

UNIT- III

cloud platform Architecture:

- ⇒ cloud computing and service models
- ⇒ public cloud platforms
- ⇒ Service oriented Architecture.
- ⇒ Programming on Amazon AWS and Microsoft Azure.

Cloud computing and service models:-

⇒ Cloud computing can be defined as the practice of using a network of remote servers hosted on the Internet to store, manage, and process data.

Types of cloud computing:-

Most cloud computing services fall into five broad categories.

1. Software as a Service (SaaS)
2. Platform as a Service (PaaS)
3. Infrastructure as a Service (IaaS)
4. Anything/ Everything as a Service (XaaS)
5. Function as a Service (FaaS)

1. Software as a Service (SaaS):-

⇒ Software as a service is a way of delivering services and applications over the internet.

⇒ Instead of installing and maintaining software we simply access it via the internet.

⇒ SaaS provides a complete software solution that you purchase on a Pay-as-you-go basis from a cloud service provider.

⇒ Most SaaS services/applications can be

run directly from a web browser.

→ The SaaS applications are sometimes called web-based software, on-demand software, or hosted software.

Advantages of SaaS:- Disadvantages of SaaS:-

- | | |
|----------------------|--|
| 1. cost-effective | 1. Limited customization |
| 2. Reduced Time | 2. Dependence on Internet connectivity |
| 3. Accessibility | 3. Security concerns |
| 4. Automatic updates | 4. Limited control over data |
| 5. Scalability | |

2. Platform as a Service:-

→ PaaS is a category of cloud computing that provides a platform and environment to allow developers to build applications and services over the Internet.

→ PaaS services are hosted in the cloud and accessed by users simply via their web browser.

Advantages of PaaS:-

- 1) simple and convenient for users
- 2) cost-effective
- 3) Efficiently managing the life cycle

4) Efficiency

⇒ The various companies providing PaaS are Amazon web services Elastic Beanstalk, sales force, windows Azure, Google APP engine.

Disadvantages of PaaS:-

- 1) Limited Control over Infrastructure
- 2) Dependence on the Provider
- 3) Limited flexibility.

3. Infrastructure as a Service:-

⇒ Infrastructure as a Service (IaaS) is a service model that delivers computer infrastructure on an outsourced basis to support various operations.

⇒ Typically IaaS is a service where infrastructure is provided as outsourcing to enterprises such as networking equipment, devices, database and web server.

⇒ It is also known as Hardware-as-a-service.

Advantages of IaaS:- Disadvantages:-

- | | |
|--------------------|--|
| 1) Cost-Effective | 1. Limited control over Infrastructure |
| 2) website hosting | 2. Security concerns |
| 3) security | 3. Limited Access |
| 4) maintenance | |

4. Anything as a Service: (XaaS)

- ⇒ It is also known as Everything as a Service.
- ⇒ nowadays most of the Cloud Providers to provide anything as a Service.

Advantages:-

- 1) Scalability
- 2) Flexibility
- 3) cost-effectiveness

Disadvantages:-

- 1) Dependence on the Provider
- 2) Limited flexibility
- 3) Limited Integration.

Function as a Service:-(FaaS)

- ⇒ FaaS provides a platform for PaaS users or customers to develop, compute, run and deploy the code or entire application as functions.
- ⇒ It allows the user to entirely develop the code and update it at any time without worrying about the maintenance of infrastructure.
- ⇒ It is implemented in the serverless container.
- ⇒ In FaaS, users only have to pay for the number of execution time happened.
- ⇒ In PaaS, users have to pay for the amount based on Pay-as-you-go Price regardless

Advantages:-

- 1) Highly Scalable
- 2) Cost-effective
- 3) Code Simplification

Disadvantages:-

- 1) Cold Start latency
- 2) Limited control over infrastructure
- 3) Security concerns
- 4) Limited scalability

Public cloud platforms:-

- ⇒ Public cloud is a range of computing services that are offered by platforms such as Amazon web services(AWS), Microsoft Azure, and Google cloud platform(GCP) and making them available over the Internet.
- ⇒ Public cloud provides a shared platform that is accessible to the general public through an internet connection.
- ⇒ Public cloud operated on the Pay-as-you-use model and administered by the third party, i.e., cloud service providers.
- ⇒ In the Public cloud, the same storage is used by multiple users at the same time.
- ⇒ Public cloud is owned, managed and operated by businesses, universities, government organizations.

Shareable storage

Public cloud

IBM

Amazon

VMware

Google

Advantages of Public Cloud:

1. Low cost:

⇒ Public cloud has low cost than private or hybrid cloud.

