

Edge Computing

► CAO Jiannong



CAO Jiannong is currently a chair professor and head of the Department of Computing at Hong Kong Polytechnic University, Hung Hom, Hong Kong, China. His research interests include parallel and distributed computing, wireless networks and mobile computing, big data and cloud computing, pervasive computing, and fault tolerant computing. He has co-authored three books, co-edited nine books, and published over 300 papers in major international journals and conference proceedings. He is a fellow of IEEE, a senior member of China Computer Federation, and a member of ACM. He was the Chair of the Technical Committee on Distributed Computing of IEEE Computer Society from 2012–2014. Dr. CAO has served as an associate editor and a member of the editorial boards of many international journals, including *ACM Transactions on Sensor Networks*, *IEEE Transactions on Computers*, *IEEE Transactions on Parallel and Distributed Systems*, *IEEE Networks*, *Pervasive and Mobile Computing Journal*, and *Peer-to-Peer Networking and Applications*. He has also served as a chair and member of organizing/program committees for many international conferences, including PERCOM, INFOCOM, ICDCS, IPDPS, ICPP, RTSS, DSN, ICNP, SRDS, MASS, PRDC, ICC, GLOBECOM, and WCNC. Dr. CAO received the B.Sc. degree in computer science from Nanjing University, Nanjing, China, and the M.Sc. and the Ph.D. degrees in computer science from Washington State University, Pullman, WA, USA.

► RONG Chunming



RONG Chunming is the chair of IEEE Cloud Computing. He works as the head of the Center for IP-based Service Innovation (CIPSI) at the University of Stavanger, Norway and also as adjunct Senior Scientist leading Big - Data Initiative at IRIS. He is co-founder and the chair of the Board of Dataunitor.com—a new start-up in Norway. He was the vice president of CSA Norway Chapter (2016–2017). His research work focuses on data science, cloud computing, security and privacy. He is an IEEE senior member and is honoured as member of the Norwegian Academy of Technological Sciences (NTVA) since 2011. He has extensive contact network and projects in both the industry and academic. He is also the founder and steering chair of IEEE CloudCom conference and workshop series. He is the steering chair and associate editor of *IEEE Transactions on Cloud Computing (TCC)*, and co-Editors-in-Chief of the *Journal of Cloud Computing* (ISSN: 2192-113X) by Springer. Prof. RONG has extensive experience in managing large-scale R&D projects funded by both industry and funding agencies, both in Norway and EU.

Edge computing refers to the computing paradigm in which the processing power, communication capabilities and intelligence are pushed down to the edge of the networking system like gateways and devices, where the data originates. In doing so, edge computing enables an infrastructure for processing the data directly from devices with low latency, battery consumption and bandwidth cost. With opportunities for research and advanced applications such as augmented reality and wearable cognitive assistance come new challenges. This special issue reports the current research on various topics related to edge computing, addressing the challenges in the enabling technologies and practical implementations.

The first paper, “Adaptive Service Provisioning for Mobile Edge Cloud”, by HUANG and GUO studies how to efficiently provide the services from the edge cloud to a given group of mobile users. The authors consider the challenge arising from the user’s mobility, and develop an adaptive method to decide when to update the service provision solution with the objective of maximizing the profit for network operators.

In the paper “Software Defined Networking Based On-Demand Routing Protocol in Vehicle Ad-Hoc Networks”, DONG et al. propose to implement SDN in VANETs, and develop an SDN Based Vehicle Ad-Hoc On-Demand Routing Protocol (SVAO) to enhance the data transmission efficiency with VANETs. Through comprehensive simulations, the authors demonstrate that SVAO outperforms traditional ad-hoc routing protocols in terms of packet reception rate and average packet delay.

The paper “An MEC and NFV Integrated Network Architecture” by BING et al. explores the benefits of Mobile Edge Computing (MEC) at the radio access network and extends the NFV framework, and then proposes a new MEC/NFV fusion based architecture for 5G network. The authors further discuss several application scenarios of the new architecture.

In the paper “Key Technologies and Application of Edge Computing”, TU et al. present an overview of edge computing including its definition and models, applications, benefits and values, and research issues respectively related with computation, storage and networks. The authors then introduce ZTE’s edge computing solutions to 5G communications (5G MEC) and content delivery network (CDN MEC).

The paper “Scheduling Heuristics for Live Video Transcoding on Cloud Edges” by Oikonomou et al. studies the task scheduling problem in the video delivery. In the system model, the video coding and transcoding are performed at the network edges to decrease both the workload and network traffic towards the data centers. Several heuristics are designed to decide on which tasks should be assigned to an edge mini-datacenter, and which to backend datacenter.

With these articles, we wish to inform the readers of the state-of-the-art research and technologies on various topics in edge computing, and meanwhile attract the researchers and engineers to further investigate the challenges and issues that remain to be solved in the area.

The special issue would not be possible without the help from many people. We thank all the authors and reviewers for their contributions and efforts.