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A Survey Paper on Various Computing to Emerge Cloud Computing

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Abstract: It is a vision that sounds a lot like what we are calling cloud computing. One of the first milestones in cloud computing history was the arrival of Salesforce.com in 1999, which pioneered the concept of delivering enterprise applications via a simple website. Cloud computing is an internet based computing which has powerful computational architecture and it offers universal services to the customers and it has several benefits over grid and other computing. In this paper, we have given a review on evolution of cloud computing, its comparison with other computing.

Keywords: Cloud, Computer bureau, Fog Computing, Dew Computing.

I. INTRODUCTION

The practice of using a network of remote servers hosted on the Internet to store, manage, and process data, rather than a local server or a personal computer.

Cloud computing is a type of Internet-based computing that provides shared computer processing resources and data to computers and other devices on demand.

The word "cloud" is commonly used in science to describe a large agglomeration of objects that visually appear from a distance as a cloud and describes any set of things whose details are not further inspected in a given context. The word cloud was used as a metaphor for the Internet and a standardized cloud-like shape was used to denote a network on telephony schematics.

Cloud Computing Services provide information technology (IT) as a service over the Internet or dedicated network, with delivery on demand, and payment based on usage. Cloud computing services range from full applications and development platforms, to servers, storage, and virtual desktops.

The cloud symbol was used to represent networks of computing equipment in the original ARPANET by as early as 1977, and the CSNET by 1981both predecessors to the Internet itself.

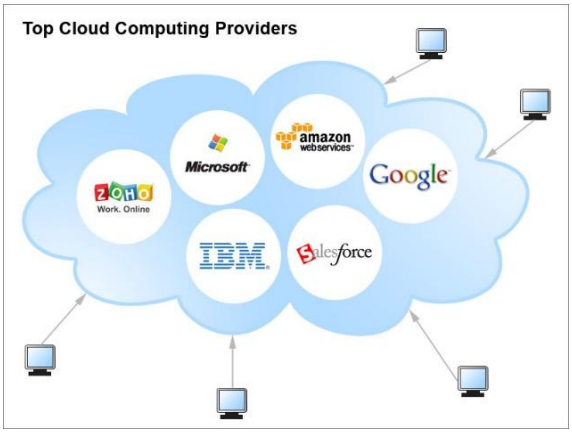

Fig: Top cloud computing providers

II.DIFFERENT TYPES OF COMPUTING

1. Client–server model:

A relatively new “buzz-word” for an old concept.

To many vendors, any system that uses personal computers networked to a larger server is a “client-server” system.

Even systems where the personal computer works solely in the terminal emulation are called client-server by some vendors. Such systems look exactly like the old mainframe-terminal systems except that the personal computer has replaced the terminal.

A true client-server application is one in which a complex application is decomposed into a part that runs on a server and one which runs on personal computers (the clients).

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Besides doing part of the computing for the application, the PC client provides a natural point and click graphical interface to the application.
Advances in networking and personal computers allow client-server applications to be more widely deployed today than has been possible in the past.
Client/server is a program relationship in which one program (the client) requests a service or resource from another program (the server). Although the client/server model can be used by programs within a single computer, it is a more important concept for networking. The client–server model is a distributed application structure that partitions tasks or workloads between the providers of a resource or service, called servers, and service requesters, called clients.

