Stealth RDAP

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Agenda

1. RDAP Service Discovery

2. Survey of RDAP clients

3. RDAP deployment timeline (RIRs, gTLDs & ccTLDs)

4. Stealth RDAP

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6. The impact of Stealth RDAP

"If a tree were to fall on an island where there were no human beings would there be any sound?"

The Chautauquan, 1883

RDAP Service Discovery

- WHOIS lacked any way to authoritatively identify the server for a registry, resulting in various ad-hoc approaches.

- Service discovery was not one of the original deliverables of the WEIRDS working group and caused heated discussions with arguments for and against.

- Ultimately, RFC 7484* was published which defines an IANA registry for each registry type (domain, IPv4/IPv6 network, autonomous system)**.

  "An RDAP client fetches the RDAP Bootstrap Service Registries, extracts the data, and then performs a match with the query data to find the authoritative registration data server and appropriate query base URL."

ICANN

Survey of RDAP clients

Client	Language	Supports IANA Registries
RDAP Browser	Swift(?)	Yes
client.rdap.org*	Javascript	Yes
rdap.org bootstrap server*	PHP	Yes
Net::RDAP / rdapper*	Perl	Yes
nicinfo	Ruby	Yes
ICANN RDAP client	Rust	Yes
OpenRDAP client	Go	Yes
rdap.net bootstrap server	Go	Yes
DNS Belgium RDAP client	Java	Yes
CNNIC RDAP client	Java	Yes
Metaregistrar RDAP client	PHP	Yes
rdapcheck	Typescript	Yes
arrayaccess/rdap-client	PHP	Yes
rdap_client	Rust	Yes

* maintained by me in my personal capacity.

Conclusion

◉ Essentially **all** off-the-shelf RDAP clients natively support bootstrapping using the IANA registry.

◉ If a TLD does not have an entry in the bootstrap file, it is essentially **invisible** to all users of these clients, unless they manually specify it (and not all clients provide for this).

"If a registry deploys an RDAP service but doesn't tell anyone about it, did they actually deploy an RDAP service?"

Me, 2024

RDAP deployment timeline

RDAP deployment in the RIR space

◉ The IPv6, IPv6 and ASN spaces achieved 100% coverage in 2019.

  ○ This is partly due to cooperation between RIRs to put redirections in place, for example where larger allocations have been split into smaller blocks and transferred to other RIRs.
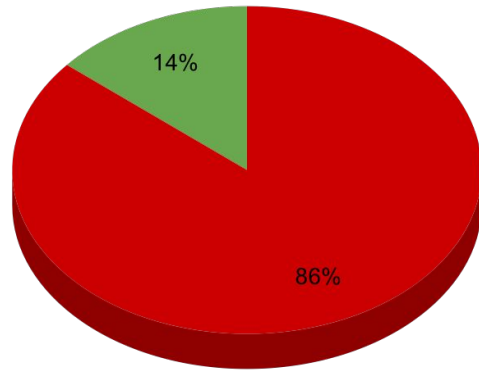
RDAP deployment in gTLDs

◉ RDAP became mandatory for all gTLD registries and registrars on August 26, 2019.

◉ 100% of gTLD domains have an RDAP record accessible via the bootstrap registry.

