THE UNIVERSITY OF CHICAGO

MPCS 51033 • SUMMER 2019 • SESSION 1

BACKENDS FOR MOBILE APPLICATIONS

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WELCOME TO BACKENDS FOR MOBILE APPLICATIONS

COURSE LOGISTICS

COURSE LOGISTICS

- Lectures
  - Thursday, 5:30-8:30pm
  - JCL 298 or JCL 354
  - No class on July 4th 🧨
- Attendance is highly recommended

COURSE LOGISTICS

- Office Hours
  - Before/after class

COURSE LOGISTICS

- Prerequisites
  - iOS
  - Android
  - Comfortable with UNIX tools

COURSE LOGISTICS

- Instructor
  - Andrew Binkowski

COURSE LOGISTICS

- Small class logistics
  - Let's discuss

COURSE RESOURCES

COURSE RESOURCES

- Course website
  - http://uchicago.cloud
  - Lecture slides
  - Assignments
  - Resources and links
- Class communication
  - Course website for information, articles, homework, etc.

MPCS 51033

backends for mobile applications

Home
About This Course
Sessions Notes
Course Information
Forum

anytime has become th
and development. New
to connect applications
considerations such as
balanced to mee the de

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COURSE RESOURCES

- Github forum
  - https://github.com/uchicago-cloud/mpcs51033-2019-summer-forum
- Post questions, interesting links, etc.
  - Anyone can post
  - Anyone can answer

All class communication will be done through this forum

COURSE RESOURCES

- No required text books
- Documentation from services
- Slides
- Sample projects or playgrounds
- Online tutorials, videos, etc.

COURSE RESOURCES

- Additional Resources:
  - Stack Overflow
  - Google Groups (iPhone SDK, etc.)
  - Blogs
  - You Tube
  - …

WARNING: CHECK THE DATES

COURSE DESIGN

COURSE DESIGN

- Today an app is not enough
  - Complexity
  - Interconnected
  - User expectations
  - Insights/analytics
- Provide exposure to technologies to complete mobile applications

COURSE DESIGN

COURSE DESIGN

- Current state of the field
  - Technologies come and go
  - Consolidation/duplication of services
  - Fight against DIY mentality
  - Industry proving ground doesn't fit with the narrative

Google App Engine

Windows Azure
The Future Made Familiar

amazon web services™

rackspace® HOSTING

COURSE DESIGN

- Polled former students and colleagues about the topics that are most beneficial to industry

COURSE DESIGN

- Challenges for this course...which ones to explore?
  - Most likely to be around next year
  - Easiest
  - Most powerful
  - Cost effective
  - Use in industry

COURSE DESIGN

- This class is meant to be a discussion and exploration
  - Please ask questions

COURSE DESIGN

- Expectations
  - You are highly motivated 🤔
  - You will do a lot of self-learning to address questions that effect your work 😓
  - You will not wait until the last minute to work on assignments and projects 🤔
  - You will show up and participate in class 😇
  - You will have fun 😀

COURSE WORK

SYLLABUS

- Class Sessions
  - Lectures
  - Discussion
  - Demos
  - Labs

SYLLABUS

- Labs
  - "White board" ideas for upcoming assignment
  - Address pain points on current assignment
  - Review code
  - Share solutions with peers
- On "as needed basis" as course progresses

SYLLABUS

- Technologies
  - Google Cloud Platform
  - Firebase
  - Serverless Solutions
  - Realm
  - Swift on the Server
  - iCloud
  - IBM BlueMix

SYLLABUS

- Topics
  - API Design
  - Cost benefit analysis
  - Production vs. development
  - ...

COURSE DESIGN

- Assignments
  - Explore/create different backends and strategies
  - Majority of the coursework
  - 1 or 2 weeks; depending on assignment
- Case Study
  - A topic you are interested related to mobile backends
- Final Project

COURSE DESIGN

- Week 1 - Google Cloud Platform
- Week 2 - No Class 🧨
- Week 3 - Google App Engine
- Week 4 - Firebase
- Week 5 - Firebase
- Week 6 - CloudKit
- Week 7 -
- Week 8 -
- Week 9 - Case Studies
- Final Exam Week - Final Projects Due

Subject to Change

COURSE DESIGN

- Assignments (6 * 10%) 60%
- Case Study (10 points) 10%
- Final Project (30 points) 20%

COURSE WORK

- Honor Code
  - All the assignments should be your own work
  - Department policies are strictly enforced
- Citing Resources
  - Cite any resources you use on homework
  - Includes online resources (StackOverfow, BioStars, blogs, GitHub, etc.)
- No late work (except for extraordinary circumstances)

ASSIGNMENTS

ASSIGNMENTS

- Assignments will all work toward backend solutions in a given technology
  - Tutorial based; add/improve features to existing code
  - New task designed and developed by you

ASSIGNMENTS

- There will be varying degrees of integration required with an actual mobile application
- In these cases, the mobile application can be a minimal function product (MFP?) 🤔
- The backend should bee the main artifact of the assignment

ASSIGNMENTS

- Github Classroom
- Private repositories for homework and projects
- Link to create a repo
- Grades will be posted in a "Grading" branch

ASSIGNMENTS

- Homework grading
  - Specific requirements to be met
  - Functioning solution on a server
  - Style Points
    - Application design, Coding factoring/style, Readability, Best practices
- Some assignments are over the course of two weeks
  - I will recommend what to cover each week

CASE STUDIES

CASE STUDIES

- Teach us all something we did not discuss
  - Related to your final project?
- Present to class (or alternative)

CONTROL STUDIES

POTENTIAL TOPICS

- Up-and-computing technology
- Strategy/technique to deal with problem
- Microsoft Azure
- Compare costs of different services
- Industry survey
- Case study on company (SnapChat, Spotify, Evernote)

Using Microservices to Encode and Publish Videos at The New York Times

By FLAVIO RIBEIRO , FRANCISCO SOUZA , MAXWELL DA SILVA and THOMPSON MARZAGÃO

NOVEMBER 1, 2016 10:30 AM Comment

Email

Share

Tweet

Save

More

Video publishing at The Times is growing

For the past 10 years, the video publishing lifecycle at The New York Times has relied on vendors and in-house hardware solutions. With our growing investment in video journalism over the past couple of years, we've found ourselves producing more video content every month, along with supporting new initiatives such as 360-degree video and Virtual Reality. This growth has created the need to migrate to a video publishing platform that could adapt to, and keep up with, the fast pace that our newsroom demands and the continued evolution of our production process. Along with this, we needed a system that could continuously scale in both capacity and features while not compromising on either quality or reliability.

A solution

At the beginning of this year, we created a group inside our video engineering team to implement a new solution for the ingesting, encoding, publishing and the syndication of our growing library of video content. The main goal of the team was to implement a job processing pipeline that was vendor agnostic and cloud-based, along with being highly efficient, elastic, and, of course, reliable. Another goal was to make the system as easy to use as possible, removing any hurdles that might get in the way of our video producers publishing their work and distributing it to our platforms and third-party partners. To do that, we decided to leverage the

FINAL PROJECTS

FINAL PROJECTS

- Opportunity to use what you've learned in a project you care about
  - Adapt old iOS project
  - New project
  - ...

