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INTERNATIONAL TELECOMMUNICATION UNION

No. 9 November 2012

ITU NEWS

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Setting global standards

What it takes

Special edition

WTSA2012

Dubai, UAE

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Editorial

Shaping the future

Debates and decisions in Dubai

Dr Hamadoun I. Touré,
ITU Secretary-General

ITU/P. M. Virot

We are looking forward to seeing all our members actively participating in three ITU world events that will take place back to back in Dubai, United Arab Emirates.

Global Standards Symposium

The first event is the Global Standards Symposium, on 19 November, which will bring together ministers, regulators, heads of other standards bodies, and industry leaders to discuss global standards challenges — especially the way the information and communication technology (ICT) sector intersects with vertical sectors such as health care, utilities and transport.

World Telecommunication Standardization Assembly

Straight afterwards comes the World Telecommunication Standardization Assembly, WTSA-12, which will set the programme and priorities for the ITU's Standardization Sector for the next four years.

This Special Edition of *ITU News* highlights ITU's standardization achievements since the last Assembly, held in Johannesburg, South Africa, in 2008.

World Conference on International Telecommunications

WTSA-12 will be followed by the World Conference on International Telecommunications (WCIT-12), running from 3 to 14 December, which has the crucial task of reviewing the International Telecommunication Regulations (ITRs). These regulations were forward-looking when they were adopted in Melbourne in 1988, setting the stage for the mobile revolution and the information society.

At the request of our membership, important topics to be discussed at WCIT-12

include affordability — reducing the cost of international mobile roaming; how to prevent fraud; misuse of the telephone numbering system; the empowerment of consumers; and perhaps most importantly, finding ways of bringing Internet connectivity to the two-thirds of the global population that is still offline.

No proposals will be accepted if they are not agreed by consensus — this is the ITU way, which has proven extraordinarily successful throughout the Union's almost 150 years of existence.

WCIT-12 has already attracted enormous interest and media coverage — but not always for the right reasons. Let me take this opportunity to summarize the key issues — and to dispel some of the persistent myths surrounding the conference.

Contrary to some of the sensationalist claims in the press, WCIT-12 is definitively not about taking control of the Internet, especially in terms of the management of the Internet's critical resources, such as names and addresses. Also WCIT-12 is not in any way about restricting people's freedom of expression or freedom of speech.

WCIT-12 is about laying down the principles to ensure global connectivity — not global Internet governance.

The 1988 ITRs still provide the only truly globally agreed principles on international telecommunications — to which 178 countries are officially bound. By advocating market liberalization, the current ITRs laid the foundations for the growth of the Internet and mobile telephony. Researchers in America and Europe invented the Internet, and the ITRs helped the Internet to grow exponentially — by establishing clear, mutually agreed principles for what has become a global public good.

My role as Secretary-General of ITU — and the role of the ITU secretariat — is simply to facilitate the dialogue. We will provide an impartial forum where all of the substantive issues can be debated.

Simply put, WCIT-12 is about the free flow of information; promoting affordable and equitable access for all, including people with disabilities; the continued development of broadband — including an increased focus on energy efficiency; continuing investment in networks, services and applications; and continuing promotion of a harmonious and conducive international environment that drives innovation. WCIT-12 is where these fundamental challenges can be openly debated in search of solutions that are acceptable to all.

There have also been misleading statements in the press claiming that ITU maintains a relatively closed, non-transparent decision-making process. But ITU is no more and no less than its membership: 193 Member States and some 700 Sector Members, including both private-sector organizations and academic institutions. All have access to ITU documents — and most Member States make ITU documents available to their citizens. The mechanism for circulating information is quite rightly left to ITU's membership — and it is they who decide how and when documents should be made public.

At its annual session in July 2012, the ITU Council agreed to make the main preparatory document for WCIT-12 public, and authorized me to set up a web consultation to collect views and opinions from the public. But very few comments have been posted to that public website.

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The unproductive scaremongering and rhetoric around WCIT-12 is reminiscent of the similar scaremongering and rhetoric in the run-up to the 1988 conference that created the present ITRs. These fears subsequently turned out to be completely unfounded, as the ITRs have been the driver of a harmonious market ecosystem for investment and innovation.

From a regulatory perspective — in a networked society — it seems clear that our members do not want heavy-handed regulation or a return to the old days of accounting rates and government-controlled telecommunications. But they do seem to be in agreement that new high-level principles are needed, and that there should be coordination and consolidation between agencies at both the national and international levels.

WCIT-12 has the potential to bring ICT within affordable reach of all of the planet's seven billion people; deliver sustainable social and economic development in every country, on every continent; to open up new streams of revenue for businesses; and to promote the creation of new business models.

The 1988 ITRs provided the foundations for massive growth in telecommunications, including the so-called "mobile miracle", and set us on the road to the information society of today. I firmly believe that WCIT-12 will create the right conditions for a "broadband miracle", and will set us on the road to the knowledge society of tomorrow.

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Setting global standards

WTSA2012
Dubai, UAE
World Telecommunication Standardization Assembly
20-29 NOVEMBER 2012

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WCIT2012
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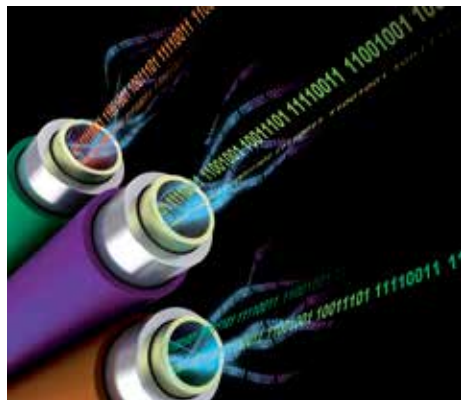


Consolidating the standards ecosystem

By Malcolm Johnson, Director, Telecommunication Standardization Bureau, ITU

Malcolm Johnson

ITU/P.M. Virot

I look forward to welcoming our membership to Dubai for what promises to be a very interesting and productive event, and I am certain that WTSA-12 will consolidate the position of ITU's Telecommunication Standardization Sector (ITU–T) as the only truly global ICT standardization body: one where all countries have equal rights, and all companies have equal rights, no matter how large or small; where standards can be developed quickly to meet the needs of all countries, whether in remote regions or urban areas; and where products and services meeting ITU–T standards can be used throughout the world; and where ITU–T's diverse membership can rely on an inclusive, consensus-driven approach to international ICT standardization.

The challenge for WTSA-12

An important task for WTSA-12 is to evaluate the progress on actions initiated at the previous WTSA in Johannesburg, South Africa, in 2008. That Assembly took pivotal decisions which now need to be refined and consolidated.

I am sure that WTSA-12 will identify new areas of work for ITU–T by assessing the scope and scale of emerging trends in the ICT industry. One obvious example is the need to respond to increasing industry convergence brought about by technological changes. "Vertical markets" such as the healthcare sector will benefit from ICT-enabled borderless transfer of information and skills; the automotive industry from greener, safer intelligent transport systems; and public utilities, such as electricity and water, from the efficiency gains achieved by smart electricity grids and smart water management.

The future of such innovations depends upon the availability of international ICT standards that are purpose built to meet the needs of vertical markets. The Global Standards Symposium (GSS) that precedes WTSA-12 will focus on this topic and contribute its findings to the Assembly.

The role of world telecommunication standardization assemblies

World telecommunication standardization assemblies (WTSAs) are held every four years. They gather the membership of ITU–T together to evaluate the Sector's structure and working methods, elect the leaders of its advisory and study groups, and decide the strategic path of ITU–T.

WTSAs allow our global, public-private partnership of members to review the state of play in the world of ICT and ITU–T's role in it. In this way we can ensure that ITU–T's standardization work meets the needs of industry and our member countries throughout the world.

WTSA 2012
Dubai, UAE

World Telecommunication Standardization Assembly
20-29 NOVEMBER 2012

Side events

E-health standards, innovation, and network resilience will be the topics of three side events to be held during WTSA-12. The e-health event will build on ITU–T's new collaboration with the World Health Organization. Advancing the roll-out of international standards for e-health and telemedicine services will help to overcome interoperability problems.

The reciprocal relationship between innovation and standardization will be the focus of the ICT innovation event, which will look at how ITU–T can promote the exciting innovations that are emerging from the developing world.

The event on network resilience and recovery will give experts the opportunity to express their views on the various means that are available to bolster the resilience of critical communications infrastructure in the face of natural disasters.

There will also be a showcasing event to highlight current state-of-the-art products that meet ITU–T standards.

Preparing for WTSA-12

We have worked hard to prepare for WTSA-12. We know that standardization requirements differ from region to region, and have therefore held a number of regional preparatory meetings to prepare coordinated contributions reflecting regional concerns. In addition, the Telecommunication Standardization Advisory Group (TSAG) held a special preparatory meeting in July 2012.

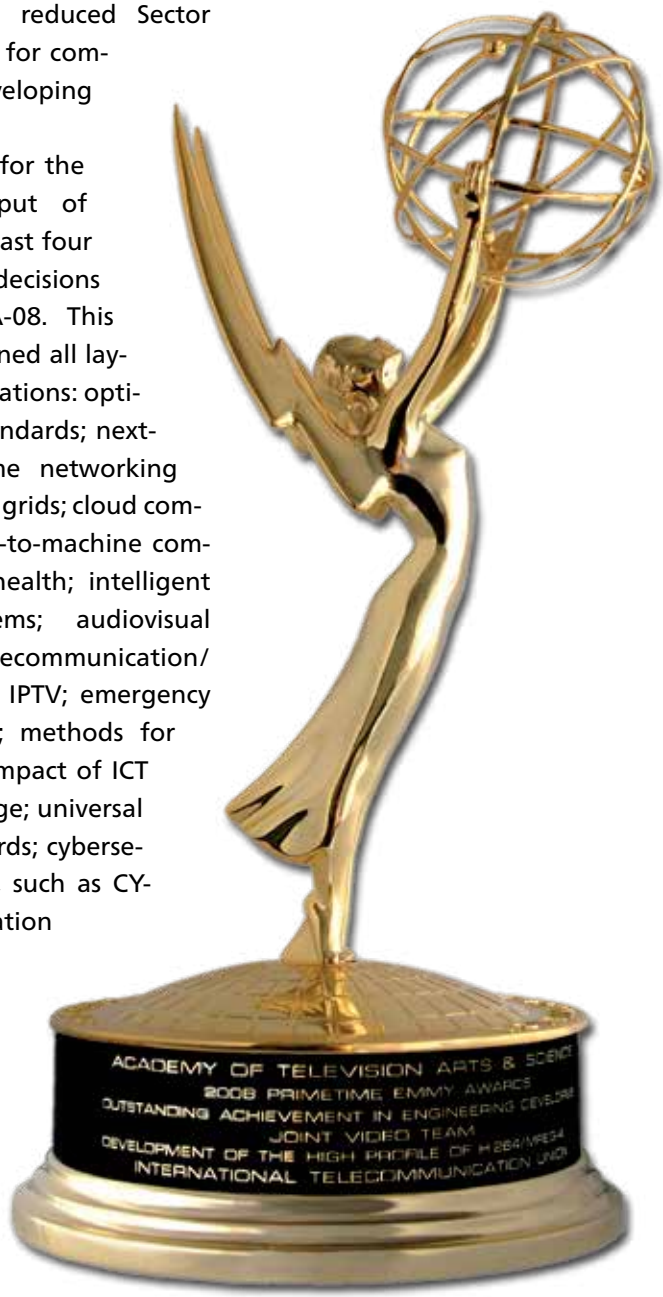
There is great interest in leading specific standardization activities under ITU auspices, and we have received candidatures from 37 countries: 17 for chairmanships and 89 for vice-chairmanships of study groups.

WTSA-08, a pivotal predecessor

WTSA-12 will build on the achievements of its predecessor, the exceptionally productive Assembly held in Johannesburg in 2008. WTSA-08 marked significant changes to ITU–T's structure and initiated many new study areas. A landmark event, WTSA-08 received 768 participants from 99 countries, more than any prior WTSA. It was also the first WTSA to be preceded by a Global Standards Symposium, was the first held in Africa, the first chaired by a woman, and the first in which special accommodation was made for academia.

WTSA-08 called for increased emphasis on areas such as cybersecurity, the deployment of IPv6, conformance and interoperability testing, ICT and climate change, and increasing accessibility to ICT for persons with disabilities, and initiated the creation of the new ITU academic membership category, and the reduced Sector membership fee for companies from developing countries.

The impetus for the substantial output of ITU–T over the past four years was the decisions taken at WTSA-08. This output has spanned all layers of communications: optical transport standards; next-generation home networking standards; smart grids; cloud computing; machine-to-machine communications; e-health; intelligent transport systems; audiovisual media and telecommunication/ICT accessibility; IPTV; emergency communications; methods for measuring the impact of ICT on climate change; universal charging standards; cybersecurity standards, such as CYBEX, on information exchange; and a successor to the Primetime Emmy Award-winning ITU–T H.264 video codec.



Cisco Pics

Bridging the standardization gap

WTSA-08 gave special emphasis to increasing the participation of developing countries in international standardization work. This led to "bridging the standardization gap" being enshrined as one of ITU–T's three strategic objectives by the ITU Plenipotentiary Conference, held in 2010, in Guadalajara, Mexico.

Good progress has been made in meeting this objective by establishing regional groups, introducing a mentoring programme, briefing sessions for new delegates, more meetings in developing nations, making "remote participation" facilities available to those unable to travel to our meetings, and granting of fellowships — as far as has been possible within our budgetary constraints.

These actions have made an appreciable contribution to the Union's mission to "Connect the World". Since 2007, more than 40 countries that had never before participated in ITU–T's work were able to do so for the first time, and in 2011 alone we welcomed 16 new countries as active participants in ITU–T.

Membership

I am pleased to say that the number of Sector Members and their financial contribution is now showing a positive trend for the first time in many years. And it is rewarding to note that, following WTSA-08's initiative, ITU–T's academic membership has become a particular area of success, with 35 new institutions joining since the category was introduced in 2011.

Women and girls in ICT

Interview with Monique Jeanne Morrow

Cisco's Service Provider Chief Technology Officer in Asia

Monique Jeanne Morrow is currently Cisco's Service Provider Chief Technology Officer in Asia and holds the title of Distinguished Consulting Engineer at the Cisco Research and Advanced Development Group. Ms Morrow previously worked for other companies in the United States and in Europe. She has more than 20 years' experience in Internet Protocol (IP) work and has designed, developed and implemented managed network services, such as remote access and local area network switching, in a service provider environment.

She deployed one of the first Multiprotocol Label Switching (MPLS) networks in the world, and has been recognized by the industry for her achievement in MPLS — a mechanism in high-performance telecommunication networks that directs data from one network node to the next based on short path labels rather than long network addresses, avoiding complex lookups in a routing table.

MPLS is used to ensure that all packets in a particular flow take the same route over a backbone. Widely deployed by many service providers for their Internet backbones, MPLS delivers the quality of service (QoS) required to support real-time voice and video as well as service level agreements (SLAs) that guarantee bandwidth. Large enterprises also use MPLS in their national private networks.

Ms Morrow is a Senior Member of the Institute of Electrical and Electronics Engineers (IEEE). She is also a Life Member of the Association of Computing Machinery, and co-author of several books: *Designing IP-Based Services — Solutions for Vendors and Service Providers; MPLS VPN Security;* and *MPLS and Next-Generation Networks — Foundations for NGN and Enterprise Virtualization.* She has been co-guest editor of several special issues of the IEEE Communications Magazine, covering the subjects of *"OAM in MPLS-based networks", "Challenges in enabling inter-provider service quality on the Internet"* and *"GMPLS — the promise of the next generation optical control plane".*

Ms Morrow is active within both ITU and the Internet Engineering Task Force (IETF). She participates in the activities of ITU's Telecommunication Standardization Sector (ITU–T) Study Group 13, with a focus on operations, administration and management, and she also provides the liaison between ITU–T's work on next-generation networks and IETF's Internet Architecture Board. She was Vice-Chairman of the ITU–T Focus Group on Cloud Computing and is currently the ITU–T JCA Chair for Cloud Computing. Ms Morrow is also Vice-Chairman of the ITU–T Focus Group on M2M Service Layer, and is serving as President of the FTTH Council Asia Pacific.

Ms Morrow holds the degrees of Master of Science in Telecommunications Management and Master of Business Administration. She speaks English, French and German, and is learning Mandarin.

ITU News caught up with Monique ahead of the World Telecommunication Standardization Assembly in Dubai, to gather her views on technology and her own career.

Monique Jeanne Morrow

How would you characterize your job and what are the rewards?

Monique Jeanne Morrow: I am having great fun in my job right now, and that is because it involves technology exploration — and yes, you could call it technology in the 21st century. But this technology is not going to be useful unless people want it. An example would be machine-to-machine communication, its use in e-health, and how it serves citizens. There is a private industry part, and there is also dialogue with governments. There is an excitement around technology —about applications — and I think that is what drives me.

I also like the mentoring and coaching aspects of what I do. Actually, the mentoring is more like partnership. Because I learn from people — and I learn from young people coming in. You are bringing in your point of view, but you have to be open to different points of views from other people, and especially people in different countries.

From your own perspective as former Vice-Chairman of the ITU–T Focus Group on Cloud Computing, what do you see as the future of the cloud?

MJM: The Focus Group concluded its work in December 2011, so I am now Chairman of the Joint Coordination Activity on Cloud Computing. I am working with colleagues, not only in ITU–T, but also in the cloud computing industry. Virtualization through cloud will lead to lower infrastructure costs, and that has implications for software. The great challenge — and opportunity — is what to do about security and privacy. We really must pay attention to those areas as data become pervasive. For example, how do you deal with repatriation of data from a cloud?

Looking at the next-generation networks and the Internet of things, what areas are most exciting right now?

MJM: We could actually call it the Internet of Everything, because it is everything, when you think about it. As an example of M2M communications, you could think about sensors. There will be health applications. You could be wearing sensors and have applications for everyday living or for elderly individuals. There is excitement around intelligent transport systems, smart cities, and health care. Sensors can be everywhere, in oceans, in what we call a smart planet. And that has implications for the development of protocols.

There's this notion of real time. What we are doing in smart grid and metering, and what you are doing in terms of mobile networking are absolutely real time.

What are next-generation networks exactly?

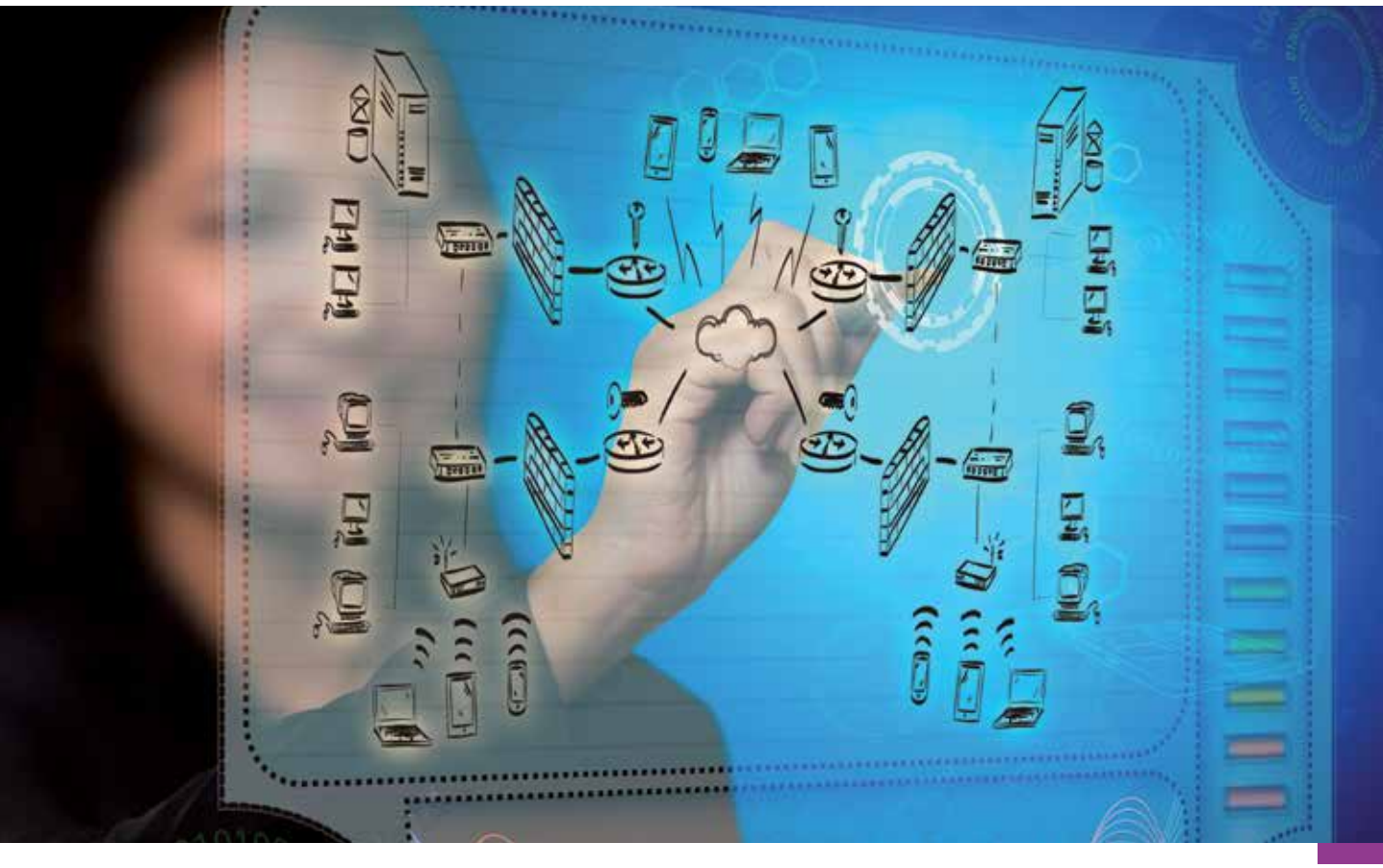
MJM: "Next-Generation Networks" is not a new term, but reflects the evolution of networking in the context of emerging technologies that may impact infrastructure and services. Examples include MPLS and nascent Named Data Networking (NDN).

