1 June 2012

**UK revised Comments to PRELIMINARY SECOND DRAFT OF THE SECRETARY-GENERAL’S REPORT**

**for the
Fifth World Telecommunication/Information and Communication Technologies Policy Forum 2013**

 **1. Preamble**

**1. 1 The fifth World Telecommunication/ICT Policy Forum (WTPF)**

**1.1.1** Originally established by the 1994 Plenipotentiary Conference, the World Telecommunication/ICT Policy Forum (WTPF) aims to provide a forum where ITU Member States and Sector Members can discuss and exchange views and information on emerging telecommunication/ICT policy and regulatory matters, especially global and cross-sectoral issues (Resolution 2, Guadalajara, 2010).

**1.1.2** By Decision 562, the 2011 Session of ITU Council decided that WTPF-2013 would discuss all the issues raised in: Resolution 101: “Internet Protocol (IP)-based Networks” (Rev. Guadalajara, 2010); Resolution 102: “ITU’s role with regard to international public policy issues pertaining to the Internet and the management of Internet resources, including domain names and addresses” (Rev. Guadalajara, 2010); and Resolution 133: “Roles of administrations of Member States in the management of Internationalized (multilingual) domain names” (Rev. Guadalajara, 2010).

**1.1.3** The ITU Secretariat prepares annual reports to Council on ITU’s activities in relation to the implementation of Resolution 101 (Rev. Guadalajara, 2010), Resolution 102 (Rev. Guadalajara, 2010) and Resolution 133 (Rev. Guadalajara, 2010). Other related activities are also undertaken by ITU within the framework of its Strategic, Operational and Financial Plans.

**1.1.4** Building on the work of the Dedicated Group,the Council Working Group on International Internet-Related Public Policy Issues (CWG-Internet) was established as a separate group by 2011 Council [Resolution 1336](http://www.itu.int/md/S11-CL-C-0099/en), in accordance with Resolutions 102 and 140 of the 2010 Plenipotentiary Conference. CWG-Internet is limited to Member States, with open consultation among all stakeholders. The[terms of reference for CWG-Internet](http://www.itu.int/council/groups/CWG-internet/index.html) are to identify, study and develop matters related to international Internet-related public policy issues, including those issues identified in 2009 Council Resolution 1305.

**1.1.5** WTPF-2013 shall prepare reports and adopt opinions by consensus for consideration by ITU membership and relevant ITU meetings, bearing in mind items 1.1.3 and1.1.4, and the need to avoid contradiction between the debates at WTPF and ongoing activities undertaken as part of ITU’s mandate under Plenipotentiary Resolutions (and other decisions of ITU Conferences and Assemblies) and the terms of reference of CWG-Internet.

**1.1.6** All information relating to WTPF-2013 is posted at: <http://www.itu.int/wtpf>.

# 1.2 Preparatory process for the Secretary-General’s Report

**1.2.1** Discussions at WTPF-2013 shall be based on a report from the Secretary-General, incorporating the contributions of ITU Member States and Sector Members, which will serve as the sole working document of the Forum, and shall focus on key issues on which it would be desirable to reach conclusions (2011 Council Decision 562). This draft Report outlines a potential scope for discussions and presents some of the Internet-related public policy issues under consideration in different stakeholder groups.

**1.2.2** According to Decision 562, the Secretary-General shall convene a balanced, informal group of experts, each of whom is active in preparing for the Policy Forum, to assist in this process. Membership of the informal group of experts is open to all stakeholders, and not limited to ITU Members.

**1.2.3** [A circular letter (DM12-1003)](http://www.itu.int/en/membership/Pages/letters.aspx) outlining the preparatory process of the fifth WTPF was sent to ITU membership on 1 February 2012 (<http://www.itu.int/en/membership/Pages/letters.aspx>). The proposed timetable, included in the letter, is given below:

**Table 1: Proposed Timetable for the Secretary-General’s Report**

**(Note: This timeline has been overtakren by events and it needs to be updated to reflect the timeline as it currently exists)**

|  |  |
| --- | --- |
| **9 March 2012** | Deadline for membership to submit materials considered relevant for the first draft of the Secretary-General’s Report.  |
| **13 April 2012** | Online posting and circulation to membership of the first draft of the Secretary-General’s Report.  |
| **15 May 2012** | Deadline for receipt of membership comments on the first draft and additional materials for the second draft. Deadline for nominations for the informal expert group (IEG) to advise the Secretary-General. |
| **5 June 2012** | First meeting of the group of experts. Preliminary second draft of the Secretary-General’s Report. |
| **31 July 2012** | Online posting and circulation of second draft (incorporating comments and broad outlines for possible draft opinions). |
| **30 September 2012** | Deadline for receipt of comments on the second draft. |
| **Jan-Feb 2013** | Second meeting of the informal group of experts. |
| **1 March 2013** | Finalization of the Report of the Secretary-General, and deadline for its publication. |
| **13 May 2013** | Proposed date for a high-level Strategic Dialogue. |
| **13-17 May 2013 (coincides with WSIS Forum 2013)** | Proposed dates for 5th WTPF on Internet-related public policy issues. |

# 2. Themes for WTPF-2013

**2.1** By Decision 562, the 2011 Session of Council decided that the fifth WTPF would discuss all the issues raised in Resolution 101 (Rev. Guadalajara, 2010), Resolution 102 (Rev. Guadalajara, 2010) and Resolution 133 (Rev. Guadalajara, 2010). Resolutions 101 (Rev. Guadalajara, 2010) and 102 (Rev. Guadalajara, 2010) were adopted in 1998 and amended most recently at PP-10.Resolution 133 (Rev. Guadalajara, 2010) was adopted in 2002 and amended recently at PP-10.

**2.2** Issues raised in Plenipotentiary Resolutions 101, 102 and 133 that are under consideration for the purposes of this report (bearing in mind item 1.1.5) have been extracted from the aforementioned Plenipotentiary Resolutions and are listed in the sections below.

**2.3.1 Development & Diffusion of Information and Communication Technologies Globally**

1. The Internet traces its origins[[1]](#footnote-1) to concepts developed in the United States more than 40 years ago, which made significant investments – financial, intellectual and human – in the development of early and later iterations of the Internet. Indeed, some of the key characteristics of the Internet today reflect priorities and historical choices made during the course of its development (e.g., its architecture, the fundamental importance of information-sharing and exchange, and the possibility of anonymity).

