

2014 ACM/IEEE Symposium on Architectures for Networking and Communications Systems (ANCS 2014)

**Marina del Rey, California, USA
20-21 October 2014**



**IEEE Catalog Number: CFP14ANC-POD
ISBN: 978-1-4799-6534-2**

**Copyright © 2014, Association for Computing Machinery (ACM)
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:	CFP14ANC-POD
ISBN (Print-On-Demand):	978-1-4799-6534-2
ISBN (Online):	978-1-4503-2839-5

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 Contents

2014 ACM/IEEE Symposium on Architectures for Networking and Communications Systems Organization	ix
ANCS 2014 Sponsors	xii
Session: Keynote Address I	
• Future Networking: Reconfiguration Heartland, Challenge and Revolution	1
Andrew Moore (<i>Cambridge University</i>)	
• Programmable Measurement Architecture	3
Minlan Yu (<i>University of Southern California</i>)	
Session: SDN and Reproducibility	
• WASP: A Software-Defined Communication Layer for Hybrid Wireless Networks	5
Murad Kaplan, Chenyu Zheng, Matthew Monaco, Eric Keller, Douglas Sicker (<i>University of Colorado Boulder</i>)	
• ElastiCon: An Elastic Distributed SDN Controller	17
Advait Dixit (<i>Purdue University</i>), Fang Hao, Sarit Mukherjee, T. V. Lakshman (<i>Bell Labs Alcatel-Lucent</i>), Ramana Rao Komppella (<i>Purdue University</i>)	
• A Packet-In Message Filtering Mechanism for Protection of Control Plane in OpenFlow Networks	29
Daisuke Kotani, Yasuo Okabe (<i>Kyoto University</i>)	
• Faithful Reproduction of Network Experiments	41
Dimosthenis Pedaditakis, Charalampos Rotsos, Andrew W. Moore (<i>University of Cambridge</i>)	
Session: Data Center	
• DiFS: Distributed Flow Scheduling for Adaptive Routing in Hierarchical Data Center Networks	53
Wenzhi Cui (<i>The University of Texas at Austin</i>), Chen Qian (<i>University of Kentucky</i>)	
• Blender: Upgrading Tenant-based Data Center Networking	65
Kevin C. Webb (<i>Swarthmore College</i>), Arjun Roy, Kenneth Yocom, Alex C. Snoeren (<i>University of California, San Diego</i>)	
• BCCC: An Expandable Network for Data Centers	77
Zhenhua Li, Zhiyang Guo, Yuanyuan Yang (<i>Stony Brook University</i>)	
Session: FPGA and Layout	
• Efficient and Programmable Ethernet Switching with a NoC-Enhanced FPGA	89
Andrew Bitar, Jeffrey Cassidy, Natalie Enright Jerger, Vaughn Betz (<i>University of Toronto</i>)	
• Laying Out Interconnects on Optical Printed Circuit Boards	101
Apostolos Siokis, Konstantinos Christodoulopoulos, Emmanouel Manos Varvarigos (<i>University of Patras & Computer Technology Institute and Press</i>)	
Session: Data Center	
• Integration and QoS of Multicast Traffic in a Server-Rack Fabric with 640 100G Ports	113
Nikolaos Chrysos, Fredy Neeser (<i>IBM Research – Zurich</i>), Brian Vanderpool, Mark Rudquist, Kenneth Valk, Todd Greenfield, Claude Basso (<i>IBM Systems & Technology Group (STG)</i>)	
• Marlin: A Memory-Based Rack Area Network	125
Cheng-Chun Tu (<i>Stony Brook University, New York</i>), Chao-tang Lee, Tzi-cker Chiueh (<i>Industrial Technology Research Institute, Taiwan</i>)	

Session: ICN and Lookup

- **Caesar: A Content Router for High-Speed Forwarding on Content Names** 137
Diego Perino, Matteo Varvello (*Bell Labs, Alcatel-Lucent*), Leonardo Linguaglossa (*INRIA*),
Rafael Laufer, Roger Boislague (*Bell Labs, Alcatel-Lucent*)
- **Design Patterns for Tunable and Efficient SSD-Based Indexes** 149
Ashok Anand (*Instart Logic*),
Aaron Gember-Jacobson, Collin Engstrom, Aditya Akella (*University of Wisconsin-Madison*)
- **CoRC: Coordinated Routing and Caching for Named Data Networking** 161
Hoon-gyu Choi, Jungmin Yoo, Taejoong Chung (*Seoul National University*),
Nakjung Choi (*Bell Labs, Alcatel-Lucent, Seoul*),
Ted Taekyoung Kwon, Yanghee Choi (*Seoul National University*)

