

# GOOGLE CLOUD PLATFORM GUIDE



 Google Cloud Platform

[Why Google](#)

[Products](#)

[Solutions](#)

[Launcher](#)

[Pricing](#)

[Customers](#)

## Build What's Next Better software. Faster.

- ✓ Use Google's core infrastructure, data analytics and machine learning.
- ✓ Secure and fully featured for all enterprises.
- ✓ Committed to open source and industry leading price-performance.



TRY IT FREE

CONTACT SALES

### Why Google Cloud Platform?



Summary by Damian Ndunda © 2020

## TABLE OF CONTENTS

<b>GOOGLE CLOUD PLATFORM GUIDE .....</b>	<b>1</b>
<b>TABLE OF CONTENTS .....</b>	<b>2</b>
<b>FOREWORD .....</b>	<b>15</b>
WHY GOOGLE WEB LINKS .....	15
GOOGLE CLOUD PRODUCTS.....	16
Featured products.....	17
Compute Engine .....	17
Cloud Run .....	17
Anthos .....	18
Vision AI .....	18
Cloud Storage .....	18
Cloud SQL.....	18
BigQuery .....	18
Security key enforcement.....	18
AI and Machine Learning .....	18
AI building blocks.....	18
AutoML.....	18
Vision AI.....	18
Video AI .....	19
Cloud Natural Language API.....	19
Cloud Translation .....	19
Text-to-Speech .....	19
Speech-to-Text .....	19
Dialogflow .....	19
AutoML Tables (beta).....	19

Cloud Inference API (alpha).....	19
AI Platform and accelerators .....	20
AI Platform .....	20
AI Platform Deep Learning VM Images .....	20
AI Platform Notebooks (beta) .....	20
AI Platform Deep Learning Containers (beta) .....	20
AI Platform Pipelines (beta) .....	20
AI Hub (beta) .....	20
Cloud GPUs.....	20
Cloud TPU.....	20
TensorFlow Enterprise .....	20
API Management .....	21
Apigee API Platform.....	21
Cloud Endpoints.....	21
Developer Portal.....	22
Apigee Sense .....	22
API Analytics .....	22
API Monetization .....	22
Apigee Hybrid .....	22
Cloud Healthcare API.....	22
Compute .....	24
Compute Engine .....	24
App Engine.....	24
Bare Metal Solution .....	24
Cloud GPUs .....	24
Migrate for Compute Engine .....	24
Preemptible VMs .....	24
Shielded VMs .....	24
Sole-tenant nodes .....	24
Containers.....	25
Google Kubernetes Engine (GKE).....	25
Artifact Registry (beta) .....	25
Container Registry .....	25

Kubernetes applications on Google Cloud Marketplace .....	25
Cloud Build.....	25
AI Platform Deep Learning Containers .....	25
Batch on GKE (beta).....	25
Data Analytics .....	25
BigQuery .....	25
Cloud Composer .....	26
Dataflow .....	26
Cloud Data Fusion.....	26
Dataprep by Trifacta .....	26
Dataproc .....	26
Google Data Studio.....	26
Pub/Sub .....	26
Data Catalog .....	26
Cloud Life Sciences (beta).....	26
Databases.....	27
Cloud Bigtable.....	27
Firestore .....	27
Memorystore.....	27
Cloud Spanner .....	27
Cloud SQL.....	27
Firebase Realtime Database .....	27
Developer Tools .....	27
Artifact Registry (beta) .....	27
Cloud SDK .....	27
Container Registry .....	28
Cloud Code .....	28
Cloud Source Repositories.....	28
Cloud Scheduler.....	28
Cloud Tasks .....	28
Cloud Code for IntelliJ.....	28
Tools for PowerShell.....	28
Tools for Visual Studio.....	28

Tools for Eclipse.....	29
Gradle App Engine Plugin .....	29
Maven App Engine Plugin.....	29
Firebase Test Lab .....	29
Firebase Crashlytics .....	29
Tekton.....	29
Workflows .....	29
Healthcare and Life Sciences .....	29
Cloud Healthcare API.....	29
Cloud Life Sciences (beta).....	30
Hybrid and Multi-cloud .....	30
Anthos .....	30
Anthos deployed on VMware.....	30
Anthos GKE .....	30
Anthos Config Management.....	30
Cloud Run for Anthos .....	30
Apigee API Management.....	30
Google Cloud Marketplace for Anthos .....	30
Migrate for Anthos .....	31
Operations.....	31
Cloud Build.....	31
Traffic Director.....	31
Internet of Things (IoT) .....	31
IoT Core .....	31
Edge TPU.....	31
Cloud IoT Edge .....	31
Management Tools.....	32
Private Catalog.....	32
Cloud Deployment Manager .....	32
Cloud Console.....	32
Cloud Shell .....	32
Cost management .....	32
Cloud APIs.....	32

Orbitera White-Label Marketplace.....	32
Media and Gaming.....	32
Game Servers.....	32
OpenCue.....	33
Zync Render.....	33
Anvato.....	33
Migration.....	33
BigQuery Data Transfer Service.....	33
Migrate for Compute Engine.....	33
Cloud Storage Transfer Service.....	33
Migrate for Anthos.....	33
Transfer Appliance.....	33
Networking.....	34
Cloud Armor.....	34
Cloud CDN.....	34
Cloud DNS.....	34
Cloud Interconnect.....	34
Cloud Load Balancing.....	34
Cloud NAT.....	34
Cloud Router.....	34
Cloud VPN.....	34
Network Intelligence Center.....	34
Network Service Tiers.....	35
Network Telemetry.....	35
Traffic Director.....	35
Virtual Private Cloud (VPC).....	35
Security and Identity.....	35
Security.....	35
Access Transparency.....	35
Binary Authorization.....	35
Cloud Asset Inventory.....	35
Cloud Audit Logs.....	35
Cloud Data Loss Prevention.....	36

Cloud HSM.....	36
Cloud Key Management Service .....	36
Security Command Center .....	36
Shielded VMs.....	36
VPC Service Controls .....	36
Incident Response and Management (alpha) .....	36
Identity and Access.....	36
IAM.....	36
Cloud Identity.....	37
Identity-Aware Proxy .....	37
Context-Aware Access.....	37
Identity Platform .....	37
Managed Service for Microsoft Active Directory (beta) .....	37
Resource Manager .....	37
Security key enforcement .....	37
Titan Security Keys .....	37
User Protection Services.....	38
Phishing Protection .....	38
reCAPTCHA Enterprise .....	38
Web Risk.....	38
Serverless Computing .....	38
Cloud Run .....	38
App Engine.....	38
Cloud Functions .....	38
Knative.....	38
Workflows .....	38
Storage .....	39
Cloud Storage .....	39
Persistent Disk .....	39
Filestore.....	39
Cloud Storage for Firebase .....	39
Operations .....	39
Operations Suite.....	39

