

IPv6 in Real Life

(Update)

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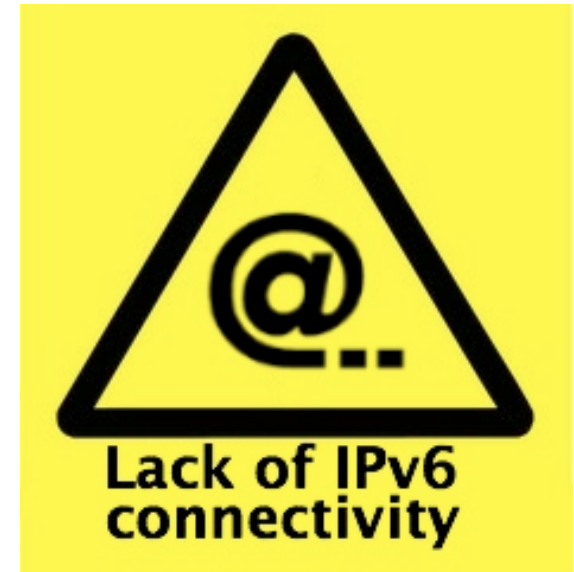
The objective?

- **Again: If our wives had a computer with only IPv6 connectivity, what would they see?**
- **N.B.: Our wives are lawyers and they manage to live without computer skills**

(FYI: at IETF-71 in Philadelphia there will be a 30-60 min. “use-ipv6-only” test to see if there’s ipv6 life out there. Good luck...)

Why?

- Everybody says IPv4 address space is depleted (now seems to be serious stuff)
- Everybody says “we have to deploy IPv6”
- But... there is such a thing as real life in IPv6 ?
- Is IPv6 really useful for something more than theoretical discussions or just small talk?



Investigative method



Investigative method

- No rocket science here
- Just plain lookups in DNS space, some easy-to-do tests
- Plus some web and mail digging
- No traffic analysis here



Investigative method (2)

- Go get the most visited webs per country
Source: <http://www.alexa.com/>
- And then:
 - Ask the DNS of that domain for...
 - an AAAA DNS entry for the web service and the email (MX), a DNS server with an IPv6 address



Investigative method (3)

- If there is a IPv6 entry in the DNS, verify that it works following three steps:
 - Open the web page with an IPv6 navigator
 - Telnet to port 25 and do some basic SMTP dialog
 - Dig to the IPv6 DNS server



Investigative method (4)

- Give ipv6 a chance...
- Though you can associate A and AAAA records to www.example.com, many domains do it by different ways:
 - www.ipv6.example.com
 - www6.example.com
 - ipv6.example.com



Periodic scan results are available at:

http://www.lab.bt.es/ipv6/global_results.html

http://www.lab.bt.es/ipv6/country_select.html

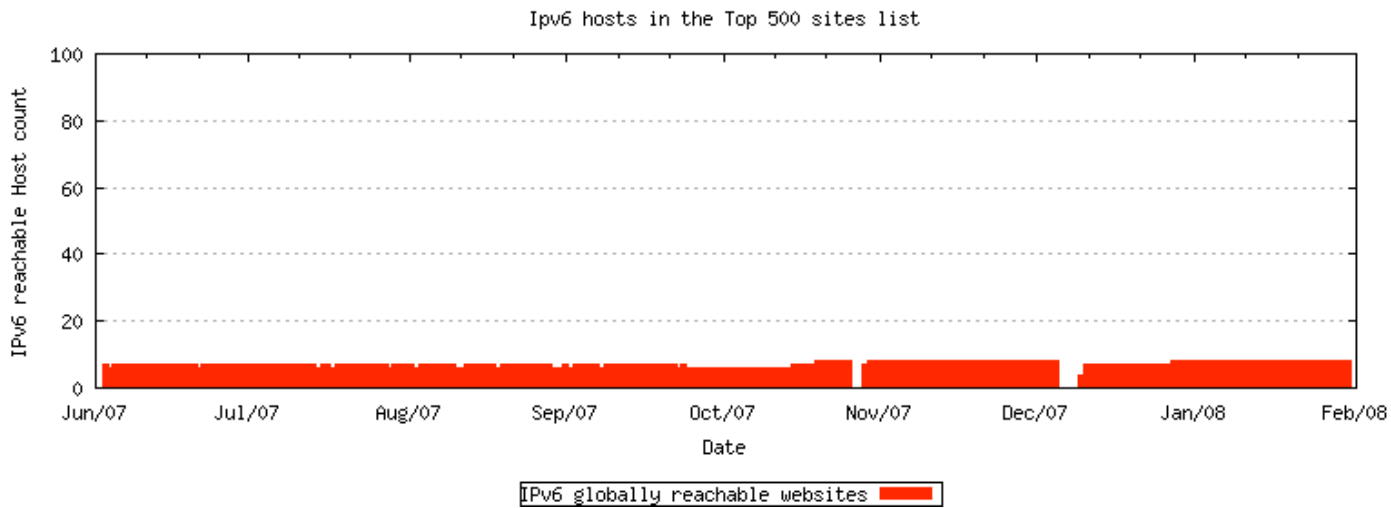
Investigative method (5)

- We also do a small check on the DNS hierarchy
 - Root servers with AAAA addressing
 - TLD (gTLD and ccTLD) with AAAA addressing
(to be increasingly automated by some scripts...)





