

Cloud Computing

Prepared by Dr. Sherif Mostafa

IT381

Lecture 5



Cloud Deployment Models

Cloud Deployment Models

Public Cloud

Private Cloud

Hybrid Cloud

Community Cloud

Server Virtualization

Cloud Deployment Models

In cloud computing, we have access to a shared pool of computer resources (**servers**, **storage**, **programs**, and so on) in the cloud. You simply need to request additional resources when you require them. Getting resources up and running quickly is a breeze thanks to the clouds. It is possible to release resources that are no longer necessary. This method allows you to just pay for what you use. Your cloud provider is in charge of all upkeep.

Cloud Deployment Models

What is a Cloud Deployment Model?

Cloud Deployment Model functions as a virtual computing environment with a deployment architecture that varies depending on the amount of data you want to store and who has access to the infrastructure.

Types of Cloud Computing Deployment Models

The cloud deployment model identifies the specific type of cloud environment based on ownership, scale, and access, as well as the cloud's nature and purpose. The location of the servers you're utilizing and who controls them are defined by a cloud deployment model. It specifies how your cloud infrastructure will look, what you can change, and whether you will be given services or will have to create everything yourself. Relationships between the infrastructure and your users are also defined by cloud deployment types.

Types of Cloud Computing Deployment Models

Different types of cloud computing deployment models are described below.

- Public Cloud
- Private Cloud
- Hybrid Cloud
- Community Cloud
- Multi-Cloud

Types of Cloud Computing Deployment Models

Public Cloud

The public cloud makes it possible for anybody to access systems and services. The public cloud may be less secure as it is open to everyone.

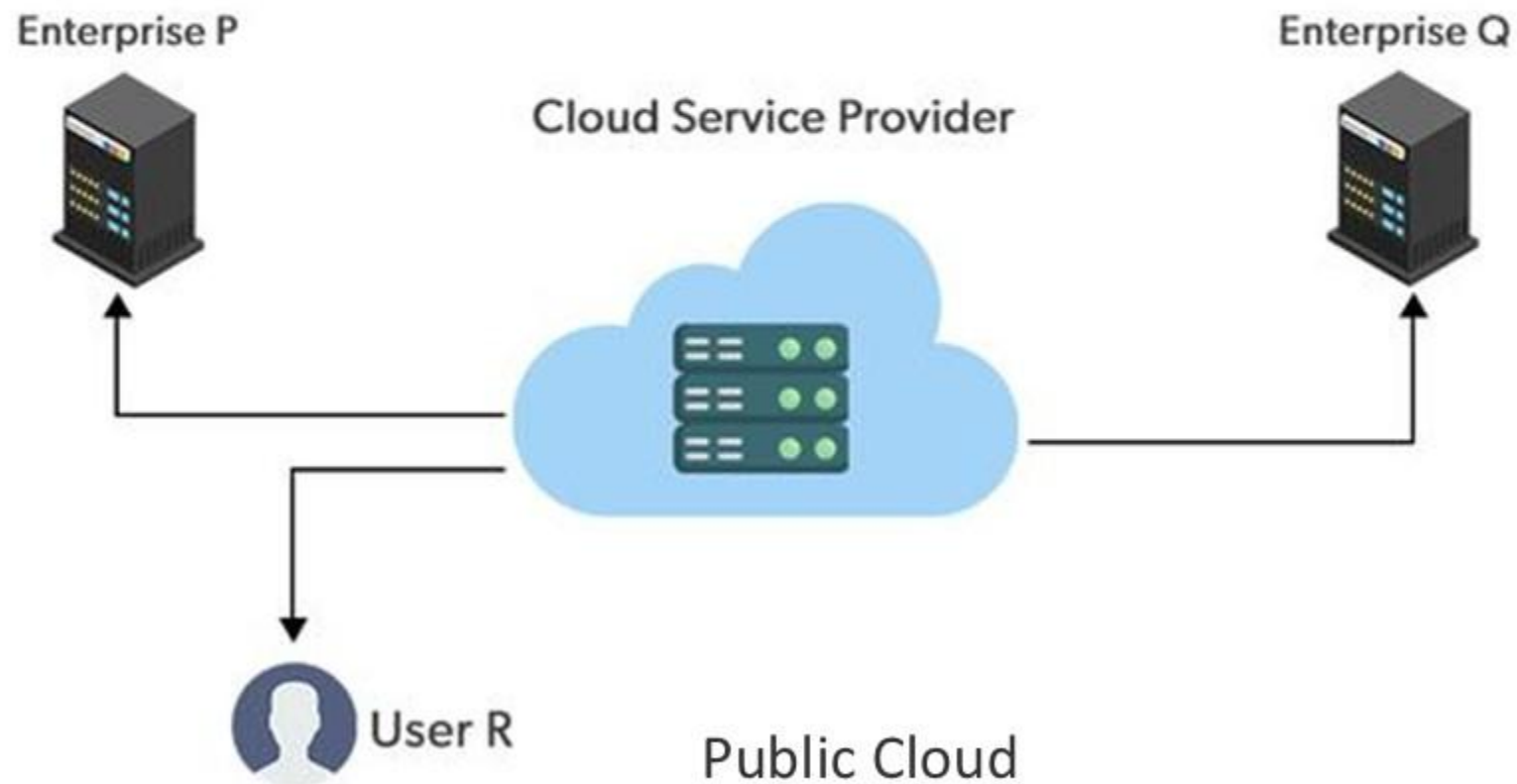
The public cloud is one in which cloud infrastructure services are provided over the internet to the general people or major industry groups. The infrastructure in this cloud model is owned by the entity that delivers the cloud services, not by the consumer.

