

Quality of Service Evaluation of Software Defined Internet of Things Network

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Abstract: With the exponential growth of the Internet of Things (IoT) devices connected to the internet, resource provisioning for such the heterogeneous network is a challenging task for the traditional network architecture. In this context, the Software-Defined Networking (SDN) introduces many opportunities and provides the potential to overcome challenges associated with traditional network architecture. This work presents a Software-Defined IoT (SDIoT) architecture. The main focus of this research is to design a control plane (CP) for the SDIoT. The scope of this work is limited to the introduction of an overlay SDN CP in the traditional IoT network architecture. The proposed architecture focuses on resource provisioning while ensuring the quality of service (QoS) satisfaction for the network. A comparative analysis between the traditional and the SDN network approach was done in terms of Jitter, Latency and Throughput. From the latency, delay and throughput performance results, the SDN-based IoT network improves network efficiency by reducing network overheads generated from frequent communication between the nodes and the controllers. Precisely, the average latency and average jitter percentile improvement from the traditional IoT network to the SDIoT for all the nodes is 574% and 600% respectively. Also, an overall throughput improvement is recorded for the SDIoT when compared to traditional IoT network for all the nodes.

Keywords: Internet of Things, Software-Defined Networking, SDIoT, QoS, Jitter, Latency and Throughput.

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1. INTRODUCTION

The introduction of the IoT and SDN technologies refines every precedent and preconceived notion of networking. The IEEE defined IoT as a system that deals with the interconnection of "Things." The word "Things" refers to any physical object that is relevant from a user or application perspective [1]. IoT envisions a self-

configuring, adaptive, complex network that interconnects 'things' to the internet through the use of standard communication protocols. The things offer services which are made available anywhere, anytime, and for anything, with or without human intervention [2, 3]. The evolution of IoT, as shown in Figure 1, dates back to the pre-internet era when there is only human to human communication.

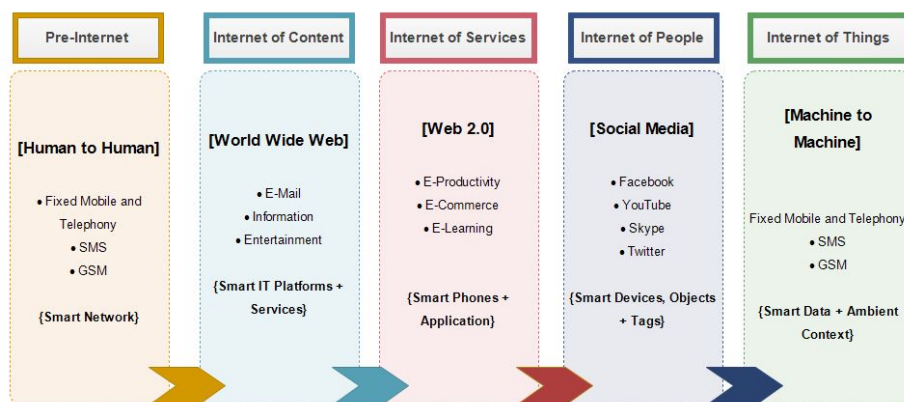


Figure 1 Evolution to IoT [4]

The era of the internet of content with the evolution of the worldwide web (www) followed afterwards. After that, we had the era of the internet of services with the evolution

of "web 2.0", the first game-changer of the modern internet. In this era, we started using the internet more frequently for communication and other purposes. Then