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THE IMPORTANCE OF VOLUNTARY TECHNICAL STANDARDS FOR THE INTERNET AND ITS USERS

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Later this year, the International Telecommunication Union (ITU) will convene a meeting of the world's governments to decide whether and how the ITU's telecom treaty should regulate the Internet.¹ In advance of that meeting, several countries have proposed that the technical standards that the ITU produces – known as “ITU-T Recommendations” – become mandatory for Internet technology companies and network operators to build into their products. These proposals would fundamentally upend the way that the Internet has always worked. Making ITU-T Recommendations mandatory would critically jeopardize the Internet's openness and capability for sustaining the free exchange of ideas, would threaten the future growth and stability of the network, and would sap the Internet's economic vitality. Internet users, civil society organizations, and all other interested parties should urge their governments to oppose these proposals.

What Are Technical Standards?

The magic and power of the Internet is that even when two computers, services, or pieces of software are created by different companies, they can seamlessly talk to each other. Emails composed on a Microsoft Windows computer can be easily read on an Apple laptop or iPhone. Websites created by an incredible diversity of companies and organizations – Twitter.com, Wikipedia.org, BBC.co.uk, and millions more – are easily viewed in web browsers made by Google or Mozilla. This ability to communicate between technologies developed by disparate companies is so automatic that it is taken for granted by most Internet users. But it is a fundamental feature that distinguishes the Internet from previous communications platforms. And the reason it exists is because of “technical standards” (or “standards” for short).

Technical standards are the language that computers, phones, software, and network equipment use to talk to each other. Without them, two computers made by different companies would not be able to understand the messages sent between them. And without technical standards, the network of networks that makes up the global Internet would not work: two networks run by different network operators would not be able to connect with each other. Standards allow any technology developer, web site creator, or equipment manufacturer anywhere in the world to have their creations instantly available to and

¹ For more background on the ITU and the World Conference on International Telecommunications, see CDT's ITU issue page at <https://www.cdt.org/issue/itu>.

interoperable with the rest of the global Internet. A wide variety of entities rely on technical standards, including network operators, software and apps developers, computer vendors, equipment manufacturers, mobile device makers, and web site designers (for simplicity, these are collectively referred to as “technology companies” below, although they may be for-profit or non-profit entities, including developers of privacy tools such as Tor).

Standards Development Organizations

Because the Internet is a complex system, there are thousands upon thousands of technical standards on which it relies. These standards are developed by a diversity of standards development organizations that specialize in creating different pieces of the language that allow Internet devices to talk to each other. The Internet Engineering Task Force (IETF) has been at the center of these efforts.

The IETF develops and maintains the core networking standards that underlie all Internet communications. The IETF has standardized:

- **IP** (Internet Protocol), the most fundamental IETF standard, which provides standardized addresses for every device on the Internet;
- **TCP** (Transmission Control Protocol), the mechanism that all computers use to avoid network congestion and ensure that data gets delivered to its destination;
- **DNS** (Domain Name System) specifications that provide the Internet’s address book, allowing names like “wikipedia.org” to be translated into IP addresses that computers can locate on the network;
- **HTTP** (Hypertext Transfer Protocol), the language that web browsers and websites use to communicate;
- **BGP** (Border Gateway Protocol), which is used within networks to determine the best network routes for delivering Internet data to its destination;
- and hundreds of other technical protocols that provide the building blocks for Internet services and applications.

Layered on top of these core networking standards are standards for applications and services. For the most popular application in the world today – the web – standards are maintained by the World Wide Web Consortium (W3C). The W3C is the home of HTML (HyperText Markup Language), the language of the web, which allows any website to be displayed in any web browser. The W3C also supports the ever more media-rich and mobile experience that web users enjoy today, providing standards for audio, video, mobile device support, and many other modern web features.

There are numerous other organizations that develop and maintain other pieces of the technical standards landscape. For example, the IEEE Standards Authority provides the standardized language that laptops use to connect to WiFi networks and Ethernet cables. Joint work between the International Organization for Standardization (ISO, which produces a broad array of standards for everything from workplace management to food safety) and the International Electrotechnical Commission (IEC) has produced, among other things, a standard video format

(MPEG) that is in wide use. OASIS (the Organization for the Advancement of Structured Information Standards) provides standard information formats that allow businesses to exchange data with each other.

