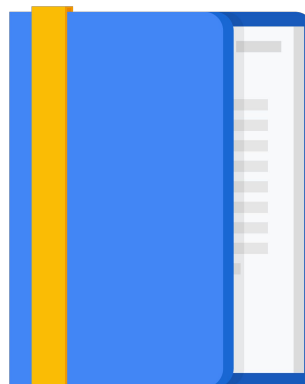# Introduction to Google Cloud

Welcome to 'Introduction to Google Cloud', the first module of this course.

Learn how to ...

Define cloud computing.

Identify Google Cloud's compute services.

Understand regions and zones.

Understand the cloud resource hierarchy.

Administer your Google Cloud resources.

Google Cloud

This first module shares a simple explanation of what cloud computing is, so that we start off with the right framework of concepts.

Here's a quick preview: cloud computing entails resources being provided to you as a service. Google Cloud offers several services that let you run general-purpose compute workloads on Google's hardware, and we will meet them.

Google Cloud has a global footprint. I will explain how Google Cloud's resources around the world are organized into regions and zones.

You can use these resources, but of course it's your job to define policies for what you use. Google Cloud offers a hierarchical structure for organizing your use of cloud resources, and we'll meet it in this module.

Finally, you'll meet the tools that let you connect to Google Cloud and allocate, change, and release resources.
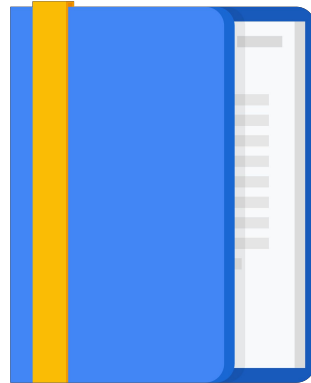
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Agenda

Cloud Computing and Google Cloud

Resource Management

Interacting with Google Cloud

Lab: Accessing the Cloud Console and Cloud Shell

Quiz

Summary

Google Cloud

Let's start by introducing the relationship between cloud computing and Google Cloud.

Cloud computing has five fundamental attributes

On-demand self-service	Broad network access	Resource pooling	Rapid elasticity	Measured service
No human intervention needed to get resources	Access from anywhere	Provider shares resources to customers	Get more resources quickly as needed	Pay only for what you consume

Google Cloud

Cloud computing has five fundamental attributes:

First, computing resources are on-demand and self-service. Cloud-computing customers use an automated interface and get the processing power, storage, and network they need, with no human intervention.

Second, resources are accessible over a network from any location.

Providers allocate resources to customers from a large pool, allowing them to benefit from economies of scale. Customers don't have to know, or care, about the exact physical location of those resources.

Resources are elastic. Customers who need more resources can get them rapidly. And when they need less, they can scale back.

Finally, customers pay only for what they use or reserve, as they go. If they stop using resources, they simply stop paying.

*** Source: According to the definition of cloud computing proposed by the United States National Institute of Standards and Technology.

That's how public clouds such as Google Cloud work. Google Cloud offers a variety of cloud services, and architects and developers like you can choose among them to build your solutions. Many of these cloud services are very familiar, such as virtual machines on demand. Other services represent an entirely new paradigm. One of those services, Google Kubernetes Engine, is the focus of this course. By the way, we informally call the service GKE, and you can too.

Google Cloud offers a range of services

Compute

Compute Engine	Google Kubernetes Engine (GKE)	App Engine	Cloud Functions
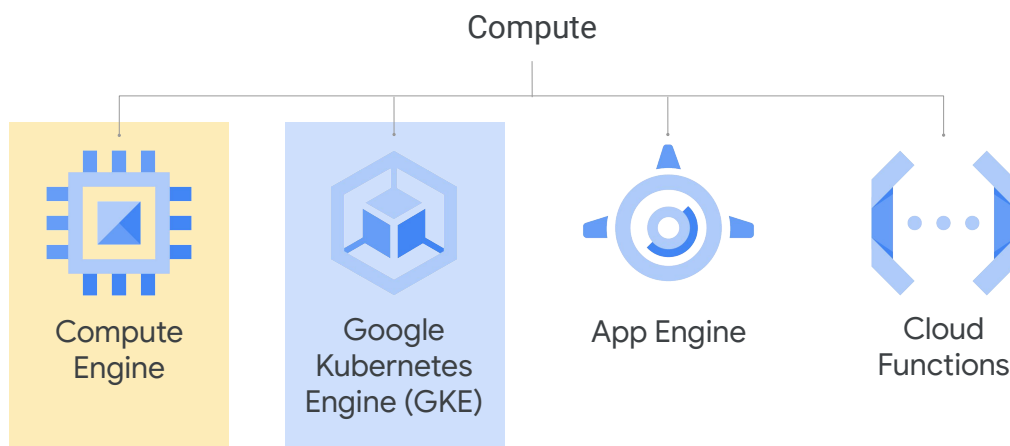
The first thing many people ask of Google Cloud is: "Please run some code in the cloud for me" Google Cloud provides a range of services for doing that, each aimed at satisfying a different set of user preferences. Here's a quick summary of the choices. In a later module we will compare them in more detail.

The service that might be most familiar to newcomers is Compute Engine, which lets you run virtual machines on demand in the cloud. It's Google Cloud's Infrastructure-as-a-Service solution. It provides maximum flexibility for people who prefer to manage server instances themselves.

GKE is different. It lets you run containerized applications on a cloud environment that Google manages for you, under your administrative control. What's a "containerized application"? And what's Kubernetes? We'll learn a lot about those topics later. For now, think of containerization as a way to package code that's designed to be highly portable and to use resources very efficiently. And think of Kubernetes as a way to orchestrate code in containers.
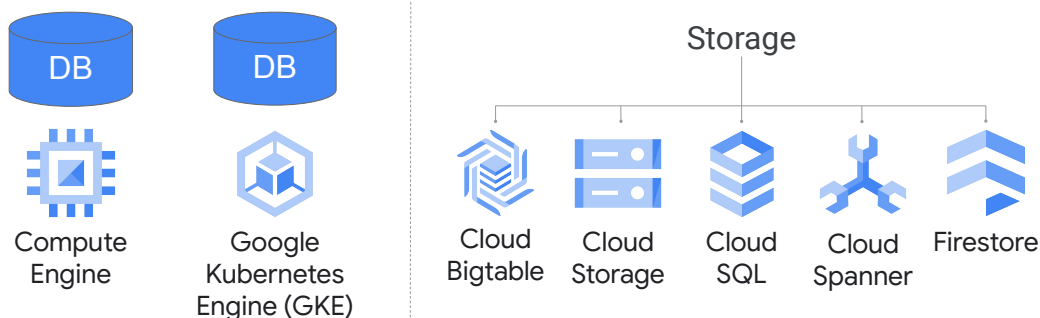
App Engine is Google Cloud's fully managed Platform-as-a-Service framework. That means it's a way to run code in the cloud without having to worry about infrastructure. You just focus on your code, and let Google deal with all the provisioning and resource management. You can learn a lot more about App Engine in the

specialization "Developing Applications in Google Cloud."

Cloud Functions is a completely serverless execution environment, or Functions-as-a-Service. It executes your code in response to events, whether those occur once a day or many times per second. Google scales resources as required, but you only pay for the service while your code runs. The specialization "Developing Applications in Google Cloud" also discusses Cloud Functions.