**Box 1: Key Stages in the Development of the Internet**

**1969 — ARPANET** (US Department of Defense)

**1972 — CYCLADES** (The French government developed its own computer network, named CYCLADES, designed by Louis Pouzin in 1972)

**1975 — TCP/IP (**allowing not only computers to be networked, but also *networks* to communicate with each other. It was designed by Robert E. Kahn and Vint Cerf working at ARPA)

**1983 — The Domain Name System** (DNS) (developed by Paul Mockapetris at ISI)

1. **— The World Wide Web** (invented by Tim Berners-Lee at CERN)
2. The Internet has evolved far beyond its initial experimental setting. Today’s global information infrastructure encompasses a host of public and private Internet Protocol (IP)-based and other networks.
3. The success of the Internet has been achieved through the management of the Internet by non-governmental organisations in a flexible manner reflecting a bottom-up multi-stakeholder approach
4. The Internet today is global in scale and supports applications that touch on virtually all aspects of society. The Internet has become a critical national resource for governments, a vital part of national infrastructure, and a key driver of socio-economic growth and development, among other drivers.
5. Total global Internet users numbered some 2.4 billion by the start of 2012, among which, total mobile broadband subscribers amounted to 1.192 billion. The increased use of the Internet introduces additional applications in telecommunication/ICT services based on its highly advanced technology, e.g. the utilization of e-mail and text messaging, Voice over IP (VoIP), video and real-time TV (IPTV) over the Internet. By the end of 2011, there were some 135.4 million VoIP subscribers and 60 million IPTV subscribers worldwide (Point Topic, 2012[[2]](#footnote-2)).

**Table 2: Summary Statistics for High-Speed Connectivity[[3]](#footnote-3)**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Total, 2011** | **High-speed, 2011** | **% Global Totalhigh-speed, 2011** |
| **Fixed Internet subscriptions** | 659 million (2010) | 527 million (2010) | 80% (2010) |
| **Mobile subscriptions** | 5.981 billion | 1.192 billion | 19.9% |
| **Handset shipments** | 1.5452 billion | 491.4 million | 31.8% |

**Figure 1: Global Internet Users, by geographic region, 2011**



1. Advances in the global information infrastructure, including the development of IP-based networks and especially the Internet, and future IP developments, are an engine of growth and socio-economic development in the world economy in the twenty-first century. A ten per cent increase in broadband penetration has been estimated to yield a 1.21 – 1.38% increase in Gross Domestic Product (GDP) growth on average for high-income and low/middle income countries respectively (World Bank, 2009). Country case studies yield similar estimates for individual countries (e.g., for Panama, the Philippines and Turkey – [www.itu.int/broadband/](http://www.itu.int/broadband/)).
2. The Internet has fundamental value as a platform for innovation, democratic expression, access to information and scientific progress. In the growing digital economy, the Internet represents a portal for knowledge, education and entertainment which is becoming increasingly available to more of the world’s population, especially if growth in the use of mobile broadband can mirror the recent overall growth in mobile communications.
3. It is widely recognized that the utility and value of a network increases with growth in the number of nodes and users of that network. Applications such as the World Wide Web, E-mail, and Instant Messaging have revolutionized the lives of ordinary people.
4. The Internet, as a decentralized and open system, must be permitted to enable the world’s citizens to freely connect and express themselves consistent with fundamental principles of freedom of expression, while taking into consideration national security or of public order (ordre public), or of public health or morals[[4]](#footnote-4). In the rapidly changing technological, economic and social environment within which new policy challenges emerge, multi-stakeholder processes have been shown to provide the flexibility and global scalability required to address Internet policy challenges. Consistent with the nature of knowledge, information and forms of expression provided over the Internet as global public goods, ITU Member States may wish to consider policy measures to increase and promote? the growth of the Internet.
5. At the World Summit on Information Society (WSIS), world leaders and Heads of State adopted general principles on a multi-stakeholder governance model, which offer a fundamental framework on which to base such policy measures. Various initiatives have been undertaken at the national level to enunciate high-level governing principles for cyberspace including, inter alia, the United States [International Strategy for Cyberspace](http://www.whitehouse.gov/sites/default/files/rss_viewer/international_strategy_for_cyberspace.pdf), the OECD Council Recommendation on Principles for Internet Policy Making,[[5]](#footnote-5) Brazil’s ten "[Principles for the Governance and Use of the Internet](http://cgi.br/)”, and following from the London Cyber Conference (November 2011):
	1. The need for governments to act proportionately in cyberspace and in accordance with national and international law;
	2. The need for everyone to have the ability to access cyberspace and the skills, technology, confidence and opportunity to do so;
	3. The need for users of cyberspace to show tolerance and respect for diversity of language, culture and ideas;
	4. Ensuring that cyberspace remains open to innovation and the free flow of ideas, information and expression;
	5. The need to respect individual rights to privacy and to the provide proper protection to intellectual property;
	6. The need for us to work collectively to tackle threats from criminals acting online; and
	7. The promotion of a competitive environment which ensures a fair return on investment in network, services and content,
6. The openness of the Internet – open to access and to innovation – has promoted its rapid uptake and development, stimulating investment and advances in global information infrastructure. As a result, the Internet has become vitally important as a major engine for growth in the world economy in the 21st century.

