



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

Department of Computing

SE-315: Cloud Computing

Lab 09: App Dev - Storing Image and Video Files in Cloud Storage

CLO3: **Distinguish** the various characteristics of public, private and hybrid cloud delivery models.

Date: 20.11.24



Lab 09: App Dev - Storing Image and Video Files in Cloud Storage

Introduction:

Cloud Storage allows world-wide storage and retrieval of any amount of data at any time. It can be used for a range of scenarios including serving website content, storing data for archival and disaster recovery, or distributing large data objects to users via direct download.

In this lab you'll configure an application to use Cloud Storage to store and retrieve application data. The application is an online Quiz, the data is the form data, including an image uploaded from user's local machine.

Lab Tasks

Go through the following link:

<https://www.cloudskillsboost.google/focuses/1075?parent=catalog>

which will take you to the 'App Dev: Storing Image and Video Files in Cloud Storage – Python' page. The list of tasks is given below. Make sure to take screenshots of each task as you will need to add them in the solution section given below.

Task 1. Prepare the quiz application

In this section, you access Cloud Shell, clone the git repository containing the Quiz application, and run the application.

Clone source code in Cloud Shell



```
(qwiklabs-gcp-04-dd4e2bbb259a) x + v
Open Editor
Welcome to Cloud Shell! Type "help" to get started.
Your Cloud Platform project in this session is set to qwiklabs-gcp-04-dd4e2bbb259a.
Use "gcloud config set project [PROJECT_ID]" to change to a different project.
student_02_000a801dad14@cloudshell:~ (qwiklabs-gcp-04-dd4e2bbb259a) $ git clone https://github.com/GoogleCloudPlatform/training-data-analyst
Cloning into 'training-data-analyst'...
remote: Enumerating objects: 65485, done.
remote: Counting objects: 100% (52/52), done.
remote: Compressing objects: 100% (41/41), done.
remote: Total 65485 (delta 18), reused 33 (delta 10), pack-reused 65433 (from 1)
Receiving objects: 100% (65485/65485), 697.48 MiB | 23.10 MiB/s, done.
Resolving deltas: 100% (41848/41848), done.
Updating files: 100% (12879/12879), done.
student_02_000a801dad14@cloudshell:~ (qwiklabs-gcp-04-dd4e2bbb259a) $
```

Configure and run the quiz application

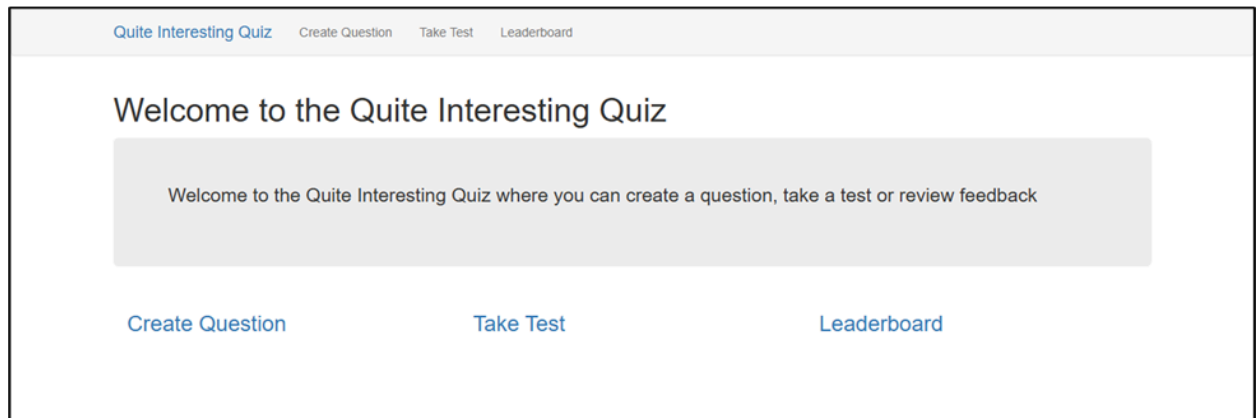
setting the region and configuring the application:

```
student_02_000a801dad14@cloudshell:~ (qwiklabs-gcp-04-dd4e2bbb259a) $ cd ~/training-data-analyst/courses/developingapps/python/cloudstorage/start
student_02_000a801dad14@cloudshell:~/training-data-analyst/courses/developingapps/python/cloudstorage/start (qwiklabs-gcp-04-dd4e2bbb259a) $ REGION=us-west1
sed -i s/us-central/$REGION/g prepare_environment.sh
student_02_000a801dad14@cloudshell:~/training-data-analyst/courses/developingapps/python/cloudstorage/start (qwiklabs-gcp-04-dd4e2bbb259a) $ . prepare_environment.sh
Creating Datastore/App Engine instance
You are creating an app for project [qwiklabs-gcp-04-dd4e2bbb259a].
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>.
```

