

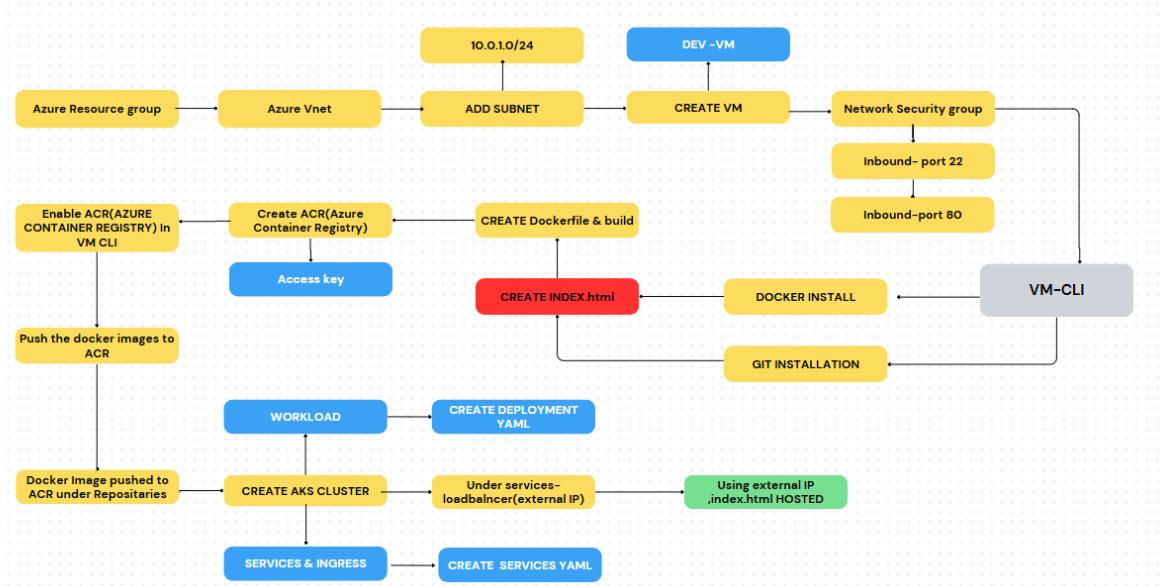
Final Usecase

PROJECT: DevOps on Azure Free Tier: CI/CD Deployment of a Containerized "Hello World" App

Objective:

This project aims to provide practical experience in cloud infrastructure, containerization, and DevOps automation. It guides the deployment of a basic "Hello World" HTML/CSS web application on Azure Free Tier using Docker and Azure Kubernetes Service (AKS). We will learn to set up essential Azure resources, containerize applications, and implement a CI/CD pipeline using Azure DevOps.

Architecture Reference:



SOLUTION:

-> **MANUAL (AZURE)**

-> **AUTOMATED (AZURE DEVOPS)**

Manual Deployment Process: Steps and Challenges

This section outlines the traditional, manual steps involved in deploying a web application to a Kubernetes cluster, demonstrating the significant effort required for each change.

1. Initial Setup and Application Preparation:

- A web application (e.g., an index.html file) is created or provided.

- A Dockerfile is prepared to define how to containerize the application, bundling the index.html and other necessary components into a Docker image.

2. Containerization and Image Management:

- The Docker image is manually built using the Dockerfile.
- The newly built Docker image is then manually pushed to a Container Registry (e.g., Azure Container Registry).

3. Kubernetes Cluster and Manifests:

- An Azure Kubernetes Service (AKS) cluster is provisioned.
- Kubernetes manifest files (e.g., deployment.yaml for workload definition and service.yaml for exposing the application) are created to describe how the application should run within the AKS cluster.

4. Application Deployment:

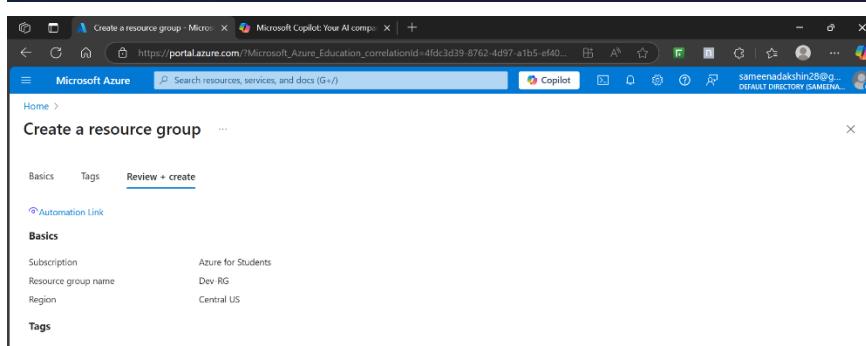
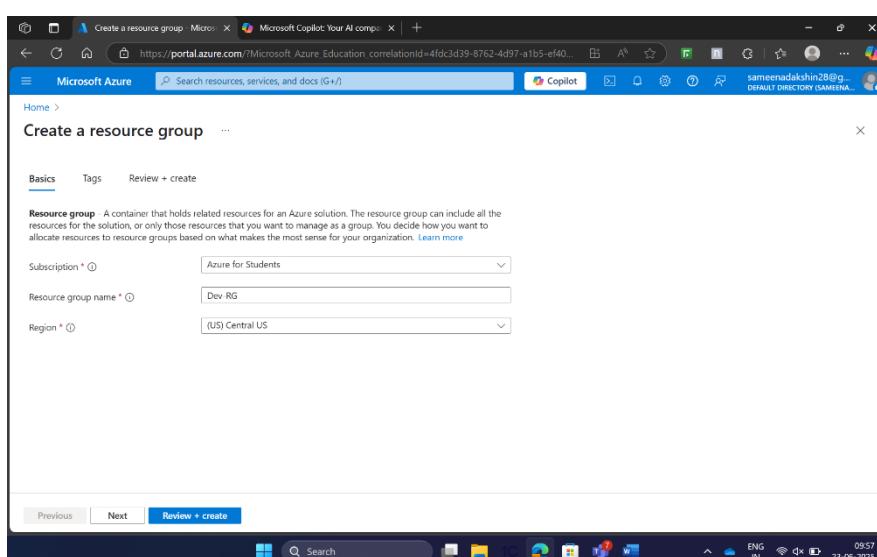
- The Kubernetes deployment.yaml and service.yaml files are manually applied to the AKS cluster, deploying the containerized application.
- The HTML page is made accessible via an external IP address, typically exposed through an Nginx server running within the containers and a Kubernetes LoadBalancer Service.

MANUAL::

Step 1::

Resource group creation

Named as Dev-RG in Centralus location.



- **Bash Command:** az group create --name Dev-RG --location "Central US"

Step 2:

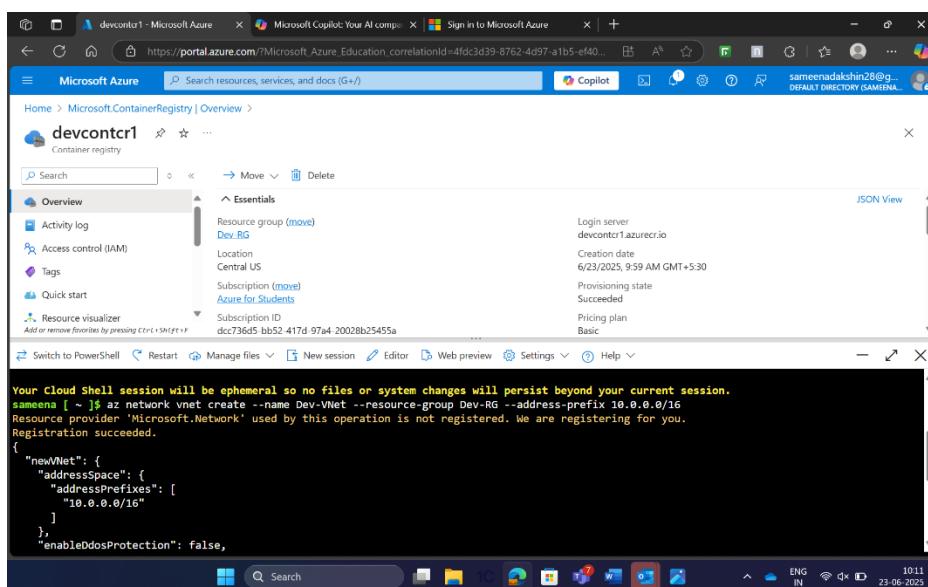
VNet Creation::

- **Name:** Dev-VNet
- **Address Space:** 10.0.0.0/16
- **Purpose:** Enable communication between resources in the Azure environment.
- **Bash Command:** az network vnet create \

 --name Dev-VNet \

 --resource-group Dev-RG \

 --address-prefix 10.0.0.0/16



```

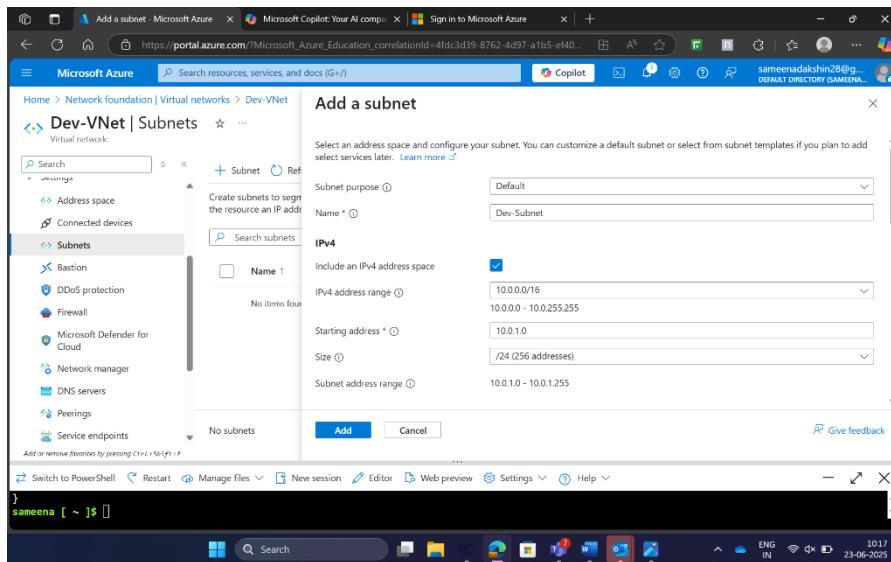
Your Cloud Shell session will be ephemeral so no files or system changes will persist beyond your current session.
sameena [ ~ ]$ az network vnet create --name Dev-VNet --resource-group Dev-RG --address-prefix 10.0.0.0/16
Resource provider 'Microsoft.Network' used by this operation is not registered. We are registering for you.
Registration succeeded.
{
  "newVNet": {
    "addressSpace": {
      "addressPrefixes": [
        "10.0.0.0/16"
      ]
    },
    "enableDdosProtection": false,
  }
}
  
```

Create the virtual Network (Vnet), Name: **Dev-VNet** with the address space: **10.0.0.0/16** which is used for the communication between the resources in the Azure Environment.

Step3::

- **Subnet**

- **Name:** Dev-Subnet
- **Address Range:** 10.0.1.0/24
- **Purpose:** Assign IP addresses for resources inside the VNet.
- **Bash Command:** az network vnet subnet create \
 --vnet-name Dev-VNet \
 --resource-group Dev-RG \
 --name Dev-Subnet \
 --address-prefix 10.0.1.0/24



In this step, we need to add **the SUBNET,with the name:Dev-Subnet** with the address range : 10.0.1.0/24 which is used to assaign ip address for the resources in the VNet

Step 4::

Storage Account::

Storage Account

- **Name:** devstorage<uniqueid> (e.g., devstorage12345)
- **Location:** East US
- **SKU:** Standard_LRS
- **Purpose:** Store logs and application-related data.
- **Bash Command:** az storage account create \
 --name devstorage12345 \
 --resource-group DevEnvironment-RG \
 --location "East US" \
 --sku Standard_LRS

```
--sku Standard_LRS \
--kind StorageV2 \
--tags Project=DevEnvironment Owner=azure-dev-user
```

The screenshot shows two consecutive screenshots of the Microsoft Azure portal.

Top Screenshot: A 'Create a storage account' dialog box. It contains two sections: 'Basics' and 'Advanced'. Under 'Basics', the following details are set:

- Subscription: Azure for Students
- Resource group: Dev-RG
- Location: Central US
- Storage account name: devstorage28
- Primary service: Standard
- Performance: Standard
- Replication: Read-access geo-redundant storage (RA-GRS)

Under 'Advanced', the following settings are selected:

- Enable hierarchical namespace: Disabled
- Enable SFTP: Disabled
- Enable network file system v3: Disabled
- Allow cross-tenant replication: Disabled
- Access tier: Hot

Bottom Screenshot: An 'Overview' page for a deployment named 'devstorage28_1750655080337'. The status bar indicates 'Deployment succeeded'. The deployment details show:

- Deployment name: devstorage28_1750655080337
- Start time: 6/23/2025, 10:35:34 AM
- Subscription: Azure for Students
- Correlation ID: af8c1725-0fef-4356-a621-e73bc5aff037
- Resource group: Dev-RG

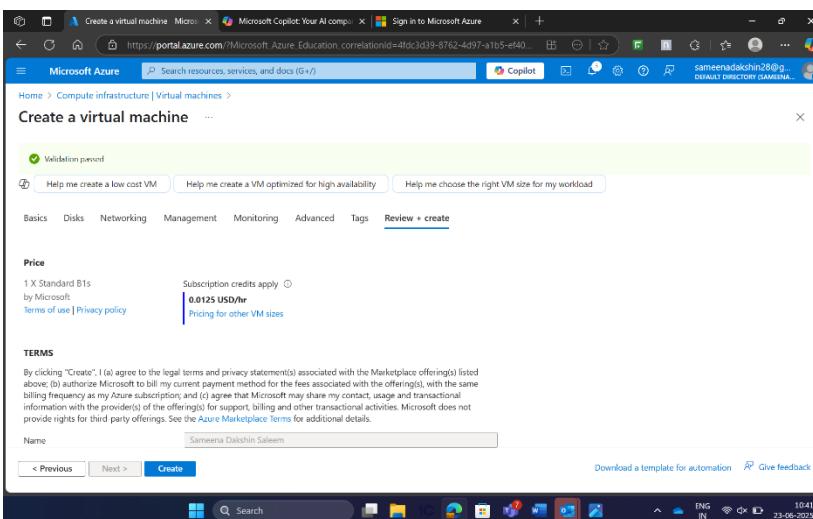
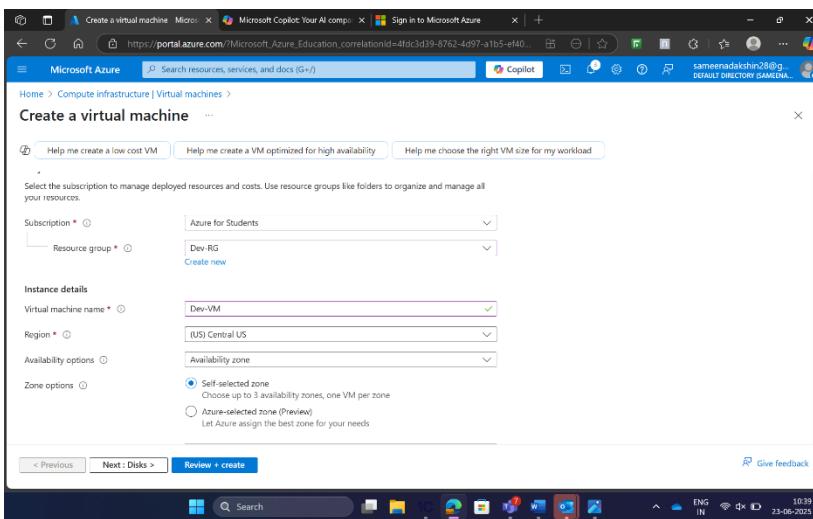
The 'Next steps' section includes a 'Go to resource' button. To the right of the main content, there are promotional cards for 'Cost Management', 'Microsoft Defender for Cloud', 'Free Microsoft tutorials', and 'Work with an expert'.

