Crossroads
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Networking: More Fun, Less Hassle

by ***Kostas Pentikousis***

Do you know what a "LAN party" is? Have you ever participated in a LAN party? If your answer is "no," you do not know how much fun you are missing. A LAN party is a formal, and sometimes informal, ad-hoc gathering of computer game aficionados, in which dozens of players compete against each other over a local area network (LAN). Gamers look forward to playing against some other human beings, instead of playing against the machine. One can do this over a residential connection (be it dialup or broadband), but there is so much more excitement when the players are actually collocated: the joy of doing well mixed with the "despair" of losing yet another round fill the same room. Players are eager to leave the solitude of their room to discover the solidarity of a LAN party. In a way, a LAN party demonstrates that computer networks enable people not only to communicate, find information, do business, and even make money, but to have fun as well.

The popularity of computer games (a multibillion dollar industry) is taken to a new dimension with networking. Gaming is simply just more fun when you have real, human opponents against you. However, what is the software driving these games, and what role does the network play? Our first article by Aaron McCoy, Declan Delaney and Tomas Ward titled "Game-state Fidelity Across Distributed Interactive Games" will introduce you to the technologies behind network games. Designing a great game is

not easy. Creating a great network game is even harder. One of the most serious problems game designers face is how to maintain the "correct" state of the game across all participants in this large-scale distributed simulation. The article introduces the networking architectures used in developing distributed interactive games, discusses the problems posed to game designers by a heterogeneous network like the Internet, and illustrates how the popular game *Unreal Tournament* works.

Going back to our LAN party, I must admit that all the fun comes *after* you set up your computer. Setting up is a chore: you have to connect peripherals, from mice to speakers, get power, and then plug into the network. Dismantling and packing after six or more hours of playing can be even more tiresome. Myra Dideles, the author of our second article, "Bluetooth: A Technical Overview", explains how all this could soon be history. Bluetooth promises to make cables unnecessary for connecting all sorts of devices, from headphones to printers. It enables the creation of Personal Area Networks (PAN), and even federations of small networks, in which devices can communicate with speeds in the order of 1Mb/s, without the need of any configuration. The author explains how all this happens, and introduces the network protocols that govern the operation of Bluetooth. Dideles also compares Bluetooth with the trendy wireless LAN technology, IEEE 802.11b.

Traditionally, in order to connect one machine to the network one needs to install drivers, configure IP addresses, define name servers, and so on. Participants in a LAN party have to deal with this issue as well. Our last article in the print issue explains how the arduous task of configuring a computer for network use can be eliminated. The Internet Engineering Task Force (IETF) has long been working on the problem. David Stirling and Firas Al-Ali, authors of "Zero Configuration Networking," motivate the need for network protocols that minimize the effort a user must put to configure devices to be attached to a network. They present the problems and the proposed solutions, explain the fundamental architecture (including name-to-address translation schemes and service discovery mechanisms), and introduce the protocols involved. In addition, they talk about actual implementations of these protocols in modern operating systems, such as Mac OS X.

Since its inception, Crossroads has dedicated three special issues to networking. Past articles featured then-emerging technologies that pushed the envelop in almost every direction, including multicast, web applications, network operating systems, and wireless networks. Networking is an extremely active field and "hot" topics are not

difficult to come across. In fact, this issue could have been devoted to the imminent 3G rollout and its associated technologies, the introduction of new transport protocols, such as SCTP, or even to recent developments in MPLS. But it is not. Instead, it is dedicated to articles describing how networks can become more fun *and* easier to set up and use. After the call for articles, we received 48 submissions from 13 countries in four continents. Three of these articles made it to the print edition of Crossroads. Additional articles, not part of the print issue due to space limitations, can be found at the Crossroads web site: www.acm.org/crossroads. Be sure to check them out as they present topics related to wireless networks and new, far-reaching ideas like sensor networks and overlay networks. Enjoy!

PS: If you local ACM chapter is organizing LAN parties, do try to participate, even if you think you are the worst player. After all, most of the fun is in participating in a competition, not winning it. If they are not organizing anything, bug them to "get the party started."

Biography

Kostas Pentikousis (**kostas@cs.sunysb.edu**) is pursuing a Ph.D. in Computer Science at Stony Brook University. His research interests lie in the area of computer networks, including transport and application layer protocols, mobile computing and wireless communications, network and energy management. He received a B.Sc. (Honors) from Aristotle University of Thessaloniki, and a M.Sc. from Stony Brook University, both in Computer Science.