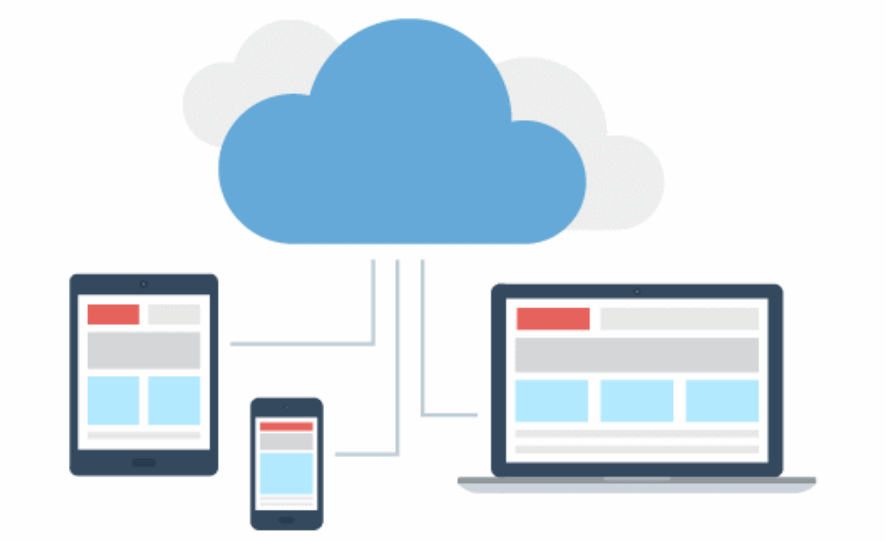
Faculty of Computer Applications &
Information Technology

