



## What Is Cloud Computing ?

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Nowadays, **Cloud computing** is adopted by every company, whether it is an MNC or a startup many are still migrating towards it because of the cost-cutting, lesser maintenance, and the increased capacity of the data with the help of servers maintained by the cloud providers.

One more reason for this drastic change from the On-premises servers of the companies to the Cloud providers is the '**Pay as you go**' principle-based services provided by them i.e., you only have to pay for the service which you are using. The disadvantage On-premises server holds is that if the server is not in use the company still has to pay for it.

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## What Is Cloud Computing?

**Cloud Computing** means storing and accessing the data and programs on remote servers that are hosted on the internet instead of the computer's hard drive or local server. Cloud computing is also referred to as Internet-based computing, it is a technology where the resource is provided as a service through the Internet to the user. The data that is stored can be files, images, documents, or any other storable document.



The following are some of the Operations that can be performed with Cloud Computing

- Development of new applications and services
- Streaming videos and audio

## Understanding How Cloud Computing Works?

Cloud computing helps users in easily accessing computing resources like storage, and processing over internet rather than local hardwares. Here we discussing how it works in nutshell:

- **Infrastructure:** Cloud computing depends on remote network servers hosted on internet for store, manage, and process the data.
- **On-Demand Access:** Users can access cloud services and resources based on-demand they can scale up or down the without having to invest for physical hardware.
- **Types of Services:** Cloud computing offers various benefits such as cost saving, scalability, reliability and accessibility it reduces capital expenditures, improves efficiency.

## Origins Of Cloud Computing

Mainframe computing in the 1950s and the internet explosion in the 1990s came together to give rise to cloud computing. Since businesses like Amazon, Google, and Salesforce started providing web-based services in the early 2000s. The term “cloud computing” has gained popularity. Scalability, adaptability, and cost-effectiveness are to be facilitated by the concept's on-demand internet-based access to computational resources.

These days, cloud computing is pervasive, driving a wide range of services across markets and transforming the processing, storage, and retrieval of data

## What is Virtualization In Cloud Computing?

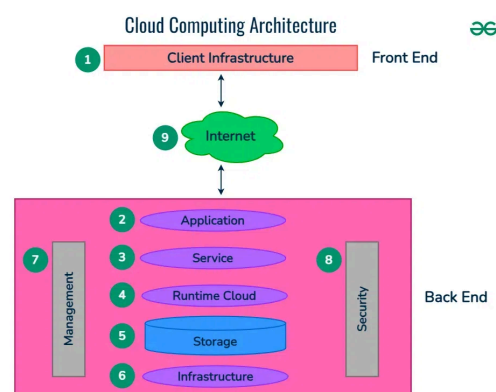
[Virtualization](#) is the software technology that helps in providing the logical isolation of physical resources. Creating logical isolation of physical resources such as RAM, CPU, and Storage.. over the cloud is known as Virtualization in Cloud Computing. In simple we can say creating [types of Virtual Instances](#) of computing resources over the cloud. It provides better management and utilization of hardware resources with logical isolation making the applications independent of others. It facilitates streamlining the resource allocation and enhancing scalability for multiple virtual computers within a single physical source offering cost-effectiveness and better optimization of resources.

To know about this refer this Article – [Virtualization in Cloud Computing and Types](#)

## Architecture Of Cloud Computing

[Cloud computing architecture](#) refers to the components and sub-components required for cloud computing. These components typically refer to:

1. Front end ( Fat client, Thin client)
2. Back-end platforms ( Servers, Storage )
3. Cloud-based delivery and a network ( Internet, Intranet, Intercloud )



### 1. Front End ( User Interaction Enhancement )

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The User Interface of Cloud Computing consists of 2 sections of clients. The Thin clients are the ones that use web browsers facilitating portable and lightweight accessibilities and others are known as Fat Clients that use many functionalities for offering a strong user experience.

## 2. Back-end Platforms ( Cloud Computing Engine )

The core of cloud computing is made at back-end platforms with several servers for storage and processing computing. Management of Applications logic is managed through servers and effective data handling is provided by storage. The combination of these platforms at the backend offers the processing power, and capacity to manage and store data behind the cloud.

## 3. Cloud-Based Delivery and Network

On-demand access to the computer and resources is provided over the Internet, Intranet, and Intercloud. The Internet comes with global accessibility, the [Intranet](#) helps in internal communications of the services within the organization and the [Intercloud](#) enables interoperability across various cloud services. This dynamic network connectivity ensures an essential component of cloud computing architecture on guaranteeing easy access and data transfer.

