AKS

Step I – Create *myfile.yaml* file

- Copy the following code and save the file as *myfile.yaml* and save it to Desktop. We will use this file to deploy an app to the AKS cluster using Azure CLI.
- There are two deployments and two services.

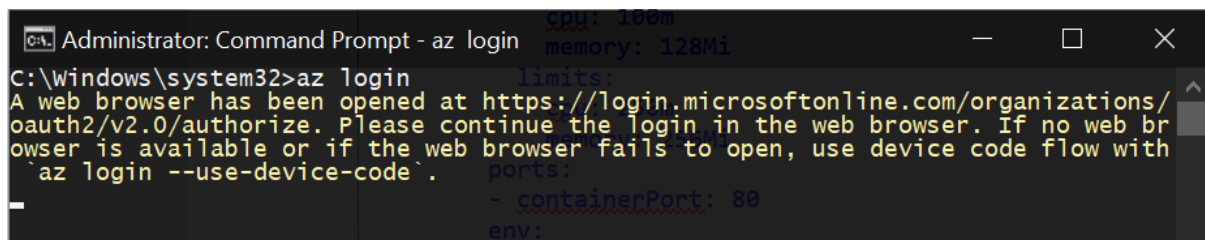
```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: azure-vote-back
spec:
  replicas: 1
  selector:
    matchLabels:
      app: azure-vote-back
  template:
    metadata:
      labels:
        app: azure-vote-back
    spec:
      nodeSelector:
        "kubernetes.io/os": linux
      containers:
        - 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
```

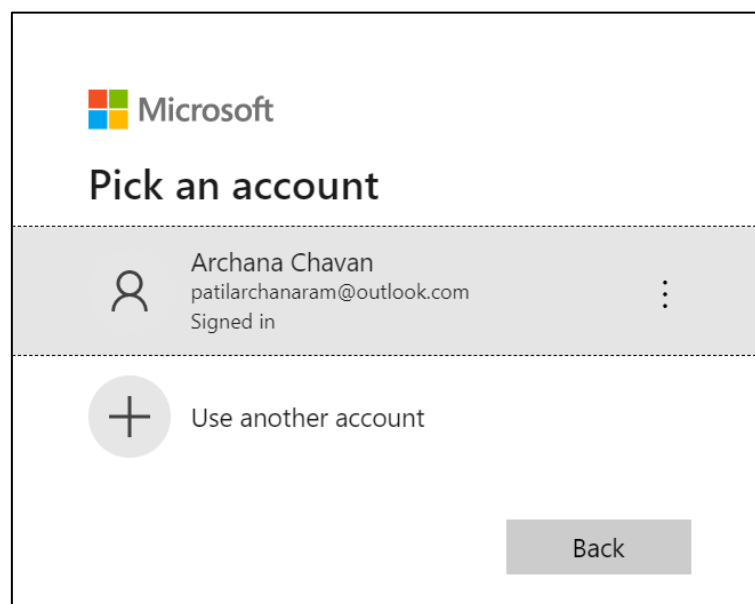
Step II – Deploy app using Azure CLI

- Now open a command prompt as an administrator. Login to your azure account by using `az login` command as shown in the figure below.

