

ICANN NCAP DG Data Analysis

Study 2

Reserved Strings

RFC 2606 – Reserved Top Level DNS Names

To safely satisfy these needs, four domain names are reserved as listed and described below.

```
.test  
.example  
.invalid  
.localhost
```

".test" is recommended for use in testing of current or new DNS related code.

".example" is recommended for use in documentation or as examples

".invalid" is intended for use in online construction of domain names that are sure to be invalid and which it is obvious at a glance are invalid.

The ".localhost" TLD has traditionally been statically defined in host DNS implementations as having an A record pointing to the loop back IP address and is reserved for such use. Any other use would conflict with widely deployed code which assumes this use.

Name	Reference
6tisch.arpa.	[RFC-ietf-6tisch-minimal-security-15]
10.in-addr.arpa.	[RFC6761]
16.172.in-addr.arpa.	[RFC6761]
17.172.in-addr.arpa.	[RFC6761]
18.172.in-addr.arpa.	[RFC6761]
19.172.in-addr.arpa.	[RFC6761]
20.172.in-addr.arpa.	[RFC6761]
21.172.in-addr.arpa.	[RFC6761]
22.172.in-addr.arpa.	[RFC6761]
23.172.in-addr.arpa.	[RFC6761]
24.172.in-addr.arpa.	[RFC6761]
25.172.in-addr.arpa.	[RFC6761]
26.172.in-addr.arpa.	[RFC6761]
27.172.in-addr.arpa.	[RFC6761]
28.172.in-addr.arpa.	[RFC6761]
29.172.in-addr.arpa.	[RFC6761]
30.172.in-addr.arpa.	[RFC6761]
31.172.in-addr.arpa.	[RFC6761]
168.192.in-addr.arpa.	[RFC6761]
170.0.0.192.in-addr.arpa.	[RFC8880]
171.0.0.192.in-addr.arpa.	[RFC8880]
254.169.in-addr.arpa.	[RFC6762]
8.e.f.ip6.arpa.	[RFC6762]
9.e.f.ip6.arpa.	[RFC6762]
a.e.f.ip6.arpa.	[RFC6762]
b.e.f.ip6.arpa.	[RFC6762]
home.arpa.	[RFC8375]
example.	[RFC6761]
example.com.	[RFC6761]
example.net.	[RFC6761]
example.org.	[RFC6761]
invalid.	[RFC6761]
ipv4only.arpa.	[RFC8880]
local.	[RFC6762]
localhost.	[RFC6761]
onion.	[RFC7686]
test.	[RFC6761]