**2.3.2 The success of the Multi-stakeholder Model**

1. The development of the Internet is today essentially market-led and is driven by both private and government initiatives, enabling a remarkably stable, open and innovative network of networks. It is widely agreed that the Internet grew within an environment facilitated by voluntary, decentralized and consensus-based processes. The growing centrality of the Internet to social and economic activities around the globe increases the importance of continuing to strengthen an Internet governance model that remains flexible, transparent and accountable. The need to engage broader participation to ensure that the Internet keeps pace with changing user requirements is today more acute than ever. As the OECD noted in its December 2011 Recommendation on Principles for Internet Policy Making, the multi-stakeholder model provides, “the flexibility and global scalability needed to address Internet policy challenges”. The private sector continues to play an important role in the expansion of the Internet - for example, through investments in infrastructure and services. Likewise, the private sector, which has been the cornerstone for the development of the Internet, has a fundamental role to play in Internet policy development within a bottom-up and pluralistic governance model; effective multi-stakeholderism, based on coordination and collective endeavour among governments, industry, academia and civil society is essential to face future policy challenges and keep up with the needs of end users. Governments are an integral part of this process and many have actively engaged to ensure that public policy interests are addressed. This positive engagement in the multi-stakeholder model strengthens the Internet, improving its ability to spread both prosperity and freedom in all its various forms.
2. The management of the Internet is a subject of valid international interest and must flow from full multi-stakeholder cooperation on the basis of the outcomes of the two phases of the World Summit on the Information Society (WSIS), as referenced in Plenipotentiary Resolution 102 (Guadalajara 2010) and the WSIS *Tunis Agenda for the Information Society* (paragraph29).
3. The *Tunis Agenda for the Information Society* (para 34) provides “a working definition” of Internet governance as “the development and application by governments, the private sector and civil society, in their respective roles, of shared principles, norms, rules, decision-making procedures, and programmes that shape the evolution and use of the Internet”.
4. The WSIS and the Tunis Agenda provide the framework for discussions on Internet-related public policy issues including a broad framework for establishing governing principles for the management of the Internet. Endorsed by world leaders in 2005, it touches on public policy issues related to the Internet and the multi-stakeholder governance model:
5. §§ 68-71 and 72-78 of the Tunis Agenda with regard to enhanced cooperation on Internet governance and the establishment of the Internet Governance Forum (IGF).
6. The relevant outcomes (§§ 29-82 Tunis Agenda) concerning Internet governance.
7. The management of the Internet encompasses technical and public policy issues and should involve all stakeholders and relevant intergovernmental and international organizations. In this respect it is recognized that [[6]](#footnote-6):
8. Policy authority for Internet-related public policy issues is the sovereign right of States. They have rights and responsibilities for international Internet-related public policy issues.
9. The private sector has had, and should continue to have, an important role in the development of the Internet, both in the technical and economic fields.
10. Civil society has also played an important role on Internet matters, especially at community level, and should continue to play such a role.
11. Intergovernmental organizations have had, and should continue to have, a facilitating role in the coordination of Internet-related public policy issues.
12. International organizations have also had and should continue to have an important role in the development of Internet-related technical standards and relevant policies.
13. The Internet is successful because it is managed using a multi-stakeholder model in which a number of non-governmental institutions oversee critical parts of its architecture with input from private and public sector participants. This bottom-up decentralized structure mirrors the decentralized nature of the networks that make up the Internet itself. It maximizes flexibility and innovation, helping to prevent any one governmental or non-governmental actor from exerting control over either the design of the Internet or the content it carries, That is why the Internet has been able to evolve and grow so quickly, both as a technological platform and as a means of expanding the free flow of commerce and ideas. Deviation from the multi-stakeholder model weakens the Internet, placing under threat the existing benefits enjoyed by end users.
14. As stated in the WSIS outcomes, all governments should have an equal role and responsibility for international Internet governance and for ensuring the stability, security and continuity of the existing Internet and its future development. The need for development of public policy by governments in consultation with all stakeholders is also recognized[[7]](#footnote-7). Many multi-stakeholder organizations have played a fundamental role in Internet governance and its evolution. These include the Internet Architecture Board; the Internet Engineering Task Force, the Internet Society, the World Wide Web Consortium and the Internet Corporation for Assigned Names and Numbers (ICANN). The Internet Governance Forum (IGF), established by in response to a recommendation from WSIS brings together governments and different sector stakeholders to promote understanding and to inform decision-shaping. The IGF has been a constructive Internet governance platform and without this forum there would be no adequate global space for discussion on current Internet governance issues among all relevant actors. However, the IGF needs to continue encouraging the participation of diverse groups, especially from the developing world.
15. Member States represent the interests of the population of the country or territory for which a ccTLD has been delegated. Countries should not be involved in decisions regarding another country's ccTLD[[8]](#footnote-9).
16. ITU membership has been discussing Internet governance for many years, from both a narrow and broad perspective. The narrow approach focuses on Internet architecture and infrastructure (DNS, IP numbers, and root servers), a field in which the Internet Corporation for Assigned Names and Numbers (ICANN) plays a significant role. According to the broad approach, Internet governance negotiations should go beyond infrastructural points and address other legal, economic, developmental, and socio-cultural issues, as adopted by the World Summit on the Information Society (WSIS).
17. While many are satisfied with the current state of Internet governance, nonetheless acknowledging that there is room for improvements, such as further enabling an environment where all stakeholders within the Internet community engage with the multi-stakeholder process. others have expressed dissatisfaction, expressing that further evolution is needed to keep pace with the global spread of the Internet, how the Internet is used today and the roles of the various players who need to work together to ensure its ongoing evolution. Those dissatisfied point out that the current governance of Internet could be improved in accordance with the WSIS outcomes (especially on the roles and responsibilities of different stakeholder groups as outlined in § 35 of the Tunis Agenda – with some citing, for example, that governments currently have a limited decision-making role in formulating international public policy) and call for all governments to have an equal role and responsibility in an inclusive global management framework of the Internet. Some others call for more balanced representation of all stakeholder groups. However involvement is open and many governments have engaged effectively with relevant international organisations, using positive engagement to ensure public policy interests are addressed.
18. Under the framework of the WSIS principles, ITU Resolutions 101, 102 and 133 resolve “to explore ways and means for greater collaboration and coordination between ITU and relevant organizations\* involved in the development of IP-based networks and the future internet, through cooperation agreements, as appropriate, in order to increase the role of ITU in Internet governance so as to ensure maximum benefits to the global community” (\* including, but not limited to, the Internet Corporation for Assigned Names and Numbers (ICANN), the Regional Internet Registries (RIRs), the Internet Engineering Task Force (IETF), the Internet Society (ISOC) and World Wide Web Consortium (W3C), on the basis of reciprocity” [Brazilian and ARIN contributions to WTPF; see Documents 9 and 8 at: <http://www.itu.int/md/S12-WTPF13PREP-C-0009/en> and ARIN <http://www.itu.int/md/S12-WTPF13PREP-C-0008/en>]. To facilitate greater collaboration and coordination between the ITU and relevant organizations the ITU specifically invites the referenced organizations to participate in the Informal Experts Group. Tunis Agenda for the Information Society para 68-71 requires that the process towards enhanced co-operation involve all stakeholders in their respective roles, a recognition of the need for all stakeholders to recognize the on-going roles of each stakeholder and for all to co-exist in an environment of mutual trusted co-operation.

It should be noted that the process towards enhanced co-operation requires the relevant stakeholders to co-exist and work together, giving each other increased opportunities to attend and speak in relevant meetings and make greater use of the opportunities available to them.

