

Experiment No:4

Aim: Prepare a detailed study of Platform as a Service

Theory:

1) What is PaaS

- Platform-as-a-service (PaaS) is a type of cloud computing offering in which a service provider delivers a platform to clients, enabling them to develop, run, and manage business applications without the need to build and maintain the infrastructure such software development processes typically require.
- As with other cloud services such as infrastructure-as-a-service (IaaS) and software-as-a-service (SaaS), PaaS is offered via a cloud service provider's hosted infrastructure. Users typically access PaaS offerings via a web browser.
- PaaS can be delivered through public, private, or hybrid clouds. With a public cloud PaaS, the customer controls software deployment while the cloud provider delivers all the major IT components needed to host the applications, including servers, storage systems, networks, operating systems, and databases.

2) How to use PaaS (Customer)

As PaaS is offered through a web browser, customers pay for PaaS on a per-use basis, with some providers charging a flat monthly fee for access to the platform and hosted on the platform.

3) How to provide PaaS (Cloud Service Provider)

The delivery model of PaaS is similar to SaaS, except instead of delivering the software over the internet, PaaS provides a platform for software creation. This platform is delivered via the web, giving developers the freedom to concentrate on building the software without having to worry about operating systems, software updates, storage, or infrastructure.

4) Advantages and Limitations of PaaS

- **Cost saving:** No need to purchase hardware or pay expenses during downtime
- **Time Savings:** No need to spend time setting up/maintaining the core stack **Speed to Market:** Speed up the creation of apps
- **Future-Proof:** Access to state-of-the-art data center, hardware, and operating systems
- **Increase Security:** PaaS providers invest heavily in security technology and expertise
- **Dynamically Scale:** Rapidly add capacity in peak times and scale down as needed
- **Custom Solutions:** Operational tools in place so developers can create custom software
- **Flexibility:** Allows employees to log in and work on applications from anywhere

5) Limitation of PaaS

Vendor Dependency: Very dependent upon the vendor's capabilities

Risk of Lock-In: Customers may get locked into a language, interface or program they no longer need.

Compatibility: Difficulties may arise if PaaS is used in conjunction with existing development platforms

Security Risks: While PaaS providers secure the infrastructure and platform, businesses are responsible for the security of the applications they build

Google App Engine

- App Engine is a fully managed, serverless platform for developing and hosting web applications at scale. You can choose from several popular languages, libraries, and frameworks to develop your apps, and then let App Engine take care of provisioning servers and scaling your app instances based on demand.
- Google App Engine primarily supports Go, PHP, Java, Python, Node.js, .NET, and Ruby applications.
- The service is free up to a certain level of consumed resources and only in a standard environment but not an inflexible environment. Fees are charged for additional storage, bandwidth, or instance hours required by the application.