gTLD RDAP Deployment Timeline
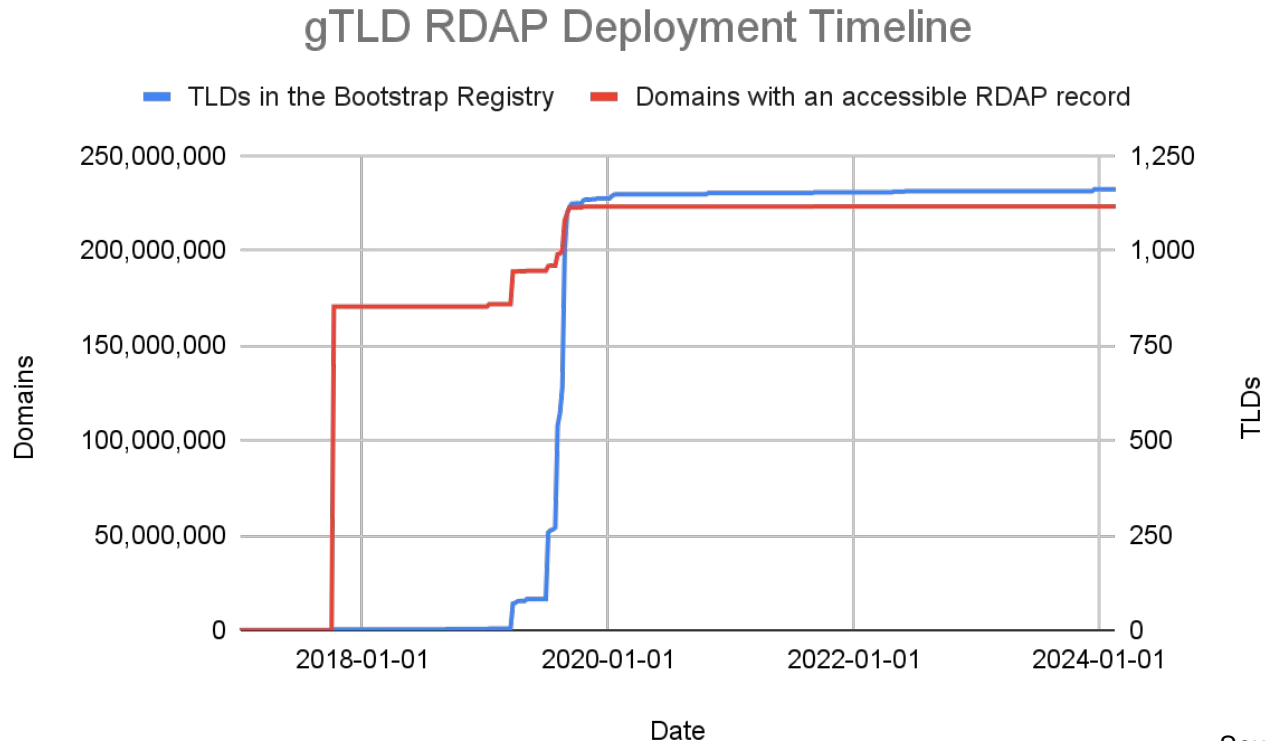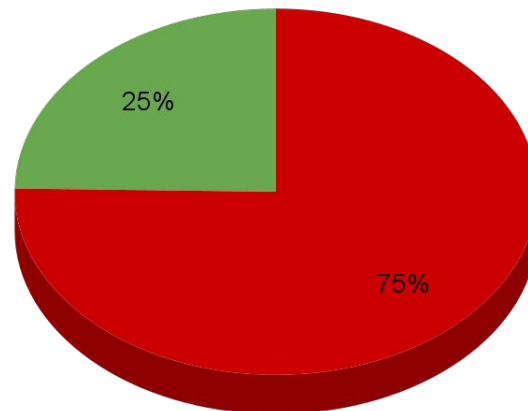

Source: deployment.rdap.org

RDAP deployment in ccTLDs

ccTLDs with RDAP

14%

86%

● No ● Yes

ccTLD DUMs with RDAP

25%

75%

● No ● Yes

◉ The first TLDs added to the IANA registry in 2017 were ccTLDs, but adoption remains low in both TLD and DUM terms:

- ○ Only 14% of ccTLDs have an RDAP server;

- ○ Only ~25% of ccTLD domains have an accessible RDAP record.

Source: deployment.rdap.org

Stealth RDAP

Stealth RDAP

⊙ The most common question submitted to feedback@rdap.org is "why doesn't rdap.org support [some RDAP server]?"

⊙ When I look, I discover that a ccTLD has deployed an RDAP server, but hasn't added it to the bootstrap registry.

⊙ I call this "Stealth" RDAP because if RDAP clients cannot autodiscover it, it's invisible to them.

