Choosing Sensible Signer Parameters

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What Parameters?

- We’re talking here about technical parameters
  - key sizes, algorithms, rollover schedules
  - authenticated denial of existence
  - signature validity periods
- We’re not talking about key management policy

Key Algorithm

- What algorithm?
  - RSASHA1 is mandatory to implement
  - RSASHA256 is used in the root zone
  - hard to recommend alternatives, unless there are layer-9 reasons not to use RSA
  - both RSASHA1 and RSASHA256 are reasonable choices

Key Sizes

- Cryptographers suggest that 1024 bit RSA keys are safe to use for the next 5 years
- ZSKs are easier to roll than KSKs
- KSKs are exercised less frequently than ZSKs
- KSKs are harder to roll, since they involve parents
  - using a 2048 bit KSK does not seem bad

ZSK Rollover

- ZSK rollover can be automated, so it's not painful to do
- Replacing keys provides an opportunity to reset your documentation trail and key management processes
- Silly to roll the ZSK too frequently, but doing it a few times a year seems prudent

KSK Rollover

- Rolling a KSK will invariably involve manual interaction with a parent zone
- You might consider that given the cost of the operation you might only plan to roll your KSK when you need to (i.e. when there is a suspicion of compromise)
- Remember however that operational procedures are difficult if you don't practice them

Non-Existence

- NSEC is simpler to understand than NSEC3, and hence easier to troubleshoot
    - but more overhead than NSEC3 with opt-out
    - NSEC facilitates zone-walking
- NSEC3 with opt-out may be the best option for large zones and zones with privacy concerns

Signing Parameters

- Every RRSIG is a ticking time bomb!
    - choose your parameters wisely
- The parameters described in the slides which follow are based on elements in the OpenDNSSEC KASP

Resign Interval

- The interval between successive runs of the OpenDNSSEC signer engine
  - it is generally not harmful to run the signer engine fairly frequently
  - signatures can be re-used in many cases

Signature Refresh

- Signature Refresh is the minimum remaining validity of any signature in your zone
- How much time do you estimate would be needed to recover from a catastrophic failure in your signer infrastructure?
    - double it, add some more

Signature Validity

- Signatures remain valid for use by a cache until they expire
  - a stolen signature can be used as an attack vector
  - the maximum validity period is hence the window of opportunity for such an attack
  - longer than the refresh interval

