Sunrise DNS-over-TLS! Sunset DNSSEC?

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ICANN DNS Symposium 2018

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Puzzlement over difference between DNSSEC and DNS-over-TLS

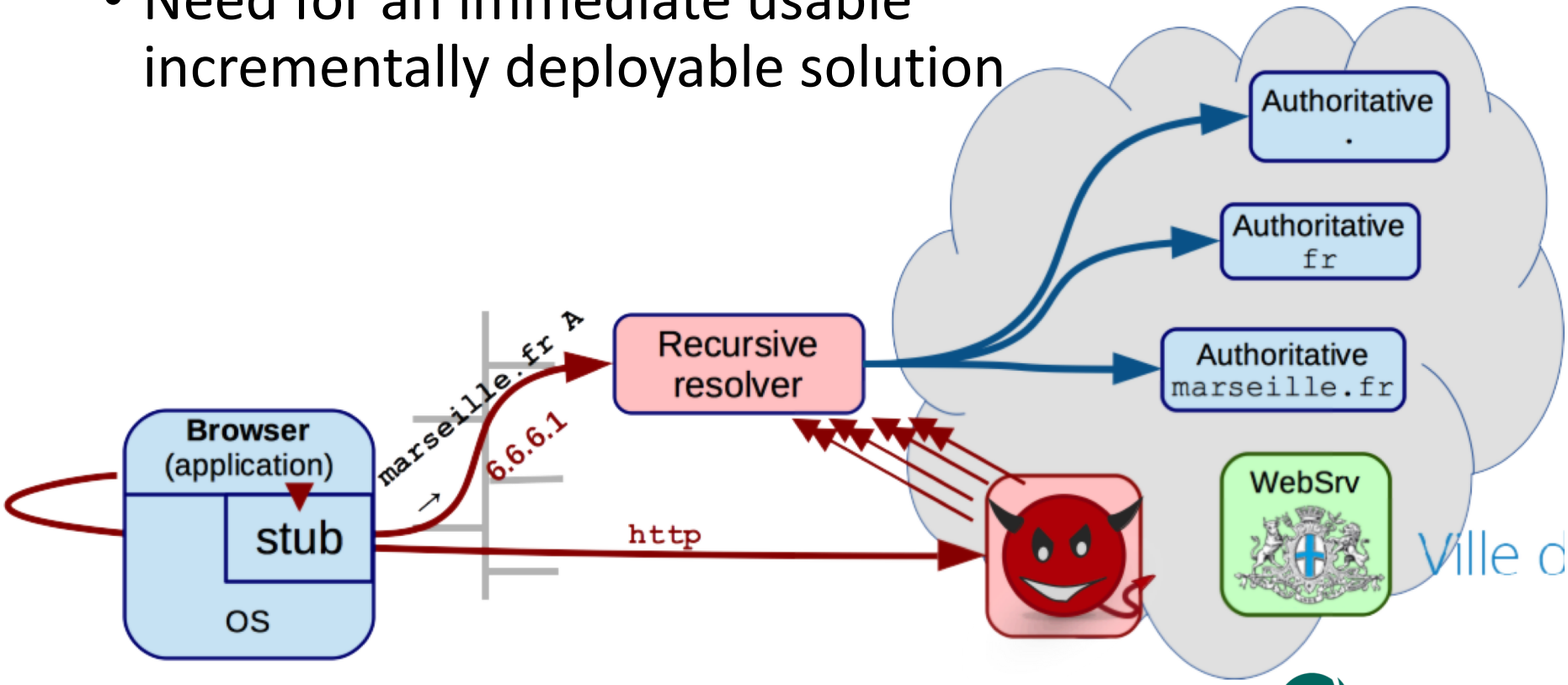
- DNSSEC Coordination dnssec-coord@elist.isoc.org:
  “People thought that using DNS-over-TLS meant they didn’t need to use DNSSEC. They have TLS, therefore are all good, right?”
- Twitter:
  “Will jump on DoH first, then see if dnssec is still needed.”
- draft-ietf-doh-dns-over-https:
  “In the absence of DNSSEC information, a DoH server can give a client invalid data in response to a DNS query. Section 4 disallows the use of DoH DNS responses that do not originate from configured servers. This prohibition does not guarantee protection against invalid data, but it does reduce the risk.”

DNSSEC

History, motivation, solution, properties and limitations

DNSSEC – History & Motivation

- UDP is easy to spoof
- Need for an immediate usable incrementally deployable solution



