

# Chapter 1: GCP Cloud Architect Professional

 <p><b>Associate Cloud Engineer</b> Demonstrate your ability to deploy applications, monitor operations, and maintain cloud projects on Google Cloud Platform.</p> <p><a href="#">REGISTER</a> <a href="#">DETAILS</a></p>	 <p><b>Professional Cloud Architect</b> Demonstrate your proficiency to design, build and manage solutions on Google Cloud Platform.</p> <p><a href="#">REGISTER</a> <a href="#">DETAILS</a></p>	 <p><b>Professional Data Engineer</b> Demonstrate your proficiency to design and build data processing systems and create machine learning models on Google Cloud Platform.</p> <p><a href="#">REGISTER</a> <a href="#">DETAILS</a></p>
 <p><b>Professional Cloud Developer</b> Demonstrate your ability to build and deploy scalable and highly available applications on Google Cloud Platform.</p> <p><a href="#">LEARN MORE</a></p>	 <p><b>G Suite</b> Prove your expertise in using G Suite productivity and collaboration tools with this certification. Demonstrate your skills and advance your career.</p> <p><a href="#">LEARN MORE</a></p>	

# Google Cloud

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- The Professional Data Engineer exam is now available in [Spanish](#) and [Portuguese](#).
- The Associate Cloud Engineer exam is now available in [Japanese](#), [Spanish](#), [Portuguese](#), [German](#), and [French](#).

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Country:  Province/State:  City:

**Search**

Select the Testing Center where you wish to take the test.

#### AVAILABLE TESTING CENTERS

<input type="checkbox"/>	Testing Location Name	Address	City	Province/State	Country	Map	Important Location Information
<input type="checkbox"/>	SureSkills_Belfast	Callender House, 58-60 Upper Arthur Street	Belfast	Antrim	United Kingdom	<a href="#">Map</a>	
<input type="checkbox"/>	Spark Educare Centre	81 London Street , 2nd Floor	Reading	Berkshire	United Kingdom	<a href="#">Map</a>	
<input type="checkbox"/>	Pitman Training Centre_Brighton	The Dock Hub, Wilbury Villas	Brighton	Brighton and Hove	United Kingdom	<a href="#">Map</a>	
<input type="checkbox"/>	Pitman Training Centre_Cambridge	2nd Floor, St Andrews House, 59 St Andrews Street	Cambridge	Cambridgeshire	United Kingdom	<a href="#">Map</a>	
<input type="checkbox"/>	Exams Ltd	Sefton House, Adam Court, Newark Road	Peterborough	Cambridgeshire	United Kingdom	<a href="#">Map</a>	
<input type="checkbox"/>	Pitman Training_Enfield	36-38 London Road	Enfield Town	Enfield	United Kingdom	<a href="#">Map</a>	
<input type="checkbox"/>	Gaia Technologies plc	Woodlands House, Parc Menai	Bangor	Gwynedd	United Kingdom	<a href="#">Map</a>	

# Google Cloud

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**Selected Testing Center**

- Pitman Training Centre\_Brighton  
The Dock Hub,  
Wilbury Villas  
Brighton,  
Brighton and Hove 20705

**Select Date**

wk	Sun	Mon	Tue	Wed	Thu	Fri	Sat
21							1
22	2	3	4	5	6	7	8
23	9	10	11	12	13	14	15
24	16	17	18	19	20	21	22
25	23	24	25	26	27	28	29
26	30						

[Select date](#)

**Select Start Time**

10:00 AM
10:15 AM
10:30 AM
10:45 AM
11:00 AM
11:15 AM
11:30 AM
11:45 AM
12:00 PM
12:15 PM
12:30 PM



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Exam	Details	Price	Actions
Exam: Google Cloud Certified - Professional Cloud Architect (English) Length : 120 minutes	Schedule : Tuesday, 04 June 2019 Start Time : 10:30 (UTC+01:00)  Location : <a href="#">[Change]</a> Pitman Training Centre, Brighton The Dock Hub, Wilbury Villas Brighton, Brighton and Hove BN1 3JL	200.00	<a href="#">Remove</a>

Coupon/Voucher Code:

[Submit](#)

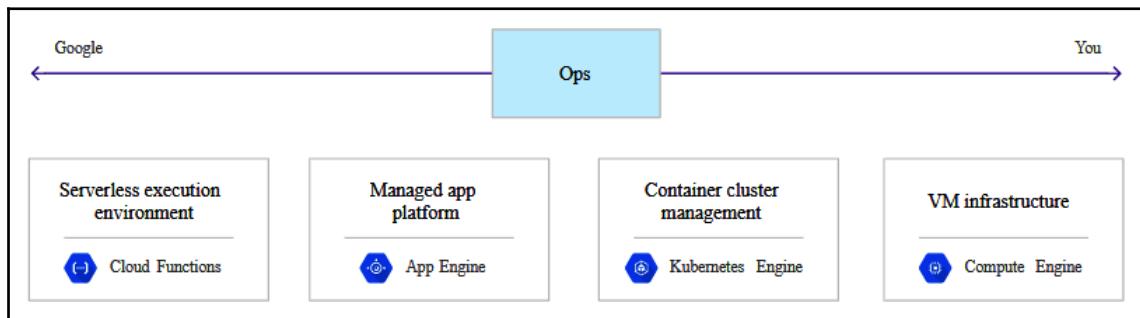
Subtotal: 200.00

**Total Price: USD 200.00**

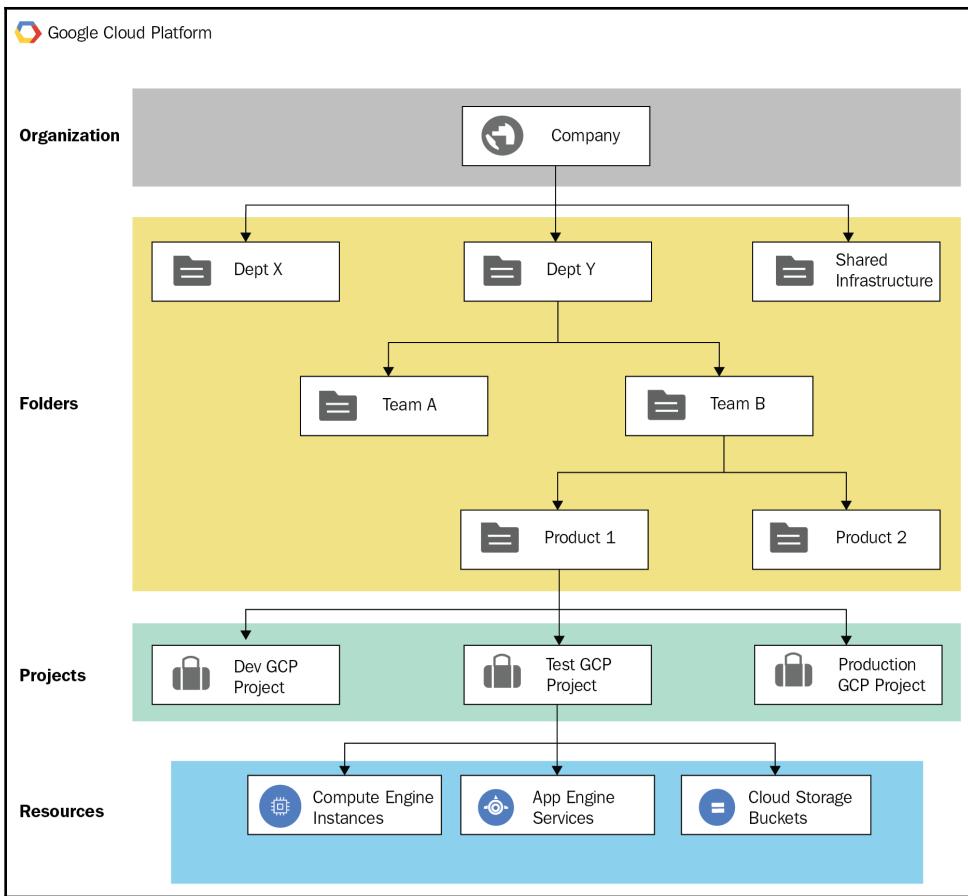
\*Charges are made in USD, currency conversion fees may apply

[Empty Cart](#) [Add Another Exam](#) [Return Home](#) [Check Out](#)

# Chapter 2: Getting Started with Google Cloud Platform







The screenshot shows the Google Cloud Platform Dashboard with the project "Certificate Project 1" selected. A modal window titled "Select a project" is open in the center. The modal has a search bar at the top labeled "Search projects and folders". Below the search bar are two tabs: "RECENT" (which is selected) and "ALL". There are two entries listed:

Name	ID
Certificate Project 1	certificate-project-1
My First Project	orbital-outpost-168608

### New Project

**⚠️** You have 17 projects remaining in your quota. Request an increase or delete projects. [Learn more](#)

[MANAGE QUOTAS](#)

**Project name \***  
GCP Cloud Architect Project

Project ID: vaulted-circle-238210. It cannot be changed later. [EDIT](#)

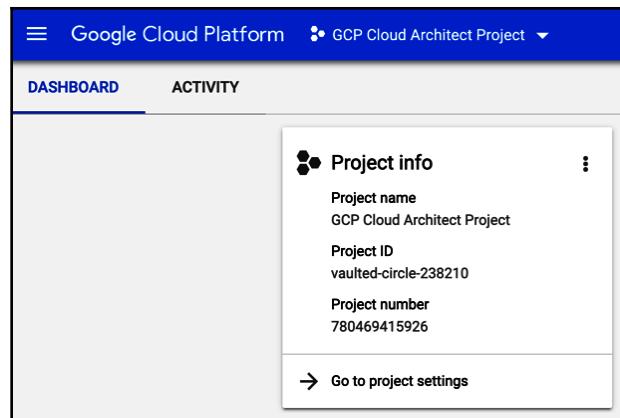
**Billing account \***  
My Billing Account

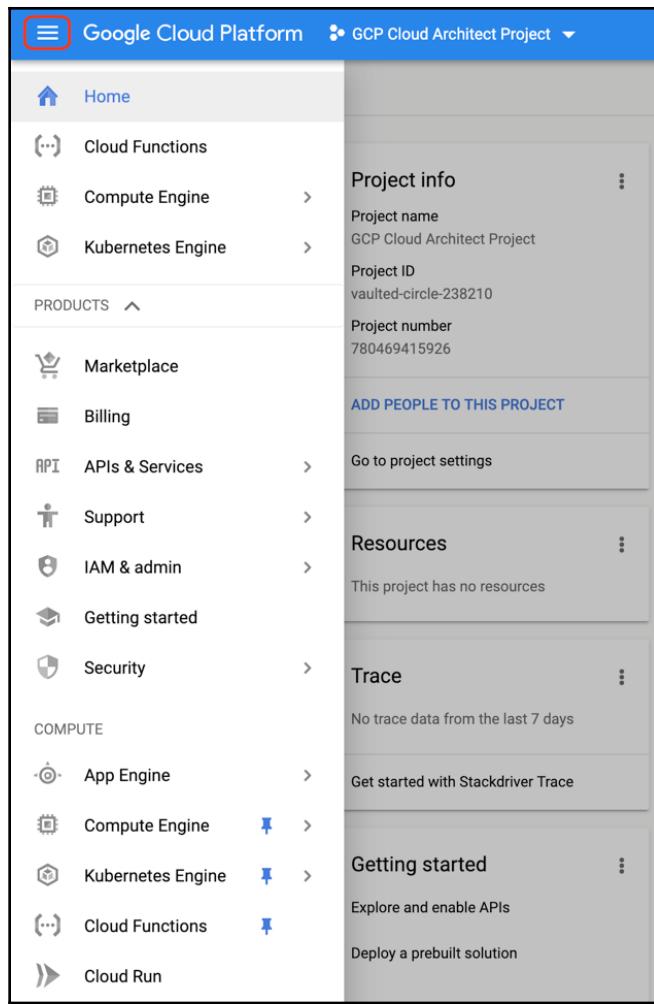
Any charges for this project will be billed to the account that you select here.

**Location \***  
No organisation [BROWSE](#)

Parent organisation or folder

**CREATE** **CANCEL**





Add members to GCP Cloud Architect Project

**Add members, roles to GCP Cloud Architect Project project**

Enter one or more members below. Then select a role for these members to grant them access to your resources. Multiple roles allowed. [Learn more](#)

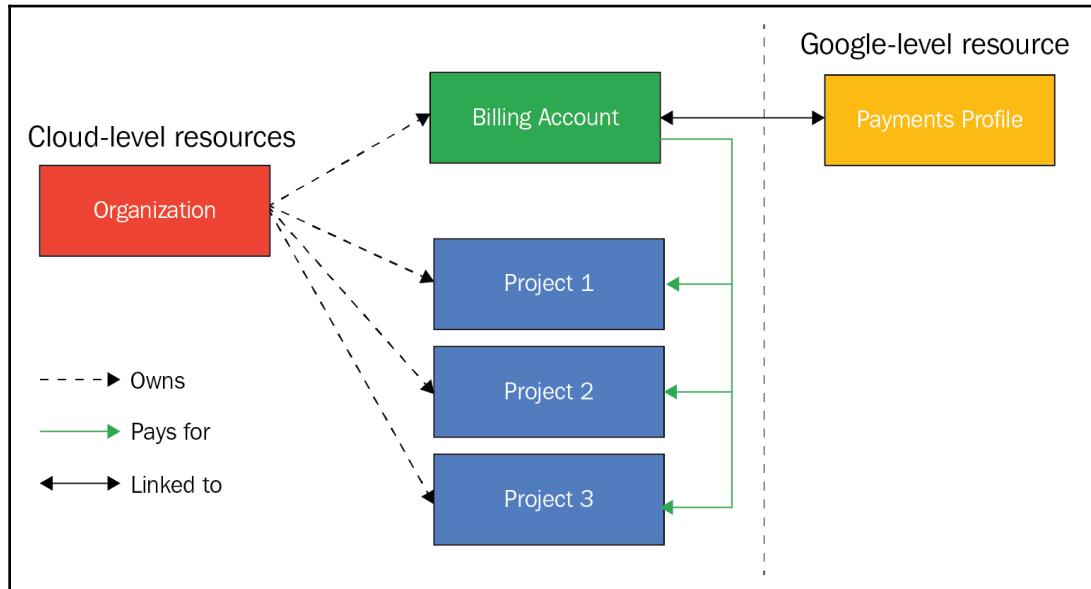
New members  
brgerrard@gmail.com X

Select a role

Type to filter	
Project	Browser
Access Approval	Editor
Actions	Owner
Android Management	Viewer

**Owner**  
Full access to all resources.

<input type="checkbox"/>	brgerrard@gmail.com	Owner <span style="color: orange;">⚠</span>	<span style="border: 1px solid #ccc; border-radius: 50%; width: 1em; height: 1em; display: inline-block; vertical-align: middle;"></span>
<input type="checkbox"/>	konradclapa@gmail.com	Konrad Clapa	<span style="border: 1px solid #ccc; border-radius: 50%; width: 1em; height: 1em; display: inline-block; vertical-align: middle;"></span>



 Billing Manage billing accounts ▾

My billing accounts My projects

Create account Show active accounts only ▾

<input type="checkbox"/> Billing account name ^	Billing account ID	Status	No. of projects
<input type="checkbox"/> My Billing Account	00E7F3-9E4B78-F03410	Active	2
<input type="checkbox"/> My Billing Account 1	0147E9-72F399-9412E9	Active	1

 Billing Set up your billing profile GCP Cloud Architect Billing Account ▾

Select the country or territory where your billing address is located.  
The choice may affect the payment options that will be available to you on the next step.

Country

Currency  
USD

**Confirm**

 Billing Set up your billing profile GCP Cloud Architect Billing Account ▾

Select the country or territory where your billing address is located.  
The choice may affect the payment options that will be available to you on the next step.

Country

Currency  
USD

**Confirm**

Billing Set up your billing profile GCP Cloud Architect Billing Account ▾

**Payments profile** ⓘ  
Choose the payments profile that will be associated with this account or transaction. A payments profile is shared and used across all Google products.

Create payments profile ▾

**Customer info**

Account type ⓘ Business

Name and address ⓘ  
Business name  
  
Name  
Konrad Clapa

Address line 1

Address line 2

**Payment method** ⓘ

Add credit or debit card ▾

**Card number**  
#  MM / YY CVC

Cardholder name  
Konrad Clapa

Credit or debit card address is same as above

**Submit and enable billing**

The screenshot shows the Google Cloud Billing interface. On the left, there's a sidebar with icons and labels: Overview, Reports, Budgets & alerts (which is selected and highlighted in blue), Billing export, Transactions, Payment settings, and Payment method. The main content area has a title 'Billing Budgets & alerts'. Below it, a text box says: 'Avoid surprises on your bill by creating budgets to monitor all your Google Cloud charges in one place. After you've set a budget, you can create budget alerts to email billing admins and users when charges exceed a certain amount.' At the bottom of this box is a blue button labeled 'Create budget'.

The screenshot shows the 'Manage billing accounts' section. At the top, there are tabs for 'My billing accounts' (which is selected and highlighted in blue) and 'My projects'. Below these are buttons for 'Create account' and 'Show active accounts only'. A table lists four billing accounts:

<input type="checkbox"/> Billing account name	Billing account ID	Status	No. of projects
<input type="checkbox"/> GCP Cloud Architect Billing Account	018F59-969ACC-0577DC	Active	0
<input type="checkbox"/> My Billing Account	00E7F3-9E4B78-F03410	Active	2
<input type="checkbox"/> My Billing Account 1	0147E9-72F399-9412E9	Active	2

 Billing

Overview My Billing Account ▾ [RENAME BILLING ACCOUNT](#)

 Overview	Billing account overview	Payment overview
 Reports	Billing account ID: 00E7F3-9E4B78-F03410	
 Budgets & alerts	Credits	
 Billing export	Promotion ID	Expires ^
 Transactions	Free Trial	24 May 2018
 Payment settings	Promotion value	Amount remaining
 Payment method	\$300.00	Expired

Projects linked to this billing account

Project name	Project ID	⋮
Certificate Project 1	certificate-project-1	⋮
GCP Cloud Architect Project	vaulted-circle-238210	⋮

[Disable billing](#)  
[Change billing](#)

## Set the billing account for project GCP Cloud Architect Project

Billing account 

GCP Cloud Architect Billing Account

[CANCEL](#) [SET ACCOUNT](#)

 Billing	Billing export	GCP Cloud Architect Billing Account ▾
 Overview	BIGQUERY EXPORT	FILE EXPORT
 Reports	BigQuery Export sends your billing data to a BigQuery data set <a href="#">Learn more about BigQuery</a>	
 Budgets & alerts	Projects *	
 Billing export	GCP Cloud Architect Project ▾	
 Transactions	This is where your billing data will be stored. Select a project with BigQuery enabled and with an existing BigQuery data set.	
 Payment settings	 You need to create a BigQuery data set first <a href="#">GO TO BIGQUERY</a>	
 Payment method	Billing export data set ▾	
	BigQuery Export will create a table with your billing data in the selected data set	
	<b>SAVE</b>	CANCEL

New Query 

Query Editor UDF Editor 

SQL

```
1 SELECT product, ROUND(SUM(cost), 2) as total_cost
2 FROM [data-analytics-pocs:public.gcp_billing_export_EXAMPL_E0XD3A_DB33F1]
3 GROUP BY product
4 ORDER BY total_cost DESC
5 LIMIT 1000
```

Ctrl + Enter: run query, Tab or Ctrl + Space: autocomplete.

RUN QUERY Save Query Save View Format Query Show Options

Query complete (1.3s elapsed, 4.33 MB processed) 

Results Explanation Job Information Download as CSV Download as JSON Save as Table Save to Google Sheets

Row	product	total_cost
1	Compute Engine	24777.04
2	Cloud Bigtable	5963.9
3	Cloud Spanner	3174.51
4	Cloud SQL	832.0
5	BigQuery	789.17
6	Cloud Dataflow	542.91
7	Stackdriver	229.51
8	Cloud Pub/Sub	44.05
9	Cloud Storage	11.56
10	App Engine	9.53
11	Cloud DNS	1.77
12	Cloud KMS	0.94
13	Container Engine	0.49
14	Cloud Functions	0.0
15	SendGrid	0.0

Table JSON

## Billing

- Overview
- Reports
- Budgets & alerts**
- Billing export
- Transactions
- Payment settings
- Payment method

### Create budget

#### Set budget

Your budget can be a specified amount or based on previous spend. Budget spend resets on the first day of each month to \$0.00.

**Setting a budget does not cap resource or API consumption. [Learn more.](#)**

**Budget name**  
GCP Cloud Architect Budget

**Project or billing account**  
Select a project or billing account for your budget to track.  
My Billing Account

**Budget amount**  
Set a budget by entering a specified amount or by selecting last month's spend.  
Specified amount \$ 1000

Cost after credit [?](#)

#### Set alert threshold rules

Send email alert notifications to billing admins and users after the actual or forecasted spend exceeds a percentage of the budget or a specified amount. [Learn more.](#)

Percentage of budget	Amount	Trigger on <a href="#">?</a>
50 %	\$ 500,00	Actual <a href="#">▼</a>
90 %	\$ 900,00	Actual <a href="#">▼</a>
100 %	\$ 1000,00	Actual <a href="#">▼</a>

[+ Add item](#)

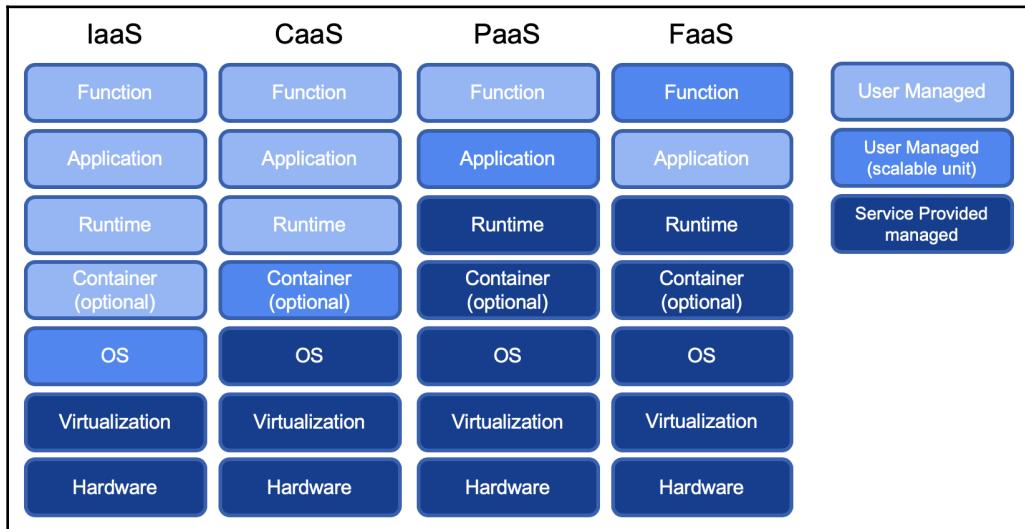
#### Manage notifications

You can use Pub/Sub notifications to programmatically receive spend updates on this budget.

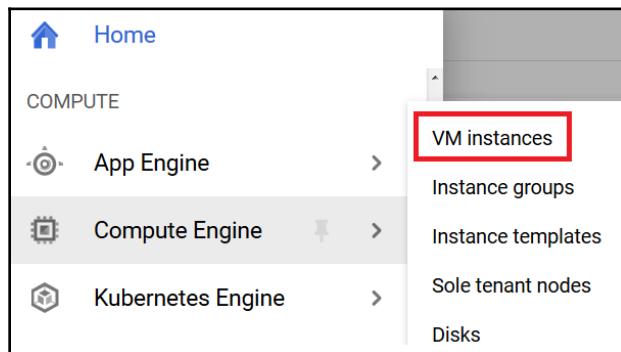
Connect a Pub/Sub topic to this budget [?](#)

**Save** **Cancel**

# Chapter 3: Google Cloud Platform Core Services



# Chapter 4: Working with Google Compute Engine



## Compute Engine

### VM instances

Compute Engine lets you use virtual machines that run on Google's infrastructure. Create micro-VMs or larger instances running Debian, Windows, or other standard images. Create your first VM instance, import it using a migration service, or try the quickstart to build a sample app.

[Create](#) or [Import](#) or [Take the quickstart](#)

---

Name [?](#)  
cloudarchitect

Region [?](#)  
europe-west2 (London) ▾ Zone [?](#)  
europe-west2-b ▾ \$31.75 monthly estimate  
That's about \$0.043 hourly  
Pay for what you use: No upfront costs and per second billing

Machine type  
Customize to select cores, memory and GPUs.

1 vCPU ▾ 3.75 GB memory [Customize](#) [▼ Details](#)

micro (1 shared vCPU)  
0.6 GB memory, f1-micro

small (1 shared vCPU)  
1.7 GB memory, g1-small

---

1 vCPU  
3.75 GB memory, n1-standard-1

2 vCPUs  
7.5 GB memory, n1-standard-2

4 vCPUs  
15 GB memory, n1-standard-4

8 vCPUs  
30 GB memory, n1-standard-8

16 vCPUs  
60 GB memory, n1-standard-16

---

## Machine type

Customize to select cores, memory and GPUs.

[Basic view](#)

### Cores



6 vCPU 1 - 96

### Memory



15 GB 5.5 - 39

Extend memory [?](#)

## Boot disk

Select an image or snapshot to create a boot disk; or attach an existing disk

[OS images](#)   [Application images](#)   [Custom images](#)   [Snapshots](#)   [Existing disks](#)

- Server with Desktop Experience, x64 built on 20190312
- Windows Server 2016 Datacenter Core**  
Server Core, x64 built on 20190312
- Windows Server 2016 Datacenter**  
Server with Desktop Experience, x64 built on 20190312
- Windows Server 2019 Datacenter Core for Containers**  
Server Core, x64 built on 20190312
- Windows Server 2019 Datacenter Core**  
Server Core, x64 built on 20190312
- Windows Server 2019 Datacenter for Containers**  
x64 built on 20190312
- Windows Server 2019 Datacenter**  
Server with Desktop Experience, x64 built on 20190312
- Intel® optimized Deep Learning Image: Base m22 (with Intel® MKL and CUDA 10.0)**  
A Debian based image with CUDA 10.0 plus Intel® optimized NumPy, SciPy, and scikit-learn.
- Deep Learning Image: PyTorch 1.0.0 and fastai m23 CUDA 10.0**  
A Debian based image with PyTorch (CUDA 10.0) fastai, CUDA and Intel® optimized NumPy, SciPy, and scikit-learn.
- Intel® optimized Deep Learning Image: TensorFlow 1.13.1 m23 (with Intel®**

Can't find what you're looking for? Explore hundreds of VM solutions in [Marketplace](#)

Boot disk type [?](#)

Size (GB) [?](#)

Standard persistent disk

50

VM instances    [CREATE INSTANCE](#)    [IMPORT VM](#)    SHOW INFO PANEL LEARN

Filter VM instances Columns

Name	Zone	Recommendation	In use by	Internal IP	External IP	Connect
<input type="checkbox"/> clouarchitect	europe-west2-b			10.154.0.2 (nic0)	35.234.155.4	RDP Set Windows password View gcloud command to reset password Download the RDP file Learn about Windows auth

## Set new Windows password

If a Windows account with the following username does not exist, it will be created and a new password assigned. If the account exists, its password will be reset.

If the account already exists, resetting the password can cause the loss of encrypted data secured with the current password, including files and stored passwords. [Learn more](#)

Username

google3066639\_studen

CANCEL

SET

## New Windows password

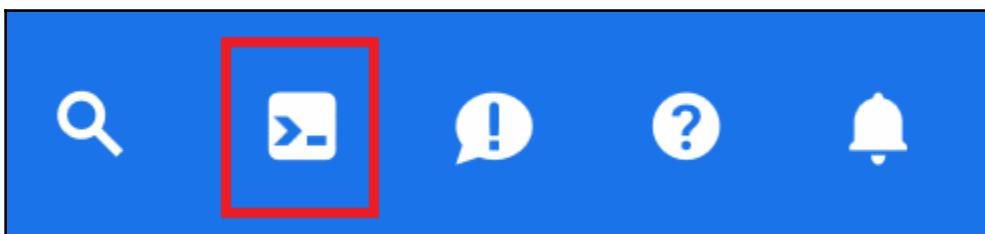
The following is the new Windows password for google3066639\_studen. Copy it and keep it secure. It will not be shown again.

LP\*igUh/A(%>&cX



[CLOSE](#)

VM instances		<a href="#">CREATE INSTANCE</a>	<a href="#">IMPORT VM</a>	<a href="#">REFRESH</a>	<a href="#">START</a>	<a href="#">STOP</a>
<input type="checkbox"/> Filter VM instances <span style="float: right;">Columns ▾</span>						
<input type="checkbox"/> Name ▾	Zone	Recommendation	In use by	Internal IP	External IP	Connect
<input checked="" type="checkbox"/> clouarchitect	us-central1-a			10.128.0.2 (nic0)	35.192.217.188	<a href="#">SSH ▾</a> <span style="float: right;">⋮</span>



## gcloud command line

This is the gcloud command line with the parameters you have selected.

```
gcloud compute --project=qwiklabs-gcp-e847de8dac6d39c7 instances create NAME --zone=europe-west2-b --machine-type=n1-standard-1 --subnet=default --network-tier=PREMIUM --maintenance-policy=MIGRATE --service-account=727867390611-compute@developer.gserviceaccount.com --scopes=https://www.googleapis.com/auth/devstorage.read_only,https://www.googleapis.com/auth/logging.write,https://www.googleapis.com/auth/monitoring.write,https://www.googleapis.com/auth/servicecontrol,https://www.googleapis.com/auth/service.management.readonly,https://www.googleapis.com/auth/trace.append --image=windows-server-2016-dc-v20190411 --image-project=windows-cloud --boot-disk-size=50GB --boot-disk-type=pd-standard
```

Line wrapping

[gcloud reference](#)

[CLOSE](#) [RUN IN CLOUD SHELL](#)

## gcloud command line

This is the gcloud command line with the parameters you have selected.

```
gcloud compute --project=qwiklabs-gcp-e847de8dac6d39c7 instances create NAME --zone=europe-west2-b --machine-type=n1-standard-1 --subnet=default --network-tier=PREMIUM --maintenance-policy=MIGRATE --service-account=727867390611-compute@developer.gserviceaccount.com --scopes=https://www.googleapis.com/auth/devstorage.read_only,https://www.googleapis.com/auth/logging.write,https://www.googleapis.com/auth/monitoring.write,https://www.googleapis.com/auth/servicecontrol,https://www.googleapis.com/auth/service.management.readonly,https://www.googleapis.com/auth/trace.append --image=windows-server-2016-dc-v20190411 --image-project=windows-cloud --boot-disk-size=50GB --boot-disk-type=pd-standard
```

Line wrapping

[gcloud reference](#)

[CLOSE](#) [RUN IN CLOUD SHELL](#)

---

- asia-east1 (Taiwan)
- asia-east2 (Hong Kong)
- asia-northeast1 (Tokyo)
- asia-northeast2 (Osaka)
- asia-south1 (Mumbai)
- asia-southeast1 (Singapore)
- australia-southeast1 (Sydney)
- europe-north1 (Finland)
- europe-west1 (Belgium)
- europe-west2 (London)
- europe-west3 (Frankfurt)
- europe-west4 (Netherlands)
- europe-west6 (Zürich)
- northamerica-northeast1 (Montréal)
- southamerica-east1 (São Paulo)
- us-central1 (Iowa)
- us-east1 (South Carolina)
- us-east4 (Northern Virginia)
- us-west1 (Oregon)
- us-west2 (Los Angeles)

### Region ?

europewest1 (Belgium) ▾

europewest1-b

europewest1-d

europewest1-c

### Machine type

Customize to select cores, memory and GPUs.