Implementation

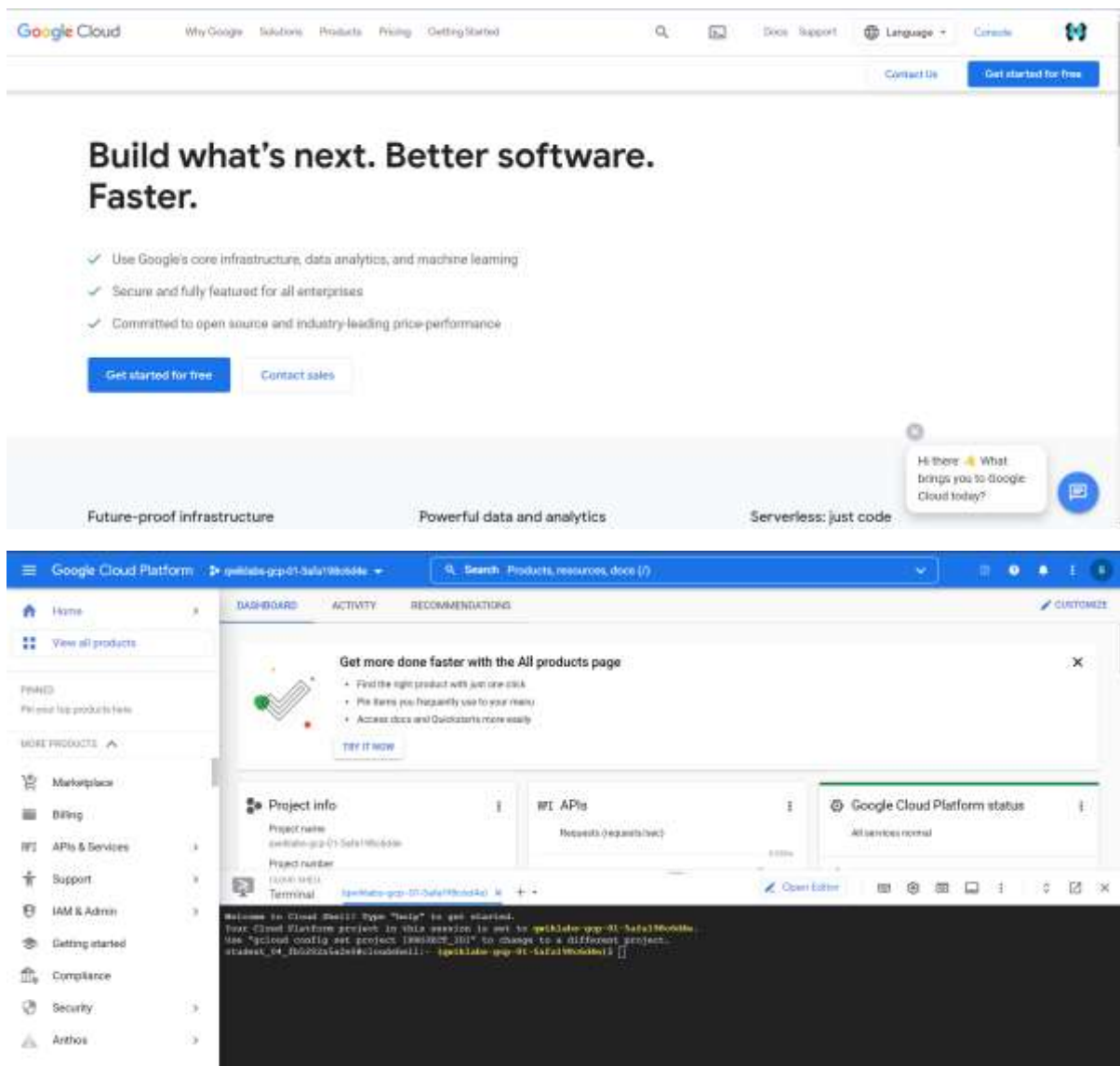


Fig 1.1 Google cloud platform

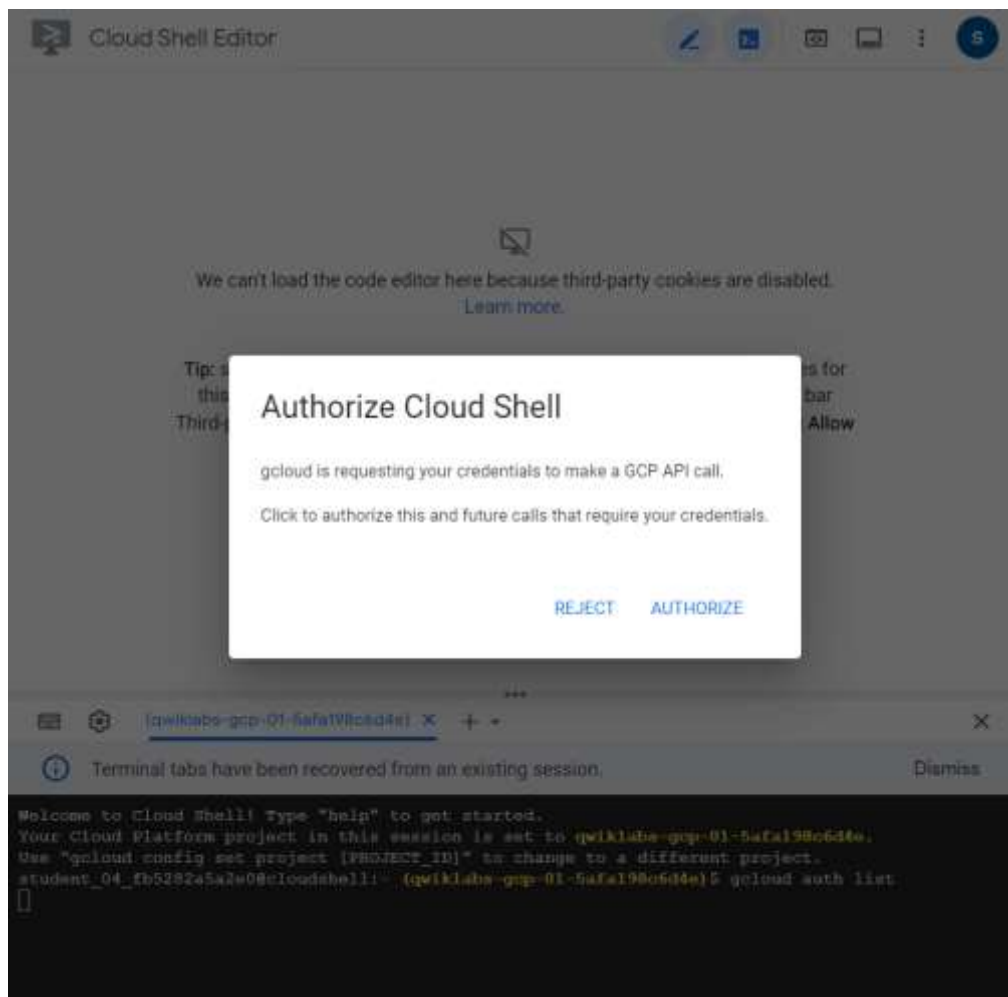


Fig 1.2 Activating google cloud shell

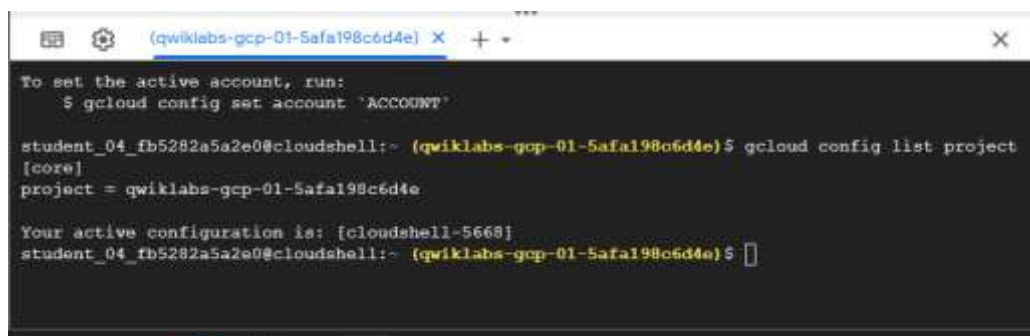


Fig 1.3 Listing Project

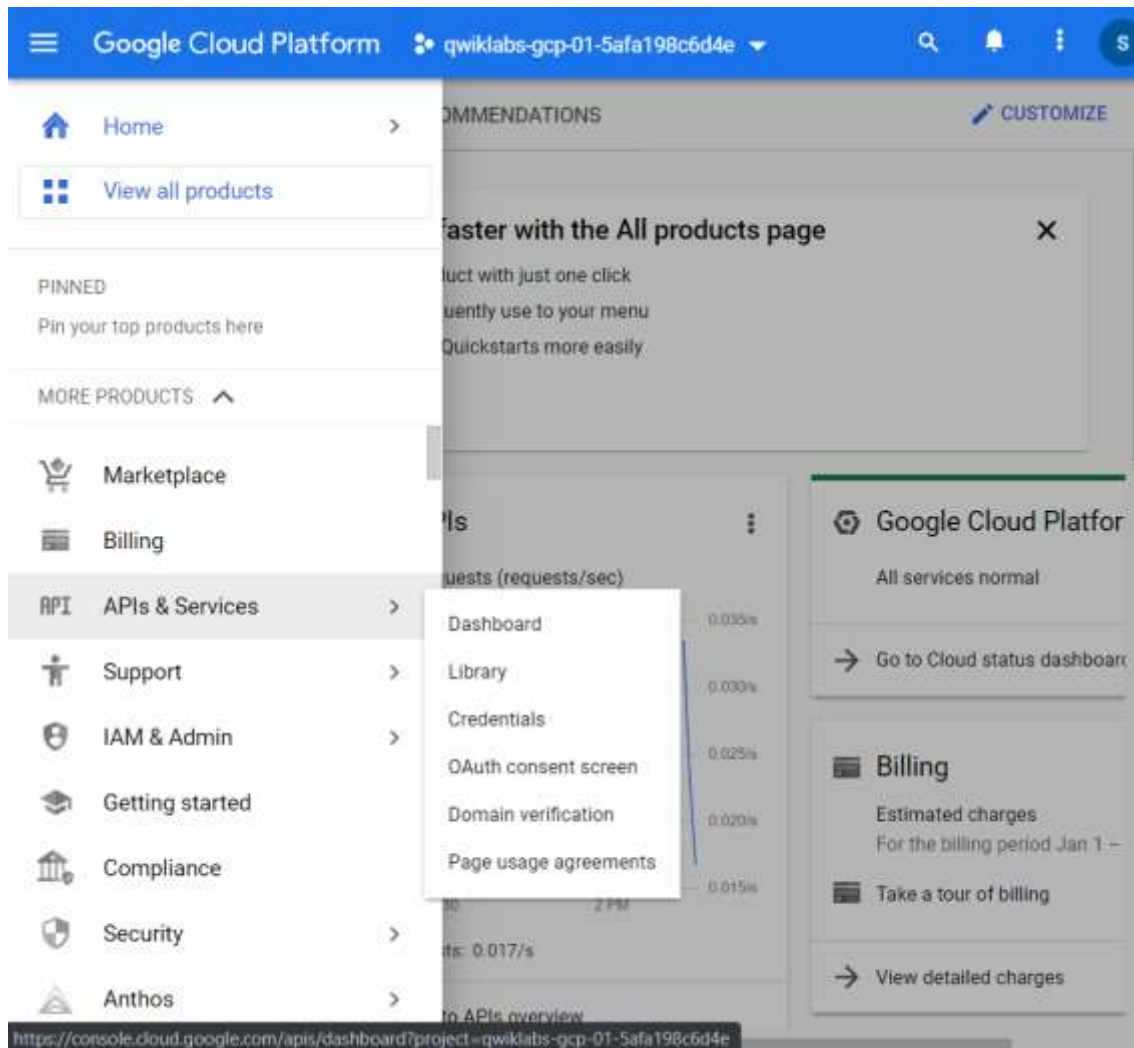