The ITU Telecommunications Standardization Sector (known as the ITU-T) is the ITU sector responsible for telecom standardization (the others being Radiocommunication, ITU-R, and Development, ITU-D). Although the ITU-T has traditionally concerned itself with standards for telephone and telegraphy services, it has developed a number of standards in use on the Internet today, including a common image format (JPEG) and standards that provide support for encryption.

How Standards Are Developed

Since the advent of the Internet, the predominant model of standards development – as exemplified by the IETF – has been based on open processes that stress technical excellence and bottom-up innovation. Any interested person (or organization) can suggest a new idea to be standardized, and the debate about its technical merits is open to the public. Through this process, the most innovative, technically sound proposals bubble up to the top and eventually become adopted as technical standards by the engineering community. The quality of the standards is bolstered by the fact that the entire standardization process, from initial proposal to final adoption, is open to anyone with relevant expertise who wants to comment and contribute.

The standards development process is also iterative and provides space for standards to change flexibly as technology use evolves. The bottom-up model of standards development allows the community of Internet technology developers and users to experiment, create technologies of their own design, and feed their real-world experience back into the standards process. All of the major standards mentioned above, from IP to DNS to HTML, have had significant updates standardized based on feedback from developers, vendors, and users. Ensuring that standards can be updated in response to technological and market developments ensures that Internet technologies do not become brittle, insecure, and outdated.

How Standards Are Used: Voluntarily

When Cisco, Telefonica, Facebook, and thousands of other technology companies around the globe set out to build new products or enhance existing ones, there is no authority telling them which technical standards their products must support. Adoption of technical standards on the Internet has always been voluntary, and for good reason. Allowing technology developers to decide how to package and build on standards within their products and services has created the most dynamic, innovative communications medium the world has ever seen. This innovation is what sets the Internet apart from previous platforms. Voluntary standards adoption is an important underpinning of that innovation—that is, thriving, technically sound innovation, without permission from some central entity.

Standards provide the building blocks of Internet technologies – not the technologies themselves. Technology designers are free to piece the building blocks together as they desire to create the hardware, software, and services that Internet users purchase or use. HTTP provides a good example. Originally designed for downloading web pages into web browsers, software makers have put HTTP to a wide variety of novel uses. Skype, iTunes, and many other applications use HTTP to log users into their services and deliver software updates. Mobile apps

rely on HTTP to retrieve files that are too big to be stored on mobile devices themselves. The HTTP standard is necessary for these applications to work, but also flexible enough to support incredibly diverse product designs.

The fact that the standards themselves do not mandate specific product designs also means that different technology companies are free to adopt upgrades and extensions to existing standards on their own individual timelines. Some may choose to be first movers while others may take longer to execute their product upgrades. Voluntary standards support this product diversity and flexibility, to the great benefit of technology users.

Global Affirmation of Voluntary Standards

Five of the world's leading Internet organizations – the IETF, the W3C, the IEEE, the Internet Society, and the Internet Architecture Board – have recently declared their commitment to voluntary standards as part of their affirmation of OpenStand (see <http://open-stand.org/>), a modern global standards paradigm. The paradigm is based on voluntarily adopted standards developed through open processes that support transparency, consensus, and the participation of all interested parties. Although these organizations and other standards bodies have been operating under this paradigm for many years, the affirmation demonstrates the commitment of these key entities to the voluntary, bottom-up processes that have made existing standards the foundation of the Internet's success as a platform for communications and commerce. The signatories give voluntary standards a powerful endorsement:²

“In this paradigm standards support interoperability, foster global competition, are developed through an open participatory process, and are voluntarily adopted globally. These voluntary standards serve as building blocks for products and services targeted at meeting the needs of the market and consumer, thereby driving innovation. Innovation in turn contributes to the creation of new markets and the growth and expansion of existing markets.”

