Tamkang University

Social Media Apps Programming

Google Cloud Platform

1031SMAP10
TLMXM1A (8687) (M2143) (Fall 2014)
(MIS MBA) (2 Credits, Elective) [Full English Course]
Thu 8,9 (15:10-17:00) V201

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Department of Information Management
Tamkang University

http://mail.tku.edu.tw/myday

2014-12-03

Course Schedule (1/3)

Week Date Subject/Topics

- 1 2014/09/17 Course Orientation and Introduction to Social Media and Mobile Apps Programming
- 2 2014/09/24 Introduction to Android / iOS Apps Programming
- 3 2014/10/01 Developing Android Native Apps with Java (Eclipse) (MIT App Inventor)
- 4 2014/10/08 Developing iPhone / iPad Native Apps with Swift / Objective-C (XCode)
- 5 2014/10/15 Mobile Apps Using HTML5/CSS3/JavaScript
- 6 2014/10/22 jQuery Mobile

Course Schedule (2/3)

Week Date Subject/Topics

- 7 2014/10/29 Create Hybrid Apps with Phonegap
- 8 2014/11/05 jQuery Mobile/Phonegap
- 9 2014/11/12 jQuery Mobile/Phonegap
- 10 2014/11/19 Midterm Exam Week
  (Midterm Project Report)
- 11 2014/11/26 Case Study on Social Media Apps Programming and Marketing in Google Play and App Store
- 12 2014/12/03 Google Cloud Platform

Course Schedule (3/3)

Week	Date	Subject/Topics
• 13	2014/12/10	Invited Talk: Social, Data and Business Model - Let's see PIXNET [Invited Speaker: Dr. Rick Cheng-Yu Lu, Technical Director, PIXNET]
• 14	2014/12/17	Google App Engine and Google Map API
• 15	2014/12/24	Facebook API (Facebook JavaScript SDK) (Integrate Facebook with iOS/Android Apps)
• 16	2014/01/31	Twitter API
• 17	2015/01/07	Final Project Presentation
• 18	2015/01/14	Final Exam Week (Final Project Report)

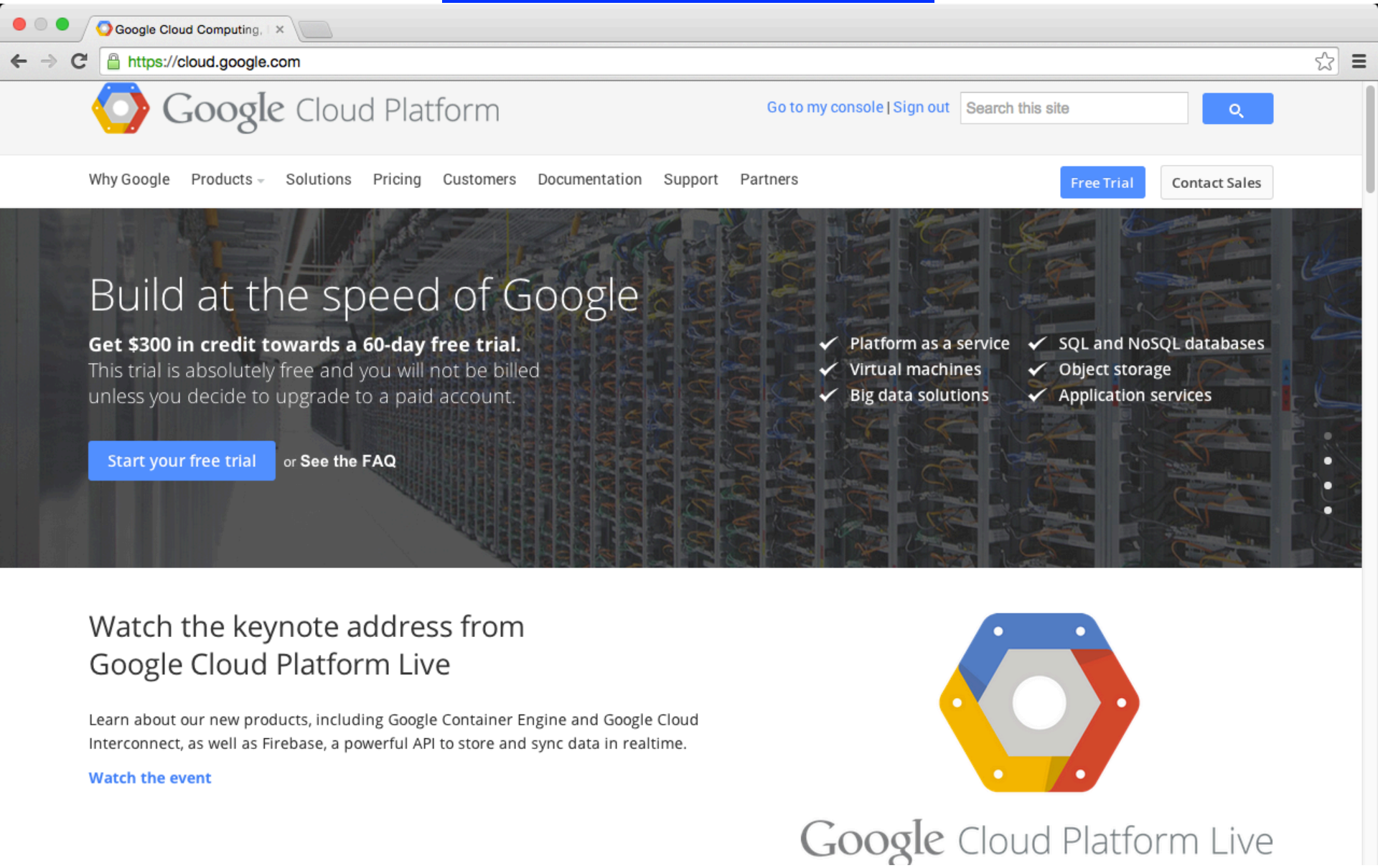
Outline

- **Google Cloud Platform**
  - Google App Engine 
  - Google Cloud Datastore 
  - Google Cloud Endpoints 

- **Mobile App with Google Cloud Platform**

Google Cloud Platform

https://cloud.google.com/



Google Cloud Platform

- Google Cloud Platform is a set of modular cloud-based services that allow you to create anything from simple websites to complex applications.

Source: https://cloud.google.com/

Google Cloud Platform

Hosting + Compute	Storage	Big Data	Services

Source: https://cloud.google.com/products/

Google Cloud Platform

Compute

App Engine

Compute Engine

Container Engine

Storage

Cloud Datastore

Cloud SQL

Cloud Storage

Big Data

Big Query

Services

Cloud Endpoints

Translate API

Prediction API

Source: https://cloud.google.com/products/

Why Google Cloud Platform

Why Google Cloud Infrastr ×

https://cloud.google.com/why-google/

Google Cloud Platform

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Why Google Cloud Platform

Google Cloud Platform enables developers to build, test and deploy applications on Google's highly-scalable and reliable infrastructure. Choose from computing, storage and application services for your web, mobile and backend solutions.

Run on Google's infrastructure

Build on the same infrastructure that allows Google to return billions of search results in milliseconds, serve 6 billion hours of YouTube video per month and provide storage for 425 million Gmail users.

Global network

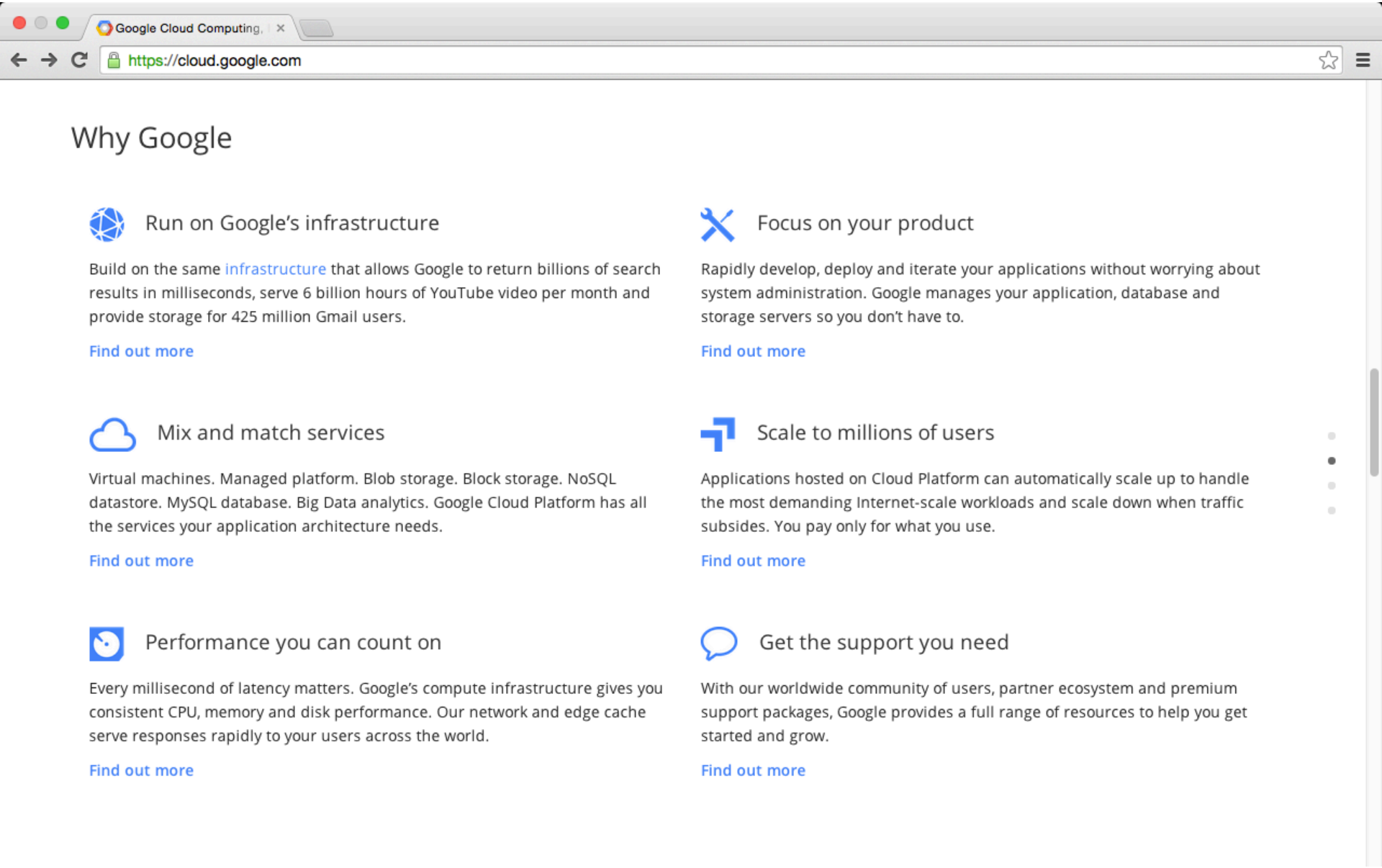
Google has one of the largest and most advanced computer networks. Google's backbone network has thousands of miles of fiber optic cable, uses advanced software-defined networking and has edge caching services to deliver fast, consistent and scalable performance. In fact, we even laid our own fiber optic cable under the Pacific Ocean.

"[Google's] ability to build, organize, and operate a huge network of servers and fiber-optic cables with an efficiency and speed that rocks physics on its heels...This is what makes Google

Redundancy

Source: https://cloud.google.com/why-google/

Why Google Cloud Platform



Source: https://cloud.google.com/

Customers of Google Cloud Platform

Snapchat

"App Engine enabled us to focus on developing the application. We wouldn't have gotten here without the ease of development that App Engine gave us."

Bobby Murphy CTO and co-Founder

Read Snapchat's story

Webfilings

"Google App Engine has the breadth and the depth to grow with you. Every 6 months, it gets better. The Google App Engine team knows what you need to make a competitive application."

Brett Harper Director of Product Development

Read Webfilings' story

Khan Academy

"If we didn't have Google App Engine, we'd be spending a lot more time figuring out server setup and working on routers. Our ability to focus on the actual product is the benefit of Google App Engine."

Ben Kamens Lead Developer

Read Khan Academy's story

Rovio

"Google App Engine allows us to launch games very quickly with teams of one or two developers per game. Because Google manages all the servers, there is little required of us in terms of maintenance."

Stefan Hauk lead server developer for web games

Read Rovio's story

MAG Interactive

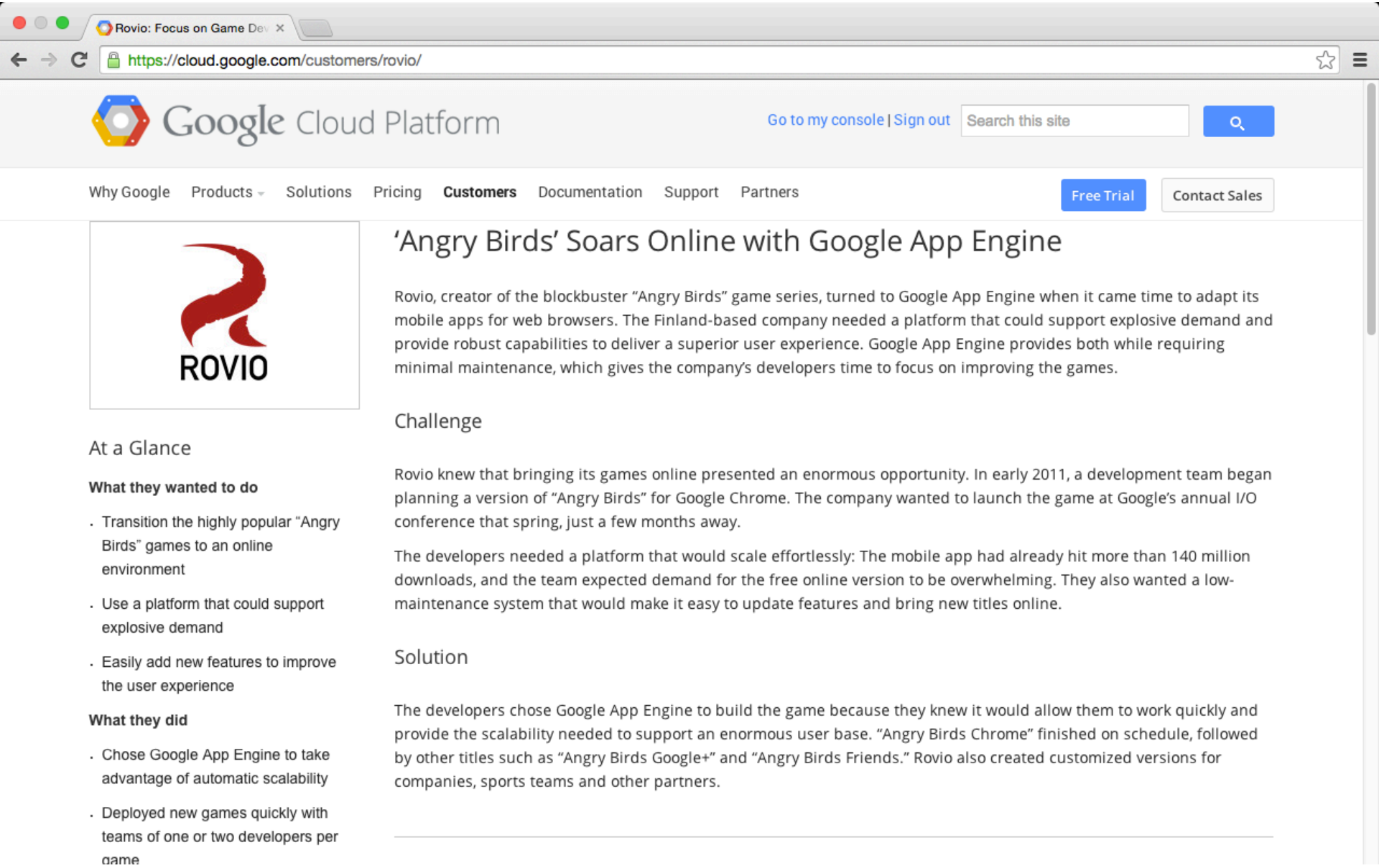
"Our rapid growth to 5M Ruzzle players in less than six months required a highly scalable server solution. Google App Engine transformed this huge challenge into a picnic."