Types of Cloud Computing Deployment Models

Public Cloud

It is a type of cloud hosting that allows customers and users to easily access systems and services. This form of cloud computing is an excellent example of cloud hosting, in which service providers supply services to a variety of customers. In this arrangement, storage backup and retrieval services are given for free, as a subscription, or on a per-user basis. For example, Google App Engine etc

Types of Cloud Computing Deployment Models



Types of Cloud Computing Deployment Models

Advantages of the Public Cloud Model

Minimal Investment: Because it is a pay-per-use service, there is no substantial upfront fee, making it excellent for enterprises that require immediate access to resources.

No setup cost: The entire infrastructure is fully subsidized by the cloud service providers, thus there is no need to set up any hardware.

Infrastructure Management is not required: Using the public cloud does not necessitate infrastructure management.

Types of Cloud Computing Deployment Models

Advantages of the Public Cloud Model

No maintenance: The maintenance work is done by the service provider (not users).

Dynamic Scalability: To fulfill your company's needs, on-demand resources are accessible.

Types of Cloud Computing Deployment Models

Disadvantages of the Public Cloud Model

Less secure: Public cloud is less secure as resources are public so there is no guarantee of high-level security.

Low customization: It is accessed by many public so it can't be customized according to personal requirements.

Types of Cloud Computing Deployment Models

Private Cloud

The private cloud deployment model is the exact opposite of the public cloud deployment model. It's a one-on-one environment for a single user (customer). There is no need to share your hardware with anyone else. The distinction between private and public clouds is in how you handle all of the hardware. It is also called the "internal cloud" & it refers to the ability to access systems and services within a given border or organization.

Types of Cloud Computing Deployment Models

Private Cloud

The cloud platform is implemented in a cloud-based secure environment that is protected by powerful firewalls and under the supervision of an organization's IT department. The private cloud gives greater flexibility of control over cloud resources.