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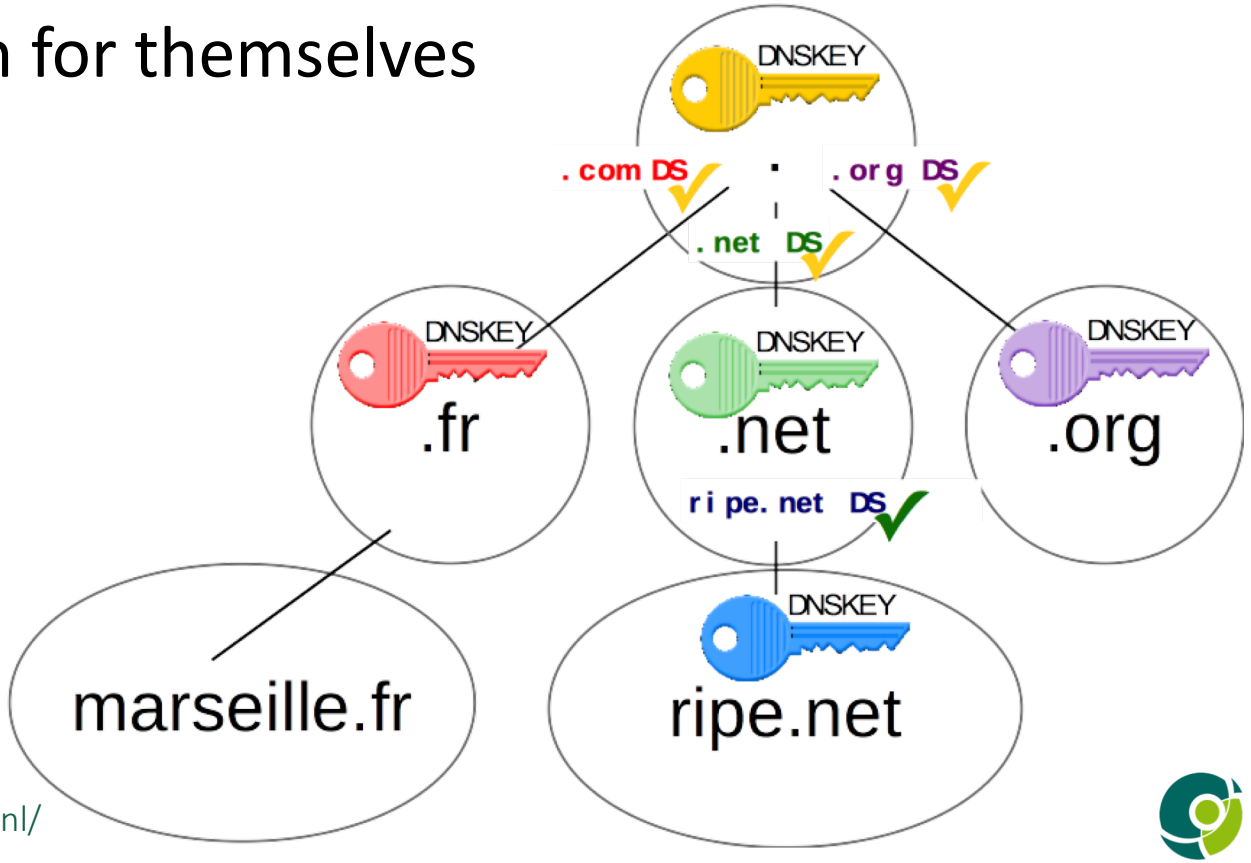
DNSSEC – The Solution

- Sign the zone content
- Child zones authorized *(by parent zone)* to sign for themselves



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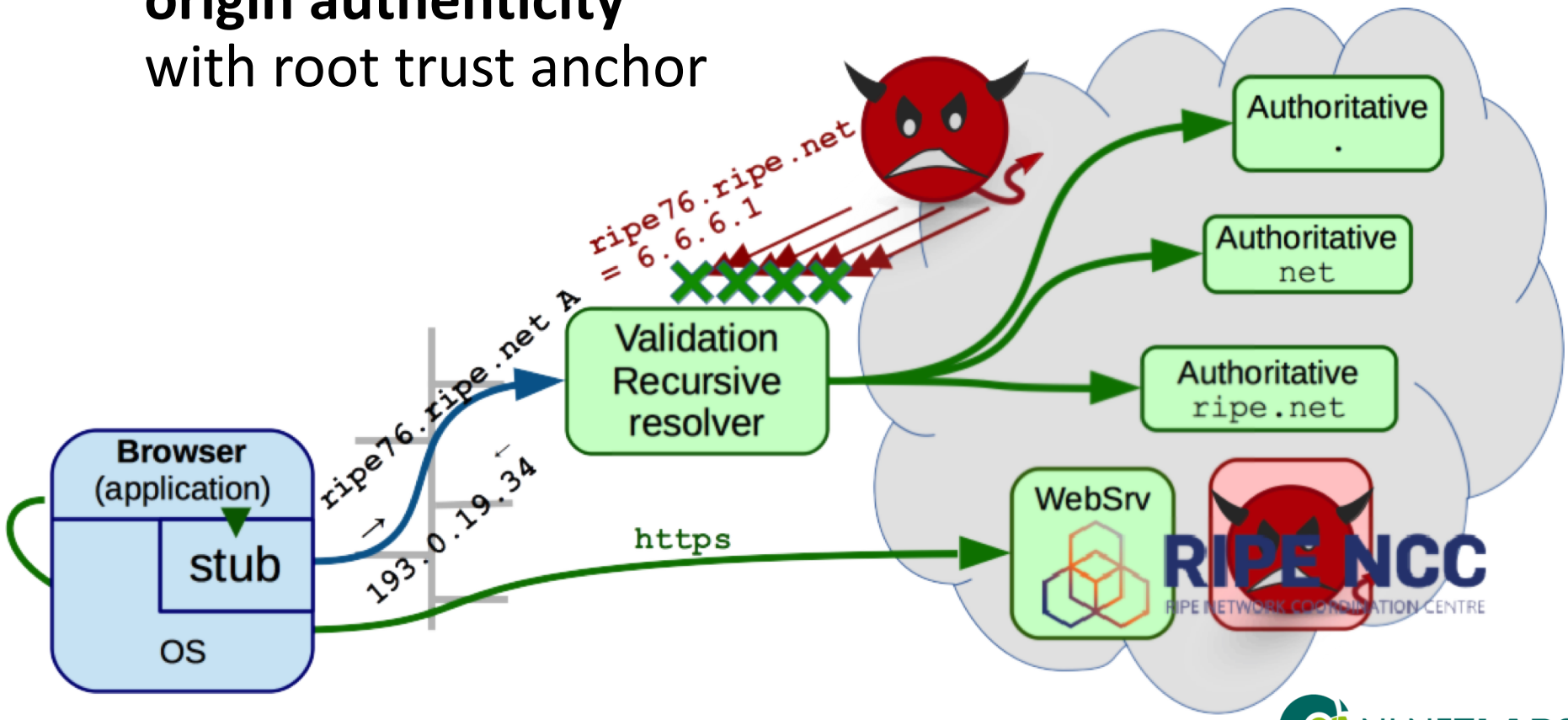
DNSSEC – The Solution (cont'd)

