

UNIVERSIDAD RAFAEL LANDÍVAR

FACULTAD DE INGENIERÍA

ANÁLISIS Y DISEÑO II

SECCIÓN 1 VESPERTINA

DR. HILDA



SECURING AND INTEGRATING COMPONENTS OF YOUR APPLICATION

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GUATEMALA DE LA ASUNCIÓN, JUNIO 16 DE 2023

CAMPUS CENTRAL

Google Cloud Paths Explore Profile Subscriptions

Google Cloud Skills Boost

Cloud Developer Learning Path

Course

Securing and Integrating Components of your Application

5 days Introductory 10 Credits

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 develop more secure applications, implement federated identity management, and integrate application components by using messaging, event-driven processing, and API gateways.

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 second course of the Developing Applications with Google Cloud series. After completing this course, enroll in the App Deployment, Debugging, and Performance course.

Next activity: IAM Concepts →

Cloud Shell (qwiklabs-gcp-01-34cb2945cd11) +

```
[core]
project = qwiklabs-gcp-01-34cb2945cd11
Your active configuration is: [cloudshell-14469]
student_00_c59ab4a38e38cloudshell: (qwiklabs-gcp-01-34cb2945cd11)$ git clone --depth=1 https://github.com/GoogleCloudPlatform/training-data-analyst
Cloning into 'training-data-analyst...'...
remote: Enumerating objects: 7647, done.
remote: Counting objects: 1000 (v661/7647), done.
remote: Compressing objects: 1000 (delta 2123), reused 5788 (delta 1515), pack-reused 0
remote: Total 7647 (delta 2123), reused 5788 (delta 1515), pack-reused 0
Receiving objects: 100% (7647/7647), 330.88 MiB | 22.31 MiB/s, done.
Resolving deltas: 100% (5788/5788), done.
Updating files: 100% (12840/12840), done.
student_00_c59ab4a38e38cloudshell: (qwiklabs-gcp-01-34cb2945cd11)$ ls -s ./training-data-analyst/courses/developingapps/v1.3/nodejs.firebaseio ~./firebase
student_00_c59ab4a38e38cloudshell: (qwiklabs-gcp-01-34cb2945cd11)$ cd ~./firebase/start
student_00_c59ab4a38e38cloudshell: (qwiklabs-gcp-01-34cb2945cd11)$ ./prepare_environment.sh
Creating App Engine app
Uploading an app for project (qwiklabs-gcp-01-34cb2945cd11).
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/location>.
Creating App Engine application in project [qwiklabs-gcp-01-34cb2945cd11] and region [us-central]....done.
Success! The app is now created. Please use 'cloud app deploy' to deploy your first app.
student_00_c59ab4a38e38cloudshell: (qwiklabs-gcp-01-34cb2945cd11)$ cd media...
student_00_c59ab4a38e38cloudshell: (qwiklabs-gcp-01-34cb2945cd11)$ ./createMedia.sh
Creating GCLLOUD PROJECT and GCLLOUD BUCKET
Installing dependencies
removed 75 packages, and audited 319 packages in 11s
10 packages are looking for funding
  run 'npm fund' for details
npm WARN deprecated multergit@1.4.1: Multer 1.x is affected by CVE-2022-24434. This is fixed in v1.4.4-its.1 which drops support for versions of Node.js before 6. Please upgrade to at least Node.js 6 and version 1.4.4-its.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 6.0.
added 319 packages, and audited 319 packages in 44s
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! 8.1.1 -> 8.6.7
npm notice Changelog: https://github.com/npm/cli/releases/tag/v9.6.7
npm notice Run npm install -g npm@8.6.7 to update!
npm notice
Creating Datastore entities
Entities created
Project ID: qwiklabs-gcp-01-34cb2945cd11
student_00_c59ab4a38e38cloudshell: (qwiklabs-gcp-01-34cb2945cd11)$
```

Google Cloud Search (qwiklabs-gcp-01-34cb2945cd11) ▾

Cloud Shell Terminal (qwiklabs-gcp-01-34cb2945cd11) X + -

```

remote: Enumerating objects: 7647, done.
remote: Counting objects: 100% (7647/7647), done.
remote: Compressing objects: 100% (5177/5177), done.
remote: Writing objects: 100% (7647/7647), done.
Resolving deltas: 100% (7647/7647), 530.08 MiB / 22.51 MiB/s, done.
Resolving deltas: 100% (123/123), done.
Up-to-date; nothing to do.
student_00_c53ab4a38e38cloudshell: (qwiklabs-gcp-01-34cb2945cd11)$ ls -s ~/.training-data/analyst/courses/developingapps/v1.3/nodejs.firebaseio ~/firebase
student_00_c53ab4a38e38cloudshell: (qwiklabs-gcp-01-34cb2945cd11)$ cd ~/.firebase/start (qwiklabs-gcp-01-34cb2945cd11)$ . prepare_environment.sh
Creating App Engine app
You are creating an app for project (qwiklabs-gcp-01-34cb2945cd11).
WARNING: Creating an App Engine application for a project is irreversible and the region cannot be changed. Most information about regions can be found at
<https://cloud.google.com/appengine/docs/locations>.

Creating App Engine application in project [qwiklabs-gcp-01-34cb2945cd11] and region [us-central]...done.
Success! The app is now created. Please use 'gcloud app deploy' to deploy your first app.
Making bucket: gs://qwiklabs-gcp-01-34cb2945cd11-media
Creating bucket [gs://qwiklabs-gcp-01-34cb2945cd11-media]...
Exporting GCLOUD_PROJECT and GCLOUD_BUCKET
Installing dependencies
removed 75 packages, and changed 118 packages in 11s
10 packages are looking for funding
  run 'npm fund' for details
npm notice 1 package 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 310 packages, and audited 319 packages in 44s
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
npm notice New major version of npm available! 8.5.4 => 9.6.7
npm notice Changelog: https://github.com/npm/cli/releases/tag/v9.6.7
npm notice Run npm install -g npm@9.6.7 to update!
npm notice
Creating Datastore entities
Entities created.
Project lib: (qwiklabs-gcp-01-34cb2945cd11)
student_00_c53ab4a38e38cloudshell: (qwiklabs-gcp-01-34cb2945cd11)$ npm start
> quite-interesting-quiz@1.0.0 start
> node server/app.js
[0]
App listening on port 8080

```

https://6080-cs-6cd948a-e3d5-43eb-a316-c53824ab0812.ql-us-east1-k8n.cloudshell.dev/?authuser=2&redirectedPreviously=true

Quite Interesting Quiz Create Question Take Test 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

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

Identity Providers [ADD A PROVIDER](#)

Take a tutorial on signing in a user with an email. [TAKE TUTORIAL](#)

Methods users can use to sign into your project. By default, all providers are disabled.

Name ↑ Enabled

No providers to display.

APPLICATION SETUP DETAILS

Google Cloud | Search (/) for resources, docs, products, and more | Identity Platform | New identity provider | Project Settings

Sign-in method

Select and configure an identity provider.

Select a provider — Email / Password

Enabled

Configure email/password

Passwords

Allow passwordless login

Sign-in occurs via confirmation email link. [Learn more](#)

Templates

Templates for emails sent to users who sign up with email/password identity provider.

[CONFIGURE TEMPLATES](#)

Import users

You can use the password hash parameters below to import users in bulk. [Learn more](#)

[VIEW PARAMETERS](#)

[SAVE](#) [CANCEL](#)

Authorized Domains

Add domains to the allowlist that authentication servers are allowed to redirect to after signing a user in

Domain ↑	Source
8080-27542cac-44d0-41a9-9e9b-0658b0c2100c.ql-europe-west1-tcsg.cloudshell.dev	Custom
localhost	Custom
qwiklabs-gcp-01-34cb2945cd11.firebaseioapp.com	Custom
qwiklabs-gcp-01-34cb2945cd11.web.app	Custom

[ADD DOMAIN](#)

Custom SMTP settings

You can use your own SMTP server instead of the built-in email service.

Enable

Domain added

Google Cloud | qwiklabs-gcp-01-34cb2945cd11 | Search (/) for resources, docs, products, and more | Search

CLOUD SHELL Editor

File Edit Selection View Go Run Terminal Help

EXPLORER

> OPEN EDITORS

> STUDENT_00_c53ab4a38683

> firebase

> end

> start

> bin

> node_modules

> server

> api

> grpc

> public/client

> app

> index.html

> web-app

> app.js

> config.js

> setup

> package-lock.json

> package.json

> prepare_environment.sh

> training-data-analysis

> README-cloudshell.txt

index.html x

```
firebase > start > server > public > client > index.html > index.html ...
```

56 <script src="app/app.js"></script>

57 <script src="app/quizzes/quiz-module.js"></script>

58 <script src="app/quizzes/quiz-factory.js"></script>

59 <script src="app/quizzes/quiz-controller.js"></script>

60 <script src="app/auth/auth-module.js"></script>

61 <script src="app/auth/auth-factory.js"></script>

62 <script src="app/auth/auth-controller.js"></script>

63 <script src="app/auth/dlg-login.js"></script>

64 <script src="https://www.gstatic.com/firebasejs/8.0.firebaseio.js"></script>

65 <script>

66 var config = {

67 apiKey: "AIzaSyA191Yau57SIDCWhdITsPK4NnL4IQdpI8",

68 authDomain: "qwiklabs-gcp-01-34cb2945cd11.firebaseioapp.com",

69 };

70 firebase.initializeApp(config);

71 </script>

72 </body>

73 </html>

74

75

76

77

78

Problems Output C%23

Required assets to build and debug are missing from 'student_00_c53ab4a38683'. 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 Line 69, Col 13 LF: UTF-8 Spaces: 4 HTML 10:00 AM

Google Cloud | qwiklabs-gcp-01-34cb2945cd11 | Search (/) for resources, docs, products, and more | Search

Identity Platform

Users ADD USER IMPORT USERS

APPLICATION SETUP DETAILS

Filter Filter by Name

Name	Created	Signed in	Status
user1@example.com	June 5, 2023	Green	Enabled

No users selected

Please select one resource to view details.

User created



Quite Interesting Quiz



Quite Interesting Quiz

The screenshot shows a web browser window with the following details:

- URL:** https://000-cs-6cc9948e7a5-43eb-3316-cf3824ab812.eu-west-1.vpn.cloudshell.dev/client/#/quiz/gcp
- Page Title:** Quite Interesting Quiz
- Header:** GCP, Places, People, Hello user1@example.com Logout

Quite Interesting Quiz

Which company runs GCP?

- Amazon
- Google
- IBM
- Microsoft

Submit Answer

The screenshot shows a web browser window with the following details:

- URL:** https://000-cs-6cc9948e7a5-43eb-3316-cf3824ab812.eu-west-1.vpn.cloudshell.dev/client/#/register
- Page Title:** Quite Interesting Quiz
- Header:** GCP, Places, People, Register, user1@example.com, Login

Quite Interesting Quiz

Register

Register to take a test by filling in your email address and password.

Email:

user2@example.com

Password:

Register

Quite Interesting Quiz GCP Places People Hello user2@example.com Logout

Quite Interesting Quiz

Which company runs GCP?

Amazon

Google

IBM

Microsoft

Submit Answer

https://console.cloud.google.com/customer-identity/users?authUser=3&cloudshell=true&gclid=c03874ab8012af0e8111991doudshell.dev-client"gap

Google Cloud qwiklabs-gcp-04-05ef898dd96f Search (/) for resources, docs, products, and more Search

Identity Platform Users ADD USER IMPORT USERS HIDE INFO PANEL

Providers MFA APPLICATION SETUP DETAILS

Users Filter Filter by Name

Name	Created	Signed in	Status
user2@example.com	June 5, 2023	June 5, 2023	Green Black More
user1@example.com	June 5, 2023	June 5, 2023	Green Black More

No users selected Please select one resource to view details.

CLOUD SHELL Terminal (qwiklabs-gcp-04-05ef898dd96f) + Open Editor

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

16:40:09.559 [restartedMain] INFO c.q.training.appspot.QuizApplication - Started QuizApplication in 4.11 seconds (JVM running for 5.147)
16:40:09.656 [restartedMain] DEBUG o.a.b.a.ApplicationAvailabilityBean - Application availability state LivenessState changed to CORRECT
16:40:09.656 [restartedMain] DEBUG o.a.b.a.ApplicationAvailabilityBean - Creating a new thread for monitoring Thread[main,5,main]
16:40:09.658 [restartedMain] DEBUG o.a.b.a.boot.devtools.restart.Restarter - Immediately restarting application
16:40:09.658 [restartedMain] DEBUG o.a.b.a.boot.devtools.restart.Restarter - Starting application com.google.training.appspot.QuizApplication with URLs [file:/home/student_00_c3014e859675/training-data-analyst/courses/developingapps/v1.3/jaws.firebaseio/start/target/classes/]
16:40:10.052 [restartedMain] DEBUG o.a.b.a.ApplicationAvailabilityBean - Application availability state ReadinessState changed to ACCEPTING_TRAFFIC
16:40:20.971 [http-nio-8080-exec-1] INFO o.a.c.C.(Tomcat).{localhost}.{/} - Initializing Spring DispatcherServlet 'dispatcherServlet'
16:40:21.011 [http-nio-8080-exec-1] DEBUG o.s.b.a.w.WelcomePageHandlerMapping - Mapped to ParameterizableViewController [view="forward:index.html"]
```

App Dev - Adding User Authentication to your Application: Node.js

Start Lab 02:00:00

In this lab, you learned how to use Identity Platform to enable email and password registration for your 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
- 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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Thanks for reviewing this lab.

Cloud Shell (qwiklabs-gcp-04-05ef898dd96f) +

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

Open Editor

Cloud Shell (qwiklabs-gcp-04-05ef898dd96f)

```
Terminal (qwiklabs-gcp-04-05ef898dd96f) +
```

```
Downloaded from central: https://repo.maven.apache.org/maven2/commons-codec/commons-codec/1.6/commons-codec-1.6.jar (233 kB at 1.1 MB/s)
[INFO] Installing /home/student_00_c3014e859675/training-data-analyst/courses/developingapps/v1.3/java.firebaseio/start/target/appdev-0.0.1.jar to /home/student_00_c3014e859675/.m2/repository/com/google/training/appdev/0.0.1/appdev-0.0.1.jar
[INFO] BUILD SUCCESS
-----
[INFO] Total time: 49.406 s
[INFO] Finished at: 2023-06-05T16:25:26Z
[INFO]
[INFO] Creating Datastore entities
[INFO] Scanning for projects...
[INFO] [INFO] Building appdev 0.0.1
[INFO] [INFO] < com.google.training:appdev >
[INFO] [INFO]   [jar]
[INFO] [INFO]   exec-maven-plugin:3.0.0:exec (create-entities) @ appdev
[INFO] [INFO] Downloading from central: https://repo.maven.apache.org/maven2/org/codehaus/plexus/plexus-utils/3.0.20/plexus-utils-3.0.20.pom
[INFO] [INFO] Downloaded from central: https://repo.maven.apache.org/maven2/org/codehaus/plexus/plexus-utils/3.0.20/plexus-utils-3.0.20.pom (3.8 kB at 9.0 kB/s)
[INFO] [INFO] Downloading from central: https://repo.maven.apache.org/maven2/org/apache/commons/commons-exec/1.3/commons-exec-1.3.pom
[INFO] [INFO] Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/commons/commons-exec/1.3/commons-exec-1.3.pom (11 kB at 145 kB/s)
[INFO] [INFO] Downloading from central: https://repo.maven.apache.org/maven2/org/apache/commons/commons-parent/35/commons-parent-35.pom
[INFO] [INFO] Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/commons/commons-parent/35/commons-parent-35.pom (56 kB at 642 kB/s)
[INFO] [INFO] Downloading from central: https://repo.maven.apache.org/maven2/org/apache/maven/shared/maven-artifact-transfer/0.10/maven-artifact-transfer-0.10.1.pom
[INFO] [INFO] Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/shared/maven-artifact-transfer/0.10/maven-artifact-transfer-0.10.1.pom (11 kB at 176 kB/s)
[INFO] [INFO] Downloading from central: https://repo.maven.apache.org/maven2/org/codehaus/plexus/plexus-utils/3.1.0/plexus-utils-3.1.0.pom
[INFO] [INFO] Downloaded from central: https://repo.maven.apache.org/maven2/org/codehaus/plexus/plexus-utils/3.1.0/plexus-utils-3.1.0.pom (4.7 kB at 65 kB/s)
[INFO] [INFO] Downloading from central: https://repo.maven.apache.org/maven2/org/apache/maven/shared/maven-shared-util/3.1.0/maven-shared-util-3.1.0.pom
[INFO] [INFO] Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/shared/maven-shared-util/3.1.0/maven-shared-util-3.1.0.pom (128 kB at 307 kB/s)
[INFO] [INFO] Downloading from central: https://repo.maven.apache.org/maven2/org/apache/maven/shared/maven-component-annotations/1.6/jar
[INFO] [INFO] Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/shared/maven-component-annotations/1.6/jar (144 kB at 144 kB/s)
[INFO] [INFO] Downloading from central: https://repo.maven.apache.org/maven2/org/apache/maven/shared/maven-common-artifact-filters/3.0.1/maven-common-artifact-filters-3.0.1.jar
[INFO] [INFO] Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/shared/maven-common-artifact-filters/3.0.1/maven-common-artifact-filters-3.0.1.jar (61 kB at 144 kB/s)
[INFO] [INFO] Downloading from central: https://repo.maven.apache.org/maven2/org/apache/maven/shared/maven-common-artifact-filters/0.10/maven-common-artifact-filters-0.10.1.jar
[INFO] [INFO] Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/shared/maven-common-artifact-filters/0.10/maven-common-artifact-filters-0.10.1.jar (164 kB at 360 kB/s)
[INFO] [INFO] Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/shared/maven-common-artifact-filters/0.10/maven-common-artifact-filters-0.10.1.jar (164 kB at 360 kB/s)
[INFO] Entity Factory Creating Initial Questions
[INFO] Questions Stored for Quiz GCP
[INFO] Question(quiz="GCP", author="Higel", title="Which GCP product is an Object Store?", answerOne="Cloud Storage", answerTwo="Datastore", answerThree="Big Table", answerFour="All of the above", correctAnswer=1, imageUrl='', id=56324990823
30112)
[INFO] Question(quiz="GCP", author="Higel", title="Which company runs GCP?", answerOne="Amazon", answerTwo="Google", answerThree="IBM", answerFour="Microsoft", correctAnswer=2, imageUrl='', id=5634161670881280)
[INFO] Question(quiz="GCP", author="Higel", title="Which GCP product is NoSQL?", answerOne="Compute Engine", answerTwo="Datastore", answerThree="Spanner", answerFour="BigQuery", correctAnswer=3, imageUrl='', id=5644004762845184)
[INFO] Questions Stored for Quiz Places
[INFO] Question(quiz="Places", author="Higel", title="What is the capital of France?", answerOne='Berlin', answerTwo='London', answerThree='Paris', answerFour='Stockholm', correctAnswer=3, imageUrl='', id=570458633556992)
[INFO] BUILD SUCCESS
-----
[INFO] Total time: 7.069 s
[INFO] Finished at: 2023-06-05T16:25:36Z
[INFO]
Project ID: qwiklabs-gcp-04-05ef898dd96f
student_00_c3014e859675$cd /qwiklabs-gcp-04-05ef898dd96f $
```

CLOUD SHELL

Terminal (qwiklabs-gcp-04-05ef89dd96f) + -

```

ConditionalOnClass did not find required classes 'org.eclipse.jetty.websocket.java.server.internal.JavaxWebSocketServerContainer', 'org.eclipse.jetty.websocket.server.JettyWebSocketServerContainer' (OnClassCondition)
WebServletAutoConfiguration.JettyWebSocketConfiguration:
    Did not match:
        - @ConditionalOnClass did not find required class 'org.eclipse.jetty.websocket.jsr356.server.deploy.WebSocketServerContainerInitializer' (OnClassCondition)

WebSocketServerAutoConfiguration.UndertowWebSocketConfiguration:
    Did not match:
        - @ConditionalOnClass did not find required class 'io.undertow.websockets.jsr.Bootstrap' (OnClassCondition)

XADataSourceAutoConfiguration:
    Did not match:
        - @ConditionalOnClass did not find required class 'javax.transaction.TransactionManager' (OnClassCondition)

