AwwVision with Kuberneter

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Agenda

- What is Cloud?
- What is GCP?
- Containers and Kubernetes
- Aww vision with Kubernetes
- ML behind the scene

Cloud 

What Cloud Computing is not?

A little history

On Premise

Time-sharing

Cloud

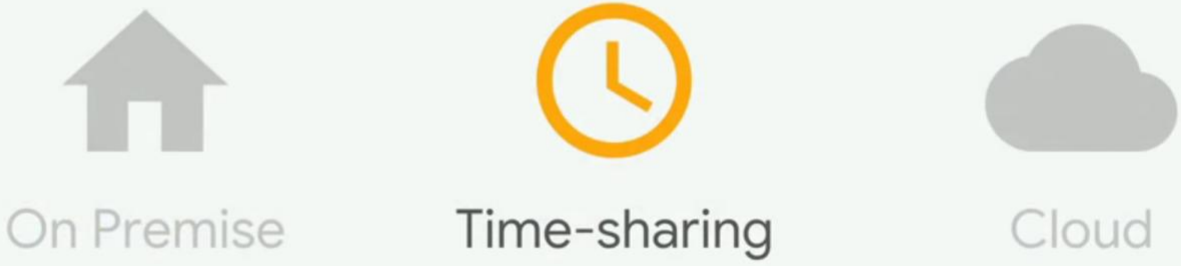
A little history

On Premise

Time-sharing

Cloud

A little history



3 Tiers of Cloud

Infrastructure

Platform

Software

... as a service

But what actually cloud is?

Cloud is just a set of tools that helps you, the developer, spend less time managing and more time being creative as a developer.

Then what is GCP?

-

What you can do with GCP?

What you can do with GCP?

What you can do with GCP?

