# Google Cloud Run : Serverless

Presented By :

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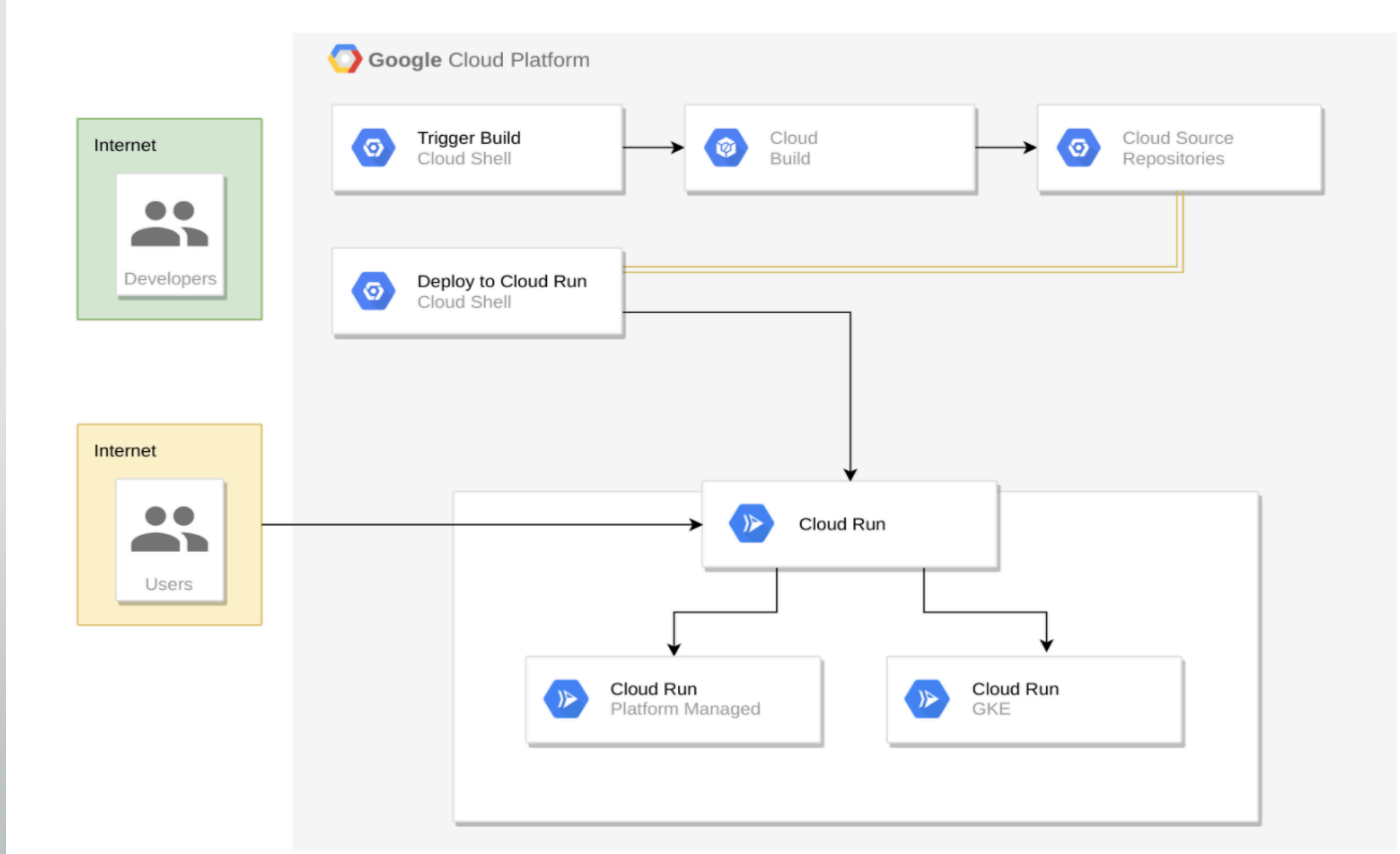
# GCR

## GCR Architecture



# GCR

**Pre-Requisites:**

- ✓ Gcloud sdk installed
- ✓ Project setup completed with correct credentials
- ✓ Docker installed on local machine
- ✓ Python 3 on local machine
- ✓ Docker & Python 3 may not be needed if you want to build/deploy/run container in cloud run.
- ✓ Even python is not needed while using google cloud run.

