UNIVERSIDAD RAFAEL LANDÍVAR

FACULTAD DE INGENIERÍA

ANÁLISIS Y DISEÑO II

SECCIÓN 1 VESPERTINA

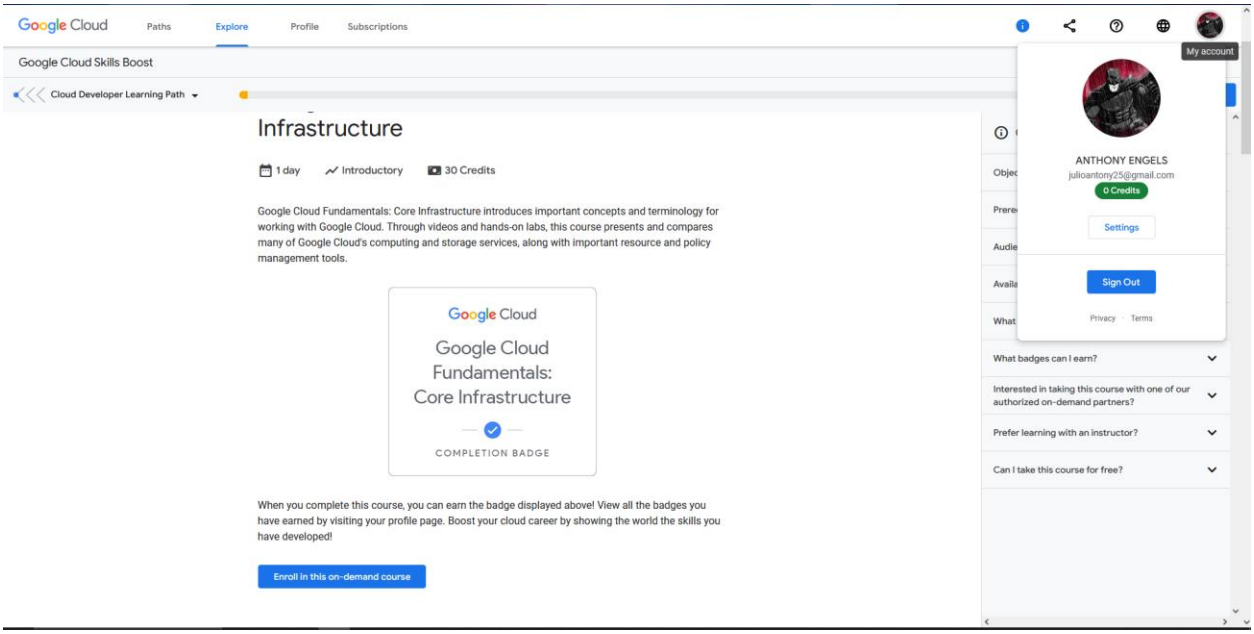
DR. HILDA

COURSE GOOGLE CLOUD FUNDAMENTALS: CORE INFRASTRUCTURE LAB 2.1

Julio Anthony Engels Ruiz Coto 1284719

GUATEMALA DE LA ASUNCIÓN, MAYO 26 DE 2023

CAMPUS CENTRAL


Google Cloud
Paths
Explore
Profile
Subscriptions
My account
Google Cloud Skills Boost
Cloud Developer Learning Path
Infrastructure
1 day
Introductory
30 Credits
Google Cloud Fundamentals: Core Infrastructure introduces important concepts and terminology for working with Google Cloud. Through videos and hands-on labs, this course presents and compares many of Google Cloud's computing and storage services, along with important resource and policy management tools.
Google Cloud
Google Cloud Fundamentals: Core Infrastructure
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When you complete this course, you can earn the badge displayed above! View all the badges you have earned by visiting your profile page. Boost your cloud career by showing the world the skills you have developed!
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ANTHONY ENGELS
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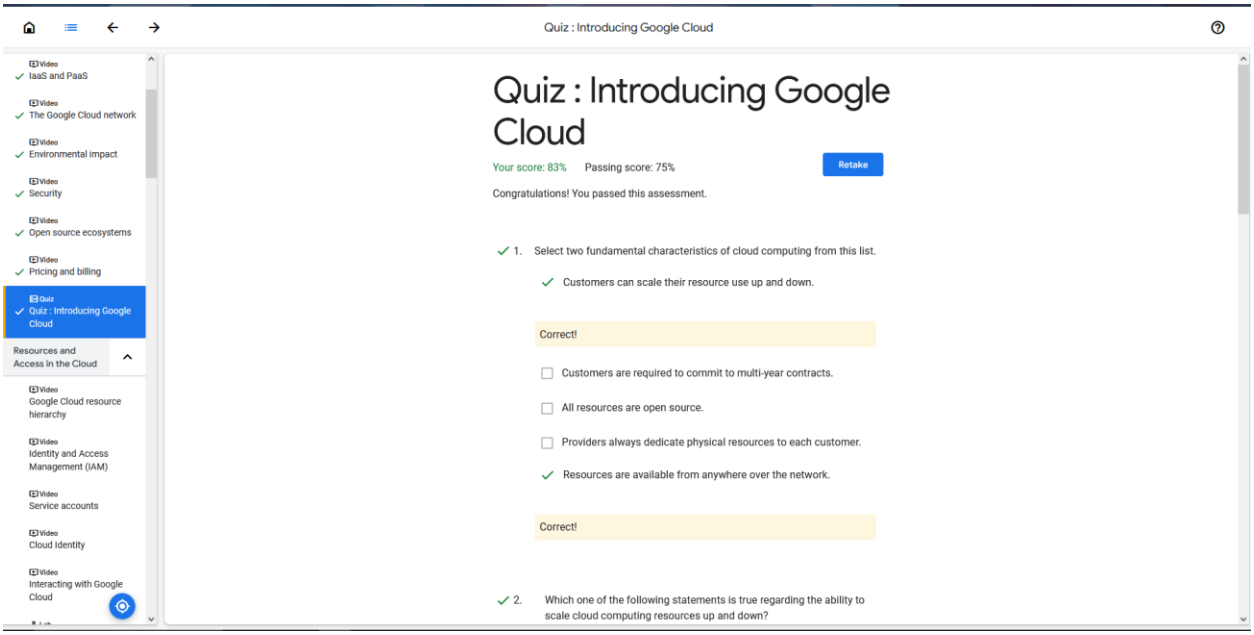
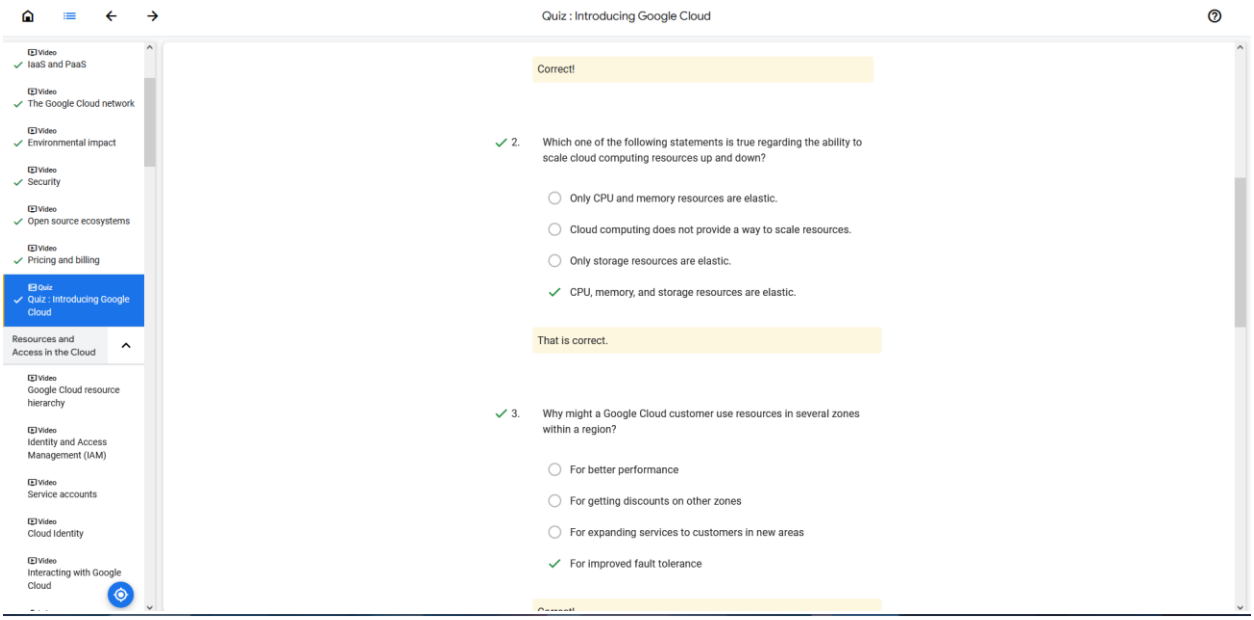

Quiz : Introducing Google Cloud
Video
IaaS and PaaS
Video
The Google Cloud network
Video
Environmental impact
Video
Security
Video
Open source ecosystems
Video
Pricing and billing
Quiz
Quiz : Introducing Google Cloud
Resources and Access in the Cloud
Video
Google Cloud resource hierarchy
Video
Identity and Access Management (IAM)
Video
Service accounts
Video
Cloud Identity
Video
Interacting with Google Cloud
Quiz : Introducing Google Cloud
Your score: 83%
Passing score: 75%
Retake
Congratulations! You passed this assessment.
1. Select two fundamental characteristics of cloud computing from this list.
Customers can scale their resource use up and down.
Correct!
Customers are required to commit to multi-year contracts.
All resources are open source.
Providers always dedicate physical resources to each customer.
Resources are available from anywhere over the network.
Correct!
2. Which one of the following statements is true regarding the ability to scale cloud computing resources up and down?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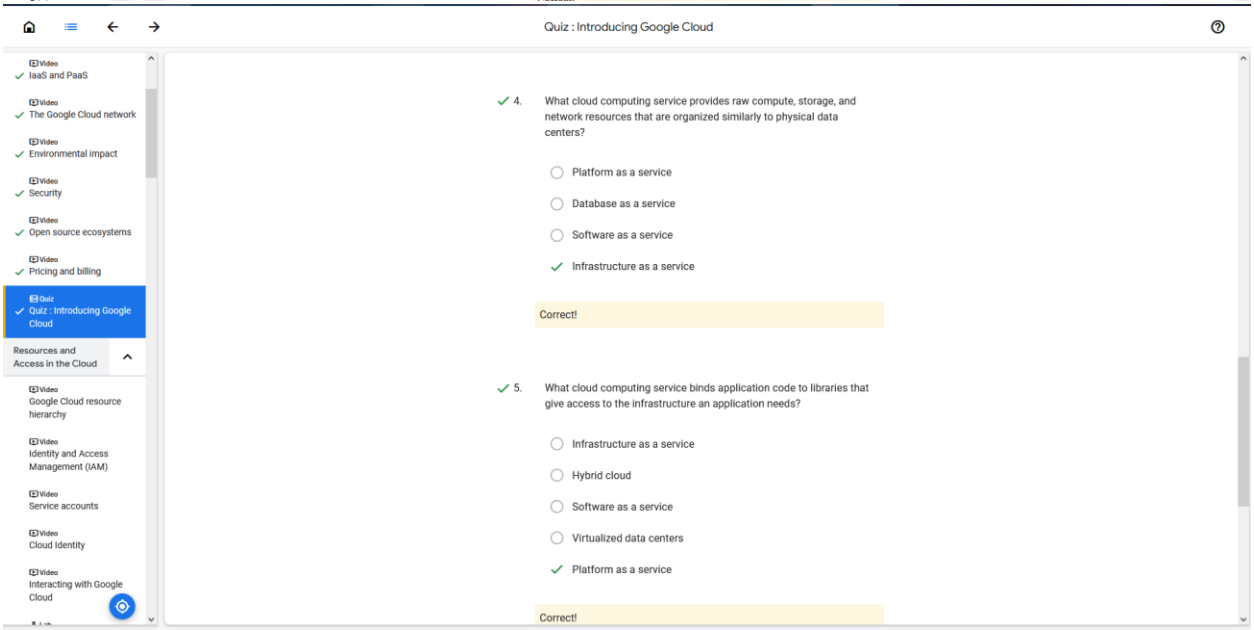
Video Google Cloud resource hierarchy
Video Identity and Access Management (IAM)
Video Service accounts
Video Cloud Identity
Video Interacting with Google Cloud
Correct!
2. Which one of the following statements is true regarding the ability to scale cloud computing resources up and down?
Only CPU and memory resources are elastic.
Cloud computing does not provide a way to scale resources.
Only storage resources are elastic.
CPU, memory, and storage resources are elastic.
That is correct.
3. Why might a Google Cloud customer use resources in several zones within a region?
For better performance
For getting discounts on other zones
For expanding services to customers in new areas
For improved fault tolerance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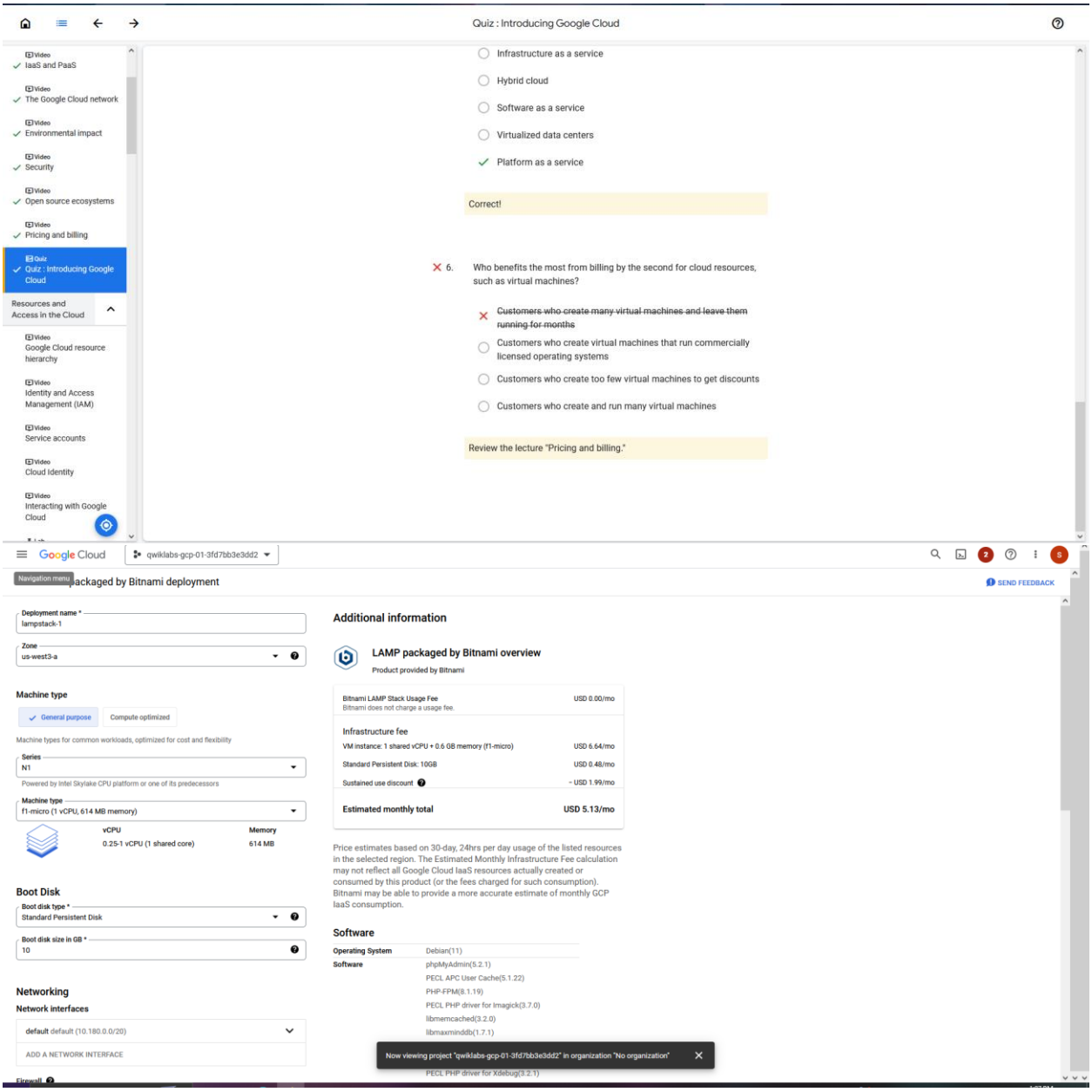
Video Google Cloud resource hierarchy
Video Identity and Access Management (IAM)
Video Service accounts
Video Cloud Identity
Video Interacting with Google Cloud
4. What cloud computing service provides raw compute, storage, and network resources that are organized similarly to physical data centers?
Platform as a service
Database as a service
Software as a service
Infrastructure as a service
Correct!
5. What cloud computing service binds application code to libraries that give access to the infrastructure an application needs?
Infrastructure as a service
Hybrid cloud
Software as a service
Virtualized data centers
Platform as a service
Correct!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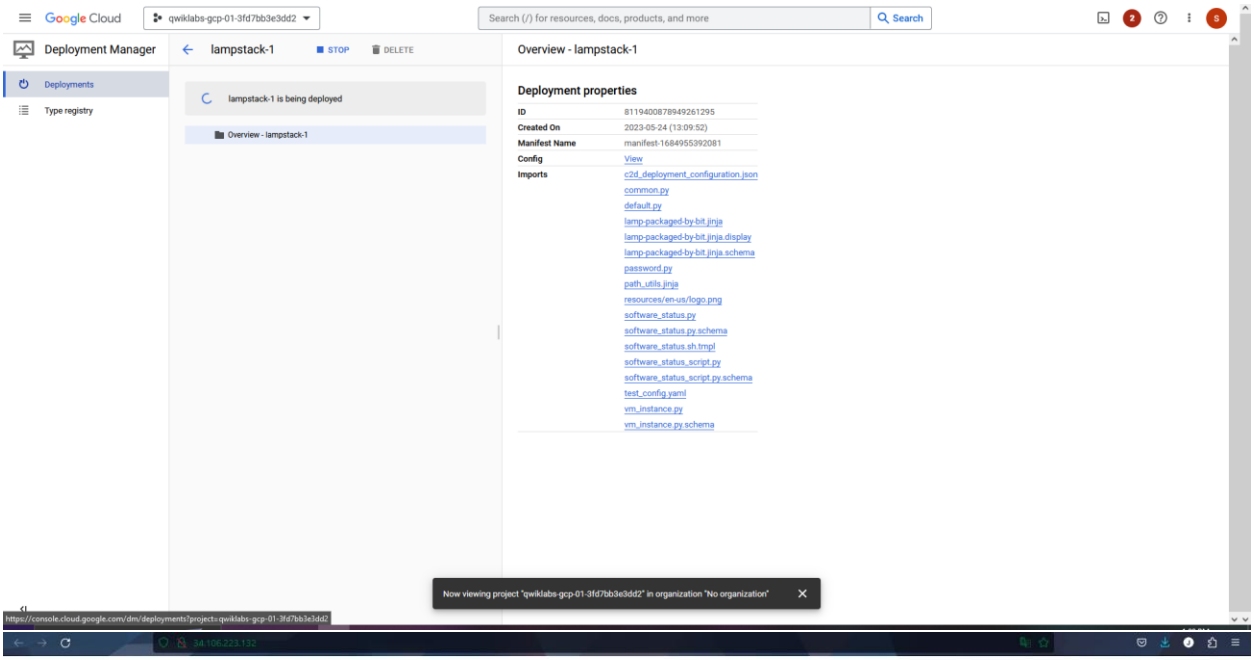
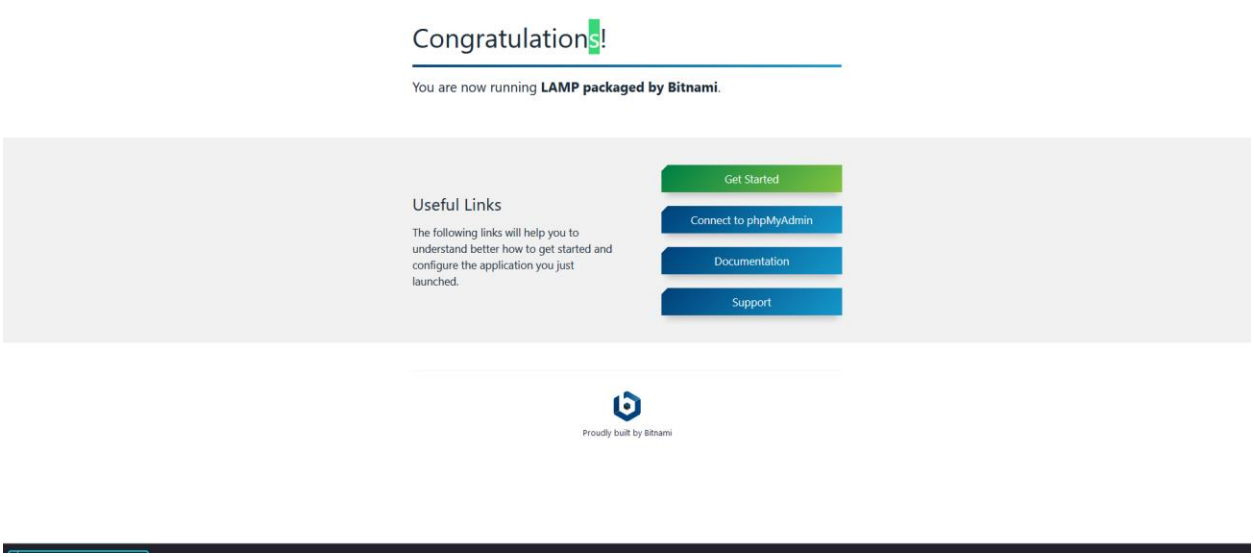
Interacting with Google Cloud
Infrastructure as a service
Hybrid cloud
Software as a service
Virtualized data centers
Platform as a service
Correct!
6. Who benefits the most from billing by the second for cloud resources, such as virtual machines?
Customers who create many virtual machines and leave them running for months
Customers who create virtual machines that run commercially licensed operating systems
Customers who create too few virtual machines to get discounts
Customers who create and run many virtual machines
Review the lecture "Pricing and billing."
Google Cloud
qwiklabs-gcp-01-3fd7bb3e3dd2
Navigation menu
packaged by Bitnami deployment
SEND FEEDBACK
Deployment name *
lampstack-1
Zone
us-west3-a
Machine type
General purpose
Compute optimized
Machine types for common workloads, optimized for cost and flexibility
Series
N1
Powered by Intel Skylake CPU platform or one of its predecessors
Machine type
f1-micro (1 vCPU, 614 MB memory)
vCPU
0.25-1 vCPU (1 shared core)
Memory
614 MB
Boot Disk
Boot disk type *
Standard Persistent Disk
Boot disk size in GB *
10
Networking
Network interfaces
default default (10.180.0.0/20)
ADD A NETWORK INTERFACE
Firewall
Additional information
LAMP packaged by Bitnami overview
Product provided by Bitnami
Bitnami LAMP Stack Usage Fee
Bitnami does not charge a usage fee.
USD 0.00/mo
Infrastructure fee
VM instance: 1 shared vCPU + 0.6 GB memory (f1-micro)
USD 6.64/mo
Standard Persistent Disk: 10GB
USD 0.48/mo
Sustained use discount
- USD 1.99/mo
Estimated monthly total
USD 5.13/mo
Price estimates based on 30-day, 24hrs per day usage of the listed resources in the selected region. The Estimated Monthly Infrastructure Fee calculation may not reflect all Google Cloud IaaS resources actually created or consumed by this product (or the fees charged for such consumption). Bitnami may be able to provide a more accurate estimate of monthly GCP IaaS consumption.
Software
Operating System
Debian(11)
Software
phpMyAdmin(5.2.1)
PECL APC User Cache(5.1.22)
PHP-FPM(8.1.19)
PECL PHP driver for Imagick(3.7.0)
libmemcached(3.2.0)
libmaxminddb(1.7.1)
PECL PHP driver for Xdebug(3.2.1)
Now viewing project "qwiklabs-gcp-01-3fd7bb3e3dd2" in organization "No organization"

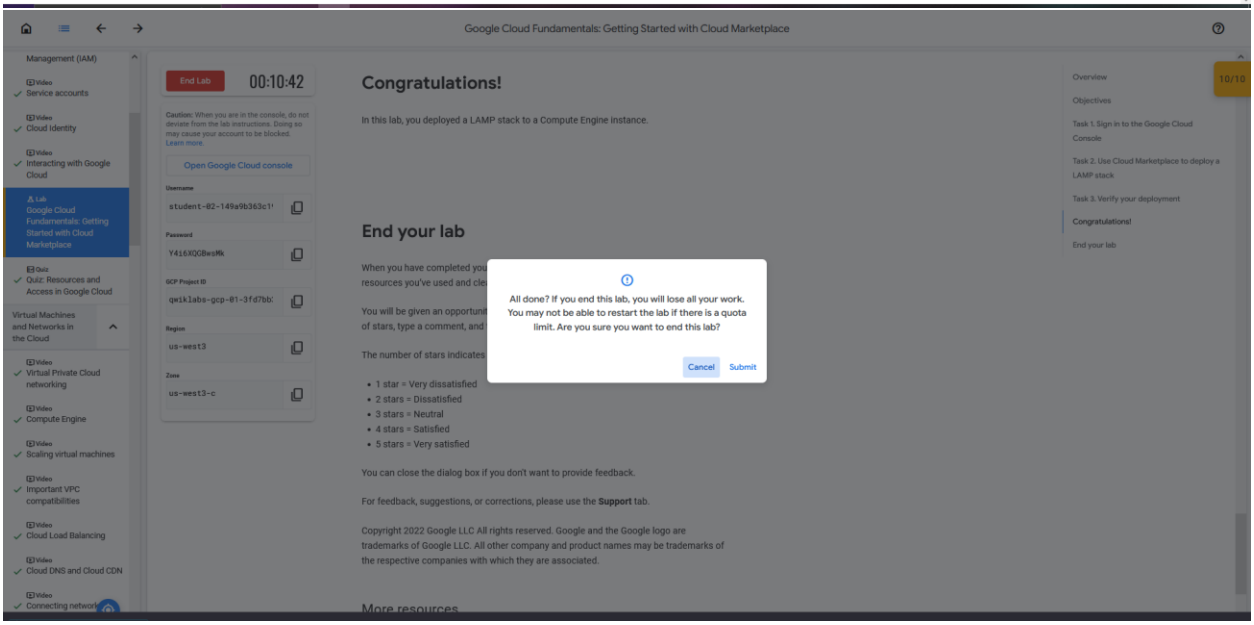

Google Cloud
qwiklabs-gcp-01-3fd7bb3e3dd2
Search (/) for resources, docs, products, and more
Search
Deployment Manager
lampstack-1
STOP
DELETE
Overview - lampstack-1
Deployments
Type registry
lampstack-1 is being deployed
Overview - lampstack-1
Deployment properties
ID
8119400878949261295
Created On
2023-05-24 (13:09:52)
Manifest Name
manifest-1684955392081
Config
View
Imports
c2d_deployment_configuration.json
common.py
default.py
lamp-packaged-by-bit.jinja
lamp-packaged-by-bit.jinja.display
lamp-packaged-by-bit.jinja.schema
password.py
path_utils.jinja
resources/en-us/logo.png
software_status.py
software_status.py.schema
software_status.sh.tmpl
software_status_script.py
software_status_script.py.schema
test_config.yaml
vm_instance.py
vm_instance.py.schema
Now viewing project "qwiklabs-gcp-01-3fd7bb3e3dd2" in organization "No organization"
https://console.cloud.google.com/dm/deployments?project=qwiklabs-gcp-01-3fd7bb3e3dd2


Congratulations!
You are now running LAMP packaged by Bitnami.
Useful Links
The following links will help you to understand better how to get started and configure the application you just launched.
Get Started
Connect to phpMyAdmin
Documentation
Support
Proudly built by Bitnami

PHP Version 8.1.19

System	Linux lampstack-2-vm 5.10.0-22-cloud-amd64 #1 SMP Debian 5.10.178-3 (2023-04-22) x86_64
Build Date	May 12 2023 13:04:56
Build System	Linux 306fc0b79ebf 4.19.0-19-cloud-amd64 #1 SMP Debian 4.19.232-1 (2022-03-07) x86_64 GNU/Linux
Configure Command	'/bitnami/blacksmith-sandox/php-8.1.19/configure' '--prefix=/opt/bitnami/php' '--with-zlib-dir' '--with-libxml-dir=/usr' '--enable-soap' '--disable-rpath' '--enable-inline-optimization' '--with-bz2' '--enable-sockets' '--enable-pcntl' '--enable-exif' '--enable-bcmath' '--with-pdo-mysql=mysqlnd' '--with-mysqli=mysqlnd' '--with-png-dir=/usr' '--with-openssl' '--with-libdir=/lib/x86_64-linux-gnu' '--enable-ftp' '--enable-calendar' '--with-gettext' '--with-xmlrpc' '--with-xsl' '--enable-fpm' '--with-fpm-user=daemon' '--with-fpm-group=daemon' '--enable-mbstring' '--enable-cgi' '--enable-ctype' '--enable-session' '--enable-mysqlnd' '--enable-intl' '--with-iconv' '--with-pdo_sqlite' '--with-sqlite3' '--with-readline' '--with-gmp' '--with-curl' '--with-pdo-pgsql=shared' '--with-pgsql=shared' '--with-config-file-scan-dir=/opt/bitnami/php/etc/conf.d' '--enable-simplexml' '--with-sodium' '--enable-gd' '--with-pear' '--with-freetype' '--with-jpeg' '--with-webp' '--with-zip' '--with-pdo-dblib=shared' '--with-tidy' '--with-ldap=/usr/' '--enable-apcu=shared' 'PKG_CONFIG_PATH=/opt/bitnami/common/lib/pkgconfig'
Server API	FPM/FastCGI
Virtual Directory Support	disabled
Configuration File (php.ini) Path	/opt/bitnami/php/lib
Loaded Configuration File	/opt/bitnami/php/etc/php.ini
Scan this dir for additional .ini files	/opt/bitnami/php/etc/conf.d
Additional .ini files parsed	(none)
PHP API	20210902
PHP Extension	20210902
Zend Extension	420210902
Zend Extension Build	API420210902,NTS
PHP Extension Build	API20210902,NTS
Debug Build	no
Thread Safety	disabled
Zend Signal Handling	enabled
Zend Memory Manager	enabled
Zend Multibyte Support	provided by mbstring
Zend Max Execution Timers	disabled
IPv6 Support	enabled
DTrace Support	disabled
Registered PHP Streams	https, ftps, compress.zlib, compress.bzip2, php, file, glob, data, http, ftp, phar, zip
Registered Stream Socket Transports	tcp, udp, unix, udg, ssl, tls, tlsv1.0, tlsv1.1, tlsv1.2, tlsv1.3
Registered Stream Filters	zlib.*, bzip2.*, convert.iconv.*, string.rot13, string.toupper, string.tolower, convert.*, consumed, dechunk

This program makes use of the Zend Scripting Language Engine:
Zend Engine v4.1.19, Copyright (c) Zend Technologies
with Zend OPcache v8.1.19, Copyright (c), by Zend Technologies



Google Cloud Fundamentals: Getting Started with Cloud Marketplace

End Lab 00:10:42

Congratulations!

In this lab, you deployed a LAMP stack to a Compute Engine instance.

End your lab

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?

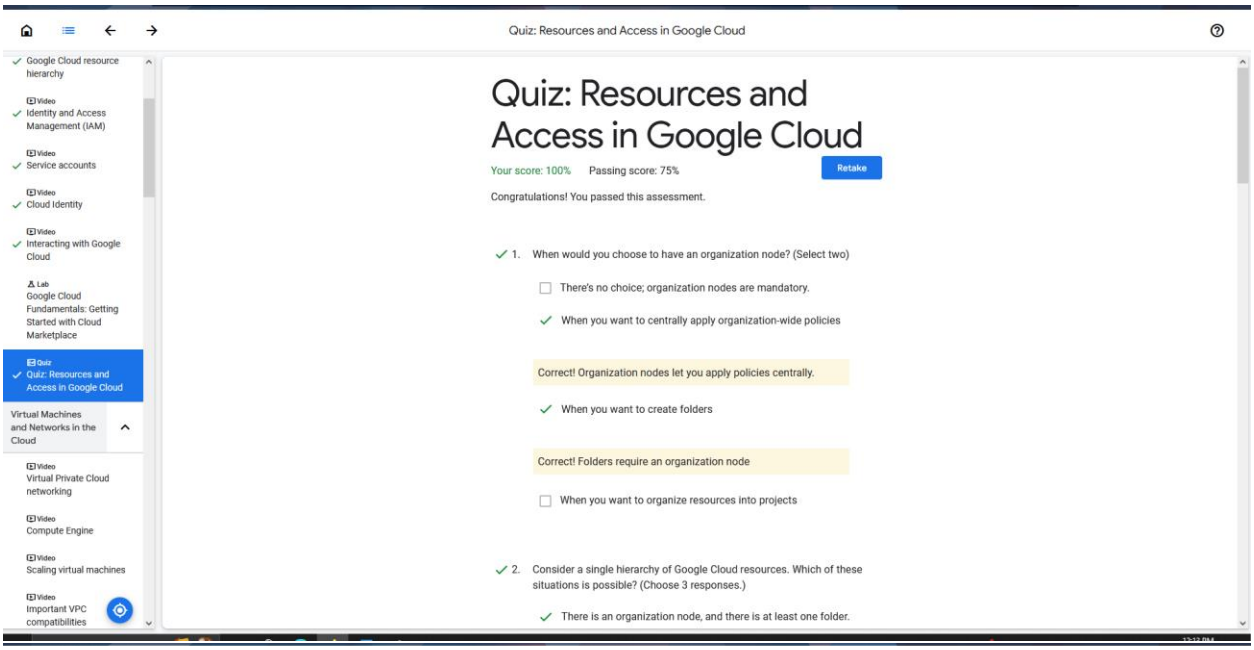
Cancel Submit

- 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.

More resources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Virtual Private Cloud networking
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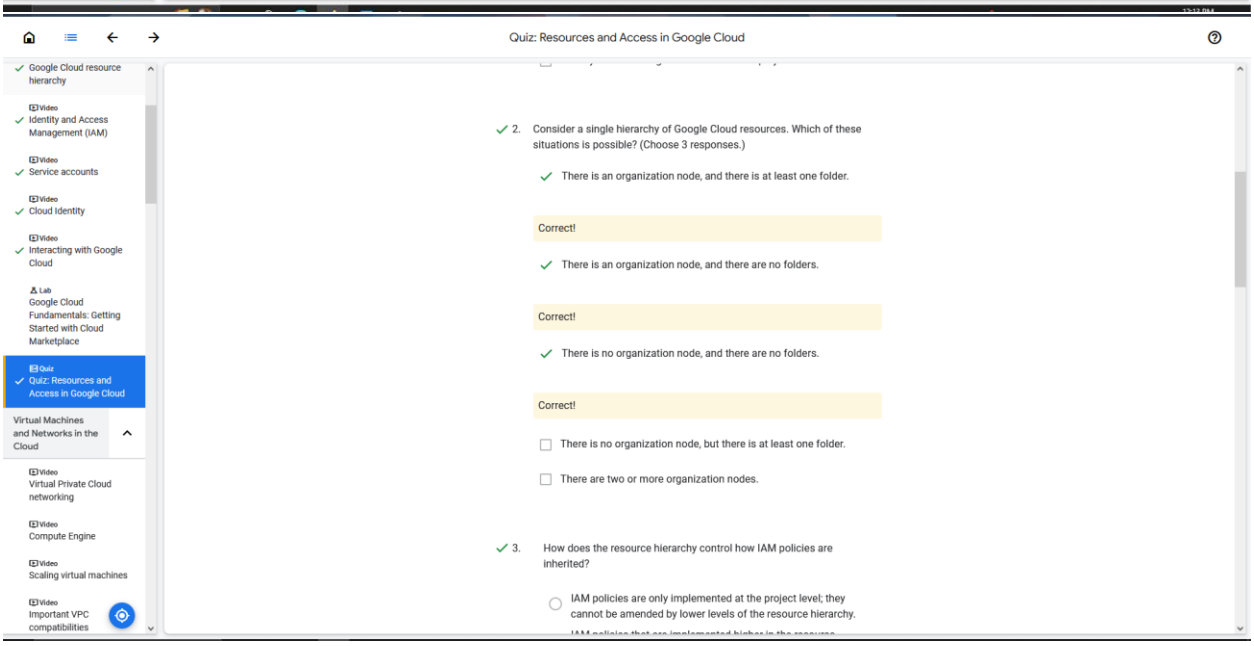
Compute Engine
Video
Scaling virtual machines
Video
Important VPC compatibilities
Quiz: Resources and Access in Google Cloud
Your score: 100%
Passing score: 75%
Retake
Congratulations! You passed this assessment.
1. When would you choose to have an organization node? (Select two)
There's no choice; organization nodes are mandatory.
When you want to centrally apply organization-wide policies
Correct! Organization nodes let you apply policies centrally.
When you want to create folders
Correct! Folders require an organization node
When you want to organize resources into projects
2. Consider a single hierarchy of Google Cloud resources. Which of these situations is possible? (Choose 3 responses.)
There is an organization node, and there is at least one folder.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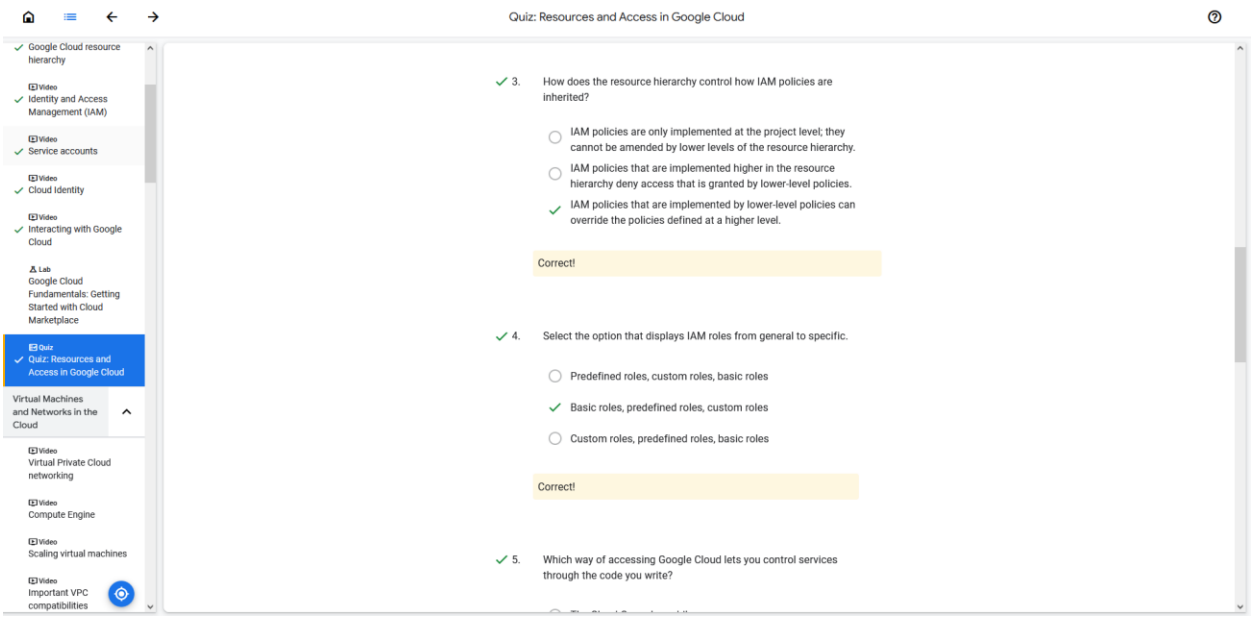
Important VPC compatibilities
2. Consider a single hierarchy of Google Cloud resources. Which of these situations is possible? (Choose 3 responses.)
There is an organization node, and there is at least one folder.
Correct!
There is an organization node, and there are no folders.
Correct!
There is no organization node, and there are no folders.
Correct!
There is no organization node, but there is at least one folder.
There are two or more organization nodes.
3. How does the resource hierarchy control how IAM policies are inherited?
IAM policies are only implemented at the project level; they cannot be amended by lower levels of the resource hierarchy.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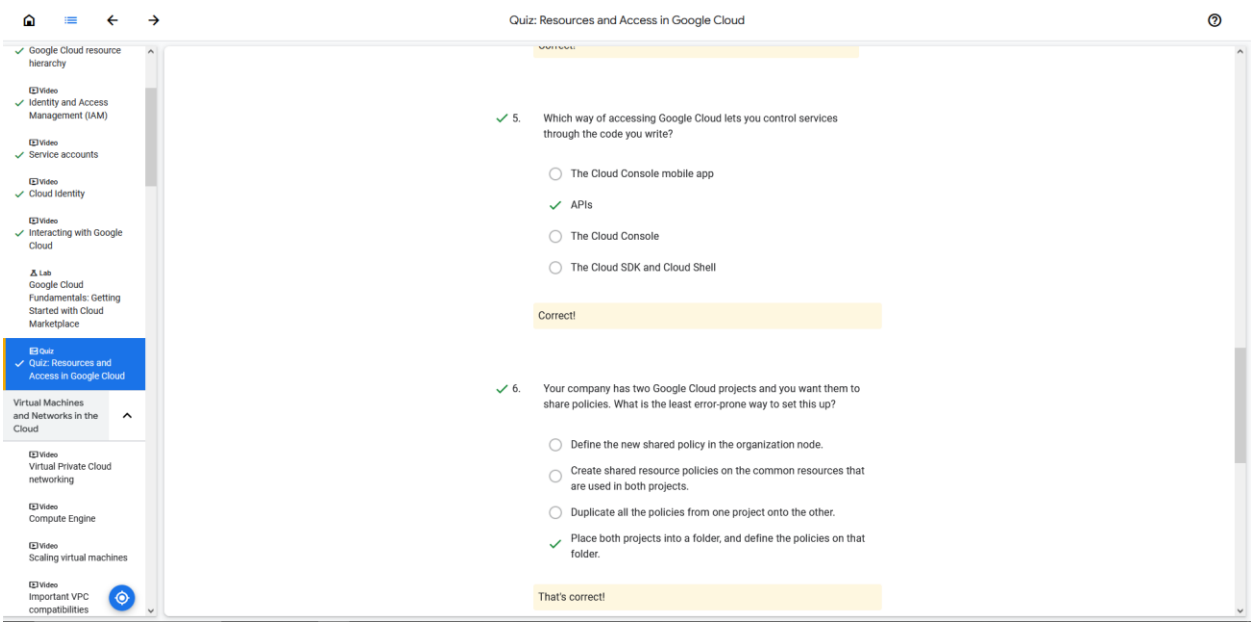
3. How does the resource hierarchy control how IAM policies are inherited?
IAM policies are only implemented at the project level; they cannot be amended by lower levels of the resource hierarchy.
IAM policies that are implemented higher in the resource hierarchy deny access that is granted by lower-level policies.
IAM policies that are implemented by lower-level policies can override the policies defined at a higher level.
Correct!
4. Select the option that displays IAM roles from general to specific.
Predefined roles, custom roles, basic roles
Basic roles, predefined roles, custom roles
Custom roles, predefined roles, basic roles
Correct!
5. Which way of accessing Google Cloud lets you control services through the code you write?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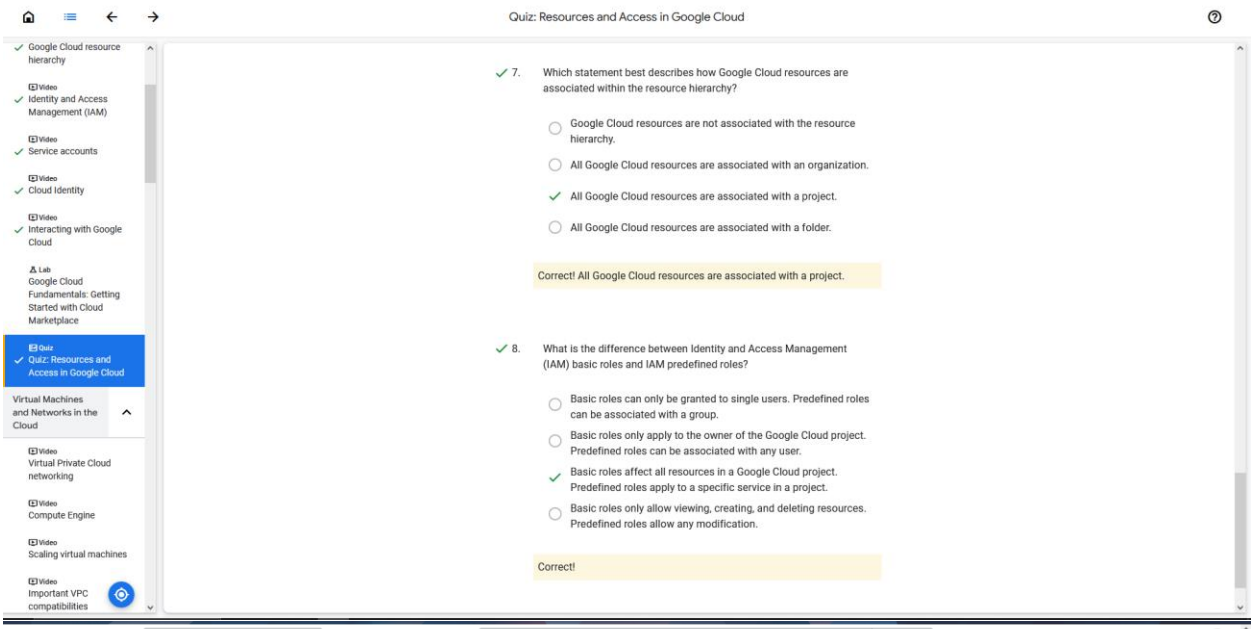
5. Which way of accessing Google Cloud lets you control services through the code you write?
The Cloud Console mobile app
APIs
The Cloud Console
The Cloud SDK and Cloud Shell
Correct!
6. Your company has two Google Cloud projects and you want them to share policies. What is the least error-prone way to set this up?
Define the new shared policy in the organization node.
Create shared resource policies on the common resources that are used in both projects.
Duplicate all the policies from one project onto the other.
Place both projects into a folder, and define the policies on that folder.
That's correct!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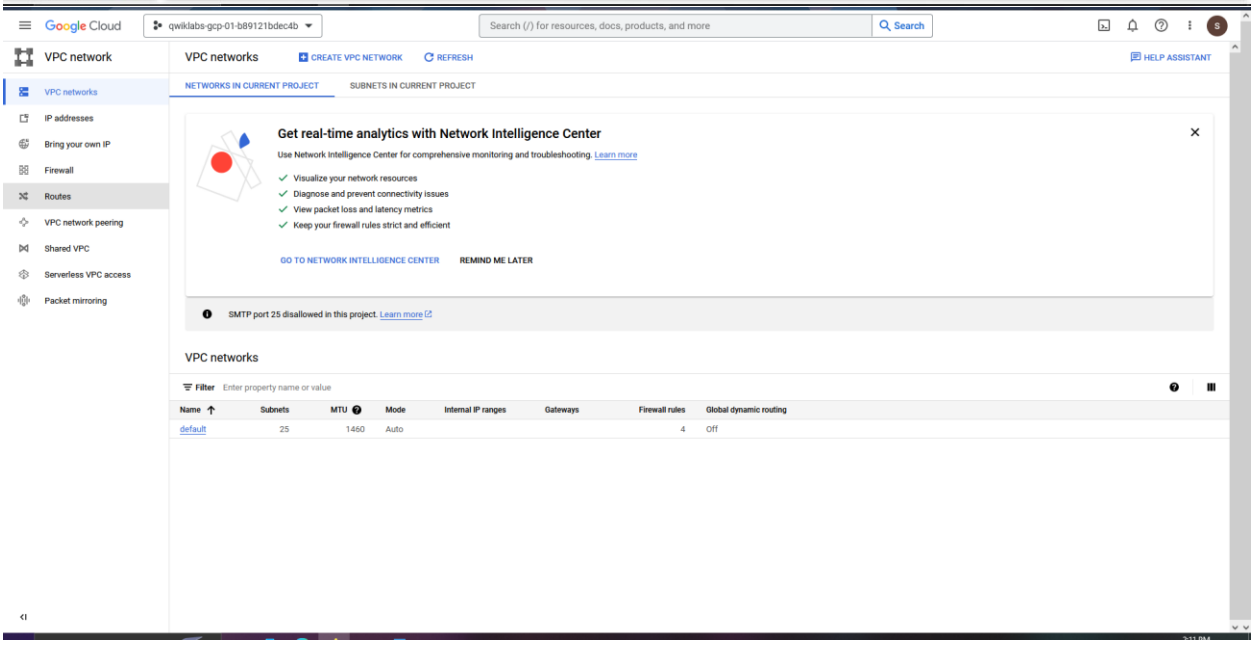
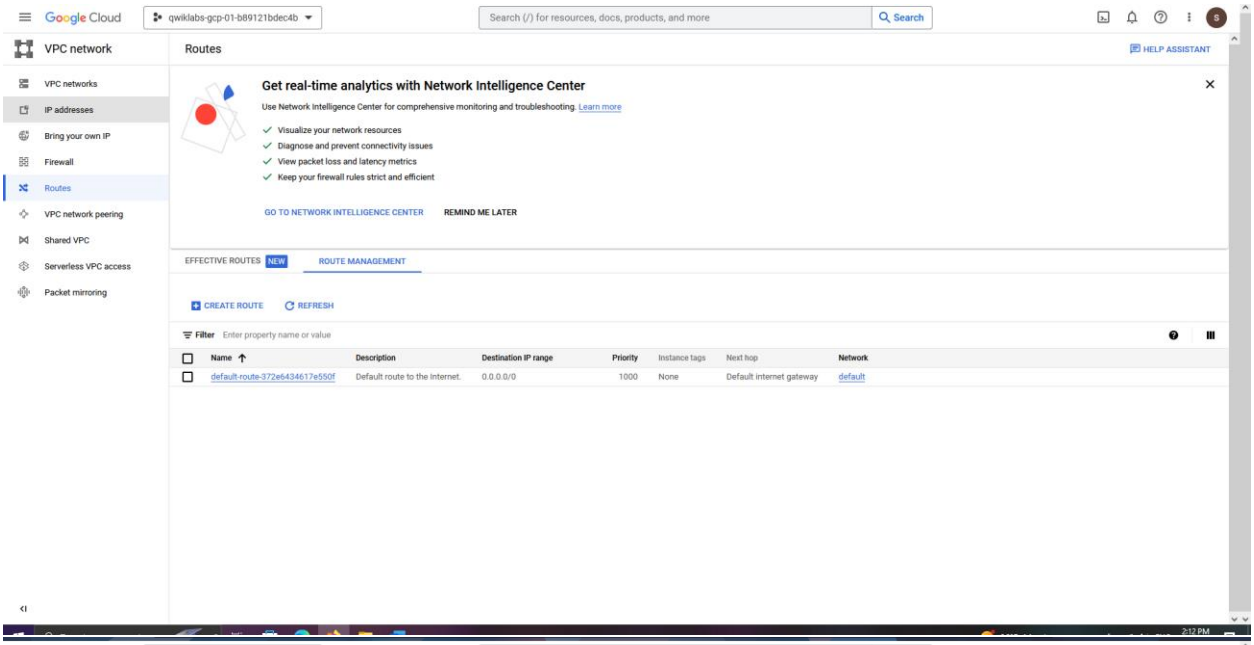
7. Which statement best describes how Google Cloud resources are associated within the resource hierarchy?
Google Cloud resources are not associated with the resource hierarchy.
All Google Cloud resources are associated with an organization.
All Google Cloud resources are associated with a project.
All Google Cloud resources are associated with a folder.
Correct! All Google Cloud resources are associated with a project.
8. What is the difference between Identity and Access Management (IAM) basic roles and IAM predefined roles?
Basic roles can only be granted to single users. Predefined roles can be associated with a group.
Basic roles only apply to the owner of the Google Cloud project. Predefined roles can be associated with any user.
Basic roles affect all resources in a Google Cloud project. Predefined roles apply to a specific service in a project.
Basic roles only allow viewing, creating, and deleting resources. Predefined roles allow any modification.
Correct!


