UNIT 4 (PART A)

CLOUD COMPUTING

Simply , cloud computing is the delivery of computing services—including servers, storage, databases, networking, software, analytics, and intelligence—over the Internet ("the cloud") to offer faster innovation, flexible resources, and economies of scale. You typically pay only for cloud services you use, helping lower your operating costs, run your infrastructure more efficiently and scale as your business needs change.

TOP BENEFITS OF CLOUD COMPUTING

Cost

Cloud computing eliminates the capital expense of buying hardware and software and setting up and running on-site datacentres—the racks of servers, the round-the-clock electricity for power and cooling, the IT experts for managing the infrastructure. It adds up fast.

Speed

Most cloud computing services are provided self service and on demand, so even vast amounts of computing resources can be provisioned in minutes, typically with just a few mouse clicks, giving businesses a lot of flexibility and taking the pressure off capacity planning.

Global scale

The benefits of cloud computing services include the ability to scale elastically. In cloud speak, that means delivering the right amount of IT resources—for example, more or less computing power, storage, bandwidth—right when it is needed and from the right geographic location.

Productivity

On-site datacentres typically require a lot of "racking and stacking"—hardware setup, software patching, and other time-consuming IT management chores. Cloud computing removes the need for many of these tasks, so IT teams can spend time on achieving more important business goals.

Performance

The biggest cloud computing services run on a worldwide network of secure datacentres, which are regularly upgraded to the latest generation of fast and efficient computing hardware. This offers several benefits over a single corporate datacentre, including reduced network latency for applications and greater economies of scale.

Reliability

Cloud computing makes data backup, disaster recovery and business continuity easier and less expensive because data can be mirrored at multiple redundant sites on the cloud provider's network.

Security

Many cloud providers offer a broad set of policies, technologies and controls that strengthen your security posture overall, helping protect your data, apps and infrastructure from potential threats.

TYPES OF CLOUD COMPUTING

What is a public cloud?

The public cloud is defined as computing services offered by third-party providers over the public Internet, making them available to anyone who wants to use or purchase them. They may be free or sold on-demand, allowing customers to pay only per usage for the CPU cycles, storage or bandwidth they consume.

Public clouds can save companies from the expensive costs of having to purchase, manage and maintain on-premises hardware and application infrastructure - the cloud service provider is held responsible for all management and maintenance of the system. Public clouds can also be deployed faster than on-premises infrastructures and with an almost infinitely scalable platform. Every employee of a company can use the same application from any office or branch using their device of choice as long as they can access the Internet.

While security concerns have been raised over public cloud environments, when implemented correctly, the public cloud can be as secure as the most effectively managed private cloud implementation if the provider uses proper security methods, such as intrusion detection and prevention systems (IDPS).

What is a private cloud?

The private cloud is defined as computing services offered either over the Internet or a private internal network and only to select users instead of the general public. Also called an internal or corporate cloud, private cloud computing gives businesses many of the benefits of a public cloud - including self-service, scalability and elasticity - with the additional control and customisation available from dedicated resources over a computing infrastructure hosted on-premises.

In addition, private clouds deliver a higher level of security and privacy through both company firewalls and internal hosting to ensure operations and sensitive data are not accessible to third-party providers.

One drawback is that the company's IT department is held responsible for the cost and accountability of managing the private cloud. So private clouds require the same staffing, management and maintenance expenses as traditional datacenter ownership.

What is a hybrid cloud?

A hybrid cloud—sometimes called a cloud hybrid—is a computing environment that combines an on-premises datacenter (also called a private cloud) with a public cloud, allowing data and applications to be shared between them. Some people define hybrid cloud to include "multicloud" configurations where an organization uses more than one public cloud in addition to their on-premises datacentre.

TYPES OF CLOUD SERVICES: IaaS, PaaS, serverless and SaaS

Most cloud computing services fall into four broad categories: infrastructure as a service (IaaS), platform as a service (PaaS), serverless and software as a service (SaaS

Infrastructure as a service (IaaS)

The most basic category of cloud computing services. With IaaS, you rent IT infrastructure—servers and virtual machines (VMs), storage, networks, operating systems—from a cloud provider on a pay-as-you-go basis.

Common IaaS business scenarios

Typical things businesses do with IaaS include:

Test and development. Teams can quickly set up and dismantle test and development environments, bringing new applications to market faster. IaaS makes it quick and economical to scale up dev-test environments up and down.

Website hosting. Running websites using IaaS can be less expensive than traditional web hosting.

Storage, backup and recovery. Organisations avoid the capital outlay for storage and complexity of storage management, which typically requires a skilled staff to manage data and meet legal and compliance requirements. IaaS is useful for handling unpredictable demand and steadily growing storage needs. It can also simplify planning and management of backup and recovery systems.

