

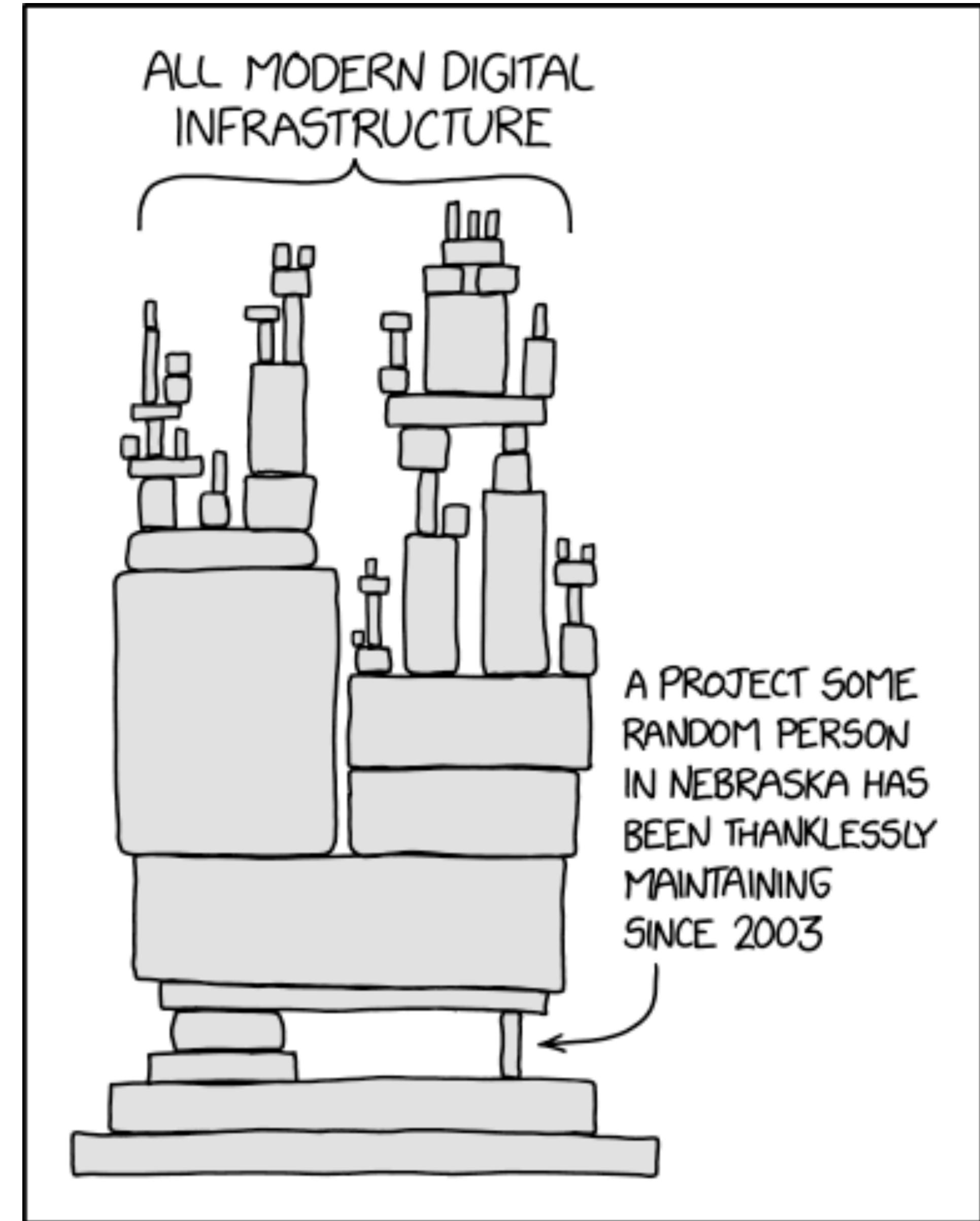
# Who controls the internet?

A look at diversity of authoritative NS records in gTLDs

Jan Schaumann <[jschauma@netmeister.org](mailto:jschauma@netmeister.org)> / [@jschauma](https://twitter.com/jschauma)

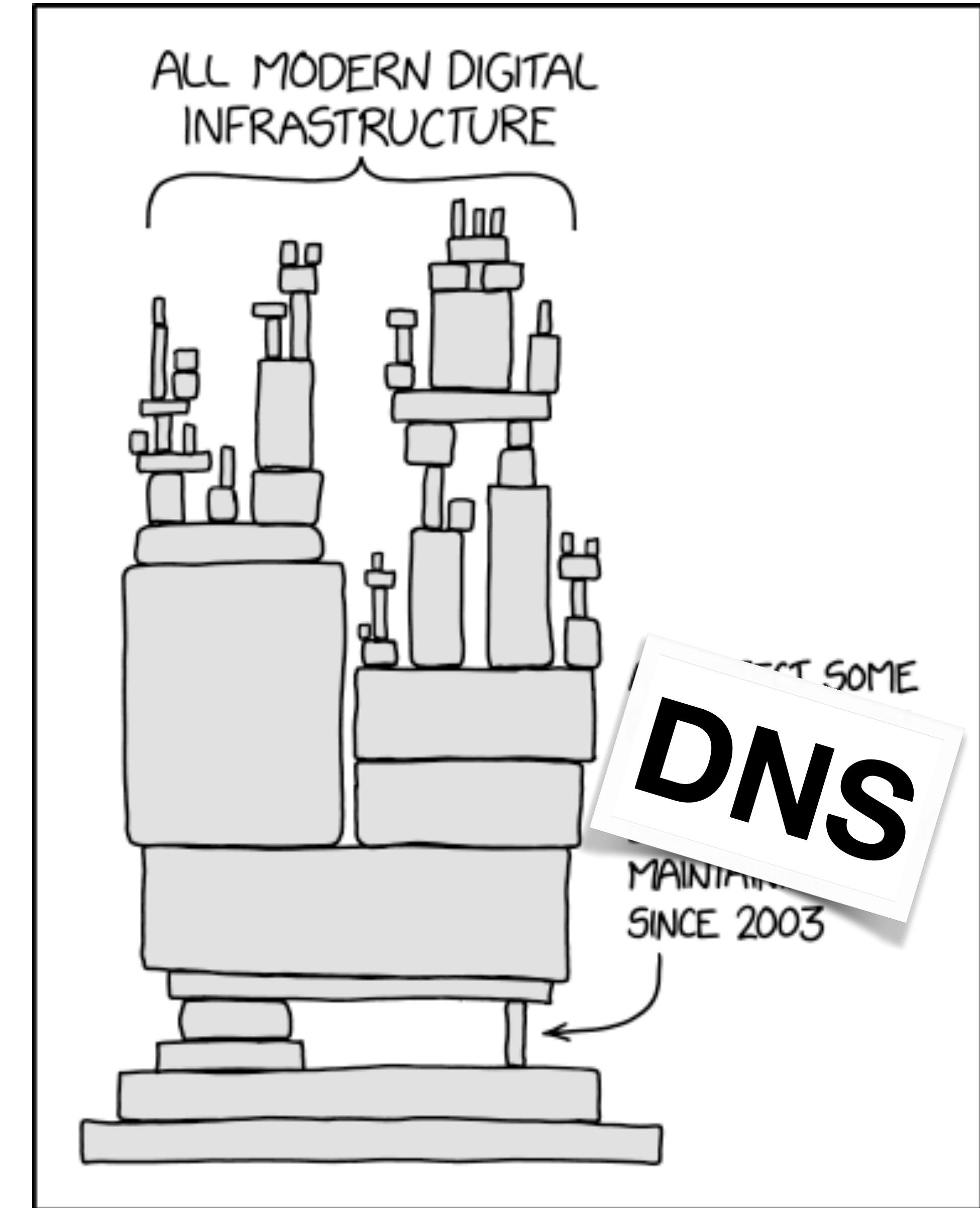
Photo by Valery Fedotov on Unsplash

# Obligatory XKCD



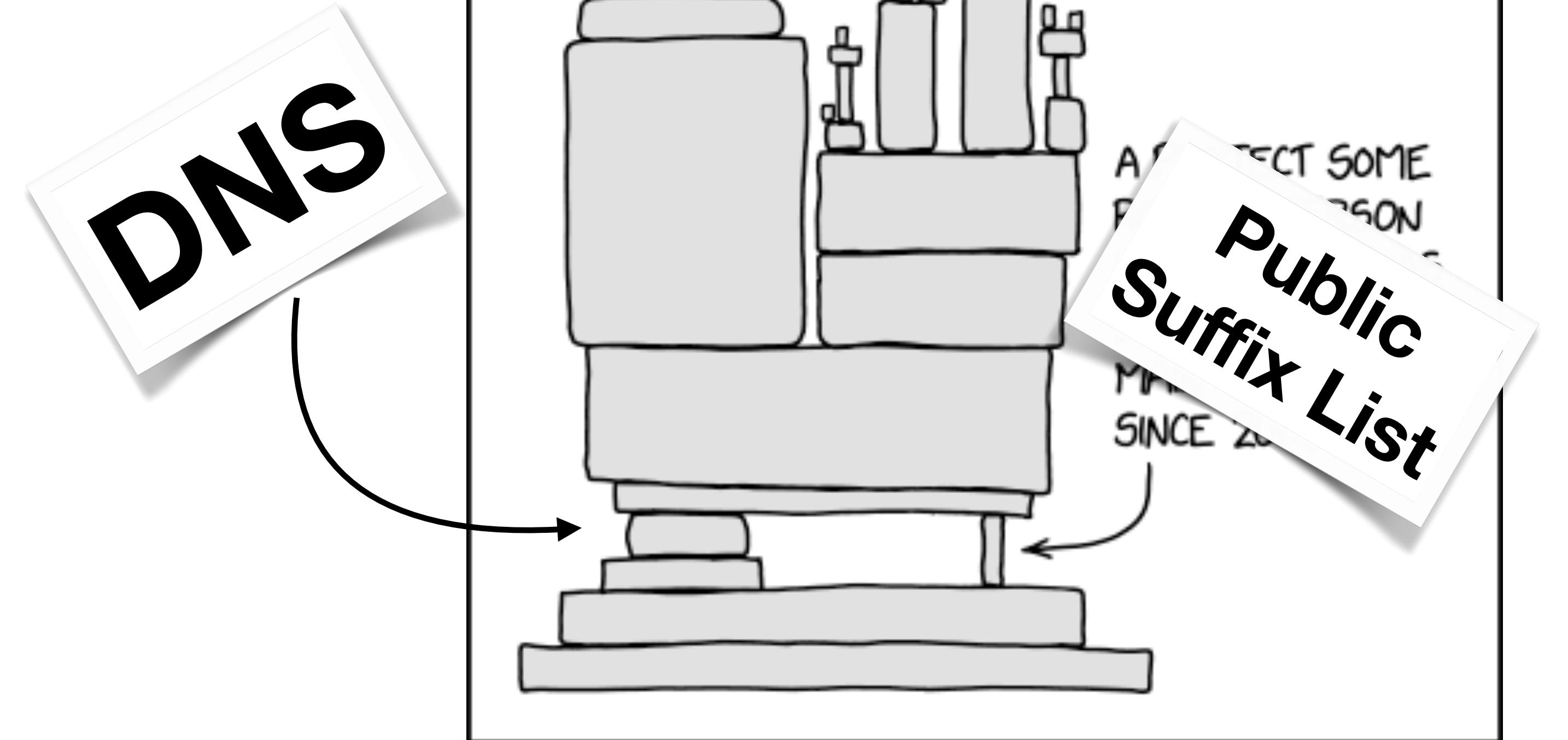
# Obligatory XKCD

- Yes, yes, we know.



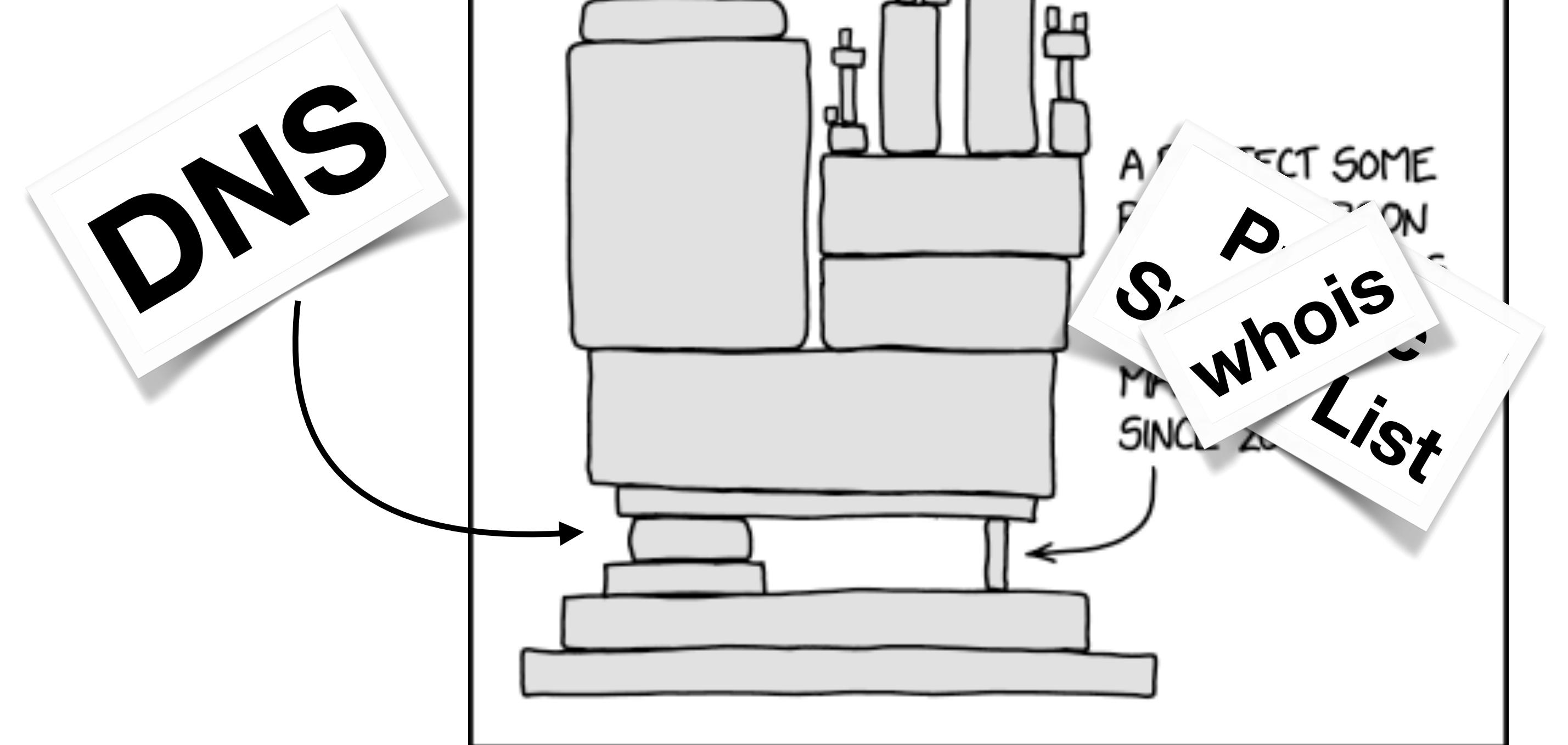
# Obligatory XKCD

- Yes, yes, we know.
- Well, actually...



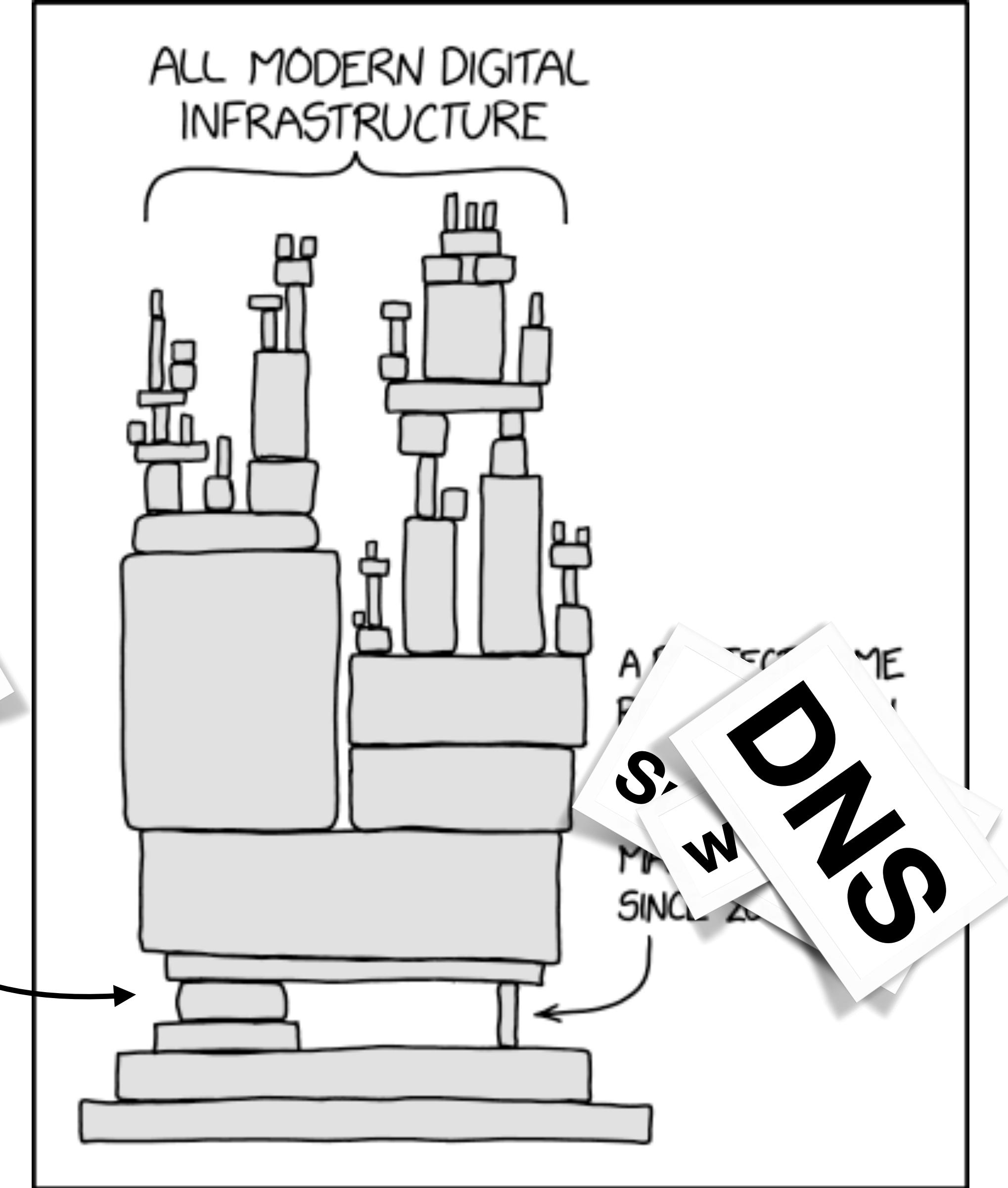
# Obligatory XKCD

- Yes, yes, we know.
- Well, actually...