The creators of OpenStand are calling on organizations and individuals worldwide to express their support for voluntary, open standards. These endorsements only reinforce the importance of voluntary standards for the continued growth and health of the Internet.

Proposals to Make ITU-T Recommendations Mandatory

The proposals to make ITU-T Recommendations mandatory have come from a number of countries and in a number of forms. A representative list is provided in the appendix. More background on the ITU meeting later this year is available on CDT's ITU resource page at <https://www.cdt.org/issue/itu>.

One of the main reasons why the ITU's renegotiation of its International Telecommunication Regulations (ITRs) has attracted so much attention is because the ITRs are a binding legal instrument on member states: when the ITU adopts changes to the ITRs, governments will be expected to enact corresponding changes in their national laws. Under the current ITRs, ITU-T Recommendations are explicitly named as not having the same legal status as Regulations, meaning that they are voluntary to use by member states and technology companies:

² See <http://open-stand.org/affirmation/>.

References to [ITU-T] Recommendations and Instructions in these Regulations are not to be taken as giving to those Recommendations and Instructions the same legal status as the Regulations. (Article 1.4)

The Arab States,³ Egypt,⁴ and the Russian Federation⁵ have all proposed modifications that would add the phrase “unless otherwise specified in these Regulations” to the existing Article 1.4 language, opening the door for Recommendations to be specified as mandatory elsewhere in the treaty.⁶

Egypt, Cote d’Ivoire, and the Arab States⁷ have additionally made proposals for new treaty articles that would explicitly make a selection of ITU-T Recommendations mandatory. The proposal from Egypt and Cote d’Ivoire, for example, is as follows:

Member States shall ensure that the legal and regulatory frameworks and instruments applicable in their territories shall mandate [Administrations, Recognized Operating Agencies, and Operating Agencies] which operate in their territory and provide international telecommunications services offered to the public to apply the ITU-T Resolutions and Recommendations relating to naming, numbering, addressing and identification. (new Article 3.5)⁸

A number of other countries’ proposals include subtler indications of a desire to raise the status of ITU-T Recommendations to mandatory. Mexico, for example, proposed language in Article 1.6 that would change an exhortation that Member States “should comply” with Recommendations to “shall comply”.⁹ The Latin American and Caribbean group, the UAE, the Pacific Islands,¹⁰ and Iran¹¹ have likewise suggested a new Article 3.7 concerning the use of “international naming, numbering, addressing and identification resources” and stating that “the provisions of the relevant ITU-T Recommendations shall be applied”.

The Dangers of Mandatory ITU-T Recommendations

While the precise effects of these kinds of proposals is uncertain, there is no affirmative reason to include any suggestion in the treaty that ITU-T Recommendations be made mandatory. The

³ WCIT Preparatory Document TD 62 rev. 2, pg. 29, 31-32, *available at* WCITLeaks.org, <http://files.wcitleaks.org/public/T09-CWG.WCIT12-120620-TD-PLN-0062R2.pdf>. All cited provisions are also available in the appendix.

⁴ TD 62 rev. 2, pg. 29-30.

⁵ TD 62 rev. 2, pg. 31.

⁶ While the ITU-T produces Recommendations related to both telephony and the Internet, this paper focuses on the potential impact of making Internet-related standards mandatory. The Internet is outside of the scope of the current ITRs, but proposals to change key definitions, including the definition of “telecommunications,” or proposals to make ITU-T standards mandatory that specifically invoke Internet-related issues such as naming resources or spam, could change the scope of the treaty.

⁷ TD 62 rev. 2, pg. 94.

⁸ TD 62 rev. 2, pg. 93-94.

⁹ TD 62 rev. 2, pg. 37.

¹⁰ TD 62 rev. 2, pg. 100-101.

¹¹ TD 62 rev. 2, pg. 102.

imposition of mandatory standards has the potential to erase the immense benefits that Internet users derive from the existing technical standards paradigm. Having governments – the only formal decision-making members of the ITU – decide which standards technology companies must build into their products would upend the existing process of technological development on the Internet. It would cut those who are closest to technology out of the loop when it comes to technological decision-making, replacing them with government officials who do not write software, run networks, or build computers. The vast expanse of technological expertise that exists in the private sector would be subordinated to the desires of these officials.