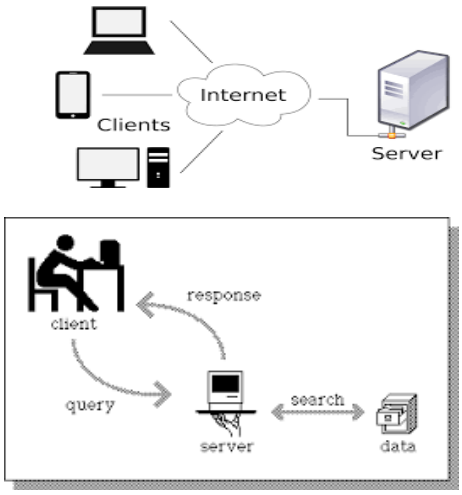

Fig: Peer-Peer computing

With a client server network, the files will not be stored on the hard drive of each workstation. Instead they will be stored on a specialised computer called a server. A server is designed to efficiently provide data to a remote client.
If you are using a client server network, then you will have a user account and you will have to log on with a user name and password.
There are a number of reasons why you do this. The first is to identify you to the server so that it knows which files belong to you and so it can make them available them for you.
The second is so that the security systems can check that you are actually who you say you are and that the account belongs to you.
On a large network there may be more than just the file server. There might also be an email server which deals with the internal email system. There may be a web server that controls access to the internet and blocks access to any unsuitable sites and a print server which deals with all of the printing requests. So that is the 'server' part of the client server network. - file, email and web servers
The 'client' part is the workstation that is connected to the network. The 'clients' rely on servers to do their job and fetch the files that the users require and manage the tasks and peripherals that the user wants to access.

Advantages: i) The biggest advantage to using this setup is central management of the server. Only one server is used to host the resources that all the clients request and use. This is especially good for server administrators, because they only have to be in one place and can solve all the problems in one place.
ii) Another advantage of using one physical server is that the configuration is simple to set up and takes less time to troubleshoot. In a single server role, all troubleshooting takes place at one physical server, so it takes much less time.
iii) Accessibility- server can be accessed remotely and across multiple platforms. iv)Ease of application development.
v) Lower total costs than “mainframe legacy systems”.
vi) User friendly - familiar point and click interface.

Disadvantages: i) Dependability - when the server goes down, operations cease
ii) Lack of mature tools - it is a relatively new technology and needed tools are lacking e.g. Automated client software distribution Lack of scalability - network operating systems (e.g. Novell Netware, Windows NT Server) are not very scalable.
iii) Higher than anticipated costs
iv) Can cause network congestion

2. Computer bureau: A service bureau providing computer services, particularly from the 1960s to 1980s. These allowed the services of a single large and expensive mainframe computer to be divided up and sold as a fungible commodity. Development of telecommunications and the first modems encouraged the growth of computer bureau as they allowed immediate access to the computer facilities from a customer's own premises. The computer bureau model shrank during the 1980s, as cheap commodity computers, particularly the PC clone but also the minicomputer allowed services to be hosted on-premises.

3. Distributed Computing: Distributed Computing is a field of computer science that studies distributed systems. A distributed system is a model in which components located on networked computers communicate and coordinate their actions by passing messages. The components interact with each other in order to achieve a common goal.
A distributed application is software that is executed or run on multiple computers within a network. These applications interact in order to achieve a specific goal or task. Traditional applications relied on a single system to run them.
Distributed computing is limited to programs with components shared among computers within a limited geographic area. Broader definitions include shared tasks as well as program components. In the broadest sense of the term, distributed computing just means that something is shared among multiple systems which may also be in different locations.

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The Distributed Computing Environment (DCE) is a widely-used industry standard that supports this kind of distributed computing. On the Internet, third-party service providers now offer some generalized services that fit into this model.

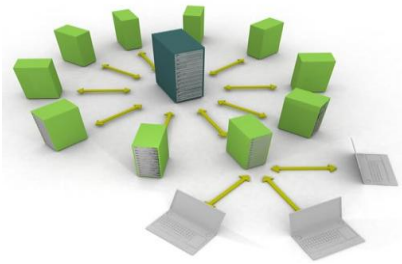

Fig: Distributed Computing

4. Parallel Computing: Parallel computing is a type of computation in which many calculations or the execution of processes are carried out simultaneously. Large problems can often be divided into smaller ones, which can then be solved at the same time.
Parallel processing is the simultaneous use of more than one CPU or processor core to execute a program or multiple computational threads. Ideally, parallel processing makes programs run faster because there are more engines (CPUs or cores) running it.