Running the server:

```
art (qwiklabs-gcp-04-dd4e2bbb259a) $ python 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: 401-546-729
```

Review the quiz application



Task 2. Examine the quiz application code

Examine the application code

add.html file

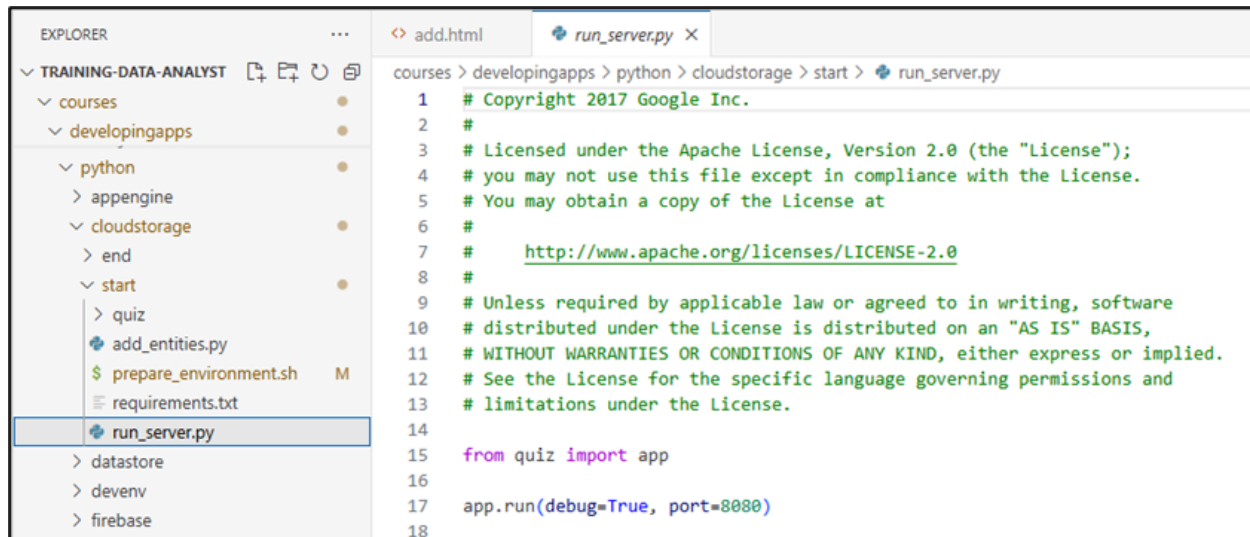
```
1 <!--
2  * Copyright 2018 Google Inc.
3  *
4  * Licensed under the Apache License, Version 2.0 (the "License");
5  * you may not use this file except in compliance with the License.
6  * You may obtain a copy of the License at
7  *
8  * http://www.apache.org/licenses/LICENSE-2.0
9  *
10 * Unless required by applicable law or agreed to in writing, software
11 * distributed under the license is distributed on an "AS IS" BASIS,
12 * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
13 * See the License for the specific language governing permissions and
14 * limitations under the License.
15 -->
16 {% extends 'master.html' %}
```