- Windows Server 2012 R2 Datacenter  
Server with Desktop Experience, x64 built on 20190411
- Windows Server 2016 Datacenter Core  
Server Core, x64 built on 20190411
- Windows Server 2016 Datacenter  
Server with Desktop Experience, x64 built on 20190411
- Windows Server 2019 Datacenter Core for Containers  
Server Core, x64 built on 20190411
- Windows Server 2019 Datacenter Core  
Server Core, x64 built on 20190411
- Windows Server 2019 Datacenter for Containers

#### SSD persistent disk

Max disk size: 65,536 GB

#### Standard persistent disk

Max disk size: 65,536 GB

VM solutions in [Marketplace](#)

Size (GB) [?](#)

50

## Boot disk

Select an image or snapshot to create a boot disk; or attach an existing disk

[OS images](#) [Application images](#) [Custom images](#) [Snapshots](#) [Existing disks](#)

- SQL Server 2012 Enterprise on Windows Server 2012 R2 Datacenter  
x64 built on 20190411
- SQL Server 2012 Standard on Windows Server 2012 R2 Datacenter  
x64 built on 20190411
- SQL Server 2012 Web on Windows Server 2012 R2 Datacenter  
x64 built on 20190411

---

**Name** ?  
disk001snapshot

**Description** (Optional)  
Snapshot of cloudbuilderdisk001

**Source disk** ?  
cloudbuilderdisk001

**Location** ?  
 Multi-regional  
 Regional  
us (United States) (default)

There may be a network transfer fee if you choose to store this snapshot in a location different than the source disk. [Learn more](#)

**Labels** ? (Optional)  
[+ Add label](#)

**Info** This snapshot will be encrypted using disk encryption settings

**Encryption type**  
Google managed

**Integrate volume shadow copy service** ?  
 Enable VSS

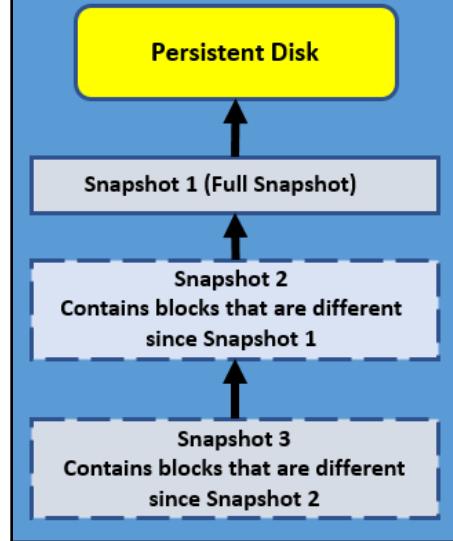
---

You will be billed for this snapshot. [Compute Engine pricing](#) ↗

**Create** **Cancel**

---

## Creating a Snapshot



Compute Engine

Create a disk

VM instances  
Instance groups  
Instance templates  
Sole tenant nodes  
**Disks**  
Snapshots  
Images  
TPUs  
Committed use discounts  
Metadata  
Health checks  
Zones  
Marketplace

Name: cloudarchitectdisk001

Description (Optional): New Disk

Type: Standard persistent disk

Replicate this disk within region

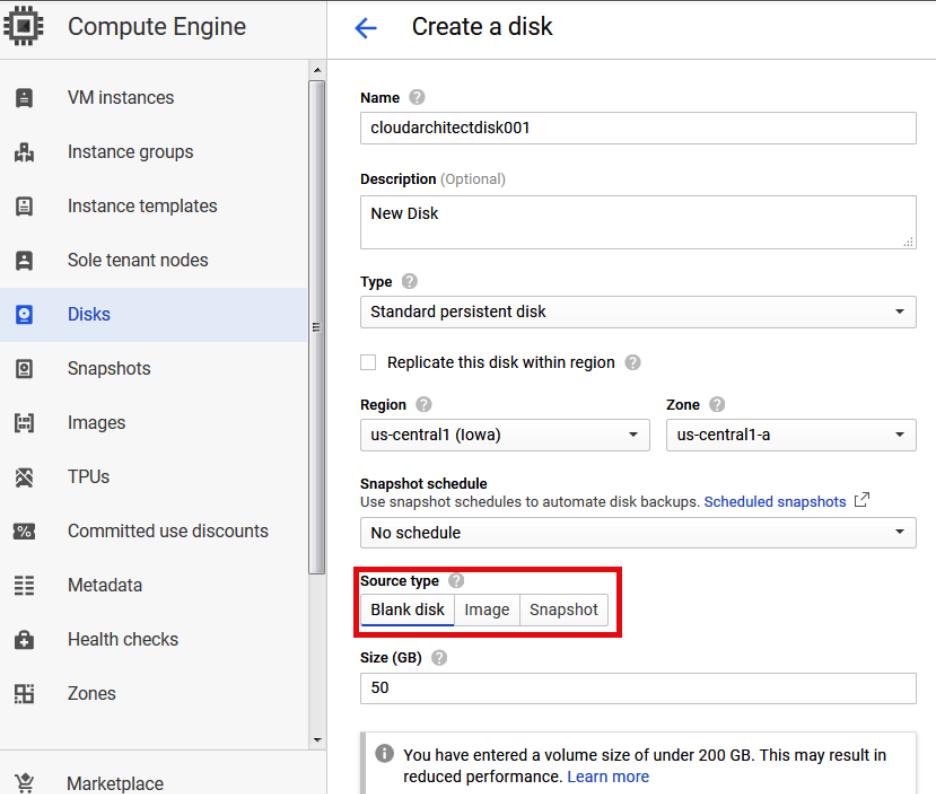
Region: us-central1 (Iowa) Zone: us-central1-a

Snapshot schedule: No schedule

Source type: **Blank disk** Image Snapshot

Size (GB): 50

You have entered a volume size of under 200 GB. This may result in reduced performance. [Learn more](#)



### Boot disk

Select an image or snapshot to create a boot disk; or attach an existing disk

OS images Application images Custom images Snapshots **Existing disks**

Unattached disks in zone us-central1-a:

- cloudarchitectdisk001 (50 GB, Standard Persistent Disk)  
Created on Apr 17, 2019, 3:12:39 PM

---

<a href="#">Management</a>	<a href="#">Security</a>	<a href="#">Disks</a>	<a href="#">Networking</a>	<a href="#">Sole Tenancy</a>
<b>Description</b> (Optional)				
<input type="text"/>				
<b>Labels</b> <small>(Optional)</small>				
<b>Key</b>	<b>Value</b>			
environment	production	X		
<a href="#">+ Add label</a>				

<b>Metadata</b> (Optional)	
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. <a href="#">Learn more</a>	
<input type="text"/> gcs-bucket	<input type="text"/> gs://deployments
<input type="text"/> startup-script-url	<input type="text"/> gs://deployments/startup.sh
<a href="#">+ Add item</a>	

<b>Availability policy</b>
<b>Preemptibility</b>
A preemptible VM costs much less, but lasts only 24 hours. It can be terminated sooner due to system demands. <a href="#">Learn more</a>
<input type="button" value="On"/> <span style="float: right;">▼</span>

## Operations

Operations are REST requests that affect resources at the global, region, or zone level [Learn more](#)

Operation summary	Target	User	Time (GMT)	Status
<span>✓</span> compute.projects.setCommonInstanceMetadata	qwiklabs-gcp-37865da19b691f65	qwiklabs-gcp-37865da19b691f65@qwiklabs-gcp-37865da19b691f65.iam.gserviceaccount.com	Start: Jun 7, 2019, 8:19:22 PM End: Jun 7, 2019, 8:19:28 PM	Done
<span>✓</span> compute.projects.setCommonInstanceMetadata	qwiklabs-gcp-37865da19b691f65	qwiklabs-gcp-37865da19b691f65@qwiklabs-gcp-37865da19b691f65.iam.gserviceaccount.com	Start: Jun 7, 2019, 8:19:18 PM End: Jun 7, 2019, 8:19:22 PM	Done

## Operations

Operations are REST requests that affect resources at the global, region, or zone level [Learn more](#)

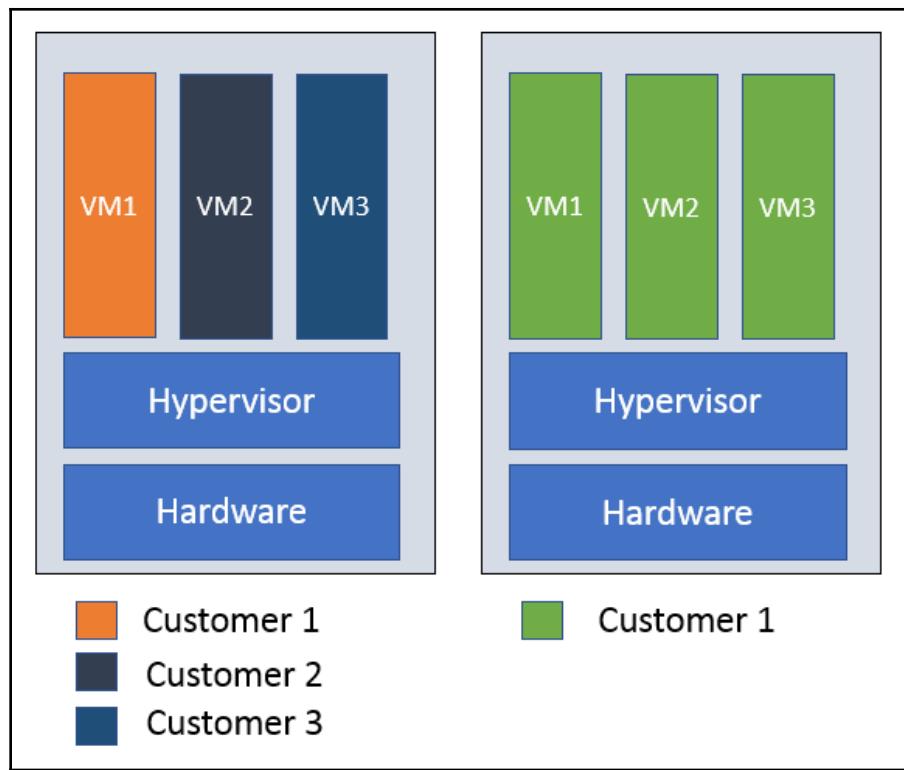
Operation summary	Target	User	Time (GMT)	Status
<span>✓</span> compute.projects.setCommonInstanceMetadata	qwiklabs-gcp-37865da19b691f65	qwiklabs-gcp-37865da19b691f65@qwiklabs-gcp-37865da19b691f65.iam.gserviceaccount.com	Start: Jun 7, 2019, 8:19:22 PM End: Jun 7, 2019, 8:19:28 PM	Done
<span>✓</span> compute.projects.setCommonInstanceMetadata	qwiklabs-gcp-37865da19b691f65	qwiklabs-gcp-37865da19b691f65@qwiklabs-gcp-37865da19b691f65.iam.gserviceaccount.com	Start: Jun 7, 2019, 8:19:18 PM End: Jun 7, 2019, 8:19:22 PM	Done

Management      Security      **Disks**      Networking      Sole Tenancy

### Boot disk

#### Deletion rule

Delete boot disk when instance is deleted



## Compute Engine

- VM instances
- Instance groups
- Instance templates
- Sole tenant nodes**
- Disks
- Snapshots
- Images
- TPUs
- Committed use discounts
- Metadata
- Health checks
- Zones

### Create a node template

Name ?

Region ?

Node type

- Smallest available node  
CPU: any, Memory: any
- n1-node-96-624  
CPU: 96, Memory: 624 GB

▼ Advanced node restart configuration

You can't edit a node template after you create it  
You can create this node template free of charge

**Create** **Cancel**

Equivalent [REST](#) or [command line](#)

Compute Engine

Create a node group

Name: cloudarchitectnode

Region: us-east1 (South Carolina)

Zone: us-east1-b

Node template: cloudarchitectnodetemplate

Number of nodes: 3

You will be billed for nodes in this group. [Compute Engine pricing](#)

[Create](#) | [Cancel](#)

[ 37 ]

---

**Name** [?](#)  
gpu-instance

**Region** [?](#)      **Zone** [?](#)  
us-west1 (Oregon)      us-west1-a

**Machine configuration**

**Machine family**  
[General-purpose](#) [Memory-optimized](#)

Machine types for common workloads, optimized for cost and flexibility

**Generation**  
First  
Powered by Skylake CPU platform or one of its predecessors

**Machine type**  
n1-standard-1 (1 vCPU, 3.75 GB memory)

	vCPU	Memory
	1	3.75 GB

**CPU platform** [?](#)  
Automatic

**GPU type** NVIDIA Tesla P100      **Number of GPUs** 1 [X](#)

Enable Virtual Workstation (NVIDIA GRID)

**Display device**  
Turn on a display device if you want to use screen capturing and recording tools.

Turn on display device

[CPU platform and GPU](#)

---

**Name** ?  
tpunode001

**Zone** ?  
europe-west4-a

**TPU type** ?  
v3-8

**TPU software version** ?  
pytorch-0.1

**Network** ?  
default

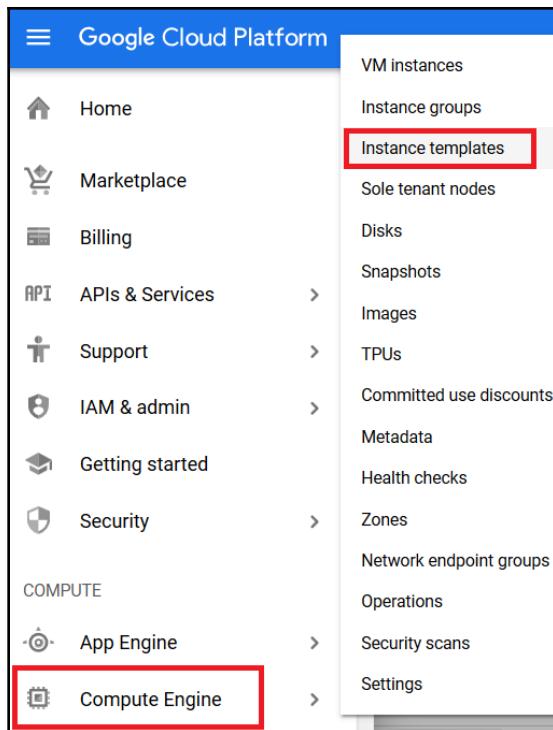
**IP address range** ?  
10.20.30.40

**Preemptibility**  
A preemptible TPU node works like a normal TPU node but costs less and lasts only for 24 hours. GCE can stop it sooner when it needs resources for other tasks  
 Turn on preemptibility for this TPU node

**Description** (Optional)

**Labels** (Optional)  
 [+ Add label](#)

<b>Estimated monthly total</b> \$6,424.00 ~730 hours per month	<b>Hourly rate</b> \$8.80
--	------------------------------



## ← Create an instance template

### Metadata (Optional)

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](#)

startup-script-url

gs://cloudbuilders/startup.sh

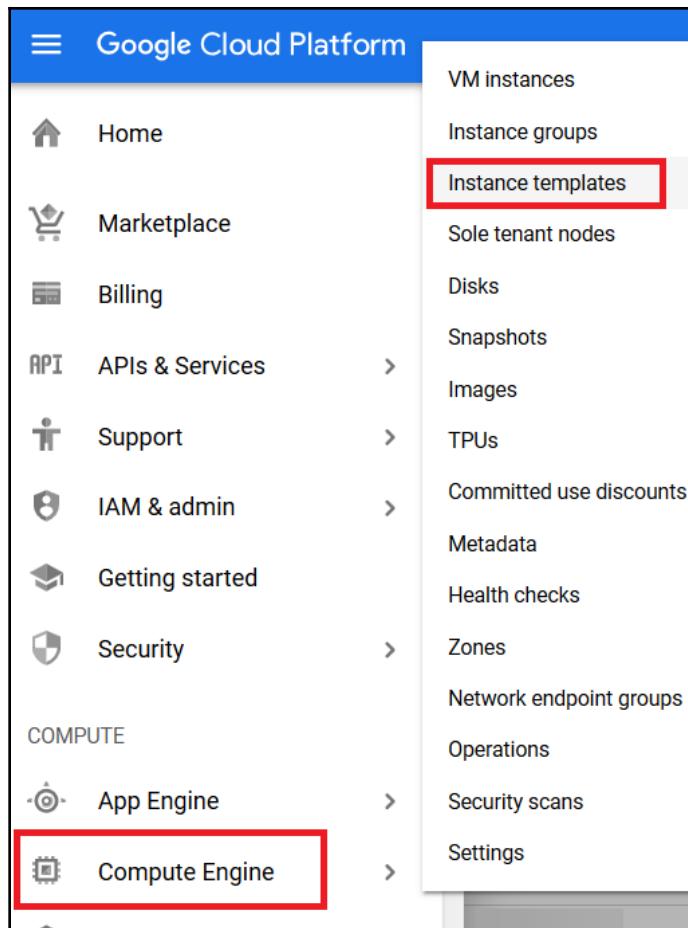


gcs-bucket

gs://cloudbuilders



+ Add item





## Create an instance template

### Metadata (Optional)

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](#)

XX[+ Add item](#)

### Compute Engine

[VM instances](#)[Instance groups](#)

[Create a new instance group](#)

**Location**  
To ensure higher availability, select a multiple zone location for an instance group.  
[Learn more](#)

Single zone  
 Multiple zones  
Only managed instance groups can exist in multiple zones.

**Region**   
us-east1 ▾

[Configure zones](#)

[Specify port name mapping \(Optional\)](#)

Managed instance group  
Managed instance group contains identical instances, created from an instance template, and supports autoscaling, autohealing, rolling updating, load balancing and more. VM instances are stateless and disks are deleted on VM deletion or recreation.  
[Learn more](#)

Unmanaged instance group  
Unmanaged instance group is best for load balancing dissimilar instances, which you can add and remove arbitrarily. Autoscaling, autohealing, and rolling updating are not supported. [Learn more](#)

Unmanaged instance groups can't exist in multiple zones.

---

**Autoscaling** ?

On

**Autoscaling policy**  
Use metrics to determine when autoscaling should resize the group.

**Autoscaling groups of instances** ?

CPU usage

**Target CPU usage** ?

60 %

**Minimum number of instances** ?

1

**Maximum number of instances** ?

10

**Cool down period** ?

60 seconds

---

**Autoscaling policy**

Use metrics to determine when autoscaling should resize the group.

**Autoscaling groups of instances** 

HTTP load balancing usage

**Target HTTP load balancing usage** 

80

%

**Minimum number of instances** 

1

**Maximum number of instances** 

1

**Cool down period** 

60

seconds

Stackdriver monitoring metric

**Stackdriver monitoring metric** ?  
Scaling dynamically creates or deletes VMs based on the provided configuration.  
[Learn more](#)

**Metric export scope**  
Time series per instance

**Metric identifier**  
custom.googleapis.com/appdemo\_queue\_depth\_01

**Monitored resource type**  
gce\_instance

**Additional filter expression for metric labels** ?

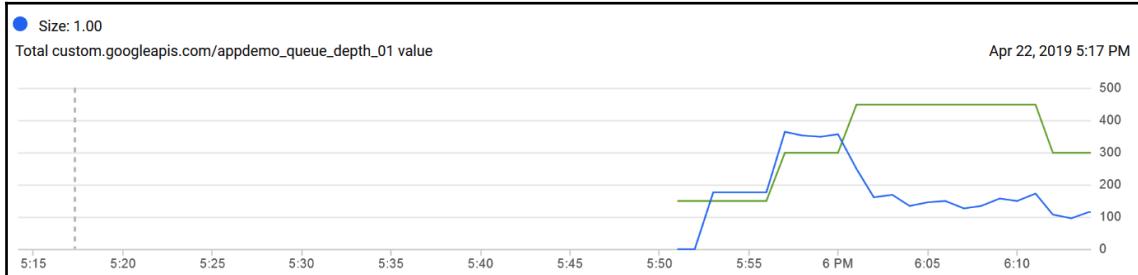
**Scaling policy** ?    **Utilization target** ?    **Utilization target type**

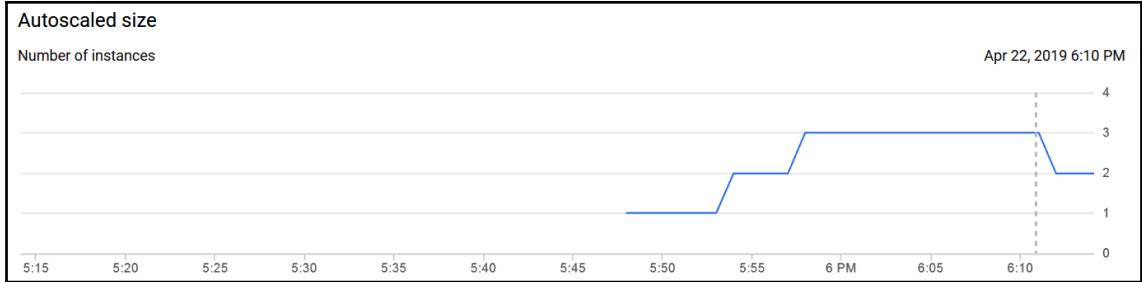
Utilization target	150	Gauge
--------------------	-----	-------

**Minimum number of instances** ?  
1

**Maximum number of instances** ?  
5

**Cool down period** ?  
60 seconds





Name ?  
healthcheck001

Description (Optional)

Protocol ?  
TCP

Port ?  
80

Proxy protocol ?  
NONE

Request (Optional) ?

Response (Optional) ?

Health criteria

Define how health is determined: how often to check, how long to wait for a response, and how many successful or failed attempts are decisive

Check interval ?  
10 seconds

Timeout ?  
5 seconds

Healthy threshold ?  
2 consecutive successes

Unhealthy threshold ?  
3 consecutive failures

Save and continue Cancel

## Autohealing

 To use autohealing, configure firewall rules. This will allow health checks to connect to VM instances in a group.

[How to configure firewall rules?](#) 

### Health check

healthcheck001 (TCP)

port: 80, timeout: 5s, check interval: 5s, unhealthy threshold: 3 attempts

 Because this health check will replace unhealthy instances, you may want to increase the check interval to at least 10 seconds and the unhealthy threshold to at least 3 times so your instances aren't replaced too often

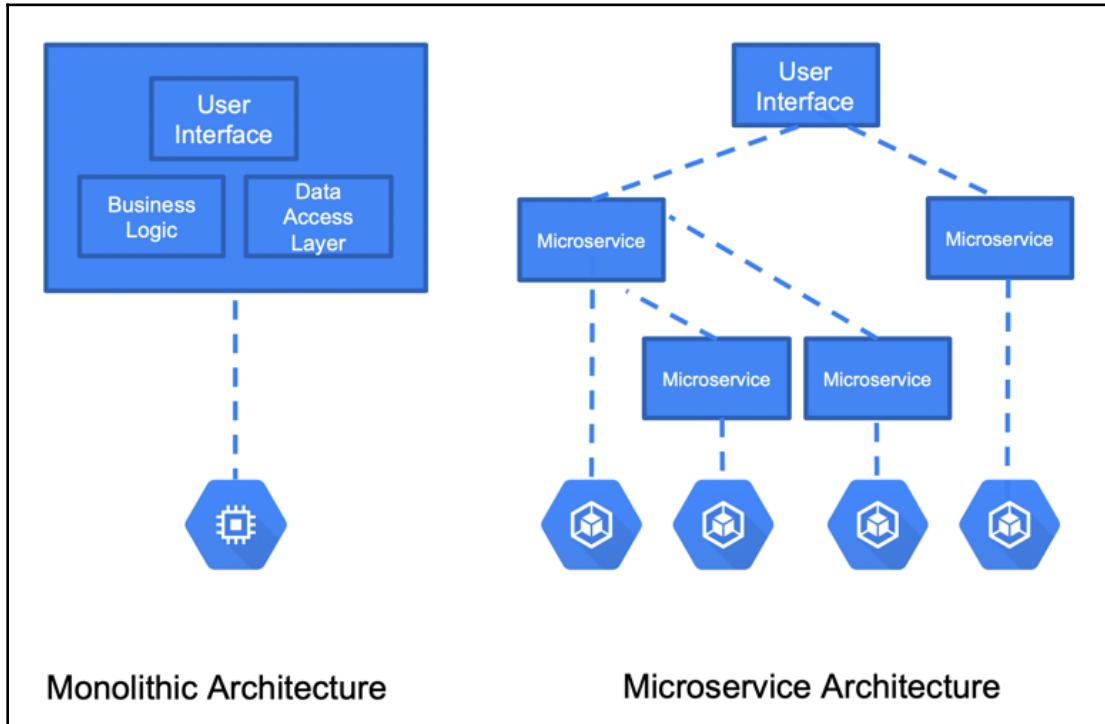
[Learn more](#)

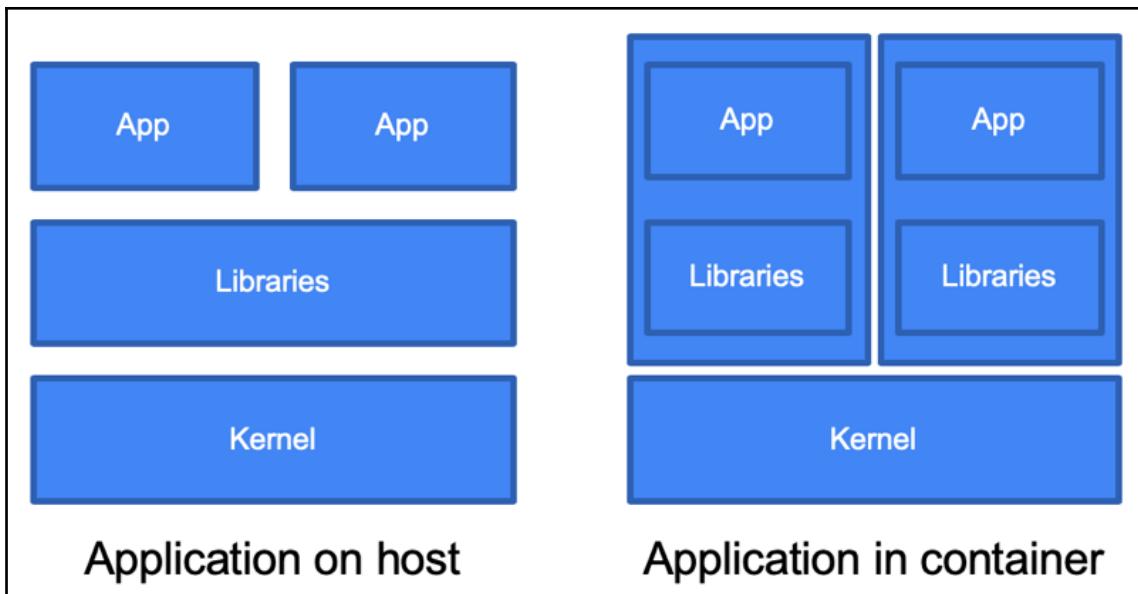
### Initial delay

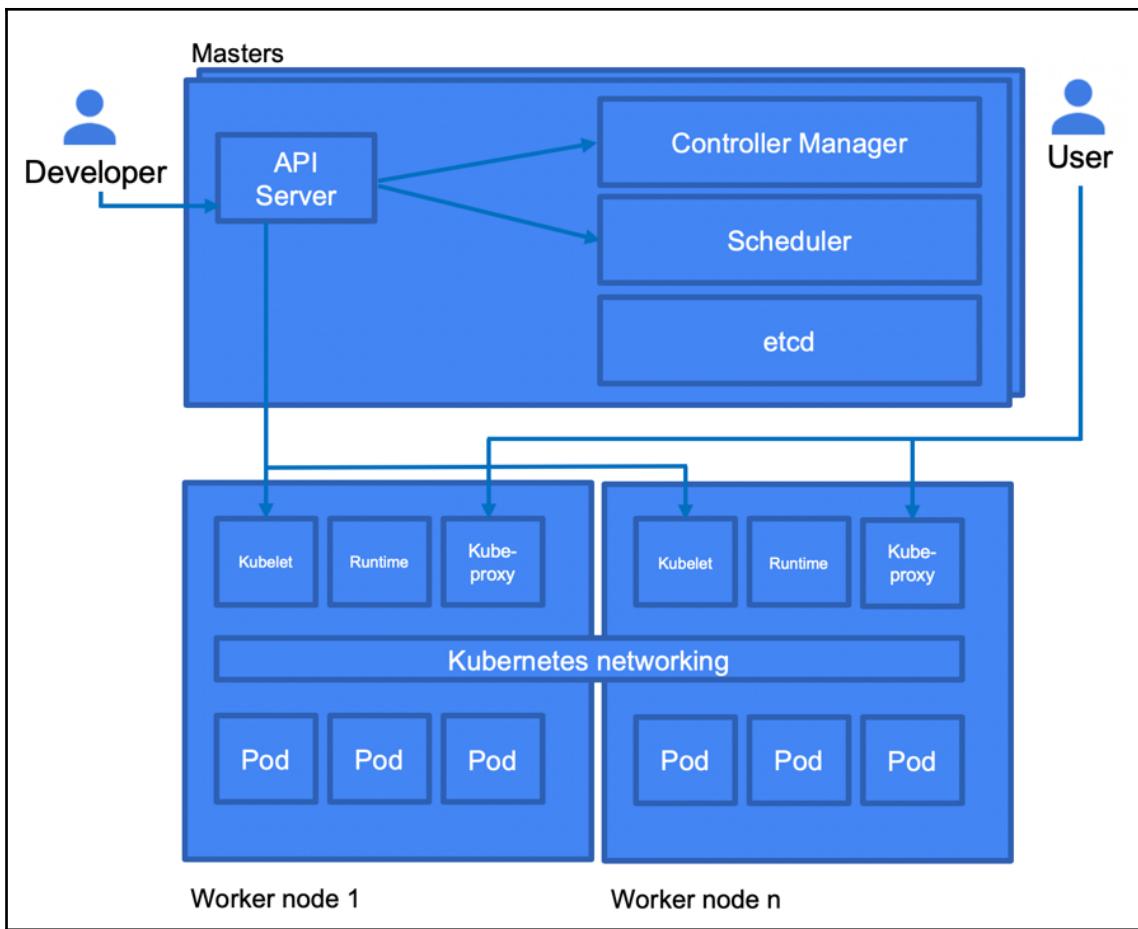
300

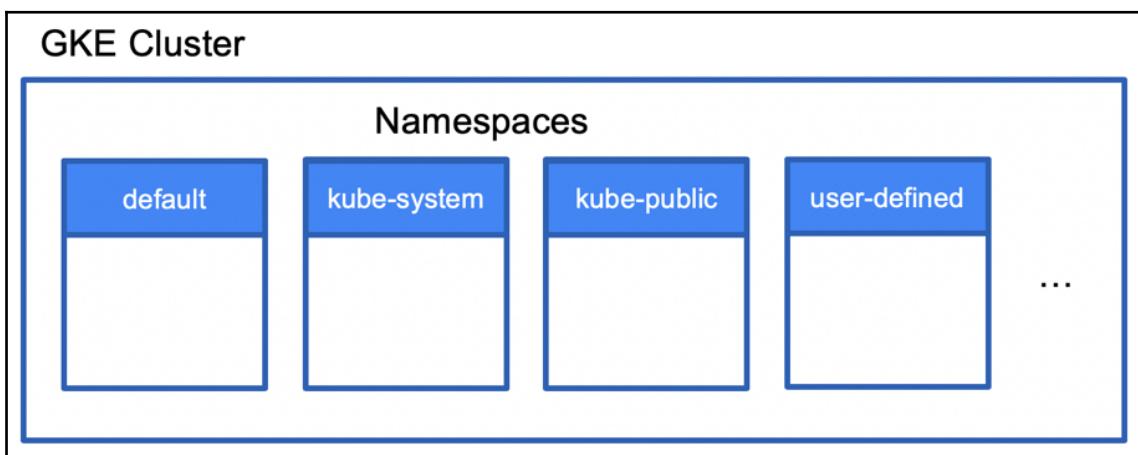
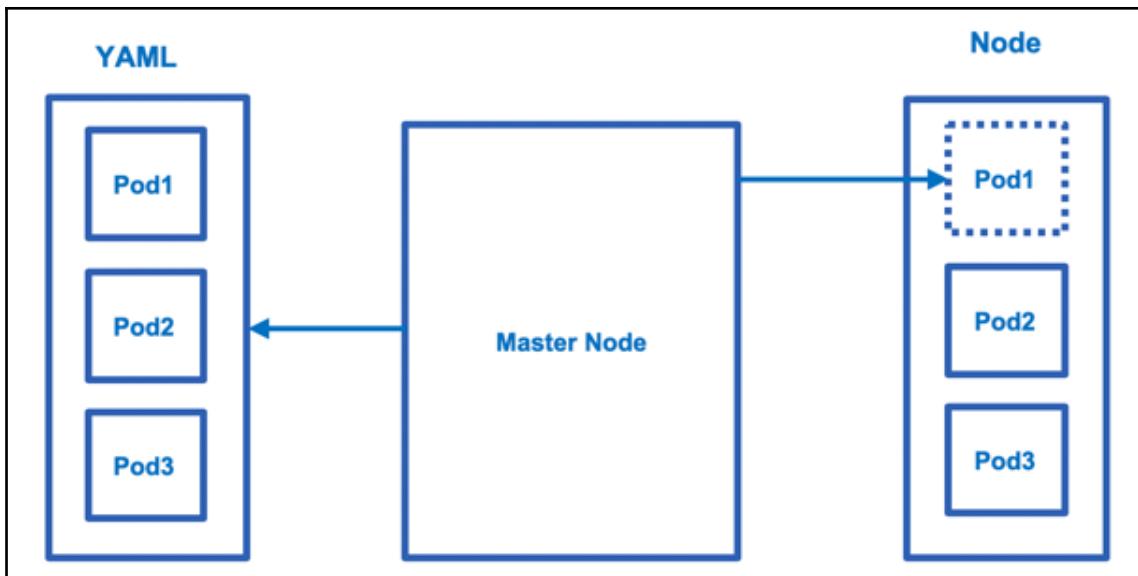
seconds

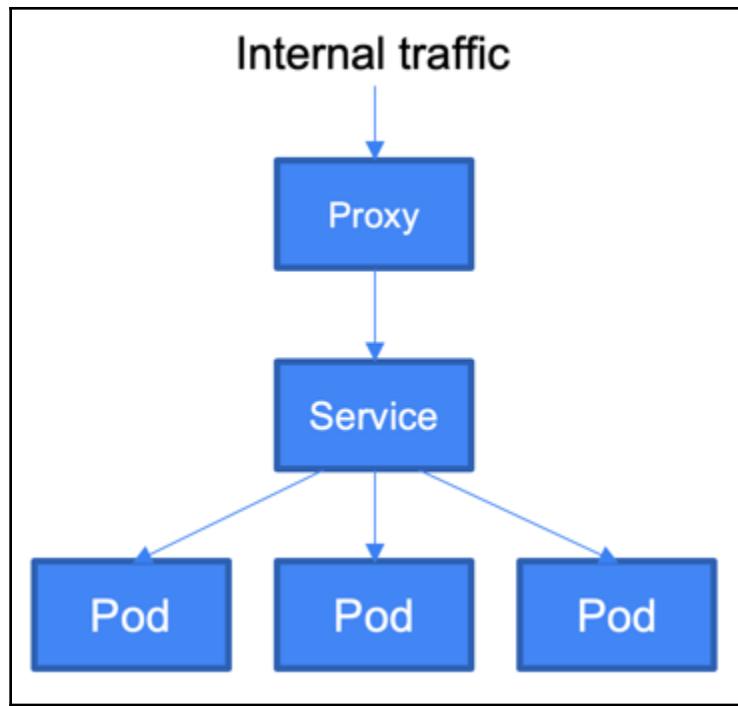
# Chapter 5: Managing Kubernetes Clusters with Google Kubernetes Engine

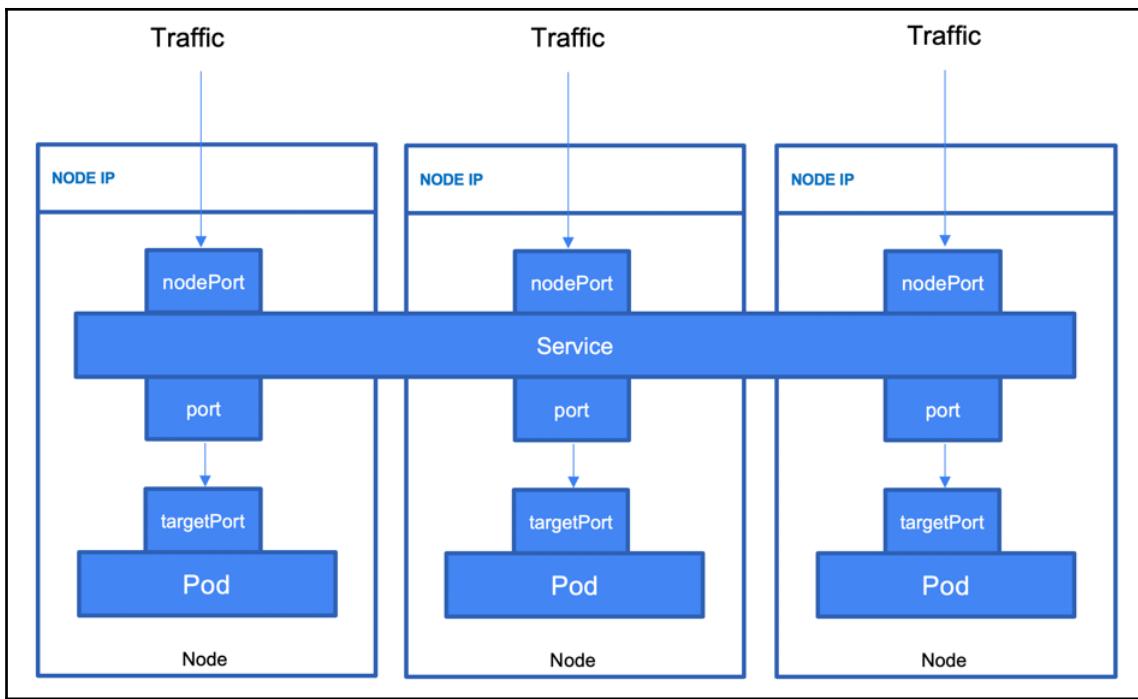


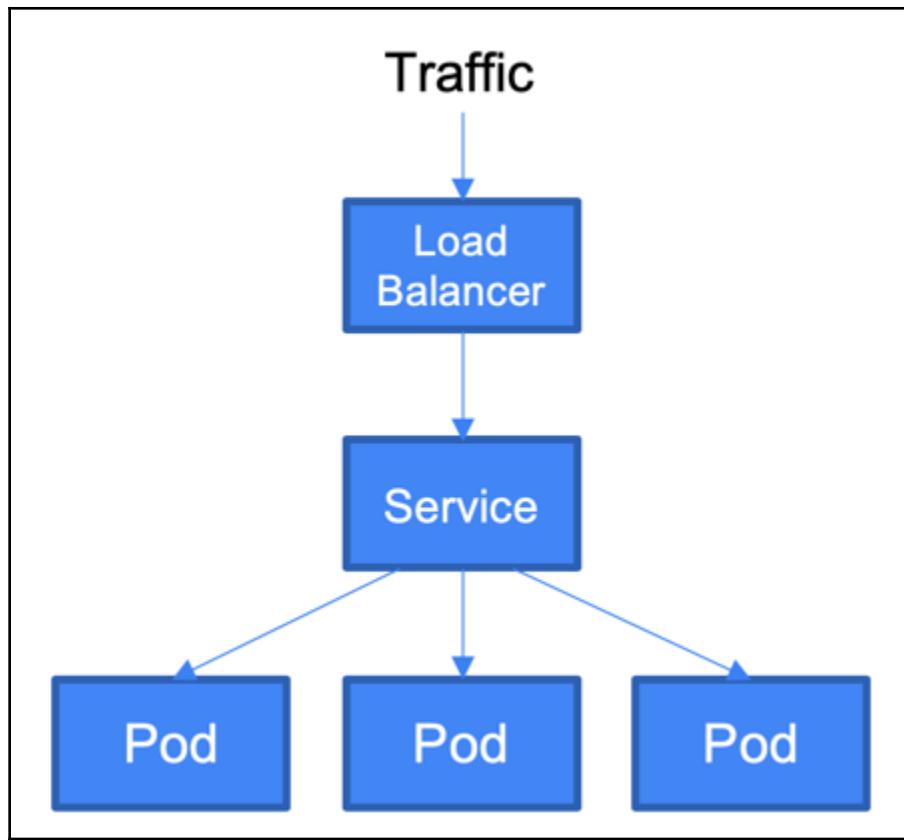


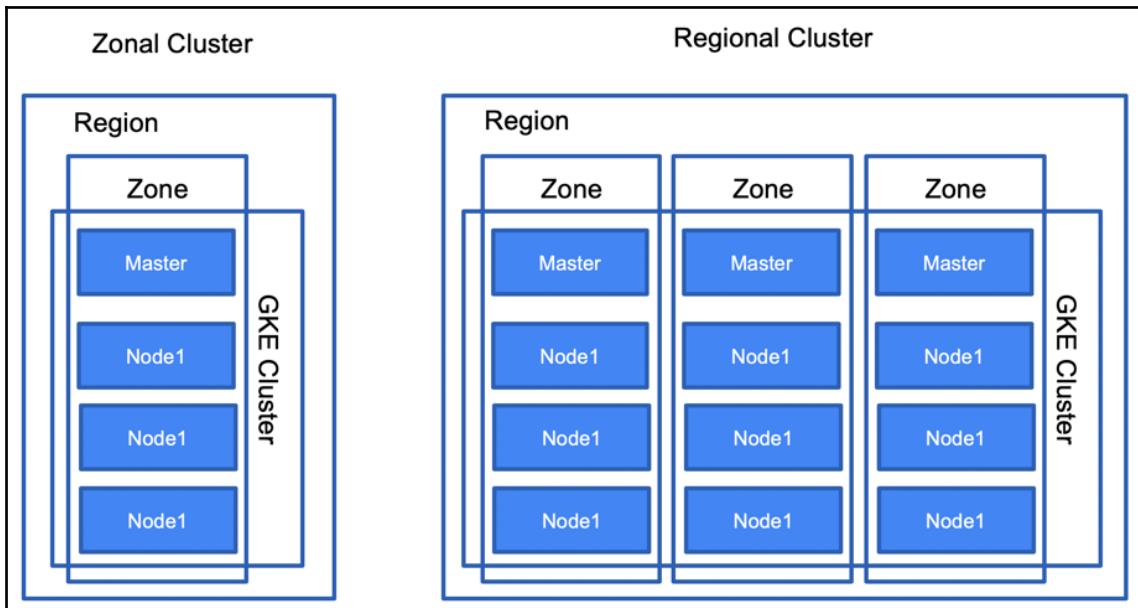
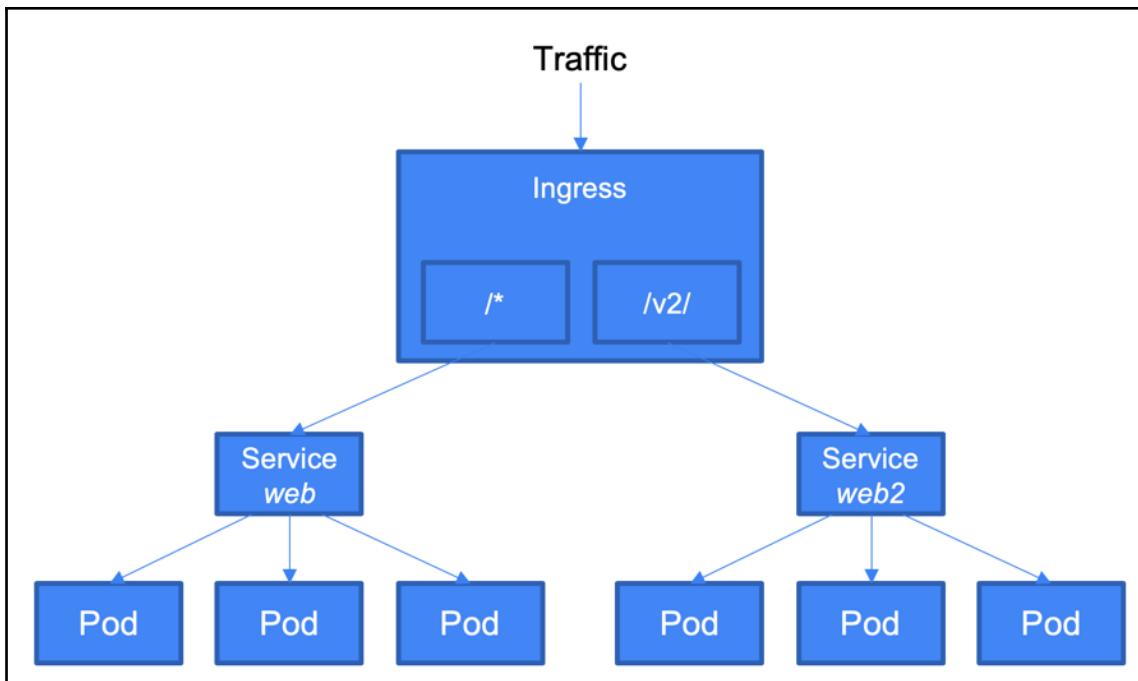