I believe that the notion of next-generation networks will be around how you deal with web applications that are personalized for you. They will follow you in terms of what it is you want — your preferences. We are starting to see footprints — and they certainly will develop.

Actually, next-generation networks will be more than personalized. They include the notion of pervasive computing, but pervasive computing that becomes very much personalized for you and is easy to use.

What opportunities did you have during your education and training that gave you a chance to pursue a career as a telecommunications engineer?

MJM: It starts with family. Your family has to encourage you. I was always encouraged to follow my dreams. I know this sounds rather idealistic, but it is true. You should follow your dreams in an area that you are



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curious about. I had wonderful mentors along the way. A colleague of mine encouraged me to take an interest in telecommunications in the mid-1980s, when the subject was very male-dominated, saying that it is just about solving problems. And support systems are key — I have been blessed in that respect.

What professional and personal obstacles have you faced in your career and how have you overcome them?

MJM: Women have their own obstacles — not about gender per se but about trying to solve a problem. Personal obstacles have been challenging, and of course you have to take a step back and say ok, slow down. As women, it is in our nature to want to take everything on, to show that you can do everything. It is not so much the quantity as the quality. Sometimes you have to take a step back and say no! You have to say this is the area that I am going to bring value to. There have been many times where I have been the only woman in a room. And someone would ask "who is going to take the minutes?" —and they would look at me. The best way to approach this is, whoever calls the meeting should take the minutes. This is not about feminism. It is more about how you approach a problem or an opportunity, and whether you are able to set boundaries for yourself. And that takes time. There is no gender in collectively seeking solutions!

You are also a writer. So which writer or philosopher has most influenced your way of seeing the world?

MJM: Marcel Proust, Arthur Rimbaud and Albert Einstein.

I appreciate very much the multidimensional aspects of space and time in *Le Temps Retrouvé ("The Past Recovered")* by Proust. My favorite quote from Proust: "The voyage of discovery is not in seeking new landscapes but in having new eyes."

Le Bateau Ivre ("The Drunken Boat") by Rimbaud is an evocation of life itself and the journey therein.

Women and girls in ICT

My favorite quote from Rimbaud: "I have stretched ropes from steeple to steeple; garlands from window to window; golden chains from star to star, and I dance." And last but not least, my favourite quote from Einstein: "Any intelligent fool can make things bigger and more complex... It takes a touch of genius — and a lot of courage to move in the opposite direction."
The combination of multidimensional viewpoints and the courage to follow your path fundamentally define who I am.

What is a typical day in the life of Monique Jeanne Morrow?

MJM: There are days when I am moving very fast, starting at 5 o'clock in the morning. Because I have a global responsibility, I have to be reachable throughout the world but I also have to take time for myself. Maybe I will do 35–40 minutes of exercise, and then some quiet reading. Of course there are a lot of meetings, and then I need quiet time to do intellectual work — writing a patent or a paper. Often I am in an airplane. But it is cyclical. At this time of the year the pace is very fast. Setting a boundary is a necessary fact of life and one must do so.

What advice would you give any young woman starting out today to build a career similar to yours?

MJM: No matter where you are in the world, follow your curiosity and your passion. Technology is so much fun. It's all about having a good time, and using technology to have impact. As you pursue your education, be curious and seek to invent. Create groups in terms of what you are curious about in technology areas. Get your mentors and coaches along the way. Get your support system along the way. Think about why you are learning something. People seem to take a systemic view to education. But they should do more than that now. How are you adding value to your society? There is no barrier. I hate the term "out of the box", because there is no box. Don't allow yourself to be boxed in. Take risks. But don't let a person stop you. That's the worst that can happen. If somebody says no — don't take it personally, ask why.

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Increasing membership

The Telecommunication Standardization Sector (ITU–T) has seen its membership increase since 2011, coinciding with the launch of a proactive strategy and service. This has reversed almost a decade of decline. The numbers and trends are shown in Table 1 and Figure 1, respectively.

Embracing academia

Following the initiative of WTSA-08 and the adoption of its Resolution 71 the Plenipotentiary Conference, held in Guadalajara, Mexico, 2010 created "Academia" as a new membership category, enabling universities and their associated research establishments to join one or all of the three ITU Sectors* at a reduced cost.

Fees were set at CHF 3975, for institutions from developed countries; and CHF 1987.50, for institutions from developing countries, which include least developed countries, small island developing States, land-locked developing

* *Radiocommunication Sector (ITU–R), Telecommunication Standardization Sector (ITU–T), and Telecommunication Development Sector (ITU–D).*

countries, and countries with economies in transition.

ITU–T has benefited from this new category of membership, attracting 34 out of the 48 universities that have joined ITU since 2011.

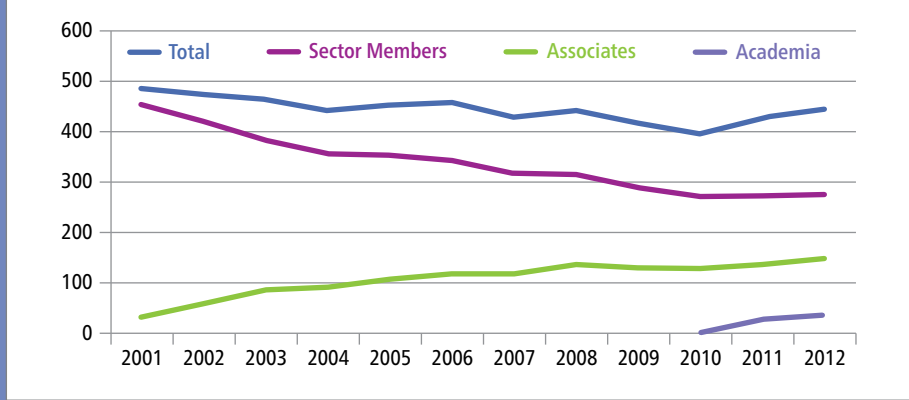
Better services for members

Responding to the decisions taken by the Plenipotentiary Conference to increase ITU membership, the ITU General Secretariat launched an ITU-wide proactive strategy to "engage and retain" members. A new integrated ITU Sector Member Service was set up, composed of staff from ITU's three Bureaux, namely the Telecommunication Standardization Bureau, the Radiocommunication Bureau, the Telecommunication Development Bureau, and the General Secretariat. This has made it easier to coordinate efforts to attract members. It has also improved the Union's capacity to serve members by consolidating services, while at the

Table 1 — ITU–T Sector Members, Associates and Academia from 31 December 2002 to 31 October 2012

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Sector Members	418	383	357	353	344	314	309	294	273	271	281
Associates	57	82	90	101	112	116	134	128	125	136	148
Academia										25	34
Total (Sector Members, Associates, Academia)	475	465	447	454	456	430	443	422	398	431	463

Figure 1 — Trends in ITU–T Sector membership from 31 December 2002 to 31 October 2012



same time allowing for a tailored approach reflecting the needs of each Sector.

ITU–T's membership strategy was presented at the meeting of the Telecommunication Standardization Advisory Group in 2011. The strategy is outlined in a report entitled "ITU–T Membership Strategy: Recruitment and Retention". The current approach includes more frequent contacts with members and close follow-up of membership status; enhanced benefits and services for members; and industry outreach and recruitment drives. At the same time, a more customer-oriented approach has been adopted, striving to better serve delegates, while actively promoting the work of ITU–T externally.

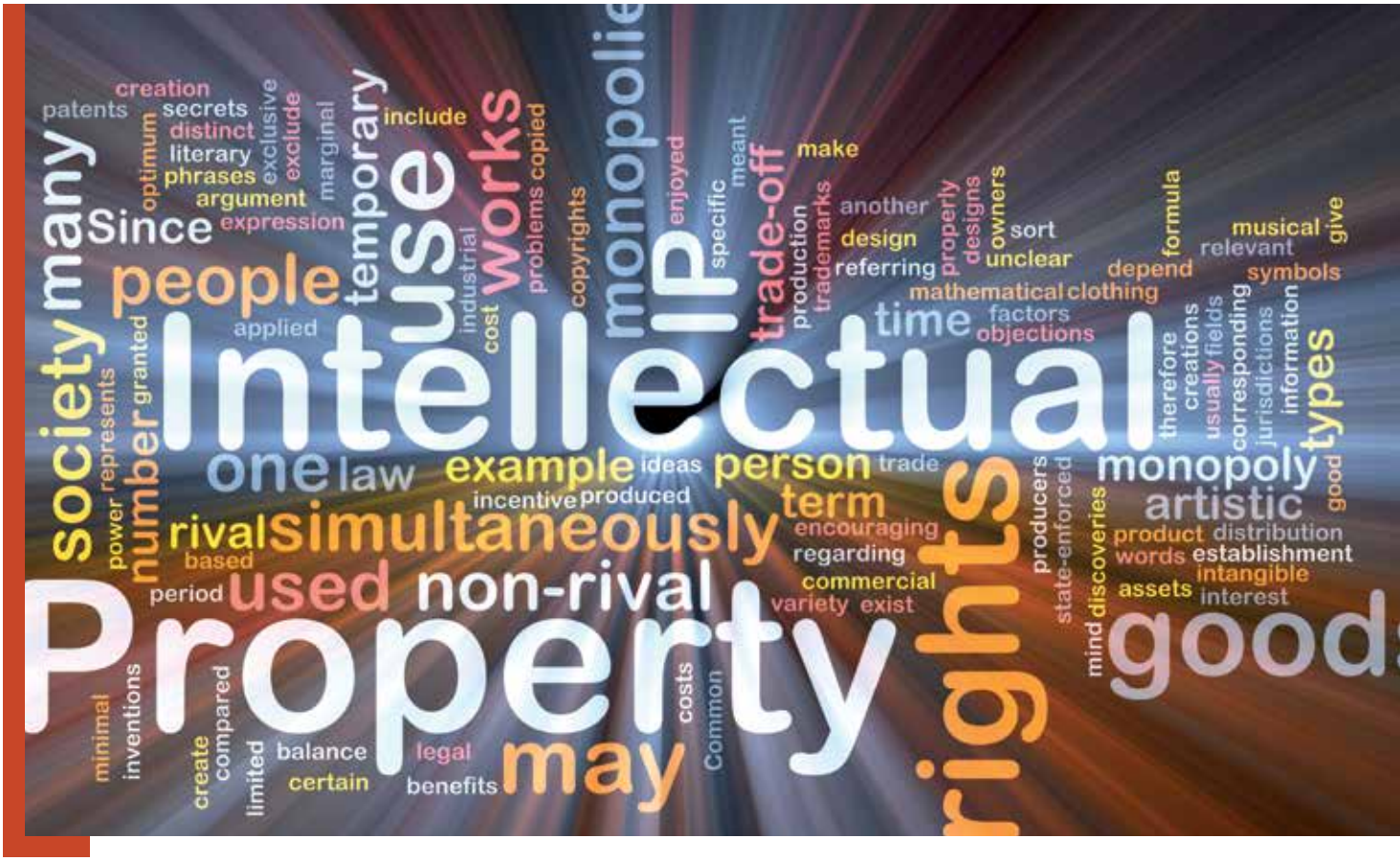
Attracting new members

The number of new members joining ITU each year is growing, with a total of 67 new members in 2011 (including 25 from academia), compared to 35 in 2010. This positive trend was reinforced in 2012 with 51 new members having joined ITU–T as of 31 October 2012. Simultaneously, remarkable results have been achieved in retaining existing members. The number of denunciations has been dramatically reduced, from more than 50 in both 2009 and 2010, to 35 in 2011 and only 24 in 2012.

Reform of membership structure

The stabilization of ITU–T membership provides a positive basis upon which to build when considering further improvements at the next Plenipotentiary Conference, to be held in the Republic of Korea in 2014. The Guadalajara Conference requested the ITU Council to review the current membership structure, including the possibility of changing fees, and membership categories, with a view to enhancing benefits for Sector Members and Associates.

The Council Working Group on Financial and Human Resources was then tasked by the Council in 2011 to review the current situation and prepare recommendations. As requested by that Working Group, an open consultation was organized for Member States, Sector Members, Associates and Academia in June 2012. The objective was to enable all categories of members to share views and provide inputs. These views and inputs from the Union's membership will be considered by the Working Group and by the Council in 2013.



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Balancing innovation and intellectual property rights in a standards-setting context

How do intellectual property rights relate to the work of ITU and, in particular, of its Telecommunication Standardization Sector (ITU–T)? And what is ITU doing to preserve the effectiveness of the standards ecosystem?

Intellectual property rights (IPRs) are legal rights that protect creations or inventions resulting from intellectual activity in the industrial, scientific, literary or artistic fields. Patents, copyrights, marks and trade secrets are some of the most common intellectual property rights. In particular, standard-essential patents (also known as "SEPs") are patents whose protected technology is necessary for the implementation of a standard adopted by a standard development organization, such as ITU. In these cases, any third party wishing to implement the standard will have to seek a licence from the owners of each SEP whose technology is contained in the standard.

Considering that ITU's mandate relies on the existence of a healthy and robust standards ecosystem, its aim has always been to strike a working balance between the interests of SEP owners and implementers of standards, by ensuring that owners of intellectual property will be motivated to contribute their patented technologies to the

standards-development process and that the standards incorporating these technologies will remain widely available to implementers. This need for such balance has led to the development of a reasonable and non-discriminatory (RAND) policy for patents contained in ITU standards — according to which SEP owners commit to license their SEPs to all interested implementers, under RAND terms.

Today, RAND policies have become the norm and govern how intellectual property rights — and especially standards-essential patents — are handled in most standards-development organizations. Indeed, with the increasing convergence of information and communication technologies (ICT), the three international standards-development organizations — ITU, the International Organization for Standardization (ISO), and the International Electrotechnical Commission (IEC) — began to discuss harmonizing policy approaches to intellectual property rights through the World Standards Cooperation. And in March 2007, a Common Patent Policy for ITU/ISO/IEC was agreed.

The current system has worked well, quietly producing numerous worldwide standards, whose unhindered implementation has been critical for the exponential growth of the ICT industry. However, in view of the recent tension evidenced by worldwide SEP-related litigation between SEP owners and implementers in the mobile sector, as well as the diverging opinions of industry players regarding the rights and obligations deriving from RAND licensing commitments, it may be necessary to consider once more whether there is further room for improvement.

ITU patent round table

In a bid to find a globally agreed solution to concerns voiced by regulators and a number of industry members that some SEP licensing practices may be incompatible with RAND commitments, ITU hosted a patent round table on 10 October 2012. ITU convened the meeting in line with its broader mandate, as a specialized agency of the United Nations, to connect the world, as well as ITU–T's mission to produce high-quality, demand-driven international standards, with the principles of global connectivity, openness, affordability, interoperability, and security.

The round table provided a neutral venue for industry, standards bodies, regulators and academia to exchange ideas to guide future discussions on whether current RAND policies and existing industry practices adequately respond to the needs of the various stakeholders.

> *"Standards and patents are crucial indicators of technological development — the central force driving growth in modern information and knowledge economies. However, complexity arises because while patents restrict the use of technologies, international standards aim to make technologies globally accessible…"*
>
> *Dr Knut Blind, Rotterdam School of Management*

"Clearly, the current cases of standards-essential patents litigation could have a negative impact on our ability to fulfil this mission," stated Dr Touré, adding that "With our unique membership mix — comprising 193 Member States and some 700 Sector Members, including both private-sector

ITU/R. Farrell

The round table examined the effectiveness of reasonable and non-discriminatory-based patent policies

organizations and academic institutions — we are well qualified to provide a global platform where all stakeholders can come together to discuss such an important issue."

The high-level round table was oversubscribed and was attended by representatives from mobile companies and several other key industry players, as well as competition authorities, patent offices, government representatives, and experts in intellectual property law.

Participants discussed the relevance of current arrangements based on RAND patent policies, acknowledging that such policies had thus far been an effective way of managing natural tensions between patent holders, standards implementers and end users. They noted, however, that the definition of what constitutes "reasonable", and whether or not SEP owners were entitled to injunctive relief (that is, to enjoin non-licensed third parties from marketing their products implementing the standard) were emerging as major points of contention.

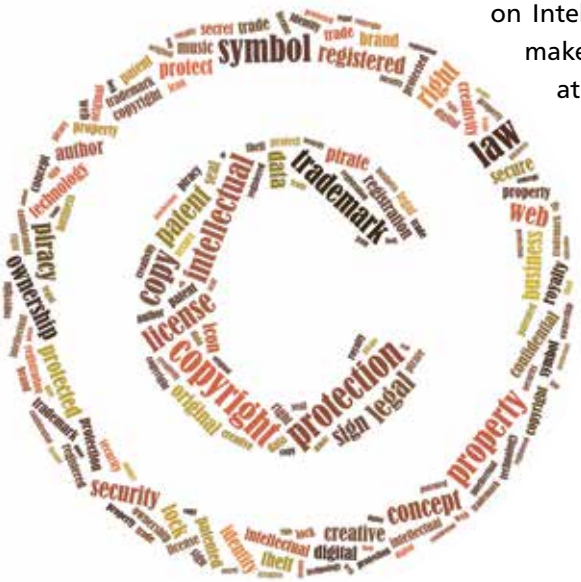
Some participants argued that if just one SEP owner decides to demand unreasonable royalties for the use of his technology, the cost of the device in which that innovation is implemented can skyrocket. Furthermore, regulators as well as certain industry participants mentioned that a threat of injunctive relief may increase the negotiating power of the SEP owner, and thus result in higher royalties than the SEP owner could have obtained if the patent had not been incorporated into a standard.

Ahead of the round table meeting, Dr Knut Blind, from the Rotterdam School of Management, commented that "Standards and patents are crucial indicators of technological development — the central force driving growth in modern information and knowledge economies. However, complexity arises because while patents restrict the use of technologies, international standards aim to make technologies globally accessible. As a result, standards

developers and patent holders are sometimes at odds, so I thank ITU for convening this round table to discuss the RAND-based IPR policies which should continue to mediate this fierce, but in general fruitful relationship."

Closing the debate at the round table, Mr Johnson said that "providing market players with clear, transparent, effective and up-to-date patent policies works for the benefit of the industry as a whole." ITU has a long history of finding solutions to global problems — for example the shared use of the radio-frequency spectrum. "We have proved today that we can get everyone to sit around the same table. Let's view this valuable dialogue as the start of a process which will bring some clarity and put confidence back into the system," Mr Johnson concluded. In this context, Mr Johnson resolved to instruct the TSB Director's Ad Hoc Group on Intellectual Property Rights to make a recommendation aimed at providing high-level principles clarifying the nature and limits of RAND commitments, particularly with respect to the availability of injunctive relief for SEPs and the meaning of "reasonable" under RAND licensing terms.

> *"Providing market players with clear, transparent, effective and up-to-date patent policies works for the benefit of the industry as a whole."*
>
> *Malcolm Johnson, Director, Telecommunication Standardization Bureau, ITU*



A closer look at injuctive relief for standard-essential patents

The TSB Director's Ad Hoc Group on IPRs met on 11–12 October 2012, and was attended by many of the participants at the round table. For more than 20 years, the Ad Hoc Group has served ITU's membership by submitting insightful feedback and numerous proposals leading to the amendment of ITU's patent policy and guidelines. Although participation in the Ad Hoc Group is usually reserved for Member States and ITU–T Sector Members, the specific meeting was open to all interested parties.

At its October meeting, the Ad Hoc Group began deliberations based on the TSB Director's instructions and agreed on a road map to address the conditions under which companies that have made reasonable and non-discriminatory commitments should be allowed to seek injunctions, and to clarify the meaning of the word "reasonable" in that context. The next meetings of the group will take place at ITU headquarters in Geneva, on 24–25 January, 20–21 March and 25–26 April 2013.