Types of Cloud Computing Deployment Models

On premise Private cloud

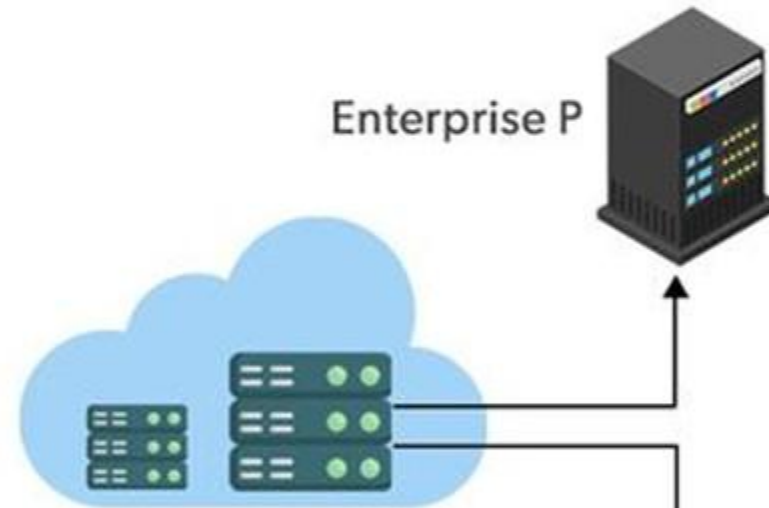
Enterprise P



Cloud Service Provider

Externally hosted Private cloud

Enterprise P



Cloud Service Provider

Dedicated for Enterprise P

Private Cloud

Types of Cloud Computing Deployment Models

Advantages of the Private Cloud Model

Better Control: You are the sole owner of the property. You gain complete command over service integration, IT operations, policies, and user behavior.

Data Security and Privacy: It's suitable for storing corporate information to which only authorized staff have access. By segmenting resources within the same infrastructure, improved access and security can be achieved.

Types of Cloud Computing Deployment Models

Advantages of the Private Cloud Model

Supports Legacy Systems: This approach is designed to work with legacy systems that are unable to access the public cloud.

Customization: Unlike a public cloud deployment, a private cloud allows a company to tailor its solution to meet its specific needs.

Types of Cloud Computing Deployment Models

Disadvantages of the Private Cloud Model

Less scalable: Private clouds are scaled within a certain range as there is less number of clients.

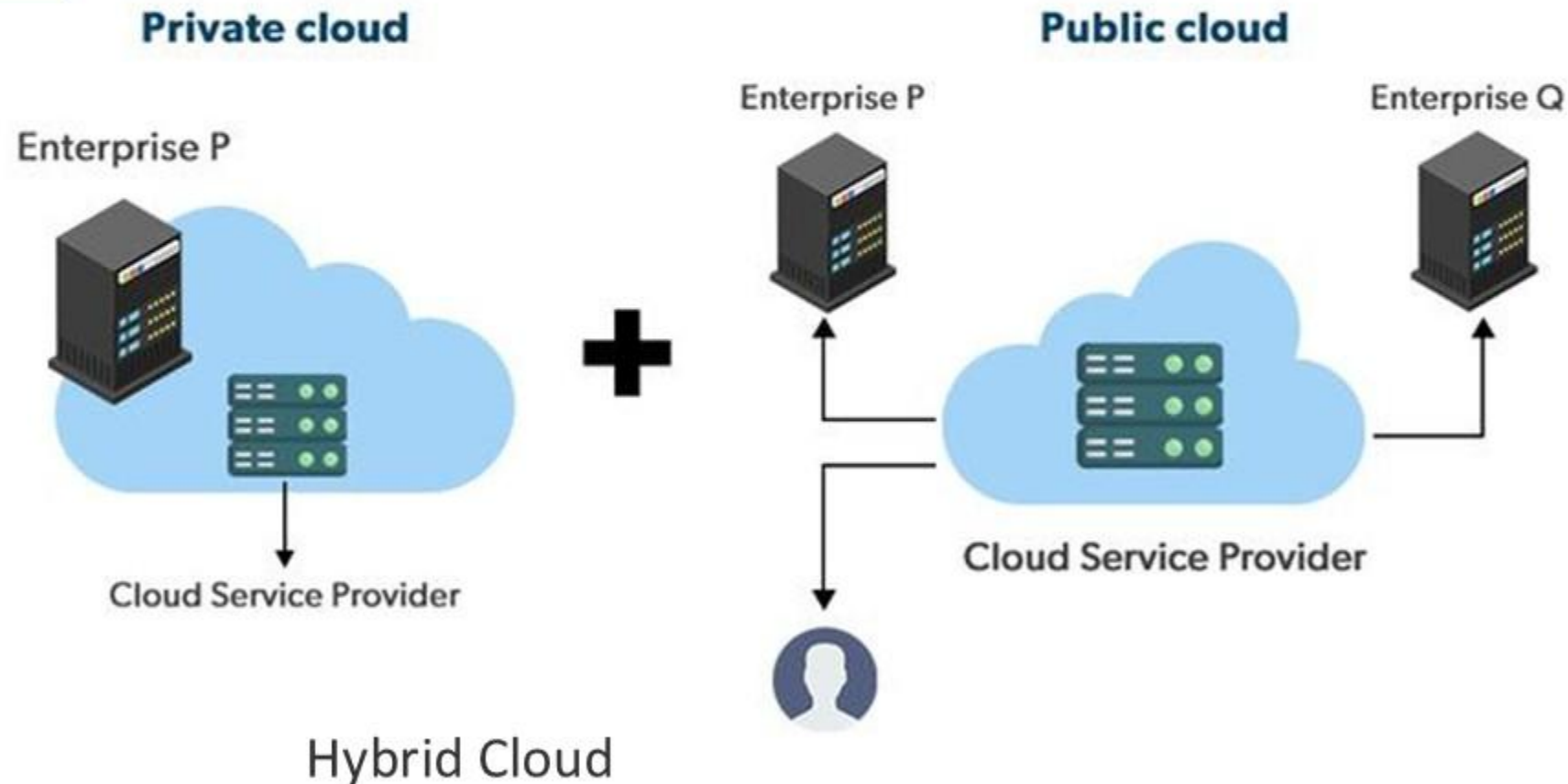
Costly: Private clouds are more costly as they provide personalized facilities.

