Announcements

- GCP demo today
  - Ensure you have redeemed Google credits through Ed discussion post instructions
  - Download [Google Cloud CLI](): Google Cloud CLI download for your respective OS and run the script to install it
- GCP assignment out today
  - Based on deployment of a simple Java logger on the Google App Engine
  - Individual Assignment. Pretty much similar to class demo.
- REST assignment due Thursday
- Next class TA check-in with mentors about Project 1 progress report

CS3300 Introduction to Software Engineering

Lecture 9: Tools of the Trade #5

Google App Engine, Google APIs

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Google App Engine - Intro

- Google's platform to build web application on Cloud, on a fully managed serverless platform.

- First Version in 2008

- Manages application platform that supports any framework, language or library, worries about the infrastructure so that you can focus on the code.

- Allows you to simply deploy your code, and the platform automates everything.

Google App Engine vs. Google Compute Engine

Compute Engine	App Engine
Delivered as Infrastructure as a Service (IAAS)	Delivered as Platform as a Service (PAAS)

IaaS provides virtualized computing resources over the internet. It offers the infrastructure – virtual machines, storage, and networking – but leaves the rest up to the user. •Provider manages the virtualization, servers, hard drives, storage, and networking. •User manages applications, data, runtime, middleware, and OS.	PaaS provides a platform allowing customers to develop, run, and manage applications without dealing with the intricacies of building and maintaining the infrastructure. •Provider manages everything from the infrastructure to the software applications. •Users manage the application and its data.

Google App Engine vs. Google Compute Engine

Compute Engine	App Engine
Unmanaged Service by Google Cloud • our responsibility to configure, administer, and monitor the system. • Google's responsibility to ensure that resources are available, reliable, and ready to use	Managed Service by Google Cloud • your focus should be on the application only • Google will manage the resources needed to run the application.
offers the users complete control and flexibility over resources	Google manages all compute resources
Requires high expertise level, since everything needs to be installed and configured by yourself.	Very easy to use and deploy
Autoscaling is slower	Faster Autoscaling
Cheaper in the longer run and for large instances	Expensive in the longer run
Less secure than App Engine	More Secure

Google App Engine - Functions

- All infrastructure to deploy app on cloud- end to end management

- Scalability- acquires more instances automatically if the traffic of your application becomes higher

- monitoring, logging, versioning, debugging using google stack driver diagnostics

- Traffic splitting

- big data, storage, compute, connectivity support using google cloud

- Applications run in language specific sandboxes or in docker containers, depending on environment

App Engine Environments

- **Standard**: Run in language specific sandboxes
  - Complete isolation from OS/Disk/Other Apps
  - **V1**: Java, Python, PHP, Go (OLD versions). Restricted network access & libraries for some languages – not Java
  - **V2**: Java, Python, PHP, Node.JS, Ruby, Go (NEWER Versions)
  - Pricing is based on instance hours.

- **Flexible-** Application instances run within Docker containers
  - Makes use of Compute engine virtual machines
  - Support ANY runtime (with built –in support for Python, Java, Node.js, Go, Ruby, PHP, or .NET)
  - Provides access to background processes and local disks
  - Pricing is dependent on memory and virtual CPU

App Engine **Demo Time**!

Deploy a HelloWorld application to Cloud using App Engine Standard

- Add GCP credits to your account.
- Create a Project on Google Cloud
- Add Billing Information
- Create a New Spring Boot Application using Spring Initializr.
- Create a HelloWorld Controller to test your application.
- Update the pom.xml file with the Google Cloud Tools Plugin.
- Create the app.yaml file to configure deployment.
- Build your application using Maven.
- Deploy to Google App Engine using Google Cloud CLI.
- Verify the deployment and manage billing settings.

For your assignment ….

- Create a SpringBoot Application
- Get 2 endpoints – name and local time
- Package project into a JAR
- Deploy using app engine

For your project ….

- Create a SpringBoot + <Any Frontend framework> Application

1. Package project into a JAR and deploy using app engine OR
2. Clone your repository in Cloud Shell and deploy from there. Another demo notes to deploy in this manner is up on the class website.

- Next lecture, TAs will check in with you about your Project 1 Progress Report.

Help Documentation to monitor projects

- [Help documentation](#) about setting alerts to monitor projects in the Console

- you can also use the [Cost Management Resource Guide](#) to learn how to monitor and manage costs in GCP.

Google APIs

- Developed by Google which allow communication with Google Services and their integration to other services.

- Examples include Search, Gmail, Translate or Google Maps.

- Third-party apps can use these APIs to take advantage of or extend the functionality of the existing services.

- Provides functionality like analytics, machine learning (the Prediction API) or access to user data (when permission to read the data is given).

- Usage of all of the APIs requires authentication and authorization using the Oauth 2.0 protocol.

Google Maps API

- Integrate, Embed, Query google maps in your application
- Create an interactive map
- Initiate actions like search directions
- Provide updated imagery to your users and help them find your location more easily
- Add markers, comments, icons to places of interest
- https://developers.google.com/maps/documentation Documentation available here to get started

Google Routes API

- High quality directions and real-time traffic updates
- Compute travel times and distances for multiple destinations
- Precise routes for pedestrian, bikers and vehicle travels
- Enjoy snap to road benefits so you know exactly which route your asset is travelling along
- Receive speed limit information for each of those roads

Google Places API

- Access Location Data using coordinates, real-time signals, phone numbers
- Convert addresses to coordinates and vice-versa
- Get time zone, latitude, longitude etc.
- Engage your users further with contextual information about places
- Search for and receive information about local businesses, points of interests on every device with the Places autocomplete feature
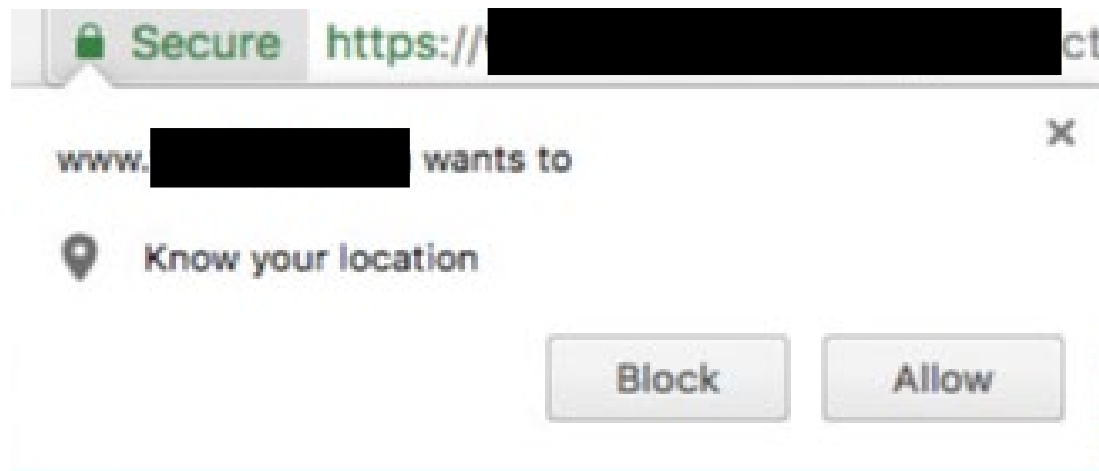
Authentication

- API key required to use any Google API

- Only works in secure contexts (HTTPS)

- Generate your API key on Google Cloud Console-- API Manager--Enable API--Credentials– API key created