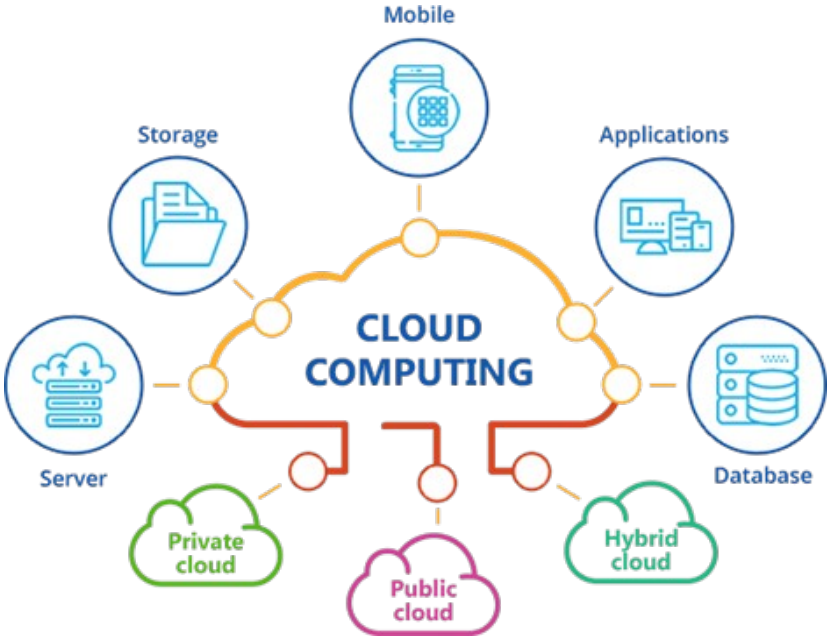
BCA Programme
Sem-V

210301503

INTRODUCTION TO CLOUD COMPUTING

Introduction to Cloud Computing



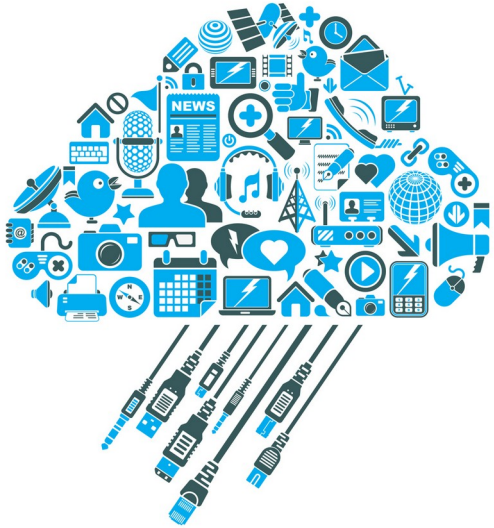


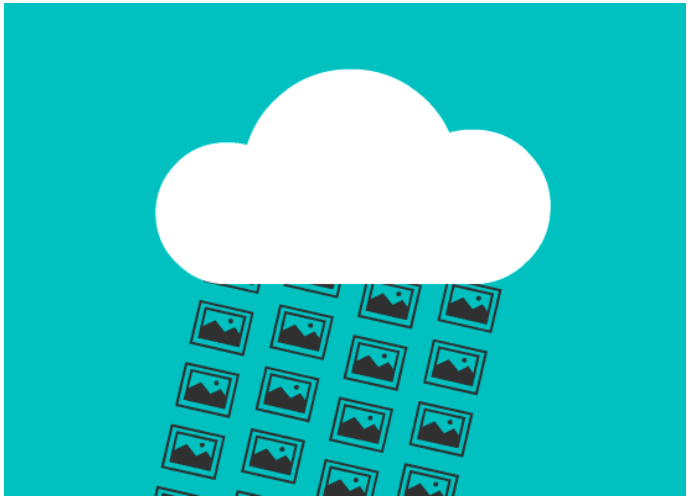
Introduction to Cloud Computing

- We have always been storing the programs and data that we need onto our computer's hard disk and accessing it whenever required.
- But now technology has taken over and the need to store everything on your physical hard disk is no longer there.
- Cloud Computing is the method of computing in which the data and programs are stored over the Internet and not on your hard disk.
- The Internet is referred to as the Cloud in '**Cloud Computing**'.

Cloud Computing Basics

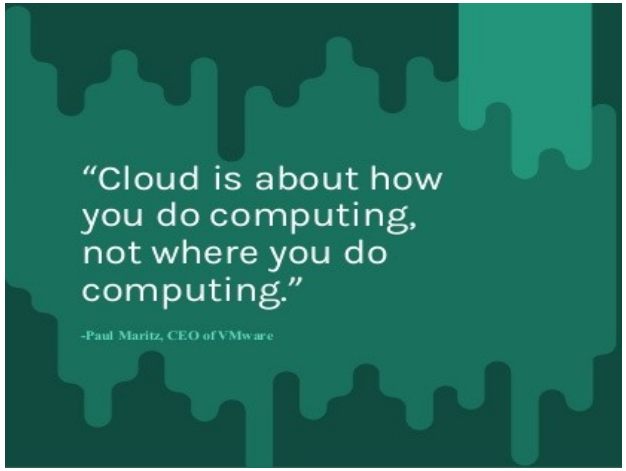
- Cloud Computing provides us a means by which we can access the applications as utilities, over the Internet.
- It allows us to create, configure, and customize applications online.

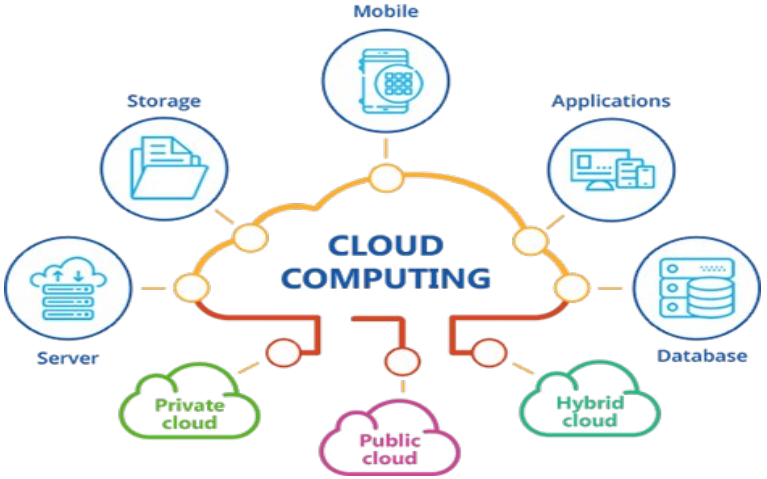




Cloud Computing Basics

- In simple terms, Cloud computing is the delivery of on-demand computing services -- from applications to storage and processing power -- typically over the internet and on a pay-as-you-go basis.





