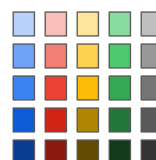


Google Cloud Platform

Introduction to GCP Infrastructure

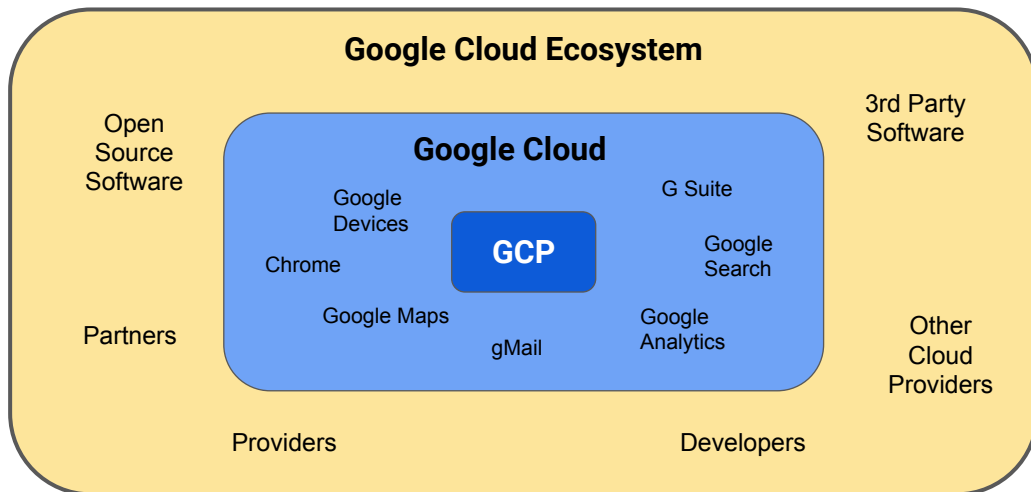
v 1.0



Agenda

- 1 → Google Cloud Platform (GCP) Infrastructure
- 2 → Using GCP
- 3 → Labs
- 4 → Review

Google Cloud Platform

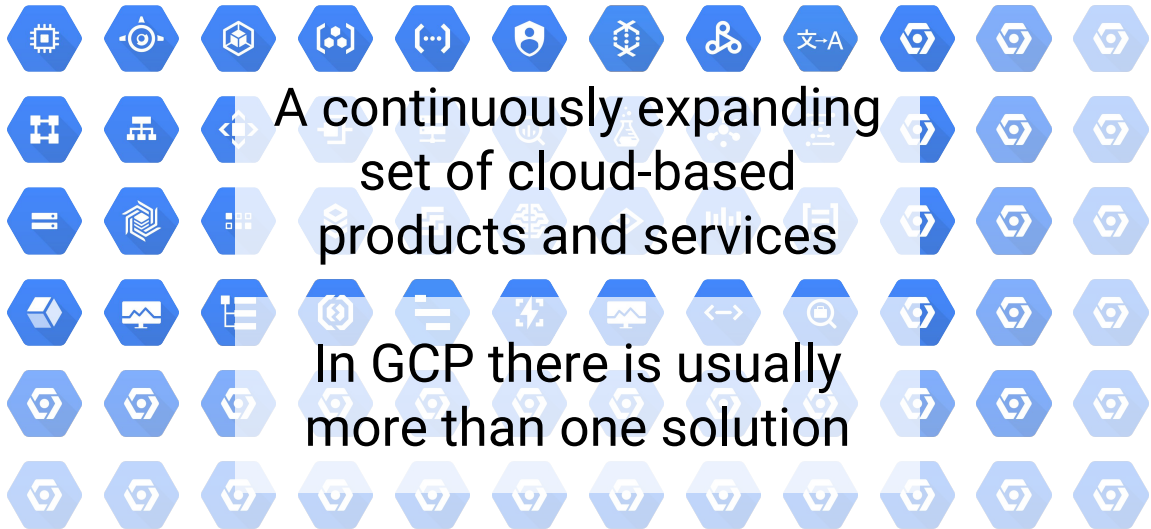


Google Cloud Platform, GCP, is part of Google Cloud, which includes many products and services.