# GCR

**Starting Project:**

**Objective :**Create a simple flask application to display some of existing courses at udemy and a hyperlink to redirect it to the udemy course.

Development of the code will done in Mac but can easily be done via windows/Linux also.

**Local Env Setup Steps:**

git clone https://github.com/trainmefordevsecops/SERVERLESS/tree/master/GCR/gcr-python-flask-project

**Install & verify that flask is installed**

pip install -r requirements.txt

**open the code in the localhost browser**

python app.py

# GCR

## Starting Project: app.py

```
amrits-MacBook-Pro:gcr-python-flask-project ihealth$ vi app.py

import os
import logging

from flask import Flask

# Change the format of messages logged to Stackdriver
logging.basicConfig(format='%(message)s', level=logging.INFO)

app = Flask(__name__)

@app.route('/')
def home():
        html = """
<html>
 <head>
  <title>
   Google Cloud Run - Hello World with my course
  </title>
 </head>
 <body>
  <p>Hello World! I am running on Cloud Run </p>
  <a href="https://www.udemy.com/course/devsecops" target="_blank">DevSecOps : DevOps + Security course</a>
  <a href="https://www.udemy.com/course/sonarqube-master-sonarqube-within-a-few-hours-2020" target="_blank">SonarQube : SAST + Code Quality course</a>
 </body>
</html>
"""
        return html

if __name__ == '__main__':
        app.run(debug=True, host='0.0.0.0', port=int(os.environ.get('PORT', 8080)))
~
```

# GCR

## Starting Project: app.py

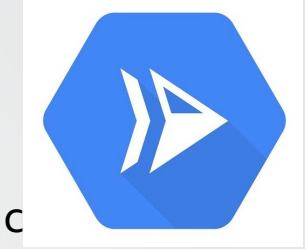
```
# Use the official Python 3 image.
# https://hub.docker.com/_/python
#
# python:3-alpine builds a 97 MB image - 33.2 MB in Google Container Registry
FROM python:3-alpine

# RUN apt-get update -y
# RUN apt-get install -y python-pip

COPY . /app

# Create and change to the app directory.
WORKDIR /app

## disable cache and install required modules ##
RUN pip install --no-cache-dir -r requirements.txt

RUN chmod 444 app.py
RUN chmod 444 requirements.txt

# Service must listen to $PORT environment variable.
# This default value facilitates local development.
ENV PORT 8080

# Run the web service on container startup.
CMD [ "python", "app.py" ]
```