Cloud Computing Basics

Examples:

- Google docs
- Drop box
- Icloud
- Youtube
- Amazon webservices
- Hubspot
- IBM Cloud
- Office 365
- Microsoft Azure

History of Cloud Computing

- Before Computing was come into existence, **client Server Architecture** was used where all the data and control of client resides in Server side.

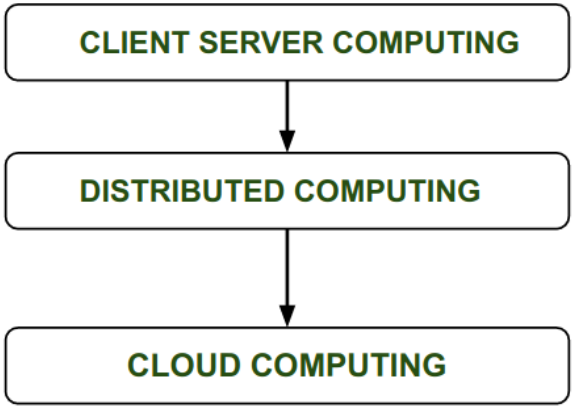
- If a single user want to access some data, firstly user need to connect to the server and after that user will get appropriate access.

- But it has many disadvantages. So, After Client Server computing, Distributed Computing was come into existence, in this type of computing all computers are networked together with the help of this, user can share their resources when needed.

History of Cloud Computing

- It also has certain limitations.
- So in order to remove limitations faced in distributed system, cloud computing was emerged.

History of Cloud Computing



- During 1961, John MacCharty delivered his speech at MIT that “Computing Can be sold as a Utility, like Water and Electricity.” According to John MacCharty it was a brilliant idea.
- But people at that time don’t want to adopt this technology.

History of Cloud Computing

- They thought the technology they are using efficient enough for them. So, this concept of computing was not appreciated much so and very less will research on it.
- But as the time fleet the technology caught the idea after few years this idea is implemented. So, this is implemented by Salesforce.com in 1999.
- This company started delivering an enterprise application over the internet and this way the boom of Cloud Computing was started.
- In 2002, Amazon started Amazon Web Services (AWS), Amazon will provide storage, computation over the internet. In 2006 Amazon will launch Elastic Compute Cloud Commercial Service which is open for Everybody to use.

History of Cloud Computing

- After that in 2009, Google Play also started providing Cloud Computing Enterprise Application as other companies will see the emergence of cloud Computing they also started providing their cloud services.

- In 2009, Microsoft launch Microsoft Azure and after that other companies like Alibaba, IBM, Oracle, HP also introduces their Cloud Services. In today the Cloud Computing become very popular and important skill.

Advantages of Cloud Computing

- It is easier to get backup in cloud.
- It allows us easy and quick access stored information anywhere and anytime.
- It allows us to access data via mobile.
- It reduces both hardware ad Software cost, and it is easily maintainable.
- One of the biggest advantage of Cloud Computing is Database Security.

Disadvantages of Cloud Computing

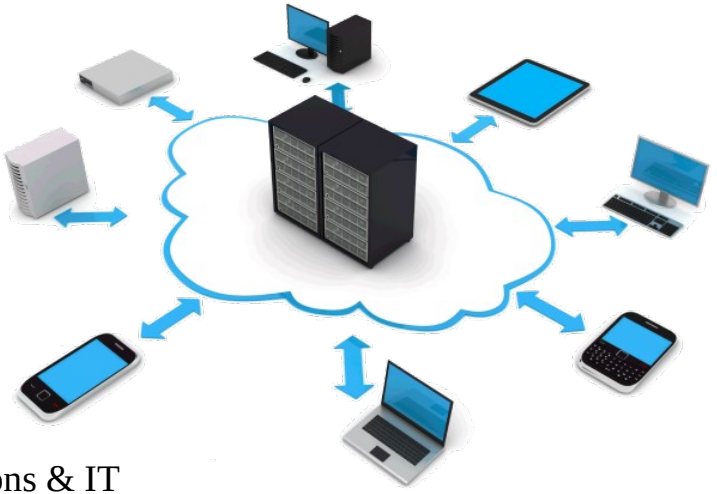
- It requires good internet connection.
- User have limited control on the data.

