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# Cloud Computing

## Final Project Presentation

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# Service Requirements

- Instances with firewalls
  - Load Balancer
  - Relational Database
  - Non-Relational Database
  - Object Storage
  - Serverless Computing
  - Notification Service
  - Identity and Access Manager
-

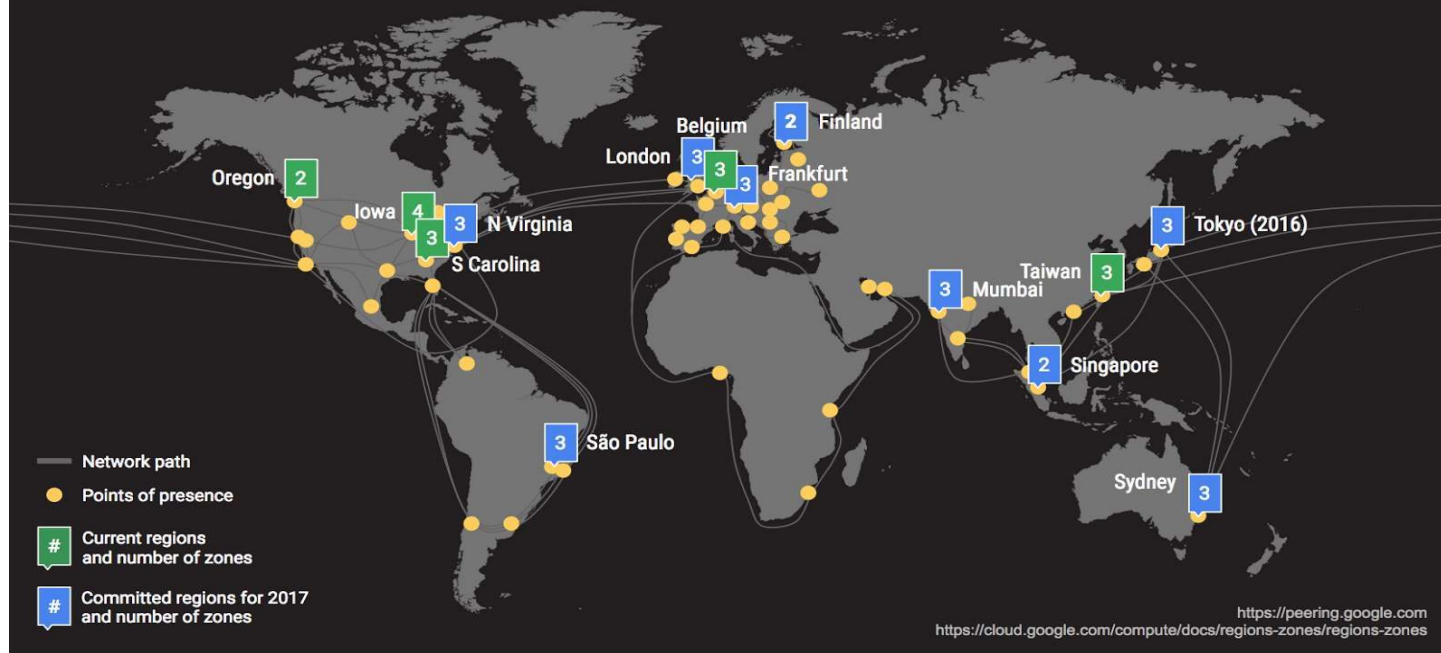


Google Cloud Platform

**VS**



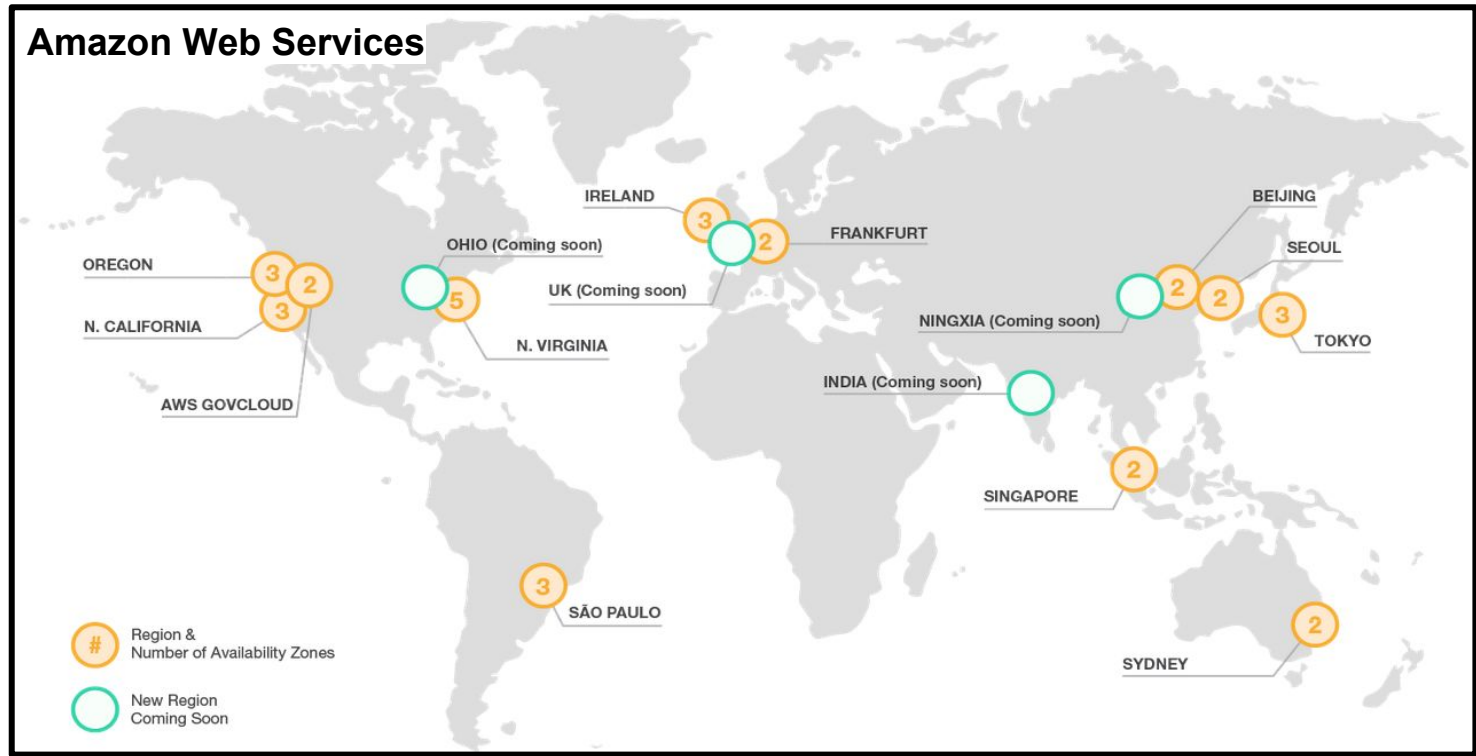
# Google Cloud Network



<b>Regions</b>	13
<b>Zones</b>	39
<b>CDN Edges</b>	80+

<b>POPs</b>	Over 90 internet exchanges and at 100 interconnection facilities around the world
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# Amazon Web Services



Regions	16
Availability Zones	42
CDN Edges	54

**Note:** Two additional regions scheduled to come online in 2017.

# Google CE





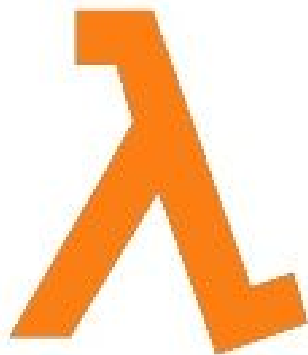
*vs*

# Amazon EC2



# Compute Instance vs EC2 Instance

Features		
Number of Instance Types	17 Predefined Types Can be customized	28 Predefined Types
Time to Create	Less Time	More Time
IP Version Support	IPv4	IPv4,IPv6
Temporary Instances	Preemptive VM Runs for max 24 hrs Fixed discounts upto 80%	Spot Instance Runs for max 6 hrs Auctioned
Machine Image Availability	Globally	Regionally
Key Management	<b>Two types</b> Instance (optional) Project wide (by default)	Must have a key-pair to SSH into an instance
Direct access to Terminal through Console	Yes	No