Cloud Logging .....	39
Cloud Monitoring.....	39
Cloud Trace.....	40
Cloud Debugger .....	40
Cloud Profiler.....	40
Error Reporting .....	40
Service Level Monitoring .....	40
Other Google Cloud Products .....	40
Google Maps Platform.....	40
Firebase .....	40
Firebase Authentication .....	40
Cloud Functions for Firebase .....	41
G Suite .....	41
Chrome Enterprise.....	41
Cloud Storage for Firebase .....	41
Firebase Test Lab .....	41
GCP CLOUD PLATFORM URLS TABLE .....	42
PRODUCTS PRICING.....	43
GCP NETWORK .....	44
GCP REGIONS .....	45
<b>CHAPTER - CLOUD .....</b>	<b>46</b>
1 What is Google Cloud Platform? .....	46
2 Why cloud? .....	46
2.1 Why not cloud?.....	46
3 What to expect from cloud services.....	47
3.1 Computing.....	47
3.2 Storage .....	47
3.3 Analytics (aka, Big Data).....	48
3.4 Networking.....	48
3.5 Pricing .....	49
4 Building an application for the cloud .....	49
4.1 What is a cloud application? .....	49



4.2 Example projects.....	49
TO-DO LIST.....	49
INSTASNAP.....	49
E*EXCHANGE.....	50
5 Getting started with Google Cloud Platform.....	50
5.1 Signing up for GCP.....	50
5.2 Exploring the console.....	53
5.3 Understanding projects.....	54
5.4 Installing the SDK.....	54
6 Interacting with GCP.....	56
6.1 In the browser: the Cloud Console.....	56
TESTING OUT YOUR INSTANCE.....	60
6.2 On the command line: gcloud.....	61
CONNECTING TO YOUR INSTANCE.....	61
6.3 In your own code: google-cloud-*.....	63
7 SUMMARY.....	66
<b>CHAPTER - CLOUD SQL: MANAGED RELATIONAL STORAGE.....</b>	<b>67</b>
1 WHAT'S CLOUD SQL?.....	67
2 INTERACTING WITH CLOUD SQL.....	67
3 CONFIGURING CLOUD SQL FOR PRODUCTION.....	75
3.1 Access control.....	75
3.2 Connecting over SSL.....	76
3.3 Maintenance windows.....	82
3.4 Extra MySQL options.....	84
4 SCALING UP (AND DOWN).....	84
4.1 Computing power.....	84
4.2 Storage.....	85
5 REPLICATION.....	86
6 BACKUP AND RESTORE.....	92
6.1 Automated daily backups.....	92
6.2 Manual data export to Cloud Storage.....	93
7 UNDERSTANDING PRICING.....	99

8 WHEN SHOULD I USE CLOUD SQL? .....	100
8.1 Structure .....	101
8.2 Query complexity .....	102
8.3 Durability.....	102
8.4 Speed (latency) .....	102
8.5 Throughput .....	102
9 COST .....	102
9.1 Overall.....	103
10 WEIGHING CLOUD SQL AGAINST A VM RUNNING MYSQL.....	103
11 SUMMARY .....	104
<b>COMPUTING ON GOOGLE COMPUTE ENGINE .....</b>	<b>105</b>
CHAPTER: COMPUTE ENGINE: VIRTUAL MACHINES .....	106
1 LAUNCHING YOUR FIRST (OR SECOND) VM .....	107
2 BLOCK STORAGE WITH PERSISTENT DISKS.....	109
2.1 Disks as resources.....	110
2.2 Attaching and detaching disks.....	111
2.3 Using your disks.....	115
2.4 Resizing disks .....	118
2.5 Snapshots .....	120
2.6 Images.....	128
2.7 Performance .....	128
2.8 Encryption.....	130
3 INSTANCE GROUPS AND DYNAMIC RESOURCES.....	135
3.1 Changing the size of an instance group .....	140
3.2 Rolling updates .....	142
3.3 Autoscaling .....	145
4 EPHEMERAL COMPUTING WITH PREEMPTIBLE VMS.....	148
4.1 Why use preemptible machines? .....	149
4.2 Turning on preemptible VMs.....	149
4.3 Handling terminations .....	150
4.4 Preemption selection.....	151
5 LOAD BALANCING .....	151

5.1 Backend configuration.....	153
CREATING A HEALTH CHECK.....	153
5.2 Host and path rules .....	155
5.3 Frontend configuration.....	155
5.4 Reviewing the configuration.....	157
6 CLOUD CDN .....	161
6.1 Enabling Cloud CDN .....	162
6.2 Cache control.....	166
7 UNDERSTANDING PRICING .....	167
7.1 Computing capacity .....	167
7.2 Sustained use discounts .....	168
7.3 Pre-emptible prices .....	172
7.4 Storage.....	173
7.5 Network traffic .....	174
8 WHEN SHOULD I USE GCE? .....	175
8.1 Flexibility.....	175
8.2 Complexity.....	176
8.3 Performance .....	176
8.4 Cost.....	176
9 SUMMARY.....	177
CHAPTER: KUBERNETES ENGINE: MANAGED KUBERNETES CLUSTERS .....	178
1 WHAT ARE CONTAINERS? .....	178
1.1 Configuration .....	179
1.2 Standardization.....	179
1.3 Isolation .....	179
2 WHAT IS DOCKER? .....	180
3 WHAT IS KUBERNETES?.....	181
3.1 Clusters .....	182
3.2 Nodes.....	183
3.3 Pods .....	183
3.4 Services.....	185
4 WHAT IS KUBERNETES ENGINE? .....	185
5 INTERACTING WITH KUBERNETES ENGINE .....	186

