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INTERNET GOVERNANCE

There is increasing international debate on 'Internet governance', which encompasses a variety of public policy issues related to internet infrastructure, management and use. This POSTnote describes the structure of the Internet and summarises the debate over its management. It also discusses the prospects for its international governance, following the first meeting of the UN-sponsored Internet Governance Forum.[1]

What is internet governance?

The rapid growth in internet use poses challenges for existing policies on its administration and regulation. 'Internet governance' covers a broad range of subjects, from technical administration to wider public policy issues such as content regulation. Although the Internet is a global network, many policies are set nationally. Some decisions require international co-operation, and there are often difficulties in agreeing uniform rules.

There is debate over which issues comprise Internet Governance, as well as appropriate policy structures. This gained momentum after the UN-led World Summit on the Information Society (WSIS), held in two stages in 2003 and 2005.[2] Its intent was to discuss the creation of a 'global information society' through increasing access to information and communication technologies, including the Internet. However, much of the debate centred on technical administration, leaving many participants disappointed, especially those from the developing world. One of the key outcomes was the establishment of the Internet Governance Forum or IGF.[1] It was convened for "multi-stakeholder policy dialogue" between governments, industry and civil society.

Box 1. The Internet Governance Forum

The first meeting of the IGF in October 2006 was attended by delegates from governments, industry, charities and civil liberties organisations. The overall theme was 'Internet Governance for Development', divided into four main discussion areas:

- **openness** to consider free expression, and the free flow of ideas and information on the Internet;
- **security** to protect users and networks;
- cultural and linguistic **diversity**;
- **access** issues, particularly on improving internet access in the developing world.

The IGF is not a decision making body, and did not make any declarations, although it did set up several "dynamic coalitions" to work on key issues, such as privacy, open standards, and an initiative on the rights and responsibilities of internet users. The 'Stop Spam Alliance' was launched at the meeting.[3] The IGF reconvenes in 2007.

How the internet works

Technical infrastructure and administration

Data transmission and networking can occur between computers connected by a physical infrastructure of optical fibres, cable networks, telephone lines, satellites or wireless links. A **network** can range from a small private system to more extensive structures: for example UK educational establishments are connected by a large network, operated by the UK Education and Research Networking Association (UKERNA). The **Internet** is described as a global 'network of networks' as it links numerous sub-networks worldwide. It works as follows:

- **Internet Service Providers (ISPs)** sell internet access to customers. An ISP provides local access from a customer to its own computer network, which then connects the customer to the Internet. An ISP can exchange data with other ISPs (usually for free) via 'hubs' called Internet Exchange Points (IXPs).
- **IXPs** allow networks to interconnect directly rather than via third parties, thus increasing efficiency and reducing costs. The largest IXP in the UK is the London Internet Exchange. Some companies provide connections between ISPs for a fee.
- Internet functionality relies on computers being able to identify each other. This is made possible by the **Domain Name System** or DNS (Box 2).

Box 2. The Domain Name System

The Internet uses the **Domain Name System (DNS)** to allow computers to identify each other. To connect to the Internet, each computer requires a unique numerical label called an **IP address**. IP addresses are matched to memorable labels called **domain names**, stored in a global database. Thus instead of typing the IP address 194.60.38.75, to connect to the computer that hosts the parliamentary website, the domain name www.parliament.uk is used. Domain names generally follow the format **www.xxxxx.yyy;**

- **.yyy** refers to a **top level domain**. This can be either a generic Top Level Domain such as '.com' or '.org' or a country code Top Level Domain such as '.uk' for the UK
- **.xxxxx** refers to a **second level domain** such as '.parliament', '.co' or '.google'. Additional subdomains, such as **www**. can be used to the left.

The DNS is coordinated to ensure addresses and domain names are unique. Due to the number of names and addresses they are stored on specialist computers.

The future management of IP addresses

The existing technical standard used for IP addresses, called IPv4, limits the total number of usable addresses to 3.7 billion. It is likely that all available addresses will be exhausted soon (estimates vary from 2012 to 2024) as more devices connect to the Internet. The solution to this is the introduction of a different standard, IPv6, to increase the number of usable IP addresses to 350 trillion. The transition has been slower than expected, raising questions over how to introduce new standards effectively and the role of industry and governments in promoting this.