routes.py



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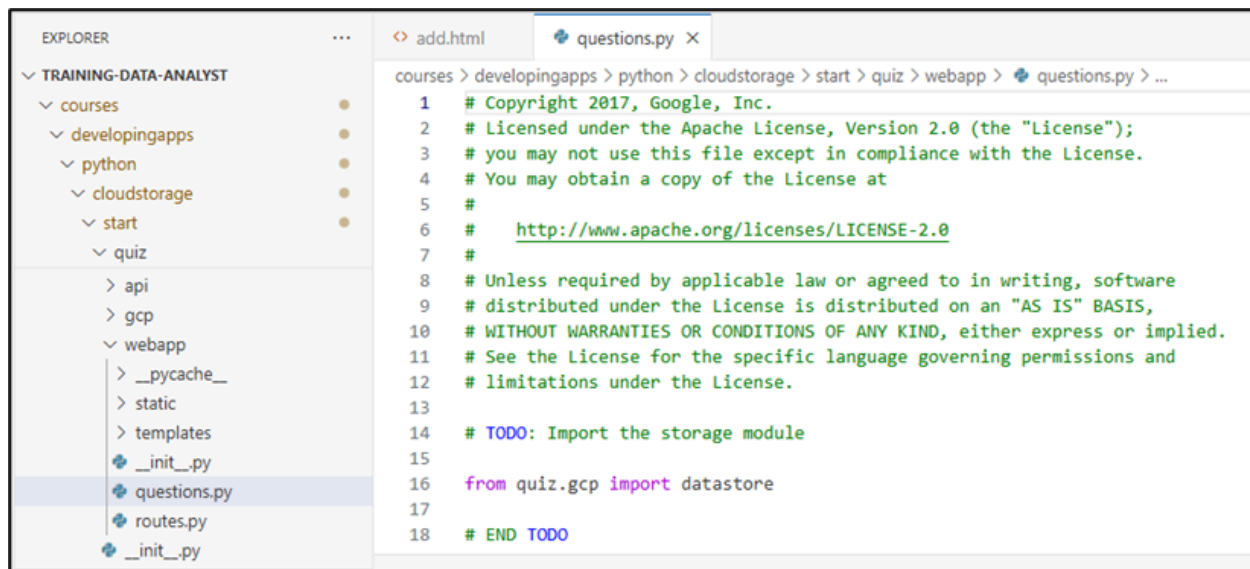
School of Electrical Engineering and Computer Science



The screenshot shows the VS Code interface. The Explorer sidebar on the left displays the project structure under 'TRAINING-DATA-ANALYST'. The file 'run_server.py' is selected under the path 'courses > developingapps > python > cloudstorage > start'. The Editor pane on the right shows the content of 'run_server.py', which includes a copyright notice for Google Inc. and a call to 'app.run(debug=True, port=8080)'.

```
1 # Copyright 2017 Google Inc.
2 #
3 # Licensed under the Apache License, Version 2.0 (the "License");
4 # you may not use this file except in compliance with the License.
5 # You may obtain a copy of the License at
6 #
7 #     http://www.apache.org/licenses/LICENSE-2.0
8 #
9 # Unless required by applicable law or agreed to in writing, software
10 # distributed under the License is distributed on an "AS IS" BASIS,
11 # WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
12 # See the License for the specific language governing permissions and
13 # limitations under the License.
14
15 from quiz import app
16
17 app.run(debug=True, port=8080)
```