GKE is our main focus. And GKE is built on top of Compute Engine, so we'll learn more about that service too along the way.
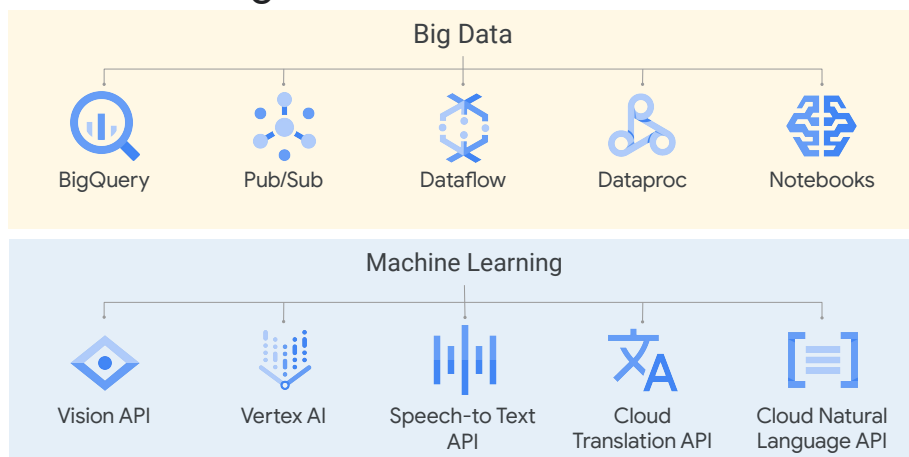
Build your own database solution or use a managed service

DB

DB

Compute
Engine

Google
Kubernetes
Engine (GKE)

Storage

Cloud
Bigtable

Cloud
Storage

Cloud
SQL

Cloud
Spanner

Firestore

Google Cloud

Most applications need a database of some kind. If you've built a cloud application, you can install and run your own database for it on a virtual machine in Compute Engine. You simply start up a virtual machine, install your database engine, and set it up, just like in your data center. Or you can run your own database server in Google Kubernetes Engine too. However, with either approach, you'll have to manage and support the database yourself.

Alternatively, you can use Google's fully managed database and storage services. What all these have in common is that they reduce the work it takes to store all kinds of data. Google Cloud offers relational and non-relational databases, and worldwide object storage.

Google Cloud offers fully managed big data and machine learning services

Big Data

| BigQuery | Pub/Sub | Dataflow | Dataproc | Notebooks |

Machine Learning

| Vision API | Vertex AI | Speech-to Text API | Cloud Translation API | Cloud Natural Language API |

Google Cloud

Just as with storage and database services, you could build and implement these services yourself, and some Google Cloud customers do.

But the fact that they're available as a service means that you can get started faster and deal with a lot less routine work along the way.
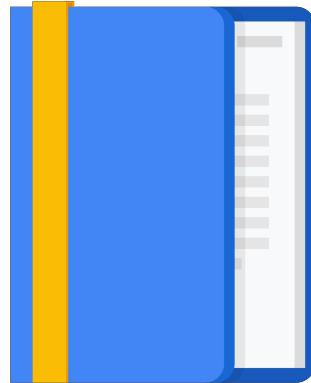
Agenda

Cloud Computing and Google Cloud

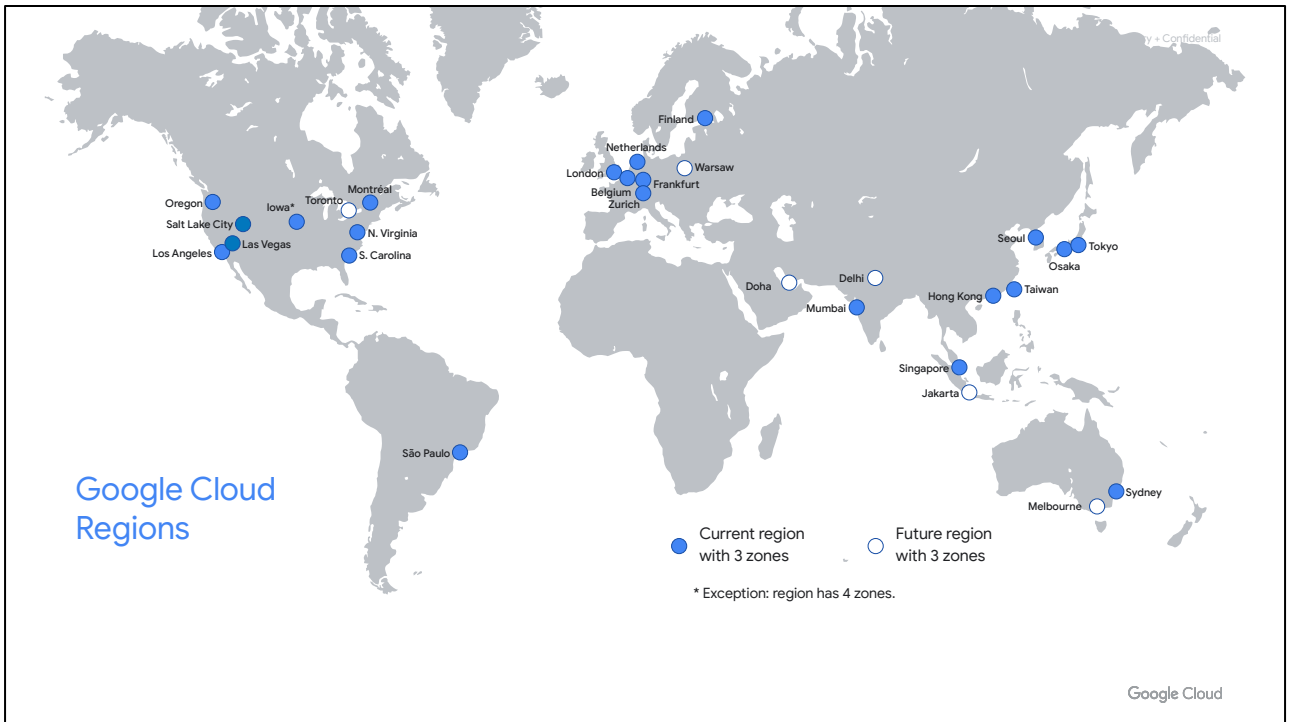Resource Management

Interacting with Google Cloud

Lab: Accessing the Cloud Console and Cloud Shell
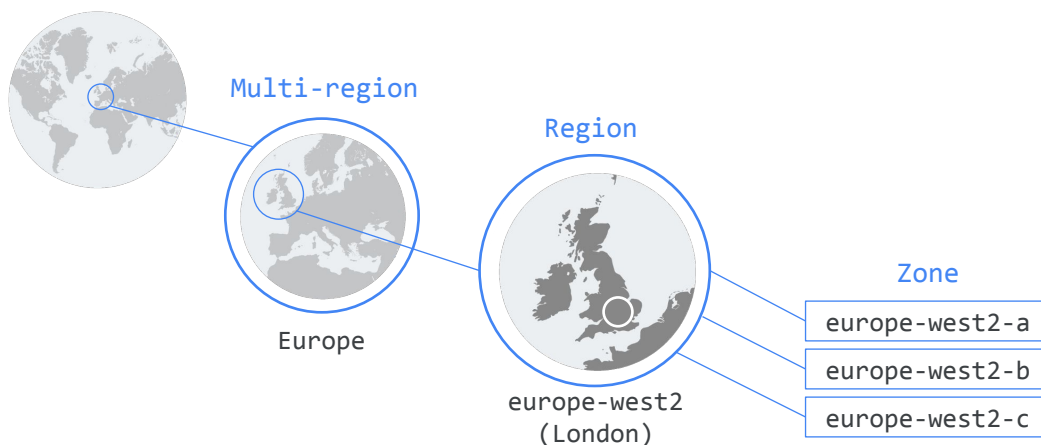
Quiz

Summary

Google Cloud

In this lesson you will learn about the topology of Google Cloud services and how they are distributed geographically in zones, regions and at a global scale. You will also learn how you structure the resources you use hierarchically, using Organizations, folders and projects, to manage your access control and your billing.