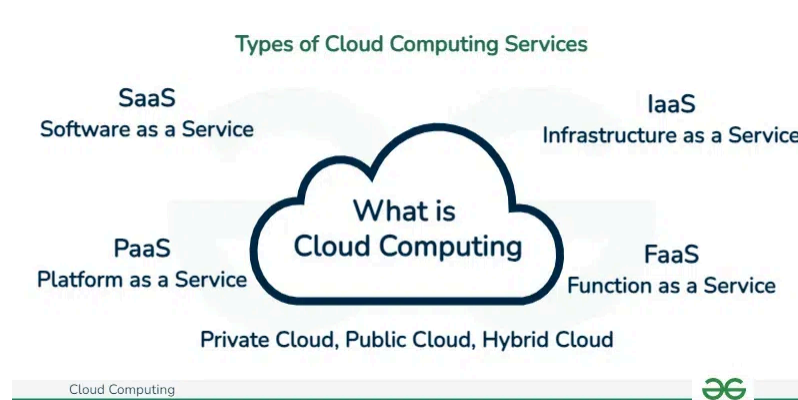
## What Are The Types of Cloud Computing Services?

The following are the types of Cloud Computing:

### 1. [Infrastructure as a Service \(IaaS\)](#).

### 3. [Software as a Service \(SaaS\)](#).

### 4. [Function as as Service \(FaaS\)](#).



### 1. Infrastructure as a Service ( IaaS )

- **Flexibility and Control:** IaaS comes up with providing virtualized computing resources such as VMs, Storage, and networks facilitating users with control over the Operating system and applications.
- **Reducing Expenses of Hardware:** IaaS provides business cost savings with the elimination of physical infrastructure investments making it cost-effective.
- **Scalability of Resources:** The cloud provides in scaling of hardware resources up or down as per demand facilitating optimal performance with cost efficiency.

### 2. Platform as a Service ( PaaS )

- **Simplifying the Development:** Platform as a Service offers application development by keeping the underlying Infrastructure as an Abstraction. It helps the developers to completely focus on application logic ( Code ) and background operations are completely managed by the AWS platform.
- **Enhancing Efficiency and Productivity:** PaaS lowers the Management of Infrastructure complexity, speeding

- **Automation of Scaling:** Management of resource scaling, guaranteeing the program's workload efficiency is ensured by PaaS.

### 3. SaaS (software as a service)

- **Collaboration And Accessibility:** Software as a Service (SaaS) helps users to easily access applications without having the requirement of local installations. It is fully managed by the AWS Software working as a service over the internet encouraging effortless cooperation and ease of access.
- **Automation of Updates:** SaaS providers manage the handling of software maintenance with automatic latest updates ensuring users gain experience with the latest features and security patches.
- **Cost Efficiency:** SaaS acts as a cost-effective solution by reducing the overhead of IT support by eliminating the need for individual software licenses.

### 4. Function as a Service (FaaS)

- **Event-Driven Execution:** FaaS helps in the maintenance of servers and infrastructure making users worry about it. FaaS facilitates the developers to run code as a response to the events.
- **Cost Efficiency:** FaaS facilitates cost efficiency by coming up with the principle "Pay as per you Run" for the computing resources used.
- **Scalability and Agility:** Serverless Architectures scale effortlessly in handling the workloads promoting agility in development and deployment.

To know more about the Types of Cloud Computing Difference please read this article – [IaaS vs PaaS vs SaaS](#)

## What Are Cloud Deployment Models?

The following are the Cloud Deployment Models:

### 1. Private Deployment Model

- It provides an enhancement in protection and customization by cloud resource utilization as per particular specified requirements. It is perfect for companies which looking for security and compliance needs.

### 2. Public Deployment Model

- It comes with offering a pay-as-you-go principle for scalability and accessibility of cloud resources for numerous users. it ensures cost-effectiveness by providing enterprise-needed services.

### 3. Hybrid Deployment Model

It comes up with a combination of elements of both private and public clouds providing seamless data and application processing in between environments. It offers flexibility in optimizing resources such as sensitive data in private clouds and important scalable applications in the public cloud.

