

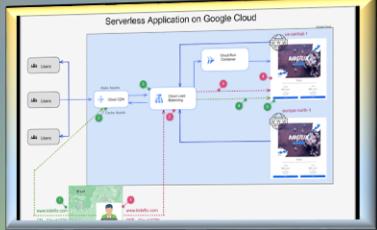


www.linkedin.com/in/prafulpatel16



<https://github.com/prafulpatel16>

Page | 0



PRAFUL PATEL

www.linkedin.com/in/prafulpatel16

<https://github.com/prafulpatel16>

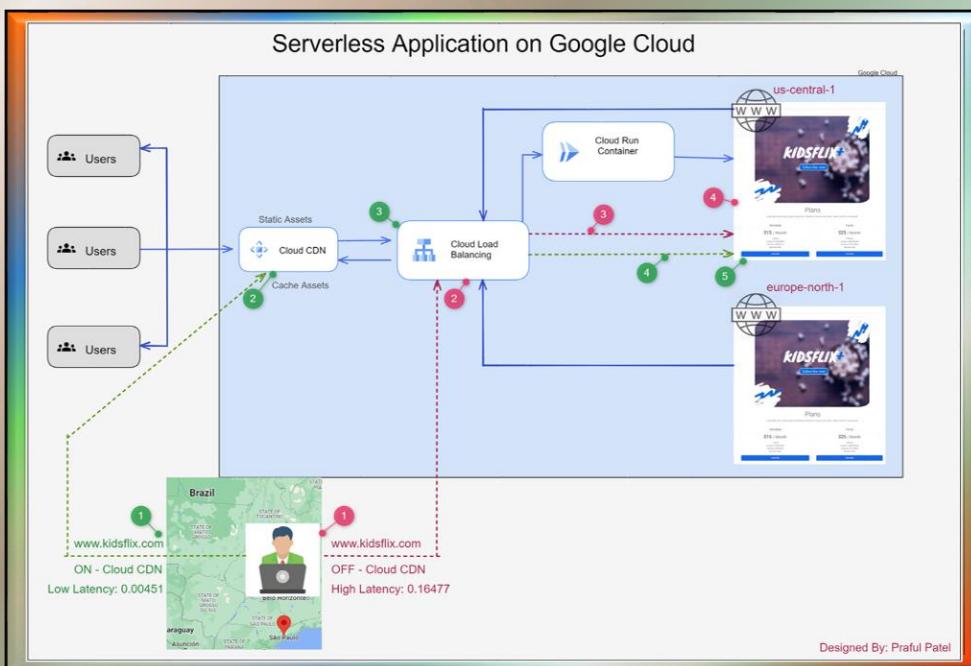
GCP BOOTCAMP CHALLENGE PROJECT

GCP PROJECT 6.1: SERVERLESS WEB

APPLICATION LOAD BALANCING SPEED UP

CHALLENGE USING CLOUD CDN

IMPLEMENTED BY: PRAFUL PATEL



Designed By: Praful Patel



Date: MAR 16, 2022

➤ **Project Definition:**

An IT services provider company called **PRAfect Systems Inc.** is engaged into providing software development solutions. Currently, they are running their legacy application on premise and needs to be migrated to the GCP cloud and application should be run into serverless architecture. The web application is a dynamic entertainment web application name "**Kidsflix+**". This web application should be containerized and it should store into google container registry and container should run using google cloud run service which is serverless application deployment service. Also the requirement is that this application should be highly available in order to access under heavy load without a single failure.

➤ **Project Description:**

Web Application Name: Kidsflix+

Serverless service: Cloud Run

This project demonstrates an experience of containerize an application and deploy via cloud run in a serverless manner, and also in order to achieve a highly available application it should be running behind load balancer.

➤ **Solution:**

This project is a challenge project for highly available serverless web application where web frontend is running on container on google cloud run which is a serverless application deployment service. Now the problem is that the user from Brazil region is trying to access the kidsflix+ application and they are having issue about performance where the application was taking too long to load the content.

There is a load balancer is deployed in front of the web app which were running on cloud run service in us-central- and north-europe1 region so application is performing well due to load balancing. Not it needs to deploy a Cloud CDN which with the load balancer so that static content of the web application can be cached so the performance of this application is increased.

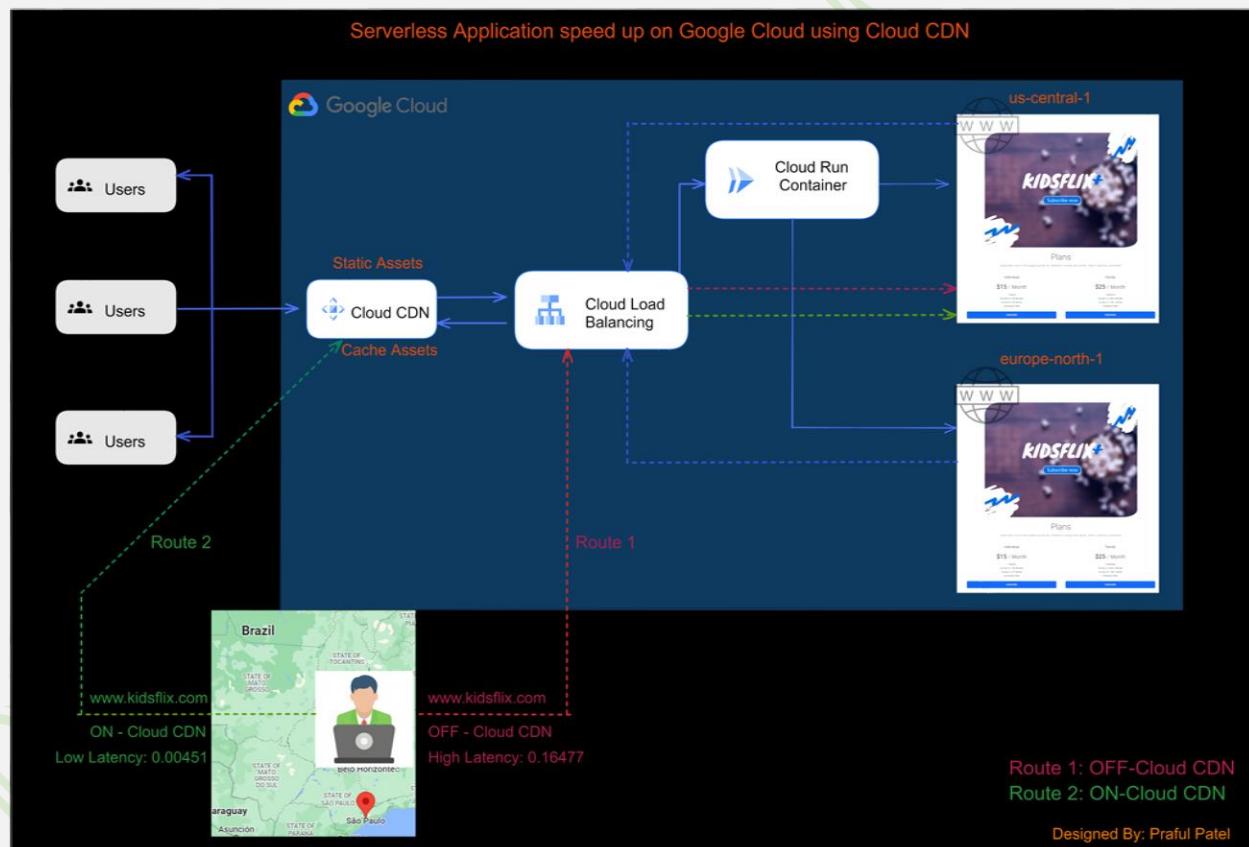
As solution in needs to enable a cloud cdn origin for the load balancing backend so that it can cache the content. Before to deploy cloud cdn it need to measure the performance of the application in a normal condition. So deploy a testing instance in brazil region and test the web application performance and observe the figures. Once it is done needs to enable the cloud cdn and then again measure the performance of the web application and compare the result. It will be noticed that the 30% of the performance has been improved based on the configuration.

Project Cost Estimation:

(Note: This cost is Not any actual cost, it's just an estimation based on high level requirement. Price may be vary based on adding and removing services based on requirement.)

Tools & Technologies covered:

- ❖ GCP Cloud
- ❖ Google IAM
- ❖ Compute Engine
- ❖ Cloud Run
- ❖ Cloud Build
- ❖ Container Registry
- ❖ Load Balancing
- ❖ Cloud CDN

➤ Architectural Diagram:

This project will be completed in 5 implementation phases.

➤ Project implementation Phase:

- ❖ Implementation Phase 1: Create a container image from source code and deploy via cloud run
- ❖ Implementation Phase 2: Deploy external http load balancer

- Implementation Phase 3: Test web application response BEFORE enabling Cloud CDN
- Implementation Phase 4: Deploy Cloud CDN to speed up the web application
- Implementation Phase 5: Test web application response AFTER enabling Cloud CDN if it's caching static content and speed up the response.

➤ **Implementation:**

- Implementation Phase 1: Create a container image from source code and deploy via cloud run

1. Enable necessary API services.
2. Download web application source code files
3. Unzip the source code files
4. Create container image from source code file
5. Run the container image via cloud build
6. Deploy container image via cloud run

- Implementation Phase 2: Deploy external http load balancer

1. Create 2 serverless Network endpoint groups
2. Create the backend service global
3. Add serverless NEG to the backend global
4. Create URL map to redirect incoming request to backend service
5. Create http proxy load balancing
6. Reserve and external ip address

- Implementation Phase 3: Test web application response BEFORE enabling Cloud CDN

1. Launch a Cloud CDN testing instance and SSH to that instance
2. Switch your location to Brazil
3. Hit USA app url with testing command to measure the response
4. Hit Finland app url with testing command to measure the response
5. Hit load balancing app url with testing command to measure the response
6. Monitor the CDN cache ratio

- Implementation Phase 4: Deploy Cloud CDN to speed up the web application

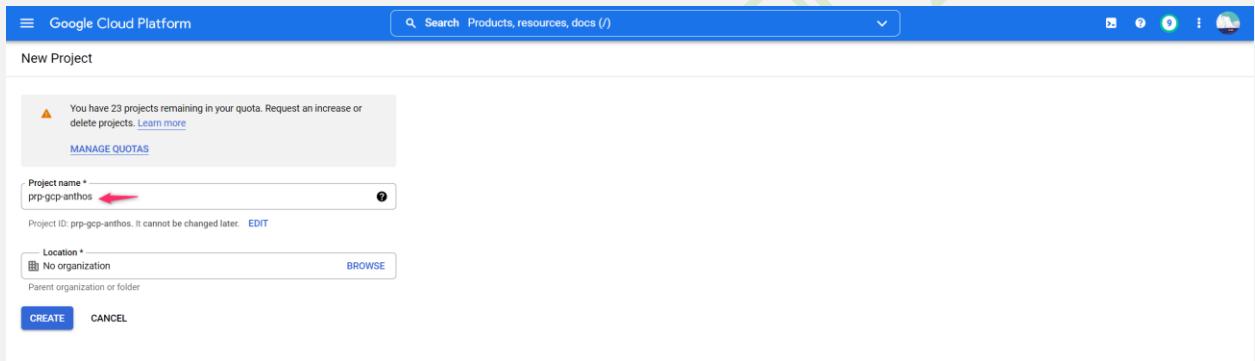
1. Enable Cloud CDN api
2. Create a CDN origin

- Implementation Phase 5: Test web application response AFTER enabling Cloud CDN if it's caching static content and speed up the response

1. Launch a Cloud CDN testing instance in Brazil and SSH to that instance
2. Switch your location to Brazil
3. Hit USA app url with testing command to measure the response
4. Hit Finland app url with testing command to measure the response
5. Hit load balancing app url with testing command to measure the response
6. Monitor the CDN cache ratio

✓ **Solution Implementation in Action:**

1. Create a GCP Project



2. Check the billing is enable for the project

Billing account name	Billing account ID	Status	Last 30 days' spend	Account type	Organization	Health checks
My Billing Account	01C1CD-32E34EF24ACC	Active	\$0	Direct	—	1

Billing account: My Billing Account

Overview, Reports, Cost table, Cost breakdown, Commitments, Commitment analysis, Budgets & alerts, Billing export, Pricing, Documents, Transactions, Payment settings, Payment method, Account management.

Projects linked to this billing account:

Project name	Project ID	Actions
My First Project	ethereal-terra-343020	⋮
prafuls-projects	prafuls-projects	⋮
prp-gcp-anthos	prp-gcp-anthos	⋮

My Billing Account

Edit or delete permissions below or 'Add Principal' to grant new

Role / Principal: Billing Account Administrator (1)

Show inherited permissions

Filter: Enter property name or value

3. Enable 3 APIs

Enable the following APIs:

Compute Engine API

Cloud Build API

Cloud Run API

Google Cloud Platform Select a project ▾

Cloud Resource Manager API

Creates, reads, and updates metadata for Google Cloud Platform containers.

TRY THIS API

OVERVIEW DOCUMENTATION

Overview

Tutorials and documentation

Learn more

Select a project

RECENT STARRED ALL

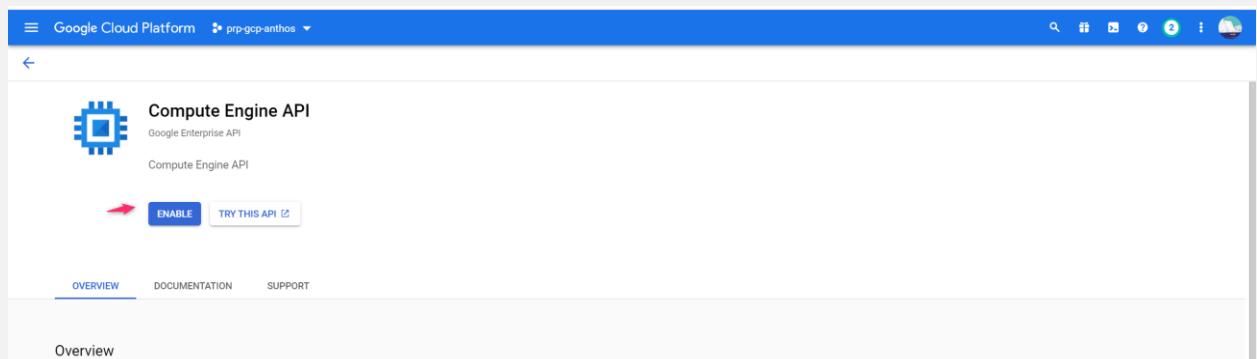
Name	ID
prp-gcp-anthos	prp-gcp-anthos
prafuls-projects	prafuls-projects
My First Project	ethereal-terra-343020

CANCEL OPEN

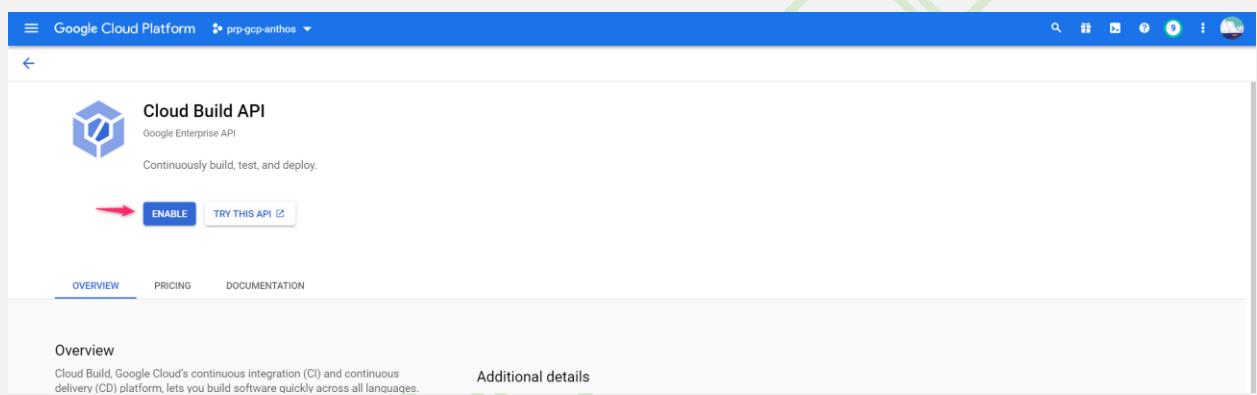
What is your main goal for visiting Google Cloud Marketplace today?

- To find information about a specific product
- To browse products offered by the Marketplace
- To use or manage a product I have purchased
- To assess it as a potential procurement channel
- To view or accept a private offer
- To try out a specific product before purchasing
- To purchase a product
- To research and find solutions for my work
- Other

Compute Engine API



Cloud Build API



Downloading and unzipping the files of the application KidsFlix (Finland and USA)

Step 1) Downloading the files:

```
wget https://storage.googleapis.com/bootcamp-gcp-en/bootcamp-gcp-module-lb-files-app-usa.zip
```

```
wget https://storage.googleapis.com/bootcamp-gcp-en/bootcamp-gcp-module-lb-files-app-finland.zip
```

```
wget https://storage.googleapis.com/bootcamp-gcp-en/bootcamp-gcp-module-lb-files-app-usa.zip
```

GCP BOOTCAMP CHALLENGE PROJECT
APPLICATION LOAD BALANCING SPEED UP CHALLENGE USING CLOUD CDN
PRAFUL PATEL

GCP PROJECT 6.1: SERVERLESS WEB
IMPLEMENTED BY:

```

Welcome to Cloud Shell! Type "help" to get started.
Your Cloud Platform project in this session is set to prp-gcp-anthos.
Use "gcloud config set project [PROJECT_ID]" to change to a different project.
aystesterl@cloudshell:~ (prp-gcp-anthos)$ wget https://storage.googleapis.com/bootcamp-gcp-en/bootcamp-gcp-module-lb-files-app-usa.zip
--2022-03-14 00:46:57-- https://storage.googleapis.com/bootcamp-gcp-en/bootcamp-gcp-module-lb-files-app-usa.zip
Resolving storage.googleapis.com (storage.googleapis.com)... 74.125.132.128, 74.125.201.128, 74.125.69.128, ...
Connecting to storage.googleapis.com (storage.googleapis.com)|74.125.132.128|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 528893 (516K) [application/x-zip-compressed]
Saving to: 'bootcamp-gcp-module-lb-files-app-usa.zip'

bootcamp-gcp-module-lb-files-app-usa.zip 100%[=====] 516.50K --.-KB/s in 0.005s
2022-03-14 00:46:58 (94.5 MB/s) - 'bootcamp-gcp-module-lb-files-app-usa.zip' saved [528893/528893]

aystesterl@cloudshell:~ (prp-gcp-anthos)$

```

[wget https://storage.googleapis.com/bootcamp-gcp-en/bootcamp-gcp-module-lb-files-app-finland.zip](https://storage.googleapis.com/bootcamp-gcp-en/bootcamp-gcp-module-lb-files-app-finland.zip)

```

Resolving storage.googleapis.com (storage.googleapis.com)... 74.125.132.128, 74.125.201.128, 74.125.69.128, ...
Connecting to storage.googleapis.com (storage.googleapis.com)|74.125.132.128|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 528893 (516K) [application/x-zip-compressed]
Saving to: 'bootcamp-gcp-module-lb-files-app-usa.zip'

bootcamp-gcp-module-lb-files-app-usa.zip 100%[=====] 516.50K --.-KB/s in 0.005s
2022-03-14 00:46:58 (94.5 MB/s) - 'bootcamp-gcp-module-lb-files-app-usa.zip' saved [528893/528893]

aystesterl@cloudshell:~ (prp-gcp-anthos)$ wget https://storage.googleapis.com/bootcamp-gcp-en/bootcamp-gcp-module-lb-files-app-finland.zip
--2022-03-14 00:48:38-- https://storage.googleapis.com/bootcamp-gcp-en/bootcamp-gcp-module-lb-files-app-finland.zip
Resolving storage.googleapis.com (storage.googleapis.com)... 172.217.219.128, 209.85.147.128, 142.250.125.128, ...
Connecting to storage.googleapis.com (storage.googleapis.com)|172.217.219.128|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 528977 (517K) [application/x-zip-compressed]
Saving to: 'bootcamp-gcp-module-lb-files-app-finland.zip'

bootcamp-gcp-module-lb-files-app-finland.zip 100%[=====] 516.58K --.-KB/s in 0.005s
2022-03-14 00:48:38 (110 MB/s) - 'bootcamp-gcp-module-lb-files-app-finland.zip' saved [528977/528977]

aystesterl@cloudshell:~ (prp-gcp-anthos)$

```

List the source code of application files

The screenshot shows the Google Cloud Platform dashboard for the project "prp-gcp-anthos". The dashboard includes sections for Project info, Compute Engine (CPU utilization at 11.29%), Google Cloud Platform status (All services normal), and Billing (Estimated charges CAD \$0.00). The Cloud Shell terminal window shows the user navigating through files in the directory, including "services-config.yaml", "Dockerfile", "migration.yaml", and "deployment-spec.yaml". Two zip files are listed: "bootcamp-gcp-module-lb-files-app-usa.zip" (marked with a red circle 1) and "bootcamp-gcp-module-lb-files-app-finland.zip" (marked with a red circle 2).

```

aystesterl@cloudshell:~ (prp-gcp-anthos)$ ls -ltr
total 1092
-rw----- 1 aystesterl aystesterl 2327 Mar 7 16:11 prp-m4a-install.json
-rw----- 1 aystesterl aystesterl 2325 Mar 7 16:36 prp-m4-ce-src.json
-rw----r-- 1 aystesterl aystesterl 4631 Mar 7 16:44 my-migration.yaml
-rw----r-- 1 aystesterl aystesterl 103 Mar 7 17:03 logs.yaml
-rw----r-- 1 aystesterl aystesterl 55 Mar 7 17:03 blocklist.yaml
-rw----r-- 1 aystesterl aystesterl 1625 Mar 7 17:03 services-config.yaml
-rw----r-- 1 aystesterl aystesterl 11 Mar 7 17:03 Dockerfile
-rw----r-- 1 aystesterl aystesterl 4631 Mar 7 17:03 migration.yaml
-rw----r-- 1 aystesterl aystesterl 4706 Mar 7 17:26 deployment-spec.yaml
drwxr-xr-x 3 aystesterl aystesterl 4096 Mar 9 14:28 cloudshell_main
-rw----r-- 1 aystesterl aystesterl 528893 Mar 9 22:53 bootcamp-gcp-module-lb-files-app-usa.zip 1
-rw----r-- 1 aystesterl aystesterl 528977 Mar 9 22:53 bootcamp-gcp-module-lb-files-app-finland.zip 2
-rw----r-- 1 aystesterl aystesterl 913 Mar 14 00:45 README-cloudshell.txt
aystesterl@cloudshell:~ (prp-gcp-anthos)$

```

Step 2) Unzipping the files:

`unzip bootcamp-gcp-module-lb-files-app-finland.zip`

The screenshot shows the Google Cloud Platform dashboard for the project "prp-gcp-anthos". The dashboard includes sections for Project info, Compute Engine (CPU utilization at 11.29%), Google Cloud Platform status (All services normal), and Billing (Estimated charges CAD \$0.00). The Cloud Shell terminal window shows the user unzipping the file "bootcamp-gcp-module-lb-files-app-finland.zip". The terminal output shows the creation and inflation of various files and directories within the archive, including "bootcamp-gcp-module-lb-files-app-usa", "DS_Store", "app.py", "requirements.txt", "static/", "banner.png", "form-validation.css", "index.html", "templates/", "checkout.html", and "index.html".

```

aystesterl@cloudshell:~ (prp-gcp-anthos)$ unzip bootcamp-gcp-module-lb-files-app-finland.zip
Archive: bootcamp-gcp-module-lb-files-app-finland.zip
  creating: bootcamp-gcp-module-lb-files-app-usa/
  inflating: bootcamp-gcp-module-lb-files-app-usa/.DS_Store
  inflating: bootcamp-gcp-module-lb-files-app-usa/app.py
  inflating: bootcamp-gcp-module-lb-files-app-usa/Dockerfile
  inflating: bootcamp-gcp-module-lb-files-app-usa/requirements.txt
  creating: bootcamp-gcp-module-lb-files-app-usa/static/
  inflating: bootcamp-gcp-module-lb-files-app-usa/static/banner.png
  inflating: bootcamp-gcp-module-lb-files-app-usa/static/form-validation.css
  inflating: bootcamp-gcp-module-lb-files-app-usa/templates/applications/policy/css
  creating: bootcamp-gcp-module-lb-files-app-usa/templates/
  inflating: bootcamp-gcp-module-lb-files-app-usa/templates/checkout.html
  inflating: bootcamp-gcp-module-lb-files-app-usa/templates/index.html
aystesterl@cloudshell:~ (prp-gcp-anthos)$

```

`unzip bootcamp-gcp-module-lb-files-app-usa.zip`

GCP BOOTCAMP CHALLENGE PROJECT
APPLICATION LOAD BALANCING SPEED UP CHALLENGE USING CLOUD CDN
PRAFUL PATEL

GCP PROJECT 6.1: SERVERLESS WEB
IMPLEMENTED BY:
PRAFUL PATEL

```

inflating: bootcamp-gcp-module-lb-files-app-usa/requirements.txt
creating: bootcamp-gcp-module-lb-files-app-usa/static/
inflating: bootcamp-gcp-module-lb-files-app-usa/static/banner.png
inflating: bootcamp-gcp-module-lb-files-app-usa/static/form-validation.css
inflating: bootcamp-gcp-module-lb-files-app-usa/static/pricing.css
creating: bootcamp-gcp-module-lb-files-app-usa/templates/
inflating: bootcamp-gcp-module-lb-files-app-usa/templates/checkout.html
inflating: bootcamp-gcp-module-lb-files-app-usa/templates/index.html
aystesterl@cloudshell:~ (prp-gcp-anthos)$ unzip bootcamp-gcp-module-lb-files-app-finland.zip
Archive: bootcamp-gcp-module-lb-files-app-finland.zip
  creating: bootcamp-gcp-module-lb-files-app-finland/
  inflating: bootcamp-gcp-module-lb-files-app-finland/.DS_Store
  inflating: bootcamp-gcp-module-lb-files-app-finland/dockerfile
  inflating: bootcamp-gcp-module-lb-files-app-finland/static/requirements.txt
  creating: bootcamp-gcp-module-lb-files-app-finland/static/
  inflating: bootcamp-gcp-module-lb-files-app-finland/static/banner.png
  inflating: bootcamp-gcp-module-lb-files-app-finland/static/form-validation.css
  inflating: bootcamp-gcp-module-lb-files-app-finland/static/pricing.css
  creating: bootcamp-gcp-module-lb-files-app-finland/templates/
  inflating: bootcamp-gcp-module-lb-files-app-finland/templates/checkout.html
  inflating: bootcamp-gcp-module-lb-files-app-finland/templates/index.html
aystesterl@cloudshell:~ (prp-gcp-anthos)$

```

Unzipped files

```

total 1100
drwxr-xr-x 3 aystesterl aystesterl 2327 Mar 7 16:11 prp-m4a-install.json
-rw-r--r-- 1 aystesterl aystesterl 2325 Mar 7 16:36 prp-m4a-prj-src.json
-rw-r--r-- 1 aystesterl aystesterl 4631 Mar 7 16:44 migration.yaml
-rw-r--r-- 1 aystesterl aystesterl 103 Mar 7 17:03 logs.yaml
-rw-r--r-- 1 aystesterl aystesterl 55 Mar 7 17:03 blocklist.yaml
-rw-r--r-- 1 aystesterl aystesterl 1625 Mar 7 17:03 services-config.yaml
-rw-r--r-- 1 aystesterl aystesterl 817 Mar 7 17:03 Dockerfile
-rw-r--r-- 1 aystesterl aystesterl 4631 Mar 7 17:03 migration.yaml
-rw-r--r-- 1 aystesterl aystesterl 1706 Mar 7 17:26 deployment.spec.yaml
drwxr-xr-x 3 aystesterl aystesterl 4096 Mar 9 14:28 cloudshell_open
drwxr-xr-x 4 aystesterl aystesterl 4096 Mar 9 19:46 bootcamp-gcp-module-lb-files-app-finland
drwxr-xr-x 4 aystesterl aystesterl 4096 Mar 9 19:46 bootcamp-gcp-module-lb-files-app-usa
-rw-r--r-- 1 aystesterl aystesterl 528993 Mar 9 22:53 bootcamp-gcp-module-lb-files-app-usa.zip
-rw-r--r-- 1 aystesterl aystesterl 528977 Mar 9 22:53 bootcamp-gcp-module-lb-files-app-finland.zip
-rw-r--r-- 1 aystesterl aystesterl 913 Mar 14 00:45 README-cloudshell.txt
aystesterl@cloudshell:~ (prp-gcp-anthos)$

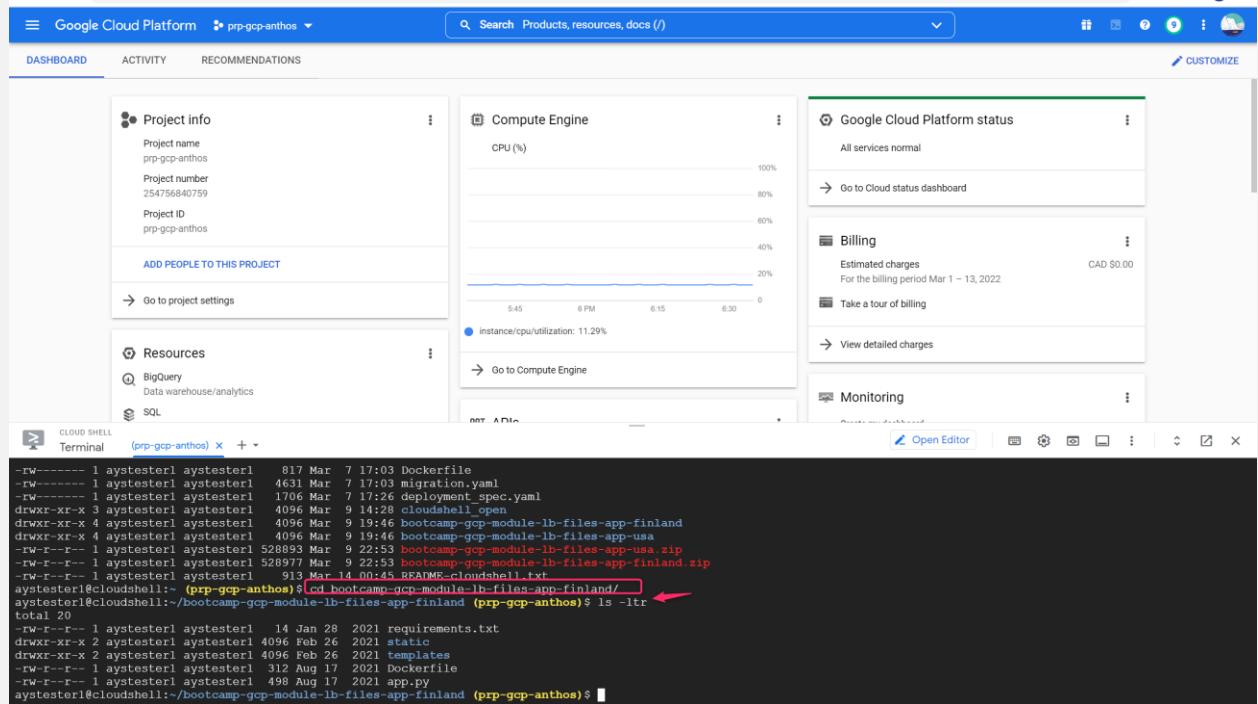
```

App Kids Flix: Finland

Creating a Container Image and deploying via Cloud Run

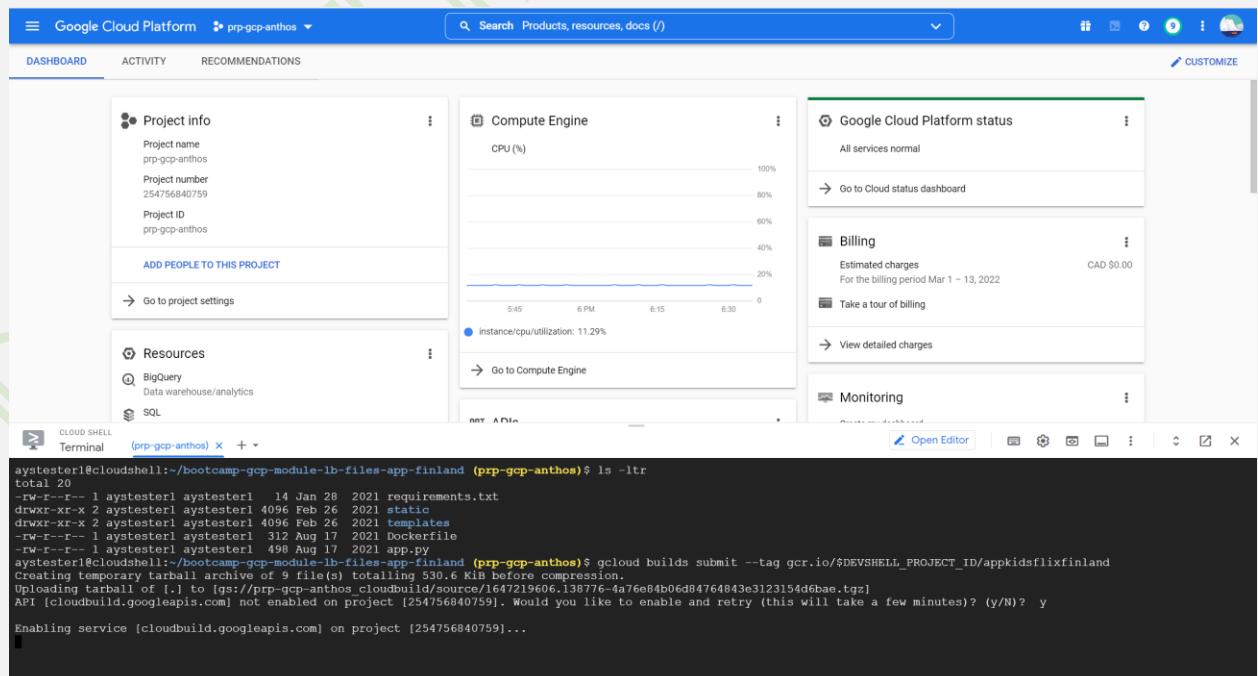
Step 1) Accessing the folder of the Finland application files:

cd ~/bootcamp-gcp-module-lb-files-app-finland

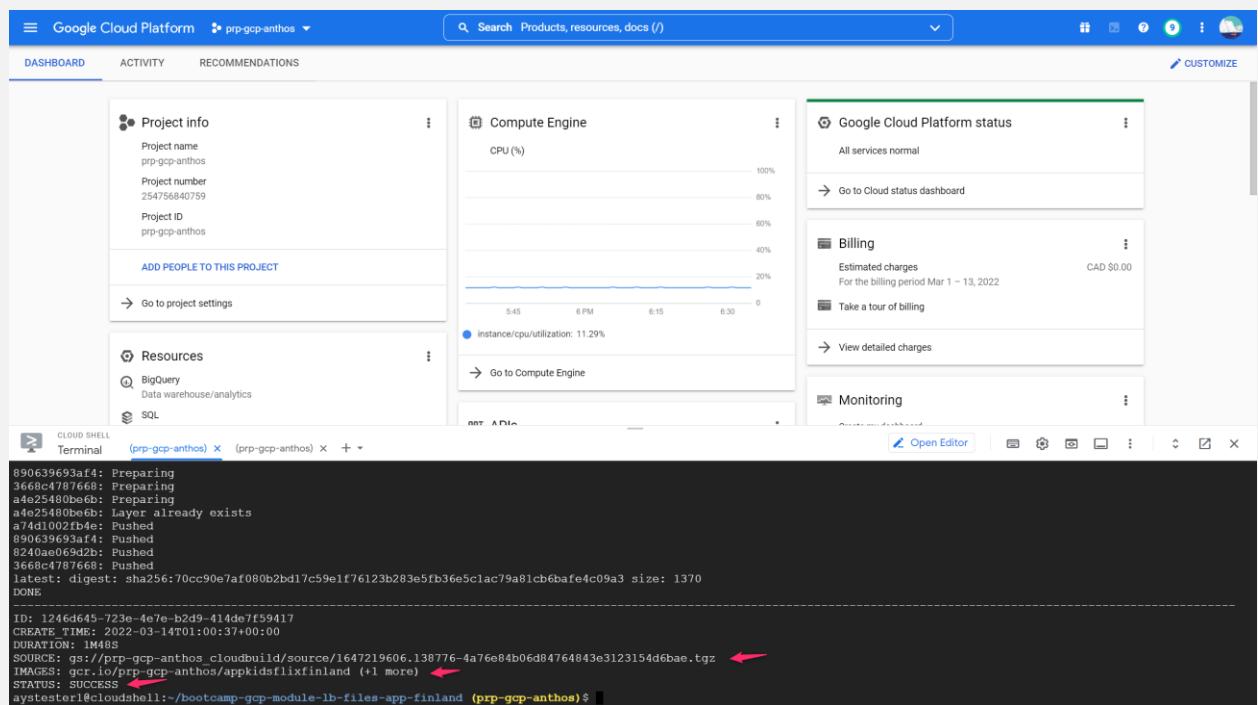


Step 2) Running the Cloud Build in the container image:

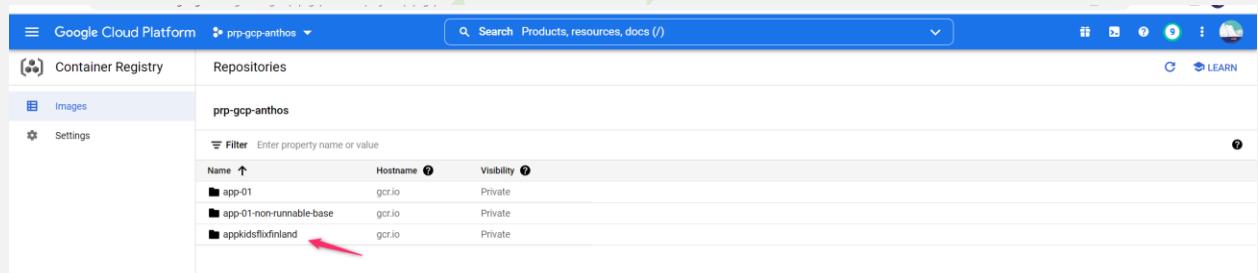
```
gcloud builds submit --tag gcr.io/$DEVSHELL_PROJECT_ID/appkidsflixfinland
```



Just waiting for the SUCCESS status, and then, go to the next step!



Verify that container is created and registered to GCR



Step 3) Deploying the application using the Cloud Run.

`gcloud run deploy --image gcr.io/$DEVSHELL_PROJECT_ID/appkidsflixfinland --port 5000 --platform managed`

Google Cloud Platform Dashboard showing the Compute Engine CPU usage chart and various status panels like Google Cloud Platform status, Billing, and Monitoring. A red arrow points to the terminal window where the deployment command is being run.

```
3668c4787668: Preparing
a4e25480be6b: Preparing
a4e25480be6b: Layer already exists
a74d1002fb4e: Pushed
890639693a4f: Pushed
8240ae069d2b: Pushed
3668c4787668: Pushed
latest: digest: sha256:70cc90e7af080b2bd17c59e1f76123b283e5fb36e5c1ac79a81cb6bafe4c09a3 size: 1370
DONE

ID: 1246d645-723e-4e7e-b2d9-414de7f59417
CREATE_TIME: 2022-03-14T01:00:37+00:00
DURATION: 1M48S
SOURCE: gs://prp-gcp-anthos/cloudbuild/source/1647219606.138776-4a76e84b06d84764843e3123154d6bae.tgz
IMAGES: gcr.io/prp-gcp-anthos/appkidsflixfinland (+1 more)
STATUS: SUCCESS
aystester@cloudshell:~/bootcamp-gcp-module-lb-files-app-finland (prp-gcp-anthos)$ gcloud run deploy --image gcr.io/$DEVSHELL_PROJECT_ID/appkidsflixfinland --port 5000 --platform managed
```

Press Enter to confirm the default application name: appkidsflixfinland

Select the region, europe-north1, typing the number: 13

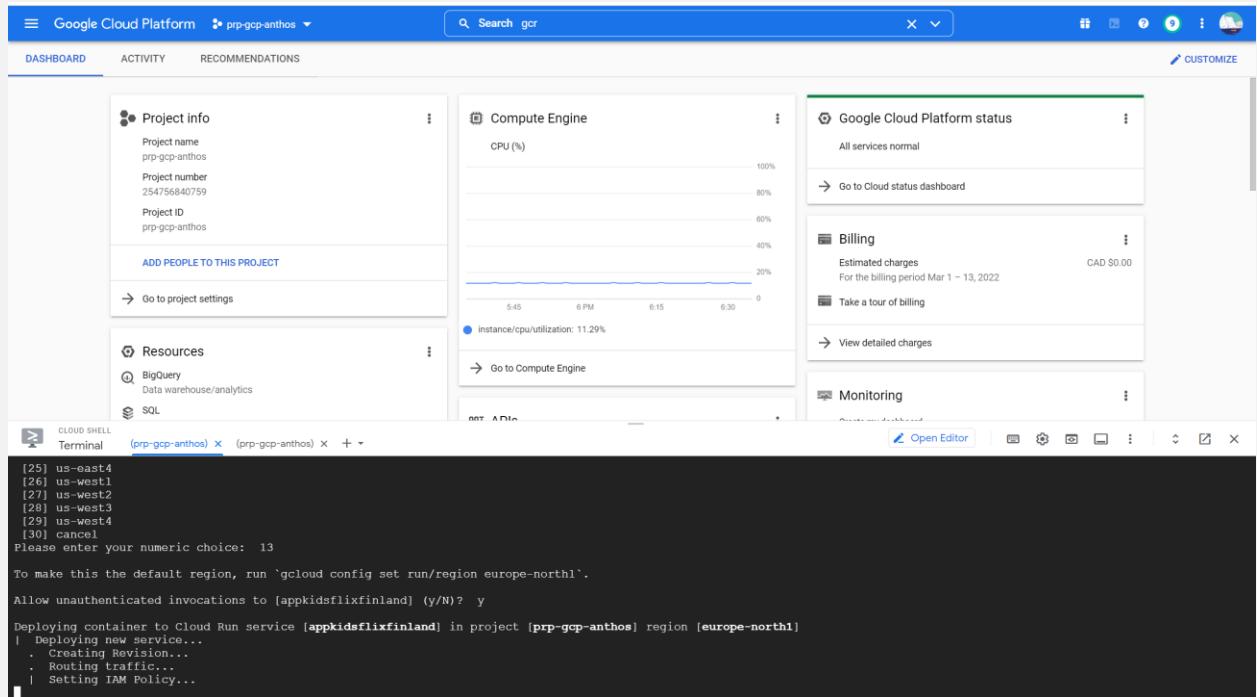
Allow unauthenticated requests by typing: y

Google Cloud Platform Dashboard showing the Compute Engine CPU usage chart and various status panels like Google Cloud Platform status, Billing, and Monitoring. A red arrow points to the terminal window where the deployment command is being run, and another red arrow points to the prompt asking for a numeric choice.

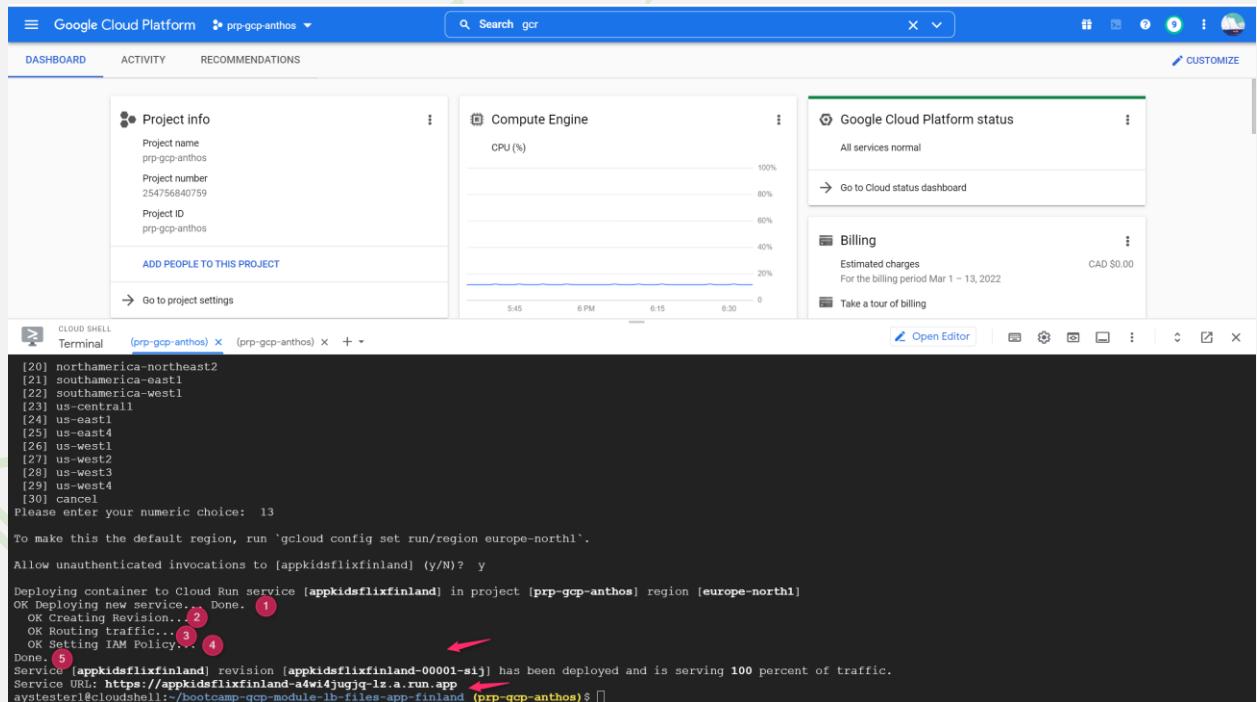
```
[18] europe-west6
[19] northamerica-northeast1
[20] northamerica-northeast2
[21] southamerica-east1
[22] southamerica-west1
[23] us-central1
[24] us-east1
[25] us-east4
[26] us-west1
[27] us-west2
[28] us-west3
[29] us-west4
[30] cancel
Please enter your numeric choice: 13
To make this the default region, run 'gcloud config set run/region europe-north1'.
Allow unauthenticated invocations to [appkidsflixfinland] (y/N)? y
```