kubernetes

TensorFlow

FORSETI
Open-source tools for GCP security

Cloud Platform services

1. Compute
2. Storage
3. Big data
4. Machine Learning

Compute

1. Compute Engine
2. Kubernetes Engine
3. App Engine
4. Cloud Functions

Storage

1. Bigtable
2. Cloud Storage
3. Cloud SQL
4. Cloud Spanner
5. Cloud Datastore

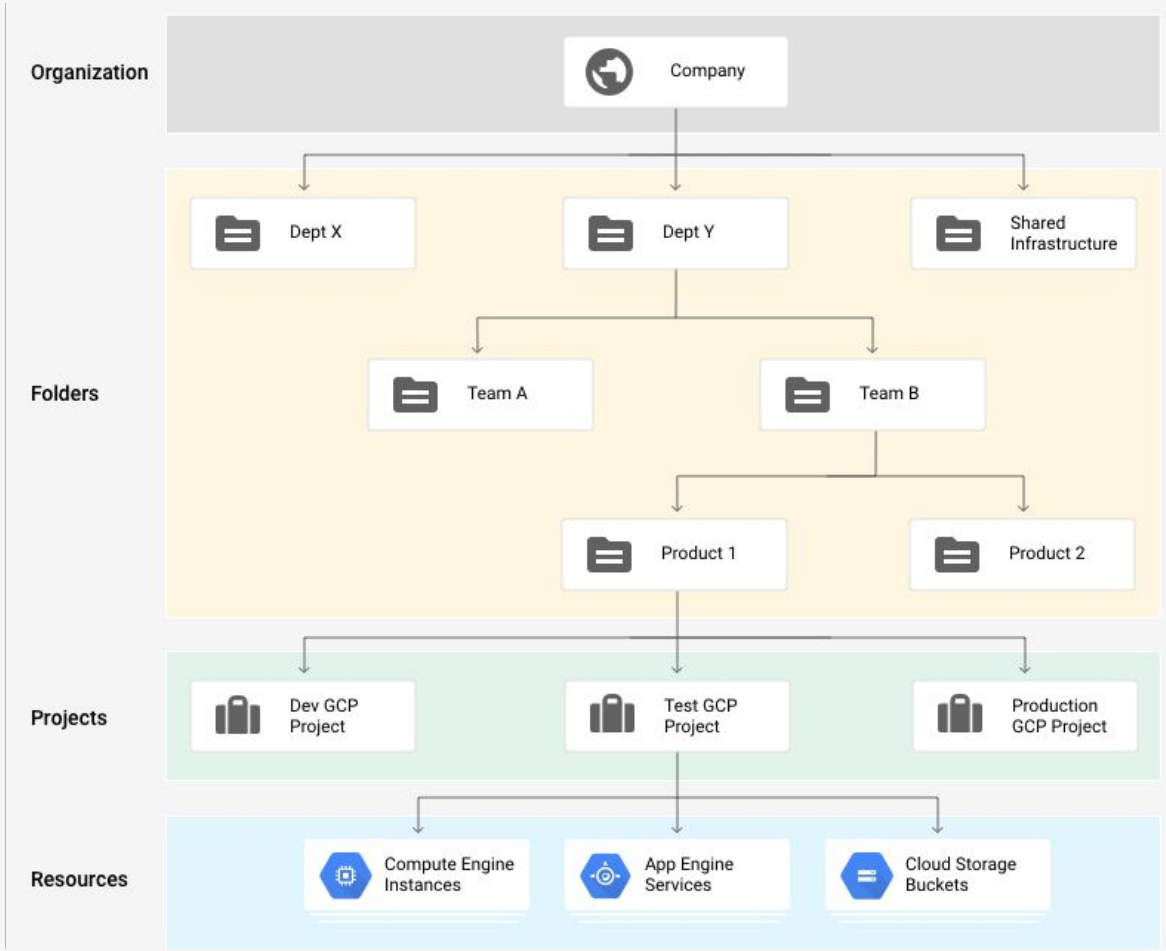
Big Data

1. Big Query
2. Pub/Sub
3. Dataflow
4. Dataproc
5. Datalab

Machine Learning

1. Natural Language Processing
2. Vision API
3. Machine Learning
4. Speech API
5. Translate API

Resource Management


Organization
Company
Folders
Dept X
Dept Y
Shared Infrastructure
Team A
Team B
Product 1
Product 2
Projects
Dev GCP Project
Test GCP Project
Production GCP Project
Resources
Compute Engine Instances
App Engine Services
Cloud Storage Buckets

IAM Roles

IAM Roles

- Primitive
- Predefined
- Custom (Beta)

Four ways to interact with GCP

1. Cloud Platform console (web user interface)
2. Cloud Shell and Cloud SDK (Command-line interface)
3. Cloud Console Mobile App (For iOS and Android)
4. REST-based API (for custom applications)

Cloud Platform Console

- Centralized console for all project data
- Developer tools
  - Cloud Source Repositories
  - Cloud Shell
  - Test Lab (Mobile app testing)
- Access to product API
- Manage and create project

Google Cloud SDK

- SDK includes CLI tools for Cloud Platform products and services
  - Gcloud, gsutil (Cloud Storage), bq (BigQuery)
- Available as Docker Image
- Available via cloud shell
  - Containerized version of Cloud SDK running on Compute Engine instance

Cloud console mobile app

- Manage virtual machine and database instances
- Manage apps in Google App Engine
- Manage your billing
- Visualize your projects with customizable dashboard

Developing, Deploying and Monitoring into Cloud

Cloud Functions Beta

- Create single-purpose functions that respond to events without a server or runtime
  - Event examples: New instance created, file added to cloud storage
- Written in javascript: execute in managed Node.js environment on GCP

Deployment Manager

- Infrastructure management service
- Create a .yaml template describing your environment and use Deployment Manager to create resources
- Provides repeatable deployments

Monitoring using stackdriver

- Monitoring
  - Platform, system and application metrices
  - Uptime/health checks
  - Dashboards and alerts
- Logging
  - Platform system, and application logs
  - Log search, view, filter and export
  - Log-based metrics
- Debug (Debug applications)
- Error reporting (Error notification, Error dashboard)
- Trace (Letency reporting and sampling, Per-URL latency and statistics)