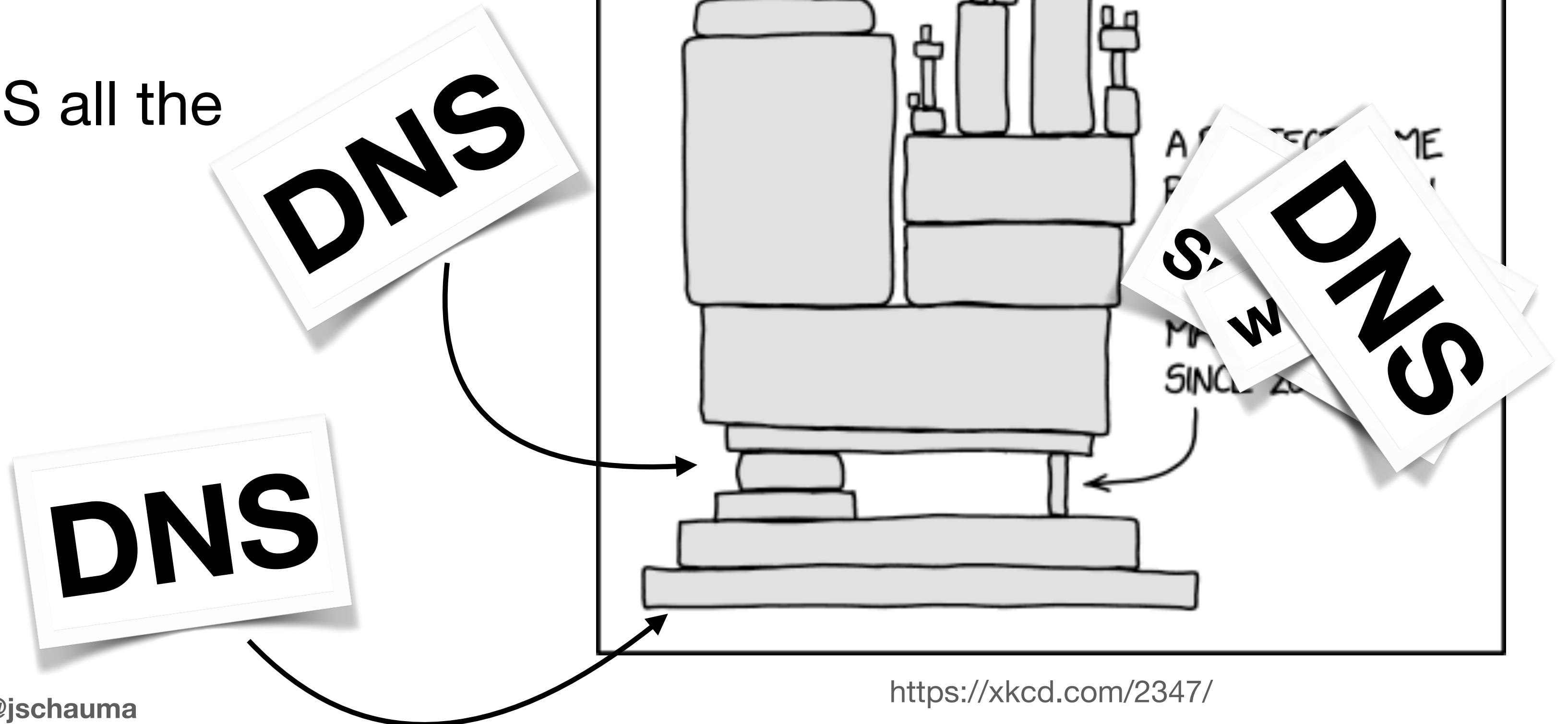
# Obligatory XKCD

- Yes, yes, we know.
- Well, actually...
- Ok, it's turtles the DNS all the way down.



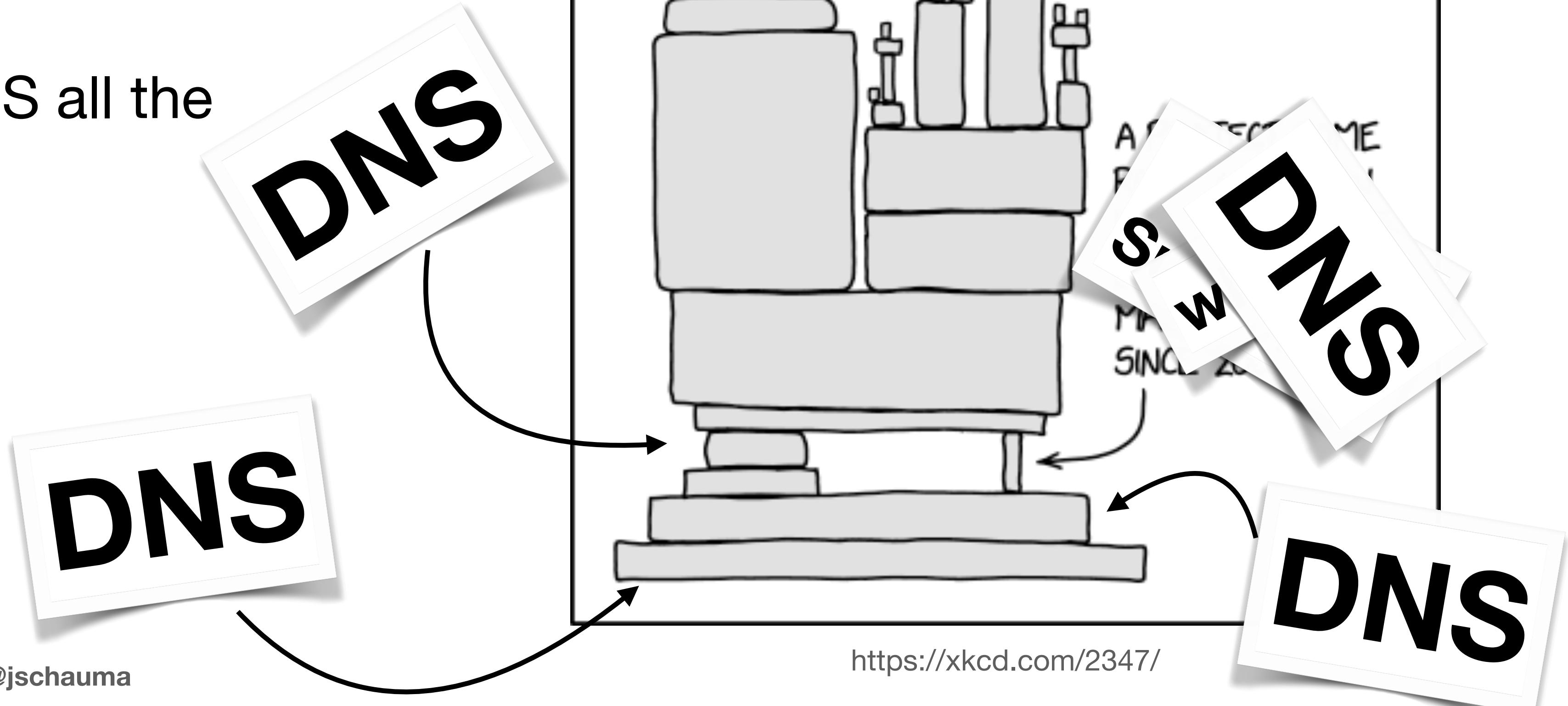
# Obligatory XKCD

- Yes, yes, we know.
- Well, actually...
- Ok, it's turtles the DNS all the way down.



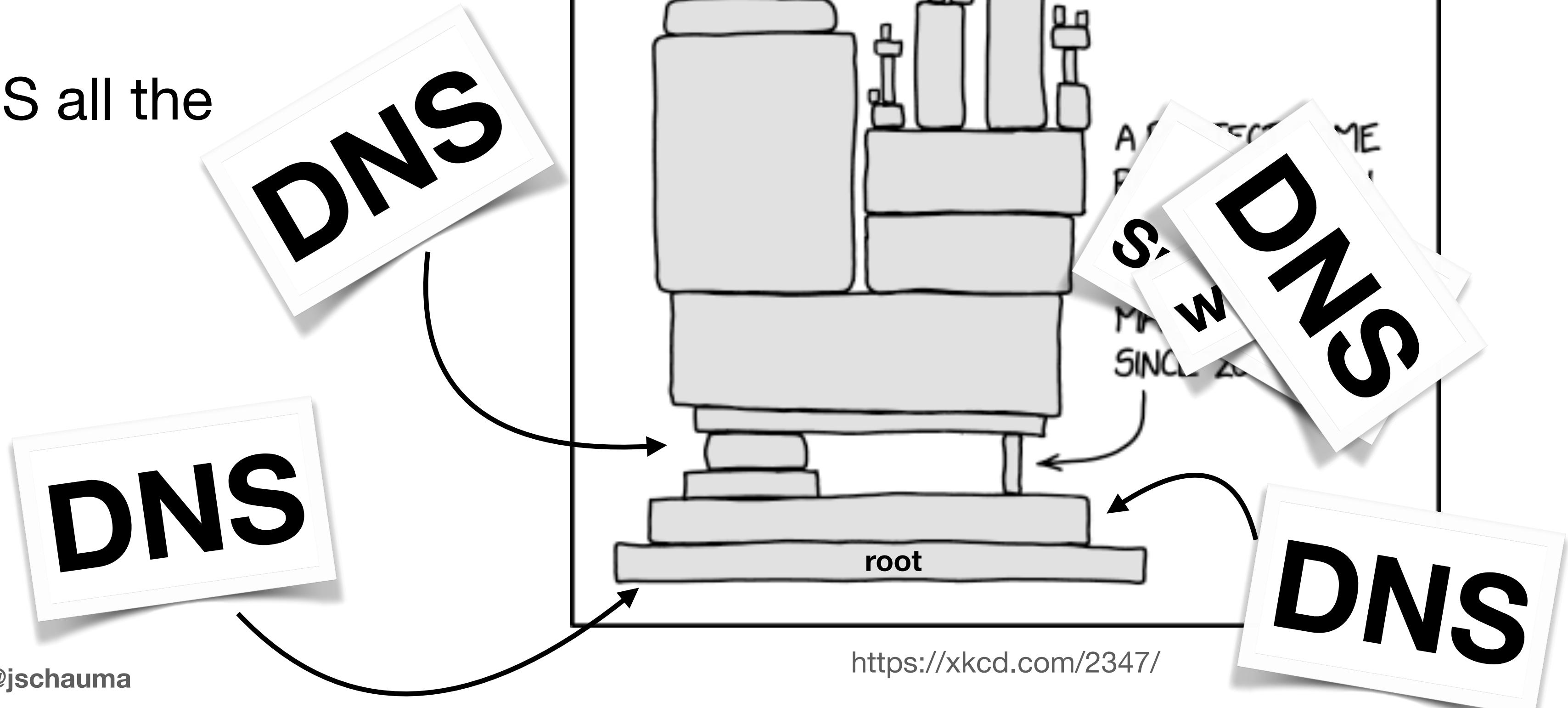
# Obligatory XKCD

- Yes, yes, we know.
- Well, actually...
- Ok, it's turtles the DNS all the way down.



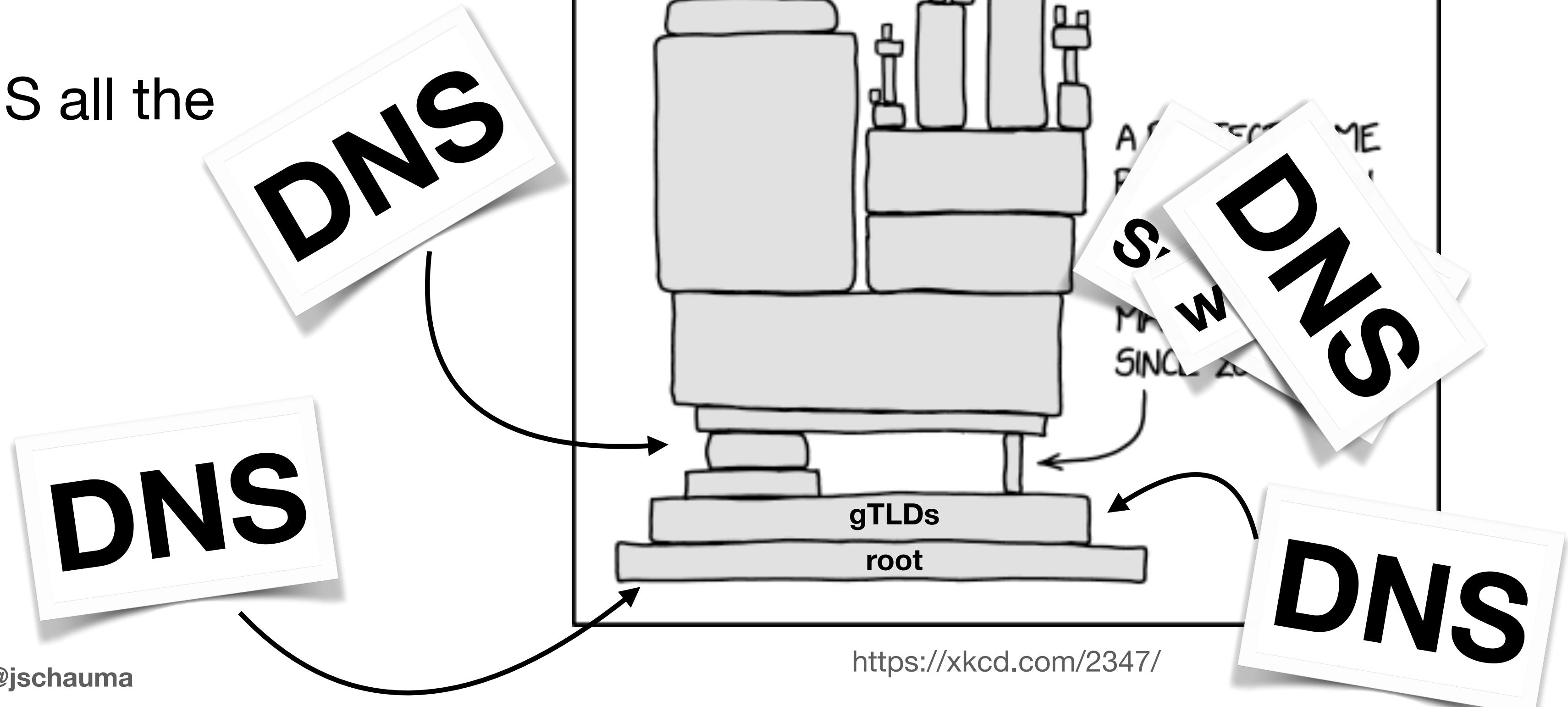
# Obligatory XKCD

- Yes, yes, we know.
- Well, actually...
- Ok, it's turtles the DNS all the way down.



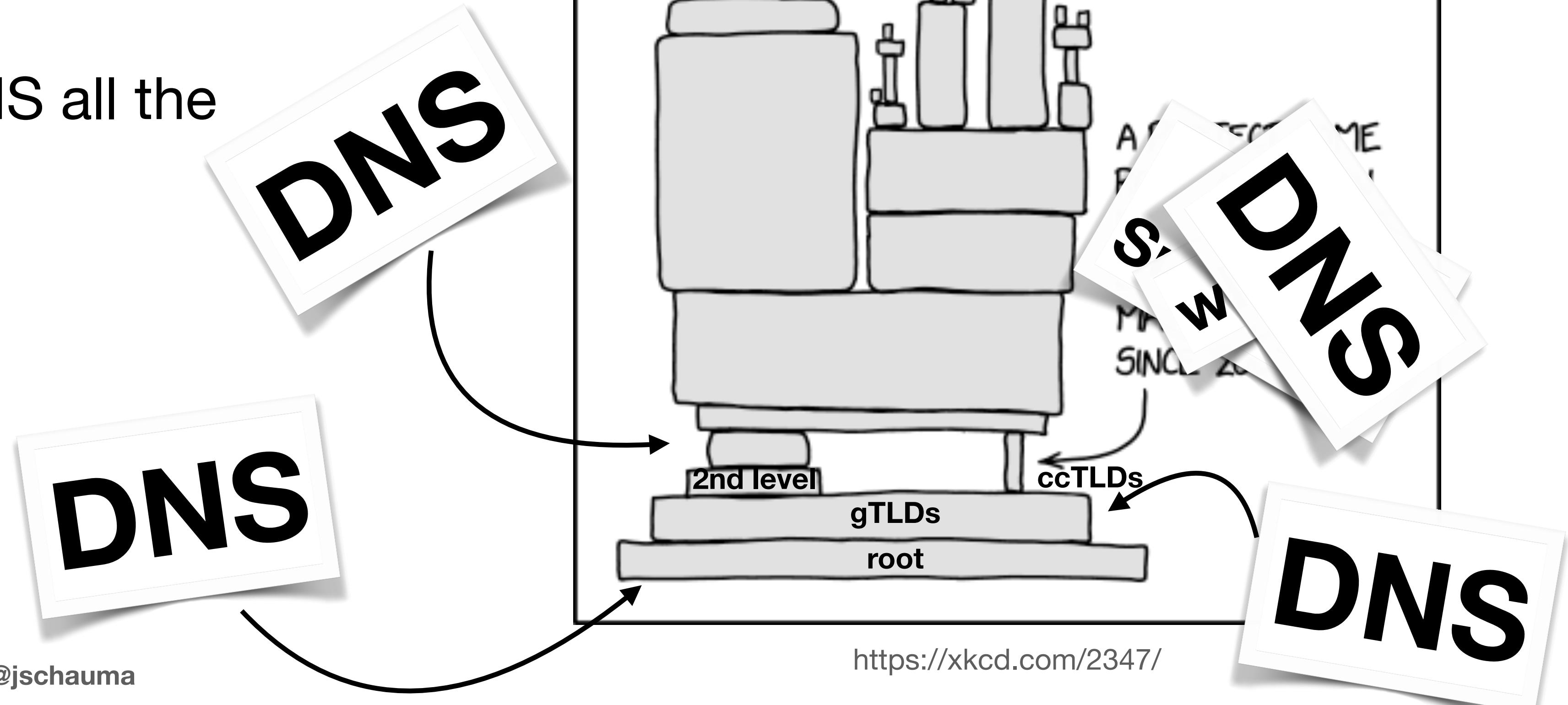
# Obligatory XKCD

- Yes, yes, we know.
- Well, actually...
- Ok, it's turtles the DNS all the way down.