5.1 Defining your application .....	186
5.2 Running your container locally .....	188
5.3 Deploying to your container registry .....	191
5.4 Setting up your Kubernetes Engine cluster .....	193
5.5 Deploying your application .....	194
5.6 Replicating your application .....	196
5.7 Using the Kubernetes UI .....	198
6 MAINTAINING YOUR CLUSTER .....	200
6.1 Upgrading the Kubernetes master node .....	201
6.2 Upgrading cluster nodes .....	203
6.3 Resizing your cluster .....	205
7 UNDERSTANDING PRICING .....	206
8 WHEN SHOULD I USE KUBERNETES ENGINE? .....	206
8.1 Flexibility .....	207
8.2 Complexity .....	207
8.3 Performance .....	207
8.4 Cost .....	207
8.5 Overall .....	208
8.6 To-Do List .....	208
8.7 E*Exchange .....	208
8.8 InstaSnap .....	209
9 SUMMARY .....	210
TABLE: SIMILARITY TO SERVICES BY OTHER CLOUD SERVICE PROVIDERS .....	211
<b>CHAPTER: NETWORKING IN GCP .....</b>	<b>212</b>
1 WHY GCP'S NETWORKING MODEL IS UNIQUE .....	213
2 VPC NETWORKS AND SUBNETS .....	215
3 THE DEFAULT VPC .....	217
4 INTERNAL AND EXTERNAL IP ADDRESSES .....	218
Advantages Of Communication On Internal IP Addresses: .....	219
Cost: .....	219
Security: .....	219
Latency: .....	219

2 Features To Consider .....	219
I. VPC peering: .....	219
II. Shared VPC: .....	220
5 VPN AND CLOUD ROUTER .....	220
6 WORKING WITH VPCS .....	221
7 WORKING WITH CUSTOM SUBNETS .....	224
8 WORKING WITH FIREWALL RULES .....	226
How To Create And Manage Custom Firewall Rules:.....	227
Steps For Creating A Firewall Rule Using A Web Console.....	228
<b>CHAPTER: SECURITY ON THE GCP .....</b>	<b>231</b>
1 SECURITY FEATURES AT GOOGLE AND ON THE GCP .....	232
Data center physical security .....	232
Custom hardware and trusted booting.....	232
Data disposal.....	233
Data encryption .....	233
Secure service deployment.....	235
This secure service deployment is based on three attributes:.....	235
I. Identity:.....	235
II. Integrity:.....	235
III. Isolation:.....	235
Secure interservice communication .....	235
Using Google Front End .....	236
In-built DDoS protections.....	236
Insider risk and intrusion detection .....	237
2 GOOGLE-PROVIDED TOOLS AND OPTIONS FOR SECURITY.....	237
Data encryption options .....	237
Customer-managed encryption keys (CMEK) using Cloud KMS .....	237
Customer-supplied encryption keys (CSEK) .....	237
Cloud security scanner.....	238
3 SOME SECURITY BEST PRACTICES.....	238
4 BEYONDCORP – IDENTITY-AWARE PROXY .....	239

<b>CHAPTER: EFFECTIVE USE OF GCP .....</b>	<b>240</b>
1 Eat the Kubernetes frog .....	240
2 Careful that you don't get nickel-and-dimed .....	241
3 Pay for what you allocate not what you use .....	242
4 Make friends with the gsuite admins .....	242
5 Try to find reasons to use network peering .....	243
6 Understand how sustained use discounts work.....	243
7 Read the fine print on GCS pricing .....	243
Keep In Mind:.....	244
Access charges on nearline and coldline buckets:.....	244
Class A and Class B operations: .....	244
8 Use BigQuery unless you have a specific reason not to .....	244
9 Use pre-emptible instances in your Dataproc clusters .....	245
10 Keep your Dataproc clusters stateless .....	245
11 Understand the unified architecture for batch and stream .....	246
12 Understand the main choices for ML applications.....	247
13 Understand the differences between snapshots and images .....	248
14 Don't be Milton! .....	248
 <b>CHAPTER: GOOGLE CLOUD CERTIFICATION .....</b>	 <b>249</b>
WHY GET GOOGLE CLOUD CERTIFIED .....	249
WHICH GOOGLE CLOUD CERTIFICATION IS RIGHT FOR YOU?.....	249
Associate certification.....	250
Professional certification .....	250
User certification.....	250
 <b>INDEX .....</b>	 <b>252</b>
 <b>REFERENCES.....</b>	 <b>253</b>

## FOREWORD

### WHY GOOGLE WEB LINKS

- ✓ [Choosing Google Cloud](#)
- ✓ [Trust and security](#)
- ✓ [Open cloud](#)
- ✓ [Global infrastructure](#)
- ✓ [Customers and case studies](#)
- ✓ [Analyst reports](#)
- ✓ [Whitepapers](#)

## GOOGLE CLOUD PRODUCTS

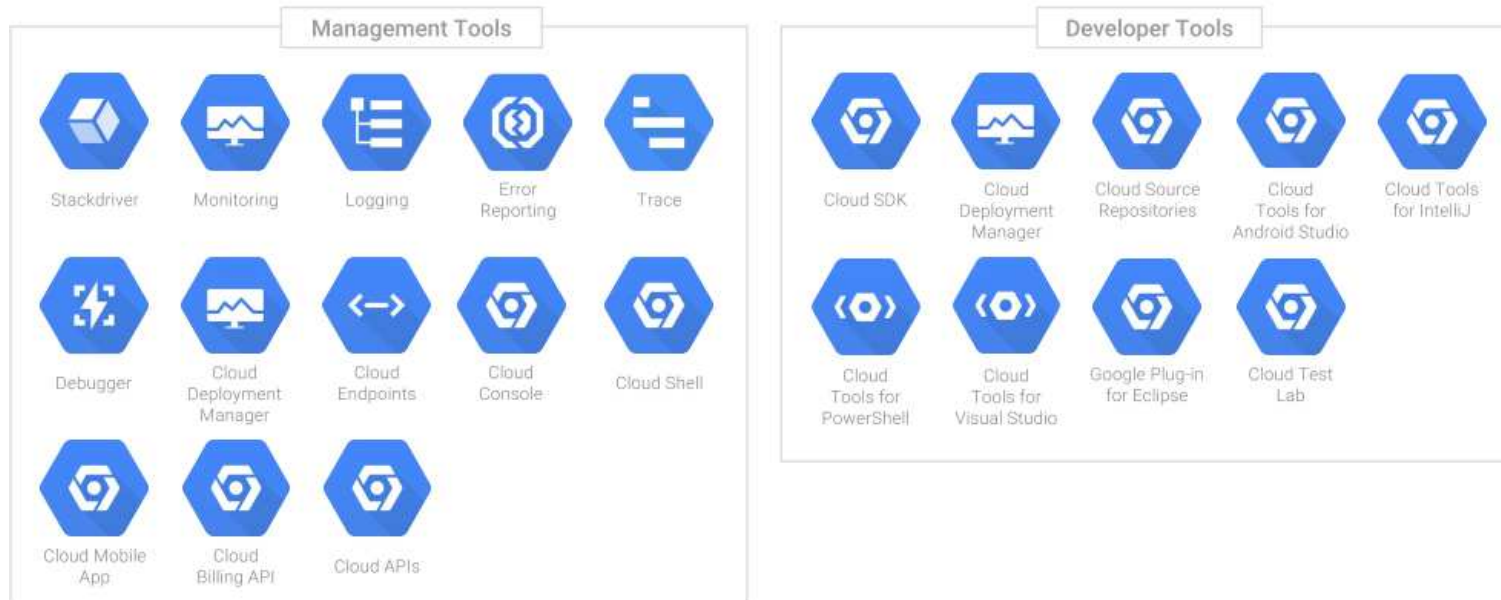
# More than 60 Google Cloud Platform services

