An Introduction to

Google Cloud Platform

And, Qwiklabs

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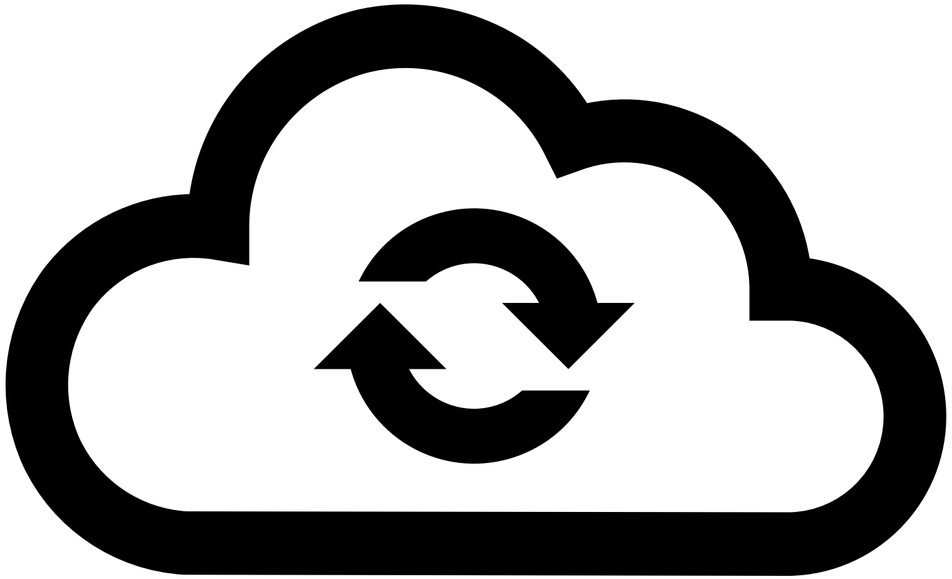
Agenda

- ✓Cloud providers in a nutshell
- ✓Getting to know GCP
- ✓Terminology
  - ✓Abstraction levels
  - ✓Services
  - ✓Zones/Regions
  - ✓User Interface
- ✓Qwicklabs: An easy way to learn GCP
- ✓A quick tutorial on Hadoop streaming API
- ✓Where to start with Qwicklabs

