

How to deploy .NET8 WebAPI Docker Image stored in Google Cloud Artifact Registry to Google Kubernetes Engine (GKE)

To create and upload the .NET8 WebAPI Docker image to Google Cloud Artifact Registry repo, see this github repo:

https://github.com/luiscoco/GoogleCloud_Sample10-Artifact-Registry

1. Set up Google Cloud SDK

Make sure you have the Google Cloud SDK installed and initialized on your local machine

```
gcloud init
```

2. Authenticate with GCP

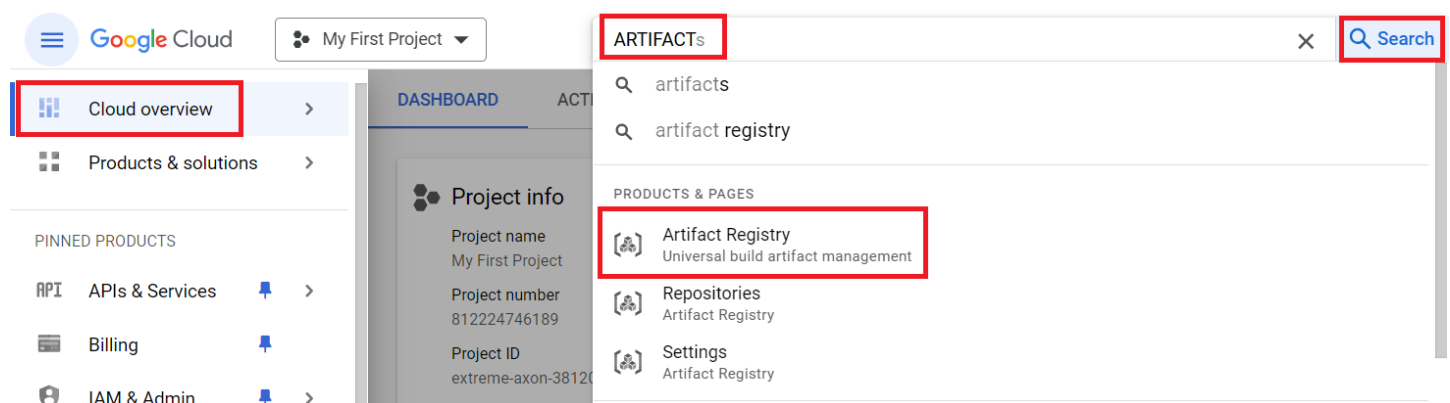
Use the gcloud auth login command to authenticate with Google Cloud

Configure Docker to use gcloud as a credential helper:

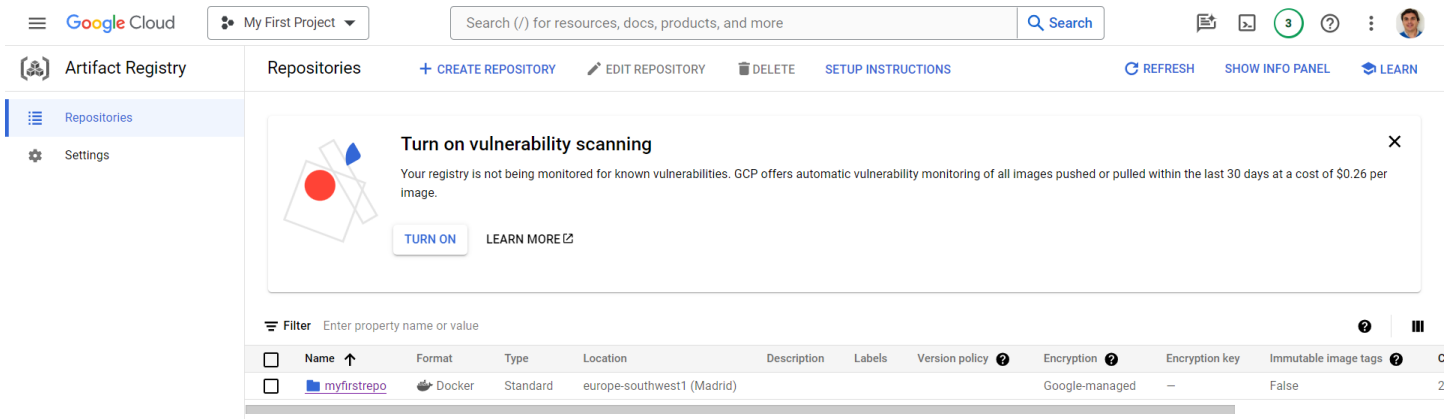
```
gcloud auth configure-docker
```

3. Pull the Docker Image from Artifact Registry

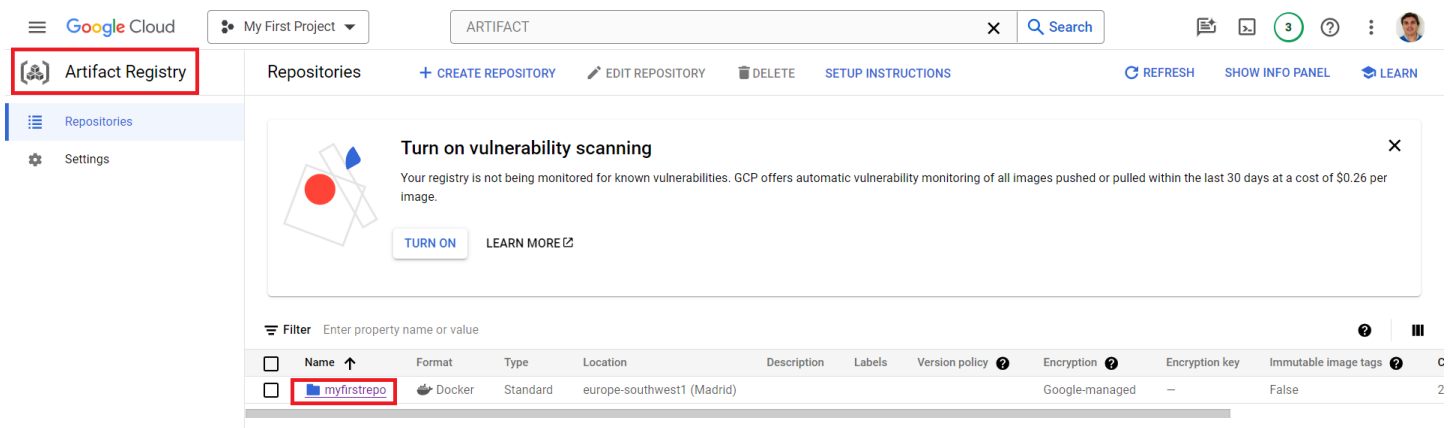
Navigate to Google Cloud Artifact Registry list



