FIFTY YEARS OF EXCELLENCE IN TELECOMMUNICATION/ICT STANDARDS

Vote for the most influential standards work from ITU-T

ITU work is behind many of the world's most prevalent information and communications technologies. Choose from our shortlist which you think has best shaped the ICT world of today.

(x)DSL
Copper cable owned by many incumbent telcos around the world is given an extended lease of life with DSL technologies which bring higher bandwidth to small businesses and residential customers. DSL is the number one choice for broadband technology. Study Group 15 is the home of standards for DSL.

ASN.1
ASN.1 is a formal language or notation that describes data structures for representing, encoding, transmitting, and decoding data. It provides a set of formal rules for describing the structure of objects that are independent of machine-specific encoding techniques and is a precise, formal notation that removes ambiguities. ASN.1 is an extremely important part of today's networks. ASN.1 is used, for example, in the signalling system (SS7) for most telephone calls, package tracking, credit card verification and digital certificates and in many of the most used software programs. Study Group 17 is the place where study on technical languages and description techniques takes place.

Audio coding (G.711 and G.72x series)
Most speech communication systems in use today, such as the public switched telephone network (PSTN) use the 4 kHz narrowband speech coding developed in ITU-T, from the pervasive 64 kbit/s G.711 of the early 70s to G.723.1 and G.729 in the 90s which are used in most VoIP deployments today, to the recently approved embedded variable bit rate and bandwidth extension to G.729. ITU-T pioneered the first global 7 kHz wideband speech coding standard in 1988 with Recommendation G.722 operating, and more recently G.722.1 and its super-wideband extension (14 kHz audio bandwidth). Study Group 16 is home to all media coding work in ITU-T including narrowband and wideband speech coders.

Bearer Independent Call Control (BICC)
BICC signalling protocols are used to support legacy PSTN/N- ISDN services over packet based (IP or Broadband) backbone networks without interfering with interfaces to the existing networks and end-to-end services. BICC protocols were a historic step toward packet based and broadband multimedia networks, to enable the seamless migration of circuit-switched TDM networks to packet based high-capacity broadband multimedia networks. Study Group 11 is the 'signalling' group within ITU-T.

Cable modems
If you have a cable modem, chances are that it will be built according to specifications from ITU-T. Cable is an increasingly popular means of accessing broadband services, and a key competitor to DSL. Cable modem standards are a product of Study Group 9.

Dial-up modems (V.21 - V.92)
Without ITU-T's modem standards the Internet may not enjoy its current state of ubiquity. Anyone accessing the Internet before the advent of ISDN and then broadband technologies would have used a modem built according to these ITU specifications. If proprietary standards had been adopted, the Internet's development could well have been far more fragmented. Even today modems remain a very important way of accessing the Internet. Study Group 16 is home to the V-series modem Recommendations.

E.106 - International Emergency Preference Scheme
For disaster relief operations (IEPS). The prioritization of calls in a disaster situation means that in an emergency, telecoms networks can be effectively cleared of non-urgent calls. Study Group 2 is the Lead Study Group for Telecommunication for Disaster Relief/Early Warning.

E.164 - Numbering plan
E.164 has played a key role in shaping the telecom networks of today. E.164 provides the structure and functionality for telephone numbers, and without it we would not be able to communicate internationally. Study Group 2 is the home to ITU-T Recommendations on numbering.

Fax standards (T.2 - T.4, T.30, T.37, T.38)
The mid eighties explosion in the use of Fax technology was in part fuelled by ITU-T Fax standards allowing interoperability between devices. Study Group 16 is home to all network signal processing work in ITU-T.

H.323 family of standards
H.323 facilitates the delivery of voice, video and data over computer networks like the Internet and remains the most used standard for this job. The H.323 family of standards has been crucial in fostering the development of new voice-over-IP services, winning widespread support from equipment vendors because of the interoperability that it enables. It is estimated that systems using H.323 carry billions of voice minutes each month. H.323 is also widely used in videoconferencing systems. Study Group 16 is home to all multimedia conferencing work in ITU-T.

Image coding (JPEG T.80 and T.800 series)
JPEG was a product of collaboration between ITU and ISO/IEC. The group was formed in 1986 to establish a standard for the sequential progressive encoding of continuous tone grayscale and colour images. In computing, JPEG (pronounced jay-peg) is a most commonly used standard method of lossy compression for photographic images. Study Group 16 is home to all media coding work in ITU-T.

IMSI codes used in SIM cards (E.212)
E.212 describes a system to identify mobile devices as they move from network to network. International mobile subscriber identity (IMSI) is a critical part of the modern mobile telecoms system allowing a roaming mobile terminal to be identified in another network and subsequently for querying of the home network for subscription and billing information to take place. Study Group 2 is the home to ITU-T Recommendations on numbering.