Keywords

- What is Cloud?
- **C**ommon, **L**ocation **I**ndependent **O**nline **U**tility available on **D**emand
- The term Cloud refers to a Network or Internet.
- In other words, we can say that Cloud is something, which is present at remote location.
- Cloud can provide services over network, i.e., on public networks or on private networks, i.e., WAN, LAN or VPN.
- Applications such as e- mail, web conferencing, customer relationship management (CRM),all run in cloud.

Keywords

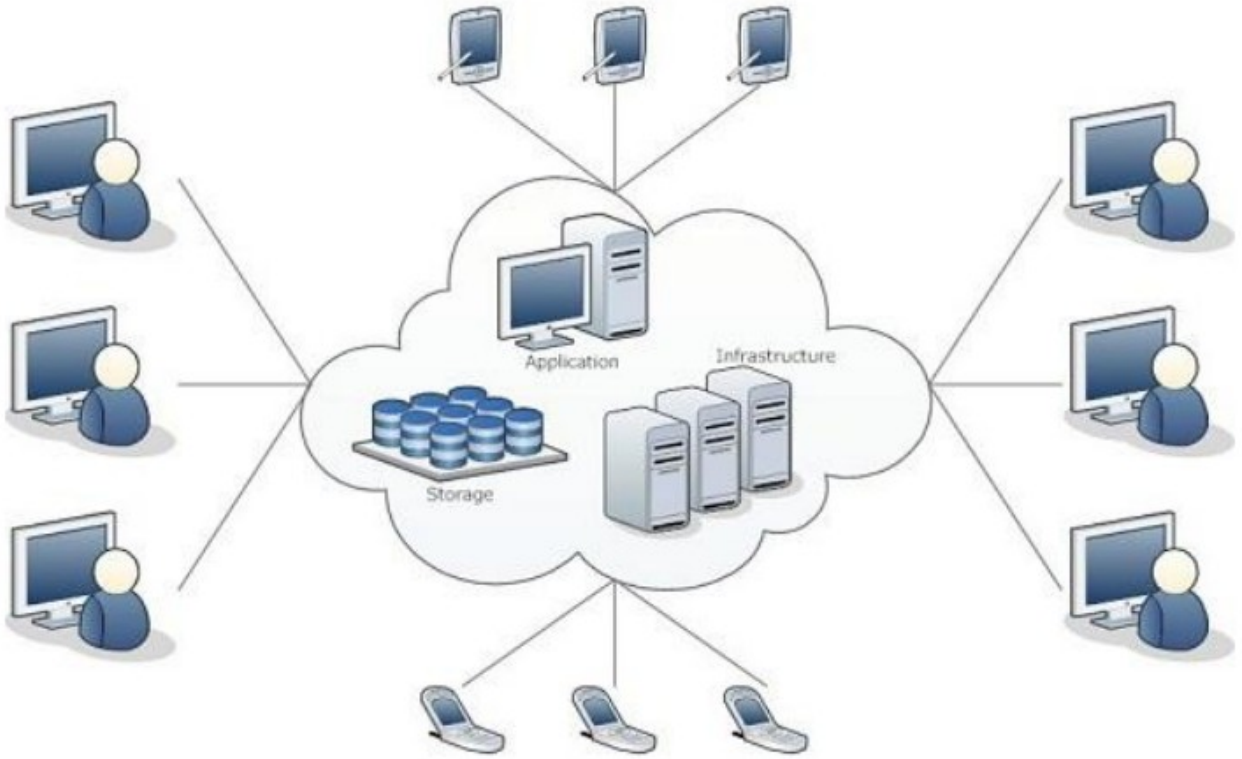
- Cloud Computing refers to manipulating, configuring, and accessing the applications online. It offers online data storage, infrastructure and application.