GCP BOOTCAMP CHALLENGE PROJECT
APPLICATION LOAD BALANCING SPEED UP CHALLENGE USING CLOUD CDN
PRAFUL PATEL

GCP PROJECT 6.1: SERVERLESS WEB
IMPLEMENTED BY:
PRAFUL PATEL



App container ran successfully



App Kids Flix: USA

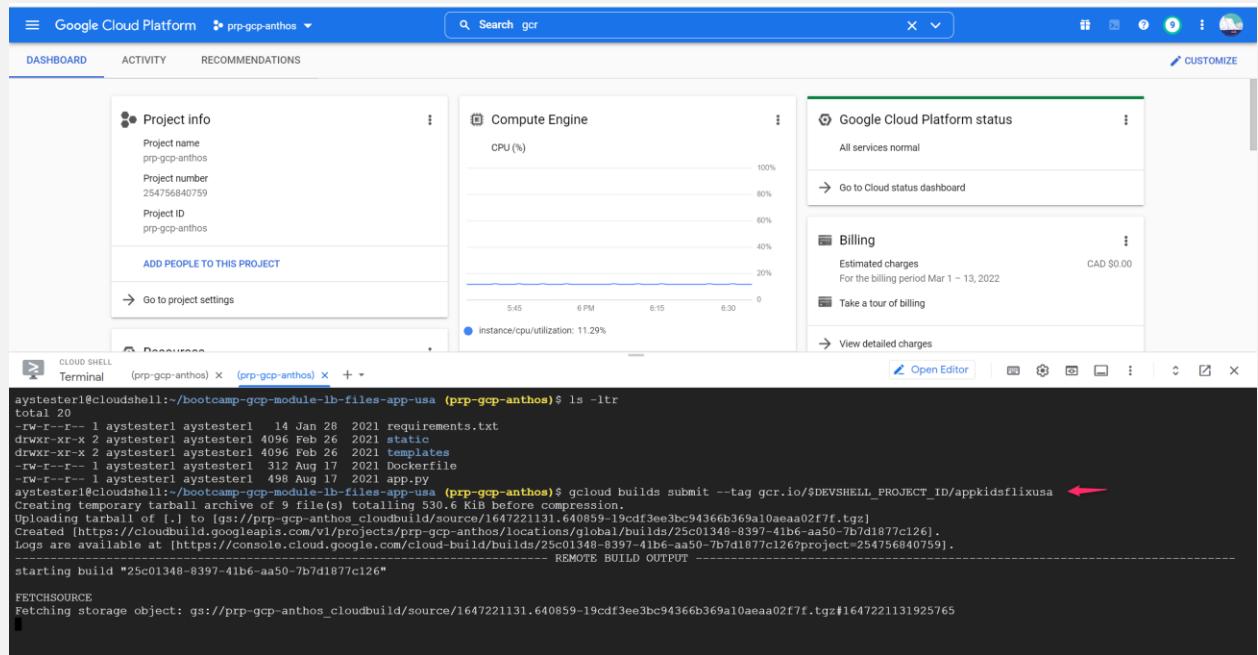
Creating a Container Image and deploying via Cloud Run

Step 1) Accessing the folder of the USA application files:

```
cd ~/bootcamp-gcp-module-lb-files-app-usa
```

Step 2) Running the Cloud Build in the container image:

```
gcloud builds submit --tag gcr.io/$DEVSHELL_PROJECT_ID/appkidsflixusa
```



The screenshot shows the Google Cloud Platform dashboard for the project "prp-gcp-anthos". The dashboard includes sections for Project info, Compute Engine (CPU usage over time), Google Cloud Platform status (All services normal), and Billing (Estimated charges CAD \$0.00 for the period Mar 1 – 13, 2022). Below the dashboard is a Cloud Shell terminal window. The terminal output shows the user navigating to the directory `~/bootcamp-gcp-module-lb-files-app-usa` and running the command `gcloud builds submit --tag gcr.io/\$DEVSHELL_PROJECT_ID/appkidsflixusa`. A red arrow points to the command line.

```
aystesterl@cloudshell:~/bootcamp-gcp-module-lb-files-app-usa (prp-gcp-anthos)$ ls -ltr
total 20
-rw-r--r-- 1 aystesterl aystesterl 14 Jan 28 2021 requirements.txt
drwxr-xr-x 2 aystesterl aystesterl 4096 Feb 26 2021 static
drwxr-xr-x 2 aystesterl aystesterl 4096 Feb 26 2021 templates
-rw-r--r-- 1 aystesterl aystesterl 312 Aug 17 2021 Dockerfile
-rw-r--r-- 1 aystesterl aystesterl 498 Aug 17 2021 app.py
aystesterl@cloudshell:~/bootcamp-gcp-module-lb-files-app-usa (prp-gcp-anthos)$ gcloud builds submit --tag gcr.io/$DEVSHELL_PROJECT_ID/appkidsflixusa ←
Creating temporary tarball archive of 9 file(s) totaling 530.6 KiB before compression.
Uploading tarball to https://gs://prp-gcp-anthos_cloudbuild/source/1647221131.640859-19cdf3ee3bc94366b369a10aeaa02f7f.tgz
Created [https://cloudbuild.googleapis.com/v1/projects/prp-gcp-anthos/locations/global/builds/25c01348-8397-41b6-aa50-7b7d1077c126]. Logs are available at [https://console.cloud.google.com/cloud-build/builds/25c01348-8397-41b6-aa50-7b7d1077c126?project=254756840759]. REMOTE BUILD OUTPUT
starting build "25c01348-8397-41b6-aa50-7b7d1077c126"
FETCHSOURCE
Fetching storage object: gs://prp-gcp-anthos_cloudbuild/source/1647221131.640859-19cdf3ee3bc94366b369a10aeaa02f7f.tgz#1647221131925765
```

Just waiting for the SUCCESS status, and then, go to the next step!

The screenshot shows the Google Cloud Platform dashboard for the project "prp-gcp-anthos". The dashboard includes sections for Project info, Compute Engine (CPU usage chart), Google Cloud Platform status (All services normal), and Billing (Estimated charges CAD \$0.00). A Cloud Shell terminal window is open, showing the command `gcloud docker build` followed by a log of Docker build steps and a successful push to the container registry. The status line at the bottom of the terminal window shows "STATUS: SUCCESS".

```
PUSH
Pushing gcr.io/prp-gcp-anthos/appkidsflixusa
The push refers to a repository [gcr.io/prp-gcp-anthos/appkidsflixusa]
87a25407aa81: Preparing
6e72d093ed67: Preparing
61963fed272: Preparing
e04bc7a882d1: Preparing
a4e25480be6b: Preparing
a4e25480be6b: Layer already exists
61963fed272: Pushed
87a25407aa81: Pushed
6e72d093ed67: Pushed
e04bc7a882d1: Pushed
latest: digest: sha256:e4895f2059b655e7316abdb009acc6d53ae10728a57462bab6eafe8b0af6ba17 size: 1370
DONE
ID: 25c01346-8397-41b6-aa50-7bd1877c126
CREATE TIME: 2022-03-14T01:25:32+00:00
DURATION: 1M4S
SOURCE: gcr://prp-gcp-anthos/cloudbuild/source/1647221131.640859-19cdf3ee3bc94366b369a10a0aa02f7f.tgz
IMAGES: gcr.io/prp-gcp-anthos/appkidsflixusa (>1 more)
STATUS: SUCCESS
syshtester1@cloudshell:~/bootcamp-gcp-module-lb-files-app-usa (prp-gcp-anthos) $
```

The screenshot shows the Google Cloud Platform Container Registry interface for the project "prp-gcp-anthos". The "Images" tab is selected, displaying a list of four Docker images: "app-01", "app-01-non-runnable-base", "appkidsflixinland", and "appkidsflixusa". Each image entry includes a checkbox, the image name, its hostname (gor.io), and its visibility status (Private).

Name	Hostname	Visibility
app-01	gor.io	Private
app-01-non-runnable-base	gor.io	Private
appkidsflixinland	gor.io	Private
appkidsflixusa	gor.io	Private

Step 3) Deploying the application using the Cloud Run.

```
gcloud run deploy --image gcr.io/$DEVSHELL_PROJECT_ID/appkidsflixusa --port 5000 --platform managed
```

```

CREATE TIME: 2022-03-14T01:25:32+00:00
DURATION: 1m46s
SOURCE: gs://prp-gcp-anthos_cloudbuild/source/1647221131.640859-19cdf3ee3bc94366b369a10aeaa02f7f.tgz
IMAGES: gcr.io/prp-gcp-anthos/appkidsflixusa (+1 more)
STATUS: SUCCESS
ayastester@cloudshell:~/bootcamp-gcp-module-lb-files-app-usa (prp-gcp-anthos)$ gcloud run deploy --image gcr.io/$DEVSHELL_PROJECT_ID/appkidsflixusa --port 5000 --platform managed
Service name (appkidsflixusa): appkidsflixusa
Please specify a region:
[1] asia-east1
[2] asia-east2
[3] asia-northeast1
[4] asia-northeast2
[5] asia-northwest3
[6] asia-south1
[7] asia-south2
[8] asia-southeast1
[9] asia-southeast2
[10] australia-southeast1
[11] australia-southeast2
[12] europe-central2
[13] europe-north1
[14] europe-west1

```

Press Enter to confirm the default application name: appkidsflixusa

Select the region, us-central1, typing the number: 23

Allow unauthenticated requests by typing: y

```

CREATE TIME: 2022-03-14T01:25:32+00:00
DURATION: 1m46s
SOURCE: gs://prp-gcp-anthos_cloudbuild/source/1647221131.640859-19cdf3ee3bc94366b369a10aeaa02f7f.tgz
IMAGES: gcr.io/prp-gcp-anthos/appkidsflixusa (+1 more)
STATUS: SUCCESS
ayastester@cloudshell:~/bootcamp-gcp-module-lb-files-app-usa (prp-gcp-anthos)$ gcloud run deploy --image gcr.io/$DEVSHELL_PROJECT_ID/appkidsflixusa --port 5000 --platform managed
Service name (appkidsflixusa): appkidsflixusa
Please specify a region:
[13] europe-north1
[14] europe-west1
[15] europe-west2
[16] europe-west3
[17] europe-west4
[18] europe-west6
[19] northamerica-northeast1
[20] northamerica-northeast2
[21] southamerica-east1
[22] southamerica-west1
[23] us-central1
[24] us-east1
[25] us-east4
[26] us-west1
[27] us-west2
[28] us-west3
[29] us-west4
[30] cancel
Please enter your numeric choice: 23
To make this the default region, run `gcloud config set run/region us-central1`.
Allow unauthenticated invocations to [appkidsflixusa] (y/N)? y

```

The screenshot shows the Google Cloud Platform dashboard for project 'prp-gcp-anthos'. It includes sections for Project info, Compute Engine (CPU usage chart), Google Cloud Platform status (All services normal), and Billing (Estimated charges CAD \$0.00). A Cloud Shell terminal window is open, showing the deployment of a service named 'appkidsflixusa' to Cloud Run. The terminal output includes steps 1 through 5, indicating the creation of a revision, routing traffic, and setting IAM policies. The final message states that the service has been deployed and is serving 100 percent of traffic at the URL <https://appkidsflixusa-a4wi4jugjq-uc.a.run.app>.

```
[23] us-central1
[24] us-east1
[25] us-east4
[26] us-west1
[27] us-west2
[28] us-west3
[29] us-west4
[30] cancel
Please enter your numeric choice: 23
To make this the default region, run `gcloud config set run/region us-central1`.
Allow unauthenticated invocations to [appkidsflixusa] (y/N)? y
Deploying container to Cloud Run service [appkidsflixusa] in project [prp-gcp-anthos] region [us-central1]
OK Deploying new service... Done. 1
OK Creating Revision... 2
OK Routing traffic... 3
OK Setting IAM Policy... 4
Done. 5
Service [appkidsflixusa] revision [appkidsflixusa-00001-ros] has been deployed and is serving 100 percent of traffic.
Service URL: https://appkidsflixusa-a4wi4jugjq-uc.a.run.app
```

Verify that both apps running from container in Cloud Run

The screenshot shows the Google Cloud Platform Cloud Run Services page. It lists two services: 'appkidsflixfinland' (version 1) and 'appkidsflixusa' (version 2). Both services are deployed to the 'europe-north1' region and have 0 requests per second. They are both unauthenticated and have All ingress. The last deployment for both was 25 minutes ago and was done by 'AYSTester1@gmail.com'. On the right side, there are sections for 'PERMISSIONS' and 'LABELS', and a note stating 'Please select at least one resource.'

Name	Req/sec	Region	Authentication	Ingress	Last deployed	Deployed by
appkidsflixfinland	0	europe-north1	Allow unauthenticated	All	25 minutes ago	AYSTester1@gmail.com
appkidsflixusa	0	us-central1	Allow unauthenticated	All	7 minutes ago	AYSTester1@gmail.com

Access app from browser:

Finland

Service URL: <https://appkidsflixfinland-a4wi4jugjq-lz.a.run.app>

Google Cloud Platform prp-gcp-anthos

Search gcr

DASHBOARD ACTIVITY RECOMMENDATIONS CUSTOMIZE

Project info

- Project name: prp-gcp-anthos
- Project number: 254756840759
- Project ID: prp-gcp-anthos

ADD PEOPLE TO THIS PROJECT

Go to project settings

Compute Engine

CPU (%)

6:45 6 PM 6:15 6:30

Google Cloud Platform status

All services normal

Go to Cloud status dashboard

Billing

Estimated charges CAD \$0.00 for the billing period Mar 1 – 13, 2022

Take a tour of billing

View detailed charges

CLOUD SHELL

Terminal (prp-gcp-anthos) x (prp-gcp-anthos) x + -

```
[25] us-east4
[26] us-west1
[27] us-west2
[28] us-west3
[29] us-west4
[30] cancel
Please enter your numeric choice: 13
To make this the default region, run 'gcloud config set run/region europe-north1'.
Allow unauthenticated invocations to [appkidsflixfinland] (y/N)? y
Deploying container to Cloud Run service [appkidsflixfinland] in project [prp-gcp-anthos] region [europe-north1]
OK Deploying new service... Done.
OK Creating Revision...
OK Routing traffic...
OK Setting IAM Policy...
Done.
Service [appkidsflixfinland] revision [appkidsflixfinland-00001-wiz] has been deployed and is serving 100 percent of traffic.
Service URL: https://appkidsflixfinland-a4wi4julgq-lz.a.run.app
aystesterl@cloudshell:~/bootcamp-gcp-module-lb-files-app-finland (prp-gcp-anthos)$ ^C
aystesterl@cloudshell:~/bootcamp-gcp-module-lb-files-app-finland (prp-gcp-anthos)$ ^C
aystesterl@cloudshell:~/bootcamp-gcp-module-lb-files-app-finland (prp-gcp-anthos)$ ^C
```

KidsFlix+

Subscribe now

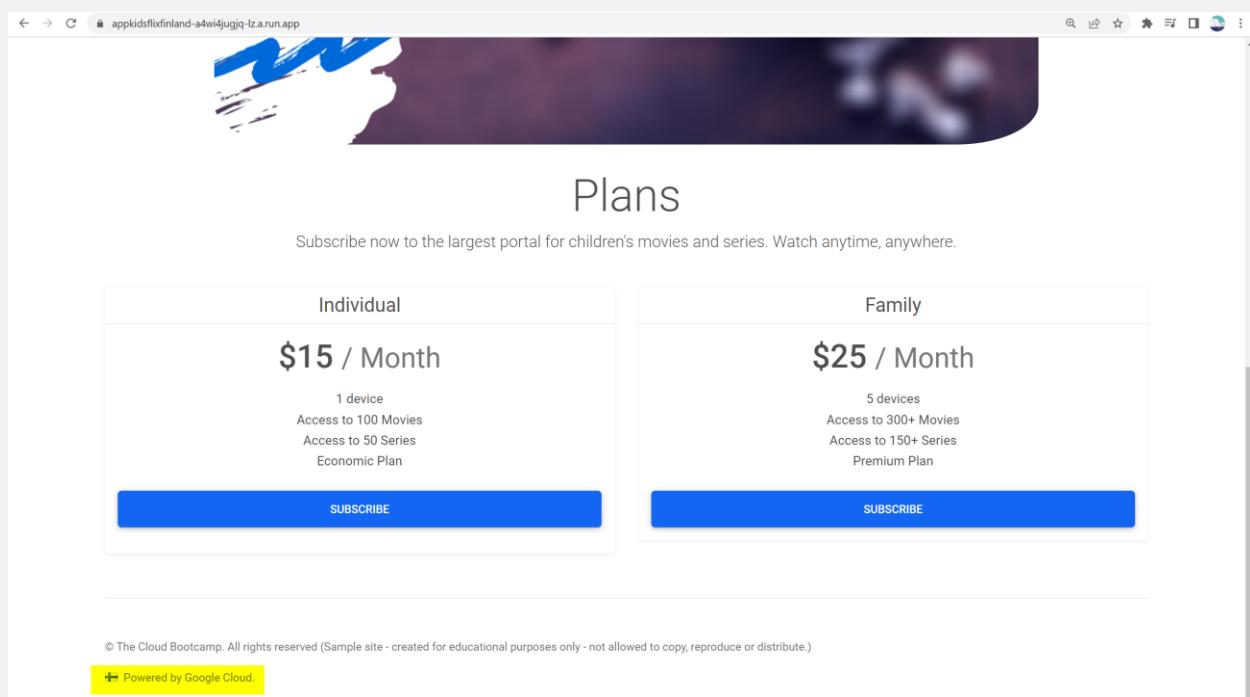
Plans

Subscribe now to the largest portal for children's movies and series. Watch anytime, anywhere.

Individual	Family
\$15 / Month	\$25 / Month
1 device Access to 100+ Movies Access to 50+ Series Economic Plan	5 devices Access to 300+ Movies Access to 150+ Series Premium Plan
SUBSCRIBE	SUBSCRIBE

© The Cloud Bootcamp. All rights reserved (Sample site - created for educational purposes only - not allowed to copy/reproduce or distribute.)

Powered by Google Cloud

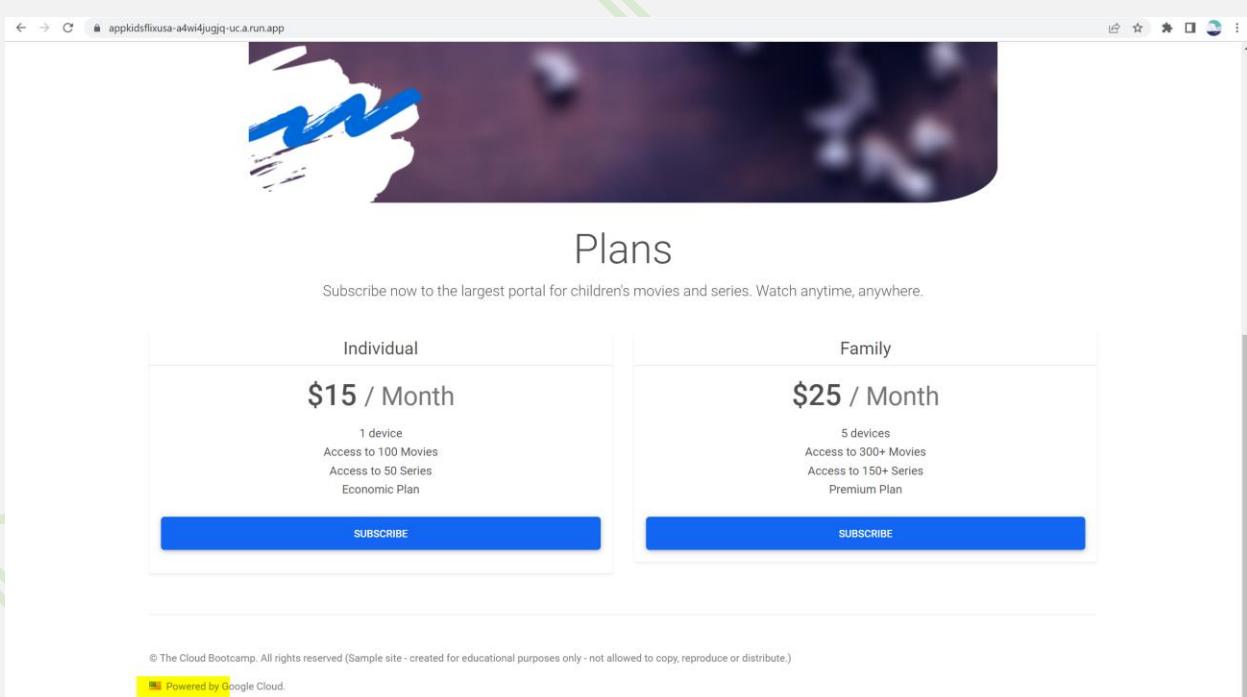
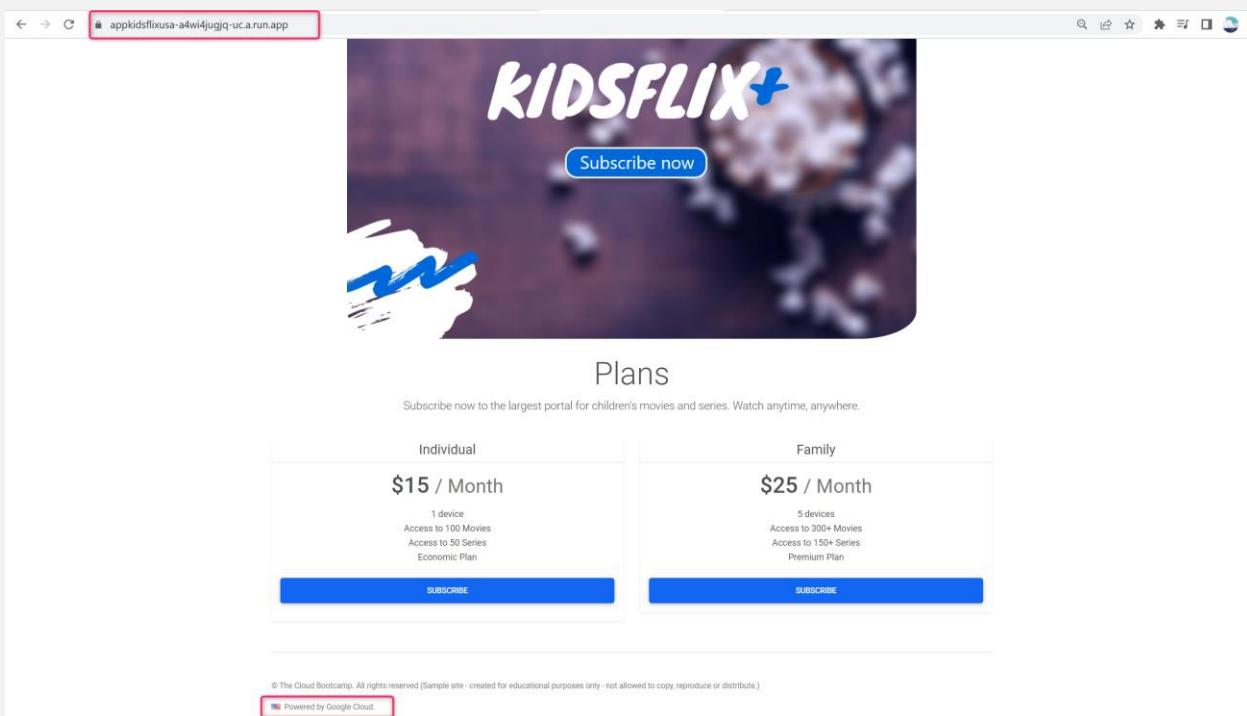