BACKENDS FOR MOBILE APPLICATION

BACKENDS FOR MOBILE APPLICATION

- Backends is a specific utilization of cloud computing

BACKENDS FOR MOBILE APPLICATION

- Can you keep a secret?

BACKENDS FOR MOBILE APPLICATION

- Cloud Computing
  - General term used to describe a class of network based computing over the Internet
  - Collection/group of integrated and networked hardware, software and Internet infrastructure (ie. platform)
  - Off-the-shelf components with OSS combined with in-house applications and/or system software

BACKENDS FOR MOBILE APPLICATION

- Cloud computing platforms
  - Provides on demand services
  - Elastic pricing (pay for what you use)
  - Scale up and down in capacity and functionalities
  - Available to general public, enterprises, corporations and businesses markets
  - Cloud are transparent to users and applications

BACKENDS FOR MOBILE APPLICATION

- Characteristics of cloud computing
  - Use the Internet for communication and transport
  - Provides hardware, software and networking services to clients
  - Hide the complexity and details of the underlying infrastructure from users and applications through APIs

BACKENDS FOR MOBILE APPLICATION

- Characteristics of cloud data, applications services and infrastructure
  - Remotely hosted - services or data are hosted on remote infrastructure
  - Ubiquitous - services or data are available from anywhere
  - Commodified - a utility

BACKENDS FOR MOBILE APPLICATION

Common Characteristics:

- Massive Scale
- Resilient Computing
- Homogeneity
- Geographic Distribution
- Virtualization
- Service Orientation
- Low Cost Software
- Advanced Security

Reproduce the features of robust architecture that would require cross discipline expertise

Essential Characteristics:

- On Demand Self-Service
- Broad Network Access
- Rapid Elasticity
- Resource Pooling
- Measured Service

Make it more cost effective

BACKENDS FOR MOBILE APPLICATION

- Cloud service models
  - Software as a service (SaaS) - Adobe Creative Cloud, Office 365
  - Storage as a service - Apple iCloud, Box, Amazon
  - Platform as a service (PaaS) - Amazon S3, Google App Engine
  - Infrastructure as a service (IaaS) - AWS, Rackspace, Google Compute Engine

BACKENDS FOR MOBILE APPLICATION

- Cloud computing providers

Application Service (SaaS)	MS Live/ExchangeLabs, IBM, Google Apps; Salesforce.com Quicken Online, Zoho, Cisco
Application Platform	Google App Engine, Mosso, Force.com, Engine Yard, Facebook, Heroku, AWS
Server Platform	3Tera, EC2, SliceHost, GoGrid, RightScale, Linode
Storage Platform	Amazon S3, Dell, Apple, ...

Naming and acronyms are not consistent across industry

BACKENDS FOR MOBILE APPLICATION

- Cloud computing service layers

	Services	Description
Application Focused	Services	Services - Complete business services such as PayPal, OpenID, OAuth, Google Maps, Alexa
	Application	Application - Cloud based software that eliminates the need for local installation such as Google Apps, Microsoft Online
	Development	Development - Software development platforms used to build custom cloud based applications (PAAS & SAAS) such as SalesForce
Infrastructure Focused	Platform	Platform - Cloud based platforms, typically provided using virtualization, such as Amazon ECC, Sun Grid
	Storage	Storage - Data storage or cloud based NAS such as CTERA, iDisk, CloudNAS
	Hosting	Hosting - Physical data centers such as those run by IBM, HP, NaviSite, etc.

BACKENDS FOR MOBILE APPLICATION

Towards managed infrastructure (DevOps)

Towards managed services (NoOps)

IaaS	**PaaS**
Raw compute, storage and network More granular control	Preset run-times Java, Go, PHP, Python... Focus is application logic
Pay for what you allocate More management overhead	Pay for what you use Less management overhead

BACKENDS FOR MOBILE APPLICATION

- Common benefits
  - “no-need-to-know” the underlying details of infrastructure
  - Applications interface with the infrastructure via the APIs (simpler)
  - “flexibility and elasticity” allows these systems to scale up and down at will utilizing the resources (eg. CPU, storage, server capacity, load balancing, and databases)
  - “pay as much as used and needed” type of utility computing
  - “always on!, anywhere and any place” type of network-based computing

BACKENDS FOR MOBILE APPLICATION

- VM (virtual machine) technology allows multiple virtual machines to run on a single physical machine
- Abstraction of a physical machine

BACKENDS FOR MOBILE APPLICATION

- Virtualization of computers, application, functions

BACKENDS FOR MOBILE APPLICATION

BACKENDS FOR MOBILE APPLICATION

- Advantages
  - Performance, cost, access, collaboration, reliability, bought expertise, security
- Disadvantages
  - Need a network, loss of control, ease of use, monopolization of industry, security

BACKENDS FOR MOBILE APPLICATION

- Design patterns for backends for mobile applications

BACKENDS FOR MOBILE APPLICATION

BACKENDS FOR MOBILE APPLICATION

BACKENDS FOR MOBILE APPLICATION

BREAK TIME 😴

GOOGLE CLOUD PLATFORM

FOR MOBILE APPLICATION DEVELOPERS

GOOGLE CLOUD PLATFORM

- Platform to build, test and deploy applications and services using Google's infrastructure
  - Highly-scalable
  - Secure
  - Reliable

GOOGLE CLOUD PLATFORM

- GCP uses Google's infrastructure and data centers
  - Global meshed backbone network
  - 33 countries

GOOGLE CLOUD PLATFORM

- Google Cloud Platform provides offerings of every type to run code in the cloud
  - Control
  - Ease of use
  - Cost
  - Products (50+)

GOOGLE CLOUD PLATFORM

- Compute
- Storage
- Big Data
- Machine Learning

GOOGLE CLOUD PLATFORM

- Compute
- Storage
- Big Data
- Machine Learning

Virtual Machines
Containers
Functions

GOOGLE CLOUD PLATFORM

- Compute
- Storage
- Big Data
- Machine Learning

Files
Archival Storage
Persistant Disks for VMs
NoSQL
RDBMS
Hadoop/Spark

GOOGLE CLOUD PLATFORM

- Compute
- Storage
- Big Data
- Machine Learning

Data pipelines
Data warehouses
Data science notebooks

GOOGLE CLOUD PLATFORM

- Compute
- Storage
- Big Data
- Machine Learning

GOOGLE CLOUD PLATFORM

- Developer Tools
- Networking
- Management Tools
- Identity and Security

GOOGLE CLOUD PLATFORM

- Developer Tools
- Networking
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- Identity and Security

GOOGLE CLOUD PLATFORM

Why Google Cloud Platform?

Future-Proof Infrastructure

Secure, global, high-performance, cost-effective and constantly improving. We’ve built our cloud for the long haul.

Seriously Powerful Data & Analytics

Tap into big data to find answers faster and build better products.

Serverless, Just Code

Grow from prototype to production to planet-scale, without having to think about capacity, reliability or performance.

