REPORT: CLOUD COMPUTING

CLOUD COMPUTING is web-based computing which allows businesses and individuals to consume computing resources such as virtual machines, databases, processing, memory, services, storage, messaging, events, and pay-as-you-go. Cloud services often improve upon older ones that mean we only have to pay for the resources that we are using.

Whether its infrastructure, software applications, services, products, or even an operating system, everything is making its way to the cloud. As a result, billions of dollars are being invested in cloud migration. Cloud computing has multiplied over the past several years.

Here are some key advantages of cloud computing:

1). Cloud computing allows a business to cut their operational and fixed monthly costs of hardware, databases, servers, software licenses. Eventually, it will reduce the need for IT resources, including people. All hardware, database servers, web servers, software, products, and services are hosted in the cloud and added to an account as needed.

2). Cloud computing offers 24/7 uptime (99.99% uptime). Cloud servers and data centers are managed by the cloud service provided. Therefore, there is no need for employee management.

3). Cloud computing is scalable and reliable. There is no limit to the number of users or resources. Furthermore, the cloud increases processing and resources as needed. If you do not need resources, you can always scale down.

4).Cloud service providers have data centers in various locations, which make them faster and more reliable. Larger companies such as Microsoft and AWS even have data centers around the world.

Cloud computing can be divided into three major categories:
1). Software as a Service (SaaS),
2). Platform as a Service (PaaS) and
3). Infrastructure as a Service (IaaS).

IaaS offers entire IT computing infrastructure, provisioned and managed over the internet. The key components of IaaS are used to replace existing development and test environments, virtual machines, website hosting, storage, backup, networking, servers, operating systems, middleware, data, and applications, and high-performance computing (HPC).

According to Gartner Magic Quadrant, AWS leads Microsoft and Google cloud in the IaaS position.

Figure 1. Magic Quadrant for Cloud Infrastructure as a Service, Worldwide

CHALLENGERS	LEADERS
	Amazon Web Services ●
	● Microsoft
	● Google
Alibaba Cloud ●	
Oracle ●	
IBM ●	
NICHE PLAYERS	VISIONARIES

ABILITY TO EXECUTE

COMPLETENESS OF VISION →   As of July 2019   © Gartner, Inc

Source: Gartner (July 2019)

The **PaaS** component of cloud computing offers a full development and deployment environment in the cloud, including dev, test, QA, debugging, and deployment tools and services.

SaaS is a software developed and hosted by someone else. Businesses or individuals are able to use them as needed.

Today, the majority of top cloud service providers offer all of these services. The two leaders in cloud computing are **Amazon and Microsoft,** followed by **Google, Alibaba, and IBM**.

	AWS	**Azure**	**Google Cloud**
Company	AWS Inc.	Microsoft	Google
Launch year	2006	2010	2008
Geographical Regions	25	54	21
Availability Zones	78	140 (countries)	61
Key offerings	Compute, storage, database, analytics, networking, machine learning, and AI, mobile, developer tools, IoT, security, enterprise applications, blockchain.	Compute, storage, mobile, data management, messaging, media services, CDN, machine learning and AI, developer tools, security, blockchain, functions, IoT.	Compute, storage, databases, networking, big data, cloud AI, management tools, Identity and security, IoT, API platform
Compliance Certificates	46	90	
Annual Revenue	$33 billion	$35 billion	$8 billion

1). Amazon Web Services (AWS)

Amazon Web Services (AWS) is an Amazon company that was launched in the year 2002. AWS is the most popular cloud service provider in the world.

Amazon Web Services (AWS) is the world's most comprehensive and broadly adopted cloud platform, offering over 165 fully-featured services from data centers globally. This service is used by millions of customers.

AWS offers hundreds of services. Some of these include:
- Virtual Private Cloud
- EC2
- AWS Data Transfer
- Simple Storage Service
- DynamoDB,
- AWS Key Management Service
- AmazonCloudWatch
- Simple Notification Service
- Relational Database Service
- Route 53
- Simple Queue Service
- CloudTrail
- Simple Email Service etc.

AWS Security

Cloud security is the highest priority for AWS. As a customer, you will benefit from a data center and network architecture built to meet the requirements of the most security-sensitive organizations.

AWS security offers services such as infrastructure security, DDoS mitigation, data encryption, inventory and configuration, monitoring and logging, identity and access control, and penetration testing.