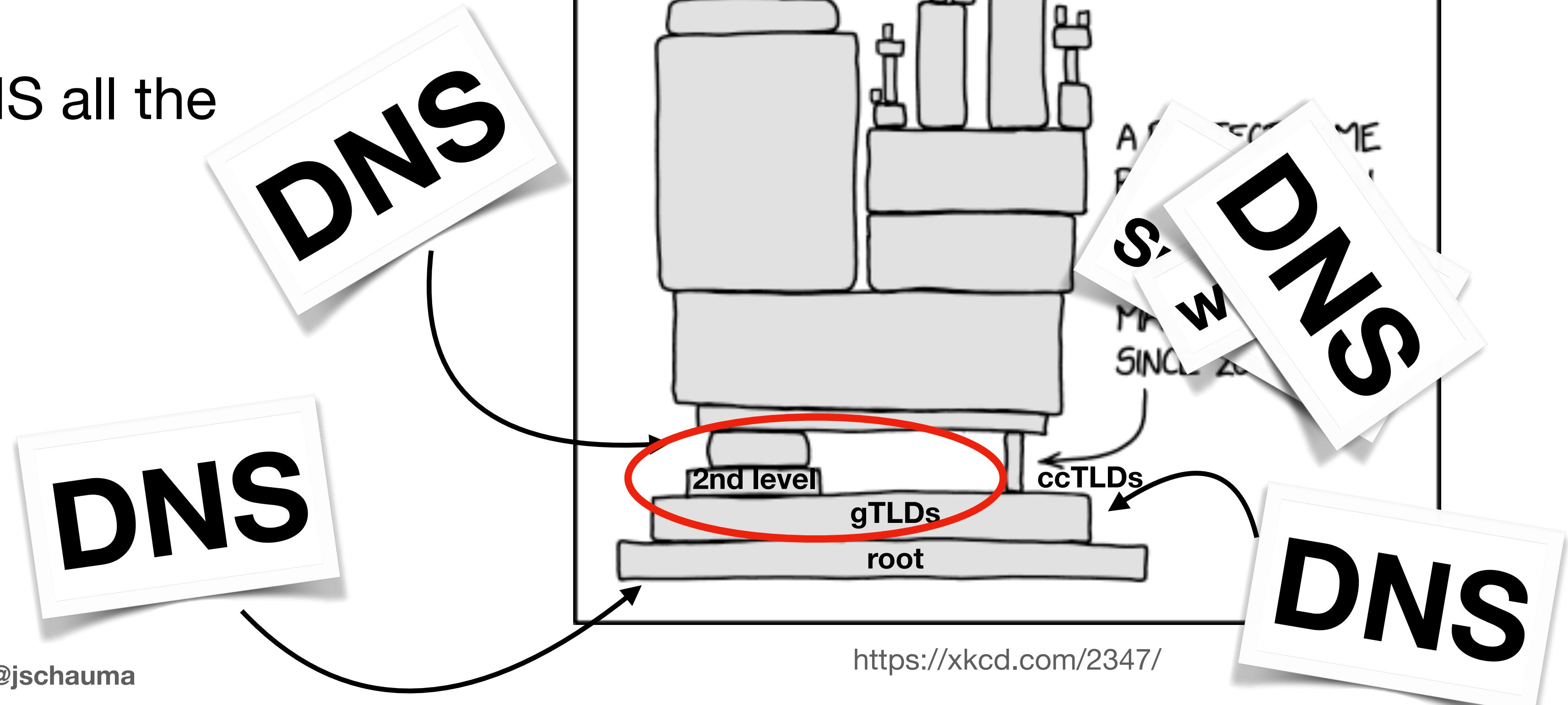
# Obligatory XKCD

- Yes, yes, we know.
- Well, actually...
- Ok, it's turtles the DNS all the way down.



# Obligatory XKCD

- Yes, yes, we know.
- Well, actually...
- Ok, it's turtles the DNS all the way down.



# Data Sources

- Root Zone: <https://www.iana.org/domains/root/files>
  - 1485 TLDs in total (including ccTLDs)
- gTLD Zones: <https://czds.icann.org/>
  - denied: .alstom, .taipei, .bnpparibas, .alstom
  - pending: .bharti, .citadel, .gdn, .moscow, .shaw, .spa, .voting, .xin, .xn--8Oadxhks, .xn--g2xx48c, .xn--kput3i, .xn--mxtqlm, .xn--ses554g
  - 1165 zones in total

# Data Sources

- Other:
  - .gov via <https://github.com/cisagov/dotgov-data>
  - .arpa via AXFR from roots (except j-root)
  - missing: .edu, .int, .mil; .post
- ccTLDs:
  - Some via AXFR: .cd, .cv, .ee, .er, .fj, .gp, .li, .mw, .nu, .se, .sl, .xn--mgbai9azgqp6j, .xn--ygbizammx
  - .sk via <https://sk-nic.sk/subory/domains.txt>
  - .ch via <https://www.switch.ch/open-data/>

# Data Sources

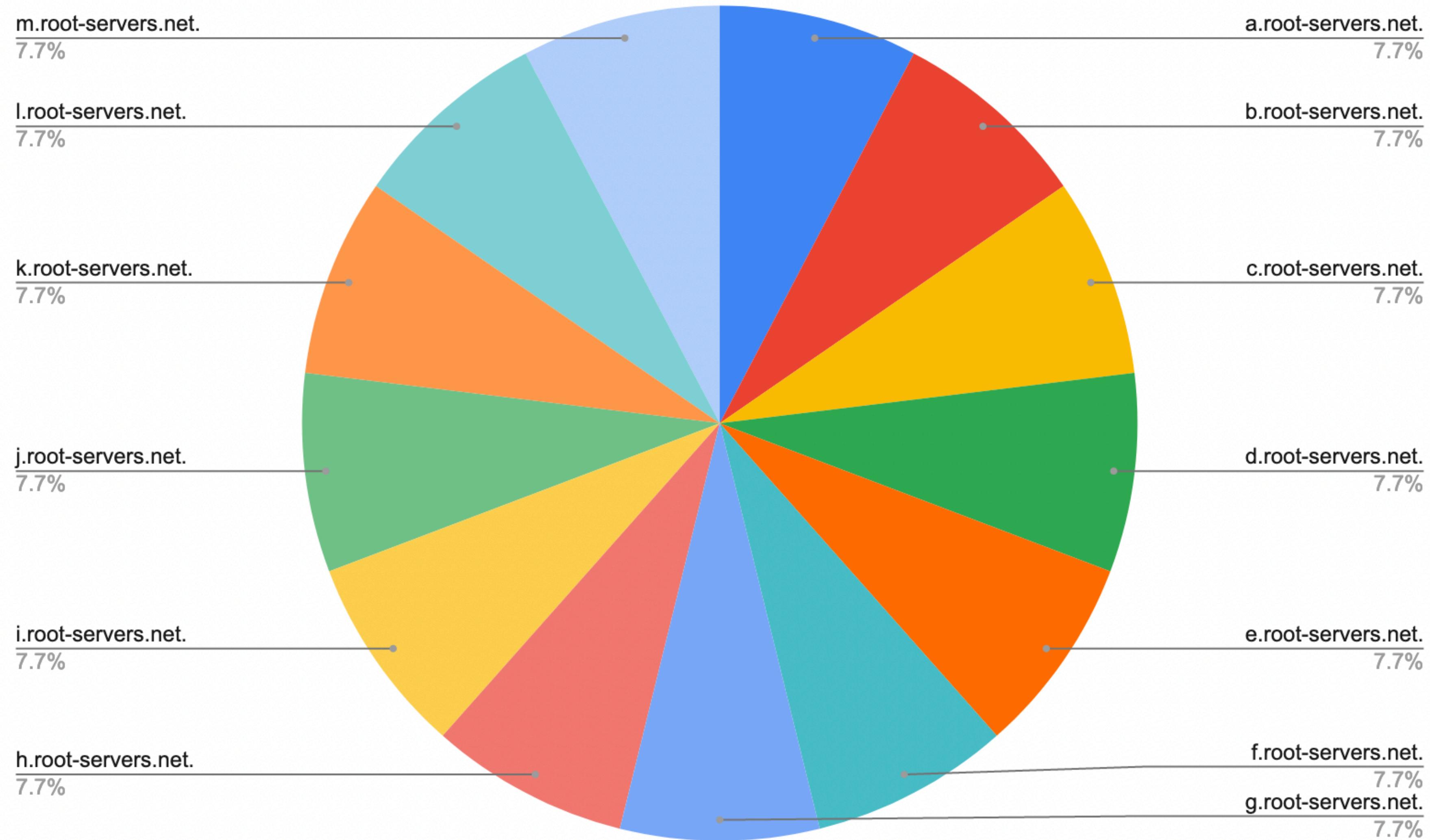
- Other:
  - .gov via <https://github.com/cisagov/dotgov-data>
  - .arpa via AXFR from roots (except j-root)
  - missing: .edu, .int, .mil; .post
- ccTLDs: ^\\_(ツ)\_/^-
  - Some via AXFR: .cd, .cv, .ee, .er, .fj, .gp, .li, .mw, .nu, .se, .sl, .xn--mgbai9azgqp6j, .xn--ygbizammx
  - .sk via <https://sk-nic.sk/subory/domains.txt>
  - .ch via <https://www.switch.ch/open-data/>

# The Plan

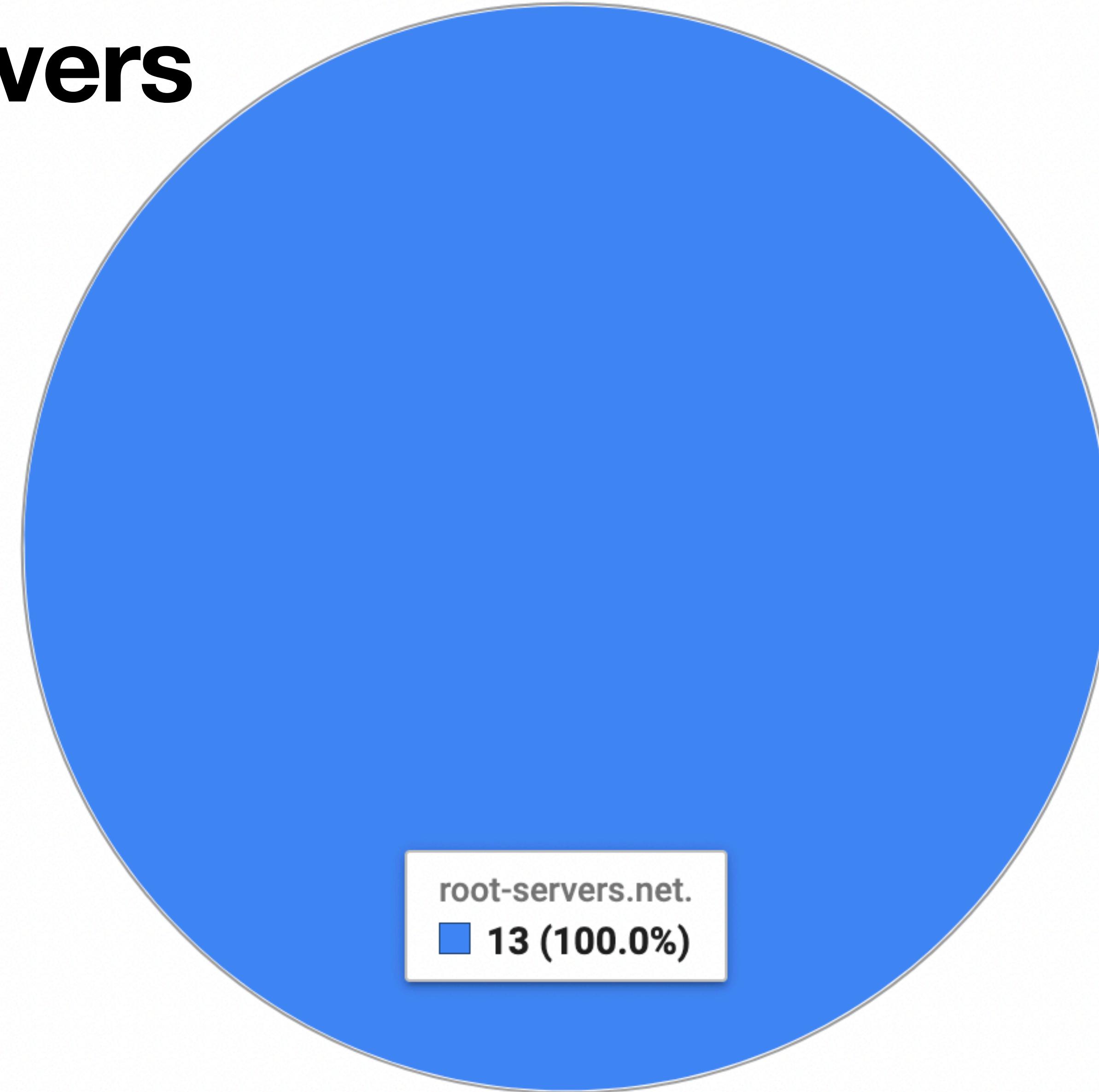
## Bonus XKCD



# Root Servers



# Root Servers



# Root Servers

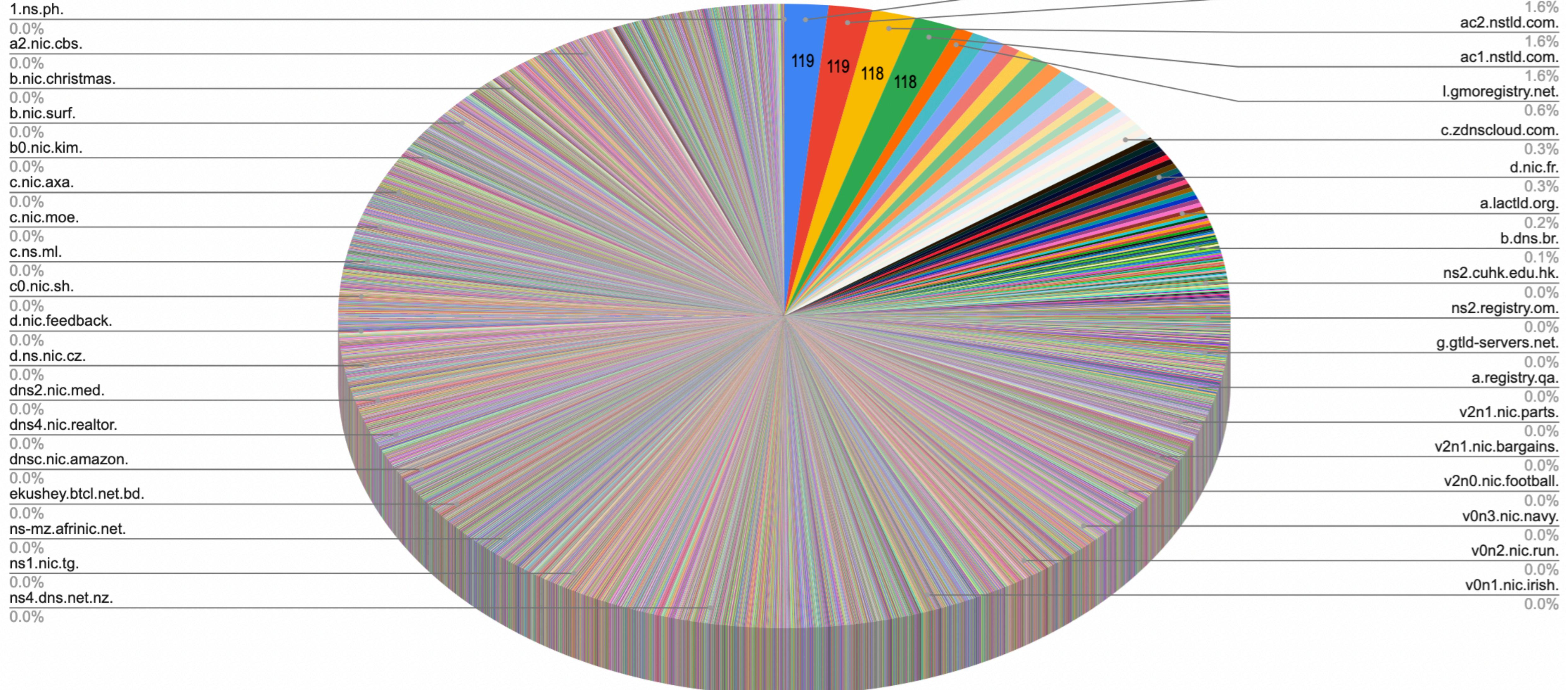
HOSTNAME	IP ADDRESSES	OPERATOR
a.root-servers.net	198.41.0.4, 2001:503:ba3e::2:30	Verisign, Inc.
b.root-servers.net	199.9.14.201, 2001:500:200::b	University of Southern California, ISOC
c.root-servers.net	192.33.4.12, 2001:500:2::c	Verisign, Inc.
d.root-servers.net	199.7.91.13, 2001:500:100::d	Verisign, Inc.
e.root-servers.net	192.33.4.14, 2001:500:2::e	Verisign, Inc. (Root Server Center)
f.root-servers.net	192.33.4.15, 2001:500:2::f	Verisign, Inc. (Root Server Consortium, Inc.)
g.root-servers.net	192.33.4.16, 2001:500:2::g	US Department of Defense (NIC)
h.root-servers.net	192.33.4.17, 2001:500:2::h	US Army (Research Lab)
i.root-servers.net	192.33.4.18, 2001:500:2::i	Netnod
j.root-servers.net	192.33.4.19, 2001:503:c27::2:30	Verisign, Inc.
k.root-servers.net	193.0.14.129, 2001:7fd::1	RIPE NCC
l.root-servers.net	199.7.83.42, 2001:500:9f::42	ICANN
m.root-servers.net	202.12.27.33, 2001:dc3::35	WIDE Project

See Ken's talk a few minutes ago.

