# ACM Transactions on Internet Technology (TOIT)
## Special Issue on
## Recent Advances in Networks and Distributed Systems

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Several recent developments like the advent of the Internet-of-Things, network softwarization, mission-critical applications, and artificial intelligence have posed challenges for the Internet, and more generally for networks and distributed systems:

**(1: IoT)** The Internet-of-Things will boost the number of Internet nodes well beyond the billions, lead to new traffic patterns (e.g., high-frequency low-volume), and accelerate the other developments described hereafter.
**(2: SDN++)** Softwarization "conquers" the net. What has started with SDN and NFV will continue to lead to more flexibility and enable disruptive change, such as the competitive co-existence of old and new, e.g., content-centric, world-wide networks. As this softwarization significantly increases the complexity of today's networks, new and more security problems will result. Moreover, softwarization comes at a performance price, which is at odds with mission-critical, real-time communication.
**(3: MCA)** Mission-critical applications, formerly confined to dedicated real-time systems and (TSN, industrial Ethernet, ...) networks, are conquering public and wide area networks. This impacts technologies and protocols (such as 5G URLLC) as well as architectures, such as approaches to move cloud functionality closer to the action scene, e.g., via fog and edge computing.
**(4: AI.net)** The resurgence of AI, evoked by stunning successes of machine learning, boosts the need for computing resources that cannot be embedded in myriads of IoT devices and energy-critical handhelds like smartphones. This and the need for joint processing, requires shuffling 'big data' from the action scene to those resources, accelerating the need for offloading approaches and, depending on the application and the distribution of stakeholders, aggravating the three aforementioned challenges.

These four challenges - abbreviated as IoT, SDN++, MCA, and AI - are densely interwoven, both mutually supporting and mutually aggravating each other. In this TOIT special issue, we bring together contributions to all four challenges and seek to track down their positive and negative interdependencies.

Topics of interest include, but are not limited to:
- Artificial Intelligence and Machine Learning and their application in, and impacts on, networking
- Evolution from cloud computing to mobile cloud, fog and edge computing
- Consistency, reliability, availability, and programming support for meeting the MCA challenge in networks
- Contributions to the four challenges in context of cyber-physical systems
- Emerging networked applications
- Green and energy-efficient networks and networked systems
- Information-centric networking, content distribution and retrieval, and their co-existence with classical networks
- Network architectures and protocols
- Approaches to the pertinent network security and privacy aspects
- Methods for design, implementation, and analysis of networked systems considering the recent challenges and advances
- Pertinent middleware architectures and platforms for networked systems
- Pertinent concepts for mobile, ad-hoc, opportunistic, vehicular, sensor networks
- Advancements to software-defined networking, network function virtualization, and further network softwarization
- Reflection of recent challenges in SoA, web services, and mobile services
- Advancements in social networks, social computing, data-intensive computing
- Novel concepts for tactile and low-latency communication
- Transport- and application-layer protocols in response to the four challenges