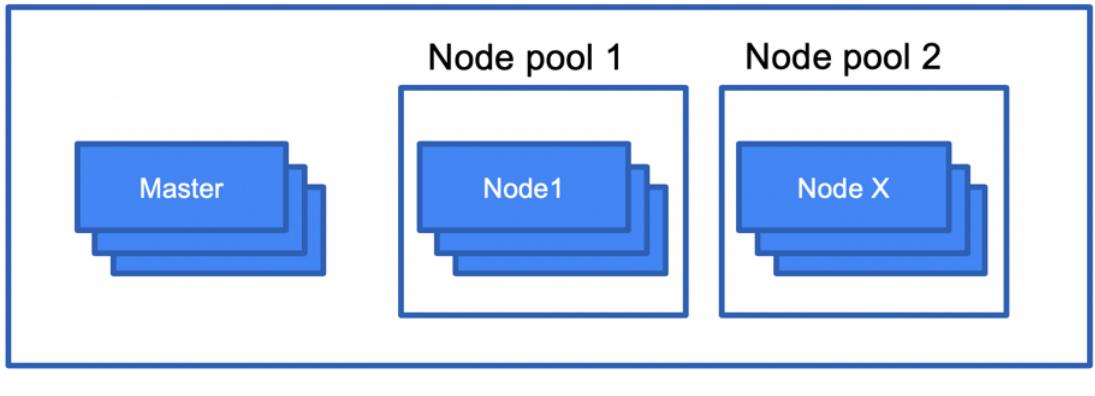




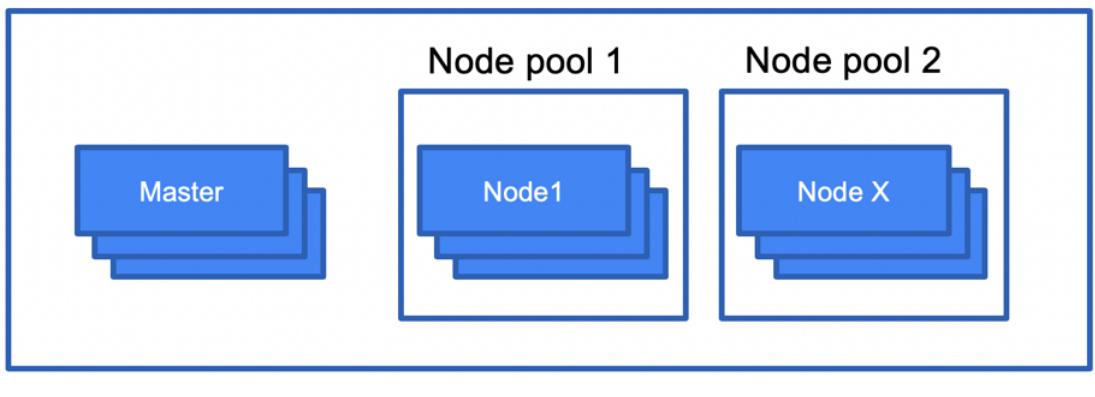


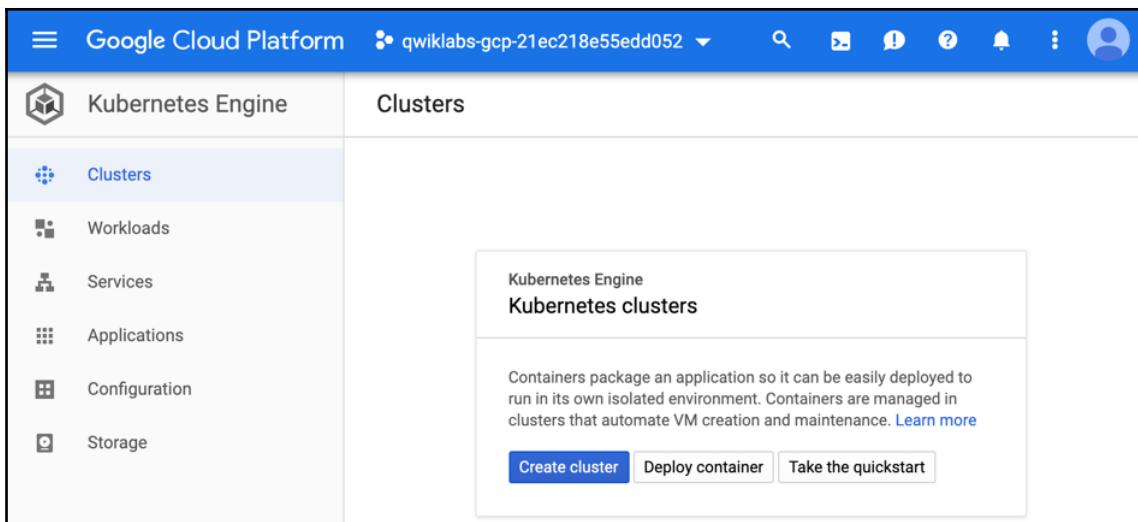


## GKE Cluster



## GKE Cluster





The screenshot shows the Google Cloud Platform (GCP) interface for the Kubernetes Engine. The top navigation bar includes the GCP logo, project name "qwiklabs-gcp-21ec218e55edd052", and various status icons. The left sidebar under "Kubernetes Engine" has a "Clusters" section selected, showing options like Workloads, Services, Applications, Configuration, and Storage. The main content area is titled "Clusters" and contains a summary box for "Kubernetes Engine" and "Kubernetes clusters". It explains that containers package applications for deployment and lists management tasks: "Create cluster", "Deploy container", and "Take the quickstart".

Google Cloud Platform • qwiklabs-gcp-21ec218e55edd052 ▾

## Create a Kubernetes cluster

**Cluster templates**

Select a template with preconfigured setting, or customize a template to suit your needs

- Clone an existing cluster**  
Select one of your existing clusters to populate fields
- Standard cluster**  
Continuous integration, web serving, backends. Best choice for further customization or if you are not sure what to choose.
- Your first cluster**  
Experimenting with Kubernetes Engine, deploying your first application. Affordable choice to get started.
- CPU intensive applications**  
Web crawling or anything else that requires more CPU.
- Memory intensive applications**  
Databases, analytics, things like Hadoop, Spark, ETL or anything else that requires more memory.
- GPU Accelerated Computing**  
Machine learning, video transcoding, scientific computations or anything else that is compute-intensive and can utilize GPUs.

**'Standard cluster' template**

Continuous integration, web serving, backends. Best choice for further customization or if you are not sure what to choose.

**Some fields can't be changed after the cluster is created.  
Hover over the help icons to learn more.** Dismiss

**Name**

**Location type**  Zonal  Regional

**Zone**

**Master version**

**Node pools**

Node pools are separate instance groups running Kubernetes in a cluster. You may add node pools in different zones for higher availability, or add node pools of different type machines. To add a node pool, click Edit. [Learn more](#)

default-pool
<b>Number of nodes</b> <input type="text" value="3"/>
<b>Machine type</b> <input type="text" value="Customize to select cores, memory and GPUs"/> <input type="text" value="1 vCPU"/> <input type="text" value="3.75 GB memory"/> <span style="float: right;"><a href="#">Customize</a></span>
Auto-upgrade: On
<a href="#">More options</a>

## 'Standard cluster' template (edited)

Continuous integration, web serving, backends. Best choice for further customization or if you are not sure what to choose.

Name [?](#)

Location type [?](#)

 Zonal Regional

Zone [?](#)

## 'Standard cluster' template (edited)

Continuous integration, web serving, backends. Best choice for further customization or if you are not sure what to choose.

Name [?](#)

Location type [?](#)

 Zonal Regional

Region [?](#)

## Master version

1.11.8-gke.6 (default)



## Node pools

Node pools are separate instance groups running Kubernetes in a cluster. You may add node pools in different zones for higher availability, or add node pools of different type machines. To add a node pool, click Edit. [Learn more](#)

default-pool

Number of nodes (per zone)

3

Total (in all zones): 9

Machine type

Customize to select cores, memory and GPUs

1 vCPU



3.75 GB memory

[Customize](#)

Auto-upgrade: On

[More options](#)

[Add node pool](#)

[Availability, networking, security, and additional features](#)

## Edit node pool

### Name ?

### Node version

### Size (per zone)

#### Number of nodes (per zone)

Total (in all zones): 9

#### Enable autoscaling ?

### Nodes

#### Image type ?

#### Machine type ?

Customize to select cores, memory and GPUs

3.75 GB memory

[Customize](#)

#### Boot disk type ?

#### Boot disk size (GB) ?

#### Local SSD disks (Optional) ?

#### Enable preemptible nodes (beta) ?

### Management

#### Enable auto-upgrade ?

#### Enable auto-repair ?

## Security

### Service account

Compute Engine default service account ▾

### Access scopes

- Allow default access
- Allow full access to all Cloud APIs
- Set access for each API

 Add node pool

⌄ Availability, networking, security, and additional features

## Availability

### Additional node locations

New nodes will be deployed for each zone selected based upon the node pools settings above.

- us-central1-b
- us-central1-c
- us-central1-f

### Maintenance window (beta)

Any Time

Hours shown in your local time zone (UTC+2)

## Availability

### Manually select node locations

New nodes will be deployed for each zone selected based upon the node pools settings above

- us-central1-a
- us-central1-b
- us-central1-c
- us-central1-f

### Maintenance window (beta)

At Any Time

Hours shown in your local time zone (UTC+2)

## Networking

### VPC-native

Enable VPC-native (using alias IP) [?](#)



VPC-native will soon become enabled by default

### Network [?](#)

default



### Subnet [?](#)

default (10.128.0.0/20)



### Pod address range (Optional) [?](#)

Example: 10.96.0.0/14

## Networking

### VPC-native

Enable VPC-native (using alias IP) [?](#)

#### Network [?](#)

default

#### Node subnet [?](#)

default (10.128.0.0/20)

Automatically create secondary ranges [?](#)

#### Pod address range (Optional) [?](#)

Example: 10.96.0.0/14

#### Maximum pods per node (Optional) [?](#)

110

Mask for Pod address range per node: /24

#### Service address range (Optional) [?](#)

Example: 10.94.0.0/18

## Load balancing

Enable HTTP load balancing [?](#)

## Network security

Private cluster [?](#)

Access master using its external IP address [?](#)

### Master IP range [?](#)

Example: 172.16.0.0/28

Enable master authorised networks [?](#)

[+ Add authorised network](#)

## Security

Enable basic authentication [?](#)

Issue a client certificate [?](#)

**⚠ Starting with version 1.12, clusters will have basic authentication and client certificate issuance disabled by default.**

Enable legacy authorization [?](#)

Enable Binary Authorization (beta) [?](#)

Enable Application-layer Secrets Encryption (beta) [?](#)

## Stackdriver

Enable Stackdriver Kubernetes Engine Monitoring [?](#)

### Stackdriver legacy features

Enable legacy Stackdriver Logging service [?](#)

Enable legacy Stackdriver Monitoring service [?](#)

### Additional features

Enable Cloud TPU [?](#)

Enable Kubernetes alpha features in this cluster [?](#)

Enable Kubernetes Dashboard (deprecated) [?](#)

Enable Istio (beta) [?](#)

Enable Cloud Run on GKE (beta) [?](#)

Enable node auto-provisioning (beta) [?](#)

Enable Vertical Pod Autoscaling (beta) [?](#)

Enable GKE usage metering (beta) [?](#)

[Create](#)[Reset](#)Equivalent [REST](#) or [command line](#)

## Kubernetes clusters

[+ CREATE CLUSTER](#)[+ DEPLOY](#)[REFRESH](#)[DELETE](#)

A Kubernetes cluster is a managed group of VM instances for running containerized applications. [Learn more](#)

Filter by label or name

 [Name ^](#)[Location](#)[Cluster size](#)[Total cores](#)[Total memory](#)[Notifications](#)[Labels](#) [standard-cluster-1](#)

us-central1-a

3

1 vCPU

3.75 GB

[Connect](#)

## Connect to the cluster

You can connect to your cluster via command-line or using a dashboard.

### Command-line access

Configure [kubectl](#) command line access by running the following command:

```
$ gcloud container clusters get-credentials standard-cluster-1 --zone us-central1-a --project quickstart-gcp-21ec
```

[Run in Cloud Shell](#)

### Cloud Console dashboard

You can view the workloads running in your cluster in the Cloud Console [Workloads dashboard](#).

[Open Workloads dashboard](#)[OK](#)

The screenshot shows a code editor interface with an 'EXPLORER' sidebar on the left and a main editor area on the right. In the 'EXPLORER' sidebar, there is a folder named 'GOOGLE3539162\_STUDENT' containing a file named 'deploy.yaml'. The main editor area displays the contents of 'deploy.yaml':

```
1  apiVersion: apps/v1
2  kind: Deployment
3  metadata:
4    name: nginx-deployment
5    labels:
6      app: nginx
7  spec:
8    replicas: 3
9    selector:
10      matchLabels:
11        app: nginx
12    template:
13      metadata:
14        labels:
15          app: nginx
16      spec:
17        containers:
18          - name: nginx
19            image: nginx:1.7.9
20        ports:
21          - containerPort: 80
22
```

Below the editor is a terminal window with the following content:

```
0 0 ▲ 0
abs-gcp-979d5d649f59493b) × + ▾
google3539162_student@cloudshell:~ (qwiklabs-gcp-979d5d649f59493b)$ kubectl apply -f deploy.yaml
deployment.apps/nginx-deployment created
```

```
google3539162_student@cloudshell:~ (qwiklabs-gcp-979d5d649f59493b)$ kubectl get pods
NAME                      READY   STATUS    RESTARTS   AGE
nginx-deployment-5c689d88bb-2d7pq   1/1     Running   0          2m33s
nginx-deployment-5c689d88bb-srtn8   1/1     Running   0          2m33s
nginx-deployment-5c689d88bb-z4mkp   1/1     Running   0          2m33s
```

Kubernetes Engine

Workloads

REFRESH DEPLOY DELETE

Clusters Workloads Services Applications Configuration Storage

Workloads are deployable units of computing that can be created and managed in a cluster.

Is system object : False Filter workloads Columns

Name	Status	Type	Pods	Namespace	Cluster
nginx-deployment	OK	Deployment	3/3	default	high-cpu-cluster-1

## nginx-deployment

To let others access your deployment, expose it to create a service

Expose

[←](#) Expose a deployment [SHOW INFO PANEL](#)

Exposing a deployment creates a Kubernetes Service. A service lets your deployment receive traffic and defines how your deployment is exposed.

Port mapping

New port mapping

Port [?](#) Target port [?](#) (Optional)

80

Protocol [?](#)

TCP

Cluster IP  
Exposes the service on an internal IP in the cluster.

Node port  
Exposes the service on the same port of each selected Node.

Load balancer  
Creates a load balancer with external IP.

Load balancer

Service name (Optional)

nginx-deployment-service

[Expose](#) [View YAML](#)

The screenshot shows a user interface for exposing a deployment. At the top, there's a back arrow, the title 'Expose a deployment', and a 'SHOW INFO PANEL' button. Below the title, a descriptive text explains what exposing a deployment does. Underneath, a section titled 'Port mapping' contains a 'New port mapping' form. The 'Port' field is populated with '80'. The 'Protocol' dropdown is set to 'TCP'. A dropdown menu for 'Service type' is open, showing three options: 'Cluster IP' (selected), 'Node port', and 'Load balancer'. The 'Cluster IP' option is described as exposing the service on an internal IP. The 'Node port' option is described as exposing on the same port on each node. The 'Load balancer' option is described as creating a load balancer with an external IP. Below the service type dropdown, there's a 'Service name (Optional)' field containing 'nginx-deployment-service'. At the bottom of the form are two buttons: a blue 'Expose' button and a grey 'View YAML' button.

Cluster	high-cpu-cluster-1		
Namespace	default		
Labels	app : nginx		
Stackdriver logs	Deployment: nginx-deployment		
Type	LoadBalancer		
External endpoints	<a href="#">35.194.21.47:80</a> ↗		
LoadBalancer			
Cluster IP	10.39.252.240		
Load balancer IP	<b>35.194.21.47</b>		
Load balancer	<a href="#">ac57afbda82f711e9b18142010a80008</a>		
Deployments			
Name	Status	Pods	
nginx-deployment	<span>✓ OK</span>	3/3	
Serving pods			
Name	Status	Restarts	Created on ^
nginx-deployment-5c689d88bb-2d7pq	<span>✓ Running</span>	0	May 30, 2019, 6:20:12 PM
nginx-deployment-5c689d88bb-srtn8	<span>✓ Running</span>	0	May 30, 2019, 6:20:12 PM
nginx-deployment-5c689d88bb-z4mkp	<span>✓ Running</span>	0	May 30, 2019, 6:20:12 PM
Ports			
Port	Node Port	Target Port	Protocol
80	31871	80	TCP
			<span>↗ Port forwarding</span>

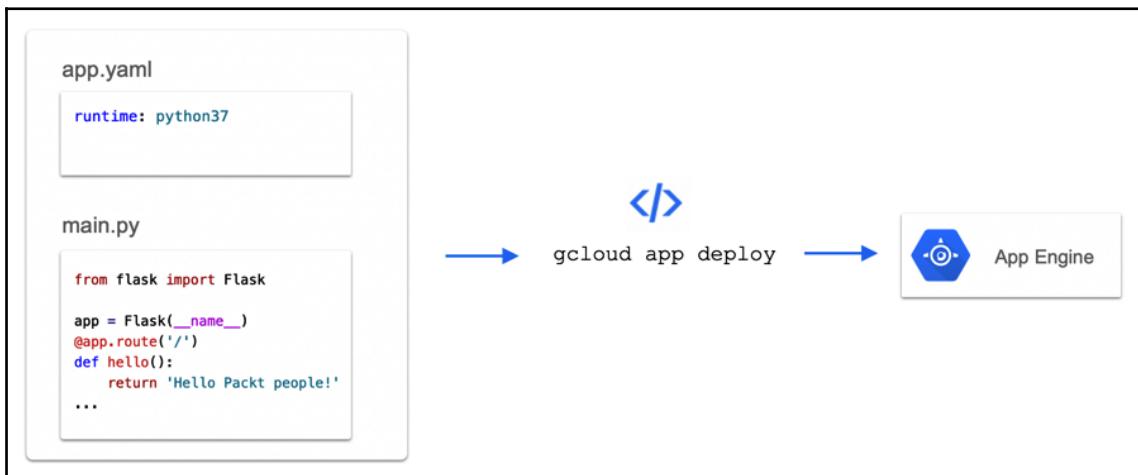
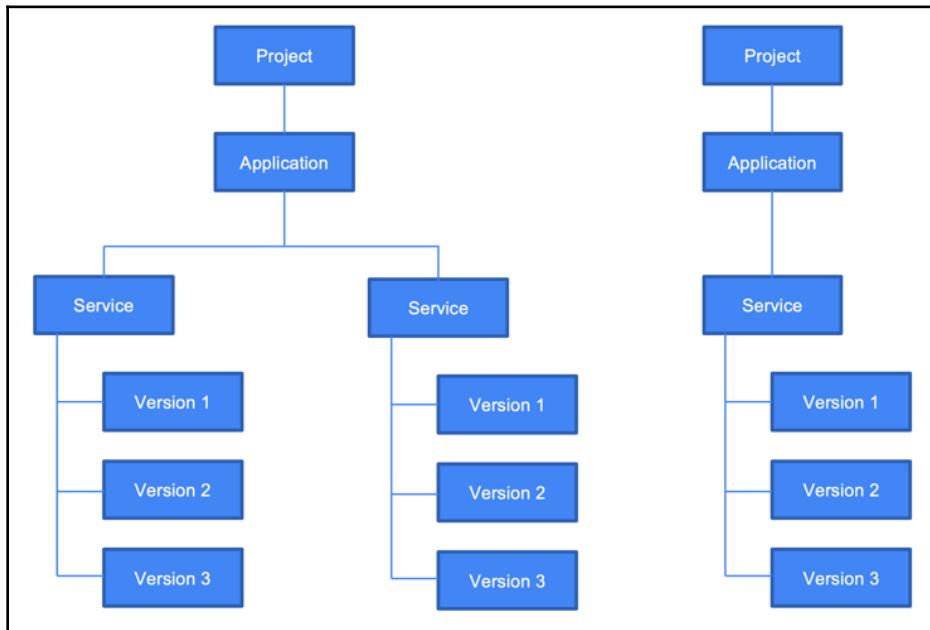
# Welcome to nginx!

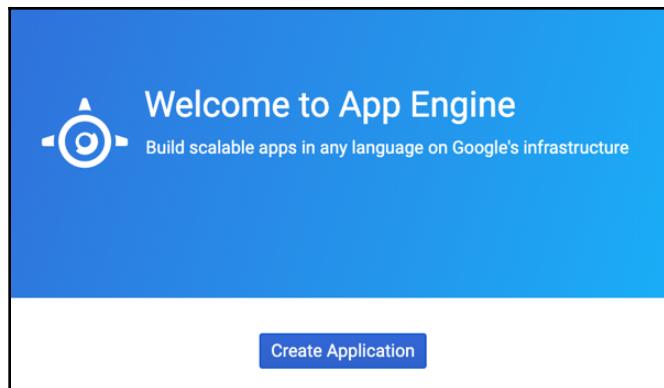
If you see this page, the nginx web server is successfully installed and working. Further configuration is required.

For online documentation and support please refer to [nginx.org](http://nginx.org).  
Commercial support is available at [nginx.com](http://nginx.com).

*Thank you for using nginx.*

# Chapter 6: Exploring Google App Engine as a Compute Option



A screenshot of the "Create app" screen in the Google App Engine interface. At the top, there is a "Region" section with a dropdown menu set to "europe-west". Below this is a world map with a blue marker indicating the selected region. At the bottom, there are two buttons: "Create app" (highlighted in blue) and "Cancel".

Region

Region is permanent.

europe-west

A world map showing the location of the "europe-west" region, which is marked with a blue pin on the continent of Europe.

Google

Create app Cancel

Map data ©2019



App Engine

Get started

**i** This step is optional. Its purpose is to guide you to the relevant SDK and code samples and, if necessary, enable billing.

**Language**

Python

Node.js

Java

Go

PHP

.NET

Ruby

Other



App Engine

Get started

**i** This step is optional. Its purpose is to guide you to the relevant SDK and code samples and, if necessary, enable billing.

**Language**

Python



**Environment**

Each version of your app can use the Standard or Flexible runtime. You can change this later.

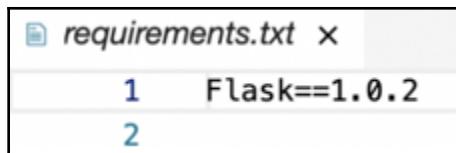
Standard

Flexible

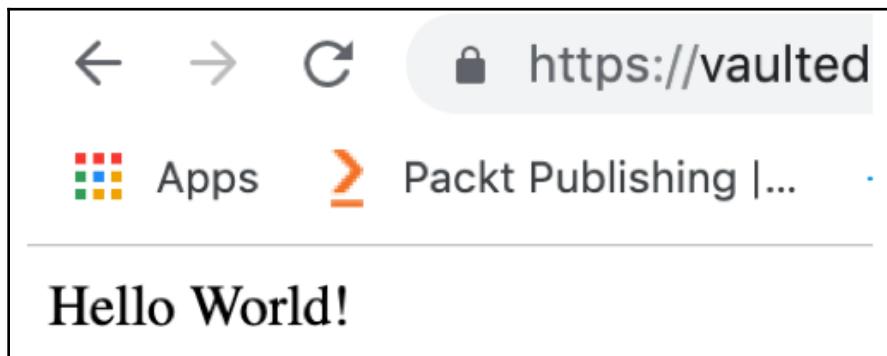
```
main.py x
1 # Copyright 2018 Google LLC
2 #
3 # Licensed under the Apache License, Version 2.0 (the "License");
4 # you may not use this file except in compliance with the License.
5 # You may obtain a copy of the License at
6 #
7 #     http://www.apache.org/licenses/LICENSE-2.0
8 #
9 # Unless required by applicable law or agreed to in writing, software
10 # distributed under the License is distributed on an "AS IS" BASIS,
11 # WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
12 # See the License for the specific language governing permissions and
13 # limitations under the License.
14
15 # [START gae_python37_app]
16 from flask import Flask
17
18
19 # If `entrypoint` is not defined in app.yaml, App Engine will look for an app
20 # called `app` in `main.py`.
21 app = Flask(__name__)
22
23
24 @app.route('/')
25 def hello():
26     """Return a friendly HTTP greeting."""
27     return 'Hello World!'
28
29
30 if __name__ == '__main__':
31     # This is used when running locally only. When deploying to Google App
32     # Engine, a webserver process such as Gunicorn will serve the app. This
33     # can be configured by adding an `entrypoint` to app.yaml.
34     app.run(host='127.0.0.1', port=8080, debug=True)
35 # [END gae_python37_app]
```

```
app.yaml x
1 runtime: python37
2
```

---



```
requirements.txt
1 Flask==1.0.2
2
```

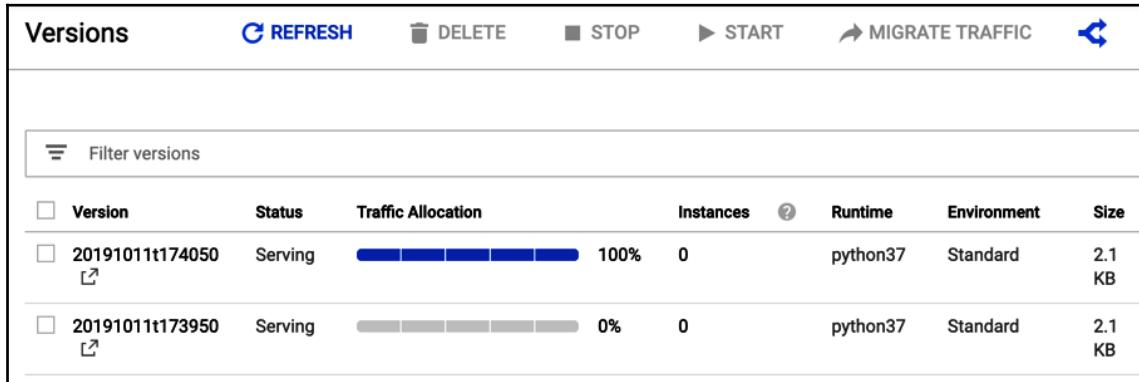


← → ⏪ https://vaulted

\_apps\_ Packt Publishing |...

# Hello World!

```
24 @app.route('/')
25 def hello():
26     """Return a friendly HTTP greeting."""
27     return 'Hello Packt people!'
```



Versions		REFRESH	DELETE	STOP	START	MIGRATE TRAFFIC	↔
		Filter versions					
Version	Status	Traffic Allocation	Instances	Runtime	Environment	Size	
20191011t174050	Serving	<div style="width: 100%;">100%</div>	0	python37	Standard	2.1 KB	🔗
20191011t173950	Serving	<div style="width: 0%;">0%</div>	0	python37	Standard	2.1 KB	🔗

[Split traffic](#)

You can split incoming traffic to different versions of your app. Traffic splitting is useful for slowly rolling out new versions or A/B testing different designs and features [Learn more](#)

**Split traffic by**

IP address [?](#)

Cookie [?](#)

Random [?](#)

**Traffic allocation**

20191011t174050	will receive the remaining	68 %	X
20191011t173950	32 %	X	

+ Add version

**Save** **Cancel**

Version	Status	Traffic Allocation	Instances	Runtime	Environment	Size
20191011t174050	Serving	<div style="width: 100%;">100%</div>	0	python37	Standard	2.1 KB
20191011t173950	Serving	<div style="width: 0%;">0%</div>	0	python37	Standard	2.1 KB

**Migrate traffic to version 20191011t173950**

All requests will be immediately routed to this version. This may cause latency for large applications.

You can also enable warmup requesting for gradual traffic migration. [Learn more](#)

Do you want to migrate all traffic to this version?

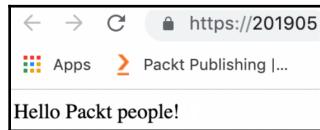
**CANCEL** **MIGRATE**

---

**Versions**

Filter versions

<input type="checkbox"/> Version	Status	Traffic Allocation	Instances		Runtime	Environment	Size
<input type="checkbox"/> 20191011t174050	Serving	0%	0		python37	Standard	2.1 KB
<input type="checkbox"/> 20191011t173950	Serving	100%	0		python37	Standard	2.1 KB



**Firewall rules**

Set App Engine firewall rules to better secure incoming traffic to your applications.  
[Learn more](#)

Filter by priority, action, IP range or description keyword

<input type="checkbox"/> Priority ^	Action	IP range	Description	
<input type="checkbox"/> default	Allow	*	The default action.	

## Settings

Application settings

Custom domains

SSL certificates

Email senders

### Custom Domains

App Engine allows you to serve your application through a custom domain. If you use a custom domain, Google will provide a managed auto-renewing SSL certificate for security.

If you don't have a domain yet, purchase one through Google Domains by clicking 'Register a new domain'

Add a custom domain

or

Register a new domain

## Settings

Application settings

Custom domains

SSL certificates

Email senders

Upload a new certificate

Delete

No certificates have been uploaded.

## Cron jobs

 REFRESH

A cron job is a scheduled task that runs at a specific time or at regular intervals.