Big data and Machine Learning Services

Cloud Dataproc

- Fast, easy, managed way to run Hadoop and Spark/Hive/Pig on GCP
- Create clusters in 90 seconds or less, on average
- Scale clusters up and down even when jobs are running

Cloud Dataflow

- Processes data using Compute Engine Instances
  - Clusters are sized for you
  - Automated scaling, no instance provisioning required
- Write code once and get **batch** and **streaming.**
- Transform-based programming model

Cloud Pub/Sub

- Supports many asynchronous messaging
- Includes support for offline customers
- Based on proven google technologies
- Integrates with cloud dataflow for data processing pipelines

Cloud Datalab

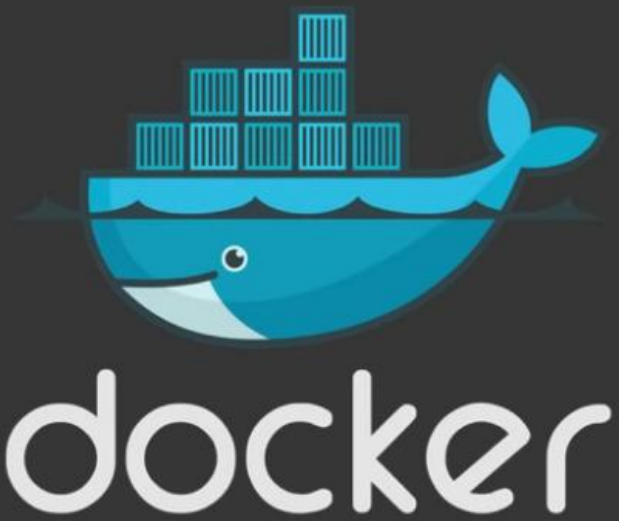
- Interactive tool for large scale data exploration, transformation, analysis and visualization
- Integrated, open source
  - Runs on App Engine
  - Built on Jupyter (formerly IPython)`

Containers in cloud

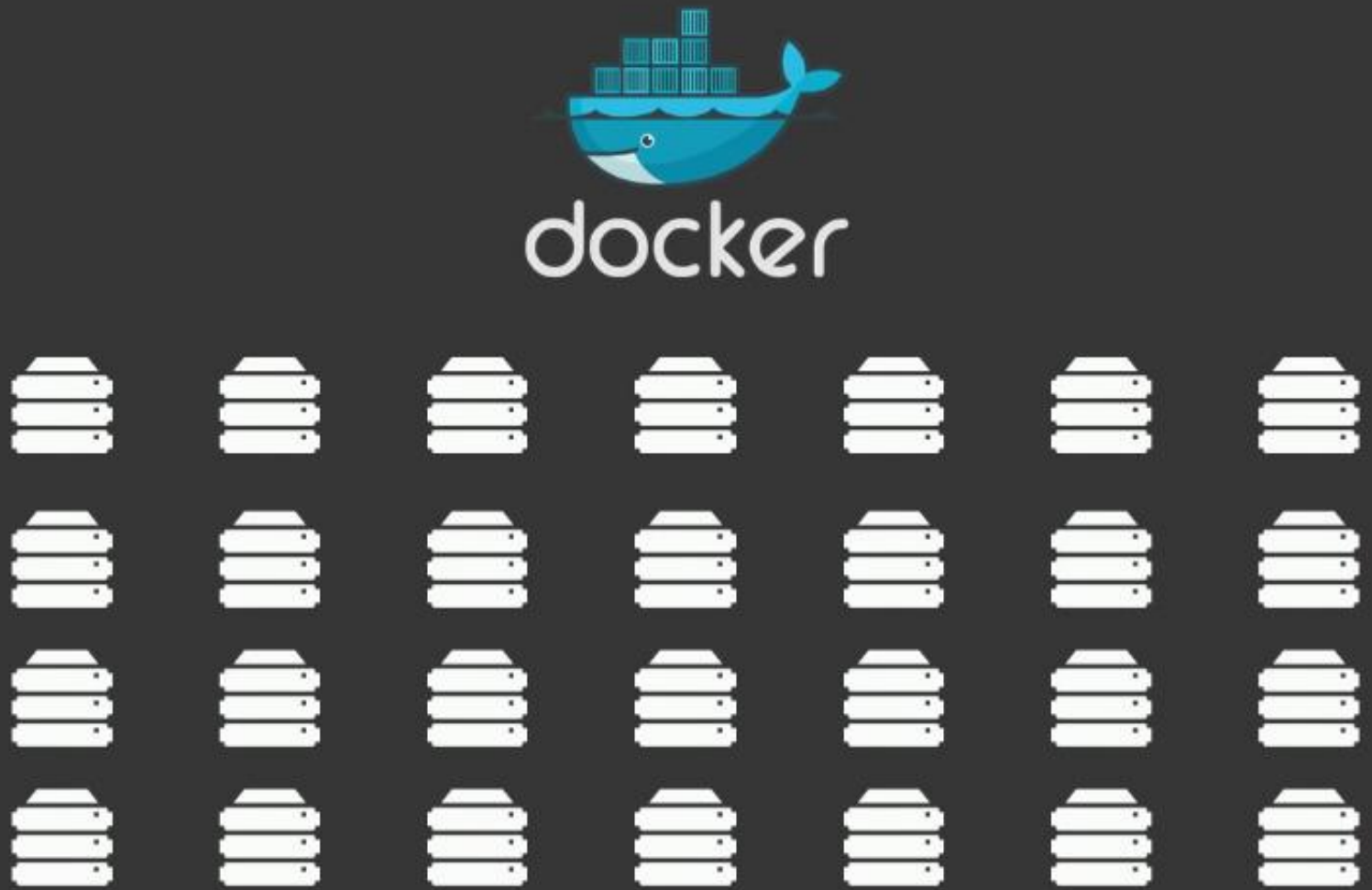
- Compute Engine
- Kubernetes Engine
- App Engine

