DevOps Project Report: Voting App

1. Project Overview

The *Example Voting App* is a distributed microservices-based web application that demonstrates fundamental DevOps practices. It showcases the orchestration and deployment of containerized services using Docker, Docker Swarm, and Kubernetes, with CI/CD pipelines implemented for automation.

This application is composed of five main components:

- A Python-based frontend voting app
- Redis message queue for vote handling
- A .NET Core worker service to process the votes
- A Postgres database for persistent storage
- A Node.js-based result app for real-time vote display

2. Technologies Used

- **Frontend**: Python (Vote App), Node.js (Results App)
- **Backend Worker**: .NET Core
- **Database**: PostgreSQL
- **Messaging Queue**: Redis
- **Containerization**: Docker, Docker Compose
- **Orchestration**: Docker Swarm & Kubernetes
- **CI/CD Tool**: GitHub Actions + ArgoCD
- **Cloud Platform**: Microsoft Azure (AKS Cluster)

3. Project Setup and Execution

3.1. Local Setup

- Docker Desktop installed with Compose.
- Project launched using:

  $docker compose up

- Applications accessible via:
  - Vote App: http://localhost:8080
  - Results App: http://localhost:8081

3.2. Swarm Mode

- Docker Swarm initialized using:

```bash
docker swarm init
docker stack deploy --compose-file docker-stack.yml vote
```

4.1. YAML Configurations

The k8s-specifications folder contains deployment and service files for all components. The app was deployed using:

```bash
kubectl create -f k8s-specifications/
```

4.2. Access

- Vote App exposed on port **31000**
- Results App exposed on port **31001**

5. CI/CD Implementation

5.1. CI (Continuous Integration)

- The project includes a functional CI pipeline via Azure Pipelines .
- On code push, automated tests and container builds are triggered.
- The container Image then Pushed To Azure Cintainer Registry

5.2. CD (Continuous Delivery)

- **Azure Kubernetes Service (AKS)** cluster created and connected.
- **ArgoCD** installed and configured for GitOps-based delivery.

Steps followed:

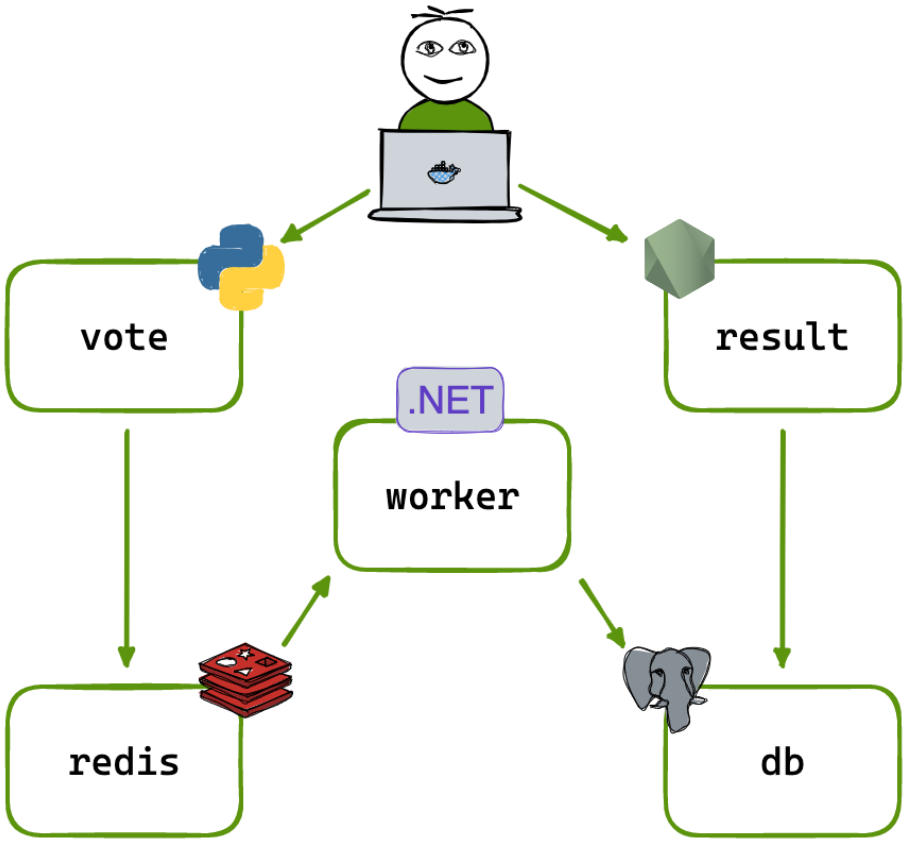
- Connect to cluster using Azure CLI:

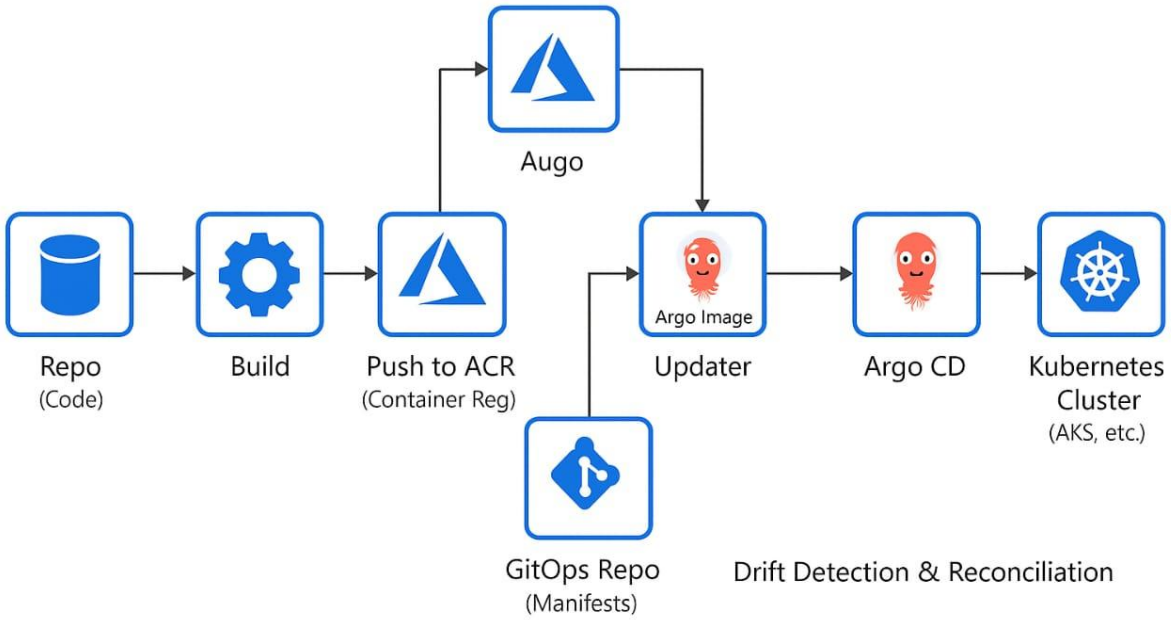
```bash
az aks get-credentials --name <cluster-name> --resource-group <group-name>
```

- Install ArgoCD and access via exposed service using:

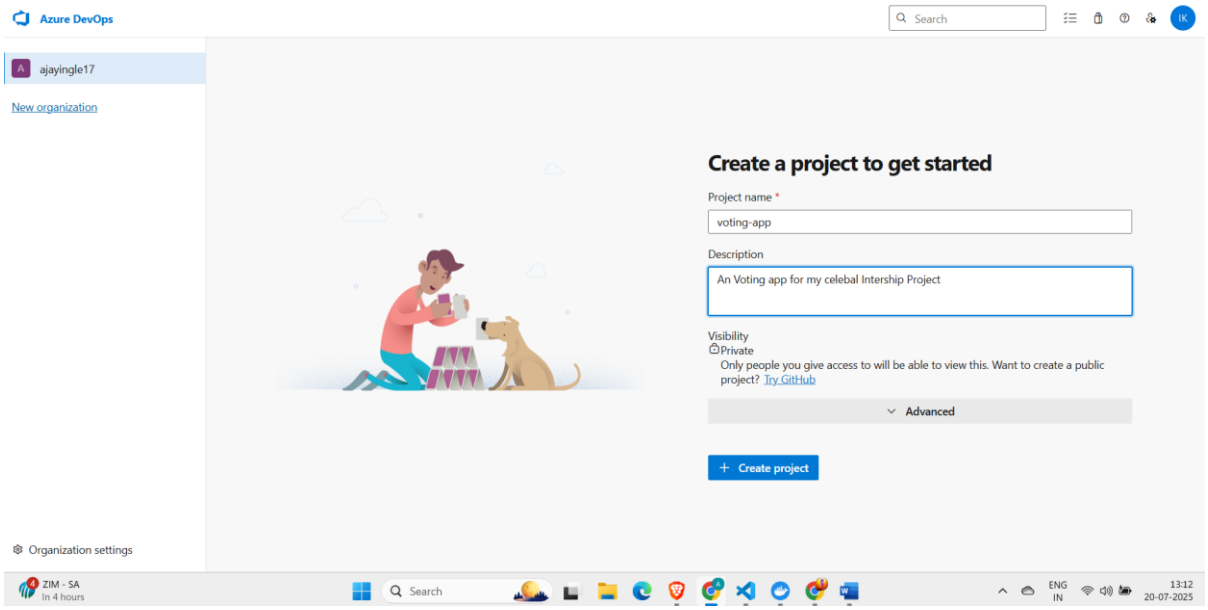
```bash
kubectl edit svc argocd-server -n argocd
```

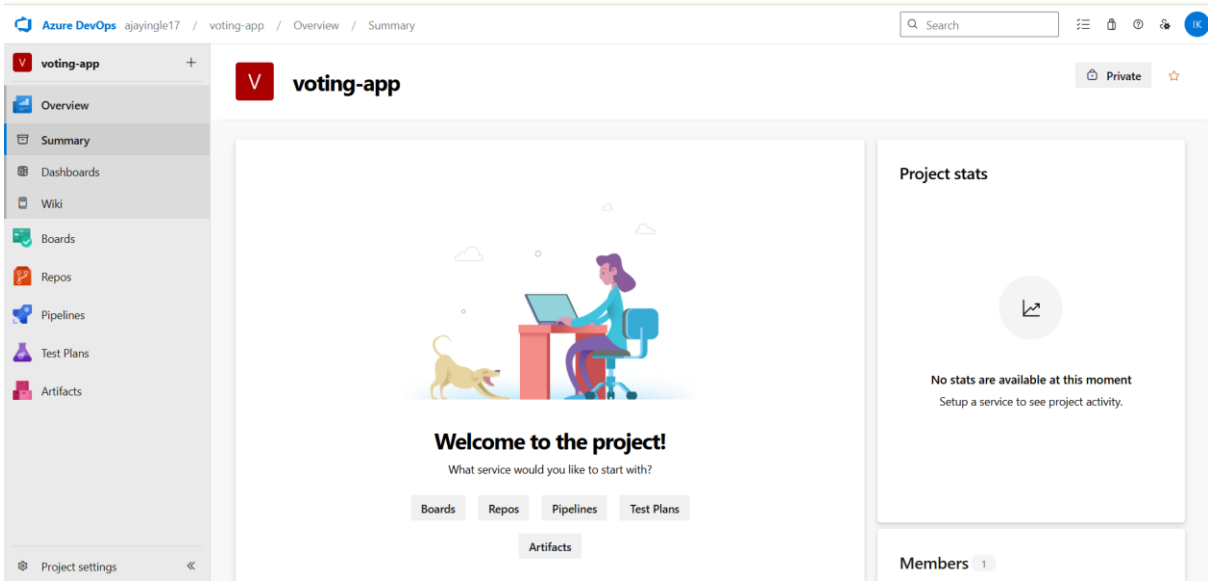
6. Architecture Diagram

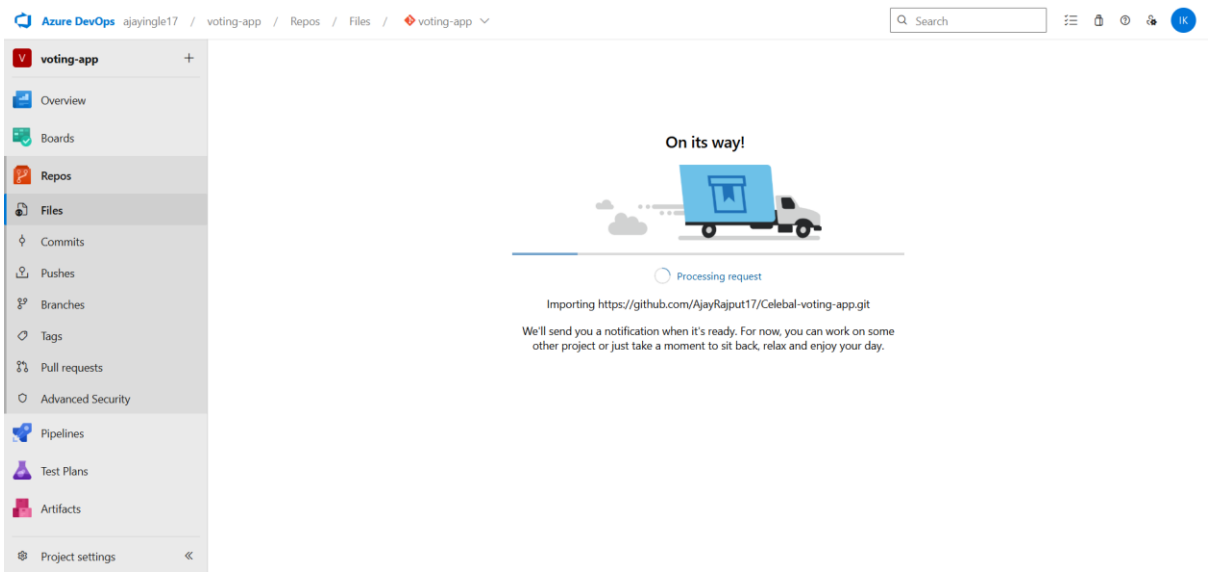



Augo
Repo
(Code)
Build
Push to ACR
(Container Reg)
Argo Image
Updater
Argo CD
Kubernetes
Cluster
(AKS, etc.)
GitOps Repo
(Manifests)
Drift Detection & Reconciliation

