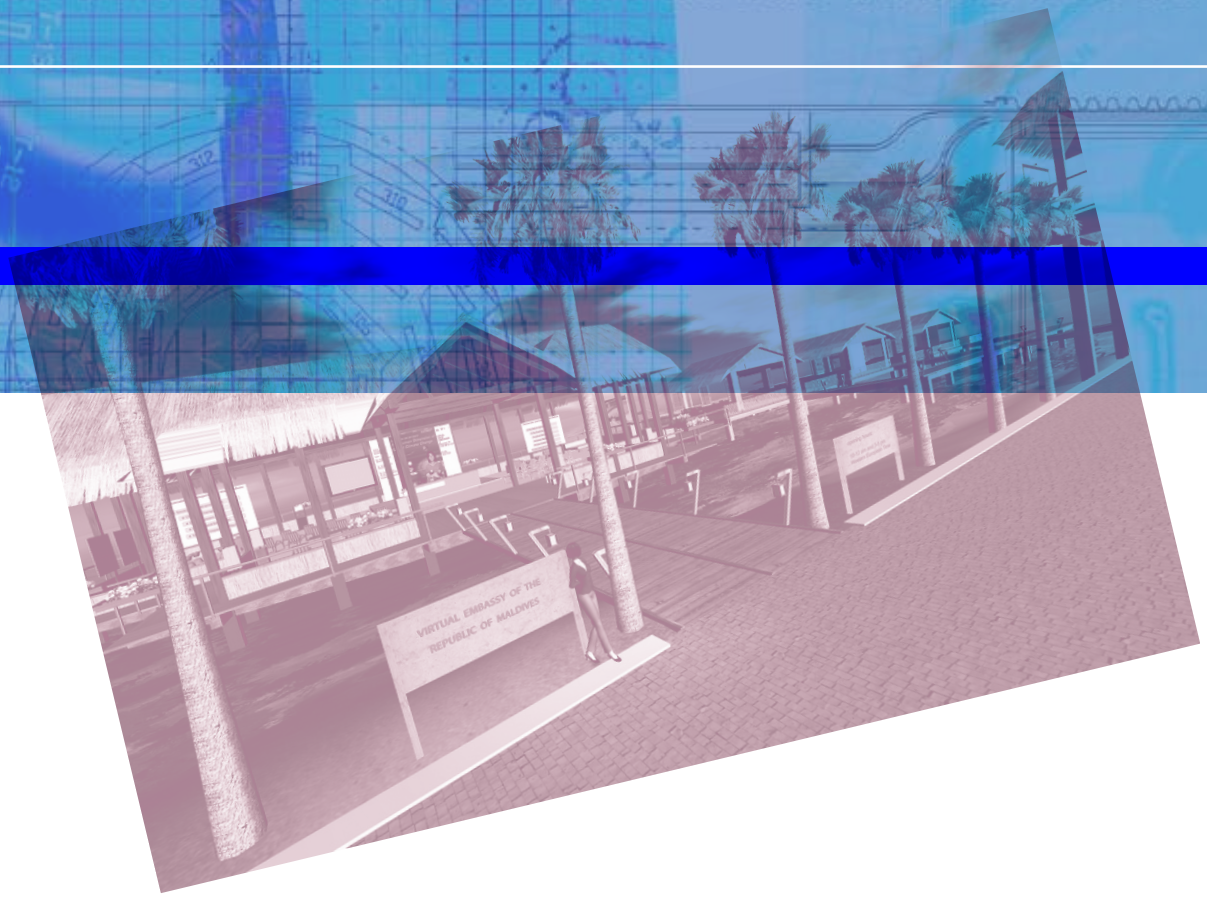
International Telecommunication Union

Remote Collaboration Tools

ITU-T Technology Watch Report #5

March 2008



Telecommunication Standardization Policy Division
ITU Telecommunication Standardization Sector

ITU International Telecommunication Union

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"Increase productivity, save time and money while reducing your company's carbon footprint"; this is the ambitious sales pitch for a new family of tools that promise to offer the 3Cs – communication, collaboration and coordination – without the requirement for physical travel. This report describes how Remote Collaboration Tools can facilitate collaboration with colleagues, and support businesses in overcoming the geographical limitations of everyday work. For developing countries, in particular, remote collaboration tools can be an important step towards bridging the standardization development gap and the wider digital divide.

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ITU-T Technology Watch Reports are intended to provide an up-to-date assessment of promising new technologies in a language that is accessible to non-specialists, with a view to:

- Identifying candidate technologies for standardization work within ITU.
- Assessing their implications for ITU Membership, especially developing countries.

Other reports in the series include:

#1 Intelligent Transport System and CALM
#2 Telepresence: High-Performance Video-Conferencing
#3 ICTs and Climate Change
#4 Ubiquitous Sensor Networks
#5 Remote Collaboration Tools
#6 Technical Aspects of Lawful Interception
#7 NGNs and Energy Efficiency

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This report was prepared by Martin Adolph (tsbtechwatch@itu.int) with Dr Tim Kelly.

The opinions expressed in this report are those of the authors and do not necessarily reflect the views of the International Telecommunication Union or its membership.

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The Technology Watch function is managed by the ITU-T Standardization Policy Division.

