

CC Lab Assignment-1

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AIM:- Introduction to various cloud service providers and comparison between these service provider.

INTRODUCTION: -

A cloud service provider is a third-party company offering a cloud-based platform, infrastructure, application or storage services. Much like a homeowner would pay for a utility such as electricity or gas, companies typically have to pay only for the amount of cloud services they use, as business demands require.

Besides the pay-per-use model, cloud service providers also give companies a wide range of benefits. Businesses can take advantage of scalability and flexibility by not being limited to physical constraints of on-premises servers, the reliability of multiple data centers with multiple redundancies, customization by configuring servers to your preferences and responsive load balancing which can easily respond to changing demands.

Now the service, which offers by Cloud Computing Providers are as follows:

1. Software as a Service (SaaS)

Software as a service, a cloud service provided by the cloud company. In SaaS, a customer provides software which can be either for a particular amount of time or for the lifetime. SaaS utilizes the internet and delivers the application to the customer. Most of the SaaS application does not require any downloads as they can use directly through the web browser.

2. Platform as a Service (PaaS)

Platform as a service is a framework for the developer where they can create an application for customizing the previously built application. This service also provided through the means of internet and here all the management is done by the enterprise or any third party provider.

3. Infrastructure as a Service (IaaS)

Infrastructure as a service, provided by the Cloud Service providers which help the customer to access and monitor things like computer, networking, and other services. In IaaS, the customer can purchase resources on demand rather than buying hardware which is costly and hard to maintain.

Now here let us take three main service provider which are **Amazon**, **Microsoft** and **Google** dominate the public cloud landscape providing the safest, flexible and reliable cloud services. Their respective cloud platforms, AWS, Azure and GCP offer clients a range of storage, computing and networking options.

At present, AWS can be considered to be much bigger than both Azure and GCP in terms of functionality and maturity. However, the other two are also progressing at a faster rate to prove their market dominance. Now let us compare all the three above.

AWS vs Azure vs Google Cloud: Establishment

Amazon Web Services

AWS was publicly launched in 2006 with service offerings such as Elastic Compute Cloud (EC2), Simple Storage Service (Amazon S3), etc. By 2009, Elastic Block Store (EBS) was made public, and services such as Amazon CloudFront, Content delivery network (CDN), and more formally joined the AWS Cloud Computing Service offerings.

Microsoft Azure

It was initially called Azure, was launched in 2010 with the intent to provide a competent Cloud Computing platform for businesses. Azure was renamed as 'Microsoft Azure' in 2014, though the name 'Azure' is still commonly used. Since its inception, Microsoft Azure has shown great progress among its competitors.

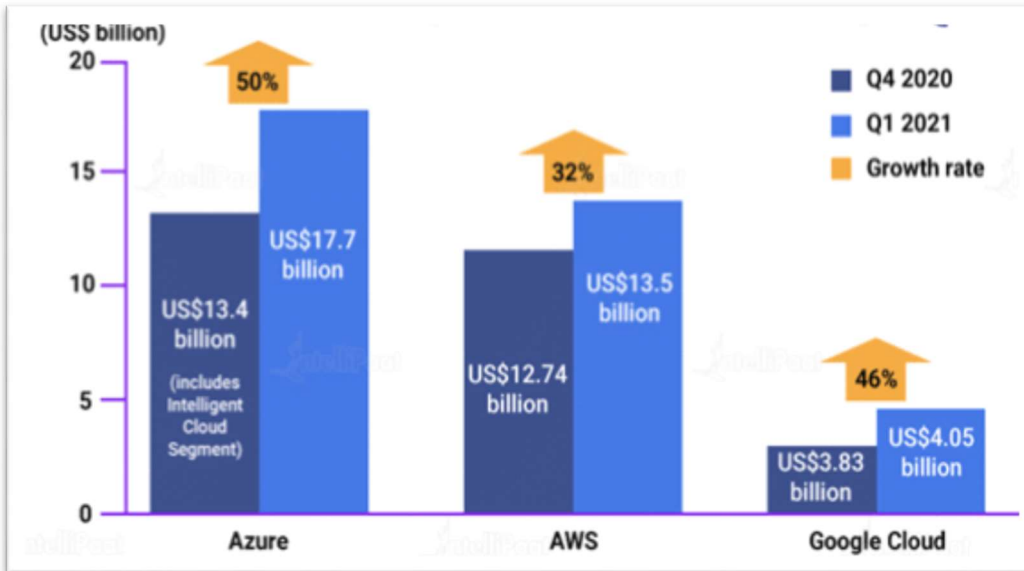
Google Cloud Platform

Google Cloud Platform (GCP), which is offered by Google, is a suite of Cloud Computing services that runs on the same infrastructure that Google uses internally for its end-user products such as Google Search engine, YouTube, and more. Google Cloud Platform began its journey in 2011, and in less than a decade it has managed to create a good presence in the cloud industry. The initial intent of Google Cloud was to strengthen Google's own products such as Google Search engine and YouTube.

AWS vs Azure vs Google Cloud: Market Shares and Growth Rate

According to the reported quarterly earnings for 2021, Microsoft's Azure cloud revenue has been observed to, once again, outperform both AWS and Google Cloud combined.