Google Cloud
Regions

Oregon
Salt Lake City
Iowa*
Toronto
Montréal
Las Vegas
N. Virginia
Los Angeles
S. Carolina

São Paulo

Finland
Netherlands
London
Warsaw
Belgium
Frankfurt
Zurich

Doha
Delhi
Mumbai

Seoul
Tokyo
Osaka
Hong Kong
Taiwan

Singapore
Jakarta

Melbourne
Sydney

Current region
with 3 zones

Future region
with 3 zones

* Exception: region has 4 zones.

Google Cloud

Behind the services provided by Google Cloud lie a huge range of Google Cloud
resources: physical assets, such as physical servers and hard disk drives; and virtual
resources, such as virtual machines and containers. These resources are managed
by Google within its global data centers. These data centers are located in 18 regions,
55 zones, and more than 100 points of presence across 35 countries.

Google Cloud provides resources in multi-regions, regions, and zones

Multi-region

Region

Zone

Europe

europe-west2
(London)

europe-west2-a

europe-west2-b

europe-west2-c

Google Cloud

It divides the world into three multi-regional areas: the Americas, Europe, and Asia Pacific.

Next, the three multi-regional areas are divided into regions, which are independent geographic areas on the same continent. Within a region, there's fast network connectivity: generally round-trip network latencies of under 1 millisecond (that is, at the 95th percentile).

Finally, regions are divided into zones, which are deployment areas for Google Cloud resources within a focused geographic area. You can think of a zone as a data center within a region, although strictly speaking a zone isn't necessarily a single data center.

We mentioned Compute Engine earlier. Compute Engine virtual-machine instances reside within a specific zone. If that zone became unavailable, so would your virtual machine and the workload running on it. And GKE uses Compute Engine, so your GKE workloads could be affected similarly.

Deploying applications across multiple zones enables fault tolerance and high availability.
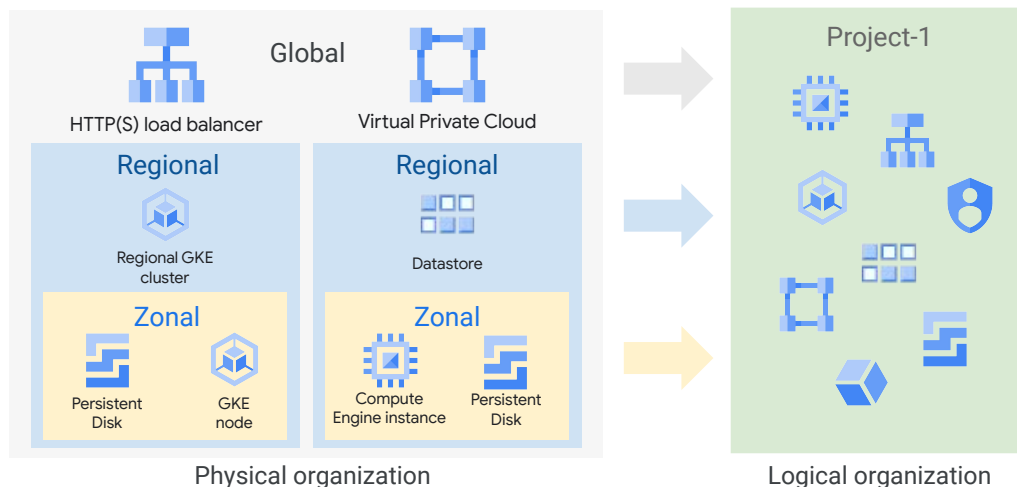
Google Cloud
PoPs and network
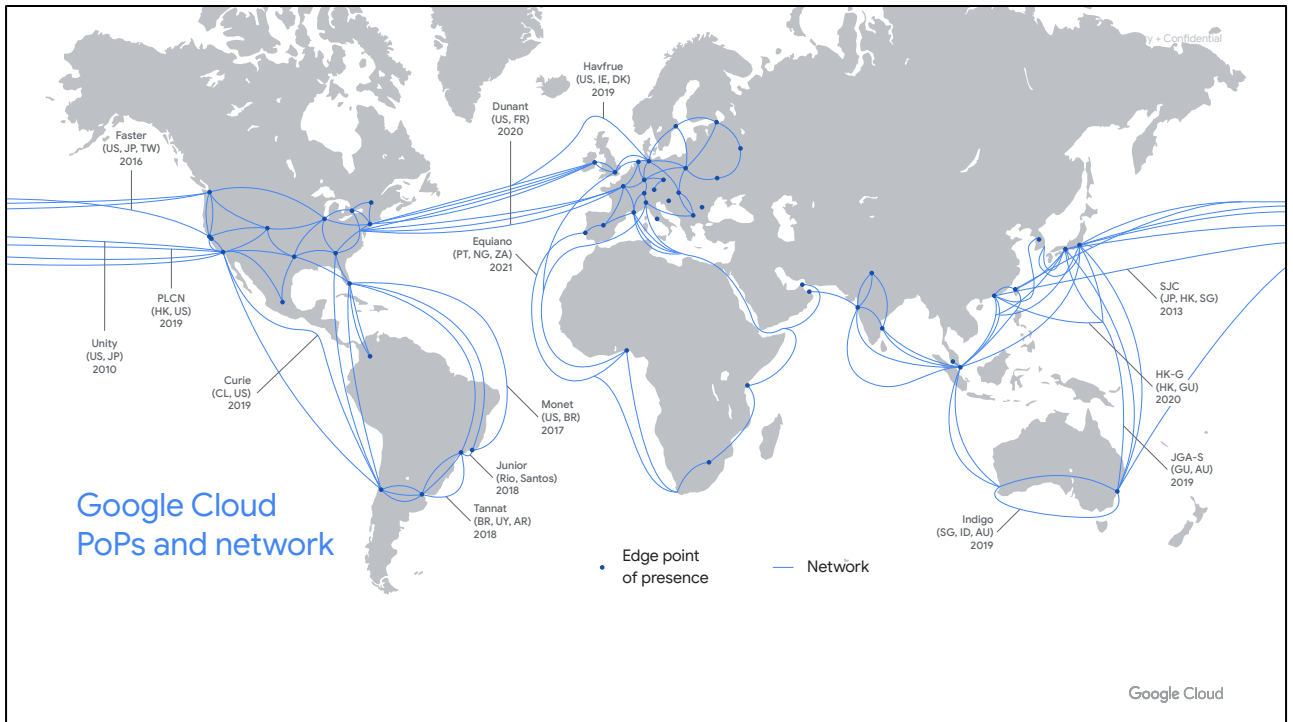
Google's data centers around the world are interconnected by the Google network, which, by some publicly available estimates, carries as much as 40% of the world's internet traffic every day. This is the largest network of its kind on Earth, and it continues to grow.

It's designed to provide the highest possible throughput and the lowest possible latencies for applications, including yours.

The network interconnects with the public internet at more than 90 internet exchanges and more than 100 points of presence worldwide. When an internet user sends traffic to a Google resource, Google responds to the user's request from an Edge Network location that will provide the lowest delay or latency. Google's edge caching network places content close to end users to minimize latency. Your applications in Google Cloud, including those running in GKE, can take advantage of this edge network too.

