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EDITORIAL

Special issue based on selected IEEE ANTS 2014 papers

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The 8th International Conference on Advanced Networks and Telecommunication Systems—IEEE ANTS 2014 (http://www.ieee-comsoc-ants.org/2014/)—was held in New Delhi, India, during December 14–17, 2014.

Over the past few years, ANTS has been a premier forum on networking and telecommunication related topics in India. It is the only conference in India financially sponsored by IEEE Communications Society. A key feature of the IEEE ANTS is that it is aimed at promoting intense dialogue between academia and industry to bridge the gap between academic research, industry initiatives, and governmental policies. Besides the technical paper and poster presentations, this is fostered through panel discussions, keynotes, invited talks, and industry exhibits.

IEEE ANTS 2014 was a four day event organized by the Centre for Development of Telematics (C-DOT), New Delhi, India. IEEE ANTS 2014 was co-sponsored by C-DOT, Tata Consultancy Services, Infinera, Cisco, IP Junction, and Avaya.

We received 135 long paper submissions and 17 short paper submissions from over 15 countries. Each paper was reviewed by at least 2 (and often 3 or 4 or even 5) members of the technical program committee, and we accepted 42 long papers and 6 short papers for oral presentation. The acceptance rate for long papers was about 31 %. The high-

quality technical program reflects the growing importance of this conference to academic and industry researchers in India and worldwide. The program also featured 7 invited papers from renowned researchers in USA, France, Sweden, South Korea, and India; 4 invited talks by influential executives from industry; and 6 keynote talks from top academics as well as industry leaders. To accommodate the growing number of high-quality papers being presented at ANTS, we organized the technical presentations in two parallel tracks, one covering optical and wireline networks and the other on wireless networks. The papers were arranged in 12 sessions across three days. The conference also hosted three exciting panels on topics that are highly relevant to the current networking industry.

Based on comments received from the reviewers, the authors of eleven accepted papers were invited to submit an extended version of their work for possible publication in this Special Issue of the Springer Photonic Network Communications (PNET) journal. After a thorough review process, 9 invited papers have been selected for publication.

In "Application-Aware Software-Defined EPON Access Network," the authors D. Chitimalla, S. Thota, S. Savas, P. Chowdhury, M. Tornatore, S.-S. Lee, H.-H. Lee, S. Park, H.-S. Chung, and B. Mukherjee propose an application-aware strategy in SDN-based EPON to flexibly cater to various competing users with widely varying quality of service (QoS) and quality of user experience (QoE) demands. Specifically, the authors propose a network congestion feedback-based video streaming to ensure graceful rate adaptation and hence better QoE.

In "Improving the Energy Efficiency of Software Defined Backbone Networks," by R. Carpa, O. Gluck, L. Lefevre, and J.-C. Mignot, the authors propose intra-domain SDN-based strategy to intelligently utilize or turn-off the backbone links in a bid to improve energy efficiency. The authors'

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OMNET++ based simulation results show nearly 44 % energy saving of backbone networks when using the proposed approach.

In "Transmission Impairments in Long-Reach WDM-TDM PON using EDFA and RSOA-based ONUs," the authors S. Mondal, S. Reddy, G. Das, and D. Datta present two novel architectures for WDM-TDM hybrid long-reach PON using reflective semiconductor optical amplifier (RSOA). Feasibility and performance limits of the proposed architectures over the uplink using RSOA are evaluated in terms of bit error rate (BER) performance for conventional as well as burst-mode reception.

In "Parallel Circuit Provisioning in ESnet's OSCARS," the authors J. M. Plante, D. A. P. Davis, and V. M. Vokkarane propose and develop a parallel scheduling enhancement to ESnet's On-demand Secure Circuits and Advance Reservation System (OSCARS). This enhancement comes in the form of a front-end solution, the behavior of which is quantitatively evaluated to compare the performance of parallel resource-provisioning to serial resource usage for both unicast and anycast scenarios.

In "Cost-Efficient Live VM Migration Based on Varying Electricity Cost in Optical Cloud Networks," by A. Gupta, U. Mandal, P. Chowdhury, M. Tornatore, and B. Mukherjee, the authors propose to exploit the electricity price variation across different geographical locations to suitably migrate the workloads, thereby reducing the operating energy cost of the network backbone in cloud services. Through case studies using a US-wide network topology, they demonstrate significant cost benefit of the proposed strategy.

In "A Minimal Redundant Shared OLT Protection for Hybrid WDM-TDM Optical Access Networks," the authors A. Kanungoe and G. Das propose a WDM/TDM hybrid architecture for optical line terminal (OLT) and partial feeder fiber protection. The proposed distributed architecture, called minimal redundant shared OLT protection (MRSO), dynamically detects faults and offers load sharing, which in turn improves the user experience of network access with reduced interruption and perturbation.

