

Southern African Internet Governance Forum

Issue Papers¹ No. 5 of 5

Managing Critical Internet Resources

Produced by the Association for Progressive Communications (APC) in partnership with SANGONeT. Written by Alex Comminos.

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1. Introduction

This is the fifth of a series of papers prepared for the Southern African Internet Governance (SAIGF) forum that serve as an introduction to the themes to be discussed at the 6th Annual Meeting of the Internet Governance Forum in Nairobi 2011. These papers are intended to provide an introduction to the possible issues to be discussed at the IGF and to stimulate debate during the SAIGF. The papers raise more questions than they answer and are not intended to inform policy recommendations or provide detailed analysis of any of the issues to be discussed at the IGF.

This paper will address the theme of managing critical internet resources in the context of development of the internet. "Critical Internet resources have traditionally included infrastructure (root servers, exchange points, connections), IP addresses and domain names".²

The guiding questions for this topic at the SAIGF are:

- "What is the role of each stakeholder in managing internet resources?"
- How to evaluate accountability, transparency, and inclusiveness in the management of internet resources?
- How do we promote capacity building in critical internet resources?

¹APC and SANGONeT would like to thank the Open Society Initiative of Southern Africa (OSISA) for making this issue paper series possible. The papers provide a background introduction and were produced especially for the SA IGF. They do not necessarily reflect the position of the organisers.

² Background Paper for the Southern African Internet Governance Forum 2011

- IPv4 and IPv6 transition, what are the burdens, impacts and opportunities for developing and developed countries?³

The session on managing critical resources at the last global IGF in Vilnius discussed four sub-themes that provided input from a number of feeder workshops. These were:

- Status of IPv6 availability around the world; examples and cases;
- The internationalization of critical Internet resources management and enhanced cooperation;
- The importance of new top level domains (TLDs) and internationalised domain names (IDNs) for development;
- and maintaining internet services in situations of disaster and crisis.⁴

The focus of this paper will be on IPv6 transition and on new TLDs and IDNs.

2. IPv6 transition

IPv4 exhaustion and IPv4 to IPv6 transition is an important issue that will probably be intensively discussed in the Managing Critical Resources session. IPv6 requires a brief technical explanation in order to be understood correctly. IPv6 stands for Internet Protocol version 6 and denotes a new standard for Internet Protocol addresses (IP addresses). IP addresses are assigned to every computer on the internet, or shared by a number of computers. IP addresses are also assigned to every computer on a network whether that is a local area network (LAN) or a wide area network (WAN). An IP is a computer's "address" on the internet or local network⁵.

In a nutshell the problem of IPv4 exhaustion involves the following problem. There are only 4.3 billion IP addresses available on the internet, theoretically allowing for only 4.4 billion IP connections to the internet. This does not mean that only 4.3 billion computers may connect, computers sharing one LAN for example connect over the same IP whilst having special IPs reserved within the LAN. Internet IPs are transformed into LAN IPs and back through network address translation (a function of most routers). Furthermore many internet service providers (ISPs) have blocks of users connect on the same IP address. Internet infrastructure has been implementing different "workarounds" to the limited number of IP addresses for some time.

Nonetheless despite all these workarounds there almost no more available IPv4 addresses. Very soon there will be no IPv4 space available on the internet. IPv6 on the other hand allows for theoretically 3.4×10^{38} possible IP addresses, and can in theory never run out. The transition to IPv6 started some time ago but is not entirely complete.

According to current estimates, available from one of a number of web applications that calculate IPv4 exhaustion, the Internet Association for Names and Numbers (IANA) IPv4 address space was exhausted on 03 February 2011. The Regional Internet Registries (RIRs) are also quickly running out of IP addresses:

³ Ibid

⁴ Chairman's Summary (Expanded Version), Fifth Meeting of the IGF, Vilnius, Lithuania, 14-17 September, intgovforum.org/cms/2010/Chairman's.Summary.Expanded.pdf

⁵ IPs on local area networks have been allocated a certain range and will not be discussed in depth.

- The Asia-Pacific Network Information Centre's (APNIC) address space was exhausted on 15 April 2011.
- The African Network Information Centre (AfricNIC) IP address space will be exhausted on the 27 July 2013.
- The American Registry for Internet Numbers (ARIN) will reach IPv4 exhaustion on December 6 2013.
- The Latin American Central Network Information Centre (LACNIC) will reach exhaustion on April 17 2014.
- The European and Middle Eastern registry, RIPE NCC will reach exhaustion on February 28 2012.⁶

IPv4 exhaustion does not mean a possible "end to the internet" or regional internet blackouts. Transitioning has been in place for some time, there are still many effective workarounds, as mentioned above, and IPv4 exhaustion furthermore means that there is no more IPv4 address space to allocate, but does not mean that all IP addresses are used.