Resources are organized both physically and logically

Global
HTTP(S) load balancer · Virtual Private Cloud

Regional — Regional GKE cluster
Regional — Datastore

Zonal — Persistent Disk, GKE node
Zonal — Compute Engine instance, Persistent Disk

Physical organization

Project-1

Logical organization

Google Cloud

When you take advantage of Google Cloud services and resources, you get to specify those resources' geographical locations. In many cases you can also specify whether you're doing so on a zonal level, a regional level, or a multi-regional level. Zonal resources operate within a single zone, which means that if a zone becomes unavailable, the resources will not be available either. A simple example would be a Compute Engine virtual machine instance and its persistent disks. GKE has a component called a "node," and these are zonal too.
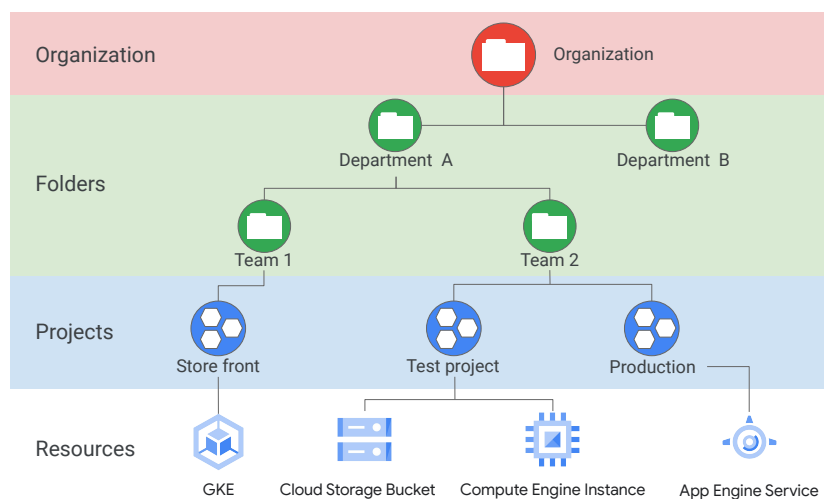
Regional resources operate across multiple zones, but within one region. An application using these resources can be redundantly deployed to improve its availability. Later, you'll learn how to use GKE so that it has resources spread across different zones in a region. Datastore is another Google Cloud service that can be deployed in a similarly redundant way.

Finally, global resources can be managed across multiple regions. These resources can further improve the availability of an application. Examples of such resources include HTTPS load balancers and Virtual Private Cloud networks, which GKE users benefit from too.

The Google Cloud resources you use, no matter where they reside, must belong to a project. So what is a project? A project is the base-level organizing entity for creating and using resources and services and managing billing, APIs, and permissions. Zones and regions *physically* organize the Google Cloud resources you use, and projects *logically* organize them. Projects can be easily created, managed, deleted, or

even recovered from accidental deletions.

Resources have hierarchy

Organization — Organization

Folders — Department A, Department B

Team 1, Team 2

Projects — Store front, Test project, Production

Resources — GKE, Cloud Storage Bucket, Compute Engine Instance, App Engine Service

Google Cloud

Each project is identified by a unique project ID and project number. You can name your project and apply labels for filtering. These labels are changeable, but the project ID and project number remain fixed.

Projects can belong to a "folder" which is another grouping mechanism.

You should use folders to reflect the hierarchy of your enterprise and apply policies at the right levels in your enterprise. You can nest folders inside folders.

For example, you can have a folder for each department, and within each department's folder, you can have subfolders for each of the teams that make it up. Each team's projects belong to its folder.

A single organization owns the folders beneath it.

An organization is the root node of a Google Cloud resource hierarchy. Although you are not required to have an organization to use Google Cloud, organizations are very useful. Organizations let you set policies that apply throughout your enterprise. Also, having an organization is required to use folders.

If you are already a Google Workspace customer, you have an organization already,

and if not, you can get one for free through Google Cloud Identity.

Your organization will have a fixed organization ID and a changeable display name.

The Google Cloud resource hierarchy helps you manage resources across multiple departments and multiple teams within an organization.

You can define a hierarchy that creates trust boundaries and resource isolation. For example, should members of your Human Resources team be able to delete running database servers? And should your engineers be able to delete the database containing employees' salaries? Probably not, in either case.

Cloud Identity and Access Management, also called Cloud IAM, lets you fine-tune access control to all the Google Cloud resources you use. You define Cloud IAM policies that control user access to resources.
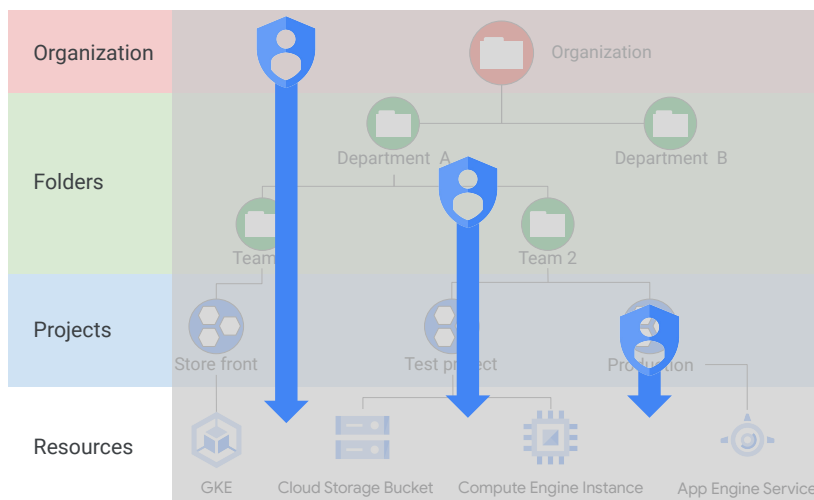
You apply these policies at the level you choose, and those policies inherit downwards. For example, a Cloud IAM policy applied at the organization level will be inherited by a folder, the project, and even the resources beneath it. Additional policies at lower levels of the hierarchy can grant additional permissions.

Resources have hierarchy

Organization — Organization

Folders — Department A, Department B, Team 1, Team 2

Projects — Store front, Test project, Production

Resources — GKE, Cloud Storage Bucket, Compute Engine Instance, App Engine Service
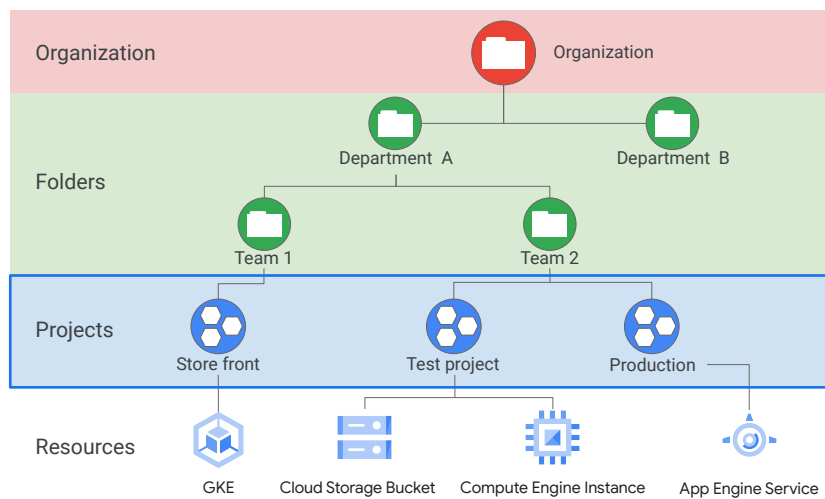
Google Cloud

Billing, on the other hand, accumulates at the project level. Most Google Cloud customers have a resource hierarchy that looks like their employee organization chart, while their project billing looks like their cost-center structure.

How billing works

- Billing account pays for project resources.
- A billing account is linked to one or more projects.
- Charged automatically or invoiced every month or at threshold limit.
- Subaccounts can be used for separate billing for projects.