Exclusions:
-----
None

Unconditional classes:
-----
org.springframework.boot.autoconfigure.context.ConfigurationPropertiesAutoConfiguration
org.springframework.boot.actuate.autoconfigure.availability.AvailabilityContributorAutoConfiguration
org.springframework.boot.actuate.autoconfigure.info.InfoContributorAutoConfiguration
org.springframework.boot.autoconfigure.context.PropertyPlaceholderAutoConfiguration
org.springframework.boot.autoconfigure.context.LifecycleAutoConfiguration
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.autoconfigure.availability.ApplicationAvailabilityAutoConfiguration
org.springframework.boot.autoconfigure.info.ProjectInfoAutoConfiguration
org.springframework.boot.actuate.autoconfigure.web.server.ManagementContextAutoConfiguration

16:27:01.480 [restartedMain] INFO o.a.training.appdev.QuizApplication - Started QuizApplication in 1:14 seconds (JVM running for 3.815)
16:27:01.542 [restartedMain] DEBUG o.a.b.a.ApplicationAvailabilityBean - Application availability state LicensedState changed to CORRECT
16:27:01.544 [restartedMain] DEBUG o.a.b.boot.devtools.restart.Restarter - Creating new Restarter for thread Thread[main,5,main]
16:27:01.544 [restartedMain] DEBUG o.a.b.boot.devtools.restart.Restarter - Immediately restarting application
16:27:01.544 [restartedMain] DEBUG o.a.b.boot.devtools.restart.Restarter - Starting application com.google.quiz.QuizApplication with URLs [file:/home/student_00_c3014e85967/training-data-analyst/courses/developingapps/v1.3/]
ava/fasterxml/jackson/core/JsonParser.class
16:27:01.546 [restartedMain] DEBUG o.a.b.a.ApplicationAvailabilityBean - Application availability state ReadinessState changed to ACCEPTING_TRAFFIC
[]
```

https://0080-cs-9f04f6b-d0b1-4757-a1b-19950f011cfca.us-east1.wifly.cloudshell.dev/authuser=35&redirectedPreviously=true

Quite Interesting Quiz Create Question Take Test 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 image consists of three vertically stacked screenshots of the Google Cloud Platform Identity Platform interface.

Screenshot 1: New identity provider

This screenshot shows the "New identity provider" configuration page. Under "Select a provider", "Email / Password" is chosen. The "Enabled" checkbox is checked. Below this, there's a "Configure email/password" section with "Passwords" and "Templates" subsections. A "Import users" section is present with a note about importing users in bulk. At the bottom are "SAVE" and "CANCEL" buttons.

Screenshot 2: Project Settings - Authorized Domains

This screenshot shows the "Project Settings" page with the "Authorized Domains" tab selected. It lists several domains with their sources: "8080-27542ca5-44d0-41a9-a9e6-065800c2100c.ql-europe-west1-cltg.cloudshell.dev" (Custom), "localhost" (Custom), "qwiklabs-gcp-04-05ef898dd96f.firebaseio.com" (Custom), and "qwiklabs-gcp-04-05ef898dd96f.web.app" (Custom). An "ADD DOMAIN" button is available.

Screenshot 3: Users - Application Setup Details

This screenshot shows the "Users" page with the "APPLICATION SETUP DETAILS" panel open. It displays a message: "No users selected" and "Please select one resource to view details." Below this, a "Cloud Shell Editor" window is visible, showing a terminal session with a "User created" message and dependency update notifications.

Google Cloud | qwiklabs-gcp-04-05ef@98dd96f | Search (/) for resources, docs, products, and more | Open Terminal | Editor

File Edit Selection View Go Run Terminal Help

EXPLORER

> OPEN EDITORS

> STUDENT_00_C3014e859675 ...

STUDENT_00_C3014e859675

- firebase
- start
- src/main
- java/com/google/training...
- resources
- static
- client
- index.html
- index.html
- templates
- application.properties
- key.json
- logback.xml
- pom.xml
- target
- prepare_environment.sh
- training-data-analyst
- README-cloudshell.txt

```

index.html ./main/resources/static index.html ./client ...
firebase > start > src > main > resources > static > client > index.html > index.html > ...
39
40 <script src="//ajax.googleapis.com/ajax/libs/angularjs/1.7.8/angular.js"></script>
41 <script src="//ajax.googleapis.com/ajax/libs/angularjs/1.7.8/angular-route.js"></script>
42 <script src="//cdnjs.cloudflare.com/ajax/libs/angular-ui-bootstrap/2.5.0/ui-bootstrap-tpls.js"></script>
43 <script src="https://cdn.firebaseio.com/lib/angularfire/2.2.0/angularfire.min.js"></script>
44 <script src="app/app.js"></script>
45 <script src="app/quizzes/quiz-module.js"></script>
46 <script src="app/quizzes/quiz-factory.js"></script>
47 <script src="app/quizzes/quiz-controller.js"></script>
48 <script src="app/auth/auth-module.js"></script>
49 <script src="app/auth/auth-factory.js"></script>
50 <script src="app/auth/auth-controller.js"></script>
51 <script src="app/auth/qqlq-login.js"></script>
52 <script src="https://www.gstatic.com/firebasejs/8.0.firebaseio.js"></script>
53 <script src="app/auth/auth.js"></script>
54 <script src="app/auth/auth-controller.js"></script>
55 <script src="app/auth/qqlq-login.js"></script>
56
57 <script src="https://www.gstatic.com/firebasejs/8.0.firebaseio.js"></script>
58
59 var config = {
60   apiKey: "AIzaSyAqpiWpQDlThZgIAVe2-HNmpDdDr8SJF4",
61   authDomain: "qwiklabs-gcp-04-05ef@98dd96f.firebaseio.com",
62 };
63 firebase.initializeApp(config);
64
65 </script>
66 </body>
</html>

```

Problems | Output | C%23

CLOUD SHELL

(qwiklabs-gcp-04-05ef@98dd96f) + * +

```

WebSocketsServletAutoConfiguration.JettyWebSocketConfiguration:
Did not match:
- @ConditionalOnClass did not find required class 'org.eclipse.jetty.websocket.jsr356.server.deploy.WebSocketServerContainerInitializer' (OnClassCondition)
WebSocketsServletAutoConfiguration.UndertowWebSocketConfiguration:
Did not match:
- @ConditionalOnClass did not find required class 'io.undertow.websockets.jsr.Bootstrap' (OnClassCondition)
XADataSourceAutoConfiguration:
Did not match:
- @ConditionalOnClass did not find required class 'javax.transaction.TransactionManager' (OnClassCondition)

Exclusions:
-----
None

Unconditional classes:
-----
org.springframework.boot.autoconfigure.context.ConfigurationPropertiesAutoConfiguration
org.springframework.boot.actuate.autoconfigure.availability.AvailabilityHealthContributorAutoConfiguration
org.springframework.boot.actuate.autoconfigure.info.InfoContributorAutoConfiguration
org.springframework.boot.autoconfigure.context.PropertyPlaceholderAutoConfiguration
org.springframework.boot.autoconfigure.context.LifecycleAutoConfiguration
org.springframework.boot.actuate.autoconfigure.health.HealthContributorAutoConfiguration
org.springframework.boot.actuate.autoconfigure.metrics.IntegrationMetricsAutoConfiguration
org.springframework.boot.actuate.autoconfigure.endpoint.EndpointAutoConfiguration
org.springframework.boot.autoconfigure.availability.ApplicationAvailabilityAutoConfiguration
org.springframework.boot.actuate.autoconfigure.info.ProjectInfoAutoConfiguration
org.springframework.boot.actuate.autoconfigure.web.server.ManagementContextAutoConfiguration

16:40:09.559 [restartedMain] INFO c.q.training.appdev.QuizApplication - Started QuizApplication in 4.11 seconds (JVM running for 5.147)
16:40:09.656 [restartedMain] DEBUG o.a.b.a.ApplicationAvailabilityBean - Application availability state LivelinessState changed to CORRECT
16:40:09.658 [restartedMain] DEBUG o.a.b.boot.devtools.restart.Restarter - Creating new Thread([main,5,main])
16:40:09.658 [restartedMain] DEBUG o.a.b.boot.devtools.restart.Restarter - Successfully restarting application
16:40:09.658 [restartedMain] DEBUG o.a.b.boot.devtools.restart.Restarter - Starting application com.google.training.appdev.QuizApplication with URLs [file:/home/student_00_c3014e859675/training-data-analyst/courses/developingapps/v1.3/]
ava/filename/startargs/otherargs/
16:40:10.658 [restartedMain] DEBUG o.a.b.a.ApplicationAvailabilityBean - Application availability state ReadinessState changed to ACCEPTING_TRAFFIC
16:40:20.971 [http-nio-8080-exec-1] INFO o.a.c.c.C.[Tomcat].[localhost].[/] - Initializing Spring DispatcherServlet 'dispatcherServlet'
16:40:21.011 [http-nio-8080-exec-1] DEBUG o.s.b.a.w.s.WelcomePageHandlerMapping - Mapped to ParameterizableViewController [view="forward:index.html"]
[]

10:36 AM

```



Quite Interesting Quiz



Quite Interesting Quiz



Quite Interesting Quiz

Which GCP product is an Object Store?

Cloud Storage

Datastore

Big Table

All of the above

Submit Answer



Quite Interesting Quiz

Register

Register to take a test by filling in your email address and password.

Email:

user2@example.com

Password:

[Register](#)



Quite Interesting Quiz

Which GCP product is an Object Store?

Cloud Storage

Datastore

Big Table

All of the above

[Submit Answer](#)

Google Cloud https://console.cloud.google.com/customer/identity/users?authuser=3&cloudshell=true&project=qwiklabs-gcp-04-05ef898dd96f

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

Identity Platform

Providers

MFA

Users

Settings

Tenants

ADD USER IMPORT USERS

APPLICATION SETUP DETAILS

No users selected

Please select one resource to view details.

CLOUD SHELL Terminal (qwiklabs-gcp-04-05ef898dd96f) +

```
org.springframework.boot.actuate.autoconfigure.availability.AvailabilityContributorAutoConfiguration
org.springframework.boot.actuate.autoconfigure.info.InfoContributorAutoConfiguration
org.springframework.boot.autoconfigure.context.PropertyPlaceholderAutoConfiguration
org.springframework.boot.autoconfigure.context.LifecycleAutoConfiguration
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

16:40:09.559 [restartedMain] INFO c.q.training.appdev.QuizApplication - Started QuizApplication in 4.11 seconds (JVM running for 5.147)
16:40:09.656 [restartedMain] DEBUG o.s.b.a.ApplicationAvailabilityBean - Application availability state ReadinessState changed to CORRECT
16:40:09.656 [restartedMain] DEBUG o.s.b.a.ApplicationAvailabilityBean - Application availability state ReadinessState changed to CORRECT
16:40:09.658 [restartedMain] DEBUG o.s.boot.devtools.restart.Restarter - Immediately restarting application
16:40:09.658 [restartedMain] DEBUG o.s.boot.devtools.restart.Restarter - Starting application com.google.training.appdev.QuizApplication with URLs [file:/home/student_00_c3014e859675/training-data-analyst/courses/developingapp/v1.3/jar]
16:40:09.658 [restartedMain] DEBUG o.s.b.a.ApplicationAvailabilityBean - Application availability state ReadinessState changed to ACCEPTING_TRAFFIC
16:40:20.971 [http-nio-8080-exec-1] INFO o.a.c.C(Tomcat).{localhost}.{/} - Initializing Spring DispatcherServlet 'dispatcherServlet'
16:40:21.011 [http-nio-8080-exec-1] DEBUG o.s.d.a.v.WelcomePageHandlerMapping - Mapped to ParameterizableViewController [view="forward:index.html"]
```

The image displays two screenshots of Google Cloud Skill Boost and Google Cloud Platform interfaces.

Top Screenshot: Google Cloud Skill Boost - App Dev - Adding User Authentication to your Application: Java

This screenshot shows a lab interface with a sidebar of available resources and a main content area.

- Left Sidebar:**
 - Video: IAM Best Practices
 - Video: OAuth2.0, IAP & Firebase Authentication
 - Video: Lab: Adding User Authentication to your Application
 - Lab:** App Dev - Adding User Authentication to your Application: Java (highlighted)
 - Lab: App Dev - Adding User Authentication to your Application: Python
 - Quiz: Practice Quiz
 - Quiz: Handling Authentication and Authorization Quiz
 - Video: Summary
 - Using Pub/Sub to Integrate Components of Your Application
 - Video: Why Pub/Sub?
- Main Content Area:**
 - Congratulations!**
 - Note: You should see user2@example.com has been added as a user.
 - 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
 - Thanks for reviewing this lab.
- Right Sidebar:**
 - Overview
 - Setup and requirements
 - Task 1. Prepare the case study application
 - Task 2. Examine the case study application code
 - Task 3. Configure Identity Platform authentication
 - Task 4. Integrate a client-side web application with Identity Platform
 - Task 5. Run the application**
 - Congratulations!
 - End your lab

Bottom Screenshot: Google Cloud Platform - Welcome

This screenshot shows the Google Cloud Platform dashboard with a sidebar and a terminal window.

- Left Sidebar:**
 - Providers
 - MFA
 - Users
 - Settings
 - Tenants
- Terminal:**

```
ACTIVE@: ~
ACCOUNT: student-00-4991c5fe31bf@qwiklabs.net
To set the active account, run:
$ gcloud config set account ACCOUNT
student_00_4991c5fe31bf@cloudshell:~ (qwiklabs-gcp-02-69efb828aec0)$ gcloud config list project
[core]
project = qwiklabs-gcp-02-69efb828aec0

Your active configuration is: [cloudshell-27490]
student_00_4991c5fe31bf@cloudshell:~ (qwiklabs-gcp-02-69efb828aec0)$ git clone https://github.com/GoogleCloudPlatform/training-data-analyst
Cloning into 'training-data-analyst'...
remote: Enumerating objects: 1000 (642/642), done.
remote: Compressing objects: 1000 (365/365), done.
remote: Writing objects: 1000 (642/642), done.
   100% (642/642), 696.15 MiB | 25.94 MiB/s, done.
Receiving objects: 1004 (64062/40962), done.
Resolving deltas: 1004 (60042/40962), done.
student_00_4991c5fe31bf@cloudshell:~ (qwiklabs-gcp-02-69efb828aec0)$ ls -l ~/.training-data-analyst/courses/developingapps/v1.3/python.firebaseio ~/.firebase
-bash: .ln command not found
student_00_4991c5fe31bf@cloudshell:~ (qwiklabs-gcp-02-69efb828aec0)$ ln -s ~/.training-data-analyst/courses/developingapps/v1.3/python.firebaseio ~/.firebase
student_00_4991c5fe31bf@cloudshell:~ (qwiklabs-gcp-02-69efb828aec0)$ cd ~/.firebase/start
student_00_4991c5fe31bf@cloudshell:~/firebase/start (qwiklabs-gcp-02-69efb828aec0)$ . prepare_environment.sh
Creating Datastore App Engine index...
You are creating an App Engine project (qwiklabs-gcp-02-4991c5fe31bf).
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/app-engine/docs/locations.

Creating App Engine application in project [qwiklabs-gcp-02-69efb828aec0] and region [us-central]....working.
```

You're working in **qwiklabs-gcp-02-69efb828aec0**

Project number: 720967995426 Project ID: qwiklabs-gcp-02-69efb828aec0

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

CLOUD SHELL (qwiklabs-gcp-02-69efb828aec0) +

```

$ pip install -r requirements.txt
Collecting google-crc32c==1.5.0-cp39-cp39-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (32 kB)
Collecting zipopp==0.5 (from requirements.txt)
Collecting MarkupSafe==2.0 (from Jinja2==3.1.2->Flask==2.0.1->requirements.txt (line 1))
Collecting MarkupSafe==2.1.3-cp39-cp39-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (25 kB)
Collecting MarkupSafe==2.1.3-cp39-cp39-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (25 kB)
Collecting charset_normalizer==3.1.0-cp39-cp39-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (199 kB)
Collecting idna==3.4-py3-none-any.whl (61 kB)
Collecting certifi==2023.5.15-py3-none-any.whl (114 kB)
Collecting pyasn1==0.4.6 (from pyasn1-modules==0.1.1->google-auth==3.0.0->google-cloud-core==1.7.1->requirements.txt (line 3))
Collecting pyasn1==0.5.0-py3-py3-none-any.whl (85 kB)
Installing collected packages: google-cloud, zipp, urllib3, six, pyasn1, protobuf, MarkupSafe, itsdangerous, idna, gRPCio, google-crc32c, click, charset-normalizer, certifi, cachetools, blinker, Werkzeug, rsa, requests, pyasn1-modules
Successfully installed Flask==2.0.1 Jinja2==3.1.2 MarkupSafe==2.1.3 Werkzeug==2.3.4 blinker==1.6.2 cachetools==5.3.1 certifi==2023.5.7 charset-normalizer==3.1.0 click==8.1.3 google-api-core==2.11.0 google-auth==2.19.1 google-cloud==0.34.0 google-cloud-core==2.0.2 google-cloud-datasource==2.15.2 google-cloud-storage==2.9.0 google-resumable-media==2.5.0 gRPCip-common-protos==1.59.0 gRPCio==1.54.2 gRPCio-status==1.54.2 idna==3.4 importlib-metadata==4.10.0 pyasn1==0.5.0 pyasn1-modules==0.3.0 requests==2.31.0 rsa==4.9 six==1.16.0 urllib3==2.26.16 zipp==3.15.0
$ python run_server.py
[developmentapp: student_v0_491cfcf31bfcloudbash://firebase/start (qwiklabs-gcp-02-69efb828aec0)$ python run_server.py
* Serving on port 8080
* Debug mode on
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
Run with --help for available options
Press CTRL+C to quit
* Restarting with stat
* Debugger is active
* Debugger PID: 381-346-150

```

11:01 AM

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](#)

Google Cloud Identity Platform

New identity provider

Sign-in method

Select and configure an identity provider.

Select a provider: Email / password

Enabled

Configure email/password

Passwords

Allow passwordless login
Sign in occurs via confirmation email link. [Learn more](#)

Templates

Templates for emails sent to users who sign up with email/password identity provider.

[CONFIGURE TEMPLATES](#)

Import users

CLOUD SHELL

Terminal (qwiklabs-gcp-02-69efb828aec0) x +

```
Installing collected packages: google-cloud-zipf, urllib3, six, pyasn1, protobuf, MarkupSafe, itdangerous, idna, grpcio, google-crc32c, click, charset-normalizer, certifi, cachetools, blinker, Werkzeug, requests, PyASN1-modules, proto-plus, Jinja2, importlib-metadata, grpcio-tools, googleapis-common-protos, google-resumable-media, grpcio-status, google-auth, Flask, google-api-core, google-cloud-core, google-cloud-storage, google-cloud-datatstore
Successfully installed Flask<2.3.2 Jinja2<3.1.2 MarkupSafe<2.3.4 blinker<1.6.2 cachetools<5.3.1 certifi<2023.5.7 charset-normalizer<3.1.0 click<8.1.3 google-api-core<3.1.0 google-auth<2.19.1 google-cloud<3.4.0 google-cloud-core<2.3.0 google-cloud-storage<2.3.0 google-resumable-media<2.5.0 googleapis-common-protos<1.89.0 grpcio<1.54.2 grpcio-status<1.54.2 grpcio-tools<1.54.2 idna<3.4 importlib-metadata<6.0.0 itsdangerous<2.1.2 proto-plus<1.22.2 protobuf<4.23.2 pyasn1<0.5.0 pyasn1-modules<5.3.0 requests<2.31.0 rsa<4.9 six<1.16.0 urllib3<2.46.16 zipp<3.15.0
Creating Database entities
Project ID: quickstart-gcp-02-69efb828aec0
(developingapps) student_00_4991c5fca31bf828aec0$ 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
* Environment: dev
* Debugging is active!
* Debugger PIN: 985-546-150
127.0.0.1 - [05/Jun/2023 17:03:37] "GET /?authuser=0&redirectedPreviously=true HTTP/1.1" 200 -
127.0.0.1 - [05/Jun/2023 17:03:37] "GET /favicon.ico HTTP/1.1" 404 -
[...]
```

Project Settings

Authorized Domains

Add domains to the allowlist that authentication servers are allowed to redirect to after signing a user in.

Domain ↑	Source
8080-27542cac-4460-41a9-9e96-065800c2100c.gle-europe-west1-ctpg.cloudshell.dev	Custom
localhost	Custom
qwiklabs-gcp-02-69efb828aec0.firebaseio.com	Custom
qwiklabs-gcp-02-69efb828aec0.web.app	Custom

[ADD DOMAIN](#)

Custom SMTP settings

You can use your own SMTP server instead of the built-in email service.

Cloud Shell

Terminal (qwiklabs-gcp-02-69efb828aec0) x +

Google Cloud Identity Platform

Users

[ADD USER](#) [IMPORT USERS](#)

APPLICATION SETUP DETAILS

No users selected

Please select one resource to view details.

CLOUD SHELL

Terminal (qwiklabs-gcp-02-69efb828aec0) x +