Remote Collaboration Tools

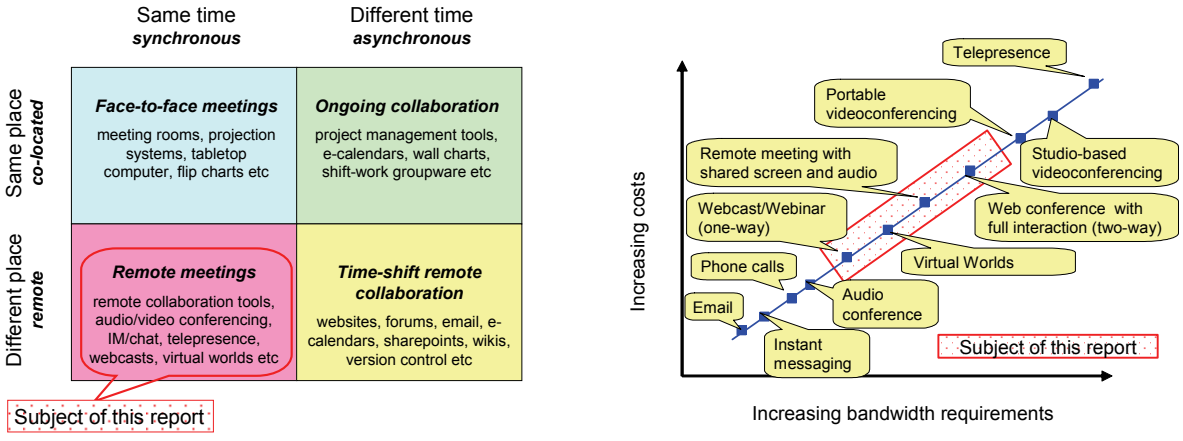
1 It's good to collaborate

"*Increase productivity, save time and money while reducing your company's carbon footprint*"; this is the ambitious sales pitch for a new family of tools that promise to offer the 3Cs – communication, collaboration and coordination – without the requirement for physical travel. For ITU-T, whose basic mission is to encourage collaborative work among a global membership on the development and adoption of international standards, remote collaboration is a daily necessity. ITU-T could therefore be expected to be an early user of such systems (see Annex), but it must also rise to the standards-making challenge of making them globally interoperable and effective.

Remote collaboration tools are one species of "groupware" – collaborative software that enables Computer-Supported Cooperative Work (CSCW). [1] Like many emerging markets, this set of tools has acquired many different names[2], some of them proprietary, as well as unclear boundaries between applications. But, for the purposes of this report, the term "**remote collaboration**" is used to describe those ICT-based tools and services that enable collaborative work to take place between individuals in multiple locations.

As shown in Figure 1 left chart, it is possible to segment the market for groupware tools according to whether or not the collaboration is in real-time, and whether in the same or different locations. This report, the fifth in the series of ITU-T Technology Watch Briefing Reports, deals with remote collaboration tools (bottom left quadrant), their features, applications, relevant standards and the impact they may have.

Figure 1: Placing remote collaboration in the continuum of groupware tools
Segmented by time and place (left chart) and by bandwidth / cost (right chart)



Source: Left chart, adapted from Wikipedia (www.en.wikipedia.org/wiki/Image:Cscwmatrix.jpg). Right chart, ITU

The market can be further segmented by price and bandwidth requirements, which tend to rise in proportion to each other (see Figure 1, right chart). At the bottom end of the market are low-bandwidth tools which are effectively free of charge to the user, and/or advertising-funded (e.g., email, instant messaging). At the high end of the

market are high-performance video conferencing tools, such as telepresence (the topic of *Briefing Report #2*), which offer the experience of "Being there, without going there".[3] The subject of this report, on the use of remote collaboration tools, lies between these two extremes and encompasses a range of technologies from simple webcasts of meetings to fully-interactive web conferences, but without the requirement for a dedicated leased line or a purpose-built studio. Although the focus of this report is on business use, the market is increasingly being influenced by developments in the entertainment sphere, especially the development of virtual worlds such as Second Life (see Box 1) and massively multiplayer online role-playing games (MMORPGs).

Box 1: Collaboration in virtual worlds

Virtual worlds provide a novel form of online collaboration and are quickly moving from the entertainment world of MMORPGs to the business world of meetings and presentations. A good example is provided by Second Life – an Internet-based three-dimensional virtual world which claims some 12 million users, or "residents" – which permits interaction through moving avatars, instant messaging and VoIP.4 Residents can explore, socialize, participate in individual and group activities, create and trade items (virtual property) and services with one another. The rapidly increasing "population" of Second Life represents an important audience for marketing, business-to-business communication, and even diplomacy.

The Maldives was the first country to open a *Second Life* embassy, allowing visitors to talk with a computer-animated ambassador about visas, trade, or sustainable development in the Maldives[5] on Diplomacy Island, established by DiploFoundation. The World Economic Forum has also used *Second Life* as a way of bringing its annual Davos Forum to a wider audience[6]. Not surprisingly, an increasing number of real-world companies, ranging from media outlets like Reuters and MTV, car manufacturers like Mazda and Pontiac, and technology-companies, such as Cisco, Dell and IBM have opened their virtual news channels and offices in *Second Life*.[7] Applications include presenting and selling products, providing customer training, and interacting with customers and business partners. Will we see a future ITU conference taking place in *Second Life*? Why not.

Note: Adapted from various sources.
Image source: www.newsroom.cisco.com/images/CES_second_life_KoolAid_003.jpg.

2 The three Cs

Remote collaboration is not only about technology but rather is an interdisciplinary field covering also psychology, artificial intelligence, sociology, organizational theory, anthropology, and other factors that influence the design of products. The so called 3C-classification model[8] describes how three main functionalities are represented in groupware:

1. *Communication.* Ability to exchange information between collaborating group members.
2. *Coordination.* Ability to coordinate tasks among a team.
3. *Collaboration.* Ability to accomplish team goals.

Remote collaboration tools are designed to help two or more participants involved in a common task to achieve their goals. To do this, they combine many different applications, facilitating the 3Cs for remote interaction in a single application: audio and video conferencing, instant messaging and chats, multi-user editors, white boards,

revision control, etc (See Box 2). Collaborators remotely share access to local devices for presentation and interaction (such as a desktop, keyboard and mouse) and software (office applications, web applications, in-house software etc) to view, annotate and edit content in real-time, through synchronous participation from different locations.