Several applications run on the Internet, including:

- the World Wide Web (WWW, or "web"), often confused with the Internet. The web comprises a set of linked documents (web pages);
- communications services such as email, internet telephony, and instant messaging systems.

International administration

There are a wide range of organisations involved in the international administration of the Internet. One of these, the Internet Corporation for Assigned Names and Numbers (**ICANN**), a US not-for-profit organisation, administers the allocation of domain names and IP addresses (Box 2). Its role generates much debate (see next section). Several others play a role in developing internet policies and standards including:

- **the Internet Society (ISOC**), an international membership organisation, responsible through groups such as the Internet Engineering Task Force (IETF) for developing internet technical standards.
- **the World Wide Web Consortium**, open to subscribing organisations, which develops technical standards and guidelines for the World Wide Web.
- **the International Telecommunications Union (ITU)** is a UN agency responsible for a wide range of telecommunication matters, including technical standards and development activities.
- **various international organisations** such as the World Trade Organisation and the World Intellectual Property Organisation.

Governance issues

Domain names and IP addresses

The role of ICANN

Until 1998, the DNS and IP address allocation was administered at the University of South California on behalf of the US government. Subsequently ICANN was created to assume this role. Its activities include:

- delegating the running of top level domains to various organisations, who maintain databases of second level domains. For example the US company Verisign maintains '.com' and '.net.' Its contract to operate '.com' was recently renewed until 2012 by the US Department of Commerce. Around 59 million domain names are registered under '.com', so the ability to award such contracts has generated controversy, due to competition concerns.
- allocating blocks of IP addresses to five Regional Internet Registries. UK ISPs receive their share from one of these, RIPE NCC. These addresses require management since their number is limited (Box 2).
- authorising the creation of top level domain names.

The influence of the US Department of Commerce (DoC) over ICANN's activities was reduced after a joint agreement in 2006, giving ICANN greater independence. ICANN is advised by several committees, including an international Governmental Advisory Committee (on which the Department of Trade and Industry (DTI) sits). However, the International Telecommunications Union (ITU) states that the DoC maintains authority to oversee certain ICANN decisions, such as the extension to Verisign's commercial contact to operate '.com'.

UK administration of domain names

Nominet UK, a not-for-profit organisation, manages the country code top level domain as well as some second level domains such as '.co.uk', '.org.uk' and 'sch.uk'. Other second level domains (including 'gov.uk' and 'ac.uk') are delegated to organisations like UKERNA. Nominet is the fourth largest domain name registry worldwide. Nominet charges a fee for registering domain names, which are offered mainly on a 'first come, first served basis', except for some which are restricted. Disagreements can arise over domain name registration if there are intellectual property issues. Nominet has a dispute resolution policy that encourages mediation rather than legal action. It engages with stakeholders via a Policy Advisory Body comprising elected members, government officials, business and intellectual property groups. Nominet retains overall decision-making powers.

New Top Level Domains

The creation of new top level domains (TLDs) is authorised by ICANN. Some argue that new TLDs provide greater choice, as well as enabling the development of new services. An example of this is the creation of a '.mobi' TLD to encourage internet services on mobile telephones. Some argue that creating new TLDs increases the costs for businesses that must purchase relevant new domain names to deter fraudulent usage. Furthermore, the demand for new TLDs has been questioned. In 2000, ICANN allowed the creation of

seven new TLDs, including '.biz' and '.info', although the take up of these new domain names has been significantly lower than projected.[4] The political nature of ICANN's role was highlighted by ongoing debate over allowing '.xxx', a new TLD for adult material.

Country code top level domains (ccTLDs) are assigned on the basis of an International Standard and are limited to recognised states. In 2005 '.eu' was launched as a ccTLD, as a special case. There are calls for new TLDs for cultural, linguistic and regional identities (Box 3).

