App Dev: Setting up a Development Environment - Java

GSP166

Objectives

In this lab, you set up a Java development environment on Google Cloud. You use Compute Engine to create a virtual machine (VM) and installing software libraries for software development.

You perform the following tasks:

- Provision a Compute Engine instance.
- Connect to the instance using SSH.
- Install a Java library on the instance.
- Verify the software installation.

Overview

Compute Engine is just one resource provided on Google Cloud.

Google Cloud

Google Cloud consists of a set of physical assets, such as computers and hard disk drives, and virtual resources, such as virtual machines (VMs), that are contained in Google's data centers around the globe. Each data center location is in a global region. Regions include Central US, Western Europe, and East Asia. Each region is a collection of zones, which are isolated from each other within the region. Each zone is identified by a name that combines a letter identifier with the name of the region. For example, zone a in the East Asia region is named asia-east1-a.

This distribution of resources provides several benefits, including redundancy in case of failure and reduced latency by locating resources closer to clients. This distribution also introduces some rules about how resources can be used together.

Projects

Any Google Cloud resources that you allocate and use must belong to a project. You can think of a project as the organizing entity for what you're building. A project is made up of the settings, permissions, and other metadata that describe your applications. Resources within a single project can work together easily, for example by communicating through an internal network, subject to the regions-and-zones rules. The resources that each project contains remain separate across project boundaries; you can only interconnect them through an external network connection.

Each Google Cloud project has:

A project name, which you provide. A project ID, which you can provide or Google Cloud can provide for you. A project number, which Google Cloud provides. As you work with Google Cloud, you'll use these identifiers in certain command lines and API calls. The following screenshot shows a project name, its ID, and number:

The Cloud Console displays project ID and name

In this example:

Example Project is the project name. example-id is the project ID. 123456789012 is the project number. Each project ID is unique across Google Cloud. Once you have created a project, you can delete the project but its ID can never be used again.

When billing is enabled, each project is associated with one billing account. Multiple projects can have their resource usage billed to the same account.

A project serves as a namespace. This means every resource within each project must have a unique name, but you can usually reuse resource names if they are in separate projects. Some resource names must be globally unique. Refer to the documentation for the resource for details.

In this lab, you provision a Compute Engine virtual machine (VM) and install software libraries for Java software development on Google Cloud.

Ways to interact with the services

Google Cloud gives you three basic ways to interact with the services and resources.

- Cloud Console: a web-based, graphical user interface that you can use to manage your Google Cloud projects and resources.
- Command-line interface

    - Cloud SDK: provides the gcloud command-line tool, which gives you access to the commands you need.
    - Cloud Shell: a browser-based, interactive shell environment for Google Cloud. You can access Cloud Shell from the Google Cloud console. If you prefer to work in a terminal window, the Cloud SDK provides the gcloud command-line tool, which gives you access to the commands you need. The gcloud tool can be used to manage both your development workflow and your Google Cloud resources. See the gcloud reference for the complete list of available commands.
- Client libraries: The Cloud SDK includes client libraries that enable you to easily create and manage resources. Google Cloud client libraries expose APIs to provide access to services and resource management functions. You also can use the Google API client libraries to access APIs for products such as Google Maps, Google Drive, and YouTube.

Setup and Requirements

Before you click the Start Lab button

Read these instructions. Labs are timed and you cannot pause them. The timer, which starts when you click **Start Lab**, shows how long Google Cloud resources will be made available to you.

This Qwiklabs hands-on lab lets you do the lab activities yourself in a real cloud environment, not in a simulation or demo environment. It does so by giving you new, temporary credentials that you use to sign in and access Google Cloud for the duration of the lab.

