

UNIVERSIDAD RAFAEL LANDÍVAR

FACULTAD DE INGENIERÍA

ANÁLISIS Y DISEÑO II

SECCIÓN 1 VESPERTINA

DR. HILDA



# COURSE GETTING STARTED WITH APPLICATION DEVELOPMENT LAB 2.2

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GUATEMALA DE LA ASUNCIÓN, MAYO 26 DE 2023

CAMPUS CENTRAL

Google Cloud Paths Explore Profile Subscriptions

Google Cloud Skills Boost

Cloud Developer Learning Path

Course Getting Started With Application Development

5 days Introductory Free

In this course, application developers learn how to design and develop cloud-native applications that seamlessly integrate managed services from Google Cloud. Through a combination of presentations, demos, and hands-on labs, participants learn how to apply best practices for application development and use the appropriate Google Cloud storage services for object storage, relational data, caching, and analytics.

Completing one version of each lab is required. Each lab is available in Node.js. In most cases, the same labs are also provided in Python or Java. You may complete each lab in whichever language you prefer.

This is the first course of the Developing Applications with Google Cloud series. After completing this course, enroll in the Securing and Integrating Components of your Application course.

Congratulations! You finished this course.

Congratulations, you've earned a badge for completing Getting Started With Application Development!

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De outline Applications with Google Cloud

Best Practices for Application Development

Video Loosely Coupled Microservices and API Gateways

Video Security, Reliability, and Migration

Quiz Practice Quiz: Best Practices for Application Development

Quiz Final Quiz: Best Practices for Application Development

Getting Started with Google Cloud Development

Video Getting Started with Google Cloud Development

Quiz Practice Quiz: Getting Started with Google Cloud Development

Quiz Lab Setting up a development environment

Practice Quiz: Best Practices for Application Development

Your score: 100% Passing score: 66% Retake

Congratulations! You passed this assessment.

✓ 1. You need to design a social application to reach a much broader audience than before. You want to achieve scalability, reliability, and security. Select two best practices that you can implement to build scalable, more secure, and highly available applications?

✓ Design for loose coupling between application components.

Design application components so that they are loosely coupled at runtime. Tightly coupled components can make an application less resilient to failures, spikes in traffic, and changes to services.

Avoid caching to minimize the number of services that your application depends on.

✓ Manage your application's code and environment by using a code repository and a dependency management system.

Managing code and dependencies will enable you to track changes to your source code and set up systems for continuous integration and

Practice Quiz: Best Practices for Application Development

✓ 2. Which of the following statements is true?

- It is better to re-architect legacy applications in one big release so that engineering teams can focus on new applications.
- For transient network errors, applications should implement retry logic with exponential backoff and fail gracefully if the errors persist.
- You can review data compliance and sovereignty requirements after you see the source of user traffic at launch.
- When rolling out builds to the production environment, consider performing canary testing to perform integration testing before deploying it to production.

When accessing services and resources in a distributed system, applications need to be resilient to temporary and long-lasting errors.

✓ 3. You have a mission-critical application that is accessed globally. You must make sure that your application is able to serve traffic reliably. What is the best way to check if your application is ready to serve traffic?

- Write a cron job to ping your application's home page every minute.
- Implement a health-check endpoint for each service.
- Ask your testing team to run the system tests every day.
- Set up monitoring dashboards that your global support team can look at 24 x 7.

Final Quiz: Best Practices for Application Development

## Final Quiz: Best Practices for Application Development

Your score: 100% Passing score: 66% Retake

Congratulations! You passed this assessment.

✓ 1. Which of the following is considered a best practice when developing cloud-native applications?

- Using the Worker pattern, develop workers that share state to reduce data storage costs.
- Implement API gateways to make backend functionality available to consumer applications.
- Store and manage log files alongside the application for quick troubleshooting in case of errors.
- Store external dependencies such as JAR files or external packages in your code repository to avoid confusion.

Correct!

✓ 2. Identify three key aspects of a sound architecture for a continuous integration and delivery (CI / CD) system. (Select all 3 correct answers)

Final Quiz: Best Practices for Application Development

Google Cloud Best Practices for Application Development

Video Loosely Coupled Microservices and API Gateways

Video Security, Reliability, and Migration

Quiz Practice Quiz: Best Practices for Application Development

Quiz Final Quiz: Best Practices for Application Development

Getting Started with Google Cloud Development

Video Getting Started with Google Cloud Development

Quiz Practice Quiz: Getting Started with Google Cloud Development

Video Lab Setting up a development environment

Lab App Dev - Setting up a

**Correct!**

2. Identify three key aspects of a sound architecture for a continuous integration and delivery (CI / CD) system. (Select all 3 correct answers)

Developers can also build container images on their laptops and deploy to the development environment.

When a developer commits code into the code repository, a continuous integration tool such as Jenkins builds a container image for the application.

**Correct!**

Builds should be tested in the development environment and canary deployments should be used before fully deploying the build to the production environment.

**Correct!**

Canary deployments can help catch unexpected issues before they affect a large number of users in production.

**Correct!**

Docker container images are stored in Cloud Storage for easy versioning and retrieval.

**Correct!**

3. Identify two key aspects of this application's architecture. (Select all 2 correct answers)

UI Layer → Business Logic Layer → Data Access Layer

The layers of this application can be scaled independently.

The application has a microservices-based architecture because the code is divided into a UI layer, business logic layer, and data access layer.

The layers of the application are loosely coupled.

The application will require longer development and QA cycles as the system grows in features and complexity.

Final Quiz: Best Practices for Application Development

versioning and retrieval.

Google Cloud Best Practices for Application Development

Video Loosely Coupled Microservices and API Gateways

Video Security, Reliability, and Migration

Quiz Practice Quiz: Best Practices for Application Development

Quiz Final Quiz: Best Practices for Application Development

Getting Started with Google Cloud Development

Video Getting Started with Google Cloud Development

Quiz Practice Quiz: Getting Started with Google Cloud Development

Video Lab Setting up a development environment

Lab App Dev - Setting up a

**Correct!**

3. Identify two key aspects of this application's architecture. (Select all 2 correct answers)

UI Layer → Business Logic Layer → Data Access Layer

The layers of this application can be scaled independently.

The application has a microservices-based architecture because the code is divided into a UI layer, business logic layer, and data access layer.

The layers of the application are loosely coupled.

The application is monolithic because all layers need to be deployed as a single unit.

**Correct!**

Practice Quiz: Getting Started with Google Cloud Development

Your score: 100% Passing score: 100%

Congratulations! You passed this assessment.

Retake

1. What tools does the Google Cloud SDK include?

- bq, gsutil, gcloud.
- gcloud, gsutil, Cloud Client Libraries
- bq, gsutil, Cloud Client Libraries.
- gRPC, gsutil, Cloud Client Libraries

Correct!

Navigation menu

VM instances

INSTANCES OBSERVABILITY INSTANCE SCHEDULES

VM instances

dev-instance us-central1-a 10.128.0.2 (nict) 35.225.42.229 (nict) Connect SSH

Related actions

- Explore Backup and DR NEW
- Monitor VMs
- Explore VM logs
- Set up firewall rules
- Patch management
- Load balance between VMs

Get started with Compute Engine

Create a website or application

- Create a "hello world" website on IIS
- Create an IIS web server VM using Compute Engine
- Create a "hello world" website on Apache
- Create an Apache web server on a Linux VM
- Transfer files to a Windows VM
- Transfer files to a Linux VM
- Configure firewall rules
- Back up and restore a VM
- Back up a boot or data disk

**App Dev - Setting up a Development Environment: Node.js**

End Lab 01:56:06

**Note:** It takes about 20 seconds for the virtual machine to be provisioned and started.

4. On the VM Instances dialog, in the row for the dev-instance, click SSH (in the Connect column).

**Note:** This launches a browser-hosted SSH session. If you have a popup blocker, you may need to click twice. There's no need to configure or manage SSH keys.

Click Check my progress below to verify the objective.

Create a Compute Engine Virtual Machine Instance

Check my progress

Assessment Completed!

Overview Objectives Setup and requirements Task 1. Create a Compute Engine Virtual Machine Instance Task 2. Install software on the VM instance Task 3. Configure the VM to run application software Review End your lab

**Getting Started with Google Cloud Development**

- Quiz Practice Quiz: Getting Started with Google Cloud Development
- Video Lab Setting up a development environment
- Lab App Dev - Setting up a Development Environment: Node.js
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- Quiz Final Quiz: Getting Started with Google Cloud Development
- Video Module Review

Overview of Data Storage Options Best Practices for Using Datastore

**App Dev - Setting up a Development Environment: Node.js**

End Lab 01:54:28

2. To install Git, execute the following command:

```
sudo apt-get update
```

Caution: When you are in the console, do not deviate from the lab instructions. Doing so may cause your account to be blocked. Learn more.

Open Google Console

Username: student-00-9bedefc3baa

Password: KzUf103KbNBN

GCP Project ID: qwiklabs-gcp-00-a0b7ea:

3. To download the Node.js source code, execute the following command:

```
curl -sL https://deb.nodesource.com/setup_12.x | sudo -E bash -
```

4. To install Node Package Manager (NPM), execute the following command:

```
sudo apt install nodejs
```

Click Check my progress to verify the objective.

Install software on the VM instance

Check my progress

Continuing in 20 seconds ...

# Installing the NodeSource Node.js 12.x repo...

5/15

**App Dev - Setting up a Development Environment: Node.js**

End Lab 01:54:28

2. To install Git, execute the following command:

```
sudo apt-get update
```

Caution: When you are in the console, do not deviate from the lab instructions. Doing so may cause your account to be blocked. Learn more.

Open Google Console

Username: student-00-9bedefc3baa

Password: KzUf103KbNBN

GCP Project ID: qwiklabs-gcp-00-a0b7ea:

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4. To install Node Package Manager (NPM), execute the following command:

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sudo apt install nodejs
```

Click Check my progress to verify the objective.

Install software on the VM instance

Check my progress

Continuing in 20 seconds ...

# Installing the NodeSource Node.js 12.x repo...

5/15

**Getting Started with Google Cloud Development**

- Quiz Practice Quiz: Getting Started with Google Cloud Development
- Video Lab Setting up a development environment
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Overview of Data Storage Options Best Practices for Using Datastore

**App Dev - Setting up a Development Environment: Node.js**

End Lab 01:54:02

**Caution:** When you are in the console, do not deviate from the lab instructions. Doing so may cause your account to be blocked. [Learn more.](#)

**Open Google Console**

**Username:** student-00-9bedfc3baa [ ]

**Password:** KzUf103KbNBN [ ]

**GCP Project ID:** qwiklabs-gcp-00-a0b7ea: [ ]

**2. To install Git, execute the following command:**

```
sudo apt-get update
```

If prompted, press **Y** then **Enter** to continue.

**3. To download the Node.js setup script, execute the following command:**

```
curl -sL https://deb.nodesource.com/setup_12.x | sudo -E bash
```

**4. To install Node Package Manager (npm) and Node.js, execute the following command:**

```
sudo apt install nodejs
```

**Click Check my progress to verify the objective.**

Install software on the VM instance

**Check my progress**

Assessment Completed!

SSH-in-browser

```
student:~$ sudo apt-get install -y nodejs
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following NEW packages will be installed:
nodejs
0 upgraded, 1 newly installed, 0 to remove and 4 not upgraded.
After this operation, 91.5 MB of additional disk space will be used.
Get: https://deb.nodesource.com/node_12.x/bullseye/main amd64 nodejs amd64 12.22.12-deb-inodesource1 [18.1
MB]
Selecting previously unselected package nodejs.
(Reading database ... 62493 files and directories currently installed.)
Unpacking nodejs (12.22.12-deb-inodesource1) ...
Setting up nodejs (12.22.12-deb-inodesource1) ...
Processing triggers for man-db (2.9.4-2) ...
student:~$
```

Overview 5/15

**App Dev - Setting up a Development Environment: Node.js**

End Lab 01:53:43

**Caution:** When you are in the console, do not deviate from the lab instructions. Doing so may cause your account to be blocked. [Learn more.](#)

**Open Google Console**

**Username:** student-00-9bedfc3baa [ ]

**Password:** KzUf103KbNBN [ ]

**GCP Project ID:** qwiklabs-gcp-00-a0b7ea: [ ]

**3. To download the Node.js setup script, execute the following command:**

```
curl -sL https://deb.nodesource.com/setup_12.x | sudo -E bash
```

**4. To install Node Package Manager (npm) and Node.js, execute the following command:**

```
sudo apt install nodejs
```

**Click Check my progress to verify the objective.**

Install software on the VM instance

**Check my progress**

Assessment Completed!

Overview 5/15

Objectives

Setup and requirements

Task 1. Create a Compute Engine Virtual Machine Instance

Task 2. Install software on the VM instance

Task 3. Configure the VM to run application software

Review

End your lab

### Task 3. Configure the VM to run application

Mozilla Firefox

https://ssh.cloud.google.com/v2/ssh/projects/qwiklabs-gcp-00-a0b7ea7c016d/zones/us-central1-a/instances/dev

SSH-in-browser

student-00-9bedefc3baae@dev-instance:~\$ sudo apt install nodejs  
Reading package lists... Done  
Building dependency tree... Done  
Reading state information... Done  
The following NEW packages will be installed:  
nodejs  
0 upgraded, 1 newly installed, 0 to remove and 4 not upgraded.  
Need to get 18.1 MB of archives.  
After this operation, 93.5 MB of additional disk space will be used.  
Get:1 https://deb.nodesource.com/node\_12.x bullseye/main amd64 nodejs amd64 12.22.12-deb-1nodesource1 [18.1  
MB]  
Fetched 18.1 MB in 1s (28.5 MB/s)  
Selecting previously unselected package nodejs.  
(Reading database ... 62443 files and directories currently installed.)  
Preparing to unpack .../nodejs\_12.22.12-deb-1nodesource1\_amd64.deb ...  
Unpacking nodejs (12.22.12-deb-1nodesource1) ...  
Setting up nodejs (12.22.12-deb-1nodesource1) ...  
Processing triggers for man-db (2.9.4-2) ...  
student-00-9bedefc3baae@dev-instance:~\$ node -v  
v12.22.12  
student-00-9bedefc3baae@dev-instance:~\$ git clone --depth=1 https://github.com/GoogleCloudPlatform/training-  
data-analyst  
Cloning into 'training-data-analyst'...  
remote: Enumerating objects: 7647, done.  
remote: Counting objects: 100% (7647/7647), done.  
remote: Compressing objects: 100% (5176/5176), done.  
remote: Total 7647 (delta 2123), reused 5787 (delta 1516), pack-reused 0  
Receiving objects: 100% (7647/7647), 330.88 MiB | 25.94 MiB/s, done.  
Resolving deltas: 100% (2123/2123), done.  
Updating files: 100% (12840/12840), done.  
student-00-9bedefc3baae@dev-instance:~\$ ln -s ~/training-data-analyst/courses/developingapps/v1.3/nodejs/dev  
env ~/devenv  
student-00-9bedefc3baae@dev-instance:~\$ cd ~/devenv  
student-00-9bedefc3baae@dev-instance:~/devenv\$ sudo node server/app.js  
Server starting...  
started.

```

Mozilla Firefox
https://ssh.cloud.google.com/v2/ssh/projects/qwiklabs-gcp-00-a0b7ea7c016d/zones/us-central1-a/instances/dev

SSH-in-browser
 UPLOAD FILE DOWNLOAD FILE ! 📈 🛡️ 🛠️ 🚧

gceImages: [GCEImages],
  [Symbol(kCapture)]: false
},
id: 'dev-instance',
createMethod: [Function: bound wrapper],
methods: { create: true, exists: true, get: true, getMetadata: true },
interceptors: [],
pollIntervalMs: undefined,
projectId: undefined,
name: 'dev-instance',
zone: Zone {
  _events: [Object: null prototype] {},
  _eventsCount: 0,
  _maxListeners: undefined,
  metadata: {},
  baseUrl: '/zones',
  parent: [Compute],
  id: 'us-central1-a',
  createMethod: undefined,
  methods: [Object],
  interceptors: [],
  pollIntervalMs: undefined,
  projectId: undefined,
  create: undefined,
  delete: undefined,
  setMetadata: undefined,
  compute: [Compute],
  name: 'us-central1-a',
  gceImages: [GCEImages],
  [Symbol(kCapture)]: false
},
hasActiveWaiters: false,
waiters: [],
url: 'https://www.googleapis.com/compute/v1/projects/{{projectId}}/zones/us-central1-a/instances/dev-instance',
[Symbol(kCapture)]: false
}
]
student-00-9bedefc3baae@dev-instance:~/devenv$ 

```

App Dev - Setting up a Development Environment: Node.js

8. To install the Node.js library for Compute Engine, execute the following command:

```
npm install
```

9. To run a simple Node.js application that lists Compute Engine instances, execute the following command:

```
node list-gce-instances.js
```

**Note:** Many details about your machine should appear in the terminal window.

**Note:** If you try to do this on your own machine, it will not work if credentials have not been set up to access Google Cloud on your machine.

Click **Check my progress** to verify the objective.

Clone the repository **Check my progress**

Assessment Completed!

Overview  
Objectives  
Setup and requirements  
Task 1: Create a Compute Engine Virtual Machine Instance  
Task 2: Install software on the VM instance  
Task 3: Configure the VM to run application software  
Review  
End your lab

10/15

- Getting Started with Google Cloud Development
- Practice Quiz: Getting Started with Google Cloud Development
- Lab Setting up a development environment
- A Lab** App Dev - Setting up a Development Environment: Node.js
- A Lab App Dev - Setting up a Development Environment: Java
- A Lab App Dev - Setting up a Development Environment: Python
- Quiz Final Quiz: Getting Started with Google Cloud Development
- Video Module Review
- Overview of Data Storage Options
- Best Practices for Using Datastore

**Google Cloud** | Search (/) for resources, docs, products, and more | **Search** | **VM Engine** | **VM instances** | **CREATE INSTANCE** | **IMPORT VM** | **REFRESH** | **HELP ASSISTANT** | **LEARN**

**INSTANCES** | **OBSERVABILITY** | **INSTANCE SCHEDULES**

**VM instances**

**dev-instance** us-central1-f

Status	Name	Zone	Recommendations	In use by	Internal IP	External IP	Connect
Green	dev-instance	us-central1-f			10.128.0.3 (nic0)	25.232.83.35 (nic0)	SSH

**Related actions**

- Explore Backup and DR **NEW**
- Monitor VMs
- Explore VM logs
- Set up firewall rules
- Patch management
- Load balance between VMs**

**App Dev - Setting up a Development Environment: Java**

Start with Google Cloud Development

**End Lab** 01:53:18

Caution: When you are in the console, do not deviate from the lab instructions. Doing so may cause your account to be blocked.

Learn more.

**Open Google Console**

Username: student-00-81b7bcd7da

Password: bdiYgAuPTViu

GCP Project ID: qwiklabs-gcp-01-230c5f1

It takes about 20 seconds for the virtual machine to be provisioned and started.

7. On the **VM instances** page, in the row for the **dev-instance**, click **SSH** (in the **Connect** column).

This launches a browser-hosted SSH session. If you have a popup blocker, you may need to click twice. There's no need to configure or manage SSH keys.

**Test completed task**

Click **Check my progress** to verify your performed task. If you have completed the task successfully you will be granted with an assessment score.

Create a Compute Engine Virtual Machine Instance (zone: us-central1-f)

**Assessment Completed!**

**Install software and configure the VM instance**

1. In the SSH session, to update the Debian package list, enter the following command:

```
sudo apt-get update
```

**Snip & Sketch**

Snip saved to clipboard

Select here to mark up and share the image

**App Dev - Setting up a Development Environment**

End Lab 01:51:46

Caution: When you are in the console, do not deviate from the lab instructions. Doing so may cause your account to be blocked. Learn more.

Open Google Console

Username: student-00-81b7bcd7da[ ]

Password: bdiYqAuPTVIu [ ]

GCP Project ID: qwiklabs-gcp-01-230c5ft [ ]

This command (above) to configure the IP tables redirects requests on Port 80 to Port 8080 - the Java Web application listens on Port 8080.

sudo iptables -t nat -A PREROUTING -p http --to-port 8080 -j REDIRECT --to-port 8080

7. Export the Project ID as an environment variable:

export GCLOUD\_PROJECT=\$(curl -H Metadata-Flavor:Google http://metadata/computeMetadata/v1/project/id)

**App Dev - Setting up a Development Environment**

End Lab 01:50:45

Caution: When you are in the console, do not deviate from the lab instructions. Doing so may cause your account to be blocked. Learn more.

Open Google Console

Username: student-00-81b7bcd7da[ ]

Password: bdiYqAuPTVIu [ ]

GCP Project ID: qwiklabs-gcp-01-230c5ft [ ]

This command (above) to configure the IP tables redirects requests on Port 80 to Port 8080 - the Java Web application listens on Port 8080.

sudo iptables -t nat -A PREROUTING -p http --to-port 8080 -j REDIRECT --to-port 8080

7. Export the Project ID as an environment variable:

export GCLOUD\_PROJECT=\$(curl -H Metadata-Flavor:Google http://metadata/computeMetadata/v1/project/id)

Test completed task

Click **Check my progress** to verify your performance. If you successfully complete the task, you will be granted with an assessment score.

Install software and configure the VM instance

Check my progress

App Dev - Setting up a Development Environment: Java

Welcome - Developing Applications with Google Cloud

Caution: When you are in the console, do not deviate from the lab instructions. Doing so may cause your account to be blocked. [Learn more](#)

[Open Google Console](#)

Username: student-00-81b7bcd7dar

Password: bd1YqAuPTIVu

GCP Project ID: qwiklabs-gcp-01-230c5f1

This command (above) to configure the IP tables redirects requests on Port 80 to Port 8080 - the Java Web application listens on Port 8080.

7. Export the Project ID as an environment variable:

```
export GCLOUD_PROJECT=$(curl -H Metadata-Flavor:Google http://metadata/computeMetadata/v1/project/project-id)
```

### Test completed task

Click [Check my progress](#) to verify your performed task. If you have completed the task successfully you will be granted with an assessment score.

Install software and configure the VM instance

[Check my progress](#)

Assessment Completed!

## Task 2. Configure the VM to run application

Overview

Objectives

Google Cloud

Setup and requirements

Task 1. Create a Compute Engine virtual machine instance

Task 2. Configure the VM to run application software

Task 3. Test your understanding

End your lab

## Task 2. Configure the VM to run application

Welcome - Developing Applications with Google Cloud

Best Practices for Application Development

Getting Started with Google Cloud Development

Video

Quiz

Practice Quiz: Getting Started with Google Cloud Development

Video

Lab Setting up a development environment

Lab

App Dev - Setting up a Development Environment: Node.js

App Dev - Setting up a Development Environment: Java

End Lab

01:48:43

Caution: When you are in the console, do not deviate from the lab instructions. Doing so may cause your account to be blocked. Learn more.

Open Google Console

Username: student-00-81b7bcd7da1

Password: bdiYqAuPTViU

GCP Project ID: qwiklabs-gcp-01-230c5f1

4. Change to the directory that contains the Java code for the application.

cd ~/devenv

5. Run a simple web application:

mvn clean install

Wait for the project to build. When the similar to this:

[INFO] [INFO] BUILD SUCCESS

[INFO] -----

[INFO] Total time: 26.429 s

[INFO] Finished at: 2021-12-06T13:48:56Z

[INFO] -----

6. Run the application:

mvn spring-boot:run

You may see a number of warnings, but the project is running when you can see an INFO message in the output similar to the following:

09:48:56.374 [restartedMain] INFO

Mozilla Firefox

https://ssh.cloud.google.com/v2/ssh/projects/qwiklabs-gcp-01-230c5fb87ba8/zones/us-central1-f/instances/dev-1

### SSH-in-browser

```
v/pom.xml to /home/student-00-81b7bcd7dac/.m2/repository/com/google/training/appdev/0.0.1/appdev-0.0.1.pom
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time: 41.128 s
[INFO] Finished at: 2023-05-24T21:40:56Z
[INFO] -----
student-00-81b7bcd7dac@dev-instance:~/devenv$ mvn spring-boot:run
[INFO] Scanning for projects...
[INFO]
[INFO] < com.google.training:appdev >
[INFO] Building appdev 0.0.1
[INFO] ----- [ jar ] -----
[INFO]
[INFO] >>> spring-boot-maven-plugin:2.5.6:run (default-cli) > test-compile @ appdev >>>
[INFO]
[INFO] --- maven-resources-plugin:3.2.0:resources (default-resources) @ appdev ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] Using 'UTF-8' encoding to copy filtered properties files.
[INFO] Copying 1 resource
[INFO] Copying 2 resources
[INFO]
[INFO] --- maven-compiler-plugin:3.8.1:compile (default-compile) @ appdev ---
[INFO] Nothing to compile - all classes are up to date
[INFO]
[INFO] --- maven-resources-plugin:3.2.0:testResources (default-testResources) @ appdev ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] Using 'UTF-8' encoding to copy filtered properties files.
[INFO] skip non existing resourceDirectory /home/student-00-81b7bcd7dac/training-data-analyst/courses/devel
opingapps/v1.3/java/devenv/src/test/resources
[INFO]
[INFO] --- maven-compiler-plugin:3.8.1:testCompile (default-testCompile) @ appdev ---
[INFO] No sources to compile
[INFO]
[INFO] <<< spring-boot-maven-plugin:2.5.6:run (default-cli) < test-compile @ appdev <<<
[INFO]
[INFO] --- spring-boot-maven-plugin:2.5.6:run (default-cli) @ appdev ---
[INFO] Attaching agents: []
```

App Dev - Setting up a Development Environment

End Lab 01:45:08

Welcome - Developing Applications with Google Cloud

Best Practices for Application Development

Getting Started with Google Cloud Development

- QVideo ✓ Getting Started with Google Cloud Development
- Quiz ✓ Practice Quiz: Getting Started with Google Cloud Development
- QVideo ✓ Lab Setting up a development environment
- A Lab ✓ App Dev - Setting up a Development Environment: Node.js

Run application software to complete the lab.

Check my progress

Assessment Completed!

8. Return to the SSH window, and stop the application.

9. To run a simple Java application that lists files in the current directory, enter the following command:

```
mvn exec:java@list-gce
```

The terminal window outputs VM data.

Task 3. Test your understanding

Below is a multiple-choice question to reinforce your understanding of this lab's concepts.

Which one of the following protocol-port combination is responsible for allowing HTTP traffic?

App Dev - Setting up a Development Environment: Java

01:44:07

Welcome - Developing Applications with Google Cloud

Best Practices for Application Development

Getting Started with Google Cloud Development

Getting Started with Google Cloud Development

Practice Quiz: Getting Started with Google Cloud Development

Lab Setting up a development environment

App Dev - Setting up a Development Environment: Node.js

App Dev - Setting up a Development Environment: Java

End Lab

Caution: When you are in the console, do not deviate from the lab instructions. Doing so may cause your account to be blocked. Learn more.

Open Google Console

Username: student-00-81b7bcd7dar

Password: bdiYqAuPTViU

GCP Project ID: qwiklabs-gcp-01-230c5f1

Task 3. Test your understanding

Below is a multiple-choice question to reinforce your understanding of this lab's concepts.

Which one of the following protocol-port combination is responsible for allowing HTTP traffic?

tcp:80

icmp

http:80

tcp:443

Submit

Overview  
Objectives  
Google Cloud  
Setup and requirements  
Task 1. Create a Compute Engine virtual machine instance  
Task 2. Configure the VM to run application software  
Task 3. Test your understanding  
End your lab

15/15

### End your lab

App Dev - Setting up a Development Environment: Java

01:47:12

Welcome - Developing Applications with Google Cloud

Best Practices for Application Development

Getting Started with Google Cloud Development

Getting Started with Google Cloud Development

Practice Quiz: Getting Started with Google Cloud Development

Lab Setting up a development environment

App Dev - Setting up a Development Environment: Node.js

App Dev - Setting up a Development Environment: Java

End Lab

Caution: When you are in the console, do not deviate from the lab instructions. Doing so may cause your account to be blocked. Learn more.

Open Google Console

Username: student-00-81b7bcd7dar

Password: bdiYqAuPTViU

GCP Project ID: qwiklabs-gcp-01-230c5f1

0.0.0.0:8080 -> /appdev-demoapplication = Started demoapplication in 2.491 seconds (JVM running for 3.28)

7. Return to the Cloud Console VM instances list, and click on the External IP address for the dev-instance.

Name	Zone	Recommendation	Internal IP	External IP	Connect
devinstance	us-central1-f		10.128.0.2	35.188.177.221	SSH

A browser opens to display a Hello GCP dev! message from Java.

Test completed task

Click **Check my progress** to verify your performed task. If you have completed the task successfully you will be granted with an assessment score.

Run application software to get success response

Check my progress

Assessment Completed!

8. Return to the SSH window, and stop the application by pressing **Ctrl+C**.

9. To run a simple Java application that lists Compute Engine instances, execute the following command:

```
java -jar /appdev-listinstances.jar
```

3:41 PM

Overview  
Objectives  
Google Cloud  
Setup and requirements  
Task 1. Create a Compute Engine virtual machine instance  
Task 2. Configure the VM to run application software  
Task 3. Test your understanding  
End your lab

10/15

Google Cloud | Search (/) for resources, docs, products, and more | [Search](#)

[VM instances](#) [CREATE INSTANCE](#) [IMPORT VM](#) [REFRESH](#)

[INSTANCES](#) [OBSERVABILITY](#) [INSTANCE SCHEDULES](#)

**VM instances**

Status	Name	Zone	Recommendations	In use by	Internal IP	External IP	Connect
<a href="#">dev-instance</a>	us-central1-a				10.128.0.2 (nic0)	34.192.154.68 (nic0)	<a href="#">SSH</a>

**Related actions**

- [Explore Backup and DR](#) NEW
- [Monitor VMs](#)
- [Explore VM logs](#)
- [Set up firewall rules](#)
- [Patch management](#)
- [Load balance between VMs](#)

**Get started with Compute Engine**

- [Create a website or application](#)
- [Create a "hello world" website on IIS](#)
- [Create a "hello world" website on Apache](#)
- [Transfer files to a Windows VM](#)
- [Transfer files to a Linux VM](#)
- [Configure firewall rules](#)

**App Dev - Setting up a Development Environment: Python**

End Lab 01:55:58

Caution: When you are in the console, do not deviate from the lab instructions. Doing so may cause your account to be blocked.

[Learn more](#)

[Open Google Console](#)

Username: student-00-9f2135dbe71

Password: bov1xtQf0A1L

GCP Project ID: qwiklabs-gcp-00-e81221t

**Test completed task**

Click [Check my progress](#) to verify your performed task. If you have completed the task successfully, the assessment score increases.

Create a Compute Engine Virtual Machine Instance (zone: us-central1-a)

[Check my progress](#)

Assessment Completed!

5. On the **VM instances** dialog, in the **dev-instance** row, click **SSH** to launch a browser-hosted SSH session. If you have a popup blocker, you may need to click twice.

Note: There's no need to configure or manage SSH keys.

Install software on the VM instance

App Dev - Setting up a Development Environment: Python

End Lab 01:49:13

Caution: When you are in the console, do not deviate from the lab instructions. Doing so may cause your account to be blocked. Learn more.

Open Google Console

Username: student-00-9f12153dbe7d71

Password: bov1XtP0A1L

GCP Project ID: qwiklabs-gcp-00-e1221t

sudo apt-get install git

When prompted, enter Y to continue, accepting the use of additional disk space.

Objectives

3. Install Python:

```
student-00-9f12153dbe7d71:~$ sudo apt-get update
Hit:1 https://packages.cloud.google.com/apt google-compute-engine-bullseye-stable InRelease
Hit:2 https://packages.cloud.google.com/apt cloud-sdk-bullseye InRelease
Hit:3 https://deb.debian.org/debian bullseye InRelease
Hit:4 https://deb.debian.org/debian-security bullseye InRelease
Hit:5 https://deb.debian.org/debian bullseye-updates InRelease
Hit:6 https://deb.debian.org/debian/bullseye-backports InRelease
Reading package lists... Done
Building dependency tree... Done
Reading status information... Done
git is already the newest version (1:12.30.2-1+deb11u2).
0 upgraded, 0 newly installed, 0 to remove and 4 not upgraded.
Reading package lists... Done
Building dependency tree... Done
Reading status information... Done
git is already the newest version (1:12.30.2-1+deb11u2).
0 upgraded, 0 newly installed, 0 to remove and 4 not upgraded.
student-00-9f12153dbe7d71:~$ sudo apt-get install python3-setuptools python3-dev build-essential
Reading package lists... Done
Building dependency tree... Done
Reading status information... Done
python3-setuptools is already the newest version (12.8).
python3-dev is already the newest version (3.9.2-1).
python3-setuptools is already the newest version (32.0.0-4).
python3-setuptools depends on python3 (>= 3.9.2-1) but it is not installed.
python3-setuptools depends on python3-dev (>= 3.9.2-1) but it is not upgraded.
student-00-9f12153dbe7d71:~$ curl https://bootstrap.pypa.io/get-pip.py -o get-pip.py
% Total    % Received % Xferd  Average Speed   Time   Time     Current
          0     0    0     0      0     0      0      0 --:--:-- --:--:-- --:--:-- 100 251B   0  16.8M  0  16.8M  0  16.8M  0  16.8M
student-00-9f12153dbe7d71:~$ sudo python3 get-pip.py
Collecting pip
  Downloading pip-23.1.2-py3-none-any.whl (2.1 kB)
Collecting wheel
  Downloading Wheel-0.40.0-py3-none-any.whl (44 kB)
Installing collected packages: wheel, pip
  Found existing installation: pip 23.1.2
  Uninstalling pip-23.1.2...
  Successfully uninstalled pip-23.1.2
Warning! Running pip as root can result in broken permissions and conflicting behaviour with the system package manager. It is recommended to use a virtual environment instead: https://pip.pypa.io/warnings
/vmlinuz
student-00-9f12153dbe7d71:~$
```

Again, when prompted, enter Y to continue, accepting the use of additional disk space.

4. Install pip:

```
curl https://bootstrap.pypa.io/get-pip.py -o get-pip.py
sudo python3 get-pip.py
```

Test completed task

Click **Check my progress** to verify you successfully completed the task. Once you have successfully you will granted with an achievement.

Install software and configure the VM instance

Check my progress

**App Dev - Setting up a Development Environment: Python**

End Lab 01:47:46

Caution: When you are in the console, do not deviate from the lab instructions. Doing so may cause your account to be blocked. Learn more.

Open Google Console

Username: student-00-9f21353dbe7f

Password: bovlxtqf0A1L

GC Project ID: qwiklabs-gcp-00-e81221t

ln -s ~/training-data-analyst/courses/developingapps/v1.3/python /devenv ~/devenv

4. Change the directory that contains the application code to the directory where the application will run.

cd ~/devenv/

5. Run a simple web server:

sudo python3 server.py

6. Return to the Cloud Console VM instances list (Navigation menu > Compute Engine > Virtual Instances), and click on the dev-instance.

A browser opens and displays a Hello GCP dev! message from Python.

**Test completed task**

Click **Check my progress** to verify your performed task. If the check fails, wait a minute and try again. When task completes successfully, the assessment score increases.

**App Dev - Setting up a Development Environment: Python**

End Lab 01:46:56

Caution: When you are in the console, do not deviate from the lab instructions. Doing so may cause your account to be blocked. Learn more.

Open Google Console

Username: student-00-9f21353dbe7f

Password: bovlxtqf0A1L

GC Project ID: qwiklabs-gcp-00-e81221t

6. Return to the Cloud Console VM instances list (Navigation menu > Compute Engine > Virtual Instances), and click on the External IP address for the dev-instance.

A browser opens and displays a Hello GCP dev! message from Python.

**Test completed task**

Click **Check my progress** to verify your performed task. If the check fails, wait a minute and try again. When task completes successfully, the assessment score increases.

Run application software to get a success response

Check my progress

Assessment Completed!

7. Return to the SSH window, and stop the application by pressing **Ctrl+C**.

8. Install the Python packages needed to enumerate Compute Engine VM instances:

sudo pip3 install -r requirements.txt

Objectives 10/15

Overview

Setup and requirements

Task 1. Create a Compute Engine virtual machine instance

Task 2. Configure the VM to run application software

Test your understanding

End your lab

App Dev - Setting up a Development Environment: Python

End Lab 01:46:23

Caution: When you are in the console, do not deviate from the lab instructions. Doing so may cause your account to be blocked.  
Learn more.

Open Google Console

Username: student-00-9f21353dbe7? [ ]

Password: bov1xtQf0All [ ]

GCP Project ID: qwiklabs-gcp-00-e81221t [ ]

8. Install the Python packages needed for your application.

```
sudo pip3 install -r requirements.txt
```

9. Now list your instance in Cloud Shell. This Python application lists your Google Cloud Project ID and the IP address of the VM you created.