⇒ In a public cloud share the same resources with a large number of consumers.

2. Location Independent:

⇒ Public cloud is location independent because its services are offered through the internet.

3. Save Time:

⇒ Cloud Service Provider is responsible for the manage and maintain data centers in which data is stored so the cloud user can save their time to establish connectivity.

4. Quickly and easily Set up:-

→ organizations can easily buy public cloud on the internet and deployed and configured it remotely.

5. Business Agility:

→ Public cloud provides an ability to elastically re-size computer resource.

6. Scalability and Reliability:

→ Public cloud offers scalable and reliable services to the users at an affordable cost.

Disadvantages of Public cloud :-

1. Low security:-

Public cloud is less secure because resources are shared publicly.

2. Performance:

Public cloud performance depends upon the speed of internet connectivity.

3. Less customizable:

Public cloud is less customizable than the private cloud.

Service oriented Architecture:-

- ⇒ Service oriented Architecture is a stage in the evolution of application development and integration.
- ⇒ It defines a way to make software components reusable using the interfaces.
- ⇒ It uses common communication standards to speed up and streamline the service integration in applications.
- ⇒ SOA allows users to combine a large number of facilities from existing service to form applications.
- The different characteristics of SOA are as follows:
- ⇒ Provides interoperability b/w the services.
- ⇒ Provides methods for service encapsulation, service discovery, service composition, service reusability and service integration.
- ⇒ Provides loosely coupled services.
- ⇒ Provides location transparency with better scalability and availability.

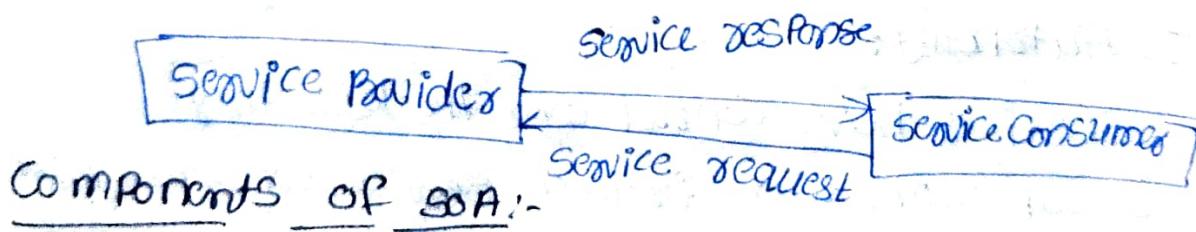
They are two major roles, ~~or~~ within SOA:

1. Service Provider

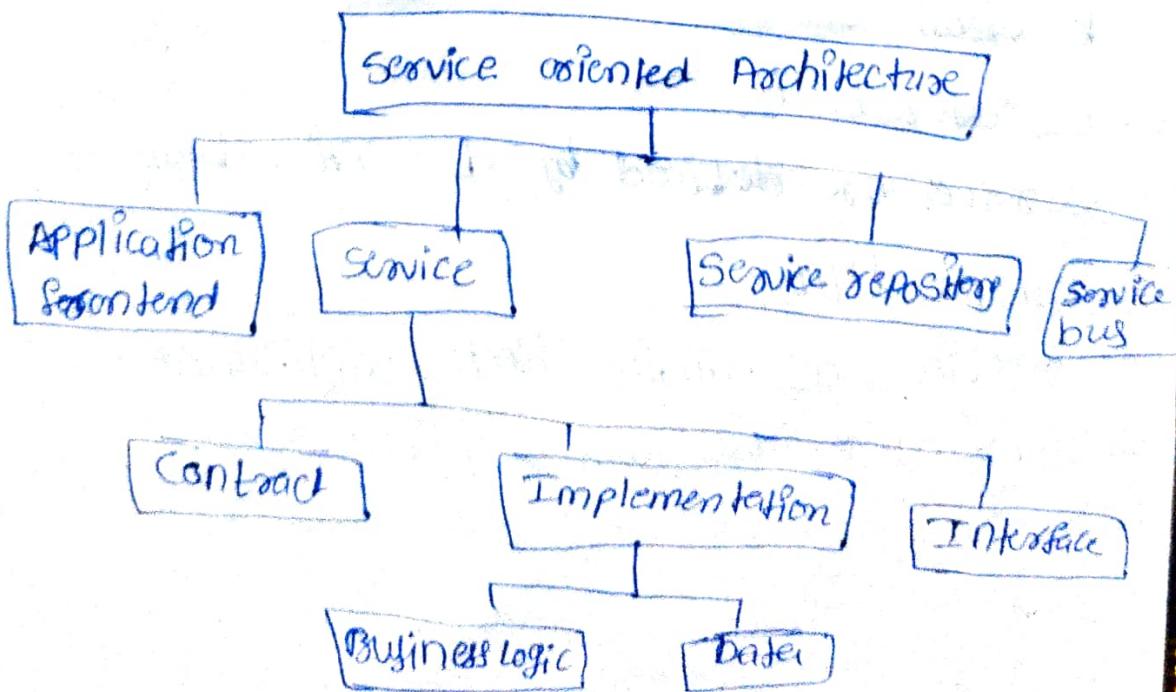
The Service Provider is the maintainer of the service and the organization that makes available one or more services for others to use.

