
Google Cloud Platform
VS
amazon
web services

GCP VS AWS

CSYE6225- NETWORK STRUCTURES AND CLOUD COMPUTING

Varsha Bhanushali, 001234580, bhanushali.v@husky.neu.edu

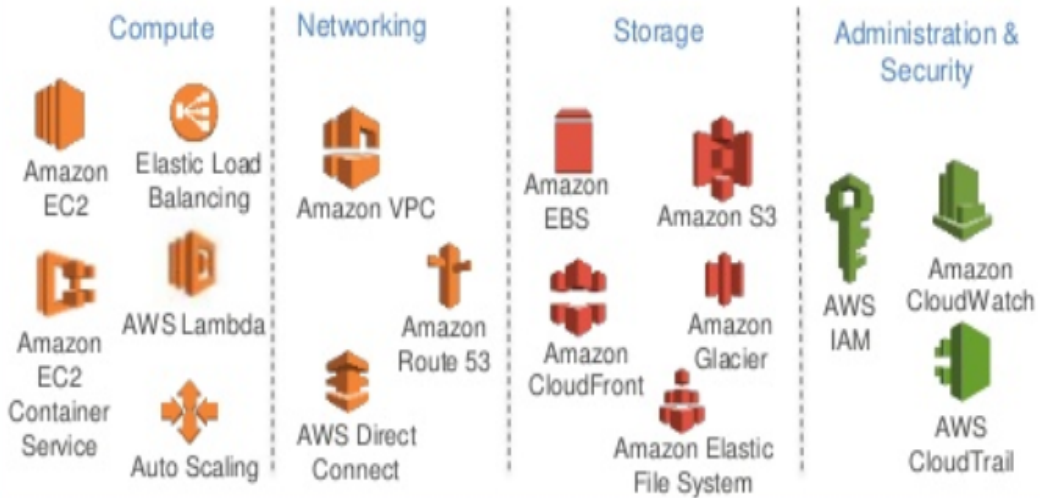
Shrikant Mudholkar, 001284732, mudholkar.s@husky.neu.edu

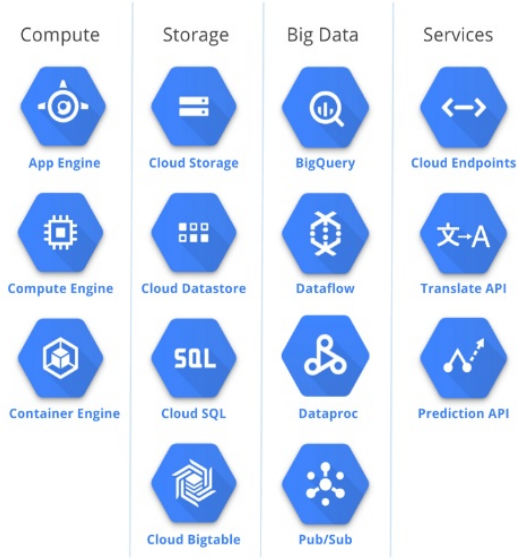
Rahul Chandra, 01225683, chandra.ra@husky.neu.edu

Manish Patil, 001228956, patil.man@husky.neu.edu

SERVICES

- From Service point of view **AWS** is clear winner as the quality and quantity (200+) as extremely broad and wide which build huge set opportunities for many needs
- On the other hand **GCP** product's list is quite small (50+) which are based on classic IaaS and PaaS services



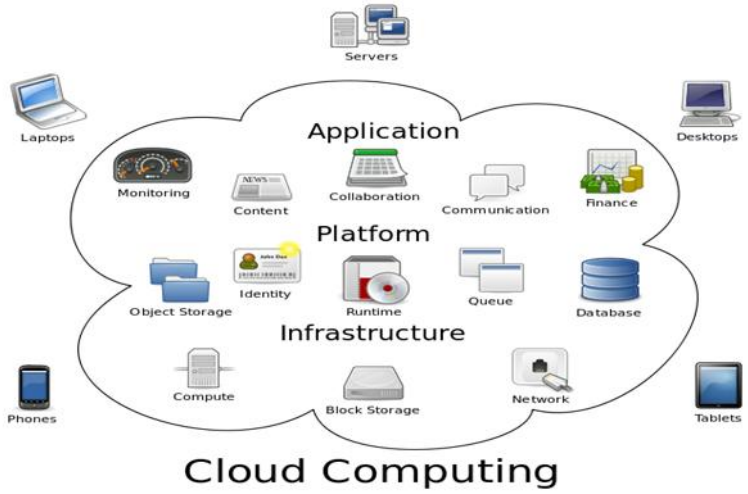


COMPUTE

Infrastructure as a service	**Google Compute Engine**	**EC2**
Platform as a service	**Google App Engine**	**AWS Elastic Beanstalk**
Functions as a service	**Cloud Functions**	**AWS Lambda**
Containers as a service	**Kubernetes Engine**	**Amazon ECS**

