

# TEACHNOOK MINOR PROJECT

## PROJECT NAME:

*Cloud Computing Minor Project*

## PROJECT DESCRIPTION:

*Use any one service of azure and show its practical demonstration...You can use speech recognition or image recognition...etc*

## TITLE OF THE PROJECT:

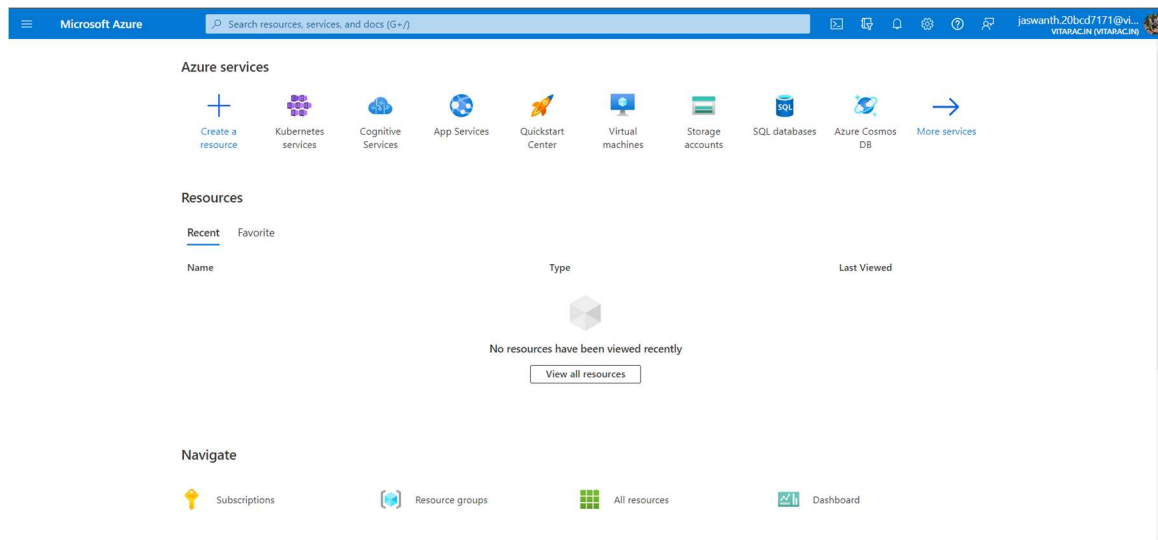
*Deploy App to Azure Kubernetes Services (AKS)*

*Index:*

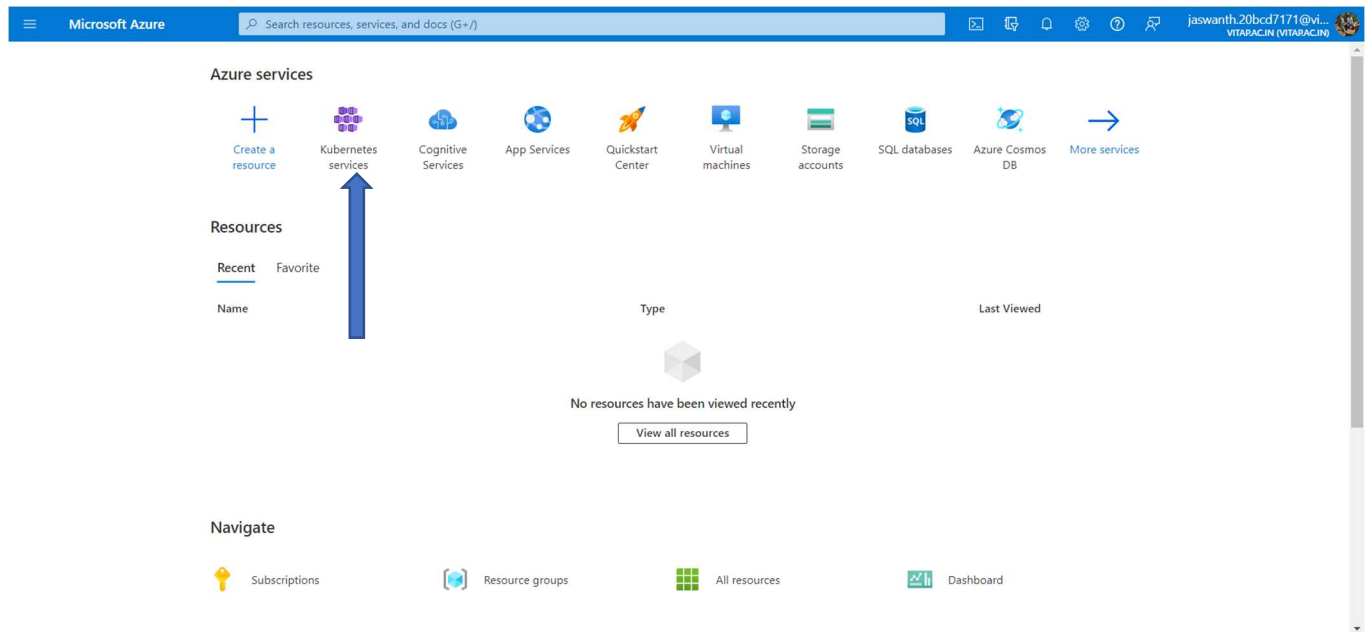
- ❖ *Creating AKS Context from our local cmd*
- ❖ *Using Azure CLI to login to AKS*
- ❖ *Executing YAML file against your AKS clustur from your local PC.*
- ❖ *Querying Pods and Service.*
- ❖ *Opening Service by their external ips on the browser*

