DNS(SEC) Views

https://dnssecviews.net

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Motivation

- Securing DNS zones is fairly straightforward
- Authoritative nameservers provide consistent data

HOWEVER

- Users rely on recursive resolvers
- Recursive resolvers follow different policies
- Timing, caching, multiple signers, etc. influence propagation
- Data from multiple sources may be combined to validate signed records
- Infrastructure providers are interested to know how their services are observed by users

We have been monitoring this through SecSpider (https://secspider.net/)

That’s why we built the DNS(SEC) Views!
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Goal: understand how the distributed nature of DNS and its eventual consistency (temporal aspect) is observed by and affects users

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Use Case: Multi-Signer DNSSEC

Common KSK Set, Unique ZSK Set per Provider

- Owner
- KSK
- Provider1
  - ZSK1
- Provider2
  - ZSK2
- Provider3
  - ZSK3

Unique KSK Set and ZSK Set per Provider

- Owner
- KSK1
- ZSK1
- Provider1
- KSK2
- ZSK2
- Provider2
- KSK3
- ZSK3
- Provider3

To verify correct deployment observations from various vantage points should simultaneously be collected.
System Overview

RIPE Atlas

Database

Persist and query

Front End

RESTful API

Schedule Measurements

Listen for results

Register Zone

Observe Stats

Infrastructure Operator
Approach: Collect Data

1. Find zone apex
2. Schedule regular measurements via RIPE Atlas for following records:
   ○ DNSKEY
   ○ DS
   ○ NS
   ○ SOA
3. Parse and serialize data into the DB iff:
   ○ Response is valid
   ○ Response is signed

Executed by a set of random probes (currently only US)

Also record when each probes sees which RRSet and RRSIG
Approach: Provide Analysis

For any given zone:

1. Calculate different combinations of observed DNSKEY sets and active keys in use.
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2. Color code each combination and calculate when each probe sees which combination.
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2. Color code each combination and calculate when each probe sees which combination.
3. Analyze for specific events or deployment models: ongoing key transitions, multi signer DNSSEC, etc.
Conclusion

- There is a measurable discrepancy between records at authoritative name servers and what recursive resolvers deliver
- DNS(SEC) Views gives operators the opportunity to follow their DNSSEC deployment from the perspective of clients in real time
- Aggregated data can be used to improve deployment practices and figure out acceptance criteria