# FINAL PRESENTATION – CLOUD COMPUTING


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# Introduction to AWS and GCP

- Amazon.com built AWS to handle its online retail operations.
- AWS was one of the first companies to introduce a pay-as-you-go cloud computing model that scales to provide users with compute, storage or throughput as needed.
- Google Cloud Platform is a suite of public cloud services that includes Google Compute Engine for infrastructure as a service and Google App Engine for platform as a service.
- The Google Cloud Platform suite of services is always evolving.
- Google periodically introduces, changes or discontinues services based on user demand or competitive pressures.

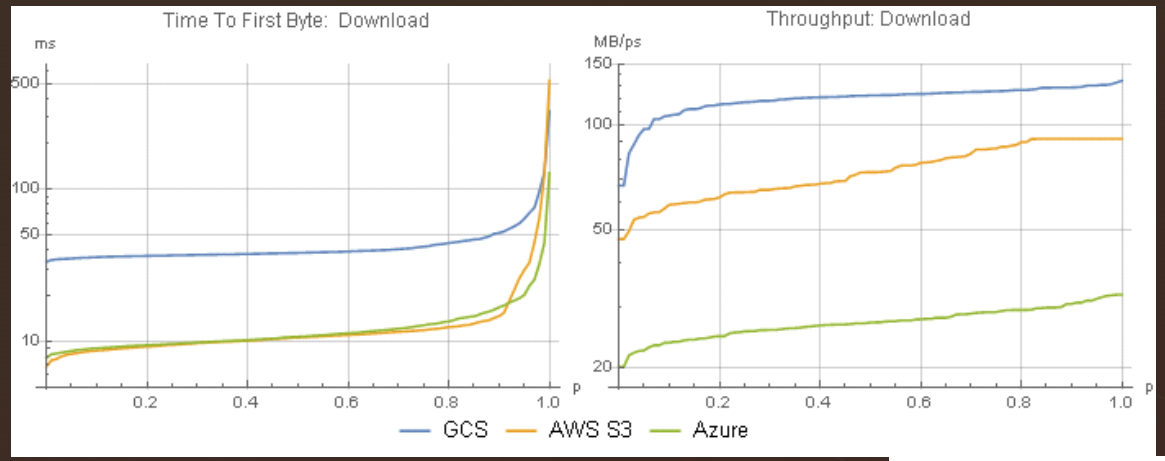
# AWS vs GCP Services

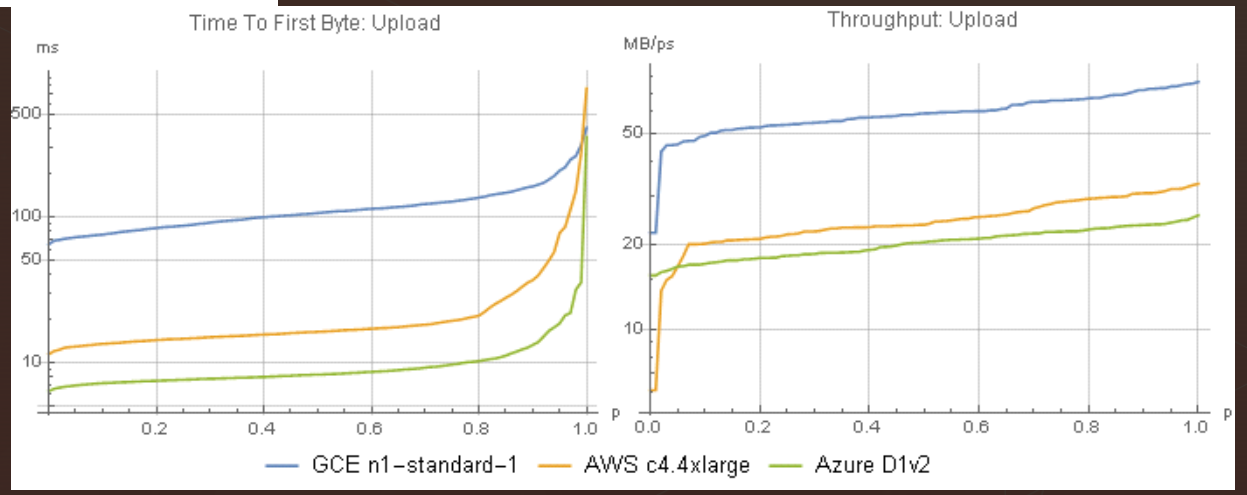
| | |
|---|---|
| Amazon EC2 | Google Compute Engine |
| AWS Lambda | Google Cloud Functions |
| Elastic Load Balancer | Google Cloud Load Balancing |
| Amazon Route 53 | Google Cloud DNS |
| Amazon S3 | Google Cloud Storage |
| Amazon RDS | Google Cloud SQL |
| Amazon DynamoDB | Google Cloud Bigtable/DataStore |
| AWS CloudFormation | Google Cloud Deployment Manager |

