ITU Journal
Future and evolving technologies

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The *ITU Journal on Future and Evolving Technologies (ITU J-FET)* is an international journal providing complete coverage of all communications and networking paradigms, free of charge for both readers and authors. The ITU Journal considers yet-to-be-published papers addressing fundamental and applied research. It shares new techniques and concepts, analyses and tutorials, and learnings from experiments and physical and simulated test beds. It also discusses the implications of the latest research results for policy and regulation, legal frameworks, and the economy and society. This publication builds bridges between disciplines, connects theory with application, and stimulates international dialogue. Its interdisciplinary approach reflects ITU's comprehensive field of interest and explores the convergence of ICT with other disciplines. The ITU Journal welcomes submissions at any time, on any topic within its scope.

Special issue on

Future of networking beyond 2030

Call for papers

Network technologies have been a great success globally. With growing business and economy, new applications are continuing to emerge. In particular, many new applications are being enabled and new requirements are needed to support 5G and 6G. ITU-T Focus Group on Network 2030 has identified a number of use cases, analyzed the technical gaps, and described some new services that are required to support new applications in the years to come.

Some new applications, for example, industrial manufacturing and control in connected industries, require KPI guarantee in terms of throughput, latency, and packet loss; some applications require massive machine-to-machine communications that have different characteristics than man-to-man and/or man-to-machine communications; other applications might depend on the integration of satellite and terrestrial networks and extend IP routing to satellite networks. Various applications may also require qualitative communications that deliver as much information as possible without retransmission and always try to deliver the most important information; and others may require features and functionalities that the current networks do not provide.

Many applications do not respond gracefully when service levels deteriorate and cannot be promoted without further technological advances in network communications. The network needs to evolve in a non-disruptive way and provide the new service capabilities that will be essential in the future. For instance, a fully connected supply chain and intelligent manufacturing are necessary to maintain production cycles. To meet these goals, new applications are needed, which in turn demand new network services to customize scenarios in each vertical. It requires the modernization of general-purpose protocols for industrial process control. Industrial applications cannot degrade due to outages or unreliable responses from the networks.

With networks becoming increasingly complex, heterogeneous, and dynamic, manual administration is far from enough. Leveraging automated decision-making from the fields of Artificial Intelligence (AI) and Machine Learning (ML) has proven to be beneficial. Such AI and ML techniques could make a similar impact on the networking ecosystem and have already transformed many other fields. They may assist in network self-organization, autonomous and intelligent control on network-wide behaviours, provide intelligent solutions for resource allocation, traffic classification, routing, scheduling, abnormality detection, etc. Moreover, the decisions made by an AI-based model with humans out of the loop may have undesired side effects. Innovations in a better understanding of those decisions through formal verification methods, explanation, and trustworthiness of such findings may be desired.

To maintain critical and emergency response infrastructure functioning reliably, innovative path diversity is required. Such paths will require for example, closer integration between terrestrial and satellite communication which may lead to new traffic engineering methods and end-to-end transmission control protocols.

Energy conservation is one of the major concerns nowadays on a global scale. With Internet traffic growing so fast, more high-speed and large-capacity routers and switches have been deployed by Internet Service Providers (ISPs). They consume a considerable amount of power. The Information and Communication Technology (ICT) sector is responsible for a very large percentage of the worldwide electricity consumption. New network infrastructures, networking protocols, router and switches are required to reduce energy consumption.

Prospective authors are cordially invited to submit their original manuscripts (research or survey/tutorial article).

Suggested topics (but not limited to):

Innovative Internet services and enabling technologies	• Support for precise and extra-low latency • Packet scheduling in large-scale networks for high-precision applications • Guarantees of QoS at a finer granularity than DiffServ, IntServ • Theory and algorithms for lossless packet delivery • Network protocol optimizations for industrial and tactile networks • Methods for transmission of very large volumetric data • Innovations in transport and networking for AR/VR and holographic type communications • Network assisted, context aware, adaptive video streaming
Machine Learning and AI for networking	• Traffic prediction and classification • Abnormality detection • ML for congestion control • Edge intelligence • Innovative applications of AI for networking and transport • Computation in the network
Green Internet	• Factors affecting energy consumption in routers and switches • Ways to quantify energy consumption • Energy consumption in data center networks and industrial networks • Protocol stack restructuring and optimization for energy use reduction • Energy efficient network services • Power-aware traffic engineering • Impact analysis of 5G deployment on global energy consumption • Mechanisms of energy consumption reduction

Internet addressing and routing	• Semantic addressing and routing • Context-ware addressing and routing • Flexible addressing and routing • Asymmetric addressing and routing • Functional addressing and routing • Addressing varieties and interoperability • Addressing and routing for Low Orbit Satellite Networks • Routing protocols for Internet of Things and Vehicle to Everything
Emerging Internet applications and scenarios	• Connected vehicles and driving • Cloudified industries and automation • Holographic type communications • Remote surgery • Smart cities, smart health, smart agriculture
Network architecture and protocols	• Integration of space and terrestrial networks • New protocols for new applications • New architectures, algorithms, and solutions for emerging applications

Keywords
Internet technology, Internet protocol, QoS, KPI guarantee, high precision networking, lossless network, AI and ML for networking, holographic type communication, addressing and routing, green Internet

Deadlines extended
Paper submission: 20 May 2022
Paper acceptance notification: 20 July 2022
Camera-ready paper submission: 20 August 2022

Paper submission
This special issue calls for original scientific papers. Submitted papers should not be under consideration for publication elsewhere. Submissions must be made electronically using EDAS: Editor's Assistant at: https://edas.info/N29184. Templates and guidelines can be found at: https://www.itu.int/en/journal/j-fet/Pages/submission-guidelines.aspx

Publication
As soon as they get accepted, papers will be continuously published on the ITU digital library. They will then be bundled into the special issue digital publication.

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