Interactions Marketing

"We are always looking for ways to maximize return and minimize investment. BigQuery is the perfect combination. It's an on-demand, scalable resource."

Source: https://cloud.google.com/customers/

Angry Birds



Source: https://cloud.google.com/customers/

Compute

Compute Engine

Compute Engine is Google's Infrastructure-as-a-Service (IaaS). Run large-scale workloads on virtual machines hosted on Google's infrastructure. Choose a VM that fits your needs and gain the performance and consistency of Google's worldwide fiber network. With per-minute billing, you pay only for what you use.

App Engine

App Engine is Google's Platform-as-a-Service (PaaS). Develop your application easily using built-in services that make you more productive. Deploy to a fully-managed platform and let Google carry the pager. Just download the SDK and start building immediately for free with no credit card required.

Container Engine

Container Engine makes it easy to run Docker containers on Google Cloud Platform. Powered by Kubernetes, Container Engine takes care of provisioning and maintaining the underlying virtual machine cluster, scaling your application, and operational logistics like logging, monitoring, and health management.

Source: https://cloud.google.com/products/

Storage

Cloud Datastore

Cloud Datastore provides a managed, NoSQL, schemaless database for storing non-relational data. Cloud Datastore automatically scales as you need it and supports transactions as well as robust, SQL-like queries.

Cloud SQL

Store and manage data using a fully-managed, relational MySQL database. Google handles replication, patch management and database management to ensure availability and performance.

Cloud Storage

Use a durable and highly available object storage service. With global edge-caching, your users have fast access to your app's data from any location. Google manages versioning, guarantees a strong SLA and provides a simple API that allows you to manage your data programmatically.

Source: https://cloud.google.com/products/

BigQuery

- Analyze Big Data in the cloud with BigQuery.
- Run fast, SQL-like queries against multi-terabyte datasets in seconds.
- Scalable and easy to use, BigQuery gives you real-time insights about your data

Source: https://cloud.google.com/products/

Services

Cloud Pub/Sub

Connect your services with reliable, many-to-many, asynchronous messaging hosted on Google's infrastructure. Cloud Pub/Sub automatically scales as you need it and provides a foundation for building your own robust, global services.

Cloud DNS

Reliable, resilient, low-latency DNS serving from Google's worldwide network of Anycast DNS servers. Create DNS records with an easy to use command line interface, or program against a full featured RESTful API to customize the service to your specific needs.

Cloud Endpoints

Create RESTful services from your code and make them accessible to iOS, Android and Javascript clients. Automatically generate client libraries to make wiring up the frontend easy. Built-in critical infrastructure includes denial-of-service protection, OAuth 2.0 support and client key management.

Translate API

Create multilingual apps and translate text into other languages programmatically. Thousands of language pairs are available.

Source: https://cloud.google.com/products/

Prediction API

- Use Google's machine learning algorithms to analyze data and predict future outcomes using a familiar RESTful interface.

Source: https://cloud.google.com/products/

Google Cloud Platform Solutions

Solutions — Google Cloud

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

Google Cloud Platform

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Solutions

Cloud Platform enables you to build a wide variety of robust applications. See how you can quickly and easily build a mobile, gaming, or Hadoop solution.

Mobile

Build and host the backend for any mobile app. With an infrastructure that is managed automatically, you can focus on your app.

Read about Mobile

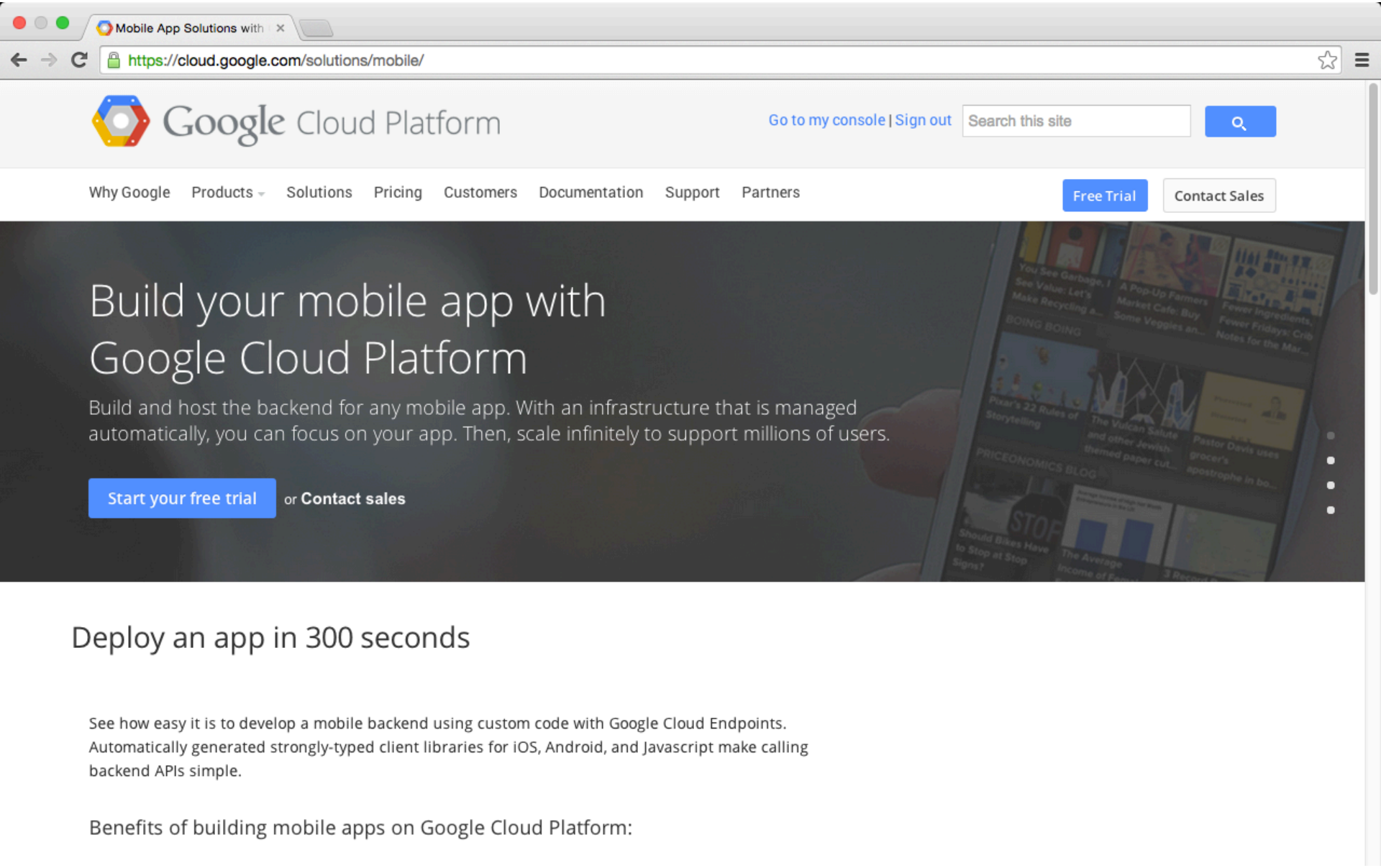
Hadoop

Take advantage of the performance and cost efficiency of Google Cloud Platform to run Apache Hadoop. Directly access data in Google Cloud Storage and BigQuery from Hadoop.

Read about Hadoop

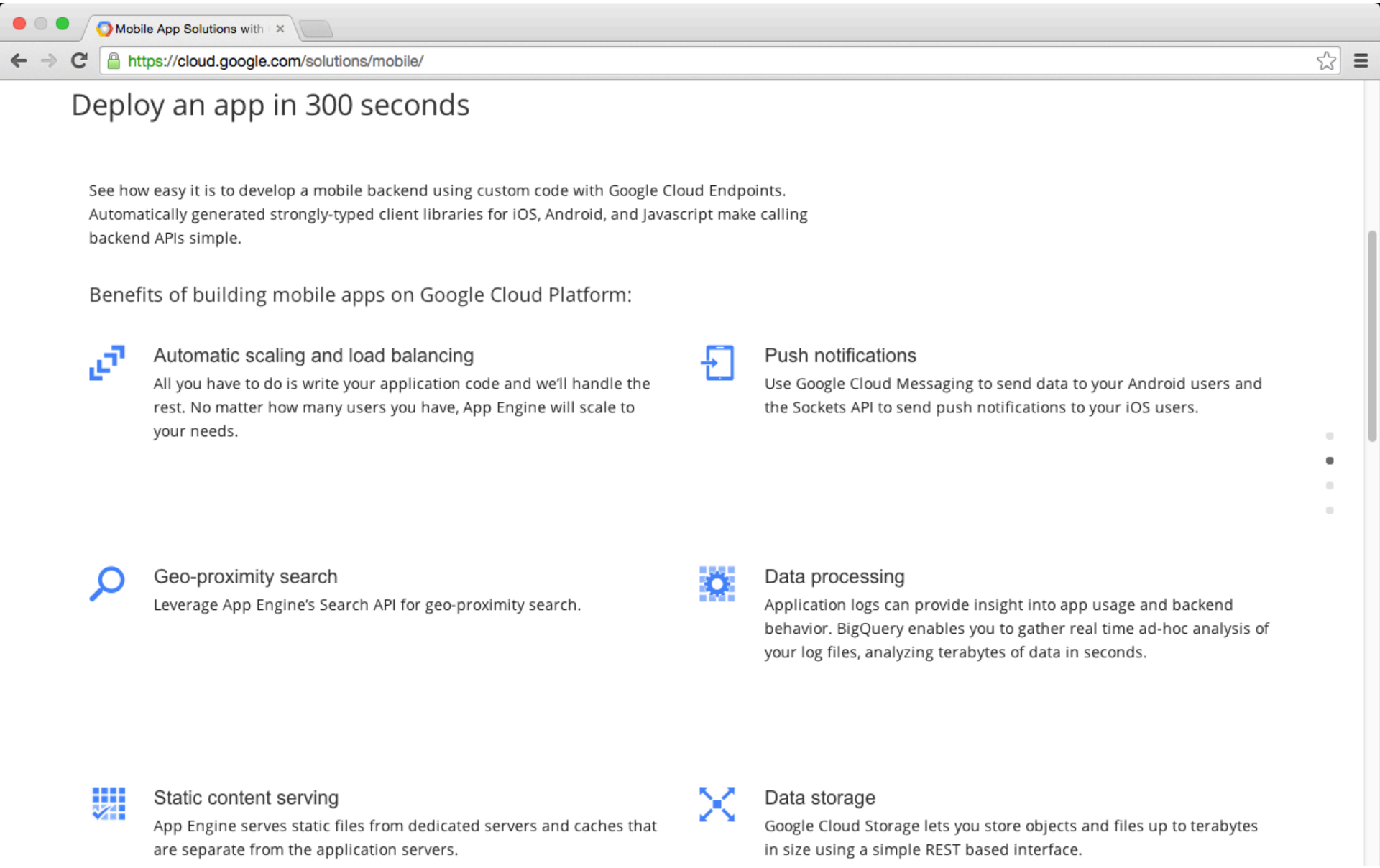
Source: https://cloud.google.com/solutions/

Mobile App with Google Cloud Platform



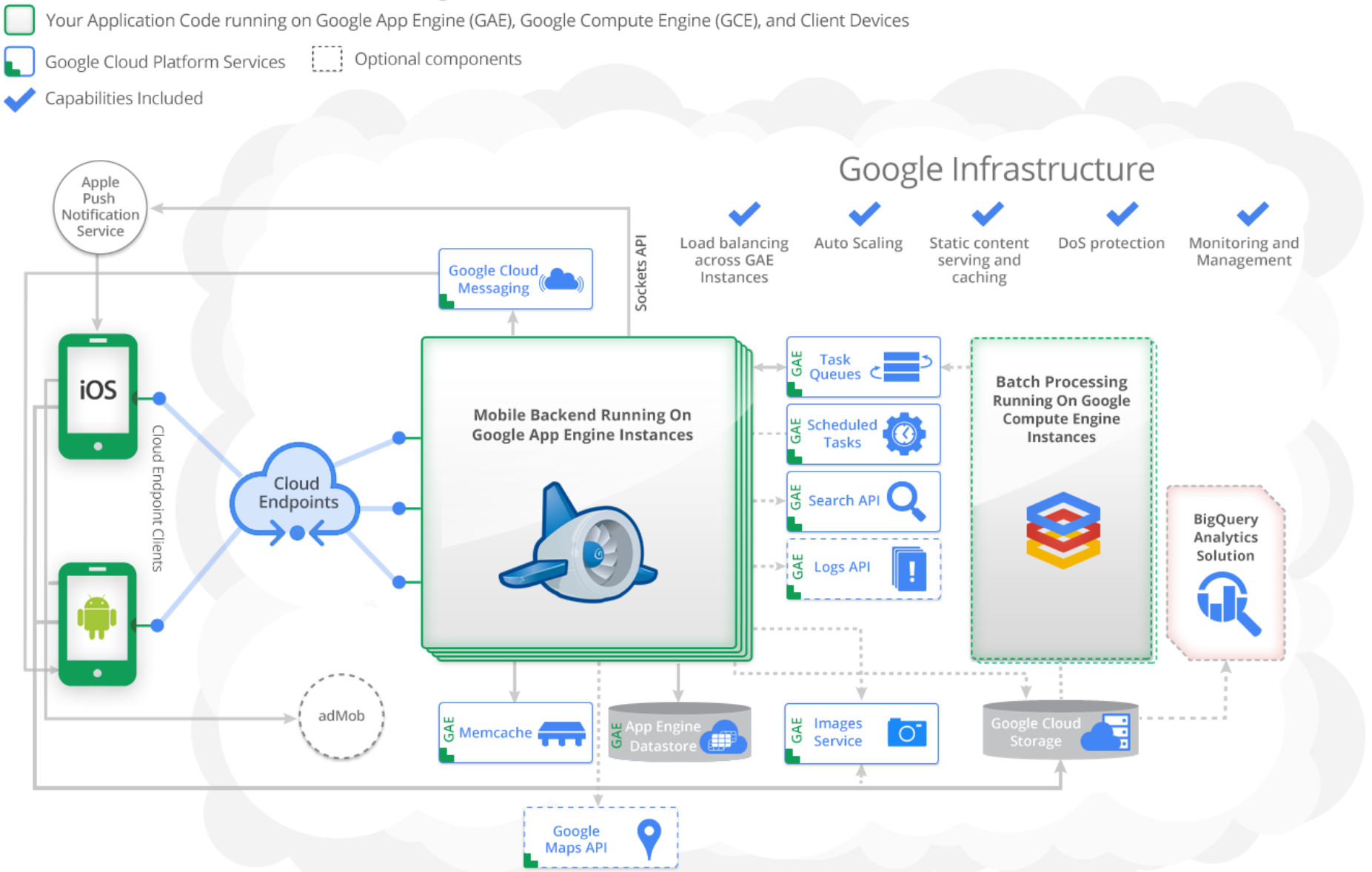
Source: https://cloud.google.com/solutions/mobile/

