CLIENT SERVER ARCHITECTURE

The data processing is split into distinct parts. A part is either requester (client) or provider (server). The client sends during the data processing one or more requests to the servers to perform specific tasks. The server part provides services for the clients.

1. 2-tier Architecture
2. 3-tier Architecture

2-tier Architecture-

Client (ex-our pc)   Server (ex-google,fb,yahoo)

Suppose we search for www.internity.com so, the client sends a request to the server. Now, server process the request like analysing from where it came, which page they want etc. then the server search for the related files and then process the request in terms of response and sends it to the client. Hence, the search result displayed on our browser.

We can say 2-tier architecture as request response cycle.

3-tier Architecture-

Client   Server

                                    Data Base

In 3-tier architecture, section of database is separate the request from client for example as we login on facebook then username and password will be sent to server then server will check it with database it will send data to query with database and then database will send response to server accordingly then server uses this response and sends response to client. This is known as 3-tier architecture.

BASICS OF CLOUD COMPUTING

The word cloud gives us first idea according to its name for example- widely distributed, network based, storage.

The term Cloud refers to a Network or Internet. In other words, we can say that Cloud is something, which is present at remote location.

Cloud- using someone else's server to host, process or store data ,with the help of cloud we are storing our data not in our system but in someone else server.

Example- if we are using tab, laptop, mobile to access cloud or we can say internet these cloud are provided by cloud providers

Cloud providers- providing the platform for process on data storing and other purpose to the clients

Like- they provide

a.) Saas- Software as a service (email,games)

b.) Paas- Platform as a service (database, webservers)

c.) Iaas- Infrastructure as a service (virtual machines,servers,networks)

HISTORY OF CLOUD COMPUTING

- Before emerging the cloud computing, there was client/server computing which is basically a centralized storage in which all the software applications, all the data and all the controls are resided on the server side.
- If a single user wants to access specific data or run a program he/she need to connect to the server and then gain appropriate access and then he/she can do his/her business.
- Then after, distributed computing came into picture, where all the computers are networked together and share their resources when needed.
- On the basis of above computing, there emerged cloud computing concept that later implemented.
- At around in 1961, John MacCharty suggested in a speech at MIT that computing can be sold like a utility just like a water or electricity. It was a brilliant idea, but like all brilliant ideas it was ahead of its time.
- In 1999, Salesforce.com started delivering of applications to users using a simple website. The applications were delivered to enterprises over the internet and his way of dream od computing sold as utility were true.
- In 2002, Amazon started Amazon Web Services providing services like storage, computation and even human intelligence.
- In 2009, Google apps also started to provide cloud computing enterprises applications. Later Microsoft, oracle, IBM and HP also joined the cloud services.

WHY CLOUD COMPUTING

We can understand the importance of cloud computing by comparing it with on premise/personal system/single organization.

On premise/personal system   Cloud Computing

1.) Higher pay, less scalability
                              1.) Pay for what you use

                                                          If scale up-pay more

                                                          If scale down-pay less

2.) Allot huge space for servers   2.) No server space required

3.) No automatic update   3.) Automatic software update

4.) Data can't be accessed remotely   4.) Data can be accessed remotely

5.) Lack of flexibility   5.) flexibility high

6.) Implementation time longer   6.) Data can be accessed & shared anywhere.

Due to the limitations of on premises or personal system, cloud computing came into existence and has many features which were sufficient for overtaking the current demand.

CLOUD COMPUTING ARCHITECTURE

The Cloud Computing architecture comprises of many cloud components, each of them are loosely coupled. We can broadly divide the cloud architecture into two parts:
1. Front End

2. Back End

Each of the ends are connected through a network, usually via internet.

FRONT END

Front End refers to the client part of cloud computing system. It consists of interfaces and applications that are required to access the cloud computing platforms, ex- Web Browser.

BACK END

Back End refers to the cloud itself. It consists of all the resources required to provide cloud computing services. It comprises of huge data storage, virtual machines, security mechanism, services, deployment models, servers, etc.
Important Points
- It is the responsibility of the back end to provide built-in security mechanism, traffic control and protocols.
- The server employs certain protocols, known as middleware, helps the connected devices to communicate with each other.

ADVANTAGES AND DISADVANTAGES

ADVANTAGES
- LOW COST COMPUTERS FOR USERS
  In , cloud you don't require a high powered computer to run cloud computing's web based applications because applications run on cloud not on pc.
- LOW IT INFRASTRUCTURE COST
  No need of large number of powerfull servers also no requirement of IT staffs to handle such powerfull servers.
- FEWER MAINTENANCE COST
  The maintenance cost in cloud computing greatly reduces both hardware and software maintenance for organizations of all sizes
- LOWER SOFTWARE COST
  It reduces software cost because you don't need to purchase separate software packages for each computer in the organization.
- INCREASED COMPUTING POWER
  The execution capacity of cloud servers are very high. It processes the applications very fast.