Google Cloud Platform

aws



Machine/Instance Type	Google Compute Engine	AWS EC2
Technology	KVM (Kernel-based Virtual Machine)	Xen
Shared	f1-micro g1-small	t2.nano - t2.2xlarge
Custom Instance types	Google Cloud Preemptible VMs	AWS EC2 Spot Instances

BLOCK STORAGE

- High throughput (IO), max IOPs per volume/instance, ability to burst capacity for short times

Block Storage	Google Cloud Platform (persistent disks)	AWS (EBS)
Service	SSD	General and Provisioned IOPS SSD
Volume Sizes	1 GB to 64 TB	1 GB to 16 TB 4GB to 16 TB Provisioned IOPS
Max IOPs per volume	40,000 read, 30,000 write	10,000 (20,000 for Provisioned IOPS) Max IOPS of 75,000/instance
Max Throughput per volume (MB/s)	800 read, 400 write	160 (320 for Provisioned IOPS)
Magnetic Pricing (per GB/month)	$0.040 (standard disk)	$0.045
SSD Pricing (per GB/month)	$0.170	$0.10

OBJECT STORAGE

- Both allow users to use disks that are locally attached to the physical machine running the instanceBlock Storage
- Local storage offers superior performance, very high input/output operations per second (IOPS), and very low latency compared to persistent disks.

Object Storage	Google Cloud Platform	AWS
Service	Google Cloud Storage	Amazon S3
Locally Attached Disks	Local SSDs	Instance Store Volumes
Hot Multi-Region Pricing (per GB/month)	$0.0260 Includes transfer	S3 Standard(x2) $0.0460 Transfer $0.0100
Hot Single Region Pricing (per GB/month)	$0.0200	$0.0230

DYNAMODB VS GOOGLE CLOUD DATASTORE

Name	Google Cloud Platform	AWS
Description	Hosted, scalable database service	Automatically scaling NoSQL Database as a Service
SQL	no	SQL-like query language (GQL)
Server-side scripts	no	using Google App Engine
Triggers	yes	Callbacks using the Google Apps Engine
Foreign keys	no	yes
Transaction concepts	no	ACID
MapReduce	no	yes
User concepts	Access rights for users and roles can be defined via the AWS Identity and Access Management (IAM)	no

PRICING

- In the huge competitive market of cloud vendor there has been a great cuts in pricing which is providing benefit to the customers
- Estimating monthly spend with both of these cloud providers can be a challenge.
- Compute Pricing:

Region: US East (N. Virginia)

	vCPU	ECU	Memory (GiB)	Instance Storage (GB)	Linux/UNIX Usage
General Purpose - Current Generation					
t2.nano	1	Variable	0.5	EBS Only	$0.0058 per Hour
t2.micro	1	Variable	1	EBS Only	$0.0116 per Hour
t2.small	1	Variable	2	EBS Only	$0.023 per Hour

Northern Virginia Monthly Hourly

Machine type	Virtual CPUs	Memory	Price (USD)	Preemptible price (USD)
f1-micro	1	0.60GB	$0.0086	$0.00375
g1-small	1	1.70GB	$0.0289	$0.00749

- Cloud Storage Pricing:

Storage Pricing (varies by region)

Region: US East (N. Virginia)

	Standard Storage	Standard - Infrequent Access Storage †	Glacier Storage
First 50 TB / month	$0.023 per GB	$0.0125 per GB	$0.004 per GB
Next 450 TB / month	$0.022 per GB	$0.0125 per GB	$0.004 per GB
Over 500 TB / month	$0.021 per GB	$0.0125 per GB	$0.004 per GB

Northern Virginia

Regional Storage (per GB per Month)	Nearline Storage (per GB per Month)	Coldline Storage (per GB per Month)
$0.023	$0.016	$0.01

- AWS EC2 offers Reserved Instance, which provide a significant discount (up to 75%) compared to on-demand pricing and provide a capacity reservation when used in a specific availability zone
- Google Cloud has Committed Use Discounts, which provide the ability to purchase committed use contracts in return for deeply discounted prices for VM usage