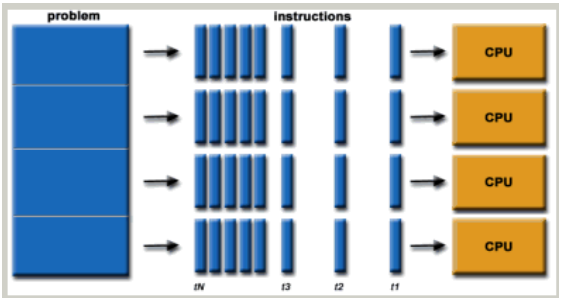

Fig: Parallel Computing

5. Cluster Computing: A computer cluster consists of a set of loosely or tightly connected computers that work together so that, in many respects, they can be viewed as a single system. Unlike grid computers, computer clusters have each node set to perform the same task, controlled and scheduled by software.

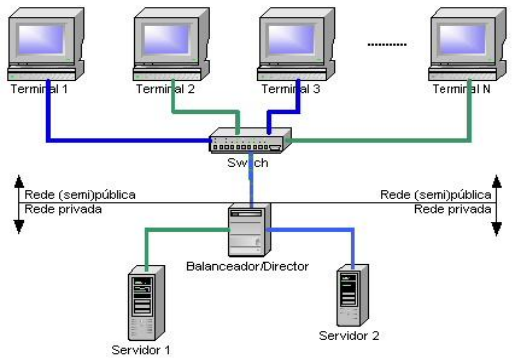

Fig: Cluster computing

They are usually deployed to improve performance and availability over that of a single computer, while typically being much more cost-effective than single computers of comparable speed or availability.
Computer clusters emerged as a result of convergence of a number of computing trends including the availability of low-cost microprocessors, high speed networks, and software for high-performance distributed computing.They have a wide range of applicability and deployment, ranging from small business clusters with a handful of nodes to some of the fastest supercomputers in the world such as IBM's Sequoia

6. Grid computing:"A form of distributed and parallel computing, whereby a 'super and virtual computer' is composed of a cluster of networked, loosely coupled computers acting in concert to perform very large tasks."
Grid computing is a computer network in which each computer's resources are shared with every other computer in the system. Processing power, memory and data storage are all community resources that authorized users can tap into and leverage for specific tasks.

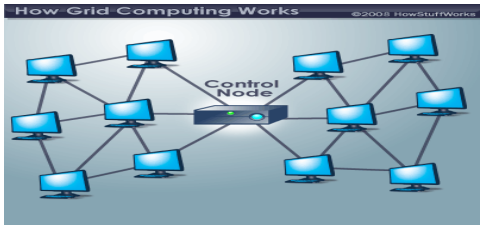

Fig: Grid Computing

A scientist studying proteins logs into a computer and uses an entire network of computers to analyse data. A businessman accesses his company's network through a PDA in order to forecast the future of a particular stock. An Army official accesses and coordinates computer resources on three different military networks to formulate a battle strategy. All of these scenarios have one thing in common: They rely on a concept called grid computing.

At its most basic level, grid computing is a computer network in which each computer's resources are shared with every other computer in the system. Processing power, memory and data storage are all community resources that authorized users can tap into and leverage for specific tasks. A grid computing system can be as simple as a collection of similar computers running on the same operating system or as complex as inter-networked

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systems comprised of every computer platform you can think of. Grid operations are generally classified into two categories:

Data Grid: A system that handles large distributed data sets used for data management and controlled user sharing. It creates virtual environments that support dispersed and organized research. The Southern California Earthquake Center is an example of a data grid; it uses a middle software system that creates a digital library, a dispersed file system and continuing archive.

CPU Scavenging Grids: A cycle-scavenging system that moves projects from one PC to another as needed. A familiar CPU scavenging grid is the search for extra-terrestrial intelligence computation, which includes more than three million computers.

Grid computing is standardized by the Global Grid Forum and applied by the Globus Alliance using the Globus Toolkit, the de facto standard for grid middleware that includes various application components. Grid architecture applies Global Grid Forum-defined protocol that includes the following:

Grid security infrastructure

- Monitoring and discovery service
- Grid resource allocation and management protocol
- Global access to secondary storage and GridFTP

7. Fog computing: Fog computing is a term created by Cisco that refers to extending cloud computing to the edge of an enterprise's network. Also known as Edge Computing or fogging, fog computing facilitates the operation of compute, storage and networking services between end devices and cloud computing data centres.