<https://www.iana.org/domains/root/servers>

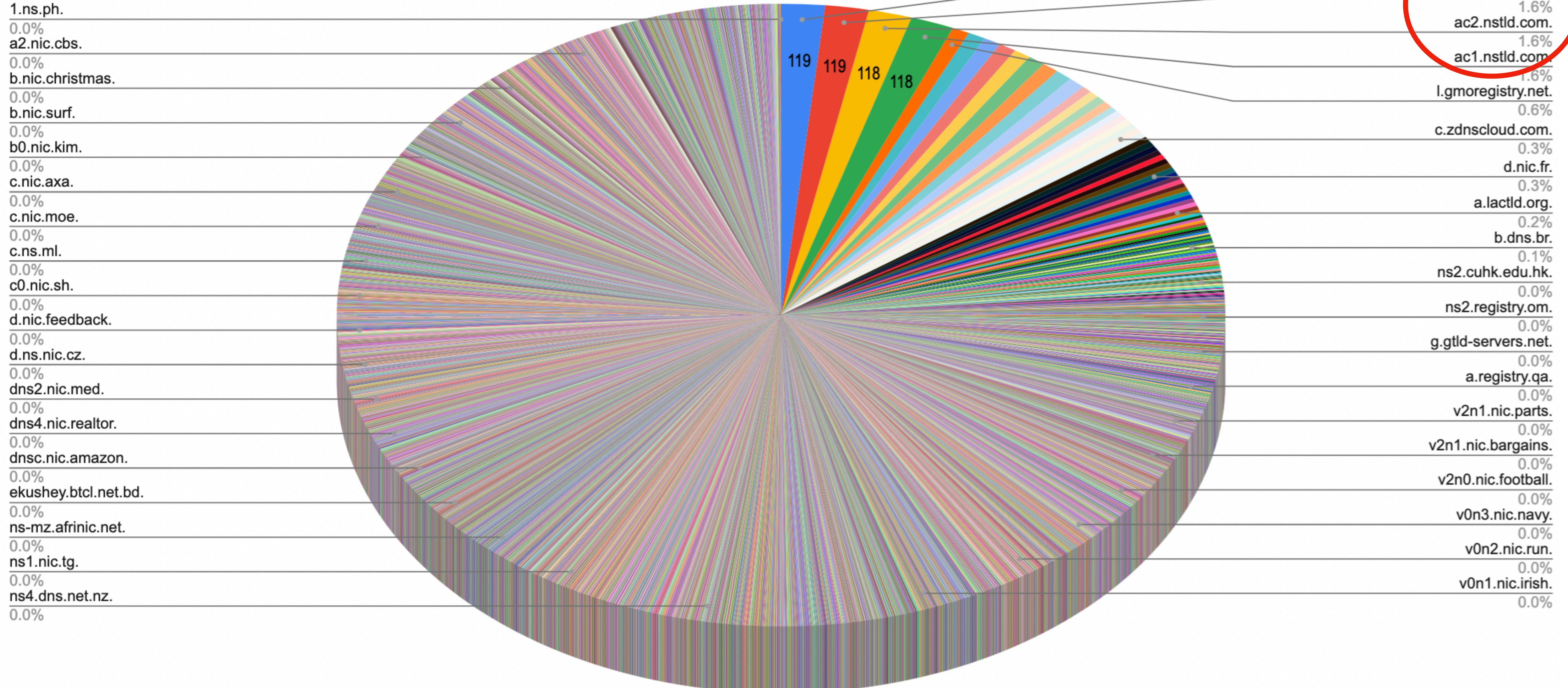
# Root Zone: NS diversity by NS

7,494 records across 5,612 NS servers



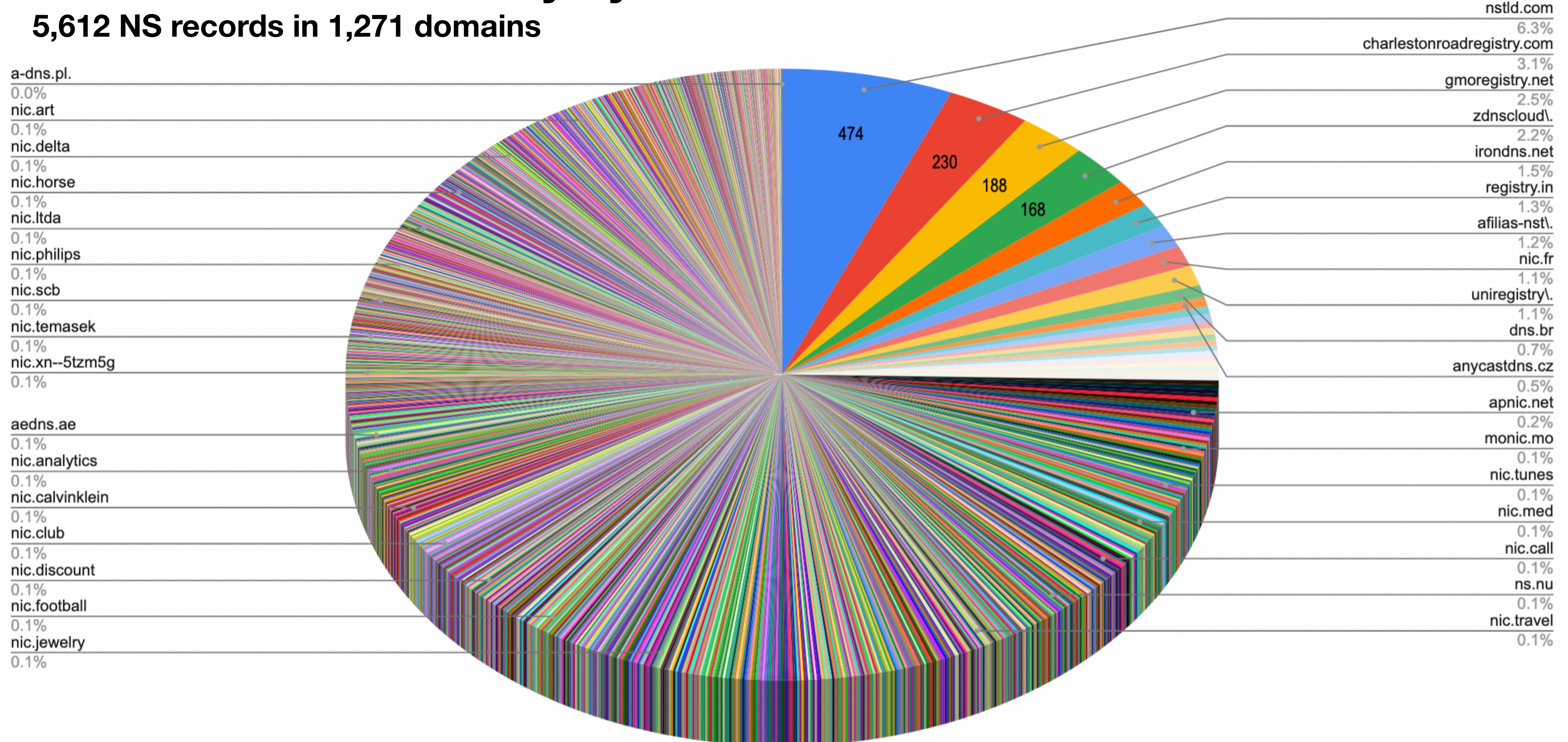
# Root Zone: NS diversity by NS

7,494 records across 5,612 NS servers



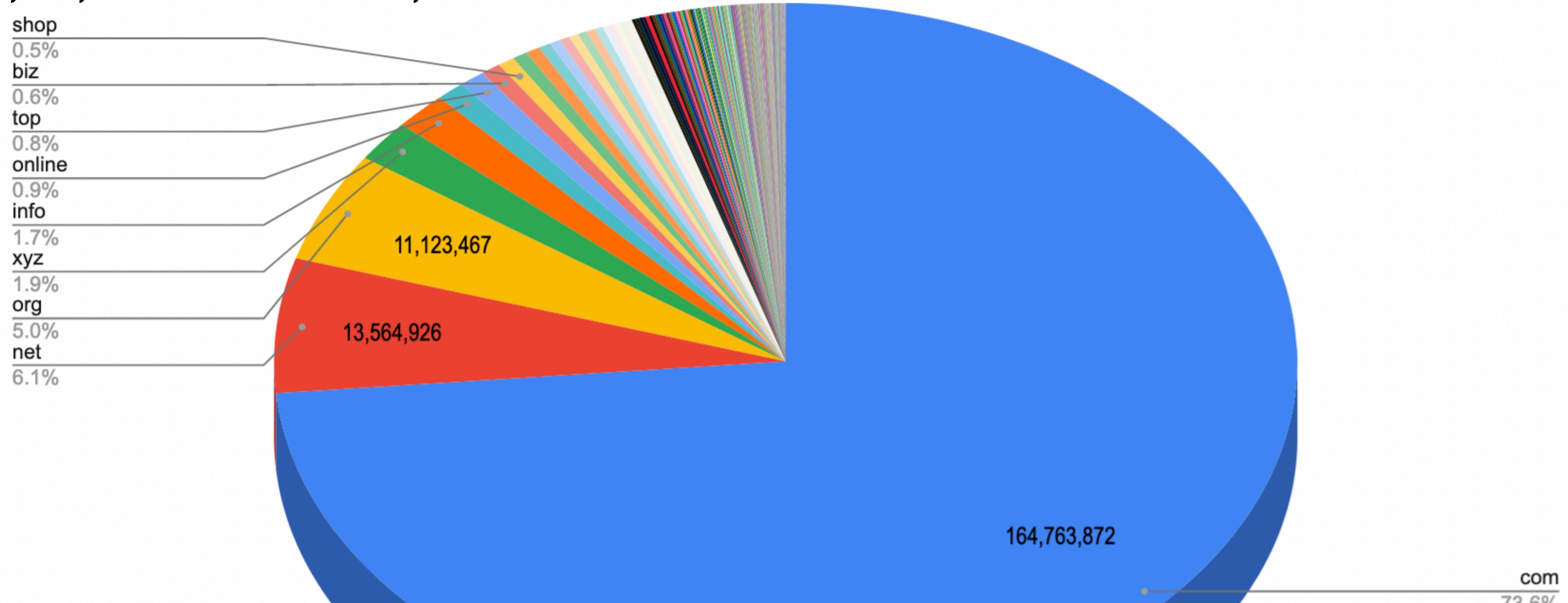
# Root Zone: NS diversity by domain

5,612 NS records in 1,271 domains



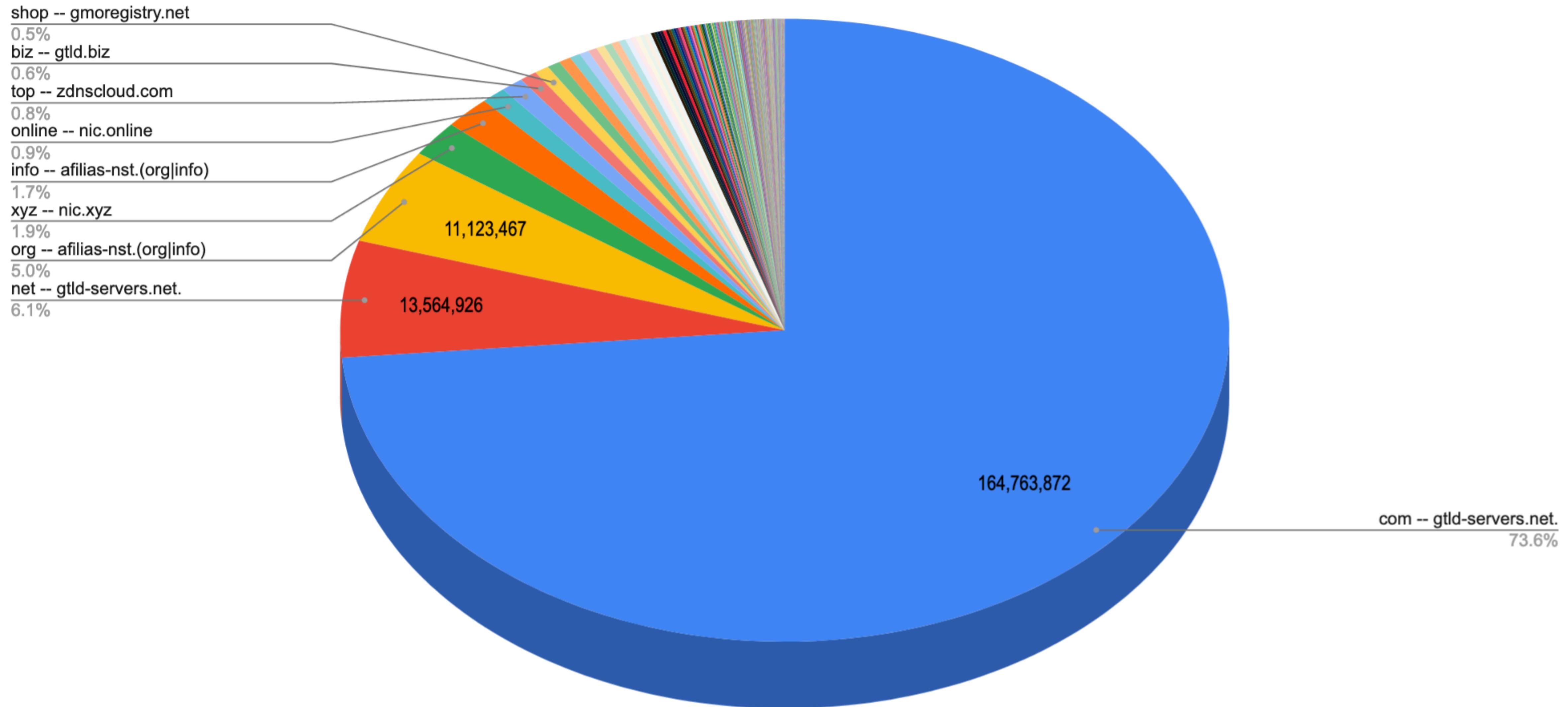
# # of NS records by gTLD

223,893,594 NS records in 1,166 TLDs



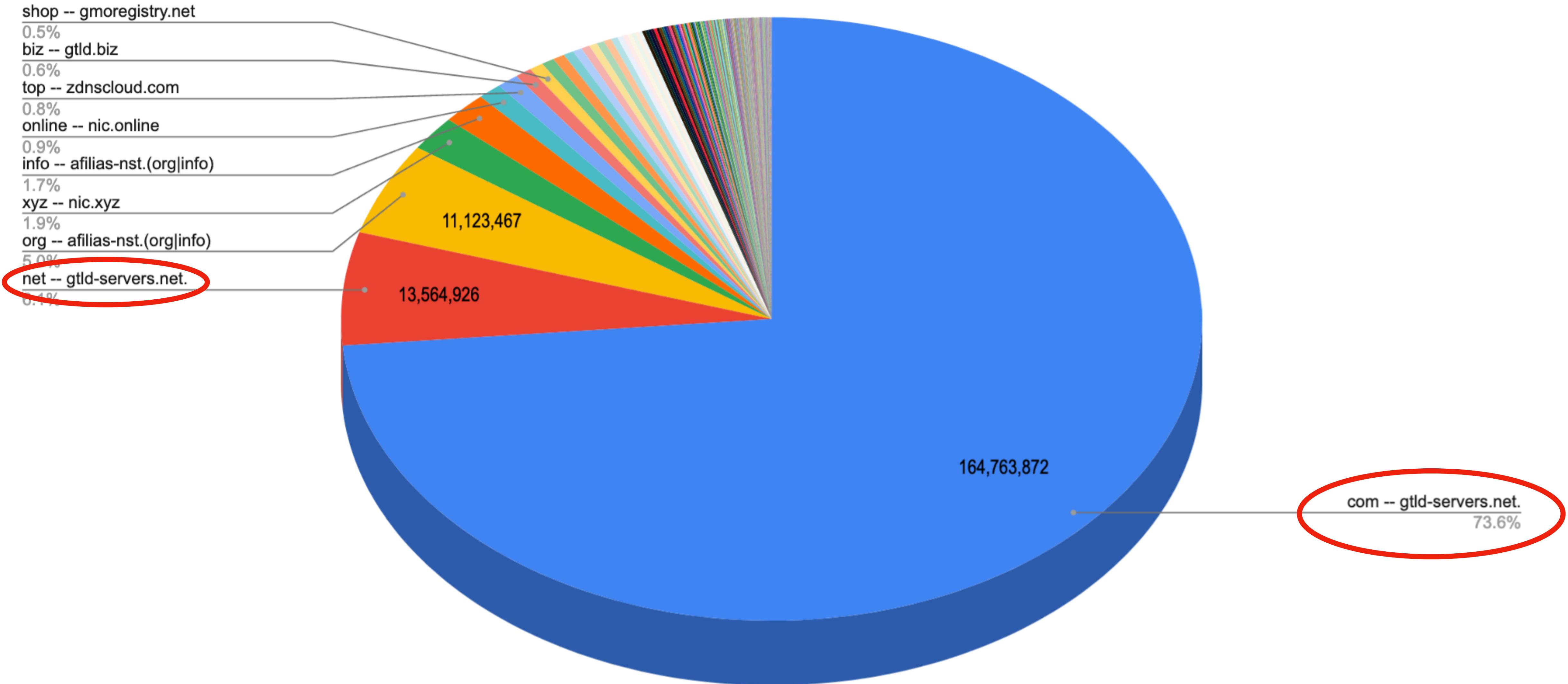
# # of NS records by gTLD

223,893,594 NS records in 1,166 TLDs



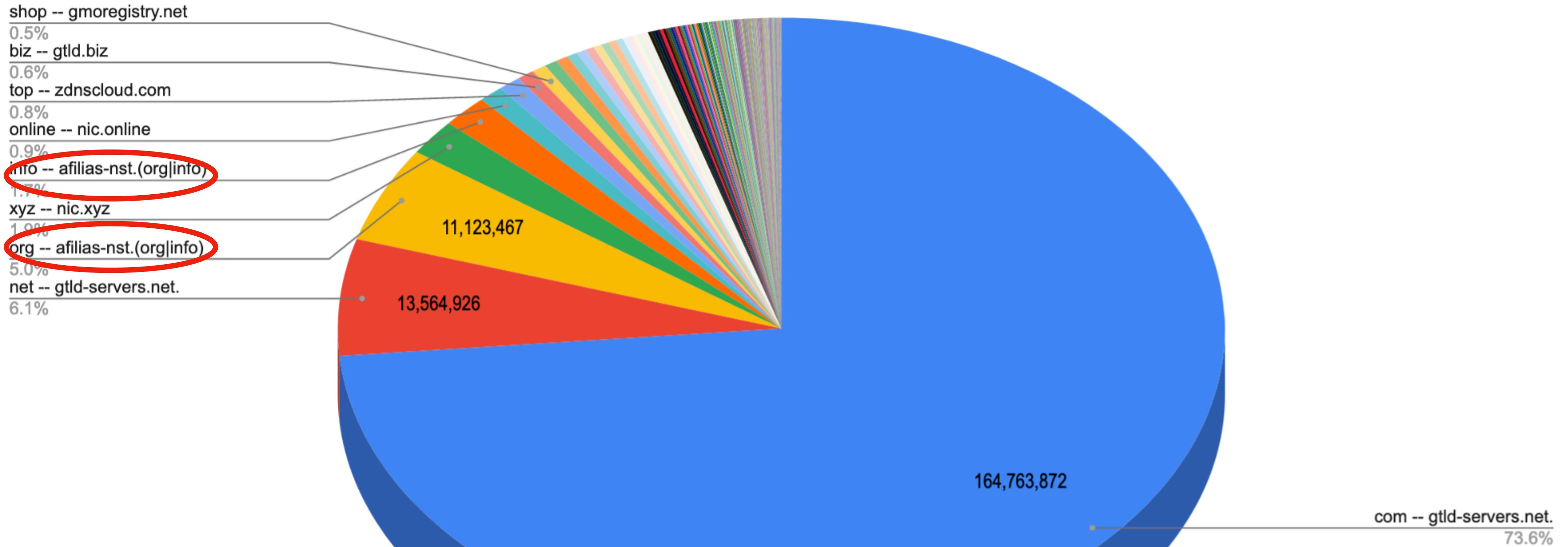
# # of NS records by gTLD

223,893,594 NS records in 1,166 TLDs



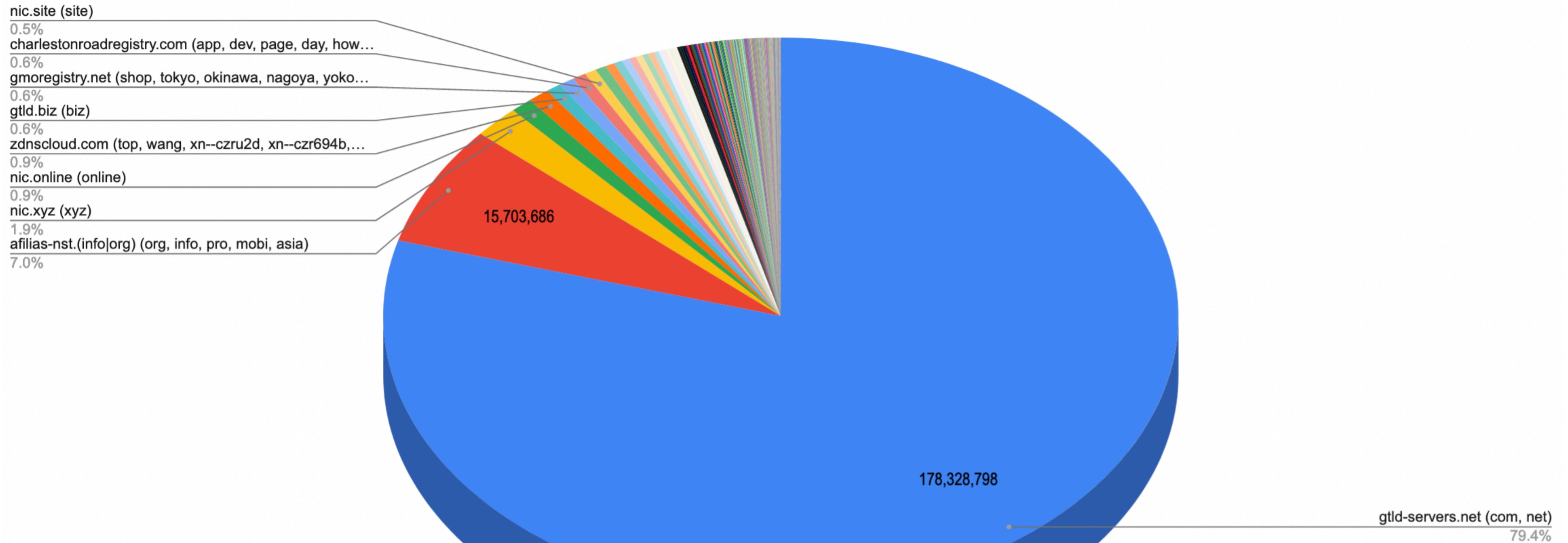
# # of NS records by gTLD

223,893,594 NS records in 1,166 TLDs



# # of NS records by gTLD NS

224,669,643 sub-domains served from 509 domains



# NS diversity in gTLDs by domain

```
$ more ns-counts
6514144 dns1.registrar-servers.com.
6512338 dns2.registrar-servers.com.
4186291 nsg2.namebrightdns.com.
4186267 nsg1.namebrightdns.com.
3099382 ns1.gname-dns.com.
3099380 ns2.gname-dns.com.
2469961 jm1.dns.com.
2469958 jm2.dns.com.
2385150 ns1.bluehost.com.
2384768 ns2.bluehost.com.
1797651 b.share-dns.net.
1797651 a.share-dns.com.
1741321 ns1.dnsowl.com.
1741279 ns2.dnsowl.com.
1709706 ns3.dnsowl.com.
1704688 ns1.dan.com.
1703126 ns2.dan.com.
1573439 ns-cloud-c1.googledomains.com.
1571833 ns-cloud-d1.googledomains.com.
1571212 ns-cloud-e1.googledomains.com.
1571101 ns-cloud-c4.googledomains.com.
1570765 ns-cloud-b1.googledomains.com.
1570315 ns-cloud-c2.googledomains.com.
1569585 ns-cloud-c3.googledomains.com.
1569577 ns-cloud-d4.googledomains.com.
1568970 ns-cloud-e4.googledomains.com.
1568618 ns-cloud-d2.googledomains.com.
1568522 ns-cloud-b4.googledomains.com.
1568054 ns-cloud-e2.googledomains.com.
1568037 ns-cloud-d3.googledomains.com.
1567572 ns-cloud-b2.googledomains.com.
1567411 ns-cloud-e3.googledomains.com.
1566959 ns-cloud-b3.googledomains.com.
1550145 ns-cloud-a1.googledomains.com.
1547971 ns-cloud-a4.googledomains.com.
1546989 ns-cloud-a2.googledomains.com.
1546347 ns-cloud-a3.googledomains.com.
```

# NS diversity in gTLDs by domain

```
Terminal — 80x38
[$ more ns-counts
6514144 dns1.registrar-servers.com.
6512338 dns2.registrar-servers.com.
4186291 nsg2.namebrightdns.com.
4186267 nsg1.namebrightdns.com.
3099382 ns1.gname-dns.com.
3099380 ns2.gname-dns.com.
2469961 jm1.dns.com.
2469958 jm2.dns.com.
2385150 ns1.bluehost.com.
2384768 ns2.bluehost.com.
1797651 b.share-dns.net.
1797651 a.share-dns.com.
1741321 ns1.dnsowl.com.
1741279 ns2.dnsowl.com.
1709706 ns3.dnsowl.com.
1704688 ns1.dan.com.
1703126 ns2.dan.com.
1573439 ns-cloud-c1.googledomains.com.
1571833 ns-cloud-d1.googledomains.com.
1571212 ns-cloud-e1.googledomains.com.
1571101 ns-cloud-c4.googledomains.com.
1570765 ns-cloud-b1.googledomains.com.
1570315 ns-cloud-c2.googledomains.com.
1569585 ns-cloud-c3.googledomains.com.
1569577 ns-cloud-d4.googledomains.com.
1568970 ns-cloud-e4.googledomains.com.
1568618 ns-cloud-d2.googledomains.com.
1568522 ns-cloud-b4.googledomains.com.
1568054 ns-cloud-e2.googledomains.com.
1568037 ns-cloud-d3.googledomains.com.
1567572 ns-cloud-b2.googledomains.com.
1567411 ns-cloud-e3.googledomains.com.
1566959 ns-cloud-b3.googledomains.com.
1550145 ns-cloud-a1.googledomains.com.
1547971 ns-cloud-a4.googledomains.com.
1546989 ns-cloud-a2.googledomains.com.
1546347 ns-cloud-a3.googledomains.com.
```

```
Terminal — 80x38
[$ more domain-counts.full
100864727 domaincontrol.com.
31446879 googledomains.com.
23619347 cloudflare.com.
15239202 registrar-servers.com.
11455368 wixdns.net.
10564711 hichina.com.
10429709 dns.com.
9929020 nsone.net.
9181618 namebrightdns.com.
6198762 gname-dns.com.
5919134 name-services.com.
5205667 dnsowl.com.
5104135 squarespacedns.com.
5009961 worldnic.com.
4793694 bluehost.com.
4674420 name.com.
4503410 myhostadmin.net.
4115642 ui-dns.org.
4115370 ui-dns.com.
4114201 ui-dns.de.
4114016 ui-dns.biz.
3854083 wordpress.com.
3825213 alidns.com.
3812136 xserver.jp.
3613349 ovh.net.
3430445 dreamhost.com.
3408267 dan.com.
2981302 hostgator.com.
2917561 dnspod.net.
2766330 dns-parking.com.
2703682 afternic.com.
2414360 gandi.net.
2377538 register.com.
2340694 rzone.de.
2211301 dynadot.com.
2187555 sedoparking.com.
2008377 parkingcrew.net.
```

# NS diversity in gTLDs by domain

```
Terminal — 80x38
[$ more ns-counts
6514144 dns1.registrar-servers.com.
6512338 dns2.registrar-servers.com.
4186291 nsg2.namebrightdns.com.
4186267 nsg1.namebrightdns.com.
3099382 ns1.gname-dns.com.
3099380 ns2.gname-dns.com.
2469961 jm1.dns.com.
2469958 jm2.dns.com.
2385150 ns1.bluehost.com.
2384768 ns2.bluehost.com.
1797651 b.share-dns.net.
1797651 a.share-dns.com.
1741321 ns1.dnsowl.com.
1741279 ns2.dnsowl.com.
1709706 ns3.dnsowl.com.
1704688 ns1.dan.com.
1703126 ns2.dan.com.
1573439 ns-cloud-c1.googledomains.com.
1571833 ns-cloud-d1.googledomains.com.
1571212 ns-cloud-e1.googledomains.com.
1571101 ns-cloud-c4.googledomains.com.
1570765 ns-cloud-b1.googledomains.com.
1570315 ns-cloud-c2.googledomains.com.
