Crossroads
The ACM Student Magazine

Introduction

by ***William Stevenson***

In this issue of *Crossroads*, we look into the most rapidly growing way to connect devices together, namely Mobile and Wireless Networking. It is hard not to walk into a coffee shop and see customers surfing the web wirelessly on their laptops or jotting emails and appointments into their palm-top computers and cell phones. Whether connecting to each other or to the larger Internet, users are increasingly on the go and yet on the net.

In our first article, "Learning from Nature: Network Architecture Inspired by Biology," Anh Nguyen, Tadashi Nakano, and Tatsuya Suda describe the Bio-Networking Architecture, a new framework for developing networks that are scalable, adaptable, and reliable. Borrowing from the biological concepts of emergent behavior and natural selection, the Bio-Networking Architecture builds network services that can adapt and evolve in order to provide the highest possible quality of service.

Next, Vishakh and Nicolas Urrea team up with Nakano and Suda in their article "An Interaction Model for Mobile Agent Services Using Social Networks." The authors argue that there is a greater degree of interaction among the components of distributed network services, such as mobile agent services. They describe a generic "N-services"

model, which takes the nature of agents and abstracts it into a referral network describing relationships and behavior. This abstraction, the authors argue, will be helpful to the design of future mobile agent services.

Our third article, "Introduction to Automatic Design of Wireless Networks," Kathryn Oliver describes cellular networks and their many design considerations. The large number of possible configurations makes manual planning nearly impossible, bringing the need for an automated cell planning process. The expertise gained from deploying second generation cell services can be put into third generation (3G) planning, which has even more design constraints, further motivating the creation of automated cell planning tools.

In their article "Overcoming Misbehavior in Mobile Ad Hoc Networks: An Overview," George Athanasiou, Leandros Tassiulas, and Gregory Yovanof discuss the implications, detection, and response proposals to node misbehavior at the MAC and Network layers. Following this, the authors describe a proposal for misbehavior detection in infrastructure wireless networks that gives incentives to nodes to curb malicious behavior.

Finally, Premshree Pillai gives a tutorial on the creation of mobile-to-Web gateways in his article "Experimental Mobile Gateways." Pillai describes the creation of SMS-to-Web and MMS-to-Web gateways, focusing on the software processes involved. In particular, he describes an Mobile-to-Web gateway for the LiveJournal blogging service. As cellular phones take on larger roles, it will become increasingly common to have them take on networking roles.

We hope that you enjoy this issue of *Crossroads*, and that you come to our web site, **http://www.acm.org/crossroads**, to see even more articles on mobile networking and other interesting topics.

Biography

William Stevenson (**billstevenson@acm.org**) is a Ph.D. student in the School of Information Sciences and Technology at the Pennsylvania State University, from which he holds a Master's degree in Computer Science. His main research interests are in Cognitive Science and High Performance Scientific Computing. In his spare time, Bill

enjoys cooking, the outdoors, and working on his Mac. He has served as Editor in Chief of *ACM Crossroads* since July 2001.