

Migrating a Monolithic Website to Microservices on Google Kubernetes Engine - LAB

GSP699



Overview

Why migrate from a monolithic application to a microservices architecture? Breaking down an application into microservices has the following advantages, most of these stem from the fact that microservices are loosely coupled:

- The microservices can be independently tested and deployed. The smaller the unit of deployment, the easier the deployment.
- They can be implemented in different languages and frameworks. For each microservice, you're free to choose the best technology for its particular use case.
- They can be managed by different teams. The boundary between microservices makes it easier to dedicate a team to one or several microservices.
- By moving to microservices, you loosen the dependencies between the teams. Each team has to care only about the APIs of the microservices they are dependent on. The team doesn't need to think about how those microservices are implemented, about their release cycles, and so on.
- You can more easily design for failure. By having clear boundaries between services, it's easier to determine what to do if a service is down.

Some of the disadvantages when compared to monoliths are:

- Because a microservice-based app is a network of different services that often interact in ways that are not obvious, the overall complexity of the system tends to grow.
- Unlike the internals of a monolith, microservices communicate over a network. In some circumstances, this can be seen as a security concern. [Istio](#) solves this problem by automatically encrypting the traffic between microservices.
- It can be hard to achieve the same level of performance as with a monolithic approach because of latencies between services.
- The behavior of your system isn't caused by a single service, but by many of them and by their interactions. Because of this, understanding how your system behaves in production (its observability) is harder. Istio is a solution to this problem as well.

In this lab you will deploy an existing monolithic application to a Google Kubernetes Engine cluster, then break it down into microservices. Kubernetes is a platform to manage, host, scale, and deploy containers. Containers are a portable way of packaging and running code. They are well suited to the microservices pattern, where each microservice can run in its own container.

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Password

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GCP Project ID

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Task 1. Clone the source repository

You will use an existing monolithic application of an imaginary ecommerce website, with a simple welcome page, a products page and an order history page. We will just need to clone the source from our git repo, so we can focus on breaking it down into microservices and deploying to Google Kubernetes Engine (GKE).

- Run the following commands to clone the git repo to your Cloud Shell instance and change to the appropriate directory. You will also install the NodeJS dependencies so you can test your monolith before deploying:

```
cd ~  
git clone https://github.com/googlecodelabs/monolith-to-  
microservices.git  
cd ~/monolith-to-microservices  
. ./setup.sh
```

It may take a few minutes for this script to run.

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```
Updated property [compute/zone].  
student_02_953d929d59b2@cloudshell:~ (qwiklabs-gcp-02-4e86b74040f4)$ cd ~  
git clone https://github.com/googlecodelabs/monolith-to-microservices.git  
cd ~/monolith-to-microservices  
./setup.sh  
Cloning into 'monolith-to-microservices'...  
remote: Enumerating objects: 1250, done.  
remote: Counting objects: 100% (367/367), done.  
remote: Compressing objects: 100% (149/149), done.  
remote: Total 1250 (delta 323), reused 218 (delta 218), pack-reused 883 (from 1)  
Receiving objects: 100% (1250/1250), 3.35 MiB | 2.20 MiB/s, done.  
Resolving deltas: 100% (629/629), done.  
Installing monolith dependencies...  
  
added 68 packages, and audited 69 packages in 2s  
  
14 packages are looking for funding  
  run `npm fund` for details  
  
5 vulnerabilities (3 low, 2 high)  
  
To address all issues, run:  
  npm audit fix  
  
Run `npm audit` for details.  
npm notice  
npm notice New patch version of npm available! 11.6.2 → 11.6.4  
npm notice Changelog: https://github.com/npm/cli/releases/tag/v11.6.4  
npm notice To update run: npm install -g npm@11.6.4  
npm notice  
Completed.  
  
Installing microservices dependencies...  
  
added 95 packages, and audited 96 packages in 5s
```

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```
Creating an optimized production build...
Browserslist: caniuse-lite is outdated. Please run:
  npx update-browserslist-db@latest
  Why you should do it regularly: https://github.com/browserslist/update-db#readme
Compiled successfully.

File sizes after gzip:

  88.22 kB (+19 kB)  build/static/js/main.e4fbf856.js

The project was built assuming it is hosted at /.
You can control this with the homepage field in your package.json.

The build folder is ready to be deployed.
You may serve it with a static server:

  npm install -g serve
  serve -s build

Find out more about deployment here:

  https://cra.link/deployment

> frontend@0.1.0 postbuild
> node scripts/post-build.js ./build ../microservices/src/frontend/public

Deleting stale folder: ../microservices/src/frontend/public
Deleted stale destination folder: ../microservices/src/frontend/public
Copying files from ./build to ../microservices/src/frontend/public
Copied ./build to ../microservices/src/frontend/public successfully!
Completed.

Setup completed successfully!
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices (qwiklabs-gcp-02-4e86b74040f4) $
```

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It may take a few minutes for this script to run.

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Password: L3fZEAou87Gv
GCP Project ID: qwiklabs-gcp-02-4e86b74f

Task 2. Create a GKE cluster

Now that you have your working developer environment, you need a Kubernetes cluster to deploy your monolith, and eventually the microservices, to! Before you can create a cluster, make sure the proper API's are enabled.

1. Run the following command to enable the Containers API so you can use Google Kubernetes Engine:

```
gcloud services enable container.googleapis.com
```

2. Run the command below to create a GKE cluster named **fancy-cluster** with 3 nodes:

```
gcloud container clusters create fancy-cluster --num-nodes 3 --machine-type=e2-standard-4
```

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Username

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Password

L3fZEAou87Gv

GCP Project ID

qwiklabs-gcp-02-4e86b74l

2. Run the command below to create a GKE cluster named **fancy-cluster** with **3** nodes:

```
gcloud container clusters create fancy-cluster --num-nodes 3 --  
machine-type=e2-standard-4
```

Warning: If you get an error about region/zone not being specified, please see the environment set up section to make sure you set the default compute zone.

It may take several minutes for the cluster to be created.

3. Once the command has completed, run the following to see the cluster's three worker VM instances:

```
gcloud compute instances list
```

Output:

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```
serve -s build

Find out more about deployment here:
https://cra.link/deployment

> frontend@0.1.0 postbuild
> node scripts/post-build.js ./build ../microservices/src/frontend/public

Deleting stale folder: ../microservices/src/frontend/public
Deleted stale destination folder: ../microservices/src/frontend/public
Copying files from ./build to ../microservices/src/frontend/public
Copied ./build to ../microservices/src/frontend/public successfully!
Completed.

Setup completed successfully!
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices (qwiklabs-gcp-02-4e86b74040f4)$ gcloud services enable container.googleapis.com
Operation "operations/acf.p2-897896520706-61029596-ddd2-4132-8870-8937cb41664b" finished successfully.
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices (qwiklabs-gcp-02-4e86b74040f4)$ gcloud container clusters create fancy-cluster --num-nodes 3 --machine-type=e2-standard-4
Note: Your Pod address range (`--cluster-ipv4-cidr`) can accommodate at most 1008 node(s).
Creating cluster fancy-cluster in us-east4-b... Cluster is being health-checked (Kubernetes Control Plane is healthy)...done.
Created [https://container.googleapis.com/v1/projects/qwiklabs-gcp-02-4e86b74040f4/zones/us-east4-b/clusters/fancy-cluster].
To inspect the contents of your cluster, go to: https://console.cloud.google.com/kubernetes/workload\_gcloud/us-east4-b/fancy-cluster?project=qwiklabs-gcp-02-4e86b74040f4
kubeconfig entry generated for fancy-cluster.
NAME: fancy-cluster
LOCATION: us-east4-b
MASTER_VERSION: 1.33.5-gke.1201000
MASTER_IP: 34.145.189.216
MACHINE_TYPE: e2-standard-4
NODE_VERSION: 1.33.5-gke.1201000
NUM_NODES: 3
STATUS: RUNNING
STACK_TYPE: IPV4
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices (qwiklabs-gcp-02-4e86b74040f4)$
```

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Warning: If you get an error about region/zone not being specified, please see the environment set up section to make sure you set the default compute zone.

It may take several minutes for the cluster to be created.

- Once the command has completed, run the following to see the cluster's three worker VM instances:

```
gcloud compute instances list
```

Output:

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You can also view your Kubernetes cluster and related information in the Cloud Console. From the [Navigation menu](#), scroll down to [Kubernetes Engine](#) and click [Clusters](#).

You should see your cluster named *fancy-cluster*.

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```
kubeconfig entry generated for fancy-cluster.  
NAME: fancy-cluster  
LOCATION: us-east4-b  
MASTER_VERSION: 1.33.5-gke.1201000  
MASTER_IP: 34.145.189.216  
MACHINE_TYPE: e2-standard-4  
NODE_VERSION: 1.33.5-gke.1201000  
NUM_NODES: 3  
STATUS: RUNNING  
STACK_TYPE: IPV4  
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices (qwiklabs-gcp-02-4e86b74040f4)$ gcloud compute instances list  
NAME: gke-fancy-cluster-default-pool-9eb2be35-crbm  
ZONE: us-east4-b  
MACHINE_TYPE: e2-standard-4  
PREEMPTIBLE:  
INTERNAL_IP: 10.150.0.5  
EXTERNAL_IP: 34.48.160.177  
STATUS: RUNNING  
  
NAME: gke-fancy-cluster-default-pool-9eb2be35-dtpg  
ZONE: us-east4-b  
MACHINE_TYPE: e2-standard-4  
PREEMPTIBLE:  
INTERNAL_IP: 10.150.0.4  
EXTERNAL_IP: 34.48.220.6  
STATUS: RUNNING  
  
NAME: gke-fancy-cluster-default-pool-9eb2be35-jqzr  
ZONE: us-east4-b  
MACHINE_TYPE: e2-standard-4  
PREEMPTIBLE:  
INTERNAL_IP: 10.150.0.3  
EXTERNAL_IP: 136.107.6.223  
STATUS: RUNNING  
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices (qwiklabs-gcp-02-4e86b74040f4)$
```

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Kubernetes Engine / Clusters

All Fleets No fleets in the current project

Resource Management

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- Storage
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Kubernetes clusters + Create + Deploy Refresh Attach cluster New

Overview Utilization Observability Cost Optimization

Health ② 100% healthy Upgrade ② 100% up to date Estimated monthly cost ② \$0.00 / month · 0%
No recommendations No recommendations No recommendations

Filter Enter property name or value

Status	Name ↑	Location	Number of nodes	Total vCPUs	Total memory	Notifications	Labels
<input type="checkbox"/>	<input checked="" type="checkbox"/> fancy-cluster	us-east4-b	3	12	48 GB	💡 Low resource requests	-

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Create a GKE Cluster



Check my progress

Assessment completed!

End Lab

01:16:12

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Username

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Password

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Task 3. Deploy the existing monolith

Since the focus of this lab is to break down a monolith into microservices, you need to get a monolith application up and running.

