**Cloud Computing:-**

Cloud computing is the on-demand availability of computer resources, especially data storage (cloud storage) and complex computing power, without direct active management by the user.

**How does cloud computing work?**

Rather than owning computing infrastructure or data centers, companies can rent access to anything from applications to storage from a cloud service provider.

One benefit of using cloud computing services is that firms can avoid the upfront cost and complexity of owning and maintaining their own IT infrastructure, and instead simply pay for what they use, when they use it.

In turn, providers of cloud computing services can benefit from significant economies of scale by delivering the same services to a wide range of customers.

Benefits:

1-Reduced cost and complexity of owning and maintaining the IT infrastructure.

2-

|  |
| --- |
| Application |
| Data |
| Runtime |
| Middleware |
| OS |
| Virtualization |
| Server |
| Storage |
| Network |

**Cloud Benefits:-**

**Scalaibility**

**Availibilty**

**Pay as you go**

**Cost Savings**

**Security**

**Flexibility**

**Ease of using**

**Disaster Recovery**

**Sustainability**

**Scalable**– A cloud service allows quick scaling up and down of computing resources to accommodate your changing needs.

**Affordable** – You pay less for a cloud service, as it eliminates unnecessary costs involved in hardware upgrades and maintenance.

**Secure** – By signing up for a cloud service, you are essentially making your data more secure using their industry-grade security protocols.

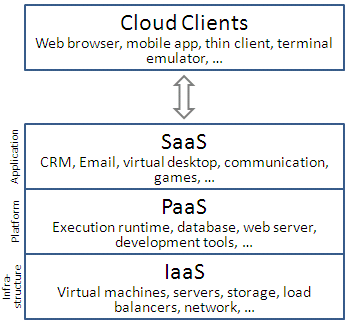
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IAAS🡪 SERVER +STORAGE+NETWORK 🡪IN FORM OF VIRTUALIZATION

PAAS🡪 Runtime + Middleware + OS + Virtualization +STORAGE+NETWORK

SAAS🡪APPLICATION+DATA+ Runtime + Middleware + OS + Virtualization +STORAGE+NETWORK

# Cloud Service Models ||| Cloud Computing Models



**Iaas 🡪**

Infrastructure-as-a-Service, commonly referred to as simply “IaaS,” is one of the basic service model in cloud computing that provides fundamental computing, network, and storage resources to consumers on-demand, over the internet, and on a pay-as-you-go basis.

IaaS enables end users to scale and shrink resources on an as-needed basis, reducing the capital expenditures or unnecessary “owned” infrastructure, especially in the case of “spiky” workloads. In contrast to PaaS and SaaS (even newer computing models like containers and server less), IaaS provides the lowest-level control of resources in the cloud.

Example: Amazon Web Services (AWS) EC2, Google Compute Engine (GCE), Cisco Meta pod.

**Cloud computing offers the following three type of services:**

1**. Software as a Service (SaaS)** – It is also known as cloud application services. Mostly, SaaS applications run directly through the web browser means we do not require to download and install these applications. Some important example of SaaS is given below –

Example: Google Apps, Salesforce Dropbox, Slack, Hubspot, Cisco WebEx.

2. **Platform as a Service (PaaS)** – It is also known as cloud platform services. It is quite similar to SaaS, but the difference is that PaaS provides a platform for software creation, but using SaaS, we can access software over the internet without the need of any platform.

Example: Windows Azure, Force.com, Magento Commerce Cloud, OpenShift.

3. **Infrastructure as a Service (IaaS)** – It is also known as cloud infrastructure services. It is responsible for managing applications data, middleware, and runtime environments.

Example: Amazon Web Services (AWS) EC2, Google Compute Engine (GCE), Cisco Metapod.

**Deployment model in cloud:**

1-Public Cloud🡪GOOGLE,AZURE,GCP

2-Private Cloud🡪ENTERPRISE {DELL{CALCUTTA,HYD,USA}ONLY ACCESSABLE BY DELL USERS}It is secure

3-Hybrid Cloud🡪COMBINATION OF TWO

**EC2**

**AWS STORAGE TYPE**

###### **Amazon Simple Storage Service (Amazon S3)**

###### **Amazon Glacier**

###### **Amazon Elastic File System (Amazon EFS)**

###### **Amazon Elastic Block Store (Amazon EBS)**

###### **Amazon EC2 Instance Storage**

###### **AWS Storage Gateway**

###### **AWS Snowball**

###### **Amazon CloudFront**

**9. Amazon FSx for Windows File Server**

**10. Amazon FSx for Lustre**

Furthermore, this article will explore all of the above me

**AWS**

Amazon web services is a collection of remote computing services that together make a cloud computing platform.

**What AWS offer:**

* **Scalability**
* **Availability**
* **Pay as you go**

Amazon Elastic Compute Cloud (Amazon EC2) is a web service that provides secure, resizable compute capacity in the cloud.

SNS –Simple notification service

S3- For storage

* Amazon EC2 provides Scalable computing capacity in AWS Cloud.
* You can use Amazon EC2 to launch one or more virtual servers as you need.
* Amazon EC2 is having two storage option that is EBS and instance store.
* Preconfigured templates are available on AWS known as Amazon machine Image.
* By default when you create an EC2 account with amazon your account is limited to a maximum of 20 instances per EC2 region with 2 default high I/O instances.

Creating EC2 Instance

1-Choosing an AMI amazon machine image this is a software and application packages that we need to run our application //**step1:** **Choose an Amazon Machine Image**

2-Choosing an instance type –choosing hardware based on our requirement**//step2** **Choose an Instance Type** //ram cpu and all size and all.