Google Cloud
qwiklabs-gcp-01-b89121bdec4b
Search (/) for resources, docs, products, and more
Search
VPC network
VPC networks
IP addresses
Bring your own IP
Firewall
Routes
VPC network peering
Shared VPC
Serverless VPC access
Packet mirroring
VPC networks
CREATE VPC NETWORK
REFRESH
HELP ASSISTANT
NETWORKS IN CURRENT PROJECT
SUBNETS IN CURRENT PROJECT
Get real-time analytics with Network Intelligence Center
Use Network Intelligence Center for comprehensive monitoring and troubleshooting. Learn more
Visualize your network resources
Diagnose and prevent connectivity issues
View packet loss and latency metrics
Keep your firewall rules strict and efficient
GO TO NETWORK INTELLIGENCE CENTER
REMIND ME LATER
SMTP port 25 disallowed in this project. Learn more
VPC networks
Filter
Enter property name or value
Name
Subnets
MTU
Mode
Internal IP ranges
Gateways
Firewall rules
Global dynamic routing
default
25
1460
Auto
4
Off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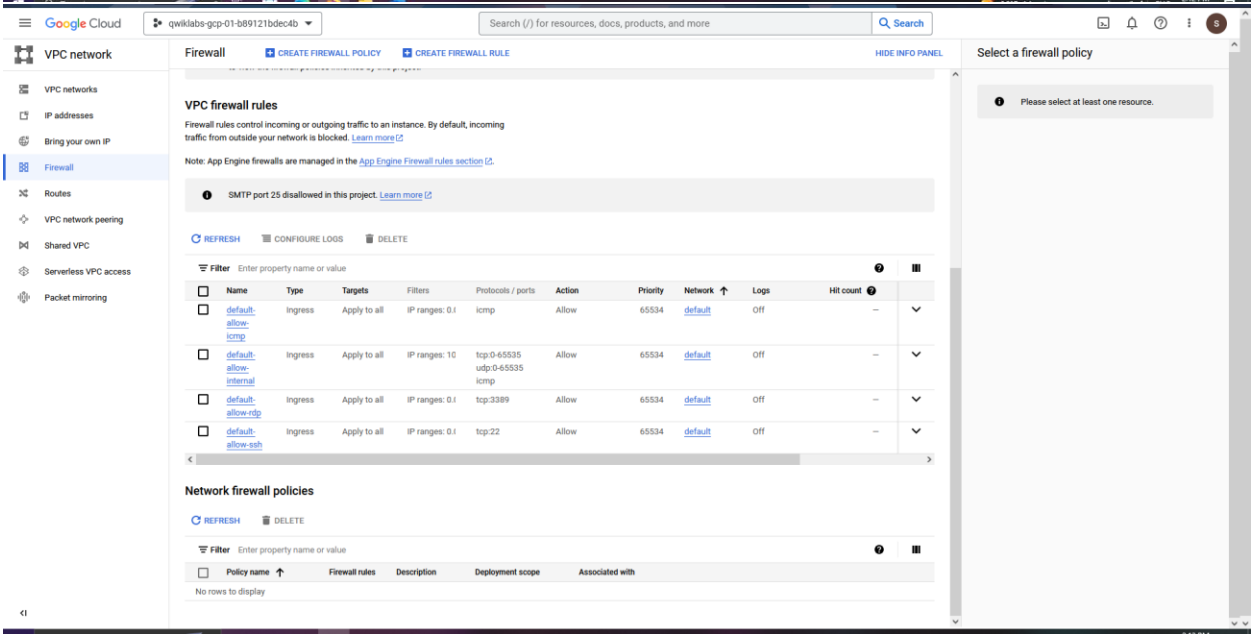
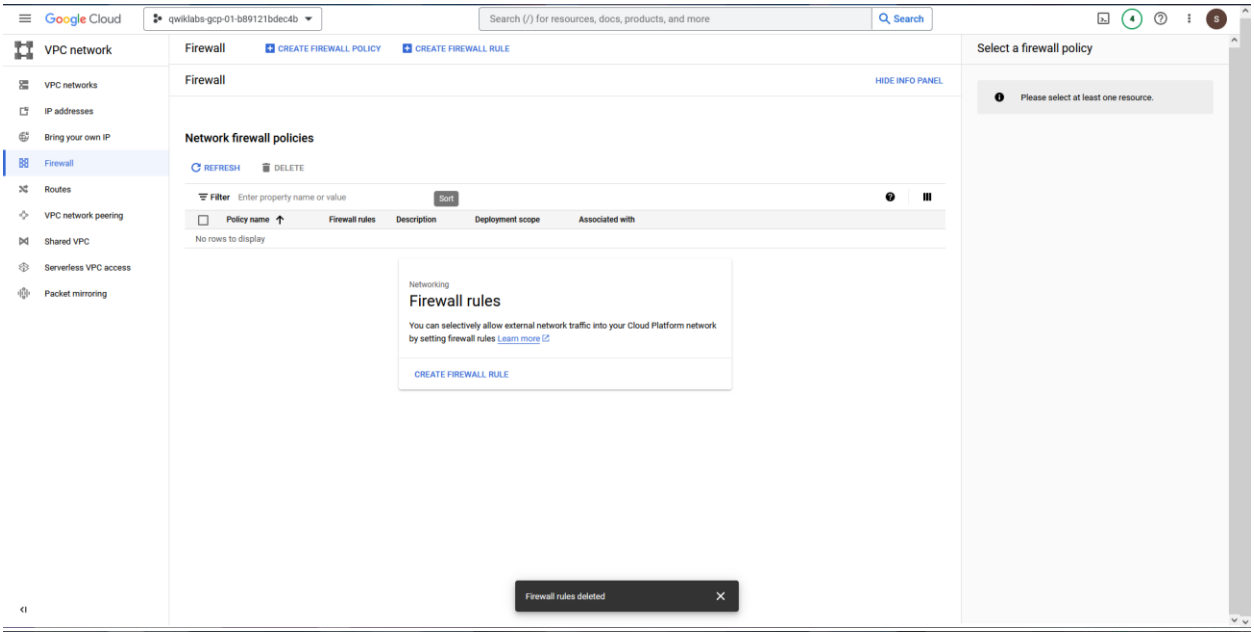
EFFECTIVE ROUTES
NEW
ROUTE MANAGEMENT
CREATE ROUTE
REFRESH
Filter
Enter property name or value
Name
Description
Destination IP range
Priority
Instance tags
Next hop
Network
default-route-372e6434617e550f
Default route to the Internet.
0.0.0.0/0
1000
None
Default internet gateway
default


Google Cloud
qwiklabs-gcp-01-b89121bdec4b
Search (/) for resources, docs, products, and more
Search
VPC network
Firewall
CREATE FIREWALL POLICY
CREATE FIREWALL RULE
HIDE INFO PANEL
Select a firewall policy
Please select at least one resource.
VPC networks
IP addresses
Bring your own IP
Firewall
Routes
VPC network peering
Shared VPC
Serverless VPC access
Packet mirroring
VPC firewall rules
Firewall rules control incoming or outgoing traffic to an instance. By default, incoming traffic from outside your network is blocked. Learn more
Note: App Engine firewalls are managed in the App Engine Firewall rules section.
SMTP port 25 disallowed in this project. Learn more
REFRESH
CONFIGURE LOGS
DELETE
Filter
Enter property name or value
Name
Type
Targets
Filters
Protocols / ports
Action
Priority
Network
Logs
Hit count
default-allow-icmp
Ingress
Apply to all
IP ranges: 0.0
icmp
Allow
65534
default
Off
default-allow-internal
IP ranges: 10
tcp:0-65535
udp:0-65535
icmp
default-allow-rdp
tcp:3389
default-allow-ssh
tcp:22
Network firewall policies
Policy name
Firewall rules
Description
Deployment scope
Associated with
No rows to display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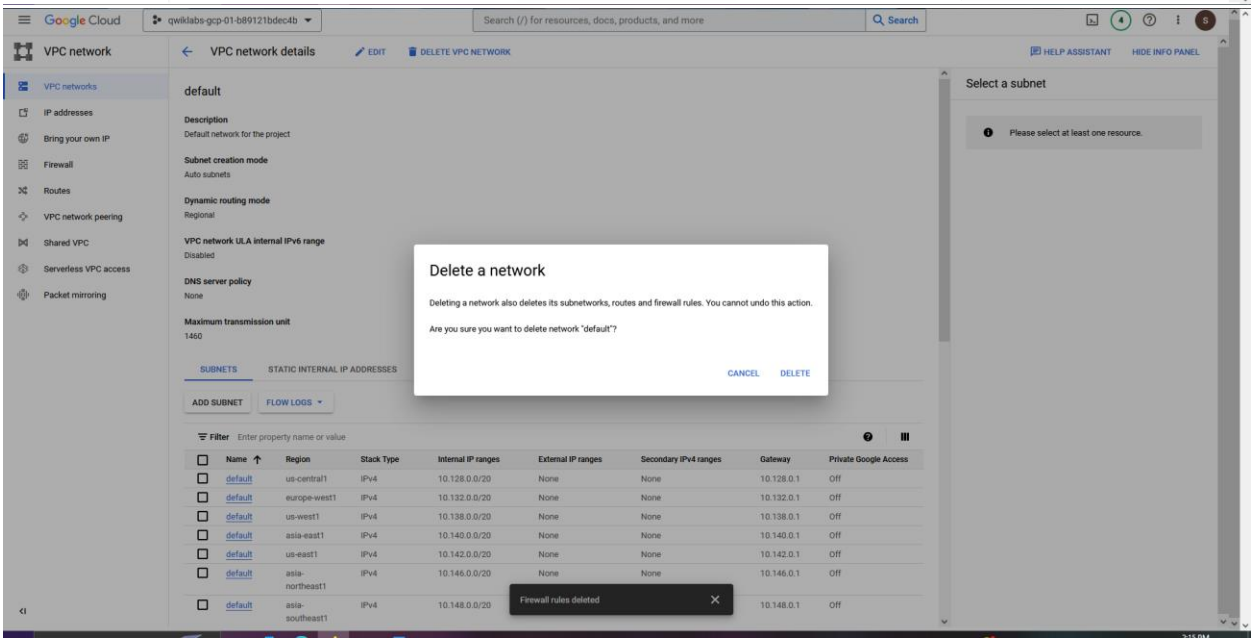
VPC network
Firewall
CREATE FIREWALL POLICY
CREATE FIREWALL RULE
VPC networks
IP addresses
Bring your own IP
Firewall
Routes
VPC network peering
Shared VPC
Serverless VPC access
Packet mirroring
Firewall
HIDE INFO PANEL
Network firewall policies
REFRESH
DELETE
Filter
Enter property name or value
Sort
Policy name
Firewall rules
Description
Deployment scope
Associated with
No rows to display
Networking
Firewall rules
You can selectively allow external network traffic into your Cloud Platform network by setting firewall rules Learn more
CREATE FIREWALL RULE
Select a firewall policy
Please select at least one resource.
Firewall rules deleted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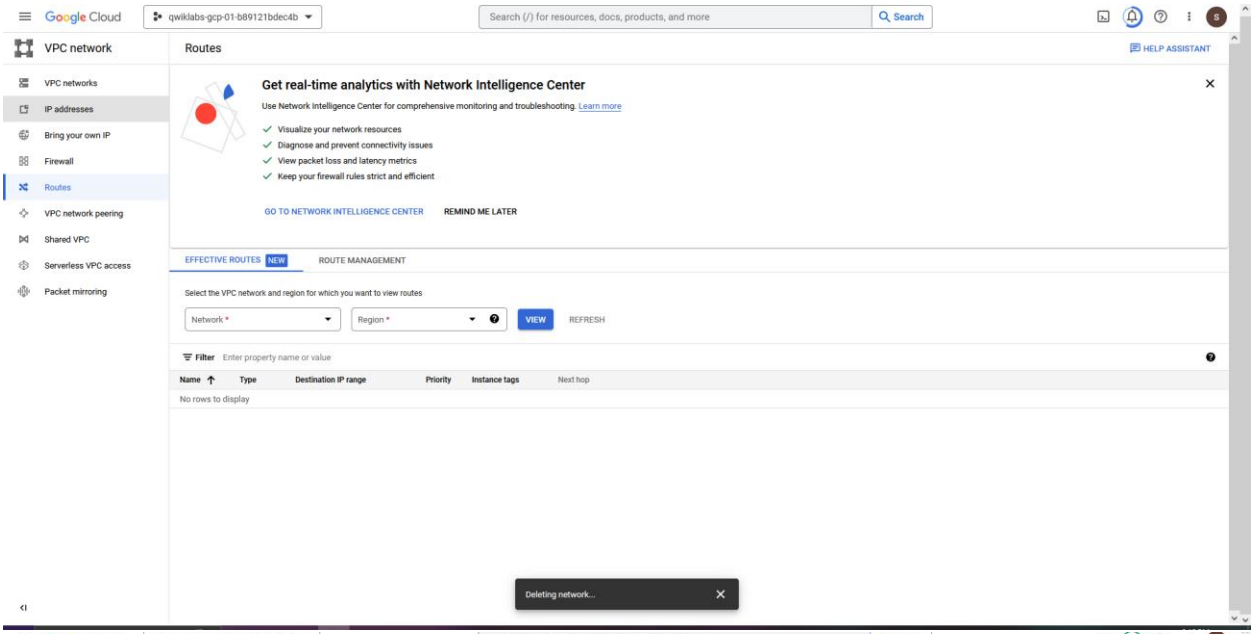
VPC network
VPC network details
EDIT
DELETE VPC NETWORK
HELP ASSISTANT
HIDE INFO PANEL
default
Description
Default network for the project
Subnet creation mode
Auto subnets
Dynamic routing mode
Regional
VPC network ULA internal IPv6 range
Disabled
DNS server policy
None
Maximum transmission unit
1460
SUBNETS
STATIC INTERNAL IP ADDRESSES
ADD SUBNET
FLOW LOGS
Filter
Enter property name or value
Name
Region
Stack Type
Internal IP ranges
External IP ranges
Secondary IPv4 ranges
Gateway
Private Google Access
default us-central1 IPv4 10.128.0.0/20 None None 10.128.0.1 Off
default europe-west1 IPv4 10.132.0.0/20 None None 10.132.0.1 Off
default us-west1 IPv4 10.138.0.0/20 None None 10.138.0.1 Off
default asia-east1 IPv4 10.140.0.0/20 None None 10.140.0.1 Off
default us-east1 IPv4 10.142.0.0/20 None None 10.142.0.1 Off
default asia-northeast1 IPv4 10.146.0.0/20 None None 10.146.0.1 Off
default asia-southeast1 IPv4 10.148.0.0/20 None None 10.148.0.1 Off
Delete a network
Deleting a network also deletes its subnetworks, routes and firewall rules. You cannot undo this action.
Are you sure you want to delete network "default"?
CANCEL
DELETE
Select a subnet
Please select at least one resource.
Firewall rules deleted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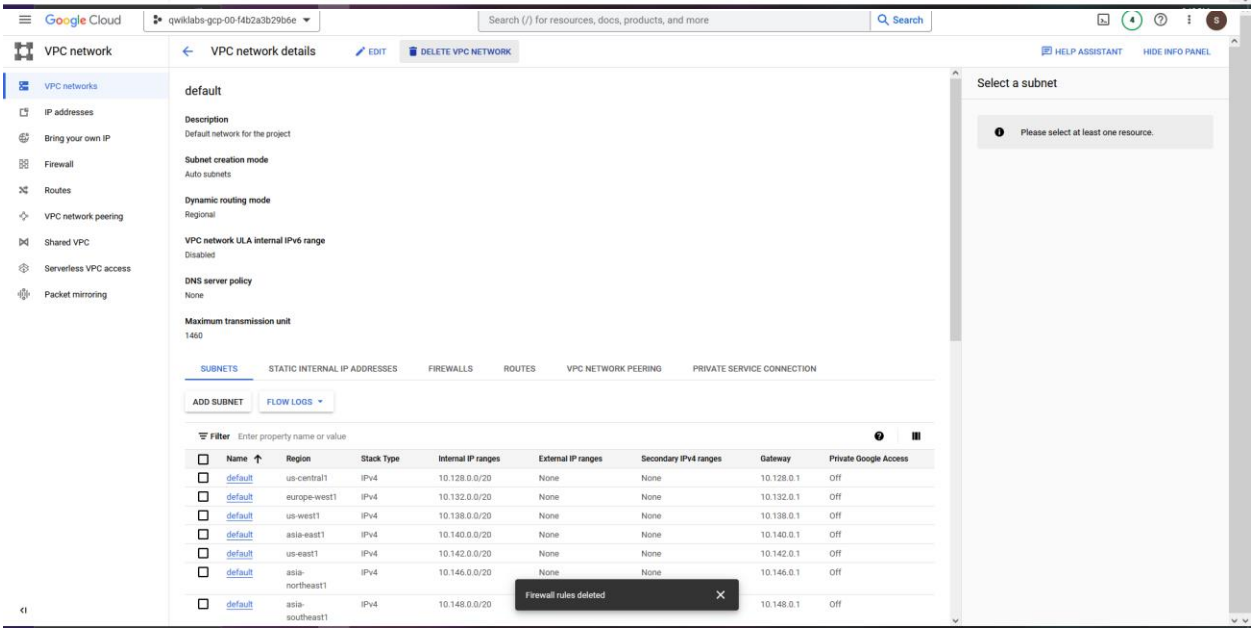
VPC network
Routes
HELP ASSISTANT
VPC networks
IP addresses
Bring your own IP
Firewall
Routes
VPC network peering
Shared VPC
Serverless VPC access
Packet mirroring
Get real-time analytics with Network Intelligence Center
Use Network Intelligence Center for comprehensive monitoring and troubleshooting. Learn more
Visualize your network resources
Diagnose and prevent connectivity issues
View packet loss and latency metrics
Keep your firewall rules strict and efficient
GO TO NETWORK INTELLIGENCE CENTER
REMIND ME LATER
EFFECTIVE ROUTES
NEW
ROUTE MANAGEMENT
Select the VPC network and region for which you want to view routes
Network *
Region *
VIEW
REFRESH
Filter
Enter property name or value
Name
Type
Destination IP range
Priority
Instance tags
Next hop
No rows to display
Deleting network...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VPC network
VPC network details
EDIT
DELETE VPC NETWORK
HELP ASSISTANT
HIDE INFO PANEL
VPC networks
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Bring your own IP
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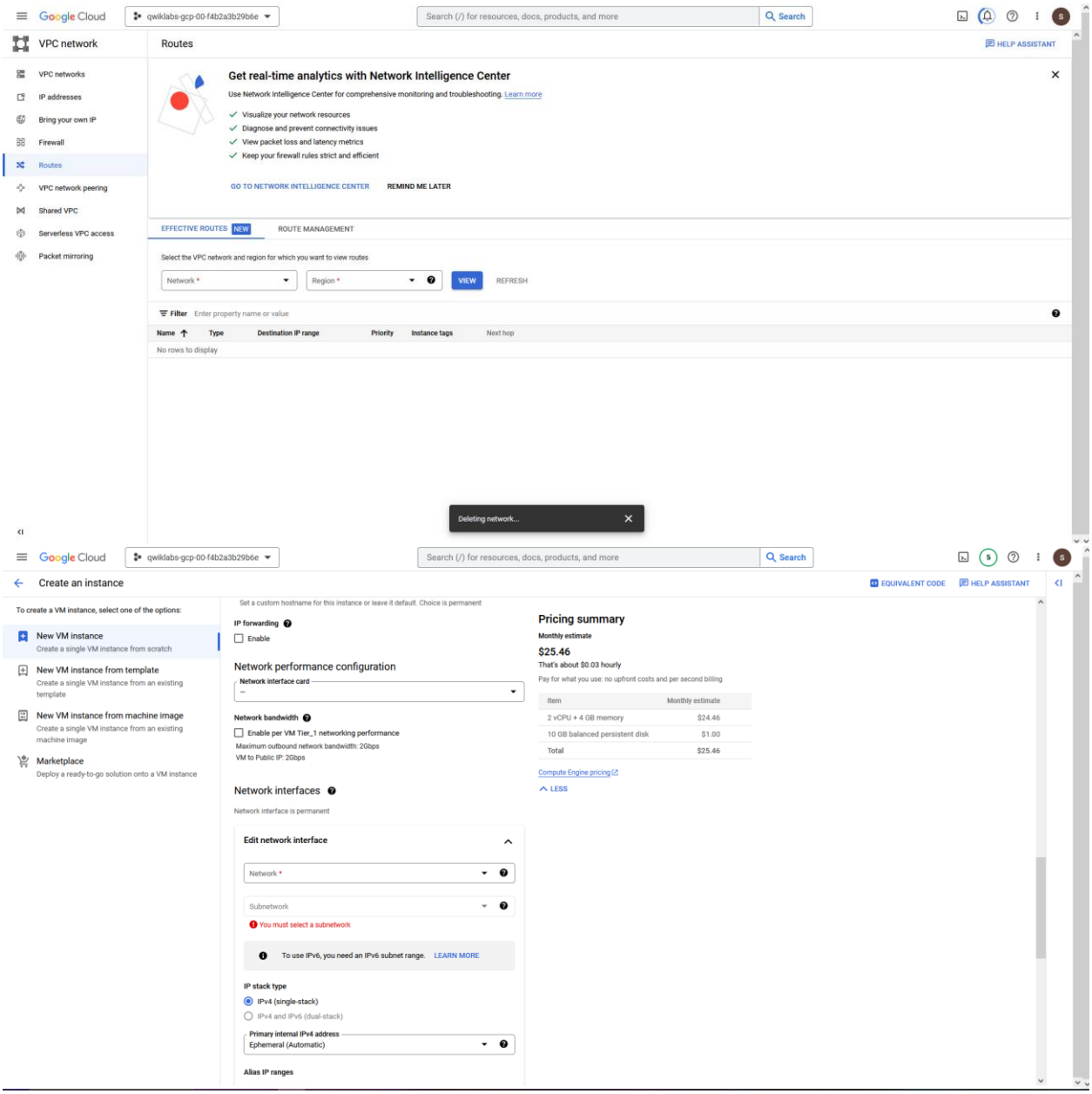
Routes
VPC network peering
Shared VPC
Serverless VPC access
Packet mirroring
default
Description
Default network for the project
Subnet creation mode
Auto subnets
Dynamic routing mode
Regional
VPC network ULA internal IPv6 range
Disabled
DNS server policy
None
Maximum transmission unit
1460
SUBNETS
STATIC INTERNAL IP ADDRESSES
FIREWALLS
ROUTES
VPC NETWORK PEERING
PRIVATE SERVICE CONNECTION
ADD SUBNET
FLOW LOGS
Filter
Enter property name or value
Name
Region
Stack Type
Internal IP ranges
External IP ranges
Secondary IPv4 ranges
Gateway
Private Google Access
default us-central1 IPv4 10.128.0.0/20 None None 10.128.0.1 Off
default europe-west1 IPv4 10.132.0.0/20 None None 10.132.0.1 Off
default us-west1 IPv4 10.138.0.0/20 None None 10.138.0.1 Off
default asia-east1 IPv4 10.140.0.0/20 None None 10.140.0.1 Off
default us-east1 IPv4 10.142.0.0/20 None None 10.142.0.1 Off
default asia-northeast1 IPv4 10.146.0.0/20 None None 10.146.0.1 Off
default asia-southeast1 IPv4 10.148.0.0/20 10.148.0.1 Off
Firewall rules deleted
Select a subnet
Please select at least one resource.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VPC network
Routes
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VPC networks
IP addresses
Bring your own IP
Firewall
Routes
VPC network peering
Shared VPC
Serverless VPC access
Packet mirroring
Get real-time analytics with Network Intelligence Center
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Visualize your network resources
Diagnose and prevent connectivity issues
View packet loss and latency metrics
Keep your firewall rules strict and efficient
GO TO NETWORK INTELLIGENCE CENTER
REMIND ME LATER
EFFECTIVE ROUTES NEW
ROUTE MANAGEMENT
Select the VPC network and region for which you want to view routes
Network *
Region *
VIEW
REFRESH
Filter Enter property name or value
Name Type Destination IP range Priority Instance tags Next hop
No rows to display
Deleting network...
Google Cloud
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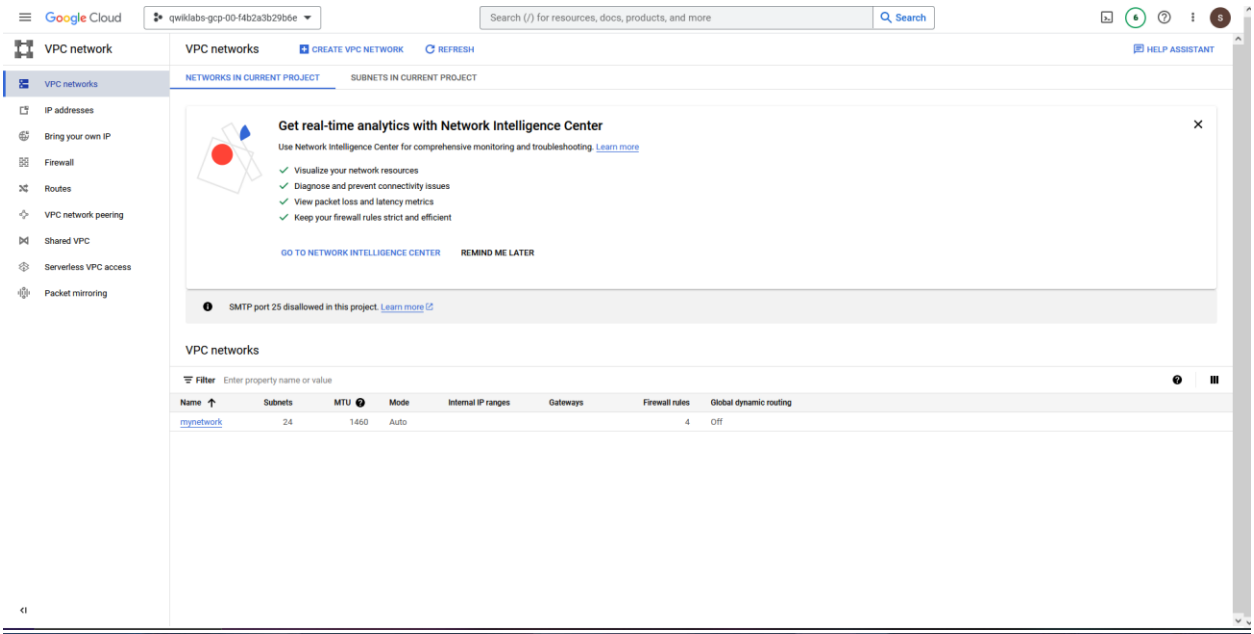
Create an instance
EQUIVALENT CODE
HELP ASSISTANT
To create a VM instance, select one of the options:
New VM instance
Create a single VM instance from scratch
New VM instance from template
Create a single VM instance from an existing template
New VM instance from machine image
Create a single VM instance from an existing machine image
Marketplace
Deploy a ready-to-go solution onto a VM instance
Set a custom hostname for this instance or leave it default. Choice is permanent
IP forwarding
Enable
Network performance configuration
Network interface card
–
Network bandwidth
Enable per VM Tier_1 networking performance
Maximum outbound network bandwidth: 2Gbps
VM to Public IP: 2Gbps
Network interfaces
Network interface is permanent
Edit network interface
Network *
Subnetwork
You must select a subnetwork
To use IPv6, you need an IPv6 subnet range. LEARN MORE
IP stack type
IPv4 (single-stack)
IPv4 and IPv6 (dual-stack)
Primary internal IPv4 address
Ephemeral (Automatic)
Alias IP ranges
Pricing summary
Monthly estimate
$25.46
That's about $0.03 hourly
Pay for what you use: no upfront costs and per second billing
Item Monthly estimate
2 vCPU + 4 GB memory $24.46
10 GB balanced persistent disk $1.00
Total $25.46
Compute Engine pricing
LESS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VPC network
VPC networks
CREATE VPC NETWORK
REFRESH
HELP ASSISTANT
NETWORKS IN CURRENT PROJECT
SUBNETS IN CURRENT PROJECT
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Bring your own IP
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Packet mirroring
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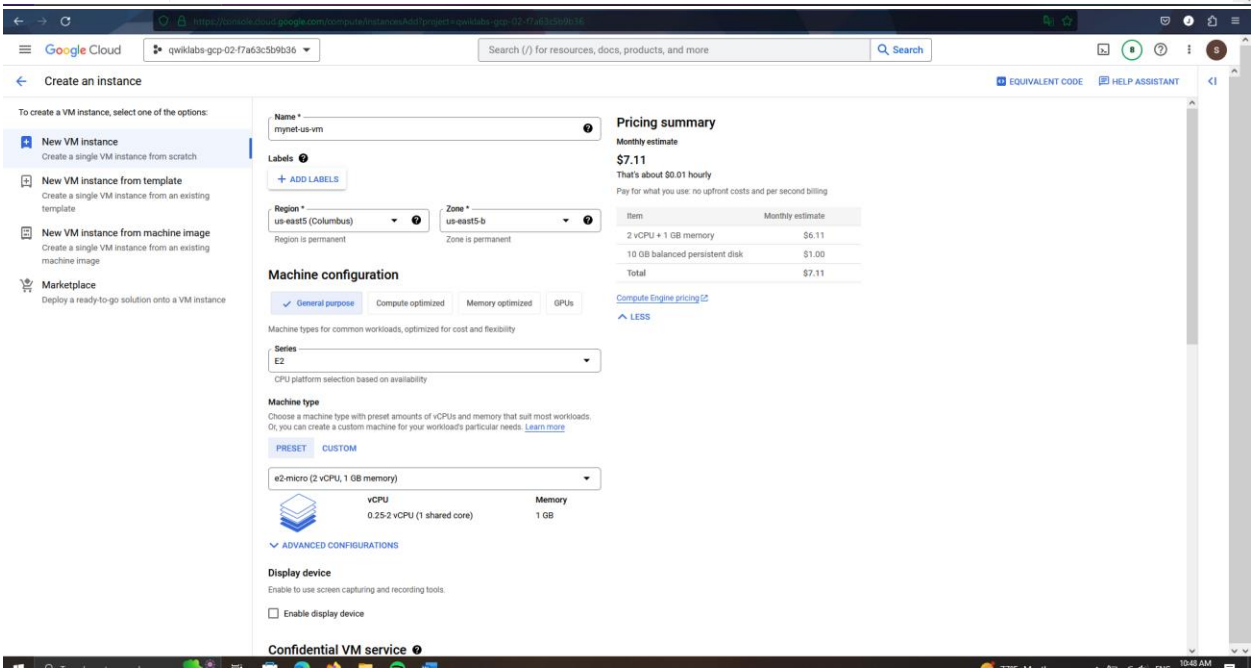
View packet loss and latency metrics
Keep your firewall rules strict and efficient
GO TO NETWORK INTELLIGENCE CENTER
REMIND ME LATER
SMTP port 25 disallowed in this project. Learn more
VPC networks
Filter
Enter property name or value
Name
Subnets
MTU
Mode
Internal IP ranges
Gateways
Firewall rules
Global dynamic routing
mynetwork
24
1460
Auto
4
Off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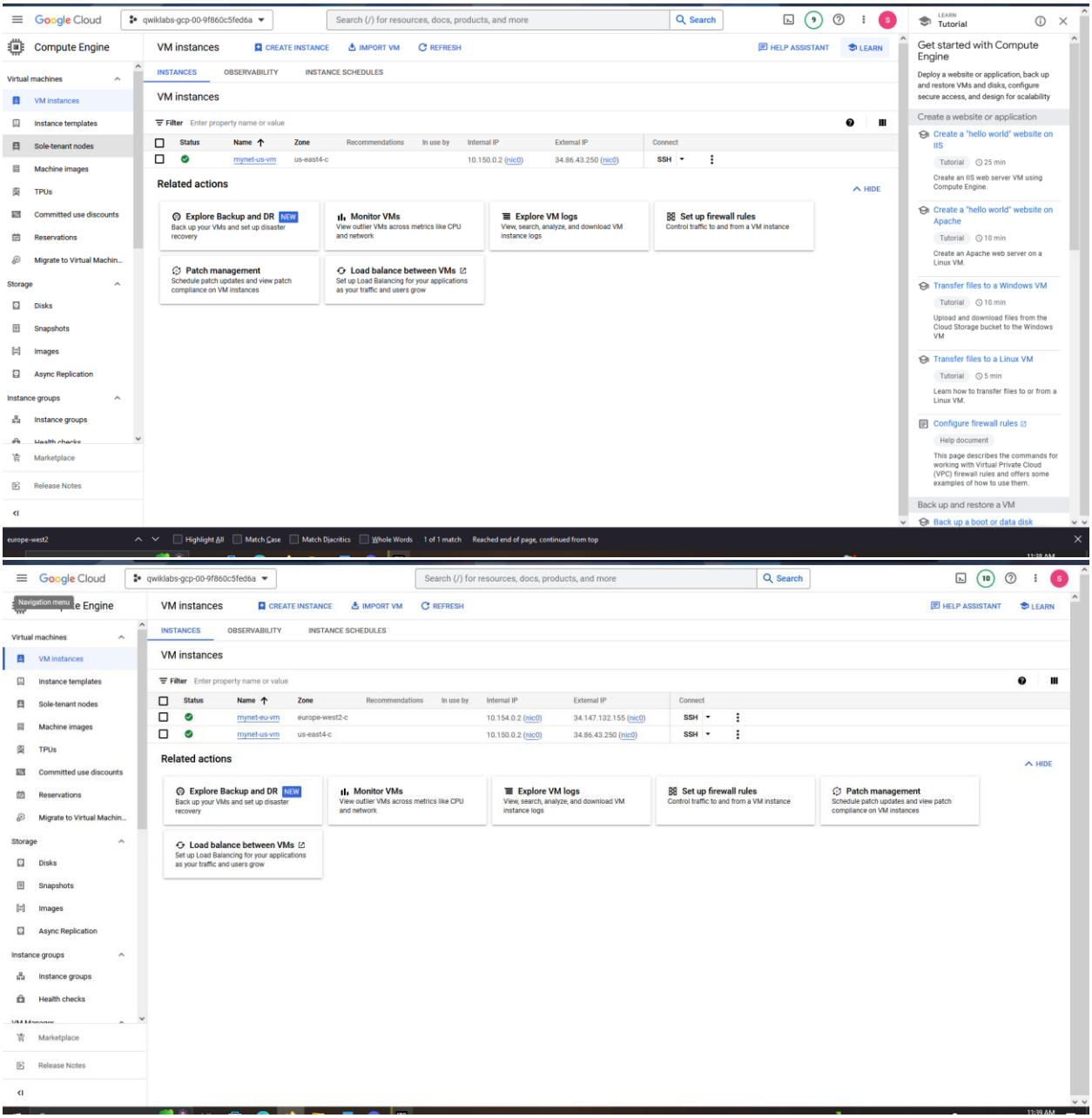
Create an instance
EQUIVALENT CODE
HELP ASSISTANT
To create a VM instance, select one of the options:
New VM instance
Create a single VM instance from scratch
New VM instance from template
Create a single VM instance from an existing template
New VM instance from machine image
Create a single VM instance from an existing machine image
Marketplace
Deploy a ready-to-go solution onto a VM instance
Name *
mynet-us-vm
Labels
ADD LABELS
Region *
us-east5 (Columbus)
Region is permanent
Zone *
us-east5-b
Zone is permanent
Machine configuration
General purpose
Compute optimized
Memory optimized
GPUs
Machine types for common workloads, optimized for cost and flexibility
Series
E2
CPU platform selection based on availability
Machine type
Choose a machine type with preset amounts of vCPUs and memory that suit most workloads. Or, you can create a custom machine for your workload's particular needs. Learn more
PRESET
CUSTOM
e2-micro (2 vCPU, 1 GB memory)
vCPU
0.25-2 vCPU (1 shared core)
Memory
1 GB
ADVANCED CONFIGURATIONS
Display device
Enable to use screen capturing and recording tools.
Enable display device
Confidential VM service
Pricing summary
Monthly estimate
$7.11
That's about $0.01 hourly
Pay for what you use: no upfront costs and per second billing
Item
Monthly estimate
2 vCPU + 1 GB memory
$6.11
10 GB balanced persistent disk
$1.00
Total
$7.11
Compute Engine pricing
LESS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Compute Engine
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IMPORT VM
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Migrate to Virtual Machin...
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Disks
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Async Replication
Instance groups
Instance groups
Marketplace
Release Notes
Filter
Enter property name or value
Status
Name
Zone
Recommendations
In use by
Internal IP
External IP
Connect
mynet-us-vm
us-east4-c
10.150.0.2 (nic0)
34.86.43.250 (nic0)
SSH
Related actions
HIDE
Explore Backup and DR
NEW
Back up your VMs and set up disaster recovery
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
Load balance between VMs
Set up Load Balancing for your applications as your traffic and users grow
LEARN
Tutorial
Get started with Compute Engine
Deploy a website or application, back up and restore VMs and disks, configure secure access, and design for scalability
Create a website or application
Create a "hello world" website on IIS
Tutorial
25 min
Create an IIS web server VM using Compute Engine.
Create a "hello world" website on Apache
Tutorial
10 min
Create an Apache web server on a Linux VM.
Transfer files to a Windows VM
Tutorial
10 min
Upload and download files from the Cloud Storage bucket to the Windows VM
Transfer files to a Linux VM
Tutorial
5 min
Learn how to transfer files to or from a Linux VM.
Configure firewall rules
Help document
This page describes the commands for working with Virtual Private Cloud (VPC) firewall rules and offers some examples of how to use them.
Back up and restore a VM
Back up a boot or data disk
europe-west2
Highlight All
Match Case
Match Diacritics
Whole Words
1 of 1 match
Reached end of page, continued from top

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Navigation menu
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REFRESH
HELP ASSISTANT
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Reservations
Migrate to Virtual Machin...
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Instance groups
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Enter property name or value
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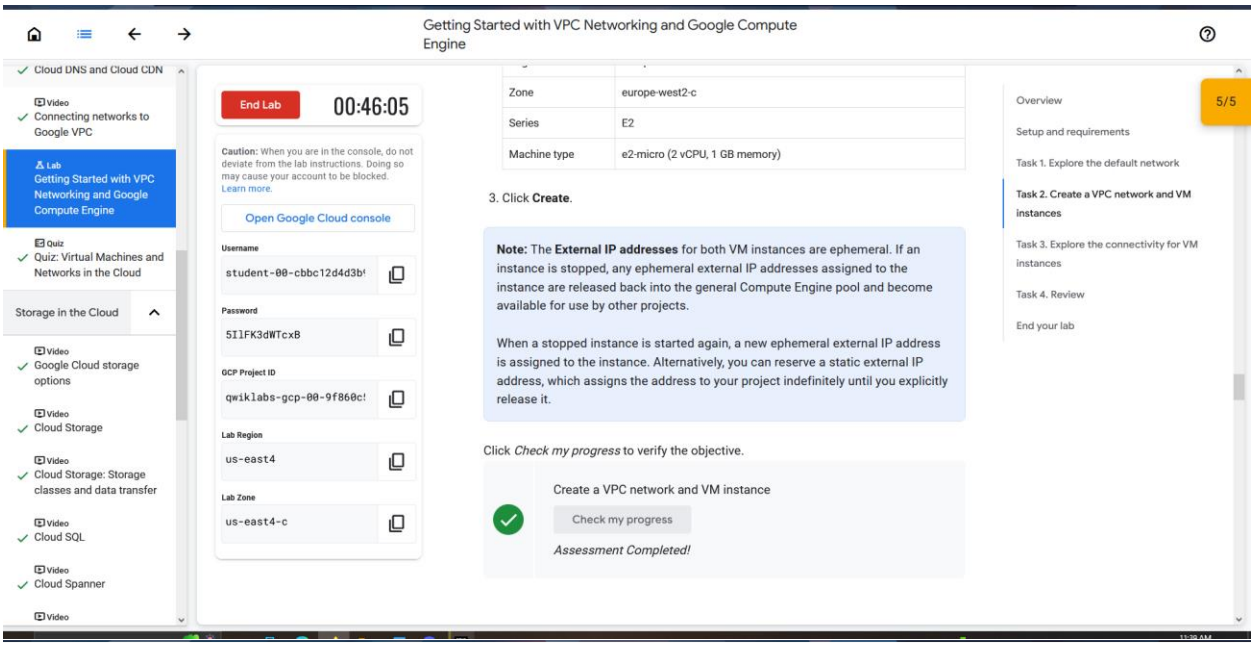
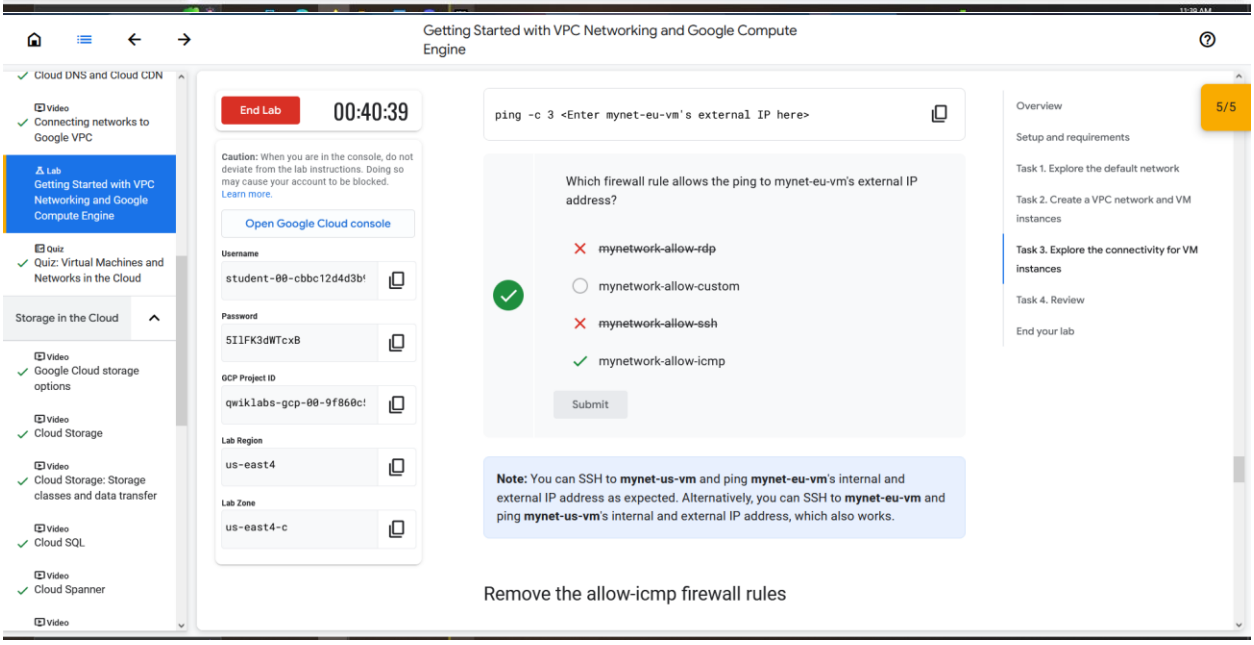
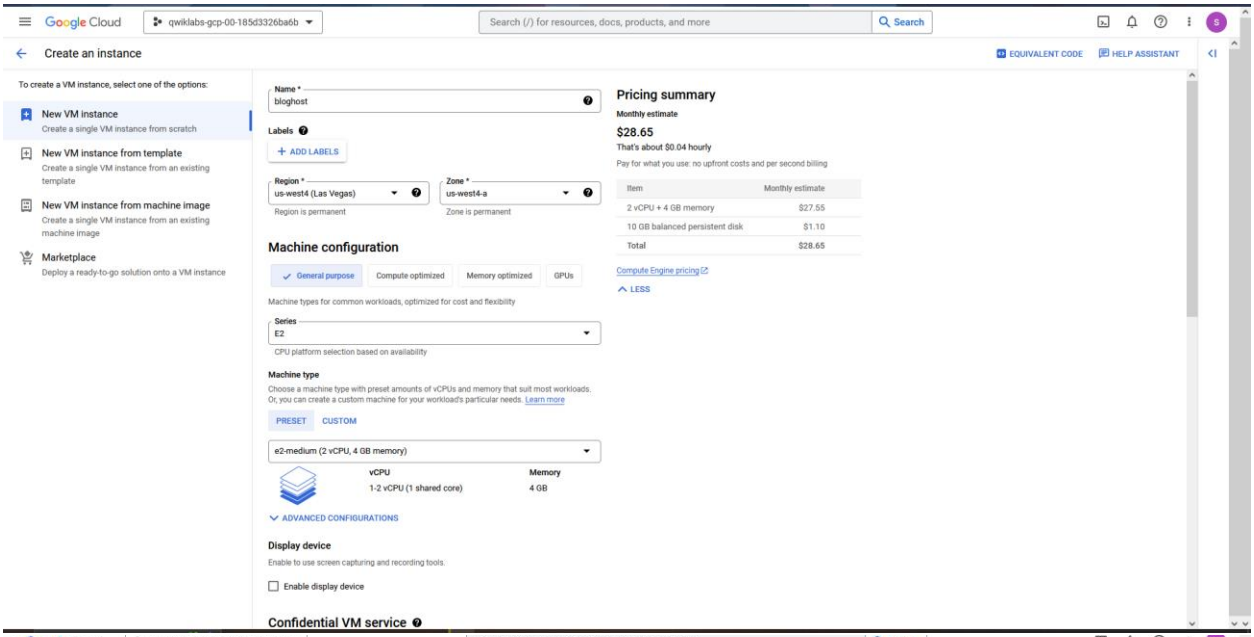
Name
Zone
Recommendations
In use by
Internal IP
External IP
Connect
mynet-eu-vm
europe-west2-c
10.154.0.2 (nic0)
34.147.132.155 (nic0)
SSH
mynet-us-vm
us-east4-c
10.150.0.2 (nic0)
34.86.43.250 (nic0)
SSH
Related actions
HIDE
Explore Backup and DR
NEW
Back up your VMs and set up disaster recovery
Monitor 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
Load balance between VMs
Set up Load Balancing for your applications as your traffic and users grow


