

Commenced Publication in 1973

Founding and Former Series Editors:

Gerhard Goos, Juris Hartmanis, and Jan van Leeuwen

Editorial Board

David Hutchison

Lancaster University, UK

Takeo Kanade

Carnegie Mellon University, Pittsburgh, PA, USA

Josef Kittler

University of Surrey, Guildford, UK

Jon M. Kleinberg

Cornell University, Ithaca, NY, USA

Alfred Kobsa

University of California, Irvine, CA, USA

Friedemann Mattern

ETH Zurich, Switzerland

John C. Mitchell

Stanford University, CA, USA

Moni Naor

Weizmann Institute of Science, Rehovot, Israel

Oscar Nierstrasz

University of Bern, Switzerland

C. Pandu Rangan

Indian Institute of Technology, Madras, India

Bernhard Steffen

TU Dortmund University, Germany

Madhu Sudan

Microsoft Research, Cambridge, MA, USA

Demetri Terzopoulos

University of California, Los Angeles, CA, USA

Doug Tygar

University of California, Berkeley, CA, USA

Gerhard Weikum

Max Planck Institute for Informatics, Saarbruecken, Germany

Jordi Domingo-Pascual Pietro Manzoni
Sergio Palazzo Ana Pont
Caterina Scoglio (Eds.)

NETWORKING 2011

10th International IFIP TC 6 Networking Conference
Valencia, Spain, May 9-13, 2011
Proceedings, Part II

Volume Editors

Jordi Domingo-Pascual
Universitat Politècnica de Catalunya (UPC) - Barcelona TECH
Campus Nord, Mòdul D6, Jordi Girona 1-3, 08034 Barcelona, Spain
E-mail: jordi.domingo@ac.upc.edu

Pietro Manzoni
Ana Pont
Universitat Politècnica de València
Camí de Vera, s/n, 46022 Valencia, Spain
E-mail: {pmanzoni, apont}@disca.upv.es

Sergio Palazzo
University of Catania
V.le A. Doria 6, 95125 Catania, Italy
E-mail: sergio.palazzo@diit.unict.it

Caterina Scoglio
Kansas State University
2069 Rathbone Hall, Manhattan, KS 66506, USA
E-mail: caterina@ksu.edu

ISSN 0302-9743
ISBN 978-3-642-20797-6
DOI 10.1007/978-3-642-20798-3
Springer Heidelberg Dordrecht London New York

e-ISSN 1611-3349
e-ISBN 978-3-642-20798-3

Library of Congress Control Number: 2011925929

CR Subject Classification (1998): C.2, H.4, D.2, K.6.5, D.4.6, H.3

LNCS Sublibrary: SL 5 – Computer Communication Networks
and Telecommunications

© IFIP International Federation for Information Processing 2011

This work is subject to copyright. All rights are reserved, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, re-use of illustrations, recitation, broadcasting, reproduction on microfilms or in any other way, and storage in data banks. Duplication of this publication or parts thereof is permitted only under the provisions of the German Copyright Law of September 9, 1965, in its current version, and permission for use must always be obtained from Springer. Violations are liable to prosecution under the German Copyright Law.

The use of general descriptive names, registered names, trademarks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

Typesetting: Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India

Printed on acid-free paper

Springer is part of Springer Science+Business Media (www.springer.com)

Welcome Message from the General Chairs

It is our honor and pleasure to welcome you to the proceedings of the 2011 IFIP Networking Conference. This was the 10th edition of what is already considered one of the best international conferences in computer communications and networks.

The objective of this edition of IFIP Networking conferences was to attract innovative research works in the areas of: applications and services, next-generation Internet, wireless and sensor networks, and network science. This goal was reached and we would like to thank our Technical Program Committee Co-chairs, Jordi Domingo-Pascual, Sergio Palazzo, and Caterina Scoglio, who organized the review of around 300 submissions, for the splendid technical program provided. The selected 64 high-quality papers were organized in two parallel tracks. The conference also included three technical talks from very prestigious scientists: Jim Kurose, José Duato, and Antony Rowstron. We would like to express our gratitude to them for accepting; their presence was a privilege for us all.

