Illinois Center for Wireless Systems

ICWS Seminar Series

Routing in Delay/Disruption Tolerant Networks: Principles and Protocols

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Friday, June 1, 2007, 11:00 a.m.
B02 CSL

Abstract: In recent years there has been an explosion of interest in so-called Delay/Disruption Tolerant Networks (DTN). A DTN is characterized by highly disconnected environments with progressive contacts among mobile devices often used to transport information. Also known as ``opportunistic'' or ``challenged'' networks, DTNs are applicable to military networks, sensor networks, communication in remote/developing areas, and inter-planetary networks.

In this talk, I will discuss a number of research challenges in DTNs being investigated at BBN via the DARPA DTN program, focusing in particular on routing in a DTN. I shall begin with a semi-formal examination of some basic questions: Why can't we use MANET routing protocols to solve DTNs? Is the knowledge of node schedules (trajectories) necessary/sufficient? What role does replication play? I shall then move on to describing a simple, practical protocol for DTNs called Prioritized Epidemic (PREP), which prioritizes bundles based on distances to destination, source, and expiry time. I shall present some simulation results that compare PREP to AODV and Epidemic Routing.

Time permitting, I will briefly discuss some other research topics that I have been pursuing recently, and my view of future research directions in wireless ad hoc networking.

Dr. Ram Ramanathan – Ram Ramanathan is a Principal Scientist at BBN Technologies. He has more than 10 years of advanced research experience in MANETs and has been recognized as pioneering several areas – topology control, use of directional antennas, and scalable flat routing for MANETs. His current research interests include Disruption/Delay Tolerant Networking (DTN), routing and channel access in MANETs, cognitive radios, and novel network architectures. He has been the Principal Investigator for many DARPA programs including XG, FCS Communications, and Global Mobile Information Systems (GloMo). He has published over 30 refereed papers in international journals and conferences, including best paper award winning papers at IEEE Milcom, IEEE Infocom, and ACM Sigcomm. Ram received his M.S and Ph.D degrees in Computer and Information Sciences from the University of Delaware, in 1989 and 1992 respectively.

ICWS Seminar Series is supported by a grant from Rockwell Collins