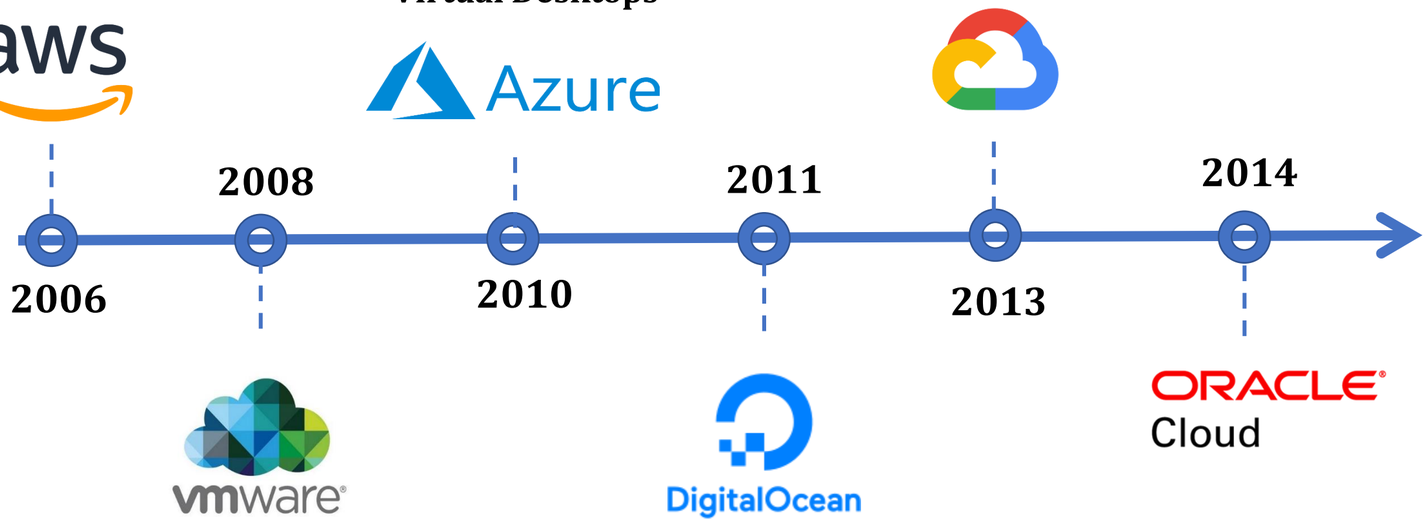


Cloud providers in a nutshell

Wide range of compute servers:
- **ARM**
- **Xen**
- **Bare-metal**

Business/organizational Tools
- **Active Directory**
- **Virtual Desktops**

TPUs
A lot of published research: Snap



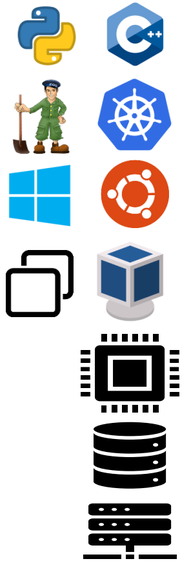
Private Cloud
Datacenter Virtualization

User-friendly VM management
Interfaces

IBM **Cloud**

Watson

Terminology - Abstractions

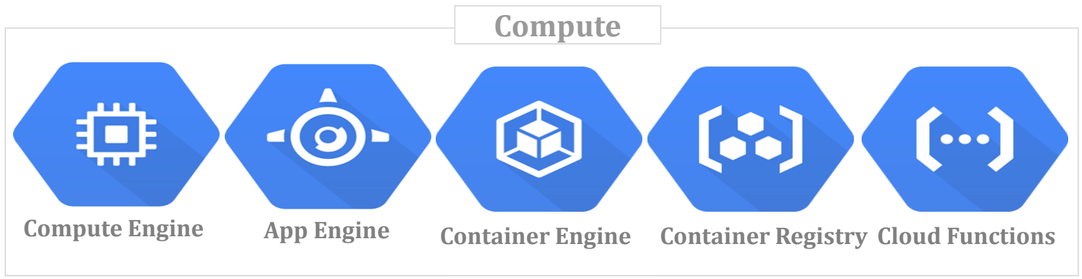


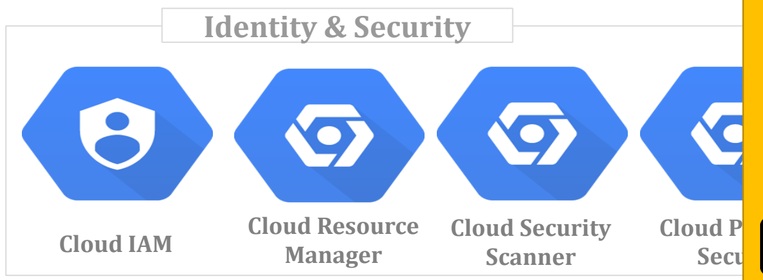
Bare Metals On-premises Datacenters	Infrastructure (IAAS)	Platform (PAAS)	Software (SAAS)	Function (FAAS)
Application	Application	Application	Application	
Data	Data	Data	Data	Data
Runtime	Runtime	Runtime	Runtime	Runtime
Middleware	Middleware	Middleware	Middleware	Middleware
Operating System	Operating System	Operating System	Operating System	Operating System
Virtualization	Virtualization	Virtualization	Virtualization	Virtualization
Computing Hardware	Computing Hardware	Computing Hardware	Computing Hardware	Computing Hardware
Storage	Storage	Storage	Storage	Storage
Networking	Networking	Networking	Networking	Networking