# GCR

```
amrits-MacBook-Pro:gcr-python-flask-project ihealth$ pip install -r requirements.txt
DEPRECATION: Python 2.7 reached the end of its life on January 1st, 2020. Please upgrade your Python as Python 2.7 is no longer maintained. A future version of pip wil
l drop support for Python 2.7. More details about Python 2 support in pip, can be found at https://pip.pypa.io/en/latest/development/release-process/#python-2-support
Defaulting to user installation because normal site-packages is not writeable
Requirement already satisfied: Flask==1.0.2 in /Users/ihealth/Library/Python/2.7/lib/python/site-packages (from -r requirements.txt (line 1)) (1.0.2)
Requirement already satisfied: itsdangerous>=0.24 in /Users/ihealth/Library/Python/2.7/lib/python/site-packages (from Flask==1.0.2->-r requirements.txt (line 1)) (1.1.
0)
Requirement already satisfied: Jinja2>=2.10 in /Users/ihealth/Library/Python/2.7/lib/python/site-packages (from Flask==1.0.2->-r requirements.txt (line 1)) (2.11.2)
Requirement already satisfied: Werkzeug>=0.14 in /Users/ihealth/Library/Python/2.7/lib/python/site-packages (from Flask==1.0.2->-r requirements.txt (line 1)) (1.0.1)
Requirement already satisfied: click>=5.1 in /Users/ihealth/Library/Python/2.7/lib/python/site-packages (from Flask==1.0.2->-r requirements.txt (line 1)) (7.1.2)
Requirement already satisfied: MarkupSafe>=0.23 in /Users/ihealth/Library/Python/2.7/lib/python/site-packages (from Jinja2>=2.10->Flask==1.0.2->-r requirements.txt (li
ne 1)) (1.1.1)
```

```
amrits-MacBook-Pro:gcr-python-flask-project ihealth$ python app.py
 * Serving Flask app "app" (lazy loading)
 * Environment: production
   WARNING: Do not use the development server in a production environment.
   Use a production WSGI server instead.
 * Debug mode: on
 * Running on http://0.0.0.0:8080/ (Press CTRL+C to quit)
 * Restarting with stat
 * Debugger is active!
 * Debugger PIN: 222-854-357
127.0.0.1 - - [14/Jun/2020 00:33:05] "GET / HTTP/1.1" 200 -
127.0.0.1 - - [14/Jun/2020 00:33:06] "GET /favicon.ico HTTP/1.1" 404 -
```

# GCR : Dockerize the application



As we already know how docker has revolutionized the IT industry, so we will be building a docker c
our application code.