The Google Cloud itself is part of a much larger ecosystem that consists of partners and providers. Google is a strong supporter of open source software and participates with a global community of contributors.

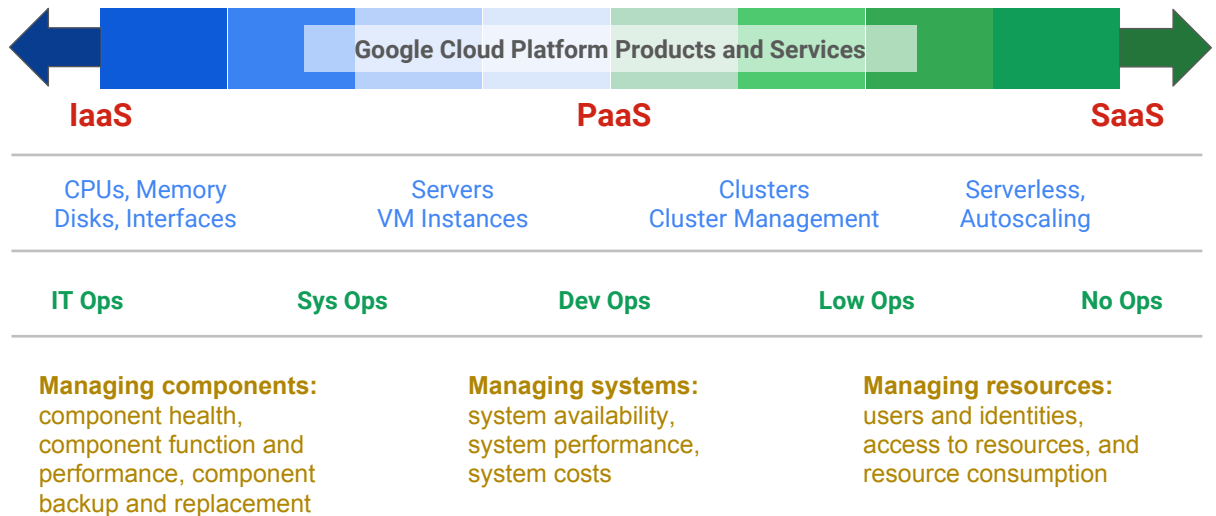
GCP is a computing solution platform that includes Infrastructure, Platform, and Software

GCP is...



Many GCP products and services have a unique blue hexagonal logo. Products without a unique logo are represented by a generic hexagon logo. There are presently between 50 and 100 products in GCP.

