Lecture 6:
• Overview of GCP (for HW-1)
• Key Background Terms & Ideas (cont)

Announcements:
• R-1 out
• HW-1 out

GCP Basics

Logging into GCP
• Use your zagmail account
• Select Google Workspace account ... should take you to SSO
• Apply coupon (see Piazza)

Main ways to interact with GCP services
• Cloud console ... HW-1
• CLI from local terminal or via cloud shell ... HW-1
• Programmatically via cloud SDK ... HW-1
• Cloud REST APIs
GCP Basics

GCP Regions and Zones: geographic abstraction above physical data centers

- A **region** is an area divided into (3 or more) **zones**
- Zones are hosted in one or more cluster (in a data center)
- Specific clusters depend on organization (zones/clusters decoupled)

Resource/Service Deployment

- Generally want to use regions/zones nearby
- Some resources/services have scope restrictions (e.g., VMs tied to zones)
- Some can be global (multi-region), regional, or zonal
- Scope impacts accessibility of one resource by another (same zone/region)

⇒ In HW-1 we’ll create cloud storage buckets in us-west-1 (region)

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Zones considered single failure domains

- Can put resources in different zones (e.g., replicate)
- Regional deployment protects against zone failures
- Global deployment protects against region failures

More on regions and zones

- us-west1 (Oregon) region has a, b, and c zones (e.g., us-west1-a)
- The 4 us-west regions are Oregon, Los Angeles, Salt Lake, and Las Vegas
- There are 39 regions and 118 zones ... but 24 official data centers!
Review: Metrics for Data Volume

Byte (B): 8 bits where bit is smallest unit of data

Kilobyte (kB): 1,000 bytes 1 kB = 1,000 B = 8,000 bits
- kilo means 10^3 = 1,000 (base 10)
- kibi means 2^10 = 1,024 (base 2), which is 1 kibibyte (KiB)
- base 2 prefixes frequently used for memory (either KiB or KB)

Megabyte (MB): 1,000 kB 1 MB = 1,000,000 bytes
- Mebibyte (MiB) is 2^20 = 1,024^2 bytes

Gigabyte (GB): 1,000 MB 1 GB = 1,000,000,000 bytes

Terabyte (TB): 1,000 GB 1 TB = 1,000,000,000,000 bytes

Petabyte (PB): 1,000 TB 1 PB = 1,000,000 gigabytes

Exabyte (EB): 1,000 PB 1 EB = 1,000,000,000 gigabytes

Zetabyte (ZB): 1,000 EB 1 ZB = 1,000,000,000,000 gigabytes

Examples – GCP Compute Engine

Cloud providers provide “on-demand” VMs: always available, charge $ if on
- can “provision” a VM with specific hardware specs (and OS)
- can then use just like any other machine (server)
- various types, eg, general purpose, compute or memory optimized, etc.

Some examples of GCP general-purpose VM specs ... among many
- E2 machines are “cost-optimized” ... second gen machines
- C3 machines are higher-performance ... third gen machines
- N2 machines offer more customization (CPU, storage, etc.)

<table>
<thead>
<tr>
<th>E2 Standard Machines (on-demand)</th>
<th>N2 Standard Machines (on-demand)</th>
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</thead>
<tbody>
<tr>
<td>2 to 32 vCPUs, 4 GiB RAM per no local SSDs</td>
<td>2 to 128 vCPUs, 4 GiB RAM per local SSD option</td>
</tr>
<tr>
<td>about $0.02 per vCPU hour</td>
<td>about $0.03 per vCPU hour</td>
</tr>
<tr>
<td>about $0.003 per GiB (RAM) hour</td>
<td>about $0.004 per GiB (RAM) hour</td>
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Summary – Things to Know

• Regions, zones, global (multi-region)

• bit, byte, kilobyte, etc.