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The internet and its governance

Antoni Elias
UPC professor, former member of the Telecommunications Market Commission

eliasfuste@gmail.com

Abstract
In just over fifteen years, the internet has become the vehicle for and instrument that sustains the new social model we know of as the "information society". The internet is a service based on a system of telecommunication networks of a different nature, with various models of exploitation and under different legal jurisdictions.
To show the complexity of internet governance, a view is presented from three perspectives: technical, economic and social. The combination of the economic aspect with the social leads to the need to find a balance in order to integrate the "open service" (neutral network) nature of the internet, with good quality service provided in the supporting telecom networks. The article proposes a distribution of a network's capacity that allows the aforementioned integration, and the need for an independent international body to manage internet governance.

Keywords
Internet, networks, technology, neutrality, governance, economy, society.

Resum
En poc més de quinze anys, internet s'ha convertit en l'eina vehicular que sustenta aquest nou model social que coneixem com a "societat de la informació". Internet és un servei que es basa en un entramat de xarxes de telecomunicació de naturalesa diferent, amb diversos models d'explotació i sota diferents jurisdiccions legals. Per tal de mostrar la complexitat de la governança d'internet, es presenta una visió sota tres perspectives: la tècnica, l'econòmica i la social. La combinació del vessant econòmic amb el social indueix a la necessitat de trobar un equilibri que permeti conjugar el caràcter de "servei obert" (xarxa neutral) d'internet, amb actuacions de qualitat de servei a les xarxes de telecomunicacions que el suporten.
L'article proposa una distribució de la capacitat d'una xarxa que permet la conjunció anteriorment esmentada i la necessitat d'un organisme internacional independent que gestioni la governança d'internet.

Paraules clau
internet, xarxes, tecnologia, neutralitat, governança, economia, societat.

The internet, the paradigm of convergence between computing and telecommunications, has become an essential tool to get information and knowledge, to share, store, recall, produce, investigate, compete... In short, to take part.

When computing proposed the need to send data between computers located at a considerable distance apart (further than the printer), it resorted to telecommunication networks, which had always stood out for working under perfectly defined standards implemented as large engineering projects. These networks suddenly received a fresh, agile boost from a technique free from any kind of *a priori* definition, for which competition, the market, imposed the most widely used, in terms of machinery and also programming, as the reference to be followed and improved. How computing has evolved has therefore encouraged the development of telecommunication networks, making them proactive and vivid, but has also infected them with the chaotic disorder that has always characterised computing. As a product of the coming together of computing and telecommunications, the internet owes a large part its success to this evolutionary chaos, as well as a large part of its current problems.

It's not at all easy to attempt to manage the internet and even less so govern it. To tackle the issue of internet governance, our aim is to approach the system from three points of view: technical, economic and social.

The internet from a technical point of view

The internet originated in the ARPANET project by the US Defence Department. It was conceived along the lines of what we now know as an "open network": the use of telecommunication networks to establish a system that permits the exchange of data between centres irrespective of the type of machinery or programming each of these centres has and uses. At the beginning, in the early 1960s, ARPANET was connected to four centres[1] via the NCP (network control program) protocol and the file transfer protocol (FTP). By the mid-1970s, Vinton Cerf and Robert Khan presented TCP/IP (transmission code protocol / internet protocol): IP is a first level program that makes the heterogeneity of the different networks and devices compatible

while TCP ensures, at a second level, the effective routing of packets of data. The philosophy of ARPANET inspired other systems, such as the National Science Foundation Network (NSFNET) for the exchange of scientific data. In 1971, ARPANET was made up of 15 nodes; in 1980 ARPANET and NSFNET were connected and the resulting system had 100 nodes in 1985 and more than 500 in 1989. The system closed in 1990 and the internet was born, which inherited the know-how and interconnection infrastructure of ARPANET-NSFNET; after four years, the internet became widespread as a global system to exchange data and by 1995 the internet had 35,000 interconnected networks, with around 4,800,000 servers (central computers) and an estimated figure of 30 million users.