Box 3. New top level domains for cultural identities – '.cym' and '.sco'

In 2005, ICANN approved '.cat' after a campaign for a new domain for the Catalan cultural and linguistic community. Similar campaigns exist for the creation of a '.sco' for Scotland and a '.cym' for Wales. The '.cym' campaign argue that the domain name will help to promote the Welsh language and culture, in Wales and globally. They are seeking the support of the Welsh Assembly, having received support from several Assembly Committees, and the Welsh Office. They are supported by the Welsh Language Board. The campaign has to demonstrate its business case to ICANN, and the technical ability to run the '.cym' domain.

Internationalised domain names (IDNs)

Domain names were originally limited to the letters a to z, the numbers 0-9 and the hyphen. As the Internet has expanded, so has the number of users who use alphabets based on alternative scripts, such as Russian and Chinese. There is demand for domain names in these scripts. The Internet Engineering Task Force has developed a system which converts domain names from other alphabets into Latin-script characters. This is already in use with several TLDs, such as '.com', '.info' and '.de' within second level domains. ICANN is testing the use of IDNs within TLDs. The expansion of possible characters through IDNs poses a security risk (Box 4).

Box 4. Security vulnerabilities of Internationalised Domain Names

Internet users can be intentionally fooled by different websites with similar domain names. Introducing extra characters through IDNs increases this risk. While characters in one alphabet may look identical to characters in another alphabet to a user, they are discriminated by computers. The threat was highlighted by a spoof website for **www.paypal.com** using a Cyrillic 'a' rather than a Latin 'a'. Users could receive this link in an email and give personal and financial details on the false site. One solution proposed is for software manufacturers to develop more sophisticated tools for distinguishing scripts.

Some have criticised ICANN for being too slow in implementing IDNs, and warn that others could create an alternative system, which could misdirect internet traffic. Some argue that domain names are becoming less important as other techniques for navigating the Internet are used. For example, search engines work by looking for content on web pages, rather than in the domain name. Others argue that as domain names are merely identifiers, and are limited in what they can express to web users.

Security

A full discussion of internet security is beyond the scope of this note. POSTnote 271, Computer crime, describes the scale and nature of the problem and the various means of tackling it, including:

- UK legislation such as the 2006 update of the Computer Misuse Act (1990);
- European legislation to combat unsolicited email, ('spam') and attacks on computers and networks;
- government bodies such as the National Infrastructure Security Coordination Centre which work to protect the UK's essential services from electronic attack.

Internet access in the developing world

There are approximately 1 billion internet users worldwide, mainly concentrated in the developed world. Whereas 62% of the UK population have internet access, this figure is as low as 3.6% for Africa.[5] This disparity in access has been termed the 'Digital Divide'. The UN Millennium Project recognises that Information and Communication Technology (ICT) plays an important role in development. Discussion of development issues at the IGF (Box 1) focussed on Africa since it lacks significant communications infrastructure, resulting in the use of expensive satellite connections. Mobile telephony may be part of the solution, but generally has a lower capacity to carry data than fixed lines. Constructing Internet Exchange Points will reduce costs to users and other projects to improve connectivity are underway (Box 5).

Box 5. EASSy Cable

The construction of the East Africa Submarine Cable System (EASSy) will provide a high capacity fibre-optic connection along the East Coast of Africa, expected to be operational by the end of 2007. The project has been funded by the World Bank and the Development Bank of Southern Africa.

Competition is seen by the UK government as important for improving access. The Organisation for Economic Co-operation and Development (OECD) reports that liberalising markets has been a success in several countries.[6] Some suggest that reform should be tailored to individual markets. Other socio-cultural barriers to access include language issues which could be tackled through promoting IDNs and local content. Agencies such as the DiploFoundation, run 'capacity building' courses to train professionals in ICT skills.

Internet content

Content regulation

There is concern that internet content requires stricter regulation. Some argue that this is not practicable since the Internet is a global, open environment. In the UK, unlawful internet content is covered by existing crime legislation which is not media-specific. There is consensus that a self-regulatory approach to some internet content can be successful. For example a UK organisation called the Internet Watch Foundation works to minimise online child abuse images.