Fog computing, also known as fog networking, is a decentralized computing infrastructure in which computing resources and application services are distributed in the most logical, efficient place at any point along the continuum from the data source to the cloud. The goal of fog computing is to improve efficiency and reduce the amount of data that needs to be transported to the cloud for data processing, analysis and storage. This is often done for efficiency reasons, but it may also be carried out for security and compliance reasons.

The term fog computing is often associated with Cisco. "Cisco Fog Computing" is a registered name; “fog computing” is open to the community at large. The choice of the word "fog" is meant to convey the idea that the advantages of cloud computing should be brought closer to the data source. (In meteorology, fog is simply a cloud that is close to the ground.)

What if the laptop could download software updates and then share them with the phones and tablets? Instead of using precious (and slow) bandwidth for each device to individually download the updates from the cloud, they could utilize the computing power all around us and communicate internally. That is fog computing.

Data is not the issue. We have more of it than we can analyse or utilize already, and we’re gathering more and more every day. The problem is going to be storing and accessing the data when we want it in a convenient fashion.

8. Dew computing: Dew computing is an emerging new research area and has great potentials in applications. The definition of dew computing is: dew computing is an on-premises computer software/hardware organization paradigm in the cloud computing environment where the on-premises computer provides functionality that is independent of cloud services and is also collaborative with cloud services. This definition emphasizes two key features of dew computing: independence and collaboration. The goal of dew computing is to fully realize the potentials of on-premises computers and cloud services.

In the existing computing hierarchy, the Dew computing is positioned as the ground level for the cloud and fog computing paradigms. Compared to fog computing, which supports emerging IoT applications that demand real-time and predictable latency and the dynamic network reconfigurability, Dew computing pushes
the frontiers to computing applications, data, and low level services away from centralized virtual nodes to the end users.

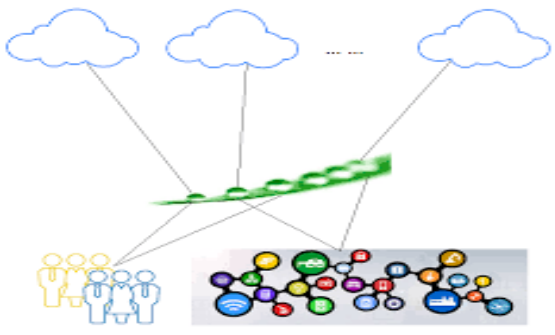

Fig: Dew Computing

category	Resources in dew	Key function	Existing application
Web in Dew(WiD)	Web fraction	Access Web fraction without Internet connection	
Storage in Dew(STiD)	Storage	Storage in dew has a cloud copy	Dropbox
Database in Dew(DiD)	Database	Local database has a cloud backup	

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Software in Dew(SiD)	Software	Software ownership And settings have a cloud copy	Apple App store, Google play
Platform in Dew(PiD)	Platform suite	SDK and projects Have a cloud copy	Git Hub
Infrastructure as Dew(IaD)	Whole Computer	On-premises computer settings and data have a cloud copy	
Data in Dew(DiD)	Data in forms	Dew computing applications not in above categories	Novel Group wise 7

Table 1: Category of dew computing

9. Mainframe computer: Powerful computers used mainly by large organizations for critical applications, typically bulk data processing such as: census; industry and consumer statistics; police and secret intelligence services; enterprise resource planning; and financial transaction processing. Used primarily by large organizations for critical applications, bulk data processing, such as census, industry and consumer statistics, enterprise resource planning, and transaction processing.

The number of MIPS (million instructions per second) is a general measure of computing performance and, by implication, the amount of work a larger computer can do. For large servers or mainframes, MIPS is a way to measure the cost of computing: the more MIPS delivered for the money, the better the value.

Fig: Mainframe computers

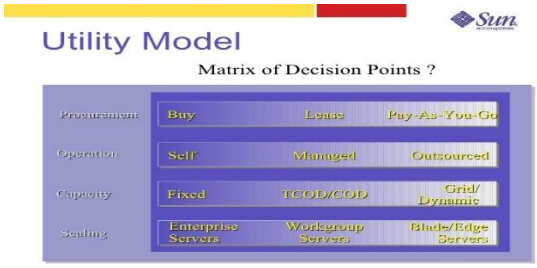
Mainframe data types:
Mainframes store data in one of two ways. Most use the EBCDIC code set, though some may use the ASCII code set. The code set relates to the way mainframes code the alphabet internally. For example, those using the ASCII code set store the letter "A" as the hexadecimal value 45 (65 decimal). In the EBCDIC code set, the same letter is represented by the hex value C1 (193 decimal). Data cannot be transferred between machines using different code sets without first being converted.