Web apps. IaaS provides all the infrastructure to support web apps, including storage, web and application servers and networking resources. Organisations can quickly deploy web apps on IaaS and easily scale infrastructure up and down when demand for the apps is unpredictable.

High-performance computing. High-performance computing (HPC) on supercomputers, computer grids or computer clusters helps solve complex problems involving millions of variables or calculations. Examples include earthquake and protein folding simulations, climate and weather predictions, financial modeling and evaluating product designs.

Big data analysis. Big data is a popular term for massive data sets that contain potentially valuable patterns, trends and associations. Mining data sets to locate or tease out these hidden patterns requires a huge amount of processing power, which IaaS economically provides.

Platform as a service (PaaS)

Platform as a service (PaaS) is a complete development and deployment environment in the cloud, with resources that enable you to deliver everything from simple cloud-based apps to sophisticated, cloud-enabled enterprise applications. You purchase the resources you need from a cloud service provider on a pay-as-you-go basis and access them over a secure Internet connection.

PaaS includes infrastructure—servers, storage and networking—but also middleware, development tools, business intelligence (BI) services, database management systems and more. PaaS is designed to support the complete web application lifecycle: building, testing, deploying, managing and updating.

Common PaaS scenarios

Development framework. PaaS provides a framework that developers can build upon to develop or customise cloud-based applications. Similar to the way you create an Excel macro, PaaS lets developers create applications using built-in software components. Cloud features such as scalability, high-availability and multi-tenant capability are included, reducing the amount of coding that developers must do.

Analytics or business intelligence. Tools provided as a service with PaaS allow organisations to analyse and mine their data, finding insights and patterns and predicting outcomes to improve forecasting, product design decisions, investment returns and other business decisions.

Additional services. PaaS providers may offer other services that enhance applications, such as workflow, directory, security and scheduling.

serverless computing

Serverless computing enables developers to build applications faster by eliminating the need for them to manage infrastructure. With serverless applications, the cloud service provider automatically provisions, scales and manages the infrastructure required to run the code.

In understanding the definition of serverless computing, it is important to note that servers are still running the code. The serverless name comes from the fact that the tasks associated with infrastructure provisioning and management are invisible to the developer. This approach enables developers to increase their focus on the business logic and deliver more value to the core of the business. Serverless computing helps teams increase their productivity and bring products to market faster and it allows organisations to better optimise resources and stay focused on innovation.

Software as a service (SaaS)

Software as a service (SaaS) allows users to connect to and use cloud-based apps over the Internet. Common examples are email, calendaring and office tools (such as Microsoft Office 365).

SaaS provides a complete software solution which you purchase on a pay-as-you-go basis. You rent the use of an app for your organisation and your users connect to it over the Internet, usually with a web browser. All of the underlying infrastructure, middleware, app software and app data are located in the service provider's data center. The service provider manages the hardware and software and with the appropriate service agreement, will ensure the availability and the security of the app and your data as well. SaaS allows your organisation to get quickly up and running with an app at minimal upfront cost

USES OF CLOUD COMPUTING

- **Create cloud-native applications**

Quickly build, deploy and scale applications—web, mobile and API. Take advantage of cloud-native technologies and approaches, such as containers, Kubernetes, microservices architecture, API-driven communication and DevOps.

- **Test and build applications**

Reduce application development cost and time by using cloud infrastructures that can easily be scaled up or down.

- **Store, back up and recover data**

Protect your data more cost-efficiently—and at massive scale—by transferring your data over the Internet to an offsite cloud storage system that is accessible from any location and any device.

- **Analyse data**

Unify your data across teams, divisions and locations in the cloud. Then use cloud services, such as machine learning and artificial intelligence, to uncover insights for more informed decisions.

- **Stream audio and video**

Connect with your audience anywhere, anytime, on any device with high-definition video and audio with global distribution.

- **Embed intelligence**

Use intelligent models to help engage customers and provide valuable insights from the data captured.

- **Deliver software on demand**

Also known as software as a service (SaaS), on-demand software lets you offer the latest software versions and updates around to customers—anytime they need, anywhere they are.

AWS (AMAZON WEB SERVICES)

Amazon web service is a platform that offers flexible, reliable, scalable, easy-to-use and cost-effective cloud computing solutions.

AWS is a comprehensive, easy to use computing platform offered Amazon. The platform is developed with a combination of infrastructure as a service (IaaS), platform as a service (PaaS) and packaged software as a service (SaaS) offerings.