- Validating resolvers can verify **origin authenticity** with root trust anchor



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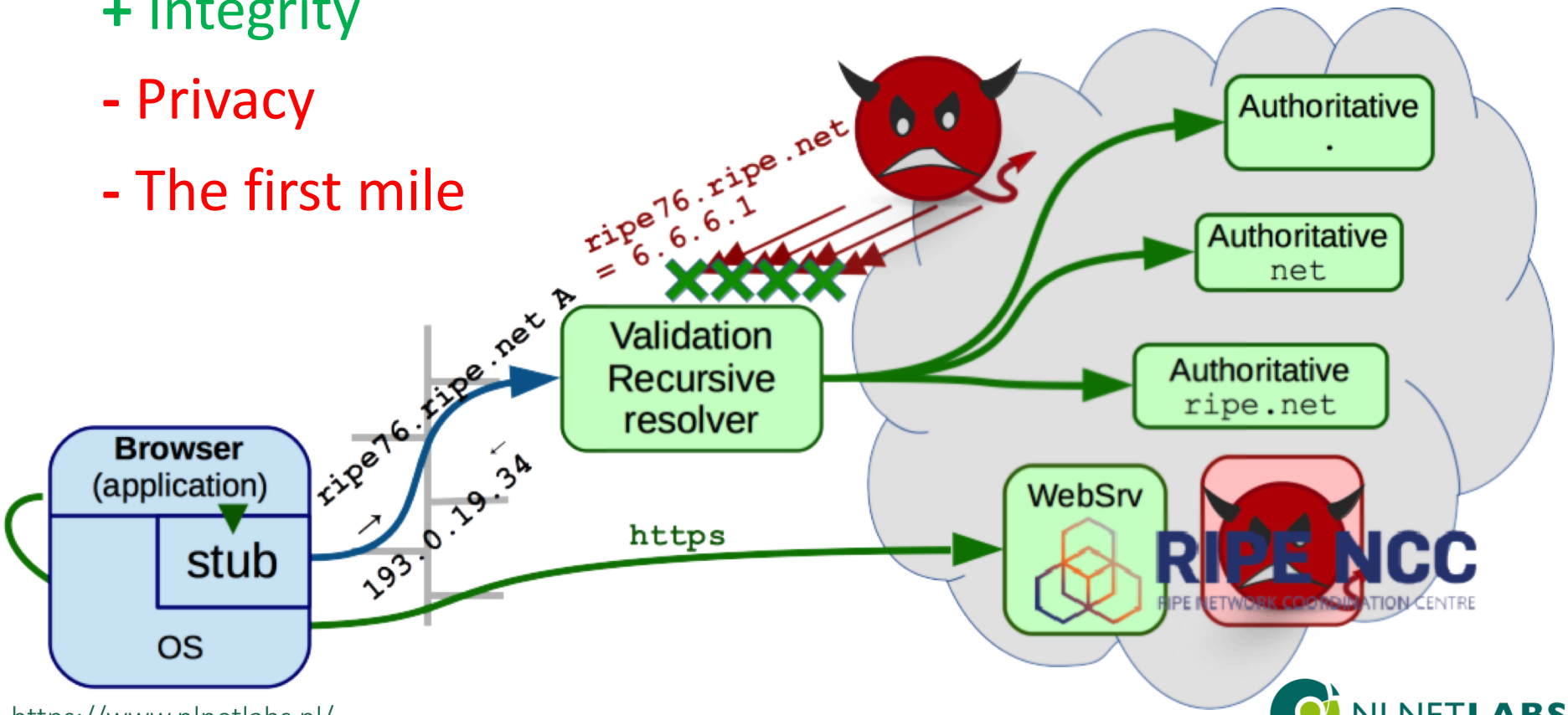
DNSSEC – Properties & Limitations

+ Origin Authentication
+ Integrity
- Privacy
- The first mile



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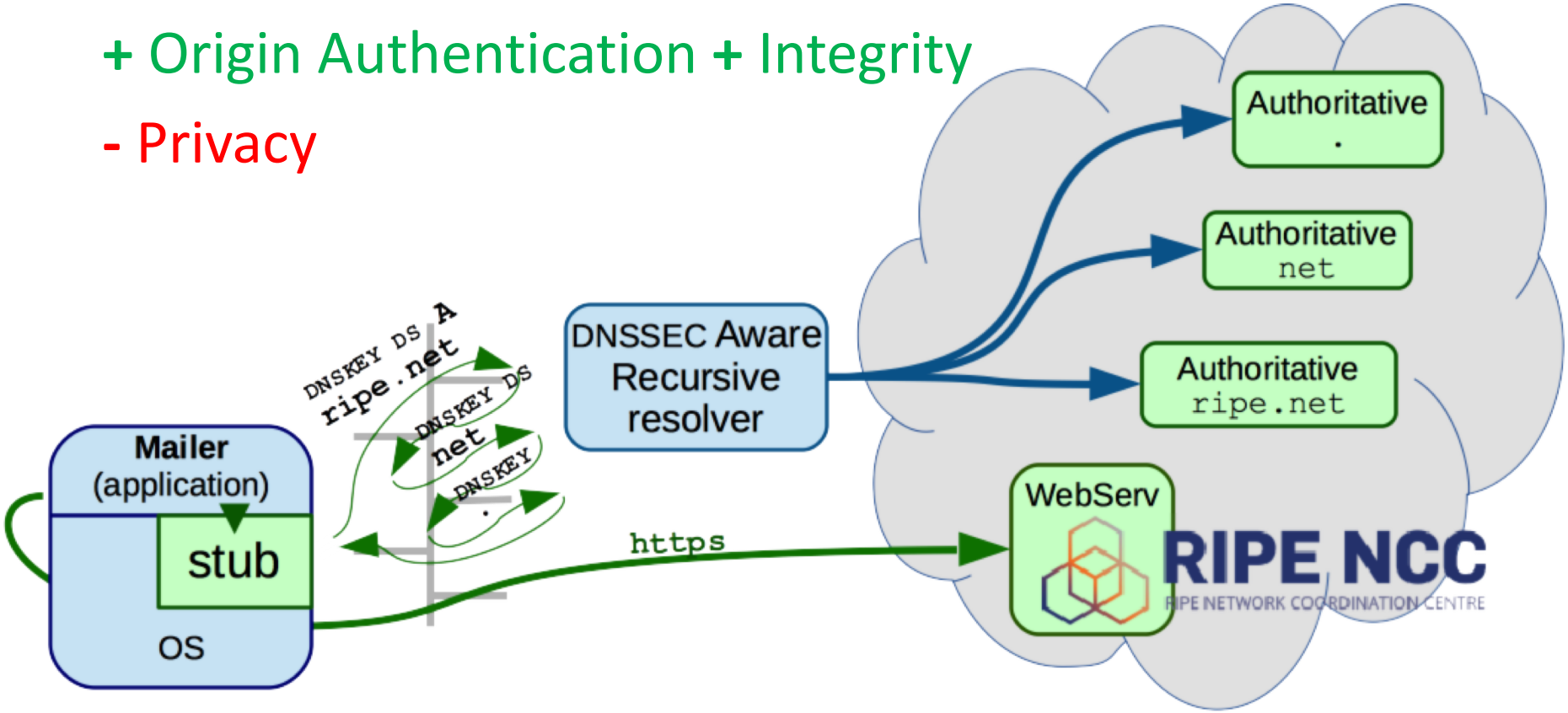
DNSSEC – Properties & Limitations (2)

