

IEEE NETWORK[®]

March/April 2016, Vol. 30, No. 2

THE MAGAZINE OF GLOBAL INTERNETWORKING

www.comsoc.org

Innovation in Network Pricing



A Publication of the IEEE Communications Society
in cooperation with the
IEEE Computer Society and the
Internet Society



IEEE NETWORK[®]

THE MAGAZINE OF GLOBAL INTERNETWORKING

MARCH/APRIL 2016, VOL. 30, NO. 2

- 4** *Guest Editorial:*
Innovation in Network Pricing
Matthew Andrews, Mung Chiang, Sangtae Ha,
Jianwei Huang, and Soumya Sen
- 6** **A Game-Theoretic Perspective on Advance Reservations**
Eran Simhon and David Starobinski
- 12** **The Role of Data Cap in Two-Part Pricing under Market Competition**
Xin Wang, Richard T. B. Ma, and Yinlong Xu
- 18** **Smart Data Pricing Models for the Internet of Things: A Bundling Strategy Approach**
Dusit Niyato, Dinh Thai Hoang, Nguyen Cong Luong, Ping Wang, Dong In Kim, and Zhu Han
- 26** **An Economic Model for a New Broadband Ecosystem Based on Fast and Slow Lanes**
Hassan Habibi Gharakheili, Arun Vishwanath, and Vijay Sivaraman
- 32** **Under a Cloud of Uncertainty: Legal Questions Affecting Internet Storage and Transmission of Copyright-Protected Video Content**
Fraida Fund, S. Amir Hosseini, and Shivendra S. Panwar
- 40** **Trace-Driven Analysis for Location-Dependent Pricing in Mobile Cellular Networks**
Yong Li and Fengli Xu
- Accepted from Open Call*
- 46** **A Performance Comparison of Delay-Tolerant Network Routing Protocols**
Tamer Abdelkader, Kshirasagar Naik, Amiya Nayak, Nishith Goel, and Vineet Srivastava
- 54** **Energy-Efficient Dynamic Traffic Offloading and Reconfiguration of Networked Data Centers for Big Data Stream Mobile Computing: Review, Challenges, and a Case Study**
Enzo Baccarelli, Nicola Cordeschi, Alessandro Mei, Massimo Panella, Mohammad Shojafar, and Julinda Stefa
- 62** **Privacy and Performance Trade-off in Cyber-Physical Systems**
Heng Zhang, Yuanhao Shu, Peng Cheng, and Jiming Chen
- 68** **End-to-End Coding for TCP**
Yong Cui, Lian Wang, Xin Wang, Yisen Wang, Fengyuan Ren, and Shutao Xia
- 74** **Interference Alignment for Multihop Wireless Networks: Challenges and Research Directions**
Huacheng Zeng, Feng Tian, Y. Thomas Hou, Wenjing Lou, and Scott F. Midkiff
- 82** **Three-Dimensional Geographic Routing in Wireless Mobile Ad Hoc and Sensor Networks**
Haojun Huang, Hao Yin, Yan Luo, Xu Zhang, Geyong Min, and Qilin Fan
- 92** **Information-Centric Networking for the Internet of Things: Challenges and Opportunities**
Marica Amadeo, Claudia Campolo, José Quevedo, Daniel Corujo, Antonella Molinaro, Antonio Iera, Rui L. Aguiar, and Athanasios V. Vasilakos
- 102** **A Tutorial on the Internet of Things: From a Heterogeneous Network Integration Perspective**
Ke Xu, Yi Qu, and Kun Yang
- 110** **Fine-Grained Resource-Aware Virtual Network Function Management for 5G Carrier Cloud**
Faqr Zarrar Yousaf and Tarik Taleb
- 116** **Self-Organization in Disaster-Resilient Heterogeneous Small Cell Networks**
Haijun Zhang, Chunxiao Jiang, Rose Qingyang Hu, and Yi Qian
- 122** **Pairing for Resource Sharing in Cellular Device-to-Device Underlays**
Li Wang and Gordon L. Stüber

Editor's Note 2

IEEE NETWORK ISSN 0890-8044 is published bimonthly by the Institute of Electrical and Electronics Engineers, Inc. Headquarters address: IEEE, 3 Park Avenue, 17th Floor, New York, NY 10016-5997, USA; tel: +1-212-705-8900; e-mail: ieee.network@ieee.org. Responsibility for the contents rests upon authors of signed articles and not the IEEE or its members. Unless otherwise specified, the IEEE neither endorses nor sanctions any positions or actions espoused in *IEEE Network*.

ANNUAL SUBSCRIPTION: \$40 in addition to IEEE Communications Society or any other IEEE Society member dues. Non-member prices: \$250. Single copy price \$50.

EDITORIAL CORRESPONDENCE: Nei Kato, Editor-in-Chief, *IEEE Network*, IEEE Communications Society, 3 Park Avenue, 17th Floor, New York, NY 10016-5997, USA; e-mail: kato@it.ecei.tohoku.ac.jp

COPYRIGHT AND REPRINT PERMISSIONS: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limits of U.S. Copyright law for private use of patrons: those articles that carry a code on the bottom of the first page provided the per copy fee indicated in the code is paid through the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923, USA. For other copying, reprint, or republication permission, write to Director, Publishing Services, at IEEE Headquarters. All rights reserved. Copyright ©2016 by the Institute of Electrical and Electronics Engineers, Inc.

POSTMASTER: Send address changes to *IEEE Network*, IEEE, 445 Hoes Lane, Piscataway, NJ 08855-1331, USA. Printed in USA. Periodical-class postage paid at New York, NY and at additional mailing offices. Bulk rate postage paid at Easton, PA permit #7. Canadian GST Reg# 40030962. Return undeliverable Canadian addresses to: Frontier, P.O. Box 1051, 1031 Helena Street, Fort Eire, ON L2A 6C7.

SUBSCRIPTIONS: All subscriptions, orders, and address changes should be sent to IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08855-1331, USA. Tel. +1-732-981-0060.

ADVERTISING: Advertising is accepted at the discretion of the publisher. Address correspondence to *IEEE Network*, 3 Park Avenue, 17th Floor, New York, NY 10016-5997, USA.