



CTO MEETING

8 September 2019, Budapest, Hungary

COMMUNIQUÉ

Chief Technology Officers (CTOs) met with the senior management of the ITU Telecommunication Standardization Bureau at the eleventh annual CTO Meeting in Budapest, Hungary, 8 September 2019, held in conjunction with ITU Telecom World, 9-12 September 2019. The meeting brings CTOs together to exchange views on industry needs and related standardization priorities.

Industry preparations for IMT-2020/5G dominated the debate.

CTOs received an executive briefing on the preparations for the ITU World Radiocommunication Conference 2019 (WRC-19) in Sharm El-Sheikh, Egypt, 28 October to 22 November 2019, and its implications for spectrum that will be available in the future for IMT (5G) and for various radiocommunication services and systems.

CTOs discussed the importance of collaboration in the interests of 5G security; the benefits and practical aspects of network infrastructure sharing; the insights gained from early 5G deployments, the impact of 5G on network operators' business models, and lessons learned regarding the business drivers and rationale for 5G deployment; the necessity of investment in all-fibre networks; regulators' perspectives on the assessment of quality of service/experience (QoS and QoE); the innovation required to achieve 'intelligent' networks; and the evolution of standardization activities in view of the open-source movement and network 'softwarization'.

5G era security

More than half of all Web connections are now encrypted but a similar proportion of all Web attacks are also now encrypted, with the result that privacy does not equate to security. If AI and Machine Learning are to support security, industry must consider how security defences incorporating AI and Machine Learning could be subverted. Quantum information technologies are approaching, with significant potential to introduce new security threats. Where Quick UDP Internet Connections (QUIC) replace TCP and DNS runs over HTTPS (DoH), network operators' security defences should reflect this evolution. In the 5G era with a fast-increasing number and diversity of network end-points, and the need for legacy technologies to coexist with the latest technologies, we should consider new implications for network defence.

Against this backdrop, CTOs highlighted that 5G security will demand significant industry collaboration and well-coordinated contributions from a wide range of standards bodies.

CTOs considered the 'Ottawa Accord', a set of security priorities developed in June 2019 by network operators, standards bodies and industry associations.

The CTO meeting endorsed the findings of the Ottawa Accord in relation to three security priorities:

- Global threat exchange: Common understanding of security threats and common terminology to enable the sharing of threat intelligence.
- Best practices for operational security: Best practices for 5G security and widespread commitment to infrastructure protection.
- Security Incentives: Measurement schemes based on agreed metrics could bring attention to prevailing levels of security and create incentives for investment in security.

CTOs highlighted the alignment of these three priorities with the priorities of the ITU standardization expert group for 'security', ITU-T Study Group 17.

CTOs also considered that a holistic approach to 5G era security could receive valuable support from a global centre for the development of security solutions and their testing and assurance. Such a 'living lab' open to multiple interested parties, said CTOs, could bring cohesion to 5G security efforts as well as reduce the costs of testing security solutions.

Network infrastructure sharing

Infrastructure sharing can assist network operators in reducing time-to-market for new solutions and in gaining cost efficiencies.

CTOs illustrated potential scenarios for the sharing of infrastructure such as core networks, central offices, backhaul infrastructure, and towers and radio access networks (RANs).

CTOs considered an example of 'Multi-Core Operator Networks', networks said to be capable of reducing an operator's infrastructure investments by as much as 50 per cent and also enable improvements in network performance.

Business rationale for 5G deployment

5G will support enhanced mobile broadband, massive-scale Internet of Things, and ultra-reliable and low latency communications for applications such as Virtual Reality and automated driving. It presents a key opportunity for network operators to serve consumers as well as other industry sectors.

But 5G deployment calls for considerable investment, leading CTOs to highlight that network operators – particularly in developing countries – may benefit from greater clarity around the business opportunities presented by 5G.

CTOs suggested that ITU examine the possibility to establish a 5G observatory in order to gain lessons from various technical developments and implementations of 5G technology, use cases and vertical experiments, and establish appropriate guidelines if needed.

CTOs discussed the potential for ITU to develop guidance for operators on the business rationale for 5G deployment. Such guidance might bring greater clarity to 5G investment strategies and funding mechanisms, the costs of different 5G deployment scenarios, the possible business models to monetize 5G assets, and the 5G ecosystem and the roles played by its constituents.

Fibre future

CTOs with experience in the early commercial deployment of 5G reiterated the importance of investment in fibre. Fibre-optic networks form the 'backbone' of the Information Society. Investment in fibre continues to rise, with fibre recognized as the key infrastructure underlying today's ultra-broadband Gigabit era.