- Google Cloud offers automatic discounts on longer use of the instance, unlike with AWS where you have to reserve the instance for a long period of time

NETWORK

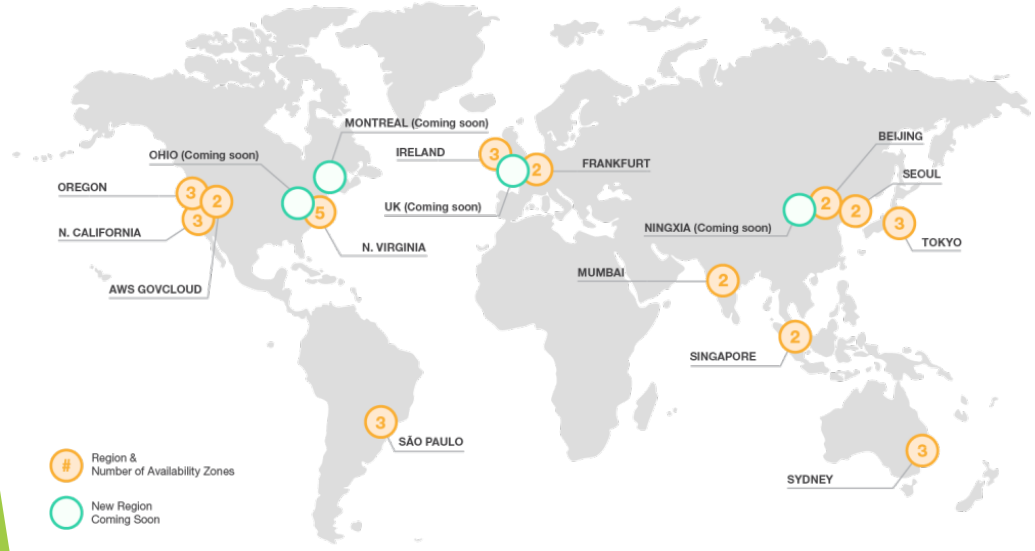
- Google Cloud and AWS both utilize different networks and partners to interconnect their data centers across the globe and deliver content via ISPs to end users.

Product	Google Cloud Platform	AWS
VPC	Virtual Private Cloud	Amazon VPC
Load Balancing	Cloud Load Balancing	Elastic Load Balancing
CDN	Cloud CDN	Amazon CloudFront
Interconnect	Cloud Interconnect	AWS Direct Connect
DNS	Cloud DNS	Amazon Route 53
Tiers	Network Service Tiers	N/A

- Google firewall does not have outgoing rules
- Google subnets can span multiple regions
- No IP on Load balancer in Amazon, while Google has static IP

Availability

- The AWS Cloud operates 46 Availability Zones within 17 geographic Regions around the world, Whereas GCP cloud operates 39 Availability zones within 13 Regions.



