

App Modernization Labs

Azure Kubernetes Service

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Contents

Pre-Requisites	3
1. Create Resources	3
1.1 Create a resource group	3
1.2 Create a virtual network and subnets	4
1.3 Create Azure Container Registry	6
1.4 Create Azure Kubernetes Service instance.	8
2. Create a container application and deploy to AKS.....	14
3. Monitor the cluster using Azure Monitor.	18
4. Continuous Deployment using DevOps pipelines (GitHub)	19
5. Mount Azure File Share as a Kubernetes volume.....	26
5.3 Create a Kubernetes secret.....	29
5.4 Create a new image and push to Azure Container Registry	29
5.6 Create a deployment that references Azure File Share (using the file share name and Kubernetes secret)	30
5.6 Expose the deployment as a service.	31

Pre-Requisites

1. Azure Account with contributor access to the Azure subscription or Resource Group where AKS, Virtual Network, and other resources will be created.
2. GitHub account

1. Create Resources

In this lab, you will create a resource group in Azure, virtual network and subnets in Azure, Azure Kubernetes Service and an instance of Azure Container Registry.

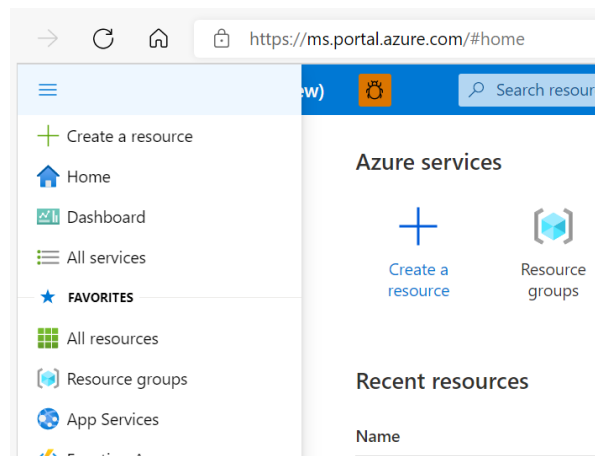
Steps:

Sign up / Log in to Azure Portal.

<http://portal.azure.com>

1.1 Create a resource group

From the menu on top left, select "Resource Groups". Click "+Create".



Specify a name for the resource group, and specify a location (for example, West Europe).

Create a resource group ...

[Basics](#) [Tags](#) [Review + create](#)

Resource group - A container that holds related resources for an Azure solution. The resource group can include all the resources for the solution, or only those resources that you want to manage as a group. You decide how you want to allocate resources to resource groups based on what makes the most sense for your organization. [Learn more](#)

Project details

Subscription *	Francis-Internal
Resource group *	rg-aksdemo

Resource details

Region *	(Europe) West Europe
----------	----------------------

Click "Review & Create", followed by "Create". The resource group should be created after this step.

1.2 Create a virtual network and subnets

Go to the resource group (click on the resource group name)
Click on +Create










From the menu, select "Networking"
Under "Virtual Networks", click "Create".

Recently created

Categories

- AI + Machine Learning
- Analytics
- Blockchain
- Compute
- Containers
- Databases
- Developer Tools
- DevOps
- Identity
- Integration
- Internet of Things
- IT & Management Tools
- Media
- Migration
- Mixed Reality
- Monitoring & Diagnostics
- Networking**
- Security

Popular Azure services [See more in All s](#)

	Application Gateway Create Learn more
	App Service Domain Create Learn more
	Public IP address Create Learn more
	Reserved IP Address Create Learn more
	Route table Create Learn more
	Traffic Manager profile Create Docs MS Learn
	Virtual network Create Docs MS Learn
	Virtual network gateway Create Learn more
	Virtual WAN Create Learn more

Provide a name for the resource (For example, vnet-aksdemo). Choose the region as same as the resource group's region. And Click "Next: IP Addresses>".

Project details

Subscription * ⓘ

Resource group * ⓘ [Create new](#)

Instance details

Name *

Region *

In the IP addresses tab, delete the default IPV4 Address Space.
Add an IPV4 address space: 20.0.0.0/22

click + Add Subnet

- Specify a name for the subnet: snet-aks
- Specify the IP address range: 20.0.0.0/24
- In the service end points, select "Microsoft.ContainerRegistry"

Click "Add" to add the subnet

Subnet name *

snet-aks

Subnet address range * ⓘ

20.0.0.0/24

20.0.0.0 - 20.0.0.255 (251 + 5 Azure reserved addresses)

NAT GATEWAY

Simplify connectivity to the internet using a network address translation gateway. Outbound connectivity is possible without a load balancer or public IP addresses attached to your virtual machines. [Learn more](#)

NAT gateway

None

SERVICE ENDPOINTS

Create service endpoint policies to allow traffic to specific azure resources from your virtual network over service endpoints. [Learn more](#)

Services ⓘ

Microsoft.ContainerRegistry

Basics **IP Addresses** Security Tags Review + create

The virtual network's address space, specified as one or more address prefixes in CIDR notation (e.g. 192.168.1.0/24).

IPv4 address space

20.0.0.0/22

☐ Add IPv6 address space ⓘ

The subnet's address range in CIDR notation (e.g. 192.168.1.0/24). It must be contained by the address space of the virtual network.