BENEFITS OF GCP 👍

BENEFITS OF GCP

- Time
  - Faster to market
  - Borrowed expertise
  - Fast infrastructure (for development and growth)

BENEFITS OF GCP

- Money
  - Pay for what you use; scales to 0
  - No capital investments; rent vs. buy
  - Man hours

BENEFITS OF GCP

- Co$t benefits (compared to other clouds)
  - Sub-hour billing
  - Sustained user discounts
  - Custom machine

BENEFITS OF GCP

- Scaling
  - Default is to autoscale
  - Set limits

BENEFITS OF GCP

- Upgrades
  - Frequent improvements to infrastructure
  - Services added/upgraded

BENEFITS OF GCP

- Compliance
  - Certifications for compliance across different industries

Google Cloud Platform

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GOOGLE CLOUD PLATFORM SECURITY

Google Cloud Platform meets rigorous privacy and compliance standards that test for data safety, privacy, and security.

Independent Audits of Infrastructure, Services, and Operations

Our customers and regulators expect independent verification of security, privacy and compliance controls. Google undergoes several independent third party audits on a regular basis to provide this assurance. This means that an independent auditor has examined the controls present in our data centers, infrastructure and operations. Google has annual audits for the following standards:

- SSAE16 / ISAE 3402 Type II:
  - SOC 1
  - SOC 2
  - SOC 3 public audit report
- ISO 27001, one of the most widely recognized, internationally accepted independent security standards. Google has earned ISO 27001 certification for the systems, applications, people, technology, processes and data centers serving Google Cloud Platform. The ISO 27001 Certificate for Google Cloud Platform is here. Google has also earned the ISO 27001 certification for Google's shared Common Infrastructure. The ISO 27001 Certificate for Common Infrastructure is here.
- ISO 27017, Cloud Security, This is an international standard of practice for information security controls based on ISO/IEC 27002 specifically for cloud services. Our ISO 27017 Certificate is here.
- ISO 27018, Cloud Privacy, This is an international standard of practice for protection of personally identifiable information (PII) in public clouds services. Our ISO 27018 Certificate is here.
- FedRAMP ATO for Google App Engine
- PCI DSS v3.2

RELATED TOPICS

Cloud Platform Security

PCI DSS

EU Data Protection

FAQ

Answers to your frequently asked questions

View the FAQ

Security Whitepaper

Read more about Google's approach to security

View the whitepaper

Contact us

Talk with a Cloud Platform

BENEFITS OF GCP

- The bad
  - Options are daunting; "Am I doing this the right (best) way"
  - Documentation
  - Potential for di$a$ter

TOOLS AND LIBRARIES

TOOLS AND LIBRARIES

- Google tools
- Consoles/GUIs
- Command line
- Third-party tools

Choosing Developer Tools on GCP

Google Cloud Platform provides a collection of tools and libraries that help you develop quicker. This page helps you identify the tools that best fit your situation, whether you're looking to manage your resources from the command line, need better ways to debug source code in production, need a solution for running API backends or just want intuitive integration into your favorite IDE.

TOOL	DESCRIPTION	BENEFITS
Cloud SDK	Command-line interface for Google Cloud Platform products and services	Manage all of your Google Cloud Platform projects from the command line including compute, networking, storage and development products.
Cloud Shell	Manage your infrastructure and applications from the command-line in any browser	Your own Linux VM accessible from your browser allows you to manage your GCP resources with all of the necessary tools pre-installed and up-to-date.
Cloud Source Repositories	Private Git repositories hosted on Google Cloud Platform	Enable collaborative development with hosted Git repositories and improve developer productivity with automatic integration with Stackdriver Debugger and other Google Cloud Platform diagnostic tools.
Cloud Tools for Android Studio	Build backend services on Google Cloud Platform for your Android apps	Google Cloud Platform plugin for Android Studio lets you unify the development experience by letting you code, build, test and validate your backends in the same environment you use to develop your mobile apps.
Cloud Tools for IntelliJ	Deploy and debug production cloud applications right inside of IntelliJ	Google Cloud Platform plugin for IntelliJ lets you easily deploy and debug your Java applications directly from your IDE.
Cloud Tools for Eclipse	Deploy and debug App Engine Standard applications right inside of Eclipse	Google Cloud Platform plugin for Eclipse lets you easily deploy and debug your Java App Engine Standard applications directly from your IDE.
Cloud Tools for PowerShell	Full Google Cloud Platform control from Windows PowerShell	Cloud Tools for PowerShell lets you script, automate, and manage your Google Cloud Platform projects.
Cloud Tools for Visual Studio	Deploy Visual Studio applications to Google Cloud Platform	Google Cloud Platform plugin for Visual Studio lets you easily deploy your .NET applications directly and manage your projects from Visual Studio.
Cloud Deployment Manager	Create and manage cloud resources with simple templates	Google Cloud Deployment Manager allows you to specify all the resources needed for your application in a declarative format using yaml.
Maven App Engine Plugin	Build and deploy your App Engine apps using Maven	The Google Maven Plugin and archetypes lets you easily build and deploy your App Engine applications using Maven
Gradle App Engine Plugin	Build using	

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

TOOLS AND LIBRARIES

Google Cloud Platform | Faculty Institute 2017 VM

DASHBOARD | ACTIVITY | CUSTOMIZE

Project info

Project name
Faculty Institute 2017 VM

Project ID
faculty-institute-2017-vm

Project number
513361153813

Go to project settings

Resources

Cloud Storage
1 bucket

Trace

No trace data from the past 7 days

APIs

Requests (requests/sec)

There is no data for this chart

Go to APIs overview

Google Cloud Platform status

All services normal

Go to Cloud status dashboard

Billing

Estimated charges $0.00
For the billing period Sep 1 – 25, 2017

View detailed charges

Error Reporting

No sign of any errors. Have you set up Error Reporting?

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

TOOLS AND LIBRARIES

TOOLS AND LIBRARIES

Google Cloud Platform | Faculty Institute 2017 VM

IAM & admin

- IAM
- Identity
- Quotas
- Manage resources

Settings | SHUT DOWN | MIGRATE

Project name
Faculty Institute 2017 VM | Save

Project ID
faculty-institute-2017-vm

Project number
513361153813

faculty-institute-2017-vm

```
tabinks@faculty-institute-2017-vm:~/global$ ls
compute-engine-template.jinja  firewall-template.jinja  networking-lab.yaml  network-template.jinja  subnetwork-template.jinja  vm-template.jinja
tabinks@faculty-institute-2017-vm:~/global$ ls
compute-engine-template.jinja  firewall-template.jinja  networking-lab.yaml  network-template.jinja  subnetwork-template.jinja  vm-template.jinja
tabinks@faculty-institute-2017-vm:~/global$
```