In spite of the Goliath-like stature of Amazon's AWS, Microsoft's Azure cloud outperformed its competitors with its US\$17.7 billion (50% revenue growth over the previous quarter) in commercial-cloud revenue as per the fiscal earnings report. While Amazon's AWS reported US\$13.5 billion in cloud business revenue for the quarter (revenue grew 32% in the quarter), Google Cloud had a modest US\$4.05 billion.



Reports by Canals mentions that as of April 2021, the global cloud market grew 35% this quarter to \$41.8 billion. AWS covers 32% of the market, followed by Azure at 19% and Google at 7%.

AWS vs Azure vs Google Cloud: Services

Service offerings from AWS, Azure, and GCP that come under the domains of compute, database, storage, and networking are mapped below:

1. Compute Services

Services	AWS	Azure	GCP
IaaS	Amazon Elastic Compute Cloud	<u>Virtual Machines</u>	Google Compute Engine
PaaS	<u>AWS Elastic Beanstalk</u>	App Service and Cloud Services	Google App Engine
Containers	Amazon Elastic Compute Cloud Container Service	<u>Azure Kubernetes Service (AKS)</u>	Google Kubernetes Engine

Serverless Functions	<u>AWS Lambda</u>	Azure Functions	Google Cloud Functions
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2. Database Services

Services	AWS	Azure	GCP
RDBMS	Amazon Relational Database Service	SQL Database	Google Cloud SQL
NoSQL: Key-Value	<u>Amazon DynamoDB</u>	Table Storage	Google Cloud Datastore Google Cloud Bigtable
NoSQL: Indexed	Amazon SimpleDB	<u>Azure Cosmos DB</u>	Google Cloud Datastore

3. Storage Services

Services	AWS	Azure	GCP
Object Storage	Amazon Simple Storage Service	<u>Blob Storage</u>	Google Cloud Storage
Virtual Server Disks	Amazon Elastic Block Store	Managed Disks	Google Compute Engine Persistent Disks
Cold Storage	<u>Amazon Glacier</u>	Azure Archive Blob Storage	Google Cloud Storage Nearline
File Storage	Amazon Elastic File System	Azure File Storage	ZFS/Avere

4. Networking Services

Services	AWS	Azure	GCP
Virtual Network	Amazon virtual private cloud (VPC)	Virtual Networks (VNETs)	Virtual Private Cloud
Elastic Load Balancer	Elastic Load Balancer	Azure Load Balancer	Google Cloud Load Balancing
Peering	Direct Connect	ExpressRoute	Google Cloud Interconnect
DNS	Amazon Route 53	Azure DNS	Google Cloud DNS

AWS vs Azure vs Google Cloud: Pros and Cons

AWS: Pros and Cons

It is no brainer that AWS is the biggest player in the cloud computing industry, covering a total market share of about 33 percent. One of the obvious reasons for this popularity is the 200+ managed services offered by AWS and the ease with which they can be used.

In addition to this, there are several other advantages that make AWS a prime market player. It has a massive scope of operations and a comprehensive network of worldwide data centers. With its ease of providing scalability and holistic security to its users, AWS has become the most mature and enterprise-ready provider.

Besides having these advantages, AWS has a drawback in its pricing strategy. While organizations find AWS to be the most suitable cloud service provider, they are often perplexed about its pricing strategy. Even after constantly reducing its prices, many enterprises find it difficult to understand AWS's cost structure and to manage those costs effectively while running high-volume workloads on the service.

Microsoft Azure: Pros and Cons

Microsoft entered the cloud market by taking its on-premise services, such as Windows Server, Office, SQL Server, Sharepoint, and others, to the cloud. This helps Microsoft to carve out its competitors as Azure is integrated with other applications that are popularly used by a majority of organizations. In addition, Microsoft also gives significant discounts to its customers on service contracts.

Some of the areas where Microsoft falls short is the maintenance required for the platform and the high expertise needed to use Azure. However, the ample advantages of the platform often outweigh its disadvantages, and organizations trust Azure for their on-cloud requirements.

Google Cloud: Pros and Cons

Google Cloud which comes along with Google Workspace is a strong competitor when it comes to offering cloud services. It started its offerings in containers since Google developed the Kubernetes standard that is now offered by AWS and Azure. Specializing in high compute offerings, such as big data, analytics, and machine learning, Google cloud offers considerable scaling and load balancing capabilities.

While Google Cloud has certain advantages, it also has a few drawbacks. Google does not have a traditional relationship with organizational customers. However, it is quickly expanding its offerings and footprint of global data centers. In the future, we can expect Google Cloud to be a tougher competitor to Amazon and Azure.

AWS vs Azure vs Google Cloud: What is Best for You?

Now, let's wrap up this Azure vs AWS vs Google Cloud blog and take a look at the most significant pros and cons of these three cloud giants. So which cloud provider would be claimed the winner for all the factors that have been discussed above?

- **Establishment:** With a head start of 5 years, the winner here is AWS.
- **Availability zones:** With a greater number of regions and availability zones, the winner here is AWS.
- **Market shares:** With around one-third of market shares in its name, the winner here is AWS.
- **Growth rate:** Having a growth rate of almost 100 percent, the winner is GCP.
- **Services:**
 - When it comes to the number of services, the winner is AWS.
 - Regarding the integration with open-source and on-premise systems, such as MS tools, that are mostly used in almost all organizations, the winner is Azure.
- **Pricing Models:** With more customer-friendly pricing models and discount models, the winner here is Google Cloud.