- REQUIRE A CONSTANT INTERNET CONNECTION
  Cloud computing is impossible without internet connection. Web based applications often require a lot of bandwidth to download, as need to download large documents
- STORED DATA MIGHT NOT BE SECURE
  With cloud computing, all our data is stored in the cloud. That's all well and good, but how secure is the cloud?

PUBLIC CLOUD

The Public Cloud allows systems and services to be easily accessible to general public, ex-Google, Amazon, Microsoft offers cloud services via Internet.

BENEFITS-

COST EFFECTIVE
Since public cloud share same resources with large number of consumer, it has low cost.

RELIABILITY
Since public cloud employs large number of resources from different locations, if any of the resource fail, public cloud can employ another one.

FLEXIBILITY
It is also very easy to integrate public cloud with private cloud, hence gives consumers a flexible approach.

LOCATION INDEPENDENCE
Since, public cloud services are delivered through Internet, therefore ensures location independence.

UTILITY STYLE COSTING
Public cloud is also based on pay-per-use model and resources are accessible whenever consumer needs it.

HIGH SCALABILITY
Cloud resources are made available on demand from a pool of resources, i.e., they can be scaled up or down according the requirement.

PRIVATE CLOUD

The Private Cloud allows systems and services to be accessible with in an organization. The Private Cloud is operated only within a single organization. However, It may be managed internally or by third-party.

BENEFITS-

HIGHER SECURITY AND PRIVACY
Private cloud operations are not available to general public and resources are shared from distinct pool of resources, therefore, ensures high security and privacy.

MORE CONTROL
Private clouds have more control on its resources and hardware than public cloud because it is accessed only within an organization.

COST AND ENERGY EFFICIENCY
Private cloud resources are not as cost effective as public clouds but they offer more efficiency than public cloud.

DISADVANTAGES

Here are the disadvantages of using private cloud model:

RESTRICTED AREA
Private cloud is only accessible locally and is very difficult to deploy globally.

INFLEXIBLE PRICING
In order to fulfill demand, purchasing new hardware is very costly.

LIMITED SCALABILITY
Private cloud can be scaled only within capacity of internal hosted resources.

HYBRID CLOUD

The Hybrid Cloud is a mixture of public and private cloud. Non-critical activities are performed using public cloud while the critical activities are performed using private cloud.

BENEFITS-

SCALABILITY
It offers both features of public cloud scalability and private cloud scalability.

FLEXIBILITY
It offers both secure resources and scalable public resources.

COST EFFICIENCIES
Public cloud are more cost effective than private, therefore hybrid cloud can have this saving.

SECURITY
Private cloud in hybrid cloud ensures higher degree of security.

DISADVANTAGES-

NETWORKING ISSUES
Networking becomes complex due to presence of private and public cloud.

CLOUD SERVICE PROVIDERS
1.) Amazon web services
2.) Microsoft azure
3.) IBM BLUEMIX
4.) Google cloud platform

5.) Salesforce.com
6.) Adobe
7.) Oracle cloud
8.) Sap
9.) Rackspace
10.) Orange scape

CLOUD SERVICES

A cloud service is any service made available to users on demand via internet from a cloud computing provider's servers as opposed to being provided from company's own on-premises servers.

Cloud services are designed to provide easy, scalable access to applications, resources and services and are fully managed by a cloud service providers.

There are three basic types of cloud services:

1.) Software as a service (SaaS)
This model allows to provide software application as a service to the end users. It refers to a software that is deployed on a hosted service and is accessible via Internet. There are several SaaS applications, some of them are listed below:

- Billing and Invoicing System

- Customer Relationship Management (CRM) applications

- Help Desk Applications

- Human Resource (HR) Solutions

2.) Platform as a Service (PaaS)

PaaS offers the runtime environment for applications. It also offers development & deployment tools, required to develop applications.

PaaS has a feature of point-and-click tools that enables non-developers to create web applications. Google's App Engine, Force.com are examples of PaaS offering vendors.
Developer may log on to these websites and use the built-in API to create web-based applications. But the disadvantage of using PaaS is that the developer lock-in with a particular vendor.
For example, an application written in Python against Google's API using Google's App Engine is likely to work only in that environment. Therefore, the vendor lock-in is the biggest problem in PaaS.

3.) Infrastructure as a service (Iaas)
IaaS provides access to fundamental resources such as physical machines, virtual machines, virtua storage, etc., Apart from these resources, the IaaS also offers:
- Virtual machine disk storage

- Virtual local area network (VLANs)

- Load balancers

- IP addresses

- Software bundles