The universal use of the internet arrived with the hypertext information distribution system, the World Wide Web, developed by CERN physicist Tim Berners-Lee in 1990,[2] and the first user-friendly browser, "Mosaic",[3] created in 1993 by Marc Andreessen and Eric Bina.

The rapid growth of the internet over 18 years has meant that the current IP addressing protocol, IPv4, has exhausted its capacity. On 3 February 2011, the Internet Assigned Numbers Authority (IANA) released the last block of addresses available (33 million) to the organisation responsible for allocating addresses in Asia. IPv4 has enabled 2 to the power of 34 addresses (4,294,967,296 different addresses). The ambition of the internet to have an address for each person, for each telephone, for each vehicle, even for each object, has meant that a new protocol has had to be defined, IPv6:[4] it provides 2 to the power of 128 addresses, a practically inexhaustible number of addresses (in the order of 10 to the power of 38), and is also a more suitable IP protocol for mobile applications, better at data authentication, integrity and security, favourable for pricing and with more facilities for real time applications, such as videoconferencing, since it allows the automatic self-configuration of *plug and play*. The US government ordered IPv6 to be implemented in all its agencies in 2008 and it is currently being adopted by operators in all countries.

In the 1980s, at the same time as the internet was developing, telecom operators also developed the integrated service digital network (ISDN) to provide their users with an efficient, reliable data exchange system; however, the magnificent ISDN, with its seven levels of open system interconnection (OSI), has given way to the effectiveness and lower cost of the IP protocols. The reason for this, firstly, lies in the appearance of local networks and work stations with UNIX operating systems in the 1980s: users wanted to access ARPANET-NSFNET with their computers, so manufacturers gave them work stations with the free protocols of FTP and TCP; ISDN was being designed at that time but, even if it had been operational, its complexity and patent protection would not have made it attractive to the manufactures of domestic computers. The second reason lies in the simplicity of the IP protocols compared with the ISDN, a simplicity that has not involved any loss of efficiency thanks to the great improvement in reliability experienced by electronics for the equipment that comprised telecom networks at the end of the 1980s.

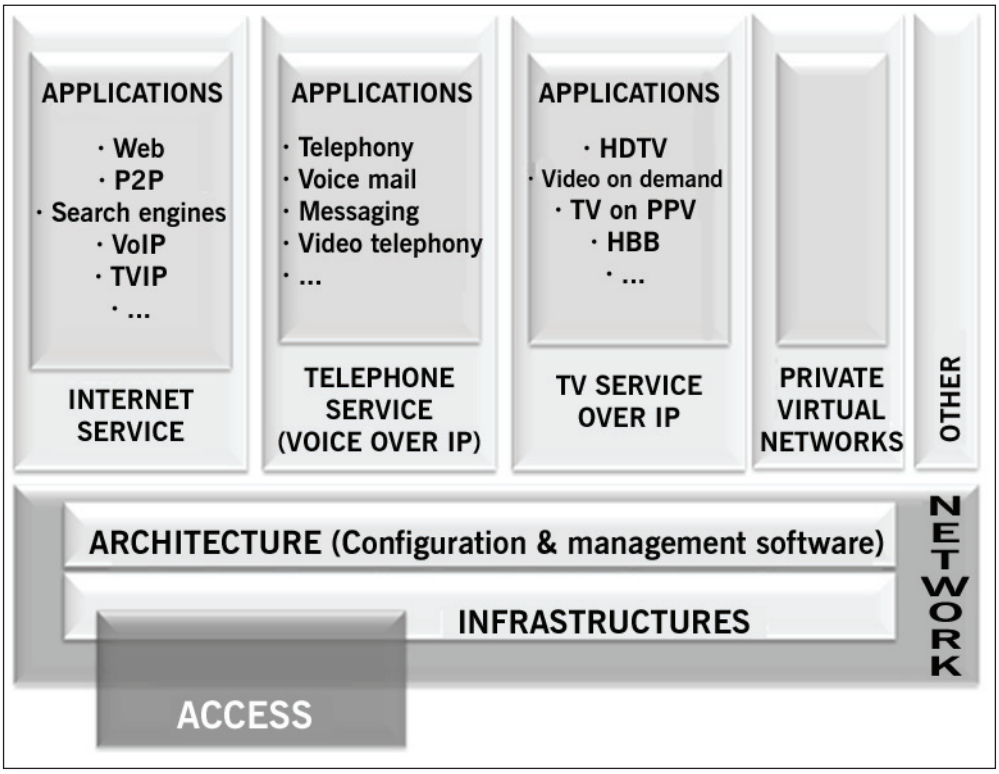
Up to the mid-1990s, telecom operators were still detached from the internet phenomenon. In 1992, the European Telecommunication Standard Institute (ETSI) set up the GSM (global system mobile) digital mobile telephone system, designed with all the typical telecom engineering traits: reliable, robust, secure, confidential and good quality but... it only provided mobile voice communications. It wasn't until 2000 that mobile communications operators set up a variant of GSM, GPRS (general packet radio service), which allowed the transmission and reception of packets of data via radio. Telecom operators were now fully aware of the real and potential volume the internet service required from them. The beginning of this century also saw the adaptation of landline telephone networks so that they could provide broadband services or high speed services in data transmission by using ADSL techniques (asymmetric digital subscriber line), as well as the roll-out of hybrid coaxial-bifilar and fibre optic networks and the development of the third generation mobile telephone system UMTS (universal mobile telecommunications system), specifically designed based on the commutation of packets of voice and data to attend to the growing demand for fast data transmission, fostered above all and especially by the internet service.