History of AWS

- 2002- AWS services launched
- 2006- Launched its cloud products
- 2012- Holds first customer event
- 2015- Reveals revenues achieved of $4.6 billion
- 2016- Surpassed $10 billon revenue target
- 2016- Release snowball and snowmobile
- 2019- Offers nearly 100 cloud services

IMPORTANT AWS SERVICES

AWS Compute Services

Here, are Cloud Compute Services offered by Amazon:

1. EC2(Elastic Compute Cloud) - EC2 is a virtual machine in the cloud on which you have OS level control. You can run this cloud server whenever you want.
2. LightSail-This cloud computing tool automatically deploys and manages the computer, storage, and networking capabilities required to run your applications.
3. Elastic Beanstalk— The tool offers automated deployment and provisioning of resources like a highly scalable production website.
4. EKS (Elastic Container Service for Kubernetes)—The tool allows you to Kubernetes on Amazon cloud environment without installation.
5. AWS Lambda—This AWS service allows you to run functions in the cloud. The tool is a big cost saver for you as you to pay only when your functions execute.

Migration

Migration services used to transfer data physically between your datacenter and AWS.

1. DMS (Database Migration Service)-DMS service can be used to migrate on-site databases to AWS. It helps you to migrate from one type of database to another — for example, Oracle to MySQL.

2. SMS (Server Migration Service)- SMS migration services allows you to migrate on-site servers to AWS easily and quickly.
3. Snowball—Snowball is a small application which allows you to transfer terabytes of data inside and outside of AWS environment.

Storage

1. Amazon Glacier- It is an extremely low-cost storage service. It offers secure and fast storage for data archiving and backup.
2. Amazon Elastic Block Store (EBS)- It provides block-level storage to use with Amazon EC2 instances. Amazon Elastic Block Store volumes are network-attached and remain independent from the life of an instance.
3. AWS Storage Gateway- This AWS service is connecting on-premises software applications with cloud-based storage. It offers secure integration between the company's on-premises and AWS's storage infrastructure.

Security Services

1. IAM (Identity and Access Management)— IAM is a secure cloud security service which helps you to manage users, assign policies, form groups to manage multiple users.
2. Inspector—It is an agent that you can install on your virtual machines, which reports any security vulnerabilities.
3. Certificate Manager—The service offers free SSL certificates for your domains that are managed by Route53.
4. WAF (Web Application Firewall)— WAF security service offers application-level protection and allows you to block SQL injection and helps you to block cross-site scripting attacks.
5. Cloud Directory—This service allows you to create flexible, cloud-native directories for managing hierarchies of data along multiple dimensions.
6. KMS (Key Management Service)—It is a managed service. This security service helps you to create and control the encryption keys which allows you to encrypt your data.
7. Organizations—You can create groups of AWS accounts using this service to manages security and automation settings.
8. Shield—Shield is managed DDoS (Distributed Denial of Service protection service). It offers safeguards against web applications running on AWS.
9. Macie—It offers a data visibility security service which helps classify and protect your sensitive critical content.
10. GuardDuty —It offers threat detection to protect your AWS accounts and workloads.

Database Services

1. Amazon RDS- This Database AWS service is easy to set up, operate, and scale a relational database in the cloud.
2. Amazon DynamoDB- It is a fast, fully managed NoSQL database service. It is a simple service which allow cost-effective storage and retrieval of data. It also allows you to serve any level of request traffic.
3. Amazon ElastiCache- It is a web service which makes it easy to deploy, operate, and scale an in-memory cache in the cloud.
4. Neptune- It is a fast, reliable and scalable graph database service.
5. Amazon RedShift-It is Amazon's data warehousing solution which you can use to perform complex OLAP queries.

Analytics

1. Athena—This analytics service allows perm SQL queries on your S3 bucket to find files.
2. CloudSearch—You should use this AWS service to create a fully managed search engine for your website.
3. ElasticSearch—It is similar to CloudSearch. However, it offers more features like application monitoring.
4. Kinesis—This AWS analytics service helps you to stream and analyzing real-time data at massive scale.
5. QuickSight —It is a business analytics tool. It helps you to create visualizations in a dashboard for data in Amazon Web Services. For example, S3, DynamoDB, etc.
6. EMR (Elastic Map Reduce)—This AWS analytics service mainly used for big data processing like Spark, Splunk, Hadoop, etc.
7. Data Pipeline—Allows you to move data from one place to another. For example from DynamoDB to S3.

Management Services

1. CloudWatch—Cloud watch helps you to monitor AWS environments like EC2, RDS instances, and CPU utilization. It also triggers alarms depends on various metrics.
2. CloudFormation—It is a way of turning infrastructure into the cloud. You can use templates for providing a whole production environment in minutes.
3. CloudTrail—It offers an easy method of auditing AWS resources. It helps you to log all changes.