CTOs highlighted that 1-5 Gbit/s access speeds can support Virtual Reality, cloud gaming and smart cities. 5-10 Gbit/s access speeds, said CTOs, could bring us applications such as holographic communications.

Recognizing the leadership of ITU-T Study Group 15 in the standardization of fibre-optic networks, technologies and infrastructures, CTOs encouraged ITU to support industry in taking full advantage of ITU-standardized Fibre to the Home (FTTH) technologies.

CTOs thus encouraged ITU to analyze standardization gaps relevant to the relationship between advanced FTTH technologies; high-quality service experience marked by ultra-low latency; all-scenario optical networking including datacentres and home networking; cloud computing and network slicing; and automated network operation and maintenance with AI.

Regulatory perspective on QoS and QoE

A more homogeneous environment for the assessment of QoS and QoE would deliver key benefits to national regulators promoting high-quality services, said CTOs.

The shift to packet-based communications and the increasing importance of over-the-top (OTT) applications introduces new challenges to the assessment of QoS and QoE. The prices of data and data-enabled devices are decreasing, making these assessment challenges progressively more relevant to developing countries.

Regulators are increasingly interested in the real-time monitoring of network performance as well as performance prediction, said CTOs.

CTOs recognized the value of the technical guidance to regulators developed by the ITU standardization expert group for 'performance, QoS and QoE', ITU-T Study Group 12. Collaboration in standardization has also proven effective in building common understanding and trust between regulators and network operators.

Towards intelligent networks

Machine Learning holds great promise to enhance network management and orchestration. Drawing insight from network-generated data, Machine Learning can yield predictions to support the optimization of network operations and maintenance.

This optimization is becoming increasingly challenging, and increasingly important, as networks gain in complexity to support the coexistence of a diverse range of ICT services.

CTOs expressed support for the work of the ITU-T Focus Group studying Machine Learning's contribution to 5G and future networks, a group reporting to the ITU standardization expert group for 'future networks and cloud', ITU-T Study Group 13.

The Focus Group has delivered an architectural framework for networks to accommodate current as well as future use cases of Machine Learning, approved as an ITU standard by ITU-T Study Group 13

The architectural framework is the first of a nascent series of ITU standards addressing Machine Learning's contribution to networking, with other standards under development to address mechanisms for data handling, the design of a 'Machine Learning Function Orchestrator', standard methods to assess the intelligence levels across networks, and the interoperability of Machine Learning marketplaces.

Interaction between standardization and open source

The use of open source in the development of both software and hardware will add value to standardization activities, said CTOs, activities that must be capable of supporting technological as well as business aspects of open-source development.

CTOs discussed examples of successful ITU interaction with open-source communities, highlighting the value of this interaction to both standardization and open-source projects.

CTOs explored in particular the concept of 'closed-loop' standards, the concept of standardization and open-source projects taking a proactive approach to collaboration adopting well-aligned timelines, iterative interaction and harmonized terminology. Closed-loop standards development, said CTOs, can result in working instances of standards and practical feedback to standardization projects, as well as standard-compliant code to open-source projects.

Briefings on upcoming ITU conferences

CTOs were briefed on preparations for the ITU World Radiocommunication Conference 2019 (WRC-19) in Sharm El-Sheikh, Egypt, 28 October to 22 November 2019, as well as preparations for the ITU World Telecommunication Standardization Assembly (WTSA-20) in Hyderabad, India, 17-27 November 2020.

WRC is the conference responsible for the Radio Regulations, the international treaty governing the use of radiofrequency spectrum and satellite orbits. WTSA is the governing body of the ITU Telecommunication Standardization Sector (ITU-T), responsible for reviewing the strategy, structure and working methods of ITU-T.

Update on ITU-T membership

Chaesub Lee, the Director of the ITU Telecommunication Standardization Bureau, updated CTOs on the evolution of ITU-T membership.

ITU-T membership has maintained strong growth in 2019, with the sector welcoming 40 new members (14 Sector Members and 26 Associates).

New ITU-T members include companies in energy and utilities, shipping and logistics, mobile payments, over-the-top applications, automotive, IoT/M2M connectivity, distributed ledger technologies, quantum communications, cybersecurity, AI, and quality of service and experience.

The participating organizations were:

China Mobile; du; Ericsson; ETRI; Fujitsu; Futurewei Technologies; Global Voice Group; Huawei; Juniper; NICT; Nokia; NTT; Orange; Rohde and Schwarz; Symantec; Telecom Review; Telekom Indonesia; TELUS; TIA; TTC; Tunisie Télécom; UNITEL; Verizon; and the Chairmen of ITU TSAG, ITU-T SG12, ITU-T SG13, ITU-T SG17, ITU-T FG DPM, and ITU-T FG NET2030.