Getting Started with VPC Networking and Google Engine
Cloud DNS and Cloud CDN
Video
Connecting networks to Google VPC
Lab
Getting Started with VPC Networking and Google Compute Engine
Quiz
Quiz: Virtual Machines and Networks in the Cloud
Storage in the Cloud
Video
Google Cloud storage options
Video
Cloud Storage
Video
Cloud Storage: Storage classes and data transfer
Video
Cloud SQL
Video
Cloud Spanner
Video
End Lab
00:46:05
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 Cloud console
Username
student-00-cbbc12d4d3bf
Password
5I1FK3dWTcxB
GCP Project ID
qwiklabs-gcp-00-9f860c1
Lab Region
us-east4
Lab Zone
us-east4-c
Zone
europe-west2-c
Series
E2
Machine type
e2-micro (2 vCPU, 1 GB memory)
3. Click Create.
Note: The External IP addresses for both VM instances are ephemeral. If an instance is stopped, any ephemeral external IP addresses assigned to the instance are released back into the general Compute Engine pool and become available for use by other projects.
When a stopped instance is started again, a new ephemeral external IP address is assigned to the instance. Alternatively, you can reserve a static external IP address, which assigns the address to your project indefinitely until you explicitly release it.
Click Check my progress to verify the objective.
Create a VPC network and VM instance
Check my progress
Assessment Completed!
Overview
5/5
Setup and requirements
Task 1. Explore the default network
Task 2. Create a VPC network and VM instances
Task 3. Explore the connectivity for VM instances
Task 4. Review
End your lab


Getting Started with VPC Networking and Google Engine
Cloud DNS and Cloud CDN
Video
Connecting networks to Google VPC
Lab
Getting Started with VPC Networking and Google Compute Engine
Quiz
Quiz: Virtual Machines and Networks in the Cloud
Storage in the Cloud
Video
Google Cloud storage options
Video
Cloud Storage
Video
Cloud Storage: Storage classes and data transfer
Video
Cloud SQL
Video
Cloud Spanner
Video
End Lab
00:40:39
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 Cloud console
Username
student-00-cbbc12d4d3bf
Password
5I1FK3dWTcxB
GCP Project ID
qwiklabs-gcp-00-9f860c1
Lab Region
us-east4
Lab Zone
us-east4-c
ping -c 3 <Enter mynet-eu-vm's external IP here>
Which firewall rule allows the ping to mynet-eu-vm's external IP address?
mynetwork-allow-rdp
mynetwork-allow-custom
mynetwork-allow-ssh
mynetwork-allow-icmp
Submit
Note: You can SSH to mynet-us-vm and ping mynet-eu-vm's internal and external IP address as expected. Alternatively, you can SSH to mynet-eu-vm and ping mynet-us-vm's internal and external IP address, which also works.
Remove the allow-icmp firewall rules
Overview
5/5
Setup and requirements
Task 1. Explore the default network
Task 2. Create a VPC network and VM instances
Task 3. Explore the connectivity for VM instances
Task 4. Review
End your lab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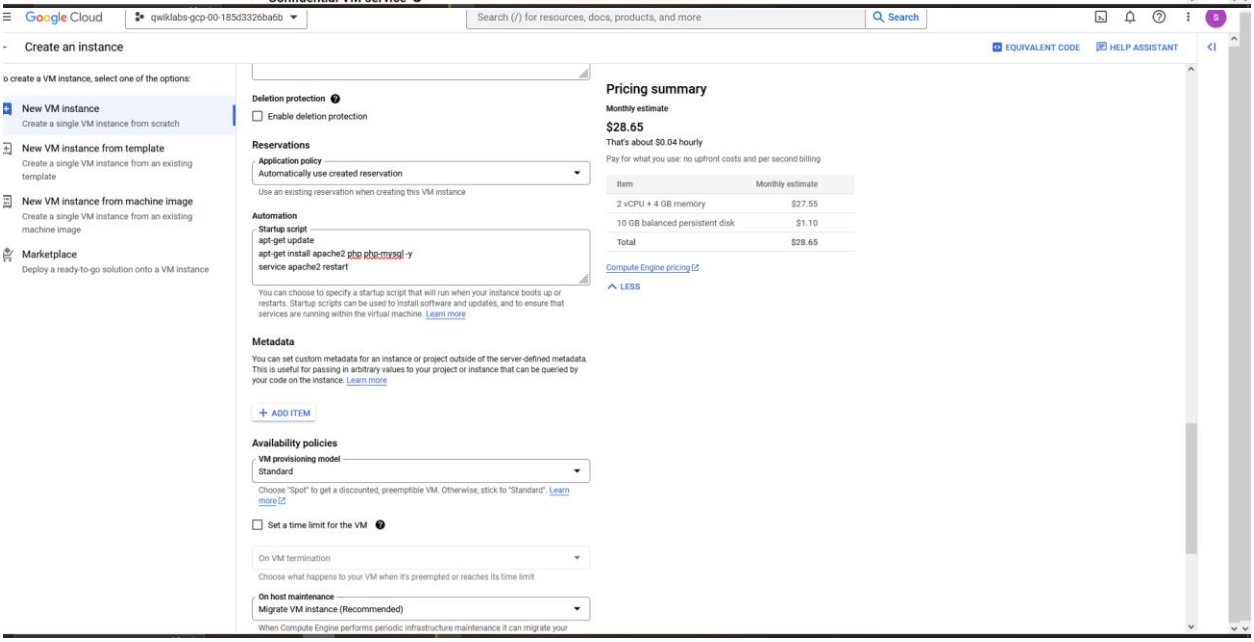
Create an instance
EQUIVALENT CODE
HELP ASSISTANT
To create a VM instance, select one of the options:
New VM instance
Create a single VM instance from scratch
New VM instance from template
Create a single VM instance from an existing template
New VM instance from machine image
Create a single VM instance from an existing machine image
Marketplace
Deploy a ready-to-go solution onto a VM instance
Name *
bloghost
Labels
+ ADD LABELS
Region *
us-west4 (Las Vegas)
Region is permanent
Zone *
us-west4-a
Zone is permanent
Machine configuration
General purpose
Compute optimized
Memory optimized
GPUs
Machine types for common workloads, optimized for cost and flexibility
Series
E2
CPU platform selection based on availability
Machine type
Choose a machine type with preset amounts of vCPUs and memory that suit most workloads. Or, you can create a custom machine for your workload's particular needs. Learn more
PRESET
CUSTOM
e2-medium (2 vCPU, 4 GB memory)
vCPU
1-2 vCPU (1 shared core)
Memory
4 GB
ADVANCED CONFIGURATIONS
Display device
Enable to use screen capturing and recording tools.
Enable display device
Confidential VM service
Pricing summary
Monthly estimate
$28.65
That's about $0.04 hourly
Pay for what you use: no upfront costs and per second billing
Item
Monthly estimate
2 vCPU + 4 GB memory
$27.55
10 GB balanced persistent disk
$1.10
Total
$28.65
Compute Engine pricing
LESS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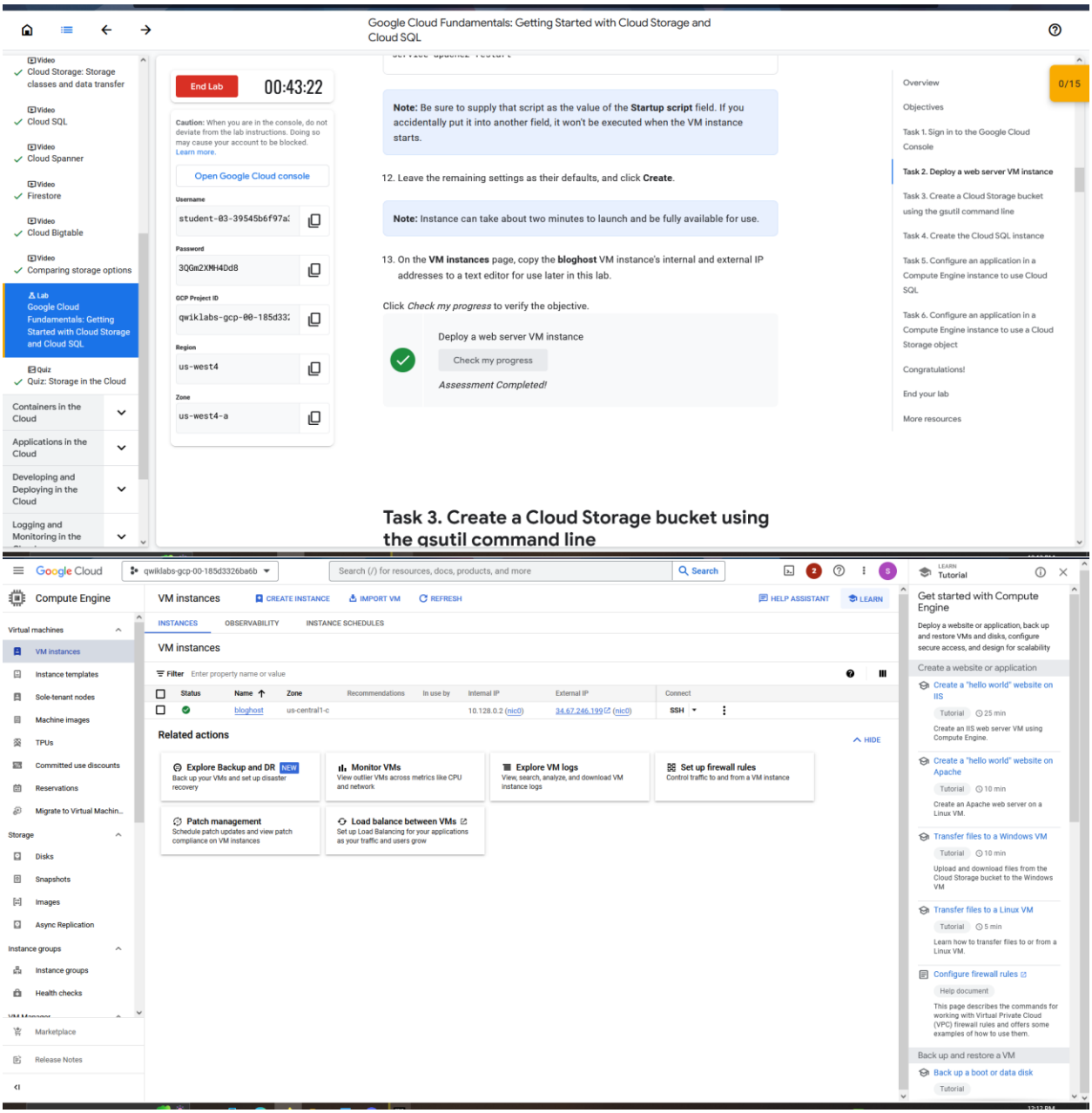
Create an instance
EQUIVALENT CODE
HELP ASSISTANT
o create a VM instance, select one of the options:
New VM instance
Create a single VM instance from scratch
New VM instance from template
Create a single VM instance from an existing template
New VM instance from machine image
Create a single VM instance from an existing machine image
Marketplace
Deploy a ready-to-go solution onto a VM instance
Deletion protection
Enable deletion protection
Reservations
Application policy
Automatically use created reservation
Use an existing reservation when creating this VM instance
Automation
Startup script
apt-get update
apt-get install apache2 php php-mysql -y
service apache2 restart
You can choose to specify a startup script that will run when your instance boots up or restarts. Startup scripts can be used to install software and updates, and to ensure that services are running within the virtual machine. Learn more
Metadata
You can set custom metadata for an instance or project outside of the server-defined metadata. This is useful for passing in arbitrary values to your project or instance that can be queried by your code on the instance. Learn more
+ ADD ITEM
Availability policies
VM provisioning model
Standard
Choose "Spot" to get a discounted, preemptible VM. Otherwise, stick to "Standard". Learn more
Set a time limit for the VM
On VM termination
Choose what happens to your VM when it's preempted or reaches its time limit
On host maintenance
Migrate VM instance (Recommended)
When Compute Engine performs periodic infrastructure maintenance it can migrate your
Pricing summary
Monthly estimate
$28.65
That's about $0.04 hourly
Pay for what you use: no upfront costs and per second billing
Item
Monthly estimate
2 vCPU + 4 GB memory
$27.55
10 GB balanced persistent disk
$1.10
Total
$28.65
Compute Engine pricing
LESS


Google Cloud Fundamentals: Getting Started with Cloud Storage and Cloud SQL
End Lab
00:43:22
Open Google Cloud console
Username
Password
GCP Project ID
Region
us-west4
Zone
us-west4-a
Note: Be sure to supply that script as the value of the Startup script field. If you accidentally put it into another field, it won't be executed when the VM instance starts.
12. Leave the remaining settings as their defaults, and click Create.
Note: Instance can take about two minutes to launch and be fully available for use.
13. On the VM instances page, copy the bloghost VM instance's internal and external IP addresses to a text editor for use later in this lab.
Click Check my progress to verify the objective.
Deploy a web server VM instance
Check my progress
Assessment Completed!
Overview
Objectives
Task 1. Sign in to the Google Cloud Console
Task 2. Deploy a web server VM instance
Task 3. Create a Cloud Storage bucket using the gsutil command line
Task 4. Create the Cloud SQL instance
Task 5. Configure an application in a Compute Engine instance to use Cloud SQL
Task 6. Configure an application in a Compute Engine instance to use a Cloud Storage object
Congratulations!
End your lab
More resources
0/15
Task 3. Create a Cloud Storage bucket using the gsutil command line

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REFRESH
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INSTANCE SCHEDULES
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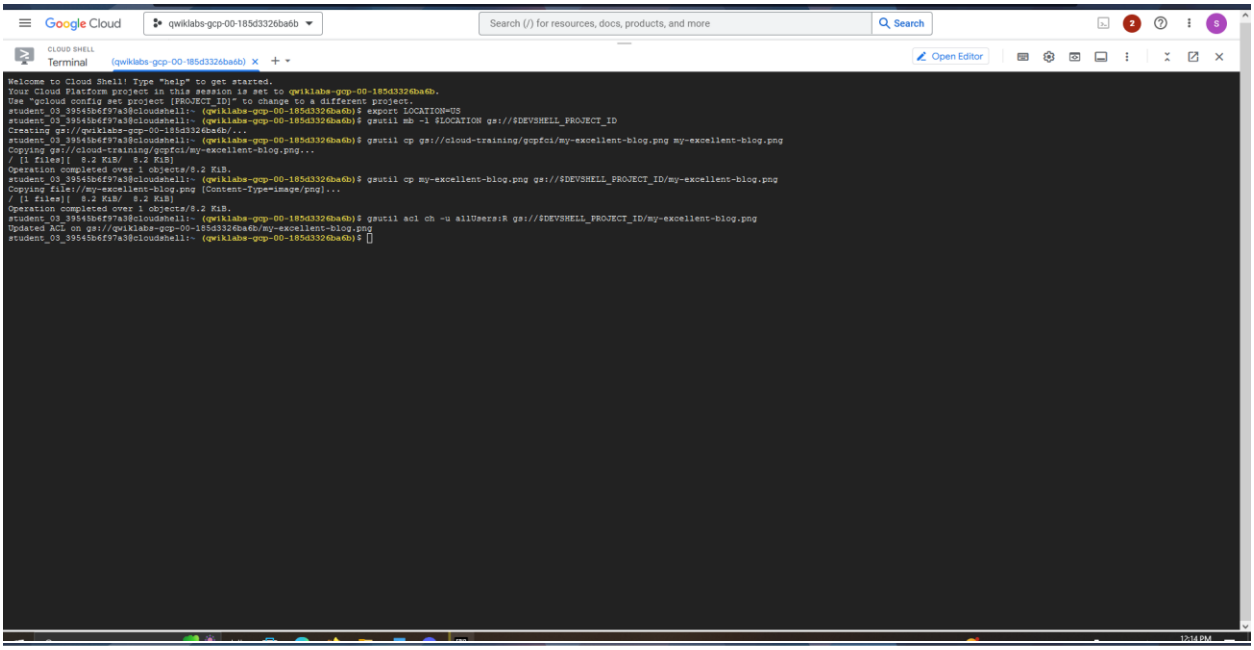
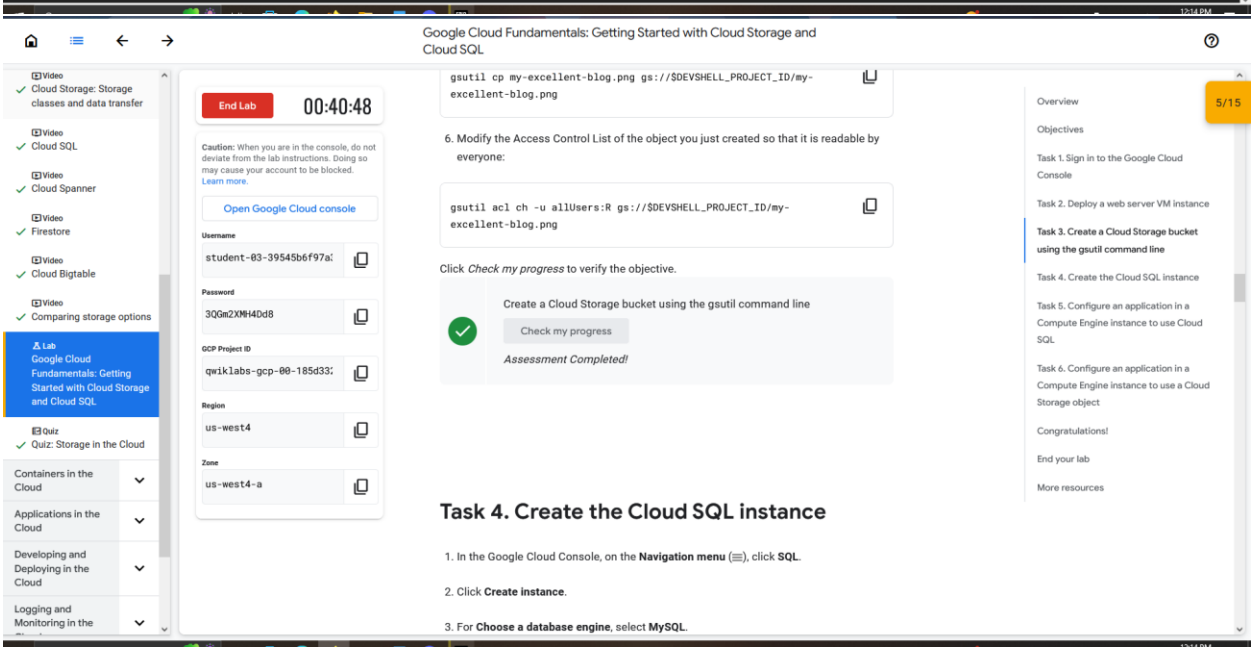
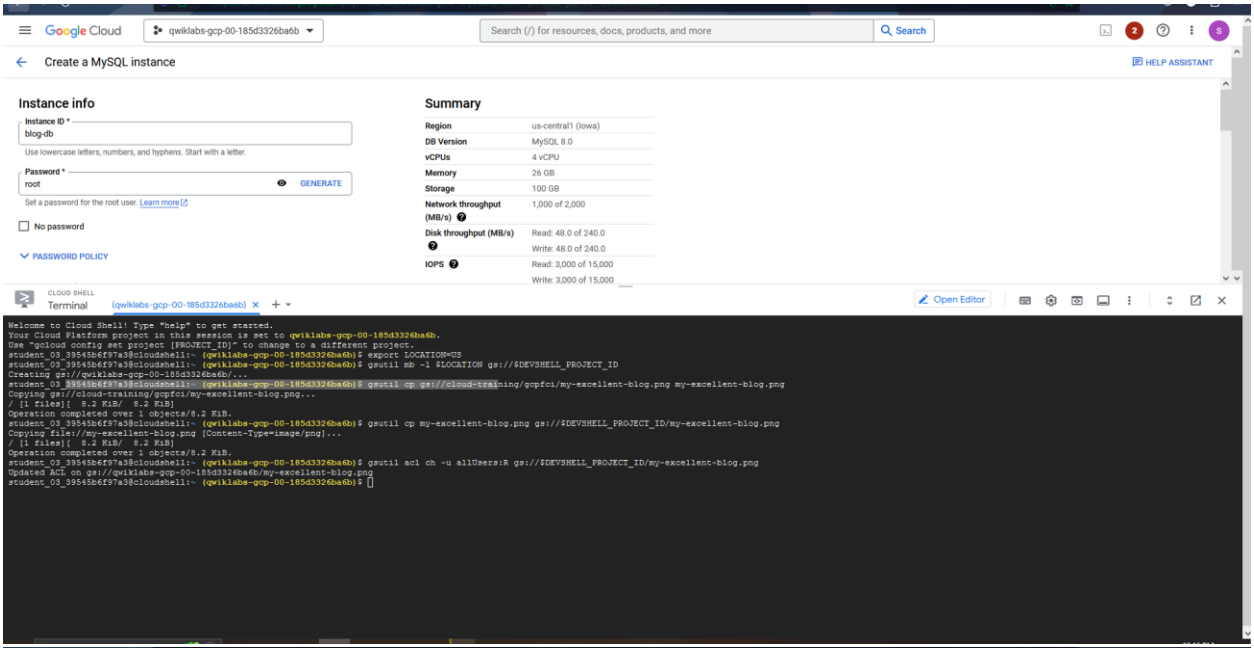
Monitor VMs
Explore VM logs
Set up firewall rules
Patch management
Load balance between VMs
Get started with Compute Engine
Create a website or application
Back up and restore a VM


Google Cloud
qwiklabs-gcp-00-185d3326ba6b
Search (/) for resources, docs, products, and more
Search
CLOUD SHELL
Terminal
(qwiklabs-gcp-00-185d3326ba6b)
Open Editor
Welcome to Cloud Shell! Type "help" to get started.
Your Cloud Platform project in this session is set to qwiklabs-gcp-00-185d3326ba6b.
Use "gcloud config set project [PROJECT_ID]" to change to a different project.
student_03_39545b6f97a3@cloudshell:~ (qwiklabs-gcp-00-185d3326ba6b)$ export LOCATION=US
student_03_39545b6f97a3@cloudshell:~ (qwiklabs-gcp-00-185d3326ba6b)$ gsutil mb -l $LOCATION gs://$DEVSHELL_PROJECT_ID
Creating gs://qwiklabs-gcp-00-185d3326ba6b/...
student_03_39545b6f97a3@cloudshell:~ (qwiklabs-gcp-00-185d3326ba6b)$ gsutil cp gs://cloud-training/gcpfci/my-excellent-blog.png my-excellent-blog.png
Copying gs://cloud-training/gcpfci/my-excellent-blog.png...
/ [1 files][8.2 KiB/ 8.2 KiB]
Operation completed over 1 objects/8.2 KiB.
student_03_39545b6f97a3@cloudshell:~ (qwiklabs-gcp-00-185d3326ba6b)$ gsutil cp my-excellent-blog.png gs://$DEVSHELL_PROJECT_ID/my-excellent-blog.png
Copying file://my-excellent-blog.png [Content-Type=image/png]...
/ [1 files][8.2 KiB/ 8.2 KiB]
Operation completed over 1 objects/8.2 KiB.
student_03_39545b6f97a3@cloudshell:~ (qwiklabs-gcp-00-185d3326ba6b)$ gsutil acl ch -u allUsers:R gs://$DEVSHELL_PROJECT_ID/my-excellent-blog.png
Updated ACL on gs://qwiklabs-gcp-00-185d3326ba6b/my-excellent-blog.png
student_03_39545b6f97a3@cloudshell:~ (qwiklabs-gcp-00-185d3326ba6b)$


Google Cloud Fundamentals: Getting Started with Cloud Storage and Cloud SQL
Video
Cloud Storage: Storage classes and data transfer
Video
Cloud SQL
Video
Cloud Spanner
Video
Firestore
Video
Cloud Bigtable
Video
Comparing storage options
Lab
Google Cloud Fundamentals: Getting Started with Cloud Storage and Cloud SQL
Quiz
Quiz: Storage in the Cloud
Containers in the Cloud
Applications in the Cloud
Developing and Deploying in the Cloud
Logging and Monitoring in the
End Lab
00:40:48
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 Cloud console
Username
student-03-39545b6f97a
Password
3QGm2XMH4Dd8
GCP Project ID
qwiklabs-gcp-00-185d33
Region
us-west4
Zone
us-west4-a
gsutil cp my-excellent-blog.png gs://$DEVSHELL_PROJECT_ID/my-excellent-blog.png
6. Modify the Access Control List of the object you just created so that it is readable by everyone:
gsutil acl ch -u allUsers:R gs://$DEVSHELL_PROJECT_ID/my-excellent-blog.png
Click Check my progress to verify the objective.
Create a Cloud Storage bucket using the gsutil command line
Check my progress
Assessment Completed!
Task 4. Create the Cloud SQL instance
1. In the Google Cloud Console, on the Navigation menu (≡), click SQL.
2. Click Create instance.
3. For Choose a database engine, select MySQL.
Overview
5/15
Objectives
Task 1. Sign in to the Google Cloud Console
Task 2. Deploy a web server VM instance
Task 3. Create a Cloud Storage bucket using the gsutil command line
Task 4. Create the Cloud SQL instance
Task 5. Configure an application in a Compute Engine instance to use Cloud SQL
Task 6. Configure an application in a Compute Engine instance to use a Cloud Storage object
Congratulations!
End your lab
More resources


Google Cloud
qwiklabs-gcp-00-185d3326ba6b
Search (/) for resources, docs, products, and more
Search
Create a MySQL instance
HELP ASSISTANT
Instance info
Instance ID *
blog-db
Use lowercase letters, numbers, and hyphens. Start with a letter.
Password *
root
GENERATE
Set a password for the root user. Learn more
No password
PASSWORD POLICY
Summary
Region
us-central1 (Iowa)
DB Version
MySQL 8.0
vCPUs
4 vCPU
Memory
26 GB
Storage
100 GB
Network throughput (MB/s)
1,000 of 2,000
Disk throughput (MB/s)
Read: 48.0 of 240.0
Write: 48.0 of 240.0
IOPS
Read: 3,000 of 15,000
Write: 3,000 of 15,000
CLOUD SHELL
Terminal
(qwiklabs-gcp-00-185d3326ba6b)
Open Editor
Welcome to Cloud Shell! Type "help" to get started.
Your Cloud Platform project in this session is set to qwiklabs-gcp-00-185d3326ba6b.
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student_03_39545b6f97a3@cloudshell:~ (qwiklabs-gcp-00-185d3326ba6b)$ export LOCATION=US
student_03_39545b6f97a3@cloudshell:~ (qwiklabs-gcp-00-185d3326ba6b)$ gsutil mb -l $LOCATION gs://$DEVSHELL_PROJECT_ID
Creating gs://qwiklabs-gcp-00-185d3326ba6b/...
student_03_39545b6f97a3@cloudshell:~ (qwiklabs-gcp-00-185d3326ba6b)$ gsutil cp gs://cloud-training/gcpfci/my-excellent-blog.png my-excellent-blog.png
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Copying file://my-excellent-blog.png [Content-Type=image/png]...
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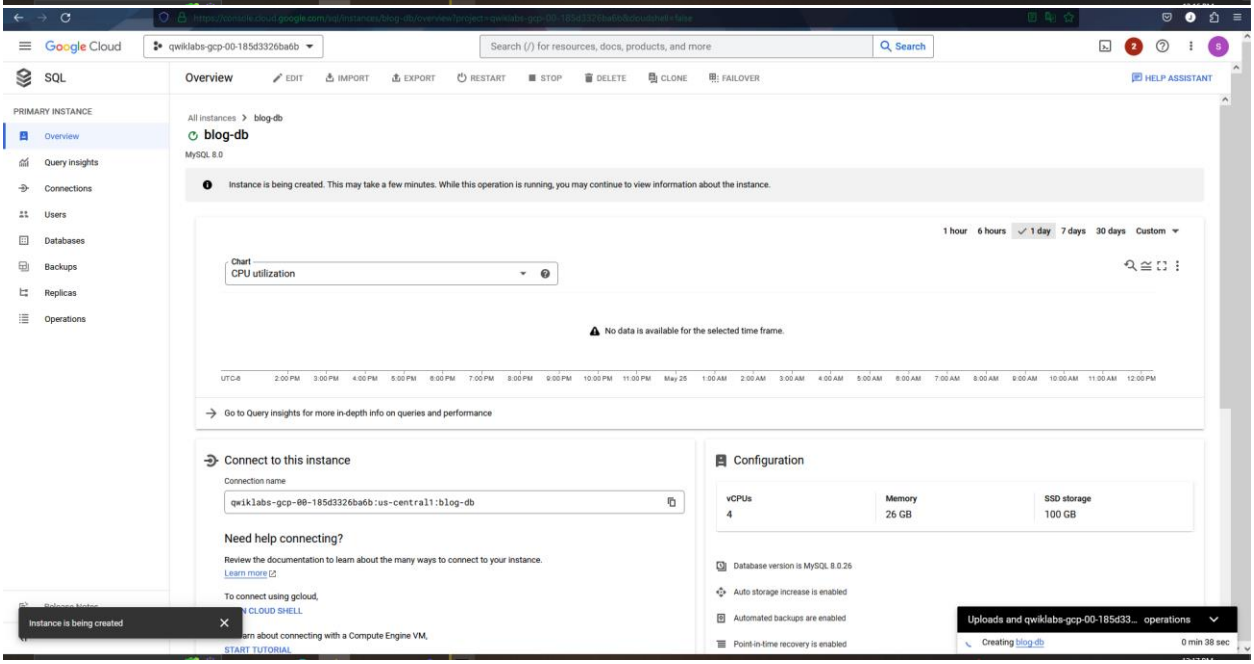
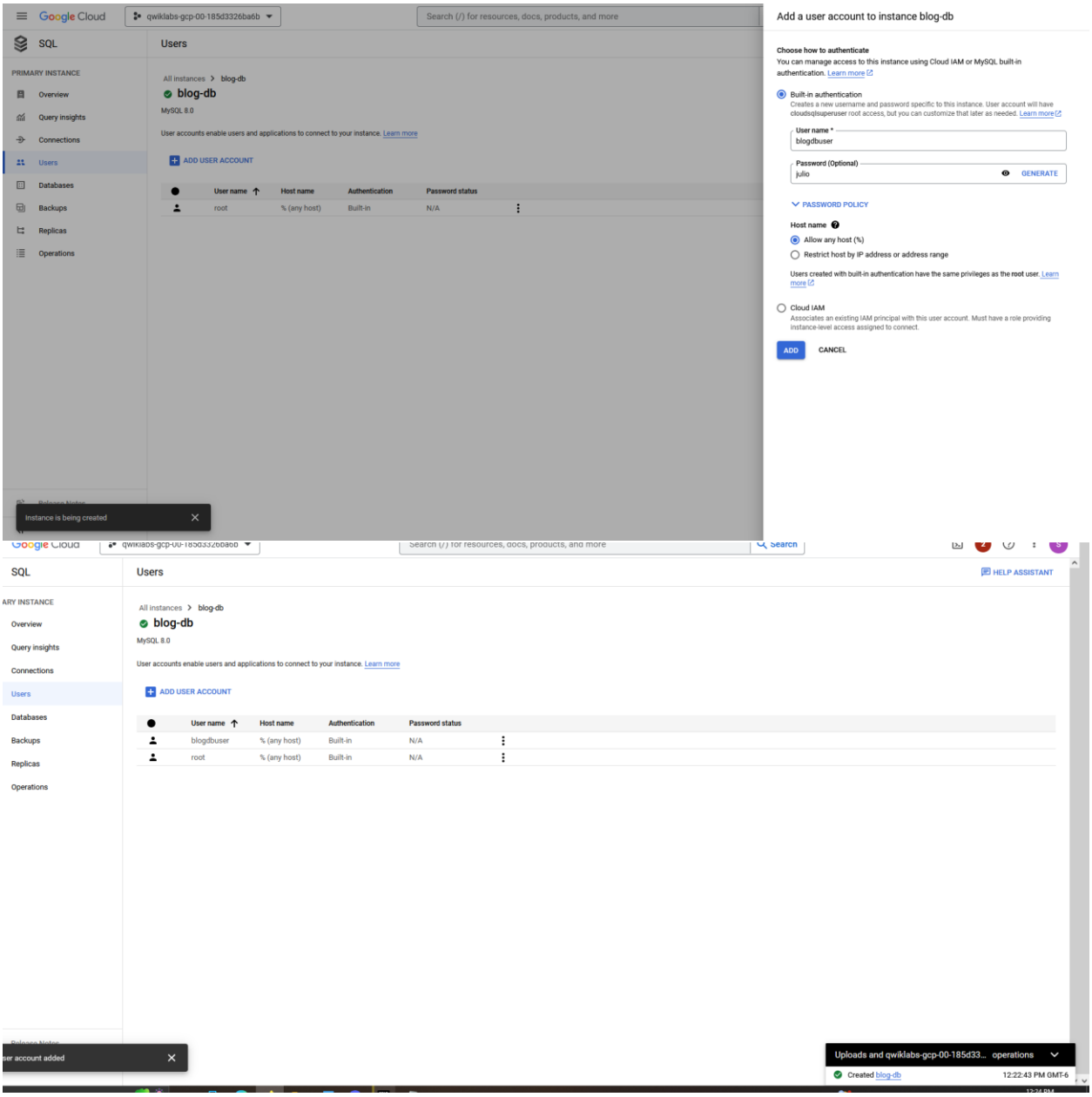
Updated ACL on gs://qwiklabs-gcp-00-185d3326ba6b/my-excellent-blog.png
student_03_39545b6f97a3@cloudshell:~ (qwiklabs-gcp-00-185d3326ba6b)$


Google Cloud
qwiklabs-gcp-00-185d3326ba6b
Search (/) for resources, docs, products, and more
Search
SQL
Overview
EDIT
IMPORT
EXPORT
RESTART
STOP
DELETE
CLONE
FAILOVER
HELP ASSISTANT
PRIMARY INSTANCE
Overview
Query insights
Connections
Users
Databases
Backups
Replicas
Operations
All instances > blog-db
blog-db
MySQL 8.0
Instance is being created. This may take a few minutes. While this operation is running, you may continue to view information about the instance.
1 hour
6 hours
1 day
7 days
30 days
Custom
Chart
CPU utilization
No data is available for the selected time frame.
Go to Query insights for more in-depth info on queries and performance
Connect to this instance
Connection name
qwiklabs-gcp-00-185d3326ba6b:us-central1:blog-db
Need help connecting?
Review the documentation to learn about the many ways to connect to your instance.
Learn more
To connect using gcloud,
Configuration
vCPUs
4
Memory
26 GB
SSD storage
100 GB
Database version is MySQL 8.0.26
Auto storage increase is enabled
Automated backups are enabled
Point-in-time recovery is enabled
Instance is being created
Uploads and qwiklabs-gcp-00-185d33... operations
Creating blog-db
0 min 38 sec


Google Cloud
qwiklabs-gcp-00-185d3326ba6b
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SQL
Users
PRIMARY INSTANCE
Overview
Query insights
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Users
Databases
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Replicas
Operations
All instances > blog-db
blog-db
MySQL 8.0
User accounts enable users and applications to connect to your instance. Learn more
ADD USER ACCOUNT
User name
Host name
Authentication
Password status
root
% (any host)
Built-in
N/A
Instance is being created
Add a user account to instance blog-db
Choose how to authenticate
You can manage access to this instance using Cloud IAM or MySQL built-in authentication. Learn more
Built-in authentication
Creates a new username and password specific to this instance. User account will have cloudsqlsuperuser root access, but you can customize that later as needed. Learn more
User name *
blogdbuser
Password (Optional)
julio
GENERATE
PASSWORD POLICY
Host name
Allow any host (%)
Restrict host by IP address or address range
Users created with built-in authentication have the same privileges as the root user. Learn more
Cloud IAM
Associates an existing IAM principal with this user account. Must have a role providing instance-level access assigned to connect.
ADD
CANCEL

SQL
Users
HELP ASSISTANT
Overview
Query insights
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Users
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All instances > blog-db
blog-db
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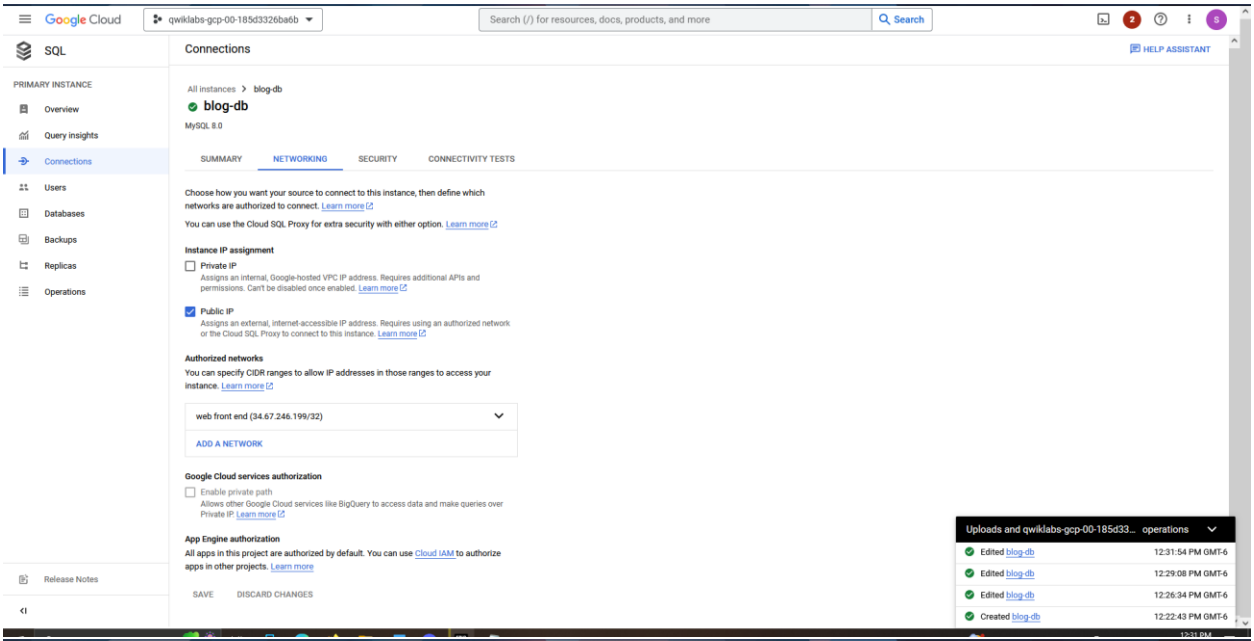
User name
Host name
Authentication
Password status
blogdbuser
% (any host)
Built-in
N/A
root
% (any host)
Built-in
N/A
Uploads and qwiklabs-gcp-00-185d33... operations
Created blog-db
12:22:43 PM GMT-6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PRIMARY INSTANCE
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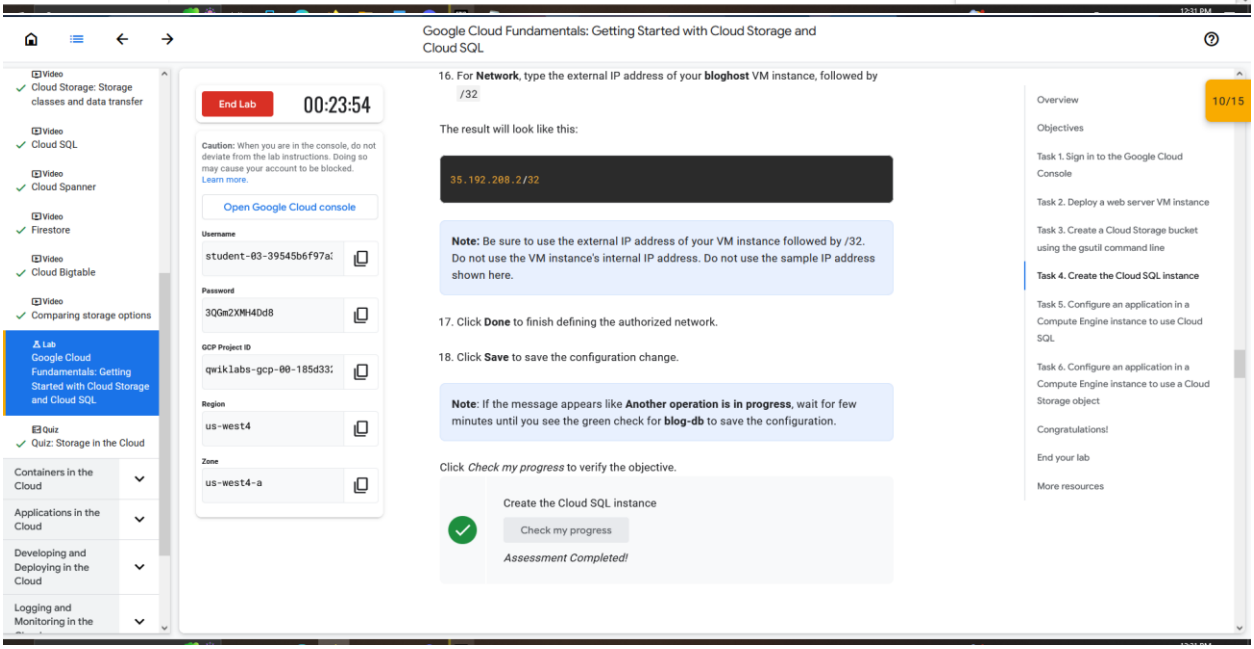
All instances > blog-db
blog-db
MySQL 8.0
SUMMARY
NETWORKING
SECURITY
CONNECTIVITY TESTS
Choose how you want your source to connect to this instance, then define which networks are authorized to connect. Learn more
You can use the Cloud SQL Proxy for extra security with either option. Learn more
Instance IP assignment
Private IP
Assigns an internal, Google-hosted VPC IP address. Requires additional APIs and permissions. Can't be disabled once enabled. Learn more
Public IP
Assigns an external, internet-accessible IP address. Requires using an authorized network or the Cloud SQL Proxy to connect to this instance. Learn more
Authorized networks
You can specify CIDR ranges to allow IP addresses in those ranges to access your instance. Learn more
web front end (34.67.246.199/32)
ADD A NETWORK
Google Cloud services authorization
Enable private path
Allows other Google Cloud services like BigQuery to access data and make queries over Private IP Learn more
App Engine authorization
All apps in this project are authorized by default. You can use Cloud IAM to authorize apps in other projects. Learn more
SAVE
DISCARD CHANGES
Release Notes
Uploads and qwiklabs-gcp-00-185d33... operations
Edited blog-db 12:31:54 PM GMT-6
Edited blog-db 12:29:08 PM GMT-6
Edited blog-db 12:26:34 PM GMT-6
Created blog-db 12:22:43 PM GMT-6


