LPWAN WG

WG Chairs:
Alexander Pelov <a@ackl.io>
Pascal Thubert <pthubert@cisco.com>

AD: Suresh Krishnan
<suresh@kaloom.com>

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BCP 9 (Internet Standards Process)

BCP 25 (Working Group processes)

BCP 25 (Anti-Harassment Procedures)

BCP 54 (Code of Conduct)

BCP 78 (Copyright)

BCP 79 (Patents, Participation)

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Minutes are taken *
This meeting is recorded **
Presence is logged ***

* Scribe; please contribute online to the minutes at: https://etherpad.tools.ietf.org/p/lpwan
** Recordings and Minutes are public and may be subject to discovery in the event of litigation.
*** From the Webex login

Agenda bashing

17:05	Opening, agenda bashing (Chairs) • Note-Well, Scribes, Agenda Bashing, Approval minutes from last meeting • Review todo • Status of drafts	10mn
17:15	SCHC padding - Dominique	20mn
17:35	SCHC Tickets and Discussed options - Ana + Laurent	20mn
17:55	AOB	QS

Action items

- Milestone Dates to revisit
- SCHC UDP checksum => refer to RFC 6282
- Find reviewers for drafts
  - CoAP
  - IP/UDP SCHC
- Adoption of Technology dependent specs
- Todos
  - Laurent to propose text on ticket 18
  - Pascal to propose text on UDP checksum compression