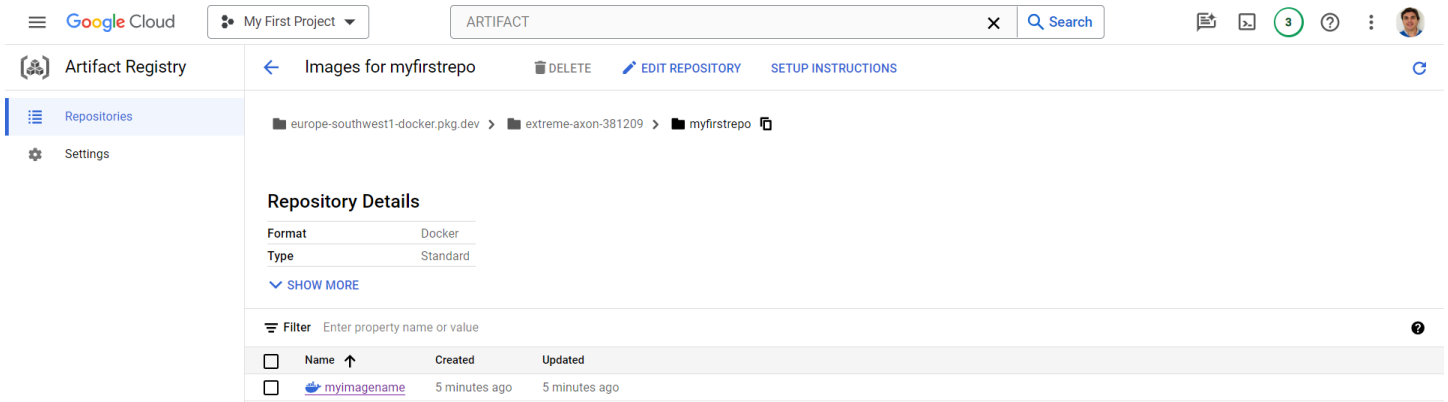
See the repos list



We click on our repo



Then we click on myimagenam



We also the image

Google Cloud My First Project ARTIFACT X Search

Artifact Registry

Digests for myimagename DELETE SETUP INSTRUCTIONS

Turn on vulnerability scanning

Your registry is not being monitored for known vulnerabilities. GCP offers automatic vulnerability monitoring of all images pushed or pulled within the last 30 days at a cost of \$0.26 per image.

TURN ON LEARN MORE

europa-southwest1-docker.pkg.dev > extreme-axon-381209 > myfirstrepo > myimagename

Filter Enter property name or value

Name	Description	Tags	Created	Updated	
946adbbab134		v1.0	6 minutes ago	6 minutes ago	

Finally we click on the Pull tab

Google Cloud My First Project ARTIFACT X Search

Artifact Registry

946adbbab1343 DELETE SETUP INSTRUCTIONS DEPLOY REFRESH SHOW ALL VERSIONS

europa-southwest1-docker.pkg.dev > extreme-axon-381209 > myfirstrepo > myimagename > sha256:946adbbab1343f14423ef0e795bd48376b0c9bb598be6da67abca365d31b0a3c

OVERVIEW **PULL** MANIFEST

Format Docker

Media type application/vnd.docker.distribution.manifest.v2+json

Project extreme-axon-381209

Location europa-southwest1 (Madrid)

Repository myfirstrepo

Image myimagename

Digest sha256:946adbbab1343f14423ef0e795bd48376b0c9bb598be6da67abca365d31b0a3c

Virtual size 88 MB

Built Jan 11, 2024, 11:40:54 PM

Created Jan 14, 2024, 12:16:45 PM

Updated Jan 14, 2024, 12:16:45 PM

Tags v1.0

We copy the command to authenticate and pull the image from the repo

Google Cloud My First Project ARTIFACT X Search

Artifact Registry

946adbbab1343 DELETE SETUP INSTRUCTIONS DEPLOY REFRESH SHOW ALL VERSIONS

europa-southwest1-docker.pkg.dev > extreme-axon-381209 > myfirstrepo > myimagename > sha256:946adbbab1343f14423ef0e795bd48376b0c9bb598be6da67abca365d31b0a3c

OVERVIEW **PULL** MANIFEST

Use these commands with the Docker client to pull the image. To use these commands, your Docker client must be configured to authenticate with europa-southwest1-docker.pkg.dev. If this is the first time that you are pulling an image from europa-southwest1-docker.pkg.dev with your Docker client, run the following command on the machine where Docker is installed.

```
$ gcloud auth configure-docker europa-southwest1-docker.pkg.dev
```

RUN IN CLOUD SHELL

Pull by tag

```
$ docker pull \
  europa-southwest1-docker.pkg.dev/extreme-axon-381209/myfirstrepo/myimagename:v1.0
```

RUN IN CLOUD SHELL

Pull by digest

```
$ docker pull \
  europa-southwest1-docker.pkg.dev/extreme-axon-381209/myfirstrepo/myimagename:sha256:946adbbab1343f14423ef0e795bd48376b0c9bb598be6da67abca365d31b0a3c
```

