



THE CHINESE UNIVERSITY OF HONG KONG
Department of Information Engineering

Seminar

**FEMOS: Fog-Enabled Multi-tier Operations Scheduling
in Dynamic Wireless Networks**

by

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The Chinese University of Hong Kong

Abstract

Fog computing has recently emerged as a promising technique in content delivery wireless networks to alleviate the heavy bursty traffic burdens on backhaul connections. In order to improve the overall system performance, in terms of network throughput, service delay and fairness, it is very crucial and challenging to jointly optimize node assignments at control tier and resource allocation at access tier under dynamic user requirements and wireless network conditions. To solve this problem, in this talk, a fog-enabled multi-tier network architecture is proposed to model a typical content delivery wireless network with heterogeneous node capabilities in computing, communication and storage. Further, based on Lyapunov optimization techniques, a new online low-complexity algorithm, namely “Fog-Enabled Multi-tier Operations Scheduling” (FEMOS), is developed to decompose the original complicated problem into two operations across different tiers. Rigorous performance analysis derives the tradeoff relationship between average network throughput and service delay, i.e., $[O(1/V), O(V)]$ with a control parameter V , under FEMOS algorithm in dynamic wireless networks. For different network sizes and traffic loads, extensive simulation results show that FEMOS is a fair and efficient algorithm for all user terminals (UTs) and, more importantly, it can offer much better performance, in terms of network throughput, service delay, and queue backlog, than traditional node assignment and resource allocation algorithms.

Biography

Dr. Yang Yang received the BEng and MEng degrees in Radio Engineering from Southeast University, Nanjing, China, in 1996 and 1999, respectively; and the PhD degree in Information Engineering from the Chinese University of Hong Kong in 2002.

He is currently a professor with Shanghai Institute of Microsystem and Information Technology (SIMIT), Chinese Academy of Sciences, serving as Director of CAS Key Laboratory of Wireless Sensor Network and Communication, Director of Shanghai Research Center for Wireless Communications (WiCO), and a Co-Director of Shanghai Institute of Fog Computing Technology (SHIFT). He is also a Distinguished Adjunct Professor with the School of Information Science and Technology, ShanghaiTech University. Prior to that, he has held faculty positions at The Chinese University of Hong Kong, Brunel University, and University College London (UCL), UK.

Yang is a member of the Chief Technical Committee of the National Science and Technology Major Project “New Generation Mobile Wireless Broadband Communication Networks” (2008-2020), which is funded by the Ministry of Industry and Information Technology (MIIT) of China. In addition, he is on the Chief Technical Committee for the National 863 Hi-Tech R&D Program “5G System R&D Major Projects”, which is funded by the Ministry of Science and Technology (MOST) of China. Since January 2017, he has been serving the OpenFog Consortium as a Board Member and the Director of Greater China Region.

Yang’s current research interests include wireless sensor networks, Internet of Things, Fog computing, Open 5G, and advanced wireless testbeds. He has published more than 160 papers and filed over 80 technical patents in wireless communications. He is a Fellow of the IEEE.

**** ALL ARE WELCOME ****