Packet Delivery Deadline Time in 6LoWPAN Routing Header

draft-ietf-6lo-deadline-time-05

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Overview

• Deadline-6LoRHE type for 6LoWPAN dispatch page 1
  – Carries Packet Delivery Deadline Time
  – Optional Packet Origination Time
• Enables delay-aware forwarding and scheduling decisions
• Operates on time-synchronized constrained networks
• Handles different time zones over heterogeneous networks
Draft History

- **IETF 97** - Presented the first version of draft: <draft-lijo-6lo-expiration-time>

- **IETF 98 & 99** – 4 revisions
  - Included Origination Time (OT)
  - Provided Header compression mechanism
  - Network ASN included as new Time Unit (TU) representation
  - Provided Header compression mechanism

- **Implemented** the draft in OpenWSN platform for a 6tisch network and the code has been merged with OpenWSN

- **IETF 100** - Adopted as a WG Document: <draft-ietf-6lo-deadline-time>

- **IETF 101** – 1st revision
  - Few editorial corrections and added references for time synchronization protocols

- **IETF 103** – 3rd revision
  - Editorial corrections and updates based on the review comments

- **IETF 104** – 4th revision
  - Replaced OT field by OTD, allowing a more compressed representation
  - Added new section on Synchronization Aspects
  - Updates based on the review comments
# Current Status

- Under IESG Evaluation

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**Packet Delivery Deadline time in 6LoWPAN Routing Header**

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<table>
<thead>
<tr>
<th>Status</th>
<th>IESG evaluation record</th>
<th>IESG writeups</th>
<th>Email expansions</th>
<th>History</th>
</tr>
</thead>
</table>

**Discuss**
- Alissa Cooper
- Roman Danyliv
- Magnus Westerlund

**Yes**
- Suresh Krishnan

**No Objection**
- Deborah Brungard
- Warren Kumari
- Mirja Kühlemann
- Barry Leiba
- Alexey Melnikov
- Alvaro Retana
- Adam Roach
- Éric Vyncke

**Summary:** Has 3 DISCUSSes. Needs one more YES or NO OBJECTION position to pass.

**Alissa Cooper**

**Discuss (2019-05-15 for -04)**

The Gen-ART reviewer made the following observation, which I’d like to discuss:

There is a serious problem with the last 5 paragraphs of section 8, "Synchronization Aspects": they seem to assume that the time representation for the Deadline Time and Origination Time values **will** wrap around, that is, that the representation is the absolute value modulo the size of the field. In addition, there is a lack of clarity how the new epoch point will be chosen after the value wraps around.

This seems to contradict the earlier sections of the document which speak of the values as if they are always to be considered as absolute values on a time scale selected by the TU field, viz., either the NTP time scale (in seconds) or the network’s ASN numbering.

It's possible that four of these paragraphs are intended to only apply to the use of TU = 00, the NTP time scale, and perhaps that usage of the header is understood not to be completely specified yet.

However, the final paragraph discusses TU = 10 (the ASN time scale),...
Draft Reviewers

• Dale Worley
• Éric Vyncke
• Alexey Melnikov
• Barry Leiba
• Warren Kumari
• Mirja Kühlewind
• Deborah Brungard
• Magnus Westerlund
• Roman Danyliw
• Alissa Cooper

Thanks to all reviewers !!
Draft Updates

- Included additional relevant material in security considerations regarding expected deployment scenarios and the effect of disclosing additional information during the travel of a packet.

- Reworked the specification for using time ranges shorter than the maximum allowed by the choice of Time Units (TU)

- Revised the figures and examples to use new parameters

- Reordered the field definitions for the Deadline-6LoRHE

- Responded to numerous reviewer comments to improve terminology and editorial consistency
### Deadline-6LoRHE Format

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Length</strong></td>
<td>1 bit</td>
</tr>
<tr>
<td><strong>6LoRH Type</strong></td>
<td>6 bits</td>
</tr>
<tr>
<td><strong>D</strong></td>
<td>Drop flag: MUST drop the packet if the deadline time is elapsed, MAY ignore and forward</td>
</tr>
<tr>
<td><strong>TU</strong></td>
<td>Indicates the time units for DT and OT: 00: Time represented in seconds and fractional seconds, 01: Reserved, 10: Network ASN, 11: Reserved</td>
</tr>
<tr>
<td><strong>DTL</strong></td>
<td>Length of DT field: 0000: 1 hex digits (4 bits), 1111: 16 hex digits (64 bits)</td>
</tr>
<tr>
<td><strong>OTL</strong></td>
<td>Length of OTD field: 000: OTD field absent, 111: 7 hex digits (28 bits)</td>
</tr>
<tr>
<td><strong>BinaryPt</strong></td>
<td>A signed integer indicating the position of binary point within the value for the DT: 0: Number of bits of the integer part and number of bits of fractional part of DT are same, +ve: Number of bits of the integer part for the DT is increased by value of BinaryPt, -ve: Number of bits of the integer part for the DT is decreased by value of BinaryPt</td>
</tr>
<tr>
<td><strong>DT</strong></td>
<td>Deadline Time value: 8..64-bit</td>
</tr>
<tr>
<td><strong>OTD</strong></td>
<td>Origination Time as a negative offset from the DT value: Optional (0..28-bit)</td>
</tr>
</tbody>
</table>

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**Legend**

- **DTL**: Length of DT field
- **OTL**: Length of OTD field
- **D flag**: Drop flag
- **TU**: Indicates the time units for DT and OT
- **BinaryPt**: A signed integer indicating the position of binary point within the value for the DT
Comments and Questions

Thanks !!!