3-Configure Instance –which subnet, or updating a patch**//step3** **Configure InstanceDetails**

4-Adding additional storage **//step4:Add storage**

5-Adding tags-Identify the instances using the tag**//step5:Add Tags**

6-Configuring security group/firewall**//step6: Configure security group**

7-Review

1-AMI-

🡪Is a template that is used to create a new instance/new vm /new machine based on user requirement.

🡪The AMI would conatin : Software Information ,Operating System information , Volume Information , Access Permission.

AMI’s are of 2 type:

1-Predefined AMI’s

2-Custom AMI’s

Predefined AMI’s are created by Amazon and can be modified by User.

Custom AMI’s are created by user and can be modified by user.

2-Instance/Hardware

Instance Type Families

1-Compute Optimised

2-Memory Optimised

3-GPU Optimised

4-Storage

5-General Purpose

3-Configure Instance

We have to specify the number of instances, kind of network, Stopping the services that is shutdown Behaviour

4-Adding Storage

🡪 Ephemeral Storage

🡪 Amazon Elastic Block Store

🡪 Amazon S3

Free subscription user’s they get to use 30 Gb for 1 year.

Before launching it will ask Key-Pair

Private Key-Is downloaded by the user

Public cloud- Is used by Amazon to check the identity of the user

* [**General Purpose**](https://cloudacademy.com/blog/aws-ec2-instance-types-explained/#general) **:** The most popular; used for web servers, development environments, etc.
* [**Compute Optimized**](https://cloudacademy.com/blog/aws-ec2-instance-types-explained/#compute) **:** Good for compute-intensive applications such as some scientific modelling or high-performance web servers.

Ex:- Bank applications

* [**Memory Optimized**](https://cloudacademy.com/blog/aws-ec2-instance-types-explained/#memory) **:**Used for anything that needs memory-intensive applications, such as real-time big data analytics, or running Hadoop or Spark.
* [**Accelerated Computing**](https://cloudacademy.com/blog/aws-ec2-instance-types-explained/#accelerated) **:** Include additional hardware (GPUs, FPGAs) to provide massive amounts of parallel processing for tasks such as graphics processing.
* [**Storage Optimized**](https://cloudacademy.com/blog/aws-ec2-instance-types-explained/#storage) **:**Ideal for tasks that require huge amounts of storage, specifically with sequential read-writes, such as log processing.

**Series Code**

|  |  |
| --- | --- |
| **Type** | **Series** |
| **General Purpose** | **A,T, M** |
| **Compute Optimized** | **C** |
| [**Memory Optimized**](https://cloudacademy.com/blog/aws-ec2-instance-types-explained/#memory) | **R,X,Z,High Memory** |
| [**Accelerated Computing**](https://cloudacademy.com/blog/aws-ec2-instance-types-explained/#accelerated) | **F,P,G,In** |
| [**Storage Optimized**](https://cloudacademy.com/blog/aws-ec2-instance-types-explained/#storage) | **H,D,I** |

**EC2 PURCHASING TYPES:**

On-Demand Instances

Reserved Instances

Spot Instances

**AWS CLI**

Download AWS CLI for windows

Configure user on powershell/cmd

Configure in powershell:-- aws configure –profile name

AWS Access Key:-

AWS Secret Access Key

Default key region:

To use services use commands:

AWS IAM

AWS help

AWS IAM list-users

**AWS STORAGE TYPE**

**1.Amazon Simple Storage Service (Amazon S3)**

**2.Elastic block storage --> This can be accessible through EC2 instance. Connected with EC2 Instance.**

**3.Elastic File System only for Linux based**

**4-Amazon S3 Glacier-->Reliable , Durable storage cheaper.**

**Example-T-SERIES OLD SONGS**

**4.1AWS Snowball -->Portable storage basically used for migration.**

**1-Amazon S3 🡪Object Level**

**AWS Backup**

**2-Amazon EBS 🡪Block Level**

**3-Amazon EFS 🡪Object Level**

**4-Amazon FSx**

**5-Amazon S3 Glacier**

**AWS Snow Family**

**AWS Storage Gateway**

###### **Amazon Simple Storage Service (Amazon S3)🡪 Object level storage**

###### **Amazon S3 Glacier**

**BLOCK**

Block storage is suitable for transactional database ,random read/write.

Block storage divides data to be stored in evenly sized blocks for instance, a file can be split into evenly sized blocks before it is stored.

EX-EBS

**OBJECT**

Object storage stores the file as it is.

EX-Dropbox, Facebook

**AMAZON S3 (Simple Storage Service)**

Amazon Simple Storage Service (Amazon S3) is an object storage service that offers storing any amount of data for a range of use cases, such as data lakes, websites, mobile applications, backup and restore, archive, enterprise applications, IoT devices, and big data analytics.

Amazon S3 provides easy-to-use management features so you can organize your data and configure finely-tuned access controls to meet your specific business, organizational, and compliance requirements. Amazon S3 is designed for 99.999999999% (11 9's) of durability, and stores data for millions of applications for companies all around the world.

🡪S3 is an object storage Service.

🡪 S3 is a storage for the internet(http or https). It has a simple web-services interface for simple storing retrieving of any amount of data anytime from anywhere on the internet.

🡪It’s separate from the instance or system.

🡪 You can share data stored with others.

🡪You cannot install operating system on S3.

🡪S3 has a distributed data-store architecture where objects are redundantly stored in multiple locations.

🡪Data is stored in bucket (It is a kind of store/folder).

🡪Maximum capacity of a bucket is 5TB.

🡪You can create folder inside bucket (available through console)

🡪You cannot create nested bucket.

🡪Bucket ownership is not transferable.

🡪S3 Bucket is region specific .

🡪You can have 100 buckets per account.