



**THE CHINESE UNIVERSITY OF HONG KONG**  
Department of Information Engineering

*Seminar*

**Software-Based Networks: Leveraging high-performance  
NFV platforms to meet future communication challenges**

by

**Professor K. K. Ramakrishnan**  
University of California, Riverside, U.S.A.

**Date : 20 May, 2016 (Friday)**  
**Time : 2:30pm – 3:30pm**  
**Venue : Room 1009, William M.W. Mong Engineering Building**  
**The Chinese University of Hong Kong**

Abstract

Communication networks are changing. They are becoming more and more “software-based.” The use of Network Function Virtualization to run network services in software enables Software Defined Networks (SDN) to create a largely software-based network. To truly achieve the vision of a high-performance software-based network that is flexible, lower- cost, and agile, a fast and carefully designed network function virtualization platform along with a comprehensive SDN control plane is needed. Our high-performance NFV platform, OpenNetVM, enables high bandwidth network functions to operate at near line speed, while taking advantage of the flexibility and customization of low cost commodity servers. OpenNetVM exploits Intel’s DPDK libraries to minimize the overhead of packet processing, and to provide high throughput, low latency networking in virtualized environments. OpenNetVM allows true zero-copy delivery of data to VMs, both for packet processing and high-speed inter-VM communication through shared huge pages within a trust boundary. We envision a dynamic and flexible network that can support a smarter data plane than just simple switches that forward packets. We build on our OpenNetVM NFV platform by developing our SDNFV network architecture that supports complex stateful routing of flows where processing by network functions (NFs) can dynamically modify the path taken by flows, without unduly burdening the centralized SDN controller.

Biography

Dr. K. K. Ramakrishnan is Professor of Computer Science and Engineering at the University of California, Riverside. Until recently was a Distinguished Member of Technical Staff at AT&T Labs-Research. He joined AT&T Bell Labs in 1994 and has been with AT&T Labs-Research since its inception in 1996. Prior to 1994, he was a Technical Director and Consulting Engineer in Networking at Digital Equipment Corporation. Between 2000 and 2002, he was at TeraOptic Networks, Inc., as Founder and Vice President. Dr. Ramakrishnan is an AT&T Fellow, recognized for his fundamental contributions on communication networks and lasting impact on AT&T and the industry, including his work on congestion control, traffic management and VPN services. He is an IEEE Fellow, and has received other awards. His work on the "DECbit" congestion avoidance protocol was recognized in the 1995 retrospective issue of ACM Sigcomm Computer Communication Review as one of the 16 most important papers published over the previous 25 years in ACM Sigcomm publications. The work once again received the ACM Sigcomm Test of Time Paper Award in 2006. He has published nearly 200 papers and has more than 120 patents issued in his name. K.K. has been on the editorial board of several journals and has served as the TPC Chair and General Chair for several networking conferences and has been a member of the National Research Council Panel on Information Technology for NIST. K. K. received his MS from the Indian Institute of Science (1978), MS (1981) and Ph.D. (1983) in Computer Science from the University of Maryland, College Park, USA.

**\*\* ALL ARE WELCOME \*\***