RUN IN CLOUD SHELL

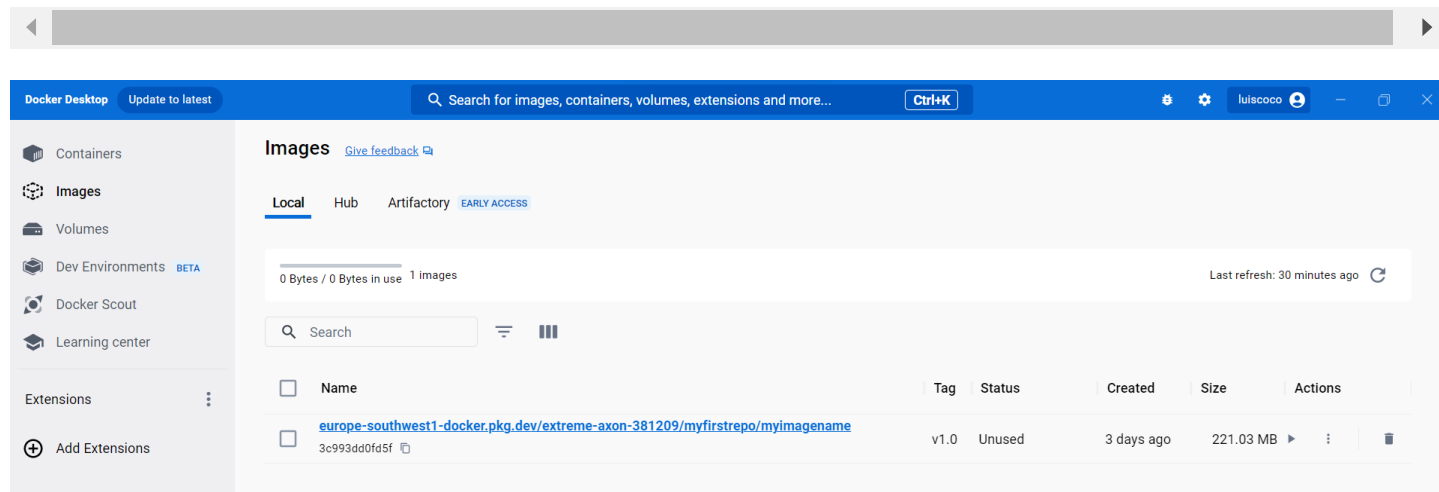
Release Notes

```
gcloud auth configure-docker europa-southwest1-docker.pkg.dev
```

```
docker pull LOCATION-docker.pkg.dev/PROJECT-ID/REPOSITORY/IMAGE:TAG
```

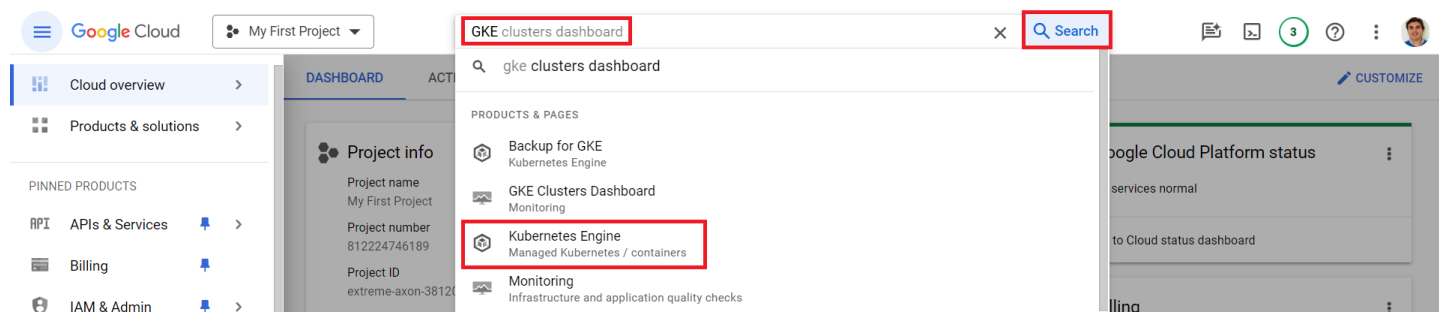
Replace LOCATION, PROJECT-ID, REPOSITORY, IMAGE, and TAG with your specific details

```
docker pull europe-southwest1-docker.pkg.dev/extreme-axon-381209/myfirstrepo/myimagename:v1.0
```



4. Set up your Kubernetes cluster

Search for GKE



Enable GKE API

[←](#) Detalles del producto

Kubernetes Engine API

[Google Enterprise API](#)

Builds and manages container-based applications, powered by the open source Kubernetes technology.