7. Screenshots of Project all Process






Azure DevOps ajayingle17 / voting-app / Repos / Files / voting-app
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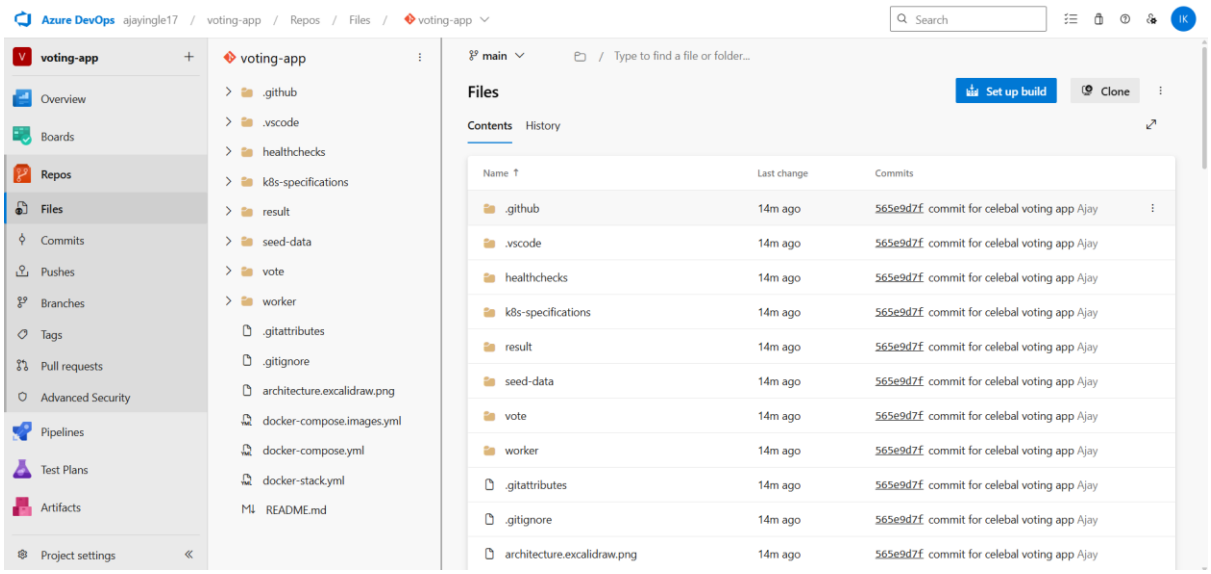
Test Plans
Artifacts
Project settings
On its way!
Processing request
Importing https://github.com/AjayRajput17/Celebal-voting-app.git
We'll send you a notification when it's ready. For now, you can work on some other project or just take a moment to sit back, relax and enjoy your day.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Artifacts
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voting-app
.github
.vscode
healthchecks
k8s-specifications
result
seed-data
vote
worker
.gitattributes
.gitignore
architecture.excalidraw.png
docker-compose.images.yml
docker-compose.yml
docker-stack.yml
README.md
main
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Files
Set up build
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History
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Last change
Commits
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.vscode 14m ago 565e9d7f commit for celebal voting app Ajay
healthchecks 14m ago 565e9d7f commit for celebal voting app Ajay
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result 14m ago 565e9d7f commit for celebal voting app Ajay
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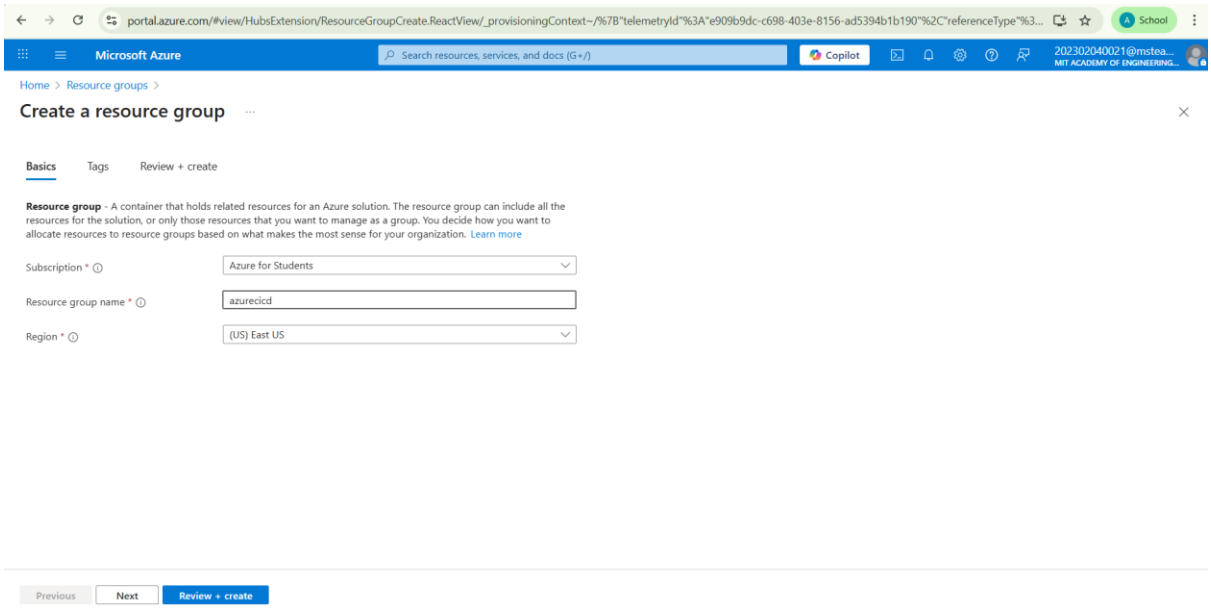
portal.azure.com/#view/HubsExtension/ResourceGroupCreate.ReactView/_provisioningContext~/%7B"telemetryId"%3A"e909b9dc-c698-403e-8156-ad5394b1b190"%2C"referenceType"%3...
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Subscription *
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Region *
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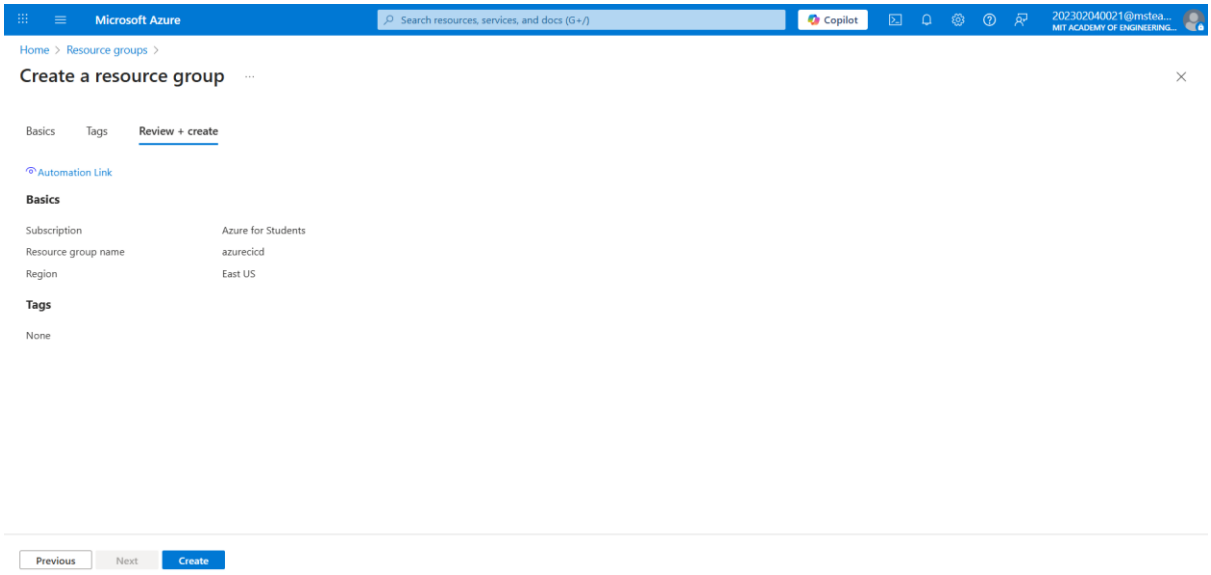
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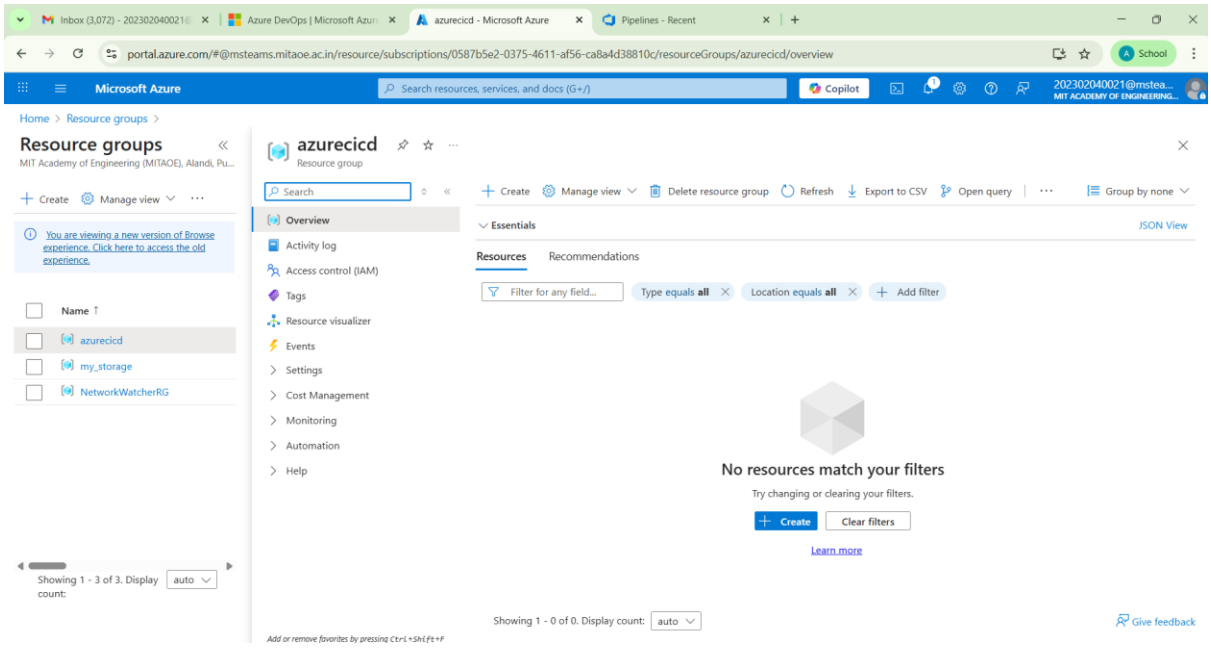
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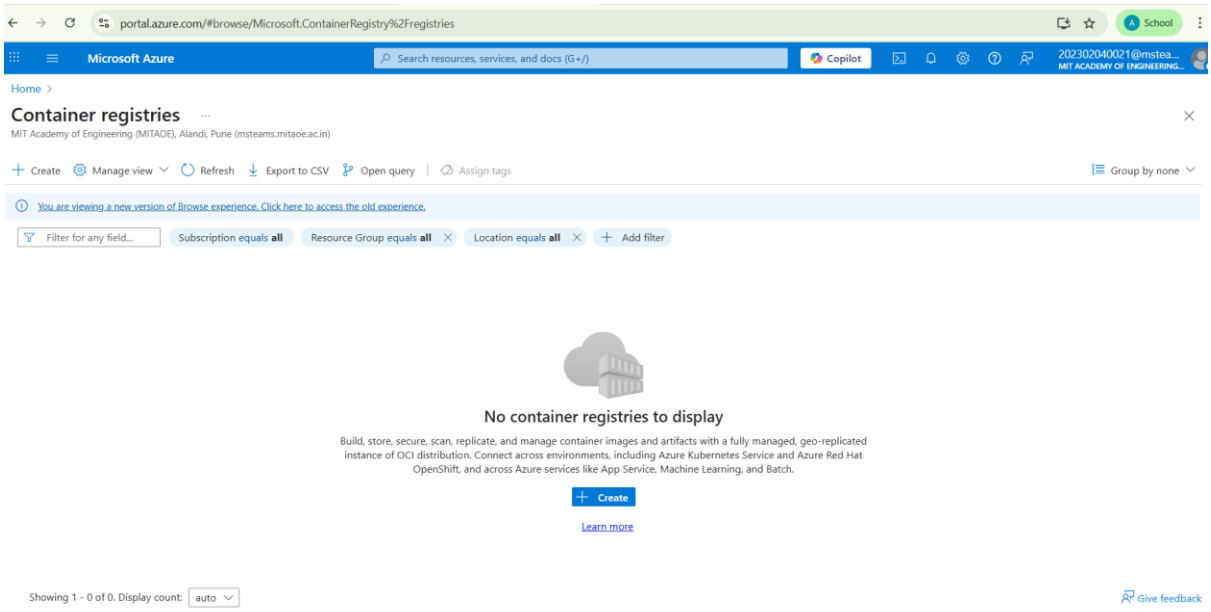
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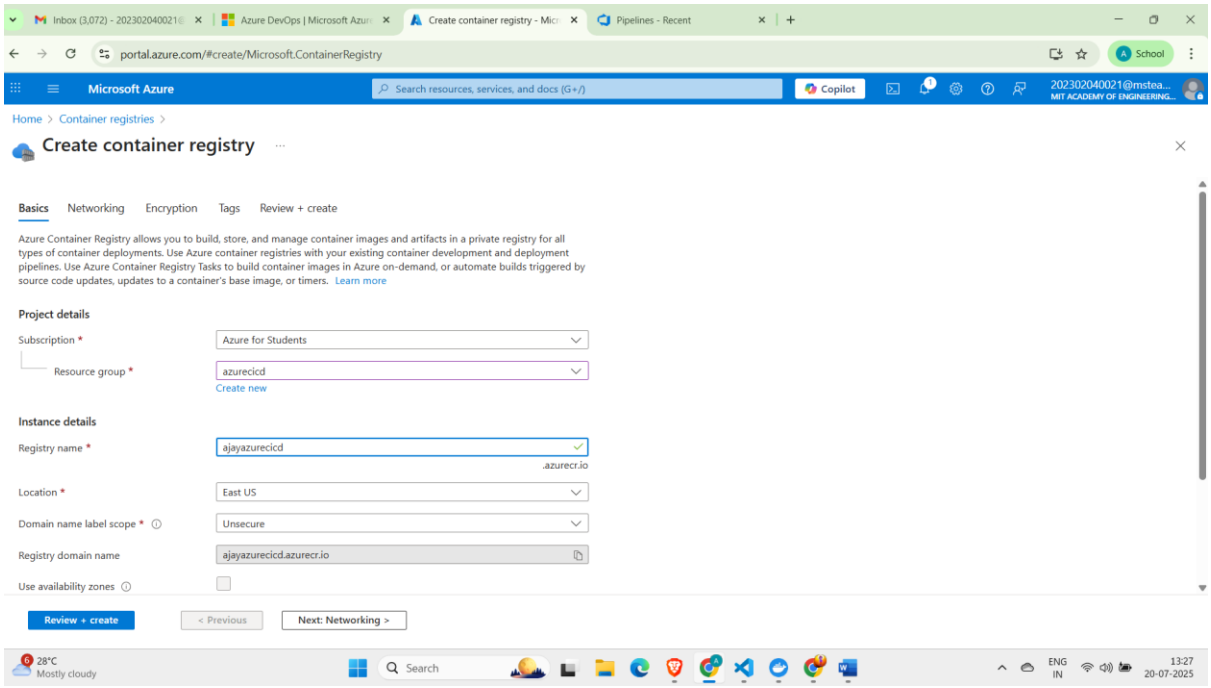
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Pipelines - Recent
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Project details
Subscription * Azure for Students
Resource group * azurecicd
Create new
Instance details
Registry name * ajayazurecicd
.azurecr.io
Location * East US
Domain name label scope * Unsecure
Registry domain name ajayazurecicd.azurecr.io
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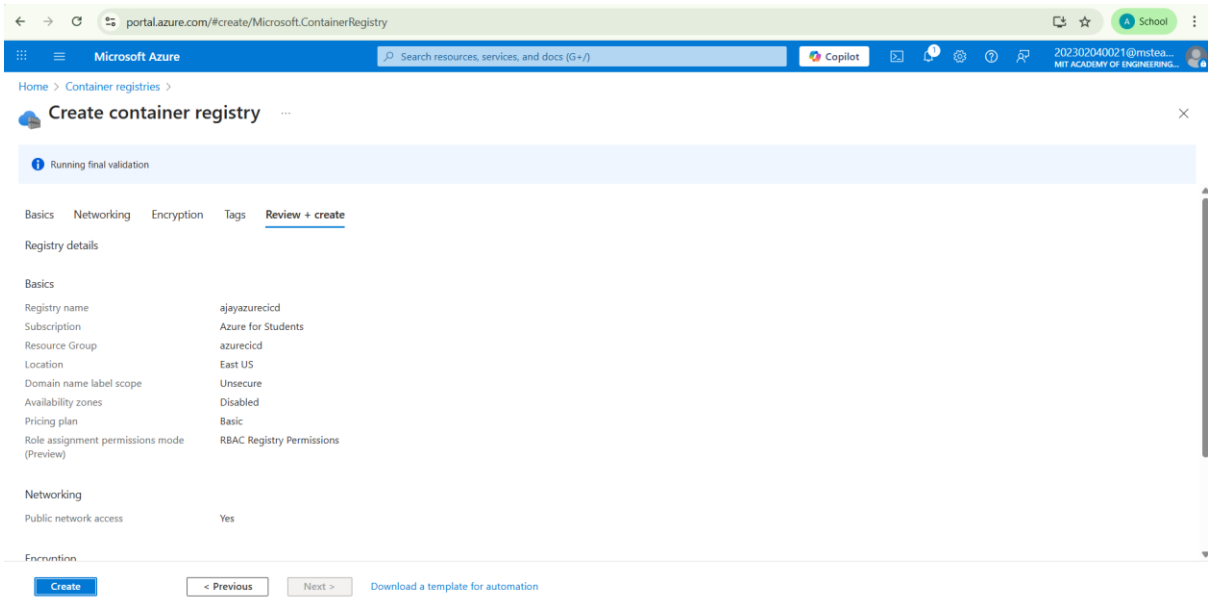
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Subscription Azure for Students
Resource Group azurecicd
Location East US
Domain name label scope Unsecure
Availability zones Disabled
Pricing plan Basic
Role assignment permissions mode (Preview) RBAC Registry Permissions
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Public network access Yes
Encryption
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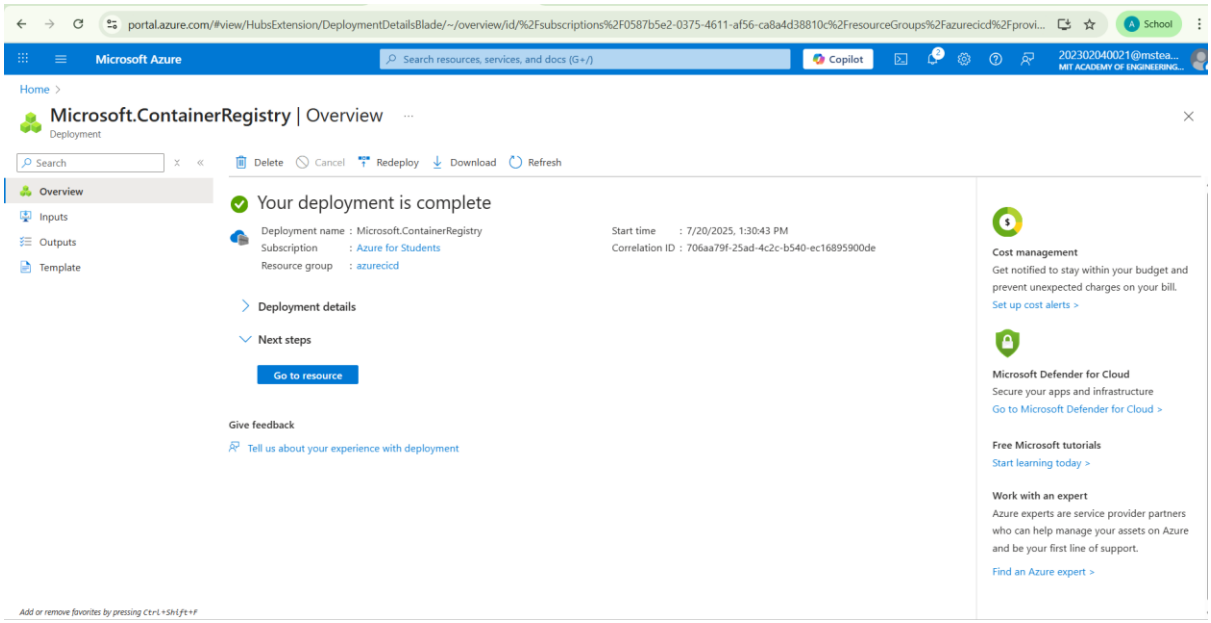
portal.azure.com/#view/HubsExtension/DeploymentDetailsBlade/~/overview/id/%2Fsubscriptions%2F0587b5e2-0375-4611-af56-ca8a4d38810c%2FresourceGroups%2Fazurecicd%2Fprovi...
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Your deployment is complete
Deployment name : Microsoft.ContainerRegistry
Subscription : Azure for Students
Resource group : azurecicd
Start time : 7/20/2025, 1:30:43 PM
Correlation ID : 706aa79f-25ad-4c2c-b540-ec16895900de
Deployment details
Next steps
Go to resource
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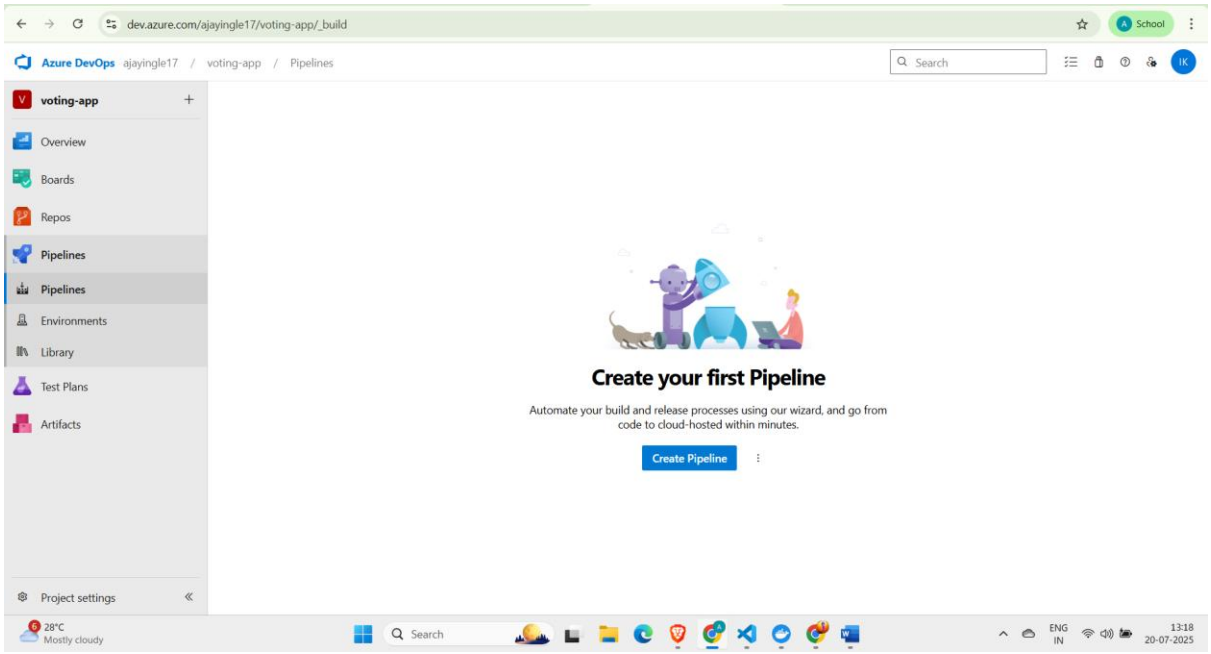
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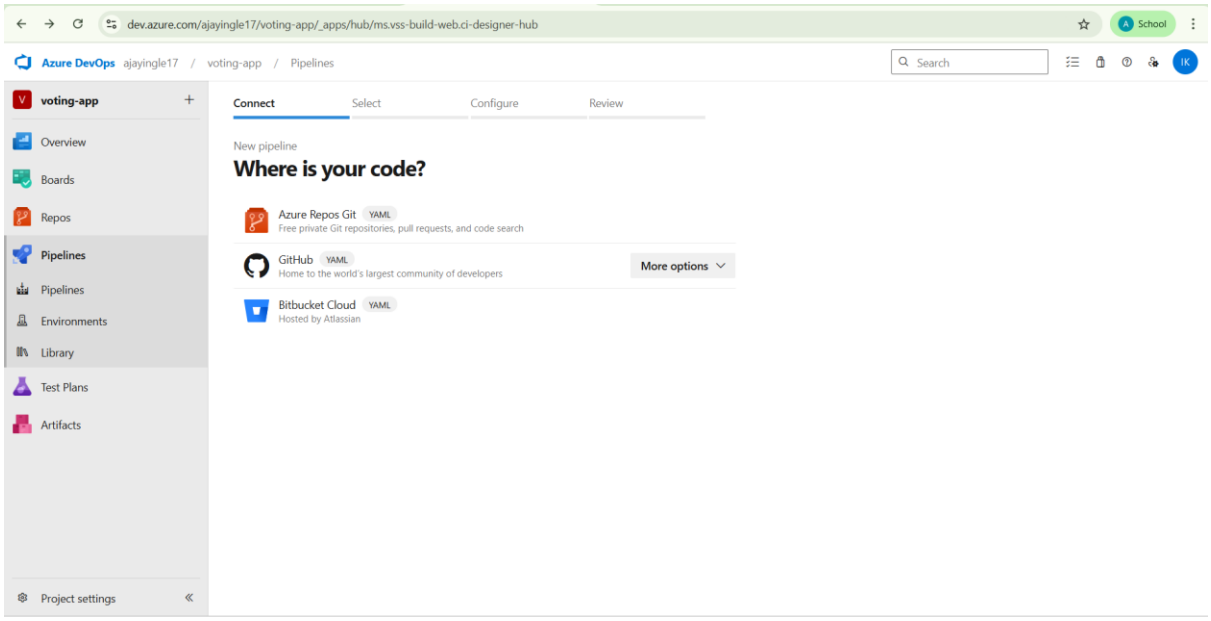
dev.azure.com/ajayingle17/voting-app/_apps/hub/ms.vss-build-web.ci-designer-hub
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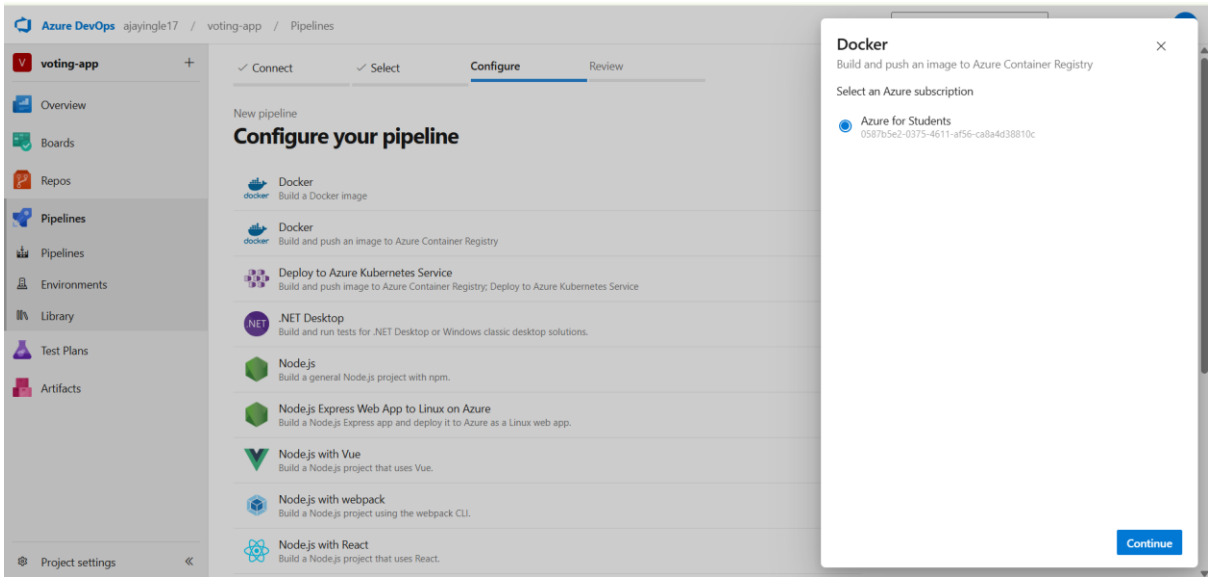
GitHub YAML
Home to the world's largest community of developers
More options
Bitbucket Cloud YAML
Hosted by Atlassian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voting-app
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✓ Connect
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Configure
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New pipeline
Configure your pipeline
Docker
Build a Docker image
Docker
Build and push an image to Azure Container Registry
Deploy to Azure Kubernetes Service
Build and push image to Azure Container Registry; Deploy to Azure Kubernetes Service
.NET Desktop
Build and run tests for .NET Desktop or Windows classic desktop solutions.
Node.js
Build a general Node.js project with npm.
Node.js Express Web App to Linux on Azure
Build a Node.js Express app and deploy it to Azure as a Linux web app.
Node.js with Vue
Build a Node.js project that uses Vue.
Node.js with webpack
Build a Node.js project using the webpack CLI.
Node.js with React
Build a Node.js project that uses React.
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Build and push an image to Azure Container Registry
Select an Azure subscription
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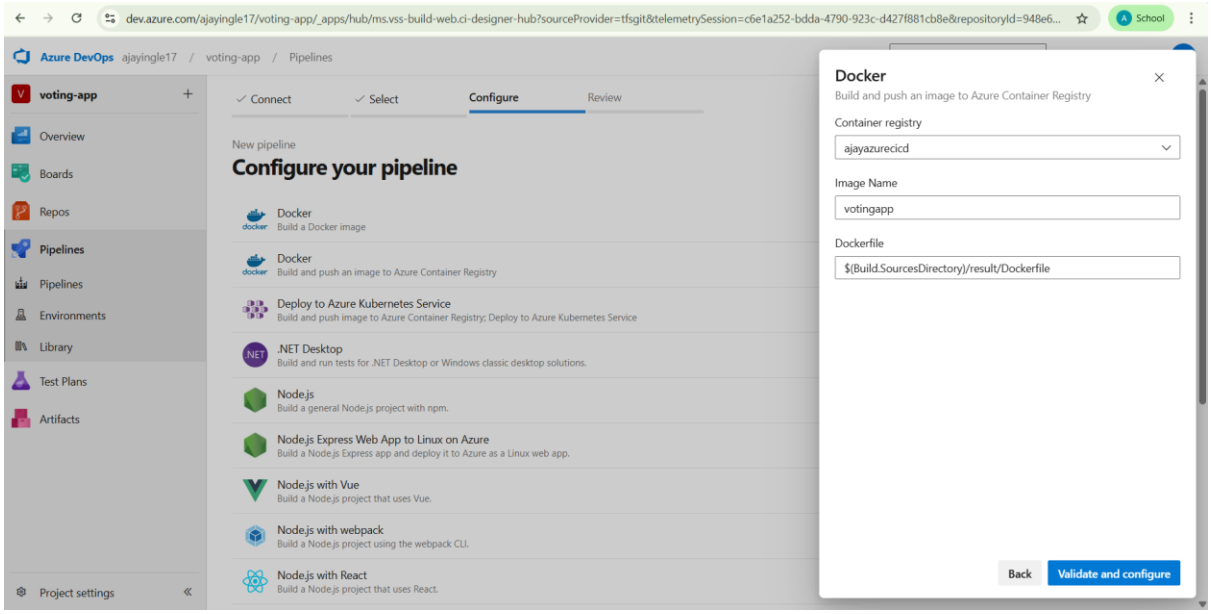
dev.azure.com/ajayingle17/voting-app/_apps/hub/ms.vss-build-web.ci-designer-hub?sourceProvider=tfsgit&telemetrySession=c6e1a252-bdda-4790-923c-d427f881cb8e&repositoryId=948e6...
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Docker
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Build a Node.js Express app and deploy it to Azure as a Linux web app.
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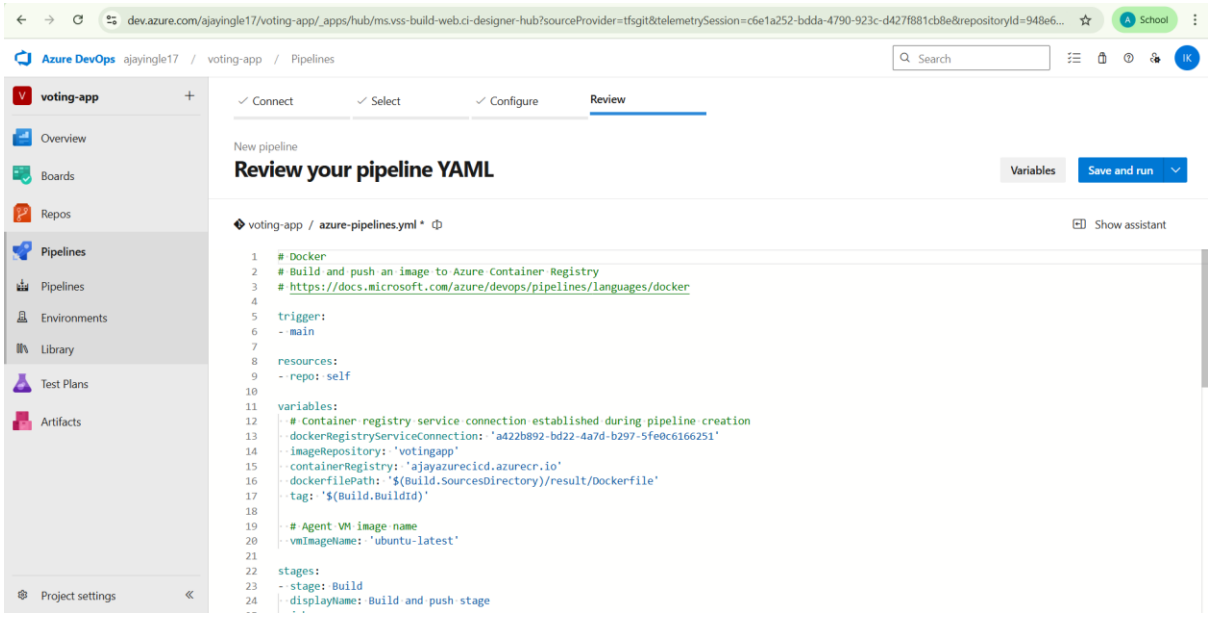
Build a Node.js project that uses Vue.
Node.js with webpack
Build a Node.js project using the webpack CLI.
Node.js with React
Build a Node.js project that uses React.
Docker
Build and push an image to Azure Container Registry
Container registry
ajayazurecicd
Image Name
votingapp
Dockerfile
$(Build.SourcesDirectory)/result/Dockerfile
Back
Validate and configure