4. OpsWorks—The service allows you to automated Chef/Puppet deployments on AWS environment.
5. Config—This AWS service monitors your environment. The tool sends alerts about changes when you break certain defined configurations.
6. Service Catalog—This service helps large enterprises to authorize which services user will be used and which won't.
7. AWS Auto Scaling—The service allows you to automatically scale your resources up and down based on given CloudWatch metrics.
8. Systems Manager—This AWS service allows you to group your resources. It allows you to identify issues and act on them.
9. Managed Services—It offers management of your AWS infrastructure which allows you to focus on your applications.

Internet of Things

1. IoT Core— It is a managed cloud AWS service. The service allows connected devices like cars, light bulbs, sensor grids, to securely interact with cloud applications and other devices.
2. IoT Device Management—It allows you to manage your IoT devices at any scale.
3. IoT Analytics—This AWS IOT service is helpful to perform analysis on data collected by your IoT devices.
4. Amazon FreeRTOS—This real-time operating system for microcontrollers helps you to connect IoT devices in the local server or into the cloud.

Application Services

1. Step Functions—It is a way of visualizing what's going inside your application and what different microservices it is using.
2. SWF (Simple Workflow Service)—The service helps you to coordinate both automated tasks and human-led tasks.
3. SNS (Simple Notification Service)—You can use this service to send you notifications in the form of email and SMS based on given AWS services.
4. SQS (Simple Queue Service)—Use this AWS service to decouple your applications. It is a pull-based service.
5. Elastic Transcoder—This AWS service tool helps you to changes a video's format and resolution to support various devices like tablets, smartphones, and laptops of different resolutions.

Deployment and Management

1. AWS CloudTrail: The services records AWS API calls and send backlog files to you.
2. Amazon CloudWatch: The tools monitor AWS resources like Amazon EC2 and Amazon RDS DB Instances. It also allows you to monitor custom metrics created by user's applications and services.
3. AWS CloudHSM: This AWS service helps you meet corporate, regulatory, and contractual, compliance requirements for maintaining data security by using the Hardware Security Module(HSM) appliances inside the AWS environment.

Developer Tools

1. CodeStar—Codestar is a cloud-based service for creating, managing, and working with various software development projects on AWS.
2. CodeCommit— It is AWS's version control service which allows you to store your code and other assets privately in the cloud.
3. CodeBuild—This Amazon developer service help you to automates the process of building and compiling your code.
4. CodeDeploy—It is a way of deploying your code in EC2 instances automatically.
5. CodePipeline—It helps you create a deployment pipeline like testing, building, testing, authentication, deployment on development and production environments.
6. Cloud9 —It is an Integrated Development Environment for writing, running, and debugging code in the cloud.

Mobile Services

1. Mobile Hub—Allows you to add, configure and design features for mobile apps.
2. Cognito—Allows users to signup using his or her social identity.
3. Device Farm—Device farm helps you to improve the quality of apps by quickly testing hundreds of mobile devices.
4. AWS AppSync —It is a fully managed GraphQL service that offers real-time data synchronization and offline programming features.

Business Productivity

1. Alexa for Business—It empowers your organization with voice, using Alexa. It will help you to Allows you to build custom voice skills for your organization.
2. Chime—Can be used for online meeting and video conferencing.
3. WorkDocs—Helps to store documents in the cloud
4. WorkMail—Allows you to send and receive business emails.

Desktop & App Streaming

1. WorkSpaces—Workspace is a VDI (Virtual Desktop Infrastructure). It allows you to use remote desktops in the cloud.
2. AppStream —A way of streaming desktop applications to your users in the web browser. For example, using MS Word in Google Chrome.

Artificial Intelligence

1. Lex—Lex tool helps you to build chatbots quickly.
2. Polly— It is AWS's text-to-speech service allows you to create audio versions of your notes.
3. Rekognition —It is AWS's face recognition service. This AWS service helps you to recognize faces and object in images and videos.
4. SageMaker—Sagemaker allows you to build, train, and deploy machine learning models at any scale.
5. Transcribe— It is AWS's speech-to-text service that offers high-quality and affordable transcriptions.
6. Translate—It is a very similar tool to Google Translate which allows you to translate text in one language to another.

AR & VR (Augmented Reality & Virtual Reality)

1. Sumerian—Sumerian is a set of tool for offering high-quality virtual reality (VR) experiences on the web. The service allows you to create interactive 3D scenes and publish it as a website for users to access.

