ITU Backgrounders

ITU-T: SETTING THE STANDARD

HOW TO MAKE A STANDARD…

ITU assigns standards setting work to a series of Study Groups. A Study Group is able to draw on input from a wide range of stakeholders including governments but mainly private sector members – a unique feature of ITU. Decision making and agreement to produce standards (the ITU calls these Recommendations) is on a consensual and democratic basis, and is designed to be fast, flexible, transparent and accompanied by a clear and consistent intellectual property rights policy. The independence of the ITU and consensus approach means that standards can be objectively formulated and optimized. All standards are checked for environmental sustainability considerations, in particular, the promotion of energy efficiency, as well as accessibility and potential security implications. The average time for development of an ITU-T global standard is just 18 months.

We encounter ITU's global standards every day without knowing it. A hidden part of the ICT networks and devices we all use every day, ITU standards are rarely perceived by users but vital to assuring ICT equipment and devices manufactured by hundreds of thousands of different companies around the world interoperates seamlessly. ITU standards provide developers with a global market, enabling economies of scale in production and deployment that translates into real benefits for users in both cost and functionality.

Standards need standards-making bodies. ITU is globally recognized as the world's pre-eminent standards making body for the ICT industry. ITU's Telecommunication Standardardization Sector (ITU-T) and executive arm, the Telecommunication Standardization Bureau (TSB), play a crucial role in defining the core transport and access technologies that underpin communications networks around the world. Today's advanced wireless, broadband and multimedia technologies are all powered by ITU standards.

Moving from its telephony-oriented roots to providing standards for next-generation converged networks and services, ITU standardization focuses on true end-to-end connectivity – standards that really do 'Connect the World'.

A growing community

Technological convergence has seen the ICT standardization process gain new stakeholders; ITU is creating new partnerships to support innovation in areas such as e-health, intelligent transport systems, mobile money and smart grids.

The global applicability of ITU standards is founded on a contribution-led, consensus-based approach to standardization. Meeting several times a year under the auspices of specialized ITU-T Study Groups voluntary experts from the public and private sector develop and update the equipment and transmission specifications which become **ITU-T Recommendations**.

ITU's growing membership is testimony to its role as the industry's key international standards body; representatives of 193 Member States and over 700 private-sector players and academic and research institutes are active participants in the work of ITU's Telecommunication Standardization Sector.

Streamlined standards for converged networks

ITU continues to streamline its processes, reflecting the dynamism of the industry it serves. Between 200 and 300 new ITU-T standards are approved each year, adding to over 4,000 ITU-T Recommendations in force today.

The ICT standardization ecosystem is complex, requiring a strong commitment to collaboration with a wide range of standards bodies working on complementary aspects of ICTs.

Find more information on ITU's activities on the ITU Blog: http://itu4u.wordpress.com/

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In a world with over 800 bodies working in some capacity on ICT standards, ITU provides focus, clarity and leadership. A programme of proactive cooperation with other respected standardization groups has strengthened ITU-T's technical capabilities, providing access to new expertise and resources.

Driving new developments in multimedia

ITU's Primetime Emmy award winning video coding standard, ITU-T H.264/AVC (Advanced Video Coding), is omnipresent in the audiovisual sphere, delivering excellent quality across the entire bandwidth spectrum, from HDTV to 3G mobile multimedia.

ITU-T H.264 is now being supplanted by its successor, ITU-T H.265/HEVC (High Efficiency Video Coding). With double the compression power, H.265 is expected to provide the common platform for the next decade of innovation in video and will be phased-in as new products and services outgrow the limits of current network and display technology.

ITU-T H.323 – the ITU standard for interoperability in audio, video and data transmissions over IP – is a key protocol in voice over IP (VoIP) systems. Standards for third-generation conferencing systems are being developed to provide innovative ways for people and systems to interact with anyone, anywhere, anytime.

Internet Protocol TV (IPTV) and digital signage are also hot topics, with experts defining advanced standards that will enable the global rollout of new interactive services in domains such as the Internet of Things (IoT), telepresence, e-health, and vehicular gateways for intelligent transport systems (ITS).

ITU standards enable interoperability across networks and markets worldwide. A recent achievement in IPTV standardization was the joint ITU-IEC development of a new metadata standard, ITU-T H.751 | IEC 62698, which provides a common framework for communicating data such as that accompanying material under copyright, to ensure that multimedia content can be shared legally across different platforms. The standard eases the exchange of content rights between service providers to prevent customer 'lock-in'.

The backbone that connects the world

It is estimated that over 95 per cent of international traffic runs over fibre-optic networks. ITU standardizes architectures of optical transport networks as well as physical and operational characteristics of their constituent technologies.

The terabit-capable Optical Transport Network (OTN) is rapidly supplanting its predecessor, Synchronous Digital Hierarchy (SDH), which has been the dominant transport protocol for the previous 20 years. Wave-division multiplexing (WDM) is a key ITU-standardized technology within OTN, increasing the traffic-carrying capacity of optical fibres by allowing simultaneous operation over multiple wavelengths.