```
python3 list-gce-instances.py
```

Your instance name shows in the SSH output:

```
student-00-9f21353dbe7@qwiklabs-gcp-00-e81221t:~/Desktop
```

Output example:

```
student-00-9f21353dbe7@qwiklabs-gcp-00-e81221t:~/Desktop$ python3 list-gce-instances.py
[REDACTED]
```

7. Return to the SSH window, and stop the application by pressing Ctrl+C.

Objectives

SSH in-browser

```
https://ssh.cloud.google.com/v/sshproxy/qwiklabs-gcp-00-e81221t6e27zeccus-central-vm/instances/00-e81221t6e27zeccus-central-vm
```

UPLOAD FILE DOWNLOAD FILE

```
student-00-9f21353dbe7@qwiklabs-gcp-00-e81221t:~/Desktop$ python3 list-gce-instances.py
[REDACTED]
```

student-00-9f21353dbe7@qwiklabs-gcp-00-e81221t:~/Desktop\$

App Dev - Setting up a Development Environment: Python

- dev-instance

End Lab 01:44:35

Caution: When you are in the console, do not deviate from the lab instructions. Doing so may cause your account to be blocked.  
[Learn more.](#)

[Open Google Console](#)

Username: student-00-9f21353dbe7f

Password: bov1xtQf0A1L

GCP Project ID: qwiklabs-gcp-00-e81221t

## Test your understanding

Below are multiple choice questions to reinforce your understanding of this lab's concepts. Answer them to the best of your abilities.

pip is a package management system used to install and manage software packages written in Python.

True

False

End your lab

Final Quiz: Getting Started with Google Cloud Development

development environment

✓ Lab Final Quiz: Getting Started with Google Cloud Development

Module Review

Overview of Data Storage Options

Cloud Storage, Datastore, Cloud Bigtable, Cloud SQL, and Cloud Spanner

BigQuery, Microsoft SQL Server images on Google Cloud, and Firebase Storage Options

Demo: Connecting Securely to a Cloud SQL Database

Final Quiz: Getting Started with Google Cloud Development

# Final Quiz: Getting Started with Google Cloud Development

Your score: 75% Passing score: 75%

Congratulations! You passed this assessment.

Retake

✓ 1. What tools does the Google Cloud SDK include?

bq, gsutil, Cloud Client Libraries

bq, gsutil, gcloud

gRPC, gsutil, Client Libraries

Gcloud, gsutil, Client Libraries

Correct!

✗ 2. Which of the following statements about Cloud Code are true? (Select the 2 correct answers)

Note: To get credit for a multiple-select question, you must select all of the correct options and none of the incorrect ones.

Cloud Code is a new integrated development environment for creating cloud-native applications.

Cloud Code integrates with Secret Manager to securely store sensitive data.

Cloud Code works with Cloud Run and Kubernetes applications.

Correct.

✗ Cloud Code's YAML authoring assistance provides autocomplete and inline documentation for Docker files.

Incorrect. Consider reviewing the Getting Started with Google Cloud Development lecture.

Final Quiz: Getting Started with Google Cloud Development

development environment

✓ Lab App Dev - Setting up a Development Environment: Node.js

✓ Lab App Dev - Setting up a Development Environment: Java

✓ Lab App Dev - Setting up a Development Environment: Python

✓ Lab Final Quiz: Getting Started with Google Cloud Development

Module Review

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Demo: Connecting Securely to a Cloud SQL Database

Final Quiz: Getting Started with Google Cloud Development

✗ 2. Which of the following statements about Cloud Code are true? (Select the 2 correct answers)

Note: To get credit for a multiple-select question, you must select all of the correct options and none of the incorrect ones.

Cloud Code is a new integrated development environment for creating cloud-native applications.

Cloud Code integrates with Secret Manager to securely store sensitive data.

Cloud Code works with Cloud Run and Kubernetes applications.

Correct.

✗ Cloud Code's YAML authoring assistance provides autocomplete and inline documentation for Docker files.

Incorrect. Consider reviewing the Getting Started with Google Cloud Development lecture.

✓ 3. Your code throws errors because the actual response from a Google Cloud API is not what you expect. You want to quickly find the response values for a set of test parameter values. How can you execute the API with minimal effort to determine the response data?

Use the API Explorer to invoke the API with test parameter

Final Quiz: Getting Started with Google Cloud Development

development environment

✓ 3. Your code throws errors because the actual response from a Google Cloud API is not what you expect. You want to quickly find the response values for a set of test parameter values. How can you execute the API with minimal effort to determine the response data?

Use the API Explorer to invoke the API with test parameter values.

Invoke the unit test for your code with test parameter values.

Use the API Explorer to execute a snippet of your code with test parameter values.

Use the API Explorer to run the equivalent gcloud command.

Correct!

✓ 4. Which of the following statements about Google Cloud Client Libraries are accurate? (Select all 3 correct answers)

Cloud Client Libraries are the latest and recommended approach to making requests to the server.

Cloud Client Libraries handle low-level communication, retry logic, and authentication.

Cloud Client Libraries are helpful because they support a language's natural conventions and styles.

Correct!

Final Quiz: Getting Started with Google Cloud Development

Module Review

Overview of Data Storage Options

Cloud Storage, Datastore, Cloud Bigtable, Cloud SQL, and Cloud Spanner

BigQuery, Microsoft SQL Server images on Google Cloud, and Firebase Storage Options

Demo: Connecting Securely to a Cloud SQL Database

Final Quiz: Data Storage Options

Video

Final Quiz: Data Storage Options

## Final Quiz: Data Storage Options

Your score: 100% Passing score: 66% [Retake](#)

Congratulations! You passed this assessment.

✓ 1. A restaurant in your neighborhood wants to put up a website that displays static information including a menu, restaurant hours, and location on a map. You want to help set up the website. What is the best solution for serving the website's content on Google Cloud?

Serve the website's content from an application server running on a Compute Engine instance.

Serve the website's content from Cloud Bigtable.

Serve the website's content from a web server running on a Compute Engine instance.

Serve the website's content from a Cloud Storage bucket.

Correct!

✓ 2. You are building a banking application that is expected to have a very large number of users across the world. When users make a deposit, they want to see the result of this deposit reflected immediately when they view their balance. What data storage option is ideal for storing

Development

Module Review

Overview of Data Storage Options

Cloud Storage, Datastore, Cloud Bigtable, Cloud SQL, and Cloud Spanner

BigQuery, Microsoft SQL Server images on Google Cloud, and Firebase Storage Options

Demo: Connecting Securely to a Cloud SQL Database

Final Quiz: Data Storage Options

Video

Best Practices for Using Datastore

Datastore Concepts and Indexes

Demo Explore Cloud Datastore

Design Considerations & Sharding

Final Quiz: Data Storage Options

✓ 2. You are building a banking application that is expected to have a very large number of users across the world. When users make a deposit, they want to see the result of this deposit reflected immediately when they view their balance. What data storage option is ideal for storing account balance information for users?

Cloud SQL is ideal because it is a relational database that supports transactions.  
 Cloud Firestore for Firebase is ideal because it enables you to develop a mobile app later.  
 Cloud Bigtable is ideal because it supports low-latency read/write access.  
 Cloud Spanner is ideal because it supports strongly consistency reads in addition to horizontal scalability, low latency, and high throughput.

Correct!

✓ 3. You have a very large database that you are using for complex queries in a suite of business intelligence applications. You want to move the data to a fully-managed solution. Which database option is ideal for such use cases?

Cloud Datastore  
 Firestore  
 Cloud Bigtable

Final Quiz: Data Storage Options

✓ 2. You are building a banking application that is expected to have a very large number of users across the world. When users make a deposit, they want to see the result of this deposit reflected immediately when they view their balance. What data storage option is ideal for storing account balance information for users?

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 Cloud Bigtable is ideal because it supports low-latency read/write access.  
 Cloud Spanner is ideal because it supports strongly consistency reads in addition to horizontal scalability, low latency, and high throughput.

Correct!

✓ 3. You have a very large database that you are using for complex queries in a suite of business intelligence applications. You want to move the data to a fully-managed solution. Which database option is ideal for such use cases?

Cloud Datastore  
 Firestore  
 Cloud Bigtable  
 BigQuery

Correct!

Google Cloud | Search (/) for resources, docs, products, and more | Search

Welcome

You're working in `qwiklabs-gcp-02-d24097b1da83`

Project number: 271108793083 | Project ID: `qwiklabs-gcp-02-d24097b1da83`

Dashboard | Recommendations

Create a VM | Run a query in BigQuery | Create a GKE cluster | Create a storage bucket

Privacy Policy | Terms of Service

CLOUD SHELL Terminal (qwiklabs-gcp-02-d24097b1da83) + +

```
Welcome to Cloud Shell! Type "help" to get started.  
Your Cloud Platform project in this session is set to qwiklabs-gcp-02-d24097b1da83.  
Use gcloud config set project [PROJECT_ID] to change to a different project.  
student_00197d58f785$cloudshell:~ (qwiklabs-gcp-02-d24097b1da83)$ gcloud auth list  
Credentialed Accounts
```

```
ACTIVE: *  
ACCOUNT: student_00197d58f785@qwiklabs.net  
To set the active account, run:  
  $ gcloud config set account ACCOUNT'  
student_00197d58f785$cloudshell:~ (qwiklabs-gcp-02-d24097b1da83)$ [ ]
```

10:59 PM

Google Cloud | Search (/) for resources, docs, products, and more | Search

Welcome

You're working in `qwiklabs-gcp-02-d24097b1da83`

Project number: 271108793083 | Project ID: `qwiklabs-gcp-02-d24097b1da83`

Dashboard | Recommendations

Create a VM | Run a query in BigQuery | Create a GKE cluster | Create a storage bucket

Privacy Policy | Terms of Service

CLOUD SHELL Terminal (qwiklabs-gcp-02-d24097b1da83) + +

```
Welcome to Cloud Shell! Type "help" to get started.  
Your Cloud Platform project in this session is set to qwiklabs-gcp-02-d24097b1da83.  
Use gcloud config set project [PROJECT_ID] to change to a different project.  
student_00197d58f785$cloudshell:~ (qwiklabs-gcp-02-d24097b1da83)$ gcloud auth list  
Credentialed Accounts
```

```
ACTIVE: *  
ACCOUNT: student_00197d58f785@qwiklabs.net  
To set the active account, run:  
  $ gcloud config set account ACCOUNT'  
student_00197d58f785$cloudshell:~ (qwiklabs-gcp-02-d24097b1da83)$ gcloud config list project  
[none]  
project = qwiklabs-gcp-02-d24097b1da83  
Your active configuration is: [cloudshell-14873]  
student_00197d58f785$cloudshell:~ (qwiklabs-gcp-02-d24097b1da83)$ [ ]
```

10:59 PM

Google Cloud | qwiklabs-gcp-02-d24097b1da83 | Search (/) for resources, docs, products, and more | Search

Welcome

You're working in `qwiklabs-gcp-02-d24097b1da83`

Project number: 271108793083 | Project ID: `qwiklabs-gcp-02-d24097b1da83`

[Dashboard](#) [Recommendations](#)

[Create a VM](#) [Run a query in BigQuery](#) [Create a GKE cluster](#) [Create a storage bucket](#)

Privacy Policy · Terms of Service

CLOUD SHELL Terminal (qwiklabs-gcp-02-d24097b1da83) X + = Open Editor

```
Welcome to Cloud Shell! Type "help" to get started.
Your Cloud Platform project in this session is set to use qwiklabs-gcp-02-d24097b1da83.
Use gcloud config set project [PROJECT_ID] to change to a different project.
student_00_00197d5f788@cloudshell:~ (qwiklabs-gcp-02-d24097b1da83)$ gcloud auth list
Credentialed Accounts

ACTIVE: *
ACCOUNT: student_00_00197d5f788@qwiklabs.net

To set the active account, run:
  $ gcloud config set account ACCOUNT

student_00_00197d5f788@cloudshell:~ (qwiklabs-gcp-02-d24097b1da83)$ gcloud config list project
[core]
project = qwiklabs-gcp-02-d24097b1da83

Your active configuration is: [cloudshell-1487]
student_00_00197d5f788@cloudshell:~ (qwiklabs-gcp-02-d24097b1da83)$ git clone --depth=1 https://github.com/GoogleCloudPlatform/training-data-analyst
cloning into 'training-data-analyst'...
remote: Enumerating objects: 1764, done.
remote: Counting objects: 100% (764/764), done.
remote: Compressing objects: 100% (764/764), done.
remote: Writing objects: 100% (2698/2698), done.
remote: Compressing objects: 52% (1349/2576)

11:00 PM
```

Google Cloud | qwiklabs-gcp-02-d24097b1da83 | Search (/) for resources, docs, products, and more | Search

Welcome

You're working in `qwiklabs-gcp-02-d24097b1da83`

Project number: 271108793083 | Project ID: `qwiklabs-gcp-02-d24097b1da83`

[Dashboard](#) [Recommendations](#)

[Create a VM](#) [Run a query in BigQuery](#) [Create a GKE cluster](#) [Create a storage bucket](#)

Privacy Policy · Terms of Service

CLOUD SHELL Terminal (qwiklabs-gcp-02-d24097b1da83) X + = Open Editor

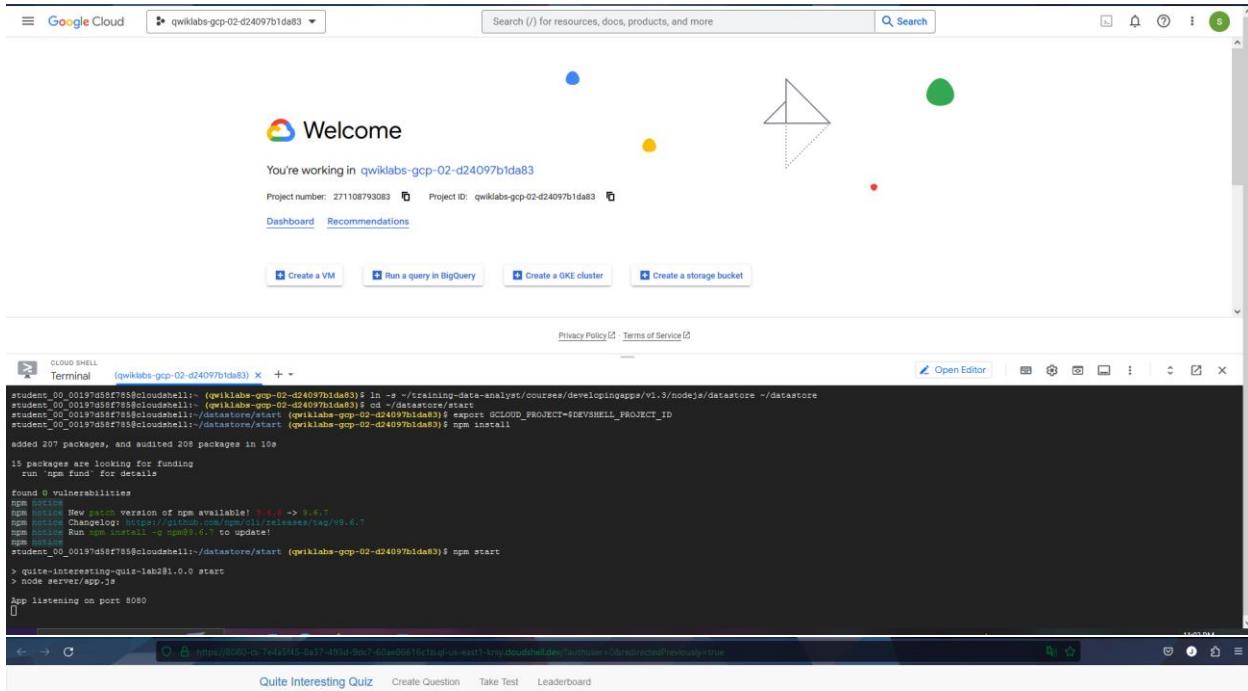
```
ACCOUNT: student_00_00197d5f788@qwiklabs.net

To set the active account, run:
  $ gcloud config set account ACCOUNT

student_00_00197d5f788@cloudshell:~ (qwiklabs-gcp-02-d24097b1da83)$ gcloud config list project
[core]
project = qwiklabs-gcp-02-d24097b1da83

Your active configuration is: [cloudshell-1487]
student_00_00197d5f788@cloudshell:~ (qwiklabs-gcp-02-d24097b1da83)$ git clone --depth=1 https://github.com/GoogleCloudPlatform/training-data-analyst
Cloning into 'training-data-analyst'...
remote: Enumerating objects: 1764, done.
remote: Counting objects: 100% (764/764), done.
remote: Compressing objects: 100% (764/764), done.
remote: Writing objects: 100% (5176/5176), done.
remote: Compressing objects: 100% (5176/5176), done.
remote: Writing objects: 100% (5176/5176), done.
remote: Total 1764 (delta 1516), pack-reused 0
Receiving objects: 100% (7647/7647), 530.68 MiB / 51.94 MiB/s, done.
Resolving deltas: 100% (2123/2123), done.
remote: Total 1764 (delta 1516), pack-reused 0
student_00_00197d5f788@cloudshell:~ (qwiklabs-gcp-02-d24097b1da83)$ ln -s ~/training-data-analyst/courses/developingapps/v1.3/nodejs/datastore ~/datastore
student_00_00197d5f788@cloudshell:~ (qwiklabs-gcp-02-d24097b1da83)$ cd ~/datastore/start
student_00_00197d5f788@cloudshell:~/datastore/start (qwiklabs-gcp-02-d24097b1da83)$ export GCLLOUD_PROJECT=qwiklabs_gcp-02-d24097b1da83
student_00_00197d5f788@cloudshell:~/datastore/start (qwiklabs-gcp-02-d24097b1da83)$ [
```

11:01 PM



## 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](#)

The screenshot displays two separate sessions of the Google Cloud Shell Editor, each showing a file editor and a terminal window.

**Left Session (app.js):**

- File Explorer:** Shows the project structure: `STUDENT_00_00197058F7B5`, `datastore`, `end`, `start`, `bin`, `node_modules`, `server` (containing `api`, `gcp`, `public`, `web-app`), and `training-data-analyst`.
- Code Editor:** Displays the `app.js` file content:

```
datastore > start > server > app.js > ...
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 'use strict';
15
16 const path = require('path');
17 const express = require('express');
18 const config = require('./config');
19
20 const app = express();
21
22 // Static files
23 app.use(express.static('server/public/'));
```
- Terminal:** Shows the command `master` and other status indicators.

**Right Session (questions.js):**

- File Explorer:** Shows the same project structure as the left session.
- Code Editor:** Displays the `questions.js` file content:

```
datastore > start > server > web-app > questions.js > ...
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 'use strict';
15
16 const express = require('express');
17 const bodyParser = require('body-parser');
18
19 const model = require('../gcp/datastore');
20
21 const router = express.Router();
22
23 // Automatically parse request body as form data
```
- Terminal:** Shows the command `master` and other status indicators.

**Common UI Elements:**

- Search Bar:** Located at the top center, with the placeholder "Search (/) for resources, docs, products, and more".
- Search Button:** A magnifying glass icon next to the search bar.
- Open Terminal:** A button in the top right corner.
- Notification Bar:** At the bottom of each editor, it shows a dependency update message: "Dependency Analytics has been updated to v0.3.5 — check out what's new!" with buttons for "README" and "Release Notes".
- Terminal Status Bar:** Shows "Ln 1, Col 1 LF UTF-8 Spaces 4 JavaScript" and the current time "11:54 PM".

Google Cloud | qwiklabs-gcp-02-d24097b1da83 | Search (/) for resources, docs, products, and more | Search

CLOUD SHELL Editor

**EXPLORER**

- > OPEN EDITORS
- > STUDENT\_00\_00197d58f785
- > datastore
- > bonus
- > end
- > start
- > bin
- > node\_modules
- > server
  - > api
  - > gcp
  - > public
  - > web-app
    - > views
      - > questions
        - > add.pug
        - > list.pug
        - > base.pug
        - > home.pug
        - > questions.js
        - > app.js
        - > config.js
        - > package-lock.json
        - > package.json
- > training-data-analyst
- > README-cloudshell.txt

**File Edit Selection View Go Run Terminal Help**

**add.pug**

```

datastore > start > server > views > questions > add.pug
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 extends ../base.pug
15
16 block content
17   h3 #{action} question
18   form(method="POST")
19     .form-group
20       label(for="author") Author
21       input.form-control(type="text", name="author", id="author", value=question.author)
22     .form-group
23       label(for="quiz") Quiz

```

**Problems** **Output** C%23

Required assets to build and debug are missing from 'STUDENT\_00\_00197d58f785'. Add them?

Don't Ask Again Not Now Yes

Dependency Analytics has been updated to v0.3.5 — check out what's new!

README Release Notes

Ln 1, Col 1 LF UTF-8 Spaces: 4 Pug 2 11:05 PM

---

Google Cloud | qwiklabs-gcp-02-d24097b1da83 | Search (/) for resources, docs, products, and more | Search

CLOUD SHELL Editor

**EXPLORER**

- > OPEN EDITORS
- > STUDENT\_00\_00197d58f785
- > datastore
- > bonus
- > end
- > start
- > bin
- > node\_modules
- > server
  - > api
    - > index.js
- > bin
- > node\_modules
- > server
- > views
  - > questions
    - > add.pug
    - > list.pug
    - > base.pug
    - > home.pug
    - > questions.js
    - > app.js
    - > config.js
    - > package-lock.json
    - > package.json
- > training-data-analyst
- > README-cloudshell.txt

**File Edit Selection View Go Run Terminal Help**

**index.js**

```

datastore > start > server > api > index.js
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 'use strict';
15
16 const express = require('express');
17 const bodyParser = require('body-parser');
18
19 const model = require('../gcp/datastore');
20
21 const router = express.Router();
22
23 // Automatically parse request body as JSON

```

**Problems** **Output** C%23

Required assets to build and debug are missing from 'STUDENT\_00\_00197d58f785'. Add them?

Don't Ask Again Not Now Yes

Dependency Analytics has been updated to v0.3.5 — check out what's new!

README Release Notes

Ln 1, Col 1 LF UTF-8 Spaces: 4 JavaScript 2 11:06 PM

The screenshot shows the Google Cloud Platform interface with the following details:

- Cloud Shell:** The terminal window displays the command `gcloud config set project [PROJECT\_ID]` followed by a list of accounts and their status.
- Explorer:** The sidebar shows the project structure, including the `datastore.js` file which is currently selected.
- Output:** The bottom pane shows the execution of the command `npm start` and the creation of an App Engine application named `quiz-lab281.0`.
- Terminal:** The terminal window also shows the creation of the App Engine application and the deployment command `gcloud app deploy`.

Google Cloud | qwiklabs-gcp-02-d24097b1da83 | Search (/) for resources, docs, products, and more | Search | Open Terminal | Editor | Help

**File Explorer**

- > OPEN EDITORS
- > STUDENT\_00\_00197d5f785
- > database
  - bonus
  - end
  - start
  - bin
  - node\_modules
  - server
  - api
  - index.js
  - gcp
  - datastore.js
  - public
  - web-app
  - views
  - questions
  - add.pug
  - list.pug
  - base.pug
  - home.pug
  - questions.js
  - app.js
  - config.js
  - package-lock.json
  - package.json
- > training-data-analyst
- README.cloudshell.txt

**datastore.js**