+ Origin Authentication + Integrity

- Privacy



+ **Transitivity**

- Still first mile issues

https://www.nlnetlabs.nl/

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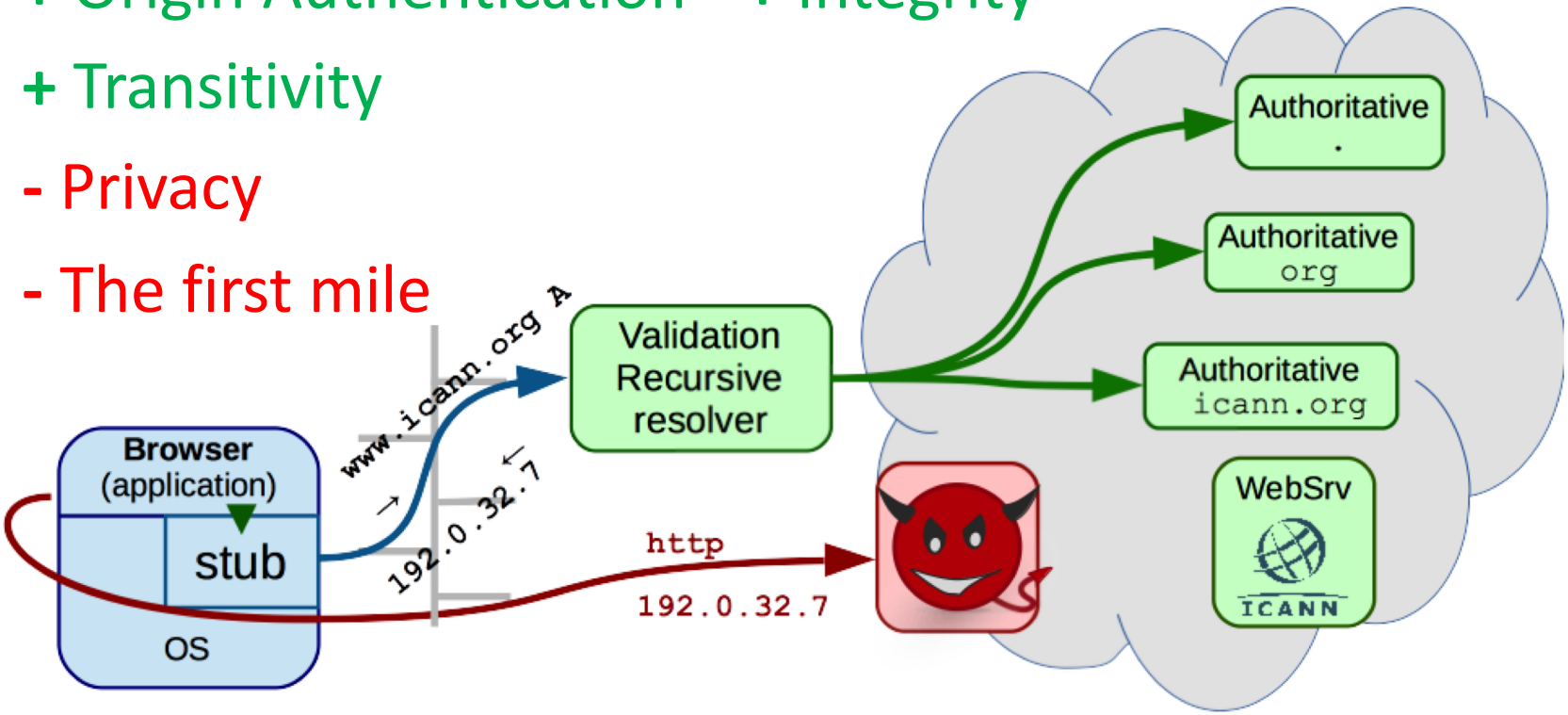
DNSSEC – Properties & Limitations (3)