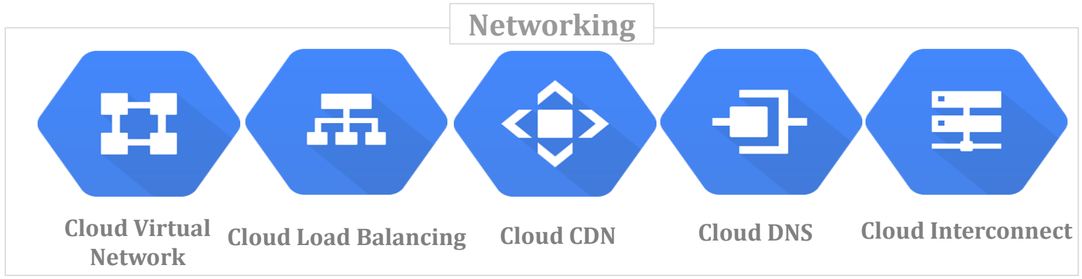
VM

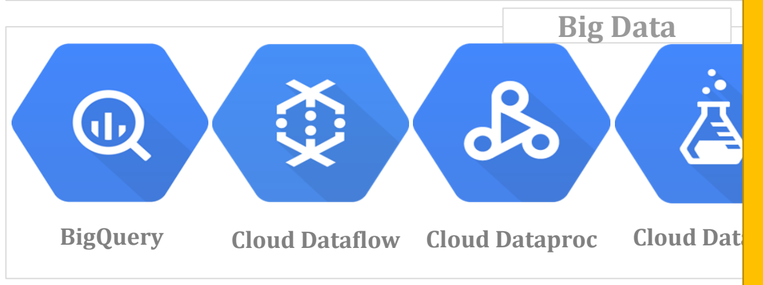
docker

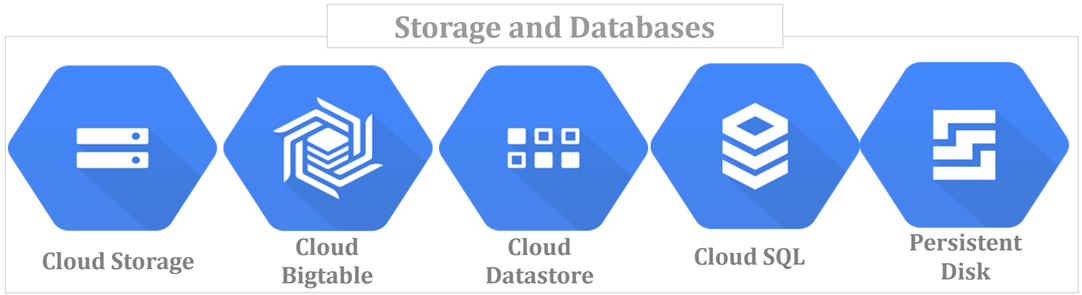
Terminology - Services

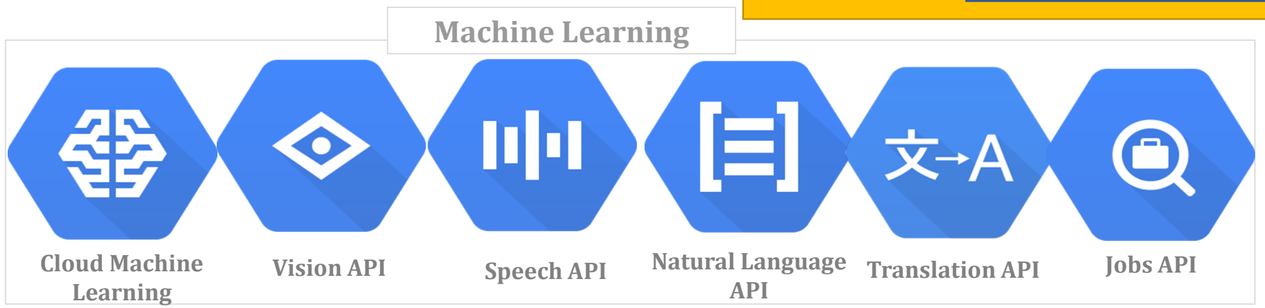


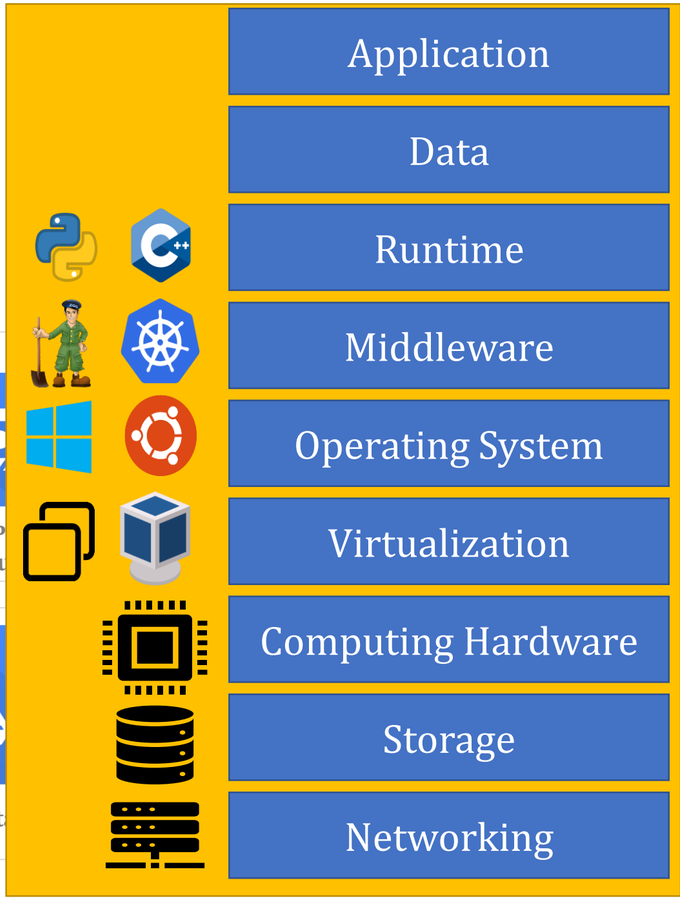










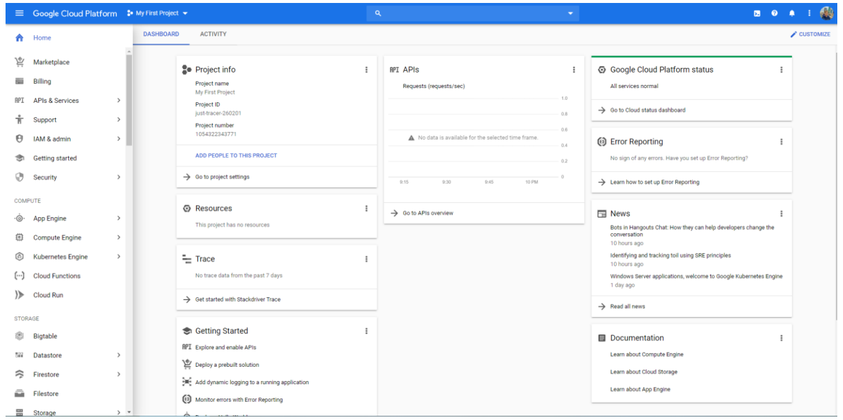


Terminology – Zones and Regions

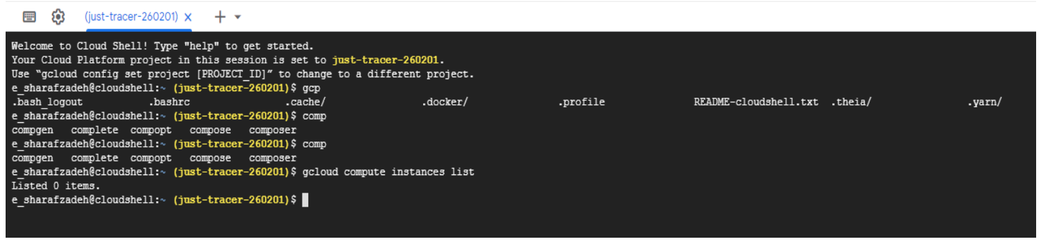
Region	Zones	Location
asia-east1	a, b, c	Changhua County, Taiwan
asia-east2	a, b, c	Hong Kong
asia-northeast1	a, b, c	Tokyo, Japan
asia-northeast2	a, b, c	Osaka, Japan
asia-northeast3	a, b, c	Seoul, South Korea
asia-south1	a, b, c	Mumbai, India
asia-southeast1	a, b, c	Jurong West, Singapore
australia-southeast1	a, b, c	Sydney, Australia
europe-north1	a, b, c	Hamina, Finland
europe-west1	b, c, d	St. Ghislain, Belgium
europe-west2	a, b, c	London, England, UK
europe-west3	a, b, c	Frankfurt, Germany
europe-west4	a, b, c	Eemshaven, Netherlands
europe-west6	a, b, c	Zürich, Switzerland
northamerica-northeast1	a, b, c	Montréal, Québec, Canada
southamerica-east1	a, b, c	Osasco (São Paulo), Brazil
us-central1	a, b, c, f	Council Bluffs, Iowa, USA
us-east1	b, c, d	Moncks Corner, South Carolina, USA
us-east4	a, b, c	Ashburn, Northern Virginia, USA
us-west1	a, b, c	The Dalles, Oregon, USA
us-west2	a, b, c	Los Angeles, California, USA

