Packet Delivery Deadline Time in 6LoWPAN Routing Header

draft-ietf-6lo-deadline-time-03

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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 -** 1st and 2nd revision

- Included Origination Time (OT)
- Provided Header compression mechanism

❑ **IETF 99 -** 3rd and 4th revision

- Network ASN included as new Time Unit (TU) representation
- Provided Header compression mechanism

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

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

❑ **IETF 101** – 1st revision

- Editorial corrections; added references for time synchronization protocols

Draft Reviewers

- Georgios Z. Papadopoulos

- Wesley Eddy (IoT Directorate)

- Donald E. Eastlake (IoT Directorate)

- Samita Chakrabarti (Shepherd review)

Thanks to all reviewers !!

Draft Updates

- Replaced 6LoRHE description by reference to RFC 8138.
- Added figure to illustrate change to Origination Time when a packet crosses timezone boundaries.
- Clarified that use in 6tisch networks is descriptive, not normative.
- Clarified that In-Band OAM is used as an example and is not normative.
- Specified that the Origination Time (OT) is the time when the packet is enqueued for transmission
- Described additional sources of packet delay, e.g., serialization, and MAC contention delays
- Reasoning why packet MAY be forwarded if 'D' bit is 0
- Updated bibliographic citations for BLE Mesh and Wi-SUN

Deadline-6LoRHE Format

0	1	2	3	4	5	6	7	8	9	0 (1)	1	2	3	4	5	6	7	8	9	0 (2)	1	2	3	4	5	6	7	8	9	0 (3)	1

1 0 1	Length	6LoRH Type = TBD	O	D	DTL	OTL	TU	EXP	RSV

DT (Variable length)	OT (Optional) (variable length)
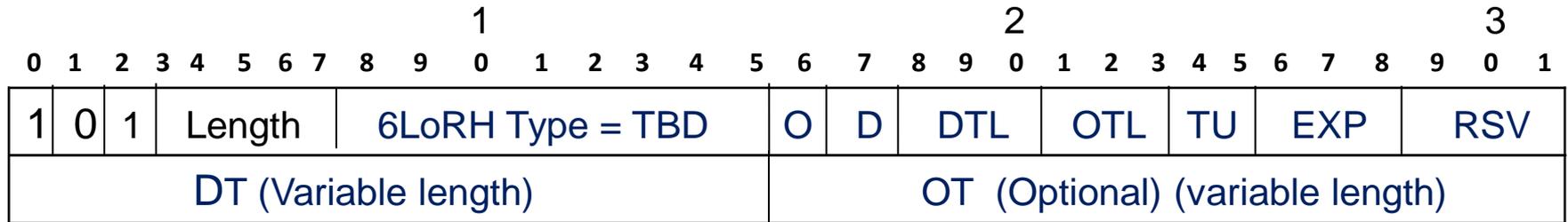
O flag (1 bit)	Origination Time flag 1: Origination Time is present 0 : Origination Time is absent
D flag (1 bit)	Drop flag 1 : MUST drop the packet if the deadline time is elapsed 0 : MAY ignore and forward
DTL (3 bits [bbb])	[bbb]+1 = Length of DT field 000 : Length of DTL is "1 octet" : 111 : Length of DTL is "8 octets"
OTL (3 bits [bbb])	[bbb]+1 = Length of OT field 000 : Length of OTL is "1 octet" : 111 : Length of OTL is "8 octets"

TU (2 bits)	Indicates the time units for DT and OT 00 : Time in microseconds 01 : Time in seconds 10 : Network ASN 11 : Reserved
EXP (3 bits)	Multiplication factor (exponent of base 10)
RSV (3 bits)	Reserved

DT (Variable length)	Deadline Time value (8..64-bit)
OT (Variable length)	Origination Time value (Optional) (8..64-bit)

Way Forward

Comments and Questions

Thanks !!!