TOOLS AND LIBRARIES

```
INFO     2017-09-23 20:14:21,891 recording.py:676] Saved; key: __appstats__:061800, part: 50 bytes, full: 1206 bytes, overhead: 0.000 + 0.005
; link: http://localhost:8080/_ah/stats/details?time=1506197661886
INFO     2017-09-23 20:14:21,900 module.py:832] default: "GET /apple-touch-icon-precomposed.png HTTP/1.1" 404 154
INFO     2017-09-23 20:14:21,924 recording.py:676] Saved; key: __appstats__:061900, part: 38 bytes, full: 1202 bytes, overhead: 0.000 + 0.009
; link: http://localhost:8080/_ah/stats/details?time=1506197661914
INFO     2017-09-23 20:14:21,932 module.py:832] default: "GET /apple-touch-icon.png HTTP/1.1" 404 154
INFO     2017-09-23 20:14:21,937 module.py:832] default: "GET /favicon.ico HTTP/1.1" 404 -
INFO     2017-09-23 20:14:21,963 recording.py:676] Saved; key: __appstats__:061900, part: 12 bytes, full: 1330 bytes, overhead: 0.000 + 0.006
; link: http://localhost:8080/_ah/stats/details?time=1506197661956
INFO     2017-09-23 20:14:21,975 module.py:832] default: "GET / HTTP/1.1" 200 21531
INFO     2017-09-23 20:14:22,002 recording.py:676] Saved; key: __appstats__:061900, part: 50 bytes, full: 1212 bytes, overhead: 0.000 + 0.005
; link: http://localhost:8080/_ah/stats/details?time=1506197661997
INFO     2017-09-23 20:14:22,011 module.py:832] default: "GET /apple-touch-icon-precomposed.png HTTP/1.1" 404 154
INFO     2017-09-23 20:14:22,030 recording.py:676] Saved; key: __appstats__:062000, part: 38 bytes, full: 1198 bytes, overhead: 0.000 + 0.005
; link: http://localhost:8080/_ah/stats/details?time=1506197662025
INFO     2017-09-23 20:14:22,042 module.py:832] default: "GET /apple-touch-icon.png HTTP/1.1" 404 154
INFO     2017-09-23 20:14:22,047 module.py:832] default: "GET /favicon.ico HTTP/1.1" 404 -
INFO     2017-09-23 20:14:22,069 recording.py:676] Saved; key: __appstats__:062000, part: 50 bytes, full: 1234 bytes, overhead: 0.000 + 0.008
; link: http://localhost:8080/_ah/stats/details?time=1506197662059
INFO     2017-09-23 20:14:22,083 module.py:832] default: "GET /apple-touch-icon-precomposed.png HTTP/1.1" 404 154
INFO     2017-09-23 20:14:22,102 recording.py:676] Saved; key: __appstats__:062000, part: 38 bytes, full: 1221 bytes, overhead: 0.000 + 0.005
; link: http://localhost:8080/_ah/stats/details?time=1506197662096
INFO     2017-09-23 20:14:22,112 module.py:832] default: "GET /apple-touch-icon.png HTTP/1.1" 404 154
INFO     2017-09-23 20:14:22,117 module.py:832] default: "GET /favicon.ico HTTP/1.1" 404 -
^CINFO     2017-09-25 04:12:42,163 shutdown.py:45] Shutting down.
INFO     2017-09-25 04:12:42,212 api_server.py:945] Applying all pending transactions and saving the datastore
INFO     2017-09-25 04:12:42,229 api_server.py:948] Saving search indexes
tabinkowski@Ts-MacBook-Pro ~/Documents/Development/GitHub/everydaycomputing/everydaycomputing.org (dev-microservice)
501 %
  [Restored Sep 25, 2017, 5:42:39 PM]
Last login: Mon Sep 25 17:42:38 on ttys001
```

TOOLS AND LIBRARIES

Google Cloud Platform | Faculty Institute 2017 VM

API APIs & services

- Dashboard
- Library
- Credentials

Library

Google APIs

Search all 100+ APIs

Popular APIs

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

Google Cloud Machine Learning
- Vision API
- Natural Language API
- Speech API
- Translation API
- Machine Learning Engine API

Google Maps APIs
- Google Maps Android API
- Google Maps SDK for iOS
- Google Maps JavaScript API
- Google Places API for Android
- Google Places API for iOS
- Google Maps Roads API
- More

G Suite APIs
- Drive API
- Calendar API
- Gmail API
- Sheets API
- Google Apps Marketplace SDK
- Admin SDK
- More

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

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

YouTube APIs
- YouTube Data API

Advertising APIs
- AdSense Management API

Other popular APIs
- Analytics API

TOOLS AND LIBRARIES

GOOGLE STACKDRIVER

Monitoring, logging, and diagnostics for applications on Cloud Platform and AWS

TRY IT FREE

VIEW GOOGLE STACKDRIVER DOCS

Monitoring, logging & diagnostics

Google Stackdriver provides powerful monitoring, logging, and diagnostics. It equips you with insight into the health, performance, and availability of cloud-powered applications, enabling you to find and fix issues faster. It is natively integrated with Google Cloud Platform, Amazon Web Services, and popular open source packages. Stackdriver provides a wide variety of metrics, dashboards, alerting, log management, reporting, and tracing capabilities.

Monitor Cloud Platform and AWS

Stackdriver is built from the ground up for cloud-powered applications. Whether you're running on

GCP ARCHITECTURE EXAMPLES

GCP ARCHITECTURES

GCP ARCHITECTURES

GCP ARCHITECTURES

GCP ARCHITECTURES

GCP ARCHITECTURES

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GCP ARCHITECTURES

Google Cloud Platform

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MOBILE SOLUTIONS

Create compelling mobile apps using the best of Google

DEVELOPMENT GUIDES | CONTACT SALES

The Mobile Cloud Era

Mobile devices backed by scalable machine intelligence in the cloud is the defining computing paradigm of our time. Modern tools require special consideration for the challenges developers face on mobile: serverless capabilities, a cloud-first data model capable of persisting data even when the device is offline, low-latency access to media anywhere in the world, and real-time data synchronization across all mobile platforms. Cloud Platform gives developers comprehensive solutions with a focus on ease of use and speed – all without having to manage infrastructure.

https://cloud.google.com/solutions/mobile/#development_guides

SETTING UP GOOGLE CLOUD PLATFORM

SETTING UP GCP

SETTING UP GCP

- Use a gmail account
- $300 free trials available from signup (60 day expiration)
- May need a paid account for some services

SETTING UP GCP

- Use a gmail account
- $300 free trials available from signup (60 day expiration)
- May need a paid account for some services

SETTING UP GCP

- University credits of $50 that will last the length of the class
- May still need to enter a credit card for some services
- We will use very little of it

Dear Students,

Here is the URL you will need to access in order to request a Google Cloud Platform coupon. You will be asked to provide your school email address and name. An email will be sent to you to confirm these details before a coupon is sent to you.

Student Coupon Retrieval Link

- You will be asked for a name and email address, which needs to match the domain. A confirmation email will be sent to you with a coupon code.
- You can request a coupon from the URL and redeem it until: 10/27/2019
- Coupon valid through: 6/27/2020
- You can only request ONE code per unique email address.

Please contact me if you have any questions or issues.

SETTING UP GCP

- Sign up for edu grants

Google Cloud Platform Select a project

Education grants

Please enter the coupon code provided to you via the Google Cloud Platform Education Grants program to receive credit for Google Cloud Platform. Get what you need to build and run your apps, websites and services.

Coupon code

HLGN-TUQ3-CM6T-QRM5

Credit amount	Expiration date	Course
$100.00	Sep 25, 2018	51033-Backends for Mobile Applications- Sep 2017

Please email me updates regarding feature announcements, performance suggestions, feedback surveys and special offers.