Types of Cloud Computing Deployment Models

Hybrid Cloud

By bridging the public and private worlds with a layer of proprietary software, hybrid cloud computing gives the best of both worlds. With a hybrid solution, you may host the app in a safe environment while taking advantage of the public cloud's cost savings. Organizations can move data and applications between different clouds using a combination of two or more cloud deployment methods, depending on their needs.

Types of Cloud Computing Deployment Models



Types of Cloud Computing Deployment Models

Advantages of the Hybrid Cloud Model

Flexibility and control: Businesses with more flexibility can design personalized solutions that meet their particular needs.

Cost: Because public clouds provide scalability, you'll only be responsible for paying for the extra capacity if you require it.

Security: Because data is properly separated, the chances of data theft by attackers are considerably reduced.

Types of Cloud Computing Deployment Models

Disadvantages of the Hybrid Cloud Model

Difficult to manage: Hybrid clouds are difficult to manage as it is a combination of both public and private cloud. So, it is complex.

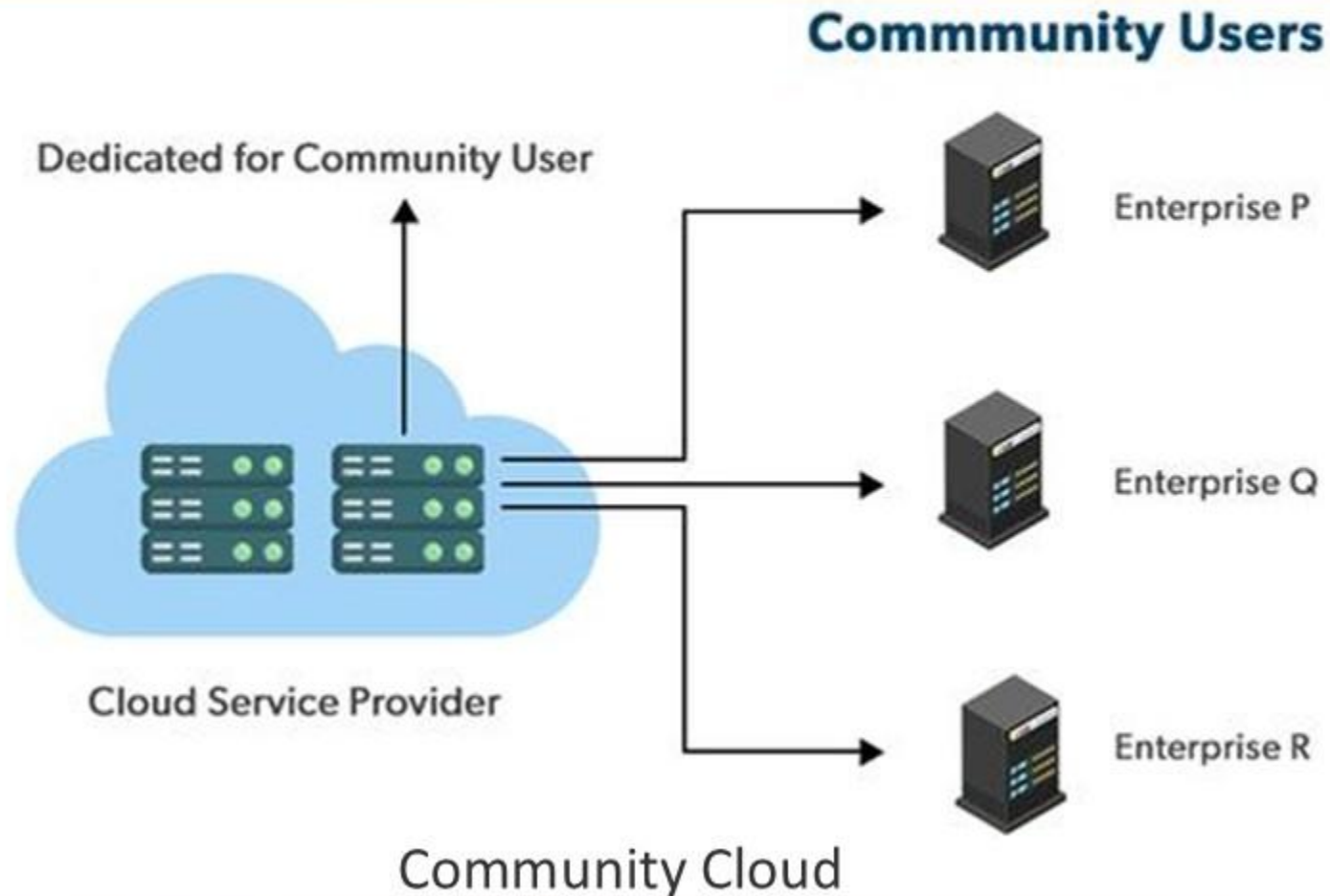
Slow data transmission: Data transmission in the hybrid cloud takes place through the public cloud so latency occurs.

