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Comparative study of Google cloud and Amazon cloud: which is a better cloud?

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ABSTRACT: Amazon AWS and Google Cloud are two prominent players in the cloud computing arena, each offering a vast array of services and advantages. This research paper conducts a comprehensive comparison of Amazon AWS and Google Cloud, considering factors such as pricing, features, scalability, security, andperformance. Our analysis reveals that Amazon AWS is superior to Google Cloud, particularly for large-scale enterprises.

I. INTRODUCTION:

Cloud computing is nothing but the provision of different types of computing services such as storage, services, databases , networking, analytics, etc. There are different types of cloud service providers in the world, such as Google Cloud, Amazon Cloud, Microsoft Azure, IBM Cloud, Alibaba Cloud, etc. They are some of the most well known and prominent cloud service providers in the field of cloud technology. Each cloud provides different types of services, and different points of comparison can be noted in a comparative study of different clouds. In this article, we will compare two major cloud service providers: Google Cloud and Amazon Web Services (AWS). We are going to discuss the different parameters of these cloud service providers. This comparative study will give us an understanding of the selection of a cloud service provider for our use. We will be concluding that "which cloud should be selected?" In both of these clouds there can be different types of points that we can compare such as market share comparison, price comparison machine type comparison, region and Zone c comparison and big data analytics comparison and the last one is free trials comparison we will be discussing about all these points in this paper. At the end of this research paper we will be concluding which is a good Cloud platform.

Service comparison:

If we talk about Services of Google cloud and Amazon web services then we can see following services that are provided by Google cloud and Amazon.

Computing services:

Paas	Google App engine	AWS elastic beanstalks
Iaas	Google compute engine	AWS elastic compute cloud
Containers	Google kubernetes engine	AWS elastic compute cloud Container service
Serverless functions	Google cloud functions	AWS Lambda
Storage	RESTful online file storage	Amazon s3

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Storage services:

File storage	ZFS	Amazon elastic file system
Cold storage	Google cloud storage near line	Amazon glacier
Block storage	Google computer engine persistent disks	Amazon elastic block store
Object storage	Google cloud storage	Elastic load balancer

Database:

RDBMS	Google cloud SQL	Amazon Relational database service
NoSql : key:value	Google cloud Data Store Google cloud Big table	Amazon Dynamo DB
NoSQL :Indexed	Google cloud Data Store	Amazon Simple DB

Management Services:

Monitoring	StackDriver Monitoring	Amazon cloudWatch
Deployment	Google cloud deployment manager	AWS Cloud Formation

Network services:

Load Balancer	Google cloud load balancing	Elastic load balancer
Peering	Google cloud interconnect	Direct connect
DNS	Google cloud DNS	Amazon Route S3

These are some common services provided by Google cloud and AWS cloud . In the terms of services we can see what type of services are provided by Google cloud as well as Amazon cloud .We can see how these clouds are better for development and deployment.

Comparison based on pricing:

Pricing is a crucial factor to consider when selecting a cloud platform. Both Amazon AWS and Google Cloud offer a pay-as-you- go pricing model. However, Amazon AWS offers more flexible pricing options, including reserved instances and spot instances, which allow customers to save up to 75% of their costs. Additionally, Amazon AWS offers different pricing options for different services, which helps customers to optimize their costs. In the below given table we can see the object storage pricing comparison of Google cloud and AWS:

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Storage Parameters	Google Cloud Price Per GB	AWS Price Per GB
Frequent Access / First 50 TB	$0.026	$0.0230
Frequent Access / 51-500 TB	$0.026	$0.0220
Infrequent Access	$0.010	$0.0125

Below we provide a table of pricing for common instance sizes. AWS has a price advantage for general purpose and memory optimized instances, while Google Cloud is cheaper for compute optimized.

Instance Parameter	GCPPerHour Price	AWSPer-Hour Price
On-Demand / Linux / General Purpose / 2 CPUs(Memory: AWS 8 GB / Google Cloud 7.5 GB)	$0.107	$0.100
On-Demand / Linux / Compute Optimized / 2 CPUs(Memory: AWS 3.75 GB / Google Cloud 1.8 GB)	$0.813	$0.100
On-Demand / Linux / Memory Optimized / 2 CPUs(Memory: AWS 15.25 GB / Google Cloud 13 GB)	$0.134	$0.133

On the basis of above two tables we can confirm that AWS has low prices in their services in comparison of Google Cloud.

Scalability:

Scalability is a critical factor in cloud computing as it determines how quickly an organization can increase or decrease its computing resources. Both Amazon AWS and Google Cloud offer scalable solutions, but Amazon AWS has a better track record for scalability. For instance, Amazon AWS has a global infrastructure that spans 24 regions and 77 availability zones, enabling customers to scale their resources globally. Additionally, Amazon AWS offers Auto Scaling and Elastic Load Balancing, which automatically adjusts resources based on traffic patterns. Google Cloud offers similar services, including Google Cloud Load Balancing and Google Cloud Autoscaling. However, Amazon AWS has a more robust infrastructure, making it a better choice for large-scale organizations.

Security:

Security is a critical factor in cloud computing, and both Amazon AWS and Google Cloud have robust security measures in place. Amazon AWS offers a range of security services, including AWS Identity and Access Management (IAM), Amazon Inspector, and Amazon GuardDuty. Additionally, Amazon AWS complies with a range of security certifications, including ISO 27001, SOC 1, SOC 2, and PCI DSS.On the other hand, Google Cloud offers similar security measures, including Google Cloud IAM, Google Cloud Security Scanner, and Google Cloud Data Loss Prevention (DLP). However, Amazon AWS has a better track record for security, and its compliance with various security standards makes it a better choice for organizations that require high-level security.