Mobile App with Google Cloud Platform



Source: https://cloud.google.com/solutions/mobile/

Mobile Solutions on the Google Cloud Platform



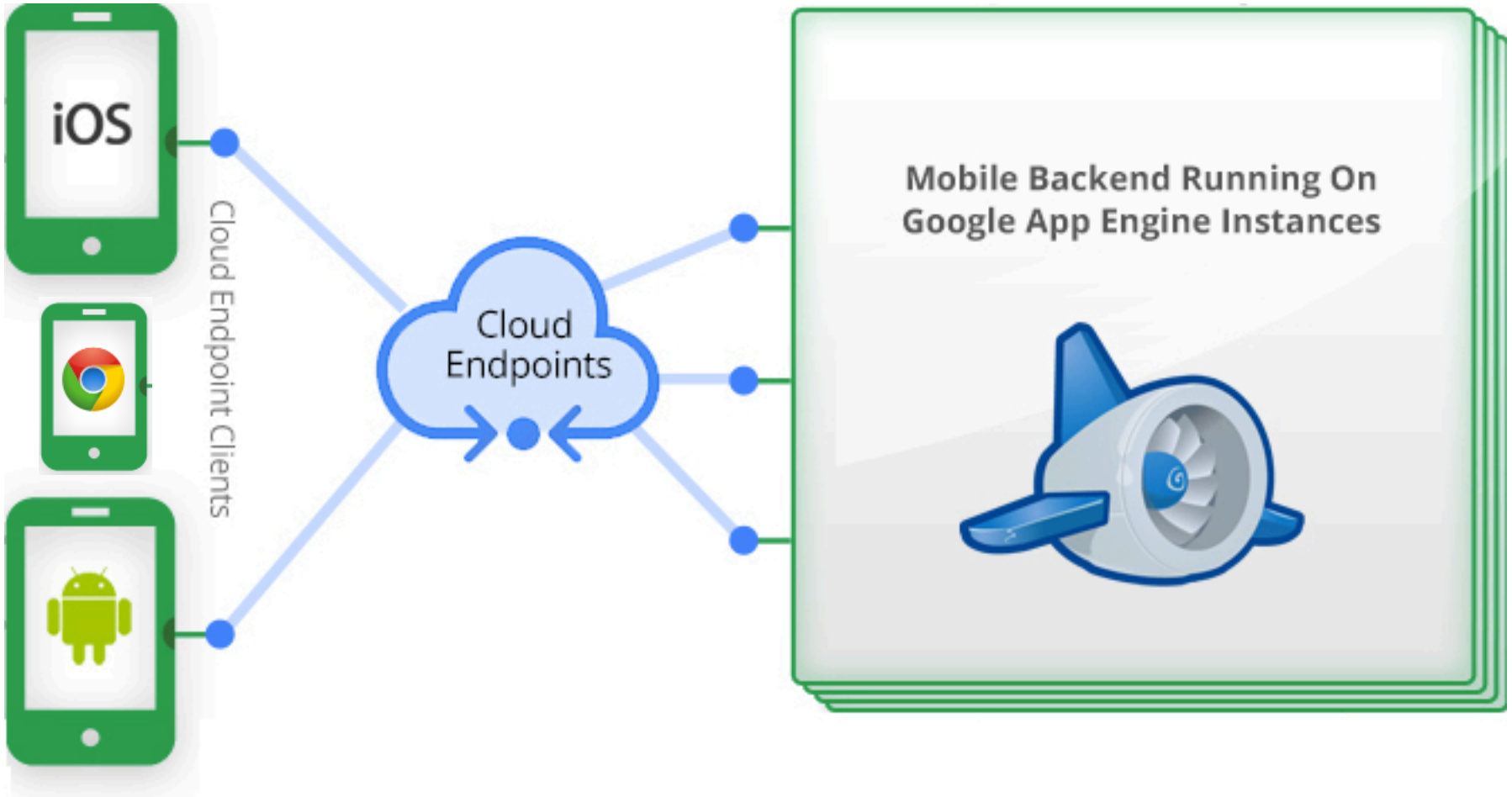
Source: https://cloud.google.com/developers/articles/mobile-application-solutions/

Mobile Solution on Google Cloud Platform

- Support for Android and iOS devices through native applications
- Storage, retrieval, and processing data outside of mobile devices
- Orchestrating push notification to Android and IOS devices
- Geo-location awareness and geo-proximity search
- User authentication
- High scalability

Source: https://cloud.google.com/developers/articles/mobile-application-solutions/

Mobile App Solutions Architecture



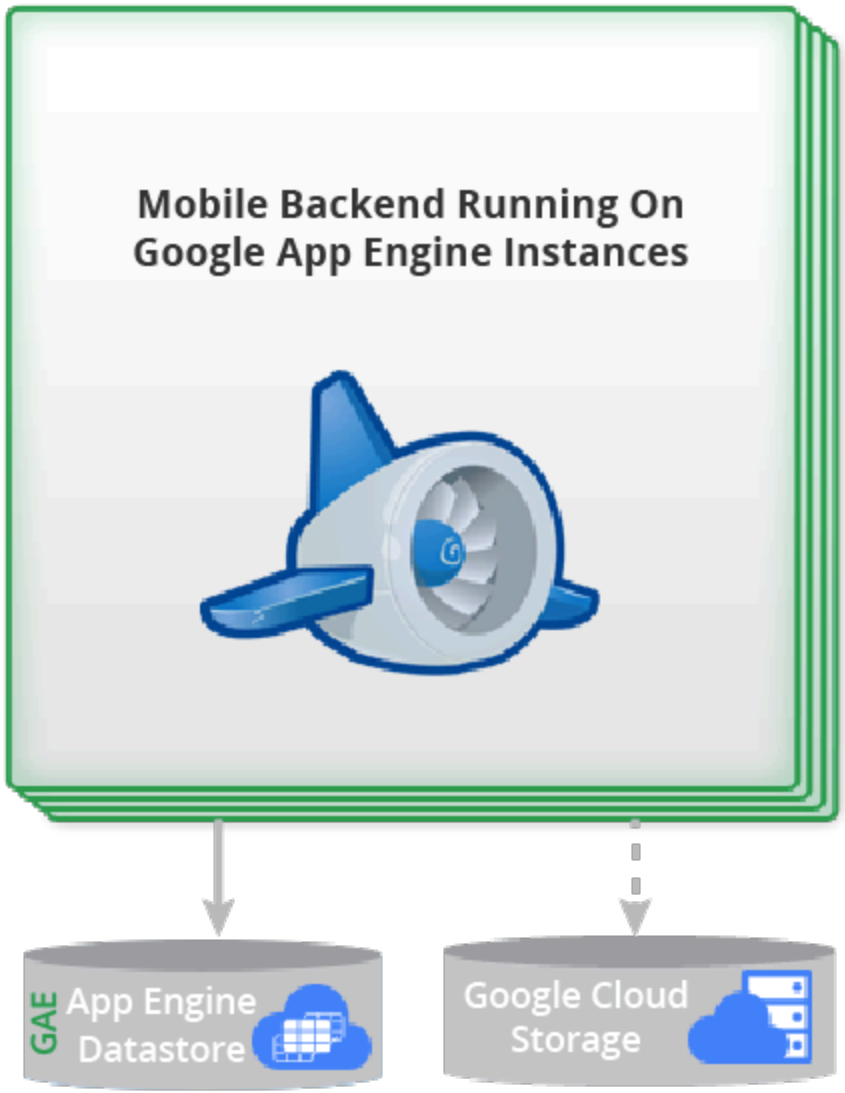
Source: https://cloud.google.com/developers/articles/mobile-application-solutions/

Mobile App Solutions Architecture

- Android and/or iOS mobile clients.
- Google Cloud Endpoints used for communications between the clients and the backend over REST API with optional OAuth2 authentication.
- Your mobile backend application code running on Google App Engine and responsible for serving requests from the clients.

Source: https://cloud.google.com/developers/articles/mobile-application-solutions/

Storing data

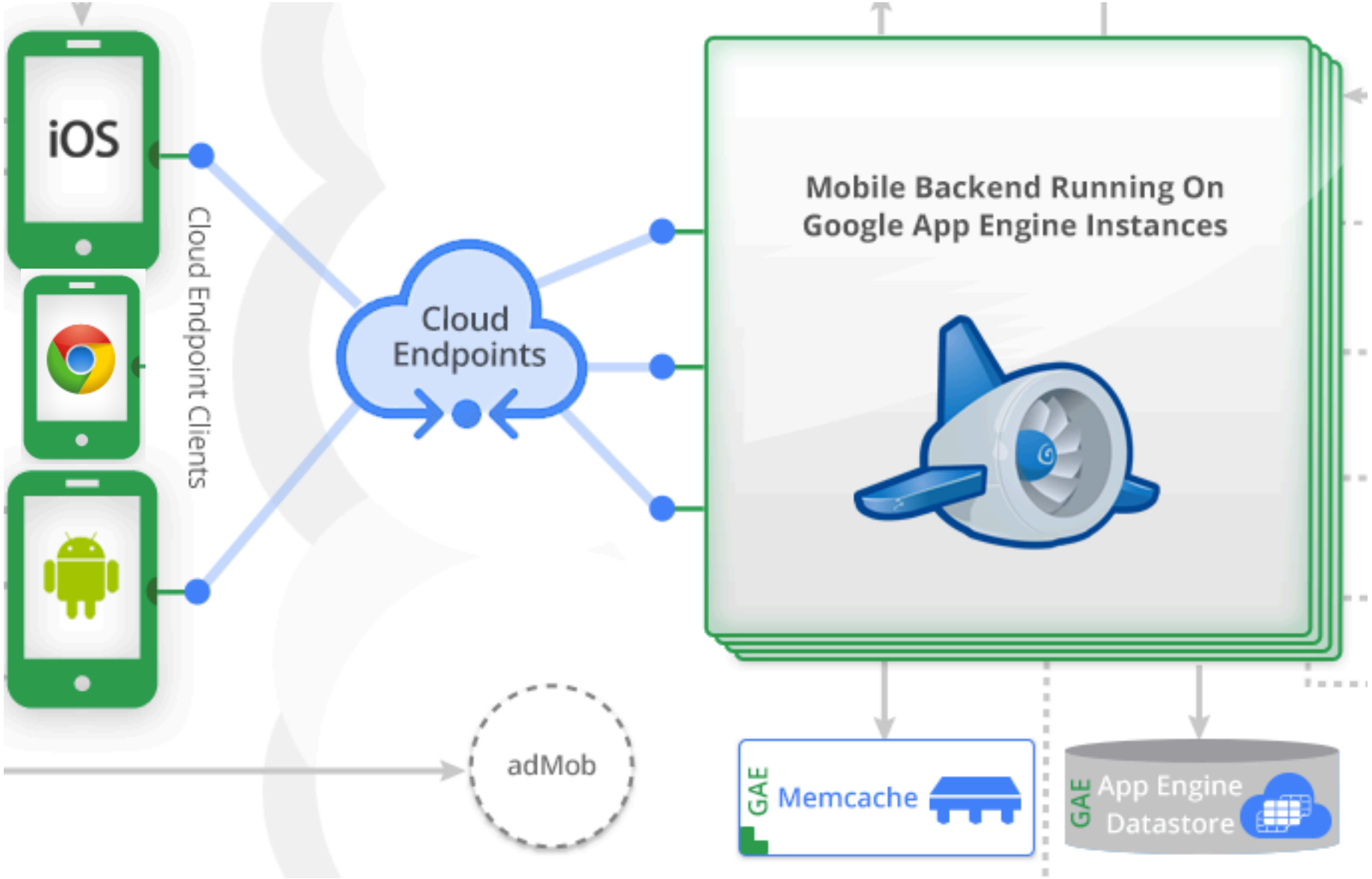


Google App Engine
Datastore Quotas and limits

Limit	Amount
Maximum entity size	1 megabyte
Maximum transaction size	10 megabytes
Maximum number of index entries for an entity	20000
Maximum number of bytes in composite indexes for an entity	2 megabytes

Source: https://cloud.google.com/appengine/docs/java/datastore/

Optimizing data access with Memcache



Source: https://cloud.google.com/developers/articles/mobile-application-solutions/

Google App Engine

Platform as a Service (PaaS)

build and run applications on
Google's infrastructure

Source: https://cloud.google.com/appengine/docs

Google App Engine

- 1 GB of data storage and traffic for free

- can be increased by enabling paid applications

Source: https://cloud.google.com/appengine/docs/whatisgoogleappengine

Google App Engine

Google App Engine supports apps written in a variety of programming languages: Python, Java, PHP, Go

Python

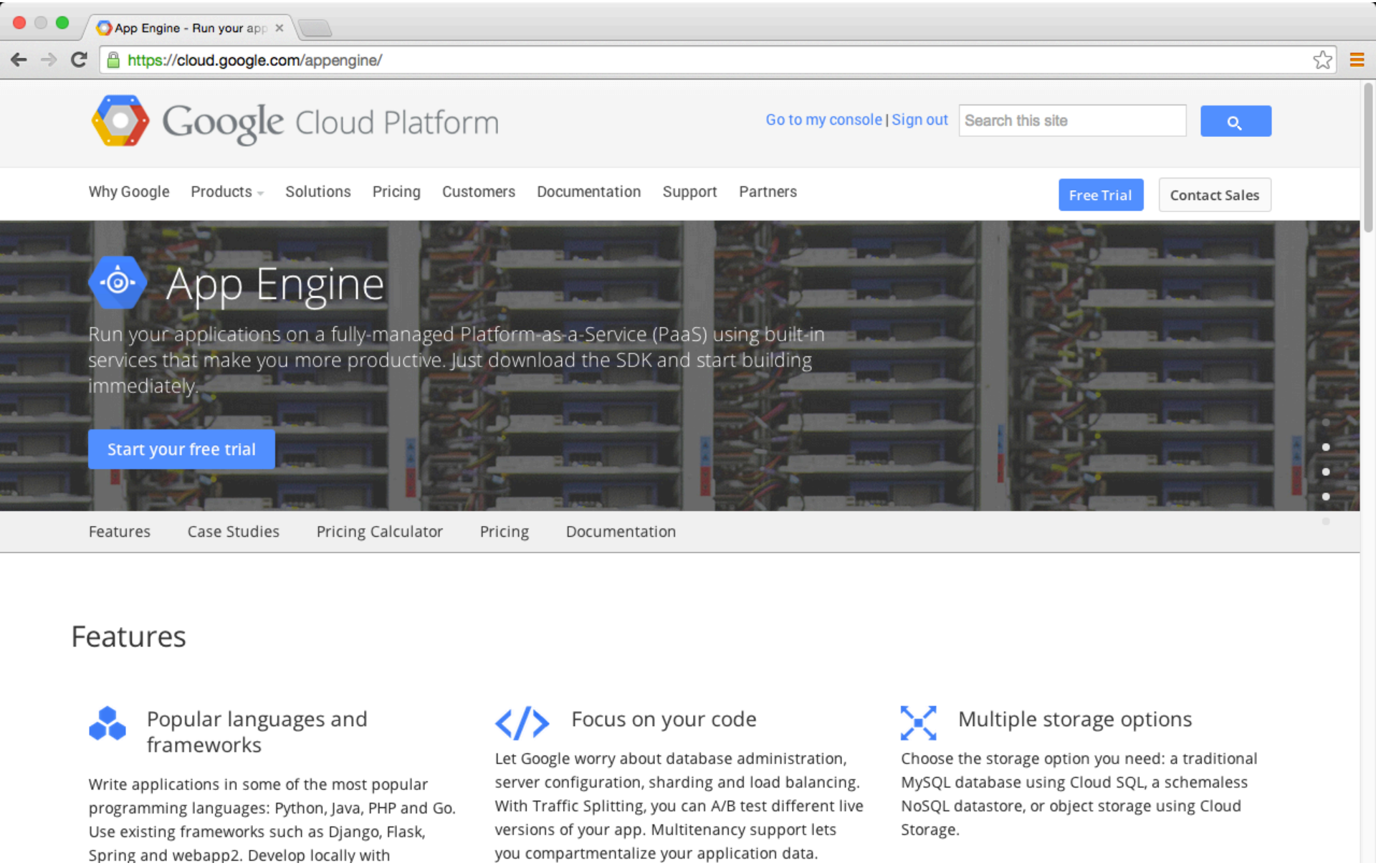
Java

PHP

Go

Source: https://cloud.google.com/appengine/docs/whatisgoogleappengine

Google App Engine



https://cloud.google.com/appengine/

Google App Engine

Features

Popular languages and frameworks

Write applications in some of the most popular programming languages: Python, Java, PHP and Go. Use existing frameworks such as Django, Flask, Spring and webapp2. Develop locally with language-specific SDKs. Pair your applications with Compute Engine to integrate other familiar technologies such as Node.js, C++, Scala, Hadoop, MongoDB, Redis and more.