To know more about the Cloud Deployment Models, read this Articles

- [Cloud Deployment Models](#)
- [Differences of Cloud Deployment Models](#)

## What Is Cloud Hosting?

The Infrastructure is where the people start and begin to build from the scratch. This is the layer where the cloud hosting lives. Let's say you have a company and a website and the website has a lot of communications that are exchanged between members. You start with a few members talking with each other and then gradually the number of members increases. As time passes, as the number of members increases, there would be more traffic on the network and your server will get slow down. This would cause a problem.

using them and as well as when you are not using them. This is called hosting. This problem is overcome by cloud hosting. With Cloud Computing, you have access to computing power when you need it. Now, your website is put in the cloud server as you put it on a dedicated server. People start visiting your website and if you suddenly need more computing power, you would scale up according to the need.

## Characteristics Of Cloud Computing

The following are the characteristics of Cloud Computing:

1. **Scalability:** With Cloud hosting, it is easy to grow and shrink the number and size of servers based on the need. This is done by either increasing or decreasing the resources in the cloud. This ability to alter plans due to fluctuations in business size and needs is a superb benefit of cloud computing, especially when experiencing a sudden growth in demand.
2. **Save Money:** An advantage of cloud computing is the reduction in hardware costs. Instead of purchasing in-house equipment, hardware needs are left to the vendor. For companies that are growing rapidly, new hardware can be large, expensive, and inconvenient. Cloud computing alleviates these issues because resources can be acquired quickly and easily. Even better, the cost of repairing or replacing equipment is passed to the vendors. Along with purchase costs, off-site hardware cuts internal power costs and saves space. Large data centers can take up precious office space and produce a large amount of heat. Moving to cloud applications or storage can help maximize space and significantly cut energy expenditures.
3. **Reliability:** Rather than being hosted on one single instance of a physical server, hosting is delivered on a virtual partition that draws its resource, such as disk space, from an extensive network of underlying physical servers. If one server goes offline it will have no effect on availability, as the virtual servers will continue to pull resources from the remaining network of servers.
4. **Physical Security:** The underlying physical servers are still housed within data centers and so benefit from the security measures that those facilities implement to prevent people from accessing or disrupting them on-site.
5. **Outsource Management:** When you are managing the business, Someone else manages your computing infrastructure. You do not need to worry about management as well as degradation.

## Top Reasons to Switch from On-premise to Cloud Computing

The following are the Top reasons to switch from on-premise to cloud computing:

1. **Reduces cost:** The cost-cutting ability of businesses that utilize cloud computing over time is one of the main advantages of this technology. On average 15% of the total cost can be saved by companies if they migrate to the cloud. By the use of cloud servers businesses will save and reduce costs with no need to employ a staff of technical support personnel to address server issues. There are many great business modules regarding the cost-cutting benefits of cloud servers such as the **Coca-Cola** and **Pinterest** case studies.
2. **More storage:** For software and applications to execute as quickly and efficiently as possible, it provides more servers, storage space, and computing power. Many tools are available for [cloud storage](#) such as Dropbox, Onedrive, Google Drive, iCloud Drive, etc.
3. **Employees Better Work Life Balance:** Direct connections between cloud computing benefits, and the work and personal lives of an enterprise's workers can both improve because of cloud computing. Even on holidays, the employees have to work with the server for its security, maintenance, and proper functionality. But with cloud storage the thing is not the same, employees get ample of time for their personal life and the workload is even less comparatively.

## Top leading Cloud Computing companies

### 1. [Amazon Web Services\(AWS\)](#)

One of the most successful cloud-based businesses is Amazon Web Services(AWS), which is an Infrastructure as a Service(IaaS) offering that pays rent for virtual computers on Amazon's infrastructure.

### 2. [Microsoft Azure Cloud Platform](#)

Microsoft is creating the Azure platform which enables the .NET Framework Application to run over the internet

### 3. [Google Cloud Platform \( GCP \)](#).

- Google has built a worldwide network of data centers to service its search engine. From this service, Google has captured the world's advertising revenue. By using that revenue, Google offers free software to users based on infrastructure. This is called Software as a Service(SaaS).

