Rolling with Confidence

Managing the Complexity of DNSSEC Operations

Extended Abstract

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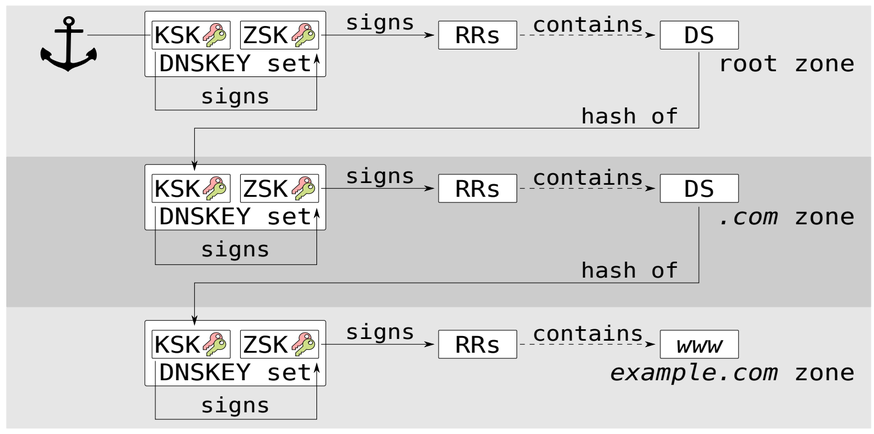
- DNSSEC secures the DNS, using public-key cryptography
- DNS operators need to roll their keys (KSK or ZSK), in case of a:
  - key compromise
  - key management policy
  - algorithm change
- Errors during a rollover can have a massive impact on the availability of a domain

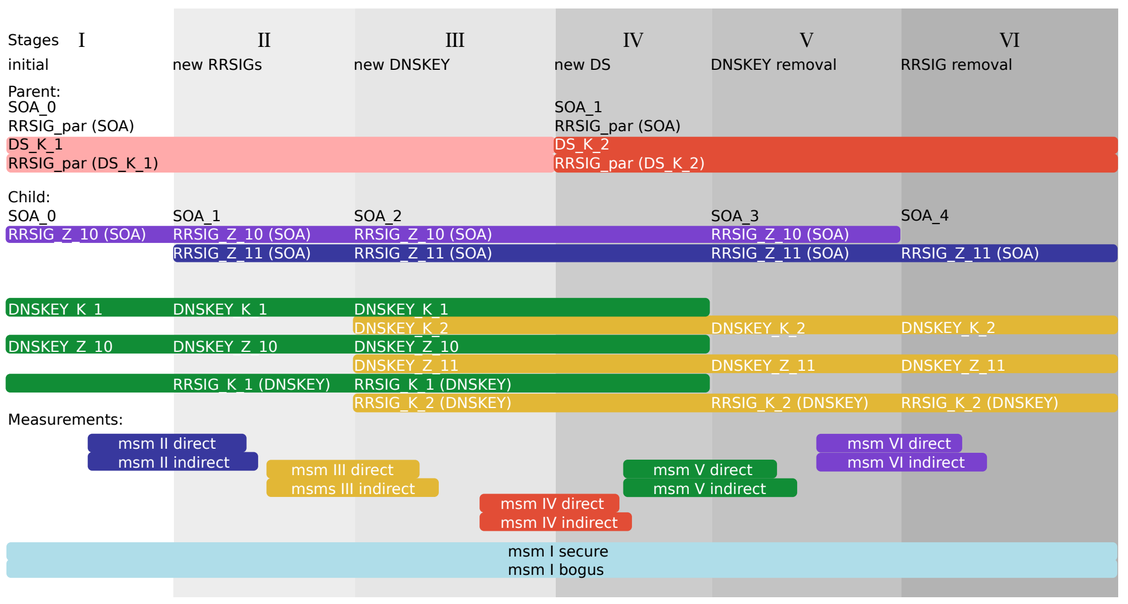


The DNSSEC chain of trust

Right timing is crucial

- DNS recursive resolvers cache records
- Keys withdrawn too early can lead to validation errors
- DNSSEC keys need to be rolled in stages
- It is safe to move to the next stage after:
  - every name server serves the new records (publication delay)
  - and every resolver has the new records in cache (propagation delay)