2. Service Consumer

The Service consumer can locate the service metadata in the registry and develop the required client components to bind and use the service.



Components of SOA:-



Guiding Principles of SOA:

1. Standardized service contract:

Specified through Service oriented documentation

2. Loose coupling:

Services are designed as self-contained components

3. Abstraction:

A Service is completely defined by Service contracts and description documents.

4. Reusability:

Designed as components, services can be reused more effectively.

5. Autonomy:

Services have control over the logic they encapsulate and, from a service consumer point of view.

6. Discoverability:

Services are defined by description documents

7. Composability:

Services as building blocks, sophisticated and complex operations can be implemented.

Advantages of SoA:-

- ⇒ Service Reusability
- ⇒ Easy maintenance
- ⇒ Platform Independent
- ⇒ Availability
- ⇒ Reliability
- ⇒ Scalability

Disadvantages of SoA:-

- ⇒ High overhead
- ⇒ High Investment
- ⇒ complex Service management

Applications of SoA:-

- ⇒ SoA Infra Structure is used by many Armies and Air Forces.
- ⇒ SoA is used to improve healthcare delivery
- ⇒ SoA helps maintain museums a virtualized Storage Pool.

Programming on Amazon Web Services and Microsoft Azure:

What is AWS:-

- ⇒ AWS stands for Amazon web services
- ⇒ The AWS service is provided by the Amazon that uses distributed IT infrastructure to provide different IT resources available on demand.
- ⇒ It provide different services such as Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Packaged Software as a Service (SaaS).

Uses of AWS:-

- ⇒ A small manufacturing organization uses their expertise to expand their business.
- ⇒ A large enterprise spread across the globe can utilize the AWS to deliver.

Pay - As - You - Go:-

- ⇒ Based on the concept Pay-as-you-go, AWS provide services to the customers.
- ⇒ Pay-As-You-Go enables the customers to provide services from AWS.
 - * computing
 - * Programming models

* Database Storage

* Networking.

Advantages of AWS:-

- 1) Flexibility
- 2) cost - effectiveness
- 3) Scalability/ Elasticity
- 4) Security