**2.3.3 Internet Protocol (IP)-Based Networks and Management of Internet Resources**

1. The openness of the Internet to innovation and investment that has lead to the advances in infrastructure that are an engine of growth in the twenty-first century. National development of infrastructure, including mobile Internet and broadband networks will help countries benefit from the growing global economy.. These services have become commonplace, although for some users challenges regarding quality of service, uncertainty of origin, and high costs of international connectivity persist.
2. The Internet, and IP-based networks more broadly, form a vital part of national infrastructure, including for governmental use. Current and future IP-based networks and future IP developments will continue to introduce dramatic changes in the way we acquire, produce, circulate and consume information.
3. On the basis of such growth, demands are now growing on the existing Internet design and infrastructure. New applications, services and functionality frequently appear on the Internet and it is this openness to innovation and access that has been the Internet’s crucial success. Some experts have suggested that the underlying technical architecture of the present Internet was not designed for, and might not be sufficiently robust, to support some new classes of applications and services, but the current architecture has allowed astonishing levels of innovation and growth with, in particular, massive uptake of video traffic and multi-user applications. There is no evidence that the current infrastructure will not be able to continue to evolve and grow to cope with demand..
4. The high costs of the international circuit for Internet connectivity between least developed countries and the Internet backbone networks remains a serious problem for these countries. Paragraph 50 of the Tunis Agenda (2005) acknowledged significant concerns and calls for the charges for international Internet connectivity to be better balanced to enhance access, particularly from developing countries. It therefore called for the development of strategies for increasing affordable global connectivity, thereby facilitating improved and equitable access for all, by:
5. Promoting Internet transit and interconnection costs that are commercially negotiated in a competitive environment and that should be oriented towards objective, transparent and non-discriminatory parameters, taking into account ongoing work on this subject.
6. Setting up regional high-speed Internet backbone networks and the creation of national, sub-regional and regional Internet Exchange Points (IXPs).[[9]](#footnote-10)
7. Recommending donor programmes and developmental financing mechanisms to consider the need to provide funding for initiatives that advance connectivity, IXPs and local content for developing countries.
8. Encouraging ITU and other relevant institutions to continue the study of the question of International Internet Connectivity (IIC) as a matter of urgency, and to periodically provide outputs for consideration and possible implementation.
9. Promoting the development and growth of low-cost terminal equipment, such as individual and collective user devices, especially for use in developing countries.
10. Encouraging Internet Service Providers (ISPs) and other parties in the commercial negotiations to adopt practices towards attainment of fair and balanced interconnectivity costs.
11. Encouraging relevant parties to commercially negotiate reduced interconnection costs for Least Developed Countries (LDCs), taking into account the special constraints of LDCs.
12. Rates for International Internet Connectivity (IIC) have been studied in ITU-T Study Group 3 with several recommendations[[10]](#footnote-11) having been made on methods to reduce connectivity rates. To complement the work of such groups, the ITU may consider what policy environments and strategies can help facilitate the growth of networks and reduction in connectivity rates, especially as they relate to the establishment and growth of IXPs (both at a local and regional level).
13. The need for international Internet Connectivity can be reduced through the development of local and national networks. Content hosted within a country, rather than abroad, will reduce demand for international connectivity. A further benefit of hosting local content closer to the users is reduced latency which improves the user experience and increases demand for Internet connectivity.
14. With the move from traditional networks (based on dedicated service-channels and/or separate networks for each service) to integrated (transport) services on a single packet-based transport infrastructure, pre-defined transmission planning of Quality of Service (QoS)[[11]](#footnote-12) has become a major challenge, since IP-based networks cannot provide for self-standing end-to-end QoS, but only transport classes, which enable QoS differentiation.
15. Due to the dramatic increase in mobile communications, both in terms of the number of registered devices and of the volume and transmission of requested resources, some experts have cautioned that migration scenarios and hybrid connections with existing wire-bound and traditional networks and terminals may be neglected and it may become increasingly difficult to establish or enforce certain QoS standards.
16. Some commentators have stressed the importance of standardization so that the quality of service is consistent with international standards. They opine that it is in the public interest that IP-based networks and other telecommunication networks should be both interoperable and provide, at a minimum, the level of QoS provided by traditional networks. Others have stated that any attempt to mandate telephony style QoS in a packet switching Internet will significantly increase costs. A likely consequence of this is pricing LDCs out of the Internet and reducing participation rates in developed and developing countries.
17. According to some, the present situation of the wide penetration of OTT (Over The Top) services over operators’ networks and their enhanced impact on operators’ services, may require ITU to consider management of QoS of OTT services which are carried over the Internet [Russian contribution – see Document 10 at <http://www.itu.int/md/S12-WTPF13PREP-C-0010/en>]. Others suggest that any international technical standards in relation to the Internet and IP networks continue to draw on voluntary and established expert bodies that have to date facilitated the unprecedented growth of the Internet, especially in developing countries. Other commenters suggest that any international technical standards in relation to the internet and IP networks continue to draw upon established expert bodies that have to date facilitated the unprecedented growth of the internet, especially to developing and transitioning countries.
18. Today, from a commercial perspective, there is a growing discrepancy between the growth in traffic (requiring corresponding significant growth in investment in telecommunication infrastructure) and trends in pricing and revenues (Figure 2). This poses a significant challenge the future of the telecommunication/ICT and Internet services industry going forward.

**Figure 2: Trends in pricing and revenues[[12]](#footnote-13)** 

1. IP-based networks have evolved into a widely accessible medium used for global commerce and communication. There is hence a need to identify the global activities related to IP-based networks with respect to, for example:
	1. infrastructure, interoperability and standardization;
	2. Internet naming and addressing;
	3. dissemination of information about IP-based networks and the implications of their development for ITU Member States, particularly among developing countries.

**2.3.3.1 Infrastructure, interoperability and standardization[[13]](#footnote-14)**

1. Convergence of ICT technology is making the Internet the most important infrastructure of modern telecommunications, while the Internet and telecommunication services are becoming indistinguishable, but significant differences remain.
2. There have been calls for bold new initiatives to expand the capabilities of the Internet well beyond incremental improvements to its deployed capabilities. In order to provide additional flexibility to accommodate current and new and unforeseen innovations, further research and development and innovation in the fundamental design of the Internet (including architecture, protocols, interfaces and services) may need to be encouraged.
3. Given the depth to which Internet is today embedded in the socio-economic fabric of society, any evolutionary approach to building the Internet should ensure full continued interoperability.
4. Standardization plays an important role in ensuring this interoperability, while promoting the continuous development of Internet. Significant work and research on IP-related issues and the future Internet is being conducted by many bodies at the national, regional and international levels, some examples include: ITU; the Internet Engineering Task Force (IETF); US National Science Foundation (NSF) projects, including the Global Environment for Network Innovations (GENI) and Future Internet Design (FIND) projects; Japan’s National Institute for ICT (NICT) Akari project; and the European Union’s Future Internet Research & Experimentation (FIRE) initiative.