Customer Engagement

1. Amazon Connect—Amazon Connect allows you to create your customer care center in the cloud.
2. Pinpoint—Pinpoint helps you to understand your users and engage with them.
3. SES (Simple Email Service)—Helps you to send bulk emails to your customers at a relatively cost-effective price.

Game Development

1. GameLift- It is a service which is managed by AWS. You can use this service to host dedicated game servers. It allows you to scale seamlessly without taking your game offline.

APPLICATIONS OF AWS SERVICES

Amazon Web services are widely used for various computing purposes like:

1) Web site hosting
2) Application hosting/SaaS hosting
3) Media Sharing (Image/ Video)
4) Mobile and Social Applications
5) Content delivery and Media Distribution
6) Storage, backup, and disaster recovery
7) Development and test environments
8) Academic Computing
9) Search Engines
10) Social Networking

COMPANIES USING AWS

1) Instagram
2) Zoopla
3) Smugmug
4) Pinterest
5) Netflix
6) Dropbox
7) Etsy
8) Talkbox
9) Playfish
10) Ftopia

ADVANTAGES OF AWS

Following are the pros of using AWS services:

- AWS allows organizations to use the already familiar programming models, operating systems, databases, and architectures.
- It is a cost-effective service that allows you to pay only for what you use, without any up-front or long-term commitments.
- You will not require to spend money on running and maintaining data centers.
- Offers fast deployments
- You can easily add or remove capacity.

- You are allowed cloud access quickly with limitless capacity.
- Total Cost of Ownership is very low compared to any private/dedicated servers.
- Offers Centralized Billing and management
- Offers Hybrid Capabilities
- Allows you to deploy your application in multiple regions around the world with just a few clicks

DISADVANTAGES OF AWS

- If you need more immediate or intensive assistance, you'll have to opt for paid support packages.
- Amazon Web Services may have some common cloud computing issues when you move to a cloud. For example, downtime, limited control, and backup protection.
- AWS sets default limits on resources which differ from region to region. These resources consist of images, volumes, and snapshots.
- Hardware-level changes happen to your application which may not offer the best performance and usage of your applications.

G00GLE CLOUD PLATEFORM

Google Cloud is a suite of Cloud Computing services offered by Google. The platform provides various services like compute, storage, networking, Big Data, and many more that run on the same infrastructure that Google uses internally for its end users like Google Search and YouTube.

Google server hasn't gone down in years. So, if you are planning to run your application on the Google Cloud infrastructure, then you can be assured of your applications being safe and secure.

Why Google Cloud?

Google Cloud has been one of the top cloud providers in the IT industry. The services they offer can be accessed by software developers, as it provides a reliable and highly scalable infrastructure to build, test, and deploy their applications..

Few benefits that Google Cloud has to offer to its users:

1) Best Pricing: Google Cloud hosting plans are cheaper than other platforms' hosting plans. Google Cloud offers to its customers the pay-as-you-go feature where the users only have to pay for the resources they use.

2) Work from Anywhere: Employees gain complete access to information across devices from anywhere in the world through web-based applications powered by Google.
3) Private Network: Google provides its own network to every customer so that they have more control and scalability over the network. It uses fiber-optic cables to spread its network, as they tend to bear any amount of traffic. Users get maximum time and efficiency due to this private network.
4) Security: Google has hired a large set of security professionals who help in protecting the data on servers. All data on the Cloud platform is encrypted. So, users can be sure of their data being safe and secure.
5) Redundant Backup: Google has its own in-built redundant backups. So, if the data stored by the user is lost, then Google would have created a backup for it. So, your data is technically not lost! Redundancy helps ensure data integrity, reliability, and durability.

GOOGLE CLOUD SERVICES

Compute Services

- Google App Engine: Platform as a Service to deploy Java, PHP, and other applications. It is a Cloud Computing platform for developing and hosting web applications in Google-managed data centers. It offers the automatic scaling feature, i.e., as the number of requests for an application increases, the App Engine automatically allocates more resources for the application to handle additional demand.
- Compute Engine: Infrastructure as a Service to run Microsoft Windows and Linux virtual machines. It is a component of the Google Cloud platform which is built on the same infrastructure that runs Google's search engine, YouTube, and other services.
- Kubernetes Engine: It aims at providing a platform for automating deployment, scaling, and operations of application containers across clusters of hosts. It works with a wide range of container tools including docker.