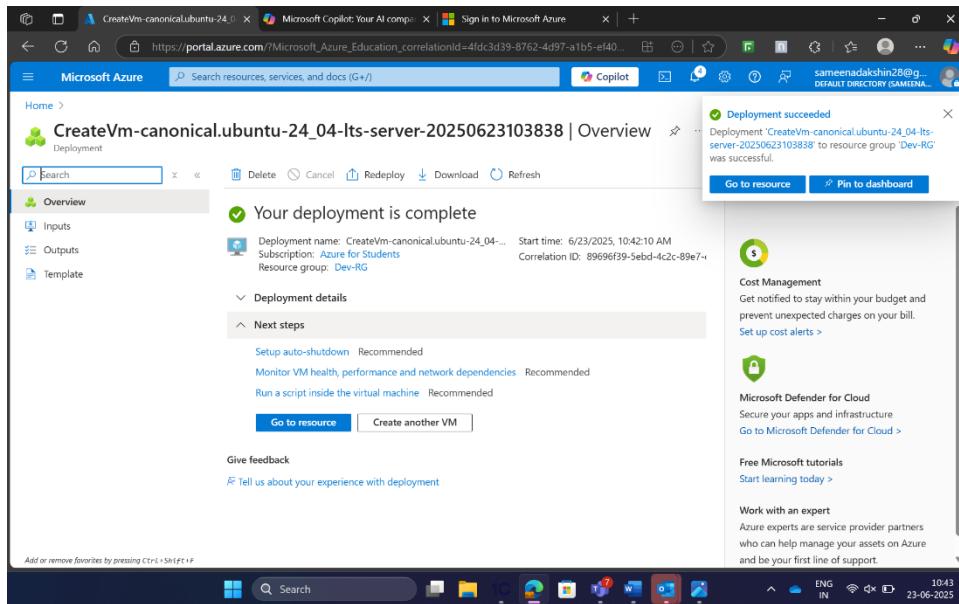
Step 5::

Virtual Machine

- az vm create \
--resource-group Dev-RG \
--name Dev-VM \

```
--image UbuntuLTS \
--size Standard_B1s \
--admin-username azure-dev-user \
--generate-ssh-keys \
--vnet-name Dev-VNet \
```





STEP 6:

Network security group:

- Name: Dev-NSG
- Rules: Allow HTTP traffic on port 80 and SSH traffic on port 22.
- Bash Command to Create NSG: az network nsg create --resource-group Dev-RG --name Dev-NSG

Command to Add Rules: az network nsg rule create \

--resource-group Dev-RG \

--nsg-name Dev-NSG \

--name Allow-HTTP \

--priority 100 \

--direction Inbound \

--access Allow \

--protocol Tcp \

--destination-port-ranges 80

az network nsg rule create \

--resource-group Dev-RG \

--nsg-name Dev-NSG \

--name Allow-SSH \

--priority 110 \

--direction Inbound \

--access Allow \

--protocol Tcp \

--destination-port-ranges 22

The screenshot shows the Microsoft Azure Network Security Group (NSG) overview page for 'Microsoft.NetworkSecurityGroup-20250623104432'. The deployment status is marked as 'complete' with a green checkmark. Deployment details include a name ('Microsoft.NetworkSecurityGro...'), start time ('6/23/2025, 10:45:18 AM'), subscription ('Azure for Students'), and resource group ('Dev-RG'). A 'Cost management' section provides a link to set up cost alerts. Other sections include 'Microsoft Defender for Cloud' (link to secure apps and infrastructure), 'Free Microsoft tutorials' (link to start learning), and 'Work with an expert' (link to find Azure experts). The browser taskbar at the bottom shows various open tabs and system icons.

Enabled PORT:22 and PORT:80,

The screenshot shows the 'Inbound security rules' section of the Dev-NSG configuration. It lists several rules with their priority, name, port, protocol, source, destination, and action. The rules are:

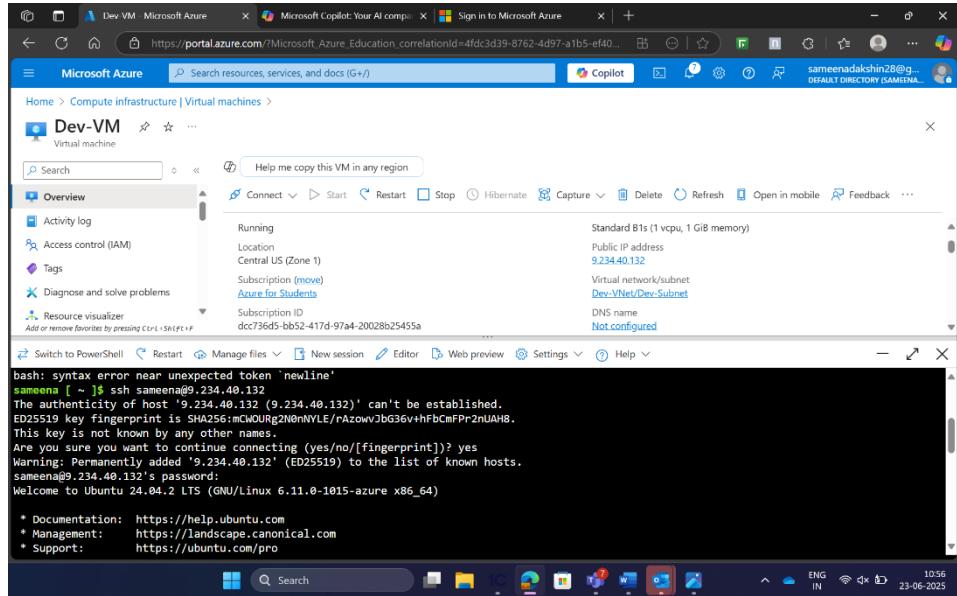
Priority	Name	Port	Protocol	Source	Destination	Action
100	AllowAnyCustom80in...	80	TCP	Any	Any	Allow
110	AllowAnyCustom22in...	22	TCP	Any	Any	Allow
65000	AllowVnetInBound	Any	Any	VirtualNetwork	VirtualNetwork	Allow
65001	AllowAzureLoadBalanc...	Any	Any	AzureLoadBalancer	Any	Allow
65500	DenyAllInBound	Any	Any	Any	Any	Deny

Step7::

Installing Docker on VM::

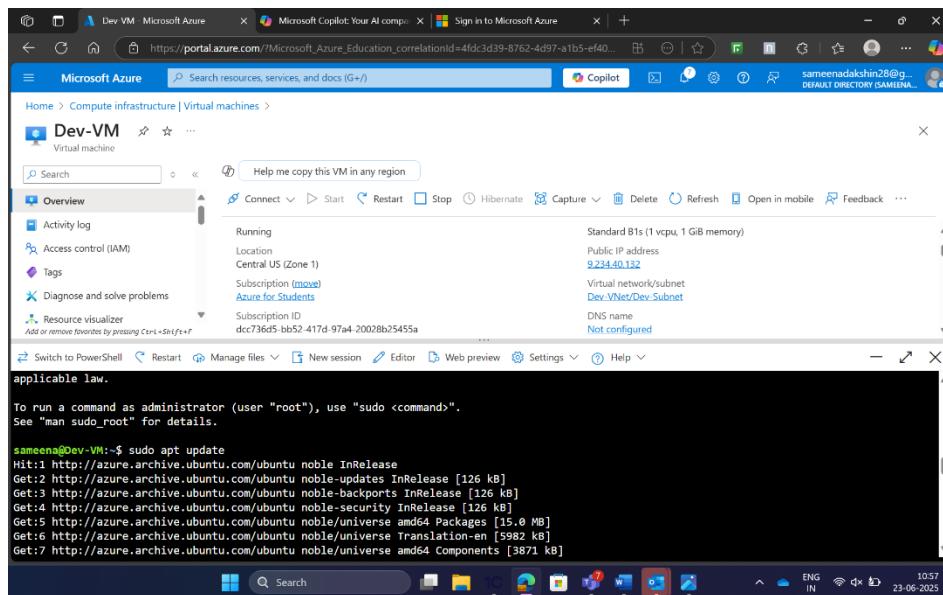
VM is connected with the Bash shell,

Here ,we update the Vm ,and run the command like SUDO user and update.



```
bash: syntax error near unexpected token `newline'
sameena [ ~ $ ssh sameena@9.234.40.132
The authenticity of host '9.234.40.132 (9.234.40.132)' can't be established.
ED25519 key fingerprint is SHA256:mC0URg2h0nNYLE/rAz0wJbg36v4Hf5cmPr2nUAM8.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '9.234.40.132' (ED25519) to the list of known hosts.
sameena@9.234.40.132's password:
Welcome to Ubuntu 24.04.2 LTS (GNU/Linux 6.11.0-1015-azure x86_64)

 * Documentation: https://help.ubuntu.com
 * Management: https://landscape.canonical.com
 * Support: https://ubuntu.com/pro
```



```
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

sameena@Dev-VM:~$ sudo apt update
Hit:1 http://azure.archive.ubuntu.com/ubuntu noble InRelease
Get:2 http://azure.archive.ubuntu.com/ubuntu noble-updates InRelease [126 kB]
Get:3 http://azure.archive.ubuntu.com/ubuntu noble-backports InRelease [126 kB]
Get:4 http://azure.archive.ubuntu.com/ubuntu noble-security InRelease [126 kB]
Get:5 http://azure.archive.ubuntu.com/ubuntu/noble/universe amd64 Packages [15.0 MB]
Get:6 http://azure.archive.ubuntu.com/ubuntu/noble/universe Translation-en [5982 kB]
Get:7 http://azure.archive.ubuntu.com/ubuntu/noble/universe amd64 Components [3871 kB]
```

Dev-VM Overview

```

Help me copy this VM in any region

Running
Location: Central US (Zone 1)
Subscription (move): Azure for Students
Subscription ID: ddc736d5-bb52-417d-97a4-20028b25455a
Standard B1s (1 vcpu, 1 GiB memory)
Public IP address: 92.34.40.132
Virtual network/subnet: Dev-VNet/Dev-Subnet
DNS name: Not configured

```

Activity log

```

Building dependency tree... Done
Reading state information... Done
39 packages can be upgraded. Run 'apt list --upgradable' to see them.
sameena@Dev-VM:~$ sudo apt install -y docker.io
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
bridge-utils containedr dns-root-data dnsmasq-base pigz runc ubuntu-fan
Suggested packages:
ifupdown aufs-tools cgrulesengine debbootstrap docker-buildx docker-compose-v2 docker-doc rinse zfs-fuse | zfsutils
The following NEW packages will be installed:
bridge-utils containedr dns-root-data dnsmasq-base docker.io pigz runc ubuntu-fan

```

Resource visualizer

Diagnose and solve problems

Tags

Access control (IAM)

Activity log

Help me copy this VM in any region

Connect

- Start
- Stop
- Hibernate
- Capture
- Delete
- Refresh
- Open in mobile
- Feedback

Switch to PowerShell

```

No VM guests are running outdated hypervisor (qemu) binaries on this host.
sameena@Dev-VM:~$ sudo systemctl start docker
sameena@Dev-VM:~$ sudo systemctl enable docker
sameena@Dev-VM:~$ sudo usermod -aG docker sameena
sameena@Dev-VM:~$ sudo apt install -y git
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
git is already the newest version (1:2.43.0-1ubuntu7.2).
git set to manually installed.
0 upgraded, 0 newly installed, 0 to remove and 39 not upgraded.
sameena@Dev-VM:~$ 

```

Resource visualizer

Diagnose and solve problems

Tags

Access control (IAM)

Activity log

Help me copy this VM in any region

Connect

- Start
- Restart
- Stop
- Hibernate
- Capture
- Delete
- Refresh
- Open in mobile
- Feedback

Switch to PowerShell

```

hello-world-app index.html
sameena@Dev-VM:~$ mv index.html hello-world-app/index.html
sameena@Dev-VM:~$ ls
hello-world-app
sameena@Dev-VM:~/hello-world-app$ ls
index.html
sameena@Dev-VM:~/hello-world-app$ vi Dockerfile
sameena@Dev-VM:~/hello-world-app$ sudo docker build .
DEPRECATED: The legacy builder is deprecated and will be removed in a future release.
Install the buildx component to build images with BuildKit:
https://docs.docker.com/go/buildx/

```

Sending build context to Docker daemon 3.584kB

Step 1/4 : FROM nginx:latest

latest: Pulling from library/nginx

dadd7da3f26b: Pull complete

3b00567da964: Pull complete

56b81cfa547d: Pull complete

1bc5dc0b475d: Pull complete

979e6233a40a: Pull complete

d2a7ba8dbfee: Pull complete

32ea4235e1d5: Pull complete

Digest: sha256:6784fb0834aa7dbbe12e3d7471e69c290df3e6ba810dc38b34ae33d3c1c05f7d

Status: Downloaded newer image for nginx:latest

--> ie5f3c5b091a

Step 2/4 : COPY ./usr/share/nginx/html

--> a5e9ea9ff430b

Step 3/4 : EXPOSE 80

--> Running in f566c7b1a915

Step 8 and 9::