Bringing data to your doorstep

In the access domain, ITU produces the digital subscriber line (DSL) standards that provide broadband Internet connections to over 600 million households around the world. ITU experts continue to challenge the existence of a ceiling to network capacity in

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the predominantly copper last mile (between the exchange and the customer premises). VDSL2 vectoring achieves access speeds of 250 Mbit/s, and the next update of DSL (G.fast) will raise the bar to 1 Gbit/s by combining the best aspects of optical networks and DSL.

ITU also standardizes shared-access fibre-to-the-home (FTTH) technologies known as passive optical networks (PONs). PONs are a crucial step towards all-optical networks, and, by eliminating the dependence on expensive active network elements, PONs enable carriers to make significant savings. XG-PON is ITU-T's latest series of PON standards, achieving access speeds of up to 10 Gbit/s.

Ensuring network security

The ITU CYBEX series (Cybersecurity Information Exchange) presents a globally standardized means of exchanging crucial cybersecurity information required by computer incident response teams (CIRTs).

ITU public-key infrastructure (PKI) standards have been instrumental in the rise of e-business. Public-key encryption technology underpins the identity authentication systems essential to the online exchange of privileged data. By specifying standard formats for public-key certificates, Recommendation ITU-T **X.509** has become the default industry benchmark for PKI certificates.

Abstract Syntax Notation One (ASN.1), alongside its standardized encoding rules, is an ITU-standardized language used to represent, encode and decode data in telecoms and computer networking, enabling secure information exchange in fields as diverse as fixed and mobile communications; aviation; spaceflight; healthcare and genetics; biometrics; electronic cards and tags; parcel tracking; energy distribution; banking; transportation, and more.

Bringing the power of technology to our everyday world

e-Health standardization has brought a multitude of new partners into ITU-T's work. ITU-T is providing the standardized multimedia systems required to drive the widespread adoption of e-health innovations.

An important milestone for global e-health standardization was achieved in 2013 with the approval of **ITU-T H.810**, the formalization of Continua Health Alliance's Design Guidelines, as an ITU-T standard. The guidelines will better enable global interoperability between personal connected health devices. Devices such as wireless blood pressure cuffs, weight scales and a wide range of activity trackers can play a critical role in the prevention and improved management of chronic conditions such as diabetes, hypertension and heart disease.

Some 32 new ITU standards are under development to support ITU-T H.810. For manufacturers, standards will decrease time-to-market, reduce development costs and increase efficiencies. In particular they will enable quicker, less expensive integration to electronic medical records (EMR) or health information exchange (HIE) platforms.

Intelligent transport systems (ITS) give vehicles the potential to communicate with other vehicles and surrounding infrastructure to foresee and avoid collisions, navigate the quickest route to their destination, make use of up-to-the-minute traffic reports, identify the nearest available parking slot and minimize their carbon emissions.

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ITU has developed a range of standards to enable ITS and standardization to support automated driving is fast becoming central to this work. A regular fixture of the Geneva International Motor Show, one of the world's leading automotive trade events, ITU's 'Future Networked Car' symposium is a unique event bringing together the ICT and automotive industries to focus on the standards that experts agree will drive the market for ITS.

Smart Grid innovations are driving the modernization of electricity grids to reflect the energy demands of the 21st century. ITU-T has standardized a family of orthogonal frequency-division multiplexing (OFDM)-based narrowband powerline communications (NB-PLC) standards that reuse the electric grid as a telecommunication medium, primarily to monitor, analyze and control power supply/usage.

In combination with ITU-T's G.hn broadband home-networking standards, the NB-PLC standards increase the electricity grid's efficiency and reliability, reducing energy consumption and minimizing greenhouse gas (GHG) emissions.

Cloud computing enables access to advanced ICT systems as a service. ITU-T cloud standardization work includes infrastructure and networking aspects of cloud computing models, as well as deployment considerations and requirements for interoperability, data portability and security. Cloud-based 'big data' is an important element of this work.

Cloud computing relies on the interplay of a variety of telecommunications and information technology resources. ITU-T develops standards enabling consistent end-to end, multi-cloud management and the monitoring of services exposed by and across different service providers' domains and technologies.

Software-Defined Networking (SDN) standardization has been championed by private-sector ITU members in search of greater network efficiency. ITU-T is standardizing signalling requirements and protocols for SDN as well as its functional requirements and architectures, providing practical SDN solutions for enhancements to Next-Generation Networks. SDN is a promising route towards network virtualization, a major shift in networking technology to give network operators the ability to establish and manage new virtualized resources and networks without deploying new hardware technologies.

ICT solutions to increase energy efficiency and combat climate change are crucial in a world with every industry sector now dependent on ICTs. ITU-T 'green ICT' standards include universal charging solutions for mobile devices; ways of improving the energy efficiency of networks and data centres; methods of recycling rare-metal components of ICTs; and procedures for the sound management of e-waste.

Work is underway on eco-rating schemes for mobile handsets, and methodologies to assess the environmental impacts of ICTs and the emissions-savings enabled by ICTs in other industry sectors.