- EC2 vs Compute Engine
  - In GCP, if the machine running your application has a hardware failure or needs a software patch, your instance is automatically migrated to another server.
  - Google's instances start up much faster than Amazon's, by a factor about 60-80%.
  - Market share – AWS:31% , GCP:8%
- Lambda vs Google Cloud Functions
  - AWS : zip only; languages : java, C#, python, php, JS, go
  - GCP: zip and cloud repos; languages: JS
- Elastic Load Balancer vs Google Cloud Load Balancing
  - ELB: default health check
  - Google CLB: supports more than 1 million requests per second.
- Amazon Route 53 vs Google Cloud DNS

- Amazon S3 vs Google Cloud Storage
  - GCS has 3 times the latency than AWS, it has multi-regional bucket.
  - But, 2 times throughput
  - GCS snapshots are stored globally,
- Amazon RDS vs Google Cloud SQL
  - GCP: supports only MySQL , postgreSQL in beta
  - AWS: SQL Server, MySQL, PostgreSQL, Oracle, MariaDB..
- Amazon DynamoDB vs Bigtable
- Security Group – AWS: Outbound and inbound, GCP: only inbound traffic

# AWS VS GCP Storage



# Comparing Costs

- Whilst both Google Cloud Platform and Amazon Web Services offer very similar pricing, the key difference for us lies in their long-term commitment discounts.
- Both of them offer a 30% discount when using the service for an extended period of time. There is, however, one fundamental difference:
- In AWS, you get the discount in exchange for making a one-year or three-year commitment with the longer commitment giving a higher discount.
- If you also pay for some or all of that committed usage upfront, the discount gets larger.

- Google has a different model for incentivizing customers to maximize their cloud use and it's called Sustained Usage Discounts (SUD).
- The SUD, which happens automatically and requires no upfront commitment, gives you a discount on each monthly bill based on the percentage of time that instances in a certain family were running during the month.
- Basically, the more you use the VM, the less expensive it becomes. If an instance runs for 25% of a month, there is a 20% discount on future use; if its running 50% of the month then another 20% discount is applied. If it runs for 100% of a month there is a 30% discount compared to on-demand pricing.

- Google’s Cloud is always preferred over AWS when it comes to compute and storage costs.
- For example, a 2 CPUs/8GB RAM instance will cost $69/month with AWS, compared to only $52/month with GCP (25% cheaper).
- As for cloud storage costs, GCP’s regional storage costs are only 2 cents/GB/month vs 2.3 cents/GB/month for AWS.
- Additionally, GCP offers a “multi-regional” cloud storage option, where the data is automatically replicated across several regions for very little added cost (total of 2.6 cents/GB/month)

- Google beats AWS on free trials.
- AWS offers a generous 1-year-free trial. The trial includes 750 hours/month of a small 1 CPU/1GB RAM instance with 30GB disk storage, 750 hours/month of a similarly-sized managed database instance (e.g. MySQL), and 5GB of cloud storage (enough for a small web server running constantly for a year).
- Google Cloud only offered a 60-day, $300 credit trial, which felt less like a trial and more like a $300 discount.
- Recently, however, GCP extended their $300 credit to last for 12 months, and added a Free Tier that isn't time-limited. For example, you can get an instance with 0.2 CPU/0.6GB RAM with 30GB disk storage and 5GB cloud storage, all for free. If they keep this up, you'll be able to run a small website on the GCP for free, for forever

# Cost Analysis of GCP

## Your Estimated Bill *

### Estimated Monthly Cost: $383.86

| | | | |
|---|---|---|---|
| 3 x | f1-micro<br><br>Sustained Usage Discount Monthly Breakdown:<br>• 1st ¼ - 547.5 hrs @ 0.0% off: $4.16<br>• 2nd ¼ - 547.5 hrs @ 20.0% off: $3.33 ($0.83 saved)<br>• 3rd ¼ - 547.5 hrs @ 40.0% off: $2.50 ($1.66 saved)<br>• 4th ¼ - 547.5 hrs @ 60.0% off: $1.66 ($2.50 saved) | 2190 total hours per month | $11.65 |
| Persistent disk | Storage | 16 GB | 0 |
| Forwarding rules | Forwarding rules | 1 | $18.25 |
| Load Balancer ingress | Ingress | 1024 GB | $8.19 |
| Cloud Storage | Regional storage | 1024 GB | $20.38 |
| db-g1-small | 100 GB | 730 total hours per month | $85.10 |
| Pub/Sub | Operations | 1024 GB | $60.84 |
| Managed Zones | Managed Zones | 1 zones | $0.20 |
| Queries | Cloud dns queries | 1000000 | $0.40 |
| Datastore Storage | Datastore Storage | 1024 GB | $178.85 |
| Datastore | Entity Reads | 333 | 0 |
| Datastore | Entity Writes | 334 | 0 |
| Datastore | Entity Deletes | 333 | 0 |
| **Total Estimated Monthly Cost** | | | **$383.86** |