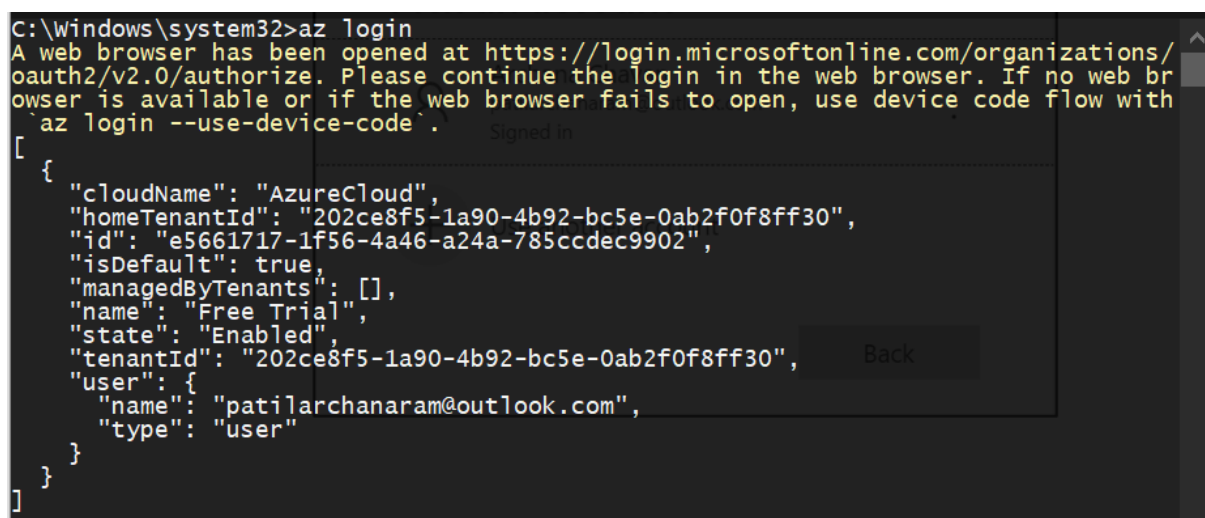


```
Administrator: Command Prompt - az login
C:\Windows\system32>az login
A web browser has been opened at https://login.microsoftonline.com/organizations/
oauth2/v2.0/authorize. Please continue the login in the web browser. If no web br
owser is available or if the web browser fails to open, use device code flow with
`az login --use-device-code`.
limits:
- containerPort: 80
env:
```

- It will redirect you to another page. Select your Microsoft account here.



- You will get access to your azure account from the Azure CLI and you will get the following screen.



```
C:\Windows\system32>az login
A web browser has been opened at https://login.microsoftonline.com/organizations/
oauth2/v2.0/authorize. Please continue the login in the web browser. If no web br
owser is available or if the web browser fails to open, use device code flow with
`az login --use-device-code`.
Signed in
[
  {
    "cloudName": "AzureCloud",
    "homeTenantId": "202ce8f5-1a90-4b92-bc5e-0ab2f0f8ff30",
    "id": "e5661717-1f56-4a46-a24a-785ccdec9902",
    "isDefault": true,
    "managedByTenants": [],
    "name": "Free Trial",
    "state": "Enabled",
    "tenantId": "202ce8f5-1a90-4b92-bc5e-0ab2f0f8ff30",
    "user": {
      "name": "patilarchanaram@outlook.com",
      "type": "user"
    }
  }
]
```

- Now navigate to the desktop where the myfile.yaml file is saved.
- Now run the following command to deploy the app on AKS cluster.

kubectl apply -f myfile.yaml

```
C:\Windows>cd system32
C:\Windows\System32>cd /
C:\>cd users\patil\Desktop
C:\Users\patil\Desktop>kubectl apply -f myfile.yaml
deployment.apps/azure-vote-back created
service/azure-vote-back created
deployment.apps/azure-vote-front created
service/azure-vote-front created
```

	Namespace	Status
deployment.apps/azure-vote-back	kube-system	Ok
service/azure-vote-back	kube-system	Ok
deployment.apps/azure-vote-front	kube-system	Ok
service/azure-vote-front	kube-system	Ok

- Here we can see that there are 2 deployments and 2 services created successfully.
- Now run command

kubectl get pods

```
C:\Users\patil\Desktop>kubectl get pods
NAME                                READY   STATUS    RESTARTS   AGE
azure-vote-back-6c4dd64bdf-9bfpv    1/1     Running   0           6m7s
azure-vote-front-85b4df594d-zzfrg    1/1     Running   0           6m7s
```