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Setting global standards

Achievements of the past four years

Throughout the course of every year, hundreds of experts from different regions of the world gather at ITU meetings, contributing their time, know-how and expertise to the study groups of the Telecommunication Standardization Sector (ITU–T). These study groups develop and maintain international ICT standards, known as ITU–T Recommendations. They are led by more than 150 chairmen and vice-chairmen, and together with more than 250 rapporteurs, they manage the Sector's contribution-driven, consensus-based standardization process. Their reports to the World Telecommunication Standardization Assembly 2012 in Dubai give an overview of the key achievements of the 2009–2012 study period. Here, we highlight just a handful.

Total number of texts that were approved in the 2009–2012 study period				
Product	**2009**	**2010**	**2011**	**2012***
Recommendations	137	148	172	86
Amendments	63	46	41	28
Corrigenda	21	8	44	20
Supplements	13	18	17	9
Technical Papers and Tutorials	4	8	8	2

** As of 14 June 2012.*

Access networks and home networking

Next-generation home networking

New standards that will enable cost-effective smart grid applications such as distribution automation, smart meters, smart appliances and advanced recharging systems for electric vehicles, have been approved by ITU–T Study Group 15 (Transport and access). These include Recommendations ITU–T G.9955 and G.9956 (G.hnem) which define a family of narrowband power line communication standards.

These Recommendations are optimized for the various topologies and characteristics of power grids around the world, and will provide a "smart" link between electricity and communication networks through their support of the use of power lines as a communication medium.

G.hnem is being extended in a wireless access project called "G.wnb". It comprises a protocol component in ITU–T G.9959 and a radio component drafted as "G.wnb-freq" for consideration as an ITU Radiocommunication Sector (ITU–R) Recommendation. Other standards include the ITU–T G.9960-series (ex G.hn) for next-generation home broadband networking transceivers.

Architectural overview of next-generation home networks

Recommendation ITU–T Y.2291 provides an architectural overview of next-generation home networks, identifying their overall features and functions. It was developed by ITU–T Study Group 13 (Future networks).

Lightning effects on home networks installed in customer premises

Recommendation ITU–T K.85, developed by ITU–T Study Group 5 (Environment and climate change), describes the requirements for home network equipment and installations in customer premises.

Home network performance parameters

Recommendation ITU–T Y.1565 describes the performance parameters for generic home networks and their interfaces to operators' broadband access networks. IPv4 and IPv6 are both within its scope, as well as the possibility to perform network address and port translation, allowing the use of private address space in the home network. It was developed by ITU–T Study Group 12 (Performance, quality of service and quality of experience).

Home gateway in set-top box

A home gateway, incorporated in the advanced cable set-top box, enables the deployment of a home network. Recommendation ITU–T J.295, developed by ITU–T Study Group 9 (Broadband cable and television), defines functional requirements for the advanced cable set-top box to enable cable television operators to provide advanced services to their subscribers. The agreed architecture and requirements have driven the work on ITU–T J.296, which specifies hybrid cable set-top box for use in cable television networks.

Video quality

ITU–T Study Group 9 has also developed Recommendations for video quality measurement in digital cable television, including high-definition television (J.249, J.340, J.341 and J.342).

Transport

Optical transport networks

ITU–T Study Group 15 is responsible for studies on optical transport networks and access network infrastructure, providing higher speed broadband access and core-network transport Recommendations required for IP-based networks, future networks and next-generation networks. This work includes studies focusing on timing, synchronization, measurement, performance, speed, reliability, installation and maintenance.

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Multiprotocol label switching — transport profiles

Multiprotocol label switching — transport profiles (MPLS-TP) refers to extensions to the multiprotocol label switching protocol developed by ITU–T Study Group 15 in cooperation with the Internet Engineering Task Force (IETF). Many network operators expect MPLS-TP to work under the same principles as longstanding ITU transport network technologies such as synchronous digital hierarchy and optical transport network. There have been extensive discussions between ITU–T and IETF experts over the last few years. Study Group 15 has forwarded an important draft standard (ITU–T G.8113.1), an Ethernet-based protocol for operations, administration and management for MPLS-TP, to WTSA-12 for approval, as well as draft standard ITU–T G.8113.2 on "Operations, administration and maintenance mechanisms for MPLS-TP networks using the tools defined for MPLS".

Media coding

ITU–T Study Group 16 (Multimedia) is making progress on media coding for a range of applications, including content delivery over the Internet and managed Internet protocol networks. The joint work between ITU–T Study Group 16 and ISO/IEC JTC1 SC29/WG11 (MPEG) on a new video compression codec under the Joint Collaborative Team on Video Coding (JCT-VC) is particularly noteworthy. As an indication of the industry interest in the topic, work at the JCT-VC meeting in November 2011 on the successor to ITU–T H.264 (the Primetime Emmy Award-winning video coding standard) attracted more than 1000 contributions, up from 700 at the preceding meeting in July 2011. The new standard, provisionally called "H.HEVC", is expected to be agreed in early 2013.

At its last meeting in April-May 2012, ITU–T Study Group 16 agreed to create another collaborative group with MPEG, for the development of efficient three-dimensional (3D) video coding extensions applicable to ITU–T H.262, ITU–T H.264 and the future H.HEVC.

ITU–T Study Group 16 cooperation on image coding has continued with JPEG (ISO/IEC JTC1 SC29/WG1) in the extension of the JPEG and JPEG-2000 suite of successful image coding standards, as well as in defining the new JPEG-XR compression methods of the T.830-series.

ITU–T Study Group16 continued the extension of existing audio codecs to allow compression of audio with higher fidelity as well as to support stereo applications.

ICT and climate change

Resolution 73 of the World Telecommunication Standardization Assembly (Johannesburg, 2008) was the first major instrument adopted by the ITU–T membership on the important topic of ICT and climate change. This has since been followed by Opinion 3 of the World Telecommunication Policy Forum (Lisbon, 2009), Resolution 1307 of the ITU Council in 2009, Resolution 66 revised by the 2010 World Telecommunication Development Conference, held in Hyderabad, Resolution 182 of the Plenipotentiary Conference (Guadalajara, 2010) and ITU–R Resolution 60.

Most of the ITU–T activities on ICT and climate change take place within ITU–T Study Group 5. Other ITU–T study groups are carrying out studies and developing standards on the use of ICT for significant reduction of greenhouse gas emissions in areas such as teleworking (Study Group 16), video and teleconferencing (Study Group 16), dematerialization (replacing atoms with bits) and standardization for low-power devices (Study Group 15), telepresence systems (Study Group 16), and conferencing and telemeeting assessment (Study Group 12).

ITU–T Study Group 16 also completed work on ITU–T F.747.2, which provides deployment guidelines for ubiquitous sensor network applications and services for mitigating climate change.

Universal charger

ITU's one-size-fits-all universal charger standard ITU–T L.1000 was approved in 2009 and further improved in 2011 to maximize the benefits for end users by extending its use to a wider variety of devices and making it even more energy efficient. ITU–T Study Group 5 has also agreed first-stage approval (consent) of a new Universal Power Adapter (UPA) technical standard for devices such as modems, set-top boxes, home networking equipment and fixed telephones. Recommendation ITU–T L.1001 standardizes the requirements of "External universal power adapter (UPA) solutions for ICT equipment for stationary use". It will enable further energy savings, reductions in e-waste and enhanced consumer convenience by expanding the concept of Recommendation ITU–T L.1000 to the vast majority of ICT devices.

Climate change mitigation

ITU–T Study Group 5 is developing a set of common methodologies to assess the lifecycle impact of the ICT sector, both in terms of its own emissions and the savings created through ICT applications in other industry sectors. The following Recommendations have been approved:

- "Overview and general principles of methodologies for assessing the environmental impact of ICT" (ITU–T L.1400) outlines methods to assess the environmental impact of: ICT goods, networks and services; ICT projects; ICT in organizations; ICT in cities; and ICT in countries or groups of countries.
- "Methodology for environmental impact assessment of information and communication technologies goods, networks and services" (ITU–T L.1410) based on the lifecycle assessment method standardized in ISO 14040 and ISO 14044.
- "Methodology for energy consumption and greenhouse gas emissions impact assessment of Information and Communication Technologies in organizations" (ITU–T 1420).

Other draft Recommendations are also in the works, such as "L.methodology ICT projects", "L.methdology ICT cities" and "L.methodology ICT countries", which are being developed in cooperation with the United Nations Framework Convention on Climate Change.

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A man displays a universal charger plugged into a mobile phone during a presentation at the Mobile World Congress, Barcelona, Spain, February 2012

"Best practices for green data centres" (ITU–T L.1300) was approved in 2011. Best practices are outlined for the use, management and planning of data centres, for cooling and power equipment, for the optimum design of data centre buildings, and for the monitoring of data centres after construction.

Numbering resources

Country codes, area codes and local numbering

Misuse of numbering resources is a growing problem. On the basis of a contribution from the Pacific Island nations, a new Supplement to ITU–T E.156 was agreed. This supplement identifies possible actions that are open to Member States and Sector Members to counter misuse of numbering resources.

ITU–T Study Group 2 (Operational aspects) approved new ITU–T E.157 on calling party number delivery and a new Supplement to Recommendation ITU–T E.156 on numbering misuse.

A contribution from the GSMA Fraud Forum led to an agreement to analyse a large number of new misuse reports and to issue a Circular to solicit information from Member States.

Based on a contribution from India, ITU–T Study Group 2 issued a liaison statement and a Circular regarding the possibility of requiring that all new E.212 mobile network codes be three-digit, as opposed to the current practice of assigning two-digit codes. This change would increase the number of available codes, which could be required to support machine-to-machine services. Further studies will be conducted following the replies.

Several Recommendations related to numbering were updated, and a new Recommendation on the specification of an international numbering resource for use in the provisioning of international help lines was approved. New Recommendations were approved regarding operations management, including next-generation networks, and several existing Recommendations in this area were revised.

ITU Operational Bulletin and International Numbering Resources database

The ITU Operational Bulletin is the preferred medium for the exchange of information among administrations and recognized operating agencies. Codes assigned by ITU and communications received from administrations are published in the ITU Operational Bulletin for dissemination to all administrations and recognized operating agencies. This publication, which started in 1966, is now available on-line with free access. During the study period 2009–2012, some 96 ITU Operational Bulletins and 50 annexes listing codes and numbers administered by ITU have been published.

The E.164 geographical country code 211 was assigned to the newly formed country South Sudan.

ITU is responsible for the registration of global services, such as universal international freephone numbers. During this study period, 4500 requests were received for universal international freephone numbers. Currently, 35 150 such numbers are in service.

Since 6 June 2012, a new version of the International Numbering Resources database has been available from the ITU–T website. This allows ITU members to have access to all the ITU–T E.212 related resources: mobile country codes; mobile network codes; international mobile shared codes; and mobile country and mobile network codes used extra-territorially.

As for international signalling point codes, and signalling area or network codes, this database is searchable on codes, countries or areas, and operators when relevant. Search results can be exported into MS Word and Excel files, and they can be bookmarked as favourites in a browser.

Tariff and accounting matters

For those involved in the provision of international Internet connectivity a supplement to ITU–T D.50, agreed in April 2011, recommends ways to negotiate and agree to bilateral commercial arrangements enabling direct international Internet connections. It was developed by ITU–T Study Group 3 (Economic and policy issues) and marks a step forward in fulfilling the mandate given to ITU by the Plenipotentiary Conference in Resolution 101 (Guadalajara, 2010). The ITU–T D.50 standard on international Internet connection was also revised.

Several new Supplements on avoiding and resolving disputes in billing were approved, as was a new Supplement on billing for SMS services. ITU–T D.195, dealing with the time-scale for settlement of accounts for international telecommunication services, was revised. New ITU–T D.98 on charging in international mobile roaming service was agreed after extensive studies and discussion. New annexes to ITU–T D.156 on network externalities were agreed.

Ethernet-based services

Developed by ITU–T Study Group 12, the ITU–T Y.1564 standard has already gained momentum in the test and measurement industry. It defines a test method to assess and troubleshoot the proper configuration and performance of an Ethernet network to deliver Ethernet-based services.

Future networks and next-generation networks

A key standard outlining objectives and design goals for future networks was approved in May 2011, and further details were worked out in the ITU–T Y.3000-series of Recommendations. These include frameworks for network virtualization and energy saving. A handbook on future networks was published in June 2012. New elements including mobility, content delivery, and access for service providers and identity management services were added to a key next-generation network architecture Recommendation. A workshop on future networks standardization took place in June 2012, looking into the differences and commonalities in the standardization efforts of ITU–T Study Group 13 and ISO/IEC JTC 1/SC 6 in that area.

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Cloud computing

In early 2012, ITU–T Study Group 13 established a new working party on cloud computing. This working party is home to three new Questions on cloud computing. Work has started on standards for the cloud computing ecosystem.

The Joint Coordination Activity for Cloud Computing was also established in early 2012. It distributed the deliverables of the Focus Group on Cloud Computing to the study groups according to their area of competence and has initiated work on a cloud computing standardization road map.

Internet of Things

The ITU Global Standards Initiative on the Internet of Things promotes a unified approach to the development of technical standards in this area.

The "Overview of Internet of Things" (ITU–T Y.2060) standard was jointly developed by ITU–T Study Groups 11, 13, and 16, and approved in June 2012. A work plan for the Internet of Things is also being developed.

In June 2012, ITU–T Study Group 13 approved standards on a framework of object-to-object communication for ubiquitous networking (ITU–T Y.2062) and on requirements for the support of machine oriented communication applications (ITU–T Y.2061). It also agreed on two new Recommendations — a framework for the Web of Things (ITU–T Y.2063), and a standard on terms and definitions for the Internet of Things (ITU–T Y.2069).

Within the scope of its work on multimedia systems ubiquitous sensor networks, ITU–T Study Group 16 produced several Recommendations that are applicable to the Internet of Things. They cover framework aspects (ITU–T F.744), sensor network management (ITU–T H.641), tag-based retrieval of object information (ITU–T H.642.x series), cross-sector applications for sensors in smart grid applications (ITU–T F.747.1), and a standard for climate change mitigation applications (ITU–T F.747.2).

The Joint Coordination Activity on Internet of Things, formerly JCA-NID, was established by the Telecommunication Standardization Advisory Group in February 2011. One of its activities is to

maintain the Internet of Things standards road map, which brings together standards that have been approved (or are under development) from the worldwide ecosystem of standards developing organizations.

The Focus Group on machine-to-machine service layer has to date met four times; in April, June, August and November 2012.

Protocols and signalling

ITU–T Study Group 11 has developed a set of protocol procedures and applications to support next-generation networks. The standards cover such areas as resource control (Q.33xx-series), session and service control (Q.36xx series), and multicast communication (X.6xx series).

Standards have also been developed on resource admission control on some Internet Engineering Task Force protocols, as well as signalling flows and protocols to support Internet protocol television services. In addition, in line with its role as lead study group on test specifications, ITU–T Study Group 11 has worked on global interoperability testing for modern networks to foster next-generation network interoperability worldwide (Q.39xx series).

Internet protocol television

The family of ITU–T Internet protocol television standards has grown substantially over the last four years, in particular under the H.700-series. These standards have been developed by ITU–T Study Group 16 and cover not only network and service definitions, but also terminals (for example, set-top boxes), and support services such as audience measurement and digital signage. New specifications have been developed in this family of standards, and specifications on conformance testing of Internet protocol television implementations based on ITU–T Recommendations have been produced, applied and improved at various events.

In July 2011, ITU launched an Internet protocol television application challenge and encouraged developers to create innovative apps running over ITU standards. ITU announced the winners at ITU Telecom World 2011. Major sponsors Sumitomo Electric Networks and Dentsu each contributed USD 10 000 to support the event and provide the cash prize. Following the success of this first Internet protocol television application challenge, a second challenge — themed "Better quality of life" — was launched in June 2012. The awards ceremony will take place during WTSA-12 in Dubai.

Telepresence

ITU is working on standards to provide interoperability for telepresence systems. Telepresence represents an important evolution of the videoconferencing market. Anyone who has used a telepresence system will testify to its quality — some have described it as "the next best thing to a face-to-face meeting". However, proprietary solutions have stifled the market.

Work in ITU–T Study Group 16 has progressed on standardizing full interoperability between telepresence systems. Coordination with standards developing organizations is taking place for increased compatibility in a multi-vendor environment. As drafts mature, plans are to organize telepresence Interop events.

Electromagnetic compatibility

In April 2012, ITU–T Study Group 5, as lead study group on electromagnetic compatibility and electromagnetic effects, consented a standard offering guidance on the assessment, evaluation and monitoring of human exposure to radio frequency electromagnetic fields (ITU–T K.91). Recognizing that a significant part of the infrastructure needed to bridge the digital divide involves wireless technologies, the guide was created in response to concerns in developing countries about the risks of human exposure to radio frequency electromagnetic fields. There is

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growing resistance by local communities to the deployment of radio installations in their surroundings.

Cybersecurity and security

Tremendous headway has been made by ITU–T Study Group 17 (Security) on how to achieve meaningful cybersecurity capabilities. ITU–T's Cybersecurity Information Exchange (CYBEX) offers the tools to ensure rapid, internationally-coordinated responses to cyberthreats. The ITU–T X.1500 CYBEX set of techniques is a collection of best-of-breed standards from government agencies and industry. It presents a standardized means to exchange cybersecurity information requested by Computer Incident Response Teams (CIRTS), and is an essential tool to prevent the contagion of cyberattacks from nation to nation.

Work during 2009–2012 has resulted in seven new Recommendations, one amendment and three new supplements. Among these are:

- Cybersecurity capabilities (ITU–T X.1209);
- CYBEX overview (X.1500);
- OID registration procedures for CYBEX (X.1500.1);
- Common vulnerabilities and exposures (X.1520);
- Common vulnerability scoring system X.1521);
- Common weakness enumeration (X.1524);
- Discovery mechanisms for cybersecurity (X.1570).

There are also major accomplishments, with Recommendations addressing security architecture, telecommunication information security management (ITU–T X.1052, X.1055—X.1057), a suite of spam countermeasures (ITU–T X.1242–X.1245), a set of Internet protocol television security technical specifications (ITU–T X.1191—X.1195, X.1197), ubiquitous sensor network security (ITU–T X.1311, X.1312), telebiometrics security (ITU–T X.1080.1, X.1086, X.1090, X.1091) and identity management (ITU–T X.1250–X.1253, X.1275).

Other remarkable results are the revision of the X.500 series of Recommendations, SDL-2010 suite specifications, and the TTCN-3 testing notation specification suite.

A new Joint Coordination Activity on Child Online Protection was also launched to coordinate ITU–T's child online protection work among ITU–T study groups, and to liaise with ITU–R and ITU–D as well as with the Council Working Group on Child Online Protection.

Emergency telecommunications

Various ITU–T study groups are advancing their work on emergency telecommunications. As lead study group on the theme, ITU–T Study Group 2 is developing a Recommendation that defines service requirements for terrestrial mobile alerting broadcast capabilities and has begun work to provide guidelines for Member States that are in the process of selecting message identifier assignments to be used for such services. An ITU–T Recommendation indicating what features and mechanisms of a next-generation network may be used to facilitate the requirements of emergency telecommunications was completed.

ITU–T Study Groups 9, 11, 13 and 16 added elements to their sets of Recommendations that provide for communications in emergency situations. A new Supplement 19 to the Y-series was approved in June 2012 on "Risk analysis service over next generation network". It provides guidelines on developing a risk analysis for next-generation network services, which include external risks associated with natural and man-made disasters (earthquakes, typhoons, tsunamis, floods, and so on).

Various workshops were organized with the World Meteorological Organization and the Organization for the Advancement of Structured Information Standards to further the deployment of the "Common Alerting Protocol (CAP) Implementation" (ITU–T X.1303).

The use of broadband over power lines is another means of providing communications following a disaster. ITU–T has developed a standard for a wireline technology that operates over any copper medium in the home and over power lines outside the home (ITU–T G.9960, known as G.hn). While the use of this standard for outside the home is not completely defined at present, the standard provides a strong foundation for technology to assist in re-establishing communications after a disaster. Once power lines or any other copper medium are deployed, the standard could be used to pass very high-speed data to facilitate emergency, discovery, evacuation and retrieval efforts.

In January 2012, the Telecommunication Standardization Advisory Group created a new Focus Group on disaster relief systems, network resilience and recovery. This group is studying disaster relief systems and applications, network resilience, and recovery issues.

Multimedia transmission performance

ITU–T Study Group 12 has been active in the domain of multimedia performance studies. Several new Recommendations have been produced, for example "Network model for evaluating multimedia transmission performance over Internet Protocol" (ITU–T G.1050), "Opinion model for video-telephony applications" (ITU–T G.1070), "Quality of experience requirements for IPTV services" (ITU–T G.1080), "Performance monitoring points for IPTV" (ITU–T G.1081), and "Measurement-based methods for improving the robustness of IPTV performance" (ITU–T G.1082).