Communication is enriched by chat, multi-point video and audio conferencing (Figure 2 shows a typical interface for remote collaboration tools). Some of the basic functionality may be provided by existing office automation tools (such as MS Outlook or IBM Lotus Notes) but additional functions may be added, for instance allowing the organizer of a meeting to schedule a remote collaboration session, and to invite participants by email with a few mouse clicks. Meeting sessions may be recorded and archived for future reference, evaluation, or for training purposes.[9]

Box 2: Remote collaboration tools – a combination of groupware

Remote collaboration tools combine the functions of software for communication, collaboration and coordination in one solution. Some examples, and related standards, are shown below:

Type of groupware >>	**Audio and video conferencing**	**Instant messaging**	**Multi-user editors, whiteboards, version control**
Examples	• Wengo • Skype • Gizmo • Sipgate	• IRC • ICQ • AIM • Jabber	• Google Docs • Zoho • MediaWiki • ACE • SVN
Standards and protocols involved	H.320, H.323, SIP, H.264, others	XMPP, SIMPLE, others	HTTP, ODF, XML, WebDAV, others

	Remote collaboration tools (vendor)
Examples	Acrobat Connect (Adobe) GoToMeeting (Citrix) Lotus Sametime (IBM) Office Live Meeting (Microsoft) one2meet (Netviewer) OpenMeetings (Open Source project) Marratech (acquired by Google) WebEx Meeting Center (Cisco) etc.
Standards and protocols involved	H.323, T.120, SIP, SIMPLE, XML, XMPP, SSL, TLS, AES, HTTP, LDAP, etc.

Note: Please find annexed to this report a glossary of abbreviations and acronyms

While a meeting is in progress, the organizer and participants may decide which windows, applications, or parts of the screen they want to share with others. Remote desktop control allows participants to manipulate the presenters' screen and to edit documents remotely. Text chat may be used for live question and answer sessions or to ask for the floor.

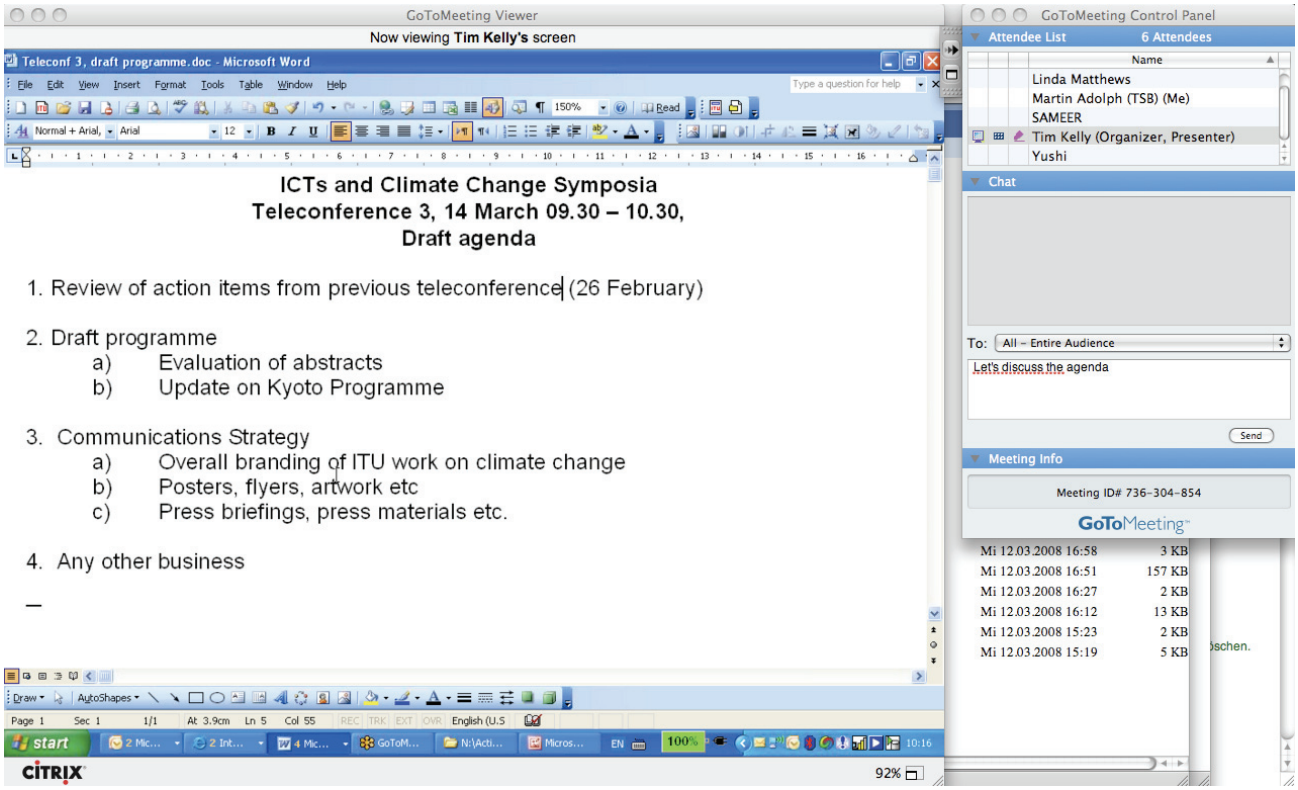
Remote collaboration tools usually allow two main modes of operation with

variations on each according to the size of the meeting:

- In **peer-to-peer meetings,** the organizer and participants may interact (two-way communication) by following an agenda, communicating with the help of audio, video and text, and jointly editing documents.
- **Webinars** (web seminars), often used for product presentations or the transmission of conferences, tend to involve mostly one-way communication, from speaker to audience. Compared to meetings, audience interaction is limited. However, this one-to-many format may include survey and feedback sessions following the speaker's presentation, and is particularly appropriate for archiving material.

Client software is, in many cases, programmed in *Java* language, which makes it interoperable on most operating-system platforms. Other products may be implemented with *Flash* technology, a popular method for adding animation and interactivity to web pages, and integrating Voice over IP (VoIP). Thus, these programmes only require a web browser to hold a meeting, and the client software can be downloaded at the point of entering an online meeting. Alternatively, for a higher quality and fewer transmission delays, it is possible to use the public switched telephone network (PSTN) for audio-conferencing equipment and use the online tools for the visual portion of the meeting. This hybrid arrangement is currently the most common for peer-to-peer meetings with today's networks, requiring no special reservation of additional bandwidth or guaranteed service quality.

