DNS Data and Analysis

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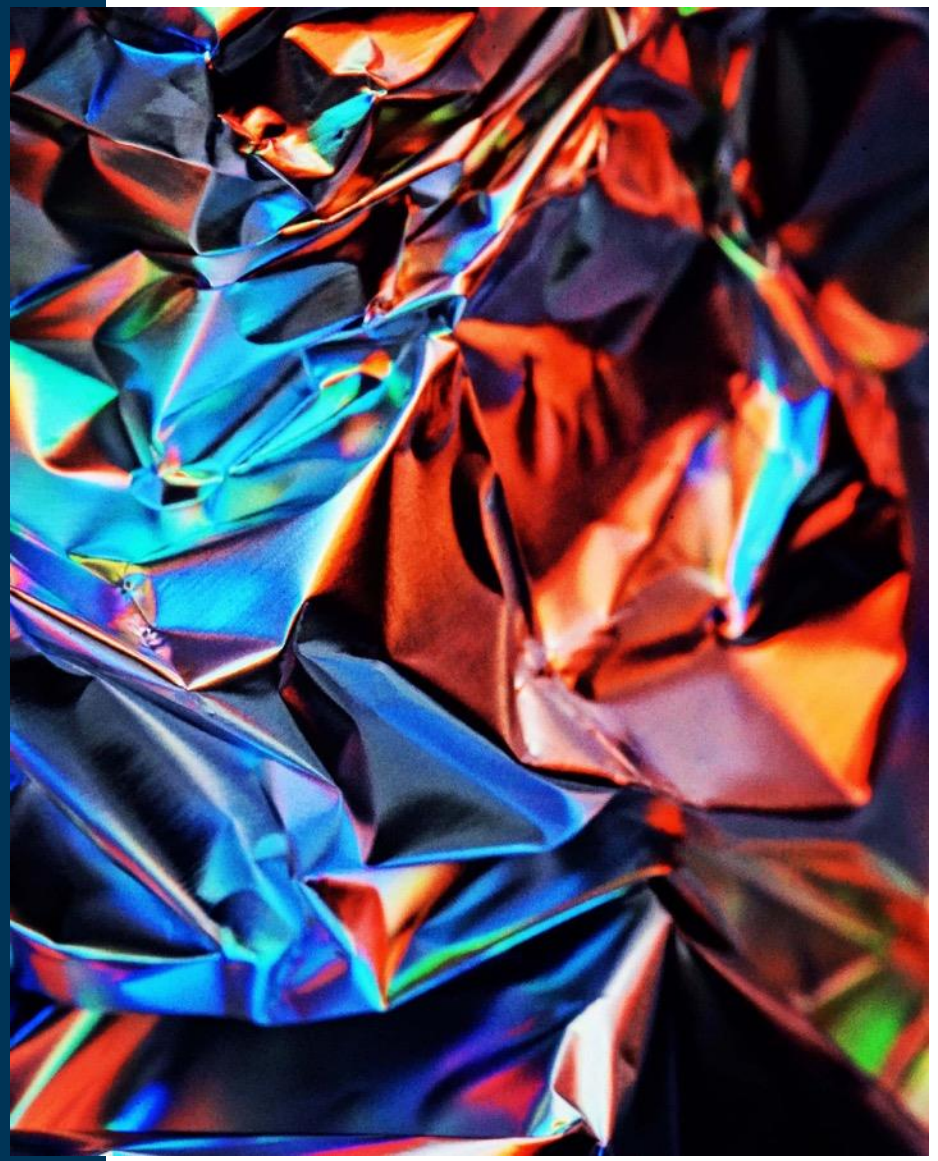

TLD DNS

GoDaddy Registry is a Backend Registry Operator (BERO)

- Clients include ccTLDs (.us) and gTLDs (.biz)
- Support over 200 "TLDs" combined

Provide DNS at the Top Level

- 30+ globally diverse nodes
- Multiple anycast networks

As DNS Operators our Key Principle is to Provide a DNS Service that:

- Aims for Availability (DDOS protection), Performance (fast response/resolution time) and Stability (30+ nodes)
- Adheres to industry best practices (DNSSEC, req of gTLDs however it should be the case for all TLDs regardless of type)
- Exceeds contracted SLAs and internal expectations