⊙ I decided that RDAP.ORG will only ever use the vanilla IANA registries, with no hard-coded entries for Stealth RDAP servers.

How many Stealth RDAP servers are there?

- I ran a survey carried out on 2024-05-30.

- I extracted all domain & host names from the IANA TLD database for all ccTLDs that don't already have an entry in the bootstrap registry.

- For each ccTLD:

    a. generate a list of potential RDAP hostnames:

    - "rdap." + {admin,tech} contact email address domain;

    - "rdap." + website domain (if any);

    - whois server name (if any).

    b. For each hostname, construct a set of potential RDAP help query URLs based on common prefixes: "`/help`", "`/$tld/help`", "`/rdap/help`", "`/v1/help`".

    c. Perform GET request for each URL and examine the response:

    - 200 status;

   - Media type of `application/rdap+json` or `application/json`.

Stealth RDAP survey results

◉ 13 stealth RDAP servers detected:

.ad .bh* .bv .co** **.de** .dm .ga **.in***

.my **.nl** .om .sj .sn **.us**

◉ These represent ~25% of all ccTLD DUMs.

◉ If they were added to the bootstrap file, ~48% of all ccTLD domains would have an addressable RDAP record (twice the current figure).

◉ The overall percentage of all domains with RDAP records would increase to 82%!

Impact of Stealth RDAP

24.7%   23.4%

51.9%

⬤ Stealth   ⬤ No   ⬤ Yes
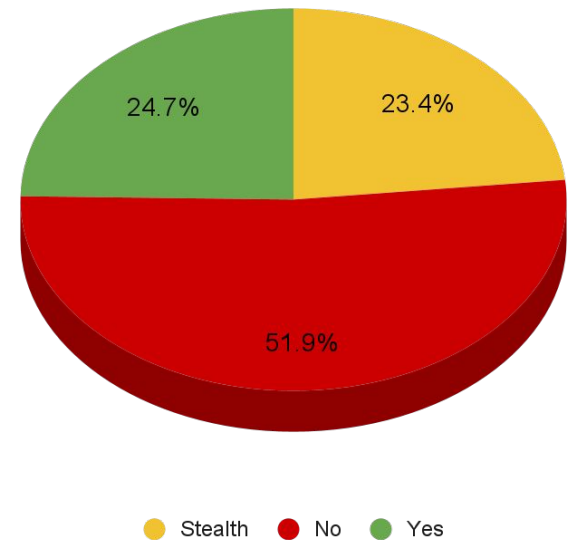
* plus IDN ccTLDs
** appeared in a previous run but has subsequently disappeared

Stealth RDAP: why?

Why would a ccTLD not register their RDAP server?

1. They're not ready to:

   - RDAP deployment is still in progress;
   - The infrastructure isn't ready for production load;
   - They want to coordinate with local community, raise awareness first.

2. They didn't know they could:

   - They stopped reading the RFCs before getting to RFC 9224.

3. They don't want/feel they need to:

   - They only care about the local community, who have been informed out-of-band.

4. They can't:

   - Adding it requires approval at Layer 9 which is not always feasible.

Stealth RDAP: why does it matter?

1. Effectively all RDAP clients use the IANA registry, so not adding the URL adds friction, even to users who have a close relationship with the registry operator.

2. There's a lot of legacy code that depends on WHOIS.

   a. The decision to update it to use RDAP is an economic one: is it worth the cost?

   b. If a large part of the ecosystem still appears to only run on port 43, it slows the transition to RDAP.

   c. ccTLDs are putting the effort into implementing RDAP but a lot of that effort is wasted by not taking the final step and registering the service.

3. RDAP is better than WHOIS, so life on the Internet is worse all the time people are forced to use port 43.

Adding a URL to the registry

TLD administrators can request addition of a Base URL through the Root Zone Management System at:

https://rzm.iana.org

It takes a couple of minutes to submit the change request which will usually be processed within 24 hours.

Then you get a nice green **Yes** in your row on deployment.rdap.org :)

Questions?

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