dev.azure.com/ajayingle17/voting-app/_apps/hub/ms.vss-build-web.ci-designer-hub?sourceProvider=tfsgit&telemetrySession=c6e1a252-bdda-4790-923c-d427f881cb8e&repositoryId=948e6...
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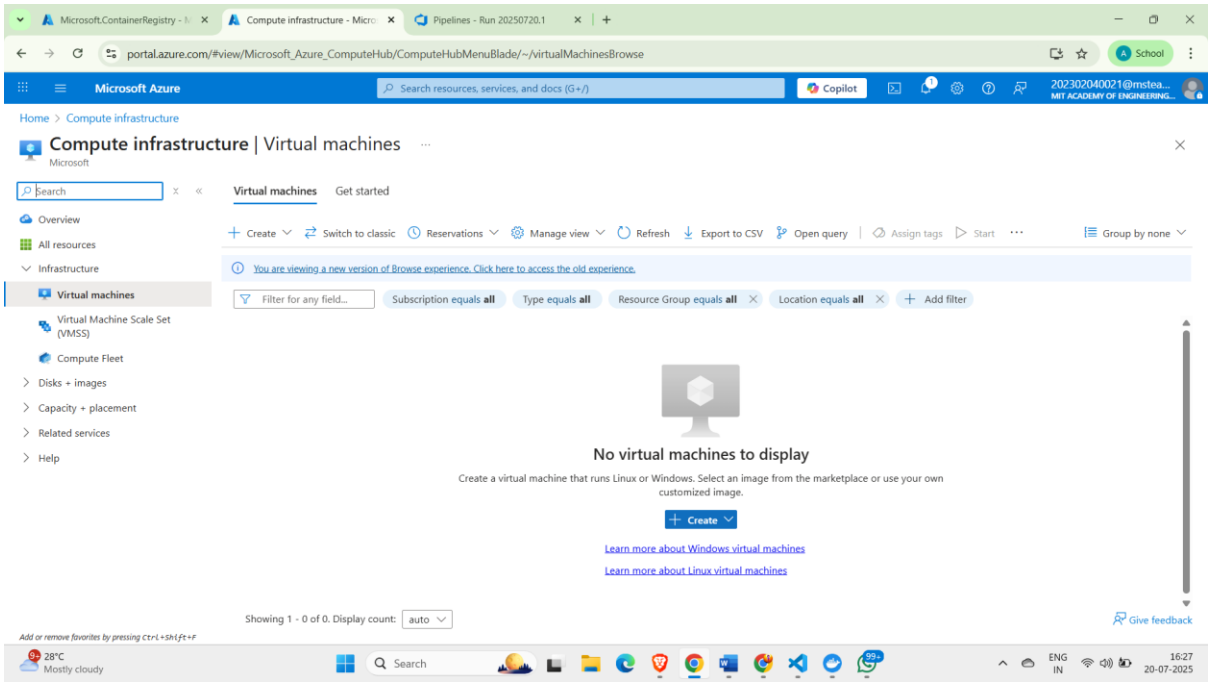
Review
New pipeline
Review your pipeline YAML
Variables
Save and run
voting-app / azure-pipelines.yml *
Show assistant
Docker
Build and push an image to Azure Container Registry
https://docs.microsoft.com/azure/devops/pipelines/languages/docker
trigger:
- main
resources:
- repo: self
variables:
Container registry service connection established during pipeline creation
dockerRegistryServiceConnection: 'a422b892-bd22-4a7d-b297-5fe0c6166251'
imageRepository: 'votingapp'
containerRegistry: 'ajayazurecicd.azurecr.io'
dockerfilePath: '$(Build.SourcesDirectory)/result/Dockerfile'
tag: '$(Build.BuildId)'
Agent VM image name
vmImageName: 'ubuntu-latest'
stages:
- stage: Build
displayName: Build and push stage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Create
Learn more about Windows virtual machines
Learn more about Linux virtual machines
Showing 1 - 0 of 0. Display count: auto
Give feedback
Add or remove favorites by pressing Ctrl+Shift+F
28°C
Mostly cloudy
Search
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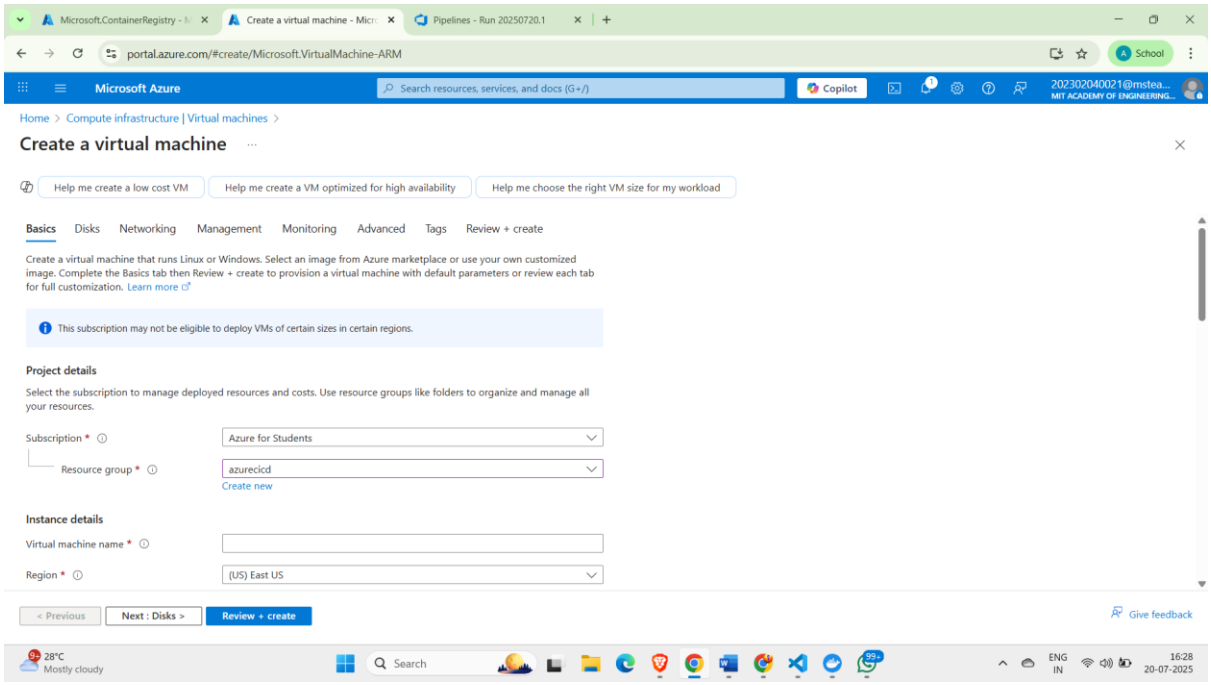
Microsoft.ContainerRegistry - M
Create a virtual machine - Micr
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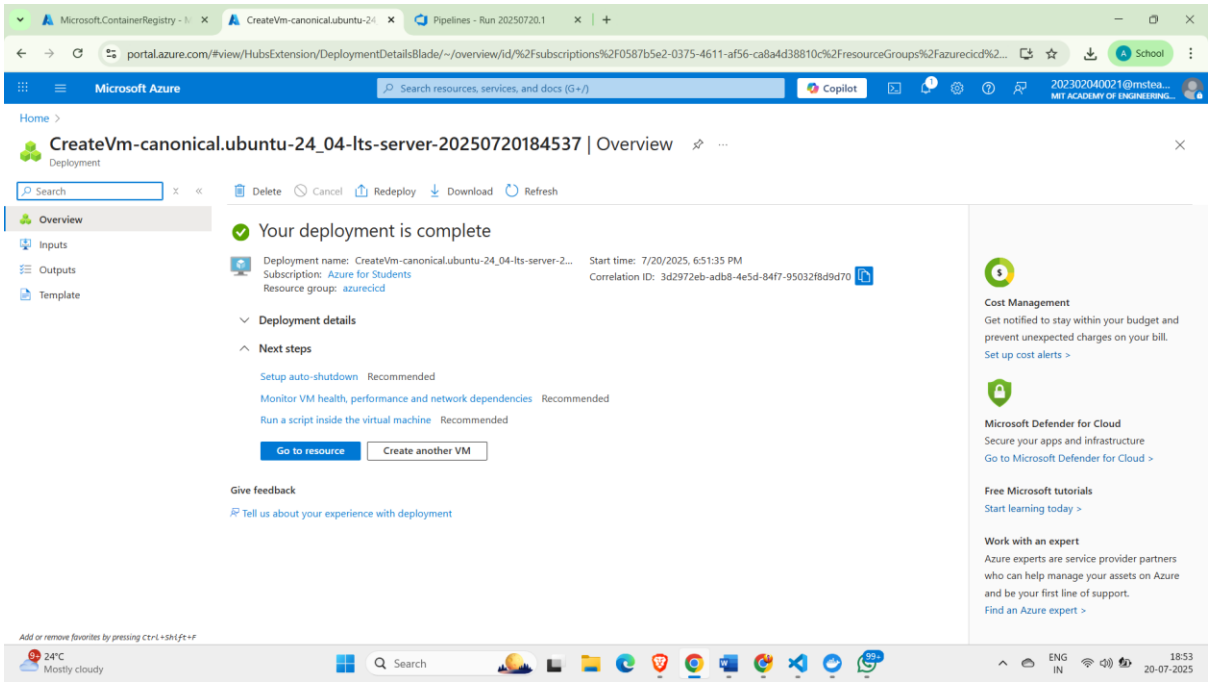
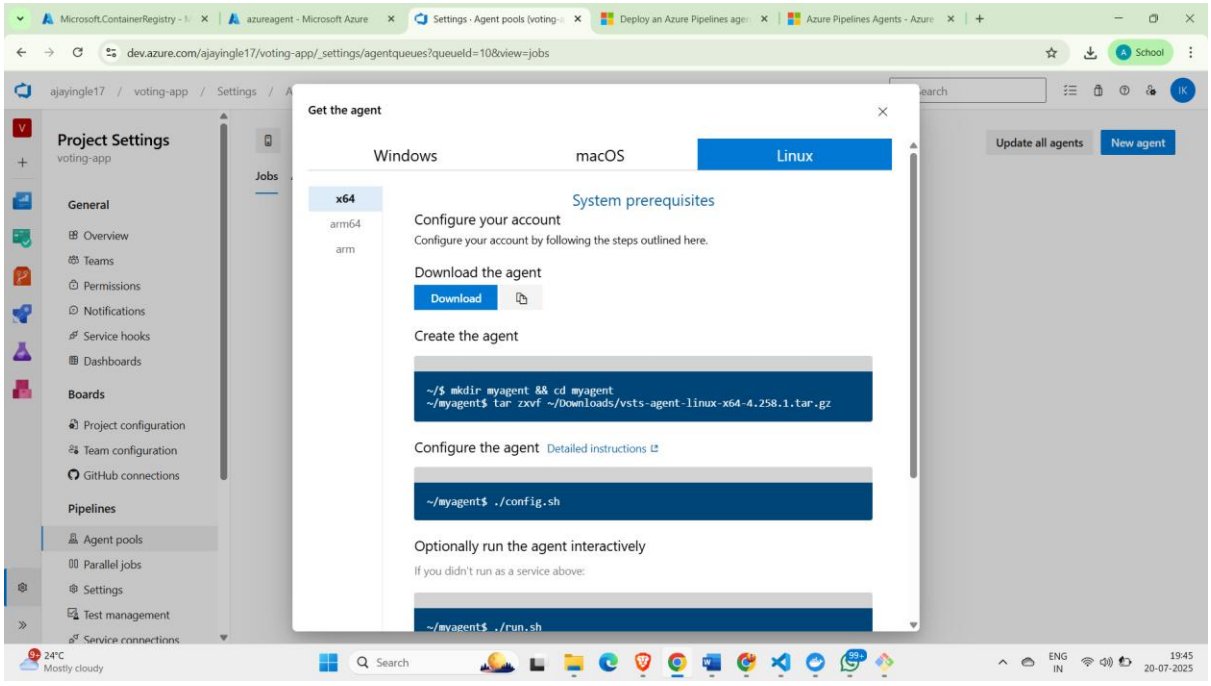
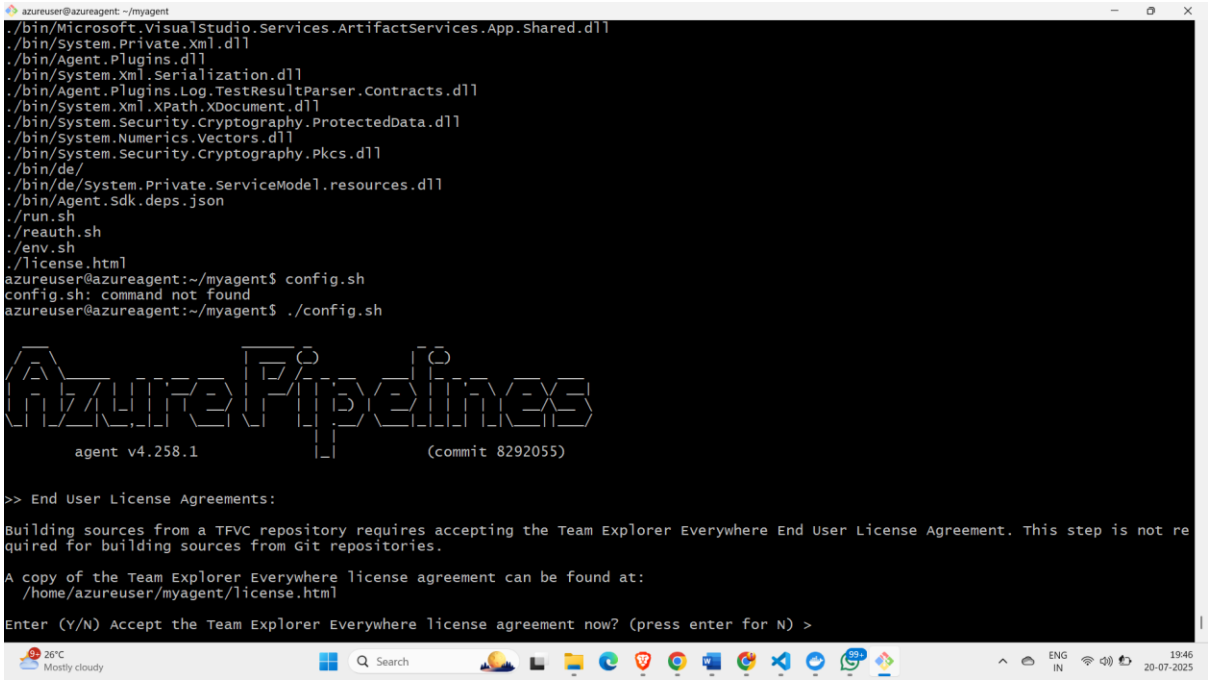
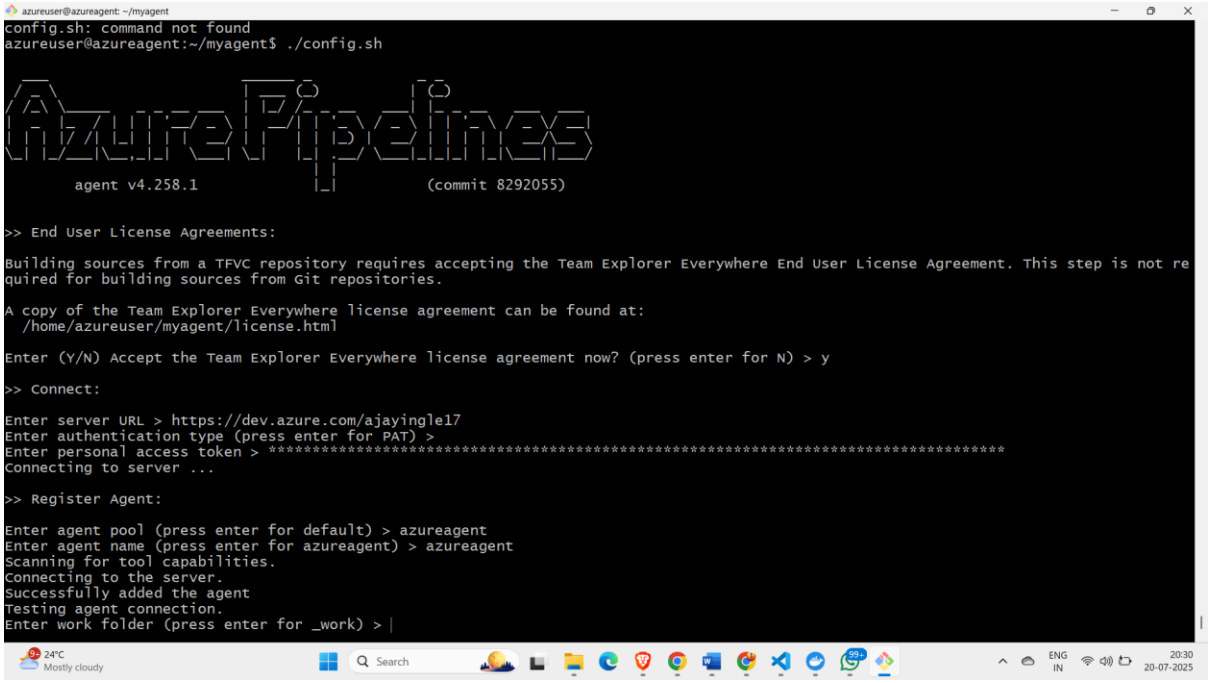
202302040021@mstea...
MIT ACADEMY OF ENGINEERING...
Home > Compute infrastructure | Virtual machines >
Create a virtual machine
Help me create a low cost VM
Help me create a VM optimized for high availability
Help me choose the right VM size for my workload
Basics
Disks
Networking
Management
Monitoring
Advanced
Tags
Review + create
Create a virtual machine that runs Linux or Windows. Select an image from Azure marketplace or use your own customized image. Complete the Basics tab then Review + create to provision a virtual machine with default parameters or review each tab for full customization. Learn more
This subscription may not be eligible to deploy VMs of certain sizes in certain regions.
Project details
Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.
Subscription *
Azure for Students
Resource group *
azurecicd
Create new
Instance details
Virtual machine name *
Region *
(US) East US
< Previous
Next : Disks >
Review + create
Give feedback
28°C
Mostly cloudy
Search
ENG
IN
16:28
20-07-2025

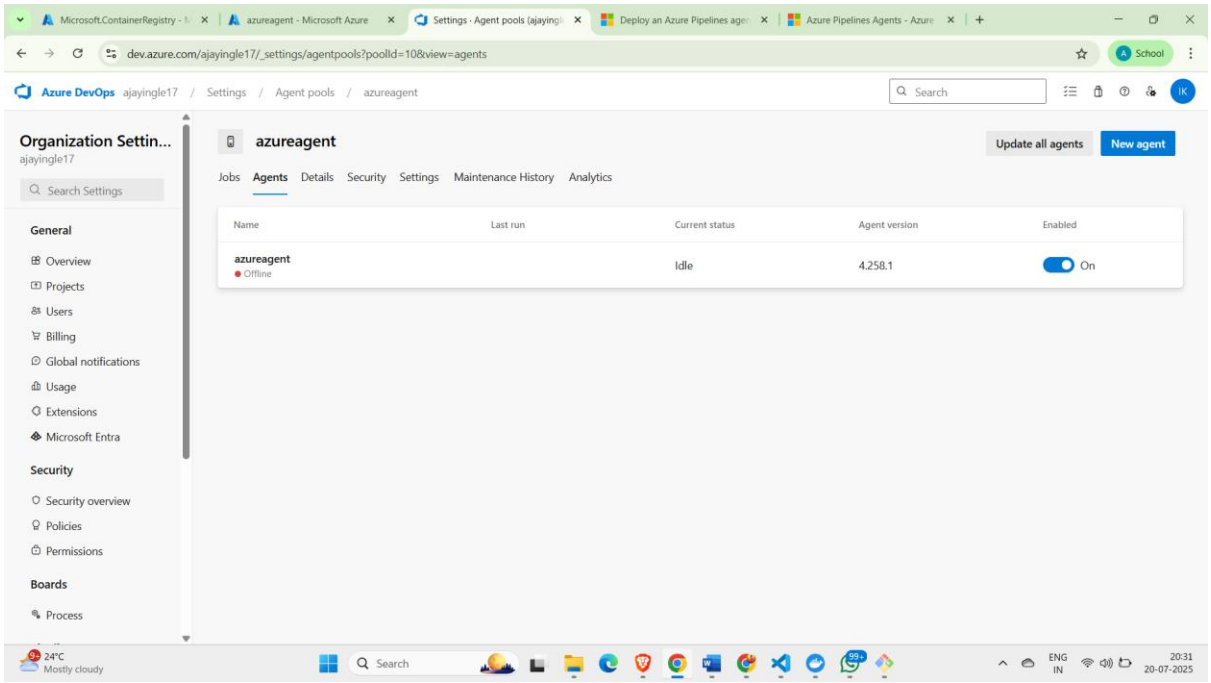


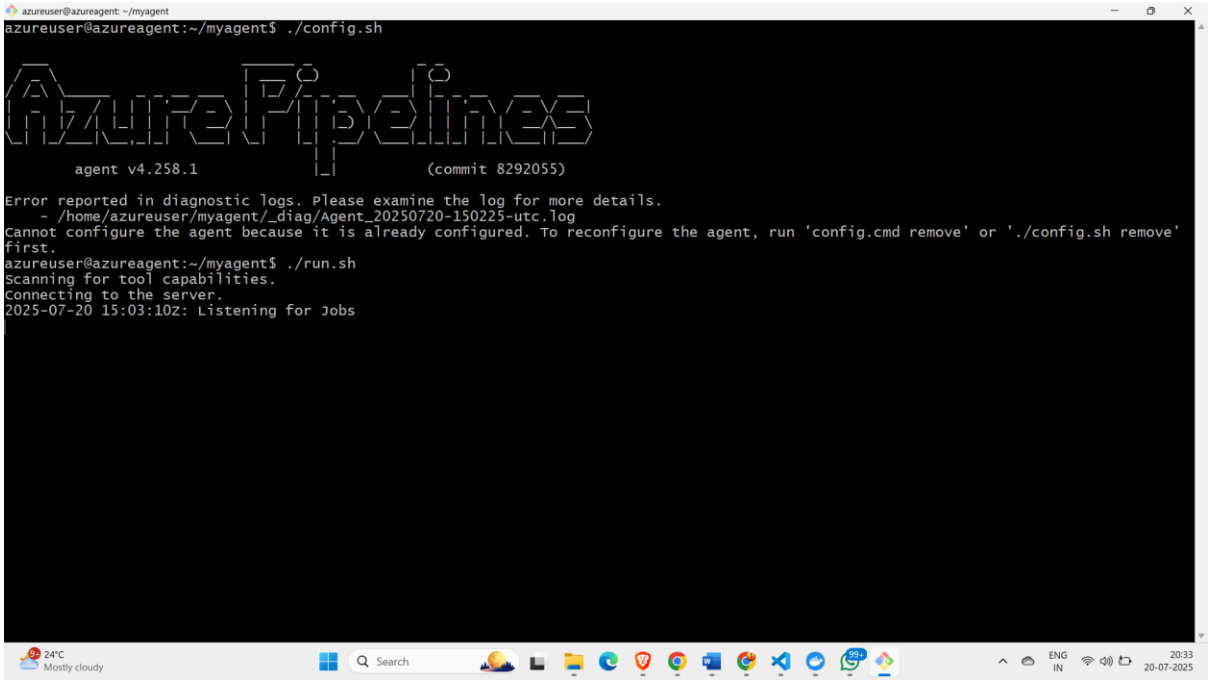
- Configure the agent on Virtual Machine