Google Cloud Fundamentals: Getting Started with Cloud Storage and Cloud SQL
Video
Cloud Storage: Storage classes and data transfer
Video
Cloud SQL
Video
Cloud Spanner
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Firestore
Video
Cloud Bigtable
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Quiz: Storage in the Cloud
Containers in the Cloud
Applications in the Cloud
Developing and Deploying in the Cloud
Logging and Monitoring in the
End Lab
00:23:54
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 Cloud console
Username
student-03-39545b6f97a1
Password
3QGm2XMH4Dd8
GCP Project ID
qwiklabs-gcp-00-185d33
Region
us-west4
Zone
us-west4-a
16. For Network, type the external IP address of your bloghost VM instance, followed by /32
The result will look like this:
35.192.208.2/32
Note: Be sure to use the external IP address of your VM instance followed by /32. Do not use the VM instance's internal IP address. Do not use the sample IP address shown here.
17. Click Done to finish defining the authorized network.
18. Click Save to save the configuration change.
Note: If the message appears like Another operation is in progress, wait for few minutes until you see the green check for blog-db to save the configuration.
Click Check my progress to verify the objective.
Create the Cloud SQL instance
Check my progress
Assessment Completed!
Overview
10/15
Objectives
Task 1. Sign in to the Google Cloud Console
Task 2. Deploy a web server VM instance
Task 3. Create a Cloud Storage bucket using the gsutil command line
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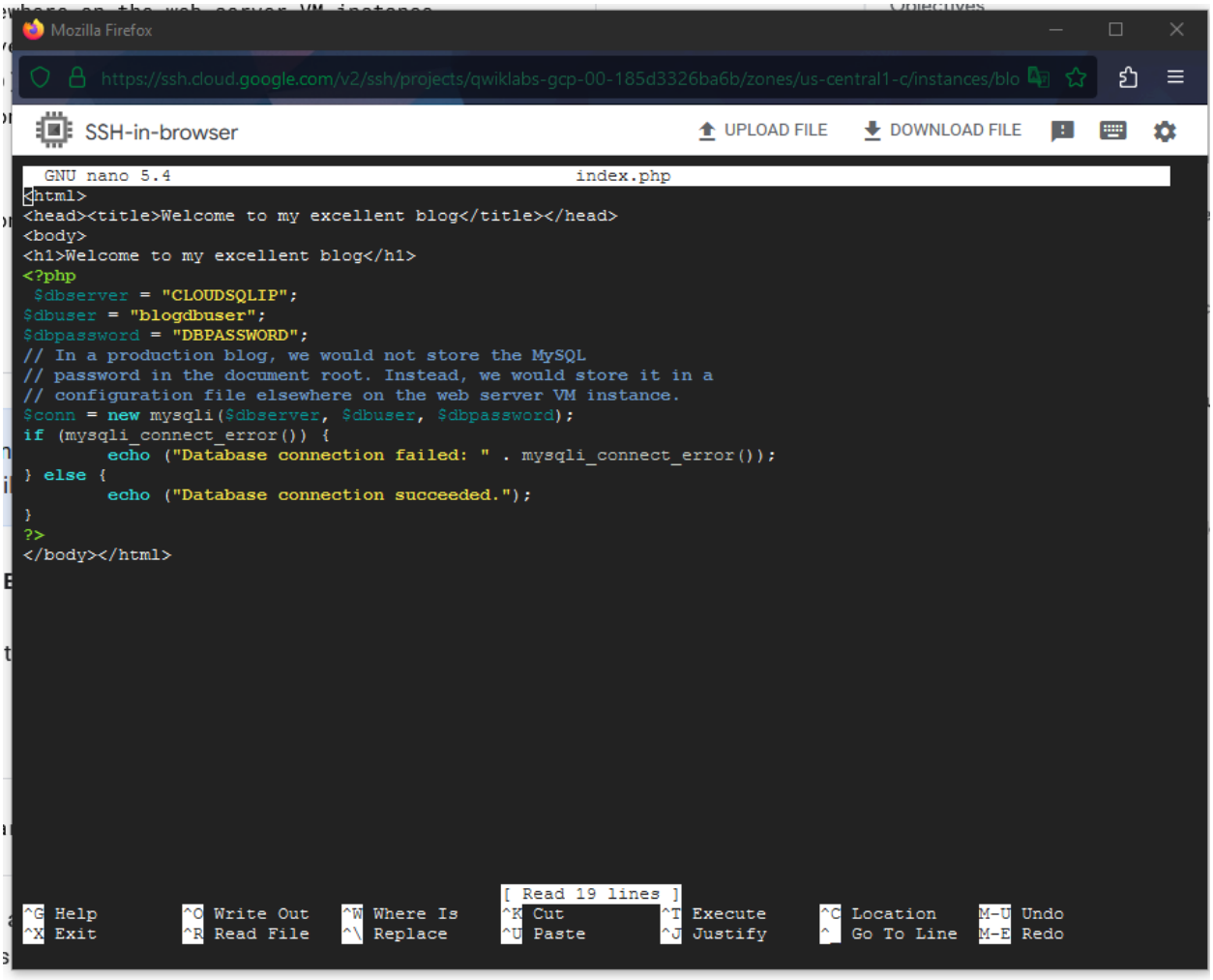
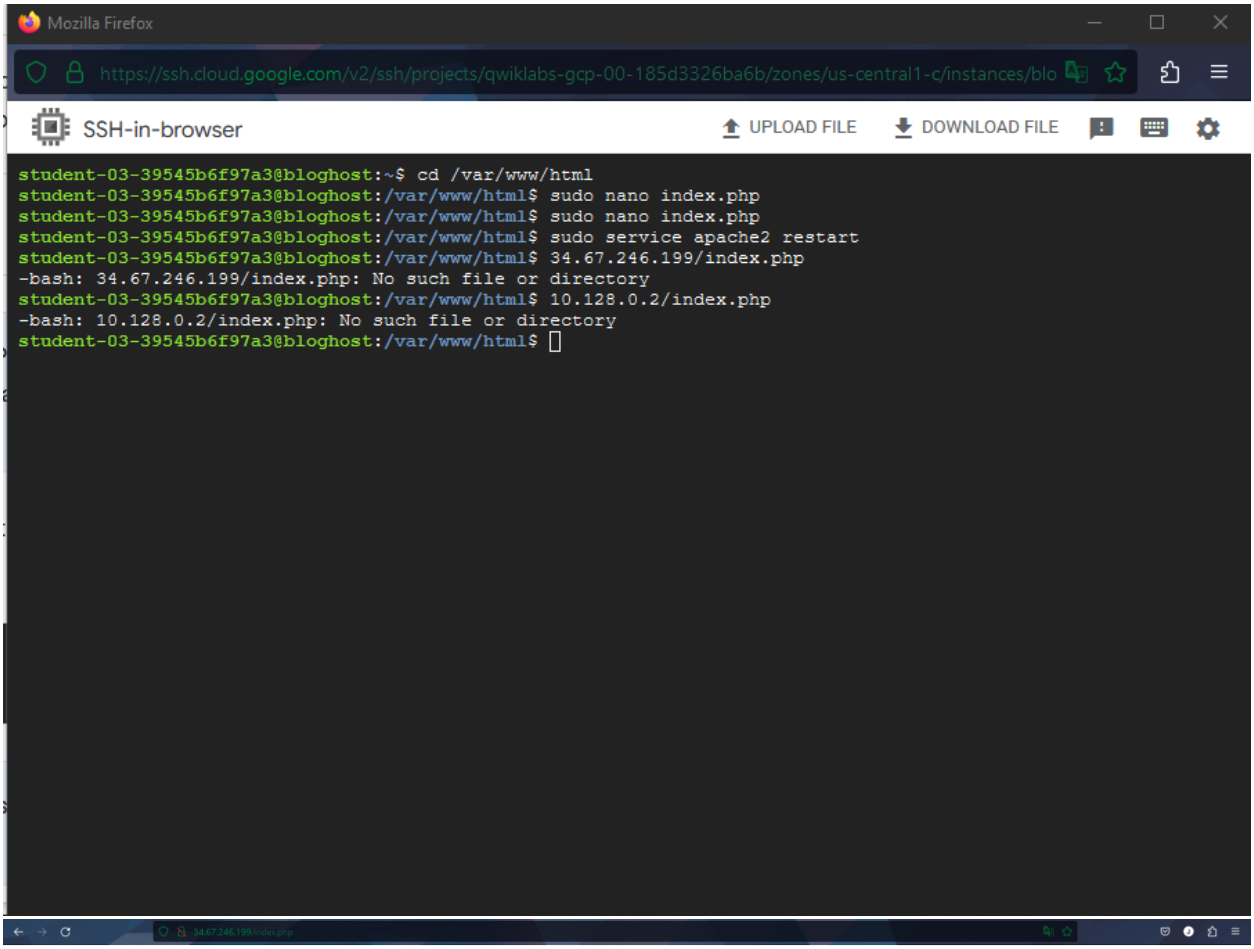
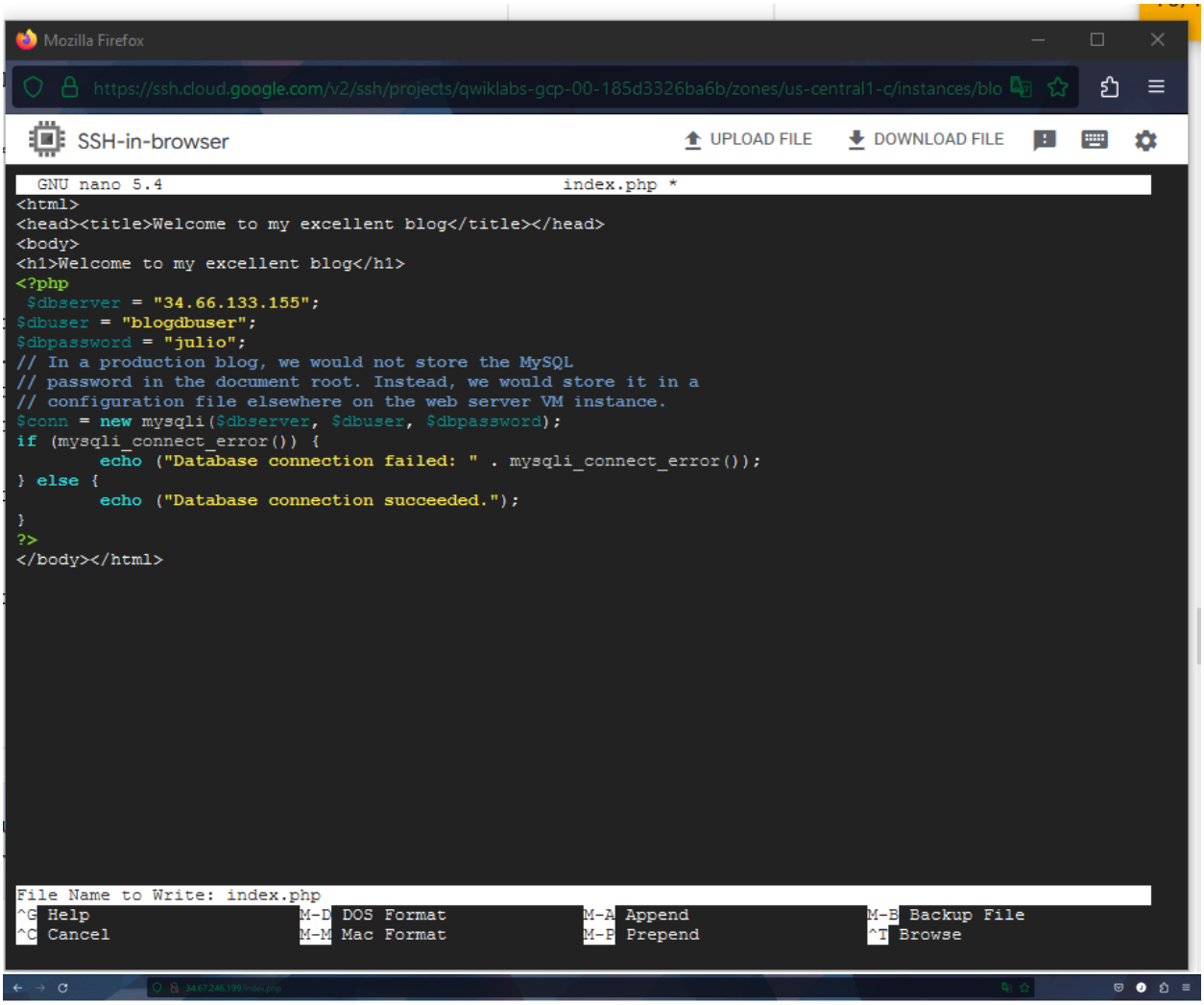
Task 6. Configure an application in a Compute Engine instance to use a Cloud Storage object
Congratulations!
End your lab
More resources


Mozilla Firefox
https://ssh.cloud.google.com/v2/ssh/projects/qwiklabs-gcp-00-185d3326ba6b/zones/us-central1-c/instances/blo
SSH-in-browser
UPLOAD FILE
DOWNLOAD FILE
GNU nano 5.4 index.php
<html>
<head><title>Welcome to my excellent blog</title></head>
<body>
<h1>Welcome to my excellent blog</h1>
<?php
$dbserver = "CLOUDSQLIP";
$dbuser = "blogdbuser";
$dbpassword = "DBPASSWORD";
// In a production blog, we would not store the MySQL
// password in the document root. Instead, we would store it in a
// configuration file elsewhere on the web server VM instance.
$conn = new mysqli($dbserver, $dbuser, $dbpassword);
if (mysqli_connect_error()) {
echo ("Database connection failed: " . mysqli_connect_error());
} else {
echo ("Database connection succeeded.");
}
?>
</body></html>
[Read 19 lines]
^G Help ^O Write Out ^W Where Is ^K Cut ^T Execute ^C Location M-U Undo
^X Exit ^R Read File ^\ Replace ^U Paste ^J Justify ^_ Go To Line M-E Redo



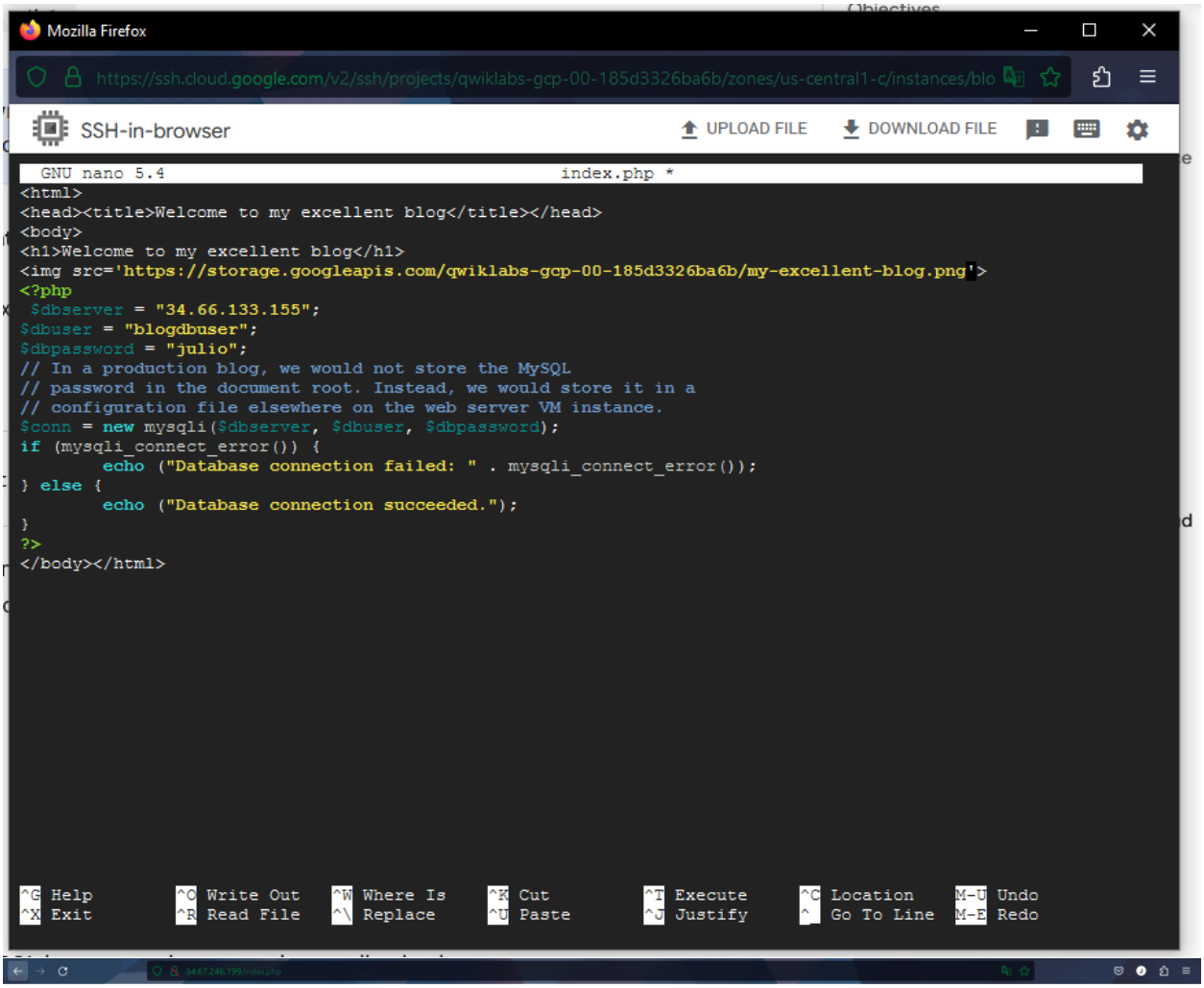
Welcome to my excellent blog

Database connection failed: php_network_getaddresses: getaddrinfo failed: Name or service not known



Welcome to my excellent blog

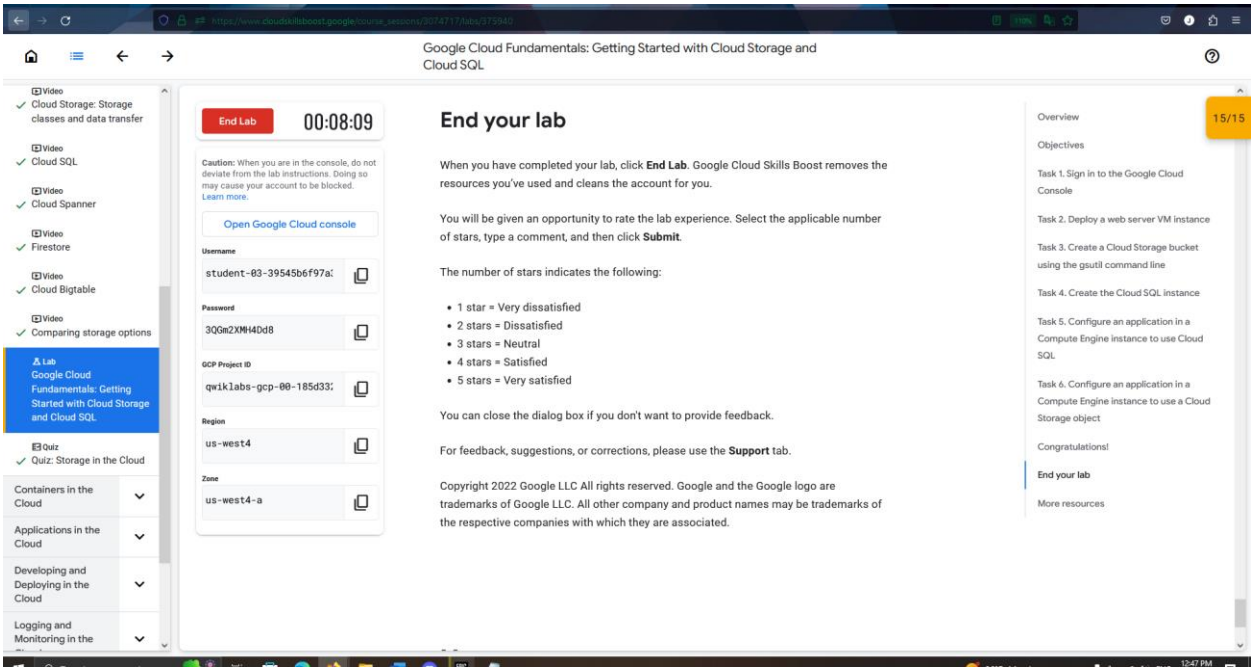
Database connection succeeded.



Welcome to my excellent blog

My Excellent Blog

Database connection succeeded.


Google Cloud Fundamentals: Getting Started with Cloud Storage and Cloud SQL
Video
Cloud Storage: Storage classes and data transfer
Video
Cloud SQL
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Cloud Spanner
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Firestore
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Cloud Bigtable
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Comparing storage options
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Quiz: Storage in the Cloud
Containers in the Cloud
Applications in the Cloud
Developing and Deploying in the Cloud
Logging and Monitoring in the
End Lab
00:08:09
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 Cloud console
Username
student-03-39545b6f97a
Password
3QGm2XMH4Dd8
GCP Project ID
qwiklabs-gcp-00-185d33
Region
us-west4
Zone
us-west4-a
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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15/15
Overview
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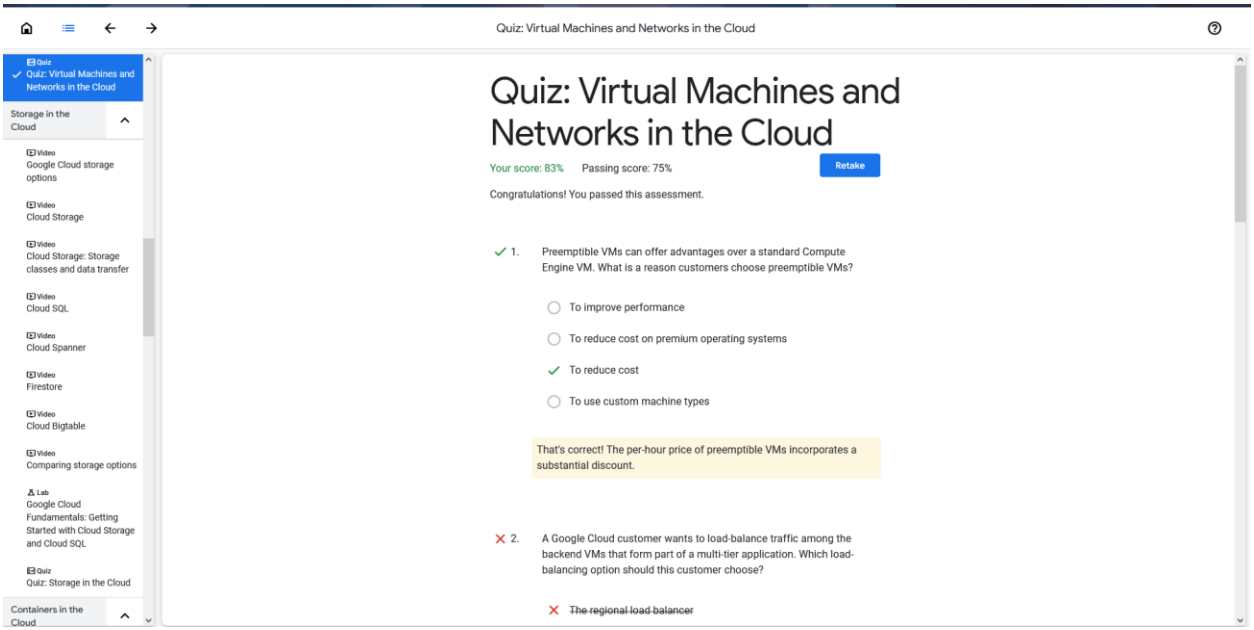
Congratulations!
End your lab
More resources


Quiz: Virtual Machines and Networks in the Cloud
Quiz
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Storage in the Cloud
Video
Google Cloud storage options
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Cloud Storage
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Cloud Storage: Storage classes and data transfer
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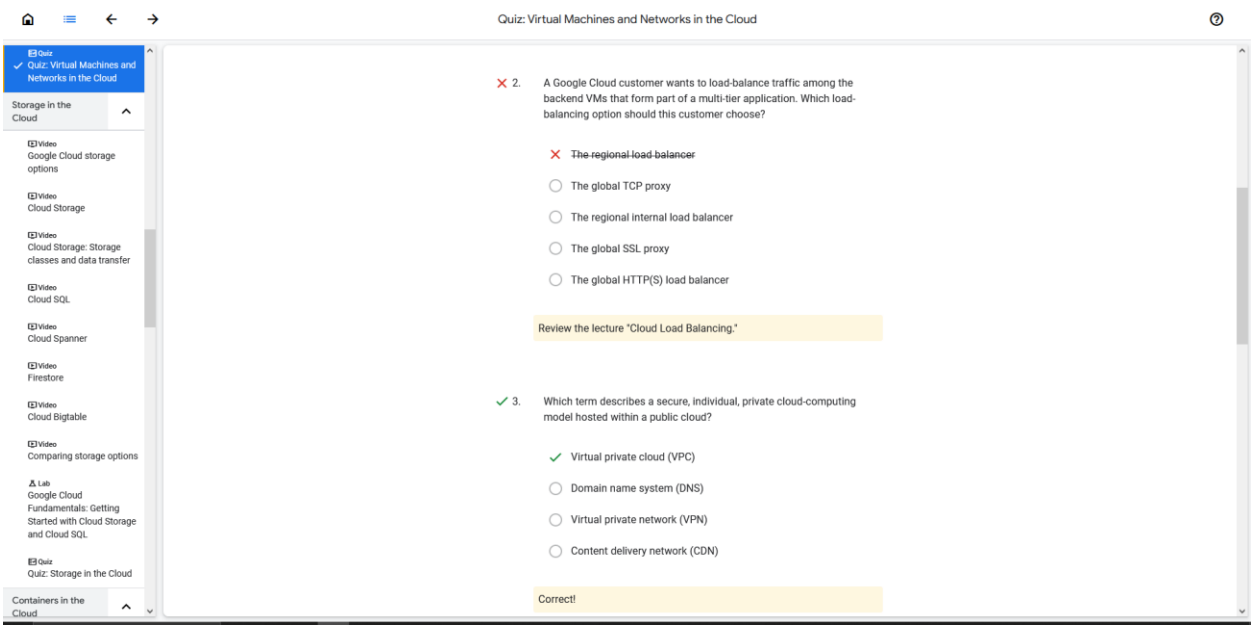
Google Cloud Fundamentals: Getting Started with Cloud Storage and Cloud SQL
Quiz
Quiz: Storage in the Cloud
Containers in the Cloud
Quiz: Virtual Machines and Networks in the Cloud
Your score: 83%
Passing score: 75%
Retake
Congratulations! You passed this assessment.
1. Preemptible VMs can offer advantages over a standard Compute Engine VM. What is a reason customers choose preemptible VMs?
To improve performance
To reduce cost on premium operating systems
To reduce cost
To use custom machine types
That's correct! The per-hour price of preemptible VMs incorporates a substantial discount.
2. A Google Cloud customer wants to load-balance traffic among the backend VMs that form part of a multi-tier application. Which load-balancing option should this customer choose?
The regional load balancer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Quiz: Storage in the Cloud
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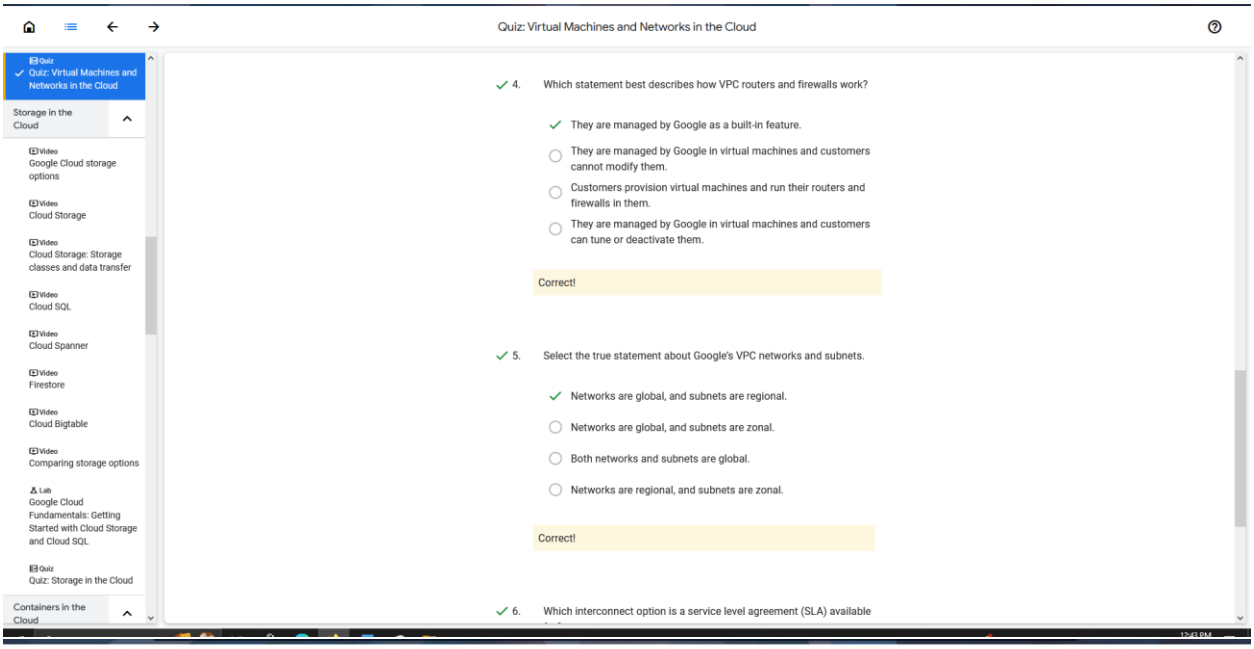
2. A Google Cloud customer wants to load-balance traffic among the backend VMs that form part of a multi-tier application. Which load-balancing option should this customer choose?
The regional load balancer
The global TCP proxy
The regional internal load balancer
The global SSL proxy
The global HTTP(S) load balancer
Review the lecture "Cloud Load Balancing."
3. Which term describes a secure, individual, private cloud-computing model hosted within a public cloud?
Virtual private cloud (VPC)
Domain name system (DNS)
Virtual private network (VPN)
Content delivery network (CDN)
Correct!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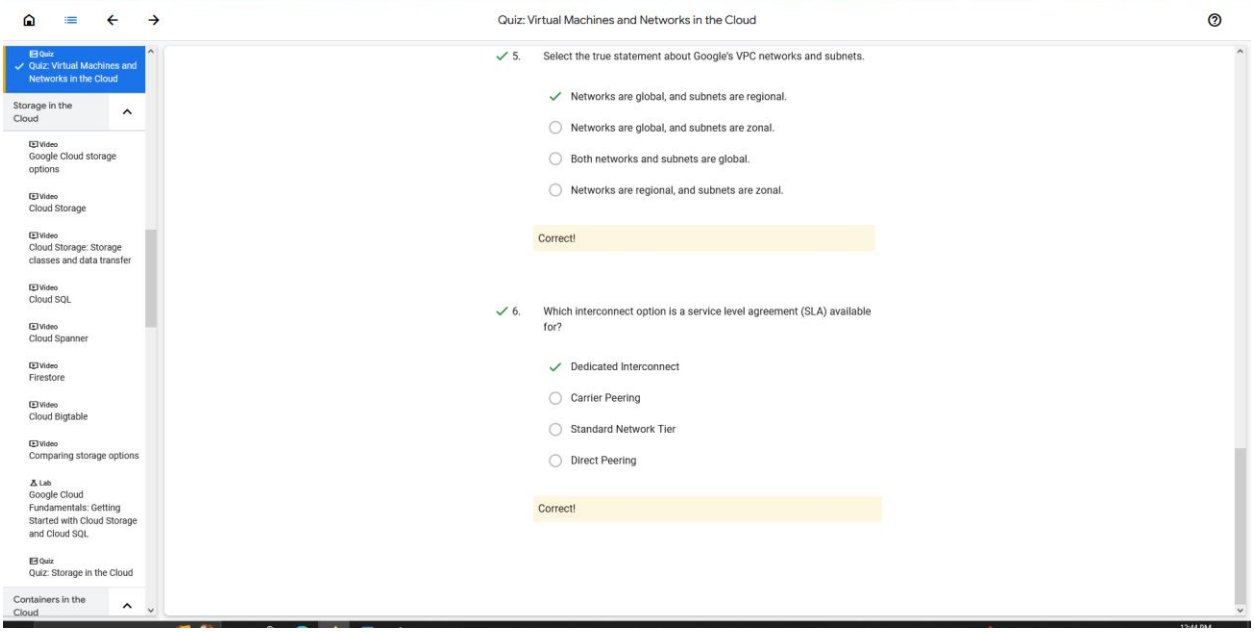
Quiz: Storage in the Cloud
Containers in the Cloud
4. Which statement best describes how VPC routers and firewalls work?
They are managed by Google as a built-in feature.
They are managed by Google in virtual machines and customers cannot modify them.
Customers provision virtual machines and run their routers and firewalls in them.
They are managed by Google in virtual machines and customers can tune or deactivate them.
Correct!
5. Select the true statement about Google's VPC networks and subnets.
Networks are global, and subnets are regional.
Networks are global, and subnets are zonal.
Both networks and subnets are global.
Networks are regional, and subnets are zonal.
Correct!
6. Which interconnect option is a service level agreement (SLA) available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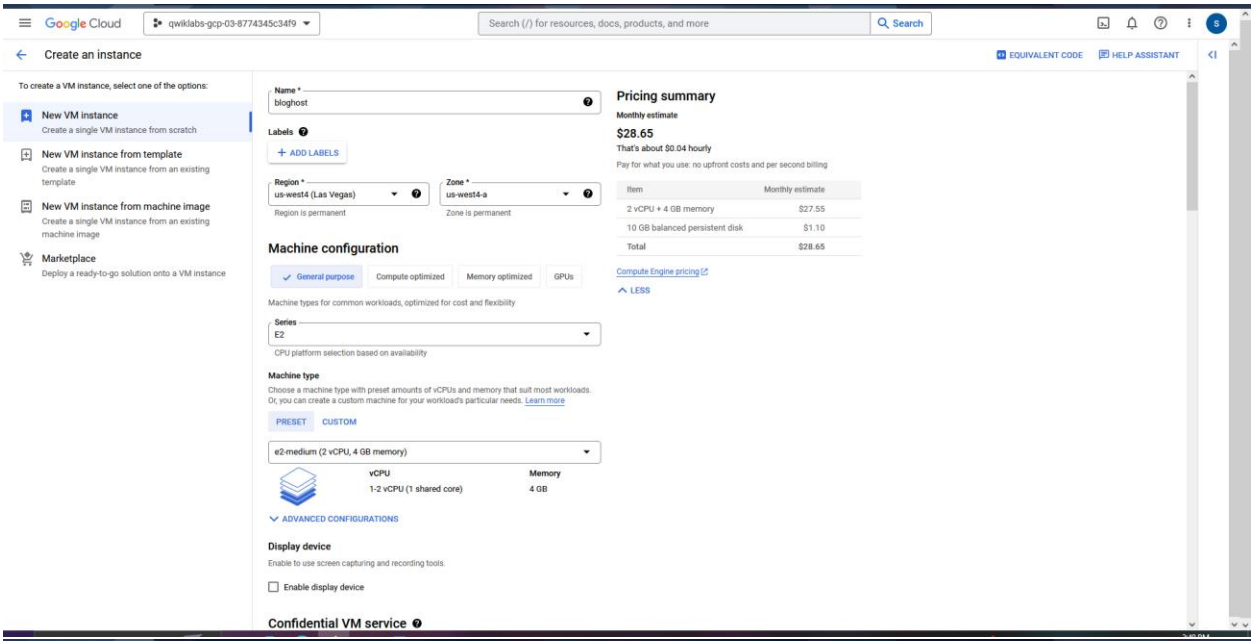
Quiz
Quiz: Storage in the Cloud
Containers in the Cloud
5. Select the true statement about Google's VPC networks and subnets.
Networks are global, and subnets are regional.
Networks are global, and subnets are zonal.
Both networks and subnets are global.
Networks are regional, and subnets are zonal.
Correct!
6. Which interconnect option is a service level agreement (SLA) available for?
Dedicated Interconnect
Carrier Peering
Standard Network Tier
Direct Peering
Correct!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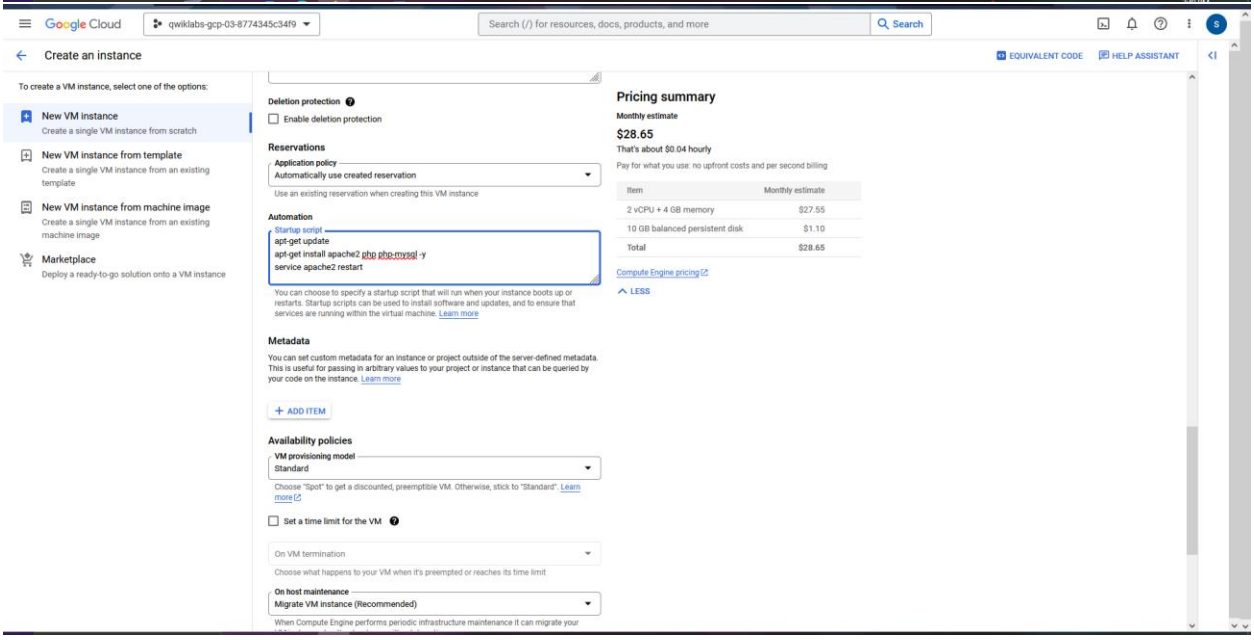
Create an instance
EQUIVALENT CODE
HELP ASSISTANT
To create a VM instance, select one of the options:
New VM instance
Create a single VM instance from scratch
New VM instance from template
Create a single VM instance from an existing template
New VM instance from machine image
Create a single VM instance from an existing machine image
Marketplace
Deploy a ready-to-go solution onto a VM instance
Name *
bloghost
Labels
ADD LABELS
Region *
us-west4 (Las Vegas)
Region is permanent
Zone *
us-west4-a
Zone is permanent
Machine configuration
General purpose
Compute optimized
Memory optimized
GPUs
Machine types for common workloads, optimized for cost and flexibility
Series
E2
CPU platform selection based on availability
Machine type
Choose a machine type with preset amounts of vCPUs and memory that suit most workloads. Or, you can create a custom machine for your workload's particular needs. Learn more
PRESET
CUSTOM
e2-medium (2 vCPU, 4 GB memory)
vCPU
1-2 vCPU (1 shared core)
Memory
4 GB
ADVANCED CONFIGURATIONS
Display device
Enable to use screen capturing and recording tools.
Enable display device
Confidential VM service
Pricing summary
Monthly estimate
$28.65
That's about $0.04 hourly
Pay for what you use: no upfront costs and per second billing
Item
Monthly estimate
2 vCPU + 4 GB memory
$27.55
10 GB balanced persistent disk
$1.10
Total
$28.65
Compute Engine pricing
LESS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New VM instance from machine image
Create a single VM instance from an existing machine image
Marketplace
Deploy a ready-to-go solution onto a VM instance
Deletion protection
Enable deletion protection
Reservations
Application policy
Automatically use created reservation
Use an existing reservation when creating this VM instance
Automation
Startup script
apt-get update
apt-get install apache2 php php-mysql -y
service apache2 restart
You can choose to specify a startup script that will run when your instance boots up or restarts. Startup scripts can be used to install software and updates, and to ensure that services are running within the virtual machine. Learn more
Metadata
You can set custom metadata for an instance or project outside of the server-defined metadata. This is useful for passing in arbitrary values to your project or instance that can be queried by your code on the instance. Learn more
ADD ITEM
Availability policies
VM provisioning model
Standard
Choose "Spot" to get a discounted, preemptible VM. Otherwise, stick to "Standard". Learn more
Set a time limit for the VM
On VM termination
Choose what happens to your VM when it's preempted or reaches its time limit
On host maintenance
Migrate VM instance (Recommended)
When Compute Engine performs periodic infrastructure maintenance it can migrate your
Pricing summary
Monthly estimate
$28.65
That's about $0.04 hourly
Pay for what you use: no upfront costs and per second billing
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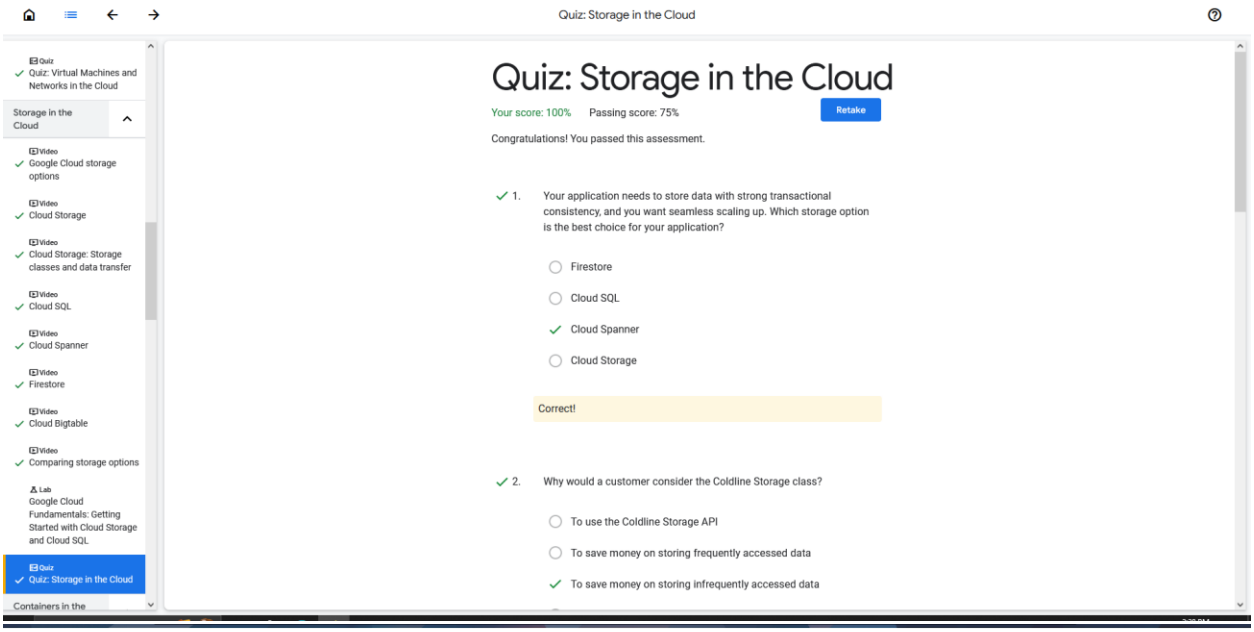
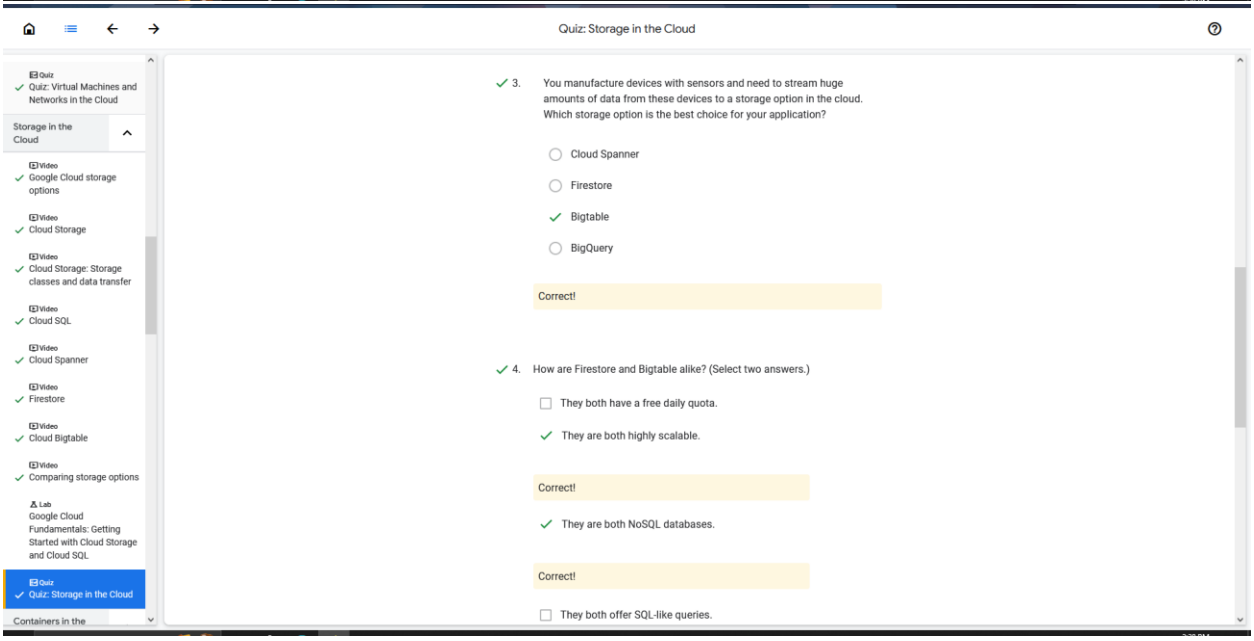