Cron job ^	Description	Frequency	Last run	Status	Log
/tasks/summary	daily summary job	every 24 hours (GMT)		Has not run yet.	<a href="#">View</a> <a href="#">Run now</a>

## Memcache

 NEW KEY

 EDIT

 DELETE

 FLUSH CACHE

Memcache service level

Shared

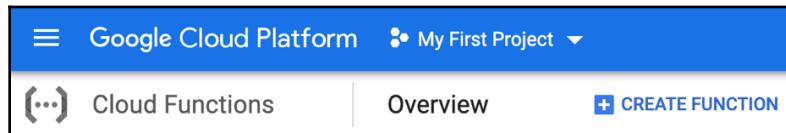
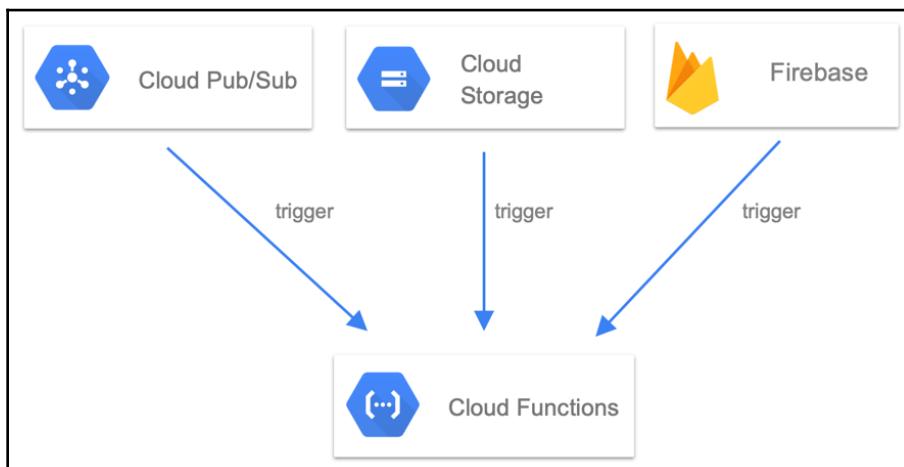
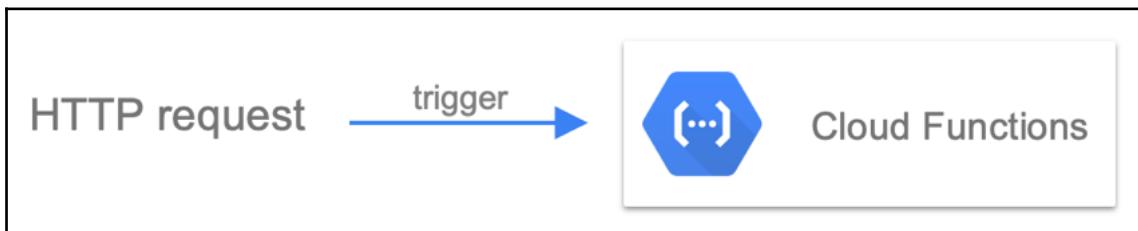
Best effort. [Change](#)

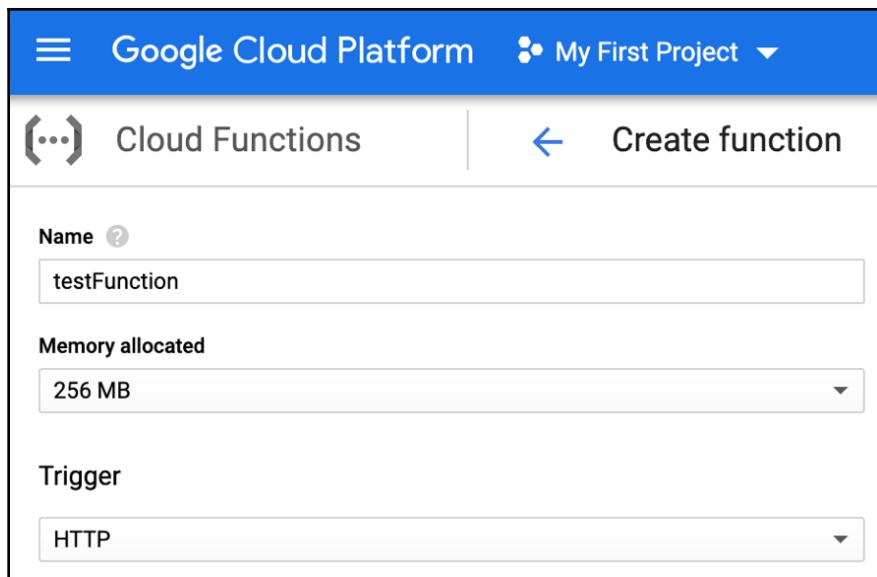
Hit ratio

100%

2 hit / 0 miss

# Chapter 7: Running Serverless Functions with Google Cloud Functions





Google Cloud Platform My First Project

Cloud Functions Create function

Trigger

- HTTP
- Cloud Pub/Sub
- Cloud Storage
- Cloud Firestore (Beta)
- Google Analytics for Firebase (Beta)
- Firebase Authentication (Beta)
- Firebase Realtime Database (Beta)
- Firebase Remote Config (Beta)

Trigger

HTTP

URL

<https://us-central1-orbital-outpost-168608.cloudfunctions.net/function-3>

## Source code



Inline editor



ZIP upload



ZIP from Cloud Storage



Cloud Source repository

### Runtime

Python 3.7

main.py requirements.txt

```
1 def hello_world(request):
2     """Responds to any HTTP request.
3     Args:
4         request (flask.Request): HTTP request object.
5     Returns:
6         The response text or any set of values that can
7         Response object using
8         `make_response <http://flask.pocoo.org/docs/1.0/api
9     """
10    request_json = request.get_json()
11    if request.args and 'message' in request.args:
12        return request.args.get('message')
13    elif request_json and 'message' in request_json:
14        return request_json['message']
15    else:
16        return f'Hello World!'
```

## Runtime

Python 3.7

main.py    [requirements.txt](#)

```
1 # Function dependencies, for example: []
2 # package>=version
3
4 requests==2.19.0
5
```

Function to execute 

hello\_world

## Advanced options

### Region ?

us-central1

### VPC connector ?

Fully qualified resource name

### Timeout ?

60

seconds

### Maximum function instances ?

### Service account ?

App Engine default service account

### Environment variables ?

Name	Value
------	-------

myvariable	0
------------	---

X

+ Add variable

Create

Cancel

---

Cloud Functions Overview

**CREATE FUNCTION** **REFRESH** **DELETE** **COPY**

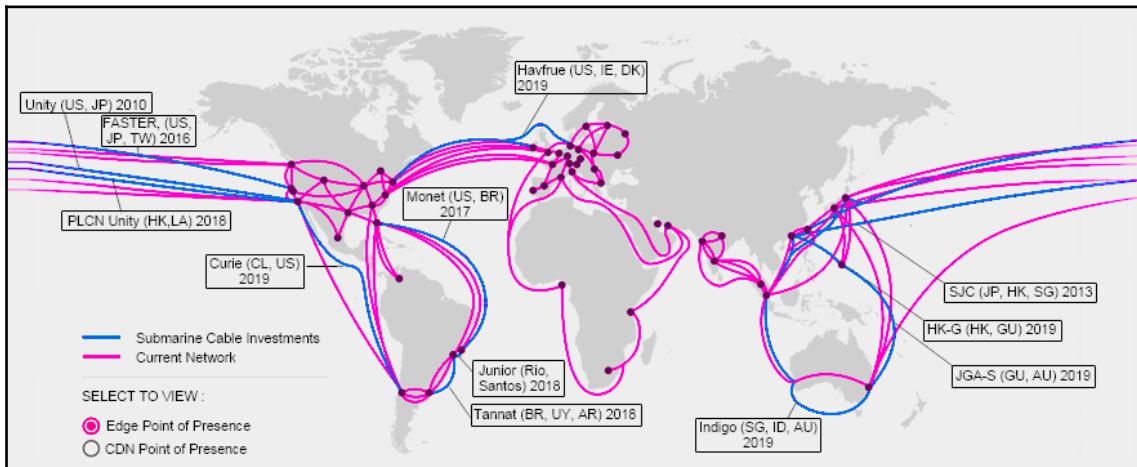
Filter functions Columns ▾

Name	Region	Trigger	Runtime	Memory allocated	Executed function	Last deployed	⋮
function-1	us-central1	HTTP	Node.js 8	256 MB	helloWorld	07/05/2019, 20:29	⋮

---



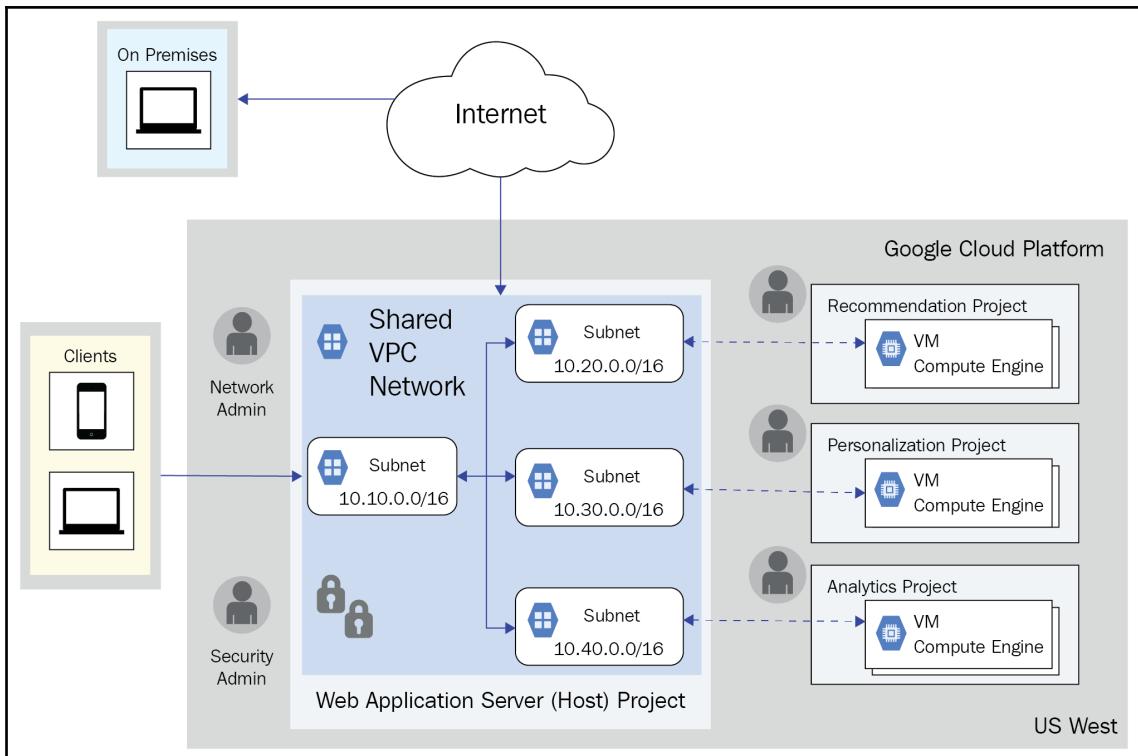
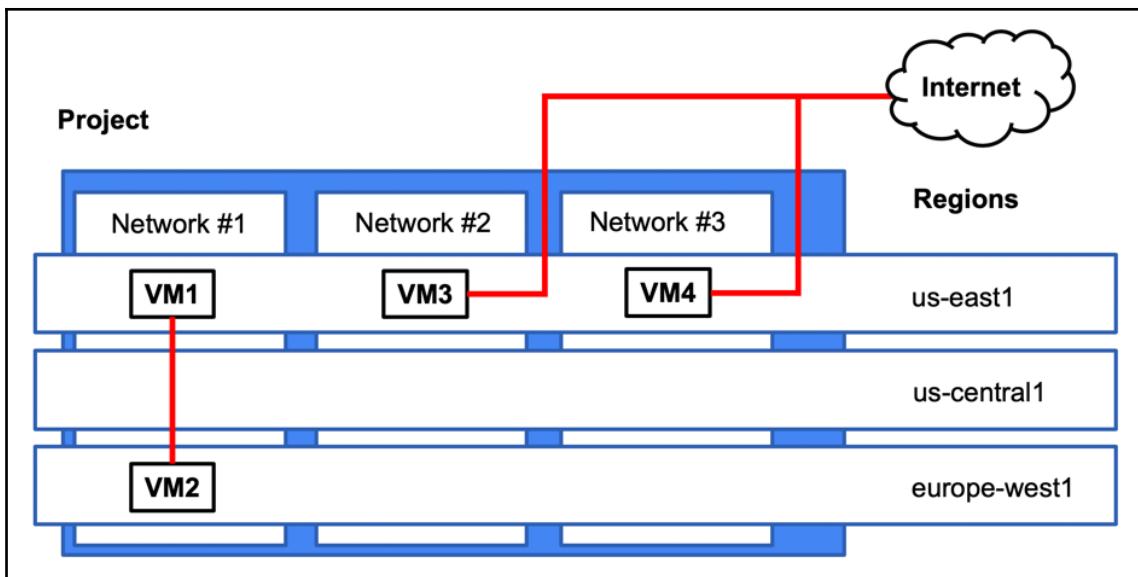
# Chapter 8: Networking Options in GCP

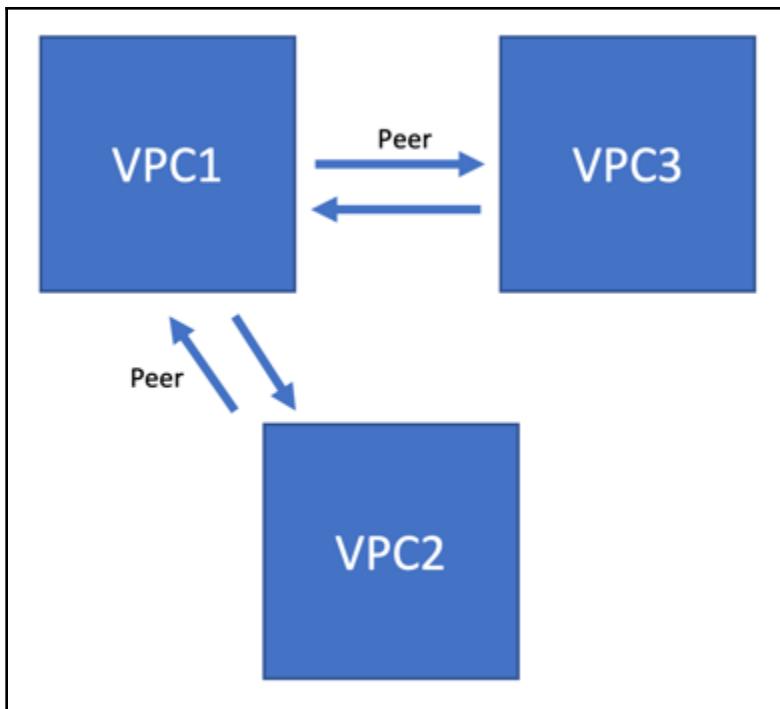


VPC networks

[CREATE VPC NETWORK](#) [REFRESH](#)

Name	Region	Subnets	Mode	IP addresses ranges	Gateways	Firewall Rules
default		11	Auto			11
	us-central1	default		10.128.0.0/20	10.128.0.1	
	europe-west1	default		10.132.0.0/20	10.132.0.1	
	us-west1	default		10.138.0.0/20	10.138.0.1	
	asia-east1	default		10.140.0.0/20	10.140.0.1	
	us-east1	default		10.142.0.0/20	10.142.0.1	
	asia-northeast1	default		10.146.0.0/20	10.146.0.1	
	asia-southeast1	default		10.148.0.0/20	10.148.0.1	
	us-east4	default		10.150.0.0/20	10.150.0.1	
	australia-southeast1	default		10.152.0.0/20	10.152.0.1	
	europe-west2	default		10.154.0.0/20	10.154.0.1	
	europe-west3	default		10.156.0.0/20	10.156.0.1	



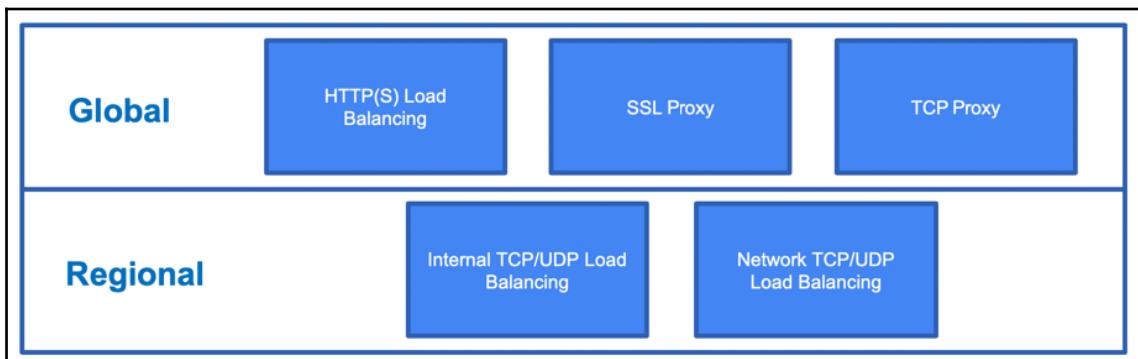


<b>HTTP(S) Load Balancing</b> Layer 7 load balancing for HTTP and HTTPS applications <a href="#">Learn more</a>  <b>Configure</b> HTTP LB HTTPS LB (includes HTTP/2 LB)  <b>Options</b> Internet-facing or internal Single or multi-region  <a href="#">Start configuration</a>	<b>TCP Load Balancing</b> Layer 4 load balancing or proxy for applications that rely on TCP/SSL protocol <a href="#">Learn more</a>  <b>Configure</b> TCP LB SSL Proxy TCP Proxy  <b>Options</b> Internet-facing or internal Single or multi-region  <a href="#">Start configuration</a>	<b>UDP Load Balancing</b> Layer 4 load balancing for applications that rely on UDP protocol <a href="#">Learn more</a>  <b>Configure</b> UDP LB  <b>Options</b> Internet-facing or internal Single-region  <a href="#">Start configuration</a>
---	---	---

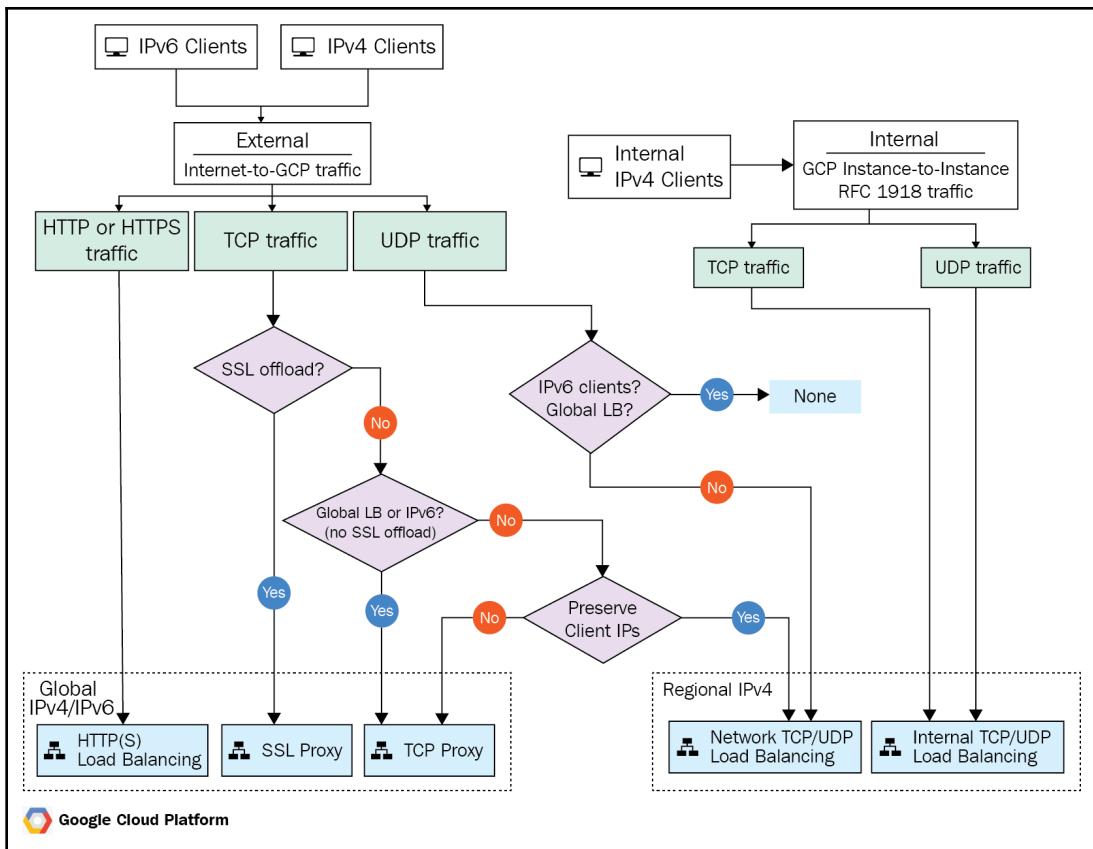
## Internet facing or internal only

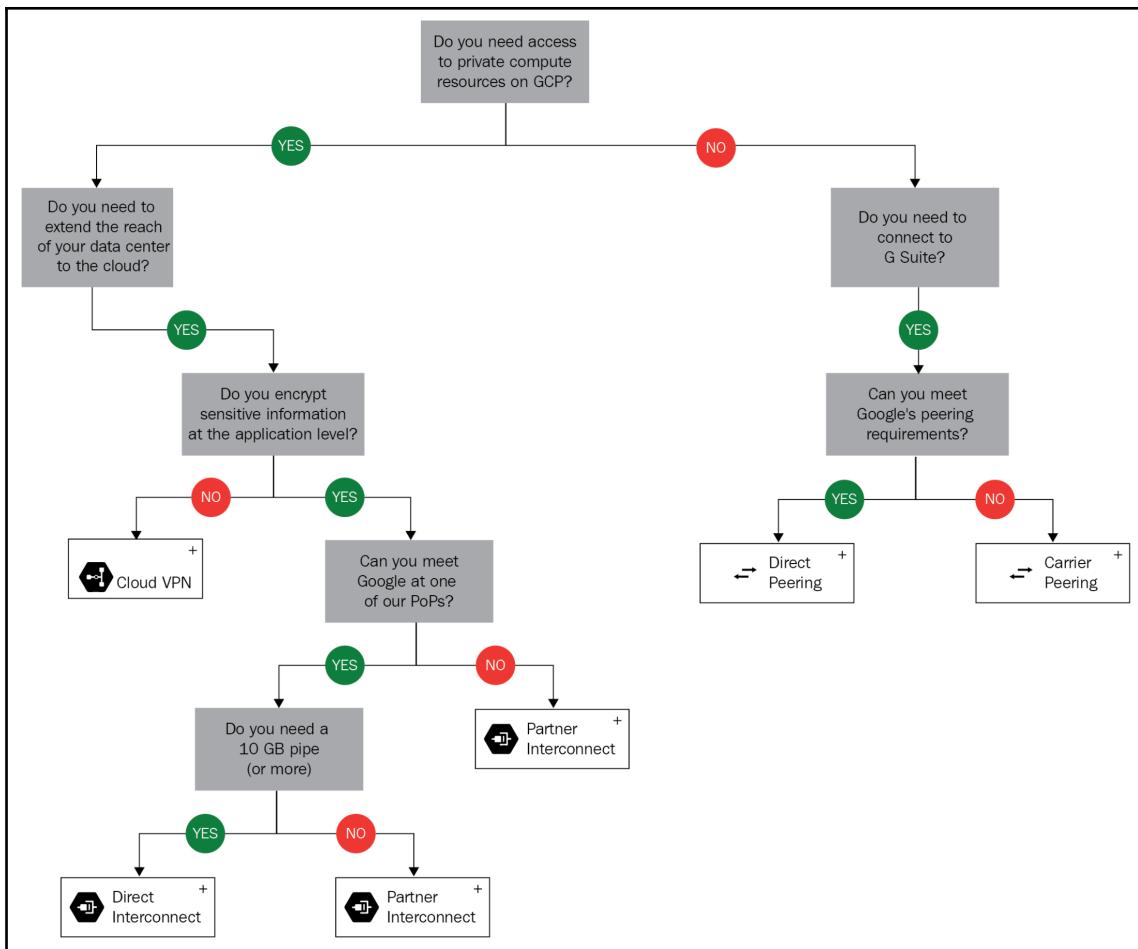
Do you want to load balance traffic from the Internet to your VMs or only between VMs in your network?

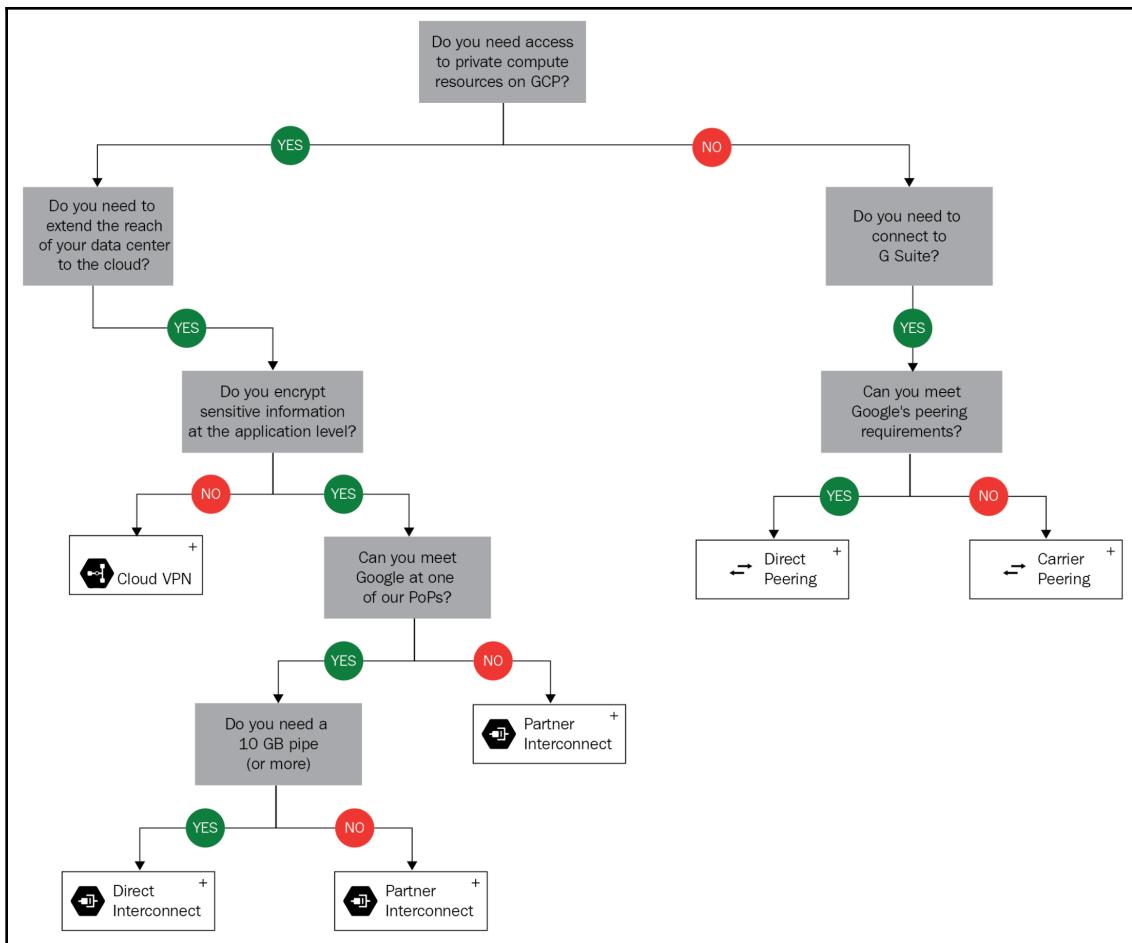
- From Internet to my VMs
- Only between my VMs



Load balancer	Traffic type	Global/Regional	External/Internal	External Ports for Load Balancing
HTTP(S)	HTTP or HTTPS	Global	External	HTTP on 80 or 8080; HTTPS on 443
SSL Proxy	TCP with SSL offload	Global	External	25, 43, 110, 143, 195, 443, 465, 587, 700, 993, 995, 1883, and 5222
TCP Proxy	TCP without SSL offload. Does not preserve client IP addresses	Global	External	25, 43, 110, 143, 195, 443, 465, 587, 700, 993, 995, 1883, 5222
Network TCP/UDP	TCP/UDP without SSL offload. Preserves client IP addresses.	Regional	External	Any
Internal TCP/UDP	TCP or UDP	Regional	Internal	Any







<input type="checkbox"/> Name	Type	Targets	Filters	Protocols/ports	Action	Priority	Network ^
<input type="checkbox"/> default-allow-http	Ingress	http-server	IP ranges: 0.0.0.0/0	tcp:80	Allow	1000	default
<input type="checkbox"/> default-allow-https	Ingress	https-server	IP ranges: 0.0.0.0/0	tcp:443	Allow	1000	default
<input type="checkbox"/> default-allow-icmp	Ingress	Apply to all	IP ranges: 0.0.0.0/0	icmp	Allow	65534	default
<input type="checkbox"/> default-allow-internal	Ingress	Apply to all	IP ranges: 10.128.0.0/9	tcp:0-65535 udp:0-65535 icmp	Allow	65534	default
<input type="checkbox"/> default-allow-rdp	Ingress	Apply to all	IP ranges: 0.0.0.0/0	tcp:3389	Allow	65534	default
<input type="checkbox"/> default-allow-ssh	Ingress	Apply to all	IP ranges: 0.0.0.0/0	tcp:22	Allow	65534	default

VPC network

Firewall rules

[CREATE FIREWALL RULE](#)

[REFRESH](#)

[DELETE](#)

VPC networks

External IP addresses

**Firewall rules**

Routes

VPC network peering

Shared VPC

Serverless VPC access

Firewall rules control incoming or outgoing traffic to an instance. By default, incoming traffic from outside your network is blocked. [Learn more](#)

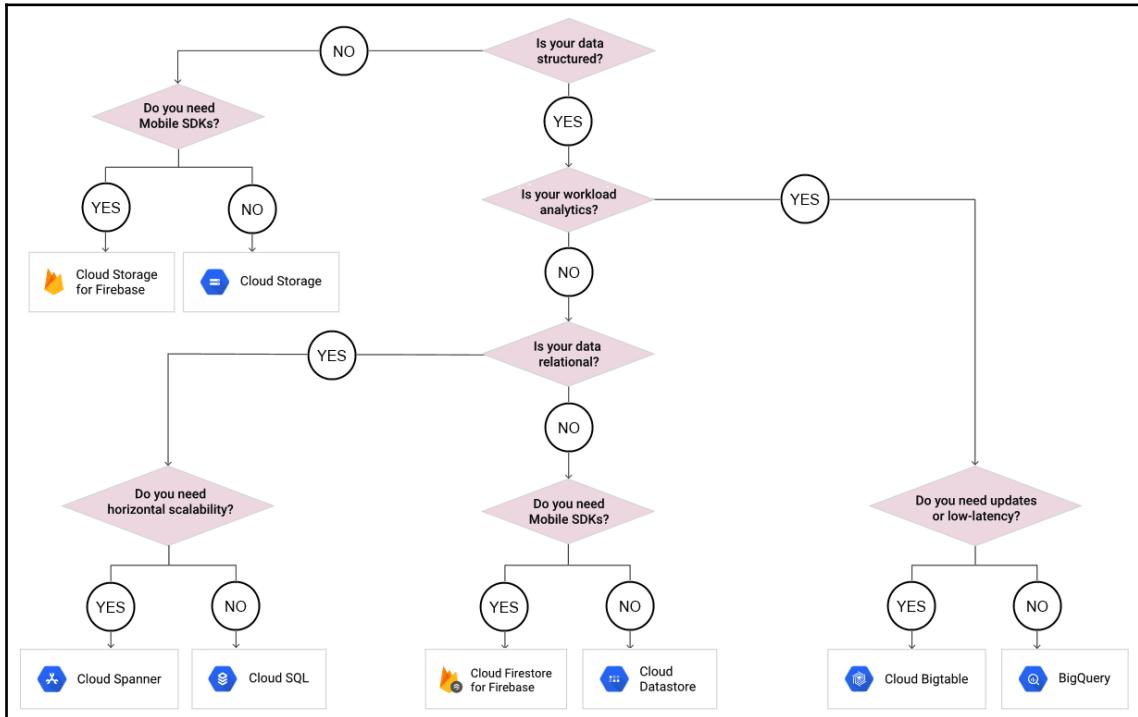
Note: App Engine firewalls are managed [here](#).

Filter resources

Columns ▾

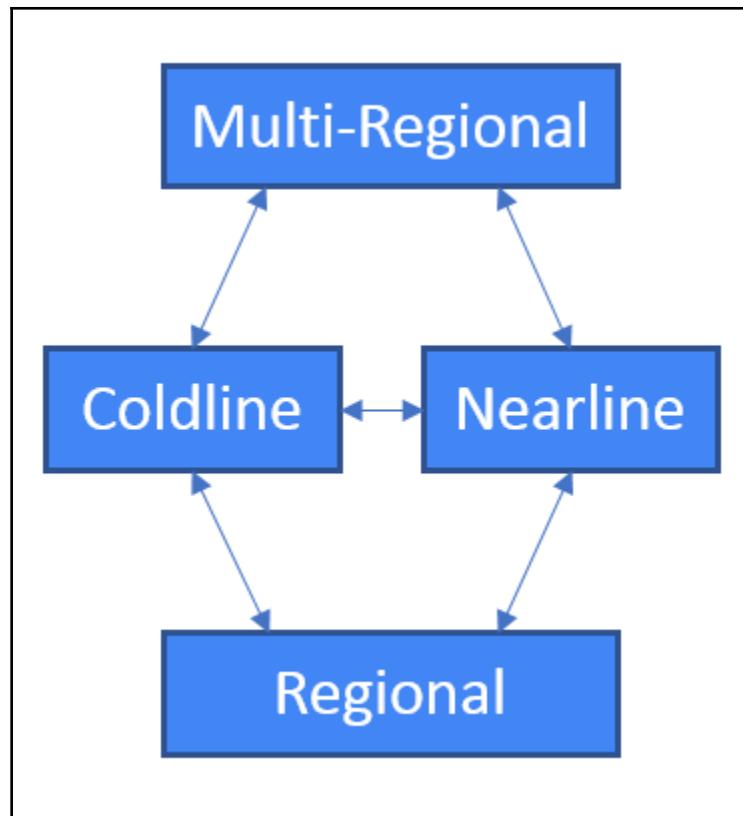
Name	Type	Targets	Filters	Protocols/ports	Action	Priority	Network
default-allow-icmp	Ingress	Apply to all	IP ranges: 0.0.0.0/0	icmp	Allow	65534	default
default-allow-internal	Ingress	Apply to all	IP ranges: 10.128.0.0/9	tcp:0-65535 udp:0-65535 icmp	Allow	65534	default
default-allow-rdp	Ingress	Apply to all	IP ranges: 0.0.0.0/0	tcp:3389	Allow	65534	default
default-allow-ssh	Ingress	Apply to all	IP ranges: 0.0.0.0/0	tcp:22	Allow	65534	default

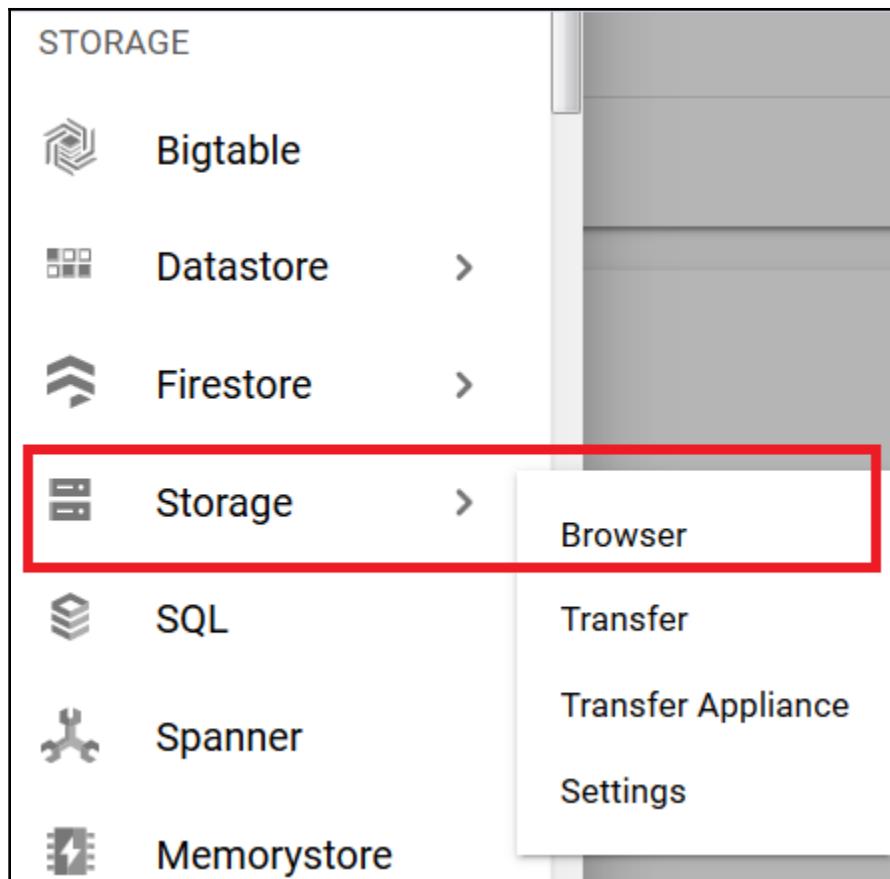
# Chapter 9: Exploring Storage Options in GCP - Part 1



Cloud Storage Classes at a glance			
Standard	Nearline	Coldline	Archive
99.9% Availability (single region)	99.0% Availability (single region)	99.0% Availability (single region)	99.9% Availability (single region)
99.95% Availability (Multi/Dual region)	99.9% Availability (Multi/Dual region)	99.9% Availability (Multi/Dual region)	99.95% Availability (Multi/Dual region)
99.99999999% durability	99.99999999% durability	99.99999999% durability	99.99999999% durability
No retrieval cost	retrieval costs	retrieval costs	retrieval costs
Frequently accessed	Accessed once a month	Accessed once a quarter	Accessed once a year
No Minimum storage term	30 day minimum	90 day minimum	365 day minimum
			Lowest cost storage

Cloud Storage Classes at a glance			
HIGH FREQUENCY ACCESS		LOW FREQUENCY ACCESS	
LOWEST FREQUENCY ACCESS			
<b>Regional</b>	<b>Multi-Regional</b>	<b>Nearline</b>	<b>Coldline</b>
99.9% Availability	99.95% Availability	99.9% or 99.0% Availability	99.9% or 99.0% Availability
99.99999999% Durability	99.99999999% Durability	99.99999999% Durability	99.99999999% Durability
Lower cost storage	Geo Redundant	Low cost storage	Lowest cost storage
No Retrieval cost	No Retrieval cost	Retrieval costs	High Retrieval costs
		30 day minimum	90 day minimum





Store and retrieve your data

Get started by creating a bucket – a container where you can organize and control access to your data and files in Cloud Storage.