Storage Services

- Google Cloud Storage: An online file storage web service for storing and accessing data on a Google Cloud platform infrastructure. The service combines the performance and scalability of Google Cloud with advanced security and sharing capabilities.
- Cloud SQL: A web service that allows you to create, configure, and use relational databases that live in Google Cloud. It maintains, manages, and administers your databases allowing you to focus on your applications and services.
- Cloud Bigtable: A fast, fully managed, and a highly scalable NoSQL database service. It is designed for the collection and retention of data from 1 TB to hundreds of PB.

Networking

- VPC: Virtual Private Cloud provides a private network with IP allocation, routing, and network firewall policies to create a secure environment for your deployments.
- Cloud Load Balancing: It is a process of distributing workloads across multiple computing resources. This reduces the cost and maximizes the availability of the resources.
- Content Delivery Network: A geographically distributed network of proxy servers and their data centers. The goal here is to provide high availability and high performance by spatially distributing the service relating to end users.

Big Data

- BigQuery: Google BigQuery Service is a fully managed data analysis service that enables businesses to analyse Big Data. It features highly scalable data storage, the ability to perform ad-hoc queries, and the ability to share data insights via the web.
- Google Cloud Datastore: A fully managed, schema less, non-relational datastore. It supports atomic transactions and a rich set of query capabilities and can automatically scale up and down depending on the load.
- Google Cloud Dataproc: A fast, easy-to-use and manage Spark and Hadoop service for distributed data processing. With Cloud Dataproc, you can create Spark or Hadoop clusters, sized for your workloads precisely when you need them.

Cloud AI

- Cloud Machine Learning Engine: A managed service that will enable you to build Machine Learning models based on mainstream frameworks.
- Cloud AutoML: A Machine Learning product that enables developers to provide their data sets and obtain access to quality trained models by Google's transfer learning and Neural Architecture Search.

Management Tools

- Google Stackdriver: Provides performance and diagnostics data in the form of monitoring, logging, tracing, error reporting, and alerting it to public cloud users.
- Google Cloud Console App: A native mobile application that enables customers to manage the key Google Cloud services. It provides monitoring, altering, and the ability to take actions on resources.

Identity and Security

- Cloud Data Loss Prevention API: It helps you manage sensitive data. It provides a fast and scalable classification for sensitive data elements like credit card numbers, names, passport numbers, and more.

- Cloud IAM: Cloud Identity and Access Management refers to a framework of policies and technologies for ensuring that proper people in an enterprise have the appropriate access to technology resources. It is also called identity management (IdM).
- Cloud IoT Core: It is a fully managed service that allows you to easily and securely connect, manage, and ingest data from devices that are connected to the Internet. It permits utilization of other Google Cloud services for collecting, processing, analysing, and visualizing IoT data in real time.
- Cloud IoT Edge: Edge computing brings memory and computing power closer to the location where it is needed.

TOP USERS OF GOOGLE CLOUD

1) Twitter: A well-known application, which lets people share information. With people tweeting more and more every day, the data produced is enormously large. Google Cloud is used for storing and computing purpose.
2) 20th Century Fox: Data scientists at 20th Century Fox and Google Cloud have developed a Machine Learning software that can analyse movie trailers and predict how likely people are to see those movies in theaters.
3) PayPal: PayPal partners with Google Cloud to increase security, build a faster network, and develop services for its customers.
4) eBay: eBay uses Google Cloud to innovate in image search, improve customer experiences in China, and train translation models.
5) Chevron: Chevron uses Google AutoML Vision to find information that is always challenging to get when you need it.
6) HSBC: HSBC brings a new level of security, compliance, and governance to its banks using Google Cloud.
7) LG CNS: LG CNS data analytics solution, with Google AI and Edge TPU, will provide a great value for LG CNS customers in the smart factory arena.

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MICROSOFT CLOUD SERVICES

Microsoft is one of the oldest and biggest cloud service platforms that enterprises rely on. The host of cloud services offered by the giant includes SaaS (Software as a Service), PaaS (Platform as a Service) and IaaS (Infrastructure as a Service). Cloud computing with MS Cloud services lets you rent the tech or software you want for a monthly rental fee.

SaaS: With SaaS, you can rent the app or software you need, while data, runtime, middleware, servers, O/S, storage, networking and virtualization are handled by other managers.

PaaS: With PaaS, you can rent everything except for the app. You manage apps and data, while Microsoft's cloud services takes over runtime, O/S, middleware, networking, servers, storage

etc.

IaaS: With IaaS, you can rent the hardware and tools to maintain it as well. You can manage data, apps, runtime, O/S, middleware while the cloud services manage servers, storage, networking and virtualization.