## Execution:

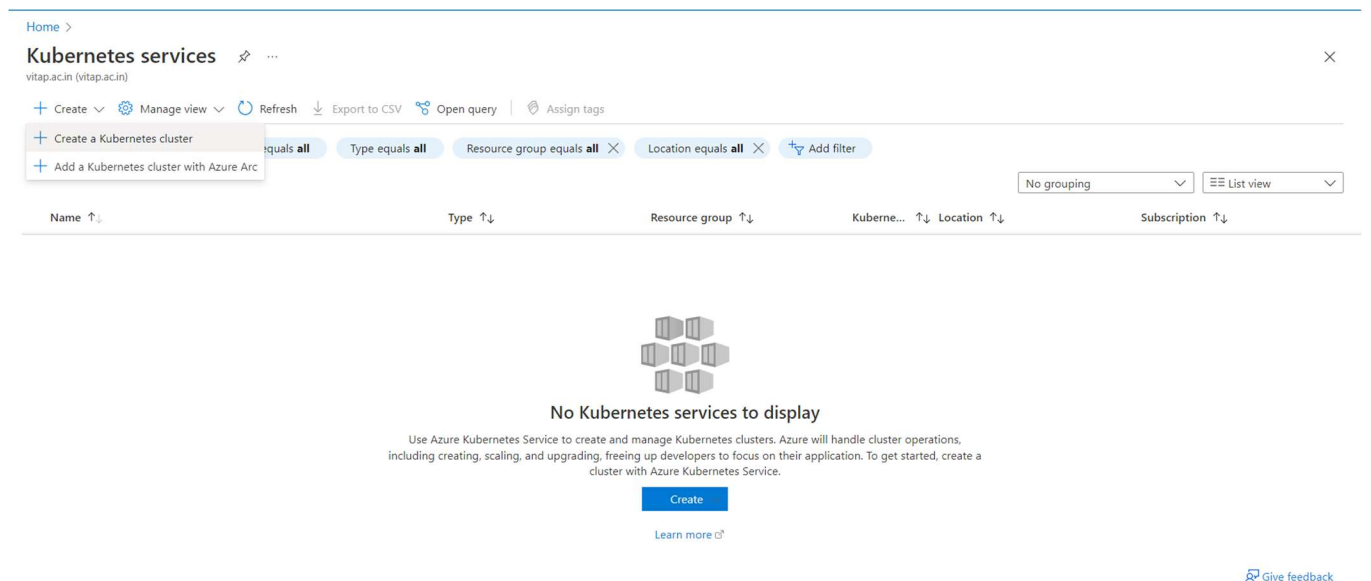
1. Sign in with your azure account.



## 2. Get ahead to Kubernetes Services



## 3. Click on the Create Kubernetes Cluster to create



#### 4.Naming and all inside the Cluster Kubernetes Services

##### ❖ Create New Resource name im giving it as “R1”

[Home](#) > [Kubernetes services](#) >

### Create Kubernetes cluster ...

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 \* ⓘ

Resource group \* ⓘ  [Create new](#)

##### ❖ Give a name to Kubernetes Cluster I have given it as “myKuber”

Kubernetes cluster name \* ⓘ  ✓

Region \* ⓘ

Availability zones ⓘ    
 High availability is recommended for standard configuration.

Kubernetes version \* ⓘ

API server availability ⓘ   
☒ 99.95%   
 Optimize for availability.   
☐ 99.5%   
 Optimize for cost.   
 99.95% API server availability is recommended for standard configuration.

##### ❖ Give a Node Count Range as “1to2”

#### 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**   
 Standard DS2\_v2 is recommended for standard configuration.   
[Change size](#)


Scale method \* ⓘ   
☐ Manual   
☒ Autoscale   
 Autoscaling is recommended for standard configuration.