[+](#) Add subnet [🗑](#) Remove subnet

<input type="checkbox"/> Subnet name	Subnet address range	NAT gateway
<input type="checkbox"/> snet-aks	20.0.0.0/24	-

Click "Review & Create", and "Create" to create the virtual network with subnets.

1.3 Create Azure Container Registry

Go to the resource group (click on the resource group name)

Click on +Create
From the menu, select "Containers"

[Home](#) > [rg-aksdemo](#) >

Create a resource ...

Get Started

Recently created

Categories

AI + Machine Learning

Analytics


Blockchain


Compute


Containers

Search services

Popular Azure se


 Virtual m
[Create](#) | [Le](#)


 Kubernetes
[Create](#) | [D](#)


 Azure Co
[Create](#) | [D](#)


In the list of items, under "Container Registry", click on Create


Popular Azure services [See more in All services](#)


 **Kubernetes Service**
[Create](#) | [Docs](#) | [MS Learn](#)

 **Web App for Containers**
[Create](#) | [Docs](#) | [MS Learn](#)

 **Batch Service**
[Create](#) | [Docs](#) | [MS Learn](#)

 **Kubernetes - Azure Arc**
[Create](#) | [Learn more](#)

 **Container Instances**
[Create](#) | [Learn more](#)

 **Container Registry**
[Create](#) | [Docs](#) | [MS Learn](#)

Specify a unique name for the container registry (for example, acrdemo followed by few random numbers).

Select the region (select the same region of resource group).

Leave everything else to defaults, and click "Review & Create" followed by "Create".

Project details

Subscription *

Resource group * [Create new](#)

Instance details

Registry name * ☒ [.azurecr.io](#)

Location *

Availability zones ☐ Enabled

Availability zones are enabled on premium registries and in regions that support availability zones. [Learn more](#)

SKU *

Enable admin access to the container registry:

Open the container registry that got created, and in the left menu, select Settings -> Access Keys.

Toggle "Admin User" to Enabled.

Registry name

Login server

Admin user ☒ Enabled

Username

1.4 Create Azure Kubernetes Service instance.

Go to the resource group (click on the resource group name)

Click on +Create

From the menu, select "Containers"

Under Kubernetes Service, click "Create"

[Home](#) > [rg-aksdemo](#) >


Create a resource


Get Started

Recently created Popular Azure services [See more in All services](#)

Categories

- AI + Machine Learning
- Analytics
- Blockchain

**Kubernetes Service**
[Create](#) | [Docs](#) | [MS Learn](#)

**Web App for Containers**
[Create](#) | [Docs](#) | [MS Learn](#)

Provide a name for the cluster (for example, aks-demo)

Select the region (same as the resource group's region)

Leave the defaults for availability zones

Leave the defaults for Kubernetes version.

Leave the defaults for default node size.

For scale method, select "Auto Scale". Select minimum as 1 and maximum as 2.

Project details

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

Subscription * ⓘ Francis-Internal

Resource group * ⓘ rg-aksdemo
[Create new](#)

Cluster details

Kubernetes cluster name * ⓘ aks-demo ✓

Region * ⓘ (Europe) West Europe

Availability zones ⓘ Zones 1,2,3

Kubernetes version * ⓘ 1.20.9 (default)

Primary node pool

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

Node size * ⓘ **Standard DS2 v2**
[Change size](#)

Scale method * ⓘ ☐ Manual ☒ Autoscale

Node count range * ⓘ 1 2

Click "Next > Node Pools"

In the Node Pools screen, leave the defaults for node pools.

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

Node pools

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

[+ Add node pool](#) [Delete](#)

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

Enable virtual nodes

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

Enable virtual nodes ⓘ

☐

Enable virtual machine scale sets

Enabling virtual machine scale sets will create a cluster that uses virtual machine scale sets instead of individual virtual machines for the cluster nodes. Virtual machine scale sets are required for scenarios including autoscaling, multiple node pools, and Windows support. [Learn more about virtual machine scale sets in AKS](#)

Enable virtual machine scale sets ⓘ

☒

i Virtual machine scale sets are required for availability zones

Click "Next > Authentication"

Leave the defaults for authentication.

[Basics](#)[Node pools](#)[Authentication](#)[Networking](#)[Integrations](#)[Tags](#)[Review + create](#)

Cluster infrastructure

The cluster infrastructure authentication specified is used by Azure Kubernetes Service to manage cloud resources attached to the cluster. This can be either a [service principal](#) or a [system-assigned managed identity](#).

Authentication method

☐

Service principal

☒

System-assigned managed identity

Kubernetes authentication and authorization

Authentication and authorization are used by the Kubernetes cluster to control user access to the cluster as well as what the user may do once authenticated. [Learn more about Kubernetes authentication](#)

Role-based access control (RBAC) ⓘ

☒

Enabled

☐

Disabled

AKS-managed Azure Active Directory ⓘ

☐

Node pool OS disk encryption

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

Encryption type

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



Click "Next: Networking>"

Change the network plugin from kubenet to Azure CNI.

Select the VNET you created earlier.

Select the Subnet you created earlier.

For network policies, select "Calico".


Create Kubernetes cluster ...