USA

Service URL: <https://appkidsflixusa-a4wi4jugjq-uc.a.run.app>

The screenshot shows the Google Cloud Platform dashboard for the project "prp-gcp-anthos". The dashboard includes sections for Project info, Compute Engine (CPU usage chart), Google Cloud Platform status, and Billing. On the left, there is a Cloud Shell terminal window displaying the following command-line session:

```
[24] us-east1
[25] us-east4
[26] us-west1
[27] us-west2
[28] us-west3
[29] us-west4
[30] cancel
Please enter your numeric choice: 23
To make this the default region, run `gcloud config set run/region us-central1`.
Allow unauthenticated invocations to [appkidsflixusa] (y/N)? y
Deploying container to Cloud Run service [appkidsflixusa] in project [prp-gcp-anthos] region [us-central1]
OK Deploying new service... Done.
OK Creating Revision...
OK Routing traffic...
OK Setting IAM Policy...
Done.
Service [appkidsflixusa] revision [appkidsflixusa-00001-root] has been deployed and is serving 100 percent of traffic.
Service URL: https://appkidsflixusa-a4wi4jugjq-uc.a.run.app
```

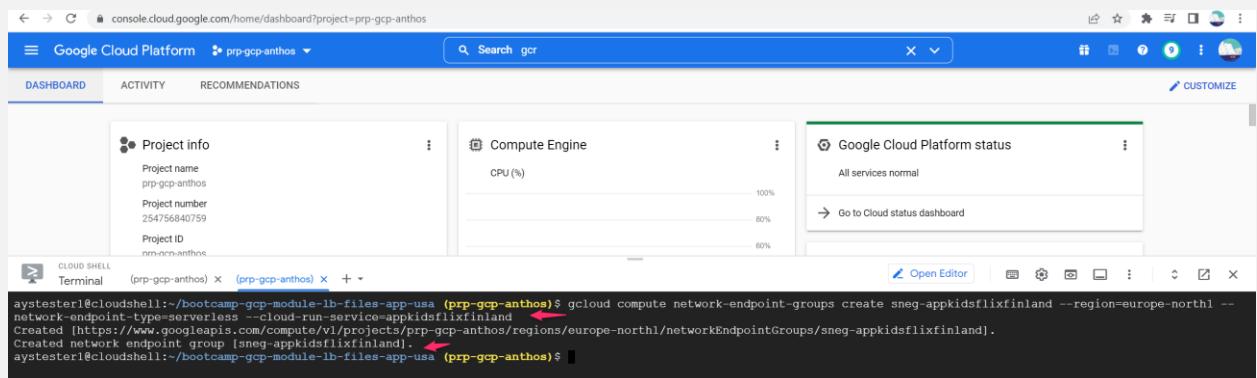


Deploying of the External HTTP Load Balancer

Step 1) Creating 2 serverless NEG:

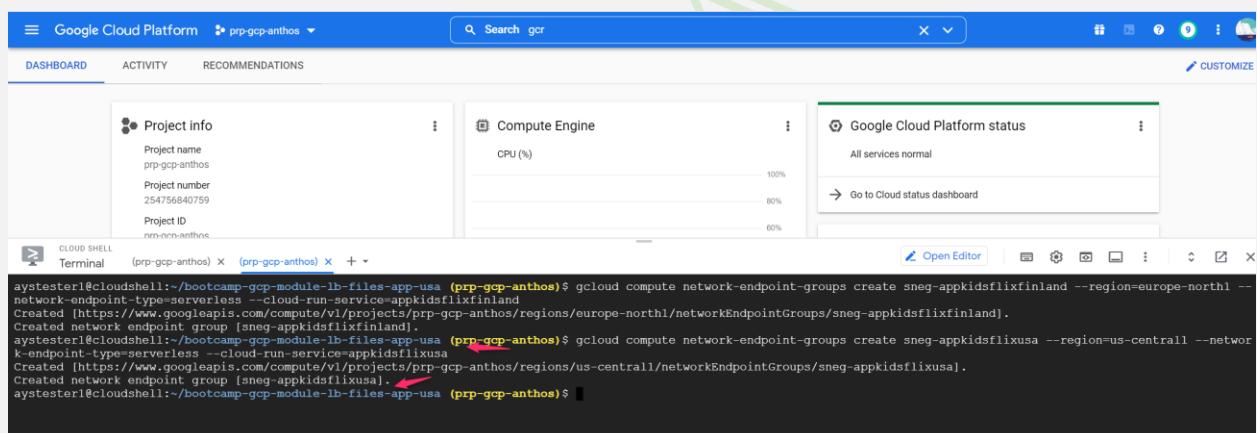
P.S.: Before running, copy the command to a notepad and remove all "\". After that, run the command.

gcloud compute network-endpoint-groups create sneg-appkidsflixfinland --region=europe-north1 --network-endpoint-type=serverless --cloud-run-service=appkidsflixfinland



The screenshot shows the Google Cloud Platform dashboard for the project 'prp-gcp-anthos'. The terminal window displays the command: `gcloud compute network-endpoint-groups create sneg-appkidsflixfinland --region=europe-north1 --network-endpoint-type=serverless --cloud-run-service=appkidsflixfinland`. The output shows the group was created successfully at the URL `[https://www.googleapis.com/compute/v1/projects/prp-gcp-anthos/regions/europe-north1/networkEndpointGroups/sneg-appkidsflixfinland]`.

gcloud compute network-endpoint-groups create sneg-appkidsflixusa --region=us-central1 --network-endpoint-type=serverless --cloud-run-service=appkidsflixusa



The screenshot shows the Google Cloud Platform dashboard for the project 'prp-gcp-anthos'. The terminal window displays two commands: `gcloud compute network-endpoint-groups create sneg-appkidsflixfinland --region=europe-north1 --network-endpoint-type=serverless --cloud-run-service=appkidsflixfinland` and `gcloud compute network-endpoint-groups create sneg-appkidsflixusa --region=us-central1 --network-endpoint-type=serverless --cloud-run-service=appkidsflixusa`. Both commands were successful, creating endpoint groups at their respective URLs.

The screenshot shows the Google Cloud Platform interface for managing network endpoint groups. The left sidebar is expanded to show the 'Compute Engine' section, which is highlighted with a red box. Within the 'Compute Engine' section, the 'Network endpoint groups' option is also highlighted with a red box. The main content area displays a table of existing network endpoint groups, with two specific entries circled in red and numbered 1 and 2: 'sneg-appkidsflxfinland' (Serverless NEG) and 'sneg-appkidsflxusa' (Serverless NEG). The table includes columns for Name, Type, Network endpoints, Scope, Subnet, VPC network, and In use by.

This screenshot shows a detailed view of a network endpoint group named 'sneg-appkidsflxfinland'. The page includes tabs for 'Virtual machines' and 'Cloud Functions'. The main content area displays a table with columns for Name, Type, Network endpoints, Scope, Subnet, VPC network, and In use by. The table shows one entry: 'sneg-appkidsflxfinland' (Serverless NEG), which is circled in red and numbered 1. The 'Scope' column indicates it is a 'Regional (europe-north1)' NEG.

Step 2) Creating the backend service global

```
gcloud compute backend-services create kidsflix-backend-global --global
```

This screenshot shows the Google Cloud Platform dashboard with a terminal window open in the Cloud Shell. The terminal output shows the command 'gcloud compute backend-services create kidsflix-backend-global --global' being run. Arrows point from the text 'kidsflix-backend-global' in the command to the corresponding entry in the previous screenshot's table, and another arrow points from the word 'GLOBAL' to the 'Global' status in the GCP status card.

```
aystester1@cloudshell:~/bootcamp-gcp-module-1b-files-app-usa (prp-gcp-anthos)$ gcloud compute backend-services create kidsflix-backend-global --global
Created [https://www.googleapis.com/compute/v1/projects/prp-gcp-anthos/global/backendServices/kidsflix-backend-global].
NAME: kidsflix-backend-global
BACKENDS: 1
PROTOCOL: HTTP
aystester1@cloudshell:~/bootcamp-gcp-module-1b-files-app-usa (prp-gcp-anthos)$
```

The screenshot shows the Google Cloud Platform Load Balancing interface. On the left sidebar, under 'Network services', 'Load balancing' is selected. In the main pane, the 'LOAD BALANCERS' tab is active, showing a table with one row:

Name	Backend type	Scope	Protocol	Load balancer
kidsflix-backend-global	Backend service (Classic)	Global	HTTP	lb-kidsflix-global

A red arrow points to the 'Backend type' column of the table.

The screenshot shows the same Google Cloud Platform Load Balancing interface. The table in the 'LOAD BALANCERS' tab now shows two rows:

Name	Load balancer type	Protocols	Region	Backends
lb-kidsflix-global	HTTP(S) (Classic)	HTTP		1 backend service (0 instance groups, 2 network endpoint groups)

A red arrow points to the 'Load balancer type' column of the table.

Step 3) Adding the serverless NEG created to the backend service global:

P.S.: Before running, copy the command to a notepad and remove all "\". After that, run the command.

`gcloud compute backend-services add-backend kidsflix-backend-global --global --network-endpoint-group=sneg-appkidsflixfinland --network-endpoint-group-region=europe-north1`

The screenshot shows the Google Cloud Platform Dashboard. The 'DASHBOARD' tab is selected. In the bottom-left corner, there is a 'Terminal' window with the following command history:

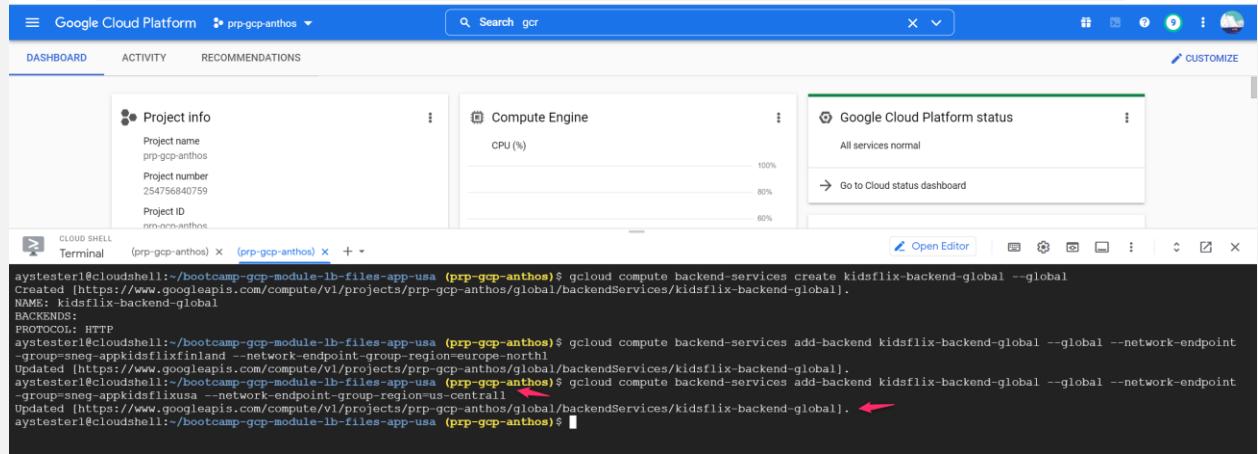
```

aystester1@cloudshell:~/bootcamp-gcp-module-lb-files-app-usa (prp-gcp-anthos)$ gcloud compute backend-services create kidsflix-backend-global --global
Created [https://www.googleapis.com/compute/v1/projects/prp-gcp-anthos/global/backendServices/kidsflix-backend-global].
NAME: kidsflix-backend-global
BACKENDS:
PROTOCOL: HTTP
aystester1@cloudshell:~/bootcamp-gcp-module-lb-files-app-usa (prp-gcp-anthos)$ gcloud compute backend-services add-backend kidsflix-backend-global --global --network-endpoint-group=sneg-appkidsflixfinland --network-endpoint-group-region=europe-north1
Updated [https://www.googleapis.com/compute/v1/projects/prp-gcp-anthos/global/backendServices/kidsflix-backend-global].
aystester1@cloudshell:~/bootcamp-gcp-module-lb-files-app-usa (prp-gcp-anthos)$

```

Two red arrows point to the 'network-endpoint-group' and 'network-endpoint-group-region' parameters in the command.

`gcloud compute backend-services add-backend kidsflix-backend-global --global --network-endpoint-group=sneg-appkidsflixusa --network-endpoint-group-region=us-central1`



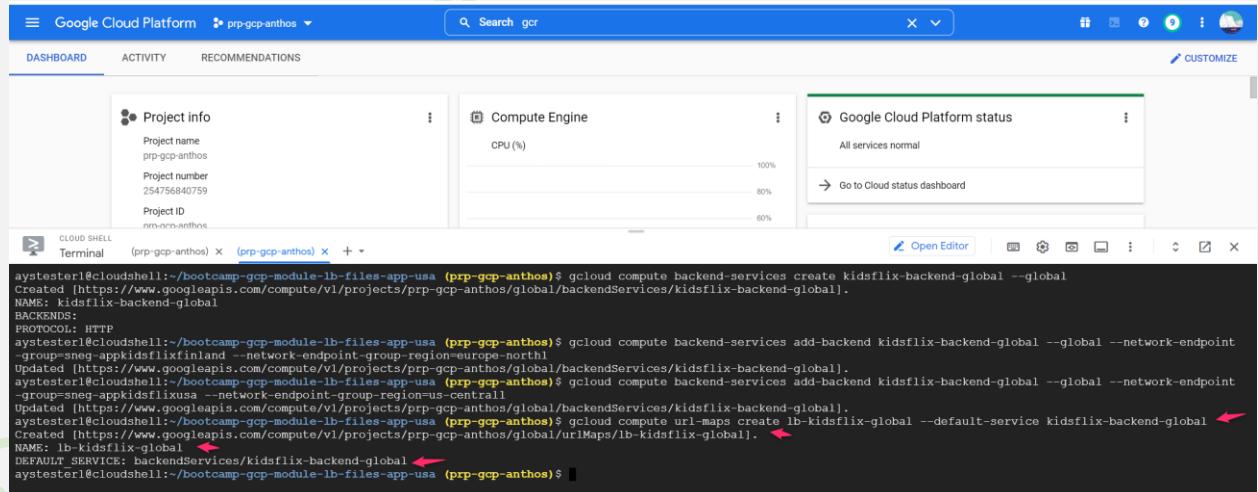
The screenshot shows the Google Cloud Platform dashboard with the project 'prp-gcp-anthos'. A terminal window is open in the 'CLOUD SHELL' tab, showing the command being run:

```
aystester1@cloudshell:~/bootcamp-gcp-module-lb-files-app-usa (prp-gcp-anthos)$ gcloud compute backend-services create kidsflix-backend-global --global
Created [https://www.googleapis.com/compute/v1/projects/prp-gcp-anthos/global/backendServices/kidsflix-backend-global].
NAME: kidsflix-backend-global
BACKENDS:
PROTOCOL: HTTP
aystester1@cloudshell:~/bootcamp-gcp-module-lb-files-app-usa (prp-gcp-anthos)$ gcloud compute backend-services add-backend kidsflix-backend-global --global --network-endpoint-group=sneg-appkidsflixfinland --network-endpoint-group-region=europe-north1
Updated [https://www.googleapis.com/compute/v1/projects/prp-gcp-anthos/global/backendServices/kidsflix-backend-global].
aystester1@cloudshell:~/bootcamp-gcp-module-lb-files-app-usa (prp-gcp-anthos)$ gcloud compute backend-services add-backend kidsflix-backend-global --global --network-endpoint-group=sneg-appkidsflixusa --network-endpoint-group-region=us-central1
Updated [https://www.googleapis.com/compute/v1/projects/prp-gcp-anthos/global/backendServices/kidsflix-backend-global]. ↗
aystester1@cloudshell:~/bootcamp-gcp-module-lb-files-app-usa (prp-gcp-anthos)$ ↗
```

Step 4) Creating an URL map to redirect the incoming requisitions to the backend service:

P.S.: Before running, copy the command to a notepad and remove the "\\". After that, run the command.

`gcloud compute url-maps create lb-kidsflix-global --default-service kidsflix-backend-global`



The screenshot shows the Google Cloud Platform dashboard with the project 'prp-gcp-anthos'. A terminal window is open in the 'CLOUD SHELL' tab, showing the command being run:

```
aystester1@cloudshell:~/bootcamp-gcp-module-lb-files-app-usa (prp-gcp-anthos)$ gcloud compute backend-services create kidsflix-backend-global --global
Created [https://www.googleapis.com/compute/v1/projects/prp-gcp-anthos/global/backendServices/kidsflix-backend-global].
NAME: kidsflix-backend-global
BACKENDS:
PROTOCOL: HTTP
aystester1@cloudshell:~/bootcamp-gcp-module-lb-files-app-usa (prp-gcp-anthos)$ gcloud compute backend-services add-backend kidsflix-backend-global --global --network-endpoint-group=sneg-appkidsflixfinland --network-endpoint-group-region=europe-north1
Updated [https://www.googleapis.com/compute/v1/projects/prp-gcp-anthos/global/backendServices/kidsflix-backend-global].
aystester1@cloudshell:~/bootcamp-gcp-module-lb-files-app-usa (prp-gcp-anthos)$ gcloud compute backend-services add-backend kidsflix-backend-global --global --network-endpoint-group=sneg-appkidsflixusa --network-endpoint-group-region=us-central1
Updated [https://www.googleapis.com/compute/v1/projects/prp-gcp-anthos/global/backendServices/kidsflix-backend-global].
aystester1@cloudshell:~/bootcamp-gcp-module-lb-files-app-usa (prp-gcp-anthos)$ gcloud compute url-maps create lb-kidsflix-global --default-service kidsflix-backend-global ↗
Created [https://www.googleapis.com/compute/v1/projects/prp-gcp-anthos/global/urlMaps/lb-kidsflix-global]. ↗
NAME: lb-kidsflix-global ↗
DEFAULT SERVICE: backendServices/kidsflix-backend-global ↗
aystester1@cloudshell:~/bootcamp-gcp-module-lb-files-app-usa (prp-gcp-anthos)$ ↗
```

Step 5) Creating the target HTTP(S) proxy to redirect the requisitions to the URL map

`gcloud compute target-http-proxies create lb-kidsflix-httpproxy --url-map=lb-kidsflix-global`

```

ayesterl@cloudshell:~/bootcamp-gcp-module-lb-files-app-usa (prp-gcp-anthos)$ gcloud compute backend-services create kidsflix-backend-global --global
Created [https://www.googleapis.com/compute/v1/projects/prp-gcp-anthos/global/backendServices/kidsflix-backend-global].
NAME: kidsflix-backend-global
BACKENDS:
PROTOCOL: HTTP
ayesterl@cloudshell:~/bootcamp-gcp-module-lb-files-app-usa (prp-gcp-anthos)$ gcloud compute backend-services add-backend kidsflix-backend-global --global --network-endpoint
--group=sneq-akppkidsflixfinland --network-endpoint-group-region=europe-north
Updated [https://www.googleapis.com/compute/v1/projects/prp-gcp-anthos/global/backendServices/kidsflix-backend-global].
ayesterl@cloudshell:~/bootcamp-gcp-module-lb-files-app-usa (prp-gcp-anthos)$ gcloud compute backend-services add-backend kidsflix-backend-global --global --network-endpoint
--group=sneq-akppkidsfluxus --network-endpoint-group-region=us-central
Updated [https://www.googleapis.com/compute/v1/projects/prp-gcp-anthos/global/backendServices/kidsflix-backend-global].
ayesterl@cloudshell:~/bootcamp-gcp-module-lb-files-app-usa (prp-gcp-anthos)$ gcloud compute url-maps create lb-kidsflix-global --default-service kidsflix-backend-global
Created [https://www.googleapis.com/compute/v1/projects/prp-gcp-anthos/global/urlMaps/lb-kidsflix-global].
NAME: lb-kidsflix-global
DEFAULT SERVICE: backendServices/kidsflix-backend-global
ayesterl@cloudshell:~/bootcamp-gcp-module-lb-files-app-usa (prp-gcp-anthos)$ gcloud compute target-http-proxies create lb-kidsflix-httpproxy --url-map=lb-kidsflix-global
Created [https://www.googleapis.com/compute/v1/projects/prp-gcp-anthos/global/targetHttpProxies/lb-kidsflix-httpproxy]. ↗
NAME: lb-kidsflix-httpproxy
URL MAP: lb-kidsflix-global ↗
ayesterl@cloudshell:~/bootcamp-gcp-module-lb-files-app-usa (prp-gcp-anthos)$

```

Step 6) Reserving an IP address to the External HTTP Load Balancer

`gcloud compute addresses create kidsflix-global-ip --ip-version=IPV4 --global`

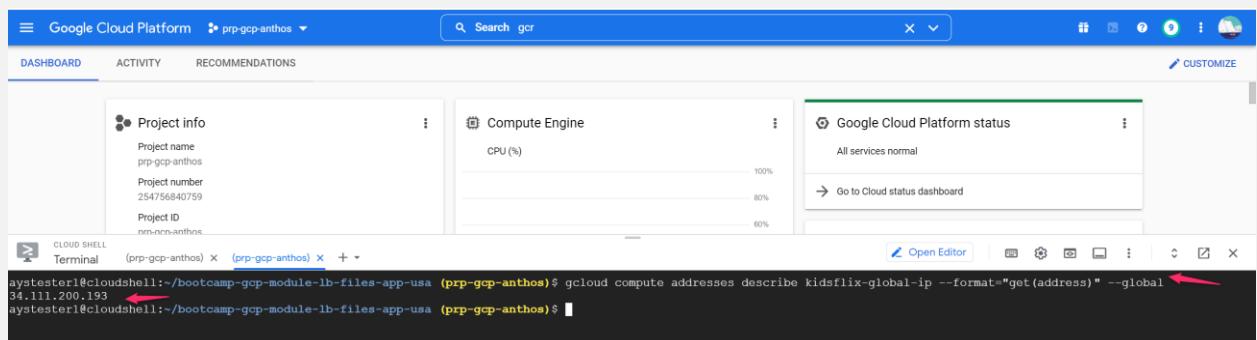
```

ayesterl@cloudshell:~/bootcamp-gcp-module-lb-files-app-usa (prp-gcp-anthos)$ gcloud compute backend-services create kidsflix-backend-global --global
Created [https://www.googleapis.com/compute/v1/projects/prp-gcp-anthos/global/backendServices/kidsflix-backend-global].
NAME: kidsflix-backend-global
BACKENDS:
PROTOCOL: HTTP
ayesterl@cloudshell:~/bootcamp-gcp-module-lb-files-app-usa (prp-gcp-anthos)$ gcloud compute backend-services add-backend kidsflix-backend-global --global --network-endpoint
--group=sneq-akppkidsflixfinland --network-endpoint-group-region=europe-north
Updated [https://www.googleapis.com/compute/v1/projects/prp-gcp-anthos/global/backendServices/kidsflix-backend-global].
ayesterl@cloudshell:~/bootcamp-gcp-module-lb-files-app-usa (prp-gcp-anthos)$ gcloud compute backend-services add-backend kidsflix-backend-global --global --network-endpoint
--group=sneq-akppkidsfluxus --network-endpoint-group-region=us-central
Updated [https://www.googleapis.com/compute/v1/projects/prp-gcp-anthos/global/backendServices/kidsflix-backend-global].
ayesterl@cloudshell:~/bootcamp-gcp-module-lb-files-app-usa (prp-gcp-anthos)$ gcloud compute url-maps create lb-kidsflix-global --default-service kidsflix-backend-global
Created [https://www.googleapis.com/compute/v1/projects/prp-gcp-anthos/global/urlMaps/lb-kidsflix-global].
NAME: lb-kidsflix-global
DEFAULT SERVICE: backendServices/kidsflix-backend-global
ayesterl@cloudshell:~/bootcamp-gcp-module-lb-files-app-usa (prp-gcp-anthos)$ gcloud compute target-http-proxies create lb-kidsflix-httpproxy --url-map=lb-kidsflix-global
Created [https://www.googleapis.com/compute/v1/projects/prp-gcp-anthos/global/targetHttpProxies/lb-kidsflix-httpproxy].
NAME: lb-kidsflix-httpproxy
URL MAP: lb-kidsflix-global
ayesterl@cloudshell:~/bootcamp-gcp-module-lb-files-app-usa (prp-gcp-anthos)$ gcloud compute addresses create kidsflix-global-ip --ip-version=IPV4 --global ↗
Created [https://www.googleapis.com/compute/v1/projects/prp-gcp-anthos/global/addresses/kidsflix-global-ip]. ↗
ayesterl@cloudshell:~/bootcamp-gcp-module-lb-files-app-usa (prp-gcp-anthos)$

```

Use this command below to check the IP of the kidsflix-global-ip

`gcloud compute addresses describe kidsflix-global-ip --format="get(address)" --global`

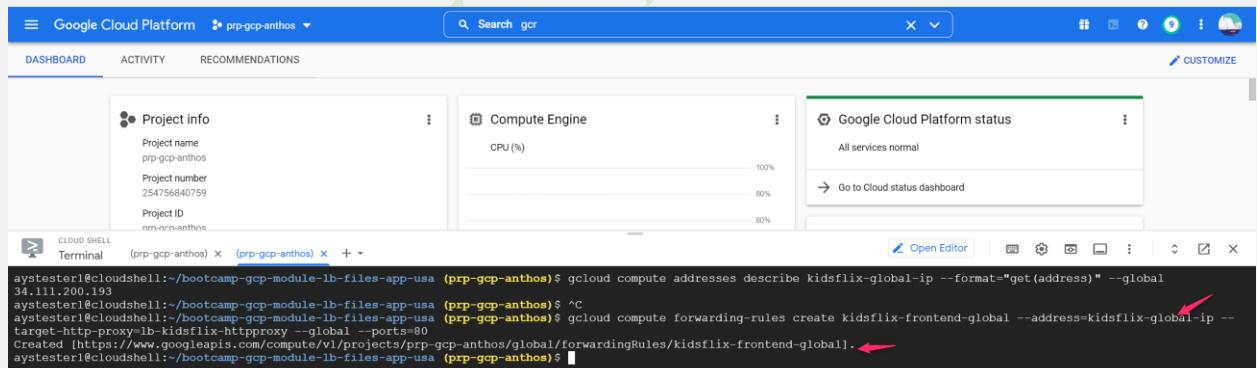


34.111.200.193

Step 7) Creating a global forwarding rule to redirect the incoming requisitions to the Proxy (Frontend).