The image displays 60 Google Cloud Platform services organized into six categories, each with a title and a grid of icons:

- Compute:** Compute Engine, App Engine, Container Engine, Container Registry, Cloud Functions.
- Storage and Databases:** Cloud Storage, Cloud Bigtable, Cloud Datastore, Cloud SQL, Cloud Spanner, Persistent Disk.
- Networking:** Virtual Private Cloud, Cloud Load Balancing, Cloud CDN, Cloud Router, External IP, Cloud Interconnect, Cloud DNS, Networking, VPN.
- Big Data:** BigQuery, Cloud Dataflow, Cloud Dataproc, Cloud Datalab, Cloud Pub/Sub, Genomics.
- Machine Learning:** Cloud Machine Learning, Cloud Vision API, Cloud Speech API, Cloud Natural Language API, Cloud Translation API, Cloud Jobs API.
- Identity & Security:** Cloud IAM, Cloud Resource Manager, Cloud Security Scanner, Key Management Service, Firewall, BeyondCorp, Data Loss Prevention, Identity-Aware Proxy, Security Key Enforcement.



# More than 60 Google Cloud Platform services



Saxby R. Salama K. Gibson B. Deep Learning with Google Cloud

## Featured products

### [Compute Engine](#)

Create and deploy scalable, high-performance VMs.

### [Cloud Run](#)

Run stateless containers on a fully managed environment or on Anthos.

### [Anthos](#)

Modernize existing apps and build new apps rapidly in hybrid and multi-cloud environments.

### [Vision AI](#)

Derive insights from images, text, and more using custom or pretrained models.

### [Cloud Storage](#)

Store objects with global edge caching.

### [Cloud SQL](#)

Add MySQL, PostgreSQL, and SQL Server database services to your apps.

### [BigQuery](#)

Understand your data using a fully managed, highly scalable data warehouse with built-in ML.

### [Security key enforcement](#)

Enforce the use of security keys to help prevent account takeovers.

## **AI and Machine Learning**

AI building blocks

### [AutoML](#)

Easily train high-quality, custom ML models.

### [Vision AI](#)

Derive insights from images, text, and more using custom or pretrained models.

### [Video AI](#)

Enable powerful content discovery and engaging video experiences.

### [Cloud Natural Language API](#)

Derive insights from unstructured text.

### [Cloud Translation](#)

Dynamically translate between languages.

### [Text-to-Speech](#)

Convert text to natural-sounding speech using ML.

### [Speech-to-Text](#)

Convert speech to text using the power of ML.

### [Dialogflow](#)

Build engaging voice and text-based conversational interfaces.

### [AutoML Tables \(beta\)](#)

Build and deploy machine learning models on structured data.

### [Cloud Inference API \(alpha\)](#)

Quickly run large-scale correlations over typed time-series datasets.

AI Platform and accelerators

[AI Platform](#)

Build AI applications that run on Google Cloud and on-premises.

[AI Platform Deep Learning VM Images](#)

Deploy VM images that are optimized for data science and ML tasks.

[AI Platform Notebooks \(beta\)](#)

Get enterprise projects running in minutes.

[AI Platform Deep Learning Containers \(beta\)](#)

Take advantage of preconfigured and optimized containers for deep learning environments.

[AI Platform Pipelines \(beta\)](#)

Orchestrate machine learning pipelines using Kubeflow Pipelines and TensorFlow Extended.

[AI Hub \(beta\)](#)

Discover, share, and deploy AI on Google Cloud.

[Cloud GPUs](#)

