Continue to intro

Cloud Computing

Cloud computing: is the delivery of computing services over the Internet. Cloud services allow individuals to use software and hardware that are managed by third parties at remote locations.

Cloud Computing refers to **controlling** and **accessing** the applications online. It offers online data storage, infrastructure and application.

Cloud computing attributes

1-Shared resources:

Cloud computing resources are shared (i.e., multiple users use the same resource) at the network level.

2- Massive scalability

Cloud computing provides the ability to scale to tens of thousands of systems, as well as the ability to scale bandwidth and storage space.

3- Elasticity

Users can increase and decrease their computing resources as needed and release resources for other uses when they are no longer required.

Benefits of cloud computing:

1- Scalability: Rather than having to buy, install, and configure new equipment, you can buy additional CPU cycles or storage from a third party. As you require more capacity, the service provider can make scalability much simpler and without cost.

2- Simplicity: The cloud solution makes possible to get your application started immediately, and it costs a fraction of what it would cost to implement an on-site solution.

3-Security: There are plenty of security risks when using a cloud vendor, but reputable companies strive to keep you safe and secure.

4- Access to resources: The greatest advantage of cloud computing is the access it provides to the processing power of multiple remote computers.

5- Mobility: Customers can access the services from almost any location in the world because the services are web-based. This can enable employees to access important business tools while they are on the move.

6- Maintenance and Support: The supplier will usually offer ongoing support services. The supplier can handle backups, updates and upgrades automatically and remotely without visiting a customer's site.

Limitations of cloud computing:

1- Your Sensitive Information: We've talked about the concern of storing sensitive information on the cloud, but it can't be understated. Once data leaves your hands and lands in the lap of a service provider, you've lost a layer of control.

2- Applications Not Ready: In some cases the applications themselves are not ready to be used on the cloud. They may have little quirks that prevent them from being used to their fullest abilities

3- Developing Your Own Applications: Developing your own applications can certainly be a problem if you don't know how to program, or if you don't have programmers on staff. In such a case, you'll have to hire a software company (or developer).

Security Benefits:

1- Centralized Data

There are some good security traits that come with centralizing your data. Just in practice, you make your system more inherently secure.

2- Reduced Data Loss

If a computer can be effectively compromised, the information will be in the hands of the thief. By maintaining data on the cloud, cloud computing can limit the amount of information that could potentially be lost.

Cloud computing services

Cloud computing services goes by the acronym "SPI.". This acronym (SPI) stands for the three major services provided through the cloud**:**

1- **Software-as-a-service (SaaS)**
2- **Platform-as-a-service (PaaS)**
3- **Infrastructure-as-a-service (IaaS)**

Software-as-a-Service model(SaaS)

- SaaS: allows using software applications as a service to end users. Such as Google Docs. Benefits of a SaaS model include the following:

1. SaaS enables the user to outsource the hosting and management of applications to a third party.
2. SaaS enables software vendors to control and limit use (copying and distribution, and facilitates the control of all derivative versions of their software.
3. Applications delivery using the SaaS model typically uses the one-to-many delivery approach.
4. A typical SaaS deployment does not require any hardware and can run over the existing Internet access infrastructure.

Platform-as-a-Service model(PaaS)

- PaaS provides the runtime environment for applications, development & deployment tools, etc**.**

Benefits

1. Lower administrative overhead
2. Lower total cost of ownership
3. Scalable solutions
4. More current system software

Infrastructure-as-a-Service (IaaS)

➢ **IaaS:** Provides access to fundamental resources such as physical machines, virtual machines, virtual storage, etc. A part from these resources, the IaaS also offers:

1. Virtual machine disk storage
2. Virtual local area network (VLANs)
3. Load balancers
4. IP addresses
5. Software bundles

benefits others of IaaS :

1. Full Control of the computing resources through Administrative Access to VMs.
2. Flexible and Efficient renting of Computer Hardware.
3. Portability, Interoperability with Legacy Applications.

Cloud Deployment Models

Cloud can have any of the four types of access:

1. Public
2. Private
3. Hybrid
4. Community.

Public Clouds

- Public clouds (or external clouds):-The Public Cloud allows systems and services to be easily accessible to the general public. e.g., Google, Amazon, Microsoft offers cloud services via Internet.
- A public cloud is hosted, operated, and managed by a third-party vendor from one or more data centers. The service is offered to multiple customers over a common infrastructure.
- Public cloud may be less secure because of its open source e.g., e-mail.

Benefits

1. Cost effective
2. Reliability
3. Flexibility
4. Location independence
5. High scalability

Disadvantages

1. Low security
2. Less customizable

Private clouds

Private clouds (internal clouds):- used to describe offerings that emulate cloud computing on private networks

There are types of private cloud patterns:

1. Dedicated: Private clouds hosted within a customer-owned data center or at a collocation facility.
2. Community: Private clouds located at the premises of a third party; owned, managed, and operated by a vendor.
3. Managed: Private cloud infrastructure owned by a customer and managed by a vendor

Benefits

1. Higher security and privacy
2. More control
3. Cost and energy efficiency

Disadvantages

1. Restricted area
2. Inflexible pricing
3. Limited scalability

Hybrid Clouds

A hybrid cloud environment consisting of multiple internal and/or external providers is a possible deployment for organizations.

Benefits

1. Scalability
2. Flexibility
3. Cost efficiencies
4. Security

Disadvantages

1. Networking issues
2. Security compliance
3. Infrastructural dependency