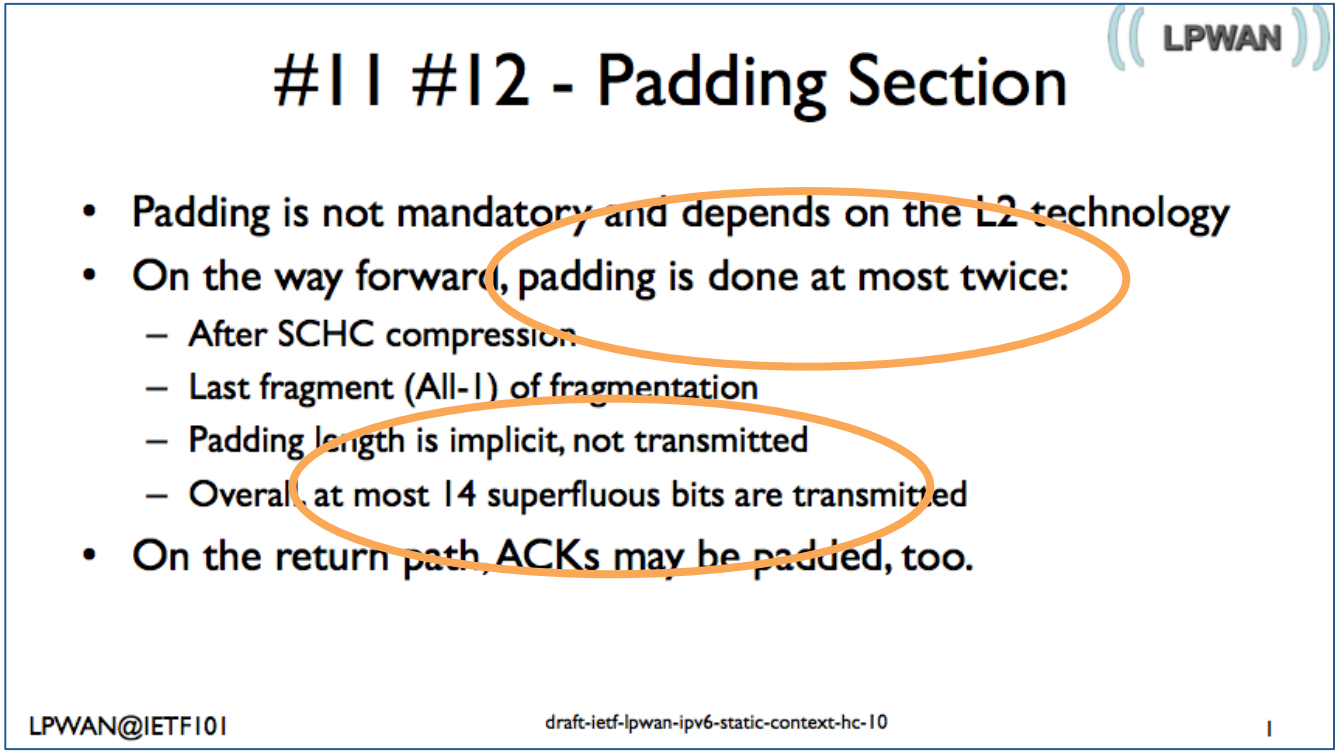
Milestones Updated

Date	Milestone
Jul 2018	Submit CoAP compression mechanism to the IESG for publication as a Proposed Standard
Jul 2018	Submit IP/UDP compression and fragmentation mechanism to the IESG for publication as a Proposed Standard
Done	Submit LPWAN specification to the IESG for publication as an Informational Document
Done	Adopt CoAP compression mechanism as a WG item
Done	Adopt IP/UDP compression and fragmentation mechanism as a WG item
Done	Adopt LPWAN specifications as WG item

draft-ietf-lpwan-ipv6-static-context-hc-13
Single padding proposal

Authors:
Laurent Toutain <Laurent.Toutain@imt-atlantique.fr>
Carles Gomez <carlesgo@entel.upc.edu>
Ana Minaburo ana@ackl.io
Dominique Barthel <dominique.barthel@orange.com>