Types of Cloud Computing Deployment Models

Community Cloud

It allows systems and services to be accessible by a group of organizations. It is a distributed system that is created by integrating the services of different clouds to address the specific needs of a community, industry, or business. The infrastructure of the community could be shared between the organization which has shared concerns or tasks. It is generally managed by a third party or by the combination of one or more organizations in the community.

Types of Cloud Computing Deployment Models



Types of Cloud Computing Deployment Models

Advantages of the Community Cloud Model

Cost Effective: It is cost-effective because the cloud is shared by multiple organizations or communities.

Security: Community cloud provides better security.

Shared resources: It allows you to share resources, infrastructure, etc. with multiple organizations.

Collaboration and data sharing: It is suitable for both collaboration and data sharing.

Types of Cloud Computing Deployment Models

Disadvantages of the Community Cloud Model

Limited Scalability: Community cloud is relatively less scalable as many organizations share the same resources according to their collaborative interests.

Rigid in customization: As the data and resources are shared among different organizations according to their mutual interests if an organization wants some changes according to their needs they cannot do so because it will have an impact on other organizations.

Types of Cloud Computing Deployment Models

Multi-Cloud

We're talking about employing multiple cloud providers at the same time under this paradigm, as the name implies. It's similar to the hybrid cloud deployment approach, which combines public and private cloud resources. Instead of merging private and public clouds, multi-cloud uses many public clouds. Although public cloud providers provide numerous tools to improve the reliability of their services, mishaps still occur. It's quite rare that two distinct clouds would have an incident at the same moment. As a result, multi-cloud deployment improves the high availability of your services even more.

Types of Cloud Computing Deployment Models



Multi-Cloud

Types of Cloud Computing Deployment Models

Advantages of the Multi-Cloud Model

You can mix and match the best features of each cloud provider's services to suit the demands of your apps, workloads, and business by choosing different cloud providers.

Reduced Latency: To reduce latency and improve user experience, you can choose cloud regions and zones that are close to your clients.

High availability of service: It's quite rare that two distinct clouds would have an incident at the same moment. So, the multi-cloud deployment improves the high availability of your services.

Disadvantages of the Multi-Cloud Model

Complex: The combination of many clouds makes the system complex, and bottlenecks may occur.

Security issue: Due to the complex structure, there may be loopholes to which a hacker can take advantage, hence, makes the data insecure.

What is the Right Choice for Cloud Deployment Model?

As of now, no such approach fits picking a cloud deployment model. We will always consider the best cloud deployment model as per our requirements. Here are some factors which should be considered before choosing the best deployment model.

