Google Cloud Platform

Introducing Google Cloud Platform

Google Cloud Platform Fundamentals

V2.1

Timing: Approximately 20 minutes

Agenda

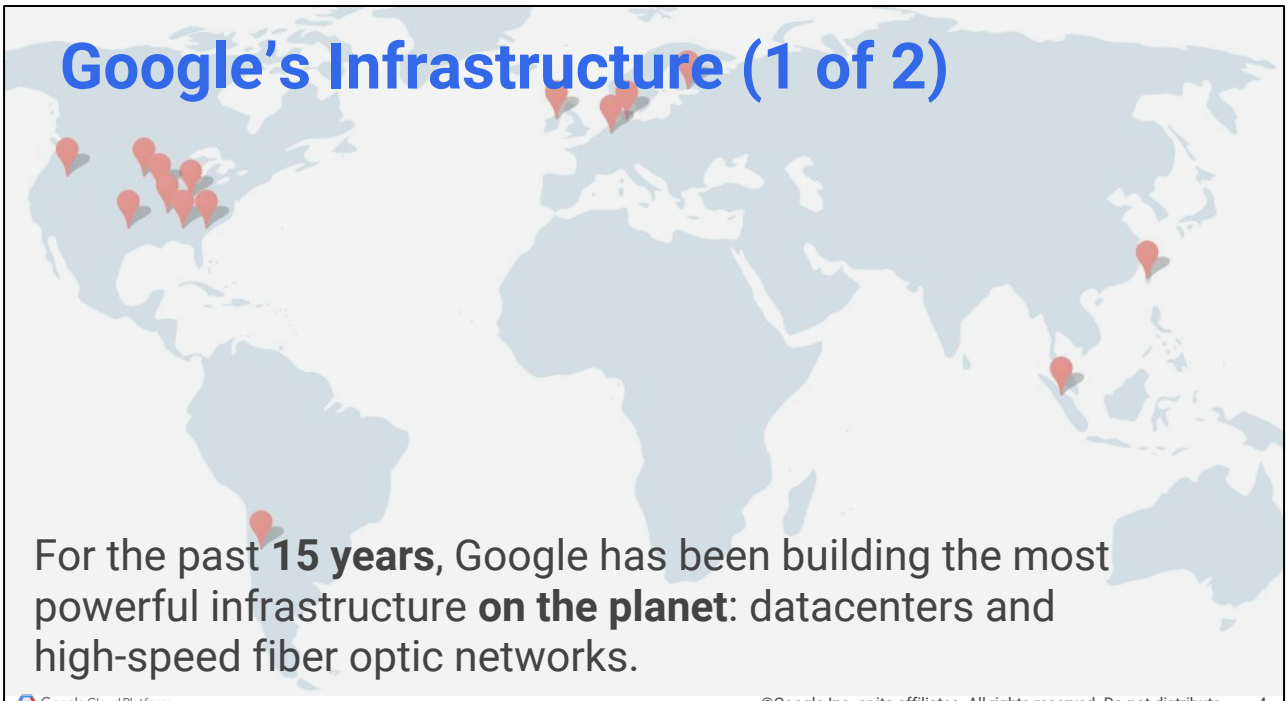
1. Introduction to Google Cloud Platform
2. Quiz & Lab

Why Choose Google Cloud Platform?

Google Cloud Platform enables developers to **build**, **test** and **deploy** applications on Google's *highly-scalable, secure,* and *reliable* infrastructure.

Choose from **computing**, **storage**, **big data/machine learning**, and **application** services for your *web*, *mobile*, *analytics*, and *backend* solutions.

Google's Infrastructure (1 of 2)



For the past **15 years**, Google has been building the most powerful infrastructure **on the planet**: datacenters and high-speed fiber optic networks.

Google's Infrastructure (2 of 2)

Data Centers

Google operates an extensive deployment of high-efficiency backend **data centers** used for **computation** and backend **storage**.

