

2018 IFIP Networking Conference (IFIP Networking 2018) and Workshops

**Zurich, Switzerland
14-16 May 2018**



**IEEE Catalog Number: CFP18IFI-POD
ISBN: 978-1-5386-6280-9**

**Copyright © 2018, International Federation for Information Processing (IFIP)
All Rights Reserved**

****** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP18IFI-POD
ISBN (Print-On-Demand):	978-1-5386-6280-9
ISBN (Online):	978-3-903176-08-9

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

Table of Content

Burkhard Stiller: <i>Welcome Message from the General Chair</i>	iii
Claudio Casetti, Fernando Kuipers, James P.G. Sterbenz: <i>Welcome Message from the TPC Co-chairs</i>	iv
Keynote Session I	
Salil Kanhere: <i>Blockchain for Cyber Physical Systems</i>	v
Keynote Session II	
Wolfgang Kellerer: <i>Flexibility Matters: On the Design and Evaluation of Softwarized Networks</i>	vi
Keynote Session III	
Jürgen Quittek: <i>Artificial Intelligence in Network Operations and Management</i>	vii
Panel Session	
Organizer: James P.G. Sterbenz <i>Security and Privacy in the Internet of Things</i>	vii
<i>IFIP Networking 2018 Organizing Committee</i>	viii
<i>IFIP Networking 2018 Technical Program Committee</i>	ix
<i>IFIP Networking 2018 Table of Content</i>	xii
Session 1A - Security and Resilience	
George Geoffrey Michaelson, Matthew Roughan, Jonathan Tuke, Matt Wand, Randy Bush: <i>Rasch Analysis of HTTPS Reachability</i>	1
Lumin Shi, Mingwei Zhang, Jun Li, Peter Reiher: <i>PathFinder: Capturing DDoS Traffic Footprints on the Internet</i>	10
Jun Wu, Patrick Pak-Ching Lee, Qi Li, Lujia Pan, Jianfeng Zhang: <i>CellPAD: Detecting Performance Anomalies in Cellular Networks via Regression Analysis</i>	19
Elias A. Doumith, Sawsan Al Zahr: <i>An M:N Shared Regenerator Protection Scheme in Translucent WDM Networks</i>	28
Session 1B - Service Function Chaining	
Fabien Duchene, David Lebrun, Olivier Bonaventure: <i>SRv6Pipes: Enabling In-network Bytestream Functions</i>	37
Ahmed Abdelsalam, Stefano Salsano, Francois Clad, Pablo Camarillo, Clarence Filsfils: <i>SERA: SEgment Routing Aware Firewall for Service Function Chaining Scenarios</i>	46

Matthias Rost, Stefan Schmid: <i>Charting the Complexity Landscape of Virtual Network Embeddings</i>	55
Sara Ayoubi, Shihabur Rahman Chowdhury, Raouf Boutaba: <i>Breaking Service Function Chains with Khaleesi</i>	64
Session 2A - Measurements and Analysis	
Ermias Andargie Walelgne, Setälä Kim, Vaibhav Bajpai, Stefan Neumeier, Jukka M J Manner, Jörg Ott: <i>Factors Affecting Performance of Web Flows in Cellular Networks</i>	73
Qian Zhou, Yang Chen, Chuanhao Ma, Fei Li, Yu Xiao, Xin Wang, Xiaoming Fu: <i>Measurement and Analysis of the Reviews in Airbnb</i>	82
Meenakshi Syamkumar, Sathiya Kumaran Mani, Ramakrishnan Durairajan, Paul Barford, Joel Sommers: <i>Wrinkles in Time: Detecting Internet-wide Events via NTP</i>	91
Ruairí de Fréin: <i>State Acquisition in Computer Networks</i>	100
Session 2B - Congestion Control	
Dominik Scholz, Benedikt Jaeger, Lukas Schwaighofer, Daniel Raumer, Fabien Geyer, Georg Carle: <i>Towards a Deeper Understanding of TCP BBR Congestion Control</i>	109
Soheil Abbasloo, Tong Li, Yang Xu, H. Jonathan Chao: <i>Cellular Controlled Delay TCP (C2TCP)</i>	118
Tristan Braud, Martin Heusse, Andrzej Duda: <i>The Virtue of Gentleness: Improving Connection Response Times with SYN Priority Active Queue Management</i>	127
Roland Bless, Mario Hock, Martina Zitterbart: <i>Policy-Oriented AQM Steering</i>	136
Session 3A - Traffic Engineering	
Davide Sanvito, Ilario Filippini, Antonio Capone, Stefano Paris, Jeremie Leguay: <i>Adaptive Robust Traffic Engineering in Software Defined Networks</i>	145
Adriana Fernández-Fernández, Cristina Cervelló-Pastor, Leonardo Ochoa-Aday, Paola Grosso: <i>An Online Power-Aware Routing in SDN with Congestion-Avoidance Traffic Reallocation</i>	154
Reuven Cohen, Yuval Dagan, Gabi Nakibly: <i>Proactive Rerouting in Network Overlays</i>	163
Seppo Hättönen, Petri Savolainen, Ashwin Rao, Hannu Flinck, Sasu Tarkoma: <i>SWIFT: Bringing SDN Based Flow Management to Commodity Wi-Fi Access Points</i>	172
Session 3B - Multipath Communications	
Liyang Sun, Guibin Tian, Guanyu Zhu, Yong Liu, Hang Shi, David Dai: <i>Multipath IP Routing on End Devices: Motivation, Design, and Performance</i>	181
Tanya Shreedhar, Nitinder Mohan, Sanjit K Kaul, Jussi Kangasharju: <i>QAware: A Cross-Layer Approach to MPTCP Scheduling</i>	190