Quiz: Storage in the Cloud
Quiz: Virtual Machines and Networks in the Cloud
Storage in the Cloud
Google Cloud storage options
Cloud Storage
Cloud Storage: Storage classes and data transfer
Cloud SQL
Cloud Spanner
Firestore
Cloud Bigtable
Comparing storage options
Google Cloud Fundamentals: Getting Started with Cloud Storage and Cloud SQL
Quiz: Storage in the Cloud
Containers in the
Quiz: Storage in the Cloud
Your score: 100%
Passing score: 75%
Retake
Congratulations! You passed this assessment.
1. Your application needs to store data with strong transactional consistency, and you want seamless scaling up. Which storage option is the best choice for your application?
Firestore
Cloud SQL
Cloud Spanner
Cloud Storage
Correct!
2. Why would a customer consider the Coldline Storage class?
To use the Coldline Storage API
To save money on storing frequently accessed data
To save money on storing infrequently accessed data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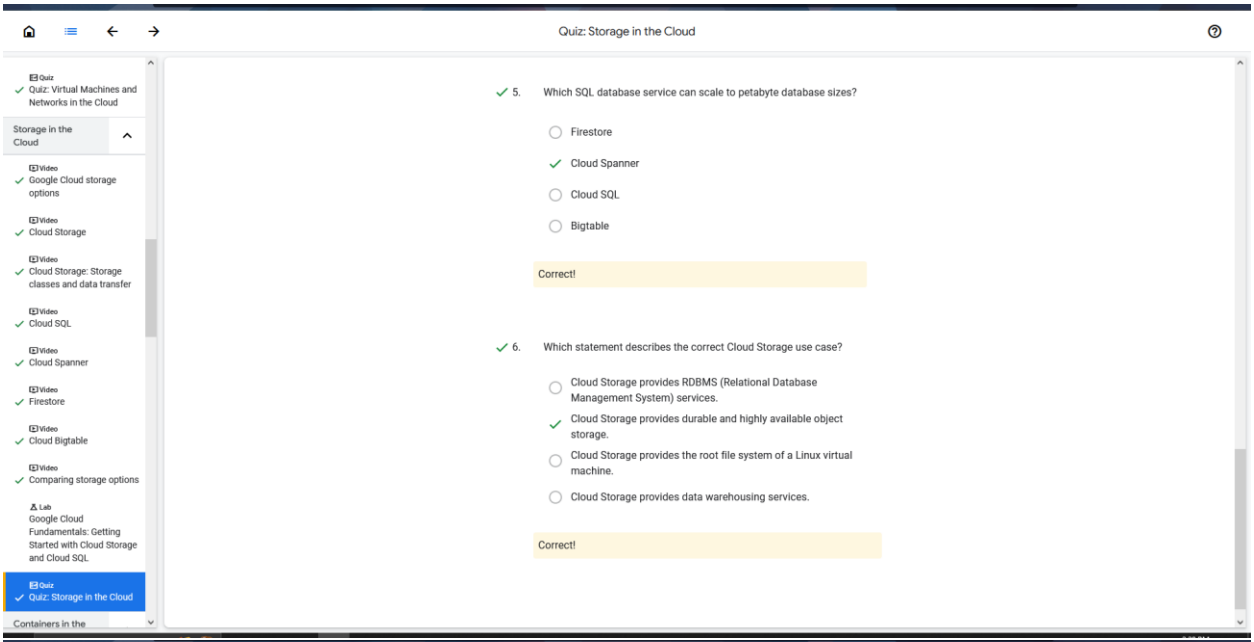
Cloud Spanner
Firestore
Cloud Bigtable
Comparing storage options
Google Cloud Fundamentals: Getting Started with Cloud Storage and Cloud SQL
Quiz: Storage in the Cloud
Containers in the
3. You manufacture devices with sensors and need to stream huge amounts of data from these devices to a storage option in the cloud. Which storage option is the best choice for your application?
Cloud Spanner
Firestore
Bigtable
BigQuery
Correct!
4. How are Firestore and Bigtable alike? (Select two answers.)
They both have a free daily quota.
They are both highly scalable.
Correct!
They are both NoSQL databases.
Correct!
They both offer SQL-like queries.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Firestore
Cloud Bigtable
Comparing storage options
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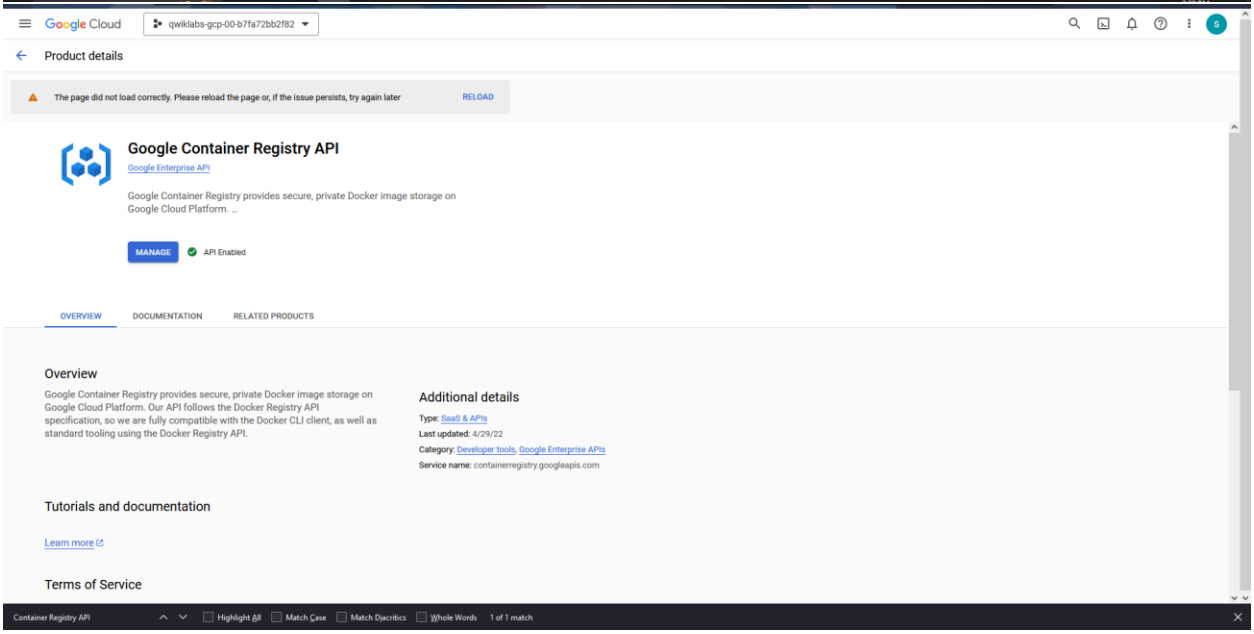
Quiz: Storage in the Cloud
Containers in the
5. Which SQL database service can scale to petabyte database sizes?
Firestore
Cloud Spanner
Cloud SQL
Bigtable
Correct!
6. Which statement describes the correct Cloud Storage use case?
Cloud Storage provides RDBMS (Relational Database Management System) services.
Cloud Storage provides durable and highly available object storage.
Cloud Storage provides the root file system of a Linux virtual machine.
Cloud Storage provides data warehousing services.
Correct!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Google Container Registry API
Google Enterprise API
Google Container Registry provides secure, private Docker image storage on Google Cloud Platform. ...
MANAGE
API Enabled
OVERVIEW
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Overview
Google Container Registry provides secure, private Docker image storage on Google Cloud Platform. Our API follows the Docker Registry API specification, so we are fully compatible with the Docker CLI client, as well as standard tooling using the Docker Registry API.
Additional details
Type: SaaS & APIs
Last updated: 4/29/22
Category: Developer tools, Google Enterprise APIs
Service name: containerregistry.googleapis.com
Tutorials and documentation
Learn more
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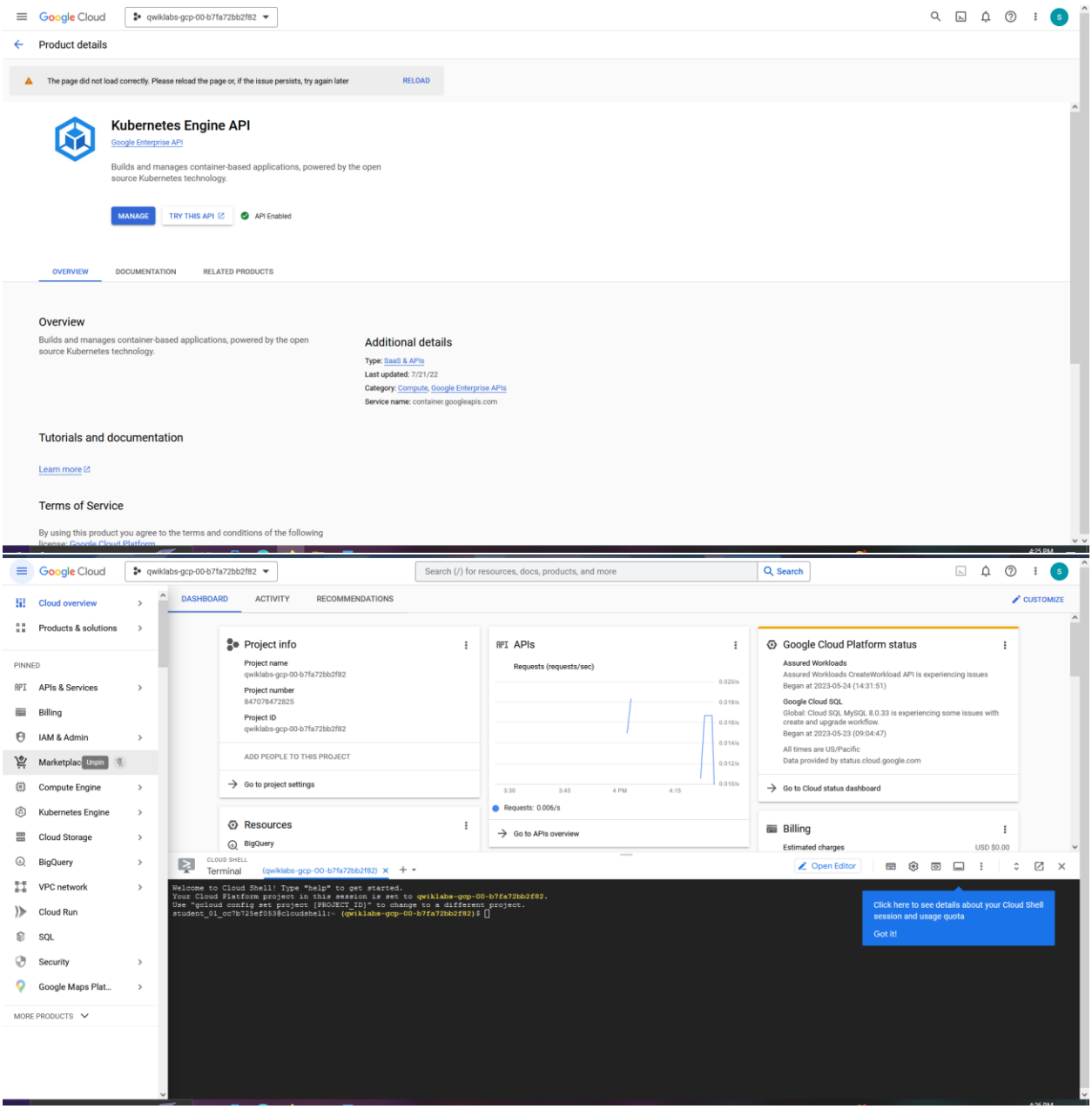
Match Diacritics
Whole Words
1 of 1 match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Kubernetes Engine API
Google Enterprise API
Builds and manages container-based applications, powered by the open source Kubernetes technology.
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TRY THIS API
API Enabled
OVERVIEW
DOCUMENTATION
RELATED PRODUCTS
Overview
Builds and manages container-based applications, powered by the open source Kubernetes technology.
Additional details
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Last updated: 7/21/22
Category: Compute, Google Enterprise APIs
Service name: container.googleapis.com
Tutorials and documentation
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Project number
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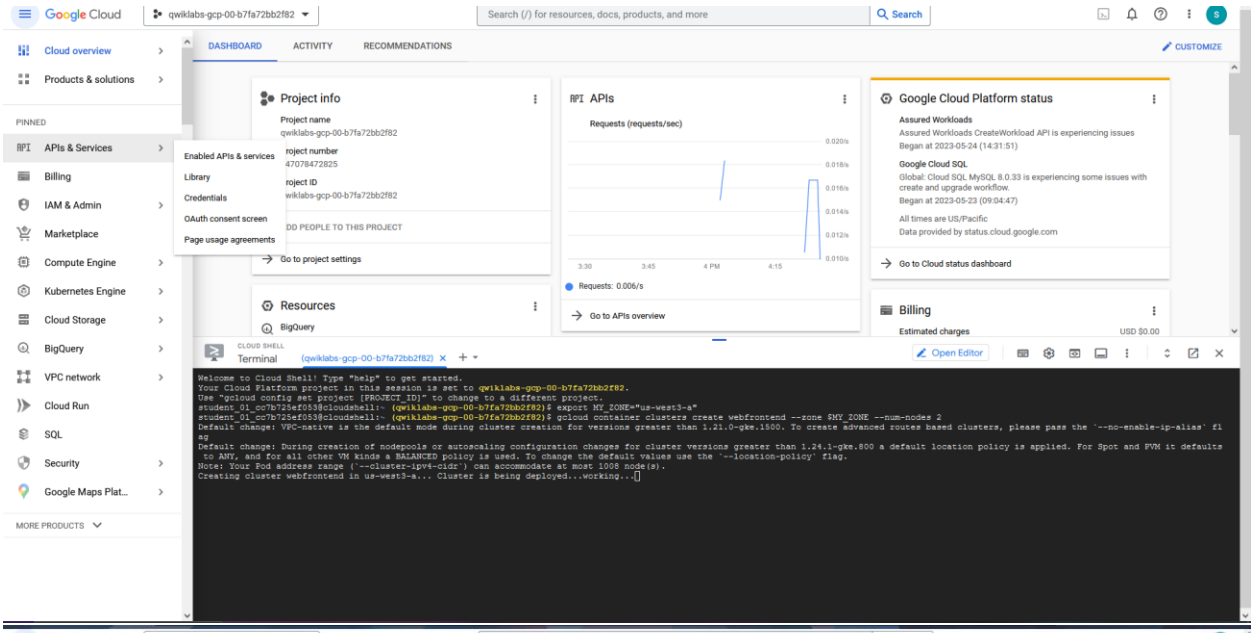
Project ID
qwiklabs-gcp-00-b7fa72bb2f82
ADD PEOPLE TO THIS PROJECT
Go to project settings
APIs
Requests (requests/sec)
Requests: 0.006/s
Go to APIs overview
Google Cloud Platform status
Assured Workloads
Assured Workloads CreateWorkload API is experiencing issues
Began at 2023-05-24 (14:31:51)
Google Cloud SQL
Global: Cloud SQL MySQL 8.0.33 is experiencing some issues with create and upgrade workflow.
Began at 2023-05-23 (09:04:47)
All times are US/Pacific
Data provided by status.cloud.google.com
Go to Cloud status dashboard
Resources
BigQuery
Billing
Estimated charges
USD $0.00
CLOUD SHELL
Terminal
(qwiklabs-gcp-00-b7fa72bb2f82)
Open Editor
Welcome to Cloud Shell! Type "help" to get started.
Your Cloud Platform project in this session is set to qwiklabs-gcp-00-b7fa72bb2f82.
Use "gcloud config set project [PROJECT_ID]" to change to a different project.
student_01_cc7b725ef053@cloudshell:~ (qwiklabs-gcp-00-b7fa72bb2f82)$
Click here to see details about your Cloud Shell session and usage quota
Got it!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Page usage agreements
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Project name
qwiklabs-gcp-00-b7fa72bb2f82
Project number
847078472825
Project ID
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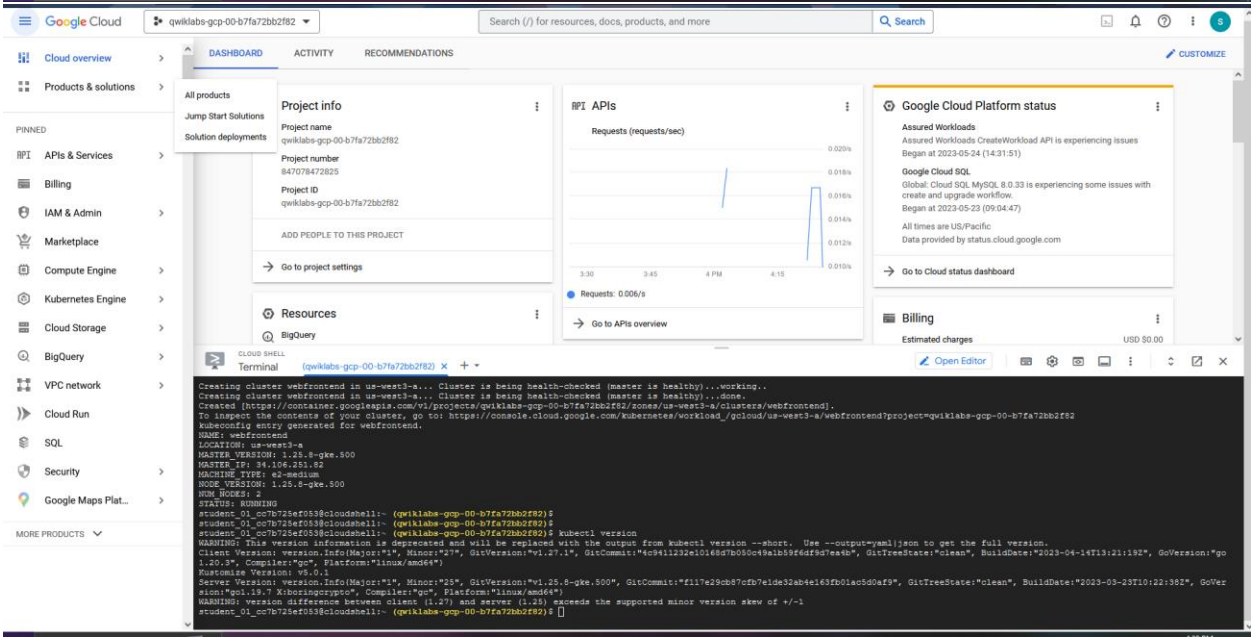
CLOUD SHELL
Terminal
(qwiklabs-gcp-00-b7fa72bb2f82)
Open Editor
Welcome to Cloud Shell! Type "help" to get started.
Your Cloud Platform project in this session is set to qwiklabs-gcp-00-b7fa72bb2f82.
Use "gcloud config set project [PROJECT_ID]" to change to a different project.
student_01_cc7b725ef053@cloudshell:~ (qwiklabs-gcp-00-b7fa72bb2f82)$ export MY_ZONE="us-west3-a"
student_01_cc7b725ef053@cloudshell:~ (qwiklabs-gcp-00-b7fa72bb2f82)$ gcloud container clusters create webfrontend --zone $MY_ZONE --num-nodes 2
Default change: VPC-native is the default mode during cluster creation for versions greater than 1.21.0-gke.1500. To create advanced routes based clusters, please pass the '--no-enable-ip-alias' flag
Default change: During creation of nodepools or autoscaling configuration changes for cluster versions greater than 1.24.1-gke.800 a default location policy is applied. For Spot and PVM it defaults to ANY, and for all other VM kinds a BALANCED policy is used. To change the default values use the '--location-policy' flag.
Note: Your Pod address range ('--cluster-ipv4-cidr') can accommodate at most 1008 node(s).
Creating cluster webfrontend in us-west3-a... Cluster is being deployed...working...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Cloud Storage
BigQuery
VPC network
Cloud Run
SQL
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Google Maps Plat...
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Project number
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Project ID
qwiklabs-gcp-00-b7fa72bb2f82
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Requests: 0.006/s
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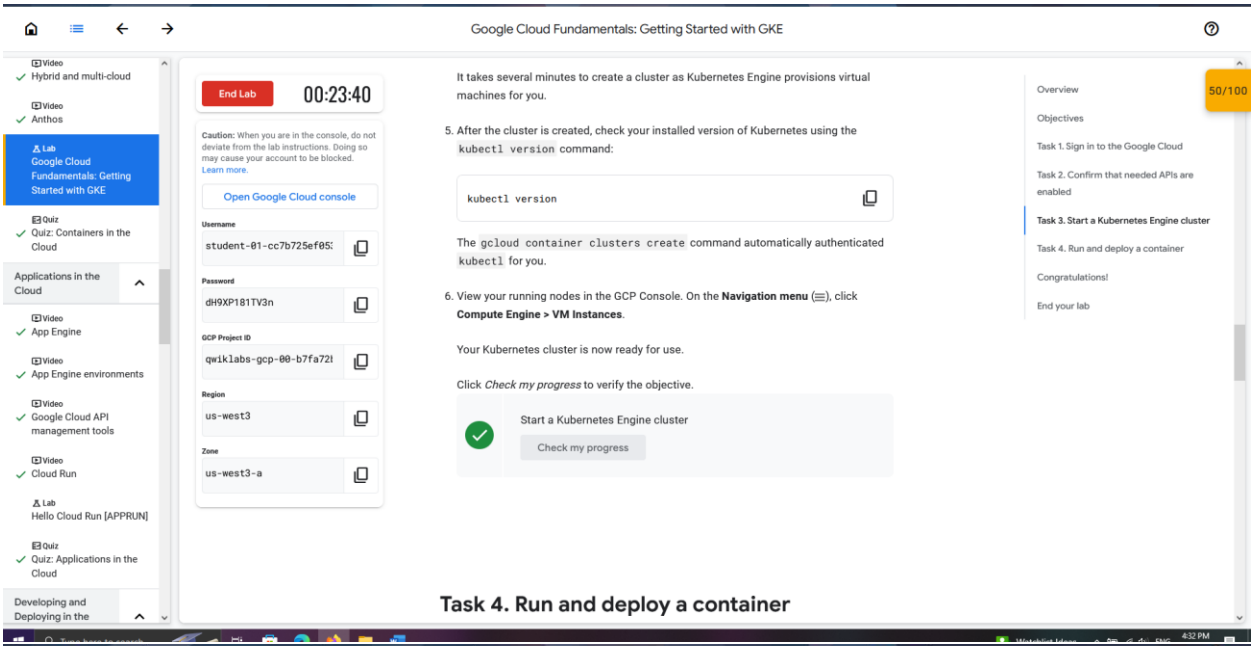
CLOUD SHELL
Terminal
(qwiklabs-gcp-00-b7fa72bb2f82)
Open Editor
Creating cluster webfrontend in us-west3-a... Cluster is being health-checked (master is healthy)...working..
Creating cluster webfrontend in us-west3-a... Cluster is being health-checked (master is healthy)...done.
Created [https://container.googleapis.com/v1/projects/qwiklabs-gcp-00-b7fa72bb2f82/zones/us-west3-a/clusters/webfrontend].
To inspect the contents of your cluster, go to: https://console.cloud.google.com/kubernetes/workload_/gcloud/us-west3-a/webfrontend?project=qwiklabs-gcp-00-b7fa72bb2f82
kubeconfig entry generated for webfrontend.
NAME: webfrontend
LOCATION: us-west3-a
MASTER_VERSION: 1.25.8-gke.500
MASTER_IP: 34.106.251.82
MACHINE_TYPE: e2-medium
NODE_VERSION: 1.25.8-gke.500
NUM_NODES: 2
STATUS: RUNNING
student_01_cc7b725ef053@cloudshell:~ (qwiklabs-gcp-00-b7fa72bb2f82)$
student_01_cc7b725ef053@cloudshell:~ (qwiklabs-gcp-00-b7fa72bb2f82)$
student_01_cc7b725ef053@cloudshell:~ (qwiklabs-gcp-00-b7fa72bb2f82)$ kubectl version
WARNING: This version information is deprecated and will be replaced with the output from kubectl version --short. Use --output=yaml|json to get the full version.
Client Version: version.Info{Major:"1", Minor:"27", GitVersion:"v1.27.1", GitCommit:"4c9411232e10168d7b050c49a1b59f6df9d7ea4b", GitTreeState:"clean", BuildDate:"2023-04-14T13:21:19Z", GoVersion:"go1.20.3", Compiler:"gc", Platform:"linux/amd64"}
Kustomize Version: v5.0.1
Server Version: version.Info{Major:"1", Minor:"25", GitVersion:"v1.25.8-gke.500", GitCommit:"f117e29cb87cfb7e1de32ab4e163fb01ac5d0af9", GitTreeState:"clean", BuildDate:"2023-03-23T10:22:38Z", GoVersion:"go1.19.7 X:boringcrypto", Compiler:"gc", Platform:"linux/amd64"}
WARNING: version difference between client (1.27) and server (1.25) exceeds the supported minor version skew of +/-1
student_01_cc7b725ef053@cloudshell:~ (qwiklabs-gcp-00-b7fa72bb2f82)$


Google Cloud Fundamentals: Getting Started with GKE
End Lab
00:23:40
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 Cloud console
Username
student-01-cc7b725ef053
Password
dH9XP181TV3n
GCP Project ID
qwiklabs-gcp-00-b7fa72b
Region
us-west3
Zone
us-west3-a
Video
Hybrid and multi-cloud
Video
Anthos
Lab
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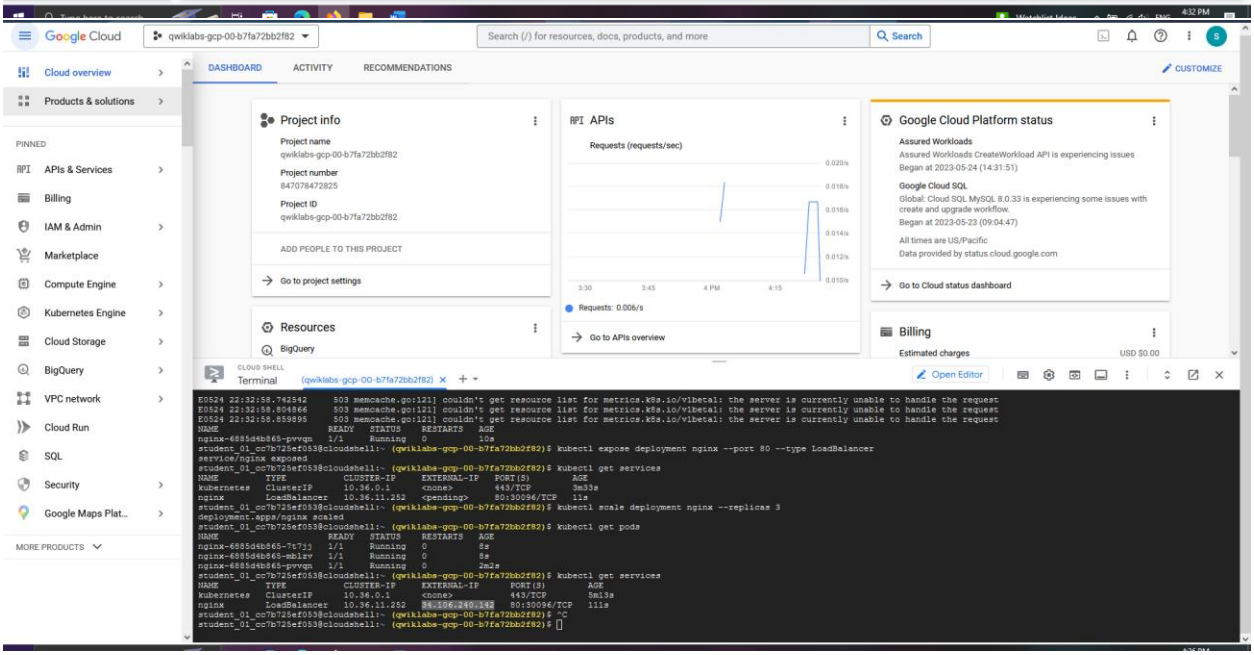
Quiz
Quiz: Containers in the Cloud
Applications in the Cloud
Video
App Engine
Video
App Engine environments
Video
Google Cloud API management tools
Video
Cloud Run
Lab
Hello Cloud Run [APPRUN]
Quiz
Quiz: Applications in the Cloud
Developing and Deploying in the
It takes several minutes to create a cluster as Kubernetes Engine provisions virtual machines for you.
5. After the cluster is created, check your installed version of Kubernetes using the kubectl version command:
kubectl version
The gcloud container clusters create command automatically authenticated kubectl for you.
6. View your running nodes in the GCP Console. On the Navigation menu (≡), click Compute Engine > VM Instances.
Your Kubernetes cluster is now ready for use.
Click Check my progress to verify the objective.
Start a Kubernetes Engine cluster
Check my progress
Overview
50/100
Objectives
Task 1. Sign in to the Google Cloud
Task 2. Confirm that needed APIs are enabled
Task 3. Start a Kubernetes Engine cluster
Task 4. Run and deploy a container
Congratulations!
End your lab
Task 4. Run and deploy a container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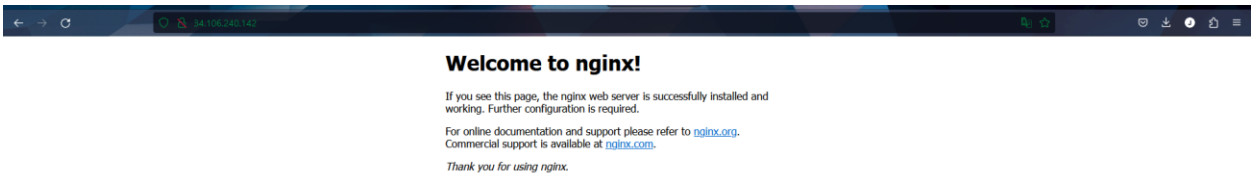
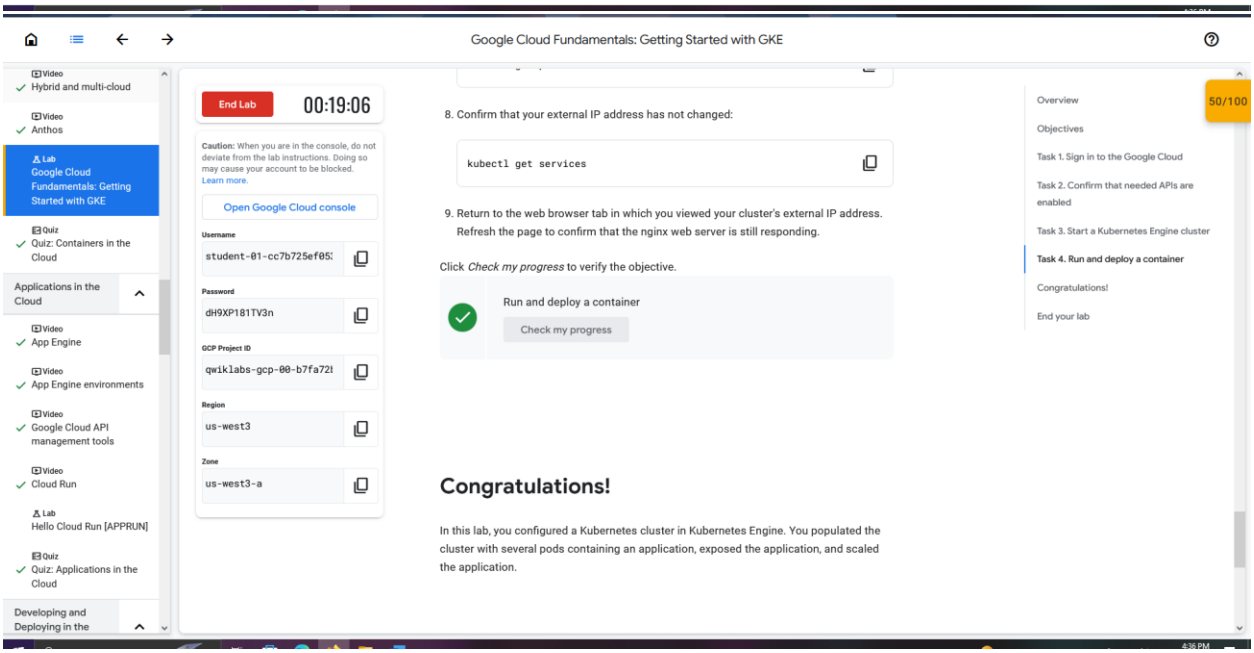
E0524 22:32:58.742542 503 memcache.go:121] couldn't get resource list for metrics.k8s.io/v1beta1: the server is currently unable to handle the request
E0524 22:32:58.804866 503 memcache.go:121] couldn't get resource list for metrics.k8s.io/v1beta1: the server is currently unable to handle the request
E0524 22:32:58.859855 503 memcache.go:121] couldn't get resource list for metrics.k8s.io/v1beta1: the server is currently unable to handle the request
NAME READY STATUS RESTARTS AGE
nginx-6885d4b865-pvvqn 1/1 Running 0 10s
student_01_cc7b725ef053@cloudshell:~ (qwiklabs-gcp-00-b7fa72bb2f82)$ kubectl expose deployment nginx --port 80 --type LoadBalancer
service/nginx exposed
student_01_cc7b725ef053@cloudshell:~ (qwiklabs-gcp-00-b7fa72bb2f82)$ kubectl get services
NAME TYPE CLUSTER-IP EXTERNAL-IP PORT(S) AGE
kubernetes ClusterIP 10.36.0.1 <none> 443/TCP 3m33s
nginx LoadBalancer 10.36.11.252 <pending> 80:30096/TCP 11s
student_01_cc7b725ef053@cloudshell:~ (qwiklabs-gcp-00-b7fa72bb2f82)$ kubectl scale deployment nginx --replicas 3
deployment.apps/nginx scaled
student_01_cc7b725ef053@cloudshell:~ (qwiklabs-gcp-00-b7fa72bb2f82)$ kubectl get pods
NAME READY STATUS RESTARTS AGE
nginx-6885d4b865-7c7jj 1/1 Running 0 5s
nginx-6885d4b865-mblzv 1/1 Running 0 5s
nginx-6885d4b865-pvvqn 1/1 Running 0 2m2s
student_01_cc7b725ef053@cloudshell:~ (qwiklabs-gcp-00-b7fa72bb2f82)$ kubectl get services
NAME TYPE CLUSTER-IP EXTERNAL-IP PORT(S) AGE
kubernetes ClusterIP 10.36.0.1 <none> 443/TCP 5m13s
nginx LoadBalancer 10.36.11.252 34.106.240.142 80:30096/TCP 111s
student_01_cc7b725ef053@cloudshell:~ (qwiklabs-gcp-00-b7fa72bb2f82)$ ^C
student_01_cc7b725ef053@cloudshell:~ (qwiklabs-gcp-00-b7fa72bb2f82)$


34.106.240.142
Welcome to nginx!
If you see this page, the nginx web server is successfully installed and working. Further configuration is required.
For online documentation and support please refer to nginx.org.
Commercial support is available at nginx.com.
Thank you for using nginx.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Video
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Quiz: Containers in the Cloud
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App Engine environments
Video
Google Cloud API management tools
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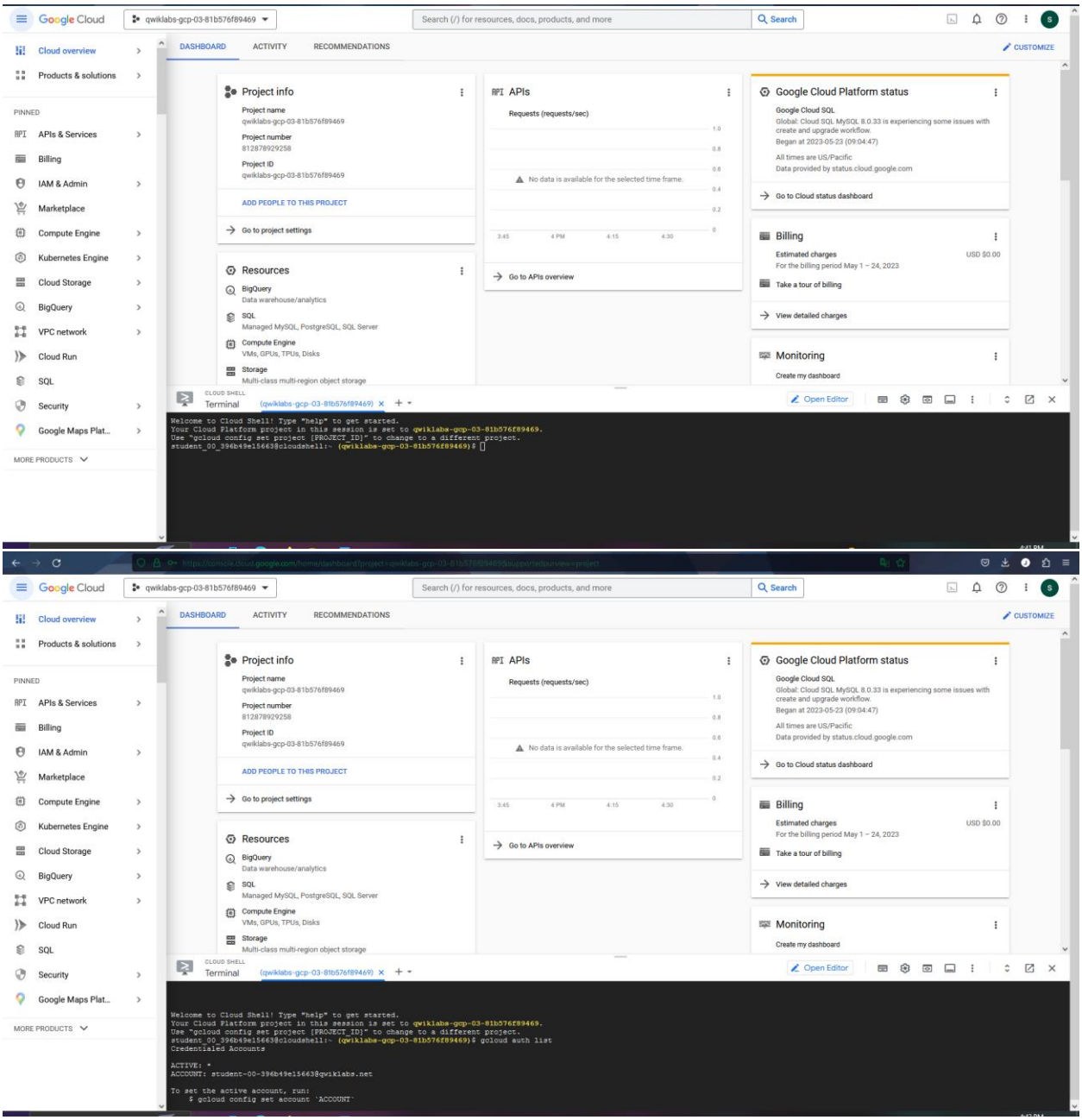
Cloud Run
Lab
Hello Cloud Run [APPRUN]
Quiz
Quiz: Applications in the Cloud
Developing and Deploying in the
End Lab
00:19:06
Caution: When you are in the console, do not deviate from the lab instructions. Doing so may cause your account to be blocked.
Learn more.
Open Google Cloud console
Username
student-01-cc7b725ef05
Password
dH9XP181TV3n
GCP Project ID
qwiklabs-gcp-00-b7fa72
Region
us-west3
Zone
us-west3-a
8. Confirm that your external IP address has not changed:
kubectl get services
9. Return to the web browser tab in which you viewed your cluster's external IP address. Refresh the page to confirm that the nginx web server is still responding.
Click Check my progress to verify the objective.
Run and deploy a container
Check my progress
Congratulations!
In this lab, you configured a Kubernetes cluster in Kubernetes Engine. You populated the cluster with several pods containing an application, exposed the application, and scaled the application.
Overview
50/100
Objectives
Task 1. Sign in to the Google Cloud
Task 2. Confirm that needed APIs are enabled
Task 3. Start a Kubernetes Engine cluster
Task 4. Run and deploy a container
Congratulations!
End your lab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Create my dashboard
CLOUD SHELL
Terminal
(qwiklabs-gcp-03-81b576f89469)
Open Editor
Welcome to Cloud Shell! Type "help" to get started.
Your Cloud Platform project in this session is set to qwiklabs-gcp-03-81b576f89469.
Use "gcloud config set project [PROJECT_ID]" to change to a different project.
student_00_396b49e15663@cloudshell:~ (qwiklabs-gcp-03-81b576f89469)$

