CSYE6225- Network Structure and Cloud Computing

Amazon Web Services versus Google Cloud Platform

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AWS Services used:

- Elastic Cloud Compute (EC2)
- Simple Storage Service (S3)
- Relational Database Service (RDS)
- DynamoDB
- Identity & Access Management (IAM)
- AWS Lambda Function
- Route53
- CodeDeploy
- CloudWatch
- CloudFormation
- Elastic LoadBalancer
- Certificate Manager
- Simple Notification Service (SNS)
- Simple Email Service (SES)

Google Cloud Platform Services used:

- Compute Engine
- Firewall
- Cloud Load Balancing
- Cloud DNS
- BigTable
- Cloud SQL
- Cloud Function
- Cloud Pub/Sub
- Cloud Storage

Google Cloud Platform

Service Differentiator

AWS EC2

- Referred as **instance types**
- It takes time to boot
- Block storage using EBS and Object storage using S3

Google Compute Engine

- Referred as **machine types**
- VM instances have faster boot time as compared to AWS EC2
- Provides sustained use discounts
- Uses persistent disks and Google Cloud Storage for Object storage

Service Differentiator

AWS Elastic Load Balancer

- Auto-scaling requires to specify minimum number of instances
- Pre warming or initialization is required to avoid performance hit but the new EBS volumes don't require this
- Charges vary as per region and charged per hour and as per the use of Load balancer capacity units

Google Cloud Load Balancer

- Scales on its own as per traffic
- No pre-warming required to handle spikes in traffic
- Charges are same for all regions based on hourly usage

Service Differentiator

AWS S3

- Pricing: AWS S3 is a zero cost operation if we use S3 from EC2
- Region: Offers single region cloud storage option
- No mechanism of preconditions available in AWS S3

Google Cloud Storage

- Pricing: Google charges for app engined accessing storages
- Google's unique multi-region buckets keep costs down when working with data from multiple datacenters in the same region. eg: Continent
- Preconditions available to support updates for PUT and DELETE operations

Service Differentiator

AWS RDS

- Supports many DBMS engines for implementing SQL solutions
- Automatic failover is not present is RDS. It is provided in Aurora
- Data encryption at rest is an option in RDS

Google Cloud SQL

- Supports MySQL and PostgreSQL which is still in beta for implementing SQL solutions
- If you have replicas in your setup and the master becomes unavailable, Google Cloud SQL automatically switches over to a replica to ensure continuity.
- Data encryption at rest is by default in cloud SQL making it more convenient

Service Differentiator

AWS Route53

- Route53 supports two kinds of routing that cloud DNS does not.(Geography based routing and latency based routing)
- It has hosted zones
- Route53 charges more for the two kinds of routing it supports

Cloud DNS

- Cloud DNS does not support two kinds of routing which Route53 does
- It has managed zones
- The costs are similar to Route53 except for the two other routing kinds

Service Differentiator

AWS Lambda

- Supported Languages: JavaScript, Java, C# and Python
- Re-deploy the deployment package every time you change your code or update a dependency.
- Pricing
  First 2 million:Free
  Beyond 2 million: $0.40/million

Google Cloud Function

- Supported Languages: Only NodeJS
- Allows to choose a bucket to stage changes in function's code
- Pricing
  First 1 million:Free
  Beyond 1 million: $0.20/million

Service Differentiator

AWS DynamoDB

- Key-value store
- APIs:
  - Get
  - Put
- No security features

Google BigTable

- Multi-ordered sorted map
- APIs:
  - Get
  - Put
  - Scan
  - Delete
- Access control rights are given at column family level

Service Differentiator

AWS Cloud Formation

- It is called as Stack
- The Template files are written in JSON or YAML format
- Maximum number of stacks is 200

Google Deployment Manager

- It is termed as deployment
- The Template files are written in YAML,JINJA or Python
- Maximum number of deployments is 1000

Cost Of Technology Stack

- One of the major differences in pricing policies is:
  - AWS bills as per account
  - GCP bills as per the service usage by project.
- In an Organizational setting, GCP can be advantageous allowing to create project spaces for separate groups in same company.
- Irrespective of the account type, GCP gives $300 promotional credit whereas in AWS you need to have student account or so to gain the promotional benefit.
- GCP is advantageous especially for those who need cloud infrastructure for the long term. GCP offers discounts based on length of usage. The longer you use GCP, the more discounts you will get. AWS, in comparison, requires users to reserve long usage contracts without any cost relief.

Developer and Management Tools

- AWS and Cloud Platform each provide a command-line interface (CLI) for interacting with the services and resources. AWS provides the **Amazon CLI**, and Cloud Platform provides the **Cloud SDK**.
- In addition, in Cloud Platform, you can use the Cloud SDK in your web browser by using **Google Cloud Shell**.
- AWS and Google Cloud Platform also provide web-based consoles. Each console allows users to create, manage, and monitor their resources.

AWS

- IDE ToolKit
  - Eclipse
  - Visual Studio
  - VSTS

GCP

- IDE Toolkit
  - Eclipse
  - Visual Studio
  - IntelliJ

Global Infrastructure

AWS

17 geographic Regions around the world with 46 Zones

GCP

13 Geographic Regions around the world with 39 Zones

- Regions are independent geographic areas that consist of zones. Zones consist of one or more discrete data centers, each with redundant power, networking and connectivity, housed in separate facilities.

- Zones offer you the ability to operate production applications and databases which are more highly available, fault tolerant and scalable than would be possible from a single data center.

Takeaway

- AWS is well documented as compared to GCP. Although AWS is a bit complex, it is doable because of the proper documentation. We started our work on GCP by making jinja templates but eventually we had to move to CLI.
- If you are looking for a big cloud platform with plenty of services, then AWS is the best pick.
- If you are looking for an affordable service with big data perks, then GCP is better.

Thank You