INFORMATION OF THE DOCTORAL THESIS

Thesis title:

THE SOLUTIONS FOR CONGESTION CONTROL IN IoT NETWORK WITH CoAP PROTOCOL

Specified field of study: **Telecommunication Engineering**
Code of specialty: **9.52.02.08**
Name of PhD candidate: **Le Thi Thuy Duong**
Supervisors:

1. **Assoc.Prof. Sc.Dr. Hoang Dang Hai**
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Academic Institution: Posts and Telecommunications Institute of Technology

NEW RESULTS OF THE DISSERTATION:

The thesis does research the mechanism control of CoAP and its improved protocols. The thesis analysed the remaining constraints about the abilities to early detect congestion, the abilities to control the burst packets transmitted and transmission speeds. Base on the analyses, the thesis proposed two new protocols, namely: RCoAP based on burst packets transmission model and FCoAP based on fuzzy logic. The new contributions of researches presented in the thesis are as follow:

1) Building a model to analyse data transmission with burst packets for CoAP and building a new protocol RCoAP based on transmission speed to control congestion in IoT network. This new protocol uses variable speed mechanism control to adapt with the conditions of congestion to achieve high performance in delay, throughput, packet loss rate, re-transmission rate, and double-transmission rate in comparison with current CoAP standards.
2) Building a new FCoAP congestion control protocol using dynamic fuzzy logic system, which is adaptable with the conditions of congestion and network's parameters in order to achieve high performance in delay, throughput, packet loss rate, re-transmission rate, and double-transmission rate in comparison with current CoAP standards in the dynamic conditions of the network, even in the case of serious congestion.

APPLICATIONS, PRACTICAL APPLICABILITIES OR FURTHER STUDIES:

The FCoAP and RCoAP protocols built in the thesis are able to transmit reliable burst packets, which are suitable with the applications to transmit the real time big data flows such as: live video flows, surveillance camera networks, medical monitoring and health care, and public surveillance. FCoAP is more suitable with the applications that have long turnaround time in multi-hop transmission. RCoAP may be more suitable for the applications of burst packets transmission in short hop with short turnaround time.

The research directions can be developed from this thesis including: researching on the capabilities to optimize the control parameters for RCoAP and FCoAP; study to evaluate the complexities of RCoAP and FCoAP in comparison with CoAP.

Confirmation of representative supervisors **PhD candidate**

Hoang Dang Hai **Le Thi Thuy Duong**