Yes No

Google Cloud Platform education grants credits terms and conditions

By clicking "Accept and continue" below, you, on behalf of yourself and the organization you represent ("You") agree to these terms and conditions:

The credit is valid for Google Cloud Platform products and is subject to Your acceptance of the applicable Google Cloud Platform License Agreement and any other applicable terms of service. The credit is non-transferable and may not be sold or bartered. Unused credit expires on the date indicated on the media conveying the promotion code. The credit may be issued in increments as You use the credit over the period of time during which the credit is valid. Offer void where prohibited by law.

SETTING UP GCP

SETTING UP GCP

- Be very careful about billing
- Shut down services after you are down when testing
- Set up budgets
- Check console

SETTING UP GCP

https://cloud.google.com/free/

PROJECTS

PROJECTS

- "Project" is the organizational structure on GCP
- Projects is a container for services
  - Don't have to be in same location
  - Don't have to be same type of service
- Project identifier

PROJECTS

- "Project" is the organizational structure on GCP
- Projects is a container for services
  - Don't have to be same type of service

PROJECTS

- Projects have regions
  - Cost
  - Performance
  - Availability
- Rule: The closer the better

PROJECTS

Google Cloud Platform

New Project

You have 3 projects remaining in your quota. Learn more.

Project name

MyFirstProject

Your project ID will be myfirstproject-181100 Edit

Billing account

MCPS51033-2017-Autumn-Staff

Organization

uchicago.edu

You have logged in under a managed account. Your domain administrator may be able to access, change or suspend any projects created using this account. If you do not want your domain administrator

PROJECTS

oud Platform
EverydayComputingOrg
ACTIVITY
Notifications
Create Project: MyFirstProject
5s
SEE ALL ACTIVITY
fo
e
nputingOrg
nputingorg
per
8
App Engine
Summary (count/sec)
0.2
0.15
0.1
0.05
All services normal
Go to Cloud status dashboard
Billing

PROJECTS

Success!

Google Cloud Platform MyFirstProject

DASHBOARD ACTIVITY CUSTOMIZE

Project info

Project name
MyFirstProject

Project ID
myfirstproject-181100

Project number
627857732929

Go to project settings

Resources

Compute Engine

Compute Engine

CPU (%)

There is no data for this chart

Go to the Compute Engine dashboard

Google Cloud Platform status

All services normal

Go to Cloud status dashboard

Billing

Estimated charges $0.00
For the billing period Sep 1 – 25, 2017

View detailed charges

PROJECTS

Google Cloud Platform MyFirstProject

DASHBOARD ACTIVITY CUSTOMIZE

Project info

Project name
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All services normal

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Estimated charges $0.00
For the billing period Sep 1 – 25, 2017

View detailed charges

PROJECTS

3 different ways of identifying a project

BILLING

BILLING

- Billing is per project
- Different billing administrators for each project

BILLING

- Create budgets

BILLING

- Credits can be applied to budgets

BILLING

uchicago.edu

Budgets & alerts

MCPS51033-2017-Autumn-Staff

CREATE BUDGET

DELETE

Budgets track expenses within a Google Cloud Platform project or billing account. Your budget can be a specified amount or based on previous spend. You can set alerts to notify billing admins when a budget goes over a specified amount.

Budget name	Budget type	Applies to	Trigger alerts at	Spend and budget amount
Daily Spend	Specified amount	This billing account	50%, 90%, and 100%	$0.00 / $5.00 No credits used

APIS

BILLING

- Not every service or API is available by default
- Quickly see what services are available in menu

BILLING

- APIs that are enabled

API Dashboard - MyFirstProject

Secure https://console.cloud.google.com/apis/dashboard?project=myfirstproject-181100&organizationId=409994573993&duration=P...

Google Cloud Platform MyFirstProject

API APIs & services

Dashboard

Library

Credentials

Dashboard ENABLE APIS AND SERVICES

Enabled APIs and services

Some APIs and services are enabled automatically

Activity for the last hour

1 hour | 6 hours | 12 hours | 1 day | 2 days | 4 days | 7 days | 14 days | 30 days

Traffic

Requests/sec

There is no traffic for this time period.

Errors

Percent of requests

There are no errors for this time period.

Median latency

Milliseconds

There is no latency data.

API	Requests	Errors	Error ratio	Latency, median	Latency, 98%	
BigQuery API	–	–	–	–	–	Disable
Google Cloud APIs	–	–	–	–	–	Disable
Google Cloud Datastore API	–	–	–	–	–	Disable
Google Cloud SQL	–	–	–	–	–	Disable
Google Cloud Storage	–	–	–	–	–	Disable
Google Cloud Storage JSON API	–	–	–	–	–	Disable
Google Compute Engine API	–	–	–	–	–	Disable
Google Service Management API	–	–	–	–	–	Disable
Stackdriver Debugger API	–	–	–	–	–	Disable
Stackdriver Logging API	–	–	–	–	–	Disable
Stackdriver Monitoring API	–	–	–	–	–	Disable
Stackdriver Trace API	–	–	–	–	–	Disable

BILLING

API	Requests	Errors			
BigQuery API	—	—			
Google Cloud APIs	—	—			
Google Cloud Datastore API	—	—			
Google Cloud SQL	—	—			
Google Cloud Storage	—	—			
Google Cloud Storage JSON API	—	—	—	—	—
Google Compute Engine API	—	—	—	—	—
Google Service Management API	—	—	—	—	—
Stackdriver Debugger API	—	—	—	—	—
Stackdriver Logging API	—	—	—	—	—

BILLING

API APIs & services

- Dashboard
- Library
- Credentials

Library

Google APIs | Private APIs

Search all 100+ APIs

Popular APIs

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

Google Cloud Machine Learning
- Vision API
- Natural Language API
- Speech API
- Translation API
- Machine Learning Engine API

Google Maps APIs
- Google Maps Android API
- Google Maps SDK for iOS
- Google Maps JavaScript API
- Google Places API for Android
- Google Places API for iOS
- Google Maps Roads API
- More

G Suite APIs
- Drive API
- Calendar API
- Gmail API
- Sheets API
- Google Apps Marketplace SDK
- Admin SDK

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

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

BILLIN

API APIs & servi

Dashboard

Library

Credentials

Google Cloud Vision API

ENABLE

About this API

Documentation

Try this API in APIs Explorer

Integrates Google Vision features, including image labeling, face, logo, and landmark detection, optical character recognition (OCR), and detection of explicit content, into applications.

Using credentials with this API

Accessing user data with OAuth 2.0

You can access user data with this API. On the Credentials page, create an OAuth 2.0 client ID. A client ID requests user consent so that your app can access user data. Include that client ID when making your API call to Google. Learn more

Server-to-server interaction

You can use this API to perform server-to-server interaction, for example between a web application and a Google service. You'll need a service account, which enables app-level authentication. You'll also need a service account key, which is used to authorize your API call to Google. Learn more

G Suite APIs

Drive API
Calendar API
Gmail API
Sheets API
Google Apps Marketplace SDK
Admin SDK

Mobile APIs

Google Cloud Messaging
Google Play Game Services
Google Play Developer API
Google Places API for Android

Social APIs

Google+ API
Blogger API
Google+ Pages API
Google+ Domains API

BILLING

API APIs & services - MyFirstProje
Google APIs Explorer
Secure
https://developers.google.com/apis-explorer/?hl=en_US#p/vision/v1/
Google
Search for services, methods, and recent requests...
APIs Explorer
Services
All Versions
Request History
Learn more about using the Google Cloud Vision API by reading the documentation.
Services > Google Cloud Vision API v1
Authorize requests using OAuth 2.0:
OFF
vision.images.annotate
Run image detection and annotation for a batch of images.