The present edition took place at the Computer Engineering School of the Universitat Politècnica of Valencia, in Spain.

All this would not have been possible without the hard and enthusiastic work of a number of people who contributed to making Networking 2011 a successful conference. Thus, we would like to thank all of them, from the Technical Committee Chairs and members, to the Local Organizing Committee, to the authors, and also to the staff of CFP-UPV who dealt with all local arrangements. Thanks also to the Steering Committee of Networking and all the members of the IFIP-TC6 for their support.

And finally, we would also like to encourage current and future authors to continue working in this direction and to participate in forums like this conference for the exchange of knowledge and experiences.

May 2011

Pietro Manzoni
Ana Pont

Technical Program Chairs' Message

It is a great pleasure to welcome you to the proceedings of Networking 2011, which was the 10th event of the series of International Conferences on Networking, sponsored by the IFIP Technical Committee on Communication Systems (TC6). The main objectives of these IFIP conferences are to bring together members of the networking community from both academia and industry, to discuss recent advances in the broad and fast-evolving field of computer and communication networks, and to highlight key issues, identify trends, and develop visions. For this year we had four main areas in the call for papers, namely, applications and services, next-generation Internet, wireless and sensor networks, and network science, which received, respectively, 18.8%, 45.2%, 20.6%, and 15.4% of the submitted papers.

This year, the conference received 294 submissions, representing a huge increase over the figures of the most recent years: it confirms this IFIP-supported initiative as a leading reference conference for the researchers who work in networking. Papers came from Europe, the Middle East and Africa (69.1%), Asia Pacific (16.5%), the USA and Canada (11.6%), and Latin America (2.8%).

With so many papers to choose from, the Technical Program Committee (TPC) job to select the final high-quality technical program was challenging and time consuming. The TPC was formed by 106 researchers from 22 different countries.

All papers were evaluated through a three-phase review process by at least three Program Committee members, who provided their own regular reviews; then, one of the three reviewers, being entitled as a meta-reviewer, opened a discussion among the three reviewers and provided a sum-up recommendation; finally, after a careful analysis of all recommendations, 64 papers were selected for the technical program, organized in 16 sessions, covering the main research aspects of next-generation networks. We would like to thank the members of the TPC, for they had to deal with a significant load reviewing papers due to the increase in the number of submissions. Also, we acknowledge the contribution of the additional reviewers who helped the TPC members in their task.

This event would not have been possible without the hard and enthusiastic work of a number of people who contributed to making Networking 2011 a successful conference. We would especially like to thank the General Co-chairs, Ana Pont and Pietro Manzoni, for their support throughout the whole review process, and the Steering Committee Chair, Guy Leduc, for his invaluable advice and encouragement.

All in all, we would like to thank all participants for attending the conference. We truly hope you enjoy the proceedings of Networking 2011!

Jordi Domingo-Pascual
Sergio Palazzo
Caterina Scoglio

Organization

Executive Committee

Honorary Chair	Ramón Puigjaner, Universitat Illes Balears, Spain
General Chairs	Ana Pont, Universitat Politècnica de València, Spain Pietro Manzoni, Universitat Politècnica de València, Spain
Technical Program Chairs	Jordi Domingo-Pascual, Universitat Politècnica de Catalunya, BarcelonaTECH, Spain Sergio Palazzo, University of Catania, Italy Caterina Scoglio, Kansas State University, USA
Tutorial Chairs	Juan Carlos Cano, Universitat Politècnica de València, Spain Dongkyun Kim, Kyungpook National University, South Korea
Publication Chair	Josep Domenech, Universitat Politècnica de València, Spain
Technical Organization Chair	José A. Gil, Universitat Politècnica de València, Spain
Publicity Chair	Carlos T. Calafate, Universitat Politècnica de València, Spain
Financial Chair	Enrique Hernández-Orallo, Universitat Politècnica de València, Spain
Workshops Chair	Vicente Casares, Universitat Politècnica de València, Spain