BigQuery Cloud Storage VMs Cloud Network Cloud APIs
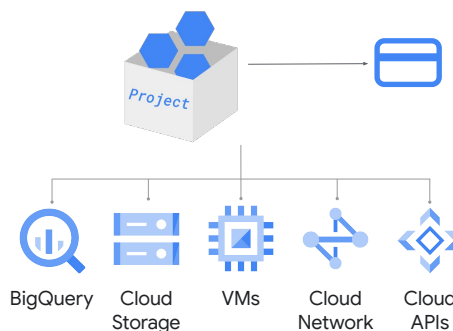
Google Cloud

Billing in Google Cloud is set up at the project level. When you define a Google Cloud project, you link a billing account to it. This billing account is where you will configure all your billing information, including your payment option.

You can link your billing account to one or more projects. Projects that you don't link to any billing account can only use free Google Cloud services.

Your billing account can be charged automatically and invoiced every month, or at every threshold limit.

You can separate project billings by setting up billing subaccounts. Some Google Cloud customers who resell Google Cloud services use subaccounts for each of their own clients.

Resource hierarchy matters because of Google Cloud's shared security model

- Google is responsible for managing its infrastructure security.
- You are responsible for securing your data.
- Google helps you with best practices, templates, products, and solutions.

Responsibility

	On-premises	Infrastructure as a Service	Platform as a Service	Managed services
Content				
Access policies				
Usage				
Deployment				
Web application security				
Identity				
Operations				
Access and authentication				
Network security				
OS, data, and content				
Audit logging				
Network				
Storage and encryption				
Hardware				

🔵 Customer-managed   🟡 Google-managed
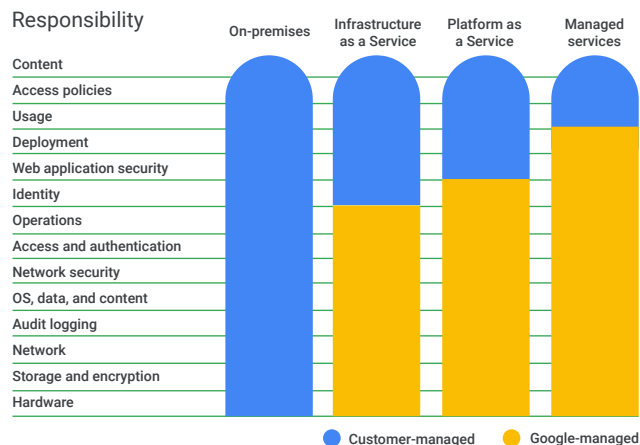
Google Cloud

When you build an application on your on-premises infrastructure, you're responsible for the entire stack's security: from the physical security of the hardware and the premises in which they are housed, through the encryption of the data on disk, the integrity of your network, and all the way up to securing the content stored in those applications.

But when you move an application to Google Cloud, Google handles many of the lower layers of security, like the physical security of the hardware and its premises, the encryption of data on disk, and the integrity of the physical network. Because of its scale, Google can deliver a higher level of security at these layers than most customers could afford on their own.

The upper layers of the security stack, including the securing of data, remain your responsibility. Google provides tools to help you implement the policies you define at these layers. The resource hierarchy we just explored is one of those tools. Cloud IAM is another.

How to keep your billing under control

- Budgets and alerts
- Billing export
- Reports

Google Cloud

You're probably thinking, "How can I make sure I don't accidentally run up a big Google Cloud bill?" Google Cloud provides three tools to help:
- Budgets and alerts,
- Billing export, and,
- Reports.

Budgets and alerts keep your billing under control

Google Cloud

You can define budgets at the billing account level or at the project level.

To be notified when costs approach your budget limit, you can create an alert. For example, with a budget limit of $20,000 and an alert set at 90%, you'll receive a notification alert when your expenses reach $18,000.
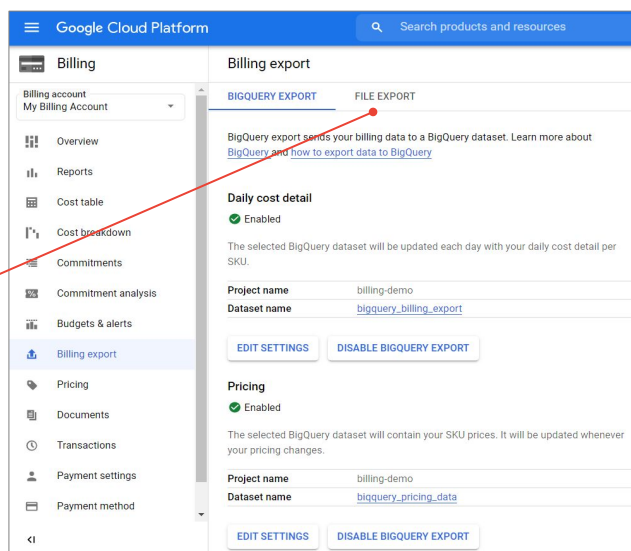
You can also set up a webhook to be called in response to an alert. This webhook can control automation based on billing alerts. For example, you could trigger a script to shut down resources when a billing alert occurs. Or you could use this webhook to file a trouble ticket for your team.

Source:
https://cloud.google.com/solutions/best-practices-for-iam-and-billing-in-higher-education

Billing export allows you to send your billing data to a BigQuery dataset

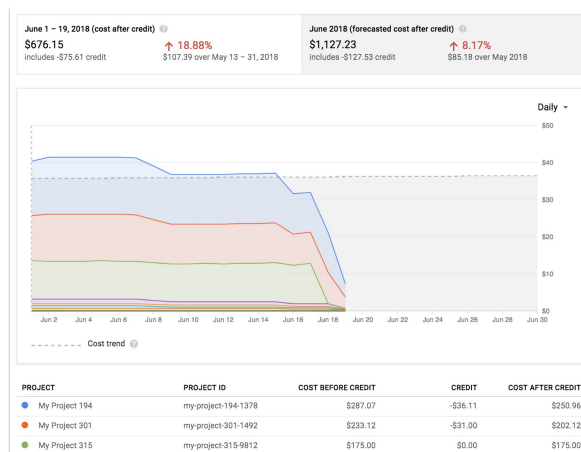File export of billing data to CSV and JSON is deprecated.

Cloud Billing export to BigQuery enables you to export detailed Google Cloud billing data (such as usage, cost estimates, and pricing data) automatically throughout the day to a BigQuery dataset that you specify. Then you can access your Cloud Billing data from BigQuery for detailed analysis, or use a tool like Google Data Studio to visualize your data.

Note that the exporting of Cloud Billing data to a file is now deprecated and available only to existing customers using this feature.

Reports is a visual tool to monitor expenditure

June 1 – 19, 2018 (cost after credit)		June 2018 (forecasted cost after credit)	
$676.15	↑ 18.88%	$1,127.23	↑ 8.17%
includes -$75.61 credit	$107.39 over May 13 – 31, 2018	includes -$127.53 credit	$85.18 over May 2018

Daily ▾

PROJECT	PROJECT ID	COST BEFORE CREDIT	CREDIT	COST AFTER CREDIT
● My Project 194	my-project-194-1378	$287.07	-$36.11	$250.96
● My Project 301	my-project-301-1492	$233.12	-$31.00	$202.12
● My Project 315	my-project-315-9812	$175.00	$0.00	$175.00

Google Cloud

And Reports is a visual tool in the Console that allows you to monitor expenditure based on a project or services.

Source:
https://cloud.google.com/billing/docs/how-to/reports

Quotas are helpful limits

Rate quota
GKE API: 1,000 requests per 100 seconds

Allocation quota
5 networks per project

Many quotas are changeable

Google Cloud

Google Cloud also implements quotas, which limit unforeseen extra billing charges. Quotas are designed to prevent the over-consumption of resources because of an error or a malicious attack.

Quotas apply at the level of the Google Cloud project.