Fig 1.4 Google cloud platform

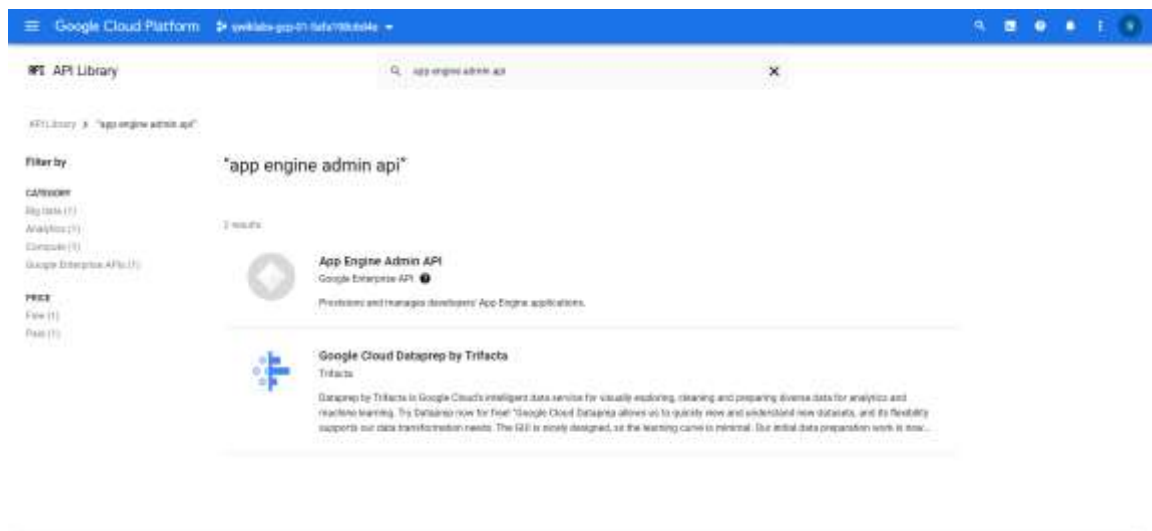


Fig 1.5 Search App engine API

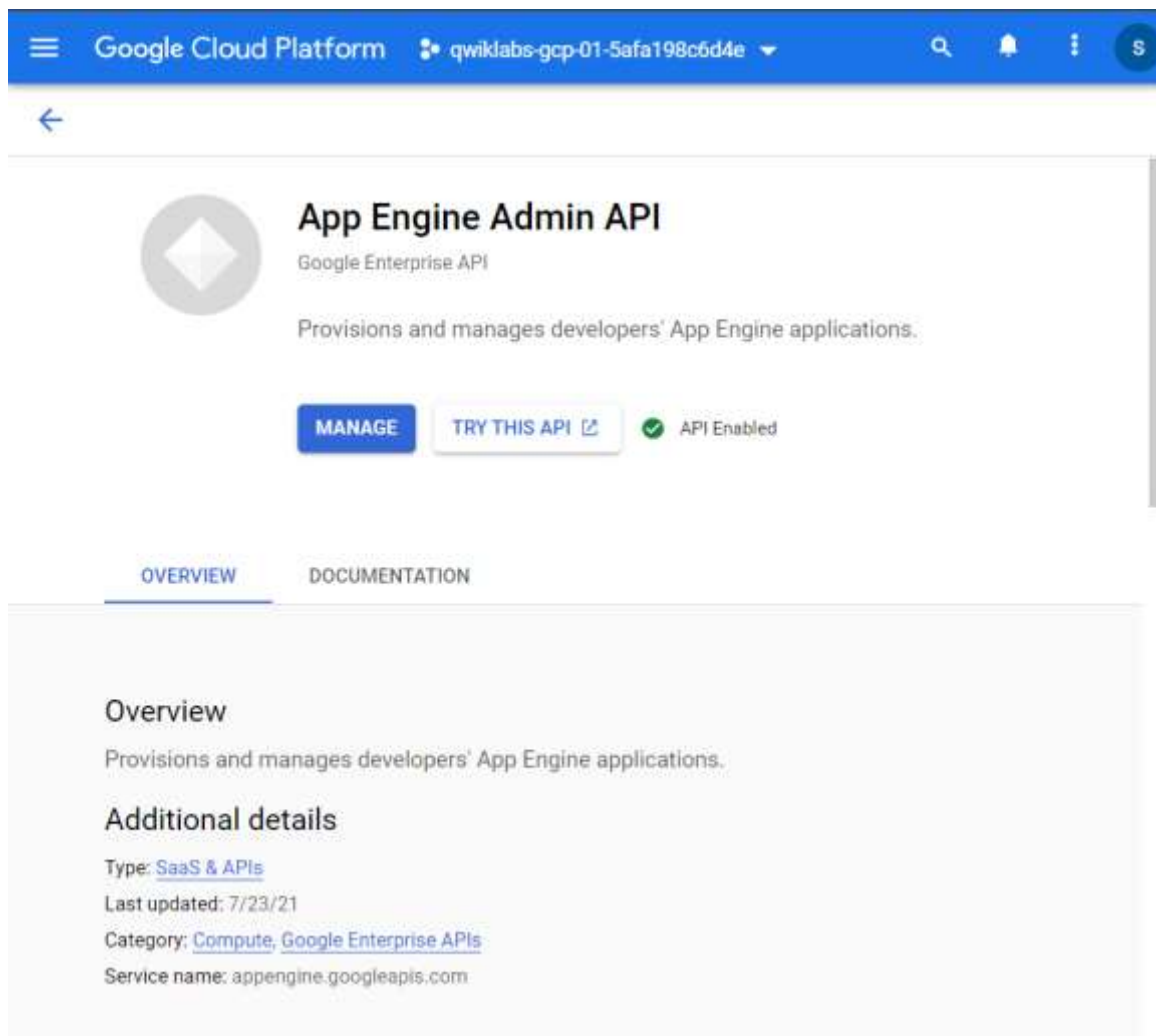


Fig 1.6 Activate API

```
student_04_fb5282a5a2e0@cloudshell:~ (qwiklabs-gcp-01-5afa198c6d4e)$ gsutil -m cp -r gs://spls/
gsp067/python-docs-samples .
Copying gs://spls/gsp067/python-docs-samples/appengine/standard_python3/hello_world/requirement
s.txt...
Copying gs://spls/gsp067/python-docs-samples/appengine/standard_python3/hello_world/main_test.p
y...
Copying gs://spls/gsp067/python-docs-samples/appengine/standard_python3/hello_world/requirement
s-test.txt...
Copying gs://spls/gsp067/python-docs-samples/appengine/standard_python3/hello_world/app.yaml...
Copying gs://spls/gsp067/python-docs-samples/appengine/standard_python3/hello_world/main.py...
student_04_fb5282a5a2e0@cloudshell:~ (qwiklabs-gcp-01-5afa198c6d4e)$
```