Quality of service and network performance for Internet protocol-based services

Other achievements of ITU–T Study Group 12 include new and revised Recommendations in the ITU–T Y.1500-series, which determine the performance model, reference events, and performance parameters for Internet protocol-based services. The newly consented ITU–T Y.1566 defines a limited set of classes that provide a basis for inter-working between the different traffic class aggregates of different service providers, while preserving the original intent of the service (although packet markings might change).

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Driving simulator at the 19th Intelligent Transport Systems World Congress, Vienna, Austria, October 2012

Hands-free communication in motor vehicles

Based on research performed in the Focus Group on Car Communication, ITU–T Study Group 12 has produced two Recommendations — "Narrow-band hands-free communication in motor vehicles" (ITU–T P.1100) and "Wideband hands-free communication in motor vehicles" (ITU–T P.1110).

Intelligent transport systems

Intelligent transport systems is a topic that cuts across the work programmes of different ITU activities, such as multimedia, future networks, security, quality of service, environment and climate change, and the Internet of Things. Numerous standards organizations are working on intelligent transport systems.

The "Collaboration on ITS Communication Standards", a new type of collaboration, is currently being piloted. The intent of the collaboration is to create an internationally accepted, globally harmonized set of intelligent transport system communication standards by promoting and cross-referencing existing standards (independent of source), modifying and extending existing standards where appropriate, and developing new standards where necessary.

Four meetings of the collaboration have taken place, with the first one on 14 December 2011 in Geneva, and the second on 3 April 2012 in Troy, Michigan, United States, at the invitation of SAE International. The third meeting took place on 26 June 2012 in Munich, Germany, at the invitation of BMW, and the fourth on 21 August 2012 in Tokyo, Japan, hosted by TTC.

The World Radiocommunication Conference 2012 (WRC-12), in its Resolution 654, made intelligent transport systems an agenda item for WRC-15, and instructed the ITU Secretary-General to "to bring this Resolution to the attention of the international and regional organizations concerned, including ISO and the ITU's Collaboration on ITS Communication Standards."

The collaboration gives particular emphasis to the reporting of communication requirements for high-priority intelligent transport system applications in different geographical regions.

Measuring the Information Society

Edition of 2012

The 2012 edition of Measuring the Information Society features two benchmarking tools to measure the information society: the ICT Development Index (IDI) and the ICT Price Basket (IPB). The IDI captures the level of ICT developments in 155 economies worldwide and compares progress made during the past years. The IPB combines fixed-telephone, mobile-cellular and fixed-broadband prices for around 160 economies into one measure and compares these across countries and over time. The Report also highlights the latest global market trends, takes a closer look at recent revenue and investment trends in the ICT sector and presents a new approach, which consists in measuring the information society by looking at telecommunication capacity. The analytical report is complemented by a series of statistical tables providing country-level data for the indicators included in the two indices.

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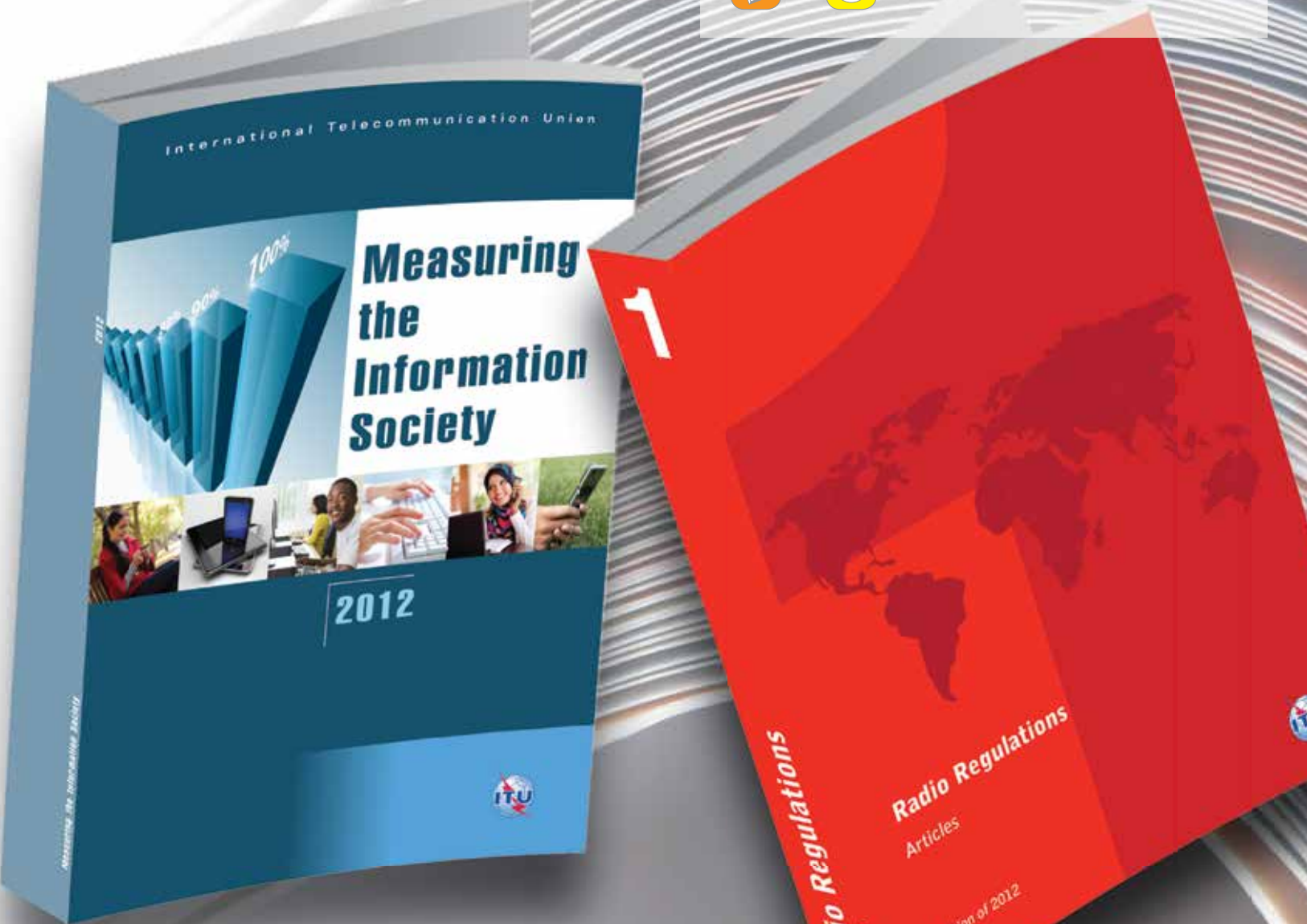

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Focus groups

What they are and what they do

Focus groups are widely used to rapidly address industry needs as they emerge, in areas not covered by existing study groups of the ITU Telecommunication Standardization Sector (ITU–T). The key difference between the two types of groups is that focus groups are open to non-members of ITU–T and have the freedom to organize and finance themselves. They can be created quickly, are usually short-lived, and can choose their own working methods, leadership, financing, and types of deliverables.

This article highlights twelve focus groups, ten of which were created between 2009 and 2012. Seven focus groups are currently active and five have concluded their mandate.

Work in progress

Smart cable television: In operation since May 2012, the "Focus Group on Smart Cable" is driven by the cable industry to collect and analyse information from existing activities, and to produce deliverables to assist the future development of ITU–T Recommendations in support of smart cable television. It reports to ITU–T Study Group 9 (Broadband cable and television).

Machine-to-machine (M2M) service layer: In operation since January 2012, the **"Focus Group on M2M Service Layer"** develops technical reports to support the progress on M2M application programming interfaces and protocols with an initial focus on eHealth. It boasts strong participation from the World Health Organization (WHO) and healthcare companies in addition to the traditional ICT companies active in ITU–T. M2M falls under the umbrella of the Internet of Things, an area of focus in ITU–T driven by industry. The focus group reports to ITU–T Study Group 11 (Protocols and test specifications).

Bridging the gap — from innovation to standards: Puts the spotlight on developing countries' successful innovation in information and communication technologies (ICT) by documenting and analysing it. The **"Focus Group on Innovation"** aims to identify standardization gaps, leading to new study items for ITU–T. The focus group has been in operation since January 2012, and reports to the Telecommunication Standardization Advisory Group.

Disaster relief systems, network resilience and recovery: In operation since January 2012, the **"Focus Group on Disaster Relief, and Network Resilience and Recovery"** was set up in response to a recommendation from the CTO Group meeting in October 2011. It collects and documents information and concepts, from a telecommunication perspective, in order to identify requirements, as well as additional standards that may need to be developed for disaster relief systems and applications, network resilience and recovery. The focus group reports to the Telecommunication Standardization Advisory Group.

Audiovisual media accessibility: The objective of the **"Focus Group on Audiovisual Media Accessibility"** is to make audiovisual media accessible for persons with disabilities. It has been in operation since May 2011, and reports to ITU–T Study Group 16 (Multimedia).

Driver distraction: The objective of the **"Focus Group on Distraction"** is to reduce injuries and fatalities by minimizing the cognitive demands associated with both driving tasks (for example navigating and collision avoidance) and non-driving tasks (such as talking on the phone and checking meeting information). It has been in operation since February 2011, and reports to ITU–T Study Group 12 (Performance, quality of service and quality of experience).

Car communication: The **"Focus Group on Car Communication"** is developing a new set of requirements and specifications to help advance the work of ITU–T Study Group 12 (to which it reports) and to encourage the participation in this activity of members of other standards organizations involved in the car and ICT industries. Activities cover sub-system level requirements, in-car communication, and requirements and testing of front-ends used for speech recognition in cars. The focus group has been in operation since November 2009.

Work completed

Cloud computing: The **"Focus Group on Cloud"** collected and documented information and concepts for developing Recommendations to support cloud computing. It transmitted seven technical reports to the ITU–T study groups for further development as Recommendations by the newly created

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working party on cloud computing in ITU–T Study Group 13 (Future networks) and the new question on security in ITU–T Study Group 17 (Security). These reports are publicly available from the Joint Coordination Activity on Cloud Computing (JCA-Cloud). The focus group was established in February 2010 and concluded its work in December 2011; it reported to the Telecommunication Standardization Advisory Group.

Smart grid: The "Focus Group on Smart Grid" collected and documented information and concepts for developing Recommendations to support smart grids from a telecommunication perspective. The focus group produced five deliverables, which the Joint Coordination Activity on Smart Grid and Home Networking, a successor mechanism of this focus group, sent to all study groups and focus groups, encouraging them to use the deliverables to develop Recommendations. ITU–T Study Group 15 (Transport and access) developed a number of Recommendations on power line transmission in support of the smart grid and ITU–T Study Group 5 (Environment and climate change) is introducing a new question focused on smart grids. The focus group was established in February 2010 and concluded its work in December 2011; it reported to the Telecommunication Standardization Advisory Group.

From- or in- or to-car communication: The "Focus Group on Car Communication" developed a new set of requirements and specifications on wideband communication in cars. Its key areas of attention included in-car communication quality parameters and testing methods; interaction of car hands-free systems with the radio channel; requirements for car hands-free on a sub-system level; requirements and testing procedures for super-wideband and full-band systems, and interaction

with other audio components and systems in the car; special requirements and testing procedures for speech recognition systems in cars; quality models and how they can be applied in the car environment. The focus group was established in May 2008 and concluded its work in November 2009; it reported to ITU–T Study Group 12.

Future networks: Stimulated by debates at the first ITU–T Kaleidoscope academic conference in 2008 "ITU–T Innovations in Next-Generation Networks", and subsequent contributions from Sector Members, ITU–T Study Group 13 established the "**Focus Group on Future Networks**" in January 2009. The focus group engaged experts in the discussion on future networks, and specifically on how to ensure a global common understanding of such networks. It concluded its work in December 2010, having produced six deliverables for its parent group for progression into ITU–T Recommendations.

ICT and climate change: The "**Focus Group on ICT and Climate Change**" identified from the standardization viewpoint the impact of ICT on climate change. The focus group was established in July 2008 and terminated in April 2009; it reported to the Telecommunication Standardization Advisory Group.

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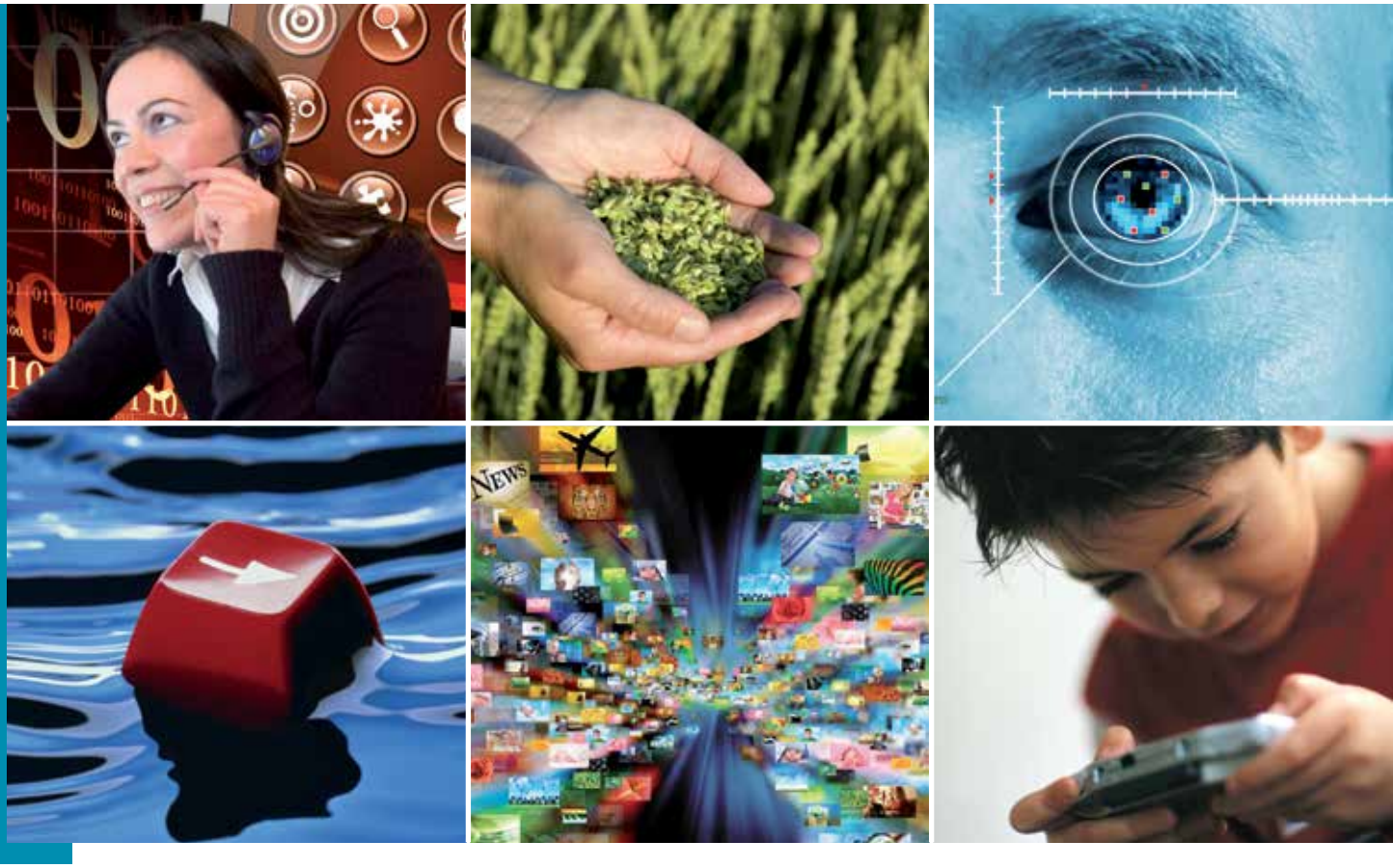

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Technology Watch

Its impact on ITU activities

ITU has published a total of 22 "Technology Watch" reports between October 2007 and September 2012. These reports assess new technologies and consider the likely implications for future standardization. As a function, "Technology Watch" was formalized by the World Telecommunication Standardization Assembly, held in Johannesburg in 2008.

The Technology Watch function and reports have contributed to identifying new activities for ITU's Telecommunication Standardization Sector (ITU–T). Study Questions have been created based on findings, while reports have helped to seed new ITU–T Focus Groups and have stimulated discussion in a number of ITU workshops.

ITU News magazine has featured many of these reports, and the Journal of the ITU Association of Japan has re-published some of the work in Japanese. Some reports have been cited in research papers published by the Institute of Electrical and Electronics Engineers (IEEE). This article highlights some key takeaways.

Distributed computing: utilities, grids and clouds

Geographically distributed resources, such as storage devices, data sources and supercomputers, are interconnected and can be exploited by users around the world as single, unified resource. A new paradigm is emerging in which computing is offered as a utility by third parties, and the user is billed only for services consumed.

The report "Distributed Computing: Utilities, Grids and Clouds", published in March 2009, describes the advent of new forms of distributed computing, notably grid and cloud computing, the applications that they enable, and their potential impact on future standardization. Discussion of the report at the first CTO Meeting (October 2009, Geneva) led to the establishment of the ITU–T Focus Group on Cloud Computing.

The future Internet

The Internet has grown from a small experiment into a collaborative network with around 2.4 billion users today. It keeps on evolving, but is the underlying architecture robust enough to continue adapting to ever-growing demands?

The report "The Future Internet", published in April 2009, surveys the debate on Internet architecture, and identifies key emerging trends and features of the Internet, in an attempt to provide pointers for future standards work.

The existing architecture has already enabled eBay, Google, YouTube, Skype and Facebook to thrive. Despite some critics, evolutionary changes to the original design have proved adequate to meet most new needs. Yet some argue for a clean slate approach to the Internet, and work is under way on features of such a design. This report has identified a number of new trends that would need to be addressed in any new architecture.

ICT and food security

Rising prices and shortages of food and agricultural commodities, particularly in many developing countries, have led to global concern about food security.

ICT are used by many international organizations for mapping and monitoring world food supplies, early warning systems, and to respond when disasters strike.

For farmers and the rural population in developing countries, the availability of mobile phones offers new benefits for agricultural production. Better access to weather, market and price information can have an impact on the incomes of farmers and fishermen. But the full potential of these technologies to address food security has yet to be realized.

The report "ICTs and Food Security", published in July 2009, examines some of the main ways in which ICT can be used locally and globally to address the problems of food security and hunger. In its work under Question 23/5 on using ICT to enable countries to adapt to climate change, ITU–T is looking at how ICT standards can contribute to food security.

Biometrics and standards

The three main categories of biometric applications are forensic, governmental and commercial. In each case, biometric identification systems need to be reliable, secure, interoperable and easy to use. Standards are also needed to protect biometric data, both to maintain personal privacy and to prevent attacks that would open the way for fraud or impersonation.

AFP/ImageSource

The underlying objectives in standardization are to make biometric systems easier to install, cheaper to run and more reliable to use.

The report "Biometrics and Standards", published in December 2009, spotlights biometric recognition as a key form of authentication, one which is increasingly used in a wide range of applications made possible by advanced pattern recognition algorithms applied through powerful ICT. It highlights the work of ITU–T in the field of telebiometrics, under Question 9/17.

Decreasing driver distraction

Texting, making calls, and other interaction with in-vehicle information and communication systems while driving is a serious source of driver distraction and increases the risk of traffic accidents.

The report "Decreasing Driver Distraction", published in August 2010, was sparked by the ITU Council Resolution 1318, adopted in April 2010, on "ITU's role in ICTs and improving road safety". All of this led to the establishment of the ITU–T Focus Group on Driver Distraction in February 2011.

The report provides an overview of technology-caused driver distraction. It surveys standards, guidelines and initiatives aiming at making the use of in-vehicle information and communication systems less distracting.

ICT as an enabler for smart water management

The delivery of fresh water to millions of people is increasingly under threat, with economic growth, climatic conditions and rising population all affecting the availability of water resources. The situation is being worsened by the effects of climate change.

The report, "ICT as an Enabler for Smart Water Management", published in October 2010, provides an overview of how ICT can be a strategic enabler for

smart water management policies. It surveys the ICT standards being developed to enable smart water initiatives.

Using submarine communications networks to monitor the climate

The oceans are one of the most important factors in governing worldwide warming processes and climate variability, and existing submarine cables could provide a real-time global climate surveillance network. Future generations of cables and their associated components could directly measure climate variables such as water temperature, salinity and pressure on the ocean floor. By encouraging technical standardization, ITU can facilitate implementation of this capacity.

The report, "Using Submarine Communications Networks to Monitor the Climate", published in November 2010, gives an overview of how old and new submarine cables could be used for decades to come as a major resource and a real-time global network to monitor climate change and to provide tsunami warnings.

A joint task force of ITU, the United Nations Educational, Scientific and Cultural Association/Intergovernmental Oceanographic Commission (UNESCO/IOC) and the World Meteorological Organization has been established to investigate this proposed use of submarine cables.

