THE CHINESE UNIVERSITY OF HONG KONG
Institute of Network Coding
and
Department of Information Engineering
Seminar

Local Phy + Global Routing :
A Fundamental Layering Principle for Wireless Networks

by

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Date   :   **20 July 2011 (Wednesday)**
Time   :   **11:30 am- 12:30 pm**
Venue :   **Room 833, Ho Sin Hang Engineering Building**
              The Chinese University of Hong Kong

Abstract

Engineering design of wireless networks typically involves "layering": reliable communication over the wireless medium -- the physical (phy) layer -- is used to create bit pipes between the nodes, over which the data is routed. The optimality of such an approach, as well as the fuzziness in where to draw the boundary between physical and network layers, is often unclear.

In this talk we derive a fundamental, information-theoretic, layering principle: "local" physical layer schemes combined with global routing are near optimal for general multiple unicast traffic. We show this in a broad context: networks with both wireless and wireline components (eg: cellular networks) and under different channel models: packet erasures and additive Gaussian noise.

As part of this design principle we derive rules of thumb for where to draw the line between physical and network layers. Feedback is seen to play a critical role in enabling the separation between physical and network layers. The key technical contribution is an approximate max flow, min cut theorem in polymatroidal wireline networks.

Biography

Pramod Viswanath received the PhD degree in EECS from the University of California at Berkeley in 2000. He was a member of technical staff at Flarion Technologies until August 2001 before joining the University of Illinois, Urbana-Champaign where he is a professor in the ECE department. He is a recipient of the Xerox Award for Faculty Research from the College of Engineering at UIUC (2010), the Eliahu Jury Award from the EECS department of UC Berkeley (2000), the Bernard Friedman Award from the Mathematics department of UC Berkeley (2000), and the NSF CAREER Award (2003). He was an associate editor of the IEEE Transactions on Information Theory for the period 2006-2008.

**ALL ARE WELCOME **

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