Interconnection rate harmonization

Interconnection rates are the costs between telecommunication service providers when linking networks for the exchange of traffic. This work has become increasingly complex with the more widespread use of VoIP, and the move to IP based or next generation networks (NGN). In order to cope with this paradigm shift, SG3 developed principles to negotiate accounting rates and measures to facilitate developing countries to allow "soft landing" to the reality of the new market (Recommendation D.140). It also introduced the new concept of international remuneration which is the shift from accounting rate system to the termination rate system (Recommendation D.150). Study Group 3 is tasked with the complicated job of recommending some principles for the harmonization of global interconnection rates.

ISDN (Q.931)

Before DSL, the international communications standard for allowing voice and data to be transmitted simultaneously across the world using end-to-end digital connectivity. ISDN supports data transfer rates of 64 Kbps (64,000 bits per second).

Next generation networks (NGN)

Broadly speaking the phrase NGN refers to the move from circuit switched to packet based networks that many operators worldwide will undertake in the next few years. It will mean reduced costs for service providers who will in turn be able to offer a richer variety of services.

Passive optical networks (PON) (G.983.1, G.984.1/2)

PONs are an effective way of implementing fiber to the home/building etc. and a crucial step towards all-optical networks. PON technology is used in the local loop to connect residential and SME end users premises in an all-fibre network. By eliminating the dependence on expensive active network elements, the use of PON enables carriers to make significant savings. Study Group 15 experts are the authors of standards (ITU-T Recommendations) relating to passive optical networks (PONs).

Public key infrastructure (PKI) (X.509)

A key reference for security standards in use today, Recommendation X.509 provides electronic authentication over public networks, is a cornerstone for designing applications related to public key infrastructure (PKI), and is widely used in a wide range of applications from securing the connection between a browser and a server on the web to providing digital signatures that enable e-commerce transactions to be conducted with the same confidence as in a traditional system. Without wide acceptance of the standard, the rise of e-business would have been impossible. Study Group 17 is the Lead Study Group on Telecommunication Security.

SDH (G.707 - G.803)

Standards for synchronous data transmission over fiber optic networks that are employed in a significant portion of the telecommunication backbone. The use of synchronous digital transmission by carriers in their backbone fibre-optic and radio networks put in place the enabling technology for many of the new broad-band data services that we take for granted. It not only brought about high-speed gigabit networks but also simplified access bringing the full benefits of software control in the form of flexibility and introduction of network management. Study Group 15 is the place where development of standards for the backbone including the key standard for synchronous data transmission over fiber optic networks, synchronous digital hierarchy (SDH) takes place.

Security framework (X.805)
Gives telecom network operators and enterprises the ability to provide an end-to-end architecture description from a security perspective. Key players from telecom network operators, manufacturers and governments have defined the specifications that will alter the way that companies look at their networks. The Recommendation will allow operators to pinpoint all vulnerable points in a network and mitigate them. Study Group 17 is the Lead Study Group on Telecommunication Security.

SS7 (Q.7xx series)
Without which telecom systems worldwide would not interoperate. All telephone switching systems need signalling. It provides the means for monitoring the status of a line to see if it is busy or idle, alerts that indicate the arrival of a call, and the addressing system that routes calls. Before SS7's implementation, not all nations were parties to standards agreements, which would facilitate the handling of international telephone calls. SS7's implementation paved the way for an efficiently operating international telecommunication networks. Study Group 11 is the 'signalling' group within ITU-T.

Standards relating to quality of service (QoS)
Standards for QoS allow telecoms operators to capture important information that can help shape current and future services. The G.1000 Framework helps capture the many QoS dimensions, and acknowledges that QoS can be viewed from four different perspectives. G.1010 presents user application needs as a function of error tolerance and sensitivity to overall delay (includes delay from servers, networks and applications). Study Group 12 is the place in ITU-T where standards for QoS are developed.

TMN - Telecommunications Management Network (M.1400)
The TMN provides a framework or model to support the management and deployment of telecommunications services. Methods are defined for managing networks using object-oriented principles, and standard interfaces facilitate communication between deployed management entities. Interoperability is a key aspect of TMN-compliant networks. It is used by many of the world's largest telecoms carriers. Study Group 4 is responsible for standards for the management of telecom services, networks, and equipment.

Video coding (H.262/MPEG2-Video, H.264/AVC)
ITU-T produced the first digital video compression standard H.261 in 1988, and together with ISO/IEC has produced the H.262 | MPEG2/Video coding spec, which is used in all digital TV and DVDs worldwide. ITU's latest video coding standard, H.264/AVC, is the first truly scalable video codec, delivering excellent quality across the entire bandwidth spectrum - from high definition television to videoconferencing and 3G mobile multimedia. Study Group 16 is home to all media coding work in ITU-T.

Wave division multiplexing (WDM)
An example of a technology in which ITU-T standards have played a very important role. WDM increases the data carrying capacity of an optical fibre by allowing simultaneous operation at more than one wavelength. Study Group 15 is home to ITU-T's work on WDM.

X.25
X.25 is the highly influential ITU-T standard protocol suite for WAN. Emerging in the 1980s it was the first packet switched network and had large coverage throughout the world in the eighties and nineties before being largely supplanted by newer technologies such as frame relay, ISDN, ATM, ADSL, packet over SDH, and the Internet Protocol (IP).