Backbone

Google has built a **global, meshed backbone network** to interconnect their data centers and to deliver traffic to their Edge points of presence (POPs).

Points of Presence

Present at **90+** internet exchanges and at over **100** interconnection facilities around the world.

Edge Caching

Google runs an **edge caching platform** on top of their network infrastructure with edge locations in virtually every country. The caching platform also has elements within ISP and access networks.

Notes:
For more information on Google's Edge Network, see: https://peering.google.com/#/.

Notes:

Regions and zones

Regions are independent geographic areas that consist of zones. Locations within regions tend to have round-trip network latencies of under 5ms on the 95th percentile.

A zone is a deployment area for Cloud Platform resources within a region. Zones should be considered a single failure domain within a region. In order to deploy fault-tolerant applications with high availability, you should deploy your applications across multiple zones in a region to help protect against unexpected failures.

To project against the loss of an entire region due to natural disaster, you should have a disaster recovery plan and know how to bring up your application in the unlikely event that your primary region is lost.
For more information on the specific resources available within each location option, see our Global Data Center Locations.

The Cloud Platform's services and resources can be zonal, regional, or managed by Google across multiple regions. For more information on what these options mean for your data, see geographic management of data.

Zonal resources
Zonal resources operate within a single zone. If a zone becomes unavailable all of the zonal resources in that zone are unavailable until service is restored. An example of a zonal resource is a Google Compute Engine instance that resides within a specific zone.

Regional resources
Regional resources are deployed with redundancy within a region. This gives them higher availability relative to zonal resources.

Multi-regional resources
A few Cloud Platform services are managed by Google to be redundant and distributed within and across regions. These services optimize availability, performance, and resource efficiency. As a result, these services require a trade off on either latency or the consistency model. These trade-offs are documented on a product specific basis. The following services have one or more multi-regional deployments in addition to any regional deployments:

- Google App Engine and its features
- Google Cloud Datastore
- Google Cloud Storage
- Google BigQuery

The data associated with multi-regional resources is not tied to a specific region and can be moved between regions and regions can be added and removed from a region group. For example, buckets in the European Union location for Google Cloud Storage keep data at-rest inside the European Union, but at-rest data can be stored in or moved to any Cloud Storage region within the European Union (subject to terms of service and service specific terms).