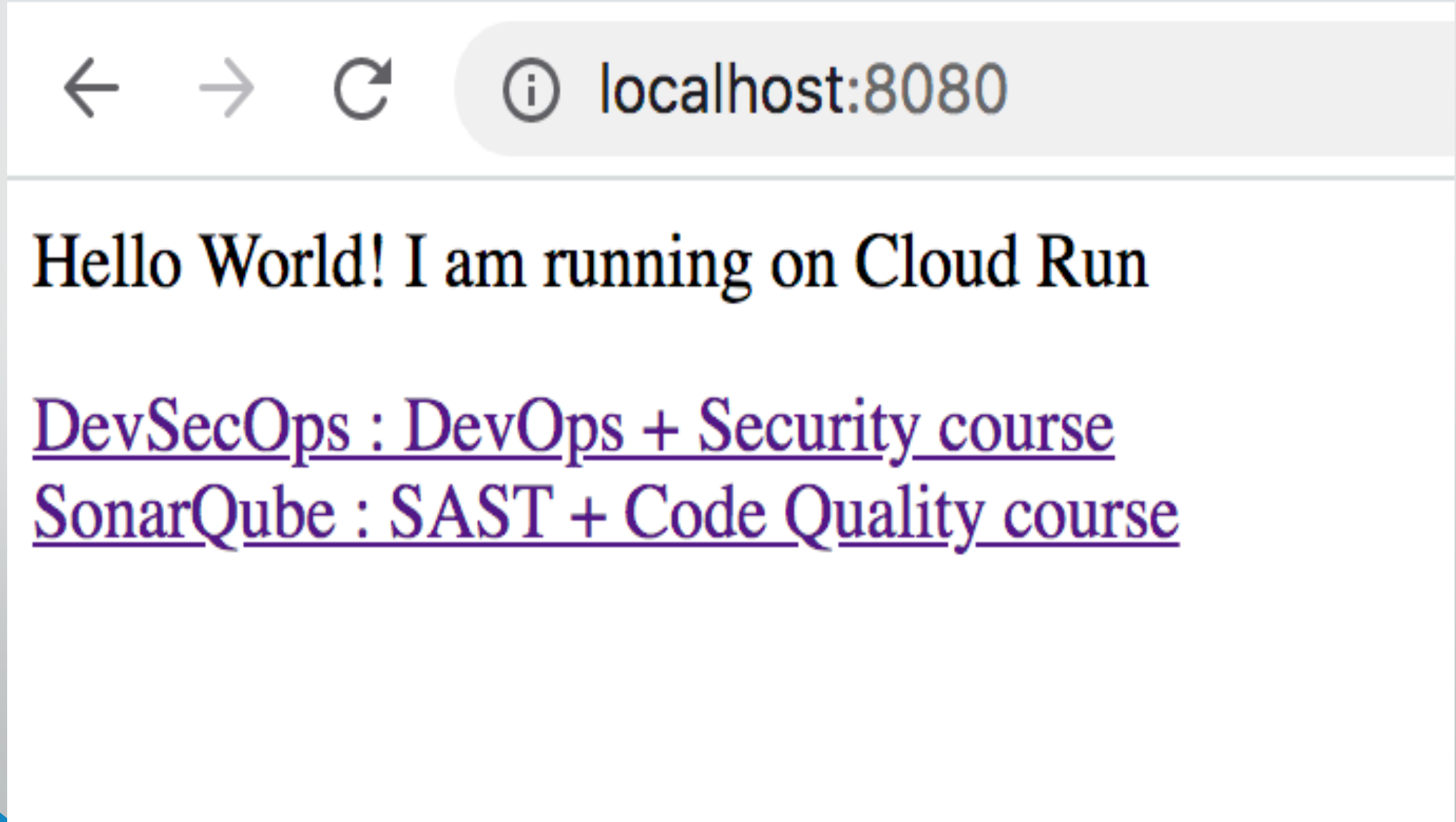
```
amrits-MacBook-Pro:gcr-python-flask-project ihealth$ docker build -t gcr-flask-python:latest .
Sending build context to Docker daemon  5.632kB
Step 1/8 : FROM python:3-alpine
 ---> db0e2316082c
Step 2/8 : COPY . /app
 ---> b5aec20f9ebb
Step 3/8 : WORKDIR /app
 ---> Running in bcf87ba359b9
Removing intermediate container bcf87ba359b9
 ---> 300dc60f48ac
Step 4/8 : RUN pip install --no-cache-dir -r requirements.txt
 ---> Running in 8e7b72ce22d7
Collecting Flask==1.0.2
  Downloading Flask-1.0.2-py2.py3-none-any.whl (91 kB)
Collecting Jinja2>=2.10
  Downloading Jinja2-2.11.2-py2.py3-none-any.whl (125 kB)
Collecting itsdangerous>=0.24
  Downloading itsdangerous-1.1.0-py2.py3-none-any.whl (16 kB)
Collecting click>=5.1
  Downloading click-7.1.2-py2.py3-none-any.whl (82 kB)
Collecting Werkzeug>=0.14
  Downloading Werkzeug-1.0.1-py2.py3-none-any.whl (298 kB)
Collecting MarkupSafe>=0.23
  Downloading MarkupSafe-1.1.1.tar.gz (19 kB)
Building wheels for collected packages: MarkupSafe
  Building wheel for MarkupSafe (setup.py): started
  Building wheel for MarkupSafe (setup.py): finished with status 'done'
  Created wheel for MarkupSafe: filename=MarkupSafe-1.1.1-py3-none-any.whl size=12629 sha256=52ed962ccf63fffb552f7c16c58915781ff75f0b6f767d3dbbb50ce20921b01b
  Stored in directory: /tmp/pip-ephem-wheel-cache-6woacjbp/wheels/0c/61/d6/4db4f4c28254856e82305fdb1f752ed7f8482e54c384d8cb0e
Successfully built MarkupSafe
Installing collected packages: MarkupSafe, Jinja2, itsdangerous, click, Werkzeug, Flask
Successfully installed Flask-1.0.2 Jinja2-2.11.2 MarkupSafe-1.1.1 Werkzeug-1.0.1 click-7.1.2 itsdangerous-1.1.0
WARNING: You are using pip version 20.1; however, version 20.1.1 is available.
You should consider upgrading via the '/usr/local/bin/python -m pip install --upgrade pip' command.
Removing intermediate container 8e7b72ce22d7
 ---> 4eae7dcc0d3e
Step 5/8 : RUN chmod 444 app.py
 ---> Running in 815cb66a1e82
Removing intermediate container 815cb66a1e82
 ---> 4e2bfeb1b795
Step 6/8 : RUN chmod 444 requirements.txt
 ---> Running in 73686b117e10
Removing intermediate container 73686b117e10
 ---> c6a66ddb6a17
Step 7/8 : ENV PORT 8080
 ---> Running in 2860c185e8de
Removing intermediate container 2860c185e8de
 ---> b176aacf64c9
Step 8/8 : CMD [ "python", "app.py" ]
 ---> Running in c623c74d9c68
Removing intermediate container c623c74d9c68
 ---> 98f3ae22c5ab
Successfully built 98f3ae22c5ab
Successfully tagged gcr-flask-python:latest
```