P.S.: Before running, copy the command to a notepad and remove all "\". After that, run the command.

`gcloud compute forwarding-rules create kidsflix-frontend-global --address=kidsflix-global-ip --target-http-proxy=lb-kidsflix-httpproxy --global --ports=80`



LOAD BALANCERS	BACKENDS	FRONTENDS
<input type="checkbox"/> Forwarding rule name	<input type="checkbox"/> Frontend type	<input type="checkbox"/> Scope
<input type="checkbox"/> kidsflix-frontend-global	HTTP(S) (Classic)	Global
34.111.200.193	HTTP	Premium
lb-kidsflix-global		

Load balancer IP

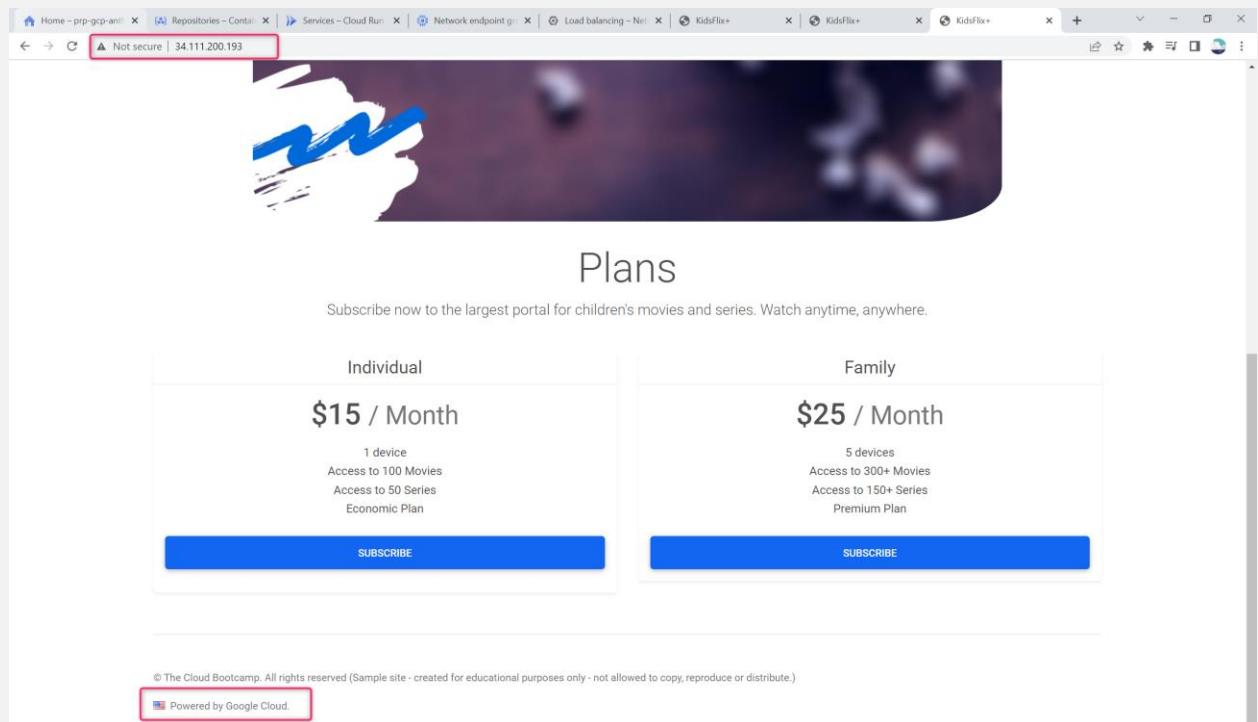
The screenshot shows the Google Cloud Platform interface for managing a load balancer. The left sidebar lists various network services, with 'Load balancing' selected. The main pane displays the configuration for a global load balancer named 'lb-kidsflix-global'. Key details include:

- Frontend:** Protocol is set to HTTP and the IP-Port is 34.111.200.193:80.
- Host and path rules:** A single rule maps all unmatched host paths to the 'kidsflix-backend-global' backend.
- Backend:** One backend service, 'kidsflix-backend-global', is listed. It uses the HTTP endpoint protocol, has a 30-second timeout, and no health check or Cloud CDN configured.
- Advanced Configurations:** A table shows two serverless network endpoint groups: 'sneq-appkidsflixfinland' (Europe North 1 zone) and 'sneq-appkidsflixusa' (US Central 1 zone), both with 100% capacity.

Access the application from LB ip

A screenshot of a web browser window. The address bar shows the URL '34.111.200.193'. The page content displays an 'Error: Not Found' message: 'The requested URL / was not found on this server.'

Application is accessible from Load balancer IP



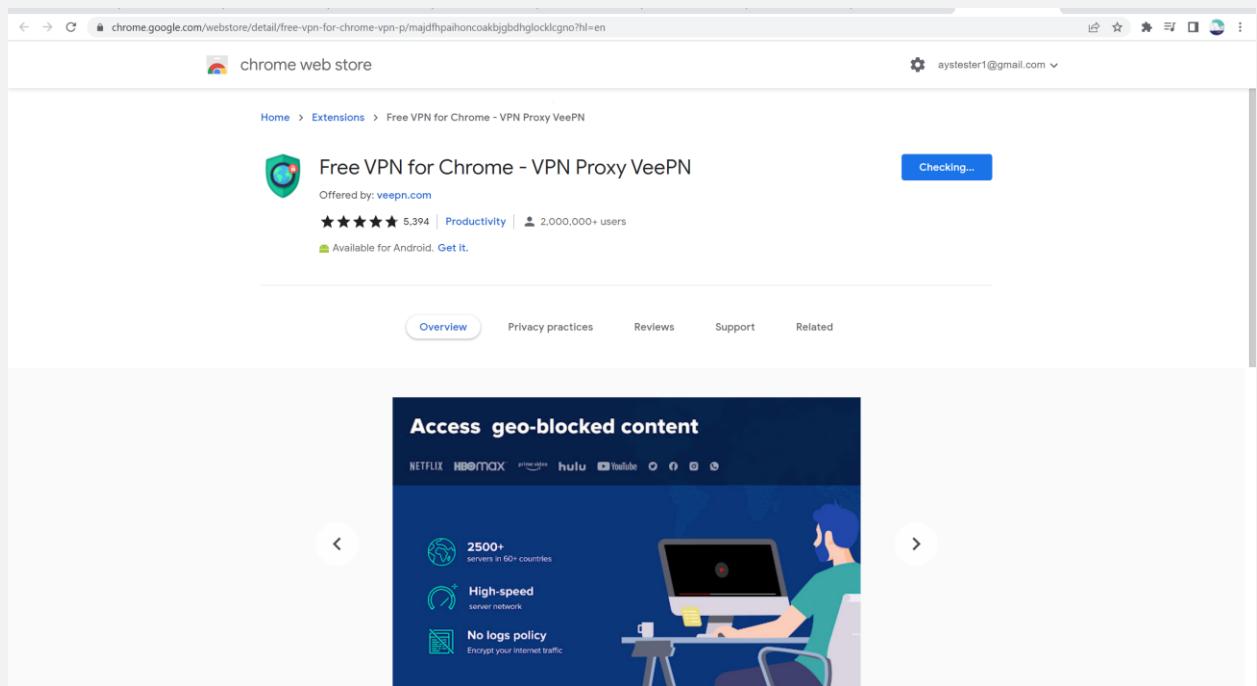
It is still accessing from USA region

Step 8) Installing a VPN Extension in the Chrome browser:

Extension name: Free VPN for Chrome - VPN Proxy VeePN

Download link: [here](#)

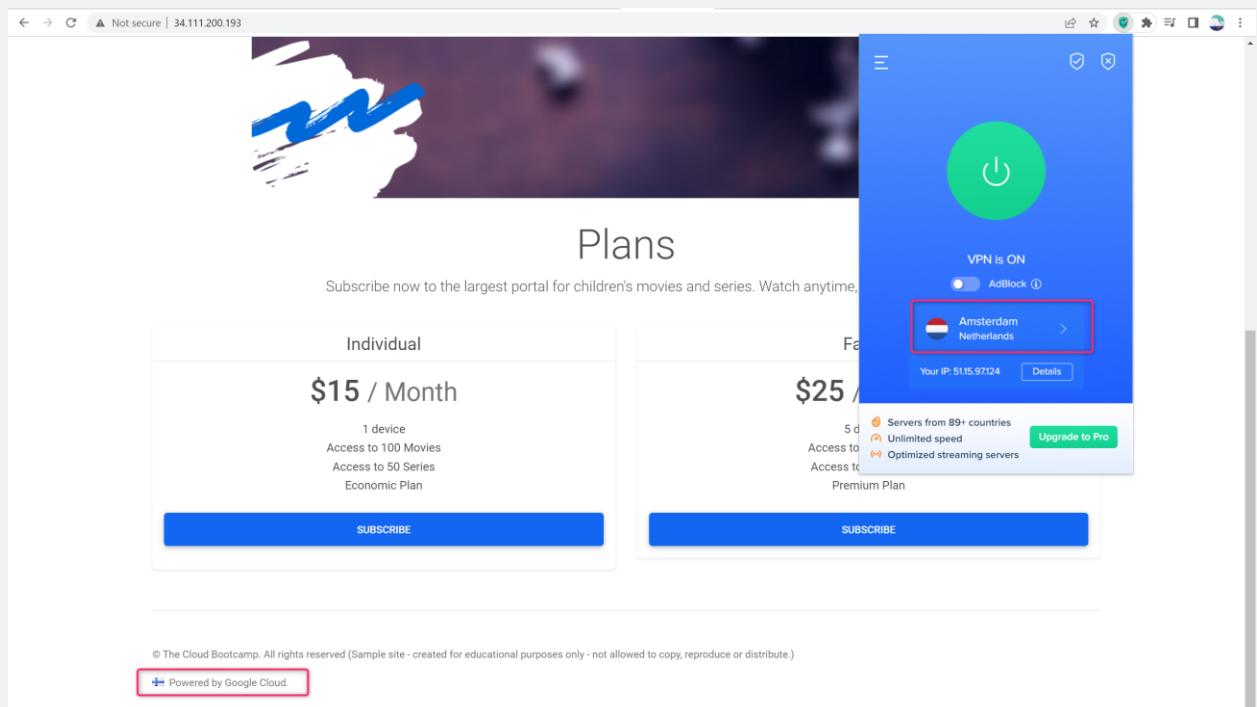
Active the extension and make some tests!



Forward your ip from Netherland

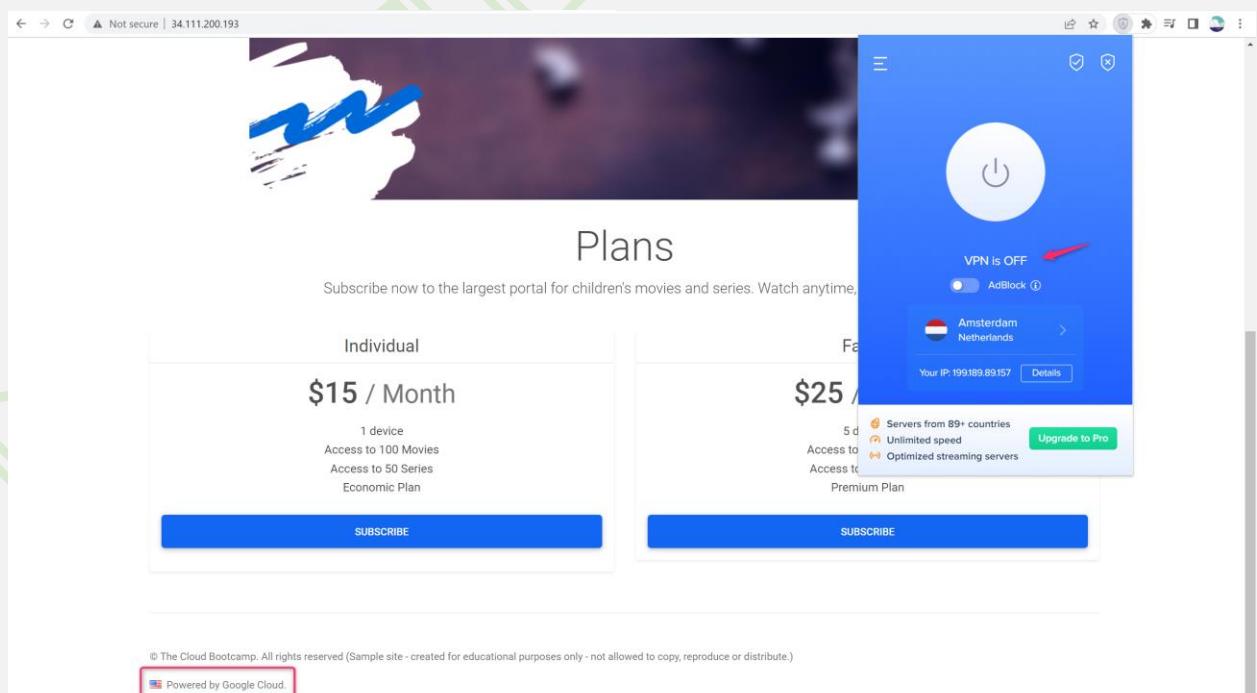
Switch Location to Europe from VPN

Now app is loaded from Finland



VPN is now OFF, I am located in Canada

So now App is loaded from nearest location USA



Good Job!!!

completed one more mission successfully!!

SPEED UP CHALLENGE

Imagine the following scenario. A father with 4 kids is scrolling through Facebook desperately trying to find an entertainment solution for his kids to stay focused on watching some entertainment, and while scrolling through his Feed, he sees KidsFlix+. At the same moment, from Brazil, he felt the desire to subscribe to the service. After a few moments, he clicked on the link available on Facebook, and a request to Load Balancer was made. Upon receiving the request, the Load Balancer delivered it to the application it defined as the closest, because at the moment there is no KidsFlix+ application running in Brazil, making it necessary to go all the way there. What is the problem with this in an Internet Application Architecture? To access the application, what will happen? He needs to make a request to the Load Balancer that will be there in the United States, for example. After that, when he makes this request all the static data of this page will be transferred from the United States back to Brazil, drastically raising the latency level.

What component in the Google Cloud Platform network services layer do you need to implement in order to generate an acceleration for a person accessing an application from Brazil that is in another region, so that you can implement the caching of static images, CSS, JavaScript files, so that the client does not have to go to that region every time to access this type of file?

SPEED UP CHALLENGE TEST -1

Launch a Cloud CDN testing instance

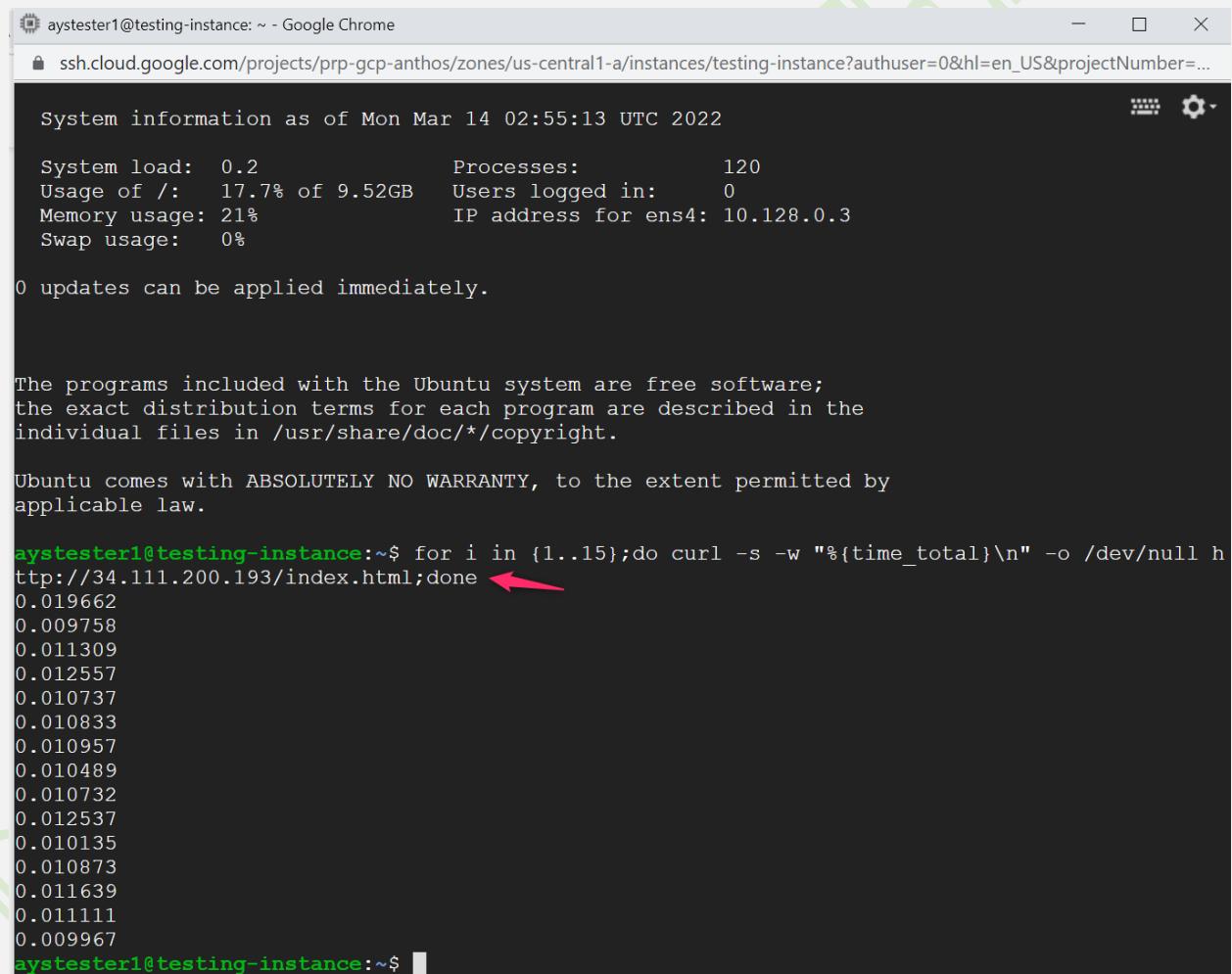
Status	Name	Zone	Recommendations	In use by	Internal IP	External IP	Connect
<input type="checkbox"/>	migration-vm	us-east1-b			10.142.0.12 (nic0)	None	SSH
<input checked="" type="checkbox"/>	testing-instance	us-central1-a			10.128.0.3 (nic0)	34.132.61.45	SSH

Run the below command in Cloud Shell to download and execute a script to build out the same environment used in the demo:

After you are connected to your `testing-instance` via SSH, the below commands will send a curl command to both the **index.html** pages and measure the response time to each. Be sure to substitute your unique frontend IP address for the site:

```
for i in {1..15};do curl -s -w "%{time_total}\n" -o /dev/null http://(your-frontend-ip)/index.html;  
done
```

if hit loadbalancer



The screenshot shows a terminal window titled "aystester1@testing-instance: ~ - Google Chrome". The title bar also displays the URL: "ssh.cloud.google.com/projects/prp-gcp-anthos/zones/us-central1-a/instances/testing-instance?authuser=0&hl=en_US&projectNumber=...". The terminal content includes system information as of Mon Mar 14 02:55:13 UTC 2022, a note about free software, a warranty notice, and a command history. A red arrow points to the last command in the history, which is a curl command. The command is: `aystester1@testing-instance:~$ for i in {1..15};do curl -s -w "%{time_total}\n" -o /dev/null http://34.111.200.193/index.html;done`.

```
for i in {1..15};do curl -s -w "%{time_total}\n" -o /dev/null http://(your-frontend-ip)/page-2.html;  
done
```

`http://34.111.200.193/`

Hit finland app url

```
for i in {1..15};do curl -s -w "%{time_total}\n" -o /dev/null http://appkidsflixfinland-a4wi4jugjq-lz.a.run.app;done
```

```
aystester1@testing-instance:~$ for i in {1..15};do curl -s -w "%{time_total}\n" -o /dev/null http://appkidsflixfinland-a4wi4jugjq-lz.a.run.app;done
0.775919
0.761772
0.760408
0.771196
0.760268
0.762459
0.762977
0.758958
0.762092
0.763712
0.761103
0.759656
0.758611
0.761400
0.762084
aystester1@testing-instance:~$
```

Hit USA app url

<https://appkidsflixusa-a4wi4jugjq-uc.a.run.app/>

```
for i in {1..15};do curl -s -w "%{time_total}\n" -o /dev/null https://appkidsflixusa-a4wi4jugjq-uc.a.run.app;done
```

```
aystester1@testing-instance: ~ - Google Chrome
ssh.cloud.google.com/projects/prp-gcp-anthos/zones/us-central1-a/instances/testing-instance?authuser=0&hl=en_US&projectNumber=...
0.010444
0.011422
aystester1@testing-instance:~$ for i in {1..15};do curl -s -w "%{time_total}\n" -o /dev/null https://appkidsflixfinland-a4wi4jugjq-lz.a.run.app;done
0.775919
0.761772
0.760408
0.771196
0.760268
0.762459
0.762977
0.758958
0.762092
0.763712
0.761103
0.759656
0.758611
0.761400
0.762084
aystester1@testing-instance:~$ for i in {1..15};do curl -s -w "%{time_total}\n" -o /dev/null https://appkidsflixusa-a4wi4jugjq-uc.a.run.app;done
0.694255
0.026042
0.025642
0.038107
0.025325
0.024769
0.023839
0.025893
0.024971
0.024946
0.037801
0.025663
0.024383
0.023412
0.027166
aystester1@testing-instance:~$
```

Load balancer

The screenshot shows the Google Cloud Platform Load Balancing interface. On the left, there's a sidebar with icons for Network services: Load balancing, Cloud DNS, Cloud CDN, Cloud NAT, Traffic Director, Service Directory, Cloud Domains, and Private Service Connect. The 'Load balancing' icon is selected. The main area has a header with 'Google Cloud Platform' and 'prp-gcp-anthos'. It includes a search bar, a refresh button, and a delete button. Below the header, there's a callout for 'Get real-time analytics with Network Intelligence Center' with options to 'GO TO NETWORK INTELLIGENCE CENTER' or 'REMIND ME LATER'. The main content area shows a table with three tabs: LOAD BALANCERS, BACKENDS, and FRONTENDS. Under the LOAD BALANCERS tab, there's a filter section with a dropdown set to 'Name ↑' and a checkbox checked for 'kidsflix-backend-global'. The table lists one row: 'kidsflix-backend-global' (Backend service (Classic), Global, HTTP, lb-kidsflix-global).