HTML and CSS web application, Writing Docker File

The image shows two side-by-side Microsoft Azure PowerShell windows. Both windows have the title bar "Microsoft Azure" and the URL "https://portal.azure.com/?Microsoft_Azure_Education.correlationId=4fd3d39-8762-4d97-a1b5-e140...". The top window displays the command history and output for building a Docker image:

```
hello-world-app index.html
sameena@Dev-VM:~$ mv index.html hello-world-app/index.html
sameena@Dev-VM:~$ ls
hello-world-app
sameena@Dev-VM:~$ cd hello-world-app/
sameena@Dev-VM:~/hello-world-app$ ls
index.html
sameena@Dev-VM:~/hello-world-app$ vi Dockerfile
sameena@Dev-VM:~/hello-world-app$ sudo docker build .
DEPRECATED: The legacy builder is deprecated and will be removed in a future release.
Install the buildx component to build images with BuildKit:
https://docs.docker.com/go/buildx/

Sending build context to Docker daemon 3.584kB
Step 1/4 : FROM nginx:latest
latest: Pulling from library/nginx
d4d67d83f26b: Pull complete
3b00567d9e4a: Pull complete
5eb81cf4a47d: Pull complete
1bc5dc8b475d: Pull complete
979e6233a49a: Pull complete
d2a7ba8d9fee: Pull complete
32e424235e1d5: Pull complete
Digest: sha256:6794f6b83a4a7dbbc12a3d7471e69c290df3e6ba810dc38b34ae33d3c1c05f7d
Status: Downloaded newer image for nginx:latest
--> 3ef3c5b981a
Step 2/4 : COPY ./usr/share/nginx/html
--> a569ea9f430b
Step 3/4 : EXPOSE 80
--> Running in f566c7b1a915
```

The bottom window shows the deployment of the Docker image to Azure:

```
Status: Downloaded newer image for nginx:latest
--> 1ef1fc59881a
Step 2/4 : COPY ./usr/share/nginx/html
--> a569ea9f430b
Step 3/4 : EXPOSE 80
--> Running in f566c7b1a915
--> Removed intermediate container f566c7b1a915
--> c8190a0d976
Step 4/4 : CMD ["nginx", "-g", "daemon off;"]
--> Running in b40e961f2f3a
--> Removed intermediate container b40e961f2f3a
--> e4aa466a307
Successfully built e4aa466a307
sameena@Dev-VM:~/hello-world-app$ docker images
permission denied while trying to connect to the Docker daemon socket at unix:///var/run/docker.sock: Head "http://%2Fvar%2Frun%2Fdocker.sock/_ping": dial unix /var/run/docker.sock: connect: permission denied
sameena@Dev-VM:~/hello-world-app$ sudo docker images
REPOSITORY TAG IMAGE ID CREATED SIZE
<none> <none> e4aa466a307 10 seconds ago 192MB
nginx <none> 1ef3c5b981a 2 months ago 192MB
sameena@Dev-VM:~/hello-world-app$ sudo docker -t e4aa466a307 devconctrl1.azurecr.io/hello-world-app1
unknown shorthand flag: 't' in -t
See 'docker --help'.
```

Both windows show the command prompt "sameena@Dev-VM:" and the status "ENG IN". The bottom window also shows the command "Usage: docker [OPTIONS] COMMAND" and "A self-sufficient runtime for containers".

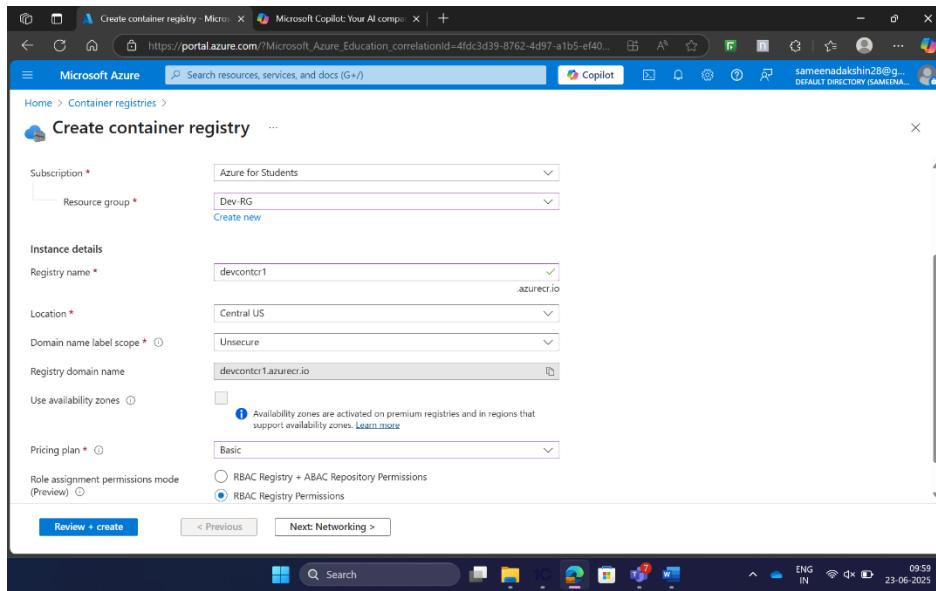
STEP 10:

Azure Container Registry:

- Name: devconcr1
- Commands to Create and Push Docker Image:

```
az acr create \
--resource-group Dev-RG \
--name devconcr1 \
--sku Basic
```

```
az acr login --name devconcr1
docker tag hello-world-app devconcr1.azurecr.io/hello-world-app:latest
docker push devconcr1.azurecr.io/hello-world-app:latest
```



Container registry
username:: devconctr1

Password1:: 85Lif/PiX47GqypaFqTRxhlgEV+npbWL9NCDeSw3SE+ACRCPkepR

ACR CREATED

To get the ACR connected with the vm ,we should run some prerequisites,

- sudo apt-get install ca-certificates curl apt-transport-https lsb-release gnupg -y
- echo "deb [arch=amd64] <https://packages.microsoft.com/repos/azure-cli/> \$(lsb_release -cs) main" | sudo tee /etc/apt/sources.list.d/azure-cli.list
- sudo apt-get update
- sudo apt-get install azure-cli -y

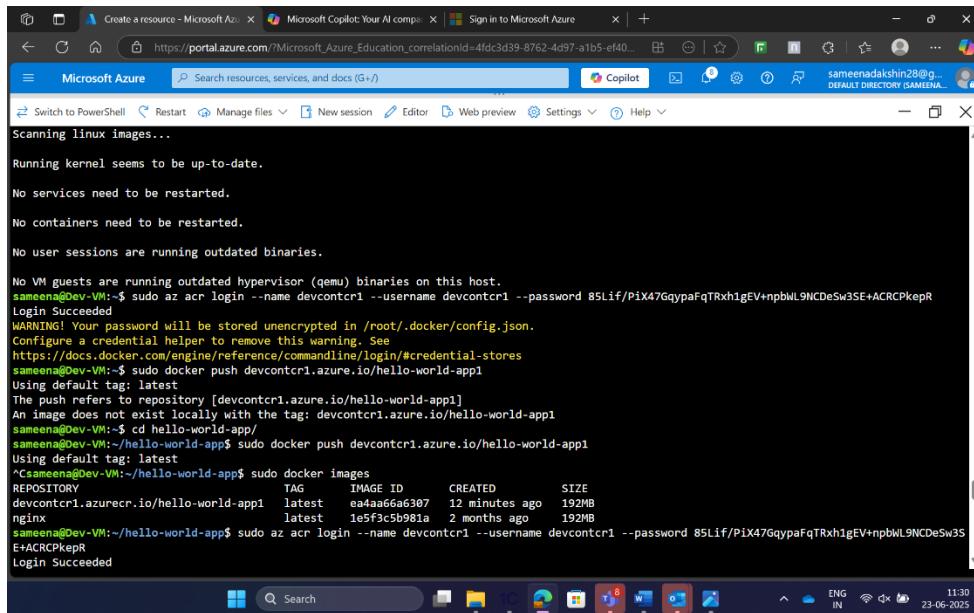
```
--tiscacert string  Trust certs signed only by this CA (default "/root/.docker/ca.pem")
--tlscert string   Path to TLS certificate file (default "/root/.docker/cert.pem")
--tlsckey string   Path to TLS key file (default "/root/.docker/key.pem")
--tlsvrify         Use TLS and verify the remote
-v, --version      Print version information and quit

Run 'docker COMMAND --help' for more information on a command.

For more help on how to use Docker, head to https://docs.docker.com/go/guides/

sameena@Dev-VM:~/hello-world-app$ sudo docker tag ea4aa66a6307 devconctr1.azurecr.io/hello-world-app1
sameena@Dev-VM:~/hello-world-app$ sudo docker images
REPOSITORY          TAG      IMAGE ID      CREATED       SIZE
devconctr1.azurecr.io/hello-world-app1  latest    ea4aa66a6307  About a minute ago  192MB
nginx              latest    1e5fc5b981a   2 months ago  192MB
sameena@Dev-VM:~/hello-world-app$ sudo apt update
Hit:1 http://archive.ubuntu.com/ubuntu noble InRelease
Hit:2 http://archive.ubuntu.com/ubuntu noble-updates InRelease
Hit:3 http://archive.ubuntu.com/ubuntu noble-backports InRelease
Hit:4 http://archive.ubuntu.com/ubuntu noble-security InRelease
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
39 packages can be upgraded. Run 'apt list --upgradable' to see them.
sameena@Dev-VM:~/hello-world-app$ cd ..
sameena@Dev-VM:~$ 1. Update your package list
sudo apt-get update

# 2. Install prerequisites
sudo apt-get install ca-certificates curl apt-transport-https lsb-release gnupg -y
```



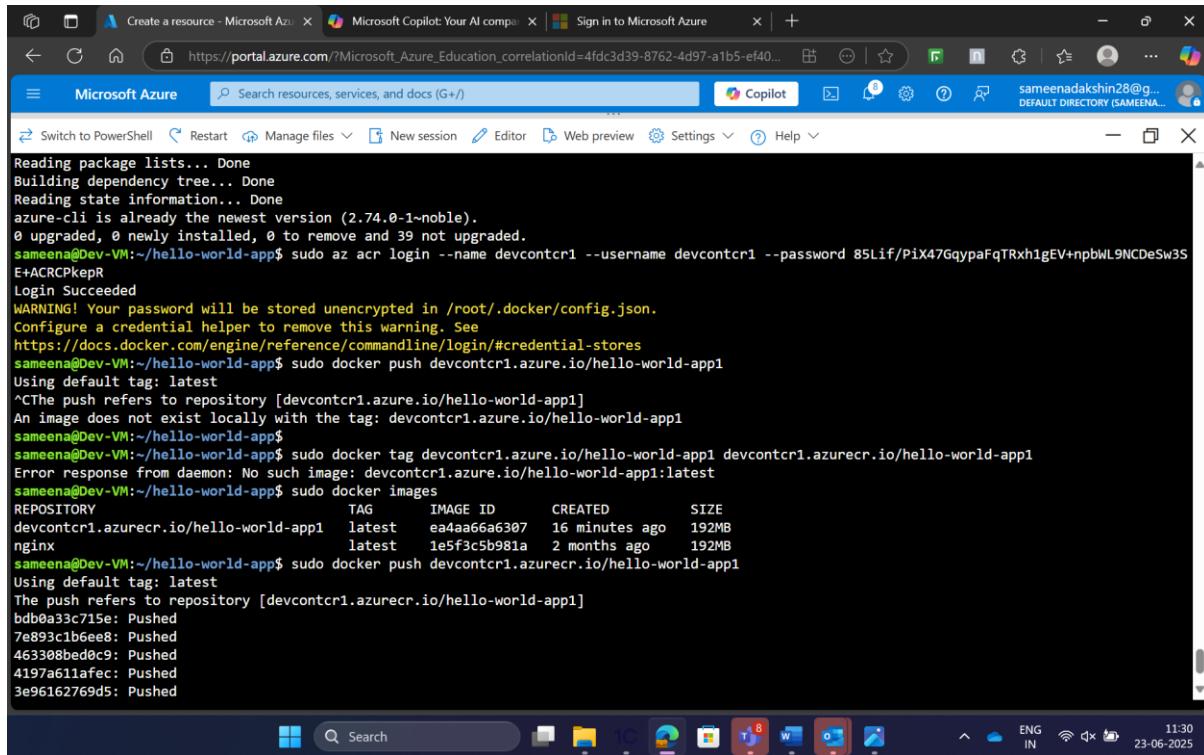
```
Scanning linux images...
Running kernel seems to be up-to-date.
No services need to be restarted.
No containers need to be restarted.
No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
sameena@Dev-VM:~$ sudo az acr login --name devconctr1 --username devconctr1 --password 85Lif/PiX47GqypaFqTRxh1gEV+npbWL9NCDeSw3SE+ACRPCkepR
Login Succeeded
WARNING! Your password will be stored unencrypted in /root/.docker/config.json.
Configure a credential helper to remove this warning. See
https://docs.docker.com/engine/reference/commandline/login/#credential-stores
sameena@Dev-VM:~$ sudo docker push devconctr1.azure.io/hello-world-app1
Using default tag: latest
The push refers to repository [devconctr1.azure.io/hello-world-app1]
An image does not exist locally with the tag: devconctr1.azure.io/hello-world-app1
sameena@Dev-VM:~$ cd hello-world-app/
sameena@Dev-VM:~/hello-world-app$ sudo docker push devconctr1.azure.io/hello-world-app1
Using default tag: latest
^Csameena@Dev-VM:~/hello-world-app$ sudo docker images
REPOSITORY          TAG      IMAGE ID   CREATED        SIZE
devconctr1.azurecr.io/hello-world-app1  latest    ea4aa66a6307  12 minutes ago  192MB
nginx              latest    1e5f3c5b981a  2 months ago   192MB
sameena@Dev-VM:~/hello-world-app$ sudo az acr login --name devconctr1 --username devconctr1 --password 85Lif/PiX47GqypaFqTRxh1gEV+npbWL9NCDeSw3S
E+ACRPCkepR
Login Succeeded
```

After that we need to

push it to the docker push ,by providing the full iamge name .

devconctr.azurecr.io/hello-world-app



```
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
azure-cli is already the newest version (2.74.0-1-noble).
0 upgraded, 0 newly installed, 0 to remove and 39 not upgraded.
sameena@Dev-VM:~/hello-world-app$ sudo az acr login --name devconctr1 --username devconctr1 --password 85Lif/PiX47GqypaFqTRxh1gEV+npbWL9NCDeSw3S
E+ACRPCkepR
Login Succeeded
WARNING! Your password will be stored unencrypted in /root/.docker/config.json.
Configure a credential helper to remove this warning. See
https://docs.docker.com/engine/reference/commandline/login/#credential-stores
sameena@Dev-VM:~/hello-world-app$ sudo docker push devconctr1.azure.io/hello-world-app1
Using default tag: latest
^CThe push refers to repository [devconctr1.azure.io/hello-world-app1]
An image does not exist locally with the tag: devconctr1.azure.io/hello-world-app1
sameena@Dev-VM:~/hello-world-app$ sameena@Dev-VM:~/hello-world-app$ sudo docker tag devconctr1.azure.io/hello-world-app1 devconctr1.azurecr.io/hello-world-app1
Error response from daemon: No such image: devconctr1.azure.io/hello-world-app1:latest
sameena@Dev-VM:~/hello-world-app$ sudo docker images
REPOSITORY          TAG      IMAGE ID   CREATED        SIZE
devconctr1.azurecr.io/hello-world-app1  latest    ea4aa66a6307  16 minutes ago  192MB
nginx              latest    1e5f3c5b981a  2 months ago   192MB
sameena@Dev-VM:~/hello-world-app$ sudo docker push devconctr1.azurecr.io/hello-world-app1
Using default tag: latest
The push refers to repository [devconctr1.azurecr.io/hello-world-app1]
bdb0a33c715e: Pushed
7e893c1b6ee8: Pushed
463308beddc9: Pushed
4197a611afec: Pushed
3e96162769d5: Pushed
```

Step 11:

Azure K8s cluster

Under Kubernetes cluster, we need to create the resource group and the cluster details as **Dev/Test**.