# GCR

- **Note : Build the smallest container you can. This will decrease costs, r the testing footprint, reduce data transfer time to start the container and improve security.**
- **Run docker container:**
- docker run -it --rm -p 8080:8080 sample-flask-example:latest

```
amrits-MacBook-Pro:gcr-python-flask-project ihealth$ docker run -it --rm -p 8080:8080 gcr-flask-python:latest
 * Serving Flask app "app" (lazy loading)
 * Environment: production
   WARNING: Do not use the development server in a production environment.
   Use a production WSGI server instead.
 * Debug mode: on
 * Running on http://0.0.0.0:8080/ (Press CTRL+C to quit)
 * Restarting with stat
 * Debugger is active!
 * Debugger PIN: 192-301-008
172.17.0.1 - - [13/Jun/2020 16:48:06] "GET / HTTP/1.1" 200 -
172.17.0.1 - - [13/Jun/2020 16:48:07] "GET /favicon.ico HTTP/1.1" 404 -
```

# GCR : Application on browser



# GCR : CLI

## gcloud Components Installation:

gcloud components install beta

```
amrits-MacBook-Pro:gcr-python-flask-project ihealth$ gcloud components install beta

Your current Cloud SDK version is: 296.0.1
Installing components from version: 296.0.1

These components will be installed.

Name                 Version      Size
gcloud Beta Commands  2019.05.17  < 1 MiB

For the latest full release notes, please visit:
  https://cloud.google.com/sdk/release_notes

Do you want to continue (Y/n)?  y

Creating update staging area
Installing: gcloud Beta Commands
Creating backup and activating new installation

Performing post processing steps...done.

Update done!

amrits-MacBook-Pro:gcr-python-flask-project ihealth$
```

# GCR : CLI

## gcloud Components Installation:

gcloud components install alpha

```
amrits-MacBook-Pro:gcr-python-flask-project ihealth$ gcloud components install alpha


Your current Cloud SDK version is: 296.0.1
Installing components from version: 296.0.1

┌──────────────────────────────────────────────┐
│     These components will be installed.      │
├─────────────────────┬────────────┬───────────┤
│         Name        │   Version  │    Size   │
├─────────────────────┼────────────┼───────────┤
│ gcloud Alpha Commands │ 2019.05.17 │ < 1 MiB │
└─────────────────────┴────────────┴───────────┘

For the latest full release notes, please visit:
  https://cloud.google.com/sdk/release_notes

Do you want to continue (Y/n)?  y

╔══════════════════════════════════════════════╗
╠═ Creating update staging area               ═╣
╠═ Installing: gcloud Alpha Commands          ═╣
╠═ Creating backup and activating new installation ═╣
╚══════════════════════════════════════════════╝

Performing post processing steps...done.

Update done!

amrits-MacBook-Pro:gcr-python-flask-project ihealth$
```