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

Network configuration ⓘ

☐ Kubenet

☒ Azure CNI

i The Azure CNI plugin requires an IP address from the subnet below for each pod on a node, which can more quickly exhaust available IP addresses if a high value is set for pods per node. Consider modifying the default values for pods per node for each node pool on the "Node pools" tab. [Learn more](#) 

Virtual network * ⓘ

vnet-aksdemo ▼

[Create new](#)

Cluster subnet * ⓘ

snet-aks (20.0.0.0/24) ▼

[Manage subnet configuration](#)

Kubernetes service address range * ⓘ

10.0.0.0/16 ✓

Kubernetes DNS service IP address * ⓘ

10.0.0.10

Docker Bridge address * ⓘ

172.17.0.1/16 ✓

DNS name prefix * ⓘ

aks-demo-dns ✓

Traffic routing

Load balancer ⓘ

Standard

Enable HTTP application routing ⓘ

☐

Security

Enable private cluster ⓘ

☐

Set authorized IP ranges ⓘ

☐

Network policy ⓘ

☐ None

☒ Calico

☐ Azure

Select "Next: Integrations>"

Select the container registry you created earlier.

Leave container monitoring as enabled.


Select Azure Policy to Enabled.

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

Connect your AKS cluster with additional services.

Azure Container Registry

Connect your cluster to an Azure Container Registry to enable seamless deployments from a private image registry. You can create a new registry or choose one you already have. [Learn more about Azure Container Registry](#)

Container registry 
[Create new](#)

Azure Monitor

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

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

[Learn more about pricing](#)

Container monitoring ☒ Enabled ☐ Disabled

Log Analytics workspace ⓘ 
[Create new](#)

Azure Policy

Apply at-scale enforcements and safeguards for AKS clusters in a centralized, consistent manner through Azure Policy.

[Learn more about Azure Policy for AKS](#)

Azure Policy ☒ Enabled ☐ Disabled

Click "Review & Create", and "Create".

2. Create a container application and deploy to AKS

In the following lab, we are going to create a HTML based container application (with NGINX container image as the base layer).

- a. On the top blue ribbon, click on "Cloud Shell" button.



Select "Bash" as the environment.

- b. Create an HTML file index.html by using the following command:

code index.html

- Copy the following contents to the file

```
<html>
  <body>
    <div align="center">
      <font size="20px">Welcome!</font>
    </div>
  </body>
</html>
```

- Save the file (CTRL + S)
- Exit out of code (CTRL + Q)

- c. Create Dockerfile using the following command:

code Dockerfile

- Copy the following contents to Dockerfile

```
FROM nginx
COPY index.html /usr/share/nginx/html
```

- Save the file (CTRL + S)
- Exit out of code (CTRL + Q)

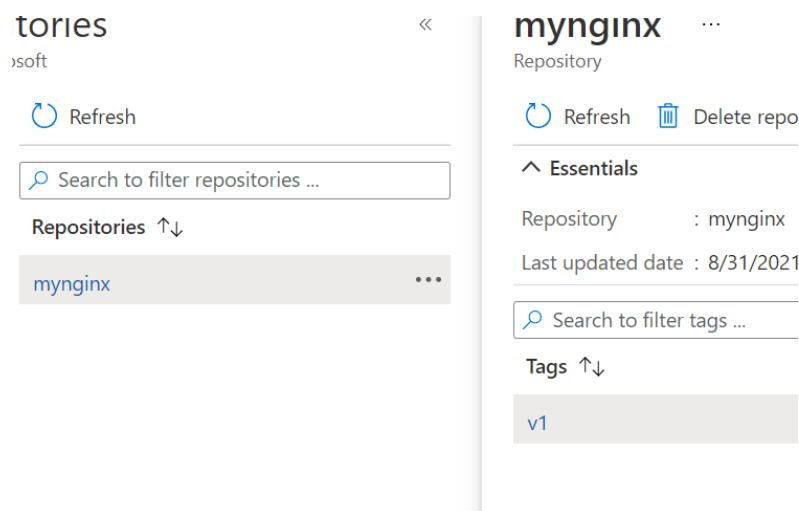
- d. Build the docker image and push the docker image to the container registry using the following command

az acr build --registry <<Azure Container Registry Name>> --image mynginx:v1 .

For example,

az acr build --registry acrdemo232.azurecr.io --image mynginx:v1 .

- e. In the container registry, select "Services -> Repositories". View the container image that was uploaded.



- f. In the cloud shell, run the following command (to merge Kubernetes context).

az aks get-credentials --resource-group <<resource group name>> --name <<AKS cluster name>>

For example,

az aks get-credentials --resource-group rg-aksdemo --name aks-demo

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

Welcome to Azure Cloud Shell

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

francis@Azure:~$
francis@Azure:~$
francis@Azure:~$
francis@Azure:~$ az aks get-credentials --resource-group rg-aksdemo --name aks-demo
Merged "aks-demo" as current context in /home/francis/.kube/config
francis@Azure:~$
```

g. Check the Kubernetes cluster status

kubectl get nodes -o wide

h. Create a deployment using the container image we uploaded

kubectl create deploy hello-deploy --image <repository name>/<image>:<tag> --replicas=3

For example,

kubectl create deploy hello-deploy --image acrdemo232.azurecr.io/mynginx:v1 --replicas=3

i. Check the pods deployed

kubectl get pods

You should see 3 pods in the running state.

