Transmission of SCHC-compressed packets over IEEE 802.15.4 networks

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Introduction (I/II)

- RFC 6282: the basis for header compression in 6Lo(WPAN)
  - Designed for IEEE 802.15.4 as the target technology
  - Adapted/Reused for *relatively* similar IoT technologies
  - Compressed IPv6/UDP header size of 7 bytes
    - Best case, with global addresses
- RFC 8724 (aka “SCHC”), a product of the LPWAN WG
  - Adaptation layer functionality:
    - **Header compression**
    - Fragmentation
  - Designed for even more constrained (LPWAN) technologies
- SCHC header compression
  - Compressed IPv6/UDP header size of e.g. 1 byte
    - Best case, with global addresses
  - Static Context: exploit a priori knowledge of header field values

Introduction (II/II)

- Compressed IPv6/UDP/CoAP header size
  - 6Lo(WPAN) compression: 11 bytes
  - SCHC compression: e.g. 2 bytes

- Best case, global addresses
- No CoAP header options

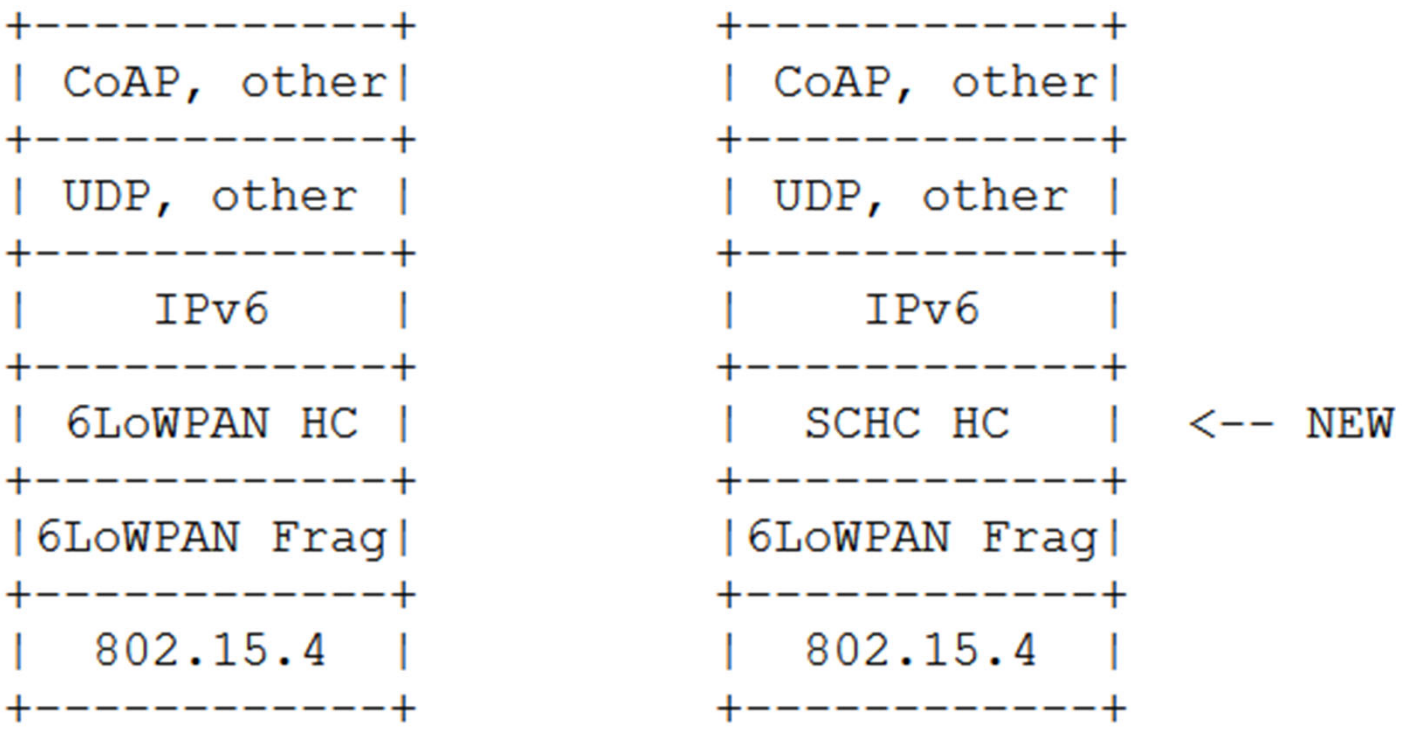
- Theoretical battery lifetime improvement over IEEE 802.15.4 by up to ~40%
  - Including also a 1-byte SCHC Dispatch (see later)
  - Actual improvement will be lower, depending on various parameters and features: device hardware, MAC settings, application settings, payload size, etc.