The mandatory imposition of ITU-T Recommendations would prevent technology developers from exercising their creativity and innovation in using standards as building blocks in their products. Mandating the use of specific Recommendations would likely lock developers into a vision of the Internet as it exists at a particular point in time. Since governments would be loath to constantly add new mandatory requirements to their countries' entire technology sectors, technology companies across the board would be wedded to outdated standards even when some of them would have otherwise been prepared to make upgrades.

The mandatory imposition of any specific set of standards would be problematic, but requiring support for ITU-T Recommendations in particular has additional drawbacks. ITU-T Recommendations comprise just a small fraction of all the standards in use on the Internet today and do not include most of the core standards necessary for global interoperability. Even veterans of the ITU-T argue that ITU-T Recommendations are “virtually unused” and largely irrelevant to the development of Internet technologies today.¹² Making ITU-T Recommendations mandatory, while all other standards remain voluntary, would skew technology development in favor of whatever is standardized at the ITU-T, regardless of the technical merit or necessity of ITU-T Recommendations. The result would be a distorted marketplace in which governmental interests, rather than engineering quality and market technology users' needs, determine how technology companies design their products.

Furthermore, while the IETF and others clearly operate in accordance with the OpenStand principles, the same cannot be said for the ITU-T. As with the ITU writ large, participation in ITU-T decision-making is limited to governments. Although companies can pay to participate in the standardization process as sector members, they cannot cast formal votes to decide which standards get adopted or not. Draft ITU-T documents are available only to ITU members, meaning that the public lacks complete visibility into the standardization work taking place there. These and other aspects of the ITU-T's operations run contrary to the processes in place at other standards organizations that have fostered the creation of the most widely deployed and used Internet standards. Mandating the use of ITU-T Recommendations would perpetuate the closed, outdated, government-run model of technical standardization that Internet technology developers and users have already rejected by choosing to build and use products based on open standards.

¹² See Anthony Rutkowski, “[Privatizing the ITU-T: Back to the Future](http://www.circleid.com/posts/20120816_privatizing_the_itu_t_back_to_the_future/),”
<http://www.circleid.com/posts/20120816_privatizing_the_itu_t_back_to_the_future/>.

Threats to Civil Liberties and Human Rights

Technical standards affect more than purely technical matters of interoperability. Design of these standards can also determine some of the most fundamental features that support free expression, privacy, and other human rights online. For example, while IP addresses could have been designed to include personal identity information, such that a specific individual's communications could be automatically identified by any other entity on the network, instead IP addresses include only combinations of arbitrary numbers. Anonymous expression online would have been much more difficult, or impossible, had that decision been made differently. Likewise, numerous Internet standards have been developed to allow communications to be encrypted end-to-end so that they cannot be intercepted in transit. Other key decisions have involved, for example, the extent to which control over content is centralized or decentralized, whether new bottlenecks are created that allow for censorship or control of communications, whether geographic location information can be blurred or obfuscated in transit, and a variety of other factors of significance for free expression and privacy.

The weight that would accrue to ITU-T Recommendations should they become mandatory could cause the ITU-T to become a magnet for standardization proposals that undermine freedom of expression, privacy, and civil liberties more broadly. Knowing that adopted standards would become mandatory, some governments may step up their efforts to have standards adopted that would increase network-based surveillance capability, create backdoors in existing encryption systems, embed identity information in all communications, or introduce other similar functionality that would threaten the Internet's ability to support free expression and private communication. Because the ITU-T standardization process is generally opaque to civil society, the ability for civil society and human rights advocates to challenge such proposals and have a real impact on their outcome would be extremely limited.

Opposing Proposals to Make ITU-T Recommendations Mandatory

Civil society, Internet users, and other parties with a stake in the future of the Internet should press their national governments to oppose proposals to make ITU-T Recommendations mandatory at December's World Conference on International Telecommunications.¹³ National delegations need to be persuaded that such proposals would represent a major departure from the existing paradigm of Internet standardization and that these proposals would endanger the future of the Internet as an open, innovative platform.

