CE644 Cloud Computing and Applications

- *Private Cloud*: deployed by a **single organization for its personal use**. It is **not shared by other organizations**, and it is **not allowed for public use.**
- It is usually **on premise** but **can be outsourced** also.
- *Community Cloud:* which is an extension of the private cloud. Here, the **cloud is the same as the private cloud but is shared by several organizations**. The community cloud is established for a **common cause**.
- *Public Cloud:* This cloud allows **access from any place in the world and is open to the public**. This cloud is **biggest in size** among all other deployment models. The public cloud model is one of the **most popular** deployment models. The public cloud service provider **charges the users on an hourly basis** and serve the users according to the **service-level agreements (SLAs).**
- *Hybrid Cloud:* It consists of the **private and public clouds combined**. Several properties of the private cloud are used with the properties of the public cloud.

Community Cloud

- Definition: According to National Institute of Standards and Technology (NIST), community cloud can be defined as the cloud infrastructure that is provisioned for **exclusive use by a specific community of consumers from organizations that have shared concerns** (e.g., mission, security reqr, policy and compliance considerations). It may be **owned, managed, and operated by one or more organizationz in community, a third party, or some combination of them**, and it may exist **on or off premises**.
- It is extension of private cloud, here this cloud is shared between several organizations.

Characteristics:

1. Collaborative and distributive maintenance: It's wholly collaborative, usually no single party has full control over whole cloud. Distributive(better cooperation gives better results)
2. Partially Secure: Few organization share cloud, so chances of data leaked from one organization to other (though safe from outside world).
3. Cost Effective: Whole cloud is shared by several organizations or community. Responsibilities along with cost is shared and divided among groups.

Suitability (most suitable conditions and environment where this cloud model can be used):

- Want to establish a private cloud but have financial constraint.
- Do not want to complete maintenance responsibility of the cloud.
- Want to establish the cloud in order to collaborate with other cloud.
- Want to have collaborative cloud with more security features than the public cloud.

The community cloud platform is *not suitable* for the following:

- Prefer autonomy and control over the cloud.
- Doesn't want to collaborate with other organizations.

The community cloud can be classified into two types:

- *On-premise community cloud:* Cloud is **deployed within the premises** and is **maintained by the organizations themselves.**

- *Outsourced community cloud:* The cloud is outsourced to a third party. The third party is **responsible for maintenance and management of cloud.**

On-premise community cloud: Issues

- SLA: As more than one organization is involved, SLA has to be there to have fair play among the users of the cloud and among the organization themselves.
- Network: Each organization will have separate network and they will connect to the cloud. It is responsibility of each organization to take care of their own network. The service provider is not responsible for network issues
- Performance: In this type of deployment, more than one organization coordinate together and provide the services. It depends on maintenance and management team.
- Multitenancy: The cloud is meant for several organizations, the unprivileged access into inter organizational data may lead to several problems.

On-premise community cloud: Issues

- Location: The cloud is deployed at any one of organization or is maintained off site by any third party.
- Security and Privacy: Organizations should have complete trust on service provider
- Laws and Conflicts: This applies if organizations are located in different countries. AS they have to abide by rules of country in which infrastructure is present.
- Cloud Management: done by service provider. They have management team specifically for this cloud and responsible for operations.
- Cloud Maintenance: done by organizations collectively. The maintenance team collectively maintains all resources. It is responsible for continuous replacement of resources.

Outsourced community cloud: Issues

- SLA: SLA between organizations and service providers. Here it is stringent as it involves third party. THE SLA here is aimed at fair share of resources among the organizations. The service provider is not responsible for technical problems within organizations.
- Network: Issues are same but here the service provider is outsourced hence Each organization are responsible for their own network and service provider is responsible for cloud network.
- Performance: Depends on outsourced service provider. It is responsible for efficient services, except for network issue in client side.
- Security and Privacy: there issues as several organizations are involved, but in addition to that involvement of third party as service provider will create more issues as organizations have to completely rely on third party.
- Laws and Conflicts: Location of service provider. (outside country – conflict with data laws).
- Cloud Management: Done by service provider. The complexity of managing and maintenance increases with number of organizations in community.

Advantages of **Community cloud**

-It allows establishing a low cost private cloud

-It allows collaborative work on cloud

-It allows sharing of responsibilities among the organization

It has better security than public cloud

Disadvantages of **Community cloud**

-Autonomy of an organization is lost.

-Security features are not as good as private cloud.

-It is not suitable if there is no collaboration.

Hybrid Cloud

- Definition: According to National Institute of Standards and Technology (NIST), community cloud can be defined as the cloud infrastructure that is a combination of two or more distinct cloud infrastructures(private, community, public) that remain unique entities but are bound together by standardized or proprietary technology that enables data and application portability.
- It is combination of public and private cloud
- It is private cloud extended to public cloud.

Characteristics:

1. Scalable: Hybrid cloud is combination of one or more deployment model. We can use property of public cloud with private environment.
2. Partially Secure: Combination of public and private. Since public included there is risk of security breach.
3. Stringent SLAs: Combination of public and private. Since public included they are stringent.
4. Complex cloud management: Combination of public and private. More number of users.

Suitability (most suitable conditions and environment where this cloud model can be used):

- Organizations that want private cloud environment with the scalability of public cloud.
- Organizations that require more security than the public cloud.

The hybrid cloud platform is *not suitable* for the following:

- Organizations that consider security as prime objective
- Organizations that will not be able to handle hybrid cloud management.

Hybrid cloud: Issues

- SLA:
- Network:
- Performance:
- Multitenancy:
- Location:
- Security and Privacy:
- Laws and conflicts:
- Cloud maintenance:
- Cloud management:

Advantages of **hybrid cloud**

-It gives power of both private and public clouds

-It is highly scalable

-It provides better security than the public cloud

Disadvantages of **hybrid cloud**

-security features are not as good as public cloud.

-manging a hybrid cloud is complex

-It has stringent SLAs