Steering Committee

George Carle	TU Munich, Germany
Marco Conti	IIT-CNR, Pisa, Italy
Pedro Cuenca	Universidad de Castilla-la-Mancha, Spain
Guy Leduc	University of Liège, Belgium
Henning Schulzrinne	Columbia University, USA

Supporting and Sponsoring Organizations (Alphabetically)

Departamento de Informática de Sistemas y Computadores (DISCA)
Escuela Técnica Superior de Ingeniería Informática
IFIP TC 6

Instituto de Automática e Informática Industrial
Ministerio de Ciencia e Innovación
Telefonica Investigación y Desarrollo
Universitat Politècnica de València

Technical Program Committee

Rui Aguiar	University of Aveiro, Portugal
Ozgur Akan	Koc University, Turkey
Khaldoun Al Agha	University of Paris XI, France
Ehab Al-Shaer	University of North Carolina, Charlotte, USA
Kevin Almeroth	University of California, Santa Barbara, USA
Tricha Anjali	Illinois Institute of Technology, USA
Pere Barlet-Ros	Universitat Politècnica de Catalunya, BarcelonaTECH, Spain
Andrea Bianco	Politecnico di Torino, Italy
Chris Blondia	University of Antwerp, Belgium
Fernando Boavida	University of Coimbra, Portugal
Olivier Bonaventure	Université catholique de Louvain, Belgium
Azzedine Boukerche	University of Ottawa, Canada
Raouf Boutaba	University of Waterloo, Canada
Torsten Braun	University of Bern, Switzerland
Wojciech Burakowski	Warsaw University of Technology, Poland
Albert Cabellos-Aparicio	Universitat Politècnica de Catalunya, BarcelonaTECH, Spain
Eusebi Calle	University of Girona, Spain
Antonio Capone	Politecnico di Milano, Italy
Damiano Carra	University of Verona, Italy
Augusto Casaca	Instituto Superior Técnico, Lisbon, Portugal
Claudio Casetti	Politecnico di Torino, Italy
Baek-Young Choi	University of Missouri, Kansas City, USA
Piotr Cholda	AGH University of Science and Technology, Poland
Marco Conti	IIT-CNR, Italy
Pedro Cuenca	University of Castilla la Mancha, Spain
Alan Davy	Waterford Institute of Technology, Ireland
Marcelo Dias de Amorim	UPMC Paris Universitatis, France
Christian Doerr	Delft University of Technology, The Netherlands
Jordi Domingo-Pascual	Universitat Politècnica de Catalunya, BarcelonaTECH Spain
Constantine Dovrolis	Georgia Institute of Technology, USA
Wolfgang Effelsberg	University of Mannheim, Germany
Lars Eggert	Nokia Research Center, Finland
Gunes Ercal	University of California, Los Angeles, USA
Laura Feeney	Swedish Institute of Computer Science, Sweden