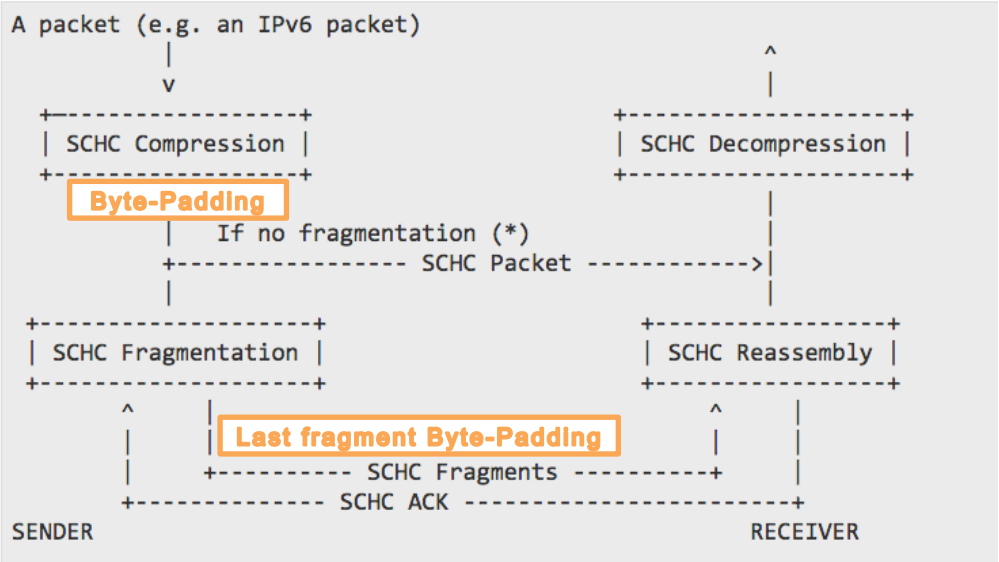
Current Padding situation



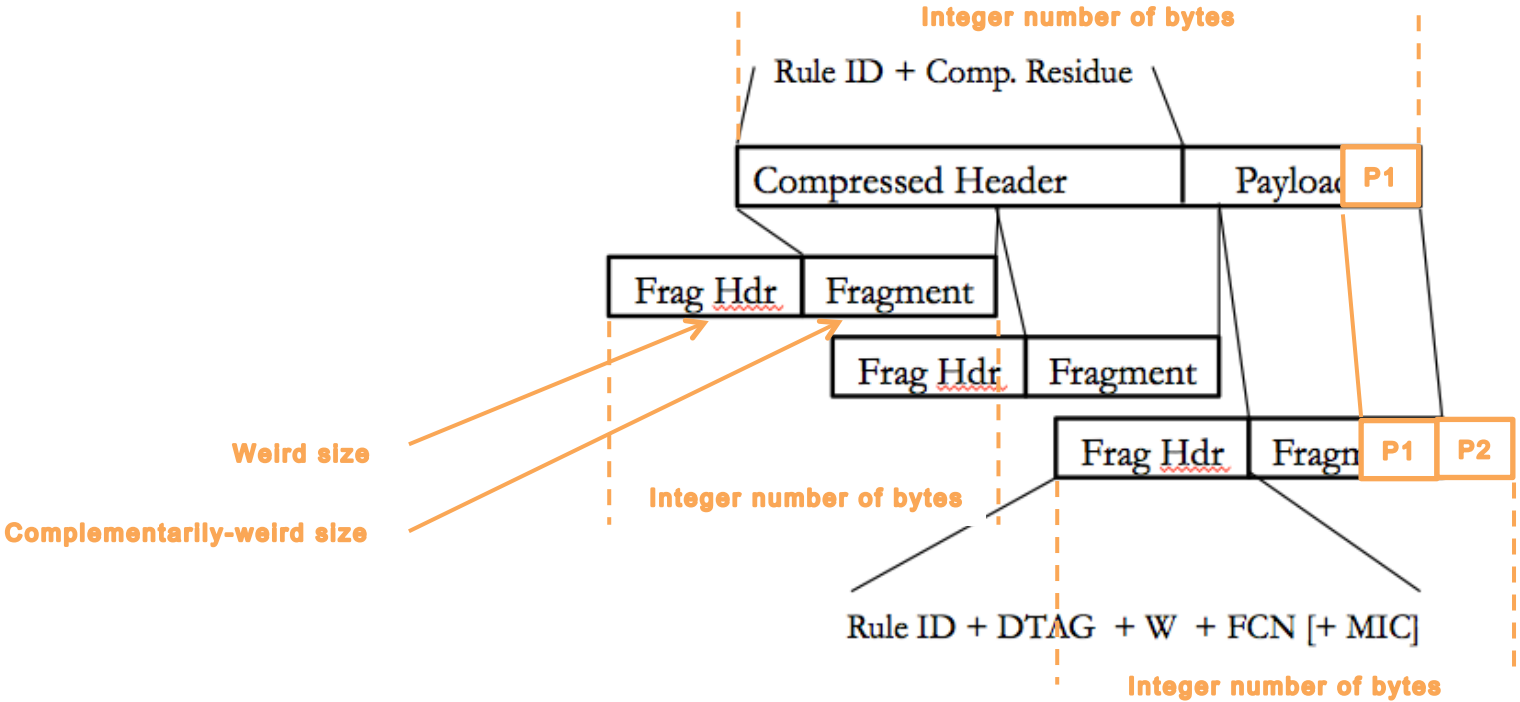
Proposed Padding

- Padding done at most once:
  - At most 7 superfluous bits transmitted (for a byte-oriented L2 technology)
- How?

