DNS Error Reporting

Roy Arends

What is the problem

The DNS is

loosely connected
fault tolerant
configure and go

Any warnings and errors are buried in the logs of recursive resolvers

Then came DNSSEC

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~~fault tolerant~~ error prone
configure and ~~go~~ stay

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Then came DNSSEC

What is the problem

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figu ~~ge~~ ay

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Then came DNSSEC

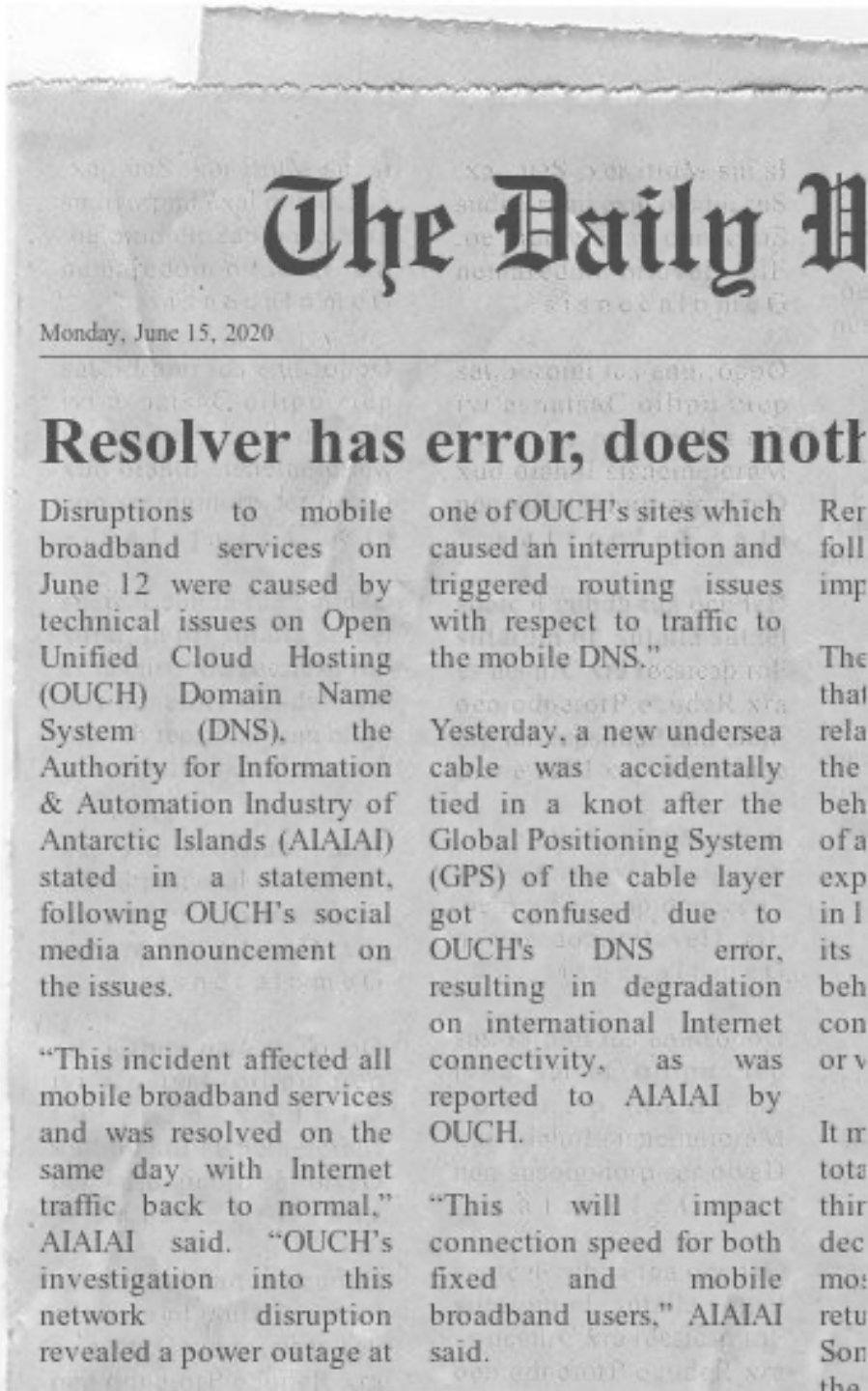
What is the problem

Any warnings and errors are buried in the logs of recursive resolvers

Problem Statement

Resolver encounters an error

does nothing



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Resolver has error, does noth

Disruptions to mobile broadband services on June 12 were caused by technical issues on Open Unified Cloud Hosting (OUCH) Domain Name System (DNS), the Authority for Information & Automation Industry of Antarctic Islands (AIAIAI) stated in a statement, following OUCH's social media announcement on the issues.