There are two types of quotas: rate quotas and allocation quotas. Rate quotas reset after a specific time. For example, by default, the GKE service implements a quota of 1,000 calls to its API from each Google Cloud project every 100 seconds. After that 100 seconds, the limit is reset. This doesn't limit the rate of calls to your *applications running in GKE*, but, rather, calls to the administrative configuration of your GKE clusters themselves. It would be very unusual to make that many calls in such a short period of time. The quota might well catch and stop erroneous behavior.

Allocation quotas govern the number of resources you can have in your projects. This count doesn't reset at intervals; instead you need to free up resources to stay within them. For example, by default, each Google Cloud project has a quota allowing it no more than 5 Virtual Private Cloud networks.

These quotas are not the same for all projects. Although projects start with the same quotas, you can change some of them by requesting an increase from Google Cloud

Support. Some quotas may increase automatically, based on your use of a product. And you can use the Cloud Console to explicitly lower some of them for your own projects, say, if you want to put a more stringent cap on your consumption.

Finally, some quotas are fixed for all Google Cloud customers. Regardless, in addition to their benefits to customers, Google Cloud quotas also protect the community of Google Cloud users by reducing the risk of unforeseen spikes in usage.
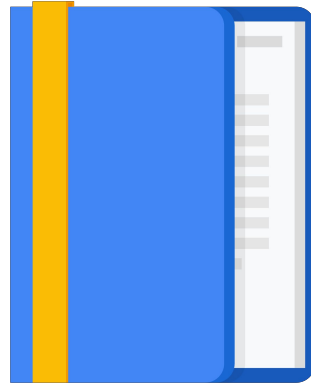
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Google Cloud

This next lesson looks at how you interact with Google Cloud. You'll learn about the Google tools and interfaces that you can use to manage and configure Google Cloud resources.

There are four ways to interact with Google Cloud

Google Cloud Console

Web user interface

Cloud SDK and Cloud Shell

Command-line interface

Cloud Console mobile app

For iOS and Android

REST-based API

For custom applications

The Google Cloud Console, the Cloud Shell and Cloud SDK, the Cloud Console mobile app, and REST-based APIs.

We will not focus very much on these APIs. Developers use them to build applications that allocate and manage Google Cloud resources. But our present focus is on letting Kubernetes manage resources for us.

The Cloud Console

- Web-based GUI to manage all Google Cloud resources.
- Executes common tasks using simple mouse clicks.
- Provides visibility into Google Cloud projects and resources.
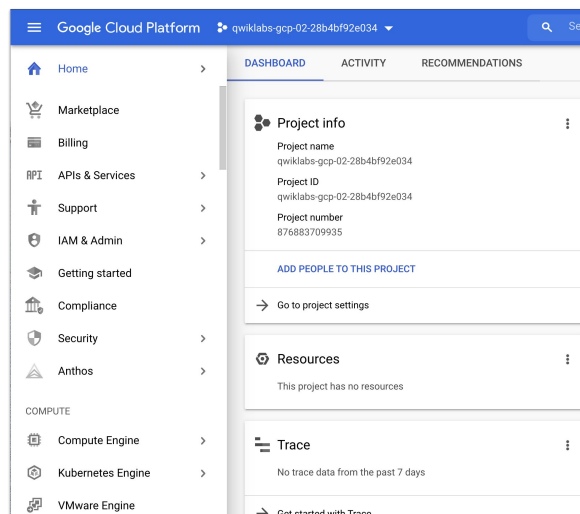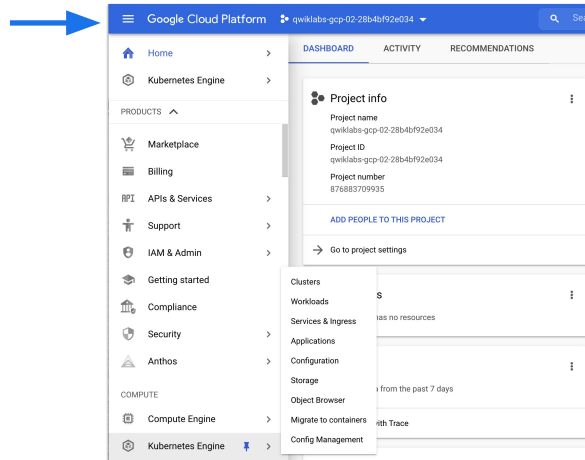

Google Cloud

The Cloud Console is a web-based, graphical user interface from where you manage your Google Cloud resources.

It lets you execute common tasks using simple mouse clicks with no need to remember commands or avoid typos.

It also provides visibility into your Google Cloud project and its resources.

Interacting with the Cloud Console

You can sign in to the Cloud Console from a web browser at console.cloud.google.com. All Google Cloud services are accessible through the simple Navigation Menu button in the top-left corner. You can pin frequently used services to this menu. You'll learn how to use the Cloud Console during an upcoming lab.

The Cloud SDK contains a set of command-line tools for Google Cloud
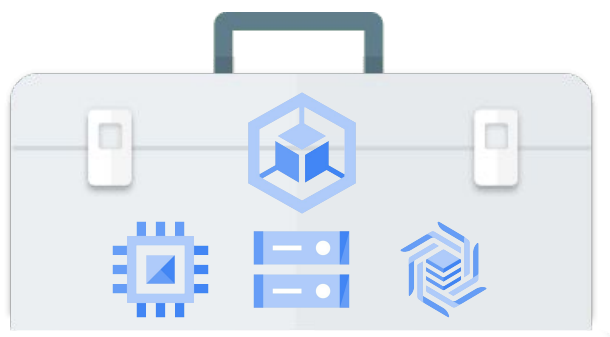
- gcloud
- kubectl
- gsutil
- bq

Alternatively, you can download and install the Cloud SDK onto a computer of your choice. The Cloud SDK contains a set of command-line tools for Google Cloud. Most notably, it contains the gcloud and kubectl commands, which we will use a lot in this course. It also contains the gsutil and bq utilities. You can run these tools interactively, or in your automated scripts. The Cloud SDK contains client libraries for various programming languages too.

Cloud Shell is an alternative to installing the Cloud SDK

- Command-line access to your cloud resources directly from your browser.
- Constant availability of gcloud command-line tool and other utilities.
- Ephemeral Compute Engine virtual machine instance.
- Built-in authorization for access to Cloud Console projects and resources.

Google Cloud

But what if it isn't convenient to install the Cloud SDK on the machine you're working with? Cloud Shell provides command-line access to your cloud resources directly from within your browser.

Using Cloud Shell, you can manage your projects and resources easily without having to install the Cloud SDK or other tools locally. The Cloud SDK gcloud and kubectl command-line tools and other utilities are always available, up to date, and fully authenticated.

So how does Cloud Shell do that? It's built using a docker container running on a Compute Engine virtual machine instance that you're not billed for. Each Google Cloud user has one.

Your Cloud Shell virtual machine is ephemeral, which means that it will be stopped whenever you stop using it interactively, and it'll be restarted when you re-enter Cloud Shell. So you wouldn't want to run a production web server in your Cloud Shell, for example. You also get five gigabytes of persistent disk storage that is reattached for you every time a new Cloud Shell session is started.

It also provides web preview functionality and built-in authorization for access to Cloud Console projects and resources, including your GKE resources.