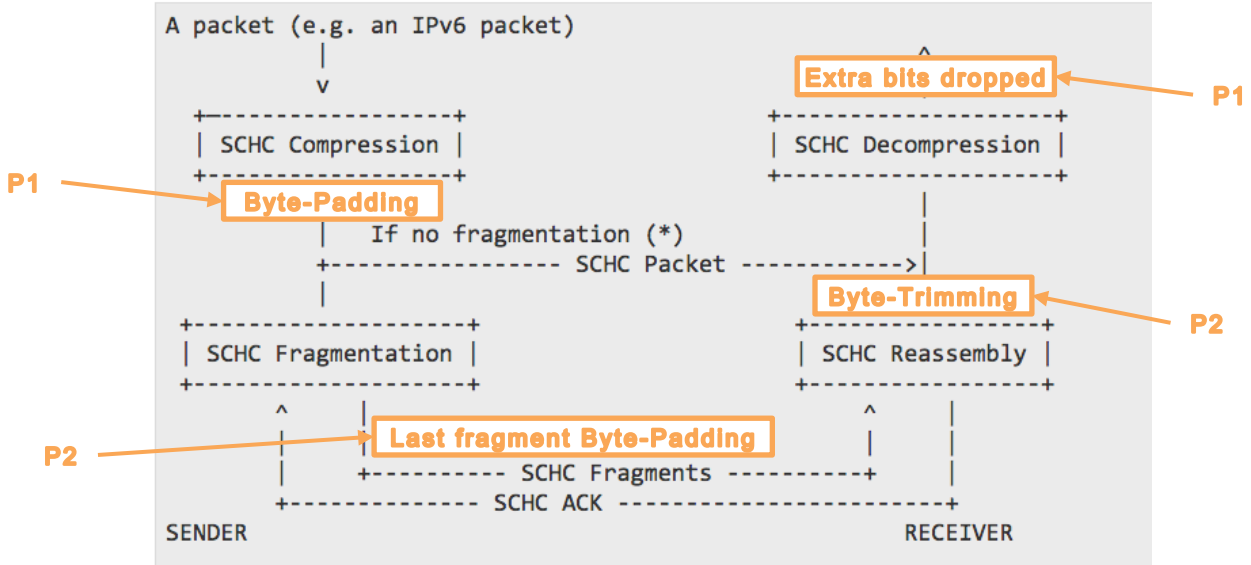
Current Padding mechanism (1/3)



Current Padding mechanism (2/3)

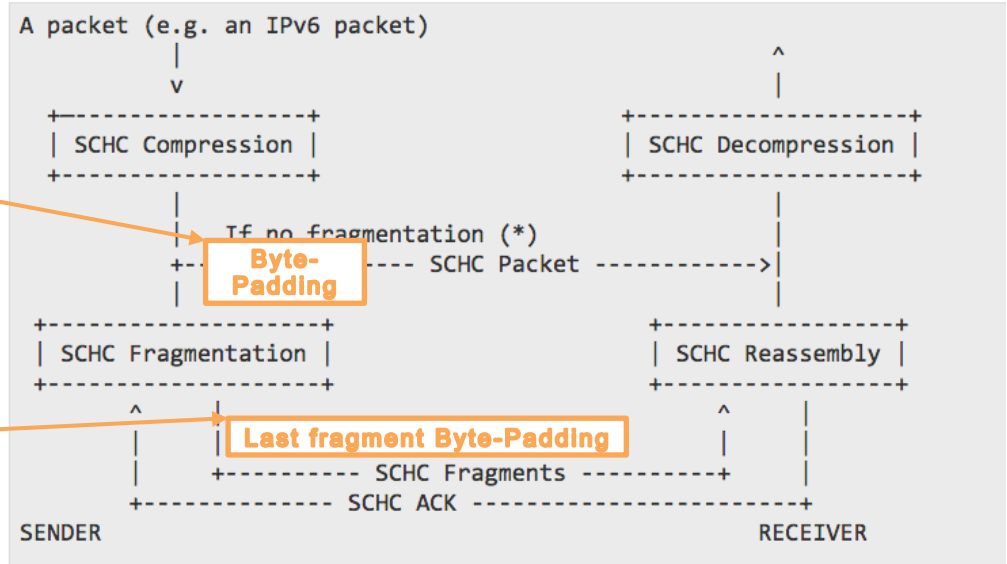


Current Padding mechanism (3/3)

