

Mock drill on Different Computing Environments

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Abstract - There are number of computing technology available in computing world. To tackle the data in data science field. There is always a need of new technologies that can handle and process the data. This paper focus on the different computing environments available in computing world and how these computing evolved time to time to handle the data world and also introduce the latest computing technologies that are used now a days.

Keywords: cloud computing , Fog ,Ubiquitous

I.INTRODUCTION

There are different computing technologies or techniques available time to time for the demand of data handling and analysis such technologies are peer to peer computing, Distributed computing , Green computing , Hybrid computing and now a days according to the situation and demand there new computing paradigm are available such as Cloud computing ,Ubiquitous computing. So this paper review the different computing technologies and their significance in today's world.

II. LITERATURE REVIEW

2.1 Peer-to-Peer Computing[1]

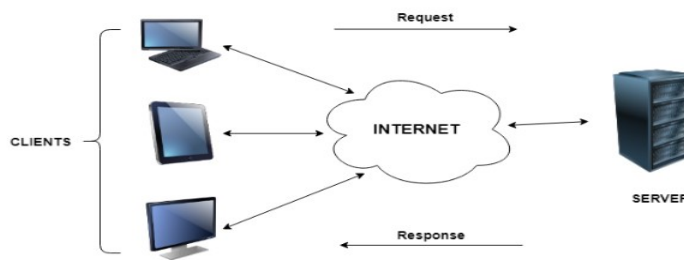
The term "peer-to-peer" (P2P) refers to a class of systems and applications that employ distributed resources to perform a critical function in a decentralized manner. With the pervasive deployment of computers, P2P is increasingly receiving attention in research, product development, and investment circles. This interest ranges from enthusiasm, through hype, to disbelief in its potential. Some of the benefits of a P2P approach include: improving scalability by avoiding dependency on centralized points; eliminating the need for costly infrastructure by enabling direct communication among clients; and enabling resource aggregation.[1]

NAPSTER Napster is a well known P2P file sharing application; written by "Shawn Fanning" in 1999. Napster was first created for those who had difficulty in discovering and downloading MP3 music files. Napster is a combination of a search engine and a file-sharing application. Napster is a file sharing service that facilitates the location and exchange of files, which usually include images, audio or video, via access to the internet. Napster being the first sharing application paved way for various programs including Kazaa, Morpheus, LimeWire and Bearshare. [2] ,GNUTELLA ,KAZAA KaZaA [3], BIT-TORRENT[4] are application of P2P computing.

2.2 Client server computing[5]

In client server computing, the clients requests a resource and the server provides that resource. A server may serve multiple clients at the same time while a client is in contact with only one server. Both the client and server usually communicate via a computer network but sometimes they may reside in the same system.

An illustration of the client server system is given as follows:



2.3 Mobile computing[6]

Recent advances in wireless data networking and portable information appliances have engendered a new paradigm of computing, called mobile computing, in which users carrying portable devices have access to data and information services regardless of their physical location or movement behavior. In the meantime, research addressing information access in mobile environments has proliferated.

2.4 Distributed Computing:

Distributed computing refers to two or more computers networked together sharing the same computing work. The objective of distributed computing is to sharing the job between multiple computers. Distributed network is mainly heterogeneous in nature in the sense that the processing nodes, network topology, communication medium, operating system etc. may be different in different network which are widely distributed over the globe [7, 8]. Presently several hundred computers are connected to build the distributed computing system. In order to get the maximum efficiency of a system the overall work load has to be distributed among the nodes over the network. So the issue of load balancing became popular due to the existence of distributed memory multiprocessor computing systems [9,10].Down in hardware costs and advancement in computer networking technologies have increased interest in the use of large-scale parallel and distributed computing systems. Distributed computing systems offer the potential for improved performance and resource sharing.

2.5 Cluster Computing:

A cluster is a collection of parallel or distributed computers which are interconnected among themselves using high-speed networks, such as gigabit Ethernet, SCI, Myrinet and Infiniband. They work together in the execution of compute intensive and data intensive tasks that would be not feasible to execute on a single computer. Clusters are used mainly for high availability, load-balancing and for compute purpose. They are used for high availability purpose as they maintain redundant nodes which are used to provide service when system components fail. The performance of the system is improved here because even if one node fails there is another standby node which will carry the task and eliminates single points of failure without any hindrance [11].

2.6 Grid Computing:

Grid computing [12] combines computers from multiple administrative domains to reach a common goal, to solve a single task, and may then disappear just as quickly. It is analogous to the power grid [7].Buyya et. al. [13] defined grid as a type of parallel and distributed system that enables the sharing, selection, and aggregation of geographically distributed autonomous resources dynamically at runtime depending on their availability, capability, performance, cost, and users quality-of-service requirements.