IDENTITY AND ACCESS MANAGEMENT (IAM)

IAM

- Set permissions for services and users

IAM

- IAM is for users
- Best practice in production is to limit access

IAM

- Service accounts are for services
- Default service account is for a VM associated with every account
  - Default behavior

CLOUD SDK

CLOUD SDK

- Command line interface for GCP
  - gcloud (apis)
  - gsutil (storage)
  - bq (big query)
  - kubectl (containers)

IAM

- Install script

Cloud SDK > Documentation

SEND FEEDBACK

Quickstart for Mac OS X

This page shows how to install the Google Cloud SDK, initialize it and run core `gcloud` commands from the command-line.

Before you begin

1. Make sure that Python 2.7 is installed on your system:

```
python -V
```

2. Download the archive file best suited to your operating system. Most machines will run the 64-bit package.

Platform	Package	Size	SHA256 Checksum
Mac OS X (x86_64)	google-cloud-sdk-172.0.1-darwin-x86_64.tar.gz	13.8 MB	31df8ec3f972d3cb5c3705118e6d468e9aee5607ebd0cf2bf2043ee6ad03c790
Mac OS X (x86)	google-cloud-sdk-172.0.1-darwin-x86.tar.gz	13.8 MB	043326392e7a10e0e6370b8a93bc2a2b027026a6556c0cbe529593498c479c29

https://cloud.google.com/sdk/docs/quickstart-mac-os-x

4. Set up the Cloud SDK for use. If you're having trouble getting the `gcloud` command to work, ensure your

IAM

- Install authorization and configuration

```
$ gcloud version

$ gcloud auth login

$ gcloud info --show-log

$ gcloud config set project <my-project-id>

$ gcloud init <my-project>
```

IAM

tabinkowski — -bash — 72×16

```
tabinkowski@Ts-MacBook-Pro ~
513 % gcloud --version
Google Cloud SDK 172.0.1
app-engine-python 1.9.60
bq 2.0.26
core 2017.09.21
gcloud
gsutil 4.27
tabinkowski@Ts-MacBook-Pro ~
514 %
```

QUICK START AND TUTORIALS

QUICK START AND TUTORIALS

- Really simple quick start tutorials are available from the console

QUICK START AND TUTORIALS

- Really simple quick start tutorials are available from the console

QUICK START AND TUTORIALS

Google Cloud Platform MyFirstProject

DASHBOARD ACTIVITY CUSTOMIZE

Project info

Project name
MyFirstProject

Project ID
myfirstproject-181100

Project number
627857732929

Go to project settings

Resources

Cloud Functions
You do not have permission to see this information

APIs

Requests (requests/sec)

There is no data for this chart

Go to APIs overview

Google Cloud Platform status

All services normal

Go to Cloud status dashboar

DEMO

Billing

Estimated charges
For the billing period Sep 1 – 2017

View detailed charges

Create a Linux virtual machine instance in Compute Engine in this guided walkthrough.

Build a Compute Engine Application
Learn how to spin up virtual machines using Google Compute Engine, Node.js, and MongoDB to create a To-Do app.

Try Container Engine
Try out Container Engine by creating a Hello World app with a guided tutorial. Container Engine lets you package an application so you can easily deploy it to run in its own isolated environment.

Build a Guestbook on Container Engine
Learn how to use Google Container Engine clusters built on the power of open source Kubernetes to deploy a Guestbook application.

Learn Cloud Pub/Sub
Learn how to use Cloud Pub/Sub to connect your applications with a reliable, many-to-many messaging service on Google's infrastructure.

QUICK START AND TUTORIALS

- Bucket listed in resources

Go to project settings

Resources

Cloud Storage
1 bucket

Cloud Functions
You do not have permission to see this information

Trace

No trace data from the past 7 days

Get started with Stackdriver Trace

Getting Started

Enable APIs and get credentials like keys

Go to APIs overview

QUICK START AND TUTORIALS

```
# Set current project using project ID (not name)
> gcloud config set project myfirstproject-181100

# Check
> gcloud info
```

https://cloud.google.com/storage/docs/quickstart-gsutil

QUICK START AND TUTORIALS

```
# Create a bucket (with unique name)
> gsutil mb gs://myfirstprojectbucket-1000/

# Check
> gsutil cp ~/Desktop/IMG_1484.m4v  \
                        gs://myfirstprojectbucket-1000/
```

QUICK START AND TUTORIALS

- Bucket listed in resources

QUICK START AND TUTORIALS

- Delete

QUICK START AND TUTORIALS

Google Cloud Platform MyFirstProject

Getting started

Try Compute Engine

Spin up virtual machines using Google Compute Engine, Node.js, and MongoDB to create a To-Do app in this guided walkthrough.

Get started

Learn to use Cloud Storage

Cloud Storage is a powerful and simple storage service. In this tutorial you'll learn the basics by creating a storage bucket, and then uploading and sharing a sample file as a public URL link.

Get started

Learn Google Cloud Platform

Take an interactive tutorial now and learn how to deploy and build simple applications.

Get Started

Use Google APIs

Enable APIs, create credentials, and track your usage

API Enable and manage APIs

Create an empty project

Create a Cloud SQL instance

Cloud SQL is a MySQL database that runs in Google's cloud, with no installation or maintenance required

Get started

Try App Engine

Create and deploy a Hello World app

Get started

Try BigQuery

Documentation

Learn about Compute Engine

Learn about Cloud Storage

Compute Engine Quickstart

Build a to-do app with MongoDB

15 minutes

In this quickstart, you'll use Compute Engine to create a two-tier application. The front-end VM runs a Node.js todo web app, and the back-end VM runs MongoDB.

This tutorial will walk you through:

- Creating and configuring two VMs
- Setting up firewall rules
- Using SSH to install packages on your VMs

Continue

QUICK START AND TUTORIALS

Features Business Explore Marketplace Pricing This organization Search Sign in or Sign up

Google Cloud Platform

https://github.com/GoogleCloudPlatform/Template/wiki/Template

Repositories 418 People 434

Search repositories... Type: All Language: All

php-docker

Docker images for running PHP applications on the App Engine Flexible Runtime

PHP 84 30 Updated 10 minutes ago

forseti-security

google-cloud-platform security-tools

Python 146 40 Updated 13 minutes ago

Top languages

Python Java Shell Go JavaScript

Most used topics

google-cloud java docker

https://github.com/GoogleCloudPlatform

CLOUD SHELL

GCP COMPUTE (WITH APP ENGINE)