+ Origin Authentication + Integrity

+ Transitivity

- Privacy

- The first mile



- Does not protect against address hijacking

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TLS

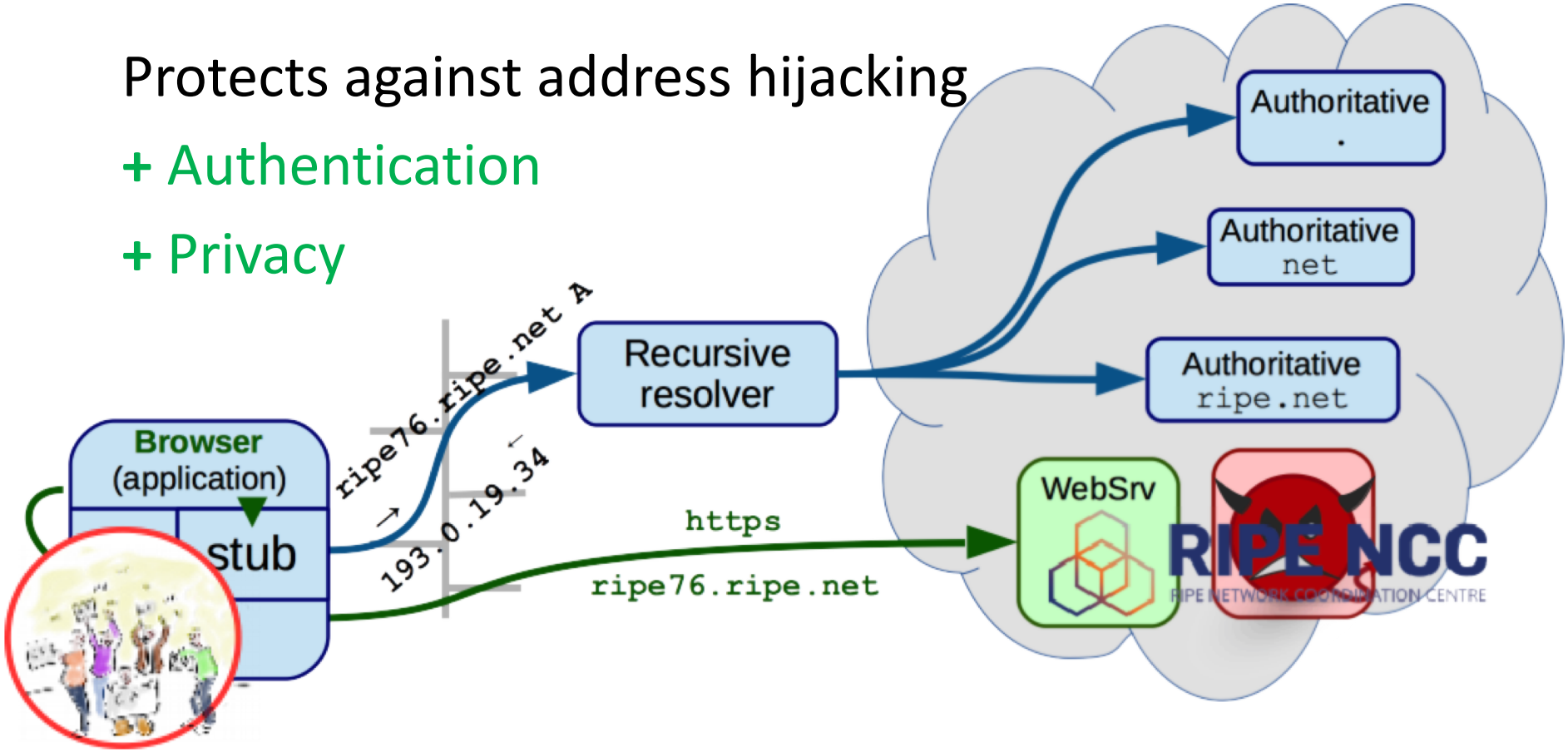
Properties and limitations

TLS – Properties & Limitations

Protects against address hijacking

+ Authentication

+ Privacy



DNSSEC not needed anymore

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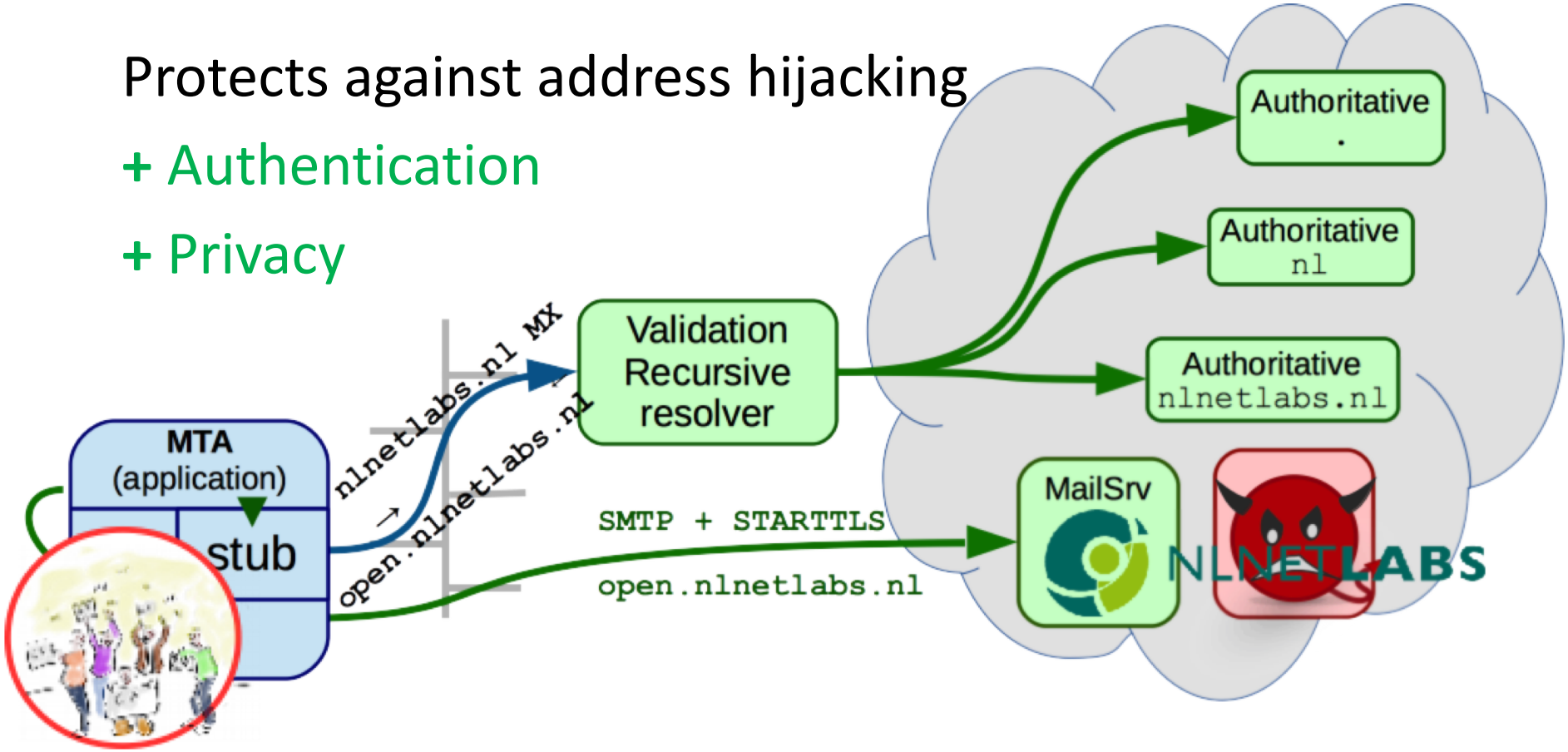
TLS – Properties & Limitations (2)