The screenshot shows the 'Load balancer details' page for 'lb-kidsflix-global'. The left sidebar lists various network services, with 'Load balancing' selected. The main pane displays the configuration for the load balancer, including the frontend (Protocol: HTTP, IP-Port: 34.111.200.193:80, Certificate: -, SSL Policy: -, Network Tier: Premium) and host and path rules (All unmatched (default) mapped to kidsflix-backend-global). Below this is the 'Backend' section, which lists 'kidsflix-backend-global' with its endpoint protocol (HTTP), timeout (30 seconds), health check (disabled), and Cloud CDN status (disabled). A 'Marketplace' section is also visible on the left.

Enable Cloud CDN

Enabling Cloud CDN for your Cloud Run service allows you to optimize content delivery by caching content close to your users.

You can enable Cloud CDN on backend services used by global external HTTP(S) load balancers by using the `gcloud compute backend-services update` command.

Cloud CDN is supported for backend services with Cloud Run, Cloud Functions, and App Engine backends.

```
gcloud compute backend-services update kidsflix-backend-global --enable-cdn --global
kidsflix-backend-global
```

Project info

- Project name: prp-gcp-anthos
- Project number: 254756940759
- Project ID: nm-nnm-anthos

Compute Engine

CPU (%)

Google Cloud Platform status

All services normal

Go to Cloud status dashboard

Cloud Shell (prp-gcp-anthos)

```
aystester1@cloudshell:~ (prp-gcp-anthos)$ gcloud compute backend-service update kidsflix-backend-global --enable-cdn --global
ERROR: (gcloud.compute) Invalid choice: 'backend-service'.
Maybe you meant:
  gcloud compute backend-services
```

To search the help text of gcloud commands, run:
gcloud help -- SEARCH TERMS

```
aystester1@cloudshell:~ (prp-gcp-anthos)$ gcloud compute backend-services update kidsflix-backend-global --enable-cdn --global
Updated [https://www.googleapis.com/compute/v1/projects/prp-gcp-anthos/global/backendServices/kidsflix-backend-global].
```

Network services

- Load balancing
- Cloud DNS
- Cloud CDN** (highlighted with a red arrow)
- Cloud NAT
- Traffic Director
- Service Directory

Cloud CDN

ADD ORIGIN REFRESH

Filter Enter property name or value

Origin name (CDN enabled) ↑	Associated load balancers	Cache hit ratio
kidsflix-backend-global	lb-kidsflix-global	n/a

Configure Cloud CDN

Network services

- Load balancing
- Cloud DNS
- Cloud CDN**
- Cloud NAT
- Traffic Director
- Service Directory
- Cloud Domains
- Private Service Connect

Origin details

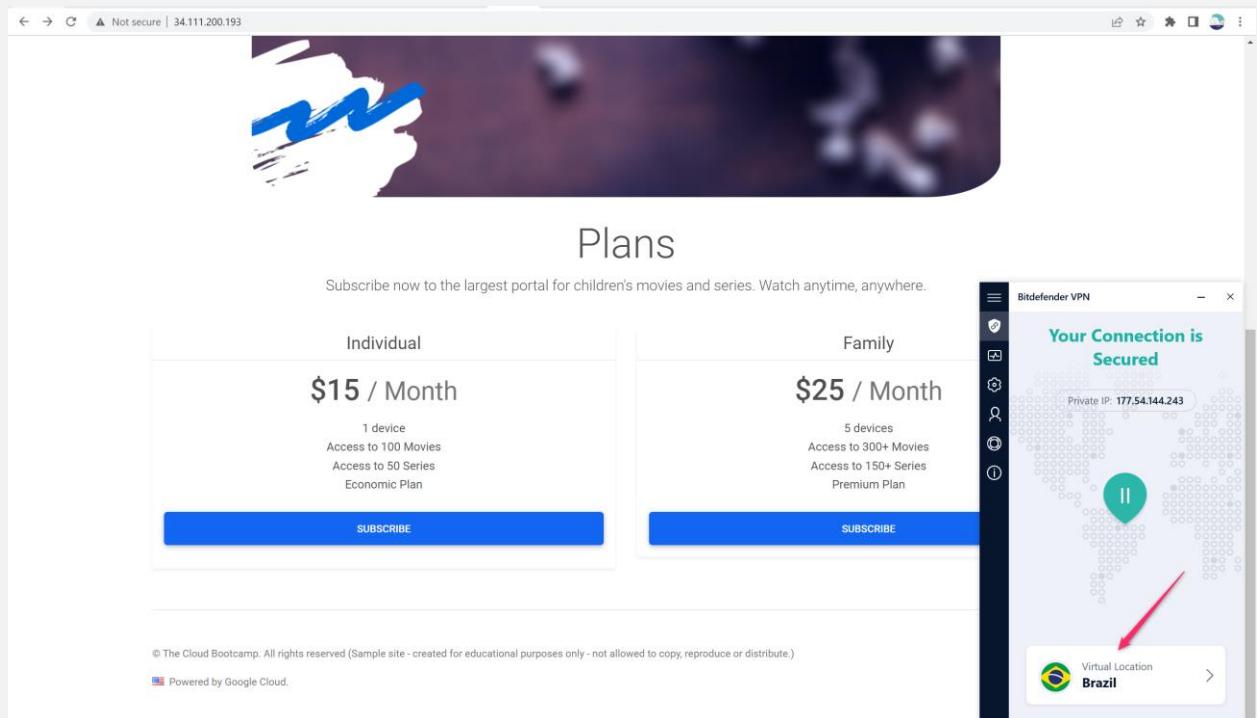
EDIT REMOVE

Backend services					
Name	Backend type	Cache mode	Cache key	Signed URL	Security policy
✓ kidsflix-backend-global	Unknown	Cache static content	Default	None	Disabled

Configure (highlighted with a red arrow)

Update Cancel

Access Web application from Brazil



Test without CDN

```
for i in {1..15};do curl -s -w "%{time_total}\n" -o /dev/null http://34.111.200.193/index.html; done
```

<http://34.111.200.193/>

```
ayester1@testing-instance: ~ - Google Chrome
ssh.cloud.google.com/projects/prp-gcp-anthos/zones/us-central1-a/instances/testing-instance?authuser=0&hl=en_US&projectNumber=254756840759&useAdminProxy=true&troubleshoot400SEnabled=t...
0.003928
0.003752
0.005862
0.004022
0.006210
ayester1@testing-instance:~$ for i in {1..15};do curl -s -w "%{time_total}\n" -o /dev/null http://34.111.200.193; done
0.019154
0.013664
0.015248
0.011873
0.012024
0.015736
0.011819
0.012393
0.012284
0.011093
0.013908
0.010944
ayester1@testing-instance:~$ for i in {1..15};do curl -s -w "%{time_total}\n" -o /dev/null http://34.111.200.193/checkout/1; done
0.015323
0.013362
0.014685
0.019381
0.011821
0.012967
0.011534
0.012793
0.014029
0.013436
0.013562
0.014082
0.011756
0.011665
0.026445
ayester1@testing-instance:~$
```

Enable Cloud CDN

The screenshots illustrate the process of enabling Cloud CDN for a specific origin.

Screenshot 1: Configure kidsflix-backend-global

This screen shows the configuration details for the 'kidsflix-backend-global' origin. Key settings include:

- Cache mode:** Cache static content (recommended).
- Client time to live:** 1 hour.
- Default time to live:** 1 hour.
- Maximum time to live:** 1 day.
- Cache key:** Default (include all components of a request URL).
- Serve stale:** 1 day (recommended).
- Restricted content:** Allow public access to my content cached by Cloud CDN (recommended).
- Negative Caching Policy:** Add negative caching policy.
- Bypass cache on request header:** Add header.

Screenshot 2: Origin details

This screen shows the 'lb-kidsflix-global' origin details. A red arrow points to the 'Backend type' field, which is set to 'Unknown' and has 'Cloud CDN: Enabled' checked. The 'Cache key' dropdown is also highlighted.

Setting	Value
Frontend	Protocol: HTTP, IP:Port: 34.111.200.193:80, Network Tier: Premium
Backend services	1. kidsflix-backend-global
Backend type	Unknown
Cloud CDN	Enabled
Cache key	Default (incorporate all URL components into cache keys)

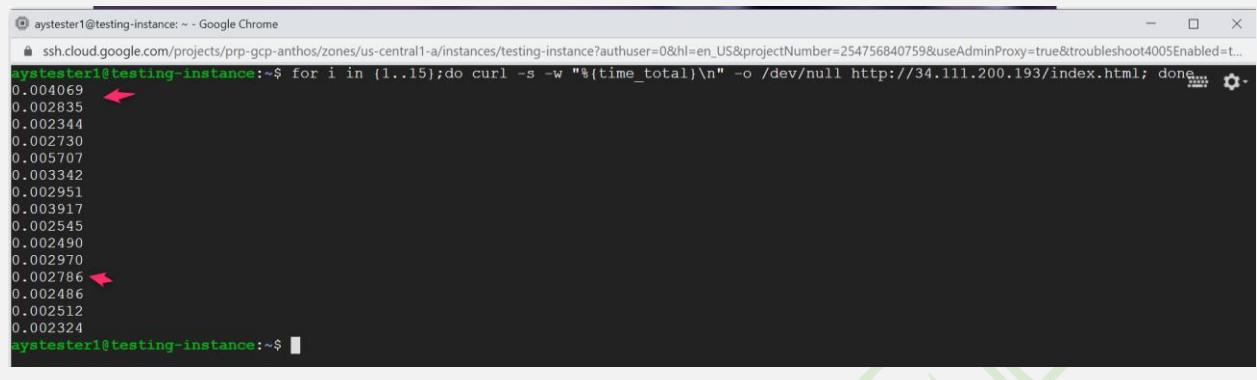
Screenshot 3: Cloud CDN

This screen shows the list of origins. A red box highlights the 'kidsflix-backend-global' entry, which is associated with 'lb-kidsflix-global' and has a 'Cache hit ratio' of 58.8%.

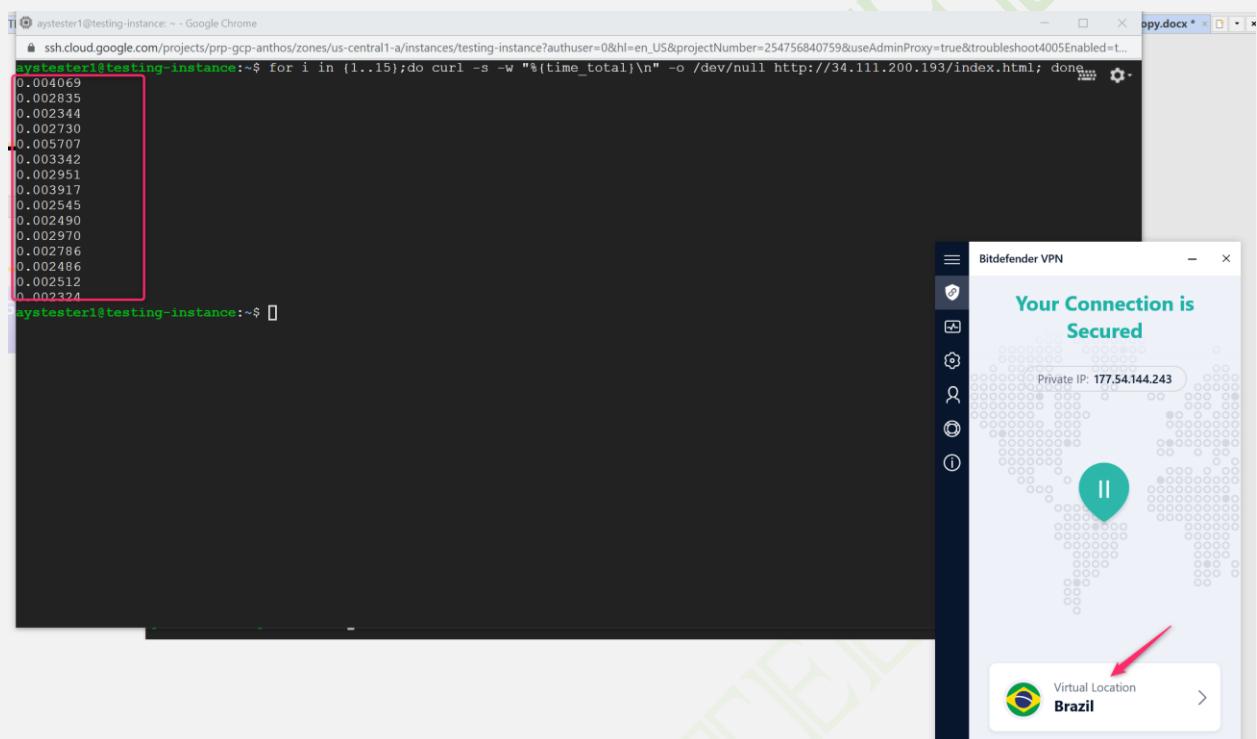
Origin name (CDN enabled)	Associated load balancers	Cache hit ratio
kidsflix-backend-global	lb-kidsflix-global	58.8%

Test Application after adding CDN

After CDN Enabled



```
aysterer1@testing-instance:~ - Google Chrome
ssh.cloud.google.com/projects/prp-gcp-anthos/zones/us-central1-a/instances/testing-instance?authuser=0&hl=en_US&projectNumber=254756840759&useAdminProxy=true&troubleshoot4005Enabled=...
aysterer1@testing-instance:~$ for i in {1..15};do curl -s -w "%{time_total}\n" -o /dev/null http://34.111.200.193/index.html; done
0.004069
0.002835
0.002344
0.002730
0.005707
0.003342
0.002951
0.003917
0.002545
0.002490
0.002970
0.002786
0.002486
0.002512
0.002324
aysterer1@testing-instance:~$
```

```
aysterer1@testing-instance:~ - Google Chrome
ssh.cloud.google.com/projects/prp-gcp-anthos/zones/us-central1-a/instances/testing-instance?authuser=0&hl=en_US&projectNumber=254756840759&useAdminProxy=true&troubleshoot4005Enabled=...
aysterer1@testing-instance:~$ for i in {1..15};do curl -s -w "%{time_total}\n" -o /dev/null http://34.111.200.193/index.html; done
0.004069
0.002835
0.002344
0.002730
0.005707
0.003342
0.002951
0.003917
0.002545
0.002490
0.002970
0.002786
0.002486
0.002512
0.002324
aysterer1@testing-instance:~$
```

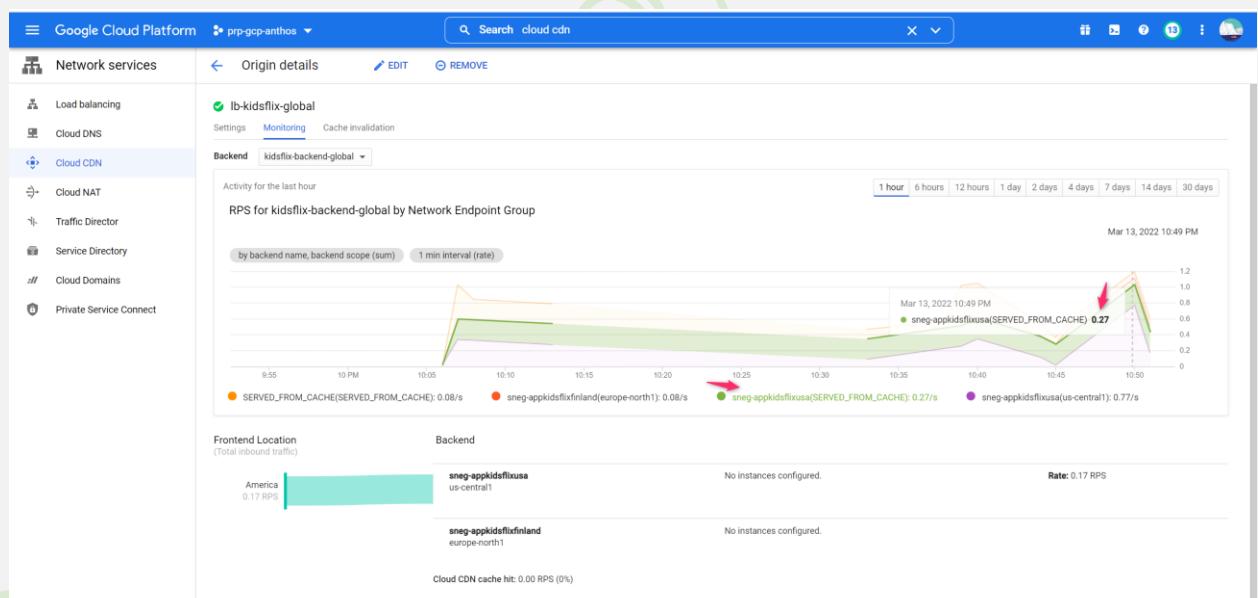
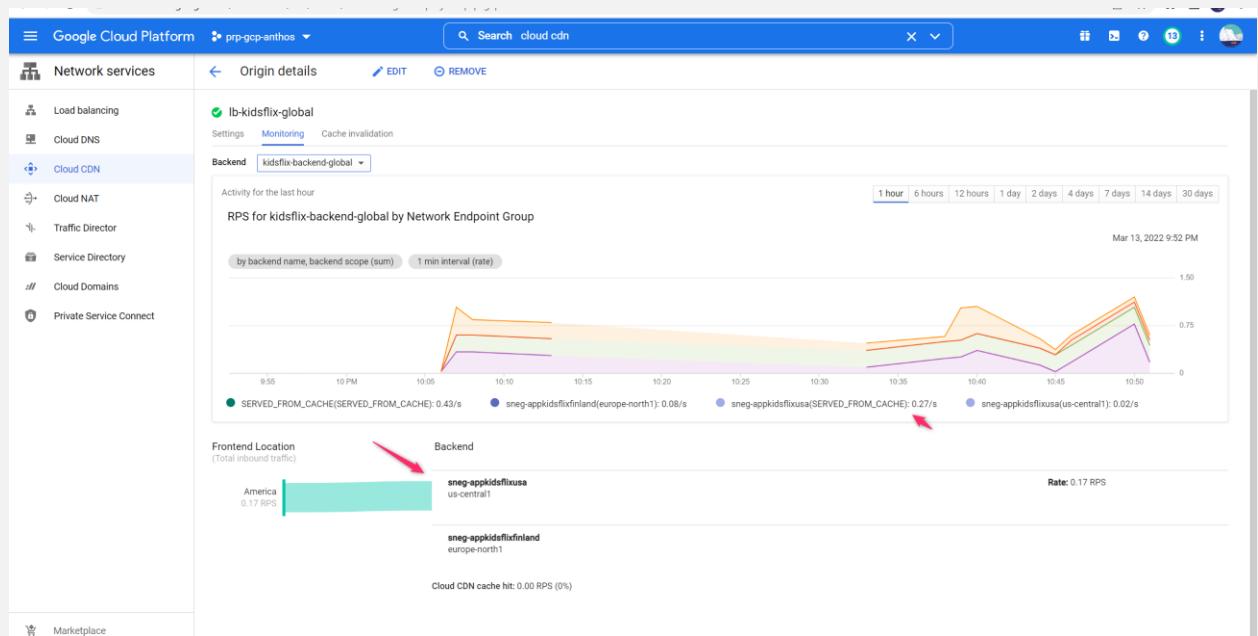
Bitdefender VPN

Your Connection is Secured

Private IP: 177.54.144.243

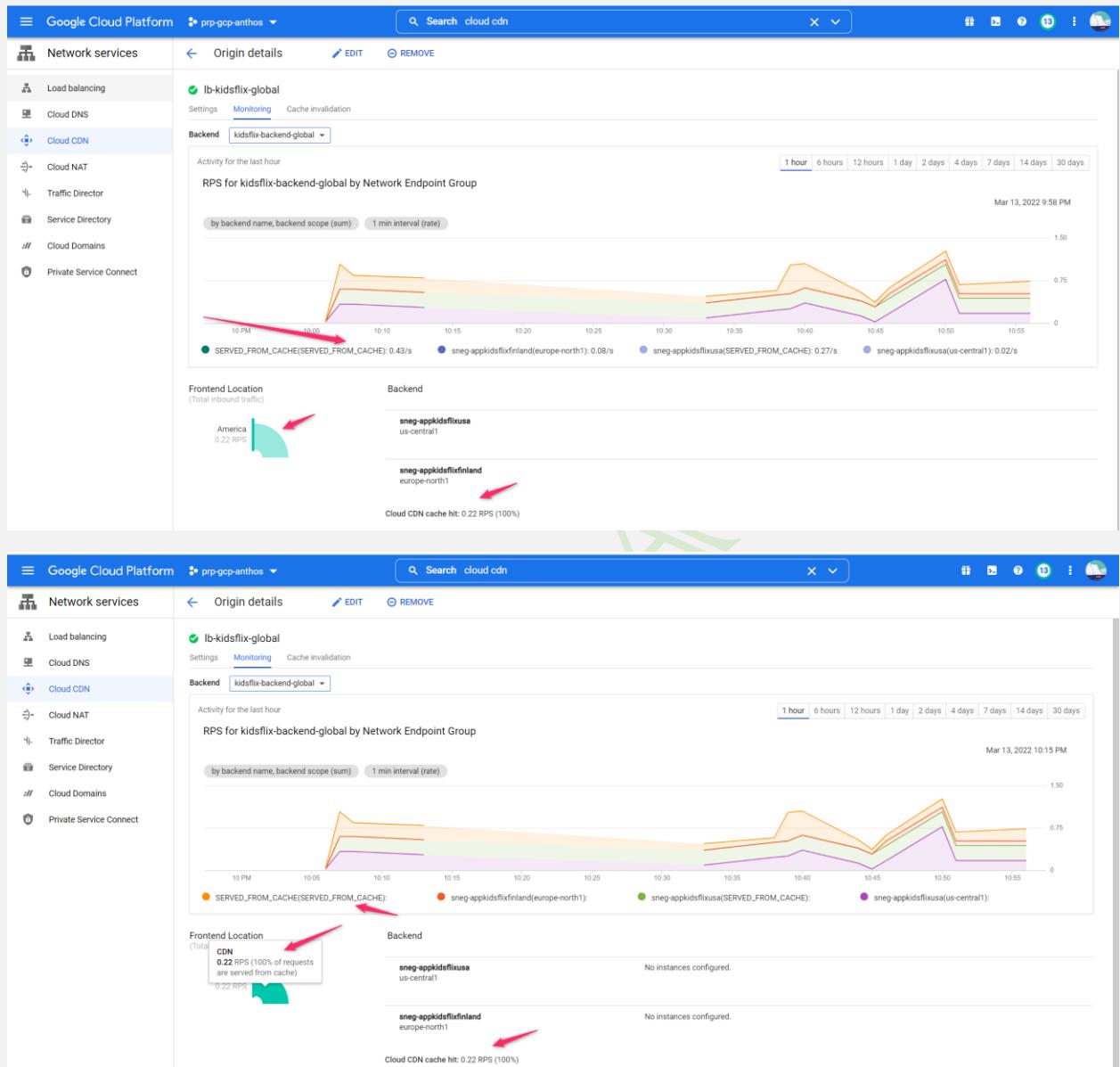
Brazil

Application Monitoring



GCP BOOTCAMP CHALLENGE PROJECT
 APPLICATION LOAD BALANCING SPEED UP CHALLENGE USING CLOUD CDN
 PRAFUL PATEL

GCP PROJECT 6.1: SERVERLESS WEB
 IMPLEMENTED BY:
 PRAFUL PATEL



for i in {1..15};do curl -s -w "%{time_total}\n" -o /dev/null http://34.111.200.193; done

SPEED UP CHALLENGE TEST -2

Cloud CDN Test 2 :

Create a testing instance in region- sauopaulo

To create a VM instance, select one of the options:

- New VM instance** Create a single VM instance from scratch
- New VM instance from template** Create a single VM instance from an existing template
- New VM instance from machine image** Create a single VM instance from an existing machine image
- Marketplace** Deploy a ready-to-go solution onto a VM instance

Name * testing-instance 1

Labels + ADD LABELS

Region * southamerica-east1 (São Pa... 2) **Zone *** southamerica-east1-b 3

Monthly estimate \$28.65
That's about \$0.04 hourly
You have \$371.87 free trial credits remaining
Pay for what you use: No upfront costs and per second billing

Machine configuration

Machine family GENERAL-PURPOSE COMPUTE-OPTIMIZED MEMORY-OPTIMIZED

Machine types for common workloads, optimized for cost and flexibility

Series E2

CPU platform selection based on availability

Machine type e2-micro (2 vCPU, 1 GB memory)

	vCPU	Memory
1 shared core	1 GB	

CPU PLATFORM AND GPU

Display device Enable to use screen capturing and recording tools.