```
francis@Azure:~$ kubectl create deploy hello-deploy --image acrdemo232.azurecr.io/mynginx:v1 --replicas=3
deployment.apps/hello-deploy created
francis@Azure:~$ kubectl get pods
NAME                                READY   STATUS    RESTARTS   AGE
hello-deploy-f6bff5f76-2d9kv        1/1     Running   0           82s
hello-deploy-f6bff5f76-sd5hp        1/1     Running   0           82s
hello-deploy-f6bff5f76-sxm46        1/1     Running   0           82s
```

j. Expose the deployment as a Kubernetes service (a load balancer with a public IP, which distributes the load to the three pods).

kubectl expose deploy hello-deploy --port=80 --target-port=80 --type=LoadBalancer

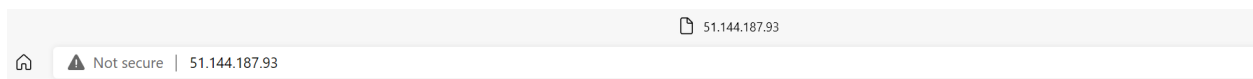
k. Check the IP address of the service that got created, using the command:

kubectl get services

```
^Cfrancis@Azure:~$ kubectl get services
NAME          TYPE          CLUSTER-IP    EXTERNAL-IP    PORT(S)          AGE
hello-deploy  LoadBalancer  10.0.124.128  51.144.187.93  80:32331/TCP     47s
kubernetes    ClusterIP      10.0.0.1      <none>         443/TCP          16h
```

l. Access the public IP address in a browser

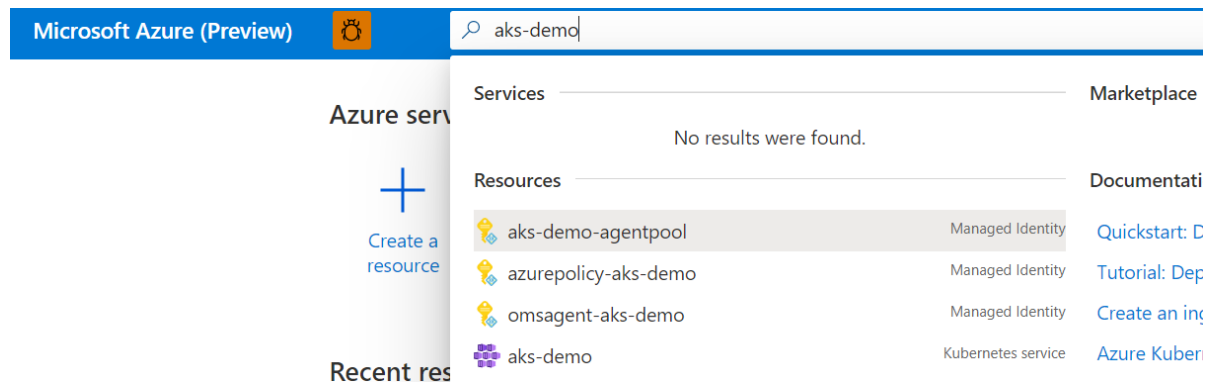
You should see the welcome page rendered in the browser.



Welcome!

3. Monitor the cluster using Azure Monitor.

- a. Search for the cluster name in the Azure portal's search bar.



- b. Click on the Kubernetes service name to go to the cluster view.
- c. In the left menu, select Kubernetes resources -> Namespaces
- d. Select (click on) the default namespace, and select "View Events".
- e. Go back to the cluster view, and select Kubernetes resources -> Workloads
- f. Click on the deployment we created (hello-deploy)
- g. Select one of the pods, and try deleting the pod.
- h. While on the deployments screen, on the left menu, view events
- i. While on the deployments screen, on the left menu, select "Insights".
- j. Expand the controller name to see the container details.
- k. Go back to the cluster view, and select Kubernetes resources -> Services and ingresses
- l. View the details of the service we created (hello-deploy)