In some languages the internet is popularly known as the "network of networks" and although it's true that this is the first conceptual perception it offers, perhaps it would be more appropriate to see the internet at a "service of services" with a global scope or coverage and provided via electronic communications networks.

The European Union itself, in its document entitled *European Principles and Guidelines for Internet Resilience and Stability,*[5] defines the internet as follows: "the Internet is to be understood as the global and public network of networks whose nodes communicate with one another using the Internet Official Protocol Standards and are identified by a globally unique address assigned via the relevant process". These unique addresses are currently granted by IANA, a body that reports to the Internet Corporation for Assigned Names and Numbers (ICANN).[6]

From a telecom network engineering point of view, the internet would be just another service (in a strict sense and without taking into account the absolute or relative volume of the data it handles). The latest generation or new generation networks (NGN) are structured as shown in figure 1: we can see that the concept of network includes not only infrastructures but also management software. Infrastructures include all physical and technical supports of the network, fibre optics, coaxial, copper pair and radio channels, together with the transmission-reception techniques (modulation, multiplex, xDSL technologies, etc.) and constitute the so-called "first layer". The management software that makes up the architecture of the network and that constitutes the "second layer" is currently all IP. However, this does not mean, as shown in the figure, that the whole network is the internet. Because of their simplicity and effectiveness, IP

Figure 1. Structure of networks and latest generation services



Source: Author.

protocols have become the standard for configuring telecom networks, allowing the convergence of different types of electronic transport infrastructures, including the access capillary network.

Different services are set up over the telecom networks (third layer). In fact, telecom operators charge users for the service taken out: each service has different applications and each application manages certain content; it's the so-called horizontal structure of modern telecom networks and services (see figure 1). Although the different services and applications also use TCP/IP protocols, they can only be considered part of the internet service if, for their function, they need the unique addressing (DNS, TLD, etc.) provided by IANA. So, by way of example, the TV over IP services of Imagenio and Orange TV and the TV services of cable operators are not internet applications, and neither are the telephone services that are currently provided almost totally via IP techniques (VoIP): simply because their signalling and peer-to-peer routing is not carried out in all cases via internet addresses but via the classic telephone numbering system. In short, and according to the Federal Communications Commission (FCC), the internet should be seen as "the system of interconnected networks that use the IP to intercommunicate with network or terminal elements that are directly accessible or via a proxy server and that are identified by means of a unique address globally assigned by IANA".

The access infrastructures (radio, copper pair, fibre optic) also form part of the network and telecom operators also charge users for the type of access depending essentially on the kind of infrastructure and bandwidth this infrastructure is capable of providing.

