Transmission of IPv6 Packets over LoRaWAN

draft-vilajosana-lpwan-lora-hc-00

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Status

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https://datatracker.ietf.org/doc/draft-vilajosana-lpwan-lora-hc/

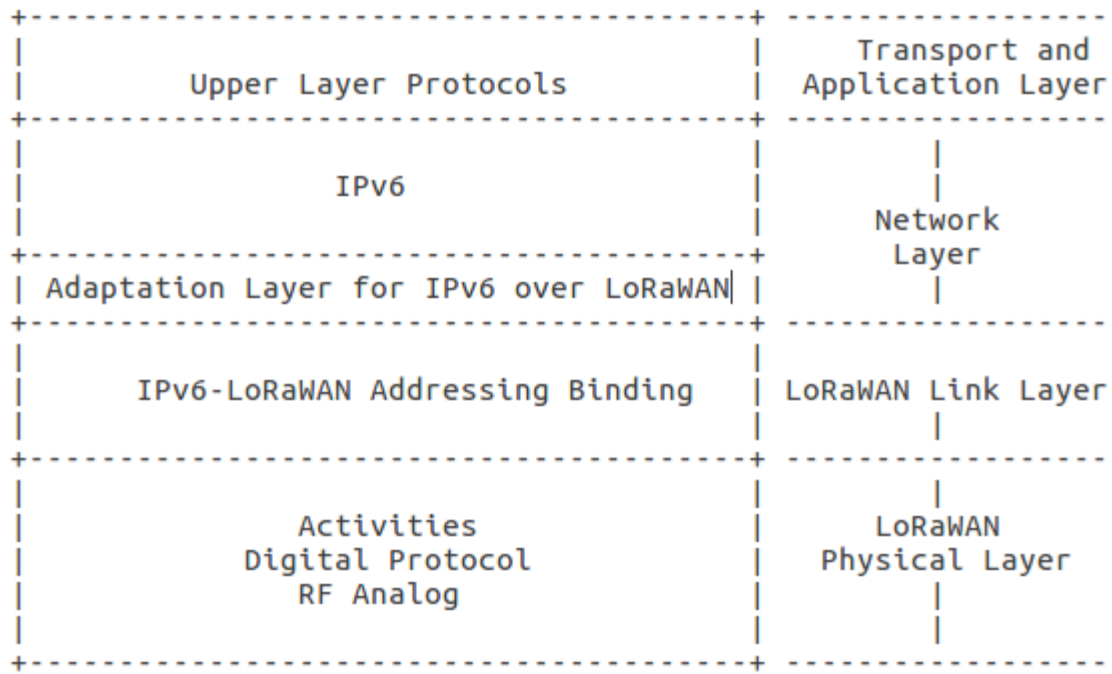
Draft summary

- Address auto-configuration
- Neighbor discovery? Using ND? Context distribution?
- Static Header compression for LoRaWAN
- Fragmentation particularities for LoRaWAN

- Idea for this draft:
  - Define a profile with the specific (if any) details for LoRaWAN.
  - Leverage/Reuse from LPWAN general drafts.

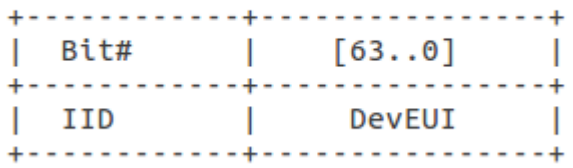
Protocol Stack

Figure 2: Protocol Stack for IPv6 over LoRaWAN



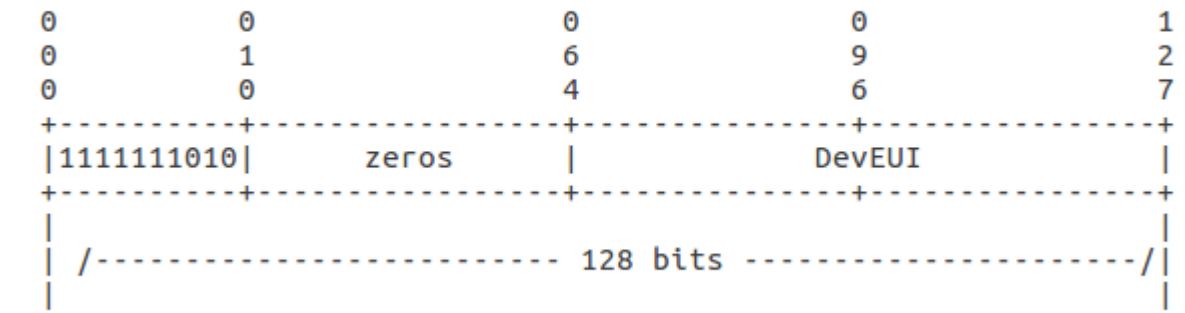
IPv6 Address Auto-configuration

Figure 3: DevEUI



A LoRaWAN end device performs stateless address auto-configuration as per [RFC4862]. A 64-bit Interface identifier (IID) for a LoRaWAN interface MAY be formed by utilizing the 64-bit LoRaWAN DevEUI. That IID MAY guarantee a stable IPv6 address and MUST be used along the lifetime of the network.

Figure 4: IPv6 link-local address in LoRaWAN



Neighbor Discovery

Explore Static Context distribution.

- Using ND?

- Options

- Use 6LoWPAN Context Option (6CO) + ND Distribution
- Use Static contexts (lora-yang) + distribution
  - Distribution: Predefined/ Application/Out of band.

Header Compression

Considerations:

- Use 6LowPAN IPHC + 6CO from ND

LoRaWAN MAC Header → EUI64 representing Src or Dst

- IPv6 Compression as per RFC6282. SAC/DAC?

-Use Static context

draft-toutain-lpwan-yang-static-context-hc.

draft-toutain-lpwan-ipv6-static-context-hc.

Fragmentation

Approach by draft-gomez-lpwan-ipv6-analysis-00

- first packet includes datagram size
- subsequent fragments don’t
- datagram_tag to identify all fragments of a packet.

Considerations:

- Different Spreading Factors mandate different packet sizes if ADR active. Fragment size may be constrained by the SF.
- Possible Solution, fragment size = SF 12 payload size. (59B frame)
- Problem → overhead due to fragmentation header in SF < 12 packets.

Fragmentation

DataRate	Configuration	Indicative physical bit rate [bit/s]
0	LoRa: SF12 / 125 kHz	250
1	LoRa: SF11 / 125 kHz	440
2	LoRa: SF10 / 125 kHz	980
3	LoRa: SF9 / 125 kHz	1760
4	LoRa: SF8 / 125 kHz	3125
5	LoRa: SF7 / 125 kHz	5470
6	LoRa: SF7 / 250 kHz	11000
7	FSK: 50 kbps	50000
8..15	RFU	

Table 14: Data rate and TX power table

DataRate	*M*	*N*
0	59	51
1	59	51
2	59	51
3	123	115
4	230	222

Thanks!

- Q&A