Solution Continuum

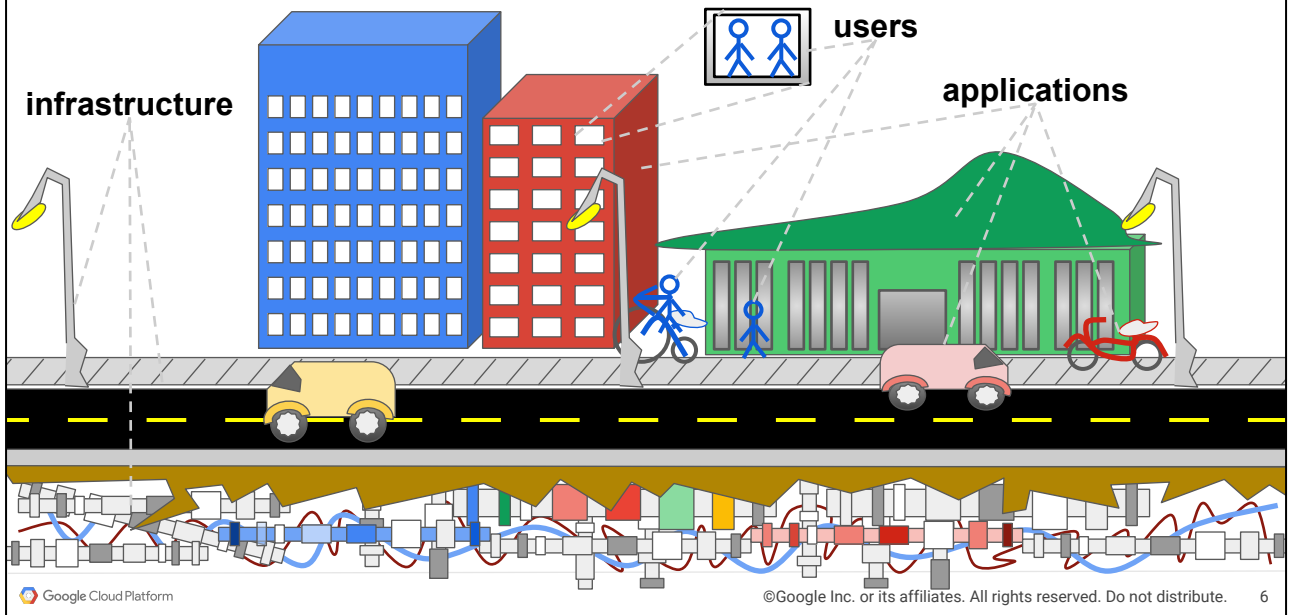


Google Cloud Platform spans from Infrastructure as a Service (IaaS) to Software as a Service (SaaS). You really can build applications on GCP for the web or mobile that are global, autoscaling, assistive, and provide services where the infrastructure is completely invisible to the user. It is not just that Google has opened the infrastructure that powers applications like search, gmail, maps, and G Suite. Google has opened all of the services that make these products possible and packaged them up for your use.

Alternative solutions are possible. For example, you could start up your own VM in GCE, install open source MySQL on it, and run it just like a MySQL database on your own computer in a datacenter. Or, you could use the Cloud SQL service, which provides a MySQL instance and handles rote work like backups and security patching for you, using the same services Google does to automate backups and patches. Or, you could move to a NOSQL database that is autoscaling and serverless so that growth no longer requires adding server instances or possible changing the design to handle the new capacity.

Notice also that each alternative solution on the continuum causes us to be concerned about different objects, which changes the role of the operations staff, and changes the items that are being managed.

Infrastructure analogy



An IT infrastructure is like a "city infrastructure". The infrastructure is the basic underlying framework of fundamental facilities and systems such as transport, communications, power, water, fuel and other essential services. The people in the city are like "users". And the cars and bikes and buildings in the city are like "applications". Everything that goes into creating and supporting those applications/buildings for the users/citizens is the infrastructure.

Our purpose in this class is to explore, as efficiently and clearly as possible, the infrastructure services provided by GCP.

We want you to become familiar enough with the infrastructure services that you will know what the services do and basically how to use them.

By the end of this class you will be prepared to learn anything you need to know to use the Google Cloud Platform.

Architecting GCP: Infrastructure

Essential Infrastructure

- Cloud Virtual Networking
- Virtual Machines
- Cloud IAM
- Data Storage Services
- Resource Management
- Resource Monitoring

Augmented Infrastructure

- Interconnecting Networks
- Load Balancing
- Autoscaling
- Infrastructure Automation with Cloud API
- Infrastructure Automation with Deployment Manager
- Managed Services

Application Infrastructure

- Application Infrastructure Services
- Application Development Services
- Containers

This class is in three parts:

1. Essential Infrastructure - the basic building blocks
2. Augmented Infrastructure - systems built on top of the basics that multiply their power
3. Application Infrastructure - services specifically provided to make it easier to develop applications for your users

Details:

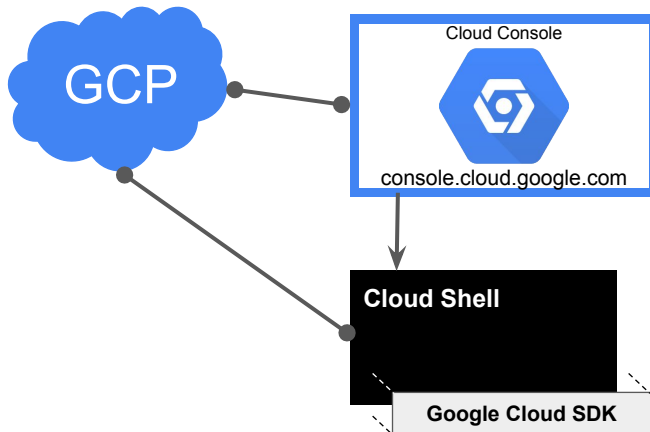
- Essential Infrastructure - the basic technologies and building blocks of all solutions in GCP
- Augmented Infrastructure - building on top of the base infrastructure for leverage, scale, and power
 - Building on top of networking, first connecting networks, then load balancing for high availability
 - Autoscaling is a bridge subject, it creates identical VMs in response to network load ... leading to the topic of Automation
 - Building up from Autoscaling, there are three kinds of automation
 - Programmatic automation using the Cloud API to create objects in GCP - programming in a supported language
 - Deployment Manager automation. A template approach using YAML files, python, and jinja to create objects in GCP.

- Managed services with visibility to servers and clusters
 - Managed services without visibility to servers or clusters (serverless or NoOps)
- Application Infrastructure
 - We don't teach software development in this class, there is a track for that, but we do address the infrastructure services available to developers
 - Infrastructure Services - Services that help you connect the parts of your application together
 - Development Services - Services that help developers create code -- "code first" services
 - Containers - More complexity for greater portability

Agenda

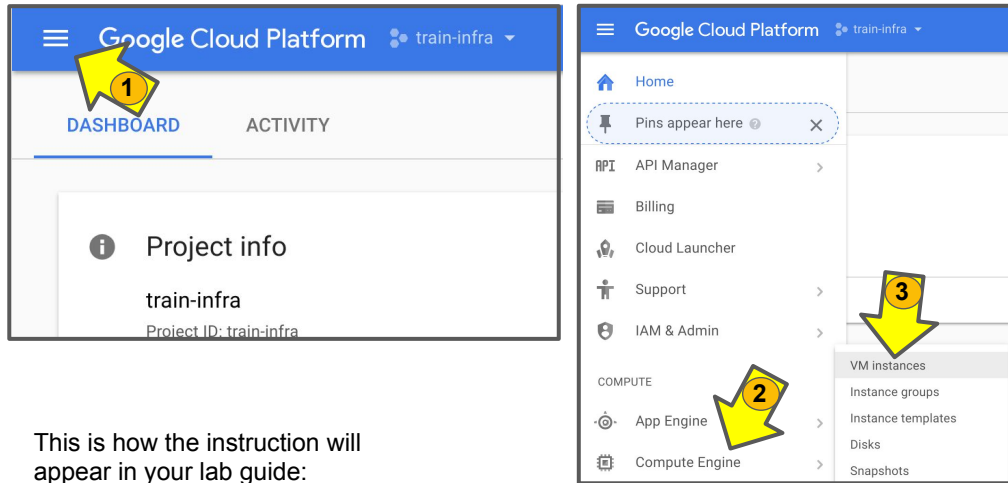
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Console Web UI



- The Web UI comes with a CLI
- The CLI has Google Cloud SDK pre-installed
- Cloud Shell is...
- A tiny *ephemeral* VM
- CLI pre-installed
 - **gcloud**
 - **gsutil**
- SDK APIs pre-installed
- 5GB user data persists
- OS + SW is reconstituted
 - After 30 minutes
 - If there is a connection interruption

Lab conventions: console



This is how the instruction will appear in your lab guide:

Console: **Products and Services > Compute Engine > VM Instances**

You can get to almost any dialog in console with three clicks.

- (1) The three horizontal lines is the "Products and Services" icon. It opens a menu from the side.
- (2) All of the major products and services are listed in the menu. Selecting one usually opens a submenu.
- (3) The submenu contains major sections.