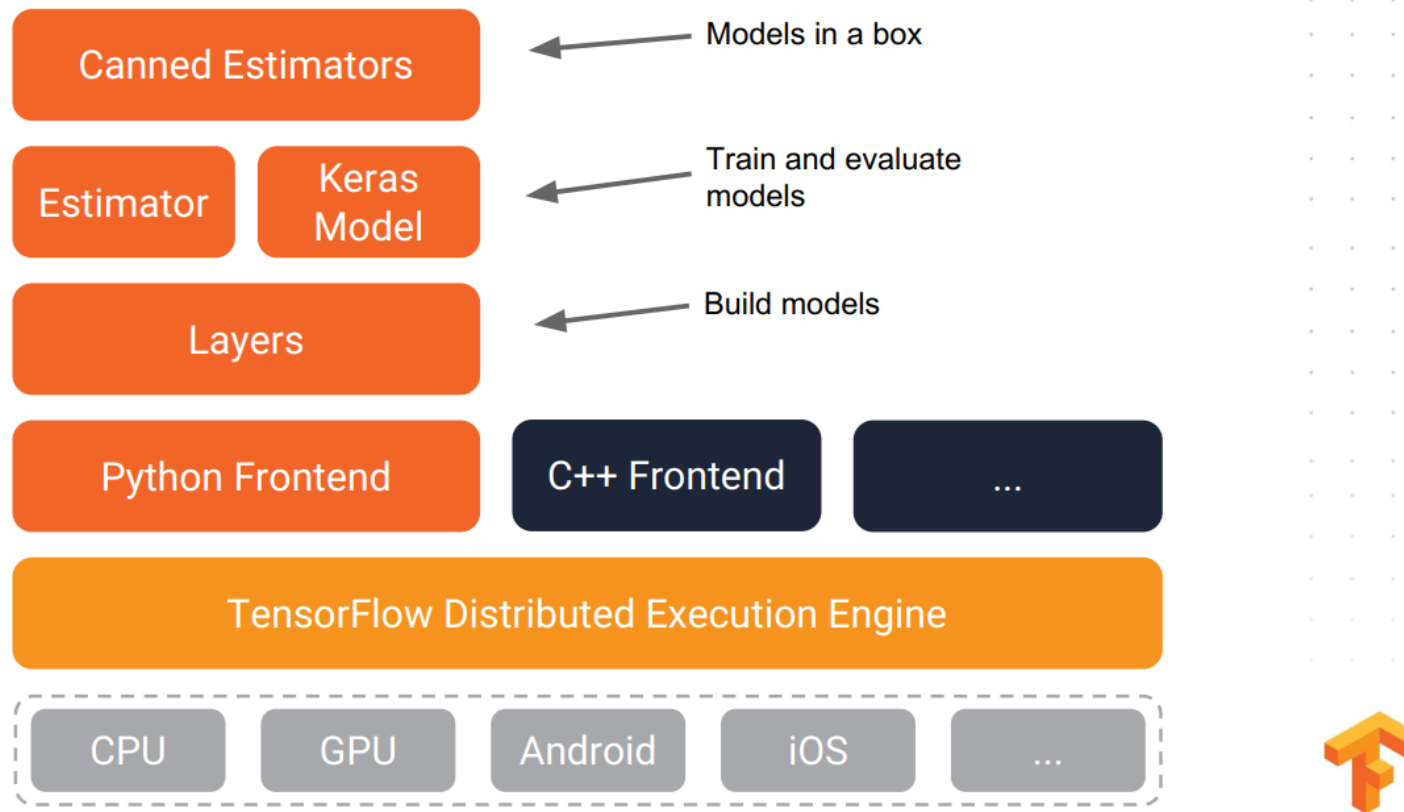
Deploy GPUs for ML, scientific computing, and 3D visualization.

[Cloud TPU](#)

Quickly train and run ML models using custom hardware.

[TensorFlow Enterprise](#)

Accelerate and scale ML workflows on the cloud with compatibility-tested and optimized TensorFlow.



## API Management

### [Apigee API Platform](#)

Develop, secure, deploy, and monitor your APIs everywhere.

### [Cloud Endpoints](#)

Develop, deploy, and manage APIs on Google Cloud.

### [Developer Portal](#)

Create a lightweight portal that enables developers and API teams, using a turnkey self-service platform.

### [Apigee Sense](#)

Add intelligent behavior detection to protect APIs from attacks.

### [API Analytics](#)

Get insight into operational and business metrics for your APIs.

### [API Monetization](#)

Realize value from your APIs with a flexible, easy-to-use solution.

### [Apigee Hybrid](#)

Manage APIs on-premises, on Google Cloud, or in a hybrid environment.

### [Cloud Healthcare API](#)

Help secure APIs that power actionable healthcare insights.

Search all 100+ APIs

### Popular APIs



- Google Cloud APIs**
- Compute Engine API
  - BigQuery API
  - Cloud Storage API
  - Cloud Datastore API
  - Cloud Deployment Manager API
  - Cloud DNS API
  - More



- Google Maps APIs**
- Google Maps Android API
  - Google Maps SDK for iOS
  - Google Maps JavaScript API
  - Google Maps Embed API
  - Google Places API for Android
  - Geocoding API
  - More



- Mobile APIs**
- Cloud Messaging for Android
  - Google Play Game Services
  - Google Play Developer API
  - Google Places API for Android



- Social APIs**
- Google+ API
  - Blogger API
  - Google+ Pages API
  - Google+ Domains API



- Advertising APIs**
- AdSense Management API
  - DCM/DFA Reporting And Trafficking API
  - Ad Exchange Seller API
  - Ad Exchange Buyer API
  - DoubleClick Search API
  - Analytics API



- Other popular APIs**
- Translate API
  - Custom Search API
  - URL Shortener API
  - PageSpeed Insights API
  - Fusion Tables API
  - Web Fonts Developer API

*Subset of APIs available to Google developers*

## Compute

### [Compute Engine](#)

Create and deploy scalable, high-performance VMs.

### [App Engine](#)

Build and deploy apps on a fully managed, highly scalable platform without having to manage the underlying infrastructure.

### [Bare Metal Solution](#)

Providing hardware to run specialized workloads with low latency on Google Cloud.

### [Cloud GPUs](#)

Add GPUs to your workloads for machine learning, scientific computing, and 3D visualization.

### [Migrate for Compute Engine](#)

Migrate servers and VMs from on-premises or another cloud to Compute Engine. (Formerly Velostrata.)

### [Preemptible VMs](#)

Deploy affordable, short-lived compute instances suitable for batch jobs and fault-tolerant workloads.

### [Shielded VMs](#)

Deploy hardened virtual machines on Google Cloud.

### [Sole-tenant nodes](#)

Help meet compliance, licensing, and management needs by keeping your instances physically separated with dedicated hardware.



## Containers

### [Google Kubernetes Engine \(GKE\)](#)

Reliably, efficiently, and securely deploy and scale containerized applications on Kubernetes.

### [Artifact Registry \(beta\)](#)

Store, manage, and secure container images and language packages.

### [Container Registry](#)

Store, manage, and secure your Docker container images.

### [Kubernetes applications on Google Cloud Marketplace](#)

Deploy prebuilt containerized apps.

### [Cloud Build](#)

Continuously build, test, and deploy containers using the Google Cloud infrastructure.

### [AI Platform Deep Learning Containers](#)

Take advantage of containers preconfigured with data science frameworks, libraries, and tools.

### [Batch on GKE \(beta\)](#)

Efficiently run batch jobs using Kubernetes.

## Data Analytics

### [BigQuery](#)

Understand your data using a fully managed, highly scalable data warehouse with built-in ML.

### [Cloud Composer](#)

Create, schedule, monitor, and manage workflows using a fully managed orchestration service built on Apache Airflow.

### [Dataflow](#)

Develop real-time batch and stream data processing pipelines.

### [Cloud Data Fusion](#)

Quickly build and manage data pipelines using fully managed, code-free data integration with a graphical interface.