1569585 ns-cloud-c3.googledomains.com.
1569577 ns-cloud-d4.googledomains.com.
1568970 ns-cloud-e4.googledomains.com.
1568618 ns-cloud-d2.googledomains.com.
1568522 ns-cloud-b4.googledomains.com.
1568054 ns-cloud-e2.googledomains.com.
1568037 ns-cloud-d3.googledomains.com.
1567572 ns-cloud-b2.googledomains.com.
1567411 ns-cloud-e3.googledomains.com.
1566959 ns-cloud-b3.googledomains.com.
1550145 ns-cloud-a1.googledomains.com.
1547971 ns-cloud-a4.googledomains.com.
1546989 ns-cloud-a2.googledomains.com.
1546347 ns-cloud-a3.googledomains.com.
```

```
Terminal — 80x38
[$ more domain-counts.full
100864727 domaincontrol.com.
31446879 googledomains.com.
23619347 cloudflare.com.
15239202 registrar-servers.com.
11455368 wixdns.net.
10564711 hichina.com.
10429709 dns.com.
9929020 nsone.net.
9181618 namebrightdns.com.
6198762 gname-dns.com.
5919134 name-services.com.
5205667 dnsowl.com.
5104135 squarespacedns.com.
5009961 worldnic.com.
4793694 bluehost.com.
4674420 name.com.
4503410 myhostadmin.net.
4115642 ui-dns.org.
4115370 ui-dns.com. 4115370
4114201 ui-dns.de.
4114616 ui-dns.biz.
3854083 wordpress.com.
3825213 alidns.com.
3812136 xserver.jp.
3613349 ovh.net.
3430445 dreamhost.com.
3408267 dan.com.
2981302 hostgator.com.
2917561 dnspod.net.
2766330 dns-parking.com.
2703682 afternic.com.
2414360 gandi.net.
2377538 register.com.
2340694 rzone.de.
2211301 dynadot.com.
2187555 sedoparking.com.
2008377 parkingcrew.net.
```

# NS diversity in gTLDs by domain

```
Terminal — 80x38
[$ grep awsdns- domain-counts.full | head
52221 awsdns-02.org.
49614 awsdns-23.net.
49264 awsdns-49.com.
48276 awsdns-05.co.uk.
46392 awsdns-35.org.
45955 awsdns-53.com.
45593 awsdns-19.net.
44409 awsdns-25.com.
44176 awsdns-22.co.uk.
44140 awsdns-45.org.
[$ grep azure-dns domain-counts.full | head
246256 azure-dns.com.
244412 azure-dns.net.
239018 azure-dns.org.
236932 azure-dns.info.
62 azure-dns-2.cn.
58 azure-dns.cn.
56 azure-dns-1.cn.
45 azure-dns.ne.
12 azure-dns.de.
3 azure-dns.co.
[$ grep ultradns domain-counts.full | head
575951 ultradns.net.
535067 ultradns.org.
441057 ultradns.com.
434495 ultradns.biz.
61901 ultradns.info.
59427 ultradns.co.uk.
371 ultradns.eu.
16 ultradns.uk.
7 ultradnscloud.com.
7 ultradns2.com.
$ ]
```

```
Terminal — 80x38
[$ more domain-counts.full
100864727 domaincontrol.com.
31446879 googledomains.com.
23619347 cloudflare.com.
15239202 registrar-servers.com.
11455368 wixdns.net.
10564711 hichina.com.
10429709 dns.com.
9929020 nsone.net.
9181618 namebrightdns.com.
6198762 gname-dns.com.
5919134 name-services.com.
5205667 dnsowl.com.
5104135 squarespacedns.com.
5009961 worldnic.com.
4793694 bluehost.com.
4674420 name.com.
4503410 myhostadmin.net.
4115642 ui-dns.org.
4115370 ui-dns.com.
4114201 ui-dns.de.
4114016 ui-dns.biz.
3854083 wordpress.com.
3825213 alidns.com.
3812136 xserver.jp.
3613349 ovh.net.
3430445 dreamhost.com.
3408267 dan.com.
2981302 hostgator.com.
2917561 dnspod.net.
2766330 dns-parking.com.
2703682 afternic.com.
2414360 gandi.net.
2377538 register.com.
2340694 rzone.de.
2211301 dynadot.com.
2187555 sedoparking.com.
2008377 parkingcrew.net.
$ ]
```

# NS diversity in gTLDs by domain

```
Terminal — 80x38
[$ grep awsdns- domain-counts.full | head
52221 awsdns-02.org.
49614 awsdns-23.net.
49264 awsdns-49.com.
48276 awsdns-05.co.uk.
46392 awsdns-35.org.
45955 awsdns-53.com.
45593 awsdns-19.net.
44409 awsdns-25.com.
44176 awsdns-22.co.uk.
44140 awsdns-45.org.
[$ grep azure-dns domain-counts.full | head
246256 azure-dns.com.
244412 azure-dns.net.
239018 azure-dns.org.
236932 azure-dns.info.
62 azure-dns-2.cn.
58 azure-dns.cn.
56 azure-dns-1.cn.
45 azure-dns.ne.
12 azure-dns.de.
3 azure-dns.co.
[$ grep ultradns domain-counts.full | head
575951 ultradns.net.
535067 ultradns.org.
441057 ultradns.com.
434495 ultradns.biz.
61901 ultradns.info.
59427 ultradns.co.uk.
371 ultradns.eu.
16 ultradns.uk.
7 ultradnscloud.com.
7 ultradns2.com.
$ ]
```

```
Terminal — 80x38
[$ more domain-counts
100864743 domaincontrol.com.
31446979 googledomains.com.
23619596 cloudflare.(com|net)
16459284 ui-dns\.
15239412 registrar-servers.com.
11455372 wixdns.net.
10564711 hichina.com.
10429709 dns.com.
10414391 awsdns-
9929083 nsone.net.
9181618 namebrightdns.com.
6198762 gname-dns.com.
5919379 name-services.com.
5205703 dnsowl.com.
5104139 squarespacedns.com.
5011741 worldnic.com.
4793700 bluehost.com.
4674420 name.com.
4503410 myhostadmin.net.
3854851 wordpress.(org|com)
3825213 alidns.com.
3812136 xserver.jp.
3613371 ovh.net.
3430445 dreamhost.com.
3408269 dan.com.
2981316 hostgator.com.
2917561 dnspod.net.
2766330 dns-parking.com.
2703682 afternic.com.
2414877 gandi.net.
2377642 register.com.
2340694 rzone.de.
2211319 dynadot.com.
2187559 sedoparking.com.
2108819 ultradns\.
2008377 parkingcrew.net.
2000304 markmonitor.com.
$ ]
```

# NS diversity in gTLDs by domain

534,836,984 NS records in 1,063,092 domains

listdns.info.

0.0%

solidhosting.pro.

0.0%

z.com.

0.0%

lcn.com.

0.0%

o2switch.net.

0.1%

nic.ru.

0.1%

hostgator.com.br.

0.1%

dynect.net.

0.1%

domain.com.

0.2%

hugedomainsdns.com.

0.2%

bodis.com.

0.3%

ultradns\.