Kubernetes Engine

When you might use Kubernetes?



When you might use Kubernetes?

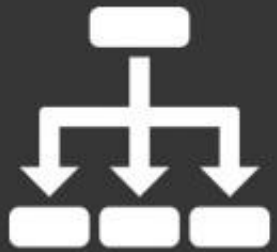

docker

Where's redis-1 again?


kubernetes

kubernetes

Deployment



Scaling

Monitoring

kubernetes

Master

kubernetes

Cluster

kubernetes

"Deployment"

kubernetes

Naive Scaling

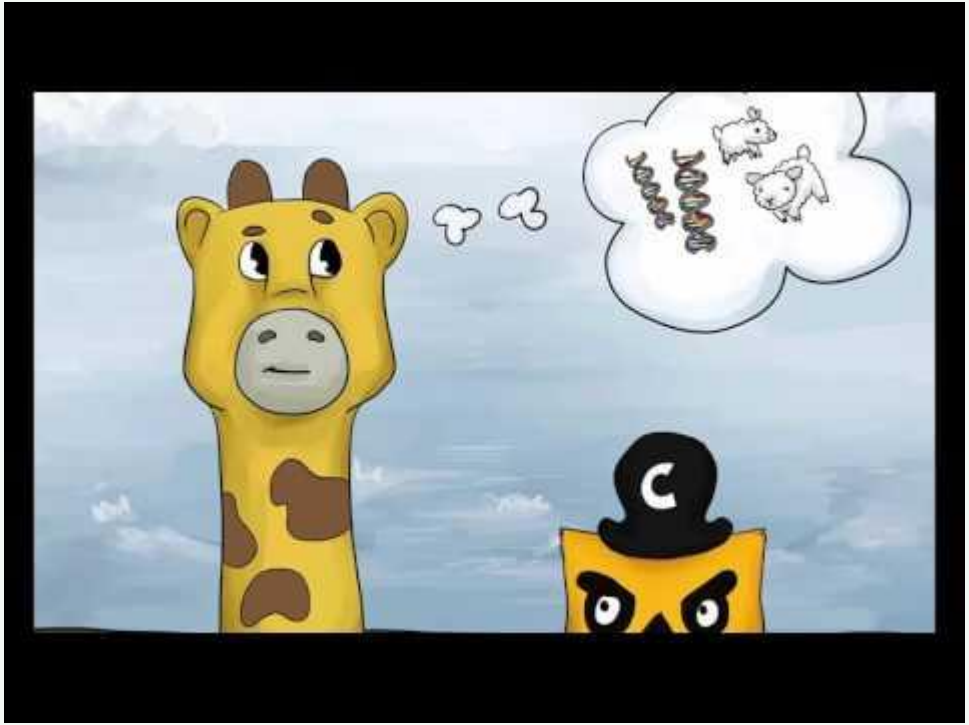
kubernetes

Scaling Deployment

What is Kubernetes

- Automates deployments, scaling, and operations for container clusters
- OpenSource, based on Google’s Experience over 10+ years
- Built for multi-cloud world
    - Public, private, hybrid

Kubernetes



Ease application management

- Workload portability
  - You can run in many environments, across cloud providers
  - Implementation is open and modular
- Rolling updates
  - You can upgrade applications without downtime
- Persistent storage
  - Details of how storage is provided are abstracted from how it is consumed

Kubernetes clusters are more elastic

- **Multi-zone Clusters**
  - Run a single cluster in multiple zones
- **Load balancing**
  - External IP address routes traffic to correct port
- **Autoscaling**
  - Automatically adapt to changes in workload

Why Kubernetes Engine

- Decoupes operational, development concerns
- Manages and maintains
  - Logging, health management, monitoring
- Easily update Kubernetes versions as they are released

When you use Kubernetes you have

1. Google Cloud Container Builder
    a. Create Docker container in images from app code in GCP
2. Google Cloud Registry
    a. Docker image storage that’s private to your GCP project

Machine Learning APIs enable apps to see, hear and understand

Cloud Machine Learning Platform

Open source tool to build and run neural network Models

- Wide platform support CPU or GPU mobile, server or cloud

Fully managed machine learning service

- Familiar notebook-based developer experience
- Optimized for Google infrastructure: integrates with BigQuery and Cloud Storage

Cloud Machine Learning Platform

Pretrained machine learning models built by Google

- Speech: Stream results in real time, detects 80 languages
- Vision: Identify objects, landmarks, text and content
- Translate: Language translation including detection
- Natural Language: Structure, meaning of text

Structured data

For structured data

- Classification and regression
- Recommendation
- Anamoly detection

For unstructured data

- Image and video analytics
- Text analytics

Cloud Vision API

- Analize images with a simple REST API
  - Logo detection, lable detection etc
- With Cloud vision API you can
  - Gain insight from images
  - Detect inapporpriate content
  - Analyze sentiment
  - Extract text

Cloud speech API

- Recognizes over 80 languages and variants
- Can return text in real time
- Highly accurate, even in noisy environment
- Access from any devices
- Powered by Google’s Machine Learning

Cloud Natural Language API

- Uses machine learning models to reveal structure and meaning of text
- Extract information about items mentioned in text documens, news articles, and blog postss
- Analyze text uploaded in request or integrate with Cloud storage

Cloud translation API

- Translate arbitrary strings between thousands of languages in pairs
- Programmatically detect a document’s language
- Supports for dozens of languages

Cloud Video Intelligence API Beta

- Annotate the content of videos
- Detect scenes changes
- Flag inappropriate content
- Support for variety of video formats

References and links for GCP

- (Hands on training) https://google.qwiklabs.com/
- (More training with multiple APIs) https://cloud.google.com/training/

Reference and links for Kubernetes

- https://cloud.google.com/kubernetes-engine/
- https://cloud.google.com/kubernetes-engine/docs/tutorials/
- https://kubernetes.io/
- https://cloud.google.com/container-registry/docs/

Certifications

- http://cloud.google.com/certification
- https://www.coursera.org/lecture/gcp-fundamentals/interacting-with-google-cloud-platform-hlpvL
- https://www.coursera.org/learn/google-kubernetes-engine