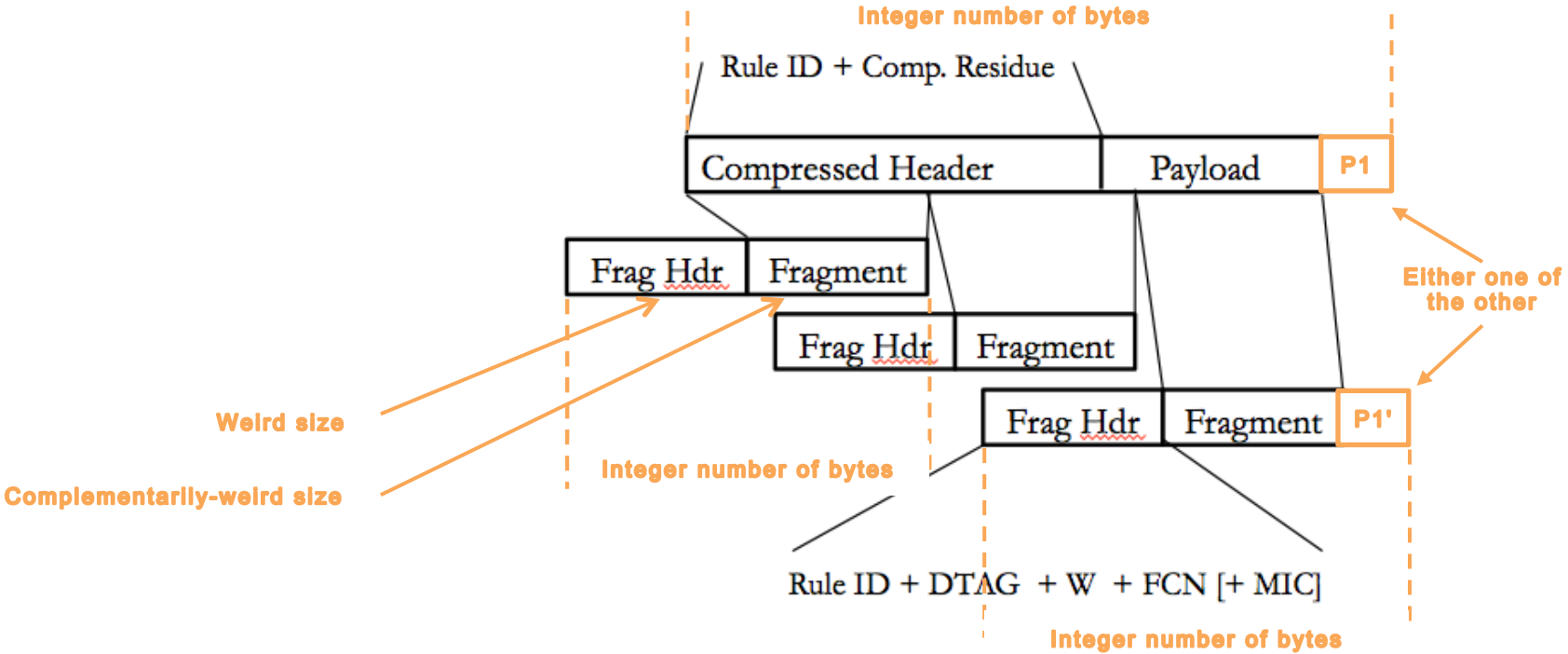


Proposed Padding mechanism (1/3)

- Padding done only for transmission
  - Either for transmitting the SCHC packet unfragmented
  - Or for transmitting the last fragment

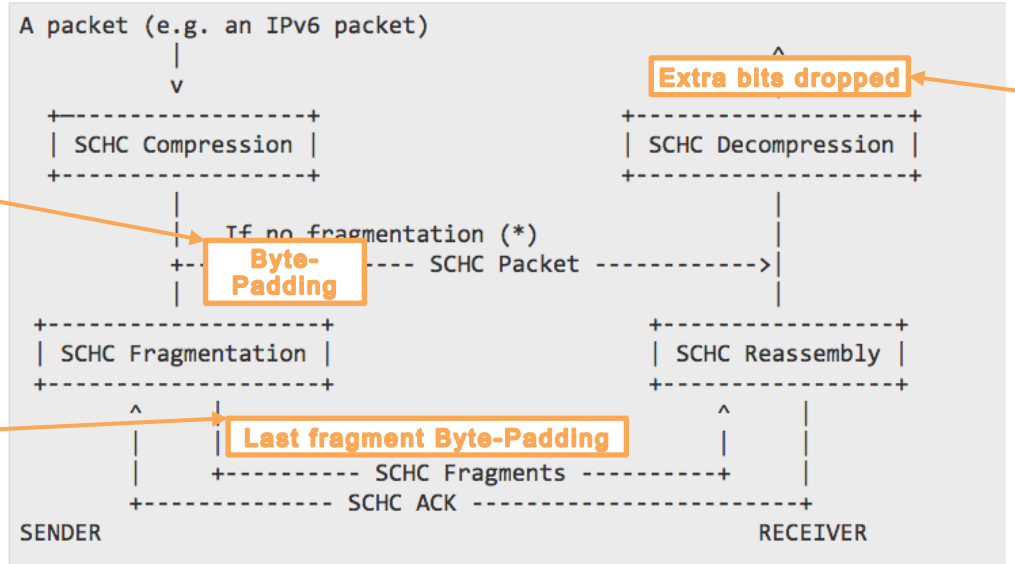


Proposed Padding mechanism (2/3)