Fig 1.7 Cloning the dataset

```
student_04_fb5282a5a2e0@cloudshell:~ (qwiklabs-gcp-01-5afa198c6d4e)$ cd python-docs-samples/app
engine/standard_python3/hello_world
student_04_fb5282a5a2e0@cloudshell:~/python-docs-samples/appengine/standard_python3/hello_world
(qwiklabs-gcp-01-5afa198c6d4e)$
```

Fig 1.8 Move to the directory of the “Hello World” app

```

student_04_fb5252a5a2e0@cloudshell:~/python-docs-samples/appengine/standard_python3/hello_world (qwiklabs-gcp-01-5afaf90c6d4e) $ dev_appserver.py app.yaml
*****
Python 2 is deprecated. Upgrade to Python 3 as soon as possible.
See https://cloud.google.com/python/docs/python2-sunset

To suppress this warning, create an empty ~/.cloudshell/no-python-warning file.
The command will automatically proceed in seconds or on any key.
*****
INFO    2022-01-27 08:51:36,437 devappserver2.py:316] Skipping SDK update check.
WARNING 2022-01-27 08:51:36,639 simple_search_stub.py:1196] Could not read search indexes from /tmp/appengine-home/student_04_fb5252a5a2e0/search_indexes
INFO    2022-01-27 08:51:36,700 <string>:383] Starting API server at: http://localhost:8080
INFO    2022-01-27 08:51:36,798 instance_factory.py:156] Detected python version "Python 3.7.3"
* for runtime "python37" at "python3".
INFO    2022-01-27 08:51:38,732 instance_factory.py:313] Using pip to install dependency libraries; pip stdout is redirected to /tmp/tmpXfvdq8
INFO    2022-01-27 08:51:38,788 instance_factory.py:335] Running /tmp/tmpjyud1/bin/pip install --upgrade pip
INFO    2022-01-27 08:51:42,993 instance_factory.py:335] Running /tmp/tmpjyud1/bin/pip install -r /tmp/tmpVWta31
INFO    2022-01-27 08:51:45,660 dispatcher.py:201] Starting module "default" running at: http://localhost:8080
INFO    2022-01-27 08:51:45,662 admin_server.py:150] Starting admin server at: http://localhost:8080
INFO    2022-01-27 08:51:46,661 instance.py:557] Detected GOOGLE_CLOUD_PROJECT=qwiklabs-gcp-01-5afaf90c6d4e in environment variables
[2022-01-27 08:51:46 +0000] [868] [INFO] Starting gunicorn 20.1.0
[2022-01-27 08:51:46 +0000] [868] [INFO] Listening at: http://0.0.0.0:22429 (868)
[2022-01-27 08:51:46 +0000] [868] [INFO] Using worker: sync
[2022-01-27 08:51:46 +0000] [872] [INFO] Booting worker with pid: 872
INFO    2022-01-27 08:51:47,671 instance.py:234] Instance PID: 868
INFO    2022-01-27 08:51:47,774 module.py:443] (default) Detected file changes:
/home/student_04_fb5252a5a2e0/python-docs-samples/appengine/standard_python3/hello_world/_pycache_
[2022-01-27 08:51:57 +0000] [868] [INFO] Handling signal: winch

