A Concise Binary Object Representation (CBOR) of DNS Messages

draft-lenders-dns-cbor, Status Update

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Outline

Motivation

Objectives and Definition

Progress

Implementation @ Hackathon

Next Steps
Packet size exceeds 802.15.4 PDU depending on queried name length

⇒ Fragmentation

<table>
<thead>
<tr>
<th>Name length</th>
<th>2 chars</th>
<th>24 chars</th>
<th>25.9 chars</th>
<th>83 chars</th>
</tr>
</thead>
<tbody>
<tr>
<td>(min)</td>
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</tr>
</tbody>
</table>

IEEE 802.15.4+6LoWPAN RIOT-most (w/o L2 security)
CoAP with OSCORE, Content-Format and URI-Path “/dns”

IEEE 802.15.4+6LoWPAN RIOT-most (w/ L2 security)
CoAP with OSCORE, Content-Format and URI-Path “/dns”

DNS over CoAP (draft-ietf-core-dns-over-coap) messages for different name lengths
Motivation: DNS in Constrained Networks

Packet size exceeds 802.15.4 PDU depending on queried name length

⇒ Fragmentation

Name length = 2 chars (min)  Name length = 24 chars (median)  Name length = 25.9 chars (mean)  Name length = 83 chars (max)

IEEE 802.15.4+6LoWPAN RIOT-most (w/o L2 security)
CoAP with OSCORE, Content-Format and URI-Path "/dns"

Compression of DNS messages is needed!

application/dns+cbor

DNS over CoAP (draft-ietf-core-dns-over-coap) messages for different name lengths
Objectives of draft-lenders-dns-cbor (application/dns+cbor)

Reduce packet sizes of DNS queries and replies with conciseness and compression:

1. Encoding of DNS messages in CBOR (conciseness)
2. Omit (redundant) DNS fields in DNS queries and responses (conciseness)
3. Address and name compression using packed CBOR (compression, optional)
Changes to DNS+CBOR Draft Since IETF 116 in -03

+ Clarify that compression algorithm for Packed CBOR is up to the implementation
+ Discuss format decisions for Packed CBOR
  - Structural cleanups
  - Fixing syntax bugs in examples
cbor4dns – An application/dns+cbor en-/decoder

IETF 117 Hackathon project: https://github.com/netd-tud/cbor4dns

Done:

• Encoder (needs larger test vector)
• Finding a lib name (thanks Marco!)
• Going public: https://github.com/netd-tud/cbor4dns

Almost done:

• Decoder, packed CBOR support missing

Lessons learned with regard to draft:

• Section elision may need rethinking
• Dedicated specs for pseudo-RRs (e.g. OPT) may be needed
Ongoing Work towards -04

+ Provide and compare examples for compression algorithms
+ Address Vadim Concharov’s feedback: Provide comparison DNS wire-format vs. CBOR vs. Packed CBOR
  • Address lessons learned from Hackathon
Next Steps

- Implementation and in-depth evaluation of DNS+CBOR
- Explore potential for global compression contexts or implied table entries