User Interface

The Console



The Cloud Shell

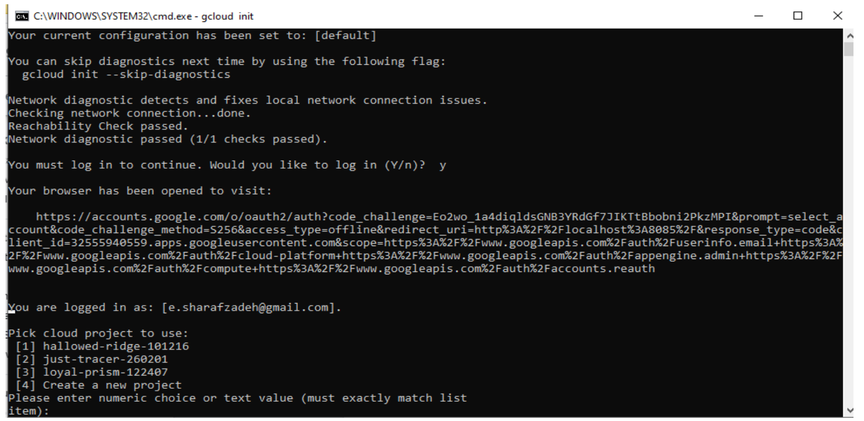


REST APIs

REST Resource: v2.datasets

Methods	
delete	DELETE /bigquery/v2/projects/{projectId}/datasets/{datasetId} Deletes the dataset specified by the datasetId value.
get	GET /bigquery/v2/projects/{projectId}/datasets/{datasetId} Returns the dataset specified by datasetID.
insert	POST /bigquery/v2/projects/{projectId}/datasets Creates a new empty dataset.
list	GET /bigquery/v2/projects/{projectId}/datasets Lists all datasets in the specified project to which the user has been granted the READER dataset role.
patch	PATCH /bigquery/v2/projects/{projectId}/datasets/{datasetId} Updates information in an existing dataset.
update	PUT /bigquery/v2/projects/{projectId}/datasets/{datasetId} Updates information in an existing dataset.

GCloud SDK



Qwiklabs: GCP Tutorials

- ✓ Hands-on Labs
- ✓ Quests
- ✓ Challenges

Qwiklabs: Demo

Creating a Virtual Machine…

https://www.qwiklabs.com/focuses/3563?parent=catalog

Hadoop Streaming API on GCP

Steps:

1. Create a VM on GCP (Alternatively we can use CS department ugrad lab machines)
2. Download Hadoop binaries from http://mirror.cc.columbia.edu/pub/software/apache/hadoop/common/hadoop-3.1.3/hadoop-3.1.3.tar.gz using *wget*.
3. Extract the Hadoop tarball (`tar xfv hadoop-3.1.3.tar.gz`)
4. Install JAVA using "`sudo apt install openjdk-8-jre`" (ugrad machines have JAVA installed already)
5. Define the environment variables for Hadoop:
   1. `export JAVA_HOME=/usr/lib/jvm/java-8-openjdk-amd64`
   2. `export HADOOP_HOME=~/hadoop-3.1.3`
6. Write your Python scripts (as map.py and reduce.py) and copy the data to the machine via SFTP to a directory named "cloud"
7. Run the map-reduce job:

```
$HADOOP_HOME/bin/hadoop  jar $HADOOP_HOME/share/hadoop/tools/lib/hadoop-streaming-3.1.3.jar -input cloud -output output_dir -mapper ~/map.py -reducer ~/reduce.py
```

Qwiklabs: Where to go from here

1. "Introduction to GCP" Quest
2. "Kubernetes in the Google Cloud" Quest
3. "Networking in the Google Cloud" Quest
4. Lots of quests on Data Science and ML
5. More advanced quests on Kubernetes and Networking
6. Challenge your understanding

Follow up

- Piazza – use “GCP” tag
- Email: e.sharafzadeh@jhu.edu, erfan@cs.jhu.edu
- Office hours: shoot me an email to set a time

Stay Tuned!

- Next Tutorial: OpenStack