ITHI Measurement

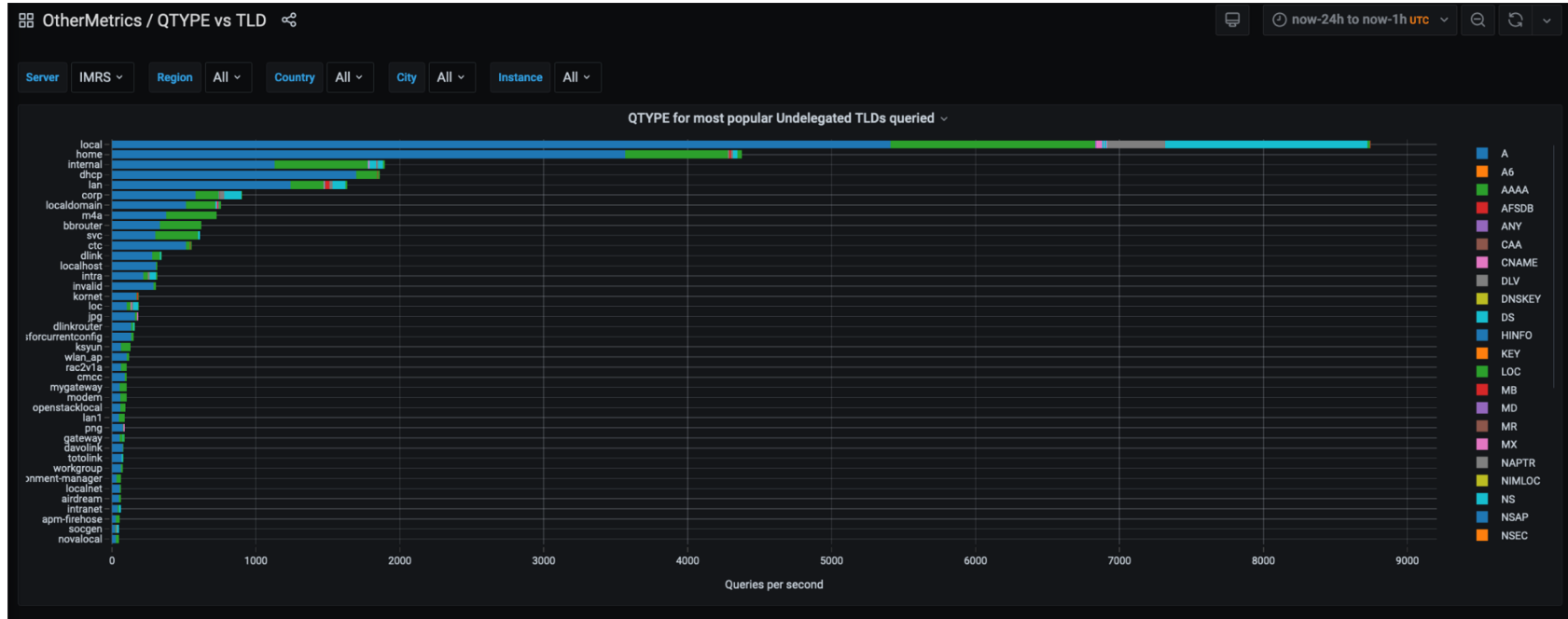
Queries to RFC 6761 reserved names [\(?\)](#)

In the following table, the *current value* is the fraction of queries to the root directed at RFC 6761 names in the current month. The table also provides the average value over the 3 previous months, and the "historical" minimum and maximum observed since the beginning of the measurements.

RFC 6761 name	As of Dec 2020	Past 3 months	Historic Low	Historic High
LOCAL	6.106%	4.607%	2.360%	5.079%
LOCALHOST	0.370%	0.265%	0.206%	0.561%
INVALID	0.260%	0.203%	0.191%	0.341%
TEST	0.075%	0.043%	0.008%	0.049%
ONION	0.011%	0.007%	0.002%	0.008%
EXAMPLE	0.003%	0.002%	0.001%	0.020%

<https://ithi.research.icann.org/graph-m3.html>

Current Top Strings



<https://stats.dns.icann.org/stats/d/wom-ext-5minagg-qtype-vs-tld/qtype-vs-tld?orgId=1>

ITHI Measurement

Queries to frequently leaked strings (2)