1. Microsoft Azure

Azure is Microsoft's big enterprise cloud, offered as a PaaS and IaaS service. It is a popular service used by developers who write apps with the support of the company's coding tools. Azure offers the capability to save money, work faster and integrate data and on-premises apps in a powerful, scalable and flexible way. This feature-filled service offers a hybrid cloud solution, unlike many other cloud providers that force customers to choose between the public cloud and their own data centers. Hybrid cloud solutions are known to offer more efficiency and economy in storage, backup and recovery of data.

Support for Azure has been expanded from Windows to Linux as well, opening up the services to more users. Clients only pay for the services they need. With Azure, clients can better provision Windows and Linux VM apps, develop modern mobile and business solution apps for Windows, iOS and Android, gain insights from data and manage user accounts, synching with on-premises data directories.

Deployment of Azure services takes less than 5 minutes, just as it is claimed by Microsoft. 57 percent of Fortune 500 companies on the bleeding edge already use Azure, and the numbers are expected to rise as the capability offered by Azure improves and expands further.

2. MS Office 365

It was an excellent move for Microsoft to put its hit MS Office solutions on the cloud. Called Office 365, it allows clients to access email and calendars on the go, work from anywhere with Office apps, get easier conferencing capability all with extra security. The Office 365 package includes Word, PowerPoint, Excel, OneNote, Outlook, Access, Publisher, Lync and InfoPath on the cloud. This highly popular MS cloud service has satisfied users across the world.

MS clients already using MS Office will find that 365 adds more cloud power, allowing work to be done from PCs, Macs and mobile devices. Calendars and emails can be kept in sync with enterprise-grade services. Users can quickly and easily set up online HD video conferences, share screens and facilitate real-time note taking. File sharing and collaborating with partners, customers and teammates is also easier because of easy sharing. For those who are wary of the cloud, the built-in anti-spam and anti-malware protection will come as a relief.

3. MS Windows Intune

Windows Intune is Microsoft's cloud mobile management service that allows organizations to manage devices across the cloud or when connected to a MS System Center. It offers support for Windows, iOS and Android platforms, and makes it easy to manage mobile devices and

PCs from one place. Users can configure their devices in a way that suits the company's compliance needs and improves efficiency without the need for additional infrastructure. The app allows users to work from anywhere while offering the security that is synonymous with Microsoft's products. It is a boon for enterprises that want to avoid third-party tools and keep everything centralized in organizations that are Windows client-heavy.

4. Microsoft SQL Server with MS System Center

It has been popular since its release in 2012, allowing organizations to run SQL servers on the cloud. This offers the benefits of a private cloud environment for companies that are hesitant about data security and other concerns. The cloud-based SQL Azure server can run with the support of Microsoft System Center Virtual Machine Manager 2012. Users can manage their SQL databases on a private cloud; take advantage of a higher level of management of apps, and virtualization benefits that are offered by the System Center.

The latest 2014 upgrades to MS SQL Server offers better security and backup, simple conversions for in-memory tables, faster disaster recovery and migration, SSD support, automatic backups and other features. Licensing is easy even with the Standard Edition, so smaller businesses can benefit from the backup features even without a full-time database admin.

5. Enterprise Mobility Suite

The recently launched Enterprise Mobility Suite allows users to leverage existing Microsoft technologies like Windows Intune, MS Azure Active Directory Premium and MS Azure Rights Management to help manage different devices from a single environment. With the MS EMI, you can manage all your devices from one unified environment with Intune's capabilities, protect your data with MS Azure Rights Management and manage identity with Azure Active Directory. Though the product is relatively new in the cloud services market, it is fast becoming popular with enterprises and smaller organizations seeking hybrid cloud management services with reliable security.

Have you always dreamt of designing and deploying dynamically scalable and reliable applications on cloud platforms? Learn everything with this Cloud Computing Training program, and scale up your career today!

6. Microsoft Visual Studio

MS Visual Studio in the cloud is aimed at developers who want to efficiently manage their code, work and builds on the cloud. Users can also install the Multi-Device Hybrid apps extension to create apps for Windows, iOS and Android devices with standard web technologies and Apache Cordova. MS Visual Studio users will be able to debug, edit, deploy projects and manage project architecture with ALM improvements more productively with the cloudversion.

IBM CLOUD SERVICES

When it comes to public cloud computing vendors, IBM doesn't always enjoy the same mindshare as Amazon Web Services (AWS), Microsoft Azure and Google Cloud Platform. However, some analyst reports have claimed that IBM actually has a larger share of the infrastructure as a service (IaaS) and platform as a service (PaaS) market than Google. Other analyses place it solidly in fourth place behind the "big three." Either way, IBM is one of the largest cloud computing providers on the planet.

