

Cloud Computing and its Features

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Received: November 12, 2019; **Published:** December 02, 2019

Introduction

The use cloud computing is on demand availability of computer system resources for usage of computing power [1]. Cloud computing are divided in various subcategories based on requirements and physical location of computing resources. Few of cloud service models are 1) Software as a Service (SaaS) – it is a software transfer method that provides access to software and its functions remotely as a Web based service. 2) Platform as a Service (PaaS) – it is a computing platform being provided as a service. This is outsourced in place of a company or data center purchasing and managing its own hardware and software layers. 3) Infrastructure as a Service (IaaS) – computer infrastructure for instance, servers, storage and networking is provided as a service. IaaS is common with enterprises that have the convenience of having the cloud vendor manage their Information Technology infrastructure [2]. The Figure 1 illustrates Cloud Computing.

This editorial article gives brief insights about few from plenty of various cloud computing and its features.

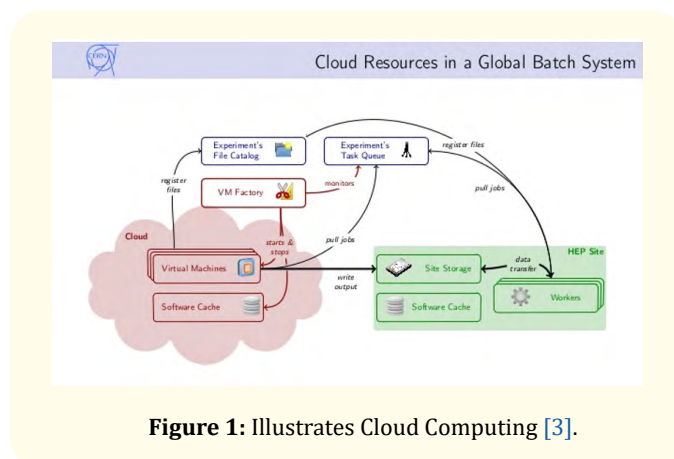


Figure 1: Illustrates Cloud Computing [3].

Self-check using quantum cloud computing

With this novel technique of quantum coprocessor in the cloud, scientists from Innsbruck, Austria developed a new method to the simulation of previously unresolved problems in materials research, chemistry or high-energy physics. In this research, scientists have simulated a particle phenomenon on 20 quantum bits and validated the quantum simulator self-verified the result for the first time.

Scientists simulated spontaneous formation of a pair elementary particles with digital quantum computer. Because of the error rate, more sophisticated simulations would require a large number of quantum bits. Using this new method, they have surpassed the limits. They used ion trap quantum computer method and utilized 20 quantum bits as a quantum coprocessor, in which they performed quantum mechanical calculations that limits of classical computers are outsourced. They used variational method known from theoretical physics but applied on quantum experiment. The programmable variational quantum simulator offers individual building blocks. In this quantum simulator, building blocks are entanglement [4,5]. Figure 2 illustrates concepts of Quantum computing.

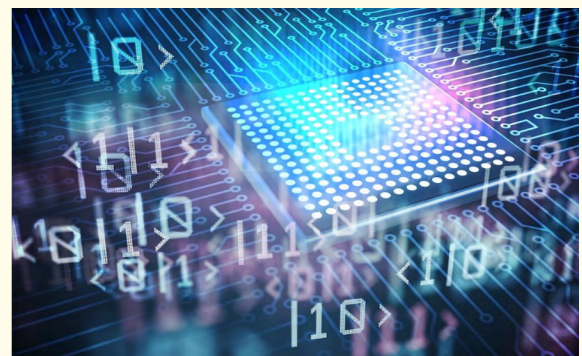


Figure 2: Illustrates Quantum Computing concepts [5].

In computing is fog more secure than cloud?

A new concept was developed by scientist in Italy; a remote and distributed storage of documents that have all the advantages of cloud computing with an catch of security of driving one's sensitive files and documents on a single remote server.

Having's one's documents or files hosted on remote servers dislocates hardware requirements and makes files accessible to remote users more effectively. Nevertheless, there are gaps in security and accessibility of files "in the cloud". Scientist has turned to another meteorological metaphor called "fog" and is alternative to cloud storage that makes any specified file entirely irrelevant rather than locating it on a single server. They visualize a fog of files rather than a cloud. The files are distributed on private or pub-

lic network and have no single location, in this method there is no single server that would target for hackers and only legitimate users can access them.

Figure 3 illustrates fog computing and Internet of things. Fog computing would essentially avoid the security and legal complications placing files and documents off-limits to hackers and elsewhere reach of law enforcement and in specific rogue authorities [6,7].

