USENIX Association

Proceedings of the 19th USENIX Symposium on Networked Systems Design and Implementation

April 4–6, 2022 Renton, WA, USA

© 2022 by The USENIX Association

All Rights Reserved

This volume is published as a collective work. Rights to individual papers remain with the author or the author's employer. Permission is granted for the noncommercial reproduction of the complete work for educational or research purposes. Permission is granted to print, primarily for one person's exclusive use, a single copy of these Proceedings. USENIX acknowledges all trademarks herein.

ISBN 978-1-939133-27-4

Conference Organizers

Program Co-Chairs

Amar Phanishayee, Microsoft Research Vyas Sekar, Carnegie Mellon University

Program Committee

Sangeetha Abdu-Jyothi, University of California, Irvine, and VMware Research Fadel Adib, Massachusetts Institute of Technology Behnaz Arzani, Microsoft Research Anirudh Badam, Microsoft Research Mahesh Balakrishnan, Facebook Aruna Balasubramanian, Stony Brook University Hitesh Ballani, Microsoft Research Sujata Banerjee, VMware Research Theo Benson, Brown University Matthew Caesar, University of Illinois at Urbana-Champaign Vijay Chidambaram, The University of Texas at Austin Asaf Cidon, Columbia University Angela Demke Brown, University of Toronto Fahad Dogar, Tufts University Giulia Fanti, Carnegie Mellon University Rodrigo Fonseca, Microsoft Research Manya Ghobadi, Massachusetts Institute of Technology Soudeh Ghorbani, Johns Hopkins University Phillipa Gill, Google Brighten Godfrey, University of Illinois at Urbana-Champaign and VMware Shyam Gollakota, University of Washington Ramesh Govindan, University of Southern California Chuanxiong Guo, ByteDance Andreas Haeberlen, University of Pennsylvania Kurtis Heimerl, University of Washington Wenjun Hu, Yale University Kyle Jamieson, Princeton University Junchen Jiang, University of Chicago Anuj Kalia, Microsoft Research Anurag Khandelwal, Yale University Ana Klimovic, ETH Zurich Dejan Kostic, KTH Royal Institute of Technology Franck Le, IBM Research Kate Lin, National Chiao Tung University Zaoxing Alan Liu, Boston University Jay Lorch, Microsoft Research Jonathan Mace, Max Planck Institute for Software Systems (MPI-SWS)

Harsha Madhyastha, University of Michigan Aurojit Panda, New York University Kyoongsoo Park, Korea Advanced Institute of Science and Technology (KAIST) Chunyi Peng, Purdue University Ben Pfaff, VMware Research George Porter, University of California, San Diego Costin Raiciu, University Politehnica of Bucharest and Correct Networks Robert Ricci, University of Utah Michael Schapira, The Hebrew University of Jerusalem Stefan Schmid. Technische Universität Berlin and University of Vienna Brent Stephens, University of Utah Laurent Vanbever, ETH Zurich Shivaram Venkataraman, University of Wisconsin-Madison David Walker, Princeton University Jia Wang, AT&T Labs Michael Wei, VMware Research John Wilkes, Google Xiaowei Yang, Duke University Minlan Yu, Harvard University Ellen Zegura, Georgia Institute of Technology Ying Zhang, Facebook Yiying Zhang, University of California, San Diego Ben Zhao, University of Chicago Wenting Zheng, Carnegie Mellon University Lin Zhong, Yale University Danyang Zhuo, Duke University

Steering Committee

Aditya Akella, University of Wisconsin–Madison Sujata Banerjee, VMware Research Ranjita Bhagwan, Microsoft Research India Casey Henderson, USENIX Association Jon Howell, VMware Research Arvind Krishnamurthy, University of Washington Jay Lorch, Microsoft Research James Mickens, Harvard University Jeff Mogul, Google George Porter, University of California, San Diego Timothy Roscoe, ETH Zurich Srinivasan Seshan, Carnegie Mellon University Renata Teixeira, Netflix Minlan Yu, Harvard University

Anubhavnidhi "Archie" Abhashkumar Rachit Agarwal Fawad Ahmad Lixiang Ao Rodrigo Bruno Ang Chen Italo Cunha Weiqi Feng Bryan Ford Jiaqi Gao Rajrup Ghosh Junzhi Gong Arpit Gupta Indranil Gupta Dongsu Han Yitao Hu Ryan Huang Keon Jang Weifan Jiang

External Reviewers

- Swarun Kumar Chonlam Lao Minghao Li Devon Loehr Pooria Namyar Dave Oran Dan Pei Sivaram Ramanathan Christopher Rossbach Siddhartha Sen
- Srini Seshan Srinath Setty Rob Sherwood Alex Snoeren Jiri Srba Srikanth Sundaresan Francois Taiani Matteo Varvello Yongqiang Xiong Zhiying Xu
- Francis Yan Michelle X. Yeo Irene Zhang Mingyang Zhang Yang Zhou Noa Zilberman