- Run the following script to deploy a monolith application to your GKE cluster:

```
cd ~/monolith-to-microservices  
. ./deploy-monolith.sh
```

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```
EXTERNAL_IP: 136.107.6.223
STATUS: RUNNING
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices (qwiklabs-gcp-02-4e86b74040f4)$ cd ~/monolith-to-microservices
./deploy-monolith.sh
Enabling Cloud Build APIs...
Completed.

Building Monolith Container...
Creating temporary archive of 27 file(s) totalling 2.4 MiB before compression.
Uploading tarball of [.] to [gs://qwiklabs-gcp-02-4e86b74040f4_cloudbuild/source/1764150357.378125-6efbb4d68ceb4efba6f3b06f0dd8282e.tgz]
Created [https://cloudbuild.googleapis.com/v1/projects/qwiklabs-gcp-02-4e86b74040f4/locations/global/builds/7cc3810a-e0c6-4811-918f-6b8e9823680d].
Logs are available at [ https://console.cloud.google.com/cloud-build/builds/7cc3810a-e0c6-4811-918f-6b8e9823680d?project=897896520706 ].
Waiting for build to complete. Polling interval: 1 second(s).
----- REMOTE BUILD OUTPUT -----
starting build "7cc3810a-e0c6-4811-918f-6b8e9823680d"

FETCHSOURCE
Fetching storage object: gs://qwiklabs-gcp-02-4e86b74040f4_cloudbuild/source/1764150357.378125-6efbb4d68ceb4efba6f3b06f0dd8282e.tgz#1764150361426322
Copying gs://qwiklabs-gcp-02-4e86b74040f4_cloudbuild/source/1764150357.378125-6efbb4d68ceb4efba6f3b06f0dd8282e.tgz#1764150361426322...
/ [1 files] [ 1.4 MiB/ 1.4 MiB]
Operation completed over 1 objects/1.4 MiB.
BUILD
Already have image (with digest): gcr.io/cloud-builders/gcb-internal
Sending build context to Docker daemon 2.577MB
Step 1/7 : FROM node:16
16: Pulling from library/node
311da6c465ea: Pulling fs layer
7e9bf114588c: Pulling fs layer
ffd9397e94b7: Pulling fs layer
513d77925604: Pulling fs layer
ae3b95bbaa61: Pulling fs layer
0e421f66aff4: Pulling fs layer
ca266fd61921: Pulling fs layer
ee7d78be1eb9: Pulling fs layer
ca266fd61921: Waiting
```

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```
9af5f53e8f62: Preparing
684f82921421: Waiting
9af5f53e8f62: Waiting
f25ec1d93a58: Layer already exists
794ce8b1b516: Layer already exists
d41bcd3a037b: Layer already exists
fe0d845e767b: Layer already exists
3220beed9b06: Layer already exists
be322b479aee: Layer already exists
cb78ebf55ea8: Pushed
9af5f53e8f62: Layer already exists
684f82921421: Layer already exists
3e85e2d63d58: Pushed
959701c632af: Pushed
9ad01898c7c7: Pushed
1.0.0: digest: sha256:0ec26546f118c050fcba2014c69fbacfe89f117d7edf69f26c39a7605421d1bc size: 2841
DONE
-----
ID: 7cc3810a-e0c6-4811-918f-6b8e9823680d
CREATE_TIME: 2025-11-26T09:46:02+00:00
DURATION: 45S
SOURCE: gs://qwiklabs-gcp-02-4e86b74040f4_cloudbuild/source/1764150357.378125-6efbb4d68ceb4efba6f3b06f0dd8282e.tgz
IMAGES: gcr.io/qwiklabs-gcp-02-4e86b74040f4/monolith:1.0.0
STATUS: SUCCESS
Completed.

Deploying Monolith To GKE Cluster...
deployment.apps/monolith created
service/monolith exposed
Completed.

Please run the following command to find the IP address for the monolith service: kubectl get service monolith

Deployment completed successfully!
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices (qwiklabs-gcp-02-4e86b74040f4)$
```



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Password

L3fZEAou87Gv



GCP Project ID

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Accessing the monolith

1. To find the external IP address for the monolith application, run the following command:

```
kubectl get service monolith
```



You should see output similar to the following:

NAME	CLUSTER-IP	EXTERNAL-IP	PORT(S)	AGE
monolith	10.3.251.122	203.0.113.0	80:30877/TCP	3d

2. If your output lists the external IP as <pending> give it a minute and run the command again.
3. Once you've determined the external IP address for your monolith, copy the IP address. Point your browser to this URL (such as http://203.0.113.0) to check if your monolith is accessible.

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d41bcd3a037b: Layer already exists
fe0d845e767b: Layer already exists
3220beed9b06: Layer already exists
be322b479aee: Layer already exists
cb78ebf55ea8: Pushed
9af5f53e8f62: Layer already exists
684f82921421: Layer already exists
3e85e2d63d58: Pushed
959701c632af: Pushed
9ad01898c7c7: Pushed
1.0.0: digest: sha256:0ec26546f118c050fcba2014c69fbacfe89f117d7edf69f26c39a7605421d1bc size: 2841
DONE

ID: 7cc3810a-e0c6-4811-918f-6b8e9823680d
CREATE_TIME: 2025-11-26T09:46:02+00:00
DURATION: 45S
SOURCE: gs://qwiklabs-gcp-02-4e86b74040f4_cloudbuild/source/1764150357.378125-6efbb4d68ceb4efba6f3b06f0dd8282e.tgz
IMAGES: gcr.io/qwiklabs-gcp-02-4e86b74040f4/monolith:1.0.0
STATUS: SUCCESS
Completed.

Deploying Monolith To GKE Cluster...
deployment.apps/monolith created
service/monolith exposed
Completed.

Please run the following command to find the IP address for the monolith service: kubectl get service monolith

Deployment completed successfully!

```
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices (qwiklabs-gcp-02-4e86b74040f4)$ kubectl get service monolith
NAME      TYPE      CLUSTER-IP      EXTERNAL-IP      PORT(S)      AGE
monolith  LoadBalancer  34.118.238.211  136.107.13.129  80:30148/TCP  54s
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices (qwiklabs-gcp-02-4e86b74040f4)$ ^C
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices (qwiklabs-gcp-02-4e86b74040f4)$ █
```

9+ 22°C Sunny ENG US 03:19 PM 26-11-2025

Fancy Store

Home

Products

Orders

Welcome to the Fancy Store!

Take a look at our wide variety of products.



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Username: student-02-953d929d59b2 (copy)

Password: L3fZEaou87Gv (copy)

GCP Project ID: quicklabs-gcp-02-4e86b74 (copy)

Assessment Completed!

20/100

Lab instructions and tasks

GSP699

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Task 1. Clone the source repository

Task 2. Create a GKE cluster

Task 3. Deploy the existing monolith

Task 4. Migrate orders to a microservice

Task 5. Migrate Products to microservice

Task 6. Migrate Frontend to microservice

Congratulations!

Task 4. Migrate orders to a microservice

Now that you have a monolith website running on GKE, start breaking each service into a microservice. Typically, a planning effort should take place to determine which services to break into smaller chunks, usually around specific parts of the application like business domain.

For this lab you will create an example and break out each service around the business domain: Orders, Products, and Frontend. The code has already been migrated for you so you can focus on building and deploying the services on Google Kubernetes Engine (GKE).

Create Orders microservice

The first service to break out is the Orders service. Make use of the separate codebase provided and create a separate Docker container for this service.

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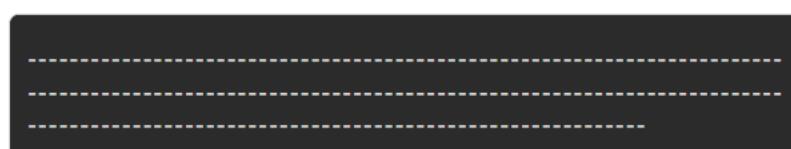
to build the Docker container **and** put the image in the Artifact Registry with a single command!

Google Cloud Build will compress the files from the directory and move them to a Cloud Storage bucket. The build process will then take all the files from the bucket and use the Dockerfile to run the Docker build process. The `--tag` flag is specified with the host as `gcr.io` for the Docker image, the resulting Docker image will be pushed to the Artifact Registry.

1. Run the following commands to build your Docker container and push it to the Artifact Registry:

```
cd ~/monolith-to-microservices/microservices/src/orders
gcloud builds submit --tag
gcr.io/${GOOGLE_CLOUD_PROJECT}/orders:1.0.0 .
```

This process will take a minute, but after it is completed, there will be output in the terminal similar to the following:



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Task 1. Clone the source repository

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Task 3. Deploy the existing monolith

Task 4. Migrate orders to a microservice

Task 5. Migrate Products to microservice

Task 6. Migrate Frontend to microservice

Congratulations!

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```
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices (qwiklabs-gcp-02-4e86b74040f4)$ ^C
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices (qwiklabs-gcp-02-4e86b74040f4)$ cd ~/monolith-to-microservices/microservices/src/orders
gcloud builds submit --tag gcr.io/${GOOGLE_CLOUD_PROJECT}/orders:1.0.0 .
Creating temporary archive of 8 file(s) totalling 24.3 KiB before compression.
Some files were not included in the source upload.

Check the gcloud log [/tmp/tmp.xRecYv86Px/logs/2025.11.26/09.50.23.848380.log] to see which files and the contents of the
default gcloudignore file used (see `\$ gcloud topic gcloudignore` to learn
more).

Uploading tarball of [...] to [gs://qwiklabs-gcp-02-4e86b74040f4_cloudbuild/source/1764150624.100888-184f702e91324eaaa11c475ddf854a1a.tgz]
Created [https://cloudbuild.googleapis.com/v1/projects/qwiklabs-gcp-02-4e86b74040f4/locations/global/builds/8e7e58ee-82b1-4361-9d8d-c457a5a2f3c8].
Logs are available at [ https://console.cloud.google.com/cloud-build/builds/8e7e58ee-82b1-4361-9d8d-c457a5a2f3c8?project=897896520706 ].
Waiting for build to complete. Polling interval: 1 second(s).
----- REMOTE BUILD OUTPUT -----
starting build "8e7e58ee-82b1-4361-9d8d-c457a5a2f3c8"

FETCHSOURCE
Fetching storage object: gs://qwiklabs-gcp-02-4e86b74040f4_cloudbuild/source/1764150624.100888-184f702e91324eaaa11c475ddf854a1a.tgz#1764150625056873
Copying gs://qwiklabs-gcp-02-4e86b74040f4_cloudbuild/source/1764150624.100888-184f702e91324eaaa11c475ddf854a1a.tgz#1764150625056873...
/ [1 files] [ 8.9 KiB/ 8.9 KiB]
Operation completed over 1 objects/8.9 KiB.