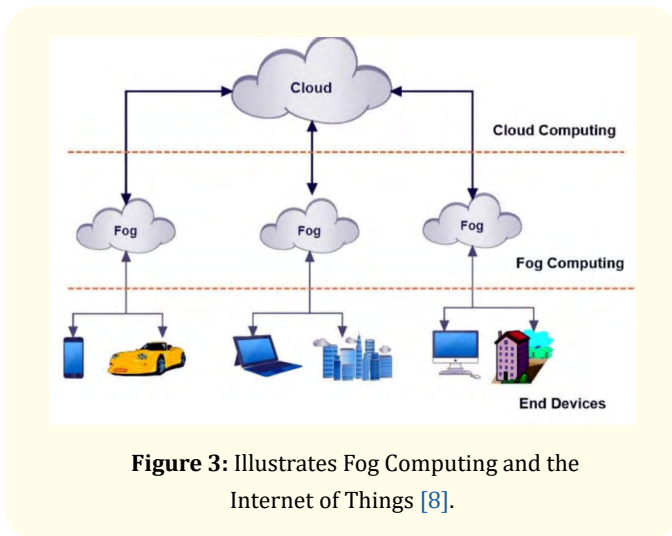


Figure 3: Illustrates Fog Computing and the Internet of Things [8].

Cloud computing for robots

Scientists from European universities developed a cloud computing platform for robots. This platform lets robots connected to the internet directly giving access to computing, storage and communications infrastructure of data centers.

Figure 4 illustrates cloud computing platform for robotics. With the expansion of the RoboEarth cloud engine the team resumes their work towards creating internet for robots. This platform extends previous work on allowing robots to share knowledge with other robots using World Wide Web (www) style database, drastically speeding up robot learning and adaptation in complex tasks. This platform was created as Service (PaaS) for robots that lets to perform complex tasks and various functions like navigation, mapping or processing human voice commands in the cloud. By creating it as enterprise computing infrastructure that is, available to any robot with wireless connection, scientists and researchers believe that this new method of computing platform will not only pave the way towards lighter and economical but also intelligent robots [9,10].

Expanding world of cloud computing

A novel computer method with significant potential for accomplishing significant cost savings and information technology agility was unclassified by the team of computer security experts at National Institute of Standards and Technology (NIST). Because federal government is looking for cloud computing as component of its new technology infrastructure, NIST role was to examine it and then endorse its effective and secure use within government

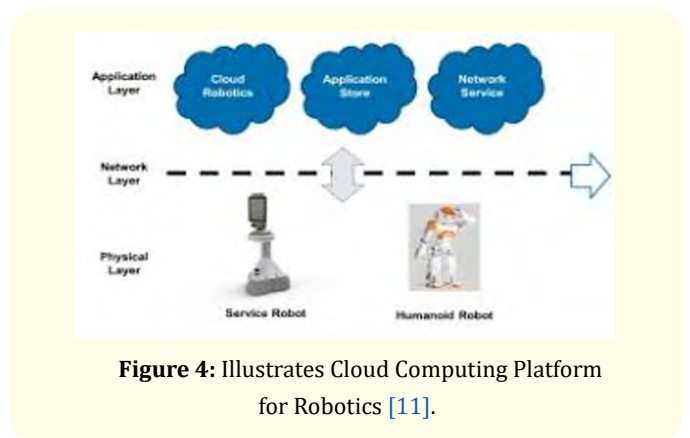


Figure 4: Illustrates Cloud Computing Platform for Robotics [11].

and industry by providing technical guidance and creating quality standards.

Figure 5 illustrates cycle of cloud computing. NIST cloud computing research team is examining cloud architecture, security and deployment strategies for usage of federal government. But its priority task is to collaborate with industry and government to create a working definition of cloud computing that assist as a foundation for its research and development. Security is always a worry with any new computer method and this is not different from others [12].

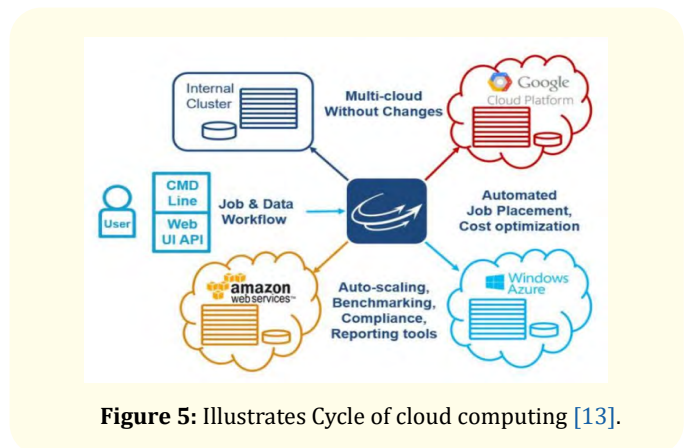


Figure 5: Illustrates Cycle of cloud computing [13].

High energy physics experiments in cloud computing

A new method was developed, assisting high energy physicists at CERN in Switzerland, to make production runs that integrate existing pool of distributed computers with dynamic resources.

This integration was accomplished by leveraging two mechanisms: one developed by computer scientist at US department of Energy and other at University of Chicago. CernVM technology was initiated with the intention of supplying portable development environments that researchers can run on their laptops and desktops. A variety of virtual image formats are supported, including Xen images that was used by the Amazon EC2 as well as Science Clouds.

One of the most remarkable accomplishment of the research project was the fact that work was completed by integrating cloud computing into the existing mechanisms was according to Keahey [14].

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Volume 2 Issue 1 January 2020

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