

## Chapter 3

# Examining of QoS in Cloud Computing Technologies and IoT Services

**Akash Chowdhury**

*Institute of Science and Technology, India*

**Swastik Mukherjee**

*Institute of Science and Technology, India*

**Sourav Banerjee**

*Kalyani Government Engineering College, India*

### **ABSTRACT**

*The various services that are offered by IoT and Cloud Service Providers (CSPs) to the customers today feature a pay-per-use service-charging policy. Customers can choose and avail these services when they want, how they want, and from where they want on demand. Demand for these services has increased drastically over the years among individuals and enterprises worldwide, and thus, it is very important to keep up good Quality of Service (QoS). This chapter highlights the history of internet, the gradual evolution of cloud computing, the reasons behind it, evolution and concepts of the Internet of Things (IoT), CloudIoT and its necessities, and various applications and service fields of CloudIoT. This chapter also precisely highlights various concepts regarding maintenance of good QoS, controversies in QoS maintenance, different parameters that the QoS depends on, various problems faced in maintaining those parameters, and the possible solutions for overcoming those problems. Possible directions towards future works are also highlighted in this chapter.*

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## **1. INTRODUCTION**

The evolution of Internet and then the creation of the World Wide Web (WWW) made people from all over the world, capable of connecting, communicating and exchanging data with each other and thus got rapidly extended. This new revolution led to the business expansion of individuals and enterprises from all over world which showed them a steep growth of their economy. But with the passing time, various kinds of data that are created by the people, for the people and about the people started increasing in an exponential rate. Organizing and structuring this data became very difficult as huge processing tasks are involved. Storing such huge amount of data was a bigger challenge that was faced until new enterprises took to solve this issues by providing services of rented storage and processing units and enabled a pay-per use model regarding rents for those services and thus the concept of cloud and cloud computing evolved, which is described in section 2.2.

With more advancement in technology and increasing demand for better or smarter living standards, new services were started to be created that supported real life scenarios like smart homes, smart cities, intelligent working environments, smart transportation, and smart environmental monitoring systems, etc. This new technology involved the concepts of connecting the real world objects or things to the Internet, incorporating all sorts of infrastructural support required, from the cloud to create Smart Living Services (SLSs). In this technology, things from the real world were made to connect, communicate and share data with other things over the Internet, to create different SLSs and thus named as the IoT. Maintenance of smart living standards depends on the maintenance of good QoS and on the various parameters that the QoS depends on. But maintenance of good QoS is a very big challenge and thus faces many problems regarding different parametric issues, as described in section 3.

## **2. BACKGROUND**

The IoT technology though stands as an independent technology, it depends on the Cloud Computing technologies for its proper implementations. Cloud computing further found its backbone in the Internet Technology.

### **2.1. Evolution of Internet**

In the late 1960s (Cisco.com, 2017) DARPA or Defense Advanced Research Projects Agency, formerly known as ARPA or Advanced Research Projects Agency under the Department of Defense of United States did an experiment by inter-connecting computer networks of different universities and private companies and granting their involvements in the research related works. This experimented network went online for the first time in 1969 having a four node network connected with circuits of 56 Kbps. United States and Europe found proofs regarding this network's reliability and created their own military networks named MILNET and MINET respectively. With the passing years more and more universities and private organizations connected their private networks to this network and thus gave birth to ARPANET or "ARPA Internet". The Acceptable Use Policy (AUP) followed by the ARPANET clearly stated that ARPANET cannot be used for commercial purposes. ARPANET was so heavily used that by 1985 it got vigorously congested and in 1989 it got decommissioned.

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