



Review Paper on Cloud Service Provider - AWS, AZURE, GCP

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Review Paper on Cloud Service Provider – AWS, Azure, GCP

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Abstract--- Cloud computing attained prominence after Amazon introduced first of its kind of cloud services in 2006. Cloud computing provides computing infrastructure, storage, and any type of application imaginable, from audio to word processors. Cloud computing has the ability to allocate the necessary resources to any client on demand. The clients do not need to pay for the construction of computing infrastructure or the maintenance of any hardware or software, which relieves them off a significant financial burden and mental stress. Clients simply connect their computers or networks to the cloud computing servers. In this paper, we focused on the three major cloud service providers such as Amazon Web Services (AWS), Google Cloud Platform (GCP) and Microsoft Azure and compared the services offered by each provider.

Keywords--- Cloud Computing, AWS, Azure, Google Cloud Platform, Software.

I. INTRODUCTION

In 1961, John McCarty suggested in a speech at MIT that computing can be sold like a utility, just like a water or electricity. Later in 1999, Salesforce.com started delivering off applications to users using a simple website. The applications were delivered to enterprises over the Internet, and this way the dream of computing sold as utility came true.

Cloud computing has become a significant technology trend, and many experts expect that cloud computing will reshape information technology processes and the IT marketplace.

Cloud computing is the delivery of computing services over the internet rather than having local servers or personal devices handle applications. Computing services can include servers, storage, databases, networking, software, analytics, and intelligence.

A. Characteristics of Cloud Computing

1) *Self-Service provisioning:* On-demand compute resources for almost any type of workload are available to end users. End users can provision computing capabilities such as server time

and network storage, eliminating the need for IT administrators to provision and manage compute resources in the past.

2) *Scalability:* Companies can freely scale up as computing demands rise and scale down as they fall. This eliminates the need for large investments in local infrastructure that may or may not remain operational.

3) *Resource Pooling:* Cloud providers use resource pooling to serve multiple customers from the same physical resources. Cloud providers' resource pools should be large and flexible enough to service the needs of multiple customers.

II. CLOUD ARCHITECTURE

Cloud architecture refers to how technology components work together to create a cloud, in which resources are pooled and shared across a network using virtualization technology.

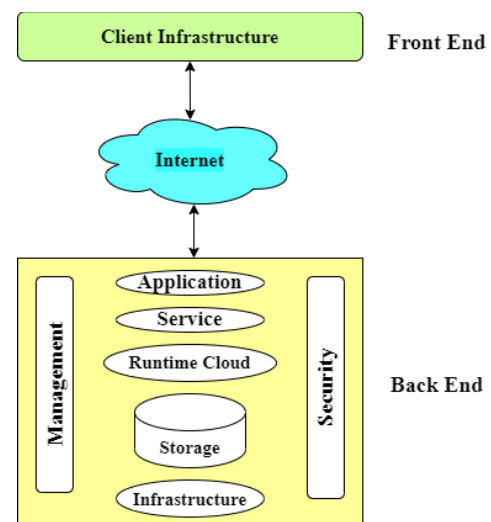


Fig. 1 Cloud Architecture

III. CLOUD DEPLOYMENT MODELS

It defines how your cloud infrastructure will look, what you can change, and whether you will be provided with services or must create everything yourself. Cloud deployment types also define the relationships between the infrastructure and your users.

Different types of Cloud Deployment models are as follows:

A. Public Cloud

The public cloud is one in which cloud infrastructure services are made available to the general public or major industry groups via the internet. Less secure as it open and can be accessed by everyone.

B. Private Cloud

The private cloud deployment model is diametrically opposed to the public cloud deployment model. It is a one-on-one setting for a single user (customer). It is not necessary to share your hardware with anyone. It is more secure than the public cloud.

C. Hybrid Cloud

Hybrid cloud computing provides the best of both worlds by bridging the public and private worlds with a layer of proprietary software. With a hybrid solution, you can host the app in a secure environment while benefiting from the cost savings of the public cloud.