In this example you would be instructed to click on Products and Services, then Compute Engine, and then

Lab conventions: Cloud Shell

Items in black boxes with white type are command line instructions you are to enter into Cloud Shell:

```
gcloud compute list
```

Usually you can cut-and-paste these commands if desired. That's often useful for more complex commands.

An example of what the command output should look like:

Result:

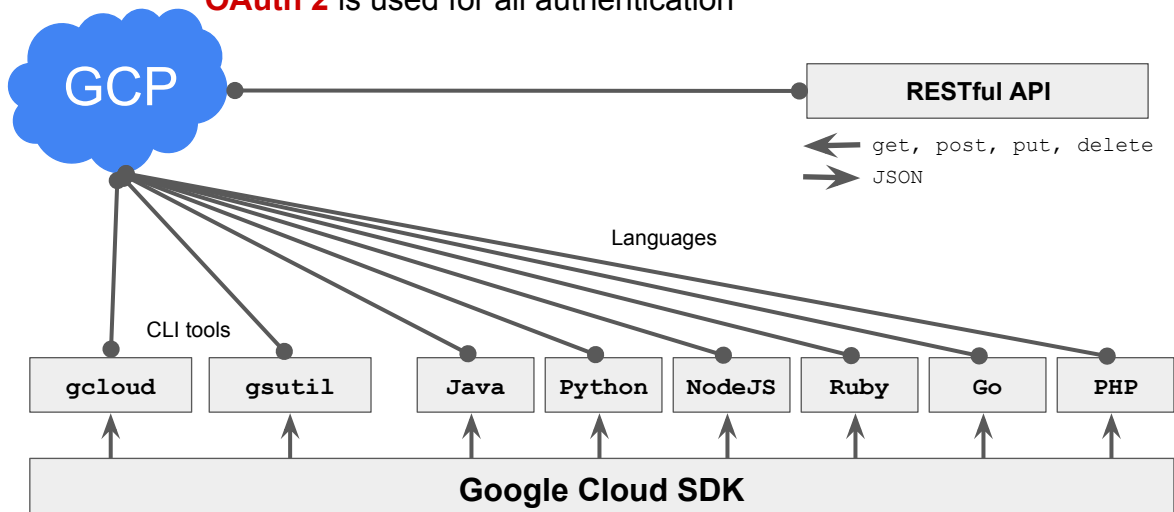
```
username@train-infra: gcloud compute list

Your active configuration is:
[cloudshell-30772]
[component_manager]
disable_update_check = True
[compute]
gce_metadata_read_timeout_sec = 5
[core]
account = tomstern@google.com
check_gce_metadata = False
disable_usage_reporting = False
project = train-infra
[metrics]
environment = devshell

username@train-infra:~$
```

API Interfaces

OAuth 2 is used for all authentication



For historical reasons, gsutil and gcloud are currently separate. gsutil is a python application that uses the SDK to access Google Cloud Storage (GCS) API. gcloud is a command line tool that is the home to all the rest of the GCP API.

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Lab #1 - Console and Cloud Shell

In this lab you will become familiar with the GCP web-based interface including Console, the GUI (graphical user interface) environment, and Cloud Shell, the CLI (command line interface) environment.

You will use the `gcloud` tool and the `gsutil` tool.

Lab #2 - Projects

In this lab you will become familiar with GCP Projects, including how to create them and switch contexts between them.

01-2 Projects

Lab #3 - Infrastructure Preview

In this lab you will use Cloud Launcher to examine some of the powerful infrastructure features available in GCP.

Many of the services that are used automatically in this lab will be explored in detail later in the class.

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Questions ?

More...

- Google Cloud Platform
 - <https://cloud.google.com/>
- Console
 - <https://console.cloud.google.com/>
- Documentation
 - <https://cloud.google.com/docs/>
- Training
 - <https://cloud.google.com/training/>
- Certification
 - <https://cloud.google.com/certification/>

More to learn on this subject. Here are some suggestions and links.

