



Illinois Center for Wireless Systems

ICWS Seminar Series



Living in the WAM Continuum: Unified Design and Operation of Wireless and Mobile Networks

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Abstract: Until recently, the vast majority of research in wireless and mobile (WAM) networking fell in the MANET (Mobile Ad Hoc Network) category, where relatively stable end-to-end paths are the norm. More recently, research has focused on a different Disruption Tolerant Network (DTN) paradigm, where stable end-to-end paths are the exception and intermediate nodes may store data while waiting for transfer opportunities towards the destination. Protocols developed for MANETs generally do not work in DTNs and vice versa, since the connectivity assumptions are so different. In this talk I will first give an overview of DTNs and the types of challenges involved in their design and operation. I will then discuss our work in the WAM (wireless and mobile) Continuum project which is based on the simple but powerful observation that MANETs and DTNs fit into a continuum that generalizes these two previously distinct categories. Building on this observation, our work develops a framework that goes further to scope the entire space of Wireless and Mobile networks.

I will summarize two efforts: The first aims at developing a formal WAM Continuum framework where a network can be characterized by its position in this continuum. Certain network equivalence classes can be defined over subsets of this WAM continuum and this classification can be used to inform network design and operation. I will demonstrate how the unified view enabled by our framework can be used as a systematic, formal descriptive and evaluative tool. The second effort aims to unify the use of message ferrying (a technique in which some mobile nodes are tasked with carrying data among other network nodes) with the well-known use of connected dominating set-based routing in MANETs. My presentation will include illustrations that demonstrate our concepts in the context of networks described by mobility models and traces.

Bio: Mostafa Ammar is a Regents' Professor with the School of Computer Science at Georgia Tech. He has been with Georgia Tech since 1985. He received the S.B. and S.M. degrees from the Massachusetts Institute of Technology in 1978 and 1980, respectively and the Ph.D. in Electrical Engineering from the University of Waterloo, Ontario, Canada in 1985. Dr. Ammar's research interests are in network architectures, protocols and services. He has contributions in the areas of multicast communication and services, multimedia streaming, content distribution networks, network simulation and most recently in disruption-tolerant networks and overlay network design. Dr. Ammar has published extensively in these areas. To date, 27 PhD students have completed their degrees under his supervision. He served as the Editor-in-Chief of the IEEE/ACM Transactions on Networking from 1999 to 2003. Most recently he was the co-TPC Chair for ACM Co-Next 2006 and ACM SIGMETRICS 2007 conferences. Dr. Ammar is a Fellow of the IEEE and a Fellow of the ACM.

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