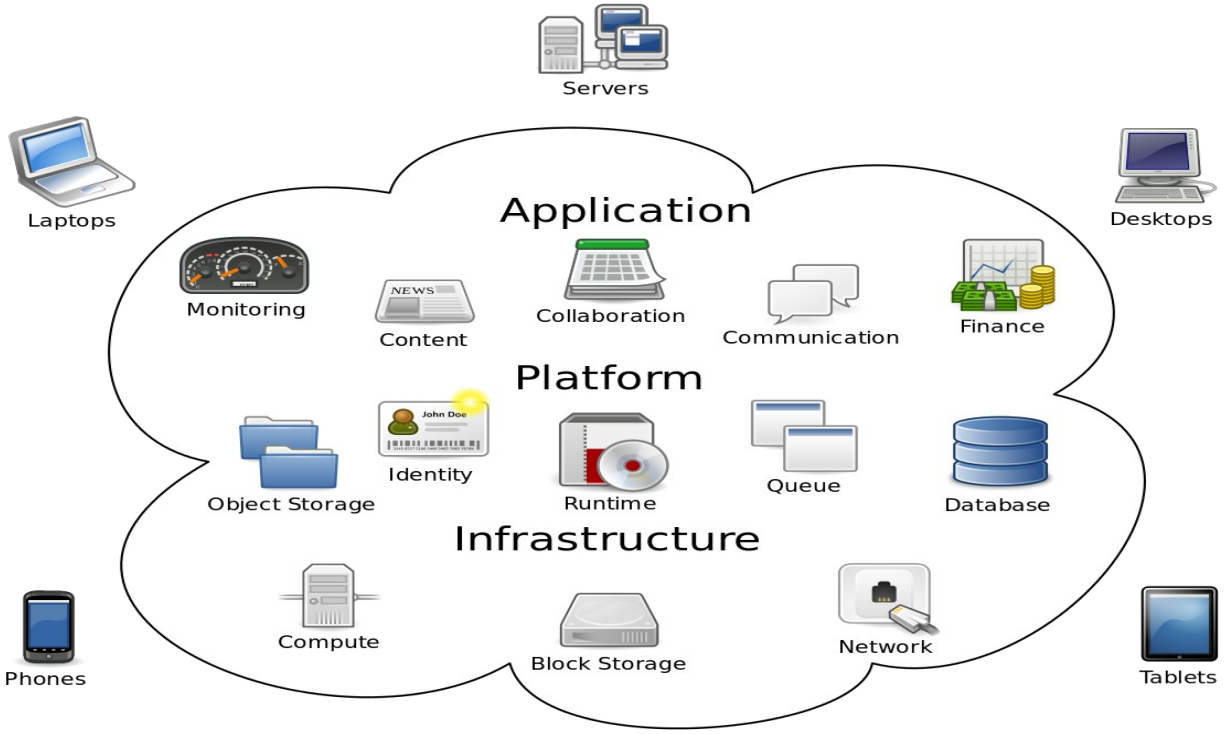
Cloud Computing Uses

- These 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 Uses



Cloud Computing Uses



Cloud computing

Cloud Service Providers

1. Amazon Web Services (AWS): AWS provides a comprehensive cloud computing platform for businesses, including storage, computing, and analytics services.
2. Microsoft Azure: Azure offers a range of cloud computing services, including virtual machines, storage, and artificial intelligence.
3. Google Cloud Platform (GCP): GCP provides a suite of cloud computing services, including computing, storage, and machine learning.
4. Salesforce: Salesforce is a cloud-based customer relationship management (CRM) platform that enables businesses to manage sales, marketing, and customer service.
5. Dropbox: Dropbox is a cloud-based file sharing and storage platform that enables individuals and businesses to store and access files from anywhere.

Industry Examples of Cloud Service

1. Healthcare: Cloud computing enables healthcare organizations to store and analyze large amounts of medical data, improving patient outcomes and reducing costs.
2. Finance: Cloud computing enables financial institutions to process transactions, manage risk, and comply with regulations more efficiently.
3. Retail: Cloud computing enables retailers to manage inventory, process transactions, and analyze customer data in real-time.
4. Manufacturing: Cloud computing enables manufacturers to optimize production, manage supply chains, and analyze equipment performance in real-time.
5. Education: Cloud computing enables educational institutions to provide online learning platforms, virtual 5. Education: classrooms, and access to digital resources.

