

How to deploy to Azure Kubernetes AKS a Web API .NET 8

1. Prerequisites

Install kubectl command in Windows: <https://kubernetes.io/docs/tasks/tools/install-kubectl-windows/>

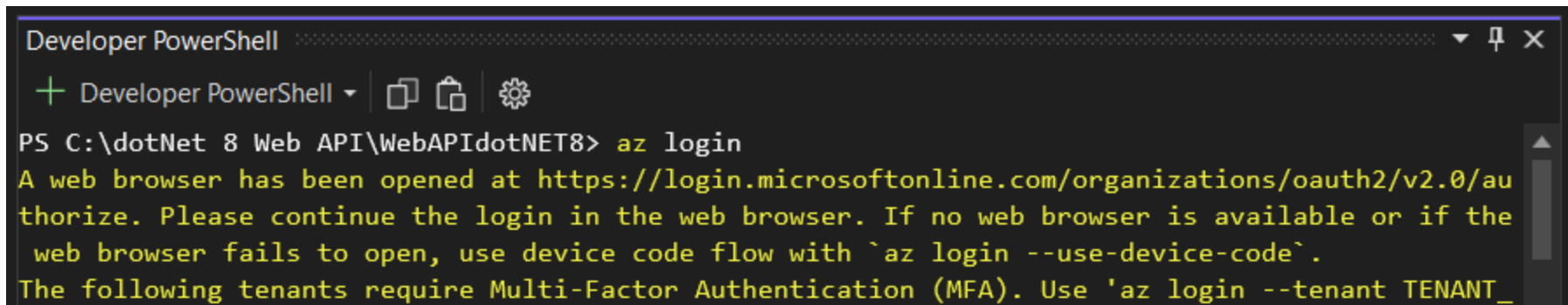
Download and Install Docker Desktop: <https://docs.docker.com/desktop/install/windows-install/>

Install Azure CLI: <https://learn.microsoft.com/en-us/cli/azure/install-azure-cli-windows>

2. Create Azure Container Registry (ACR)

2.1. Login in to Azure:

```
az login
```



```
Developer PowerShell
+ Developer PowerShell | [Icons]
PS C:\dotNet 8 Web API\WebAPIdotNET8> az login
A web browser has been opened at https://login.microsoftonline.com/organizations/oauth2/v2.0/authorize. Please continue the login in the web browser. If no web browser is available or if the web browser fails to open, use device code flow with `az login --use-device-code`.
The following tenants require Multi-Factor Authentication (MFA). Use 'az login --tenant TENANT_
```

2.2. Create a ResourceGroup:

```
az group create --name myRG --location westeurope
```

```
Developer PowerShell
+ Developer PowerShell | [Icons]
PS C:\dotNet 8 Web API\WebAPIdotNET8> az group create --name myRG --location westeurope
{
  "id": "/subscriptions/846901e6-da09-45c8-98ca-7cca2353ff0e/resourceGroups/myRG",
  "location": "westeurope",
  "managedBy": null,
  "name": "myRG",
  "properties": {
    "provisioningState": "Succeeded"
  },
  "tags": null,
  "type": "Microsoft.Resources/resourceGroups"
}
PS C:\dotNet 8 Web API\WebAPIdotNET8>
```

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

Home > Resource groups particular (luiscocoenriquezhotmail.onmicrosoft.com)

+ Create Manage view Refresh Export to CSV Open query Assign tags

Filter for any field... Subscription equals all Location equals all Add filter

Showing 1 to 1 of 1 records. No grouping List view

<input type="checkbox"/> Name ↑↓	Subscription ↑↓	Location ↑↓	
<input type="checkbox"/> myRG	Azure subscription 1	West Europe	...

2.3. Create an ACR instance (Note: only use lowercase letters for the ACR name):

```
az acr create --resource-group myRG --name myregistryluiscoco1974 --sku Basic --location westeurope
```

Microsoft Azure

Search resources, services, and docs (G+)

Home > Resource groups > myRG

Resource groups

particular (luiscocoenriquezhotmail.onmicrosoft.c...)

+ Create Manage view ...