We need to select the cluster region, as central US.

After that we need to create the node pool, in which we need to create the pool name and choose the mode as **USER**,

User Node Pools:

- **Purpose:**

Dedicated to running your application workloads, allowing for customized configurations based on your application's specific requirements.

- **Characteristics:**

Can be scaled independently, and their configurations can be tailored to the needs of the applications they host (e.g., different VM sizes, operating systems, storage options).

System Node Pools:

- **Purpose:**

Designed to host essential Kubernetes system components that are vital for the cluster's operation.

- **Characteristics:**

Often have a fixed size and configuration, ensuring the stability of core cluster functionalities.

The screenshot shows the Microsoft Azure portal with the URL https://portal.azure.com/#Microsoft_Azure_Education_correlationId=4fd3d39-8762-4d97-a1b5-ef40.... The page title is "Create Kubernetes cluster". The top navigation bar includes "Microsoft Azure", "Search resources, services, and docs (G+)", "Copilot", and "Sign in to Microsoft Azure". The main content area shows the "Create Kubernetes cluster" wizard with tabs: Basics, Node pools, Networking, Integrations, Monitoring, Security, Advanced, Tags, and Review + create (which is selected). Under the Basics tab, there are fields for Subscription (Azure for Students), Resource group (Dev-RG), Region (Central US), Kubernetes cluster name (dev-aks), Kubernetes version (1.31.8), Automatic upgrade (patch), Automatic upgrade scheduler (Every week on Sunday (recommended)), Node security channel type (NodeImage), and Security channel scheduler (Every week on Sunday (recommended)). Below the Basics section is a "Node pools" section with "Create" and "Give feedback" buttons. The status bar at the bottom shows "11:35 ENG IN 23-06-2025".

The screenshot shows the Microsoft Azure portal with the URL https://portal.azure.com/#Microsoft_Azure_Education_correlationId=4fd3d39-8762-4d97-a1b5-ef40.... The page title is "microsoft.aks-1750658723312 | Overview". The top navigation bar includes "Microsoft Azure", "Search resources, services, and docs (G+)", "Copilot", and "Sign in to Microsoft Azure". The main content area shows the deployment overview with a summary: "Your deployment is complete". It lists the deployment name (microsoft.aks-1750658723312), start time (6/23/2025, 11:35:58 AM), subscription (Azure for Students), and correlation ID (2d7ddf2d-fb6d-481d-8726-dc9d8537b8). There are sections for "Deployment details" and "Next steps" with a "Go to resource" button. On the right side, there are promotional cards for "Cost Management", "Microsoft Defender for Cloud", "Free Microsoft tutorials", and "Work with an expert". The status bar at the bottom shows "11:50 ENG IN 23-06-2025".

```

5   labels:
6     app: nginx
7   spec:
8     replicas: 3
9     selector:
10    matchLabels:
11      app: nginx
12   template:
13     metadata:
14       labels:
15         app: nginx
16     spec:
17       containers:
18         - name: nginx
19           image: devconctrl.azurecr.io/
20
21
22

```

Draft with Copilot PREVIEW

Tell Copilot what to do next or type '?' for commands

Hint: Use CTRL + Enter to accept changes

Apply

```

1 apiVersion: v1
2 kind: Service
3 metadata:
4   name: nginx-service
5   spec:
6     type: LoadBalancer
7     selector:
8       app: nginx
9     ports:
10      - protocol: TCP
11        port: 80
12        targetPort: 80

```

Draft with Copilot PREVIEW

Tell Copilot what to do next or type '?' for commands

Hint: Use CTRL + Enter to accept changes

Apply | Deploy | Cancel

This is the **YAML file** for the deployment provided in the **WORKLOAD,deployment.yaml**
Nginx-deployment is created in the workload.

Go to the **Services and ingress, and create and add the yaml file and create a services type with loadbalancer.**

Services

Name	Namespace	Status	Type	Cluster IP	External IP	Ports
kubernetes	default	Ok	ClusterIP	10.0.0.1		443/TCP
kube-dns	kube-system	Ok	ClusterIP	10.0.0.10		53/UDP, 53/TCP
metrics-server	kube-system	Ok	ClusterIP	10.0.114.223		443/TCP
azure-wi-webhook-web...	kube-system	Ok	ClusterIP	10.0.203.253		443/TCP
nginx-service	default	Pending	LoadBalancer	10.0.71.18		80:30897/TCP

In the Services and Ingress ,there we have created the nginx-services,where it generated the External IP address to access the HTML PAGE.

Hello, World!

Welcome to your first deployed web application!

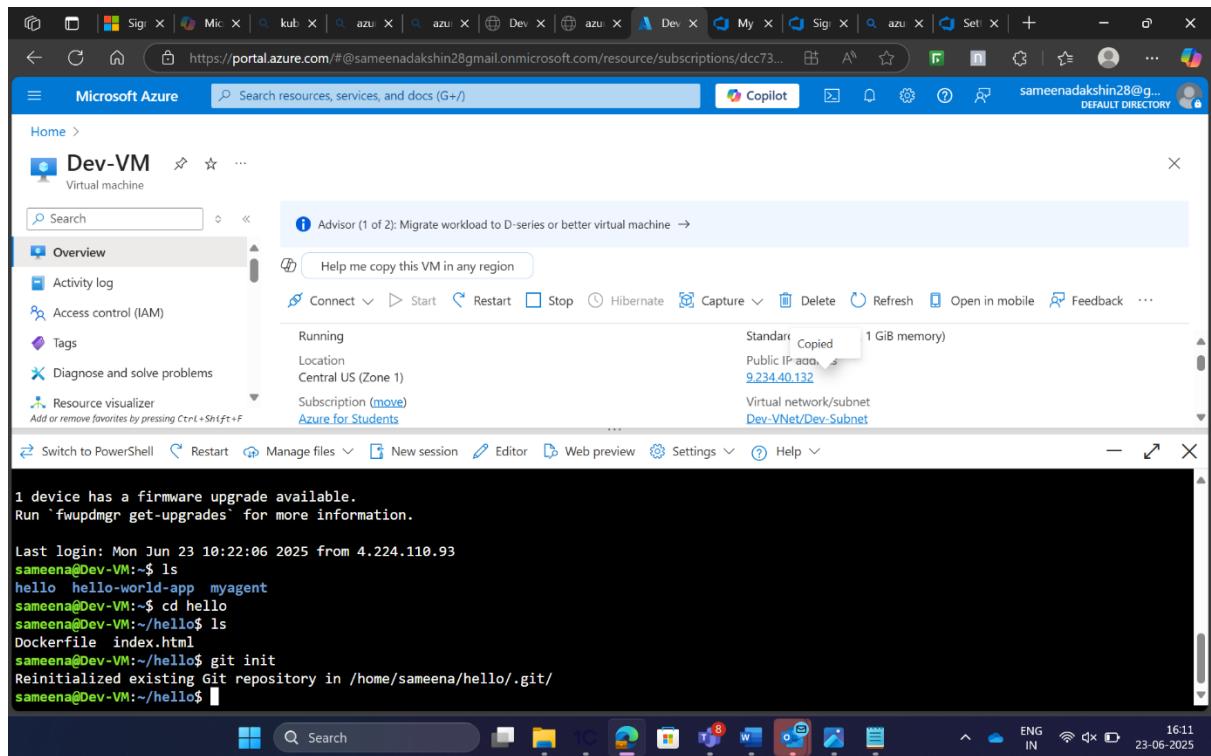
Deploymrnt.yaml and service.yaml::

```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: hello-world-app
```

```
spec:
replicas: 1
selector:
matchLabels:
  app: hello-world-app
template:
metadata:
labels:
  app: hello-world-app
spec:
containers:
- name: hello-world-app
image: devenvironmentcr.azurecr.io/app:${resources.pipeline.ci_build.runID}
ports:
- containerPort: 80
---
apiVersion: v1
kind: Service
metadata:
name: hello-world-service
spec:
type: LoadBalancer
selector:
app: hello-world-app
ports:
- protocol: TCP
port: 80
targetPort: 80
```

PIPELINE INTEGRATION (CI/CD)::

Clone Repository :



The screenshot shows the Microsoft Azure portal interface. The top navigation bar has multiple tabs open, including 'Mic', 'kub', 'azu', 'azu', 'Dev', 'Dev', 'My', 'azu', 'Set'. The main content area is titled 'Dev-VM' under 'Virtual machine'. On the left, there's a sidebar with options like 'Overview', 'Activity log', 'Access control (IAM)', 'Tags', 'Diagnose and solve problems', and 'Resource visualizer'. The main panel displays the VM's status as 'Running', location 'Central US (Zone 1)', and subscription 'Azure for Students'. It also shows a public IP address '9.234.40.132' and a virtual network/subnet 'Dev-VNet/Dev-Subnet'. Below this, a terminal window is open with the following command history:

```
1 device has a firmware upgrade available.  
Run `fwupdmgr get-upgrades` for more information.  
  
Last login: Mon Jun 23 10:22:06 2025 from 4.224.110.93  
sameena@Dev-VM:~$ ls  
hello hello-world-app myagent  
sameena@Dev-VM:~$ cd hello  
sameena@Dev-VM:~/hello$ ls  
Dockerfile index.html  
sameena@Dev-VM:~/hello$ git init  
Reinitialized existing Git repository in /home/sameena/hello/.git/  
sameena@Dev-VM:~/hello$
```

A screenshot of the Microsoft Azure portal showing the settings for a Dev VM. The VM name is 'Dev-VM'. The 'Overview' tab is selected. In the center, there's a large button with the text 'Help me copy this VM in any region...'. Below it, there are tabs for 'Running', 'Location', 'General', 'Storage', 'Subscription (new)', and 'Review for Reserves'. On the right, there are buttons for 'Create', 'Delete', 'Refresh', 'Open in mobile', and 'Feedback'. At the bottom, there's a 'Save' button and a 'Cancel' button. The status bar at the bottom shows the date as 10/24/2015 and the time as 10:54 AM.

The screenshot shows the Microsoft Azure Dev-VM dashboard. On the left, there's a sidebar with 'Overview' selected. The main area has a search bar and a 'Copilot' button. A migration advisor message says 'Advisor (1 of 2): Migrate workload to D-series or better virtual machine'. Below it, a button says 'Help me copy this VM in any region'. The VM details show it's a Standard B1s (1 vcpu, 1 GiB memory) with a Public IP address of 92.34.40.132, running in Central US (Zone 1). The 'Resource visualizer' section shows 'Azure for Students'. At the bottom, a terminal window shows the command 'git push -u origin --all' being run, with a password prompt for 'https://sameenadakshin28@dev.azure.com'. The terminal also displays the progress of the git push operation.

```
sameena@Dev-VM:~$ git push -u origin --all
Password for 'https://sameenadakshin28@dev.azure.com':
Enumerating objects: 4, done.
Counting objects: 100% (4/4), done.
Compressing objects: 100% (4/4), done.
Writing objects: 100% (4/4), 682 bytes | 682.00 KiB/s, done.
Total 4 (delta 0), reused 0 (delta 0), pack-reused 0
remote: Analyzing objects... (4/4) done (0 ms)
remote: Validating commits... (1/1) done (0 ms)
remote: Storing packfile... done (79 ms)
remote: Storing index... done (40 ms)
remote: Updating refs... done (223 ms)
```

```
--[no]progress      force progress reporting
--[no]prune        prune locally removed refs
--no-prune        bypass pre-push hook
--verify          opposite of --no-verify
--[no]follow-tags push missing but relevant tags
--[no]signed=(yes|no|if-asked)
GPG sign the push
--[no]atomic       request atomic transaction on remote side
-o, --[no]push-option <server-specific>
option to transmit
-4, --ipv4        use IPv4 addresses only
-6, --ipv6        use IPv6 addresses only

sameena@Dev-VM:~/hello$ git push -u origin origin --all
Password for 'https://sameenadakshin28@dev.azure.com':
Enumerating objects: 4, done.
Counting objects: 100% (4/4), done.
Compressing objects: 100% (4/4), done.
Writing objects: 100% (4/4), 682 bytes | 682.00 KiB/s, done.
Total 4 (delta 0), reused 0 (delta 0), pack-reused 0
remote: Analyzing objects... (4/4) (4 ms)
remote: Validating commits... (1/1) done (0 ms)
remote: Storing packfile... done (79 ms)
remote: Storing index... done (40 ms)
remote: Updating refs... done (223 ms)
remote: We noticed you're using an older version of Git. For the best experience, upgrade to a newer version.
To https://dev.azure.com/sameenadakshin28/Finalusecase/_git/Finalusecase
 * [new branch]    master -> master
branch 'master' set up to track 'origin/master'.
sameena@Dev-VM:~/hello$
```

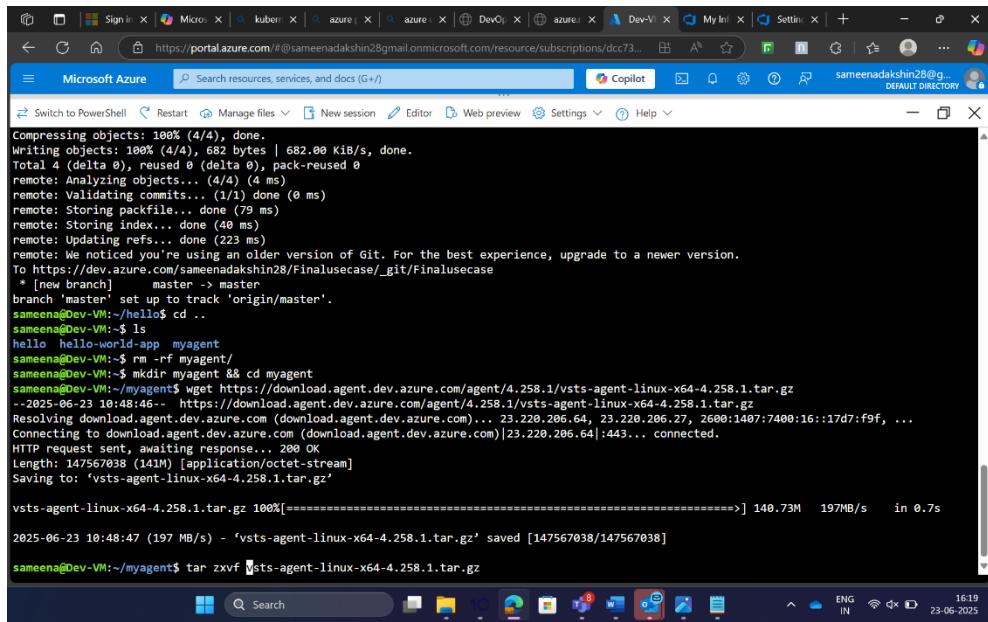
SELF HOSTED AGENT CREATION:

The screenshot shows the 'Agent pools' creation dialog in the Azure DevOps interface. The dialog title is 'Add agent pool'. It includes a note about transitioning to new IP addresses. The 'Self-hosted' option is selected, showing fields for 'Name' (set to 'azureagent') and 'Pipeline permissions' (checkbox 'Grant access permission to all pipelines' is checked). A 'Create' button is at the bottom right.