```
Installing collected packages: google-cloud-zipf, urllib3, six, pyasn1, protobuf, MarkupSafe, itdangerous, idna, grpcio, google-crc32c, click, charset-normalizer, certifi, cachetools, blinker, Werkzeug, requests, PyASN1-modules, proto-plus, Jinja2, importlib-metadata, grpcio-tools, googleapis-common-protos, google-resumable-media, grpcio-status, google-auth, Flask, google-api-core, google-cloud-core, google-cloud-storage, google-cloud-datatstore
Successfully installed Flask<2.3.2 Jinja2<3.1.2 MarkupSafe<2.3.4 blinker<1.6.2 cachetools<5.3.1 certifi<2023.5.7 charset-normalizer<3.1.0 click<8.1.3 google-api-core<3.1.0 google-auth<2.19.1 google-cloud<3.4.0 google-cloud-core<2.3.0 google-cloud-storage<2.3.0 google-resumable-media<2.5.0 googleapis-common-protos<1.89.0 grpcio<1.54.2 grpcio-status<1.54.2 grpcio-tools<1.54.2 idna<3.4 importlib-metadata<6.0.0 itsdangerous<2.1.2 proto-plus<1.22.2 protobuf<4.23.2 pyasn1<0.5.0 pyasn1-modules<5.3.0 requests<2.31.0 rsa<4.9 six<1.16.0 urllib3<2.46.16 zipp<3.15.0
Creating Database entities
Project ID: quickstart-gcp-02-69efb828aec0
(developingapps) student_00_4991c5fca31bf828aec0$ 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
* Environment: dev
* Debugging is active!
* Debugger PIN: 985-546-150
127.0.0.1 - [05/Jun/2023 17:03:57] "GET /?authuser=0&redirectedPreviously=true HTTP/1.1" 200 -
127.0.0.1 - [05/Jun/2023 17:03:57] "GET /favicon.ico HTTP/1.1" 404 -
[...]
```

The screenshot shows the Google Cloud Shell Editor interface. On the left is the Explorer sidebar with project files like index.html, firebase, start, quiz, static, client, templates, and requirements.txt. The main area displays the content of index.html:

```
index.html X
firebase > start > quiz > webapp > static > client > index.html > index.html > ...
57   <script src='app/quizzes/quiz-module.js'></script>
58   <script src='app/quizzes/quiz-factory.js'></script>
59   <script src='app/quizzes/quiz-controller.js'></script>
60
61   <script src='app/auth/auth-module.js'></script>
62   <script src='app/auth/auth-factory.js'></script>
63   <script src='app/auth/auth-controller.js'></script>
64   <script src='app/auth/quiz-login.js'></script>
65
66   <script src="https://www.gstatic.com/firebasejs/8.0.firebaseio.js"></script>
67   <script>
68     var config = {
69       apiKey: "AIzaSyA1aZ1lDAG1RoQ0dbg95g5R0M5fxxE3eSA",
70       authDomain: "qwiklabs-gcp-02-69efb828aec0.firebaseioapp.com",
71     };
72     firebase.initializeApp(config);
73   </script>
74 </body>
75 </html>
76
```

Below the code editor is a preview window showing the rendered HTML. At the bottom, there are tabs for Problems and Output, and status information: Line 74, Col 8, LF: 17, UFT-8, Spaces: 4, HTML, 11:09 AM.

Quite Interesting Quiz



Quite Interesting Quiz

Which company runs GCP?

- Amazon
- Google
- IBM
- Microsoft

Submit Answer



Quite Interesting Quiz

Register

Register to take a test by filling in your email address and password.

Email:

Password:

Quite Interesting Quiz GCP Places People

Hello user2@example.com Logout

Quite Interesting Quiz

Which company runs GCP?

- Amazon
- Google
- IBM
- Microsoft

Submit Answer

Google Cloud

qwiklabs-gcp-02-69efb82baec0

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

Search

Identity Platform

Providers

MFA

Users

Settings

Tenants

Users

ADD USER

IMPORT USERS

APPLICATION SETUP DETAILS

No users selected

Please select one resource to view details.

Name	Created	Signed in	Status
user2@example.com	June 5, 2023	June 5, 2023	Green checkmark
user1@example.com	June 5, 2023	June 5, 2023	Green checkmark

https://www.cloudskillsboost.google/course_sessions/3222490/labs/369390

App Dev - Adding User Authentication to your Application: Python

Start Lab 02:00:00

In this lab, you learned how to use Identity Platform to enable email and password registration for your 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
- 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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Thanks for reviewing this lab.

Overview
Setup and requirements
Task 1: Prepare the case study application
Task 2: Examine the case study application code
Task 3: Configure Identity Platform Authentication
Task 4: Integrate a client-side web application with Identity Platform
Task 5: Run the application
Congratulations!
End your lab

Authentication
Lab: Adding User Authentication to your Application
Lab: App Dev - Adding User Authentication to your Application: Node.js
Lab: App Dev - Adding User Authentication to your Application: Java
Quiz
Practice Quiz
Handling Authentication and Authorization Quiz
Summary
Using Pub/Sub to Integrate Components of Your Application
Pub/Sub?
Pub/Sub Concepts
Videos

Practice Quiz

Your score: 100% Passing score: 50%

Congratulations! You passed this assessment.

1. Review the following permission: `bigrquery.jobs.create`. Which of the following statements about the permission is accurate? Select two.

IAM members with this permission can create new jobs in BigQuery.

Cloud IAM permissions have the following format: <service>.<resource>. <verb>. This permission is related to the Google BigQuery service, its 'jobs' resource, and its 'create' action. IAM members with this permission can create new jobs in BigQuery.

This permission is invalid because it does not restrict access to a single project.

IAM members with this permission can create large jobs and queries.

This permission is related to the BigQuery service, 'jobs' resource, and 'create' action.

Cloud IAM permissions have the following format: <service>.<resource>. <verb>. This permission is related to the Google BigQuery service, its 'jobs' resource, and its 'create' action. IAM members with this permission can create new jobs in BigQuery.

Practice Quiz

✓ This permission is related to the BigQuery service, 'jobs' resource, and 'create' action.

Cloud IAM permissions have the following format: <service>.<resource>. <verb>. This permission is related to the Google BigQuery service, its 'jobs' resource, and its 'create' action. IAM members with this permission can create new jobs in BigQuery.

2. What mechanism should you use to authenticate your applications when invoking Google APIs?

Cloud IAM policy

Google account

Cloud IAM role

Service account

A service account is a special Google account that belongs to your application or a VM instance, instead of to an individual end user. Use a service account to call the Google API of a service.

Handling Authentication and Authorization Quiz

Handling Authentication and Authorization Quiz

Your score: 100% Passing score: 66%

Congratulations! You passed this assessment.

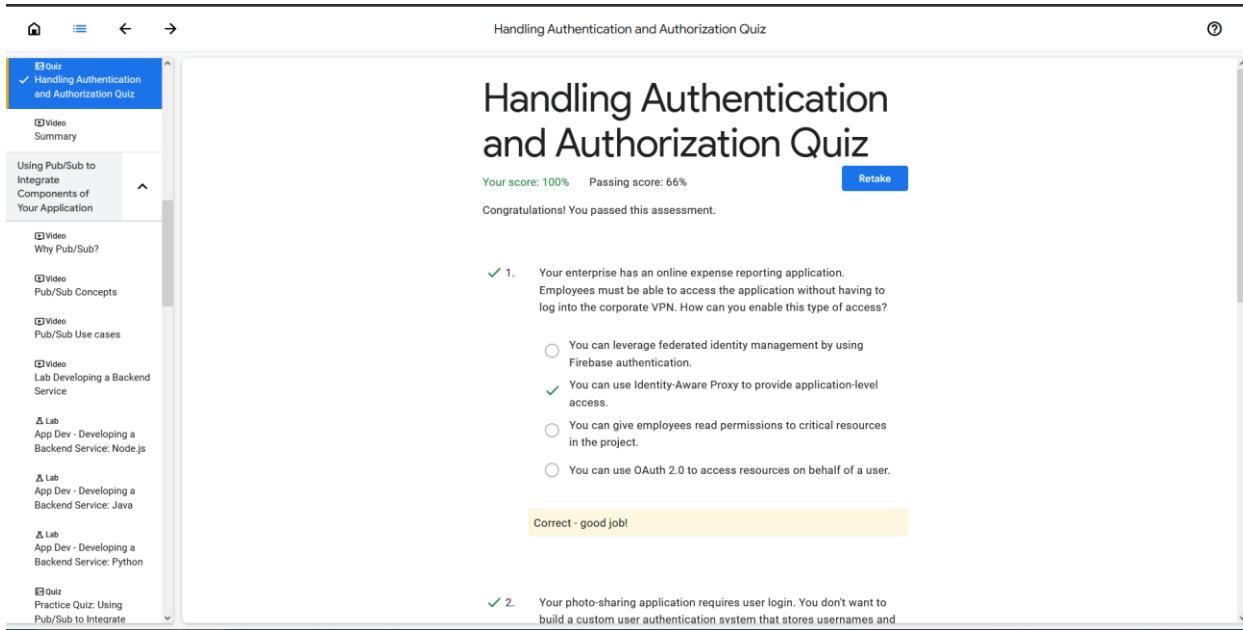
Retake

✓ 1. Your enterprise has an online expense reporting application. Employees must be able to access the application without having to log into the corporate VPN. How can you enable this type of access?

You can leverage federated identity management by using Firebase authentication.
 You can use Identity-Aware Proxy to provide application-level access.
 You can give employees read permissions to critical resources in the project.
 You can use OAuth 2.0 to access resources on behalf of a user.

Correct - good job!

✓ 2. Your photo-sharing application requires user login. You don't want to build a custom user authentication system that stores usernames and



Handling Authentication and Authorization Quiz

Handling Authentication and Authorization Quiz

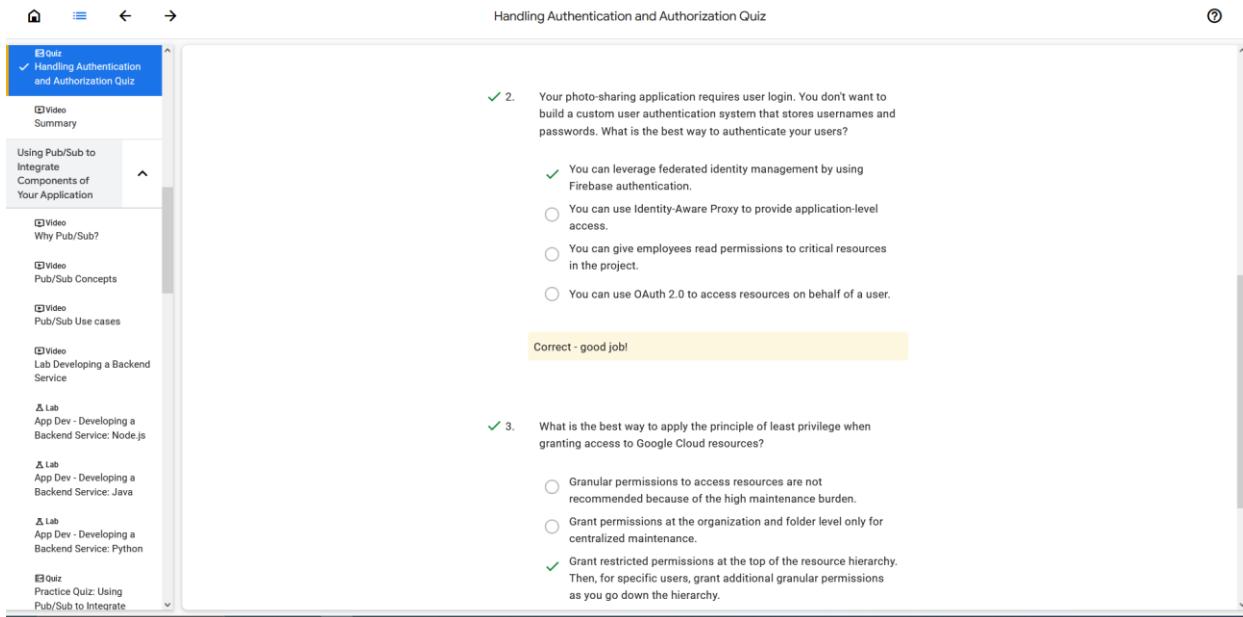
✓ 2. Your photo-sharing application requires user login. You don't want to build a custom user authentication system that stores usernames and passwords. What is the best way to authenticate your users?

You can leverage federated identity management by using Firebase authentication.
 You can use Identity-Aware Proxy to provide application-level access.
 You can give employees read permissions to critical resources in the project.
 You can use OAuth 2.0 to access resources on behalf of a user.

Correct - good job!

✓ 3. What is the best way to apply the principle of least privilege when granting access to Google Cloud resources?

Granular permissions to access resources are not recommended because of the high maintenance burden.
 Grant permissions at the organization and folder level only for centralized maintenance.
 Grant restricted permissions at the top of the resource hierarchy. Then, for specific users, grant additional granular permissions as you go down the hierarchy.



Handling Authentication and Authorization Quiz

You can give employees read permissions to external resources in the project.

You can use OAuth 2.0 to access resources on behalf of a user.

Correct - good job!

3. What is the best way to apply the principle of least privilege when granting access to Google Cloud resources?

- Granular permissions to access resources are not recommended because of the high maintenance burden.
- Grant permissions at the organization and folder level only for centralized maintenance.
- Grant restricted permissions at the top of the resource hierarchy. Then, for specific users, grant additional granular permissions as you go down the hierarchy.
- Grant broad permissions at the top of the resource hierarchy. Then, for some users, deny specific permissions at the individual resource level.

Correct - good job!

```

Welcome to Cloud Shell! Type "help" to get started.
Your Cloud Platform project in this session is set to wikilabs-gcp-00-c8a75da87533.
Use "gcloud config set project [PROJECT_ID]" to change to a different project.
student_00-d534e87aa$@cloudshell:~ (wikilabs-gcp-00-c8a75da87533)$ gcloud auth list
Credentialed Accounts

ACTIVE: *
ACCOUNT: student_00-d534e87aa$@wikilabs.net

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

student_00-d534e87aa$@cloudshell:~ (wikilabs-gcp-00-c8a75da87533)$ gcloud config list project
[core]
project = wikilabs-gcp-00-c8a75da87533

Your active configuration is: [cloudshell-15092]
student_00-d534e87aa$@cloudshell:~ (wikilabs-gcp-00-c8a75da87533)$ git clone --depth=1 https://github.com/GoogleCloudPlatform/training-data-analyst
[core]
remote: Enumerating objects: 1000 (k4477647), done.
remote: Compressing objects: 1000 (k1775177), done.
remote: Total 7647 (delta 2309), reused 1798 (delta 1313), pack-reused 0
Receiving objects: 100% (7647/7647), 1.50 GB / 25.24 MiB/s, done.
Resolving deltas: 100% (21240/21240), done.
Updating files: 100% (12840/12840), done.
student_00-d534e87aa$@cloudshell:~ (wikilabs-gcp-00-c8a75da87533)$ mvn clean package
student_00-d534e87aa$@cloudshell:~ (wikilabs-gcp-00-c8a75da87533)$ ls -l ~/*training-data-analyst/courses/developingapps/v1.3/nodejs/pubsub-languagesapi-spanner ~/pubsub-languagesapi-spanner
student_00-d534e87aa$@cloudshell:~ (wikilabs-gcp-00-c8a75da87533)$ cd ~/pubsub-languagesapi-spanner
student_00-d534e87aa$@cloudshell:~/pubsub-languagesapi-spanner$ ./start
student_00-d534e87aa$@cloudshell:~/pubsub-languagesapi-spanner$ ./prepare_web_environment.sh
[...]
You are creating an app for project [wikilabs-gcp-00-c8a75da87533].
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/app-engine/docs/locations.

Creating App Engine application in project [wikilabs-gcp-00-c8a75da87533] and region [us-central]....working...

```

Google Cloud | Terminal (qwiklabs-gcp-00-c8a75da87533) | Search (/) for resources, docs, products, and more | Open Editor | Help

```

CLOUD SHELL
Terminal (qwiklabs-gcp-00-c8a75da87533) + -
Search (/) for resources, docs, products, and more
Open Editor Help
Cloud Shell Help
Cloud Shell Help

remote: Total 7617 (delta 212), reused 9788 (delta 1515), pack-reused 0
Receiving objects: 100% (7617/7617), 330.88 MiB / 28.44 MiB/s, done.
Resolving deltas: 100% (1212/1212), done.
Updating files: 100% (12840/12840), done.
student_00_d539e37a3a@cloudshell:~ (qwiklabs-gcp-00-c8a75da87533)$ cd ~/pubsub-languageapi-spanner
student_00_d539e37a3a@cloudshell:~/pubsub-languageapi-spanner$ ./start (qwiklabs-gcp-00-c8a75da87533)$ . prepare_web_environment.sh
student_00_d539e37a3a@cloudshell:~/pubsub-languageapi-spanner$ ls
You are creating an App Engine application for project [qwiklabs-gcp-00-c8a75da87533].
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/regions.
Creating App Engine application in project [qwiklabs-gcp-00-c8a75da87533] and region [us-central]...done.
Bucket(s) have been created. Please use 'gcloud app deploy' to deploy your first app.
Making bucket gs://qwiklabs-gcp-00-c8a75da87533-media...
Creating gs://qwiklabs-gcp-00-c8a75da87533-media/...
https://qwiklabs-gcp-00-c8a75da87533.firebaseioapp.com and GCELOUD_BUCKET
Installing dependencies...
removed 75 packages, and changed 118 packages in 12s
10 packages are looking for funding
  run 'npm fund' for details
npm notice Multer 1.4.1 Multer 1.x is affected by CVE-2022-24494. 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 296 packages, and audited 297 packages in 17s
21 packages are looking for funding
  run 'npm fund' for details
  6 high severity vulnerabilities

To address issues that do not require attention, run:
  npm audit fix

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

Run 'npm audit' for details.
npm notice New major version of npm available! 1.1.1 -> 8.6.7
npm notice Changelog: https://github.com/npm/cli/releases/tag/v8.6.7
npm notice Run `npm install -g npm@8.6.7` to update
npm notice
npm notice Extract Datasrc entities
Entities created.
Project ID: qwiklabs-gcp-00-c8a75da87533
student_00_d539e37a3a@cloudshell:~/pubsub-languageapi-spanner$ start (qwiklabs-gcp-00-c8a75da87533)$ npm start
> quite-interesting-quiz@1.0.0 start
> node server/app.js
App listening on port 8080
[  ]
```

https://8080-cs-d98745d-6d12-47f3-86da-9a35c96db44.g.us-east1.ghq.cloudshell.dev/?authUser=0&redirectedPreviously=true

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](#)



Google Cloud qwiklabs-gcp-00-c8a75da87533 Search (/) for resources, docs, products, and more Search

CLOUD SHELL Terminal (qwiklabs-gcp-00-c8a75da87533) (qwiklabs-gcp-00-c8a75da87533) + v