Focus on your code

Let Google worry about database administration, server configuration, sharding and load balancing. With Traffic Splitting, you can A/B test different live versions of your app. Multitenancy support lets you compartmentalize your application data.

Multiple storage options

Choose the storage option you need: a traditional MySQL database using Cloud SQL, a schemaless NoSQL datastore, or object storage using Cloud Storage.

Powerful built-in services

App Engine makes you more productive by eliminating the need to write boilerplate code. Managed services, such as Task Queues, Memcache and the Users API, let you build any application.

Familiar development tools

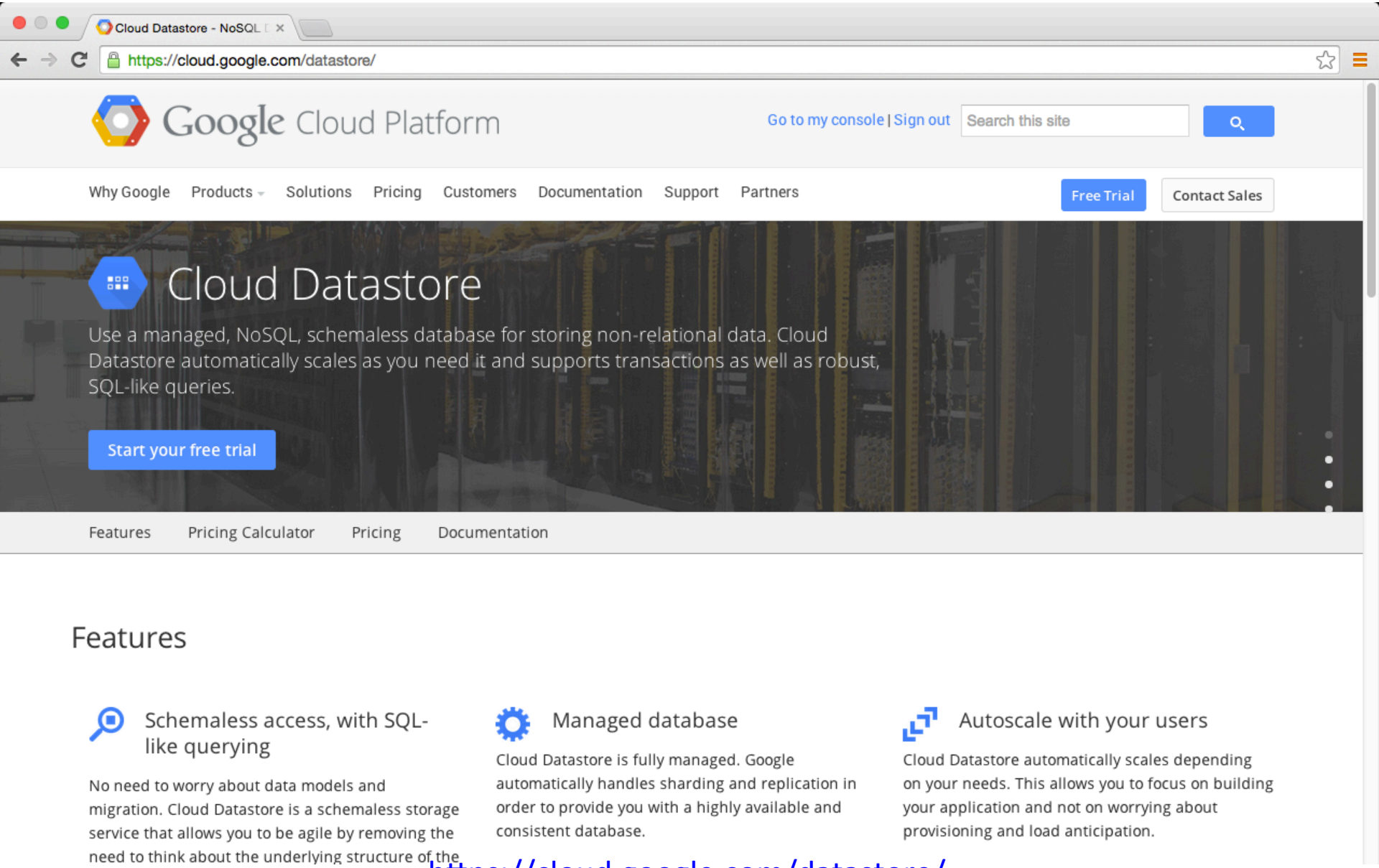
Use the tools you know, including Eclipse, IntelliJ, Maven, Git, Jenkins, PyCharm and more. The App Engine SDK allows you to test applications locally in a simulated environment and then deploy your app with simple command-line tools or the desktop launcher.

Deploy at Google scale

Some of the world's most popular web services are built on our platform. You can scale up to 7 billion requests per day and automatically scale down when traffic subsides.

https://cloud.google.com/appengine/

Google Cloud Datastore



https://cloud.google.com/datastore/

Google Cloud Datastore

Schemaless access, with SQL-like querying

No need to worry about data models and migration. Cloud Datastore is a schemaless storage service that allows you to be agile by removing the need to think about the underlying structure of the data. Cloud Datastore provides a robust query engine that allows you to search for data across multiple properties and sort as needed.

Managed database

Cloud Datastore is fully managed. Google automatically handles sharding and replication in order to provide you with a highly available and consistent database.

Autoscale with your users

Cloud Datastore automatically scales depending on your needs. This allows you to focus on building your application and not on worrying about provisioning and load anticipation.

ACID transactions

Cloud Datastore provides ACID transactions using optimistic concurrency control. Your application can execute multiple datastore operations in a single transaction in which either all succeed or all fail, ensuring the integrity of your data.

Built-in redundancy

With a single API call, data is automatically replicated across multiple data centers. High availability and durability are built in from the very core.

Local development tools

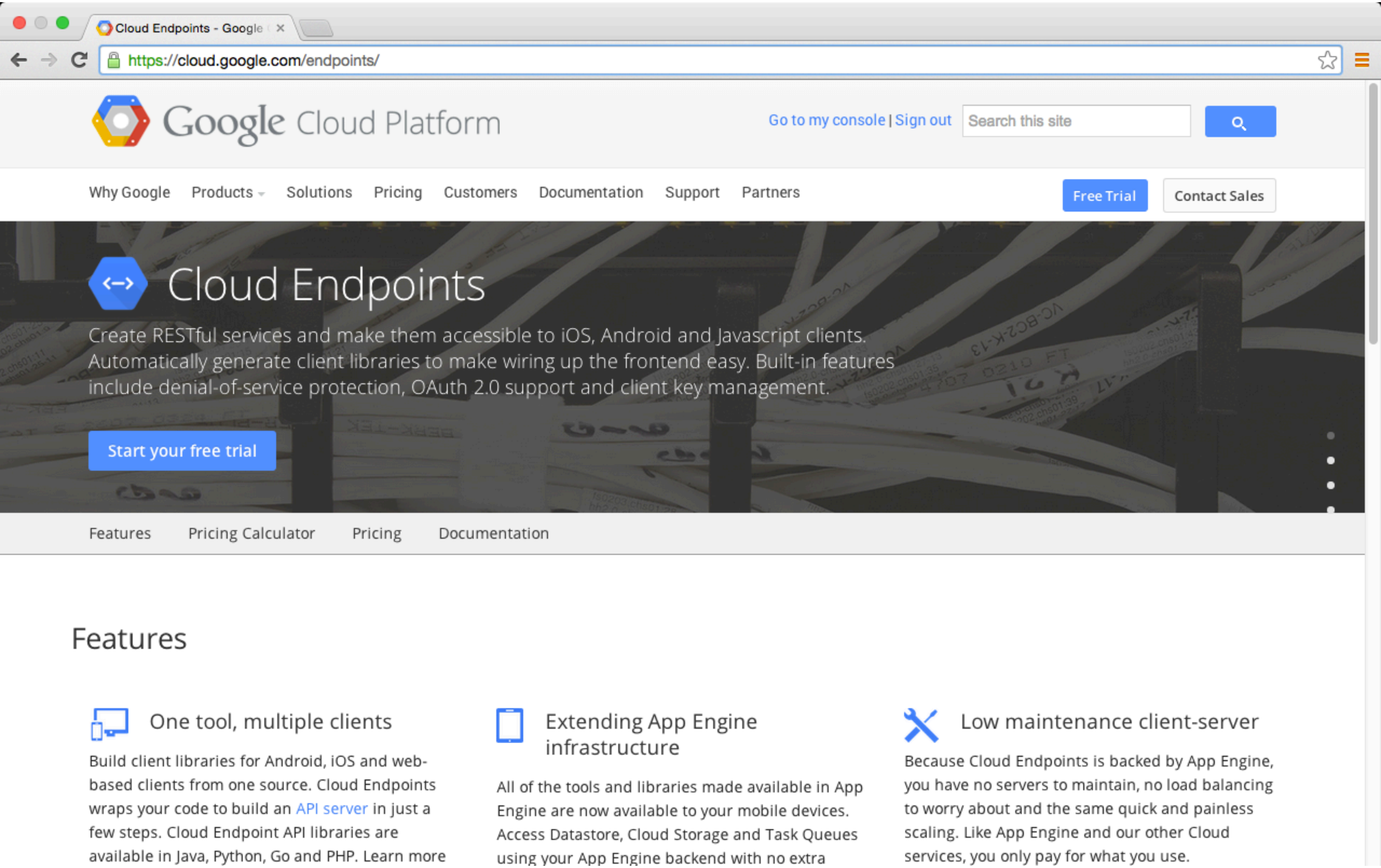
With the Cloud Datastore Development Kit, you can develop, test and iterate your applications locally without doing full deployments.

Access your data from anywhere

Build solutions that span App Engine and Compute Engine, and rely on Cloud Datastore as the integration point. With the RESTful interface that is exposed by Cloud Datastore, data can easily be accessed by any deployment target.

https://cloud.google.com/datastore/

Google Cloud Endpoints



Source: https://cloud.google.com/endpoints/

Google Cloud Endpoints

Features

One tool, multiple clients

Build client libraries for Android, iOS and web-based clients from one source. Cloud Endpoints wraps your code to build an API server in just a few steps. Cloud Endpoint API libraries are available in Java, Python, Go and PHP. Learn more about Cloud Endpoints in our documentation or just dive in and try our sample Tic Tac Toe web application.

Extending App Engine infrastructure

All of the tools and libraries made available in App Engine are now available to your mobile devices. Access Datastore, Cloud Storage and Task Queues using your App Engine backend with no extra work. Integrate OAuth 2.0 authentication quickly by following our examples.

Low maintenance client-server

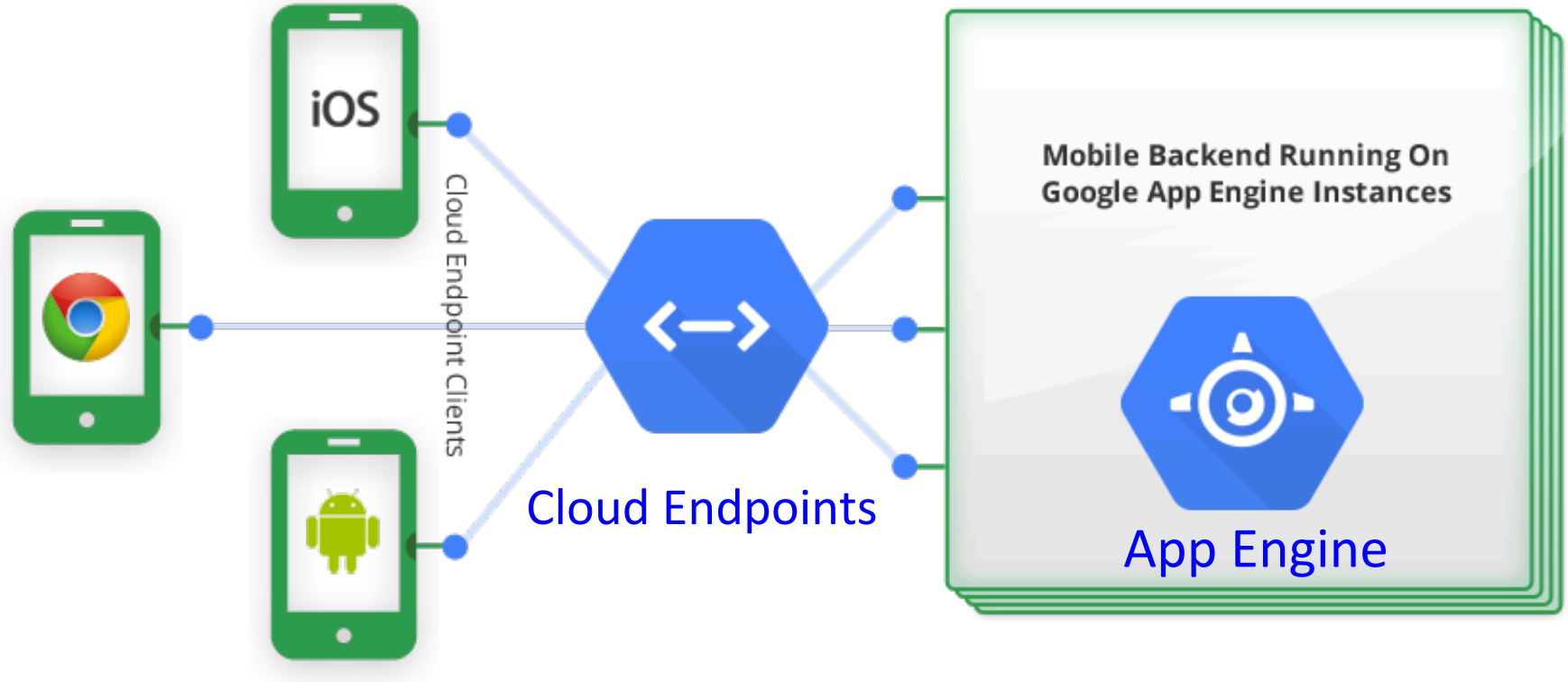
Because Cloud Endpoints is backed by App Engine, you have no servers to maintain, no load balancing to worry about and the same quick and painless scaling. Like App Engine and our other Cloud services, you only pay for what you use.

Flexible client-side integration

Annotate your server-side API and then build your client libraries automatically. Client libraries are built for Android and iOS. Get standard web clients up and running with a minimal JavaScript client library. All of your clients use similar APIs and the same backend, which keeps development time down.