[CREATE BUCKET](#)

[TAKE QUICKSTART](#)



## Name your bucket

Pick a globally unique, permanent name. [Naming guidelines](#)

cloudarchitect1

Tip: Don't include any sensitive information

[CONTINUE](#)

### Choose a default storage class for your data

A storage class sets costs for storage, retrieval, and operations. Pick a default storage class based on how long you plan to store your data and how often it will be accessed. [Learn more](#)

Standard [?](#)

Best for short-term storage and frequently accessed data

Nearline

Best for backups and data accessed less than once a month

Coldline

Best for disaster recovery and data accessed less than once a quarter

Archive

Best for long-term digital preservation of data accessed less than once a year

[CONTINUE](#)

- Choose how to control access to objects

#### Access control

Fine-grained

Specify access to individual objects by using object-level permissions (ACLs) in addition to your bucket-level permissions (IAM). [Learn more](#)

Uniform

Ensure uniform access to all objects in the bucket by using only bucket-level permissions (IAM). This option becomes permanent after 90 days. [Learn more](#)

**CONTINUE**

- Advanced settings (optional)

#### Encryption

Google-managed key

No configuration required

Customer-managed key

Manage via Google Cloud Key Management Service

#### Retention policy

Set a retention policy to specify the minimum duration that this bucket's objects must be protected from deletion or modification after they're uploaded. You might set a policy to address industry-specific retention challenges. [Learn more](#)

Set a retention policy

```
google3339831_student@cloudshell:~ (qwiklabs-gcp-e7f0f69cddalb280)$ gsutil versioning set on gs://cloudarchitect
Enabling versioning for gs://cloudarchitect/...
google3339831_student@cloudshell:~ (qwiklabs-gcp-e7f0f69cddalb280)$ gsutil versioning get gs://cloudarchitect
gs://cloudarchitect: Enabled
```

```
google3339831_student@cloudshell:~ (qwiklabs-gcp-e7f0f69cddalb280)$ gsutil cp -v vm.yaml gs://cloudarchitect
Copying file:/vm.yaml [Content-Type=application/octet-stream]...
Created: gs://cloudarchitect/vm.yaml#1557763393469362
Operation completed over 1 objects/492.0 B.
```

```
google3339831_student@cloudshell:~ (qwiklabs-gcp-e7f0f69cdd1b280)$ gsutil ls -a gs://cloudarchitect/vm.yaml
gs://cloudarchitect/vm.yaml#1557760768160333
gs://cloudarchitect/vm.yaml#1557763393469362
gs://cloudarchitect/vm.yaml#1557763527069403
```

		Bandwidth						Time to transfer data
		1 Mbps	10 Mbps	100 Mbps	1 Gbps	10 Gbps	100 Gbps	
Amount of data to transfer	1 GB	3 Hours	18 Mins	2 Mins	22 Secs	1 Sec	0.1 Secs	
	10 GB	30 hours	3 Hours	18 Mins	2 Mins	11 Secs	1 Sec	
	100 GB	12 Days	30 Hours	3 Hours	18 Mins	2 Mins	11 Secs	
	1 TB	124 Days	12 Days	30 Hours	3 Hours	18 Mins	2 Mins	
	10 TB	3 Years	124 Days	12 Days	30 Hours	3 Hours	18 Mins	
	100 TB	34 Years	3 Years	124 Days	12 Days	30 Hours	3 Hours	
	1 PB	340 Years	34 Hours	3 Years	124 Days	12 Days	30 Hours	
	10 PB	3,404 Years	340 Years	34 Years	3 Years	124 Days	12 Days	
	100 PB	34,048 Years	3,404 Years	340 Years	34 Years	3 Years	124 Days	

Concept	SQL Database	Cloud Datastore
Category of object	Table	Kind
One object	Row	Entity
Individual data for an object	Column	Property
Unique ID for an object	Primary Key	Key

---

## STORAGE



Bigtable

⋮



Datastore >

Entities



Firebase >

Dashboard



Storage >

Indexes

Admin

	<b>Native mode</b>  Enable all of Cloud Firestore's features, with offline support and real-time synchronization.	<b>Datastore mode</b>  Leverage Cloud Datastore's system behavior on top of Cloud Firestore's powerful storage layer.
	<a href="#" style="background-color: #0070C0; color: white; padding: 5px 20px; text-decoration: none; border-radius: 5px;">SELECT NATIVE MODE</a>	<a href="#" style="background-color: #0070C0; color: white; padding: 5px 20px; text-decoration: none; border-radius: 5px;">SELECT DATASTORE MODE</a>
API	Firestore	Datastore
Scalability	Automatically scales to millions of concurrent clients	Automatically scales to millions of writes per second
App engine support	Not supported in the App Engine standard Python 2.7 and PHP 5.5 runtimes	All runtimes
Max writes per second	10,000	No limit
Real-time updates	✓	✗
Mobile/web client libraries with offline data persistence	✓	✗
Query consistency	Strong	Strong
Data model	Documents / collections	Entities / kinds
Web console	Firestore page in Google Cloud Platform and Firebase	Datastore page in Google Cloud Platform

## Get started

- Select a Cloud Firestore mode — 2 Choose where to store your data

You selected Cloud Firestore in Datastore mode. Now choose a database location.

The location of your database affects its cost, availability, and durability. Choose a regional location (lower write latency, lower cost) or a multi-region location (higher availability, higher cost). [Learn more](#)

⚠ Choose carefully: your location selection is permanent and will also apply to this project's App Engine app

Select a location

eur3 (Europe)



To improve performance, store your data close to the users and services that need it

**CREATE DATABASE**

**BACK**

**Entities**

+ **CREATE ENTITY**

**QUERY BY KIND**

**QUERY BY GQL**

---

[Create an entity](#)

Namespace  
[default] [?](#)

Kind  
exam [?](#)

Key identifier  
Numeric ID (auto-generated) [?](#)

[SPECIFY PARENT](#)

Properties

[ADD PROPERTY](#)

[CREATE](#) [CANCEL](#)

---

## Properties

### New property



Name \*

title

Type

String

Value

Professional Cloud Architect

Index this property

CANCEL

DONE

Kind

exam

FILTER ENTITIES



Name/ID

cost

title



id=5071211717459968

200

Professional Cloud Developer



id=5634161670881280

200

Professional Cloud Architect



id=5644004762845184

100

Associate Cloud Engineer

Entities    [+ CREATE ENTITY](#)    [DELETE](#)

[QUERY BY KIND](#)    [QUERY BY GQL](#)

Kind  
exam    [FILTER ENTITIES](#)

Title    is a string    equal to    Professional Cloud Developer

[APPLY FILTERS](#)    [CLEAR FILTERS](#)

	Name/ID ↑	Cost	Title
<input type="checkbox"/>	id=5636645067948032	200	Professional Cloud Developer

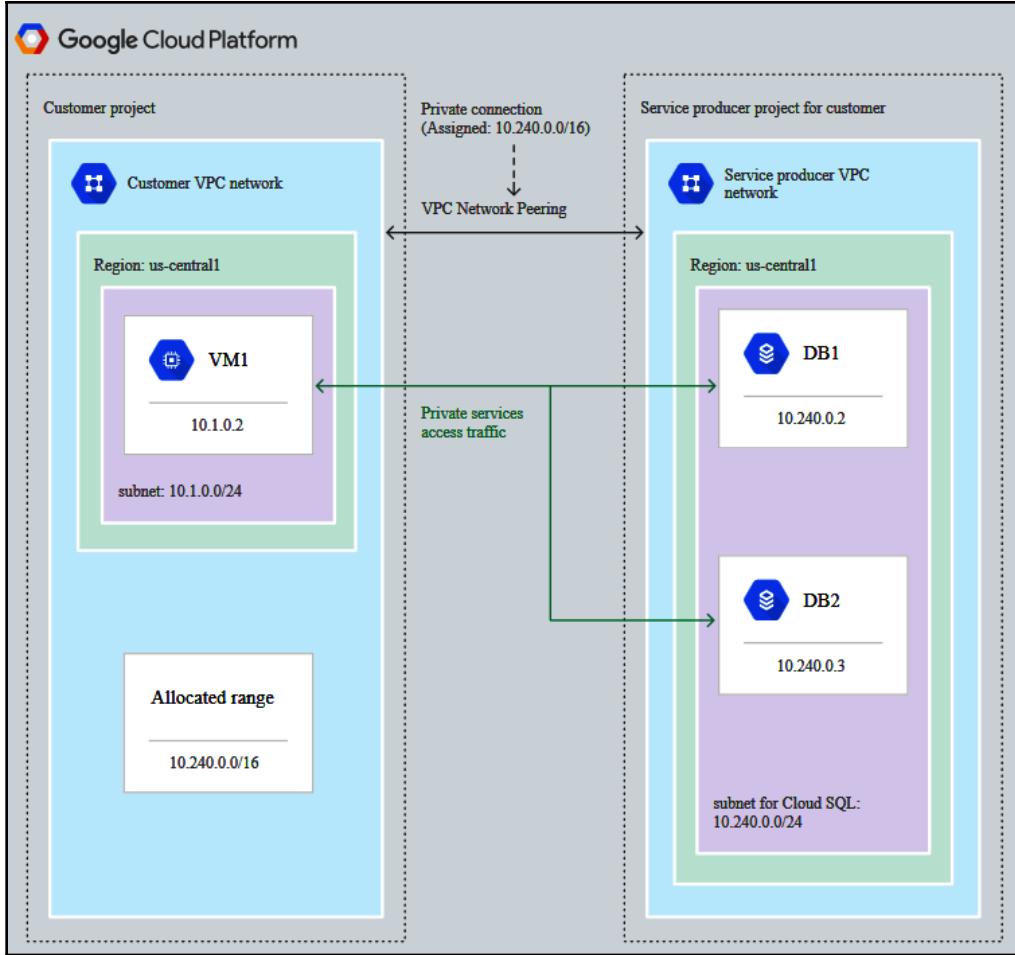
Entities    [+ CREATE ENTITY](#)    [DELETE](#)

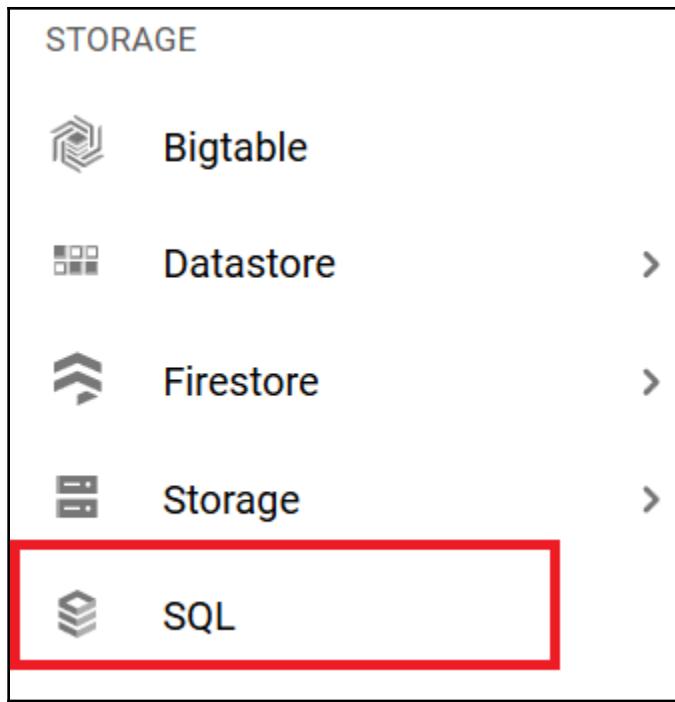
[QUERY BY KIND](#)    [QUERY BY GQL](#)

```
1 SELECT * from exam where Title = 'Professional Cloud Developer'
```

[RUN QUERY](#)    [CLEAR QUERY](#)    [GQL query help](#)

	Name/ID ↑	Cost	Title
<input type="checkbox"/>	id=5636645067948032	200	Professional Cloud Developer





This screenshot shows the 'SQL' section of the Google Cloud console, specifically the 'Create an instance' page. It allows users to choose between MySQL and PostgreSQL database engines.

Choose your database engine

MySQL Versions: 5.6, 5.7 → Choose MySQL	PostgreSQL Versions: 9.6, 11 → Choose PostgreSQL
---	--

For First Generation MySQL instances,  
[click here](#)



SQL



## Create a MySQL Second Generation instance

**Instance ID**

Choice is permanent. Use lowercase letters, numbers, and hyphens. Start with a letter.

cloudarchitect

**Root password**

Set a password for the root user. [Learn more](#)

8g7z0WjlB3t0e6Aq



Generate

 No password**Location**

For better performance, keep your data close to the services that need it.

**Region**

Choice is permanent

**Zone**

Can be changed at any time

us-central1

Any

**Database version**

MySQL 5.7

## Configuration options

### Set connectivity ^

Choose how you would like to connect to your database instance

#### Private IP

Private IP connectivity requires additional APIs and permissions. You may need to contact your organization's administrator for help enabling or using this feature. Currently, Private IP cannot be disabled once it has been enabled.

#### Public IP

**i** You have not authorized any external networks to connect to your Cloud SQL instance. External applications can still connect to the instance through the Cloud SQL Proxy. [Learn more](#)

#### Authorized networks

Authorize a network or use a Proxy to connect to your instance. Networks will only be authorized via these addresses. [Learn more](#)

[+ Add network](#)

[Close](#)

## Configure machine type and storage

### Machine type ?

For better performance, choose a machine type with enough memory to hold your largest table



db-n1-standard-1

vCPUs

1

Memory

3.75 GB

[Change](#)

### Network throughput (MB/s) ?

250 of 2,000

### Storage type ?

Choice is permanent.

**SSD (Recommended)**

Most popular choice. Lower latency than HDD with higher QPS and data throughput.

**HDD**

Lower performance than SSD with lower storage rates.

### Storage capacity ?

10 – 10230 GB. Higher capacity improves performance, up to the limits set by the machine type. Capacity cannot be decreased later.

10

GB

**Enable automatic storage increases**

Whenever you're near capacity, space will be incrementally increased.

All increases are permanent. [Learn more](#)

### Disk throughput (MB/s) ?

Read: 4.8

Max: 250.0

Write: 4.8

Max: 75.8

### IOPS ?

Read: 300

Max: 15,000

Write: 300

Max: 15,000

Enable auto backups and high availability ^

**Backups and binary logging**  
Both options add small performance and monetary costs. [Learn more](#)

Automate backups  
2:00 AM – 6:00 AM ▼

Choose a window for automated backups. May continue outside window until complete. Time is your local time (UTC+1).

Enable binary logging (required for replication and earlier position point-in-time recovery)

**High availability**

i Recommended for all production instances to improve fault tolerance. Failover replica is hosted in a different zone from the master and is billed as a separate instance. [Learn more](#)

Create failover replica

### Set maintenance schedule ^

**Maintenance window** ?

Sunday 2:00 AM – 3:00 AM ▼

Hours shown in your local time zone ( UTC+1 ).

**Maintenance timing** ?

Any ▼

Close

The screenshot shows the Google Cloud SQL Instances page. At the top, there are navigation links for 'SQL' and 'Instances', along with buttons for 'CREATE INSTANCE' and 'MIGRATE DATA'. Below this is a search bar labeled 'Filter instances' and a 'Columns' dropdown. A table lists instances, with one row selected: 'cloudarchitect' (MySQL 2nd Gen 5.7). To the right of this row is a context menu with options: 'Edit', 'Create read replica' (which is highlighted with a red box), 'Create clone', 'Connect VM', and 'Delete'. The 'Edit' option is also highlighted with a red box.

### ← Create read replica of cloudarchitect

**Instance ID**  
Choice is permanent. Use lowercase letters, numbers, and hyphens. Start with a letter.

**Location** ⓘ  
For better performance, keep your data close to the services that need it.

<b>Region</b> <input type="text" value="us-central1"/>	<b>Zone</b> <input type="text" value="us-central1-a"/>
---	---

**Database version**  
MySQL 5.7

[>Show configuration options](#)

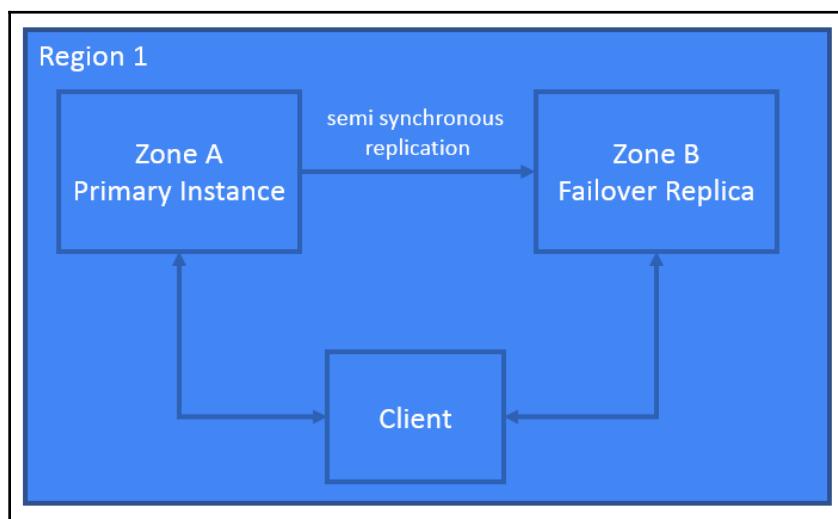
**Create** **Cancel**

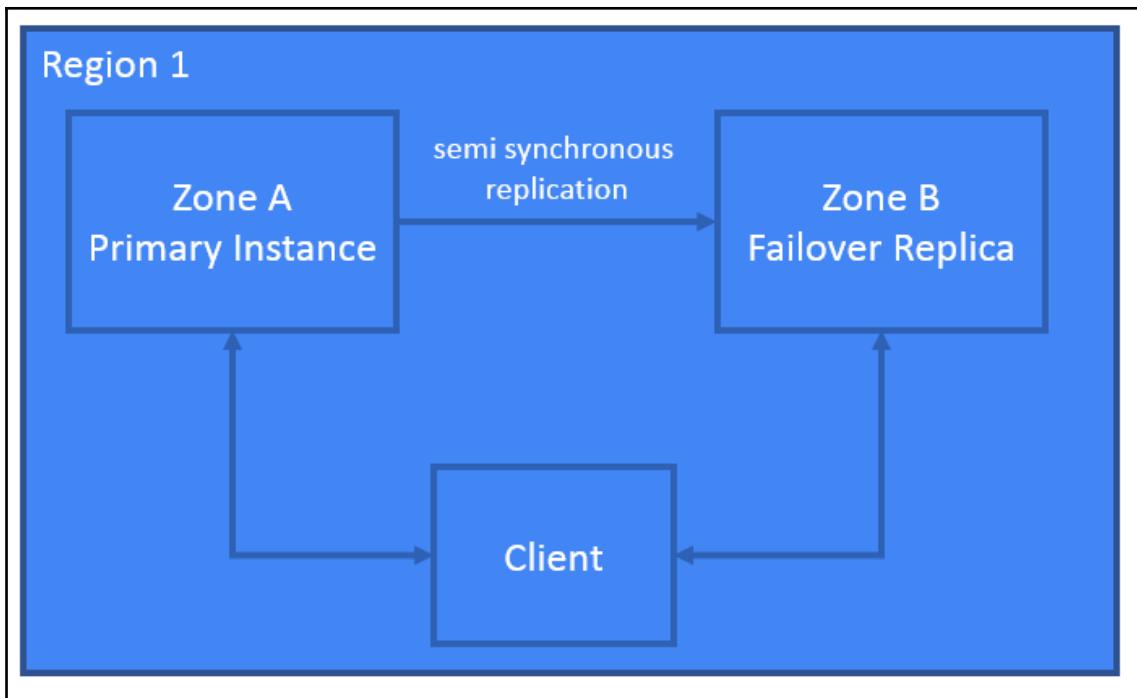
---

SQL Instances [CREATE INSTANCE](#) [MIGRATE DATA](#)

Filter instances

	Type
<input checked="" type="checkbox"/> cloudarchitect	MySQL 2nd Gen 5.7
<input type="checkbox"/> cloudarchitect-replica	MySQL 2nd Gen read replica





Screenshot of the AWS Cloud9 Instances list:

	Instances	<a href="#">CREATE INSTANCE</a>	<a href="#">MIGRATE DATA</a>
<input type="checkbox"/> Instance ID		Type	High availability
<input type="checkbox"/> <input checked="" type="checkbox"/> cloudarchitect	MySQL 2nd Gen 5.7	Enabled	
<input type="checkbox"/> <input checked="" type="checkbox"/> cloudarchitect-failover	MySQL 2nd Gen failover	–	

Screenshot of the MySQL instance settings for "cloudarchitect-failover":

**Backup settings**

Automated backups	Enabled
Backup time	12:00 AM – 4:00 AM (UTC+1)

cloudbuild

MySQL Second Generation master

OVERVIEW CONNECTIONS USERS DATABASES BACKUPS

Backup settings

Automated backups	Enabled
Backup time	8:00 AM – 12:00 PM (UTC+1)
Binary logging	Enabled

Manage automated backups

Backups

Restoring from a backup reverts your instance to its state at the backup's creation time.

Create backup

Creation time	Type	Description	⋮
May 21, 2019, 8:22:57 PM	On-demand	–	<span>Restore</span>

## Restore instance from backup

Backup time May 21, 2019, 8:22:57 PM UTC+1

Target Instance ? cloudbuild

The Cloud SQL instance cloudbuild has replicas:

- qwiklabs-gcp-1ef01bc4dfdc379d:cloudbuild-failover

**!** If you need to restore a master with replicas from a backup, delete the replicas.

## Restore instance from backup

Backup time

May 21, 2019, 8:31:00 PM UTC+1

Target Instance 

cloudarchitect001

cloudarchitect001cloned

Instance cloudarchitect001 data

cloudarchitect001 backup from May 21, 2019 at 8:31:00 PM UTC+1.

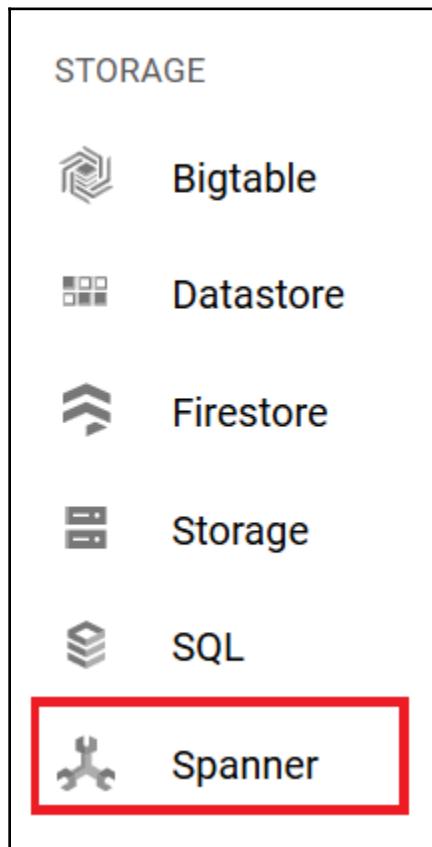


Restoring an instance from a backup will overwrite the data currently in the instance. Are you sure you want to restore your instance from this backup?

[CLOSE](#) [OK](#)

---

# Chapter 10: Exploring Storage Options in GCP - Part 2



## [Create an instance](#)

### Name your instance

An instance has both a name and an ID. The name is for display purposes only. The ID is a permanent and unique identifier.

Instance name \*

cloudarchitect

Name must be 4-30 characters long

Instance ID \*

cloudarchitect

Lowercase letters, numbers, hyphens allowed

### Choose a configuration

Determines where your nodes and data are located. Permanent. Affects cost, performance, and replication. Select a configuration to view its details. [Learn more](#)

Regional

Multi-region

eur3



### Allocate nodes

Add nodes to increase data throughput and queries per second (QPS). Affects billing.

Nodes \*

3

Minimum of 3 nodes recommended for production environments



## Name your database



Enter a permanent name for your database.

**Name**

**Continue**



Edit as text

### DDL statements

Add Spanner Database Definition Language SQL statements below. Separate statements with a semicolon. [Learn more](#)

```
1 CREATE TABLE ProfessionalCloudArchitect (
2 EmployeeId    INT64 NOT NULL,
3 Name      STRING(1024),
4 Result     STRING(1024),
5 ) PRIMARY KEY(EmployeeId);
```

**Create**

**Cancel**

---

ProfessionalCloudArchitect		
SCHEMA	INDEXES	DATA
<hr/>		
<input type="button" value="Insert"/>	<input type="button" value="Edit"/>	<input type="button" value="Delete"/>
This table has no data.		

ProfessionalCloudArchitect		
SCHEMA	INDEXES	DATA
<hr/>		
<input type="button" value="Insert"/>	<input type="button" value="Edit"/>	<input type="button" value="Delete"/>
This table has no data.		

## Primary key column

• EmployeeId: INT64

1

## Columns

For NULL values, leave fields blank.

Name: STRING

Brian Gerrard

Empty string

Result: STRING

Pass

Empty string

Save

Cancel

ProfessionalCloudArchitect

SCHEMA	INDEXES	DATA
<a href="#">Insert</a>	<a href="#">Edit</a>	<a href="#">Delete</a>
<a href="#"> Filter by primary key</a>		
<input type="checkbox"/> EmployeeId	Name	Result
<input type="checkbox"/> 1	Brian Gerrard	Pass
<input type="checkbox"/> 2	Konrad Clapa	Pass
<input type="checkbox"/> 3	Joe Bloggs	Pass
<input type="checkbox"/> 4	Paul McDonal	Fail
<input type="checkbox"/> 5	Alison Munro	Fail

## ProfessionalCloudArchitect

SCHEMA

INDEXES

DATA

[Insert](#)

[Edit](#)

[Delete](#)



[Filter by primary key](#)

<input type="checkbox"/> EmployeeId	Name	Result
<input type="checkbox"/> 1	Brian Gerrard	Pass
<input type="checkbox"/> 2	Konrad Clapa	Pass
<input type="checkbox"/> 3	Joe Bloggs	Pass
<input type="checkbox"/> 4	Paul McDonal	Fail
<input type="checkbox"/> 5	Alison Munro	Fail

1

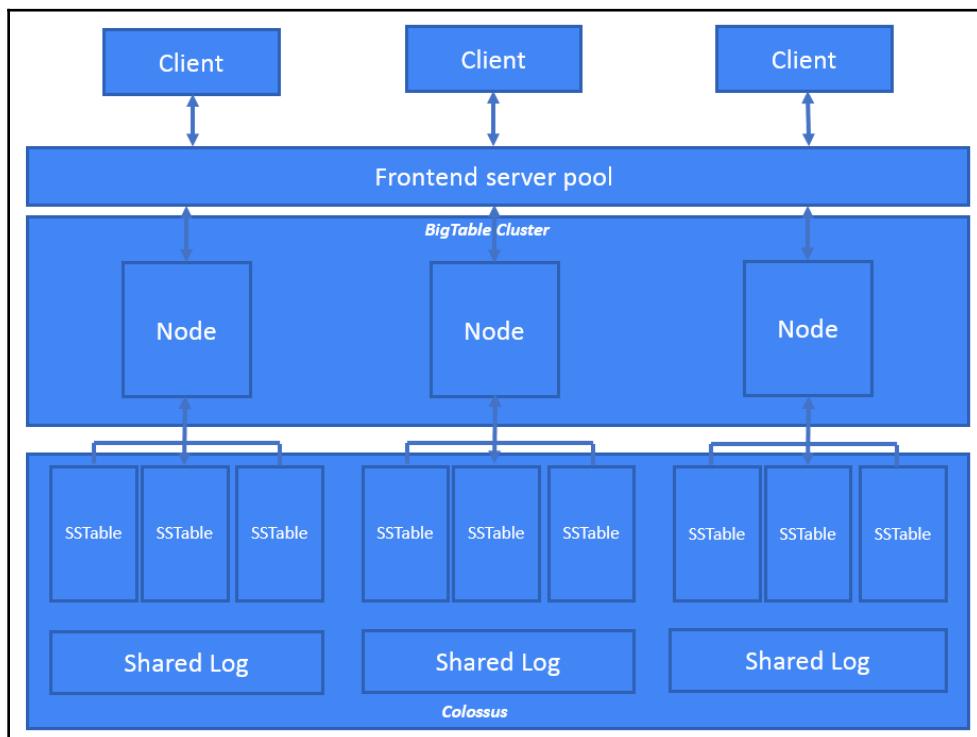
```
SELECT Name FROM ProfessionalCloudArchitect WHERE Result = 'Pass'
```

[Run query](#)

[Clear query](#)

[SQL query help](#)

Schema	Results table	Explanation
Query complete (2.83ms elapsed)		
<b>Name</b>		
Brian Gerrard		
Konrad Clapa		
Joe Bloggs		



---

 Bigtable	<b>Application Profiles</b>	<b>CREATE APPLICATION PROFILE</b>
 Instance details	<b>tst001</b>	
 Monitoring	<b>Instance ID</b>	
 Tables	tst001	
 Application profiles		An application profile defines how your instance handles incoming requests. Create a different profile for each use case, such as click ingestion or BigQuery federation. <a href="#">Learn more</a>

## [Create an application profile](#)

Instance ID: tst001

### Application profile ID

Name a particular use case (e.g., click-ingestion).

### Description (Optional)

...

### Cluster routing

Route requests to a single, specific cluster or to the nearest available cluster (multi-cluster). [Learn more](#)

**tst001-c1 (single-cluster)**

europe-west4-c

**Any cluster (multi-cluster)**

This instance currently has only one cluster, so all requests will be routed to that cluster. Add more clusters to get the full benefits of multi-cluster routing, such as higher availability.

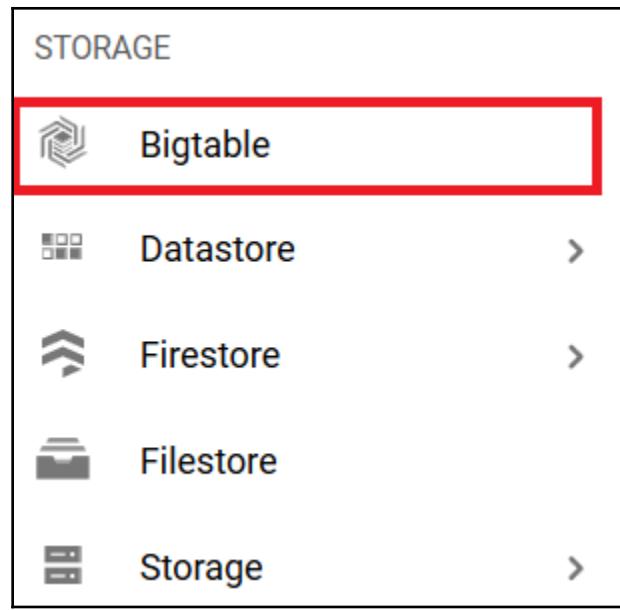
### Single-row transactions

Allows **ReadModifyWrite** and **CheckAndMutate** operations. Not recommended unless necessary for your application. [Learn more](#)

Allow single-row transactions

**Create**

**Cancel**





Bigtable



Create an instance

A Cloud Bigtable instance is a container for your clusters. [Learn more](#)

**Instance name**

For display purposes only

**Instance ID**

ID is permanent

**Instance type**  **Production (recommended)**

Minimum of 3 nodes. High availability. Cannot downgrade later.

 **Development**

Low-cost instance for development and testing. Does not provide high availability or replication. Can upgrade to Production later.

**Storage type** 

Choice is permanent. Applies to all clusters. Affects cost.

 **SSD**

Lower latency and more rows read per second. Typically used for real-time serving use cases, such as ad serving and mobile app recommendations.

 **HDD**

Higher latency for random reads. Good performance on scans and typically used for batch analytics, such as machine learning or data mining.

---

## Clusters

### Cluster

**Cluster ID**  
ID is permanent.

cloudarchitect001-c1

**Location**  
Choice is permanent. Determines where cluster data is stored. To reduce latency and increase throughput, store your data near the services that need it.

Region	Zone
asia-east1	asia-east1-c

**Nodes**  
Add nodes to increase your cluster's capacity for data throughput, storage, and rows read per second. Add enough to keep each cluster's CPU utilization under the recommended threshold for your current number of clusters and app profile routing policy. [Contact us](#) if you need to increase your node quota. [Learn more](#)

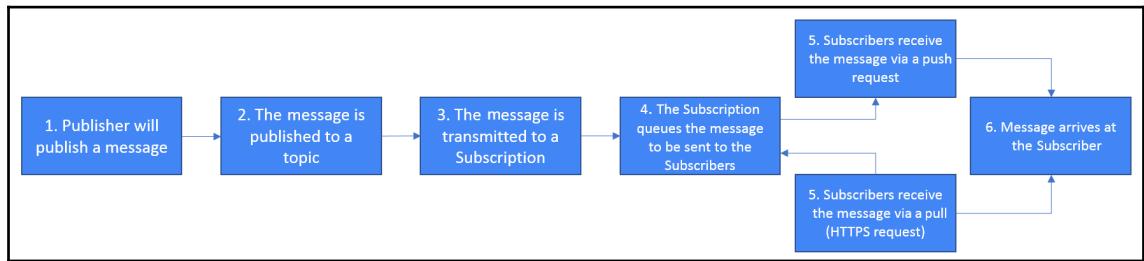
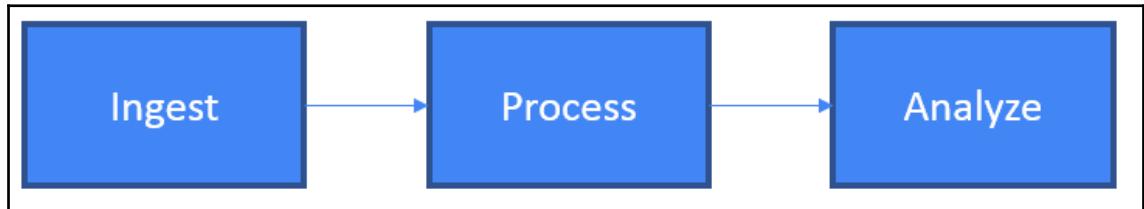
3

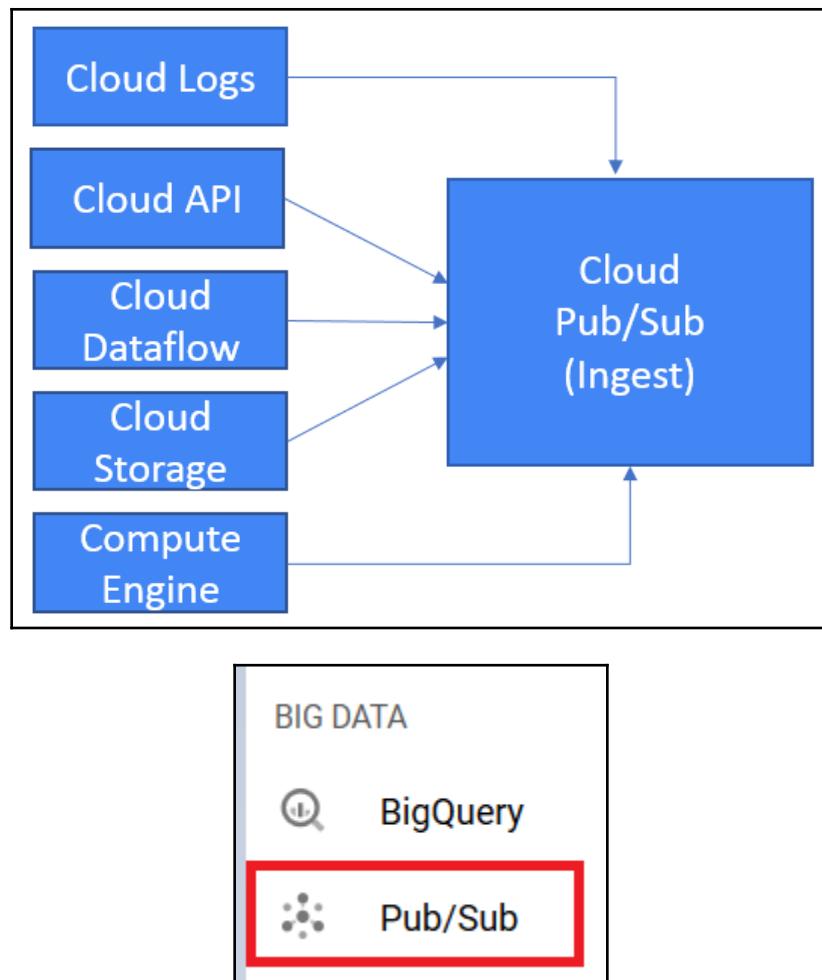
**Performance**  
Based on current node count and storage type.  
Adding a cluster increases read throughput but not write throughput. When writing, Cloud Bigtable uses the additional throughput for replication.

