

TELECOMMUNICATIONS STANDARDS: PART II



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Telecommunications is driving what is perhaps the most significant social revolution that mankind has ever known, changing the way people live, work, interact, and socialize. Telecommunications has been thus attracting ever increasing attention from researchers in both academia and industry. Although both communities have made great achievements and outstanding contributions to communications, these two domains are frequently unaware of the capacities, expertise, and challenges faced by the other.

As enablers of global systems interoperability, standards are at the heart of success of the communications industry. Since standardization is inherently a social enterprise, it is the perfect environment for promoting technologies that evolve an increasingly social world. On the other hand, all of the world's telecommunication systems have their roots in research. Academic research and findings have helped system designers decide on the overall system architecture down to the smallest details.

Building on the success of The 1st IEEE Telecom Standards Workshop: From Research to Standards (which won the Best Workshop Award at IEEE ICC 2012), as another attempt to bridge the gap between researchers, scientists, and standardization experts in both academia and industry, and to promote standardization as an important vehicle for information sharing and cooperation between academia and industry, we have organized this Feature Topic on Telecommunications Standards. This Feature Topic was dedicated to research work that is already included in standards, and shows how it is achieved; current research work focused to become part of a new standard or enhance an existing one; and work done to make adoption by the relevant standards bodies likely. Original contributions were solicited in relevant areas of different standardization bodies, such as the IEEE, International Telecommunication Union Telecommunication Standardization Sector (ITU-

T), Internet Engineering Task Force (IETF), Third Generation Partnership Project (3GPP), and European Telecommunications Standards Institute (ETSI). The Feature Topic attracted a great number of submissions, exceeding 50, out of which 11 papers were accepted. Part 1 of the Feature Topic consisted of six articles and was published in the March 2013 issue of *IEEE Communications Magazine*. Part 2 of the Feature Topic consists of 5 articles.

In the first article, Timmers *et al.* introduce the G.fast project group of the ITU-T, which is currently defining a new copper access technology to provide aggregate (upstream and downstream) data rates of up to 1 Gb/s over distances up to 250 m. The authors indicate how the analog domain has become the predominant bottleneck for copper access technology and how the design of the digital modulation can relax constraints on the analog front-end.

The second article is related to the IEEE 802.15.6 body area network (BAN) standard. Chávez-Santiago *et al.* explain the research that has been done to obtain accurate propagation models supporting the standardization of implant communication in BANs. The article also covers new results in the field of UWB propagation for implant communication.

In the third article, Law *et al.* present the evolution of Ethernet standards in the IEEE 802.3 working group, which has been working for the last 30+ years, pushing the boundaries on the speed and capacity of wireline Ethernet links, migrating from shared medium carrier sense multiple access with collision detection (CSMA/CD) systems to switched point-to-point Ethernet, and then introducing multilane technology and point-to-point emulation over shared media of passive optical networks.

Reviriego *et al.*, in the fourth article, provide insights on the VDE 0885-763 standard for high-speed communication over plastic optical fiber (POF). The new standard enables 1 Gb/s communication over 50 m of POF, and is intended

for use in automotive, industrial, and home networking applications. In addition, the performance of the energy efficiency mechanisms in the standard is evaluated. The results show that the new standard provides good energy efficiency over a wide range of traffic loads.

In the last article of the feature topic, Abu Ali *et al.* highlight some of the features of LTE-Advanced Release 12 relevant to improving quality of service. They focus on solutions to enhance network capacity and service delivery in terms of offloading, improved services, and improved congestion control.

As Guest Editors, we would like to thank all the authors for their submissions to this Feature Topic. The interest and quality of submissions were beyond our imagination. We are also grateful to the reviewers for the timely responses and their valuable comments to improve the quality of the articles. We appreciate the support from both Dr. Sean Moore, current Editor-in-Chief of *IEEE Communications Magazine*, and Dr. Steve Gorshe, past Editor-in-Chief. We also appreciate the help of Joseph Milizzo, Jennifer Porcello, and Catherine Kemelmacher throughout the publication process. Finally, our hope is that the readers of *IEEE Communications Magazine* enjoy the articles of this Feature Topic, and would consider contributing to future editions.

BIOGRAPHIES

TARIK TALEB (talebtarik@gmail.com) is currently working as a senior researcher at NEC Europe Ltd. Prior to his current position and until March 2009, he worked as an assistant professor at the Graduate School of Information Sciences (GSIS), Tohoku University, Japan. He received his B. E degree in information engineering with distinction, and M.Sc. and Ph.D. degrees in information sciences from GSIS, Tohoku University, in 2001, 2003, and 2005, respectively. His research interests lie in the field of architectural enhancements to mobile core networks, mobile cloud networking, mobile multimedia streaming, congestion control protocols, handoff and mobility management, and intervehicular communications. He has been also directly engaged in the development and standardization of the

Evolved Packet System as a member of 3GPP's System Architecture working group. He is/was on the Editorial Boards of many IEEE magazines and journals. He is serving as Vice-Chair of the Wireless Communications Technical Committee. He is a recipient of many awards including the 2009 IEEE Com-Soc Asia-Pacific Best Young Researcher award and the 2008 TELECOM System Technology Award. Some of his research work has also received best paper awards at prestigious conferences.

ROLF WINTER (ROLF.WINTER@NECLAB.EU) is a professor of data networks at the University of Applied Sciences Augsburg (HSA). He received his Ph.D. from the Freie University Berlin in 2006. Before joining HSA, he was a senior researcher at NEC Laboratories Europe, where he was active in EU-funded research projects and standardization. His research interests are in the areas of routing and switching, energy management, transport protocols, and network measurement. He is very involved in the IETF, where he chaired the recently closed LEDBAT working group. He is also a member of the IETF transport area directorate and co-author of a number of standards documents.

TUNCER BAYKAS (tbaykas@ieee.org) is a postdoctoral research fellow in Tohoku University, Japan. He received his B.A.Sc. degree in electrical and electronics engineering from Bogazici University, Istanbul, Turkey. He received his M.A.Sc. and Ph.D. degrees, both in electrical engineering, from the University of Ottawa, Canada. From 2007 to 2012, he worked as an expert researcher at the National Institute of Information and Communications Technology, Japan. He is heavily involved in IEEE standardization activities. He served as secretary and subeditor for the IEEE 802.15 WPAN Task Group 3c (802.15.3c) Millimeter Wave Alternative PHY group and as Chair of IEEE 802.19 Task Group 1, Wireless Coexistence in the TV White Space. He made contributions to IEEE P802.11ad, P802.11af, Dyspan P1900.7, and 802.15.4k standardization projects. He received an IEEE-SA Standards Board award for his contributions to IEEE 802.15.3c. He served as TPC Vice Chair of PIMRC 2009. His research interests include 60 GHz systems, interference mitigation, and wireless sensor networks.

FAROOQ BARI [SM] (farooq.bari@att.com) is a lead member of technical staff with AT&T. He holds a Ph.D. in electrical/computer engineering from the University of British Columbia, Vancouver, Canada. His primary area of work and research is in developing standards for telecommunication systems. Over the years he has contributed to standards related work in 3GPP, IETF, IEEE, GSMA, NGMN, ATIS and Onem2m. He is a long-time member and volunteer of IEEE, and currently is a member of the IEEE SA Standards Board (and its ICCOM and NESCOM committees), member and treasurer of IEEE Communication Society Standards Development Board, and member of the IEEE SA Corporate Advisory Group. He also chairs GSMA/WBA Joint Task Force on Wi-Fi Roaming. Before working in standards, he was a research engineer involved in R&D and new product development in the area of real-time embedded systems.