Ofcom, the UK communications regulator, is responsible for content standards on broadcast platforms, but does not regulate media distributed over the Internet. Ofcom sees its role as raising user awareness and supporting industry bodies and consumers to encourage a self-regulatory approach. The EU is reviewing the Framework for regulating broadcasting. One proposal is the Audiovisual Media Services Directive for regulation of internet video content, but critics say self-regulation would be a better approach.

The Internet has given rise to many concerns over copyright, (see POSTnote 185, Copyright & the Internet). The government-commissioned Gowers Review, which examined the UK's intellectual property framework, was published in December 2006. It recommended that although the UK's IP system is strong, it requires reform in several areas, one of which is dealing with digital information so that it is 'fit for the digital age'.

Network neutrality
"Net neutrality" - treating all data transport equally regardless of its content – is a prominent issue in the US. This stems from concerns that network access providers might start charging content providers (such as Google or Yahoo!) for different levels of service to consumers. Net neutrality laws have been proposed to impose legal requirements on access providers to treat all content providers equally. Access providers oppose these arguing that limiting their scope for commercial arrangements would impede network investment. The context for this debate in the UK differs as there is more competition in access provision because of regulatory requirements that require BT to open up its network to competitors.

Civil liberties
Organisations such as Amnesty International are concerned over censorship of internet content. Several companies have been criticised for operating in countries where censorship occurs, although they argue that on balance, their services are beneficial. The Open Net Initiative, an academic partnership, concluded that many states use 'pervasive' or 'substantial' filtering systems. The countries involved say these measures are taken in the interest of security.

One concern is over access to WHOIS data: information about domain name registrants originally provided for network operators and administrators, but also widely used by law enforcement agencies. There is concern about WHOIS data accuracy, its continued availability to law enforcement agencies, and its possible misuse. The Governmental Advisory Committee to ICANN is developing principles for the service. Nominet allows non-commercial UK registrants to conceal their details.

The future of internet governance

The debate over ICANN is unlikely to disappear. Some countries are critical about the role of the US government and concerned that ICANN is not fully representative of all stakeholders. The EU has welcomed moves towards independence for ICANN from the US government. In the UK, there is broad support for a private-sector lead on co-ordinating the technical administration of the Internet.

There are two options for ICANN's future. The first is to place some of its functions under the authority of an intergovernmental body like the UN or the ITU, an idea originally proposed at the WSIS. The second is to give it independent private sector status, with international multistakeholder input. The DTI favours an industry-led solution, arguing that the Internet's success largely is due to private sector involvement, and that intergovernmental control may stifle innovation and investment. It recognises the need for improved international accountability. It remains to be seen how organisations such as the ITU, the World Intellectual Property Organisation and the World Trade Organisation will integrate into future governance arrangements. In 2006, the ITU's Member States set out proposals on its role in international public policy issues related to the Internet and the management of Internet resources.[7]

The IGF generated stakeholder interest and future annual meetings will allow greater participation in discussions about the Internet's governance, but critics view the IGF as a 'talking shop'. This dialogue is seen in the UK as key to improving understanding and involvement in decisions relating to the Internet, especially in helping governments in the developing world and civil society to contribute. The remit of the IGF will be reviewed in five years.

Overview

- Much of the debate over the governance of the Internet has focused on the role of ICANN and the US government in administering the DNS.
- There are several other issues including crime and security, civil liberties, and increasing access.
- As the Internet becomes more internationalised, its governance structures are likely to change.
- The Internet Governance Forum is a new approach to foster discussion and increase participation. Although lacking decision making powers, it is recognised that it should aid consensus building on key issues.

Endnotes

1 Internet Governance Forum, www.intgovforum.org/
2 Tunis Agenda, WSIS Outcome document, 2005
3 www.stopspamalliance.org
4 *Generic Top Level Domain Names: Market Development and Allocation Issues*, OECD Report, 2004
5 www.internetworldstats.com
6 *Regulatory Reform as a tool for bridging the digital divide*, OECD, 2004
7 ITU Resolution 102, www.itu.int

POST is an office of both Houses of Parliament, charged with providing independent and balanced analysis of public policy issues that have a basis in science and technology.

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