Heartbeat Mechanism: Last Round
draft-ietf-dots-signal-channel-39

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Envoyé : mardi 16 juillet 2019 17:41
Objet : Re: [Dots] Behavior when keep-alives fail (RE: Mirja Kühlewind's
Discuss on draft-ietf-dots-signal-channel-31: (with DISCUSS and COMMENT)

Thanks for the updates. I think there is one remaining issue on the use of
ping/heart-beats (see also my other message). However, I believe all other
discuss points have been addressed now. Thanks for that!

Mirja
The Issue

• The WG went for a design that leverages on base CoAP features:
  – CoAP Ping with a full control from the DOTS application
  – DOTS client behaves as CoAP client
  – DOTS server behaves as a CoAP server
• That design was challenged by Mirja (Transport AD)
  – We failed to progress since 05/2019 because of this pending issue.
The Alternative Approach

• The DOTS client behaves as CoAP client endpoint
• The DOTS server behaves as a CoAP server endpoint

NEW in -39:

DOTS clients and servers behave as CoAP endpoints. By default, a DOTS client (or server) behaves as a CoAP client (or server). Nevertheless, a DOTS client (or server) behaves as a CoAP server (or client) for specific operations such as DOTS heartbeat operations (Section 4.7).
The Alternative Approach

- **CoAP Ping with a full control from the DOTS application** Define DOTS-specific heartbeat messages

<table>
<thead>
<tr>
<th>Operation</th>
<th>Operation Path</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mitigation</td>
<td>/mitigate</td>
<td>Section 4.4</td>
</tr>
<tr>
<td>Session configuration</td>
<td>/config</td>
<td>Section 4.5</td>
</tr>
<tr>
<td>Heartbeat</td>
<td>/hb</td>
<td>Section 4.7</td>
</tr>
</tbody>
</table>

And

```
+---rw dots-signal
    +---rw (message-type)?
        +---:(heartbeat)
            +---rw peer-hb-status boolean
```
The Alternative Approach

- DOTS heartbeats are set as **Confirmable** Non-Confirmable

NEW in -39:
The DOTS Heartbeat mechanism uses non-confirmable PUT requests (Figure 27) with an expected 2.04 (Changed) Response Code (Figure 28). The PUT request used for DOTS heartbeat MUST NOT have a 'cuid', 'cdid,' or 'mid' Uri-Path. Such PUT requests MUST NOT be relayed by DOTS gateways.

Header: PUT (Code=0.03)
Uri-Path: ".well-known"
Uri-Path: "dots"
Uri-Path: "hb"
Content-Format: "application/dots+cbor"

```

{
    "ietf-dots-signal-channel:heartbeat": {
        "peer-hb-status": true;
    }
}
```
The Alternative Approach

• CoAP uses PROBING_RATE to control the rate of sending when no response is received for a non-confirmable request

• DOTS controls this rate. It can be negotiated between the peer DOTS agents

NEW in -39:

probing-rate: The average data rate that must not be exceeded by a DOTS agent in sending to a peer DOTS agent that does not respond (referred to as PROBING_RATE parameter in CoAP).
The Alternative Approach

- No interference between pacing of HBs and mitigation requests
- Add a guard to avoid interfering with mitigation requests
  - That would be blocked otherwise: delay signaling attacks to a DOTS server, which is undesirable.
  - Can be avoided by adequately tweaking the probing rate or the DOTS application dynamically adjusts the probing rate value (implementation-specific)

NEW in -39:

Mitigation requests MUST NOT be delayed because of other congestion control checks. Typically, mitigation requests must be sent without checks on probing rate (Section 4.7 of [RFC7252]).
The Alternative Approach

• CAUTION: probing-rate should be adequately set, otherwise side effects will be experienced (e.g., delay heartbeats)

NEW in -39:

Given that the size of the heartbeat request can not exceed (heartbeat-interval * probing-rate) bytes, probing-rate should be set appropriately to avoid slowing down heartbeat exchanges. For example, probing-rate may be set to 2 * "(size of encrypted DOTS heartbeat request"/heartbeat-interval) or (("size of encrypted DOTS heartbeat request" + "average size of an encrypted mitigation request")/heartbeat-interval). Absent any explicit configuration or inability to dynamically adjust probing-rate values (Section 4.8.1 of [RFC7252]), DOTS agents use 5 bytes/second as a default probing-rate value.
The Alternative Approach

• No changes to how heartbeats are interpreted by peer DOTS agent
Summary

• We believe the new design addresses the pending “issue”