BUILD
Already have image (with digest): gcr.io/cloud-builders/gcb-internal
Sending build context to Docker daemon 33.28kB
Step 1/7 : FROM node:16
16: Pulling from library/node
311da6c465ea: Pulling fs layer
7e9bf114588c: Pulling fs layer
ffd9397e94b7: Pulling fs layer
513d77925604: Pulling fs layer
ae3b95bbbaa61: Pulling fs layer
0e421f66aff4: Pulling fs layer
ca266fd61921: Pulling fs layer
ee7d78beleb9: Pulling fs layer
```

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```
76633dd18981: Preparing  
dd58d9437506: Preparing  
8f8b4a2d4b2b: Preparing  
be322b479aeee: Preparing  
d41bcd3a037b: Preparing  
fe0d845e767b: Preparing  
f25ec1d93a58: Preparing  
794ce8b1b516: Preparing  
3220beed9b06: Preparing  
684f82921421: Preparing  
9af5f53e8f62: Preparing  
684f82921421: Waiting  
9af5f53e8f62: Waiting  
3220beed9b06: Layer already exists  
794ce8b1b516: Layer already exists  
fe0d845e767b: Layer already exists  
be322b479aeee: Layer already exists  
f25ec1d93a58: Layer already exists  
d41bcd3a037b: Layer already exists  
684f82921421: Layer already exists  
9af5f53e8f62: Layer already exists  
dd58d9437506: Pushed  
0ba5ad9eb5cf: Pushed  
8f8b4a2d4b2b: Pushed  
76633dd18981: Pushed  
1.0.0: digest: sha256:0256b035ef030d00e8cadcc39ba987315bcfe2c4943a25ff2d3a5658d25d6f6d size: 2838  
DONE
```

```
ID: 8e7e58ee-82b1-4361-9d8d-c457a5a2f3c8  
CREATE TIME: 2025-11-26T09:50:26+00:00  
DURATION: 43S  
SOURCE: gs://qwiklabs-gcp-02-4e86b74040f4_cloudbuild/source/1764150624.100888-184f702e91324eaaa11c475ddf854ala.tgz  
IMAGES: gcr.io/qwiklabs-gcp-02-4e86b74040f4/orders:1.0.0  
STATUS: SUCCESS  
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/microservices/src/orders (qwiklabs-gcp-02-4e86b74040f4) $
```

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Cloud Build / History

Dashboard History Repositories Triggers Worker Pools Permissions Release Notes

Build history Stop streaming builds

This page shows your builds, sorted by the most recently started. Explore the build details to see logs, execution details, and build artifacts.

Filter Enter property name or value

<input type="checkbox"/>	Status	Build	Region	Source	Ref	Commit	Trigger Name	Created	Duration	Security Insights
<input type="checkbox"/>	✓	8e7e58ee	global	–	–	–	–	11/26/25, 3:20 PM	42 sec	View
<input type="checkbox"/>	✓	7cc3810a	global	–	–	–	–	11/26/25, 3:16 PM	45 sec	View

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Cloud Build / History / Build details: 7cc3810a-e0c6-4811-918f-6b8e9823680d

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Build details Retry build Copy url

Successful: 7cc3810a-e0c6-4811-918f-6b8e9823680d
Started on Nov 26, 2025, 3:16:08 PM

Steps	Duration
✓ Build Summary	00:00:45
1 Step	
✓ 0: gcr.io/cloud-builders/gcb-internal	00:00:27
docker build --network cloudbuild --no-cache -t gcr.io/qw...	

Source: gs://qwiklabs-gcp-02-4e86b74040f4_cloudbuild/source/1764150357.378125-6efbb4d68ceb4efba6f3b06f0dd8282e.tgz

Build Summary

Execution details

Build id	7cc3810a-e0c6-4811-918f-6b8e9823680d
Status	Successful
Region	global
Timing	
Created	November 26, 2025 at 3:16:02 PM UTC+5:30
Started	November 26, 2025 at 3:16:08 PM UTC+5:30
Finished	November 26, 2025 at 3:16:53 PM UTC+5:30
Queued time	6 sec
Total build time	45 sec
Fetch source	2 sec
Build step(s)	27 sec
Push	11 sec
Timeout	1 hr
Source	gs://qwiklabs-gcp-02-4e86b74040f4_cloudbuild/source/1764150357.378125-6efbb4d68ceb4efba6f3b06f0dd8282e.tgz
Image	gcr.io/qwiklabs-gcp-02-4e86b74040f4/monolith:1.0.0
Service Account	897896520706-compute@developer.gserviceaccount.com
Built-in substitutions	
BUILD_ID	7cc3810a-e0c6-4811-918f-6b8e9823680d
LOCATION	global
PROJECT_ID	qwiklabs-gcp-02-4e86b74040f4
PROJECT_NUMBER	897896520706

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Cloud Build / History / Build details: 8e7e58ee-82b1-4361-9d8d-c457a5a2f3c8

Dashboard History Repositories Triggers Worker Pools Permissions Release Notes

Build details Retry build Copy url

Successful: 8e7e58ee-82b1-4361-9d8d-c457a5a2f3c8

Started on Nov 26, 2025, 3:20:27 PM

Source: gs://qwiklabs-gcp-02-4e86b74040f4_cloudbuild/source/1764150624.100888-184f702e91324aaaa11c475ddf854a1a.tgz

Steps	Duration
Build Summary	00:00:42
1 Step	
0: gcr.io/cloud-builders/gcb-internal	00:00:31
docker build --network cloudbuild --no-cache -t gcr.io/qw...	

Build Summary

Execution details

Build id	8e7e58ee-82b1-4361-9d8d-c457a5a2f3c8
Status	Successful
Region	global
Timing	
Created	November 26, 2025 at 3:20:26 PM UTC+5:30
Started	November 26, 2025 at 3:20:27 PM UTC+5:30
Finished	November 26, 2025 at 3:21:10 PM UTC+5:30
Queued time	0 sec
Total build time	42 sec
Fetch source	2 sec
Build step(s)	32 sec
Push	4 sec
Timeout	1 hr
Source	gs://qwiklabs-gcp-02-4e86b74040f4_cloudbuild/source/1764150624.100888-184f702e91324aaaa11c475ddf854a1a.tgz
Image	gcr.io/qwiklabs-gcp-02-4e86b74040f4/orders:1.0.0
Service Account	897896520706-compute@developer.gserviceaccount.com
Built-in substitutions	
BUILD_ID	8e7e58ee-82b1-4361-9d8d-c457a5a2f3c8
LOCATION	global
PROJECT_ID	qwiklabs-gcp-02-4e86b74040f4
PROJECT_NUMBER	897896520706

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Build a Website on Google Cloud

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01:07:14

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Password

L3fZEaou87Gv



GCP Project ID

qwiklabs-gcp-02-4e86b74f



cluster. In this case, the Deployment will be running only one pod of your application.

Deployments ensure this by creating a [ReplicaSet](#). The ReplicaSet is responsible for making sure the number of replicas specified are always running.The `kubectl create deployment` command below causes Kubernetes to create a Deployment named **Orders** on your cluster with 1 replica.

- Run the following command to deploy your application:

```
kubectl create deployment orders --  
image=gcr.io/${GOOGLE_CLOUD_PROJECT}/orders:1.0.0
```

Note: As a best practice, using a YAML file is recommended to declare your change to the Kubernetes cluster (e.g. creating or modifying a deployment or service) and a source control system such as GitHub to store those changes. You can learn more about this from the [Kubernetes Deployments Documentation](#).

Verify the deployment

- To verify the Deployment was created successfully, run the following command:

```
curl -k https://[...]
```

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Lab instructions and tasks

GSP699

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Setup and requirements

Task 1. Clone the source repository

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Congratulations!

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```
be322b479aee: Preparing  
d41bcd3a037b: Preparing  
fe0d845e767b: Preparing  
f25ec1d93a58: Preparing  
794ce8b1b516: Preparing  
3220beed9b06: Preparing  
684f82921421: Preparing  
9af5f53e8f62: Preparing  
684f82921421: Waiting  
9af5f53e8f62: Waiting  
3220beed9b06: Layer already exists  
794ce8b1b516: Layer already exists  
fe0d845e767b: Layer already exists  
be322b479aee: Layer already exists  
f25ec1d93a58: Layer already exists  
d41bcd3a037b: Layer already exists  
684f82921421: Layer already exists  
9af5f53e8f62: Layer already exists  
dd58d9437506: Pushed  
0ba5ad9eb5cf: Pushed  
8f8b4a2d4b2b: Pushed  
76633dd18981: Pushed  
1.0.0: digest: sha256:0256b035ef030d00e8cadcc39ba987315bcfe2c4943a25ff2d3a5658d25d6f6d size: 2838  
DONE
```

```
ID: 8e7e58ee-82b1-4361-9d8d-c457a5a2f3c8  
CREATE_TIME: 2025-11-26T09:50:26+00:00  
DURATION: 43S  
SOURCE: gs://qwiklabs-gcp-02-4e86b74040f4_cloudbuild/source/1764150624.100888-184f702e91324eaa11c475ddf854a1a.tgz  
IMAGES: gcr.io/qwiklabs-gcp-02-4e86b74040f4/orders:1.0.0  
STATUS: SUCCESS  
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/microservices/src/orders (qwiklabs-gcp-02-4e86b74040f4)$ kubectl create deployment orders --image=gcr.io/${GOOGLE_CLOUD_PROJECT}/orders:1.0.0  
deployment.apps/orders created  
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/microservices/src/orders (qwiklabs-gcp-02-4e86b74040f4)$
```

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End Lab 01:06:19

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Password

L3fZEAou87Gv



GCP Project ID

qwiklabs-gcp-02-4e86b74f



source control system such as GitHub to store those changes. You can learn more about this from the [Kubernetes Deployments Documentation](#).

Verify the deployment

- To verify the Deployment was created successfully, run the following command:

`kubectl get all`

It may take a few moments for the pod status to be Running.

Output:

NAME	READY	STATUS	RESTARTS	AGE
pod/monolith-779c8d95f5-dxnzl	1/1	Running	0	15h
pod/orders-5bc6969d76-kdxkk	1/1	Running	0	21s
NAME	TYPE	CLUSTER-IP	EXTERNAL-IP	
PORT(S)	AGE			
service/kubernetes	ClusterIP	10.39.240.1	<none>	
443/TCP	19d			
service/monolith	LoadBalancer	10.39.241.130	34.74.209.57	
80:30412/TCP	15h			
NAME	READY	UP-TO-DATE	AVAILABLE	AGE

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Task 6. Migrate Frontend to microservice
Congratulations!

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```

684f82921421: Layer already exists
9af5f53e8ff62: Layer already exists
dd58d9437506: Pushed
0ba5ad9eb5cf: Pushed
8f8b4a2d4b2b: Pushed
76633dd18981: Pushed
1.0.0: digest: sha256:0256b035ef030d00e8cadcc39ba987315bcfe2c4943a25ff2d3a5658d25d6f6d size: 2838
DONE

ID: 8e7e58ee-82b1-4361-9d8d-c457a5a2f3c8
CREATE_TIME: 2025-11-26T09:50:26+00:00
DURATION: 43s
SOURCE: gs://qwiklabs-gcp-02-4e86b74040f4/_cloudbuild/source/1764150624.100888-184f702e91324eaaa11c475ddf854a1a.tgz
IMAGES: gcr.io/qwiklabs-gcp-02-4e86b74040f4/orders:1.0.0
STATUS: SUCCESS
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/microservices/src/orders (qwiklabs-gcp-02-4e86b74040f4)$ kubectl create deployment orders --image=gcr.io/${GOOGLE_CLOUD_PROJECT}/orders:1.0.0
deployment.apps/orders created
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/microservices/src/orders (qwiklabs-gcp-02-4e86b74040f4)$ kubectl get all
NAME           READY   STATUS    RESTARTS   AGE
pod/monolith-7c978c99ff-8lmqj   1/1     Running   0          8m39s
pod/orders-6f85d49dc4-29xdl    1/1     Running   0          45s

NAME            TYPE      CLUSTER-IP       EXTERNAL-IP      PORT(S)        AGE
service/kubernetes ClusterIP  34.118.224.1    <none>          443/TCP       15m
service/monolith  LoadBalancer 34.118.238.211  136.107.13.129  80:30148/TCP  8m37s

NAME          READY   UP-TO-DATE   AVAILABLE   AGE
deployment.apps/monolith  1/1      1           1           8m40s
deployment.apps/orders     1/1      1           1           46s

NAME          DESIRED   CURRENT   READY   AGE
replicaset.apps/monolith-7c978c99ff  1         1         1         8m40s
replicaset.apps/orders-6f85d49dc4    1         1         1         46s
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/microservices/src/orders (qwiklabs-gcp-02-4e86b74040f4)$

```

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[Learn more](#)

Username

student-02-953d929d59b2



Password

L3fZEaou87Gv



GCP Project ID

qwiklabs-gcp-02-4e86b74f



would use an API gateway to secure your public endpoints.