Realizing the potential risks of mandatory imposition of ITU-T Recommendations, a number of governments have already expressed their opposition to proposals that would elevate the status of Recommendations in the treaty. These include the Asia-Pacific Telecommunity regional group (APT), the European regional group (CEPT), and the Americas regional group (CITEL). Their opposition is strong, as APT has articulated:

It should be noted that as a general rule, the application of ITU-T Recommendations are non mandatory and optional/voluntary. There is neither a technical nor a regulatory basis for giving any of the ITU-T Recommendations the same legal status as the very general, high level provisions contained in the ITRs. APT Members are therefore of the opinion that there seems to be no need to modify the existing provision of Article 1.4 of the ITRs,

¹³ WCIT-12 Overview, <http://www.itu.int/en/wcit-12/Pages/overview.aspx>.

. . . which establishes that the ITU-T Recommendations are voluntary for ITU Member States.¹⁴

The task that lies ahead is to convince delegations from Latin America, the Middle East, Africa, and Russia of the strength of these arguments.

Finally, while civil society participation in the WCIT (and WCIT preparatory processes) has been very limited, there are several ways civil society can express concerns about proposals for mandatory imposition of ITU-T standards:

- Advocates should press their government delegations to the WCIT to oppose proposals to make ITU-T Recommendations mandatory.
- Advocates should express concern about mandatory application of ITU-T Recommendations on the public comment page for the WCIT at <http://www.itu.int/en/wcit-12/Pages/public.aspx>.
- Advocates should show their support for the OpenStand principles at open-stand.org.

For more resources on how civil society and other stakeholders can express their views and resources on the importance of voluntary standards, please see CDT's ITU issue page at <https://www.cdt.org/issue/itu>.

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¹⁴ APT, WCIT Contribution 92, as reported in TD 62 rev. 2, pg. 28.

Appendix:

Proposals to Amend the ITRS to Make ITU-T Recommendations Mandatory

As reported in WCIT Preparatory Document TD 62 revision 2 (29 June 2012), available at WCITLeaks.org, <http://files.wcitleaks.org/public/T09-CWG.WCIT12-120620-TD-PLN-0062R2.pdf>.

Modification of Article 1.4

Unless otherwise specified in these Regulations, references to [ITU-T] Recommendations and Instructions in these Regulations are not to be taken as giving to those Recommendations and Instructions the same legal status as the Regulations.

Source: Russian Federation and Africa (C 116).
TD 62 rev. 2, pg. 26.

Similar proposals supported by Egypt (C 81)(TD 62 rev. 2, pg. 29-30), Russian Federation (C 95)(TD 62 rev. 2, pg. 31), Arab States (C 103)(TD 62 rev. 2, pg. 31-32).

References to ~~[ITU-T] Recommendations and Instructions~~ in these Regulations are not to be taken as providing that applying them is mandatory, unless otherwise specified in these Regulations.

Source: Arab States (C 67).
TD 62 rev. 2, pg.29.

Modification of Article 1.6

1.6 Unless otherwise specified in these Regulations, ~~it~~ in implementing the principles of these Regulations, ~~administrations~~ Member States and operating agencies should comply with, to the greatest extent practicable, the relevant ~~CCITT~~ ITU-T Recommendations, including any Instructions forming part of or derived from these Recommendations.

Source: Egypt (C 81)
TD 62 rev. 2, pg. 35-36

Similar proposals supported by Russian Federation (C 95)(TD 62 rev. 2, pg. 36), Africa regional group (C 116)(TD 62 rev. 2, pg. 36)

1.6 In implementing the principles of these Regulations, the administrations of the Member States shall encourage operating agencies to should comply with, to the greatest extent practicable, the relevant ~~CCITT~~ ITU-T Recommendations, to guarantee the interconnection and interoperability of telecommunication networks by offering the public a satisfactory quality service including any Instructions forming part of or derived from these Recommendations.

Source: Mexico (C 124)
TD 62 rev. 2, pg. 37

Modification of Article 3.1

3.1 Members ~~States~~ shall ensure that ~~administrations*~~ operating agencies cooperate in the establishment, operation and maintenance of the international network to provide a satisfactory

quality of service and above a minimum level taking into consideration the relevant Recommendations of the ITU.