The screenshot shows the 'Get the agent' dialog for the Linux platform. It displays system prerequisites, download links for Windows, macOS, and Linux (selected), and configuration steps. The Linux section shows a terminal command to download the agent and a configuration command:

```
~/myagent$ ./config.sh
```

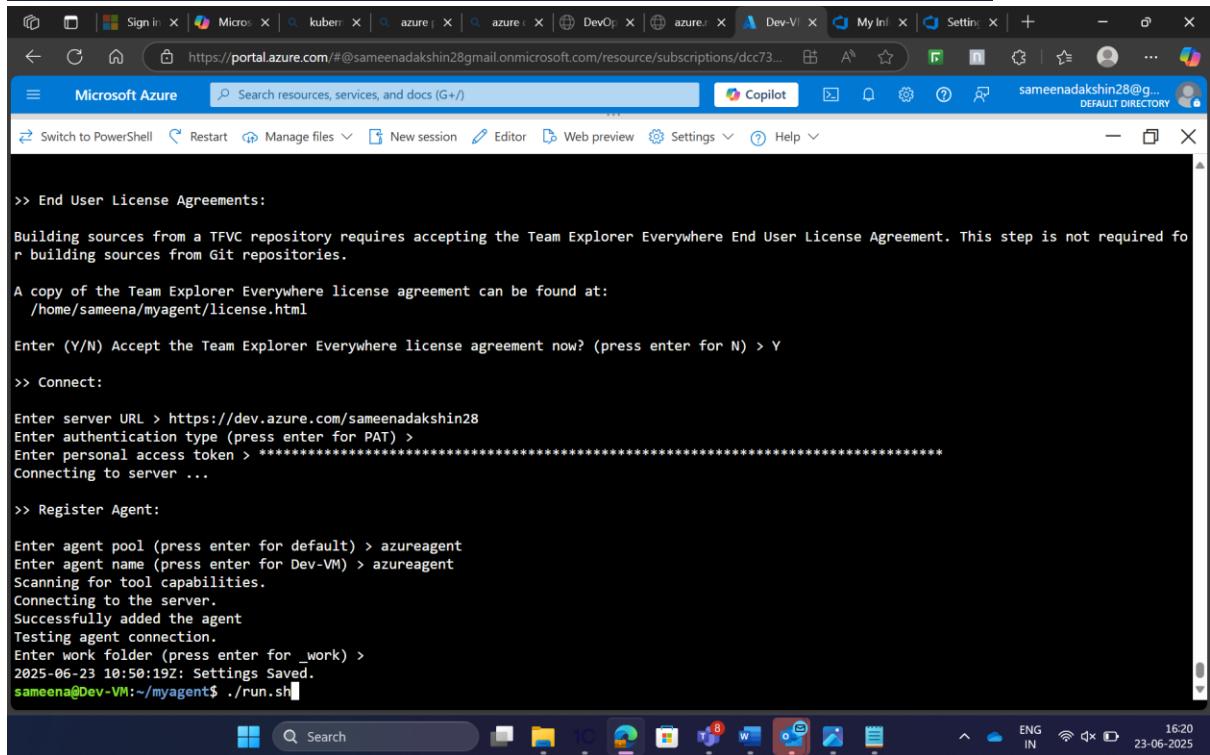
.



```
Compressing objects: 100% (4/4), done.
Writing objects: 100% (4/4), 682 bytes | 682.00 KiB/s, done.
Total 4 (delta 0), reused 0 (delta 0), pack-reused 0
remote: Analyzing objects... (4/4) (4 ms)
remote: Validating commits... (1/1) done (0 ms)
remote: Storing packfile... done (79 ms)
remote: Storing index... done (40 ms)
remote: Updating refs... done (223 ms)
remote: We noticed you're using an older version of Git. For the best experience, upgrade to a newer version.
To https://dev.azure.com/sameenadakshin28/Finalusecase/_git/Finalusecase
 * [new branch]      master -> master
branch 'master' set up to track 'origin/master'.
sameena@Dev-VM:~/hello$ cd ..
sameena@Dev-VM:~$ ls
hello  hello-world-app myagent
sameena@Dev-VM:~$ rm -rf myagent/
sameena@Dev-VM:~$ mkdir myagent && cd myagent
sameena@Dev-VM:~/myagent$ wget https://download.agent.dev.azure.com/agent/4.258.1/vsts-agent-linux-x64-4.258.1.tar.gz
--2025-06-23 10:48:46 - https://download.agent.dev.azure.com/agent/4.258.1/vsts-agent-linux-x64-4.258.1.tar.gz
Resolving download.agent.dev.azure.com (download.agent.dev.azure.com)... 23.220.206.64, 23.220.206.27, 2600:1407:7400:16::17d7:f9f, ...
Connecting to download.agent.dev.azure.com (download.agent.dev.azure.com)|23.220.206.64|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 147567038 (141M) [application/octet-stream]
Saving to: 'vsts-agent-linux-x64-4.258.1.tar.gz'

vsts-agent-linux-x64-4.258.1.tar.gz 100%[=====] 140.73M  197MB/s   in 0.7s
2025-06-23 10:48:47 (197 MB/s) - 'vsts-agent-linux-x64-4.258.1.tar.gz' saved [147567038/147567038]

sameena@Dev-VM:~/myagent$ tar zxvf vsts-agent-linux-x64-4.258.1.tar.gz
```



```
>> End User License Agreements:
Building sources from a TFVC repository requires accepting the Team Explorer Everywhere End User License Agreement. This step is not required for building sources from Git repositories.

A copy of the Team Explorer Everywhere license agreement can be found at:
 /home/sameena/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/sameenadakshin28
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 Dev-VM) > azureagent
Scanning for tool capabilities.
Connecting to the server.
Successfully added the agent
Testing agent connection.
Enter work folder (press enter for _work) >
2025-06-23 10:50:19Z: Settings Saved.
sameena@Dev-VM:~/myagent$ ./run.sh
```

```

./run.sh
./reauth.sh
./env.sh
./license.html
sameena@Dev-VM:~/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 required for building sources from Git repositories.

A copy of the Team Explorer Everywhere license agreement can be found at:
/home/sameena/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/sameenadakshin28
Enter authentication type (press enter for PAT) >

```

The screenshot shows a Microsoft Edge browser window with the Microsoft Azure portal URL. The tab bar has multiple tabs related to Azure services like Sign in, Kubernetes, Azure DevOps, and Azure DevTest Labs. The main content area is a terminal window titled 'Microsoft Azure'. It displays the configuration of a 'myagent' service, including the download and execution of configuration scripts, the acceptance of the End User License Agreement, and the connection to an Azure DevOps organization.

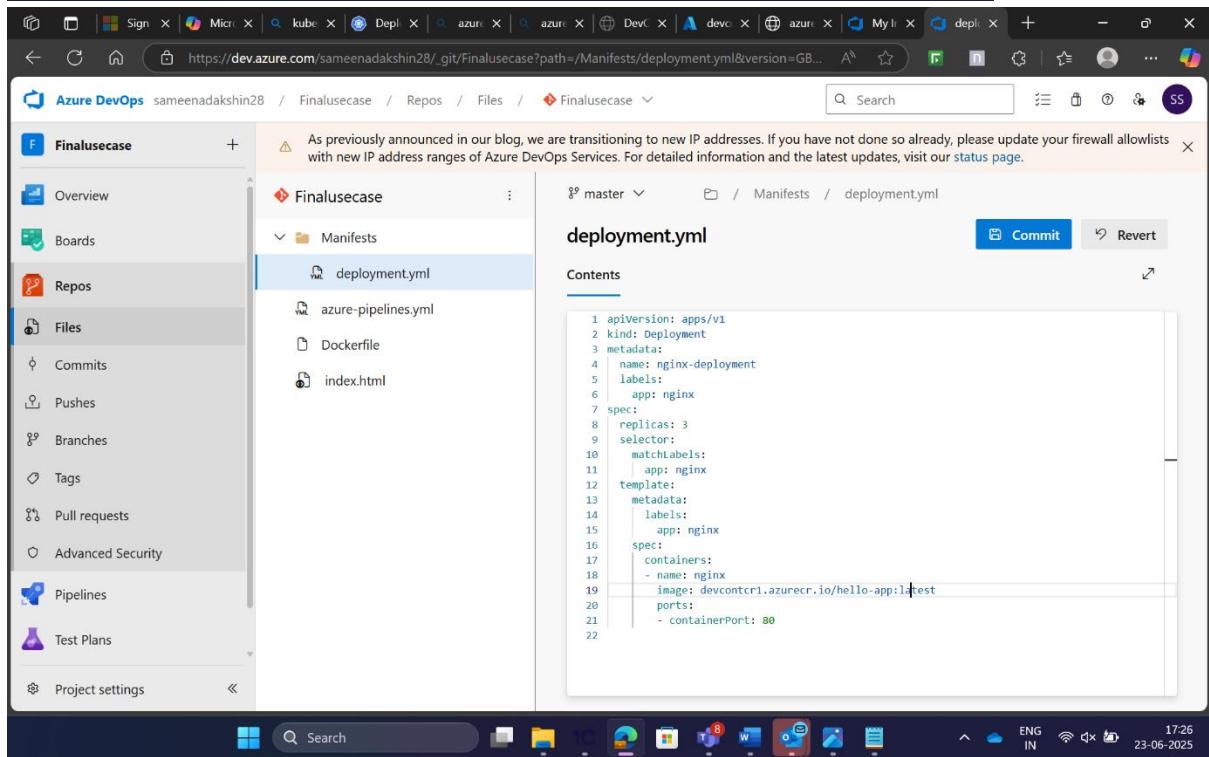
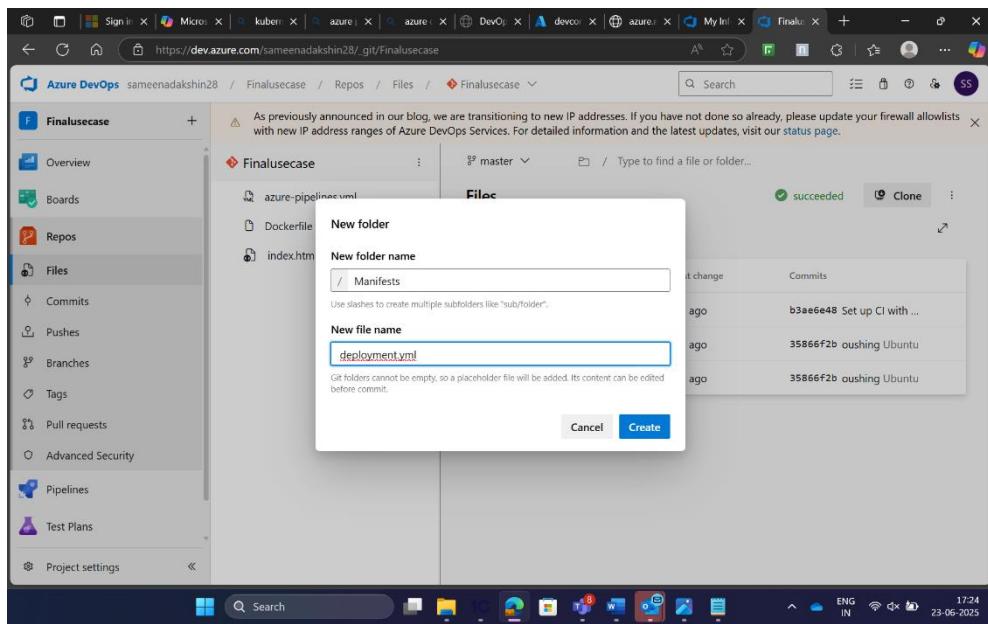
CI Pipeline:

I created new pipeline and added task of command line script where I pushed built image to ACR,publish build artifact and copy files to stagingartifact.

The screenshot shows the 'Organization Settings' page in the Azure DevOps portal. The left sidebar lists sections like General, Security, and Permissions. The main content area is titled 'Pipeline settings' and contains several configuration options:

- Disable stage chooser:** Off (radio button)
- Disable creation of classic build pipelines:** Off (radio button)
- Disable creation of classic release pipelines:** Off (radio button)
- Triggers:**
 - Limit building pull requests from forked GitHub repositories:** On (radio button)
 - Disable building pull requests from forked repositories:** Off (radio button)
 - Securely build pull requests from forked repositories:** Off (radio button)

The status bar at the bottom indicates the date as 23-06-2025 and the time as 16:51.