Source: https://cloud.google.com/endpoints/

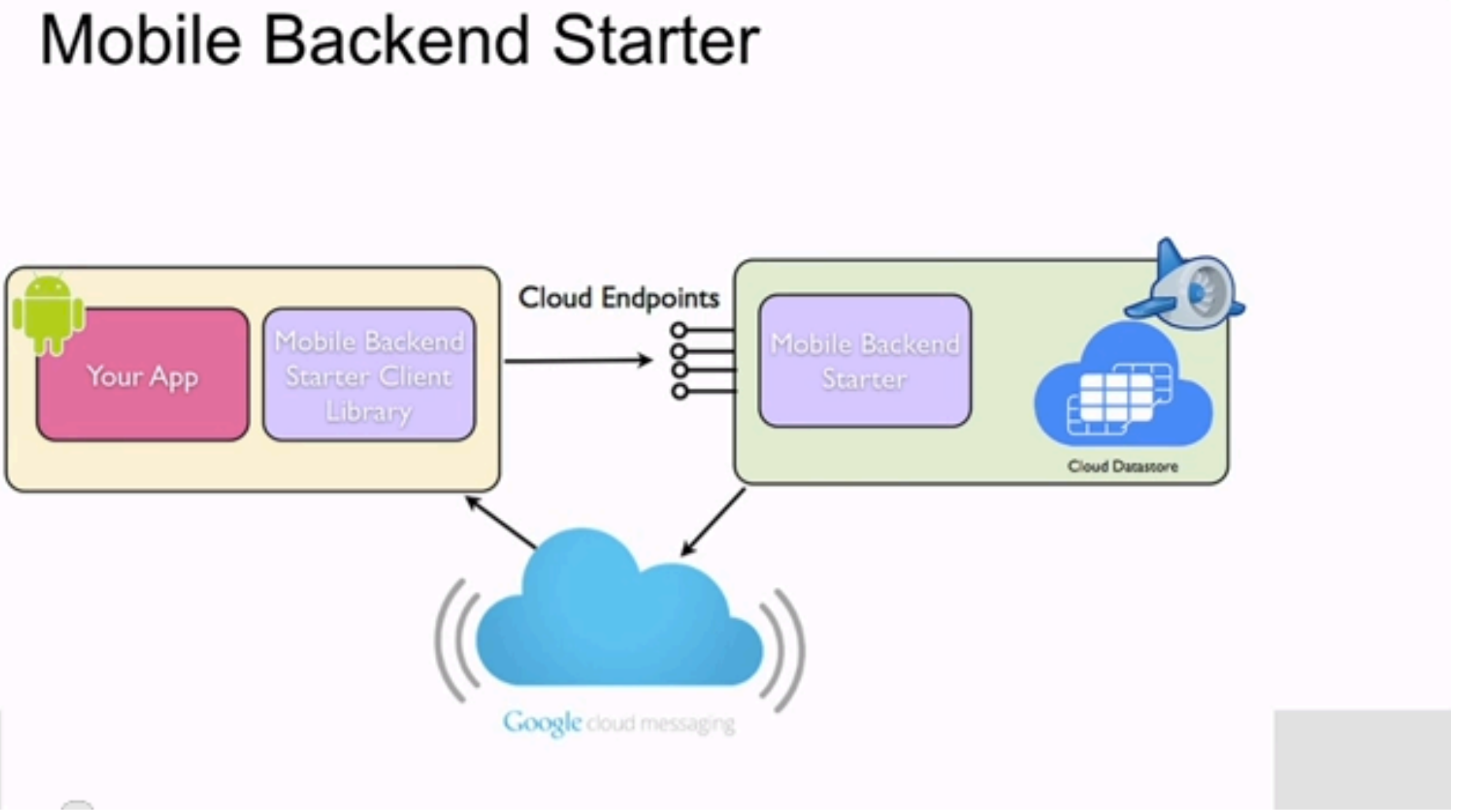
Mobile Apps Backend on Google App Engine



Google Cloud Endpoints Architecture

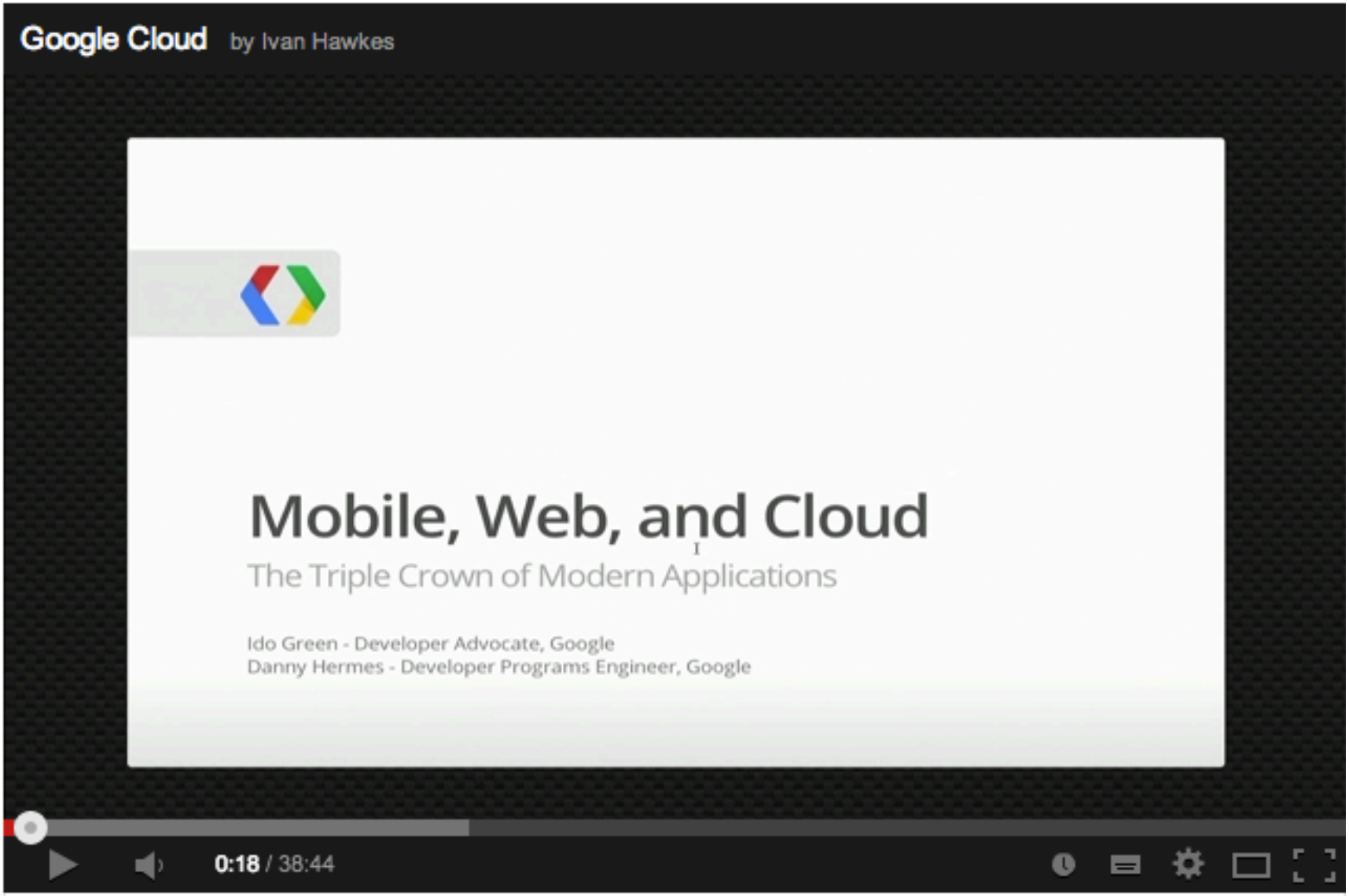
Source: https://cloud.google.com/appengine/docs/java/endpoints/

Mobile App, Goolge App Engine, Cloud Datasotre



http://www.youtube.com/watch?v=v5u_Owtbfew

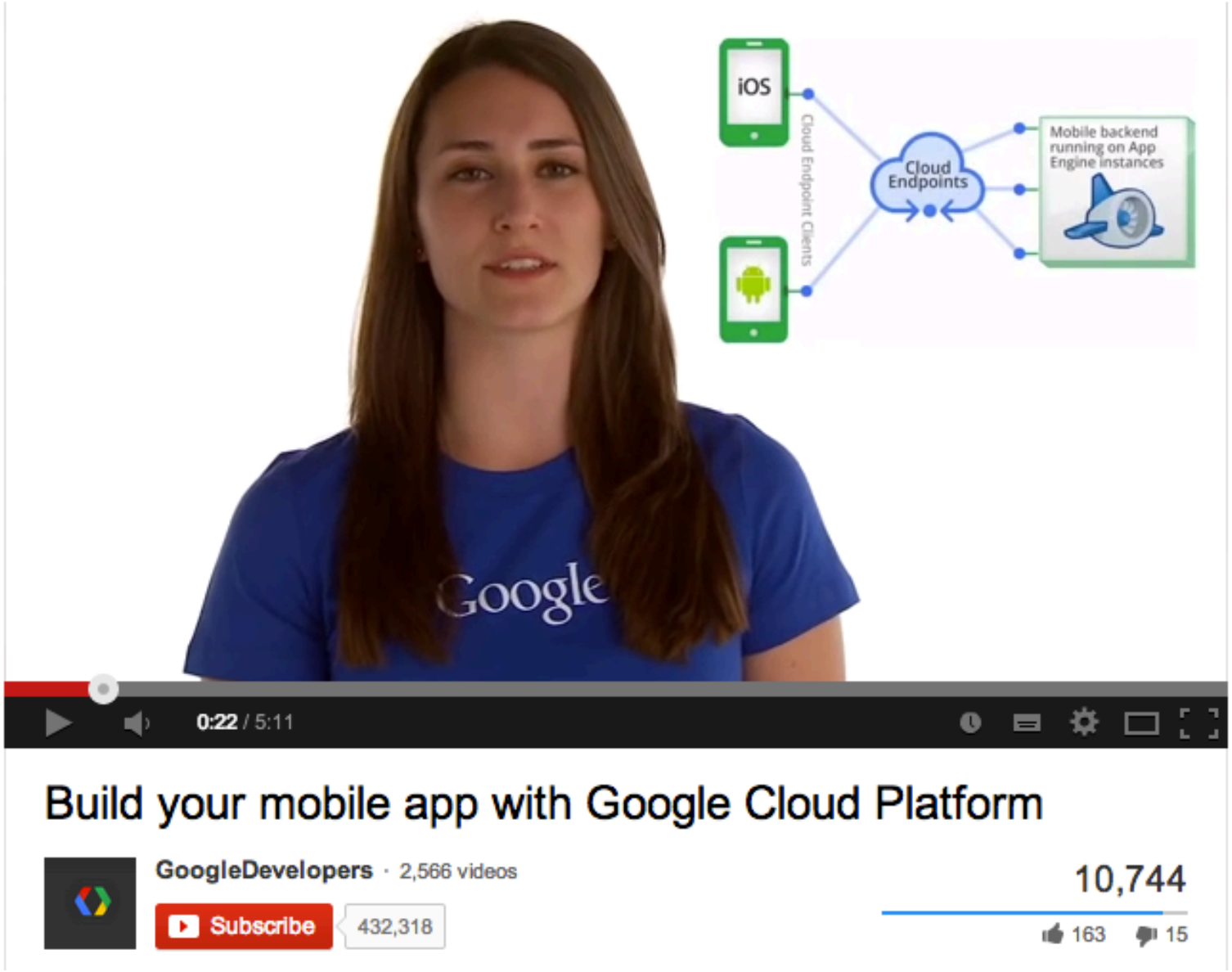
Mobile, Web and Cloud



Google I/O 2013 - Mobile, Web and Cloud - The Triple Crown of M...

http://www.youtube.com/watch?v=6_oO9Gwf_do

Build your mobile app with Google Cloud Platform



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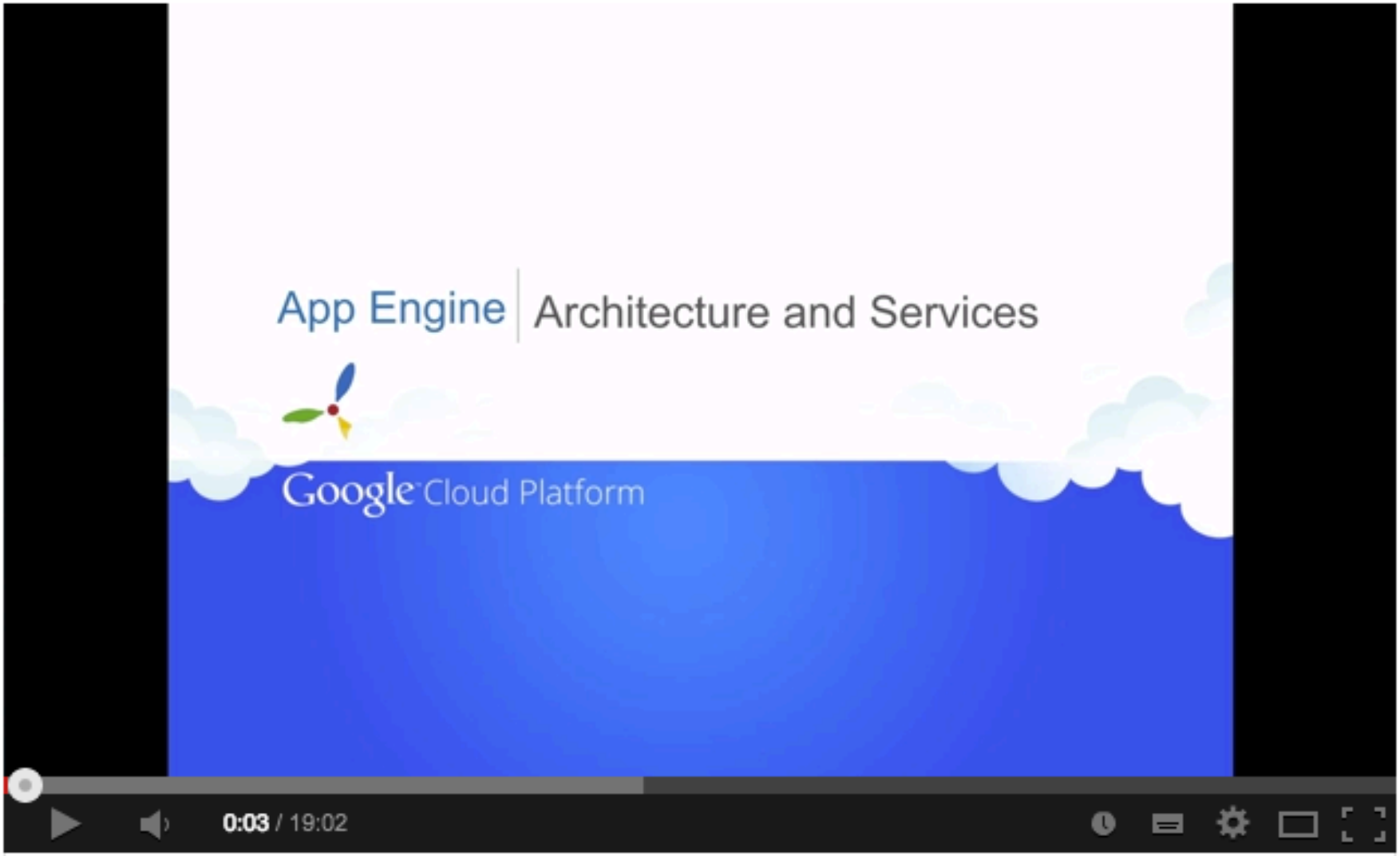
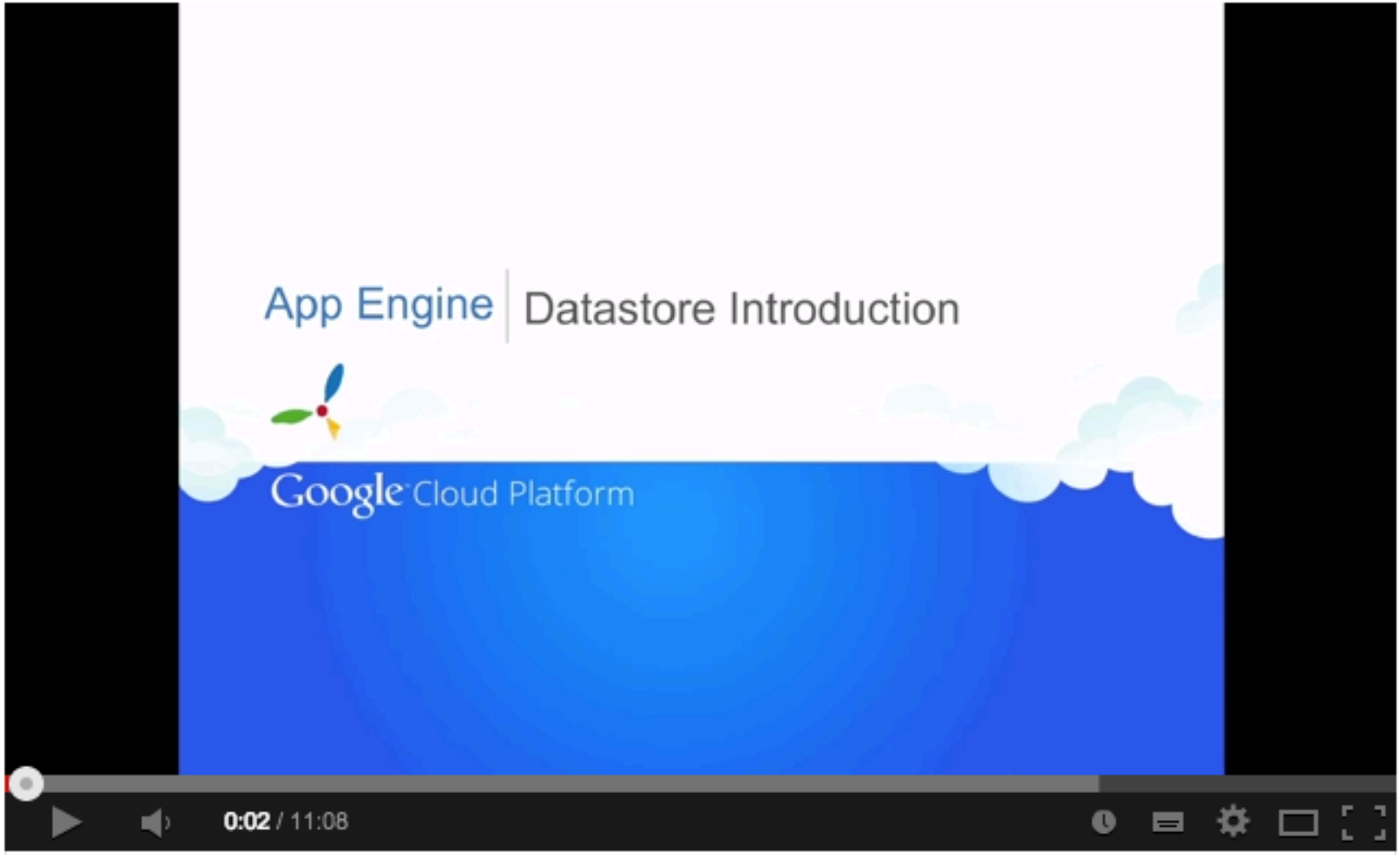
App Engine Architecture and Services