Protects against address hijacking

+ Authentication

+ Privacy



Except for name redirections

- MX, CNAME, DNAME, SRV, NAPTR, …

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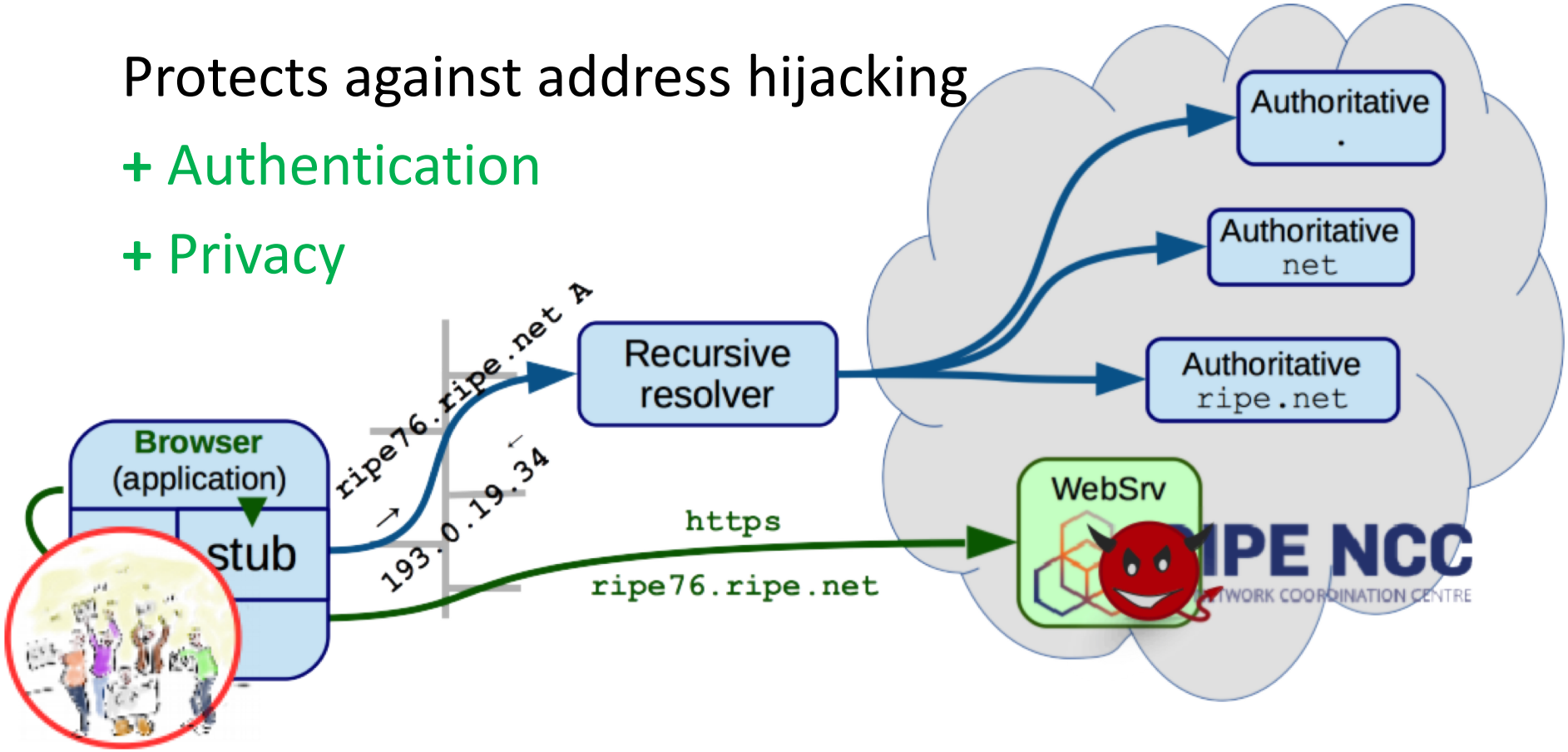
TLS – Properties & Limitations (3)

