International Journal of Sciences and Innovation Engineering
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
website: www.ijsci.com
Vol.02 No.09.
E-ISSN : 3049-0251
DOI: https://doi.org/10.70849/ijsci

A Contemporary Comparative Study of Cloud Infrastructures: AWS, Microsoft Azure, and Google Cloud Platform

Yogeshwari Yawalkar[1], Tarnnum Shikalgar[2], Shubhangi Patil[3], Rakhi Khakare [4]
[1] *Prof, Department of Computer Applications and Management, D.Y. Patil Institute of Computer Applications and Management, Akurdi, Pune.*
[2,3,4] *Student, Department of Computer Applications, D.Y. Patil Institute of Computer Applications and Management, Akurdi, Pune.*

Article Info

Article History:

Published:18 Sept 2025

Publication Issue:
Volume 2, Issue 9
September-2025

Page Number:
868-872

Corresponding Author:
Yogeshwari Yawalkar

Abstract:

Cloud computing has transformed how organizations deploy, scale, and secure their IT resources. This paper merges research insights and preparatory components to provide a synthesized analysis of three leading cloud platforms—Amazon Web Services (AWS), Microsoft Azure, and Google Cloud Platform (GCP). It evaluates their performance, pricing, scalability, security, and customer support, and outlines future trends such as sustainability, AI integration, and multi-cloud strategies.

Keywords: Cloud Computing, Cloud Leaders, AWS, AZURE, GCP, Cloud Service Providers.

1. INTRODUCTION

Cloud computing has become an essential pillar of modern IT, enabling organizations to deploy scalable and cost-effective resources on demand. Among the leading providers, Amazon Web Services (AWS), Microsoft Azure, and Google Cloud Platform (GCP) dominate the global market. They offer robust solutions for computing, storage, networking, security, and analytics, helping businesses accelerate innovation and reduce infrastructure costs. Recent advances in artificial intelligence, containerization, and hybrid architectures have further increased their relevance. Choosing an appropriate platform, however, requires careful evaluation of performance, cost, scalability, and compliance needs. This paper presents a systematic comparison of AWS, Azure, and GCP to support organizations in making informed decisions.

2. PROBLEM STATEMENT

Although AWS, Azure, and GCP are widely adopted, organizations often struggle to select the most suitable platform due to fragmented research and rapidly evolving service portfolios. There is a lack of comprehensive studies integrating performance, cost, scalability, security, and support insights to guide decision-makers. Addressing this gap is vital for enterprises seeking optimal cloud adoption strategies.

3. OBJECTIVE

- To analyze and compare the compute, storage, and networking performance of AWS, Azure, and GCP.
- To evaluate pricing models and total cost of ownership across common workload scenarios.
- To examine security, compliance, and customer support mechanisms provided by the three platforms.
- To highlight future trends—such as sustainability, multi-cloud, and AI integration— shaping cloud infrastructure.

4. LITERATURE REVIEW

Cloud computing research emphasizes scalability, flexibility, and reduced capital expenditure compared to traditional IT [1].AWS, Azure, and GCP dominate the market, each excelling in specific areas. AWS is noted for its vast global infrastructure and mature service ecosystem [2]. Azure integrates seamlessly with Microsoft products and leads in hybrid solutions through Azure Arc and Azure Stack [1]. GCP leverages Google's strength in data analytics, AI, and container orchestration, offering competitive pricing and innovative services such as BigQuery and Anthos [3]. Performance benchmarks indicate AWS provides superior compute and storage throughput, whereas GCP achieves the lowest response times for analytics workloads [2]. Pricing studies show
AWS is cost-effective for small deployments, GCP benefits data-heavy use cases, and Azure suits enterprises invested in Microsoft licensing [3].Security is robust across all platforms, featuring identity management, encryption, and compliance certifications, although implementation quality depends on organizational strategy [1]. Hybrid and multi-cloud trends are reshaping infrastructure planning, with Azure prominent in hybrid setups and GCP offering open-source-oriented multi-cloud management [2].

5. COMPARATIVE ANALYSIS

Dimension	AWS	Microsoft Azure	Google Cloud Platform
Compute & Storage	Broad instance options (EC2, S3), low latency worldwide	VMs, Blob Storage, robust for hybrid workloads	Fast analytics (BigQuery), Kubernetes leadership
Pricing	Pay-as-you-go, reserved instances, discounts for longterm use	Complex but beneficial for Microsoft users	Transparent, sustained-use savings, datafriendly
Scalability	Outstanding elasticity across 30+ regions	Hybrid excellence (Azure Arc, Azure Stack)	Smooth scaling for analytics and AI
Security & Compliance	IAM, Security Hub, rich compliance	Sentinel, strong enterprise controls	Zero-trust, Security Command Center

Customer Support	Quickest SLA response times	High satisfaction, slightly slower	Balanced response time and rich documentation
Specialization	IoT, edge computing, vast marketplace	Enterprise governance, DevOps	AI/ML, containerization, Anthos

AWS consistently delivers high throughput and minimal latency, making it suitable for compute-intensive workloads. Azure offers solid performance and is advantageous for enterprises leveraging Microsoft tools. GCP stands out in analytics and machine learning efficiency, with smooth scalability and cost-friendly options for data-heavy operations.

