



Cloud Computing and Its Technologies: A Survey

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Abstract: Cloud computing play a big role in today business environment. It provides on-demand services. Here we provide what actually cloud computing is and it's various computing technologies and their characteristics.

Keywords: Cloud computing, Architecture, computing technologies, characteristics.

I. INTRODUCTION

Cloud computing means using resources remotely rather than locally. Today cloud computing play an important role in business applications. Cloud computing remove the headaches of managing hardware and software for the users, it is the responsibility of cloud provider for managing all these. Cloud computing is an internet based computing where different services are provided to customers with the help of internet. Fig 1 shows a sample cloud computing architecture.

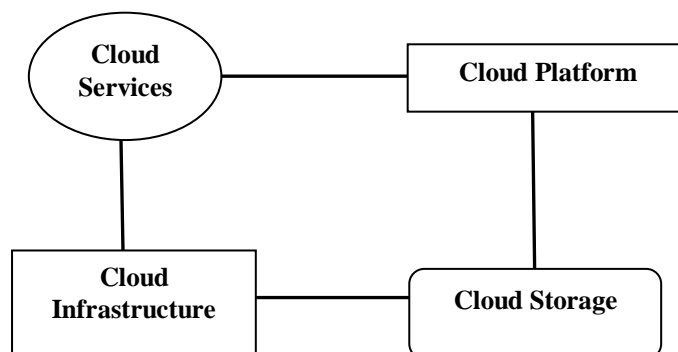


Fig1: Simple Cloud Architecture

The two most significant component of cloud architecture is the front end and the back end [1]. The front end is the computer user and the application that is used to access the cloud via a user interface such as web browser. The back end is the cloud itself that include servers and cloud storage devices.

II. COMPUTING TECHNOLOGIES

A. Client-Server Computing

In client-server computing the system is divided into two entities [4]. First one is the server that provides resources or services and second is the client that uses the resources or services provided by the server.

In this computing client sends request to the server through computer network. The server share resources with the client but client do not share any of its resources. For e.g. World Wide Web and E-mail.

The various characteristics of client-server computing are:-

- Client-Server Computing uses local processing power-the power of desktop platform. It changes the way enterprise accesses and uses data. In this approach, there is no restriction on data access i.e. all company staff can access data and they are also involved in various decision making process.
- Client-Server computing is open systems. It means you can configure your systems that include software or hardware from various vendors as long as they follow a common standard. Due to this feature company can make systems that include cost effective software and hardware to accomplish a particular task.
- Client-Server computing using the concept of modularity in which we combine software and hardware of different features together as a whole. These software and hardware components are actually modular in nature. Modularity allows the system to expand and modernize to meet requirements and needs as the company grows.



B. Cluster Computing

A cluster computing is a type of computing in which group of computers are linked together to perform various tasks so that user of the system thinks that it can work on single system. Cluster computing take an advantage of parallel or distributed computer system for linking of two or more computers into the network.

The various characteristics of cluster computing are:

- The processing power of cluster computer is same as a mainframe computer.
- Cluster computing has typically low cost, high bandwidth and low latency.
- Parallel applications designed to run on it.
- Gives the impression of a single powerful computer
- Generally cost effective compared to single computers of comparable speed and availability
- Deployed to improve performance and availability over that of a single computer

C. Peer-to-Peer Computing

A peer-to-peer (P2P) computing is a distributed type of computing in which each computer is connected to other computer in the network. The computer in the network can act as both client and server for the other computers in the network, allowing shared access to various resources such as files, peripherals, and sensors without the need for a central server. Each peer called computer in the network makes their resources available to other peers in the network without the need of centralized control.

The various characteristics of Peer-to-peer computing are:

- No centralized control.
- Clients are also servers and routers.
- Nodes contribute content, storage, memory, CPU.
- Nodes are autonomous.
- Ad-hoc Nature.
- Limited Capacity and Reliability of Peers.
- Scalability

D. Ubiquitous Computing

Ubiquitous computing also known as pervasive computing is an advanced computing concept where computing is made to appear everywhere and anywhere. Ubiquitous computing can occur using any device, in any location, and in any format. Pervasive computing makes devices smart by using sensor network.

The various characteristics of Peer-to-peer computing are:

- Permanency: The information always remains their and can only be removed if the learners want to remove it.
- Accessibility: The information is always available whenever the learners need to use it.
- Immediacy: The information can be retrieved immediately by the learners.
- Invisibility: Computing can be performed by Invisible Intelligent Devices - Wearable Computing Devices.
- Adaptation: Adapting to Device Type, Time, Location, Temperature, Weather, etc.

E. Grid Computing

Grid computing is types of distributed computing in which the resources of different computers in the network are used to solve a big task that require large number of CPU cycle and huge amount of data [3]. Grid computing is a computer network in which each computer's resources like processing power, memory and data storage are shared with every other computer in the system. O grid computing turn a computer network into a powerful supercomputer.

Grids provide protocols and services at five different layers as shown in Fig 2.

- Fabric layer: - It deal with resource management. The different resources in this layer are computer, storage system and networks, code repository, etc.
- Connectivity layer: - The connectivity layer deal with security i.e. it defines communication and authentication protocols for secure network transactions.
- Resource layer: - It provides access to resources by defining different protocols for monitoring, accounting and payment of sharing operations on individual resources.
- Collective layer: - It controls the interaction between different types of resources.
- Application layer: - Application layer rely on lower layers for grid to run which comprises user applications that operate within virtual organization Environments.

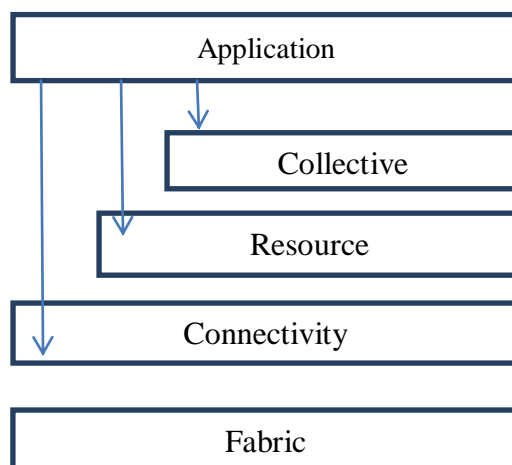


Fig.2. Grid Architecture

The various characteristics of Grid computing are:-

- Large scale: The resources in the grid range from few to millions.
- Geographical distribution: The resources in the grid may be located at distant places.
- Resource sharing: The shareable resources in a grid belong to many different organizations.
- Multiple administrations: In grid resources are shared from different organization. Each organization maintains their own security and administrative policies for their owned resources which result in challenging security problem for different policies.
- Resource coordination: In a grid resources must be coordinated.
- Grid cannot be built by one or by a single resource. One can be a part of grid.

III.CONCLUSION

Cloud computing is a new technology in today's environment Cloud is widely used in today's business environment. This paper discussed what actually cloud computing is and different cloud computing technologies with their characteristics. In spite of various challenges like performance, security cloud computing gaining more importance especially in enterprises.

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BIOGRAPHY



Mr. Mohd Saleem has received B.Tech from BGSBU Rajouri, J&K and he is awarded M.Tech from MDU Rohtak specialized in CSE. He is working as an Assistant Professor in the department of CSE in BGSBU. He has attended various seminar and conferences. His research area includes Cloud Computing, Security and Database.