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TLD DNS Versus Recursive

- We don’t operate a recursive, for our TLDs we are purely the authoritative server
- Recursive servers get all the interesting data, in general we provide NS records
- However, we also do get some interesting data as well
  - NXDomains, leads to
  - Clues to potential misconfigured networks (e.g. smtp.domain.example, intranet.domain.example, home.domain.example, router-name.domain.example)
  - New botnets not yet launched? (e.g. fd70q43fhjd.domain.example)
  - Zone walking

Name Collision and Controlled Interruption

All gTLD launches required a "name collision" assessment

- SSAC (Stability Advisory Committee) analysed all DNS queries found in the root for TLDs that previously did not exist
- Reason may be due to misconfigured networks (go out to the internet first before looking locally)
- Used to determine client networks that may be impacted

Name Collision and Controlled Interruption

Prior to launch all gTLDs go through a Controlled Interruption (CI) for 18 months

- Zone file published with a wildcard record (NOT STANDARD!!!)
- For 90 days a gTLD MUST NOT have any delegated domains and all DNS responses
- Response to queries that hit the zone must alert the client that they DNS setup needs to be reviewed

```
<TLD>. 3600 IN MX 10 your-dns-needs-immediate-attention.<TLD>.
* 3600 IN MX 10 your-dns-needs-immediate-attention.<TLD>.
<TLD>. 3600 IN SRV 10 10 0 your-dns-needs-immediate-attention.<TLD>.
* 3600 IN SRV 10 10 0 your-dns-needs-immediate-attention.<TLD>.
<TLD>.    3600    IN    TXT    "Your    DNS    configuration    needs    immediate    attention    see
https://icann.org/namecollision"
*    3600    IN    TXT    "Your    DNS    configuration    needs    immediate    attention    see
https://icann.org/namecollision"
<TLD>. 3600 IN A 127.0.53.53
* 3600 IN A 127.0.53.53
```

- After the initial 90 days until the remainder of the CI period, Registries have to provide an emergency contact which can be called upon if client experienced a catastrophic failure (e.g. a hospital network, national emergency network, etc)
- No known catastrophic events, over 1200 gTLDs added in the root since 2014 (xn--ngbc5azd or (شبكةwas the first gTLD… operated by GoDaddy Registry

Reference material
https://www.icann.org/resources/pages/ctld-mitigation-2014-10-02-en

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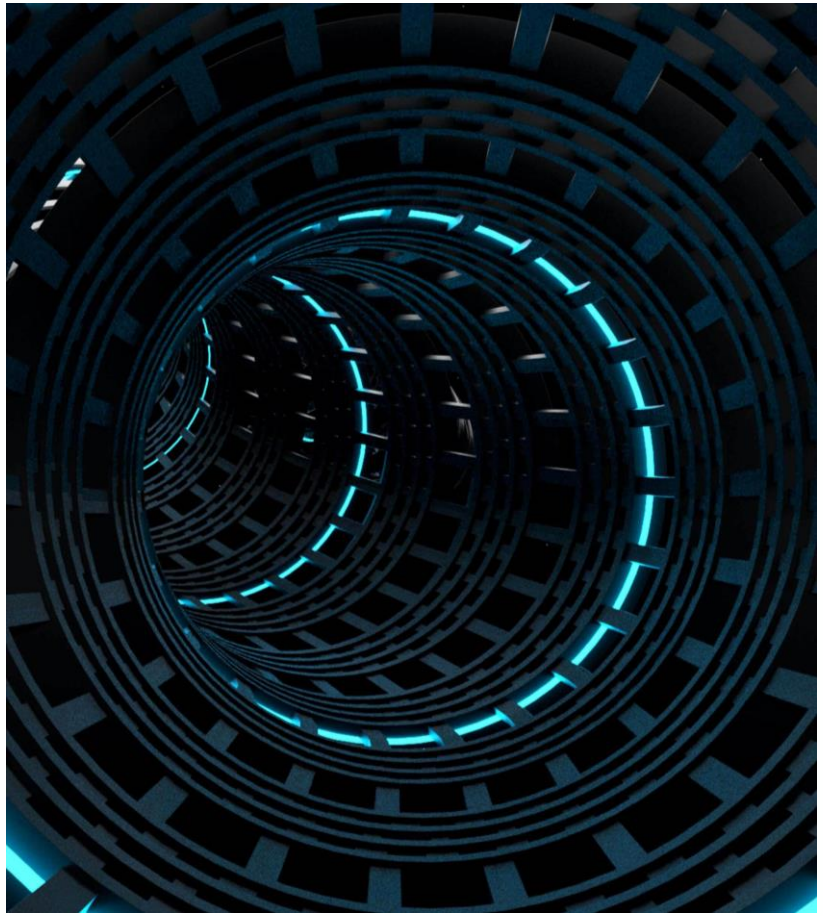
Data Analytics