Figure 2: Remote collaboration for ITU Symposia on ICTs and Climate Change



Participants in Bangkok, Geneva, London and Tokyo, Bangkok use *GoToMeeting* to prepare the ITU Symposia on ICTs and Climate Change. The figure shows a remote participant's screen, the attendee list, and the chat box.

3 Standards Watch

A traditional form of remote collaboration – video conferencing – became popular in the early 1990s as a result of the acceptance of ITU-T Recommendation H.320 by equipment manufacturers. This resulted in interoperability between different brands and lower prices on equipment, both of which resulted in increasing use. H.320 is an international standard for video conferencing on ISDN (Integrated Services Digital Network) which is still in wide use despite the fact that ISDN bandwidth is costly compared to IP (Internet Protocol) bandwidth. The main advantage of ISDN is that it offers quality of service (QoS), since it is a circuit switched technology. Today's IP networks, on the other hand, offer a much greater bandwidth at a much lower cost. Consequently, most of today's remote collaboration tools are based on IP networks and use standards developed by the Internet Engineering Task Force (IETF) and the World Wide Web Consortium (W3C). Nevertheless, ITU-T contributes with a series of Recommendations describing protocols for real-time, multipoint audio-visual communication on any packet-based network (e.g., ITU-T Recommendations T.120 and H.323). Most products leave the choice to the organizer of a meeting whether to use H.323 or IETF's Session Initiation Protocol (SIP). The Technology Watch report on Telepresence discusses the advantages and drawbacks of both protocols and reports on efforts to develop a new Recommendation (H.325 or Advanced Multimedia System).

ITU-T's Next Generation Network Global Standards Initiative (NGN-GSI) focuses on developing the detailed standards necessary for NGN deployment to give service providers the means to offer the wide range of services expected in NGN. One of these services, remote collaboration, will become more reliable with NGN, which will provide end-to-end QoS.

To allow IT staff and software developers to extend their remote collaboration applications to fit individual needs (e.g. integration of in-house software), producers of remote collaboration tools typically offer Software Development Kits (SDKs) and Application Programming Interfaces (APIs) that implement extensible formats and protocols, such as OpenDocument Format (ODF) or eXtensible Markup Language (XML).

Besides *interoperability, extensibility* and *flexibility*, in terms of audio transmission, *security* may also be of key importance. At the time of joining the online meeting, users need to know the meeting ID and password to access the remote meeting. At the system level, confidentiality may be assured, for instance, by SSL (Secure Sockets Layer) or AES (Advanced Encryption Standard) end-to-end encryption between participants.

4 Market Watch

Security and performance characteristics should apply irrespective of the number of meeting participants and the nature of their different networks, computer operating systems and terminal devices. Thus, remote collaboration poses quite a challenge for standards developers. As discussed in section 2, the range of remote collaboration tools includes online meetings of only two people, as well as Webinars of one organizer and a thousand or more attendees. *Scalability* and high demands of *availability* often require hosting the tools on multiple servers.

Service providers seek to meet those demands by offering their "software as a service" (SaaS). SaaS is a software application delivery model whereby a software vendor develops a web-native software application and hosts and operates the application for use by its customers over the Internet. Customers do not pay for "owning" the software itself but rather for using it, either on a flat-rate or pay-as-you-go basis. This is a particularly appropriate model in the early part of a product lifecycle, because it allows potential users to experiment with the service without

having to commit large sums in upfront purchases.

According to estimates from the IT research company Gartner, the market for SaaS applications reached USD 5.1 billion in 2007, and is forecast to grow to USD 11.5 billion by 2011, at which date it will account for more than a quarter of software sold to companies.[10] Today, between 70 and 80 per cent of remote collaboration applications are run on external SaaS deployments. The market may be segmented between:

- companies that are primarily specialized in remote collaboration (e.g., Citrix, Netviewer; see Box 2);
- companies that have added the remote component to their existing office application packages (e.g., Adobe, IBM, Microsoft); and
- market entrants that have identified remote collaboration as a promising business area and therefore have acquired companies from the first group (e.g., Cisco which acquired WebEx, and Google which acquired Marratech).

The increasing number of competitors, new flexible pricing and licensing models, and the continuous development of new features will increase competitive pressure on providers of remote collaboration tools. The market is arguably ripe for its "Google moment", when some new entrant, or existing player, brings out a product with sufficient momentum to build market share rapidly at the expense of its rivals, as Google did in the search market. It is also possible that one market player may decide to offer remote collaboration tools free of charge, perhaps incorporated into a different product, in order to build market share and perhaps gain revenue through a different model from SaaS (e.g., advertising, mobile usage time).

5 Applications

Remote collaboration tools support people in overcoming geographical limitations in their everyday work with colleagues, and in sharing information amongst business partners and clients. They can accelerate an organization's decision-making processes and increase productivity by enabling its employees to work on several remote projects simultaneously, while limiting travel costs. Crucially, they can assist individuals companies in reducing their carbon footprint by reducing the need for travel, and thereby contributing to the global combat against climate change. Although they cannot overcome time differences between countries, remote collaboration tools can bring more flexibility into the workplace (for instance, by enabling workers in a different time zone to join a meeting from home if it is held outside normal working hours).

Originally employed to support only specific purposes and user groups (such as students in e-learning, engineers in online product development, or contractors in outsourced projects) remote collaboration tools are now gaining influence in office environments across all sectors. They work alongside email, instant messaging and document versioning as an enabler of collaboration, communication and coordination. Using online meetings, collaboration that might not have occurred otherwise (as a consequence of tight schedules, long distances, or the high cost of business travel) may now take place.