Results



Results

- In most countries the same results were obtained
- We'll show a summary and some distinguished cases



The big numbers on web servers

	RIPE 53	RIPE 54	RIPE 55
Countries	75	102	103
Unique domains	4315	4937	4572
Unique web servers on IPv6	12	10	15

Incorrect webs servers

- Some servers displayed “test”, “it works”, blah, blah... (4)
- Others simply didn't answer (9)
 - 2002: ... 2
 - 2001: ... 7



SMTP & DNS servers

- SMTP servers

- 14 domains with IPv6 server that answered
- 2 didn't

- DNS servers

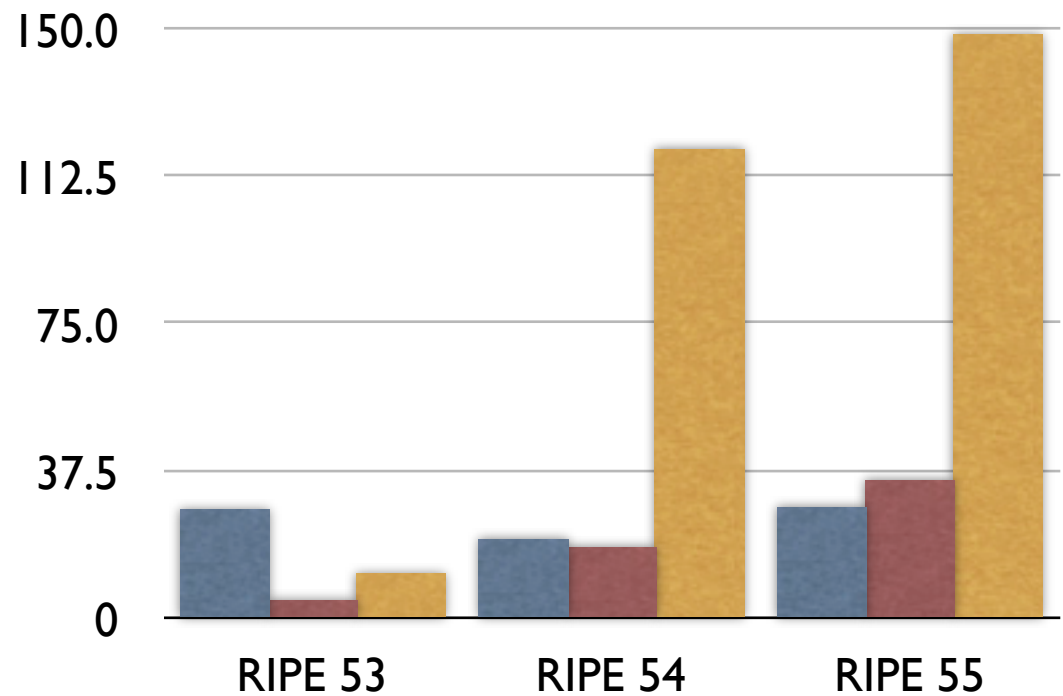
- 68 answered
- 2 didn't



“Growing” rate in IPv6 servers

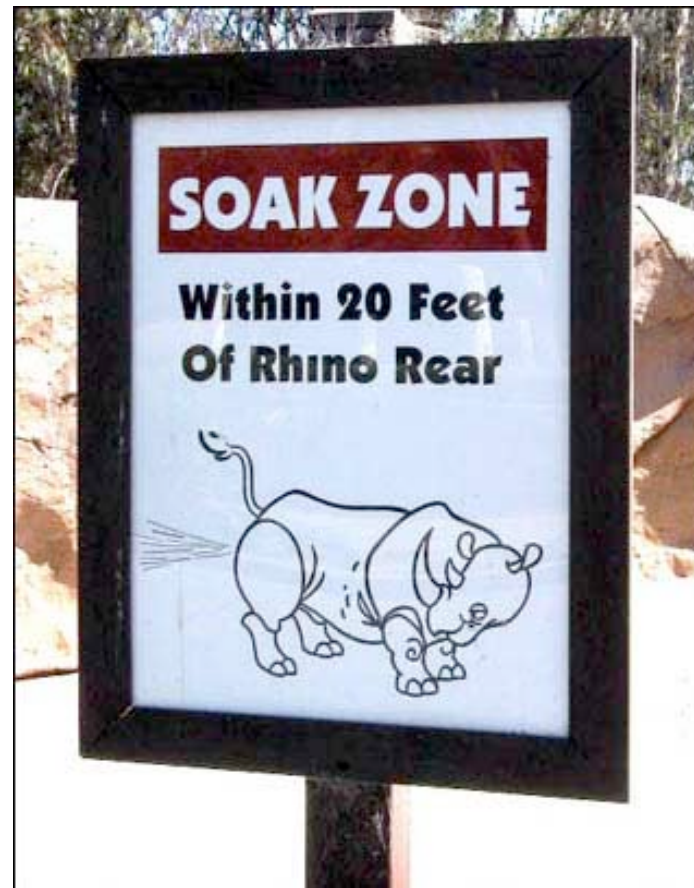
- Web servers
- SMTP Servers
- DNS Servers