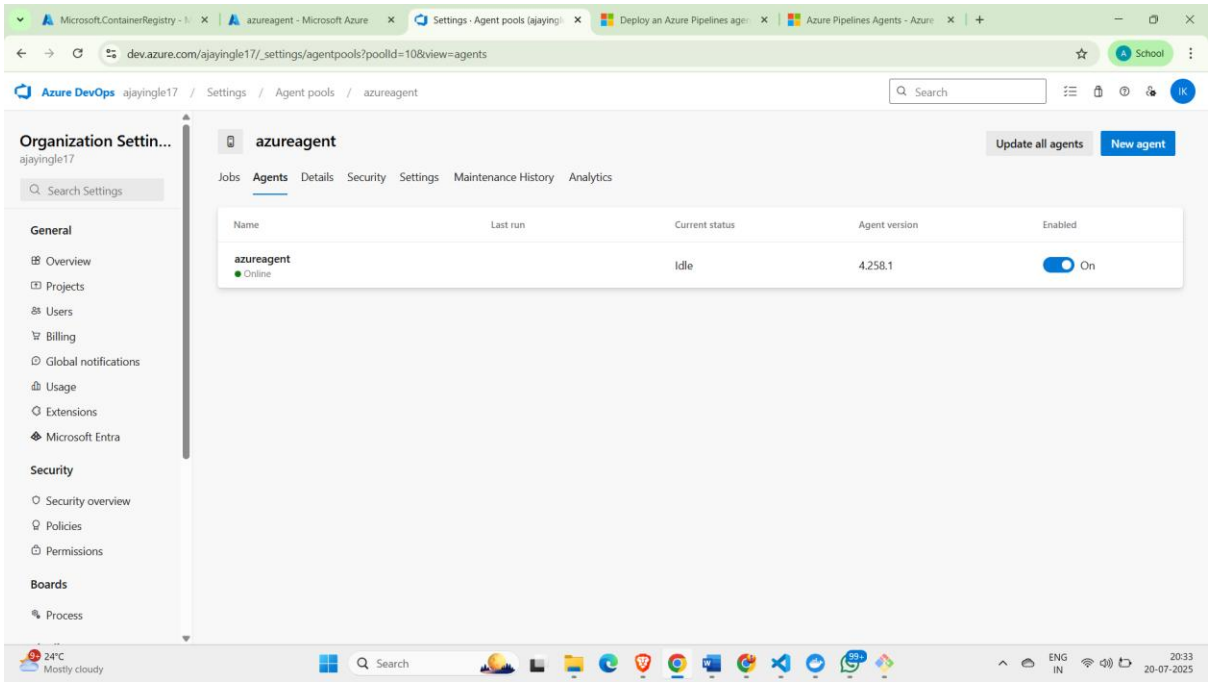


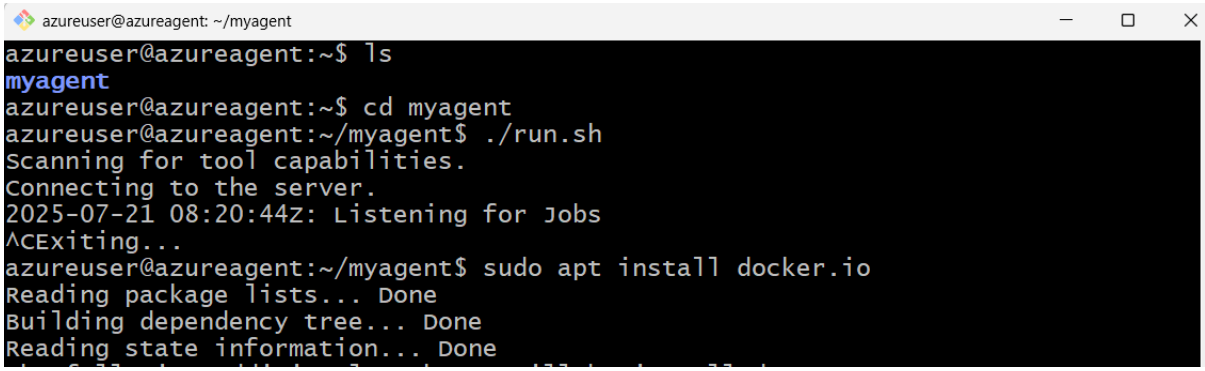

azureuser@azureagent: ~/myagent
./bin/Microsoft.VisualStudio.Services.ArtifactServices.App.Shared.dll
./bin/System.Private.Xml.dll
./bin/Agent.Plugins.dll
./bin/System.Xml.Serialization.dll
./bin/Agent.Plugins.Log.TestResultParser.Contracts.dll
./bin/System.Xml.XPath.XDocument.dll
./bin/System.Security.Cryptography.ProtectedData.dll
./bin/System.Numerics.Vectors.dll
./bin/System.Security.Cryptography.Pkcs.dll
./bin/de/
./bin/de/System.Private.ServiceModel.resources.dll
./bin/Agent.Sdk.deps.json
./run.sh
./reauth.sh
./env.sh
./license.html
azureuser@azureagent:~/myagent$ config.sh
config.sh: command not found
azureuser@azureagent:~/myagent$ ./config.sh
agent v4.258.1
(commit 8292055)
>> End User License Agreements:
Building sources from a TFVC repository requires accepting the Team Explorer Everywhere End User License Agreement. This step is not re
quired for building sources from Git repositories.
A copy of the Team Explorer Everywhere license agreement can be found at:
/home/azureuser/myagent/license.html
Enter (Y/N) Accept the Team Explorer Everywhere license agreement now? (press enter for N) >
26°C
Mostly cloudy
Search
ENG
IN
19:46
20-07-2025

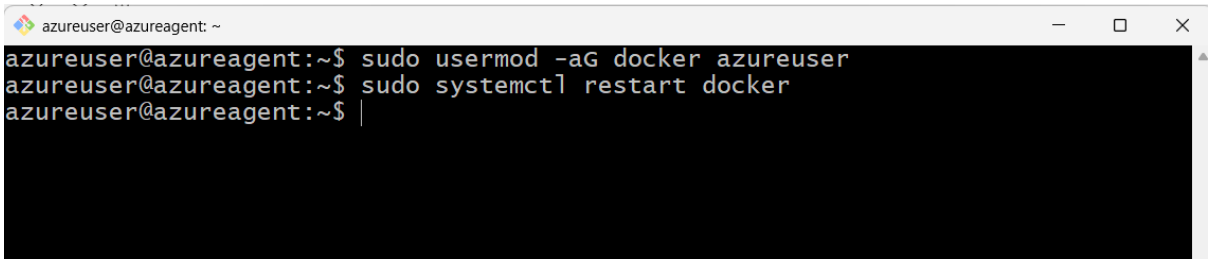

azureuser@azureagent: ~/myagent
config.sh: command not found
azureuser@azureagent:~/myagent$ ./config.sh
agent v4.258.1
(commit 8292055)
>> End User License Agreements:
Building sources from a TFVC repository requires accepting the Team Explorer Everywhere End User License Agreement. This step is not re
quired for building sources from Git repositories.
A copy of the Team Explorer Everywhere license agreement can be found at:
/home/azureuser/myagent/license.html
Enter (Y/N) Accept the Team Explorer Everywhere license agreement now? (press enter for N) > y
>> Connect:
Enter server URL > https://dev.azure.com/ajayingle17
Enter authentication type (press enter for PAT) >
Enter personal access token > **********
Connecting to server ...
>> Register Agent:
Enter agent pool (press enter for default) > azureagent
Enter agent name (press enter for azureagent) > azureagent
Scanning for tool capabilities.
Connecting to the server.
Successfully added the agent
Testing agent connection.
Enter work folder (press enter for _work) >
24°C
Mostly cloudy
Search
ENG
IN
20:30
20-07-2025


Microsoft.ContainerRegistry - N
azureagent - Microsoft Azure
Settings · Agent pools (ajayingl
Deploy an Azure Pipelines agen
Azure Pipelines Agents - Azure
dev.azure.com/ajayingle17/_settings/agentpools?poolId=10&view=agents
School
Azure DevOps ajayingle17 / Settings / Agent pools / azureagent
Search
IK
Organization Settin...
ajayingle17
Search Settings
General
Overview
Projects
Users
Billing
Global notifications
Usage
Extensions
Microsoft Entra
Security
Security overview
Policies
Permissions
Boards
Process
azureagent
Update all agents
New agent
Jobs
Agents
Details
Security
Settings
Maintenance History
Analytics
Name
Last run
Current status
Agent version
Enabled
azureagent
Offline
Idle
4.258.1
On
24°C
Mostly cloudy
Search
ENG
IN
20:31
20-07-2025

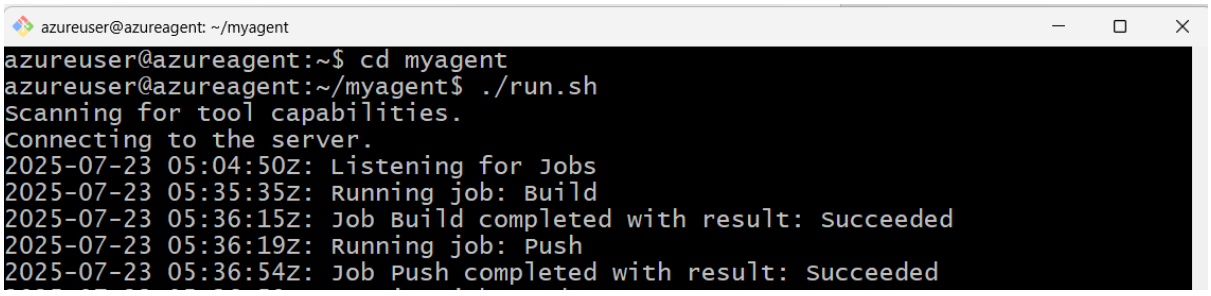

azureuser@azureagent: ~/myagent
azureuser@azureagent:~/myagent$ ./config.sh
agent v4.258.1
(commit 8292055)
Error reported in diagnostic logs. Please examine the log for more details.
- /home/azureuser/myagent/_diag/Agent_20250720-150225-utc.log
Cannot configure the agent because it is already configured. To reconfigure the agent, run 'config.cmd remove' or './config.sh remove'
first.
azureuser@azureagent:~/myagent$ ./run.sh
Scanning for tool capabilities.
Connecting to the server.
2025-07-20 15:03:10Z: Listening for Jobs
24°C
Mostly cloudy
Search
ENG
IN
20:33
20-07-2025

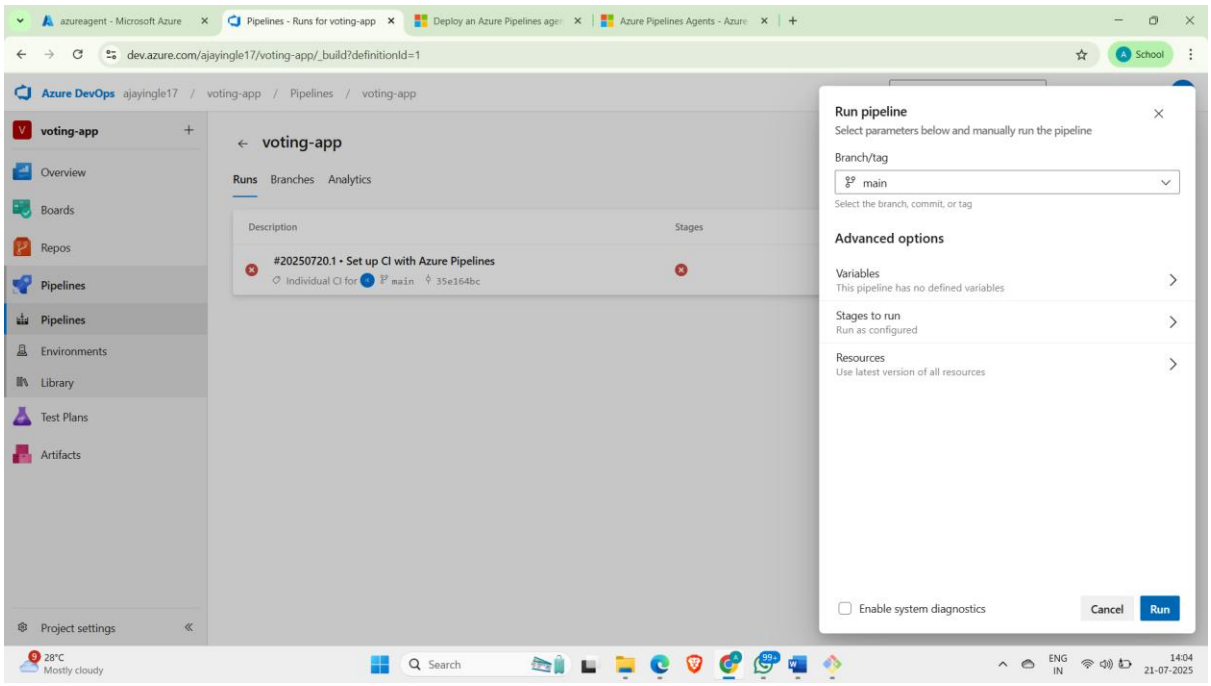






- Agent start listening for job




azureagent - Microsoft Azure
Pipelines - Runs for voting-app
Deploy an Azure Pipelines agent
Azure Pipelines Agents - Azure
dev.azure.com/ajayingle17/voting-app/_build?definitionId=1
School
Azure DevOps ajayingle17 / voting-app / Pipelines / voting-app
voting-app
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Pipelines
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Library
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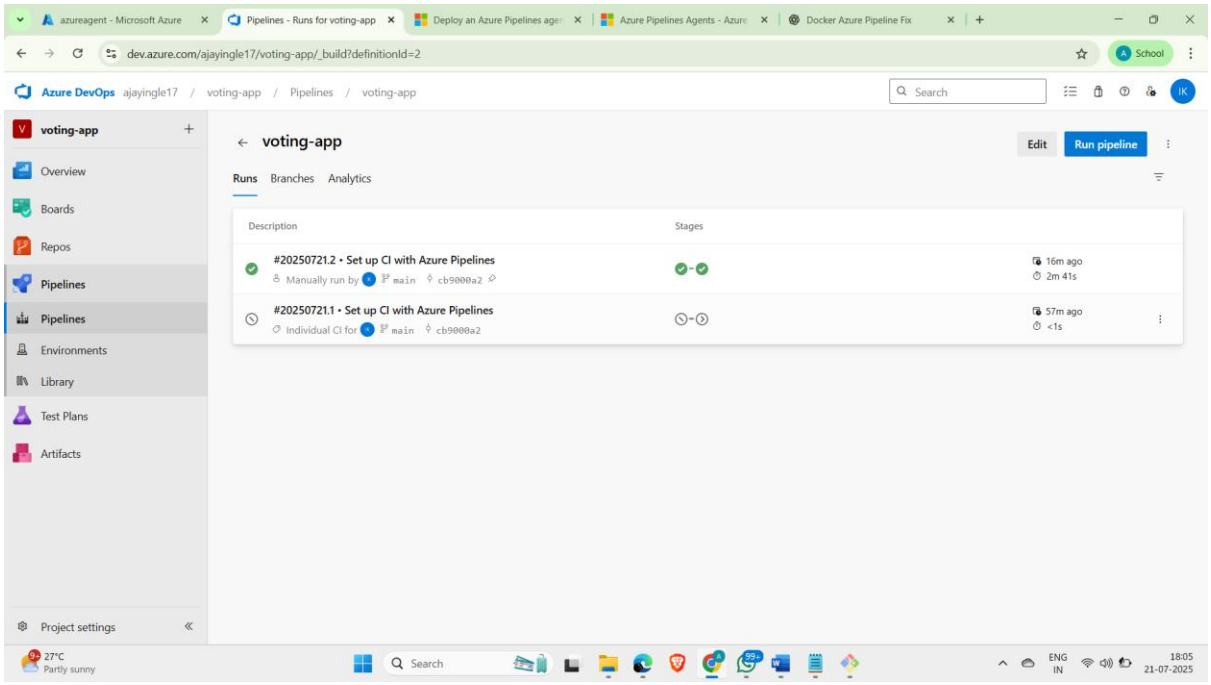
Artifacts
Project settings
voting-app
Runs Branches Analytics
Description
Stages
#20250720.1 • Set up CI with Azure Pipelines
Individual CI for main 35e164bc
Run pipeline
Select parameters below and manually run the pipeline
Branch/tag
main
Select the branch, commit, or tag
Advanced options
Variables
This pipeline has no defined variables
Stages to run
Run as configured
Resources
Use latest version of all resources
Enable system diagnostics
Cancel
Run
28°C
Mostly cloudy
Search
ENG
IN
14:04
21-07-2025


azureagent - Microsoft Azure
Pipelines - Runs for voting-app
Deploy an Azure Pipelines agent
Azure Pipelines Agents - Azure
Docker Azure Pipeline Fix
dev.azure.com/ajayingle17/voting-app/_build?definitionId=2
School
Azure DevOps ajayingle17 / voting-app / Pipelines / voting-app
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voting-app
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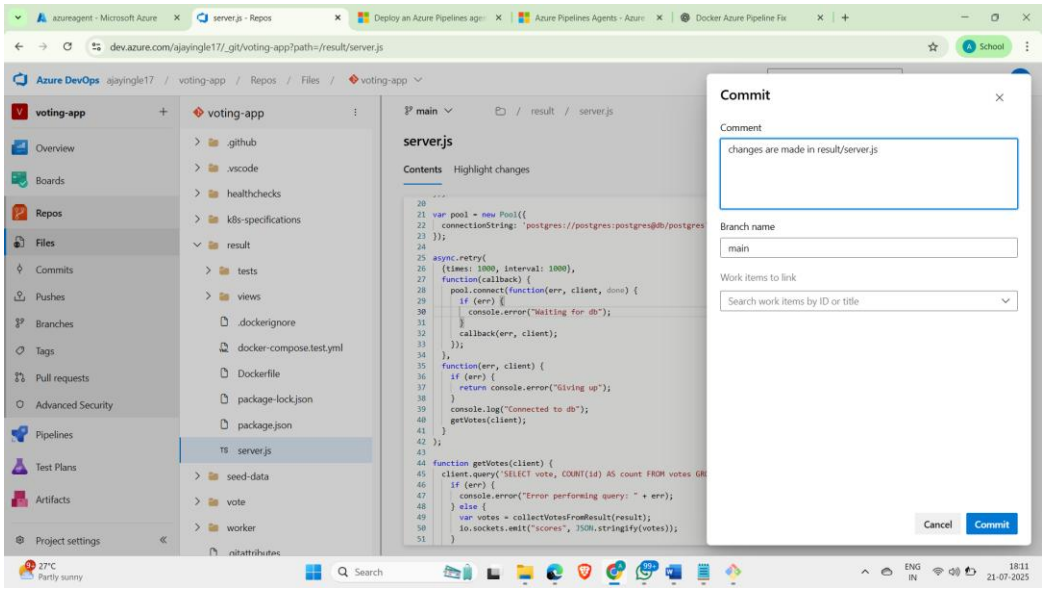
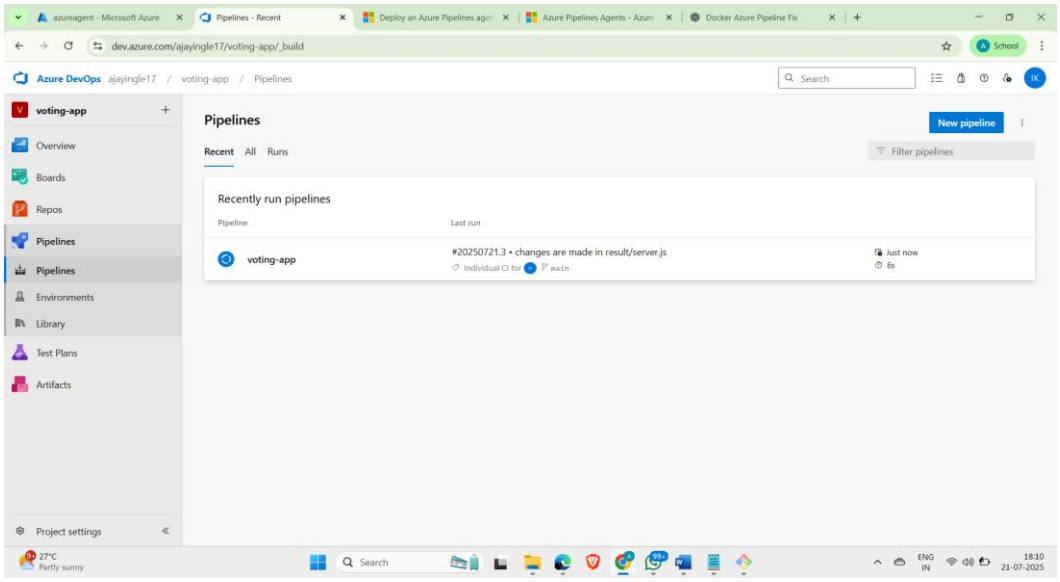
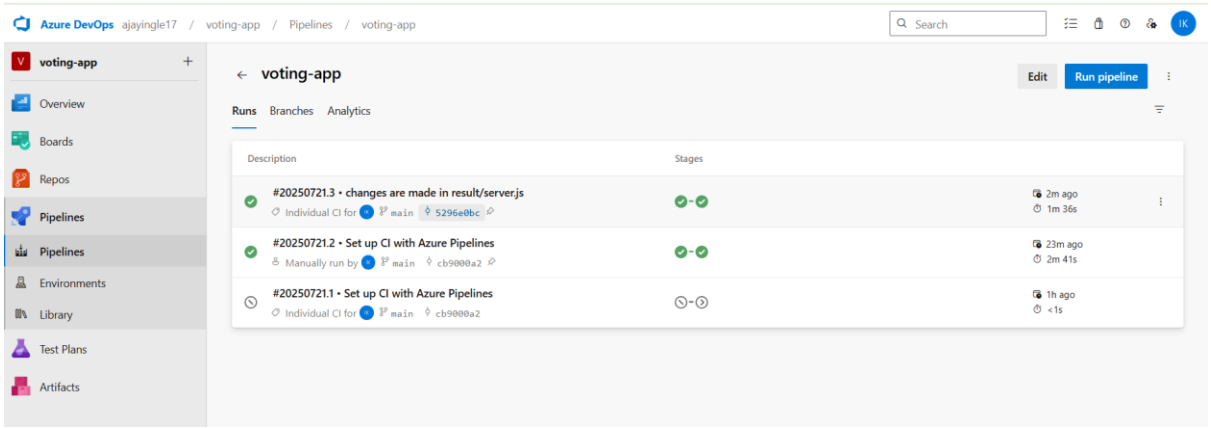
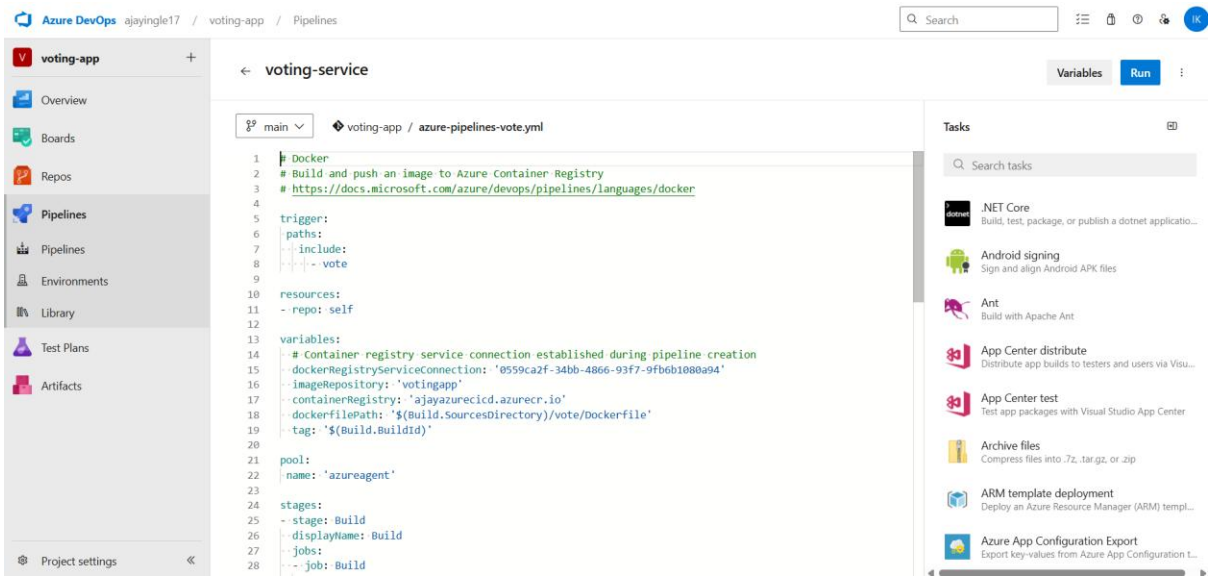
Pipelines
Pipelines
Environments
Library
Test Plans
Artifacts
Project settings
voting-app
Edit
Run pipeline
Runs Branches Analytics
Description
Stages
#20250721.2 • Set up CI with Azure Pipelines
Manually run by main cb9000a2
16m ago
2m 41s
#20250721.1 • Set up CI with Azure Pipelines
Individual CI for main cb9000a2
57m ago
<1s
27°C
Partly sunny
Search
ENG
IN
18:05
21-07-2025


Commit
Comment
changes are made in result/server.js
Branch name
main
Work items to link
Search work items by ID or title
Cancel
Commit
server.js
Contents
Highlight changes


Pipelines
New pipeline
Recent
All
Runs
Filter pipelines
Recently run pipelines
Pipeline
Last run
voting-app
#20250721.3 • changes are made in result/server.js
Individual CI for
main
just now
6s


voting-app
Edit
Run pipeline
Runs
Branches
Analytics
Description
Stages
#20250721.3 • changes are made in result/server.js
Individual CI for
main
5296e0bc
2m ago
1m 36s
#20250721.2 • Set up CI with Azure Pipelines
Manually run by
main
cb9000a2
23m ago
2m 41s
#20250721.1 • Set up CI with Azure Pipelines
Individual CI for
main
cb9000a2
1h ago
<1s


Azure DevOps ajayingle17 / voting-app / Pipelines
Search
voting-app
Overview
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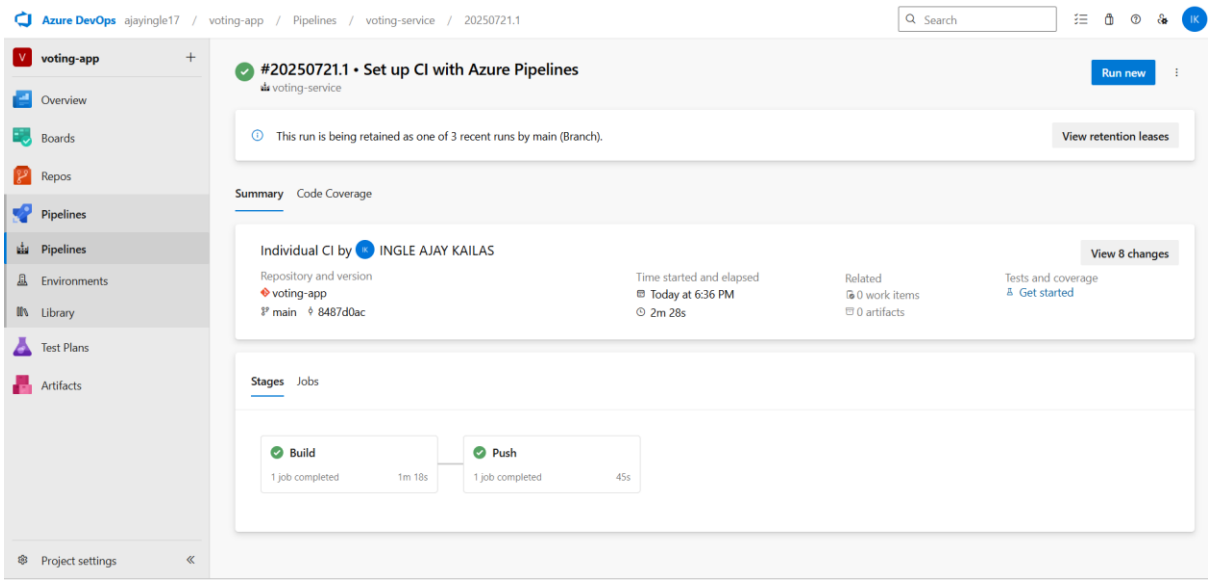
Pipelines
Pipelines
Environments
Library
Test Plans
Artifacts
Project settings
voting-service
Variables
Run
main
voting-app / azure-pipelines-vote.yml
Docker
Build and push an image to Azure Container Registry
https://docs.microsoft.com/azure/devops/pipelines/languages/docker
trigger:
paths:
include:
- vote
resources:
- repo: self
variables:
Container registry service connection established during pipeline creation
dockerRegistryServiceConnection: '0559ca2f-34bb-4866-93f7-9fb6b1080a94'
imageRepository: 'votingapp'
containerRegistry: 'ajayazurecicd.azurecr.io'
dockerfilePath: '$(Build.SourcesDirectory)/vote/Dockerfile'
tag: '$(Build.BuildId)'
pool:
name: 'azureagent'
stages:
- stage: Build
displayName: Build
jobs:
- job: Build
Tasks
Search tasks
.NET Core
Build, test, package, or publish a dotnet applicatio...
Android signing
Sign and align Android APK files
Ant
Build with Apache Ant
App Center distribute
Distribute app builds to testers and users via Visu...
App Center test
Test app packages with Visual Studio App Center
Archive files
Compress files into .7z, .tar.gz, or .zip
ARM template deployment
Deploy an Azure Resource Manager (ARM) templ...
Azure App Configuration Export
Export key-values from Azure App Configuration t...