[PROBAR ESTA API](#)

DESCRIPCIÓN GENERAL

DOCUMENTACIÓN

PRODUCTOS RELACIONADOS

If you haven't already, create a Kubernetes cluster in GKE

Google Cloud My First Project GKE Search

Kubernetes Engine Kubernetes clusters CREATE REFRESH

ONBOARDING NEW LEARN

Kubernetes Engine
Kubernetes clusters

Containers package an application so it can easily be deployed to run in its own isolated environment. Containers are run on Kubernetes clusters. [Learn more](#)

CREATE DEPLOY CONTAINER TAKE THE QUICKSTART

8 steps to set-up GKE

Now it will be easier to set up GKE. Learn the best practices and Google recommendations how to run production grade clusters on GKE.

START

Google Cloud My First Project GKE Search

Create an Autopilot cluster SWITCH TO STANDARD CLUSTER LEARN

1 Cluster basics
Set up basics for your cluster

2 Networking
Define applications communication in the cluster

3 Advanced settings
Review additional options

4 Fleet
Register your cluster to a Fleet

5 Review and create
Review all settings and create your cluster

Cluster basics

Create an Autopilot cluster by specifying a name and region. After the cluster is created, you can deploy your workload through Kubernetes and we'll take care of the rest, including:

- ✓ **Nodes:** Automated node provisioning, scaling, and maintenance
- ✓ **Networking:** VPC-native traffic routing for public or private clusters
- ✓ **Security:** Shielded GKE Nodes and Workload Identity
- ✓ **Telemetry:** Cloud Operations logging and monitoring

Name autopilot-cluster-1

Region europe-southwest1

Cluster names must start with a lowercase letter followed by up to 39 lowercase letters, numbers, or hyphens. They can't end with a hyphen. You cannot change the cluster's name once it's created.

The regional location in which your cluster's control plane and nodes are located. You cannot change the cluster's region once it's created.

NEXT: NETWORKING RESET SETTINGS

CREATE CANCEL Equivalent REST or COMMAND LINE

←

Create an Autopilot cluster

SWITCH TO STANDARD CLUSTER

LEARN

✓

Cluster basics

Set up basics for your cluster

2

Networking

Define applications communication in the cluster

3

Advanced settings

Review additional options

4

Fleet

Register your cluster to a Fleet

5

Review and create

Review all settings and create your cluster

Networking

Define how applications in this cluster communicate with each other and how clients can reach them.

Network *

default

?

Node subnet *

default

?

IPv4 network access

Choose the type of network you want to allow to access your cluster's workloads. [Learn more](#)

Public cluster

Choose a public cluster to configure access from public networks to the cluster's workloads. Routes aren't created automatically. You cannot change this setting after the cluster is created.

Private cluster

Choose a private cluster to assign internal IP addresses to Pods and nodes. This isolates the cluster's workloads from public networks. You cannot change this setting after the cluster is created.

Override control plane's default private endpoint subnet

GKE provisions a private endpoint in the cluster's subnet by default. To select your own subnet where the control plane's private endpoint will be provisioned, override the control plane's default. [Learn more](#)

CREATE

CANCEL

Equivalent

REST

or

COMMAND LINE

←

Create an Autopilot cluster

SWITCH TO STANDARD CLUSTER

LEARN

✓

Cluster basics

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2

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Define applications communication in the cluster

3

Advanced settings

Review additional options

4

Fleet

Register your cluster to a Fleet

5

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Cluster default Pod address range

/17

?

Example: 192.168.0.0/16

Service address range

?

Example: 192.168.0.0/16

Enable Control plane global access

?

Enable control plane authorized networks

?

Auto-provisioning network tags

?

PREVIOUS

NEXT: ADVANCED SETTINGS

RESET SETTINGS

CREATE

CANCEL

Equivalent

REST

or

COMMAND LINE

←

Create an Autopilot cluster

SWITCH TO STANDARD CLUSTER

LEARN

✓

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✓

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3

Advanced settings

Review additional options

4

Fleet

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5

Review and create

Review all settings and create your cluster

Advanced settings

Release channel

Regular channel (default)

?

These versions have passed internal validation and are considered production-quality, but don't have enough historical data to guarantee their stability. Known issues generally have known workarounds. [Release notes](#)

Automation

▼

Anthos Service Mesh

▼

Security

▼

Operations

▼

Metadata

▼

PREVIOUS

NEXT: FLEET

RESET SETTINGS

CREATE

CANCEL

Equivalent

REST

or

COMMAND LINE

https://md2pdf.netlify.app

6/11

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Google Cloud

My First Project

GKE

X

Search

📄

🔍

3

?