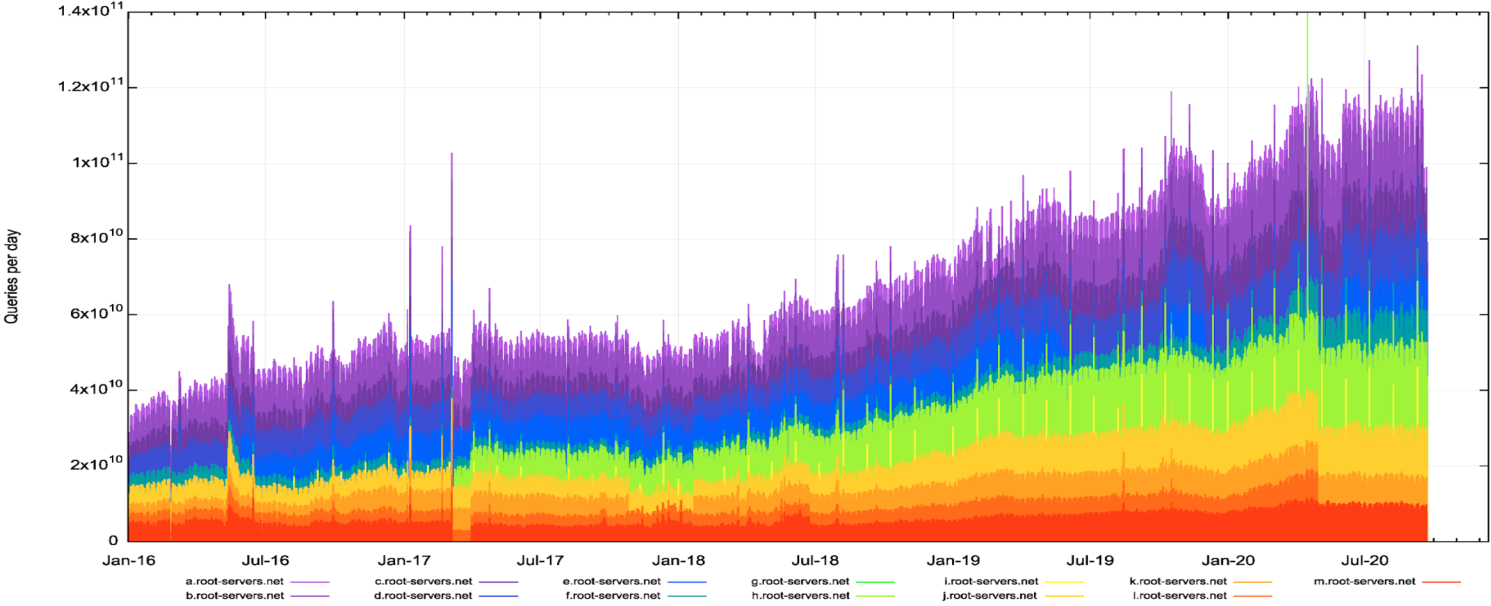
In the following table, the *current value* is the fraction of queries to the root directed at frequently used strings in the current month. The table also provides the average value over the 3 previous months, and the "historical" minimum and maximum observed since the beginning of the measurements.

Frequently used string	As of Dec 2020	Past 3 months	Historic Low	Historic High
HOME	3.218%	3.034%	2.478%	3.674%
INTERNAL	1.744%	0.714%	0.301%	0.971%
LAN	1.095%	1.174%	0.469%	1.306%
DHCP	0.890%	0.787%	0.206%	1.285%
CORP	0.608%	0.439%	0.191%	0.572%
LOCALDOMAIN	0.482%	0.516%	0.298%	0.604%
DLINK	0.289%	0.244%	0.141%	0.341%
BBROUTER	0.283%	0.278%	0.000%	0.379%
CTC	0.276%	0.138%	0.000%	0.232%
INTRA	0.240%	0.174%	0.000%	0.270%
M4A	0.208%	0.223%	0.000%	0.278%
SVC	0.184%	0.000%	0.000%	0.000%
LOC	0.176%	0.131%	0.000%	0.178%
JPG	0.152%	0.039%	0.000%	0.116%
OPENSTACKLOCAL	0.122%	0.000%	0.000%	0.396%
GETCACHEDDHCPRESULTSFORCURRENTCONFIG	0.121%	0.076%	0.000%	0.129%
DLINKROUTER	0.118%	0.151%	0.123%	0.220%
IP	0.000%	0.000%	0.000%	1.010%
DHCP_HOST	0.000%	0.000%	0.000%	0.877%
GATEWAY	0.000%	0.152%	0.000%	0.234%
_0x83	0.000%	0.000%	0.000%	0.304%
BELKIN	0.000%	0.000%	0.000%	0.186%

