Domain Name System (DNS) IPv6 update

TLD and Root Zone work

Prior Work

- Testbeds
  - www.rs.net
  - RIPE n/m
  - WIDE/ISI/ISC work
- Early Adopters
  - TLDs from all regions

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The problem (from the Server)

- DNS has a defined size limit.
- UDP fragmentation is operationally -BAD-
  - NAT boxes tend to drop UDP fragments
- The defined limit is 512 bytes !!!!
  - not IPv6 friendly :)
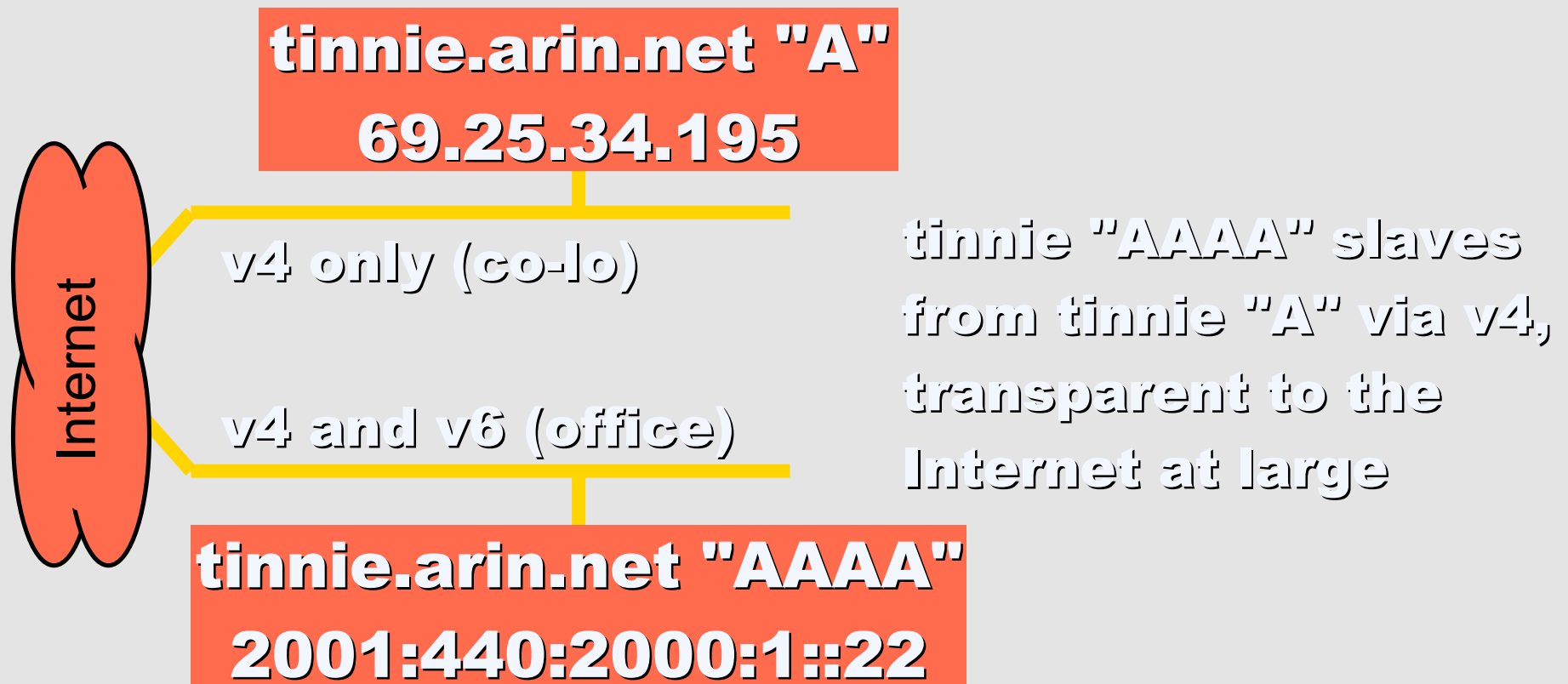- HOW MANY SERVERS CAN I DEFINE?
  - …before fragmentation occurs?

