

Internet Governance - technical details

The internet, widely regarded as a physical network spanning more or less the whole globe, may be more accurately described as a collection of standards for sharing traffic between networks. While many of these standards are self-evolving and deregulated, there are four crucial areas where a minimum level of administration and of harmonisation is necessary in order to assure the smooth working of the network. This is what is meant by the term 'internet governance':

1. Domain names
2. Root servers
3. IP addresses
4. Internet protocols

The Domain Name System ([DNS](#)) can be described as a distributed database that stores information about host names and domain names. It provides a physical location (the so-called IP address) for each host name, and lists the mail exchange servers accepting e-mail for each domain, thus assuring that e-mails reach their recipients and users of the internet find the pages they are looking for. Name servers are attributed to a particular top-level domain ([TLD](#)), such as .com, .org, .de or .uk.

[Root name servers](#) are DNS servers that answer requests for the root name space domain, and redirect these requests for a particular top-level domain to that TLD's name servers. Due to a technical flaw dating back to the time of the internet's creation, there cannot be more than the presently 13 worldwide root name servers. Of these 13 servers, only three (in London, Stockholm and Tokyo) are located outside the US. Root name servers synchronise with each other. The database governing all root servers is called the internet's authoritative root zone file. It is currently controlled by ICANN; the future control over it is one of the most disputed issues in internet governance.

[IP addresses](#) are the unique twelve-digit numbers assigned to each computer on the internet to identify itself to other computers. As there were relatively few computers at the time of the creation of the IP name system, it was decided that this system, allowing for only around 4 billion IP addresses, would be sufficient. For years the numbers have not been sufficient any more, leading to the replacement of once-static IP addresses with dynamically attributed ones that change each time a device connects to the internet. Static IP addresses would however facilitate many internet-based services, and the number of available IP addresses will become completely insufficient when many consumer goods connect also to the internet. A new standard is therefore currently being deployed, the 128-digit hexadecimal numbers of which theoretically allow for 3.4×10^{38} unique internet addresses - "If the earth were made entirely out of 1 cubic millimetre grains of sand, then you could give a unique address to each grain in 300 million planets the size of the earth", as Wikipedia puts it.

The best-known [protocols](#) are the Hypertext transfer protocol, the file transfer protocol and the post office protocol. As http://, ftp:// and pop:// they precede internet addresses of web pages, file repositories and mail servers. But there are dozens of other protocols, and with the emergence of new services such as internet-based interactive television, more will be necessary in the future. In order to ensure that different clients and servers on the internet work smoothly together, the number of protocols must be limited, and they must be harmonised by some kind of central authority.

Since 1998, all root servers have to follow the guidance of [ICANN](#), the Internet Corporation for Assigned Names and Numbers. ICANN is a California non-profit corporation which took over the task of administering names and addresses in the internet. ICANN acts under a [contract](#) with the US [Department of Commerce](#). The contract was "sole sourced", which means no-one else was able to submit a bid to perform the task. Currently, ICANN has responsibility for generic [[gTLD](#)] and country code Top-Level Domain [[ccTLD](#)] name system management, for root server system management, Internet Protocol [[IP](#)] address space allocation and protocol identifier assignment.

A [geographical](#) and a [topological](#) map illustrate the internet's structure and the importance of Europe within the World Wide Web.



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