05-06-2023

**INTRODUCTION TO CLOUD COMPUTING**

The term cloud refers to a network or the internet. It is a technology that uses remote servers on the internet to store, manage, and access data online rather than local drives. The data can be anything such as files, images, documents, audio, video, and more.

There are the following operations that we can do using cloud computing:

* Developing new applications and services
* Storage, back up, and recovery of data
* Hosting blogs and websites
* Delivery of software on demand
* Analysis of data
* Streaming videos and audios

Cloud computing is on-demand access, via the internet, to computing resources—applications, servers (physical servers and virtual servers), data storage, development tools, networking capabilities, and more—hosted at a remote data center managed by a cloud services provider (or CSP). The CSP makes these resources available for a monthly subscription fee or bills them according to usage. Compared to traditional on-premises IT, and depending on the cloud services you select, cloud computing helps do the following:

* **Lower IT costs:** Cloud lets you offload some or most of the costs and effort of purchasing, installing, configuring, and managing your own on-premises infrastructure.
* **Improve agility and time-to-value**: With cloud, your organization can start using enterprise applications in minutes, instead of waiting weeks or months for IT to respond to a request, purchase and configure supporting hardware, and install software. Cloud also lets you empower certain users—specifically developers and data scientists—to help themselves to software and support infrastructure.
* **Scale more easily and cost-effectively:** Cloud provides elasticity—instead of purchasing excess capacity that sits unused during slow periods, you can scale capacity up and down in response to spikes and dips in traffic. You can also take advantage of your cloud provider’s global network to spread your applications closer to users around the world.

**Cloud Computing Services:**

Cloud computing services refer to the various offerings and capabilities provided by cloud service providers to users and organizations. These services are typically categorized into three main types:

1. **Infrastructure as a Service (IaaS):**

* IaaS provides virtualized computing resources, including virtual machines (VMs), storage, networks, and other infrastructure components.
* Users have control over the operating systems, applications, and configurations they want to run on the provided infrastructure.
* Examples of IaaS providers include Amazon Web Services (AWS) EC2, Microsoft Azure Virtual Machines, and Google Cloud Compute Engine.

1. **Platform as a Service (PaaS):**

* PaaS offers a higher level of abstraction by providing a platform with pre-configured computing resources, development tools, and frameworks for users to build, deploy, and manage their applications.
* Users can focus on writing code and developing applications without worrying about the underlying infrastructure.
* Examples of PaaS providers include Heroku, Google App Engine, and Microsoft Azure App Service.

1. **Software as a Service (SaaS):**

* SaaS delivers software applications over the internet on a subscription basis.
* Users can access these applications through a web browser or a client application without the need to install or maintain any infrastructure or software.
* SaaS providers handle the underlying infrastructure, maintenance, and updates.
* Examples of SaaS applications include Salesforce, Microsoft Office 365, and Google Workspace.

**Types of Cloud Computing:**

1. **Public Cloud:**

* Public cloud refers to cloud infrastructure and services that are owned and operated by third-party cloud service providers.
* These providers make computing resources, such as virtual machines, storage, and applications, available to the public over the internet.
* Public cloud services are typically offered on a pay-as-you-go basis, allowing users to scale their resources as needed.
* Examples of public cloud providers include Amazon Web Services (AWS), Microsoft Azure, and Google Cloud Platform (GCP).

1. **Private Cloud:**

* Private cloud refers to cloud infrastructure and services that are dedicated to a single organization.
* The infrastructure can be physically located on-premises within the organization's data centres or hosted by a third-party service provider.
* Private cloud offers more control and security as the organization has exclusive use and access to the resources.
* It is often used by organizations with strict security or compliance requirements.
* Private cloud can be managed by the organization itself or by a managed service provider.

1. **Hybrid Cloud:**

* Hybrid cloud combines elements of both public and private cloud models.
* It involves integrating and orchestrating services across public and private cloud environments.
* Organizations can use a combination of public and private cloud resources, allowing them to leverage the scalability and cost-effectiveness of public cloud for non-sensitive workloads while keeping critical data and applications in a private cloud for enhanced security and control.
* Hybrid cloud deployments require integration and management of both environments to ensure seamless operation.

1. **Multi-Cloud:**

* Multi-cloud refers to the use of multiple cloud service providers to meet an organization's computing needs.
* It involves distributing workloads across different cloud platforms, either by using different providers simultaneously or by switching between providers based on specific requirements.
* Multi-cloud strategies aim to avoid vendor lock-in, increase redundancy and availability, and optimize costs by leveraging the strengths and services of different cloud providers.
* Organizations may choose to use specific providers for different services, such as storage, analytics, or machine learning.