History Of IBM Cloud

IBM begins its telling of the history of cloud computing not with AWS in the early 2000s, but with the invention of the mainframe back in the 1950s. It follows the thread of the story through IBM's 1970s development of the VM operating system, which enabled multiple virtual machines on a shared node.

The company first dove into modern cloud computing in 2008, when it announced a software as a service collaboration suite codenamed Bluehouse. That suite became LotusLive, which launched in early 2009 and later was renamed IBM SmartCloud for Social Business.

In 2009, IBM also launched Cloudburst, a tool for setting up a private cloud, and its first real IaaS service, the IBM Smart Business Storage Cloud, appeared that same year.

The company continued adding cloud services to its portfolio, and in 2011 it announced a major new cloud effort under the SmartCloud brand name.

IBM's cloud efforts took a major step forward in 2013, when it acquired SoftLayer, which was then the world's largest privately held cloud computing infrastructure provider. IBM continued running SoftLayer as a separate service, but also begin integrating SoftLayer technology into its cloud hardware, software, and services. At the same time, IBM also set up a Cloud Services division within the company.

In early 2014, IBM said it would expand SoftLayer and launched a public beta of a PaaS service called Bluemix. A few months later, Bluemix hit general availability, and since then, it has taken on more and more importance in the overall IBM Cloud strategy. Today, Bluemix encompasses IaaS services and IBM's extensive Watson cognitive computing services, as well as its PaaS offerings.

IBM Cloud Services

The company divides its Bluemix Services into twelve categories:

- **Compute Infrastructure** — includes its bare metal servers (single-tenant servers that are highly customizable), virtual servers, GPU computing, POWER servers (based on IBM's POWER architecture) and server software

- **Compute Services** — includes OpenWhisk serverless computing, containers and Cloud Foundry runtimes
- **Storage** — includes object, block and file storage, as well as server-backup capabilities
- **Network** — includes load balancing, Direct Link private secure connections, network appliances, content delivery network and domain services
- **Mobile** — includes IBM's Swift tools for creating iOS apps, its MobileFirst Starter package for getting a mobile app up and running, and its Mobile Foundation app back-end services
- **Watson** — includes IBM's artificial intelligence and machine learning services, which it calls "cognitive computing," such as Discovery search and content analytics, Conversation natural language services and speech-to-text
- **Data and analytics** — includes data services, analytics services, big data hosting, Cloudera hosting, MongoDB hosting and Riak hosting
- **Internet of Things** — includes IBM's IoT platform and its IoT starter packages
- **Security** — includes tools for securing cloud environments, such as a firewall, hardware security modules (physical devices with key management capabilities), Intel Trusted Execution Technology, security software and SSL certificates
- **DevOps** — includes the Eclipse IDE, continuous delivery tools and availability monitoring
- **Application services** — includes Blockchain, Message hub and business rules, among others
- **Integration** — includes tools for building virtual bridges for hybrid cloud and multi-cloud environments, such as API Connect and Secure Gateway

Features And Costs Of Popular IBM Cloud Services

See Full Table

Service	Features	Costs
Bare metal Servers	• Highly customizable and can be built to spek • Excellent performance • Available within 20 minutes to 4 hours • Single-tenant servers that are not shared with any other	Single processor servers start at $158 per month or $0.595 per hour. Quad-processor configurations start at $1,439 per month or $1.893 per hour.

	organizations • Ideal for I/O-intensive workloads	
Virtual Servers	• Both public and private nodes available • Local and SAN storage options available • Fast performance • Hybrid cloud capabilities Global data centers	Prlces start at $0.038 per hour or $25 per month for a public node with 1 core and 1 GB of RAM.
GPU servers	• Designed for HPC, deep learning and AI use cases • Pay for GPU capabilities only when in use • Choice of NVIDIA Tesla or NVIDIA GRID GPUs	Servers equipped with an NVIDIA Tesla M60 start at $3.50 per hour or $1,709 per month.
Object Storage	• Free tier • Slmple pricing based on data access • Geographically dispersed data centers for resiliency • Integrated security • Flex storage option for automatic tiering	Standard access for the flrst 500TB is $0.03 per GB per month, while Cold Vault access Is $0.011per GB per month. Additional fees for public outbound bandwldth and operational requests
Watson Discovery	• Free tier with a 30 day trial • Quickly build a cognitive search and content analytics engine • Includes pre·enriched datasets like the Discovery News collection • SDKs for Node.js, Java, Python, iOS and Unity	Pricing starts at $960 per environment per month for a Size 1 Environment. News queries are $0.10 each.
Cloudera Hosting	• Supports Cloudera Hadoop • Runs on bare metal servers • Customization capabilities available	Recommender server configurations start at $749 per month.

	• Can be deployed in a few hours	