

CLOUD WARS: A COMPARATIVE STUDY OF AWS, AZURE AND GOOGLE CLOUD

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ABSTRACT

Cloud computing has revolutionized the way organizations work, and advancing us to a new technology era. Amazon Web Services, Microsoft Azure, and Google Cloud Platform are the top cloud service providers that dominate the worldwide cloud market. So our aim to develop this research paper to provide a comparative study of aws , azure and Google cloud.

Keywords: AWS, Azure, Google Cloud Platform.

I. INTRODUCTION

AWS (Amazon Web Services) is a broad, emerge cloud computing platform provided by Amazon that includes a concoction of infrastructure-as-a-service (IaaS), platform-as-a-service (PaaS) and packaged-software-as-a-service (SaaS) offerings.

Azure is Microsoft's public cloud platform. Azure offers a huge collection of services, which includes platform as a service (PaaS), infrastructure as a service (IaaS), and managed database service capabilities.

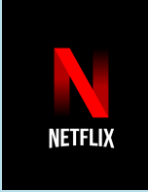



Google Cloud Platform (GCP) is a forcible, and flexible cloud computing platform that offers a wide range of services for businesses and individuals.


II. OVERVIEW

2.1: Amazon Web Services (AWS)

The current market leader of the cloud computing platforms, Amazon Web Services is a subsidiary of Amazon.com, Inc. AWS is the most mature cloud platform offering a wide range of services to practically everyone: individual developers, large enterprises, and even governments. AWS started its life as an internal cloud offering. By 2006, it had evolved into a publicly available cloud platform with services like Amazon S3 cloud storage and elastic compute cloud (EC2). AWS now offers more than 200 fully featured services to cater to any demand and serve millions of users.

Prominent AWS customers are

Netflix	
coinbase	
cocacola	
coursera	

Food drug administration(FDA)	
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2.2 MICROSOFT AUZURE

Microsoft Azure, formerly known as Windows Azure, is Microsoft's public cloud computing platform. It gives a wide range of cloud services, including compute, analytics, storage and networking. Users can pick and choose from these services to develop and scale new applications or run existing applications in the public cloud.

The Azure platform aims to assist business manage challenges and catch their organizational goals. It offers tools that support all industries -- including e-commerce, finance and a variety of Fortune 500 companies -- and is compatible with open source technologies. This provides users the flexibility to use their preferred tools and technologies. In addition, Azure offers four different forms of cloud computing: infrastructure as a service (IaaS), platform as a service (PaaS), software as a service (SaaS) and serverless functions.

Microsoft charges for Azure on a pay-as-you-go (PAYG) basis, meaning subscribers receive a bill each month that only charges them for the specific resources and services they have used.

Prominent Auzure customers are

Bing	
Delta	
Bosch	

2.3 GOOGLE CLOUD

Google Cloud Platform is mostly used in the industry to describe the suite of cloud computing services available for end users and companies who want to build their own digital cloud infrastructures. It is interesting to note that products like YouTube, Gmail and the generative AI Google chatbot bard also run on GCP.

Prominent GCP customers are

Verizon	
LinkedIn Corp	



DIFFERENCE BETWEEN AWS, AZURE AND GCP

➤ **Compute Services**

SERVICE	AWS	AZURE	GCP
VM (Compute Instance)	EC2 (Elastic Compute)	Azure Virtual Machine	Google Compute Engine
PaaS	AWS Elastic Beanstalk	App Service	Google App Engine
Container	AWS Elastic Container/Kubernetes Service	Azure Kubernetes Service (AKS)	Google Kubernetes Engine
Serverless Functions	AWS Lambda	Azure Function	Google Cloud Functions

➤ **Database & Storage Services**

SERVICE	AWS	AZURE	GCP
RDBMS (Multiple Database Types – SQL, MySQL, etc..)	AWS RDS	Azure SQL/ Database for MySQL/PostgreSQL	Cloud SQL
NoSQL	DynamoDB, Simple DB	Azure Cosmos DB, Table Storage	BigTable, Cloud Datastore
Object Storage	S3 (Simple Storage Service)	Blob Storage	Google Cloud Storage

File Storage	Elastic File System	Azure File Storage	Google Filestore
Archive Storage	Amazon Glacier	Azure Archive Storage	Google Storage (Archive Storage)
Data Warehouse/Data Lake	Amazon Redshift	Azure Synapse Analytics	Google BigQuery

➤ **Networking**

SERVICE	AWS	AZURE	GCP
Virtual Network	Virtual Private Cloud (VPC)	Virtual Network (Vnet)	Virtual Private Cloud (VPC)
Load Balancing	Elastic Load Balancer	Azure Load Balancer	Google Cloud Load Balancing
Firewall	AWS Firewall / Web Application Firewall	Azure Firewall	Google Cloud firewalls
DNS	Route 53	Azure DNS	Google Cloud DNS
CDN	Amazon CloudFront	Azure Content Delivery Network (CDN)	Cloud CDN

➤ **Specialized services**

SERVICE	AWS	AZURE	GCP
DevOps	Code Pipeline, Code Build, Code Deploy, Code Star	Azure Boards, Pipelines, Repos, Test Plans, Artifacts	GCP DevOps Cloud Build, Artifact Registry
AI & ML	Amazon Sage Maker, Amazon Comprehend, Amazon Lex, Amazon Polly	Azure Machine Learning, Azure Data bricks, Azure Cognitive Search, Azure Bot Service, Cognitive Services	Vertex AI, AutoML, Dataflow CX, Cloud Vision, Virtual Agents
IoT	Free RTOS, IoT Core, Greengrass, IoT Analytics, SiteWise	Azure IoT Hub/Central, IoT Edge, Azure Sphere, Azure RTOS	Google Cloud IoT Core
AR & VR	Amazon Sumerian	Azure Mixed Reality (Spatial Anchors/Remote Rendering)	ARCore

Game Development	Amazon Game Lift	Azure PlayFab	
Business Analytics	Amazon Quick sight	Azure Power BI	Looker
End-User Computing	Amazon Workspaces	Azure Virtual Desktop	
Robotics	AWS Robo Maker		

III. CONCLUSION

Hence, AWS is the top in cloud computing, with the broadest range of services, the largest community, and the most mature tooling. Azure is a strong competitor to AWS, with a broad range of services and good hybrid cloud support. GCP is the most affordable of the three major cloud providers and strongly focuses on machine learning and artificial intelligence. Thus, AWS vs Azure vs Google Cloud is a powerful confrontation in cloud computing. Azure stands out for its seamless integration with Microsoft products. AWS maintains its dominance in the market with its vast service portfolio and extensive global infrastructure. Google Cloud shines in its data analytics and AI capabilities, appealing to organizations focused on advanced data processing.

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