Azure DevOps ajayingle17 / voting-app / Pipelines / voting-service / 20250721.1
Search
voting-app
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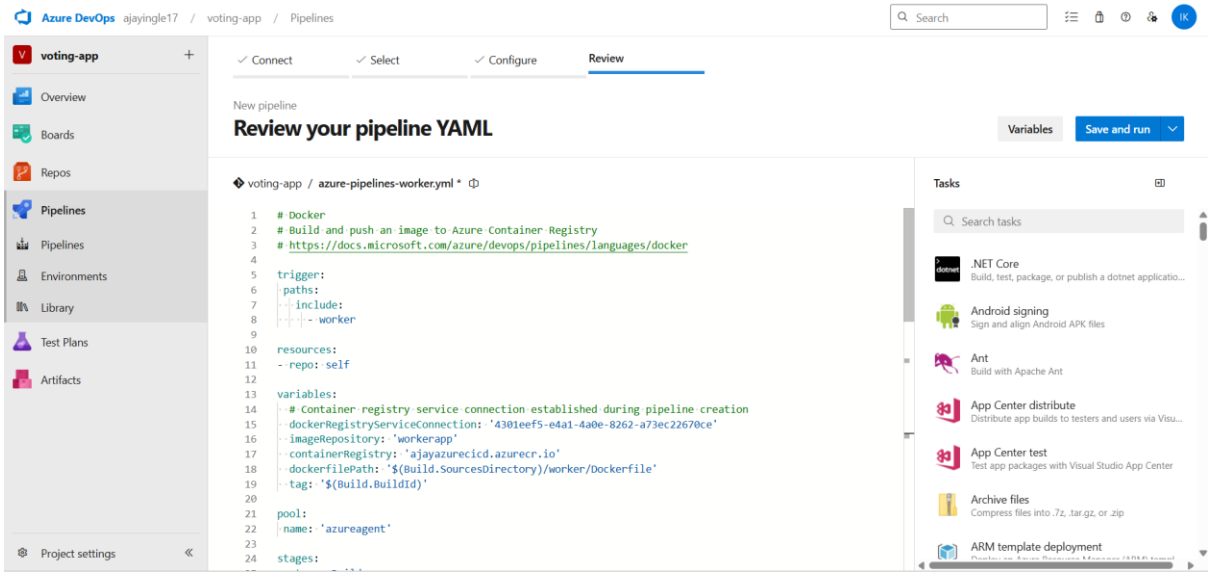
Repos
Pipelines
Pipelines
Environments
Library
Test Plans
Artifacts
Project settings
#20250721.1 • Set up CI with Azure Pipelines
voting-service
Run new
This run is being retained as one of 3 recent runs by main (Branch).
View retention leases
Summary
Code Coverage
Individual CI by INGLE AJAY KAILAS
View 8 changes
Repository and version
voting-app
main 8487d0ac
Time started and elapsed
Today at 6:36 PM
2m 28s
Related
0 work items
0 artifacts
Tests and coverage
Get started
Stages
Jobs
Build
1 job completed
1m 18s
Push
1 job completed
45s


Azure DevOps ajayingle17 / voting-app / Pipelines
Search
voting-app
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Boards
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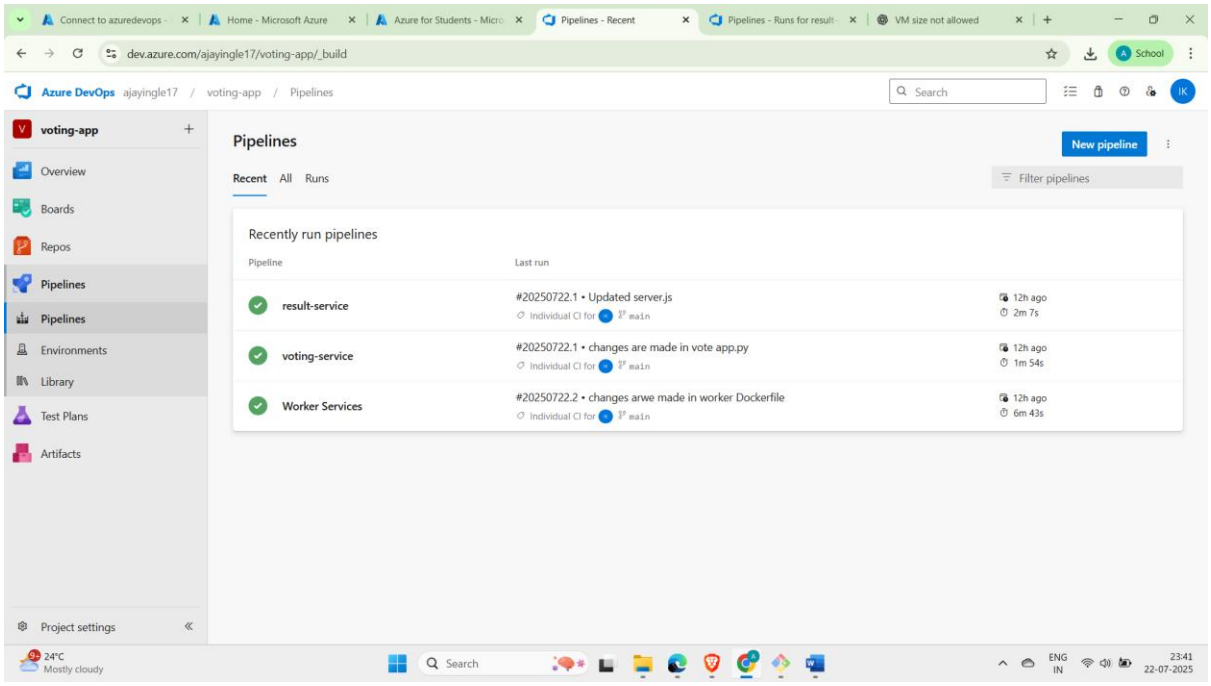
Pipelines
Pipelines
Environments
Library
Test Plans
Artifacts
Project settings
Connect
Select
Configure
Review
New pipeline
Review your pipeline YAML
Variables
Save and run
voting-app / azure-pipelines-worker.yml *
Docker
Build and push an image to Azure Container Registry
https://docs.microsoft.com/azure/devops/pipelines/languages/docker
trigger:
paths:
include:
- worker
resources:
- repo: self
variables:
Container registry service connection established during pipeline creation
dockerRegistryServiceConnection: '4301eef5-e4a1-4a0e-8262-a73ec22670ce'
imageRepository: 'workerapp'
containerRegistry: 'ajayazurecicd.azurecr.io'
dockerfilePath: '$(Build.SourcesDirectory)/worker/Dockerfile'
tag: '$(Build.BuildId)'
pool:
name: 'azureagent'
stages:
Tasks
Search tasks
.NET Core
Build, test, package, or publish a dotnet applicatio...
Android signing
Sign and align Android APK files
Ant
Build with Apache Ant
App Center distribute
Distribute app builds to testers and users via Visu...
App Center test
Test app packages with Visual Studio App Center
Archive files
Compress files into .7z, .tar.gz, or .zip
ARM template deployment


Connect to azuredevops -
Home - Microsoft Azure
Azure for Students - Micro
Pipelines - Recent
Pipelines - Runs for result-
VM size not allowed
dev.azure.com/ajayingle17/voting-app/_build
School
Azure DevOps ajayingle17 / voting-app / Pipelines
Search
IK
voting-app
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Pipelines
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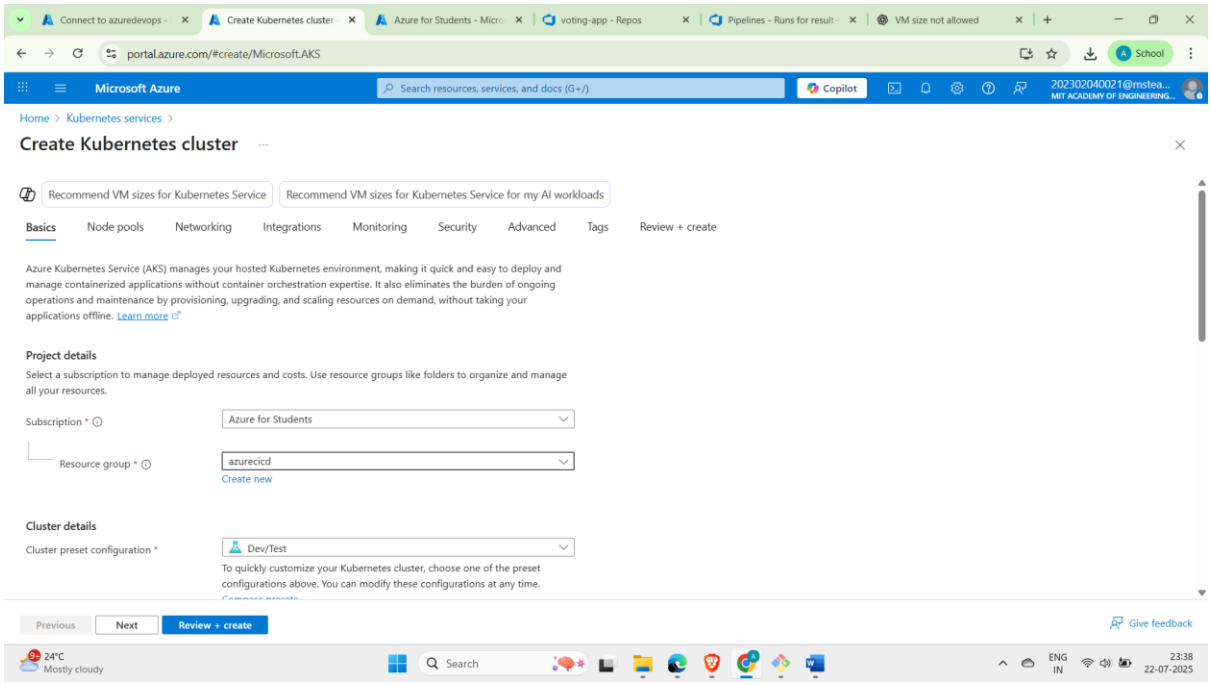
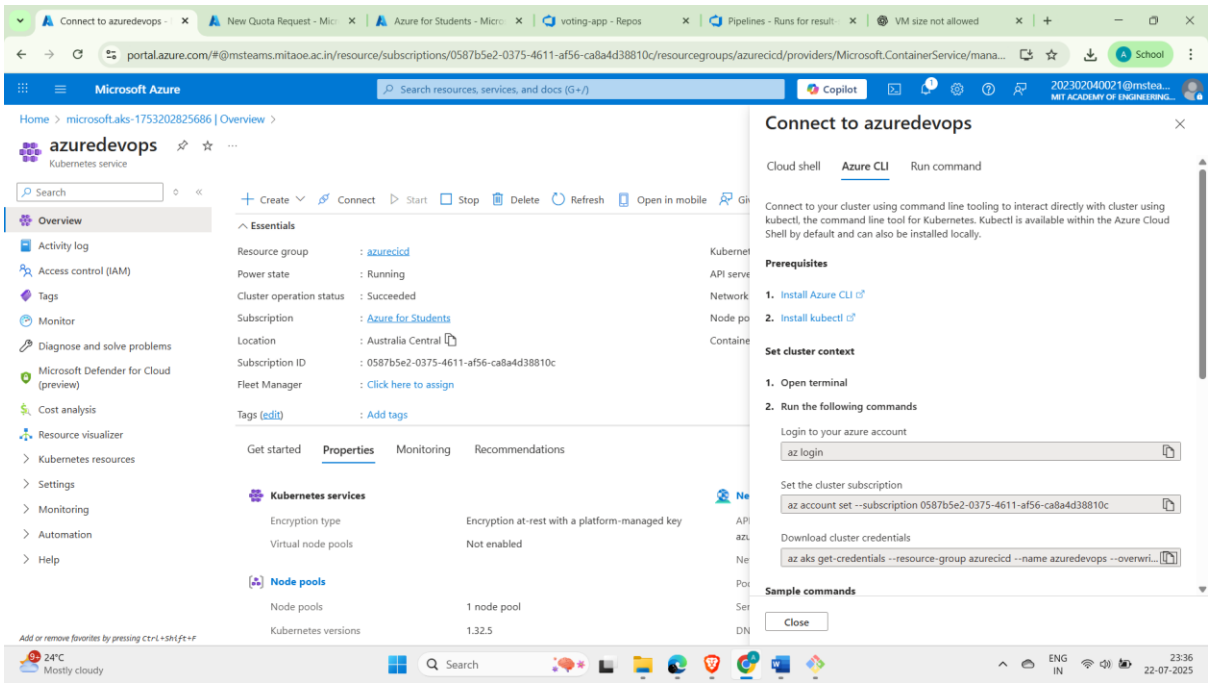
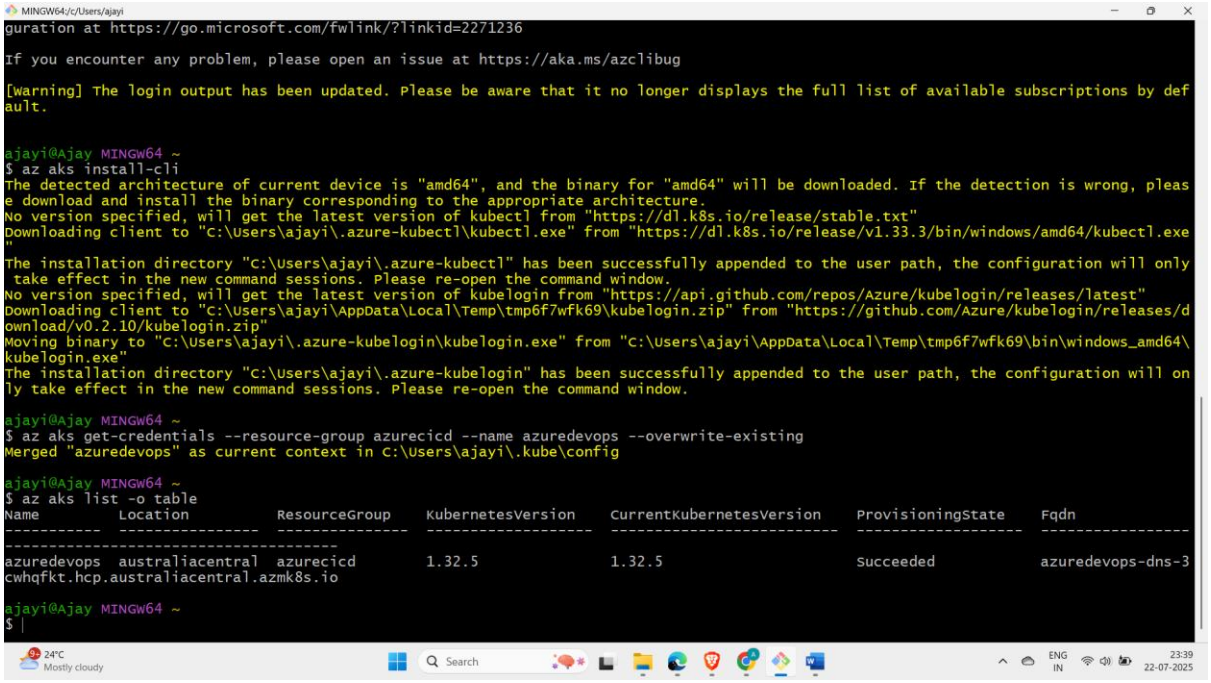
Artifacts
Project settings
Pipelines
New pipeline
Recent All Runs
Filter pipelines
Recently run pipelines
Pipeline
Last run
result-service
#20250722.1 • Updated server.js
Individual CI for
main
12h ago
2m 7s
voting-service
#20250722.1 • changes are made in vote app.py
Individual CI for
main
12h ago
1m 54s
Worker Services
#20250722.2 • changes arwe made in worker Dockerfile
Individual CI for
main
12h ago
6m 43s
24°C
Mostly cloudy
Search
ENG
IN
23:41
22-07-2025

- **Create the K8 cluster**

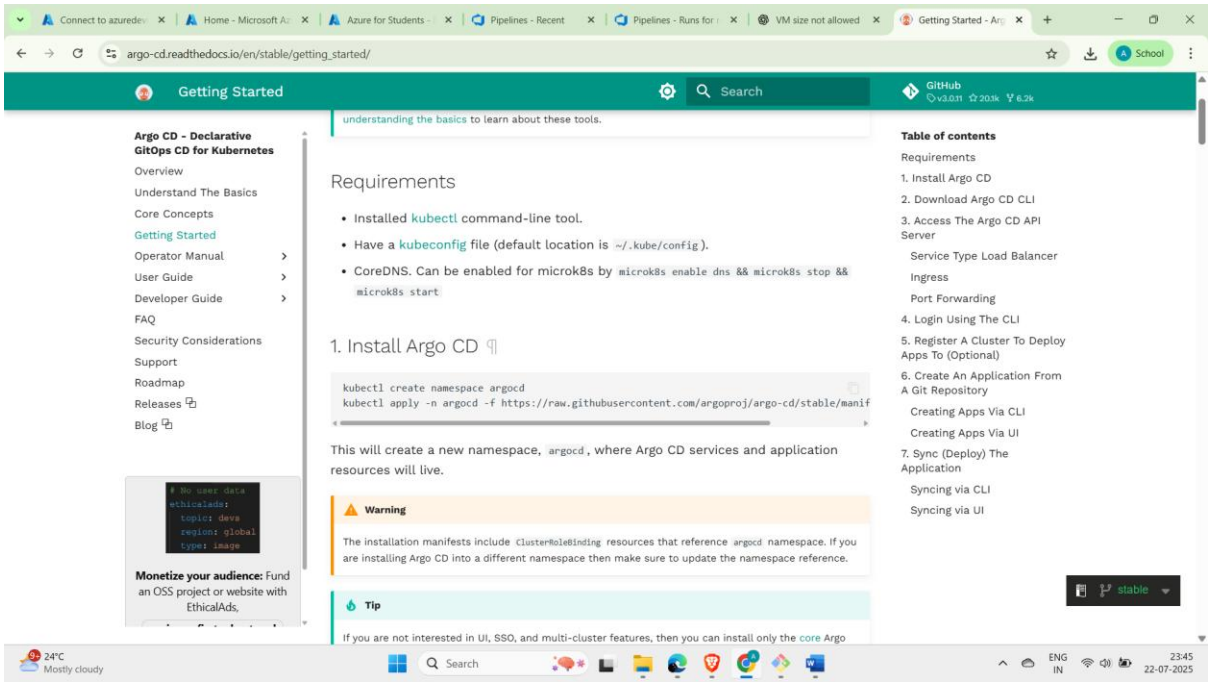


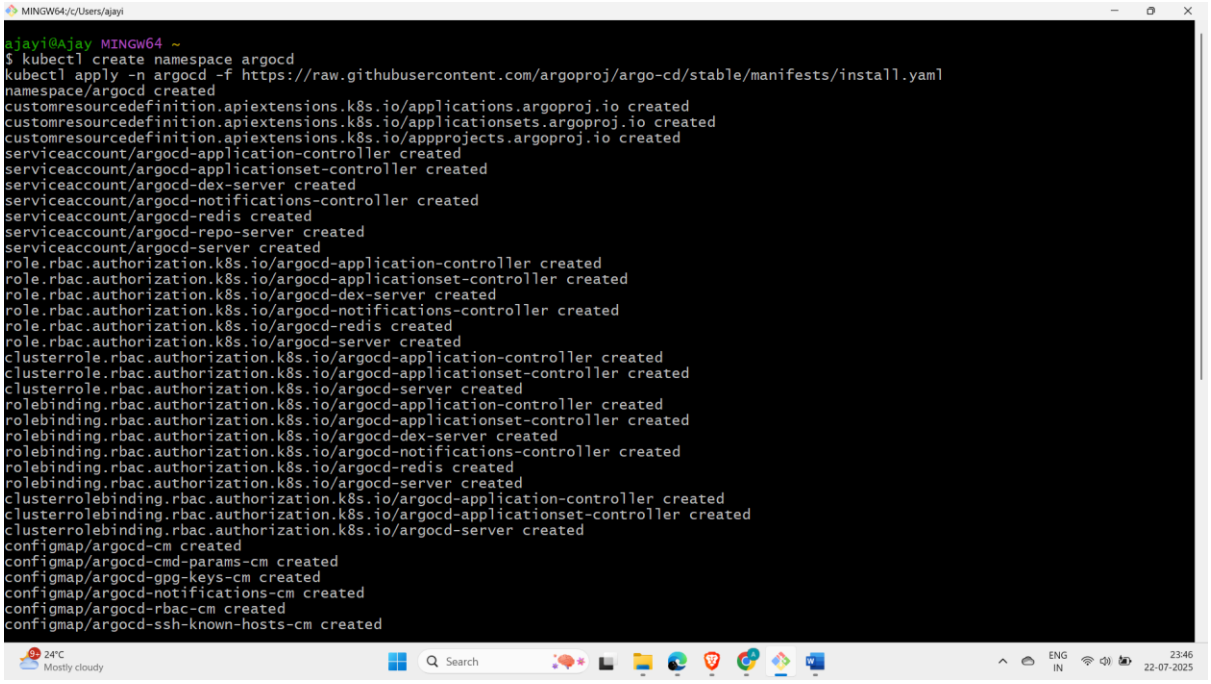


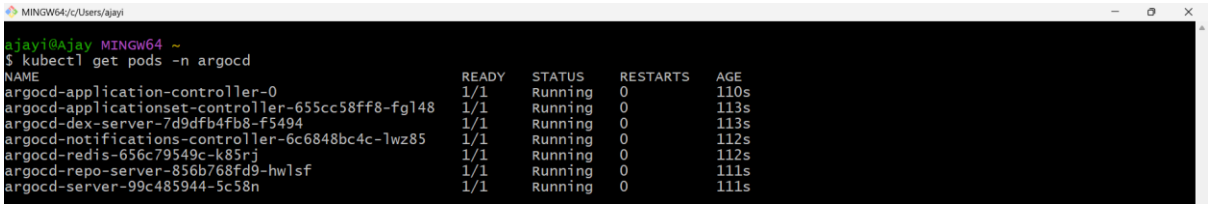
- **Connect the cluster using azure cli**