Access infrastructure bandwidth has become the main bottleneck for the internet service's access and download speeds. To be able to provide new applications, principally audiovisuals, and continue developing networks in the sense of offering greater bandwidth to develop new applications, telecom operators have to renew the current access infrastructures. Basically, they have to implement a fibre optic access network for landline networks and an LTE (long-term evolution or fourth generation) network for mobile communications. As we might expect, this is encountering several problems in Europe: strong telecom regulations, the little or inexistent internet regulation together with the problems caused by "net neutrality" do not seem to encourage investment on the part of the large electronic communications operators.[7]

Around 25,000 routing domains or autonomous systems currently make up the internet, having reached voluntary interconnection agreements. Autonomous systems are large organisations (universities, companies, etc.), retail internet access providers, wholesale internet connectivity providers, suppliers of content and applications and providers of caching[8] services or similar. Each autonomous system is responsible for a series of IP addresses or destinations for communications (their routing domain).

Traditionally, two kinds of interconnection agreement have been distinguished on the internet: by traffic –a service by which, via remuneration, a supplier offers access and complete

connectivity to another supplier; and by peering –when two suppliers exchange traffic, normally without remuneration, whose origin and destination are in their respective routing domains.

The internet from an economic point of view

Over the last thirty years, ICTs have caused a rapid innovation in economic models, so much so that we can almost speak of a new economy, an economy that has become global and is above all based on applying, creating and spreading knowledge acquired via research, which generates wealth via invention and innovation, to which end it needs all economic, academic and social sectors to share and exchange growing amounts of information. An economic system like this requires excellent telecom infrastructures, systems and services, both to generate value and also to turn this into economic goods, either a product or a service.

As a telecommunication service, the internet is probably the one that best fulfils the service-based objectives for this new global economy and its greatest impact is probably yet to come. In the first decade of this century, the internet has been a salutary lesson in economic terms for developed economies and will continue to be so if we can continue to invest in broadband infrastructures that allow high quality electronic communication services and applications to be offered. Nevertheless, in the decade we have just started, the internet will particularly transform the economic and social dynamic of emerging economies and its global impact will be much bigger than it was in the first decade of the 21st century.

Apart from the important economic effects of the internet as an essential across-the-board service for the aforementioned economic transformation, it is also an asset of great economic value *per se*. The internet has undergone the phenomenon of focusing on users as suppliers of content. Web 2.0 is permitting social networks, blogs, indexed multimedia content, semantic networks, P2P (peer to peer) exchange, homemade video portals, mobility with wireless internet access and the use of the ubiquity of information in applications. The outcome of all this is billions of users, of content, of growth, interactions, etc., which it wouldn't be apposite to detail here but which are accessible on thousands of websites.

The internet has given rise to a multitude of innovative dot coms, has generated new business models, has stimulated the creation of new products and services and is changing the traditional way consumers buy. The internet is transforming how companies sell and supply and even, with the appearance of cloud computing, how production and control processes are structured and carried out, as well as the size of human resources and investment in capital goods.

Cloud computing is becoming a reality incredibly quickly, not only because users have devices (PCs, tablets, Smartphones, etc.) that allow them to access any kind of information at any time and anywhere, but also because it provides access to services that had previously been reserved for large firms and corporations. In this way, software to manage companies, for security, storage solutions, corporate servers, business analytics solutions (BAS), CRM (customer relationship management), etc. can be accessed by any company or business and at totally affordable and competitive prices (by time used, subscription fee, access, etc.), reducing the cost of computing services for firms and avoiding the need for huge investment in machinery, software and personnel. In the immediate future, concepts such as software as a service (SaaS) and platform as a service (PaaS) will form part of the management vocabulary of any business. There are many cloud computing service providers and these are quite diverse: some are very large and generalist (such as Amazon, IBM, Hewlett Packard, Salesforce, VMware...) while others are smaller and more specialised (NetApp, Examworks, Quota, Professional Answers, B-Kin, E-nomina), but to access any of their services, at the moment it is vital to use the internet and, given how important they become for a company that chooses these services, secure, reliable and robust access is required: in short, internet access with guaranteed service quality.