Wu-chi Feng	Portland State University, USA
Markus Fiedler	Blekinge Institute of Technology, Sweden
Luigi Fratta	Politecnico di Milano, Italy
Laura Galluccio	University of Catania, Italy
Zihui Ge	AT&T Labs - Research, USA
Silvia Giordano	University of Applied Science - SUPSI, Switzerland
Vera Goebel	University of Oslo, Norway
Sergey Gorinsky	Madrid Institute for Advanced Studies in Networks (IMDEA Networks), Spain
Timothy Griffin	University of Cambridge, UK
Carmen Guerrero	University Carlos III of Madrid, Spain
Guenter Haring	Universität Wien, Austria
Paul Havinga	University of Twente, The Netherlands
Markus Hofmann	Bell Labs/Alcatel-Lucent, USA
David Hutchison	Lancaster University, UK
Mohan Iyer	Oracle Corporation, USA
Carlos Juiz	Universitat de les Illes Balears, Spain
Andreas J. Kassler	Karlstad University, Sweden
Kimon Kontovasilis	NCSR Demokritos, Greece
Georgios Kormentzas	University of the Aegean, Greece
Yevgeni Koucheryavy	Tampere University of Technology, Finland
Udo Krieger	Otto Friedrich University Bamberg, Germany
Fernando Kuipers	Delft University of Technology, The Netherlands
Thomas Kunz	Carleton University, Canada
Guy Leduc	University of Liège, Belgium
Kenji Leibnitz	Osaka University, Japan
Jorg Liebeherr	University of Toronto, Canada
Richard Ma	National University of Singapore, Singapore
Pietro Manzoni	Universidad Politècnica de Valencia, Spain
Janise McNair	University of Florida, USA
Deep Medhi	University of Missouri-Kansas City, USA
Tommaso Melodia	State University of New York at Buffalo, USA
Michael Menth	University of Würzburg, Germany
Edmundo Monteiro	University of Coimbra, Portugal
Ioanis Nikolaidis	University of Alberta, Canada
Ilkka Norros	VTT Technical Research Centre of Finland, Finland
Philippe Owezarski	LAAS, France
Sergio Palazzo	University of Catania, Italy
Christos Papadopoulos	Colorado State University, USA
Giovanni Pau	University of California Los Angeles, USA

Harry Perros	North Carolina State University, USA
Thomas Plagemann	University of Oslo, Norway
George Polyzos	Athens University of Economics and Business, Greece
Dario Pompili	Rutgers University, USA
Ana Pont	Universitat Politècnica de València, Spain
Guy Pujolle	University of Paris 6, France
Peter Reichl	Telecommunications Research Center Vienna (FTW), Austria
James Roberts	INRIA, France
Paolo Santi	IIT-CNR, Italy
Caterina Scoglio	Kansas State University, USA
Aruna Seneviratne	NICTA, Australia
Siraj Shaikh	Coventry University, UK
Hanan Shpungin	University of Calgary, Canada
Raghupathy Sivakumar	Georgia Institute of Technology, USA
Josep Solé-Pareta	Universitat Politècnica de Catalunya, BarcelonaTECH, Spain
Christoph Sommer	University of Erlangen, Germany
Otto Spaniol	RWTH Aachen University, Germany
Ioannis Stavrakakis	National and Kapodistrian University of Athens, Greece
Ralf Steinmetz	Technische Universität Darmstadt, Germany
James Sterbenz	University of Kansas, USA, and Lancaster University, UK
Burkhard Stiller	University of Zürich, Switzerland
Vijay Subramanian	National University of Ireland, Maynooth, Ireland
Violet Syrotiuk	Arizona State University, USA
Tarik Taleb	NEC Europe Ltd., Germany
Phuoc Tran-Gia	University of Würzburg, Germany
Vassilis Tsaoussidis	Democritus University of Thrace, Greece
Piet Van Mieghem	Delft University of Technology, The Netherlands
Huijuan Wang	Delft University of Technology, The Netherlands
Lars Wolf	Technische Universität Braunschweig, Germany
Tilman Wolf	University of Massachusetts, USA
Guoliang Xue	Arizona State University, USA
Martina Zitterbart	KIT (Karlsruhe Institute of Technology), Germany

