The High Performance Switching and Routing (HPSR) workshop is the flagship meeting of the IEEE Communication Society’s Technical Committee on Communication Switching and Routing. HPSR 2003 (http://www.tle-networks.polito.it/HPSR2003) took place in Torino, Italy, June 24–27, 2003 under the technical co-sponsorship of IEEE, and was financially supported by a number of other organizations.

HPSR 2003 attracted 112 submissions from 29 countries; among those, 53 papers were selected for presentation at the conference. One hundred thirty participants from 24 countries attended the workshop.

The technical program covered a wide spectrum of research topics, such as switch architectures, wavelength-division multiplexing (WDM) networks, scheduling algorithms, quality of service (QoS) issues, metro ring networks, optical burst switching networks, resilience, protection and restoration, traffic engineering, packet lookup, classification and forwarding, and routing.

This Feature Topic of IEEE Communications Magazine features extended versions of five of the best papers presented at the conference; these papers represent the state of the art in terms of research in the field of high-performance switching and router architectures. The articles span a wide range of technical issues, including architectural, algorithmic, and performance issues. We believe these articles will be a valuable source of reference for years to come.

A lot of attention was devoted in HPSR 2003 to switch architecture. Sapunjis and Katevenis address the issue of efficient implementation of a backpressure mechanism in multistage buffered switches based on the Benes network architecture.

Traffic engineering is a hot topic that is tightly related to routing. Multipoint-to-point label switched path (LSP) trees has been proposed as a technique to reduce label space usage. Given a set of precomputed point-to-point LSPs, Bhatnagar, Ganguly, and Nath propose an efficient heuristic for multipoint-to-point LSP creation.

Although advances in WDM provide large amounts of bandwidth, most of today’s end-to-end applications require only sub-wavelength bandwidth. This bandwidth mismatch makes wavelength circuits inefficient in many cases unless traffic grooming is adopted (i.e., multiple traffic flows are time multiplexed together on the same wavelength). The article by Cerutti and Fumagalli addresses the fundamental problem of achieving efficient traffic grooming in static WDM networks.

Oki, Shiomoto, Shimazaki, Imajuku, Yamanaka, and Takigawa describe and study the performance of two dynamic multilayer routing policies that are implemented in the photonic multiprotocol label switching (MPLS) router developed by NTT for IP+GMPLS (generalized MPLS).

Zhang and Mouftah propose a protocol to introduce the idea of recursive unicast into an existing multicast routing protocol. The protocol, multicast extension to Open Shortest Path First (MOSPF), achieves scalable multicast while reducing computational overhead and forwarding state at routers.

We wish to acknowledge the hard work of the authors, the reviewers, and Editor-in-Chief Roch Glitho in the preparation of this Feature Topic. We wish to thank all of them for their cooperation and timeliness. We hope that these best papers from HPSR 2003 will create enough interest among readers to contribute to the success of future HPSR workshops (please check http://www.cs.ust.hk/hpsr05/ for HPSR 2005).

**Biographies**

Andrea Bianco [M] (Andrea.Bianco@polito.it) is an associate professor at the Dipartimento di Elettronica of Politecnico di Torino. He holds a Dr. Ing degree in electronics engineering (1986) and a Ph.D. in telecommunications Engineering (1994), both from Politecnico di Torino. He participated in several national and European projects such as the Italian projects on optical networks, Ringo and IPPO, the IST European project DAVID, and the European ACTS projects on a single-layer optical network, SONATA. He was deeply involved in management of the Italian project QoS Techniques in Multiservice Telecommunication Networks (MQOS). Presently, he is involved in the Italian project on open router architectures, EURO, and the European Network of Excellence on Optical Networks, e-PHOTON/One. He has also been involved in several consulting and research project with private industries, including BT, Lucent, TILAB, and Alcatel. His current research interests are high-speed switching and all-optical networks. He has co-authored over 100 papers published in international journals and presented at leading international conferences in the area of telecommunications networks. He was Technical Program Co-Chair for HPSR 2003. He was a member of the TPC of IEEE INFOCOM 2000, QoS-IP 2001, IFIP Optical Networks Design and Modelling (ONDM) 2002, ONDM 2003, ONDM 2004, Networking 2004, HPSR 2004, and the Workshop on Optical Burst Switching (WOBs) 2004. He was co-editor of two books: *LNCS* vol. 1989, *QoS in Multiservice IP Networks*; and *Next Generation Optical Network and Modelling* (Kluwer, 2003), and of two Special Issues: Special Issue of *Computer Networks Journal* on QoS for IP Networks (2002), and Special Issue of *Optical Networks Magazine* on Dynamic Optical Networking (2003).
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