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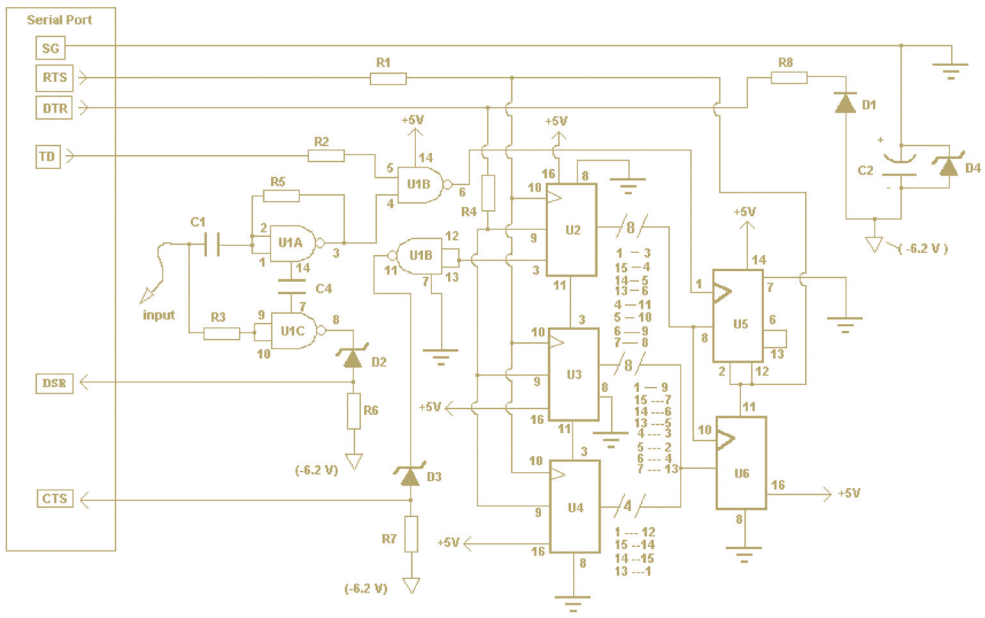
Resource Management in Broadband Wireless Access Networks

A Seminar by Hossam Hassanein

Telecommunications Research Lab
Queen's University



Sunday, March 30, 2008

1:00–2:00 p.m.

Lecture Hall 144

The success of emerging Broadband Wireless Access Networks (BWANs) such as 3.5G wireless cellular networks and 802.16 broadband wireless networks (WiMAX) will depend, among other factors, on their ability to manage their shared wireless resources in the most efficient way. This is a complex task due to the heterogeneous nature of access networks and the diverse bandwidth and Quality of Service (QoS) requirements of the applications that these networks are required support.

Resource Management (RM) in BWANs requires considerations of elements at different networking dimensions and time scales. This talk describes our efforts in addressing the challenges to RM in BWANs in three main directions. The first describes a comprehensive bandwidth provisioning framework for BWANs at different time scales. We address the problem of dynamic bandwidth allocation in BWANs. We then introduce a packet scheduling scheme at the frame level that employs practical economic models through the use of novel utility and opportunity cost functions to simultaneously satisfy the diverse QoS requirements of mobile users and maximize the revenues of network operators. The second direction entails the introduction of novel and non-traditional RM mechanisms that exploit network heterogeneity. We show how technologies within a BWAN can be enhanced through joint functionalities. The third direction shows how vertical handoffs, despite their challenges, can be used to the benefit of the service provider; and how the use of wireless multi-hop communication can be utilized in a structurally-hybrid environment to maintain a robust network operation.

About the Speaker:

Hossam Hassanein is a leading researcher in the School of Computing at Queen's University in the areas of broadband, wireless and variable topology networks architecture, protocols, control and performance evaluation. Before joining Queen's University in 1999, he worked at the department of Mathematics and Computer Science at Kuwait University (1993-1999) and the department of Electrical and Computer Engineering at the University of Waterloo (1991-1993). Dr. Hassanein obtained his Ph.D. in Computing Science from the University of Alberta in 1990. He is the founder and director of the Telecommunication Research (TR) Lab http://www.cs.queensu.ca/~trl in the School of Computing at Queen's. Dr. Hassanein has more than 300 publications in reputable journals, conferences and workshops in the areas of computer networks and performance evaluation. Dr. Hassanein has organized and served on the program committee of a number international conferences and workshops. He also serves on the editorial board of a number of International Journals. He is a senior member of the IEEE and is currently vice-chair of the IEEE Communication Society Technical Committee on Ad hoc and Sensor Networks (TC AHSN). Dr. Hassanein is the recipient of Communications and Information Technology Ontario (CITO) Champions of Innovation Research award in 2003. In 2007, Dr. Hassanein received best paper awards at the *IEEE Wireless Communications and Networks* and the *IEEE Global Communication Conferences* (both flagship IEEE communications society conferences).

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