A Concise Binary Object Representation (CBOR) of DNS Messages

draft-lenders-dns-cbor-02

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IETF 116 CBOR Meeting, 2023-03-30
Outline

Motivation

Objectives and Definition

Progress

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

⇒ Fragmentation

Motivation: DNS in Constrained Networks

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

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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

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

Compression of DNS messages is needed!
application/dns+cbor

DNS over CoAP (draft-ietf-core-dns-over-coap) messages for different name lengths
Reduce packet sizes of DNS queries and replies:

1. Encoding of DNS messages in CBOR
2. Omit (redundant) DNS fields in DNS queries and responses
3. Address and name compression using packed CBOR (optional)
Changes to DNS+CBOR Draft Since IETF 115

Addressing feedback from Carsten Bormann (now a co-author):

- Remove definition of application/dns+cbor-packed, now application/dns+cbor;packed=1

Addressing feedback from Ben Schwartz & Vadim Goncharov (thanks!):

+ Extensibility: Resource records may now also be represented as pure bstr
  
  - Clarify that fallback to application/dns-message MUST always possible

More changes:

- Queries, like responses, now also array of arrays to allow for inclusion of additional and authority section (for OPT records)
+ Discuss format decisions for Packed CBOR
  • Clarify that compression algorithm for Packed CBOR is up to the implementation

TBD:

+ Provide and compare examples for compression algorithms
+ Addressing Vadim Concharov’s feedback: Provide comparison DNS wire-format vs. CBOR vs. Packed CBOR
Next Steps

- Implementation and in-depth evaluation of DNS+CBOR
- Define more details on using packed CBOR:
  - Explore potential for global compression contexts/implied table entries
  - (Your thoughts.)