Importance of CC in current era

Examples:

- Remote Work and Collaboration
- E-commerce Platforms
- Healthcare and Telemedicine
- Streaming Services
- Disaster Recovery and Backup

Scenario

- According to Forbes, 83% of IT enterprise workload will be exerted over cloud computing by 2020.
- As per the latest Gartner report, the cloud tech services market is projected to grow 17.3% ($206 billion) in 2019, up from $175.8 billion in 2018 and by 2022, 90% of organizations will be using cloud services.
- In November 2023, Gartner published a forecast estimating that global end-user spending on public cloud services in 2024 will reach $679 billion, up from $564 billion in 2023. IaaS is expected to grow the most, with a spending increasing of 26.6% in 2024, while PaaS should grow by 21.5%

Reasons for Server crash

- Low storage capacity
- Single server
- Leaking of information
- Network Overload

Solution

- Add additional servers to balance the load
- FB has more than 120000 servers and is increasing its capacity on daily basics.
- Google servers to be unbelievable numbers: more than 1 Million across the world

Characteristics of Cloud Computing

- Dynamic Computing Infrastructure
- IT Service-centric Approach
- Self-Service-based Usage Model
- Minimally or Self-managed Platform
- Consumption-based Billing

Dynamic Computing Environment

- Cloud computing provides a flexible and scalable infrastructure that can automatically adjust resources such as CPU, memory, storage, and bandwidth based on current demand.
- Resources are provisioned and de-provisioned dynamically, often in real-time.
- Enables organizations to handle variable workloads efficiently.
- Supports rapid deployment and scaling of applications without the need for manual intervention.

IT Service-centric Approach Environment

- Instead of managing hardware and software components individually, cloud computing emphasizes delivering IT services as manageable units.
- Focuses on providing services like storage, computing power, databases, etc., as services.
- Users can consume these services without worrying about underlying infrastructure details.
- Promotes service-oriented architecture (SOA) that enables interoperability and integration.

Self Service based Usage Model

- Cloud platforms allow users to provision, configure, and manage resources on their own without human intervention from the service provider.
- Users can request and control resources via web portals or APIs.
- Empowers developers and IT teams to rapidly deploy applications.
- Reduces dependency on IT departments for resource provisioning.