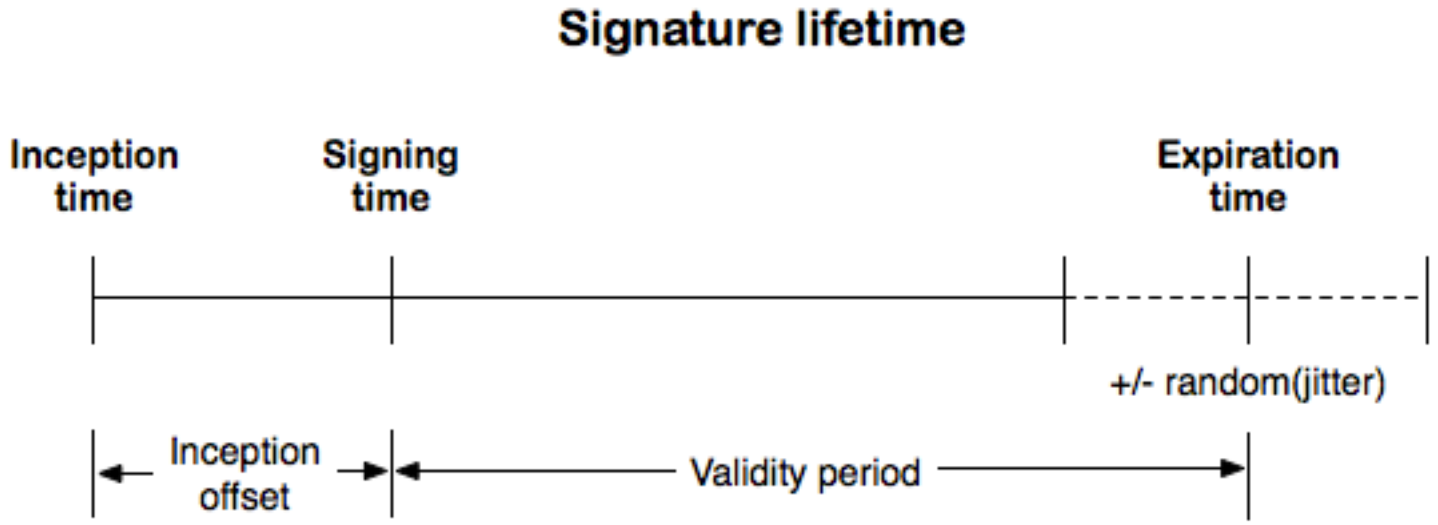
Jitter

- You can spread your signing load more evenly by applying jitter to signature inception and expiration times
  - times will be shifted by a random amount within +/- the value specified
  - ensure that the worst-case jitter does not present operational risks

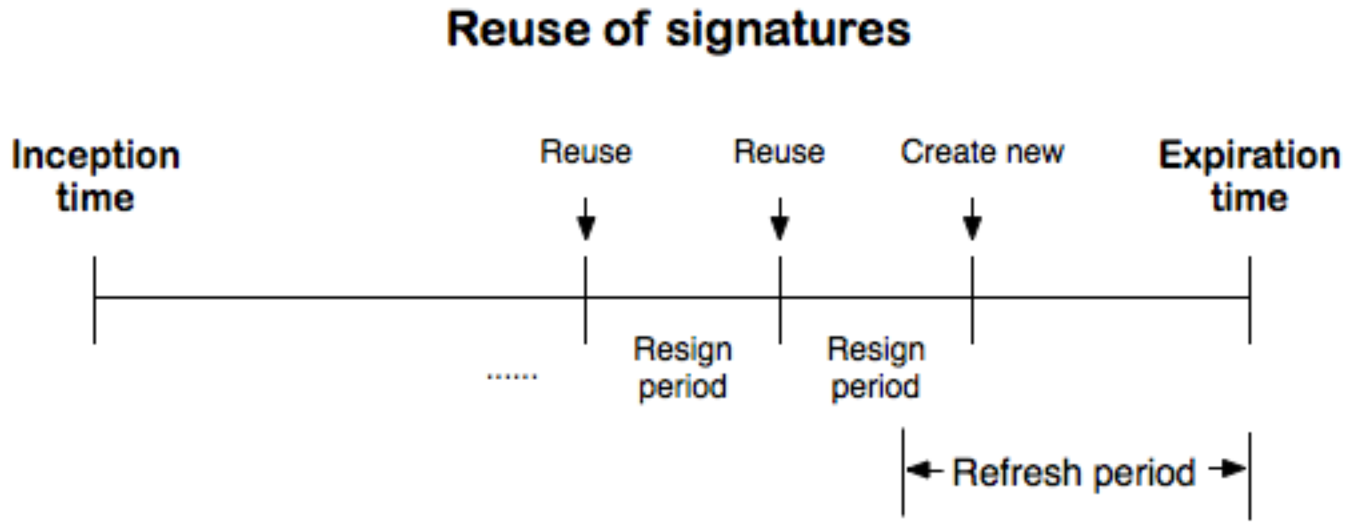
Inception Offset

- It’s prudent to specify a signature inception time which is in the past
  - even if your clocks are accurate, validators run by others might not be
  - the window of opportunity to exploit a signature in the past is, well, past

Signature Lifetime



Re-Use of Signatures



TTL Parameters

- The DNSKEY RRSet TTL determines how long your keys might be cached elsewhere, and is relevant for rollover scheduling
- The SOA RRSet TTL determines (with the MINIMUM field) the negative cache TTL, and since OpenDNSSEC generates the SOA, we need to specify both in the KASP

Further Reading

- http://trac.opendnssec.org/wiki/Signer/Using/Configuration/kasp
- http://tools.ietf.org/html/draft-ietf-dnsop-dnssec-key-timing-02