**2.3.3.2 Internet Naming and Addressing**

1. For more than two decades, the industry-level management of the IPv4 address distribution mechanisms has provided a stable, predictable and open environment for Internet growth and evolution. The IPv4 addressing standard has provide successive generations of newly emerging ISPs and online content providers with an open and reliable means of being integrated into the Internet.
2. New and evolving technologies and protocols, with their enabling effect on broader opportunities and innovation such as IPv6 and cloud computing, are emerging as an engine for economic and social development.
3. Every device connected to the Internet is identified by an IP address used to route data packets globally across the Internet.. The first implementation, IP version 4 or ‘IPv4’, was deployed on 1 January 1983 and uses 32 bits to represent addresses, generating a theoretical total limit of 232 (4 billion addresses). It is still the most widely used today. IP addresses are a finite resource and a new version of IPv6 was developed by IETF in 1996.
4. The Internet Assigned Numbers Authority (IANA) is responsible for globally coordinating the IP addressing systems and its role is to allocate IP addresses form the pools of unallocated addresses to the Regional Internet Registries (RIRs) according to their needs. Another key IANA role is the reservation of IP addresses for specific technical purposes, on the direction of the IETF. Examples include Multicast assignments, transition tunneling technologies and private use addresses.
5. The continued rapid growth of the number of devices connected to the Internet is leading to the exhaustion of IPv4 addresses. To prepare for this, a new version (IPv6) was developed by IETF by 1996 and provides a greatly expanded address space since it uses 128 bits to represent addresses (generating a new limit of 2128 addresses is equivalent to some 340 unidecillion). In February 2011, IANA assigned the last five remaining blocks of IPv4 addresses to the five RIRs. IANA began the first production of IPv6 address allocations in 1999.[[14]](#footnote-15)[[15]](#footnote-16)
6. The smooth migration from IPv4 to IPv6 represents a key global issue. It is important to note that IPv4 and IPv6 will coexist on the Internet and in many networks and devices, for the upcoming years. Despite the benefits of IPv6 and the foreseen IPv4 exhaustion, IPv6 implementation has progressed slowly, but it now increasing at an exponential rate[[16]](#footnote-17)
7. According to some, deployment of IPv6 should become a clearly-stated priority objective for national policy-makers. This should build on the significant work carried out over more than a decade to encourage ISPs, Web site operators, the software industry and the general public to adopt IPv6.
8. Many have supported the proposal that new IPv6 allocation policies should be similar to IPv4 policies, on a “first come, first serve” basis with ‘demonstrated’ need. However, some observers suggest that this may represent a cause for concern. These observers caution that this policy has led to the occupancy of a substantial amount of the finite IP addresses in the IPv4 address space and may work against late entrants, especially developing countries, although there is a lack of supporting research for this claim. However, IPv6 address policies apply from day 1, whilst IPv4 policies were subsequently. On the other hand, many argue that as the IPv6 address space is virtually inexhaustible the previous allocation policy is feasible for IPv6. The [background report of WSIS-Working Group on Internet Governance (WGIG)](http://www.itu.int/wsis/wgig/docs/wgig-background-report.pdf) in 2005 has acknowledged that “the current numbering management is required to ensure equitable distribution of resources and access for all into the future”.
9. Furthermore, Internet Service Providers (ISPs) using IPv6 still need to use IPv4 in order to be able to access most of the existing content, so the availability (or lack thereof) of IPv4 addresses is a factor which continues to be relevant today in the context of migrating to IPv6, after IANA and APNIC exhausted their IPv4 free pools in January and April 2011 respectively (although this need has been taken into account in the RIR’s allocation policies). The exhaustion of IPv4 address and migration to IPv6 has lead to suggestions that the governance structure of IP addresses needs reform for improvement[[17]](#footnote-18), and that this reform should use the existing Regional Internet Registry (RIR) processes that are open to all and which are agreed by the multi-stakeholder community they represent. It should be noted that many commercial Content Delivery Networks (CDNs) enabled their networks for IPv6 before 6 June 2012 (World IPv6 Launch Day). Today, the content for large sites can be made available over IPv6 at the request of the content owner. Similarly, large services like Facebook and Netflix, who manage their own content delivery, have enabled IPv6 on their networks. When looked at from the perspective of the most used content, a large proportion was available over IPv6 from 6 June 2012.Any reform to the current governance structure should use existing Regional Internet Registry Processes, that are open to all, and which are agreed by the multi-stakeholder community that they represent.
10. According to some, the present situation of the deficit of the IPv4 addresses for Internet connections and expansions of Internet resources requires to recommend organize rational usages the IPv6 addresses in all regions within further ITU function of the IPv6 allocation [Russian contribution – see Document 10 at <http://www.itu.int/md/S12-WTPF13PREP-C-0010/en>]. Other commentators believe present IPv6 allocation mechanisms are adequate and that they key objective should be identifying ways to spur IPv6 adoption by relevant stakeholders.
11. As the Internet evolves, major changes are underway in Internet routing and addressing policy. Resource Public Key Infrastructure (RPKI)[[18]](#footnote-19) is a security technology that would create a hierarchy of digital certificates which would be used to authenticate the allocation of address blocks and route announcements using those blocks in order to improve the security of the global routing system.

Observers note with caution that such a rigid global hierarchy could converge on a single trust anchor. The Syracuse University-based Internet Governance Project states that[[19]](#footnote-20) :

*The critical feature of the proposed RPKI solution is the attempt to link resource certificates to the authoritative sources of internet resources, namely ICANN and the RIRs. This could fundamentally change their governance role.*

(Note: Issues related to Internet Naming are addressed in section 2.3.4).

**2.3.3.3 Dissemination of information about** **IP-based networks and the implications of their development for ITU Member States, particularly developing countries**

1. Providing open and equitable access to information about critical Internet resources by enabling the adaptation of adequate national and/or regional policy processes, specifically for IP-based networks - including the transition from IPv4 and migration to/deployment of IPv6, domain names and their internationalized versions - and ensuring that countries improve awareness of issues pertaining to Internet-related public policy, including Internet governance, are key issues for ITU Member States[[20]](#footnote-21).
2. With the ever-increasing migration to all-IP based networks and the evolution of the current Internet governance arrangements, many developing countries need to build national capacity and improve their contribution and involvement in the management and effective governance of the Internet.
3. Some observers suggest that participants from developing and Least Developed Countries are disadvantaged by the significant costs and human capacity requirement associated with participation in various global fora where Internet-related technical and public policy issues are discussed. However, there is no fee required to participate in IETF, RIRs, and ICANN fora. International travel is not necessary to effectively participate in the discussions, making participation in these fora significantly less expensive and more equitable than participation in other global fora,