Node count range \* ⓘ

After it Click on “Review+Create”

5. Now the final Validation has done so click on “Create”

## Create Kubernetes cluster ...

 Validation passed

Basics
Node pools
Access
Networking
Integrations
Advanced
Tags
Review + create

**Basics**

Subscription	Azure for Students
Resource group	(new) R1
Region	East US
Kubernetes cluster name	myKuber
Kubernetes version	1.23.12
Enable automatic upgrades	False

**Node pools**

Node pools	1
Enable virtual nodes	Disabled

**Access**

Resource identity	System-assigned managed identity
-------------------	----------------------------------

[Create](#)

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

6. Now after clicking on create our deployment will begin we should wait for some time (min 1 to 2min) after you will get as Deployment complete

Home > **microsoft.aks-20221016212449** | Overview ...

Deployment


Delete Cancel Redeploy Download Refresh


Overview

Inputs

Outputs

Template

 **Your deployment is complete**

 Deployment name: microsoft.aks-20221016212449

Subscription: Azure for Students

Resource group: R1

Start time: 10/16/2022, 9:39:29 PM

Correlation ID: ad9b8f58-56c9-4cfc-a769-7a8c790b6819

Deployment 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](#)


Give feedback

[Tell us about your experience with deployment](#)

 **Deployment succeeded**


Deployment 'microsoft.aks-20221016212449' to resource group 'R1' was successful.

[Go to resource](#)
[Pin to dashboard](#)

 **Cost Management**

Get notified to stay within your budget and prevent unexpected charges on your bill.

[Set up cost alerts >](#)

 **Container Insights**

Comprehensive health and performance data in addition to the default cluster metrics

[Go to Azure Monitor insights](#)

**Free Microsoft tutorials**

[Introduction to Docker containers](#)

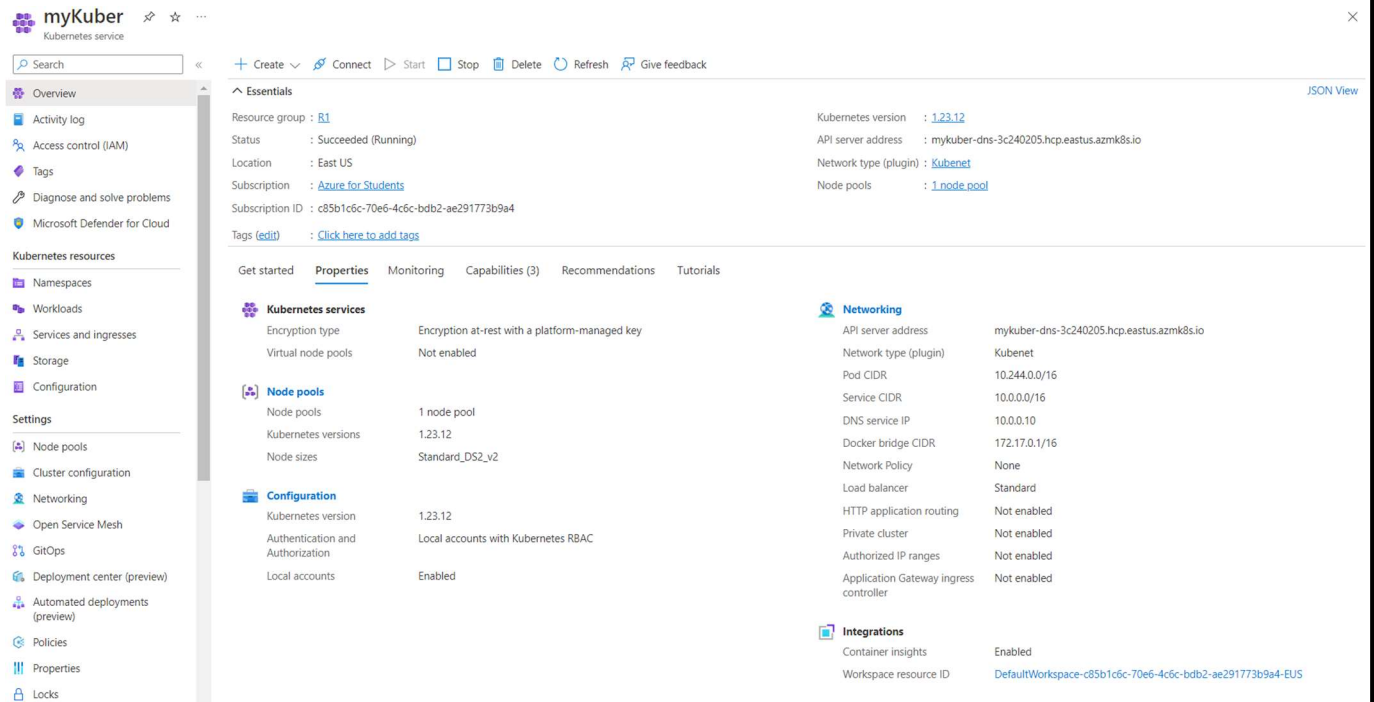
[Build and store container images with Azure Container Registry](#)

