Module 01: Cloud Computing Overview

AWS Community Builder Directory:

AWS Community Builders Directory | Worldwide Cloud Community

The AWS Community Builders directory allows the general public to see Community Builders who have opted to be included in this directory. This is not a full list of all Community Builders.

https://aws.amazon.com/developer/community/community-builders/community-builders-directory/?cb-cards.sort-by=item.additionalFields.cbName&cb-cards.sort-order=asc&awsf.builder-category=*all&awsf.location=*all&awsf.year=*all

What is Cloud Computing?

Cloud computing means storing and accessing data and programs over the internet instead of your computer’s hard drive.

NIST (National Institute of Standard on Technology) definition of cloud computing: Cloud computing is a model for enabling **ubiquitous**, **convenient**, **on-demand** network access to a **shared pool of configurable computing resources** (e.g., networks, servers, storage, applications, and services) that can be **rapidly provisioned** and **released** with **minimal management effort or service provider interaction**.

- *Ubiquitous* : Services or anything offered over the cloud are accessible from anywhere.
- *Convenience*: Stop and start the service when we want based on our requirement.
- *Configurable Resources*: Storage is shared across multiple users (dedicated storage can also be requested)
- Rapidly *Provision* and Released: Can be created quickly and released.
- *Minimal management effort or service provider interaction*: To perform server EC2 upgradation, down-gradation, or delete, we need not contact AWS. AWS is a self managed portal.

Pay-as-you-go: pay for the resources you are actually using. Example: You used a server for 1 hour in a day, we pay only 1 hour cost.

Essential Characteristics/Advantages of Cloud Computing

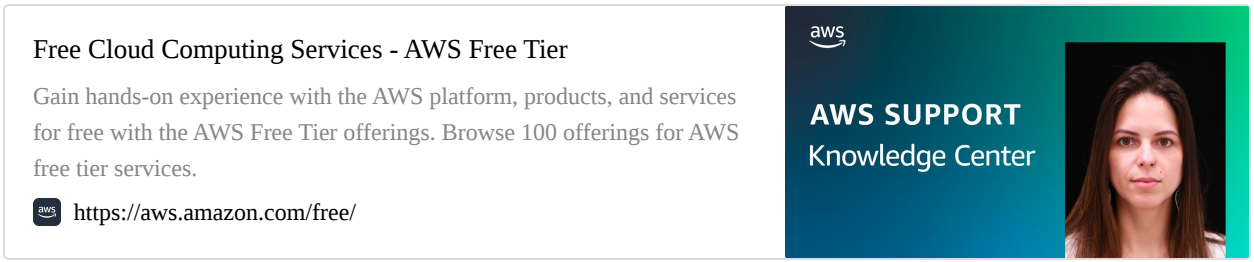
1. **On-demand Self-Service**: You can choose what service you want to use. You will get charged for the resources that you are actually using. You do not have to depend on service provider to get these things done.
2. **Broad network access & high availability**: Cloud service providers has infra almost across the globe. Instead of spending time and building our own infra, we can use this cloud Example: I want to deliver a webpage for everyone across the globe. We need to design a UI, Server → web servers like IIS, nginx, or apache, domain & IP, database, network etc., and have servers across many countries - India, USA, SA, AUS etc., because users in other countries may raise complaints of slow website due to **latency** because of geographical location/distance when server is only placed in India.
3. **Resource pooling**: You can use cloud **shared tenancy** mechanism to save cost. Underlying resources are shared with multiple customers. Example: Multiple customers servers, databases, etc., runs on same hardware.

   Some customers/clients may raise some concerns that they do not want to share the resource then we can go with **dedicated tenancy** as well but cost would increase. With shared tenancy, cost would be reduced.
4. **Rapid elasticity**: We can easily upgrade or downgrade the resources based on our requirement. It won't take much time to perform.