```
Your Cloud Platform project in this session is set to qwiklabs-gcp-00-c8a75da87533. Use gcloud config set project [PROJECT_ID] to change to a different project.
student_00_d534e37aa8cloudshell:/~/pubsub-languageapi-spanner/start $ cd ~/pubsub-languageapi-spanner/start (qwiklabs-gcp-00-c8a75da87533) $ ./prepare_worker_environment.sh
Exporting GCLOUD_PROJECT and GCLOUD_BUCKET
Creating quiz-account Service Account
Creating account [quiz-account@qwiklabs-gcp-00-c8a75da87533].
Creating key [actif3ff62fae2999d398ddfe410c9a57ea13f7] of type [json] for [quiz-account@qwiklabs-gcp-00-c8a75da87533.iam.gserviceaccount.com]
Setting quiz-account IAM Role
Updating IAM policy for project [qwiklabs-gcp-00-c8a75da87533].
bindings:
- members:
  - role: roles/owner
    member: serviceAccount:qwiklabs-gcp-00-c8a75da87533@qwiklabs-gcp-00-c8a75da87533.iam.gserviceaccount.com
  - role: roles/bigquery.admin
    member: serviceAccount:qwiklabs-gcp-00-c8a75da87533@qwiklabs-gcp-00-c8a75da87533.iam.gserviceaccount.com
  - role: roles/cloudBuild.builder
    member: serviceAccount:qwiklabs-gcp-00-c8a75da87533@qwiklabs-gcp-00-c8a75da87533.iam.gserviceaccount.com
  - role: roles/cloudBuild.serviceAgent
    member: serviceAccount:qwiklabs-gcp-00-c8a75da87533@qwiklabs-gcp-00-c8a75da87533.iam.gserviceaccount.com
  - role: roles/compute.serviceAgent
    member: serviceAccount:qwiklabs-gcp-00-c8a75da87533@qwiklabs-gcp-00-c8a75da87533.iam.gserviceaccount.com
  - role: roles/container.serviceAgent
    member: serviceAccount:qwiklabs-gcp-00-c8a75da87533@qwiklabs-gcp-00-c8a75da87533.iam.gserviceaccount.com
  - role: roles/editor
    member: serviceAccount:qwiklabs-gcp-00-c8a75da87533@qwiklabs-gcp-00-c8a75da87533.iam.gserviceaccount.com
  - role: roles/firestore.serviceAgent
    member: serviceAccount:qwiklabs-gcp-00-c8a75da87533@qwiklabs-gcp-00-c8a75da87533.iam.gserviceaccount.com
  - role: roles/owner
    member: serviceAccount:qwiklabs-gcp-00-c8a75da87533@qwiklabs-gcp-00-c8a75da87533.iam.gserviceaccount.com
  - role: roles/storage.admin
    member: user@student_00-d534e37aa8cloudshell:~$ etag: BwXeJukj_aw
version: 1
Last modified by Qwiklabs-gcp-00-c8a75da87533
student_00_d534e37aa8cloudshell:/~/pubsub-languageapi-spanner/start (qwiklabs-gcp-00-c8a75da87533) $ npm run worker
> quiz-interesting-quiz#1.0.0 worker
> node console/worker.js
Worker starting...
student_00_d534e37aa8cloudshell:/~/pubsub-languageapi-spanner/start (qwiklabs-gcp-00-c8a75da87533) $
```

Trace back to search 10:35 AM

App Dev - Developing a Backend Service: Node.js

Pub/Sub Use cases

- End Lab 01:53:49
- Lab Developing a Backend Service
- A Lab App Dev - Developing a Backend Service: Node.js
- A Lab App Dev - Developing a Backend Service: Java
- Beta Practice Quiz: Using Pub/Sub to Integrate Components of Your Application
- Beta Final Quiz: Using Pub/Sub to Integrate Components of Your Application
- Video Summary
- Adding Intelligence to Your Application
- Using Cloud Functions for Event-Driven Processing
- Cloud Functions Concepts
- Writing, Deploying, and Monitoring Cloud Functions
- Demo: Invoke Cloud

• Exports environment variables `GCLOUD_PROJECT` and `GCLOUD_BUCKET`.

• Creates and configures a GCP Service Account.

• Prints out the GCP Project ID.

7. To start the worker application, enter the following command:

`npm run worker`

Note: The worker application runs as a console application.

By the end of the lab, it will:

- Subscribe to a Cloud Pub/Sub topic.
- Consume message data published to the topic.
- Use the Cloud Natural Language ML API to perform sentiment analysis on the text.
- Save the feedback data and the sentiment score to Cloud Spanner.

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

Configure and run the case study application

Check my progress

Review the changes to the case study application

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

10:35 AM

The screenshot shows the Google Cloud Platform Console interface for the project "qwiklabs-gcp-00-c8a75da87533". The main view is the "Pub/Sub" section under the "Topics" tab. A modal window titled "feedback" is open, showing options to "EXPORT TO BIGQUERY" or "EXPORT TO CLOUD STORAGE". The "PERMISSIONS" tab of the "feedback" topic's details page is visible on the right, listing roles like "Owner" and "Editor". A success message at the bottom indicates a new topic and subscription were created.

A second screenshot below shows a terminal session in Cloud Shell. The user runs the command:

```
student_00_d53a837aa$@cloudshell: ~ (qwiklabs-gcp-00-c8a75da87533)$ gcloud pubsub subscriptions create cloud-shell-subscription --topic feedback
Created subscription [projects/qwiklabs-gcp-00-c8a75da87533/subscriptions/cloud-shell-subscription].
student_00_d53a837aa$@cloudshell: ~ (qwiklabs-gcp-00-c8a75da87533)$
```

https://www.cloudskillsboost.google/courses/722297/69598

App Dev - Developing a Backend Service: Node.js

End Lab 01:50:40

Create a Cloud Pub/Sub subscription

- Go to the second Cloud Shell window.
- To create a Cloud Pub/Sub subscription named `cloud-shell-subscription` against the `feedback` topic, execute the following command:

```
gcloud pubsub subscriptions create cloud-shell-subscription --topic feedback
```

Note: If you receive an error about the active account not having valid credentials, wait for a minute and try the command again.

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

Publish a message to a Cloud Pub/Sub topic

- To publish a "Hello World" message into the `feedback` topic, execute the following command:

```
gcloud pubsub topics publish feedback --message "Hello World"
```

Cloud Platform Console

Pub/Sub

Topics

feedback

Pub/Sub Lite

CLOUD SHELL Terminal (qwiklabs-gcp-00-c8a75da87533) + =

Welcome to Cloud Shell! Type "help" to get started.
Your Cloud Platform project for this session is set to `qwiklabs-gcp-00-c8a75da87533`.
The Cloud Shell session is set to `qwiklabs-gcp-00-c8a75da87533` to match a different project.
student_00_d5534837aa5@cloudshell:~ (qwiklabs-gcp-00-c8a75da87533)\$ gcloud pubsub subscriptions create cloud-shell-subscription --topic feedback
Created subscription [projects/qwiklabs-gcp-00-c8a75da87533/subscriptions/cloud-shell-subscription].
student_00_d5534837aa5@cloudshell:~ (qwiklabs-gcp-00-c8a75da87533)\$ gcloud pubsub topics publish feedback --message "Hello World"
messageId: "8219933424077093"
publishedAt: "2023-07-10T10:40:58Z@cloudshell:~ (qwiklabs-gcp-00-c8a75da87533)\$ gcloud pubsub subscriptions pull cloud-shell-subscription --auto-ack
DATA: Hello World
MESSAGE_ID: 8219933424077093
CLOUD_SHELL_ATTEMPT:
ATTRIBUTES:
DELIVERY_ATTEMPT:
ACK_STATUS: SUCCESS
student_00_d5534837aa5@cloudshell:~ (qwiklabs-gcp-00-c8a75da87533)\$ []

Cloud Shell Editor

File Edit Selection View Go Run Terminal Help

EXPLORER

pubsub.js 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 // TODO: Load the ../gcp/pubsub module
22
23 const publisher = require('../gcp/pubsub');
24
25 // END TODO
26
27
28 const router = express.Router();
29
30 // Automatically parse request body as JSON
31 router.use(bodyParser.json());
32
33 /**
34 * GET /api/quizzes/:quiz
35 *
36 * Retrieve all the questions in the quiz.
37 */
38 router.get('/:quiz', (req, res, next) => {
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Cloud Shell (qwiklabs-gcp-00-c8a75da87533) x (qwiklabs-gcp-00-c8a75da87533) +

```

serviceAccount:qwiklabs-gcp-00-c8a75da87533@qwiklabs-gcp-00-c8a75da87533.iam.gserviceaccount.com
  roles:
    - roles/bigquery.admin
  members:
    - serviceAccount:729552454962@cloudbuild.gserviceaccount.com
    - roles/cloudBuild.builds.builder
  members:
    - serviceAccount:service-729552454962@gcp-sa-cloudbuild.iam.gserviceaccount.com
    - roles/iam.gcloudId.serviceAgent
  members:
    - serviceAccount:service-729552454962@compute-system.iam.gserviceaccount.com
    - roles/compute.serviceAgent
  members:
    - serviceAccount:service-729552454962@container-engine-robot.iam.gserviceaccount.com
    - roles/container.serviceAgent
  members:
    - serviceAccount:298552454962@cloudservices.gserviceaccount.com
    - serviceAccount:298552454962@qwiklabs-gcp-00-c8a75da87538.googleapis.gserviceaccount.com
    - roles/editor
  members:
    - serviceAccount:service-729552454962@gcp-sa-firebase.iam.gserviceaccount.com
    - roles/firestore.serviceAgent
  members:
    - serviceAccount:admin1@qwiklabs-service-prod.iam.gserviceaccount.com
    - serviceAccount:qwiklabs-qn-accounts@qwiklabs-gcp-00-c8a75da87533.iam.gserviceaccount.com
  users:
    - student@qwiklabs-gcp-00-c8a75da87538@qwiklabs.net
  roles:
    - roles/owner
  members:
    - serviceAccount:qwiklabs-gcp-00-c8a75da87533@qwiklabs-gcp-00-c8a75da87533.iam.gserviceaccount.com
    - roles/owner
  members:
    - user@student-00-d5534837aa5a@qwiklabs.net
  roles:
    - roles/owner
etag: BwXxMuzObI
version: 1
Project: quicklabs-gcp-00-c8a75da87533
student_00_d5534837aa5a@cloudshell:/~/pubsub-languageapi-spanner/start (qwiklabs-gcp-00-c8a75da87533)$ npm run worker
> quick-interesting-quiz@1.0.0 worker
> node console-worker.js

Worker starting...
student_00_d5534837aa5a@cloudshell:~/pubsub-languageapi-spanner/start (qwiklabs-gcp-00-c8a75da87533)$ gcloud pubsub topics publish feedback --message "Hello World"
message[0]:
  "8220612267495836"
student_00_d5534837aa5a@cloudshell:~/pubsub-languageapi-spanner/start (qwiklabs-gcp-00-c8a75da87533)$ gcloud pubsub subscriptions pull cloud-shell-subscription --auto-ack
DATA: Hello World
MESSAGE ID: 8220612267495836
DEADLINE: 2023-01-01T00:00:00Z
ATTRIBUTES:
DELIVERY_ATTEMPT:
ACK_STATUS: SUCCESS
ACKED_MESSAGES: 1
ACKED_MESSAGE_ID: 8220612267495836
student_00_d5534837aa5a@cloudshell:~/pubsub-languageapi-spanner/start (qwiklabs-gcp-00-c8a75da87533)$ gcloud pubsub subscriptions pull cloud-shell-subscription --auto-ack
Listed 0 items.
student_00_d5534837aa5a@cloudshell:~/pubsub-languageapi-spanner/start (qwiklabs-gcp-00-c8a75da87533)$

```

Cloud Shell (qwiklabs-gcp-00-c8a75da87533) x Cloud Platform Console x

File Edit Selection View Go Run Terminal Help

EXPLORE > OPEN EDITORS > index.js

```

STUDENT_00_D5534837AA5A
  pubsub-languageapi-spanner
    start
      bin
        www
        console
          worker.js
      node_modules
        server
          api
            index.js
            gcp
              cloudstorage.js
              datastore.js
              languageapi.js
              pubsub.js
              spanner.js
            public
            web-app
              app.js
              config.js
          setup
            iam_modified.json
            iam.json
            key.json
            package-lock.json
            package.json
            prepare_web_environment...
            prepare_worker_environment...
        Go

```

Output C%23

Required assets to build and debug are missing from 'STUDENT_00_D5534837AA5A'. Add them?

Don't Ask Again Not Now Yes

The screenshot shows two instances of the Google Cloud Platform Editor interface, each displaying a file named `worker.js` from a project structure. The project structure includes `STUDENT_00_d5534837aa5a`, `bin`, `console`, `node_modules`, `server`, `api`, `gcp`, `public`, `web-app`, and `setup` directories. The `worker.js` file contains the following code:

```
36 console.log('Worker starting...');  
37  
38 // The callback function - invoked when a message arrives  
39 function handler(message) {  
40   console.log('Message received');  
41  
42   // TODO: Log the message to the console  
43   var messageData = JSON.parse(message.toString());  
44   console.log(messageData);  
45  
46   // END TODO  
47  
48   // TODO: Invoke the languageapi module method  
49   // with the feedback from the student  
50   //  
51   // TODO: Log sentiment score  
52  
53   //  
54  
55 }  
56  
57 //  
58 //  
59 //  
60 // END TODO  
61  
62 //  
63 // TODO close off the promise chain with a catch() and log  
64 // any errors to the console  
65  
66 // END TODO  
67  
68 }  
69  
70 // TODO: Register the callback with the module  
71 subscriber.registerFeedbackNotification(handler);  
72  
73  
74 // END TODO  
75  
76  
77  
78  
79  
80  
81  
82  
83  
84  
85  
86  
87  
88  
89  
90  
91  
92  
93  
94  
95
```

A tooltip message at the bottom right of both editors states: "Required assets to build and debug are missing from 'STUDENT_00_d5534837aa5a'. Add them?". The bottom status bar indicates the code is in "Line 91, Col 50, LF, UTF-8, Spaces 4, JavaScript".



Quite Interesting Quiz

What is the capital of France?

- Berlin
- London
- Paris
- Stockholm

Submit Answer



Quite Interesting Quiz

Game Over

You scored 0 out of 1

What did you think?

Please let us know how you found the quiz!

1

super cool

Send Feedback

```
https://console.cloud.google.com/cloudpubsub/topic/detail/feedback?project=kwiklabs-gcp-00-c8a75da87533&cloudshell=true

Google Cloud Terminal (kwiklabs-gcp-00-c8a75da87533) x (kwiklabs-gcp-00-c8a75da87533) x + ~

Cloud Shell Terminal (kwiklabs-gcp-00-c8a75da87533) x (kwiklabs-gcp-00-c8a75da87533) x + ~

members:
- serviceAccount:service-7285524596@kwiklabs-firebase.googleapis.com
- serviceAccount:17285524596@cloudservices.iam.gserviceaccount.com
- serviceAccount:kwiklabs-gcp-00-c8a75da87533appspot.gserviceaccount.com
role: roles/editor
members:
- serviceAccount:service-7285524596@kwiklabs-firebase.googleapis.com
role: roles/firestore.serviceAgent
members:
- serviceAccount:admiral1@kwiklabs-services-prod.iam.gserviceaccount.com
- serviceAccount:admiral1@kwiklabs-gcp-00-c8a75da87533.iam.gserviceaccount.com
- serviceAccount:admiral1@kwiklabs-gcp-00-c8a75da87533.iam.gserviceaccount.com
- user@student-00-d5534837aa5@kwiklabs.net
role: roles/owner
members:
- serviceAccount:kwiklabs-gcp-00-c8a75da87533@kwiklabs-gcp-00-c8a75da87533.iam.gserviceaccount.com
role: roles/storage.admin
- members:
  - user@student-00-d5534837aa5@kwiklabs.net
  role: roles/viewer
status: BxK9eMuD0I
creationTime: 2023-05-10T14:44:00Z
Project ID: kwiklabs-gcp-00-c8a75da87533
student_00_d5534837aa5@cloudshell:~/pubsub-languageapi-spanner/start (kwiklabs-gcp-00-c8a75da87533)$ npm run worker
* quite-interesting-quiz$1.0.0 worker
> node console/worker.js

Worker starting...
student_00_d5534837aa5@cloudshell:~/pubsub-languageapi-spanner/start (kwiklabs-gcp-00-c8a75da87533)$ gcloud pubsub topics publish feedback --message "Hello World"
messageId: 59220412267498836
student_00_d5534837aa5@cloudshell:~/pubsub-languageapi-spanner/start (kwiklabs-gcp-00-c8a75da87533)$ gcloud pubsub subscriptions pull cloud-shell-subscription --auto-ack
DATA: {"id": 59220412267498836
MESSAGE_ID: 59220412267498836
ORDERING_KEY: ATTRIBUTES: {}
ATTEMPT_ID: 1
ATTEMPT: 
ACK_STATUS: SUCCESS
student_00_d5534837aa5@cloudshell:~/pubsub-languageapi-spanner/start (kwiklabs-gcp-00-c8a75da87533)$ gcloud pubsub subscriptions pull cloud-shell-subscription --auto-ack
student_00_d5534837aa5@cloudshell:~/pubsub-languageapi-spanner/start (kwiklabs-gcp-00-c8a75da87533)$ npm run worker
* quite-interesting-quiz$1.0.0 worker
> node console/worker.js

Worker starting...
Message received
{
  email: 'app-dev.student@example.org',
  quiz: 'intermediate',
  timestamp: 1684070796652,
  rating: 5,
  feedback: 'Super cool!'
}

Snip & Sketch
Snip saved to clipboard
Select here to mark up and share the image
```

The screenshot shows the Google Cloud Platform Console interface. The left sidebar contains the Cloud Shell Editor with a file tree and code editor. The code editor displays a file named `worker.js` which contains the following code:

```
const functions = require('firebase-functions');
const admin = require('firebase-admin');
admin.initializeApp(functions.config().firebase);

// TODO: Add logic here to trigger when a new message is sent
// to the 'messages' topic
functions.pubsub.topic("languageapi-spammer").onPublish((message) => {
    const document = message.data;
    const sentiment = document.get("sentiment");
    if (sentiment < -0.5) {
        return message.nack();
    }
    return message.ack();
});
```

The right side of the screen shows the Cloud Platform Console interface with various tabs and a search bar.

The screenshot shows the Google Cloud Platform Editor interface. In the center, the code editor displays `worker.js` with the following content:

```
// TODO: Invoke the languageapi module method  
// with the feedback from the student  
languageAPI.analyze(messageData.feedback)  
.then(score => {  
  // TODO: Log sentiment score  
  console.log(`Score: ${score}`);  
  // END TODO  
  
  // TODO: add a score property to feedback object  
  // and return updated feedback object  
  messageData.score = score;  
  return messageData;  
});  
// END TODO  
  
// TODO: Pass on the feedback object  
// to next Promise handler  
// END TODO
```

A tooltip at the bottom right of the code editor says: "Required assets to build and debug are missing from 'Student_00_d5534837aa5a'. Add them?". The options are "Don't Ask Again", "Not Now", and "Yes".

Below the code editor is a browser window titled "Quite Interesting Quiz". It asks "What is the capital of France?" with four options: Berlin, London, Paris (selected), and Stockholm. A "Submit Answer" button is at the bottom.

Quite Interesting Quiz

What is the capital of France?

- Berlin
- London
- Paris
- Stockholm

Submit Answer



Quite Interesting Quiz

Game Over

You scored 1 out of 1

What did you think?

Please let us know how you found the quiz!

3

WOOOW

Send Feedback

A screenshot of a Google Cloud Platform Console terminal window titled "Cloud Shell". The URL is https://console.cloud.google.com/cloudpubsub/topic/list/feedback?project=qwiklabs-gcp-00-c8a75da87533&cloudShell=true. The terminal shows the execution of a Node.js script named "worker.js". The log output details the creation of a worker, publishing a message to a Pub/Sub topic, pulling messages from a subscription, and running the worker script again. It also shows the creation of a feedback subscription and the processing of a feedback message with a rating of 3 and the feedback "WOOOW".

