RIPE NCC
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Deployment of CDS

Automating DNSSEC maintenance

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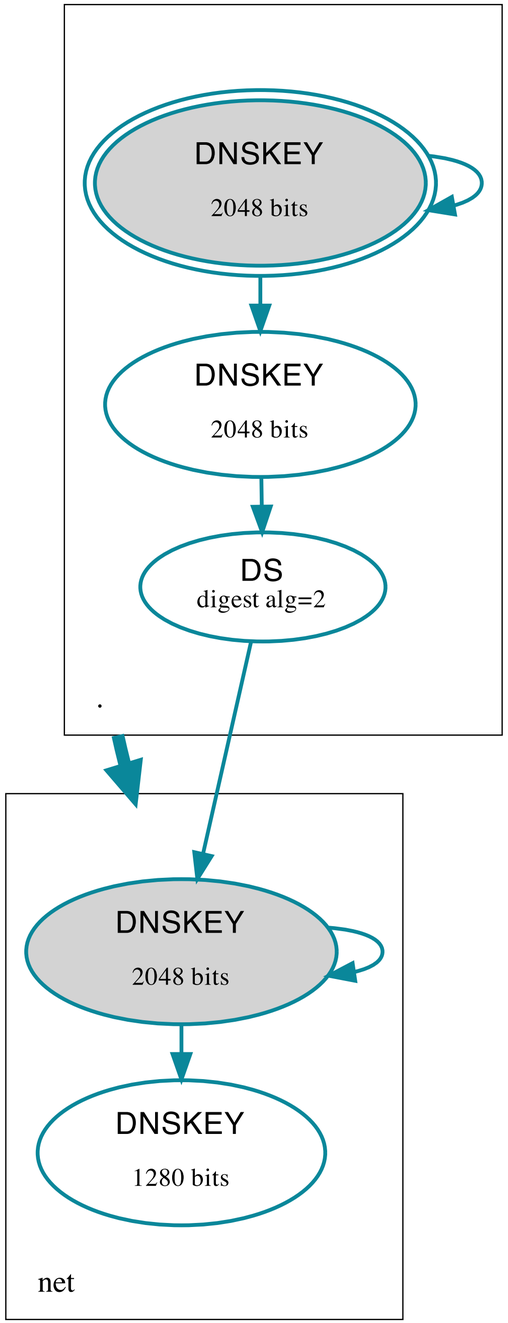
Trust model of DNSSEC

- Every zone is an *island* with its own signatures and public keys
- Trust is delegated from the parent zone by DS records
- DS records are unique for particular **key**, **hash function** and **zone name**

```
DS = hash(DNSKEY + zonename)
```



Updating the DS records

- Submit DS records directly
  - via *Extensible Provisioning Protocol* if you are a *registrar* and parent is a *registry*
  - via e-mail, web interface, or custom API to your *registrar*
  - as a *zonelet* containing the DS records if your parent uses plain zone files
- Submit DNSKEY and let the parent calculate DS
  - the **only supported option** for some TLD *registries* like .eu or .cz
  - allows **easy key sharing** between different domain names
  - allows parent to be in control of the used **hashing algorithm**

Use of CDS/CDNSKEY records

- In-band signalling for change in parent delegation
- Child publishes desired state of DS records in the zone
  - SHOULD publish both CDS and CDNSKEY and they MUST match
- Parent consumes either CDS or CDNSKEY
  - the CDS content replaces current DS set
  - no CDS means no update
  - a special DNSSEC Delete algorithm for removing DS records
- Bootstrapping from insecure to secure
  - usually by TCP queries to all authoritative servers over a longer time period

Registries supporting CDS

Registry	CDS	CDNSKEY	Delete	Bootstrap from insecure	Notes
.cz	✗	✓	✓	7 days TCP-only	FRED is used
.cr	✗	✓	✓	7 days TCP-only	No info found; FRED is used
.ch	✓	✗	✓	72 hours TCP-only	
.li	✓	✗	✓	72 hours TCP-only	
.sk	✓	✗	✓	72 hours	No clear information about using TCP for bootstrap
RIPE NCC	✓	✗	✓	No support	

DNS providers supporting CDS

Provider	CDS	CDNSKEY	Delete
Cloudflare	✓	✓	✓
DNSimple	✓	✓	
GoDaddy	✓	✓	
Google Domains			

Self-hosted DNSSEC solutions

- CDS publishing supported in **Knot DNS**, **BIND9**, **PowerDNS**
- **Fully automated** KSK rollovers in Knot DNS
- Manual intervention needed to finish the key rollover in others
- All of them publish both CDS and CDNSKEY records

```
DS check, outgoing, remote ::1@53, KSK submission check: positive
DS check, outgoing, remote 2001:4860:4860::8888@53, KSK submission check: positive
DS check, outgoing, remote 2606:4700:4700::1111@53, KSK submission check: positive
DNSSEC, KSK submission, confirmed
DNSSEC, signing zone
DNSSEC, key, tag 12829, algorithm ECDSAP256SHA256, KSK, public, active
DNSSEC, key, tag 55288, algorithm ECDSAP256SHA256, KSK, public, active+
DNSSEC, key, tag 39374, algorithm ECDSAP256SHA256, public, active
DNSSEC, signing started
DNSSEC, zone is up-to-date
```

Parent-side software

- dnssec-cds
  - part of BIND9 meant to keep DS *zonelets* up to date
  - can read both CDS and CDNSKEY records
  - can produce a script for `nsupdate` utility
- parts of FRED registry
  - `fred-akm`: scanning management
  - `cdnskey-scanner`: the actual scanner worker
  - `akm-multi-scanner`: next generation scanner
  - probably hard to reuse outside FRED *registry*

Adoption slowly grows

- CDS updates are well supported in DNSSEC software
  - confirmed with RIPE NCC CDS scanner: there are **already users out there**
- Single, standard way to perform updates seems beneficial even for ***registrars*** with EPP access to *registries*
  - there are many incompatible dialects of EPP
- List of *registries* is *slowly* growing
- Join the **CDS Updates** channel on DNS-OARC Mattermost

Questions

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