DNS over CoAP (DoC)

`draft-ietf-core-dns-over-coap`

Martine S. Lenders (m.lenders@fu-berlin.de), Christian Amsüss, Cenk Gündoğan,
Thomas C. Schmidt, Matthias Wählisch

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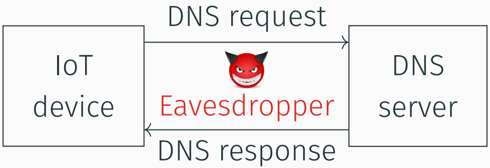
Motivation for DNS over CoAP

Attack Scenario



Countermeasure: Encrypt name resolution triggered by IoT devices against eavesdropping

Our Proposal: DNS over CoAP (DoC), `draft-ietf-core-dns-over-coap`

- **Encrypted communication** based on DTLS or OSCORE
- **Block-wise message transfer** to overcome Path MTU problem (DNS over DTLS)
- **Share system resources** with CoAP applications
  - Same socket and buffers can be used
  - Re-use of the CoAP retransmission mechanism

Evaluation?

- Full evaluation will be published at ACM CoNEXT 2023
- Pre-print available at `https://arxiv.org/abs/2207.07486`

How does this draft relate to `draft-lenders-dns-cbor`

- This draft (`draft-ietf-core-dns-over-coap`) introduces `application/dns-message` content format
  - Classic DNS wire format
  - Easily transferable to other DNS transports
- However: Sometimes not small enough (even with classic name compression)

⇒ CBOR-based `application/dns+cbor` format (`draft-lenders-dns-cbor`) to reduce message size

  - Optional support for packed CBOR (`draft-ietf-cbor-packed`) for even more compression
  - `application/dns-message` serves as fallback

Changes to DoC Draft Since IETF 116

(currently only in GitHub)

- + Clarify that DoC is orthogonal to DoH
- + Recommend root path ”/” as DNS resource path
- + Set ”application/dns-message” CF to 35353
- + Rationalize TTL rewriting
- + Added ”Implementation Status” section

Open Discussions on DoC (I)

Address feedback from DNSOP (thanks Ben Schwartz!) in `-03`:

- Recommendation to add a section describing how to bootstrap DoC in a SVCB-DNS record. May require to allocate a new ALPN ID for CoAP/DTLS (see also GH issue 22).
  - `coap` ID already exists in ALPN registry for TLS (RFC 8323)
  - Never mandated for DTLS; Ben recommends to keep TLS only, define new ID for DTLS (see mailing list)
  - SVCB with OSCORE/EDHOC: Discussion started on mailing list, some concensus needed
- Translate between DoC and DoH at CoAP-HTTP-Proxy or just use DNS forwarder?
  - Main question for CoRE: How to translate FETCH to HTTP?

Open Discussions on DoC (II)

Other open issues:

- GH issue 23: Guidance says MID!=0 for unprotected case
  - Can we keep caching advantage of MID=0 and rely on CoAP tokens to prevent response spoofing instead?

What do we need from the WG for progress?

- Guidance on how to translate FETCH to HTTP(S)
- Statement on SVCB with OSCORE/EDHOC and CoAP-over-DTLS resources
- More feedback

Next Steps

- Address feedback where possible
- Publish `-03` before IETF 117 draft cut-off
- ⟨ Your thoughts.⟩