Standards and e-health

The report, "Standards and e-Health" was published in January 2011. It envisions the future of e-health, presents a snapshot of the current e-health standardization landscape, describes some obstacles that must be overcome, and identifies the emerging standardization opportunities and activities within ITU that will contribute to the global deployment of efficient and secure e-health systems.

The optical world

Optical technologies are the driving force behind the bandwidth growth of the Internet. The concept of the energy-efficient optical network requires further study, because it will contribute to reducing the carbon footprint of ICT. New concepts, such as energy-aware routing (green routing) and energy-aware traffic grooming, will represent a paradigm shift in the way network design, traffic engineering and network engineering have been carried on so far. Similarly, all-optical computers need further study, as this new field will be reaching maturity over the next five years or so.

The report, "The Optical World", published in June 2011, surveys standards and research work which will lead to a new generation of Internet and computing devices. The report contributed to the discussion of new work items in ITU–T Study Group 15.

Trends in video games and gaming

Video gaming is a fast-moving multibillion dollar global business. Lack of interoperability restricts players to one particular gaming platform with rather expensive games. There are signs that similar walled gardens are being established in the area of mobile and social network games.

The trend is towards a one-box-fits-all solution, run on the latest processor technologies. Such a solution will integrate audio and video streaming, gaming and other entertainment features, natural user interfaces and secure payment mechanisms.

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The report, "Trends in Video Games and Gaming", published in September 2011, surveys some of the hottest developments and highlights the standardization activities needed to offer consumers a better gaming experience. The report contributed to the discussion of new work items in ITU–T Study Group 16 and in the field of cloud gaming services.

Digital signage: the right information in all the right places

Wherever people wait, shop or transit, there is likely to be a rapidly changing digital display. Often these displays are part of an extensive centrally-managed network. This emerging medium for sending out targeted information, entertainment, merchandising and advertising is described as digital signage.

Advertising industry associations, technical suppliers, national interest groups and a number of standards-development bodies such as ITU–T are calling for interoperability to facilitate the roll-out of large-scale digital signage networks, foster innovative applications and avoid vendor lock-in. ITU–T Study Group 16 has taken an

important first step by starting work on a "Framework for Digital Signage Services".

The report, "Digital signage: the right information in all the right places" was published in November 2011. It gives an overview of digital signage technologies and their major applications, making the case for interoperable standards for digital signage products. ITU held a workshop on digital signage in December 2011.

Privacy in cloud computing

Privacy concerns are increasingly important in the online world, and the secure processing of personal data in the cloud represents a huge challenge. Adoption of privacy-enhancing technologies in the cloud will depend upon the existence of uniform ways of handling personal data at the international level and on technical standards which can help to demonstrate compliance with legal and regulatory frameworks.

The global dimension of cloud computing requires standardized methodologies and technical solutions to enable stakeholders to assess privacy risks and establish adequate protection levels.

The report, "Privacy in Cloud Computing" was published in March 2012. It analyses the challenges posed by cloud computing and the standardization work undertaken by various standards-development organizations in the field.

ITU–T Study Group 17 has taken the initiative, through a number of study Questions, to work on specific topics related to cloud security.

E-health standards and interoperability

Most citizens in the world today do not have sufficient and affordable access to health care. E-health technologies could help close this gap, not only by lowering healthcare costs through efficiencies in health information delivery, but also by reaching underserved and remote areas.

But e-health is one of the most complicated and challenging areas from a standardization perspective because the healthcare industry has an enormous installed base of legacy systems based on proprietary technologies. Also, e-health systems inherently involve "big data" and they address hundreds of areas of technology.

The report, "E-health Standards and Interoperability" was published in April 2012. It served as background material for the joint ITU/World Health Organization workshop, held in April 2012, on e-health standards and interoperability.

What next?

ITU is reaching out to experts from within and outside its membership to contribute to Technology Watch reports as authors and reviewers. Experts from industry, research and academia are invited to submit topic proposals and abstracts for future reports in the Technology Watch series.

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Technology Watch

Standards for technology-enabled learning

Education is a prerequisite to using information and communication technologies (ICT) — and in return, these same technologies can facilitate learning processes, taking education beyond classrooms as we know them. A Technology Watch report "Standards for technology-enabled learning," published by ITU in September 2012, surveys emerging technologies, which, if applied in an educational context, will contribute to more efficient and more affordable education and training for all.

For a number of years now, standardization bodies have been defining standards and guidelines for ICT-enhanced distance-learning. Their output is taken up in this report with a view to exploring and identifying new applications and directions for this work.

Improving educational access, equity and quality around the world

Education is a fundamental human right for everyone. It is critical to our development as individuals and societies, and it helps pave the way to a successful

and productive future. Universal primary education is one of the eight Millennium Development Goals ("Ensure that, by 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary schooling").

Coupling ICT and education is not new. In the 1930s, for example, the Jim Hardy Organization produced a training film for General Motors about the differential gear, and since 1951 the School of the Air has delivered lessons by radio to students in the remote outback of Australia.

While film and video continue to be used to support learning and teaching, it is clear that social change, globalization and recent technological advances have significantly changed the role of ICT in education.

The report reviews technical standards and standardization activities from the standpoint of their applicability in technology-rich learning. Recognizing the dynamic nature of the innovative ICT-in-education field, however, the report does not claim to cover all educational technologies.

Tech-rich learning: mobiles, tablets, laptops and more

The lines are blurring between categories of device, and what makes a device suitable for an educational context is not clearly defined. Certainly, radios and DVD players have educational value, as do MP3 players, digital cameras, video-gaming equipment and, of course, purpose-built educational devices.

Sustainability of donated devices

In an attempt to spread the benefits of computer-assisted learning, established knowledge societies have donated or sold equipment to regions lacking access to ICT. Often, however, the technologies are obsolete as far as their original users are concerned, and no thought is given to logistical matters such as set-up, maintenance, local content and standard requirements.

Economic sustainability (for example, cost of connectivity) and environmental sustainability (including disposal of equipment and e-waste) must be addressed before devices are shipped, and there must be capacity building in recipient countries.

With the One Laptop per Child project, nearly three million low-cost and low-power laptops have been distributed globally — to empower children through education. Hardware, software and content have been designed to facilitate collaborative, joyful and self-empowered learning.

Mobiles and tablets

With more than six billion subscriptions, mobile phones reach communities where educational opportunities are scarce. Multi-faceted handsets are the Swiss army knives of the 21st century and are recognized tools in trade and banking, healthcare, farming and education.

Together with tablets (mobile computers with flat touch-screens) and digital textbooks (e-readers), smartphones have opened the doors to mobile learning (m-learning), overcoming the capacity limitations of fixed learning locations. Accessible from virtually anywhere, m-learning can include collaborative features for feedback and tips, as well as rich and entertaining content.

Salman Khan (right) and Bill Gates in 2011, discussing the future of education with technology

Photo by Jurvetson (flickr), CC BY 2.0.

Educational apps

Programmers are populating app stores with a wide range of educational software addressing different needs and stages of learning. The recent trend is for educational apps to run on smartphones, tablets and other all-purpose ICT gadgets, rather than being limited to purpose-built educational devices.

The trend is contributing to the increasing scalability and sustainability of ICT in education initiatives. New sets of apps can be installed as learners graduate from elementary to middle to high school, or to cover specific interests, strengths or weaknesses.

Learning for all?

Worldwide, there are many public, private, non-profit and for-profit institutions offering distance education.

A growing number of organizations, universities and individuals have come to realize that access to digital-learning resources should no longer be limited to a privileged few, and various courses are being made accessible over the Internet.

Harvard University "opened its classroom to the world" and invited the philosophy-savvy web audience to find answers to enduring questions such as "What's the right thing to do?" Lectures and lecturer, Michael J. Sandel, became popular in China and Japan where universities now offer philosophy classes following a similar style.

Recently, Harvard and MIT together launched the edX joint initiative to offer online learning to anyone with an Internet connection. Other universities have joined since, and courses will be taught using an interactive open-source online learning platform.

Related platforms and services include Academic Earth (videos and lectures from some 30 universities), Connexions (an open educational resource repository of some 17 000 learning materials), Coursera (video lectures and assignments), OpenStax College

(peer-reviewed digital textbooks), and Udacity (video lectures in conjunction with integrated quizzes and follow-up homework).

Educational video

The biggest platform for educational content may well be the video-sharing site, YouTube.

Global video-coding standards such as Recommendation ITU–T H.264 facilitate the creation, compression and distribution of multimedia content, independent of device, operating system and distribution platform. A new standard is being developed and Recommendation ITU–T H.264 is being extended to support 3D capability at an even more efficient compression rate. We anticipate innovative implementation of video standards in many applications, including teaching and learning.

TED, famous for its videos of inspirational 18-minute talks, is an educational resource in itself. The curators have also launched a platform for educational video clips, enriched with quizzes and further food for thought.

Apple is also a strong player in educational content. An education-focused category of the digital media store, iTunes, lists some 500 000 free audio lectures, videos and books suitable for learners of all ages. With the help of an authoring tool, educators are invited to convert their own content into modules accessible to the company's mobile devices.

Educational games are another genre of learning resource, and a Technology Watch report on video games and gaming describes the notion of "gamification" and the role of video games in developing problem-solving skills.

Khan Academy

The not-for-profit Khan Academy was born when Salman Khan uploaded a few calculus video clips to YouTube for the purpose of remotely tutoring some relatives and friends. The popularity of those videos made him realize that he could help others learn, and so he did. Extensive media coverage, praise by Bill Gates and a TED talk in 2011 helped secure funding to keep the lectures free and to develop a web-based exercise, assessment and reporting tool for learners, parents and teachers. Mr Khan's academy inverts traditional teaching methods — instruction is delivered online and "homework" is moved into the classroom.

Teacher tech

Various tools are available to present and keep track of educational content, structure courses, monitor class enrolment, and evaluate the learning process and progress.

While many of these tools are web-based, SMS messages, 160 characters short, can be used to provide learning and evaluation support to educators. Frontline SMS, the popular open-source software able to turn a laptop into a fully-fledged SMS communications hub, offers to help schools, trainers and educators "improve the quality of education and training in the last mile."

Moodle is a free learning-management system, widely used by distance-learning programmes, including the ITU Academy. Features such as assignment management, grading and quizzes facilitate communication between teachers and students. A community of programmers is developing new modules to increase Moodle's functionality and to adapt it to the needs of users.

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Piazza is an interactive website where students pose questions related to offline courses, to which peers and educators respond. The best responses from peers are endorsed by instructors. This social-networking website encourages active student participation.

Interactive whiteboards combine both software and hardware components (large interactive display, projector, computer) and have replaced traditional chalkboards in many developed-world classrooms. Recognizing and capturing user input and interaction are some of the features supported by interactive whiteboards. In part, this is realized through electromagnetic, optical and ultrasonic technologies that can be found in other consumer electronics (such as screens and video consoles).

Open-Sankoré is an example of free open-source software for interactive whiteboards, offered alongside an associated resources platform, and promoted by France's Inter-ministerial Delegation for Digital Education in Africa. The availability of interfaces using open standards reduces cost, drives scalability and innovation, and constitutes an important factor stimulating the adoption of learning technologies.

Technical standard for ICT in education

In 2005, ITU's Telecommunication Standardization Sector (ITU–T) published a standard to support a multimedia framework for distance-learning services. The standard, Recommendation ITU–T F.742, describes application scenarios of distance learning and deduces general requirements to be met by distance-learning services. ITU's Focus Group on Innovation is maintaining a living list of emerging ICT products and services, some of them addressing the needs of the teaching and education sector.

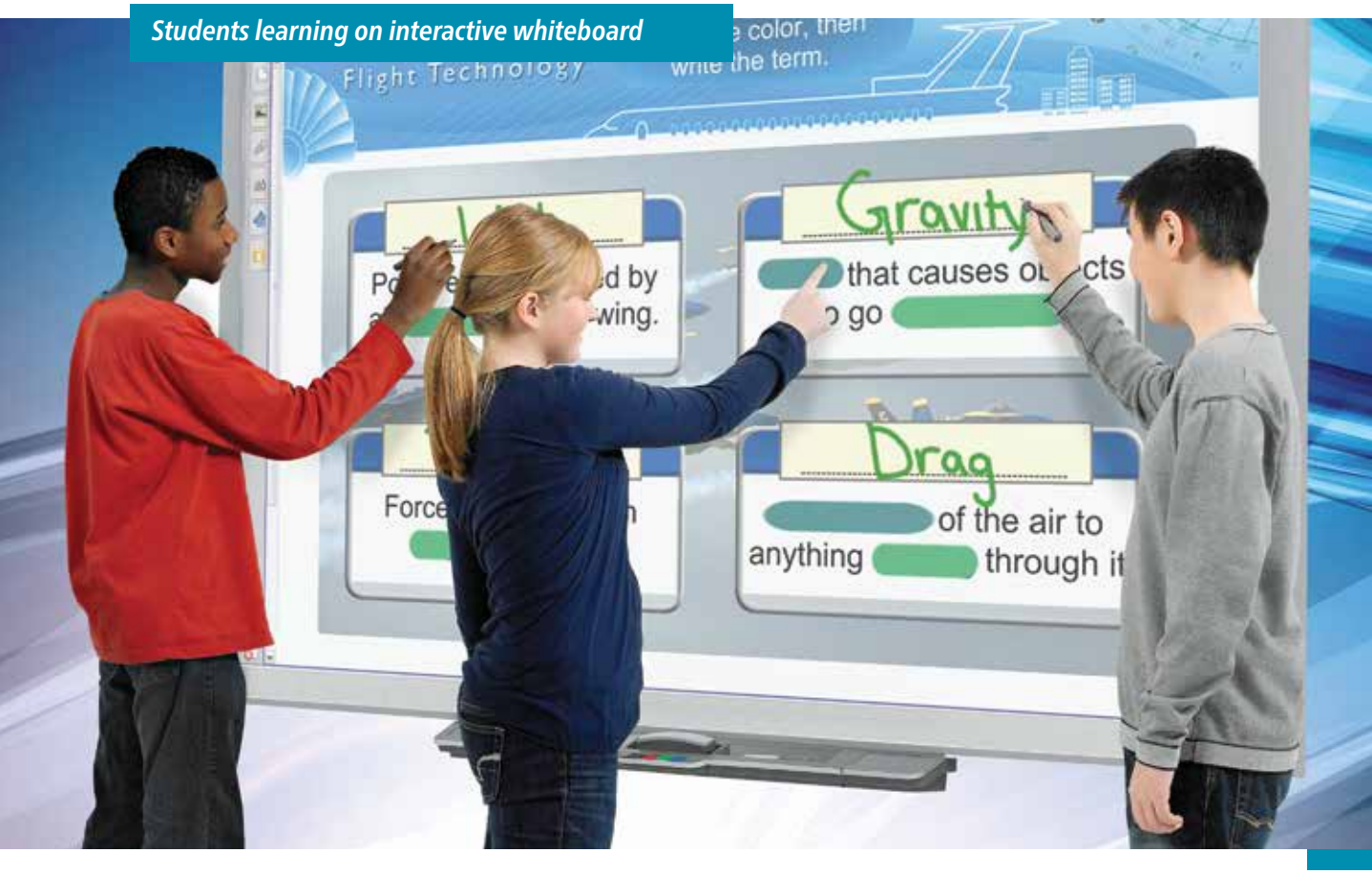
A way forward

A review and update by providers and users of learning resources would be of benefit to existing ITU–T distance-learning standards. Well-crafted standards, policies and strategies are another aspect of successfully incorporating ICT into a country's education system.

National administrations and education ministries of the developing world must play a central role in the standardization process if we are to address the current disconnect between the development and implementation of educational technologies. Technical standards will certainly form an integral part of national or regional ICT-in-education policies. But in order to achieve lasting positive results, technical standards must go hand in hand with best practices in training on the implementation, use and maintenance of educational ICT.

All Technology Watch reports are available at http://itu.int/techwatch.

Students learning on interactive whiteboard



SMART Technologies, http://smarttech.com/

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Bridging the standardization gap

ITU's Telecommunication Standardization Sector (ITU–T) is leading efforts to improve the capacity of developing countries to fully participate in the development and implementation of information and communication technology (ICT) standards. The disparity between developing and developed countries in their national standards capability continues to be a factor in the persistence of the digital divide. This disparity diminishes opportunities for economic development and technological innovation.

The goal of bridging the standardization gap has been moving up the ITU agenda since the Plenipotentiary Conference in Marrakesh, Morocco, in 2002 adopted Resolution 123 calling for initiatives to assist in closing this gap. Later, the World Telecommunication Standardization Assembly held in Florianópolis (WTSA-04), Brazil, in 2004 adopted Resolution 44, "Bridging the standardization gap between developing and developed countries". Resolution 44 was updated by WTSA-08, held in Johannesburg, South Africa, in 2008, giving further impetus to the work of ITU–T in this area. And in October 2010, the Plenipotentiary Conference, held in Guadalajara, Mexico, established bridging the standardization gap as one of the three strategic objectives of ITU–T for 2012–2015.

Why closing the gap matters

A paper to the World Telecommunication Standardization Assembly (WTSA-12) states that, "Telecommunication standardization has always been of great importance to the progress of all nations. In the current global context, however, it is more crucial than ever that all countries participate in the creation of standards from the very first steps of the process, and not merely in the adoption stage". This paper from the administrations of the Inter-American Telecommunication Commission (CITEL) goes on to state that in recent years, "developing countries have been faced with severe restrictions to obtain fellowships and, as a consequence, an insurmountable financial barrier has emphasized disparity, isolating countries and making ITU's work go unnoticed". It concludes with a clarion call "to take action and remedy this situation, in order for developing countries to regain active participation in ITU–T activities."

ITU fellowships are limited to countries with annual GDP per capita not exceeding USD 2000. One full fellowship or two partial fellowships are available for meetings of all ten ITU–T study groups.

Public policy

Decisions about how a standard is defined can have implications for a wide range of public policy issues. For instance, the design of encryption standards affects not only national security, but also individual privacy online and the security of financial transactions.

The emerging area of e-health has the potential to improve access to medical services in the developing world. Whether there is a standardized format for electronic medical (or other) records can determine the degree of interoperability among systems, and the security, privacy, and accessibility of these data.

Innovation and competitiveness

Access to ICT standards is a critical factor in a country's global economic competitiveness. These standards can provide a common platform on which innovation can proceed, giving developing countries the opportunity to create products for a world market.

Reviewing progress of the Action Plan endorsed by WTSA-08

WTSA-08 set out an action plan to further address the disparity in standardization between developed and developing countries — these include the least developed countries, small island developing States and countries with economies in transition. The plan outlines five major programmes on "strengthening standards-making capabilities", "assisting developing countries in enhancing efforts in respect of standards application", "building human resources", and setting up flagship groups, as well as fundraising for bridging the standardization gap.

In a paper to WTSA-12, the Asia-Pacific Telecommunity (APT) administrations comment that "One of the major tasks of ITU Member States is to select appropriate international standards and adopt them into their national standards. ITU Member States, especially developing countries, are facing difficulties in dealing with a large variety of international standards — not only ITU–T Recommendations but also standards from other well-known international and regional standardization organizations." The APT administrations therefore propose that programme 2

(assisting developing countries in enhancing efforts in respect of standards application), should be extended, in particular to cover reviewing and assessing existing national standards to determine whether they are consistent and in accordance with current ITU–T Recommendations.

Programme 1: Strengthening standards-making capabilities of developing countries

Under the first phase of the ITU–T project, "Reducing the Standardization Gap" from Programme 1 of the Action Plan, a research study was undertaken in September 2009 on the capability and readiness of developing countries to establish and implement standards. The aim was to propose actionable steps that would improve the standardization capability in the developing world. Responses were received from 16 countries.

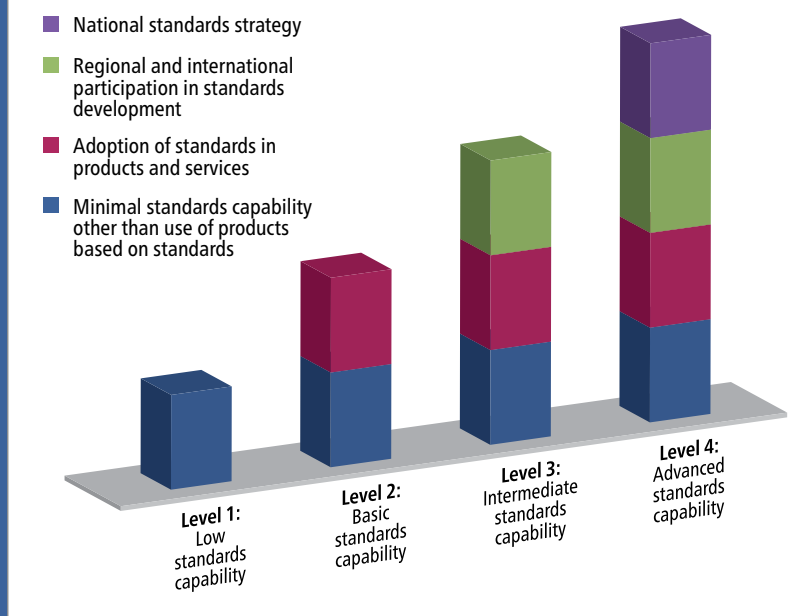
In order to improve the response rate of the research study, the questionnaire was sent out again in December 2010 to some 95 ITU Member States of the developing world that did not respond to the initial survey. This follow-up elicited responses from a further 35 countries. It was observed that developing countries' participation in ICT standardization is hampered by a lack of understanding of the importance of ICT standards. This results in inadequate funding for standardization work and coordination at national level for participation in international standards forums.