Protects against address hijacking

+ Authentication

+ Privacy



- Integrity when service provider ≠ content provider

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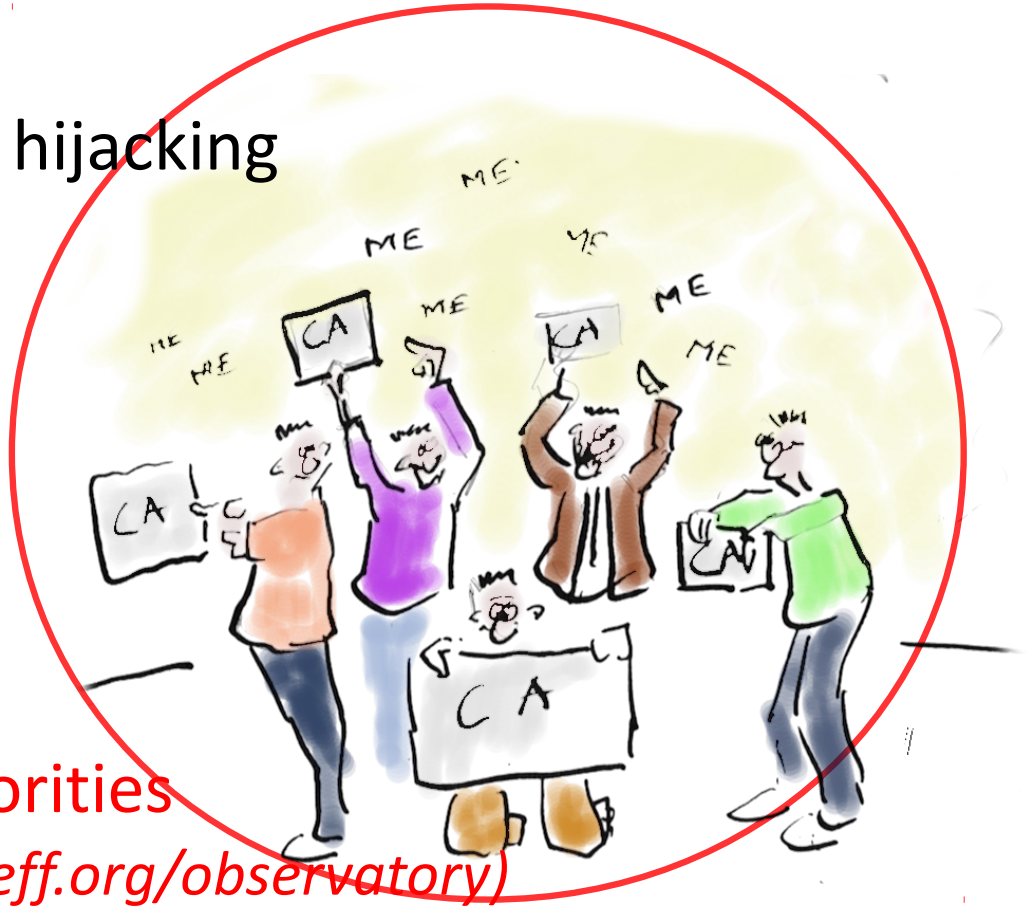
TLS – Properties & Limitations (4)

Protects against address hijacking

+ Authentication

+ Privacy



- 1500+ Certificate Authorities
  (in 2010, see https://www.eff.org/observatory)