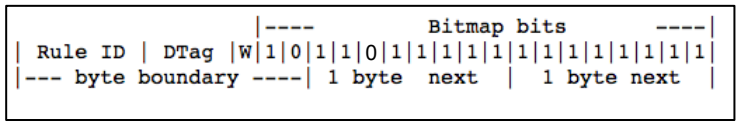
Proposed Padding mechanism (3/3)

- SCHC Reassembly by itself does not know the padding boundary
- MIC must be over payload and padding bits
- Extra bits will be dropped at Decompression anyway



Proposed notion of L2 Word

- Will usually be a Byte, but can be one bit
- Padding adds strictly less than an L2 Word
- If L2 Word == 1 bit, then padding adds 0 bit
- Simplifies description: one single mechanism
- SCHC ACK Bitmap shortened to L2 Word boundary. Better than today's situation.
- L2 Word size MUST be defined

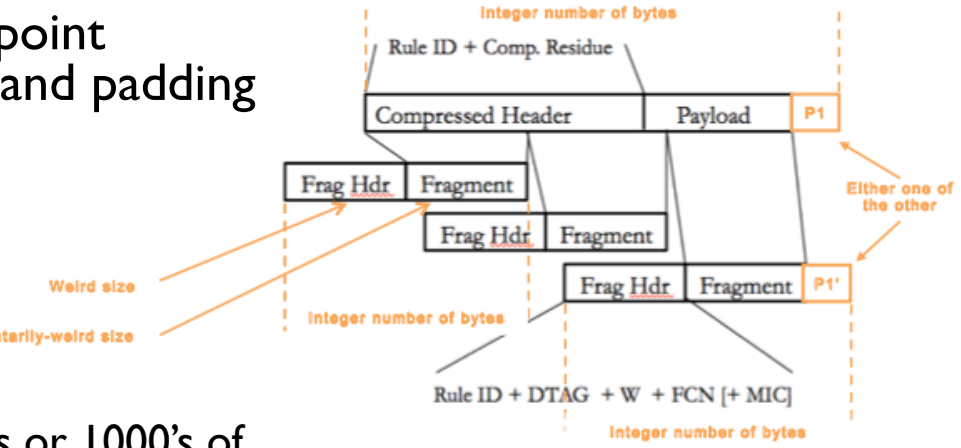


Value of padding bits

- Padding bits included in MIC computation
- Their value MUST be defined
  - Either in generic SCHC specification (not my favorite)
  - Or in technology-specific document (together with MIC formula)