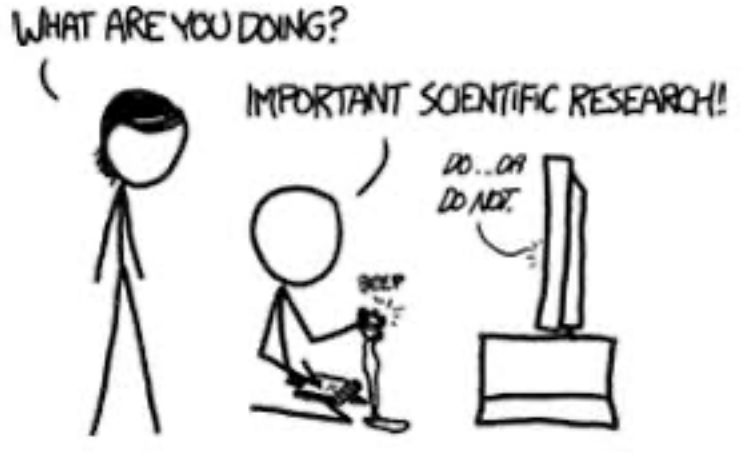
"This incident affected all mobile broadband services and was resolved on the same day with Internet traffic back to normal," AIAIAI said. "OUCH's investigation into this network disruption revealed a power outage at one of OUCH's sites which caused an interruption and triggered routing issues with respect to traffic to the mobile DNS."

Yesterday, a new undersea cable was accidentally tied in a knot after the Global Positioning System (GPS) of the cable layer got confused due to OUCH's DNS error, resulting in degradation on international Internet connectivity, as was reported to AIAIAI by OUCH.

"This will impact connection speed for both fixed and mobile broadband users," AIAIAI said.

What if …

… the resolver can notify the operator and domain owner?



Requirements

- Reporting should be lightweight.
  - The camel is hurting
- Should not rely on additional complexities
  - No email, no PDFs, no whois lookups, no shaming
- Should not have any guesswork
  - No guessing who owns what domain
  - No guessing what the cause of a failure may be
  - No heuristics, trial & error, etc.

How?

- Send an error report

Where?

- Can’t send it to the authoritative server of the broken domain.
  - Its broken

- Can’t send it to the owner of the domain.
  - No clue who that is.
    - don’t want to burden the poor resolver with secure whois/rdap and rich email client

How?

- Send an error report

Where? (continued)

- Introducing

Reporting Agent

How?

- Send an error report to a Reporting Agent
  - This error report is just another query
- How does the resolver learn about the Reporting Agent?
  - Don’t want to do another round trip to the broken server
- Via EDNS0 option
- Resolver indicates support
- Server includes Reporting Agent Domain in EDNS0 option

Then what?

- on error:
  - Resolver sends query bad-qname._er.a01.error.com
  - ”a01.error.com.” (reporting agent) learned via EDNS0 option
  - + plus prepend qtype & error…., but you get the idea

7.1.bad-qname._er.a01.error.com

- Responses can be cached, and caching helps against sending too many reports

- The reporting agent can be an intermediary dedicated to deal with these problems, analogy here is ”intermediaries” for DMARC

Does that work?

- The reporting part:
  - We have experience with _ta- (trust-anchor) reports being send to a dedicated nameserver, by appending rfc8145.research.icann.org. to a “trust anchor report”
- On the EDNS0 part:
  - EDNS0 options work, nothing new here.
- Many little caveats documented in the draft
  - Including security and privacy related

What else?

What is with the _er label?

- To have a separator between the reporting agent domain and the reported query.

What else is in the report ?

- qtype and the error.

What errors can be reported ?

- Extended-DNS-Errors
  - Extended-DNS-Errors are meant to inform the Stub-Resolver why a name could not be resolved.
  - Our idea is to inform the domain-owner or operator of an error.

Questions