An Approach for Increasing Root And TLD DNS Servers
draft-yasuhiro-dnsop-increasing-dns-server-01.txt

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dnsop wg
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Concepts of the draft

- This draft proposes increasing IP addresses of DNS servers without IP anycast, DNS protocol extensions

- Reducing DNS packet size by using "multiple-addresses per host"
  - authority section of DNS response packet
  - This does not violate the DNS protocol

- Zone administrator can add IPv6 addresses without (or minimum) reducing of IPv4 address

"single-address per host"

- Example: single address per host

net.	IN	NS	a.gtld-servers.net.
	IN	NS	b.gtld-servers.net.
...			
	IN	NS	m.gtld-servers.net.
a.gtld-servers.net.	IN	A	192.5.6.30
b.gtld-servers.net.	IN	A	192.33.14.30
...			
m.gtld-servers.net.	IN	A	192.55.83.30

"multiple-addresses per host"

- Example: multiple addresses per host

net.	IN	NS	x.gtld-servers.net.
	IN	NS	y.gtld-servers.net.
	IN	NS	z.gtld-servers.net.
x.gtld-servers.net.	IN	A	aaa.aaa.aaa.aaa
	IN	A	bbb.bbb.bbb.bbb
	IN	A	ccc.ccc.ccc.ccc
y.gtld-servers.net.	IN	A	ddd.ddd.ddd.ddd
	IN	A	eee.eee.eee.eee
	IN	A	fff.fff.fff.fff

...

Changes from -00

- Added 3 issues
  - "Number of Addresses per Server" issue
  - "Server Selection" issue
  - "Registration" issue
- Added the test result on appendix A
  - Some various cases of combinations
    - Number of DNS servers
    - IPv4 addresses per name
    - IPv6 addresses per name

"Number of Addresses per Server" issue

- DNS treats all the resource records (RRs) per 'RRSet' basis
  - This makes direct influence on additional section in a DNS packet. Because, if it is occurred at NS query, whole of glue A records may be cancelled
  - This is harmful for name resolution and this must be avoided

- We did the test some various cases of combinations "the number of DNS servers" and "IPv4 and IPv6 addresses per name", the result of the test on appendix A of the draft

"Server Selection" Issue

- If some trouble is occurred at one of the host of 'DNS server set', it may be harmful for whole of 'server set'
  - For example, one bad server may block access to other good servers
- It may effect server selection algorithm of DNS cache servers (not yet issued by draft)
  - On many implementations, multiple A returns 'round-robin' basis, it may effects DNS server selection algorithm

"Registration" Issue

- Some registries and/or registrars (especially root = IANA), this "multiple IP addresses registration" for DNS server host may not be allowed
  - I am not sure IANA allows this or not
- In this case, users can not register this

- .jp registry allows the multiple IP addresses

ToDo

- Needs more tests and experiences
  - Testing the behavior of existing DNS server implementations (especially, DNS cache servers)
    - Treats of multiple address per name as glue A
    - Server selection algorithm
    - 'Round-robin' issue
  - Testing for searching most suitable pattern of number of NSes, IPv4 addresses and IPv6 addresses per name

Thank you

- Please give us comments
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