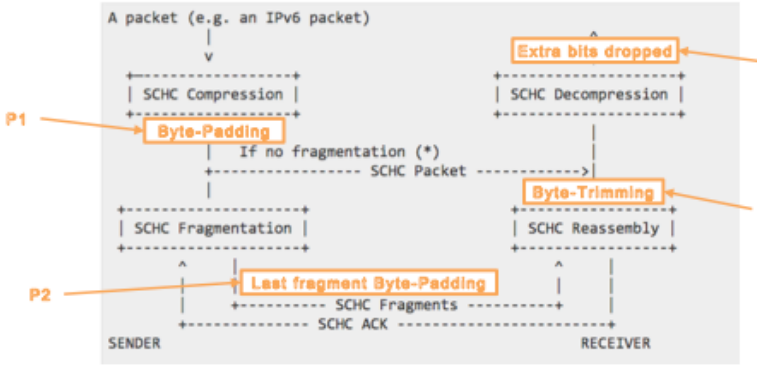
Discussion on padding included in MIC

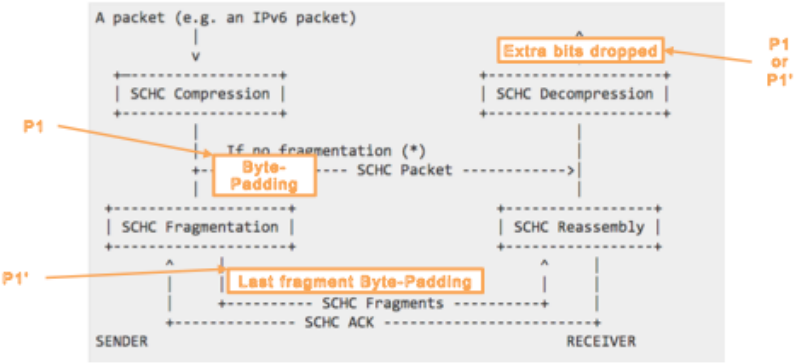
- Pros:
  - Does not require feedback from decompressor to find splitting point between last fragment payload and padding
- Cons:
  - A reception error on padding bits creates a reject on the reassembly buffer
    - Maximum 7 padding bits vs 100's or 1000's of payload bits, L2 CRC,



Discussion on layering

- Philosophical debate on adding bits at fragmentation and removing them at decompression
- My take
  - Padding bits not processed, simply dropped
  - "The re-assembly buffer MAY contain unused bits at the end"
  - SCHC Packet (if transmitted unfragmented) already comes with extra bits appended, that decompressor must deal with
  - Decompressor works from left to right in incoming buffer and drops whatever is leftover
  - Decompressor does not analyse the extra bits





My (biased) conclusions

- Less bits on the wire(less)
- Simpler description
- Solves tickets #12, #20

- But Acklio's implementation needs to be changed to see running code

END

- Thank you
  - questions?

#12 Padding place

- Is it possible to put padding between SCHC fragment header and payload to align the byte boundary so to easily put and take the payload?

- Non, the padding is put after the payload, because as the payload is also not aligned is better to align once and not twice.

Edgar: comment about the whole padding thing. NB-IOT does not need byte alignement of the payload. There is padding a Layer 2 anyway. Does padding need to be here, or should be left to the technology dcument?

JCZ: agree to remove it from the general SCHC document, and leave it to the technology documents.

Ana: several months ago, decided that padding was best put at the end.

Edgar: padding here is to achieve byte alignement. Also filling a transport block. leave the latter to the L2. The former may not be needed on some technologies.

Carles: the SCHC doc could mention the two options (padding between header and payload or at the end). Leave to the tech document to select.

Edgar: rather have only one specified, and activate it or not. Otherwise interop will be hard, especially multi-RAT networks.

Laurent: in LoRa, we (Acklio) use the FPort byte to carry the Rule ID, in one full byte. Some form of padding!

Ana: suggests to have a DEFAULT specification in the SCHC document, and leave it to the technology document to specify differently if it wants!

#20 Byte Boundary

<Ana> The term is not good to express what we want to.

- Normally the idea is to have an integer number of bytes to complete the fragmentation header format, the term used was byte boundary but this creates the idea of 1 byte and in some cases, this will not probably be possible, so inputs to get a term that represents "AN INTEGER NUMBER OF BYTES" instead of byte boundary

JCZ: I prefer not to limit the protocol to byte boundaries

Ana: I agree that this will depend on technology L2, but:

- We need a term to identify for example in Abort message the first number of entire bytes to add one byte with FF
- We need to identify the number of bytes for Bitmap
- So we need to agree on how to name: "an integer number of bytes"

draft-ietf-lpwan-ipv6-static-context-hc-13

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Laurent Toutain <Laurent.Toutain@imt-atlantique.fr>
Carles Gomez <carlesgo@entel.upc.edu>
Ana Minaburo <ana@ackl.io>
Dominique Barthel <dominique.barthel@orange.com>