Additional Reviewers

Saeed Al-Haj	Marcel Cavalcanti	Johnathan Ishmael
Carlos Anastasiades	de Castro	Jochen Issing
Emilio Ancillotti	Sotiris Diamantopoulos	Eva Jaho
Carles Anton	Nikos Dimitriou	Loránd Jakab
Panayotis Antoniadis	Lei Ding	Matthew R Jakeman
Markus Anwander	Jerzy Domzal	Parikshit Juluri
Shingo Ata	Falko Dressler	Frank Kargl
Baris Atakan	Otto Carlos M.B.	Dominik Klein
Jeroen Avonts	Duarte	Murat Kocaoglu
Mohammad Awal	Michael Duelli	Stavros Kolliopoulos
Serkan Ayaz	Zbigniew Dulinski	Ioannis Komninos
Sasitharan	Roman A. Dunaytsev	Robert Kooij
Balasubramaniam	Juergen Eckert	Efthymios Koutsogiannis
Pradeep Bangera	David Eckhoff	Stein Kristiansen
Youghourta Benfattoum	Philipp Eittenberger	Michal Kryczka
Mehdi Bezahaf	Ozgur Ergul	Adlen Ksentini
Nikolaos Bezirgiannidis	David Erman	Mirja Kuehlewind
Ozan Bicen	Chockalingam	Berend W.M. Kuipers
Alex Bikfalvi	Eswaramurthy	Harsha Kumara
Alberto P Blanc	Wissam Fawaz	Li-Chung Kuo
Norbert Blenn	Adriano Fiorese	Andreas Lavén
Thomas Bocek	Hans Ronald Fischer	Yee Wei Law
Chiara Boldrini	Bryan Ford	Fotis Lazarakis
Roksana Boreli	Anna Förster	Eun Kyung Lee
Raffaele Bruno	Dario Gallucci	Hendrik Lemelson
Shelley Buchinger	Wilfried Gansterer	Sotirios-Angelos Lenas
Filipe Caldeira	Xin Ge	Nanfeng Li
Valentín Carela-Español	Andrea Ghittino	Yunxin (Jeff) Li
David Carrera	Luca Girauda	Morten Lindeberg
Pietro Cassarà	Diogo Gomes	Teck Chaw Ling
Egemen K Çetinkaya	Roberto Gonzalez	Zeyu Liu
Supriyo Chatterjea	Jorge Granjal	Xuan Liu
Ioannis Chatzigiannakis	Vijay Gurbani	Dajie Liu
Lin Chen	Thomas Haenselmann	Dimitris Loukatos
Baozhi Chen	Matthias Hartmann	Chris Yu Tak Ma
Luca Chiaraviglio	Syed Anwar Ul Hasan	Francesco Malandrino
Mosharaf Chowdhury	Fabio Hecht	Jose Marinho
Delia Ciullo	Volker Hilt	Angelos K Marnerides
Florin Coras	David Hock	Steven Martin
Paul Coulton	Michael Hoefling	Alfons Martin
Joana Dantas	Philipp Hurni	Brian Meskill
Ignacio de Castro	Fida Hussain	Jakub Mikians

Philip Mildner	Sylvia A. Romaszko	Michael Tüxen
Gen Motoyoshi	Claudio Rossi	Ruud van de Bovenkamp
Xenia Mountrouidou	Walid Saad	Daniel Van den Akker
Hoang Anh Nguyen	Ehssan Sakhaee	Andrei Vancea
Thanh Nguyen	Konstantinos Samdanis	Salvatore Vanini
Jasmina Omic	Josep Sanjuàs-Cuxart	Matteo Varvello
David Fonseca Palma	Lambros Sarakis	Constantinos Vassilakis
Panagiotis	Bart Sas	Hariharasudhan
Pantazopoulos	Damien Saucez	Viswanathan
Giorgos Papastergiou	Raimund Schatz	Ryan Vogt
Ignasi Paredes-Oliva	Daniel Schlosser	Michael Voorhaen
Parth Pathak	Sascha Schnauffer	Gerald Wagenknecht
Oscar Pedrola	Charles Shen	Naoki Wakamiya
Pedro A. Vale Pinheiro	Benny Shimony	Anjing Wang
Antonio Pinizzotto	William Somers	Chih-Chiang Wang
Bartosz Polaczyk	Bruno Miguel Sousa	Xuetao Wei
Marc Portoles-Comeras	Kathleen Spaey	Christian Wilms
Aiko Pras Pras	Barbara Staehle	Wynand Winterbach
Daniele Puccinelli	Rafal Stankiewicz	Robert Wójcik
Muhammad Qasim Ali	Thomas Staub	Piotr Wydrych
Haiyang Qian	Moritz Steiner	Yufeng Xin
Massimo Reineri	Martin Stiemerling	Dejun Yang
Elisabete Reis	Siyu Tang	Yang Zhang
Cristiano Gato Rezende	Orestis A. Telelis	Zhongliang Zhao
Fabio Ricciato	Plarent Tirana	Quanyan Zhu
Michal Ries	Wim Torfs	Fang Zhu
André Rodrigues	Tonio Triebel	Thomas Zinner
Justin P. Rohrer	Fani Tsapeli	Patrick Zwickl