The countries surveyed were categorized as having low, basic, intermediate or advanced standards capability (see chart). Two reports, "Measuring and reducing the standards gaps" and "ICT Standardization Capabilities of developing countries" have been published in the first phase.

The studies were carried out with generous support from the Republic of Korea, through the Korea Communications Commission and the Telecommunications Technology Association.

As part of the second phase of the project a guide is being drafted to help developing countries

Four levels of national standards capability



set up and manage a standardization secretariat. Creating this type of secretariat will enhance the involvement of developing countries in ITU–T study groups.

Remote participation

ITU has increased the number of meetings in the regions, created regional study groups, and offered remote participation for all study group meetings.

As a result, since 2007, over 40 countries that had not previously participated in ITU–T meetings have done so. In 2011 alone, 16 countries participated in ITU–T meetings for the first time.

Programme 2: Assisting developing countries in implementing ITU–T Recommendations

Technical manuals

A series of technical manuals produced during the period 2009–2012 provide additional information for developing countries on best practice in implementing ITU–T Recommendations.

A handbook published in 2012 called "Future networks", is broad in scope and covers social, economic and environmental, as well as technological aspects.

A handbook on "Practical procedures for subjective testing" was published in 2011. It describes procedures to be used to quantify the perceived audio quality of end-to-end speech and audio communication systems.

Four handbooks were published in 2010: "Convergent Networks" presents ITU–T Recommendations on next-generation networks in the context of ongoing convergence of the telecommunication and media industries. "Optical Transport Networks from TDM to Packet" discusses technologies covered by ITU–T Recommendations related to synchronous digital hierarchy, optical transport networks and Ethernet over transport, as well as automatically switched optical networks.

"DSL Story" provides an overview of the 18 ITU–T Recommendations dealing with the xDSL technology published in 2009. The xDSL Recommendations are grouped into nine categories: HDSL; SHDSL; five ADSL (G.992.2, splitterless ADSL, ADSL2 reach extended, splitterless ADSL2 and ADSL2plus); and two VDSL (VDSL1 and VDSL2). Operations and signalling principles of these nine families of xDSL systems are presented, emphasizing the commonalities.

Finally, "Object identifiers (OIDs) and their registration authorities" describes the structure of the International OID tree, the high-level arcs and major branches, and the notations and encodings used for expressing OID values. The handbook also covers the practical use of OIDs.

Of the three handbooks published in 2009, "Deployment of packet-based networks" presents guidelines for operators planning migration of PSTN/ISDN services to packet-based networks in the evolution to next-generation networks. "Optical Fibres, Cables and Systems" offers a functional grouping of Study Group 15 Recommendations on optical technology. The third handbook deals with "Security in Telecommunications and Information Technology".

Standards Q&A Forum

The Standards Q&A Online Forum, launched in September 2011, allows anyone to send their queries regarding the implementation of ITU–T Recommendations directly to study group experts. The Forum offers a unique opportunity to engage with the experts who develop the standards that underpin ICT, as well as providing a platform to facilitate the exchange of information between developing and

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developed countries on the application of these standards.

Mentoring

A mentoring programme for ITU–T study group members from developing countries was introduced in August 2011 with the aim of informing new delegates about ITU–T meeting procedures as a way of enhancing contributions from these countries.

At the Telecommunication Standardization Advisory Group (TSAG) meeting in January 2012, a new position of mentor was established in study groups. The main role of the mentor is to coordinate with developing-country participants, and to share information and best practice in regard to the application of ITU–T Recommendations.

Programme 3: Building human resources

Technical workshops

Workshops are held in developing countries to disseminate information about best practice for implementing ITU–T Recommendations and to attract more participation from developing countries in ITU–T study group work. In 2010 and 2011, some 29 workshops were organized in developing countries. Three regional Bridging the Standardization Gap workshops were held in 2011, in Fiji, Algeria and Moldova. In 2012, two regional "Bridging the Standardization Gap" workshops are planned. One was held in the Lao People's Democratic Republic in July 2012 and the other will take place in India on 17–18 December 2012.

Technical tutorials on ITU–T Recommendations and standardization

Two-week technical tutorials, based on the handbook "Optical Fibres, Cables and Systems", were held in Rwanda in 2010 and Mexico in 2011. Their main objective was to assist engineers, technicians, technologists, mid-level

management and regulators in the implementation of optical fibre-based systems, and they provided insight into the ITU standards that have shaped the optical transport networks of the world.

Four standardization tutorials were held, in Malaysia, India, Fiji and Algeria, offering an interactive learning experience through a simulated study-group meeting.

The tutorials provided background information on how standardization works and how participants can increase their effectiveness in ITU–T meetings.

In addition, tutorials were organized for rapporteurs and editors (one in 2011 and another in 2012) to increase the efficiency of the work of study groups.

E-learning

ITU has also embraced e-learning channels for education on ITU–T Recommendations and working methods. In 2011, webcasts on optical transport networks were held during a meeting of ITU–T Study Group 15.

Programme 4: Flagship and regional groups

Five new ITU–T regional groups were established during the period 2009–2012. These were the Study Group 2 Regional Group for East Africa, three Study Group 5 Regional Groups — for the Africa Region, the Arab Region, and for Latin America and the Caribbean — and the Study Group 12 Regional Group on Quality of Service for the Africa region.

Programme 5: Fundraising for bridging standardization

One notable way of helping participants from developing countries to participate in standardization work is through the Bridging the Standardization Gap Fund, established as proposed by the Assembly in Florianópolis.

Since opening in August 2007, the fund has made it possible for more events to take place in developing countries. Examples include the technical tutorials in Rwanda and Mexico on optical fibres, cables and systems. The fund has also been used to provide fellowships to participants from developing countries to enable them to attend workshops.

So far, a total of CHF 289 070 has been contributed to the fund. Contributors include Nokia Siemens Networks, Microsoft, Cisco and the Korean Communications Commission.

Looking ahead

The increased involvement of developing countries in standardization work provides an opportunity to better reflect their interests and requirements when new standards are drawn up. This helps meet ITU–T's core objective of continuing to ensure global interoperability of communications so that all countries can enjoy better opportunities for economic development and technological innovation. In this regard, there are regional proposals to modify Resolution 44 at WTSA-12.

ITU–T

Transcontinental IPTV experiment demonstration, Geneva, Switzerland, February 2012

Conformance and interoperability testing

A major concern raised at the World Telecommunication Standardization Assembly in 2008 (WTSA-08) was that equipment being put on the market, especially in developing countries, does not always conform to standards, causing problems of interoperability with other equipment. This led the Assembly to adopt Resolution 76 on studies related to conformance and interoperability testing, assistance to developing countries, and a possible future "ITU Mark" programme.

The studies gave rise to proposals for further activities, and the ITU Plenipotentiary Conference (Guadalajara, 2010), in Resolution 177 on conformity and interoperability, allocated the four main areas (pillars) of work within the Union: the Telecommunication Standardization Bureau (TSB) leads the conformity assessment programme and interoperability events (Pillars 1 and 2), while the Telecommunication Development Bureau (BDT) leads in capacity building and the establishment of test centres in developing countries (Pillars 3 and 4).

Conformity assessment programme

A conformity database is being considered, which would allow companies to state publicly that their products conform to ITU–T Recommendations requirements. Opinions differ among ITU–T members on the route that should be taken to allow entries into the database, namely third party testing (routes 1 and 2, as is the case for ISO/IEC Conformity Assessment standards) versus self-assessment procedures (routes 3 and 4). Route 4, where only ITU members

are allowed to make entries into the database through a Supplier's Declaration of Conformity is the most discussed. A pilot project is being considered.

Interoperability events

ITU has organized and facilitated seven ITU Interop and related events. Six IPTV Interop events were held to test and/or demonstrate the interoperability of products meeting ITU–T's Internet Protocol television (IPTV) standards. They took place in Geneva (July 2010 and October 2011), Singapore (September 2010), Pune, India (December 2010), Rio de Janeiro (July 2011) and Dubai (September 2011).

ITU participated in the first transcontinental IPTV experiment during the Sapporo Snow Festival in Japan in February 2012. This was the first transcontinental broadcast of a live event using IPTV technology standardized end-to-end by ITU. Organizations from Japan, Singapore and Thailand also participated in the experiment.

In addition, ITU organized two ITU IPTV Application Challenges. The aim was to encourage innovative IPTV applications and expand the IPTV ecosystem to include e-health and accessibility applications to ICT in order to improve digital inclusion and social welfare. Winners of the first competition demonstrated their applications at ITU Telecom World 2011 and at various other events. The apps of winners of both competitions will be showcased at WTSA-12 in Dubai, as will real-time content streaming over native IPv6 using IPTV technology standardized end-to-end by ITU.

In May 2011, ITU hosted the first interoperability testing event on the ITU–T G.9960 (G.hn) standard for home networking. The event was a joint effort of the HomeGrid Forum and the Broadband Forum. It was facilitated by the University of New Hampshire Interoperability Laboratory, which has become an ITU–T Academia member.

ITU supported an interoperability testing event on the ITU–T Q.3900 standards series for next-generation networks, organized in Japan on 11–13 July 2012. This event led to the idea of exploring a new model of collaboration, in which regional or national standards developing organizations would hold next-generation network interoperability events using ITU–T Recommendations. The aim is to promote the adoption of next-generation networks in developing countries.

Capacity building

ITU has organized various capacity-building events. Contacts have been established with *Centro de Investigación de las telecomunicaciones (CINTEL)* in Colombia, *(Normalización y Certificación Electrónica (NYCE)* in Mexico, *Centro de Pesquisa e Desenvolvimento (CPqD)* in Brazil, Research and Studies Telecommunication Centre (CERT) in Tunisia and Sintesio in Slovenia in order to prepare the ground for creating test centres in the regions and for developing test suites for ITU–T Recommendations.

ITU has signed Memoranda of Understanding (MoU) with CERT and Sintesio for conducting conformance and interoperability training. The training is being conducted for African and Arab countries in 2012, and will be carried out for the other regions in 2013 and 2014. Plans are under way to sign an MoU with CPqD.

ITU Interop event on IPTV, Rio de Janeiro, Brazil, July 2011

ITU-T

Test centres

ITU has produced a set of guidelines on building testing labs for conformance and interoperability of equipment and systems in developing countries. The guidelines cover the process of building testing labs, site analysis, economic analysis, financing and training opportunities, collaboration mechanisms, best practices, reference standards and ITU Recommendations.

ITU is also discussing with the United Nations Industrial Development Organization (UNIDO), the International Laboratory Accreditation Cooperation (ILAC) and the International Accreditation Forum (IAF) how they could assist in the establishment of ICT test centres. Together, they are also looking at how to encourage the establishment of Conformity Assessment infrastructure at national, sub-regional and regional levels.

An MoU has been signed with ILAC and IAF for cooperation in the implementation of the ITU Conformance and Interoperability Programme. Contacts have also been established with the Worldwide System for Conformity Testing and Certification of Electrotechnical Equipment and Components, as well as with the accreditation bodies of Colombia (ICONTEC) and Brazil (INMETRO).

Business plan

KPMG consultancy was selected to do the groundwork for a business plan and estimated that the total resources needed for the five-year period 2012–2016 amounts to CHF 5–8 million, depending on the scenario. The ITU budget for conformance and interoperability is zero for 2012–2013 and about CHF 0.5 million in the base scenario for 2014–2015.

Accessibility

Accessibility is an important area where ITU, which has long championed the principles of inclusion and universal design, is addressing challenges through its standardization efforts. Equipment and software are now available to provide amazing support for people with disabilities, but there are many barriers to finding the most appropriate equipment, particularly at affordable prices.

Making sure that people with disabilities have access to information and communication technologies (ICT) has been an increasingly important part of the work of ITU's Telecommunication Standardization Sector (ITU–T) since 2009. This work meets the requirements of World Telecommunication Standardization Assembly 2008 (WTSA-08) Resolution 70 on "Telecommunication/information and communication technology accessibility for persons with disabilities" and the United Nations Convention on the Rights of Persons with Disabilities.

While WTSA-08 Resolution 70 was the first ITU text embracing the topic of accessibility, ITU's Telecommunication Development Sector (ITU–D) followed in mid-2010 with Resolutions 58 and 70 on the same subject. The ITU Plenipotentiary Conference (Guadalajara, 2010), in Resolution 175, confirmed the priority that the Union accords to accessibility.

Providing services

An accessibility portal, launched in June 2009, brings together many standardization resources on accessibility as a one-stop shop. There is also the Joint ITU/G3ict "e-Accessibility Policy Toolkit for Persons with Disabilities". This online tool covers areas such as broadcasting, education, health, transport and e-government services. The toolkit is a valuable resource for policy-makers implementing the Convention on the Rights of Persons with Disabilities.

ITU has put accessibility into practice at some of its own meetings and workshops by providing accessibility services such as running these meetings online, and adding teleconference and captioning facilities as well as sign-language interpretation. These services have been welcomed by participants — both virtual and on-site — whether with or without disability.

Increasing accessibility

Technical standardization work on accessibility to ICT has progressed within the two main ITU–T Study Groups dealing with that topic: Study Group 16 (Multimedia), the lead study group for accessibility; and Study Group 2 (Operational aspects) for the part relating to human factors.

A Joint Coordination Activity on Accessibility and Human Factors (JCA-AHF) was established in December 2007 and works under ITU–T Study Group 2. To achieve its objectives of promoting awareness, offering advice and assistance, and fostering collaboration, coordination and networking, JCA-AHF has enhanced cooperation with the other ITU Sectors, and reached out to entities throughout the United Nations system.

Meanwhile, technical work on accessibility has also continued within ITU–T Study Groups 9 (Broadband cable and television), 12 (Performance, quality of service

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and quality of experience) and 13 (Future networks).

A new Focus Group on Audiovisual Media Accessibility was created in May 2011 to make audiovisual media accessible for persons with disabilities. This group encourages all stakeholders to become involved in the accessibility work of ITU. It therefore welcomes all standards bodies working in the area, and encourages experts, people with disabilities, academics from universities and research centres, and industry leaders to participate.

Dynamic Coalition on Accessibility and Disability

During the Internet Governance Forum, held in Rio de Janeiro, Brazil, in 2007, ITU initiated the Dynamic Coalition on Accessibility and Disability (DCAD). The Coalition's goal is to make it easier for people with disabilities, nongovernmental organizations and civil society to communicate with the Forum, so that their voices are heard in the key debates on Internet governance. ITU–T provides the support for the DCAD website, acting as secretariat and coordinator.

ITU has provided fellowships to enable many DCAD members to participate in Internet Governance Forums. It has also offered guidance to help make the Forum's meetings and websites more accessible to people with disabilities.

IPv6

Pressure from the exhaustion of Internet protocol Version 4 (IPv4) addresses was on the minds of participants at the World Telecommunication Standardization Assembly in 2008 (WTSA-08), leading them to adopt Resolution 64 on "IP address allocation and encouraging the deployment of IPv6".

Resolution 64 has given rise to a series of ITU activities. For example, ITU's Telecommunication Standardization Bureau (TSB) set up an ITU IPv6 website in early 2010 to offer easy access to an inventory of global IPv6 activities, training events, and materials for tutorials and discussions.

TSB carried out a survey in March-August 2009 on the topic of IPv6 address allocation and encouraging the deployment of IPv6. Two independent studies on IPv6 allocation matters were then undertaken by external consultants, on behalf of ITU. The results of these studies, which dealt with IPv6 address allocation and distribution methods, and with the possibility of introducing economic factors, were reported to the ITU Council in 2009.

The Council instructed the Director of TSB to collaborate closely with the Director of the Telecommunication Development Bureau (BDT) to convene a group, known as the ITU IPv6 Group, open to the membership of ITU–T and ITU's Telecommunication Development Sector (ITU–D).

Then in 2010, the World Telecommunication Development Conference (WTDC-10) adopted Resolution 63 on "IP address allocation and encouraging the deployment of IPv6 in the developing countries". The ITU Plenipotentiary Conference (Guadalajara, 2010) subsequently adopted Resolution 180 on "Facilitating the transition from IPv4 to IPv6". The ITU IPv6 Group was given the task of conducting further activities towards implementing these Resolutions.

Meanwhile, ITU–T Study Group 13 has completed its work on the impact of IPv6 on next-generation networks. The scope of this work covered identification/location split, migration, object mapping, network access and interworking aspects of IPv6. Four new standards (Recommendations) were completed in this area during 2009–2012.

ITU–T Study Group 17 has continued to work both on a "Technical security guideline on deploying IPv6" and on a "Security management guideline for implementation of IPv6 environment in telecommunication organizations".

Standardization with IPv6 in mind

In their standardization work, ITU–T Study Groups are taking care to consider the impact of IPv4 exhaustion and the deployment of IPv6, where applicable. Many ITU–T Recommendations have both IPv4 and IPv6 in their scope. Examples of standards applicable to both IPv4 and IPv6 include Recommendations on topics such as requirements for the support of Internet protocol television (IPTV) services (Y.1901), a framework for

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multicast based IPTV content delivery (Y.1902), an overview of IPTV terminal devices and end systems (H.720), a basic model for IPTV terminal devices (H.721), and home network performance parameters (T Y.1565).

IPv6 is also deployed internally in ITU — its headquarters is connected to native IPv6, and all its websites are IPv6 accessible.

ITU–T has successfully conducted several IPTV showcasing events using ITU's IPv6 connectivity facility. It has also initiated a global IPTV IPv6 testbed project to connect interested ITU members. This will help facilitate IPTV standardization, interoperability testing, and promote IPv6 deployment worldwide. A real-time content stream over native IPv6 using IPTV technology standardized end-to-end by ITU will be demonstrated during WTSA-12.

ITU–T

Meetings of chief technology officers

Dubai is the venue of the fourth meeting (18 November 2012) of high-level industry executives — chief technology officers (CTOs). This builds on the success of three earlier meetings.

The first CTO meeting was held on 6 October 2009 during ITU Telecom World 2009. Participants recognized that the standardization landscape had become too complicated and fragmented, with hundreds of industry forums and consortia in addition to national, regional and international standards developing organizations competing for business. They stressed that it is becoming increasingly difficult for the information and communication technology (ICT) industry to decide where to concentrate their standardization resources. The CTOs therefore called for a review of the standardization landscape to clarify why and what types of standards are needed, to identify the different standards developing organizations along with their roles and capabilities, and to implement improvements to the current standards environment, so that standards developing organizations complement rather than compete with one another.

The second annual meeting was held in Paris on 29 October 2010, and was hosted by Orange. Participants called for immediate steps to streamline and modernize the standards landscape, emphasizing the need for a new approach based

Participants in the fourth meeting of high-level industry executives

on collaboration, cooperation and coordination. Their aim is to improve the efficiency of standards work, reduce the duplication of activities and avoid the drafting of conflicting standards. The ultimate objective is to promote a seamless, interoperable future global communications network. Participants identified ITU as a key standardization organization, along with a number of regional and national standards bodies.

The third annual meeting was held in Geneva on 25 October 2011, during ITU Telecom World. Participants were drawn from leading ICT companies. They pressed ITU to accelerate technical standardization work in the field of e-health. The CTOs believe that any revision of the International Telecommunication Regulations (ITRs) should reflect technology-neutral, high-level principles, and should be stable enough to reduce the need for future updates of the regulations. Having been informed of the effect on networks caused by the earthquake and tsunami in Japan, the CTOs recommended that the Telecommunication Standardization Advisory Group establish a focus group to learn from the experience and develop standards and best practice for network resilience in the event of similar disasters. One crucial area would be a system allowing individuals to notify a victim's friends, family or employer. A second would be a disaster relief guidance mechanism to help victims reach safety.

Cooperation and collaboration

ITU's Telecommunication Standardization Sector (ITU–T) is a leader in global standardization, working with all the main standards developing entities in the area of information and communication technologies (ICT) to achieve the best outcomes for manufacturers, operators, service providers and consumers. This article outlines cooperation and collaboration between ITU–T and its partners since 2009.

Kaleidoscope conferences and academic institutions

The Kaleidoscope academic conferences, organized by ITU–T, aim to identify emerging trends in ICT and prompt the development of international standards. The next Kaleidoscope conference — the fifth such event — will take place from 22 to 24 April 2013 in Kyoto, Japan.