IV. CLOUD SERVICE MODELS

There are three types of Cloud Service models and they are as follows:

A. IaaS (Infrastructure as a Service)

The primary benefit of using IaaS is that it allows users to avoid the cost and complexity of purchasing and managing physical servers.

B. PaaS (Platform as a Service)

The PaaS cloud computing platform was designed to allow programmers to develop, test, run, and manage applications.

C. SaaS (Software as a Service)

It is a piece of software in which applications are hosted by a cloud service provider. Users can gain access to these applications by using an internet connection and a web browser.

V. CLOUD SERVICE PROVIDERS

A third-party company that provides cloud-based platform, infrastructure, application, or storage services is known as a cloud service provider. Companies typically have to pay only for the amount of cloud services they use, as business demands require, similar to how a homeowner would pay for a utility such as electricity or gas. Some cloud service providers include:

A. Amazon Web Services (AWS)

AWS, or Amazon Web Services, is the cloud service platform provided by Amazon and offers users computing, storage, and delivery along with other services. Working together, each of these software as a service (SaaS), infrastructure as a service (IaaS), and platform as service (PaaS) offerings are a scalable approach to assisting your organisation in efficiently deploying applications

1) *Features of AWS:* Amazon offers 18,000+ services, including:

- Computing
- Storage solutions
- Cloud app integration
- Analytics and machine learning
- Productivity tools
- Developer and management tools

2) *Pros and Cons of AWS:* Many of AWS's advantages stem from its position as the world's first modern cloud services provider and the size of its global operations. Together, these factors have aided AWS's expansion and allowed it to offer a diverse set of services to businesses all over the world.

Pros:

- All major operating systems are supported like MacOS, Windows.
- Large selection of services
- Continuous growth of service selection
- Maturity and availability
- Capable of handling a large number of end-users and resources
- Simple start-up

While AWS is a strong provider, it does have its weaknesses like any other service provider

Cons:

- Comparatively high cost
- Additional fees for essential services
- Additional fees for customer technical support
- Resource caps
- Sharp learning curve after startup



Fig. 2 Amazon Web Service logo.

B. Microsoft Azure

While AWS is the largest cloud computing platform, Microsoft Azure is the fastest-growing and second-largest.

Azure is an organised platform that offers computing, storage, development, and database opportunities as SaaS, IaaS, PaaS. Together, businesses can use the platform to deploy and manage applications and other services in the cloud. To get access to these resources and services, all you need to have is an active internet connection and the ability to connect to the Azure portal.

1) *Features of Azure:* Azure has repurposed and offered a number of easily-configured, quickly served services by leveraging the existing structure established by Microsoft's software and business app offerings including:

- Cloud development platform
- Blockchain technologies
- Predictive analytics
- Comprehensive IoT integration
- DevOps features

2) *Pros and Cons:* Many of Azure's strengths as a traditional provider of IaaS correspond to its extensive development history in this area.

Pros include:

- Wide availability
- Integration with Microsoft tools and software
- Service contract discounts for Microsoft cloud computing users
- Built-in apps which support a variety of languages (including JavaScript, Python, .NET, Node.js and PHP)
- Fairly low on-demand pricing
- High redundancies to cutdown downtime
- Support for open source

However, Azure is not without its weaknesses, and you'll have to decide if the drawbacks outweigh the potential benefits of cloud computing for your organization.

Cons include:

- Lack of data management
- Reports of difficulties regarding network management
- Some believe it is more challenging to learn than other platforms
- Design may feel less professional than other platforms
- Reported issues with technical support



Fig. 3 Microsoft Azure logo

C. Google Cloud Platform

Google cloud Platform was officially released in 2008. Google has only recently emerged as a strong competitor to both AWS and Azure. Like the other two platforms, GCP offers IaaS and PaaS, as well as a serverless platform offering computing, storage, databases, multiple networking options, and database and IoT management.

1) *Features of Google Cloud Platform:* With the backing of Google's extensive global reach and seemingly endless capacity for innovation, GCP is quickly catching up to the competition. Currently, it offers services like:

- Productivity management
- Data storage and management
- Cloud app development
- AI and machine learning engines, including cloud speech API, vision API, and more
- Business analytics

2) *Pros and Cons:* As a highly developer-focused cloud-based platform, Google Cloud Platform's strengths lie in high-end computing, machine learning, and cloud developer tools.