questions.py



The screenshot shows the VS Code interface. The Explorer sidebar on the left displays the project structure under 'TRAINING-DATA-ANALYST'. The file 'questions.py' is selected under the path 'courses > developingapps > python > cloudstorage > start > quiz > webapp'. The Editor pane on the right shows the content of 'questions.py', which includes a copyright notice for Google, Inc. and a 'TODO' comment for importing the storage module.

```
1 # Copyright 2017, Google, Inc.
2 # Licensed under the Apache License, Version 2.0 (the "License");
3 # you may not use this file except in compliance with the License.
4 # You may obtain a copy of the license at
5 #
6 #     http://www.apache.org/licenses/LICENSE-2.0
7 #
8 # Unless required by applicable law or agreed to in writing, software
9 # distributed under the License is distributed on an "AS IS" BASIS,
10 # WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
11 # See the License for the specific language governing permissions and
12 # limitations under the License.
13
14 # TODO: Import the storage module
15
16 from quiz.gcp import datastore
17
18 # END TODO
```

storage.py



```
EXPLORER
TRAINING-DATA-ANALYST
  courses
    developingapps
      python
        cloudstorage
          start
            quiz
              api
              gcp
                __pycache__
                __init__.py
                datastore.py
                storage.py
              webapp
                __pycache__
                static
                templates
add.html
questions.py
storage.py X
courses > developingapps > python > cloudstorage > start > quiz > gcp > storage.py > ...
1 Copyright 2017 Google Inc.
2 #
3 # Licensed under the Apache License, Version 2.0 (the "License");
4 # you may not use this file except in compliance with the License.
5 # You may obtain a copy of the License at
6 #
7 # http://www.apache.org/licenses/LICENSE-2.0
8 #
9 # Unless required by applicable law or agreed to in writing, software
10 # distributed under the License is distributed on an "AS IS" BASIS,
11 # WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
12 # See the License for the specific language governing permissions and
13 # limitations under the License.
14
15 import os
16 project_id = os.getenv('GLOUD_PROJECT')
17
18 # TODO: Get the Bucket name from the GLOUD_BUCKET environment variable
```

Task 3. Create a Cloud Storage Bucket

Create a Cloud Storage bucket named <Project ID>-media and export the Cloud Storage bucket name as an environment variable named GLOUD_BUCKET

```
22:00:11 [20/Nov/2024 07:22:30] ...
~/C(developingapps) student_02_000a801dad14@cloudshell:~/training-data-analyst/courses/developingapps/python/cloudstorage/start (qwiklabs-gcp-04-dd4e2bbb259a) $
(developingapps) student_02_000a801dad14@cloudshell:~/training-data-analyst/courses/developingapps/python/cloudstorage/start (qwiklabs-gcp-04-dd4e2bbb259a) $ gs
util mb gs://$DEVSHLL_PROJECT_ID-media
Creating gs://qwiklabs-gcp-04-dd4e2bbb259a-media/...
(developingapps) student_02_000a801dad14@cloudshell:~/training-data-analyst/courses/developingapps/python/cloudstorage/start (qwiklabs-gcp-04-dd4e2bbb259a) $ ex
port GLOUD_BUCKET=$DEVSHLL_PROJECT_ID-media
(developingapps) student_02_000a801dad14@cloudshell:~/training-data-analyst/courses/developingapps/python/cloudstorage/start (qwiklabs-gcp-04-dd4e2bbb259a) $
```

Task 4. Adding objects to Cloud Storage

Import and use the Python Cloud Storage module



Write code to send a file to Cloud Storage

storage.py:

```
15 import os
16 project_id = os.getenv('GCP_PROJECT')
17
18 # TODO: Get the Bucket name from the
19 # GCP_BUCKET environment variable
20 bucket_name = os.getenv('GCP_BUCKET')
21 # END TODO
22
23 # TODO: Import the storage module
24 from google.cloud import storage
25 # END TODO
26
27 # TODO: Create a client for Cloud Storage
28 storage_client = storage.Client()
29 # END TODO
30
31 # TODO: Use the client to get the Cloud Storage bucket
32 bucket = storage_client.get_bucket(bucket_name)
33 # END TODO
34
35 """
36 Uploads a file to a given Cloud Storage bucket and returns the public url to the new object.
37 """
38
39 def upload_file(image_file, public):
40     # TODO: Use the bucket to get a blob object
41     blob = bucket.blob(image_file.filename)
42     # END TODO
43
44     # TODO: Use the blob to upload the file
45     blob.upload_from_string(
46         image_file.read(),
47         content_type=image_file.content_type)
48     # END TODO
49
50     # TODO: Make the object public
51     if public:
52         blob.make_public()
53     # END TODO
54
55     # TODO: Modify to return the blob's Public URL
56     return blob.public_url
57     # END TODO
```