Please observe the cluster IP, external IP, and the ports / pods
- m. Go back to the cluster view, and select Monitoring -> Insights
Observe the following tabs:
- Cluster
 - Reports -> Resource Monitoring -> Deployments
 - Nodes
 - Controllers (observe the hello-deploy controller)
 - Containers (observe the mynginx containers)
- n. Go back to the cluster view, and select "Advisor Recommendations"

o. Go back to cluster view, and select Monitoring -> Metrics

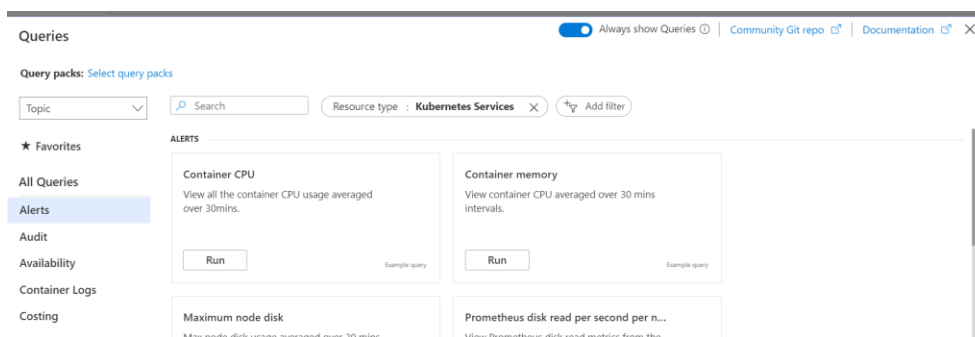
For the metric, select "CPU usage millicores", and observe the graph.

p. Go back to the cluster view, and select Monitoring -> Alerts

- o Click "+New Alert Rule"
- o For the condition, click "Add condition" and select "CPU Usage Percentage"
- o On the alert logic, select the threshold value of 70
- o Explore the action group, etc. But don't create the alert rule.

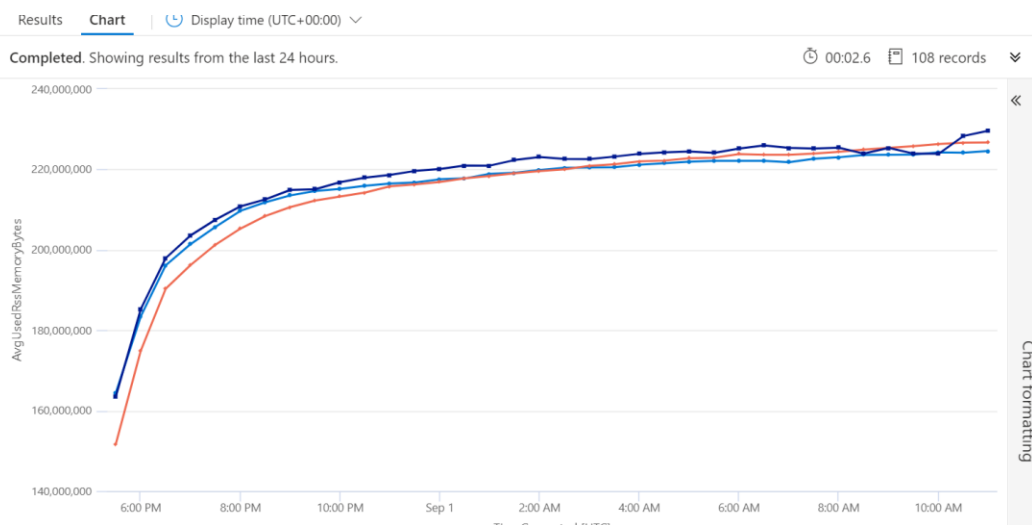
q. Go back to cluster view, and select Monitoring -> Logs

Click on Container Memory -> Run



For the query results, select "Chart".

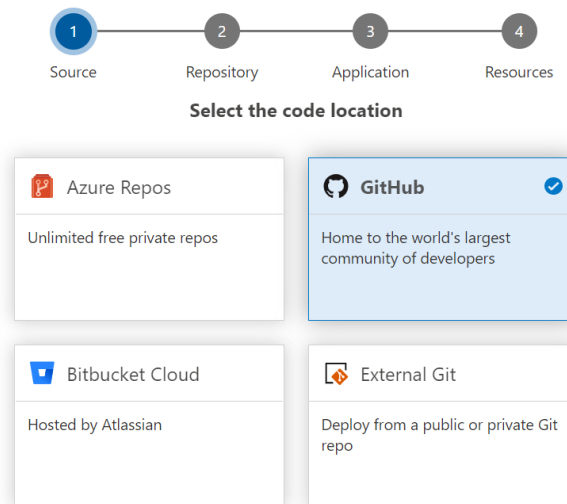
You should see a graph of container memory usage



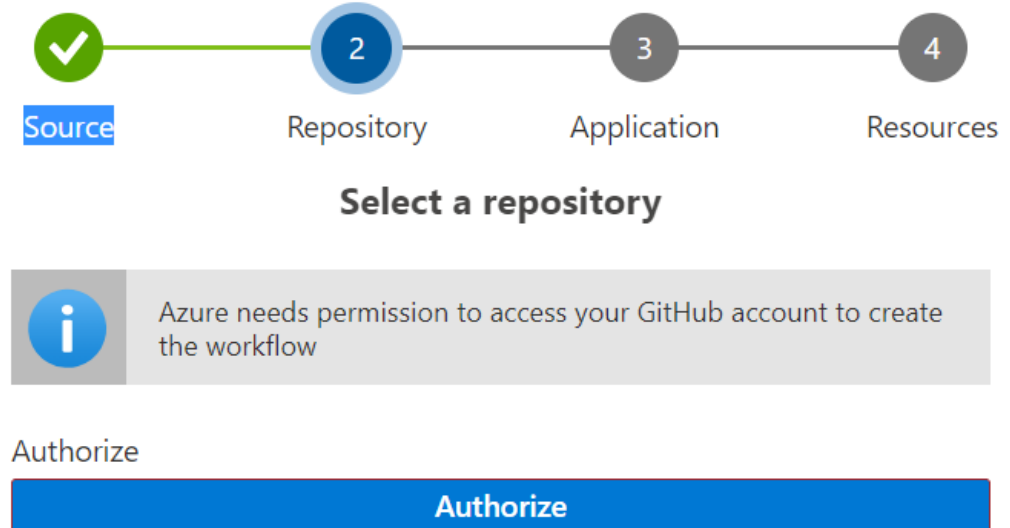
4. Continuous Deployment using DevOps pipelines (GitHub)

1. Signup / login to your GitHub account (www.github.com)

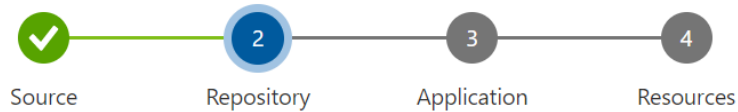
2. Fork the following repository -> [francisnazareth/hello \(github.com\)](https://github.com/francisnazareth/hello)
3. In the Azure Portal, search for the Kubernetes cluster you created and go to the settings -> Deployment Center
4. Click on (+Add Projects)
5. In the source, select "GitHub" and click Next



6. In the repository screen, click on "Authorize" to authorize azure to access GitHub.



7. Once authorization is done, select the repository you forked



Select a repository

My repositories All repositories

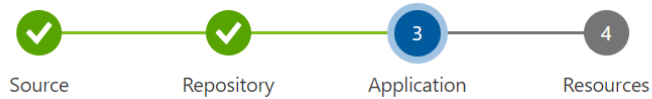
Repository *

francisnazareth/hello

Branch *

master

8. In the next screen, accept the defaults (deployment center automatically detects the Dockerfile).



Confirm application settings

Detected the following Dockerfile

Dockerfile path *

/Dockerfile

/Dockerfile