App Engine Architecture and Services

http://www.youtube.com/watch?v=QJp6hmASstQ

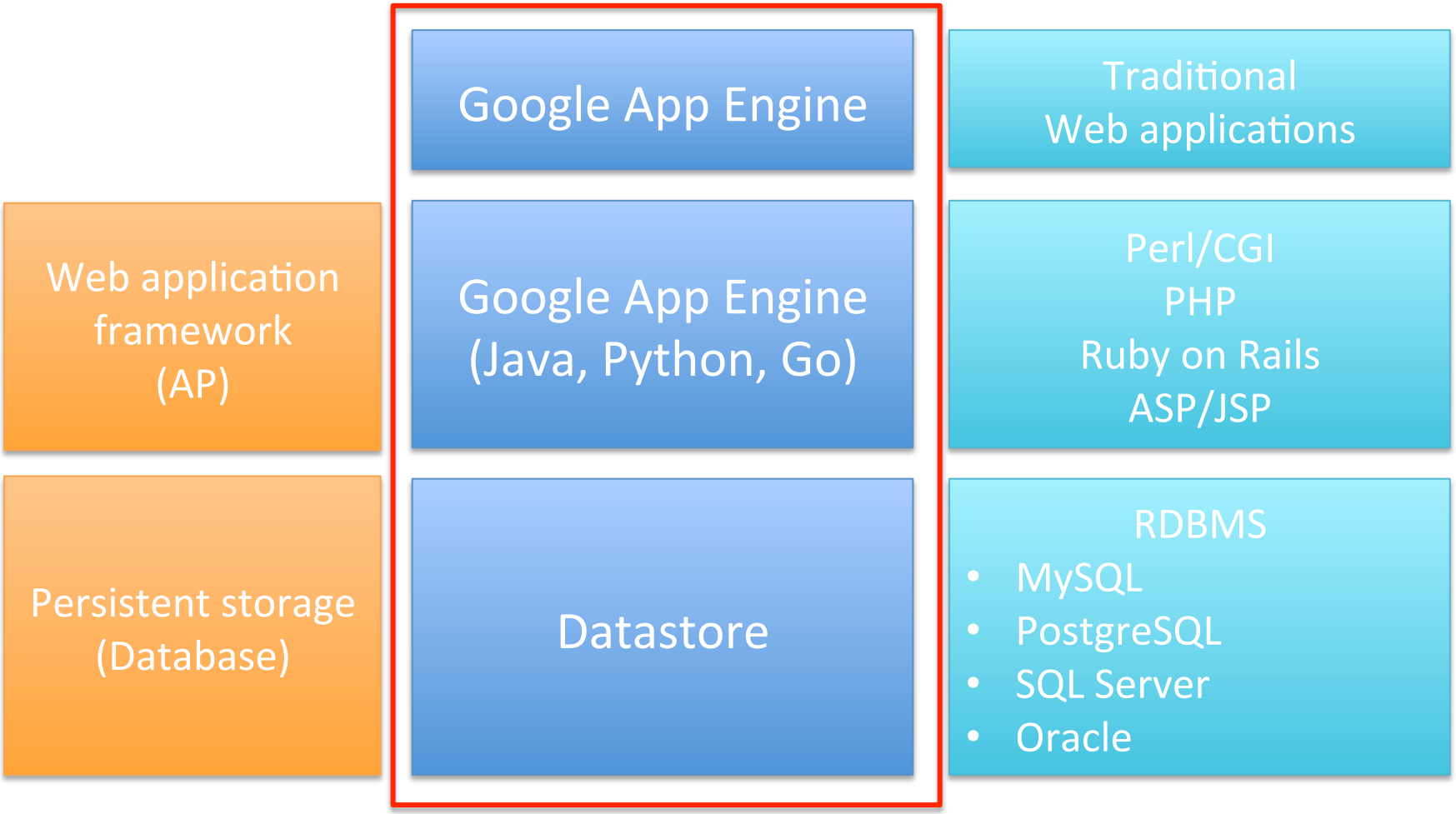
Datastore Introduction



Source: Datastore Introduction,
http://www.youtube.com/watch?v=fQazhzcC-rg

Google Cloud Datastore

Datasotre is a database (persistent storage) for App Engine



Source: Datastore Introduction, http://www.youtube.com/watch?v=fQazhzcC-rg

Google Cloud Platform

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  - Cloud Datastore
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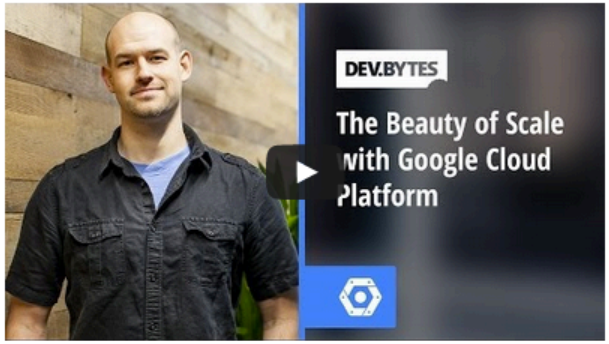
  - Carrier Interconnect
  - Direct Peering
  - HTTP Load Balancing Beta
  - Network Load Balancing
- Big Data
  - BigQuery
  - Hadoop on Google

Google Cloud Platform

With Google Cloud Platform, developers can build, test and deploy applications on Google's highly-scalable and reliable infrastructure for your web, mobile and backend solutions.

Focus on writing code, not on infrastructure, and use the same infrastructure that Google uses for your application, computing and big data needs.



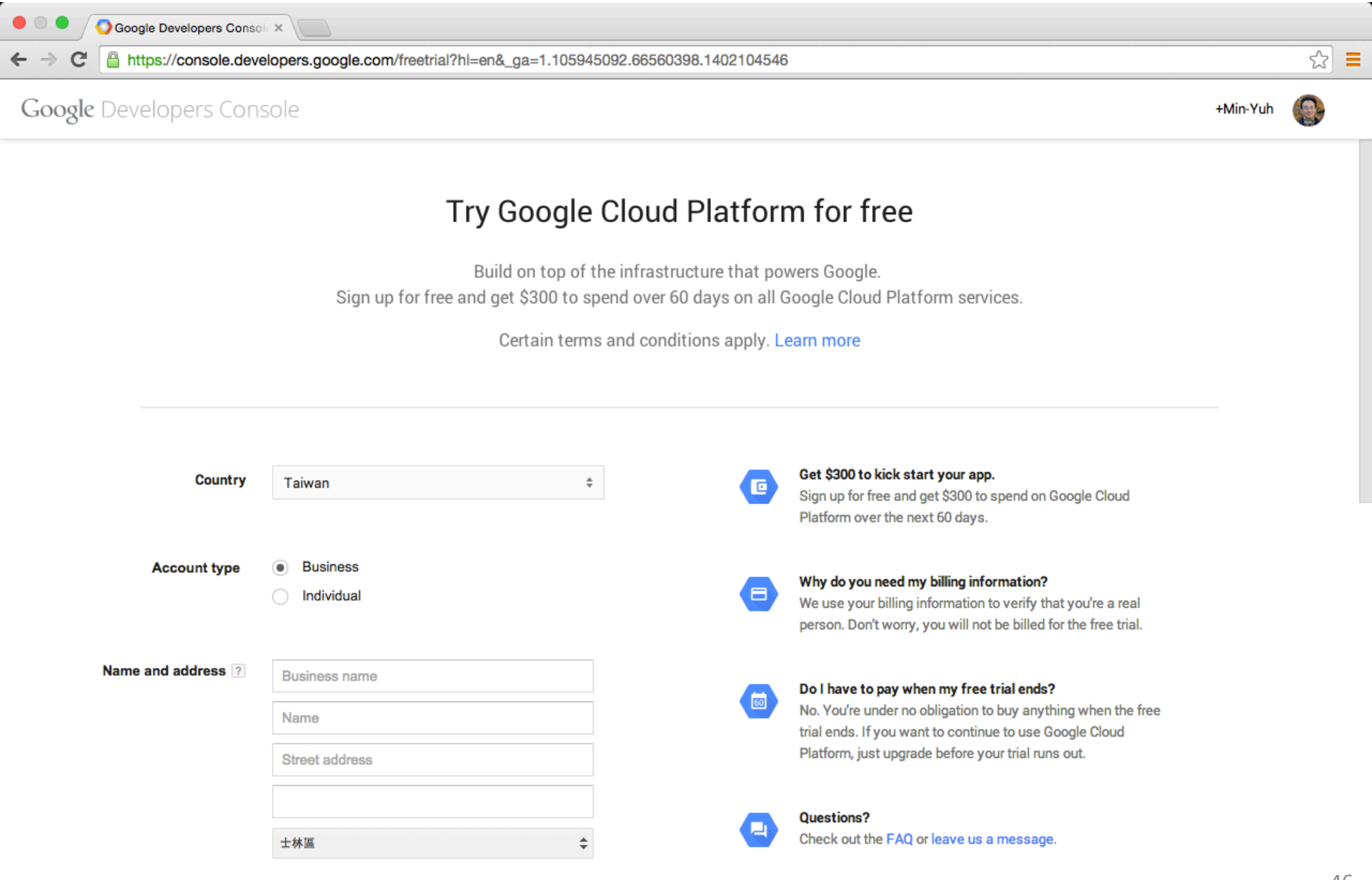
Get started quickly

If you're ready to get started, try these solutions for getting software up and running on our platform!