Google Cloud components

- What is Google Cloud
- What is Kubernetes

Kubernetes components

- Pod
- Services
- Container

Why we need Kubernetes

- Pod
- Services
- Container

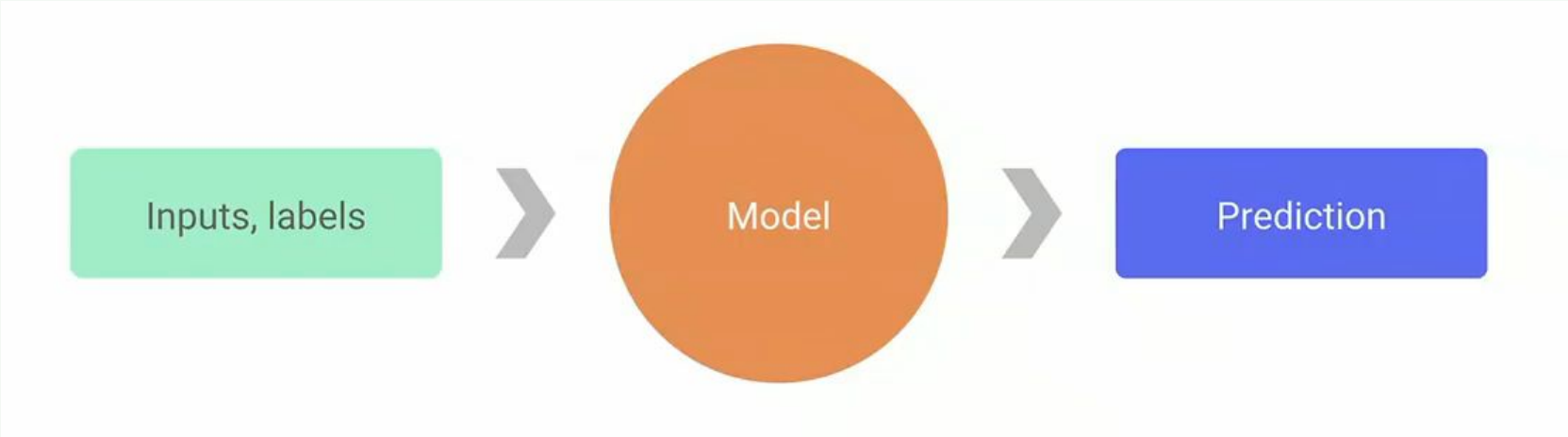
Redis

- Open source in-memory data structure store
- It can be used as a database and/or a cache and message broker
- NoSQL Key/Value store
- Supports multiple data structures
- Built-in replication

Demo time

- Aww vision with Kubernetes

Behind the scene



How do we get from **input** to **prediction**?