For developing countries, remote collaboration tools can thus be seen as a helpful instrument in overcoming the digital divide and for "Bridging the Standardization Gap", which is addressed in ITU Plenipotentiary Conference 2006 Resolution 123 (PP-06, Antalya) and World Telecommunication Standardization Assembly 2004 Resolution 44 (WTSA-04, Florianópolis). The tools make it easier for representatives from developing countries, with a limited travel budget or facing visa restrictions, to participate actively in the standardization process.[11]

ITU workshops and tutorials held online can address a wider audience, notably in reaching attendees from developing countries, and non-members. Specific types of remote collaboration tools (for instance, facilitating remote interpretation, or remote

captioning) have also allowed more ITU meetings to be held away from headquarters in Geneva.

Furthermore, replacing long-distance travel by online meetings makes remote collaboration tools a clean, green technology, which is particularly important in the context of current global concerns over climate change. A report on using ICTs for reduced CO_2 emissions --"Saving the climate @ the speed of light" published by ETNO and WWF-- states that replacing 20 per cent of business travel in the EU could cut some 22.3 million tonnes of CO_2 per year. Furthermore, if half of employees in the EU replaced just one meeting per year with an audio-, video- or web-conference call, then an additional 2.12 million tons of CO_2 emissions could be avoided.[12]

The WWF-ETNO roadmap also points out the potential positive impacts of flexi-work (also called telecommuting or telework), which – made possible by tools for synchronous and asynchronous remote collaboration – gives potential for reduction of another 22.2 million tones of CO_2 emissions, if 10% of employees in the EU worked from home. The savings result from less work-related travel and a reduced need for office space, which generates a smaller requirement for heating, lighting and air-conditioning. The resulting CO_2 savings could be even greater in the megacities of the developing world, where poor public transport and high levels of road congestion make commuting especially wasteful. A similar study, entitled "Towards a high-bandwidth, low carbon future" [13], commissioned by Australian public telecommunication operator Telstra, and conducted by Climate Risk pty, concluded that a "de-centralized business district", which facilitated remote collaboration and teleworking, could save some 3.1 million tonnes of CO_2 per year in Australia alone.

In 2007, ITU-T organized and provided logistical and secretarial support for some 85 meetings/workshops, representing a total of 339 meeting days, as well as numerous smaller informal meetings, such as rapporteur groups and steering committees. Holding even a small number of those meetings online would have a significant impact on ITU-T's carbon footprint (See Box 3).

There are a number of ways in which remote collaboration tools could be used to both increase and facilitate participation in ITU meetings, especially from developing countries, while also reducing travel requirements:

- The simplest solution is to provide tools that facilitate remote participation. Already, all ITU-T's working documents are posted online and most published Recommendations have been free of charge online since the start of 2007. An increasing number of meetings are broadcast live over the Internet (usually audio-only, but sometimes also with live video). Seven ITU-T meetings were broadcast live in 2007, including the meetings of Study Groups 2 and 3.[14]
- The live audio stream can be enhanced in a number of ways. For instance, using a tool like *GoToMeeting*, the presentation of slides, or of a screen where editing of a text is taking place, can be broadcast live. Control of the screen can also be given to external presenters. Other visual enhancements include real-time captioning, which is particularly useful for non-native speakers of the meeting language[15], or recording of a presentation for archiving.[16]
- A third option, appropriate for smaller, shorter meetings such as a rapporteur's group or a steering committee, is to hold the whole meeting using an online remote collaboration tool. ITU-T Study Group 15 has been experimenting with these tools for a number of activities, including the preparation of the energy saving checklist [17], and reports that some 13 "ear-to-ear meetings" (typically of 1-2 hours duration) replaced approximately two "face-to-face meetings" (typically of 1-2 days duration), resulting in a saving of 200-400 tonnes of CO_2 per meeting. Details of how to use these services is provided in the Annex.
- A fourth option would be to further decentralize a meeting by using ITU's existing high performance network linking its regional offices to establish remote collaboration links between the Geneva HQ and ITU's regional offices in Addis Ababa, Bangkok, Brasília, Cairo

and Moscow. Participants from neighboring countries of the regional offices could travel there rather than flying long haul to Geneva. Considering the high costs for business travel (transport and accommodation) and flight time, this approach would also have positive impacts on both the time and money budgets of participants as well as resulting in savings of approximately 55 tonnes of CO_2 emissions.[18]

ITU-T is currently carrying out an evaluation of two-specific web conferencing tools—*WebEx* and *GoToMeeting*—under the auspices of Working Party 3 of TSAG and has issued a liaison statement to all Study Groups on their availability.[19]

Box 3: Remote participation – an environmentally friendly way of taking part in ITU-T meetings

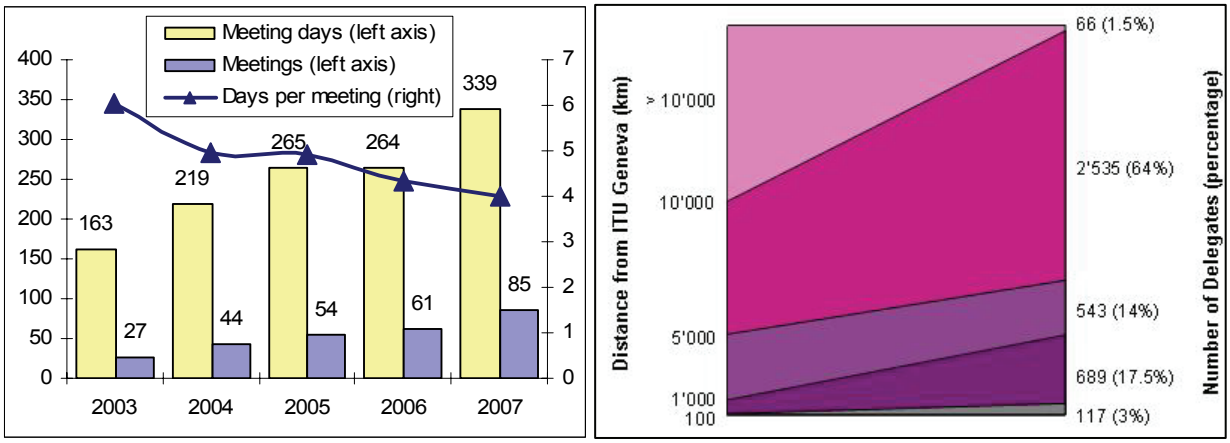
In 2007, ITU-T offered its membership a total of 339 face-to-face meeting days, in the form of Study Groups, Focus Groups, workshops etc, in addition to numerous other smaller meetings (such as rapporteur groups, meetings of Study Group management teams etc). As shown in the charts below, both the number of meetings and the number of meeting days are rising, but the average length of the meetings has fallen from just over 6 days per meeting (implying staying over a weekend) in 2003 to just under 4 in 2007.

