IPv6 Addresses on the DNS

Fernando Gont

IPv6 Hackers #1
Berlin, Germany. July 30, 2013
Some background...
Background

- IPv6-toolkit's addr6 tool analyzes IPv6 addresses
- Originally produced to gain insights into IPv6 address scanning
- Two datasets:
  - Alexa's top 1M sites
  - World IPv6 Launch Day
- Sample of the results...
IPv6 address distribution for the web
IPv6 address distribution for MXs

- WIIPv6LD (MX records)
- Alexa's Top-1M sites (MX records)

Legend:
- Byte-pattern
- Embed-IPv4
- Embed-Port
- IEEE-based
- ISATAP
- Low-byte
- Random
- Teredo
IPv6 address distribution for the DNS
Some “surprises”...
Alexa's Top 1M sites dataset
Web server IPv6 addresses

- Overall analysis:
  - Unicast: 6045 (99.90%)
  - Multicast: 0 (0.00%)
  - Unspec.: 6 (0.10%)  

- Unicast addresses:
  - Global: 5955 (98.51%)  
  - 6to4: 43 (0.71%)  
  - IPv4-comp: 36 (0.60%)  
  - Link-local: 5 (0.08%)  
  - Loopback: 6 (0.10%)
Mail server IPv6 addresses

- Overall analysis:
  - Unicast: 4596 (100.00%)
  - Multicast: 0 (0.00%)
  - Unspec.: 0 (0.00%)

- Unicast addresses:
  - Global: 5955 (98.51%)
  - 6to4: 4 (0.09%) ??
  - IPv4-comp: 3 (0.07%) ??
  - Link-local: 1 (0.02%) ??
DNS server IPv6 addresses

- Overall analysis:
  - Unicast: 3595 (100.00%)
  - Multicast: 0 (0.00%)
  - Unspec.: 0 (0.00%)

- Unicast addresses:
  - Global: 3589 (99.83%)
  - 6to4: 5 (0.14%) <---- ???
  - IPv4-comp: 1 (0.03%) <---- ???
World IPv6 Launch Day site dataset
Web server IPv6 addresses

- Overall analysis:
  - Unicast: 2652 (99.96%)
  - Unspec.: 0 (0.00%)
  - Multicast: 1 (0.04%)  

- Unicast addresses:
  - Global: 2645 (99.74%)
  - 6to4: 7 (0.26%)
Mail server IPv6 addresses

- Overall analysis:
  - Unicast: 4273 (100.00%)
  - Multicast: 0 (0.00%)
  - Unspec.: 0 (0.00%)

- Unicast addresses:
  - Global: 4260 (99.70%)
  - 6to4: 13 (0.30%)
DNS server IPv6 addresses

- Overall analysis:
  - Unicast: 4788 (100.00%)
  - Multicast: 0 (0.00%)
  - Unspec.: 0 (0.00%)

- Unicast addresses:
  - Global: 4784 (99.92%)
  - 6to4: 4 (0.08%)
Further work and ideas...
DNS police

- Generate a tool to automatically check and report incorrect DNS entries
Client addresses

- Only limited data (we should analyze the User Agent string)
Thanks!

Fernando Gont
fgont@si6networks.com
@FernandoGont

SI6 Networks
www.si6networks.com
@SI6Networks