```
> node console/worker.js
Worker starting...
student_00_d534e37aa8@cloudshell:~/pubsub-languageapi-spanner/start (qwiklabs-gcp-00-c8a75da87533)$ gcloud pubsub topics publish feedback --message "Hello World"
- 0220412267495836
student_00_d534e37aa8@cloudshell:~/pubsub-languageapi-spanner/start (qwiklabs-gcp-00-c8a75da87533)$ gcloud pubsub subscriptions pull cloud-shell-subscription --auto-ack
Data: Hello World
Message ID: 0220412247495836
ORDERING KEY:
ATTRIBUTES:
  key: "rating"
  value: "3"
ACF STATUS: SUCCESS
student_00_d534e37aa8@cloudshell:~/pubsub-languageapi-spanner/start (qwiklabs-gcp-00-c8a75da87533)$ gcloud pubsub subscriptions pull cloud-shell-subscription --auto-ack
Listened 00_d534e37aa8@cloudshell:~/pubsub-languageapi-spanner/start (qwiklabs-gcp-00-c8a75da87533)$ npm run worker
student_00_d534e37aa8@cloudshell:~/pubsub-languageapi-spanner/start (qwiklabs-gcp-00-c8a75da87533)$ npm run worker
> quite-interesting-quiz#1.0.0 worker
> node console/worker.js
Worker starting...
Message received
{
  email: 'app.dev.student@example.org',
  quiz: 'places',
  timestamp: 1686070746645,
  rating: '1',
  feedback: 'super cool'
}
^C
student_00_d534e37aa8@cloudshell:~/pubsub-languageapi-spanner/start (qwiklabs-gcp-00-c8a75da87533)$ npm run worker
> quite-interesting-quiz#1.0.0 worker
> node console/worker.js
Worker starting...
Feedback subscription already exists
Message received
{
  email: 'app.dev.student@example.org',
  quiz: 'places',
  timestamp: 1686070746645,
  rating: '1',
  feedback: 'super cool'
}
Score: 0.8999999761581421
Message received
{
  email: 'app.dev.student@example.org',
  quiz: 'places',
  timestamp: 1686071192745,
  rating: '1',
  feedback: 'WOOOW'
}
Score: 0.30000001182092896
```

Create an instance

Summary

Storage cost depends on 68 stored per month. Compute cost refers to the hourly charge of nodes or processing units in your instance.

Configuration us-central1 (Iowa)

Replicas 3 read-write replicas in 3 separate zones within the region us-central1

Availability 99.9% availability SLA

Maximum storage capacity 4 TB

Configuration details

Your instance configuration defines the location of your instance's storage and serving resources: all data and nodes will be located within the geographic areas defined by your configuration. Certain region configurations allow you to add more read replicas within them. Adding read replicas to a single regional configuration does not change the availability service level agreement (SLA). If the region you'd like to request doesn't yet offer read-only replicas, complete the [request form](#). Check the configuration details and pricing carefully before you click save – your choice permanently affects cost, performance, and replication.

Performance guidelines

- For optimal performance with this configuration, we recommend you place your critical compute resources (writes and latency-sensitive reads) within the same region.

Learn more

- Quickstart using the console
- Instances
- Regional configurations

COMPARE REGION CONFIGURATIONS

Regional

Multi-region

us-central1 (Iowa)

Configure additional read-only replicas

CLOUD SHELL

```
Terminal (qwiklabs-gcp-00-c8a75da87533) x (qwiklabs-gcp-00-c8a75da87533) x +
```

```
Worker starting...
Feedback subscription already exists
Message received
{
  email: 'app.dev.student@example.org',
  quiz: 'places',
  timestamp: 168607396682,
  rating: '1',
  feedback: 'super cool'
}
Score: 0.8999999761581421
Message received
{
  email: 'app.dev.student@example.org',
  quiz: 'places',
  timestamp: 168607192748,
  rating: '3',
  feedback: 'wow'
}
Score: 0.30000001192092896
```

Create a database in quiz-instance

Sample DDL statements

Spanner's DDL syntax is similar to standard SQL with some distinctions. DDL lets you manipulate databases, tables, and indexes, as well as change streams and fine-grained access controls (FAC).

Schema and data model

Spanner relies on three core concepts to maximize the efficiency and performance of a database.

Schema updates

Spanner allows you to make schema updates with no downtime.

Data types

Spanner supports simple data types such as integers, as well as more complex types such as ARRAY and STRUCT.

Fine-grained access control

Spanner users that have IAM roles with Spanner admin permissions are able to set up fine-grained access control by creating and granting Spanner database roles that limit access to data for particular Spanner users.

CREATE CANCEL

CLOUD SHELL

```
Terminal (qwiklabs-gcp-00-c8a75da87533) x (qwiklabs-gcp-00-c8a75da87533) x +
```

```
Worker starting...
Feedback subscription already exists
Message received
{
  email: 'app.dev.student@example.org',
  quiz: 'places',
  timestamp: 168607396682,
  rating: '1',
  feedback: 'super cool'
}
Score: 0.8999999761581421
Message received
{
  email: 'app.dev.student@example.org',
  quiz: 'places',
  timestamp: 168607192748,
  rating: '3',
  feedback: 'wow'
}
Score: 0.30000001192092896
```

Instance created

<https://www.cloudskillsboost.google/courses/3222490/labs/369398>

App Dev - Developing a Backend Service: Node.js

6. Click **Create**.

Create a Cloud Spanner database and table

- On the **Instance Details** page for **quiz-instance**, click **Create database**.
- For **Name**, type **quiz-database**.
- Under **Define your schema**, type the following SQL statement:

```
CREATE TABLE Feedback (
    feedbackId STRING(100) NOT NULL,
    email STRING(100),
    quiz STRING(20),
    feedback STRING(MAX),
    rating INT64,
    score FLOAT64,
    timestamp INT64 )
PRIMARY KEY (feedbackId);
```

4. Click **Create**.

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

Create a Cloud Spanner instance and database

Check my progress

Write code to persist data into Cloud Spanner

<https://console.cloud.google.com/spanner/instances/quiz-instance/databases/quiz-database/tables?cloudshell=true&project=quiklabs-gcp-00-c8a75da87533>

Cloud Platform Console

Spanner

All instances INSTANCE quiz-instance: Overview > GOOGLE STANDARD SQL DATABASE quiz-database: Overview

Release Notes

CLOUD SHELL Editor

```
// END TODO
// TODO: Insert the record into the table using await
// use try {} catch () and check for err.code==6 to trap
// insert errors caused by duplicated Pub/Sub messages
try {
  console.log('Saving feedback');
  await feedbackTable.insert(record);
} catch (err) {
  if (err.code === 6) {
    console.log("Duplicate message - feedback already saved");
  } else {
    console.error('ERROR processing feedback:', err);
  }
}
```

Required assets to build and debug are missing from 'student_00_d5534837aa5a'. Add them?

Don't Ask Again Not Now Yes

The screenshot shows the Google Cloud Platform Console interface. At the top, it displays a Spanner instance named "quiz-instance: Overview". Below this, the "Cloud Platform Console" header includes a search bar and several navigation links: WRITE DDL, DELETE DATABASE, LEARN, and HIDE INFO PANEL.

The main content area is titled "GOOGLE STANDARD SQL DATABASE quiz-database: Overview". It shows the Database Dialect as Google Standard SQL, Encryption type as Google managed, and Schema updates as No recent updates. A "quiz-database" table is listed in the database.

A "CLOUD SHELL Editor" tab is active, showing a code editor with several files open:

- pubsub.js
- worker.js
- spanner.js
- languageapi.js
- index.js

The "worker.js" file contains the following code:

```
// TODO close off the promise chain with a catch() and log
88
89 // any errors to the console
90 .catch(console.error);
91
92 // END TODO
93
94 }
95
96 // TODO: Register the callback with the module
97 subscriber.registerFeedbackNotification(handler);
98
99
100 // END TODO
101
```

The "Output" panel shows a message: "Required assets to build and debug are missing from 'student_00_d5534837aa5a'. Add them?" with options: Don't Ask Again, Not Now, and Yes.

At the bottom, a terminal window shows the command "ls" with output: "master" "Go 1.20.4" "110" "Cloud Code" "cartservice.de" "Connect to Google Cloud". The status bar indicates "Ln 81, Col 27 LF UTF-8 Spaces: 4 JavaScript" and the time "13:17 AM".

Quite Interesting Quiz

What is the capital of France?

Berlin

London

Paris

Stockholm

[Submit Answer](#)

The screenshot shows a web browser window with the URL <https://0000-cs-298745d5-6d12-4f03-06da-9c35ce96d44.cloudshell.dev/client/#/quiz/places>. The page title is "Quite Interesting Quiz". The main content area displays a "Game Over" message: "You scored 1 out of 1" and "What did you think?". Below this is a text input field with the value "3" and the word "amazing" highlighted in red. A blue button at the bottom right says "Send Feedback". At the top right, there is a "Hello app dev student@example.org Logout" link.

Quite Interesting Quiz

Game Over

You scored 1 out of 1

What did you think?

Please let us know how you found the quiz!

3

amazing

Send Feedback

The screenshot shows a web browser window with the URL <https://www.cloudskillsboost.google/courses/3222490/labs/369398>. The page title is "App Dev - Developing a Backend Service: Node.js". On the left, there is a sidebar with a tree view of course content. In the center, a modal dialog box is open with the heading "End your lab". It contains fields for "Username" (student-88-d5534837aa6), "Password" (HRFgkE92Bm0z), and "GCP Project ID" (qwiklabs-gcp-88-c8a75d). A message in the dialog says: "All done? If you end this lab, you will lose all your work. You may not be able to restart the lab if there is a quota limit. Are you sure you want to end this lab?". Below the message, there is a satisfaction rating scale from 1 star to 5 stars. At the bottom of the dialog are "Cancel" and "Submit" buttons. To the right of the dialog, the main page content continues with a list of tasks: "Task 1. Preparing the case study application", "Task 2. Examining the case study application code", "Task 3. Working with Cloud Pub/Sub", "Task 4. Publishing messages to Cloud Pub/Sub programmatically", "Task 5. Subscribing to Cloud Pub/Sub topics programmatically", "Task 6. Using the Cloud Natural Language API", "Task 7. Persisting data to Cloud Spanner", and "Task 8. Bonus: Implementing the Leaderboard". The status bar at the bottom shows "Russell 2000" and the time "11:19 AM".

Practice Quiz: Using Pub/Sub to Integrate Components of Your Application

Backend Service: Java

- Lab
- App Dev - Developing a Backend Service: Python
- Quiz** Practice Quiz: Using Pub/Sub to Integrate Components of Your Application
- Quiz Final Quiz: Using Pub/Sub to Integrate Components of Your Application
- Video Summary
- Adding Intelligence to Your Application
- Video Adding Intelligence
- Quiz Practice Quiz: Adding Intelligence to Your Application
- Quiz Final Quiz: Adding Intelligence to Your Application
- Video Summary
- Using Cloud Functions for Event-Driven Processing

Practice Quiz: Using Pub/Sub to Integrate Components of Your Application

Your score: 100% Passing score: 66%

Congratulations! You passed this assessment.

1. How does Cloud Pub/Sub enable you to build scalable and reliable applications? Select two.

By using Cloud Pub/Sub, you can avoid brittle point-to-point connections between applications.

Cloud Pub/Sub enables you to build highly performant connections between applications.

Cloud Pub/Sub enables you to scalably and reliably ingest large volumes of data.

Cloud Pub/Sub enables you to scalably and reliably ingest large volumes

11:34 AM

Practice Quiz: Using Pub/Sub to Integrate Components of Your Application

Backend Service: Java

- Lab
- App Dev - Developing a Backend Service: Python
- Quiz** Practice Quiz: Using Pub/Sub to Integrate Components of Your Application
- Quiz Final Quiz: Using Pub/Sub to Integrate Components of Your Application
- Video Summary
- Adding Intelligence to Your Application
- Video Adding Intelligence
- Quiz Practice Quiz: Adding Intelligence to Your Application
- Quiz Final Quiz: Adding Intelligence to Your Application
- Video Summary
- Using Cloud Functions for Event-Driven Processing

2. Review the following diagram. Which of the following statements is accurate? Select two.

The diagram shows a message fan out scenario. With Cloud Pub/Sub, your application can fan out messages from one publisher to multiple subscribers. Applications avoid making point-to-point connections with each other.

The architecture does not solve the problem of point-to-point connections between applications.

Each subscriber processes every order in the Orders topic.

The diagram shows a message fan out scenario. With Cloud Pub/Sub, your application can fan out messages from one publisher to multiple subscribers. Applications avoid making point-to-point connections with each other.

Each subscriber can share the workload and process different orders.

The architecture solves the problem of point-to-point connections between applications.

11:35 AM

Practice Quiz: Using Pub/Sub to Integrate Components of Your Application

Backend Service: Java

Lab App Dev - Developing a Backend Service: Python

Quiz Practice Quiz: Using Pub/Sub to Integrate Components of Your Application

Video Summary

Adding Intelligence to Your Application

Video Adding Intelligence

Quiz Practice Quiz: Adding Intelligence to Your Application

Quiz Final Quiz: Adding Intelligence to Your Application

Video Summary

Using Cloud Functions for Event-Driven Processing

Diagram

3. Review the following diagram. Which of the following statements is accurate? Select three.

Subscribers can process orders at a reasonable pace because the Orders topic acts as a buffer to hold data that is coming in rapidly.

The Orders service publishes orders to the Orders topic.

Cloud Pub/Sub can reliably receive and store large amounts of rapidly incoming data. The downstream service can then act as a subscriber and consume this data at a reasonable pace.

Multiple instances of the Orders service are publishing unique orders.

Cloud Pub/Sub can reliably receive and store large amounts of rapidly incoming data. The downstream service can then act as a subscriber and consume this data at a reasonable pace.

The Inventory service will be overwhelmed by the high rate of incoming order messages because there are more publishers than subscribers.

Final Quiz: Using Pub/Sub to Integrate Components of Your Application

App Dev - Developing a Backend Service: Node.js

Lab App Dev - Developing a Backend Service: Java

Lab App Dev - Developing a Backend Service: Python

Quiz Practice Quiz: Using Pub/Sub to Integrate Components of Your Application

Video Summary

Adding Intelligence to Your Application

Video Adding Intelligence

Quiz Practice Quiz: Adding Intelligence to Your Application

Quiz Final Quiz: Adding Intelligence to Your Application

Video Summary

Final Quiz: Using Pub/Sub to Integrate Components of Your Application

Your score: 66% Passing score: 66%

Congratulations! You passed this assessment.

Retake

1. Sales data is published to a Cloud Pub/Sub topic called SalesTopic. The Finance application subscribes to the topic and begins receiving sales data messages. Later, the Inventory team creates another subscription to the topic to receive the Sales data as well. However, the Inventory team's data does not tally with the Finance team's data. What could the reason be?

The Inventory team's subscriber only receives messages that are published after the subscription was created.

The Inventory team's subscriber might have a misconfigured push endpoint.

The Inventory team's subscriber likely missed sending acknowledgements back to the Cloud Pub/Sub service.

The messages lacked identifying attributes to perform idempotent operations.

Correct - good job!

Final Quiz: Using Pub/Sub to Integrate Components of Your Application

Correct - good job!

✓ 2. Why is Cloud Pub/Sub used in the architecture of an application that performs real-time data analysis of Twitter data?

Cloud Pub/Sub is used to enforce message ordering in a queue.

Cloud Pub/Sub is used to fan out messages to Kubernetes pods and BigQuery.

Cloud Pub/Sub is not really needed. The Twitter-to-Cloud-Pub/Sub-pod can write to BigQuery directly.

Cloud Pub/Sub is used to buffer the high volume of incoming tweets.

Correct - good job!

✗ 3. When a new employee joins your organization, HR needs to notify the security, facilities, and training teams so that those teams can perform their tasks related to new employees. You need to design an application architecture that notifies all teams promptly and reliably. Select the four steps that create the most effective design for this scenario.

Snip & Sketch

Snip saved to clipboard

Select here to mark up and share the image

Final Quiz: Using Pub/Sub to Integrate Components of Your Application

Correct - good job!

✗ 3. When a new employee joins your organization, HR needs to notify the security, facilities, and training teams so that those teams can perform their tasks related to new employees. You need to design an application architecture that notifies all teams promptly and reliably. Select the four steps that create the most effective design for this scenario.

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

Create a Cloud Datastore entity to keep track of unique notifications.

Create a Cloud Pub/Sub topic called NewEmployee.

Correct - good job!

✗ Create a single subscription for security, facilities, and training.

Consider reviewing the Cloud Pub/Sub Use Cases lecture.

Create SecuritySubscriber, FacilitiesSubscriber, and TrainingSubscriber services that subscribe to messages in the

Final Quiz: Using Pub/Sub to Integrate Components of Your Application

App Dev - Developing a Backend Service: Node.js

Lab App Dev - Developing a Backend Service: Java

Lab App Dev - Developing a Backend Service: Python

Quiz Practice Quiz: Using Pub/Sub to Integrate Components of Your Application

Quiz Final Quiz: Using Pub/Sub to Integrate Components of Your Application

Video Summary

Adding Intelligence to Your Application

Video Adding Intelligence

Quiz Practice Quiz: Adding Intelligence to Your Application

Quiz Final Quiz: Adding Intelligence to Your Application

Video Summary

Correct - good job!

Create a Cloud Datastore entity to keep track of unique notifications.

Create a Cloud Pub/Sub topic called NewEmployee.

Correct - good job!

Create a separate subscription for security, facilities, and training.

Create an HRPublisher service that publishes messages to the NewEmployee topic.

Correct - good job!

Create a single subscription for security, facilities, and training.

Consider reviewing the Cloud Pub/Sub Use Cases lecture.

Create SecuritySubscriber, FacilitiesSubscriber, and TrainingSubscriber services that subscribe to messages in the NewEmployee topic.

Correct - good job!

Practice Quiz: Adding Intelligence to Your Application

Quiz Practice Quiz: Adding Intelligence to Your Application

Final Quiz: Adding Intelligence to Your Application

Video Summary

Using Cloud Functions for Event-Driven Processing

Video Cloud Functions Concepts

Video Writing, Deploying, and Monitoring Cloud Functions

Video Demo: Invoke Cloud Functions through direct request-response

Video Lab: Process Pub/Sub Data Using Cloud Functions

Lab App Dev - Processing Cloud Pub/Sub Data using Cloud Functions: Node.js

Quiz Practice Quiz: Using Cloud Functions for Event-Driven Processing

Correct

Your score: 100% Passing score: 66%

Congratulations! You passed this assessment.

Retake

✓ 1. What API would you use in an Expense Report application to extract text from images of receipts?

Vision API

Video Intelligence API

None of the above

Cloud Natural Language API

The Vision API can perform optical character recognition (OCR).

✓ 2. Which of the following statements about the Vision API are accurate? Select two.

The Vision API can categorize objects under labels in individual

Practice Quiz: Adding Intelligence to Your Application

✓ 2. Which of the following statements about the Vision API are accurate? Select two.

The Vision API can categorize objects under labels in individual frames of a 15-second video.

The Vision API can categorize objects under labels and perform optical character recognition (OCR).

Correct - good job!

Currently, the Vision API cannot analyze emotions on people's faces.

The Vision API can detect landmarks, logos, faces, and explicit content.

Correct - good job!

✓ 3. What API would you use to transcribe audio into text?

Cloud Natural Language API

Speech-to-Text API

None of the above

Video Intelligence API

The Speech-to-Text API enables developers to convert audio to text. It handles over 100 languages and variants to support your global user

Final Quiz: Adding Intelligence to Your Application

Final Quiz: Adding Intelligence to Your Application

Your score: 100% Passing score: 66% Retake

Congratulations! You passed this assessment.

✓ 1. How can you invoke the pre-trained machine learning APIs (such as the Vision API or Natural Language API) from your application?

Use the gcloud command.

Use the REST API.

Use the Google Cloud console.

Use TensorFlow.

Correct - good job!

✓ 2. Your support database contains feedback data from customers. You want to analyze customer sentiment for the last quarter. What property and pre-trained machine learning API can you use to gauge customer sentiment?

Label score and description from the Vision API

Sentiment score and magnitude from the Cloud Natural Language API

Final Quiz: Adding Intelligence to Your Application

✓ 2. Your support database contains feedback data from customers. You want to analyze customer sentiment for the last quarter. What property and pre-trained machine learning API can you use to gauge customer sentiment?

Label score and description from the Vision API
 Sentiment score and magnitude from the Cloud Natural Language API
 Transcript from the Speech-to-Text API
 Transcript and confidence from the Speech-to-Text API

Correct - good job!

✓ 3. What pre-trained machine learning APIs would you use in this image processing pipeline?



Vision API, Cloud Natural Language API
 Vision API, Speech-to-Text API, Video Intelligence API
 Cloud Machine Learning API
 Audio API, Vision API, Video Intelligence API

Snip & Sketch
Select here to mark up and share the image

Final Quiz: Adding Intelligence to Your Application

✓ Sentiment score and magnitude from the Cloud Natural Language API
 Transcript from the Speech-to-Text API
 Transcript and confidence from the Speech-to-Text API

Correct - good job!

✓ 3. What pre-trained machine learning APIs would you use in this image processing pipeline?



Vision API, Cloud Natural Language API
 Vision API, Speech-to-Text API, Video Intelligence API
 Cloud Machine Learning API
 Audio API, Vision API, Video Intelligence API

Snip & Sketch
Select here to mark up and share the image

Welcome, student Od179ced

