IEEE Transactions on Sustainable Computing Special Issue on Sustainability of Fog/Edge Computing Systems

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EDGE Computing is an emerging architectural and technical approach aimed at addressing various shortcomings in traditional cloud computing paradigms and responding to today's constantly increasing data-demanding services such as Internet-of-Things, 5G embedded artificial intelligence and smart cities. In Fog/Edge Computing, nodes at the edge of a network are equipped with processing, storage, networking, etc. capabilities to take over several tasks that were used to be sent to cloud services. Pre-filtering and aggregation of data as well as online processing and actuation are sample procedures envisaged/dedicated to fog/edge nodes.

Although slightly different in the way they are implemented, fog and edge paradigms are designed in direct response to various challenges in operating smooth IoT and 5G services including –but not limited to– stringent latency requirements from sensing to actuation, network bandwidth limitation for large-sized aggregated data, limited resources for edge devices to perform tasks, and security requirements for all data flows and operations. Satisfying all aforementioned concerns becomes even more challenging when considering the rapid constant grow of edge devices/sensors.

To address several major issues regarding sustainability of future fog/edge systems, this special section aims at highlighting challenges, state-of-the-art, and solutions to a set of currently unresolved key questions including –but not limited to– performance, modelling, optimisation, reliability, security, privacy and techno-economic aspects of fog/edge architectures. Through addressing these concerns while understanding their impacts and limitations, technological advancements will be channelled toward more sustainable/efficient platforms for tomorrow's ever-connected systems.

We received a total of 16 submissions for this special issue, of which only 10 papers have been accepted. Each paper went through a rigorous peer review process, in addition to multiple follow-up rounds with the authors.

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Guest Editors

Javid Taheri (Senior Member, IEEE) received the bachelor's and master's degrees in electrical engineering from the Sharif University of Technology, Tehran, Iran, in 1998 and 2000, respectively, and the PhD degree in mobile computing from the University of Sydney, Sydney, Australia, in 2007. He is a full professor with the Department of Computer Science, Karlstad University, Sweden. He is the recipient of many awards including being selected as one of the top 200 young researchers in the world by the Heidelberg Forum in 2013, the recipient of several best paper awards since 2007, and the recipient of the prestigious IEEE Middle Career Researcher award from TSCS in Scalable Computing in 2019. He holds several cloud/networking related industrial certification from VMware, Cisco, Microsoft, and IBM. His research interests include cloud computing, edge/fog computing, network function virtualization, software-defined networking, and AI-based optimization techniques. He is the editor of two books entitled "*Big Data and Software Defined Networks*", and "*Edge Computing: Models, Technologies and Applications*". He coauthored more than 200 scientific articles and papers, has been serving as an editor for more than 15 journals, as well as a member of organizing team for more than 40 international conferences.

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Massimo Villari (Senior Member, IEEE) is a full professor in computer science and computer engineering. He was recognized as a full professor after the National evaluation for the Italian Professorship Abilitation List, in 2017. He is also an IT Security and Distributed Systems Analyst in cloud computing, virtualization, and storage. He is the author of more than 100 journal and conference publications and one book on cloud computing and federation. His main research interests include virtualization, migration, security, federation, autonomic systems, smart sensing, big data storage, cloud federation, Internet of Things, and energy efficiency. Since 2011, he has been a fellow of IARIA and has been recognized as a cloud computing expert. In 2014, he was recognized by an independent assessment (*IEEE Transactions on Cloud Computing*, Issue April 2014) as a world-wide scientific researcher, top 27 classification, in the cloud computing area. He is currently an editor-in-chief of the *EAI Endorsed Transactions on Smart Cities*. He is a member of the editorial board of the *Computer Science* (Springer). He served as the chair in several conferences and workshop. He also has been scientific coordinator for European project, such as reservoir, vision-cloud, cloudwave, frontierCities, and cloud for Europe.