

A Comparative Analysis of AWS, Microsoft Azure, and Google Cloud Services

Sasi Preetham Gundu

M. Tech Scholar, Computer Science and Engineering
BVC Engineering College, Andhra Pradesh, India.
Email: gspreetham369@gmail.com

Abstract:

Cloud computing has transformed IT infrastructure by delivering scalable and on-demand resources. This study presents a detailed comparison of Amazon Web Services (AWS), Microsoft Azure, and Google Cloud Platform (GCP), focusing on aspects such as performance, pricing, security, and service features. It identifies the advantages, limitations, and ideal use cases of each platform.

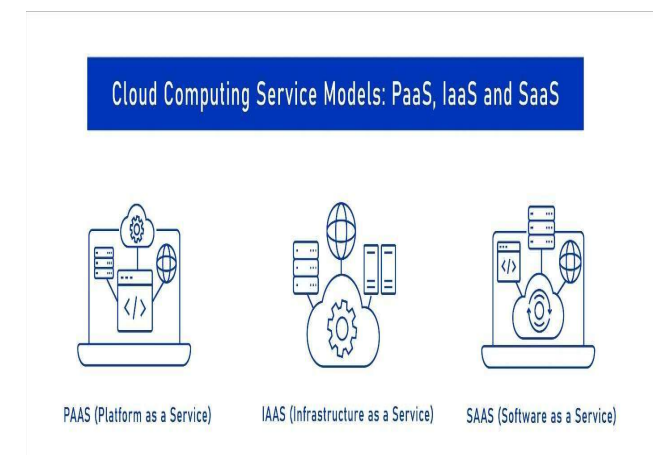
Keywords — Cloud Computing, AWS, Azure, Google Cloud, Multi-Cloud, DevOps

1. Introduction

Cloud computing enables flexible and scalable access to resources through the internet, reducing reliance on physical hardware. It plays a key role in digital transformation. As the industry evolves, organisations are moving away from a one-size-fits-all approach and instead selecting cloud services tailored to their specific requirements.

2. Literature Review

Research indicates that AWS holds the largest market share, Azure is widely adopted in enterprise environments, and GCP performs strongly in AI and machine learning workloads. Recent studies also highlight a growing shift toward serverless computing and the integration of edge computing within cloud ecosystems.



3. Methodology

This study uses a comparative approach, evaluating cloud platforms based on their service offerings, pricing structures, performance metrics, and security capabilities. Data was collected from official provider documentation (2023) and industry reports such as Gartner and IDC.

4. Comparative Analysis

Although AWS, Azure, and GCP provide similar core services, they differ in implementation and ecosystem integration.

4.1 Compute Capabilities

AWS EC2: Known for its maturity and flexibility in the cloud market
 Azure Virtual Machines: Seamlessly integrates with Microsoft enterprise tools
 GCP Compute Engine: Focuses on high performance and customizable machine configurations

Storage Comparison

Feature	AWS (S3/EBS)	Azure (Blob/Disk)	GCP (Cloud Storage)
Object Storage	Industry standard durability	Strong tiering options	High-speed global access
Feature	AWS (S3/EBS)	Azure (Blob/Disk)	GCP (Cloud Storage)
Global Network	Extensive Edge locations	Strongest private fiber	Optimized for data heavy lifting

AWS: Offers highly durable and reliable storage solutions
 Azure: Provides strong tiered storage options
 GCP: Ensures fast and globally accessible storage services
 Global Network
 AWS: Extensive edge locations worldwide
 Azure: Strong private network infrastructure
 GCP: Optimized for handling large-scale data processing

5. Results and Discussion

The findings suggest that AWS is best suited for scalability, Azure excels in enterprise integration, and GCP is highly effective for data analytics and processing tasks.

5.1 Market Distribution and Usage

The data reflects the current competitive landscape and adoption trends among cloud providers.

5.2 Cost Efficiency

Cost effectiveness varies depending on workload type, usage patterns, and pricing models offered by each provider.

6. Challenges

Despite the benefits, several critical challenges persist in the cloud domain:
 Vendor Lock-in: The difficulty of migrating proprietary services between providers.
 Pricing Complexity: Difficulties in predicting monthly expenditures due to hidden egress fees.
 Data Security: Maintaining compliance in shared responsibility models.

7. Future Scope

Future research can explore AI-driven cloud optimization and green cloud computing. As environmental impact becomes a corporate KPI, the energy efficiency of data centres will become a primary competitive metric.

8. Conclusion

Each cloud provider has unique strengths. Selection depends on business needs and technical requirements. Organizations are increasingly moving toward multi-cloud strategies to mitigate the risks of downtime and vendor lock-in.

References

[1] Amazon Web Services, "Overview of AWS," 2023.
 [2] Microsoft Azure, "What is Azure?" 2023.
 [3] Google Cloud, "Cloud Overview," 2023.
 [4] Gartner, "Magic Quadrant for Cloud," 2023.