The majority of meetings and meeting days – 59 of 85 meetings; 255 of 339 meeting days in 2007 – take place in ITU headquarters in Geneva, Switzerland. Given the international nature of the work—with Member States, Sector members and Associates from 191 countries around the globe—many delegates must travel long distances to participate in ITU-T meetings, even though they may sometimes only be interested in one brief part of a meeting. For instance, the 85 meetings held in 2007 attracted some 3'950 delegates (an average of 47 per meeting), of which some 1'626 came from China, Japan or the Republic of Korea, requiring flights of longer than 12 hours. In total, almost two-thirds of delegates traveled round trips of more than 10'000 km to participate in ITU-T meetings in 2007 (see Figure 3, right-hand side).

Estimations on the basis of calculation tools developed by the Greenhouse Gas (GHG) Protocol Initiative[20] have shown that the use of remote collaboration tools for ITU-T meetings, workshops, and other events would have a significant positive impact on ITU-T's carbon footprint. The simplistic calculation model charges per passenger 110 grams of CO_2 emissions per kilometer on long haul flights (short haul: 150g/km).[21] One participant's roundtrip from Buenos Aires to Geneva (2* 11'200km) would account for approximately 2.5 tons of CO_2 (circa 2t for a roundtrip from Bangkok).

Figure 3: Potential for remote collaboration in ITU-T's activities

Meetings, meeting days and average length of meetings, 2003-07 (left chart) and distance traveled by delegates in 2007 (right chart)



Source: Adapted from ITU-T Review of the Year, 2007.

6 Conclusion

Remote collaboration tools are well-suited to increase an organization's productivity, by increasing collaboration and reducing costs. The substitution of business travel by meeting online saves both money and time and reduces CO_2 emissions related to travel. Four factors suggest that this is a technology whose time has come:

- The tools themselves are becoming easier to use, are Internet-based, require little modification of working practices, and are now being offered with cheaper and more flexible pricing models. Remote collaboration tools basically require little more than a standard PC with access to the Internet and a telephone or mobile phone.
- Broadband access networks are improving all the time, offering much quicker responses times and faster download times. Thus, it is no longer necessary to use dedicated networks for online collaboration or video conferencing.
- A new generation of users is leaving schools and universities that have grown up using multi-player games and virtual worlds and are now ready to use similar skills in their work lives.
- Finally, the increasing urgency of concerted international action against global warming is encouraging more companies and individuals to reduce their travel wherever possible, and adopt more flexible work practices, as part of overall corporate social responsibility programmes.

Nevertheless, there will always be certain factors that cannot be replaced by remote collaboration: agreements and contracts often need to be signed in person, informal discussions during meeting breaks often play an important role in making deals, not to mention social events and receptions after long meeting days, etc. But while remote collaboration will never replace face-to-face meetings, they can help to make those meetings that still take place in the real world much more efficient.

ITU and Climate Change

ITU has launched a major initiative to better understand the relationship between information and communications technologies (ICTs) and climate change, with two global symposia being held in the first half of 2008.

See www.itu.int/ITU-T/climatechange.

Annex 1: How to do it: A guide to online meeting facilitation services in ITU

In ITU-T, under the guidance of Working Party 3 of the TSAG, a pilot project is currently evaluating two online meeting facilitation services, GoToMeeting and WebEx. This annex provides some information to the ITU membership on how to use these tools.

Requesting an online meeting

ITU-T Study Group participants should send the request for an online meeting to the ITU-T Study Group Counsellor. The Study Group Counsellor can perform the role of the meeting organizer and provide to the participants all the necessary information about the online meeting (e.g., date, time, agenda etc.).

Joining an online meeting

There are several ways to join a meeting depending on how you receive the meeting invitation.

The easiest way to join a meeting is directly from an email invitation sent to you by the meeting organizer. It usually contains the meeting's date and time, a meeting title, a hyperlink to the meeting and login details, such as meeting ID and password. On the date and time of the meeting, just click the link provided in the invitation, enter your name, your email address, and the meeting password when prompted. If it is the first meeting you start or join a meeting, you might additional be asked to accept the download of the self-installing and self-configuring meeting client. The audio for the meeting might be provided online or via a separate conference call.

Attending an online meeting

During a meeting, participants can play one or more of the following three roles:

- **Organizer/Host** – Organizers/Hosts have accounts with the remote collaboration tool that enable them to schedule and conduct meetings. Organizers/Hosts are also the initial meeting presenter, but may pass the presenter role to any other participant. Organizers/Hosts have the ability to grant or revoke participant privileges, invite or dismiss attendees during a meeting and make other attendees organizers.
- **Presenter** – A presenter is any participant who is giving a presentation and shares his or her computer screen remotely with all the participants. The initial presenter is usually the meeting organizer. The presenter also determines who gets to control the keyboard and mouse of the remotely viewed screen.
- **Participant** – A participant is any person who attends a meeting either physically or virtually – including organizers, and presenters. By default, participants can view the presenter's screen. A participant may remotely control the presenter's computer screen, for instance to edit text, if given that privilege. A participant may chat with other participants (a form of instant messaging) or view the Participant list and other documentation.