The internet has revolutionised the telecommunications business. At the end of the last century, the average occupation of a landline circuit was less than 20 minutes a day; internet access via the broadband techniques that really only required small modifications in the access network allowed data traffic to be increased in those networks with excess capacity that had been designed following a criterion of a certain probability of congestion. The charging of this new service via flat rates provided operators with substantial marginal income. Flat rates led to internet growth, both in terms of access and content: innovative applications appeared that required increasingly more bandwidth, new service providers and new user terminal equipment. To be able to continue handling the increase in traffic caused by the internet, telecom networks gradually modernised, in the sense of growing in bandwidth and transforming the old design criterion based on the probability of congestion into a new criterion, the probability of concurrence, with services supplied under the *best effort*[9] concept. In other words, networks that had been designed based on the view that not all users were connected at the same time and paid for the time they occupied, had to adapt to a situation where most users were permanently connected and only paid a flat rate for this connection.

Mobile telephone networks have always been physically more limited in providing access to great bandwidth. That's why they have never proposed to offer flat rates for data services: for data services, mobile telephone operators have always offered prices for downloading or rates with download limits, or different prices depending on the time or day, never purely flat rates like landline telephone operators.

Given this continual increase in data traffic, operators are planning on investing in new generation access (NGA)[10] networks and focusing on access models such as those of mobile networks. However, the disappearance of flat rates does not solve the problem of too much traffic, so they are also looking

at handling the management of data and internet traffic more efficiently, and the issue of "net neutrality" has also appeared.

Net neutrality has aroused debate regarding how operators treat the traffic of their users' internet access and whether limitations should be established to the traffic management mechanisms applied or whether offering delivery with guaranteed quality for a fee to companies providing internet applications should not be allowed. The measures aimed at guaranteeing traffic is treated neutrally aim to maintain the original essence of the internet, an open, free network with an environment that fosters innovation for internet firms, but they can also hinder the introduction of new functions on networks, so that we must be cautious when intervening in such dynamic markets as those related to the internet.

Practically all telecom regulatory bodies are taking up the position in favour of maintaining the neutrality of internet traffic[11] but, at the same time, they are also allowing certain traffic management practices, especially those related to filtering spam and malware.

Telecom operators propose offering a series of applications, either internet or not, as "managed services" that would charge users based on the type of service and quality guaranteed for the bit per second rate, based on the same traditional economic model as telecommunications (charging users for access to the network and for each of the services taken out). On the other hand, they realise that the internet has become a "two-sided market", where not only users have to pay for using services but also the suppliers of these services; consequently, operators are negotiating agreements with some suppliers. In this respect, operators have started to win some legal battles against the prohibitions of electronic communication regulators.[12]

Applying the right to competition does not result in any principle of "neutral network" that impedes network providers from differentiating between the various suppliers of information society services in accessing the network. Quite the contrary; the differentiation of traffic via quality of access and delivery increases what is on offer and therefore also increases competition between operators.

With the issue of "net neutrality", the internet service's value chain is being redefined; however, we cannot renounce the original essence of the internet: the concept of an open network that has fostered the virtuous circle of innovations and developments of the internet. We must find intermediary solutions that satisfy, if not completely then at least partially, both telecom operators and social groups and suppliers that need an open internet. We need to try out solutions of the type: "Telecom operators will preserve x% (50?) of their data transmission capacity at least 90% of the time per year (month) of operation for the best effort of freely managed data transfer."

The internet is facing a new challenge: achieving the total convergence of services and achieving users' complete trust (security, robustness, user-friendliness). The former is not futile: we must all manage to combine the "open service" nature of the internet with actions to ensure service quality on telecom networks, a quality that can only be offered by managing the traffic circulating on it. The problems of "net neutrality" must be resolved, also in terms of governance.

The internet from a social point of view

It is evident that the internet is changing how we communicate with each other, how we access information, how we work, our habits in general. The internet influences us individually and as a social group. The internet is becoming the main conductor of the social revolution fostered by information and communication technologies (ICTs). Terms such as *website, blog, email*, etc. did not exist just over fifteen years ago; others such as *server, portal, site, browser, chat, mobile*... have extended their meaning and, by default, when we use them, we understand them in their present context. The prefix "e" (from *electronic*) before the name of classic services suggests modernity and progress: *e-government*, *e-health*, *e-justice*, *e-administration*, even *e-democracy*. Never before in history has a change of this size been taken on by a single generation. It is therefore a true revolution and one that is not easy to quantify or evaluate, given that it is currently in full flow.

