



Fall 2009 CIS Colloquium Series

Fairness, Bandwidth Differentiation, and Quality of Service in CSMA/CA Networks

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*11am-12pm, Wednesday, October 7, 2009
4th Floor Conference Room (Wachman Hall, CC 447)*

Abstract: In this talk, we examine some intriguing problems related to fairness, bandwidth differentiation and quality of service in CSMA/CA networks. IEEE 802.11 access points have been almost universally deployed in most populous areas in US. We demonstrate an anomaly caused by location-dependent interference among nearby access points, allowing some hosts to acquire most channel bandwidth at the expense of others. As our study reveals, today's overhearing-based solutions, as well as several non-overhearing AIMD solutions, cannot achieve MAC-layer fairness among contending wireless LANs under various settings. We propose several new rate control methods, such as PISD (Proportional Increase Synchronized multiplicative Decrease) and Queue Spreading, which support weighted rate/time fairness among CSMA/CA networks, particularly IEEE 802.11 networks, by using only local information and performing localized operations. These new methods work well even when two contending wireless LANs are within the carrier sensing range but outside the transmission range of each other so that they cannot explicitly exchange any information. Finally we move to multihop wireless networks and show that weighted bandwidth allocation at the MAC layer can help provide prioritized rate assurance for end-to-end flows without using resource reservation and admission control.

Bio: Dr. Shigang Chen (sgchen@cise.ufl.edu) is an associate professor with the Department of Computer and Information Science and Engineering at the University of Florida. He received his B.S. degree in computer science from University of Science and Technology of China in 1993. He received M.S. and Ph.D. degrees in computer science from University of Illinois at Urbana-Champaign in 1996 and 1999, respectively. After graduation, he had worked with Cisco Systems for three years before joining the University of Florida in 2002. He served on the technical advisory board for Protego Networks in 2002-2003. His research interests include wireless traffic engineering and network security. He received IEEE Communications Society Best Tutorial Paper Award in 1999 and NSF CAREER Award in 2007. He was a TPC co-chair for IWQoS 2009 and the Computer and Network Security Symposium of ACM IWCMC 2009. He served as a TPC co-chair for the Computer and Network Security Symposium of IEEE IWCCC 2006, a vice TPC chair for IEEE MASS 2005, a vice general chair for QShine 2005, and a TPC co-chair for QShine 2004.

Refreshments will be served!