Session 4A - SDN Architectures

Viktoria Fodor, Muhammad Zeshan Naseer:

The Effect of Network Topology on the Control Traffic in Distributed SDN 199

Levente Csikor, Laszlo Toka, Márk Szalay, Gergely Pongrácz,

Dimitrios P. Pazaros, Gábor Rétvári:

HARMLESS: Cost-Effective Transitioning to SDN for Small Enterprises 208

Robert Krösche, Kashyap Thimmaraju, Liron Schiff, Stefan Schmid:

I DPID it my Way! A Covert Timing Channel in Software-Defined Networks 217

Session 4B - 5G Communications

Mohammad Nourifar, Francesco Devoti, Ilario Filippini:

Blockage-Robust 5G mm-Wave Access Network Planning 226

Chrysa Papagianni, Panagiotis Papadimitriou, John Baras:

Rethinking Service Chain Embedding for Cellular Network Slicing..... 253

Safwan Alwan, Ilhem Fajjari, Nadjib Aitsaadi:

D2D Multihop Energy-Efficient Routing and

OFDMA Resource Allocation in 5G Networks 244

Misikir Gebrehiwot, Pasi Lassila, Samuli Aalto:

Dynamic Load Balancing in 5G HetNets for Optimal Performance-Energy Tradeoff 253

Session 5A - Named Data Networking

JJ Garcia-Luna-Aceves, Ehsan Hemmati:

Making Name-Based Content Routing More Efficient than Link-State Routing 262

Jonnahtan Saltarin, Torsten Ingo Braun, Eirina Bourtsoulatzé, Nikolaos Thomos:

PopNetCod: A Popularity-based Caching Policy for

Network Coding-enabled Named Data Networking 271

Karim A. Khalil, Azeem Aqil, Srikanth V. Krishnamurthy,

Tarek Abdelzaher, Lance Kaplan:

NEST: Efficient Transport of Data Summaries over Named Data Networks 280

Chavoosh Ghasemi, Hamed Yousefi, Kang Shin, Beichuan Zhang:

MUCA: New Routing for Named Data Networking 289

Session 5B - Wireless and Mobile Networks

Mohammed Amer, Anthony Busson, Isabelle Guérin Lassous:

Association Optimization in Wi-Fi Networks

based on the Channel Busy Time Estimation 298

Marcelo M Carvalho, JJ Garcia-Luna-Aceves:

Carrier-Sense Multiple Access with Transmission Acquisition (CSMA/TA) 307

Alberto Ceselli, Marco Fiore, Angelo Furno,

Marco Premoli, Stefano Secci, Razvan Stanica:

Prescriptive Analytics for MEC Orchestration 316

Nesrine Ben Khalifa, Amal Benhamiche, Alain Simonian, Marc Bouillon:

Profit and Strategic Analysis for MNO-MVNO Partnership 325

Session 6A - Data Center and Overlay Networks

Soheil Abbasloo, Yang Xu, H. Jonathan Chao:

HyLine: A Simple and Practical Flow Scheduling for Commodity Datacenters 334

Céline Comte:	
<i>Dynamic Load Balancing with Tokens</i>	343
Pradeeban Kathiravelu, Marco Chiesa, Pedro de B Marcos, Marco Canini, Luís Veiga:	
<i>Moving Bits with a Fleet of Shared Virtual Routers</i>	352
Martijn De Vos, Johan Pouwelse:	
<i>Real-time Money Routing by Trusting Strangers with Your Funds</i>	361
Session 6B - Virtualization and Resource Sharing	
Matthias Rost, Stefan Schmid:	
<i>Virtual Network Embedding Approximations: Leveraging Randomized Rounding</i>	370
Johannes Zerwas, Patrick Kalmbach, Carlo Fuerst, Arne Ludwig, Andreas Blenk, Wolfgang Kellerer, Stefan Schmid:	
<i>Ahab: Data-Driven Virtual Cluster Hunting</i>	379
Vamsi Addanki, Leonardo Linguaglossa, James Roberts, Dario Rossi:	
<i>Controlling Software Router Resource Sharing by Fair Packet Dropping</i>	388
Session 7A - Network Models and Algorithms	
Fang Dong, Kui Wu, Venkatesh Srinivasan:	
<i>A New Dependence Model for Heterogeneous Markov Modulated Poisson Processes</i> ...	397
Paul Nikolaus, Jens Schmitt:	
<i>Improving Output Bounds in the Stochastic Network Calculus</i> <i>Using Lyapunov's Inequality</i>	406
Marie Schaeffer, Roman Naumann, Stefan Dietzel, Björn Scheuermann:	
<i>Hierarchical Layer Selection with Low Overhead in Prioritized Network Coding</i>	415
Kelong Cong, Zhijie Ren, Johan Pouwelse:	
<i>A Blockchain Consensus Protocol with Horizontal Scalability</i>	424
Session 7B - Content Distribution	
Tilak Varisetty, Markus Fidler, Matthias Ueberheide, Marcus Magnor:	
<i>On the Delay Performance of Browser-based Interactive TCP</i> <i>Free-viewpoint Streaming</i>	433
Felix Weinrank, Irene Rüngeler, Michael Tüxen, Erwin P. Rathgeb:	
<i>Alternative Handshake Mechanism for the Stream Control Transmission Protocol</i>	442
Eman Ramadan, Pariya Babaie, Zhi-Li Zhang:	
<i>A Framework for Evaluating Caching Policies in a Hierarchical Network of Caches</i>	451
Sukhpreet Kaur Khangura, Markus Fidler, Bodo Rosenhahn:	
<i>Neural Networks for Measurement-based Bandwidth Estimation</i>	460
Session 8A - Short Presentation Papers I	
Slađana Jošilo, György Dán:	
<i>Decentralized Scheduling for Offloading of Periodic Tasks in Mobile Edge Computing</i> ...	469
Yue Cao, Laiping Zhao, Rongqi Zhang, Yanan Yang, Xiaobo Zhou, Keqiu Li:	
<i>Experience-Availability Analysis of Online Cloud Services using Stochastic Models</i>	478
Quentin De Coninck, Olivier Bonaventure:	
<i>Tuning Multipath TCP for Interactive Applications on Smartphones</i>	487

Saeed Akhoondian Amiri, Klaus-Tycho Foerster, Riko Jacob, Mahmoud Parham, Stefan Schmid: <i>Waypoint Routing in Special Networks</i>	496
--	-----

Session 8B - Short Presentation Papers II

The An Binh Nguyen, Marius Rettberg-Päprow, Christian Meurisch, Tobias Meuser: <i>Complex Services Offloading in Opportunistic Networks</i>	505
Sanaz Taheri Boshrooyeh, Alptekin Küpçü, Ozgur Ozkasap: <i>PPAD: Privacy Preserving Group-Based ADvertising in Online Social Networks</i>	514
Jawad Manzoor, Ramin Sadre, Idilio Drago, Llorenç Cerdà-Alabern: <i>Is There a Case for Parallel Connections with Modern Web Protocols?</i>	523
Vadim Kirilin, Sergey Gorinsky: <i>A Protocol-Ignorance Perspective on Incremental Deployability of Routing Protocols</i>	532
<i>List of Authors</i>	541

Annex: Demonstration and Poster Session

Ahmed Abdelsalam: <i>Demo: Chaining of Segment Routing Aware and Unaware Service Functions</i>	A-3
Fred Aklamanu, Sabine Randriamasy, Eric Renault, Imran Latif, Abdelkrim Hebbar, Alberto Contem Bilal Al Jamal, Warda Hamdaoui: <i>Demo: Intent-Based 5G IoT Application Slice Energy Monitoring</i>	A-5
The An Binh Nguyen, Christian Klos, Christian Meurisch, Patrick Lampe: <i>Demo: Enabling In-Network Processing utilizing Nearby Device-to-Device Communication</i>	A-7
Vamsi Addanki, Leonardo Linguaglossa, Jim Roberts, Dario Rossi: <i>Demo: Controlling Software Router Resource Sharing by Fair Packet Dropping</i>	A-9
Marie Schaeffer, Roman Naumann, Stefan Dietzel, Björn Scheuermann: <i>Poster: Impact of Prioritized Network Coding on Sensor Data Collection in Smart Factories</i>	A-11
Sina Rafati Niya, Burkhard Stiller: <i>Poster: Design and Evaluation of a Time Efficient Vertical Handoff Algorithm between LTE-A and IEEE 802.11ad Wireless Networks</i>	A-13
Corinna Schmitt, Dominik Bünzli, Burkhard Stiller: <i>Poster: WebMaDa 2.0 - Automated Handling of User Requests</i>	A-15