Hot Interconnects is an annual conference that specializes in emerging technologies for interconnecting computer systems and subsystems, as well as networks. The conference has a high degree of industrial participation, with paper submissions, panel discussions, and tutorials that often reflect the melding of industrial and university perspectives. Hot Interconnects 11, which took place 20 to 22 August 2003 at Stanford University, continued this tradition.

The conference covered a spectrum of microcomputing topics from the very small and slow, to the very large and fast. The keynote, by Stav Prodromou of Alien Technology Corp., described very tiny, short-range interconnections, radio frequency ID tags, and the efforts to lower the production costs of this technology to a few pennies per tag via novel assembly techniques. Supercomputing and the interconnections within clustered computers represented the very large. Packet
In this issue

The Hot Interconnects program focused on 19 papers presented over two days. I selected the articles in this issue of IEEE Micro based on attendee feedback, technical considerations, and the paper’s overall match with Micro’s editorial profile. Technology evolution has at its core a continuing process of rebalancing relationships among components. The design assumptions and tradeoffs appropriate in a previous generation are often no longer appropriate, given new technology.

The article by Hurwitz and Feng illustrates the changing context of networking. The authors describe performance evaluations of 10-gigabit Ethernet interfaces. Issues such as interrupt latency, which have heretofore not been major concerns, have noticeable impact on 10-gigabit Ethernet performance.

Regnier et al. discuss a possible answer to some of the challenges posed by the emergence of 10-gigabit Ethernet interfaces. They suggest that, in the networking context, dedication of a processor to networking might be better than simply running a symmetric multiprocessor. While processor dedication is not a new concept, it is especially relevant as we explore the challenges of using 10-gigabit network connections and the impact of having multiple processors on a single chip.

High-performance computer interconnections has been a major theme at Hot Interconnects for many years. For interconnecting multiple processors on single chips, the article by Lines describes a very high-performance asynchronous crossbar interconnect.

Interconnections for cluster-based scientific computing is not yet a mature topic, in part because the scientific-computing community is still learning how to evaluate clustered solutions. Evaluation tools have either been complete applications or based on microbenchmarks that did not include many of the features used by segments of the scientific-computing community. Liu et al. describe a set of microbenchmarks that extend the set of tools for interconnect evaluation, and present data describing the performance of three cluster interconnection technologies.

Intrusion detection systems, virus scanners, and other security subsystems require deep inspection of packet contents. Partially because of performance concerns, network administrators have not used these systems on high-speed links. Two articles from Washington University in St. Louis illustrate how careful networking researchers must be in asserting that deep packet processing is impossible at core Internet speeds. Dharmapurikar et al. describe a method for matching the contents of packets against very large sets of strings; this method will run at core network speeds. Schuehler et al. take a different approach to the same problem; in their approach, reassembly of the TCP byte stream allows string scanning to occur across packet boundaries.

Many thank yous

As with any conference, Hot Interconnects 11 would not have been possible without the dedicated work of many individuals. I especially thank John Lockwood, who served as general conference chair; Liz Rogers, local chair; Anne Watters, treasurer; Fabrizio Pettino, panel chair; James Sterbenz, tutorial chair; and the Hot Interconnects steering committee—Daniel Pitt, Mark Laubach, Allen Baum, Hasan Alkhatib, Paul Borrill, and Glenn Langdon. I also thank the members of the program committee for their careful work.

Hot Interconnects 12 will take place in August 2004, once again at Stanford University. If you are interested in participating, please visit http://www.hoti.org.

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