AWS Lambda  
Functions

vs



Google Cloud  
Functions



# Serverless Computing

## Features



**Service Name**

Google Cloud Function

AWS Lambda

**Code Update Latency**

Within minutes

Within Seconds

**Maximum Deployment Size**

100 MB compressed  
500 MB uncompressed

- 50 MB compressed
- 250 MB uncompressed

**Language Supported**

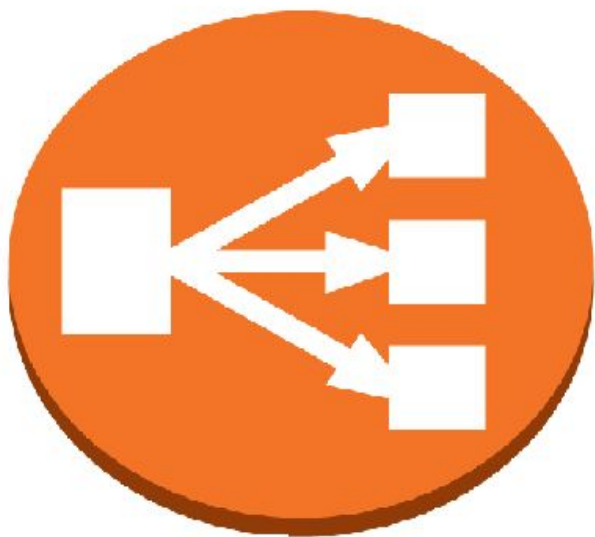
Only Node.js

Node.js, Java, Python , c#

**Number of Possible Triggers**

5 GCP Services

15 AWS Services





**AWS Elastic Load Balancer**

*vs*

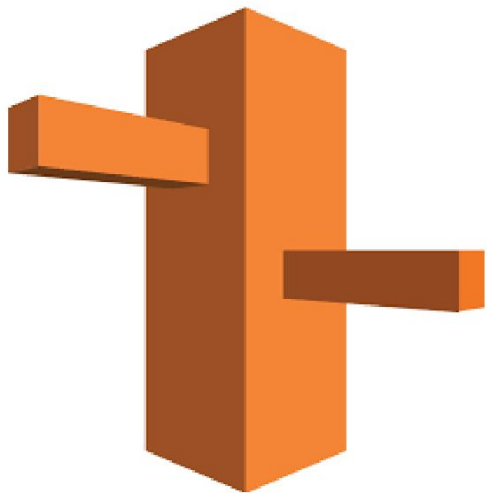


**Google Load Balancer**

# Load Balancer

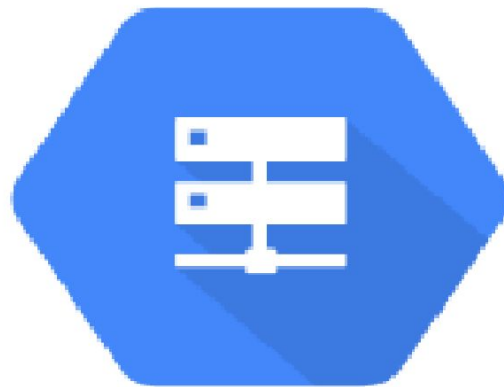
Features		
Pre - Warming	No	Yes
Autoscaling	Yes	Yes
Static IP Support	Yes	No
Cross-region load balancing	Yes	No
Content based Load Balancing	Yes	No
Deployment locality	Globally and Regionally	Regionally

Cost: Both AWS and Google Cloud Platform load balancing services use the same pricing model for load balancer. Each charges an hourly rate for the load balancer and a separate rate for the amount of traffic that passes through the load balancer.





**Route 53**

*vs*



**Google DNS**

# Cloud DNS vs Route 53

Features		
Latency-based routing	No	Yes
Geography-based routing	No	Yes
DNSSEC for DNS service (DNS Security)	Yes (Configure the system to use public resolvers)	No

Cost: They both cost the same, based on the number of zones hosted per month and queries per month. **But, AWS Route 53 charges a higher rate for geographic-based and latency-based routing queries.**



**Amazon RDS**

*vs*



**Google SQL**

# Databases

## Features



**Supported Relational Database Engines**

MySQL

Amazon Aurora, PostgreSQL, MySQL, MariaDB, Oracle and Microsoft SQL Server

**Non-Relational Database Service**

Bigtable, Datastore

DynamoDB

**Private Network Support**

Yes (Global)

Yes(AWS VPC) (Regional)

**Data Encryption**

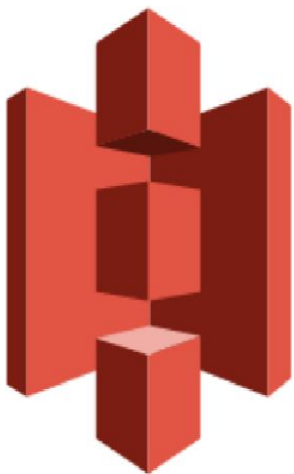
Yes

No

**Maximum Storage Space**

10TB

64TB(Amazon Aurora)