Enable display device

Confidential VM service ?

Enable the Confidential Computing service on this VM instance.

Compute Engine VM Instances CREATE INSTANCE IMPORT VM REFRESH START / RESUME STOP OPERATIONS HELP ASSISTANT HIDE INFO PANEL LEARN

Virtual machines

- VM instances** migration-vm testing-instance
- Instance templates
- Sole-tenant nodes
- Machine images
- TPUs
- Committed use discounts
- Migrate for Compute Eng...

Storage

- Disks
- Snapshots

INSTANCES INSTANCE SCHEDULE

VM instances are highly configurable virtual machines for running workloads on Google infrastructure. [Learn more](#)

Status	Name	Zone	Recommendations	In use by	Internal IP	External IP	Connect
Running	migration-vm	us-east1-b			10.142.0.12 (nic0)	None	SSH
Running	testing-instance	southamerica-east1-b			10.158.0.2 (nic0)	34.95.221.148	SSH

Refresher controls

- View billing report** View and manage your Compute Engine billing
- Monitor VMs** View outlier VMs across metrics like CPU and network
- Explore VM logs** View, search, analyze, and download VM instance logs
- Set up firewall rules** Control traffic to and from a VM instance
- Patch management** Schedule patch updates and view patch compliance on VM

Select an instance Please select at least one resource.

Test without Cloud CDN Enabled

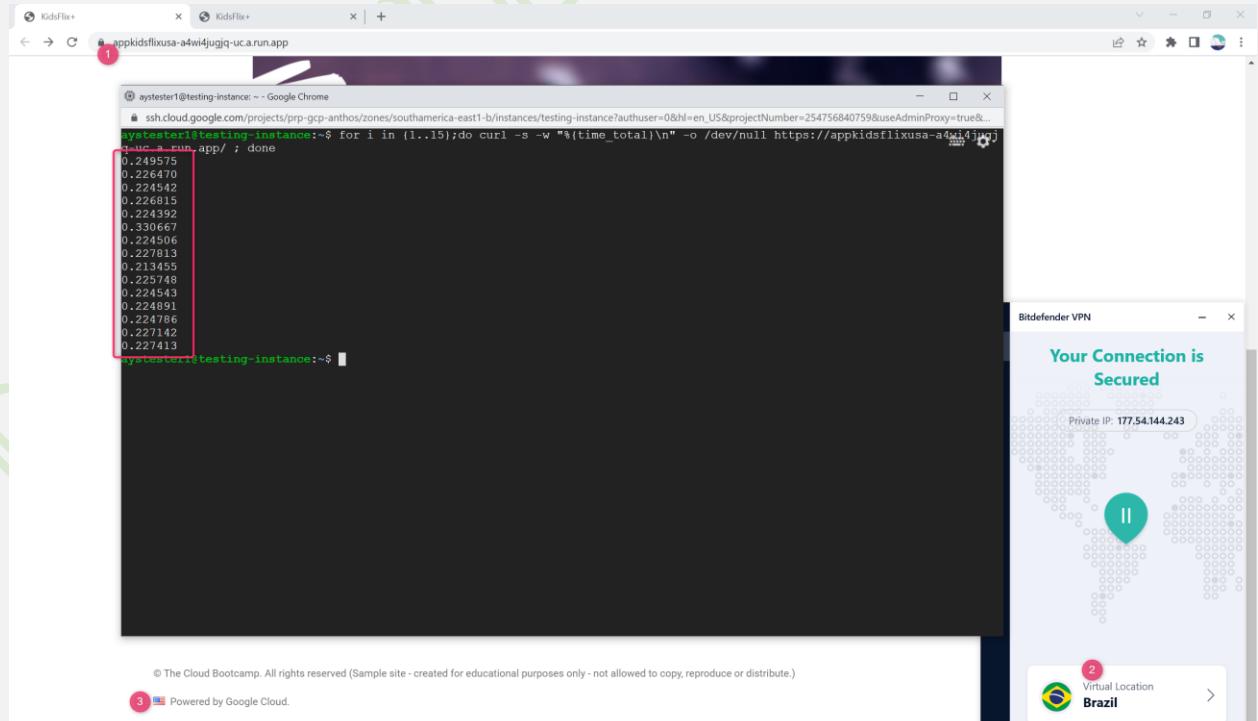
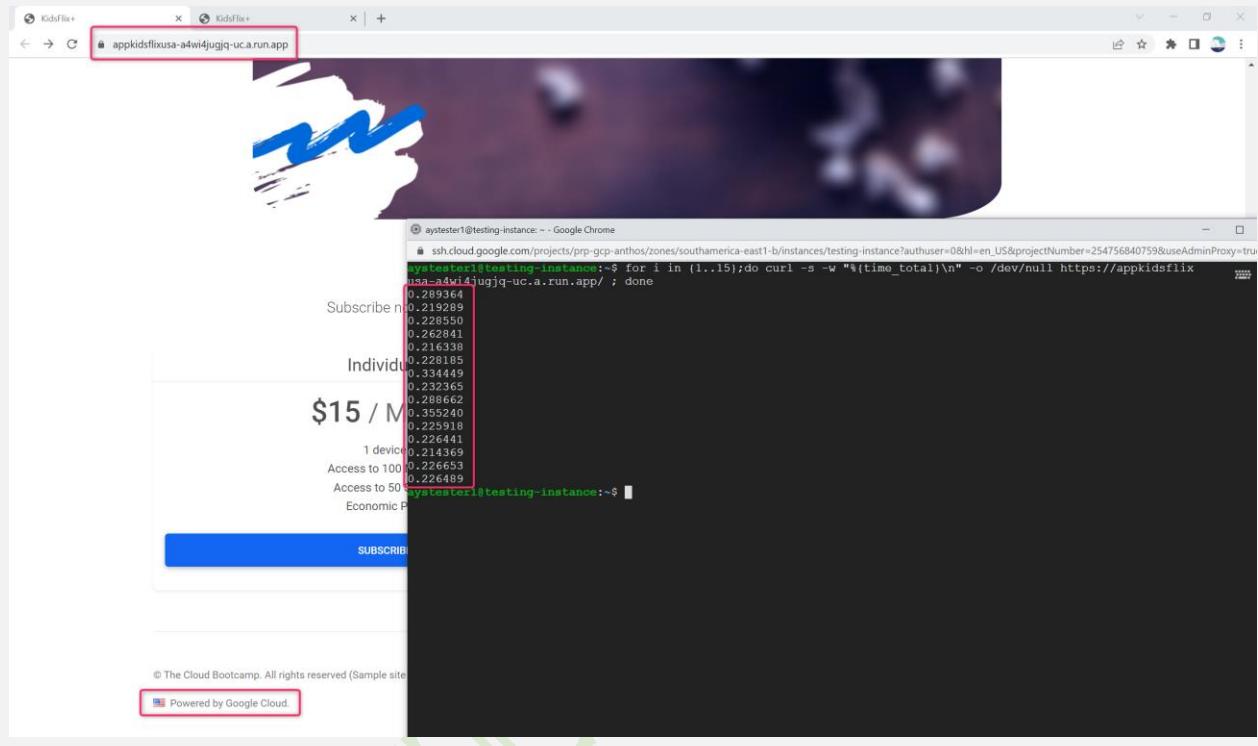
```
for i in {1..15};do curl -s -w "%{time_total}\n" -o /dev/null http://34.111.200.193/index.html; done
```

<https://appkidsflixusa-a4wi4jugjq-uc.a.run.app/>

<https://appkidsflixfinland-a4wi4jugjq-lz.a.run.app/>

Test to access USA appkidsflix from Brazil testng instance

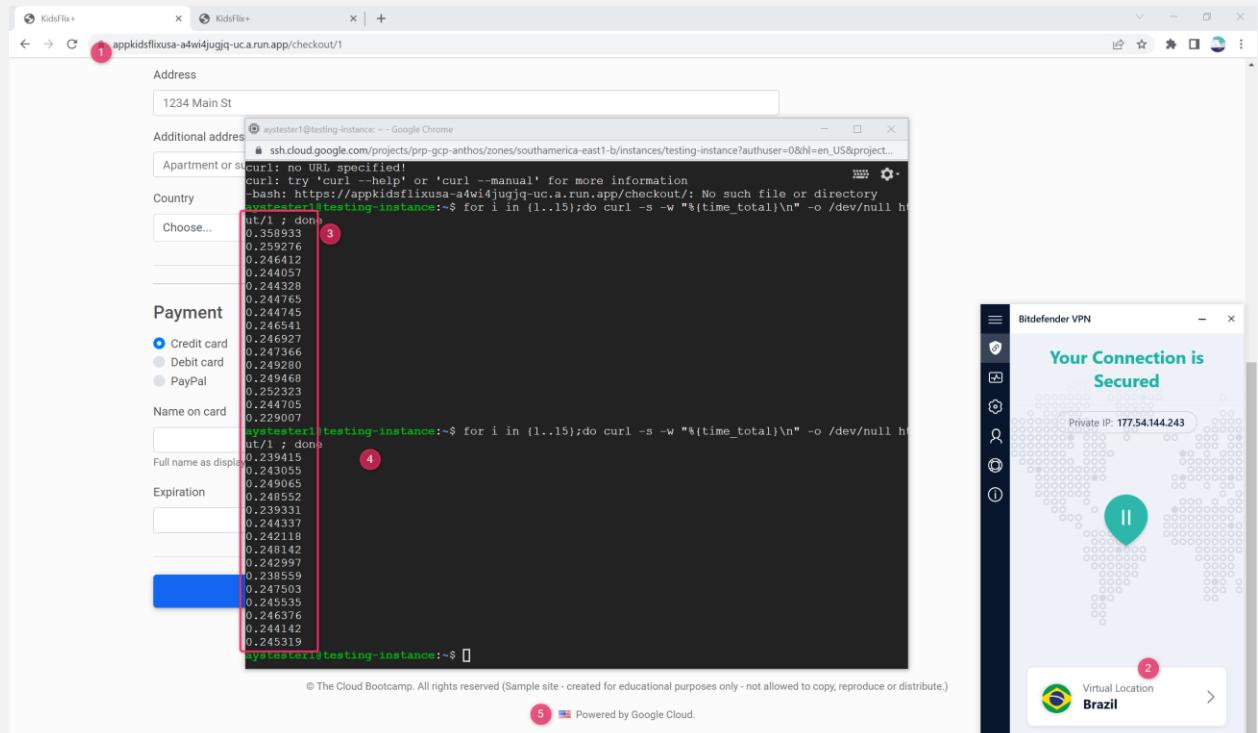
```
for i in {1..15};do curl -s -w "%{time_total}\n" -o /dev/null https://appkidsflixusa-a4wi4jugjq-uc.a.run.app/ ; done
```



<https://appkidsflixusa-a4wi4jugjq-uc.a.run.app/checkout/1>

```
for i in {1..15};do curl -s -w "%{time_total}\n" -o /dev/null
```

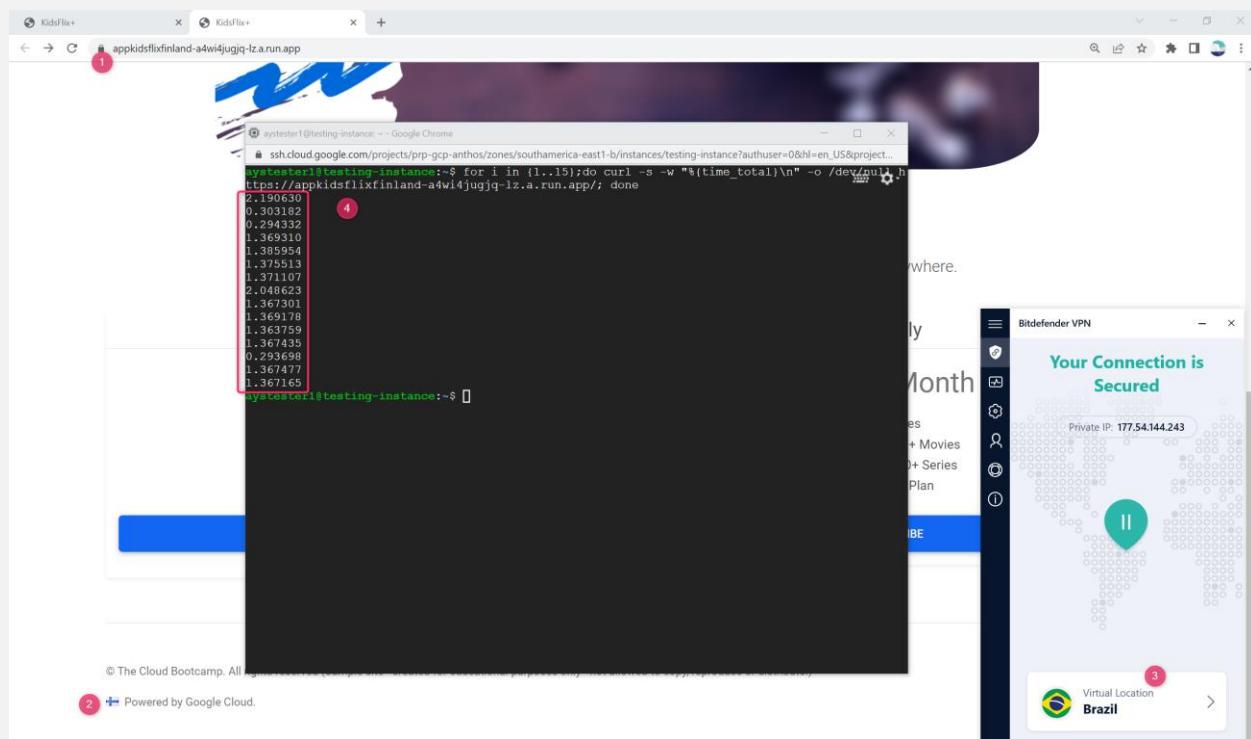
<https://appkidsflixusa-a4wi4jugjq-uc.a.run.app/checkout/1>; done



<https://appkidsflixfinland-a4wi4jugjq-lz.a.run.app/>

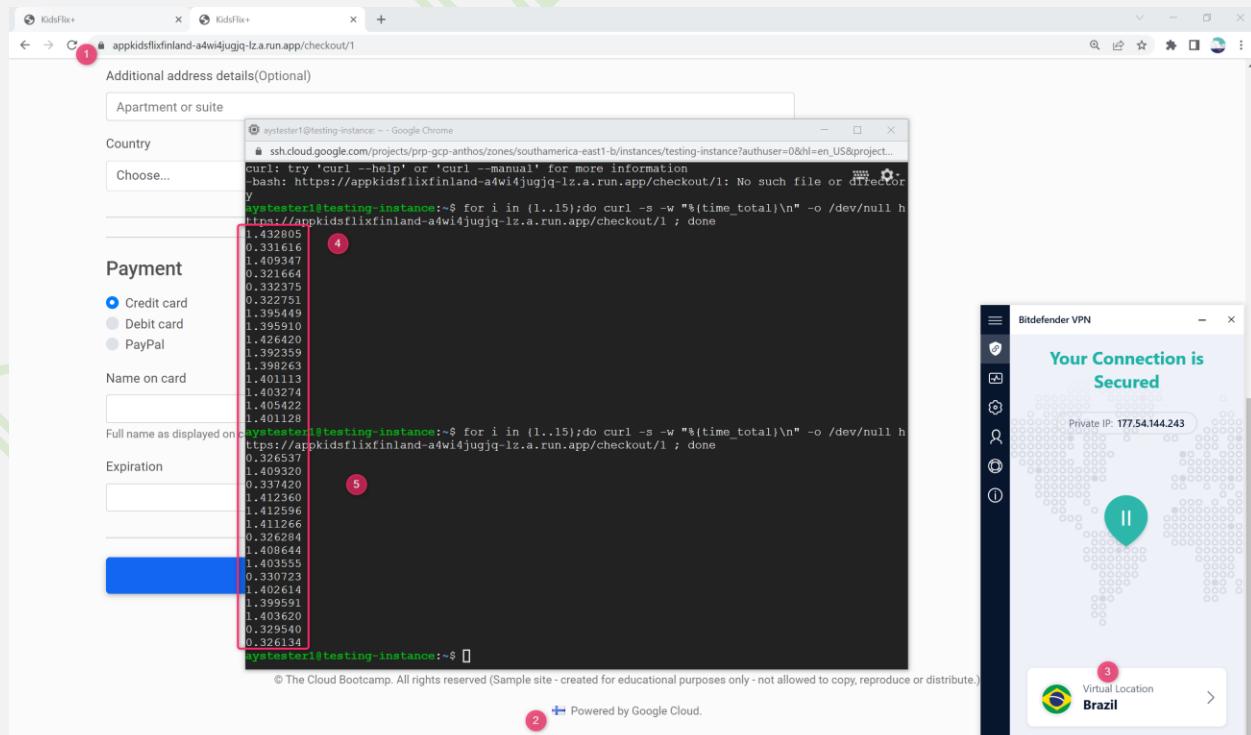
Test for Finland

for i in {1..15};do curl -s -w "%{time_total}\n" -o /dev/null <https://appkidsflixfinland-a4wi4jugjq-lz.a.run.app/>; done



```
for i in {1..15};do curl -s -w "%{time_total}\n" -o /dev/null
```

<https://appkidsflixfinland-a4wi4jugjq-lz.a.run.app/checkout/1> ; done



Create a backend for Finland

The screenshot shows the Google Cloud Platform Network services - Load balancing interface. A modal window titled 'Create backend service' is open. The 'Name' field is set to 'kidsflix-backend-global'. The 'Backend type' is selected as 'Serverless network endpoint group'. The 'Protocol' is set to 'HTTPS' and 'Named port' is set to 'http'. The 'Timeout' is set to '30s'. In the 'Backends' section, a sub-modal window titled 'New backend' is open, showing a dropdown menu with 'sneg-appkidsflixfinland' selected. There are 'CANCEL' and 'DONE' buttons at the bottom of this sub-modal. Below the main modal, there are 'Cloud CDN' and 'Enable Cloud CDN' checkboxes, and 'CREATE' and 'CANCEL' buttons.

Load balancing deployed

The screenshot shows the Google Cloud Platform Network services - Load balancer details for 'lb-kidsflix-global'. The 'Frontend' section shows 'Protocol' as 'HTTP' and 'IP-Port' as '34.149.241.164:80'. The 'Host and path rules' section shows 'All unmatched (default)' mapping to 'kidsflix-backend-global'. The 'Backend' section shows '1. kidsflix-backend-global' with 'Endpoint protocol' as 'HTTP', 'Timeout' as '30 seconds', 'Health check' as '—', and 'Cloud CDN' as 'Disabled'. The 'ADVANCED CONFIGURATIONS' section lists two serverless network endpoint groups: 'sneg-appkidsflixfinland' (Zone: europe-north1, Healthy: N/A, Autoscaling: No configuration, Capacity: 100%) and 'sneg-appkidsflixusa' (Zone: us-central1, Healthy: N/A, Autoscaling: No configuration, Capacity: 100%).

Get real-time analytics with Network Intelligence Center

LOAD BALANCERS BACKENDS FRONTENDS

Forwarding rule name	Frontend type	Scope	Address	Protocol	Network tier	Load balancer	Labels
kidsflix-frontend-global	HTTP(S) (Classic)	Global	34.149.241.164	HTTP	Premium	lb-kidsflix-global	

Select a forwarding rule

Labels help organize your resources (e.g., cost_center:sales or env:prod).

No forwarding rules selected.

Cloud CDN is not yet enabled

lb-kidsflix-global

Faster web performance and improved web protection with Cloud CDN and Cloud Armor. [Learn more](#)

DETAILS MONITORING CACHING

Caching is not enabled on your backend services. You could enable [Cloud CDN](#) to deliver content faster to users while reducing serving costs.

[ADD CDN ORIGIN](#)

Test Without CDN

KidsFix+ Not secure | 34.149.241.164

Plans

Subscribe now to the largest portal for children's movies and series. Watch anytime, anywhere.

Individual	Family
\$15 / Month	\$25 / Month
1 device Access to 100 Movies Access to 50 Series Economic Plan	5 devices Access to 300+ Movies Access to 150+ Series Premium Plan
SUBSCRIBE	SUBSCRIBE

© The Cloud Bootcamp. All rights reserved (Sample site - created for educational purposes only - not allowed to copy, reproduce or distribute.)