Commitment to Environmental Responsibility

Developing our infrastructure while respecting our ecosystem

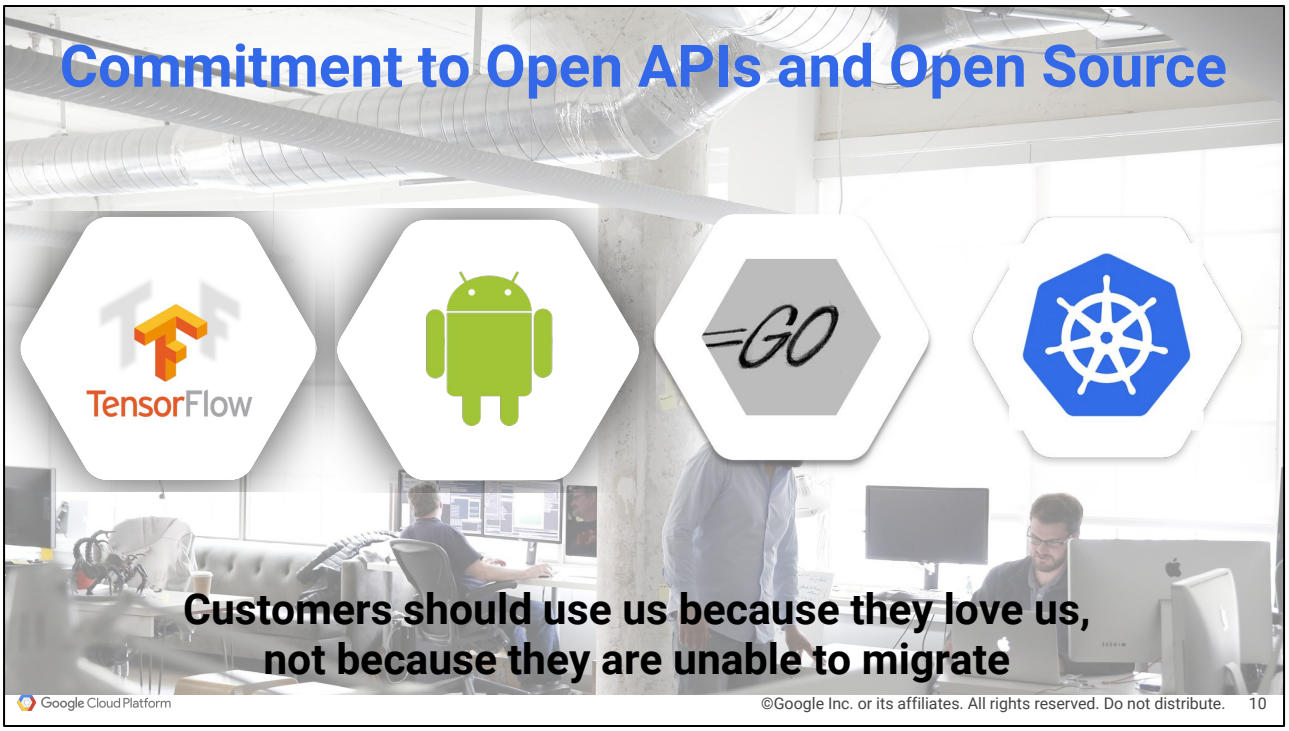
- Pioneering data center efficiency
- Largest private investor in renewables (wind, solar)
- First data centers to receive ISO 14001 certification
- 100% carbon neutral since 2007

Notes:
For more information on Google's datacenters, see:
http://www.google.com/about/datacenters/

Innovative, Customer-Friendly Pricing

- Sub-hour billing
- Sustained-use discounts
  - **Automatically** reward users who run virtual machines for over **25%** of any calendar month
- Compute Engine custom machine types
  - Pay only for the resources you need for your application

Notes:
Try the online pricing calculator to help estimate your costs.