```
CLOUD SHELL (qwiklabs-gcp-01-190b0f20ded5) X + *  
Get started with Google Cloud  
  
Welcome to Cloud Shell! Type 'help' to get started.  
Your Cloud Platform project in this session is set to qwiklabs-gcp-01-190b0f20ded5.  
Use "gcloud config set project [PROJECT_ID]" to change to a different project.  
student_00_fab6c44f5384@cloudshell:  
student_00_fab6c44f5384@cloudshell:~ (qwiklabs-gcp-01-190b0f20ded5)$ gcloud auth list  
[REDACTED] Accounts  
  
ACTIVE:  
ACCOUNT: student-00-fab6c44f5384@qwiklabs.net  
  
To set the active account, run:  
  $ gcloud config set account '[ACCOUNT']  
  
student_00_fab6c44f5384@cloudshell:  
student_00_fab6c44f5384@cloudshell:~ (qwiklabs-gcp-01-190b0f20ded5)$ gcloud config list project  
[REDACTED]  
  
Your active configuration is: [qwikshell-1935]  
student_00_fab6c44f5384@cloudshell:  
student_00_fab6c44f5384@cloudshell:~ (qwiklabs-gcp-01-190b0f20ded5)$ git clone --depth=1 https://github.com/GoogleCloudPlatform/training-data-analyst  
Cloning into 'training-data-analyst'...  
remote: Enumerating objects: 100K (5176/5176), done.  
remote: Total 7647 (delta 2123), reused 5785 (delta 1516), pack-reused 0  
Receiving objects: 100% (7647/7647), 2.88 MiB / 27.70 MiB/s, done.  
Resolving deltas: 100% (2124/2124), done.  
Updating file: 100% (1280/1280), done.  
student_00_fab6c44f5384@cloudshell:  
student_00_fab6c44f5384@cloudshell:~ (qwiklabs-gcp-01-190b0f20ded5)$ ls -s ./training-data-analyst/courses/developingapps/v1.3/nodejs/cloudfunctions ~/cloudfunctions  
student_00_fab6c44f5384@cloudshell:  
student_00_fab6c44f5384@cloudshell:~/cloudfunctions$ start (qwiklabs-gcp-01-190b0f20ded5)$ . prepare_environment.sh  
Creating App Engine app  
You are about to create an app for project [qwiklabs-gcp-01-190b0f20ded5].  
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-01-190b0f20ded5] and region [us-central]...working.
```

Welcome, student Od179ced

```
CLOUD SHELL (qwiklabs-gcp-01-190b0f20ded5) X + *  
Get started with Google Cloud  
  
Success! The app is now created. Please use 'gcloud app deploy' to deploy your first app.  
Making bucket: gs://qwiklabs-gcp-01-190b0f20ded5-media  
Exporting GCLINUX_PROJECT and GCLINUX_REGION  
Installing dependencies  
  
removed 75 packages, and changed 118 packages in 9s  
10 packages are looking for funding  
  run 'npm fund' for details  
npm WARN deprecated multer@1.4.1 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 296 packages, and audited 297 packages in 16s  
21 packages are looking for funding  
  run 'npm fund' for details  
  6 high severity vulnerabilities  
  
To address issues that do not require attention, run:  
  npm audit fix  
  
Some issues need review, and may require choosing  
a different dependency.  
Run 'npm audit' for details.  
npm notice New major version of npm available: 8.1.2 > 8.6.7  
npm notice Changelog: https://github.com/npm/cli/releases/tag/v8.6.7  
npm notice Run npm install -g npm@8.6.7 to update!  
npm notice  
Creating Datastore entities  
Entities created  
Creating Cloud Pub/Sub topic  
Creating Cloud Functions projects/[qwiklabs-gcp-01-190b0f20ded5/topics/feedback].  
Creating Cloud Spanner Instance, Database, and Table  
Creating instance...done  
Creating database...done  
Creating table...done  
Project ID: qwiklabs-gcp-01-190b0f20ded5  
student_00_fab6c44f5384@cloudshell:  
student_00_fab6c44f5384@cloudshell:~/cloudfunctions$ npm start  
> quite-interesting-quiz@1.0.0 start  
> node server/app.js  
App listening on port 8080
```

The screenshot shows a web browser window with the URL <https://0000-cs-03d247-b9f4-4c77-8af6-17ea9e43a9c.us-east-1.cloudshell.dev/auth/login?redirectPreviously=true>. The page title is "Quite Interesting Quiz". Below the title are links for "Create Question", "Take Test", and "Leaderboard". A central message box says "Welcome to the Quite Interesting Quiz where you can create a question, take a test or review feedback".

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 a web browser window with the URL <https://cloudskillsbootcamp.appspot.com/lab/10234904896411>. The page title is "App Dev - Processing Cloud Pub/Sub Data using Cloud Functions: Node.js". On the left, there's a sidebar with a tree view of lab contents: "Writing, Deploying, and Monitoring Cloud Functions", "Demo: Invoke Cloud Functions through direct request-response", "Lab: Process Pub/Sub Data Using Cloud Functions", "Arg Day - Processing Cloud Pub/Sub Data using Cloud Functions: Node.js", "Practice Quiz: Using Cloud Functions for Event-Driven Processing", "Final Quiz: Using Cloud Functions for Event-Driven Processing", "Cloud Endpoints Concepts", "Cloud Endpoints for REST APIs", and "Lab Overview". The main content area shows a timer at 01:55:24. It has sections for "End Lab", "Note: This script file:", "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: i6c44f5384@qwiklabs.net", "Password: vFERTsLerMPr", and "GCP Project ID: qwiklabs-gcp-81-198b8f". A note says "3. To run the web application, enter the following command: npm start". Below it, a button says "Click Check my progress to verify the objective." Another section says "Configure and run the case study application" with a "Check my progress" button and a message "Assessment Completed!". On the right, there's a sidebar with tabs: "Overview" (selected), "Objectives", "Setup and requirements", "Task 1. Preparing the case study application", "Task 2. Working with Cloud Functions" (selected), "Task 3. Examining the case study application code", "Task 4. Coding a Cloud Function", "Task 5. Testing the case study application", "Task 6. Bonus: Storing student answers using a Cloud Function", and "End your lab".

Task 2. Working with Cloud Functions

In this section, you create a Cloud Function in your Google Cloud project that is triggered by publishing a message to Cloud Pub/Sub, runs the application, and monitors the Cloud

Google Cloud Platform - https://console.cloud.google.com/functions/add?authuser=1&project=qwiklabs-gcp-01-190b0f20ded5

Cloud Functions | Create function

Configuration — **Code**

Basics

Environment: 1st gen

Function name: process-feedback

Region: us-central1

Trigger

Cloud Pub/Sub

Trigger type: Cloud Pub/Sub

Select a Cloud Pub/Sub topic: projects/qwiklabs-gcp-01-190b0f20ded5/topics/feedback

Retry on failure

SOURCE CANCEL

NEXT CANCEL

CLOUD SHELL (qwiklabs-gcp-01-190b0f20ded5) +

```
Creating database...done.
Project ID: qwiklabs-gcp-01-190b0f20ded5
student_00_fe66c44ff538#cloudshell:~/cloudfunctions/start (qwiklabs-gcp-01-190b0f20ded5)$ npm start
> quite-interesting-quiz$1.0.0 start
> node server/app.js
App listening on port 8080
[]
```

https://console.cloud.google.com/functions/details/us-central1/process-feedback?env=gen1&authuser=1&project=qwiklabs-gcp-01-190b0f20ded5

Cloud Functions | Function details

Version: Version 1, deployment started at Jun 6, 2023, 1...

METRICS DETAILS SOURCE VARIABLES TRIGGER PERMISSIONS LOGS TESTING

Configure dashboard

Invocations/Second

No data is available for the selected time frame.

UTC-6 10:55 AM 11:00 AM 11:05 AM 11:10 AM 11:15 AM 11:20 AM 11:25 AM 11:30 AM 11:35 AM 11:40 AM 11:45 AM 11:50 AM

Execution time: No data is available for the selected time frame. Milliseconds/call

Memory utilization: No data is available for the selected time frame. MB/call

Instance count: No data is available for the selected time frame.

CLOUD SHELL (qwiklabs-gcp-01-190b0f20ded5) +

```
Creating database...done.
Project ID: qwiklabs-gcp-01-190b0f20ded5
student_00_fe66c44ff538#cloudshell:~/cloudfunctions/start (qwiklabs-gcp-01-190b0f20ded5)$ npm start
> quite-interesting-quiz$1.0.0 start
> node server/app.js
App listening on port 8080
[]
```

Google Cloud Functions

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

Functions CREATE FUNCTION REFRESH

LEARN RELEASE NOTES

Filter Filter functions

Environment	Name	Last deployed	Region	Recommendation	Trigger	Runtime	Memory allocated	Executed function	Actions
1st gen	process-feedback	Jun 6, 2023, 11:58:20 AM	us-central		Topic: feedback	Node.js 18	256 MB	helloPubSub	⋮

CLOUD SHELL Terminal (qwiklabs-gcp-01-190b0f20ded5) + Open Editor Dismiss

```

npm WARN New major version of npm available! 6.14.12 > 9.6.7
npm WARN Changelog: https://github.com/npm/cli/releases/tag/v9.6.7
npm WARN Run npm install -g npm@9.6.7 to update!
npm WARN
npm WARN Creating Datastore entities
Entities created
Creating Cloud Pub/Sub topic
Creating Topic [projects/qwiklabs-gcp-01-190b0f20ded5/topics/feedback].
Creating Cloud Spanner Instance, Database, and Table
Creating instance...done
Create database...done
Project ID: qwiklabs-gcp-01-190b0f20ded5
student_00_fe66c44f5384@cloudshell:~/cloudfunctions/start (qwiklabs-gcp-01-190b0f20ded5)$ npm start
> quite-interesting-quiz@1.0.0 start
> node server/app.js
App listening on port 8080
^C
student_00_fe66c44f5384@cloudshell:~/cloudfunctions/start (qwiklabs-gcp-01-190b0f20ded5)$
  
```

1558 AM

App Dev - Processing Cloud Pub/Sub Data using Cloud Functions: Node.js

4. Click **Create function.**

In the Create function dialog, set the following properties and leave the remaining settings as their defaults:

Property	Value
Function name	process-feedback
Trigger type	Cloud Pub/Sub
Topic	Select projects/[PROJECT_ID]/topics/feedback

5. Click **Save**, and then click **Next**.

6. Review the provided function implementation, and then click **Deploy**.

Note: It might take a minute or two to create the Cloud Function.

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

Create a Cloud Function

Check my progress Assessment Completed!

Run the web application

- Return to the Cloud Shell window.
- Preview the web application by clicking on the Web Preview button and selecting **Preview on port 8080**.

Home

- Writing, Deploying, and Monitoring Cloud Functions
- Demo: Invoke Cloud Functions through direct request-response
- Lab: Process Pub/Sub Data Using Cloud Functions
- Out
- Practice Out: Using Cloud Functions for Event-Driven Processing
- Out
- Final Out: Using Cloud Functions for Event-Driven Processing
- Summary

Managing APIs with Cloud Endpoints

- Cloud Endpoints Concepts
- Cloud Endpoints for REST APIs
- Lab Overview

Overview

Objectives

Setup and requirements

Task 1: Preparing the case study application

Task 2: Working with Cloud Functions

Task 3: Examining the case study application code

Task 4: Coding a Cloud Function

Task 5: Testing the case study application

Task 6: Bonus: Storing student answers using a Cloud Function

End your lab

10/15

A screenshot of a web browser window. The address bar shows the URL: <https://0000-cs-0353-247-b6ff-4cd7-8a46-17ea69c439c.ap-southeast-1.cloudshell.dev/client/#/quiz/places>. The page title is "Quite Interesting Quiz". The navigation bar includes links for "Quite Interesting Quiz", "GCP", "Places", "People", and "Hello app dev student@example.org Logout".

Quite Interesting Quiz

What is the capital of France?

- Berlin
- London
- Paris
- Stockholm

[Submit Answer](#)

A screenshot of a web browser window, identical to the one above but showing a different page. The address bar shows the same URL: <https://0000-cs-0353-247-b6ff-4cd7-8a46-17ea69c439c.ap-southeast-1.cloudshell.dev/client/#/quiz/places>. The page title is "Quite Interesting Quiz". The navigation bar includes links for "Quite Interesting Quiz", "GCP", "Places", "People", and "Hello app dev student@example.org Logout".

Quite Interesting Quiz

Game Over

You scored 1 out of 1

What did you think?

Please let us know how you found the quiz!

3

omg

[Send Feedback](#)

Google Cloud Functions - Cloud Functions

Cloud Functions

Filter functions

Environment	Name	Last deployed	Region	Recommendation	Trigger	Runtime	Memory allocated	Executed function	Actions
1st gen	process-feedback	Jun 6, 2023, 11:58:20 AM	us-central1		Topic: feedback	Node.js 18	256 MB	helloPubSub	⋮

CLOUD SHELL Terminal (qwiklabs-gcp-01-190b0f20ded5) + ⋮

```
<`student_00_fa66c44ff5384#cloudshell:~/cloudfunctions/start (qwiklabs-gcp-01-190b0f20ded5)$ npm start
> quite-interesting-quiz@1.0.0 start
> node server/app.js
App listening on port 8080
[
  {
    email: 'app.dev.student@example.org',
    id: '4',
    answer: '3',
    timestamp: 1686074404587
  }
]
email: 'app.dev.student@example.org',
quiz: 'places',
timestamp: 1686074418528,
rating: 3,
feedback: 'img'
`>
```

Open Editor

Cloud Functions - Function details

process-feedback

Version 1, deployed at Jun 6, 2023, 11:58:20 AM

METRICS DETAILS SOURCE VARIABLES TRIGGER PERMISSIONS LOGS TESTING

Logs Severity Default Filter Search all fields and values

Severity TIMESTAMP SUMMARY

- Loading... Scanned up to 8/29/22, 5:59 PM. Scanned 5.7 KB.
- Cloud Functions CreateFunction us-central1:process-feedback student-00-fa66c44ff5384@qwiklabs.net (@type: type.googleapis.com/google.cloud.audit.AuditLog, authenticationInfo: {..}, authorizationInfo: {..}, methodName: google.cloud.functions.CreateFunction)
- Cloud Functions CreateFunction us-central1:process-feedback student-00-fa66c44ff5384@qwiklabs.net (@type: type.googleapis.com/google.cloud.audit.AuditLog, authenticationInfo: {..}, authorizationInfo: {..}, methodName: google.cloud.functions.v1.CloudFunctions.CreateFunction)
- process-feedback appj7hf2adi Function execution started
- process-feedback appj7hf2adi (email: app.dev.student@example.org, feedback: img, quiz: places, rating: 3, timestamp: 1686074418528)
- process-feedback appj7hf2adi Function execution took 202 ms, finished with status: 'ok'

CLOUD SHELL Terminal (qwiklabs-gcp-01-190b0f20ded5) + ⋮

```
<`student_00_fa66c44ff5384#cloudshell:~/cloudfunctions/start (qwiklabs-gcp-01-190b0f20ded5)$ npm start
> quite-interesting-quiz@1.0.0 start
> node server/app.js
App listening on port 8080
[
  {
    email: 'app.dev.student@example.org',
    id: '4',
    answer: '3',
    timestamp: 1686074404587
  }
]
email: 'app.dev.student@example.org',
quiz: 'places',
timestamp: 1686074418528,
rating: 3,
feedback: 'img'
`>
```

Open Editor

Google Cloud Editor

File Edit Selection View Go Run Terminal Help

EXPLORER

- > OPEN EDITORS
- > STUDENT_00_FA96C4F5304
- > cloudfunctions
 - > bonus
 - > end
 - > start
 - > bin
 - > function
 - index.js
 - languageapi.js
 - package.json
 - spanner.js
 - > node_modules
 - > server
 - > setup
 - package-lock.json
 - package.json
 - prepare_environment.sh
 - > training-data-analyst
 - README-cloudshell.txt

```

index.js X
cloudfunctions > start > function > index.js > subscribe > ...
60   return FeedbackObject;
61
62   // END TODO
63 })
64 // TODO: Insert record
65
66 // TODO: Log and return success
67 .then(feedbackStorage.saveFeedback).then(() => {
68   // TODO: Log and return success
69   console.log('Feedback saved...');
70   return 'success';
71
72 })
73 // END TODO
74
75 })
76 // END TODO
77
78 // TODO: Catch and Log error
79 .catch(console.error);
80 // END TODO
81
82 );
83
84

```

Cloud Functions | Edit function

Configuration — Code

Runtime: Node.js 18 | Entry point: helloPubSub

Source code: ZIP from Cloud Storage | ZIP from Cloud Storage

Cloud Storage location: quiklabs-gcp-01-190b0f20ded5/media/cf.zip | BROWSE

PREVIOUS DEPLOY CANCEL

CLOUD SHELL /quiklabs-gcp-01-190b0f20ded5 | + x