**2.3.4 International public policy issues and the management of Internet resources**

**2.3.4.1 Inclusion of new generic Top Level Domains (gTLDs) under the Domain Name System**

1. The Domain Name System (DNS) specifies a hierarchical structure of the delegation authorities in domain naming. The DNS hierarchy is divided into top-level domains (TLDs), second-level domains (SLDs), etc. TLDs are generally categorized in two different groups: namely, generic Top Level Domains (gTLDs) and country code Top Level Domains (ccTLDs).[[21]](#footnote-22)
2. Originally, there were only seven gTLDs (.com, .org, .net, .gov, .edu, .mil and .int). Following growth in the demand for more gTLDs, several gTLDs (i.e., .biz, .info, .aero, .coop) have been added to the DNS. Historically, a new gTLD was added to the DNS based on proposals solicited by ICANN during specific application periods. Currently, there are 22 functional gTLDs.
3. In June 2008, ICANN announced its new gTLD expansion policy, under which any public or private-sector entity can apply to create and operate a new gTLD. ICANN clarifies that applying for a new gTLD is not the same as buying a domain name on a “first come, first served” basis, but will be operating a registry business for a new gTLD based on the applicant’s technical and business capability and a commitment to implement ICANN’s policies effectively. After more than three years of careful preparation and open consultation, ICANN finally initiated the first round of the new gTLDs application opening on 12 January 2012 for three months. Each gTLD applied-for string requires an online application via ICANN’s online application system and an evaluation fee (currently set at US$ 185,000 per requested application) to cover the cost of the rigorous evaluation process (with any surplus budget being used for charitable support).
4. Some observers have raised concerns about the magnitude and scale of gTLD expansion and transparency in the cost evaluation used in the determination of registry fees. There is no upper limit on the number of applications for new gTLDs. Many observers are concerned about competition in the market for gTLDs, and the risk of creating a multitude of monopolies, rather than increasing competition in the gTLD market.
5. Some stakeholders remain concerned about the impact of multiple new gTLDs on trademark holders or right holders, especially those in developing countries, who would be compelled to assume high costs of addressing the possible proliferation of cyber-squatters inhabiting an unlimited number of new gTLDs. For example, since a domain name navigates to a website for a certain company or organization, there are more possibilities that trademark abusers could use new gTLDs with trademark protected names or look-alike names that may lead users/consumers to spoofed websites (“phishing”) or to rival company websites (“free riders”). It may thus be necessary for “www.A.com” registrant to register the same domain name in all other gTLDs, such as “A.info”, “A.biz”, “A.mobi”, and “A.(all other new gTLDs)” to protect the trademarked name of “A”. With the proposed simultaneous roll-out of multilingual (IDN) gTLDs, observers point out that applicants may find themselves having to pay several multiples of the application fees for multiple domain names in different languages. This could result in a significant financial burden for applicants from developing countries.
6. While ICANN has put in place some dispute resolution procedures to resolve disputes as they arise, some observers note that various policy challenges persist. The protection against the misleading use of the names and acronyms of inter-governmental organizations (IGOs) has been cited as one example. Within ICANN, it has been acknowledged that the rights of governments or public authorities in relation to the rights of the sovereign state or territory which they represent cannot be limited or made conditional by any procedures that ICANN introduces for new gTLDs, and as such, ICANN should avoid country, territory or place names, and country, territory or regional language or people descriptions, unless in agreement with the relevant governments or public authorities[[22]](#footnote-23).

**2.3.4.2 country code Top Level Domains (ccTLDs) under the Domain Name System**

1. A ccTLD is generally used or reserved for a country, territory or area of geographical interest. Its subdivisions are identified in ISO 3166-1 standard and represented by two US-ASCII characters. The two letters chosen for each ccTLD are taken directly from the ISO 3166-1 list or the list of reserved Alpha-2 code elements defined by the ISO 3166 Maintenance Agency.
2. IANA is responsible for the delegation or re-delegation of an appropriate trustee for each ccTLD, but it has no responsibility over the entries on the ISO 3166-1 list. From the list of ccTLDs, the authority over each ccTLD is delegated to a trustee responsible for the policies and operation of the domain.
3. Since ccTLDs are based on a “territory” set, debates over ccTLD often focus on the relationship between a TLD string and a “territory” (per the ISO 3166-1 list). More specifically, questions can arise as to whether a TLD string exactly matches with the territory in the ISO 3166-1 list, whether the ccTLD easily represents the name of the territory, how many ccTLDs are possible for one listed territory, and so on.
4. The current delegation or re-delegation of a ccTLDs is a process comprising several stages, with many different players involved in the process. It starts with:[[23]](#footnote-24)
5. a proposed new operator who is an applicant for a name in a ccTLD; and
6. the existing operator who confirms the change is appropriate in the case of a re-delegation request.
7. In many cases, a national government associated with the ccTLD is asked to verify that the re-delegation is supported.
8. The IANA functions operator then manages and analyzes the request, including investigating the details of the request, preparing a recommendation for the ICANN Board, and implementing the request if it is approved.
9. the ICANN Board of Directors considers the IANA recommendation and votes on whether the request should move forward.
10. Finally, the U.S. government evaluates a report on the request prepared by IANA.
11. Observers note that some serious issues have also arisen with regard to the authority to delegate and administer the ccTLDs. In fact, some governments have sought assistance from the United Nations system to reclaim their own ccTLDs or tried to use national legislation to reclaim ccTLDs from incumbent ccTLD managers.[[24]](#footnote-25) The Tunis Agenda (2005) acknowledges that Member States represent the interests of the population of the country or territory for which a ccTLD has been delegated. It goes on to state that countries should not be involved in decisions regarding another country's ccTLD and this is the case in the current process..
12. The existing role and sovereignty of ITU Member States is recognized with respect to allocation and management of their country code numbering resources as recognized in Recommendation ITU-T E.164.

**2.3.4.3 Security of the Domain Name System**

1. The DNS resolution mechanism has critical security flaws that malicious entities have taken advantage of in order to launch attacks such as ‘man-in-the-middle’ attacks (a malicious third party can intercept a query, send a fake response and redirect the user to their own site) and ‘cache poisoning’ (the introduction of fake DNS data into the cache stored in DNS name servers). [These types of attacks are the source of the majority of identity theft incidents and pose a great threat to the users’ “trust” of the Internet.] To counter these threats, a set of Security Extensions to the DNS, known as DNSSEC, have been developed to provide origin authentication of DNS data to DNS clients – a mechanism that provides an added layer of assurance that a responding entity (name server) really is who it purports to be.
2. The resolution process ensures the “origin authentication of DNS data” by establishing an unbroken “chain of trust” between zones. DNSSEC facilitates the provision of cryptographic signatures which allow relying parties to verify that DNS responses are authentic. The key characteristic of this chain of trust is that each parent zone vouches for its child. If any part of the authentication chain breaks due to a response from an unrecognized entity, then the resolution of that address is not achieved.
3. For the “chain of trust” in DNSSEC to work, it needs a single origin of trust (at the root) i.e., a trust anchor that the users can have faith in and from where the trust chain can be built. The entity managing this is responsible for creating and maintaining the key that signs the root. The U.S. Department of Commerce has identified the maintenance of this cryptographic key and the publication of the corresponding trust anchor as an IANA function, currently carried out by ICANN. A private organization, VeriSign creates the bulk of the cryptographic signatures in the root zone in its role as Root Zone Maintainer. NTIA, ICANN and VeriSign liaised extensively with the naming and security communities in developing the processes for signing the root DNS root to make sure that they are transparent, independently audited and effective, as the entity to manage and have operational responsibility for the Zone Signing Key. ICANN will manage the Key Signing Key process. ICANN will work closely with VeriSign regarding the operational and cryptographic issues involved Some observers are concerned about this arrangement supporting this critical function[[25]](#footnote-26).