```

datastore > start > server > gcp > datastore.js > ...
80 // TODO: Declare the entity key,
81 // which is a datastore generated id
82 const key = ds.key(kind);
83
84 // TODO: Declare the entity object, with the key and data
85 const entity = {
86   key,
87   // The entity's members are represented in a data property.
88   // This is an array where each element represents one
89   // member in the entity. Each element is an object with a
90   // name and a value.
91   data: [
92     { name: 'quiz', value: quiz },
93     { name: 'author', value: author },
94     { name: 'title', value: title },
95     { name: 'answers', value: answer1 },
96     { name: 'answer2', value: answer2 },
97     { name: 'answer3', value: answer3 },
98     { name: 'answer4', value: answer4 },
99     { name: 'correctAnswer', value: correctAnswer },
100   ],
101 }
102
103 // END TODO
104
105 // This is an array where each element represents one
106 // member in the entity. Each element is an object with a
107 // name and a value.
108
109 // END TODO
110
111 // END TODO
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Google Cloud | qwiklabs-gcp-02-d24097b1da83 | Search (/) for resources, docs, products, and more | Open Editor

```
CLOUD SHELL Terminal (qwiklabs-gcp-02-d24097b1da83) + -
```

```
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-d24097b1da83] and region [us-central]...done.
Default port is 8080. Go to http://127.0.0.1:8080 to deploy your first app.
student_00_00197d58f785$cloudshell:~/datastore/start (qwiklabs-gcp-02-d24097b1da83)$ npm start
> quite-interesting-quiz-lab2@1.0.0 start
> node server/app.js

/home/student_00_00197d58f785/training-data-analyst/courses/developingapps/v1.3/nodejs/datastore/start/server/gcp/datastore.js:191
  list
  ^
ReferenceError: list is not defined
  at Object.<anonymous> (/home/student_00_00197d58f785/training-data-analyst/courses/developingapps/v1.3/nodejs/datastore/start/server/gcp/datastore.js:191:3)
  at Module._compile (internal/modules/cjs/loader:1198:14)
  at Module._extensions..js (internal/modules/cjs/loader:1218:10)
  at Module.load (internal/modules/cjs/loader:1071:32)
  at Module._load (internal/modules/cjs/loader:1061:12)
  at Function.Module.require (internal/modules/cjs/loader:1061:13)
  at require (internal/modules/cjs/loader:1051:13)
  at Object.<anonymous> (/home/student_00_00197d58f785/training-data-analyst/courses/developingapps/v1.3/nodejs/datastore/start/server/web-app/questions.js:19:15)
  at Module._compile (internal/modules/cjs/loader:1198:14)
  at Module._extensions..js (internal/modules/cjs/loader:1218:10)

Node.js v18.12.1
student_00_00197d58f785$cloudshell:~/datastore/start (qwiklabs-gcp-02-d24097b1da83)$ npm start
> quite-interesting-quiz-lab2@1.0.0 start
> node server/app.js

/home/student_00_00197d58f785/training-data-analyst/courses/developingapps/v1.3/nodejs/datastore/start/server/gcp/datastore.js:73
  list
  ^
ReferenceError: list is not defined
  at Object.<anonymous> (/home/student_00_00197d58f785/training-data-analyst/courses/developingapps/v1.3/nodejs/datastore/start/server/gcp/datastore.js:73:3)
  at Module._compile (internal/modules/cjs/loader:1198:14)
  at Module._extensions..js (internal/modules/cjs/loader:1218:10)
  at Module.load (internal/modules/cjs/loader:1071:32)
  at Module._load (internal/modules/cjs/loader:1061:12)
  at Function.Module.require (internal/modules/cjs/loader:1061:13)
  at require (internal/modules/cjs/loader:1051:13)
  at Object.<anonymous> (/home/student_00_00197d58f785/training-data-analyst/courses/developingapps/v1.3/nodejs/datastore/start/server/web-app/questions.js:19:15)
  at Module._compile (internal/modules/cjs/loader:1198:14)
  at Module._extensions..js (internal/modules/cjs/loader:1218:10)

Node.js v18.12.1
student_00_00197d58f785$cloudshell:~/datastore/start (qwiklabs-gcp-02-d24097b1da83)$ npm start
> quite-interesting-quiz-lab2@1.0.0 start
> node server/app.js
[]
```

## 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](#)

A screenshot of the Google Cloud Platform interface. On the left, the "Datastore" section is open, showing entities for a "Question" kind. One entity is selected with the ID "id=5634161670881280", which has fields: answer1="amazon", answer2="google", answer3="IBM", answer4="microsoft", author="julio", correctAnswer="2", quiz="gcp", and title="Which company owns GCP?". In the center, the "Cloud Firestore in Datastore mode" interface shows a query results table with the same data. On the right, a "Cloud Shell" terminal window is open, showing a Node.js application running. The terminal output includes npm package updates, a gcloud app create command, and an App Engine deployment process.

App Dev - Storing Application Data in Cloud Datastore: Node.js

End Lab 01:49:43

Now: Review

Choose the two correct options to create a key in Cloud Datastore.

1. You can specify the kind and let Cloud Datastore generate a unique numeric ID.
2. You can specify the kind and a unique string ID.
3. You can ask Cloud Datastore to leave the key as a null value.
4. You can create an entity without a key.

Which method enables you to store entities in Cloud Datastore?

1. Persist
2. Save

Click *Check my progress* to verify the objective.

Create an App Engine application and add entities to Cloud Datastore

Check my progress

Overview  
Objectives  
Setup and requirements  
Task 1. Previewing the case study application  
Task 2. Examining the case study application code  
Task 3. Adding entities to Cloud Datastore  
Task 4. Bonus: querying Cloud Datastore  
End your lab

0/5

Lab Overview

A Lab App Dev - Storing Application Data in Cloud Datastore: Node.js

A Lab App Dev - Storing Application Data in Cloud Datastore: Java

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

✓ Quiz Practice Quiz: Best Practices for Using Datastore

✓ Quiz Final Quiz: Best Practices for Using Datastore

Video Module Review

Best Practices for Using Cloud Storage

Wrap up

Course Resources

01:49:43

#### Task 4. Bonus: querying Cloud Datastore

In this section, you write code to retrieve entity data from Cloud Datastore.

App Dev - Storing Application Data in Cloud Datastore: Node.js

End Lab 01:49:13

1. Save the ...`gcp/datastore.js` file, and then return to the Cloud Shell command.

2. Stop the application by pressing **Ctrl+C**.

3. Start the application.

4. In Cloud Shell, click **Web preview > Preview on port 8080** to preview the quiz application.

5. Replace the querystring at the end of the application's URL with `/api/quizzes/gcp`.

Note: The URL will be in the form:  
`https://8080-###-##.ql-###-.cloudshell.dev/api/quizzes/gcp`

You should see that JSON data has been returned to the client corresponding to the question you added in the web application!

6. Return to the application home page, and click **Take Test**.

7. Click **GCP**.

Note: You should see that the quiz question has been formatted inside the client-side web application!

You can find the solution to the bonus in the lab's **bonus** folder.

Overview  
Objectives  
Setup and requirements  
Task 1. Previewing the case study application  
Task 2. Examining the case study application code  
Task 3. Adding entities to Cloud Datastore  
Task 4. Bonus: querying Cloud Datastore  
End your lab

5/5

Lab Overview

A Lab App Dev - Storing Application Data in Cloud Datastore: Node.js

A Lab App Dev - Storing Application Data in Cloud Datastore: Java

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

✓ Quiz Practice Quiz: Best Practices for Using Datastore

✓ Quiz Final Quiz: Best Practices for Using Datastore

Video Module Review

Best Practices for Using Cloud Storage

Wrap up

Course Resources

01:49:13

```
Welcome to Cloud Shell! Type "help" to get started.  
Your Cloud Platform project in this session has been set to gcp1labs-gcp-00-603dec052d733.  
You can change this project by running "gcloud config set project PROJECT_ID".  
student_00_efdf2fb234a9@cloudshell: ~ (gcp1labs-gcp-00-603dec052d733)$ gcloud auth list  
Credentialed Accounts:  
  
ACTIVE: *  
ACCOUNT: student-00-efdf2fb234a9@gcp1labs.net  
  
To set the active account, run:  
$ gcloud config set account 'ACCOUNT'  
  
student_00_efdf2fb234a9@cloudshell: ~ (gcp1labs-gcp-00-603dec052d733)$ gcloud config list project  
[core]  
project = gcp1labs-gcp-00-603dec052d733  
  
Your active configuration is: [cloudshell-32036]  
student_00_efdf2fb234a9@cloudshell: ~ (gcp1labs-gcp-00-603dec052d733)$ git clone --depth=1 https://github.com/GoogleCloudPlatform/training-data-analyst  
Cloning into 'training-data-analyst'...  
remote: Counting objects: 100K (7647/7647), done.  
remote: Compressing objects: 100K (5176/5176), done.  
remote: Writing objects: 100K (7647/7647), done: 100% (7647/7647) 151.6K B/s  
Receiving objects: 100K (7647/7647), 330.38 MiB | 20.00 MiB/s, done.  
Resolving deltas: 100K (2123/2123), done.  
Updating files: 100K (22840/22840), done.  
student_00_efdf2fb234a9@cloudshell: ~ (gcp1labs-gcp-00-603dec052d733)$ ls -1 ~/training-data-analyst/courses/developingapps/v1.3/java/datastore ~/datastore  
student_00_efdf2fb234a9@cloudshell: ~ (gcp1labs-gcp-00-603dec052d733)$ cd ~/datastore/start  
student_00_efdf2fb234a9@cloudshell: ~/datastore/start (gcp1labs-gcp-00-603dec052d733)$ export OLCLOUD_PROJECT=$DEVSHELL_PROJECT_ID  
[INFO] Scanning for projects  
Downloading from central: https://repo.maven.apache.org/maven2/org/springframework/boot/spring-boot-starter-parent/2.5.6/spring-boot-starter-parent-2.5.6.pom  
downloaded from central: https://repo.maven.apache.org/maven2/org/springframework/boot/spring-boot-starter-parent/2.5.6/spring-boot-starter-parent-2.5.6.pom (8.6 kB at 11 kB/s)  
[
```



## 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

A screenshot of a Google Cloud Shell terminal window titled "Terminal (qwiklabs-gcp-00-603dcc52d733)". The terminal displays several lines of log output from a Spring Boot application. The logs show the application starting up, changing its availability state from "LIVENESS" to "CORRECT", and then transitioning to "ACCEPTING\_TRAFFIC". It also shows the application being shutdown and stopping beans. At the bottom of the terminal, there is a command history showing the execution of "gcloud app create" to deploy the application to Google App Engine.





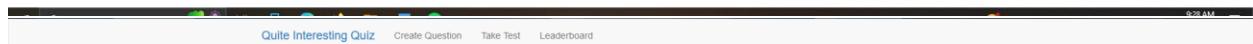
## Welcome to the Quite Interesting Quiz

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

Create Question

Take Test

Leaderboard



### Add question

Author

julio

Quiz

Google Cloud Platform

Title

Which company owns GCP?

Answer 1

amazon

Answer 2

google

Answer 3

IBM

Answer 4

microsoft

Save



Google Cloud | Search (/) for resources, docs, products, and more | Open Terminal

CLOUD SHELL Editor

File Edit Selection View Go Run Terminal Help

OPEN EDITORS > QuestionService.java

src/main/java/com/google/training/services/gcp/datastore QuestionService.java

```

112 // This class has a static newEntityQueryBuilder()
113 // method that allows you to specify the kind(s) of
114 // entities to be retrieved.
115 // This query can be customized to filter the Question
116 // entities for a quiz.
117 // TODO: Create the query
118 // The Query class has a static newEntityQueryBuilder()
119 // method that allows you to specify the kind(s) of
120 // entities to be retrieved.
121 // This query can be customized to filter the Question
122 // entities for a quiz.
123 Query<Entity> query = Query.newEntityQueryBuilder()
124     .setKind(ENTITY_KIND)
125     .setFilter(StructuredQuery.PropertyFilter.eq(
126         Question.QUIZ, quiz))
127     .build();
128
129 // END TODO
130
131 // TODO: Execute the query
132 // The datastore.run(query) method returns an iterator
133 // for entities
134 Iterator<Entity> entities = datastore.run(query);
135
136 // END TODO
137
138 // TODO: Return the transformed results
139 // Use the buildQuestions(entities) method to convert
140 // from Datastore entities to domain objects
141 return buildQuestions(entities);
142
143

```

Problems Output

Dependency Analytics has been updated to v0.3.5 — check out what's new!

README Release Notes

Cloud Shell Terminal (qwiklabs-gcp-00-619a383c3154) +

java.base/jdk.internal.reflect.NativeMethodAccessorImpl.invoke(Native Method)

at java.base/jdk.internal.reflect.DelegatingMethodAccessorImpl.invoke(DelegatingMethodAccessorImpl.java:43)

at java.base/java.lang.reflect.Method.invoke(Method.java:164)

at org.springframework.web.method.support.InvocableHandlerMethod.doInvoke(InvocableHandlerMethod.java:205)

at org.springframework.web.method.support.InvocableHandlerMethod.invokeForHttpMethod(InvocableHandlerMethod.java:150)

at org.springframework.web.servlet.mvc.method.annotation.ServicetInvokerHandlerMethod.invokeForHandle(ServicetInvokerHandlerMethod.java:117)

at org.springframework.web.servlet.mvc.method.annotation.RequestMappingHandlerAdapter.invokeHandlerMethod(RequestMappingHandlerAdapter.java:895)

at org.springframework.web.servlet.mvc.method.annotation.RequestMappingHandlerAdapter.handleInternal(RequestMappingHandlerAdapter.java:805)

at org.springframework.web.servlet.mvc.method.annotation.RequestMappingHandlerAdapter.handleInternal(RequestMappingHandlerAdapter.java:787)

at org.springframework.web.servlet.DispatcherServlet.doDispatch(DispatcherServlet.java:1067)

at org.springframework.web.servlet.DispatcherServlet.doService(DispatcherServlet.java:963)

at org.springframework.web.servlet.FrameworkServlet.processEvent(FrameworkServlet.java:906)

at org.springframework.web.servlet.FrameworkServlet.doGet(FrameworkServlet.java:895)

at javax.servlet.http.HttpServlet.service(HttpServlet.java:655)

at org.springframework.web.servlet.FrameworkServlet.service(FrameworkServlet.java:885)

at javax.servlet.http.HttpServlet.service(HttpServlet.java:764)

at org.apache.catalina.core.ApplicationFilterChain.internalDoFilter(ApplicationFilterChain.java:227)

at org.apache.catalina.core.ApplicationFilterChain.doFilter(ApplicationFilterChain.java:162)

at org.apache.tomcat.websocket.server.WsFilter.doFilter(WsFilter.java:53)

at org.apache.catalina.core.ApplicationFilterChain.internalDoFilter(ApplicationFilterChain.java:189)

at org.apache.catalina.core.ApplicationFilterChain.doFilter(ApplicationFilterChain.java:141)

at org.apache.catalina.core.StandardWrapperValve.invoke(StandardWrapperValve.java:100)

at org.apache.catalina.core.StandardContextValve.invoke(OncePerRequestFilter.java:119)

at org.apache.catalina.core.ApplicationFilterChain.internalDoFilter(ApplicationFilterChain.java:189)

at org.apache.catalina.core.ApplicationFilterChain.doFilter(ApplicationFilterChain.java:162)

at org.springframework.web.filter.FormContentFilter.doFilterInternal(FormContentFilter.java:93)

at org.springframework.web.filter.OncePerRequestFilter.doFilter(OncePerRequestFilter.java:119)

at org.apache.catalina.core.ApplicationFilterChain.internalDoFilter(ApplicationFilterChain.java:189)

at org.apache.catalina.core.ApplicationFilterChain.doFilter(ApplicationFilterChain.java:142)

at org.springframework.boot.actuate.metrics.web.servlet.WebMvcMetricsFilter.doFilterInternal(WebMvcMetricsFilter.java:96)

at org.springframework.boot.actuate.metrics.web.servlet.WebMvcMetricsFilter.doFilterInternal(WebMvcMetricsFilter.java:90)

at org.springframework.web.filter.DelegatingFilterProxy.invokeDelegate(DelegatingFilterProxy.java:188)

at org.springframework.web.filter.DelegatingFilterProxy.doFilter(DelegatingFilterProxy.java:162)

at org.springframework.web.filter.CharacterEncodingFilter.doFilterInternal(CharacterEncodingFilter.java:201)

at org.springframework.web.filter.CharacterEncodingFilter.doFilter(CharacterEncodingFilter.java:113)

at org.apache.catalina.core.ApplicationFilterChain.internalDoFilter(ApplicationFilterChain.java:189)

at org.apache.catalina.core.ApplicationFilterChain.doFilter(ApplicationFilterChain.java:162)

at org.apache.catalina.core.StandardContextValve.invoke(StandardContextValve.java:97)

at org.apache.catalina.authenticator.AuthenticatorBase.invoke(AuthenticatorBase.java:540)

at org.apache.catalina.core.StandardHostValve.invoke(StandardHostValve.java:137)

at org.apache.catalina.valves.ErrorReportValve.invoke(ErrorReportValve.java:92)

at org.apache.catalina.core.StandardEngineValve.invoke(StandardEngineValve.java:78)

at org.apache.catalina.core.StandardEngineValve.invoke(StandardEngineValve.java:77)

at org.apache.catalina.connector.CoyoteAdapter.service(CoyoteAdapter.java:323)

at org.apache.coyote.ajp.AjpProcessor.service(AjpProcessor.java:192)

at org.apache.coyote.AbstractProcessorLight.process(AbstractProcessorLight.java:65)

at org.apache.coyote.AbstractProtocol\$ConnectionHandler.process(AbstractProtocol.java:895)

at org.apache.tomcat.util.net.NioEndpoint\$SocketProcessorBase.run(SocketProcessorBase.java:49)

at org.apache.tomcat.util.threads.ThreadPoolExecutor.runWorker(ThreadPoolExecutor.java:1691)

at org.apache.tomcat.util.threads.WorkerThread.run(WorkerThread.java:93)

at org.apache.tomcat.util.threads.TaskThread\$WrappingRunnable.run(TaskThread.java:61)

at java.lang.Thread.run(Thread.java:828)

```
  Google Cloud [qwiklabs-gcp-01-f40a1806829d] Search (/) for resources, docs, products, and more Q Search Open Editor
  CLOUD SHELL Terminal [qwiklabs-gcp-01-f40a1806829d] + x
  Welcome to Cloud Shell! Type "help" to get started.
  You are currently in project [PROJECT_ID], which is qwiklabs-gcp-01-f40a1806829d.
  Use "gcloud config set project [PROJECT_ID]" to change to a different project.
  student_00_efd2fb234a59@cloudshell: ~ (qwiklabs-gcp-01-f40a1806829d)$ gcloud auth list
  Credentialed Accounts

  ACTIVE: *
  ACCOUNT: student-00-efd2fb234a59@qwiklabs.net

  To set the active account, run:
    $ gcloud config set account 'ACCOUNT'

  student_00_efd2fb234a59@cloudshell: ~ (qwiklabs-gcp-01-f40a1806829d)$ gcloud config list project
  [core]
  project = qwiklabs-gcp-01-f40a1806829d

  Your active configuration is: [cloudshell-28534]
  student_00_efd2fb234a59@cloudshell: ~ (qwiklabs-gcp-01-f40a1806829d)$ virtualenv -p python3 vrenv
  created virtual environment C:\Python39\9.2.final.0-64 in 127ms
  creator C:\Python39\9.2.final.0-64\Scripts\python.exe --version
  clear=False, no_vcs_ignore=False, global=False)
  added package: pip==23.1.2, setuptools==61.7.2, wheel==0.46.0
  activators HashActivator, CodelabActivator, FishActivator, HushActivator, PowerShellActivator, PythonActivator
  vrenv\Scripts\00_efd2fb234a59@cloudshell: ~ (qwiklabs-gcp-01-f40a1806829d)$ source vrenv\bin\activate
  vrenv\Scripts\00_efd2fb234a59@cloudshell: ~ (qwiklabs-gcp-01-f40a1806829d)$ git clone https://github.com/GoogleCloudPlatform/training-data-analyst
  Cloning into 'training-data-analyst'...
  remote: Enumerating objects: 1000 (363/363), done.
  remote: Compressing objects: 1000 (363/363), done.
  received: [progress]: 1000/1000 (4006/4006), pack-reused 62351
  Resolving deltas: 100% (4006/4006), done.
  Updating files: 100% (12840/12840), done.
  vrenv\Scripts\00_efd2fb234a59@cloudshell: ~ (qwiklabs-gcp-01-f40a1806829d)$ ln -s ./training-data-analyst/courses/developingepps/v1.3/python/datasource ~/datasource
  [vrenv] student_00_efd2fb234a59@cloudshell: ~ (qwiklabs-gcp-01-f40a1806829d)$ cd ./datasource/start
  [vrenv] student_00_efd2fb234a59@cloudshell: ~ (qwiklabs-gcp-01-f40a1806829d)$ export OZONE_PROJECT_ID=DEVSHHELL_PROJECT_ID
  [vrenv] student_00_efd2fb234a59@cloudshell: ~ (qwiklabs-gcp-01-f40a1806829d)$ python3 -m pip install -r requirements.txt
  Collecting flask==2.0.1 (from -r requirements.txt (line 1))
    Downloading flask-2.0.1-py3-none-any.whl (96 KB)
  Collecting google-cloud==0.34.0 (from -r requirements.txt (line 2))
    Downloading google_cloud-0.34.0-py3-none-any.whl (1.8 kB)
  Collecting google-cloud-storage==2.3.2 (from -r requirements.txt (line 3))
    Downloading google-cloud-storage-2.3.2-py3-none-any.whl (29 kB)
  Collecting google-cloud-core==2.1.4 (from -r requirements.txt (line 4))
    Downloading google_cloud_core-2.1.4-py3-none-any.whl (178 kB)
  [vrenv] student_00_efd2fb234a59@cloudshell: ~ (qwiklabs-gcp-01-f40a1806829d)$
```



