The DNS is not a right. Oh yes It is.
Oh no it isn't. Oh yes it is...

Jon Crowcroft
The Computer Laboratory, University of Cambridge
Cambridge, UK

jon.crowcroft@cl.cam.ac.uk

ABSTRACT

The Internet is not a Universal service, but then neither is democracy. So should the Internet be viewed as a right? It's certainly sometimes wrong. In this brief article, we depend on the Internet to reach our readers, and we hope that they don't object our doing that.

Categories and Subject Descriptors

C [.]: 2.1 [Packet-switching networks],[Network Communication]

General Terms

General Terms: Algorithms, Performance, Design

Keywords

Communications Systems Research. The Internet

1. INTRODUCTION

There has been a debate in the public recently about whether the Internet is a right. On the one hand, the Interweb evangelist for the Houyhnhnms Corporation has claimed that the DNS is not a right. On the other hand Lord Waterloo of West SandWich has claimed that it is. On the other hand (if you're a monkey like me) I claim this is just a bit more subtle than either of these thinly disguised gentlemen admit.

Cory Doctorow of Boing-Boing fame has made a passionate plea [1] to comprehend and resist the nature of arbitrary restrictions that various agencies are trying to impose on General Computing, and, by extension, on the end-to-end services of the Internet, in the name of Security or DRM.

The core of his argument is that computers embody Turing machines, which of course are, as Alan Turing[2] pointed out, capable of arbitrary computations. Placing extreme (e.g. remove any arbitrary recursion or iteration, or simply remove ability to re-programme) restrictions on these (reducing them to a mere appliance capable of a single task) throws away their fundamental value (adaptability/shared

use). Anything less in restriction will always be surmountable.

By analogy, the Internet is the most general form of communications network one can envisage. The famous hourglass model partly illustrates this. Previous attempts by vested interests (i.e. telcos) to control the vertical stack led to stovepipe monopolies with services only, concentrated at the tip of a pyramid[3]. By contrast, the narrow waist of the hourglass allows arbitrary channels below, and an arbitrary inverted pyramid (a very wide divergence) of heterogeneous expandable applications above. We all know who won this in the past. However, the war seems to have re-emerged from new quarters.

Recently, various aberrations caused both by bad luck (lack of IPv4 address space) and bad design (lack of decent end system security) have appeared in the deployed internet. Because the core must still maintain some end-to-end services (e.g. Amazon, Akamai, Facebook and Google's cloud boxes have to talk to each other in the traditional way), workarounds for these aberrations (NATs, Firewalls, other broken-middle-boxes) always manage to appear, by leveraging rendezvous (super-node, NAT traversal, articulation points, whatever you want to call them) within the core, to get from edge-to-edge, even when the edge you want to get to doesn't have an always-on, globally reachable address (or name) – we can make one for you. As (I believe) J. Noel Chiappa once said, the Internet will route around damage.

So the only way that the Internet can be restricted as a right is to make it a pointy pyramid structure rather than an hour glass - i.e. remove the *Turing Complete* nature of the service.

Now, there are arguments for the agencies policing laws and carrying out intelligence services doing various things on the net to make sure that other human rights are not abused. However, these do not require the so much limitation to Internet technology so that it can't provide an arbitrary range of technical communication activities. Such laws (and ethics) require those agencies to look at what people say (write) and do, in the same way they always have, with due care and attention. And they require all of us as users to behave responsibly too.

So why have I titled this piece "The DNS is not a right"?

---

[1] Video of his talk at the Chaos Computer Convention at the end of 2011 linked in the references below, assuming it has not been blocked just yet.
[2] Whose parents had the foresight to name him after them.

[3] It is not known if the Egyptians had stoves or chimneys in Pyramids, but one assumes that the Pharaohs would have had at least fine BBQ equipment.

Well, because this is a *reductio ad absurdum* argument. We are all familiar with stunning and stunting techniques for NAT traversal. It is also well known that one of the most extreme ways to route around damage is to run IP over DNS queries and build a DNS server that de-capsulates the (Uni-coded) IP packet from the DNS Lookup and forwards it on native[4]. To remove this capablity specifically would require an agency to own all the DNS servers in the world. Or to remove the DNS itself. To remove this kind of capability generally, would require reducing the functionality of every-thing at the edge and within the network to only a fixed set of services pre-defined by the provider(s). How would app-stores and the like flourish in such a world? Answer is that they wouldn't. They'd be still-born.

To illustrate another aspect of the problem, that of rights versus responsibilities, lets think about *TCP-friendliness*. TCP-friendliness is not a right. That is true - you can send traffic in an uncontrolled way. However, pretty soon, your ISP might disconnect you. or charge you a lot of money. It's not that you can't send TCP-unfriendly traffic. It's just irresponsible.

And that's no joke.

You'll notice that I have not gone on to discuss different notions of what a "right" is. There are some pretty impor-tant, but subtle differences between what is considered a right in the Bill of Rights that the US employs, versus other notions of Universal Human Rights such as those in the UN declaration on same topic. US rights are operationally en-coded in the constitution, and crucially controlled by a set of checks and balances. These are sufficient to understand that the same approach can be taken to providing a TCP-friendly, Human Readably Named Internet, that can em-body the abstract notion of the Right to communicate freely with whomsoever we wish on any subject they care to hear about, in a concrete technology that is the communications equivalent of a Turing Complete Difference Engine.

Those rights go along with responsibilities. Taking away freedom to exercise the responsibility, by limiting the tech-nology so much that it doesn't even afford the right, is wrong.

2. REFERENCES

Yes it is: http://www.huffingtonpost.com/2011/04/13/berners-lee-internet-access-human-right_n_848833.html

No it isn't: http://www.nytimes.com/2012/01/05/opinion/internet-access-is-not-a-human-right.html

I don't know: http://www.un.org/en/documents/udhr/

But he does: http://boingboing.net/2011/12/27/the-coming-war-on-general-purp.html

3. ACKNOWLEDGEMENTS

---

[4]This apparently first happened on Docomo's seminal smartphone internetwork, where native IP from the phone was blocked, possibly to prevent VOIP applications losing them voice revenue. DNS was not blocked. Of course, IP over DNS would have a small (255 octet) MTU and prob-ably take a big performance hit in other ways too. Keshav suggests Tor over IP over DNS, which would afford privacy too.