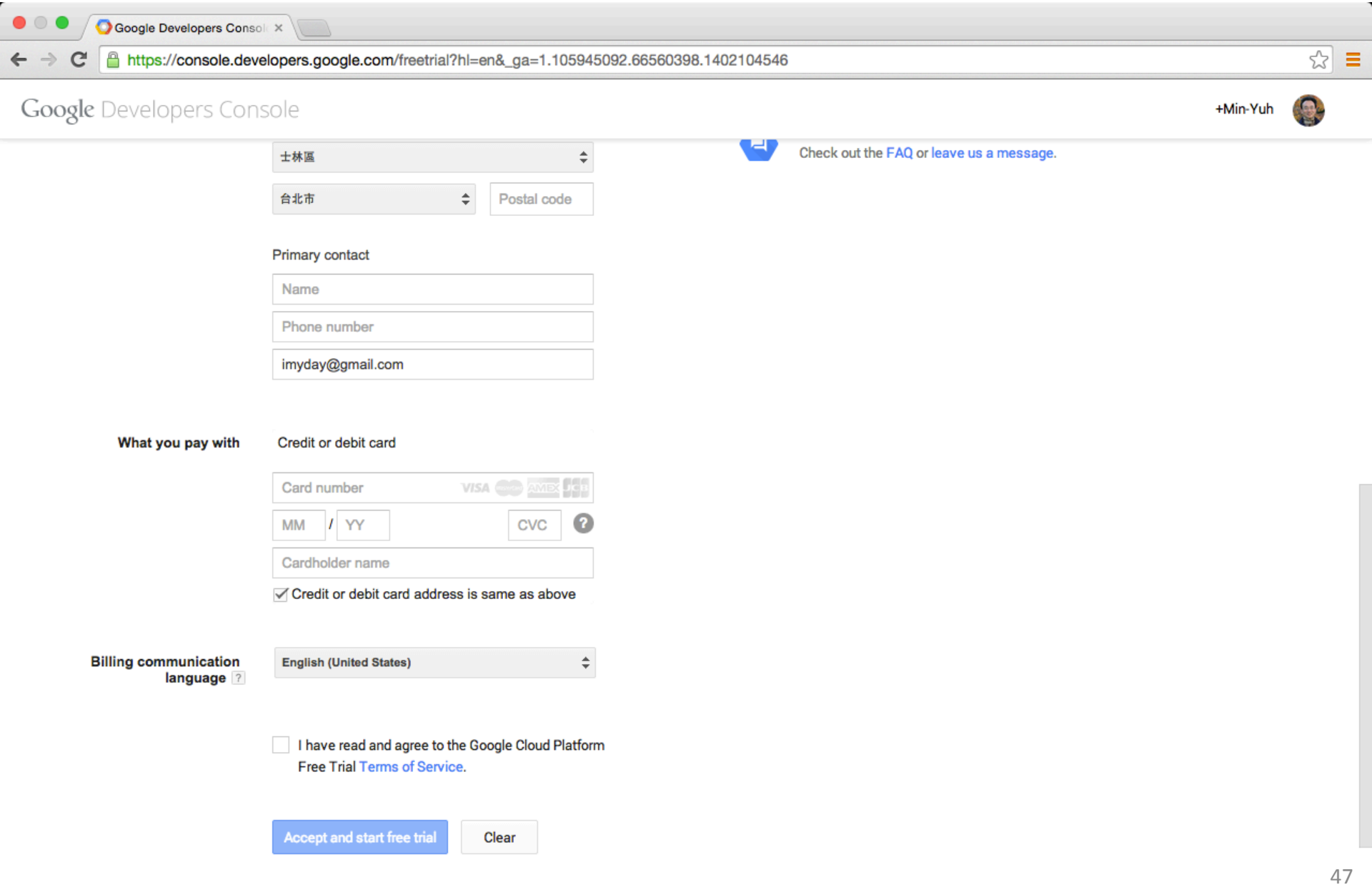
LAMP development stack

Ruby development stack

Try Google Cloud Platform for free

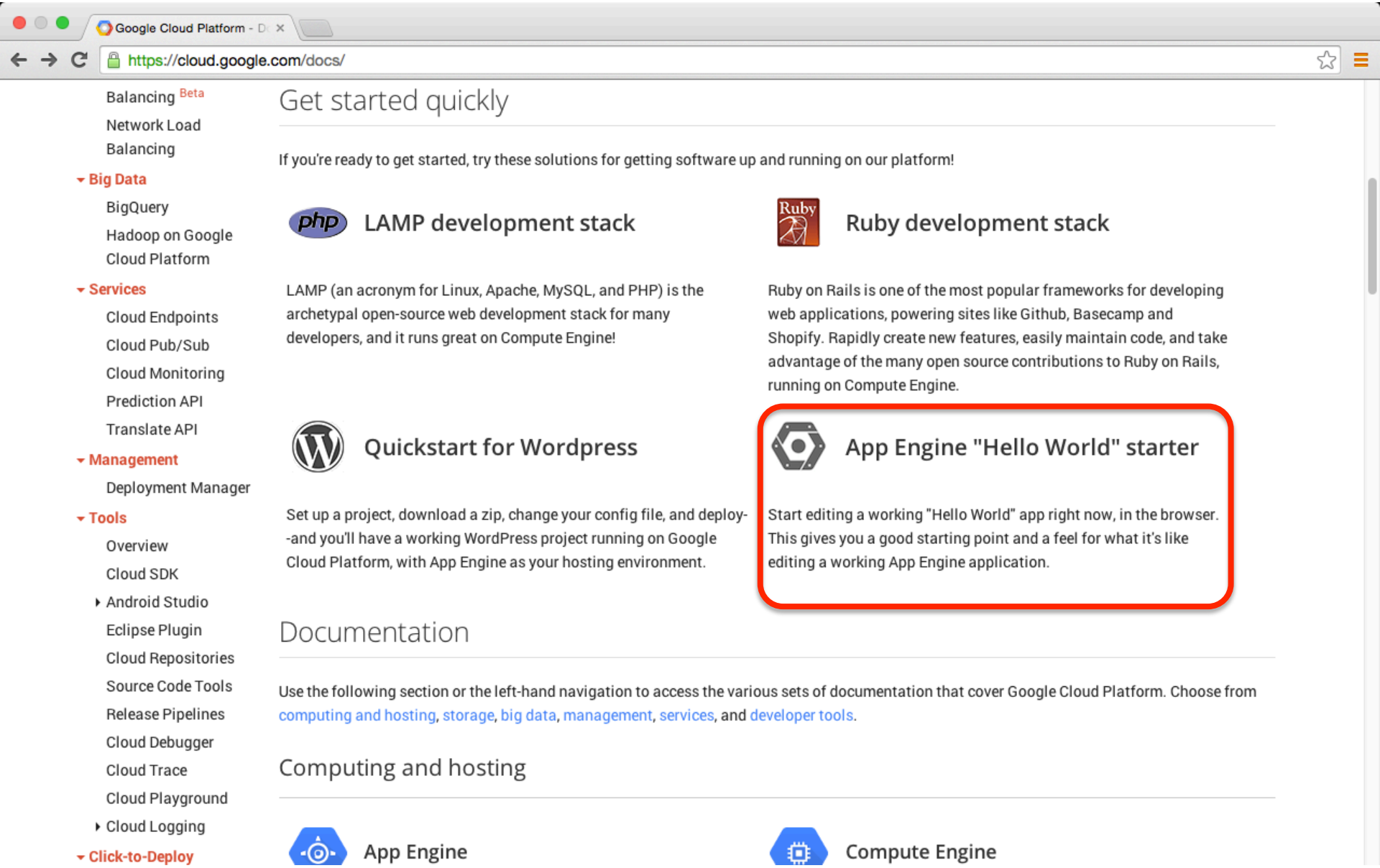


Try Google Cloud Platform for free



Google Cloud Platform

https://cloud.google.com/docs/



Google Cloud Platform

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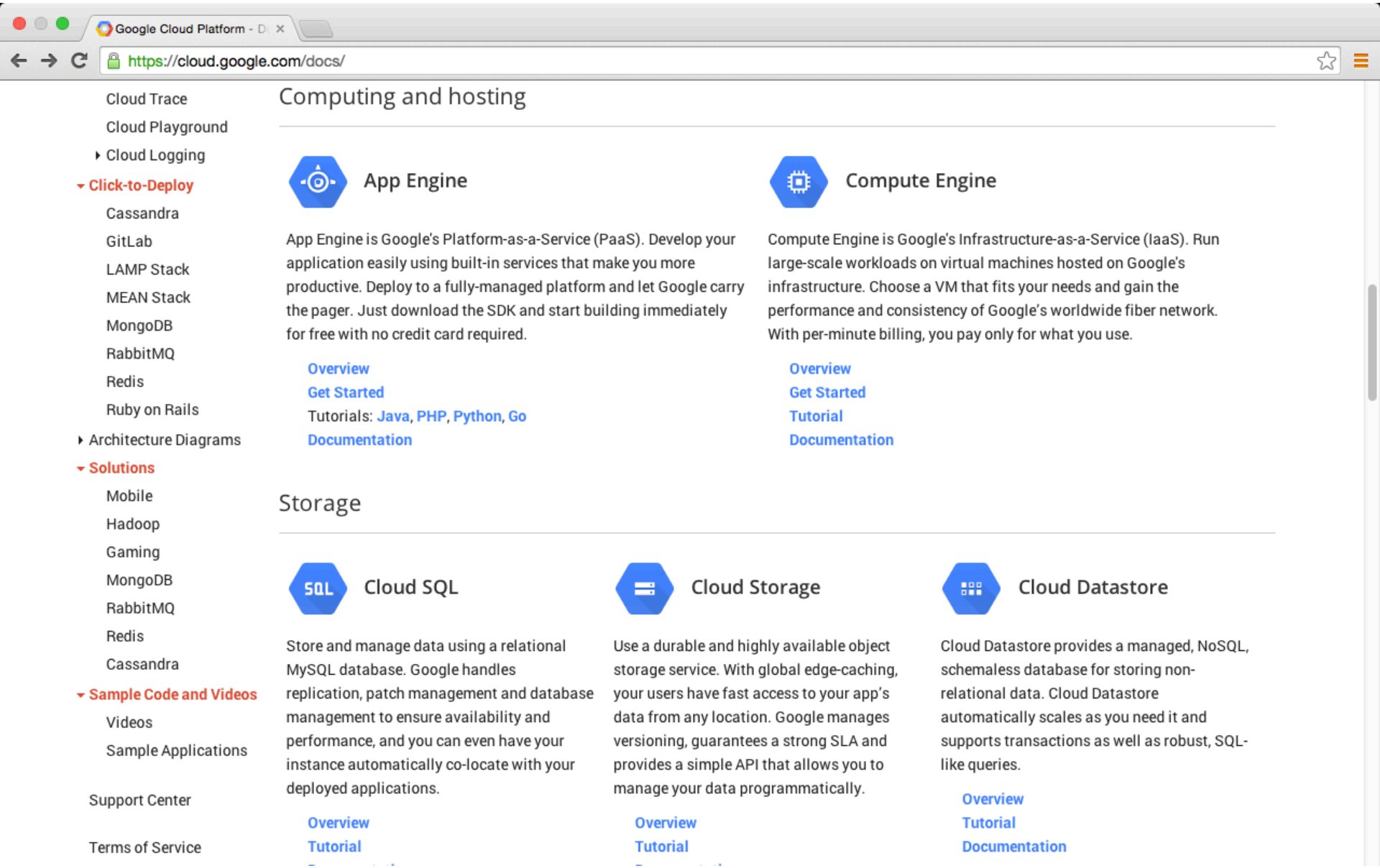

App Engine "Hello World" starter

https://console.developers.google.com/start/appengine

Deploy your first app in five minutes

- Start editing a working "Hello World" app right now, in the browser.
- This gives you a good starting point and a feel for what it's like editing a working App Engine application.

Try Google App Engine Now

1. NAME YOUR PROJECT
2. SELECT YOUR LANGUAGE
3. EXPLORE THE STARTER CODE
4. INSTALL GOOGLE CLOUD SDK
5. RUN YOUR APP LOCALLY
6. CREATE YOUR PROJECT AND DEPLOY

Google App Engine

Google Developers Consol ×

https://console.developers.google.com/start/appengine?_ga=1.26824890.66560398.1402104546

Google Developers Console

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+Min-Yuh

1. NAME YOUR PROJECT
2. SELECT YOUR LANGUAGE
3. EXPLORE THE STARTER CODE
4. INSTALL GOOGLE CLOUD SDK
5. RUN YOUR APP LOCALLY
6. CREATE YOUR PROJECT AND DEPLOY

Try Google App Engine Now

Creating an App Engine app is easy, and it's free to start. Upload your app and share it with users right away, at no charge and with no commitment required.

1 NAME YOUR PROJECT

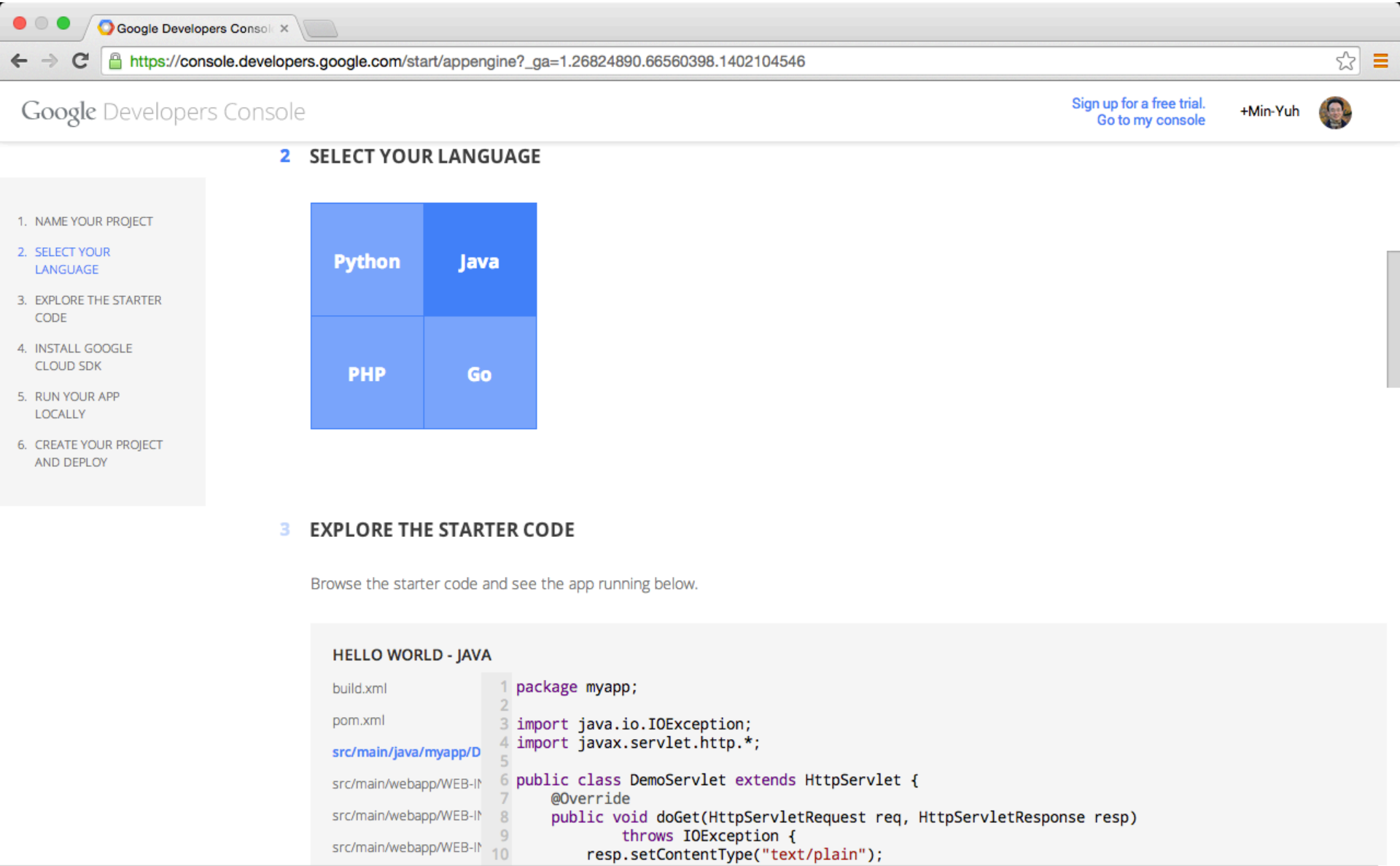
You use your project to manage all of the Google Cloud Platform resources for your app, including deployment, access control, billing, and services. You can change your project name later.

HelloWorldGoogleAppEngine

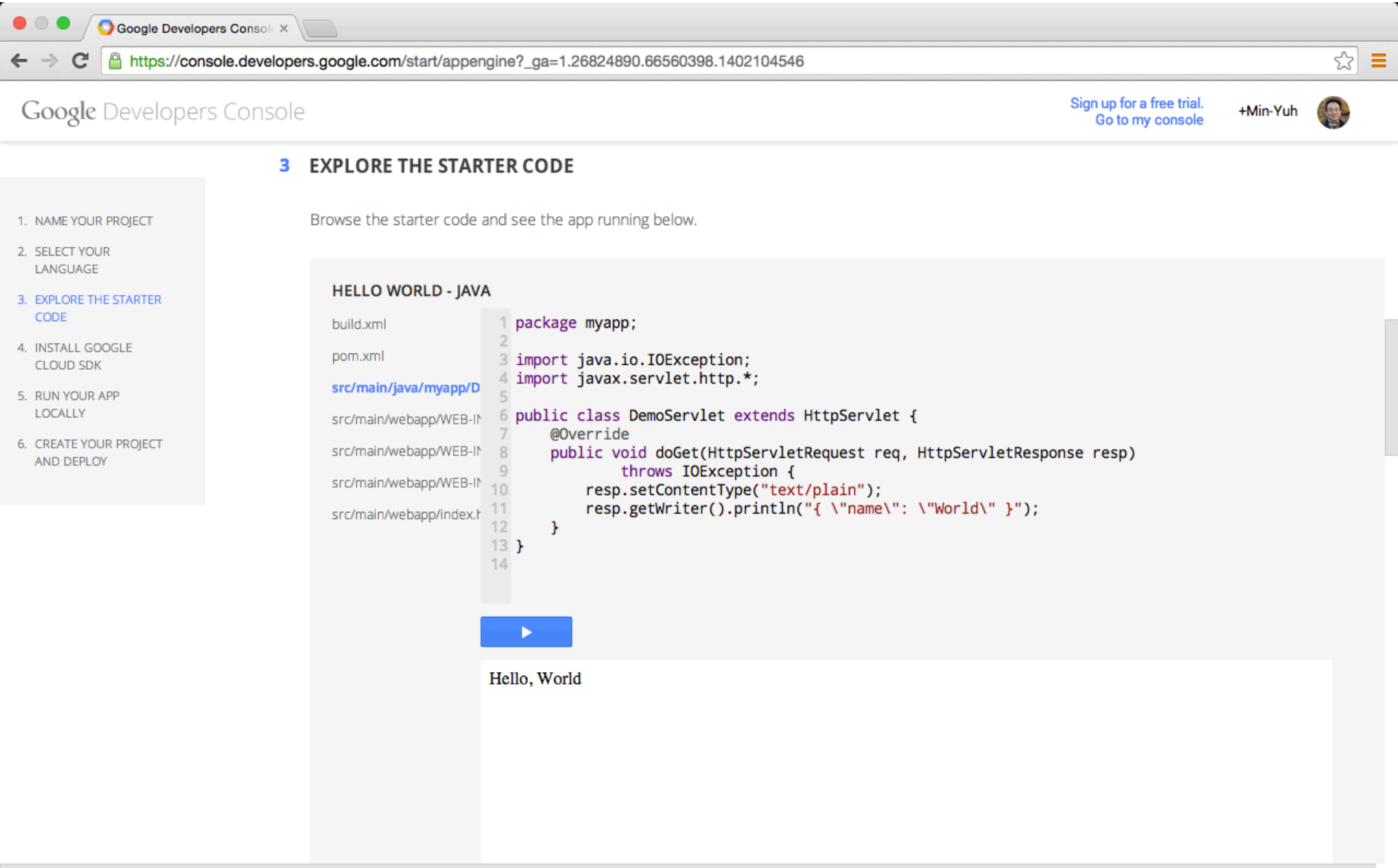
2 SELECT YOUR LANGUAGE

Python | Java

Google App Engine



Google App Engine



Google App Engine

HELLO WORLD - JAVA

build.xml

pom.xml

src/main/java/myapp/D

src/main/webapp/WEB-I

src/main/webapp/WEB-I

src/main/webapp/WEB-I

src/main/webapp/index.h

```java
package myapp;

import java.io.IOException;
import javax.servlet.http.*;

public class DemoServlet extends HttpServlet {
    @Override
    public void doGet(HttpServletRequest req, HttpServletResponse resp)
            throws IOException {
        resp.setContentType("text/plain");
        resp.getWriter().println("{ \"name\": \"World\" }");
    }
}
```