What you need

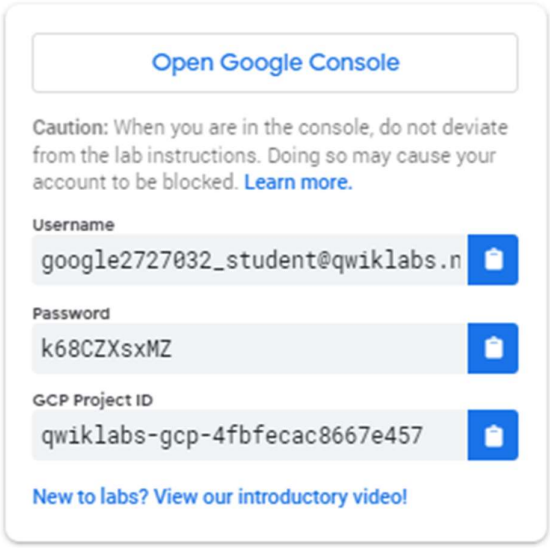
To complete this lab, you need:

- Access to a standard internet browser (Chrome browser recommended).
- Time to complete the lab.
  Note: If you already have your own personal Google Cloud account or project, do not use it for this lab.

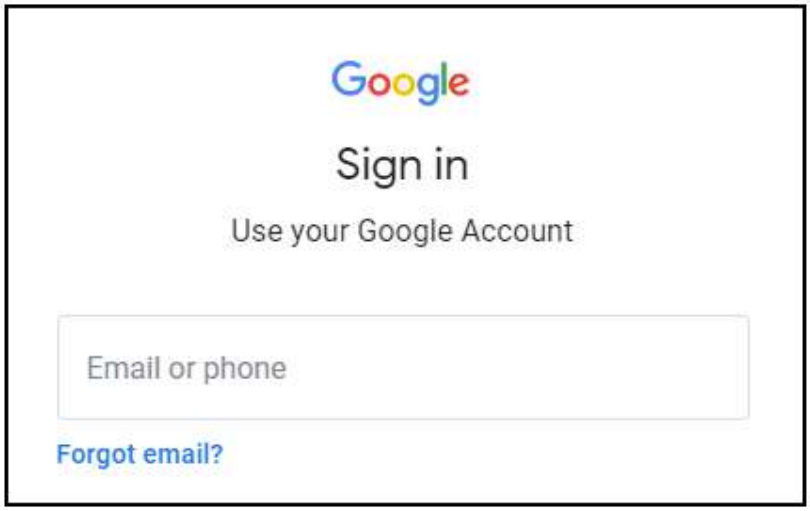
Note: If you are using a Pixelbook, open an Incognito window to run this lab.

How to start your lab and sign in to the Google Cloud Console

1. Click the **Start Lab** button. If you need to pay for the lab, a pop-up opens for you to select your payment method. On the left is a panel populated with the temporary credentials that you must use for this lab.

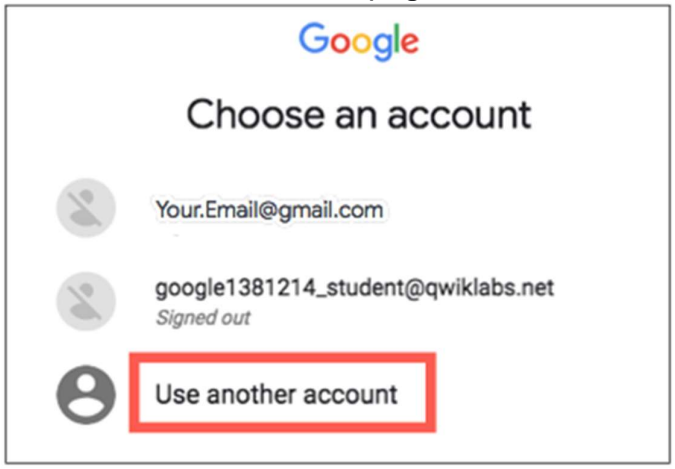


2. Copy the username, and then click **Open Google Console**. The lab spins up resources, and then opens another tab that shows the **Sign in** page.



Tip: Open the tabs in separate windows, side-by-side.

If you see the **Choose an account** page, click **Use Another Account**.



3. In the **Sign in** page, paste the username that you copied from the Connection Details panel. Then copy and paste the password.