When you deployed the Orders service, you exposed it on port 8081 internally via a Kubernetes deployment. In order to expose this service externally, you need to create a Kubernetes service of type LoadBalancer to route traffic from port 80 externally to internal port 8081.

- Run the following command to expose your website to the Internet:

```
kubectl expose deployment orders --type=LoadBalancer --port 80 -  
-target-port 8081
```

Accessing the service

GKE assigns the external IP address to the Service resource, not the Deployment.

- To find out the external IP that GKE provisioned for your application, inspect the Service with the `kubectl get service` command:

```
kubectl get service orders
```

Output:

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GSP699

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Task 5. Migrate Products to microservice

Task 6. Migrate Frontend to microservice

Congratulations!

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```
Oba5ad9eb5cf: Pushed
8f8b4a2d4b2b: Pushed
76633dd18981: Pushed
1.0.0: digest: sha256:0256b035ef030d00e8cadcc39ba987315bcfe2c4943a25ff2d3a5658d25d6f6d size: 2838
DONE

ID: 8e7e58ee-82b1-4361-9d8d-c457a5a2f3c8
CREATE_TIME: 2025-11-26T09:50:26+00:00
DURATION: 43s
SOURCE: gs://qwiklabs-gcp-02-4e86b74040f4/_cloudbuild/source/1764150624.100888-184f702e91324eaaallc475ddf854a1a.tgz
IMAGES: gcr.io/qwiklabs-gcp-02-4e86b74040f4/orders:1.0.0
STATUS: SUCCESS
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/microservices/src/orders (qwiklabs-gcp-02-4e86b74040f4)$ kubectl create deployment orders --image=gcr.io/${GOOGLE_CLOUD_PROJECT}/orders:1.0.0
deployment.apps/orders created
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/microservices/src/orders (qwiklabs-gcp-02-4e86b74040f4)$ kubectl get all
NAME           READY   STATUS    RESTARTS   AGE
pod/monolith-7c978c99ff-8lmqj   1/1     Running   0          8m39s
pod/orders-6f85d49dc4-29xdl    1/1     Running   0          45s

NAME            TYPE      CLUSTER-IP        EXTERNAL-IP      PORT(S)        AGE
service/kubernetes ClusterIP   34.118.224.1    <none>          443/TCP       15m
service/monolith  LoadBalancer 34.118.238.211  136.107.13.129  80:30148/TCP  8m37s

NAME           READY   UP-TO-DATE   AVAILABLE   AGE
deployment.apps/monolith  1/1      1           1           8m40s
deployment.apps/orders     1/1      1           1           46s

NAME           DESIRED  CURRENT  READY   AGE
replicaset.apps/monolith-7c978c99ff  1        1        1        8m40s
replicaset.apps/orders-6f85d49dc4    1        1        1        46s
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/microservices/src/orders (qwiklabs-gcp-02-4e86b74040f4)$ kubectl expose deployment orders --type=LoadBalancer --port 80 --target-port 8081
service/orders exposed
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/microservices/src/orders (qwiklabs-gcp-02-4e86b74040f4)$
```

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End Lab 01:05:14

Caution: When you are in the console, do not deviate from the lab instructions. Doing so may cause your account to be blocked.

Learn more

Open Google Console

Username: student-02-953d929d59b2c

Password: L3fZEAou87Gv

GCP Project ID: qwiklabs-gcp-02-4e86b74f

kubectl expose deployment orders --type=LoadBalancer --port 8081 --target-port 8081

Accessing the service

GKE assigns the external IP address to the Service resource, not the Deployment.

- To find out the external IP that GKE provisioned for your application, inspect the Service with the `kubectl get service` command:

kubectl get service orders

Output:

NAME	CLUSTER-IP	EXTERNAL-IP	PORT(S)	AGE
orders	10.3.251.122	203.0.113.8	80:30877/TCP	3s

Once you've determined the external IP address for your application, copy the IP address. Save it for the next step when you change your monolith to point to the new Orders service!

40/100

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Congratulations!

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```
1.0.0: digest: sha256:0256b035ef030d00e8cadcc39ba987315bcfe2c4943a25ff2d3a5658d25d6f6d size: 2838
DONE
-----
ID: 8e7e58ee-82b1-4361-9d8d-c457a5a2f3c8
CREATE_TIME: 2025-11-26T09:50:26+00:00
DURATION: 43S
SOURCE: gs://qwiklabs-gcp-02-4e86b74040f4_cloudbuild/source/1764150624.100888-184f702e91324eaa11c475ddf854ala.tgz
IMAGES: gcr.io/qwiklabs-gcp-02-4e86b74040f4/orders:1.0.0
STATUS: SUCCESS
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/microservices/src/orders (qwiklabs-gcp-02-4e86b74040f4)$ kubectl create deployment orders --image=gcr.io/${GOOGLE_CLOUD_PROJECT}/orders:1.0.0
deployment.apps/orders created
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/microservices/src/orders (qwiklabs-gcp-02-4e86b74040f4)$ kubectl get all
NAME           READY   STATUS    RESTARTS   AGE
pod/monolith-7c978c99ff-8lmqj   1/1     Running   0          8m39s
pod/orders-6f85d49dc4-29xdl    1/1     Running   0          45s

NAME            TYPE      CLUSTER-IP      EXTERNAL-IP      PORT(S)        AGE
service/kubernetes   ClusterIP   34.118.224.1    <none>           443/TCP       15m
service/monolith    LoadBalancer 34.118.238.211  136.107.13.129  80:30148/TCP  8m37s

NAME           READY   UP-TO-DATE   AVAILABLE   AGE
deployment.apps/monolith  1/1      1           1           8m40s
deployment.apps/orders     1/1      1           1           46s

NAME           DESIRED   CURRENT   READY   AGE
replicaset.apps/monolith-7c978c99ff  1         1         1         8m40s
replicaset.apps/orders-6f85d49dc4    1         1         1         46s
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/microservices/src/orders (qwiklabs-gcp-02-4e86b74040f4)$ kubectl expose deployment orders --type=LoadBalancer --port 80 --target-port 8081
service/orders exposed
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/microservices/src/orders (qwiklabs-gcp-02-4e86b74040f4)$ kubectl get service orders
NAME      TYPE      CLUSTER-IP      EXTERNAL-IP      PORT(S)        AGE
orders   LoadBalancer 34.118.227.32  136.107.57.157  80:32489/TCP  36s
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/microservices/src/orders (qwiklabs-gcp-02-4e86b74040f4)$
```

IP of the order instance: 136.107.57.157

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ENG US 03:26 PM 26-11-2025



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End Lab 01:03:44

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[Learn more.](#)

[Open Google Console](#)

Username
student-02-953d929d59b2✖

Password
L3fZEaou87Gv✖

GCP Project ID
qwiklabs-gcp-02-4e86b741✖

Orders service!

Reconfigure the monolith

Since you removed the Orders service from the monolith, you will have to modify the monolith to point to the new external Orders microservice.

When breaking down a monolith, you are removing pieces of code from a single codebase to multiple microservices and deploying them separately. Since the microservices are running on a different server, you can no longer reference your service URLs as absolute paths - you need to route to the Order microservice server address. This will require some downtime to the monolith service to update the URL for each service that has been broken out. This should be accounted for when planning on moving your microservices and monolith to production during the microservices migration process.

You need to update your config file in the monolith to point to the new Orders microservices IP address.

1. Use the `nano` editor to replace the local URL with the IP address of the Orders microservice:

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Congratulations!

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Learn more

Open Google Console

Username: student-02-953d929d59b2

Password: L3fZEaou87Gv

GCP Project ID: quicklabs-gcp-02-4e86b741

Codebase to multiple microservices and deploying them separately. Since the microservices are running on a different server, you can no longer reference your service URLs as absolute paths - you need to route to the Order microservice server address. This will require some downtime to the monolith service to update the URL for each service that has been broken out. This should be accounted for when planning on moving your microservices and monolith to production during the microservices migration process.

You need to update your config file in the monolith to point to the new Orders microservices IP address.

1. Use the nano editor to replace the local URL with the IP address of the Orders microservice:

```
cd ~/monolith-to-microservices/react-app
nano .env.monolith
```

When the editor opens, your file should look like this:

```
REACT_APP_ORDERS_URL=/service/orders
REACT_APP_PRODUCTS_URL=/service/products
```

40/100

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Task 5. Migrate Products to microservice

Task 6. Migrate Frontend to microservice

Congratulations!