If there is any time in the history of humanity that can be compared with the situation today it is undoubtedly, in my opinion, the arrival of the printing press as a tool for communication and to disseminate knowledge and ideas. To get an idea of what the internet means for the society of the first few decades of the 21st century, we can attempt to establish a parallel with what the printing press meant for the society of the 16th to 20th century.

Printing *per se* appeared thanks to Johannes Gutenberg in 1450, but it wouldn't be until the beginning of the 16th century when its use became widespread throughout the western world. For 16th century society, the printing press represented the chance to access and contribute to information, to culture, to documentation that, until that time, had been confined to monasteries and was parsimoniously administered by, with all due respect, the great multinational of the time. The development of printing meant that anticlerical ideas could be more readily disseminated and, when Martin Luther published his 95 theses against the papal indulgences in 1517, he could disseminate his ideas much more than his predecessors. Printing encouraged a renaissance in science and humanism: printing is the genesis and support of the great humanist and scientific movement of the 18th century known as the Age of Enlightenment.

I don't think it is any exaggeration to state that, in the five centuries from the 16th to the 21st century, society was organised based on printing: printing represented a new way of teaching, a new way of doing business and of evaluating it, a new way of spreading news, of governing... In short, a new economic and social model.

If we briefly review some notable events for printing, we will realise that the following are being repeated with the internet, among others:

- Lists of banned books were drawn up in an attempt to monopolise the use of printing. Today we can still find many different attempts by some countries to filter or even prohibit the internet.[13]
- Encyclopaedias were printed in an attempt to preserve and disseminate all explicit knowledge. The different Wikis on the internet are based on the same philosophy.
- There is so much information on the internet that it dazzles rather than enlightens. There is good and bad information on the internet. The same thing can be said for books and printed publications.
- Printing made 16th century society become aware of its illiteracy, as people had to learn to read in order to access printed products. To access the internet, we need to have a minimal knowledge of how to use new technologies, we have to learn how to "surf the net" and it is also useful to know how to install and uninstall a program and handle an antivirus, etc. We currently have a problem that must be eradicated and we can't take 400 years: digital illiteracy.

Printing still supports our social and economic model today. Certified and official documents, contracts, invoices, title deeds, official registries, laws and decrees, etc. are still on paper. It's true that things are starting to change in the sense that documents are now being produced in digital format,[14] but this is just beginning and I personally believe this will be the accurate indicator of the full shift from a social and economic structure based on, and through, printing to an evolved structure founded on electronic supports and increasingly located on a network. This is what is known as the "information society"; a new social model that, conceptually, we have to develop into a "knowledge society".

Although we can glimpse the importance of the social change we are going through, we are incapable of quantifying its extent. Once again, a glance at history regarding the developing of printing can act as a guide in terms of the ideals that should be preserved. What would have happened if "the powers that be" of the 16th century had taken control of printing? Surely the Enlightenment wouldn't have occurred (or at least it would have been held back several centuries) and our western world today would be quite different. In this same respect, the internet must keep its original character of an open, free network, where everyone can contribute and share. The internet must continue to be the remote space that allows us to grow in knowledge: the only growth we can classify as sustainable or even sustained, and this must be so as we must become wiser, because we have to continue being happy with fewer resources and only the wise know how to find and appreciate what is crucial in order to be happy.

Governance

By governance, we mean "the art or way of governing whose aim is to achieve lasting economic, social and institutional development, promoting a healthy balance between the state, civil society and the market of the economy".[15]

Given this definition, it seems that "governance" is the appropriate term to refer to safeguarding the internet system because it groups together, under a praiseworthy objective, the three actors most involved in the internet's future: states (political bodies), civil society (social institutions) and the market (economic goods). In this respect, Mr. Jorge Pérez Martínez, Professor at the Universidad Politécnica de Madrid, defines internet governance as "the development and application by governments, the private sector and civil society, in the functions they are respectively responsible for, of principles, standards, rules, decision-making procedures and common programmes that make up the evolution and use of the internet".[16]

Nevertheless, and in spite of all this, there is no obvious answer to the question of who makes the decisions regarding the internet. The internet is managed via a complex structure that is not at all static, where efficiency has been sacrificed for representation and for which we can surmise that the most important administrative agreement is the Declaration of Affirmation and Commitments[17] signed by ICANN with the US Department of Commerce, which is probably the body with the last word.