```

student_00_fa66c4f5304@cloudshell:~/cloudfunctions/start (quiklabs-gcp-01-190b0f20ded5)$ cd function
student_00_fa66c4f5304@cloudshell:~/cloudfunctions/start/function (quiklabs-gcp-01-190b0f20ded5)$ zip cf.zip *.js*
adding: index.js (deflated 38%)
adding: languageapi.js (deflated 44%)
adding: package.json (deflated 26%)
adding: spanner.js (deflated 50%)
student_00_fa66c4f5304@cloudshell:~/cloudfunctions/start/function (quiklabs-gcp-01-190b0f20ded5)$ gsutil cp cf.zip gs://$G_CLOUD_BUCKET/
gs://$G_CLOUD_BUCKET/cf.zip [cf.zip type=application/zip]...
[1 files] [ 3.0 KB/ 3.0 KB]
Operation completed over 1 objects/3.0 KiB.
student_00_fa66c4f5304@cloudshell:~/cloudfunctions/start/function (quiklabs-gcp-01-190b0f20ded5)$

```

The screenshot shows a browser window for a Cloud Skills Boost lab titled "App Dev - Processing Cloud Pub/Sub Data using Cloud Functions: Node.js". The main area displays a step-by-step guide with numbered instructions and a form for deploying a Cloud Function. A note at the bottom right indicates that the process-feedback function has been updated. On the left, a sidebar lists various lab modules and their completion status. On the right, a sidebar shows the progress of the current task, which is 15/15 complete.

9. Under Source code, select ZIP from Cloud Storage.
10. For Cloud Storage location, click Browse.
11. Select the `cf.zip` file in the bucket named after your project ID with the `-media` suffix, and click Select.
12. In the Entry point field, type subscribe.
13. Click Deploy.

Note: It may take a minute or two to update the `process-feedback` function with your new code that performs sentiment analysis with the Cloud Natural Language Machine Learning API and inserts data into Cloud Spanner.

Open Google Console

Username: i6c44f5384@qwiklabs.net

Password: vFERTsLerMPr

GCP Project ID: qwiklabs-gcp-81-198b0f

Package and deploy the Cloud Function code

Check my progress

Assessment Completed!

Overview
Objectives
Setup and requirements
Task 1. Preparing the case study application
Task 2. Working with Cloud Functions
Task 3. Examining the case study application code
Task 4. Coding a Cloud Function
Task 5. Testing the case study application
Task 6. Bonus: Storing student answers using a Cloud Function
End your lab

Task 5. Testing the case study application

Run the web application

The screenshot shows a browser window for the same lab. A modal dialog box titled "End your lab" is open, asking for satisfaction feedback. The user has selected 5 stars and provided the comment "Great lab! Very informative". The sidebar on the left shows the lab is now 100% complete, and the sidebar on the right shows the task is 15/15 complete.

Start Lab 02:00:00

• Unlimited

How satisfied are you with this lab? *

5 stars

You will give _____ stars, type a number

Additional Comments

The number of stars you gave is 5

Cancel Submit

When you have finished using the resources you were given, please close this dialog box.

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
Objectives
Setup and requirements
Task 1. Preparing the case study application
Task 2. Working with Cloud Functions
Task 3. Examining the case study application code
Task 4. Coding a Cloud Function
Task 5. Testing the case study application
Task 6. Bonus: Storing student answers using a Cloud Function
End your lab

Practice Quiz: Using Cloud Functions for Event-Driven Processing

Your score: 100% Passing score: 66%

Congratulations! You passed this assessment.

Retake

✓ 1. Identify two ways of invoking Cloud Functions.

Invoke node.js function like a local function invocation.

Invoke asynchronously at a specific time.

Invoke asynchronously when triggered by an event.

External systems can synchronously invoke functions as web hooks in response to events in those systems. Cloud Functions can also be triggered asynchronously in response to events in Google Cloud services.

Invoke synchronously as a web hook.

External systems can synchronously invoke functions as web hooks in response to events in those systems. Cloud Functions can also be triggered asynchronously in response to events in Google Cloud services.

Monitoring Cloud Functions

- Video Demo: Invoke Cloud Functions through direct request-response
- Video Lab: Process Pub/Sub Data Using Cloud Functions
- Lab App Dev - Processing Cloud Pub/Sub Data using Cloud Functions: Node.js

Final Quiz: Using Cloud Functions for Event-Driven Processing

Video Summary

Managing APIs with Cloud Endpoints

- Video Cloud Endpoints Concepts
- Video Cloud Endpoints for REST APIs
- Video Lab Overview
- Lab App Dev - Deploying an API for the Quiz Application: Node.js

Practice Quiz: Using Cloud Functions for Event-Driven Processing

✓ 2. Cloud Functions is ideal for which of the following use cases?

Light-weight, event-driven, serverless, microservices

Microservices deployed by using Kubernetes

Applications with large and complex codebases

Applications that need point-to-point connections

Cloud Functions are ideal for microservices that require a small piece of code to quickly process data related to an event.

✓ 3. You can view the output from your console.log and console.error messages in which of the following services?

Cloud Monitoring

Cloud Trace

Cloud Logging

Error Reporting

You can view the output from your console.log and console.error messages in Cloud Logging.

Monitoring Cloud Functions

- Video Demo: Invoke Cloud Functions through direct request-response
- Video Lab: Process Pub/Sub Data Using Cloud Functions
- Lab App Dev - Processing Cloud Pub/Sub Data using Cloud Functions: Node.js

Final Quiz: Using Cloud Functions for Event-Driven Processing

Video Summary

Managing APIs with Cloud Endpoints

- Video Cloud Endpoints Concepts
- Video Cloud Endpoints for REST APIs
- Video Lab Overview
- Lab App Dev - Deploying an API for the Quiz Application: Node.js

Final Quiz: Using Cloud Functions for Event-Driven Processing

Your score: 100% Passing score: 66%

Congratulations! You passed this assessment.

1. Identify the key aspects of this application's architecture. (Select all 4 correct answers)

When media content is uploaded to a Cloud Storage bucket, the system generates a Cloud Pub/Sub notification message and sends it to the configured Cloud Pub/Sub topic. This message triggers Cloud Functions.

Cloud Functions are invoked synchronously by the Cloud Pub/Sub topic.

Cloud Functions invoke the Vision API and Cloud Video Intelligence API to classify the uploaded media based on logos, labels, text, and safe search results.

Correct - good job!

Final Quiz: Using Cloud Functions for Event-Driven Processing

2. Which one of the following statements is accurate?

You can deploy Cloud Functions directly from a Google Cloud Source Repository.

You must set the `console.log = true` flag to enable logging with Cloud Logging.

You can run Cloud Functions in App Engine flexible environment.

You must package all dependencies for Cloud Functions in a package.zip file.

Correct - good job!

3. Identify the events that trigger Cloud Functions in the following architecture. Select two.

A message is received in Cloud Pub/Sub.

A web hook is invoked from Cloud Pub/Sub.

Search index is updated.

Correct - good job!

Final Quiz: Using Cloud Functions for Event-Driven Processing

You must package all dependencies for Cloud Functions in a package.zip file.

Correct - good job!

3. Identify the events that trigger Cloud Functions in the following architecture. Select two.

A message is received in Cloud Pub/Sub.

Correct - good job!

A web hook is invoked from Cloud Pub/Sub.

Search index is updated.

Media asset is uploaded to a Cloud Storage bucket.

Correct - good job!

Google Cloud Platform

qwiklabs-gcp-02-919da6faf52f

Welcome, student 941a5868

Get started with Google Cloud

Cloud overview

Products & solutions

PINNED

RPI APIs & Services

Billing

IAM & Admin

Marketplace

Compute Engine

Kubernetes Engine

Cloud Storage

BigQuery

VPC network

Cloud Run

SQL

Security

Google Maps Platform

GO TO CHECKLIST

CLOUD SHELL Terminal (qwiklabs-gcp-02-919da6faf52f) ✘ + ×

```
Welcome to Cloud Shell! Type "help" to get started.
Your Cloud Platform account in this session is set to "qwiklabs-gcp-02-919da6faf52f".
The current default project (Project ID) is set to "qwiklabs-gcp-02-919da6faf52f". (qwiklabs-gcp-02-919da6faf52f)$ gcloud auth list
Credentialed Accounts
ACTIVE: -
ACCOUNT: student-00-bf0ce64ff239@qwiklabs.net

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

student_00_bf0ce64ff239@cloudshell:~ (qwiklabs-gcp-02-919da6faf52f)$ gcloud config list project
(project) = quickstart-qcp-02-919da6faf52f

Your active configuration is: [cloudshell-6180]
student_00_bf0ce64ff239@cloudshell:~ (qwiklabs-gcp-02-919da6faf52f)$ git clone --depth=1 https://github.com/GoogleCloudPlatform/training-data-analyst
CloudShell: Cloning into 'quickstart-qcp'...
remote: Enumerating objects: 7647, done.
remote: Counting objects: 100% (7647/7647), done.
remote: Compressing objects: 100% (2537/2537)
CloudShell: Now viewing project "qwiklabs-gcp-02-919da6faf52f" in organization "No organization"
```

Welcome, student 941a5868

Get started with Google Cloud

Cloud overview Products & solutions

PINNED

APIs & Services Billing IAM & Admin Marketplace Compute Engine Kubernetes Engine Cloud Storage BigQuery VPC network Cloud Run SQL Security Google Maps Platform

CLOUD SHELL Terminal (qwiklabs-gcp-02-919da6faf52f) + -

```
Your active configuration is: [cloudshell-8180]
student_00_bf0c64ff2399@cloudshell: ~ (qwiklabs-gcp-02-919da6faf52f)$ git clone --depth=1 https://github.com/GoogleCloudPlatform/training-data-analyst
Cloning into 'training-data-analyst'...
remote: Counting objects: 100% (7647/7647), done.
remote: Compressing objects: 100% (5177/5177), done.
remote: Total 7667 (delta 2123), reused 5788 (delta 1518), pack-reused 0
Resolving deltas: 100% (2123/2123), done.
Updating files: 100% (1280/1280), done.
student_00_bf0c64ff2399@cloudshell: ~ (qwiklabs-gcp-02-919da6faf52f)$ ln -s ~/training-data-analyst/courses/developingapps/v1.3/nodejs/cloudbuildpoints ./cloudbuildpoints
student_00_bf0c64ff2399@cloudshell: ~ (qwiklabs-gcp-02-919da6faf52f)$ cd ./cloudbuildpoints/start
student_00_bf0c64ff2399@cloudshell: ./cloudbuildpoints/start (qwiklabs-gcp-02-919da6faf52f)$ . prepare_environment.sh
Creating App Engine application project [qwiklabs-gcp-02-919da6faf52f] and region [us-central]...done.
Creating App Engine application project [qwiklabs-gcp-02-919da6faf52f] and region [us-central]...done.
Creating bucket gs://qwiklabs-gcp-02-919da6faf52f-media...
Creating gs://qwiklabs-gcp-02-919da6faf52f-media/...
  Requested object quota and GCLUSTER_BUCKET
Installing dependencies
removed 75 packages, and changed 118 packages in 12s
10 packages are looking for funding
  run `npm fund` for details
(qwiklabs-gcp-02-919da6faf52f)$ idealTree: start: $1 idealTree buildDeps
```

Welcome, student 941a5868

Get started with Google Cloud

CLOUD SHELL Terminal (qwiklabs-gcp-02-919da6faf52f) + -

```
Run `npm audit` for details.
Creating database entities
Entities created.
Creating Cloud Pub/Sub topic
Creating Topic [ProjectId]@qwiklabs-gcp-02-919da6faf52f/copics/feedback].
Creating Cloud Function instance, Database, and Table
Creating instance...done.
Creating Database...done.
Creating Cloud Function API
Creating Cloud Function
Deploying Function (may take a while - up to 2 minutes)...working..
For more information visit: https://console.cloud.google.com/cloud-build/builds?region=us-central1/68865379-c3dd-4474-a892-97f85e1266a1?project=617816516195
Deploying function (may take a while - up to 2 minutes)...done.
availableMemoryGb: 256
buildLogs: https://cloud.google.com/functions/docs/logs/invocations/617816516195/locations/us-central1/builds/68865379-c3dd-4474-a892-97f85e1f66a1
buildName: projects/617816516195/locations/us-central1/builds/68865379-c3dd-4474-a892-97f85e1f66a1
dockerRegistry: CONTAINER_REGISTRY
entrypoint: subscriber
execTrigger:
  eventtype: google.pubsub.topic.publish
  failurePolicy: {}
  maxInstances: 1
  maxParallelisms: 1
  maxRetries: 3
  service: pubsub.googleapis.com
  ingressSettings: ALLOW_ALL
  maxConcurrentCalls: 1
  deploymentTool: cloudbuild
  maxInstances: 5
  maxParallelisms: 1
  maxRetries: 3
  serviceAccountEmail: qwiklabs-gcp-02-919da6faf52f@appspot.gserviceaccount.com
  source: gs://qwiklabs-gcp-02-919da6faf52f-media/us-central1-projects/qwiklabs-gcp-02-919da6faf52f/locations/us-central1/functions/process-feedback-miwbioqqjw.zip
  strategy: ACTIVATION
  timeout: 60s
  updateTime: '2023-06-05T19:01:24.287Z'
  version: '1'
Project ID: qwiklabs-gcp-02-919da6faf52f
student_00_bf0c64ff2399@cloudshell: ./cloudbuildpoints/start (qwiklabs-gcp-02-919da6faf52f)$ npm start
> quite-interesting-quiz@1.0.0 start
> node server/app.js
App listening on port 8080
```



Welcome to the Quite Interesting Quiz

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

Create Question

Take Test

Leaderboard

The screenshot shows a web browser window with the URL <https://8080-cs-1-1fe490-0b19-4d60-bbf2-7452a4ce50fc.us-east1-wfhy.cloudshell.dev/api/quizzes/places>. The page displays a JSON object representing a quiz question. The object has a single key, "questions", which contains an array with one element. This element is another object with the following properties:

```
JSON Datos sin procesar Encabezados
Guarda Copiar Convertir todo Expandir todo Filtro JSON
▼ questions:
  ▼ 0:
    quiz: "places"
    author: "sigit"
    imageurl: ""
    answer1: "Paris"
    answer2: "London"
    answer3: "Stockholm"
    answer4: "Berlin"
    title: "What is the capital of France?"
    answer: "Berlin"
    id: "a"
  nextpagetoken: false
```

App Dev - Deploying an API for the Quiz Application: Node.js

End Lab 01:53:18

npm start

The application is now running from Cloud Shell.

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-bf0ce64f234#

Password: 2w07lpx7kdS

GCP Project ID: qwiklabs-gcp-02-919da6faf52f

Note: You should see JSON data returned from the quiz application API corresponding to the questions in the places quiz.

5. Make a note of the complete API URL to use later in this lab and save the url so you can paste it in a command in the next section.

Note: The URL will look similar to: https://8080-cs-***.cloudshell.dev/api/quizzes/places

Click Check my progress to verify the objective.

Configure and run the case study application

Check my progress

Assessment Completed!

Overview
Objectives
Setup and requirements
Task 1. Preparing the case study application
Task 2. Generating an Open API specification
Task 3. Deploying the API backend
Task 4. Testing and modifying Cloud Endpoint
Task 5. Monitoring the API
End your lab

5/10

Task 2. Generating an Open API

Google Cloud https://console.cloud.google.com/gcp/resource-manager/cloudshell/editor?cloudshell.project=qwiklabs-gcp-02-919da6faf52f

```
student_00_bf0ce64f234#cloudshell:~/cloudbuildpoints/start/endpoint (qwiklabs-gcp-02-919da6faf52f) $ apid2swagger -e https://8080-cs-11fa690-0b19-4d60-b8f2-7452a4ce50fc.q1-us-east1-wfhy.cloudshell.dev/api/quizzes/places -o ./quiz-api.json
details: 'Make sure you specify http endpoint using -e option. For Example swaggergen -e http://example.com/helloWorld'
student_00_bf0ce64f234#cloudshell:~/cloudbuildpoints/start/endpoint (qwiklabs-gcp-02-919da6faf52f) $ apid2swagger
{
  title: 'Input Missing',
  message: 'Input missing is missing to make a call',
  details: 'Make sure you specify endpoint using -e option. For Example swaggergen -e http://example.com/helloWorld'
}
student_00_bf0ce64f234#cloudshell:~/cloudbuildpoints/start/endpoint (qwiklabs-gcp-02-919da6faf52f) $ apid2swagger -e https://8080-cs-11fa690-0b19-4d60-b8f2-7452a4ce50fc.q1-us-east1-wfhy.cloudshell.dev/api/quizzes/places -o ./quiz-api.json
Title of Swagger Spec ? Quite Interesting Quiz API
API Version ? 0.0.1
Title of API ? Quite Interesting Quiz
Terms of Service URL ? http://example.com/about/cosme
Version of your API Program ? 0.0.1
Contact Name? API Docs
Contact Email? spidocse@example.com
License Name ? Apache 2.0
License URL ? http://example.com
Does your API support http ? Yes
Pick Base Path from your API ? /api/quizzes
A short summary of what the operation does. ? Gets questions for a quiz
Additional external documentation for this operation. ? http://docs.example.com/management/apis/get/entities
A list of tags for API documentation control. ? apid2swagger
Making an API Call & fetching more details...Please stay tuned...
API Path has any dynamic parameters ? Yes
Choose Dynamic Params in URL ?
{
  "swagger": "2.0",
  "host": "https://8080-cs-11fa690-0b19-4d60-b8f2-7452a4ce50fc.q1-us-east1-wfhy.cloudshell.dev",
  "schemes": [
    "https",
    "http"
  ],
  "info": {
    "description": "The API for the Quite Interesting Quiz",
    "title": "Quite Interesting Quiz API",
    "version": "0.0.1",
    "termsOfService": "http://example.com/about/terms",
    "contact": {
      "name": "API Docs",
      "url": "http://example.com/contact",
      "email": "spidocse@example.com"
    },
    "license": {
      "name": "Apache 2.0",
      "url": "http://example.com"
    }
  },
  "basePath": "/api/quizzes",
  "paths": {}
}
Swagger JSON file successfully generated in : ./quiz-api.json
student_00_bf0ce64f234#cloudshell:~/cloudbuildpoints/start/endpoint (qwiklabs-gcp-02-919da6faf52f) $
```

Google Cloud | qwiklabs-gcp-02-919da6faf52f | Search (/) for resources, docs, products, and more | Q Search | Open Terminal | ☰

CLOUD SHELL Editor

File Edit Selection View Go Run Terminal Help

EXPLORER

- > OPEN EDITORS
- > STUDENT_00_BF0CE64F2549
- > cloudendpoints
- > bonus
- > end
- > start
- > bin
- > endpoint
- > quiz-api
- quiz-api.json
- function
- node_modules
- server
- setup
- package-lock.json
- package.json
- prepare_environment.sh
- training-data-analyst
- README-cloudshell.txt
- README.md

```
quiz-api.json
1 {
  "swagger": "2.0",
  "host": "quiz-api.endpoints.qwiklabs-gcp-02-919da6faf52f.cloud.goog",
  "schemes": [
    "https",
    "http"
  ],
  "info": {
    "description": "An API for the Quite Interesting Quiz",
    "title": "Quite Interesting Quiz API",
    "version": "0.0.1",
    "termsOfService": "http://example.com/about/terms",
    "contact": {
      "name": "API Docs",
      "url": "http://example.com/contact",
      "email": "apidocs@example.com"
    },
    "license": {
      "name": "Apache 2.0",
      "url": "http://example.com"
    }
  },
  "basePath": "/api/quizzes",
  "paths": {}
```

Problems Output C%23

Required assets to build and debug are missing from student_00_bf0ce64f2549. 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

Cloud Shell | Cloud Code | CartService | Connect to Google Cloud

Google Cloud | qwiklabs-gcp-02-919da6faf52f | (qwiklabs-gcp-02-919da6faf52f) | Search (/) for resources, docs, products, and more | Q Search | Open Editor | ☰

CLOUD SHELL Terminal (qwiklabs-gcp-02-919da6faf52f) + (qwiklabs-gcp-02-919da6faf52f)

```
License Name ? Apache License 2.0
License URL ? http://example.com
Does your API support https? Yes
Protocol ? https://
Swagger UI Path ? /api/quizzes
A verbose explanation of the operation behavior. ? Gets questions for a quiz
A short summary of what the operation does. ? Get quiz questions
Additional external documentation for the operation. ? http://docs.example.com/management/apis/get/entities
Unique string used to identify the operation
A list of tags for API documentation control. ? #apiswagger
Main page for the API. Testing more details...Please stay tuned...
API Path has any dynamic parameters? No
Choose Dynamic Params in URL ?
```

```
"swagger": "2.0",
"host": "0800-0c-11fa6490-8b19-4d60-b8f2-7452a4ce58fc.rl-us-east1-wfhy.cloudshell.dev",
"schemes": [
  "https",
  "http"
],
"info": {
  "description": "An API for the Quite Interesting Quiz",
  "title": "Quite Interesting Quiz API",
  "version": "0.0.1",
  "termsOfService": "http://example.com/about/terms",
  "contact": {
    "name": "API Docs",
    "url": "http://example.com/contact",
    "email": "apidocs@example.com"
  },
  "license": {
    "name": "Apache 2.0",
    "url": "http://example.com"
  }
},
"basePath": "/api/quizzes",
"paths": {}
```

Swagger JSON file successfully generated in : ./quiz-api.json

student_00_bf0ce64f2549@cloudshell:~/cloudendpoints\$ curl -X POST http://qwiklabs-gcp-02-919da6faf52f.cloud.goog:7127479-3d9-4fb5-a6ff-6f77931d056 -H "Content-Type: application/json" -d '{"operation": "getQuiz", "id": 1}'

Waiting for sync operation operations/serviceConfigs.quiz-api.endpoints.qwiklabs-gcp-02-919da6faf52f.cloud.goog:650d80fc-e48a-40e0-a49f-c17699bda20 to complete...

Operation finished successfully. The following command can describe the Operation details:

curl -X GET http://qwiklabs-gcp-02-919da6faf52f.cloud.goog:7127479-3d9-4fb5-a6ff-6f77931d056

Waiting for async operation operations/rollouts.quiz-api.endpoints.qwiklabs-gcp-02-919da6faf52f.cloud.goog:7127479-3d9-4fb5-a6ff-6f77931d056 to complete...

Operation finished successfully. The following command can describe the Operation details:

curl -X GET http://qwiklabs-gcp-02-919da6faf52f.cloud.goog:77127479-3d9-4fb5-a6ff-6f77931d056

Enabling service (quiz-api.endpoints.qwiklabs-gcp-02-919da6faf52f.cloud.goog) on project (qwiklabs-gcp-02-919da6faf52f)...

Operation "operations/enable.qwiklabs-gcp-02-919da6faf52f.cloud.goog" finished successfully.

Service Configuration [2023-06-05#0] uploaded for service [quiz-api.endpoints.qwiklabs-gcp-02-919da6faf52f.cloud.goog]

To manage your API, go to: https://console.cloud.google.com/endpoints/api/quiz-api.endpoints.qwiklabs-gcp-02-919da6faf52f.cloud.goog/overview#project=qwiklabs-gcp-02-919da6faf52f

student_00_bf0ce64f2549@cloudshell:~/cloudendpoints\$ curl -X POST http://qwiklabs-gcp-02-919da6faf52f.cloud.goog:7127479-3d9-4fb5-a6ff-6f77931d056 -H "Content-Type: application/json" -d '{"operation": "getQuiz", "id": 1}'

Cloud Shell Terminal (qwiklabs-gcp-03-b79c67ab1057) X (qwiklabs-gcp-03-b79c67ab1057) +

```
Pick Base Path from your API ? /api/quizzes
Additional external documentation for this operation. ? Gets questions for a quiz
API Path dynamic of this operation does. ? Get quiz questions
Additional external documentation for this operation. ? http://docs.example.com/management/apis/get/entities
Unique string used to identify the operation. ? getQuizQuestions
API Path dynamic of this operation does. ? /api/quizzes/{quizId}
Making an API Call & fetching more details...Please stay tuned..
API Path have any dynamic parameters ? Yes
Choose Dynamic Params in URL ?