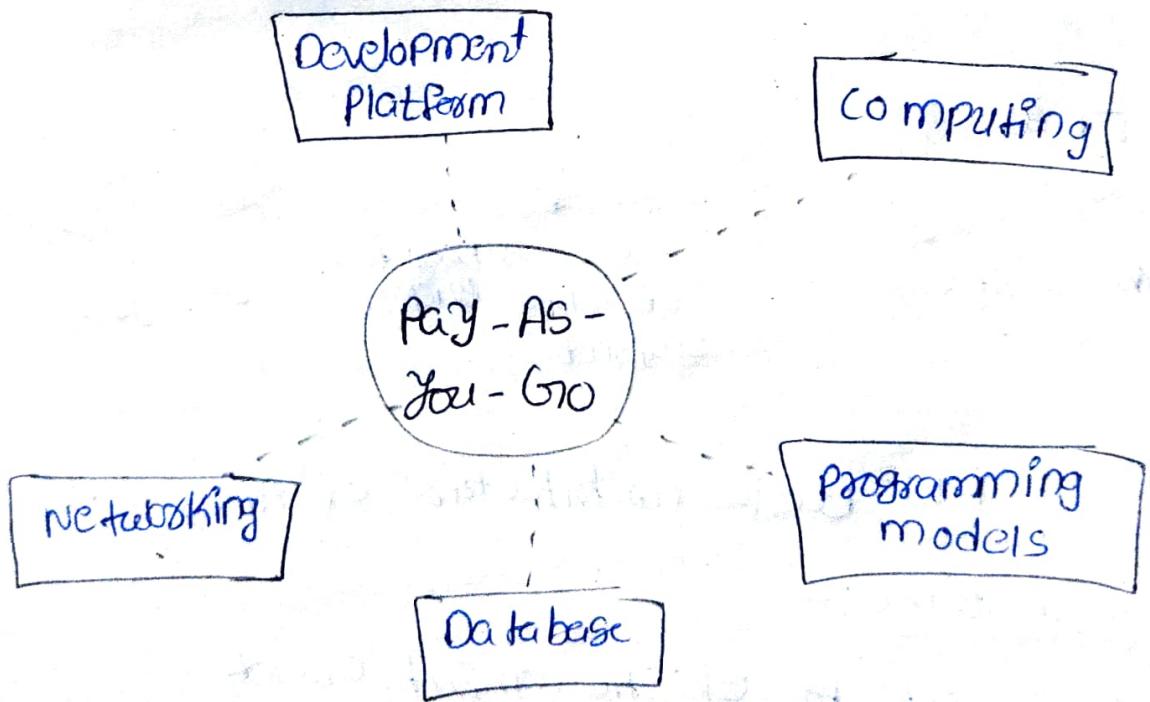


Fig : Amazon web services

Basic Architecture

Internet

Domain name

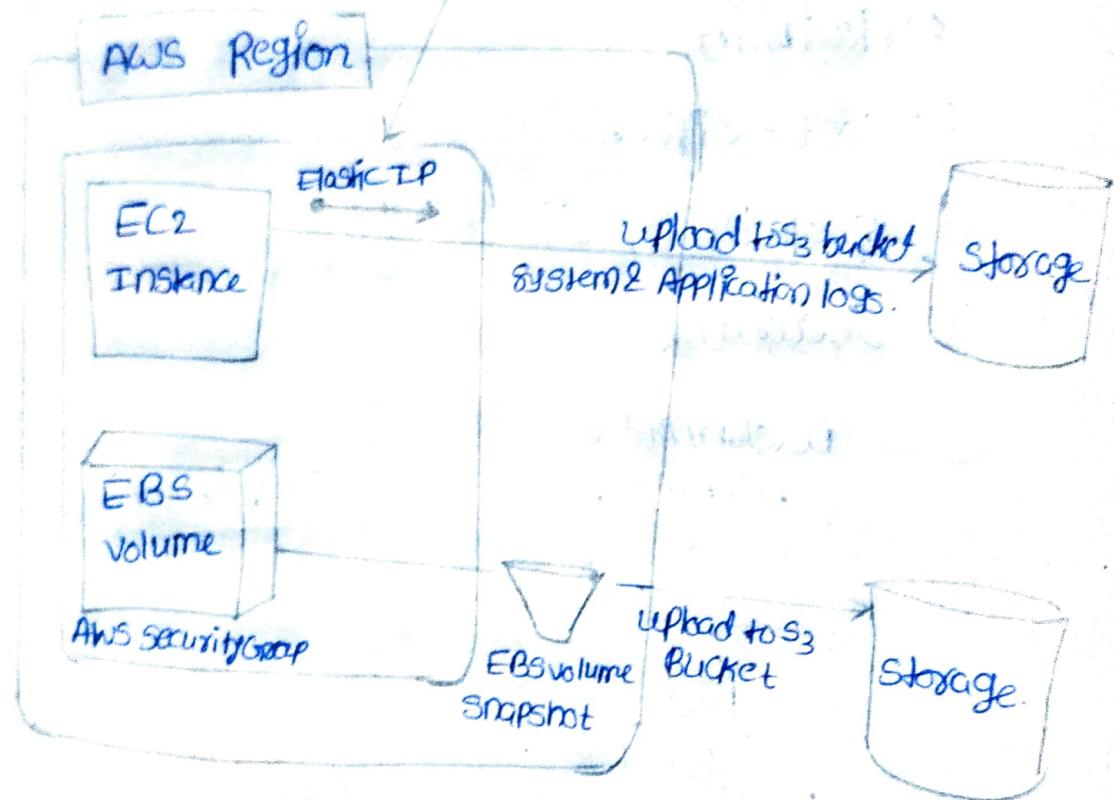


Fig: Basic Architecture of AWS

EC2 Instance:-

- ⇒ EC2 stands for elastic compute cloud.
- ⇒ EC2 allows users to use virtual machines of different configuration.

S3 Bucket:-

- ⇒ S₃ stands for simple storage service.
- ⇒ It allows the users to store and retrieve various types of data using API calls.

microsoft Azure:-

- ⇒ Azure is Microsoft's cloud platform, just like Google.
- ⇒ Generally, it is a platform through which we can use Microsoft's resource.
- ⇒ For example, to set up a huge server, we will require huge investment, effort, physical space, and so on.
- ⇒ It will provide us with virtual machine, fast processing of data, analytical and monitoring tools.
- ⇒ The pricing of Azure is also simple and cost-effective.