10. Utility computing: The "packaging of computing resources, such as computation and storage, as a metered service similar to a traditional public utility, such as electricity."

The Computer Utility, is a service provisioning model in which a service provider makes computing resources and infrastructure management available to the customer as needed, and charges them for specific usage rather than a flat rate.

Utility computing" has usually envisioned some form of virtualization so that the amount of storage or computing power available is considerably larger than that of a single time-sharing computer. Multiple servers are used on the "back end" to make this possible. These might be a dedicated computer cluster specifically built for the purpose of being rented out, or even an under-utilized supercomputer. The technique of running a single calculation on multiple computers is known as distributed computing.

Another version of utility computing is carried out within an enterprise. In a shared pool utility model, an enterprise centralizes its computing resources to serve a larger number of users without unnecessary redundancy.



11.Peer-to-peer:A distributed architecture without the need for central coordination. Participants are both suppliers and consumers of resources (in contrast to the traditional client–server model).

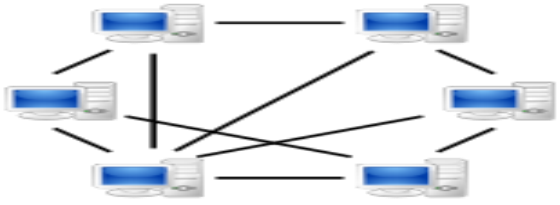


Fig: Peer-Peer computing

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Peers make a portion of their resources, such as processing power, disk storage or network bandwidth, directly available to other network participants, without the need for central coordination by servers or stable hosts.[1] Peers are both suppliers and consumers of resources, in contrast to the traditional client-server model in which the consumption and supply of resources is divided. Emerging collaborative P2P systems are going beyond the era of peers doing similar things while sharing resources, and are looking for diverse peers that can bring in unique resources and capabilities to a virtual community thereby empowering it to engage in greater tasks beyond those that can be accomplished by individual peers, yet that are beneficial to all the peers. In addition to tying up bandwidth and possibly exposing the administrator's organization legally, P2P applications can be used to bypass firewalls and distribute malware. Networks are often set up to prevent peer-to-peer "side talk" by PCs.

12. Green computing

Green computing is the environmentally responsible and eco-friendly use of computers and their resources. In broader terms, it is also defined as the study of designing, manufacturing/engineering, using and disposing of computing devices in a way that reduces their environmental impact.

The goal of green computing reduces the use of hazardous materials, maximize energy efficiency during the product's lifetime, and promote the recyclability or biodegradability of defunct products and factory waste.

Fig: Green Computing

13. Cloud sandbox: A live, isolated computer environment in which a program, code or file can run without affecting the application in which it runs.

A sandbox is a testing environment that isolates untested code changes and outright experimentation from the production environment or repository, in the context of software development including

Web development and revision control.

Create at least one test account for each user represented in the transactions you generate with the PayPal APIs. The Sandbox supports two different test account types: Personal, represents the buyer, or sender, in a transaction. Business represents the merchant, or receiver, in a transaction.

A security measure in the Java development environment. The sandbox is a set of rules that are used when creating an applet that prevents certain functions when the applet is sent as part of a Web page.

III.BUSINESS AND DEVELOPING TECHNOLOGYPLAYS AMAJOR ROLE IN RISE OF CLOUD COMPUTING

There are three major market forces that enable cloud computing and drive its adoption by computing user Organizations and by service providers:

i. IT becomes embedded in the business
ii. Shared service architecture mature
iii. Technology populism spread

IV. CONCLUSION

In this review paper we have discussed about the different computing technologies which evolved before the cloud computing. And also we discussed about the basics of cloud computing. so, we understand that the cloud computing has a major impact on society and commercial business.

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