- **Install the ARGOCD**

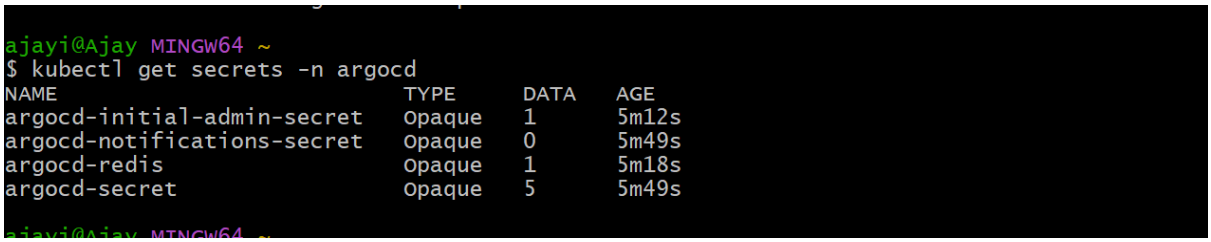






- **Configure ARGOCD**

$ kubectl get secrets -n argocd



$ kubectl edit argocd-initial-admin-secret -n argocd

```
# Please edit the object below. Lines beginning with a '#' will be ignored,
# and an empty file will abort the edit. If an error occurs while saving this file will be
# reopened with the relevant failures.
#
apiVersion: v1
data:
  password: cEJ3QnB0OXdWalIycUtsTQ==
kind: Secret
metadata:
  creationTimestamp: "2025-07-22T18:16:03Z"
  name: argocd-initial-admin-secret
  namespace: argocd
  resourceVersion: "24418"
  uid: b21e8b54-adae-4ad2-b5af-a9e3194894db
type: Opaque
```

$ echo cEJ3QnB0OXdWalIycUtsTQ== | base64 –decode

```
MINGW64:/c/Users/ajayi

ajayi@Ajay MINGW64 ~
$ echo cEJ3QnB0OXdWalIycUtsTQ== | base64 --decode
pBwBpt9wVjR2qKlM
ajayi@Ajay MINGW64 ~
$
```

$ kubectl get svc -n argocd

```
ajayi@Ajay MINGW64 ~
$ kubectl get svc -n argocd
NAME                                      TYPE        CLUSTER-IP      EXTERNAL-IP   PORT(S)                      AGE
argocd-applicationset-controller          ClusterIP   10.0.214.46     <none>        7000/TCP,8080/TCP            19m
argocd-dex-server                         ClusterIP   10.0.150.84     <none>        5556/TCP,5557/TCP,5558/TCP   19m
argocd-metrics                            ClusterIP   10.0.138.219    <none>        8082/TCP                     19m
argocd-notifications-controller-metrics   ClusterIP   10.0.17.156     <none>        9001/TCP                     19m
argocd-redis                              ClusterIP   10.0.151.53     <none>        6379/TCP                     19m
argocd-repo-server                        ClusterIP   10.0.242.42     <none>        8081/TCP,8084/TCP            19m
argocd-server                             ClusterIP   10.0.211.5      <none>        80/TCP,443/TCP               19m
argocd-server-metrics                     ClusterIP   10.0.86.181     <none>        8083/TCP                     19m
```

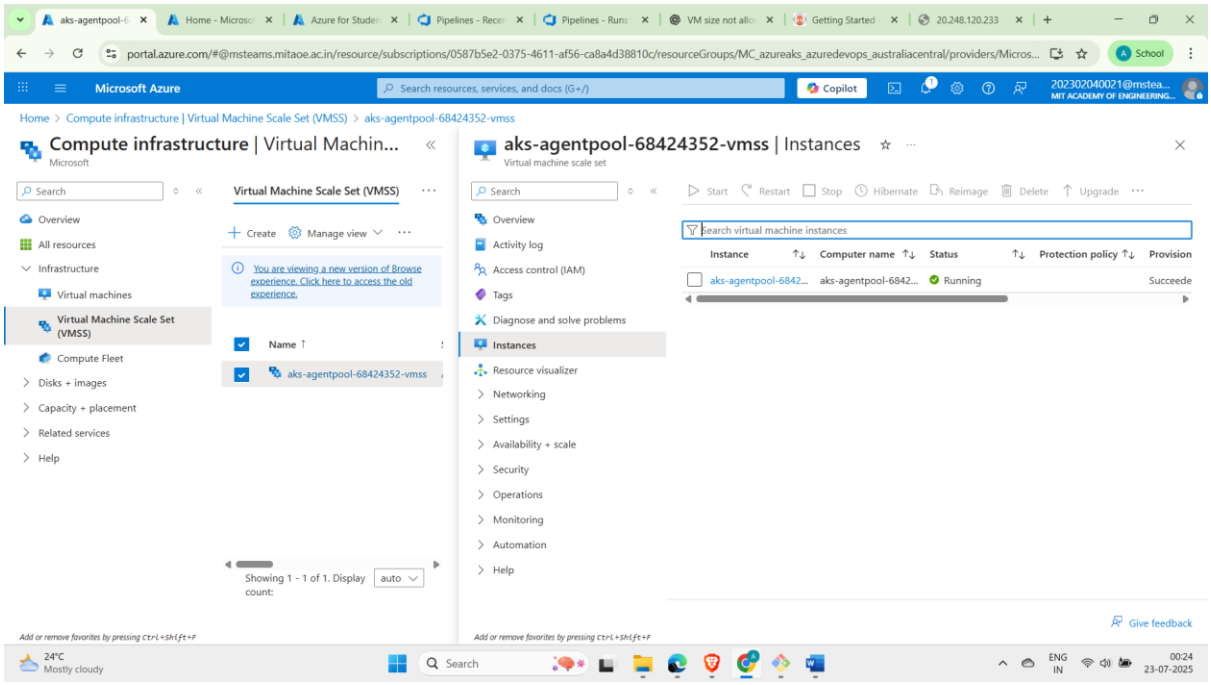
$kubectl edit svc argocd-server -n argocd

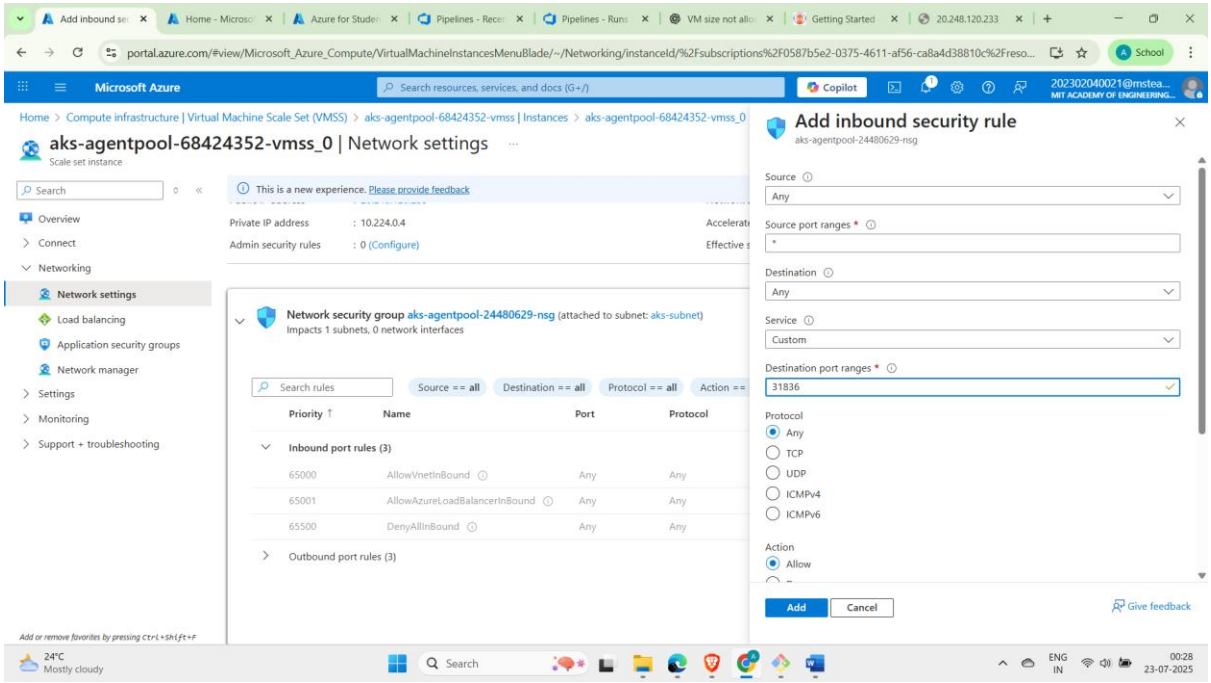
```
MINGW64:/c/Users/ajayi
  creationTimestamp: "2025-07-22T18:15:30Z"
  labels:
    app.kubernetes.io/component: server
    app.kubernetes.io/name: argocd-server
    app.kubernetes.io/part-of: argocd
  name: argocd-server
  namespace: argocd
  resourceVersion: "32140"
  uid: f44fccd1-6825-424b-bb74-c56c8e3d62b3
spec:
  clusterIP: 10.0.211.5
  clusterIPs:
  - 10.0.211.5
  externalTrafficPolicy: Cluster
  internalTrafficPolicy: Cluster
  ipFamilies:
  - IPv4
  ipFamilyPolicy: SingleStack
  ports:
  - name: http
    nodePort: 31836
    port: 80
    protocol: TCP
    targetPort: 8080
  - name: https
    nodePort: 31818
    port: 443
    protocol: TCP
    targetPort: 8080
  selector:
    app.kubernetes.io/name: argocd-server
  sessionAffinity: None
  type: NodePort
status:
  loadBalancer: {}
~
~
/tmp/kubectl.exe-edit-4219745091.yaml [dos] (00:16 23/07/2025)                  45,1 Bot
```


```
ajayi@Ajay MINGW64 ~
$ kubectl get svc -n argocd
NAME                                      TYPE        CLUSTER-IP      EXTERNAL-IP   PORT(S)                      AGE
argocd-applicationset-controller          ClusterIP   10.0.214.46     <none>        7000/TCP,8080/TCP            33m
argocd-dex-server                         ClusterIP   10.0.150.84     <none>        5556/TCP,5557/TCP,5558/TCP   33m
argocd-metrics                            ClusterIP   10.0.138.219    <none>        8082/TCP                     33m
argocd-notifications-controller-metrics   ClusterIP   10.0.17.156     <none>        9001/TCP                     33m
argocd-redis                              ClusterIP   10.0.151.53     <none>        6379/TCP                     33m
argocd-repo-server                        ClusterIP   10.0.242.42     <none>        8081/TCP,8084/TCP            33m
argocd-server                             NodePort    10.0.211.5      <none>        80:31836/TCP,443:31818/TCP   33m
argocd-server-metrics                     ClusterIP   10.0.86.181     <none>        8083/TCP                     33m
```

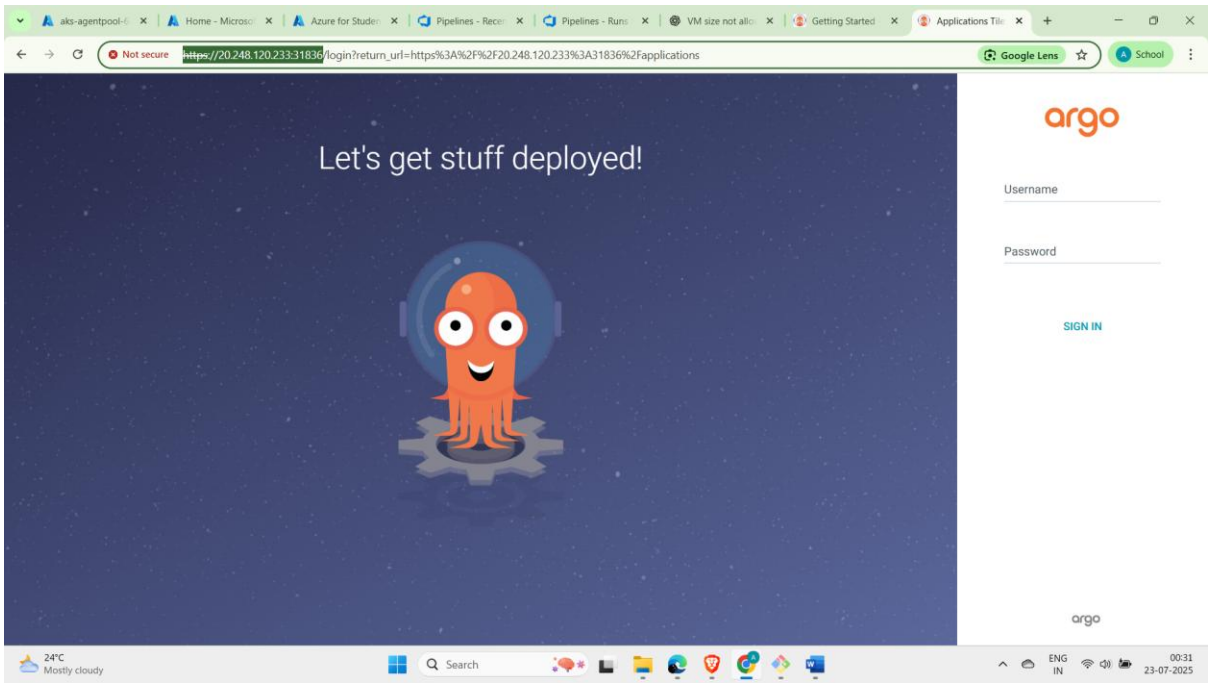
```
ajayi@Ajay MINGW64 ~
$ kubectl get svc -n argocd
NAME                                      TYPE        CLUSTER-IP     EXTERNAL-IP   PORT(S)                       AGE
argocd-applicationset-controller          ClusterIP   10.0.214.46    <none>        7000/TCP,8080/TCP             33m
argocd-dex-server                         ClusterIP   10.0.150.84    <none>        5556/TCP,5557/TCP,5558/TCP    33m
argocd-metrics                            ClusterIP   10.0.138.219   <none>        8082/TCP                      33m
argocd-notifications-controller-metrics   ClusterIP   10.0.17.156    <none>        9001/TCP                      33m
argocd-redis                              ClusterIP   10.0.151.53    <none>        6379/TCP                      33m
argocd-repo-server                        ClusterIP   10.0.242.42    <none>        8081/TCP,8084/TCP             33m
argocd-server                             NodePort    10.0.211.5     <none>        80:31836/TCP,443:31818/TCP    33m
argocd-server-metrics                     ClusterIP   10.0.86.181    <none>        8083/TCP                      33m

ajayi@Ajay MINGW64 ~
$ kubectl get nodes -o wide
NAME                                STATUS   ROLES    AGE   VERSION   INTERNAL-IP   EXTERNAL-IP      OS-IMAGE             KERNEL-VERSI
ON       CONTAINER-RUNTIME
aks-agentpool-68424352-vmss000000   Ready    <none>   118m  v1.32.5   10.224.0.4    20.248.120.233   Ubuntu 22.04.5 LTS   5.15.0-1091-
azure    containerd://1.7.27-1
```

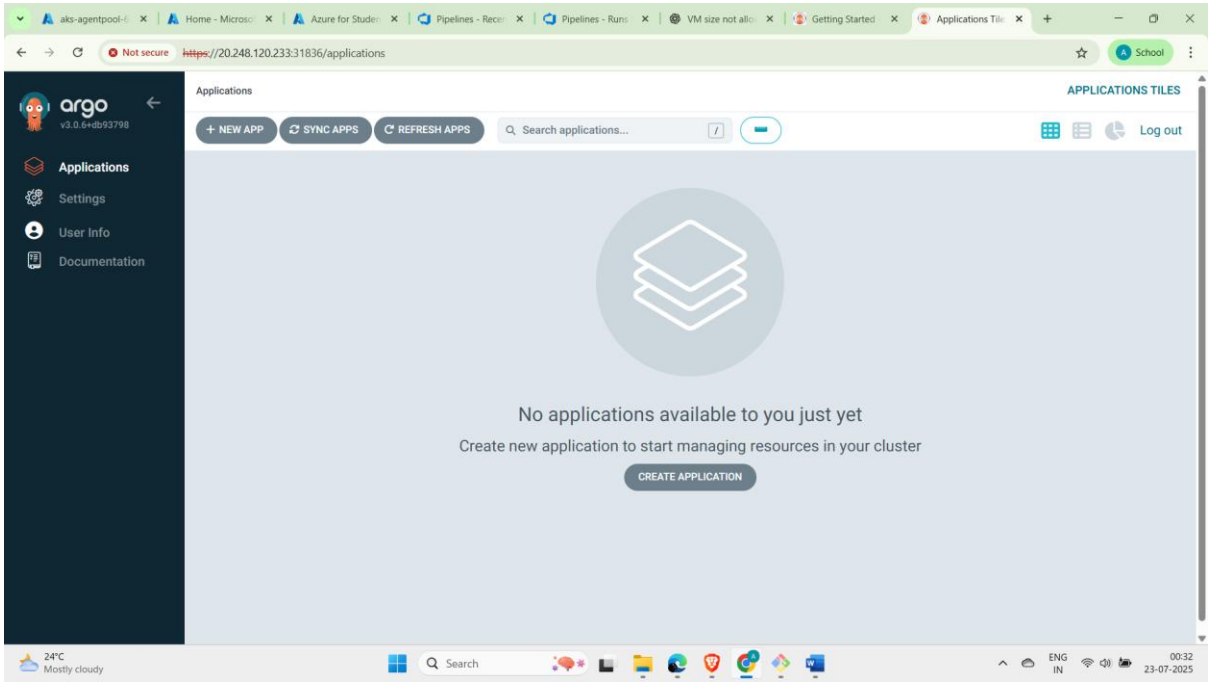
- **Copy the node ip and argocd-sever port and past in browser**
- **Before that expose the port in azure k8 to external world**



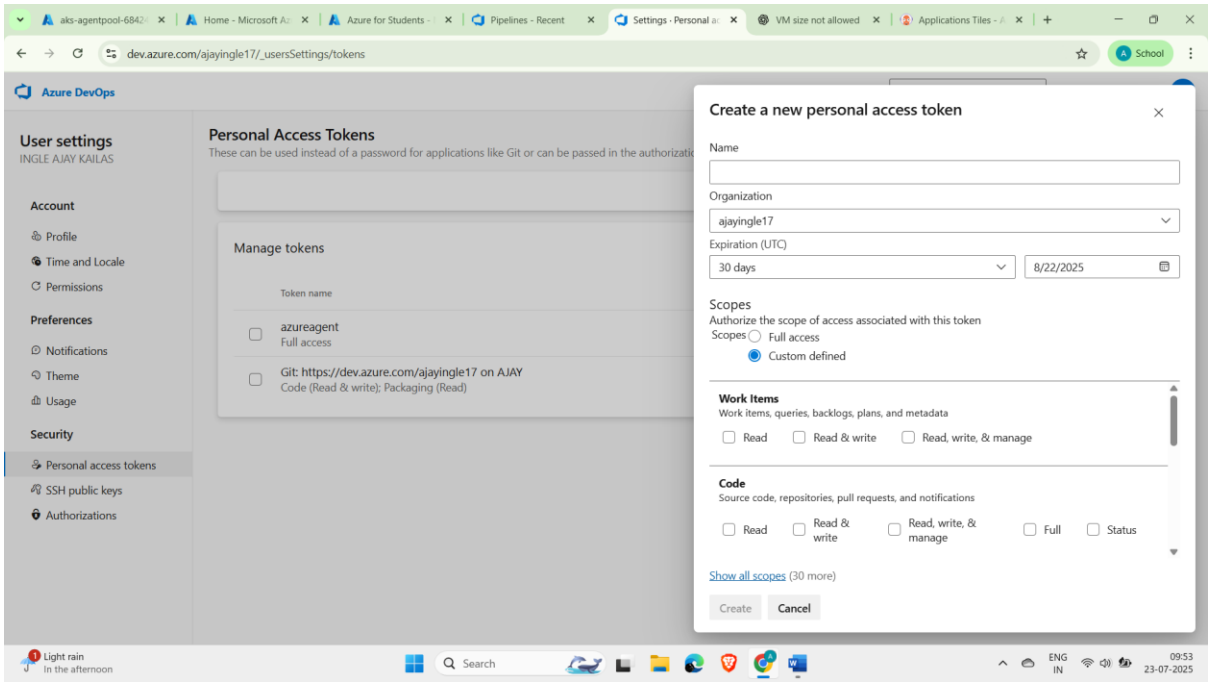


- **Now enter the ip of node folled by port in browser**
  https://20.248.120.233:31836/