[Introduction to Azure Kubernetes Service](#)

**Work with an expert**

Azure experts are service provider partners

7.Now Click on “Go to Resource”. You can see all the things what we have done yet



**myKuber** Kubernetes service

Search < Create Connect Start Stop Delete Refresh Give feedback

**Overview**

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

**Kubernetes resources**

- Namespaces
- Workloads
- Services and ingress
- Storage
- Configuration

**Settings**

- Node pools
- Cluster configuration
- Networking
- Open Service Mesh
- GitOps
- Deployment center (preview)
- Automated deployments (preview)
- Policies
- Properties
- Locks

**Essentials**

Resource group : [R1](#) Kubernetes version : [1.23.12](#)

Status : Succeeded (Running) API server address : [mykuber-dns-3c240205.hcp.eastus.azurek8s.io](#)

Location : East US Network type (plugin) : [Kubernetes](#)

Subscription : [Azure for Students](#) Node pools : [1 node pool](#)

Subscription ID : c85b1c6c-70e6-4c6c-bdb2-ae291773b9a4

Tags (edit) : [Click here to add tags](#)

Get started **Properties** Monitoring Capabilities (3) 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	1.23.12
Node sizes	Standard_DS2_v2

**Configuration**

Kubernetes version	1.23.12
Authentication and Authorization	Local accounts with Kubernetes RBAC
Local accounts	Enabled

**Networking**

API server address	mykuber-dns-3c240205.hcp.eastus.azurek8s.io
Network type (plugin)	Kubernetes
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 controller	Not enabled

**Integrations**

Container insights	Enabled
Workspace resource ID	DefaultWorkspace-c85b1c6c-70e6-4c6c-bdb2-ae291773b9a4-EUS

## ❖ Creating AKS Context from our local cmd:

1. First of all you should connect your powershell to Azure. For that you need to install "Azure CLI and kubectl Commands"
2. So it goes now on.....

```
PS 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 browser is available or if the web browser fails
to open, use device code flow with `az login --use-device-code`.
[
  {
    "cloudName": "AzureCloud",
    "homeTenantId": "ff335ba2-bb68-489a-bbdd-f49ab4319838",
    "id": "c85b1c6c-70e6-4c6c-bdb2-ae291773b9a4",
    "isDefault": true,
    "managedByTenants": [],
    "name": "Azure for Students",
    "state": "Enabled",
    "tenantId": "ff335ba2-bb68-489a-bbdd-f49ab4319838",
    "user": {
      "name": "jaswanth.20bcd7171@vitap.ac.in",
      "type": "user"
    }
  }
]
```

3. Now it was logged in. So our next task is to connect Kubernetes to it and know what we are all the programs running in it

```
PS C:\WINDOWS\system32> az account set --subscription c85b1c6c-70e6-4c6c-bdb2-ae291773b9a4
PS C:\WINDOWS\system32> az aks get-credentials --resource-group R1 --name myKuber
Merged "myKuber" as current context in C:\Users\jassu\.kube\config
PS C:\WINDOWS\system32> kubectl get pods
No resources found in default namespace.
```

4. Finally we connected AKS with the local Command prompt

```
PS C:\WINDOWS\system32> kubectl config get-contexta
error: unknown command "get-contexta"
See 'kubectl config -h' for help and examples
PS C:\WINDOWS\system32> kubectl config get-contexts
CURRENT  NAME      CLUSTER  AUTHINFO  NAMESPACE
*         myKuber   myKuber  clusterUser_R1_myKuber
```

```
PS C:\WINDOWS\system32> kubectl config get-clusters
NAME
myKuber
PS C:\WINDOWS\system32> █
```

5.Finally we have AKS connected to Command prompt

```
PS C:\WINDOWS\system32> az aks get-credentials --resource-group R1 --name myKuber
Merged "myKuber" as current context in C:\Users\jassu\.kube\config
PS C:\WINDOWS\system32> kubectl config get-contexts
CURRENT   NAME             CLUSTER   AUTHINFO           NAMESPACE
*          myKuber          myKuber   clusterUser_R1_myKuber
PS C:\WINDOWS\system32> kubectl config get-clusters
NAME
myKuber
PS C:\WINDOWS\system32> kubectl get pods
No resources found in default namespace.
PS C:\WINDOWS\system32>
```



### ❖ Deployment of APP into AKS clusters :

1. For deploying the app we should write a code.I named my coded file as(myfile.yaml)
2. Code for that file will given in the resources section
3. Now the execution is as follows