```
1 FROM nginx
2 COPY index.html /usr/share/nginx/html
3 COPY cloud_skills.jpg /usr/share/nginx/html
```

We have detected the following values from your Dockerfile. Please update if required.

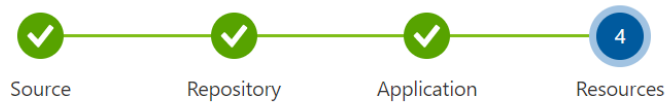
Port *

80

Docker build context * ⓘ

/

9. Accept the defaults for the namespace, select the Azure Container Registry that you created, and click "Done".



Almost there!

A pipeline is chosen automatically. You can change pipeline settings [here](#).

Namespace

Namespace *

Create new Use existing

Name *

aks-demo ✓

Container Registry

Container Registry *

Create new Use existing

Name *

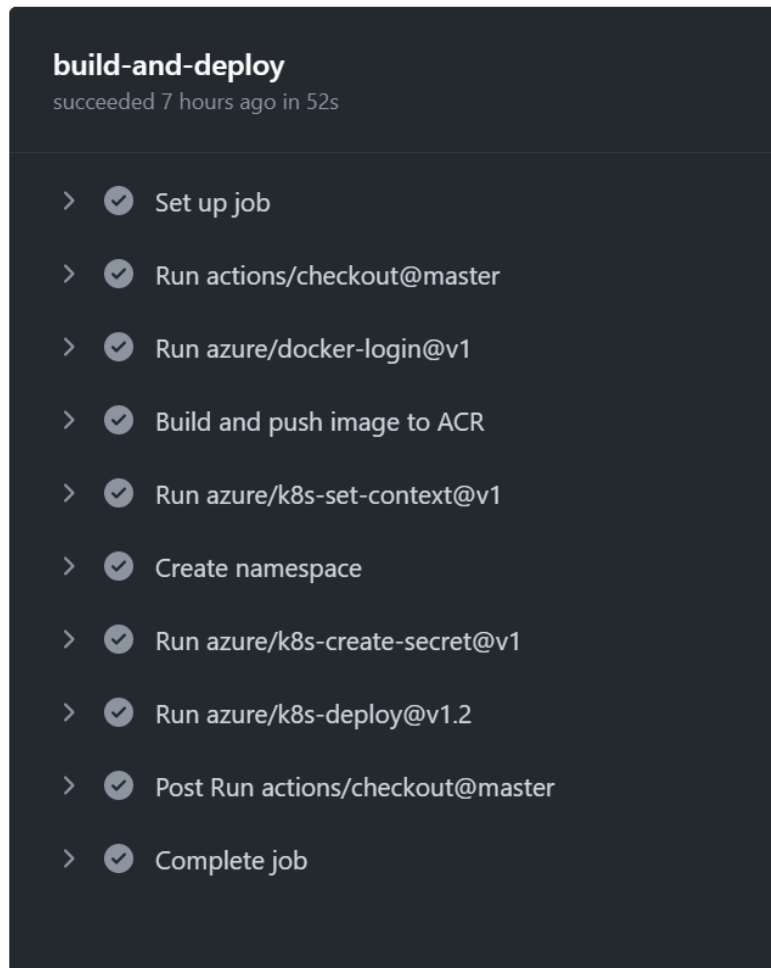
acrdemo232 ✓

10. In the project in deployment center, click on "View all runs"
11. This will take you to GitHub page. Click on the "Build & Deploy" GitHub action.

deploytoAksCluster.yml
on: push

✓ build-and-deploy 52s

12. You should be able to view the pipeline steps that got executed.



13. In Azure Portal, within Deployment Center, view the manifest files deployment.yml and service.yml that got generated.

Namespace	Dockerfile	Manifest	Pipeline	Repository	Updated
aks-demob7f1	Dockerfile fnacr100.azurecr.io	deployment.yml service.yml	deploytoAksCluster.yml	hello 🐳 master	6 minutes ago (View all runs)

Also, make a note of the namespace that got generated.

14. In Azure Portal, within the cluster view, select "Kubernetes Resources -> Services and Ingresses". In Filter by namespace field select the namespace where deployment center created resources.

[+ Add](#)
[Delete](#)
[Refresh](#)
[Show labels](#)


[Services](#)
[Ingresses](#)


Filter by service name:
 Filter by namespace:


<input type="checkbox"/>	Name	Namespace	Status	Type	Cluster IP	External IP	Ports	Age ↓
<input type="checkbox"/>	aksdemo-b06d	aks-demob7f1	🟢 Ok	LoadBalancer	10.0.63.123	20.76.166.162 🌐	80:30127/TCP	7 hours

15. Click on the External IP to view the container application.

16. Go back to GitHub, go to "Code" tab, and select the file "index.html"

 master ▾


 1 branch






 0 tags

Go to file

Add file ▾

Code ▾

 francisnazareth Adding workflow file ✖ 7e57ad0 12 minutes ago 🕒 9 commits

 .github/workflows	Adding workflow file	12 minutes ago
 manifests	Workflow asset	12 minutes ago
 Dockerfile	caps	3 days ago
 cloud_skills.jpg	first commit	3 days ago
 index.html	first commit	3 days ago

17. Edit the file (using the pencil icon)

9 lines (9 sloc) | 200 Bytes

RawBlame📄✎🗑