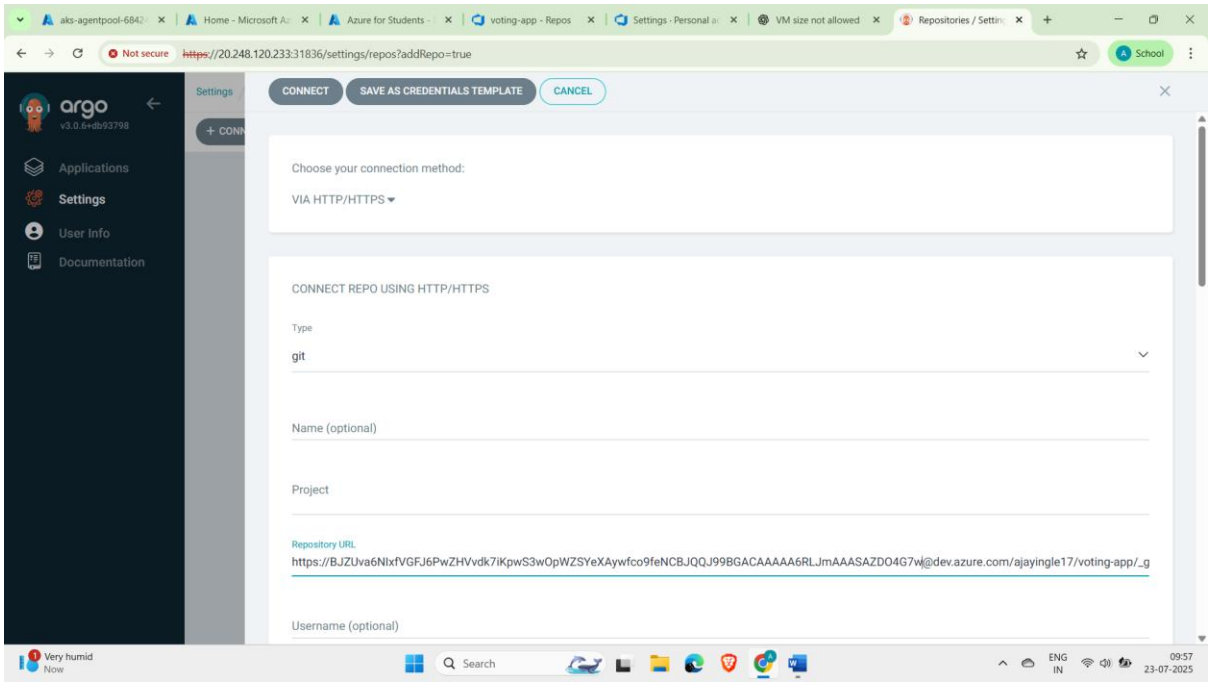


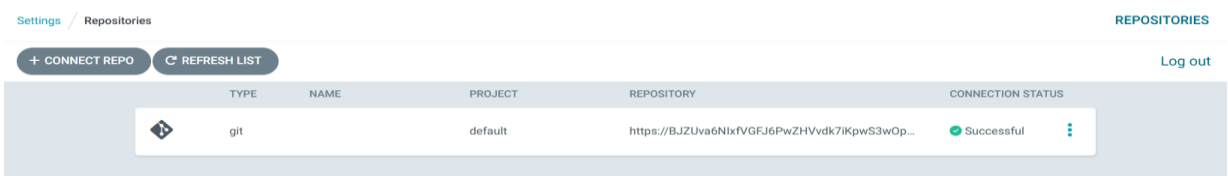


- **Get The Access Token from Azure DevOps to connect the repositories**

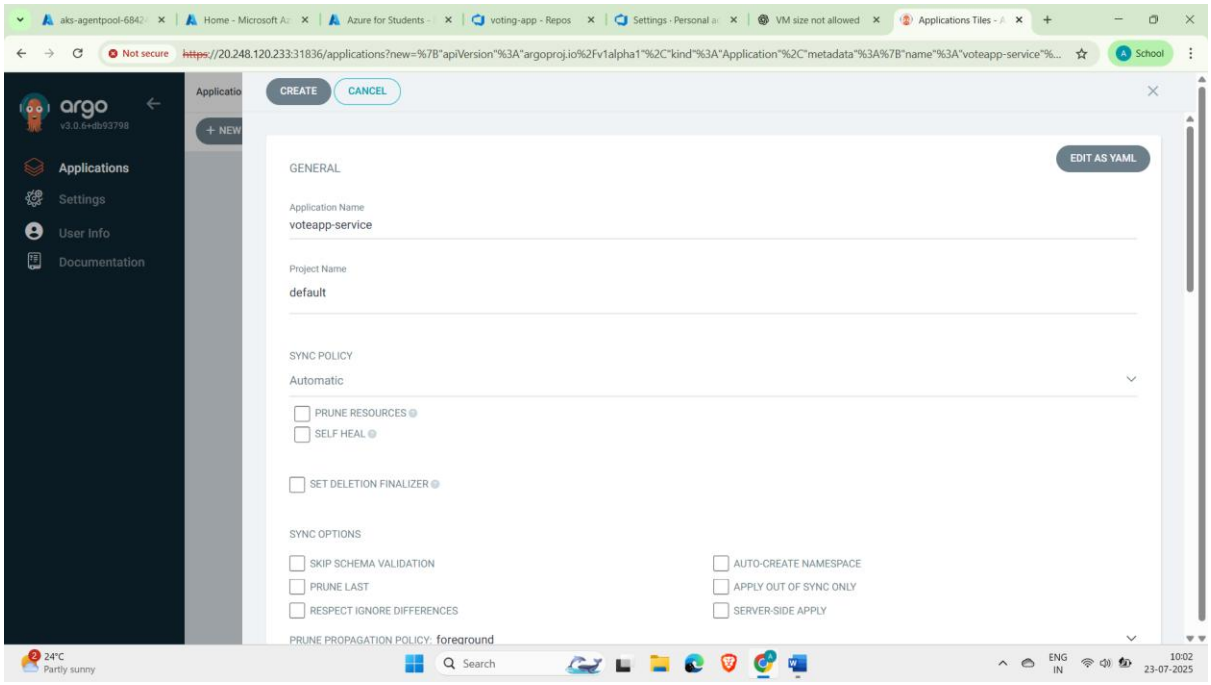


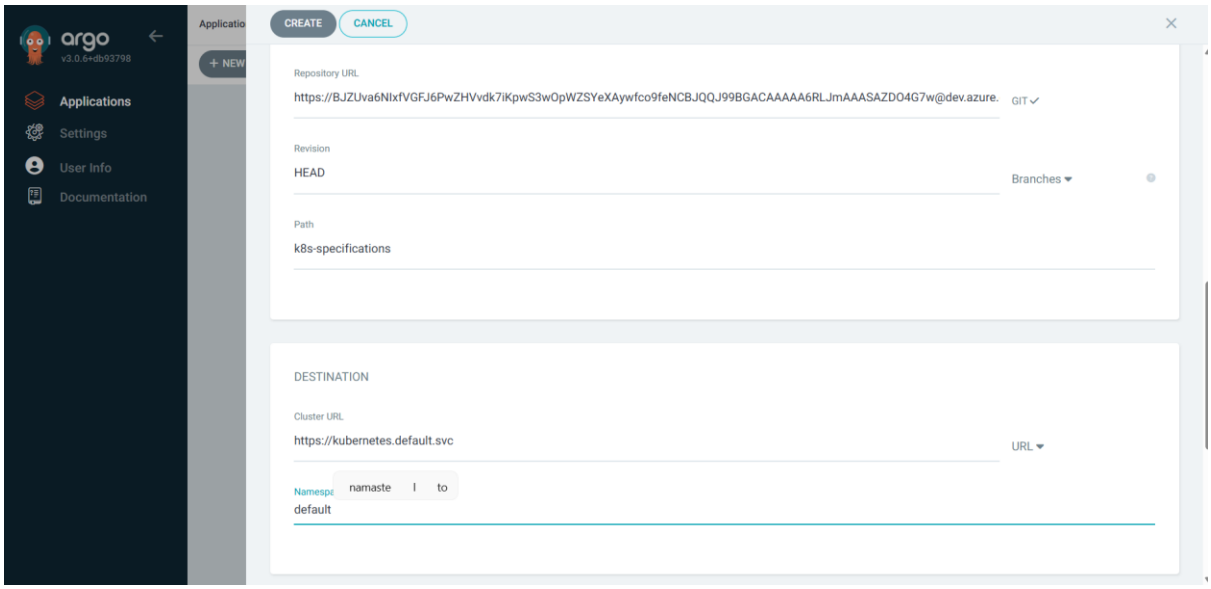
- **Go to the setting of argocd and click on connect**
- **Get the repo link and paste in repo link section**
- **Inside the repo link replace the organization name with the access token**

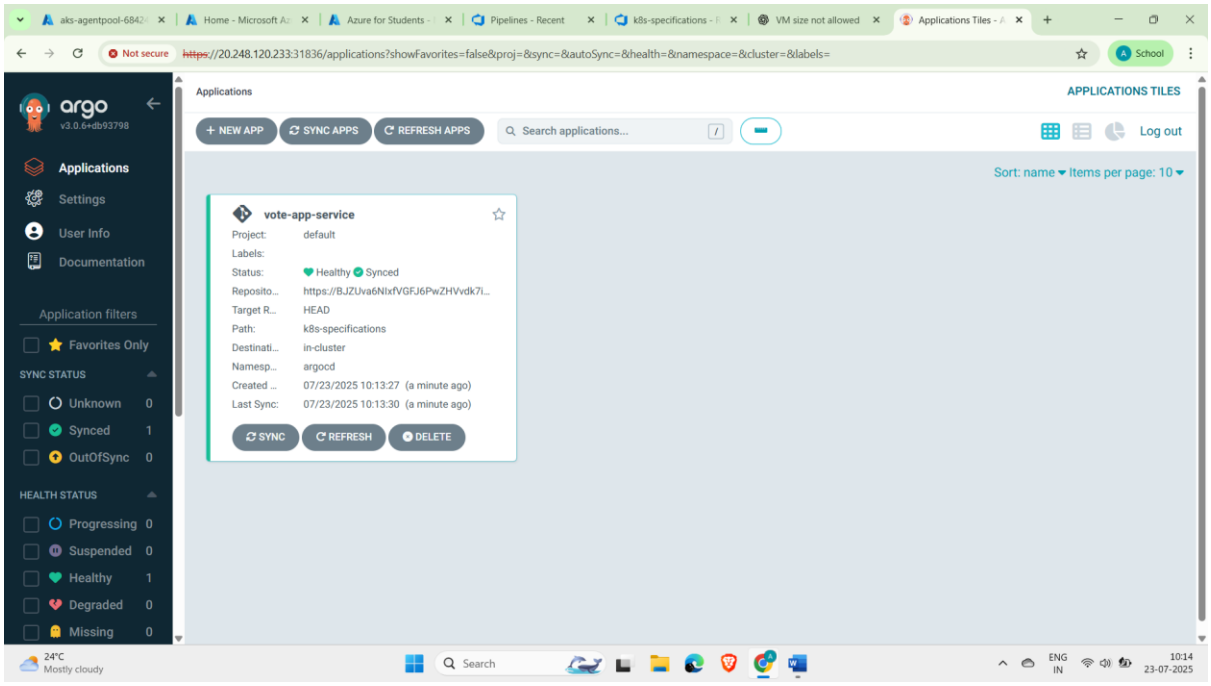




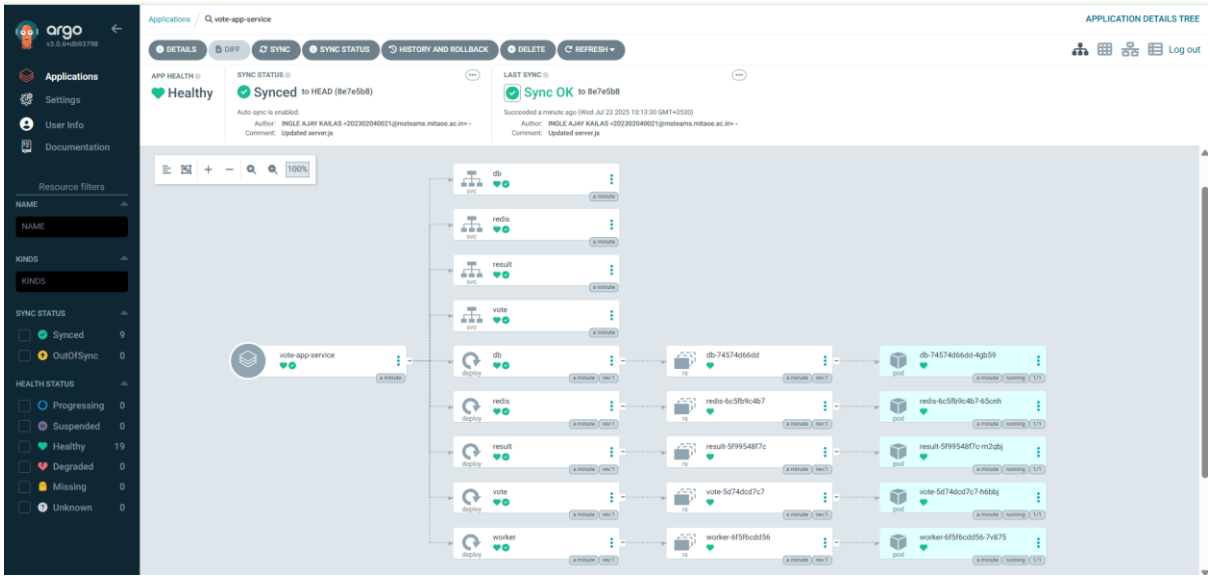
- **Now create the argocd Application**



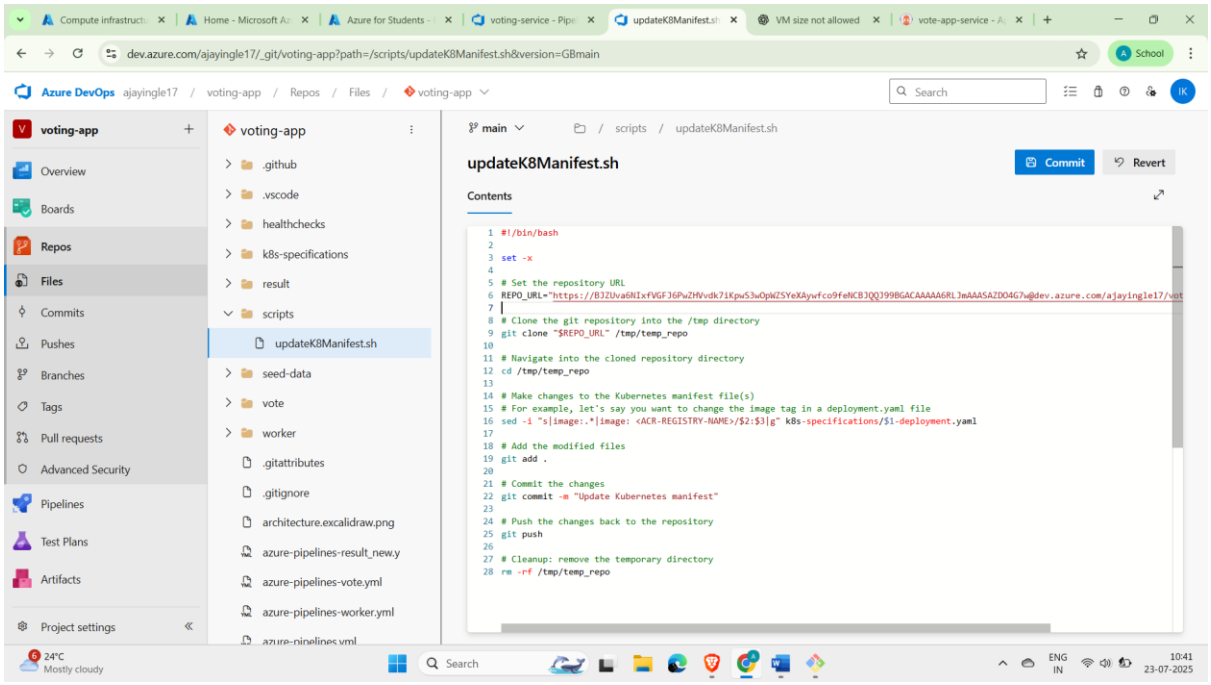




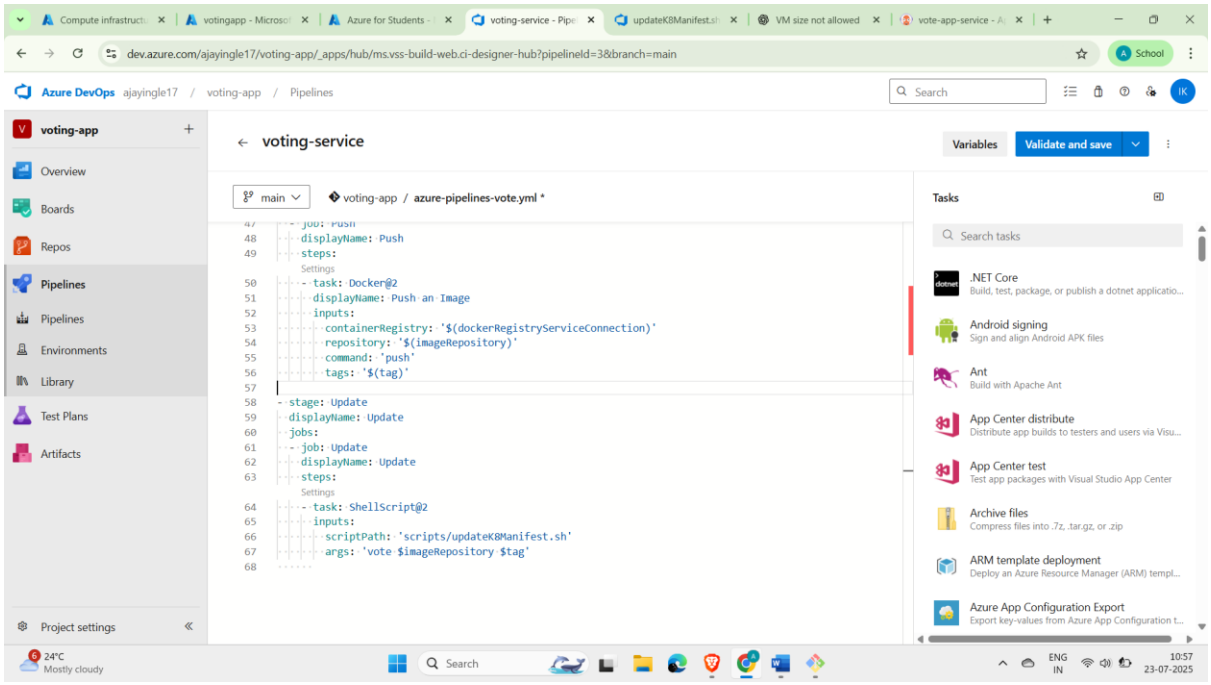
- **Now argocd Application is configured**

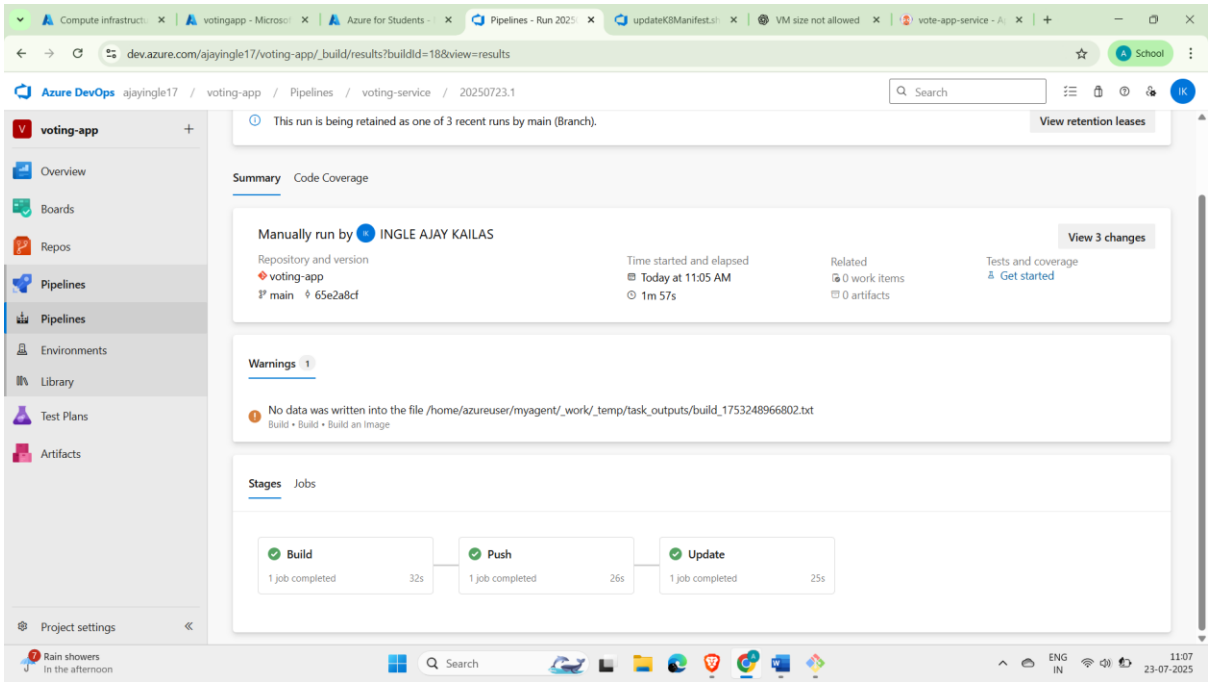


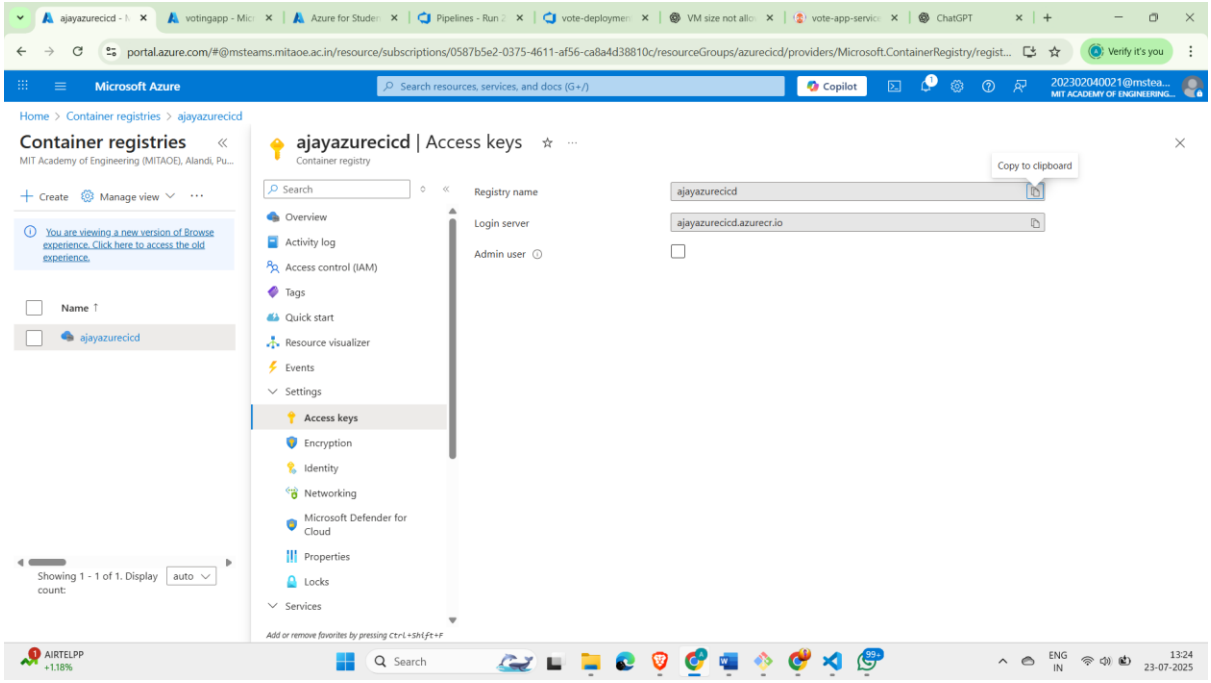
- **Create the updateK8Manifest.sh script to replace the new image name**

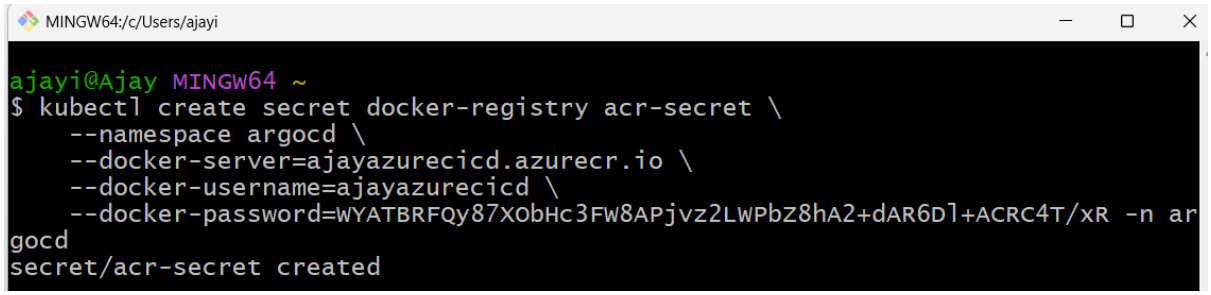


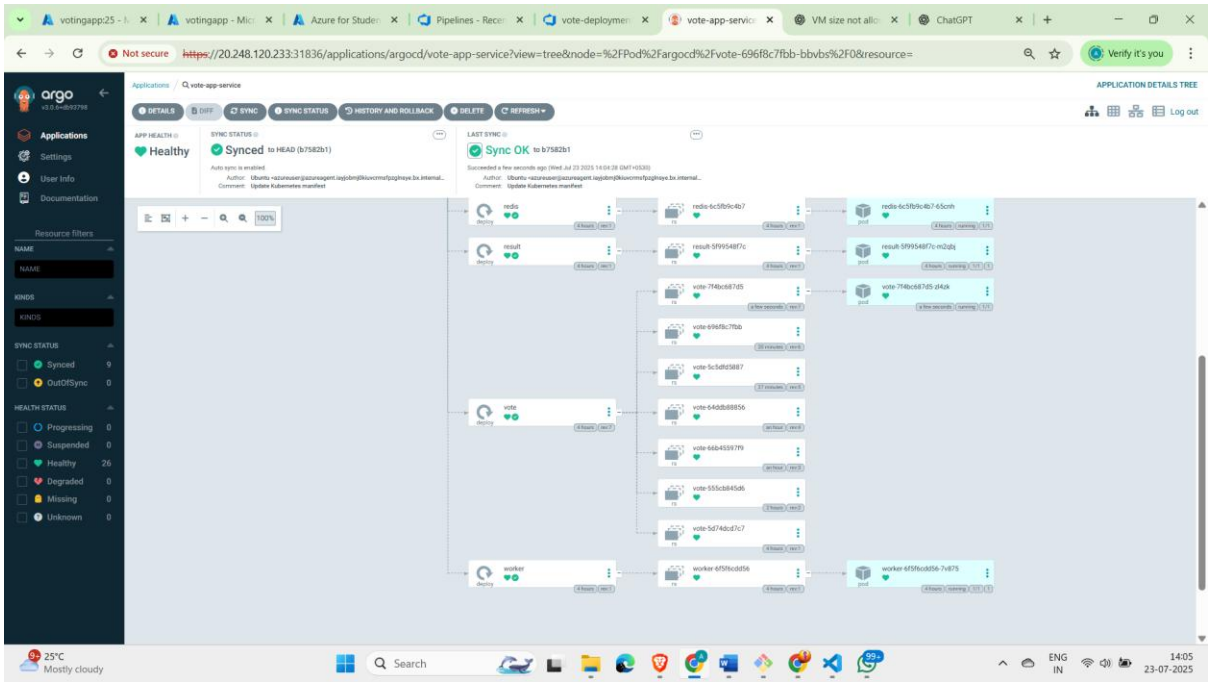
- **Add the update stage in every Pipelines**