Numbers in units per 10,000



Funs and Facts

(Not too much changes from previous editions)



facts from top 500/100 lists

- (ipv6)Microsoft present (and unreachable) everywhere
- (ipv6)hp.com still there (and unreachable), but in much less countries
- (ipv6)elmundo.es has stopped providing service, although the name still solved to AAAA
- Less (overall) ipv6 www sites found at this round:
 - of 103 countries, 69 have the same number of sites (most of them compatible with 0), 21 have less, and 13 more than in previous edition.

100,000 Lemmings
can't be wrong!

facts from top 500/100 lists (ii)

- Some “real” sites disappeared, some new came out, and also some “incorrect” sites went out.
- The general balance keeps being slightly positive (+0.001% ipv6 to ipv4 ratio) for the real sites.
- Still no significant tracks of ipv6 real services in the commercial web environment.



facts from top 500/100 lists (ii)

- Countries that have **less** ipv6-reachable web sites:
 - 1 site less: bolivia, brunei, ecuador, germany, malta, romania, sri-lanka, switzerland, taiwan, thailand, uruguay, venezuela, vietnam
 - 2 sites less: indonesia, kuwait, mexico, pakistan, panama, tunisia, united kingdom, united states
- Countries that have(had) **more** ipv6-reachable web sites:
 - egypt, jordan, libya, oman, palestinian territory, sudan, syrian arab republic, yemen
(the same web site (www.paran.com) at ~ the same time: 2nd week of october '07, disappeared ~ end of November '07)
 - bulgaria, greece, jamaica, moldova, nicaragua, france, lebanon



Servers that really works!

(and still fit on a slide...)



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www.ipv6.elmundo.es



Tecnocom



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(6 servers)



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Usual suspects

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	Web	MX	NS
ripe.net	yes	no	yes
arin.net	yes	no	yes
apnic.net	yes	no	yes
lacnic.net	yes	yes	yes
afrinic.net	no	no	yes

more usual suspects

more usual suspects

	Web	MX	NS
iana.org	no	no	yes
icann.org	no	no	yes
ietf.org	yes	yes	yes

DNS Hierarchy



Root servers

- 5 root servers operating in IPv6 (No change since RIPE-53) (according to www.root-servers.org)
- But they **STILL** don't appear in `/domain/named.root`, so are nearly invisible... until today



TLD DNS servers

	RIPE 53	RIPE 54	RIPE 55
with 5 IPv6 DNS servers	-	-	2
with 4 IPv6 DNS servers	17	16	16
with 3 IPv6 DNS servers	27	31	30
with 2 IPv6 DNS servers	51	51	55
with 1 IPv6 DNS server	72	75	69
without IPv6 DNS servers	97	96	109
TOTALS	264	267	281

TLD DNS Servers (2)

gTLD	RIPE-53	RIPE-54	RIPE-55
.int	2	2	2
.biz	2	2	2
.com	2	2	2
.info	2	2	2
.mobi	2	2	2
.org	3	3	5
.museum	-	1	0

gTLD	RIPE-53	RIPE-54	RIPE-55
.aero	1	1	1
.edu	0	0	0
.gov	0	0	0
.mil	0	0	0
.cat	-	2	2
.tel	-	2	2
.travel	-	2	2

more numb3rs

- For the 281 TLDs, 353 DNS with ipv6 address were found:
 - 322 IPv6 DNS servers answered (315 authoritative, 7 not)
 - 21 never answered



Popular DNS servers

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- 36 domains served by 2001:6b0:7::2 (sunic.sunet.se)

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- 13 domains served by 2001:dc0:1:0:4777::140 (sec3.apnic.net)

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- 13 domains served by 2001:502:d399::1 (tld1.ultradns.net)
- 8 domains served by 2001:4200:1010::1 (hippo.ru.ac.za)

RIPE support of DNS

- Many TLD use RIPE IPv6 DNS servers as secondary
 - 5(4) TLD have two RIPE IPv6 DNS servers as secondaries
 - 61(65) TLD have one



Questions?

Suggestions & Corrections are absolutely welcome



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