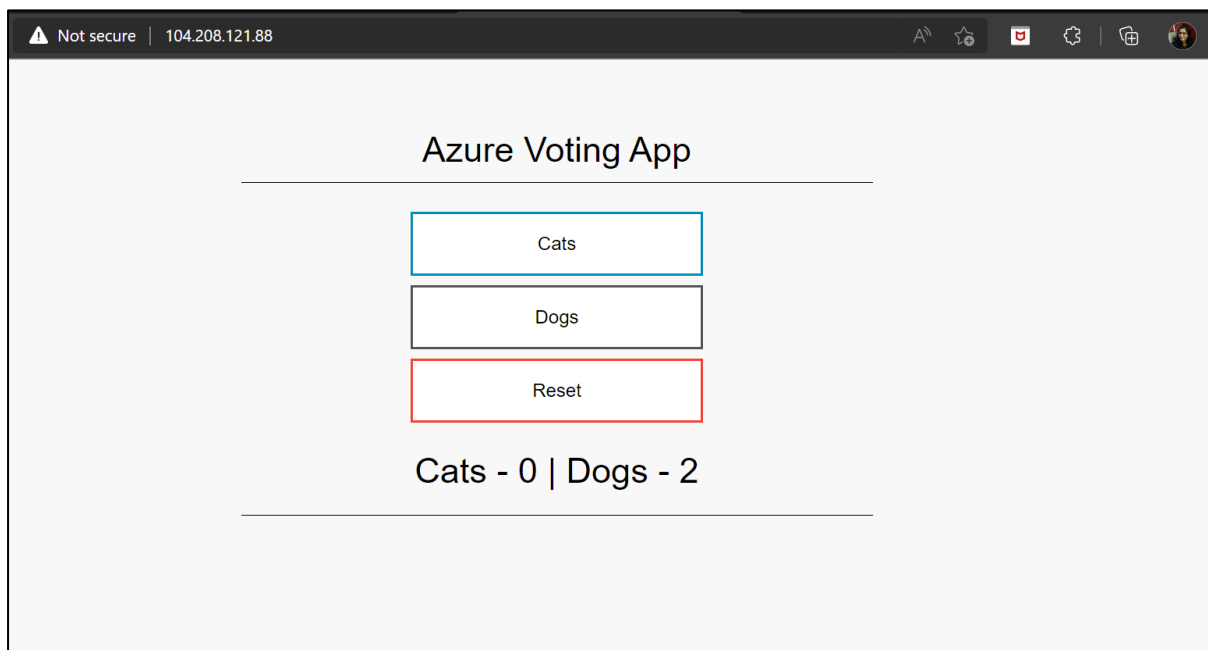
- We can see there are 2 pods running successfully.
- Now to see services run command

kubectl get services

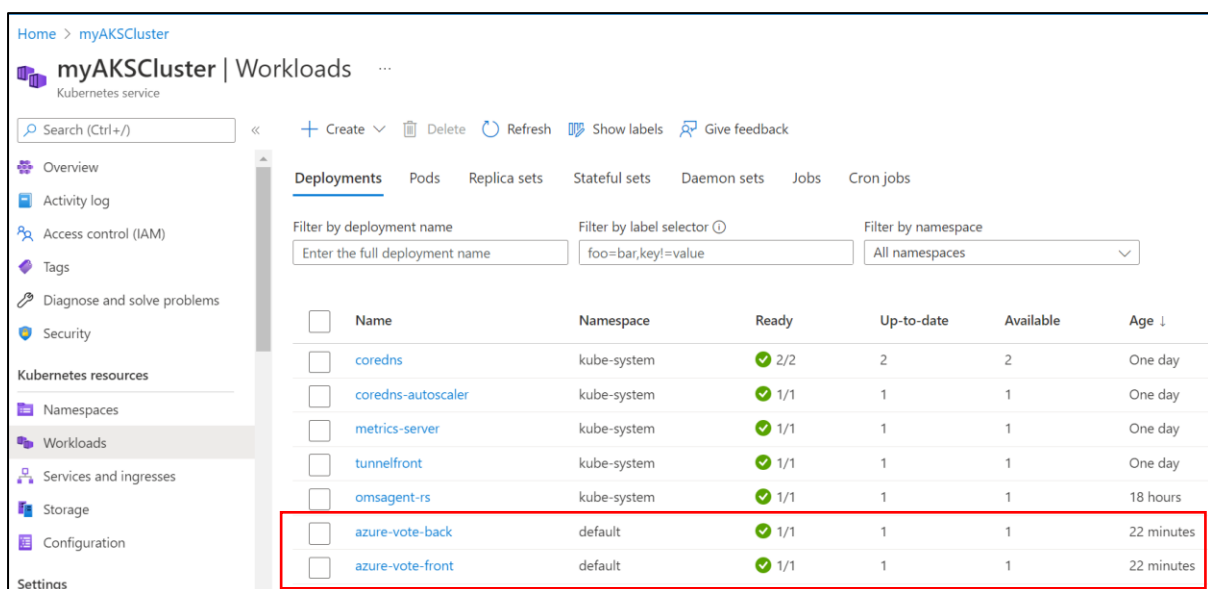
```
C:\Users\patil\Desktop>kubectl get services
NAME                                TYPE        CLUSTER-IP    EXTERNAL-IP    PORT(S)
AGE
azure-vote-back                     ClusterIP    10.0.64.248    <none>         6379/TCP
8m44s
azure-vote-front                     LoadBalancer 10.0.91.173    104.208.121.88 80:30588/TCP
8m43s
kubernetes                           ClusterIP    10.0.0.1       <none>         443/TCP
5h24m
```