Example: Image classification

Generic task

Custom task

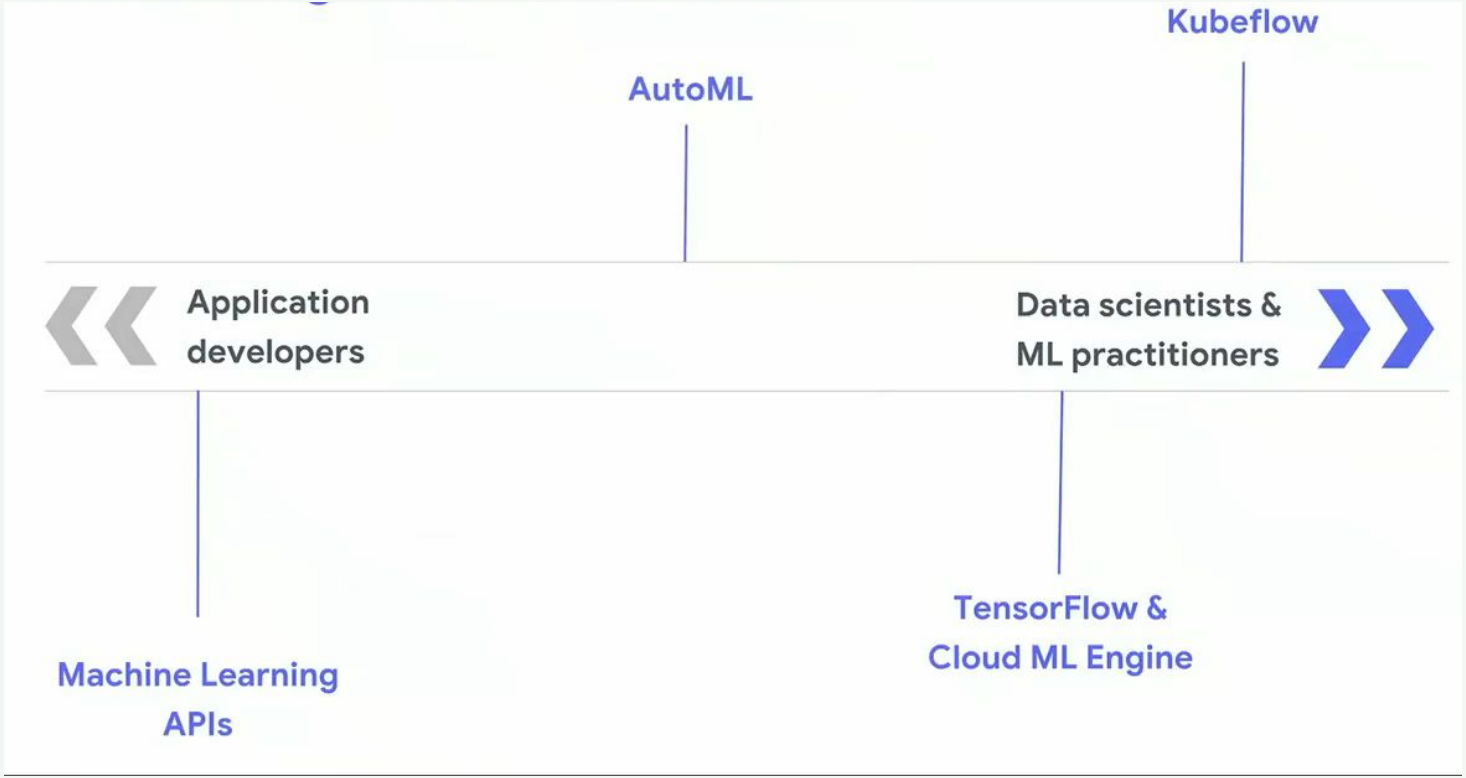
Task has been solved before

Task is specific to your dataset

"cat"

"chloe"

