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IEEE Communications Magazine
Optical Communications Supplement - August 2005

Feature Topic:

Optical Networking Testbeds: Experiences, Challenges, and Future Directions

Background

Given the continuing maturation and declining costs of optical technologies, many paradigms are taking shape within the optical networking arena. In many cases, these advances are being targeted for more entrenched metro and access domains. In particular *wavelength division multiplexing* (WDM) is advancing to Metro networks for various reasons compared to core networks, since transparent solutions are even more important in these network segments. Besides the re-emergence of "data-aware opto-electronic" grooming technologies, various testbeds aiming to a dynamically reconfigurable optical layer have been implemented. Overall, these developments represent crucial steps for the future of the optical networking market, particularly as carriers and vendors search for new directions in the "post-bubble" environment. As the above evolutions take shape, numerous additional optical testbed activities are currently being conducted across the world. Specifically, on the industry side, many carriers are actively deploying metro WDM and "next-generation" SONET/SDH technologies and looking to develop novel interoperability with legacy TDM technologies. Meanwhile, several large "telco" carriers have recently concluded extensive PON trials and are seriously contemplating further service offerings. Apart from the optical circuit switching networks and PON, in recent years there is much interest in optical networking community on various new emerging and rapidly advancing concepts such as optical burst switching, optical packet switching, and IP/MPLS-over-WDM. Many leading agencies and the governments have also funded renewed testbed initiatives and numerous projects are currently being carried out around the world. Clearly, these newer testbed initiatives will play a crucial "prove-in" role for emergent optical technologies, and their importance cannot be understated. This special issue will focus on optical networking testbeds and will serve to share the collective experiences of researchers, industry professionals, practicing engineers, network operators, and equipment vendors across many emergent areas in the optical space.

Scope of Contributions

This Feature Topic aims to consolidate and disseminate the recent developments and advances in the area of optical testbeds. Papers are solicited that present research, development and deployment issues and challenges, experimental results and applications related to optical networking testbeds. The topics of interest include but are not limited to:

- Optical access network architectures/technologies and deployment trials (PON, BPON, GPON, EPON, DWDM/CWDM PON, etc)
- Metro/regional DWDM testbeds and experimental results (transport, rings, legacy inter-networking)
- Next-generation SONET/SDH and multi-service provisioning platforms (MSPP) trails and deployments, broader integration with legacy and DWDM transport infrastructures
- IEEE 802.17 RPR implementations and deployments. Applications and inter-networking with optical transport infrastructures
- Optical burst and packet-switching testbeds and trails including control plane design, identifying the optimum balance between optical and electronic technologies, propagation effects/compensation
- Free-space optics and air fiber (propagation/dispersion studies, wire line inter-networking issues, deployments and applications)

- Experimental evaluation of optical switch and router architectures and low cost components for mass deployment
- Multi-layer internetworking testbeds and practical networks (provisioning, resource management, fault-tolerance, protection/restoration, operations)
- Implementation of GMPLS over DWDM optical networks, field trials, and experimental results
- Customer controlled networks and implementation/deployment issues
- Applications, service provisioning models, revenue analysis, traffic analysis on testbed. Examples include grid computing, scientific computing, storage extension, etc.
- Innovative insights and expert opinions on future testbed activities and requirements

Schedule for Submissions

Manuscript Submission Deadline	December 15, 2004
Acceptance Notification	April 15, 2005
Final manuscript Due	May 15, 2005
Publication Date	August 2005

Authors must follow the IEEE Communications Magazine guidelines regarding the manuscript and its format. For details, please refer to the "Information for Authors" at the IEEE Communications Magazine Web site at http://www.comsoc.org/pubs/commag/sub_guidelines.html. Submission will be done through IEEE Manuscript Central: http://commag-ieee.manuscriptcentral.com. Choose "August 2005/Optical Networking Testbeds: Experiences, Challenges, and Future Directions" from the "Select a Topic or Series drop down menu" in the IEEE Manuscript Central. Please submit no later than December 15th 2004. Accepted papers will also be included in Communications Interactive (CI), the online version of Communications Magazine.

Feature Topic Editors

For additional information about this Feature Topic, please contact the Guest Editors listed below:

Mohan Gurusamy
Department of Electrical and Computer Engineering
National University of Singapore, Singapore
Email: elegm@nus.edu.sg

Nasir Ghani
Department of Electrical and Computer Engineering
Tennessee Tech University, USA
Email: nghani@tntech.edu

Chava Vijaya Saradhi
Department of Context-Aware Systems
Institute for Infocomm Research, Singapore
Email : saradhi@i2r.a-star.edu.sg

Alexandros Stavdas
Department of Telecommunications
University of Peleponnese, Greece
Email: astavdas@uop.gr