## Advantages of Cloud Computing

The following are main advantages of Cloud Computing:

1. **Cost Efficiency:** Cloud Computing provides flexible pricing to the users with the principal pay-as-you-go model. It helps in lessening capital expenditures of Infrastructure, particularly for small and medium-sized businesses companies.
2. **Flexibility and Scalability:** Cloud services facilitate the scaling of resources based on demand. It ensures the efficiency of businesses in handling various workloads without the need for large amounts of investments in hardware during the periods of low demand.
3. **Collaboration and Accessibility:** Cloud computing provides easy access to data and applications from anywhere over the internet. This encourages collaborative team participation from different locations through shared documents and projects in real-time resulting in quality and productive outputs.
4. **Automatic Maintenance and Updates:** AWS Cloud takes care of the infrastructure management and keeping with the latest software automatically making updates they is new versions. Through this, AWS guarantee the companies always having access to the newest technologies to focus completely on business operations and innvoations.

## Disadvantages Of Cloud Computing

The following are the main disadvantages of Cloud Computing:

1. **Security Concerns:** Storing of sensitive data on external servers raised more security concerns which is one of the main drawbacks of cloud computing.
2. **Downtime and Reliability:** Even though cloud services are usually dependable, they may also have unexpected interruptions and downtimes. These might be raised because of server problems, Network issues or maintenance disruptions in Cloud providers which negative effect on business operations, creating issues for users accessing their apps.
3. **Dependency on Internet Connectivity:** Cloud computing services heavily rely on Internet connectivity. For accessing the cloud resources the users should have a stable and high-speed internet connection for accessing and using cloud resources. In regions with limited internet connectivity, users may face challenges in accessing their data and applications.
4. **Cost Management Complexity:** The main benefit of cloud services is their pricing model that coming with **Pay as you go** but it also leads to cost management complexities. On without proper careful monitoring and utilization of resources optimization, Organizations may end up with unexpected costs as per their use scale. Understanding and Controlled usage of cloud services requires ongoing attention.

## Cloud Sustainability

The following are the some of the key points of Cloud sustainability:

- **Energy Efficiency:** Cloud Providers supports the optimization of data center operations for minimizing energy consumption and improve efficiency.
- **Renewable Energy:** On increasing the adoption of renewable energy sources like solar and wind power to data centers and reduce carbon emissions.
- **Virtualization:** Server virtualization facilitates better utilization of hardware resources, reducing the need for physical servers and lowering the energy consumptions.

## Cloud Security

Cloud security recommended to measures and practices designed to protect data, applications, and infrastructure

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- **Data Encryption:** Encryption is essential for securing data stored in the cloud. It ensures that data remains unreadable to unauthorized users even if it is intercepted.
- **Access Control:** Implementing strict access controls and authentication mechanisms helps ensure that only authorized users can access sensitive data and resources in the cloud.
- **Multi-Factor Authentication (MFA):** [MFA](#) adds an extra layer of security by requiring users to provide multiple forms of verification, such as passwords, biometrics, or security tokens, before gaining access to cloud services.

## Use Cases Of Cloud Computing

Cloud computing provides many use cases across industries and various applications:

1. **Scalable Infrastructure:** Infrastructure as a Service (IaaS) enables organizations to scale computing resources based on demand without investing in physical hardware.
2. **Efficient Application Development:** Platform as a Service (PaaS) simplifies application development, offering tools and environments for building, deploying, and managing applications.
3. **Streamlined Software Access:** Software as a Service (SaaS) provides subscription-based access to software applications over the internet, reducing the need for local installation and maintenance.
4. **Data Analytics:** Cloud-based platforms facilitate big data analytics, allowing organizations to process and derive insights from large datasets efficiently.
5. **Disaster Recovery:** Cloud-based disaster recovery solutions offer cost-effective data replication and backup, ensuring quick recovery in case of system failures or disasters.

## Cloud Computing – FAQs

### What is Cloud Computing?

*Cloud Computing is a technology that facilitates the users in accessing and utilizing the computing resources over the internet offering scalability and flexibility.*

### How does Cloud Security work?

*It involves encryption, maintenance of data confidentiality guarding from unauthorized, unwanted access with features [Authentication and authorization](#).*

### What are the benefits of Cloud Deployment?

*[Cloud Deployment](#) offers accessibility, scalability, and cost savings features facilitating the organizations to focus on Innovation rather than managing the physical infrastructure.*

### What is the difference between IaaS, PaaS, and SaaS?

*IaaS provides virtualized resources, PaaS comes up with features for the deployment of applications, and finally, SaaS facilitates fully managed functional software as a service over the Internet.*

### How can organizations ensure data compliance in the cloud?

*Organizations choose cloud providers with strong security features and measures for ensuring data compliance. Organizations use cloud providers for implementing encryption, maintaining security measures, and supporting industry-specific regulations.*

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