WLAN_AP	0.000%	0.077%	0.000%	0.181%
LAN1	0.000%	0.044%	0.000%	0.169%
HOMESTATION	0.000%	0.000%	0.000%	0.190%
MODEM	0.000%	0.166%	0.000%	0.222%
NULL	0.000%	0.000%	0.000%	0.220%
MYGATEWAY	0.000%	0.101%	0.000%	0.188%
DAVOLINK	0.000%	0.000%	0.000%	0.191%
DNSBL	0.000%	0.000%	0.000%	0.227%
WORKGROUP	0.000%	0.000%	0.000%	0.153%
COMM	0.000%	0.000%	0.000%	0.367%
CONSUL	0.000%	0.000%	0.000%	0.137%
SJY	0.000%	0.000%	0.000%	0.346%
KSYUN	0.000%	0.000%	0.000%	0.167%
RAC2V1A	0.000%	0.042%	0.000%	0.126%
MYNET	0.000%	0.000%	0.000%	0.121%
KSCN	0.000%	0.000%	0.000%	0.114%
DOESNOTEXIST	0.000%	0.000%	0.000%	0.195%
LOCAL_GK	0.000%	0.000%	0.000%	0.153%
MRDKA	0.000%	0.000%	0.000%	0.130%
NO-USE-NOW	0.000%	0.000%	0.000%	0.110%
TOTOLINK	0.000%	0.033%	0.000%	0.100%

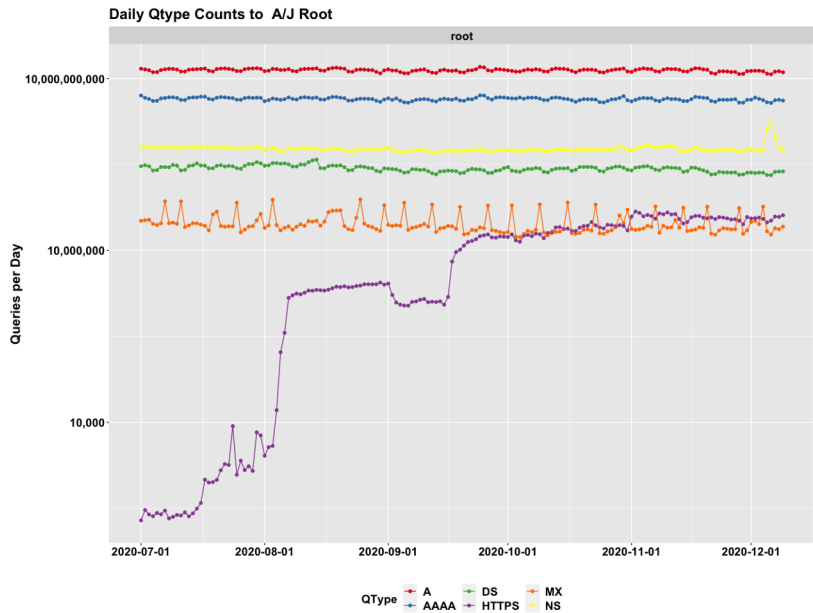
<https://ithi.research.icann.org/graph-m3.html>