Example: We can launch server with very small configuration, if required we can upgrade same server to very high configuration. No need to spend lot of time. No need to worry about hardware dependencies. If its a physical laptop, there is a problem to install 32GB or 64GB drive due to hardware incompatibility. Purchasing the drive might take a day or two from the store.

5. **Measured services**: Whatever you use, the usage will be measured. It could be per GB/month, GB/hour, GB/sec etc.,) For example: SNS (send notification) - You will be charged based on the number of requests. Some metrics will be defined. Based on that metric, you will be charged.

Free Tier AWS Services:



Deployment Models in Cloud Computing

1. **Public Cloud:** This model is open for everyone. Anyone can create an account and start using.

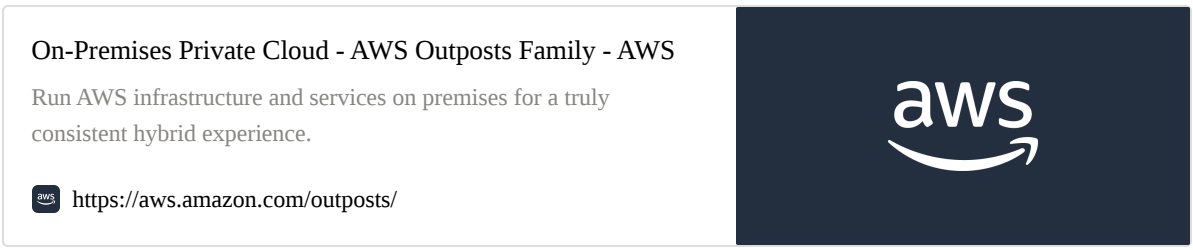
   Maintenance - In case of public cloud, when something happens to their infrastructure, service provider would be responsible for all the maintenance activities. Service providers can be Azure, GCP, AWS, etc.,

   Most of the organizations are using public and hybrid cloud.

2. **Private Cloud:** Not open for everyone, dedicated for only one organization. Only that organization uses or authorized users can use it. *Maintenance* - When something goes wrong with the infra, your team can fix it or take assistance from 3rd party.

   Example - ICICI data centers are designed and managed by Infosys (a 3rd party vendor with a contract). The data center is dedicated to ICICI. Also, we can get private cloud set up by AWS dedicated to ICICI which is called AWS Outposts.

   AWS Outposts is also a private cloud mechanism.



3. **Hybrid Cloud:** Combination of one or more cloud deployment models. It may be public + public (or) public + private.

   Example:

   a. We can have existing servers on-premise + creating new servers on AWS.

   b. Azure + AWS (it is possible to establish communication between Azure and AWS).To establish this hybrid communication , we can have site-to-site VPN connection, AWS Direct Connect.

4. **Community Cloud:** This model is not much used. Group of organizations build the infra together and only that group or organization use that infra. *Maintenance* - One of the organizations from the group or they can delegate to 3rd party.

   (This is similar to apartment complex that has a community! 🙂)

Service Models of Cloud Computing

1. **IaaS (Infrastructure as a Service):** No need to purchase any physical resources. Servers, networks, database, etc., resources are readily available. We can use those resources and deliver the application. We need to take care about OS level onwards like installation, data, etc., (More control provided to users, More effort needed to setup)

2. **PaaS (Platform as a Service):** To deliver an application, platform is already available. Moderate efforts is required. Our efforts is to design application only, not infra management or configuration management.
   Example: Amazon, Flipkart, Myntra, GitHub etc., They provide platform to sellers and buyers for products sale. People just register on the platform and use the platform to buy/sell products. Amazon takes care of processing the order. Seller just need to provide his data to Amazon.

3. **SaaS (Software as a Service):** Everything is already taken care by AWS. We just have to use it. Example: AWS Lightsail (https://aws.amazon.com/lightsail/), Email services (SNS),

Messaging Services (WhatsApp). (No efforts or very very less efforts, very less control provided for the users).

Traditional method (on-premise): Build everything from scratch, then deliver the application.