How Azure can help in business:-

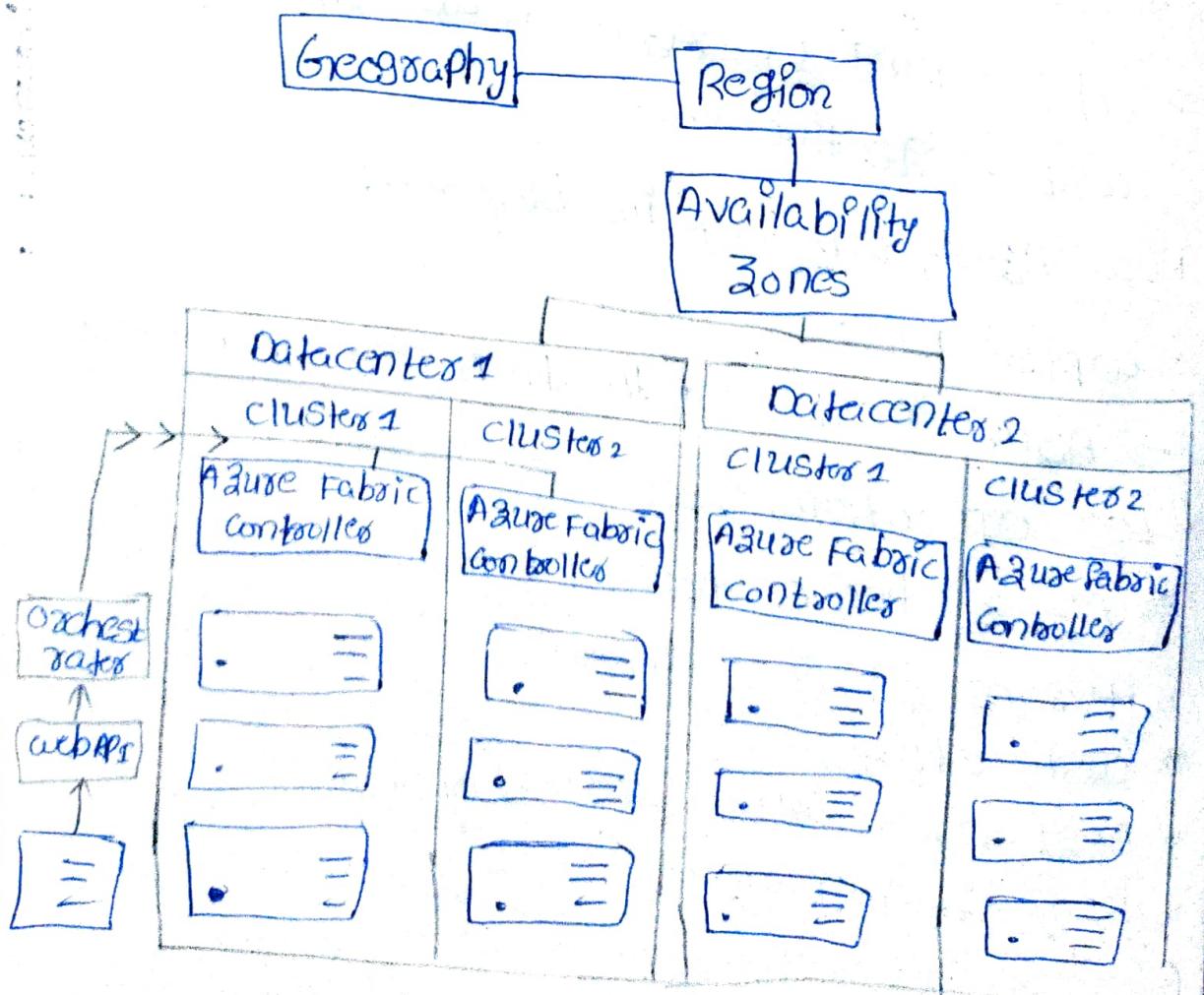
- * Capital less:
 - ⇒ Azure cuts out the high cost of hardware.
- * Less Operational cost:
 - ⇒ Azure has a low operational cost because it runs on PaaS servers.
- * Cost effective:
- * Easy Back-up and Recovery options
- * Easy to implement

- * Better security
- * Work from anywhere
- * Increased collaboration

Microsoft Azure Services:-

1. Compute
2. Networking
3. Storage
4. Web + mobile
5. Containers
6. Data bases
7. Data + Analytics
8. AI + cognitive service
9. Internet of things
10. Security + Identity

How Azure works:-



→ Microsoft Azure is completely based on the concept of virtualization.