The paper "On the Design of 5G Transport Networks," by M. Fiorani, B. Skubic, J. Mårtensson, L. Valcarenghi, P. Castoldi, L. Wosinska, and P. Monti describes the roles and challenges of the upcoming 5G systems and role of the optical transport networks. This position paper presents the key architectural challenges and cost-efficiency issues in realizing flexible 5G transport infrastructure that would require to deal with the diverse network service requirements generated from heterogeneous network end points. In particular, the critical role of software-defined networks (SDN) in 5G networks is highlighted via two case pertinent studies.

In "Integrated Network Coding and Caching in Information-Centric Networks," the authors A. Ravi, P. Ramanathan, and K. M. Sivalingam propose an integrated coding and caching algorithm to replace the cache at the information-centric network (ICN) routers that can reduce the network latency significantly. In the caching mechanism, they use the concept of network coding that has low computational cost. The authors evaluate their proposed technique using two types of network traffic, namely, rate-constrained video-on-demand and Zipf-based web traffic.

In "Universal Caching Model and Markov-based Cache Analysis for Information Centric Networks," the authors B. Panigrahi, S. Shailendra, H. K. Rath, and A. Simha investigate the performance of information-centric networks (ICN) as a replacement of the conventional end-point connection centric networks. A universal caching mechanism is proposed that for content-centric routing at network routers that offers improved service latency. Via Markov and entropy-based analysis, they evaluate the performance bounds of the proposed strategy.

We thank all the authors and reviewers as well as the PNET Editors-in-Chief for their efforts in the preparation of this Special Issue.

Swades De received the B.Tech. degree in Radiophysics and Electronics from the University of Calcutta, Calcutta, India, in 1993, the M.Tech. degree in Optoelectronics and Optical Communication from Indian Institute of Technology, Delhi, in 1998, and the Ph.D. degree in Electrical Engineering from State University of New York at Buffalo, NY, in 2004. He is currently an Associate Professor of Electrical Engineering at the Indian Institute of Technology Delhi, New Delhi, India. During 2004–2007, he was an Assistant Professor of Electrical and Computer Engineering at the New Jersey Institute of Technology, Newark, NJ, USA. In 2004, he was a Postdoctoral Researcher with the Institute for Information Science and Technologies, Italian National Research Council (ISTI-CNR), Pisa, Italy. He has nearly 5 years of industry experience in India on telecommunications hardware and software development (1993–1997 and 1999). His research interests include performance study, resource efficiency in wireless networks, broadband wireless access, and communication and systems issues in optical networks. Dr. De has been involved on technical program committees in numerous IEEE conferences. He has served as a symposium chair in ICIT conference 2008 (Wireless Networks track), NCC 2013 (Networks track), IEEE ICNC 2015 (Green Communications and Network Computing track) IEEE WCNC 2015 (Mobile and Wireless Networks track), co-chair of SuMo-CPS workshop in ICDCN 2013, TPC co-chair in IEEE ANTS 2014, and Ph.D. forum chair in COMSNETS 2015. He has served as an associate editor for the Springer Photonic Network Communications journal (2013–2015). He currently serves as an associate editor for the IEEE Communications Letters. He is a senior member of the IEEE Communications and IEEE Computer Societies; and a member of the Institute of Electronics, Information, and Communication Engineers.

Vinod Vokkarane is an Associate Professor of Electrical and Computer Engineering at the University of Massachusetts Lowell. He was a Visiting Scientist at the Claude E. Shannon Communication and Network Group, Research Laboratory of Electronics (RLE) at Massachusetts Institute of Technology (MIT) from 2011–2014. He was the Associate Professor of Computer and Information Science at the University of Massachusetts Dartmouth from 2004 to 2013. He received the B.E. degree with Honors in Computer Science and Engineering from the University of Mysore, India in 1999, the M.S. and the Ph.D. degree in Computer Science from the University of Texas at Dallas in 2001 and 2004, respectively. His primary areas of research include design and analysis of architectures and protocols for ultra-high-speed networks, grid and cloud networks, and green networking. He is the recipient of the UMass Dartmouth Scholar of the Year Award 2011, the UMass Dartmouth Chancellor's Innovation in Teaching Award 2010–2011, the University of Texas at Dallas Computer Science Dissertation of the Year Award 2003–2004, and the Texas Telecommunication Engineering Consortium Fellowship 2002–2003. Dr. Vokkarane is the co-author of a book, "Optical Burst Switched Networks," Springer, 2005. He is currently on the Editorial Board of IEEE/OSA Journal of Optical Communications and Networks and Springer Photonic Network Communications Journal and has also served as an Editor of IEEE Communications Letters and Elsevier Journal of Optical Switching and Networking. He has co-authored several Best Paper Awards, including the ONDM 2015, IEEE GLOBECOM 2005, and IEEE ANTS 2010. He has been on the technical program committees of several IEEE conferences including INFOCOM, ICC, GLOBECOM, ICCCN, HSN, and ANTS, and served as TPC Co-Chair for the Optical Networks and Systems (ONS) symposia at ICCCN 2007 and 2010, INFOCOM High-Speed Networks (HSN) workshop 2011, GLOBECOM 2011, ICC 2012, and IEEE ANTS 2013 and 2014. He is a Senior Member of the IEEE.