We have seen that the internet is configured as an open system or information service structured via different telecommunications networks of a different nature (landline, mobile, satellite), mostly of private capital but also public in some cases, operated by different companies, these also being of a differing social nature. The interconnection of these networks provides the physical infrastructure that supports the internet service. The internet is therefore "technically complex". On the other hand, the large variety of networks that make up the internet are implemented in all countries and therefore come under different sovereignties and legal regulations and, even though these tend to be convergent in democratic countries, this is not the case in all countries; in fact, the internet is the great scourge of totalitarian governments. The different regulations for telecom networks also make the issue of governance "legally complex". Due to its transparency as an all-embracing infrastructure for economic development and due to the economic potential it represents in itself, the internet is also "economically complex". Finally, due to its important role as a dynamic and structuring force in society, we must add to the aforementioned complexities that of it being a "subtle, complicated social engine" which should be allowed to run, perhaps with a need for guidance but never to be steered.

The mission of the Working Group on Internet Governance (WGIG) is to secure, improve and decide global mechanisms that help to coordinate, in a transparent way, the elements that make up the internet, from the telecom networks, services and applications that comprise it to, if applicable, the possible supervision of content (protecting children, unlawful email applications, etc.).

The WGIG is made up of 40 members from different countries and representatives of different stakeholders: governments, pri-

vate economic sector, academia, civil organisations, etc. The group was set up in 2003 and, since then, has carried out its work, summarised in annual reports that help to guide the management actions of the different bodies that really have decision-making powers in administering the internet service, an administration that, due to reasons of history and organisational distribution, both in terms of function and location, most internet users are still completely unaware of.

In most western countries there are internet governance forums (IGF) that help to make the WGIG representative. The Spanish IGF is made up of representatives from the state, academia, economics, user associations and telecom operators. The results of the talks at its annual congress are passed on to the WGIG. The documents produced by the Spanish IGF are of great interest to understanding the immense complexity of the internet universe and have been consulted extensively to produce this article.

When a worldwide phenomenon such as the internet combines the right of states and the physical laws of nature with the innovative, curious, organisational and productive spirit of human beings, it requires a representative body at a global level to safeguard its progress and allow it to develop. The current internet governance forums are doing a magnificent job as promoters of good practices, facilitators of its expansion and locators of dysfunctions but they lack the executive power to effectively solve the problems generated by something as complex as the internet. From a technical point of view, ICANN fulfils its function perfectly but its functional dependence on the US Department of Commerce makes it biased and weakens its position as an internationally representative body. The International Telecommunication Union (ITU), which manages and harmonises telecommunications by defining standards and allocating the radio spectrum, doesn't seem suitable either due to its lack of flexibility to oversee such a dynamic phenomenon as the internet.

It should also be noted that the system of telecom networks constitutes a new scenario of international relations, called "cyberspace". In some way, all the activities of our society use telecom networks for its management and control: the internet also uses these networks and it has also become a vehicle for new forms of criminal behaviour, such as attacks with viruses and identity theft and even industrial and political espionage. To maintain sovereignty, the governments of various states have been forced to create specialised units within their intelligence services to defend each country. Internet governance must not ignore this important issue that, whether we like it or not, will always affect the internet.

Considering all the above, to safeguard the internet we might propose "a body that fosters international cooperation to secure the stability and growth of an information exchange internet system with universal, free and open access that facilitates and harmonises international economic and social development". This definition has been taken, adapting the vocabulary, from the introductory definition of the International Monetary Fund (IMF).[18]

Such a body should maintain the transparency of the current organisations that contribute in some way towards the management and governance of the internet (ISOC, ICANN, WGIG), bringing them together under its hierarchy and resizing and redefining their functions, if necessary.