Source: Arab States (C 103)
TD 62 rev. 2, pg. 80

New Article 3.5

new 3.5 Member States shall ensure that the legal and regulatory frameworks and instruments applicable in their territories shall mandate [Administrations, Recognized Operating Agencies, and Operating Agencies] which operate in their territory and provide international telecommunications services offered to the public to apply the ITU-T Resolutions and Recommendations relating to naming, numbering, addressing and identification.

Source: Egypt (C 56), Côte d'Ivoire and Africa (C 116)
TD 62 rev. 2, pg. 93-94

Arab States makes a similar proposal that lists the specific ITU-T Recs: E190, E164, E164.1, E212, E156, E157, Q708.

Source: Arab States (C 67)
TD 62 rev. 2, pg. 94

New Article 3.6

new 3.6 International calling party number delivery shall be provided in accordance with relevant ITU-T Recommendations, to the greatest extent practicable. Member States may provide for data privacy by authorizing the masking of information other than the country code and national destination code, but that masked information shall be made available to duly authorized law enforcement agencies.

Source: Study Group 3 Regional Group-Latin America and Caribbean (C 25), Côte d'Ivoire.
TD 62 rev. 2, pg. 95

Similar language is proposed by *United Arab Emirates (C 30), Pacific Islands (C 42), and Arab States (C 67)*. Egypt (C 56) proposed the same language *without* the “to the greatest extent practicable” caveat, but reinserted it in their most recent proposal (C 96).

TD 62 rev. 2, pg. 94-95; 98

new 3.6: International calling party number delivery shall be provided in accordance with relevant ITU-T Recommendations.

Source: Iran
TD 62 rev. 2, pg. 99

new 3.6 Members shall ensure, consistent with technical capabilities and national legal and regulatory frameworks, that telecommunication administrations and operators cooperate in the implementation and application of the following measures:

- Administrations and operators originating calls must provide the prefix designating the calling country code, in conformity with the relevant ITU-T Recommendations.

- Transit administrations and operators must cooperate in identifying and transmitting to termination administrations and operators the code identifying the calling line corresponding to the traffic they receive.
- Members will be able to respect the privacy of the data of the calling user, provided those data involve neither the code of the country of origin nor the national destination code.

*Source: Cuba (C 47) and Côte d'Ivoire
TD 62 rev. 2, pg. 96*

new 3.6 Member States shall encourage the provision of international calling party number delivery in accordance with the relevant ITU-T Recommendations.

Source: Asia Pacific Telecommunity regional group (C 92)

New Article 3.7

new 3.7 Member States shall ensure that international naming, numbering, addressing and identification resources are used only by the assignees and only for the purposes for which they were assigned; and that unassigned resources are not used. The provisions of the relevant ITU-T Recommendations shall be applied.

*Source: Latin American and Caribbean (C 25), United Arab Emirates (C 30), Pacific Islands (C 42), Iran (C 48)
TD 62 rev. 2, pg. 100-102*

new 3.7 Members shall ensure, consistent with technical capabilities and national legal and regulatory frameworks, that telecommunication administrations and operators under their jurisdiction neither participate in the misuse/misappropriation of numbering resources not assigned to them or assigned to other administrations and operators, nor use these resources using procedures that do not conform to the relevant ITU-T Recommendations' assignment criteria.

*Source: Cuba (C 47)
TD 62 rev. 2, pg. 101-102*

Modification of Article 4.3(a)

4.3a) access to the international network by users using terminals which are permitted to be connected to the network and which do not cause harm to technical facilities and personnel; harm to technical facilities and personnel shall be construed to include spam, malware, etc. as defined in relevant ITU-T Recommendations (as the case may be), as well as malicious code transmitted by any telecommunication facility or technology, including Internet and Internet Protocol. Furthermore, the said provision shall be construed to prohibit connection of terminals that cause harm to technical facilities or personnel.

*Source: Opinion 6 of the World Technology Policy Forum and Côte d'Ivoire
TD 62 rev. 2, pg. 113-114*