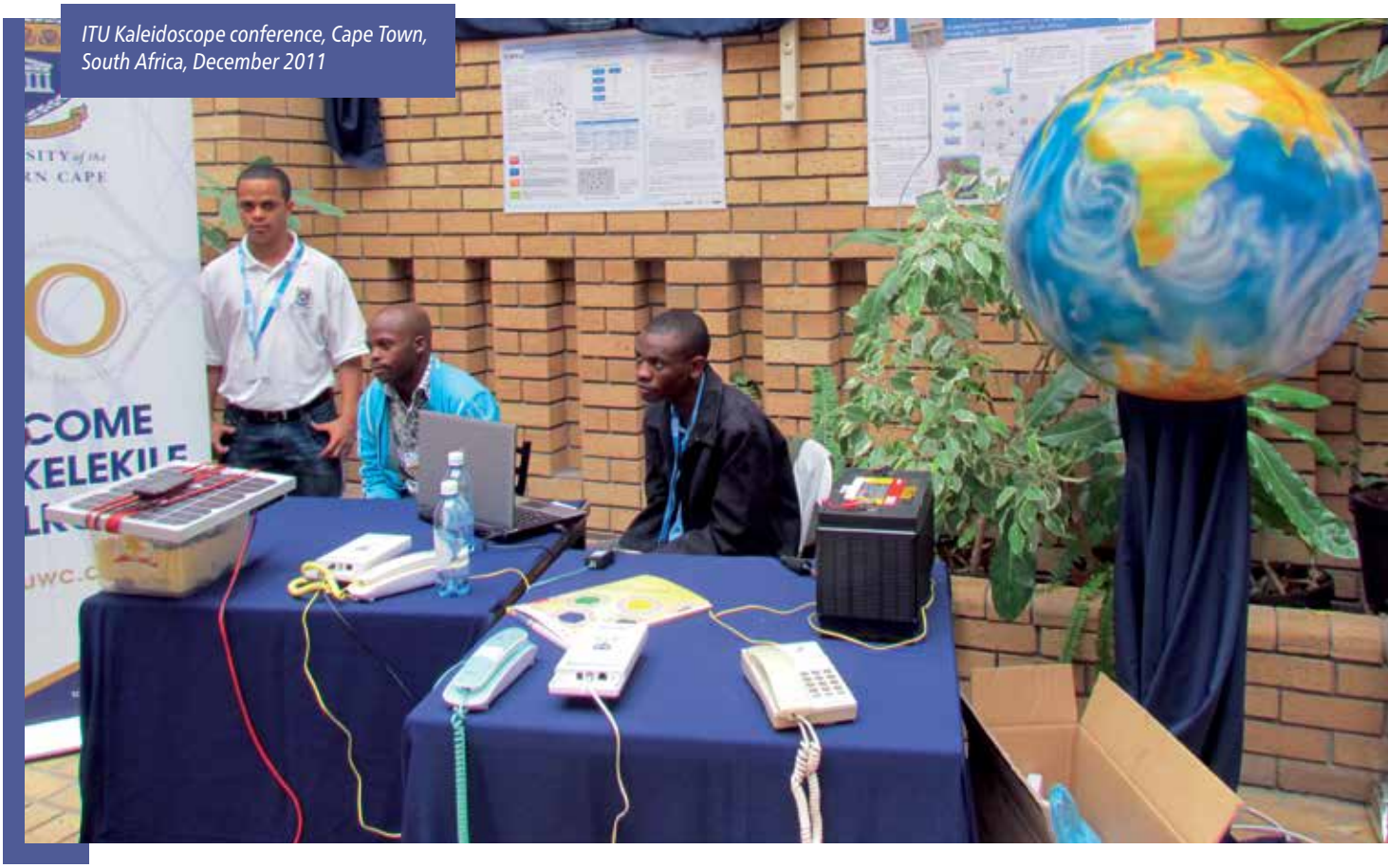
Kaleidoscope 2013, "Building Sustainable Communities", will be hosted by Kyoto University and technically co-sponsored by the Institute of Electrical and Electronics Engineers (IEEE) and its Communication Society ComSoc), as well as the Institute of Electronics, Information and Communication Engineers (IEICE).

Financial support will be provided by Telkom SA. The conference will be organized in partnership with Japan's Ministry of Internal Affairs and Communications, the Telecommunication Technology Committee (TTC), the National Institute of Information and Communications Technology (NICT), Waseda University, all from Japan, along with the Institute of Image Electronics Engineers of Japan (IIEEJ) and the European Academy for Standardization (EURAS).

The fourth Kaleidoscope conference ("The fully networked human? — Innovations for future networks and services") took place on 12–14 December 2011 in Cape Town, South Africa. Follow-up has been valuable for ITU. For example, the University of the Basque Country, Spain, an ITU–T Academia Member, submitted a paper on "Collaborative testing platform for extensive QoS experimental scenarios" to ITU–T Study Group 11.

The third Kaleidoscope conference ("Beyond the Internet? — Innovations for future networks and services") was held in Pune, India, on 13–15 December 2010. The conference hosted a Standards Corner, where a series of standardization tutorials were given, and a Jules Verne Corner. The newly established ITU membership category for Academia generated great interest, and two participating institutions — the Sinhgad Technical Education Society (STES) in India, and Aalborg University, Denmark — were among the first to join.

Kaleidoscope's Jules Verne Corner is dedicated to science-fiction writers — those dedicated technophiles who dare to imagine the potential of today's technology and articulate visions of its implications for our future.



ITU Kaleidoscope conference, Cape Town, South Africa, December 2011

ITU–T

The second Kaleidoscope conference ("Innovations for Digital Inclusion") took place in Mar del Plata, Argentina, from 31 August to 1 September 2009. It analysed technologies, services and applications that would build on next-generation network infrastructure and promote digital inclusion.

The June 2009 issue of IEEE Communications Magazine featured ITU's first Kaleidoscope conference, held in May 2008 under the theme "Innovations in Next-Generation Networks".

Standards education

ITU–T hosted a two-hour Webinar on Standards Education on 30 April 2012, to explore standardization curricula currently offered by different academic institutions and encourage other institutions to offer similar courses.

Following this virtual event, a Workshop on Standards Education, jointly organized by ITU and the Global ICT Standardization Forum for India (GISFI), was held at Aalborg University, on 8–9 October 2012. ITU Academia Members shared details of their standardization curricula, contributing to the establishment of an ITU repository of standards courses.

Another notable development is the establishment in July 2012 of the TSB Director's Ad hoc Group on "Education about Standardization". This group investigates the academic institutions' approach to ICT standardization not only to increase the importance of the subject in their curricula, but also to identify any action that ITU–T can take to assist Academia in this endeavour.

The group includes ITU–T standardization experts, representatives of academia and representatives of other standards bodies. Participation is open to all interested parties, including non-members of ITU, and is free of charge.

In this context, "education about standardization" is related not to technology topics, but rather to providing information to students at undergraduate and postgraduate levels on all aspects of international standards, such as standards development activities, standard strategy planning, and business case studies demonstrating the importance of standards to industry.

Collaboration with other organizations

World Standards Cooperation

ITU together with its World Standards Cooperation (WSC) partners — the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC) — held its first-ever Academic Week in Geneva on 5–9 July 2010 to raise awareness of the importance of including standardization in higher education programmes. The event coincided with the annual workshop of the International Cooperation on Education about Standardization (ICES). As a follow-up, WSC Academic Day 2011 was held in Hangzhou (China) on 29 June 2011, in conjunction with the annual ICES workshop.

WSC Academic Day 2012, held in Bali, Indonesia, on 11 May 2012, followed the ICES Conference on 10 May. Participants discussed the key actions that ISO, IEC and ITU should take to strengthen education about standardization in all countries.

A WSC meeting in February 2012 agreed on a three-year rolling plan for common action regarding World Standards Day, WSC workshops, academia, accessibility, relations with the World Trade Organization (WTO), intellectual property rights, conformity assessment, promotion, and sharing best practices on working methods.

WSC organized four annual editions of the Fully Networked Car@Geneva Motor Show and two WSC Academic Days. In 2011, WSC launched an electronic newsletter.

ITU–T continues to participate with ISO and IEC in the Strategic Advisory Group on Security (SAG-S).

ISO/IEC JTC 1

Two leadership meetings were held jointly by ITU–T and ISO/IEC Joint Technical Committee 1 (JTC 1), in Geneva on 4–5 February 2010 and in San Diego on 6 November 2011.

ITU–T Study Group 16 renewed its cooperation with ISO/IEC JTC 1 SC 29 with the establishment in January 2010 of a joint collaborative team for the next generation of video coding (JCT-VC). This builds on the proven cooperation of the Joint Video Team, which won a Primetime Emmy Award for ITU–T H.264. The new standard, provisionally called "H.HEVC", is expected to be ready by 2013.

In May 2012, the Moving Picture Experts Group (MPEG) was established to develop efficient three-dimensional (3D) video coding extensions applicable to ITU–T H.262 and H.264, and the future H.HEVC.

In June 2012, ITU–T Study Group 13 established two new collaborative teams with ISO/IEC JTC 1 SC 38/Working Group 3 to work on vocabulary and reference architecture for cloud computing. Work started in September, and the approval process is expected to commence at the end of 2013.

Global Standards Collaboration

The Global Standards Collaboration (GSC) brings together the major regional and national ICT standards bodies to support ITU. GSC meetings on 31 October–3 November 2011 in Halifax (Canada), 30 August–2 September 2010 in

The Fully Networked car 2011
The Tesla Roadster outside the International Telecommunication Union, Geneva, Switzerland

ITU–T

Beijing (China) and 13–16 July 2009 in Geneva (Switzerland) each attracted about 100 delegates.

The IEEE ComSoc continues its technical sponsorship of the Kaleidoscope event. Articles featuring ITU–T standardization work and the Kaleidoscope conferences have been published in ComSoc's prestigious IEEE Communications Magazine.

Two joint ITU–T/IEEE workshops were held: "The Future of Ethernet Transport" (28 May 2010, Geneva); and "100 G and beyond in ITU–T and IEEE" (18 September 2011, Geneva). IEEE and ITU–T are collaborating to develop 40 and 100 Gbit/s Ethernet. Broadly speaking, ITU–T identifies requirements of network operators and develops functional specifications, while IEEE works on detailed design specifications to allow implementation.

Internet Governance Forum

ITU–T leads two dynamic coalitions in the Internet Governance Forum (IGF), one on accessibility and disability and the other on Internet and climate change. Both

these coalitions met during IGF 2011 (26–29 September 2011).

In 2011, the Deputy Director of ITU's Telecommunication Standardization Bureau (TSB) represented ITU–T as Technical Liaison on the Board of the Internet Corporation for Assigned Names and Numbers (ICANN). The non-voting seat rotates among ITU–T, the World Wide Web Consortium (W3C) and the European Telecommunications Standards Institute (ETSI). ITU–T had also a seat on the ICANN Nominating Committee in 2011.

Asian standards developing organizations

ITU signed a Memorandum of Understanding with key Asian standards developing organizations — the Association of Radio Industries and Businesses (ARIB), a Japanese research centre, China Communications Standards Association (CCSA), the Republic of Korea's Telecommunications Technology Association (TTA) and TTC — with the aim of adopting global ITU standards and related national standards.

A leadership meeting between the Internet Engineering Task Force (IETF) and ITU–T took place on 2 August 2010.

European Telecommunications Standards Institute

A revised Memorandum of Understanding between ITU and ETSI was signed in July 2012, merging ETSI's 2000 accord with ITU–T, and 2002 understanding with ITU's Radiocommunication Sector.

United Nations Office on Drugs and Crime

ITU and the United Nations Office on Drugs and Crime (UNODC) signed a Memorandum of Understanding in May 2011 on assisting Member States to mitigate the risks posed by cybercrime. The objective is to ensure secure use of ICT.

World Trade Organization

ITU was admitted as an observer to the Technical Barriers to Trade Committee of the World Trade Organization in 2010. TSB participates in the relevant meetings, in particular those relating to international mobile roaming.

European Patent Office

ITU and the European Patent Office signed an agreement in May 2011 to share information to help improve the quality of patents.

World Meteorological Organization and Intergovernmental Oceanographic Commission of UNESCO

The Joint WMO-IOC Technical Commission for oceanography and marine meteorology is working with ITU to explore the use of undersea cables for ocean observations for tsunami and climate monitoring.

ITU

Participants in the ITU events in Tashkent

ITU events in Tashkent

Tashkent (Uzbekistan) was the venue of three ITU regional events, held between 2 and 6 April 2012, for member countries of the Regional Cooperation Council (RCC). One was a forum on "Bridging the standardization gap for RCC countries". The two others were regional preparatory meetings for the World Telecommunication Standardization Assembly (WTSA-12) and the World Conference on International Telecommunications (WCIT-12). This article highlights views from these events.

Some 70 representatives of ITU Member States, Associates and Academia from the Commonwealth of Independent States (CIS), including experts from Uzbekistan, Azerbaijan, Bulgaria, Ukraine and the Russian Federation, participated in the events.

At the opening of the forum on "Bridging the standardization gap for RCC countries", it was noted that the potential of the ICT sector could allow fundamentally new forms of interaction and information sharing, optimize State governance processes, and accelerate economic reform and development.

Uzbekistan, the host country of the events, is taking steps to promote wide application of international standards nationally, and has prepared a number of proposals for WTSA-12 and WCIT-12.

ITU

The forum discussed issues ranging from the development of interoperable international standards, bridging the digital divide between developed and developing countries to the expansion of international cooperation to that end. These issues were covered in addresses by various speakers including Malcolm Johnson, Director of the ITU Telecommunication Standardization Bureau, Nurudin Mukhitdinov, Director General of the RCC Executive Committee, and Yury Grin, Deputy Director of the ITU Telecommunication Development Bureau.

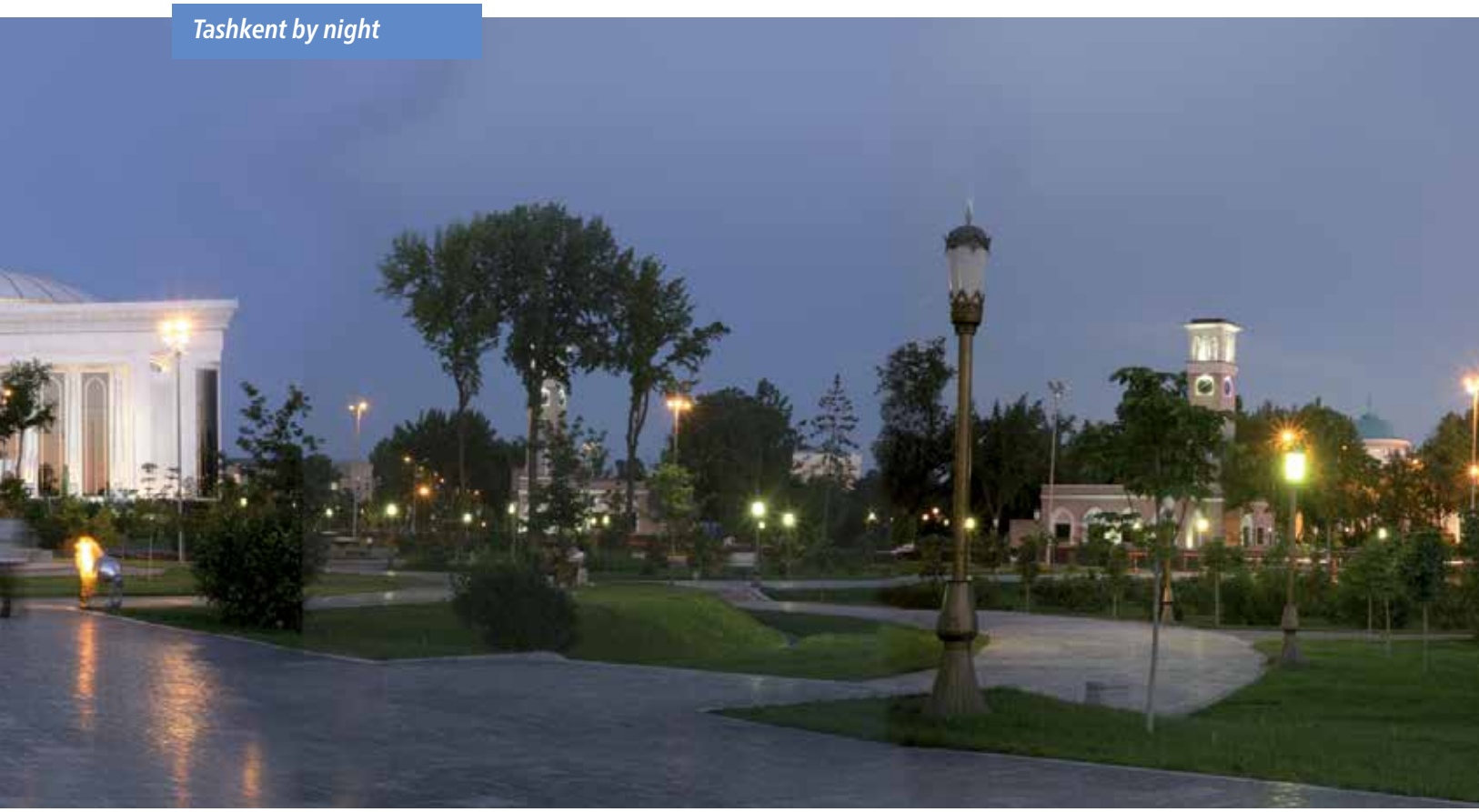
Another important topic was making broadband access universal as an aspect of the development of next-generation networks (NGNs) in Uzbekistan.

In the course of the discussions participants expressed their views on the revision of the International Telecommunication Regulations (ITRs) and the evolution of NGNs. Particular attention was paid to the convergence of office and mobile applications, IP-based platforms, multiple access networks, and the related business models.

The overall aim of regional preparatory meetings for major ITU conferences is to coordinate views and positions on issues of particular importance and produce and put forward coordinated regional proposals to those conferences.

According to participants, holding the events in Tashkent has enabled them to develop common approaches to a number of issues relating to standardization and further promotion of modern ICT, share experience, and coordinate and outline future plans for international cooperation. These events are also expected to breathe new life into efforts to develop Uzbekistan's telecommunication sector.

Day two saw the RCC Regional Preparatory Meeting for WTSA-12 review the main outcomes of WTSA-08 (Johannesburg, 2008), notably its Resolutions and Recommendations with a view to their updating at WTSA-12. Particular attention was paid to pressing



Tashkent by night

issues (from the region's perspective) on the Assembly's agenda, including changes to the structure of study groups.

Day three was devoted to the RCC Regional Preparatory Meeting for WCIT-12, the purpose of which was to coordinate positions and prepare regional proposals for the conference. Its main task was to consider the current work needed to revise or update the ITRs, which were adopted in 1988. One important task is to establish the relationship between the ITRs and the ITU basic texts (the Constitution and Convention).

Around 60 experts from CIS countries, directors and experts from the ITU Sectors, and members of the RCC Executive Committee, participated in the work of the regional preparatory meetings for WTSA-12 and WCIT-12.

Holding the regional preparatory meetings for WTSA-12 and WCIT-12 in Uzbekistan enables the country to promote its interests in the ITU arena. There was discussion of the improvement and introduction of telecommunication standards in the region, and participants were able to study Uzbekistan's experience in the area of standardization and share experience with other countries in the region.

These events also enabled Uzbek specialists, including members of the faculty of Tashkent University of Information Technologies (TUIT), to share experience with leading ITU and CIS experts on various telecommunication development and standardization issues.

The views of participants

Mr Johnson noted that forums had also been held in Tashkent four years earlier and since then Uzbekistan had made great strides in ICT development. He was pleased that in 2011 Tashkent University of Information Technologies had become an Academia member of ITU, which demonstrated the institution's great potential.

Referring to the country's rich historical and cultural heritage, he noted that Samarkand, Bukhara

and Khiva had made a lasting impression and he had been struck by the scale of Mustaqillik square in the centre of Tashkent and the marvellous architecture that combined eastern colour and modern design in the city's urban development.

According to Nazim Dzhafarov, Head of the Telecommunication Sector of the Ministry of Communications and Information Technologies of the Azerbaijani Republic, all the participants in the forum recognized the need to develop new approaches to ICT standardization issues.

NGNs could allow an unlimited array of telecommunication services of guaranteed quality and global user mobility, but there were difficulties in promoting them. These difficulties were expected to be reflected in the regional position at WTSA-12.

The main idea behind NGNs was to build a single network infrastructure to provide any type of service, which essentially meant being able to handle any form of traffic over a single network infrastructure. However, that transition was progressing unevenly in the CIS countries — partially in some places, rapidly in others. Much also depended on the level of staff training. He fully endorsed Uzbekistan's policy, which paid particular attention to training future specialists through the creation of a specialized university with branches across the country. It was no accident that in recent years Uzbekistan had achieved such significant results in the ICT sphere. Heavy investment in the sector, effective international cooperation and the creation of a competitive environment had stimulated the development of the infrastructure which today underpinned the provision of world-class services.

"This is my second visit to Uzbekistan and I have seen with my own eyes how rapidly ICT are developing here," commented Viktor Katok, Director of the Department of Scientific and Technical Policy of *Ukrtelecom*.