Filter for any field...

myRG

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Security

Deployment stacks

Policies

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Subscription (move) [Azure subscription 1](#)

Subscription ID: 846901e6-da09-45c8-98ca-7cca2353ff0e

Tags (edit) [Add tags](#)

Deployments [No deployments](#)

Location: West Europe

Resources Recommendations

Filter for any field...

Type equals all X Location equals all X Add filter

Showing 1 to 1 of 1 records. ☐ Show hidden types ⓘ

No grouping List view

Name ↑↓	Type ↑↓	Location ↑↓
myregistryluiscoco1974	Container registry	West Europe

Microsoft Azure

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Home > Resource groups > myRG > myregistryluiscoco1974

myregistryluiscoco1974

Container registry

Search

Move Delete

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Resource group (move) : myRG

Location : West Europe

Subscription (move) : [Azure subscription 1](#)

Subscription ID : 846901e6-da09-45c8-98ca-7cca2353ff0e

Soft delete (Preview) : [Disabled](#)

Tags (edit) : [Add tags](#)

Login server : myregistryluiscoco1974.azurecr.io

Creation date : 12/13/2023, 2:11 PM GMT+1

Provisioning state : Succeeded

Pricing plan : Basic

Get started Monitoring Capabilities (9) Tutorials

2.4. Set the Admin user in the ACR and copy the username and password:

The screenshot shows the Azure portal interface for a Container Registry. The left sidebar contains navigation options like 'Create a resource', 'Home', 'Dashboard', 'All services', and 'FAVORITES'. The main area displays the 'Access keys' for the registry 'myregistryluiscoco1974'. The 'Admin user' checkbox is checked. The 'Username' is 'myregistryluiscoco1974'. The 'password' and 'password2' fields are highlighted with a red box. A notification in the top right corner states 'Admin user activated' and 'myregistryluiscoco1974' is now an admin.

3. Build and Push Docker image

3.1. Navigate to your project

```
cd path/to/your/project
```

3.2. Log in to ACR:

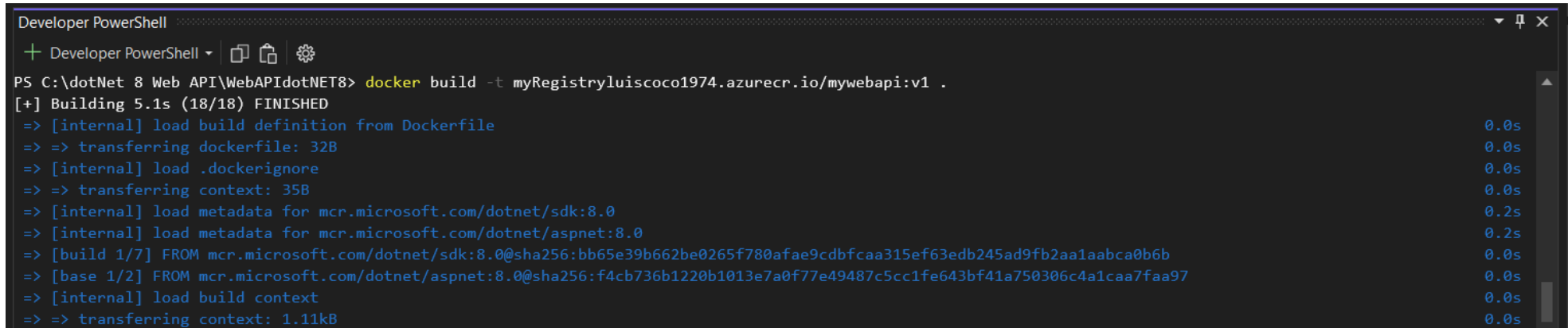
```
az acr login --name myregistryluiscoco1974
```

```
PS C:\dotNet 8 Web API\WebAPIdotNET8> az acr login --name myregistryluiscoco1974
Unable to get AAD authorization tokens with message: 2023-12-13 13:23:54.151641 An error occurred: CONNECTIVITY_REFRESH_TOKEN_ERROR
Access to registry 'myregistryluiscoco1974.azurecr.io' was denied. Response code: 401. Please try running 'az login' again to refresh permissions.
Unable to get admin user credentials with message: The resource with name 'myregistryluiscoco1974' and type 'Microsoft.ContainerRegistry/registries' could not be found in subscription 'Azure subscription 1 (846901e6-da09-45c8-98ca-7cca2353ff0e)'.
Username: myregistryluiscoco1974
Password:
Login Succeeded
```