RSSAC002 Data



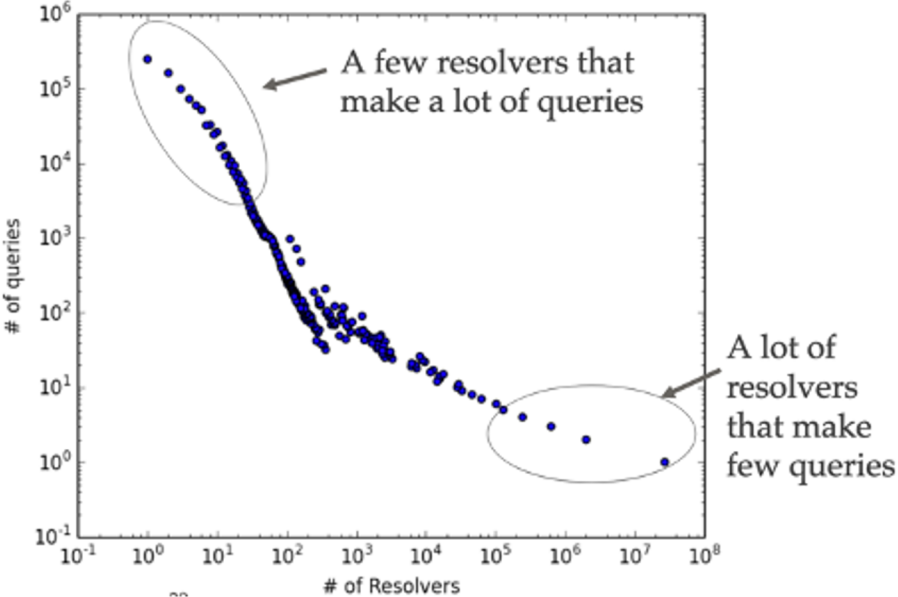
<https://www.potaroo.net/ispcol/2020-09/root-fig1.png>

Qtype Changes



Source: Verisign A/J root data

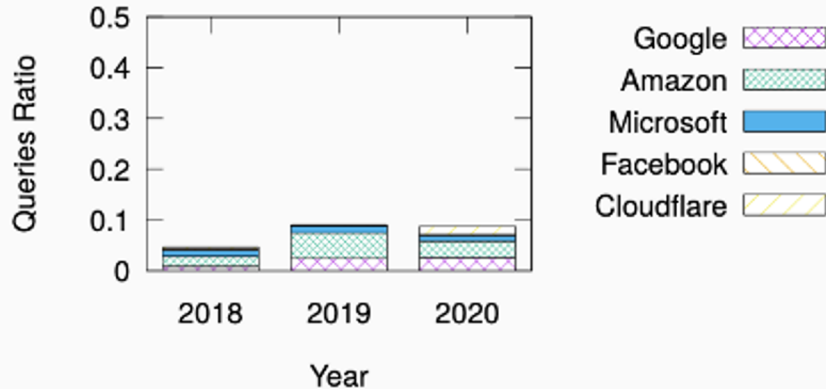
DNS Consolidation



<https://ant.isi.edu/~imana/presentations/lmana18b.pdf>

DNS Consolidation

Traffic to b.root-servers.net



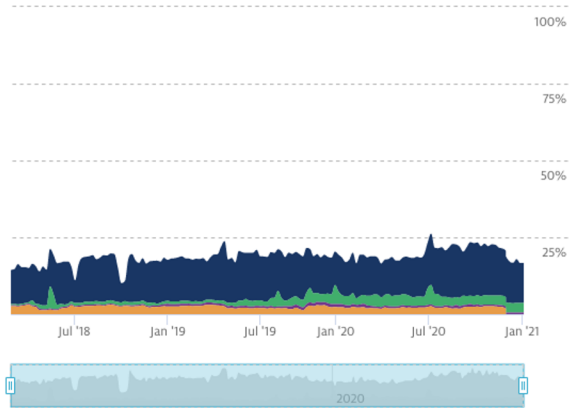
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<https://ripe81.ripe.net/presentations/6-presentation.pdf>

DNS Consolidation

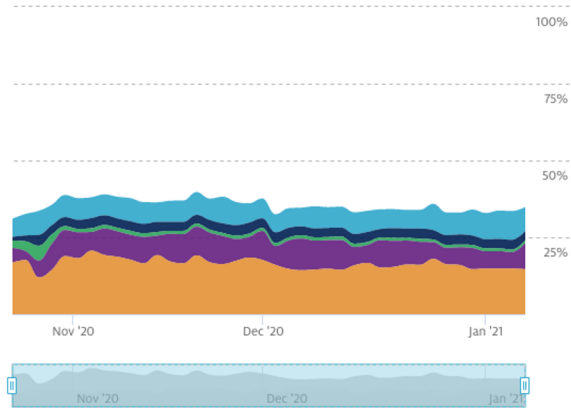
Queries from large public resolvers

Percentage of queries that originate from large public DNS resolver service providers