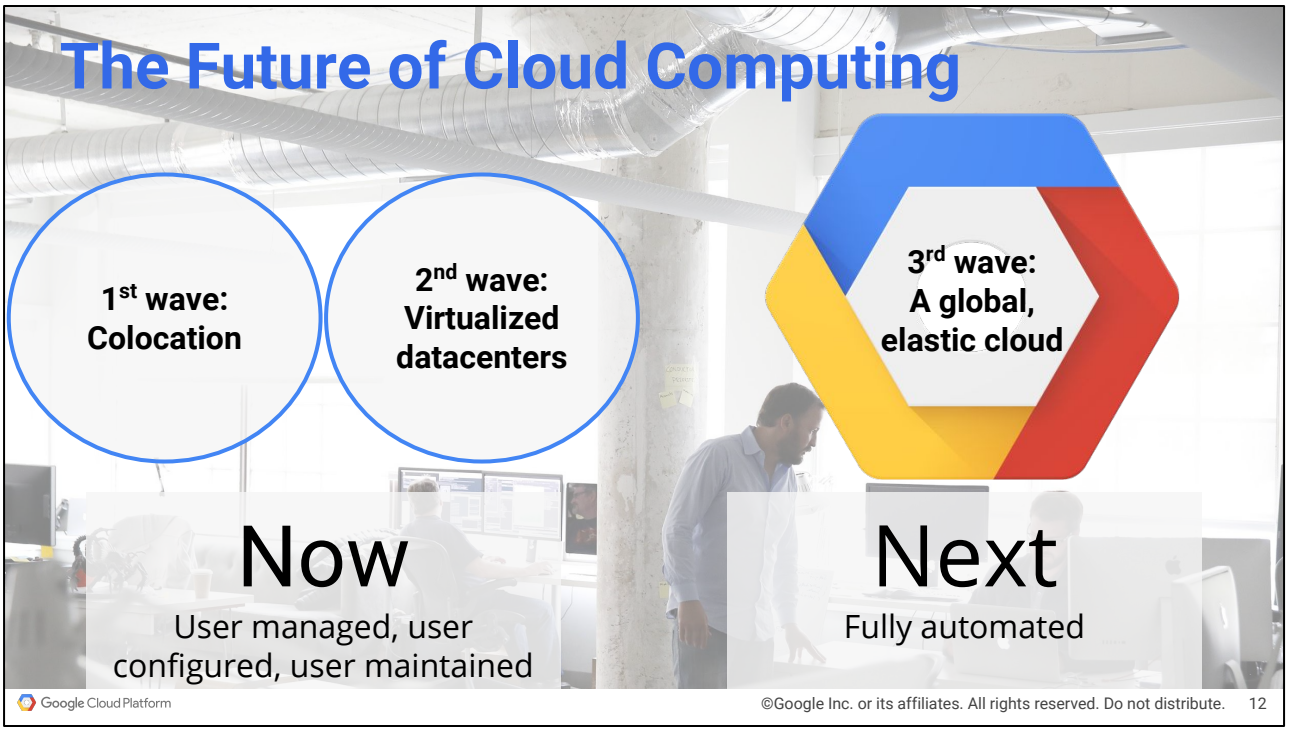


Notes:
Google gives customers the best possible combination of high-performance, value-added services while giving them the ability to run their applications elsewhere if we are no longer the best provider for their needs.

This includes:

- Using Open API's, so that our services are compatible with open source products. One example of this is Google Cloud Bigtable. Bigtable uses the Apache HBase interface which allows customers code portability.
- We publish key elements of our technology using open source licenses, to create ecosystems that provide customers with options other than Google for key technologies. Google believes ecosystems are necessary to support adoption and operationalization. Rather than just adding code, if you focus on key elements such as publishing and nurturing administrative APIs, you encourage the creation of surrounding tools and enablement.
- We constantly publish on our infrastructure innovations.
- Google provides interoperability at multiple layers of the stack. Kubernetes and Google Container Engine give customers the ability to mix and match microservices running across different clouds, and our IT operations tools let customers manage workloads across multiple cloud providers.

Google is committed to moving the IT industry forward and not just our own cloud. This requires a commitment to open innovation.



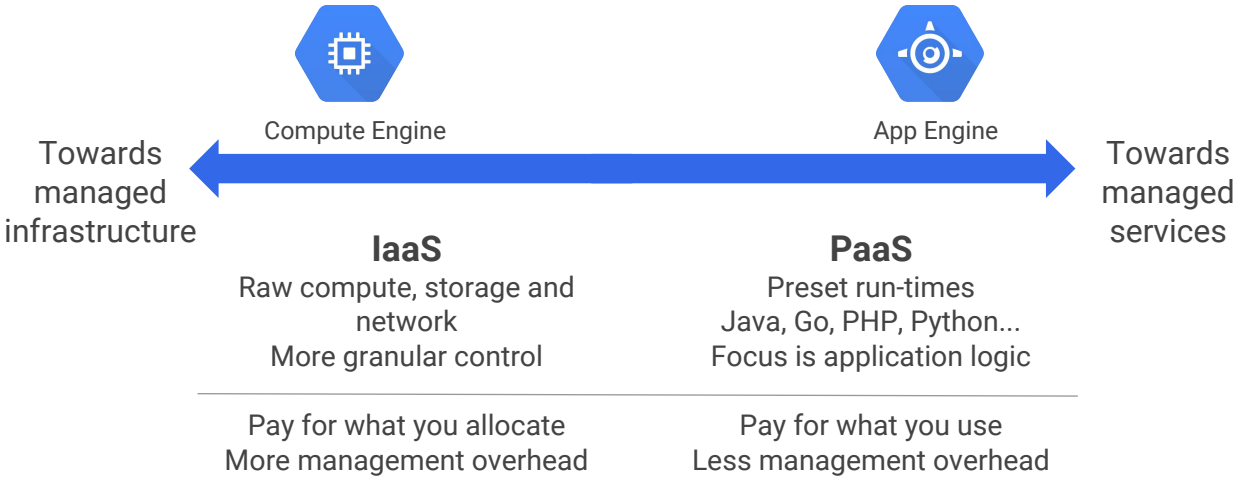
Notes:
The concept of cloud computing began with colocation. Instead of operating your own data center, you rented space in a colocation facility. This was the first wave of outsourcing IT. With colocation, the transfer of ownership was minimal - you still owned the machines and you maintained them. Traditionally, colocation is not thought of as cloud computing, but it did begin the process of transferring IT infrastructure out of your organization.