Table of Contents – Part II

Peer-to-Peer

UDP NAT and Firewall Puncturing in the Wild	1
<i>Gertjan Halkes and Johan Pouwelse</i>	
Enhancing Peer-to-Peer Traffic Locality through Selective Tracker Blocking	13
<i>Haiyang Wang, Feng Wang, and Jiangchuan Liu</i>	
Defending against Sybil Nodes in BitTorrent	25
<i>Jung Ki So and Douglas S. Reeves</i>	
Traffic Localization for DHT-Based BitTorrent Networks	40
<i>Matteo Varvello and Moritz Steiner</i>	

Pricing

BGP and Inter-AS Economic Relationships	54
<i>Enrico Gregori, Alessandro Improta, Luciano Lenzini, Lorenzo Rossi, and Luca Sani</i>	
Network Non-neutrality Debate: An Economic Analysis	68
<i>Eitan Altman, Arnaud Legout, and Yuedong Xu</i>	
Strategyproof Mechanisms for Content Delivery via Layered Multicast	82
<i>Ajay Gopinathan and Zongpeng Li</i>	
A Flexible Auction Model for Virtual Private Networks	97
<i>Kamil Koltys, Krzysztof Pienkosz, and Eugeniusz Toczyłowski</i>	

Resource Allocation

Collaboration between ISPs for Efficient Overlay Traffic Management . . .	109
<i>Eleni Agiatzidou and George D. Stamoulis</i>	
Optimal Joint Call Admission Control with Vertical Handoff on Heterogeneous Networks	121
<i>Diego Pacheco-Paramo, Vicent Pla, Vicente Casares-Giner, and Jorge Martinez-Bauset</i>	

Balancing by PREFLEX: Congestion Aware Traffic Engineering 135
João Taveira Araújo, Richard Clegg, Imad Grandi, Miguel Rio, and George Pavlou

EFD: An Efficient Low-Overhead Scheduler 150
Jinbang Chen, Martin Heusse, and Guillaume Urvoy-Keller

Resource Allocation Radio

Flexible Dynamic Spectrum Allocation in Cognitive Radio Networks Based on Game-Theoretical Mechanism Design 164
José R. Vidal, Vicent Pla, Luis Guijarro, and Jorge Martínez-Bauset

Channel Assignment and Access Protocols for Spectrum-Agile Networks with Single-Transceiver Radios 178
Haythem Bany Salameh and Marwan Krunz

The Problem of Sensing Unused Cellular Spectrum 198
Daniel Willkomm, Sridhar Machiraju, Jean Bolot, and Adam Wolisz

Adaptive Transmission of Variable-Bit-Rate Video Streams to Mobile Devices 213
Farid Molazem Tabrizi, Joseph Peters, and Mohamed Hefeeda

Resource Allocation Wireless

Multiscale Fairness and Its Application to Resource Allocation in Wireless Networks 225
Eitan Altman, Konstantin Avrachenkov, and Sreenath Ramanath

Fast-Converging Scheduling and Routing Algorithms for WiMAX Mesh Networks 238
Salim Nahle and Naceur Malouch

OFDMA Downlink Burst Allocation Mechanism for IEEE 802.16e Networks 250
Juan I. del-Castillo, Francisco M. Delicado, and Jose M. Villalón

Adaptive On-The-Go Scheduling for End-to-End Delay Control in TDMA-Based Wireless Mesh Networks 263
Yung-Cheng Tu, Meng Chang Chen, and Yeali S. Sun

