

ICANN
POLICY FORUM

77

WASHINGTON, D.C.

12-15 June 2023

DNS Concentration & DNSSEC Deployments in SLDs

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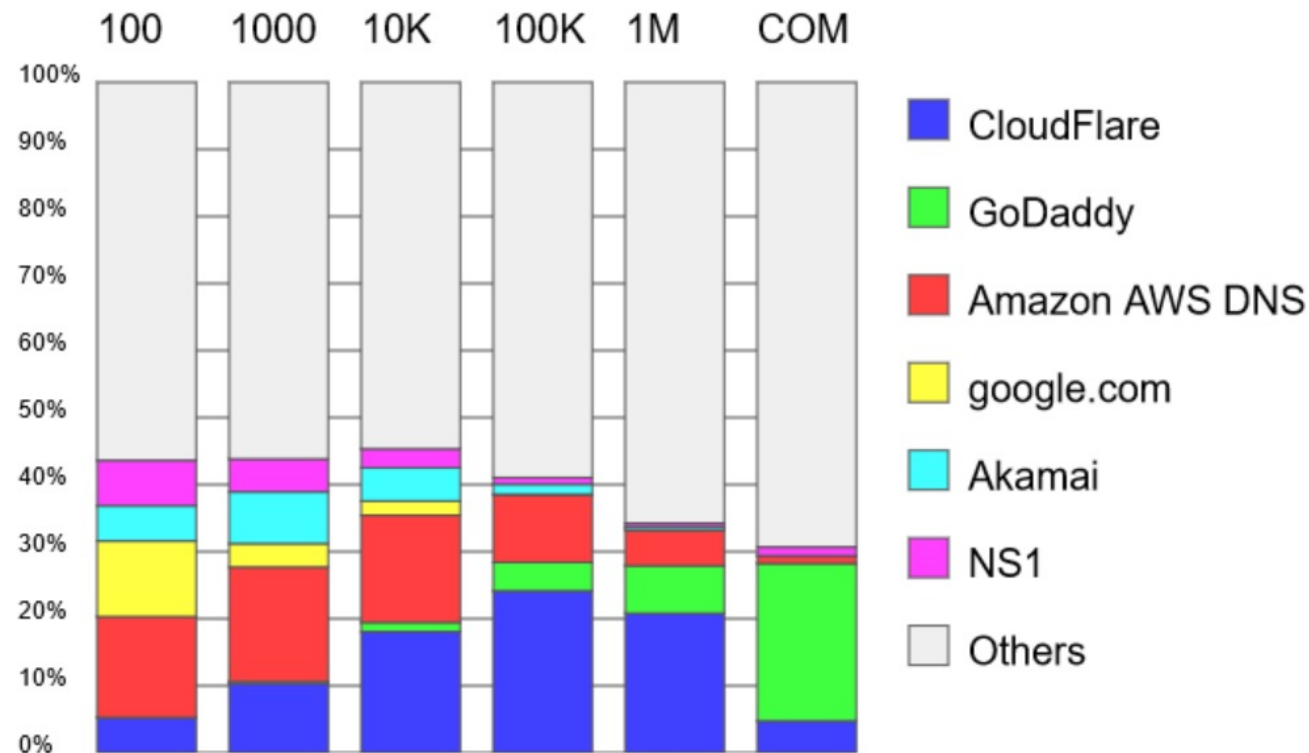
<https://ithi.research.icann.org>



Measuring DNS Concentration: Majestic Million and COM

- Start with the “Majestic Million” list
 - <https://majestic.com/reports/majestic-million>
- Slicing the top 1 Million servers
 - Top 100, 101 to 1,000, 1,001 to 10,000, 10,001 to 100,000, 100,001 to 1M
 - Also measuring the entire COM zone, for reference.
- For each domain name, find NS record
 - Identify DNS servers behind record
 - Group based on FQDN of server
 - Group servers based on common domain prefix
 - Manual grouping of name patterns, e.g. AWS servers
- Check DNSSEC status of domain name