He praised the tremendous growth of Uzbekistan's ICT sector. The production capacity of enterprises has been growing rapidly and the latest telecommunication methods and technologies are being introduced. The country has laid fibre-optic cable and digital radio-relay links along long-distance inter-city and intraregional communication trunk lines, implemented modernization efforts, installed the latest television and radio transmitters, and introduced a CDMA-standard wireless radio access system in some regions.

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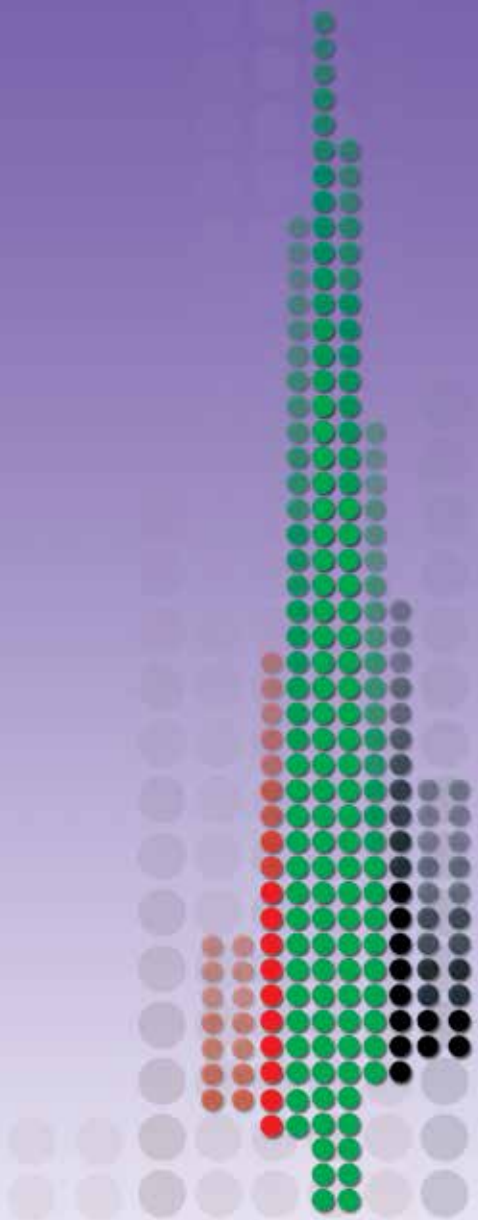
ITU TELECOM WORLD '13

World Conference on International Telecommunications



WCIT2012
World Conference on International Telecommunications
Dubai, UAE

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World Conference on International Telecommunications 2012 — An overview

From Melbourne to Dubai

Why the International Telecommunication Regulations matter

The World Conference on International Telecommunications 2012 (WCIT-12), to be held in Dubai from 3 to 14 December 2012, will review the International Telecommunication Regulations (ITRs) — a treaty that is the basis of today's connected world. The ITRs underpin how we communicate with each other by phone or computer, with voice, video or data, and across the globe. They were agreed in 1988 at the World Administrative Telegraph and Telephone Conference in Melbourne, Australia, and came into force in 1990.

Full texts of the "Background Briefs" from which these highlights are excerpted and adapted are available at http://www.itu.int/en/wcit-12/Pages/WCIT-backgroundbriefs.aspx

The ITRs set out principles for ensuring that networks can connect with each other smoothly, and that international services will be offered in a fair and efficient manner. They comprise ten articles dealing with such matters as cooperation among national administrations, giving priority to emergency telecommunications, and charging for traffic exchanged between carriers in different countries. The ITRs

laid the foundation for privatization, competition and deregulation that created the conditions for growth in information and communication technologies (ICT), including the Internet, that we see today.

But the environment has changed dramatically since 1988. Back then, the three pillars underpinning telecommunications were time, distance, and location. These have all become less important in terms of global services today. Governments have re-evaluated their policies and much of the sector has been privatized and liberalized.

There is increasing use of networks and applications based on the Internet protocol (IP), and there are security concerns. Technological convergence has blurred the distinction between voice and data traffic, and even inexpensive mobile phones are sophisticated computers. Data volumes are rising and some believe that there is insufficient growth in the infrastructure needed to carry them.

How is new infrastructure to be expanded to cope with booming demand (especially in developing countries), and who should pay for its expansion and its use?

The preparatory process for WCIT-12 was led by a working group of the ITU Council open to the Union's 193 Member States and the more than 550 Members of ITU's three Sectors — Radiocommunication, Telecommunication Standardization, and Telecommunication Development. Input has also been welcomed from the more than 200 Associates and academic institutions involved in ITU's activities, as well as many other entities that have participated in the series of information sessions and regional preparatory meetings held around the globe in 2012.

Most of the proposed changes or additions to the ITRs can be summarized under the following headings: Fundamental right of access to communications; security in the use of ICT; protection of critical national resources; international frameworks; charging and accounting, including taxation; interconnection and interoperability; quality of service; and convergence.

International mobile roaming — what to do about "bill shock"

When the ITRs were agreed in 1988, mobile phones were a rarity, and devices such as mobile tablet computers were just a dream. Now, though, we live in a world of mobile connectivity that uses the Internet as well as traditional networks, and sends videos alongside voice. The question is, can we also achieve something closer to a borderless world when it comes to the management and pricing of that connectivity? In other words, will we be able to "roam" on our mobiles from country to country, simply, easily and without experiencing "bill shock"? International cooperation is needed to achieve effective solutions to these challenges and make bill shock a thing of the past.

Proposals on international mobile roaming include adding provisions to the regulations to ensure transparency of end-user prices for international mobile services, and that users receive full information promptly whenever they cross a border. It has been suggested that transparency could lead to greater competition, with potential benefits for consumers. Another proposed provision would ensure that prices are based on either the actual costs for the service provider, or on prices charged in the user's home country, or on those charged to customers in the visited country.

In the short term, some proposals could reduce the profits of mobile operators. They gain much revenue from roaming services, which can be used not only to keep them in business, but also to expand infrastructure to meet vastly growing demand. However, while bill shock exists, people may decide to leave their phones at home when travelling abroad. Some believe that business opportunities could be expanded with the measures that have been suggested. Data roaming in particular is a booming market, and is likely to become even larger as cloud services take hold.

The division between fixed and mobile services is growing blurred, just as voice and data services tend now to be carried on a single platform. Lower prices for international mobile calls, as for fixed-line calls, would reflect these changes. And if lower prices lead to more use of

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roaming services, higher overall revenues might result that would also encourage investment in the communication networks and applications that are, nowadays, central to social and economic progress.

Convergence

When the ITRs were agreed, there was a clear distinction between different services (phone, video and so on), as well as the means of delivering them. You only ever received voice calls or faxes down the telephone line. Computers mostly had their own networks, and broadcasting was another separate world. Since then, the convergence of technologies, and the appearance of new ones, has changed the landscape dramatically — and the ITRs might need to be changed to reflect this.

There is no single definition of convergence. However, a key innovation is the transformation from circuit-based telecommunication networks to packet-based ones using IP: so-called next-generation networks (NGN). The "vertical" structure of independent networks is evolving into a "horizontal" structure based on IP that can deliver many kinds of content through a single platform. This has profound implications for the market, regulators, and ultimately the expansion of communications to people everywhere.

The global boom in mobile phone and mobile broadband subscriptions is driving development and reform. Consumers around the world have moved far beyond viewing their handheld devices as just phones on which they speak to other people.

Proposals concerning convergence are being put forward. Some relate simply to updating the language of the regulations. Other proposals seek to make substantive changes to accommodate convergence, and refer to the need to incorporate "technology neutrality" into the ITRs; that is, dealing evenhandedly with different technologies that offer similar services.

Interconnection and interoperability

The principles set forth in the ITRs (notably in Article 1.3) have achieved much greater global significance as communication technologies have evolved to become more complex, capable and integrated into so many aspects of social and business life.

One of these fundamental principles is that of "interconnection and interoperability" — ensuring that telecommunication systems and equipment in different countries can connect and work with each other.

But new equipment and systems are appearing every day. Because of the ever-changing technological and operational environment, ensuring interoperability is a never-ending task.

Promoting interoperability is one of ITU's strategic goals. And there is consensus among the ITU membership that interoperability is of prime importance — but how to make it happen is not always clear, given today's complex mix of de jure, de facto and proprietary technical standards for systems and equipment. Even when two networks are connected, it does not guarantee that every device or service will be able to run smoothly on both.

Numerous players are involved in determining interoperability, with differing needs and agendas. Specific capabilities need to be identified in particular players, as well as potential areas for collaboration among the many interests — public and commercial — that are involved. WCIT-12 could be where that collaboration is strengthened, perhaps by simply updating the current language of the regulations.

Protecting critical national infrastructure

Each nation has critical resources. As well as basics such as energy and food reserves, these include the infrastructure on which a society depends — ranging from power lines to water supplies and transport links. Among these resources are communication systems. And with the increasing reliance on IP-based networks in all sections of an economy, there have been national efforts to include a new term, "critical information infrastructure," in many national legislations.

ITU's Constitution and Convention acknowledge the right of a member country to protect its telecommunications and related infrastructure, while taking into consideration the implications of the country's actions upon the global system.

The current ITRs do not explicitly refer to protection of critical resources or information infrastructure, but they do cover the concept. In particular, Article 9 states that "technical harm" should be avoided to the operation of the telecommunication facilities of other countries.

Various proposals have been made to modify or increase the scope of such provisions in the ITRs — for example to include avoidance of "financial harm" — when reviewing the treaty at WCIT-12. And proposed provisions on preventing the misuse of numbering resources could also be considered part of protecting critical infrastructure.

Security

Public use of the Internet was in its infancy in 1988, and the ITRs compiled in that year did not contain explicit provisions on security. But they did include (in Article 9) a reference to avoiding "technical harm", added in response to one of the first pieces of malware, the Morris worm, that was circulating at the time. In the decades since then, network security has grown enormously in importance and will be considered as the ITRs are reviewed. There are proposals to add or amend articles in the treaty to include security-related elements, including measures against spam.

The number and sophistication of cyber-attacks are increasing, at the same time as our dependence grows on the Internet and other networks for critical services and information. According to the security company McAfee, 2011 saw the largest ever number of discovered threats. There are said to be at least 70 million different pieces of malware in circulation worldwide, and smartphones have become a vehicle for their dissemination. Analysts report that at least 70 per cent of e-mails are spam.

Meanwhile, smart power grids, cloud computing, industrial automation networks, intelligent transport systems, e-government and electronic banking — to name just a few new types of infrastructure — are becoming interconnected. Failure in one can affect others. Alongside

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greater convenience and efficiency lies greater vulnerability to cyber-attack.

Telecommunication origin identification

Through the telecommunication origin identification (TOI) system, it is possible to authenticate who has access to a service, find the caller's location, or trace malicious calls. The system allows "call-back" services to be provided, and calls to be logged for accounting purposes. TOI technology is also important in providing emergency services. However, the system is hampered, not only by criminals wanting to hide their traces, but also when information on a message's origin is suppressed for commercial reasons.

It has been proposed that a provision should be added to the ITRs to ensure that operators show the number of who is calling. An ITU technical standard (ITU–T E.157) provides general principles for revealing callers' numbers and their origins.

Some service providers might misuse phone numbers to inflate their revenues. In one common form of misuse, known as "short stopping", calls that terminate within the caller's own country are routed through a high-cost destination abroad. This inflates costs for consumers. Operators trying to block this practice may interfere with legitimate access to phone numbers in the foreign country. Some types of misuse are not currently illegal in all countries, and the ITRs might be amended to change that.

Accounting rates

Under the traditional system that was prevalent when the current ITRs were negotiated in 1988, when telephone traffic was exchanged between carriers in different countries, a phone operator that sent more traffic than it received had to make "settlement payments" to the receiving company. These payments were calculated bilaterally with a formula called an "accounting rate," which is established according to principles set out in the ITRs, complemented by ITU standards (Recommendations).

Accounting rates are still used in some parts of the world, but they are no longer widely used, and most traffic today is billed on the basis of bilateral commercial agreements that fall under the "special

arrangements" provision (Article 9 of the ITRs).

Indeed, advances in technology have led more and more traffic to bypass the traditional system by using the Internet (through VoIP services), or by taking the cheapest route for an international call — not necessarily the most direct one. How to reform the accounting system to reflect these changes has been studied at ITU since 1991, involving industry players alongside representatives of more than 80 countries. Various proposals on accounting matters have been gathered for WCIT-12 to consider. These range from leaving the current provisions unchanged, to adapting them to give greater weight to ITU Recommendations, to replacing the current detailed provisions with general principles related to those agreed at the World Trade Organization, to deleting the current provisions on the grounds that they are no longer appropriate in a world of liberalized telecommunications.

Taxation

Governments need tax revenues in order to provide public services and infrastructure — but who and what should be taxed, and how much? Telecommunications has often been seen as a healthy sector that can tapped; however, its central role in supporting economic growth means that taking too much in tax could have negative effects on the wider environment. The evidence suggests that the more a society has access to ICT, the more it flourishes.

Many administrations are beginning to share this view and are reducing or eliminating taxes on equipment (such as handsets) or prices for services, influencing how many people can connect and make full use of what is offered. In other countries, however, taxes are being imposed anew.

Tax authorities, regulators and operators need to work together and decide what levels of tax would be most productive. They could also look at whether, in addition, targeted incentives could be used to stimulate the provision of more advanced services, such as broadband.

Regarding international services, WCIT-12 will review Article 6, which mentions tax, and decide whether it should be altered. A related topic is double taxation: the liability of telecommunication operators to pay tax in more than one country on the same asset or service because they are involved in cross-border business and investment. These operators might also find themselves trying to obey conflicting rules and definitions of different tax authorities.

The proposals on this topic for the ITRs include revising the current text to clarify that it is intended to prevent double taxation, or to revise it in order to limit certain types of tax, especially on incoming international traffic. Other views range from leaving the current text unchanged to deleting it entirely.

Energy efficiency

Proposals have been made to add provisions to the ITRs saying that countries should cooperate to encourage operators and the ICT industry to adopt measures that lessen the use of energy and natural resources by ICT networks, and reduce waste produced by the sector. These measures would include adopting best practices and international standards for energy efficient equipment and networks.

One proposal lists as examples for cooperation best practice on take-back schemes, recycling management facilities and disclosure (for example, the responsibility of a manufacturer to mark the origin of its material), as well as (eco-) labelling schemes.

All industrial sectors — and communities — need to move towards sustainable production and consumption. By recognizing how ICT can support this progress, WCIT-12 could make a forward-looking contribution to worldwide efforts to face this major challenge of our time.

Quality of service and "net neutrality"

Traffic management has always been in use, in particular to give preference to emergency communications. But there is concern about certain approaches that affect the quality of service provided to consumers. For example, particular types or sources of traffic might be favoured above others.

ITU

Agreements might be struck between Internet service providers (ISPs) and companies that offer applications or content, so that better quality of service (QoS) is given to their transmissions over a particular network, leaving other customers with less. Then there are the so-called "over-the-top" (OTT) services that run through the networks "on top" of the basic provision of Internet access. Operators might seek to charge for reserving a percentage of capacity for these services — which is then not available for general access to the Internet.

These developments could make it more difficult, or slower, for users to access certain websites or online services. So should operators of IP networks aim to generate revenues by offering higher QoS at a higher price, even if this has an impact on the average customer?

There are proposals to revise the ITRs in order to respond to these changes in technology and the marketplace. In particular, it has been proposed to replace "minimum quality of service" in Article 4.3 with "satisfactory quality of service", while administrations should ensure that there is transparency in this area so consumers know exactly what they are getting. At present, ordinary users of the Internet might not know whether their connections are slow because of traffic congestion, or because of intentional techniques employed by an operator or ISP.

Making ICT accessible to people with disabilities

It is estimated that more than one billion people — around 15 per cent of the world's total — are living with some type of disability, physical or cognitive. A high percentage live in developing countries, while the number of elderly people is rapidly rising in populations elsewhere. To achieve a truly inclusive information society, everyone must be able to use ICT with confidence. This means that improving the "accessibility" of ICT must be high on the agenda for providers of services and equipment.

It has been proposed that a new article covering this challenge should be added to the ITRs. The new provision would encourage national governments to provide global telecommunication and

ICT services based on technical standards that ensure accessibility.

Communications as a human right

Several regional and international treaties define freedom of expression as a human right. Access to communication services is not identified as a specific human right by itself, but the treaties cover many dimensions of communication, including the media, access to information, and the influence of ICT. Legitimate restrictions on communication are also defined in some treaties. Provisions on all these aspects are contained in the International Covenant on Civil and Political Rights, in particular in its Article 19. That Covenant was adopted by the United Nations General Assembly in 1966 and is part of the Universal Declaration of Human Rights.

On ICT in particular, a comment on the Covenant by the United Nations Human Rights Committee in 2011 says that signatories "should take account of the extent to which developments in information and communication technologies, such as Internet and mobile based electronic information dissemination systems, have substantially changed communication practices around the world. There is now a global network for exchanging ideas and opinions that does not necessarily rely on the traditional mass media intermediaries. States parties should take all necessary steps to foster the independence of these new media and to ensure access of individuals thereto."

The ITRs contain provisions regarding the right to communicate. In particular, Article 3.4 states that "subject to national law, any user, by having access to the international network established by an administration (or recognized private operating agency), has the right to send traffic. A satisfactory quality of service should be maintained to the greatest extent practicable."

The right of the public to access international telecommunication services is also recognized in ITU's Constitution, which prevails over the ITRs in case of discrepancy. The provisions of Articles 33 and 34 of the ITU Constitution are consistent with those of Article 19 of the UN Covenant. Thus the ITRs cannot restrict freedom of communication beyond what is provided in Article 19 of the UN Covenant.

The time has come to pave the way for the online broadband world of tomorrow

The right to communicate has been central to ITU's mission since its foundation in 1865. Many feel that the time has now come to build on the success of the existing ITR treaty and pave the way for a fully inclusive information and networked society over the next decade: one that ensures that the entire world's people can gain equitable and affordable access, not only to traditional phone services, but also to the online broadband world of tomorrow.

Obituary

Remembering Professor John Larmouth

ITU regrets to announce the death of Professor John Larmouth (1941–2012), a great contributor to the work of ITU's Telecommunication Standardization Sector (ITU–T) and a lifelong proponent of the virtues of international standardization.

Professor Larmouth embarked on his career in computing at Cambridge University where he earned a PhD in Pure Mathematics and Computing. After a further ten years at Cambridge as a researcher and technical officer involved in running the university's computing service, Professor Larmouth moved to the University of Salford, where he founded and directed the university's Information Technology Institute, retiring as Professor Emeritus of Telematics.

Alongside his academic career, Professor Larmouth's active involvement in international standardization began in 1978 and continued for the rest of his life. In 2001, he founded Larmouth Training & Protocol Design Services Ltd, a consultancy specializing in Abstract Syntax Notation One (ASN.1), biometrics, and computer protocol design using ASN.1.

For the past 14 years, Professor Larmouth served as a Rapporteur in ITU–T Study Group 17 (Security), playing a crucial role in the successful development and implementation of ASN.1, particularly in the notation's support for Extensible Markup Language (XML). He worked as the Editor of ITU–T Recommendations, and of International Organization for Standardization (ISO) and International Electrotechnical Commission (IEC) International Standards, including ITU–T X.1082, IEC 80000-14 and several standards in ISO/IEC Joint Technical Committee 1's Subcommittee 37 (Biometrics). He was Rapporteur and Convenor of the joint work on ASN.1, object identifiers (OIDs) and associated registration in ITU–T Study Group 17 and ISO/IEC Joint Technical Committee 1's Subcommittee 6 (Telecommunications and information exchange between systems). His leadership in this effort included authoring the 2010 ITU Handbook on "Object Identifiers" and their registration authorities.

The success of ITU–T's series of ASN.1 standards was in large part due to Professor Larmouth's prowess as a writer and editor of technical standards, with the adoption of this series owing a great deal to his role in increasing the clarity of successive editions. His book, "ASN.1 Complete", is a comprehensive, authoritative work on the subject.

Professor Larmouth is survived by wife, Carol, and twins, Sarah-Jayne and James. He will be sorely missed by all those who had the pleasure of working with him.

Official Visits

During September 2012, courtesy visits were made to ITU Secretary-General Dr Hamadoun I. Touré by the following ambassadors to the United Nations Office and other international organizations in Geneva, and other important guests.

Luis Gallegos Chiriboga, Ambassador of Ecuador and Dr Touré

Seokyoung Choi, new Ambassador of the Republic of Korea and Dr Touré

Houlin Zhao, Deputy Secretary-General of ITU, representing the Secretary-General, and Ugljesa Zvekic, Ambassador of Serbia

Houlin Zhao and Worapat Tiewthanom, Deputy Permanent Secretary of Thailand's Ministry of Information and Communication Technology

All photos are by Rowan Farrell/ITU.

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