Although transitioning to IPv6 is well underway there is the threat that certain infrastructures will cease to be compatible and some computers, networks and equipment may be shut off from the internet. Particularly effected will be older infrastructure running IPv6-incompatible routing equipment.

Will IPv6 may present particular challenges to Southern African countries? Southern African countries are not leaders in the creation of technology. Often, these countries implement new technologies later than countries in the North. However during Vilnius "It was noted that ISPs in developing countries had less legacy equipment and, therefore new ISPs in developing countries often had more modern, IPv6 ready equipment."⁷ Possibly this could be an advantage to developing countries. Often in developing countries infrastructure is less established, and networks are newer, or sometime absent. Does this make infrastructure easier to establish?

GSM spread rapidly in Africa. Much of Africa saw the proliferation of GSM before the USA, and to a certain extent parts of Asia. Many GSM networks in Africa were the first networks.

At Vilnius it was suggested "that governments, as early adopters and providers of important services, have a clear role to play in procurement and can act as a model of good practice for others" and had the power to influence technology through procurement policies. It was also suggested that government tendering should include the requirement that software and hardware is IPv6 ready. Furthermore "The deployment of IPv6 was likened to the migration from leaded to unleaded petrol: for a period of time unleaded petrol was only available in a few places, but quickly the situation reversed and leaded petrol became difficult to find. The same pattern was seen to be emerging for IPv6 on the Internet."⁸

⁶ IPv6 exhaustion counter, http://inetcore.com/project/ipv4ec/index_en.html Data generated on 30 August 2011. <http://www.potaroo.net/tools/ipv4/index.html> offers slightly different figures as well as charts.

⁷ Chairman's Summary, Fifth Meeting of the IGF, Vilnius, Lithuania, 14-17 September, intgovforum.org/cms/2010/Chairman's.Summary.Expanded.pdf,

⁸ Ibid.

3. New top level domains (TLDs) and internationalised domain names

The third sub-theme of the session in Vilnius was "The importance of new Top-Level Domains (nTLDs) and Internationalised Domain Names (IDNs) for development". ICANN had created a working group to look at the issue of the impact of new geographic TLDs (gTLDs) in developing countries. The working group focused on what different kinds of support might be offered to new gTLD applicants from under-served groups.⁹

Possibly to be discussed during this session of the IGF will be ICANN's proposal for new TLDs. ICANN is proposing that in addition to traditional TLDs like .com, .org., net., .ug, .bw, za, .uk, .tv there will be new top level domains which are essentially longer and can thus be comprised of words, for example: .coke, .apple, .museum. Words that are related to places will become new gTLDs. There are already up to three consortia applying for the .Africa TLD.

The ICANN board has voted in favour of this plan (13 to 1 in favour with 2 abstaining)¹⁰. Applications for TLD names are scheduled to start on Jan 12 2012 and will be accepted up to April 2012. New TLDs will be operational from 2013.¹¹

What issues will this raise? Firstly it will raise the issue common to the internet when the domain system was first opened up to the public, and still a common issue. That is the issue of "cyber squatting" - the cherry-picking of domains to sell later for profit without adding any value to the domain. Another issue is that these domains will may also allow for the privatisation of words, in domain names in ways not seen before.

ICANN has special regulations for gTLD names, .africa would be regulated differently to for example, .coke. One would be on the basis of an auction, and the other would be on the basis of a community application.

Will TLDs result in words with linguistic, geographic and cultural roots in Africa being privatised, or sold to foreign bidders for the highest cost. What if someone proposes to buy .uhuru, .nyerere, .kwasakwasa, .boerewors how will such words with such deeply imbued cultural heritage be regulated?

New TLDs will not come cheap, and will cost around US\$185,000 for initial registration, and up to US\$2 million in costs over a two-year time period.¹²

Esther Dyson the founding Chair of ICANN commented on New TLDs "I don't really think that adds to the sum of human happiness". She added that we have not run out of domains, but rather "run out of space in human heads" and predicting huge trademark issues she added "it will create a lot of litigation".¹³

⁹ Ibid.

¹⁰ Techcrunch, IAB Calls on ICANN to Withdraw Controversial Plan for New Top-Level Domains, in Washington Post Business, August 15 2011, http://www.washingtonpost.com/business/technology/iab-calls-on-icann-to-withdraw-controversial-plan-for-new-top-level-domains/2011/08/15/gIQAiHL5GJ_story.html

¹¹ Robin Wauters, ICANN to expand Top-Level Domains, Applications Start January 2012, TechCrunch, 20th June 2011.

¹² To TLD or Not to TLD, That Is the Question, International Trademark Bulletin, November 1 2010 v65no 19 www.inta.org/INTABulletin/Pages/ToTLDorNottoTLD,ThatIstheQuestion.aspx

¹³ Eric Schonfeld, Esther Dyson: On New Top-Level Domains: "There are Huge Trademark Issues", Tech Crunch, 21 July 2011, <http://techcrunch.com/2011/07/21/esther-dyson-top-level-domains/>