Cost: Cost is an important factor for the cloud deployment model as it tells how much amount you want to pay for these things.

Scalability: Scalability tells about the current activity status and how much we can scale it.

What is the Right Choice for Cloud Deployment Model?

Easy to use: It tells how much your resources are trained and how easily can you manage these models.

Compliance: Compliance talks about the laws and regulations which impact the implementation of the model.

Privacy: Privacy talks about what data you gather for the model

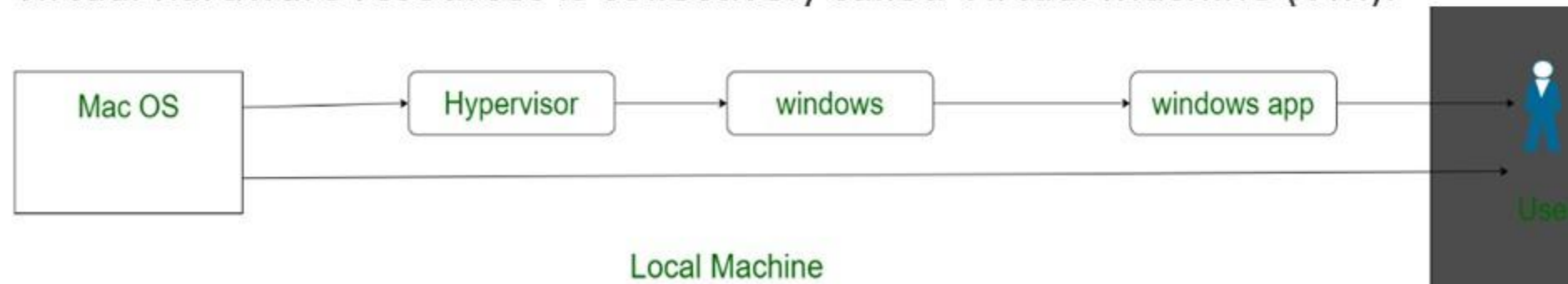
Each model has some advantages and some disadvantages, and the selection of the best is only done on the basis of your requirement. If your requirement changes, you can switch to any other model.

Analysis of Cloud Deployment Models

Factors	Public Cloud	Private Cloud	Community Cloud	Hybrid Cloud
Initial Setup	Easy	Complex, requires a professional team to setup	Complex, requires a professional team to setup	Complex, requires a professional team to setup
Scalability and Flexibility	High	High	Fixed	High
Cost-Comparison	Cost-Effective	Costly	Distributed cost among members	Between public and private cloud
Reliability	Low	Low	High	High
Data Security	Low	High	High	High
Data Privacy	Low	High	High	High