Amazon S3

vs



Google Cloud Storage



# Object Storage

## Features



**Regularly accessed data**

Multi-Regional

S3 standard

**Infrequently accessed data**

Nearline

S3 Infrequent Access

**Data archival**

Coldline

Amazon Glacier




AWS  
CloudFormation

*vs*



**Google Deployment  
Manager**

# Deployment Tools

<b>Features</b>		
<b>Known as</b>	Deployment Manager	CloudFormation
<b>Required Deployment Files</b>	Config file, Schema file, Template file	Template file
<b>Supported Syntax</b>	YAML, Jinja, Python	JSON, YAML
<b>Graphical User Interface</b>	Bad	Good
<b>Adequate Documentation</b>	No	Yes
<b>Updating Resources</b>	Not Permitted	Permitted



AWS IAM

vs



Google IAM

# IAM

## Features



### Provides Centralized Identity

No

No

### User Account Requirements

Must have Google Account

AWS Account is enough

### Custom Policy

Can only create a custom policy from existing list permissions



Can define a custom policy using JSON language

### Programmatic Access

Specifically requires an IAM service account.

Possible by attaching an IAM role to an instance

## Developer Tools

Resources		
Version Control	CodeCommit	Cloud Source Repositories
Continuous Integration and Delivery	CodePipeline + Third Party Services	Third Party Services
Building Code	CodeBuild	Gradle/Maven Engine Plugin
Code Deployment	CodeDeploy	CloudTools for IntelliJ, Powershell, etc

## Management Tools

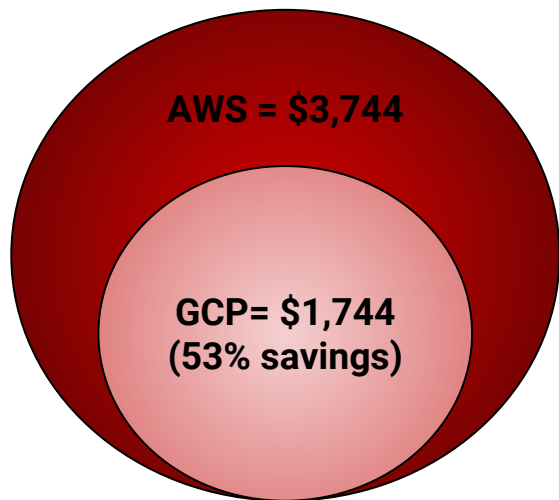
Automated Resource Provisioning	CloudFormation, MarketPlace, Service Catalog	Deployment Manager
Monitoring and Performance	CloudWatch	Stack Driver
Billing Management	Trusted Advisor	Cloud Billing API
Governance and Compliance	AWS Config, CloudTrail	StackDriver Trace

## Pricing of majorly used resources based on region(North Virginia)

Resources	AWS	GCP
2 CPUs/ 8GB RAM instance	\$69/month	\$52/month
Storage	\$2.3cents/GB/month	\$2.3cents/GB/month
Dynamo/Bigtable	\$0.25/GB/month	\$0.17/GB/month
DNS(Standard website)	\$0.50/month (first 25 hosted zones) \$0.10/month (additional hosted zones)	\$5/month
AWS Lambda/Cloud Functions	\$0.20/million(after first 1M for free)	\$0.40/million(after first 2M for free)
AWS RDS/Cloud SQL	\$0.20/GB/month	\$0.1819/GB/month

# Overview of Pricing

Estimated monthly expenditure of a  
Storage Backend Architecture



**GCP provides a better approach to discounted long-term usage:** Instead of requiring users to reserve instances for long periods of time as AWS does, GCP will automatically provide discounts the longer you use the instance — **no reservations required ahead of time.**



# Integration with Existing Infrastructure



**Partnerships with organizations**

**Nautix Calm solution**

**Nautix Xi Cloud services**

**Egnyte connect**

**Cisco-google**



**VPC**

**Using VPN  
Using IPsec**

**Direct Connect**

**AWS Storage Gateway**

# Pros Of Using GCP

- They provide long-term discounts
- No vendor lock-in
- Through Point of Presence (POPs) application endpoints and backend services are closer to the users
- The Load Balancer provides much less latency with no load balancer warm ups



### ***Our Recommendation:***

Keeping in mind the primary intentions of our company's switch to cloud, we would recommend **Google Cloud Platform**. Though AWS provides a wider range of services and is a market leader, GCP's advantage w.r.t pricing, ability to scale up in real-time and cross-datacenter networking are better suited to our needs. Afterall, it's about how you do computing, not where you compute.



Thank you.

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