# GCR : CLI

## Update if required

gcloud components update

```
amrits-MacBook-Pro:gcr-python-flask-project ihealth$ gcloud components update

All components are up to date.
amrits-MacBook-Pro:gcr-python-flask-project ihealth$ gcloud projects list
Listed 0 items.
```

## List existing projects

```
amrits-MacBook-Pro:gcr-python-flask-project ihealth$ gcloud config list core/project
[core]
project = gae-100

Your active configuration is: [default]
amrits-MacBook-Pro:gcr-python-flask-project ihealth$
```

# GCR : Build Containers Image in the Cloud

gcloud builds submit --tag gcr.io/my-project/sample-flask-example

```
amrits-MacBook-Pro:gcr-python-flask-project ihealth$ gcloud builds submit --tag gcr.io/gcr-00/gcr-flask-python
Creating temporary tarball archive of 3 file(s) totalling 1.7 KiB before compression.
Uploading tarball of [.] to [gs://gcr-00_cloudbuild/source/1592072247.64-f73f9ec76641408b93f240c0a2c7c03f.tgz]
API [cloudbuild.googleapis.com] not enabled on project [222435586265].
 Would you like to enable and retry (this will take a few minutes)?
(y/N)?  y

Enabling service [cloudbuild.googleapis.com] on project [222435586265]...
Operation "operations/acf.bd80f104-686d-415f-9659-254dd2918471" finished successfully.
Created [https://cloudbuild.googleapis.com/v1/projects/gcr-00/builds/78bebe5c-0e14-4667-bf80-f08597d22272].
Logs are available at [https://console.cloud.google.com/cloud-build/builds/78bebe5c-0e14-4667-bf80-f08597d22272?project=222435586265].
------------------------------------------------------------------------ REMOTE BUILD OUTPUT ------------------------------------
starting build "78bebe5c-0e14-4667-bf80-f08597d22272"

FETCHSOURCE
Fetching storage object: gs://gcr-00_cloudbuild/source/1592072247.64-f73f9ec76641408b93f240c0a2c7c03f.tgz#1592072249668768
Copying gs://gcr-00_cloudbuild/source/1592072247.64-f73f9ec76641408b93f240c0a2c7c03f.tgz#1592072249668768...
/ [1 files][  1.1 KiB/  1.1 KiB]
Operation completed over 1 objects/1.1 KiB.
BUILD
Already have image (with digest): gcr.io/cloud-builders/docker
Sending build context to Docker daemon  5.632kB
Step 1/8 : FROM python:3-alpine
3-alpine: Pulling from library/python
df20fa9351a1: Pulling fs layer
36b3adc4ff6f: Pulling fs layer
7031d6d6c7f1: Pulling fs layer
81b7f5a7444b: Pulling fs layer
0f8a54c5d7c7: Pulling fs layer
81b7f5a7444b: Waiting
0f8a54c5d7c7: Waiting
36b3adc4ff6f: Download complete
df20fa9351a1: Verifying Checksum
df20fa9351a1: Download complete
81b7f5a7444b: Verifying Checksum
81b7f5a7444b: Download complete
7031d6d6c7f1: Verifying Checksum
7031d6d6c7f1: Download complete
0f8a54c5d7c7: Verifying Checksum
0f8a54c5d7c7: Download complete
df20fa9351a1: Pull complete
36b3adc4ff6f: Pull complete
7031d6d6c7f1: Pull complete
81b7f5a7444b: Pull complete
0f8a54c5d7c7: Pull complete
Digest: sha256:c5623df482648cacece4f9652a0ae04b51576c93773ccd43ad459e2a195906dd
Status: Downloaded newer image for python:3-alpine
 ---> 8ecf5a48c789
```

