Wireless Communications and Mobile Computing

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Special Issue on

# IoT Approaches for Distributed Computing

# CALL FOR PAPERS

21.000 million devices will be connected to the Internet by 2021, and 16.000 of them will be part of the Internet of Things. The usage of manifold connected sensors (temperature, humidity, pressure, vibration, air quality, etc.) in different fields (plants, animals, geological phenomena, cities, homes, etc.) will enable the collection of a vast amount of data subsequently transformed into information and knowledge. However, such a knowledge creation process cannot be handled in a totally centralized way and must be combined with distributed computing so that information transmitted is reduced by sharing the processing load among devices. In traditional distributed computing, shared processing is enabled by additional hardware architectures that have to satisfy higher processing capabilities while ensuring lower power consumption.

The distinct characteristics of IoT technologies require a more intricate trade-off communication versus computation. In particular, a large number of sensors and QoS strict requirements demand new distributed techniques. As the sensor volume grows, infrastructures for IoT distributed computing must include nodes close to the edge that facilitate data analysis for a cluster of sensors. They must also perform edge analytics to reduce the data sent to the core from high-frequency readings and decrease the bandwidth needed. Finally, they must guarantee that customer experience is not compromised, which requires new robust techniques with strict QoS and latency requirements. The emerging paradigm of fog computing enables us to meet these requirements by moving storage and compute services to the network edge or even to the end devices (e.g., to a data hub or to a smart access point).

Consequently, IoT deployments require new abstraction or multiagent approaches to distribute tasks among edges and cloud; new techniques and communication standards for sharing information to increase spectrum efficiency while keeping data consistency and availability; and new meta-data, policies, and hardware/software capabilities to aid fog-orchestration in distributed databases.

The aim of this special issue is to provide state-of-the-art solutions tackling the mentioned IoT distributed computing problems. High quality research papers as well as contributions from industry that are not yet published or under review are welcomed.

Potential topics include but are not limited to the following:

- Distributed information fusion in IoT networks
- Distributed sensing and data gathering for IoT
- Computational complexity reduction approaches for IoT
- Load balancing among edge and cloud nodes for large IoT deployments
- Edge analytics for data and bandwidth reduction
- Multiagent systems for IoT distributed computing
- Hardware architectures for embedded distributed computing
- Energy harvesting for IoT distributed computing
- Battery efficient IoT devices
- New communications standards for sharing information and increasing spectrum efficiency
- Performance bounds for distributed computing
- Virtualization of edge devices
- Applications of IoT that combine edge and cloud resources

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