- Integrity when service provider ≠ content provider

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DNS-over-TLS

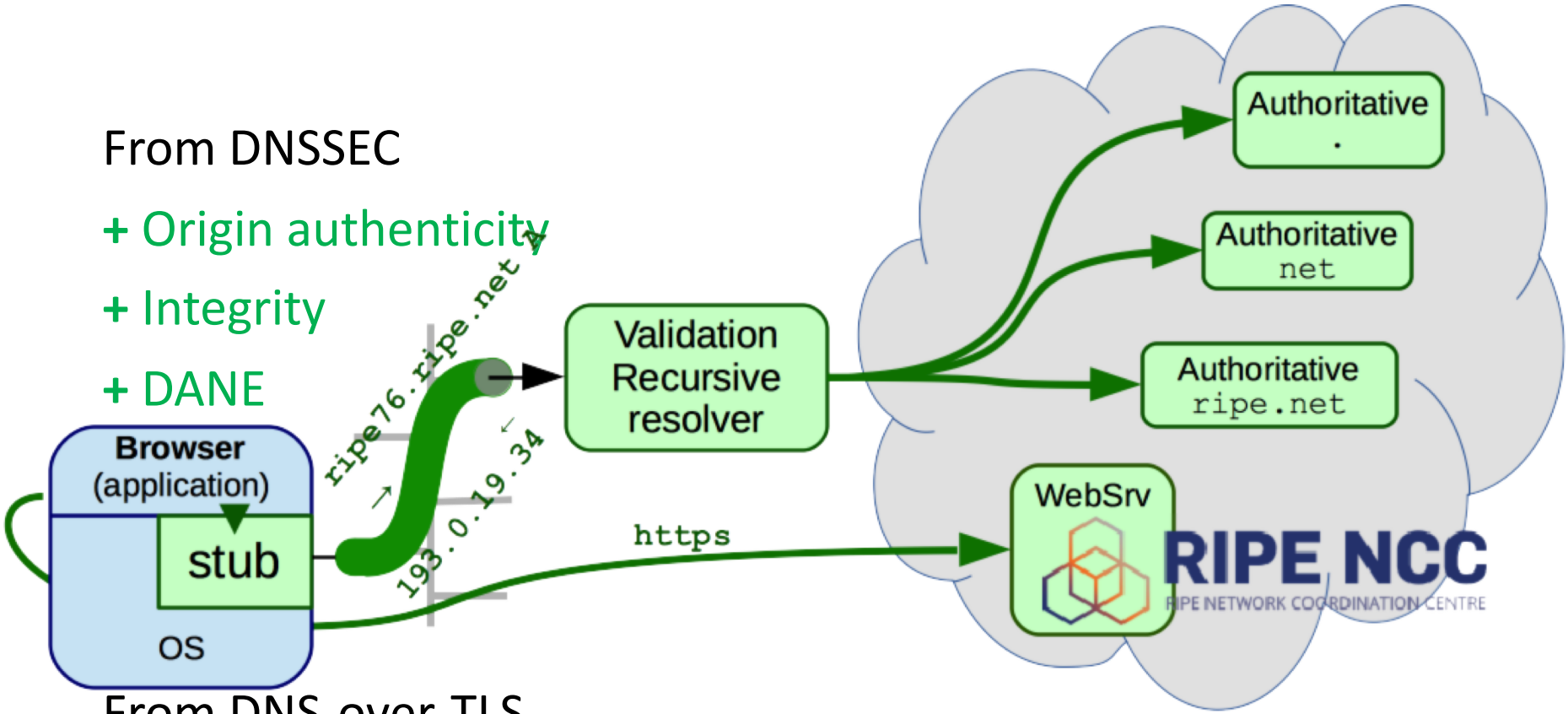
History and motivation

Encryption Everywhere

DNS-over-TLS and DNSSEC

From DNSSEC

+ Origin authenticity
+ Integrity
+ DANE



From DNS-over-TLS

+ Privacy (except from the resolver operator)
+ First mile (by authenticating a trusted server)

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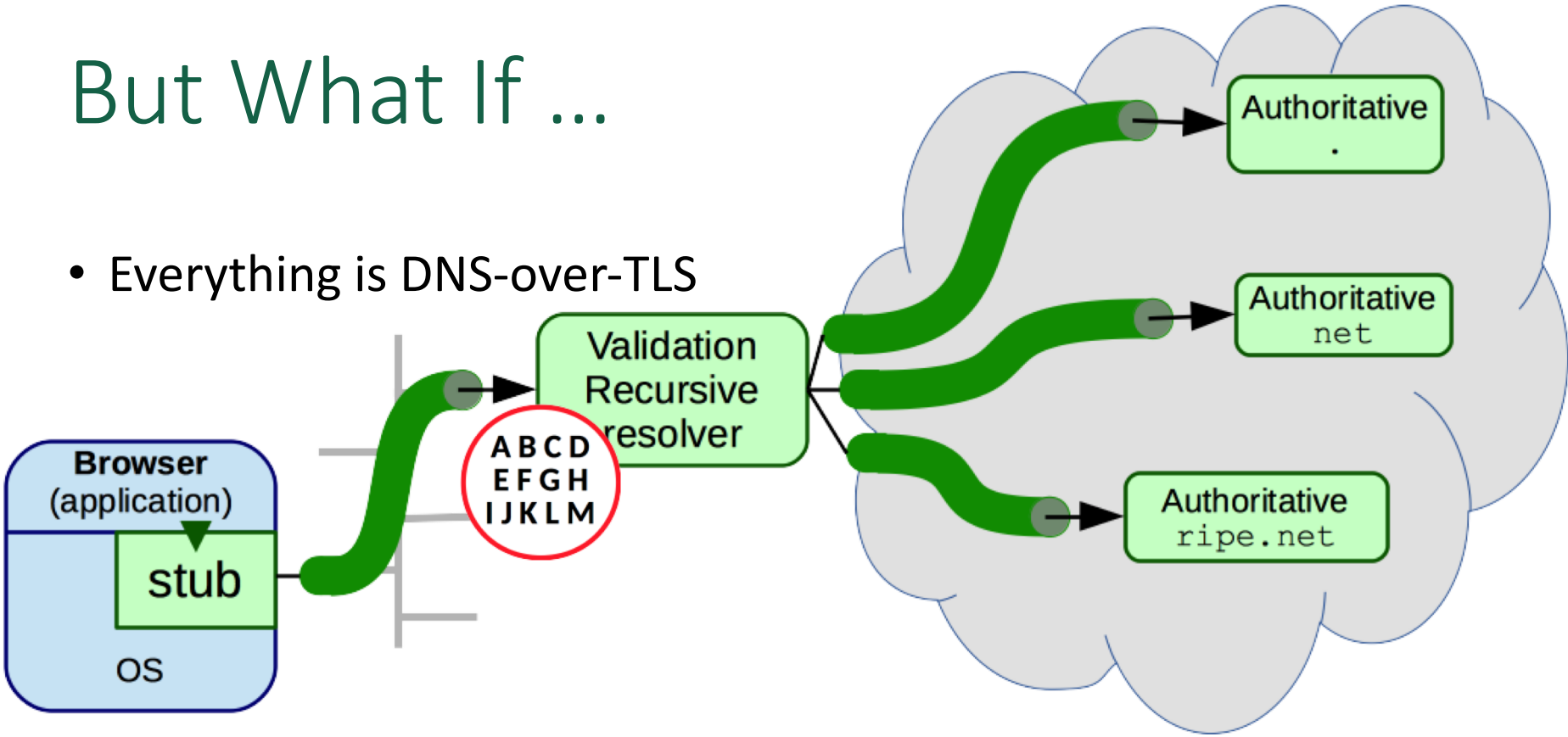
But What If …

- Everything is DNS-over-TLS



- Start with CA store with CAs of the 13 root operators
  - Or the ICANN Root CA/ICANN SSL CA?
- Learn CA of child zone operator when following delegations

Who needs reasons when you've got heroes?

Listen to reason?

- Trust zones to vouch for their own data
- Stub either DNSSEC validates itself, or
- Trusts resolver operator that vouches (via DANE) for itself

Rely on heroes!

- Trust DNS operators chosen to serve the zone
- Trust CAs to authenticate stub → resolver path