Social Networks

SMS: Collaborative Streaming in Mobile Social Networks 275
Chenguang Kong, Chuan Wu, and Victor O.K. Li

Assessing the Effects of a Soft Cut-Off in the Twitter Social Network . . .	288
<i>Saptarshi Ghosh, Ajitesh Srivastava, and Niloy Ganguly</i>	
Characterising Aggregate Inter-contact Times in Heterogeneous Opportunistic Networks	301
<i>Andrea Passarella and Marco Conti</i>	
Are Friends Overrated? A Study for the Social Aggregator Digg.com . . .	314
<i>Christian Doerr, Siyu Tang, Norbert Blenn, and Piet Van Mieghem</i>	
TCP	
Revisiting TCP Congestion Control Using Delay Gradients	328
<i>David A. Hayes and Grenville Armitage</i>	
NF-TCP: A Network Friendly TCP Variant for Background Delay-Insensitive Applications	342
<i>Mayutan Arumathurai, Xiaoming Fu, and K.K. Ramakrishnan</i>	
Impact of Queueing Delay Estimation Error on Equilibrium and Its Stability	356
<i>Corentin Briat, Emre A. Yavuz, and Gunnar Karlsson</i>	
On the Uplink Performance of TCP in Multi-rate 802.11 WLANs	368
<i>Naeem Khademi, Michael Welzl, and Renato Lo Cigno</i>	
Author Index	379

Table of Contents – Part I

Anomaly Detection

BotTrack: Tracking Botnets Using NetFlow and PageRank	1
<i>Jérôme François, Shaonan Wang, Radu State, and Thomas Engel</i>	
Learning Entropy	15
<i>Lele Zhang and Darryl Veitch</i>	
Machine Learning Approach for IP-Flow Record Anomaly Detection	28
<i>Cynthia Wagner, Jérôme François, Radu State, and Thomas Engel</i>	
UNADA: Unsupervised Network Anomaly Detection Using Sub-space Outliers Ranking	40
<i>Pedro Casas, Johan Mazel, and Philippe Owezarski</i>	

Content Management

Efficient Processing of Multi-connection Compressed Web Traffic	52
<i>Yehuda Afek, Anat Bremler-Barr, and Yaron Koral</i>	
The Resource Efficient Forwarding in the Content Centric Network	66
<i>Yifan Yu and Daqing Gu</i>	
Modelling and Evaluation of CCN-Caching Trees	78
<i>Ioannis Psaras, Richard G. Clegg, Raul Landa, Wei Koong Chai, and George Pavlou</i>	
Empirical Evaluation of HTTP Adaptive Streaming under Vehicular Mobility	92
<i>Jun Yao, Salil S. Kanhere, Imran Hossain, and Mahbub Hassan</i>	

DTN and Sensor Networks

MAC Layer Support for Delay Tolerant Video Transport in Disruptive MANETs	106
<i>Morten Lindeberg, Stein Kristiansen, Vera Goebel, and Thomas Plagemann</i>	
DTN Support for News Dissemination in an Urban Area	120
<i>Tuan-Minh Pham and Serge Fdida</i>	