2.7 Cloud computing[14]:

1960s, John McCarthy, Douglas Parkhill, and others explored the idea of computing as a public utility. Centralized, Parallel, Cluster, Distributed and Grid Computing gave birth of today's most talked computing paradigm known as Cloud Computing.

Cloud computing is regarded as massively scalable, an on-demand configurable resources computing model and is one of the latest topics in the information sector. It offers the cloud infrastructure in a distributed rather than dedicated infrastructure where clients can have full access to the scalable, reliable resources with high performance, everything is provided to the clients as a utility service over the internet.

Internet has been a driving force towards the various technologies that have been developed. Arguably, one of the most discussed among all of these is Cloud Computing. Over the last few years, cloud computing paradigm has witnessed an enormous shift towards its adoption and it has become a trend in the information technology space as it promises significant cost reductions and new business potential to its users and providers [15].

The advantages of using cloud computing include: i) reduced hardware and maintenance cost, ii) accessibility around the globe, and iii) flexibility and highly automated processes wherein the customer need not worry about mundane concerns like software up-gradation [16].

2.8 Green Computing:

The green computing technologies can reduce energy consumption. The temperature of global world is increasing very quickly. There are many factors but computers/electronics industry causes over emission of green house gas and use much energy consumption which is the main root cause of current global warming. The energy consumption may be reduced by introduction of green computing.

In America in 1992 introduced a energy star program. Its main aim was given awarded to those computing products which use minimum energy and give maximum efficiency in its working. In Energy star program were included such product as computer monitor, television sets, refrigerator ,air conditioning and other electronics devices. All these products may be friendly green computing.[17]

2.9 UBIQUITOUS COMPUTING:

Ubiquitous computing is a concept where computing is made to appear everywhere using any device, in any location and in any format [18]. In ubiquitous computing environments computation is embedded. With advancements in computer science and technology the computer applications are seamlessly integrated into our daily lives. The devices worked in networked and standalone environment and capable of communication with the human and with each others. These devices support context-aware application, nomadic users, location aware services, and mobile data access. Ubiquitous systems provide anywhere and anytime access to information and various services while making the presence of the system “invisible” to the user.[19]

2.10 Fog Computing:

Fog computing is a geographically distributed computing architecture with a resource pool consists of one or more ubiquitously connected heterogeneous devices (including edge devices) at the edge of network and not exclusively seamlessly backed by cloud services, to collaboratively provide elastic computation, storage and communication (and many other new services and tasks) in isolated environments to a large scale of clients in proximity as in fig.2. Fog computing is generally considered as a non-trivial extension of cloud computing from the core network to the edge network [20]. [21] offers a comprehensive definition of fog computing, which arise from challenges and technologies that will shape the fog, with emphasis on some prominent properties, such as predominance of wireless access, heterogeneity and geographical distribution, sand-boxed environment and flexible interoperability, and large scale of nodes.