### [Dataprep by Trifacta](#)

Explore, clean, and prepare data for analysis.

### [Dataproc](#)

Perform batch processing, querying, and streaming using a managed Apache Spark and Hadoop service.

### [Google Data Studio](#)

Tell great data stories to support better business decisions.

### [Pub/Sub](#)

Ingest event streams from anywhere, at any scale.

### [Data Catalog](#)

Discover and understand your data using a fully managed and scalable data discovery and metadata management service.

### [Cloud Life Sciences \(beta\)](#)

Process, analyze, and annotate genomics and biomedical data at scale using containerized workflows.

## Databases

### [Cloud Bigtable](#)

Store terabytes or petabytes of data using a NoSQL wide-column database service.

### [Firestore](#)

Add NoSQL document database access to mobile and web apps.

### [Memorystore](#)

Achieve extreme performance using a managed in-memory data store service.

### [Cloud Spanner](#)

Back your apps with a mission-critical, global-scale, relational database service.

### [Cloud SQL](#)

Add MySQL, PostgreSQL, and SQL Server database services to your apps.

### [Firebase Realtime Database](#)

Store and sync data in real time.

## Developer Tools

### [Artifact Registry \(beta\)](#)

Store, manage, and secure container images and language packages.

### [Cloud SDK](#)

Install a command-line interface to script and manage Google Cloud products from your own computer.

### [Container Registry](#)

Store, manage, and secure your Docker container images.

### [Cloud Code](#)

Extend your IDE with tools to write, debug, and deploy Kubernetes applications.

### [Cloud Build](#)

Continuously build, test, and deploy containers, Java archives, and more using the Google Cloud infrastructure.

### [Cloud Source Repositories](#)

Manage code and extend your Git workflow by connecting to Cloud Build, App Engine, Cloud Logging, Cloud Monitoring, Pub/Sub, and more.

### [Cloud Scheduler](#)

Schedule batch jobs, big data jobs, and cloud infrastructure operations using a fully managed cron job service.

### [Cloud Tasks](#)

Asynchronously execute, dispatch, and deliver distributed tasks.

### [Cloud Code for IntelliJ](#)

Debug production cloud apps inside IntelliJ.

### [Tools for PowerShell](#)

Use PowerShell to script, automate, and manage Windows workloads running on Google Cloud.

### [Tools for Visual Studio](#)

Develop ASP.NET apps in Visual Studio on Google Cloud.

### [Tools for Eclipse](#)

Develop apps in the Eclipse IDE for Google Cloud.

### [Gradle App Engine Plugin](#)

Build your App Engine projects using Gradle.

### [Maven App Engine Plugin](#)

Build and deploy your App Engine projects using Maven.

### [Firebase Test Lab](#)

Test your mobile apps across a wide variety of devices and device configurations.

### [Firebase Crashlytics](#)

Get clear, actionable insight into app issues.

### [Tekton](#)

Create CI/CD-style pipelines using Kubernetes-native building blocks.

### [Workflows](#)

Orchestrate and automate Google Cloud and HTTP-based API services with serverless workflows.

## **Healthcare and Life Sciences**

### [Cloud Healthcare API](#)

Store and access healthcare data in Google Cloud using standards-based data formats and protocols.

### [Cloud Life Sciences \(beta\)](#)

Process, analyze, and annotate genomics and biomedical data at scale using containerized workflows.

## Hybrid and Multi-cloud

### [Anthos](#)

Modernize existing apps, and build new apps rapidly in hybrid and multi-cloud environments, while enabling consistency between on-premises and cloud environments.

### [Anthos deployed on VMware](#)

Modernize existing apps and build new apps on your VMware environments.

### [Anthos GKE](#)

Deploy, manage, and scale containerized applications on Kubernetes, powered by Google Cloud.

### [Anthos Config Management](#)

Automate policy and security at scale for your hybrid Kubernetes deployments.

### [Cloud Run for Anthos](#)

Easily leverage the benefits of combining Kubernetes and serverless.

### [Apigee API Management](#)

Develop, secure, deploy, and monitor your APIs everywhere.

### [Google Cloud Marketplace for Anthos](#)

Easily deploy containerized apps that feature prebuilt deployment templates and consolidated billing.

### [Migrate for Anthos](#)

Migrate VMs from on-premises or other clouds directly into containers in GKE.

### [Operations](#)

Aggregate metrics, logs, and events from your infrastructure to get signals and to speed analysis.

### [Cloud Build](#)

Continuously build, test, and deploy containers, Java archives, and more using the Google Cloud infrastructure.

### [Traffic Director](#)

Deploy global load balancing across clusters and configure sophisticated traffic control policies for open service mesh.

## **Internet of Things (IoT)**

### [IoT Core](#)

Securely connect and manage IoT devices using a fully managed service.

### Edge TPU

Purpose-built ASIC designed to run inference at the edge. As of September 2018, this product is in private beta.

### Cloud IoT Edge

Brings AI to the edge computing layer.

## Management Tools

### [Private Catalog](#)

Control internal enterprise solutions and make them easily discoverable.

### [Cloud Deployment Manager](#)

Manage cloud resources using simple templates.

### [Cloud Console](#)

Manage your Google Cloud resources using a web-based, integrated management console.

### [Cloud Shell](#)

Manage your Google Cloud resources using a command-line interface from any browser.

### [Cost management](#)

Monitor, control, and optimize your costs.

### [Cloud APIs](#)

Manage Google Cloud resources programmatically.

### [Orbitera White-Label Marketplace](#)

Enable customers to find and purchase your solutions.

## Media and Gaming

### [Game Servers](#)

Deliver seamless multiplayer gaming experiences to a global player base.



### [OpenCue](#)

Manage complex media rendering tasks using an open source render manager.

### [Zync Render](#)

Render directly from your 3D modeling tools, quickly and cost efficiently.

### [Anvato](#)

Stream live and on-demand video to any device.

## Migration

### [BigQuery Data Transfer Service](#)

Automate scheduled data movement into BigQuery using a fully managed data import service.

### [Migrate for Compute Engine](#)

Migrate servers and VMs from on-premises or another cloud to Compute Engine. (Formerly Velostrata.)

### [Cloud Storage Transfer Service](#)

Transfer data between cloud storage services such as AWS S3 and Cloud Storage.

### [Migrate for Anthos](#)

Migrate VMs from on-premises or other clouds directly into containers in GKE.