Status

- draft-gomez-6lo-schc-15dot4-00

- Strictly speaking, not really a -00:
  - Extended version of draft-gomez-6lo-schc-dispatch-01
  - Greater scope
    - Transmission of SCHC-compressed packets over IEEE 802.15.4 networks
  - Aims to incorporate feedback from previous meetings

Protocol stack

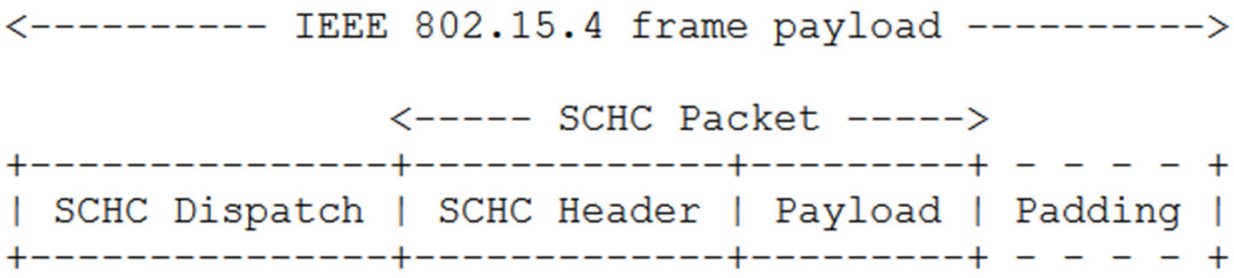


Current 6Lo(WPAN)

Proposed alternative 6Lo(WPAN)

Frame format (I/II)

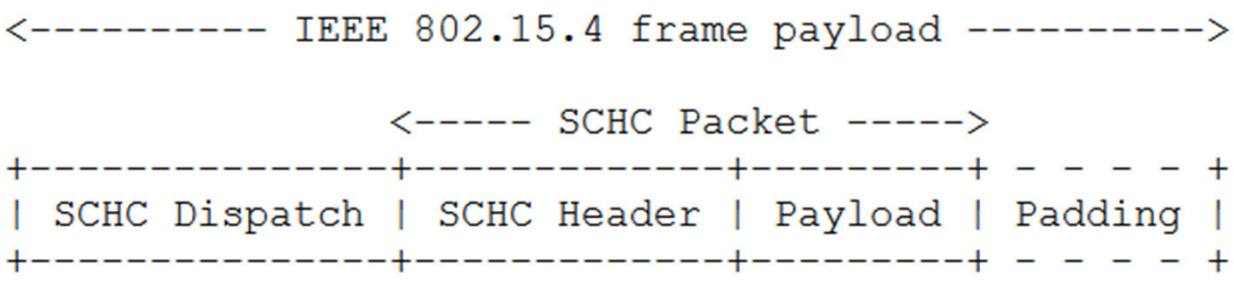
- Frame format (i.e. L2 frame payload)
  - Encapsulated SCHC compressed packet:



  - SCHC Dispatch:
    - Signal that a SCHC Packet comes next
    - 6LoWPAN Dispatch Type for SCHC header compression
    - SCHC Dispatch pattern is the Paging Dispatch (1111WXYZ)
    - Whole page (RFC 8025)
    - 1-byte bit pattern: 11110010 (Page 2)

Frame format (II/II)

