Packet Delivery Deadline Time in 6LoWPAN Routing Header

draft-lijo-6lo-expiration-time-04

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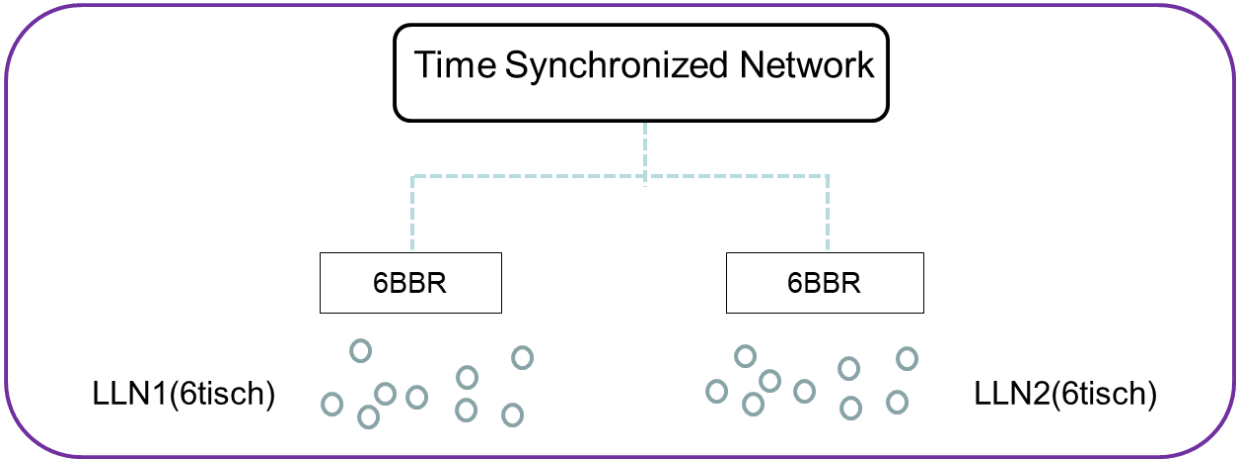
Motivation and Background

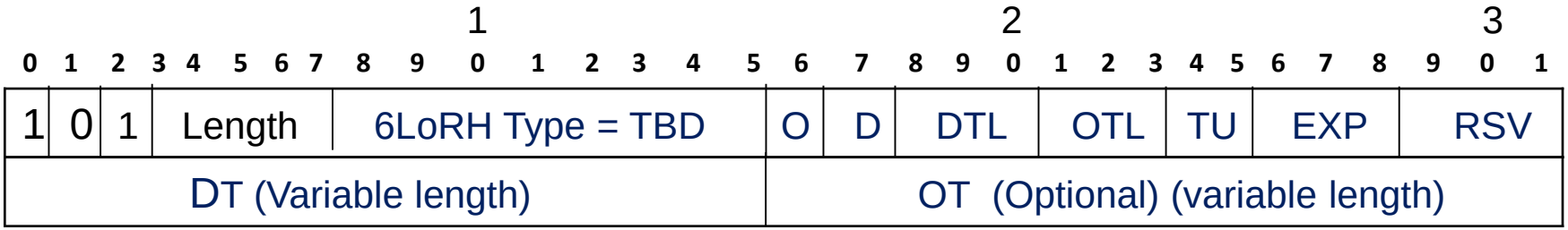
- Delay sensitive industrial M2M IoT applications
- Packet expiration assists in meeting delay constraints in deterministic network
- Positive response from the 6TiSCH ML☺
- Interest from in-band-oam draft authors to include packet expiration time in IPv6 Header
- Applicability *:* 6lo, 6tisch, roll, and detnet

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



Deadline – 6LoRHE Format



O flag (1 bit)	Origination Time flag 1: Origination Time is present 0 : Origination Time is absent
D flag (1 bit)	Drop flag 1 : SHOULD 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)

Draft Implementation

- Implemented the draft in OpenWSN platform for a 6tisch network
- The code has been merged with OpenWSN and is available for download !!
  - https://github.com/openwsn-berkeley/openwsn-fw
  - https://github.com/openwsn-berkeley/openwsn-sw
  - Thanks OpenWSN team for your support !!!!
- Recently implemented a basic EDF scheduling policy to demonstrate the draft's applicability

Way Forward

- A scheduling function based on this draft to enable realization of applications with deadlines

Comments and Questions

Thanks !!!