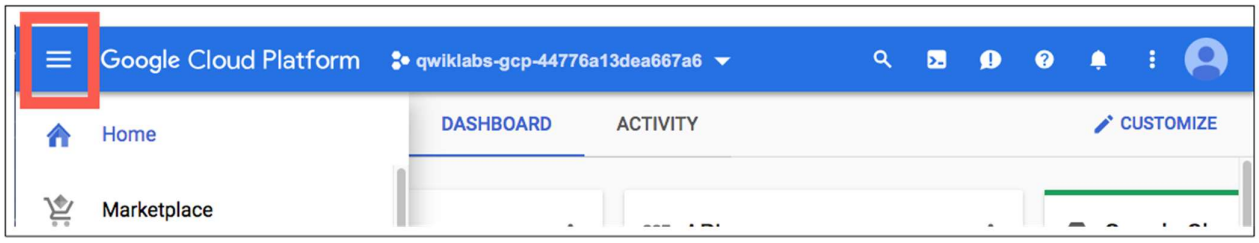
   Important: You must use the credentials from the Connection Details panel. Do not use your Qwiklabs credentials. If you have your own Google Cloud account, do not use it for this lab (avoids incurring charges).

4. Click through the subsequent pages:

   - Accept the terms and conditions.
   - Do not add recovery options or two-factor authentication (because this is a temporary account).
   - Do not sign up for free trials.

After a few moments, the Cloud Console opens in this tab.

Note: You can view the menu with a list of Google Cloud Products and Services by clicking the **Navigation menu** at the top-
left.

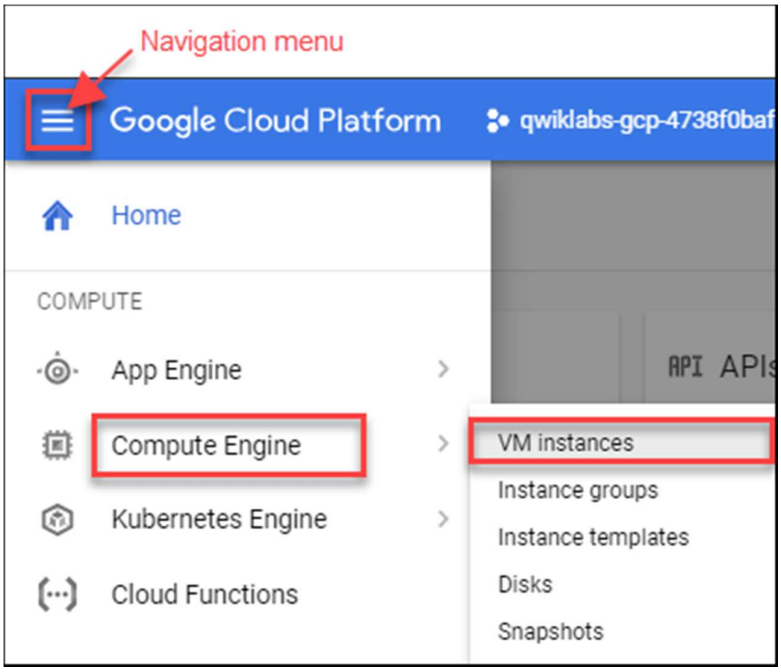


Create a Compute Engine Virtual Machine Instance

In this section, you use the Google Cloud Console to provision a new Compute Engine virtual machine (VM) instance.