Reads: 30,000 rows/s @ 6ms or Writes: 30,000 rows/s @ 6ms or Scans: 660 MB/s  
Storage: 7.5 TB

[Done](#) [Cancel](#)

# Chapter 11: Analyzing Big Data Options





## Big Data Pub/Sub

### Reliable real-time messaging

Connect your services with reliable, many-to-many, asynchronous messaging hosted on Google's infrastructure. To get started, create a topic for posting asynchronous messages to multiple subscribers

[Learn more](#) ↗

[Create a topic](#)

## Create a topic

A topic forwards messages from publishers to subscribers.

Name ?

projects/qwiklabs-gcp-0d6ace797d9fef61/topics/ [newTopic](#)

[CANCEL](#) [CREATE](#)

Topic name	Subscriptions	Labels
projects/qwiklabs-gcp-0d6ace797d9fef61/topics /newTopic	0	None

- [Publish message](#)
- [Import from](#)
- [Export to](#)
- [\*\*+ New subscription\*\*](#)
- [Create snapshot](#)
- [Delete](#)
- [Permissions](#)

[←](#) Create a subscription

A subscription directs messages on a topic to subscribers. Messages can be pushed to subscribers immediately, or subscribers can pull messages as needed.

**Topic**  
projects/qwiklabs-gcp-0d6ace797d9fef61/topics/newTopic

**Subscription name** [?](#)  
projects/qwiklabs-gcp-0d6ace797d9fef61/subscriptions/ newSub

**Delivery Type** [?](#)  
 Pull  
 Push

**Subscription expiration** [?](#)  
 Expire after this many days of inactivity (between 1 and 365)  
31 Days  
 Never expire  
The subscription will never expire no matter the activity.

**Acknowledgment Deadline** [?](#)  
Deadline time is from 10 seconds to 600 seconds  
10 Seconds

**Message retention duration**  
Time duration is from 10 minutes to 7 days

Days	Hours	Minutes
7	0	0

**Retain acknowledged messages** [?](#)  
 Enable

**Create** **Cancel**

<input type="checkbox"/> Topic name	Subscriptions	Labels	
<input type="checkbox"/> projects/qwiklabs-gcp-0d6ace797d9fef61/topics /newTopic	0	None	<a href="#">⋮</a>

**Publish message**

**Topic**  
projects/qwiklabs-gcp-0d6ace797d9fef61/topics/newTopic

**Message**

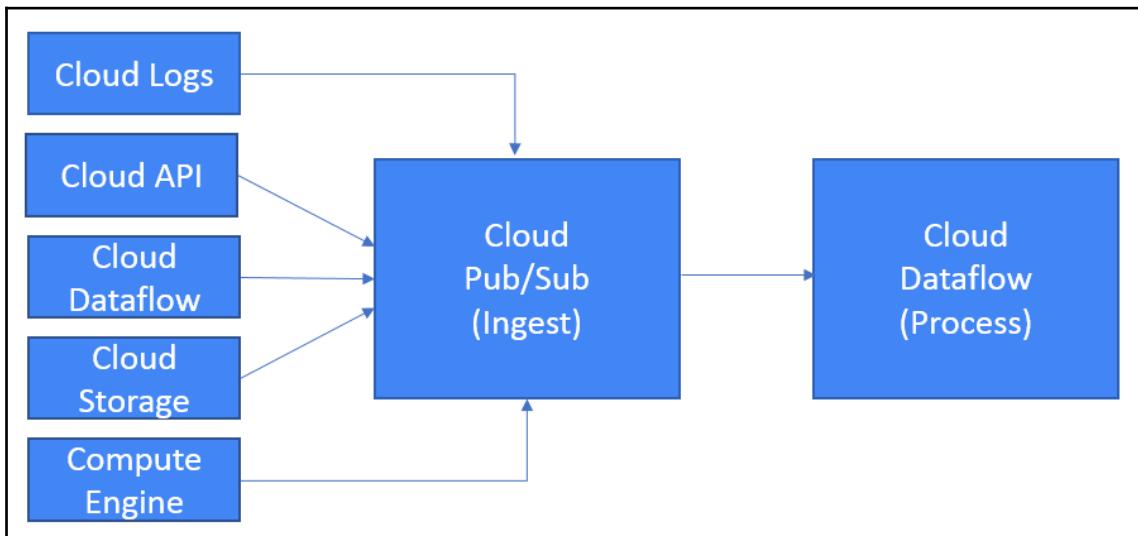
Good Luck for the exam !

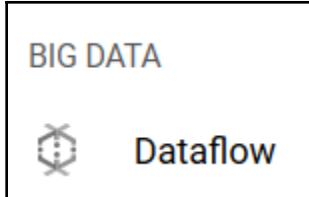
**Attributes (Optional)**

Key	Value
<input type="text" value="Key to add"/>	<input type="text"/>
<a href="#" style="color: blue; font-weight: bold;">+ Add item</a>	

[Publish](#)
[Cancel](#)

```
google3535969_student@cloudshell:~ (qwiklabs-gcp-0d6ace797d9fef61) $ gcloud pubsub subscriptions pull --auto-ack newSub
+-----+
| DATA      | MESSAGE_ID | ATTRIBUTES |
+-----+
| Good Luck for the exam ! | 559316151755636 |          |
+-----+
```





---

**Job name**  
Must be unique among running jobs. Use lowercase letters, numbers, and hyphens (-).

**Cloud Dataflow template** ?  
A pipeline that ingests a Cloud Pub/Sub stream of JSON-encoded messages from a Pub/Sub Topic, performs a transform via a user defined JavaScript function, and writes to a pre-existing BigQuery table.

**Required Parameters**

**Regional endpoint** ?  
Choose where to deploy Cloud Dataflow workers and store metadata for the job.

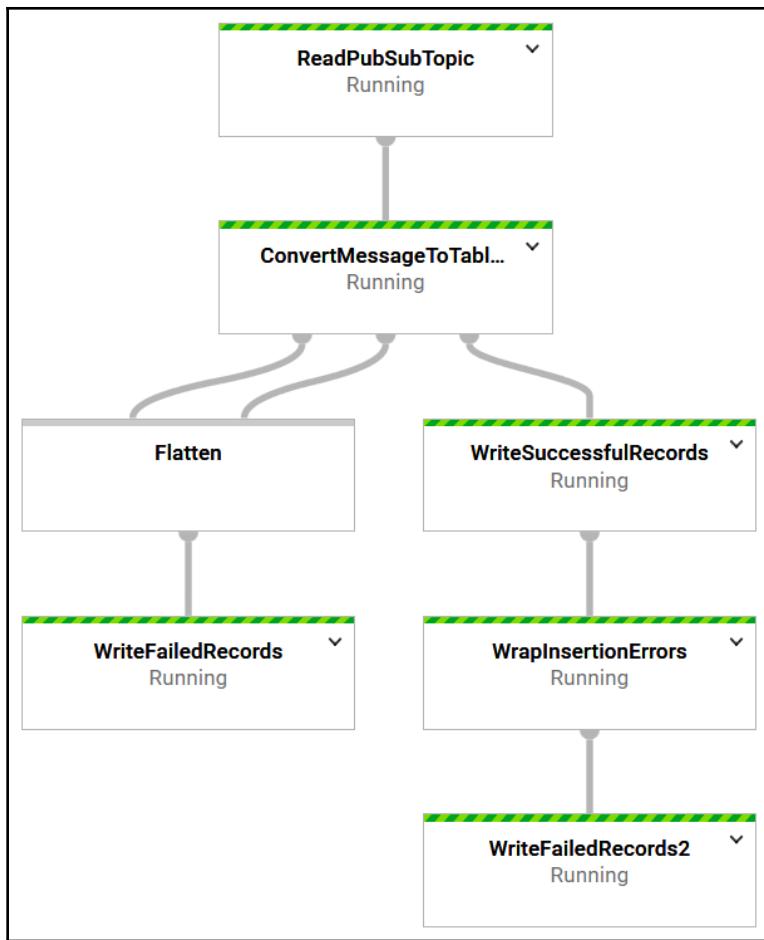
**Cloud Pub/Sub input topic**  
Cloud Pub/Sub topic to read the input from, in the format of 'projects/<project>/topics /<topic>'

**BigQuery output table**  
BigQuery table location (<project>:<dataset>. <table\_name>) to write the output to. The table's schema must match the input JSON objects.

**Temporary location**  
Path and filename prefix for writing temporary files. ex: gs://MyBucket/tmp

▼ Optional parameters

**Run job** **Cancel**



Query results								
<a href="#">SAVE RESULTS</a> <a href="#">EXPLORE WITH DATA STUDIO</a>								
Query complete (2.0 sec elapsed, 0 B processed)								
Job information <a href="#">Results</a> <a href="#">JSON</a> <a href="#">Execution details</a>								
Row	ride_id	point_idx	latitude	longitude	timestamp	meter_reading	meter_increment	ride_status
1	dc90389e-b0af-41d7-a5e5-feb77b55e677	41	40.746640000000006	-74.00165000000001	2019-06-17 09:36:44.881980 UTC	2.4404762	0.05952381	enroute
2	0591d24a-de43-44ad-bac7-5372053c09e3	123	40.75406	-73.98467000000001	2019-06-17 09:26:36.320040 UTC	7.478169	0.06079812	enroute
3	09e15c11-abdf-4ab5-84f4-71a03a61d759	56	40.71097	-74.01079	2019-06-17 09:36:02.679550 UTC	2.0024242	0.035757575	enroute
4	14099a7f-847c-4a32-b5ac-f9d63c1c0c80	306	40.77065	-73.96628000000001	2019-06-17 09:28:25.299810 UTC	10.276691	0.033583958	enroute
5	6112c79a-9b88-4b51-b3b0-fa4f716398c3	1245	40.7821	-73.94444	2019-06-17 09:31:42.533760 UTC	26.329306	0.021148037	enroute
6	1e436b54-4b2d-41cd-ac97-5808fc3f46db	781	40.787330000000004	-73.95439	2019-06-17 09:24:24.500910 UTC	15.998339	0.020484429	enroute
7	e10d5c4d-7096-4845-80fa-237eb3d5681c	392	40.661190000000005	-73.805	2019-06-17 09:26:22.369750 UTC	7.2167363	0.018410042	enroute
8	1848a706-992c-46e8-8b8f-90b330b7ee28	22	40.71967	-73.99828000000001	2019-06-17 09:27:32.841160 UTC	1.496	0.068	enroute
9	231babd8-b273-42ae-a8b6-6e3f5e18850f	367	40.76690000000001	-73.99656	2019-06-17 09:29:26.745630 UTC	10.36594	0.02824507	enroute
10	c899a1e9-3a9b-480a-91f4-e7adb59d8bd9	1718	40.65494	-73.96172	2019-06-17 09:32:40.152830 UTC	26.772797	0.0155837	enroute

---

Create dataset

Dataset ID

Data location (Optional) ?

- Default
- United States (US)
- European Union (EU)
- Los Angeles (us-west2)
- Northern Virginia (us-east4)
- Montréal (northamerica-northeast1)
- São Paulo (southamerica-east1)
- London (europe-west2)
- Finland (europe-north1)
- Zurich (europe-west6)
- Mumbai (asia-south1)
- Singapore (asia-southeast1)
- Hong Kong (asia-east2)
- Taiwan (asia-east1)
- Tokyo (asia-northeast1)
- Sydney (australia-southeast1)
- Osaka (asia-northeast2)

---

### Create dataset

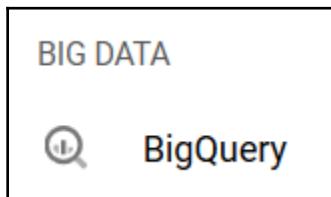
**Dataset ID**

**Data location (Optional) ?**

**Default table expiration ?**

Never

Number of days after table creation:



**Resources**

**+ ADD DATA ▾**

**Pin a project**

▶ [qwiklabs](#)

**Explore public datasets**

[Marketplace](#) > “taxi”

## Datasets

2 results

**Filter by**

TYPE

Datasets ×

 Chicago Taxi Trips  
City of Chicago  
Chicago taxi trips from 2013 to present

 NYC TLC Trips  
City of New York  
New York City taxi and limousine trips since 2009

[Marketplace](#) > “taxi”

## Datasets

2 results

**Filter by**

TYPE

Datasets ×

 Chicago Taxi Trips  
City of Chicago  
Chicago taxi trips from 2013 to present

 NYC TLC Trips  
City of New York  
New York City taxi and limousine trips since 2009



# Chicago Taxi Trips

City of Chicago

Chicago taxi trips from 2013 to present

[VIEW DATASET](#)

Resources [+ ADD DATA ▾](#)

Search for your tables and datasets [?](#)

- ▶ qwiklabs-gcp-0d6ace797d9fef61
- ▼ bigquery-public-data [☰](#)
  - ▶  [austin\\_311](#)
  - ▶  [austin\\_bikeshare](#)
  - ▶  [austin\\_crime](#)
  - ▶  [austin\\_incidents](#)
  - ▶  [austin\\_waste](#)
  - ▶  [baseball](#)
  - ▶  [bitcoin\\_blockchain](#)

### Query editor

```
1 SELECT
2   dropoff_community_area,
3   FORMAT('%.3.2f', AVG(tips)) AS average_tip,
4   FORMAT('%.3.2f', MAX(tips)) AS max_tip
5 FROM
6   `bigquery-public-data.chicago_taxi_trips.taxi_trips`
7 WHERE
8   dropoff_community_area IS NOT NULL
9 GROUP BY
10  dropoff_community_area
11 ORDER BY
12  average_tip DESC
13 LIMIT
14  10
```

No cached results

Run Save query Save view Schedule query More

### Query results

SAVE RESULTS EXPLORE IN DATA STUDIO

Query complete (2.6 sec elapsed, 1.5 GB processed)

Job information Results JSON Execution details

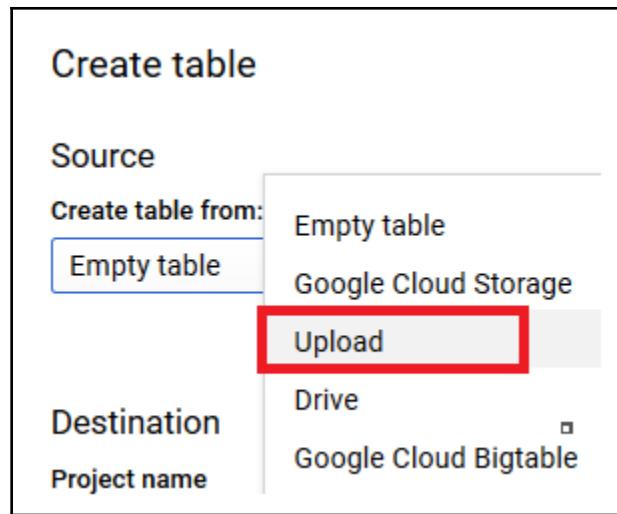
Row	dropoff_community_area	average_tip	max_tip
1	31	98.10	9700.00
2	3	96.64	45000.00

cpb101\_flight\_data

Run Save query Save view Schedule query More

qwiklabs-gcp-9801cdf8fccbb788:cpb101\_flight\_data

CREATE TABLE



### Create table

**Source**

Create table from:  File format:  
   CSV

**Destination**

Project name:  Dataset name:  Table type:

**Table name**

**Schema**

Auto detect  Schema and input parameters  Edit as text

Name	Type	Mode
airport	STRING	NULLABLE
city	STRING	NULLABLE
arrival_data	DATE	NULLABLE

**Partition and cluster settings**

Partitioning:  No partitioning

Clustering order (optional):  Clustering order determines the sort order of the data. Clustering can only be used on a partitioned table, and works with tables partitioned either by column or ingestion time.

**Advanced options ^**

cpb101\_flight\_data

**CLOUDARCHITECT**

## Export table to Google Cloud Storage

Select GCS location: [?](#)

cloudarchitect/export.csv

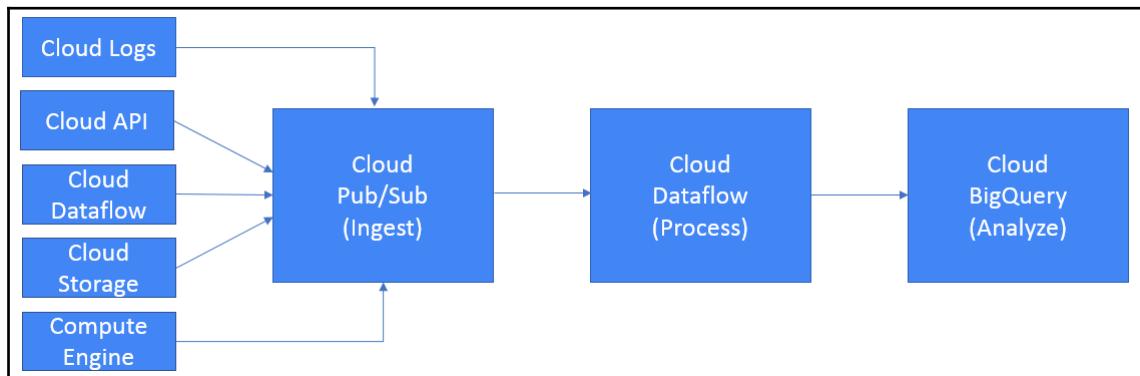
[Browse](#)

Export format:

CSV

Compression:

None



## Hadoop Ecosystem

Spark

Hadoop

Pig

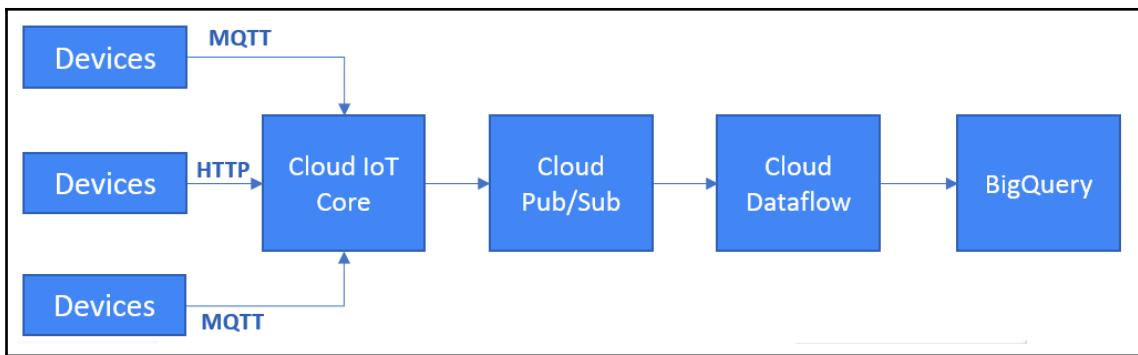
Hive

## Cluster on GCE

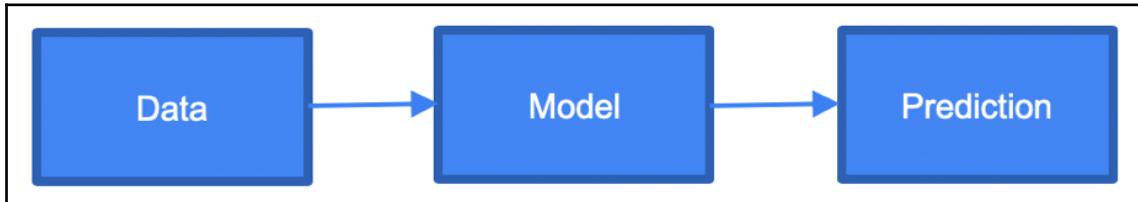
Master

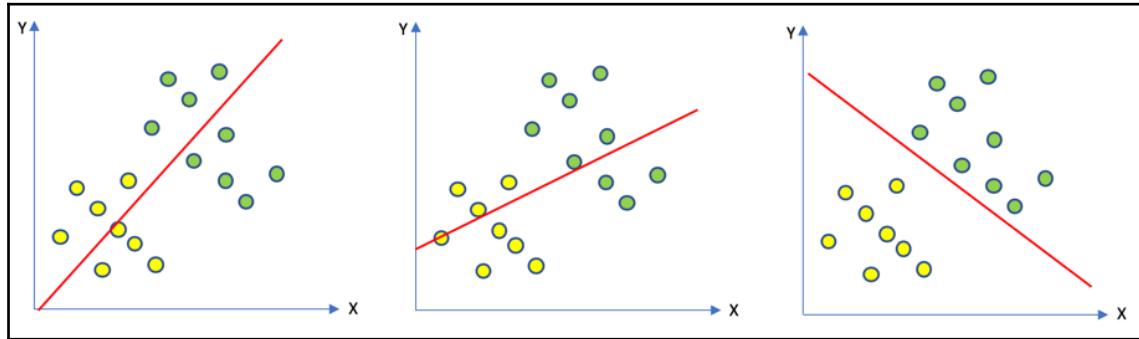
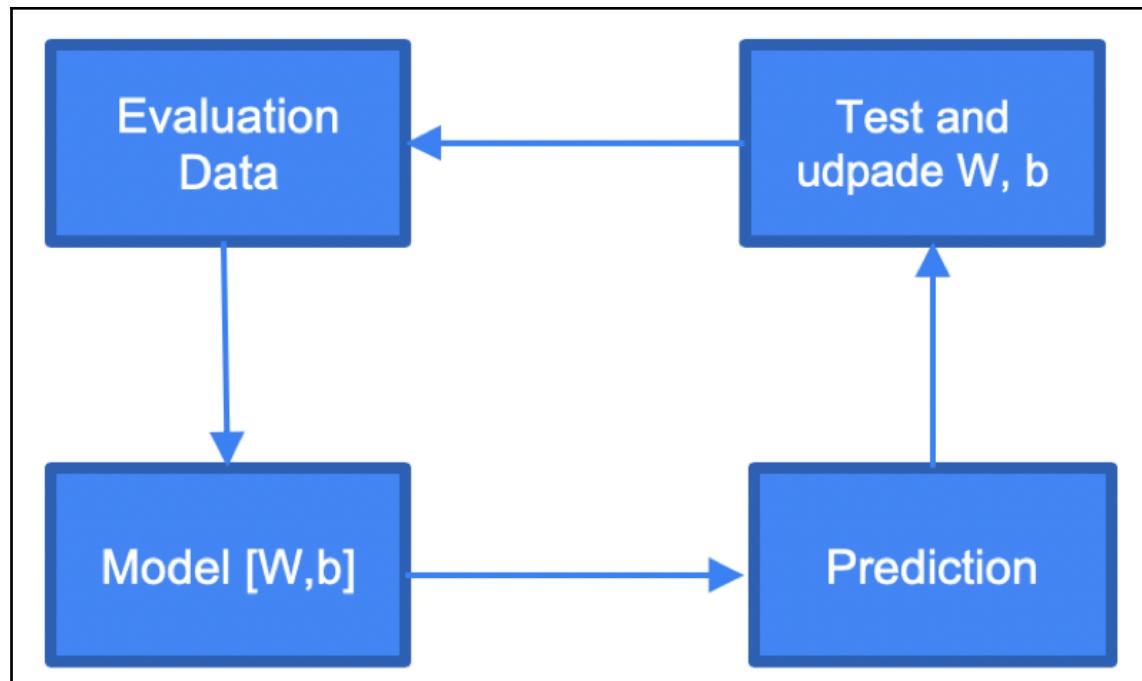
Worker

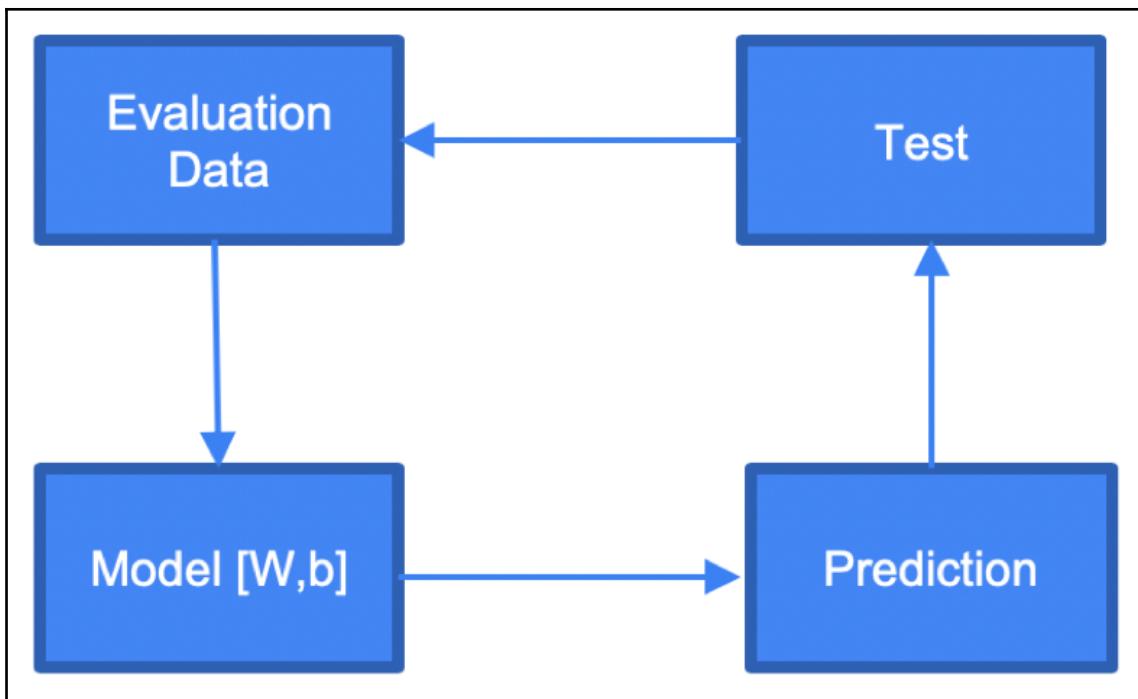
Preemptible Worker

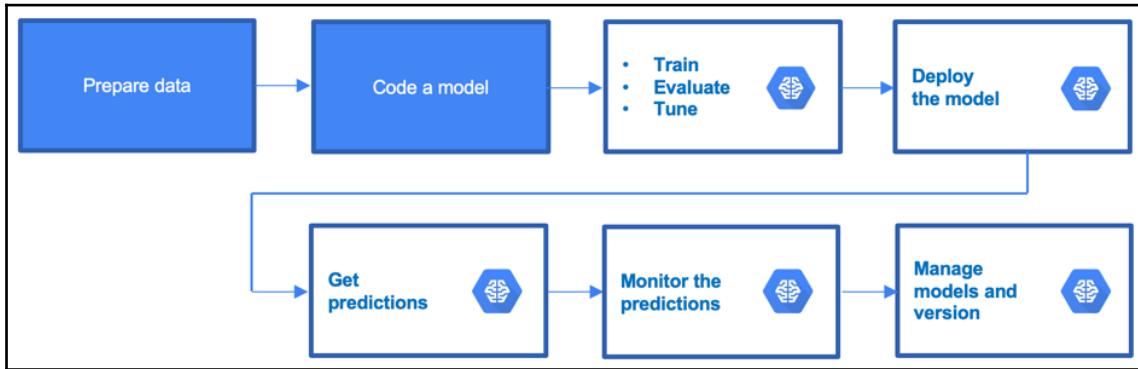
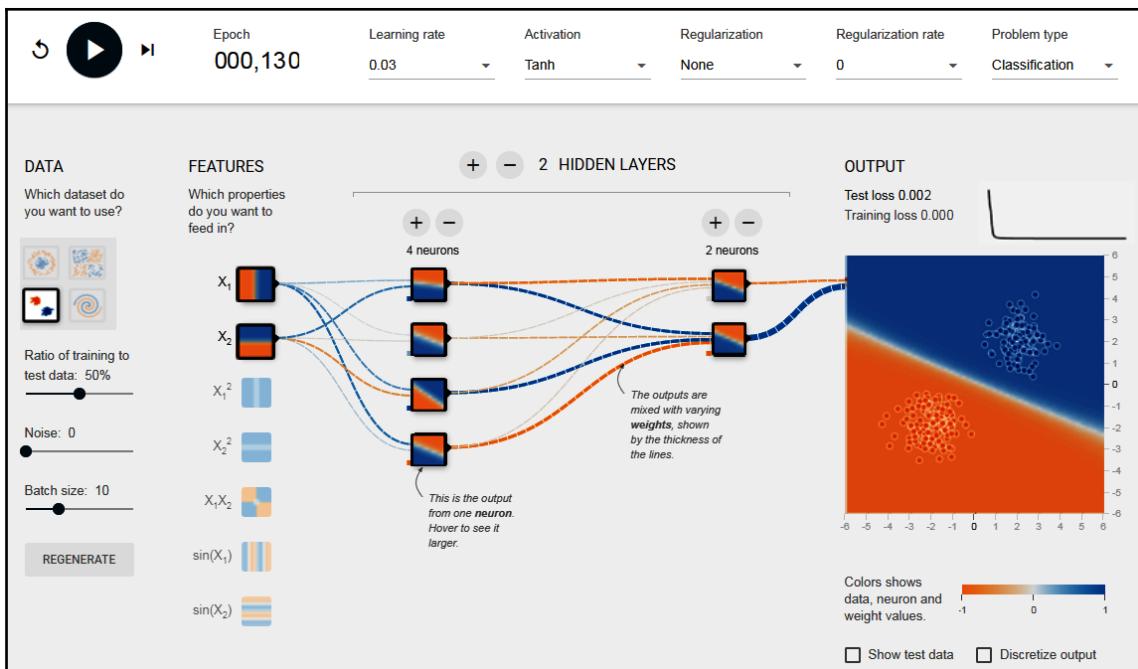


## Chapter 12: Putting Machine Learning to Work



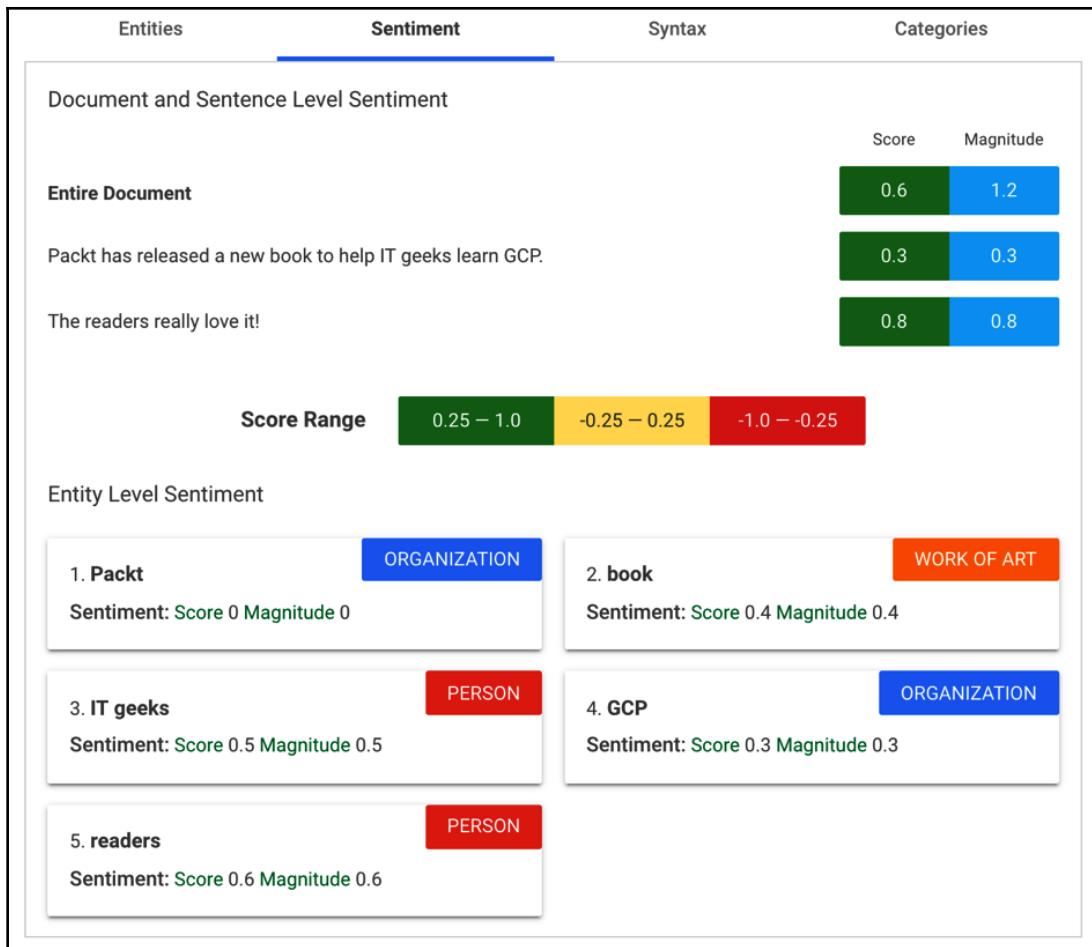




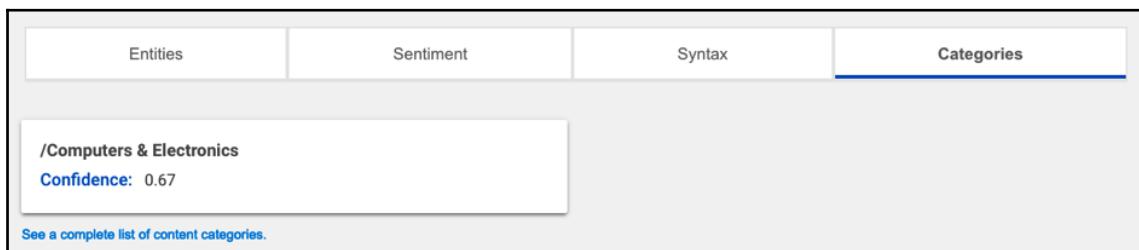
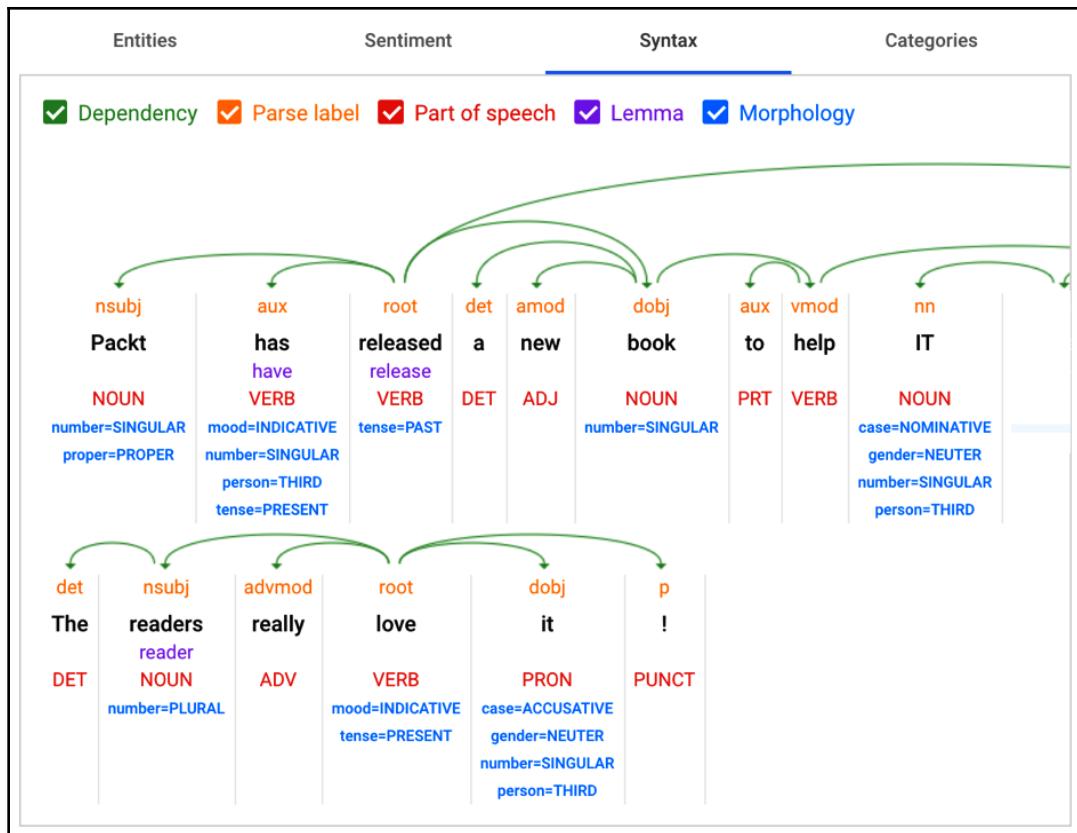




Entities	Sentiment	Syntax	Categories
<Packt> <sub>1</sub> has released a new <book> <sub>2</sub> to help <IT geeks> <sub>3</sub> learn <GCP> <sub>4</sub> . The <readers> <sub>5</sub> really love it!			
1. Packt <a href="#">Wikipedia Article</a> Salience: 0.44	ORGANIZATION	2. book Salience: 0.22	WORK OF ART
3. IT geeks Salience: 0.15	PERSON	4. GCP <a href="#">Wikipedia Article</a> Salience: 0.13	ORGANIZATION
5. readers Salience: 0.06	PERSON		

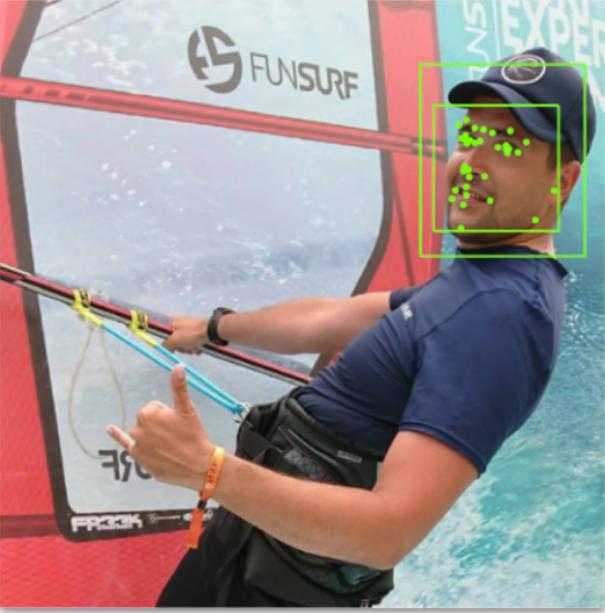






[Faces](#) [Objects](#) [Labels](#) [Web](#) [Text](#) [Properties](#) [Safe Search](#)

---



Picture1.png

Joy	<div style="width: 100px; height: 10px; background-color: #5cb85c;"></div>	Very Likely
Sorrow	<div style="width: 10px; height: 10px; background-color: #d9ead3;"></div>	Very Unlikely
Anger	<div style="width: 10px; height: 10px; background-color: #d9ead3;"></div>	Very Unlikely
Surprise	<div style="width: 10px; height: 10px; background-color: #d9ead3;"></div>	Very Unlikely
Exposed	<div style="width: 10px; height: 10px; background-color: #d9ead3;"></div>	Very Unlikely
Blurred	<div style="width: 10px; height: 10px; background-color: #d9ead3;"></div>	Very Unlikely
Headwear	<div style="width: 100px; height: 10px; background-color: #5cb85c;"></div>	Very Likely

Roll: **16°** Tilt: **3°** Pan: **-35°**

Confidence  97%

Faces Objects Labels Web Text Properties Safe Search

**Objects**

A photograph of a man wearing a blue t-shirt and a blue baseball cap, standing on a windsurfing board. He is holding onto a boom with his right hand and has a yellow wristband on his left wrist. The background shows a red sail with the word 'FUNSURF' and some water. A green bounding box surrounds the entire image, and a smaller green box highlights the man's torso and arms.

