



National University of Sciences and Technology (NUST)
School of Electrical Engineering and Computer Science

Department of Computing

SE-315: Cloud Computing

Lab 08: App Dev - Storing Application Data in Cloud Datastore: Python

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Lab 08: App Dev - Storing Application Data in Cloud Datastore: Python

Introduction:

In this lab, you create a Cloud Storage bucket and place an image in it. You also configure an application running in Compute Engine to use a database managed by Cloud SQL. For this lab, you configure a web server with PHP, a web development environment that is the basis for popular blogging software. Outside this lab, you will use analogous techniques to configure these packages.

You also configure the web server to reference the image in the Cloud Storage bucket.

Follow the 'App Dev: Storing Application Data in Cloud Datastore – Python' Setup and requirements.

1. Create a virtual environment

```
Welcome to Cloud Shell! Type "help" to get started.
Your Cloud Platform project in this session is set to qwiklabs-gcp-02-3002321c931c.
Use "gcloud config set project [PROJECT_ID]" to change to a different project.
student_02_ed60d72736d1@cloudshell:~ (quiklabs-gcp-02-3002321c931c)$ virtualenv -p python3 vrenv
created virtual environment CPython3.12.3.final.0-64 in 419ms
  creator CPython3Posix(dest=/home/student_02_ed60d72736d1/vrenv, clear=False, no_vcs_ignore=False, global=False)
  seeder FromAppData(download=False, pip=copy, app_data_dir=/home/student_02_ed60d72736d1/.local/share/virtua
lenv)
  added seed packages: pip==24.2
  activators BashActivator,CShellActivator,FishActivator,NushellActivator,PowerShellActivator,PythonActivator
student_02_ed60d72736d1@cloudshell:~ (quiklabs-gcp-02-3002321c931c)$ source vrenv/bin/activate
(vrenv) student_02_ed60d72736d1@cloudshell:~ (quiklabs-gcp-02-3002321c931c)$
```



2. Prepare the Quiz application

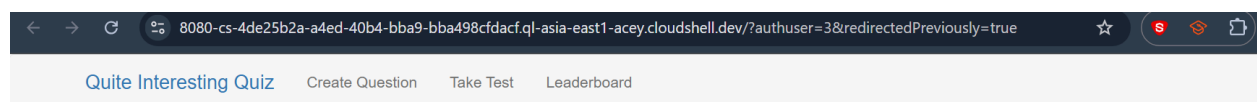
cloning the repository and running the python application;

```
Resolving deltas: 100% (41866/41866), done.
Updating files: 100% (12879/12879), done.
(vrenv) student_02_ed60d72736d1@cloudshell:~ (qwiklabs-gcp-02-3002321c931c) $ ln -s ~/training-data-analyst/courses/developing_apps/v1.3/python/datastore ~/datastore
(vrenv) student_02_ed60d72736d1@cloudshell:~ (qwiklabs-gcp-02-3002321c931c) $ cd ~/datastore/start
(vrenv) student_02_ed60d72736d1@cloudshell:~/datastore/start (qwiklabs-gcp-02-3002321c931c) $ export GCLOUD_PROJECT=$DEVSH
ELL_PROJECT_ID
(vrenv) student_02_ed60d72736d1@cloudshell:~/datastore/start (qwiklabs-gcp-02-3002321c931c) $ python3 -m pip install -r re
quirements.txt
Collecting flask>=2.0.1 (from -r requirements.txt (line 1))
  Downloading flask-3.0.3-py3-none-any.whl.metadata (3.2 kB)
Collecting google-cloud>=0.34.0 (from -r requirements.txt (line 2))
  Downloading google_cloud-0.34.0-py2.py3-none-any.whl.metadata (2.7 kB)
Collecting google-cloud-core>=1.7.1 (from -r requirements.txt (line 3))
  Downloading google_cloud_core-2.4.1-py2.py3-none-any.whl.metadata (2.7 kB)
Collecting google-cloud-datastore>=2.1.4 (from -r requirements.txt (line 4))
  Downloading google_cloud_datastore-2.20.1-py2.py3-none-any.whl.metadata (5.6 kB)
Collecting grpcio>=1.38.1 (from -r requirements.txt (line 5))
  Downloading grpcio-1.67.1-cp312-cp312-manylinux_2_17_x86_64.manylinux2014_x86_64.whl.metadata (3.9 kB)
Collecting grpcio-tools>=1.38.1 (from -r requirements.txt (line 6))
  Downloading grpcio_tools-1.67.1-cp312-cp312-manylinux_2_17_x86_64.manylinux2014_x86_64.whl.metadata (5.3 kB)
Collecting Werkzeug>=3.0.0 (from flask>=2.0.1->-r requirements.txt (line 1))
```

Python server is running!!

```
(vrenv) student_02_ed60d72736d1@cloudshell:~/datastore/start (qwiklabs-gcp-02-3002321c931c) $ python3 run_server.py
* Serving Flask app 'quiz'
* Debug mode: on
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
* Running on http://127.0.0.1:8080
Press CTRL+C to quit
* Restarting with stat
* Debugger is active!
* Debugger PIN: 413-836-926
```

Viewing the web preview of quiz application through port 8080.