```
1 <html>
2   <body>
3     <div align="center">
4       <font size="20px">Welcome!</font>
5     <p/>
6     
7   </div>
8 </body>
9 </html>
```

18. Edit the "Welcome!" text (in line 4) to something else, and click on "Commit Changes".

hello / in master

<> Edit file Preview changes

```
1 <html>
2   <body>
3     <div align="center">
4       <font size="20px">Hello World!</font>
5     <p/>
6     
7   </div>
8 </body>
9 </html>
```



Commit changes



Update index.html

Add an optional extended description...

☒ Commit directly to the master branch.
☐ Create a new branch for this commit and start a pull request. [Learn more about pull requests.](#)


Commit changes Cancel

19. Go to the Actions tab, and view the workflow executing.

Triggered via push 1 minute ago	Status	Total duration	Artifacts
 francisnazareth pushed  e5655b9 master	Success	46s	—

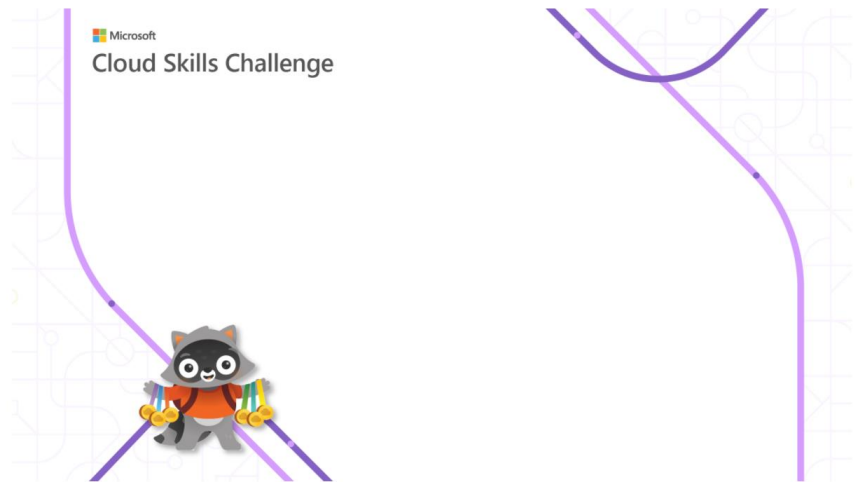
deploytoAksCluster.yml

on: push

 build-and-deploy 33s

20. Refresh the web browser page with the Kubernetes service IP (from step 15). You should see the Kubernetes service referring to new container (built from the modified HTML file).

Hello World!



5. Mount Azure File Share as a Kubernetes volume

5.1 Create a storage account

1. Create an azure storage account (search for storage accounts), click on +Create.
2. Provide a unique name for the storage account.
3. Select the resource group, and select the same region as that of resource group.
4. Select the performance as standard
5. Select the redundancy as Locally Redundant Storage (LRS)

Project details

Select the subscription in which to create the new storage account. Choose a new or existing resource group to organize and manage your storage account together with other resources.

Subscription *

Resource group * [Create new](#)

Instance details

If you need to create a legacy storage account type, please click [here](#).

Storage account name ⓘ *

Region ⓘ *

Performance ⓘ * ☒ Standard: Recommended for most scenarios (general-purpose v2 account)
☐ Premium: Recommended for scenarios that require low latency.

Redundancy ⓘ *

Click on "Review & Create", and Create.

5.2 Create a file share and upload an image to file share.

Once the storage account is provisioned, click on "Go to resource" to view properties of the storage account.

Create a file share within the storage account.

- In Data storage -> file shares, click (+FileShare) to create a file share.
- Provide a name (images) to the file share. And click Create.

New file share

Name *

images

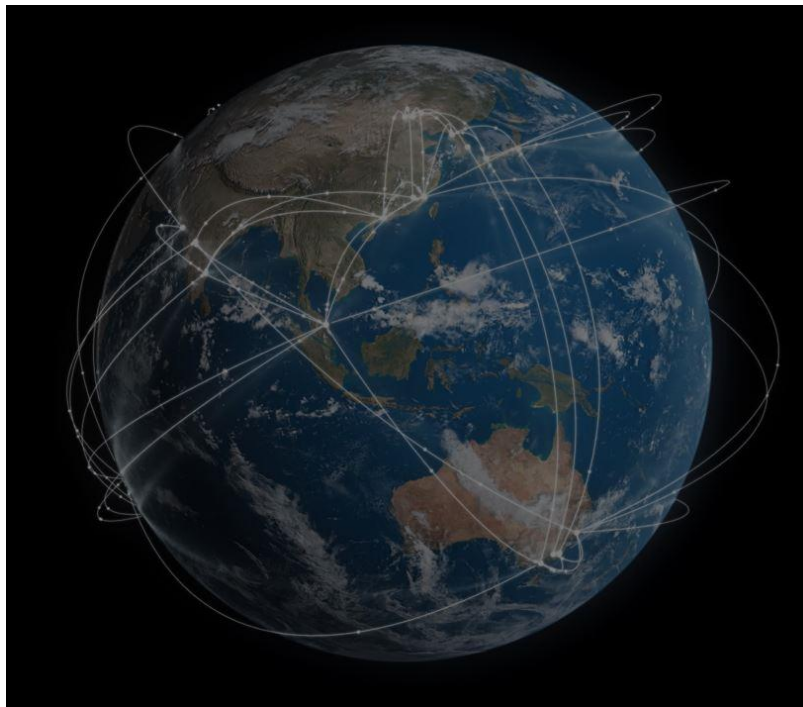
Tier ⓘ

Transaction optimized

Performance

Maximum IO/s ⓘ	1000
Egress Rate ⓘ	60 MiBytes / s
Ingress Rate ⓘ	60 MiBytes / s
Maximum capacity	5 TiB
Large file shares	Disabled

Save the following picture as file "world.jpg" on your local machine.



- In Azure Portal, once the Azure file share is created, click on "Upload" to upload an image.
- Upload the image that you just saved to Azure File Share.

Copy the access key of storage account

- In the storage account, Go to "Security + Networking" -> Access Keys, and click on "Show Keys". Copy the value of key1.

Make a note of the following values:

1. Storage Account name
2. File Share name
3. Access Key of the storage account.

5.3 Create a Kubernetes secret.

In the cloud shell, create a Kubernetes secret using the following command:

```
kubectrl create secret generic azure-file-secret --from-literal=azurestorageaccountname=<<storage account name>> --from-literal=azurestorageaccountkey=<<storage account key>>
```

For example,

```
kubectrl create secret generic azure-file-secret --from-literal=azurestorageaccountname=saaksdemo9234 --from-literal=azurestorageaccountkey=NI7AJNUcL7Jwl59fMFYbMcR+fejoBIyjV2q0sgL8WLozjTDlyz2W9vifrmJti025pF3r7Ya3NubUuuFeg97FRA==
```

5.4 Create a new image and push to Azure Container Registry

Modify the HTML file (index.html) as follows:

```
<html>
  <body>
    <div align="center">
      <font size="20px">Welcome!</font>
      <p/>
      
    </div>
  </body>
```

</html>

Build a new image and push to the Azure Container Registry

az acr build --registry <<registry name>> --image <<image name>>:<<tag>>

For example,

az acr build --registry acrdemo232.azurecr.io --image nginx-mount:v1 .

5.6 Create a deployment that references Azure File Share (using the file share name and Kubernetes secret)

Create a deployment YAML file using the following command:

kubectl create deploy world-deploy --image <<registry URL>>/<<image>>:<<tag>> --replicas=3 --dry-run=client -o yaml > world-deploy.yaml

For example,

kubectl create deploy world-deploy --image acrdemo232.azurecr.io/nginx-mount:v1 --replicas=3 --dry-run=client -o yaml > world-deploy.yaml

Edit the file

code world-deploy.yaml

Add the sections volumeMounts and volumes as follows:

(Note: correct spaces – indentation – is important in YAML files).

```
apiVersion: apps/v1
kind: Deployment
metadata:
  creationTimestamp: null
  labels:
    app: hello-deploy
    name: hello-deploy
spec:
```

```

replicas: 3
selector:
  matchLabels:
    app: hello-deploy
strategy: {}
template:
  metadata:
    creationTimestamp: null
    labels:
      app: hello-deploy
  spec:
    containers:
      - image: acrdemo232.azurecr.io/nginx-mount:v1
        name: mynginx
        resources: {}
        volumeMounts:
          - name: my-images
            mountPath: /usr/share/nginx/html/images
    volumes:
      - name: my-images
        azureFile:
          secretName: azure-file-secret
          shareName: images
          readOnly: false
status: {}

```

Save & Quit (CTRL + S, followed by CTRL + Q)

Apply the YAML file

`kubectl apply -f world-deploy.yaml`

5.6 Expose the deployment as a service.

Expose the deployment as a Kubernetes service:

kubectl expose deploy world-deploy --port=80 --type=LoadBalancer

View the public IP address for the service:

`kubectl get svc`

Access the IP address in a browser, you should be able to see the web site with image loaded from Azure Storage account.

(Note: We mounted the azure file share to container in the path `/usr/share/nginx/html/images`. Hence an HTML file in the path `/usr/share/nginx/html/` is able to access the image as `/images/world.jpg`).

■ End of Lab