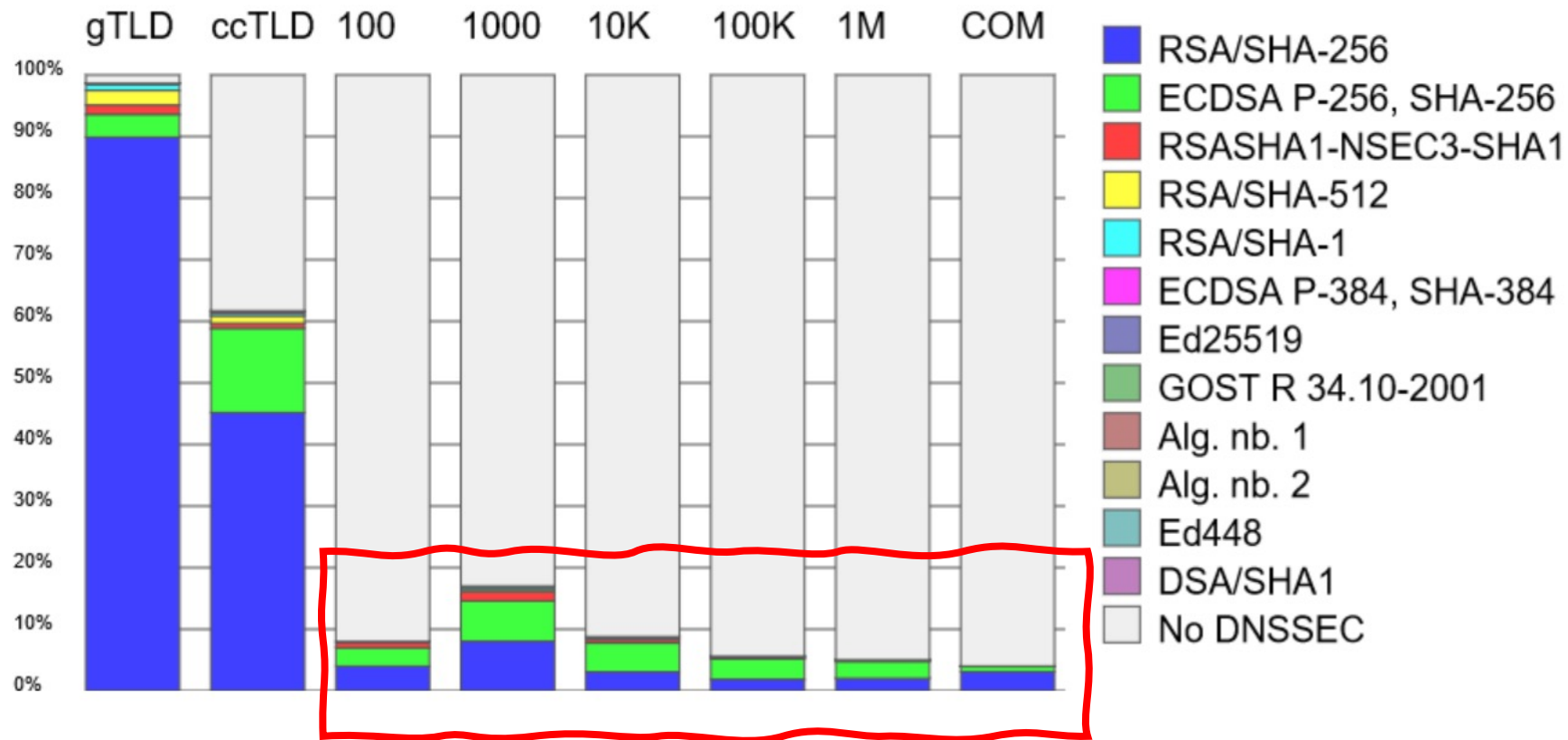
ITHI M9, Concentration of Authoritative DNS Services, May 2023