```

Fig 1.9 Command for seeing web Preview

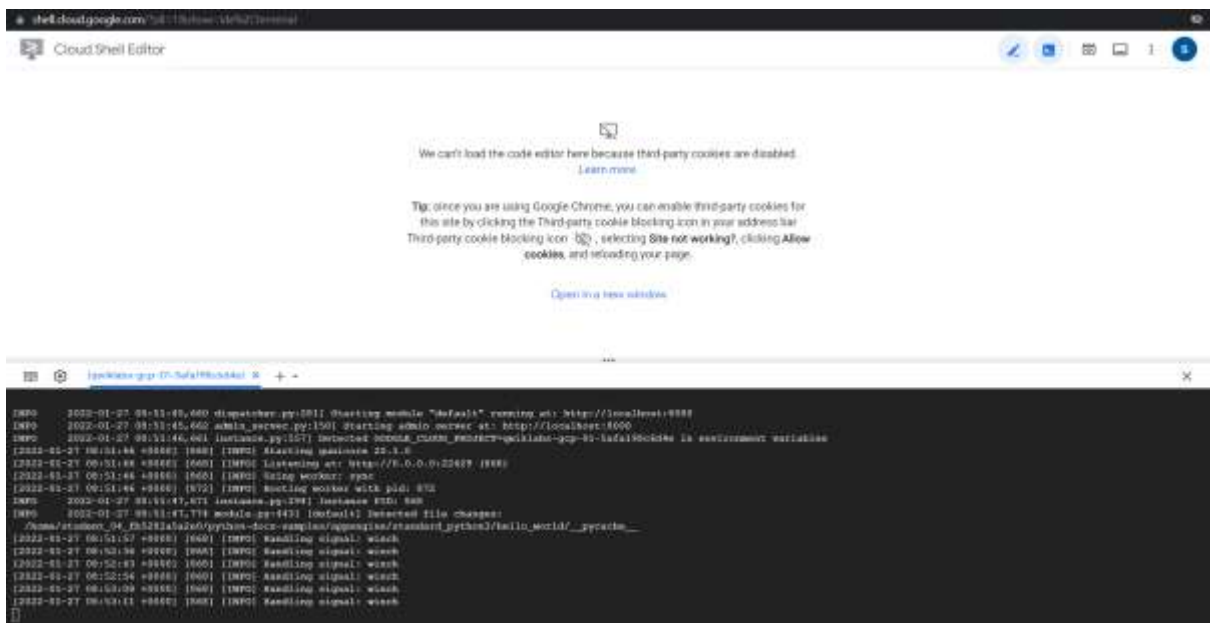


Fig 2.0 Execution of the command



Fig 2.1 Web Preview


```
(qwiklabs-gcp-01-5afai98c6d4e)$ gcloud app deploy
You are creating an app for project [qwiklabs-gcp-01-5afai98c6d4e].
WARNING: Creating an App Engine application for a project is irreversible and the region
cannot be changed. More information about regions is at
<https://cloud.google.com/appengine/docs/locations>.

Please choose the region where you want your App Engine application located:

[1] asia-east1      (supports standard and flexible)
[2] asia-east2      (supports standard and flexible and search_api)
[3] asia-northeast1 (supports standard and flexible and search_api)
[4] asia-northeast2 (supports standard and flexible and search_api)
[5] asia-northeast3 (supports standard and flexible and search_api)
[6] asia-south1      (supports standard and flexible and search_api)
[7] asia-southeast1 (supports standard and flexible)
[8] asia-southeast2 (supports standard and flexible and search_api)
[9] australia-southeast1 (supports standard and flexible and search_api)
[10] europe-central2 (supports standard and flexible)
[11] europe-west     (supports standard and flexible and search_api)
[12] europe-west2    (supports standard and flexible and search_api)
[13] europe-west3    (supports standard and flexible and search_api)
[14] europe-west6    (supports standard and flexible and search_api)
[15] northamerica-northeast1 (supports standard and flexible and search_api)
[16] southamerica-east1 (supports standard and flexible and search_api)
[17] us-central      (supports standard and flexible and search_api)
[18] us-east1        (supports standard and flexible and search_api)
[19] us-east4        (supports standard and flexible and search_api)
[20] us-west1        (supports standard and flexible)
[21] us-west2        (supports standard and flexible and search_api)

[21] us-west2      (supports standard and flexible and search_api)
[22] us-west3      (supports standard and flexible and search_api)
[23] us-west4      (supports standard and flexible and search_api)
[24] cancel
Please enter your numeric choice: 17

Creating App Engine application in project [qwiklabs-gcp-01-5afai98c6d4e] and region [us-central]....done.
Services to deploy:

descriptor:          [/home/student_04_fb5282a5a2e0/python-docs-samples/appengine/standard_python3/hello_world/app.yaml]
source:              [/home/student_04_fb5282a5a2e0/python-docs-samples/appengine/standard_python3/hello_world]
target project:      [qwiklabs-gcp-01-5afai98c6d4e]
target service:      [default]
target version:      [20220127t085932]
target url:          [https://qwiklabs-gcp-01-5afai98c6d4e.uc.r.appspot.com]
target service account: [App Engine default service account]

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

Beginning deployment of service [default]...
Created .gcloudignore file. See 'gcloud topic gcloudignore' for details.
Uploading 5 files to Google Cloud Storage
20%
40%
60%
80%
100%
100%
File upload done.
Updating service [default]...working.[]
```

