#### **Automated DNSSEC**

Ulrich Wisser Technical Engagement Manager, Europe

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### Security by DNS





SPF DKIM DMARC DANE





# 50% of all TLS certificates are issued by Let's Encrypt

# How are they verfied?



### **Security for DNS**



## DNSSEC

#### Signing your domain



## Signing

example.com. 300 IN A 127.0.0.1

example.com. 300 IN A 127.0.1.1

example.com. 300 IN A 127.1.1.1

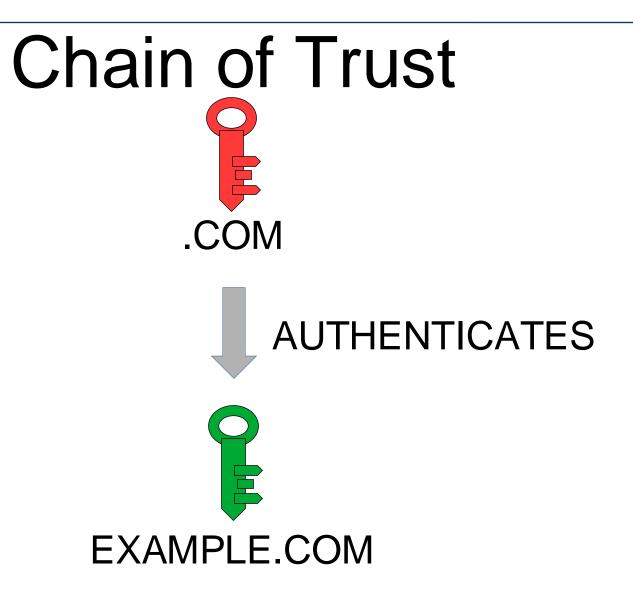
example.com. 300 IN RRSIG A 13 2 300

**20221103191825** 20221020174825 12345

gtdS0mpgFKzZAYw4FfBOHkhVHrS3cLZFU...==

# **DNSSEC Problems**

Needs constant refresh of data (signatures)
 SOLVED with modern name server software





## **DS** Records

#### example.com. 300 IN **DS** 31406 13 2 F78CF3344F72137235098ECBBD08947...

# **DNSSEC Problems**

- Needs constant refresh of data (signatures)
  SOLVED with modern name server software
- Needs to sync with parent on key introduction/roll-over SOLVED but not widely implemented (yet)



### **RFC 8078 - Managing DS Records from** the Parent via CDS/CDNSKEY

- A child zones publishes CDS / CDNSKEY records
- CDS has exactly the same format as DS RR
- CDNSKEY has exactly same format as DNSKEY RR
- The parent zone (or other parties who can change the zone)
  scan actively for CDS / CDNSKEY (at the child apex)
- The parent zone gets updated with a new DS RRset

### **RFC 7477 - Child-to-Parent Synchronization in DNS**

- A child zones publishes CSYNC records
- The parent zone or other parties who can change the zone scan actively for CSYNC (at the child apex)
- The parent zone gets updated with a new RRset



## Updating policy

RFC 8078 gives several different ways of doing this Most common so for "Accept after Delay"

#### DS in parent: NO

several vantage points use TCP/IP same results over several 3 days

#### **DS in parent: YES**

several vantage points correctly signed

Make sure domain stays resolvable with new DS record(s)

#### Who can run a scanner?

- ccTLDs operate under their own rules These rules decide if the registry can update domains and deploy dnssec automation
- gTLDs are under contract with ICANN gTLDs can not update domain information registrars can deploy dnssec automation



#### **DRAFT - Generalized DNS Notifications**

https://datatracker.ietf.org/doc/draft-ietf-dnsop-generalized-notify/

- Parent publishes a DSYNC record
- DSYNC record specifies where to send a notify
- Child sends notify to initiate scan



### DRAFT - Automating DNS Delegation Management via DDNS

https://datatracker.ietf.org/doc/draft-johani-dnsop-delegation-mgmt-via-ddns/

- Builds on "Generalized DNS Notifications"
- Defines a new scheme
- Updates get signed with a SIG(0) signature
- Describes method for bootstrapping



## Security and Stability Advisory Committee (SSAC)

#### **SAC126 DNSSEC Delegation Signer (DS) Record Automation**

https://itp.cdn.icann.org/en/files/security-and-stability-advisory-committee-ssac-reports/sac-126-16-08-2024-en.pdf





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