Cloud Computing

**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

* Storage, backup, and recovery of data
* Delivery of software on demand
* Development of new applications and services
* Streaming videos and audio

**Advantage:**

**Data Backup and Restoration:**

Cloud computing offers a quick and easy method for data backup and restoration. Businesses may simply access and restore their data in the event of any data loss or system failure by keeping it in the cloud.

**Improved Collaboration:**

Collaboration is improved because cloud technologies make it possible for teams to share information easily. Multiple users may work together on documents, projects, and data thanks to shared storage in the cloud, enhancing productivity and teamwork.

**Excellent Accessibility:**

Access to information stored in the cloud is made possible. Users can access their data from anywhere in the world with an internet connection, making remote work, flexibility, and effective operations possible.

**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.

**Flexibility and Scalability:** Cloud services facilitate the scaling of resources based on demand.

**Disadvantages**

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.

**Cloud Service model**:-

**Iaas(Infrastructure as a sevice)**:-

What is IaaS (Infrastructure as a Service)?

Infrastructure as a service is a cloud computing service that offers IT infrastructure to users on a pay-as-you-go basis. It is a self-service option made of automated and highly scalable resources companies require offered through the internet.

IaaS vendors give you access and management of the resources you need, such as networks, storage, and servers, and users get complete control of their infrastructure and can manage the operating systems, applications, middleware, data, etc. Users get the cloud servers through API and can access their servers directly. Some examples of IaaS vendors include Google App Engine, Windows Azure, OpenShift, and Heroku.

**Features of IaaS include:**

* **Dynamic scaling:**IaaS allows dynamic and flexible scaling of resources as they are available in an as-a-service model.
* **Platform virtualization:** IaaS uses platform virtualization technology to provide cloud computing infrastructure.
* **Costs:** The services are available on a pay-as-you-go basis. Therefore you pay only for the resources you use.
* **Control:** IaaS users have complete control over their infrastructure and IT platform.

**What is SaaS (Software as a Service)?**

Software as a Service is the most common cloud service used by organizations. A 2020 Virayo study found that 80 percent of organizations use one or more SaaS applications in their business. While using SaaS services, you don't have to install any software on your computer. Instead, you can easily access them on the cloud where they are stored. So, if you want to do some urgent work and do not have your laptop with you, all you need is an internet connection and a browser to access the required tools.

Since SaaS follows a web delivery model, you don’t need to download and install applications on each computer. You also don’t need to maintain the software or manage it. The vendor is responsible for all possible technical issues. Some examples of SaaS include [Google](https://www.koenig-solutions.com/google-training-certification-courses) Workspace, Microsoft 365, Salesforce, Concur, Adobe Creative Cloud, and Cisco WebEx.

Features of Saas

Some of the features of SaaS applications include:

* **Multi-tenancy model:**SaaS applications service multiple tenants (customers). Some tenants may get the right to customize some of their applications.
* **Subscription-based model:** SaaS applications have a simple subscription-based billing model. This enables tenants to discontinue their services whenever necessary.
* **Availability:** SaaS applications are available 24\*7\*365.

## What is PaaS (Platform as a Service)?

Under the Platform as a Service cloud computing model, providers provide software, hardware, and infrastructure to their customers for developing their applications. Users can develop, run, and manage their apps on the provider’s infrastructure. They don't have to build their infrastructure, which makes PaaS especially useful for developers and programmers.

PaaS providers provide operating systems, networks, development tools, servers, etc., which makes it easy for developers to build their applications as they don't have to build them from scratch. PaaS differs from SaaS in the sense that instead of offering ready-made solutions and software to the user, it offers a platform to create software. Amazon Web Services ( [AWS](https://www.koenig-solutions.com/aws-training) ), IBM Cloud, and Microsoft Azure provide PaaS solutions.

Features of PaaS

PaaS has several features. Some of them include:

* **Auto-scaling:** Since it is based on virtualization technology, resources can be scaled up and down at your convenience.
* **Resource sharing:**PaaS allows resource sharing amongst different development teams.
* **Accessibility:** It also allows several users to access the platform with the same development application.
* **Time-saving:**PaaS offers developers pre-coded components and several development tools, which saves their time and resources.

## SaaS vs PaaS vs IaaS

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| --- | --- | --- | --- |
| Parameters | SaaS | PaaS | IaaS |
| Used by | End users | Developers | Network architects |
| Technical knowledge required | No technical knowledge is required as the vendor handles everything | Requires some level of technical understanding and knowledge | Users need a high level of technical understanding to use IaaS |
| Level of control | No control | Control of the developed applications only | The entire infrastructure is controlled by the user |
| Popularity | Highly popular among all levels and sizes of companies | Popular amongst developers | Popular among researchers and developers |
| Examples | Google Workspace, Microsoft 365, Salesforce | Amazon Web Services (AWS), IBM Cloud | Windows Azure, OpenShift |

**characteristics of cloud computing**

 **On-Demand Self-Service:** Users can provision computing resources (such as storage, processing power, or applications) without human intervention from the service provider.

** Broad Network Access:** Cloud services are accessible over the internet from a wide variety of devices such as laptops, smartphones, and tablets.

**Rapid Elasticity**: Cloud computing resources can be quickly scaled up or down, depending on user needs, providing flexibility and cost-efficiency.

**Multi-Tenancy**: Multiple users (tenants) can share the same infrastructure while keeping their data separate and secure, ensuring efficient resource utilization.

**Cost Efficiency**: Since cloud services operate on a pay-as-you-go model, users avoid upfront costs for hardware and infrastructure, reducing capital expenditure.

**Security**: Cloud providers implement robust security measures, such as encryption, authentication, and access control, though security concerns like data privacy and control remain considerations for users.

**Automated Maintenance and Updates**: Cloud services often include automatic software updates and maintenance, reducing the burden on users to manage infrastructure.