Remote collaboration tools have intuitive user interfaces, use self-explanatory icons, and a layout similar to other office applications. Online manuals offer background information, see

- www2.gotomeeting.com/default/help/g2m/ (GoToMeeting)
- www.solutions.webex.com/solutions/docs/mc/help/ss/host/wwhelp/wwhimpl/js/html/wwhelp.htm (WebEx)

The article "Five tips for a better Web conference"[22] illustrates issues participants should keep in mind about online meeting etiquette.

System and network requirements

Online meetings do not require much more than a modern operating system, an up-to-date web browser, and a stable Internet connection.

For detailed system requirements read

- www2.gotomeeting.com/default/help/g2m/getting_started/system_requirements.htm (GoToMeeting)
- www.support.webex.com/support/system-requirements.html (WebEx)

Glossary of abbreviations and acronyms used in the document

3C	Communication, coordination, collaboration
ACE	"A collaborative editor"
AES	Advanced Encryption Standard
AIM	AOL Instant Messenger
AOL	America Online
API	Application Programming Interface
CSCW	Computer-Supported Cooperative Work
ETNO	European Telecommunications Network Operators' Association
HTTP	Hypertext Transfer Protocol
ICQ	"I seek you"
ICTs	Information and Communication Technologies
IETF	Internet Engineering Task Force
IP	Internet Protocol
IRC	Internet Relay Chat
ISDN	Integrated Services Digital Network
ITU	International Telecommunication Union
ITU-T	ITU Telecommunication standardization sector
LDAP	Lightweight Directory Access Protocol
NGN	Next Generation Network
NGN-GSI	Next Generation Network Global Standards Initiative
NSP	Network Service Provider
ODF	OpenDocument Format
PC	Personal Computer
PP	Plenipotentiary Conference
PSTN	Public switched telephone network
QoS	Quality of Service
SaaS	Software as a Service
SDK	Software Development Kit
SG	Study Group
SIMPLE	Session Initiation Protocol for Instant Messaging and Presence Leveraging Extensions
SIP	Session Initiation Protocol
SSL	Secure Sockets Layer
SVN	Subversion
TLS	Transport Layer Security
TSAG	Telecommunication Standardization Advisory Group
VoIP	Voice over IP
W3C	World Wide Web Consortium
WebDAV	Web-based Distributed Authoring and Versioning
Webinar	Web seminar
WTSA	World Telecommunication Standardization Assembly
WWF	World Wide Fund for Nature
XML	Extensible Markup Language
XMPP	Extensible Messaging and Presence Protocol

Notes, sources and further reading

1 The background of the term CSCW is described in Irene Greif's book "Computer-Supported Cooperative Work: A Book of Readings", see www.books.google.com/books?id=4oVMJ1vi8lkC.

2 Different terms for similar concepts include telecommuting, teleconferencing, telelearning, telepresence, distance education, remote assistance, remote engineering, remote publishing, remote surgery, remote training, etc.

3 As an example of high-performance video conferencing, the Prince of Wales appeared recently as a life-size hologram, speaking to the audience at an alternative energy summit, avoiding long-distance travel and thereby reducing his carbon footprint: see "Hologram prince hails new money for alternative energy", Guardian Unlimited, 21 January 2008. See www.guardian.co.uk/environment/2008/jan/21/energy.renewableenergy/print.

4 Economic Statistics from Second Life include population, the currency Linden Dollars (L$) and its exchange rate, Monthly Linden Dollar Flow, total land use and average land price, etc. See www.secondlife.com/whatis/economy_stats.php.

5 See www.diplomacy.edu/DiplomacyIsland/Embassies/display.asp?Topic=Maldives.

6 See www.secondlife.reuters.com/stories/category/second-life/davos/.

7 A frequently updated list of businesses and organizations in Second Life gives an overview of in-world business and user-groups founded specifically for Second Life, some of which have become legal entities in their own right, as well as preexisting companies and organizations that have involved themselves in the virtual world. See www.en.wikipedia.org/wiki/Businesses_and_organizations_in_Second_Life.

8 The 3C-classification model was first introduced by Teufel et al. in 1995. See S. Teufel, C. Sauter, T. Mühlherr, K. Bauknecht (1995). Computerunterstützung für die Gruppenarbeit, Addison-Wesley, Bonn.

9 As an example, see the tutorial sessions held by ITU-T Study Group 15 from 13-15 February 2008 on energy saving, which were facilitated using the "GoToMeeting" remote collaboration tool. The proceedings (including audio track and slide presentations) are available online at: www.itu.int/ITU-T/studygroups/com15/tutorials/power.html.

10 The term SaaS has become the industry preferred term, generally replacing the earlier terms Application Service Provider (ASP) and On-Demand. The article "A question of demand", published in The Economist, 3 January 2008, describes this aspiring software delivery model. See www.economist.com/displaystory.cfm?story_id=10431816.

11 A list of current "e-meetings" being held by ITU-T, some of which are by invitation only, is available online at: www.itu.int/ITU-T/events/icalendar-emeetings.html.

12 See WWF-ETNO roadmap for reduced CO2 emissions in EU and beyond, www.etno.be/Portals/34/ETNO%20Documents/Sustainability/Climate%20Change%20Road%20Map.pdf.

13 See Climate Risk (2007) "Towards a high-bandwidth, low carbon future: Telecommunication opportunities to reduce greenhouse gases", available at: www.climaterisk.com.au/2007/12/12/climate-risk-present-towards-a-high-bandwidth-low-carbon-future-at-cop-13-unfccc-bali/.

14 Many ITU workshops are available as webcast. Archives and live feeds can be found at: www.itu.int/ibs/.

15 The meetings of the Internet Governance Forum typically offer the facility of real-time captioning. A workshop, organized by ITU as part of the Internet Governance Forum 2007 in Rio de Janeiro, brought together experts from around the world to examine how best to take into account accessibility needs in emerging technologies. The captioning transcript of the workshop is available at: www.itu.int/dms_pub/itu-t/oth/06/0E/T060E0070030002MSWE.doc.