Session: Low Energy and Sensor

- **Secure Remote Sensing and Communication Using Digital PUFs** 173
Teng Xu, James Bradley Wendt, Miodrag Potkonjak (*University of California, Los Angeles*)
- **Thermal-Aware Vacation and Rate Adaptation for Network Packet Processing** 185
Chih-Hsun Chou, Laxmi N. Bhuyan (*University of California, Riverside*)
- **Fine-Grained Power Scaling Algorithms for Energy Efficient Routers** 197
Tian Song, Xiangjun Shi, Xiaowei Ma (*Beijing Institute of Technology*)

Session: Packet Processing

- **Efficient Software Packet Processing on Heterogeneous and Asymmetric Hardware Architectures** 207
Lazaros Koromilas, Giorgos Vasiliadis (*FORTH*), Ioannis Manousakis (*Rutgers University*),
Sotiris Ioannidis (*FORTH*)
- **A Purely Functional Approach to Packet Processing** 219
Nicola Bonelli, Stefano Giordano, Gregorio Prociassi (*University of Pisa*), Luca Abeni (*University of Trento*)

Poster Session 1

- **A Scalable Routing and Admission Control Model in SDN-Based Networks** 231
M. Rasih Celenlioglu, H. Ali Mantar (*Gebze Institute of Technology*)
- **High Performance Multi-field Packet Classification Using Bucket Filtering and GPU Processing** 233
Cheng-Liang Hsieh, Ning Weng (*Southern Illinois University*)
- **QoS Aware Dynamic Power Scaling Algorithms for Deploying Energy Efficient Routers** 235
Tian Song, Xiangjun Shi, Xiaowei Ma (*Beijing Institute of Technology*)
- **Network Monitoring Probe Based on Xilinx Zynq** 237
Jan Viktorin, Pavol Korcek, Tomas Fukac, Jan Korenek (*Brno University of Technology*)
- **Network Service Quality Rank: A Network Selection Algorithm for Heterogeneous Wireless Networks** 239
Zeynab Bahrami Bidoni, Roy George (*Clark Atlanta University*)
- **Toward Terabyte-scale Caching with SSD in a Named Data Networking Router** 241
Won So, Taejoong Chung, Haimei Yuan, David Oran, Mark Stapp (*Cisco Systems, Inc.*)
- **Spectral Clustering Based Regular Expression Grouping** 243
Zhe Fu (*Tsinghua University, China*),
Jun Li (*Tsinghua University, China & Tsinghua National Lab for Information Science and Technology*)
- **Change-Point Detection Method on 100 Gb/s Ethernet Interface** 245
Pavel Benáček, Rudolf B. Blažek (*Czech Technical University in Prague*), Tomáš Čejka (*CESNET, a.s.e.*),
Hana Kubátová (*Czech Technical University in Prague*)

Poster Session 2

• Superspreaders Detection System on NetFPGA Platform.....	247
Theophilus Wellem (<i>Chung Yuan Christian University & Satya Wacana Christian University</i>), Guan-Wei Li, Yu-Kuen Lai (<i>Chung Yuan Christian University</i>)	
• On Reducing False Positives of a Bloom Filter in Trie-Based Algorithms	249
Ju Hyoung Mun, Hyesook Lim (<i>Ewha Womans University</i>)	
• Static Power Reduction in Caches Using Deterministic Naps	251
Oluleye Olorode, Mehrdad Nourani (<i>University of Texas at Dallas</i>)	
• Secure and Efficient Key Management Protocol (SEKMP) for Wireless Sensor Networks	253
Majid Alshammari, Khaled Elleithy (<i>University of Bridgeport</i>)	
• A Digital PUF-based IP Protection Architecture for Network Embedded Systems.....	255
Jason Xin Zheng (<i>University of California, Los Angeles</i>), Miodrag Potkonjak (<i>University of California</i>)	
• PLWAH+: A Bitmap Index Compressing Scheme Based on PLWAH.....	257
Jiahui Chang, Zhen Chen, Wenxun Zheng, Yuhao Wen, Junwei Cao (<i>Tsinghua University</i>), Wen-Liang Huang (<i>China Unicom Groups</i>)	
• Impact of the End-System and Affinities on the Throughput of High-Speed Flows	259
Nathan Hanford, Vishal Ahuja, Matthew K. Farrens, Dipak Ghosal (<i>University of California, Davis</i>), Mehmet Balman, Eric Pouyoul, Brian Tierney (<i>Esnet, Lawrence Berkeley Labs</i>)	
Author Index.....	261