## 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



## Quite Interesting Quiz

Sample question



A



B



C



D

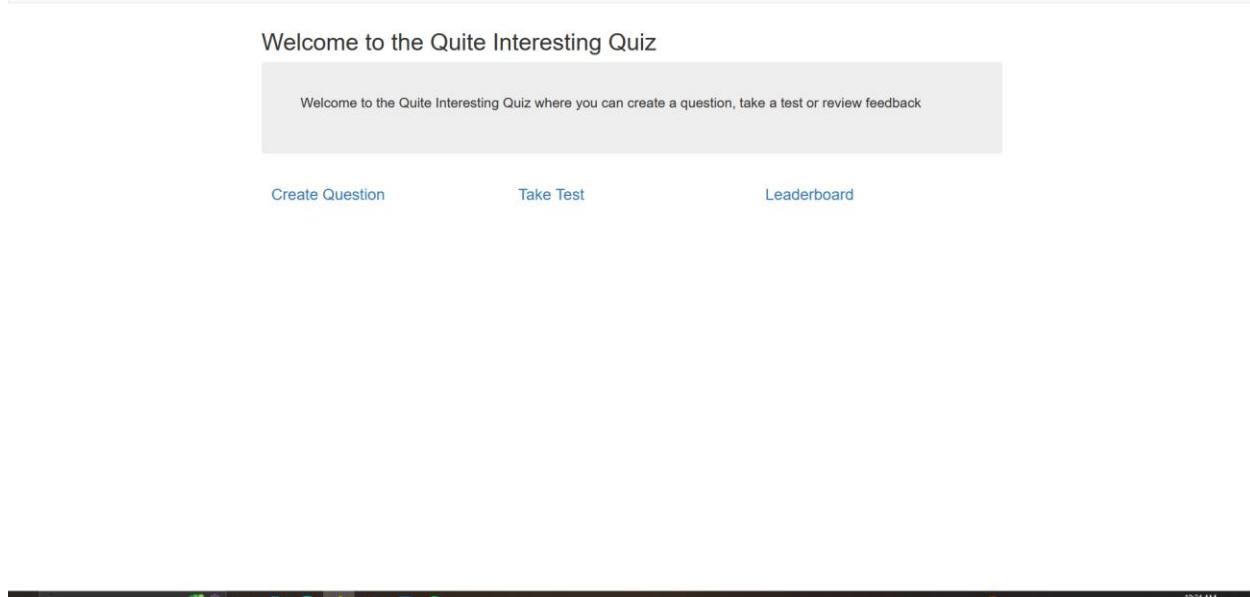
Submit Answer





```
Google Cloud Terminal (qwiklabs-gcp-01-5a2412257eb) x + - Search (/) for resources, docs, products, and more Open Editor CLOUD SHELL Terminal (qwiklabs-gcp-01-5a2412257eb) x + - [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-01-5a2412257eb] and region [us-central]...done.
[INFO] Starting local dev server at http://localhost:8080
[vnvenv] student_00_b10814#0037#cloudshell:1 - [Cloud Shell] - [Python 3.7] - [qwiklabs-gcp-01-5a2412257eb] - [ipython]
Traceback (most recent call last):
File "/home/student_00_b10814#0037/training-data-analyst/courses/developingapps/v1.3/python/datastore/start/run_server.py", line 18, in <module>
    from quiz import APP
File "/home/student_00_b10814#0037/training-data-analyst/courses/developingapps/v1.3/python/datastore/start/run_server.py", line 23, in <module>
    from quiz.api.routes import api_blueprint
File "/home/student_00_b10814#0037/training-data-analyst/courses/developingapps/v1.3/python/datastore/start/run_server.py", line 15, in <module>
    from quiz.api import api
File "/home/student_00_b10814#0037/training-data-analyst/courses/developingapps/v1.3/python/datastore/start/run_server.py", line 24, in <module>
    from quiz import api
File "/home/student_00_b10814#0037/training-data-analyst/courses/developingapps/v1.3/python/datastore/start/run_server.py", line 63
    key = datastore_client.key('Question')
IndentationError: expect an indented block
[vnvenv] student_00_b10814#0037#cloudshell:1 - [Cloud Shell] - [Python 3.7] - [qwiklabs-gcp-01-5a2412257eb] - [ipython]
Traceback (most recent call last):
File "/home/student_00_b10814#0037/training-data-analyst/courses/developingapps/v1.3/python/datastore/start/run_server.py", line 18, in <module>
    from quiz import APP
File "/home/student_00_b10814#0037/training-data-analyst/courses/developingapps/v1.3/python/datastore/start/run_server.py", line 23, in <module>
    from quiz.api.routes import api_blueprint
File "/home/student_00_b10814#0037/training-data-analyst/courses/developingapps/v1.3/python/datastore/start/run_server.py", line 15, in <module>
    from quiz.api import api
File "/home/student_00_b10814#0037/training-data-analyst/courses/developingapps/v1.3/python/datastore/start/run_server.py", line 24, in <module>
    from quiz import API
File "/home/student_00_b10814#0037/training-data-analyst/courses/developingapps/v1.3/python/datastore/start/run_server.py", line 76
    File "/home/student_00_b10814#0037/training-data-analyst/courses/developingapps/v1.3/python/datastore/start/run_server.py", line 76
    IndentationError: unexpected indent
[vnvenv] student_00_b10814#0037#cloudshell:1 - [Cloud Shell] - [Python 3.7] - [qwiklabs-gcp-01-5a2412257eb] - [ipython]
Traceback (most recent call last):
File "/home/student_00_b10814#0037/training-data-analyst/courses/developingapps/v1.3/python/datastore/start/run_server.py", line 18, in <module>
    from quiz import APP
File "/home/student_00_b10814#0037/training-data-analyst/courses/developingapps/v1.3/python/datastore/start/run_server.py", line 23, in <module>
    from quiz.api.routes import api_blueprint
File "/home/student_00_b10814#0037/training-data-analyst/courses/developingapps/v1.3/python/datastore/start/run_server.py", line 15, in <module>
    from quiz.api import api
File "/home/student_00_b10814#0037/training-data-analyst/courses/developingapps/v1.3/python/datastore/start/run_server.py", line 76
    File "/home/student_00_b10814#0037/training-data-analyst/courses/developingapps/v1.3/python/datastore/start/run_server.py", line 76
    IndentationError: unexpected indent
[vnvenv] student_00_b10814#0037#cloudshell:1 - [Cloud Shell] - [Python 3.7] - [qwiklabs-gcp-01-5a2412257eb] - [ipython]
Traceback (most recent call last):
* Restarts with stat
* Debugger is active
* Debugger PIN: 109-887-849
[INFO] Stopping Flask app "quiz"
[INFO] Stopped Flask app "quiz"
[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
[INFO] Started reloader process
[INFO] Flask app "quiz" started.
```



### Add question

Author

Julio

Quiz

Google Cloud Platform

Title

Which company owns GCP?

Answer 1

amazon

Answer 2

google

Answer 3

IBM

Answer 4

microsoft

**Save**

Name/ID	answer1	answer2	answer3	answer4	author	correctAnswer	quiz	title
id=5634161670881280	amazon	google	IBM	microsoft	julio	2	gcp	Which company owns GCP?

```

File "/home/student_00_b1081440307f/training-data-analyst/courses/developingapps/v1.3/python/datastore/start/quiz/api.py", line 24, in <module>
    from quiz.gcp import datastore
File "/home/student_00_b1081440307f/training-data-analyst/courses/developingapps/v1.3/python/datastore/start/quiz/gcp/datastore.py", line 76
    if not self._client:
IndentationError: unexpected indent
[vxenv] student_00_b1081440307f$ cd cloudshell;/datastore/start (qwiklabs-gcp-01-5a2412257eeb)$ python3 run_server.py
[2023-05-25 16:24:40,499] INFO:root:Starting development server at http://127.0.0.1:8080
[2023-05-25 16:24:40,499] INFO:root:* Restarting with stat
[2023-05-25 16:24:40,499] INFO:root:  Debugger is active
[2023-05-25 16:24:40,499] INFO:root:  Debug mode on
[2023-05-25 16:24:40,499] INFO:root:WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
[2023-05-25 16:24:40,499] INFO:root:Running on http://127.0.0.1:8080
[2023-05-25 16:24:40,499] INFO:root:  Press Ctrl+C to quit
127.0.0.1 - [25/May/2023 16:24:40] "GET /authuser=0 HTTP/1.1" 200 -
127.0.0.1 - [25/May/2023 16:25:06] "GET /questions/add HTTP/1.1" 200 -
127.0.0.1 - [25/May/2023 16:25:49] "GET /questions HTTP/1.1" 303 -
127.0.0.1 - [25/May/2023 16:25:59] "GET / HTTP/1.1" 200 -

```

Google Cloud | https://console.cloud.google.com/bigtable/datastore/entities?&\_ga=2.19747257.1474125768.1653111111-1000000000.1653111111

Cloud Firestore in Datastore mode | Database location: nam5

**Datastore**

Entities CREATE ENTITY DELETE

Database Release Notes

QUERY BY KIND QUERY BY GQL

RUN CLEAR DOCUMENTATION

Query results

CLOUD SHELL Editor

File Edit Selection View Go Run Terminal Help

EXPLORER

- > OPEN EDITORS
- > STUDENT\_00\_B1001449837F
- └ datastore
  - └ bonus
  - └ end
  - └ start
  - └ quiz
    - > \_\_pycache\_\_
    - > api
    - > gcp
      - > \_\_pycache\_\_
      - └ \_\_init\_\_.py
      - └ datastore.py
    - > webapp
      - └ \_\_init\_\_.py
      - └ requirements.txt
      - └ run\_server.py
  - └ training-data-analyst
  - └ venv
  - └ README-cloudshell.txt

datastore.py x

```

datastore > start > quiz > gcp > datastore.py
43
44
45
46 """
47 Returns a list of question entities for a given quiz
48 - filter by quiz name, defaulting to gcp
49 - no paging
50 - add in the entity key as the id property
51 - if redact is true, remove the correctAnswer property from each entity
52 """
53 def list_entities(quiz='gcp', redact=True):
54     query = datastore_client.query(kind="Question")
55     query.add_filter("quiz", "=", quiz)
56     results = list(query.fetch())
57     for result in results:
58         result['id'] = result.key.id
59     if redact:
60         for result in results:
61             del result['correctAnswer']
62     return results
63 """
64 Create and persist and entity for each question
65 The Datastore key is the equivalent of a primary key in a relational database.
66 There are two main ways of writing a key:
67 1. Specify the kind, and let Datastore generate a unique numeric id
68 2. Specify the kind and a unique string id
69 """
70 def save_question(question):
71
72

```

We found a Python environment in this workspace. Do you want to select it to start up the features in the Python extension? Only accept if you trust this environment.

Yes No Learn more Do not show again

master\* ① ② ③ ④ Cloud Code Connect to Google Cloud

Quite Interesting Quiz GCP Places People

Hello app.dev.student@example.org Logout

## Quite Interesting Quiz

Which company owns GCP?

- amazon
- google
- IBM
- microsoft

Submit Answer

10:28 AM

Practice Quiz: Best Practices for Using Datastore

# Practice Quiz: Best Practices for Using Datastore

Your score: 66% Passing score: 66%

Congratulations! You passed this assessment.

**1.** Which one of the following statements about Cloud Datastore is accurate?

- Cloud Datastore supports analytics queries.
- Cloud Datastore supports complex joins with multiple inequality filters.
- Cloud Datastore supports atomic transactions.
- Cloud Datastore supports referential integrity.

Correct!

**2.** What best practices can you apply when creating a Cloud Datastore entity with a numeric key? Choose all that are correct (3 correct answers).

- Always create keys with string IDs.

Correct!

**3.** You receive the following error code from a Cloud Datastore request:  
INTERNAL. What action should you take?

- Retry only once.
- Retry the request until it succeeds.
- Retrying-expponential-backoff.
- Retry only if the problem is fixed.

Requests that return an INTERNAL error should not be retried more than once.

Final Quiz: Best Practices for Using Datastore

Your score: 100% Passing score: 50%

Congratulations! You passed this assessment.

Retake

1. Your expense report application allows users to submit multiple expenses in a single report. You want to add each expense as a separate entity in Cloud Datastore. How can you reduce latency when adding expenses to Cloud Datastore?

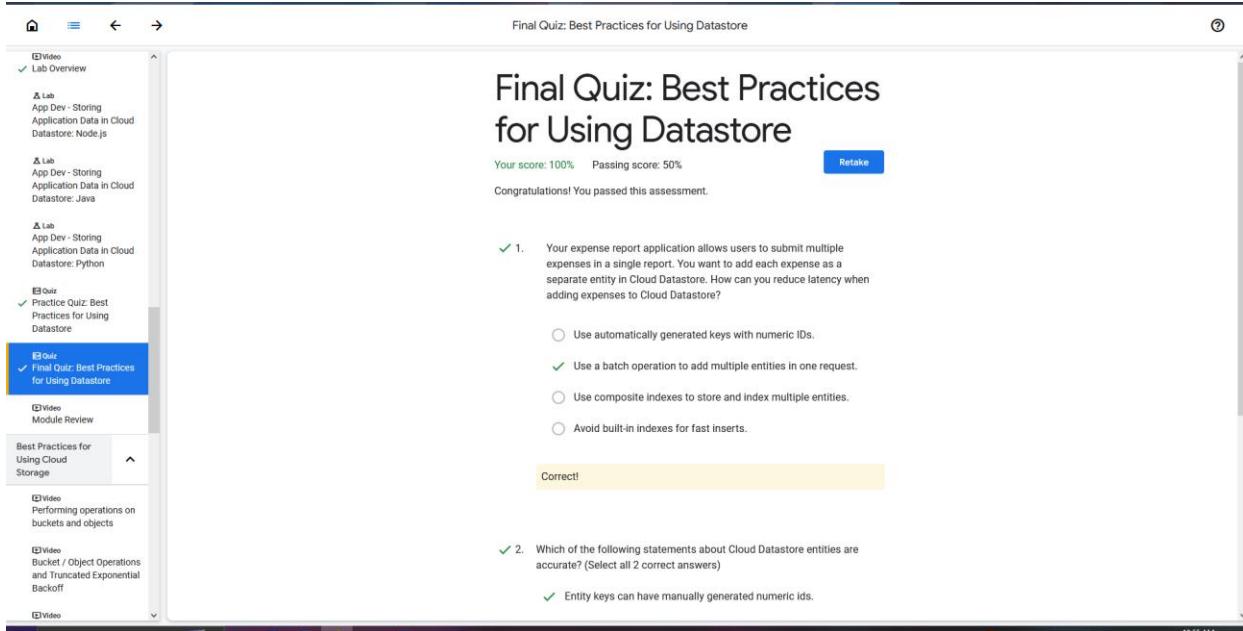
Use automatically generated keys with numeric IDs.  
 Use a batch operation to add multiple entities in one request.  
 Use composite indexes to store and index multiple entities.  
 Avoid built-in indexes for fast inserts.

Correct!

2. Which of the following statements about Cloud Datastore entities are accurate? (Select all 2 correct answers)

Entity keys can have manually generated numeric IDs.

Correct!



Final Quiz: Best Practices for Using Datastore

✓ Use a batch operation to add multiple entities in one request.

Use composite indexes to store and index multiple entities.  
 Avoid built-in indexes for fast inserts.

Correct!

2. Which of the following statements about Cloud Datastore entities are accurate? (Select all 2 correct answers)

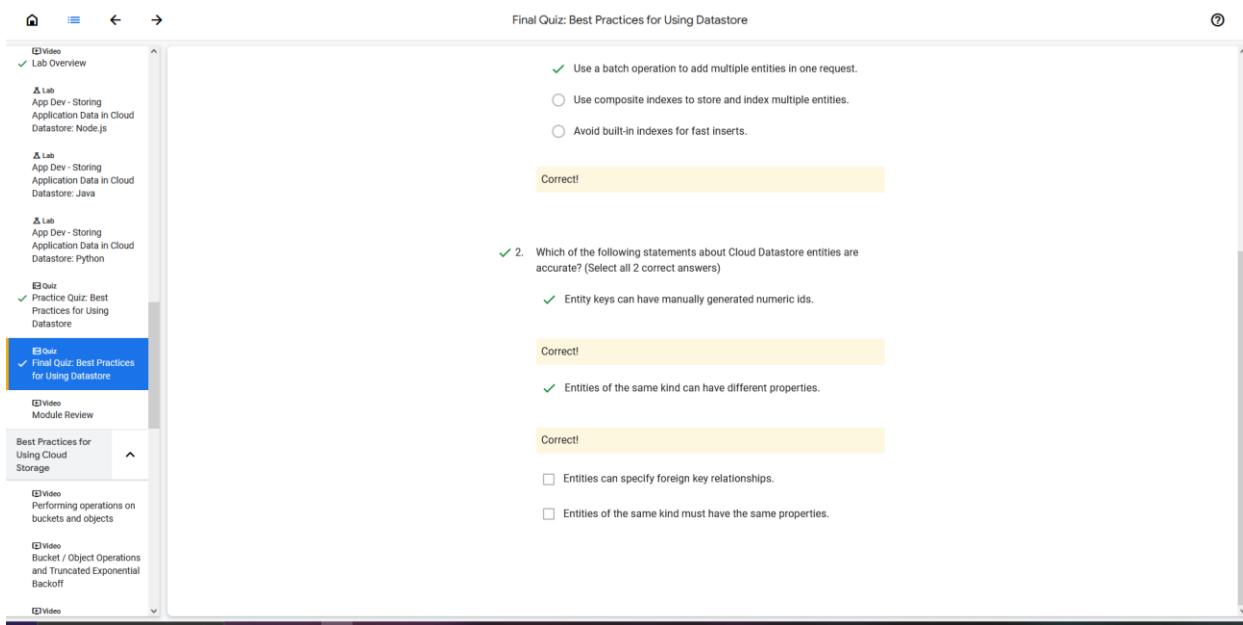
Entity keys can have manually generated numeric IDs.