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GNU nano 7.2 .env.monolith *

```
REACT_APP_ORDERS_URL=http://136.107.57.157/api/orders
REACT_APP_PRODUCTS_URL=/service/products
```

^G Help ^O Write Out ^W Where Is ^K Cut ^T Execute ^C Location ^U Undo M-A Set Mark M-J To Bracket M-Q Previous ^B Back ^X Exit ^R Read File ^\ Replace ^U Paste ^J Justify ^/ Go To Line M-E Redo M-6 Copy ^Q Where Was M-W Next ^F Forward

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The screenshot shows a Google Cloud lab interface. On the left, there's a sidebar with icons for Home, Search, Dashboard, Catalog, Paths, and Collections. The main area has a header with 'Build a Website on Google Cloud > Migrating a Monolithic Website to Microservices on Google Kubernetes Engine'. A 'Contents' section lists 'Migrating a Monolithic Website to Microservices on' followed by three horizontal dots. Below this, a 'Lab setup instructions and requirements' box contains a red 'End Lab' button and a timer showing '00:59:36'. A 'Caution' message says 'When you are in the console, do not deviate from the lab instructions. Doing so may cause your account to be blocked.' with a 'Learn more' link. An 'Open Google Console' button is also present. To the right, a large text area provides step-by-step instructions for migration:

3. Press `CTRL+S`, press `ENTER`, then `CTRL+A` to save the file in the nano editor.
4. Test the new microservice by navigating the URL you just set in the file. The webpage should return a JSON response from your Orders microservice.
5. Next, rebuild the monolith frontend and repeat the build process to build the container for the monolith and redeploy to the GKE cluster:

```
npm run build:monolith
```
6. Create Docker container with Cloud Build:

```
cd ~/monolith-to-microservices/monolith
gcloud builds submit --tag
gcr.io/${GOOGLE_CLOUD_PROJECT}/monolith:2.0.0 .
```
7. Deploy container to GKE:

```
kubectl set image deployment/monolith
monolith=gcr.io/${GOOGLE_CLOUD_PROJECT}/monolith:2.0.0
```

On the far right, a vertical sidebar shows 'Lab instructions and tasks' with numbered steps corresponding to the lab: 1. Clone the source repository, 2. Create a GKE cluster, 3. Deploy the existing monolith, 4. Migrate orders to a microservice, 5. Migrate Products to microservice, 6. Migrate Frontend to microservice, and 'Congratulations!'. The top right corner shows '40/100'.

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```
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/microservices/src/orders (qwiklabs-gcp-02-4e86b74040f4)$ ^C
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/microservices/src/orders (qwiklabs-gcp-02-4e86b74040f4)$ cd ~/monolith-to-microservices/react-app
nano .env.monolith
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/react-app (qwiklabs-gcp-02-4e86b74040f4)$ npm run build:monolith

> frontend@0.1.0 build:monolith
> env-cmd -f .env.monolith react-scripts build

(node:2340) [DEP0176] DeprecationWarning: fs.F_OK is deprecated, use fs.constants.F_OK instead
(Use `node --trace-deprecation ...` to show where the warning was created)
Creating an optimized production build...
Browserslist: caniuse-lite is outdated. Please run:
  npx update-browserslist-db@latest
  Why you should do it regularly: https://github.com/browserslist/update-db#readme
Compiled successfully.

File sizes after gzip:
  88.22 kB (+7 kB)  build/static/js/main.27e52480.js

The project was built assuming it is hosted at /.
You can control this with the homepage field in your package.json.

The build folder is ready to be deployed.
You may serve it with a static server:

  npm install -g serve
  serve -s build

Find out more about deployment here:
  https://cra.link/deployment

> frontend@0.1.0 postbuild:monolith
```

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```
(node:2340) [DEP0176] DeprecationWarning: fs.F_OK is deprecated, use fs.constants.F_OK instead
(Use `node --trace-deprecation ...` to show where the warning was created)
Creating an optimized production build...
Browserslist: caniuse-lite is outdated. Please run:
  npx update-browserslist-db@latest
  Why you should do it regularly: https://github.com/browserslist/update-db#readme
Compiled successfully.

File sizes after gzip:
  88.22 kB (+7 kB)  build/static/js/main.27e52480.js

The project was built assuming it is hosted at /.
You can control this with the homepage field in your package.json.

The build folder is ready to be deployed.
You may serve it with a static server:

  npm install -g serve
  serve -s build

Find out more about deployment here:
  https://cra.link/deployment

> frontend@0.1.0 postbuild:monolith
> node scripts/post-build.js ./build ../monolith/public

Deleting stale folder: ../monolith/public
Deleted stale destination folder: ../monolith/public
Copying files from ./build to ../monolith/public
Copied ./build to ../monolith/public successfully!
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/react-app (qwiklabs-gcp-02-4e86b74040f4) $
```

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container for the monolith and redeploy to the GKE cluster:

```
npm run build:monolith
```



6. Create Docker container with Cloud Build:

```
cd ~/monolith-to-microservices/monolith  
gcloud builds submit --tag  
gcr.io/${GOOGLE_CLOUD_PROJECT}/monolith:2.0.0 .
```



7. Deploy container to GKE:

```
kubectl set image deployment/monolith  
monolith=gcr.io/${GOOGLE_CLOUD_PROJECT}/monolith:2.0.0
```



8. Verify the application is now hitting the Orders microservice by going to the monolith application in your browser and navigating to the Orders page. All the order ID's should end in a suffix -MICROSERVICE as shown below:

 Orders

40/100

Lab instructions and tasks

GSP699

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Task 6. Migrate Frontend to microservice

Congratulations!

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```
Deleted stale destination folder: ../monolith/public
Copying files from ./build to ../monolith/public
Copied ./build to ../monolith/public successfully!
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/react-app (qwiklabs-gcp-02-4e86b74040f4)$ cd ~/monolith-to-microservices/monolith
gcloud builds submit --tag gcr.io/${GOOGLE_CLOUD_PROJECT}/monolith:2.0.0 .
Creating temporary archive of 27 file(s) totalling 2.4 MiB before compression.
Uploading tarball of [...] to [gs://qwiklabs-gcp-02-4e86b74040f4_cloudbuild/source/1764151358.965568-03176241d54b4ef096feea0aa5eb5c4e.tgz]
Created [https://cloudbuild.googleapis.com/v1/projects/qwiklabs-gcp-02-4e86b74040f4/locations/global/builds/6a6ca3c2-6a7d-4e4d-b8f0-6691cdf7557e].
Logs are available at [ https://console.cloud.google.com/cloud-build/builds/6a6ca3c2-6a7d-4e4d-b8f0-6691cdf7557e?project=897896520706 ].
Waiting for build to complete. Polling interval: 1 second(s).
----- REMOTE BUILD OUTPUT -----
starting build "6a6ca3c2-6a7d-4e4d-b8f0-6691cdf7557e"

FETCHSOURCE
Fetching storage object: gs://qwiklabs-gcp-02-4e86b74040f4_cloudbuild/source/1764151358.965568-03176241d54b4ef096feea0aa5eb5c4e.tgz#1764151362249181
Copying gs://qwiklabs-gcp-02-4e86b74040f4_cloudbuild/source/1764151358.965568-03176241d54b4ef096feea0aa5eb5c4e.tgz#1764151362249181...
/ [1 files] [ 1.4 MiB/ 1.4 MiB]
Operation completed over 1 objects/1.4 MiB.
BUILD
Already have image (with digest): gcr.io/cloud-builders/gcb-internal
Sending build context to Docker daemon 2.577MB
Step 1/7 : FROM node:16
16: Pulling from library/node
311da6c465ea: Pulling fs layer
7e9bf114588c: Pulling fs layer
ffd9397e94b7: Pulling fs layer
513d77925604: Pulling fs layer
ae3b95bbaa61: Pulling fs layer
0e421f66aff4: Pulling fs layer
ca266fd61921: Pulling fs layer
ee7d78be1eb9: Pulling fs layer
ca266fd61921: Waiting
ee7d78be1eb9: Waiting
ae3b95bbaa61: Verifying Checksum
ae3b95bbaa61: Download complete
```

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```
6b6f33413fff: Preparing  
09299141af1: Preparing  
0df5edb84429: Preparing  
be322b479aee: Preparing  
d41bcd3a037b: Preparing  
fe0d845e767b: Preparing  
f25ec1d93a58: Preparing  
794ce8b1b516: Preparing  
3220beed9b06: Preparing  
684f82921421: Preparing  
9af5f53e8f62: Preparing  
684f82921421: Waiting  
9af5f53e8f62: Waiting  
fe0d845e767b: Layer already exists  
d41bcd3a037b: Layer already exists  
794ce8b1b516: Layer already exists  
3220beed9b06: Layer already exists  
be322b479aee: Layer already exists  
f25ec1d93a58: Layer already exists  
9af5f53e8f62: Layer already exists  
684f82921421: Layer already exists  
09299141af1: Pushed  
0df5edb84429: Pushed  
ac48e25ad86b: Pushed  
6b6f33413fff: Pushed  
2.0.0: digest: sha256:0d09dcbb141e8b39d5d78bf70079c2ed2e80581515cd1f35c5faf903872baa4fb size: 2841  
DONE
```

```
ID: 6a6ca3c2-6a7d-4e4d-b8f0-6691cdf7557e  
CREATE TIME: 2025-11-26T10:02:43+00:00  
DURATION: 29s  
SOURCE: gs://qwiklabs-gcp-02-4e86b74040f4_cloudbuild/source/1764151358.965568-03176241d54b4ef096f00aa5eb5c4e.tgz  
IMAGES: gcr.io/qwiklabs-gcp-02-4e86b74040f4/monolith:2.0.0  
STATUS: SUCCESS  
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/monolith (qwiklabs-gcp-02-4e86b74040f4) $
```

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Fancy Store

Home

Products

Orders

Orders

Order Id	Date	Total Items	Cost
ORD-000001-MICROSERVICE	7/01/2019	1	\$67.99
ORD-000002-MICROSERVICE	7/24/2019	1	\$124
ORD-000003-MICROSERVICE	8/03/2019	1	\$12.49
ORD-000004-MICROSERVICE	8/14/2019	2	\$89.83
ORD-000005-MICROSERVICE	8/29/2019	1	\$12.3



Contents

Migrating a Monolithic Website to Microservices on



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00:50:38

End Lab

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[Learn more](#)[Open Google Console](#)

Username

student-02-953d929d59b2c



Password

L3fZEAou87Gv



GCP Project ID

qwiklabs-gcp-02-4e86b74f

[Previous](#)

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Lab instructions and tasks

GSP699

Overview

Setup and requirements

Task 1. Clone the source repository

Task 2. Create a GKE cluster

Task 3. Deploy the existing monolith

Task 4. Migrate orders to a microservice

Task 5. Migrate Products to microservice

Task 6. Migrate Frontend to microservice

Congratulations!

Task 5. Migrate Products to microservice

Create new Products microservice

Continue breaking out the services by migrating the Products service next. Follow the same process as before. Run the following commands to build a Docker container, deploy your container, and expose it via a Kubernetes service.

1. Create Docker container with Cloud Build:

```
cd ~/monolith-to-microservices/microservices/src/products
gcloud builds submit --tag
gcr.io/${GOOGLE_CLOUD_PROJECT}/products:1.0.0 .
```

2. Deploy container to GKE:

```
kubectl create deployment products --
```

[Next](#)

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STATUS: SUCCESS
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/monolith (qwiklabs-gcp-02-4e86b74040f4)\$ kubectl set image deployment/monolith monolith=gcr.io/\${GOOGLE_CLOUD_PROJECT}/monolith:2.0.0
deployment.apps/monolith image updated
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/monolith (qwiklabs-gcp-02-4e86b74040f4)\$ cd ~/monolith-to-microservices/microservices/src/products
gcloud builds submit --tag gcr.io/\${GOOGLE_CLOUD_PROJECT}/products:1.0.0 .
Creating temporary archive of 8 file(s) totalling 26.6 KiB before compression.
Some files were not included in the source upload.