# GCR : Build Containers in Cloud

gcloud builds submit --tag gcr.io/my-project/sample-flask-example

```
Pushing gcr.io/gcr-00/gcr-flask-python
The push refers to repository [gcr.io/gcr-00/gcr-flask-python]
8ab7585e3ce8: Preparing
8ff7fcdefbba: Preparing
14c5c5ff20de: Preparing
d1f5439f248a: Preparing
fffdb84c36f2: Preparing
50205a7df19a: Preparing
ef833453b9c7: Preparing
408e53c5e3b2: Preparing
50644c29ef5a: Preparing
50205a7df19a: Waiting
ef833453b9c7: Waiting
408e53c5e3b2: Waiting
50644c29ef5a: Waiting
8ab7585e3ce8: Pushed
d1f5439f248a: Pushed
8ff7fcdefbba: Pushed
14c5c5ff20de: Pushed
fffdb84c36f2: Pushed
50644c29ef5a: Layer already exists
50205a7df19a: Pushed
408e53c5e3b2: Pushed
ef833453b9c7: Pushed
latest: digest: sha256:8ecdc07a3011fc61e40685e93406f6499472ae3164d26d66f6320d54061f0d34 size: 2201
DONE
--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

ID                                    CREATE_TIME              DURATION  SOURCE                                                                                  IMAGES
                STATUS
78bebe5c-0e14-4667-bf80-f08597d22272  2020-06-13T18:17:47+00:00  33S       gs://gcr-00_cloudbuild/source/1592072247.64-f73f9ec76641408b93f240c0a2c7c03f.tgz  gcr.io/gcr-00/gcr-flask-pyth
on (+1 more)  SUCCESS
amrits-MacBook-Pro:gcr-python-flask-project ihealth$
```

# GCR : List Images in Cloud

List the containers in the gcloud repository

```
amrits-MacBook-Pro:gcr-python-flask-project ihealth$ gcloud container images list
NAME
gcr.io/gcr-00/gcr-flask-python
Only listing images in gcr.io/gcr-00. Use --repository to list images in other repositories.
amrits-MacBook-Pro:gcr-python-flask-project ihealth$
```