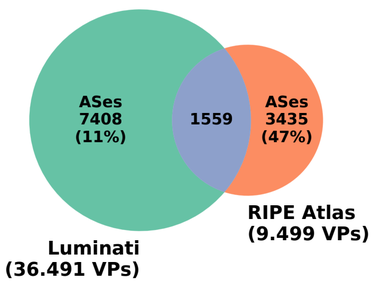
Our methodology lets operators define the correct timing and to roll with confidence



Algorithm rollover stages according to RFC6781

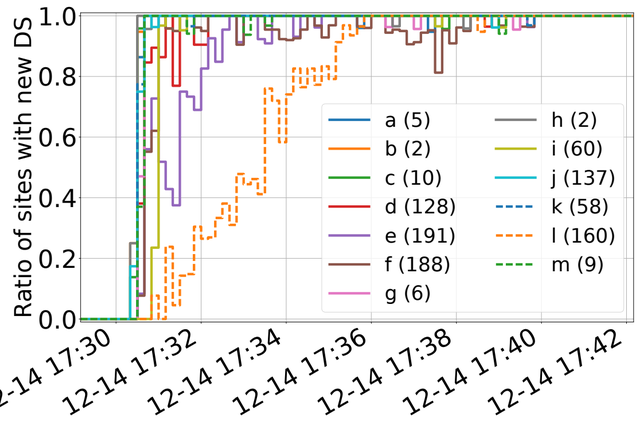
How to monitor a DNSSEC algorithm rollover - the .se use case

- We monitor the algorithm rollover of the Swedish ccTLD .se
- Any error would make 1.4 M domains unavailable
- At each stage: Monitor the propagation and publication delay, and the trust chain to validate the deployment
- Using RIPE Atlas and Luminati
- >46.000 vantage points (VPs)



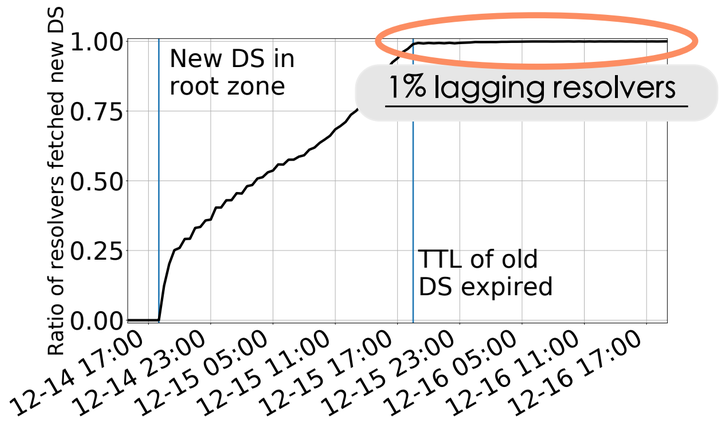
Example: Stage IV - Replacing the DS at the root

Publication Delay



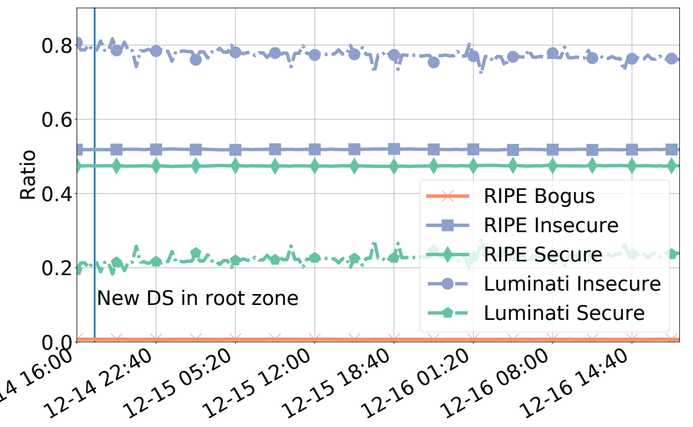
- Delay at the root servers 10 minutes

Propagation Delay



- Delay at some VPs 24h longer than expected

Trust Chain



- No validation errors during the rollover

.se Rollover was a success!

- We will make the measurement methodology and measurement tool available
- We also monitor the, even more critical, KSK rollover of the root: rootcanary.org

Read our blog post for more details:
http://bit.ly/2tsCjbM

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