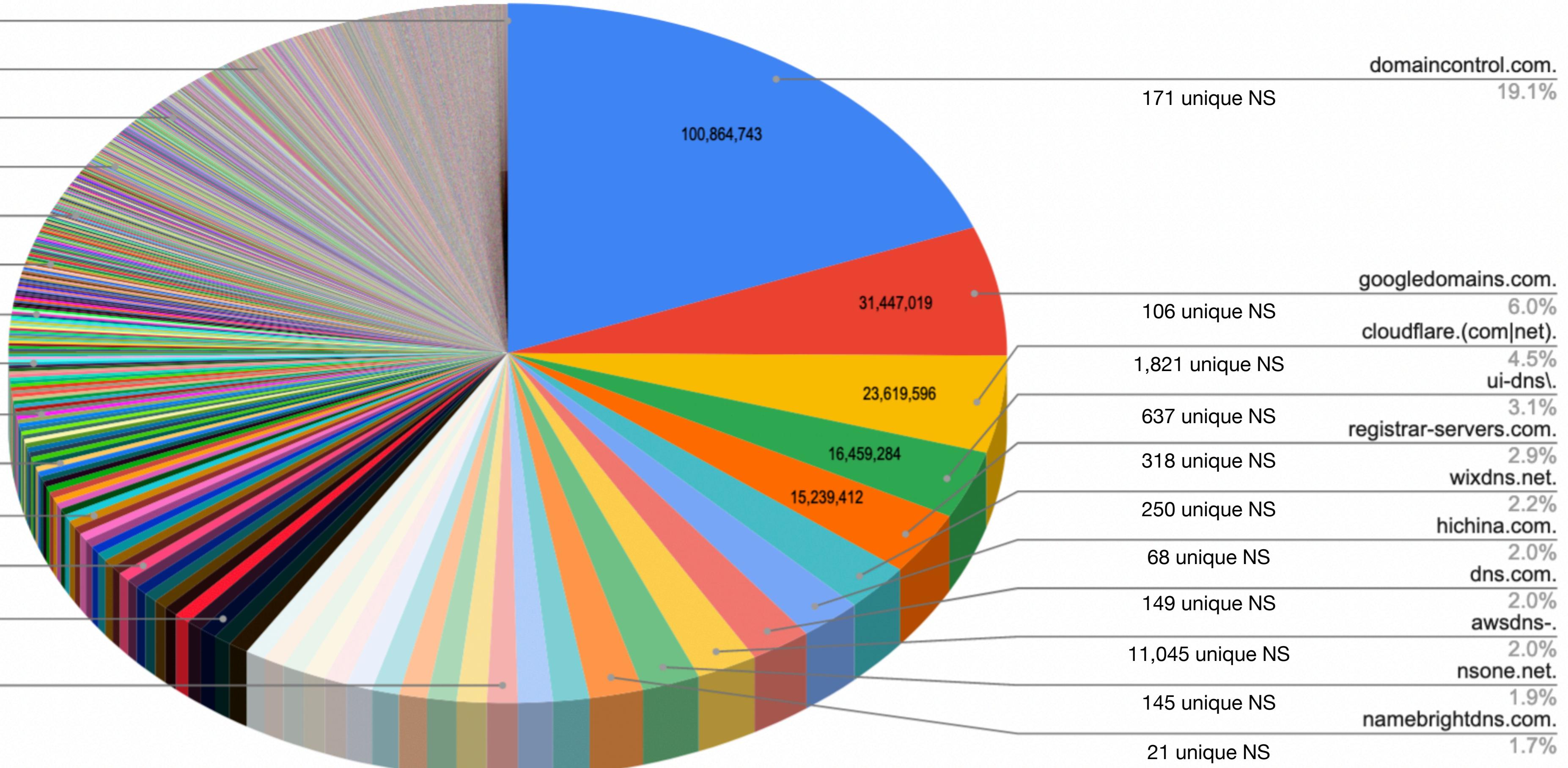
0.4%

dnspod.net.

0.6%

dnsowl.com.

1.0%



# NS diversity in gTLDs by domain

534,836,984 NS records in 1,063,092 domains

listdns.info.

0.0% solidhosting.pro.

0.0% z.com.

0.0% lcn.com.

0.0% o2switch.net.

0.1% nic.ru.

0.1% hostgator.com.br.

0.1% dynect.net.

0.1% domain.com.

0.2% hugedomainsdns.com.

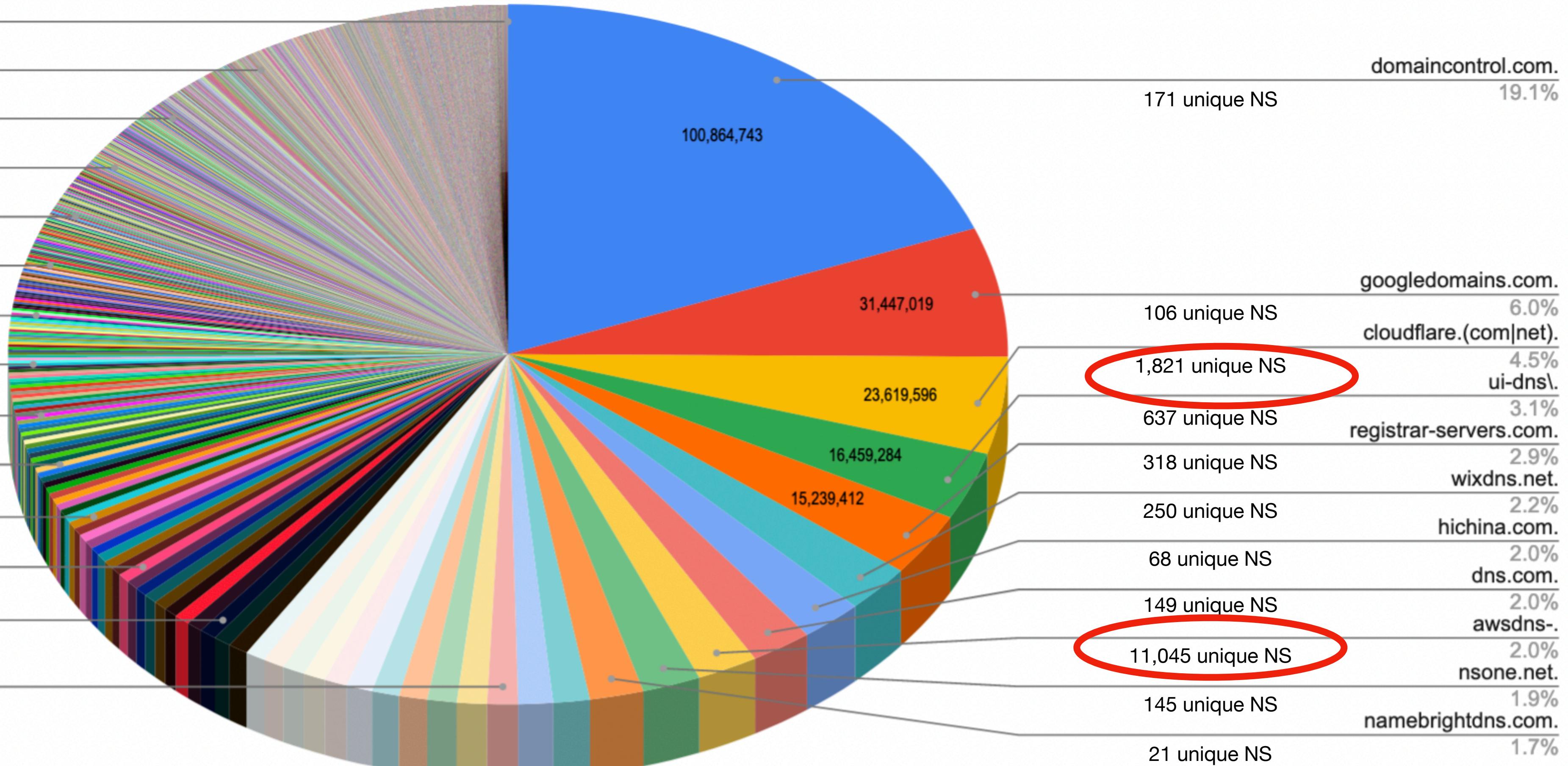
0.2% bodis.com.

0.3% ultradns\.

0.4% dnspod.net.

0.6% dnsowl.com.

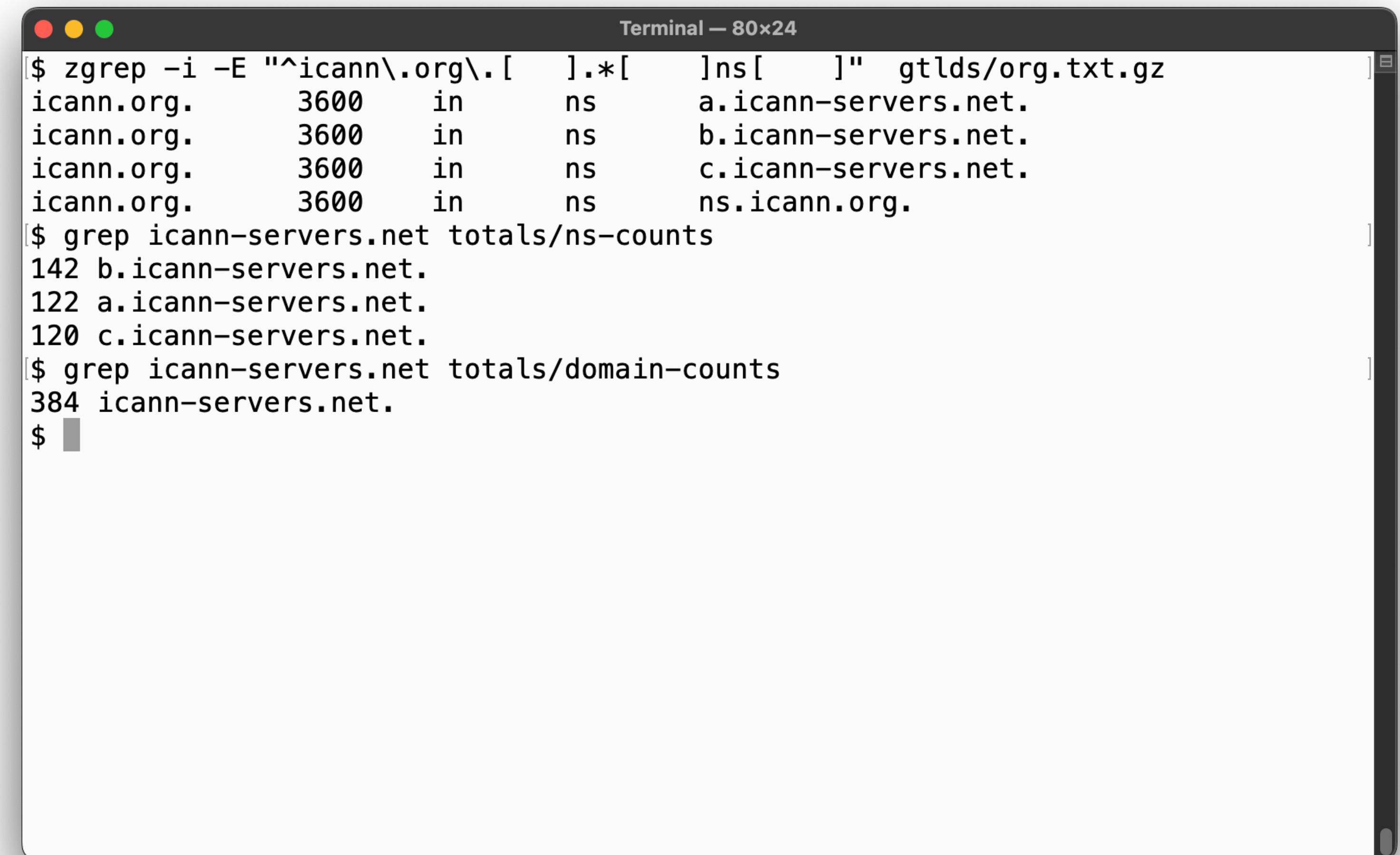
1.0%



# NS diversity in gTLDs by domain

534,836,984 NS records in 1,063,092 domains

- 43% of all NS records are found in just 10 domains (0.001%)
  - served by 165 individual NS



A terminal window titled "Terminal - 80x24" displaying command-line output. The commands used are:

```
$ zgrep -i -E "^icann\.org\.[\t]*[\n\t]*ns[\t]*]" gtlds/org.txt.gz
icann.org.    3600    in     ns      a.icann-servers.net.
icann.org.    3600    in     ns      b.icann-servers.net.
icann.org.    3600    in     ns      c.icann-servers.net.
icann.org.    3600    in     ns      ns.icann.org.

$ grep icann-servers.net totals/ns-counts
142 b.icann-servers.net.
122 a.icann-servers.net.
120 c.icann-servers.net.

$ grep icann-servers.net totals/domain-counts
384 icann-servers.net.

$
```

# NS diversity in gTLDs by domain

534,836,984 NS records in 1,063,092 domains

- 43% of all NS records are found in just 10 domains (0.001%)
  - served by 165 individual NS
- 52% of all NS records are found in just 20 domains (0.002%)
  - served by 255 individual NS
- 75% of all NS records are found in just 100 domains (0.01%)
  - served by 1,580 individual NS
- 99% of all NS records are found in just 6,000 domains (0.56%)
  - served by 345,000 individual NS

# NS diversity in gTLDs by domain

52% of all NS records are found in these 20 domains

1. domaincontrol.com is Wild West Domains GoDaddy 🇺🇸 (AS44273)
2. googledomains.com is Google 🇺🇸 (AS15169)
3. cloudflare.com is Cloudflare 🇺🇸 (AS13335)
4. ui-dns.\* is IONOS United Internet AG 🇩🇪 (AS8560)
5. registrar-servers.com is Namecheap 🇺🇸 (AS397213)
6. wixdns.net is Wix.com Ltd. 🇮🇱 (AS15169)
7. hichina.com is Alibaba Cloud Computing 🇨🇳 (AS37963)
8. dns.com is Comodo Xcitum 🇺🇸 (AS21859, AS133775 🇨🇳)
9. awsdns-\* is Amazon Web Services 🇺🇸 (AS16509)
10. nsone.net is NS1 🇺🇸 (AS62597)
11. namebrightdns.com is NameBright Turn Commerce Inc. 🇺🇸 (AS14618)
12. gname-dns.com is Gname 🇸🇬 (AS13335)
13. name-services.com is Enom 🇺🇸/🇨🇦 (AS15348)
14. dnsowl.com is NameSilo 🇺🇸 (AS13335)
15. squarespacedns.com is Squarespace 🇺🇸 (AS63911)
16. worldnic.com is Network Solutions LLC 🇺🇸 (AS13335)
17. bluehost.com is Newfold Digital, Inc 🇺🇸 (AS13335)
18. name.com is Donuts Inc Identity Digital 🇺🇸 (AS62597)
19. myhostadmin.net 🇨🇳 (AS38283)
20. wordpress.(org|com) is Automattic Inc. 🇺🇸 (AS2635)

# NS diversity in gTLDs by domain

52% of all NS records are found in these 20 domains

1. domaincontrol.com is Wild West Domains GoDaddy 🇺🇸 (AS44273)
2. googledomains.com is Google 🇺🇸 (AS15169)
3. cloudflare.com is Cloudflare 🇺🇸 (AS13335) 
4. ui-dns.\* is IONOS United Internet AG 🇩🇪 (AS8560)
5. registrar-servers.com is Namecheap 🇺🇸 (AS397213)
6. wixdns.net is Wix.com Ltd. 🇮🇱 (AS15169)
7. hichina.com is Alibaba Cloud Computing 🇨🇳 (AS37963)
8. dns.com is Comodo Xcitum 🇺🇸 (AS21859, AS133775 🇨🇳)
9. awsdns-\* is Amazon Web Services 🇺🇸 (AS16509)
10. nsone.net is NS1 🇺🇸 (AS62597)
11. gname-dns.com is Gname 🇸🇬 (AS13335) 
12. name-services.com is Enom 🇺🇸/🇨🇦 (AS15348)
13. dnsowl.com is NameSilo 🇺🇸 (AS13335) 
14. squarespacedns.com is Squarespace 🇺🇸 (AS63911)
15. worldnic.com is Network Solutions LLC 🇺🇸 (AS13335) 
16. bluehost.com is Newfold Digital, Inc 🇺🇸 (AS13335) 
17. name.com is Donuts Inc Identity Digital 🇺🇸 (AS62597)
18. myhostadmin.net 🇨🇳 (AS38283)
19. wordpress.(org|com) is Automattic Inc. 🇺🇸 (AS2635)
20. alidns.com is Alibaba Cloud Computing 🇨🇳 (AS37963)

# NS diversity in gTLDs by domain

52% of all NS records are found in these 20 domains

1. domaincontrol.com is Wild West Domains GoDaddy 🇺🇸 (AS44273)
2. googledomains.com is Google 🇺🇸 (AS15169)
3. cloudflare.com is Cloudflare 🇺🇸 (AS13335)
4. ui-dns.\* is IONOS United Internet AG 🇩🇪 (AS8560)
5. registrar-servers.com is Namecheap 🇺🇸 (AS397213)
6. wixdns.net is Wix.com Ltd. 🇮🇱 (AS15169)
7. hichina.com is Alibaba Cloud Computing 🇨🇳 (AS37963)
8. dns.com is Comodo Xcitum 🇺🇸 (AS21859, AS133775 🇨🇳)
9. awsdns-\* is Amazon Web Services 🇺🇸 (AS16509)
10. nsone.net is NS1 🇺🇸 (AS62597)
11. gname-dns.com is Gname 🇸🇬 (AS13335)
12. name-services.com is Enom 🇺🇸/🇨🇦 (AS15348)
13. dnsowl.com is NameSilo 🇺🇸 (AS13335)
14. squarespacedns.com is Squarespace 🇺🇸 (AS63911)
15. worldnic.com is Network Solutions LLC 🇺🇸 (AS13335)
16. bluehost.com is Newfold Digital, Inc 🇺🇸 (AS13335)
17. name.com is Donuts Inc Identity Digital 🇺🇸 (AS62597)
18. myhostadmin.net 🇨🇳 (AS38283)
19. wordpress.(org|com) is Automattic Inc. 🇺🇸 (AS2635)
20. alidns.com is Alibaba Cloud Computing 🇨🇳 (AS37963)

# NS diversity in gTLDs by domain

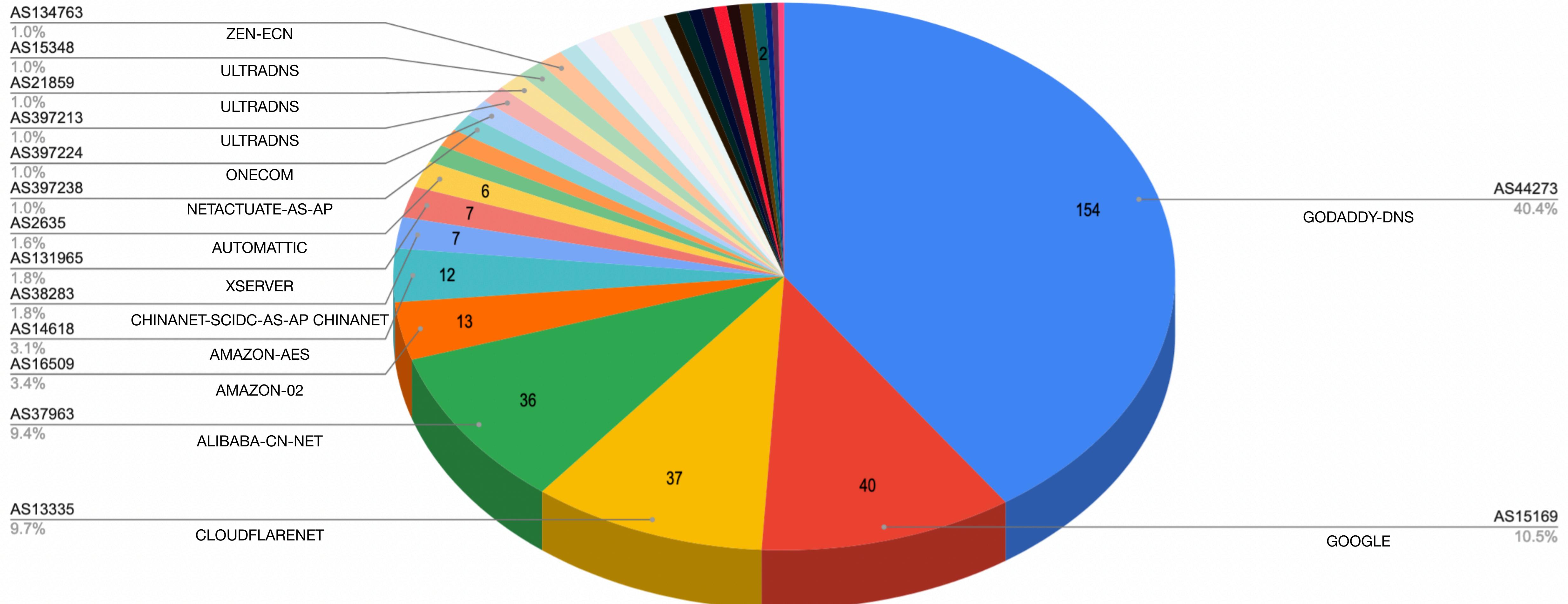
52% of all NS records are found in these 20 domains

