Illinois Center for Wireless Systems

ICWS Seminar Series

Real-Time Peer-to-Peer Streaming over Random Hamilton Cycles

Dr. Joohwan Kim
Coordinated Science Lab
University of Illinois

Monday, March 5, 2012,
4:00-5:00 p.m.
141 Coordinated Science Lab

Abstract: We are motivated by the problem of designing a simple distributed algorithm for Peer-to-Peer streaming applications that can achieve high throughput and low delay, while allowing the neighbor set maintained by each peer to be small. While previous works have mostly used tree structures, our algorithm constructs multiple random directed Hamilton cycles and disseminates content over the superposed graph of the cycles. Compared with other algorithms, the complexity of dynamically updating the network topology in response to peer churn does not increase with the network size under our algorithm. We show that it is possible to achieve the maximum streaming capacity even when each peer only transmits to and receives from $\Theta(1)$ neighbors. Further, we show that the proposed algorithm achieves the streaming delay of $\Theta(\log N)$ when the streaming rate is less than $(1-\frac{1}{K})$ of the maximum capacity for any fixed constant $K \geq 2$.

Joint work with Prof. R. Srikant at the University of Illinois at Urbana-Champaign.

Biography: Dr. Joohwan Kim received the B.S. degree from Yonsei University, Seoul, Korea, in 2004, and the M.S. degree and the Ph.D. degree from Purdue University, West Lafayette, IN, in 2006 and 2010, respectively. He is currently a post-doctorate research associate of the Coordinated Science Lab. at the University of Illinois at Urbana-Champaign. His research interests range over a variety of fundamental problems in wireless and wireline networks. He is currently interested in the analysis and the development of P2P streaming systems.

ICWS Seminar series is supported by a grant from Rockwell Collins