# Cost Analysis of AWS

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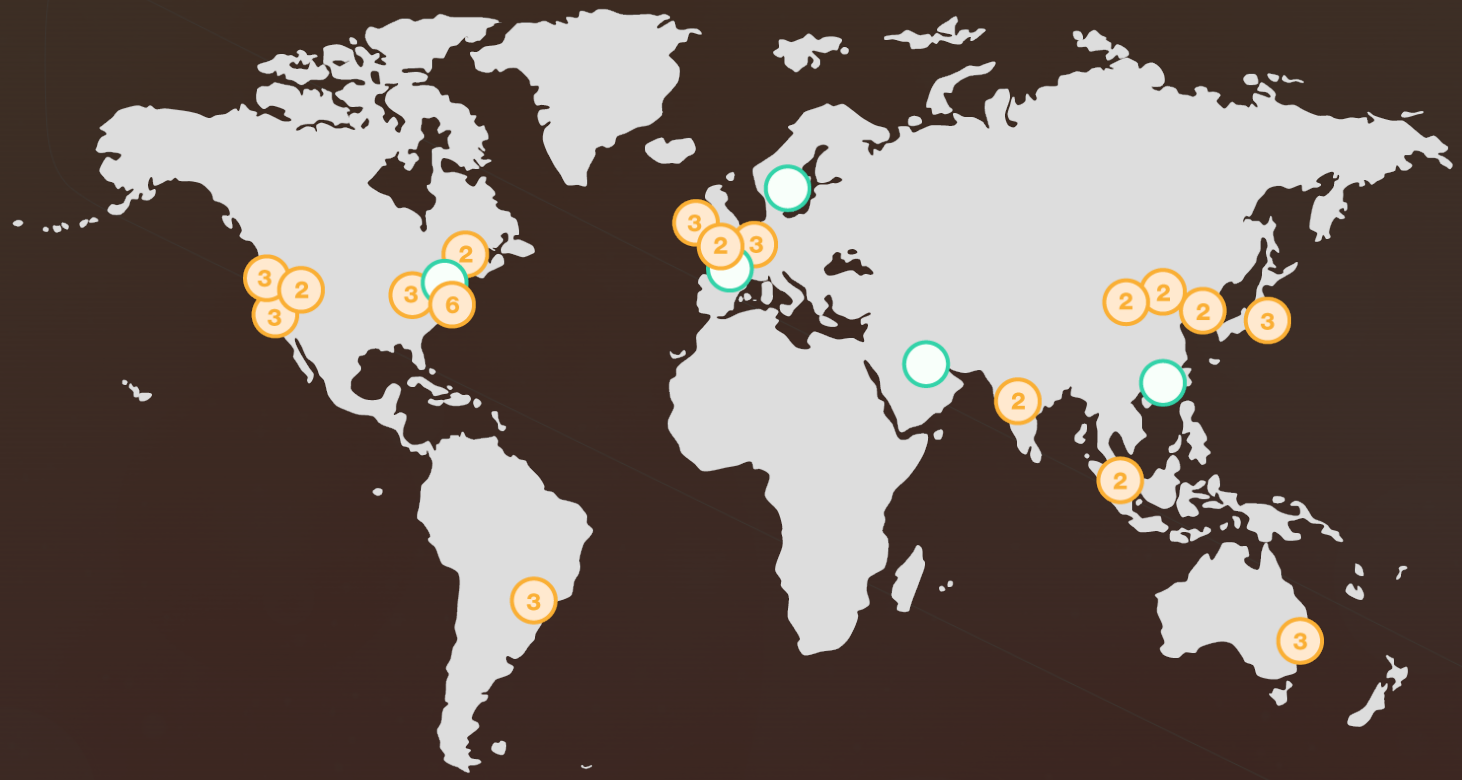
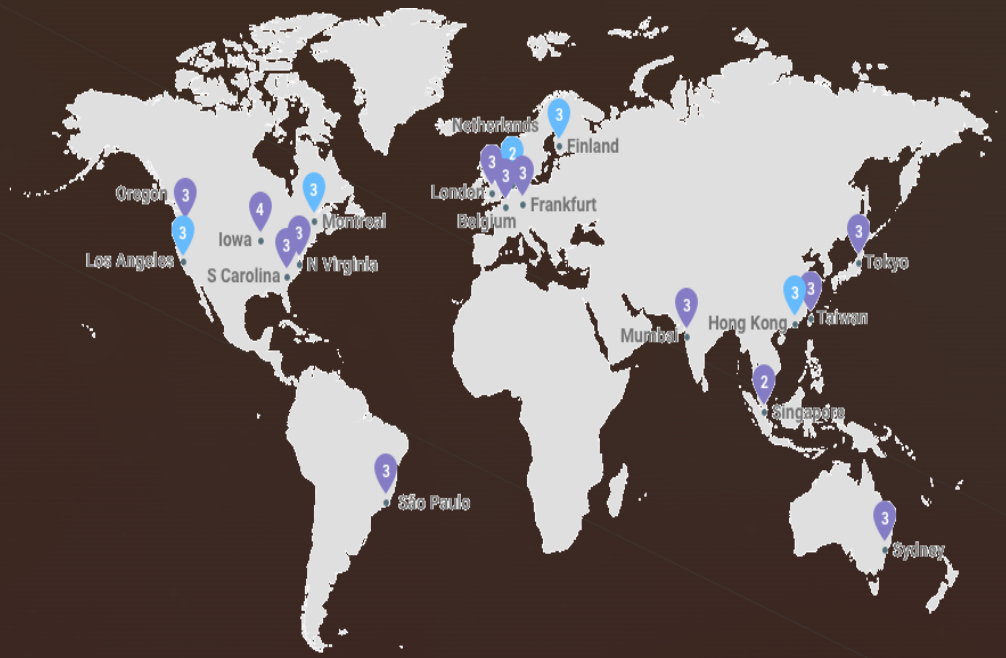
| | | | |
|---|---|---|---|
| ⊖ | Amazon EC2 Service (US-East) | | $ 72.02 |
| | Compute: | $ 43.92 | |
| | EBS Volumes: | $ 1.60 | |
| | EBS IOPS: | $ 0.00 | |
| | Elastic LBs: | $ 18.30 | |
| | Data Processed by Elastic LBs: | $ 8.20 | |
| ⊖ | Amazon S3 Service (US-East) | | $ 23.57 |
| | Standard Storage: | $ 23.56 | |
| | Standard Put/List Requests: | $ 0.01 | |
| | Standard Other Requests: | $ 0.00 | |
| ⊖ | Amazon Route 53 Service | | $ 105.40 |
| | Hosted Zones: | $ 5.00 | |
| | Traffic Flow: | $ 100.00 | |
| | Standard Queries: | $ 0.40 | |
| ⊖ | Amazon RDS Service (US-East) | | $ 61.28 |
| | DB instances: | $ 49.78 | |
| | Storage: | $ 11.50 | |
| ⊖ | Amazon DynamoDB Service (US-East) | | $ 274.75 |
| | Indexed Data Storage: | $ 274.75 | |
| | DynamoDB Streams: | $ 0.00 | |
| ⊖ | Amazon SNS Service (US-East) | | $ 0.00 |
| | Requests: | $ 0.00 | |
| | Notifications: | $ 0.00 | |
| ⊖ | AWS Data Transfer In | | $ 0.00 |
| | US-East / US Standard (Virginia) Region: | $ 0.00 | |
| ⊖ | AWS Data Transfer Out | | $ 44.91 |