Welcome to the Quite Interesting Quiz

Welcome to the Quite Interesting Quiz where you can create a question, take a test or review feedback

Create Question

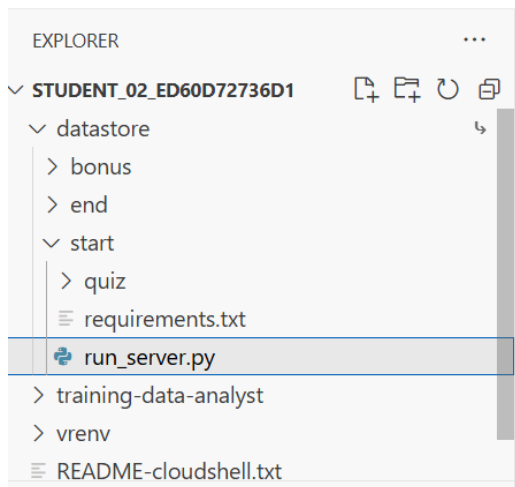
Take Test

Leaderboard

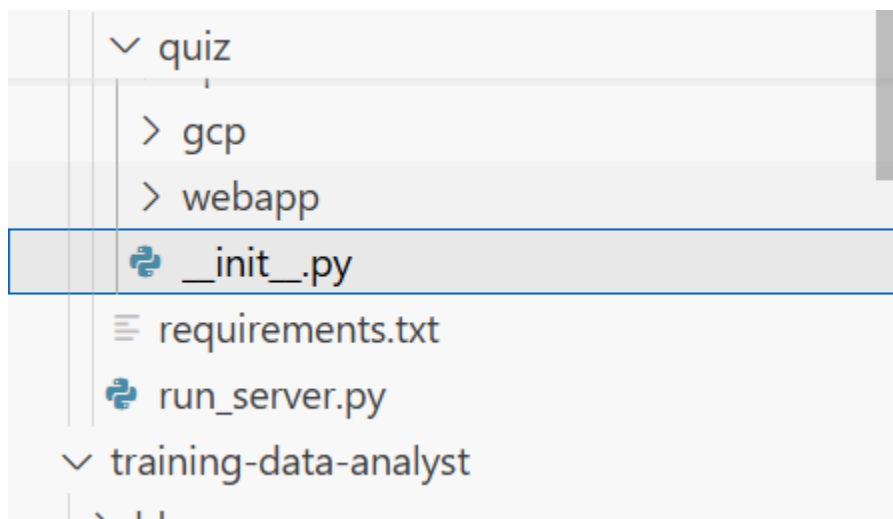


3. Examine the Quiz application code

examining the run_server.py file:



examining quiz/init_.py file:





4. Adding entities to Cloud Datastore

Importing and using the Python Datastore module;

```
datastore.py ×
datastore > start > quiz > gcp > datastore.py > ...
17 import os
18
19 # END TODO
20
21 # TODO: Get the GLOUD_PROJECT environment variable
22
23 project_id = os.getenv('GLOUD_PROJECT')
24
25 # END TODO
26
27 from flask import current_app
28
29 # TODO: Import the datastore module from the google.cloud package
30
31 from google.cloud import datastore
32
33 # END TODO
34
35 # TODO: Create a Cloud Datastore client object
36 # The datastore client object requires the Project ID.
37 # Pass through the Project ID you looked up from the
38 # environment variable earlier
```

Ln 86, Col 1 Spaces: 4 UTF-8 LF Python 3.12.3 ('vrenv':

Now, I will Create an App Engine application to provision Cloud Datastore, screenshot shows that the App engine has successfully been created.

```
You are creating an app for project [qwiklabs-gcp-02-3002321c931c].
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>.

Creating App Engine application in project [qwiklabs-gcp-02-3002321c931c] and region [us-central]....done.
Success! The app is now created. Please use `gcloud app deploy` to deploy your first app.
(vrenv) student_02_ed60d72736dl@cloudshell:~/datastore/start (qwiklabs-gcp-02-3002321c931c) $
```



after running the application and creating a Cloud Datastore entity, I will create a quiz question;

creating a quiz question:

Add question

Author

Quiz

Title

Answer 1

☐ Amazon

Answer 2

☐ Google

Answer 3

☒ IBM

Answer 4

☐ Microsoft

Save

running the Python server again;

```
(vrenv) student_02_ed60d72736d1@cloudshell:~/datastore/start (qwiklabs-gcp-02-3002321c931c)$ python3 run_server.py
* Serving Flask app 'quiz'
* Debug mode: on
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
* Running on http://127.0.0.1:8080
Press CTRL+C to quit
* Restarting with stat
* Debugger is active!
* Debugger PIN: 413-836-926
```



Task 5. Retrieve Cloud Datastore entities

Databases [CREATE DATABASE](#)

Firestore is a NoSQL document database built for automatic scaling, high performance, and ease of application development. To use Firestore, create one or more databases. Firestore databases come in two modes: Native mode and Datastore mode. [Learn more](#)

Filter

Database ID	Mode	Location	Creation time (UTC+5)	Encryption type	Encryption key	Actions
(default)	Datastore	nam5	Nov 13, 2024, 11:18:00 AM	Google-managed		

Modifying the code to retrieve Cloud Datastore entities;

```
datastore > start > quiz > gcp > datastore.py > {} datastore
17 import os
18
19 # END TODO
20
21 # TODO: Get the GLOUD_PROJECT environment variable
22
23 project_id = os.getenv('GLOUD_PROJECT')
24
25 # END TODO
26
27 from flask import current_app
28
29 # TODO: Import the datastore module from the google.cloud package
30
31 from google.cloud import datastore
32
33 # END TODO
34
35 # TODO: Create a Cloud Datastore client object
36 # The datastore client object requires the Project ID.
37 # Pass through the Project ID you looked up from the
38 # environment variable earlier
```



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Taking the quiz:

Quite Interesting Quiz

Which company owns GCP?

☐ Amazon

☒ Google

☐ IBM

☐ Microsoft

Submit Answer

Quiz result:

Quite Interesting Quiz

Game Over

You scored 1 out of 1

What did you think?

Please let us know how you found the quiz!

Send Feedback

—End of Lab—