COMPUTE

- Compute options for all types of computing
  - Fully managed to no-ops

COMPUTE

- Infrastructure as a service to platform as a service

COMPUTE

Google Cloud Platform
MyFirstProject
Home
Cloud Launcher
Billing
APIs & services
Support
IAM & admin
COMPUTE
App Engine
Compute Engine
Container Engine
Cloud Functions
STORAGE
Bigtable
CUSTOMIZE
APIs
Requests (requests/sec)
0.03
0.02
0.01
Sep 25, 11:00 PM
Sep 25, 11:38 PM
Requests: 0.0333
Go to APIs overview
Google Cloud Platform status
All services normal
Go to Cloud status dashboard
Billing
Estimated charges
$0.00
For the billing period Sep 1 – 25, 2017
View detailed charges
Error Reporting
No sign of any errors. Have you set up Error Reporting?
Learn how to set up Error Reporting
Try Compute Engine
Create a Linux virtual machine instance in Compute Engine in this guided walkthrough.
Build a Compute Engine Application
Learn how to spin up virtual machines using Google Compute Engine, Node.js, and MongoDB to create a To-Do app.
Try Container Engine
Try out Container Engine by creating a Hello World app with a guided tutorial. Container Engine lets you package an application so you can easily deploy it to run in its own isolated environment.
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Learn how to use Google Container Engine clusters built on the power of open source Kubernetes to deploy a Guestbook application.
Learn Cloud Pub/Sub
Learn how to use Cloud Pub/Sub to connect your applications with a reliable, many-to-many messaging service on Google's infrastructure.
Learn to use Cloud Storage
Cloud Storage is a powerful and simple storage service. In this tutorial you'll learn the basics by creating a storage bucket, and then uploading and sharing a sample file as a

COMPUTE

- Computing options on Google Cloud Platform

COMPUTE

- Virtual Machines
  - 1- 64 processors
  - .6 - 416 GB
  - 65 TB Persistent data
  - 3TB Ram

COMPUTE

- Cloud Marketplace (formerly luancher)
  - Prebuilt VM and container configurations

COMPUTE

- Containers
  - Alternative to VM
  - Container operates on a part of a VM but thinks its a VM
  - Many containers can be used for a workflow
    - Each container would have a specific job

COMPUTE

- App Engine variants are a container application

COMPUTE

- Serverless (platform as a service)

Cloud functions

- Javascript / Node.js
- Respond to events

APP ENGINE IN A NUTSHELL

APP ENGINE

- Google App Engine (GAE) is a Platform as a Service (PaaS) cloud computing platform for developing and hosting web applications in Google-managed data centers

APP ENGINE

- App Engine architecture

VIA GUIDO VAN ROSSUM

APP ENGINE

- App Engine is tuned to do handle HTTP(S) requests
- App configuration is preconfigured
  - No performance tuning needed
  - Everything is built to scale
  - “infinite” number of apps, requests/sec, storage capacity

APP ENGINE

SECURITY

...and limitations

- Constrain direct OS functionality
  - No processes, threads, dynamic library loading
  - No sockets (use urlfetch API)
  - Can't write files (use datastore)
  - Disallow unsafe Python extensions (e.g. ctypes)
- Limit resource usage
  - Limit 1000 files per app (1MB)
  - Hard time limit of 10s per request
  - Requests must <300 msec CPU time
  - Hard limit of 1MB on request/ response size, API call size, etc.
  - Quota system

APP ENGINE

SERVICES

- URLFetch – fetch web resources/services
- Images – manipulate images: resize, rotate, flip, crop
- Google Accounts
- Mail
- XMPP – instant messages
- Task Queue – message queue; allow integration with non-GAPPs
- Datastore – managing data objects
- Blobstore – large files, much larger than objects in datastore, use <key, object> to access

APP ENGINE

DATASTORE

- Entities have a Kind, a Key, and Properties
  - Entity ~~ Record ~~ Python dict ~~ Python class instance
  - Key ~~ structured foreign key; includes Kind
  - Kind ~~ Table ~~ Python class
  - Property ~~ Column or Field; has a type
- Key has either id or name

APP ENGINE

DATASTORE

- Properties are automatically indexed by type+value
  - There is an index for each Kind / property name combo
  - Whenever an entity is written all relevant indexes are updated
  - However Blob and Text properties are never indexed
- Supports basic and complex queries

PYTHON STANDARD ENVIRONMENT

PYTHON STANDARD ENVIRONMENT

- Standard Environment
  - Constrained, cheaper, scales better
- Flexible environment
  - Full control and access
  - Potentially more expensive
  - Scaling requires more involvement

Flexible environment

- Full open source language runtimes.
- Use any framework, library or binary of your choice.
- Code is portable to anywhere that supports Docker containers.
- Most cost-effective for applications that serve traffic continuously.
- Python 2.7, 3.5

VIEW DOCS

Standard environment

- Lightweight Python 2.7 runtime is optimized to scale nearly instantaneously to handle huge traffic spikes.
- Does not allow native code, filesystem access or arbitrary network connections. Learn more
- Uses proprietary APIs to simplify common tasks like database access, queuing and in-memory caching.
- Most cost-effective for applications that have significant periods where they are not serving traffic.
- Python 2.7

VIEW DOCS

PYTHON STANDARD ENVIRONMENT

Feature	Flexible environment	Standard environment
Instance startup time	Minutes	Milliseconds
Maximum request timeout	60 minutes	60 seconds
Background threads	Yes	Yes, with restrictions
Background processes	Yes	No
SSH debugging	Yes	No
Scaling	Manual, Automatic	Manual, Basic, Automatic
Writing to local disk	Yes, ephemeral (disk initialized on each VM startup)	No
Modifying the runtime	Yes (through Dockerfile)	No
Automatic in-place security patches	Yes (excludes container image runtime)	Yes
Network access	Yes	Only via App Engine services (includes outbound sockets)
Supports installing third-party binaries	Yes	No
Location	North America, Asia Pacific, or Europe	North America, Asia Pacific, or Europe
Pricing	Based on usage of vCPU, memory, and persistent disks	Based on instance hours

PYTHON 2 STANDARD ENVIRONMENT

- Limited number of third party packages and modules in standard environment
- There is no package manager for Python on App Engine
  - You have to include additional libraries as source code in you standard environment apps
  - Pure Python only (no C)

Name	Default version	Supported versions	Description
django	(None)	"1.2" "1.3" "1.4" "1.5" "1.9"	A full-featured web application framework for Python.
enum	(None)	"0.9.23"	A backport of the enum module introduced in python 3.4
endpoints	(None)	"1.0"	Libraries for building APIs in an App Engine application.
jinja2	(None)	"2.6"	A modern and designer friendly templating language for Python.
lxml	(None)	"2.3" "2.3.5" (alpha)	A Pythonic binding for the C libraries libxml2 and libxslt.
markupsafe	(None)	"0.15" "0.23"	A XML/HTML/XHTML markup safe string for Python.
matplotlib	(None)	"1.2.0"	A 2D plotting library which produces publication-quality figures.
MySQLdb	(None)	"1.2.4b4" (alpha) "1.2.4" (alpha) "1.2.5" (alpha)	A Python DB API v2.0 compatible interface to MySQL.
numpy	(None)	"1.6.1"	A general-purpose library for array-processing.
PIL	(None)	"1.1.7"	A library for creating and transforming images.
protorpc	"1.0"	"1.0"	A framework for implementing HTTP-based remote procedure call (RPC) services.
pytz	"2016.4"	"2016.4"	A library for cross-platform timezone calculations
crcmod	(None)	"1.7"	A library for generating Cyclic Redundancy Checks (CRC).
PyAMF	(None)	"0.6.1" "0.7.2" (alpha)	A library that provides (AMF) Action Message Format functionality.
pycrypto	(None)	"2.3" "2.6" "2.6.1"	A library of cryptography functions such as random number generation.
setuptools	(None)	"0.6c11"	A library that provides package and module discovery capabilities.
six	(None)	"1.9.0"	Abstract differences between py2.x and py3
ssl	(None)	"2.7" "2.7.11"	The SSL socket wrapper built-in module.
webapp2	"2.3"	"2.3" (deprecated) "2.5.1" "2.5.2"	A lightweight Python web framework.
webob	"1.1.1"	"1.1.1" "1.2.3"	A library that provides wrappers around the WSGI request environment.
werkzeug	"0.11.10"	"0.11.10"	A WSGI utility library.
yaml	"3.10"	"3.10"	A library for YAML serialization and deserialization.