### [Transfer Appliance](#)

Ship large volumes of data to Google Cloud using rackable storage.

## Networking

### [Cloud Armor](#)

Help protect your services against DoS and web attacks.

### [Cloud CDN](#)

Cache your content close to your users using Google's global network.

### [Cloud DNS](#)

Publish and manage your domain names using Google's reliable, resilient, low-latency DNS serving.

### [Cloud Interconnect](#)

Connect your infrastructure to Google Cloud on your terms, from anywhere.

### [Cloud Load Balancing](#)

Scale and distribute app access with high-performance load balancing.

### [Cloud NAT](#)

Provision application instances without public IP addresses while allowing them to access the internet.

### [Cloud Router](#)

Dynamically exchange routes between your Google Cloud Virtual Private Cloud (VPC) network and your on-premises networks using Border Gateway Protocol (BGP).

### [Cloud VPN](#)

Securely extend your on-premises network to Google's network through an IPsec VPN tunnel.

### [Network Intelligence Center](#)

Use a single console for comprehensive network monitoring, verification, and optimization.

### [Network Service Tiers](#)

Optimize your network for performance or cost.

### [Network Telemetry](#)

Track network flows for monitoring, forensics, real-time security analysis, and expense optimization.

### [Traffic Director](#)

Deploy global load balancing across clusters and configure sophisticated traffic control policies for open service mesh.

### [Virtual Private Cloud \(VPC\)](#)

Scale and control how workloads connect regionally and globally.

## **Security and Identity**

### [Security](#)

#### [Access Transparency](#)

Get visibility over your cloud provider through near real-time logs.

#### [Binary Authorization](#)

Deploy only trusted containers on Kubernetes Engine.

#### [Cloud Asset Inventory](#)

View, monitor, and analyze Google Cloud and Anthos assets across projects and services.

#### [Cloud Audit Logs](#)

Gain visibility into who did what, when, and where for all user activity on Google Cloud.

### [Cloud Data Loss Prevention](#)

Discover and redact sensitive data.

### [Cloud HSM](#)

Protect cryptographic keys with a fully managed hardware security module service.

### [Cloud Key Management Service](#)

Manage encryption keys on Google Cloud.

### [Security Command Center](#)

Understand your security and data attack surface.

### [Shielded VMs](#)

Deploy hardened virtual machines on Google Cloud.

### [VPC Service Controls](#)

Protect sensitive data in Google Cloud services using security perimeters.

### [Incident Response and Management \(alpha\)](#)

Improve your incident median time to mitigation.

Identity and Access

### [IAM](#)

Establish fine-grained identity and access management for Google Cloud resources.

### [Cloud Identity](#)

Easily manage user identities, devices, and applications from one console.

### [Identity-Aware Proxy](#)

Use identity and context to guard access to your applications and VMs.

### [Context-Aware Access](#)

Manage access to apps and infrastructure based on a user's identity and context.

### [Identity Platform](#)

Add Google-grade identity and access management to your apps.

### [Managed Service for Microsoft Active Directory \(beta\)](#)

Use a highly available, hardened service running Microsoft Active Directory (AD).

### [Resource Manager](#)

Hierarchically manage resources on Google Cloud.

### [Security key enforcement](#)

Enforce the use of security keys to help prevent account takeovers.

### [Titan Security Keys](#)

Defend against account takeovers from phishing attacks.

User Protection Services

[Phishing Protection](#)

Help protect your users from phishing sites.

[reCAPTCHA Enterprise](#)

Help protect your website from fraudulent activity, spam, and abuse.

[Web Risk](#)

Detect malicious URLs on your website and in client applications.

**Serverless Computing**

[Cloud Run](#)

Run stateless containers on a fully managed environment or on Anthos.

[App Engine](#)

Build and deploy apps on a fully managed, highly scalable platform without having to manage the underlying infrastructure.

[Cloud Functions](#)

Create serverless, single-purpose functions that respond to events.

[Knative](#)

Deploy and manage serverless, cloud-native applications for Kubernetes.

[Workflows](#)

Orchestrate and automate Google Cloud and HTTP-based API services with serverless workflows.

## Storage

### [Cloud Storage](#)

Store objects with global edge caching.

### [Persistent Disk](#)

Add block storage to VM instances.

### [Filestore](#)

Create fully managed, high-performance NFS file servers on Google Cloud.

### [Cloud Storage for Firebase](#)

Add Google-scale object storage and serving to your apps.

## Operations

### [Operations Suite](#)

Monitor, log, trace, and profile your apps and services.

### [Cloud Logging](#)

Store, search, analyze, monitor, and alert on log data and events from Google Cloud and AWS.

### [Cloud Monitoring](#)

Cloud Monitoring provides visibility into the performance, availability, and overall health of cloud-powered applications.

### [Cloud Trace](#)

Find performance bottlenecks in production.

### [Cloud Debugger](#)

Investigate code behavior in production.

### [Cloud Profiler](#)

Continuously gather performance information using a low-impact CPU and heap profiling service.

### [Error Reporting](#)

Identify and understand application errors.

### [Service Level Monitoring](#)

Define and measure availability, performance and other service levels for cloud-powered applications.

## **Other Google Cloud Products**

### [Google Maps Platform](#)

Integrate static and dynamic maps into your apps.

### [Firebase](#)

Rapidly develop mobile apps.

### [Firebase Authentication](#)

Configure authentication for mobile apps.



### [Cloud Functions for Firebase](#)

Add event-driven serverless storage to your mobile apps.

### [G Suite](#)

Create and collaborate using an intelligent app suite.

### [Chrome Enterprise](#)

Use Chrome management policies to meet productivity and security needs.

### [Cloud Storage for Firebase](#)

Add Google-scale object storage and serving to your apps.

### [Firebase Test Lab](#)

Test your mobile apps across a wide variety of devices and device configurations.