The screenshot shows the Azure DevOps interface for a repository named 'Finalusecase'. The left sidebar lists various project sections like Overview, Boards, Repos, Files, Pipelines, and Test Plans. The 'Files' section is currently selected. The main area displays the contents of the 'services.yml' file under the 'Manifests' folder. The code content is as follows:

```
1 apiVersion: v1
2 kind: Service
3 metadata:
4   name: nginx-service
5 spec:
6   type: LoadBalancer
7   selector:
8     app: nginx
9   ports:
10    - protocol: TCP
11      port: 80
12      targetPort: 80
```

Buttons for 'Commit' and 'Revert' are visible at the top right of the code editor.

The screenshot shows the Azure DevOps interface for setting up a new pipeline. The left sidebar lists sections like Overview, Boards, Repos, Pipelines, Environments, Releases, Library, Task groups, Deployment groups, Test Plans, and Artifacts. The 'Pipelines' section is selected. The main area has a large 'Select your repository' button with a circular arrow icon. Below it, a message says: 'Tell us where your sources are. You can customize how to get these sources from the repository later.' To the right, there's a 'Select a source' section with icons for Azure Repos Git (selected), GitHub, GitHub Enterprise Server, Subversion, Bitbucket Cloud, and Other Git. Below that, fields for 'Team project' (set to 'hello-world'), 'Repository' (set to 'hello-world'), and 'Default branch for manual and scheduled builds' (set to 'master') are shown. A 'Continue' button is at the bottom right.

The screenshot shows the Azure DevOps Pipelines interface. On the left, the sidebar is open with the 'Pipelines' section selected. The main area displays a pipeline named 'Finalusecase-Cl'. The pipeline consists of a single step: 'Get sources' (branch: Finalusecase, commit: master). Below this is an 'Agent job 1' step, which is currently running on an agent. The pipeline configuration includes fields for 'Display name' (set to 'Agent job 1'), 'Agent selection' (set to 'azureagent'), and 'Demands' (empty). The 'Execution plan' section is collapsed.

This screenshot shows the same Azure DevOps Pipelines interface as the previous one, but with additional steps added to the pipeline. The 'Command Line Script' task has been configured with the following script:

```
sudo docker build -t devconcr1.azurecr.io/hello-app:latest .
sudo az acr login --name devconcr1 --username devconcr1 --
password
85Lif/PiX47GqypaFqTRxh1gEV+npbWL9NCDeSw3SE+ACRCPkepR
sudo docker push devconcr1.azurecr.io/hello-app:latest
```

The screenshot shows the Azure DevOps Pipelines interface. On the left, there's a sidebar with project navigation: Finalusecase (selected), Overview, Boards, Repos, Pipelines (selected), Pipelines, Environments, Releases, Library, Task groups, Deployment groups, Test Plans, Artifacts, and Project settings. The main area displays a CI pipeline named 'Finalusecase-CI'. The pipeline has one job, 'Agent job 1', which runs on an agent. This job contains three tasks: 'Command Line Script' (using command line), 'Copy Files to: \${Build.StagingArtifact}' (using copy files), and 'Publish Pipeline Artifact' (using publish pipeline artifacts). The 'Copy Files to' task is currently selected. The pipeline is set to version 2.*. The status bar at the bottom shows the date and time as 23-06-2025, 16:58.

The screenshot shows two consecutive screenshots of the Azure DevOps Pipelines interface.

Screenshot 1: Pipeline Triggers

- The left sidebar shows the project navigation: Overview, Boards, Repos, Pipelines (selected), Pipelines, Environments, Releases, Library, Task groups, Deployment groups, Test Plans, Artifacts, and Project settings.
- The main area displays the "Finalusecase-Cl" pipeline configuration under the "Triggers" tab.
- Under "Continuous integration", the "Finalusecase" trigger is selected and enabled.
- Triggers listed include "Scheduled" (No builds scheduled) and "Build completion" (Build when another build completes).
- Branch filters: Type "Include" and Branch specification "master".
- Path filters: "+ Add".

Screenshot 2: Build Results

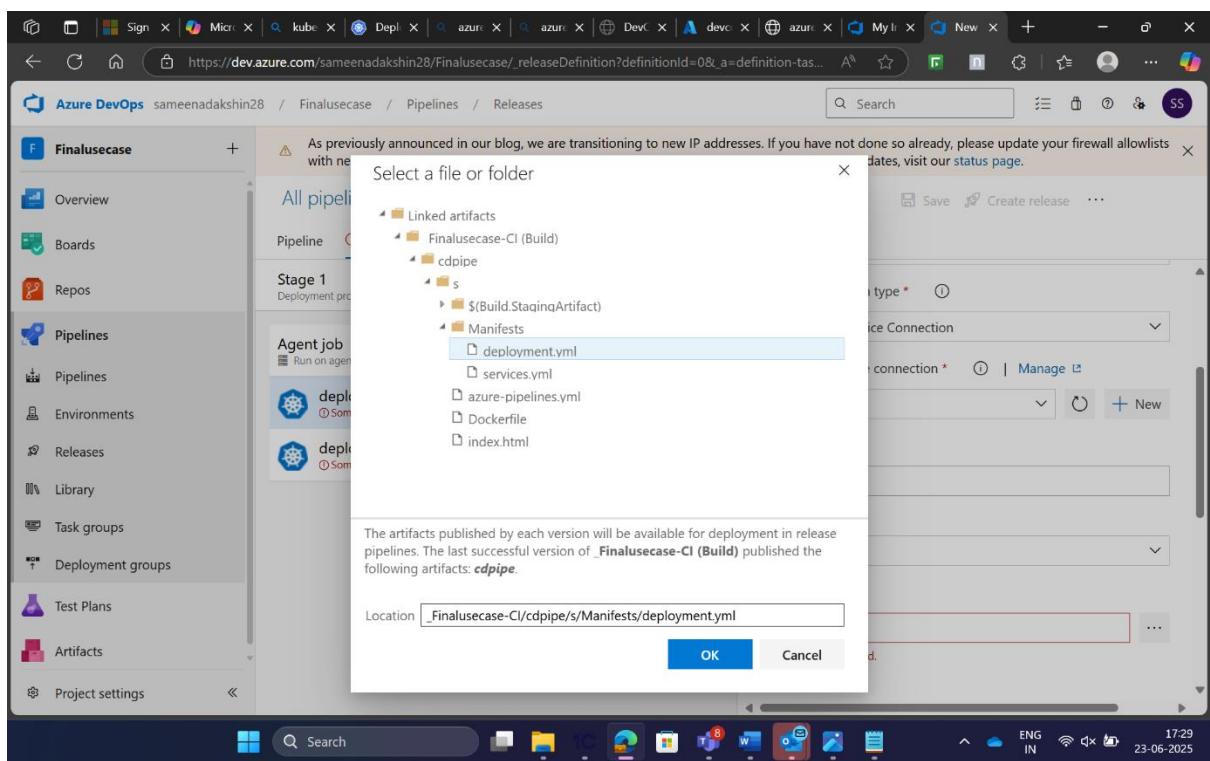
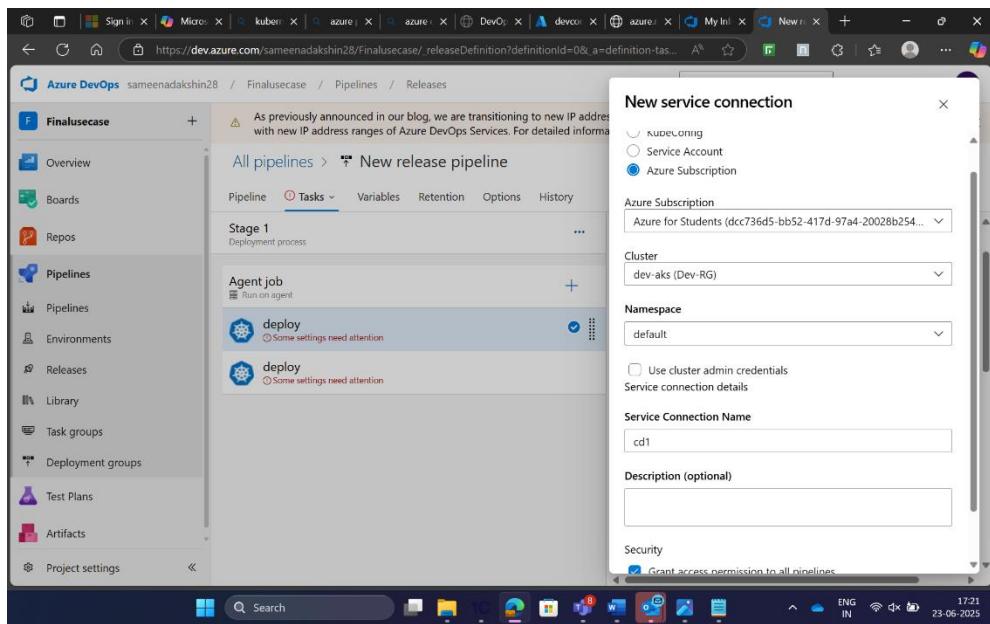
- The left sidebar remains the same.
- The main area shows the results of build #5 for the "Finalusecase-Cl" pipeline.
- The summary indicates the build was manually run by "Sameena Dakshin Saleem" just now.
- Summary details: Repository and version "Finalusecase", master branch, commit "b3ae6e48". Time started and elapsed "1m 4s". Related work items "0". Tests and coverage "1 published, 1 consumed".
- The "Jobs" section shows one job named "Agent job 1" which was successful and took "44s".

CD Pipeline::

- **CD (Release Pipeline):**
 - Pull the Docker image from ACR.
 - Deploy the application to Azure Kubernetes Service (AKS).

The screenshot shows the Azure DevOps Pipelines interface for creating a new release pipeline. On the left, the navigation bar includes 'Finalusecase' (selected), Overview, Boards, Repos, Pipelines (selected), Environments, Releases, Library, Task groups, Deployment groups, Test Plans, Artifacts, and Project settings. The main area displays 'All pipelines > New release pipeline'. A 'Pipeline' tab is selected. The 'Stages' section shows 'Stage 1' (1 job, 0 task). The 'Stage' properties pane shows 'Stage name: Stage 1' and 'Stage owner: Sameena Dakshin Saleem'. A 'Save' button is visible at the top right.

The screenshot shows the 'Add an artifact' dialog box overlaid on the Azure DevOps Pipelines interface. The dialog has a 'Source type' section with 'Build' selected (indicated by a blue border). Other options include 'Azure Repos ...', 'GitHub', and 'TFVC'. Below this are fields for 'Project' (set to 'Finalusecase') and 'Source (build pipeline)' (a dropdown menu). A note says 'This setting is required.' An 'Add' button is at the bottom. The background shows the same pipeline creation interface as the first screenshot.

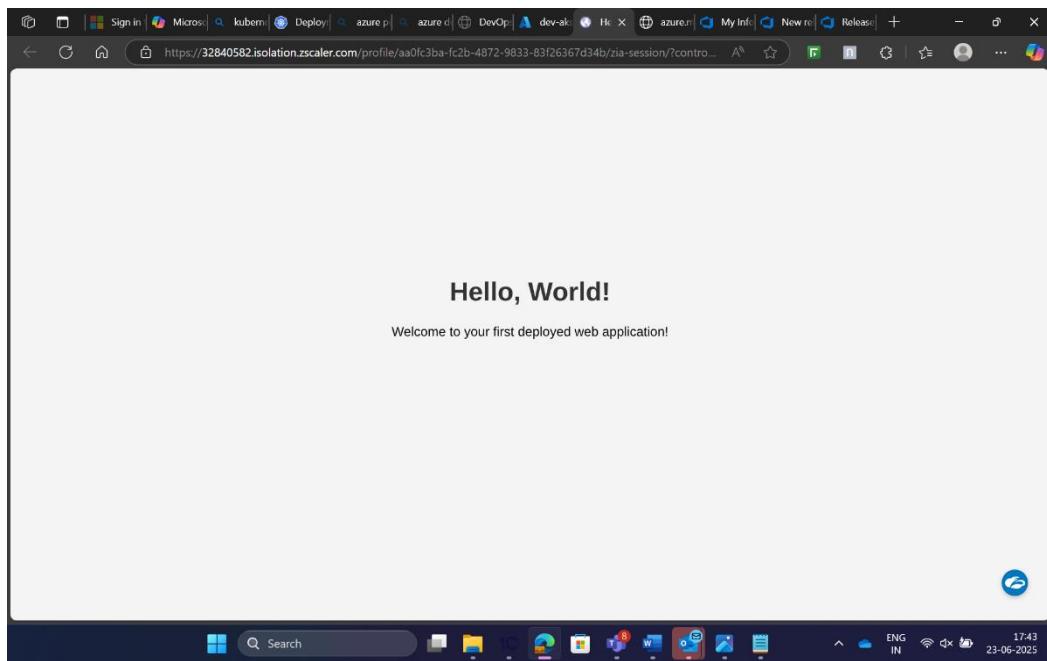


Screenshot of the Azure DevOps 'Create a new release' dialog.

The dialog shows a 'Pipeline' tab selected, displaying a single stage named 'Stage 1' with the description 'Deployment process'. Under 'Tasks', there are two 'Agent job' tasks, both labeled 'deploy' and 'Deploy to Kubernetes'. An 'Artifacts' section lists one artifact source: '_Finalusecase-Cl' at version 8. A 'Release description' field is empty. At the bottom are 'Create' and 'Cancel' buttons.

Screenshot of the Azure DevOps 'New release pipeline' view for 'Release-1'.

The left sidebar shows the project navigation. The main area displays the 'Release' card, which is 'Manually triggered' by 'Sameena Dakshin S...' on '23/6/2025, 5:31 pm'. The 'Stages' card shows 'Stage 1' has succeeded with 2 warnings on '23/6/2025, 5:32 pm'. The pipeline status bar at the bottom indicates the date as '23-06-2025'.