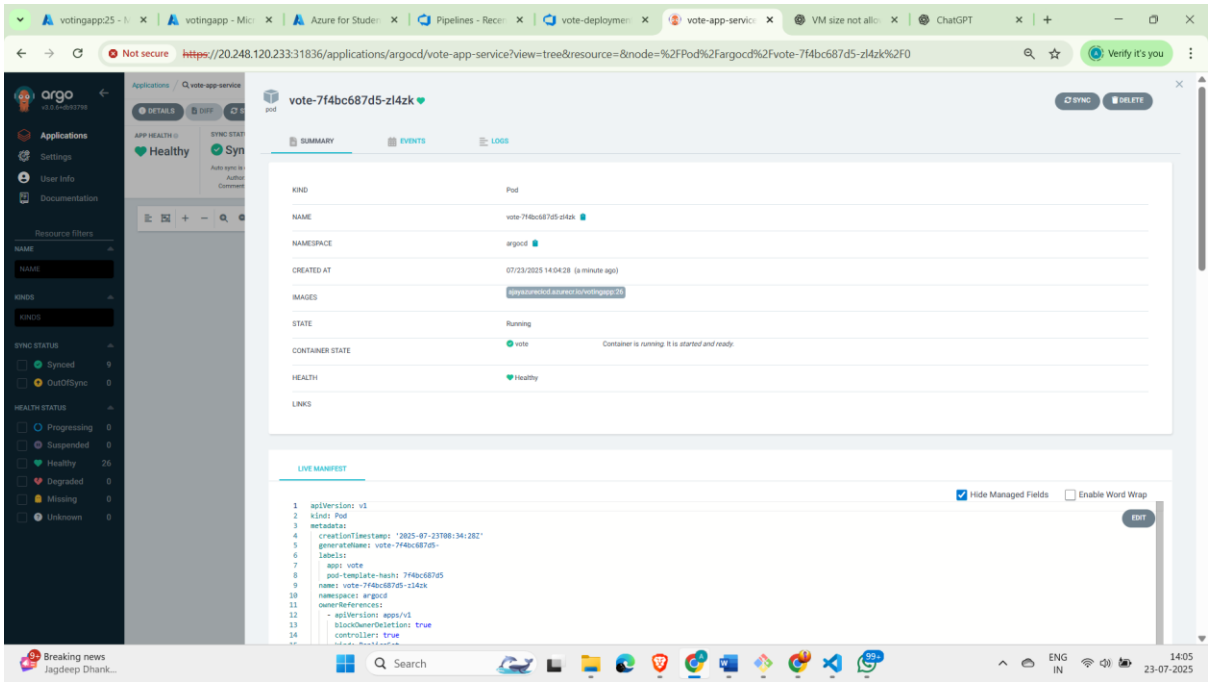



dev.azure.com/ajayingle17/voting-app/_build/results?buildId=18&view=results
Azure DevOps ajayingle17 / voting-app / Pipelines / voting-service / 20250723.1
voting-app
Overview
Boards
Repos
Pipelines
Pipelines
Environments
Library
Test Plans
Artifacts
Project settings
This run is being retained as one of 3 recent runs by main (Branch).
View retention leases
Summary
Code Coverage
Manually run by INGLE AJAY KAILAS
View 3 changes
Repository and version
voting-app
main 65e2a8cf
Time started and elapsed
Today at 11:05 AM
1m 57s
Related
0 work items
0 artifacts
Tests and coverage
Get started
Warnings 1
No data was written into the file /home/azureuser/myagent/_work/_temp/task_outputs/build_1753248966802.txt
Build • Build • Build an Image
Stages
Jobs
Build
1 job completed
32s
Push
1 job completed
26s
Update
1 job completed
25s


portal.azure.com/#@msteams.mitaoe.ac.in/resource/subscriptions/0587b5e2-0375-4611-af56-ca8a4d38810c/resourceGroups/azurecicd/providers/Microsoft.ContainerRegistry/regist...
Microsoft Azure
Search resources, services, and docs (G+/)
Copilot
Home > Container registries > ajayazurecicd
Container registries
MIT Academy of Engineering (MITAOE), Alandi, Pu...
Create
Manage view
You are viewing a new version of Browse experience. Click here to access the old experience.
Name
ajayazurecicd
Showing 1 - 1 of 1. Display count:
auto
ajayazurecicd | Access keys
Container registry
Search
Overview
Activity log
Access control (IAM)
Tags
Quick start
Resource visualizer
Events
Settings
Access keys
Encryption
Identity
Networking
Microsoft Defender for Cloud
Properties
Locks
Services
Add or remove favorites by pressing Ctrl+Shift+F
Copy to clipboard
Registry name
ajayazurecicd
Login server
ajayazurecicd.azurecr.io
Admin user


MINGW64:/c/Users/ajayi
ajayi@Ajay MINGW64 ~
$ kubectl create secret docker-registry acr-secret \
--namespace argocd \
--docker-server=ajayazurecicd.azurecr.io \
--docker-username=ajayazurecicd \
--docker-password=WYATBRFQy87XObHc3FW8APjvz2LWPbZ8hA2+dAR6Dl+ACRC4T/xR -n ar
gocd
secret/acr-secret created


Not secure
https://20.248.120.233:31836/applications/argocd/vote-app-service?view=tree&node=%2FPod%2Fargocd%2Fvote-696f8c7fbb-bbvbs%2F0&resource=
Verify it's you
argo
Applications
Settings
User Info
Documentation
vote-app-service
APPLICATION DETAILS TREE
DETAILS
DIFF
SYNC
SYNC STATUS
HISTORY AND ROLLBACK
DELETE
REFRESH
Log out
APP HEALTH
Healthy
SYNC STATUS
Synced to HEAD (b7582b1)
LAST SYNC
Sync OK to b7582b1
Resource filters
SYNC STATUS
Synced 9
OutOfSync 0
HEALTH STATUS
Progressing 0
Suspended 0
Healthy 26
Degraded 0
Missing 0
Unknown 0
redis
result
vote
worker
25°C
Mostly cloudy
Search
ENG
IN
14:05
23-07-2025


Not secure
https://20.248.120.233:31836/applications/argocd/vote-app-service?view=tree&resource=&node=%2FPod%2Fargocd%2Fvote-7f4bc687d5-zl4zk%2F0
Verify it's you
vote-7f4bc687d5-zl4zk
SYNC
DELETE
SUMMARY
EVENTS
LOGS
KIND
Pod
NAME
vote-7f4bc687d5-zl4zk
NAMESPACE
argocd
CREATED AT
07/23/2025 14:04:28 (a minute ago)
IMAGES
STATE
Running
CONTAINER STATE
vote
Container is running. It is started and ready.
HEALTH
Healthy
LINKS
LIVE MANIFEST
Hide Managed Fields
Enable Word Wrap
EDIT
apiVersion: v1
kind: Pod
metadata:
creationTimestamp: '2025-07-23T08:34:28Z'
generateName: vote-7f4bc687d5-
labels:
app: vote
pod-template-hash: 7f4bc687d5
name: vote-7f4bc687d5-zl4zk
namespace: argocd
ownerReferences:
- apiVersion: apps/v1
blockOwnerDeletion: true
controller: true
Breaking news
Jagdeep Dhank...
Search
ENG
IN
14:05
23-07-2025

- **The Pod are running now**
- **Accesss the ip and port and paste in browsers**

```
ajayi@Ajay MINGW64 ~
$ kubectl get svc -n argocd
NAME                                  TYPE        CLUSTER-IP     EXTERNAL-IP   PORT(S)                      AGE
argocd-applicationset-controller      ClusterIP   10.0.214.46    <none>        7000/TCP,8080/TCP            15h
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argocd-metrics                        ClusterIP   10.0.138.219   <none>        8082/TCP                     15h
argocd-notifications-controller-metrics ClusterIP 10.0.17.156    <none>        9001/TCP                     15h
argocd-redis                          ClusterIP   10.0.151.53    <none>        6379/TCP                     15h
argocd-repo-server                    ClusterIP   10.0.242.42    <none>        8081/TCP,8084/TCP            15h
argocd-server                         NodePort    10.0.211.5     <none>        80:31836/TCP,443:31818/TCP   15h
argocd-server-metrics                 ClusterIP   10.0.86.181    <none>        8083/TCP                     15h
db                                    ClusterIP   10.0.170.24    <none>        5432/TCP                     4h45m
redis                                 ClusterIP   10.0.144.203   <none>        6379/TCP                     4h45m
result                                NodePort    10.0.203.191   <none>        8081:31001/TCP               4h45m
vote                                  NodePort    10.0.208.10    <none>        8080:31000/TCP               4h45m

ajayi@Ajay MINGW64 ~
$ kubectl get node -o wide
NAME                                STATUS   ROLES    AGE   VERSION   INTERNAL-IP   EXTERNAL-IP      OS-IMAGE             KERNEL-VERSIO
N      CONTAINER-RUNTIME
aks-agentpool-68424352-vmss000000   Ready    <none>   16h   v1.32.5   10.224.0.4    20.248.120.233   Ubuntu 22.04.5 LTS   5.15.0-1091-a
zure   containerd://1.7.27-1
```
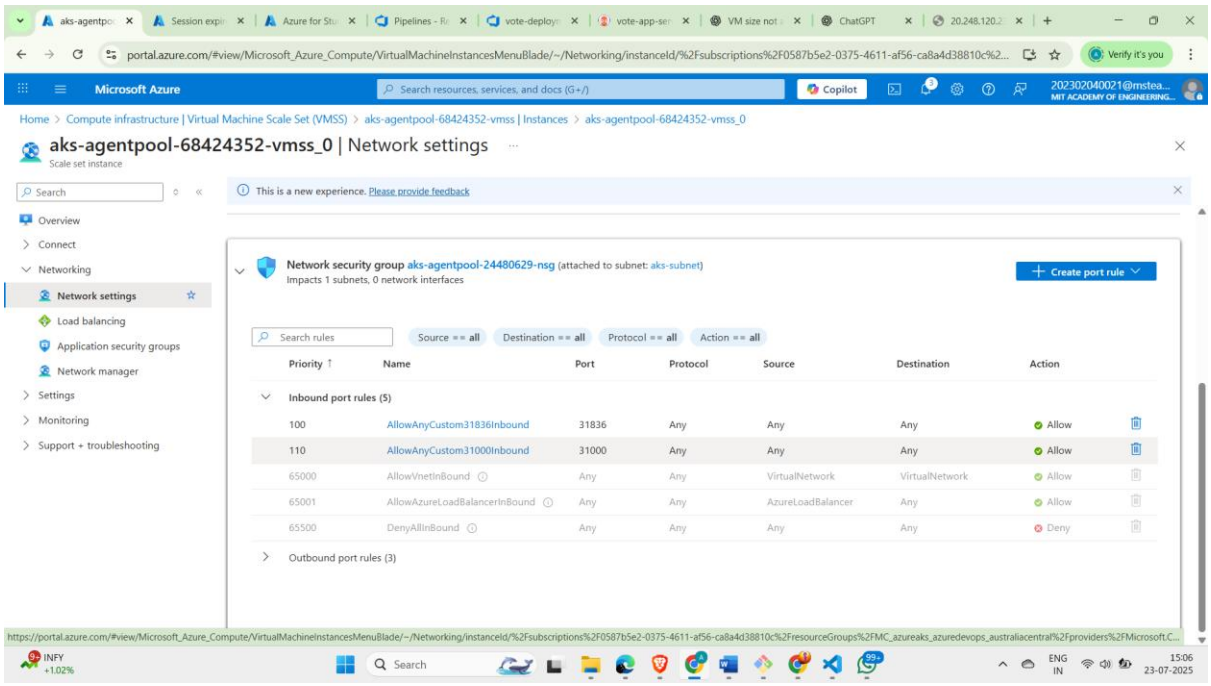
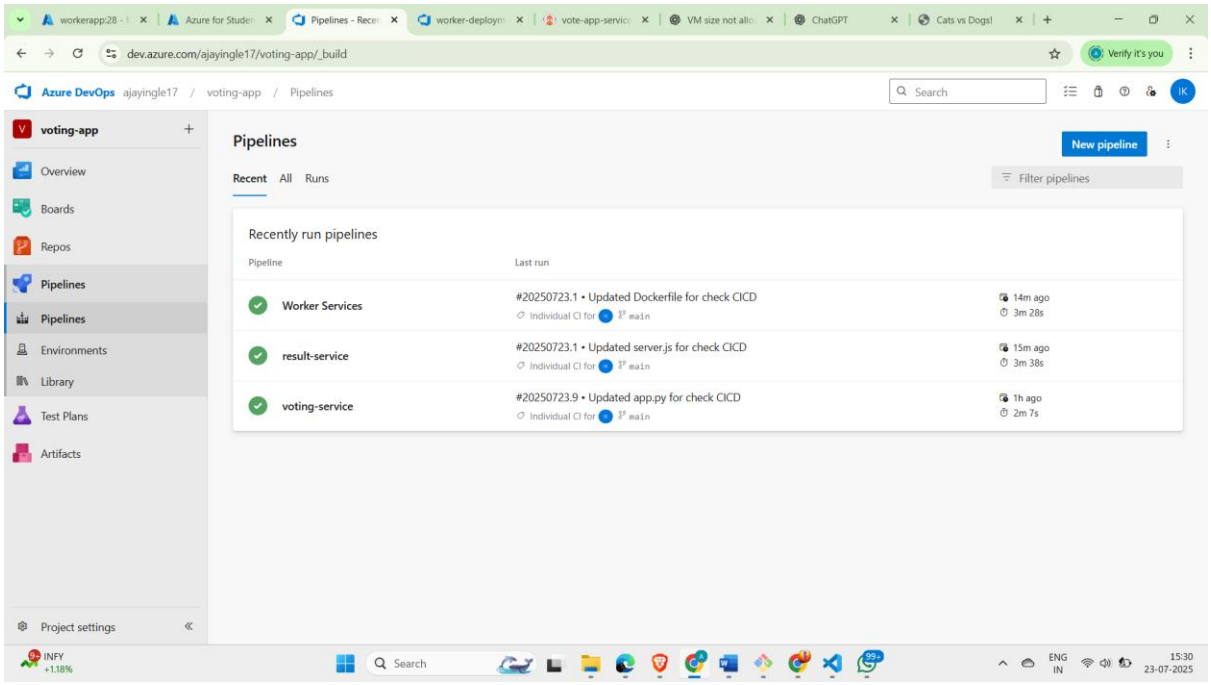
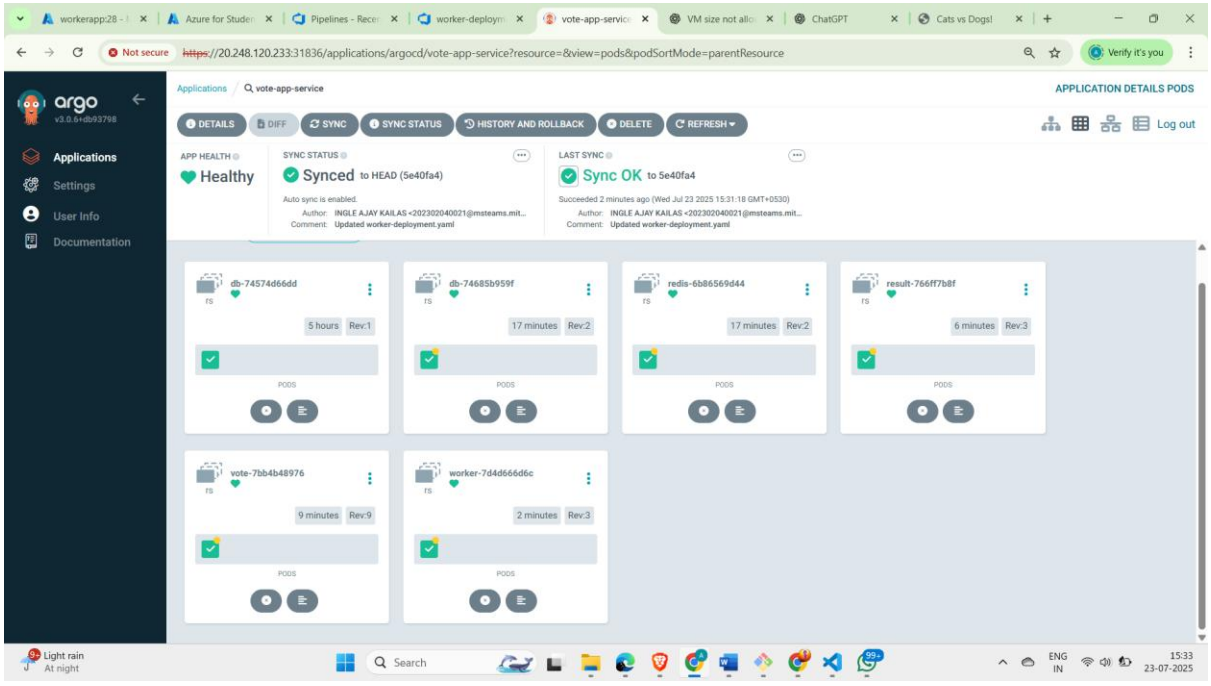

- **Allow the port 31000 by editing inbound rule**



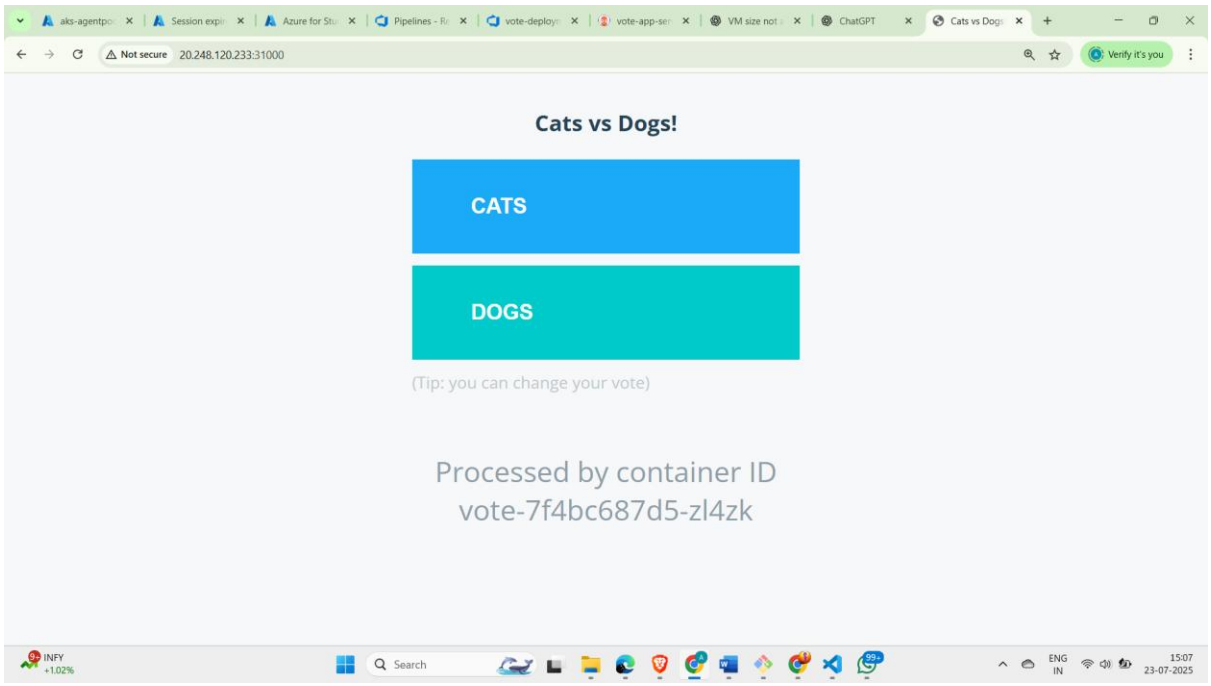

dev.azure.com/ajayingle17/voting-app/_build
Azure DevOps ajayingle17 / voting-app / Pipelines
Search
voting-app
Overview
Boards
Repos
Pipelines
Pipelines
Environments
Library
Test Plans
Artifacts
Project settings
Pipelines
New pipeline
Recent All Runs
Filter pipelines
Recently run pipelines
Pipeline
Last run
Worker Services
#20250723.1 • Updated Dockerfile for check CICD
Individual CI for main
14m ago
3m 28s
result-service
#20250723.1 • Updated server.js for check CICD
Individual CI for main
15m ago
3m 38s
voting-service
#20250723.9 • Updated app.py for check CICD
Individual CI for main
1h ago
2m 7s
INFY
+1.18%
Search
ENG
IN
15:30
23-07-2025


Not secure https://20.248.120.233:31836/applications/argocd/vote-app-service?resource=&view=pods&podSortMode=parentResource
argo
Applications
Settings
User Info
Documentation
Applications / vote-app-service
APPLICATION DETAILS PODS
DETAILS
DIFF
SYNC
SYNC STATUS
HISTORY AND ROLLBACK
DELETE
REFRESH
Log out
APP HEALTH
Healthy
SYNC STATUS
Synced to HEAD (5e40fa4)
Auto sync is enabled.
Author: INGLE AJAY KAILAS <202302040021@msteams.mit...
Comment: Updated worker-deployment.yaml
LAST SYNC
Sync OK to 5e40fa4
Succeeded 2 minutes ago (Wed Jul 23 2025 15:31:18 GMT+0530)
Author: INGLE AJAY KAILAS <202302040021@msteams.mit...
Comment: Updated worker-deployment.yaml
db-74574d66dd
5 hours Rev:1
db-74685b959f
17 minutes Rev:2
redis-6b86569d44
17 minutes Rev:2
result-766ff7b8f
6 minutes Rev:3
vote-7bb4b48976
9 minutes Rev:9
worker-7d4d666d6c
2 minutes Rev:3
PODS
Light rain
At night
Search
ENG
IN
15:33
23-07-2025

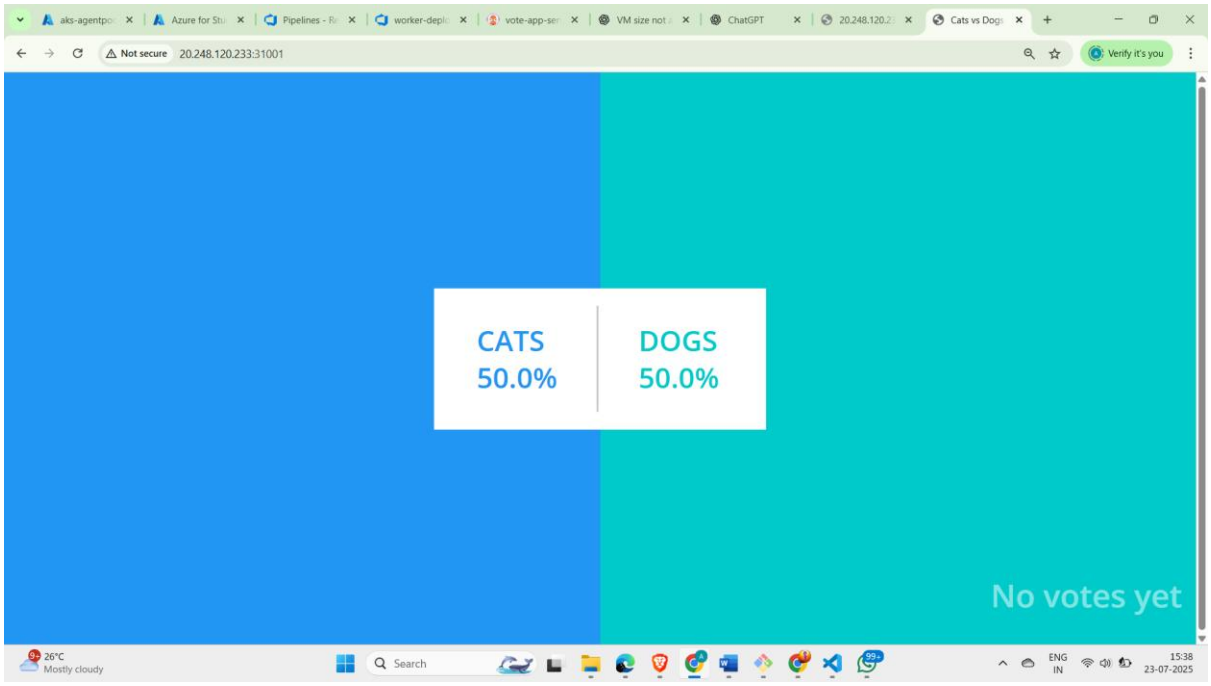
```
ajayi@Ajay MINGW64 ~
$ kubectl get svc -n argocd
NAME                                      TYPE        CLUSTER-IP     EXTERNAL-IP   PORT(S)                      AGE
argocd-applicationset-controller          ClusterIP   10.0.214.46    <none>        7000/TCP,8080/TCP            15h
argocd-dex-server                         ClusterIP   10.0.150.84    <none>        5556/TCP,5557/TCP,5558/TCP   15h
argocd-metrics                            ClusterIP   10.0.138.219   <none>        8082/TCP                     15h
argocd-notifications-controller-metrics   ClusterIP   10.0.17.156    <none>        9001/TCP                     15h
argocd-redis                              ClusterIP   10.0.151.53    <none>        6379/TCP                     15h
argocd-repo-server                        ClusterIP   10.0.242.42    <none>        8081/TCP,8084/TCP            15h
argocd-server                             NodePort    10.0.211.5     <none>        80:31836/TCP,443:31818/TCP   15h
argocd-server-metrics                     ClusterIP   10.0.86.181    <none>        8083/TCP                     15h
db                                        ClusterIP   10.0.170.24    <none>        5432/TCP                     5h20m
redis                                     ClusterIP   10.0.144.203   <none>        6379/TCP                     5h20m
result                                    NodePort    10.0.203.191   <none>        8081:31001/TCP               5h20m
vote                                      NodePort    10.0.208.10    <none>        8080:31000/TCP               5h20m

ajayi@Ajay MINGW64 ~
$ kubectl get node -o wide
NAME                                STATUS   ROLES    AGE   VERSION   INTERNAL-IP   EXTERNAL-IP      OS-IMAGE             KERNEL-VERSIO
N      CONTAINER-RUNTIME
aks-agentpool-68424352-vmss000000   Ready    <none>   17h   v1.32.5   10.224.0.4    20.248.120.233   Ubuntu 22.04.5 LTS   5.15.0-1091-a
zure   containerd://1.7.27-1

ajayi@Ajay MINGW64 ~
$
```

Now its Live

http://20.248.120.233:31000/



http://20.248.120.233:31001/



9. Conclusion

This project demonstrates the complete lifecycle of a microservices-based application, including development, containerization, orchestration, and deployment on cloud infrastructure. It also integrates modern DevOps practices such as CI/CD pipelines and GitOps via ArgoCD.