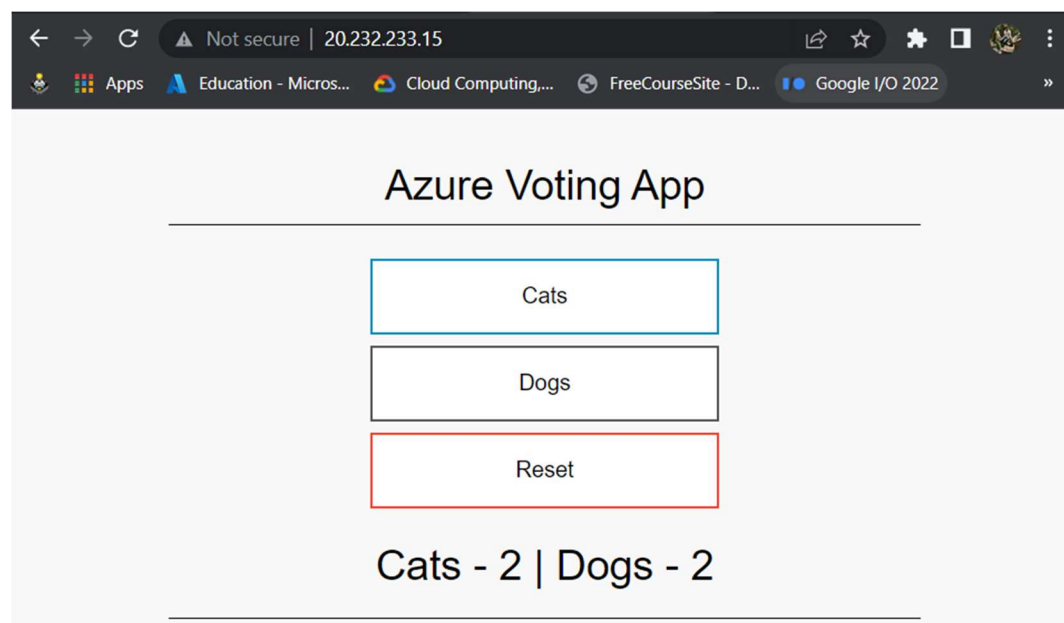
```
PS D:\> cd project
PS D:\project> dir

Directory: D:\project

Mode                LastWriteTime         Length Name
----                -
-a----          17-10-2022         00:34         1715 myfile.yaml

PS D:\project> 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
PS D:\project> kubectl get pods
NAME                                READY   STATUS    RESTARTS   AGE
azure-vote-back-59cb7dc555-1k82r    1/1     Running   0           32s
azure-vote-front-5f4d7db9c8-wfs6g  1/1     Running   0           30s
PS D:\project> kubectl get services
NAME            TYPE          CLUSTER-IP    EXTERNAL-IP    PORT(S)          AGE
azure-vote-back ClusterIP      10.0.110.0    <none>         6379/TCP         43s
azure-vote-front LoadBalancer  10.0.127.194  20.232.233.15  80:30907/TCP     42s
kubernetes      ClusterIP      10.0.0.1      <none>         443/TCP          176m
PS D:\project>
```

4. Output of the app:





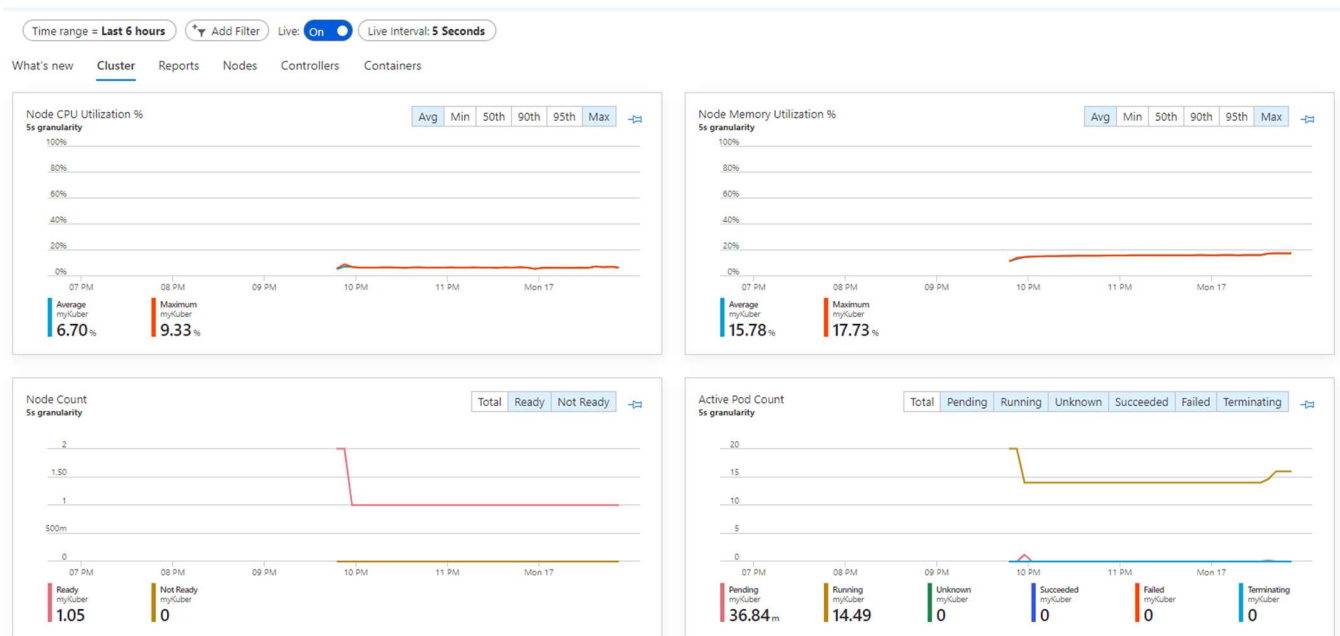
### Explanation:

This app was designed for voting whenever the user clicks on “*Cats*” the cats count will be incremented by “1” and similarly “*Dogs*”

### ❖ Results:

For the results we should open the *Azure Portal* and *Find Kubernetes services* and goto “*mykuber-insights*”











#### *Cluster:*



## Report:

What's new Cluster Reports Nodes Controllers Containers

Filter reports by name

▼ Name	Tags
▼ Node Monitoring (3)	
 Disk Capacity	node-disk-usage
 Disk IO	-
 GPU	-
▼ Resource Monitoring (4)	
 Deployments	deployment hpa
 Workload Details	pod persistent-volume k8s-events
 Kubelet	-
 Persistent Volume Details	persistent-volume storage
▼ Billing (1)	
 Data Usage	data-ingestion namespace
▼ Networking (2)	
 NPM Configuration	-
 Network	-

## Nodes:

What's new Cluster Reports Nodes Controllers Containers

Search by name...

Metric: CPU Usage (millicores) (computed from Capacity) ▼





































Min Avg 50th 90th 95th Max

2 items

Name	Status	95th % ↓	95th	Containers	UpTime	Controller	Trend 95th % (1 bar = 15m)
<input type="checkbox"/> ▶  aks-agentpool-11805086-vmss000001	✓ Ok	8%	154 mc	24	3 hours	-	
<input type="checkbox"/> ▶  aks-agentpool-11805086-vmss000000	? Unk	-	-	20	-	-	

## **Controllers:**

What's new   Cluster   Reports   Nodes   Controllers   Containers

	Name	Status	95th % ↓	95th	Containers	Restarts	UpTime	Node
<input type="checkbox"/>	▶  omsagent-rs-7b5f9fcd57 (ReplicaSet)	1  1 	1%	27 mc	2	0	3 hours	-
<input type="checkbox"/>	▶  konnectivity-agent-864656857 (ReplicaSet)	1  2 	1%	9 mc	3	0	3 hours	-
<input type="checkbox"/>	▶  omsagent (DaemonSet)	2  1 	1%	22 mc	4	0	3 hours	-
<input type="checkbox"/>	▶  konnectivity-agent-77d978549 (ReplicaSet)	2 	0.9%	5 mc	2	0	3 hours	-
<input type="checkbox"/>	▶  azure-vote-back-59cb7dc555 (ReplicaSet)	1 	0.6%	2 mc	1	0	21 mins	-
<input type="checkbox"/>	▶  metrics-server-668f55b87d (ReplicaSet)	2 	0.4%	7 mc	2	0	3 hours	-
<input type="checkbox"/>	▶  coredns-autoscaler-8566b76d4d (ReplicaSet)	1 	0.2%	0.4 mc	1	0	3 hours	-
<input type="checkbox"/>	▶  azure-vote-front-5f4d7db9c8 (ReplicaSet)	1 	0.1%	0.3 mc	1	0	21 mins	-
<input type="checkbox"/>	▶  azure-ip-masq-agent (DaemonSet)	2  1 	0.1%	0.8 mc	2	0	3 hours	-
<input type="checkbox"/>	▶  coredns-b4854dd98 (ReplicaSet)	2 	0.1%	4 mc	2	0	3 hours	-
<input type="checkbox"/>	▶  csi-azurefile-node (DaemonSet)	2  1 	0.1%	7 mc	9	0	3 hours	-
<input type="checkbox"/>	▶  csi-azuredisk-node (DaemonSet)	2  1 	0%	5 mc	7	0	3 hours	-
<input type="checkbox"/>	▶  cloud-node-manager (DaemonSet)	2  1 	0%	1 mc	2	0	3 hours	-
<input type="checkbox"/>	▶  kube-proxy (DaemonSet)	2  1 	0%	0.8 mc	6	0	3 hours	-



## Containers:

[What's new](#) [Cluster](#) [Reports](#) [Nodes](#) [Controllers](#) [Containers](#)

Search by name...