NOTE: if you cannot enter with this command run again "az login" and try again running the command "az acr login --name myregistryluiscoco1974"

3.3. Build your Docker image:

```
docker build -t myregistryluiscoco1974.azurecr.io/mywebapi:v1 .
```



```
Developer PowerShell
+ Developer PowerShell
PS C:\dotNet 8 Web API\WebAPIdotNET8> docker build -t myRegistryluiscoco1974.azurecr.io/mywebapi:v1 .
[+] Building 5.1s (18/18) FINISHED
=> [internal] load build definition from Dockerfile                                0.0s
=> => transferring dockerfile: 32B                                              0.0s
=> [internal] load .dockerignore                                                0.0s
=> => transferring context: 35B                                                 0.0s
=> [internal] load metadata for mcr.microsoft.com/dotnet/sdk:8.0                0.2s
=> [internal] load metadata for mcr.microsoft.com/dotnet/aspnet:8.0            0.2s
=> [build 1/7] FROM mcr.microsoft.com/dotnet/sdk:8.0@sha256:bb65e39b662be0265f780afae9cdbfcaa315ef63edb245ad9fb2aa1aabca0b6b  0.0s
=> [base 1/2] FROM mcr.microsoft.com/dotnet/aspnet:8.0@sha256:f4cb736b1220b1013e7a0f77e49487c5cc1fe643bf41a750306c4a1caa7faa97  0.0s
=> [internal] load build context                                                0.0s
=> => transferring context: 1.11kB                                             0.0s
```

3.4. Push the Image to ACR:

```
docker push myregistryluiscoco1974.azurecr.io/mywebapi:v1
```

```
PS C:\dotNet 8 Web API\WebAPIdotNET8> docker push myregistryluiscoco1974.azurecr.io/mywebapi:v1
The push refers to repository [myregistryluiscoco1974.azurecr.io/mywebapi]
cb9ee206da60: Pushed
5f70bf18a086: Pushed
5a1eae6cf5a3: Pushed
ab632e5b9102: Pushed
e20390680009: Pushed
62f56989de64: Pushed
a2ab801c518c: Pushed
e122ea2d6d32: Pushed
92770f546e06: Pushed
v1: digest: sha256:2b7bccaf6ef2fa36d1e1cb61ac6c6c173a130a9f131c9de3e3a3efca988c6939 size: 2204
PS C:\dotNet 8 Web API\WebAPIdotNET8> 
```

4. Create Azure Kubernetes AKS Cluster

```
az aks create --resource-group myRG --name myAKSClusterluiscoco1974 --node-count 1 --enable-addons monitoring --generate-ssh-keys
```



5. Connect to Azure Kubernetes AKS Cluster

```
az aks get-credentials --resource-group myRG --name myAKSClusterluiscoco1974
```

6. Access to the Web API endpoint

We navigate to the ResourceGroup "myRG", and Then we click in the Kubernetes service "myAKSClusterluiscoco1974":

Microsoft Azure

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Home > Resource groups >

Resource groups

particular (luiscoenriquezhotmail.onmicrosoft.c...

+ Create Manage view ...

Filter for any field...

myRG

myRG Resource group

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- Locks

Cost Management

Cost analysis

+ Create Manage view Delete resource group Refresh Export to CSV Open query Assign tags ...

Essentials

Subscription (move) Azure subscription 1

Subscription ID
846901e6-da09-45c8-98ca-7cca2353ff0e

Tags (edit) Add tags

Deployments
4 Succeeded

Location
West Europe

Resources

Recommendations

Filter for any field... Type equals all Location equals all Add filter

Showing 1 to 3 of 3 records. ☐ Show hidden types No grouping List view

<input type="checkbox"/> Name ↑↓	Type ↑↓	Location ↑↓	
<input type="checkbox"/> MSCI-west europe-myAKSClusterluisco1974	Data collection rule	West Europe	...
<input type="checkbox"/> myAKSClusterluisco1974	Kubernetes service	West Europe	...
<input type="checkbox"/> myregistryluisco1974	Container registry	West Europe	...