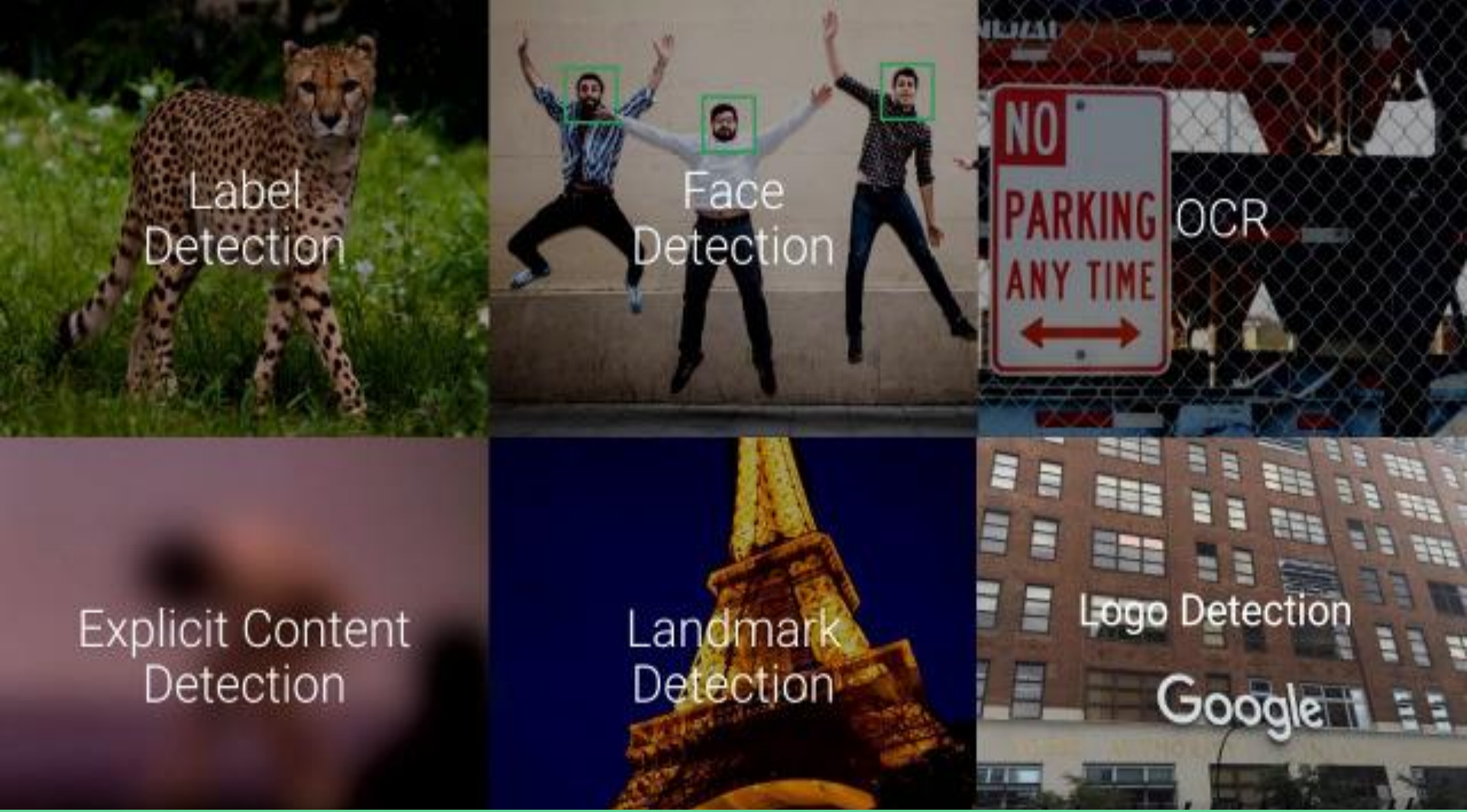
Is machine learning only for experts?



Vision API

- Complex image detection with a simple REST request.


MACHINE LEARNING
MACHINE LEARNING EVERYWHERE!
memegenerator.net


Label Detection
Face Detection
NO PARKING ANY TIME
OCR
Explicit Content Detection
Landmark Detection
Logo Detection
Google

Vision API - more feature

- Crop hints - suggested crop dimensions for your photos
- Web annotations - search the internet for more details on your image
- Document text annotation - improved OCR on large block of text


YOU GET A MACHINE LEARNING
EVERYONE GETS A
MACHINE LEARNING
YOU GET A MACHINE LEARNING
MEMECAPTAIN

Thank you!

@hackyroot

What to expect?

- Intro to Kubernetes [REDIS, Cloud PubSub, pods]
- Cloud Vision API from a Kubernetes Cluster
- How predictions are made using machine learning

Developed by Google

One of the best and most popular container orchestration

Container + Orchestration

Container

Docker

Kubernetes

Installing != Using

Google Cloud Platform

ML on GCP - https://youtu.be/gVz9jKE_9iU

Kubernetes - https://youtu .be/R-3dfURb2hA

Kubernetes guide - https://youtu.be/4ht22ReBjno

Codelab - https://codelabs.developers.google.com/codelabs/awwvision-cloud-vision-api-from-a-kubernetes-cluster/index.html?index=..%2F..index#6

ML APIs - https://youtu.be/w1xNTLH1zlA

Cloud Vision and NLP APIs - https://youtu.be/N0Ts5rc_Ou8