Fig 2.2 Execution of the command

```
shell.cloud.google.com/?pli=1&show=ide%2Cterminal
Cloud Shell Editor

[qwklabs-gcp-04-39b233dedb77] X [qwklabs-gcp-04-39b233dedb77] X + - X

Creating App Engine application in project [qwklabs-gcp-04-39b233dedb77] and region [europe-west6]...done.
Services to deploy:

descriptor:      [/home/student_04_fb5282a5a2e0/python-docs-samples/appengine/standard_python3/hello_world/app.yaml]
source:          [/home/student_04_fb5282a5a2e0/python-docs-samples/appengine/standard_python3/hello_world]
target project:  [qwklabs-gcp-04-39b233dedb77]
target service:  [default]
target version:  [20220203t085138]
target url:      [https://qwklabs-gcp-04-39b233dedb77.oa.r.appspot.com]
target service account: [App Engine default service account]

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

Beginning deployment of service [default]...
Created .gcloudignore file. See 'gcloud topic gcloudignore' for details.
Uploading 5 files to Google Cloud Storage
20%
40%
60%
80%
100%
100%
File upload done.
Updating service [default]...done.
Setting traffic split for service [default]...done.
Deployed service [default] to [https://qwklabs-gcp-04-39b233dedb77.oa.r.appspot.com]

You can stream logs from the command line by running:
$ gcloud app logs tail -s default

To view your application in the web browser run:
$ gcloud app browse
student_04_fb5282a5a2e0@cloudshell:~/python-docs-samples/appengine/standard_python3/hello_world (qwklabs-gcp-04-39b233dedb77)
$ gcloud app browse
Did not detect your browser. Go to this link to view your app:
https://qwklabs-gcp-04-39b233dedb77.oa.r.appspot.com
student_04_fb5282a5a2e0@cloudshell:~/python-docs-samples/appengine/standard_python3/hello_world (qwklabs-gcp-04-39b233dedb77)
$
```

Fig 2.3 Browsing the deployed app

```
File Edit View Run Help
CLOUDSHELL
- OPERATIONS
  - HELLO_WORLD
    - 23 _pytho...
    - gcloudapp
    - app.yaml
    - main.py
    - hello.py
    - requirements.txt
    - requirements.txt

main.py
1
2
3 # Unless required by applicable law or agreed to in writing, software
4 # distributed under the license is distributed on an "AS IS" BASIS,
5 # WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
6 # See the license for the specific language governing permissions and
7 # limitations under the license.
8
9 # [START gae_python3_app]
10 from flask import Flask
11
12
13 # If 'entrypoint' is not defined in app.yaml, App Engine will look for an app
14 # called app in main.py.
15 app = Flask(__name__)
16
17
18 @app.route('/')
19 def hello():
20     """Return a friendly HTTP greeting."""
21     return 'Hello, cruel world!'
22
23
24 if __name__ == '__main__':
25     # This is used when running locally only. When deploying to Google App
26     # Engine, a webserver process such as Gunicorn will serve the app. This
27     # can be configured by adding an 'entrypoint' to app.yaml.
28     app.run(host='127.0.0.1', port=8080, debug=True)
29 # [END gae_python3_app]
```

Fig 2.4 Shell Editor and python code

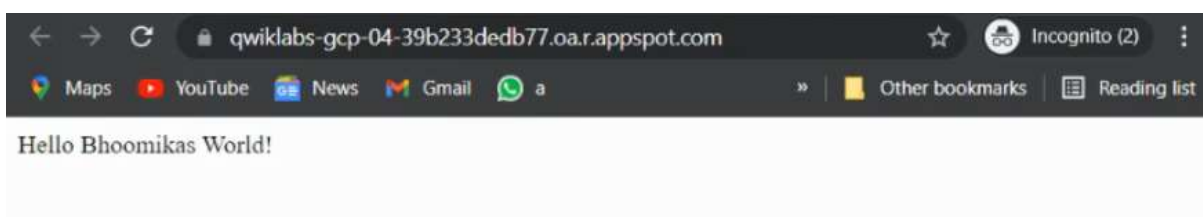


Fig 2.5 Output

Conclusion:

In this experiment, we learned about Platform as a service and successfully demonstrated how the google cloud platform can be used as Paas by exploring the google cloud platform and using the App engine in qwicklab's created environment. Deployed flask app on google cloud and used it.