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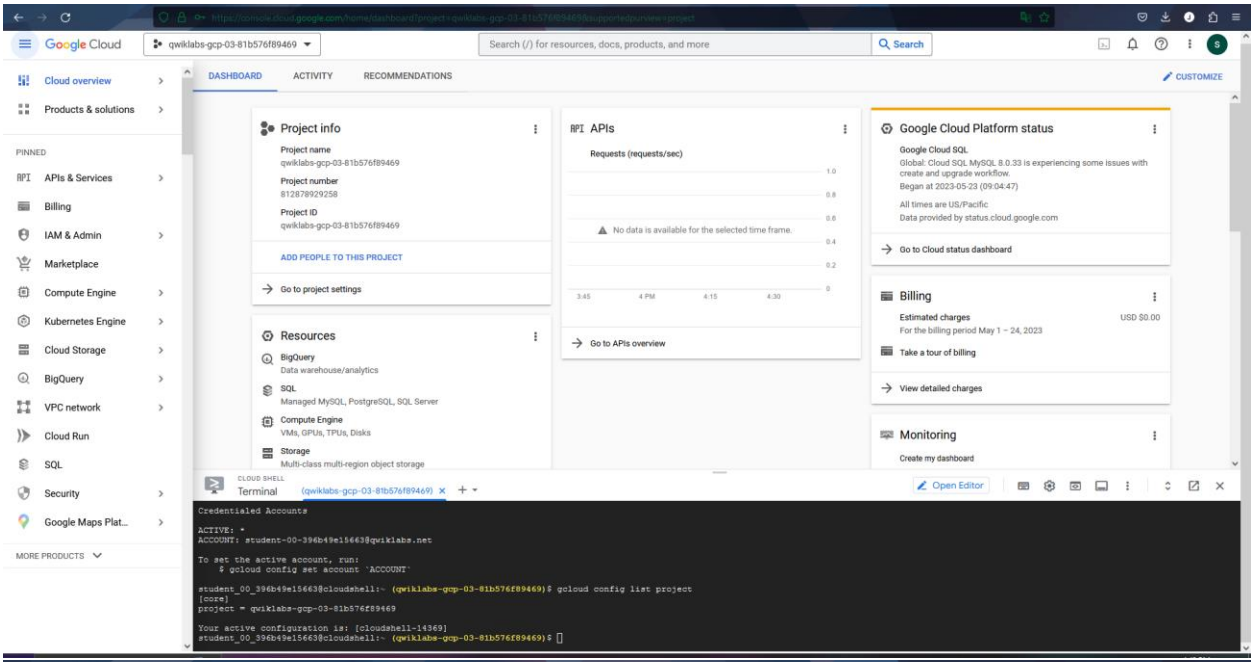
Welcome to Cloud Shell! Type "help" to get started.
Your Cloud Platform project in this session is set to qwiklabs-gcp-03-81b576f89469.
Use "gcloud config set project [PROJECT_ID]" to change to a different project.
student_00_396b49e15663@cloudshell:~ (qwiklabs-gcp-03-81b576f89469)$ gcloud auth list
Credentialed Accounts
ACTIVE: *
ACCOUNT: student-00-396b49e15663@qwiklabs.net
To set the active account, run:
$ gcloud config set account `ACCOUNT`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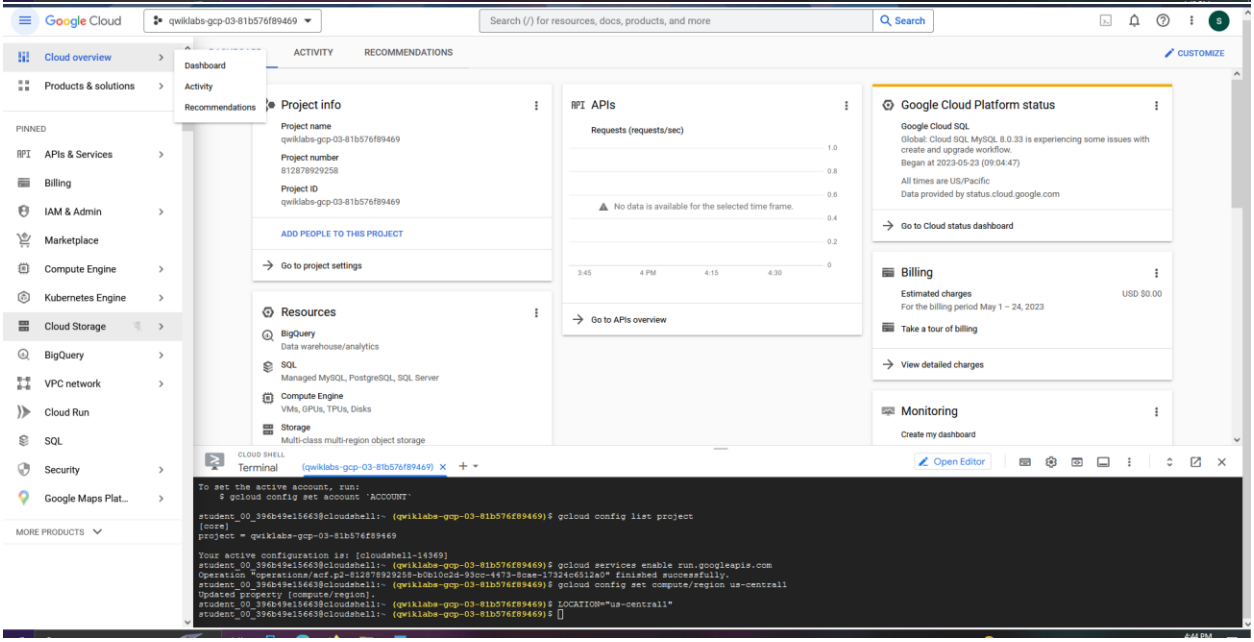
CLOUD SHELL
Terminal
(qwiklabs-gcp-03-81b576f89469)
Open Editor
Credentialed Accounts
ACTIVE: *
ACCOUNT: student-00-396b49e15663@qwiklabs.net
To set the active account, run:
$ gcloud config set account `ACCOUNT`
student_00_396b49e15663@cloudshell:~ (qwiklabs-gcp-03-81b576f89469)$ gcloud config list project
[core]
project = qwiklabs-gcp-03-81b576f89469
Your active configuration is: [cloudshell-14369]
student_00_396b49e15663@cloudshell:~ (qwiklabs-gcp-03-81b576f89469)$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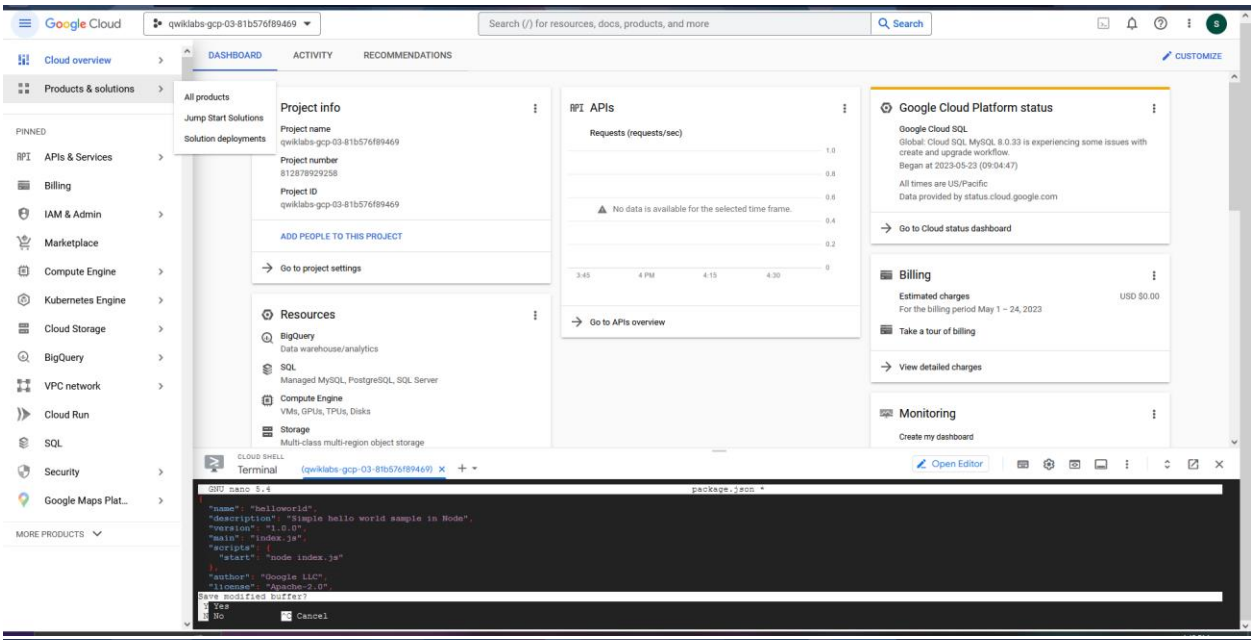
Open Editor
To set the active account, run:
$ gcloud config set account `ACCOUNT`
student_00_396b49e15663@cloudshell:~ (qwiklabs-gcp-03-81b576f89469)$ gcloud config list project
[core]
project = qwiklabs-gcp-03-81b576f89469
Your active configuration is: [cloudshell-14369]
student_00_396b49e15663@cloudshell:~ (qwiklabs-gcp-03-81b576f89469)$ gcloud services enable run.googleapis.com
Operation "operations/acf.p2-812878929258-b0b10c2d-93cc-4473-8cae-17324c6512a6" finished successfully.
student_00_396b49e15663@cloudshell:~ (qwiklabs-gcp-03-81b576f89469)$ gcloud config set compute/region us-central1
Updated property [compute/region].
student_00_396b49e15663@cloudshell:~ (qwiklabs-gcp-03-81b576f89469)$ LOCATION="us-central1"
student_00_396b49e15663@cloudshell:~ (qwiklabs-gcp-03-81b576f89469)$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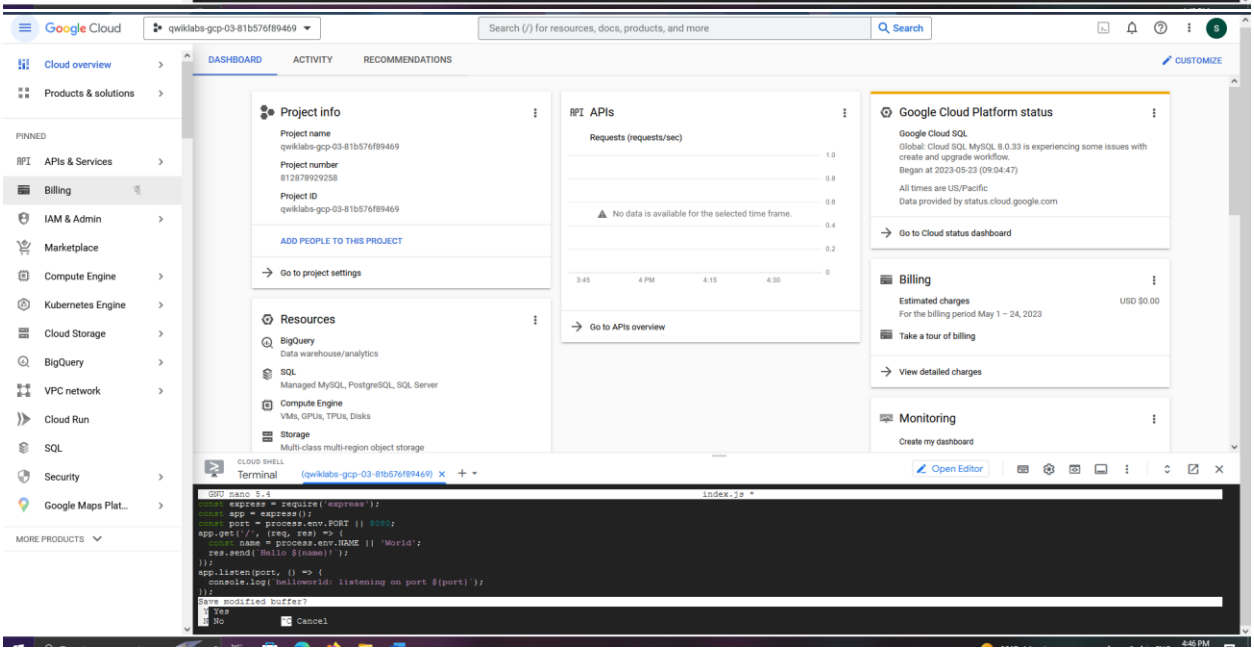
CLOUD SHELL
Terminal
(qwiklabs-gcp-03-81b576f89469)
Open Editor
GNU nano 5.4
package.json *
{
"name": "helloworld",
"description": "Simple hello world sample in Node",
"version": "1.0.0",
"main": "index.js",
"scripts": {
"start": "node index.js"
},
"author": "Google LLC",
"license": "Apache-2.0"
Save modified buffer?
Yes
No
Cancel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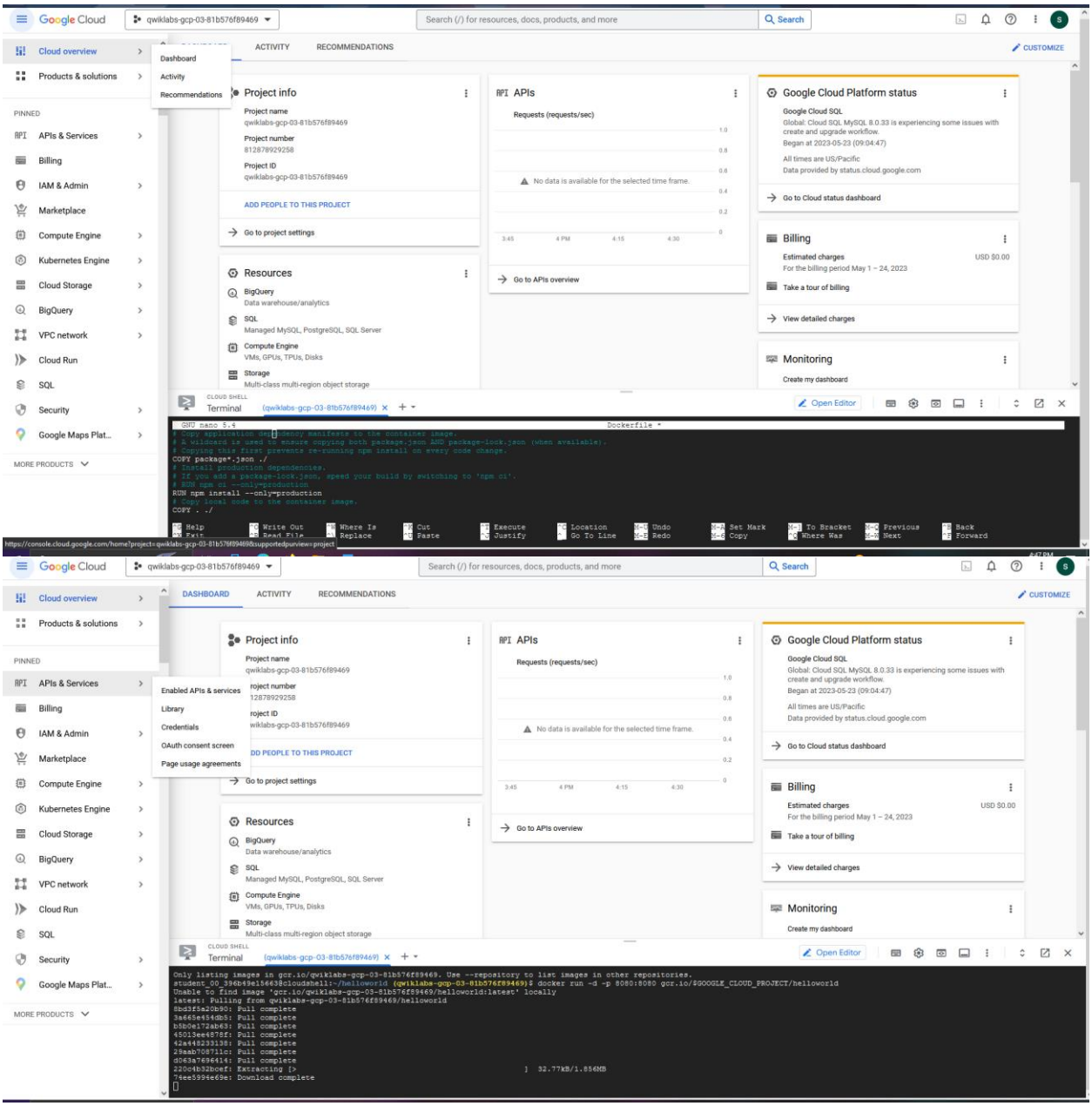
CLOUD SHELL
Terminal
(qwiklabs-gcp-03-81b576f89469)
Open Editor
GNU nano 5.4
index.js *
const express = require('express');
const app = express();
const port = process.env.PORT || 8080;
app.get('/', (req, res) => {
const name = process.env.NAME || 'World';
res.send(`Hello ${name}!`);
});
app.listen(port, () => {
console.log('helloworld: listening on port ${port}');
});
Save modified buffer?
Yes
No
Cancel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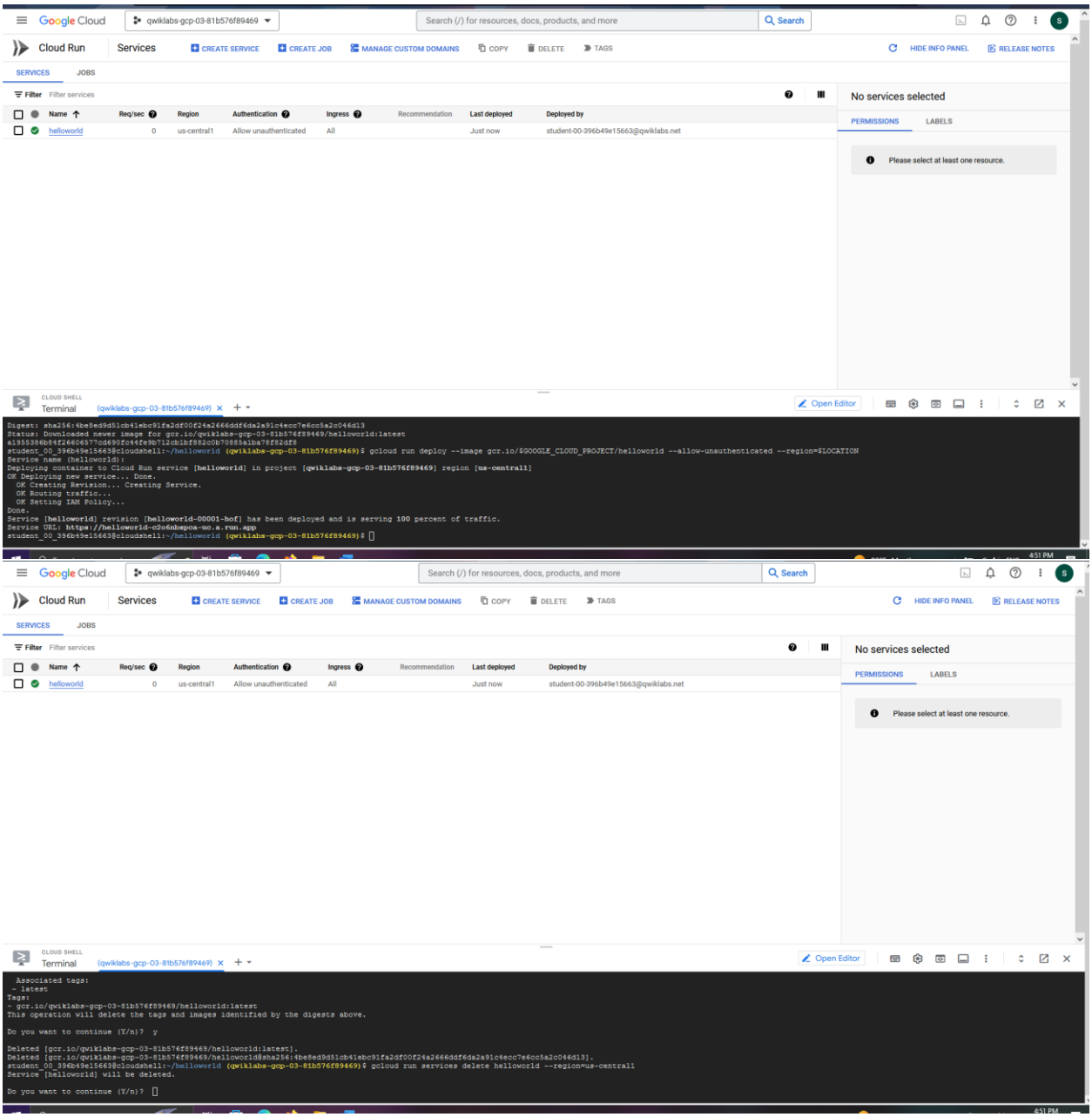
CLOUD SHELL
Terminal
(qwiklabs-gcp-03-81b576f89469)
Open Editor
GNU nano 5.4
Dockerfile *
Copy application dependency manifests to the container image.
A wildcard is used to ensure copying both package.json AND package-lock.json (when available).
Copying this first prevents re-running npm install on every code change.
COPY package*.json ./
Install production dependencies.
If you add a package-lock.json, speed your build by switching to 'npm ci'.
RUN npm ci --only=production
RUN npm install --only=production
Copy local code to the container image.
COPY . ./
Help
Write Out
Where Is
Cut
Execute
Location
Undo
Set Mark
To Bracket
Previous
Back
Exit
Read File
Replace
Paste
Justify
Go To Line
Redo
Copy
Where Was
Next
Forward
https://console.cloud.google.com/home?project=qwiklabs-gcp-03-81b576f89469&supportedpurview=project
APIs & Services
Enabled APIs & services
Library
Credentials
OAuth consent screen
Page usage agreements
Only listing images in gcr.io/qwiklabs-gcp-03-81b576f89469. Use --repository to list images in other repositories.
student_00_396b49e156e3@cloudshell:~/helloworld (qwiklabs-gcp-03-81b576f89469)$ docker run -d -p 8080:8080 gcr.io/$GOOGLE_CLOUD_PROJECT/helloworld
Unable to find image 'gcr.io/qwiklabs-gcp-03-81b576f89469/helloworld:latest' locally
latest: Pulling from qwiklabs-gcp-03-81b576f89469/helloworld
8bd3f8a20b90: Pull complete
3a665e454db5: Pull complete
b5b0e172ab63: Pull complete
45013ee4878f: Pull complete
42e448233138: Pull complete
29aab708711c: Pull complete
d063a7696414: Pull complete
220c4b32bcef: Extracting [>
] 32.77kB/1.856MB
74ee5994e69e: Download complete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Filter services
Name
Req/sec
Region
Authentication
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Recommendation
Last deployed
Deployed by
helloworld
0
us-central1
Allow unauthenticated
All
Just now
student-00-396b49e15663@qwiklabs.net
No services selected
PERMISSIONS
LABELS
Please select at least one resource.
CLOUD SHELL
Terminal
(qwiklabs-gcp-03-81b576f89469)
Open Editor
Digest: sha256:4be8ed9d51cb41ebc91fa2df00f24a2666ddf6da2a91c4ecc7e6cc5a2c046d13
Status: Downloaded newer image for gcr.io/qwiklabs-gcp-03-81b576f89469/helloworld:latest
a1955386e84f2660677cd690fc44fe9b712cb1bf882c0b7088a1ba78f82df8
student_00_396b49e15663@cloudshell:~/helloworld (qwiklabs-gcp-03-81b576f89469)$ gcloud run deploy --image gcr.io/$GOOGLE_CLOUD_PROJECT/helloworld --allow-unauthenticated --region=$LOCATION
Service name (helloworld):
Deploying container to Cloud Run service [helloworld] in project [qwiklabs-gcp-03-81b576f89469] region [us-central1]
OK Deploying new service... Done.
OK Creating Revision... Creating Service.
OK Routing traffic...
OK Setting IAM Policy...
Done.
Service [helloworld] revision [helloworld-00001-hof] has been deployed and is serving 100 percent of traffic.
Service URL: https://helloworld-c2o6nbspca-uc.a.run.app
student_00_396b49e15663@cloudshell:~/helloworld (qwiklabs-gcp-03-81b576f89469)$
4:51 PM

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No services selected
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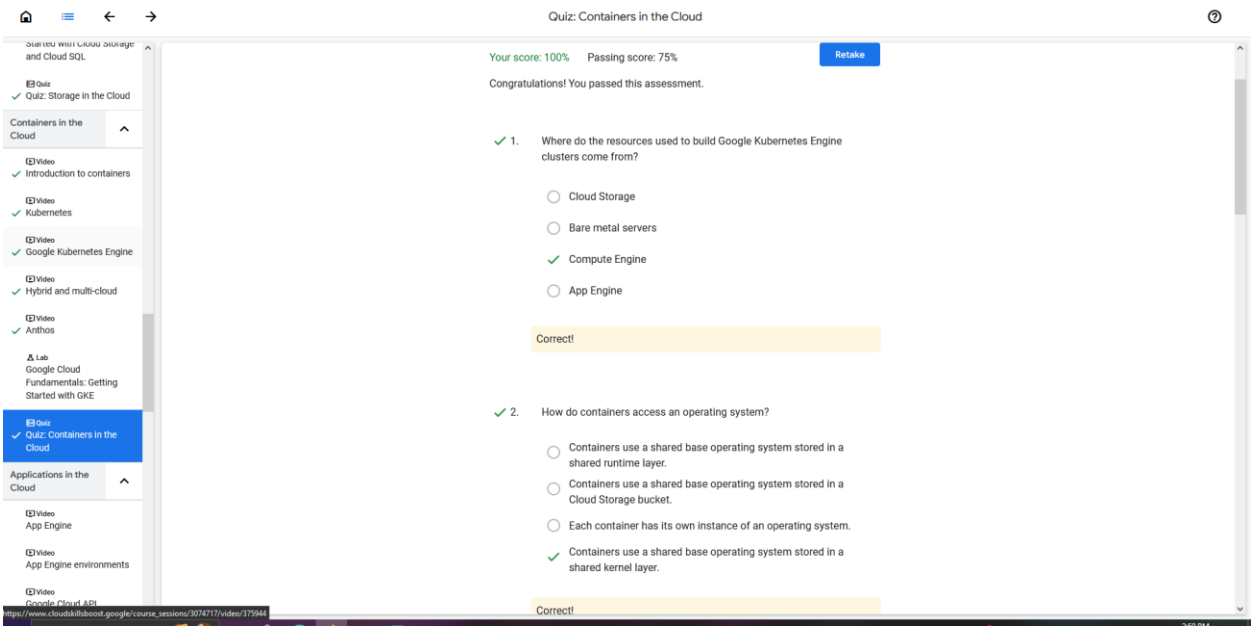
LABELS
Please select at least one resource.
CLOUD SHELL
Terminal
(qwiklabs-gcp-03-81b576f89469)
Open Editor
Associated tags:
- latest
Tags:
- gcr.io/qwiklabs-gcp-03-81b576f89469/helloworld:latest
This operation will delete the tags and images identified by the digests above.
Do you want to continue (Y/n)? y
Deleted [gcr.io/qwiklabs-gcp-03-81b576f89469/helloworld:latest].
Deleted [gcr.io/qwiklabs-gcp-03-81b576f89469/helloworld@sha256:4be8ed9d51cb41ebc91fa2df00f24a2666ddf6da2a91c4ecc7e6cc5a2c046d13].
student_00_396b49e15663@cloudshell:~/helloworld (qwiklabs-gcp-03-81b576f89469)$ gcloud run services delete helloworld --region=us-central1
Service [helloworld] will be deleted.
Do you want to continue (Y/n)?
4:51 PM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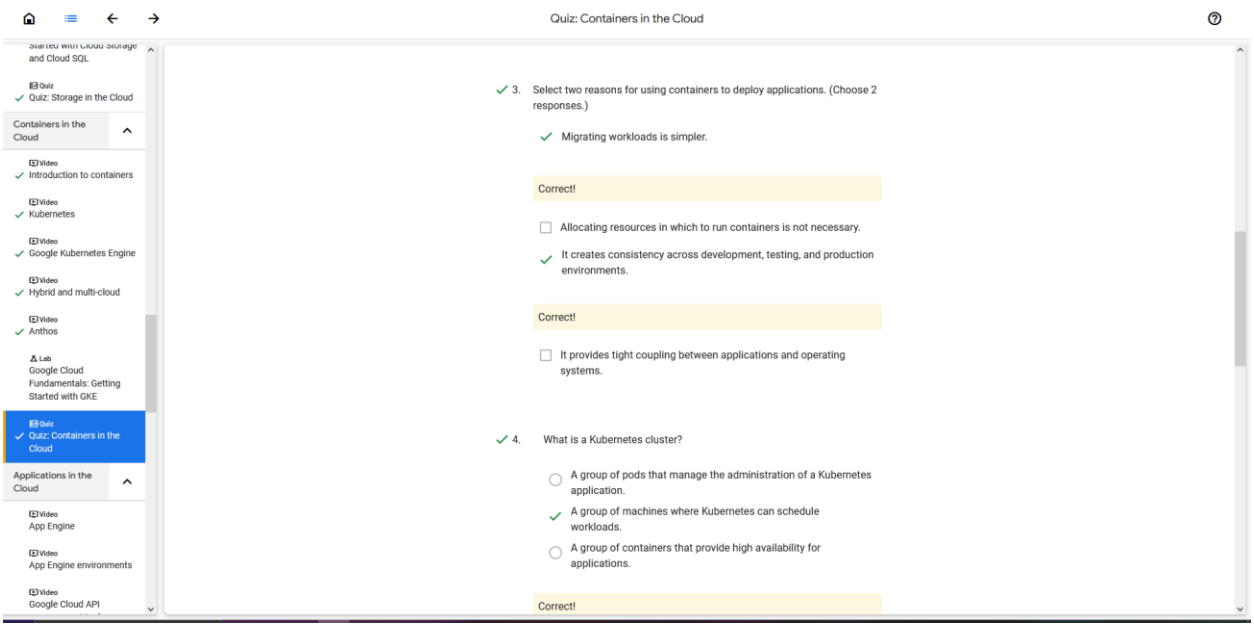
Your score: 100%
Passing score: 75%
Retake
Congratulations! You passed this assessment.
1. Where do the resources used to build Google Kubernetes Engine clusters come from?
Cloud Storage
Bare metal servers
Compute Engine
App Engine
Correct!
2. How do containers access an operating system?
Containers use a shared base operating system stored in a shared runtime layer.
Containers use a shared base operating system stored in a Cloud Storage bucket.
Each container has its own instance of an operating system.
Containers use a shared base operating system stored in a shared kernel layer.
Correct!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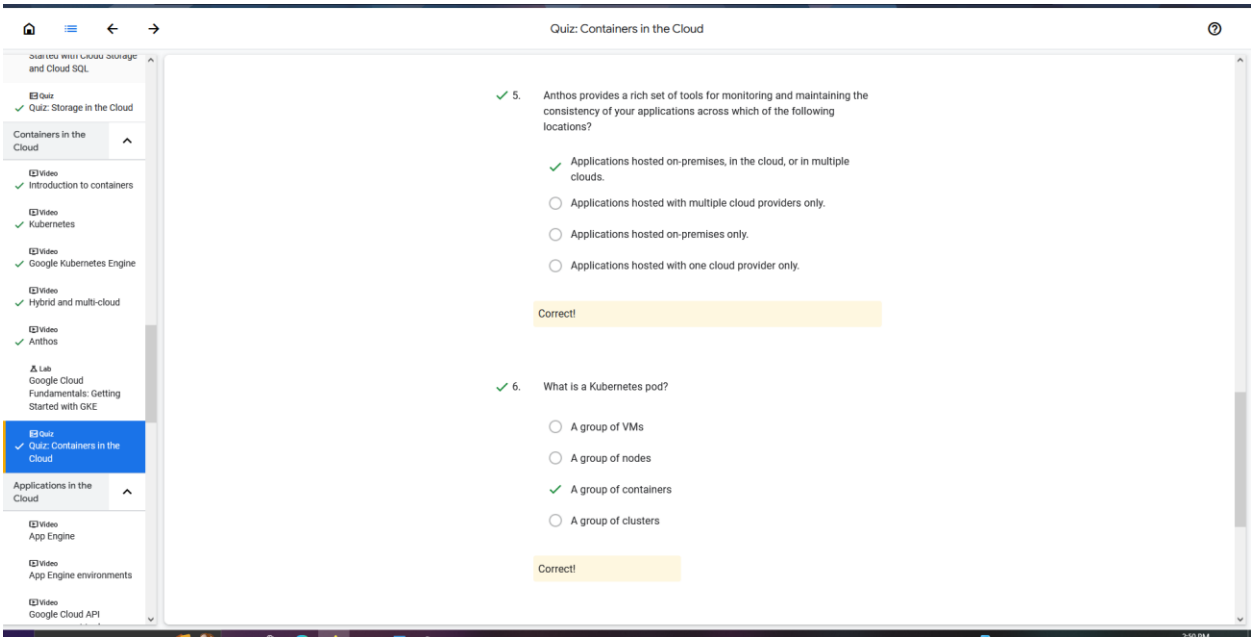
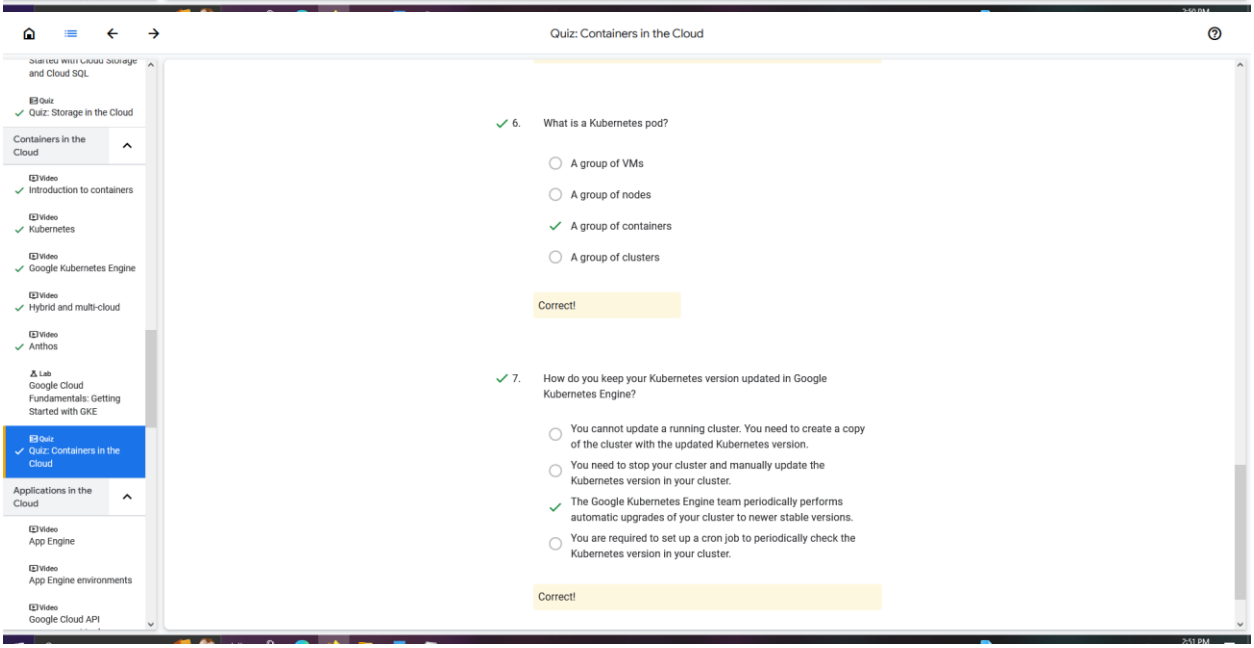
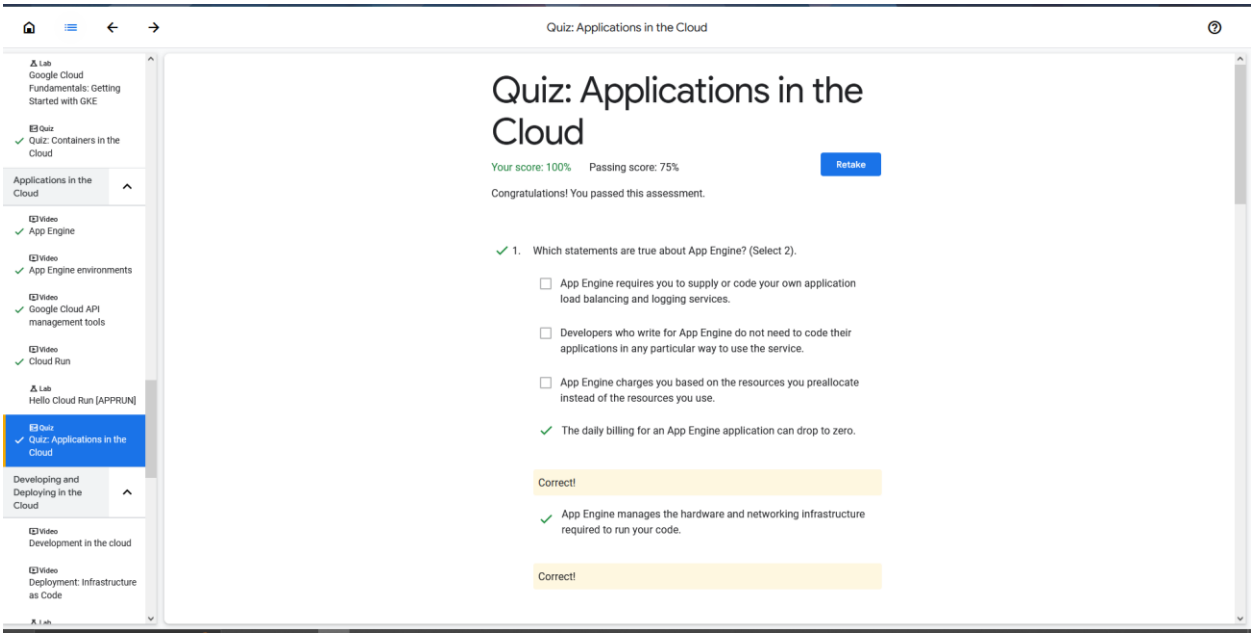
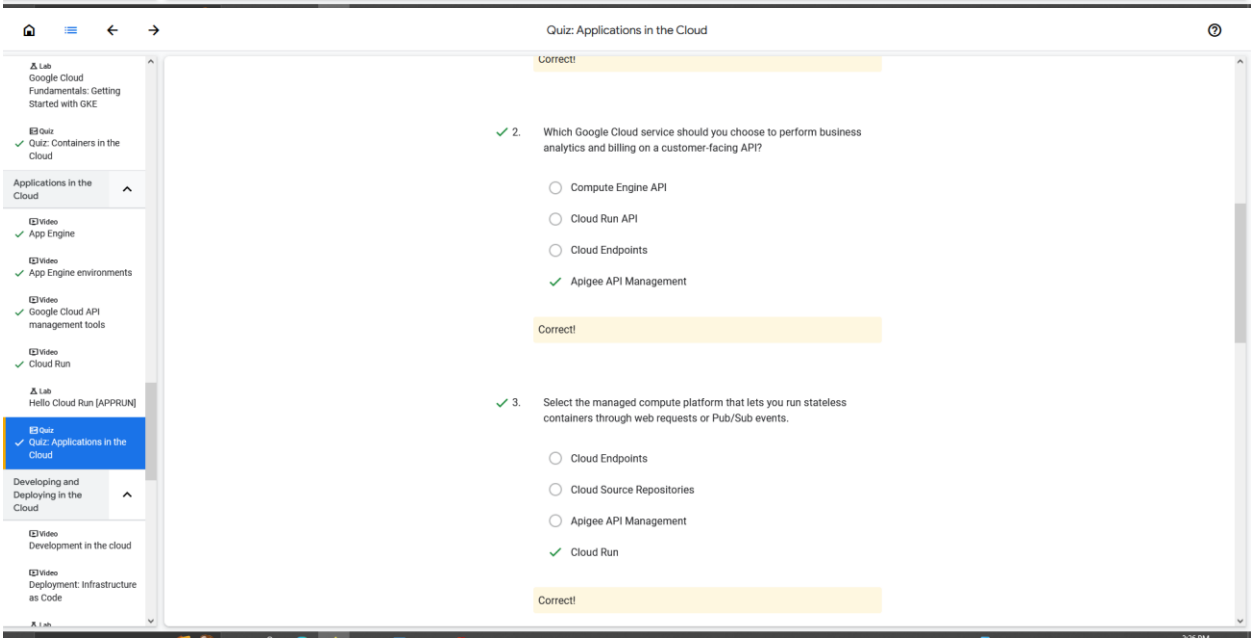
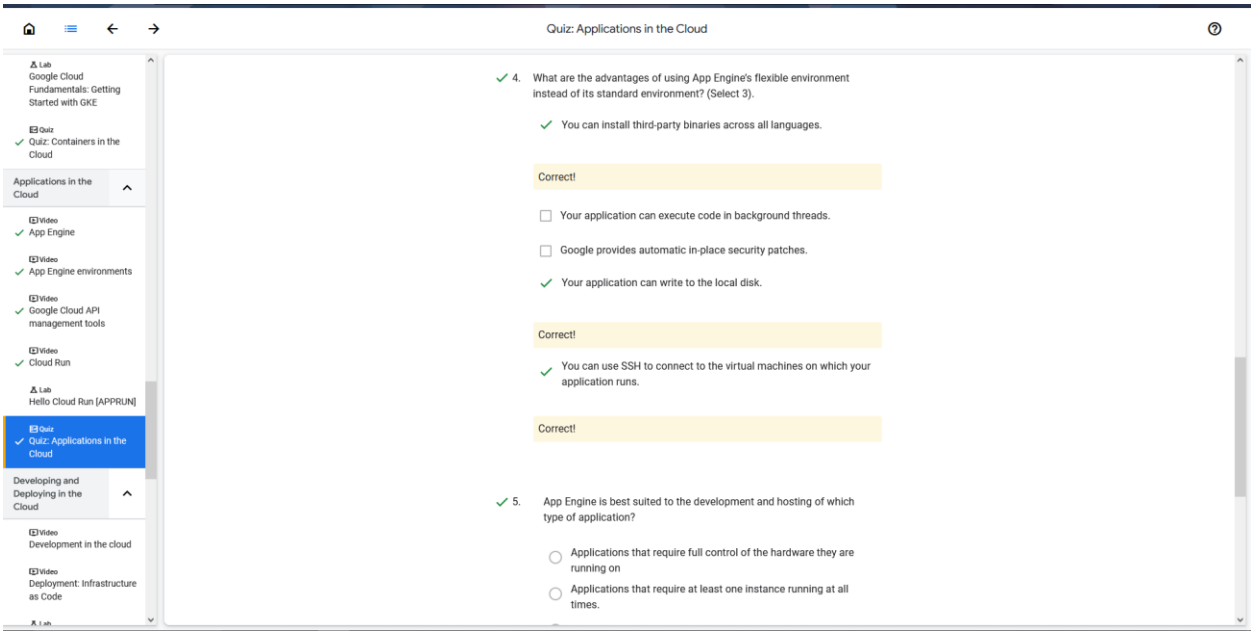
Google Cloud API
3. Select two reasons for using containers to deploy applications. (Choose 2 responses.)
Migrating workloads is simpler.
Correct!
Allocating resources in which to run containers is not necessary.
It creates consistency across development, testing, and production environments.
Correct!
It provides tight coupling between applications and operating systems.
4. What is a Kubernetes cluster?
A group of pods that manage the administration of a Kubernetes application.
A group of machines where Kubernetes can schedule workloads.
A group of containers that provide high availability for applications.
Correct!

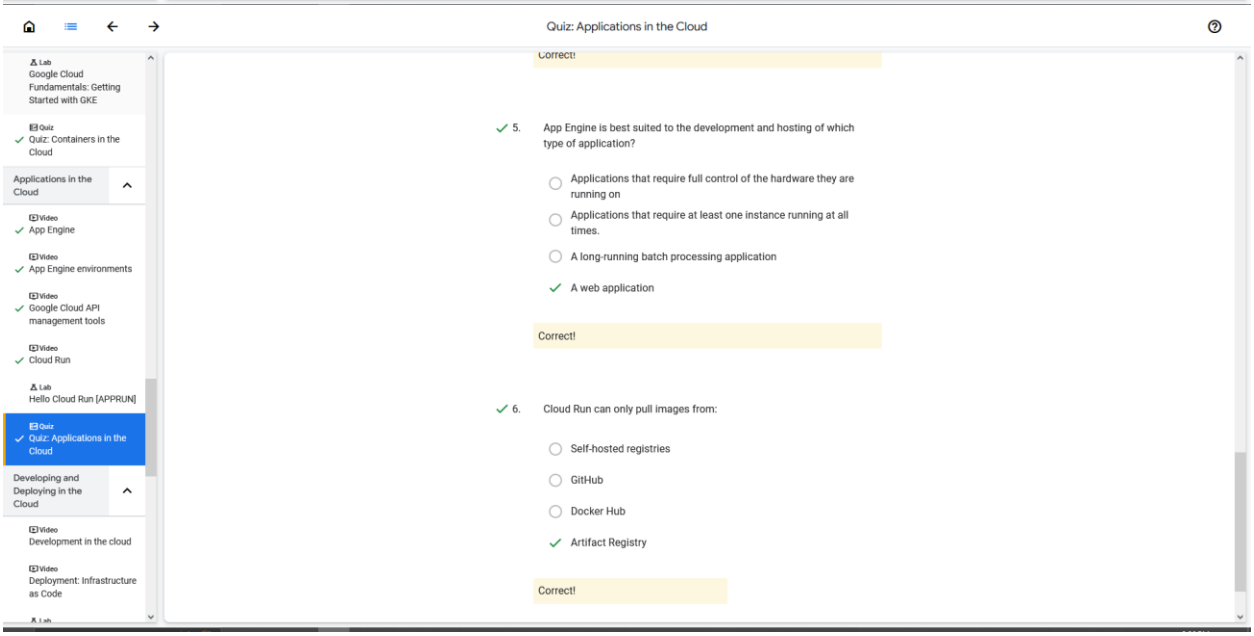

Quiz: Containers in the Cloud
and Cloud SQL
Quiz: Storage in the Cloud
Containers in the Cloud
Introduction to containers
Kubernetes
Google Kubernetes Engine
Hybrid and multi-cloud
Anthos
Google Cloud Fundamentals: Getting Started with GKE
Quiz: Containers in the Cloud
Applications in the Cloud
App Engine
App Engine environments
Google Cloud API
5. Anthos provides a rich set of tools for monitoring and maintaining the consistency of your applications across which of the following locations?
Applications hosted on-premises, in the cloud, or in multiple clouds.
Applications hosted with multiple cloud providers only.
Applications hosted on-premises only.
Applications hosted with one cloud provider only.
Correct!
6. What is a Kubernetes pod?
A group of VMs
A group of nodes
A group of containers
A group of clusters
Correct!

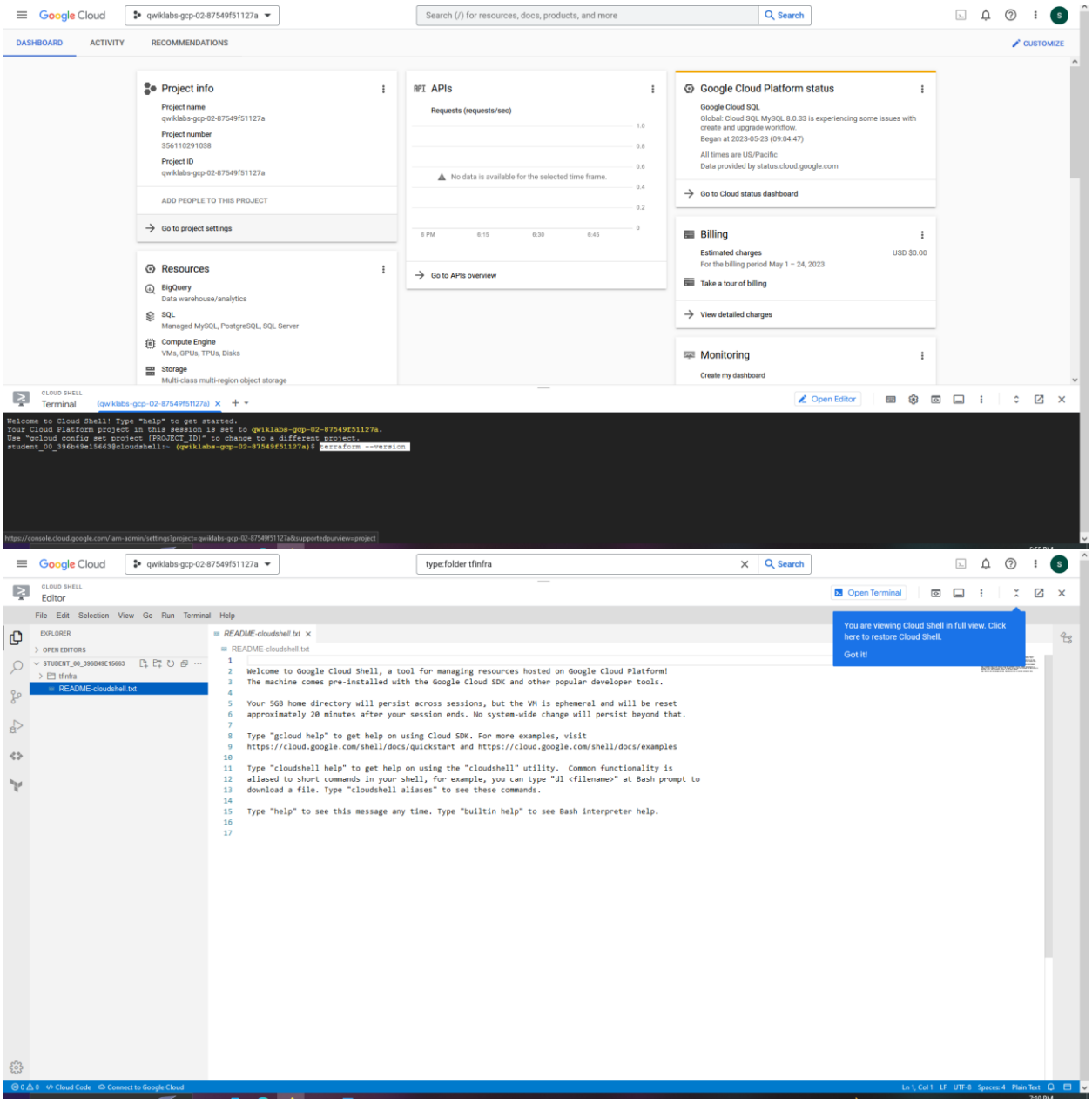

Quiz: Containers in the Cloud
and Cloud SQL
Quiz: Storage in the Cloud
Containers in the Cloud
Introduction to containers
Kubernetes
Google Kubernetes Engine
Hybrid and multi-cloud
Anthos
Google Cloud Fundamentals: Getting Started with GKE
Quiz: Containers in the Cloud
Applications in the Cloud
App Engine
App Engine environments
Google Cloud API
6. What is a Kubernetes pod?
A group of VMs
A group of nodes
A group of containers
A group of clusters
Correct!
7. How do you keep your Kubernetes version updated in Google Kubernetes Engine?
You cannot update a running cluster. You need to create a copy of the cluster with the updated Kubernetes version.
You need to stop your cluster and manually update the Kubernetes version in your cluster.
The Google Kubernetes Engine team periodically performs automatic upgrades of your cluster to newer stable versions.
You are required to set up a cron job to periodically check the Kubernetes version in your cluster.
Correct!


Quiz: Applications in the Cloud
Lab
Google Cloud Fundamentals: Getting Started with GKE
Quiz
Quiz: Containers in the Cloud
Applications in the Cloud
Video
App Engine
Video
App Engine environments
Video
Google Cloud API management tools
Video
Cloud Run
Lab
Hello Cloud Run [APPRUN]
Quiz
Quiz: Applications in the Cloud
Developing and Deploying in the Cloud
Video
Development in the cloud
Video
Deployment: Infrastructure as Code
Quiz: Applications in the Cloud
Your score: 100%
Passing score: 75%
Retake
Congratulations! You passed this assessment.
1. Which statements are true about App Engine? (Select 2).
App Engine requires you to supply or code your own application load balancing and logging services.
Developers who write for App Engine do not need to code their applications in any particular way to use the service.
App Engine charges you based on the resources you preallocate instead of the resources you use.
The daily billing for an App Engine application can drop to zero.
Correct!
App Engine manages the hardware and networking infrastructure required to run your code.
Correct!

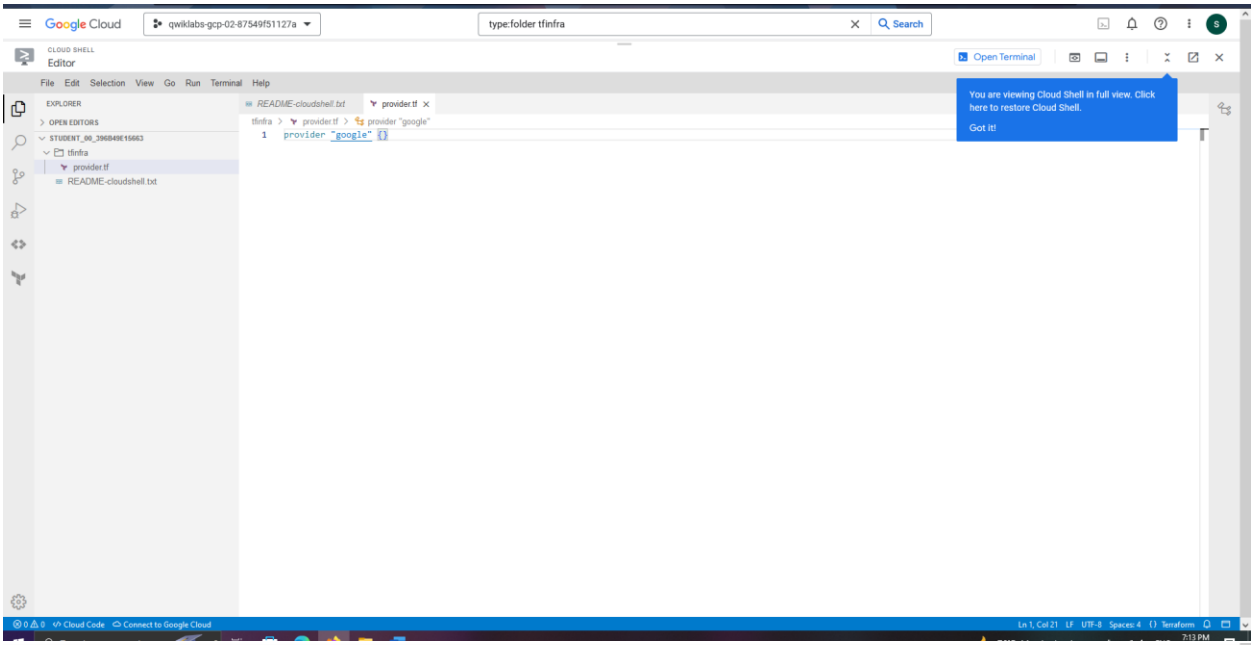

Quiz: Applications in the Cloud
Correct!
2. Which Google Cloud service should you choose to perform business analytics and billing on a customer-facing API?
Compute Engine API
Cloud Run API
Cloud Endpoints
Apigee API Management
Correct!
3. Select the managed compute platform that lets you run stateless containers through web requests or Pub/Sub events.
Cloud Endpoints
Cloud Source Repositories
Apigee API Management
Cloud Run
Correct!