HEALTH CHECKS::

Health-check.ps1::

```
# health-check.ps1
# Kubernetes Cluster Health Check Script

function Check-Nodes {
    Write-Host "Checking Kubernetes Nodes..."
    $nodes = kubectl get nodes --no-headers | ForEach-Object {
        $fields = $_ -split '\s+'
        [PSCustomObject]@{
            NodeName = $fields[0]
            Status   = $fields[1]
        }
    }

    $allHealthy = $true
    foreach ($node in $nodes) {
        if ($node.Status -ne "Ready") {
            Write-Error "Node $($node.NodeName) is not healthy. Status: $($node.Status)"
        }
    }
}
```

```

$allHealthy = $false

} else {
    Write-Host "Node $($node.NodeName) is healthy."
}

}

if (-not $allHealthy) {
    exit 1
}

}

function Check-Pods {
    Write-Host "Checking Kubernetes Pods..."

    $pods = kubectl get pods --all-namespaces --no-headers | ForEach-Object {
        $fields = $_ -split '\s+'
        [PSCustomObject]@{
            Namespace = $fields[0]
            PodName  = $fields[1]
            Status   = $fields[2]
        }
    }

    $allHealthy = $true
    foreach ($pod in $pods) {
        if ($pod.Status -notin @("Running", "Completed")) {
            Write-Error "Pod $($pod.PodName) in namespace $($pod.Namespace) is not healthy. Status: $($pod.Status)"
            $allHealthy = $false
        } else {
            Write-Host "Pod $($pod.PodName) in namespace $($pod.Namespace) is healthy."
        }
    }

    if (-not $allHealthy) {
        exit 1
    }
}

```

Check-Nodes

Check-Pods

```
Write-Host "All Kubernetes components are healthy."
```

```
exit 0
```

and change to be added in pipelines-1.yml::

```
- checkout: self  
- task: PowerShell@2
```

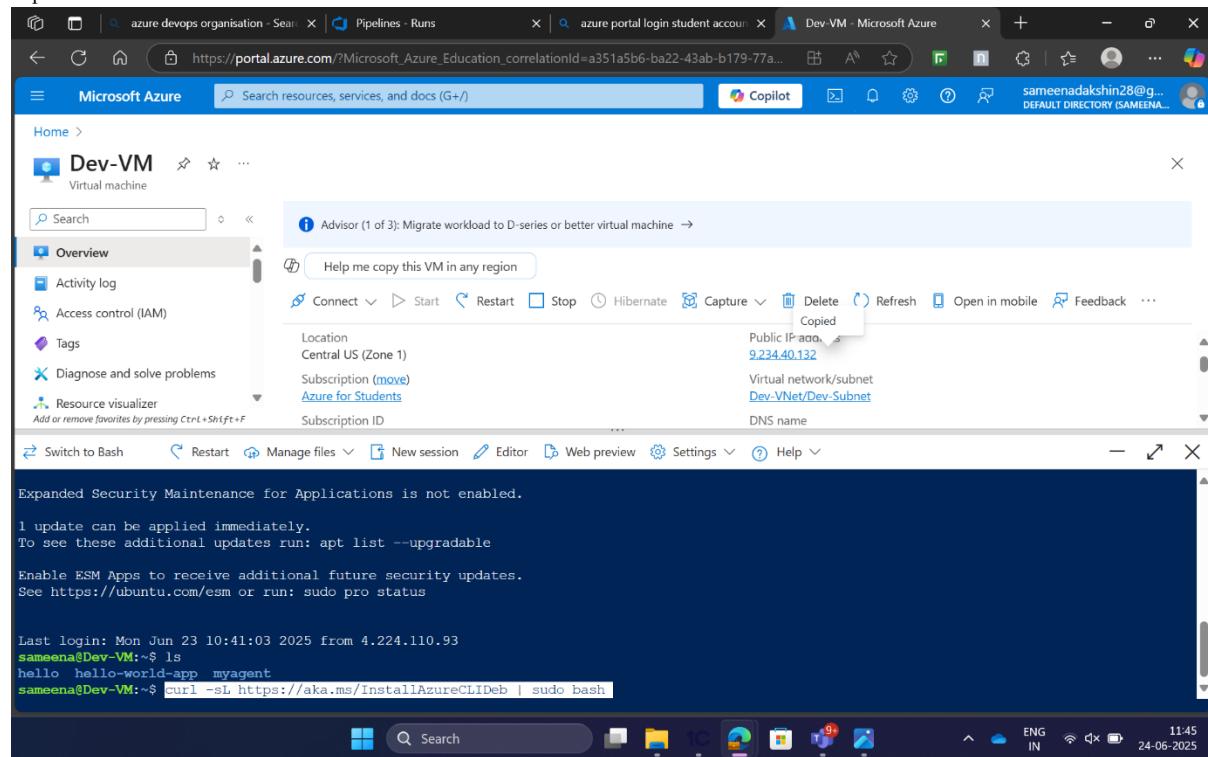
```
displayName: 'Kubernetes Cluster Health Check'
```

inputs:

```
targetType: 'filePath'
```

```
filePath: 'health-check.ps1'
```

```
pwsh: true
```



azure devops organisation - Search | Pipelines - Runs | azure portal login student account | Dev-VM - Microsoft Azure

https://portal.azure.com/?Microsoft_Azure_Education_correlationId=a351a5b6-ba22-43ab-b179-77a...

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

sameenadakshin28@gmail.com | DEFAULT DIRECTORY (SAMEENA...)

Home > Dev-VM

Virtual machine

Search

Overview

Activity log

Access control (IAM)

Tags

Diagnose and solve problems

Resource visualizer

Help me copy this VM in any region

Connect | Start | Restart | Stop | Hibernate | Capture | Delete | Refresh | Open in mobile | Feedback | ...

Location: Central US (Zone 1)

Subscription (move): Azure for Students

Public IP address: 9.234.40.132

Virtual network/subnet: Dev-VNet/Dev-Subnet

Subscription ID: ...

DNS name: ...

Switch to Bash | Restart | Manage files | New session | Editor | Web preview | Settings | Help | ...

```

0 upgraded, 0 newly installed, 0 to remove and 1 not upgraded.
sameena@Dev-VM:~$ curl -LO "https://dl.k8s.io/release/$(curl -s https://dl.k8s.io/release/stable.txt)/bin/linux/amd64/kubectl" && chmod +x kubectl && sudo mv kubectl /usr/local/bin/ && kubectl version --client
  % Total    % Received % Xferd  Average Speed   Time      Time     Current
          Dload  Upload Total Spent   Left Speed
100  138  100  138  0    0  1634  0 --:--:-- --:--:--:--:--:-- 1642
100 57.3M  100 57.3M  0    0  119M  0 --:--:-- --:--:--:--:--:-- 215M
Client Version: v1.33.2
Kustomize Version: v5.6.0
sameena@Dev-VM:~$ sudo apt update && sudo apt install -y wget apt-transport-https software-properties-common && wget -q https://packages.microsoft.com/config/ubuntu/$(lsb_release -rs)/packages-microsoft-prod.deb && sudo dpkg -i packages-microsoft-prod.deb && sudo apt update && sudo apt install -y powershell
Hit:1 http://azure.archive.ubuntu.com/ubuntu noble InRelease
Hit:2 http://azure.archive.ubuntu.com/ubuntu noble-updates InRelease

```

11:46 | ENG IN | 24-06-2025

azure devops organisation - Search | Pipelines - Runs | azure portal login student account | Dev-VM - Microsoft Azure

https://portal.azure.com/?Microsoft_Azure_Education_correlationId=a351a5b6-ba22-43ab-b179-77a...

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

sameenadakshin28@gmail.com | DEFAULT DIRECTORY (SAMEENA...)

Home > Dev-VM

Virtual machine

Search

Overview

Activity log

Access control (IAM)

Tags

Diagnose and solve problems

Resource visualizer

Help me copy this VM in any region

Connect | Start | Restart | Stop | Hibernate | Capture | Delete | Refresh | Open in mobile | Feedback | ...

Location: Central US (Zone 1)

Subscription (move): Azure for Students

Public IP address: 9.234.40.132

Virtual network/subnet: Dev-VNet/Dev-Subnet

Subscription ID: ...

DNS name: ...

Switch to Bash | Restart | Manage files | New session | Editor | Web preview | Settings | Help | ...

Successfully started Kubernetes service

Successfully started the Kubernetes service 'dev-aks'.

```

Scanning linux images...
Running kernel seems to be up-to-date.
No services need to be restarted.
No containers need to be restarted.
No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
sameena@Dev-VM:~$ az login
To sign in, use a web browser to open the page https://microsoft.com/devicelogin and enter the code BRZLCQF3C to authenticate.

```

11:46 | ENG IN | 24-06-2025

The screenshot shows a Microsoft Edge browser window with two tabs open:

- Top Tab:** https://login.microsoftonline.com/common/reprocess?ctx=rQQlARAAjY9Pa9NgAifTddMx3Ow8efDQwxR0pk... (Sign in to your account)
- Bottom Tab:** https://portal.azure.com/?Microsoft_Azure_Education_correlationId=a351a5b6-ba22-43ab-b179-77a... (Home - Microsoft Azure)

The main content area displays the Microsoft Azure CLI sign-in dialog:

Microsoft Azure

Microsoft
sameenadakshin28@gmail.com

Are you trying to sign in to Microsoft Azure CLI?

Only continue if you downloaded the app from a store or website that you trust.

Cancel **Continue**

Below the dialog, the Azure portal interface is visible, showing a list of resources:

Name	Type	Last Viewed
Dev-VM	Virtual machine	5 minutes ago
sameena-Vm	Virtual machine	6 minutes ago
dev-aks	Kubernetes service	7 minutes ago
devconctr1	Container registry	7 minutes ago
sameena-Vm_group	Resource group	18 hours ago
Dev-VNet	Virtual network	18 hours ago
Dev-RG	Resource group	20 hours ago
Dev-NSG	Network security group	a day ago
devstorage28	Storage account	a day ago

At the bottom, the command-line interface (Bash shell) shows the following output:

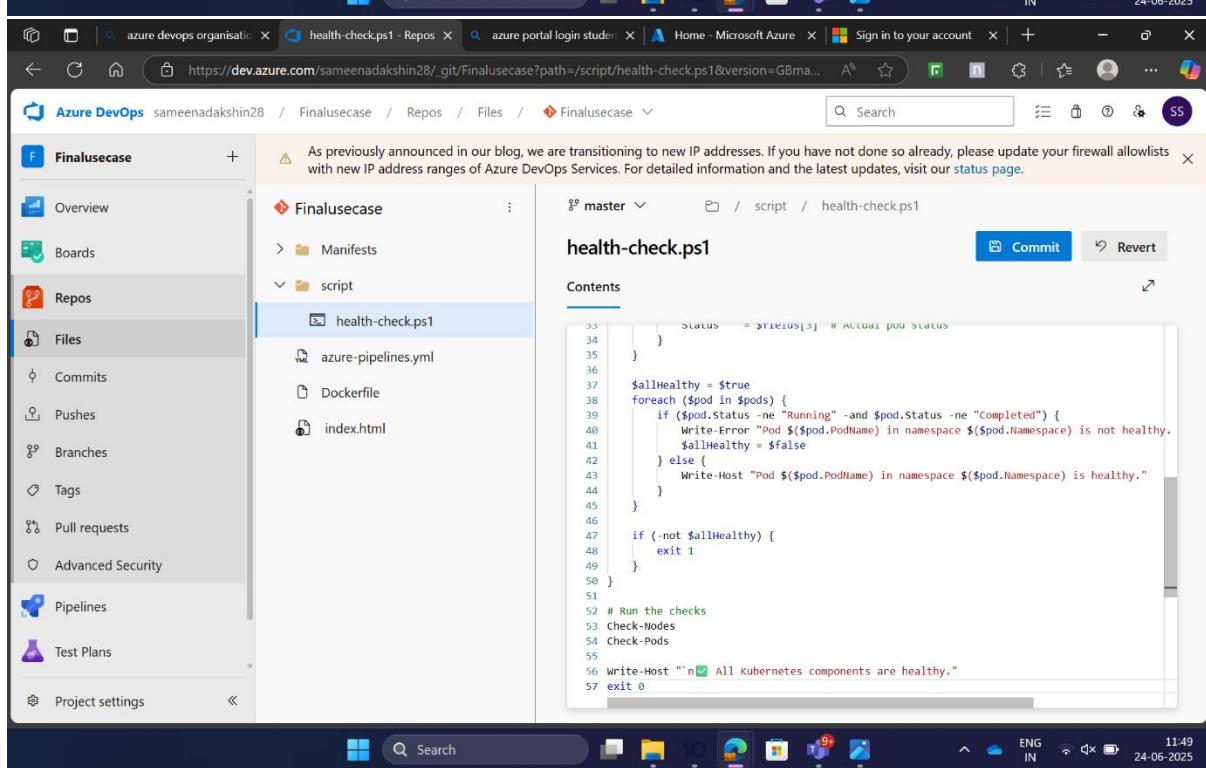
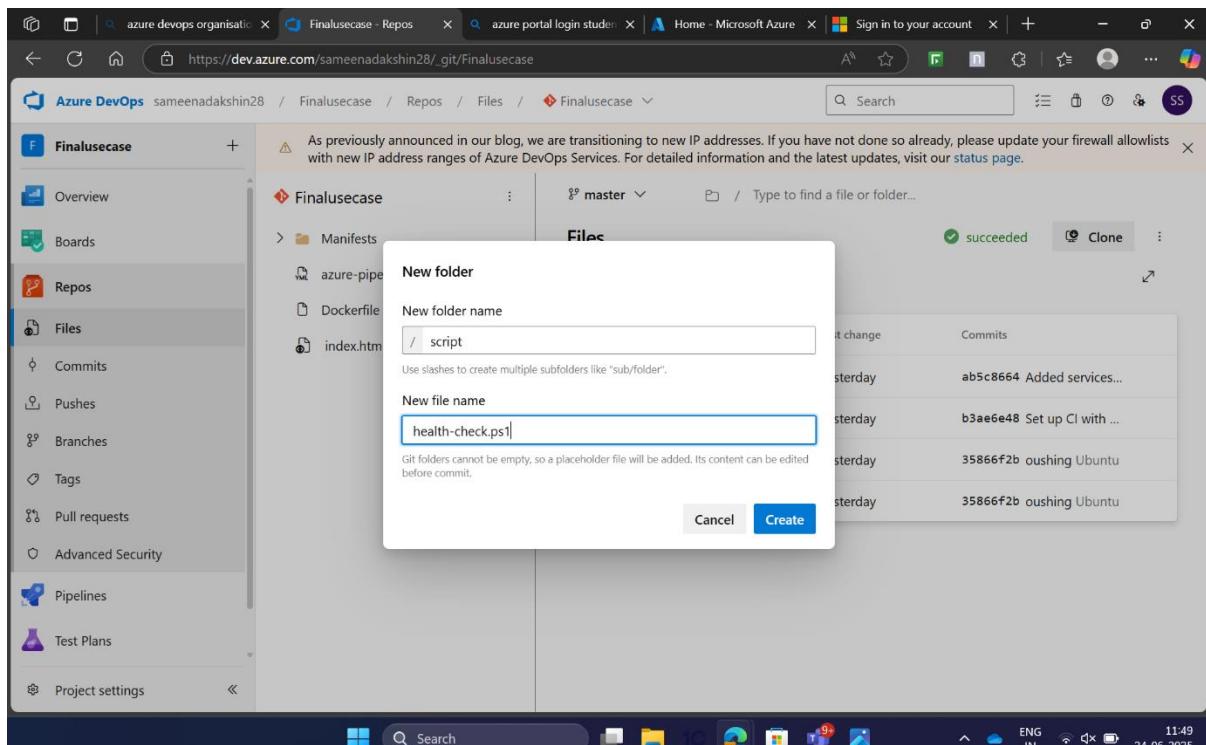
```
Tenant: Default Directory
Subscription: Azure for Students (dcc736d5-bb52-417d-97a4-20028b25455a)

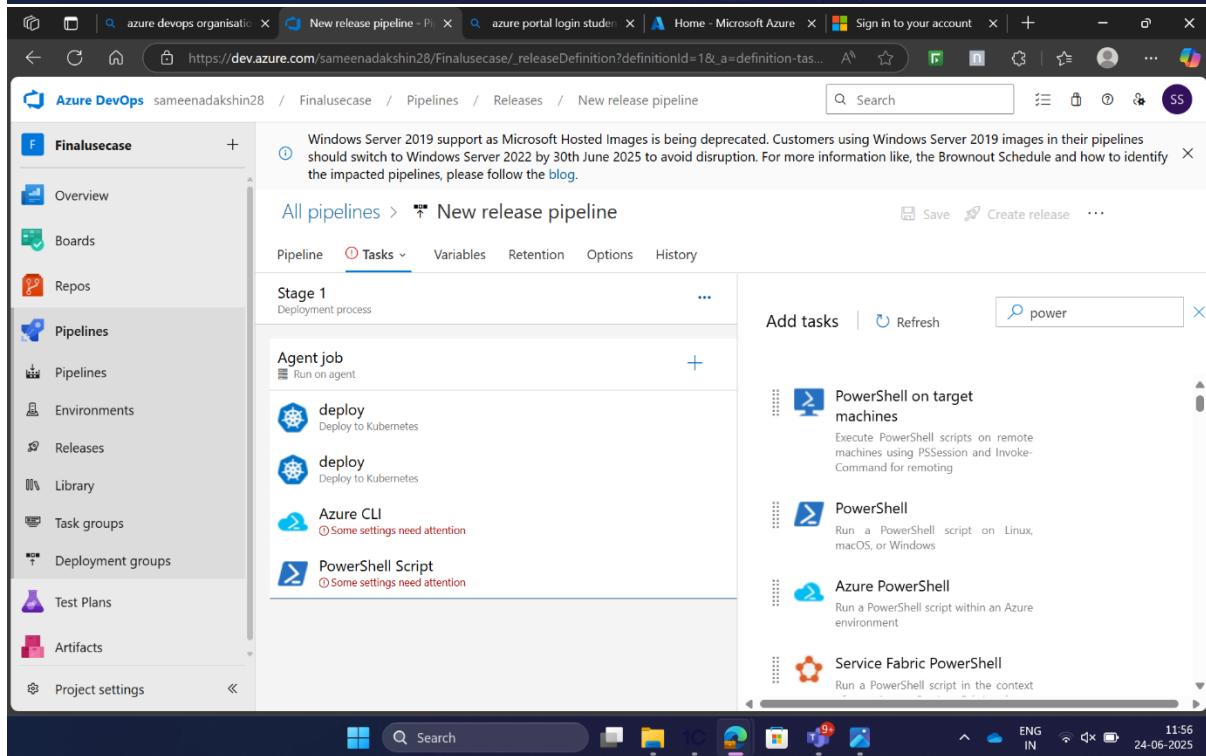
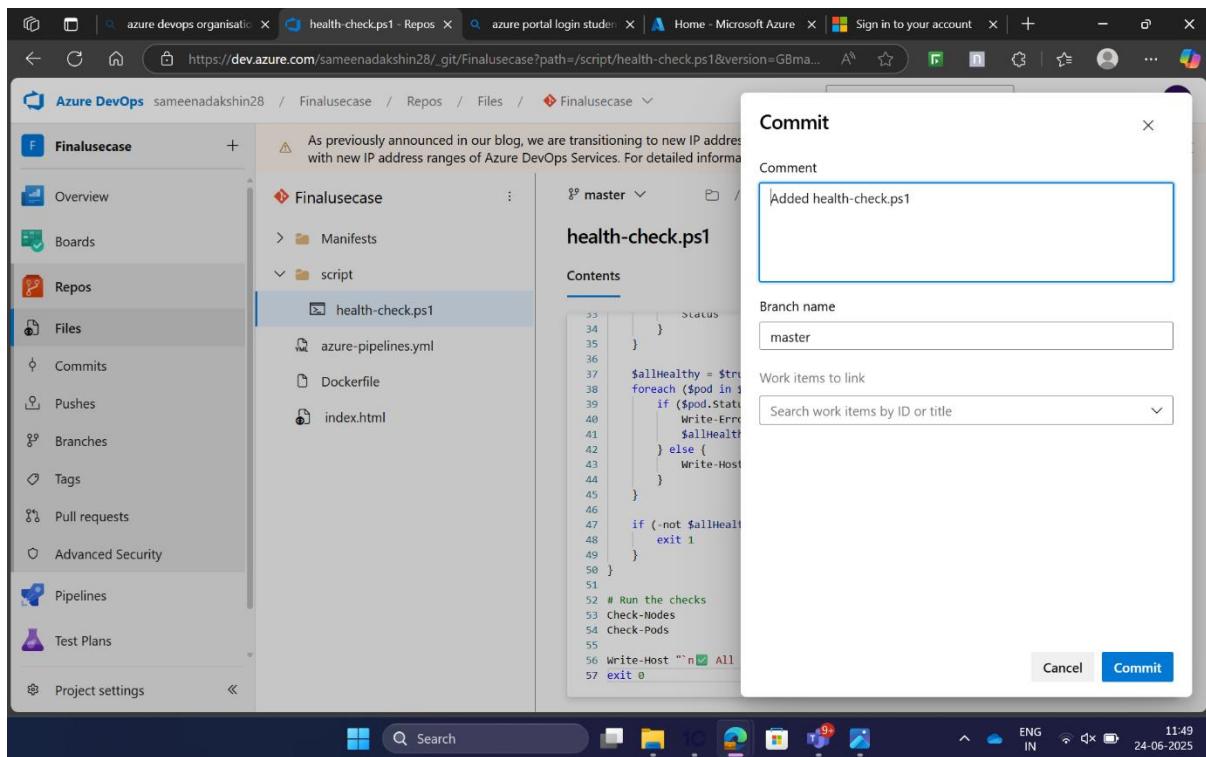
[Announcements]
With the new Azure CLI login experience, you can select the subscription you want to use more easily. Learn more about it and its configuration at https://go.microsoft.com/fwlink/?linkid=2271236

If you encounter any problem, please open an issue at https://aka.ms/azclibug

[Warning] The login output has been updated. Please be aware that it no longer displays the full list of available subscriptions by default.

sameena@Dev-VM:~$ az aks get-credentials --resource-group Dev-RG --name dev-aks
```





The screenshot shows the Azure DevOps Pipelines interface for a project named "Finalusecase". The "Tasks" tab is selected for the "Stage 1" deployment process. A "PowerShell Script" task is currently being configured. The task details pane on the right shows:

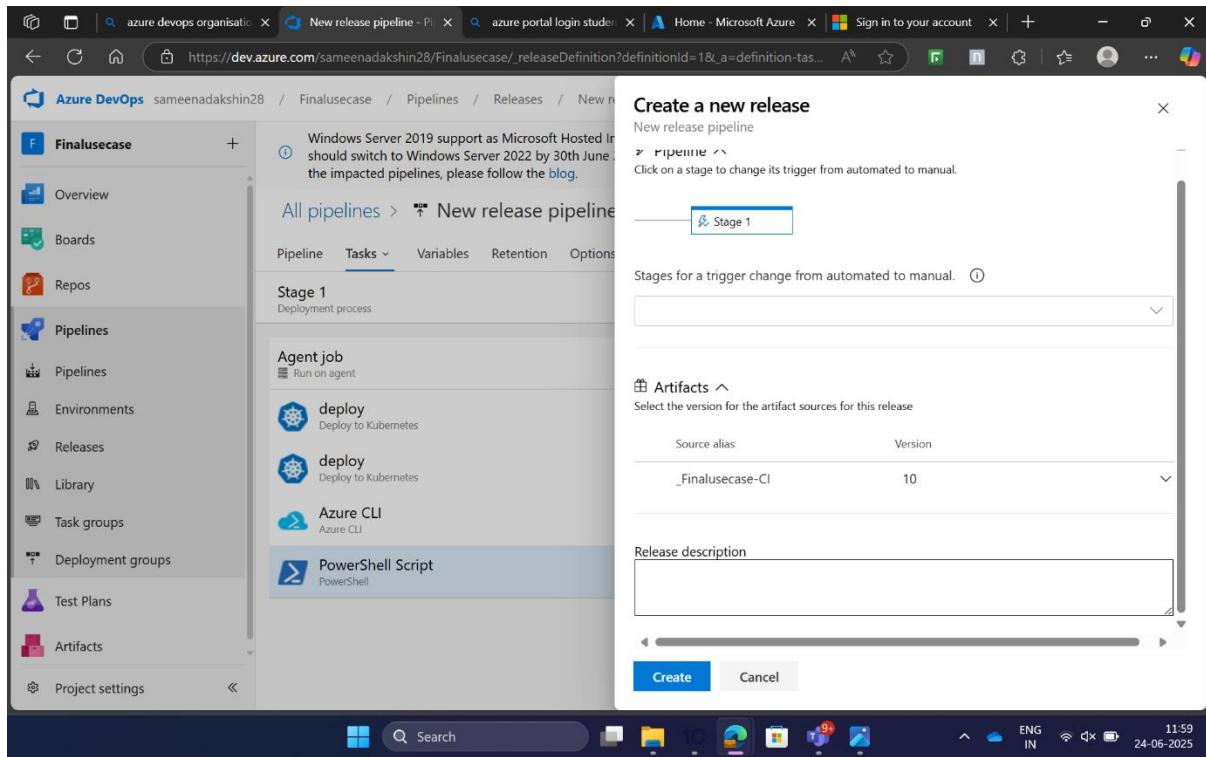
- Display name:** Azure CLI
- Azure Resource Manager connection:** Azure for Students (dcc736d5-bb52-417d-97a4-2002e)
- Script Type:** PowerShell Core
- Script Location:** Inline script
- Inline Script:** az aks get-credentials --resource-group Dev-RG --name dev-aks

The status bar at the bottom indicates the date and time as 24-06-2025, 11:58.

The screenshot shows the same Azure DevOps Pipelines interface, but the "PowerShell Script" task has been modified. The task details pane now shows:

- Type:** File Path (radio button selected)
- Script Path:** \$(System.DefaultWorkingDirectory)/_Finalusecase-CI/cdpipe/s/script/health-check.ps1
- Arguments:** (empty)

The status bar at the bottom indicates the date and time as 24-06-2025, 11:59.



```

PowerShell Script
Previous task | Next task | X

2025-06-24T06:30:27.7242378Z Generating script.
2025-06-24T06:30:27.7318397Z ===== Starting Command Output =====
2025-06-24T06:30:27.7351367Z [command]/usr/bin/pwsh -NoLogo -NoProfile -NonInteractive -Command . '/home/sameena/myagent/_work/_temp/10000000000000000000000000000000.ps1'
2025-06-24T06:30:28.1780597Z Checking Kubernetes Nodes...
2025-06-24T06:30:28.46162577 Node: aks-pool1-00740691-wmss000001 is healthy.
2025-06-24T06:30:28.4657182Z Checking Kubernetes pods...
2025-06-24T06:30:28.61781912 Pod nginx-deployment-cc49f8f9-2dh1w in namespace default is healthy.
2025-06-24T06:30:28.61785832 Pod nginx-deployment-cc49f8f9-d7vdv in namespace default is healthy.
2025-06-24T06:30:28.61788962 Pod nginx-deployment-cc49f8f9-garsc in namespace default is healthy.
2025-06-24T06:30:28.61791847 Pod azure-cns-w7775 in namespace kube-system is healthy.
2025-06-24T06:30:28.61791847 Pod azure-ip-masq-agent-mc8h8 in namespace kube-system is healthy.
2025-06-24T06:30:28.61797997 Pod azure-wi-webhook-controller-manager-759f7c8aff-4qghh in namespace kube-system is healthy.
2025-06-24T06:30:28.61801408 Pod azure-wi webhook-controller-manager-759f7c8aff-pkzjj in namespace kube-system is healthy.
2025-06-24T06:30:28.61804682 Pod cloud-node-manager-flplj in namespace kube-system is healthy.
2025-06-24T06:30:28.61974482 Pod coredns-57d88e0994-299k2 in namespace kube-system is healthy.
2025-06-24T06:30:28.61981837 Pod coredns-autoscaler-55bd0876cc-qj924 in namespace kube-system is healthy.
2025-06-24T06:30:28.61985080 Pod csi_azuredisk node_ndr8x in namespace kube-system is healthy.
2025-06-24T06:30:28.61991172 Pod csi-azurefile-node-wx5kf in namespace kube-system is healthy.
2025-06-24T06:30:28.61994187 Pod eraser_aks_pooli_20740693_wmss000001_dpbq in namespace kube-system is healthy.
2025-06-24T06:30:28.61997687 Pod eraser-controller-manager-8694d54d99_9x2k8 in namespace kube-system is healthy.
2025-06-24T06:30:28.62469442 Pod connectivity-agent-6dd4cd9d48_hu6sp in namespace kube-system is healthy.
2025-06-24T06:30:28.62476292 Pod kube-proxy-fc4jx in namespace kube-system is healthy.
2025-06-24T06:30:28.62479742 Pod metrics-server-5fcccfd75-6d8jv in namespace kube-system is healthy.
2025-06-24T06:30:28.62484142 Pod metrics-server-5fcccfd75-ppdfk in namespace kube-system is healthy.
2025-06-24T06:30:28.62555197 All Kubernetes components are healthy.
2025-06-24T06:30:28.69953952
2025-06-24T06:30:28.70456732 #[section]Finishing: PowerShell Script

```

Conclusion: This project successfully demonstrates a complete CI/CD pipeline implementation using Azure DevOps, Docker, Azure Container Registry (ACR), and Azure Kubernetes Service (AKS). Starting from building a static "Hello World" web application, I containerized it using Docker, pushed the image to ACR, and deployed it on AKS using Kubernetes manifests — all automated through Azure DevOps Classic Pipelines.

Through this end-to-end setup, I gained hands-on experience with:

Containerization and image management,

CI/CD automation, Kubernetes deployment workflows, Azure cloud services integration.