Microsoft Azure

Search resources, services, and docs (G+)

Home > Resource groups > myRG >

myAKSClusterluisco1974
Kubernetes service

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Diagnose and solve problems

Microsoft Defender for Cloud

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Services and ingresses

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Run command

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Networking

Essentials

Resource group : [myRG](#)

Status : Succeeded (Running)

Location : West Europe

Subscription : [Azure subscription 1](#)

Subscription ID : 846901e6-da09-45c8-98ca-7cca2353ff0e

Tags ([edit](#)) : [Add tags](#)

Kubernetes version : [1.27.7](#)

API server address : [myaksclust-myrg-846901-473zvr88.hcp.westeurope.azmk8s.io](#)

Network type (plugin) : [Kubenet](#)

Node pools : [1 node pool](#)

Get started **Properties** Monitoring Capabilities (4) Recommendations Tutorials

Kubernetes services

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

Node pools

Node pools	1 node pool
Kubernetes versions	1.27.7
Node sizes	Standard_DS2_v2

Configuration

Kubernetes version	1.27.7
Auto Upgrade Type	-
Authentication and Authorization	Local accounts with Kubernetes RBAC

Networking

API server address	myaksclust-myrg-846901-473zvr88.hcp.westeurope.azmk8s.io
Network type (plugin)	Kubenet
Pod CIDR	10.244.0.0/16
Service CIDR	10.0.0.0/16
DNS service IP	10.0.0.10
Docker bridge CIDR	-
Network Policy	None
Load balancer	Standard
HTTP application routing	Not enabled
Private cluster	Not enabled
Authorized IP ranges	Not enabled

We copy the Load Balancer External IP:

Microsoft Azure

Search resources, services, and docs (G+)

Home > Resource groups > myRG > myAKSClusterluiscoco1974

myAKSClusterluiscoco1974 | Services and ingresses

Kubernetes service

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Services Ingresses

Filter by service name: Enter the full service name

Filter by namespace: All namespaces

Add label filter

Name	Namespace	Status	Type	Cluster IP	External IP	Ports	Age
kubernetes	default	Ok	ClusterIP	10.0.0.1		443/TCP	56 minutes
kube-dns	kube-system	Ok	ClusterIP	10.0.0.10		53/UDP,53/TCP	56 minutes
metrics-server	kube-system	Ok	ClusterIP	10.0.2.176		443/TCP	56 minutes
azure-policy-webhook-service	kube-system	Ok	ClusterIP	10.0.25.208		443/TCP	46 minutes
gatekeeper-webhook-service	gatekeeper-system	Ok	ClusterIP	10.0.189.230		443/TCP	46 minutes
webapidotnet8-service	default	Ok	LoadBalancer	10.0.183.217	20.93.186.72	80:30530/TCP	9 minutes

In the internet web browser we input the Load Balancer External IP followed by the controller name "weatherforecast":

← ↻ ⚠ Not secure | 20.93.186.72/weatherforecast

```
1  [
2    {
3      "date": "2023-12-14",
4      "temperatureC": 15,
5      "temperatureF": 58,
6      "summary": "Hot"
7    },
8    {
9      "date": "2023-12-15",
10     "temperatureC": 31,
11     "temperatureF": 87,
12     "summary": "Balmy"
13   },
14   {
15     "date": "2023-12-16",
16     "temperatureC": 13,
17     "temperatureF": 55,
18     "summary": "Chilly"
19   },
20   {
21     "date": "2023-12-17",
22     "temperatureC": -20,
23     "temperatureF": -3,
24     "summary": "Bracing"
25   },
26   {
27     "date": "2023-12-18",
28     "temperatureC": -4,
29     "temperatureF": 25,
30     "summary": "Mild"
31   }
32 ]
```