Person	93%
Hat	70%
Skirt	69%
Top	53%

Faces Objects Labels Web Text Properties Safe Search



Picture1.png

Labels

Arm	89%
Recreation	76%
Shoulder	75%
Elbow	75%
Tennis Racket	72%
Sports	65%

Faces Objects Labels Web Text Properties Safe Search



Picture1.png

+Page 1  
+Block 1  
SN

+Block 2  
S FUISURE

+Block 3  
S FUNSURF

-Block 4

Show JSON ▾

RESET

NEW FILE

**Request URL**

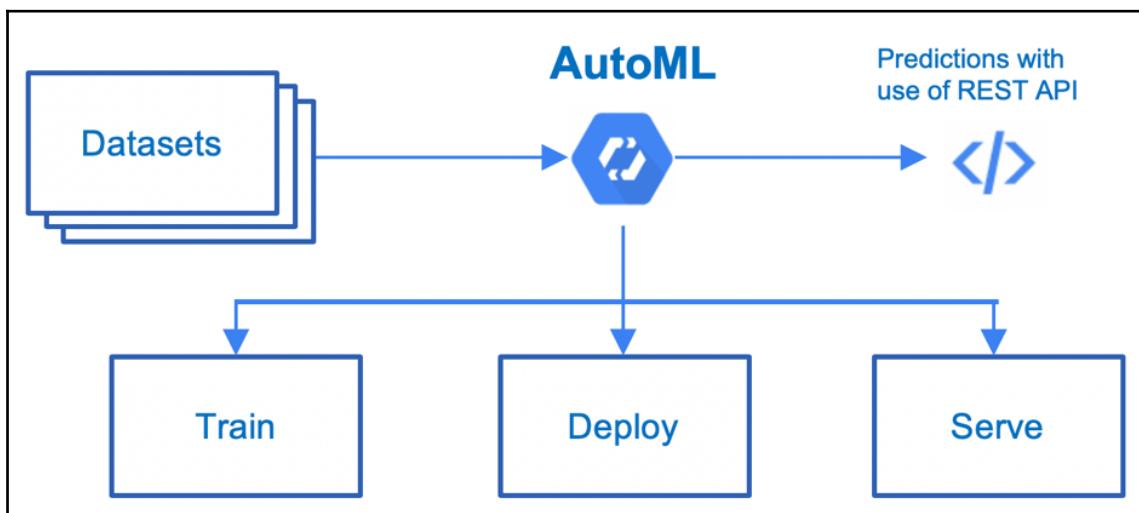
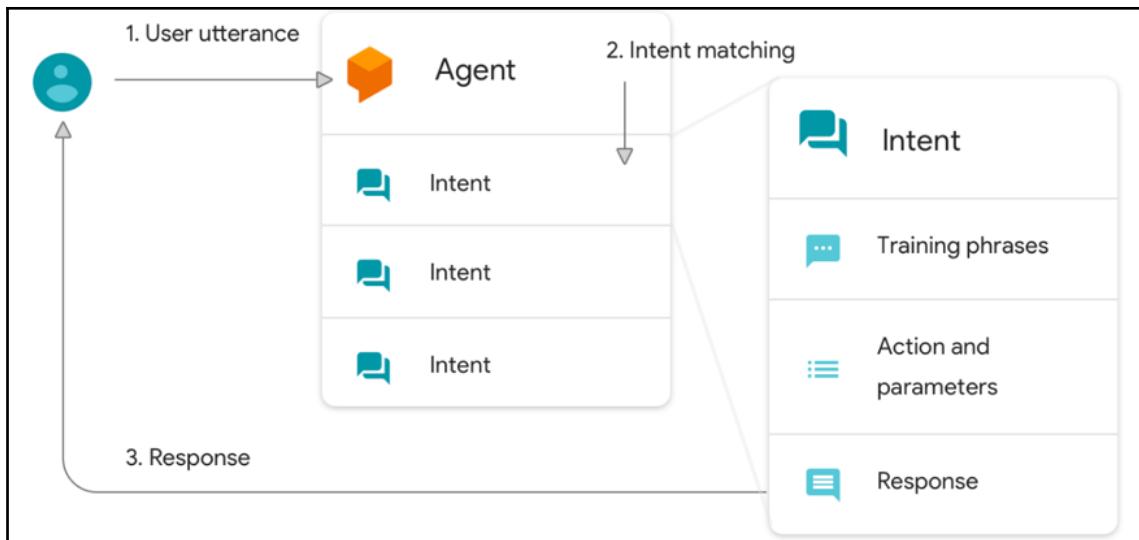
```
https://vision.googleapis.com/v1/images:annotate
```

**Request**

```
{  
  "requests": [  
    {  
      "features": [  
        {  
          "maxResults": 50,  
          "type": "LANDMARK_DETECTION"  
        },  
        {  
          "maxResults": 50,  
          "type": "FACE_DETECTION"  
        },  
        {  
          "maxResults": 50,  
          "type": "OBJECT_LOCALIZATION"  
        },  
        {  
          "maxResults": 50,  
          "type": "LOGO_DETECTION"  
        },  
        {  
          "maxResults": 50,  
          "type": "LABEL_DETECTION"  
        }  
      ]  
    }  
  ]  
}
```

**Response**

```
{  
  "cropHintsAnnotation": {  
    "cropHints": [  
      {  
        "boundingPoly": {  
          "vertices": [  
            {  
              "x": 84  
            },  
            {  
              "x": 492  
            },  
            {  
              "x": 492,  
              "y": 503  
            },  
            {  
              "x": 84,  
              "y": 503  
            }  
          ]  
        },  
        "confidence": 1  
      }  
    ]  
  }  
}
```



# Chapter 13: Security and Compliance

The screenshot shows the Google Admin console dashboard. At the top, there's a search bar and several navigation icons. Below the header, the "Admin console" is visible. The main area contains ten cards arranged in two rows of five:

- Dashboard**: See relevant insights about your domain.
- Users**: Add or manage users.
- Groups**: Create groups and mailing lists.
- Device management**: Secure corporate data on devices.
- Apps**: Manage apps and their settings.
- Billing**: View charges and manage licenses.
- Company profile**: Update information about your company.
- Admin roles**: Add new admins.
- Domains**: Verify your domain or add domains.
- Support**: Talk with our support team.

**Password management**  
Locally applied

Configure password policies for your organization. Some of these policies can't be enforced for users who are authenticated by a third party identity provider via SAML, or if you upload a cryptographic hash of the password using our API. [Learn more](#)

**Password strength**  
Require strong passwords in line with security best practices. [?](#)

Enforce strong password

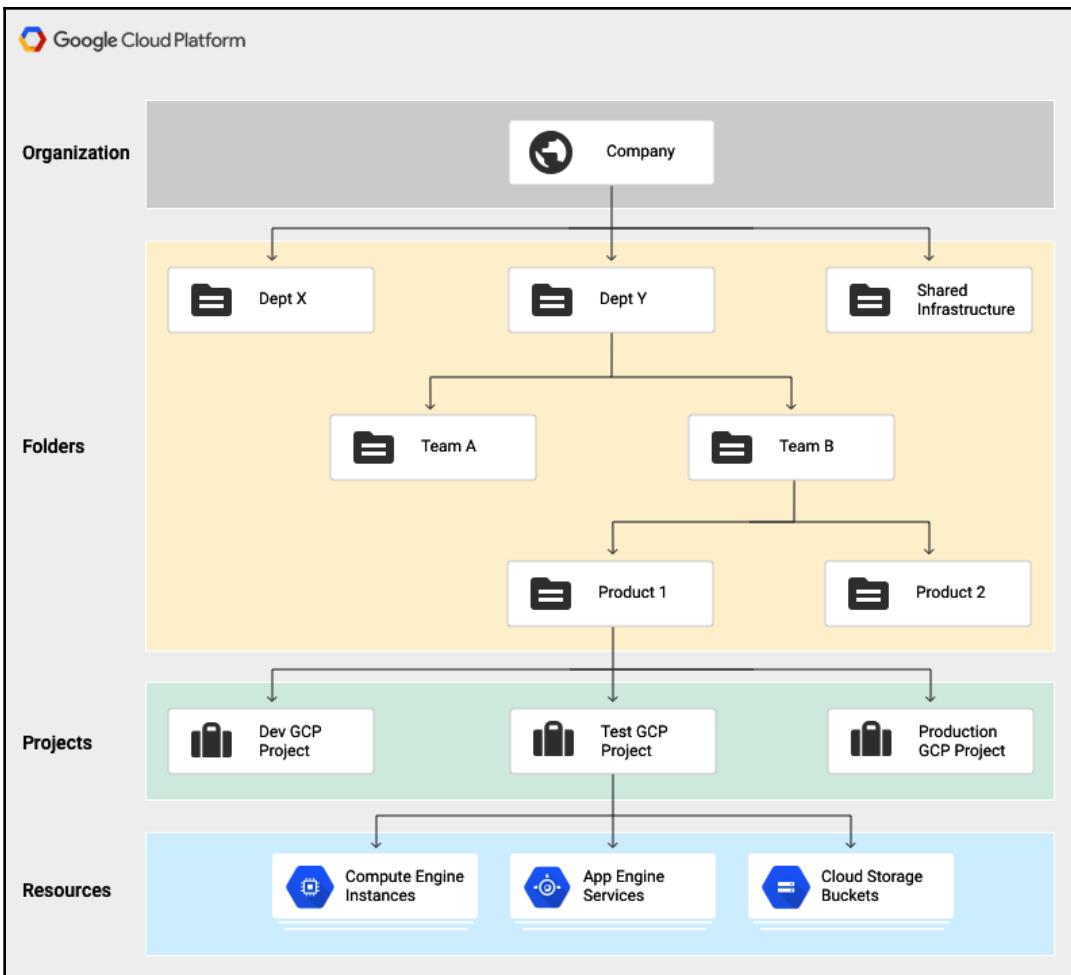
**Password length**  
Passwords must be between 8 and 100 characters.

Minimum length  
8

Maximum length  
100

---

<input type="text" value="brgerrard.co.uk"/> <input type="button" value="▼"/>	<input type="text" value="Filter by name, ID, project number, or label"/>
Name	
<input type="checkbox"/> <input type="button" value="▼"/>  brgerrard.co.uk	
<input type="checkbox"/> <input type="button" value="▼"/>  Departments	
<input type="checkbox"/>  Finance	
<input type="checkbox"/> <input type="button" value="▼"/>  Project Management	
<input type="checkbox"/>  Google Cloud Architect Project	



## Permissions for folder "Google Cloud Architect Project"

These permissions affect this folder and all of its resources. [Learn more](#)

**MEMBERS**    **ROLES**

View By:

Filter table

Type	Member	Name	Role	Inheritance
<input type="checkbox"/>	brgerrard.co.uk		Owner Folder Creator Organization Administrator	brgerrard.co.uk  brgerrard.co.uk  brgerrard.co.uk
<input type="checkbox"/>	brian@brgerrard.co.uk	Brian Gerrard	Owner Folder Admin Folder Editor Project Creator	Departments
<input type="checkbox"/>	konrad@brgerrard.co.uk	Konrad Clapa	Project Creator	

## Create new group

X

Project Creator

projectCreator

@brgerrard.co.uk

Description (optional)

Access Level

Public



Anyone in brgerrard.co.uk can join, post messages, view the members list, and read the archives.

Add all users within brgerrard.co.uk to this group.

CANCEL    CREATE

## Add members, roles to "Google Cloud Architect Project" folder

Enter one or more members below. Then select a role for these members to grant them access to your resources. Multiple roles allowed. [Learn more](#)

New members

projectcreator@brgerrard.co.uk 



Role

Project Creator 



Access to create new GCP projects.

 [ADD ANOTHER ROLE](#)

**SAVE**

**CANCEL**

## Add members, roles to "Cloud Architect" project

Enter one or more members below. Then select a role for these members to grant them access to your resources. Multiple roles allowed. [Learn more](#)

New members

vmviewer@brgerrard.co.uk 



Role

Compute Viewer 



Read-only access to get and list information about all Compute Engine resources, including instances, disks, and firewalls. Allows getting and listing information about disks, images, and snapshots, but does not allow reading the data stored on them.

 [ADD ANOTHER ROLE](#)

[SAVE](#)

[CANCEL](#)

## Add members, roles to "Cloud Architect" project

Enter one or more members below. Then select a role for these members to grant them access to your resources. Multiple roles allowed. [Learn more](#)

New members

vmadmin@brgerrard.co.uk 



Role

Compute Instance Admin ... ▾



Full control of Compute Engine instance resources.

 [ADD ANOTHER ROLE](#)

[SAVE](#)

[CANCEL](#)

## Service account details

Name

AccessCloudStorage

Description

Allow VM instance to access Cloud Storage

Email

accesscloudstorage@cloud-architect-230809.iam.gserviceaccount.com

Unique ID

105065029252103294073



Service account details



Grant this service account access to project (optional)

### Service account permissions (optional)

Grant this service account access to Cloud Architect so that it has permission to complete specific actions on the resources in your project. [Learn more](#)

Role

Storage Admin



Full control of GCS resources.

[+ ADD ANOTHER ROLE](#)

Identity and API access ?

Service account ?

AccessCloudStorage

Filter x

AccessCloudStorage  
accesscloudstorage@cloud-architect-230809.iam.gserviceaccount.com

Compute Engine default service account  
951071968842-compute@developer.gserviceaccount.com

No service account

This screenshot shows the 'Identity and API access' section of the Google Cloud Platform console. It displays a list of service accounts. At the top, 'AccessCloudStorage' is selected as the service account. Below it is a 'Filter' input field. The list contains two entries: 'AccessCloudStorage' with the email 'accesscloudstorage@cloud-architect-230809.iam.gserviceaccount.com' and 'Compute Engine default service account' with the email '951071968842-compute@developer.gserviceaccount.com'. A third option, 'No service account', is also listed. A blue dropdown arrow icon is visible on the left side of the list.

---

**Access scopes** ?

Allow default access  
 Allow full access to all Cloud APIs  
 Set access for each API

**BigQuery**  
None

**Bigtable Admin**  
None

**Bigtable Data**  
None

**Cloud Datastore**  
None

**Cloud Debugger**  
None

**Cloud Pub/Sub**  
None

**Cloud Source Repositories**  
None

**Cloud SQL**  
None

**Compute Engine**  
None

**Service Control**  
Enabled

**Service Management**  
Read Only

<b>Stackdriver Logging API</b>
Write Only
<b>Stackdriver Monitoring API</b>
Write Only
<b>Stackdriver Trace</b>
Write Only
<b>Storage</b>
Read Only
<b>Task queue</b>
None
<b>User info</b>
None

gcp-bucket-file.txt permissions		
If you don't rely on individual object-level permissions, you can start managing all permissions uniformly at the bucket-level. Go to the bucket's Permissions tab to get started. <a href="#">Learn more</a>		
ENTITY	NAME	ACCESS
Project	owners-951071968842	Owner
Project	editors-951071968842	Owner
Project	viewers-951071968842	Reader
User	brian@brgerrard.co.uk	Owner
<a href="#">+ Add item</a>		
		CANCEL SAVE

Cloud Architect ▾

## Create a firewall rule

Firewall rules control incoming or outgoing traffic to an instance. By default, incoming traffic from outside your network is blocked. [Learn more](#)

**Name** ?  
gcp-architect-003

**Description** (Optional)

**Logs**  
Turning on firewall logs can generate a large number of logs which can increase costs in Stackdriver. [Learn more](#)  
 On  
 Off

**Network** ?  
gcp-architect-vpc-001

**Priority** ?  
Priority can be 0 - 65535 Check priority of other firewall rules  
1000

**Direction of traffic** ?  
 Ingress  
 Egress

**Action on match** ?  
 Allow  
 Deny

Create a new scan

**Name**

**Starting URLs** ?  
List one or more apps hosted on App Engine Standard or Flexible environment.

X

**Additional starting URLs**

**Excluded URLs (Optional)** ?  
Use patterns to match more than one URL. [Learn more](#)

**Authentication** ?

**Schedule** ?

**Export options (Optional)** ?

Export to Cloud Security Command Center  
Automatically export scan configurations and scan results to Cloud Security Command Center after scans are finished.

**User agent** ?

**Maximum scan speed (QPS)** ?

▲ Less

**Create**

[←](#) Security scans    [RUN](#)    [EDIT](#)    [DELETE](#)

Scan\_qwiklabs-gcp-449b1c0190634385.appspot.com\_264  
3/14/19, 10:46 PM (Latest run)

Scan date	URLs tested	Duration	Vulnerabilities found
Mar 14, 2019 10:46 PM	0	19 sec Stopped by user	0

Results    URLs tested    Details

No vulnerabilities found. [Run scan again](#)

Cloud Security Scanner is continuously updated, so check back and re-run this scan to look for new vulnerabilities.

[←](#) Create key ring

Key rings group keys together to keep them organized. In the next step, you'll create keys that are in this key ring. [Learn more](#)

Project name  
qwiklabs-gcp-14b4ec87c43190ba

Key ring name [?](#)

Key ring location [?](#)  
  
HSM is not available in this location [See available regions](#)

[Create](#) [Cancel](#)

---

**Key ring**  
gcp-architect-key-ring

**Location** ?  
global

**Key name** ?

**Purpose** ?

**Algorithm** ?

**Protection level** ?  
  
HSM is not available on global keyrings [See available regions](#)

**Rotation period** ?

**Starting on**

Rotation summary: Every 30 days starting on Apr 7, 2019

**Labels** ?  
[+ Add label](#)

## Encryption

Data is encrypted automatically. Select an encryption key management solution.

Google-managed key

No configuration required

Customer-managed key

Manage via Google Cloud Key Management Service

Customer-supplied key

Manage outside of Google Cloud

**Select a customer-managed key**

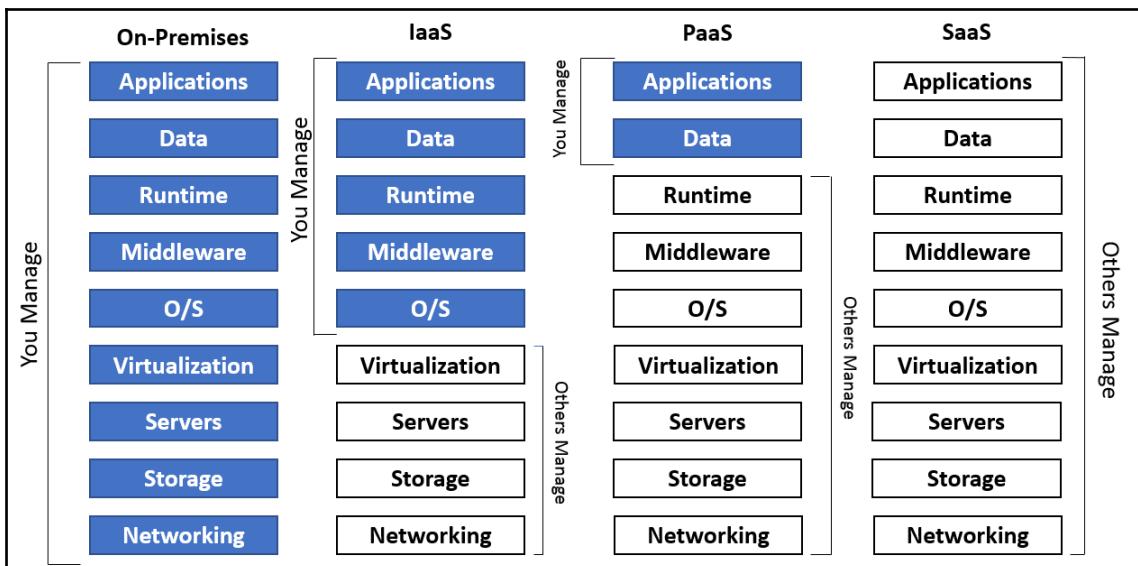
Keys can be configured in your [Cloud KMS settings](#)

Select an encryption key.

gcp-architect-key

global / gcp-architect-key-ring

Don't see your key? Enter key resource ID.



Security

**Identity-Aware Proxy**

Identity-Aware Proxy (IAP) lets you manage who has access to services hosted on App Engine, Compute Engine, or an HTTPS Load Balancer. [Learn more](#)

To get started with IAP, add an [App Engine app](#), a [Compute Engine instance](#) or configure an [HTTPS Load Balancer](#).

**HTTPS RESOURCES**      **SSH AND TCP RESOURCES**

Filter tree

Resource	IAP ?	Published ?	Configuration ?
All Web Services			
App Engine app	<input checked="" type="checkbox"/>	<input type="checkbox"/>	https://qwiklabs-gcp-53a0f24530d8ca5c.appspot.com  OK
default	<input type="checkbox"/>	<input type="checkbox"/>	https://qwiklabs-gcp-53a0f24530d8ca5c.appspot.com

**Rules**    **Targets**    **Logs**

Rules are evaluated by priority: Lower numbers are evaluated first. [Learn more](#)

Search by matches, action or priority

Add rule    Delete    More ▾    Columns ▾

Action	Type	Match	Description	Priority ^
<input type="checkbox"/> Deny (404)	IP addresses/ranges	35.189.26.18		1,000
<input checked="" type="checkbox"/> Allow	IP addresses/ranges	* (All IP addresses)	Default rule, higher priority overrides it	2,147,483,647

**Rules**    **Targets** Logs

Targets are Google Cloud Platform resources that you want to control access to. Access is controlled by policies, which are applied to targets.

Apply policy to new target    Remove

Target	Load balancer	Target type
web-backend	web-lb	Backend service of Load balancer

0 target selected

Showing logs from the last hour ending at 9:37 PM (GMT) [Download logs](#)

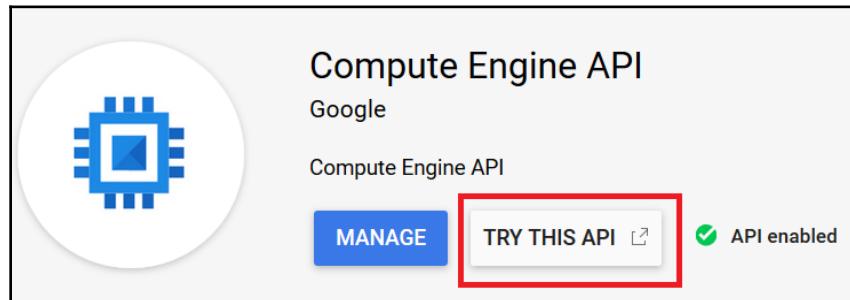
↓ No older entries found matching current filter in the last hour. [Load older logs](#)

! 2019-03-08 21:30:31.492 GMT GET 404 1.68 KiB null curl/7.52... http://35.186.227.65  
35.189.26.18 - "GET http://35.186.227.65/" 404 1716 "curl/7.52.1"

▼ { [Expand all](#) | [Collapse all](#)

- ▶ httpRequest: {...}
- insertId: "jzn4fsfmat4d3"
- ▶ jsonPayload: {...}
  - logName: "projects/qwiklabs-gcp-aea339b3f57da547/logs/requests"
  - receiveTimestamp: "2019-03-08T21:30:32.461440888Z"
- ▶ resource: {...}
- severity: "WARNING"
- spanId: "1bd10a2a1e00ec5d"
- timestamp: "2019-03-08T21:30:31.492502202Z"

# Chapter 14: Google Cloud Management Options



A screenshot of the Google APIs Explorer interface. The top navigation bar includes the Google logo, a search bar with placeholder text "Search for services, methods, and recent requests...", a "Loading..." status indicator, and a magnifying glass search icon. Below the navigation is a section titled "APIs Explorer". Under "Services", "Compute Engine API" is selected, indicated by a blue hexagon icon. The version "v1" is shown next to it, with the description "Creates and runs virtual machines on Google Cloud Platform.".

A screenshot of the Google APIs Explorer showing available methods for the Compute Engine API. The "compute.instances.insert" method is highlighted with a red box. Its description is "Creates an instance resource in the specified project using the data included in the request." Below it, the "compute.instances.list" method is listed with the description "Retrieves the list of instances contained within the specified zone.".

A screenshot of the Google APIs Explorer showing parameter configuration. Two parameters are defined: "project" with the value "cloud-achicitect-gcp-projects-12j" and "zone" with the value "us-central1-f". The "project" parameter is described as "Project ID for this request. (string)". The "zone" parameter is described as "The name of the zone for this request. (string)".

```
{
  "machineType": "zones/us-central1-f/machineTypes/n1-standard-1",
  "name": "instance001",
  "disks": [
    {
      "type": "PERSISTENT",
      "initializeParams": {
        "sourceImage": "projects/debian-cloud/global/images/family/debian-9"
      },
      "boot": true
    }
  ]
}
```

200 OK

- Show headers -

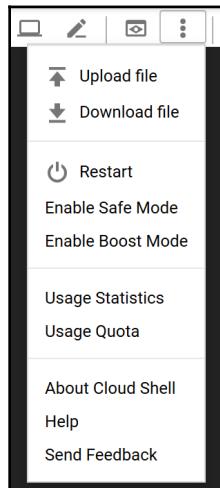
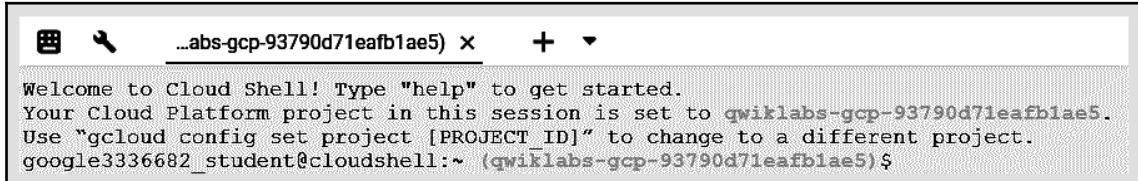
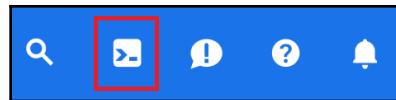
```
{
  "kind": "compute#operation",
  "id": "1506986924064556374",
  "name": "operation-155474219982-58607a08c18ac-71978ce0-e8119a6d",
  "zone": "https://www.googleapis.com/compute/v1/projects/qwiklabs-gcp-7463f770b17e1dc7/zones/us-central1-f",
  "targetLink": "https://www.googleapis.com/compute/v1/projects/qwiklabs-gcp-7463f770b17e1dc7/zones/us-central1-f/instances/instance-1",
  "targetId": "4032531473407329623",
  "status": "RUNNING",
  "user": "google3004538_student@qwiklabs.net",
  "progress": 0,
  "insertTime": "2019-04-08T09:50:01.662-07:00",
  "startTime": "2019-04-08T09:50:01.665-07:00",
}
```

```
{
  "name": "newdisk001",
  "sizeGb": "10"
}
```

200 OK

- Show headers -

```
{
  "kind": "compute#operation",
  "id": "971166634079601434",
  "name": "operation-1554742773093-58607c2b5151c-1b31c368-c00bd32b",
  "zone": "https://www.googleapis.com/compute/v1/projects/qwiklabs-gcp-7463f770b17e1dc7/zones/us-central1-f",
  "targetLink": "https://www.googleapis.com/compute/v1/projects/qwiklabs-gcp-7463f770b17e1dc7/zones/us-central1-f/disks/newdisk001",
  "targetId": "4908396006527648538",
  "status": "RUNNING",
  "user": "google3004538_student@qwiklabs.net",
  "progress": 0,
  "insertTime": "2019-04-08T09:59:33.945-07:00",
  "startTime": "2019-04-08T09:59:33.953-07:00",
}
```



Cloud Shell

File Edit Selection View Go Help

Files brian ~key.json example.json

example.json

```
1
2     "glossary": {
3         "title": "example glossary",
4         "GlossDiv": {
5             "title": "S",
6             "GlossList": {
7                 "GlossEntry": {
8                     "ID": "SGML",
9                     "SortAs": "SGML",
10                    "GlossTerm": "Standard Generalized Markup Language",
11                    "Acronym": "SGML",
12                    "Abbrev": "ISO 8879:1986",
13                    "GlossDef": {
14                        "para": "A meta-markup language, used to create markup languages such as DocBook.",
15                        "GlossSeeAlso": ["GML", "XML"]
16                    },
17                    "GlossSee": "markup"
18                }
19            }
20        }
21    }
22 }
```

```
google3167498_student@cloudshell:/home (qwiklabs-gcp-cf3e4b1a188f0368)$ gcloud -h
Usage: gcloud [optional flags] <group | command>
  group may be          access-context-manager | alpha | app | asset | auth |
                      beta | bigtable | builds | components | composer |
                      compute | config | container | dataflow | dataproc |
                      datastore | debug | deployment-manager | dns |
                      domains | endpoints | filestore | firebase |
                      functions | iam | iot | kms | logging | ml |
                      ml-engine | organizations | projects | pubsub | redis |
                      resource-manager | services | source | spanner | sql |
                      topic
  command may be       docker | feedback | help | info | init | version

For detailed information on this command and its flags, run:
  gcloud --help
```

---

word	corpus	f0
beloved	cymbeline	1
beloved	romeoandjuliet	1
beloved	winterstale	1
beloved	tamingoftheshrew	1
beloved	hamlet	1
beloved	twogentlemenofverona	1
beloved	tempest	1
beloved	timonofathens	1
beloved	kinglear	1
beloved	sonnets	1
beloved	coriolanus	1
beloved	1kinghenryiv	1
beloved	juliuscaesar	1
beloved	3kinghenryvi	1
beloved	antonyandcleopatra	1
beloved	comedyoferrors	1
beloved	periclesprinceoftyre	1
beloved	titusandronicus	1
beloved	rapeoflucrece	1
beloved	measureforemeasure	1
beloved	midsummersnightsdream	1
beloved	merchantofvenice	1
beloved	asyoulikeit	1
beloved	othello	1
beloved	troilusandcressida	1
beloved	2kinghenryvi	1
beloved	twelfthnight	1
beloved	kinghenryviii	1

Instance details    [EDIT INSTANCE](#)    [DELETE INSTANCE](#)

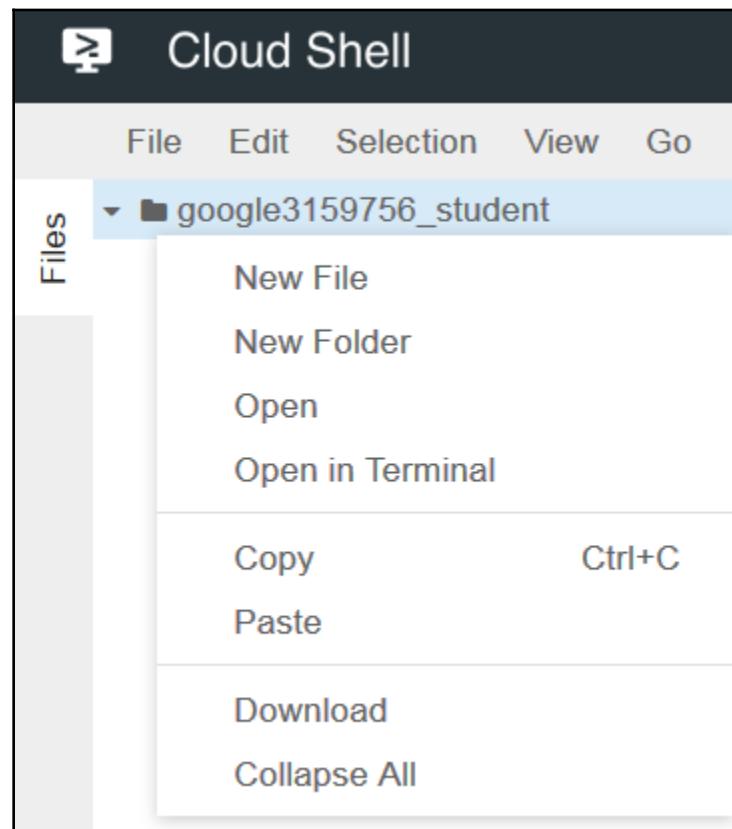
myfirstinstance

Instance ID: instance001 Type: Production Storage: SSD

cluster001

CPU utilization	Rows	Throughput	System error rate
Average: 0.2%	Read: 0/s Write: 0/s	Read: 0 B/s Write: 0 B/s	0%
Hottest node: 0.2%			

Cluster ID	Zone	Nodes	Storage utilization
<input checked="" type="checkbox"/> cluster001	europe-west2-a	3	0 B / 7.5 TB



 Deployment Manager

← deployment01  DELETE

 Deployments

 Type registry

 deployment01 has been deployed

 Overview - deployment01

 vm001 vm instance

VM instances  CREATE INSTANCE    

 Filter VM instances

<input type="checkbox"/> Name ^	Zone	Recommendation	In use by	Internal IP
<input checked="" type="checkbox"/> vm001	europe-west4-a			10.164.0.2 (nic0)

VM instances  CREATE INSTANCE     

 Filter VM instances

<input type="checkbox"/> Name ^	Zone	Recommendation	In use by	Internal IP
<input checked="" type="checkbox"/> createdbytemplate	europe-west4-a			10.164.0.5 (nic0)

VM instances

**CREATE INSTANCE** **IMPORT VM** **REFRESH** **START** **STOP**

Filter VM instances

Columns ▾

Name	Zone	Recommendation	In use by	Internal IP	External IP	Connect
vm002	europe-west4-a			10.164.0.4 (nic0)	None	SSH ▾

```
The fingerprint of the deployment is NdVsfAvJTKQnTfuTYocnBQ==  
Waiting for create [operation-1556477906253-5879bc0b3f6a3-e71eb3bb-b27e918e]...done.  
Create operation operation-1556477906253-5879bc0b3f6a3-e71eb3bb-b27e918e completed successfully.  
NAME      TYPE          STATE        ERRORS   INTENT  
app001    compute.v1.instance  COMPLETED  []  
db001    compute.v1.instance  COMPLETED  []  
web001    compute.v1.instance  COMPLETED  []
```

**Deployment Manager**

**multideployment** **DELETE**

**Deployments**

**Type registry**

**multideployment has been deployed**

**Overview - multideployment**

**multipleinstances multivm.jinja**

- web001 vm instance**
- app001 vm instance**
- db001 vm instance**

VM instances														<a href="#">SHOW INFO PANEL</a>
<input type="checkbox"/> Filter VM instances							Columns							
<input type="checkbox"/>	Name ^	Zone	Recommendation	In use by	Internal IP	External IP	Connect							
<input type="checkbox"/>	✓ app001	europe-west4-b			10.164.0.3 (nic0)	None	SSH	▼	⋮					
<input type="checkbox"/>	✓ db001	europe-west6-c			10.172.0.4 (nic0)	None	SSH	▼	⋮					
<input type="checkbox"/>	✓ web001	europe-west2-a			10.154.0.3 (nic0)	None	SSH	▼	⋮					

The fingerprint of the deployment is 2A6YxCYsxQ\_e04Se7N6Rpw==  
 Waiting for create [operation-1556741126674-587d909dc9bd-c1d90539-9a25356a]...done.  
 Create operation operation-1556741126674-587d909dc9bd-c1d90539-9a25356a completed successfully.