**2.3.5 Role of administrations of Member States in the management of internationalized (multilingual) domain names[[26]](#footnote-27)**

1. The *Tunis Agenda for the Information Society* adopted by the WSIS made a commitment to advance the process for the introduction of multilingualism in a number of areas, including domain names, e-mail, Internet addresses and keyword look-up.
2. Considering the continuing progress towards the integration of telecommunications and the Internet, and the fact that that Internet users are generally more comfortable reading or browsing texts in their own language, for the Internet to become more widely available to a large number of users, it is necessary to make the Internet (DNS system) available in non-Latin based scripts, taking into account the progress recently made in this regard.
3. Recalling the outcomes of WSIS, there should be a commitment to working earnestly towards multilingualization of the Internet, as part of a multilateral, transparent and democratic process, involving governments and all stakeholders, in their respective roles.
4. The current domain name system does not fully reflect the diverse and growing language needs of all users language (Resolution 133, Rev. Guadalajara, 2010).
5. Internationalized Internet domain names, and more generally ICTs and the Internet, must be widely accessible to all citizens without regard to gender, race, religion, country of residence or language (Resolution 133, Rev. Guadalajara, 2010).
6. Internet domain names should not privilege any country or region of the world to the detriment of others, and should take into account the global diversity of languages (Resolution 133, Rev. Guadalajara, 2010).
7. Recalling the results of WSIS and the needs of linguistic groups, there was an urgent need to:
	1. advance the process for the introduction of multilingualism in a number of areas, including domain names, e-mail addresses and keyword look-up.
	2. implement programmes that allow for the presence of multilingual domain names and content on the Internet and the use of various software models in order to fight against the linguistic digital divide and to ensure that everyone can participate in the emerging new society.
	3. strengthen cooperation between relevant bodies for the further development of technical standards and to foster their global deployment.
8. There are a number of challenges with regard to intellectual property and the deployment of internationalized domain names, and adequate solutions are being explored by the relevant organizations.
9. The roles played by the World Intellectual Property Organization (WIPO) (with regard to dispute resolution for domain names), and by the United Nations Educational, Scientific and Cultural Organisation (UNESCO) (with regard to promoting cultural diversity and identity, linguistic diversity and local content) are recognized. It is also recognized that ITU enjoys close cooperation with both WIPO and UNESCO.
10. It is paramount to maintain global interoperability as domain names expand to include non-Latin character sets.

**2.3.5.1 Internationalized Domain Names (IDNs) under the Domain Name System**

1. Historically, the DNS root zone was limited to a set of characters conforming to US-ASCII or the Latin alphabets. This changed with the introduction of Internationalized Domain Names (IDNs), which introduced TLDs in different scripts (e.g., characters in Arabic, Chinese, Cyrillic or Korean), which enables Internet users to access domain names in their own languages.
2. The process to advance the introduction of multilingualism in the DNS through IDNs has progressed considerably since 2010. Approval of the IDN ccTLD Fast Track Process by the ICANN Board at its annual meeting in Seoul, South Korea in October 2009, enabled countries and territories to submit requests to ICANN for IDN ccTLDs representing their respective country or territory names in scripts other than US-ASCII characters. IDN’s exist to-day.
3. Implementation of IDN in the new gTLDs program and the implementation of IDN ccTLDs raise some complex issues – for example, defining policies for scripts that the registries can accept, agreement on the type and number of characters in the strings etc. [[27]](#footnote-28)

**2.3.5.2 Regional Root Servers**

1. The DNS associates IP addresses with semantically meaningful domain names assigned to computers. When a user types “www.itu.int”, the DNS resolves this address in a right-to-left order by first going to a root server (“.”), which provides a referral to the location of an “.int” name server, which in turn provides a referral to an “itu.int” name server. Here, a root name server is a DNS server that answers requests for the DNS root zone, and provides referrals for names within a particular top-level domain (TLD) to that TLD’s name servers. There are currently 12 operators running 13 root servers specified with names in the form “letter.root-servers.net”, where the letter ranges from A to M. The A, C, E, F, G, I, J, K, L and M servers now exist in multiple locations on different continents to provide decentralized service.[[28]](#footnote-29)

**Table 3: List of Operators Involved in the Root Zone Management System**

|  |  |  |
| --- | --- | --- |
| Server | Operator | Locations |
| A | VeriSign, Inc. | Distributed using anycast |
| B | Information Sciences Institute  | Marina Del Rey, California, US |
| C | Cogent Communications | Distributed using anycast |
| D | University of Maryland | College Park, Maryland, US |
| E | NASA Ames Research Center | Distributed using anycast |
| F | Internet Systems Consortium, Inc. | Distributed using anycast |
| G | U.S. DOD Network Information Center | Distributed using anycast  |
| H | U.S. Army Research Lab | Distributed using anycast within the US |
| I | Netnod (formerly Autonomica) | Distributed using anycast |
| J | VeriSign, Inc. | Distributed using anycast |
| K | RIPE NCC | Distributed using anycast |
| L | ICANN | Distributed using anycast |
| M | WIDE Project | Distributed using anycast |

Source: [www.root-servers.org](http://www.root-servers.org)

1. The 12 operators manage the system used to publish the root zone that is administered through the IANA functions process, and cryptographically-signed and distributed by VeriSign as the Root Zone Maintainer.
2. Only 3 root sever operators have administrative headquarters outside of the US (the Netherlands, Sweden and Japan); however, most root server operators have deployed mirror copies of existing root servers throughout the world. For instance, while ICANN has headquarters in California in the United States, service for L ROOT-SERVERS.NET. is provided using infrastructure located in 112 locations in 49 countries.
3. Many observers have noted the uneven geographical distribution of the DNS root servers (and mirrors) [[29]](#footnote-30). Figure 3 highlights the disparity between this geographical distribution and the global distribution of Internet users. In Resolution 133 (Rev. Guadalajara, 2010), ITU membership has highlighted the need to promote regional root servers. Others have noted that the existing system has demonstrated it is capable of facilitating wider distribution of root servers. It is not necessary to modify the administrative structure of the root server system by reassigning responsibility for existing root servers or adding new ones in order to achieve this goal. All thirteen root servers are available all the time, every time, at any time and from any location. Most of the root-server operators deploy nodes globally based on demand on their system and availability of locations. The numbers are also dynamically changing. The report mentions 90 for the L-root. It was 112 in May and growing rapidly. The operators of L-root are scaling operations up globally and it is expected that L-root will be deployed in 300 locations by the end of August.
4. The effect of deploying a root-server more widely using anycast is three fold. (1) It protects the system against distributed denial of service attacks (DDOS). (2) It protects against single point of failures (catastrophic events like earthquakes, or incidents like ruptured transatlantic cables), and (3) it slightly decreases latency of websites by a fraction of a millisecond, as the path to a nearest root-server contains less hops. Note that now-a-days, any ISP can just put their hand up and get a root-server placed in their network from ISC (F-root) or ICANN (L-root). Hence, using Anycast to deploy more root-server locations is more to the benefit of the root-server operator, and has only secondary marginal benefits for the end user.