Today, cloud computing involves virtualized datacenters - virtual machines and APIs. Virtualization provides elasticity. You automate infrastructure procurement instead of purchasing hardware. With virtualization you still maintain the infrastructure. It is still a user-controlled/user-configured environment. This is the same as an on-premises datacenter, but now, the hardware is in a different location. Virtualization does provide a number of benefits: your development teams can move faster and you can turn capital expenses into operating expenses.

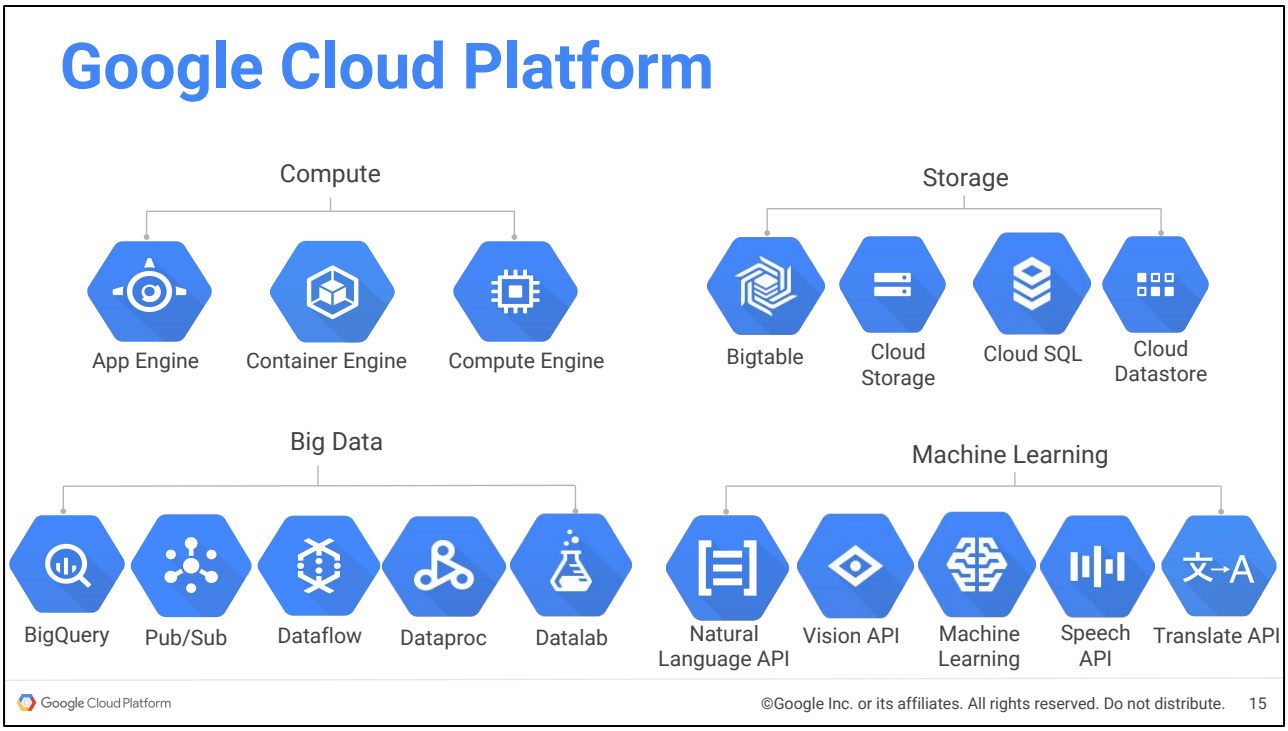
The next wave of cloud computing is a fully automated, elastic cloud. This involves a move from user-maintained infrastructure to automated services. In a fully automated environment, developers do not think about individual machines. The service automatically provisions and configures the infrastructure used to run your applications. Google is uniquely positioned to