NAME	TYPE	STATE	ERRORS	INTENT
custom-firewall-rule	compute.v1.firewall	COMPLETED	[]	
custom-net	compute.v1.network	COMPLETED	[]	
custom-subnet	compute.v1.subnetwork	COMPLETED	[]	

Google Cloud Platform Pricing Calculator Prices are up to date. Last update: 05-June-2019

### Estimate 1

Network Bandwidth

Egress - Americas/EMEA: 2,048 GB  
 Egress - Asia/Pacific: 1 GB  
 Egress - Australia: 1 GB  
 Egress - China: 1 GB  
**USD 246.30**

**Total Estimated Cost: USD 246.30 per 1 month**

Estimate Currency USD - US Dollars

Adjust Estimate Timeframe 1 day 1 week 1 month 1 quarter 1 year 3 years

**Google Cloud Network Bandwidth**

Egress - Americas and EMEA	GB	
Egress - Asia/Pacific	GB	
Egress - Australia	GB	
Egress - China	GB	
Google Cloud Interconnect Egress to United States	GB	
Google Cloud Interconnect Egress to Europe	GB	

Google Cloud Platform Pricing Calculator

Prices are up to date. Last update: 05-June-2019

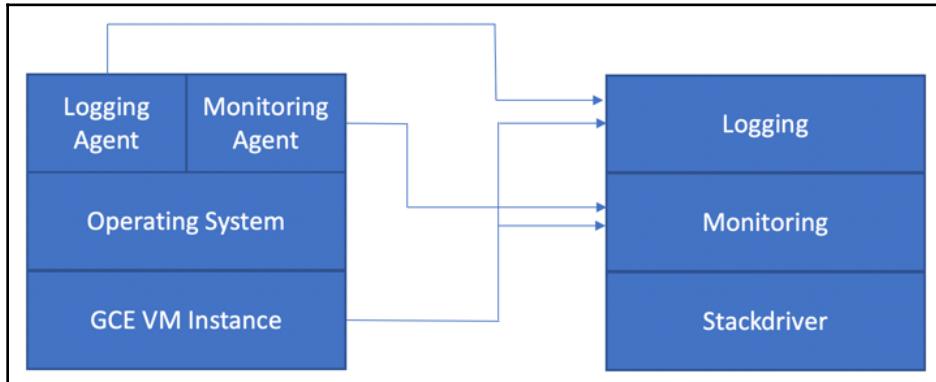
The screenshot shows the Google Cloud Platform Pricing Calculator. The top navigation bar includes icons for Compute Engine, App Engine, Kubernetes Engine, Cloud Run, Cloud Storage, Networking (selected), BigQuery, and BigQuery ML. A search bar at the top allows users to search for products. Below the search bar, a section titled "Google Cloud Network Bandwidth" lists various egress options with dropdown menus for selecting GB amounts. To the right, the "Estimate 1" panel displays the estimated cost for "Egress - Americas/EMEA: 2,048 GB" at "USD 246.30". It also shows currency selection ("USD - US Dollars") and an adjustment slider for the estimate timeframe (set to 1 month). Buttons for "EMAIL ESTIMATE" and "SAVE ESTIMATE" are present.

Google Cloud Platform Pricing Calculator

Prices are up to date. Last update: 13-September-2019

The screenshot shows the Google Cloud Platform Pricing Calculator. The top navigation bar includes icons for Compute Engine, App Engine, Kubernetes Engine, Cloud Run, Cloud Storage (selected), Networking, BigQuery, and BigQuery ML. A search bar at the top allows users to search for products. Below the search bar, a section titled "Google Cloud Storage" includes a dropdown for "Location" set to "Iowa (us-central1)". It also includes fields for "Total Amount of Storage" (1,024 GB) and two "operations per month" fields ("Class A" and "Class B", both at 0.5 million). A checkbox at the bottom allows users to include "Always Free usage in my estimate". To the right, the "Estimate" panel displays the estimated cost for "Total Amount of Storage: 1,024 GB" at "USD 23.18". It shows currency selection ("USD - US Dollars") and an adjustment slider for the estimate timeframe (set to 1 month). Buttons for "EMAIL ESTIMATE" and "SAVE ESTIMATE" are present.

# Chapter 15: Monitoring Your Infrastructure



Stackdriver Select workspace

Create your free Workspace

Select or create a new Google Cloud Platform project to store your workspace settings and user permissions. The selection cannot be changed, but you can create other Workspaces later. [Learn more](#)

Google Cloud Platform project

Create workspace Cancel

## Add Google Cloud Platform projects to monitor optional

Add Google Cloud Platform projects to monitor as part of this Workspace. You can edit this selection later in workspace settings. [Learn more](#)



Select all None



qwiklabs-gcp-224610610fbaf237 (qwiklabs-gcp-224610610fbaf237)



qwiklabs-gcp-c3a57d69ba270e1a (qwiklabs-gcp-c3a57d69ba270e1a)

### Monitor AWS accounts (optional)

Add AWS accounts to monitor as part of this Workspace. You can edit this selection later in workspace settings. [Learn more](#)

#### Authorize AWS for Stackdriver

1. [Log in to your Amazon IAM console and click Roles.](#)

2. Click "Create New Role"

3. Select the role type "Another AWS account"

4. Check the box "Require external ID"

5. Enter the following:

Account ID **314658760392**

External ID **sd6850140**

Require MFA **unchecked**

6. Click "Next: Permissions"

7. Select "ReadOnlyAccess" from the policy template list and click "Next: Review".

8. Enter a "Role Name" such as **Stackdriver** and click "Create Role"

9. Select the "Role Name" you just entered from the role list to see the summary page.

10. Copy the "Role ARN" value and paste it in the AWS Role ARN field below.

#### Add AWS accounts (optional)

##### Role ARN

arn:aws:iam::<accountid>:role/<rolename>

##### Description of account

required

When you add an AWS account, a Google Cloud Platform project will be created to store your AWS monitoring and logging data.

AWS Data Collection may take a few minutes to start.

[Add AWS account](#)

[Skip AWS Setup](#)

The screenshot shows the Stackdriver Monitoring Overview page. On the left, there's a sidebar with navigation links: Monitoring Overview, Resources, Alerting, Uptime Checks, Groups, Dashboards, Debug, Trace, Logging, Error Reporting, and Profiler. The main area has a heading "Welcome to Stackdriver Monitoring!" with a sub-instruction: "Complete the Stackdriver getting started checklist to gain deeper insights into your system." Below this are four cards: "Install Stackdriver agents" (with a "INSTALL AGENTS" button), "Create uptime checks" (with a "CREATE CHECK" button), "Create alerting policies" (with a "CREATE POLICY" button), and "Create custom dashboards" (with a "CREATE DASHBOARD" button). At the bottom, there are dropdown menus for "Resource dashboards", "Incidents", "Uptime checks", and "Groups". To the right, there's a section titled "Charts" with three small preview images.

The screenshot shows the "Create group" dialog box. It starts with a "Group Name" input field. Below it is a "Filter criteria match" section with a dropdown set to "Any" and a note: "of the rules below". There's a search bar with "Name" and "Contains" dropdowns, and a text input field containing "instance". A "Add Criteria" button is available. At the bottom, there's a checkbox: "This is a cluster. I would like cases highlighted when any node's performance or configuration differs from others in the cluster." Finally, there are "Save Group" and "Cancel" buttons at the bottom.

### Add Chart

**Title**

**Resource Type**

**Metric Type**

**STACKDRIVER**

- CPU Usage (GCE Monitoring)
- Disk Read I/O (GCE Monitoring)
- Disk Write I/O (GCE Monitoring)
- Network Inbound Traffic (GCE Monitoring)
- Network Outbound Traffic (GCE Monitoring)** 

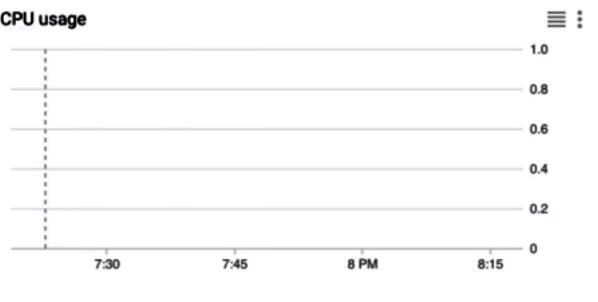
**AGENT**

- Blocked processes
- CPU (agent)
- CPU Load Average (past 15m)
- CPU Load Average (past 1m)
- CPU Load Average (past 5m)
- CPU Steal (agent)
- CPU idle (agent)

**Preview**

TIME **1h** 6h 1d 1w 1m 6w

**CPU usage**



Time	CPU usage
7:30	~0.8
7:45	~0.75
8 PM	~0.9
8:15	~0.95

**Incidents**  Create Alerting Policy

OPEN (1) ACKNOWLEDGED (0) RESOLVED (1)

Yesterday

12:48 AM  Uptime Check for nginx group **nginx-plus-1** 

- Acknowledge
- Resolve
- Comment

[View Policy](#) [Edit Alerting Policy](#)

**Uptime Checks** 

 /

**Uptime Health Check on DemoGroup uptime check**

Violates when: Any monitoring.googleapis.com/uptime\_check/check\_passed stream is above a threshold of 1 for greater than 1 minute

[Edit](#) [Delete](#)

[Add Condition](#)

**Notifications (optional)**

When alerting policy violations occur, you will be notified via these channels. [Learn more](#).

Campfire

Google Cloud Console (mobile)

**Email**

HipChat

PagerDuty

PagerDuty Sync

text entered here. This can convey useful information about the problem and ways to approach

**Name this policy**

A policy's name is used in identifying which policies were triggered, as well as managing configurations of different policies.

Uptime Check Policy

## New Uptime Check

**Title****Check Type****Resource Type****Hostname****Path**

Select protocol and enter the path component of the URL you want to check.

**Check every**[Advanced Options](#)

GCE VM Instance ▾

All logs ▾

Any log level ▾

Recently selected resources

(CET)

GCE VM Instance

Audited Resource

Audited Resource ▶

Cloud Pub/Sub Topic ▶

GCE Project ▶

GCE VM Instance ▶

Google Project ▶

Service Account ▶

ute Engine insert us-central1-a:inst

ute.instances.insert {"actor":{"user"

ute Engine insert us-central1-a:inst

ute.instances.insert {"trace\_id":"ope

GCE VM Instance ▾

All logs ▾

Any log level ▾

Last hour ▾

Showing logs from the last hour ending at 10:16 AM

All logs

cloudaudit.googleapis.com/activity

compute.googleapis.com/activity\_log

No older

2019-01-19 09:54:38.056 CET

2019-01-19 09:54:39.623 CET

2019-01-19 09:55:05.017 CET

2019-01-19 09:55:05.101 CET compute.instances.insert {"trace\_id":"operation-1547888

OK Cancel

google2

"google2182275

google2

GCE VM Instance All logs Any log level Last hour

Showing logs from the last hour ending at 10:16 AM (CET)

↓

▶ i 2019-01-19 09:54:38.056 CET Compute Engine insert us

▶ i 2019-01-19 09:54:39.623 CET compute.instances.insert

▶ i 2019-01-19 09:55:05.017 CET Compute Engine insert us

▶ i 2019-01-19 09:55:05.101 CET compute.instances.insert

↑

!!! Critical  
!! Error  
! Warning  
i Info  
λ Debug  
\* Any log level

GCE VM Instance All logs Any log level Last hour Jump to now

Showing logs from the last hour ending at 10:16 AM (CET)

↓

▶ i 2019-01-19 09:54:38.056 CET Compute Engine insert us-central1-a:inst

▶ i 2019-01-19 09:54:39.623 CET compute.instances.insert {"actor":{"user"

▶ i 2019-01-19 09:55:05.017 CET Compute Engine insert us-central1-a:inst

▶ i 2019-01-19 09:55:05.101 CET compute.instances.insert {"trace\_id":"ope

↑

Last hour  
Last 6 hours  
Last 24 hours  
Last 7 days  
No limit  
Custom  
Jump to time

found matching  
2275\_student@qwiklabs  
2275\_student@qwi  
871-57fcbc70897  
Load

```
1 resource.type="gce_instance"
2 severity>=INFO
3
```

Submit Filter Last 24 hours Jump to now

Showing logs from the last 24 hours ending at 10:21 AM (CET)

↓ No older entries found matching

▶ i 2019-01-19 09:54:38.056 CET Compute Engine insert us-central1-a:instance-1 google2182275\_stude
▶ i 2019-01-19 09:54:39.623 CET compute.instances.insert {"request":{"body":"null","url":"https://
▶ i 2019-01-19 09:55:05.017 CET Compute Engine insert us-central1-a:instance-1 google2182275\_stude
▶ i 2019-01-19 09:55:05.101 CET compute.instances.insert {"event\_timestamp\_us":"1547888105101765"

↑

**CREATE METRIC**
**CREATE EXPORT**
C ►

1 `logName = "projects/my-gcp-project-id/logs/syslog"`

"Control + Space" for autocomplete suggestions

Submit Filter   Last hour   Jump to now

View Options ▾

No newer entries found matching current filter. Double this time range towards now

- ▶ [ ] 2017-10-31 14:22:00.000 UTC Oct 31 14:22:00 your-gce-instance col... [⋮]
- ▶ [ ] 2017-10-31 14:22:00.000 UTC Oct 31 14:22:00 your-gce-instance col... [⋮]
- ▶ [ ] 2017-10-31 14:21:00.000 UTC Oct 31 14:21:00 your-gce-instance col... [⋮]
- ▶ [ ] 2017-10-31 14:21:00.000 UTC Oct 31 14:21:00 your-gce-instance col... [⋮]
- ▶ [ ] 2017-10-31 14:20:00.000 UTC Oct 31 14:20:00 your-gce-instance col... [⋮]
- ▶ [ ] 2017-10-31 14:20:00.000 UTC Oct 31 14:20:00 your-gce-instance col... [⋮]

**Edit Export**

Sink Name

Sink Service

Sink Destination

Creating a log sink will export future matching logs to the selected destination.

**Logs-based metrics**
**CREATE METRIC**
**DELETE**

### System Metrics

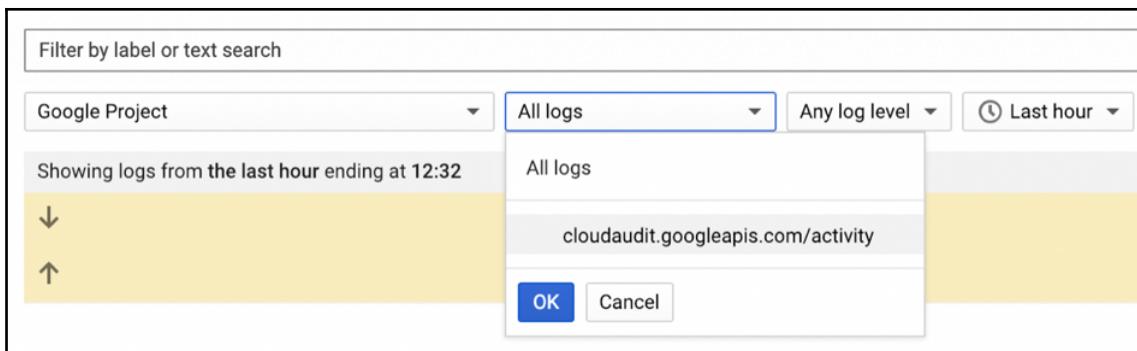
Predefined logs-based system metrics for your project. These metrics record the number of events that occurred within a specific time period.

Name ▾	Description
byte_count	The total number of bytes received in log entries.
excluded_byte_count	The total number of bytes excluded from log entries
excluded_log_entry_count	The total number of log entries that were not counted because they are being excluded by a resource type exclusion or an exclusion filter.
log_entry_count	The total number of log entries received.
logs_based_metrics_error_count	The total number of log entries that were not counted due to their timestamp being too old.

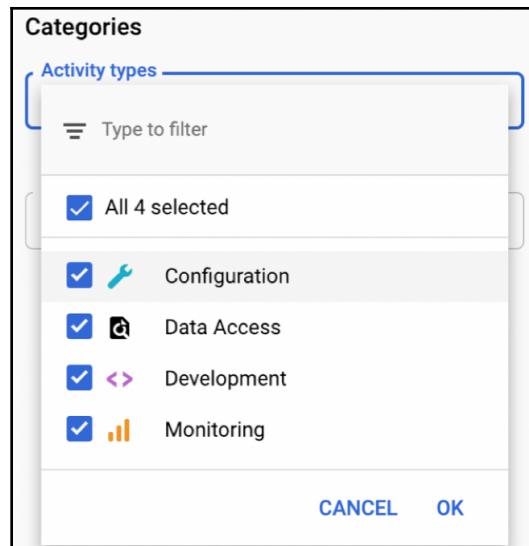
### User-defined Metrics

User defined logs-based metrics that count the number of log entries that match a given filter.

Name ▾	Type	Description	Previous Month Usage	Usage (MTD)	Filter
user/200Responses	Counter	Test - 200 responses from Uptimesss	0 B	0 B	<code>resource.type="http_load_balancer" httpRequest.status=200 httpRequest.userAgent="GoogleStackdriverMonitoring-UptimeChecks(https://cloud.google.com/monitoring)"</code>
user/404Errors	Counter		225.23 KB	217.17 KB	<code>resource.type="gae_app" logName="("projects/cloud-logs-test-project/logs/appengine.googleapis.com%2Fstderr" OR "projects/project/logs/appengine.googleapis.com%2Fnginx.request" OR "</code>

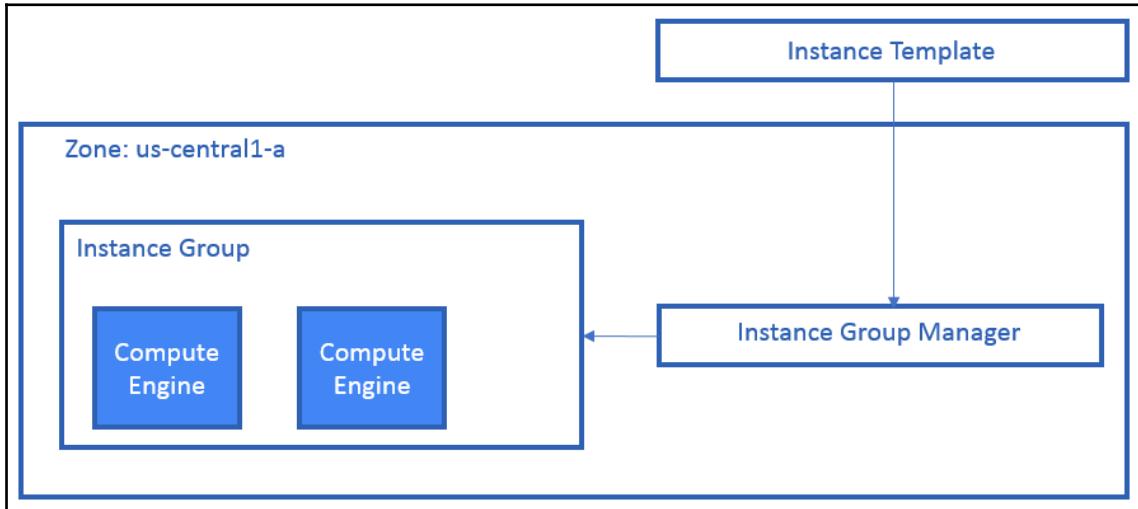
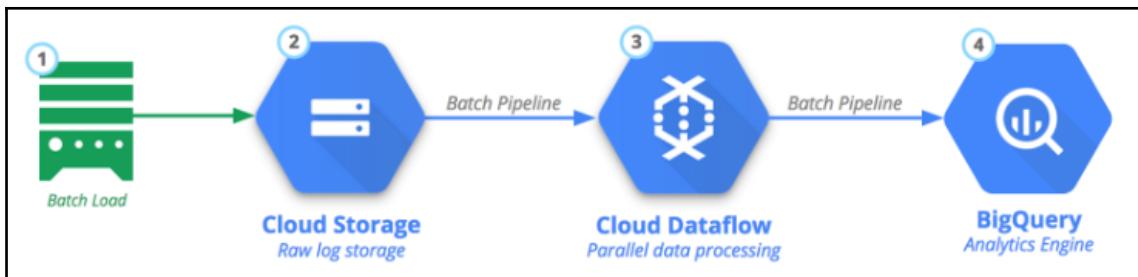
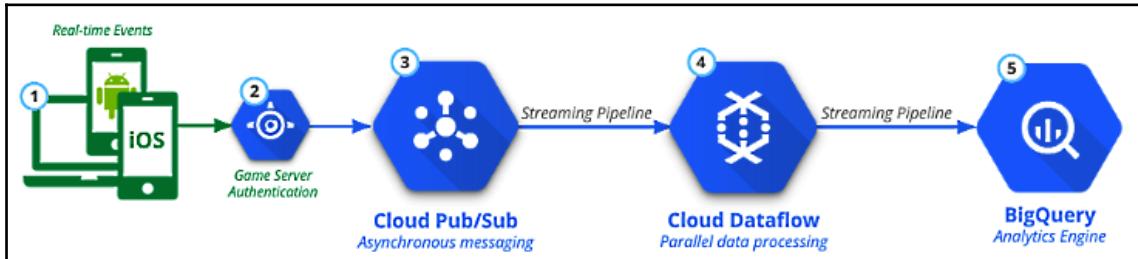


DASHBOARD	ACTIVITY
Today	
10:33 AM	Completed: Create network google2182275_student@qwiklabs.net created
10:33 AM	Create network google2182275_student@qwiklabs.net created
10:19 AM	Create dataset google2182275_student@qwiklabs.net created
10:09 AM	Create Stackdriver alerting policy google2182275_student@qwiklabs.net created
10:04 AM	Delete Stackdriver uptime check configuration google2182275_student@qwiklabs.net deleted
10:03 AM	Create Stackdriver uptime check configuration google2182275_student@qwiklabs.net created
10:03 AM	Create Stackdriver uptime check configuration google2182275_student@qwiklabs.net created
10:01 AM	Create group google2182275_student@qwiklabs.net created
9:55 AM	Completed: google.api.servicemanagement.v1.ServiceManager.Activate... sd-provisioning-enabler@system
9:55 AM	google.api.servicemanagement.v1.ServiceManager.Activate... sd-provisioning-enabler@system.gserviceaccount
9:55 AM	Completed: Create VM google2182275_student@qwiklabs.net created
9:54 AM	Create VM google2182275_student@qwiklabs.net created
9:49 AM	Update project 936076353769-dcb7hgk8cpl26aetfq99c7min7o6qfr
9:49 AM	Set IAM policy on project 936076353769-dcb7hgk8cpl26aetfq99c7min7o6qfr
9:49 AM	Completed: Set metadata on project 936076353769-dcb7hgk8cpl26aetfq99c7min7o6qfr
9:49 AM	Update project 936076353769-dcb7hgk8cpl26aetfq99c7min7o6qfr
9:49 AM	Set metadata on project 936076353769-dcb7hgk8cpl26aetfq99c7min7o6qfr

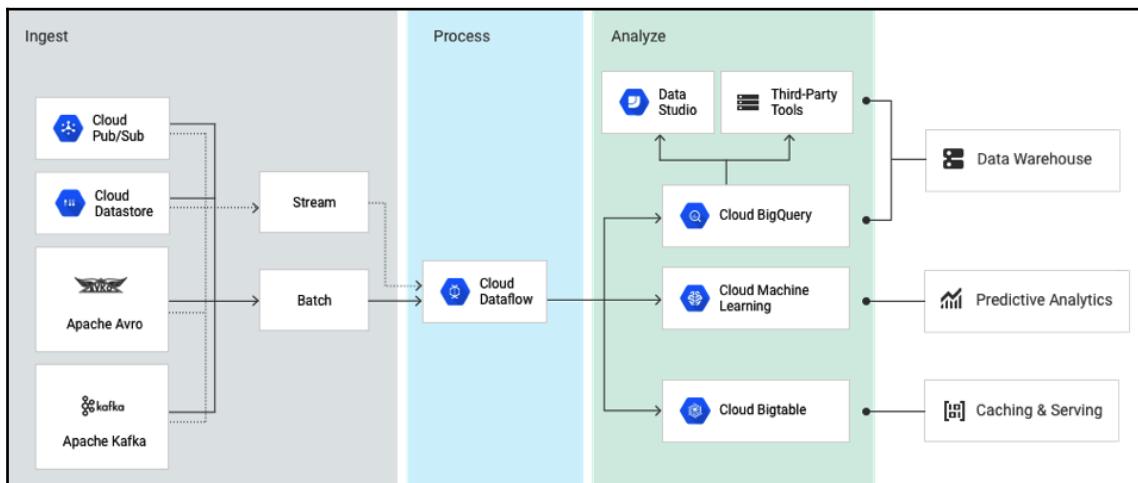
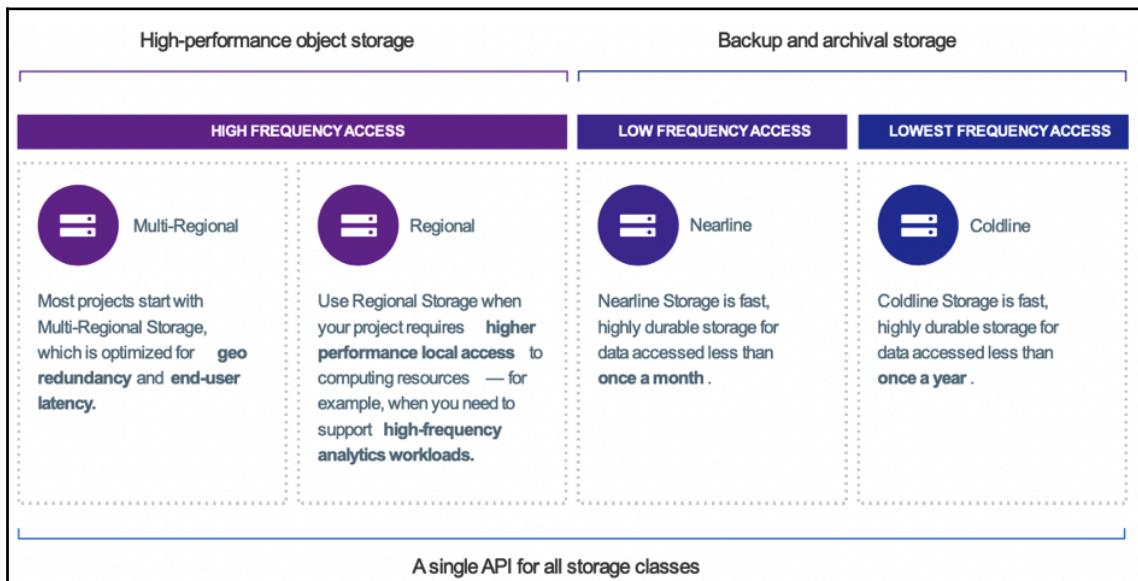


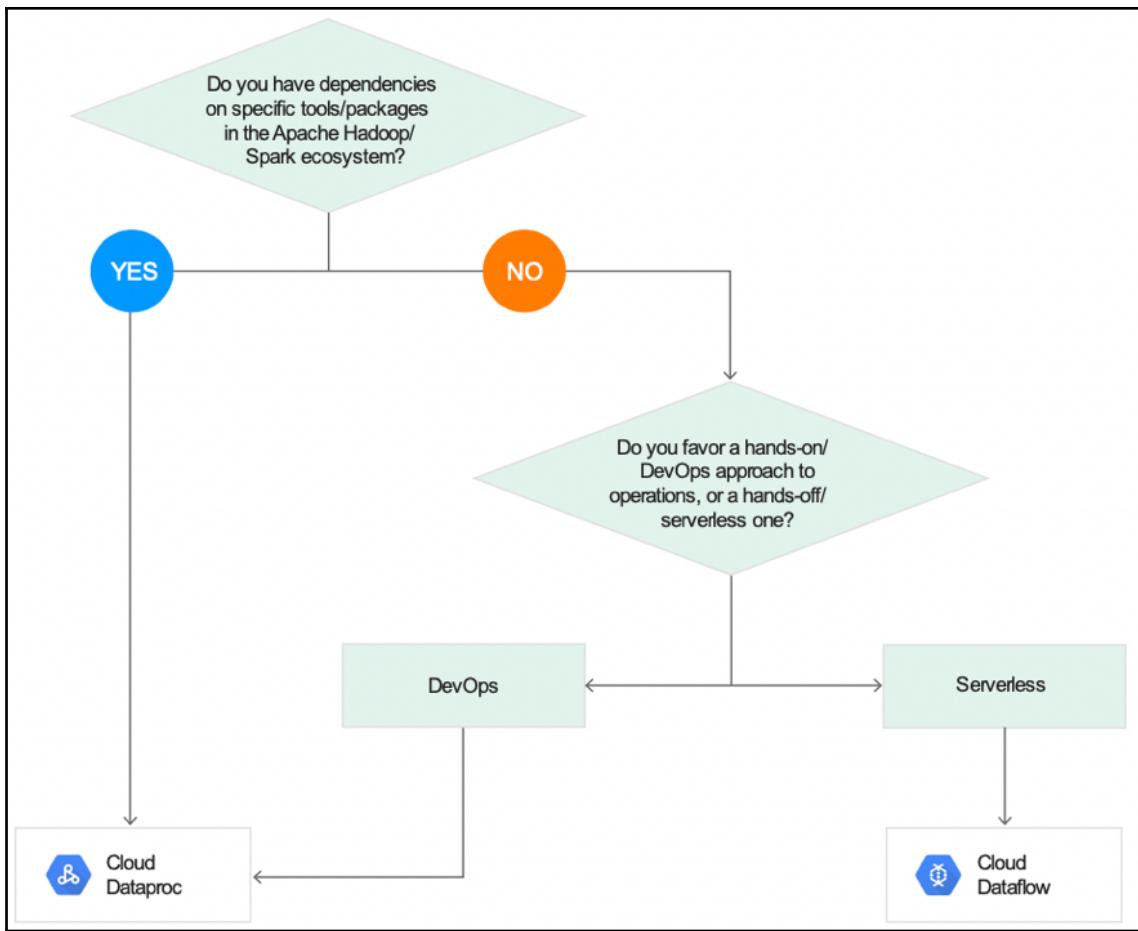
The screenshot shows the Google Cloud Platform Stackdriver Profiler interface. At the top, it displays "Google Cloud Platform" and "A GCP Project". The main title is "Stackdriver Profiler". The "Timespan" dropdown is set to "7 days" and "NOW". The "End Time" is "3/13/18, 11:36 AM" and the "EDT" dropdown is visible. The "Service" dropdown is set to "hello-profiler", "Profile type" is "CPU", "Zone name" is "All zones", and "Version" is "All versions". A search bar at the top right contains the text "Metric: CPU time". Below the search bar, there is a table with three rows: "Name" (root (100%, averaged over 31 profiles)), "File" (no file), and "Values" (total: 4.95 s (100%)). The main area shows a tree view of profiled code: "100%, averaged over 31 profiles" (grey bar), "main" (green bar), "main" (orange bar), "busyloop" (orange bar), and "load" (orange bar).

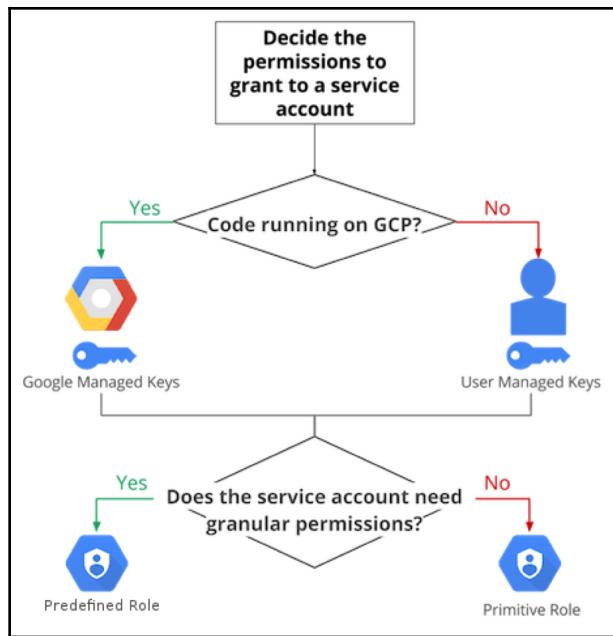
# Chapter 16: Case Studies



# Assessments







**Uptime Checks**

CHECKS	VIRGINIA	OREGON	IOWA	BELGIUM	SINGAPORE	SAO PAULO	POLICIES	ACTIONS
default	!	!	!	!	!	!		

An arrow points from the "Add Uptime Check" button to a dropdown menu containing "Download source IPs".