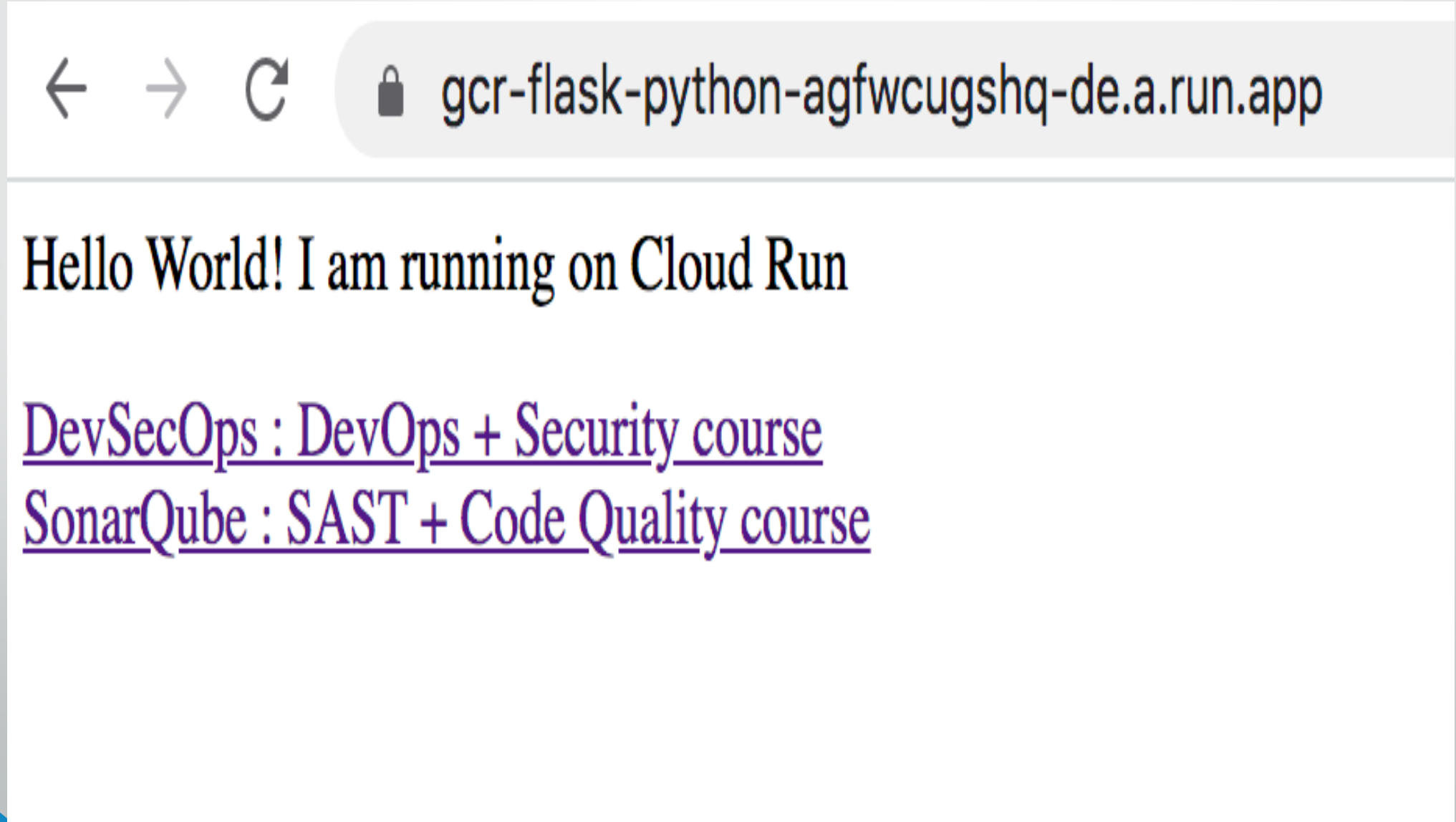
# GCR : Deploy Containers in the Cloud

gcloud beta run deploy sample-flask-example --image gcr.io/my-project/sample-flask-example --allow-unauthenticated

```
amrits-MacBook-Pro:gcr-python-flask-project ihealth$ gcloud beta run deploy gcr-flask-python --image gcr.io/gcr-00/gcr-flask-python --allow-unauthenticated
Please choose a target platform:
 [1] Cloud Run (fully managed)
 [2] Cloud Run for Anthos deployed on Google Cloud
 [3] Cloud Run for Anthos deployed on VMware
 [4] cancel
Please enter your numeric choice:  1

To specify the platform yourself, pass `--platform managed`. Or, to make this the default target platform, run `gcloud config set run/platform managed`.

API [run.googleapis.com] not enabled on project [222435586265]. Would
you like to enable and retry (this will take a few minutes)? (y/N)?  y

Enabling service [run.googleapis.com] on project [222435586265]...
Operation "operations/acf.f5ec083d-43c3-4589-a288-e3fdcb7ed375" finished successfully.
Please specify a region:
 [1] asia-east1
 [2] asia-northeast1
 [3] europe-north1
 [4] europe-west1
 [5] europe-west4
 [6] us-central1
 [7] us-east1
 [8] us-east4
 [9] us-west1
 [10] cancel
Please enter your numeric choice:  1

To make this the default region, run `gcloud config set run/region asia-east1`.

Deploying container to Cloud Run service [gcr-flask-python] in project [gcr-00] region [asia-east1]
✓ Deploying new service... Done.
  ✓ Creating Revision... Revision deployment finished. Waiting for health check to begin.
  ✓ Routing traffic...
  ✓ Setting IAM Policy...
Done.
Service [gcr-flask-python] revision [gcr-flask-python-00001-bef] has been deployed and is serving 100 percent of traffic at https://gcr-flask-python-agfwcugshq-de.a.run.app
amrits-MacBook-Pro:gcr-python-flask-project ihealth$
```

# GCR : Deploy Containers in the Cloud

Application running



# GCR : Deploy Containers in the Cloud

Dashboard