propel organizations into the next wave of cloud computing.

IaaS and PaaS



Notes:
This slide highlights the shift in cloud computing. Virtualized datacenters brought you infrastructure as a service (IaaS) and platform as a service (PaaS) offerings. At Google, we have services that provide these options. As cloud computing has evolved, the momentum has shifted toward managed infrastructure and managed services. As the course progresses, you see how the Google Cloud Platform products and services are positioned to propel you into the next wave of cloud computing - a fully automated, elastic cloud.



Notes:
Google Cloud Platform's products and services can be broadly categorized as Compute, Storage, Big Data, Machine Learning, Networking, and Operations/Tools. This slide highlights many of the services that form the core of the Google Cloud Platform. Throughout this course, you explore the Cloud Platform products and services in lectures and in the hands-on labs. For now, it is helpful to see the breadth of the Cloud Platform offerings at a glance.

For more information, see: https://cloud.google.com/products/

Agenda

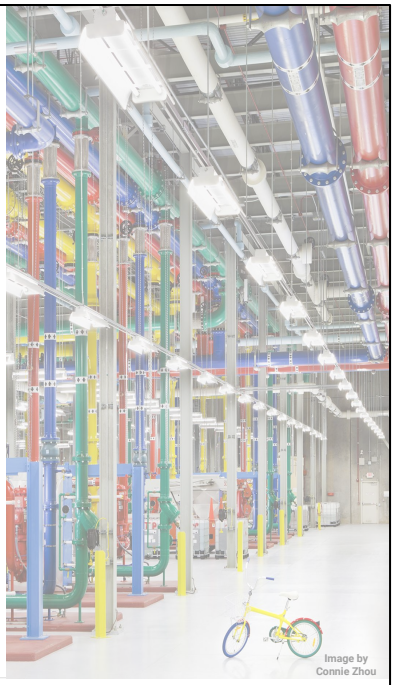
1. Introduction to Google Cloud Platform
2. Quiz & Lab

Quiz

1. Name 3 pricing innovations that make Google Cloud Platform the most cost effective public cloud.
2. In addition to innovative pricing, name 3 benefits of using Google Cloud Platform for your cloud applications.

Lab

- Sign up for the free trial ($300 over 60 days)
- Create a project



Resources

- Why Google Cloud Platform?
  https://cloud.google.com/why-google/
- Pricing philosophy
  https://cloud.google.com/pricing/philosophy/
- Data Centers
  https://www.google.com/about/datacenters/
- Google Cloud Platform product overview
  http://cloud.google.com/products/
- Google Cloud Platform solutions
  http://cloud.google.com/solutions/

Quiz Answers

1. Name 3 pricing innovations that make Google Cloud Platform the most cost effective public cloud.

   Answer: Sub-hour billing, sustained-use discounts, Compute Engine custom machine types

2. In addition to innovative pricing, name 3 benefits of using Google Cloud Platform.

   Answer: Commitment to environmental responsibility, commitment to open source technologies, robust infrastructure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