Powered by Google Cloud

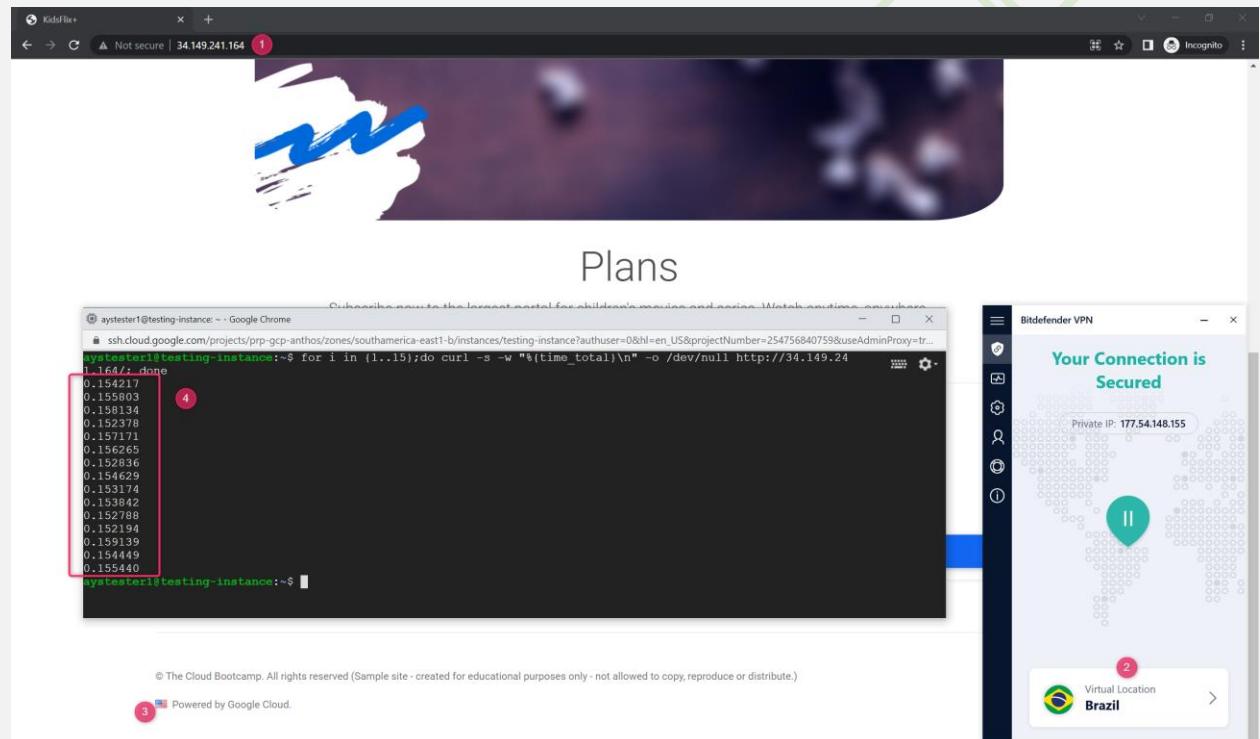
```
for i in {1..15};do curl -s -w "%{time_total}\n" -o /dev/null
```

<https://appkidsflixusa-a4wi4jugjq-uc.a.run.app/checkout/1>; done

<http://34.149.241.164/>

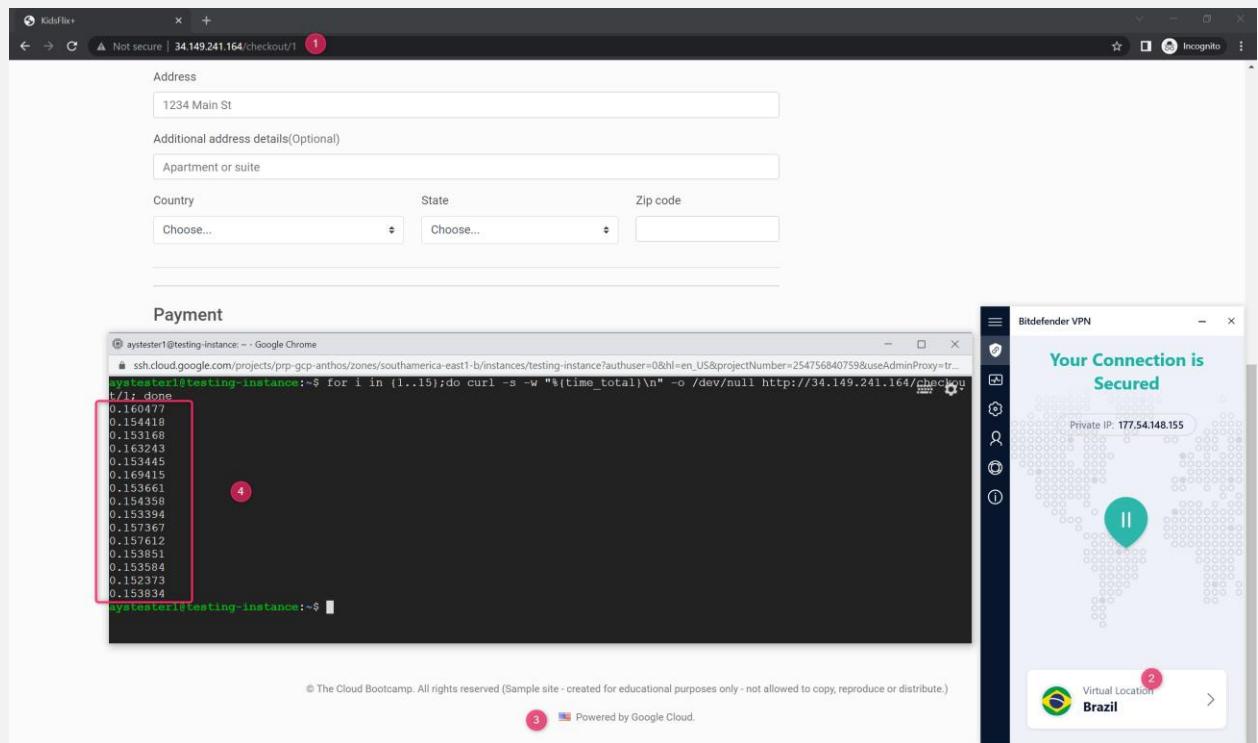
```
for i in {1..15};do curl -s -w "%{time_total}\n" -o /dev/null
```

<http://34.149.241.164/>; done

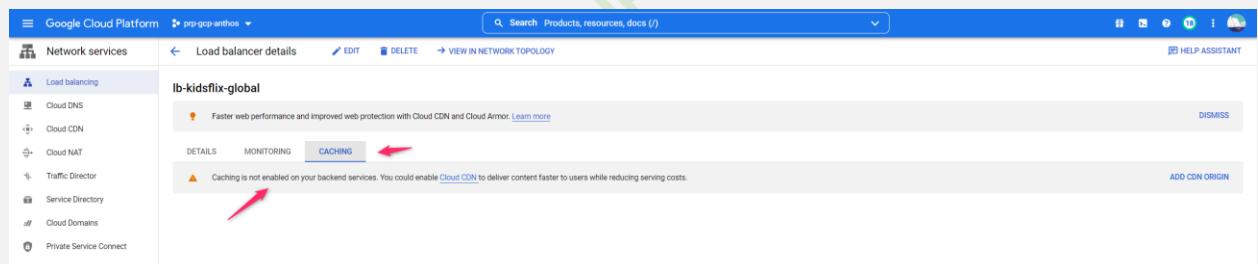
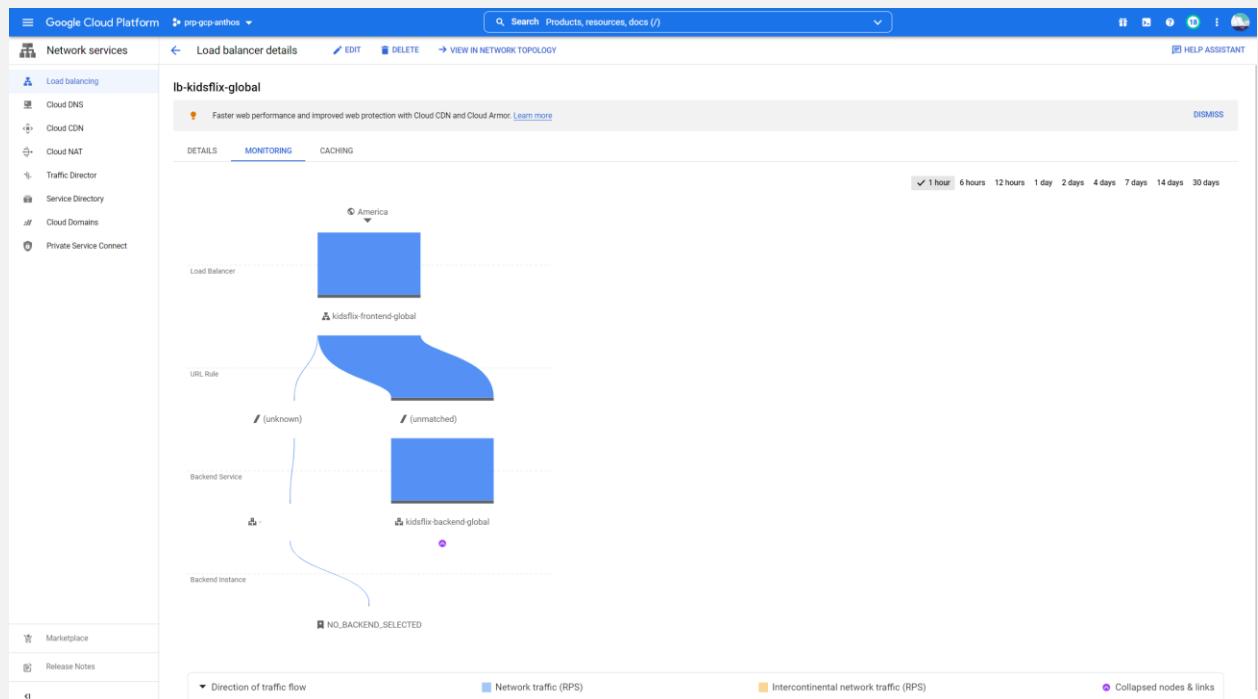


```
for i in {1..15};do curl -s -w "%{time_total}\n" -o /dev/null
```

<http://34.149.241.164/checkout/1>; done



The screenshot shows the Google Cloud Platform Backend service details page for 'kidsflix-backend-global'. It displays general properties for the endpoint protocol (HTTP), in use by (lb-kidsflix-global), timeout (30 seconds), backends (2 Serverless network endpoint groups), health check, session affinity (None), and Cloud CDN (Disabled). Red arrows point to the 'lb-kidsflix-global' value under 'In use by' and the 'Disabled' value under 'Cloud CDN'.



Enable Cloud CDN

Enable Cloud CDN

Enabling Cloud CDN for your Cloud Run service allows you to optimize content delivery by caching content close to your users.

You can enable Cloud CDN on backend services used by global external HTTP(S) load balancers by using the gcloud compute backend-services update command.

Cloud CDN is supported for backend services with Cloud Run, Cloud Functions, and App Engine backends.

```
gcloud compute backend-services update kidsflix-backend-global --enable-cdn --global
```

The screenshot shows the Google Cloud Platform interface. In the top navigation bar, it says "Google Cloud Platform" and "prp-gcp-anthos". Below the navigation bar, there's a search bar with "Search load" and a "Cloud Run" tab selected. Under "Cloud Run", there are two services listed: "appkidsflixfinland" and "appkidsflixusa". Both services have 0 requests per second, are in the "europe-north1" region, and are "Allow unauthenticated". They were last deployed 1 hour ago by "AYSTester1@gmail.com". On the right side of the screen, there's a sidebar with "No services selected" and tabs for "PERMISSIONS" and "LABELS". A message at the bottom of the sidebar says "Please select at least one resource." At the bottom of the screen is a terminal window titled "CLOUD SHELL Terminal (prp-gcp-anthos) x (prp-gcp-anthos) x +". It shows the command "gcloud compute backend-services update kidsflix-backend-global --enable-cdn --global" being run, with a red arrow pointing to the "--enable-cdn" option.

Cloud CDN is ENABLED

This screenshot shows the "Backend service details" page for "kidsflix-backend-global". The left sidebar has "Network services" selected, with "Load balancing" expanded, showing "Cloud CDN" under it. The main panel shows the "kidsflix-backend-global" service with "General properties". Under "Cloud CDN", the "Enabled" checkbox is checked, and a red arrow points to it. Another red arrow points to the "VIEW CDN DETAILS" link.

This screenshot shows the same "Backend service details" page for "kidsflix-backend-global". The "Cloud CDN details" pane is open on the right. It shows the "Cloud CDN: enabled" status, which is highlighted with a red arrow. Other settings shown include "Cache mode" (Client time to live: 1 hour, Default time to live: 1 hour, Maximum time to live: 1 day), "Restricted content" (Public access to the content cached by Cloud CDN allowed), "Negative caching" (Enabled), and "Negative caching policies" (HTTP status code: Cache time to live (TTL), Serve while stale: 1 day). Red arrows point to each of these highlighted areas.

GCP BOOTCAMP CHALLENGE PROJECT
APPLICATION LOAD BALANCING SPEED UP CHALLENGE USING CLOUD CDN
PRAFUL PATEL

GCP PROJECT 6.1: SERVERLESS WEB
IMPLEMENTED BY:

The screenshots illustrate the step-by-step configuration of a Cloud CDN origin named "lb-kidsflix-global".

- Screenshot 1: Cloud CDN List**
Shows the Cloud CDN list with one origin entry: "lb-kidsflix-global" (Associated load balancers: "lb-kidsflix-global", Cache hit ratio: n/a). Red arrows point to the origin name and the associated load balancer.
- Screenshot 2: Origin Details**
Shows the "Origin details" page for "lb-kidsflix-global". It displays the frontend settings (Protocol: HTTP, IP/Port: 34.149.241.164:80, Network Tier: Premium) and the backend service "kidsflix-backend-global". Red arrows point to the "Settings" tab, the IP/Port field, and the backend service.
- Screenshot 3: Backend Services**
Shows the "Backend services" section where two instances are listed: "sneq-appkidsflixusa" (region: us-central1) and "sneq-appkidsflixfinland" (region: europe-north1). Red arrows point to the "Frontend Location" dropdown and the instance names.
- Screenshot 4: Edit Origin**
Shows the "Edit" screen for the origin. It lists the checked backend services: "kidsflix-backend-global" (Backend type: Unknown, Cache mode: Cache static content, Cache key: Default, Signed URL: None, Security policy: Disabled). A red arrow points to the "Configure" button.

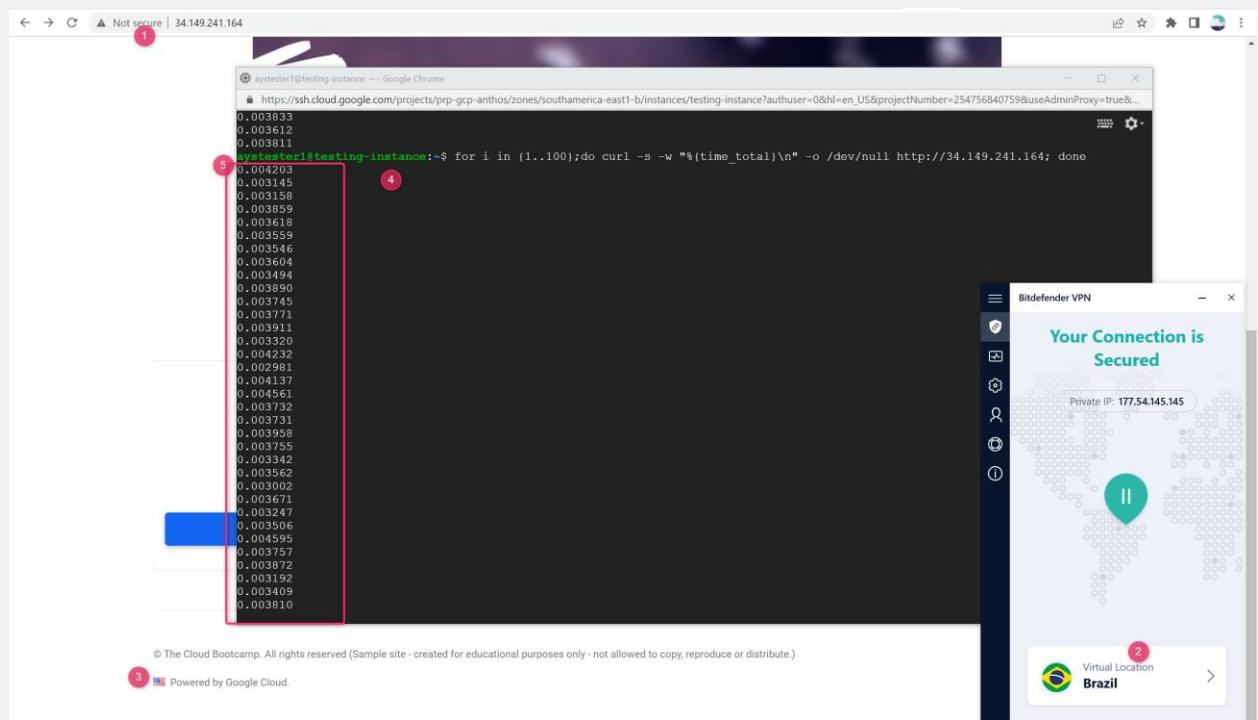
Let's test after Cloud CDN enabled

```
for i in {1..15};do curl -s -w "%{time_total}\n" -o /dev/null http://34.149.241.164; done
for i in {1..15};do curl -s -w "%{time_total}\n" -o /dev/null
http://34.149.241.164/checkout/1; done
```

```
aystester1@testing-instance: ~ - Google Chrome
ssh.cloud.google.com/projects/prp-gcp-anthos/zones/southamerica-east1-b/instances/testing-instance?authuser=0&hl=en_US&projectNumber=254756840759&useAdminProxy=true&trou...
0.003687
0.003894
0.003206
aystester1@testing-instance: ~$ for i in {1..50};do curl -s -w "%{time_total}\n" -o /dev/null http://34.149.241.164; done
0.004501
0.003821
0.003498
0.003773
0.003848
0.003710
0.003582
0.004054
0.003613
0.003347
0.003961
0.003662
0.003771
0.003876
0.004100
0.003672
0.003703
0.003485
0.003803
0.003653
0.003736
0.004325
0.003537
0.003557
0.003951
```

The screenshot shows the Google Cloud Platform Network services - Cloud CDN interface. On the left sidebar, 'Cloud CDN' is selected. In the main pane, it shows 'lb-kidsflix-global' as the origin. The 'Monitoring' tab is selected, showing traffic distribution and cache hit statistics. A red box highlights the message 'Cloud CDN cache hit: 1.97 RPS (100%)'.

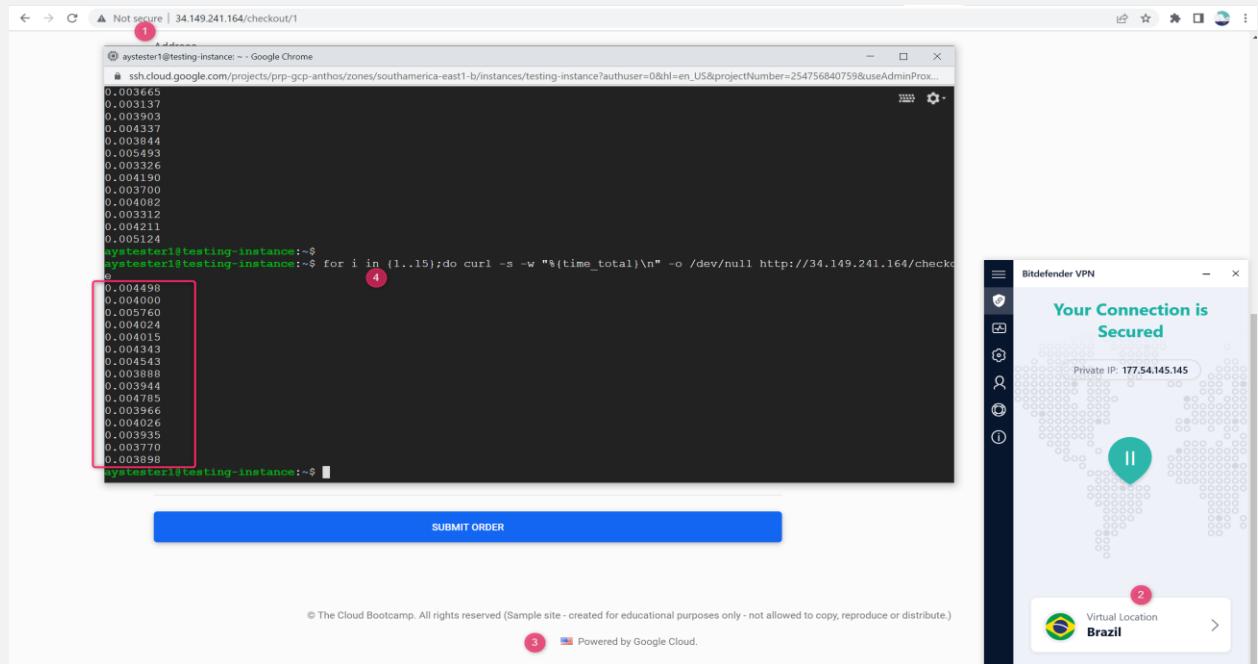
The screenshot shows the same Google Cloud Platform Network services - Cloud CDN interface as the previous one, but with a different configuration. The 'Monitoring' tab is selected, showing traffic distribution and cache hit statistics. A red box highlights the message 'Cloud CDN cache hit: 0.08 RPS (83.3%)'. A green arrow points from the first screenshot's highlighted message to this one, indicating a comparison.



This screenshot shows the Google Cloud Platform Network services - Cloud CDN page. The left sidebar lists options like Load balancing, Cloud DNS, Cloud CDN (which is selected), Cloud NAT, Traffic Director, Service Directory, Cloud Domains, and Private Service Connect. The main pane shows a table for Cloud CDN configurations. One row is highlighted with a red box, showing 'kidsflix-backend-global' as the Origin name (CDN enabled), 'lb-kidsflix-global' as the Associated load balancers, and '100.0%' as the Cache hit ratio. A red arrow points to the 'Cache hit ratio' column.

This screenshot shows the Google Cloud Platform Network services - Origin details page for the 'lb-kidsflix-global' configuration. The left sidebar is identical to the previous screenshot. The main pane shows the 'lb-kidsflix-global' configuration with 'Monitoring' selected under Settings. It displays 'Frontend Location' (Total inbound traffic) in America with 1.58 RPS and 'Backend' locations: 'sneq-appkidsflixusa' in us-central1 and 'sneq-appkidsflixfinland' in europe-north1. A red arrow points to the 'Cloud CDN cache hit: 1.58 RPS (100%)' message at the bottom.

```
aystester1@testing-instance:~$ for i in {1..15};do curl -s -w "%{time_total}\n" -o /dev/null http://34.149.241.164/checkout/1; done
```



Backend	Location	Latency
sneg-appkidsfixusa	us-central1	0.73 RPS
sneg-appkidsfixfinland	europe-north1	

Clean up the project.

Note: Please make sure that all project resources have been cleaned up correctly so it doesn't get charged unnecessarily.

Great Job!

Successfully accomplished speed up challenge!

PRAFUL PATEL