Check the gcloud log [/tmp/tmp.xRecYv86Px/logs/2025.11.26/10.11.32.687122.log] to see which files and the contents of the default gcloudignore file used (see `\\$ gcloud topic gcloudignore` to learn more).

Uploading tarball of [...] to [gs://qwiklabs-gcp-02-4e86b74040f4_cloudbuild/source/1764151892.949994-240a6cee5da845bcb472ec84369ee18d.tgz]
Created [<https://cloudbuild.googleapis.com/v1/projects/qwiklabs-gcp-02-4e86b74040f4/locations/global/builds/f575921f-1095-4496-b2c4-649e55a68239>].
Logs are available at [<https://console.cloud.google.com/cloud-build/builds/f575921f-1095-4496-b2c4-649e55a68239?project=897896520706>].
Waiting for build to complete. Polling interval: 1 second(s).

----- REMOTE BUILD OUTPUT -----
starting build "f575921f-1095-4496-b2c4-649e55a68239"

FETCHSOURCE
Fetching storage object: gs://qwiklabs-gcp-02-4e86b74040f4_cloudbuild/source/1764151892.949994-240a6cee5da845bcb472ec84369ee18d.tgz#1764151893918918
Copying gs://qwiklabs-gcp-02-4e86b74040f4_cloudbuild/source/1764151892.949994-240a6cee5da845bcb472ec84369ee18d.tgz#1764151893918918...
/ [1 files] [9.4 KiB/ 9.4 KiB]
Operation completed over 1 objects/9.4 KiB.

BUILD
Already have image (with digest): gcr.io/cloud-builders/gcb-internal
Sending build context to Docker daemon 35.33kB
Step 1/7 : FROM node:16
16: Pulling from library/node
311da6c465ea: Pulling fs layer
7e9bf114588c: Pulling fs layer
ffd9397e94b7: Pulling fs layer
513d77925604: Pulling fs layer
ae3b95bbbaa61: Pulling fs layer

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26-11-2025 03:42 PM ENG US

```
145f7084b438: Preparing
72acd9760d52: Preparing
5f71affd38d5: Preparing
be322b479aee: Preparing
d41bcd3a037b: Preparing
fe0d845e767b: Preparing
f25ec1d93a58: Preparing
794ce8b1b516: Preparing
3220beed9b06: Preparing
684f82921421: Preparing
9af5f53e8f62: Preparing
684f82921421: Waiting
9af5f53e8f62: Waiting
794ce8b1b516: Layer already exists
f25ec1d93a58: Layer already exists
be322b479aee: Layer already exists
fe0d845e767b: Layer already exists
d41bcd3a037b: Layer already exists
3220beed9b06: Layer already exists
684f82921421: Layer already exists
9af5f53e8f62: Layer already exists
5f71affd38d5: Pushed
cd7810972aea: Pushed
72acd9760d52: Pushed
145f7084b438: Pushed
1.0.0: digest: sha256:8217651253cfad752a93d742b47bebf02331da98e5e31030dc3f2fbb5349133e size: 2838
DONE
```

```
ID: f575921f-1095-4496-b2c4-649e55a68239
CREATE_TIME: 2025-11-26T10:11:34+00:00
DURATION: 29S
SOURCE: gs://qwiklabs-gcp-02-4e86b74040f4_cloudbuild/source/1764151892.949994-240a6cee5da845bcb472ec84369ee18d.tgz
IMAGES: gcr.io/qwiklabs-gcp-02-4e86b74040f4/products:1.0.0
```

STATUS: SUCCESS
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/microservices/src/products (gwiklabs-gcp-02-4e86b74040f4) \$

Contents

Migrating a Monolithic Website to Microservices on 

```
cd ~/monolith-to-microservices/microservices/src/products  
gcloud builds submit --tag  
gcr.io/${GOOGLE_CLOUD_PROJECT}/products:1.0.0 .
```

2. Deploy container to GKE:

```
kubectl create deployment products --  
image=gcr.io/${GOOGLE_CLOUD_PROJECT}/products:1.0.0
```

3. Expose the GKE container:

```
kubectl expose deployment products --type=LoadBalancer --port 80  
--target-port 8082
```

4. Find the public IP of the Products services the same way you did for the Orders service:

```
kubectl get service products
```

Output:

 00:47:43

Caution: When you are in the console, do not deviate from the lab instructions. Doing so may cause your account to be blocked.

[Learn more.](#)

Username

student-02-953d929d59b2f



Password

L3fZEAou87Gv



GCP Project ID

qwiklabs-gcp-02-4e86b74f



60/100

Lab instructions and tasks

GSP699

Overview

Setup and requirements

Task 1. Clone the source repository

Task 2. Create a GKE cluster

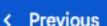
Task 3. Deploy the existing monolith

Task 4. Migrate orders to a microservice

Task 5. Migrate Products to microservice

Task 6. Migrate Frontend to microservice

Congratulations!



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```
684f82921421: Preparing  
9af5f53e8f62: Preparing  
684f82921421: Waiting  
9af5f53e8f62: Waiting  
794ce8b1b516: Layer already exists  
f25ec1d93a58: Layer already exists  
be322b479aee: Layer already exists  
fe0d845e767b: Layer already exists  
d41bcd3a037b: Layer already exists  
3220beed9b06: Layer already exists  
684f82921421: Layer already exists  
9af5f53e8f62: Layer already exists  
5f71affd38d5: Pushed  
cd7810972aea: Pushed  
72acd9760d52: Pushed  
145f7084b438: Pushed  
1.0.0: digest: sha256:8217651253cfad752a93d742b47bebf02331da98e5e31030dc3f2fbb5349133e size: 2838  
DONE  
  
ID: f575921f-1095-4496-b2c4-649e55a68239  
CREATE_TIME: 2025-11-26T10:11:34+00:00  
DURATION: 29s  
SOURCE: gs://qwiklabs-gcp-02-4e86b74040f4/_cloudbuild/source/1764151892.949994-240a6cee5da845bcb472ec84369ee18d.tgz  
IMAGES: gcr.io/qwiklabs-gcp-02-4e86b74040f4/products:1.0.0  
STATUS: SUCCESS  
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/microservices/src/products (qwiklabs-gcp-02-4e86b74040f4)$ kubectl create deployment products --image=gcr.io/${GOOGLE_CLOUD_PROJECT}/products:1.0.0  
deployment.apps/products created  
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/microservices/src/products (qwiklabs-gcp-02-4e86b74040f4)$ kubectl expose deployment products --type=LoadBalancer --port 80 --target-port 8082  
service/products exposed  
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/microservices/src/products (qwiklabs-gcp-02-4e86b74040f4)$ kubectl get service products  
NAME      TYPE      CLUSTER-IP      EXTERNAL-IP      PORT(S)      AGE  
products   LoadBalancer   34.118.239.88   34.186.48.195   80:31522/TCP   59s  
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/microservices/src/products (qwiklabs-gcp-02-4e86b74040f4)$ IP of products instance: 34.186.48.195
```

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Contents
Migrating a Monolithic Website to Microservices on

Products microservices:

```
cd ~/monolith-to-microservices/react-app
nano .env.monolith
```

00:46:00

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[Learn more.](#)

[Open Google Console](#)

Username

student-02-953d929d59b2



Password

L3fZEaou87Gv



GCP Project ID

qwiklabs-gcp-02-4e86b74l



Lab setup instructions and requirements

Products microservices:

```
cd ~/monolith-to-microservices/react-app
nano .env.monolith
```

When the editor opens, your file should look like this:

```
REACT_APP_ORDERS_URL=http://<ORDERS_IP_ADDRESS>/api/orders
REACT_APP_PRODUCTS_URL=/service/products
```

2. Replace the `REACT_APP_PRODUCTS_URL` to the new format while replacing with your Product microservice IP address so it matches below:

```
REACT_APP_ORDERS_URL=http://<ORDERS_IP_ADDRESS>/api/orders
REACT_APP_PRODUCTS_URL=http://<PRODUCTS_IP_ADDRESS>/api/products
```

3. Press `CTRL+O`, press `ENTER`, then `CTRL+X` to save the file.

4. Test the new microservice by navigating the URL you just set in the file. The webpage should return a JSON response from the Products microservice.

60/100

Lab instructions and tasks

GSP699

Overview

Setup and requirements

Task 1. Clone the source repository

Task 2. Create a GKE cluster

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Task 4. Migrate orders to a microservice

Task 5. Migrate Products to microservice

Task 6. Migrate Frontend to microservice

Congratulations!

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GNU nano 7.2 .env.monolith

```
REACT_APP_ORDERS_URL=http://136.107.57.157/api/orders
REACT_APP_PRODUCTS_URL=http://34.186.48.195/api/products
```

[Read 2 lines]

^G Help ^O Write Out ^W Where Is ^K Cut ^T Execute ^C Location M-U Undo ^A Set Mark M-Q Previous ^B Back
^X Exit ^R Read File ^\ Replace ^U Paste ^J Justify ^/ Go To Line M-E Redo M-6 Copy ^Q Where Was M-W Next ^F Forward

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Build a Website on Google Cloud > Migrating a Monolithic Website to Microservices on Google Kubernetes Engine

Contents

Migrating a Monolithic Website to Microservices on

Container for the monolith and redeploy to the GKE cluster. Run the following commands complete these steps:

6. Rebuild monolith config files:

```
npm run build:monolith
```

7. Create Docker container with Cloud Build:

```
cd ~/monolith-to-microservices/monolith
gcloud builds submit --tag
gcr.io/${GOOGLE_CLOUD_PROJECT}/monolith:3.0.0 .
```

8. Deploy container to GKE:

```
kubectl set image deployment/monolith
monolith=gcr.io/${GOOGLE_CLOUD_PROJECT}/monolith:3.0.0
```

9. Verify your application is now hitting the new Products microservice by going to the monolith application in your browser and navigating to the Products page. All the product names should be prefixed by MS- as shown below:

End Lab 00:43:44

Caution: When you are in the console, do not deviate from the lab instructions. Doing so may cause your account to be blocked. Learn more.

Open Google Console

Username: student-02-953d929d59b2

Password: L3fZEAou87Gv

GCP Project ID: qwiklabs-gcp-02-4e86b741

Lab instructions and tasks: 60/100

GSP699

Overview

Setup and requirements

Task 1. Clone the source repository

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```
nano .env.monolith
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/react-app (qwiklabs-gcp-02-4e86b74040f4)$ npm run build:monolith

> frontend@0.1.0 build:monolith
> env-cmd -f .env.monolith react-scripts build

(node:2513) [DEP0176] DeprecationWarning: fs.F_OK is deprecated, use fs.constants.F_OK instead
(Use `node --trace-deprecation ...` to show where the warning was created)
Creating an optimized production build...
Browserslist: caniuse-lite is outdated. Please run:
  npx update-browserslist-db@latest
  Why you should do it regularly: https://github.com/browserslist/update-db#readme
Compiled successfully.

File sizes after gzip:

  88.23 kB (+10 kB)  build/static/js/main.4b205f93.js

The project was built assuming it is hosted at /.
You can control this with the homepage field in your package.json.

The build folder is ready to be deployed.
You may serve it with a static server:

  npm install -g serve
  serve -s build

Find out more about deployment here:

  https://cra.link/deployment

> frontend@0.1.0 postbuild:monolith
> node scripts/post-build.js ./build ../monolith/public
```

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```
(Use `node --trace-deprecation ...` to show where the warning was created)
Creating an optimized production build...
Browserslist: caniuse-lite is outdated. Please run:
  npx update-browserslist-db@latest
  Why you should do it regularly: https://github.com/browserslist/update-db#readme
Compiled successfully.