6. FUTURE DIRECTIONS

1. Sustainability: Carbon-aware workloads and energy-efficient data centers will gain importance.
2. Multi-Cloud Ecosystems: Demand for orchestration tools will accelerate.
3. Sector-Specific Platforms: Tailored services for finance, healthcare, and government will grow.
4. AI-Enhanced Operations: Integrated AI and ML will optimize cost, security, and automation.

7. BENEFITS OF AMAZON WED SERVICE(AWS), MICROSOFT AZURE, AND GOOGLE CLOUD PLATFORM(GCP)

Amazon Web Services (AWS) :- Amazon Web Services (AWS) is a leading cloud computing platform introduced by Amazon, providing a wide range of on-demand services including computing, storage, databases, networking, analytics, and machine learning. Built on a pay-as-you-go pricing model, AWS enables organizations to efficiently scale their operations worldwide while ensuring flexibility, security, and high availability.

Microsoft Azure :- Microsoft Azure is Microsoft's cloud platform that provides IaaS, PaaS, and SaaS services for application development, deployment, and management.
Leveraging a global network of data centers, it is well-regarded for its integration with Microsoft tools and strong support for AI, machine learning, DevOps, and hybrid cloud solutions.

Google Cloud Platform (GCP) :- Google Cloud Platform (GCP) is Google's cloud computing suite offering services for computing, storage, networking, data analytics, and
AI. Running on the same infrastructure as Google's core products, GCP is recognized for its expertise in data-driven solutions, Kubernetes, and open-source innovation.

8. CONCLUSION

AWS, Azure, and GCP remain the backbone of enterprise cloud adoption, each excelling in distinct areas. AWS offers unmatched global infrastructure, Azure specializes in hybrid solutions and governance, while GCP leads innovation in analytics and AI. Organizations should align cloud

selection with workload type, cost sensitivity, and longterm strategy. Sustainability, AI integration, and seamless multi-cloud management will define the next phase of competition.

References

1. Shekhar, S., Pandey, P., & Goel, O. (2021). Evaluating scalable solutions: A comparative study of AWS, Azure, and GCP. International Journal of Novel Research and Development, 6(9), 20–33.
2. Huang, R., & Fang, S. (2024). Comparative analysis of cloud service providers.
3. International Journal of Cloud Computing and Database Management, 5(1), 13–16.
4. Mufti, T., Mittal, P., & Gupta, B. (2021). A review on Amazon Web Service, Microsoft Azure & Google Cloud Platform services. EAI ICIDSSD Proceedings, New Delhi.
5. Gartner (2024). Cloud Infrastructure Market Share Report. Gartner Research. AWS, Azure & GCP official documentation (2025).
6. Kumar, S., Jain, A., Rani, S., Ghai, D., Achampeta, S., & Raja, P. (2021, December).
7. Enhanced SBIR-based Re-Ranking and Relevance Feedback. In 2021 10th International Conference on System Modeling & Advancement in Research Trends (SMART) (pp. 7– 12). IEEE.
8. Jain, A., Singh, J., Kumar, S., Florin-Emilian, T., Traian Candin, M., & Chithaluru, P.
9. (2022). Improved recurrent neural network schema for validating digital signatures in VANETs. Mathematics, 10(20), 3895
10. Kumar, S., Haq, M. A., Jain, A., Jason, C. A., Moparthi, N. R., Minal, N., & Alzamil, Z. S. (2023). Multilayer Neural Network Based Speech Emotion Recognition for Smart Assistance. Computers, Materials & Continua, 75(1).
11. Misra, N. R., Kumar, S., & Jain, A. (2021, February). A review on E-waste: Fostering the need for green electronics. In 2021 International Conference on Computing, Communication, and Intelligent Systems (ICCCIS) (pp. 1032–1036). IEEE
12. Kumar, S., Shailu, A., Jain, A., & Moparthi, N. R. (2022). Enhanced method of object tracing using extended Kalman filter via binary search algorithm. Journal of Information Technology Management, 14 (Special Issue: Security and Resource Management challenges for Internet of Things), 180–199.
13. Saraswat M. Tripathi RC. Cloud computing: Comparison and analysis of cloud service providers-AWs, Microsoft and Google. In 2020 9th international conference system modeling and advancement in research trends (SMART) 2020 Dec 4 p. 281-285,
14. Islam N, Rehman AU. A comparative study of major service providers for cloud computing. Inproceedings of 1 International Conference on Information and Communication Technology Trends. At Karachi, Pakistan 2013 Sep.

15. Deshmukh RK, Mishra A, Dewangan M. Comparative study between existing cloud service providers. International Journal of Advanced Research in Computer Science. 2018 Mar 1;9(2):537-9.

16. Khan 1, Dewangan B, Meena A, Birthare M. Study of Various Cloud Service Providers: A Comparative Analysis. In 5th International Conference on Next Generation Computing Technologies (NGCT-2019) 2020 Mar 1.

17. Rao, S. Madhusudhana, and Arpit Jain. "Advances in Malware Analysis and Detection in Cloud Computing Environments: A Review." International Journal of Safety & Security Engineering 14, no. 1 (2024).