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Guest-editorial

Wireless Broadband Technologies and Systems

The evolution of wireless networks can be summarized with a single statement: 'We want more bandwidth'. The requirement for more bandwidth can be explained by a number of motivators. One example is the ongoing convergence of telecommunication networks with computer networks into a single-platform (hopefully) capable of supporting video, audio, and data services. Of course, we all love having our cellular phones. But, we would also like to have access to e-mail, e-commerce shopping, all possible services that the World Wide Web brings with it, perhaps some movie-on-demand service, and more. As a consequence, network bandwidth requirements are increasing, and we need to evolve our wireless network to support these demands.

Over the past few years, a number of wireless networks have emerged to increase wireless transmission bandwidth. Diverse products supporting long-haul point-to-point transmission data rates at OC-3 data rates (155.52 Mb/s) exist today. Different research efforts are now aiming at supporting OC-12 (622.08 Mb/s) point-to-point data rates. LMDS and MMDS have appeared for point-to-multipoint transmission system as possible 'last mile' solutions. In the area of wireless LANs (WLAN), IEEE 802.11-based equipment presently provides connectionless mode, low-mobility, indoor wireless communications at transmission data rates of 1 Mb/s to 11 Mb/s. Hiperlan I was also proposed to support a WLAN environment supporting connectionless mode traffic at 25 Mb/s. The IMT-2000 standard group effort continues to discuss the standardization of a mobile network infrastructure capable of supporting up to 2 Mb/s traffic. Wireless ATM has been prototyped in diverse research laboratories to provide a low mobility indoor and outdoor environment capable of supporting connectionless, and connection oriented services, in a single communication platform at data rates of 25 Mb/s. Finally, Hiperlan 2 (HL/2) is presently evolving from its initial ATM network based infrastructure to an IP based solution. As of now, it seems that HL/2 can potentially share a lot of similarity with the IEEE 802.11 effort at 25 Mb/s data rates.

In this edition of the *Journal of High Speed Networks*, we present four papers discussing some generic issues that need to be considered in the design of wireless broadband networks. Papers by Barton and Chang, and by Sheu, focus on the problem of minimizing transmission errors in wireless environments. Barton and Chang study the performance of rate-compatible puncture convolution (RCPC) at the wireless ATM physical layer, and at the data link control (DLC) layer. Meanwhile, Sheu proposes a method for reducing the wireless ATM cell loss probability. A third paper by Sinner and Wolf concentrates in solving the problem of wireless access contention resolution and dynamic bandwidth assignment. Sinner and Wolf propose a new media access control (MAC) protocol, called Distributed and Dynamic Resource Allocation (DADRA), and compare it with other similar protocols. Finally, the last paper by Liu and Silvester study two congestion control policies in order to achieve quality of service in an integrated multimedia based wireless CDMA network. We hope you enjoy reading this edition, and look forward to future similar publications in such a rapidly growing and important field.

Cesar A. Johnston
Associate Editor
C&C Research Laboratories
NEC USA
Princeton, NJ, USA
E-mail: cesar@ccrl.nj.nec.com

Anthony Chung
Associate Editor
School of Computer Science, Telecommunications and Information Systems
DePaul University
Chicago, IL, USA
E-mail: chung@cs.depaul.edu