Metric: CPU Usage (millicores) ▾

Min

Avg































50th

90th

95th

Max

	Name	Status	95th % ↓	95th	Pod	Node	Restarts	UpTime
<input type="checkbox"/>	omsagent	✓ Ok	2%	9 mc	omsagent-6s2dv	aks-agentpool-...	0	3 hours
<input type="checkbox"/>	omsagent	✓ Ok	2%	16 mc	omsagent-rs-7b5f9fc...	aks-agentpool-...	0	3 hours
<input type="checkbox"/>	connectivity-agent	✓ Ok	1%	3 mc	connectivity-agent-8...	aks-agentpool-...	0	3 hours
<input type="checkbox"/>	connectivity-agent	✓ Ok	1%	3 mc	connectivity-agent-8...	aks-agentpool-...	0	3 hours
<input type="checkbox"/>	omsagent-prometheus	✓ Ok	0.7%	4 mc	omsagent-6s2dv	aks-agentpool-...	0	3 hours
<input type="checkbox"/>	azure-vote-back	✓ Ok	0.6%	2 mc	azure-vote-back-59c...	aks-agentpool-...	0	21 mins
<input type="checkbox"/>	metrics-server	✓ Ok	0.4%	4 mc	metrics-server-668f5...	aks-agentpool-...	0	3 hours
<input type="checkbox"/>	metrics-server	✓ Ok	0.3%	3 mc	metrics-server-668f5...	aks-agentpool-...	0	3 hours
<input type="checkbox"/>	autoscaler	✓ Ok	0.2%	0.4 mc	coredns-autoscaler-8...	aks-agentpool-...	0	3 hours
<input type="checkbox"/>	node-driver-registrar	✓ Ok	0.1%	2 mc	csi-azuredisk-node-c...	aks-agentpool-...	0	3 hours
<input type="checkbox"/>	node-driver-registrar	✓ Ok	0.1%	2 mc	csi-azurefile-node-g...	aks-agentpool-...	0	3 hours
<input type="checkbox"/>	azure-vote-front	✓ Ok	0.1%	0.3 mc	azure-vote-front-5f4...	aks-agentpool-...	0	21 mins
<input type="checkbox"/>	azure-ip-masq-agent	✓ Ok	0.1%	0.5 mc	azure-ip-masq-agent...	aks-agentpool-...	0	3 hours
<input type="checkbox"/>	coredns	✓ Ok	0.1%	2 mc	coredns-b4854dd98-...	aks-agentpool-...	0	3 hours
<input type="checkbox"/>	coredns	✓ Ok	0.1%	2 mc	coredns-b4854dd98-...	aks-agentpool-...	0	3 hours
<input type="checkbox"/>	cloud-node-manager	✓ Ok	0%	0.5 mc	cloud-node-manage...	aks-agentpool-...	0	3 hours
<input type="checkbox"/>	kube-proxy	✓ Ok	0%	0.4 mc	kube-proxy-nnj8m	aks-agentpool-...	0	3 hours
<input type="checkbox"/>	azurefile	✓ Ok	0%	0.2 mc	csi-azurefile-node-g...	aks-agentpool-...	0	3 hours
<input type="checkbox"/>	liveness-probe	✓ Ok	0%	0.2 mc	csi-azurefile-node-g...	aks-agentpool-...	0	3 hours
<input type="checkbox"/>	liveness-probe	✓ Ok	0%	0.2 mc	csi-azuredisk-node-c...	aks-agentpool-...	0	3 hours
<input type="checkbox"/>	azuredisk	✓ Ok	0%	0.1 mc	csi-azuredisk-node-c...	aks-agentpool-...	0	3 hours
<input type="checkbox"/>	omsagent	⚠ Unk	-	-	omsagent-rs-7b5f9fc...	aks-agentpool-...	0	?
<input type="checkbox"/>	omsagent	⚠ Unk	-	-	omsagent-5cqjf	aks-agentpool-...	0	?
<input type="checkbox"/>	omsagent-prometheus	⚠ Unk	-	-	omsagent-5cqjf	aks-agentpool-...	0	?
<input type="checkbox"/>	node-driver-registrar	⚠ Warn	-	-	csi-azurefile-node-w...	aks-agentpool-...	0	?
<input type="checkbox"/>	node-driver-registrar	⚠ Unk	-	-	csi-azurefile-node-q...	aks-agentpool-...	0	?
<input type="checkbox"/>	node-driver-registrar	⚠ Unk	-	-	csi-azuredisk-node-f...	aks-agentpool-...	0	?
<input type="checkbox"/>	liveness-probe	⚠ Warn	-	-	csi-azurefile-node-w...	aks-agentpool-...	0	?

