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قسم

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Performance Evaluation of Virtualized Networks to Serve the Smart IoT Applications

A Thesis
Submitted in partial fulfillment of the requirements of
a Master of Science Degree in Electrical Engineering
(Electronics and Communications Engineering)

Submitted by:
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Cairo, 2020

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Statement

This dissertation is submitted to Ain Shams University for the degree of Master of Science in Electrical Engineering (Electronics and Communications Engineering).

The work included in this thesis was carried out by the author at the Electronics and Communications Engineering Department, Faculty of Engineering, Ain Shams University, Cairo, Egypt.

No part of this thesis was submitted for a degree or a qualification at any other university or institution.

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Abstract

Recently, emerging technologies such as mobile devices and applications, social networks, cloud computing, and big data have experienced explosive growth, and end-users are expecting higher data rates with better quality of services (QoS) year after year.

This thesis gives a brief introduction to the software-defined network (SDN) definition, general concepts, and architecture as technology, then illustrates various mobile network architectures using different technologies. It shows the simulation of these architectures plus real live networks measurement, so in the end, it can propose SDN architecture that can be used to serve multiple applications and technologies. Network simulation models are used to evaluate the performance of the proposed SDN architectures as well as various architectures representing the traditional networking technologies for different scenarios under different conditions.

The simulation results show the improvement of the SDN performance over the other ones. The traditional architectures have been im-

plemented and tested in two mobile operator's production environments and test labs; and the practical measurements have been compared with the simulation results for its consistency.

This work is considered as SDN proof-of-concept and interoperability with other technologies which is an essential aspect during the migration to SDN so a hybrid proposed model is simulated to gain benefits of SDN at the lowest cost keeping part of the traditional network as well.

Keywords: SDN; Open Flow; Open Day light; Cisco SDN; Mininet; Throughput; Simulated Networks; IoT applications; Performance Measurements

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