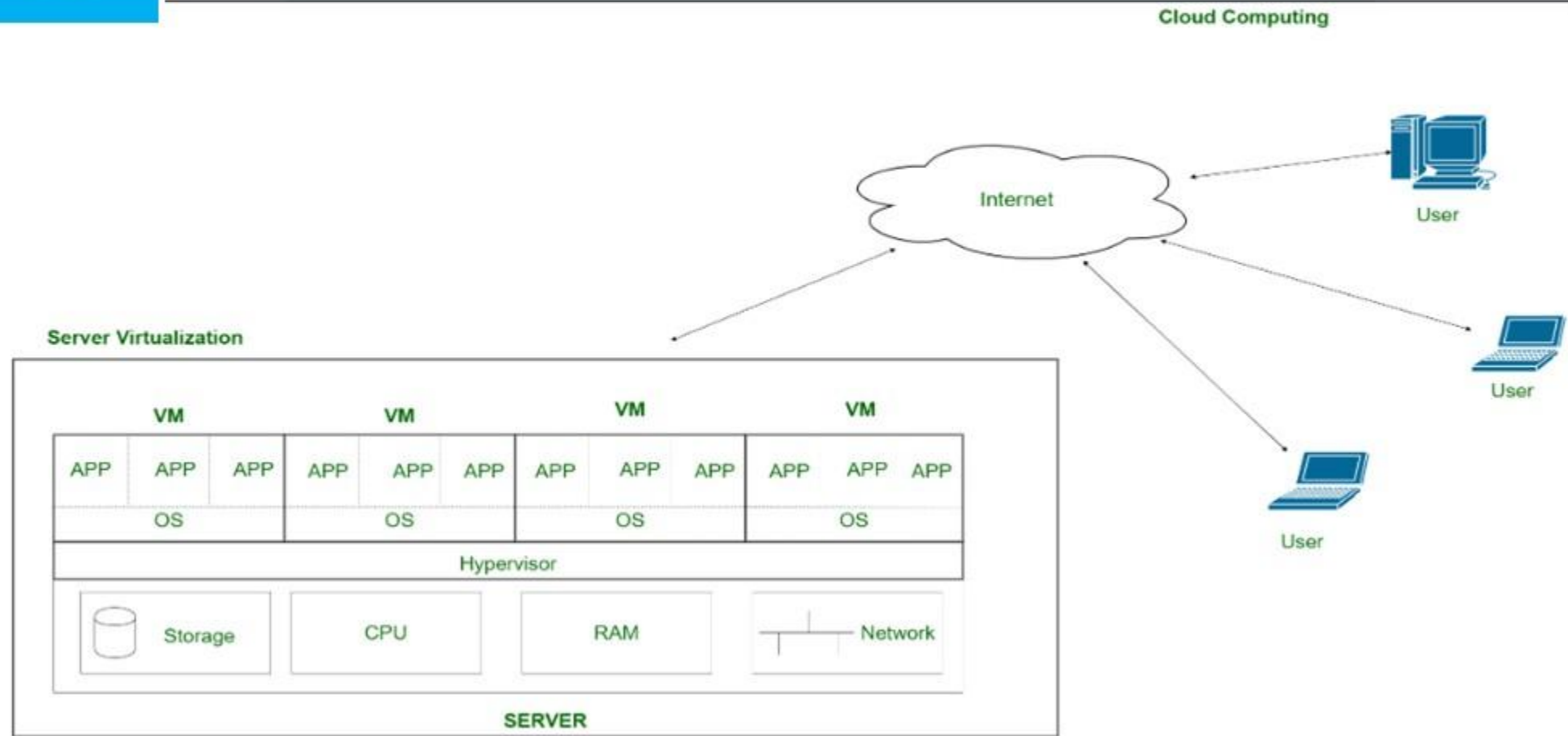
Server Virtualization is most important part of Cloud Computing. So, Talking about Cloud Computing, it is composed of two words, cloud and computing. Cloud means Internet and computing means to solve problems with help of computers. Computing is related to CPU & RAM in digital world. Now Consider situation, You are using Mac OS on your machine but particular application for your project can be operated only on Windows. You can either buy new machine running windows or create virtual environment in which windows can be installed and used.

Second option is better because of less cost and easy implementation. This scenario is called Virtualization. In it, virtual CPU, RAM, NIC and other resources are provided to OS which it needed to run. This resources is virtually provided and controlled by an application called Hypervisor. The new OS running on virtual hardware resources is collectively called Virtual Machine (VM).



Server Virtualization

Now migrate this concept to data centers where lot of servers (machines with fast CPU, large RAM and enormous storage) are available. Enterprise owning data center provide resources requested by customers as per their need. Data centers have all resources and on user request, particular amount of CPU, RAM, NIC and storage with preferred OS is provided to users. This concept of virtualization in which services are requested and provided over Internet is called Server Virtualization.



Server Virtualization

To implement Server Virtualization, hypervisor is installed on server which manages and allocates host hardware requirements to each virtual machine. This hypervisor sits over server hardware and regulates resources of each VM. A user can increase or decrease resources or can delete entire VM as per his/her need. This servers with VM created on them is called server virtualization and concept of controlling this VM by users through internet is called Cloud Computing.

Advantages of Server Virtualization:

- Each server in server virtualization can be restarted separately without affecting the operation of other virtual servers.
- Server virtualization lowers the cost of hardware by dividing a single server into several virtual private servers.
- One of the major benefits of server virtualization is disaster recovery. In server virtualization, data may be stored and retrieved from any location and moved rapidly and simply from one server to another.
- It enables users to keep their private information in the data centers.

Disadvantages of Server Virtualization:

- The major drawback of server virtualization is that all websites that are hosted by the server will cease to exist if the server goes offline.
- The effectiveness of virtualized environments cannot be measured.
- It consumes a significant amount of RAM.
- Setting it up and keeping it up are challenging.
- Virtualization is not supported for many essential databases and apps.



Thank You