The growing importance of the internet in all fields of human activity, its technical complexity, the legislative heterogeneity it currently supports and its potential as a tool for world cohesion and social and economic development make the internet worthy of a body that can safeguard and manage it at the same level as the IMF or other similar organisations.

Notes

1. Stanford Research Institute, University of California Los Angeles, University of California Santa Barbara and the University of Utah.
2. In order to facilitate the exchange of scientific data, Tim Berners-Lee and his team created the HTML (*hyper text markup language*), HTTP (*hyper text transfer protocol*) and the URL (*uniform resource locator*), protocols that make up the system of "www" pages.
3. Mosaic was the first browser to use the protocols "file://". The first version worked on the UNIX operating system but, given its efficacy and user-friendliness, in 1994 there were already versions for the Windows and Macintosh operating systems. In 1997, Mosaic was replaced by Netscape.
4. Designed by Steve Deering and Craig Mudge, the version 6 internet protocol (IPv6) has been defined to replace the IPv4, currently implemented in most devices that access the internet. <http://www-ipv6.es>
5. European Union. *European Principles and Guidelines for Internet Resilience and Stability*. Version of March 2011. <http://ec.europa.eu/information_society/policy/nis/docs/principles_ciip/guidelines_internet_fin.pdf>
6. Since 1998, both IANA and InterNIC have been reorganised under the control of ICANN, a Californian non-profit corporation, hired by the US Department of Commerce to manage internet addresses. The role of operating the DNS system was privatised and opened up to competition, while the main management of assigning names would be granted via contracts.
7. 2010/572/EU: Commission Recommendation of 20 September 2010, on regulated access to Next Generation Access Networks (NGA).
8. Technique of temporarily storing the most frequently requested data close to the party requesting the data.
9. *Best effort* describes a network service where the network does not offer any guarantee that the data will be delivered with a specific level of service quality. In a best effort network, all users obtain the best service possible, which means that the bit rate at which they access the network is variable and depends on the total traffic load at any given time.
10. Really, it's at access where the bandwidth bottleneck occurs, the rest of the network, backbones and trunks, already has a wide bandwidth (fibre optic).

11. The six obligations proposed by the FCC for broadband internet access service operators: <http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-09-93A1.pdf>. Body of European Regulators for Electronic Communication, BEREC, has established a permanent working group on net neutrality. <http://erg.eu.int/doc/berec/bor_10_44rev1.pdf>

12. The Court of Appeals for the District of Columbia has stated that the FCC does not have the authority to impose network management practices on Comcast. McCollum, J. *FCC vs. Comcast on Net Neutrality: FCC loses*. *Marketing Pilgrim*. 7 April 2010.<http://www.marketingpilgrim.com/2010/04/fcc-vs-comcast-on-net-neutrality-fcc-loses.html>

13. Reporteros Sin Fronteras. *Enemigos de Internet 2011*. 12 March 2011. <http://files.rsf-es.org/200000877-dcb20d-dac0/RSF_ENEMIGOS_DE_INTERNET_2011.pdf>

14. By way of example, since January 2010, in Spain, the famous "family book" has been replaced by a centralised digital registry.

15. *Diccionario de la Lengua Española* by the RAE, twenty-second edition, 2001.

16. Pérez, J.; Olmos, A. "Introducción. La gobernanza de internet". *Telos: Cuadernos de comunicación e innovación*, number 89, July-September 2009. ISSN: 0213-084X .
<http://sociedadinformacion.fundacion.telefonica.com/telos/articulocuaderno.asp@idarticulo=1&rev=80.htm>

17. Affirmation of commitments acquired by the US Department of Commerce (DOC) and the Internet Corporation for Assigned Names and Numbers (ICANN). September 2009.
<http://www.gobernanzainternet.es/doc/archivos/Declaración_de_compromisos.pdf>

18. The International Monetary Fund (IMF) works to foster international monetary cooperation, secure financial stability, facilitate international trade, promote high employment and sustainable economic growth, and reduce poverty around the world.
<http://www.imf.org/external/np/exr/facts/spa/glances.htm>