Pros include:

- Superior scalability
- Simple setup and configuration
- Utilization of popular languages like Java and Python
- Deep discounts and flexible contracts
- Data load balancing and fast response times

However, as a relative newcomer, Google's reach and diversity does tend to lag behind others for the time being. Although the platform is quickly making gains in these areas,

Cons include:

- Lack of advanced features
- Less diversity of features
- Fewer service offerings
- Fewer global data centres



Google Cloud

Fig. 4 Google Cloud

V. COMPARISON BETWEEN SERVICE PROVIDERS

TABLE 1
Comparison Between Different Service Provider

Features	AWS	Azure	GCP
Computing	Mature Catalog, Functionally Rich (EC2, plus ECS and EKS containers)	Diverse Catalog (Virtual Machines, open source plus AKS containers)	Growing Catalog (Compute Engine, plus Kubernetes Engine)
Regions/Locations	Medium-High Reach (22 regions of global infrastructure)	Best Reach (more than 54 regions)	Growing Reach (21 current regions and zones)
General Network	Speedy, Dedicated Connection (AWS Direct Connect)	Broad and Flexible (Azure Virtual Network)	Most Limited (Cloud Hybrid Connectivity)
Storage	Largest Range (S3 Object Storage, plus block, file, and hybrid storage)	Medium-Large Range (Azure Blob Storage, plus Data Lake, file and hybrid storage)	Basic (Cloud Storage)
Databases	Mid-Sized Range (SQL supported and non-SQL)	Largest Range (SQL supported and non-SQL, plus hybrid)	Mid-Sized Range (SQL supported and non-SQL)
Management	Full Range of Services	Full Range of Services	Full Range of Services
Security	Mature, Isolated (offers firewalls, granular IAM, and vulnerability assessment)	Largest Gaps (separate protocols, plus less-secure defaults)	Reliable Midpoint (centralized access through Cloud Security Command Centre)
Analytics & Big Data	Medium-High Powered (AWS Analytics, SQL support, open standard APIs)	Most Powerful (Azure Stream Analytics, SQL support, machine learning)	Strength in Advanced Analytics (Google cloud platform analytics and data analytics)
AI	Largest Provider (mature services)	Medium-Large Provider (proven platforms like Cortana Intelligence Suite)	Pioneer, Large Provider (multiple AI and ML tools)
IoT	Largest Provider (IoT Core and Alexa-based services)	Smaller, but Targeted (IoT edge-based services)	Emerging (Cloud IoT Core-based services)
Blockchain	Most Widely Used Blockchain on AWS	Three-Step Solution Blockchain Technology and Applications	Infrastructure Assistance for Ethereum and Hyperledger Fabric
Integration	Strong (Supports interoperability, especially via public cloud)	Strong (Supports hybrid architecture and interoperability)	Emerging (Strong APIs, limited ETL tools)
Migration	Requires IT Proficiency	Requires IT Proficiency	Requires IT Proficiency
Pricing	Costly (management is a hurdle – see chart)	Manageable (Multiple options – see chart)	Minimal (Free credits – see chart)
Backup	Comprehensive (Glacier backup service)	Best Backup (Azure archival backup and system recovery services)	Basic (Nearline and Coldline)
Serverless Functions	AWS Lambda	Azure Functions	Google Cloud Functions

VI. CONCLUSION

Cloud-based services often come with added features and benefits. The dramatic increase in adoption of cloud computing services has largely been driven by the significant benefits of using cloud-based software applications versus buying, installing and maintaining on-premise solutions. Start-up companies can be in business without investing in IT. An increase in the number of micro enterprises in a country will have a huge impact on its economic growth. After analysing various parameters, We discovered that in the war of AWS vs Azure vs Google Cloud, after analysing various parameters, AWS has a higher score than Azure and Google Cloud. However, it's difficult to predict when AWS will take over as the leading cloud platform. Without a doubt, Azure and GCP provide superior services and features and as a result, any of these cloud platforms has the potential to become the market leader in the future.

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