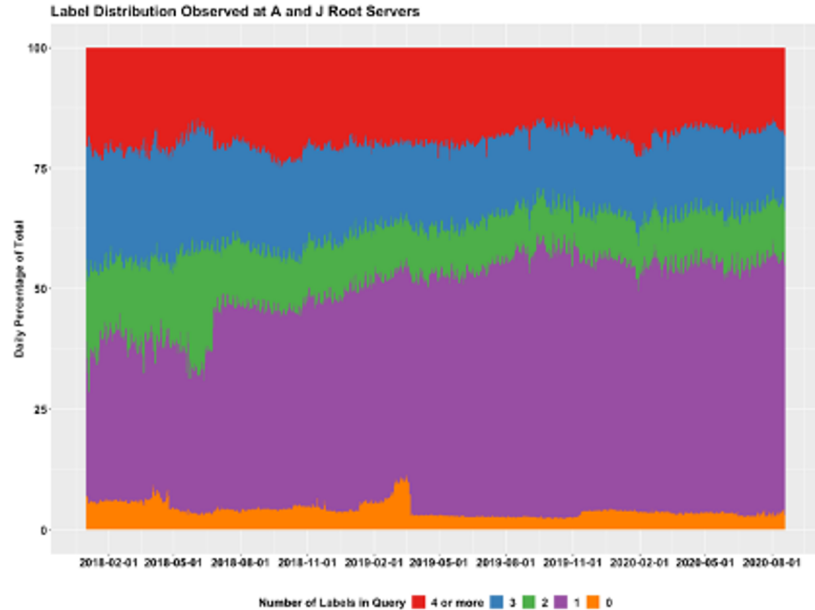
Cloud and CDN Traffic Centralization

Cloud and CDN traffic centralization measured from our authoritative servers



<https://stats.sidnlabs.nl/en/network.html>

Qname Minimization

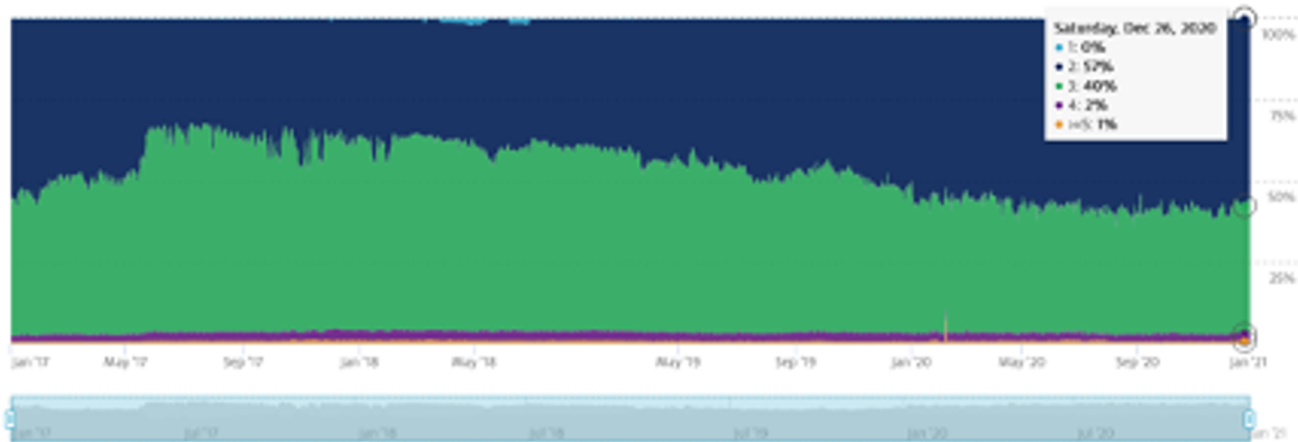


<https://blog.verisign.com/security/maximizing-qname-minimization-a-new-chapter-in-dns-protocol-evolution/>

Qname Minimization

Number of constituent labels in domain names

The most common number of constituent labels in queried domain names.