1. domaincontrol.com is Wild West Domains GoDaddy 🇺🇸 (AS44273)
2. googledomains.com is Google 🇺🇸 (AS15169)
3. cloudflare.com is Cloudflare 🇺🇸 (AS13335)
4. ui-dns.\* is IONOS United Internet AG 🇩🇪 (AS8560)
5. registrar-servers.com is Namecheap 🇺🇸 (AS397213)
6. wixdns.net is Wix.com Ltd. 🇮🇱 (AS15169)
7. hichina.com is Alibaba Cloud Co.
8. dns.com is Comodo
9. awsdns-\* is Amazon Web Services 🇺🇸 (AS509)
10. nsone.net is NS1 🇺🇸 (AS1507)
11. gname-dns.com is Gname 🇸🇬 (AS13335)
12. name-services.com is Enom 🇺🇸/🇨🇦 (AS15348)
13. dnsowl.com is NameSilo 🇺🇸 (AS13335)
14. cedns.com is Squarespace 🇺🇸 (AS63911)
15. .com is Network Solutions LLC 🇺🇸 (AS13335)
16. .com is Newfold Digital, Inc 🇺🇸 (AS13335)
17. name.com is Donuts Inc 🇺🇸 (AS62597)
18. myhostadmin.net 🇨🇳 (AS38283)
19. wordpress.(org|com) is Automattic Inc. 🇺🇸 (AS2635)
20. alidns.com is Alibaba Cloud Computing 🇨🇳 (AS37963)

**Identity Digital owns Afilias, Inc**, which runs  
.ac, .aero, .ag, .asia, .au, .bm, .bz, .gi, .info, .io,  
.lgbt, .me, .mn, .mobi, .ngo, .org, .pr, .pro, .sc, .sh, .vc, .m is Network Solutions LLC 🇺🇸 (AS13335)  
and supports .sg, .la, .hn.

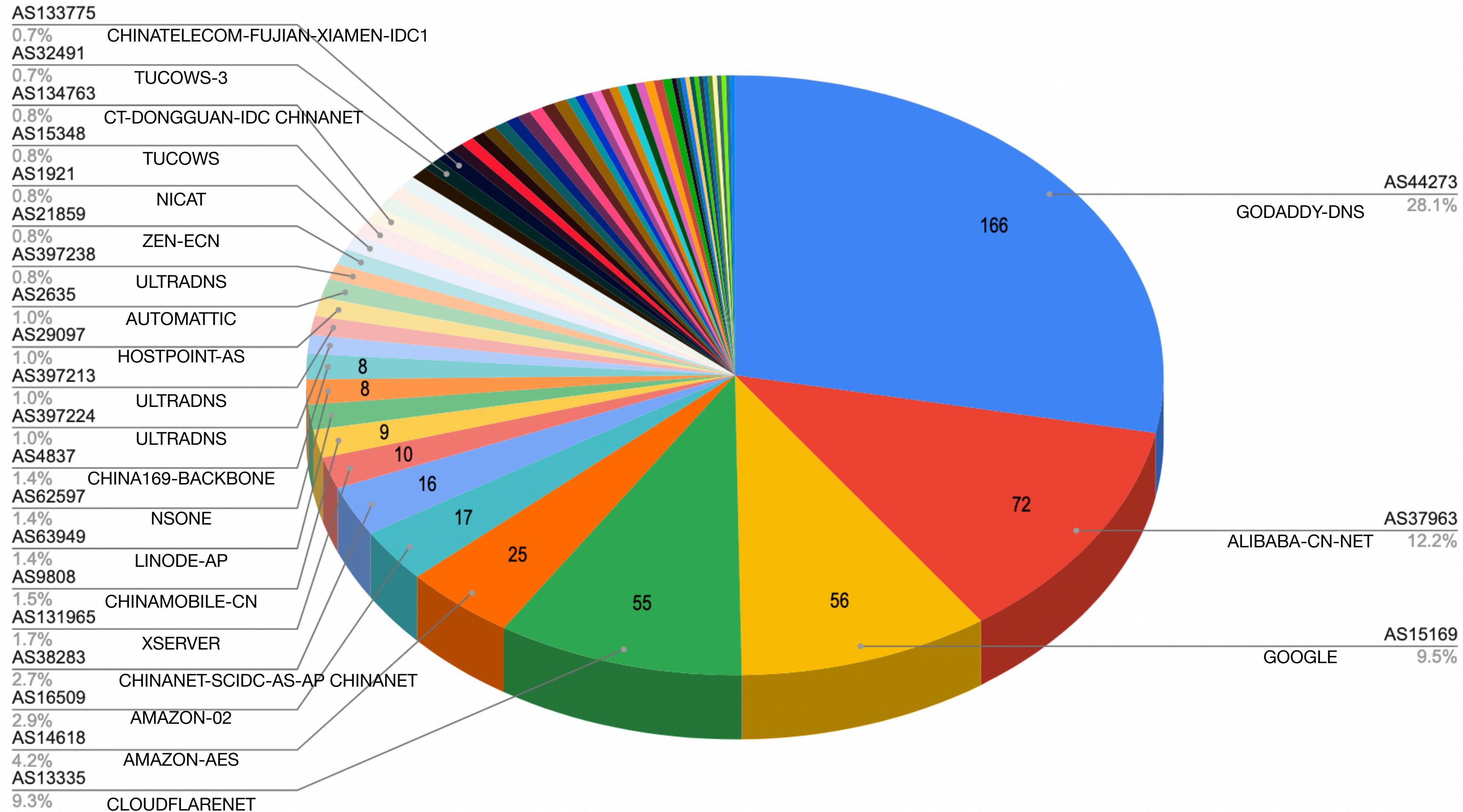
# NS diversity in gTLDs by AS

43% of all NS records are served from 381 IPs (165 NS) in 35 AS



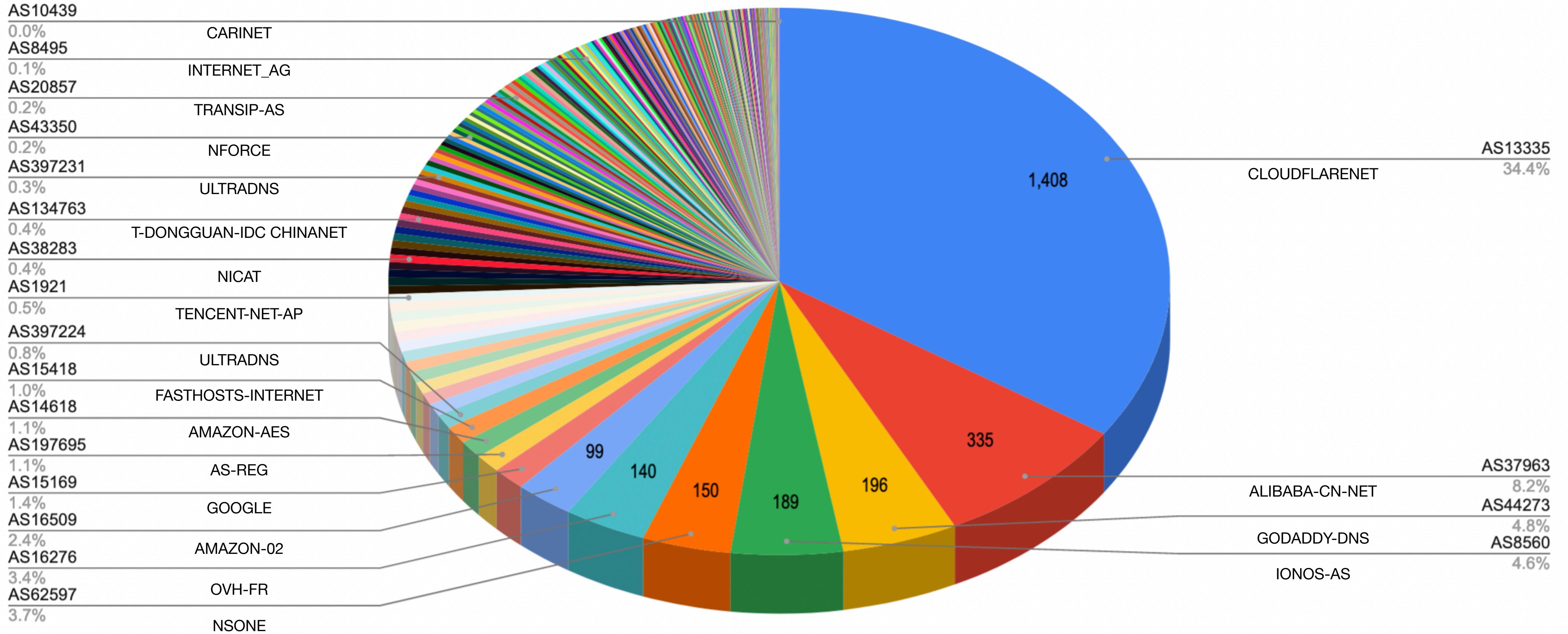
# NS diversity in gTLDs by AS

52% of all NS records are served from 591 IPs (255 NS) in 63 AS



# NS diversity in gTLDs by AS

75% of all NS records are served from 4,093 IPs (1,580 NS) in 245 AS



# Top 1M Domains



# Top 1M Domains



# Top 1M Domains



## End of Service Notice

We retired Alexa.com on May 1, 2022, after more than two decades of helping you find, reach, and convert your digital audience. Thank you for making us your go-to resource for content research, competitive analysis, keyword research, and so much more.

# Top 1M Domains



## End of Service Notice

We retired Alexa.com on May 1, 2022, after more than a decade of helping you discover new content, measure reach, and convert your digital audience. Thank you for using Alexa to power your work, from content research, competitive analysis, keyword

```
Terminal – 80x24
laptop$ curl -s -O http://s3.amazonaws.com/alexa-static/top-1m.csv.zip
laptop$ unzip top-1m.csv.zip
Archive: top-1m.csv.zip
  inflating: top-1m.csv
laptop$ mv top-1m.csv alexa-top-1m.csv
laptop$ wc -l alexa-top-1m.csv
  744509 alexa-top-1m.csv
laptop$
```

# Top 1M Domains

## Tranco

A Research-Oriented Top Sites Ranking  
Hardened Against Manipulation

By [Victor Le Pochat](#), [Tom Van Goethem](#), [Samaneh Tajalizadehkhooob](#), [Maciej Korczyński](#) and Wouter Joosen

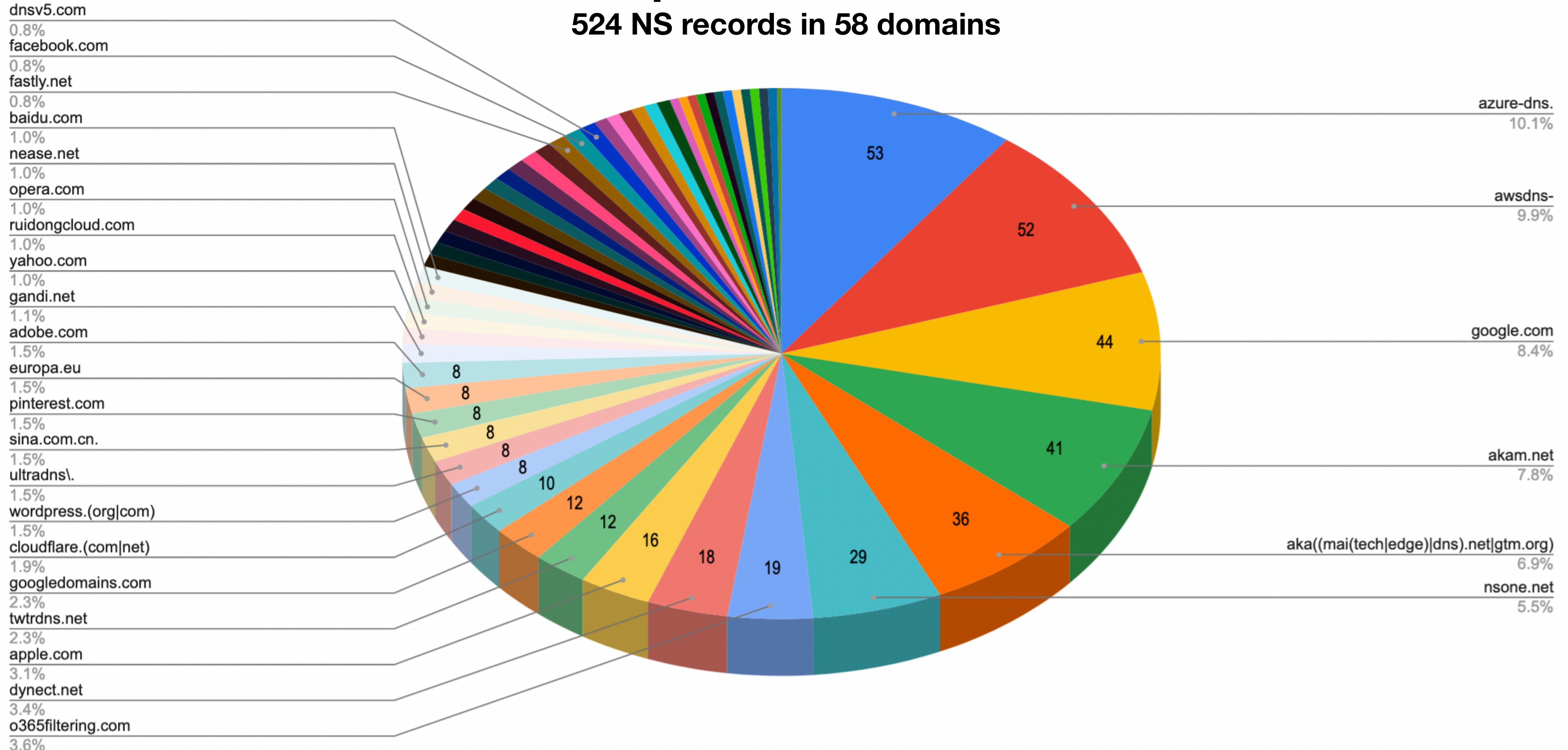
[Download the latest Tranco list](#)

<https://tranco-list.eu/>

```
Terminal – 80x24
Archive: top-1m.csv.zip
  inflating: top-1m.csv
[laptop$ mv top-1m.csv alexa-top-1m.csv
[laptop$ wc -l alexa-top-1m.csv
  744509 alexa-top-1m.csv
[laptop$ curl -L -s -o tranco-top-1m.csv.zip https://tranco-list.eu/download_dail
y/PZ9QJ
[laptop$ unzip tranco-top-1m.csv.zip
Archive: tranco-top-1m.csv.zip
  inflating: top-1m.csv
[laptop$ wc -l top-1m.csv
  1000000 top-1m.csv
[laptop$ head top-1m.csv
1,google.com
2,gtld-servers.net
3,youtube.com
4,facebook.com
5,microsoft.com
6,akamaiedge.net
7,netflix.com
8,twitter.com
9,instagram.com
10,baidu.com
laptop$
```