Correct!

Entities of the same kind can have different properties.

Correct!

Entities can specify foreign key relationships.  
 Entities of the same kind must have the same properties.



Google Cloud | qwiklabs-gcp-03-26a39ede5244 | Search (/) for resources, docs, products, and more | Search

Welcome

You're working in **qwiklabs-gcp-03-26a39ede5244**

Project number: 302030406282 | Project ID: **qwiklabs-gcp-03-26a39ede5244**

[Dashboard](#) [Recommendations](#)

[Create a VM](#) [Run a query in BigQuery](#) [Create a GKE cluster](#) [Create a storage bucket](#)

CLOUD SHELL Terminal (qwiklabs-gcp-03-26a39ede5244) + \* Open Editor

```

ACTIVE: *
ACCOUNT: student-00-3a8637fdff9a@qwiklabs.net

To set the active account, run:
$ gcloud config set account 'ACCOUNT'

student_00_3a8637fdff9a@cloudshell:~ (qwiklabs-gcp-03-26a39ede5244)$ gcloud config list project
[core]
project = qwiklabs-gcp-03-26a39ede5244

Your active configuration is: [cloudshell-1-1112]
student_00_3a8637fdff9a@cloudshell:~ (qwiklabs-gcp-03-26a39ede5244)$
student_00_3a8637fdff9a@cloudshell:~ (qwiklabs-gcp-03-26a39ede5244)$
student_00_3a8637fdff9a@cloudshell:~ (qwiklabs-gcp-03-26a39ede5244)$ git clone --depth=1 https://github.com/GoogleCloudPlatform/training-data-analyst
Cloning into 'training-data-analyst'...
remote: Enumerating objects: 1744, done.
remote: Counting objects: 1000 (7647/7647), done.
remote: Compressing objects: 1000 (7647/7647), done.
remote: Writing objects: 1000 (7647/7647), done.
remote: Total 1744 (delta 1515), pack-reused 0
Receiving objects: 1000 (7647/7647), 330.88 MiB / 25.61 MiB/s, done.
Resolving deltas: 1000 (1232/1232), done.
Up-to-date, pulled 1 new object (use --depth=1 to skip).
student_00_3a8637fdff9a@cloudshell:~ (qwiklabs-gcp-03-26a39ede5244)$ ln -s ./training-data-analyst/courses/developingapps/v1.3/nodejs/cloudstorage ~/cloudstorage
student_00_3a8637fdff9a@cloudshell:~ (qwiklabs-gcp-03-26a39ede5244)$ cd ~/cloudstorage/start (qwiklabs-gcp-03-26a39ede5244)$ . prepare_environment.sh
Creating App Engine app
You are creating an app for project (qwiklabs-gcp-03-26a39ede5244).
WARNING: Creating an App Engine application for a project is irreversible and the region cannot be changed after creation. If you need to change the region, please delete the app and recreate it at <https://cloud.google.com/appengine/docs/location>.

Creating App Engine application in project (qwiklabs-gcp-03-26a39ede5244) and region [us-central]...done.
Success! The app is now created. Please use 'gcloud app deploy' to deploy your first app.
Exporting GLOUD_PROJECT
Installing dependencies
[1/1] 3 reify:pm: http fetch GET 200 https://registry.npmjs.org/npm/-/npm-8.1.3.tgz 1676ms (cache miss)

```

Google Cloud | qwiklabs-gcp-03-26a39ede5244 | Search (/) for resources, docs, products, and more | Search

Welcome

You're working in **qwiklabs-gcp-03-26a39ede5244**

Project number: 302030406282 | Project ID: **qwiklabs-gcp-03-26a39ede5244**

[Dashboard](#) [Recommendations](#)

[Create a VM](#) [Run a query in BigQuery](#) [Create a GKE cluster](#) [Create a storage bucket](#)

CLOUD SHELL (qwiklabs-gcp-03-26a39ede5244) + × Open Editor

```
Terminal (qwiklabs-gcp-03-26a39ede5244) + ×
added 260 packages, and audited 261 packages in 17s
19 packages are looking for funding
  run `npm fund` for details
3 high severity vulnerabilities
Some issues need review, and may require choosing
a different dependency.
Run `npm audit` for details.
npm notice New major version of npm available! 5.1.1 -> 5.6.7
npm notice Run `npm install -g npm@5.6.7` to update!
npm notice
It's time for Cloud Storage
Creating Datastore entities
Entities created.
Project ID: qwiklabs-gcp-03-26a39ede5244
student_00_3a63fdd2e8cloudshell:/~$ cd cloudstorage/start (qwiklabs-gcp-03-26a39ede5244)$ npm start
> quite-interesting-quiz-lab2@1.0.0 start
> node server/app.js
App listening on port 8080
11:53 PM
```

App Dev - Storing Image and Video Files in Cloud Storage: Node.js

End Lab 01:56:26

2. To configure the application, execute the following command:

```
. prepare_environment.sh
```

Note: This script file:

- Creates an App Engine application.
- Exports an environment variable, GCLOUD\_PROJECT.
- Runs npm install.
- Creates entities in Cloud Datastore.
- Prints out the Google Cloud Project ID.

3. To run the application, execute the following command:

```
npm start
```

Click **Check my progress** to verify the objective.

Configure the case study application

Review the case study application

1. To view the application, click **Web preview > Preview on port 8080**.

Wrap up

Overview  
Setup and requirements  
Task 1. Reviewing the case study application  
Task 2. Examining the case study application Code  
Task 3. Creating a Cloud Storage bucket  
Task 4. Adding objects to Cloud Storage  
End your lab

5/15

The screenshot shows a web browser window with the URL <http://10.0.0.41:50009/4140.html?09210901&user=7&selected=1&isPublic=True>. The page title is "Quite Interesting Quiz". Below the title, there is a message: "Welcome to the Quite Interesting Quiz where you can create a question, take a test or review feedback". At the bottom of the page, there are three buttons: "Create Question", "Take Test", and "Leaderboard".

## 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

The screenshot shows the Google Cloud Shell interface. On the left is the Cloud Shell Explorer sidebar with a tree view of files and folders. The main area is a code editor displaying a Pug file named "add.pug". The code includes a license header and some Pug template logic. A tooltip in the center says: "You are viewing Cloud Shell in full view. Click here to restore Cloud Shell." At the bottom, there are tabs for "Problems" and "Output", and a status bar showing "C%23".

```
// Copyright 2017, Google, Inc.  
// Licensed under the Apache License, Version 2.0 (the "License");  
// you may not use this file except in compliance with the License.  
// You may obtain a copy of the License at  
// http://www.apache.org/licenses/LICENSE-2.0  
// Unless required by applicable law or agreed to in writing, software  
// distributed under the License is distributed on an "AS IS" BASIS,  
// WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.  
// See the License for the specific language governing permissions and  
// limitations under the License.  
  
extends ../base.pug  
  
block content  
  h3 #action question  
  form(method="POST", enctype="multipart/form-data")  
    .form-group  
      label(for="author") Author  
      input.form-control(type="text", name="author", id="author", value=question.author)  
    .form-group  
      label(for="quiz") Quiz
```

Google Cloud | qwiklabs-gcp-03-26a39ede5244 | Search (/) for resources, docs, products, and more | Open Editor

```

CLOUD SHELL Terminal (qwiklabs-gcp-03-26a39ede5244) + =
remote: Total 7647 (delta 2123), reused 3787 (delta 1515), pack-reused 0
Receiving objects: 100% (7647/7647), 330.88 MiB | 25.61 MiB/s, done.
Resolving deltas: 100% (3123/3123), done.
student_00_3a637fdffsacloudshell:~(qwiklabs-gcp-03-26a39ede5244)$ ls -s ~-/training-data-analyst/courses/developingapps/v1.3/nodejs/cloudstorage ~/cloudstorage
student_00_3a637fdffsacloudshell:~(qwiklabs-gcp-03-26a39ede5244)$ cd ~/cloudstorage/start
student_00_3a637fdffsacloudshell:~/cloudstorage/start(qwiklabs-gcp-03-26a39ede5244)$ . prepare_environment.sh
Creating App Engine app
You are creating an app for project [qwiklabs-gcp-03-26a39ede5244] and region [us-central]....done.
Success! The app was now created. Please use `gcloud app deploy` to deploy your first app.
Exporting GCLOUD_PROJECT
Installing dependencies
removed 75 packages, and changed 118 packages in 1s
10 packages are looking for funding
  run 'npm fund' for details
npm WARN Multer@1.4.4 Multer 1.x is affected by CVE-2022-24434. This is fixed in v1.4.4-lts.1 which drops support for versions of Node.js before 6. Please upgrade to at least Node.js 6 and version 1.4.4-lts.1 of Multer. If you need support for older versions of Node.js, we are open to accepting patches that would fix the CVE on the main 1.x release line, whilst maintaining compatibility with Node.js 0.10.
added 260 packages, and audited 261 packages in 1s
19 packages are looking for funding
  run 'npm fund' for details
$ high severity vulnerabilities
Some issues need review, and may require choosing a different dependency.
Run 'npm audit' for details.
npm WARN New major version of npm available: 8.1.3 => 9.6.7
npm WARN Changelog: https://github.com/npm/fix-releases/tag/v9.6.7
npm WARN Run `npm install --nghttp4=1` to update!
npm WARN To exit, press Control-C or Control-D.
Entities created:
Project Id: qwiklabs-gcp-03-26a39ede5244
student_00_3a637fdffsacloudshell:~/cloudstorage/start(qwiklabs-gcp-03-26a39ede5244)$ ngm start
> quite-interesting-quiz-lab281.0.0 start
> node server/app.js
App listening on port 8080
...
student_00_3a637fdffsacloudshell:~/cloudstorage/start(qwiklabs-gcp-03-26a39ede5244)$ gsutil mb gs://$DEVSHELL_PROJECT_ID-media
Creating gs://qwiklabs-gcp-03-26a39ede5244/media...
student_00_3a637fdffsacloudshell:~/cloudstorage/start(qwiklabs-gcp-03-26a39ede5244)$ export GCLOUD_BUCKET=$DEVSHELL_PROJECT_ID-media
student_00_3a637fdffsacloudshell:~/cloudstorage/start(qwiklabs-gcp-03-26a39ede5244)$

```

App Dev - Storing Image and Video Files in Cloud Storage: Node.js

End Lab 01:53:16

2. To create a Cloud Storage bucket named <Project ID>-media, execute the following command:

```
gsutil mb gs://$DEVSHELL_PROJECT_ID-media
```

**Note:** When you are in the console, do not leave the lab instructions. Doing so may cause your account to be blocked. Learn more.

[Open Google Console](#)

Username: student-88-3a637fdff91

Password: vtksx8u1JGtG

GCP Project ID: qwiklabs-gcp-03-26a39ede5244

3. Export the Cloud Storage bucket name as an environment variable named GCLOUD\_BUCKET, execute the following command:

```
export GCLOUD_BUCKET=$DEVSHELL_PROJECT_ID-media
```

**Note:** Recall that the application makes use of environment variables for configuration.

This allows the development team to deploy the application into development, test, staging, and production just by changing these variables.

Click **Check my progress** to verify the objective.

Create a Cloud Storage bucket

**✓** Check my progress

Overview  
Setup and requirements  
Task 1. Reviewing the case study application  
Task 2. Examining the case study application code  
Task 3. Creating a Cloud Storage bucket  
Task 4. Adding objects to Cloud Storage  
End your lab

5/15

Google Cloud | qwiklabs-gcp-03-26a39ede5244 | Search (/) for resources, docs, products, and more | Search

CLOUD SHELL Editor

File Edit Selection View Go Run Terminal Help

EXPLORE > OPEN EDITORS > STUDENT\_00\_3A8637DF0F9A > cloudstorage > start > sever > gcp > cloudstorage.js > sendUploadToGCS > ...

```

 1 'use strict';
 2 const config = require('../config');
 3 // TODO: Load the module for Cloud Storage
 4 const storage = require('google-cloud/storage');
 5 // END TODO
 6 // TODO: Create the storage client
 7 // The Storage(...) factory function accepts an options
 8 // object which is used to specify which project's Cloud
 9 // Storage buckets should be used via the projectId
10 // property.
11 // The projectId is retrieved from the config module.
12 // This module retrieves the project ID from the
13 // GCLOUD_PROJECT environment variable.
14 const storage = new Storage({
15   projectId: config.get('GCLOUD_PROJECT')
16 });
17 // END TODO
18 // TODO: Get the GCLOUD_BUCKET environment variable
19 // Recall that earlier you exported the bucket name into an
20 // environment variable.
21 // This module retrieves access to this environment
22 // variable so you can use it in code.
23 const GCLOUD_BUCKET = config.get('GCLOUD_BUCKET');

```

Problems Output C%23

master ① 1.204 ② 110 ③ ④ Cloud Shell ⑤ cartservice.sln ⑥ Connect to Google Cloud

Google Cloud | qwiklabs-gcp-03-26a39ede5244 | + | Search (/) for resources, docs, products, and more | Search

CLOUD SHELL Terminal (qwiklabs-gcp-03-26a39ede5244) x + =

```

student_00_3a8637df0f9a@cloudshell1:~/cloudstorage$ start (qwiklabs-gcp-03-26a39ede5244)$ . prepare_environment.sh
Creating App Engine app
You are creating an app for project (qwiklabs-gcp-03-26a39ede5244).
WARNING: Creating an app for an existing 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-03-26a39ede5244] and region [us-central]....done.
Success! The app is now created. Please use `gcloud app deploy` to deploy your first app.
Exporting GCLOUD_PROJECT
Installing dependencies
removed 75 packages, and changed 119 packages in 11s

10 packages are looking for funding
  run `npm fund` for details
npm WARN @socket.io/multi@1.4: Multer 1.x is affected by CVE-2022-24454. This is fixed in v1.4.4-lts.1 which drops support for versions of Node.js before 6. Please upgrade to at least Node.js 6 and version 1.4.4-lts.1 of Multer. If you need support for older versions of Node.js, we are open to accepting patches that would fix the CVE on the main 1.x release line, whilst maintaining compatibility with Node.js 0.10.
added 260 packages, and audited 261 packages in 17s

19 packages are looking for funding
  run `npm fund` for details

3 high severity vulnerabilities

Some issues need review, and may require choosing
a different dependency.

Run "npm audit" for details.
npm WARN New major version of npm available: 8.1.0 -> 8.6.7
npm WARN Changelog: http://github.com/npm/cli/releases/tag/v8.6.7
npm WARN Run npm install -g npm@8.6.7 to update!
npm notice To exporting Cloud Storage
Create Cloud Storage entities
Entities created
Project ID: qwiklabs-gcp-03-26a39ede5244
student_00_3a8637df0f9a@cloudshell1:~/cloudstorage$ start (qwiklabs-gcp-03-26a39ede5244)$ ngm start
> quite-interesting-quiz-lab2@1.0.0 start
> node server/app.js

App listening on port 8080
student_00_3a8637df0f9a@cloudshell1:~/cloudstorage$ start (qwiklabs-gcp-03-26a39ede5244)$ gsutil mb gs://$DEVSHLL_PROJECT_ID-media
Creating gs://qwiklabs-gcp-03-26a39ede5244-media...
student_00_3a8637df0f9a@cloudshell1:~/cloudstorage$ start (qwiklabs-gcp-03-26a39ede5244)$ export GCLOUD_BUCKET=$DEVSHLL_PROJECT_ID-media
student_00_3a8637df0f9a@cloudshell1:~/cloudstorage$ start (qwiklabs-gcp-03-26a39ede5244)$ npm start
> quite-interesting-quiz-lab2@1.0.0 start
> node server/app.js

App listening on port 8080

```

clear Default 12:04 AM



A screenshot of the Google Cloud Platform interface. The left sidebar shows "Cloud Storage" selected under "Cloud Storage". The main area displays a "View security recommendations" dialog with a warning about excess permissions on buckets. Below it is a table of buckets. On the right, a sidebar titled "Get started with Cloud Storage" lists various documentation links like "Getting bucket information", "Uploading objects", "Downloading objects", "Use cases for Cloud Storage", "Terraform samples", "Architecture guides for storage", and "Making data public". At the bottom, a terminal window shows command-line output related to exporting Cloud Storage entities and starting a Node.js application.

App Dev - Storing Image and Video Files in Cloud Storage: Node.js

01:42:26

**Form Field Value**

Author	Your Name
Quiz	Google Cloud Platform
Title	Which product does this logo relate to?
Image	Upload the Google-Cloud-Storage-Logo.svg file you previously downloaded
Answer 1	App Engine
Answer 2	<b>Cloud Storage</b> (select the Answer 2 radio button)
Answer 3	Compute Engine
Answer 4	Container Engine

Cautions: When you are in the console, do not deviate from the lab instructions. Doing so may cause your account to be blocked. Learn more.

[Open Google Console](#)

Username: student-00-3a8637fd8f91

Password: vtksxbu1JtG

GCP Project ID: qwiklabs-gcp-02-3e3e1594e561

7. Return to the Cloud Console and click on **Navigation menu > Cloud Storage**.

8. On the **Cloud Storage > Browser** page, click the correct bucket (named <Project ID>-media).

**Note:** You should see your new object named #UniqueNumber#Google-Cloud-Storage-Logo.svg.

Click **Check my progress** to verify the objective.

