



Is the Internet a Thing?

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No, I'm not trying to apply the term "Internet of Things" recursively, though it would be fun to give the root domain file an IP address and have it be reachable. I'm just using a current colloquial expression to ask what the Internet actually is, and who might own it.

I'm asking these questions because of the announcement that ICANN will move out of US Department of Commerce authority (and I assume you know what that is as well). Reactions range from saying it's the end of days to asking, "So what?" The only thing everyone agrees on is that ICANN shouldn't be turned over to the ITU (www.itu.int), or indeed, any set of governments. But then who should govern the Internet? This presumes ICANN does. Who does, and what is there to own?

A few of you know the answers already, but I'm writing for the rest of us. I assume that you know what an IP address and the DNS are, because you're reading this, but there's more to this than meets the eye, so you and I are going to travel together through the rabbit hole of asking what the Internet is.

Unweaving the Web

According to economists, "currency" is an abstract concept fulfilling three functions: medium of exchange, store of value, and unit of account.¹ Enough people will trust a "real" currency so that it can fulfill these functions. Is the currency real beyond the paper or base metal that serves as a marker for the idea? Not really, other than representing a real consensus – until something weird happens.

The Internet is just such a consensus abstraction. It has many aspects, including timekeeping, but – like currency – three main functions make the Internet work, all provided by ICANN: tracking valid IP addresses, resolving names to those addresses, and administering protocols.

Tracking IP Addresses

The first function is the Internet's core function, and is carried out by the Internet Assigned Numbers Authority (IANA). Ok, is this a thing? The IANA used to be what Jon Postel did at ISI, before he died. In 1998, ICANN was created to perform this function, among others, under contract to the US Department of Commerce. The IANA is now a thing: a department of ICANN that performs this function.

The IANA (function/thing) maintains registries for Internet protocols, some of which include things like MIME types and TCP port numbers. Most importantly, the IANA allocates IP address blocks to Regional Internet Registries (RIRs), which themselves have created the Number Resource Organization (NRO) to manage the further allocation of such address blocks. The NRO isn't part of ICANN, but has an agreement with it that supports the Address Supporting Organization (ASO), which has an Address Council that advises ICANN on IP address policy, and which nominates two members of the ICANN board of directors. Wow, what a tangled web.

It gets better. IETF RFC 2860 currently defines the IANA as a technical team (June 2000) working for ICANN, so the agreement is between the IETF (www.ietf.org/tao.html) and ICANN. Essentially, the IETF Internet Architecture Board (IAB) has designated the IANA as the official registry keeper, and ICANN has agreed to perform this function for free. The Internet Society (ISOC) has copyrighted this agreement, and supports the IETF. Now the web of governance is really tangled, so let me come back to the IETF and ISOC later. I promise.

The important people are the IANA "technical team," referred to in RFC 2860, who happen to work for ICANN, but who could work for someone else, as well as the IETF people, most of whom work for Internet stakeholder companies, and, of

course, the RiRs. The IETF has agreements with ICANN because the latter is shell-holding the IANA, but these could be rewritten – that is, ICANN as an entity isn't necessary, at least for the IANA function. Let's look at the second ICANN function.

Resolving Names

Under the authority of the US Chamber of Commerce, an ICANN committee administers the data of the root name servers at the top of the DNS tree. The key here is a relatively small file called the root zone file, which the top domain servers use – there are logically 13 of these in the world, 10 based in the US.

Who is the technical team here? Seven people hold the security keys to the DNS tree, and none of them work for ICANN.² They meet every three months under amazing security to verify the DNS tree, which is kept in a secure machine under ICANN's control. ICANN administers the security for this process.

The point is, a bunch of independent players all agree to play together. And ICANN is a convenient and trusted end point. The IETF views ICANN as providing financial support for the IANA team and security for the DNS³ – that is, it sees the IANA as an IETF function that's currently outsourced to ICANN. The US Department of Commerce pays ICANN to perform this function.

Administering Protocols

What about the third function? This is more nebulous, but it's essentially more administration of a collection of IETF-defined protocols. Now, though, we start to get to the core of asking what the Internet is, and maybe who owns it.

The Internet is really dependent on its protocols, specified by the IETF under its RFC process. ICANN implements many aspects of these under IAB oversight, authorized under RFC 2860. The IETF in turn disavows any ownership of the Internet. It generates

consensus specifications, and others choose to implement them.

In fact, just as the IANA is hardly a thing, the IETF is less so. There is no such legal entity as the IETF. Rather, there are engineer volunteers who have collectively carried on and elaborated the RFC process that Postel started. So, interestingly, IETF RFC 2860 is a memorandum between the IETF, which doesn't exist, and ICANN, which is paid by the US government to carry out functions that the IETF specifies.

In this century, out of necessity, a few legal entities have emerged. There is an IETF Trust that holds the rights to the intellectual property the IETF generates. The IETF Secretariat actually employs a few staffers to help administer the RFC process. More interestingly, this secretariat is under contract to the Structure of the IETF Administrative Support Activity (IASA) – a part of ISOC – which is a real thing, and which supplies insurance coverage and other administrative support as needed for IETF work. ISOC is supported by member fees.

ISOC and the IETF (which, I remind you, doesn't exist) have a tight connection, especially with the IAB and the IETF Engineering Steering Group (IESG) that manage IETF activities. Further description is out of scope for this brief article, but you get the picture by now.

Trust among Engineers

ICANN is a convenient trusted entity to house the Internet's top-level functions under nominal control of the US government. This isn't to belittle the major work ICANN management does to build trust among stakeholders.⁴

But the real trust comes from the engineers who implement the Internet functions, working with the other trusted engineers on IETF committees, and within the RiRs and the top domain servers. The Internet consists of machines executing protocols (based on registries) on which all of these people agree. There is no Internet

police, and there are no actual "standards": just consensus specifications.

What's important is that no government, or set of governments, gain any leverage over any of these people to enforce any kind of self-serving Internet corruption, such as eliminating domain names for inconvenient websites. But we're probably safe.

Although it's a similar nebulous agreement built on trust, the Internet is unlike currencies because there can be only one. Attempts at alternatives have arisen, but almost by definition, they have failed. A balkanized Internet loses value: the smaller versions fail because the Internet's value is exactly its massive interconnectedness.

Moreover, the Internet is built on trust among engineers, not financiers. Suppose a government tried to "take over" the Internet by taking control of ICANN. (And, by the way, there is a good reason governments don't own the central banks that actually issue the money.)

How long do you think it would take for the people who matter to form a new independent group, perhaps supported by ISOC? And would the IETF, the RiRs, and the top domain servers continue to work with the new group or the corrupted ICANN? A few RiRs might be coerced initially, but because there can be only one Internet, eventually they would be forced to join the new group. It's the people who matter, not the shell holding them.

We can see the real danger looking at Heartbleed, the latest big Internet security threat. It turns out that just one paid engineer is in charge of OpenSSL. What happens if he gets hit by a bus?

Like the Internet itself, the IETF is more robust, having survived Postel's death. But we should remember those seven people with the keys to the DNS and the other small sets of essential people who administer critical Internet functions. A lot of backups are in place,

but still, I'd like all these folk to have really excellent health insurance — and maybe bodyguards. ☒

References


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