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A Scalable Information-Centric Networking Architecture for the Future Internet

Speaker: Prof. Hang Liu
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1:00PM- 2:00PM, NVC 325

Abstract

The Internet is primarily used for content retrieval and information access. However today's IP networks were built to interconnect fixed computing nodes (terminals, servers, etc.), in which communications are based on the node's IP addresses. Such discrepancy causes inefficiencies in networks as well as in application designs. Information-Centric Networking (ICN) has recently attracted research attention and is considered as a promising paradigm for the future Internet architecture, which decouples content from hosts at the network layer, and retrieves a content object by its name (identifier), instead of its storage location (host IP address) in order to address IP network's limitations. However, ICN systems face scalability and efficiency challenges in global deployments. In this talk, we propose a scalable name resolution and routing framework, called Scalable Multi-level Virtual Distributed Hash Table (SMVDHT). SMVDHT uses a combination of name aggregation and multi-level virtual DHTs to achieve scalability. A novel aggregation scheme is proposed to reduce the size and update overhead of name resolution tables. We also design the new protocols to efficiently resolve the aggregated names and route a request to the closest available copy of content.

If time permits, I'll also give an overview of our ongoing and previous projects including video delivery over heterogeneous networks, MIMO cooperative and cognitive networking, and wireless mesh and mobile ad hoc networks.

Biography

Dr. Hang Liu joined the Catholic University of America as an Associate Professor in the Department of Electrical Engineering and Computer Science in 2013. Prior to joining CUA, he had more than 10 years of research experience in networking industry and held several senior research and management positions at InterDigital Communications LLC, Thomson (now Technicolor) Corporate Research Lab in Princeton, NJ, and NEC Laboratories America. He also led several industry-university collaboration projects. He was an adjunct professor of WINLAB, ECE Dept., Rutgers University from 2004 to 2012. Dr. Liu has published more than 60 papers in leading journals and conferences, and received one best paper award and one best student paper award. He is the inventor/co-inventor of over 80 granted and pending international patents. He has also made many contributions to the IEEE 802 wireless standards and 3GPP standards, and was the editor of the IEEE 802.11aa standard and the rapporteur of a 3GPP work item. Hang Liu received his Ph.D. degree in Electrical Engineering from the University of Pennsylvania. His current research interests include wireless communications and networking, cognitive radio networks, Internet of Things, mobile computing, information-centric networking, content distribution, media streaming, future Internet architecture, and network security.