Run the application and create a Cloud Storage object

Check my progress

Run the client application and test the Cloud Storage public URL

Google Cloud

qwiklabs-gcp-02-3e3e1594e561

Welcome

You're working in qwiklabs-gcp-02-3e3e1594e561

Project number: 106433992178 Project ID: qwiklabs-gcp-02-3e3e1594e561

Dashboard Recommendations

Create a VM Run a query in BigQuery Create a GKE cluster Create a storage bucket

CLOUD SHELL Terminal (qwiklabs-gcp-02-3e3e1594e561) +

```
Welcome to Cloud Shell! Type "help" to get started.
Your Cloud Platform project in this session is set to qwiklabs-gcp-02-3e3e1594e561.
Use "gcloud config set project [PROJECT_ID]" to change to a different project.
student_00-3e3e1594e561@qwiklabs-gcp-02-3e3e1594e561:~$ gcloud auth list
Credentials loaded from:
ACTIVE: *
ACCOUNT: student-00-3e3e1594e561@gwiklabs.net

To set the active account, run:
  $ gcloud config set account 'ACCOUNT'

student_00-3e3e1594e561@qwiklabs-gcp-02-3e3e1594e561:~$ gcloud config list project
[core]
project = qwiklabs-gcp-02-3e3e1594e561

Your active configuration is: [qwiklabs-gcp-02-3e3e1594e561]
student_00-3e3e1594e561@qwiklabs-gcp-02-3e3e1594e561:~$ git clone --depth=1 https://github.com/GoogleCloudPlatform/training-data-analyst
Cloning into 'training-data-analyst'...
remote: Enumerating objects: 7647, done.
remote: Compressing objects: 100% (5177/5177), done.
remote: Writing objects: 100% (4512/4512), done.
Receiving objects: 59% (4512/7647), 80.86 MB | 21.91 MB/s
```

Google Cloud | qwiklabs-gcp-02-3e3e1594e561 | Search (/) for resources, docs, products, and more | Q Search | ☰ 🔍 ⓘ

## Welcome

You're working in `qwiklabs-gcp-02-3e3e1594e561`

Project number: 106433992178 | Project ID: `qwiklabs-gcp-02-3e3e1594e561`

[Dashboard](#) [Recommendations](#)

[Create a VM](#) [Run a query in BigQuery](#) [Create a GKE cluster](#) [Create a storage bucket](#)

[Privacy Policy](#) · [Terms of Service](#)

CLOUD SHELL Terminal (qwiklabs-gcp-02-3e3e1594e561) +

```
student_00_4ee60f3be164@cloudshell:~ (qwiklabs-gcp-02-3e3e1594e561)$ gcloud config list project
[core]
project = qwiklabs-gcp-02-3e3e1594e561

Your active configuration is: [cloudshell-27068]
student_00_4ee60f3be164@cloudshell:~ (qwiklabs-gcp-02-3e3e1594e561)$ git clone --depth=1 https://github.com/GoogleCloudPlatform/training-data-analyst
Cloning into 'training-data-analyst'...
remote: Enumerating objects: 1000 (100%)
remote: Counting objects: 1000 (100%)
remote: Compressing objects: 1000 (100%)
remote: Total 1000 (delta 1213), reused 9787 (delta 1515), pack-reused 0
Receiving objects: 1000 (100%)
Resolving deltas: 1000 (100%)
Done.
student_00_4ee60f3be164@cloudshell:~ (qwiklabs-gcp-02-3e3e1594e561)$ ls -a ./training-data-analyst/courses/developingapps/v1.3/java/cloudstorage
student_00_4ee60f3be164@cloudshell:~ (qwiklabs-gcp-02-3e3e1594e561)$ cd ./cloudstorage/start
student_00_4ee60f3be164@cloudshell:~/cloudstorage/start (qwiklabs-gcp-02-3e3e1594e561)$ . prepare_environment.sh
Creating App Engine app
You are creating an app for project [qwiklabs-gcp-02-3e3e1594e561].
WARNING: The current region for this application is irreversible and the region cannot be changed. More information about regions is at <https://cloud.google.com/appengine/docs/location>.

Creating App Engine application in project [qwiklabs-gcp-02-3e3e1594e561] and region [us-central]....working...[ 10:11 AM
```

Google Cloud | qwiklabs-gcp-02-3e3e1594e561 | Search (/) for resources, docs, products, and more | Q Search | ☰ 🔍 ⓘ

[Navigation menu](#)

## Welcome

You're working in `qwiklabs-gcp-02-3e3e1594e561`

Project number: 106433992178 | Project ID: `qwiklabs-gcp-02-3e3e1594e561`

[Dashboard](#) [Recommendations](#)

[Create a VM](#) [Run a query in BigQuery](#) [Create a GKE cluster](#) [Create a storage bucket](#)

[Privacy Policy](#) · [Terms of Service](#)

CLOUD SHELL Terminal (qwiklabs-gcp-02-3e3e1594e561) +

```
org.springframework.boot.actuate.autoconfigure.health.HealthContributorAutoConfiguration
org.springframework.boot.actuate.autoconfigure.metrics.integration.IntegrationMetricsAutoConfiguration
org.springframework.boot.actuate.autoconfigure.endpoint.EndpointAutoConfiguration
org.springframework.boot.actuate.autoconfigure.availability.ApplicationAvailabilityAutoConfiguration
org.springframework.boot.actuate.autoconfigure.info.ProjectInfoAutoConfiguration
org.springframework.boot.actuate.autoconfigure.web.server.ManagementContextAutoConfiguration

06:13:11.702 [restartedMain] INFO c.g.training.appspot.QuizApplication - Started QuizApplication in 4.215 seconds (JVM running for 5.301)
06:13:11.702 [restartedMain] INFO c.g.training.appspot.QuizApplication - Application is running!阅读全文...[ 10:11 AM
06:13:11.844 [restartedMain] DEBUG o.s.boot.devtools.restart.Restarter - Creating new Restarter for thread Thread@4,5,main]
06:13:11.844 [restartedMain] DEBUG o.s.boot.devtools.restart.Restarter - Immediately restarting application
06:13:11.844 [restartedMain] DEBUG o.s.boot.devtools.restart.Restarter - Starting application com.google.training.appspot.QuizApplication with URLs [file:/home/student_00_4ee60f3be164/training-data-analyst/courses/developingapps/v1.3/]
06:13:11.846 [restartedMain] DEBUG o.s.b.a.ApplicationAvailabilityBean - Application availability state ReadinessState changed to ACCEPTING_TRAFFIC
06:13:47.687 [http-nio-8080-exec-1] INFO o.a.c.c.C.[Tomcat].[localhost].[] - Initializing Spring DispatcherServlet 'dispatcherServlet'
06:13:47.707 [http-nio-8080-exec-1] DEBUG o.s.b.a.w.WelcomePageHandlerMapping - Mapped to ParameterizableViewController [viewName=forward:index.html]
```



## 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

```
12:14 AM
Google Cloud qwiklabs-gcp-02-3e3e1594e561 Search (/) for resources, docs, products, and more Open Editor
CLOUD SHELL Terminal (qwiklabs-gcp-02-3e3e1594e561) + x
[THYMELEAF]
  * #locals
  * #request
  * #response
  * #status
  * #model
  * #servletContext
  * #conversions
  * #currencies
  * #formatters
  * #dates
  * #bools
  * #numbers
  * #objects
  * #strings
  * #arrays
  * #lists
  * #sets
  * #maps
  * #aggregates
  * #messages
  * #execInfo
  * #httpServletRequest
  * #httpSession
  * #request
  * #response
  * #themes
  * #src
  * #requestDataValues
  * Execution Attributes:
    * "StandardExpressionParser": Standard Expression Parser;
    * "StandardJSPExpressionParser": org.thymeleaf.standard.serializer.StandardJavaScriptSerializer@2ef3c0827
    * "StandardCSSSerializer": org.thymeleaf.standard.serializer.StandardCSSSerializer@4fd4aef3
    * "EnableSpringELCompiler": false
    * "StandardExpressionParser": SpringEL
    * "StandardConversionService": org.thymeleaf.spring5.expression.SpringStandardConversionService@4e9fe4ba
[THYMELEAF] * Dialect [2 of 2]: java8time (org.thymeleaf.extras.java8time.dialect.Java8TimeDialect)
[THYMELEAF] * Expression Objects:
[THYMELEAF]   * ...
[THYMELEAF] TEMPLATE ENGINE CONFIGURED OK
06:14:22,424 [http-nio-8080-exec-3] DEBUG org.thymeleaf.TemplateEngine - [THYMELEAF] ENGINE ENGINE INITIALIZED
06:14:22,424 [http-nio-8080-exec-3] DEBUG org.thymeleaf.ApplicationAvailabilityBean - Application availability state ReadinessState changed from ACCEPTING_TRAFFIC to REFUSING_TRAFFIC
06:15:02,546 [SpringApplicationShutdownHook] DEBUG o.s.e.b.w.a.AnnotationConfigServletWebServerApplicationContext - Closing org.springframework.boot.web.servlet.context.AnnotationConfigServletWebServerApplicationContext@428a558f, started on Thu May 28 06:13:30 UTC 2023
06:15:02,546 [SpringApplicationShutdownHook] DEBUG o.s.e.b.w.a.AnnotationConfigServletWebServerApplicationContext - Destroying beans in phase 2147483647
06:15:02,554 [SpringApplicationShutdownHook] DEBUG o.s.e.c.s.DefaultLifecycleProcessor - Stopping beans in phase 2147483647
06:15:02,554 [SpringApplicationShutdownHook] DEBUG o.s.e.c.s.DefaultLifecycleProcessor - Bean 'webServerGracefulShutdown' completed its stop procedure
06:15:02,554 [SpringApplicationShutdownHook] DEBUG o.s.e.c.s.DefaultLifecycleProcessor - Stopping beans in phase 2147483646
06:15:02,555 [SpringApplicationShutdownHook] DEBUG o.s.e.c.s.DefaultLifecycleProcessor - Bean 'logbackGelfStop' completed its stop procedure
06:15:02,555 [SpringApplicationShutdownHook] DEBUG o.s.e.c.s.DefaultLifecycleProcessor - Shutting down ExecutorService 'applicationTaskExecutor'
[INFO] BUILD SUCCESS
-----
[INFO] Total time: 05:00 min
[INFO] Finished at: 2023-05-28T06:18:02Z
[INFO]
student_00_4ee60f3be14@cloudshell:~/cloudstorage/start (qwiklabs-gcp-02-3e3e1594e561)$ gutil mb gs://$DEVSHELL_PROJECT_ID-media/
Creating gs://qwiklabs-gcp-02-3e3e1594e561-media/...
student_00_4ee60f3be14@cloudshell:~/cloudstorage/start (qwiklabs-gcp-02-3e3e1594e561)$ [ ]
```

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

**Create a Cloud Storage bucket**

1. Return to Cloud Shell and stop the application by pressing **Ctrl+C**.

2. To create a Cloud Storage bucket named <Project ID>-media, execute the following command:

```
gsutil mb gs://$DEVSHELL_PROJECT_ID-media
```

**Note:** You can create a bucket using the `gsutil mb` command, passing through the name of the bucket as `gs://BUCKET_NAME`. You can use `$DEVSHELL_PROJECT_ID` as the bucket name prefix followed by `-media`.

Click **Check my progress** to verify the objective.

**Create a storage bucket**

**Check my progress**

3. To export the Cloud Storage bucket name as an environment variable named `GCLOUD_BUCKET`, execute the following command:

```
export GCLOUD_BUCKET=$DEVSHELL_PROJECT_ID-media
```

Recall that the application makes use of environment variables for configuration. This allows the development team to deploy the application into development, test, staging, and production just by changing these variables.

Google Cloud

CLOUD SHELL (qwiklabs-gcp-02-3e3e1594e561)

Search (/) for resources, docs, products, and more

12:18 AM

Terminal

```
[THYMELAEF] * #request
[THYMELAEF] * #response
[THYMELAEF] * #server
[THYMELAEF] * #serverContext
[THYMELAEF] * #conversations
[THYMELAEF] * #utils
[THYMELAEF] * #converters
[THYMELAEF] * #dates
[THYMELAEF] * #coll
[THYMELAEF] * #members
[THYMELAEF] * #objects
[THYMELAEF] * #strings
[THYMELAEF] * #arrays
[THYMELAEF] * #lists
[THYMELAEF] * #sets
[THYMELAEF] * #maps
[THYMELAEF] * #aggregates
[THYMELAEF] * #messages
[THYMELAEF] * #ids
[THYMELAEF] * #metaInfo
[THYMELAEF] * #httpServletRequest
[THYMELAEF] * #httpSession
[THYMELAEF] * #request
[THYMELAEF] * #schema
[THYMELAEF] * #env
[THYMELAEF] * #requestDataValues
[THYMELAEF] * #Execution Attributes:
[THYMELAEF] * StandardExpressionParser": Standard Expression Parser
[THYMELAEF] * "StandardJavaScriptSerializer": org.thymeleaf.standard.serializer.StandardJavaScriptSerializer@2ef3c027
[THYMELAEF] * "StandardJavaScriptUnserializer": org.thymeleaf.standard.unserializer.StandardJavaScriptUnserializer@4f4e0f
[THYMELAEF] * "EnableSpringELCompiler": false
[THYMELAEF] * "StandardVariableExpressionEvaluator": SpringEL
[THYMELAEF] * "StandardVariableUnserializer": org.thymeleaf.spring5.expression.SpringStandardConversionService@e9fe4ba
[THYMELAEF] * "Select [ 2 of 2 ]: javaTime (org.thymeleaf.extras.javaTime.dialect.Java8TimeDialect)
[THYMELAEF] * Expression Objects:
[THYMELAEF] * Application Context
[THYMELAEF] * Template Engine Configured On
06:14:22.424 [http-nio-8080-exec-3] DEBUG org.thymeleaf.TemplateEngine - [THYMELAEF] TEMPLATE ENGINE INITIALIZED
06:14:22.424 [http-nio-8080-exec-3] DEBUG o.s.b.a.ApplicationAvailabilityBean - Application availability state ReadinessState changed from ACCEPTING_TRAFFIC to REFUSING_TRAFFIC
06:14:22.446 [SpringApplicationShutdownHook] DEBUG o.s.b.a.e.AnnotationConfigDispatcherServletApplicationContext - Closing org.springframework.web.context.AnnotationConfigDispatcherServletApplicationContext@428a558f, started on Thu May 25 06:13:08 UTC 2023
06:18:02.551 [SpringApplicationShutdownHook] DEBUG o.s.b.a.e.DefaultLifecycleProcessor - Stopping beans in phase 2147483647
06:18:02.551 [SpringApplicationShutdownHook] DEBUG o.s.b.a.e.DefaultLifecycleProcessor - Stopped beans in phase 2147483647 completed its stop procedure
06:18:02.554 [SpringApplicationShutdownHook] DEBUG o.s.b.a.e.DefaultLifecycleProcessor - Stopping beans in phase 2147483646
06:18:02.557 [SpringApplicationShutdownHook] DEBUG o.s.b.a.e.DefaultLifecycleProcessor - Bean 'webServerStartStop' completed its stop procedure
06:18:02.598 [SpringApplicationShutdownHook] DEBUG o.s.b.a.c.ThreadPoolTaskExecutor - Shutting down ExecutorService 'applicationTaskExecutor'
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time: 05:00 min
[INFO] Finished at: 2023-05-25T04:18:02Z
[INFO] 
student_00_4ee0f3be14@cloudshell1:~/cloudstorage/start (qwiklabs-gcp-02-3e3e1594e561)$ gsutil mb gs://$DEVSHELL_PROJECT_ID-media
Creating gs://qwiklabs-gcp-02-3e3e1594e561/media...
student_00_4ee0f3be14@cloudshell1:~/cloudstorage/start (qwiklabs-gcp-02-3e3e1594e561)$ export GCLOUD_BUCKET=$DEVSHELL_PROJECT_ID-media
student_00_4ee0f3be14@cloudshell1:~/cloudstorage/start (qwiklabs-gcp-02-3e3e1594e561)$ [
```

Google Cloud Editor

File Edit Selection View Go Run Terminal Help

OPEN EDITORS

STUDENT\_00\_4ee60f3be164

cloudstorage > start > src > main > java > com > google > training > appdev > services > gcp > cloudstorage > ImageService.java > ImageService > saveImage(MultipartFile)

```

56 // Use the BlobInfo class to represent this object
57 // Use the BlobInfo.Builder to customize the Blob
58 // Set the content type from the file
59 // Set the object ACL to Public Read
60
61 BlobInfo blobInfo = storage.create(
62     BlobInfo.newBuilder(bucketName, fileName)
63         .setContentType(file.getContentType())
64         .setAcl(new ArrayList<>()
65             .addAll(Acl.of(Acl.User.ofAllUsers(),
66                 Acl.Role.READER)))
67     .build(),
68     file.getInputStream());
69
70 // END TODO
71
72 // TODO: Cloud Storage public URLs are in the form:
73 // https://storage.googleapis.com/[BUCKET]/[OBJECT]
74 // Use String concatenation to create return the URL
75
76 return "https://storage-download.googleapis.com/" + bucketName + "/" + fileName;
77
78 // END TODO
79
80
81 }
82
83 }
84 }
```

Projects are imported into workspace.

View projects Don't show again

Required assets to build and debug are missing from 'STUDENT\_00\_4ee60f3be164'. Add them?

Don't Ask Again Not Now Yes

Problems Output

Java PROJECTS

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

End Lab 01:41:02

5. Click the **Create Question** link.

6. Complete the form with the following values, and then click **Save**:

Field	Value
Author	Your name
Quiz	Google Cloud Platform
Title	Which product does this logo relate to?
Image	Upload the Google_Cloud_Storage_logo.png file you previously downloaded
Answer 1	App Engine
Answer 2	Cloud Storage (select the Answer 2 radio button to indicate this as the correct answer)
Answer 3	Compute Engine
Answer 4	Container Engine

Click **Check my progress** to verify the objective.

Add Objects to Cloud Storage

Check my progress

Overview

Setup and requirements

Task 1. Review the Quiz application

Task 2. Examining the Quiz application code

Task 3. Creating a Cloud Storage bucket

Task 4. Adding objects to Cloud Storage

End your lab

5/15

7. Return to the Cloud Console and navigate to **Navigation menu > Cloud Storage**.

8. On the **Cloud Storage > Browser** page, click the correct bucket (named <Project>)

Google Cloud | qwiklabs-gcp-02-3e3e1594e561 | Search (/) for resources, docs, products, and more | Search | LEARN Tutorial | X

**Cloud Storage**

Buckets Monitoring NEW Settings

**view security recommendations**

Improve security by applying security recommendations to your buckets. The security insights column in the table describes which buckets have excess permissions.

**VIEW IN TABLE** **LEARN MORE**

**Filter** Filter buckets

Name	Created	Location type	Location	Default storage class	Last modified	Public access
qwiklabs-gcp-02-3e3e1594e561-media	May 25, 2023, 12:18:10 AM	Multi-region	us	Standard	May 25, 2023, 12:18:10 AM	Subject to object ACLs
qwiklabs-gcp-02-3e3e1594e561.appspot	May 25, 2023, 12:11:22 AM	Multi-region	us	Standard	May 25, 2023, 12:11:22 AM	Subject to object ACLs
staging.qwiklabs-gcp-02-3e3e1594e561	May 25, 2023, 12:11:22 AM	Multi-region	us	Standard	May 25, 2023, 12:11:22 AM	Subject to object ACLs

**CLOUD SHELL** Terminal (qwiklabs-gcp-02-3e3e1594e561) + \* ↻ Open Editor

```
[TMYMELAF] * #objects
[TMYMELAF] * #strings
[TMYMELAF] * #arrays
[TMYMELAF] * #maps
[TMYMELAF] * #sets
[TMYMELAF] * #maps
[TMYMELAF] * #messages
[TMYMELAF] * #ids
[TMYMELAF] * #ResourceInfo
[TMYMELAF] * #HttpServletRequest
[TMYMELAF] * #HttpSession
[TMYMELAF] * #fields
[TMYMELAF] * #types
[TMYMELAF] * #methods
[TMYMELAF] * #requestAttributes
[TMYMELAF] * #StandardExpressionParser: Standard Expression Parser
[TMYMELAF] * #StandardJavaScriptSerializer: org.thymeleaf.standard.serializer.StandardJavaScriptSerializer@2cf344d7
[TMYMELAF] * #StandardJavaObjectMapper: com.fasterxml.jackson.databind.ObjectMapper@standard.ObjectMapper@99003
[TMYMELAF] * #EnableSpringELCompiler: false
[TMYMELAF] * #StandardVariableExpressionEvaluator: SpringEL
[TMYMELAF] * #StandardConversionService: org.thymeleaf.spring3.expression.SpringStandardConversionService@1823636
[TMYMELAF] * Dialect [0 of 2]: yawntime (org.thymeleaf.extras.javaftime.dialect.JavaTimeDialect)
[TMYMELAF] * Expression Objects:
[TMYMELAF] * #temporal
[TMYMELAF] * #TemplateEngine: TEMPLATE ENGINE CONFIGURED OK
06:26:34.598 [http-nio-8080-exec-2] DEBUG org.thymeleaf.TemplateEngine - [TMYMELAF] TEMPLATE ENGINE INITIALIZED
06:27:14.880 [http-nio-8080-exec-4] DEBUG o.s.b.BeanCache.CachedintrospectionResults - Not strongly caching class [com.google.training.appdev.services.gcp.domain.Question] because it is not cache-safe
06:27:14.880 [http-nio-8080-exec-4] DEBUG o.s.b.BeanCache.CachedintrospectionResults - Not strongly caching class [com.google.training.appdev.services.gcp.domain.Question] because it is not cache-safe
06:27:47.148 [http-nio-8080-exec-5] DEBUG o.s.b.a.w.s.WelcomePageHandlerMapping - Mapped to ParameterizableViewController [view="forward:index.html"]
```

Get started with Cloud Storage

- Getting bucket information
- Uploading objects
- Downloading objects
- Use cases for Cloud Storage
- Terraform samples
- Architecture guides for storage
- Making data public

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

End Lab 01:40:00

Click **Check my progress** to verify the objective.