AWS Certifications

AWS certifications are divided into four major categories – Foundational, Associate, Professional, and Specialty.

2). Microsoft Azure

Microsoft Azure is one of the fastest-growing clouds among them all. Azure was launched years after the release of AWS and Google Cloud but is still knocking on the door to become the top cloud services provider. Microsoft Azure recently won a $10 billion US government contract.

While Microsoft Azure revenue is difficult to predict, Microsoft broke down its revenue of the last quarter into three categories, Productivity and Business Processes, Intelligent Cloud, and Personal Computing. Microsoft's Azure revenue is expected to grow between $33 billion to $35 billion. This makes Azure one of the most profitable cloud services in the world.

Azure offers hundreds of services:
It provides services within various categories including AI , Machine Learning, Analytics, Blockchain, Compute, Containers, Databases, Developer Tools, DevOps, Identity, Integration, Internet of Things, Management, Media, Microsoft Azure Stack, Migration, Mixed Reality, Mobile, Networking, Security, Storage, Web, and Windows Virtual Desktop.

Azure, the Intelligent Cloud

Azure's cloud supremacy revolves around its intelligence. Azure provides the most advanced and maximum number of intelligent products and services. Microsoft's Windows operating system Windows and database SQL Server are now available in the cloud via Windows Virtual Desktop. Microsoft's mixed reality technology (products for HoloLens) is also available in the Azure cloud.
 Microsoft's TFS and VSTS are now available in azure via **Azure DevOps**.

Microsoft's popular Office suite, enterprise products such as Sharepoint, and **Power BI** are now available in the cloud as Office 365 and PowerXXX tools.

Furthermore, some of the most popular and advanced developer tools and compilers are available in Azure via various UI, workflows, and interfaces.

Microsoft is a leader in AI + Machine Learning and Microsoft Cognitive Services is one of the company's most advanced offerings.

3). IBM Cloud

IBM Cloud developed by IBM is a set of cloud computing services for businesses. Similar to other cloud service providers, the IBM cloud includes IaaS, SaaS, and PaaS services via public, private, and hybrid cloud models.

Compute, Network, Storage, Cloud Packs, Management, Security, Database, Analytics, AI, IoT, Mobile, Dev Tools, Blockchain, Integration, Migration, Private Cloud, and VMware.

4). Google Cloud

Google cloud platform is Google's cloud. Similar to AWS and Azure, Google Cloud also offers similar services in various categories, including compute, storage, identity, security, database, AI and machine learning, virtualization, DevOps and more.

Here is a list of complete products and services categories Google Cloud Platform services:

- AI and Machine Learning
- API Management
- Compute
- Containers
- Data Analytics
- Databases
- Developer Tools
- Healthcare and Life Sciences
- Hybrid and Multi-cloud
- Internet of Things
- Management Tools
- Media and Gaming
- Migration
- Networking
- Security and Identity
- Serverless Computing and Storage.

5). Oracle Cloud

Oracle cloud platform is the cloud offering of Oracle corporation. Oracle cloud offers IaaS, PaaS, SaaS, and Data as a Service (DaaS).

Oracle offerings include the following:

Oracle IaaS offerings are Compute, Storage, Networking, Governance, Database, Load Balancing, DNS Monitoring, Ravello, and FastConnect.
Oracle PaaS offerings are Data Management, Application Development, Integration, Business Analytics, Security, Management, and Content and Enterprise.

Oracle SaaS offerings are CX, HCM, ERP, SCM, EPM, IoT, Analytics, Data, and Blockchain Applications.

Oracle DaaS is the Oracle Data Cloud.

6). Alibaba Cloud

Alibaba Cloud, founded in 2009, is registered and headquartered in Singapore. It was initially built to serve Alibaba's own e-commerce ecosystem and is now offered to the public. Alibaba Cloud is the largest cloud provider in China.

Alibaba offers various products and services in various categories, including Elastic Computing, Storage and CDN, Networking, Database Services, Security, Monitoring and Management, Domains and Websites, Analytics and Data Technology, Application Services, Media Services, Middleware, Cloud Communication, Apsara Stack, and Internet of Things.

AWS leads all the way as a leader in its ability to execute, but Microsoft's Azure leads as a visionary. Google is third in the race followed by Oracle, Alibaba, and IBM.

Microsoft Azure and AWS are necks to neck in the race of cloud supremacy. Both offer similar products, services, and costs. However, Google, IBM, and other clouds are getting better each day.