**GCP CLOUD PLATFORM URLS TABLE**

Google Cloud Platform	<a href="https://cloud.google.com/">https://cloud.google.com/</a>
GCP Console	<a href="https://console.cloud.google.com/">https://console.cloud.google.com/</a>
GCP App Engine	<a href="https://cloud.google.com/appengine/">https://cloud.google.com/appengine/</a>
Documentation	<a href="https://cloud.google.com/docs/">https://cloud.google.com/docs/</a>
Pricing	<a href="https://cloud.google.com/pricing/">https://cloud.google.com/pricing/</a>
Free Tier	<a href="https://cloud.google.com/free/">https://cloud.google.com/free/</a>
Code Labs	<a href="https://codelabs.developers.google.com/">https://codelabs.developers.google.com/</a>
Qwiklabs	<a href="https://qwiklabs.com/dashboard">https://qwiklabs.com/dashboard</a>
Stackoverflow	<a href="https://stackoverflow.com/">https://stackoverflow.com/</a>

## PRODUCTS PRICING

- [GCP pricing](#)
- [G Suite pricing](#)
- [Maps Platform pricing](#)
- [More products web link](#)

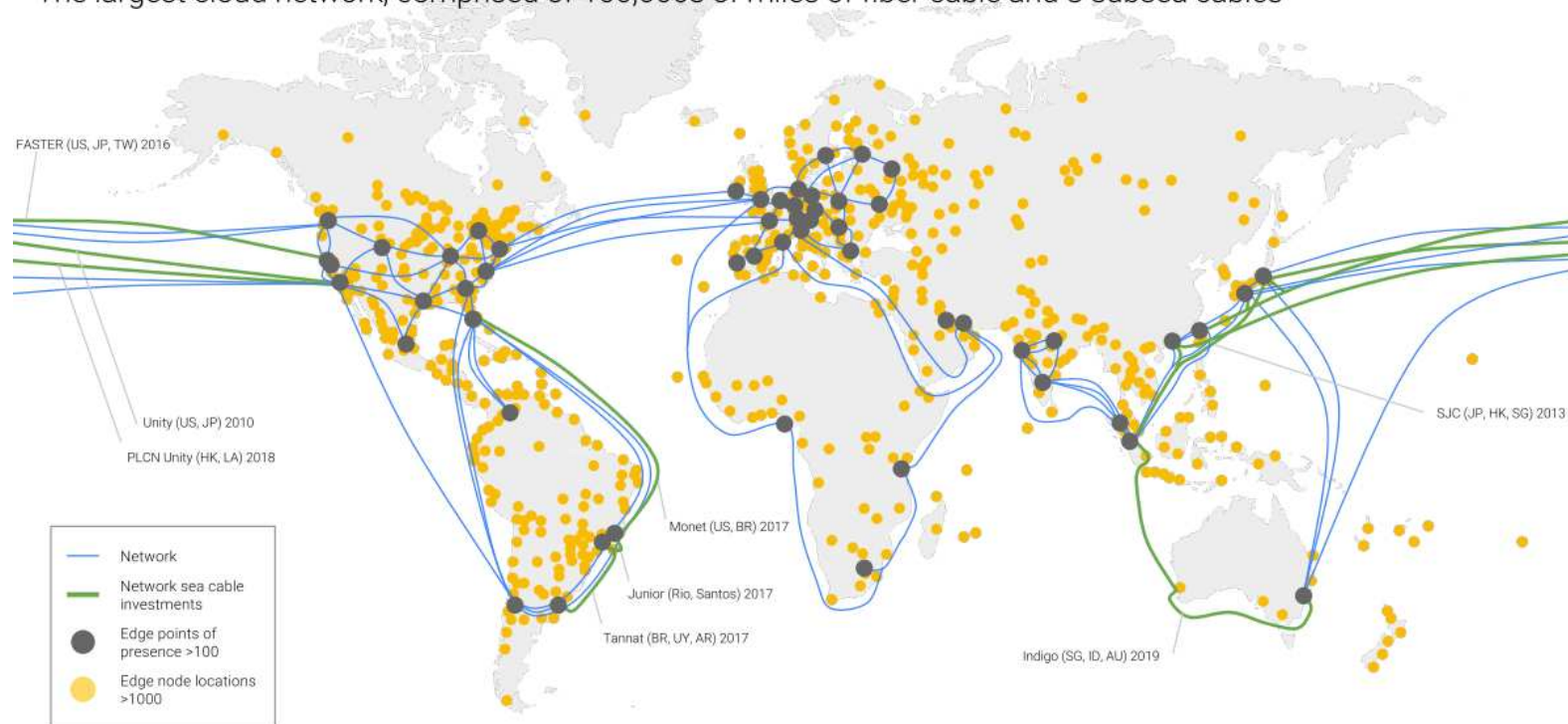
<https://cloud.google.com/>

## GCP NETWORK

Google global secure technical infrastructure designed for information processing

# Google Network

The largest cloud network, comprised of 100,000s of miles of fiber cable and 8 subsea cables



Saxby R. Salama K. Gibson B. Deep Learning with Google Cloud

GCP REGIONS

# GCP Regions

GCP has 10 regions, and is adding 7+ new regions in 2017/2018



Saxby R. Salama K. Gibson B. Deep Learning with Google Cloud

## INDEX

<b>B</b>	
BeyondCorp .....	239
<b>C</b>	
<b>CAPEX</b> .....	242
Cloud security scanner .....	238
container .....	178
Customer-supplied encryption keys (CSEK).....	237
<b>D</b>	
Docker .....	180
<b>E</b>	
<i>ephemeral</i> .....	148
<b>G</b>	
G Suite .....	250
Google Front End (GFE) .....	236
<b>I</b>	
Identity-Aware-Proxy (IAP).....	239
<b>K</b>	
Kubernetes .....	181
<b>L</b>	
LAMP .....	183
<b>O</b>	
<b>OPEX</b> .....	242
<b>P</b>	
<i>Pods</i> .....	183
<b>S</b>	
<i>service</i> .....	185, 235
<b>T</b>	
TCO .....	49, 103
inter-service communication .....	235

## REFERENCES

Geewax. JJ (2018) Google Cloud Platform in Action, by Manning Publications Co., Shelter Island, NY 11964

Srinivasan v., Ravi J., Raj J. (2018) Google Cloud Platform for Architects, Packt Publishing BIRMINGHAM MUMBAI

<https://cloud.google.com/solutions>

Krishnan S. P. T. (14 August 2017) Getting Started with Google Cloud Platform

Saxby R. Salama K. Gibson B. Deep Learning with Google Cloud

"Map AWS services to Google Cloud Platform products". Retrieved 14 April 2017.

"Map Microsoft Azure services to Google Cloud Platform products". Retrieved 14 April 2017.

"Oracle Cloud Infrastructure Service Mapping". Retrieved 13 June 2019.