- We can see the azure-vote-back and azure-vote-front services with their corresponding Type, Cluster-IP and Ports. The azure-vote-front service has External-IP that we use in the browser to run the app.

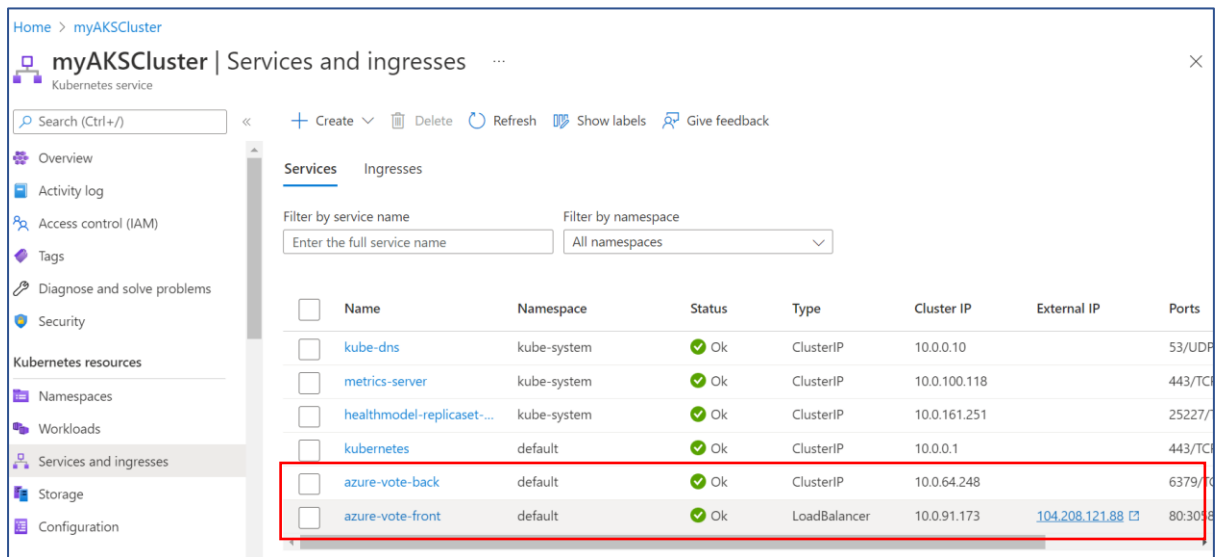
- Now copy this External-IP and paste it in the browser to run app.



- Now login to your azure portal account. > Go to your kubernetes service cluster > from the left pane click on *workloads*.
- Here in the Deployment tab you can see your current deployment



- Now click on Services and ingresses from the left pane. We can see the azure-vote-back and azure-vote-front services.



- You can see the External IP of azure-vote-front service. Just click on that ip address your app will run the browser.