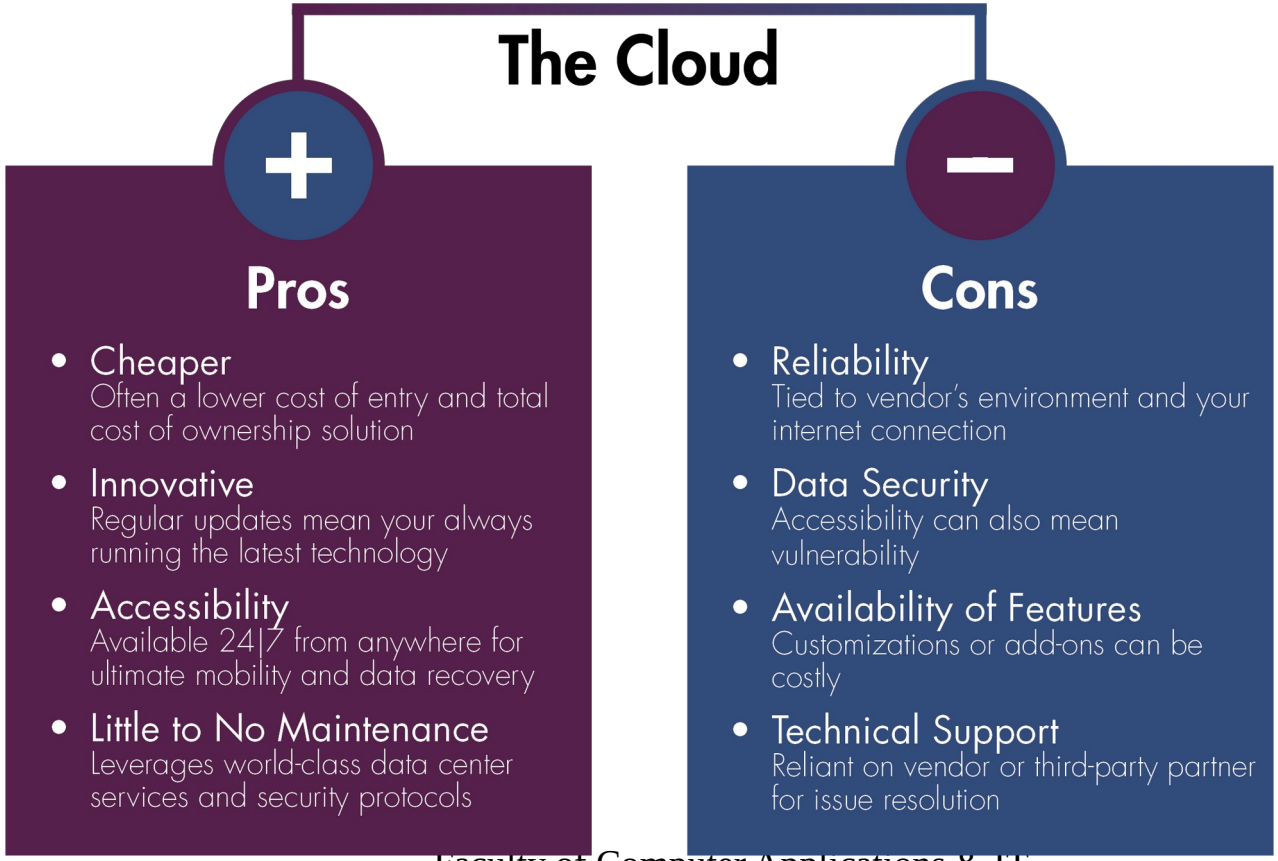
Minimally or Self managed Platform

- Cloud providers offer managed platforms that require minimal user intervention for maintenance, updates, and security.
- Infrastructure maintenance, security patches, and updates are handled by the cloud provider.
- Users focus on deploying and managing their applications rather than underlying hardware or OS.
- Supports Platform as a Service (PaaS) models where the platform is managed for the user.

Consumption based billing

- Cloud services are billed based on actual usage rather than fixed upfront costs.
- Users pay only for the resources they consume (e.g., compute hours, storage space, data transfer).
- Enables cost efficiency and better resource management.
- Supports variable workloads and helps organizations optimize their IT budgets.

PROS AND CONS OF CLOUD COMPUTING



Advantages of CC in IT Field

- **Cost Reduction:** minimize the financial endeavour in hardware
- **Back-up and restore data:**data is stored in the cloud, it is easier to get back-up and restore that data using the cloud
- **Scalability** : as the business grows put up by adding server
- **Levels the playing field:** sharing IT resource with other reduces the cost of software licensing

Advantages of CC in IT Field

- **Affordable**: reduce the operational costs
- **Efficiency :**divided hardware, automated and recognizable technologies.
- **Data Security:**Cloud offers many advanced security features that guarantee that data is securely stored and handled.
- **Mobility:**Cloud computing allows mobile access to corporate data via smartphones and devices.

Disadvantages of CC in IT Field

- Security and Privacy Concerns
- Dependence on Internet Connectivity
- Potential for Cost Overruns
- Limited Control and Flexibility

Security and Privacy Concerns

- Storing sensitive data on third-party cloud servers raises concerns about data breaches, unauthorized access, and loss of privacy.
- Cloud providers implement security measures, but ultimate responsibility often lies with the user.
- Data may be vulnerable during transmission or if the provider's security is compromised.
- Regulatory compliance (e.g., GDPR, HIPAA) can be challenging.

Dependence on Internet Connectivity

- Cloud services rely heavily on internet access; any disruption in connectivity can hinder access to resources.
- Downtime or slow internet can impact productivity.
- Remote locations or areas with poor connectivity face challenges.

Potential for Cost Overruns

- While cloud offers pay-as-you-go models, improper management can lead to unexpectedly high costs.
- Unoptimized resource usage, such as over-provisioning.
- Hidden costs related to data transfer, storage, or scaling.
- Difficulties in forecasting expenses.

Limited Control and Flexibility

- Using cloud services means relying on the provider's infrastructure and policies, which can limit customization.
- Users may not have access to underlying hardware or specific configurations.
- Certain services or configurations may be restricted.