Open Tickets

- #10 Interleave different packets (TbC)
- #11 ACK format (TbC)
- #12 Padding place
- #14 Legacy devices (TbC)
- #20 Byte Boundary
- #21 C bit in ACK
- #22 Fragmentation use (TbC)
- #23 NB-IoT (TbC)
- #24 DTag (TbC)
- #25 Rules not synchronized (TbC)
- #26 Frags and Acks
- #15 SCHC technology specific parameters => updated to version 11 (ToDo: update to last version)

#10 Interleaving different packets

- This is possible because they have different DTAG
- The use in a specific technology needs to be studied and reflected in the specific technology document

- Technical Group Meeting
  - Out of scope: Add to Ticket 15
    - Addressed on the NB-IoT technology document
    - If the SF (LoRaWAN) change during the transmission of fragments a possible solution of the abort needs to be used
  - Technologies will try to give a possible solution or the correct use of abort if it applies

#11 ACK Format

- Almost all the discussion about the padding on ACK is done
- Changes in Dtag of section 7.2 (done for next version)
  - ACK with bitmap does not need padding
  - ACK without bitmap or with full bitmap are padded as needed
  - The Receiver-Abort is padded as needed

#12 Padding Place

- More discussion
  - Rewrite section 8. Padding is done before transmission either after SCHC Compression or after SCHC Fragmentation
  - Depends on L2
  - MIC computed with padding
  - Padding on the draft is a default solution, technologies may define another solution if needed (add Ticket 15)
- Single-padding proposal … (discussion)

#14 Legacy Devices

- Need to be addressed in another document
- The uses of Rules for specific uses and devices are out of the scope of this document
- This draft gives the base for this devices (Study the usages of Rule ID and create a new document)=> For recharter

#20 Byte Boundary

- 'Byte Boundary' does not means what we want
  - Byte Boundary = 1 byte is not what we need

- Bitmap before transmission

```
                    <----         Bitmap bits       ---->
|  Rule ID |  DTag  |W|1|0|1|1|1|1|1|1|1|1|1|1|1|1|1|1|1|1|
|-INTEGER NUMBER OF BYTES-| 1 byte  next  |  1 byte next  |
```

⇒ By byte Boundary, we didn't mean 1 byte but an INTEGER NUMBER OF BYTES

- Bitmap, encoded for transmission

```
<-------   R  ------->
           <- T -> 1
+---- ... --+-... -+-+-+-+
|  Rule ID  | DTag |W|1|0|
+---- ... --+-... -+-+-+-+
|---- byte boundary -----|
```

#20 Byte Boudary

- |<------ byte boundary ------->|
- Replaced with
- | next byte boundary ->|

#21 C bit in ACK

- For the moment consensus
  - Option 1: AM, DB, CG, LT, JCZ
- So: Update Ticket 15 with the warning that last fragment is 1 bit shorter because of the use of C bit and the bitmap may be reduced

#22 Fragmentation Use

- The use of fragmentation over NB-IoT is useless because the L2 has its own segmentation protocol
  - Out of Scope but…
- Technology Specific Document for NB-IoT MUST:
  - Define the use of SCHC Compression and SCHC Fragmentation in the corresponding bearers and use case.

#23 NB-IoT

- The Multi-Rat Network Propagation is out of the scope of this draft, where Star topology is retained, but…
- Technology Specific Document for NB-IoT MUST:
  - Define the use of SCHC Compression and SCHC Fragmentation for this kind of propagation

#24 DTag

- What happens when Dtag is not present?
  - There can only be 1SCHC Packet in transit. After all the fragments has been transmitted another SCHC Packet may be sent.
- Complete Ticket with answer
  - Close Ticket

#25 Rule ID Synchronization

- The usages and applications for the Rule ID space is out of the scope of this document
  - Need to be study and referenced in another document (re-charter)

#26 Matching Acks with Frags

- Rule ID is chosen during the Fragmentation procedure
- ACK copy the same Rule ID as the one used in the fragments
- The Rule ID gives the context to refer to
- ToDo: ACK must have the same Rule ID and Dtag values than the one used in the fragments

Next Steps

- Finish all the modifications and close the tickets
- Update Ticket 15 to last version
- Publish last version (when?)

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- More Questions?
  - Thanks

AOB ?