Add Objects to Cloud Storage

Open Google Console

Username: student-88-4ee60f3be16@qwiklabs-gcp-02-3e3e1594e561.iam.gserviceaccount.com

Password: oBBCQAx1gj1B

GCP Project ID: qwiklabs-gcp-02-3e3e1594e561

7. Return to the Cloud Console and navigate to **Navigation menu > Cloud Storage**.

8. On the **Cloud Storage > Browser** page, click the correct bucket (named <Project ID>-media).

You should see your new object named #UniqueNumber#Google\_Cloud\_Storage\_logo.png.

Click **Check my progress** to verify the objective.

Create a Datastore entity

Check my progress

Assessment Completed!

Run the client application and test the Cloud Storage public URL.

1. Add /api/quizzes/gcp to the end of the Quiz application's URL.

You should see that the application returns JSON data to the client corresponding to the Question you added in the web application:

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

Start Lab 02:00:00

The `imageUrl` property should have a value corresponding to the new object you created in Cloud Storage.

2. Return to the application home page and click the **Take Test** link.

3. Click **GCP**, and answer each question.

When you get to the question you just added, you should see the image has been formatted inside the client-side web application!

How satisfied are you with this lab?

Additional Comments

Cancel Submit

End your lab

When you have finished with this lab, click the **End your lab** button. This will give you an opportunity to rate the lab experience. Select the applicable number of stars, type a comment, and then click **Submit**.

You will be given an opportunity to rate the lab experience. Select the applicable number of stars, type a comment, and then click **Submit**.

The number of stars indicates the following:

- 1 star = Very dissatisfied
- 2 stars = Dissatisfied
- 3 stars = Neutral
- 4 stars = Satisfied
- 5 stars = Very satisfied

You can close the dialog box if you don't want to provide feedback.

Cloud Shell (qwiklabs-gcp-00-179bb30077fe) +

```
Welcome to Cloud Shell! Type "help" to get started.
Your Cloud Platform project in this session is set to qwiklabs-gcp-00-179bb30077fe.
To set the active account, run:
$ gcloud config set account ACCOUNT

student_00_efd2fb234a59@cloudshell:~ (qwiklabs-gcp-00-179bb30077fe)$ gcloud auth list
Credentialed Accounts

ACTIVE: -
ACCOUNT: student-00_efd2fb234a59@qwiklabs.net

To set the active account, run:
$ gcloud config set account ACCOUNT

student_00_efd2fb234a59@cloudshell:~ (qwiklabs-gcp-00-179bb30077fe)$ gcloud config list project
[core]
project = qwiklabs-gcp-00-179bb30077fe

Your active configuration is: [cloudshell-23790]
student_00_efd2fb234a59@cloudshell:~ (qwiklabs-gcp-00-179bb30077fe)$ virtualenv -p python3 vrenv
created virtual environment CPython 3.7.final.0 in /home/student_00_efd2fb234a59/.local/share/virtualenvs/vrenv
added seed packages: Flask==2.3.2, Jinja2==3.1.2, MarkupSafe==2.1.2, Werkzeug==3.4, blinker==3.2, cachetools==3.3.0, certifi==2023.5.1, charset_normalizer==3.1.0, click==8.1.3, google-api-core==2.11.0, google-auth==2.18.1, google-auth-oauthlib==1.15.0, google-cloud-bigtable==1.15.0, google-cloud-common-protos==1.15.0, google-cloud-storage==1.15.0, google-cloud-status==1.14.2, grpcio==1.54.2, grpcio-statuscode==1.15.0, requests==2.31.0, rsa==4.7.2, setup-tools==0.7.2, six==1.16.0, utilz==1.26.16, wheel==0.40.0, zipp==3.15.0

Your active configuration is: [cloudshell-23790]
student_00_efd2fb234a59@cloudshell:~ (qwiklabs-gcp-00-179bb30077fe)$ vrenv/bin/activate
(vrenv) student_00_efd2fb234a59@cloudshell:~ (qwiklabs-gcp-00-179bb30077fe)$ git clone https://github.com/GoogleCloudPlatform/training-data-analyst
(vrenv) student_00_efd2fb234a59@cloudshell:~ (qwiklabs-gcp-00-179bb30077fe)$ cd training-data-analyst/courses/developing-apps/v1.3/python/cloudstorage
(vrenv) student_00_efd2fb234a59@cloudshell:~ (qwiklabs-gcp-00-179bb30077fe)$ cd /cloudstorage/start
(vrenv) student_00_efd2fb234a59@cloudshell:~ (qwiklabs-gcp-00-179bb30077fe)$ ./start
You are creating an app for project (qwiklabs-gcp-00-179bb30077fe).
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-00-179bb30077fe) and region (us-central)...working..
```



Cloud Storage (Part 1)

**End Lab** 00:49:11

Caution: When you are in the console, do not deviate from the lab instructions. Doing so may cause your account to be blocked. [Learn more.](#)

[Open Google Console](#)

Username: student-00-efdf2fb234a5!

Password: zStQ8J0zM5cq

GGP Project ID: qwiklabs-gcp-00-179bb3l

4. To export the Cloud Storage bucket name as an environment variable named GCLLOUD\_BUCKET, execute the following command:

```
export GCLLOUD_BUCKET=$DEVSHELL_PROJECT_ID-media
```

Note: Notice that the application makes use of environment variables for configuration. This allows the development team to deploy the application into development, test, staging, and production just by changing these variables.

Click [Check my progress](#) to verify the objective.

Create a bucket

[Check my progress](#)

Assessment Completed!

Overview 50/100

Setup and requirements

Task 1. Create a virtual environment

Task 2. Prepare the Quiz application

Task 3. Examine the Quiz application code

**Task 4. Create a Cloud Storage bucket**

Task 5. Adding objects to Cloud Storage

End your lab

### Task 5. Adding objects to Cloud Storage

Google Cloud Editor

File Edit Selection View Go Run Terminal Help

storage.py

```
cloudstorage > start > quiz > gcp > storage.py
blob = bucket.blob(image_file.filename)

# END TODO

# TODO: Use the blob to upload the file
blob.upload_from_string(
    image_file.read(),
    content_type=image_file.content_type)

# END TODO

# TODO: Make the object public
if public:
    blob.make_public()

# END TODO

# TODO: Modify to return the blob's Public URL
return blob.public_url

# END TODO
```

We found a Python environment in this workspace. Do you want to select it to start up the features in the Python extension? Only accept if you trust this environment.

Yes No Learn more Do not show again

Required assets to build and debug are missing from 'student-00-efdf2fb234a5!'. Add them?

Don't Ask Again Not Now Yes

master Go 1.20.4 Go 110 Cloud Code cartservice.de Connect to Google Cloud

Line 75, Col 27 LF UTF-8 Spaces 4 Python

Google Cloud

CLOUD SHELL Editor

File Edit Selection View Go Run Terminal Help

storage.py

```

cloudstorage > start > quiz > gcp > storage.py
72
73 # TODO: Modify to return the blob's Public URL
74
75
76
77
78 ...
79
80 uploads file into google cloud storage
81 - call method to upload file (public=True)
82 - call datastore helper method to save question
83
84 def save_question(data, image_file):
85     # TODO: If there is an image file, then upload it
86     # And assign the result to a new Datastore
87     # property imageUrl
88     # If there isn't, assign an empty string
89     if image_file:
90         data['imageUrl'] = str(
91             upload_file(image_file, True))
92     else:
93         data['imageUrl'] = u''
94     # END TODO
95     data['correctAnswer'] = int(data['correctAnswer'])
96     datastore.save_question(data)
97

```

We found a Python environment in this workspace. Do you want to select it to start up the features in the Python extension? Only accept if you trust this environment.

Yes No Learn more Do not show again

Required assets to build and debug are missing from 'student\_00\_ef02fb234a59'. Add them?

Don't Ask Again Not Now Yes

Problems Output

Quite Interesting Quiz Create Question Take Test Leaderboard

### Add question

**Author**

**Quiz**

**Title**

**Image**

Google\_Cloud\_Storage\_logo.png

**Answer 1**

app engine

**Answer 2**

cloud storage

**Answer 3**

compute engine

**Answer 4**

kubernetes engine

Snip & Sketch

Snip saved to clipboard

Select here to mark up and share the image

Google Cloud | qwiklabs-gcp-00-179bb30077fe | Search (/) for resources, docs, products, and more | Search

**Cloud Storage**

Buckets Monitoring NEW Settings

**View security recommendations**

Improve security by applying security recommendations to your buckets. The security insights column in the table describes which buckets have excess permissions.

**VIEW IN TABLE** **LEARN MORE**

**Filter** Filter buckets

Name	Created	Location type	Location	Default storage class	Last modified	Public access
qwiklabs-gcp-00-179bb30077fe-media	May 25, 2023, 12:44:39 AM	Multi-region	us	Standard	May 25, 2023, 12:44:39 AM	Subject to object ACLs
qwiklabs-gcp-00-179bb30077fe.appspot_-	May 25, 2023, 12:43:47 AM	Multi-region	us	Standard	May 25, 2023, 12:43:47 AM	Subject to object ACLs
staging.qwiklabs-gcp-00-179bb30077fe_-	May 25, 2023, 12:43:47 AM	Multi-region	us	Standard	May 25, 2023, 12:43:47 AM	Subject to object ACLs

**CLOUD SHELL** Terminal (qwiklabs-gcp-00-179bb30077fe) + - Open Editor

```
rst (line 5): (2023.6.7)
Requirement already satisfied: pyasm1<0.6.0,>=0.4.6 in /home/student_00_efd2fb234a59/vrenv/lib/python3.9/site-packages (from pyasm1-modules>=0.2.1->google-auth<3.0dev,>=1.25.0->google-cloud-core>=1.1.1,>=1 requirements.txt (line 3)) (0.5.0)
...
Project ID: qwiklabs-gcp-00-179bb30077fe
(virtualenv) student_00_efd2fb234a59$cloudshell:/~$cd /cloudstorage/start (qwiklabs-gcp-00-179bb30077fe)$ 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: 457-422-757
"C:\virtualenv\student_00_efd2fb234a59$cloudshell:/~$cd /cloudstorage/start (qwiklabs-gcp-00-179bb30077fe)$ grutil mb gs://$DEVSHELL_PROJECT_ID-media
Creating gs://qwiklabs-gcp-00-179bb30077fe-media/...
(virtualenv) student_00_efd2fb234a59$cloudshell:/~$cd /cloudstorage/start (qwiklabs-gcp-00-179bb30077fe)$ export GCLLOUD_BUCKET=$DEVSHELL_PROJECT_ID-media
(virtualenv) student_00_efd2fb234a59$cloudshell:/~$cd /cloudstorage/start (qwiklabs-gcp-00-179bb30077fe)$ 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: 457-422-757
127.0.0.1 - [25/May/2023 06:49:13] "GET /?authuser=1&redirectedPreviously=true HTTP/1.1" 200 -
127.0.0.1 - [25/May/2023 06:49:13] "GET /favicon.ico HTTP/1.1" 404 -
127.0.0.1 - [25/May/2023 06:49:20] "GET /questions/+add HTTP/1.1" 200 -
127.0.0.1 - [25/May/2023 06:49:20] "POST /questions/+add HTTP/1.1" 302 -
127.0.0.1 - [25/May/2023 06:50:43] "GET / HTTP/1.1" 200 -
```

12:51 AM

**Get started with Cloud Storage**

- Getting bucket information** Help document Get information on the size and metadata of your Cloud Storage buckets.
- Uploading objects** Help document Upload the objects containing your data to your Cloud Storage buckets.
- Downloading objects** Help document Download the objects from your Cloud Storage buckets.
- Use cases for Cloud Storage** Help document Explore use cases, best practices, and industry solutions.
- Terraform samples** Help document See examples of using Terraform to create Cloud Storage resources.
- Architecture guides for storage** Help document Discover best practices and reference architectures for storage.
- Making data public** Help document Set up your objects to be publicly readable by anyone on the Internet with the link.

**App Dev - Storing Image and Video Files in Cloud Storage: Python**

Cloud Storage (Part 1)

**End Lab** 00:37:30

**Cautions:** When you are in the console, do not deviate from the lab instructions. Doing so may cause your account to be blocked. Learn more

**Open Google Console**

Username: student-00-efd2fb234a59

Password: zSTQBj02K5cq

GCP Project ID: qwiklabs-gcp-00-179bb31

**Overview** 50/100

Setup and requirements

Task 1. Create a virtual environment

Task 2. Prepare the Quiz application

Task 3. Examine the Quiz application code

Task 4. Create a Cloud storage bucket

Task 5. Adding objects to Cloud Storage

End your lab

**Quiz** Google Cloud Platform

Title: Which product does this logo relate to?

Image: Upload the Google\_Cloud\_Storage\_logo.png file you previously downloaded

Answer 1: App Engine

Answer 2: Cloud Storage (Select the Answer 2 radio button)

Answer 3: Compute Engine

Answer 4: Kubernetes Engine

6. Return to the Cloud Console and navigate to **Navigation menu > Cloud Storage**.

7. On the **Cloud Storage > Buckets** page, click the correct bucket (named <Project ID>-media).

You should see your new object named Google\_Cloud\_Storage\_logo.png.

Click **Check my progress** to verify the objective.

Upload objects to your bucket

**Check my progress**

**Assessment Completed**

Run the client application and test the Cloud Storage public URL

1. Add /api/quizzes/gcp to the end of the application's URL.

You should see that JSON data has been returned to the client corresponding to the

12:56 AM

Cloud Storage (Part 1) Next activity

End Lab 00:37:00

When you get to the question you just added, you should see the image has been formatted inside the client-side web application!

Caution: When you are in the console, do not deviate from the lab instructions. Doing so may cause your account to be blocked. Learn more.

Open Google Console

Username: student-80-edf2fb234a5! Password: zStQ8J0zMsq GCP Project ID: qwiklabs-gcp-80-179bb3l

**End your lab**

When you have completed your lab, click **End Lab**. Google Cloud Skills Boost removes the resources you've used and cleans the account for you.

You will be given an opportunity to rate the lab experience. Select the applicable number of stars, type a comment, and then click **Submit**.

The number of stars indicates the following:

- 1 star = Very dissatisfied
- 2 stars = Dissatisfied
- 3 stars = Neutral
- 4 stars = Satisfied
- 5 stars = Very satisfied

You can close the dialog box if you don't want to provide feedback.

For feedback, suggestions, or corrections, please use the **Support** tab.

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Overview  
Setup and requirements  
Task 1. Create a virtual environment  
Task 2. Prepare the Quiz application  
Task 3. Examine the Quiz application code  
Task 4. Create a Cloud Storage bucket  
Task 5. Adding objects to Cloud Storage  
End your lab

100/100



Cloud Storage (Part 1) Start Lab 01:00:00

When you get to the question you just added, you should see the image has been formatted inside the client-side web application!

**End your lab**

When you have completed your lab, click **End Lab**. Google Cloud Skills Boost removes the resources you've used and cleans the account for you.

You will be given an opportunity to rate the lab experience. Select the applicable number of stars, type a comment, and then click **Submit**.

The number of stars indicates the following:

- 1 star = Very dissatisfied
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- 3 stars = Neutral
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Overview  
Setup and requirements  
Task 1. Create a virtual environment  
Task 2. Prepare the Quiz application  
Task 3. Examine the Quiz application code  
Task 4. Create a Cloud Storage bucket  
Task 5. Adding objects to Cloud Storage  
End your lab

-1/100



Practice Quiz: Best Practices for Cloud Storage

Your score: 100% Passing score: 66%

Congratulations! You passed this assessment.

Retake

1. Which of the following bucket names are valid? (Select all 2 correct answers)

bucket\_for\_my\_web\_app

A bucket name can contain lowercase alphanumeric characters, hyphens, and underscores. It can contain dots (.) if it forms a valid domain name with a top-level domain (such as .com). Bucket names must start and end with an alphanumeric character

vanilla-bucket

A bucket name can contain lowercase alphanumeric characters, hyphens, and underscores. It can contain dots (.) if it forms a valid domain name with a top-level domain (such as .com). Bucket names must start and end with an alphanumeric character

MyFavoriteBucket

Practice Quiz: Best Practices for Cloud Storage

1. Review the following gsutil command. What is the result when the command is executed? `gsutil mb -c regional -l us-central1 gs://parent-bucket`

The command modifies a bucket called "parent-bucket" or creates the bucket if it does not already exist.

The command modifies a bucket called "parent-bucket" and changes properties to "us-central1" location and "regional" storage class.

The command creates a bucket called "regional" in the "us-central1" location under an existing bucket called "parent-bucket".

The command creates a bucket called "parent-bucket" in the "us-central1" location with "regional" storage class.

Correct!

2. What are the advantages of hosting static websites on Google Cloud Storage? (Select all 2 correct answers)

Cloud Storage supports creation of signed URLs.

Cloud Storage automatically authenticates users.

You get automatic scaling with no additional effort.

Cloud Storage scales automatically to serve a large volume of traffic.

You don't need to set up and run a Compute Engine instance and load balancer.

Final Quiz: Best Practices for Cloud Storage

Your score: 100% Passing score: 75%

Congratulations! You passed this assessment.

**1.** Identify two key aspects of this build system's architecture.

It is best to set up gsutil scripts to transition objects to Nearline and Coldline storage classes.

As the build artifacts get older, they move through various storage classes to limit their retention cost.

**Correct!**

The build system stores build artifacts in Cloud Storage.

**Correct!**

Jenkins can also be used to store build artifacts long term.

Final Quiz: Best Practices for Cloud Storage

**2.** Before transferring data to you, a third-party breaks up each large data file into 15 small chunks because of network bandwidth issues. You want to use Google BigQuery to directly query Cloud Storage data. What is the best way to combine the chunks into a single file?

Use strongly consistent reads and writes to ensure accuracy of file transfer.

Use the "gsutil -m" command to perform a multi-threaded/multi-processing to transfer chunks as a single unit.

Use the "gsutil compose" command to build a composite object from smaller chunks.

Ask third-party to use truncated exponential backoff to failed upload of a large file.

**Correct!**

**3.** You are tasked with designing a disaster recovery system in your organization. You need to make sure that all applications recover and become available as quickly as possible. What storage class is ideal for storing backups of your data if the data is to be stored for two years and is unlikely to be accessed?

Archive

Nearline

Coldline

Standard

**Correct!**

The screenshot shows a quiz interface titled "Final Quiz: Best Practices for Cloud Storage". A question asks: "Review the following gsutil command. What is the result when the command is executed? gsutil mb -c regional -l us-central1 gs://parent-bucket". The correct answer is "The command creates a bucket called 'parent-bucket' in the 'us-central1' location with 'regional' storage class.", which is highlighted with a yellow box. Other options include "The command modifies a bucket called 'parent-bucket' or creates it if it does not already exist.", "The command creates a bucket called 'parent-bucket' in the 'us-central1' location under an existing bucket called 'parent-bucket'.", and "The command modifies a bucket called 'parent-bucket' and changes properties to 'us-central1' location and 'regional' storage class.". A "Correct!" message is displayed at the bottom.

The screenshot shows a "Course Resources" page. It displays a PDF document titled "Getting Started With Application Development" from Google Cloud. The document includes a table of contents with links to "Module 1: Best Practices for Application Development", "Module 2: Getting Started with Google Cloud Development", "Module 3: Overview of Data Storage Options", "Module 4: Best Practices for Using Datastore", and "Module 5: Best Practices for Using Cloud Storage". The left sidebar of the course interface is visible, showing navigation links like "Best Practices for Using Cloud Storage (Part2)", "Lab Overview", "Lab: App Dev - Storing Image and Video Files in Cloud Storage: Node.js", "Lab: App Dev - Storing Image and Video Files in Cloud Storage: Java", "Lab: App Dev - Storing Image and Video Files in Cloud Storage: Python", "Practice Quiz: Best Practices for Cloud Storage", "Final Quiz: Best Practices for Cloud Storage", "Module Review", and "Wrap up".