| | US-East / US Standard (Virginia) Region: | $ 44.91 | |
| ⊖ | AWS Support (Basic) | | $ 0.00 |
| | Support for all AWS services: | $ 0.00 | |
| **Free Tier Discount:** | | **$** | -38.71 |
| **Total Monthly Payment:** | | **$** | 543.22 |

# Global Infrastructure AWS



# Global Infrastructure GCP



# AWS Tools

- DEVELOPER:
  1. AWS CodeCommit
  2. AWS CodePipeline
  3. AWS CodeBuild
  4. AWS CodeDeploy
- MANAGEMENT
  1. AWS CloudFormation
  2. Amazon CloudWatch
  3. AWS Config
  4. AWS CloudTrail
  5. AWS Trusted Advisor

# GCP Tools

## DEVELOPER

- Cloud SDK
- Cloud Shell
- Cloud Source Repositories
- Cloud Tools for Android Studio
- Cloud Tools for IntelliJ
- Cloud Deployment Manager
- Gradle App Engine Plugin

## MANAGEMENT

- Stackdriver
- Monitoring
- Logging
- Error Reporting
- Cloud Deployment Manager
- Cloud Billing API
- Cloud APIs

# AWS Hybrid

- AWS Storage Gateway
- AWS Snowball
- AWS Directory Services
- AWS GreenGrass

# GCP Hybrid Model

- Cisco- Google partnership
- VMWare – pivotal –GCP partnership
- Google cloud – Nutanix partnership

# Conclusion

GCP gets an edge when it comes to pricing

AWS get an edge on variety of services available