File sizes after gzip:
  88.23 kB (+10 kB)  build/static/js/main.4b205f93.js

The project was built assuming it is hosted at /.
You can control this with the homepage field in your package.json.

The build folder is ready to be deployed.
You may serve it with a static server:

  npm install -g serve
  serve -s build

Find out more about deployment here:
  https://cra.link/deployment

> frontend@0.1.0 postbuild:monolith
> node scripts/post-build.js ./build ../monolith/public

Deleting stale folder: ../monolith/public
Deleted stale destination folder: ../monolith/public
Copying files from ./build to ../monolith/public
Copied ./build to ../monolith/public successfully!
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/react-app (qwiklabs-gcp-02-4e86b74040f4)$ nano .env.monolith
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/react-app (qwiklabs-gcp-02-4e86b74040f4)$ nano .env.monolith
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/react-app (qwiklabs-gcp-02-4e86b74040f4)$
```

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Don't show again Dismiss

```
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/react-app (qwiklabs-gcp-02-4e86b74040f4)$ nano .env.monolith
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/react-app (qwiklabs-gcp-02-4e86b74040f4)$ nano .env.monolith
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/react-app (qwiklabs-gcp-02-4e86b74040f4)$ cd ~/monolith-to-microservices/monolith
gcloud builds submit --tag gcr.io/${GOOGLE_CLOUD_PROJECT}/monolith:3.0.0 .
Creating temporary archive of 27 file(s) totalling 2.4 MiB before compression.
Uploading tarball of [...] to [gs://qwiklabs-gcp-02-4e86b74040f4_cloudbuild/source/1764152319.765107-c622a3ad7386453e8a1df05383839963.tgz]
Created [https://cloudbuild.googleapis.com/v1/projects/qwiklabs-gcp-02-4e86b74040f4/locations/global/builds/b24afa07-b61e-4e29-bd0b-3437872f22b7].
Logs are available at [ https://console.cloud.google.com/cloud-build/builds/b24afa07-b61e-4e29-bd0b-3437872f22b7?project=897896520706 ].
Waiting for build to complete. Polling interval: 1 second(s).
----- REMOTE BUILD OUTPUT -----
starting build "b24afa07-b61e-4e29-bd0b-3437872f22b7"

FETCHSOURCE
Fetching storage object: gs://qwiklabs-gcp-02-4e86b74040f4_cloudbuild/source/1764152319.765107-c622a3ad7386453e8a1df05383839963.tgz#1764152322320465
Copying gs://qwiklabs-gcp-02-4e86b74040f4_cloudbuild/source/1764152319.765107-c622a3ad7386453e8a1df05383839963.tgz#1764152322320465...
/ [1 files] [ 1.4 MiB/ 1.4 MiB]
Operation completed over 1 objects/1.4 MiB.

BUILD
Already have image (with digest): gcr.io/cloud-builders/gcb-internal
Sending build context to Docker daemon 2.577MB
Step 1/7 : FROM node:16
16: Pulling from library/node
311da6c465ea: Pulling fs layer
7e9bf114588c: Pulling fs layer
ffd9397e94b7: Pulling fs layer
513d77925604: Pulling fs layer
ae3b95bbaa61: Pulling fs layer
0e421f66aff4: Pulling fs layer
ca266fd61921: Pulling fs layer
ee7d78be1eb9: Pulling fs layer
ca266fd61921: Waiting
ee7d78be1eb9: Waiting
ae3b95bbaa61: Verifying Checksum
ae3b95bbaa61: Download complete
7e9bf114588c: Verifying Checksum
```

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```
be322b479aee: Preparing  
d41bcd3a037b: Preparing  
fe0d845e767b: Preparing  
f25ec1d93a58: Preparing  
794ce8b1b516: Preparing  
3220beed9b06: Preparing  
684f82921421: Preparing  
9af5f53e8f62: Preparing  
684f82921421: Waiting  
9af5f53e8f62: Waiting  
be322b479aee: Layer already exists  
3220beed9b06: Layer already exists  
fe0d845e767b: Layer already exists  
794ce8b1b516: Layer already exists  
f25ec1d93a58: Layer already exists  
d41bcd3a037b: Layer already exists  
684f82921421: Layer already exists  
9af5f53e8f62: Layer already exists  
db0c7df2cf0e: Pushed  
ad7574aff886: Pushed  
e5429e80ad94: Pushed  
7f21cd1b7e6d: Pushed  
3.0.0: digest: sha256:f4e6f72a0d615d257715afdbc4c9c8a13e52e77db9ac8a1c9d8effd171780f74 size: 2841  
DONE
```

```
ID: b24afa07-b61e-4e29-bd0b-3437872f22b7  
CREATE_TIME: 2025-11-26T10:18:43+00:00  
DURATION: 41S  
SOURCE: gs://qwiklabs-gcp-02-4e86b74040f4_cloudbuild/source/1764152319.765107-c622a3ad7386453e8a1df05383839963.tgz  
IMAGES: gcr.io/qwiklabs-gcp-02-4e86b74040f4/monolith:3.0.0  
STATUS: SUCCESS  
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/monolith (qwiklabs-gcp-02-4e86b74040f4)$ kubectl set image deployment/monolith monolith=gcr.io/${GOOGLE_CLOUD_PROJECT}/monolith:  
3.0.0  
deployment.apps/monolith image updated  
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/monolith (qwiklabs-gcp-02-4e86b74040f4)$
```

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Fancy Store

Home Products Orders



Vintage Typewriter - \$67.99



Vintage Camera Lens - \$12.49



Home Barista Kit - \$124



Terrarium - \$36.45



Film Camera - \$2245



Vintage Record Player - \$65.5







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Build a Website on Google Cloud > Migrating a Monolithic Website to Microservices on Google Kubernetes Engine

Contents

Migrating a Monolithic Website to Microservices on

Lab setup instructions and requirements

End Lab 00:39:04

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Username: student-02-953d929d59b2c

Password: L3fZEAou87Gv

GCP Project ID: quicklabs-gcp-02-4e86b74f

76/100

Lab instructions and tasks

GSP699

Overview

Setup and requirements

Task 1. Clone the source repository

Task 2. Create a GKE cluster

Task 3. Deploy the existing monolith

Task 4. Migrate orders to a microservice

Task 5. Migrate Products to microservice

Task 6. Migrate Frontend to microservice

Congratulations!

Task 6. Migrate Frontend to microservice

The last step in the migration process is to move the Frontend code to a microservice and shut down the monolith! After this step is completed, you will have successfully migrated the monolith to a microservices architecture!

Create a new frontend microservice

Follow the same procedure as the last two steps to create a new frontend microservice.

Previously when you rebuilt the monolith you updated the config to point to the monolith. Now you need to use the same config for the frontend microservice.

- Run the following commands to copy the microservices URL config files to the frontend microservice codebase:

```
cd ~/monolith-to-microservices/react-app
cp .env.monolith .env
npm run build
```

< Previous Next >

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```
3.0.0
deployment.apps/monolith image updated
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/monolith (qwiklabs-gcp-02-4e86b74040f4)$ cd ~/monolith-to-microservices/react-app
cp .env.monolith .env
npm run build

> frontend@0.1.0 prebuild
> npm run build:monolith

> frontend@0.1.0 build:monolith
> env-cmd -f .env.monolith react-scripts build

(node:2628) [DEP0176] DeprecationWarning: fs.F_OK is deprecated, use fs.constants.F_OK instead
(Use `node --trace-deprecation ...` to show where the warning was created)
Creating an optimized production build...
Browserslist: caniuse-lite is outdated. Please run:
  npx update-browserslist-db@latest
  Why you should do it regularly: https://github.com/browserslist/update-db#readme
Compiled successfully.

File sizes after gzip:

  88.23 kB  build/static/js/main.4b205f93.js

The project was built assuming it is hosted at /.
You can control this with the homepage field in your package.json.

The build folder is ready to be deployed.
You may serve it with a static server:

  npm install -g serve
  serve -s build

Find out more about deployment here:
```

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```
(node:2658) [DEP0176] DeprecationWarning: fs.F_OK is deprecated, use fs.constants.F_OK instead
(Use `node --trace-deprecation ...` to show where the warning was created)
Creating an optimized production build...
Browserslist: caniuse-lite is outdated. Please run:
  npx update-browserslist-db@latest
  Why you should do it regularly: https://github.com/browserslist/update-db#readme
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The project was built assuming it is hosted at /.
You can control this with the homepage field in your package.json.

The build folder is ready to be deployed.
You may serve it with a static server:

  npm install -g serve
  serve -s build

Find out more about deployment here:
  https://cra.link/deployment

> frontend@0.1.0 postbuild
> node scripts/post-build.js ./build ../microservices/src/frontend/public

Deleting stale folder: ../microservices/src/frontend/public
Deleted stale destination folder: ../microservices/src/frontend/public
Copying files from ./build to ../microservices/src/frontend/public
Copied ./build to ../microservices/src/frontend/public successfully!
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/react-app (qwiklabs-gcp-02-4e86b74040f4) $
```

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Build a Website on Google Cloud > Migrating a Monolithic Website to Microservices on Google Kubernetes Engine

Contents

Migrating a Monolithic Website to Microservices on

following commands to build a Docker container, deploy your container, and expose it to via a Kubernetes service.

3. Create Docker container with Google Cloud Build:

```
cd ~/monolith-to-microservices/microservices/src/frontend  
gcloud builds submit --tag  
gcr.io/${GOOGLE_CLOUD_PROJECT}/frontend:1.0.0 .
```

4. Deploy container to GKE:

```
kubectl create deployment frontend --  
image=gcr.io/${GOOGLE_CLOUD_PROJECT}/frontend:1.0.0
```

5. Expose GKE container:

```
kubectl expose deployment frontend --type=LoadBalancer --port 80  
--target-port 8080
```

6. Click *Check my progress* to verify the objective.

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Lab instructions and tasks

GSP699

Overview

Setup and requirements

Task 1. Clone the source repository

Task 2. Create a GKE cluster

Task 3. Deploy the existing monolith

Task 4. Migrate orders to a microservice

Task 5. Migrate Products to microservice

Task 6. Migrate Frontend to microservice

Congratulations!

