IEEE Internet of Things Journal Special Issue on

Cybertwin-driven 6G: Architectures, Methods and Applications

The increasing mobile traffic and services in Internet of Everything (IoE) bring unprecedented challenges regarding scalability, mobility, availability, and security to wireless communications. Cybertwin is emerging as a promising solution to these challenges for the next generation communications systems, i.e., 6G. Cybertwin goes further beyond the concept of digital twin — digital replica of things. It is a digital record of activities of mobile users, end devices, things etc. in the cyberspace at the edge cloud. It will leverage the capabilities of multi-access edge computing, and serves in multiple functionalities. Specifically, 1) *Cybertwin serves as a communication anchor*. It authenticates users' identities and anchors Internet traffic of users at the edge. Hence, it can route data on different access links to the end device, be it cellular, Wi-Fi, or even Li-Fi. It also indicates that uplink and downlink can be fully decoupled, which could innovate disruptive 6G architecture design. 2) *Cybertwin performs the resource trading agent function.* Instead of centrally allocating resources via an authority/third-party such as a resource scheduler, scarce resources are allocated through competition in a resource market. Cybertwin helps to reduce the transaction costs by delegating the resource trading process. Another benefit is that operators can tune the market (i.e., relationship between demand and supply) through the price instrument. 3) *Cybertwin becomes a cyberspace activity logger*. It records all the activities and profiles of its serving users as digital assets. Since the data is a kind of personally identifiable information (PII) as defined in general data protection regulation (GDPR), Cybertwin can help users to manage activity data, monitor data usage, and make decision on data trading by evaluating the risks of privacy leakage and the benefits, including convenience and money they can obtain. In summary, Cybertwin provides a composite edge service that leads to several major paradigm shifts in 6G, and will enable future applications such as multi-screen multi-stream rich media tele-conferencing. The above novel and unique features of Cybertwin will make the next-generation communication network more flexible, scalable, reliable, and secure.

This special issue aims to invite researchers to present their creative thoughts and outstanding works on the Cybertwin-driven 6G. Contents of the special issue will mainly focus on dealing with architectures, methods and challenges of the Cybertwin-driven 6G. Topics of interest include, but are not limited to:
- Novel radio access network (RAN) architecture in Cybertwin-driven 6G
- Network function virtualization and network slicing in Cybertwin-driven 6G
- Multi-access edge computing and edge intelligence in Cybertwin-driven 6G
- Novel resource allocation methods in Cybertwin-driven 6G
- Resource pricing and market mechanism design in Cybertwin-driven 6G
- Security and privacy in Cybertwin-driven 6G
- Personal digital asset management in Cybertwin-driven 6G
- Prototype and protocol design for Cybertwin-driven 6G
- IoE-oriented applications and new paradigms in Cybertwin-driven 6G

Important Dates:

Submission Deadline: February 1, 2021   First Revision Due: April 15, 2021
Revision Due: May 31, 2021   Sec. Reviews Due/Notification: July 1, 2021
Final Manuscript Due: July 15, 2021   Publication Date: 2021

Submission Instructions:

Prospective authors should prepare their submissions in accordance with the rules specified in the Information for Authors of the IEEE Internet of Things Journal guidelines (https://ieeeiotj.org/guidelines-for-authors/). Authors should submit the required manuscript material to https://mc.manuscriptcentral.com/iot.

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