<https://stats.sidnlabs.nl/en/dns.html>

Qname Minimization and resolver characteristics

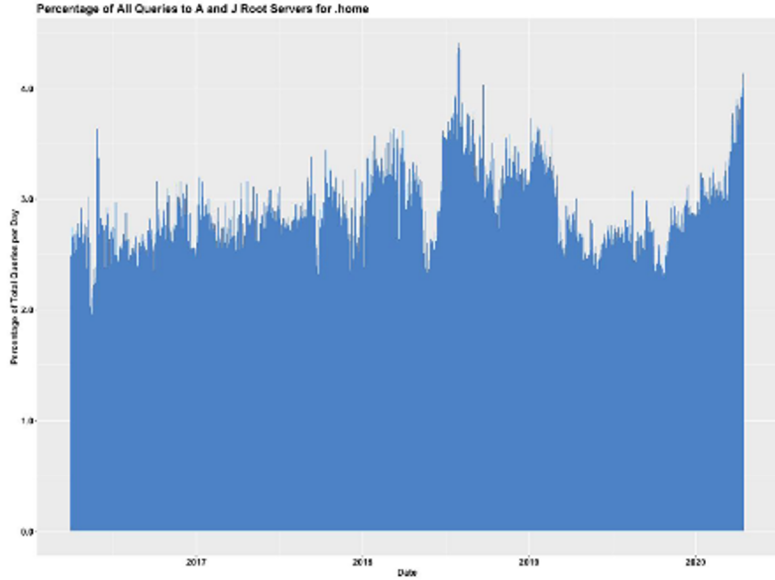
Characteristics of resolvers seen at the root

Additional metrics characterize the options found in queries sent to the root, such as whether resolvers use extended DNS (M3.4.1), what EDNS options they use (M3.4.2), whether they set the DNSSEC OK bit in queries (M3.5), and whether they appear to enforce QName Minimization (M3.6)

Metric		As of Dec 2020	Past 3 months	Historic Low	Historic High
M3.4.1 (?)	%resolvers using Extended DNS (EDNS)	89.707%	90.360%	88.683%	91.821%
M3.4.2 (?)	%resolvers using COOKIE(10)	8.394%	7.965%	3.146%	8.243%
	%resolvers using edns-client-subnet(8)	0.000%	0.072%	0.000%	0.316%
	%resolvers using 65001	0.000%	0.000%	0.000%	0.012%
	%resolvers using EDNS EXPIRE(9)	0.000%	0.000%	0.000%	0.002%
	%resolvers using NSID(3)	0.000%	0.000%	0.000%	0.001%
	%resolvers using 65433	0.000%	0.000%	0.000%	0.000%
	%resolvers using 65435	0.000%	0.000%	0.000%	0.000%
M3.5(?)	%resolvers setting DNSSEC OK (DO) flag	84.521%	84.533%	81.920%	85.881%
M3.6(?)	%resolvers using QName minimization	34.540%	29.555%	11.700%	32.582%