Cloud Shell Editor is a tool for editing files inside your Cloud Shell environment
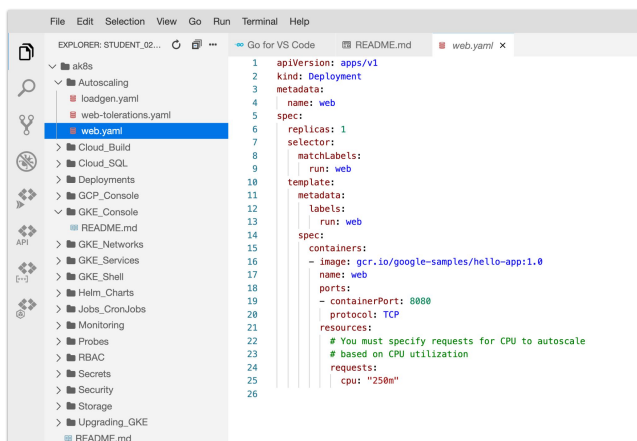
Cloud Shell Editor is a tool for editing files inside your Cloud Shell environment in real time within the web browser. You can also use text editors from the Cloud Shell command prompt.

This tool is extremely convenient when working with code-first applications or container-based workloads, because you can edit files easily without the need to download and upload changes. But is the easy way *always* the best way? Of course not. Later, we'll talk about best management practices.

The Cloud Console and Cloud Shell

Here's a screenshot of the Cloud Console's GKE area, showing you its web-based interface for administering your GKE resources. The bottom third of the screenshot is your Cloud Shell in operation, where you can launch commands to administer those resources as well. Some of those commands are from the Cloud SDK, and others will be specific to your workload. Later in this course, we'll learn about the kubectl command, and you can see it being launched from Cloud Shell here.

Cloud Console mobile app

Start, stop, and SSH into Compute Engine instances.

Get up-to-date billing information and alerts.

Set up customizable graphs, showing key metrics.

GET IT ON
Google Play

Download on the
App Store

Google Cloud
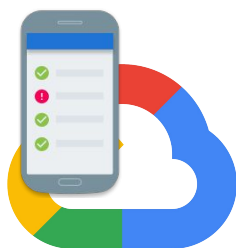
Finally, there's the Cloud Console mobile app, available for iOS and Android. It offers many capabilities, like managing virtual machines, and viewing their logs, getting up-to-date billing information for your projects, and getting billing alerts for projects that are going over budget, and setting up customizable graphs, showing key metrics such as CPU usage, network usage, requests per second, and server errors. We will not use it in this course, but it's a resource you might find convenient, and of course it's at no additional charge.

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Google Cloud

Lab Intro

Accessing the Cloud Console and
Cloud Shell

In this lab, you'll access and become familiar with the Cloud Console. You'll also become familiar with features of the Cloud Shell, including the Cloud Shell code editor.

You'll create buckets, VMs, and service accounts using the Cloud Console and the Cloud Shell and execute several other commands through the Cloud Shell.

Agenda

Cloud Computing and Google Cloud
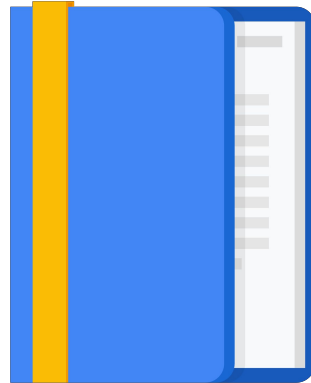
Resource Management

Interacting with Google Cloud

Lab: Accessing the Cloud Console and Cloud Shell

Quiz

Summary

Google Cloud

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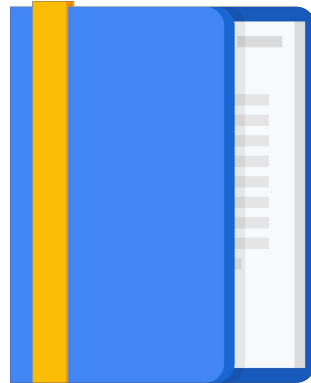
Question #1

Question

Which statements are true about cloud computing? Mark all that are true (2 correct answers).

A. Cloud computing providers dedicate particular physical resources to particular customers.

B. Customers pay for the resources they use or reserve.

C. Customers who need more resources can get them rapidly.

D. Human intervention is required to stop using cloud resources once reserved, and payment continues until the change is confirmed.

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Question #1

Answer

Which statements are true about cloud computing? Mark all that are true (2 correct answers).

A. Cloud computing providers dedicate particular physical resources to particular customers.

B. Customers pay for the resources they use or reserve. ✅

C. Customers who need more resources can get them rapidly. ✅

D. Human intervention is required to stop using cloud resources once reserved, and payment continues until the change is confirmed.

Google Cloud

A: Incorrect.
Feedback: This statement is generally false. Providers allocate resources to customers from a large pool, allowing them to benefit from economies of scale. In some cases, cloud computing customers can arrange for exclusive use of physical resources, but this is an exception rather than the rule.
B: Correct.
C: Correct.
D: Incorrect.
Feedback: This statement is generally false. Cloud computing services provide a way to stop using previously allocated resources without human intervention.

Question #2

Question

Which of these Google Cloud compute services provides environments for execution of code, in which users don't have to worry about infrastructure management? Choose all that are correct (2 correct answers).

A. App Engine

B. Cloud Functions

C. Compute Engine

D. Google Kubernetes Engine

Google Cloud

Question #2

Answer

Which of these Google Cloud compute services provides environments for execution of code, in which users don't have to worry about infrastructure management? Choose all that are correct (2 correct answers).

A. App Engine ✅

B. Cloud Functions ✅

C. Compute Engine

D. Google Kubernetes Engine

A: Correct.
B: Correct.
C: Incorrect.
Compute Engine offers virtual machines in the cloud. You define and manage these virtual machines.
D: Incorrect.
Feedback: That's not correct. Google Kubernetes Engine lets you run containerized applications in the cloud. You define and manage "clusters" (groups of virtual machines) on which your applications run.

Question #3

Question

You are considering deploying a solution using containers on Google Cloud. What Google Cloud solutions are available to you that will provide a managed compute platform with native support for containers?

A. Cloud Functions

B. Compute Engine Autoscaling Groups

C. Container Registry

D. Google Kubernetes Engine Clusters

Question #3

Answer

You are considering deploying a solution using containers on Google Cloud. What Google Cloud solutions are available to you that will provide a managed compute platform with native support for containers?

  A. Cloud Functions

  B. Compute Engine Autoscaling Groups

  C. Container Registry

  D. Google Kubernetes Engine Clusters ✅

A: Incorrect.
Feedback: Review the lesson on Cloud Computing and Google Cloud.
B: Incorrect.
Feedback: Review the lesson on Cloud Computing and Google Cloud.
C: Incorrect.
Feedback: Review the lesson on Cloud Computing and Google Cloud.
D: Correct.

Question #4

Question

One of the key characteristics of cloud computing is the concept of measured service. What is the primary customer benefit of the measured service aspect of cloud computing?

A. Resources can be allocated automatically.

B. You can get more resources as quickly as you need them.

C. You pay only for the resources you consume.

D. You can get more resources as quickly as you need them.

Question #4

Answer

One of the key characteristics of cloud computing is the concept of measured service. What is the primary customer benefit of the measured service aspect of cloud computing?

 A. Resources can be allocated automatically.

 B. You can get more resources as quickly as you need them.

 C. **You pay only for the resources you consume.** ✅

 D. You can get more resources as quickly as you need them.

Google Cloud

A: Incorrect.
Feedback: Review the lesson on Cloud Computing and Google Cloud.
B: Incorrect.
Feedback: Review the lesson on Cloud Computing and Google Cloud.
C: Correct.
D: Incorrect.
Feedback: Review the lesson on Cloud Computing and Google Cloud.

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Question #5

Question

Within which of these Google Cloud geographic scopes are network latencies generally less than 1 millisecond? Choose all that are correct (2 correct answers).

A. Global

B. Multi-Region

C. Region

D. Zone

Question #5

Answer

Within which of these Google Cloud geographic scopes are network latencies generally less than 1 millisecond? Choose all that are correct (2 correct answers).