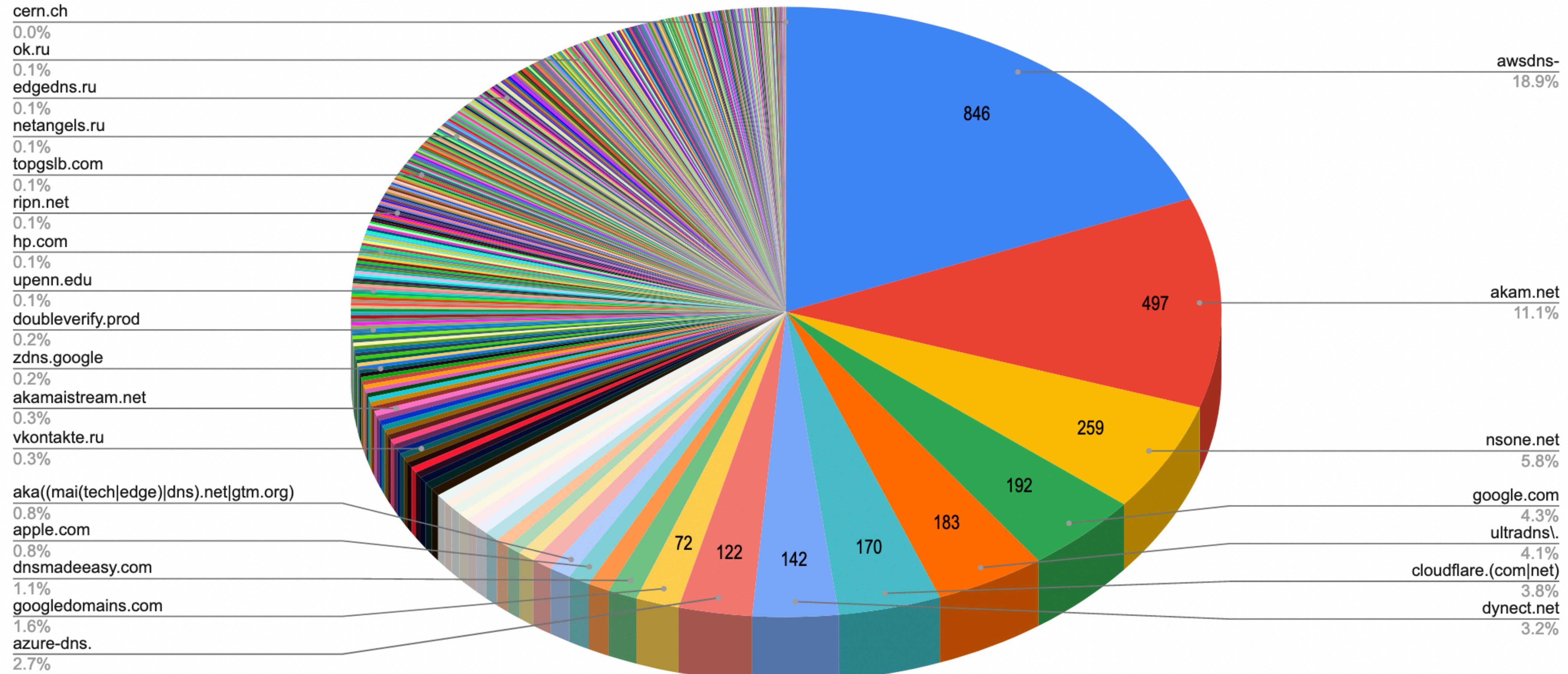
# Top 100 domains

## 524 NS records in 58 domains



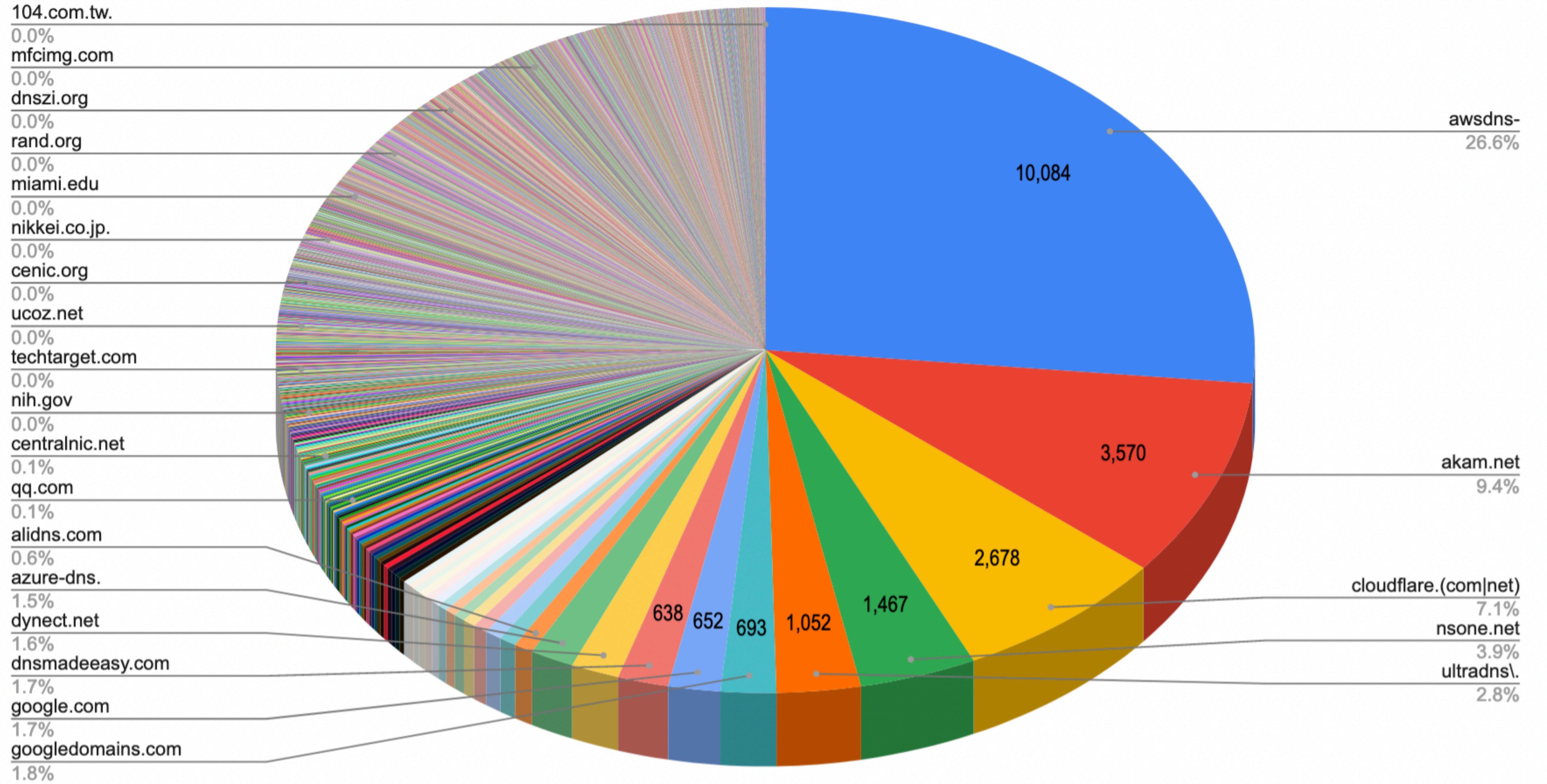
# Top 1K domains

## 4,468 NS records in 395 domains



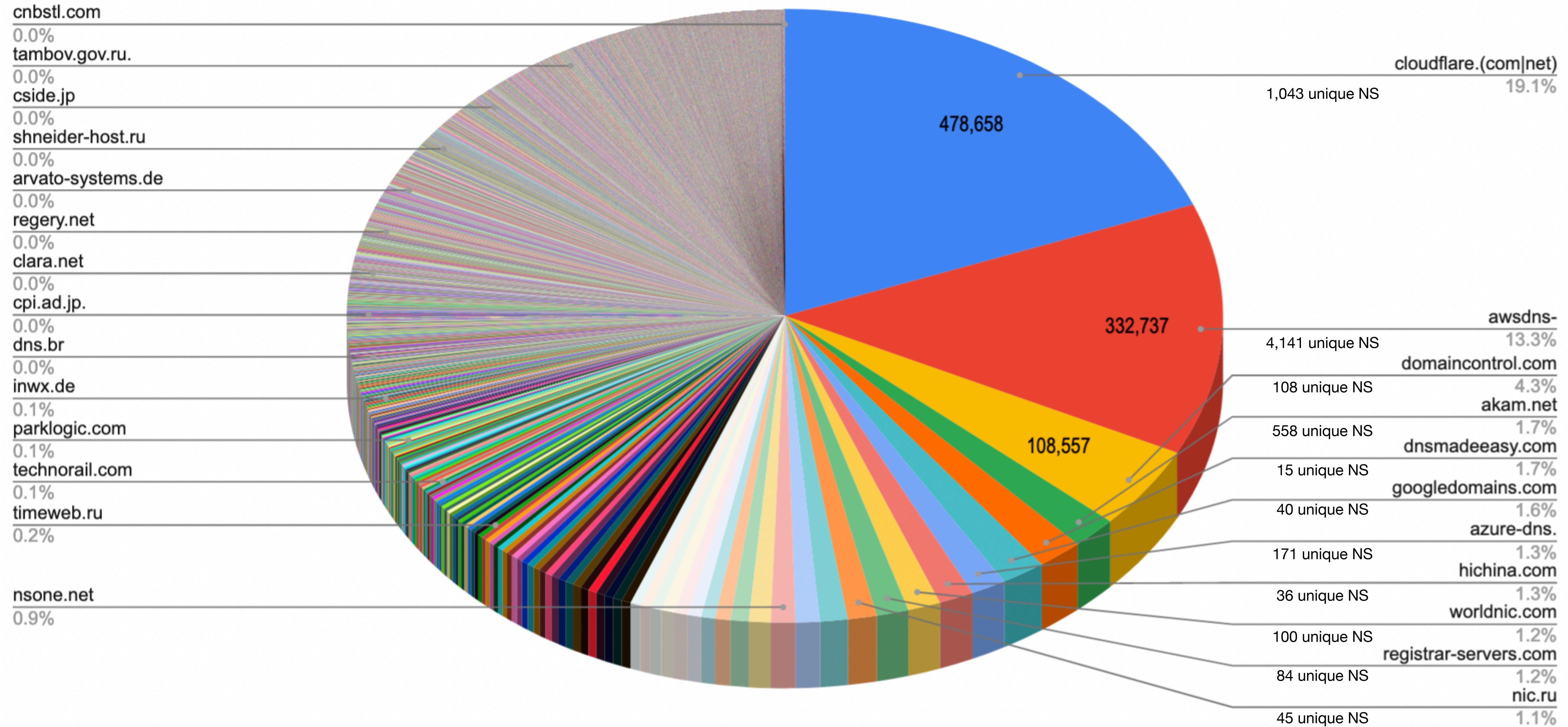
# Top 10K domains

## 37,974 NS records in 3,192 domains



# Top 1M domains

## 2,636,294 NS records in 119,291 domains



# NS diversity in top 1M domains

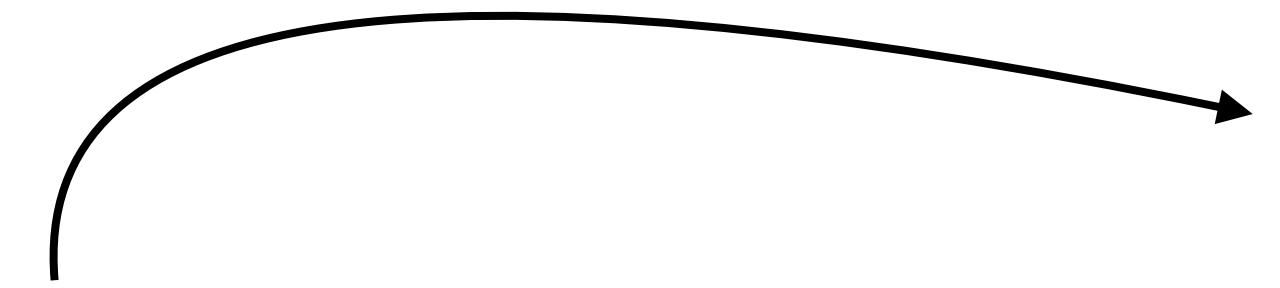
2,636,294 NS records in 119,291 domains

- 44% of all NS records are found in just 10 domains (0.008%)
  - served by 1,075 individual NS
- 51% of all NS records are found in just 20 domains (0.017%)
  - served by 1,740 individual NS
- 75% of all NS records are found in just 500 domains (0.42%)
  - served by 6,870 individual NS
- 90% of all NS records are found in 20,000 domains (16.76%)
  - served by 76,800 individual NS

# NS diversity in top 1M domains

2,636,294 NS records in 119,291 domains

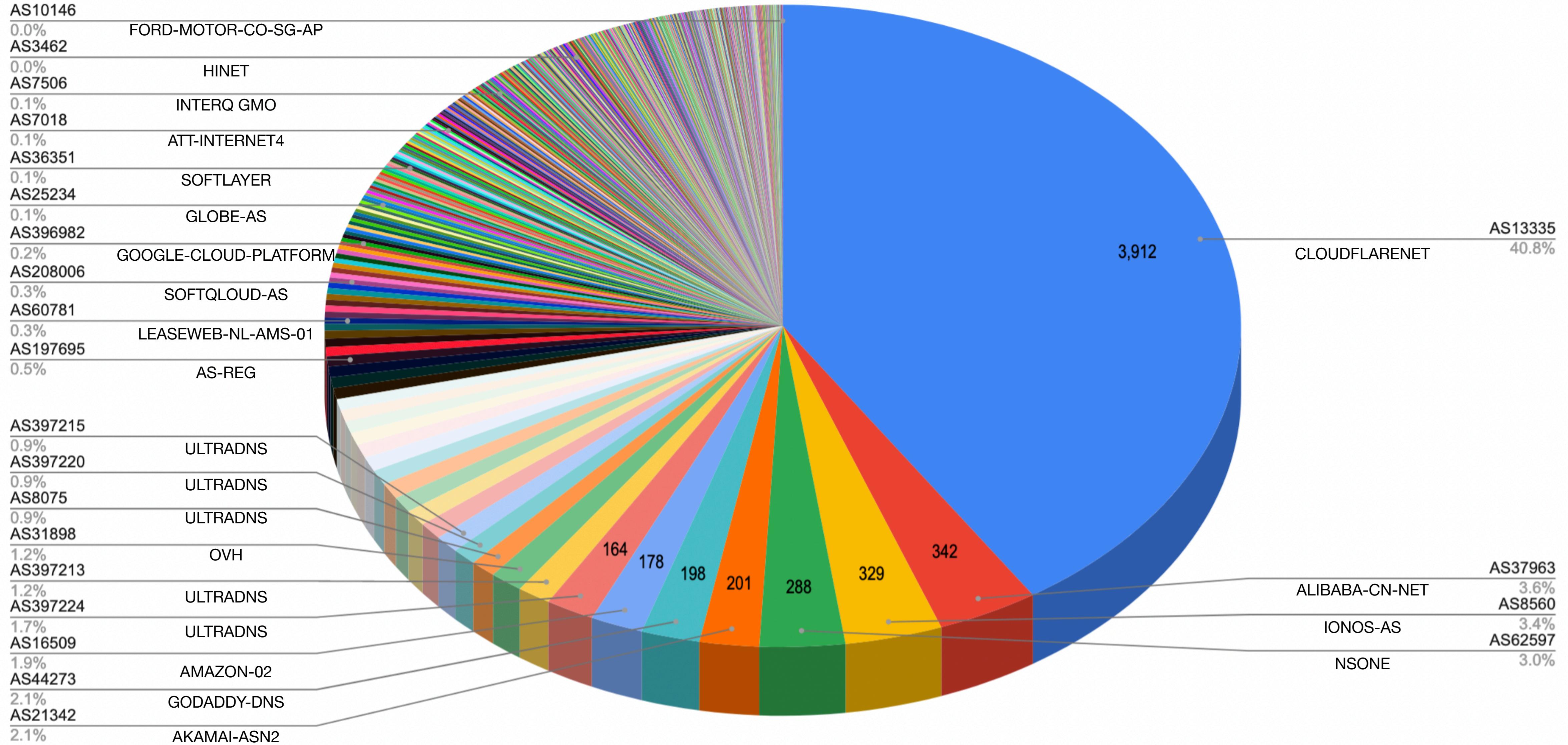
- 44% of all NS records are found in just 10 domains (0.008%)
  - served by 1,075 individual NS
- 51% of all NS records are found in just 20 domains (0.017%)
  - served by 1,740 individual NS
- 75% of all NS records are found in just 500 domains (0.42%)
  - served by 6,870 individual NS
- 90% of all NS records are found in 20,000 domains (16.76%)
  - served by 76,800 individual NS



1. Cloudflare
2. Amazon Web Services
3. GoDaddy
4. Akamai
5. DigiCert
6. Google
7. Microsoft
8. Alibaba
9. Network Solutions
10. Namecheap

# NS diversity in top 1M domains by AS

75% of all NS records are served from 9,585 IPs (6,870 NS) in 575 AS



# Who controls the internet?

# Who controls the internet?



**VERISIGN**

- `gtld-servers.net` (Verisign) responsible for ~80% of all gTLD NS records

# Who controls the internet?



- gtd-servers.net (Verisign) responsible for ~80% of all gTLD NS records
- 43% of all NS records in all gTLDs in only 10 domains; 44% in Top 1M in only 10 domains

1. GoDaddy  
2. Google  
3. Cloudflare  
4. IONOS  
5. Namecheap  
6. Wix  
7. Alibaba  
8. Xcitum  
9. Amazon  
10. NS1

1. Cloudflare  
2. Amazon Web Services  
3. GoDaddy  
4. Akamai  
5. DigiCert  
6. Google  
7. Microsoft  
8. Alibaba  
9. Network Solutions  
10. Namecheap

# Who controls the internet?



- `gtld-servers.net` (Verisign) responsible for ~80% of all gTLD NS records
- 43% of all NS records in all gTLDs in only 10 domains; 44% in Top 1M in only 10 domains
- `domaincontrol.com` (GoDaddy) responsible for ~20% of all NS records in all gTLDs

# Who controls the internet?



- `gtld-servers.net` (Verisign) responsible for ~80% of all gTLD NS records
- 43% of all NS records in all gTLDs in only 10 domains; 44% in Top 1M in only 10 domains
- `domaincontrol.com` (GoDaddy) responsible for ~20% of all NS records in all gTLDs
- `cloudflare.(com|net)` (Cloudflare) responsible for ~20% of NS records in Top 1M Domains

# Who controls the internet?



- `gtld-servers.net` (Verisign) responsible for ~80% of all gTLD NS records
- 43% of all NS records in all gTLDs in only 10 domains; 44% in Top 1M in only 10 domains
- `domaincontrol.com` (GoDaddy) responsible for ~20% of all NS records in all gTLDs
- `cloudflare.(com|net)` (Cloudflare) responsible for ~20% of NS records in Top 1M Domains
- 40% of Top 1M Domain NS records served from Cloudflare AS13335

# Who controls the internet?

- gtld-servers.net (Verisign) responsible for ~80% of all gTLD NS records
- 43% of all NS records in all gTLDs in only 10 domains; 44% in Top 1M in only 10 domains
- domaincontrol.com (GoDaddy) responsible for ~20% of all NS records in all gTLDs
- cloudflare.(com|net) (Cloudflare) responsible for ~20% of NS records in Top 1M Domains
- 40% of Top 1M Domain NS records served from Cloudflare AS13335
- ~52% of NS records are served from 4 AS (Cloudflare, Alibaba, GoDaddy, IONOS)

# Who controls the internet?

- gtld-servers.net (Verisign) responsible for ~80% of all gTLD NS records
- 43% of all NS records in all gTLDs in only 10 domains; 44% in Top 1M in only 10 domains
- domaincontrol.com (GoDaddy) responsible for ~20% of all NS records in all gTLDs
- cloudflare.(com|net) (Cloudflare) responsible for ~20% of NS records in Top 1M Domains
- 40% of Top 1M Domain NS records served from Cloudflare AS13335
- ~52% of NS records are served from 4 AS (Cloudflare, Alibaba, GoDaddy, IONOS)

## References / See also

- [https://is.gd/ids\\_ns\\_diversity](https://is.gd/ids_ns_diversity)
- <https://www.netmeister.org/blog/nsauth-diversity.html>
- <https://www.netmeister.org/blog/tlds.html>
- <https://www.statdns.com/>
- <https://tranco-list.eu/>
- <https://www.iana.org/domains/root/files>
- <https://czds.icann.org/>
- <https://github.com/cisagov/dotgov-data>
- <https://www.team-cymru.com/ip-asn-mapping>