**Figure 3: Geographical distribution of DNS root server sites and Internet users, 2011[[30]](#footnote-31)**

Geographical distribution of DNS root server sites (left chart) and Internet users (right chart)



 **2.3.6** It is to be noted that the Government Advisory Committee (GAC), an influential advisory body within the ICANN structure, discusses intensively public policy issues related to the topics highlighted above and many others[[31]](#footnote-32) related to the stability, security and continuity of the Internet domain name system. The GAC reports directly to the ICANN Board, which by its bylaws must take on its advice or develop a written explanation for not doing so. Membership of the GAC is open to all national governments and distinct economies as recognized by international fora. Multinational governmental organizations and treaty organizations may join the GAC as observers. Currently, 114 Country Members and 17 Observers participate in the GAC. The GAC also maintains a non-voting liaison on ICANN’s Board. The ICANN Board has worked extensively with the GAC to address the concern of integrating the latter more effectively into ICANN’s multi-stakeholder community. The Report issued by the Joint Working Group (JWG) of the ICANN Board and the GAC in 2011 contains several thoughtful and productive recommendations. It should be noted that further integrating the GAC into multi-stakeholder policy development has several obstacles, including misunderstandings about the GAC as an organization of nation state representatives.

**3. Conclusion**

This draft report of the Secretary-General to the WTPF-2013 aims to provide a basis for discussion at the World Telecommunication Policy Forum, incorporating the contributions of ITU Member States and Sector Members, and serving as the sole working document of the Forum focusing on key issues on which it would be desirable to reach conclusions (2011 Council Decision 562).

1. <http://www.computerhistory.org/internet_history/> [↑](#footnote-ref-1)
2. <http://point-topic.com/dslanalysis.php> [↑](#footnote-ref-2)
3. Source: ITU (<http://www.itu.int/ITU-D/ict/statistics/at_glance/KeyTelecom.html>). Smartphone shipment statistics from IDC 2012, quoted at: <http://mobithinking.com/mobile-marketing-tools/latest-mobile-stats#phone-shipments>. [↑](#footnote-ref-3)
4. Article 19, International Covenant on Civil and Political Rights (1966); Article 34 of the ITU Constitution [↑](#footnote-ref-4)
5. http://www.oecd.org/dataoecd/11/58/49258588.pdf [↑](#footnote-ref-5)
6. *Tunis Agenda for the Information Society* §§ 35 a)-e) [↑](#footnote-ref-6)
7. Resolution 102 (Rev. Guadalajara, 2012), §68 of the Tunis Agenda (2005) [↑](#footnote-ref-7)
8. Resolution 102 (Rev. Guadalajara, 2012), §68 of the Tunis Agenda (2005) [↑](#footnote-ref-9)
9. For instance, Euro-IX has run a successful twinning programme for some years which sees engineers from Least Developed Countries (LDCs) visit engineers at IXPs in developed countries for training purposes, and engineers in developed countries visit LDCs to provide on-the-ground assistance. [↑](#footnote-ref-10)
10. For example: [www.itu.int/ITU-T/worksem/apportionment/201201/index.html](http://www.itu.int/ITU-T/worksem/apportionment/201201/index.html) [↑](#footnote-ref-11)
11. As defined by ITU Recommendation E800. [↑](#footnote-ref-12)
12. TeleGeography (www.telegeography.com) [↑](#footnote-ref-13)
13. WG-WSIS-18/05\*: ‘The 'future Internet' (Version 3.0), available at: <http://www.itu.int/md/S11-RDG5-C-0004/en>. [↑](#footnote-ref-14)
14. Initial IANA Delegation of IPv6 address space, https://www.iana.org/reports/1999/ipv6-announcement.html [↑](#footnote-ref-15)
15. Number Resources, IANA, <http://www.iana.org/numbers> [↑](#footnote-ref-16)
16. http://bgp.potaroo.net/v6/as2.0/ [↑](#footnote-ref-17)
17. [Stewardship and the Management of the Internet Protocol Addresses](http://internetgovernance.org/pdf/CyberDialogue2012_Mueller.pdf), Milton Muller, available at: <http://internetgovernance.org/pdf/CyberDialogue2012_Mueller.pdf> [↑](#footnote-ref-18)
18. <http://www.apnic.net/services/services-apnic-provides/resource-certification/RPKI> [↑](#footnote-ref-19)
19. Ruling the Root part II: RPKI and the IP address space. Available at: <http://blog.internetgovernance.org/blog/_archives/2010/3/13/4479658.html> [↑](#footnote-ref-20)
20. WTDC-10 Programme 2. [↑](#footnote-ref-21)
21. [↑](#footnote-ref-22)
22. [↑](#footnote-ref-23)
23. Understanding the ccTLD Delegation and Redelegation Procedure, IANA, available at: <http://www.iana.org/domains/root/delegation-guide/> [↑](#footnote-ref-24)
24. IANA Report on the Redelegation of the .SO Top-Level Domain, <http://www.iana.org/reports/2009/so-report-03feb2009.html> [↑](#footnote-ref-25)
25. See more, <http://www.zoomerang.com/Shared/SharedResultsSurveyResultsPage.aspx?ID=L23VTKJEXCE9> [↑](#footnote-ref-26)
26. Resolution 133 (Rev. Guadalajara, 2012) [↑](#footnote-ref-27)
27. IDN Variant TLD program , ICANN, (4 May, 2012), <http://www.icann.org/en/news/public-comment/idn-variant-tld-revised-program-plan-04may12-en.htm> [↑](#footnote-ref-28)
28. Details of root server deployment can be found at http://www.root-servers.org/ [↑](#footnote-ref-29)
29. The (very) uneven distribution of DNS root servers on the Internet: <http://royal.pingdom.com/2012/05/07/the-very-uneven-distribution-of-dns-root-servers-on-the-internet/> [↑](#footnote-ref-30)
30. <http://royal.pingdom.com/2012/05/07/the-very-uneven-distribution-of-dns-root-servers-on-the-internet/> [↑](#footnote-ref-31)
31. GAC Communiqué, 43, (16 March, 2012), available at: [https://gacweb.icann.org/display/gacweb/GAC+Recent+Meetings](https://gacweb.icann.org/display/gacweb/GAC%2BRecent%2BMeetings) [↑](#footnote-ref-32)