Source: <https://ithi.research.icann.org/graph-m9.html>

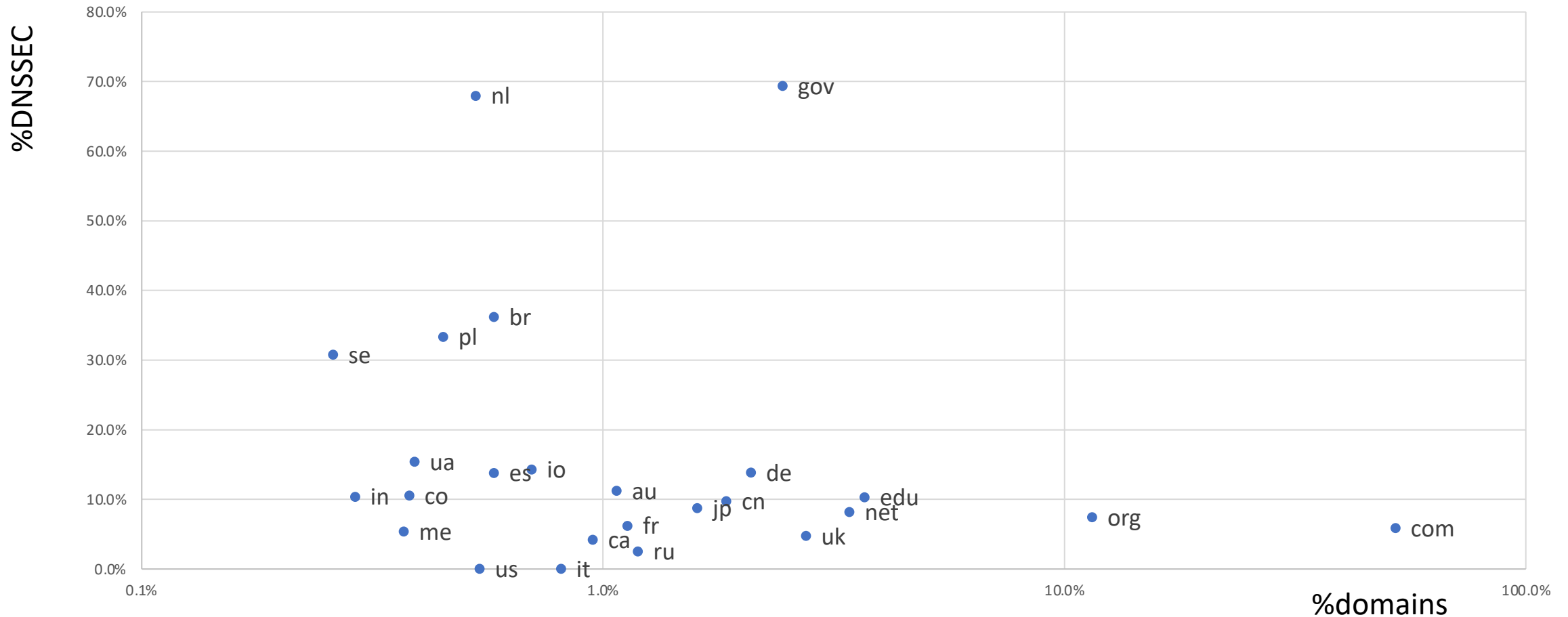
- GoDaddy serves largest share of the COM Zone
 - And some of the top 1M as well
- Cloudflare and AWS serve largest shares of “middle size” servers
- Cumulative share of big servers never exceeds 50%

ITHI M11, DNSSEC Deployments in SLDs, June 2023



Source: <https://ithi.research.icann.org/graph-m11.html>

Top 25 TLDs Present in Top 10K domains: %DNSSEC (SLD) versus %domains



Some TLDs See Zero DNSSEC SLD Deployment in Top 10k

TLD	Share 10K	%DNSSEC
il	0.1%	0.0%
fi	0.1%	0.0%
za	0.1%	0.0%
to	0.1%	0.0%
fm	0.1%	0.0%
ly	0.2%	0.0%
us	0.5%	0.0%
it	0.8%	0.0%

- Most of these TLDs have deployed DNSSEC
 - Only .TO did not
- All account for at least 10 domains in the top 10K

Some TLDs See Large DNSSEC SLD Deployment in Top 10k

TLD	Share 10K	%DNSSEC
gov	2.5%	69.4%
nl	0.5%	67.9%
cz	0.2%	52.6%
dk	0.1%	50.0%
id	0.2%	41.2%
br	0.6%	36.2%
pl	0.5%	33.3%
se	0.3%	30.8%
hk	0.1%	30.8%
no	0.1%	30.8%

- TLD policies and/or TLD DNSSEC promotion campaigns appears to have an effect on DNSSEC deployment.

DNSSEC SLD Deployment vs. DNS Service in Top 10k

Service	Share 10K	DNSSEC%
CloudFlare	20.7%	9.9%
AWS DNS	19.3%	2.0%
Akamai	5.8%	16.8%
google.com	2.9%	0.0%
NS1	2.2%	4.9%
Google Domain	1.6%	10.0%
GoDaddy	1.5%	5.2%
UltraDNS	1.5%	6.1%
Azure DNS	1.4%	0.0%
DNS Made Easy	1.3%	1.9%
<i>All others</i>	58.3%	13.5%

- Most of the SLDs managed by these services have lower deployment than average!
- Zero deployment for Google sites (google.com), and for Azure-managed domains
- Exception: Akamai, significantly above average
- Best practice?

Conclusion

- Measurement show big differences
 - Medium size (top 1000) with significantly more deployment than average, or than big sites (top 100)
- Significant differences between TLD
 - Some TLD actively encourage DNSSEC deployment
- Significant differences between provider of DNS services