Stochastic Scheduling for Underwater Sensor Networks	134
<i>Dimitri Marinakis, Kui Wu, and Sue Whitesides</i>	
Using SensLAB as a First Class Scientific Tool for Large Scale Wireless Sensor Network Experiments	147
<i>Clément Burin des Roziers, Guillaume Chelius, Tony Ducrocq, Eric Fleury, Antoine Fraboulet, Antoine Gallais, Nathalie Mitton, Thomas Noël, and Julien Vandaele</i>	
Energy Efficiency	
Using Coordinated Transmission with Energy Efficient Ethernet	160
<i>Pedro Reviriego, Ken Christensen, Alfonso Sánchez-Macián, and Juan Antonio Maestro</i>	
Online Job-Migration for Reducing the Electricity Bill in the Cloud	172
<i>Niv Buchbinder, Navendu Jain, and Ishai Menache</i>	
Stochastic Traffic Engineering for Live Audio/Video Delivering over Energy-Limited Wireless Access Networks	186
<i>Nicola Cordeschi, Tatiana Patriarca, and Enzo Baccarelli</i>	
VMFlow: Leveraging VM Mobility to Reduce Network Power Costs in Data Centers	198
<i>Vijay Mann, Avinash Kumar, Partha Dutta, and Shivkumar Kalyanaraman</i>	
Mobility Modeling	
A Collaborative AAA Architecture to Enable Secure Real-World Network Mobility	212
<i>Panagiotis Georgopoulos, Ben McCarthy, and Christopher Edwards</i>	
Markov Modulated Bi-variate Gaussian Processes for Mobility Modeling and Location Prediction	227
<i>Paulo Salvador and António Nogueira</i>	
Mobility Prediction Based Neighborhood Discovery in Mobile Ad Hoc Networks	241
<i>Xu Li, Nathalie Mitton, and David Simplot-Ryl</i>	
STEPS - An Approach for Human Mobility Modeling	254
<i>Anh Dung Nguyen, Patrick Sénac, Victor Ramiro, and Michel Diaz</i>	

Network Science

Epidemic Spread in Mobile Ad Hoc Networks: Determining the Tipping Point	266
<i>Nicholas C. Valler, B. Aditya Prakash, Hanghang Tong, Michalis Faloutsos, and Christos Faloutsos</i>	
Small Worlds and Rapid Mixing with a Little More Randomness on Random Geometric Graphs	281
<i>Gunes Ercal</i>	
A Random Walk Approach to Modeling the Dynamics of the Blogosphere	294
<i>Muhammad Zubair Shafiq and Alex X. Liu</i>	
A Nash Bargaining Solution for Cooperative Network Formation Games	307
<i>Konstantin Avrachenkov, Jocelyne Elias, Fabio Martignon, Giovanni Neglia, and Leon Petrosyan</i>	

Network Topology Configuration

Optimal Node Placement in Distributed Wireless Security Architectures	319
<i>Fabio Martignon, Stefano Paris, and Antonio Capone</i>	
Geographical Location and Load Based Gateway Selection for Optimal Traffic Offload in Mobile Networks	331
<i>Tarik Taleb, Yassine Hadjadj-Aoul, and Stefan Schmid</i>	
Femtocell Coverage Optimisation Using Statistical Verification	343
<i>Tiejun Ma and Peter Pietzuch</i>	
Points of Interest Coverage with Connectivity Constraints Using Wireless Mobile Sensors	355
<i>Milan Erdelj, Tahiry Razafindralambo, and David Simplot-Ryl</i>	

Next Generation Internet

A Deep Dive into the LISP Cache and What ISPs Should Know about It	367
<i>Juhoon Kim, Luigi Iannone, and Anja Feldmann</i>	
Data Plane Optimization in Open Virtual Routers	379
<i>Muhammad Siraj Rathore, Markus Hidell, and Peter Sjödín</i>	
Performance Comparison of Hardware Virtualization Platforms	393
<i>Daniel Schlosser, Michael Duelli, and Sebastian Goll</i>	

A Novel Scalable IPv6 Lookup Scheme Using Compressed Pipelined
Tries 406
Michel Hanna, Sangyeun Cho, and Rami Melhem

Path Diversity

oBGP: An Overlay for a Scalable iBGP Control Plane 420
*Iuniana Oprescu, Mickaël Meulle, Steve Uhlig, Cristel Pelsser,
Olaf Maennel, and Philippe Owezarski*

Scalability of iBGP Path Diversity Concepts 432
Uli Bornhauser, Peter Martini, and Martin Horneffer

MultiPath TCP: From Theory to Practice..... 444
Sébastien Barré, Christoph Paasch, and Olivier Bonaventure

Stealthier Inter-packet Timing Covert Channels..... 458
Sebastian Zander, Grenville Armitage, and Philip Branch

Author Index 471