<input type="checkbox"/>	 liveness-probe	 Unk	-	-	csi-azurefile-node-q...	aks-agentpool-...	0	?
<input type="checkbox"/>	 liveness-probe	 Unk	-	-	csi-azuredisk-node-f...	aks-agentpool-...	0	?
<input type="checkbox"/>	 kube-proxy	 Warn	-	-	kube-proxy-tjdmp	aks-agentpool-...	0	?
<input type="checkbox"/>	 kube-proxy	 Unk	-	-	kube-proxy-47hvw	aks-agentpool-...	0	?
<input type="checkbox"/>	 kube-proxy-bootstrap	 Done	-	-	kube-proxy-tjdmp	aks-agentpool-...	0	?
<input type="checkbox"/>	 kube-proxy-bootstrap	 Done	-	-	kube-proxy-nnj8m	aks-agentpool-...	0	?
<input type="checkbox"/>	 kube-proxy-bootstrap	 Done	-	-	kube-proxy-47hvw	aks-agentpool-...	0	?
<input type="checkbox"/>	 konnectivity-agent	 Unk	-	-	konnectivity-agent-7...	aks-agentpool-...	0	?
<input type="checkbox"/>	 konnectivity-agent	 Unk	-	-	konnectivity-agent-7...	aks-agentpool-...	0	?
<input type="checkbox"/>	 konnectivity-agent	 Unk	-	-	konnectivity-agent-8...	aks-agentpool-...	0	?
<input type="checkbox"/>	 cloud-node-manager	 Unk	-	-	cloud-node-manage...	aks-agentpool-...	0	?
<input type="checkbox"/>	 azurefile	 Warn	-	-	csi-azurefile-node-w...	aks-agentpool-...	0	?
<input type="checkbox"/>	 azurefile	 Unk	-	-	csi-azurefile-node-q...	aks-agentpool-...	0	?
<input type="checkbox"/>	 azuredisk	 Unk	-	-	csi-azuredisk-node-f...	aks-agentpool-...	0	?
<input type="checkbox"/>	 azure-ip-masq-agent	 Unk	-	-	azure-ip-masq-agent...	aks-agentpool-...	0	?

### ➤ Resources

#### 1) Code for myfile.yaml:

```

2) apiVersion: apps/v1
3) kind: Deployment
4) metadata:
5)   name: azure-vote-back
6) spec:
7)   replicas: 1
8)   selector:
9)     matchLabels:
10)       app: azure-vote-back
11)   template:
12)     metadata:
13)       labels:
14)         app: azure-vote-back
15)     spec:
16)       nodeSelector:
17)         "kubernetes.io/os": linux
18)       containers:
19)       - name: azure-vote-back
20)         image:
21)           mcr.microsoft.com/oss/bitnami/redis:6.0.8
22)         env:
23)         - name: ALLOW_EMPTY_PASSWORD

```

```

23)         value: "yes"
24)         resources:
25)             requests:
26)                 cpu: 100m
27)                 memory: 128Mi
28)             limits:
29)                 cpu: 250m
30)                 memory: 256Mi
31)         ports:
32)         - containerPort: 6379
33)         name: redis
34)     ---
35)     apiVersion: v1
36)     kind: Service
37)     metadata:
38)         name: azure-vote-back
39)     spec:
40)         ports:
41)         - port: 6379
42)         selector:
43)             app: azure-vote-back
44)     ---
45)     apiVersion: apps/v1
46)     kind: Deployment
47)     metadata:
48)         name: azure-vote-front
49)     spec:
50)         replicas: 1
51)         selector:
52)             matchLabels:
53)                 app: azure-vote-front
54)         template:
55)             metadata:
56)                 labels:
57)                     app: azure-vote-front
58)             spec:
59)                 nodeSelector:
60)                     "kubernetes.io/os": linux
61)                 containers:
62)                 - name: azure-vote-front
63)                   image: mcr.microsoft.com/azuredocs/azure-vote-
front:v1
64)             resources:
65)                 requests:
66)                     cpu: 100m

```

```
67)         memory: 128Mi
68)         limits:
69)           cpu: 250m
70)           memory: 256Mi
71)         ports:
72)         - containerPort: 80
73)         env:
74)         - name: REDIS
75)           value: "azure-vote-back"
76)         ---
77)         apiVersion: v1
78)         kind: Service
79)         metadata:
80)           name: azure-vote-front
81)         spec:
82)           type: LoadBalancer
83)           ports:
84)           - port: 80
85)           selector:
86)             app: azure-vote-front
```

➤ Other Sources:

- [Youtube](#)
- [Microsoft Docs](#)
- [Google Docs](#)

**Done by**

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\*\*\*\*\*THE END\*\*\*\*\*

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