▶

Hello, World

Download this code

Google App Engine

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https://console.developers.google.com/start/appengine?_ga=1.26824890.66560398.1402104546

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1. NAME YOUR PROJECT
2. SELECT YOUR LANGUAGE
3. EXPLORE THE STARTER CODE
4. INSTALL GOOGLE CLOUD SDK
5. RUN YOUR APP LOCALLY
6. CREATE YOUR PROJECT AND DEPLOY

4 INSTALL GOOGLE CLOUD SDK

Mac OS X/Linux

1. Download and install Google Cloud SDK by running the following command in your shell or Terminal:

```
curl https://sdk.cloud.google.com/ | bash
```

Follow the prompts to install the **Java** App Engine package.

2. Restart your shell or Terminal to pick up environment changes.
3. Sign in to Google Cloud Platform using this command:

```
gcloud auth login
```

4. Install the App Engine package for Java using this command:

```
gcloud components update gae-java
```

5 RUN YOUR APP LOCALLY

Google App Engine

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5 RUN YOUR APP LOCALLY

Note: App Engine supports Java 7. Make sure you have the Java 7 JDK installed.

1. Download appengine-try-java.zip and unpack it. This creates your project directory, including **`src/`** and **`war/`** subdirectories.
2. Download and install Apache Maven version 3.0 or later. The starter app includes an Apache Maven build file.
3. Build and run the sample locally using the following commands:

```
cd appengine-try-java
mvn package
dev_appserver.sh target/appengine-try-java-1.0
```

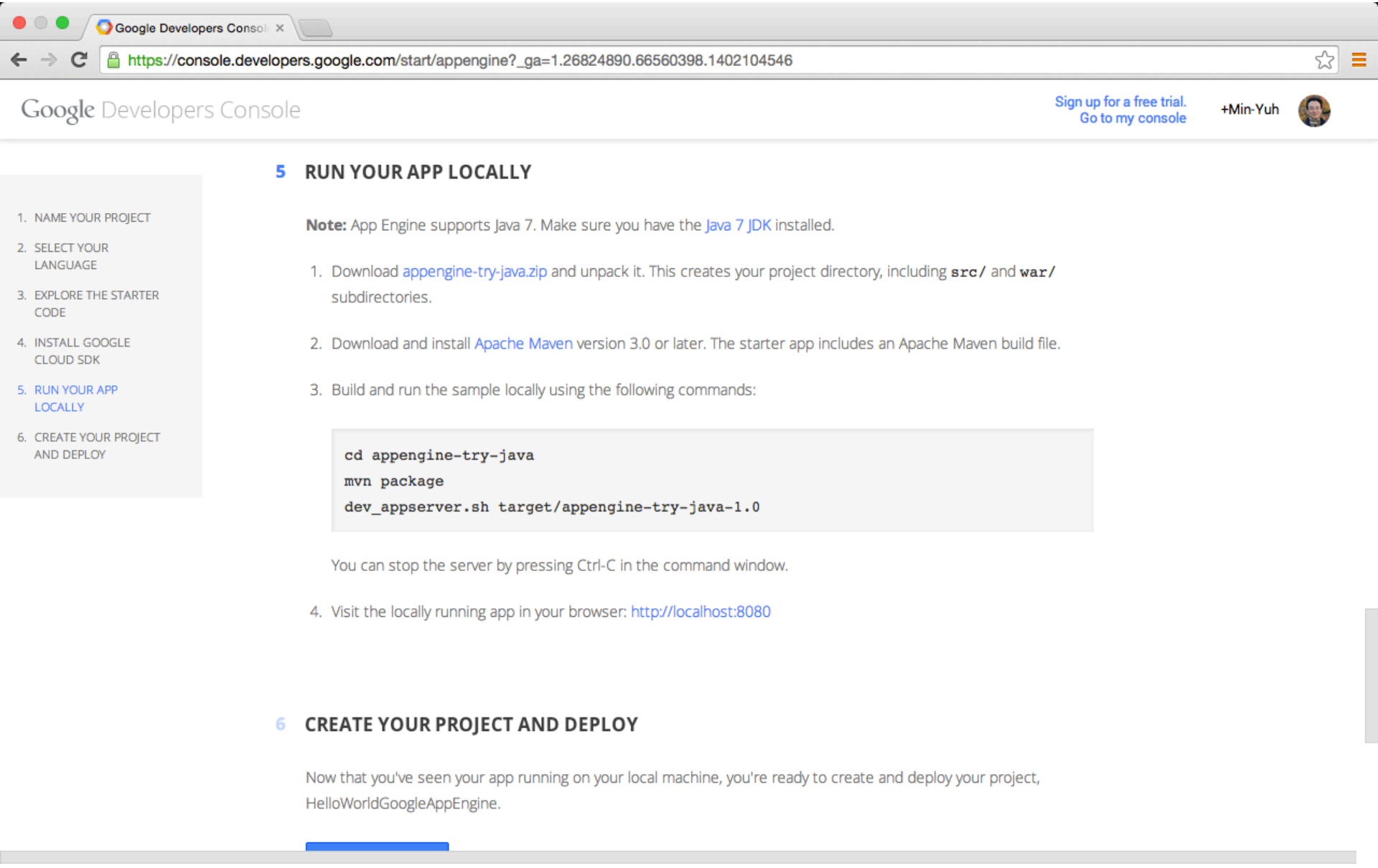
You can stop the server by pressing Ctrl-C in the command window.

4. Visit the locally running app in your browser: http://localhost:8080

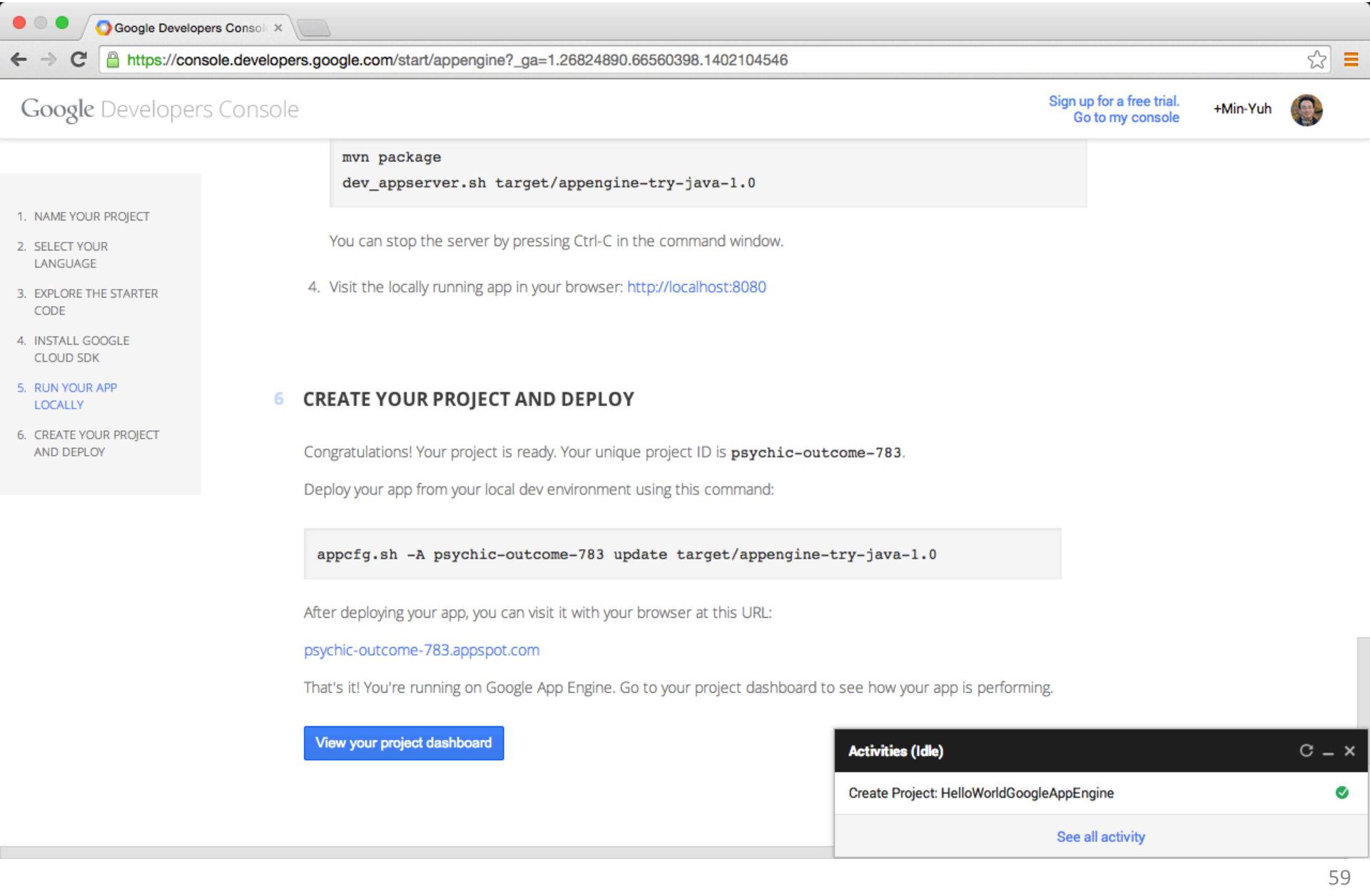
6 CREATE YOUR PROJECT AND DEPLOY

Now that you've seen your app running on your local machine, you're ready to create and deploy your project, HelloWorldGoogleAppEngine.

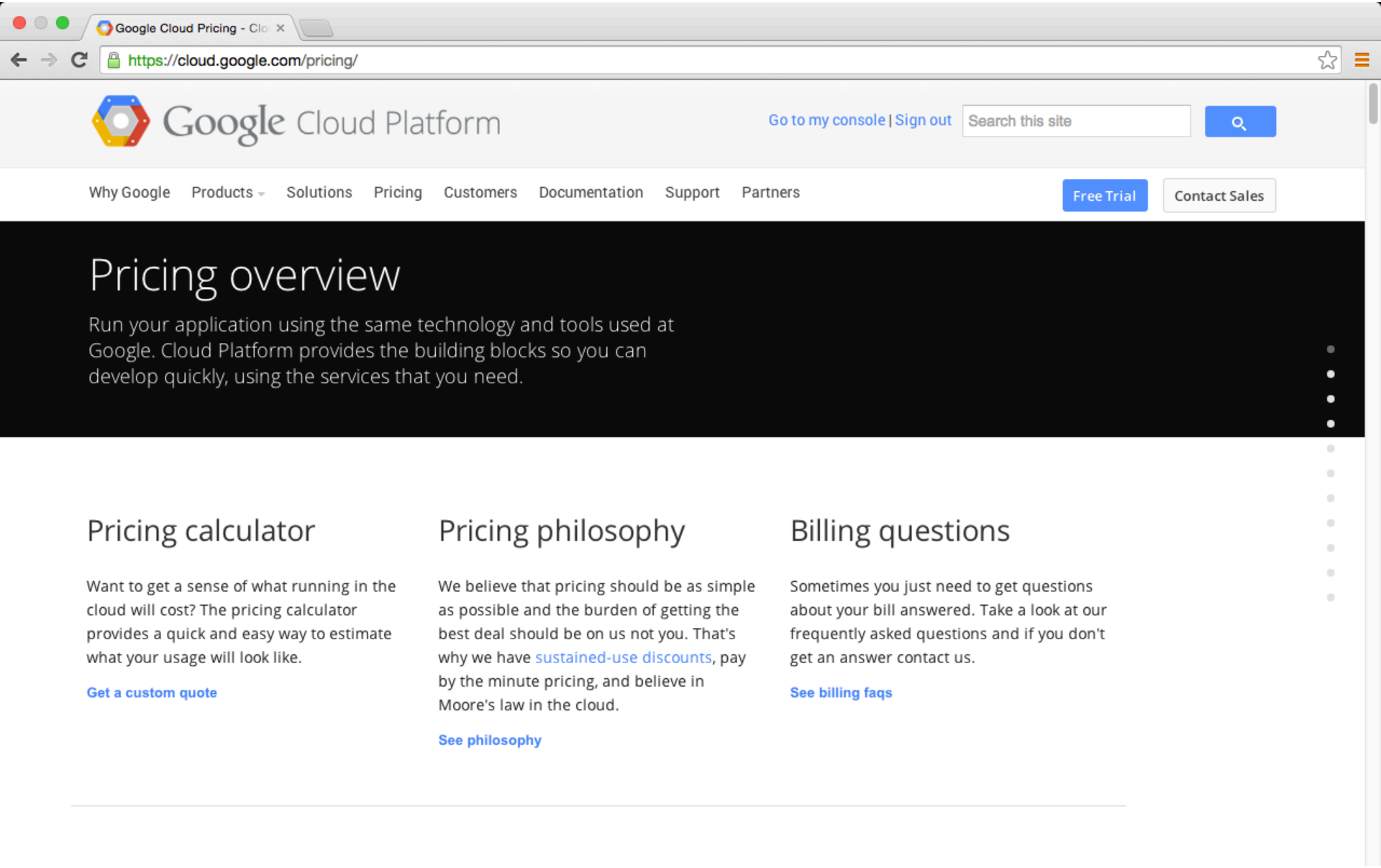
Google App Engine



Google App Engine



Google Cloud Platform



Summary

- **Google Cloud Platform**
  - Google App Engine 
  - Google Cloud Datastore 
  - Google Cloud Endpoints 

- **Mobile App with Google Cloud Platform**

References

- Google Cloud Platform, https://cloud.google.com/
- Google App Engine, https://cloud.google.com/appengine/
- Google Cloud Datastore, https://cloud.google.com/datastore/
- Google Cloud Endpoints, https://cloud.google.com/endpoints/