- Frame format (i.e. L2 frame payload)
  - Encapsulated SCHC compressed packet:



  - SCHC Packet:
    - A packet with a header compressed by using SCHC
  - Padding:
    - To align to an octet boundary

SCHC compression for IPv6, UDP, and CoAP headers

- SCHC header compression may be applied to different protocols or sets of protocols. E.g.:
  - IPv6, IPv6/UDP, IPv6/UDP/CoAP
  - TO-DO: Rule ID (base compressed header) details

- IPv6 and UDP header fields MUST be compressed as per section 10 of RFC 8724
  - TO-DO: adapt DevIID and AppIID for IEEE 802.15.4

- CoAP header fields MUST be compressed as per sections 4 to 6 of RFC 8824

Thanks!
Thoughts? Questions? Comments?

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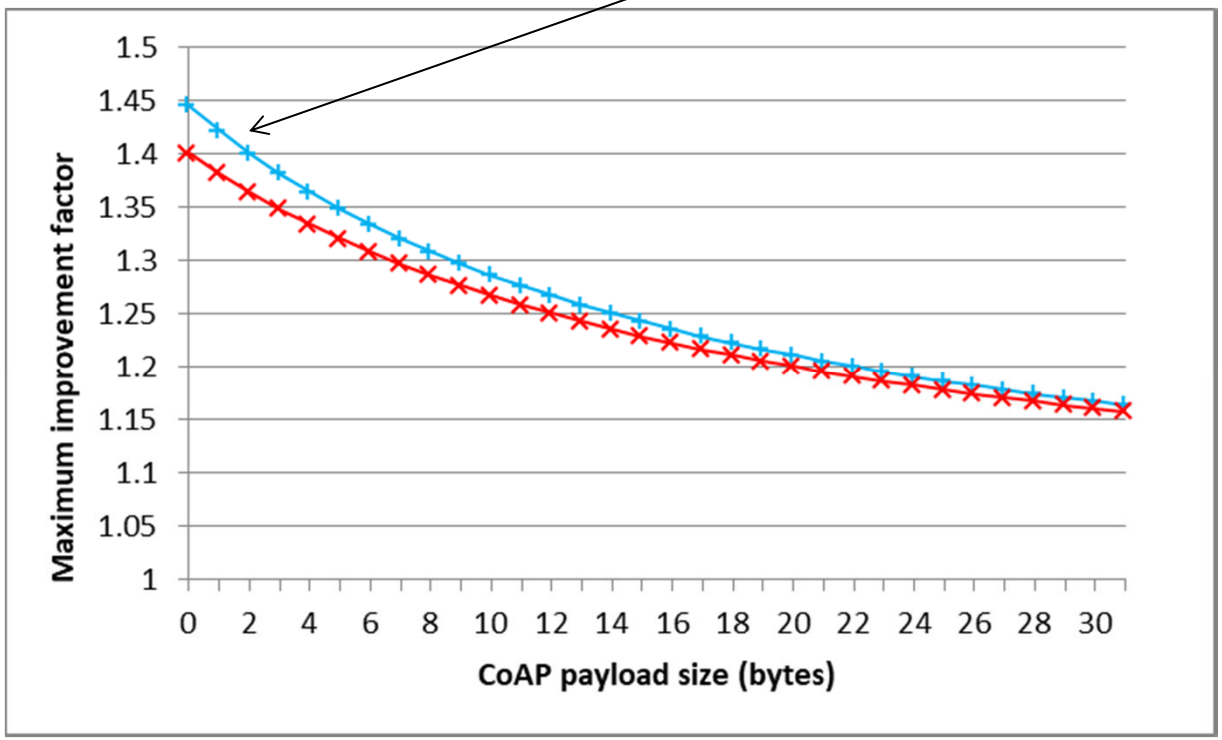
Annex

- Maximum lifetime improvement factor
  - Short MAC addresses, intra-PAN
  - E.g. a battery-operated sensor that periodically sends a message over IEEE 802.15.4



NOTE: actual improvement will be lower