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Create an Autopilot cluster

SWITCH TO STANDARD CLUSTER

LEARN

Cluster basics

Set up basics for your cluster

Networking

Define applications communication in the cluster

Advanced settings

Review additional options

Fleet

Register your cluster to a Fleet

Review and create

Review all settings and create your cluster

Fleet

WHAT ARE FLEETS?

A fleet is a collection of clusters that you administer together.

☐ Register to a fleet

❗

The fleet will be hosted in project 'extreme-axon-381209'. In the future, you'll need to be scoped to this project to register clusters to this fleet. You can register this cluster to a fleet in another project by using the CLI.

LEARN MORE

PREVIOUS

NEXT: REVIEW AND CREATE

RESET SETTINGS

CREATE

CANCEL

Equivalent

REST

or

COMMAND LINE

☰

Google Cloud

My First Project

GKE

X

Search

📄

🔍

3

?

⋮

Create an Autopilot cluster

SWITCH TO STANDARD CLUSTER

LEARN

Cluster basics

Set up basics for your cluster

Networking

Define applications communication in the cluster

Advanced settings

Review additional options

Fleet

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Review and create

Review all settings and create your cluster

Review and create

Double check your cluster settings. Pay extra attention to the ones that can't be changed later.

Cluster basics

✓ Cluster name: autopilot-cluster-1

✓ Cluster location: europe-southwest1

Networking

✓ Network: default

✓ Subnetwork: default

✓ Network access: Public cluster

✓ Override control plane's default private endpoint subnetwork: Disabled

✓ Cluster default pod address range: /17

✓ Control plane authorized networks: Disabled

CREATE

CANCEL

Equivalent

REST

or

COMMAND LINE

☰

Google Cloud

My First Project

GKE

X

Search

📄

🔍

3

?

⋮

Create an Autopilot cluster

SWITCH TO STANDARD CLUSTER

LEARN

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Define applications communication in the cluster

Advanced settings

Review additional options

Fleet

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Advanced settings

✓ Release channel: Regular channel

✓ Maintenance window: Disabled

✓ Anthos service mesh: Disabled

✓ Binary authorization: Disabled

✓ Google Groups for RBAC: Disabled

✓ Secret encryption at the application layer: Disabled

✓ Configuration auditing: Enabled

✓ Workload vulnerability scanning: Basic

✓ Boot disk encryption: Google-managed

✓ Logging: Enabled

✓ Cloud Monitoring: Enabled

Fleet

✓ Register to a fleet: Disabled

PREVIOUS

CREATE CLUSTER

CREATE

CANCEL

Equivalent

REST

or

COMMAND LINE

The screenshots show the Google Cloud console interface for Google Kubernetes Engine (GKE). The top screenshot shows the 'Kubernetes clusters' page with a table listing the cluster 'autopilot-cluster-1' in the 'eu-southwest1' region, with a status of 'Pending'. The bottom screenshot shows the same cluster with a status of 'Running' and a green checkmark, indicating it is ready for use.

Status	Name	Location	Mode	Number of nodes	Total vCPUs	Total memory	Notifications	Labels
<input type="checkbox"/>	autopilot-cluster-1	eu-southwest1	Autopilot	0	0	0 GB		

5. Configure kubectl to use your GKE cluster

We first follow the Kubectl authentication plugin installation instructions

We enter in this web page:

<https://cloud.google.com/blog/products/containers-kubernetes/kubectl-auth-changes-in-gke>

and we run this command:

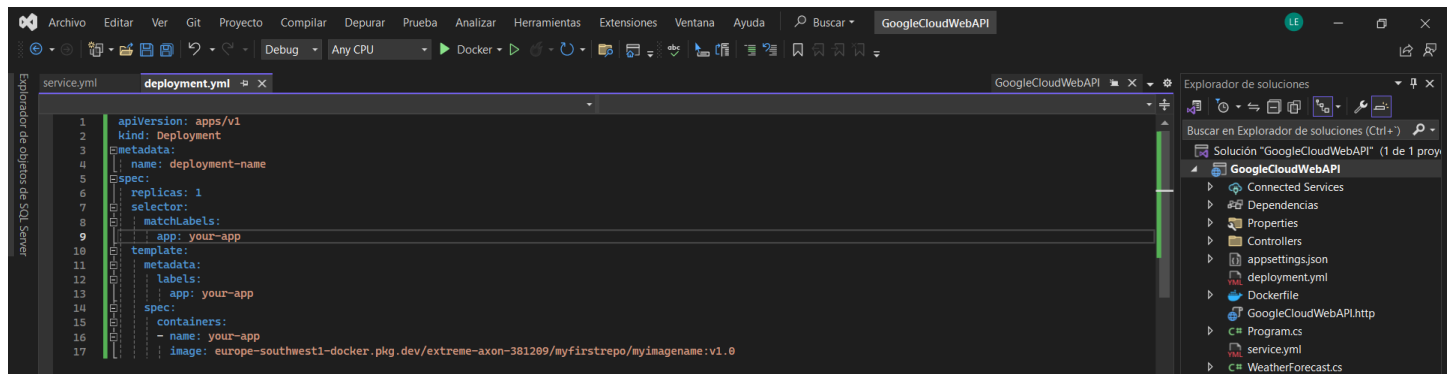
```
gcloud components install gke-gcloud-auth-plugin
```

We configure the KBE cluster to use it

```
gcloud container clusters get-credentials autopilot-cluster-1 ^
--region europe-southwest1 ^
--project extreme-axon-381209
```

6. Deploy the image to GKE

You can use a Kubernetes deployment YAML file to deploy the image



deployment.yml

```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: deployment-name
spec:
  replicas: 1
  selector:
    matchLabels:
      app: your-app
  template:
    metadata:
      labels:
        app: your-app
    spec:
      containers:
        - name: your-app
          image: europe-southwest1-docker.pkg.dev/extreme-axon-381209/myfirstrepo/myimagename:v1.0
```

service.yml

```
apiVersion: v1
kind: Service
metadata:
  name: your-app-service
spec:
  selector:
    app: your-app
  ports:
    - protocol: TCP
      port: 80
      targetPort: 8080
  type: LoadBalancer
```

We can run these commands to apply the manifest files

```
kubectl apply -f deployment.yml
```

```
kubectl apply -f service.yml
```

7. Apply this configuration and very the running application

We run this command to apply the Kubernetes manifest file

```
kubectl apply -f deployment.yaml
```

Verify the Deployment: Check that your deployment is running as expected.

```
kubectl get deployments
```

We can verify the deployment and service data with the command:

```
kubectl get all
```

```
PS C:\GoogleCloud WebAPI\GoogleCloudWebAPI> kubectl get all
```

NAME	READY	STATUS	RESTARTS	AGE
service/your-app-service	LoadBalancer	34.118.230.151	<pending>	80:30632/TCP 31s

NAME	READY	UP-TO-DATE	AVAILABLE	AGE
service/kubernetes	ClusterIP	34.118.224.1	<none>	443/TCP 7h

NAME	TYPE	CLUSTER-IP	EXTERNAL-IP	PORT(S)	AGE
service/your-app-service	LoadBalancer	34.118.230.151	34.175.17.245	80:30632/TCP	43s

NAME	READY	UP-TO-DATE	AVAILABLE	AGE
deployment.apps/deployment-name	1/1	1	1	6m2s

NAME	DESIRED	CURRENT	READY	AGE
replicaset.apps/deployment-name-65ff64b78	1	1	1	6m1s

We can connect to the application with this URL: <http://34.175.17.245/weatherforecast>



```
1  [
2    {
3      "date": "2024-01-15",
4      "temperatureC": 35,
5      "temperatureF": 94,
6      "summary": "Sweltering"
7    },
8    {
9      "date": "2024-01-16",
10     "temperatureC": -11,
11     "temperatureF": 13,
12     "summary": "Scorching"
13   },
14   {
15     "date": "2024-01-17",
16     "temperatureC": -16,
17     "temperatureF": 4,
18     "summary": "Sweltering"
19   },
20   {
21     "date": "2024-01-18",
22     "temperatureC": 23,
23     "temperatureF": 73,
24     "summary": "Mild"
25   },
26   {
27     "date": "2024-01-19",
28     "temperatureC": -17,
29     "temperatureF": 2,
30     "summary": "Cool"
31   }
32 ]
```