PYTHON 3 STANDARD ENVIRONMENT

- Python 3 is idiomatic
- Removes App Engine specific features/limitations
- Not all features in Python 2 are released yet

Understanding differences between Python 2 and Python 3 on the App Engine standard environment

The Python 3 runtime on App Engine standard environment is a second generation runtime sandboxing technology enables this runtime to support a fully idiomatic Python developme

Idiomatic Python development experience

The Python 3 runtime is built around three core ideas:

- Your app uses the latest version of the open source Python interpreter provided by th Foundation.
- Python's rich ecosystem of packages and frameworks, including those that use C co your app using a `requirements.txt` file.
- You don't need specialized, platform-specific knowledge to develop on App Engine.

The overall goal is that your app should be fully portable and run in any standard Python en standard Python app, not an App Engine Python app. As part of this shift, you are no longe App Engine APIs and services for your app's core functionality. At this time, App Engine AP Python 3.7 runtime.

Migrating between Python 2 and Python 3 on the App Engine sta

The Python 3 runtime on the App Engine standard environment is significantly different fro

INSTALLING APP ENGINE

INSTALLING APP ENGINE

SEND FEEDBACK

Download and Install the SDK for App Engine

The SDK for App Engine includes a local development server as well as the tooling for deploying and managing your applications in App Engine.

Go | Java | PHP | Python

Was this page helpful? Let us know how we did:

☆ ☆ ☆ ☆ ☆

SEND FEEDBACK

https://cloud.google.com/appengine/docs/standard/python/download

INSTALLING APP ENGINE

The preferred tooling for managing your App Engine applications in Python is now the Google Cloud SDK. The Cloud SDK includes a local development server as well as the tooling for deploying and managing your applications.

By downloading, you agree to be bound by the Terms that govern use of the SDK for App Engine.

To install the SDK for Python:

1. Install Python version 2.7:

   DOWNLOAD AND INSTALL

2. Install and initialize the Google Cloud SDK:

   DOWNLOAD AND INSTALL

3. Run the following command to install the gcloud component that includes the App Engine extension for Python:

   ```
   gcloud components install app-engine-python
   ```

4. Optional: Run the following command to install the `Extra Libraries` component for Python, which includes the graphy and Django libraries:

   ```
   gcloud components install app-engine-python-extras
   ```

INSTALLING APP ENGINE

The preferred tooling for managing your App Engine applications in Python is now the Google Cloud SDK. The Cloud SDK includes a local development server as well as the tooling for deploying and managing your applications.

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   DOWNLOAD AND INSTALL

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   DOWNLOAD AND INSTALL

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   ```
   gcloud components install app-engine-python-extras
   ```

INSTALLING APP ENGINE

gae_practice — more ~/.bash_profile — 204×35

```
# added by Anaconda2 4.3.0 installer
export PATH="/Applications/anaconda/bin:$PATH"

# The next line updates PATH for the Google Cloud SDK.
if [ -f '/Applications/google-cloud-sdk/path.bash.inc' ]; then source '/Applications/google-cloud-sdk/path.bash.inc'; fi

# The next line enables shell command completion for gcloud.
if [ -f '/Applications/google-cloud-sdk/completion.bash.inc' ]; then source '/Applications/google-cloud-sdk/completion.bash.inc'

#
export TERM=xterm-color
export GREP_OPTIONS='--color=auto' GREP_COLOR='1;32'
export CLICOLOR=1

# Aliases
alias clean='rm *~ *.o core .*~ #*'
alias h="history"
alias rm="rm -i"
alias mv="mv -i"
alias cp="cp -i"
alias m="more"


BLACK="\[\033[0m\]";
DARK_GRAY="\[\033[0;30m\]";
```

ASSIGNMENT 1

ASSIGNMENT

- Sign up for GCP (add educational credits)
- Sign up for GitHub (if you haven't)
- Post a comment on the forum

ASSIGNMENT

Deploy to GCP

- Complete the following tutorials
  - Hello World (Python 2)
    - https://cloud.google.com/appengine/docs/standard/python/quickstart
  - Guestbook application (Python 2)
    - https://cloud.google.com/appengine/docs/standard/python/getting-started/creating-guestbook

ASSIGNMENT

- Guestbook application additions
  - Create shell commands using `curl` that allow you to interact with application from command line

```
curl -X POST -H -F caption='curl' -F "name=homer" https://<your app>
```

  - Add properties to the `Greeting` entity that indicates the user agent that made the request

ASSIGNMENT

- Complete the following tutorials
  - Building a Python 3.7 App on App Engine
    - https://cloud.google.com/appengine/docs/standard/python3/building-app/

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Compute Products

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Product Overview

Python 3 Standard Environment
Documentation
Quickstart
Building an App
Overview
Creating Your Project
Writing Your Web Service
Deploying Your Web Service
Handling Data
Adding Firebase
Authenticating Users
Personalizing Data
Cleaning Up

How-to Guides
All How-to Guides
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Designing Your App
Defining Configuration Files
Testing and Deploying Your App
Debugging Your App
Installing Google Cloud Client Libraries
Storing Data and Files
Securing Your App
Controlling Access
Authenticating Users
Using a Custom Domain
Managing Your App's Traffic
Scheduling Cron Jobs

App Engine > Documentation > Python > Standard Documentation

Building a Python 3.7 App on App

Use this guide to learn the basics of developing and deploying Pyth
standard environment.

In this guide, you iterate through building and deploying versions of
building up to a personalized web page that shows authenticated us
request times.

The following tasks demonstrate the basic developer flow for creati
storage and Firebase authentication:

1. **Creating your GCP project**

   Learn how to create a GCP project and then set up the App En
2. **Writing your web service**

   Learn how to write and locally test a basic web service, and th
   deploying that web service to App Engine.
3. **Deploying your web service to App Engine**

   Learn how to deploy your Python 3.7 code and then view your
4. **Handling Data**

   Learn how to use Cloud Datastore to store and retrieve data a
5. **Adding Firebase to your web service**

   Learn how to add Firebase to your GCP project and web servic
6. **Authenticating users with Firebase**

   Learn how to use Firebase Authentication to verify user creder
   access.
7. **Personalizing data for authenticated users**

ASSIGNMENT

- Review documentation (as needed)
  - App Engine for Python
  - Cloud Datastore Features on App Engine
- Brush up on Python/Flask
- Explore GCP Console (Cloud Shell)

https://cloud.google.com/appengine/docs/standard/python/concepts

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BACKENDS FOR MOBILE APPLICATIONS

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