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Department of Electrical &
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IEEE Communication Society Distinguished Lecturer Seminar

QoE-Oriented Bandwidth Arbitration among Diversified Applications in PONs
By
Prof. Nirwan Ansari
New Jersey Institute of Technology (NJIT), Newark, USA

Date : 28 September 2010 (Tuesday)
Time : 5:00 p.m. to 6:30 p.m. (Light refreshment starts at 4:45 p.m.)
Venue : CYC-603, 6th floor, Chow Yei Ching Building
http://www.hku.hk/maps/pop_maps.html?section=mc&checklight=haking_lift
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ABSTRACT

Passive Optical Networks (PONs) have become a viable broadband access solution to tackle the “last mile” bottleneck in the telecommunications infrastructure. Data transmission over the standardized PONs is divided into timeslots. PON performance depends greatly on resource management in the upstream transmission from multiple optical network units (ONUs) to the optical line terminal (OLT). This includes resource negotiation between the OLT and the associated ONUs, transmission scheduling, and bandwidth allocation.

In this talk, I will first give an overview of time division multiplexed PONs (TDM-PONs), and then raise and illustrate one particular issue, i.e., ensuring fairness among queues with diversified quality of service (QoS) requirements. Differentiated services (DiffServ) enable higher QoS for some queues over others. However, owing to its coarse granularity, DiffServ can hardly facilitate any particular QoS profile. To ensure fairness among queues with diversified QoS requirements, application utilities are proposed to quantify users’ quality of experience (QoE) as a function of network layer QoS metrics. The fair resource allocation issue is formulated as a max-min utility problem, which is quasi-concave over queues’ delayed traffic and dropped traffic. The bisection method is further employed to obtain the optimal solution of the quasi-concave maximization problem.

At the end, I will highlight some future research directions in this area. Finally, I will briefly cover various research endeavors undertaken in the Advanced Networking Laboratory at the New Jersey Institute of Technology.

ABOUT THE SPEAKER



Speaker: Nirwan Ansari received the B.S.E.E. (summa cum laude with a perfect gpa) from the New Jersey Institute of Technology (NJIT), Newark, in 1982, the M.S.E.E. degree from University of Michigan, Ann Arbor, in 1983, and the Ph.D. degree from Purdue University, West Lafayette, IN, in 1988. He joined NJIT’s Department of Electrical and Computer Engineering as Assistant Professor in 1988, tenured and promoted to Associate Professor in 1993, and has been Full Professor since 1997. He has also assumed various administrative positions at NJIT. He authored *Computational Intelligence for Optimization* (Springer, 1997, translated into Chinese in 2000) with E.S.H. Hou, and edited *Neural Networks in Telecommunications* (Springer, 1994) with B. Yuhas. His research focuses on various aspects of broadband networks and multimedia communications. He has also contributed over 350 technical papers, over one third of which were published in widely cited refereed journals/magazines. For example, one of his published works was the sixth most cited article published in the IEEE Transactions on Parallel and Distributed Systems, according to the journal EIC report in February 2010. He has also guest-edited a number of special issues, covering various emerging topics in communications and networking. He is an IEEE Fellow, and was Visiting (Chair) Professor at several universities.

He was/is serving on the Advisory Board and Editorial Board of eight journals, including as a Senior Technical Editor of IEEE Communications Magazine (2006-2009). He had/had been serving the IEEE in various capacities such as Chair of IEEE North Jersey COMSOC Chapter, Chair of IEEE North Jersey Section, Member of IEEE Region 1 Board of Governors, Chair of IEEE COMSOC Networking TC Cluster, Chair of IEEE COMSOC Technical Committee on Ad Hoc and Sensor Networks, and Chair/TPC Chair of several conferences/symposia. Some of his recent awards and recognitions include IEEE Leadership Award (2007, from Central Jersey/Princeton Section), the NJIT Excellence in Teaching in Outstanding Professional Development (2008), IEEE MGA Leadership Award (2008), the NCE Excellence in Teaching Award (2009), and designation as an IEEE Communications Society Distinguished Lecturer.

ALL ARE WELCOME

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