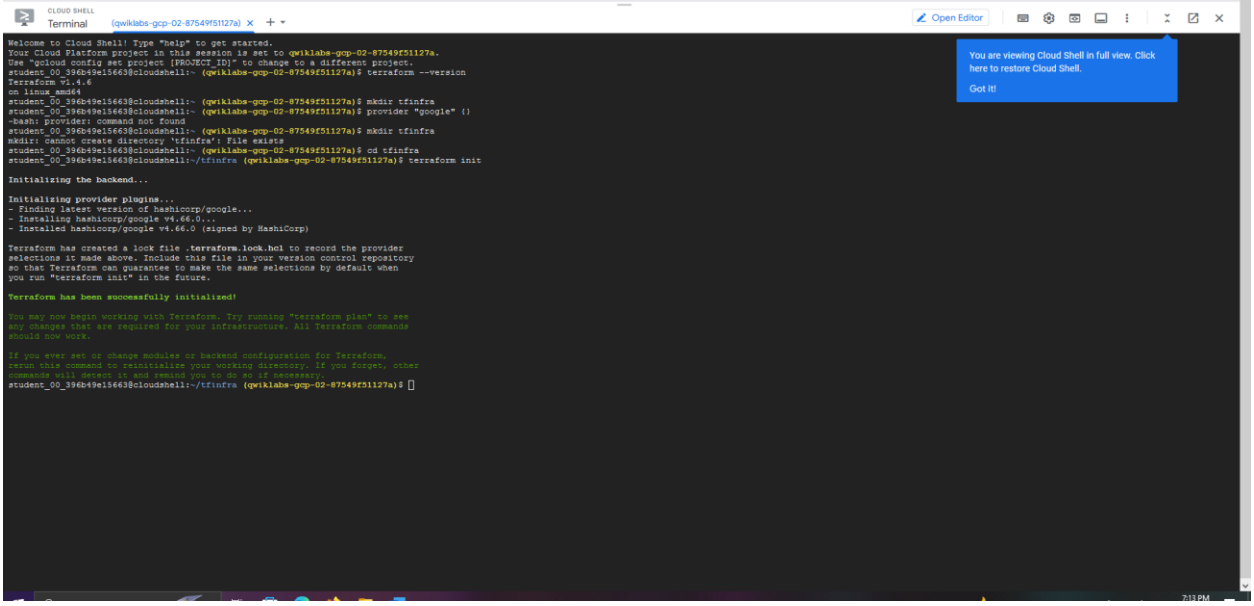

Quiz: Applications in the Cloud
Lab
Google Cloud Fundamentals: Getting Started with GKE
Quiz
Quiz: Containers in the Cloud
Applications in the Cloud
Video
App Engine
Video
App Engine environments
Video
Google Cloud API management tools
Video
Cloud Run
Lab
Hello Cloud Run [APPRUN]
Quiz
Quiz: Applications in the Cloud
Developing and Deploying in the Cloud
Video
Development in the cloud
Video
Deployment: Infrastructure as Code
4. What are the advantages of using App Engine's flexible environment instead of its standard environment? (Select 3).
You can install third-party binaries across all languages.
Correct!
Your application can execute code in background threads.
Google provides automatic in-place security patches.
Your application can write to the local disk.
Correct!
You can use SSH to connect to the virtual machines on which your application runs.
Correct!
5. App Engine is best suited to the development and hosting of which type of application?
Applications that require full control of the hardware they are running on
Applications that require at least one instance running at all times.

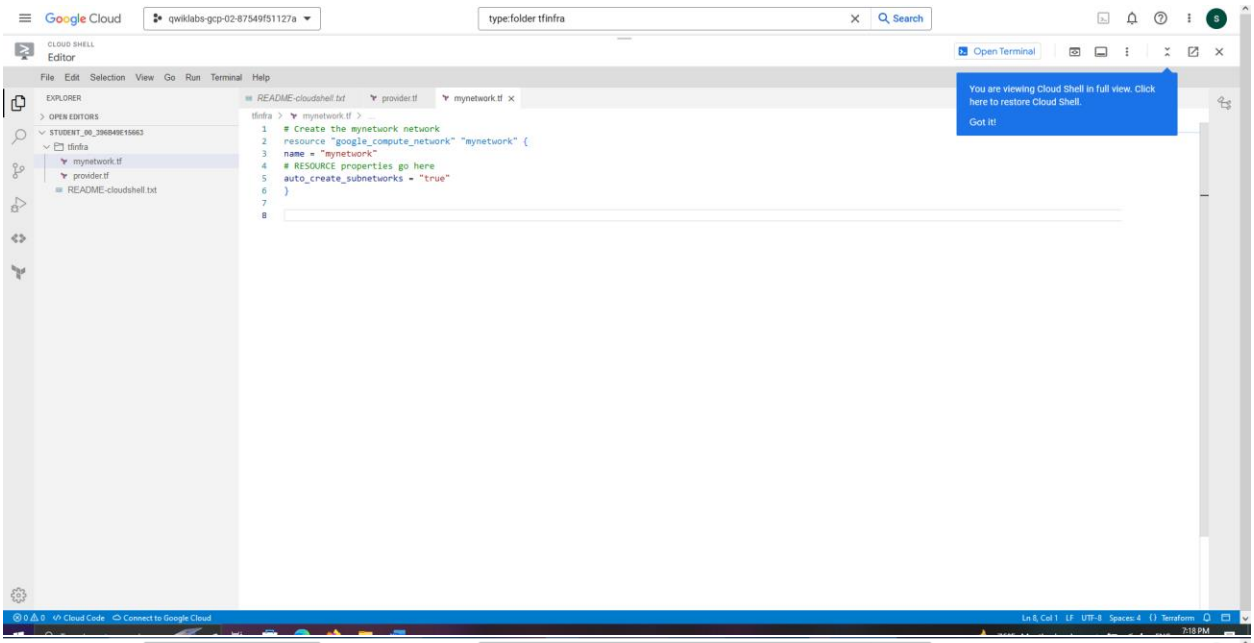

Quiz: Applications in the Cloud
Correct!
5. App Engine is best suited to the development and hosting of which type of application?
Applications that require full control of the hardware they are running on
Applications that require at least one instance running at all times.
A long-running batch processing application
A web application
Correct!
6. Cloud Run can only pull images from:
Self-hosted registries
GitHub
Docker Hub
Artifact Registry
Correct!

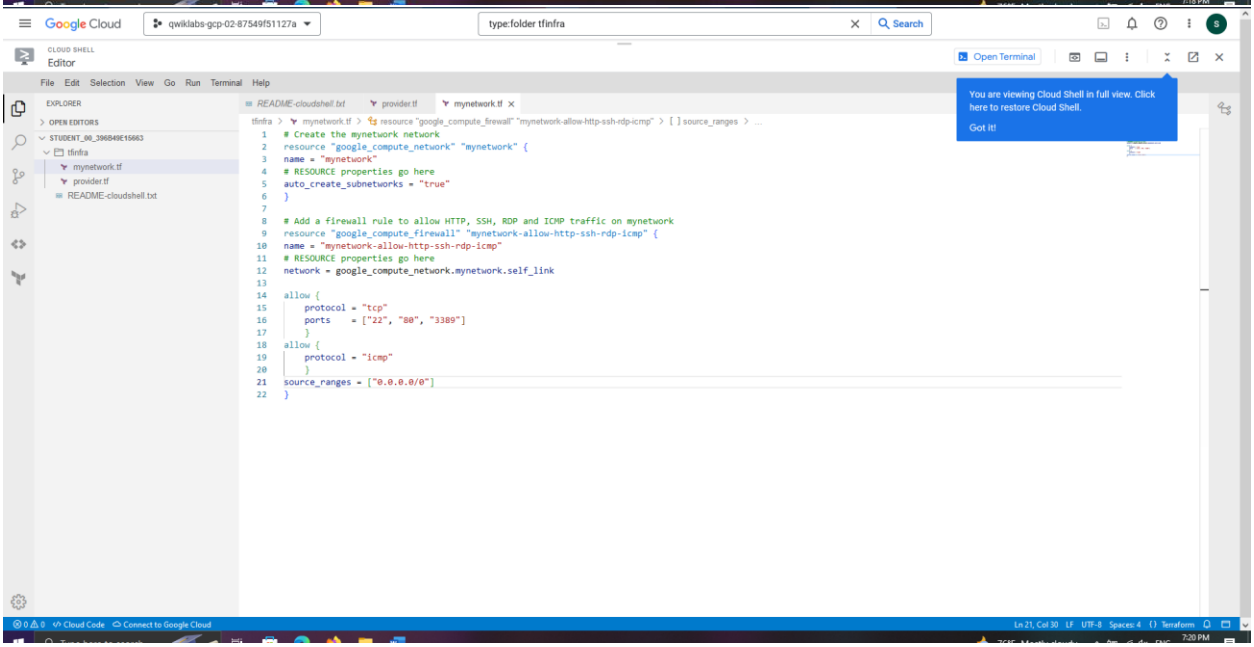

Google Cloud
qwiklabs-gcp-02-87549f51127a
Search (/) for resources, docs, products, and more
Search
DASHBOARD
ACTIVITY
RECOMMENDATIONS
CUSTOMIZE
Project info
Project name
qwiklabs-gcp-02-87549f51127a
Project number
356110291038
Project ID
qwiklabs-gcp-02-87549f51127a
ADD PEOPLE TO THIS PROJECT
Go to project settings
APIs
Requests (requests/sec)
No data is available for the selected time frame.
Go to APIs overview
Google Cloud Platform status
Google Cloud SQL
Global: Cloud SQL MySQL 8.0.33 is experiencing some issues with create and upgrade workflow.
Began at 2023-05-23 (09:04:47)
All times are US/Pacific
Data provided by status.cloud.google.com
Go to Cloud status dashboard
Billing
Estimated charges
USD $0.00
For the billing period May 1 – 24, 2023
Take a tour of billing
View detailed charges
Resources
BigQuery
Data warehouse/analytics
SQL
Managed MySQL, PostgreSQL, SQL Server
Compute Engine
VMs, GPUs, TPUs, Disks
Storage
Multi-class multi-region object storage
Monitoring
Create my dashboard
CLOUD SHELL
Terminal
(qwiklabs-gcp-02-87549f51127a)
Open Editor
Welcome to Cloud Shell! Type "help" to get started.
Your Cloud Platform project in this session is set to qwiklabs-gcp-02-87549f51127a.
Use "gcloud config set project [PROJECT_ID]" to change to a different project.
student_00_396b49e15663@cloudshell:~ (qwiklabs-gcp-02-87549f51127a)$ terraform --version

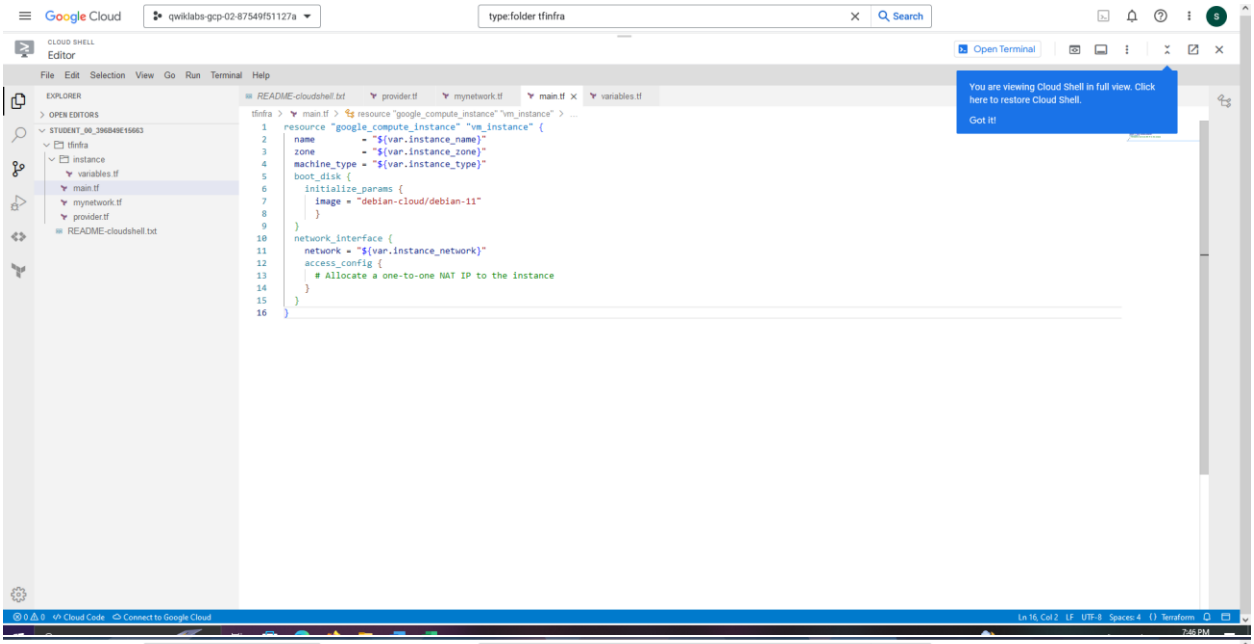
Google Cloud
qwiklabs-gcp-02-87549f51127a
type:folder tfinfra
Search
CLOUD SHELL
Editor
Open Terminal
File Edit Selection View Go Run Terminal Help
You are viewing Cloud Shell in full view. Click here to restore Cloud Shell.
Got it!
EXPLORER
OPEN EDITORS
STUDENT_00_396B49E15663
tfinfra
README-cloudshell.txt
README-cloudshell.txt
Welcome to Google Cloud Shell, a tool for managing resources hosted on Google Cloud Platform!
The machine comes pre-installed with the Google Cloud SDK and other popular developer tools.
Your 5GB home directory will persist across sessions, but the VM is ephemeral and will be reset
approximately 20 minutes after your session ends. No system-wide change will persist beyond that.
Type "gcloud help" to get help on using Cloud SDK. For more examples, visit
https://cloud.google.com/shell/docs/quickstart and https://cloud.google.com/shell/docs/examples
Type "cloudshell help" to get help on using the "cloudshell" utility. Common functionality is
aliased to short commands in your shell, for example, you can type "dl <filename>" at Bash prompt to
download a file. Type "cloudshell aliases" to see these commands.
Type "help" to see this message any time. Type "builtin help" to see Bash interpreter help.
Cloud Code
Connect to Google Cloud
Ln 1, Col 1
LF
UTF-8
Spaces: 4
Plain Text

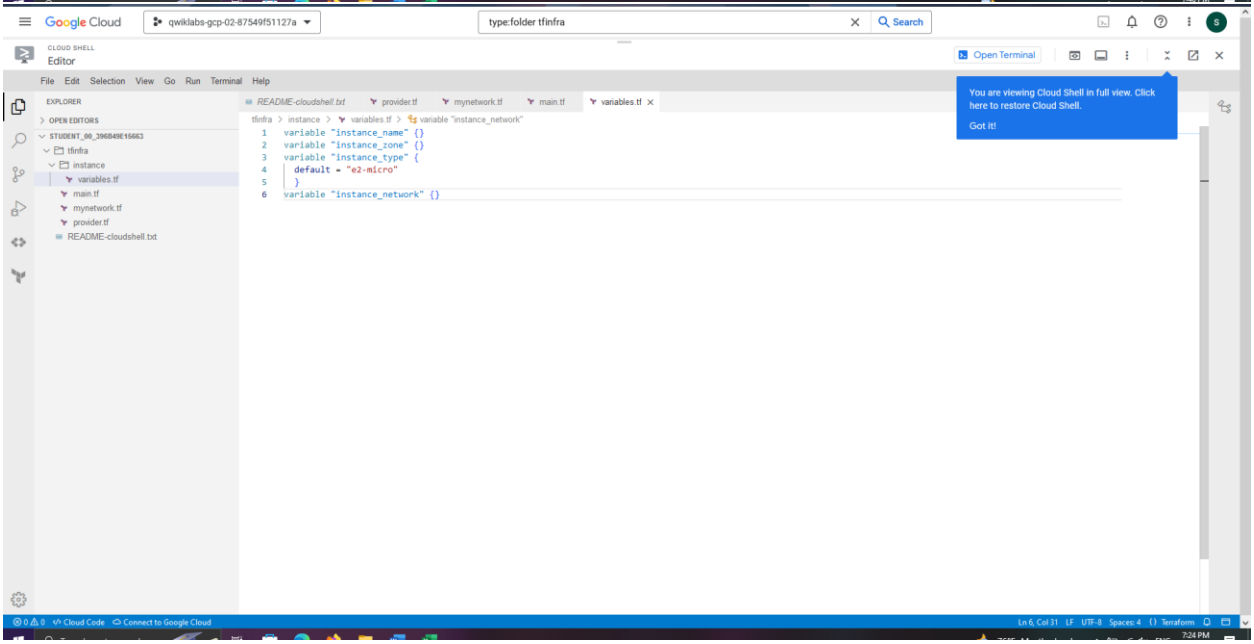

Google Cloud
qwiklabs-gcp-02-87549f51127a
type:folder tfinfra
Search
CLOUD SHELL
Editor
Open Terminal
File Edit Selection View Go Run Terminal Help
EXPLORER
OPEN EDITORS
STUDENT_00_396b49e15663
tfinfra
provider.tf
README-cloudshell.txt
README-cloudshell.txt
provider.tf
tfinfra > provider.tf > provider "google"
1 provider "google" {}
You are viewing Cloud Shell in full view. Click here to restore Cloud Shell.
Got it!
Cloud Code
Connect to Google Cloud
Ln 1, Col 21 LF UTF-8 Spaces: 4 Terraform
7:13 PM

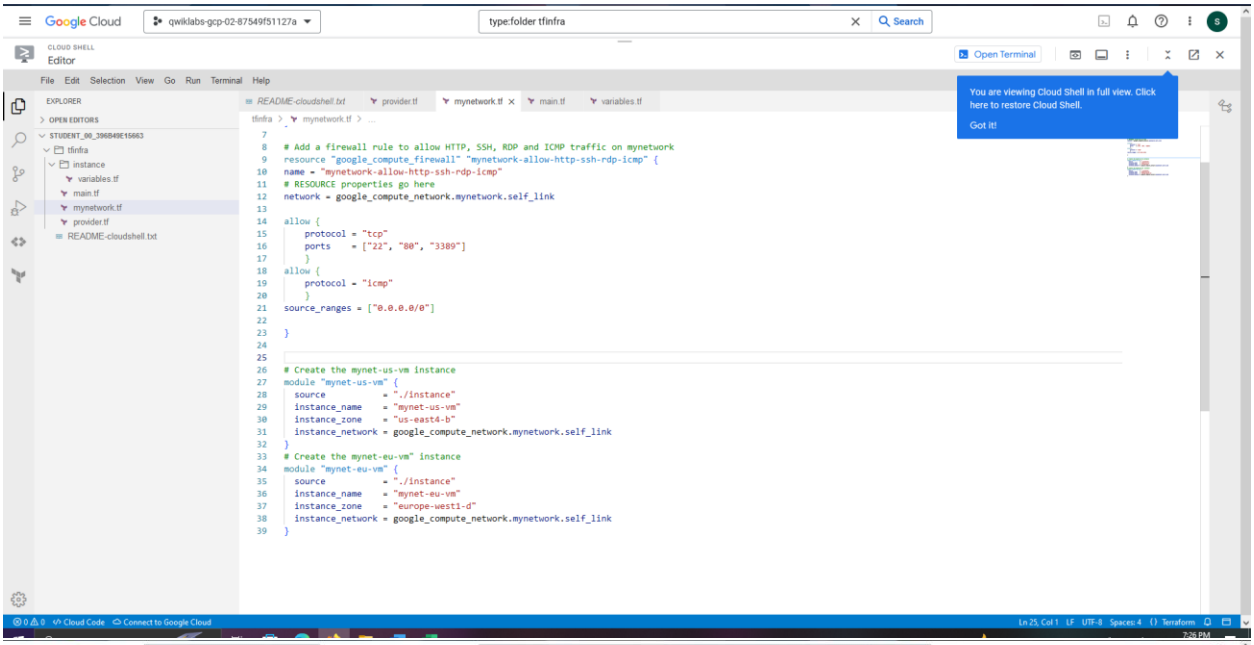

CLOUD SHELL
Terminal
(qwiklabs-gcp-02-87549f51127a)
Open Editor
Welcome to Cloud Shell! Type "help" to get started.
Your Cloud Platform project in this session is set to qwiklabs-gcp-02-87549f51127a.
Use "gcloud config set project [PROJECT_ID]" to change to a different project.
student_00_396b49e15663@cloudshell:~ (qwiklabs-gcp-02-87549f51127a)$ terraform --version
Terraform v1.4.6
on linux_amd64
student_00_396b49e15663@cloudshell:~ (qwiklabs-gcp-02-87549f51127a)$ mkdir tfinfra
student_00_396b49e15663@cloudshell:~ (qwiklabs-gcp-02-87549f51127a)$ provider "google" {}
-bash: provider: command not found
student_00_396b49e15663@cloudshell:~ (qwiklabs-gcp-02-87549f51127a)$ mkdir tfinfra
mkdir: cannot create directory 'tfinfra': File exists
student_00_396b49e15663@cloudshell:~ (qwiklabs-gcp-02-87549f51127a)$ cd tfinfra
student_00_396b49e15663@cloudshell:~/tfinfra (qwiklabs-gcp-02-87549f51127a)$ terraform init
Initializing the backend...
Initializing provider plugins...
- Finding latest version of hashicorp/google...
- Installing hashicorp/google v4.66.0...
- Installed hashicorp/google v4.66.0 (signed by HashiCorp)
Terraform has created a lock file .terraform.lock.hcl to record the provider
selections it made above. Include this file in your version control repository
so that Terraform can guarantee to make the same selections by default when
you run "terraform init" in the future.
Terraform has been successfully initialized!
You may now begin working with Terraform. Try running "terraform plan" to see
any changes that are required for your infrastructure. All Terraform commands
should now work.
If you ever set or change modules or backend configuration for Terraform,
rerun this command to reinitialize your working directory. If you forget, other
commands will detect it and remind you to do so if necessary.
student_00_396b49e15663@cloudshell:~/tfinfra (qwiklabs-gcp-02-87549f51127a)$
You are viewing Cloud Shell in full view. Click here to restore Cloud Shell.
Got it!
7:13 PM

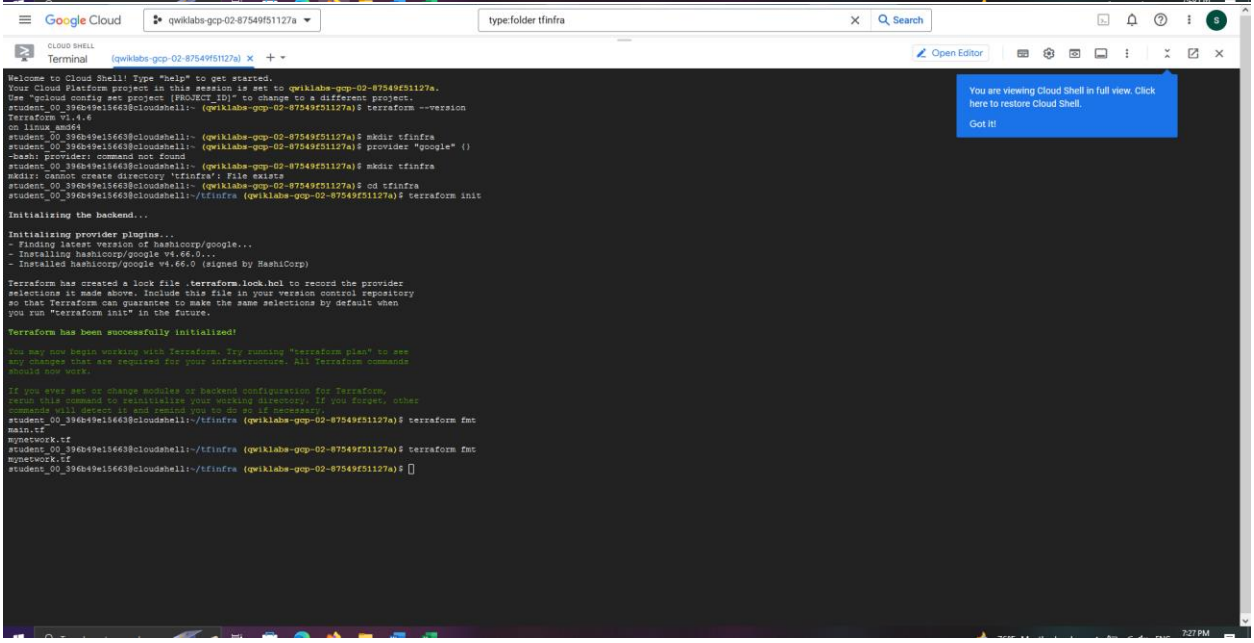

Google Cloud
qwiklabs-gcp-02-87549f51127a
type:folder tfinfra
Search
CLOUD SHELL
Editor
Open Terminal
File Edit Selection View Go Run Terminal Help
You are viewing Cloud Shell in full view. Click here to restore Cloud Shell.
Got it!
EXPLORER
OPEN EDITORS
STUDENT_00_396849E15663
tfinfra
mynetwork.tf
provider.tf
README-cloudshell.txt
README-cloudshell.txt
provider.tf
mynetwork.tf
tfinfra > mynetwork.tf > ...
1 # Create the mynetwork network
2 resource "google_compute_network" "mynetwork" {
3 name = "mynetwork"
4 # RESOURCE properties go here
5 auto_create_subnetworks = "true"
6 }
7
8
Cloud Code
Connect to Google Cloud
Ln 8, Col 1
LF
UTF-8
Spaces: 4
Terraform
7:18 PM

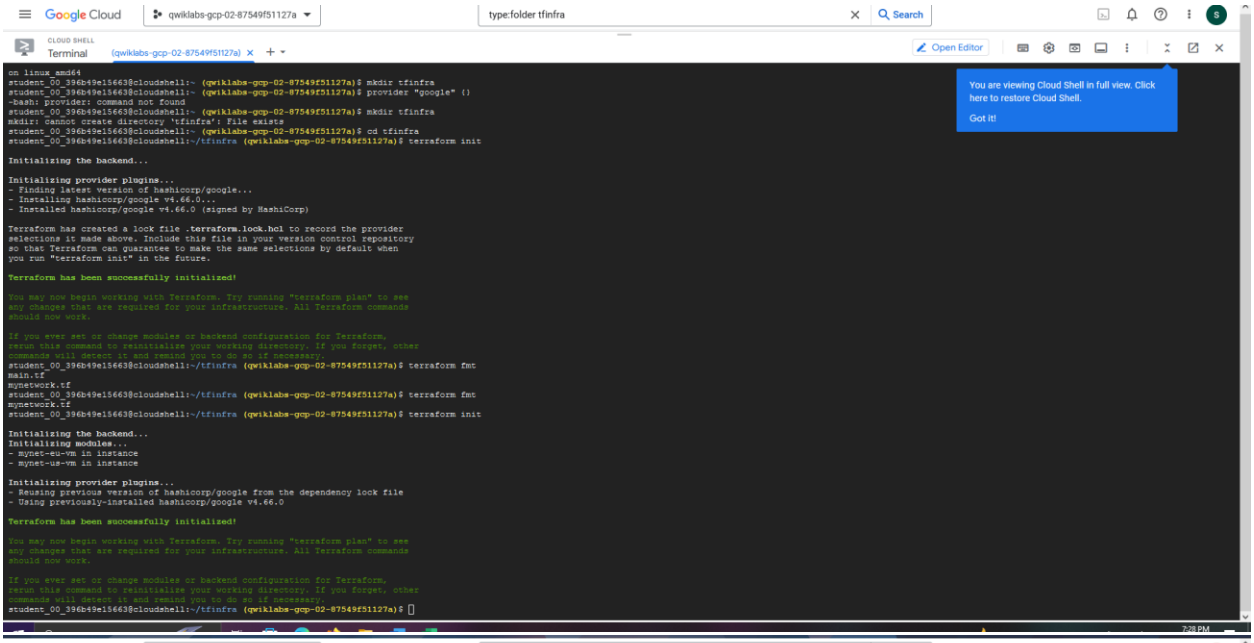

Google Cloud
qwiklabs-gcp-02-87549f51127a
type:folder tfinfra
Search
CLOUD SHELL
Editor
Open Terminal
File Edit Selection View Go Run Terminal Help
You are viewing Cloud Shell in full view. Click here to restore Cloud Shell.
Got it!
EXPLORER
OPEN EDITORS
STUDENT_00_396849E15663
tfinfra
mynetwork.tf
provider.tf
README-cloudshell.txt
README-cloudshell.txt
provider.tf
mynetwork.tf
tfinfra > mynetwork.tf > resource "google_compute_firewall" "mynetwork-allow-http-ssh-rdp-icmp" > [ ] source_ranges > ...
1 # Create the mynetwork network
2 resource "google_compute_network" "mynetwork" {
3 name = "mynetwork"
4 # RESOURCE properties go here
5 auto_create_subnetworks = "true"
6 }
7
8 # Add a firewall rule to allow HTTP, SSH, RDP and ICMP traffic on mynetwork
9 resource "google_compute_firewall" "mynetwork-allow-http-ssh-rdp-icmp" {
10 name = "mynetwork-allow-http-ssh-rdp-icmp"
11 # RESOURCE properties go here
12 network = google_compute_network.mynetwork.self_link
13
14 allow {
15 protocol = "tcp"
16 ports = ["22", "80", "3389"]
17 }
18 allow {
19 protocol = "icmp"
20 }
21 source_ranges = ["0.0.0.0/0"]
22 }
Cloud Code
Connect to Google Cloud
Ln 21, Col 30
LF
UTF-8
Spaces: 4
Terraform
7:20 PM

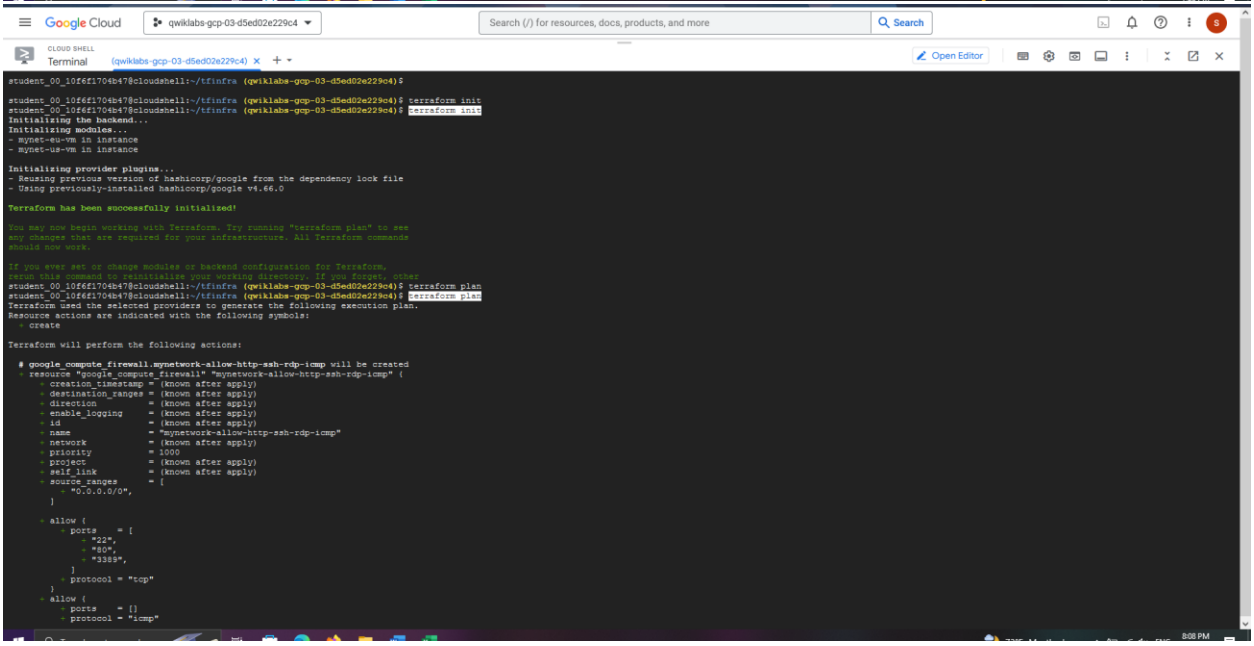

Google Cloud
qwiklabs-gcp-02-87549f51127a
type:folder tfinfra
Search
CLOUD SHELL
Editor
Open Terminal
File Edit Selection View Go Run Terminal Help
You are viewing Cloud Shell in full view. Click here to restore Cloud Shell.
Got it!
EXPLORER
OPEN EDITORS
STUDENT_00_396B49E15663
tfinfra
instance
variables.tf
main.tf
mynetwork.tf
provider.tf
README-cloudshell.txt
README-cloudshell.txt
provider.tf
mynetwork.tf
main.tf
variables.tf
tfinfra > main.tf > resource "google_compute_instance" "vm_instance" > ...
resource "google_compute_instance" "vm_instance" {
name = "${var.instance_name}"
zone = "${var.instance_zone}"
machine_type = "${var.instance_type}"
boot_disk {
initialize_params {
image = "debian-cloud/debian-11"
}
}
network_interface {
network = "${var.instance_network}"
access_config {
# Allocate a one-to-one NAT IP to the instance
}
}
}
Cloud Code
Connect to Google Cloud
Ln 16, Col 2
LF
UTF-8
Spaces: 4
Terraform
7:46 PM

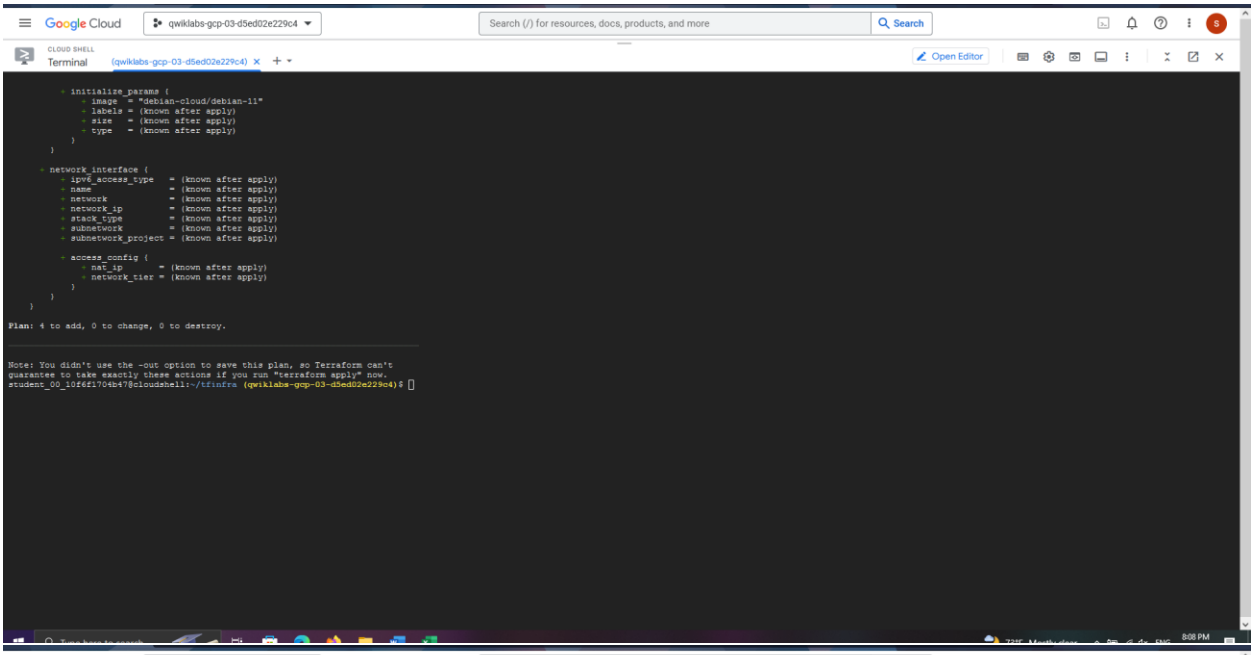

Google Cloud
qwiklabs-gcp-02-87549f51127a
type:folder tfinfra
Search
CLOUD SHELL
Editor
Open Terminal
File Edit Selection View Go Run Terminal Help
You are viewing Cloud Shell in full view. Click here to restore Cloud Shell.
Got it!
EXPLORER
OPEN EDITORS
STUDENT_00_396B49E15663
tfinfra
instance
variables.tf
main.tf
mynetwork.tf
provider.tf
README-cloudshell.txt
README-cloudshell.txt
provider.tf
mynetwork.tf
main.tf
variables.tf
tfinfra > instance > variables.tf > variable "instance_network"
variable "instance_name" {}
variable "instance_zone" {}
variable "instance_type" {
default = "e2-micro"
}
variable "instance_network" {}
Cloud Code
Connect to Google Cloud
Ln 6, Col 31
LF
UTF-8
Spaces: 4
Terraform
7:24 PM

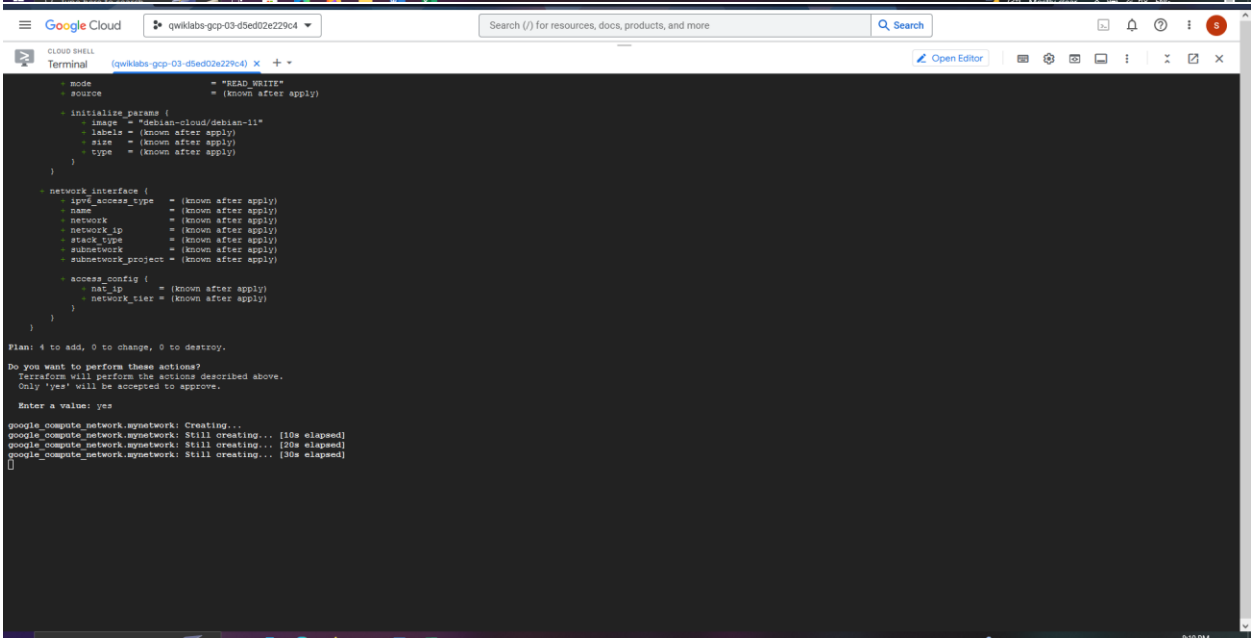

Google Cloud
qwiklabs-gcp-02-87549f51127a
type:folder tfinfra
Search
CLOUD SHELL
Editor
Open Terminal
File Edit Selection View Go Run Terminal Help
EXPLORER
OPEN EDITORS
STUDENT_00_396b49e15663
tfinfra
instance
variables.tf
main.tf
mynetwork.tf
provider.tf
README-cloudshell.txt
README-cloudshell.txt
provider.tf
mynetwork.tf
main.tf
variables.tf
tfinfra > mynetwork.tf > ...
# Add a firewall rule to allow HTTP, SSH, RDP and ICMP traffic on mynetwork
resource "google_compute_firewall" "mynetwork-allow-http-ssh-rdp-icmp" {
name = "mynetwork-allow-http-ssh-rdp-icmp"
# RESOURCE properties go here
network = google_compute_network.mynetwork.self_link
allow {
protocol = "tcp"
ports = ["22", "80", "3389"]
}
allow {
protocol = "icmp"
}
source_ranges = ["0.0.0.0/0"]
}
# Create the mynet-us-vm instance
module "mynet-us-vm" {
source = "./instance"
instance_name = "mynet-us-vm"
instance_zone = "us-east4-b"
instance_network = google_compute_network.mynetwork.self_link
}
# Create the mynet-eu-vm" instance
module "mynet-eu-vm" {
source = "./instance"
instance_name = "mynet-eu-vm"
instance_zone = "europe-west1-d"
instance_network = google_compute_network.mynetwork.self_link
}
You are viewing Cloud Shell in full view. Click here to restore Cloud Shell.
Got it!
Cloud Code
Connect to Google Cloud
Ln 25, Col 1
LF
UTF-8
Spaces: 4
Terraform
7:26 PM

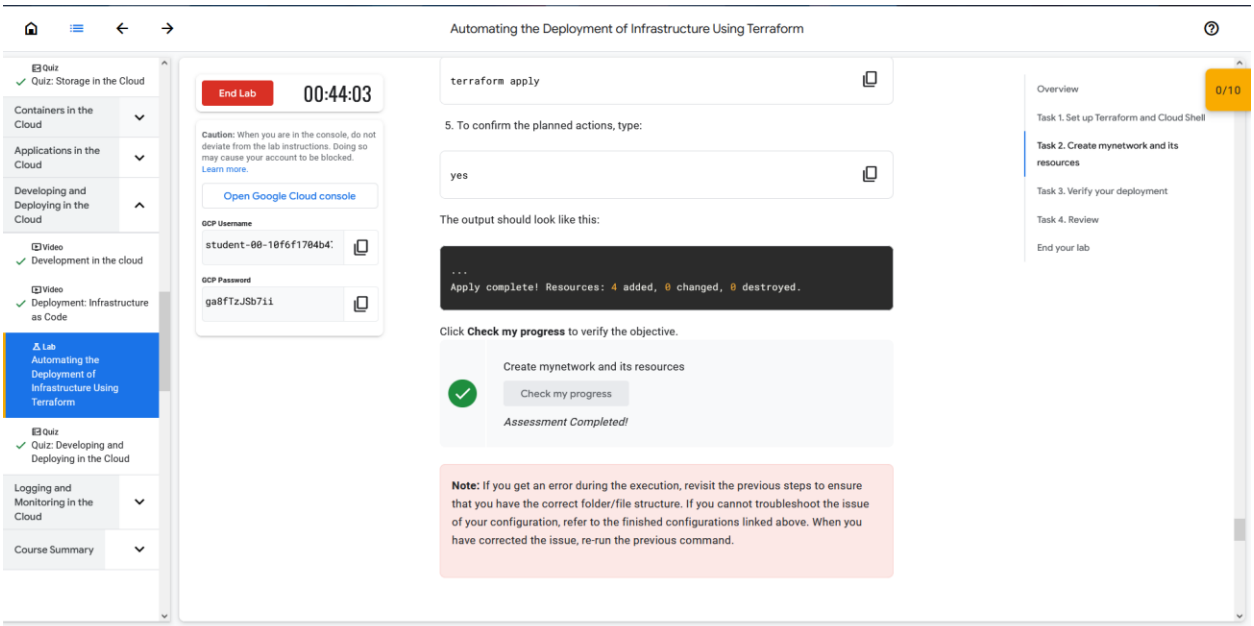

Google Cloud
qwiklabs-gcp-02-87549f51127a
type:folder tfinfra
Search
CLOUD SHELL
Terminal
(qwiklabs-gcp-02-87549f51127a)
Open Editor
Welcome to Cloud Shell! Type "help" to get started.
Your Cloud Platform project in this session is set to qwiklabs-gcp-02-87549f51127a.
Use "gcloud config set project [PROJECT_ID]" to change to a different project.
student_00_396b49e15663@cloudshell:~ (qwiklabs-gcp-02-87549f51127a)$ terraform --version
Terraform v1.4.6
on linux_amd64
student_00_396b49e15663@cloudshell:~ (qwiklabs-gcp-02-87549f51127a)$ mkdir tfinfra
student_00_396b49e15663@cloudshell:~ (qwiklabs-gcp-02-87549f51127a)$ provider "google" {}
-bash: provider: command not found
student_00_396b49e15663@cloudshell:~ (qwiklabs-gcp-02-87549f51127a)$ mkdir tfinfra
mkdir: cannot create directory 'tfinfra': File exists
student_00_396b49e15663@cloudshell:~ (qwiklabs-gcp-02-87549f51127a)$ cd tfinfra
student_00_396b49e15663@cloudshell:~/tfinfra (qwiklabs-gcp-02-87549f51127a)$ terraform init
Initializing the backend...
Initializing provider plugins...
- Finding latest version of hashicorp/google...
- Installing hashicorp/google v4.66.0...
- Installed hashicorp/google v4.66.0 (signed by HashiCorp)
Terraform has created a lock file .terraform.lock.hcl to record the provider
selections it made above. Include this file in your version control repository
so that Terraform can guarantee to make the same selections by default when
you run "terraform init" in the future.
Terraform has been successfully initialized!
You may now begin working with Terraform. Try running "terraform plan" to see
any changes that are required for your infrastructure. All Terraform commands
should now work.
If you ever set or change modules or backend configuration for Terraform,
rerun this command to reinitialize your working directory. If you forget, other
commands will detect it and remind you to do so if necessary.
student_00_396b49e15663@cloudshell:~/tfinfra (qwiklabs-gcp-02-87549f51127a)$ terraform fmt
main.tf
mynetwork.tf
student_00_396b49e15663@cloudshell:~/tfinfra (qwiklabs-gcp-02-87549f51127a)$ terraform fmt
mynetwork.tf
student_00_396b49e15663@cloudshell:~/tfinfra (qwiklabs-gcp-02-87549f51127a)$
You are viewing Cloud Shell in full view. Click here to restore Cloud Shell.
Got it!
7:27 PM