A. Global

B. Multi-Region

C. Region ✅

D. Zone ✅

A: Incorrect.
Feedback: Latencies are generally less than 1 millisecond within a region.
B: Incorrect.
Feedback: Latencies are generally less than 1 millisecond within a region.
C: Correct.
D: Correct.

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Question #6

Question

What type of resource is a Compute Engine virtual machine?

A. Global

B. Multi-regional

C. Regional

D. Zonal

Question #6

Answer

What type of resource is a Compute Engine virtual machine?

A. Global

B. Multi-regional

C. Regional

D. **Zonal** ✅

A: Incorrect.
Feedback: Compute Engine VMs reside in a zone.
B: Incorrect.
Feedback: Compute Engine VMs reside in a zone.
C: Incorrect.
Feedback: Compute Engine VMs reside in a zone.
D: Correct.

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Question #7

Question

What is the base-level organizing entity for creating and using Google Cloud resources and services?

A. Cluster

B. Folder

C. Project

D. Region

Question #7

Answer

What is the base-level organizing entity for creating and using Google Cloud resources and services?

A. Cluster

B. Folder

C. Project ✅

D. Region

A: Incorrect.
Feedback: The Google Cloud project is your fundamental tool for organizing the Google Cloud resources you use.
B: Incorrect.
Feedback: The Google Cloud project is your fundamental tool for organizing the Google Cloud resources you use.
C: Correct.
D: Incorrect.
Feedback: The Google Cloud project is your fundamental tool for organizing the Google Cloud resources you use.

Question #8

Question

You are ready to start work building an application in Google Cloud. What Cloud IAM hierarchy should you implement for this project?

A. Create a new folder inside your organization and create projects inside that folder for the resources.

B. Create a new organization for the project and create all projects and resources inside the new organization.

C. Create new projects and resources inside departmental folders for the resources needed by the component applications.

D. Create new projects for each of the component applications and create folders inside those for the resources.

Question #8

Answer

You are ready to start work building an application in Google Cloud. What Cloud IAM hierarchy should you implement for this project?

A. **Create a new folder inside your organization and create projects inside that folder for the resources.** ✅

B. Create a new organization for the project and create all projects and resources inside the new organization.

C. Create new projects and resources inside departmental folders for the resources needed by the component applications.

D. Create new projects for each of the component applications and create folders inside those for the resources.

A: Correct.
B: Incorrect.
Feedback: Review the lesson on Resource Management.
C: Incorrect.
Feedback: Review the lesson on Resource Management.
D: Incorrect.
Feedback: Review the lesson on Resource Management.

Question #9

Question

You are developing a new product for a customer and need to implement control structures in Google Cloud to help manage the Google Cloud resources consumed by the product and the billing for the customer account. What steps should you take to manage costs for this product and customer?

A. Configure quotas and limits for the product folders.

B. Configure the billing account at the product folder level in the resource hierarchy.

C. Configure the billing account for each project associated with the product.

D. Set up budgets and alerts at the project folder level for the product.

Question #9

Answer

You are developing a new product for a customer and need to implement control structures in Google Cloud to help manage the Google Cloud resources consumed by the product and the billing for the customer account. What steps should you take to manage costs for this product and customer?

 A. Configure quotas and limits for the product folders.

 B. **Configure the billing account at the product folder level in the resource hierarchy.** ✅

 C. Configure the billing account for each project associated with the product.

 D. Set up budgets and alerts at the project folder level for the product.

A: Incorrect.
Feedback: Review the lesson on Resource Management.
B: Correct.
C: Incorrect.
Feedback: Review the lesson on Resource Management.
D: Incorrect.
Feedback: Review the lesson on Resource Management.

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Question #10

Question

At what level in the Google Cloud resource hierarchy is billing set up?

A. Folder

B. Individual users

C. Organization

D. Project

Question #10

Answer

At what level in the Google Cloud resource hierarchy is billing set up?

A. Folder

B. Individual users

C. Organization

D. **Project** ✅

A: Incorrect.

Feedback: Google Cloud billing is configured on a per-project basis.

B: Incorrect.

Feedback: Google Cloud billing is configured on a per-project basis.

C: Incorrect.

Feedback: Google Cloud billing is configured on a per-project basis.

D: Correct.

Question #11

Question

Which type of quota resets at regular intervals?

A. Allocation quotas

B. Rate quotas

Question #11

Answer

Which type of quota resets at regular intervals?

A. Allocation quotas

B. Rate quotas ✅

A: Incorrect.
B: Correct.

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Question #12

Question

Which of these ways to interact with Google Cloud give you access to the `gcloud` and `kubectl` commands? Choose all that are correct (2 correct answers).

A. Cloud Console mobile app

B. Cloud SDK

C. Cloud Shell

D. Console

Google Cloud

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Question #12

Answer

Which of these ways to interact with Google Cloud give you access to the `gcloud` and `kubectl` commands? Choose all that are correct (2 correct answers).

A. Cloud Console mobile app

B. Cloud SDK ✅

C. Cloud Shell ✅

D. Console

Google Cloud

A: Incorrect.
Feedback: The Cloud Console mobile app does not offer the commands included in Cloud SDK.
B: Correct.
C: Correct.
D: Incorrect.
Feedback: The Console does not give you direct access to the commands included in Cloud SDK, although it does give you an easy way to launch Cloud Shell.

Question #13

Question

You need to write some automated scripts to run periodic updates to the resources in your Google Cloud environment. What tools can you install in your own computers to allow you to run those scripts?

A. The Cloud Console Mobile app

B. The Cloud SDK

C. The Cloud Shell

D. The Google Cloud Console

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Question #13

Answer

You need to write some automated scripts to run periodic updates to the resources in your Google Cloud environment. What tools can you install in your own computers to allow you to run those scripts?

  A. The Cloud Console Mobile app

  B. The Cloud SDK ✅

  C. The Cloud Shell

  D. The Google Cloud Console

A: Incorrect.
Feedback: Review the lesson on Interacting with Google Cloud.
B: Correct.
C: Incorrect.
Feedback: Review the lesson on Interacting with Google Cloud.
D: Incorrect.
Feedback: Review the lesson on Interacting with Google Cloud.
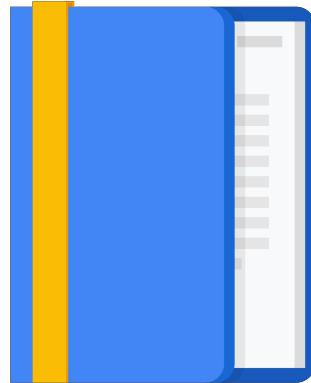
Agenda

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Quiz

Summary

Google Cloud

Summary

Cloud computing means on-demand, pay-as-you-go resources.

Google Cloud offers 4 compute services.

Google Cloud is organized into regions and zones.

The resource hierarchy helps you manage your Google Cloud use.

Use the Cloud Console and the Cloud Shell for access.

Google Cloud

That concludes the 'Introduction to Google Cloud' module. Let me remind you of what you learned.

Cloud computing is a way to organize your use of IT in which a provider gives you on-demand access over the network to resources from a pool they maintain. You pay for what you use or reserve. The provider maintains the infrastructure for you, and you can turn it off when you're done.

Google Cloud offers a lot of different kinds of cloud computing services, including four that run your code for you on hardware Google maintains. In this course, we are focusing on Kubernetes Engine.

All the resources offered by Google Cloud are organized into regions and zones. You can use resources in several zones in a region to increase your application's resiliency.

Google Cloud has a shared security model. You are responsible for defining security policies for your Google Cloud resources, and the cloud resource management hierarchy helps you do that in a manageable way.

Two important tools you can use to administer your use of Google Cloud resources are the Cloud Console and Cloud Shell.