Write code to use the Cloud Storage functionality

question.py:

```
1  # TODO: Import the storage module
2  from quiz.gcp import storage, datastore
3  # END TODO
4
5  """
6  uploads file into google cloud storage
7  - upload file
8  - return public_url
9  """
10 def upload_file(image_file, public):
11     if not image_file:
12         return None
13
14     # TODO: Use the storage client to Upload the file
15     # The second argument is a boolean
16     public_url = storage.upload_file(
17         image_file,
18         public
19     )
20     # END TODO
21
22     # TODO: Return the public URL
23     return public_url
24     # END TODO
25
26 """
27 uploads file into google cloud storage
28 - call method to upload file (public=true)
29 - call datastore helper method to save question
30 """
31 def save_question(data, image_file):
32
33     # TODO: If there is an image file, then upload it
34     # And assign the result to a new Datastore
35     # property imageUrl
36     # If there isn't, assign an empty string
37
38     if image_file:
39         data['imageUrl'] = str(
40             upload_file(image_file, True))
41     else:
42         data['imageUrl'] = u''
43
44     # END TODO
45
46     data['correctAnswer'] = int(data['correctAnswer'])
47     datastore.save_question(data)
48     return
```




Run the application and create a Cloud Storage object

```
art (qwiklabs-gcp-04-dd4e2bbb259a) $ python 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: 401-546-729
```

Run the client application and test the Cloud Storage public URL

Cloud storage public link:

<https://8080-cs-d6e38ec2-80e1-4e09-9d05-5c62a14245cb.q1-asia-east1-acey.cloudshell.dev/api/quizzes/gcp>

Json file contents:

```
{
  "questions": [
    {
      "answer1": "Cloud Storage",
      "answer2": "Datastore",
      "answer3": "Big Table",
      "answer4": "All of the above",
      "author": "Nigel",
      "id": 5636645067948772,
      "imageUrl": "",
      "quiz": "gcp",
      "title": "Which GCP product is an Object Store?"
    },
    {
      "answer1": "Amazon",
      "answer2": "Google",
      "answer3": "IBM",
      "answer4": "Microsoft",
      "author": "Nigel",
      "id": 5634161670881280,
      "imageUrl": "",
      "quiz": "gcp",
      "title": "Which company runs GCP?"
    }
  ]
}
```



```
{
  "answer1": "App Engine",
  "answer2": "Cloud Storage",
  "answer3": "Compute Engine",
  "answer4": "Container Engine",
  "author": "Saleha Zainab Fatima",
  "id": 5636645067948772,
  "imageUrl":
    "https://storage.googleapis.com/qwiklabs-gcp-02-b8926891f9c3-media/Google_Cloud_Storage_logo.
    png",
  "quiz": "gcp",
  "title": "Which product does this logo relate to?"
},
{
  "answer1": "Compute Engine",
  "answer2": "Datastore",
  "answer3": "Spanner",
  "answer4": "BigQuery",
  "author": "Nigel",
  "id": 5644004762845184,
  "imageUrl": "",
  "quiz": "gcp",
  "title": "Which GCP product is NoSQL?"
}]}
```

Return to the application home page and click the Take Test link



Which product does this logo relate to?

- ☐ App Engine
- ☐ Cloud Storage
- ☐ Compute Engine
- ☐ Container Engine

Submit Answer



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Quite Interesting Quiz

Game Over

You scored 4 out of 4

What did you think?

Please let us know how you found the quiz!

Send Feedback

The end

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