Create and connect to a VM

1. In the Cloud Console, Click **Navigation menu** > **Compute Engine** > **VM Instances**.



2. On the **VM Instances** page, click **Create instance**

3. On the **Create an instance** page, for **Name** type **dev-instance**, and select the **us-central1-f** zone.

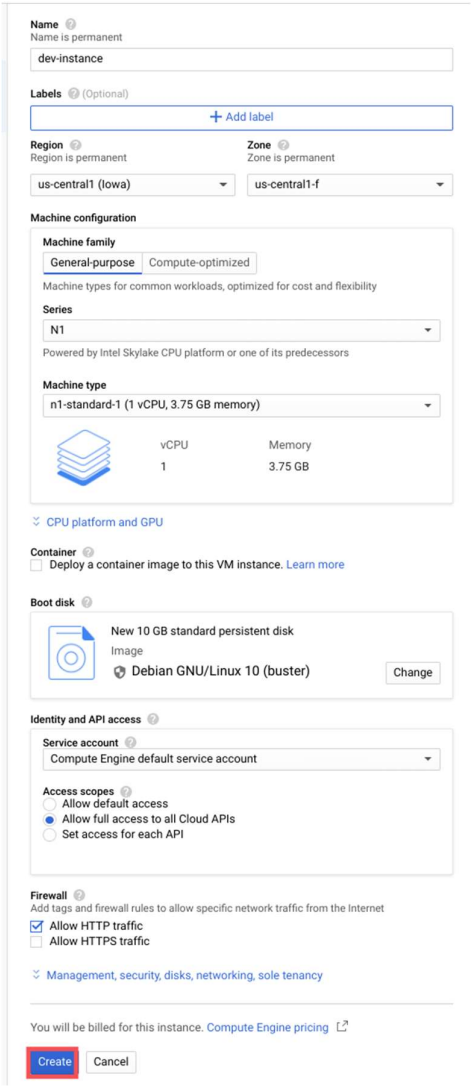
   Regions and zones: Google Cloud offers products and services in multiple distinct geographic locations, called regions. Each region has multiple distinct zones. Each zone is isolated from other zones in terms of power and internet connectivity.

4. In the **Boot disk**, click on the **Change** button. Set the **Version** to **Debian GNU/Linux 10 (buster)**, and then click on **Select**.

5. In the **Identity and API access**, **Access Scopes** section, select **Allow full access to all Cloud APIs**.

6. In the **Firewall** section, enable **Allow HTTP traffic**.

7. Leave the remaining settings as their defaults, and click **Create**.



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

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

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

Test Completed Task

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

Install software and configure the VM instance

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

```
sudo apt-get update
```

2. Install Git:

```
sudo apt-get install git -y
```

3. Install Maven:

```
sudo apt-get install -yq maven
```

4. Configure IP tables:

```
sudo iptables -t nat -A PREROUTING -p tcp --dport 80 -j REDIRECT --to-port 8080
```

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

5. Export the Project ID as an environment variable. Replace `[PROJECT_ID]` with the Project ID located under the credentials provided in your lab:

```
export GCLOUD_PROJECT=[PROJECT_ID]
```

Test Completed Task

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

Configure the VM to Run Application Software

In this section, you verify the software installation and run some sample code.

Verify Java installation

1. To check the version of Java, enter the following command:

   ```
   java -version
   ```
   You should see the Java version number for version 11.

2. Clone the class repository:

   ```
   git clone https://github.com/GoogleCloudPlatform/training-data-analyst
   ```
3. Change the working directory:

   ```
   cd ~/training-data-analyst/courses/developingapps/java/devenv/
   ```
4. Run a simple web application:

   ```
   mvn clean install
   ```
   Wait for the project to build. When the project successfully finishes you will see output similar to this:

   ```
   [INFO] BUILD SUCCESS
   [INFO] ------------------------------------------------------------------------
   [INFO] Total time: 25.913 s
   [INFO] Finished at: 2018-05-28T00:26:23+00:00
   [INFO] ------------------------------------------------------------------------
   ```
5. Run the application.

   ```
   mvn spring-boot:run
   ```
   The project is running when you see output similar to the following:

   ```
   01:11:05.274 [restartedMain] INFO  c.g.training.appdev.DemoApplication - Started
   DemoApplication in 1 (JVM running for 9.863)
   ```
6. Return to the Cloud Console VM instances list, and click on the **External IP** address for the **dev-instance**.

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

Test Completed Task

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

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

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

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

Many details about your VM should appear in the terminal window.

Test your Understanding

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

Which one of the following protocol-port combination is responsible for allowing HTTP traffic?
tcp:80

Congratulations!

You learned how to provision a Compute Engine virtual machine and install software libraries for Java software development on Google Cloud.

Finish your Quest


This lab is part of the Application Development - Java and Cloud Development Quests. A Quest is a series of related labs that form a learning path. Completing this Quest earns you the badge above to recognize your achievement. You can make your badge (or badges) public and link to them in your online resume or social media account. Enroll in this Quest and get immediate completion credit for this lab. See other available Qwiklabs Quests.

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- Learn more about Cloud Storage and Java on the Google Cloud
- Get more information about APIs and Reference

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