DANE

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Workshop „E-Mail-Sicherheit: Was Provider beitragen können“

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DNSSEC since 1999

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DNSSEC for .SE in 2007

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Root DNSSEC in 2010

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Swedish e-Id Scheme

SOU 2010:104

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RFC 6698

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DANE

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Why DANE?

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Constrained trust

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Keep PKI on a leash

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Why?

In theory PKI is simple

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Issuance

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Revocation

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Validation

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In practice, PKI is complex

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Identity proofing via insecure channels

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No name constraints

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Relaxed revocation checks

Limit trust in PKI using DNSSEC

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Limit the amount of damage that a CA can do

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Bridge trust using DNSSEC

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Validate identity without the legacy PKI

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If DNS is used for identity proofing …

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… and DNSSEC provides

data origin authentication,

why involve another

3rd party?

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How DANE?

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TLSA

Provides bindings of keys to
domains that are asserted by DNS

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CA Lock

- TLSA enumerates acceptable CA certs
- Only accept certificates under a specific CA
- Optionally used together with classic PKIX

Protects against CA malpractice

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Certificate Lock

- TLSA enumerates acceptable certificates for end entities (servers)
- Only accept specific certificates
- Optionally used together with classic PKIX

Addresses the problem with fraudulently issued certificates

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Self-signed Certificates

- Self-signed key pair certified by the user, or by a private CA

Enables TLS without depending on existing PKI infrastructure

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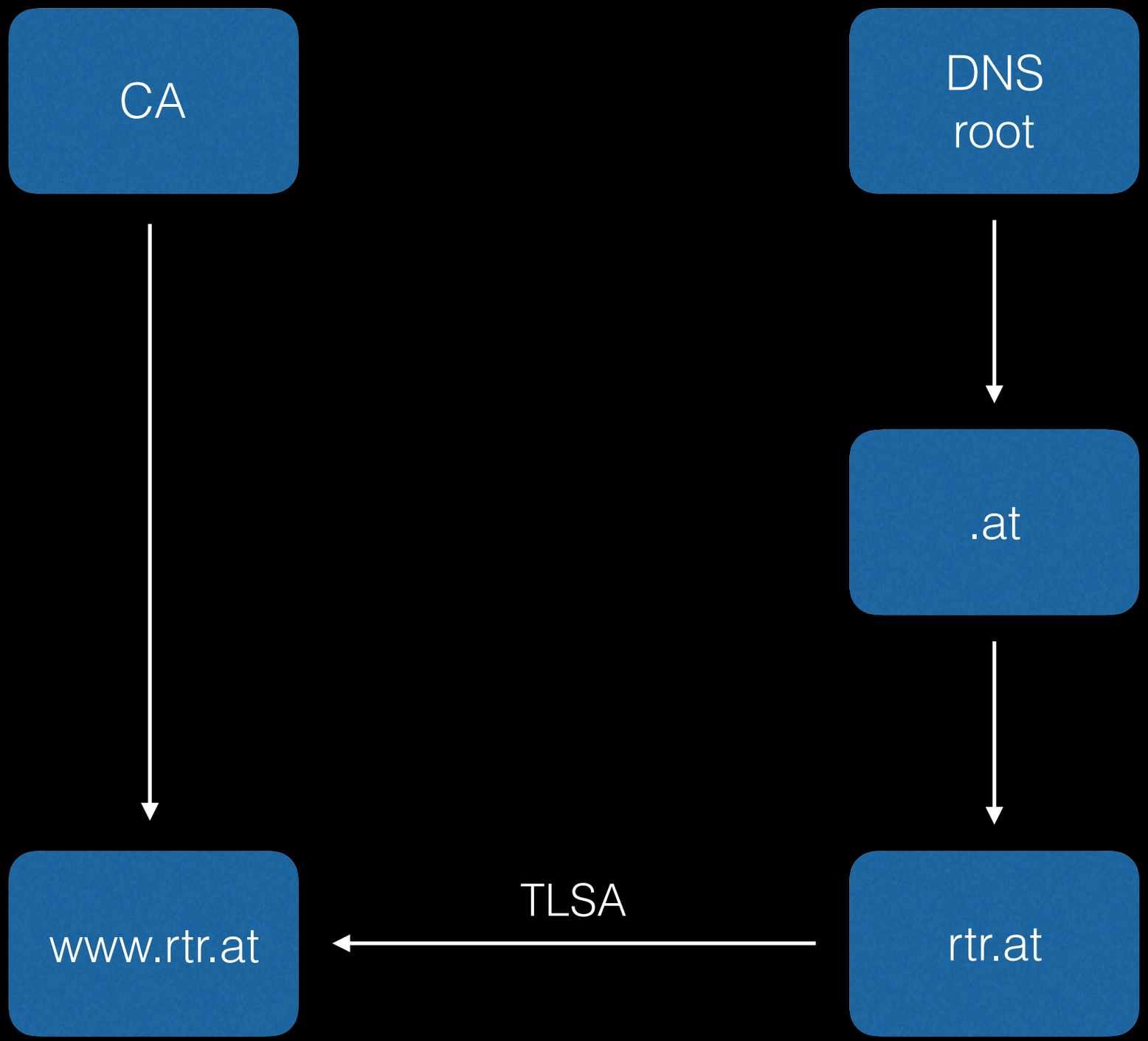

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	PKI	DANE
Authentication	DNS for identity proofing	DNSSEC when used
Revocation	OSCP / CRL / CT	DNSSEC
Validation	PKIX	PKIX & DNSSEC

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DANE for Mail Transport Security

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How does SMTP authentication & encryption work today?

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Not

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Or rather…

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Opportunistic

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No widespread deployment of universal trusted certificates

No endpoint validation

Depending on trust in DNS and routing

RFC 7672

SMTP Security via Opportunistic DNS-Based Authentication of Named Entities (DANE) Transport Layer Security (TLS)

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Example: SMTP with DANE

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kirei.se

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MX for kirei.se ?

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spg.kirei.se

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TLSA for _25._tcp.spg.kirei.se ?

TLSA 3 1 1

Hash of the public key from the X.509 certificate for spg.kirei.se

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#win

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Multiple implementations

Postfix by Wietse Venema

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Halon SMTP platform

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Inbound

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Publish TLSA records in a signed DNS zone

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Outbound

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DNSSEC validation at mail egress

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Validate TLSA for outbound connections

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DANE for
End-to-end Mail Security

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PGP mostly used by the technical community

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S/MIME supported
by not widely deployed

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Why?

S/MIME requires certificates

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DANE for OpenPGP

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DANE for S/MIME

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Signed email

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Encrypted email

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Subjects are
email addresses

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jakob@kirei.se

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SHA2-256("jakob") [0:28]

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5205c624938881 49cb6953d0a542

kirei

5205c624938881 49cb6953d0a542
._smimecert.kirei.se.

kirei

SMIMEA 3 0 0

Full certificate for jakob@kirei.se

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Work in progress

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Local part processing

jakob@kirei.se

≠

Jakob@kirei.se

kirei

mariahilfer-straße@rtr.at

≠

mariahilfer-strasse@rtr.at

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jakob@kirei.se

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