Market Share:

If we talk about market share ,then we can say that According to a Statista report from the fourth quarter of 2021, AWS has a 33% market share, Azure has a 22% market share, and Google Cloud has a 9% market share.

The below analysis show the market share of Amazon web services and as well Google cloud .We can clearly see the market share of each cloud.

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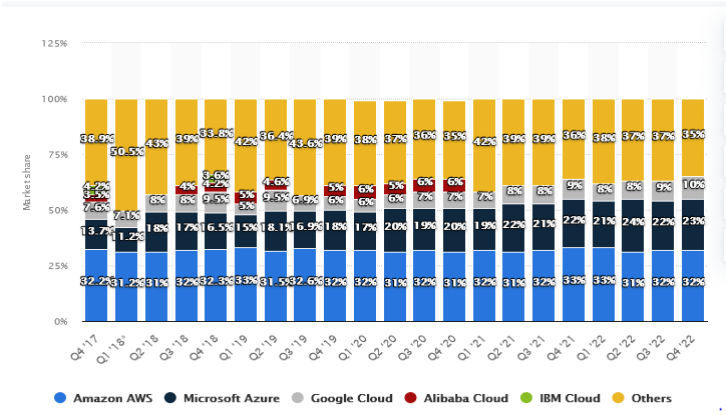
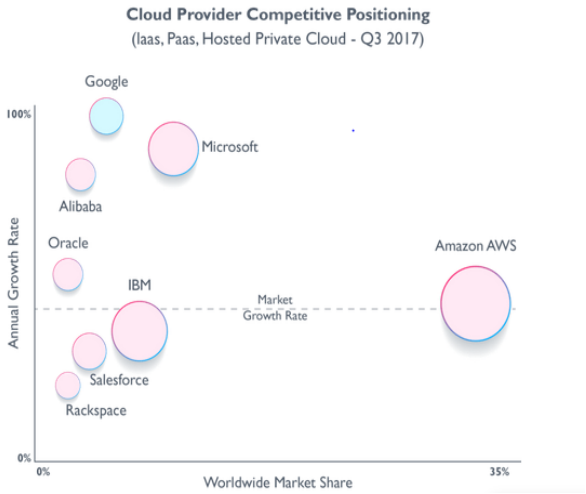


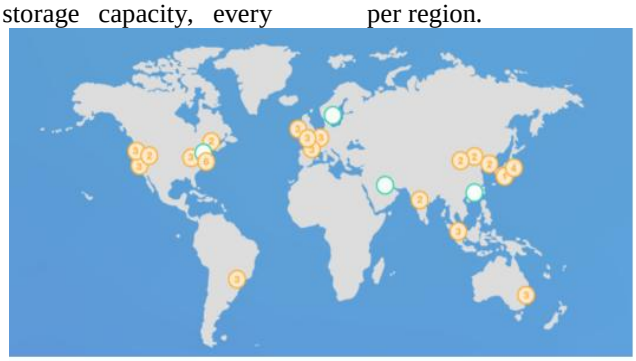
The main Cloud Computing competitors are AWS, GCP, IBM, Alibaba and MS Azure. Here, we'll discuss about **Amazon Web Services(AWS)** which has been in the game since its inception, and **Google Cloud Platform(GCP)** the comparatively newplayer, which is increasing at an alarming rate of **130%.**



Regions and Zones Comparison:

In cloud computing, we know that there are different cloud service providers and they provide different types of services and storage. For providing services and storage capacity, every cloud service provider needs datacenters and these data centers are situated in different regions and zones all over the world.

AWS: Total of 18 Regions, with more than 3 zones per region.



GCP: 15 regions in total, with more than 2 zones per Region.

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Being in the Market for almost 12 years, Amazon has a greater number of Regions with more number of Zones than GCP.

Comparison based on performance :

Performance is another critical factor to consider when choosing a cloud platform. Both Amazon AWS and Google Cloud offer excellent performance, but Amazon AWS has better performance in most cases. Amazon AWS offers a range of performance optimization tools, including Amazon CloudFront, Amazon CloudWatch, and Amazon Elastic MapReduce (EMR). Additionally, Amazon AWS offers a range of instances, including High Memory instances, High CPU instances, and GPU instances, that cater to specific workloads.

Google Cloud also offers a range of performance optimization tools, including Google Cloud CDN, Google Cloud Monitoring, and Google Cloud Trace. Additionally, Google Cloud offers custom machine types that allow customers to customize their computing resources based on their specific needs. However, in terms of raw performance, Amazon AWS outperforms Google Cloud in most cases or instance, in a benchmark test conducted by CloudHarmony, Amazon EC2 outperformed Google Compute Engine in terms of CPU and network performance. Additionally, in a study conducted by ThousandEyes, Amazon AWS had better network performance and less latency compared to Google Cloud.

II. CONCLUSION:

In conclusion, both Amazon AWS and Google Cloud are excellent cloud platforms that offer a range of features, services, and benefits. However, after analyzing different factors such as pricing, features, scalability, security, and performance, we conclude that Amazon AWS is better than Google Cloud, especially for enterprise-level organizations.

AWS offers more flexible pricing options, comprehensive features, and better scalability than Google Cloud. Additionally, Amazon AWS has a better track record for security and outperforms Google Cloud in most cases in terms of raw performance. However, this does not mean that Google Cloud is not a suitable option for some organizations. Google Cloud's unique features, such as Google Kubernetes Engine and Google Cloud Functions, make it a better choice for organizations that require specific functionalities.

Ultimately, the choice between Amazon AWS and Google Cloud depends on an organization's specific needs, budget, and requirements. We recommend that organizations carefully evaluate different cloud platforms based on their specific needs before making a final decision.

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