aws

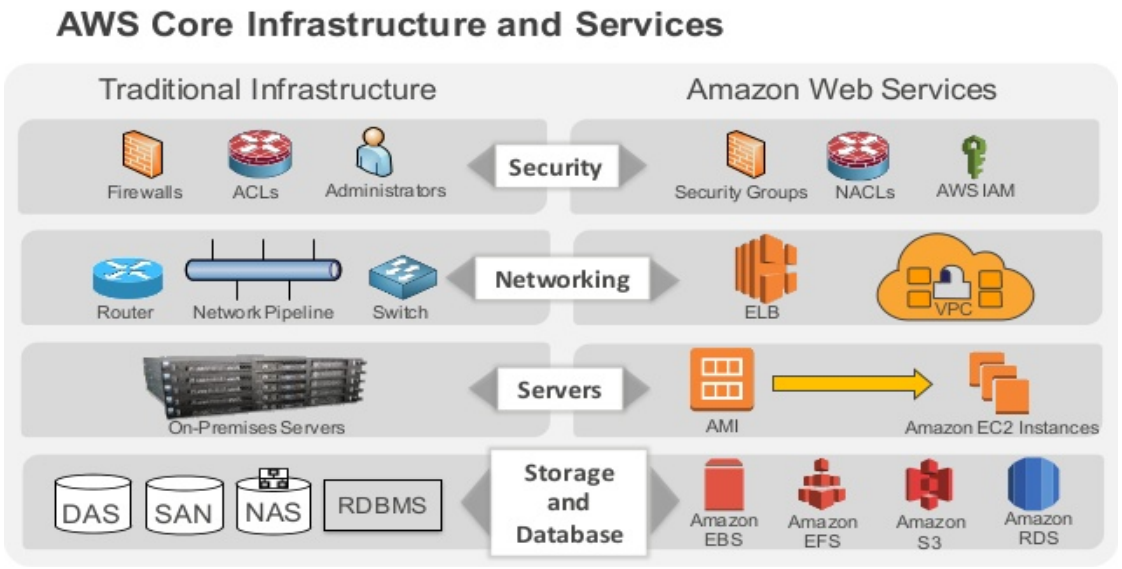
Google Cloud Platform

DEVELOPMENT TOOL

Description	AWS	GCP
Store Code in Private Git Repositories	AWS CodeCommit	Cloud Source Repositories
Release Software using Continuous Integration & Delivery	AWS CodePipeline	Maven App Engine Plugin, Gradle App Engine Plugin
Build and Test Code	AWS CodeBuild	Cloud Tools for Android Studio, Cloud Tools for IntelliJ, Cloud Tools for Eclipse, Cloud Tools for PowerShell, Cloud Tools for Visual Studio
Automate Code Deployments	AWS CodeDeploy, AWS CloudFormation	Cloud Launcher, Cloud Deployment Manager

MIGRATION

- On AWS, the user must manually migrate their affected instances from these host machines, either by rebooting the instances or recreating them using instance snapshots
- Cloud Platform features live migration, in which Cloud Platform automatically and transparently migrates instances when their host hardware needs maintenance or replacement



CLOUD SERVICES SUPPORT AND UPTIME

Google Cloud Premium Support

- Cheapest support plan starts at $150/month minimum
- The next level support plan starts at $400/month minimum, but with bill of minimum of 9% of product usage fees

AWS Support

- Cheapest paid support plan starts at $29/month or 3% of monthly AWS usage
- The next level support plan starts at $100/month minimum, but with bill of minimum of 10% of product usage fees

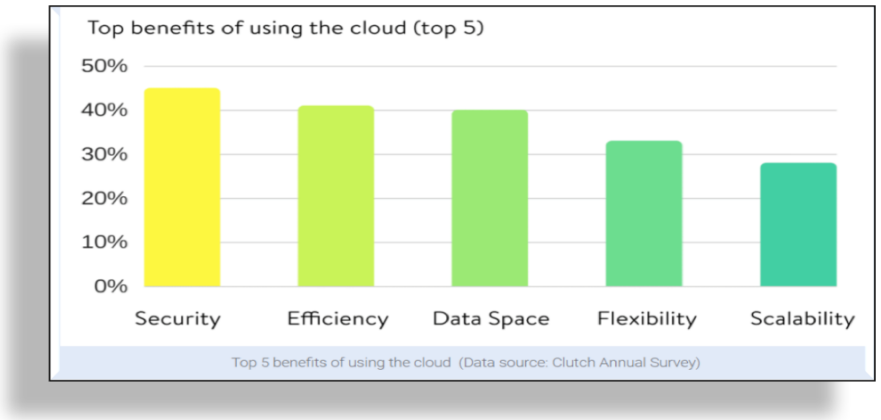
Google Cloud Uptime

- SLO will provide a Monthly Uptime Percentage to Customer of at least 99.95%
- With Google Cloud instances might be on the same machine per region
- Provides unique feature with their ability to live migrate virtual machines

AWS Uptime

- Monthly Uptime Percentage of at least 99.99%, during any monthly billing cycle as the Service Commitment
- Provides ability to get different machines within their multiple availability zones per region.

SECURITY



Google Cloud Security Features

- Data stored on persistent disks is encrypted under 256-bit AES
- Cloud IAM provide predefined roles that give granular access to specific Google Cloud Platform resources
- The layers of the Google application and storage stack require that requests coming from other components are authenticated and authorized.

AWS Security Features

- data stored on EC2 instances is encrypted under 256-bit AES
- AWS IAM, Multi-Factor Authentication, and Directory Services allow for defining, enforcing, and managing user access policies.
- Network firewalls built into Amazon VPC, and web application firewall capabilities in AWS to create private networks, and control access to your instances and applications.

CONCLUSION

- AWS clearly wins in market share and offerings
- AWS definitely has better documentation and resources
- Google Cloud offers better pricing
- Google Cloud has easier and faster instance configuration
- Google Cloud wins on the Big Data and Analytics front
- Google Cloud gives continuous Migration of Virtual Machines
- Google Cloud has Better Security
- Google Cloud provides Redundant Backups

Thank You!