DNS data is massive…that would be an understatement



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Data Analytics

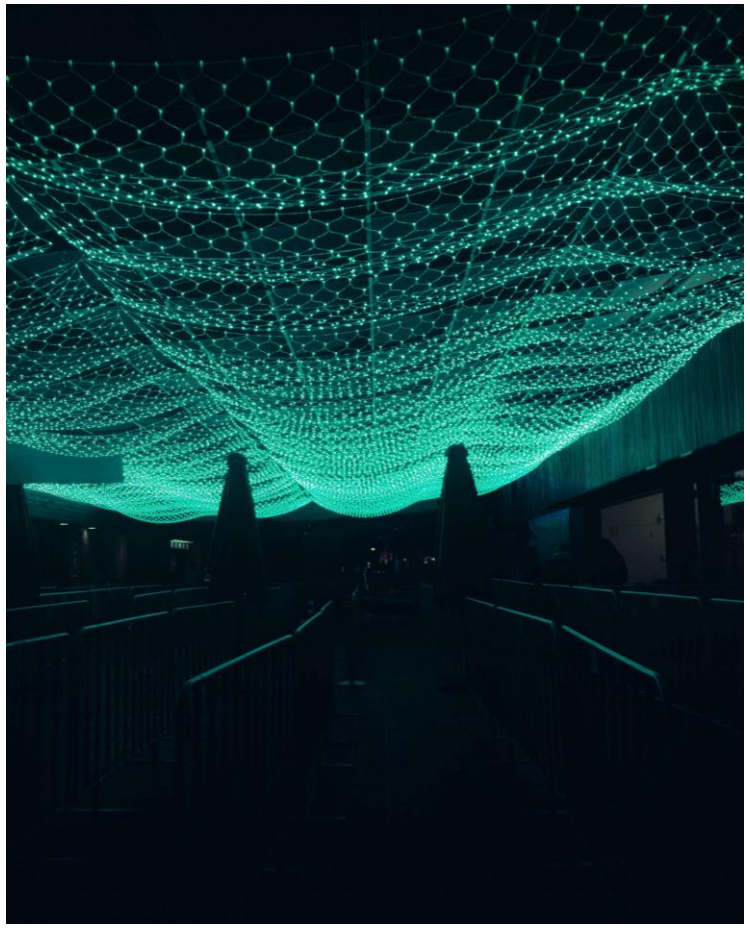
DNS is more than just A and MX records

- IoT devices
- Creative use of TXT records
- DNSSEC … making DNS response size larger! (increase in capacity and throughput requirements!!!)
- Everybody is online now

Data Analytics

What a you looking for?

- Spike in queries for a particular domain (hacked-site.gov.ccTLD)
- "random" queries at sub-domain level (at GDR anything below the zones that we manage)
- "DNS and domain history" … searching for bad actors - same IP for many domains where the IP is a known phishing host



Data Analytics

DNS data is BIG DATA...

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Data Analytics

DNS data is not enough, DNS data provides the roadmap, combine it with other data to tell the whole story

- Depends on what level you are at
- Historical patterns
- Domain registration data
- Application code

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Future/Now Enhancements

DNS over HTTPS – DoH

Harder for traditional methods in "traffic management“ in a corporate network … e.g you can just block DNS lookups and responses to and from hacker.domain.example anymore.

Need more rigid application group policy perhaps?

https://tools.ietf.org/html/rfc8484

DNS over TLS

Network admin can still monitor and block DNS queries

https://tools.ietf.org/html/rfc8310

User privacy and security is important

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Thank You

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