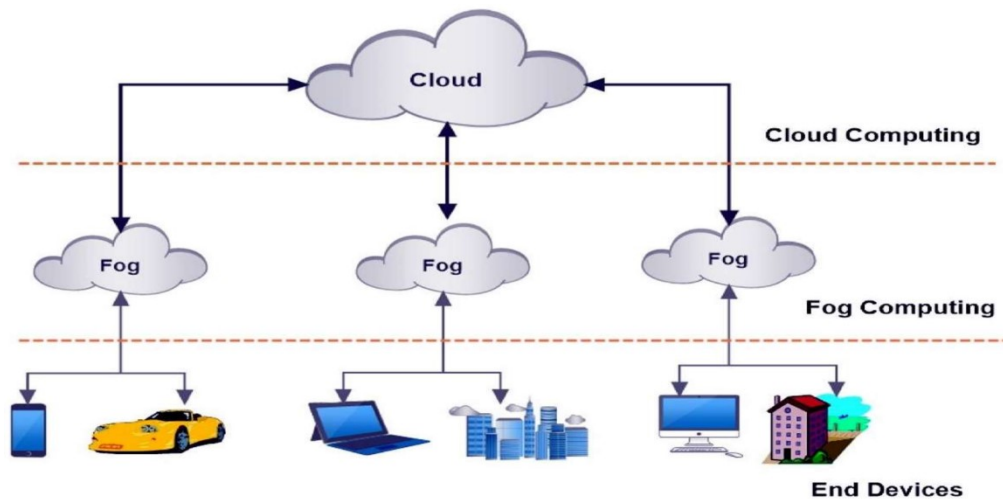


Figure 2 Fog Computing Architecture

2.11 Edge Computing:

Edge Computing combines multiple technologies such as Cloud Computing, Grid Computing, and IoT. It adds an additional tier between the Cloud and the end-devices and moves computational power to the end-device as close as possible. This means that, in the need of more computational resource by the end-device or a system, the task can be offloaded to an Edge Server instead of the Cloud. Edge Computing is expected to reduce the latency and increase the QoS for tasks which cannot be handled by these devices. These tasks are usually computationally heavy such as big data processing, video processing, artificial intelligence or time-sensitive. If the computation must be done in real-time, utilization of Cloud is out of the question since Cloud and Internet offers only best-effort service and delivery. A system is a real-time system only if it reacts to its environment by performing the correct pre defined actions within the specified time intervals[22]

III. ANALYSIS OF VARIOUS COMPUTING IN TABULAR STRUCTURE

Computing Technique	Evolution	Structure and Techniques Used	Application
Peer to Peer	1999 by Shawn Fanning	<ul style="list-style-type: none"> Routing and resource discovery Unstructured network 	<ul style="list-style-type: none"> Content delivery File-sharing networks Multimedia
Client-Server	1960s and 1970s ARPANET	<ul style="list-style-type: none"> Centralized computing Request–response, or request–reply 	<ul style="list-style-type: none"> Online banking, web browser database server
Distributed	1960s	<ul style="list-style-type: none"> Client–server model Peer-to-peer (P2P) 	<ul style="list-style-type: none"> telephone network Wireless sensor network (WSN) wireless ad hoc network
Cluster	Gene Myron Amdahl was an American computer architect in 1967	<ul style="list-style-type: none"> Loosely or tightly connected computers 	<ul style="list-style-type: none"> IBM General Parallel File System (GPFS). Cluster Shared Volumes (CSV) High-performance computing high-availability
Grid	Grid computing originated in the early 1990s Ian Foster & Carl Kesselman New Zealand-American computer scientist.	<ul style="list-style-type: none"> Heterogeneous cross-platform software CPU-scavenging, shared computing 	<ul style="list-style-type: none"> NASA's Information Power Grid Berkeley Open Infrastructure for Network Computing SETI@home ("SETI at home") is an Internet-based public
Cloud	Cloud computing" appeared as early as 1996, a Compaq internal document Amazon.com releasing its Elastic Compute Cloud product in 2006	<ul style="list-style-type: none"> Service-oriented architecture (SOA) Infrastructure as a service (IaaS) Platform as a service (PaaS) Software as a service (SaaS) 	<ul style="list-style-type: none"> Amazon Elastic Compute Cloud Google App Engine OpenNebula
Ubiquitous	Mark D. Weiser coined the phrase "ubiquitous computing" around 1988	<ul style="list-style-type: none"> Distributed Information Processing Physical computing Internet of things (IoT) 	<ul style="list-style-type: none"> ubiquitous systems was artist Natalie Jeremijenko's "Live Wire"
Edge computing	1980s and 1990s GE Digital's approach to industrial edge computing.	<ul style="list-style-type: none"> Parallel and distributed computing 	<ul style="list-style-type: none"> Time-Sensitive Networking (TSN) industrial controllers SCADA systems, Time series databases aggregating data from a variety of equipment and sensors
Fog Computing	2012 and 2015, Cisco Systems, Dell, Intel, Microsoft, and Princeton University, founded the OpenFog Consortium,	<ul style="list-style-type: none"> Internet backbone Internet exchange point content distribution network (CDN) 	<ul style="list-style-type: none"> Cisco booth's IOx (IoS and Linux) OpenFog Consortium

IV. CURRENT TRENDS IN COMPUTING WORLD

Technology is changing day by day. In computing world its changing very frequently. New technology such as IoT (Internet of Things) revolutionized the world with Internet of Everything (IoE). Now computing is embedded in day today activities and controlled from remote locations. It's the era of sense the things (with Sensors), Identify the things (RfID), shrinking the things (Nano technology), and Thinking the things (Embedded intelligence). So to control these things there is requirement of new computing environments such as Fog computing, Edge computing and Pervasive computing.

V. CONCLUSION

In this paper we had just take the overview of different computing environments available with respect to time. It helps a lot to understand the concept and applicability of various computing technologies. My main focus is to give different computing in one place and we can easily find out their meaning and concepts in less time. I have also mention the current computing environment and their use in IoT (Internet of Things).

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