End Lab 00:37:13

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Open Google Console

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Password: L3fZEaou87Gv

GCP Project ID: qwiklabs-gcp-02-4e86b74f

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```
Copied ./build to .../microservices/src/frontend/public successfully!
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/react-app (qwiklabs-gcp-02-4e86b74040f4)$ cd ~/monolith-to-microservices/microservices/src/frontend
gcloud builds submit --tag gcr.io/${GOOGLE_CLOUD_PROJECT}/frontend:1.0.0 .
Creating temporary archive of 25 file(s) totalling 2.4 MiB before compression.
Uploading tarball of [...] to [gs://qwiklabs-gcp-02-4e86b74040f4_cloudbuild/source/1764152859.879838-5600c25b6c8f46ba857233c528f59f81.tgz]
Created [https://cloudbuild.googleapis.com/v1/projects/qwiklabs-gcp-02-4e86b74040f4/locations/global/builds/ec5c5d0a-6be4-45a9-bb86-edd8888d0d42].
Logs are available at [ https://console.cloud.google.com/cloud-build/builds/ec5c5d0a-6be4-45a9-bb86-edd8888d0d42?project=897896520706 ].
Waiting for build to complete. Polling interval: 1 second(s).
----- REMOTE BUILD OUTPUT -----
starting build "ec5c5d0a-6be4-45a9-bb86-edd8888d0d42"

FETCHSOURCE
Fetching storage object: gs://qwiklabs-gcp-02-4e86b74040f4_cloudbuild/source/1764152859.879838-5600c25b6c8f46ba857233c528f59f81.tgz#1764152862502028
Copying gs://qwiklabs-gcp-02-4e86b74040f4_cloudbuild/source/1764152859.879838-5600c25b6c8f46ba857233c528f59f81.tgz#1764152862502028...
/ [1 files] [ 1.4 MiB/ 1.4 MiB]
Operation completed over 1 objects/1.4 MiB.

BUILD
Already have image (with digest): gcr.io/cloud-builders/gcb-internal
Sending build context to Docker daemon 2.543MB
Step 1/7 : FROM node:16
16: Pulling from library/node
311da6c465ea: Pulling fs layer
7e9bf114588c: Pulling fs layer
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ae3b95bbaa61: Pulling fs layer
0e421f66aff4: Pulling fs layer
ca266fd61921: Pulling fs layer
ee7d78be1eb9: Pulling fs layer
ca266fd61921: Waiting
ee7d78be1eb9: Waiting
ae3b95bbaa61: Verifying Checksum
ae3b95bbaa61: Download complete
ca266fd61921: Verifying Checksum
ca266fd61921: Download complete
```

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```
f25ec1d93a58: Preparing  
794ce8b1b516: Preparing  
3220beed9b06: Preparing  
684f82921421: Preparing  
9af5f53e8f62: Preparing  
684f82921421: Waiting  
9af5f53e8f62: Waiting  
fe0d845e767b: Layer already exists  
d41bcd3a037b: Layer already exists  
be322b479aee: Layer already exists  
794ce8b1b516: Layer already exists  
3220beed9b06: Layer already exists  
f25ec1d93a58: Layer already exists  
684f82921421: Layer already exists  
9af5f53e8f62: Layer already exists  
6373913f2721: Pushed  
a20e5a316cde: Pushed  
1f5d70a40657: Pushed  
43afb8b6fef0: Pushed  
1.0.0: digest: sha256:09df66ca51e0822840c2b98b49114e65966b6442200276fc19a7aff42d38fe74 size: 2841  
DONE  
  
ID: ec5c5d0a-6be4-45a9-bb86-edd8888d0d42  
CREATE_TIME: 2025-11-26T10:27:43+00:00  
DURATION: 39S  
SOURCE: gs://qwiklabs-gcp-02-4e86b74040f4_cloudbuild/source/1764152859.879838-5600c25b6c8f46ba857233c528f59f81.tgz  
IMAGES: gcr.io/qwiklabs-gcp-02-4e86b74040f4/frontend:1.0.0  
STATUS: SUCCESS  
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/microservices/src/frontend (qwiklabs-gcp-02-4e86b74040f4)$ kubectl create deployment frontend --image=gcr.io/${GOOGLE_CLOUD_PROJECT}/frontend:1.0.0  
error: failed to create deployment: deployments.apps "frontend" already exists  
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/microservices/src/frontend (qwiklabs-gcp-02-4e86b74040f4)$ kubectl expose deployment frontend --type=LoadBalancer --port 80 --target-port 8080  
Error from server (AlreadyExists): services "frontend" already exists  
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/microservices/src/frontend (qwiklabs-gcp-02-4e86b74040f4)$
```

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Contents

Migrating a Monolithic Website to Microservices on

Lab setup instructions and requirements

End Lab 00:31:33

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Learn more

Open Google Console

Username: student-02-953d929d59b2

Password: L3fZEaou87Gv

GCP Project ID: qwiklabs-gcp-02-4e86b74

6. Click *Check my progress* to verify the objective.

Migrate frontend to a microservice

Check my progress

Assessment Completed!

100/100

Lab instructions and tasks

GSP699

Overview

Setup and requirements

Task 1. Clone the source repository

Task 2. Create a GKE cluster

Task 3. Deploy the existing monolith

Task 4. Migrate orders to a microservice

Task 5. Migrate Products to microservice

Task 6. Migrate Frontend to microservice

Congratulations!

Delete the monolith

Now that all of the services are running as microservices, delete the monolith application! In an actual migration, this would also entail DNS changes, etc., to get the existing domain names to point to the new frontend microservices for the application.

- Run the following commands to delete the monolith:

```
kubectl delete deployment monolith
kubectl delete service monolith
```

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```
9af5f53e8f62: Preparing
684f82921421: Waiting
9af5f53e8f62: Waiting
fe0d845e767b: Layer already exists
d41bcd3a037b: Layer already exists
be322b479aeee: Layer already exists
794ce8b1b516: Layer already exists
3220beed9b06: Layer already exists
f25ec1d93a58: Layer already exists
684f82921421: Layer already exists
9af5f53e8f62: Layer already exists
6373913f2721: Pushed
a20e5a316cde: Pushed
1f5d70a40657: Pushed
43afb8b6fef0: Pushed
1.0.0: digest: sha256:09df66ca51e0822840c2b98b49114e65966b6442200276fc19a7aff42d38fe74 size: 2841
DONE
-----
ID: ec5c5d0a-6be4-45a9-bb86-edd8888d0d42
CREATE_TIME: 2025-11-26T10:27:43+00:00
DURATION: 39s
SOURCE: gs://qwiklabs-gcp-02-4e86b74040f4_cloudbuild/source/1764152859.879838-5600c25b6c8f46ba857233c528f59f81.tgz
IMAGES: gcr.io/qwiklabs-gcp-02-4e86b74040f4/frontend:1.0.0
STATUS: SUCCESS
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/microservices/src/frontend (qwiklabs-gcp-02-4e86b74040f4)$ kubectl create deployment frontend --image=gcr.io/${GOOGLE_CLOUD_PROJECT}/frontend:1.0.0
error: failed to create deployment: deployments.apps "frontend" already exists
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/microservices/src/frontend (qwiklabs-gcp-02-4e86b74040f4)$ kubectl expose deployment frontend --type=LoadBalancer --port 80 --target-port 8080
Error from server (AlreadyExists): services "frontend" already exists
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/microservices/src/frontend (qwiklabs-gcp-02-4e86b74040f4)$ kubectl delete deployment monolith
kubectl delete service monolith
deployment.apps "monolith" deleted
service "monolith" deleted
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/microservices/src/frontend (qwiklabs-gcp-02-4e86b74040f4)$
```

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Build a Website on Google Cloud > Migrating a Monolithic Website to Microservices on Google Kubernetes Engine

Contents

Migrating a Monolithic Website to Microservices on ≡

kubectl delete service monolith

Lab setup instructions and requirements >

End Lab 00:29:48

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Open Google Console

Username: student-02-953d929d59b2l Copy icon

Password: L3fZEaou87Gv Copy icon

GCP Project ID: qwiklabs-gcp-02-4e86b74l Copy icon

Test your work

To verify everything is working, your old IP address from your monolith service should not work now, and your new IP address from your frontend service should host the new application.

- To see a list of all the services and IP addresses, run the following command:

kubectl get services Copy icon

Your output should look similar to the following:

NAME	TYPE	CLUSTER-IP	EXTERNAL-IP	PORT(S)
AGE				
frontend	LoadBalancer	10.39.246.135	35.227.21.154	
80:32663/TCP	12m			
kubernetes	ClusterIP	10.39.240.1	<none>	443/TCP
18d				

100/100

Lab instructions and tasks

GSP699

Overview

Setup and requirements

Task 1. Clone the source repository

Task 2. Create a GKE cluster

Task 3. Deploy the existing monolith

Task 4. Migrate orders to a microservice

Task 5. Migrate Products to microservice

Task 6. Migrate Frontend to microservice

Congratulations!

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794ce8b1b516: Layer already exists
3220beed9b06: Layer already exists
f25ec1d93a58: Layer already exists
684f82921421: Layer already exists
9af5f53e8f62: Layer already exists
6373913f2721: Pushed
a20e5a316cde: Pushed
1f5d70a40657: Pushed
43afb8b6fef0: Pushed
1.0.0: digest: sha256:09df66ca51e0822840c2b98b49114e65966b6442200276fc19a7aff42d38fe74 size: 2841
DONE

ID: ec5c5d0a-6be4-45a9-bb86-edd8888d0d42
CREATE_TIME: 2025-11-26T10:27:43+00:00
DURATION: 39S
SOURCE: gs://qwiklabs-gcp-02-4e86b74040f4_cloudbuild/source/1764152859.879838-5600c25b6c8f46ba857233c528f59f81.tgz
IMAGES: gcr.io/qwiklabs-gcp-02-4e86b74040f4/frontend:1.0.0
STATUS: SUCCESS

```
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/microservices/src/frontend (qwiklabs-gcp-02-4e86b74040f4)$ kubectl create deployment frontend --image=gcr.io/${GOOGLE_CLOUD_PROJECT}/frontend:1.0.0
error: failed to create deployment: deployments.apps "frontend" already exists
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/microservices/src/frontend (qwiklabs-gcp-02-4e86b74040f4)$ kubectl expose deployment frontend --type=LoadBalancer --port 80 --target-port 8080
Error from server (AlreadyExists): services "frontend" already exists
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/microservices/src/frontend (qwiklabs-gcp-02-4e86b74040f4)$ kubectl delete deployment monolith
kubectl delete service monolith
deployment.apps "monolith" deleted
service "monolith" deleted
student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/microservices/src/frontend (qwiklabs-gcp-02-4e86b74040f4)$ kubectl get services
NAME      TYPE      CLUSTER-IP      EXTERNAL-IP      PORT(S)      AGE
frontend   LoadBalancer   34.118.238.88  34.186.71.121  80:31322/TCP  5m36s
kubernetes ClusterIP   34.118.224.1   <none>        443/TCP     52m
orders     LoadBalancer  34.118.227.32  136.107.57.157  80:32489/TCP  35m
products   LoadBalancer  34.118.239.88  34.186.48.195  80:31522/TCP  18m
```

student_02_953d929d59b2@cloudshell:~/monolith-to-microservices/microservices/src/frontend (qwiklabs-gcp-02-4e86b74040f4)\$

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ENG US 04:02 PM 26-11-2025