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Current Policy recommendations

- ## RSSAC to ICANN

  - "Based on empirical testing, please proceed w/ TLD delegations at your earliest" htpp://www.rssac.org/rssac-v6tldglue

- ## IETF to TLDs

  - Mind the fragments… And here is a calculator to determine when fragmentation will occur. http://www.ietf.org/internet-drafts/draft-ietf-dnsop-respsize-00.txt

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Integration "HowTo"

- Depends on your current deployment
  - Services & Transport overlap?
- IETF has some recommendations, but it is unclear to me that the authors run servers.

- Experiences from ARIN

One name, two machines

tinnie.arin.net "A"
69.25.34.195

Internet

v4 only (co-lo)

v4 and v6 (office)

tinnie "AAAA" slaves from tinnie "A" via v4, transparent to the Internet at large

tinnie.arin.net "AAAA"
2001:440:2000:1::22

Non-dual Stack DNS

Running non-dual stack servers for a zone on v4 and v6 can be done two ways

- Having the servers have an A "x"or AAAA record

- Using one server name on two machines

BIND seeks A and AAAA for all NS names

- Recommendation to use "one name, two machines"

One "gotcha"

The "other" v6 service we run, SSH

ssh tinnie.arin.net

AAAA is preferred over A

If you wanted to reach tinnie A, oops.

Once did a "tail -f log" on the wrong host

Why wasn't an event being logged?

Good thing it wasn't an "rm" command

Otherwise, acceptable but sub-optimal

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Another "gotcha"

If the "A" server is running other services that can't be brought to v6

    Separate the services physically, or

    Separate the services via domain names

We separated by purchasing a new server

    Newer hardware - good

Summary

Adding IPv6 as a Network Protocol

It's not as hard as you think. It can't be.

Recommendations

Use latest acceptable versions of software

Use the same physical media for IPv4 and IPv6

Get in early, while the bandwidth is easy to handle and grow with it

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"waiting…waiting…."

- JP
- FR
- EDU
- ..others?…
- About 1/3rd of the roots.

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ICANN, DoC, et.al.

- V6 is important: http://www.ntia.doc.gov/ntiahome/press/2004/IPv6_01152004.htm

- Concerned about stability: " Given the Department's interest in IPv6, and more importantly, in the continued smooth operation and stability of the …<dns>…, we want to see a full-blown technical proposal … that includes … what steps would be taken to protect the smooth operation of … <the dns>…" - Kathy Smith, NTIA

- ICANN procedural guidelines for public comment. http://www.iana.org/procedures/comments.html

Current Status

- ICANN has covered all the bases in their proposed procedures and the comment period has closed w/o significant changes. This is now a formal ICANN procedure.

- The backlog of requests will be processed as they meet the normal criteria that are layed out in their proposals - Most should be processed within weeks of being released.

- We then move on to native v6 support for the root servers - may take another 6-9 months of work.

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Documents

- http://www.ietf.org/internet-drafts/draft-ietf-dnsop-respsize-00.txt

- htpp://www.rssac.org/rssac-v6tldglue

- http://www.ntia.doc.gov/ntiahome/press/2004/IPv6_01152004.htm

- http://www.ietf.org/internet-drafts /draft-ietf-dnsop-ipv6-transport-guidelines-02.txt

- http://www.iana.org/procedures/comments.html

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Other parts of the System

- The "infrastructure"
  - "Middle-Box" & Proxies
  - "hijacking" the request & response - fabricate something that they think "might" be wanted.
- The resolver(s)
  - may not be a single "resolver" - some applications have their own
  - based on OS capabilities
- Lifecycle - what is the replacement cycle?

Summary

- Technical issues for IPv6 support by TLDs have been cleared

- Processes and procedures are defined for adding IPv6 support for TLDS

- It is up to the TLD operator to make the request. Requests are being honoured

- Working v6 DNS is a key component for IPv6 deployment. Middlebox and endsystems are less critical.

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Fin

- Questions?

- Bill Manning <bmanning@ep.net>