<https://ithi.research.icann.org/graph-m3.html>

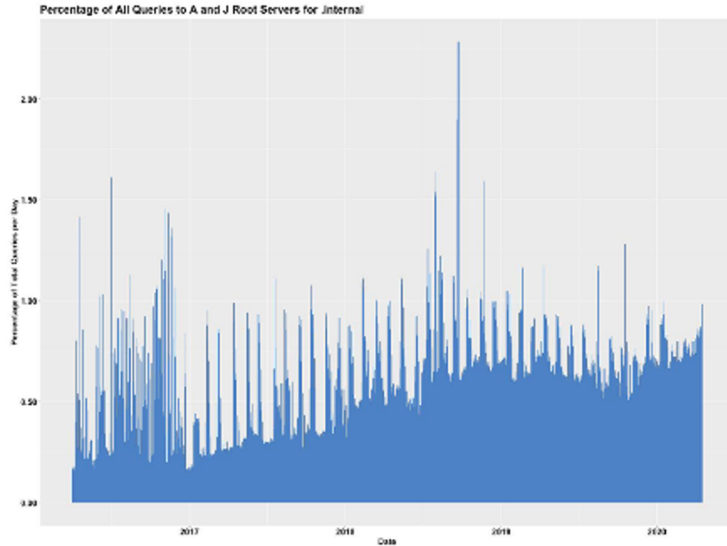
.HOME



<https://www.icann.org/en/system/files/files/sac-113-en.pdf>

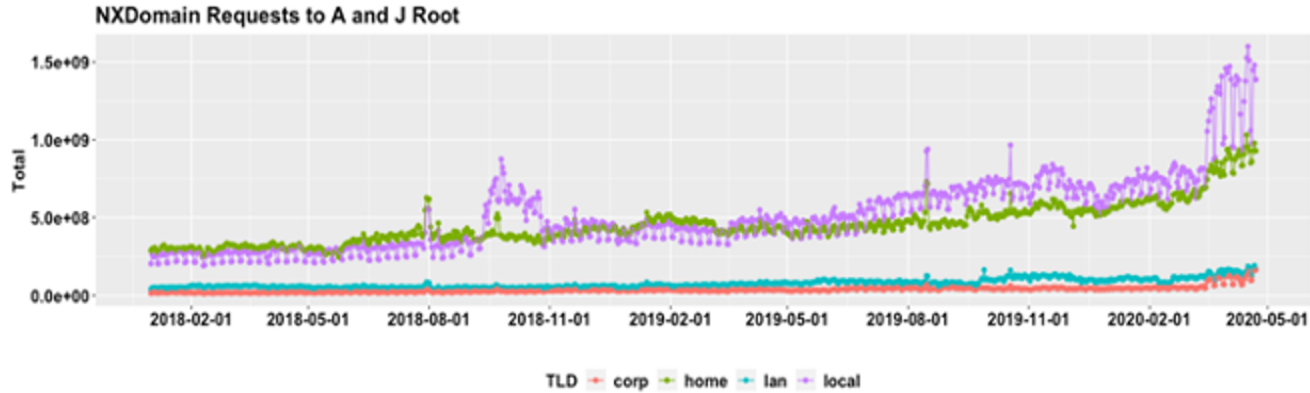
.INTERNAL

SSAC Advisory on Private Use TLDs



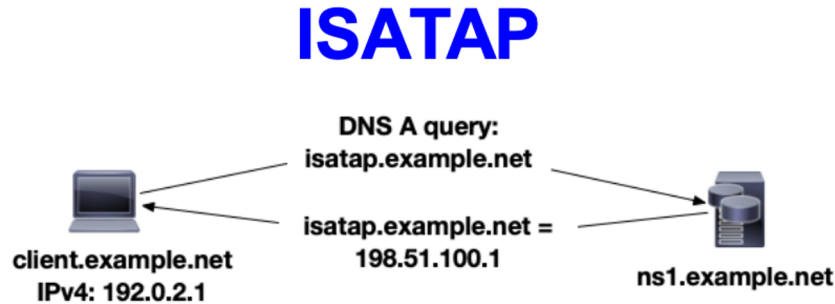
<https://www.icann.org/en/system/files/files/sac-113-en.pdf>

CORP and HOME



<https://www.icann.org/en/system/files/files/sac-113-en.pdf>

Hardcoded Labels and DNS Service Discovery



Hardcoded Labels and DNS Service Discovery

WPAD