{
  "swagger": "2.0",
  "host": "http://0.0.0.0:8080/cs-1ea13ff4-3da9-4acf-8743-257c64f03591.q1-us-east1-kphh.cloudshell.dev",
  "basePath": "/api/quizzes",
  "schemas": [
    "http://",
    "https"
  ],
  "info": {
    "description": "An API for the Quite Interesting Quiz",
    "version": "0.0.1",
    "termsOfService": "http://example.com/about/terms",
    "contact": {
      "name": "API Docs",
      "url": "http://example.com/contact",
      "email": "epidocs@example.com"
    },
    "license": {
      "name": "Apache 2.0",
      "url": "http://example.com"
    }
  },
  "paths": {}
}

Swagger JSON file successfully generated in : ./quiz-api.json
student_00_78df3f57030c1$cloudshell:/cloude ndpoints$curl -XPUT $(qwiklabs-gcp-03-b79c67ab1057)$ gcloud endpoints services deploy quiz-api.json
Waiting for sync operation operations/services.quiz-api.endpoints.qwiklabs-gcp-03-b79c67ab1057.cloud.google.com/0 to complete...
Operation finished successfully. The following command can describe the Operation details:
gcloud endpoints operations describe operations/serviceConfigs.quiz-api.endpoints.qwiklabs-gcp-03-b79c67ab1057.cloud.google.com/0

Waiting for sync operation operations/rollouts.quiz-api.endpoints.qwiklabs-gcp-03-b79c67ab1057.cloud.google.com/0 to complete...
Operation finished successfully. The following command can describe the Operation details:
gcloud endpoints operations describe operations/rollouts.quiz-api.endpoints.qwiklabs-gcp-03-b79c67ab1057.cloud.google.com/0

Enabling service [quiz-api.endpoints.qwiklabs-gcp-03-b79c67ab1057.cloud.google.com] on project [qwiklabs-gcp-03-b79c67ab1057]...
Operation "operations/acat-p2-460238833873-b6a49c2-fba1-44ee-913d-8cc2f563ad7" finished successfully.

Service Configuration [2023-06-06x0] uploaded for service [quiz-api.endpoints.qwiklabs-gcp-03-b79c67ab1057.cloud.google.com]

To manage your API, go to: https://console.cloud.google.com/endpoints/api/quiz-api.endpoints.qwiklabs-gcp-03-b79c67ab1057.cloud.google/overview?project=qwiklabs-gcp-03-b79c67ab1057
student_00_78df3f57030c1$cloudshell:/cloude ndpoints$ curl -XPUT $(qwiklabs-gcp-03-b79c67ab1057)$ gcloud endpoints config list --service="quiz-api.endpoints.qwiklabs-gcp-03-b79c67ab1057"...
```

Cloud Shell Terminal (qwiklabs-gcp-02-919da6faf52f) X (qwiklabs-gcp-02-919da6faf52f) +

```
EMAIL: epidocs@example.com
LICENSES: {
  "name": "Apache 2.0",
  "url": "http://example.com"
},
BASEPATH: "/api/quizzes",
PATCHES: {}

Swagger JSON file successfully generated in : ./quiz-api.json
student_00_78df3f57030c1$cloudshell:/cloude ndpoints$curl -XPUT $(qwiklabs-gcp-02-919da6faf52f)$ gcloud endpoints services deploy quiz-api.json
Waiting for sync operation operations/services.quiz-api.endpoints.qwiklabs-gcp-02-919da6faf52f.cloud.google.com/0 to complete...
Operation finished successfully. The following command can describe the Operation details:
gcloud endpoints operations describe operations/serviceConfigs.quiz-api.endpoints.qwiklabs-gcp-02-919da6faf52f.cloud.google.com/0

Waiting for sync operation operations/rollouts.quiz-api.endpoints.qwiklabs-gcp-02-919da6faf52f.cloud.google.com/0 to complete...
Operation finished successfully. The following command can describe the Operation details:
gcloud endpoints operations describe operations/rollouts.quiz-api.endpoints.qwiklabs-gcp-02-919da6faf52f.cloud.google.com/0

Enabling service [quiz-api.endpoints.qwiklabs-gcp-02-919da6faf52f.cloud.google.com] on project [qwiklabs-gcp-02-919da6faf52f]...
Operation "operations/acat-p2-6178161619-a4c8ff1b0-6846-423c-ba46-73114666e3b" finished successfully.

Service Configuration [2023-06-05x0] uploaded for service [quiz-api.endpoints.qwiklabs-gcp-02-919da6faf52f.cloud.google.com]

To manage your API, go to: https://console.cloud.google.com/endpoints/api/quiz-api.endpoints.qwiklabs-gcp-02-919da6faf52f
student_00_78df3f57030c1$cloudshell:/cloude ndpoints$ curl -XPUT $(qwiklabs-gcp-02-919da6faf52f)$ gcloud endpoints config list --service="quiz-api.endpoints.qwiklabs-gcp-02-919da6faf52f"...
```

Google Cloud VM instances

VM instances

Instances Observability Instance Schedules

Filter Enter property name or value

Status Name Zone Recommendations In use by Internal IP External IP Connect

Related actions

- Explore Backup and DR NEW
- Monitor VMs View outlier VMs across metrics like CPU and network
- Explore VM logs View, search, analyze, and download VM instance logs
- Set up firewall rules Control traffic to and from a VM instance
- Patch management Schedule patch updates and view patch compliance on VM instances

CLOUD SHELL Terminal (qwiklabs-gcp-03-b79c67ab1057) x (qwiklabs-gcp-03-b79c67ab1057) x +

```

        )
  "namePath": "/api/quizzes",
  "patch": {}
}

Swagger JSON file successfully generated in: ./quiz-api.json
student_00_78df357030c1$cloudshell:~/cloudepoints$ start/endpoint (qwiklabs-gcp-03-b79c67ab1057)$ gcloud endpoints services deploy quiz-api.json
Waiting for anyone operation operations/services/quiz-api.endpoints.qwiklabs-gcp-03-b79c67ab1057.cloud.google.com op to complete...
Waiting for anyone operation operations/operations/serviceConfig/quiz-api.endpoints.qwiklabs-gcp-03-b79c67ab1057.cloud.google.com op to complete...
Operation "operations/operations/serviceConfig/quiz-api.endpoints.qwiklabs-gcp-03-b79c67ab1057.cloud.google.com@2451a4-6177-4f3e-9ee4-31d450414b55" finished successfully.
gcloud endpoints operations describe operations/serviceConfig/quiz-api.endpoints.qwiklabs-gcp-03-b79c67ab1057.cloud.google.com@2451a4-6177-4f3e-9ee4-31d450414b55 to complete...
Waiting for any sync operation operations/rollouts/quiz-api.endpoints.qwiklabs-gcp-03-b79c67ab1057.cloud.google.com@2451a4-6177-4f3e-9ee4-31d450414b55 to complete...
Operation finished successfully. The following command can describe the Operation details:
gcloud endpoints operations describe operations/rollouts/quiz-api.endpoints.qwiklabs-gcp-03-b79c67ab1057.cloud.google.com@2451a4-6177-4f3e-9ee4-31d450414b55

Enabling service [quiz-api.endpoints.qwiklabs-gcp-03-b79c67ab1057.cloud.google.com] on project [qwiklabs-gcp-03-b79c67ab1057]...
Operation "operations/acct.p-46023883873-66449c2-6ba1-44ee-913d-8cc2f563ad" finished successfully.

Service Configuration [2023-06-06@0] uploaded for service [quiz-api.endpoints.qwiklabs-gcp-03-b79c67ab1057.cloud.google.com]

To manage your API, go to: https://console.cloud.google.com/endpoints/api/quiz-api.endpoints.qwiklabs-gcp-03-b79c67ab1057.cloud.google/overview#?project=qwiklabs-gcp-03-b79c67ab1057
student_00_78df357030c1$cloudshell:~/cloudepoints$ start/endpoint (qwiklabs-gcp-03-b79c67ab1057)$ gcloud endpoints configs list --service="quiz-api.endpoints.$GOOGLE_CLOUD_PROJECT.cloud.google"
CONFIG ID: 2023-06-06@0
HTTP endpoint: https://cloudepoints.qwiklabs-gcp-03-b79c67ab1057.cloud.google.com
student_00_78df357030c1$cloudshell:~/cloudepoints$ start/endpoint (qwiklabs-gcp-03-b79c67ab1057)$ gcloud endpoints configs list --service="quiz-api.endpoints.$GOOGLE_CLOUD_PROJECT.cloud.google"
CONFIG ID: 2023-06-06@0
SERVICE endpoint: https://cloudepoints.qwiklabs-gcp-03-b79c67ab1057.cloud.google.com
student_00_78df357030c1$cloudshell:~/cloudepoints$ start/endpoint (qwiklabs-gcp-03-b79c67ab1057)$

```

CLOUD SHELL Terminal (qwiklabs-gcp-03-b79c67ab1057) x (qwiklabs-gcp-03-b79c67ab1057) x +

INSTANCE DETAILS

VM instances Observability Instance Schedules

Filter Enter property name or value

Status Name Zone Recommendations In use by Internal IP External IP Connect

Related actions

- Explore Compute Engine Release Notes

CLOUD SHELL Terminal (qwiklabs-gcp-03-b79c67ab1057) x (qwiklabs-gcp-03-b79c67ab1057) x +

```

WARNING: The private SSH key file for gcloud does not exist.
WARNING: You do not have a private SSH key for gcloud.
WARNING: You do not have a private SSH key for gcloud.
WARNING: SSH keygen will be executed to generate a key.
WARNING: This tool needs to create the directory [/home/student_00_78df357030c1/.ssh] before being able to generate SSH keys.

Do you want to continue (Y/n)? y
Generating public/private rsa key pair.
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your public key has been saved in /home/student_00_78df357030c1/.ssh/google_compute_engine.pub
Your key fingerprint is:
SHA256:0JUoCfPjP+EnJPers05IK9ymHSAJpgEJ/Y student_00_78df357030c1@cs-517149657152-default
The key's randomart image is:
---[RSA 3072]---
|oo .+ |
|oo .+ |
| E oo . |
| o o ..o . |
| + S+o+o . |
| .o m+o. |
| + +.+.+ |
| o +.+.+ |
| .+.+++. |
| ..(SHA256)---|
Warning: permanently added 'compute.68248868868412498' (ECDSA) to the list of known hosts.
packages.json
config.js
pubsub.js
datastore.js
index.js
app.js
student_00_78df357030c1$cloudshell:~/cloudepoints$ start/endpoint (qwiklabs-gcp-03-b79c67ab1057)$

```

https://ssh.cloud.google.com/v2/ssh/projects/qwiklabs-gcp-03-b79c67ab1057/zones/us-central1-a/instances/enc

SSH-in-browser

student-00-78df357030c1@endpoint-host:~\$ curl -sL https://deb.nodesource.com/setup_14.x | sudo -E bash -
sudo apt-get install -y nodejs
curl -L https://npmjs.org/install.sh | sudo sh

Installing the NodeSource Node.js 14.x repo...

Populating apt-get cache...

+ apt-get update
Get:1 https://packages.cloud.google.com/apt google-compute-engine-bullseye-stable InRelease [5146 B]
Get:2 https://packages.cloud.google.com/apt cloud-sdk-bullseye InRelease [6403 B]
Hit:3 https://deb.debian.org/debian bullseye InRelease
Get:4 https://deb.debian.org/debian-security bullseye-security InRelease [48.4 kB]
Get:5 https://packages.cloud.google.com/apt google-compute-engine-bullseye-stable/main amd64 Packages [1900 B]
Get:6 https://deb.debian.org/debian bullseye-updates InRelease [44.1 kB]
Get:7 https://packages.cloud.google.com/apt cloud-sdk-bullseye/main amd64 Packages [303 kB]
Get:8 https://deb.debian.org/debian bullseye-backports InRelease [49.0 kB]
Get:9 https://deb.debian.org/debian-security bullseye-security/main Sources [201 kB]
Get:10 https://deb.debian.org/debian-security bullseye-security/main amd64 Packages [245 kB]
Get:11 https://deb.debian.org/debian-security bullseye-security/main Translation-en [160 kB]
Get:12 https://deb.debian.org/debian bullseye-updates/main Sources.diff/Index [18.5 kB]
Get:13 https://deb.debian.org/debian bullseye-updates/main amd64 Packages.diff/Index [18.5 kB]
Get:14 https://deb.debian.org/debian bullseye-updates/main Translation-en.diff/Index [7239 B]
Get:15 https://deb.debian.org/debian bullseye-updates/main Sources T-2023-05-24-2006.01-F-2023-05-24-2006.01 .pdifff [547 B]
Get:16 https://deb.debian.org/debian bullseye-updates/main amd64 Packages T-2023-05-24-2006.01-F-2023-05-24-2006.01.pdifff [362 B]
Get:15 https://deb.debian.org/debian bullseye-updates/main Sources T-2023-05-24-2006.01-F-2023-05-24-2006.01 .pdifff [547 B]
Get:16 https://deb.debian.org/debian bullseye-updates/main amd64 Packages T-2023-05-24-2006.01-F-2023-05-24-2006.01.pdifff [362 B]
Get:17 https://deb.debian.org/debian bullseye-backports/main Sources.diff/Index [63.3 kB]
Get:18 https://deb.debian.org/debian bullseye-backports/main amd64 Packages.diff/Index [63.3 kB]
Get:19 https://deb.debian.org/debian bullseye-backports/main Translation-en.diff/Index [63.3 kB]
Get:20 https://deb.debian.org/debian bullseye-updates/main Translation-en T-2023-05-24-2006.01-F-2023-05-24-2006.01.pdifff [355 B]
Get:21 https://deb.debian.org/debian bullseye-backports/main Sources T-2023-06-03-2002.59-F-2023-05-09-2004.

Click Check my progress to verify the object!

```

## To install the Yarn package manager, run:
curl -sL https://dl.yarnpkg.com/debian/pubkey.gpg | gpg --dearmor | sudo tee /usr/share/keyrings/yarnkey.gpg >/dev/null
echo "deb [signed-by=/usr/share/keyrings/yarnkey.gpg] https://dl.yarnpkg.com/debian stable main" | sudo tee /etc/apt/sources.list.d/yarn.list
sudo apt-get update && sudo apt-get install yarn

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 8 not upgraded.
Need to get 25.4 MB of archives.
After this operation, 121 MB of additional disk space will be used.
Get:1 https://deb.nodesource.com/node_14.x bullseye/main amd64 nodejs amd64 14.21.3-deb-1nodesource1 [25.4 M]
B]
Fetched 25.4 MB in 1s (50.7 MB/s)
Selecting previously unselected package nodejs.
(Reading database ... 59473 files and directories currently installed.)
Preparing to unpack .../nodejs_14.21.3-deb-1nodesource1_amd64.deb ...
Unpacking nodejs (14.21.3-deb-1nodesource1) ...
Setting up nodejs (14.21.3-deb-1nodesource1) ...
Processing triggers for man-db (2.9.4-2) ...
  % Total    % Received % Xferd  Average Speed   Time     Time      Time  Current
               Dload  Upload   Total   Spent    Left  Speed
  0     0    0     0    0     0      0 --:--:-- --:--:-- --:--:--    0
100  3755  100  3755    0     0  8672      0 --:--:-- --:--:-- --:--:--  8672
fetching: https://registry.npmjs.org/npm/-/npm-9.6.7.tgz
removing existing npm
installing npm@latest

added 1 package in 4s

27 packages are looking for funding
  run `npm fund` for details
successfully installed npm@latest
student-00-78df357030c1@endpoint-host:~$ 

```

App Dev - Deploying an API for the Quiz Application: Node.js

End Lab 01:02:34

4. Return to the Cloud Platform Console.

5. On the Compute Engine page, to connect to the endpoint-host virtual machine, click SSH.

Note: You may need to click twice if you have a popup blocker. It will take a few seconds to establish the SSH connection.

6. In the endpoint-host SSH window, install the software prerequisites:

```
curl -sL https://deb.nodesource.com/setup_14.x | sudo -E bash -
sudo apt-get install -y nodejs
curl -L https://npmjs.org/install.sh | sudo sh
```

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

Create a Compute Engine Instance and install the software prerequisites

Check my progress

Assessment Completed

7. To run the quiz API application, execute the following commands within the SSH session:

```
export GCLOUD_PROJECT=$(curl -H Metadata-Flavor:Google
http://metadata/computeMetadata/v1/project/project-id)
export GCLOUD_BUCKET=$GCLOUD_PROJECT-media
export PORT=8081
cd ~/quiz-api
```

Final Quiz: Managing APIs with Cloud Endpoints

Final Quiz: Managing APIs with Cloud Endpoints

Your score: 100% Passing score: 66%

Congratulations! You passed this assessment.

Retake

✓ 1. A small number of customers are reporting that your API gateway is slow. What data can you view to begin troubleshooting the problem?

In the Cloud Endpoints dashboard, review the number of 4xx and 5xx errors.

Add logging statements with timestamp to your code to record how long each step in the API takes.

In the Cloud Endpoints dashboard, review the latency for the median, 95th, and 99th percentile of requests.

In the Stackdriver Latency dashboard, review latency data for each request.

Correct - good job!

✓ 2. To create an order, a client application must send requests to create an order entry, update inventory, and send a transaction to a payment gateway. The client must be updated and redeployed each time any of these backend services changes. What is the best way to streamline the client's requests to the backend services?

Make the backend service calls in parallel to reduce latency.

Create an API Management layer to update and redeploy client when backend services change.

Final Quiz: Managing APIs with Cloud Endpoints

Functions for Event-Driven Processing

Final Quiz: Using Cloud Functions for Event-Driven Processing

Summary

Managing APIs with Cloud Endpoints

Cloud Endpoints Concepts

Cloud Endpoints for REST APIs

Lab Overview

Lab: App Dev - Deploying an API for the Quiz Application: Node.js

Final Quiz: Managing APIs with Cloud Endpoints

Course Recap

Course Resources

gateway. The client must be updated and redeployed each time any of these backend services changes. What is the best way to streamline the client's requests to the backend services?

Make the backend service calls in parallel to reduce latency.

Create an API Management layer to update and redeploy client when backend services change.

Create an API gateway called "order" that acts as a facade and handles all the backend API invocations.

Use a service proxy to handle authentication and authorization of backend requests.

Correct - good job!

✓ 3. You've updated your API backend. The changes are not backward compatible and will break consumers of your current API. What approach would best serve your customers?

Deploy two versions of your Cloud Endpoints API by creating a separate API configuration for each version.

Delay the release of the new API until all customers are ready to adopt the new API.

Notify customers of the loss of backwards compatibility and deploy the updated version of your API.

Disable the original version of your API and deploy an update.

Correct - good job!