16 The public digital library of the ITU-D e-Learning centre includes a number of archived presentations; see: www.itu.int/ITU-D/hrd/elearning/index.asp. A good example is the module on "Learning about numbers" which offers a number of download options such as text only, slides only, audio with slides, video with slides etc; see: www.itu.int/ITU-D/hrd/elearning/vir-lib/asp/numbering/index.html.

17 See "Checklist on energy-saving for standardization activities", adopted as an ITU-T Technical Paper at the February 2008 meeting of ITU-T Study Group 15, available as: www.itu.int/md/T05-SG15-080211-TD-GEN-0288/en.

18 This based on the assumption that 40 participants from countries close to ITU's regional offices collaborate remotely with ITU headquarters from these regional offices. When multiplied by the full range of ITU-T meetings, this would amount to a saving of over 4'600 tonnes of CO_2 per year

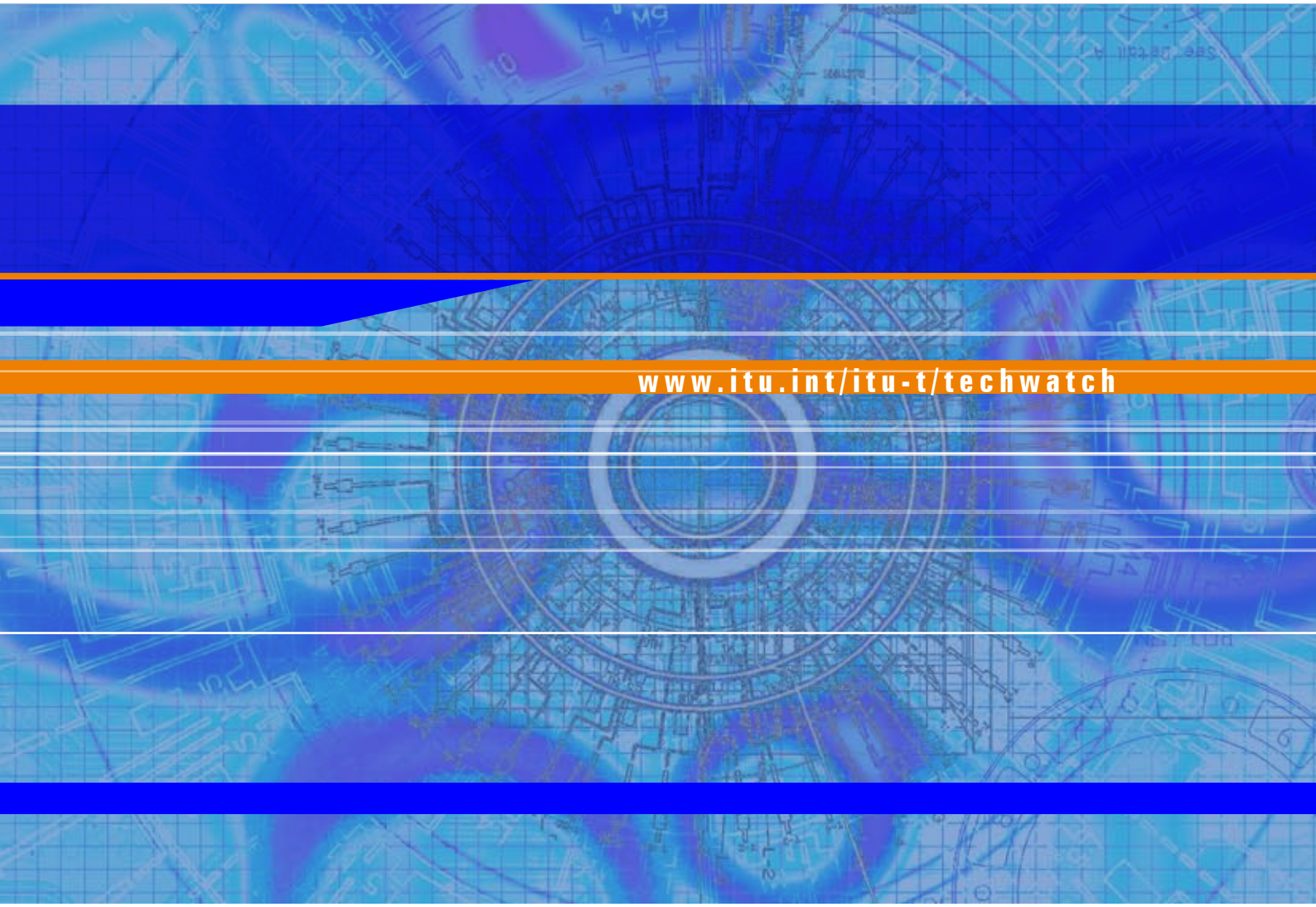
19 See Annex C to the report of WP/3 to the December 2007 meeting of TSAG, available at: www.itu.int/md/T05-TSAG-R-0025/en (Document restricted to TIES users).

20 GHG Protocol Initiative is a partnership of businesses, NGOs, governments, and others convened by the World Resources Institute (WRI), and the World Business Council for Sustainable Development (WBCSD). Its mission is to "Develop internationally accepted greenhouse gas (GHG) accounting and reporting standards for business and to promote their broad adoption". See www.ghgprotocol.org/.

21 Calculations are based on GHG Protocol Initiative Calculation Tools for Business Travel (Version 2.0, June 2006). We used the distance traveled approach (*Distance* x *CO2 emission factor* = *CO2 emissions*) with CO2 emission factors from UK DEFRA (2005). See www.ghgprotocol.org/ and

www.defra.gov.uk/environment/business/envrp/pdf/conversion-factors.pdf. Distances between ITU headquarters Geneva and regional offices and airports were estimated with webflyer and atmosfair.

22 See "Five tips for a better Web conference" by Christopher Elliott at: www.microsoft.com/smallbusiness/resources/technology/communications/5-tips-for-a-better-Web-conference.aspx.



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