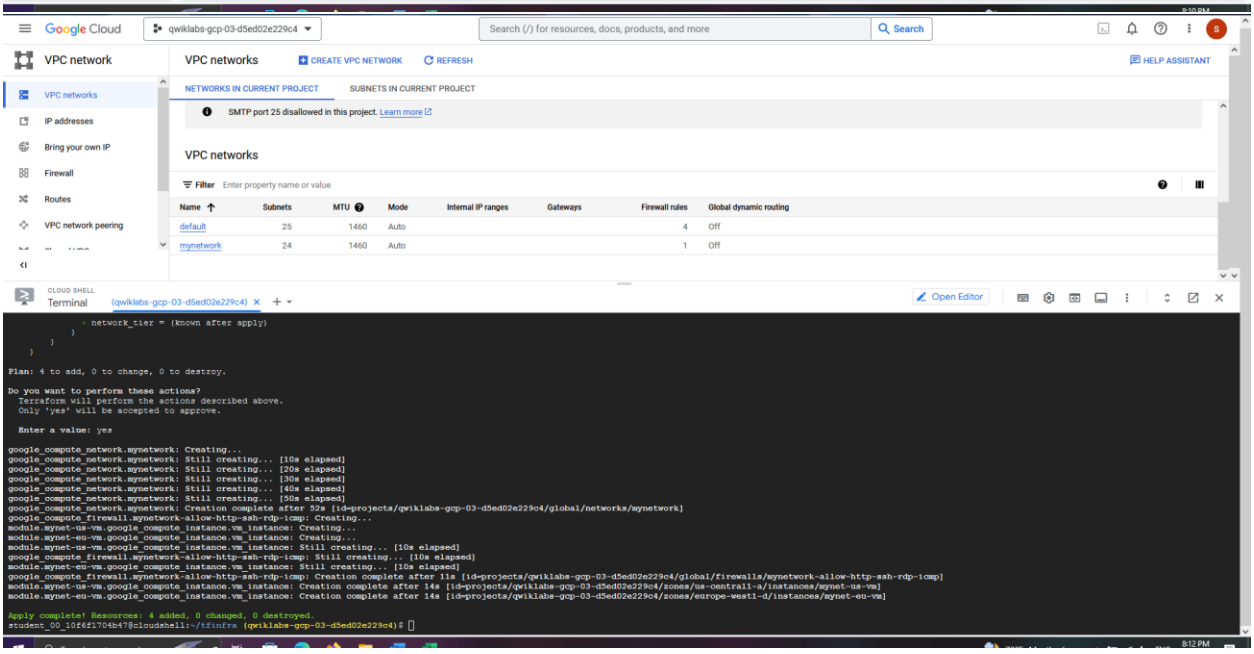

Google Cloud
qwiklabs-gcp-02-87549f51127a
type:folder tfinfra
Search
CLOUD SHELL
Terminal
(qwiklabs-gcp-02-87549f51127a)
Open Editor
You are viewing Cloud Shell in full view. Click here to restore Cloud Shell.
Got it!
on linux_amd64
student_00_396b49e15663@cloudshell:~ (qwiklabs-gcp-02-87549f51127a)$ mkdir tfinfra
student_00_396b49e15663@cloudshell:~ (qwiklabs-gcp-02-87549f51127a)$ provider "google" {}
-bash: provider: command not found
student_00_396b49e15663@cloudshell:~ (qwiklabs-gcp-02-87549f51127a)$ mkdir tfinfra
mkdir: cannot create directory 'tfinfra': File exists
student_00_396b49e15663@cloudshell:~ (qwiklabs-gcp-02-87549f51127a)$ cd tfinfra
student_00_396b49e15663@cloudshell:~/tfinfra (qwiklabs-gcp-02-87549f51127a)$ terraform init
Initializing the backend...
Initializing provider plugins...
- Finding latest version of hashicorp/google...
- Installing hashicorp/google v4.66.0...
- Installed hashicorp/google v4.66.0 (signed by HashiCorp)
Terraform has created a lock file .terraform.lock.hcl to record the provider
selections it made above. Include this file in your version control repository
so that Terraform can guarantee to make the same selections by default when
you run "terraform init" in the future.
Terraform has been successfully initialized!
You may now begin working with Terraform. Try running "terraform plan" to see
any changes that are required for your infrastructure. All Terraform commands
should now work.
If you ever set or change modules or backend configuration for Terraform,
rerun this command to reinitialize your working directory. If you forget, other
commands will detect it and remind you to do so if necessary.
student_00_396b49e15663@cloudshell:~/tfinfra (qwiklabs-gcp-02-87549f51127a)$ terraform fmt
main.tf
mynetwork.tf
student_00_396b49e15663@cloudshell:~/tfinfra (qwiklabs-gcp-02-87549f51127a)$ terraform fmt
mynetwork.tf
student_00_396b49e15663@cloudshell:~/tfinfra (qwiklabs-gcp-02-87549f51127a)$ terraform init
Initializing the backend...
Initializing modules...
- mynet-eu-vm in instance
- mynet-us-vm in instance
Initializing provider plugins...
- Reusing previous version of hashicorp/google from the dependency lock file
- Using previously-installed hashicorp/google v4.66.0
Terraform has been successfully initialized!
You may now begin working with Terraform. Try running "terraform plan" to see
any changes that are required for your infrastructure. All Terraform commands
should now work.
If you ever set or change modules or backend configuration for Terraform,
rerun this command to reinitialize your working directory. If you forget, other
commands will detect it and remind you to do so if necessary.
student_00_396b49e15663@cloudshell:~/tfinfra (qwiklabs-gcp-02-87549f51127a)$
7:38 PM

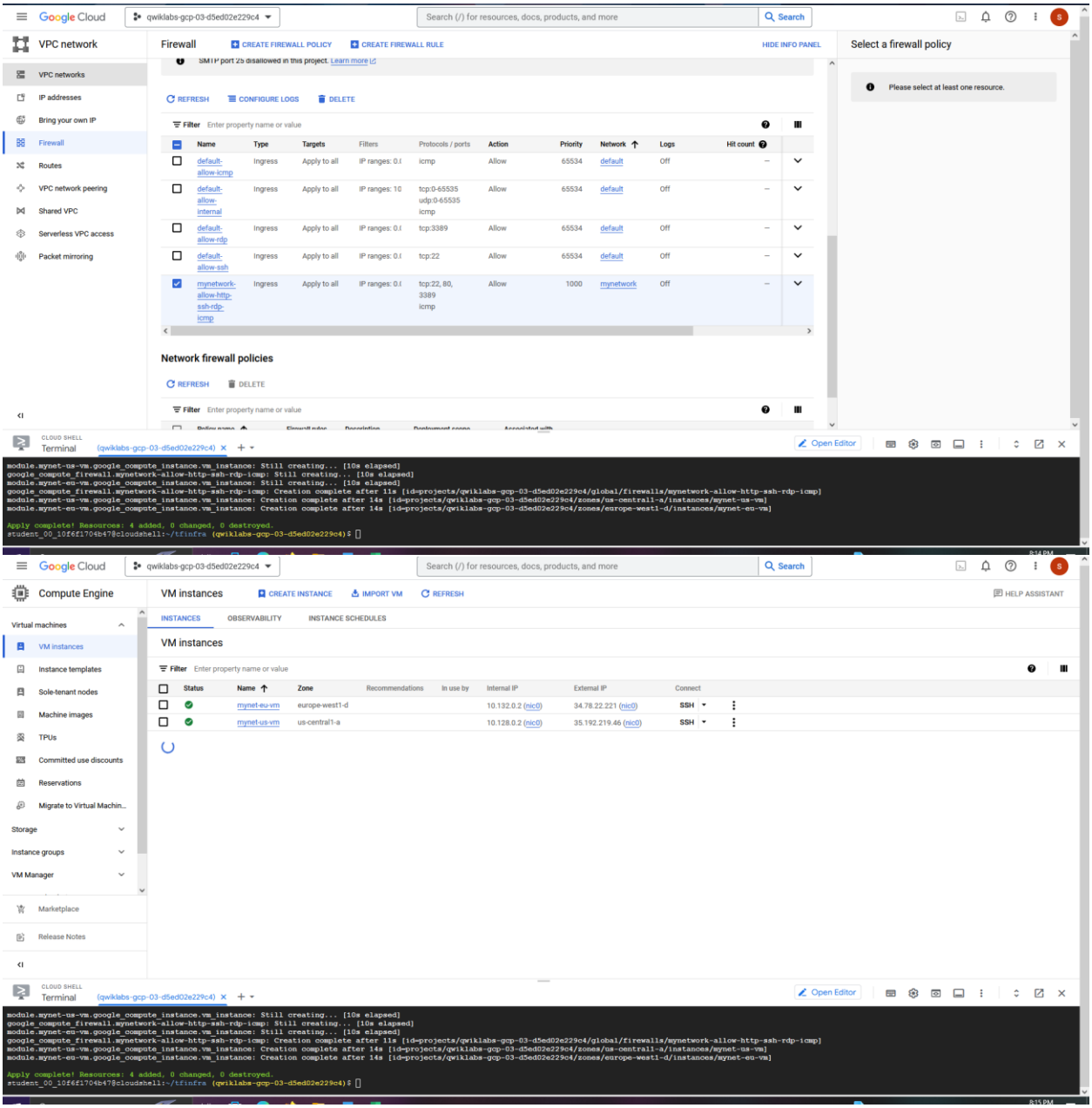

Google Cloud
qwiklabs-gcp-03-d5ed02e229c4
Search (/) for resources, docs, products, and more
Search
CLOUD SHELL
Terminal
(qwiklabs-gcp-03-d5ed02e229c4)
Open Editor
student_00_10f6f1704b47@cloudshell:~/tfinfra (qwiklabs-gcp-03-d5ed02e229c4)$
student_00_10f6f1704b47@cloudshell:~/tfinfra (qwiklabs-gcp-03-d5ed02e229c4)$ terraform init
student_00_10f6f1704b47@cloudshell:~/tfinfra (qwiklabs-gcp-03-d5ed02e229c4)$ terraform init
Initializing the backend...
Initializing modules...
- mynet-eu-vm in instance
- mynet-us-vm in instance
Initializing provider plugins...
- Reusing previous version of hashicorp/google from the dependency lock file
- Using previously-installed hashicorp/google v4.66.0
Terraform has been successfully initialized!
You may now begin working with Terraform. Try running "terraform plan" to see
any changes that are required for your infrastructure. All Terraform commands
should now work.
If you ever set or change modules or backend configuration for Terraform,
rerun this command to reinitialize your working directory. If you forget, other
commands will detect it and remind you to do so if necessary.
student_00_10f6f1704b47@cloudshell:~/tfinfra (qwiklabs-gcp-03-d5ed02e229c4)$ terraform plan
student_00_10f6f1704b47@cloudshell:~/tfinfra (qwiklabs-gcp-03-d5ed02e229c4)$ terraform plan
Terraform used the selected providers to generate the following execution plan.
Resource actions are indicated with the following symbols:
+ create
Terraform will perform the following actions:
# google_compute_firewall.mynetwork-allow-http-ssh-rdp-icmp will be created
+ resource "google_compute_firewall" "mynetwork-allow-http-ssh-rdp-icmp" {
+ creation_timestamp = (known after apply)
+ destination_ranges = (known after apply)
+ direction = (known after apply)
+ enable_logging = (known after apply)
+ id = (known after apply)
+ name = "mynetwork-allow-http-ssh-rdp-icmp"
+ network = (known after apply)
+ priority = 1000
+ project = (known after apply)
+ self_link = (known after apply)
+ source_ranges = [
+ "0.0.0.0/0",
]
+ allow {
+ ports = [
+ "22",
+ "80",
+ "3389",
]
+ protocol = "tcp"
}
+ allow {
+ ports = []
+ protocol = "icmp"
8:08 PM


Google Cloud
qwiklabs-gcp-03-d5ed02e229c4
Search (/) for resources, docs, products, and more
Search
CLOUD SHELL
Terminal
(qwiklabs-gcp-03-d5ed02e229c4)
Open Editor
+ initialize_params {
+ image = "debian-cloud/debian-11"
+ labels = (known after apply)
+ size = (known after apply)
+ type = (known after apply)
}
}
+ network_interface {
+ ipv6_access_type = (known after apply)
+ name = (known after apply)
+ network = (known after apply)
+ network_ip = (known after apply)
+ stack_type = (known after apply)
+ subnetwork = (known after apply)
+ subnetwork_project = (known after apply)
+ access_config {
+ nat_ip = (known after apply)
+ network_tier = (known after apply)
}
}
}
Plan: 4 to add, 0 to change, 0 to destroy.
Note: You didn't use the -out option to save this plan, so Terraform can't
guarantee to take exactly these actions if you run "terraform apply" now.
student_00_10fdf704b47@cloudshell:~/tfinfra (qwiklabs-gcp-03-d5ed02e229c4)$
8:08 PM

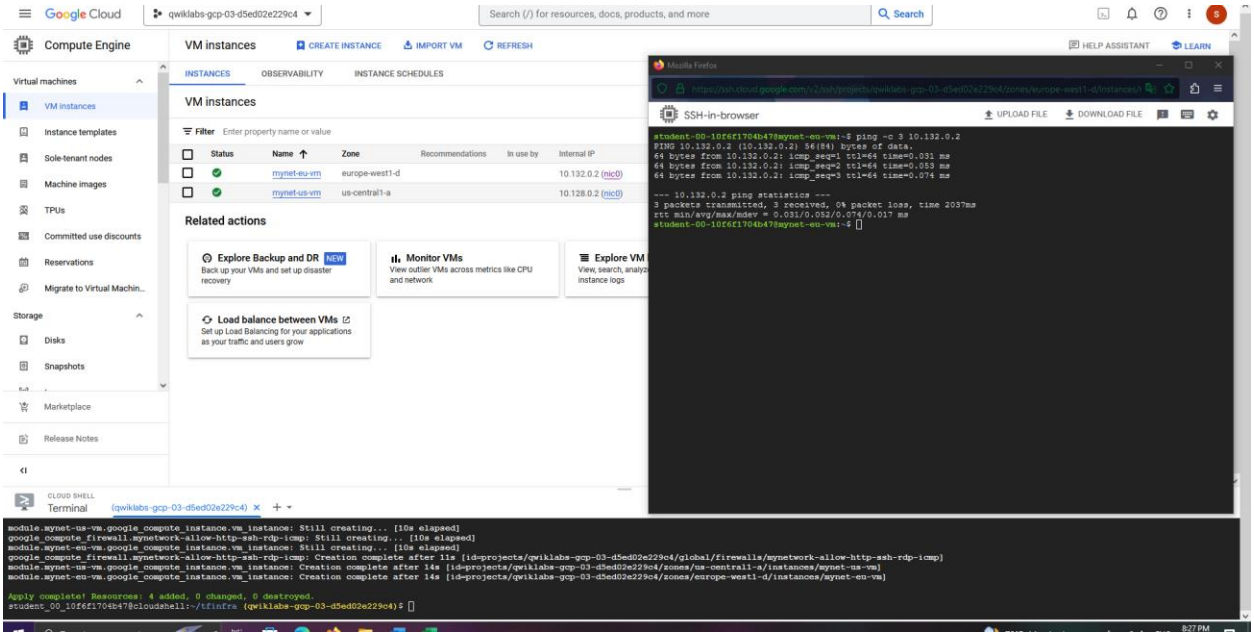

Google Cloud
qwiklabs-gcp-03-d5ed02e229c4
Search (/) for resources, docs, products, and more
Search
CLOUD SHELL
Terminal
(qwiklabs-gcp-03-d5ed02e229c4)
Open Editor
+ mode = "READ_WRITE"
+ source = (known after apply)
+ initialize_params {
+ image = "debian-cloud/debian-11"
+ labels = (known after apply)
+ size = (known after apply)
+ type = (known after apply)
}
}
+ network_interface {
+ ipv6_access_type = (known after apply)
+ name = (known after apply)
+ network = (known after apply)
+ network_ip = (known after apply)
+ stack_type = (known after apply)
+ subnetwork = (known after apply)
+ subnetwork_project = (known after apply)
+ access_config {
+ nat_ip = (known after apply)
+ network_tier = (known after apply)
}
}
}
Plan: 4 to add, 0 to change, 0 to destroy.
Do you want to perform these actions?
Terraform will perform the actions described above.
Only 'yes' will be accepted to approve.
Enter a value: yes
google_compute_network.mynetwork: Creating...
google_compute_network.mynetwork: Still creating... [10s elapsed]
google_compute_network.mynetwork: Still creating... [20s elapsed]
google_compute_network.mynetwork: Still creating... [30s elapsed]

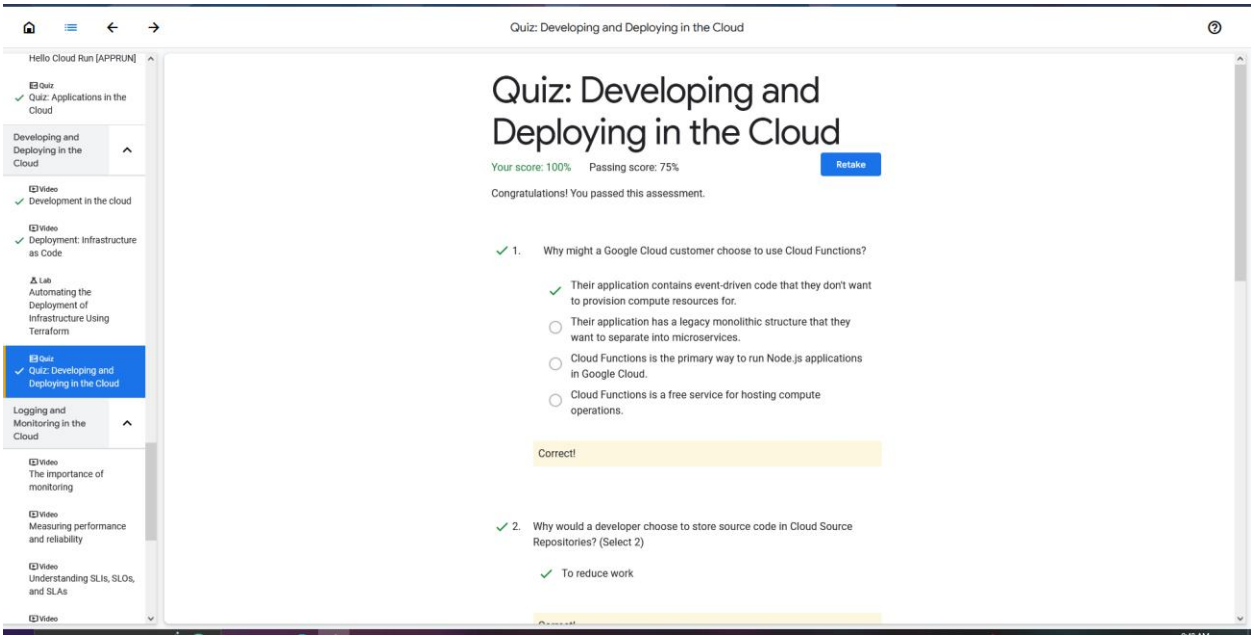

Automating the Deployment of Infrastructure Using Terraform
Quiz: Storage in the Cloud
Containers in the Cloud
Applications in the Cloud
Developing and Deploying in the Cloud
Video
Development in the cloud
Video
Deployment: Infrastructure as Code
Lab
Automating the Deployment of Infrastructure Using Terraform
Quiz: Developing and Deploying in the Cloud
Logging and Monitoring in the Cloud
Course Summary
End Lab
00:44:03
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 Cloud console
GCP Username
student-00-10f6f1704b47
GCP Password
ga8fTzJSb7ii
terraform apply
5. To confirm the planned actions, type:
yes
The output should look like this:
...
Apply complete! Resources: 4 added, 0 changed, 0 destroyed.
Click Check my progress to verify the objective.
Create mynetwork and its resources
Check my progress
Assessment Completed!
Note: If you get an error during the execution, revisit the previous steps to ensure that you have the correct folder/file structure. If you cannot troubleshoot the issue of your configuration, refer to the finished configurations linked above. When you have corrected the issue, re-run the previous command.
Overview
0/10
Task 1. Set up Terraform and Cloud Shell
Task 2. Create mynetwork and its resources
Task 3. Verify your deployment
Task 4. Review
End your lab

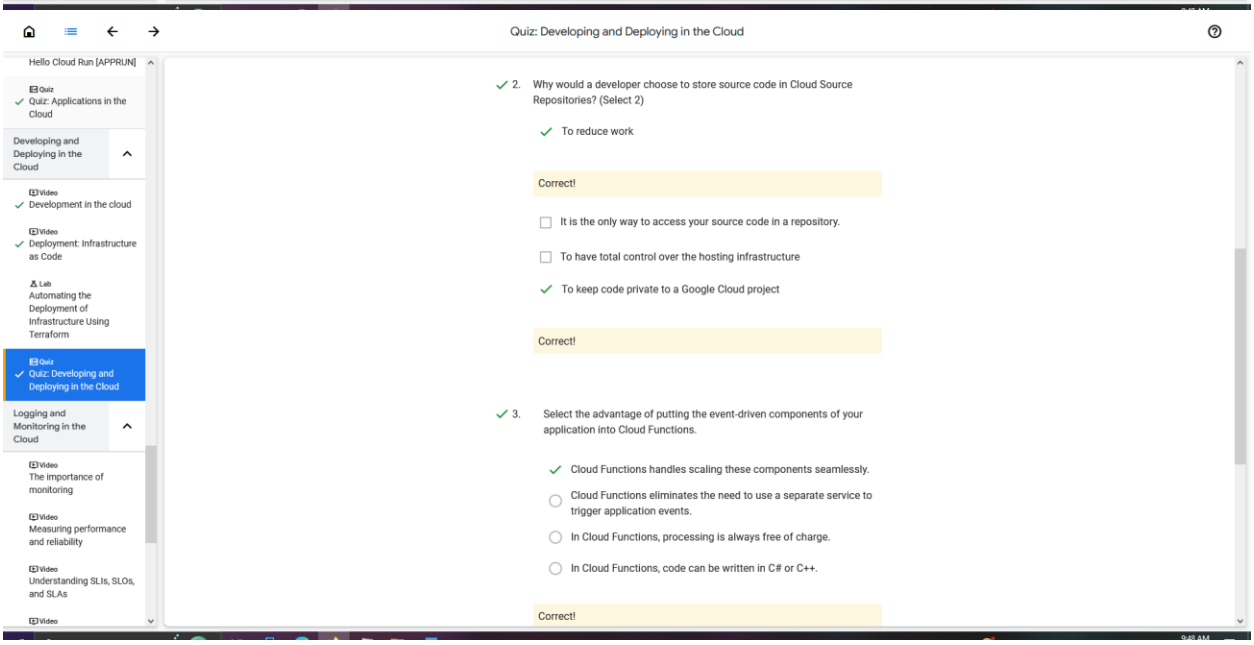

Google Cloud
qwiklabs-gcp-03-d5ed02e229c4
Search (/) for resources, docs, products, and more
Search
VPC network
VPC networks
CREATE VPC NETWORK
REFRESH
HELP ASSISTANT
VPC networks
IP addresses
Bring your own IP
Firewall
Routes
VPC network peering
NETWORKS IN CURRENT PROJECT
SUBNETS IN CURRENT PROJECT
SMTP port 25 disallowed in this project. Learn more
VPC networks
Filter
Enter property name or value
Name
Subnets
MTU
Mode
Internal IP ranges
Gateways
Firewall rules
Global dynamic routing
default 25 1460 Auto 4 Off
mynetwork 24 1460 Auto 1 Off
CLOUD SHELL
Terminal
(qwiklabs-gcp-03-d5ed02e229c4)
Open Editor
+ network_tier = (known after apply)
Plan: 4 to add, 0 to change, 0 to destroy.
Do you want to perform these actions?
Terraform will perform the actions described above.
Only 'yes' will be accepted to approve.
Enter a value: yes
google_compute_network.mynetwork: Creating...
google_compute_network.mynetwork: Still creating... [10s elapsed]
google_compute_network.mynetwork: Still creating... [20s elapsed]
google_compute_network.mynetwork: Still creating... [30s elapsed]
google_compute_network.mynetwork: Still creating... [40s elapsed]
google_compute_network.mynetwork: Still creating... [50s elapsed]
google_compute_network.mynetwork: Creation complete after 52s [id=projects/qwiklabs-gcp-03-d5ed02e229c4/global/networks/mynetwork]
google_compute_firewall.mynetwork-allow-http-ssh-rdp-icmp: Creating...
module.mynet-us-vm.google_compute_instance.vm_instance: Creating...
module.mynet-eu-vm.google_compute_instance.vm_instance: Creating...
module.mynet-us-vm.google_compute_instance.vm_instance: Still creating... [10s elapsed]
google_compute_firewall.mynetwork-allow-http-ssh-rdp-icmp: Still creating... [10s elapsed]
module.mynet-eu-vm.google_compute_instance.vm_instance: Still creating... [10s elapsed]
google_compute_firewall.mynetwork-allow-http-ssh-rdp-icmp: Creation complete after 11s [id=projects/qwiklabs-gcp-03-d5ed02e229c4/global/firewalls/mynetwork-allow-http-ssh-rdp-icmp]
module.mynet-us-vm.google_compute_instance.vm_instance: Creation complete after 14s [id=projects/qwiklabs-gcp-03-d5ed02e229c4/zones/us-central1-a/instances/mynet-us-vm]
module.mynet-eu-vm.google_compute_instance.vm_instance: Creation complete after 14s [id=projects/qwiklabs-gcp-03-d5ed02e229c4/zones/europe-west1-d/instances/mynet-eu-vm]
Apply complete! Resources: 4 added, 0 changed, 0 destroyed.
student_00_10f6f1704b47@cloudshell:~/tfinfra (qwiklabs-gcp-03-d5ed02e229c4)$

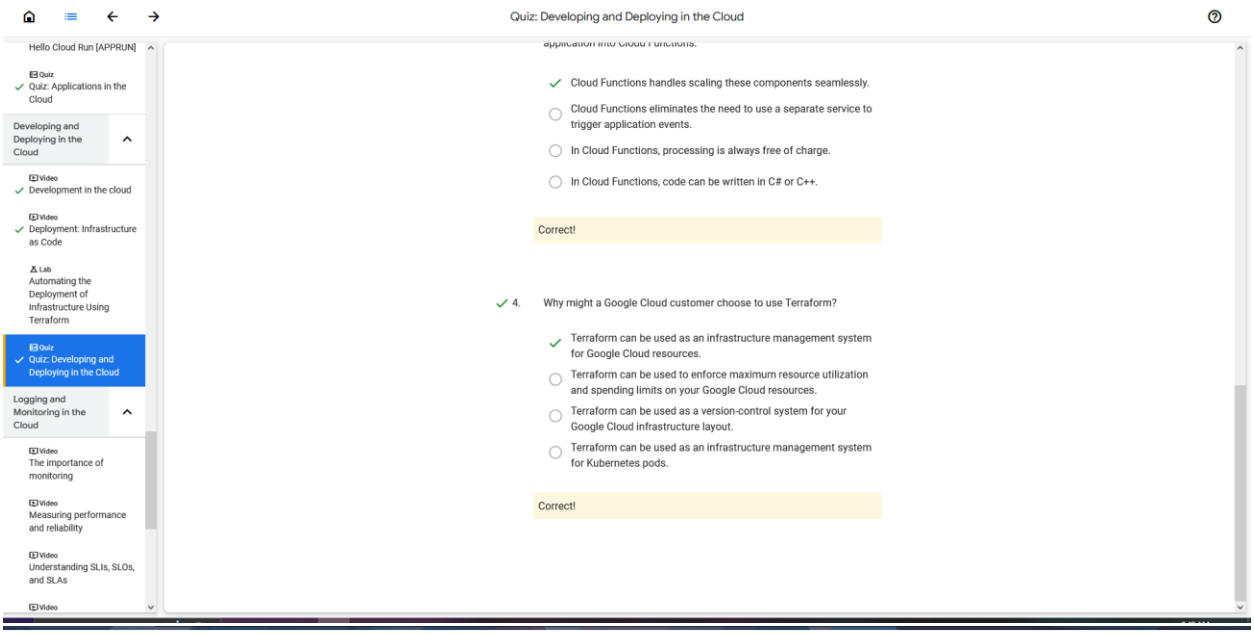

Google Cloud
qwiklabs-gcp-03-d5ed02e229c4
Search (/) for resources, docs, products, and more
Search
VPC network
VPC networks
IP addresses
Bring your own IP
Firewall
Routes
VPC network peering
Shared VPC
Serverless VPC access
Packet mirroring
Firewall
CREATE FIREWALL POLICY
CREATE FIREWALL RULE
HIDE INFO PANEL
REFRESH
CONFIGURE LOGS
DELETE
Filter
Enter property name or value
Name
Type
Targets
Filters
Protocols / ports
Action
Priority
Network
Logs
Hit count
default-allow-icmp
default-allow-internal
default-allow-rdp
default-allow-ssh
mynetwork-allow-http-ssh-rdp-icmp
Network firewall policies
REFRESH
DELETE
Select a firewall policy
Please select at least one resource.
CLOUD SHELL
Terminal
(qwiklabs-gcp-03-d5ed02e229c4)
Open Editor
module.mynet-us-vm.google_compute_instance.vm_instance: Still creating... [10s elapsed]
google_compute_firewall.mynetwork-allow-http-ssh-rdp-icmp: Still creating... [10s elapsed]
module.mynet-eu-vm.google_compute_instance.vm_instance: Still creating... [10s elapsed]
google_compute_firewall.mynetwork-allow-http-ssh-rdp-icmp: Creation complete after 11s [id=projects/qwiklabs-gcp-03-d5ed02e229c4/global/firewalls/mynetwork-allow-http-ssh-rdp-icmp]
module.mynet-us-vm.google_compute_instance.vm_instance: Creation complete after 14s [id=projects/qwiklabs-gcp-03-d5ed02e229c4/zones/us-central1-a/instances/mynet-us-vm]
module.mynet-eu-vm.google_compute_instance.vm_instance: Creation complete after 14s [id=projects/qwiklabs-gcp-03-d5ed02e229c4/zones/europe-west1-d/instances/mynet-eu-vm]
Apply complete! Resources: 4 added, 0 changed, 0 destroyed.
student_00_10f6f1704b47@cloudshell:~/tfinfra (qwiklabs-gcp-03-d5ed02e229c4) $

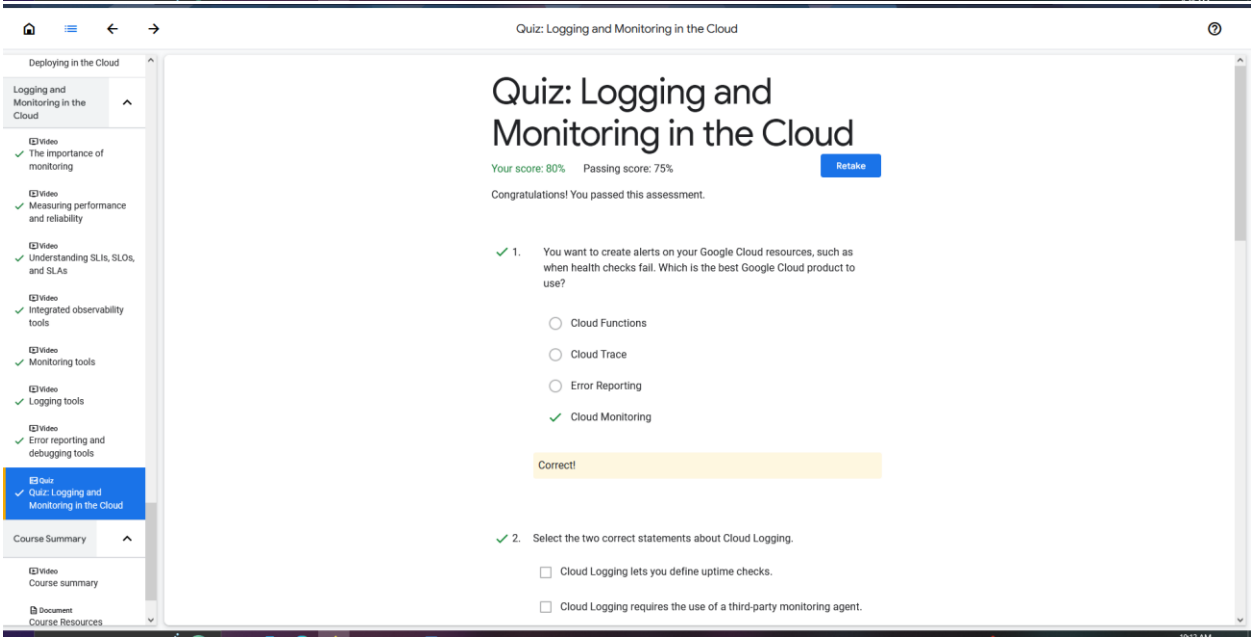
Google Cloud
qwiklabs-gcp-03-d5ed02e229c4
Search (/) for resources, docs, products, and more
Search
Compute Engine
Virtual machines
VM instances
Instance templates
Sole-tenant nodes
Machine images
TPUs
Committed use discounts
Reservations
Migrate to Virtual Machin...
Storage
Instance groups
VM Manager
Marketplace
Release Notes
VM instances
CREATE INSTANCE
IMPORT VM
REFRESH
HELP ASSISTANT
INSTANCES
OBSERVABILITY
INSTANCE SCHEDULES
VM instances
Filter
Enter property name or value
Status
Name
Zone
Recommendations
In use by
Internal IP
External IP
Connect
mynet-eu-vm
europe-west1-d
10.132.0.2 (nic0)
34.78.22.221 (nic0)
SSH
mynet-us-vm
us-central1-a
10.128.0.2 (nic0)
35.192.219.46 (nic0)
SSH
CLOUD SHELL
Terminal
(qwiklabs-gcp-03-d5ed02e229c4)
Open Editor
module.mynet-us-vm.google_compute_instance.vm_instance: Still creating... [10s elapsed]
google_compute_firewall.mynetwork-allow-http-ssh-rdp-icmp: Still creating... [10s elapsed]
module.mynet-eu-vm.google_compute_instance.vm_instance: Still creating... [10s elapsed]
google_compute_firewall.mynetwork-allow-http-ssh-rdp-icmp: Creation complete after 11s [id=projects/qwiklabs-gcp-03-d5ed02e229c4/global/firewalls/mynetwork-allow-http-ssh-rdp-icmp]
module.mynet-us-vm.google_compute_instance.vm_instance: Creation complete after 14s [id=projects/qwiklabs-gcp-03-d5ed02e229c4/zones/us-central1-a/instances/mynet-us-vm]
module.mynet-eu-vm.google_compute_instance.vm_instance: Creation complete after 14s [id=projects/qwiklabs-gcp-03-d5ed02e229c4/zones/europe-west1-d/instances/mynet-eu-vm]
Apply complete! Resources: 4 added, 0 changed, 0 destroyed.
student_00_10f6f1704b47@cloudshell:~/tfinfra (qwiklabs-gcp-03-d5ed02e229c4) $


Google Cloud
qwiklabs-gcp-03-d5ed02e229c4
Search (/) for resources, docs, products, and more
Search
Compute Engine
VM instances
CREATE INSTANCE
IMPORT VM
REFRESH
HELP ASSISTANT
LEARN
Virtual machines
VM instances
Instance templates
Sole-tenant nodes
Machine images
TPUs
Committed use discounts
Reservations
Migrate to Virtual Machin...
Storage
Disks
Snapshots
Marketplace
Release Notes
INSTANCES
OBSERVABILITY
INSTANCE SCHEDULES
VM instances
Filter Enter property name or value
Status
Name
Zone
Recommendations
In use by
Internal IP
mynet-eu-vm
europe-west1-d
10.132.0.2 (nic0)
mynet-us-vm
us-central1-a
10.128.0.2 (nic0)
Related actions
Explore Backup and DR NEW
Back up your VMs and set up disaster recovery
Monitor VMs
View outlier VMs across metrics like CPU and network
Explore VM
Load balance between VMs
Set up Load Balancing for your applications as your traffic and users grow
Mozilla Firefox
SSH-in-browser
UPLOAD FILE
DOWNLOAD FILE
student-00-10f6f1704b47@mynet-eu-vm:~$ ping -c 3 10.132.0.2
PING 10.132.0.2 (10.132.0.2) 56(84) bytes of data.
64 bytes from 10.132.0.2: icmp_seq=1 ttl=64 time=0.031 ms
64 bytes from 10.132.0.2: icmp_seq=2 ttl=64 time=0.053 ms
64 bytes from 10.132.0.2: icmp_seq=3 ttl=64 time=0.074 ms
--- 10.132.0.2 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2037ms
rtt min/avg/max/mdev = 0.031/0.052/0.074/0.017 ms
student-00-10f6f1704b47@mynet-eu-vm:~$
CLOUD SHELL
Terminal
(qwiklabs-gcp-03-d5ed02e229c4)
module.mynet-us-vm.google_compute_instance.vm_instance: Still creating... [10s elapsed]
google_compute_firewall.mynetwork-allow-http-ssh-rdp-icmp: Still creating... [10s elapsed]
module.mynet-eu-vm.google_compute_instance.vm_instance: Still creating... [10s elapsed]
google_compute_firewall.mynetwork-allow-http-ssh-rdp-icmp: Creation complete after 11s [id=projects/qwiklabs-gcp-03-d5ed02e229c4/global/firewalls/mynetwork-allow-http-ssh-rdp-icmp]
module.mynet-us-vm.google_compute_instance.vm_instance: Creation complete after 14s [id=projects/qwiklabs-gcp-03-d5ed02e229c4/zones/us-central1-a/instances/mynet-us-vm]
module.mynet-eu-vm.google_compute_instance.vm_instance: Creation complete after 14s [id=projects/qwiklabs-gcp-03-d5ed02e229c4/zones/europe-west1-d/instances/mynet-eu-vm]
Apply complete! Resources: 4 added, 0 changed, 0 destroyed.
student_00_10f6f1704b47@cloudshell:~/tfinfra (qwiklabs-gcp-03-d5ed02e229c4)$
8:27 PM


Quiz: Developing and Deploying in the Cloud
Hello Cloud Run [APPRUN]
Quiz: Applications in the Cloud
Developing and Deploying in the Cloud
Development in the cloud
Deployment: Infrastructure as Code
Automating the Deployment of Infrastructure Using Terraform
Quiz: Developing and Deploying in the Cloud
Logging and Monitoring in the Cloud
The importance of monitoring
Measuring performance and reliability
Understanding SLIs, SLOs, and SLAs
Quiz: Developing and Deploying in the Cloud
Your score: 100%
Passing score: 75%
Retake
Congratulations! You passed this assessment.
1. Why might a Google Cloud customer choose to use Cloud Functions?
Their application contains event-driven code that they don't want to provision compute resources for.
Their application has a legacy monolithic structure that they want to separate into microservices.
Cloud Functions is the primary way to run Node.js applications in Google Cloud.
Cloud Functions is a free service for hosting compute operations.
Correct!
2. Why would a developer choose to store source code in Cloud Source Repositories? (Select 2)
To reduce work


Quiz: Developing and Deploying in the Cloud
2. Why would a developer choose to store source code in Cloud Source Repositories? (Select 2)
To reduce work
Correct!
It is the only way to access your source code in a repository.
To have total control over the hosting infrastructure
To keep code private to a Google Cloud project
Correct!
3. Select the advantage of putting the event-driven components of your application into Cloud Functions.
Cloud Functions handles scaling these components seamlessly.
Cloud Functions eliminates the need to use a separate service to trigger application events.
In Cloud Functions, processing is always free of charge.
In Cloud Functions, code can be written in C# or C++.
Correct!


Quiz: Developing and Deploying in the Cloud
Hello Cloud Run [APPRUN]
Quiz
Quiz: Applications in the Cloud
Developing and Deploying in the Cloud
Video
Development in the cloud
Video
Deployment: Infrastructure as Code
Lab
Automating the Deployment of Infrastructure Using Terraform
Quiz
Quiz: Developing and Deploying in the Cloud
Logging and Monitoring in the Cloud
Video
The importance of monitoring
Video
Measuring performance and reliability
Video
Understanding SLIs, SLOs, and SLAs
Cloud Functions handles scaling these components seamlessly.
Cloud Functions eliminates the need to use a separate service to trigger application events.
In Cloud Functions, processing is always free of charge.
In Cloud Functions, code can be written in C# or C++.
Correct!
4. Why might a Google Cloud customer choose to use Terraform?
Terraform can be used as an infrastructure management system for Google Cloud resources.
Terraform can be used to enforce maximum resource utilization and spending limits on your Google Cloud resources.
Terraform can be used as a version-control system for your Google Cloud infrastructure layout.
Terraform can be used as an infrastructure management system for Kubernetes pods.
Correct!


Quiz: Logging and Monitoring in the Cloud
Deploying in the Cloud
Logging and Monitoring in the Cloud
Video
The importance of monitoring
Video
Measuring performance and reliability
Video
Understanding SLIs, SLOs, and SLAs
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Integrated observability tools
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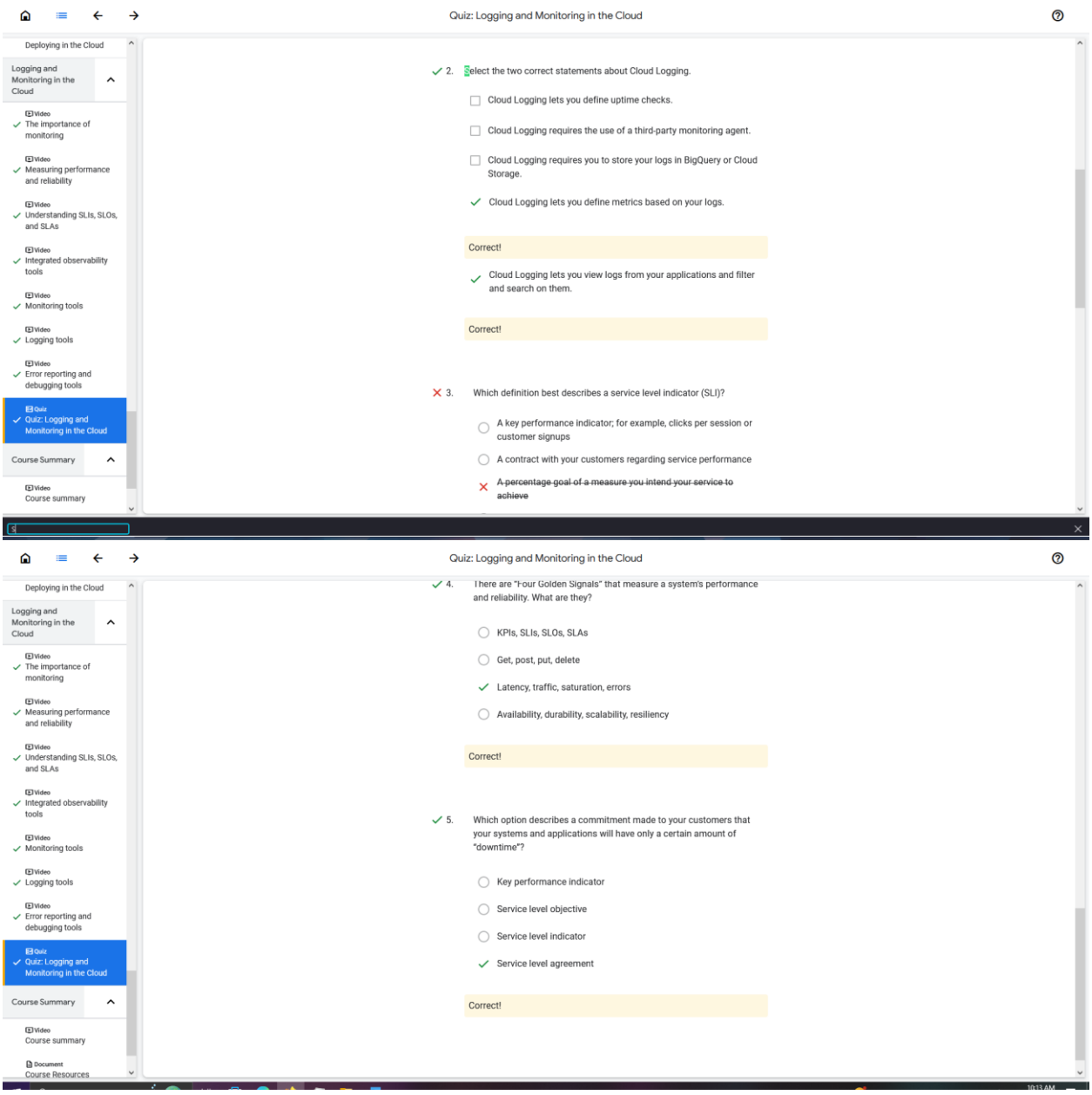
Quiz: Logging and Monitoring in the Cloud
Your score: 80%
Passing score: 75%
Retake
Congratulations! You passed this assessment.
1. You want to create alerts on your Google Cloud resources, such as when health checks fail. Which is the best Google Cloud product to use?
Cloud Functions
Cloud Trace
Error Reporting
Cloud Monitoring
Correct!
2. Select the two correct statements about Cloud Logging.
Cloud Logging lets you define uptime checks.
Cloud Logging requires the use of a third-party monitoring agent.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2. Select the two correct statements about Cloud Logging.
Cloud Logging lets you define uptime checks.
Cloud Logging requires the use of a third-party monitoring agent.
Cloud Logging requires you to store your logs in BigQuery or Cloud Storage.
Cloud Logging lets you define metrics based on your logs.
Correct!
Cloud Logging lets you view logs from your applications and filter and search on them.
Correct!
3. Which definition best describes a service level indicator (SLI)?
A key performance indicator; for example, clicks per session or customer signups
A contract with your customers regarding service performance
A percentage goal of a measure you intend your service to achieve

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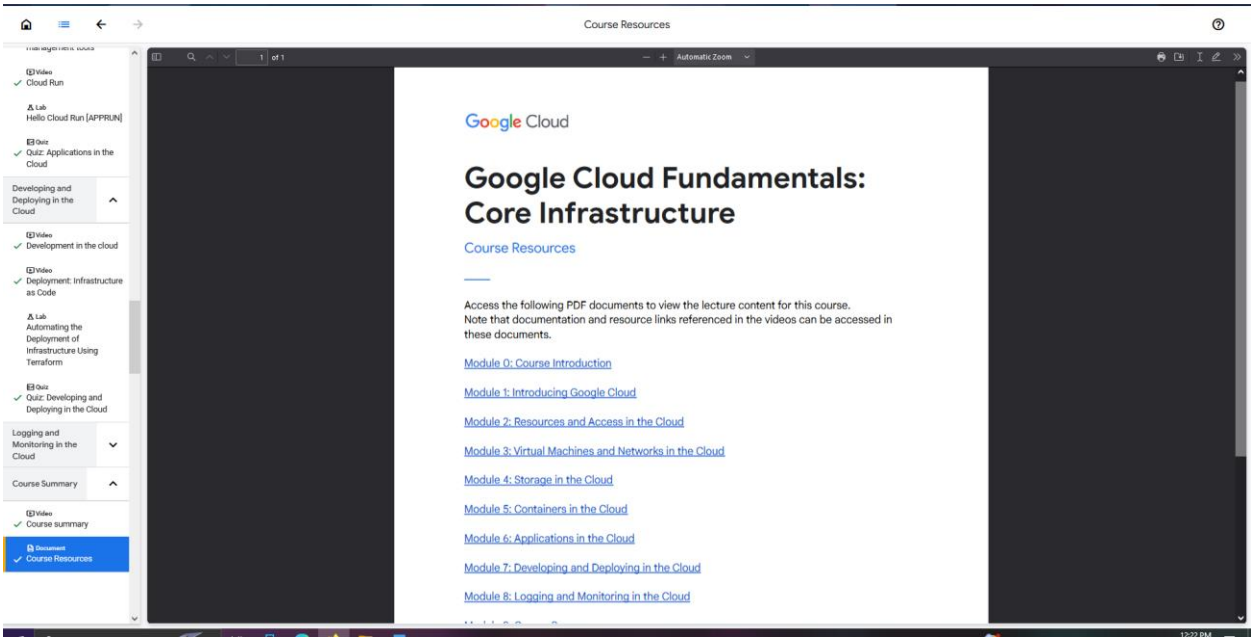
4. There are "Four Golden Signals" that measure a system's performance and reliability. What are they?
KPIs, SLIs, SLOs, SLAs
Get, post, put, delete
Latency, traffic, saturation, errors
Availability, durability, scalability, resiliency
Correct!
5. Which option describes a commitment made to your customers that your systems and applications will have only a certain amount of "downtime"?
Key performance indicator
Service level objective
Service level indicator
Service level agreement
Correct!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Lab
Hello Cloud Run [APPRUN]
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Automatic Zoom
Google Cloud
Google Cloud Fundamentals: Core Infrastructure
Course Resources
Access the following PDF documents to view the lecture content for this course.
Note that documentation and resource links referenced in the videos can be accessed in these documents.
Module 0: Course Introduction
Module 1: Introducing Google Cloud
Module 2: Resources and Access in the Cloud
Module 3: Virtual Machines and Networks in the Cloud
Module 4: Storage in the Cloud
Module 5: Containers in the Cloud
Module 6: Applications in the Cloud
Module 7: Developing and Deploying in the Cloud
Module 8: Logging and Monitoring in the Cloud